12 51 235 Remove and install / replace Module 1, sensor system engine wiring

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to battery terminal, the safety battery terminal or the intelligent battery sensor (IBS).

Damaged battery terminals can lead to malfunctions or vehicle electrical system faults.

- Pull off battery terminal from battery pole by carefully moving to and fro. Do not pry off using a tool.

TECHNICAL INFORMATION

Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

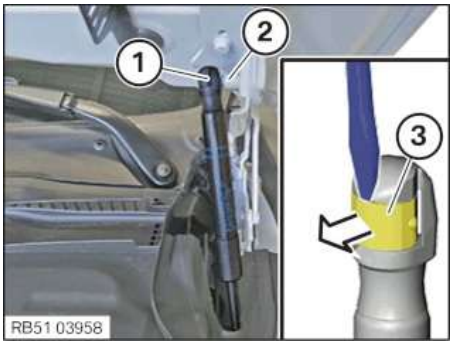
Engine compartment lid is open.

CAUTION

Shutting bonnet or tailgate.

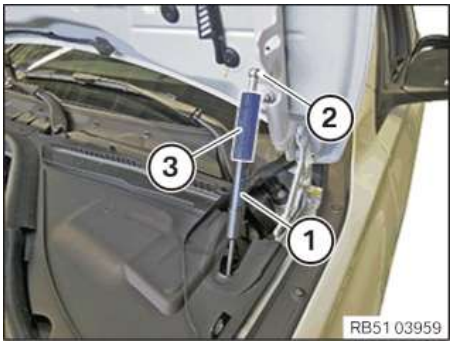
Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.



- Lift clamp (3) slightly using a screwdriver, in the direction of the arrow.
- Lift off ball socket (1) from ball pin (2).
- Repeat the operation on the other side of vehicle.

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TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

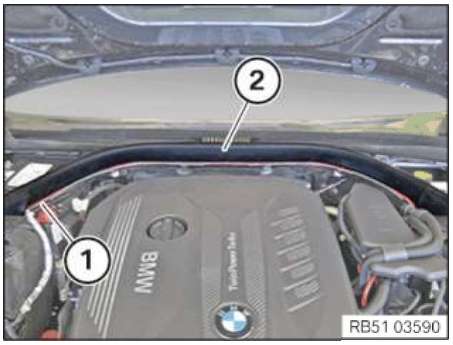
- Remove the bonnet support and open the bonnet further.
- Push special tool or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

2 – Disconnecting all battery earth leads



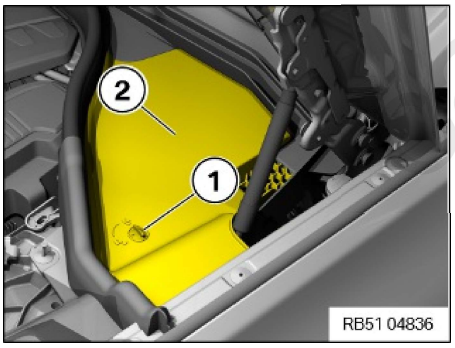
- See additional information.

3 – Remove the seal for the rear bonnet



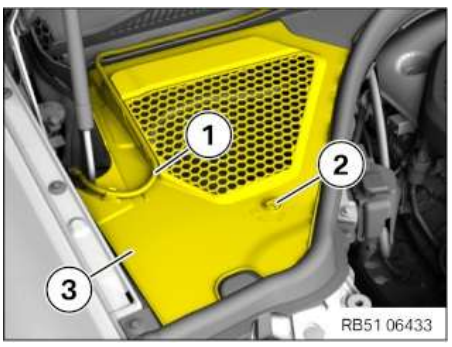
- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

4 – Remove the cover of the engine compartment at the rear left



- Loosen the lock (1).
- Remove rear left cover of engine compartment (2).

5 – Remove the cover of the rear right engine compartment



- Release washer fluid hose (1) from the guides.
- Loosen the lock (2).
- Remove the cover of rear right engine compartment (3).

6 – Removing both wiper arms

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NOTICE

Description is for left component only. Procedure on the right side is identical.

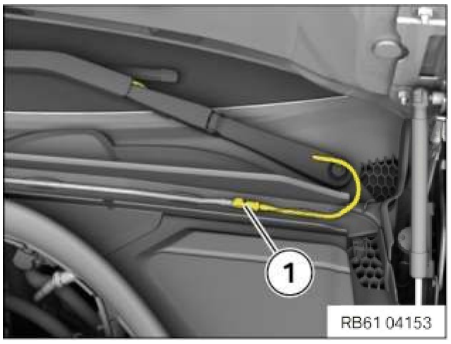
▸ **Remove the wiper arm**

RISK OF DAMAGE

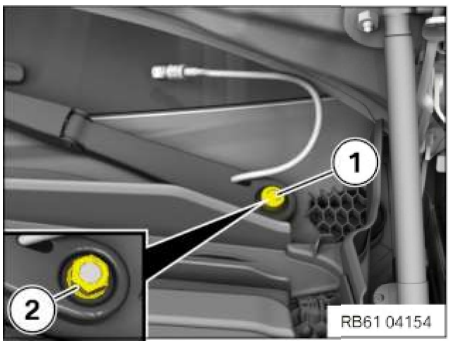
Damage to wiper console

While removing the wiper arms without using special tool, the wiper console can break.

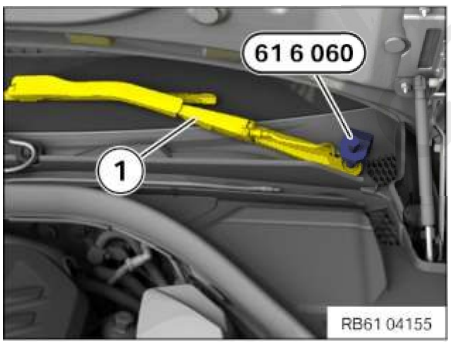
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.



- Disconnect the windscreen wash hose(1) at the separation point and remove from the cowl guide.

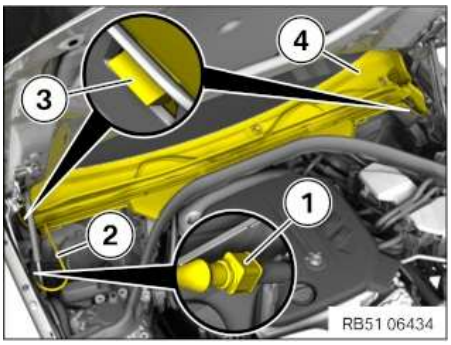


- Remove the protective cap (1).
- Loosen nut (2).



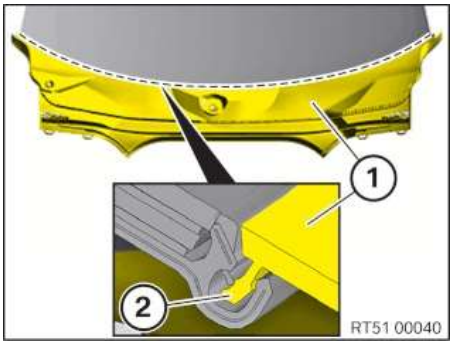
- Pull off the wiper arm (1) using special tool .

7 – Remove cowl panel cover



- Release snap fastener of the washer fluid hose (1) and put the washer fluid hose(2) to one side.
- Unclip clips (3) on the cowl panel cover (4).

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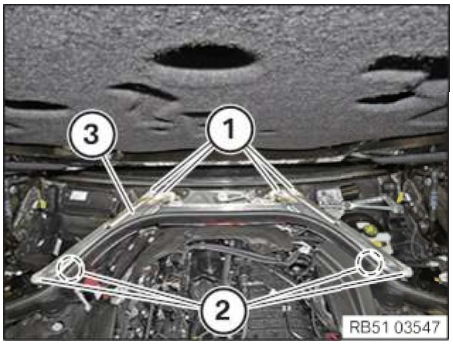


- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

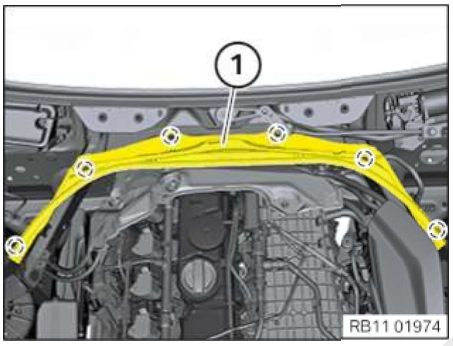
8 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

Driving without the strut brace/front end or tension strut is not permitted.

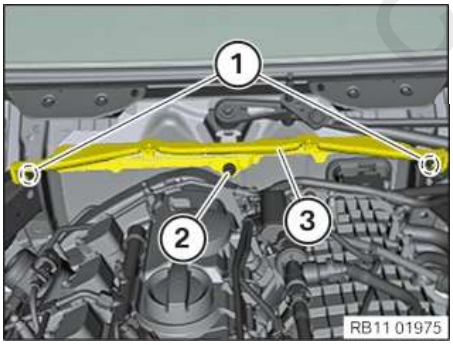


- **If installed:** Remove tension strut on spring strut dome.
- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.



- Unscrew the bolts in the marked areas.
- Remove the centre bulkhead upper part (1).

9 – Removing the centre bulkhead lower section



- Loosen screws (1).
- Loosen nut (2).
- Remove the centre bulkhead lower part (3).

10 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

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RISK OF DAMAGE

Damage to the acoustic cover.

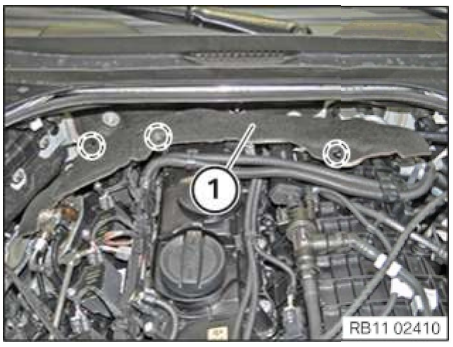
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Release the acoustic cover (1) towards the top from the rubber mounts (marks).

11 – Removing acoustic cover at rear



- Unclip the acoustic cover (1) in the marked areas and remove it to the top.

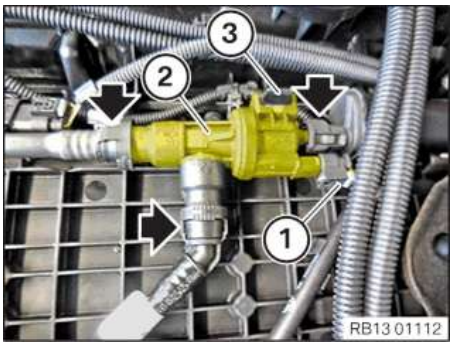
12 – Remove tank vent valve

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



- Unlock and disconnect connector (1).
- Unlock and disconnect the tank ventilation lines (arrows).
- Detach and remove the tank vent valve (2) from the holder (3).

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13 – Removing the DME control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units

TECHNICAL INFORMATION

In a warranty case, you must always provide a fault memory printout with the defective part, even if the fault memory does not contain an entry.

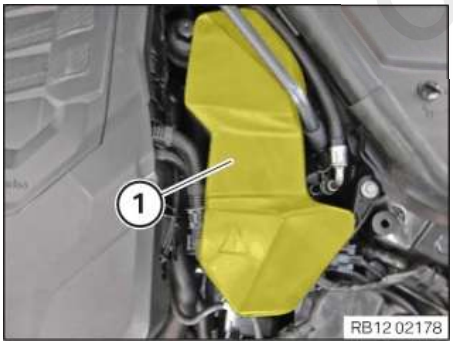
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

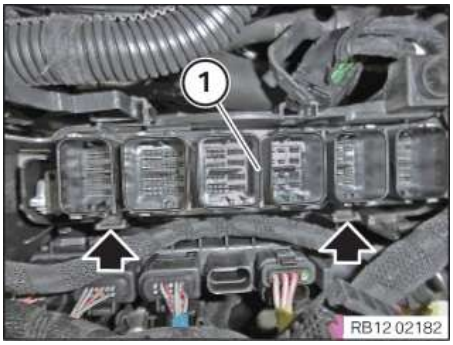


- Pull the cover (1) towards the top and feed out.



- Unlock and disconnect the plug connection (1).

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- Unlock the locks (arrows).
- Guide out and remove DME control unit (1).

14 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

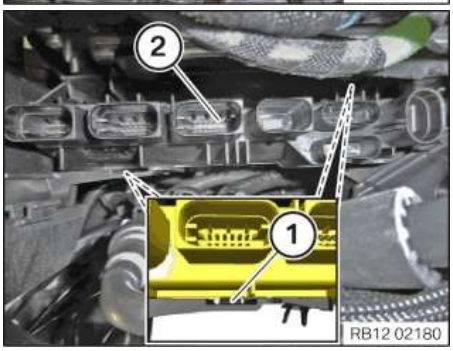
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



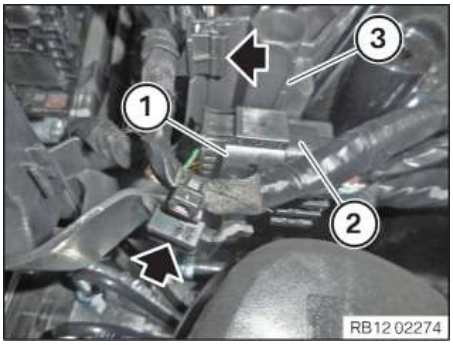
- Unlock and disconnect plug connections (1).



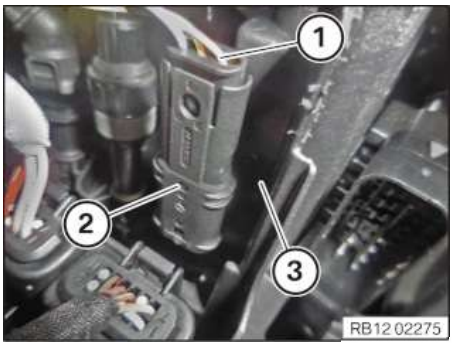
- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

15 – Removing the control unit holder

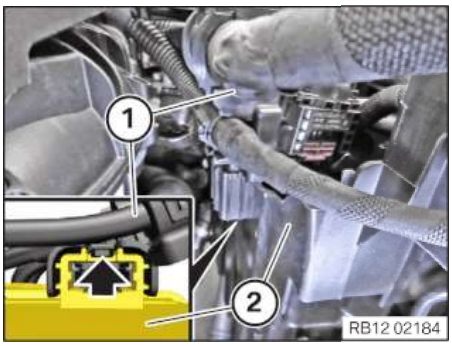
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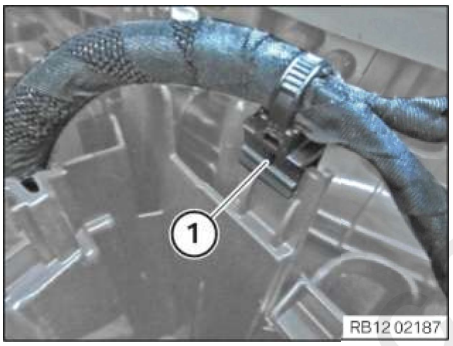
- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the control unit holder (3).
- Release the clamps (arrows).



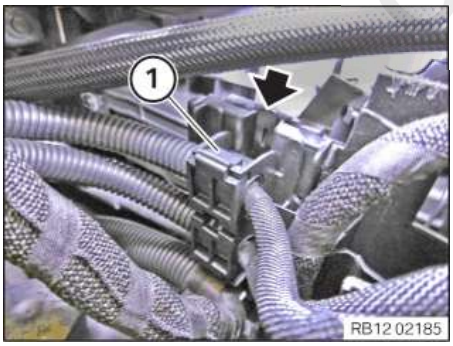
- Unlock plug connection (1) and disconnect.
- Unlock the connector and disconnect from the control unit holder (3).



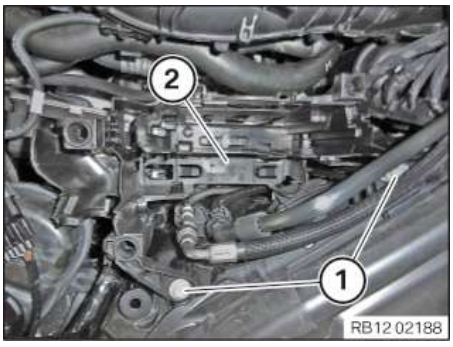
- Unlock the lock (arrow).
- Disconnect the cable holder (1) upwards from the control unit holder (2).



- Loosen clamp (1).



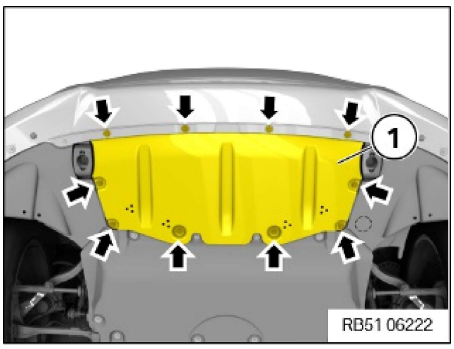
- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



- Loosen screws (1).
- Guide out and remove the control unit holder (2).

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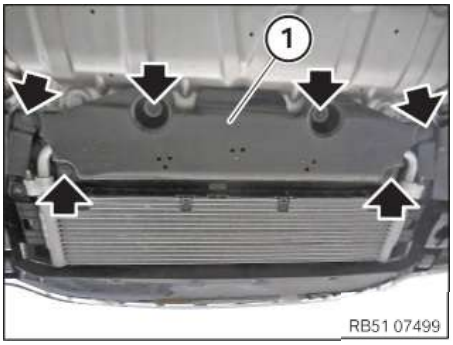
16 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

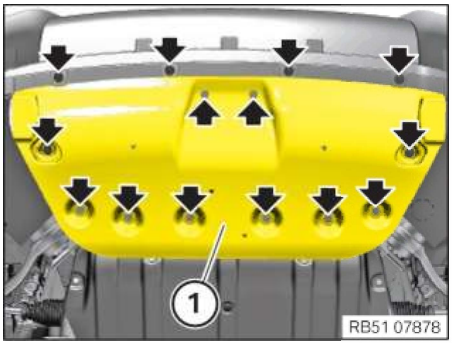
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.



- **Version 3:**

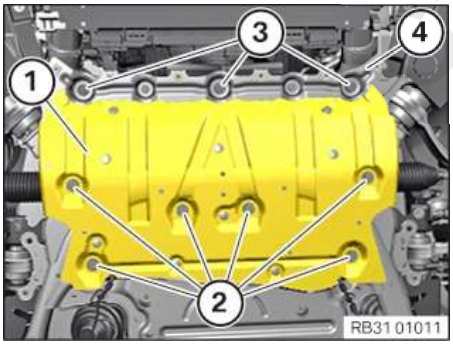
  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

17 – Removing the stiffening plate

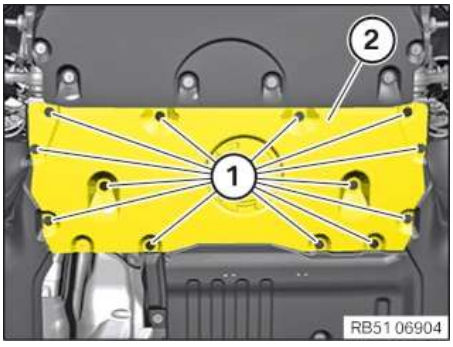
TECHNICAL INFORMATION

Driving without stiffening plate is not permissible.



- Loosen screws (3).
- Remove the holder of the underride protection (4).
- Loosen screws (2).
- Remove stiffening plate (1).

18 – Removing the centre underbody protection

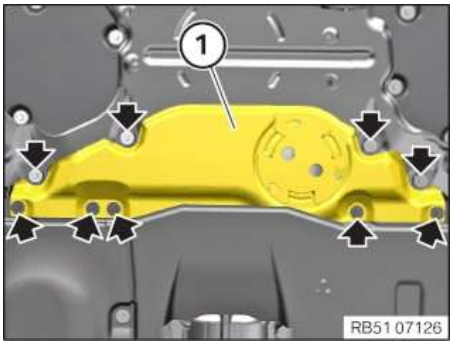


- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

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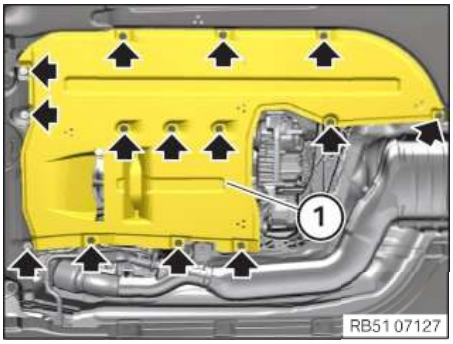


- **Version with all-wheel drive:**

  Remove screws (arrows).

  Feed out and remove the centre underbody protection (1).

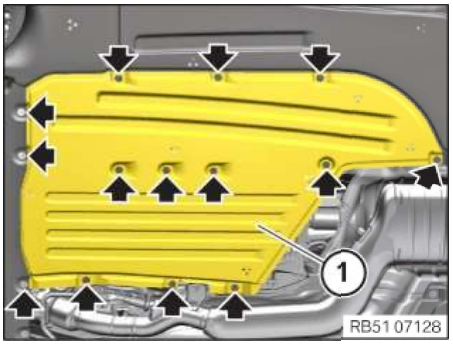
19 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



- **Version 2:**

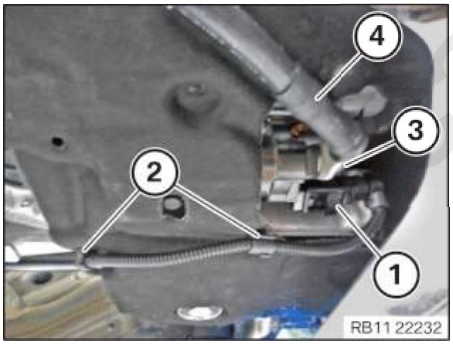
  Remove screws (arrows).

  Guide out rear underbody protection (1) and remove it.

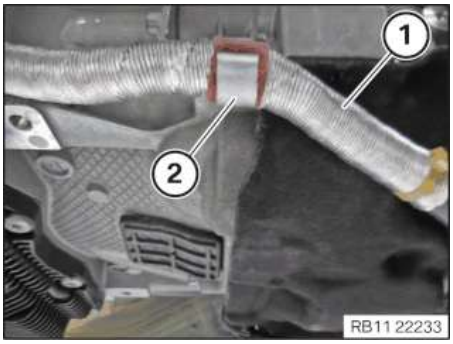
20 – Removing the acoustic cover of the oil sump

Prerequisite

Disconnect all negative battery cables.

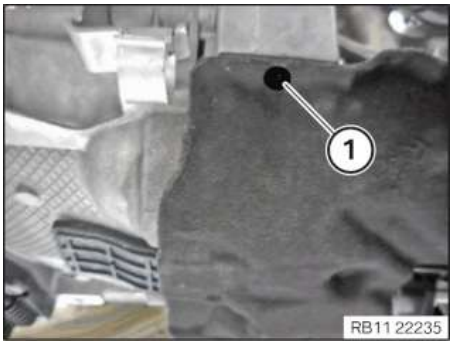


- Unlock plug connection (1) and disconnect.
- Unlock and loosen the clamps (2).
- Loosen nut (3).
- Feed out positive battery cable (4) and set it aside.

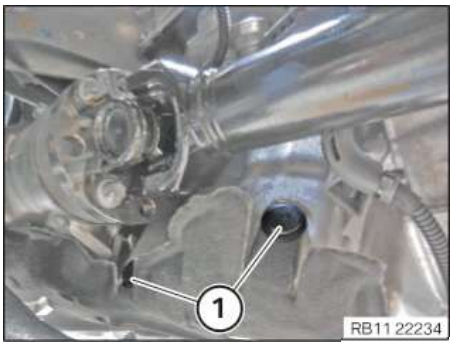


- Guide the positive battery cable (1) out of the clamp (2) and lay to one side.

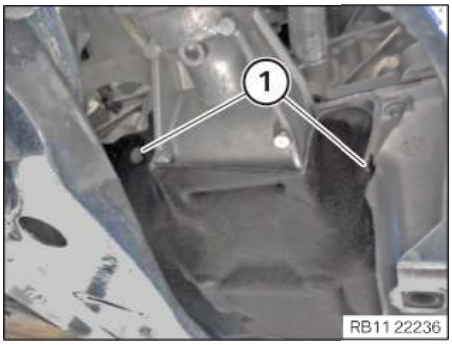
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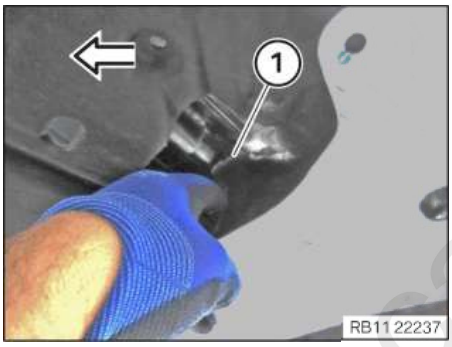
- Undo fir tree clip (1).



- Loosen the expanding rivet (1).



- Loosen the expanding rivet (1).



- Push the acoustic cover (1) downward.
- Feed out and remove the acoustic cover (1) in the **direction** of the arrow.

21 – If installed: Partially release the engine oil cooler

WARNING

Hot surfaces.

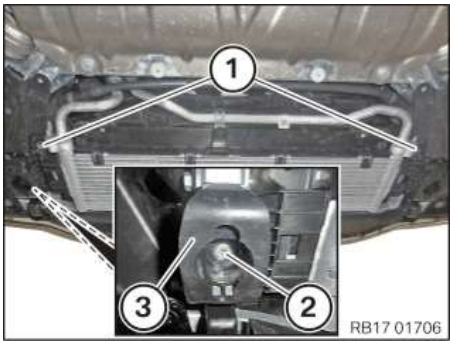
Risk of burning!

- Perform all work only on components that have cooled down.

TECHNICAL INFORMATION

The work must be performed with care to prevent component damage.

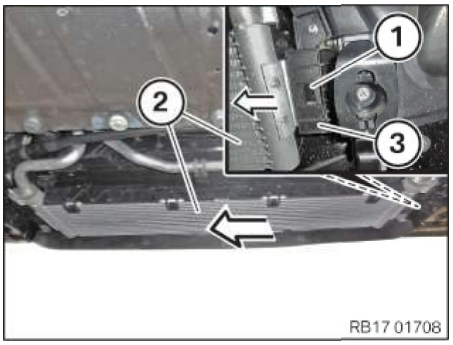
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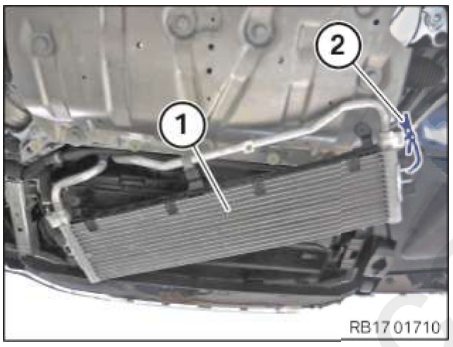
- Loosen screws (1).
- Drill out rivet on the left (2).
- Remove the left-hand damper (3).



- Loosen screw (1).



- Unlock lock (1).
- Feed out engine oil cooler (2) from the holder in the direction of arrow (3) and place to one side.



- Affix the engine oil cooler (1) with a cable strap (2) as shown.

22 – Draining the coolant from the low-temperature cooling system

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

TECHNICAL INFORMATION

Life-long fill of coolant!

Do not reuse used coolant.

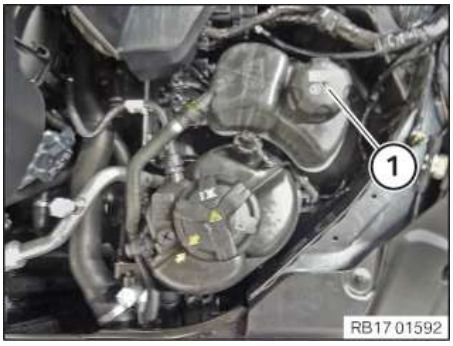
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

In the case of other removal work involving the draining of part quantities of coolant, the coolant level must be topped up with new coolant.

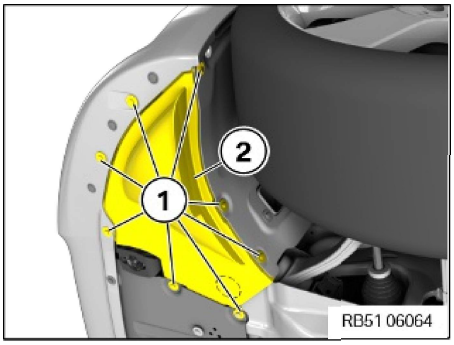
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TECHNICAL INFORMATION

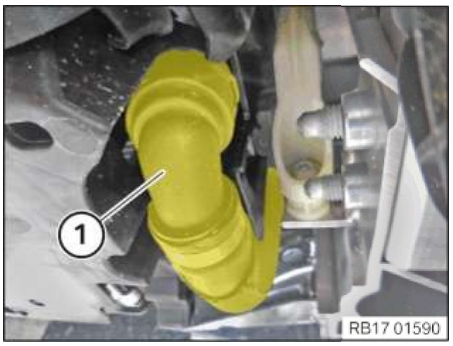
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen sealing cap (1).



- Loosen screws (1).
- Guide out and remove bottom left cover (2) to the front.

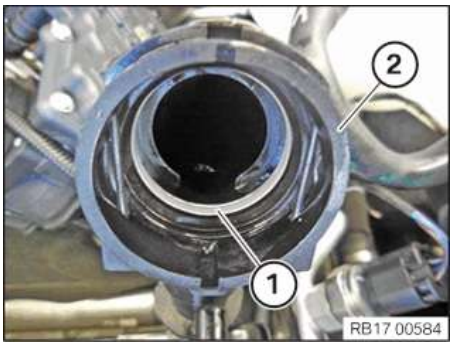


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

23 – Connecting the coolant lines for the low-temperature coolant circuit

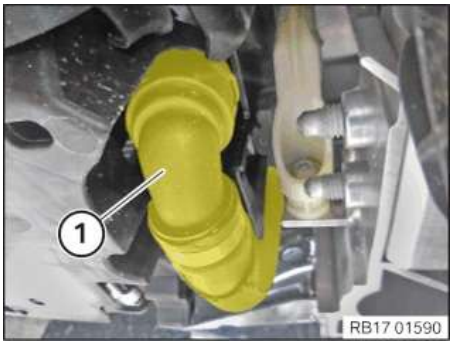
TECHNICAL INFORMATION

Make sure that the connections are locked correctly. The locks must engage audibly.



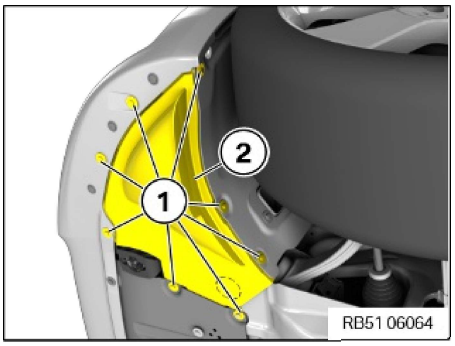
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

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- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.

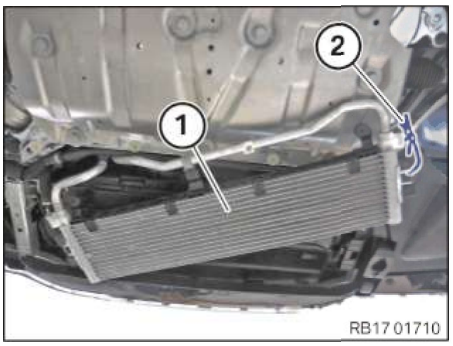


- Feed in and install cover (2) at the bottom front left.
- Tighten the screws (1).

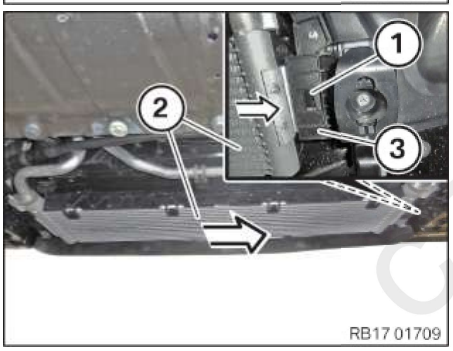
Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

24 – If installed: Secure engine oil cooler



- Remove the cable straps (2).
- Position engine oil cooler (1).



- Feed in and install the engine oil cooler (2) on the holder (3) in the direction of the arrow.
- Ensure that the lock (1)engages audibly.

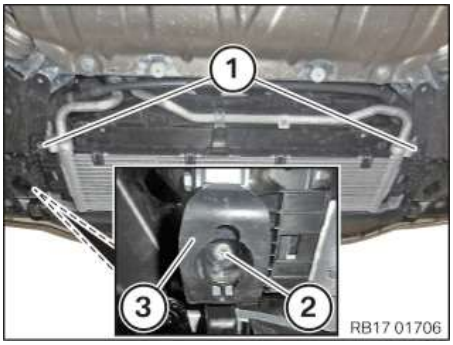


- Tighten down screw (1).

Engine oil cooler to bumper support

M6X25		Tightening torque	8 Nm

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- Renew rivet (2).

  Parts: Rivet
- Install and rivet damper (3).
- Tighten the screws (1).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

25 – Removing the intake plenum

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

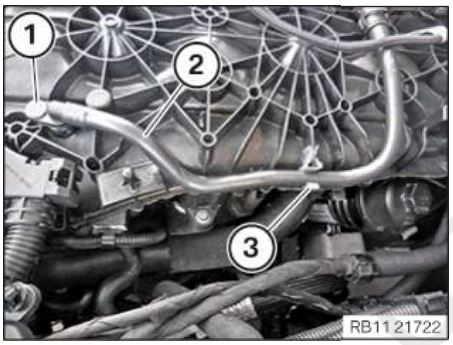
- Do not pull on the wires when disconnecting connectors and plug connections.

TECHNICAL INFORMATION

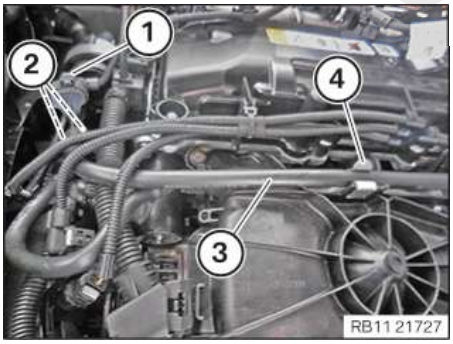
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

TECHNICAL INFORMATION

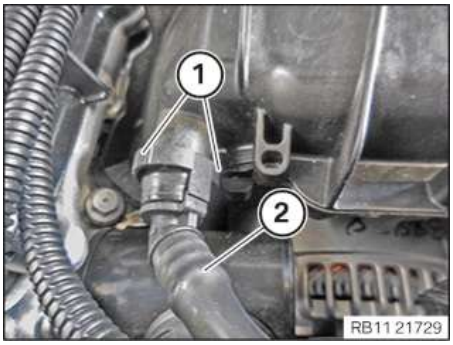
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen screw (1).
- Guide tank ventilation line (2) out of clamp (3) and remove it.

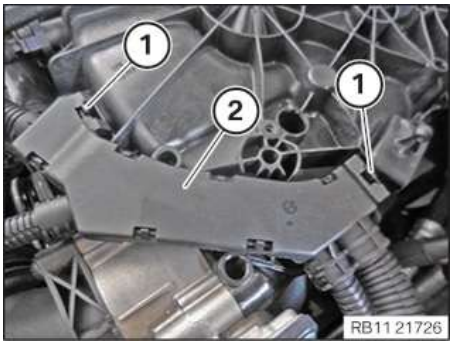


- Unlock and loosen connector (1).
- Unlock the locks (2).
- Guide tank ventilation line (3) out of clamp (4) and remove it.

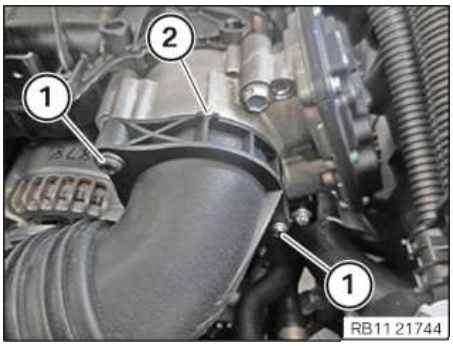


- Unlock the locks (1).
- Feed the tank ventilation line (2) out and set it aside.

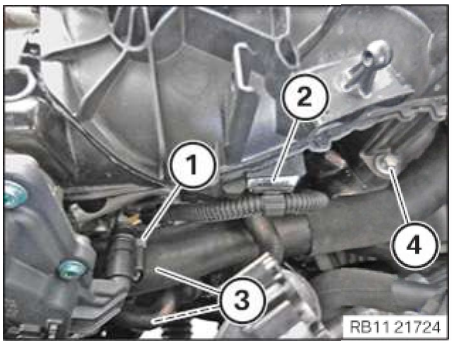
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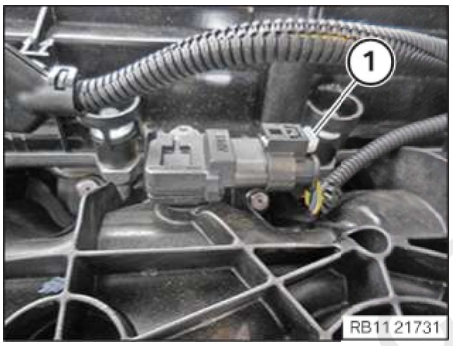
- Unlock the locks (1).
- Guide out the wiring harness section (2) for the sensor system **2** and place to one side.



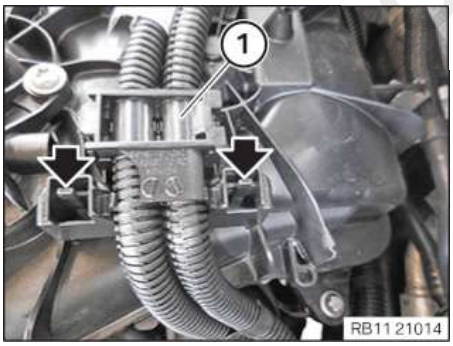
- Loosen screws (1).
- Feed out charge air line (2) and place to one side.



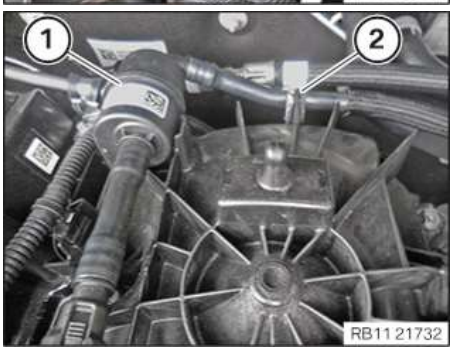
- Unlock and loosen connector (1).
- Loosen clamp (2).
- Thread off coolant line (3) and place to the side.
- Loosen screw (4).



- Unlock and loosen connector (1).

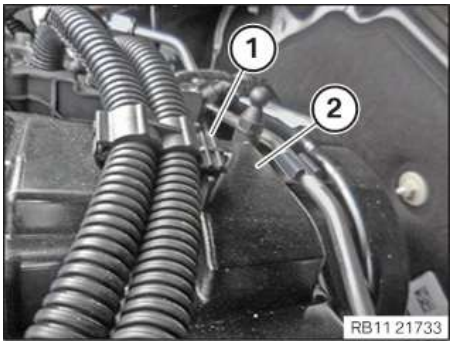


- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.



- Guide tank ventilation line (1) out of clamp (2) and place it aside.

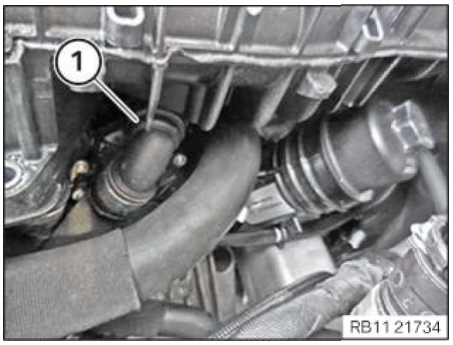
cardiagn.com



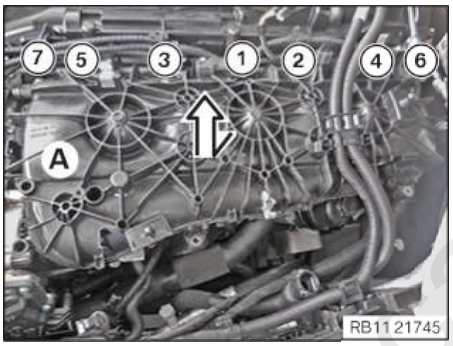
- Guide out the wiring harness section (1) for the injectors and ignition coils of the cylinder head cover (2) and set it aside.



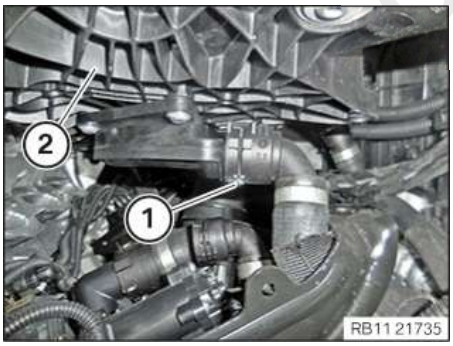
- Loosen screw (1).



- Unlock and loosen coolant line (1).
- Catch and dispose of escaping coolant.



- Loosen screws in the order (7) to (1).
- Slightly raise intake plenum (A) in direction of arrow.



TECHNICAL INFORMATION

Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

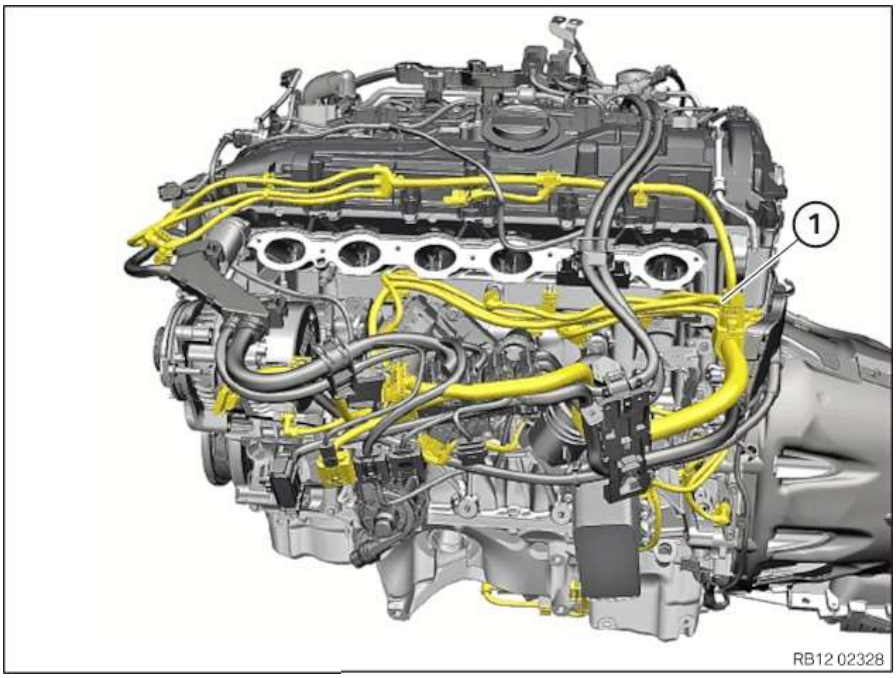
- Unlock and release coolant line (1) below the intake plenum (2).
- Catch and dispose of escaping coolant.
- Thread out intake plenum (2) and remove.

MAIN WORK

26 – Remove the engine wiring harness for sensor system 1

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Engine wiring harness for sensor system 1



1 Engine wiring harness for sensor system 1

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

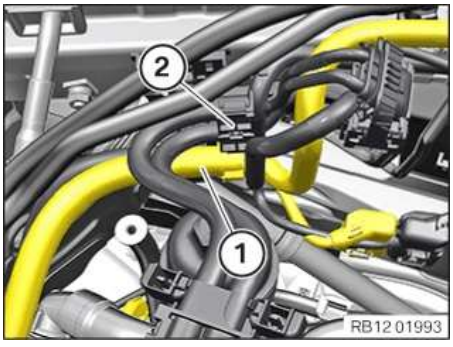
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

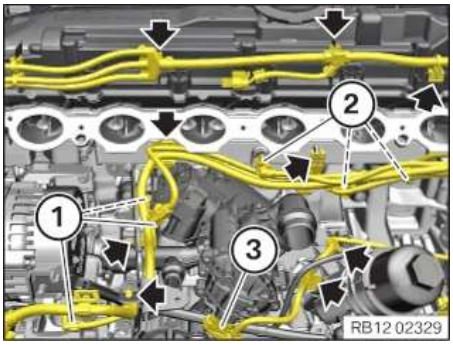
Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

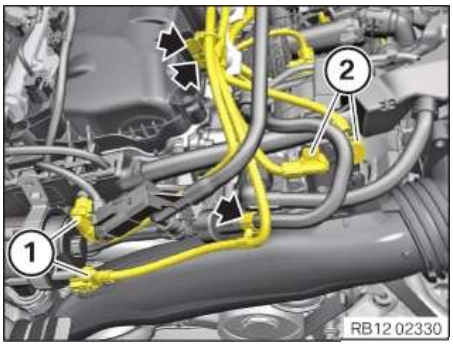


- Guide out the wiring harness section (1) for the sensor system 1 from the holder (2) and place to one side.

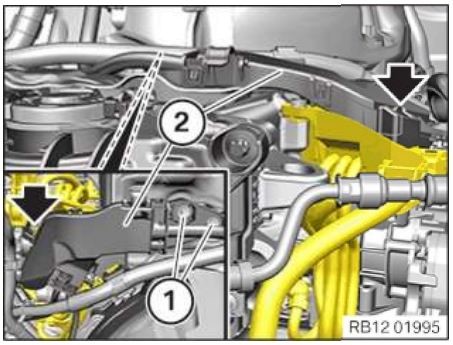
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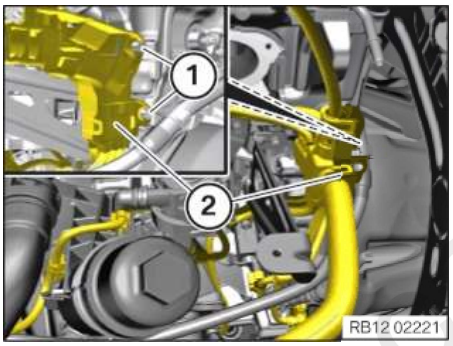
- Unlock and disconnect plug connections (1).
- Unlock plug connection (2) and disconnect.
- Unlock plug connection (3) and disconnect.
- Release the clamps (arrows).



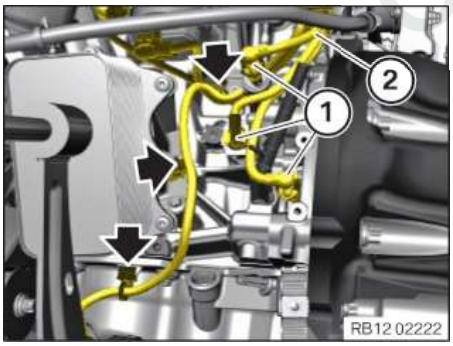
- Unlock and disconnect the plug connections (1) and (2).
- Release the clamps (arrows).



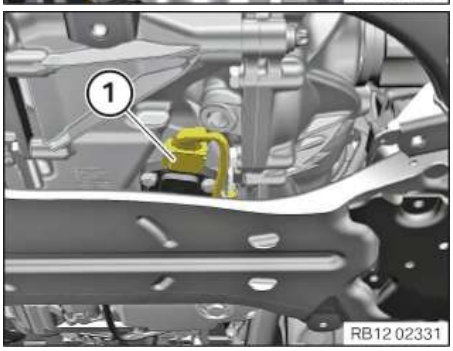
- Loosen screws (1).
- Unlock the lock (arrow).
- Remove the wiring harness section (2) and put to one side.



- Loosen screws (1).
- Thread out the engine wiring harness (2) for sensor system 1 and set it aside.

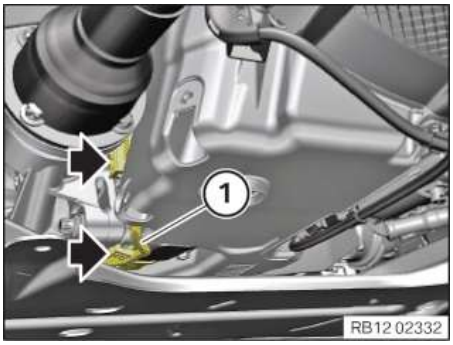


- Unlock and disconnect plug connections (1).
- Release the clamps (arrows).
- Thread out the engine wiring harness (2) for sensor system 1 and set it aside.

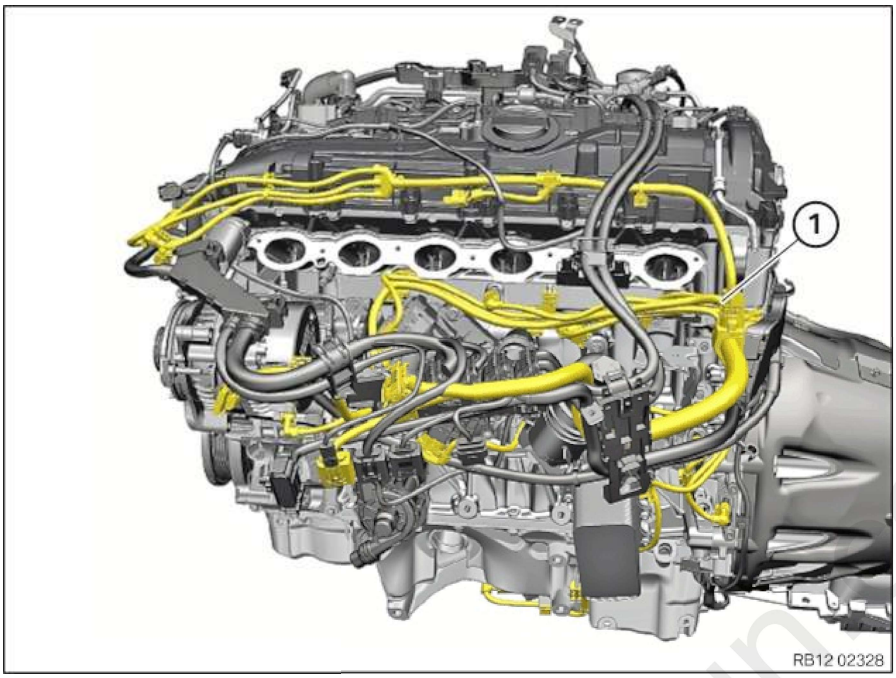


- Unlock plug connection (1) and disconnect.

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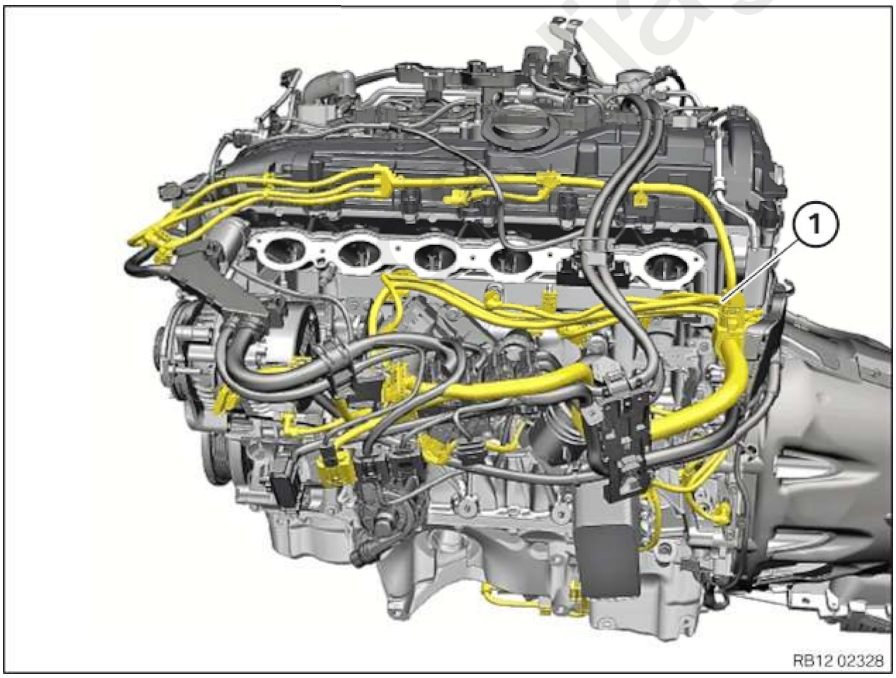
- Release the clamps (arrows).
- Thread out the engine wiring harness (1) for sensor system 1 and set it aside.



- Feed out the engine wiring harness (1) for sensor system 1 and remove it.

27 – Install the engine wiring harness for sensor system 1

Engine wiring harness for sensor system 1



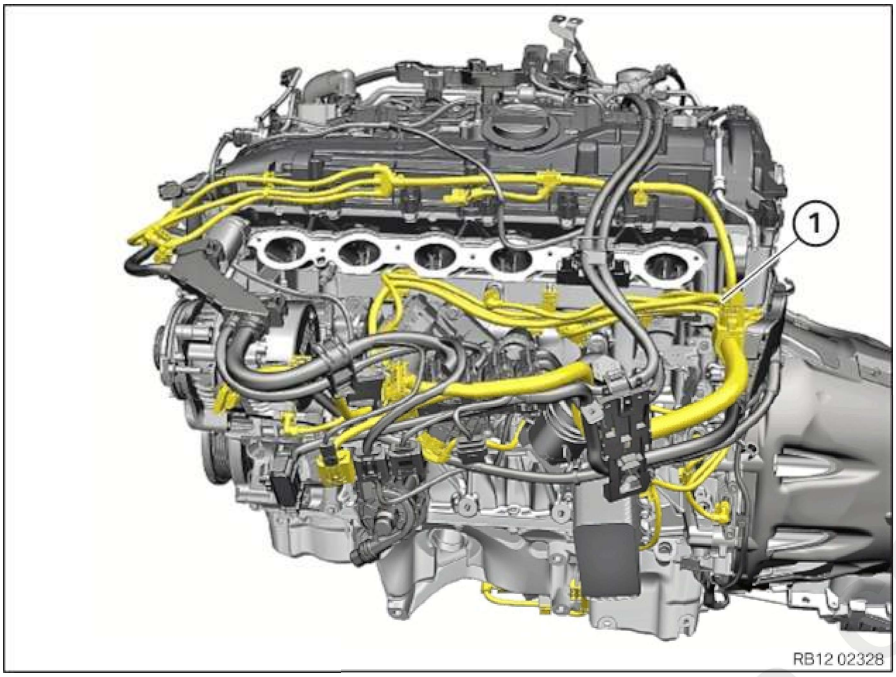
1 Engine wiring harness for sensor system 1

RISK OF DAMAGE

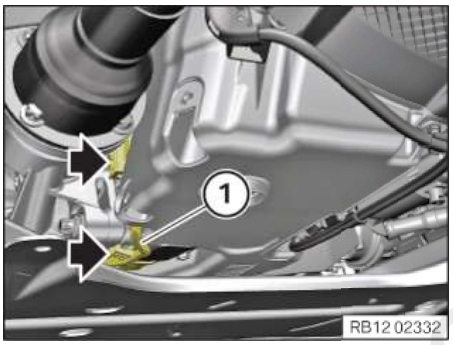
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

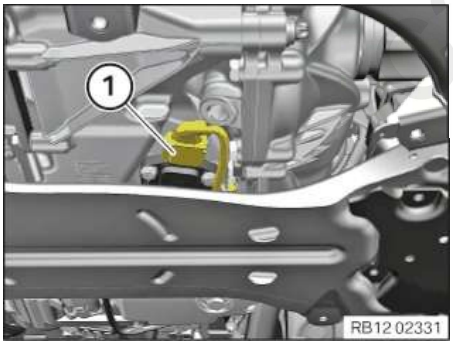
- Route all cables without abrasions, do not trap and crush.



- Thread in and install the engine wiring harness (1) for sensor system 1.

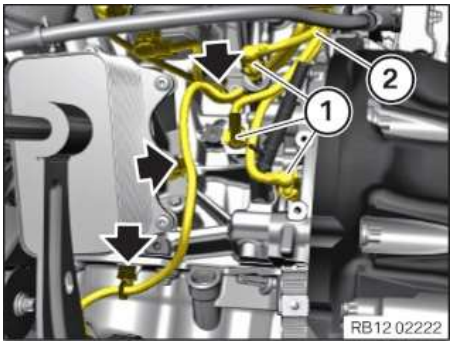


- Thread in and install the engine wiring harness (1) for sensor system 1.
- Secure the clamps (arrows).



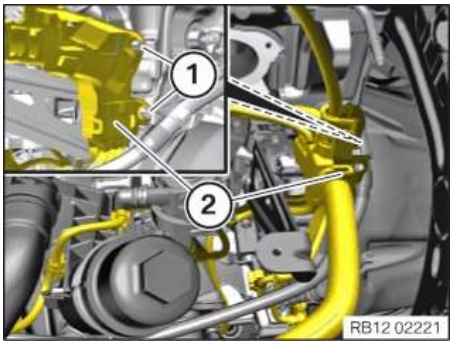
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Thread in and install the engine wiring harness (2) for sensor system 1.
- Connect connectors (1) and lock.

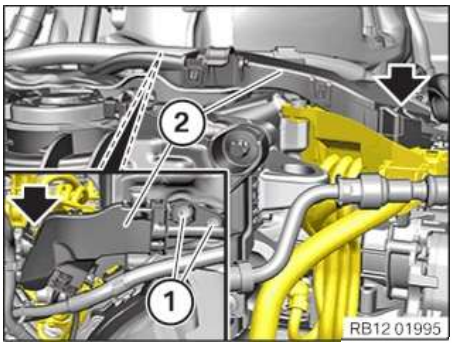
  The connectors (1) must engage audibly.
- Secure the clamps (arrows).



- Thread in and install the engine wiring harness (2) for sensor system 1.
- Tighten the screws (1).

Cable routing to cylinder head, rear

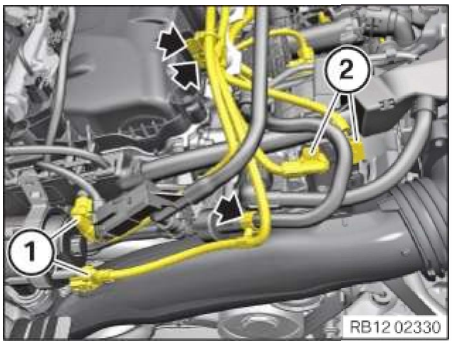
M6 x 20		Tightening torque	8 Nm



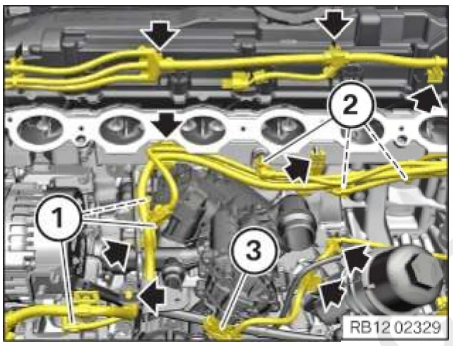
- Guide in the wiring harness section (2) and install.
- Ensure that the lock (arrow) engages correctly.
- Tighten the screws (1).

Cable routing to cylinder head, rear

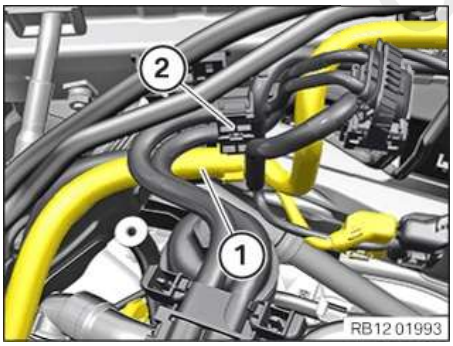
M6 x 20		Tightening torque	8 Nm



- Connect connectors (1) and (2) lock.
  The connectors (1) and (2) must audibly engage.



- Connect connectors (3) and lock.
  The connector (3) must engage audibly.
- Connect connectors (2) and lock.
  The connectors (2) must engage audibly.
- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.
- Secure the clamps (arrows).



- Guide in and install wiring harness section (1) for sensor system 1 on the holder (2).

POSTPROCESSES

28 – Installing the intake plenum

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RISK OF DAMAGE

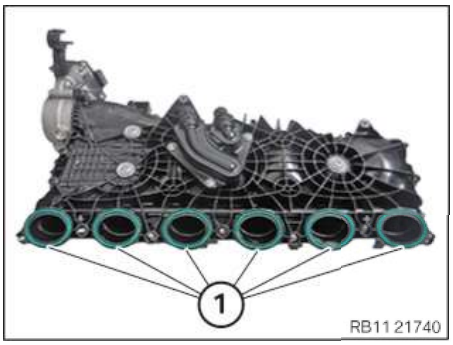
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.

TECHNICAL INFORMATION

Make sure that the connections are locked correctly. The locks must engage audibly.

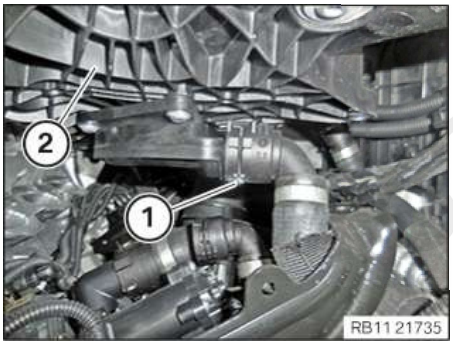


- Renew gaskets (1).

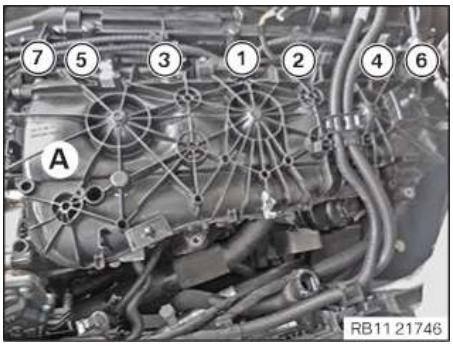
  Parts: Seals



- Clean contact surface (1).



- Feed in and position intake plenum (2).
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



TECHNICAL INFORMATION

Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

- Position the intake plenum (A).
- Tighten screws in the order (1) to (7).

Note: Tighten the bolts in 360 degree steps.

Intake plenum to cylinder head

M6		Tightening torque	10 Nm

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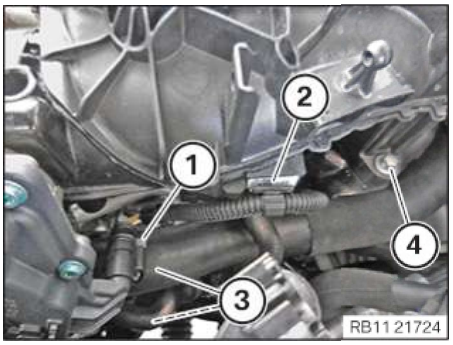
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



- Tighten down screw 1.

Intake plenum to support

M6X25		Tightening torque	8 Nm

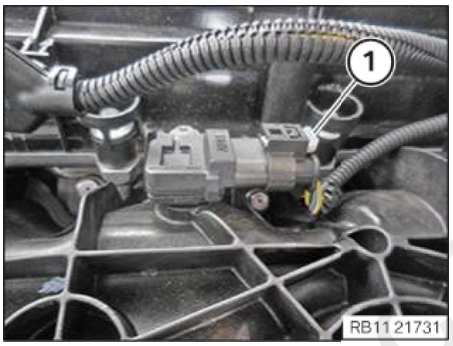


- Tighten down screw (4).

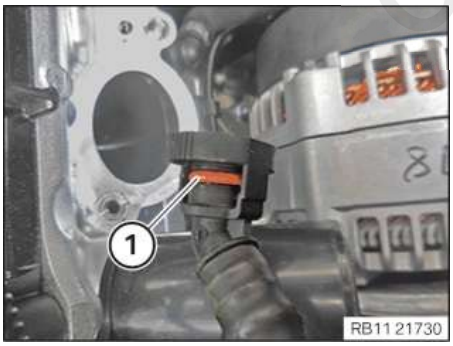
Intake plenum to support

M6X25		Tightening torque	8 Nm

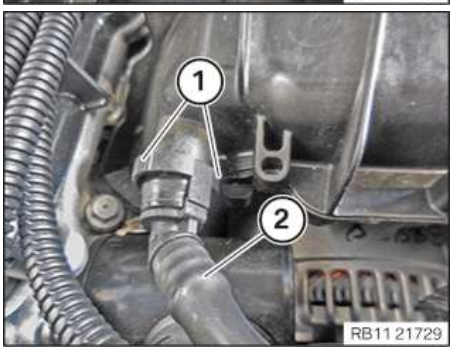
- Thread in and install coolant line (3).
- Secure clamps (2).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

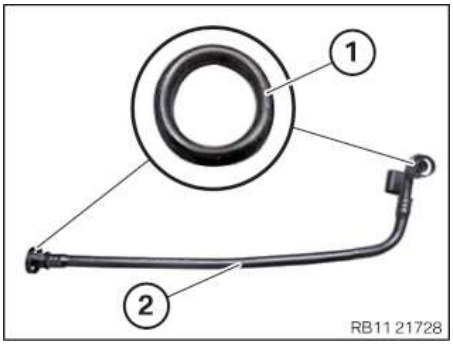


- Check sealing ring (1) for damage and renew tank ventilation line if necessary.

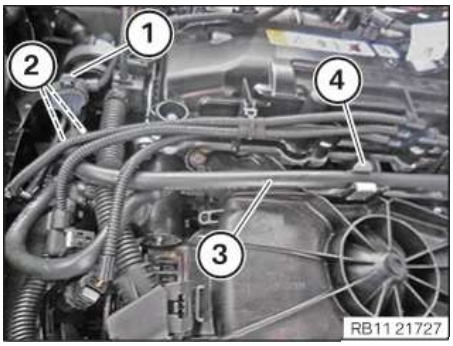


- Insert and install the tank ventilation line (2).
- Ensure that the locks (1) engage audibly.

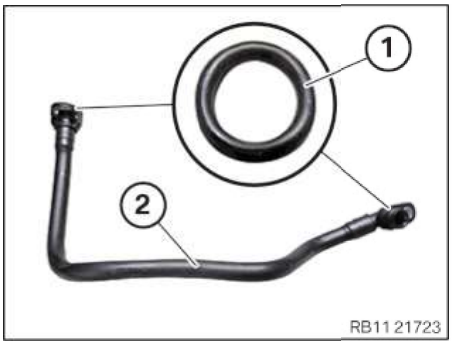
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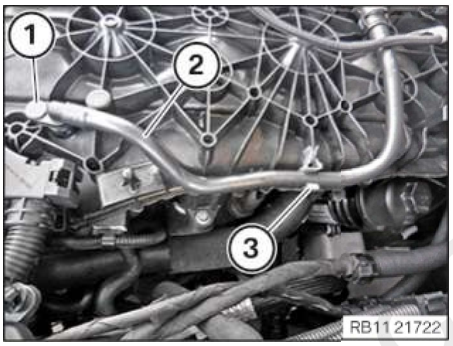
- Check sealing ring (1) for damage and renew tank ventilation line (2) if necessary.



- Insert and install the tank ventilation line (3).
- Ensure that the locks (2) engage audibly.
- Secure the tank ventilation line (3) to the clamp (4).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



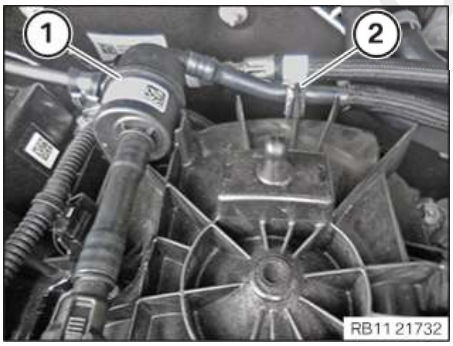
- Check sealing ring (1) for damage and renew tank ventilation line (2) if necessary.



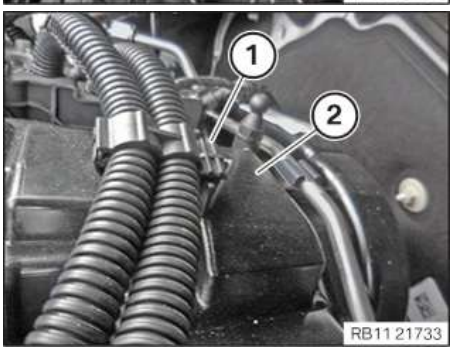
- Insert and install the tank ventilation line (2).
- Secure the tank ventilation line (2) to the clamp (3).
- Tighten down screw (1).

Tank ventilation line to intake plenum

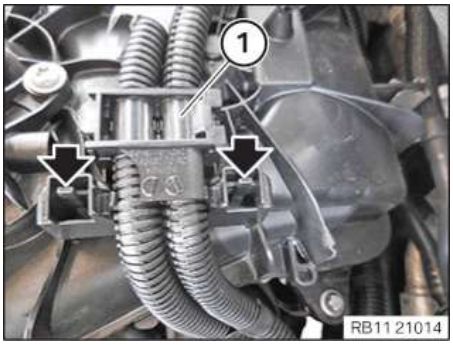
Oval-head screw		Tightening torque	3 Nm



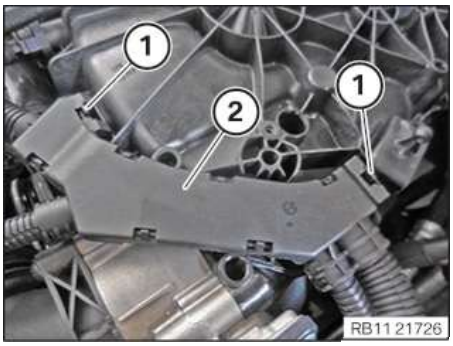
- Insert and install the tank ventilation line (1).
- Secure the tank ventilation line (1) to the clamp (2).



- Secure the wiring harness section(1) for the injectors and ignition coils on the cylinder head cover (2).



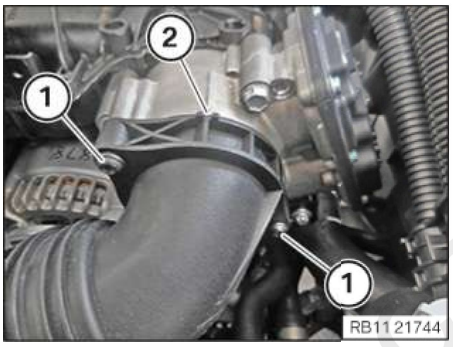
- Insert and install the wiring harness section (1) for the injectors and ignition coils.
  The locks (arrows) must engage audibly.



- Feed in and install wiring harness section (2) for sensor system **2**.
- Ensure that the locks (1) engage audibly.



- Check the sealing ring (1) for damage and renew the sealing ring (1) as needed.

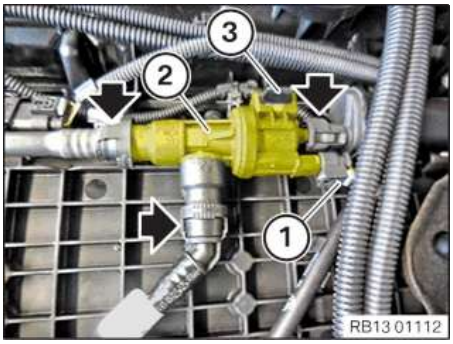


- Insert and install charge air line (2).
- Tighten the screws (1).

Charge air line to throttle valve

M6x30		Tightening torque	8 Nm

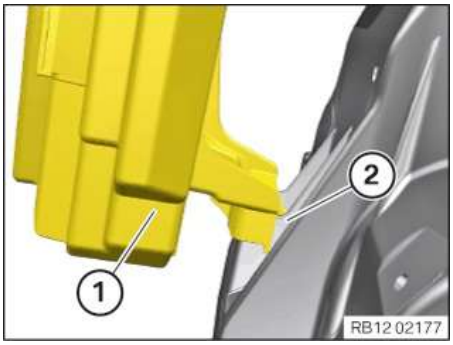
29 – Installing the tank vent valve



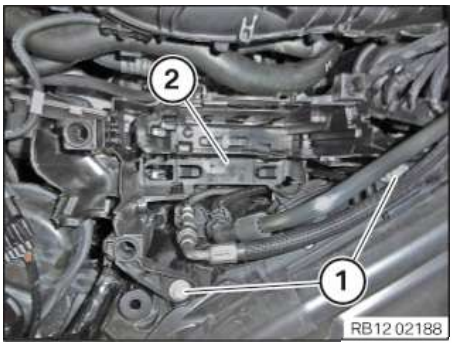
- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).
  The tank ventilation lines (arrows) must audibly engage.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.

30 – Installing the control unit holder

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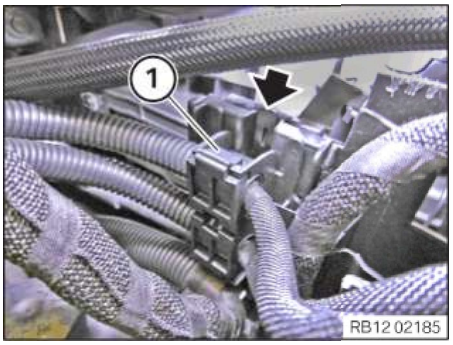
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



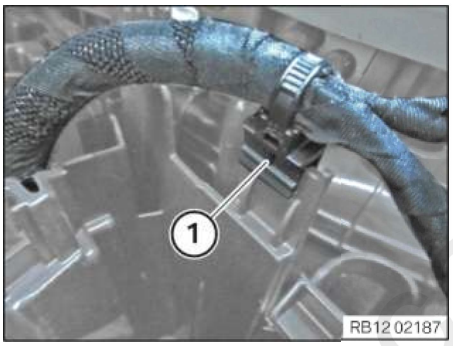
- Guide in and install control unit holder (2).
- Tighten the screws (1).

Control unit holder on spring strut dome

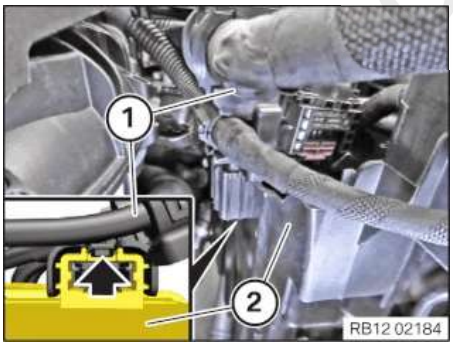
Hexagon screw		Tightening torque	8 Nm



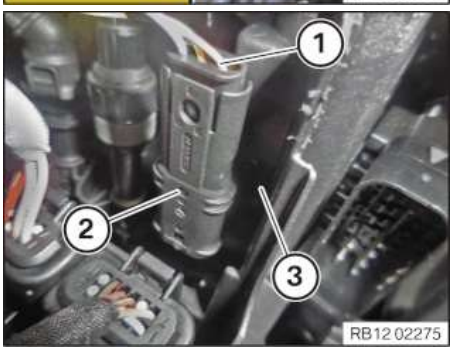
- Feed in and install the cable clip (1).
  Lock (arrow) must audibly engage.



- Secure clamps (1).

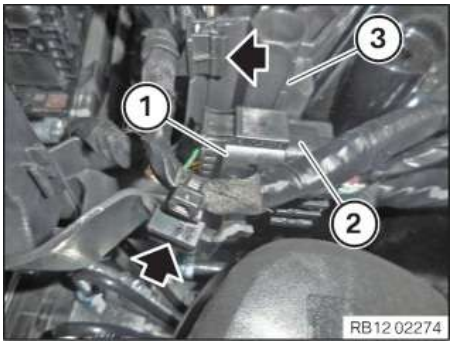


- Connect the cable clip (1) with the control unit holder (2) and lock it.
  Lock (arrow) must audibly engage.



- Connect connector (2) to the control unit holder (3) and lock it.
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.

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- Connect and lock the connector (2) with the control unit holder (3).
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.
- Secure the clamps (arrows).

31 – Installing the integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

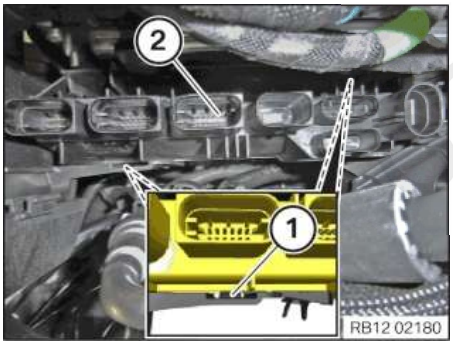
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

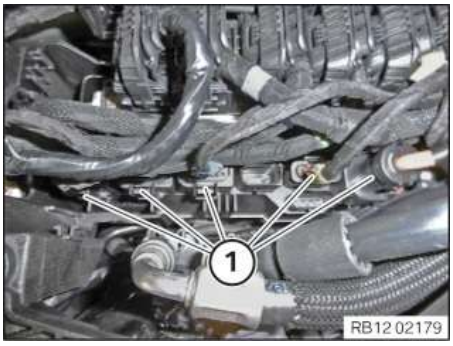
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



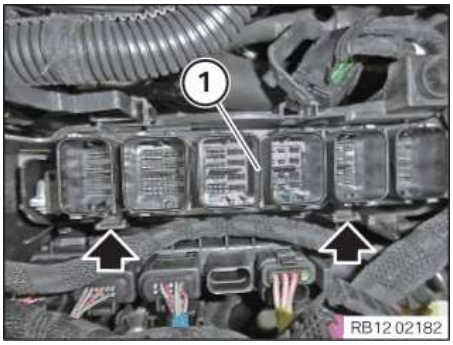
- Insert and install the integrated supply module (PDM) (2).
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



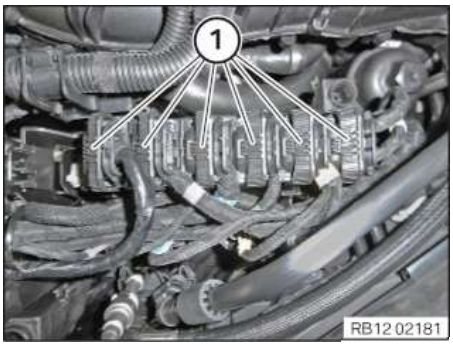
- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.

32 – Installing the DME control unit

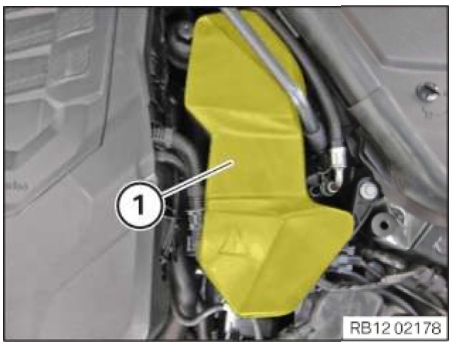
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- Feed in and install DME control unit (1).
  The locks (arrows) must engage audibly.

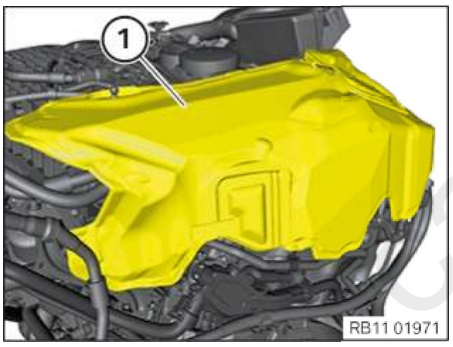


- Connect connectors (1) and lock.
  All connectors (1) must engage audibly.

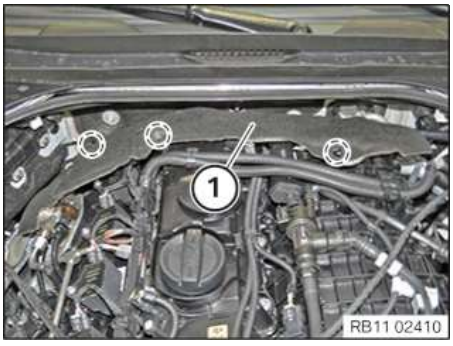


- Insert and install cover (1) into guides.

33 – Installing acoustic cover at rear



- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



- Install the acoustic cover (1) from the top and clip it in into the marked areas.

34 – Install acoustic cover

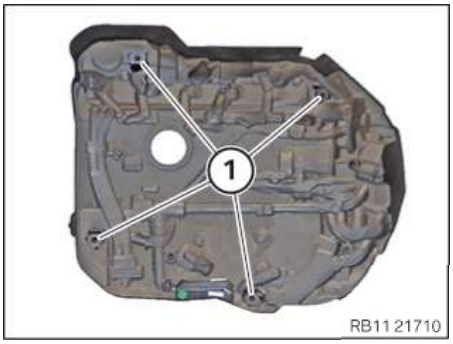
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RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.

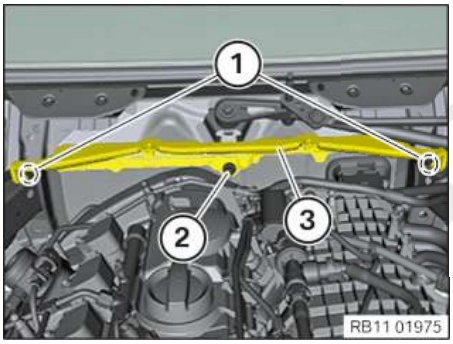


- Check the rubber mount (1) for correct fit in the acoustic cover.



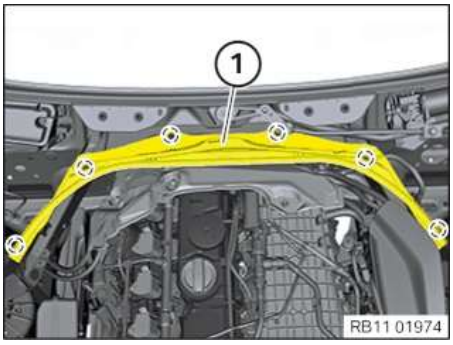
- Install acoustic cover (1) and fix in the rubber mounts (marks).

35 – Installing centre bulkhead lower section



- Position the centre bulkhead lower part (3).
- Tighten nut (2) and screws (1).

36 – Installing the centre bulkhead upper part

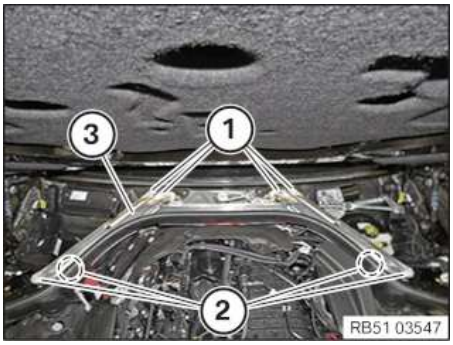


- Position the centre bulkhead upper part (1).
- Tighten the bolts in the marked areas.

Bulkhead upper part to bottom bulkhead

	Tightening torque	3 Nm

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- **If installed:** Install tension strut on spring strut dome.
- Install the tension strut (3) on the spring strut dome.
- Tighten the screws (1).

Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

Tension strut to spring strut dome

Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

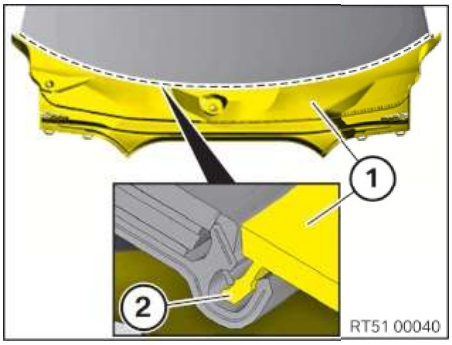
37 – Installing cowl panel cover

RISK OF DAMAGE

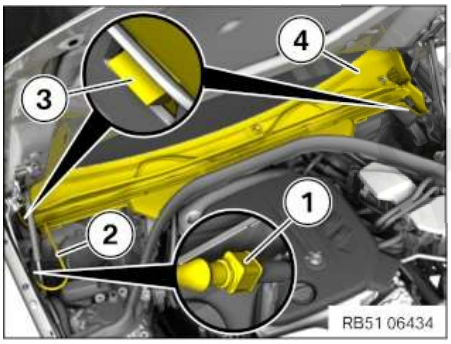
Damage caused by water ingress into the vehicle.

Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

- Ensure correct installation of the components.
- Only use undamaged components.



- Push the cowl panel cover (1) into the latch mechanism (2) beginning on the side.



- Clip cowl panel cover (4)in by means of the latch mechanisms (3).
- Position windscreen wash hose (2) and connect windscreen wash hose (1)quick lock.

38 – Installing both wiper arms

NOTICE

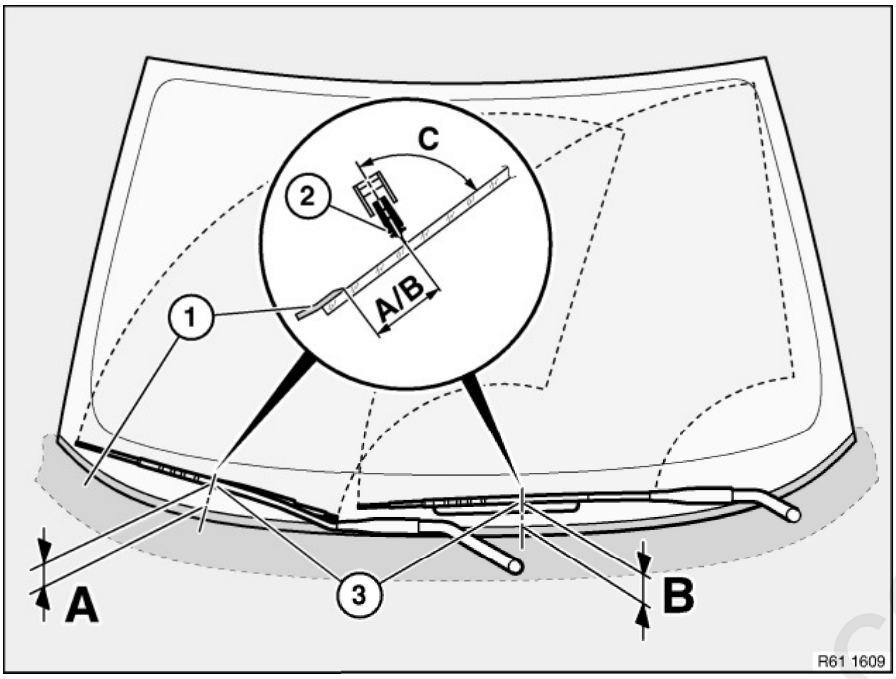
Description is for left component only. Procedure on the right side is identical.

▸ **Install the wiper arm**

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TECHNICAL INFORMATION

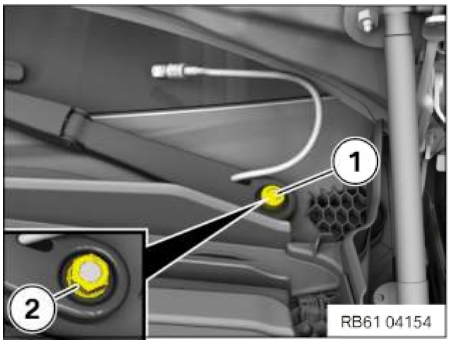
The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.



- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

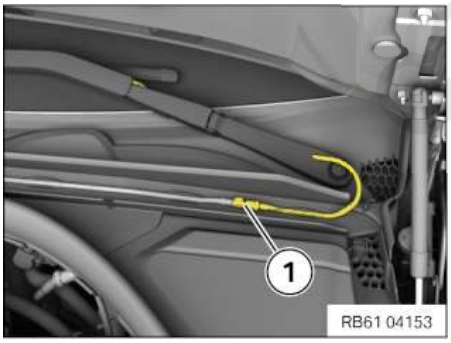


- Tighten nut (2).

Windscreen wiper arm

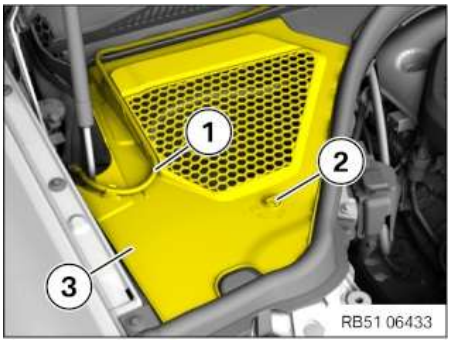
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Insert windscreen wash hose (1) into the cowl and connect at the separating point.

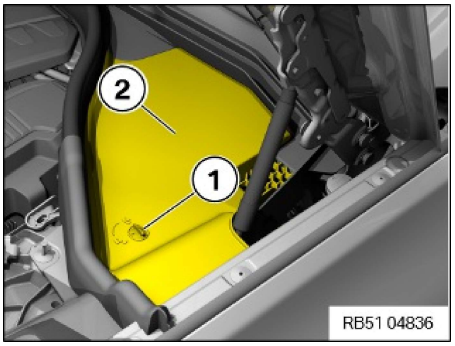
39 – Install the rear right engine compartment cover



- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

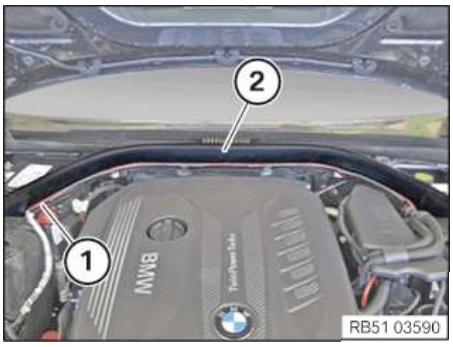
40 – Install the cover of the engine compartment on the rear left

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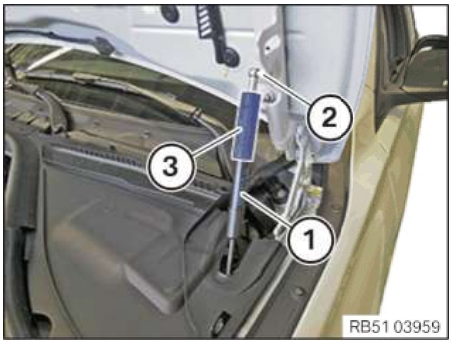
- Position the engine compartment cover at the rear left (2) .
- Close lock (1).

41 – Install the seal for the bonnet

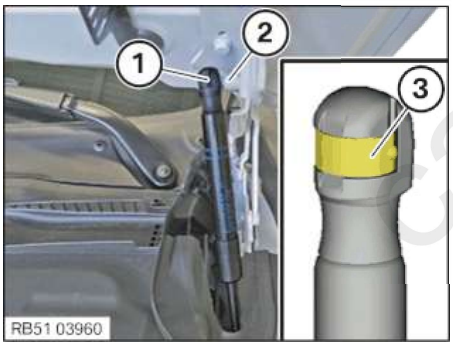


- Press the rear bonnet seal (2) into the guide.
- Feed in cable (1) into the brackets.
- Check that the rear bonnet seal (2) and the cable (1) are seated correctly.

42 – Take bonnet out of the service position



- Support the bonnet by hand.
- Remove the special tool (3) from the ball pin (2).
- Pull off the special tool (3) from the gas pressure spring (1).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.



CAUTION

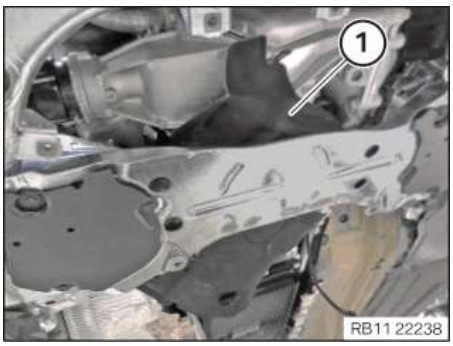
Shutting bonnet or tailgate.

Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.

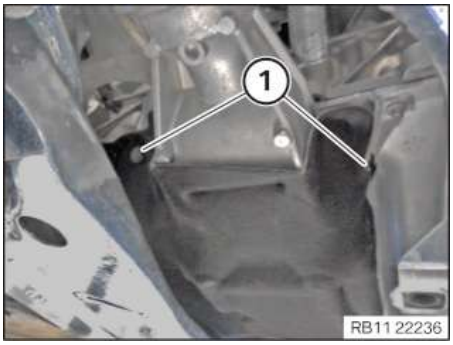
- Check the clamp (3) is fitted correctly.
- Connect ball socket (1) to ball pin (2).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.

43 – Installing the acoustic cover for the oil sump

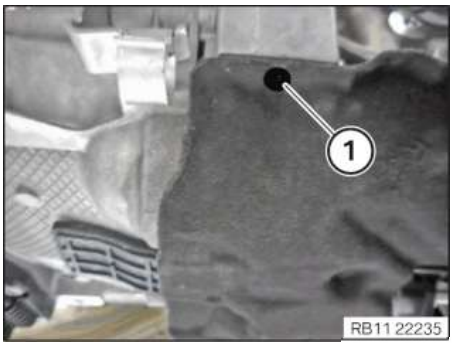


- Thread in and position the acoustic cover (1).

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- Secure expanding rivet (1).

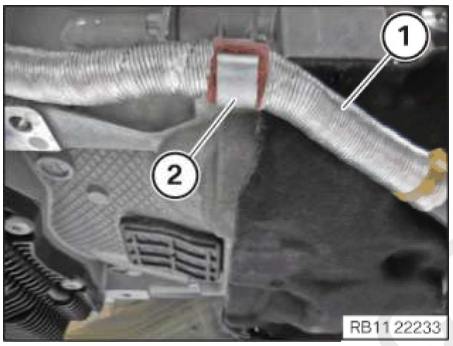


- Check the fir tree clip (1) for damage and renew if necessary.

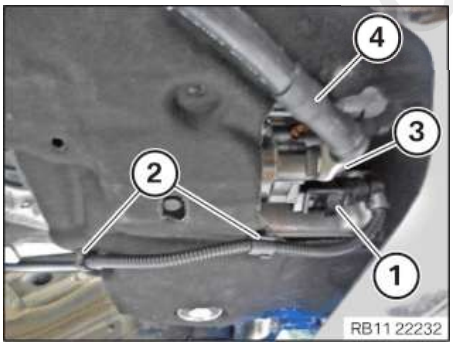
  Parts: Fir tree clip



- Secure expanding rivet (1).



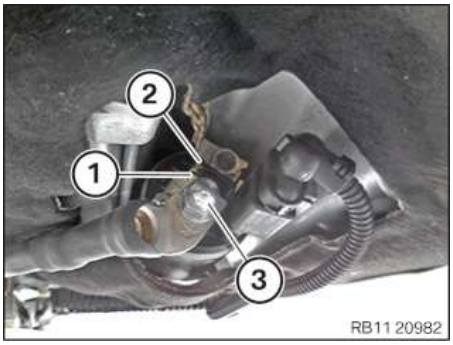
- Secure positive battery cable (1) at the clamp (2).



- Connect connectors (1) and lock.

  The connector (1) must engage audibly.
- Secure clamps (2).
- Insert and install the positive battery cable (4).
- Tighten the nut (3) hand-tight.

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CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

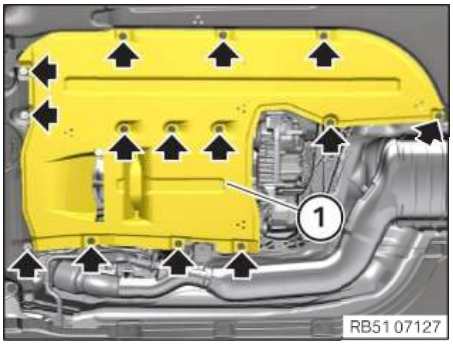
- Route the positive battery cable without abrasions and do not trap.

- Attach positive battery cable (1) **correctly** to anti-twist lock (2).
- Tighten nut (3).

Battery positive lead to starter

M8		Tightening torque	13,5 Nm

44 – Installing underbody protection at rear



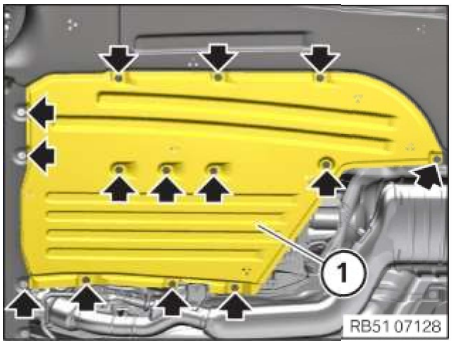
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

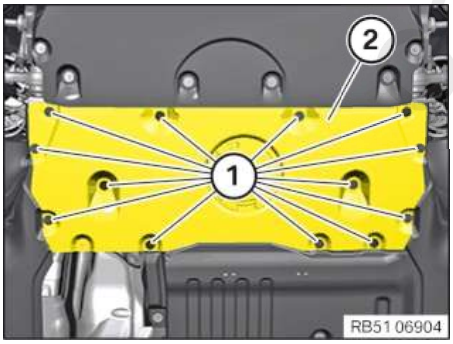
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

45 – Installing the centre underbody protection



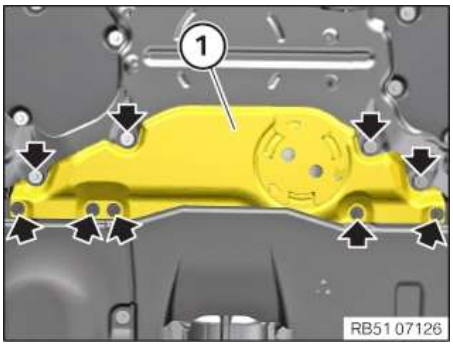
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version with all-wheel drive:**

  Guide in and install the centre of underbody protection (1).

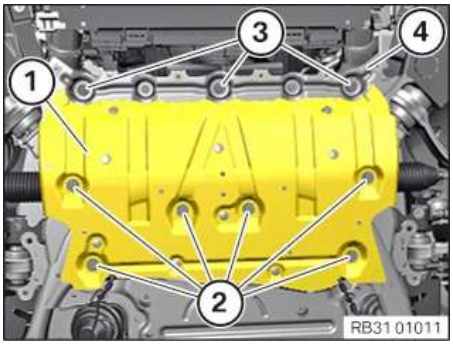
  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

46 – Installing the stiffening plate

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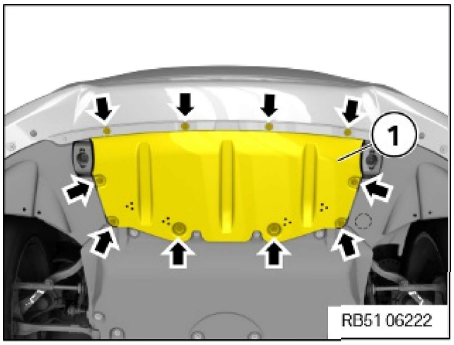


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

47 – Installing the front underbody protection



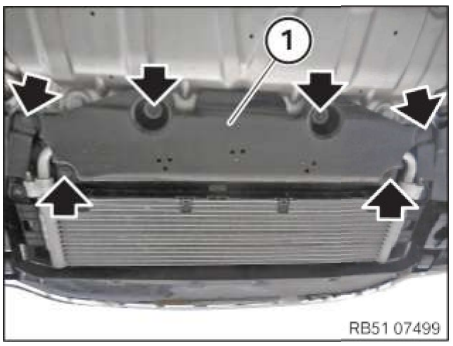
- **Version 1:**

  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



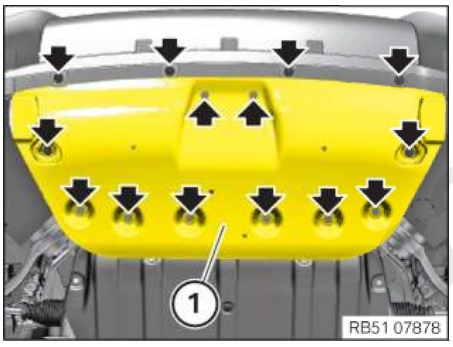
- **Version 2:**

  Feed in and position the front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



- **Version 3:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

48 – Disconnecting all battery earth leads



- See additional information.

49 – Filling and bleed the low-temperature coolant circuit



- See additional information.

Additional Information

Overview of Tightening Torques

Cover, front bottom on side			Used in step 2324
Hexagon screw for thermoplastic		Tightening torque	3 Nm

Engine oil cooler to bumper support			Used in step 24
M6X25		Tightening torque	8 Nm

Cable routing to cylinder head, rear			Used in step 27
M6 x 20		Tightening torque	8 Nm

Intake plenum to cylinder head			Used in step 28
M6		Tightening torque	10 Nm

Intake plenum to support			Used in step 28
M6X25		Tightening torque	8 Nm

Tank ventilation line to intake plenum			Used in step 28
Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle valve			Used in step 28
M6x30		Tightening torque	8 Nm

Control unit holder on spring strut dome			Used in step 30
Hexagon screw		Tightening torque	8 Nm

Bulkhead upper part to bottom bulkhead			Used in step 36
		Tightening torque	3 Nm

Tension strut on bulkhead			Used in step 36
M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome			Used in step 36
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 38
Combination hexagon nut		Tightening torque	35 Nm

Battery positive lead to starter			Used in step 43
M8		Tightening torque	13,5 Nm

Underbody protection			Used in step 4445
Hexagon screw		Tightening torque	3 Nm

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Stiffening plate to front axle support			Used in step 46
M10		Tightening torque	56 Nm

Underbody protection front			Used in step 47
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 38
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	1332

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	248
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	248
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61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
61 20 900 Disconnecting and connecting battery earth lead	248
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61 35 ... Notes on ESD protection (Electro Static Discharge)	1213142631

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61 00 730 Encode/program control unit(s) (after vehicle test)	32
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	49
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Venting cooling system and checking on watertightness	49
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	49
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	49
17 00 040 Bleeding lower-temperature cooling system (B48)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 011 Draining and topping up coolant circuit for low temperature	49
17 00 040 Bleed the low-temperature cooling system and check for watertightness (coolant circuit for low temperature)	49
17 00 040 Bleeding and filling low temperature cooling system using vacuum filler device (B48)	49
17 00 011 Draining and topping up low-temperature coolant circuit	49
17 00 011 Draining and topping up low-temperature coolant circuit	49
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	49
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	49
17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	49
17 00 011 Draining and topping up low-temperature coolant circuit	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	49

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12 51 240 Remove and install / replace Module 2, sensor system engine wiring

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to battery terminal, the safety battery terminal or the intelligent battery sensor (IBS).

Damaged battery terminals can lead to malfunctions or vehicle electrical system faults.

- Pull off battery terminal from battery pole by carefully moving to and fro. Do not pry off using a tool.

TECHNICAL INFORMATION

Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

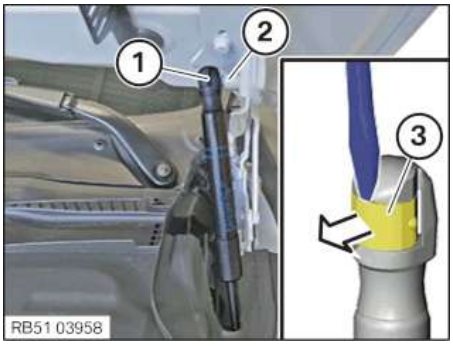
Engine compartment lid is open.

CAUTION

Shutting bonnet or tailgate.

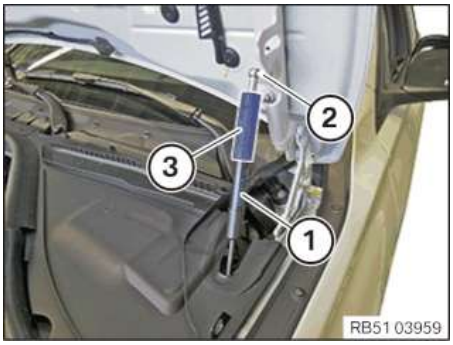
Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.



- Lift clamp (3) slightly using a screwdriver, in the direction of the arrow.
- Lift off ball socket (1) from ball pin (2).
- Repeat the operation on the other side of vehicle.

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TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

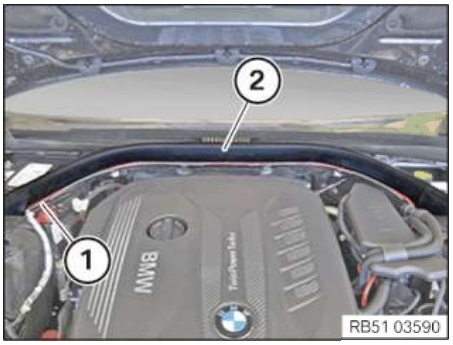
- Remove the bonnet support and open the bonnet further.
- Push special tool or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

2 – Disconnecting all battery earth leads



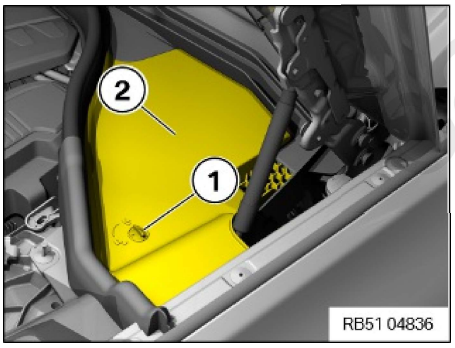
- See additional information.

3 – Remove the seal for the rear bonnet



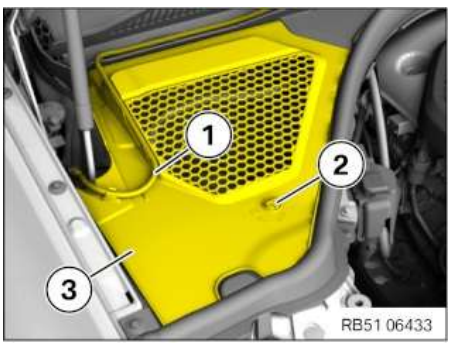
- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

4 – Remove the cover of the engine compartment at the rear left



- Loosen the lock (1).
- Remove rear left cover of engine compartment (2).

5 – Remove the cover of the rear right engine compartment



- Release washer fluid hose (1) from the guides.
- Loosen the lock (2).
- Remove the cover of rear right engine compartment (3).

6 – Removing both wiper arms

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NOTICE

Description is for left component only. Procedure on the right side is identical.

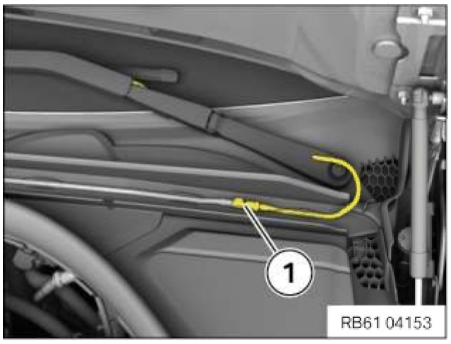
▸ **Remove the wiper arm**

RISK OF DAMAGE

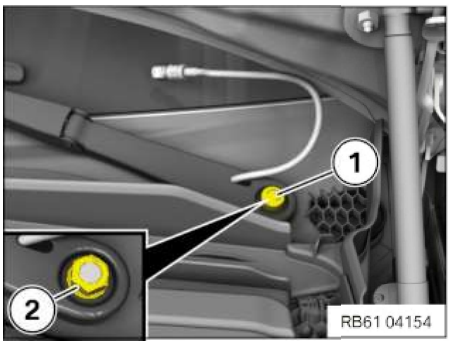
Damage to wiper console

While removing the wiper arms without using special tool, the wiper console can break.

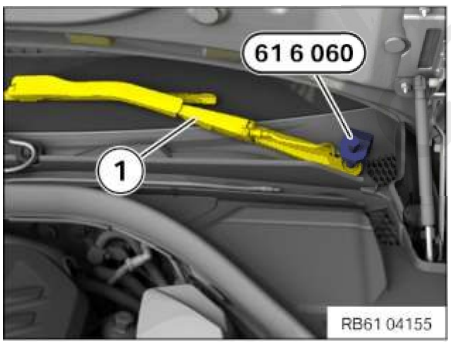
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.



- Disconnect the windscreen wash hose(1) at the separation point and remove from the cowl guide.

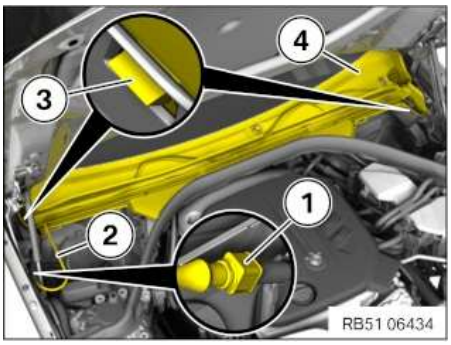


- Remove the protective cap (1).
- Loosen nut (2).



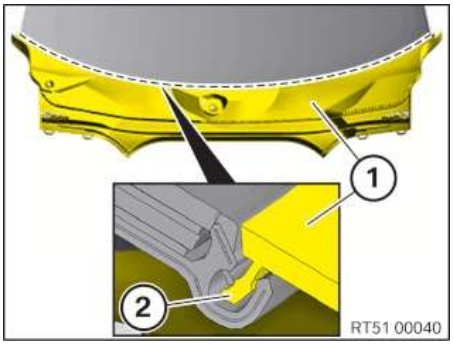
- Pull off the wiper arm (1) using special tool .

7 – Remove cowl panel cover



- Release snap fastener of the washer fluid hose (1) and put the washer fluid hose(2) to one side.
- Unclip clips (3) on the cowl panel cover (4).

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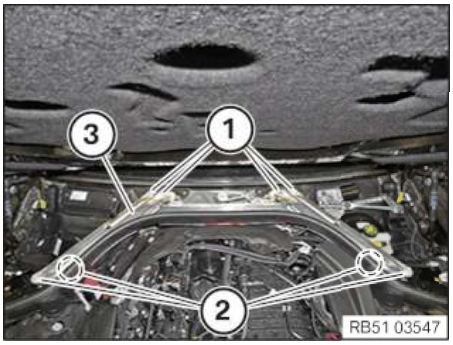


- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

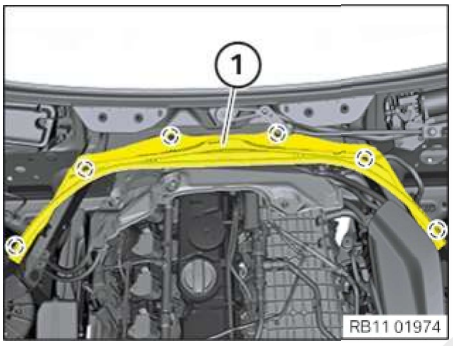
8 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

Driving without the strut brace/front end or tension strut is not permitted.



- **If installed:** Remove tension strut on spring strut dome.
- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.



- Unscrew the bolts in the marked areas.
- Remove the centre bulkhead upper part (1).

9 – Removing intake silencer housing

RISK OF DAMAGE

Damage to the clean air line. Damage to the air filter.

For changing the air filter insert, if the upper section of intake filter housing is only raised and not completely removed, the clean air line and the air filter insert may be damaged.

- Do not lift upper section of intake filter housing by force.
- Unfasten clamp.
- Remove upper section of intake filter housing completely.



- Unlock plug connection (1) and disconnect.
- Unfasten clamp (2).
- Pull out and remove the intake silencer housing (3) from the rubber mounts towards the top.

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10 – Removing clean air pipe

WARNING

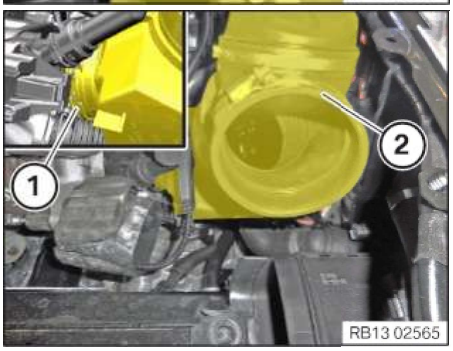
Hot surfaces.

Risk of burning!

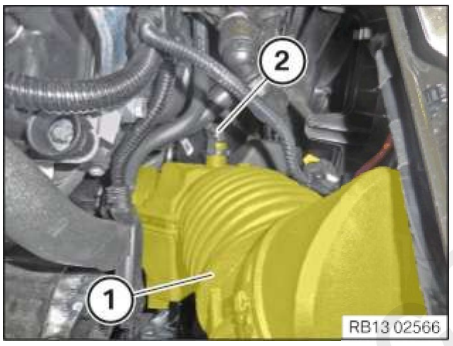
- Perform all work only on components that have cooled down.



- Loosen clamp (1).



- Unlock the clamp (1).
- Thread out clean air pipe (2) and set it aside.



- Position clean air pipe (1).
- Unlock and loosen engine ventilation line (2).
- Feed out clean air pipe and remove (1).

11 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

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RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Release the acoustic cover (1) towards the top from the rubber mounts (marks).

12 – Removing engine ventilation line

WARNING

Hot surfaces.

Risk of burning!

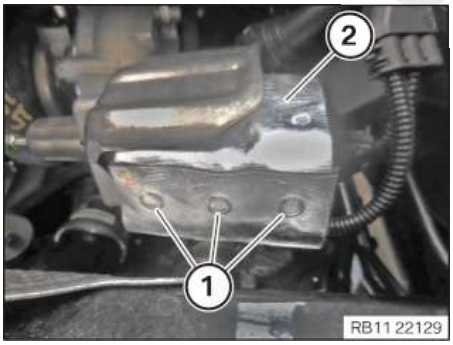
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

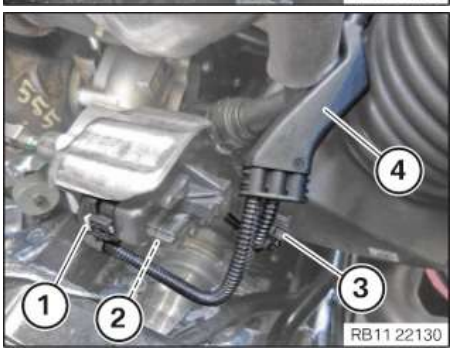
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

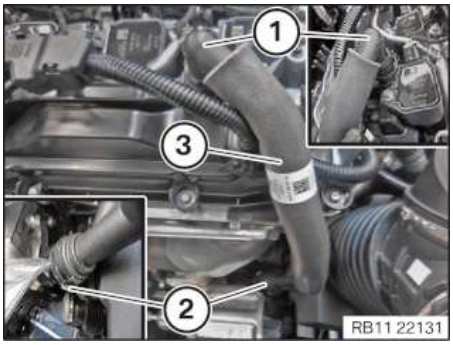


- Unlock the locks (1).
- Feed out and remove heat protection (2).

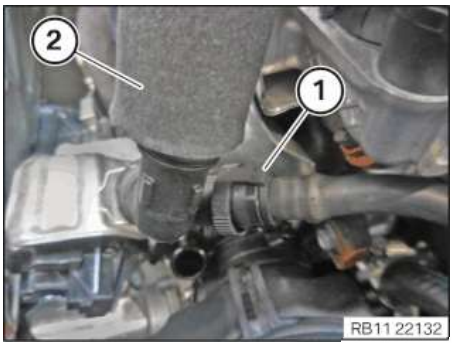


- Unlock and disconnect the plug connection (1).
- Unlock and disconnect the plug connection (2).
- Loosen clamp (3).
- Feed out wiring harness section for sensor system **2** (4) and set it aside.

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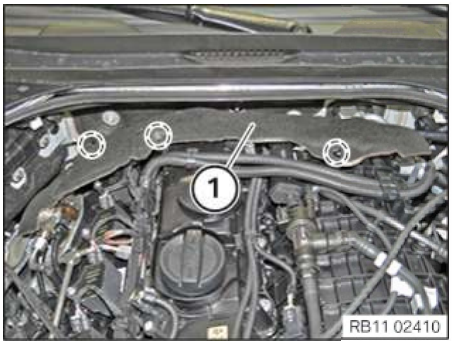


- Unlock and loosen the locks (1).
- Unlock and loosen lock (2).
- Feed the engine ventilation line (3) out and set it aside.



- Unlock and release tank ventilation line (1).
- Feed out the engine ventilation line (2) and remove.

13 – Removing acoustic cover at rear



- Unclip the acoustic cover (1) in the marked areas and remove it to the top.

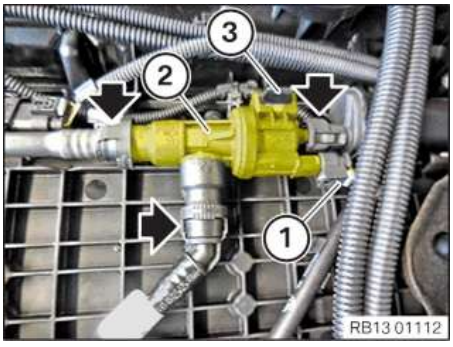
14 – Remove tank vent valve

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



- Unlock and disconnect connector (1).
- Unlock and disconnect the tank ventilation lines (arrows).
- Detach and remove the tank vent valve (2) from the holder (3).

15 – Removing the DME control unit

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RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units

TECHNICAL INFORMATION

In a warranty case, you must always provide a fault memory printout with the defective part, even if the fault memory does not contain an entry.

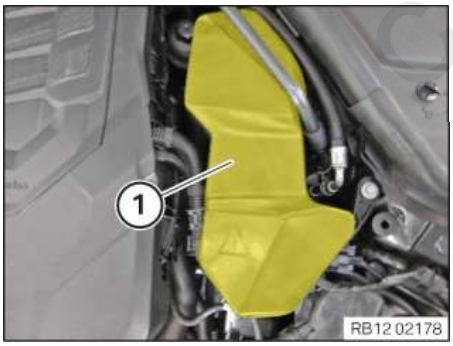
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

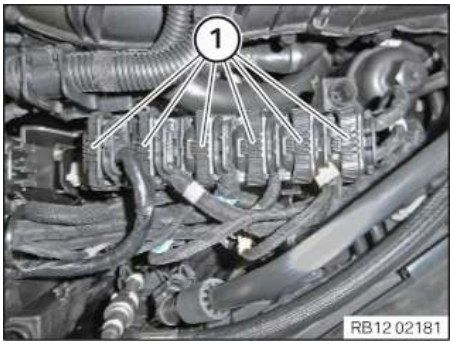
For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

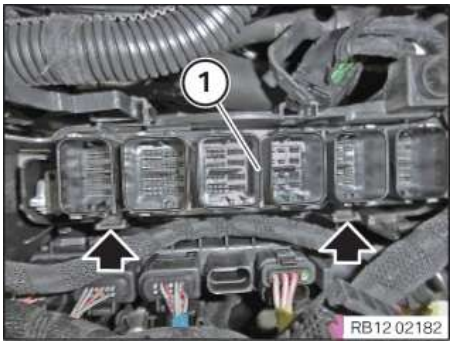


- Pull the cover (1) towards the top and feed out.



- Unlock and disconnect the plug connection (1).

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- Unlock the locks (arrows).
- Guide out and remove DME control unit (1).

16 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

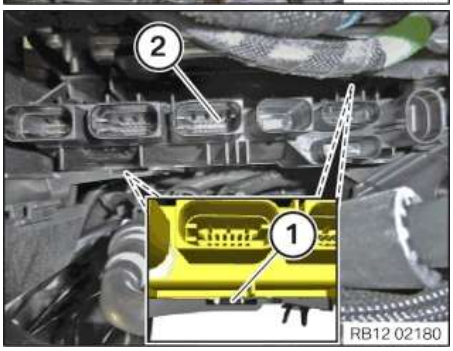
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



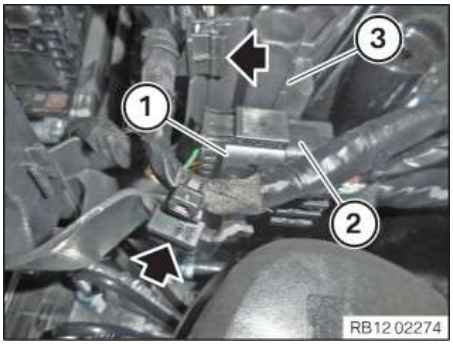
- Unlock and disconnect plug connections (1).



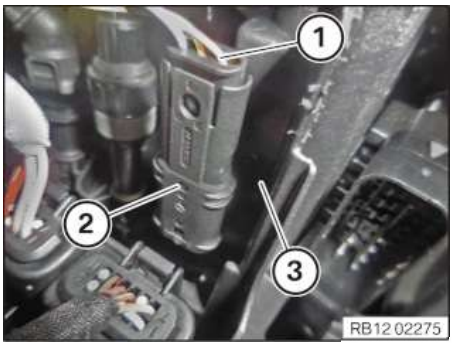
- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

17 – Removing the control unit holder

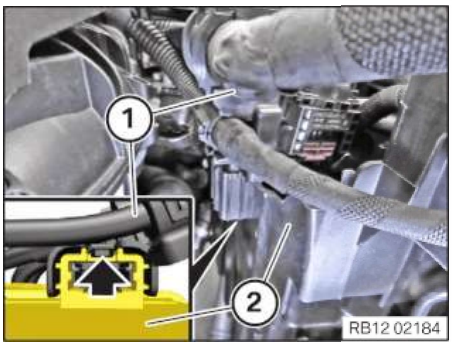
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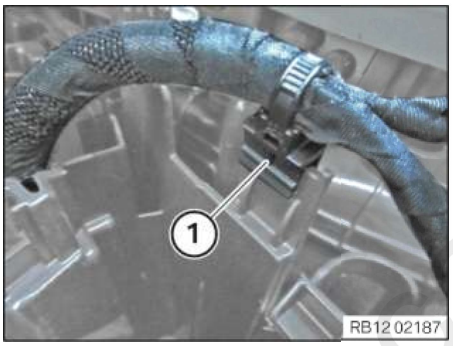
- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the control unit holder (3).
- Release the clamps (arrows).



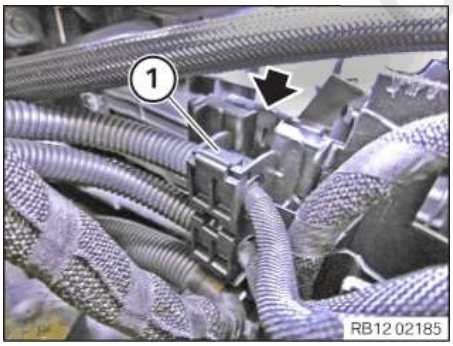
- Unlock plug connection (1) and disconnect.
- Unlock the connector and disconnect from the control unit holder (3).



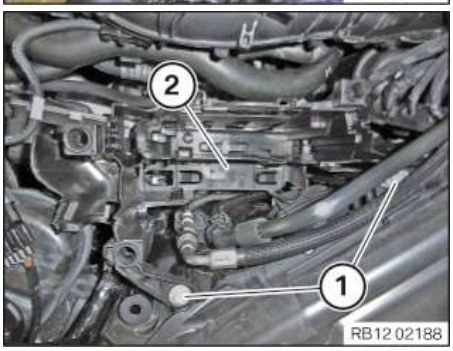
- Unlock the lock (arrow).
- Disconnect the cable holder (1) upwards from the control unit holder (2).



- Loosen clamp (1).



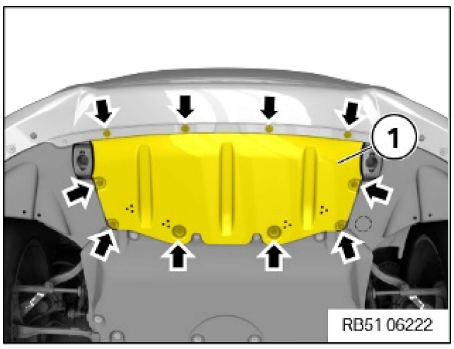
- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



- Loosen screws (1).
- Guide out and remove the control unit holder (2).

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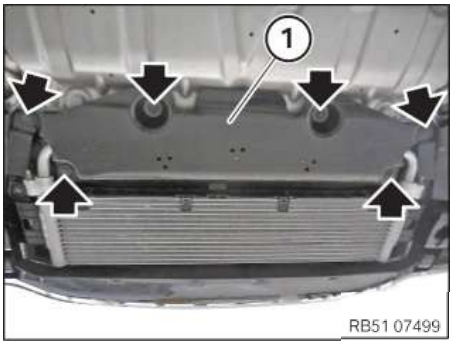
18 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

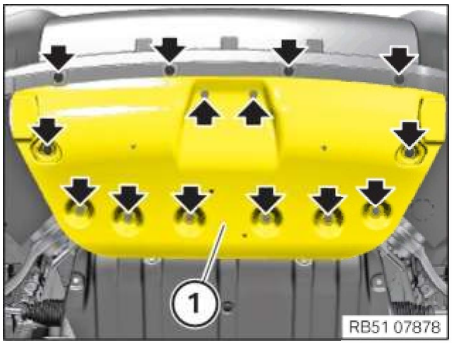
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.



- **Version 3:**

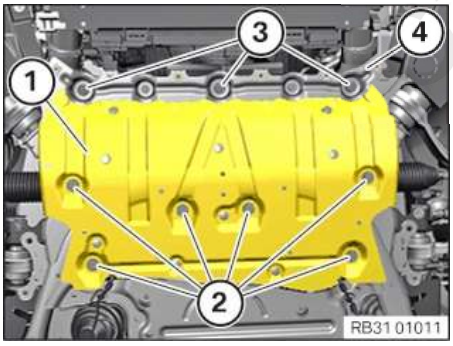
  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

19 – Removing the stiffening plate

TECHNICAL INFORMATION

Driving without stiffening plate is not permissible.



- Loosen screws (3).
- Remove the holder of the underride protection (4).
- Loosen screws (2).
- Remove stiffening plate (1).

20 – If installed: Partially release the engine oil cooler

WARNING

Hot surfaces.

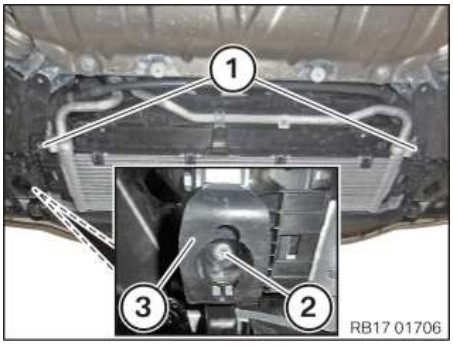
Risk of burning!

- Perform all work only on components that have cooled down.

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TECHNICAL INFORMATION

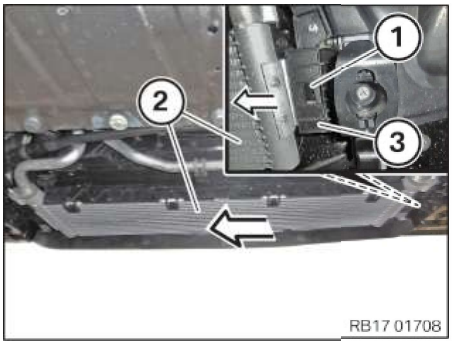
The work must be performed with care to prevent component damage.



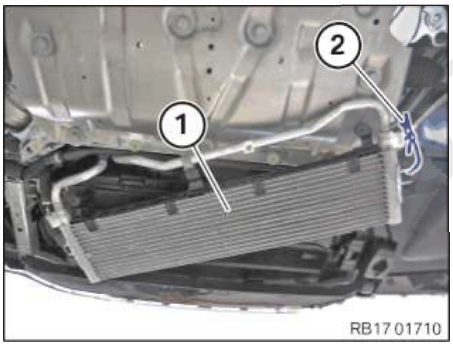
- Loosen screws (1).
- Drill out rivet on the left (2).
- Remove the left-hand damper (3).



- Loosen screw (1).



- Unlock lock (1).
- Feed out engine oil cooler (2) from the holder in the direction of arrow (3) and place to one side.



- Affix the engine oil cooler (1) with a cable strap (2) as shown.

21 – Draining the coolant from the low-temperature cooling system

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

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TECHNICAL INFORMATION

Life-long fill of coolant!

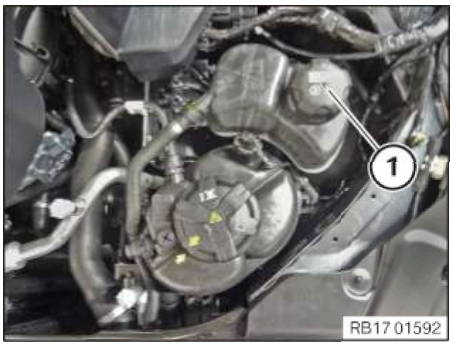
Do not reuse used coolant.

When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

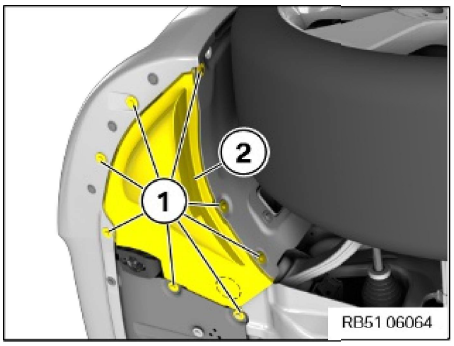
In the case of other removal work involving the draining of part quantities of coolant, the coolant level must be topped up with new coolant.

TECHNICAL INFORMATION

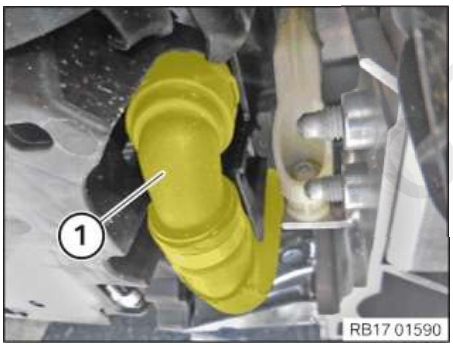
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen sealing cap (1).



- Loosen screws (1).
- Guide out and remove bottom left cover (2) to the front.



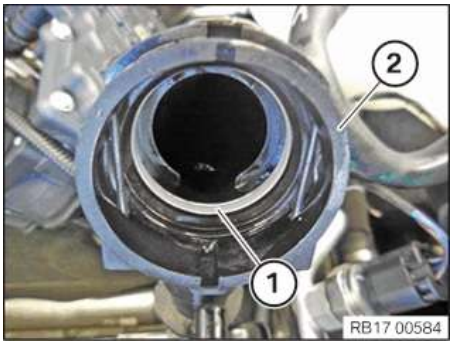
- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

22 – Connecting the coolant lines for the low-temperature coolant circuit

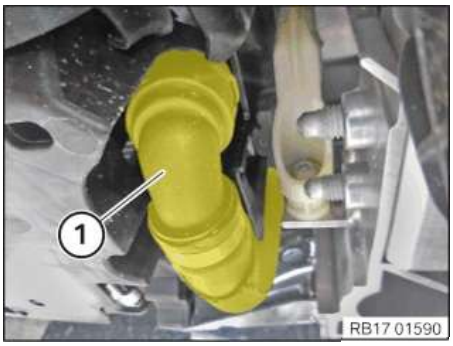
TECHNICAL INFORMATION

Make sure that the connections are locked correctly. The locks must engage audibly.

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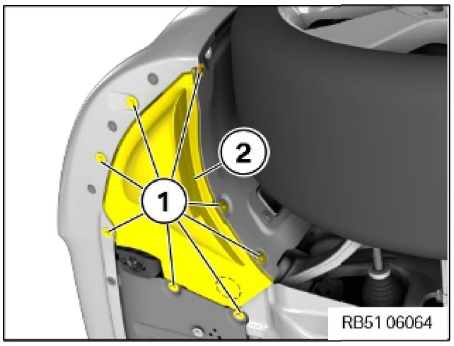


- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.



- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.

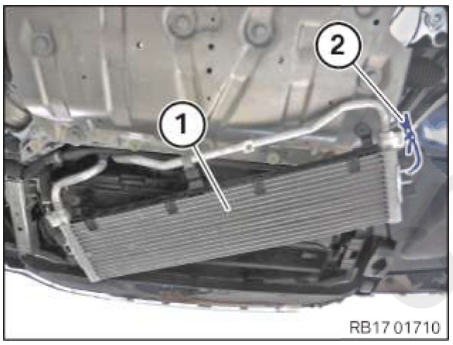


- Feed in and install cover (2) at the bottom front left.
- Tighten the screws (1).

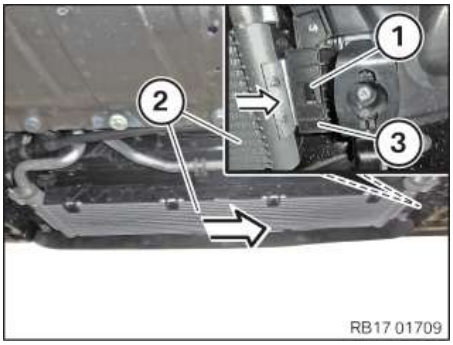
Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

23 – If installed: Secure engine oil cooler



- Remove the cable straps (2).
- Position engine oil cooler (1).



- Feed in and install the engine oil cooler (2) on the holder (3) in the direction of the arrow.
- Ensure that the lock (1)engages audibly.

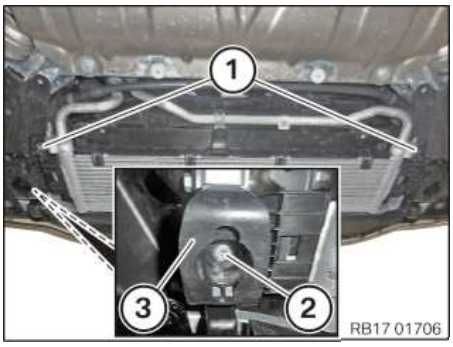
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- Tighten down screw (1).

Engine oil cooler to bumper support

M6X25		Tightening torque	8 Nm



- Renew rivet (2).

  Parts: Rivet
- Install and rivet damper (3).
- Tighten the screws (1).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

24 – Removing the intake plenum

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

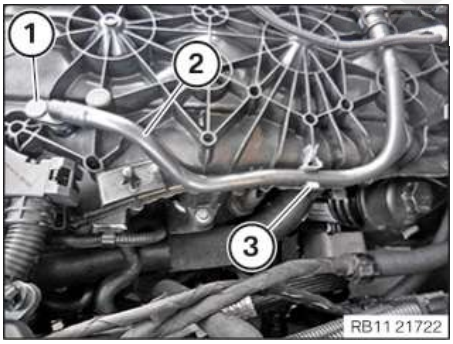
- Do not pull on the wires when disconnecting connectors and plug connections.

TECHNICAL INFORMATION

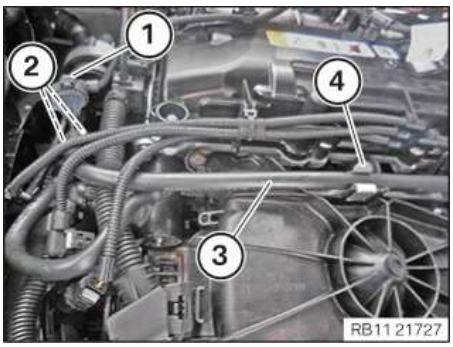
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

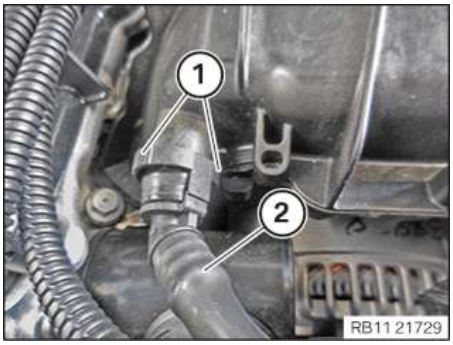


- Loosen screw (1).
- Guide tank ventilation line (2) out of clamp (3) and remove it.

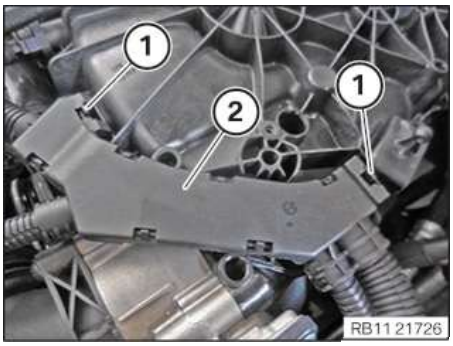


- Unlock and loosen connector (1).
- Unlock the locks (2).
- Guide tank ventilation line (3) out of clamp (4) and remove it.

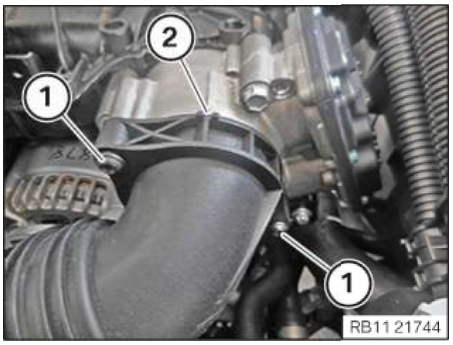
carlagn.com



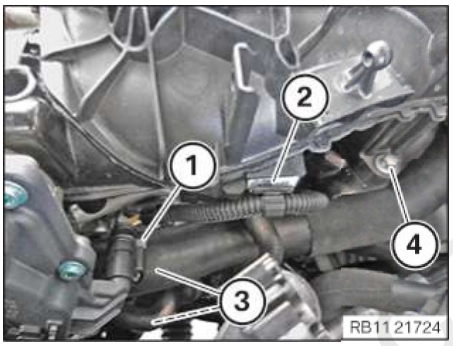
- Unlock the locks (1).
- Feed the tank ventilation line (2) out and set it aside.



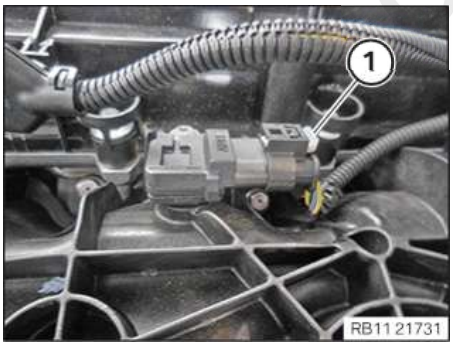
- Unlock the locks (1).
- Guide out the wiring harness section (2) for the sensor system **2** and place to one side.



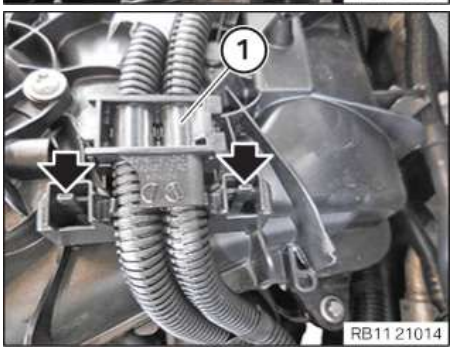
- Loosen screws (1).
- Feed out charge air line (2) and place to one side.



- Unlock and loosen connector (1).
- Loosen clamp (2).
- Thread off coolant line (3) and place to the side.
- Loosen screw (4).

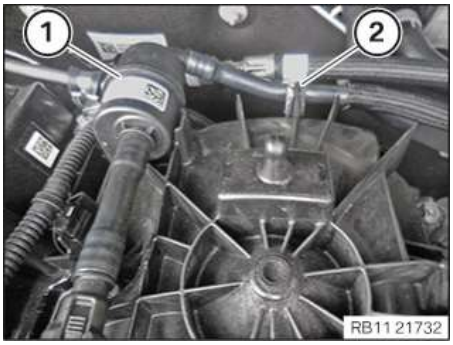


- Unlock and loosen connector (1).

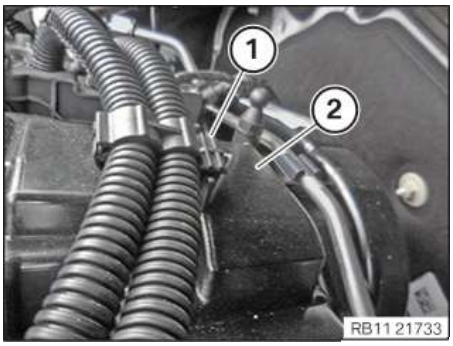


- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.

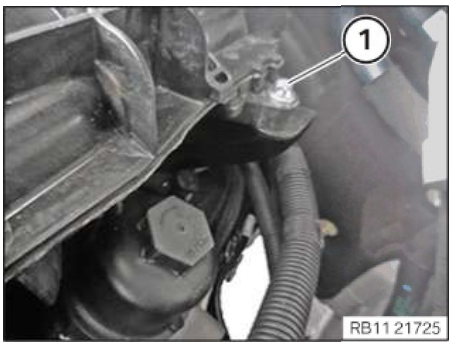
carsdiagn.com



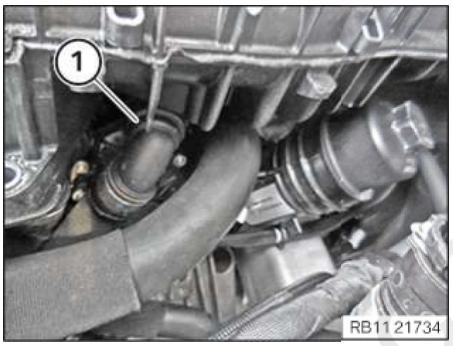
- Guide tank ventilation line (1) out of clamp (2) and place it aside.



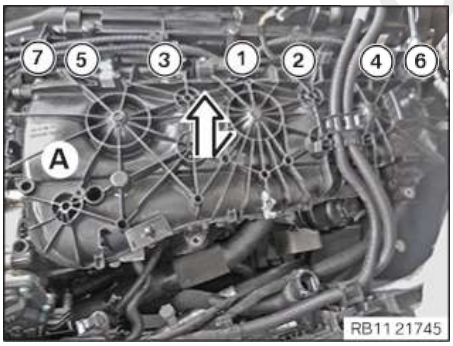
- Guide out the wiring harness section (1) for the injectors and ignition coils of the cylinder head cover (2) and set it aside.



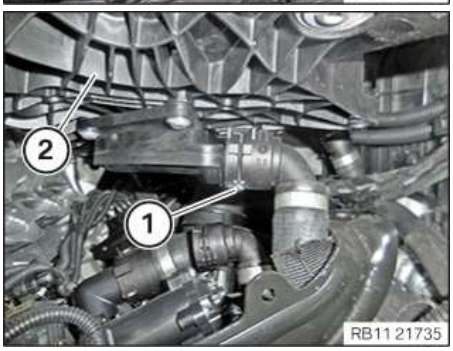
- Loosen screw (1).



- Unlock and loosen coolant line (1).
- Catch and dispose of escaping coolant.



- Loosen screws in the order (7) to (1).
- Slightly raise intake plenum (A) in direction of arrow.



TECHNICAL INFORMATION

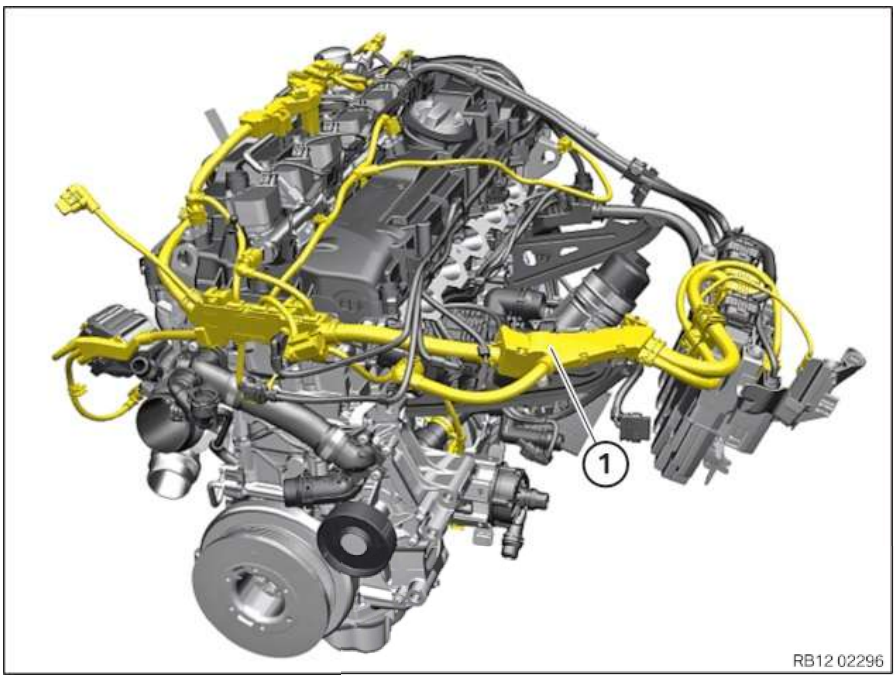
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

- Unlock and release coolant line (1) below the intake plenum (2).
- Catch and dispose of escaping coolant.
- Thread out intake plenum (2) and remove.

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25 – Removing the engine wiring harness for sensor system 2

Engine wiring harness for sensor system 2



1 Engine wiring harness for sensor system 2

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

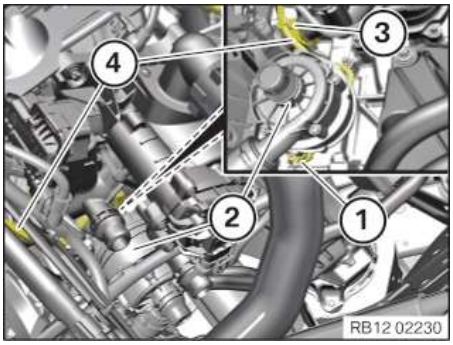
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

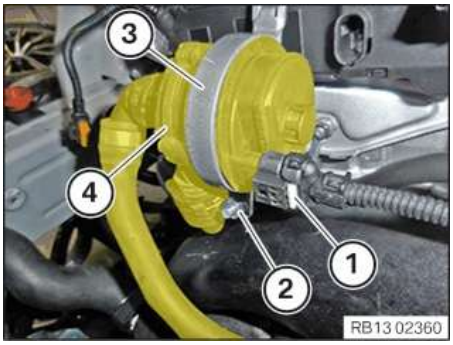
Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

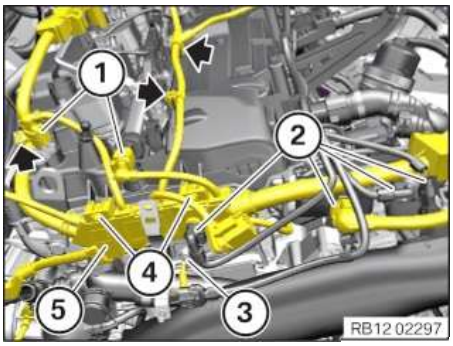


- Unlock and disconnect the plug connection (1) at the electric coolant pump(2).
- Loosen clamp (3).
- Guide out the engine wiring harness (4) for the sensor system 2 and place to one side.

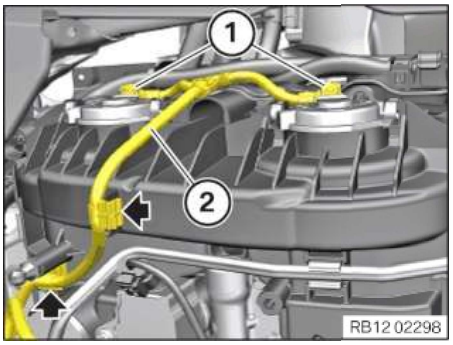
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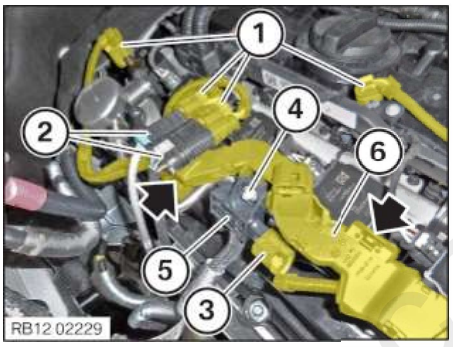
- Unlock plug connection (1) and disconnect.
- Loosen nut (2).
- Guide the retaining bracket (3)out and remove.
- Guide out auxiliary coolant pump (4) and place it aside.



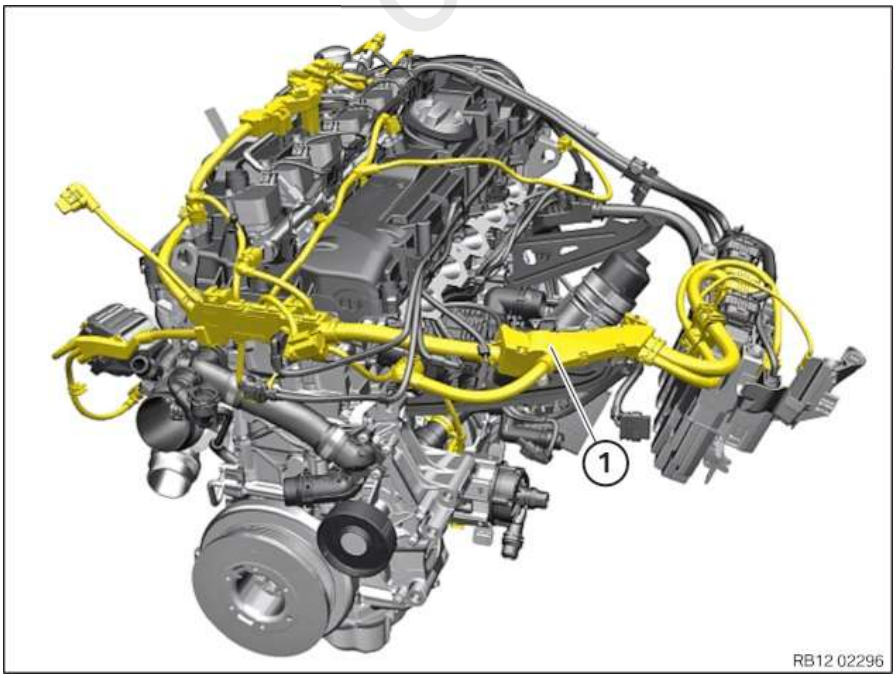
- Unlock and disconnect plug connections (1).
- Unlock plug connection (2) and disconnect.
- Loosen nut (3).
- Release the clamps (arrows).
- Unlock the locks (4).
- Guide out the engine wiring harness (5) for the sensor system 2 and place to one side.



- Unlock and disconnect plug connections (1).
- Release the clamps (arrows).
- Guide out the engine wiring harness (2) for the sensor system 2 and place to one side.



- Unlock and disconnect plug connections (1).
- Unlock the connector (2) and disconnect from the engine wiring harness (6) for sensor system 2.
- Unlock plug connection (3) and disconnect.
- Loosen screw (4).
- Remove the differential pressure sensor (5) and put it to one side.
- Unlock the locks (arrows).
- Guide out the engine wiring harness (6) for the sensor system 2 and place to one side.

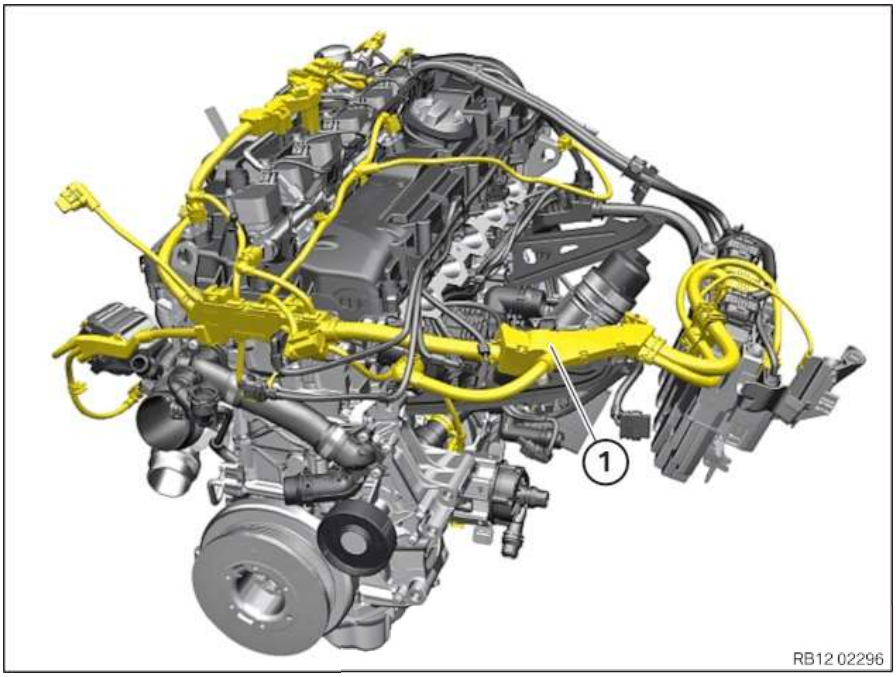


- Feed out the engine wiring harness (1) for sensor system 2 and remove it.

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26 – Installing the engine wiring harness for sensor system 2

Engine wiring harness for sensor system 2



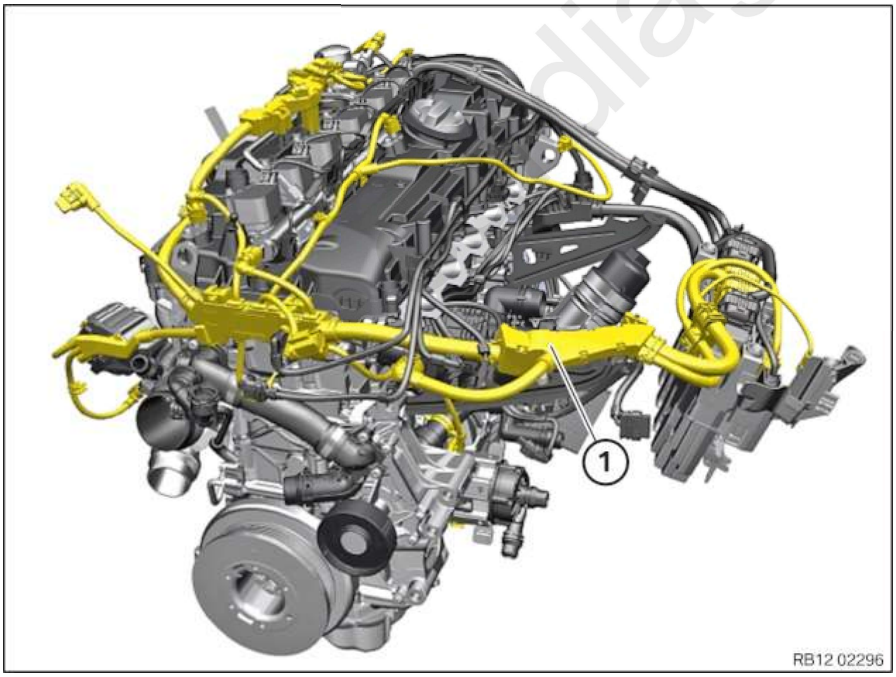
1 Engine wiring harness for sensor system 2

RISK OF DAMAGE

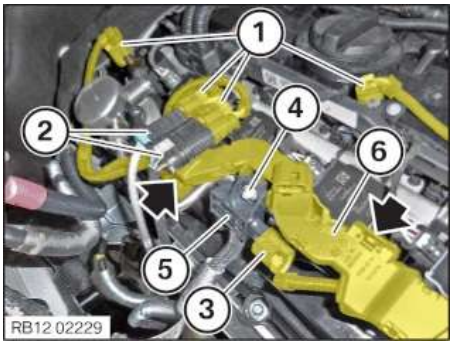
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.



- Feed in and install the engine wiring harness (1) for sensor system 2.

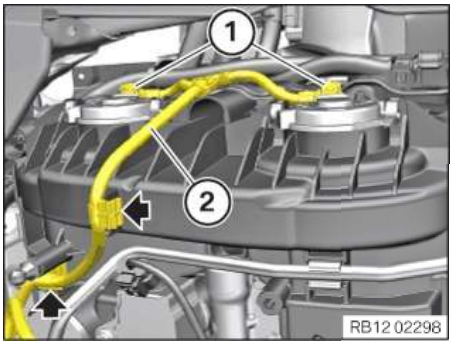


- Feed in and install the engine wiring harness (6) for sensor system 2.
  The locks (arrows) must engage audibly.
- Insert differential pressure sensor (5) and position.
- Tighten down screw (4).

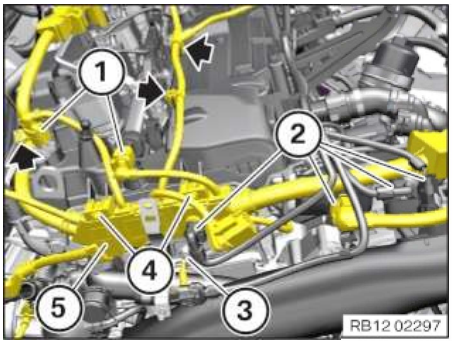
Differential pressure sensor to holder

TS6X18		Tightening torque	3,5 Nm

- Connect connectors (3) and lock.
  The connector (3) must engage audibly.
- Connect connector (2) with the engine wiring harness (6) for sensor system 2 and lock.
  The connectors (2) must engage audibly.
- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.



- Feed in and install the engine wiring harness (2) for sensor system 2.
- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.
- Secure the clamps (arrows).

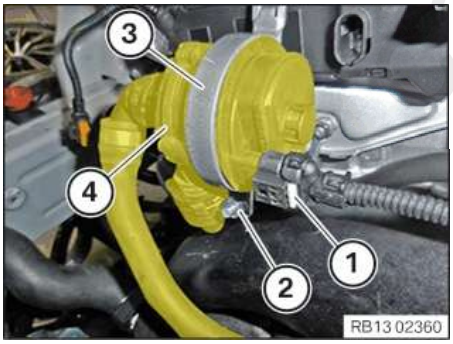


- Feed in and install the engine wiring harness (5) for sensor system 2.
- Ensure that the locks (4) engage audibly.
- Tighten nut (3).

Front ground cable to cylinder head

M6		Tightening torque	8 Nm

- Connect connectors (2) and lock.
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.
- Secure the clamps (arrows).

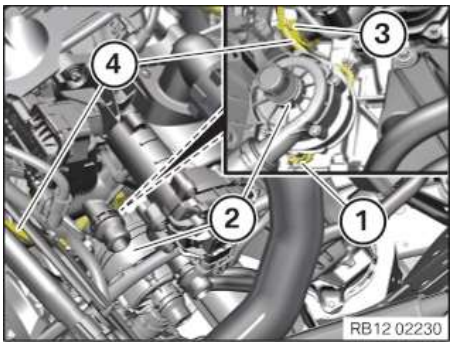


- Insert and position additional coolant pump (4).
- Insert and position retaining bracket (3).
- Tighten nut (2).

Electric coolant pump to holder

M6		Tightening torque	8 Nm

- Connect connectors (1) and lock.
  The connector (1) must engage audibly.



- Feed in and install the engine wiring harness (4) for sensor system 2.
- Secure clamps (3).
- Connect the connector(1) with the electrical coolant pump (2) and lock.
  The connector (1) must engage audibly.

POSTPROCESSES

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27 – Installing the intake plenum

RISK OF DAMAGE

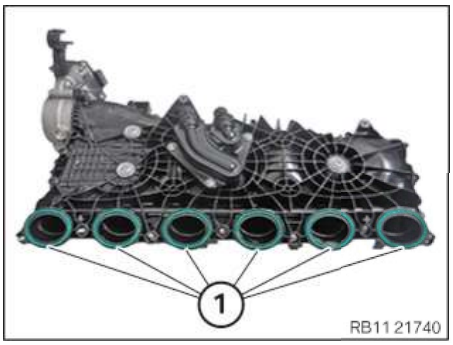
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.

TECHNICAL INFORMATION

Make sure that the connections are locked correctly. The locks must engage audibly.

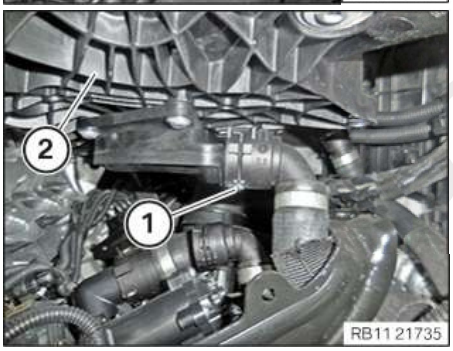


- Renew gaskets (1).

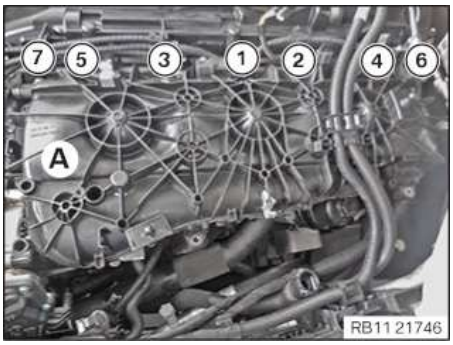
  Parts: Seals



- Clean contact surface (1).



- Feed in and position intake plenum (2).
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



TECHNICAL INFORMATION

Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

- Position the intake plenum (A).
- Tighten screws in the order (1) to (7).

Note: Tighten the bolts in 360 degree steps.

Intake plenum to cylinder head

M6		Tightening torque	10 Nm

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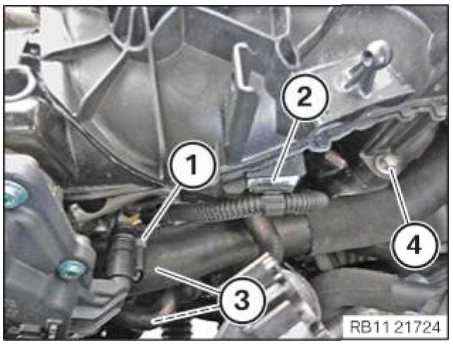
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



- Tighten down screw 1.

Intake plenum to support

M6X25		Tightening torque	8 Nm

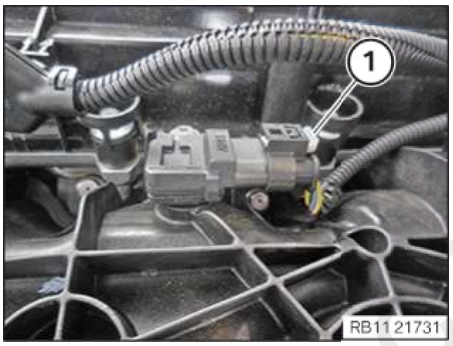


- Tighten down screw (4).

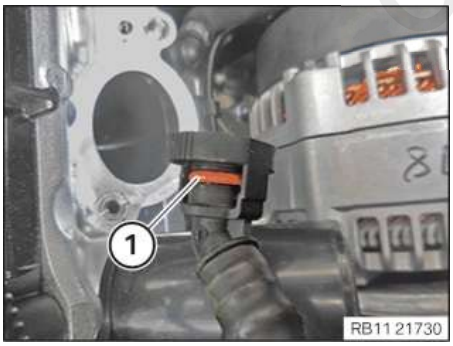
Intake plenum to support

M6X25		Tightening torque	8 Nm

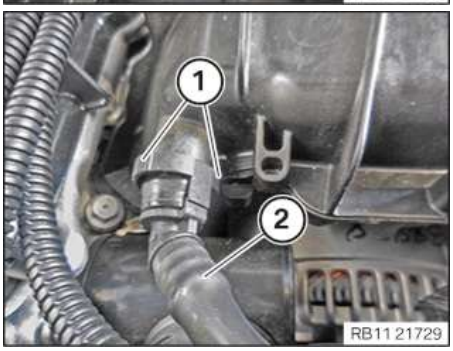
- Thread in and install coolant line (3).
- Secure clamps (2).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

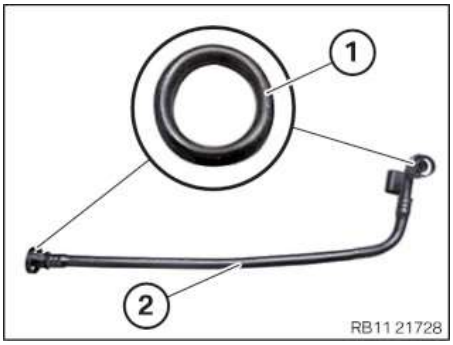


- Check sealing ring (1) for damage and renew tank ventilation line if necessary.

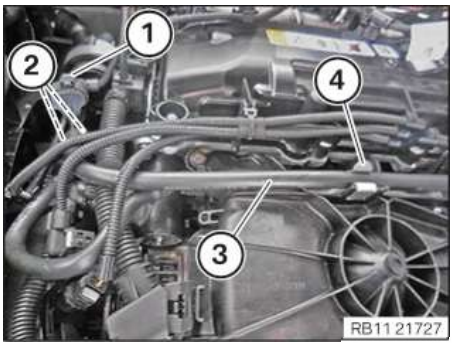


- Insert and install the tank ventilation line (2).
- Ensure that the locks (1) engage audibly.

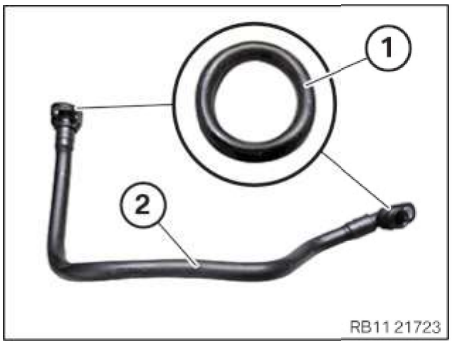
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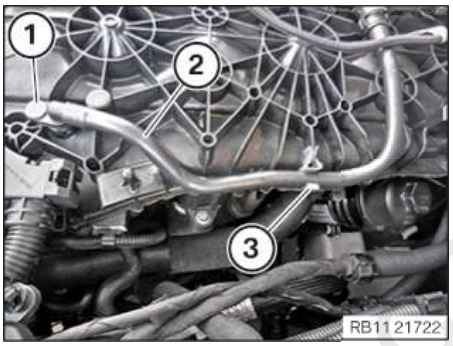
- Check sealing ring (1) for damage and renew tank ventilation line (2) if necessary.



- Insert and install the tank ventilation line (3).
- Ensure that the locks (2) engage audibly.
- Secure the tank ventilation line (3) to the clamp (4).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



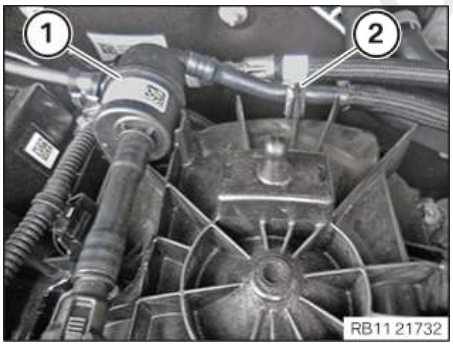
- Check sealing ring (1) for damage and renew tank ventilation line (2) if necessary.



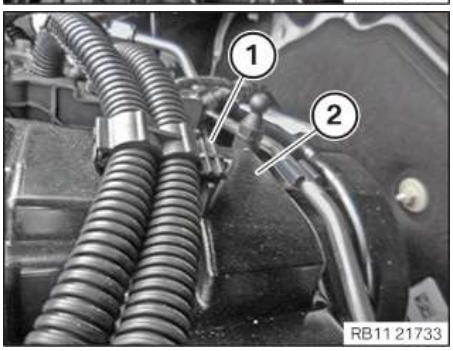
- Insert and install the tank ventilation line (2).
- Secure the tank ventilation line (2) to the clamp (3).
- Tighten down screw (1).

Tank ventilation line to intake plenum

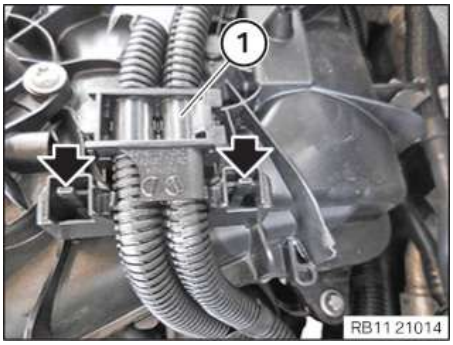
Oval-head screw		Tightening torque	3 Nm



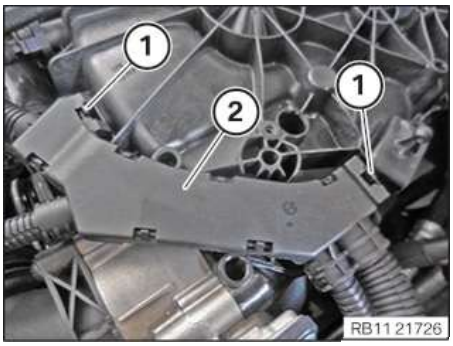
- Insert and install the tank ventilation line (1).
- Secure the tank ventilation line (1) to the clamp (2).



- Secure the wiring harness section(1) for the injectors and ignition coils on the cylinder head cover (2).



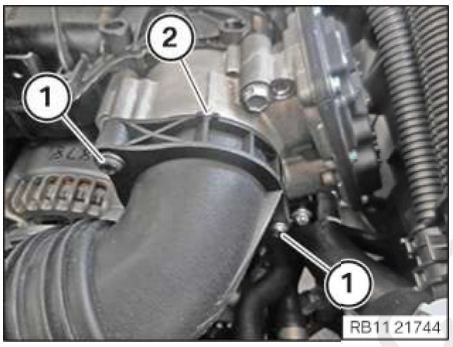
- Insert and install the wiring harness section (1) for the injectors and ignition coils.
  The locks (arrows) must engage audibly.



- Feed in and install wiring harness section (2) for sensor system **2**.
- Ensure that the locks (1) engage audibly.



- Check the sealing ring (1) for damage and renew the sealing ring (1) as needed.

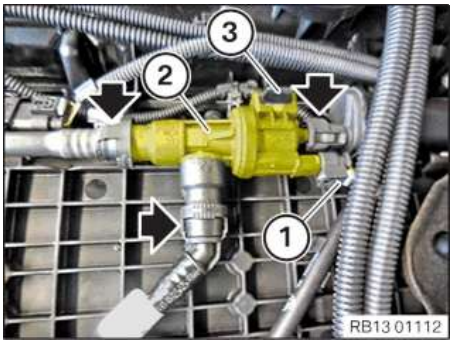


- Insert and install charge air line (2).
- Tighten the screws (1).

Charge air line to throttle valve

M6x30		Tightening torque	8 Nm

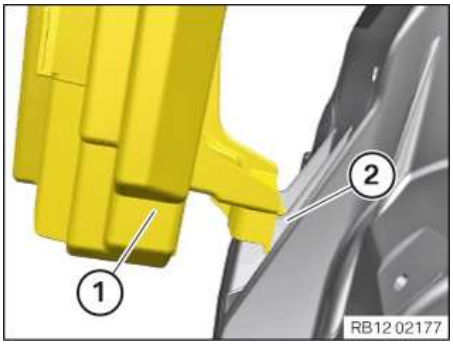
28 – Installing the tank vent valve



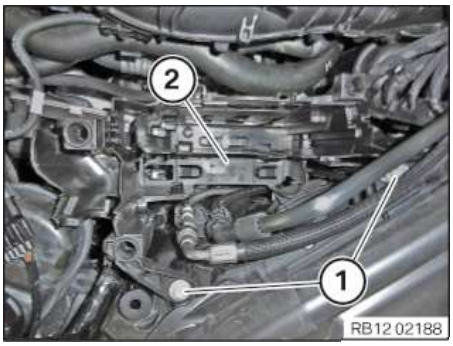
- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).
  The tank ventilation lines (arrows) must audibly engage.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.

29 – Installing the control unit holder

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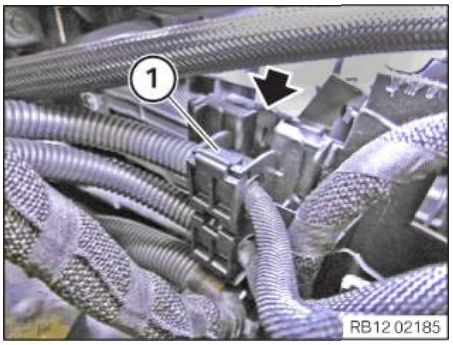
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



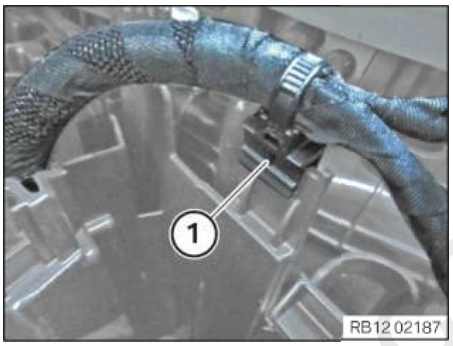
- Guide in and install control unit holder (2).
- Tighten the screws (1).

Control unit holder on spring strut dome

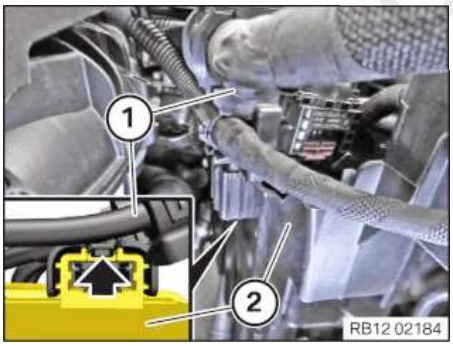
Hexagon screw		Tightening torque	8 Nm



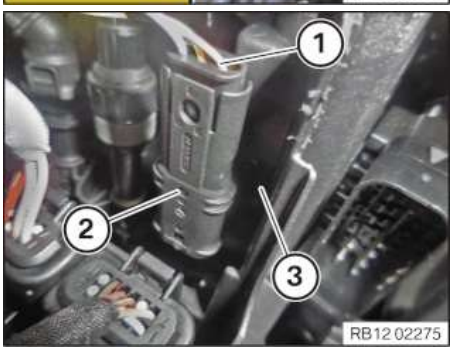
- Feed in and install the cable clip (1).
  Lock (arrow) must audibly engage.



- Secure clamps (1).

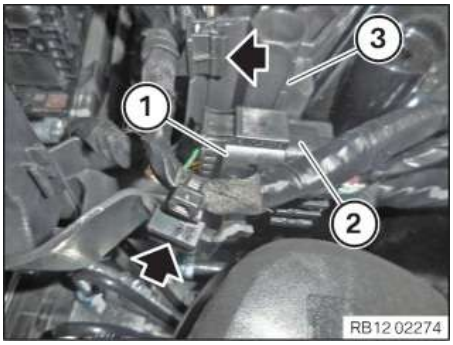


- Connect the cable clip (1) with the control unit holder (2) and lock it.
  Lock (arrow) must audibly engage.



- Connect connector (2) to the control unit holder (3) and lock it.
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.

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- Connect and lock the connector (2) with the control unit holder (3).
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.
- Secure the clamps (arrows).

30 – Installing the integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

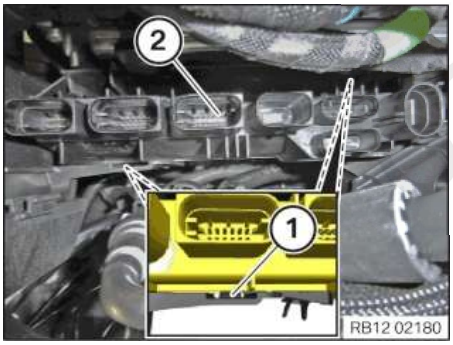
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

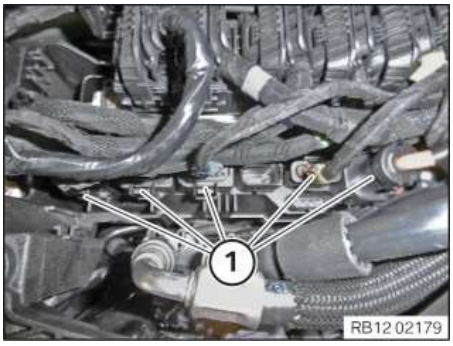
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



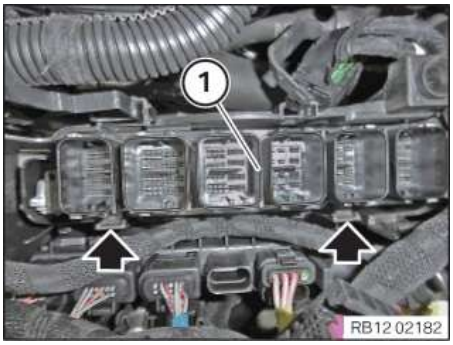
- Insert and install the integrated supply module (PDM) (2).
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



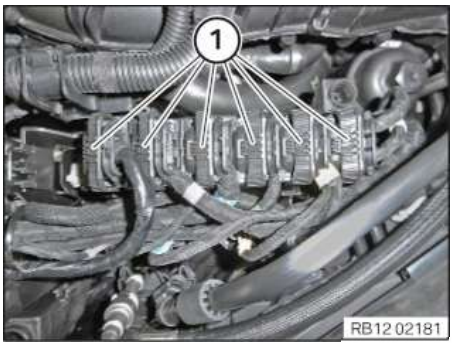
- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.

31 – Installing the DME control unit

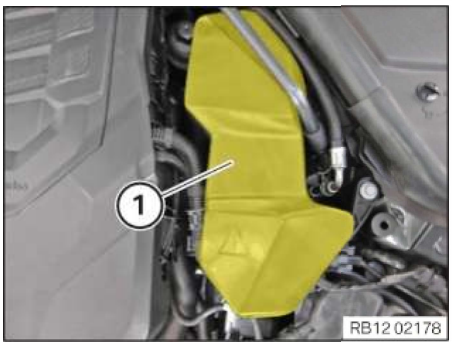
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- Feed in and install DME control unit (1).
  The locks (arrows) must engage audibly.

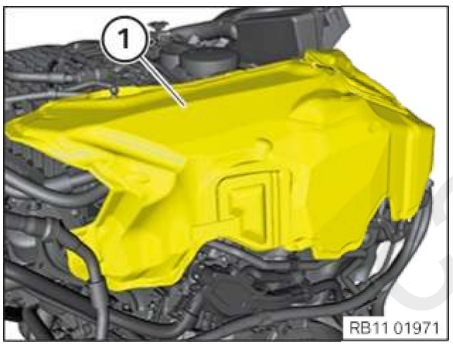


- Connect connectors (1) and lock.
  All connectors (1) must engage audibly.

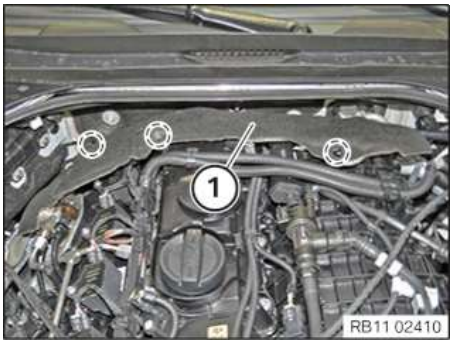


- Insert and install cover (1) into guides.

32 – Installing acoustic cover at rear



- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



- Install the acoustic cover (1) from the top and clip it in into the marked areas.

33 – Install engine ventilation line

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RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

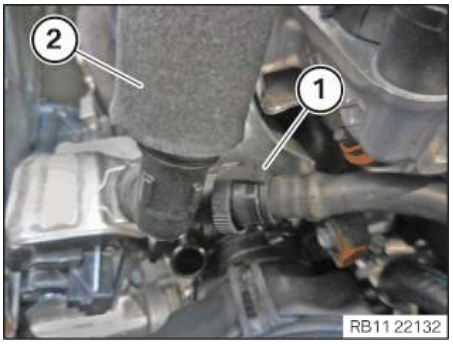
- Route all cables without abrasions, do not trap and crush.

TECHNICAL INFORMATION

Check the retaining lug on the connector for damage and perform a tension check as needed.

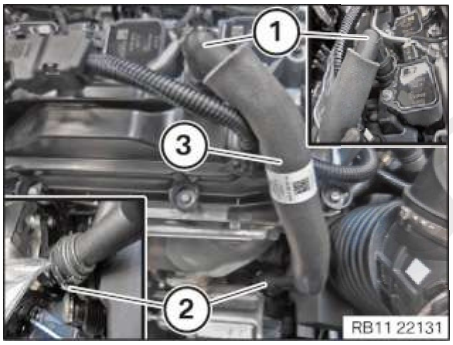


- Check sealing ring (1) for damage and renew tank ventilation line if necessary.

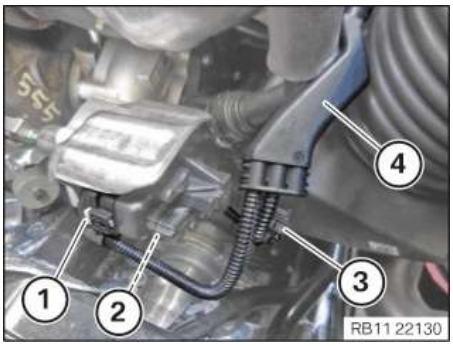


- Insert and position the engine ventilation line (2).
- Insert and install the tank ventilation line (1).

  Tank ventilation line (1) must engage audibly into place.



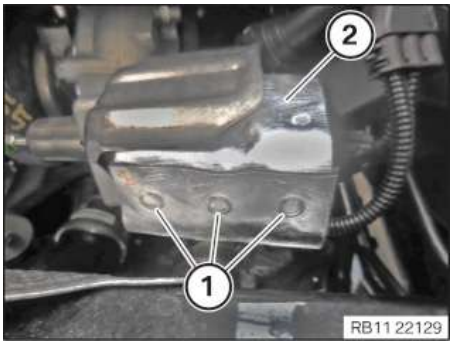
- Insert and install the engine ventilation line (3).
- Make sure you can hear the locks (1) and (2) engage.



- Feed in and position the wiring harness section of sensor system **2** (4).
- Connect connectors (2) and lock.
- Connect connectors (1) and lock.

  The connectors (1) and (2) must audibly engage.
- Secure clamps (3).

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- Feed in and install heat shield (2).
- Lock the locks (1).

  Locks (1) must engage audibly.

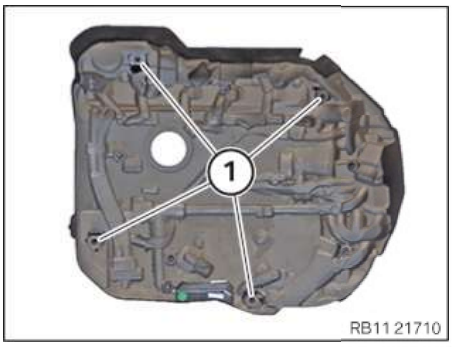
34 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the rubber mount (1) for correct fit in the acoustic cover.



- Install acoustic cover (1) and fix in the rubber mounts (marks).

35 – Installing clean air pipe



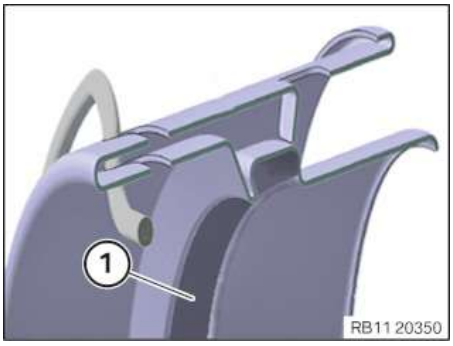
- Check the seal (1) for damage and renew if necessary.

▸ **Replace damaged gasket**

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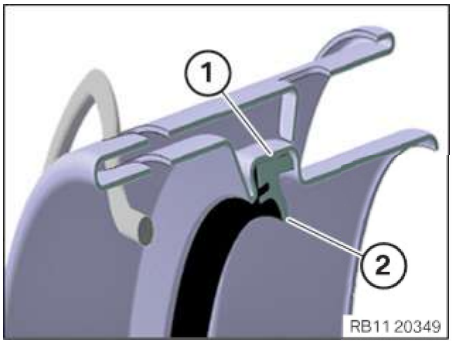
TECHNICAL INFORMATION

Do not use pointed or sharp-edged tools for the installation and/or removal.



- Remove damaged seal.
- Clean gasket groove (1) with a dry towel.

  The gasket groove (1) must be clean.



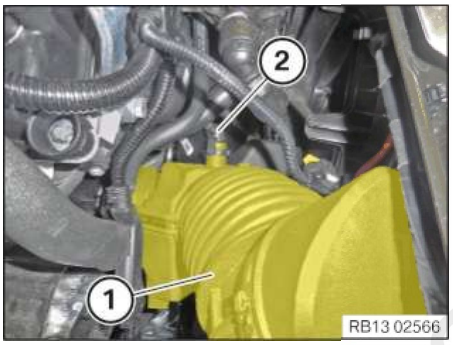
- Renew gasket.

  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

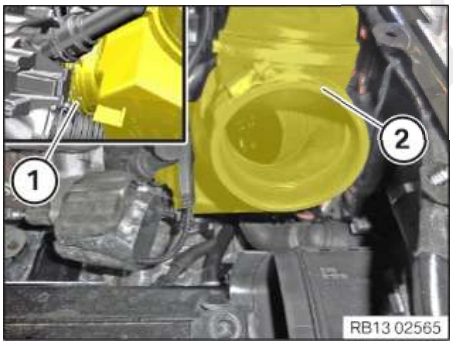
Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).



- Guide in and position clean air pipe (1).
- Connect engine ventilation line (2) and lock.

  The engine ventilation line (2) must engage audibly.



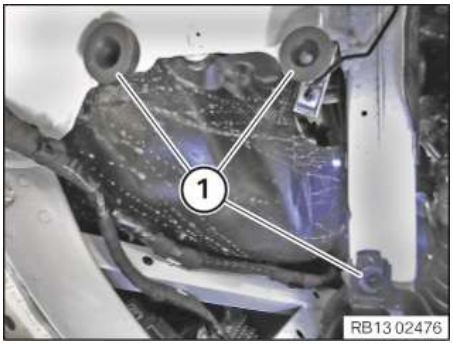
- Install the clean air pipe (2).
- Lock clamp (1).

  The clamp (1) must engage audibly.

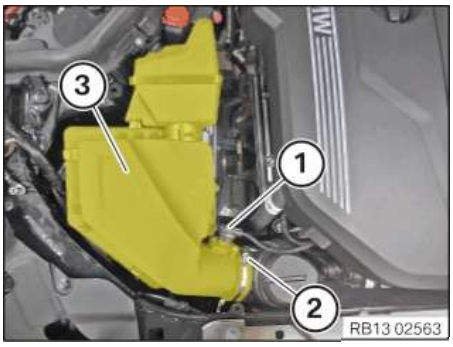


- Secure clamps (1).

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- Check the rubber mount (1) for correct fit.



- Feed the intake filter housing (3) in and engage it in the rubber mounts.
- Tighten clamp (2).

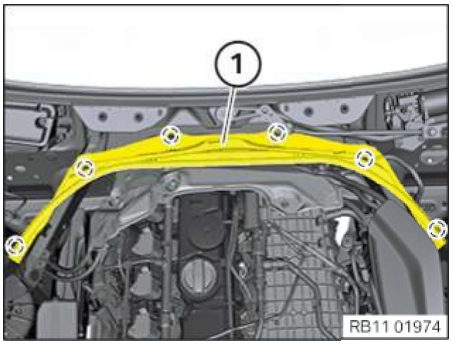
Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

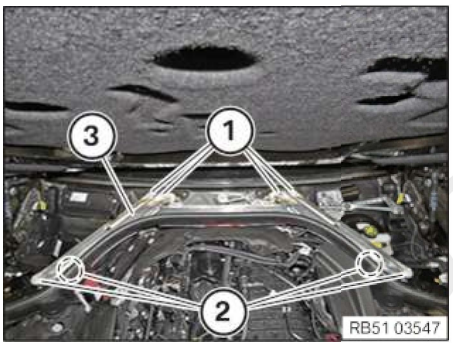
37 – Installing the centre bulkhead upper part



- Position the centre bulkhead upper part (1).
- Tighten the bolts in the marked areas.

Bulkhead upper part to bottom bulkhead

		Tightening torque	3 Nm



- **If installed:** Install tension strut on spring strut dome.
- Install the tension strut (3) on the spring strut dome.
- Tighten the screws (1).

Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

Tension strut to spring strut dome

Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

38 – Installing cowl panel cover

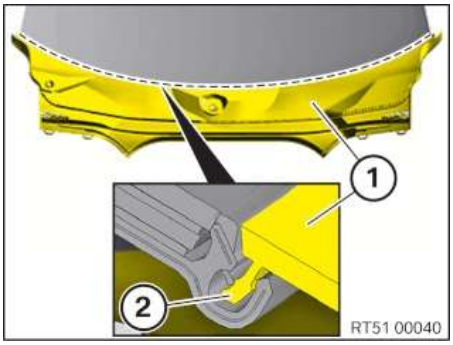
RISK OF DAMAGE

Damage caused by water ingress into the vehicle.

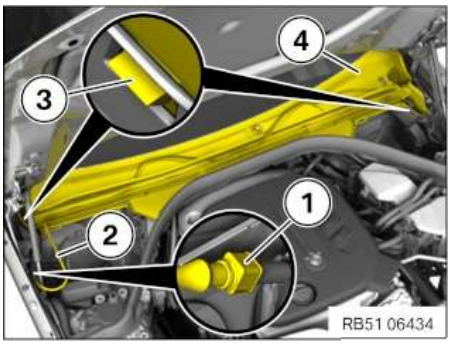
Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

- Ensure correct installation of the components.
- Only use undamaged components.

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- Push the cowl panel cover (1) into the latch mechanism (2) beginning on the side.



- Clip cowl panel cover (4)in by means of the latch mechanisms (3).
- Position windscreen wash hose (2) and connect windscreen wash hose (1)quick lock.

39 – Installing both wiper arms

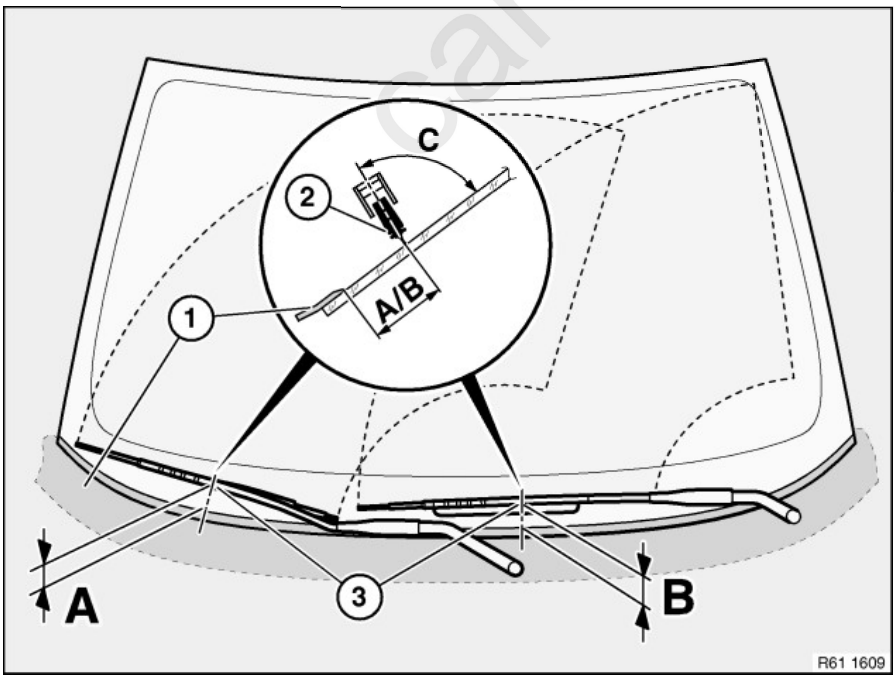
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Install the wiper arm**

TECHNICAL INFORMATION

The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.

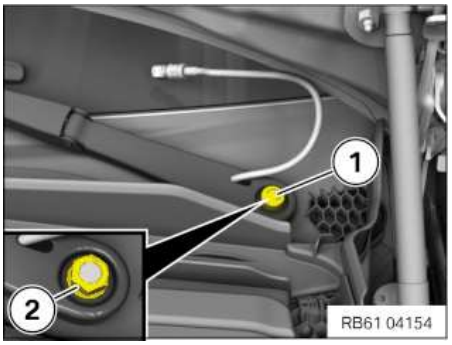


- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

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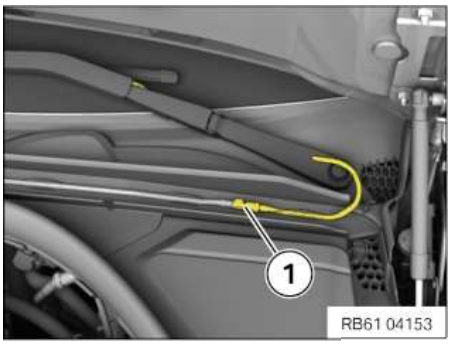


- Tighten nut (2).

Windscreen wiper arm

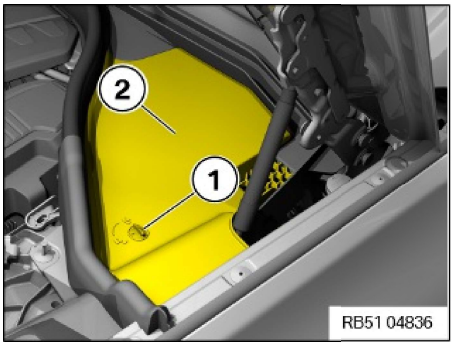
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



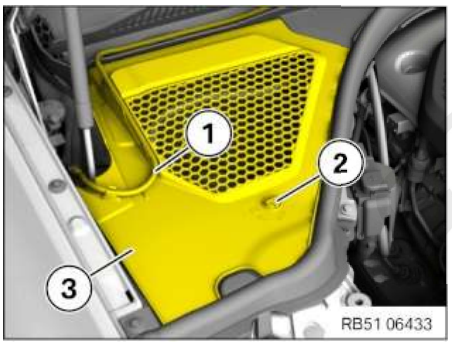
- Insert windscreen wash hose (1) into the cowl and connect at the separating point.

40 – Install the cover of the engine compartment on the rear left



- Position the engine compartment cover at the rear left (2) .
- Close lock (1).

41 – Install the rear right engine compartment cover



- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

42 – Install the seal for the bonnet



- Press the rear bonnet seal (2) into the guide.
- Feed in cable (1) into the brackets.
- Check that the rear bonnet seal (2) and the cable (1) are seated correctly.

43 – Disconnecting all battery earth leads

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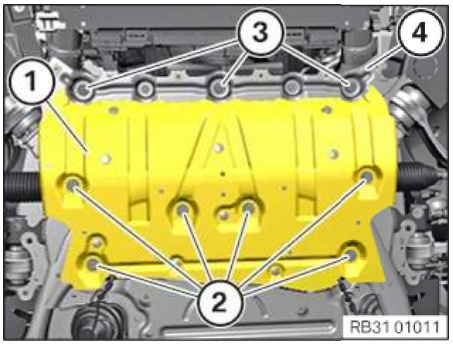
- See additional information.

44 – Filling and bleed the low-temperature coolant circuit



- See additional information.

45 – Installing the stiffening plate

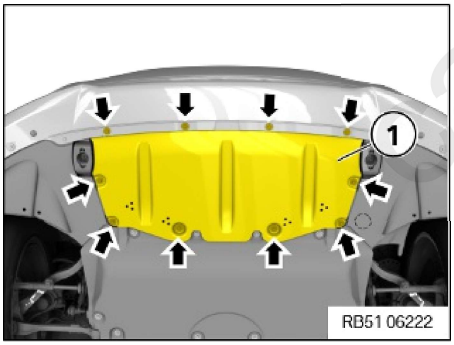


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

46 – Installing the front underbody protection



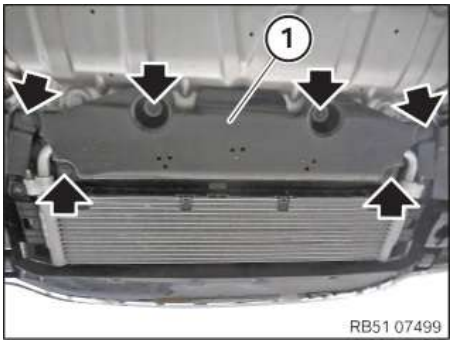
- **Version 1:**

  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



- **Version 2:**

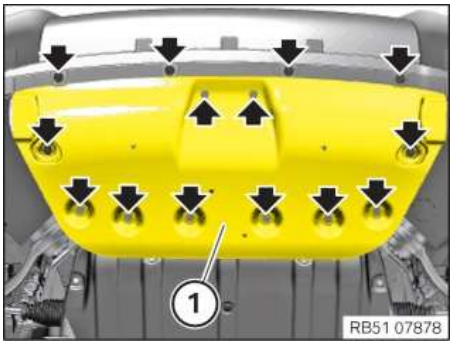
  Feed in and position the front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

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- **Version 3:**

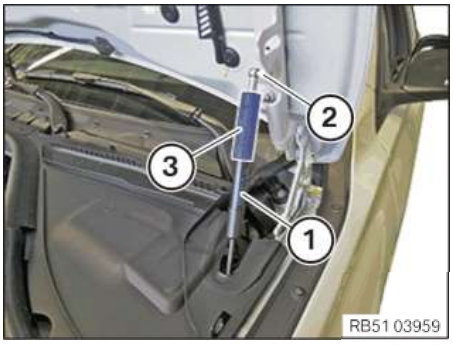
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

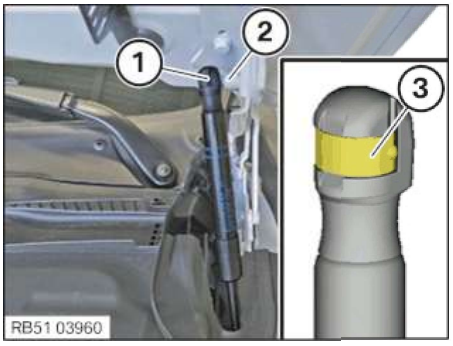
Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

47 – Take bonnet out of the service position



- Support the bonnet by hand.
- Remove the special tool (3) from the ball pin (2).
- Pull off the special tool (3) from the gas pressure spring (1).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.



CAUTION

Shutting bonnet or tailgate.

Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.

- Check the clamp (3) is fitted correctly.
- Connect ball socket (1) to ball pin (2).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.

Additional Information

Overview of Tightening Torques

Cover, front bottom on side — Used in step 2223

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Engine oil cooler to bumper support — Used in step 23

M6X25		Tightening torque	8 Nm

Differential pressure sensor to holder — Used in step 26

TS6X18		Tightening torque	3,5 Nm

Front ground cable to cylinder head — Used in step 26

M6		Tightening torque	8 Nm

Electric coolant pump to holder — Used in step 26

M6		Tightening torque	8 Nm

Intake plenum to cylinder head — Used in step 27

M6		Tightening torque	10 Nm

Intake plenum to support — Used in step 27

M6X25		Tightening torque	8 Nm

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Tank ventilation line to intake plenum			Used in step 27
Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle valve			Used in step 27
M6x30		Tightening torque	8 Nm

Control unit holder on spring strut dome			Used in step 29
Hexagon screw		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 36
Clamp		Tightening torque	3 Nm

Bulkhead upper part to bottom bulkhead			Used in step 37
		Tightening torque	3 Nm

Tension strut on bulkhead			Used in step 37
M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome			Used in step 37
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 39
Combination hexagon nut		Tightening torque	35 Nm

Stiffening plate to front axle support			Used in step 45
M10		Tightening torque	56 Nm

Underbody protection front			Used in step 46
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 39
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	1531

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	243
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	243
61 20 900 Disconnecting and connecting battery earth lead	243

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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	243
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
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61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
61 20 900 Disconnecting and connecting battery earth lead	243
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61 35 ... Notes on ESD protection (Electro Static Discharge)	1415162530
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17 00 040 Venting cooling system and checking on watertightness	44
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	44
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	44
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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	44
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	44
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17 00 011 Draining and topping up coolant circuit for low temperature	44
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17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	44
17 00 011 Draining and topping up low-temperature coolant circuit	44
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	44
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	44
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12 51 245 Removing and installing/replacing transmission module engine wiring,

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to battery terminal, the safety battery terminal or the intelligent battery sensor (IBS).

Damaged battery terminals can lead to malfunctions or vehicle electrical system faults.

- Pull off battery terminal from battery pole by carefully moving to and fro. Do not pry off using a tool.

TECHNICAL INFORMATION

Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Bring front compartment lid in the service position

Prerequisite

Engine compartment lid is open.

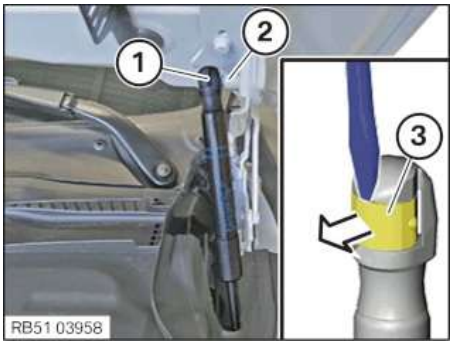
CAUTION

Shutting bonnet or tailgate.

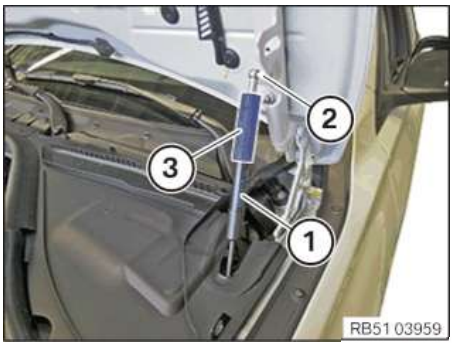
Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.

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- Lift clamp (3) slightly using a screwdriver, in the direction of the arrow.
- Lift off ball socket (1) from ball pin (2).
- Repeat the operation on the other side of vehicle.

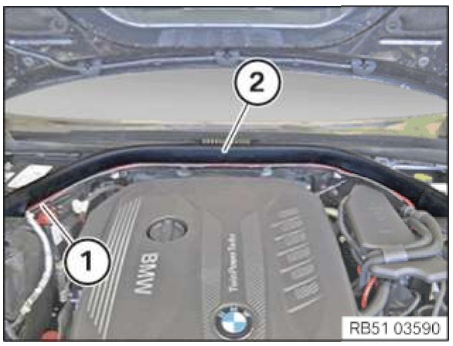


TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

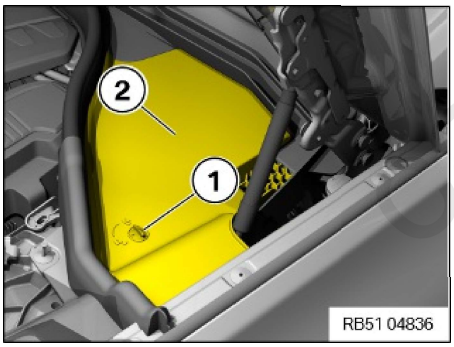
- Remove the bonnet support and open the bonnet further.
- Push special tool or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

3 – Remove the seal for the rear bonnet



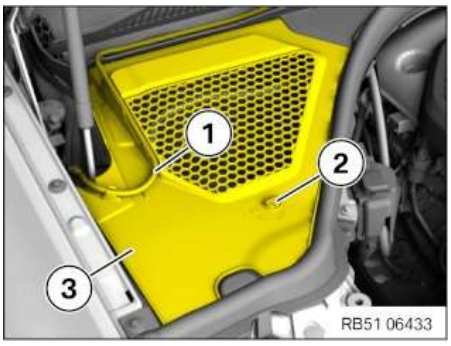
- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

4 – Remove the cover of the engine compartment at the rear left



- Loosen the lock (1).
- Remove rear left cover of engine compartment (2).

5 – Remove the cover of the rear right engine compartment



- Release washer fluid hose (1) from the guides.
- Loosen the lock (2).
- Remove the cover of rear right engine compartment (3).

6 – Removing both wiper arms

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NOTICE

Description is for left component only. Procedure on the right side is identical.

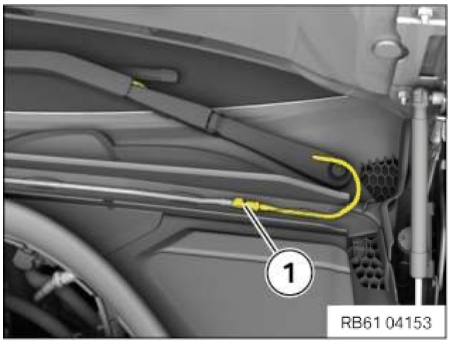
▸ **Remove the wiper arm**

RISK OF DAMAGE

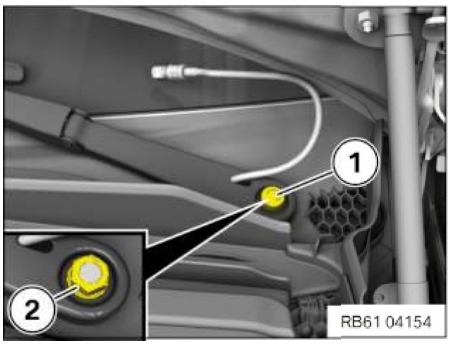
Damage to wiper console

While removing the wiper arms without using special tool, the wiper console can break.

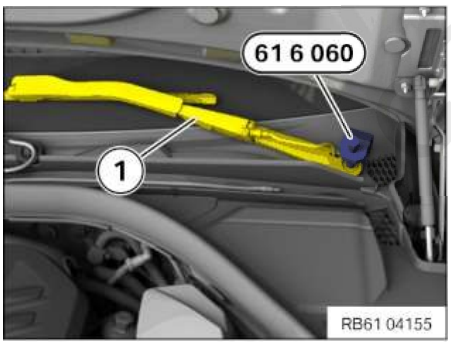
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.



- Disconnect the windscreen wash hose(1) at the separation point and remove from the cowl guide.

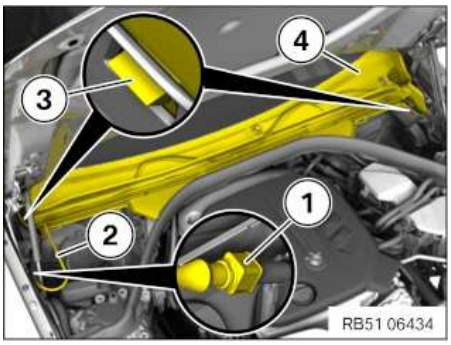


- Remove the protective cap (1).
- Loosen nut (2).



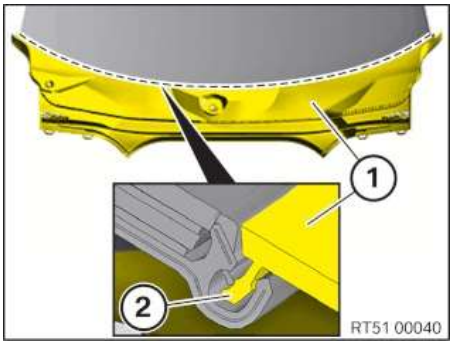
- Pull off the wiper arm (1) using special tool .

7 – Remove cowl panel cover



- Release snap fastener of the washer fluid hose (1) and put the washer fluid hose(2) to one side.
- Unclip clips (3) on the cowl panel cover (4).

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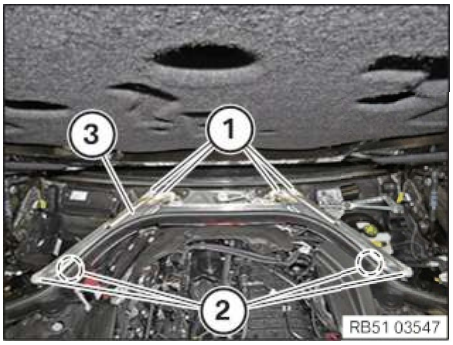


- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

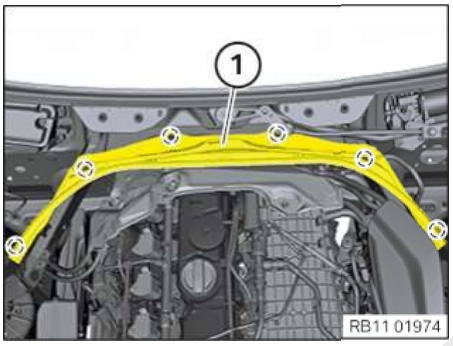
8 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

Driving without the strut brace/front end or tension strut is not permitted.

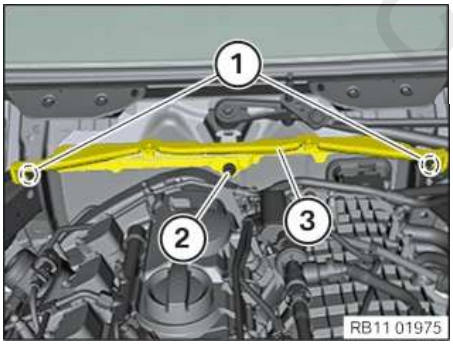


- **If installed:** Remove tension strut on spring strut dome.
- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.



- Unscrew the bolts in the marked areas.
- Remove the centre bulkhead upper part (1).

9 – Removing the centre bulkhead lower section



- Loosen screws (1).
- Loosen nut (2).
- Remove the centre bulkhead lower part (3).

10 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

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RISK OF DAMAGE

Damage to the acoustic cover.

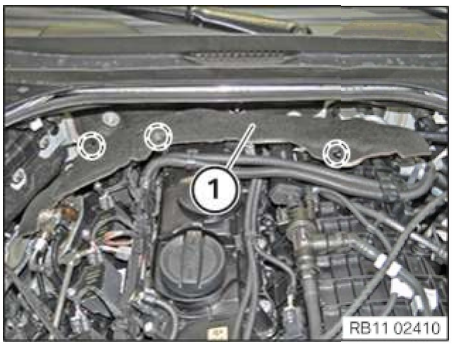
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Release the acoustic cover (1) towards the top from the rubber mounts (marks).

11 – Removing acoustic cover at rear



- Unclip the acoustic cover (1) in the marked areas and remove it to the top.

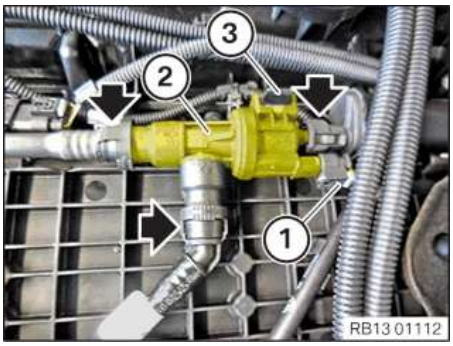
12 – Remove tank vent valve

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



- Unlock and disconnect connector (1).
- Unlock and disconnect the tank ventilation lines (arrows).
- Detach and remove the tank vent valve (2) from the holder (3).

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13 – Removing the DME control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units

TECHNICAL INFORMATION

In a warranty case, you must always provide a fault memory printout with the defective part, even if the fault memory does not contain an entry.

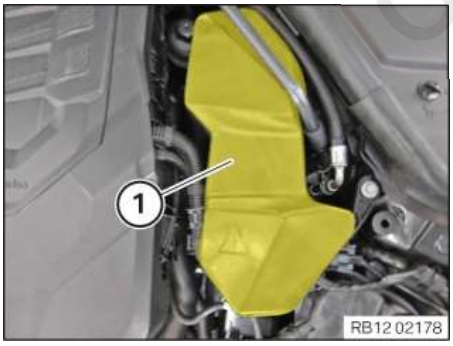
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

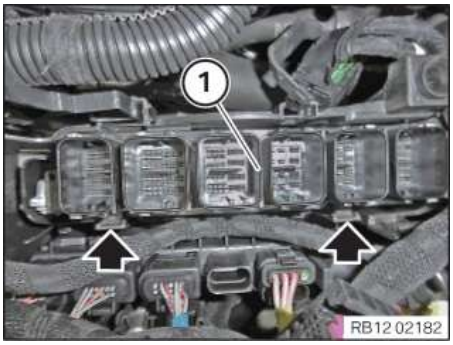


- Pull the cover (1) towards the top and feed out.



- Unlock and disconnect the plug connection (1).

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- Unlock the locks (arrows).
- Guide out and remove DME control unit (1).

14 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

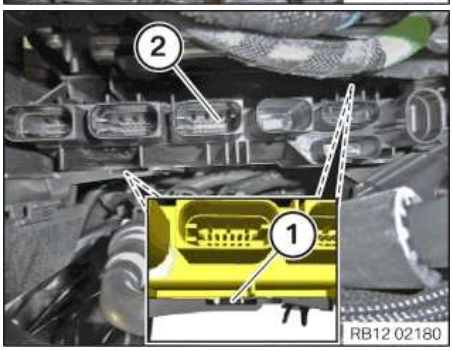
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



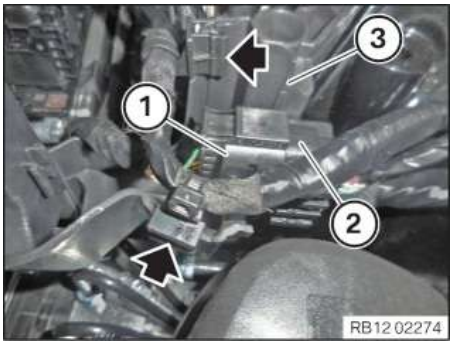
- Unlock and disconnect plug connections (1).



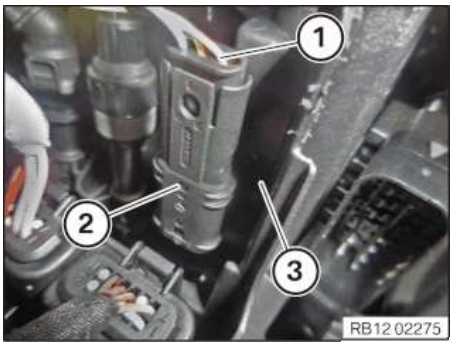
- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

15 – Removing the control unit holder

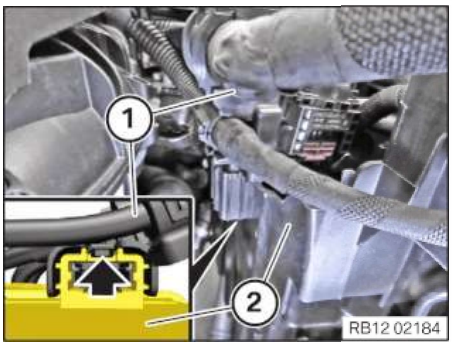
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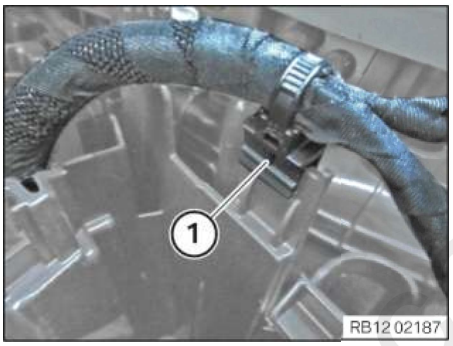
- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the control unit holder (3).
- Release the clamps (arrows).



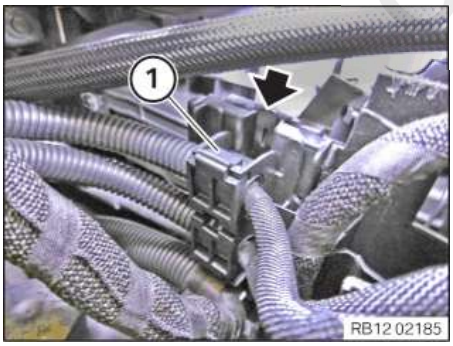
- Unlock plug connection (1) and disconnect.
- Unlock the connector and disconnect from the control unit holder (3).



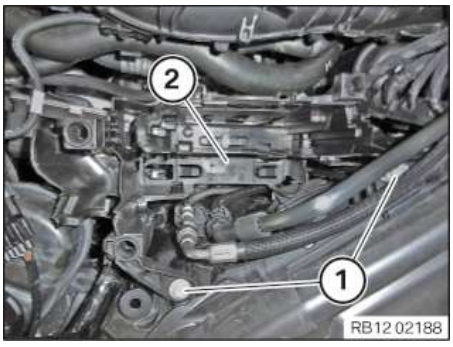
- Unlock the lock (arrow).
- Disconnect the cable holder (1) upwards from the control unit holder (2).



- Loosen clamp (1).



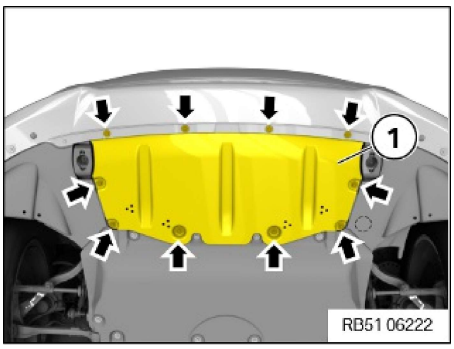
- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



- Loosen screws (1).
- Guide out and remove the control unit holder (2).

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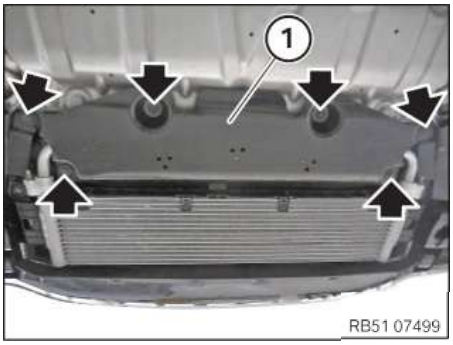
16 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

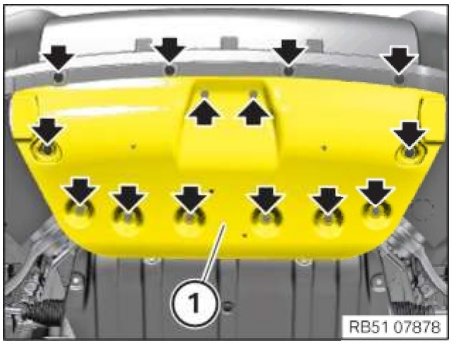
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.



- **Version 3:**

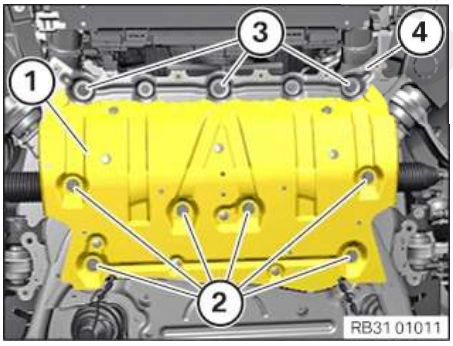
  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

17 – Removing the stiffening plate

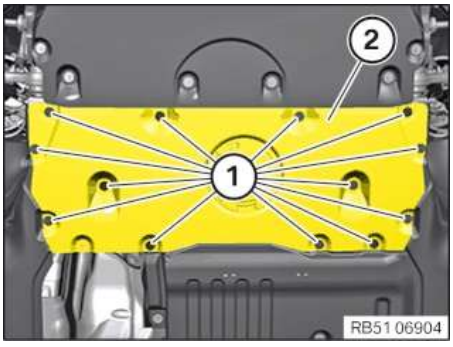
TECHNICAL INFORMATION

Driving without stiffening plate is not permissible.



- Loosen screws (3).
- Remove the holder of the underride protection (4).
- Loosen screws (2).
- Remove stiffening plate (1).

18 – Removing the centre underbody protection

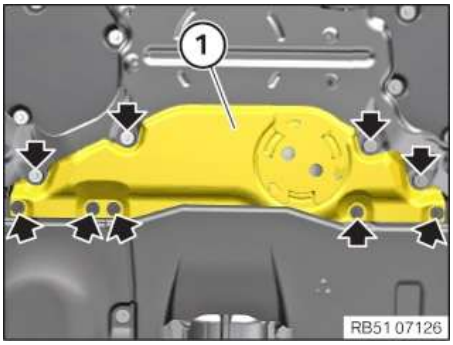


- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

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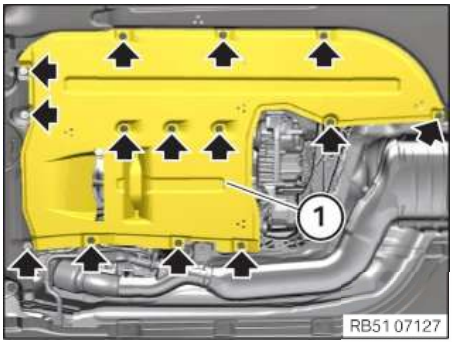


- **Version with all-wheel drive:**

  Remove screws (arrows).

  Feed out and remove the centre underbody protection (1).

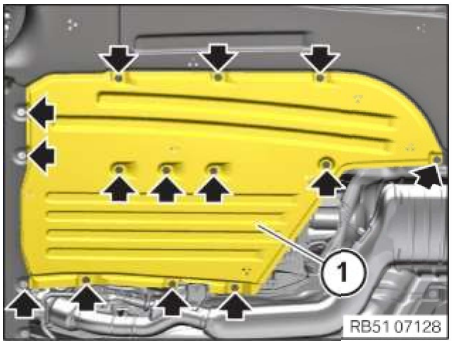
19 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



- **Version 2:**

  Remove screws (arrows).

  Guide out rear underbody protection (1) and remove it.

20 – If installed: Partially release the engine oil cooler

WARNING

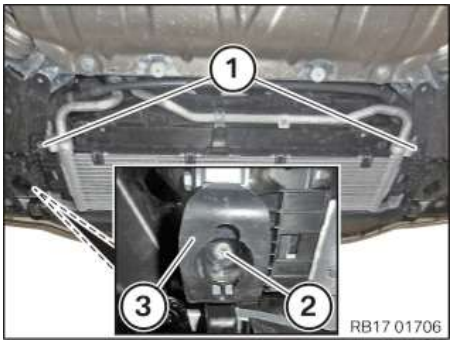
Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

TECHNICAL INFORMATION

The work must be performed with care to prevent component damage.

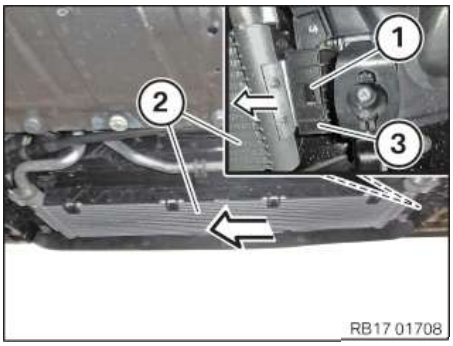


- Loosen screws (1).
- Drill out rivet on the left (2).
- Remove the left-hand damper (3).

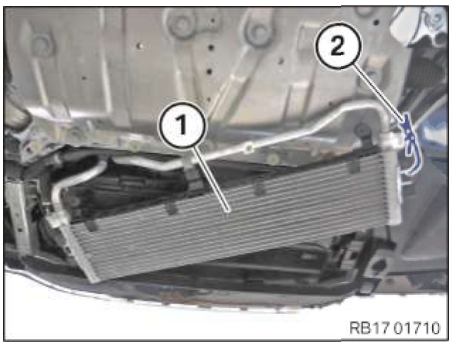
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- Loosen screw (1).



- Unlock lock (1).
- Feed out engine oil cooler (2) from the holder in the direction of arrow (3) and place to one side.



- Affix the engine oil cooler (1) with a cable strap (2) as shown.

21 – Draining the coolant from the low-temperature cooling system

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

TECHNICAL INFORMATION

Life-long fill of coolant!

Do not reuse used coolant.

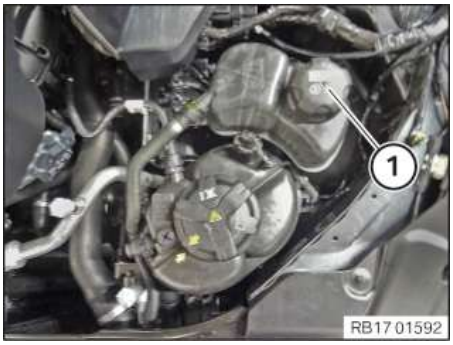
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

In the case of other removal work involving the draining of part quantities of coolant, the coolant level must be topped up with new coolant.

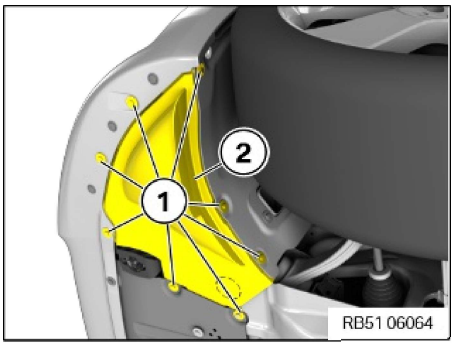
TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

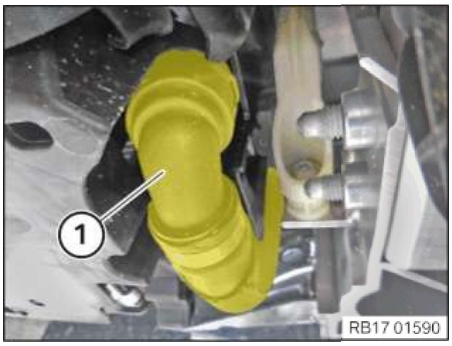
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- Loosen sealing cap (1).



- Loosen screws (1).
- Guide out and remove bottom left cover (2) to the front.

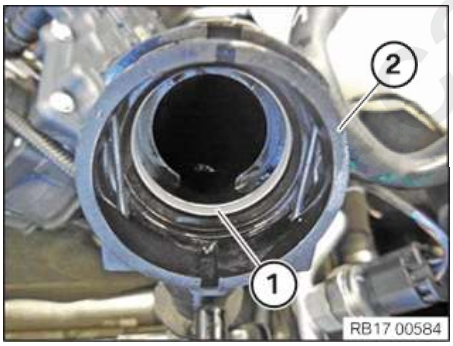


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

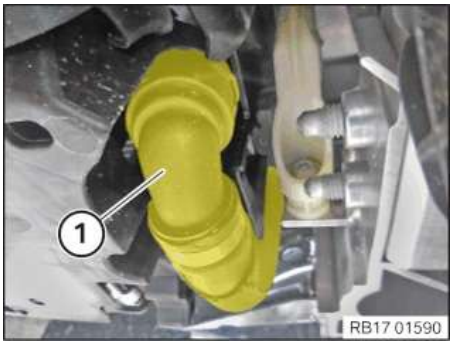
22 – Connecting the coolant lines for the low-temperature coolant circuit

TECHNICAL INFORMATION

Make sure that the connections are locked correctly. The locks must engage audibly.



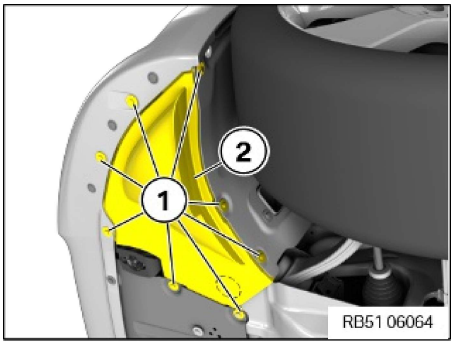
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.



- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.

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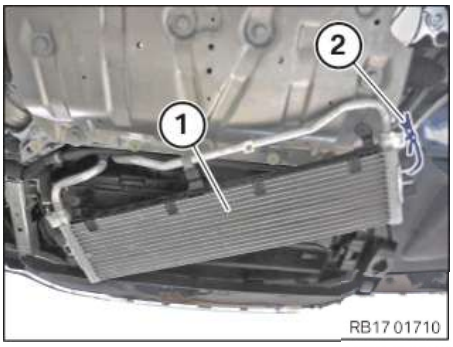


- Feed in and install cover (2) at the bottom front left.
- Tighten the screws (1).

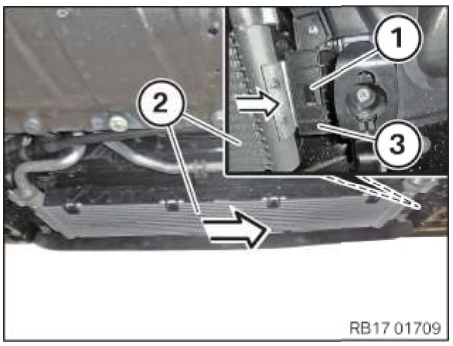
Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

23 – If installed: Secure engine oil cooler



- Remove the cable straps (2).
- Position engine oil cooler (1).



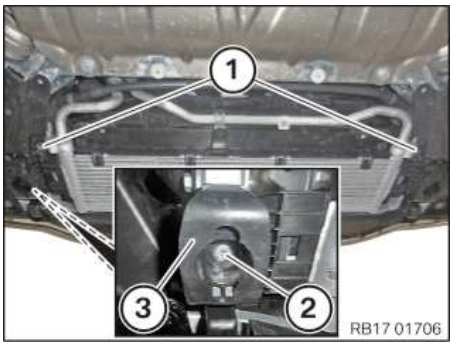
- Feed in and install the engine oil cooler (2) on the holder (3) in the direction of the arrow.
- Ensure that the lock (1)engages audibly.



- Tighten down screw (1).

Engine oil cooler to bumper support

M6X25		Tightening torque	8 Nm



- Renew rivet (2).

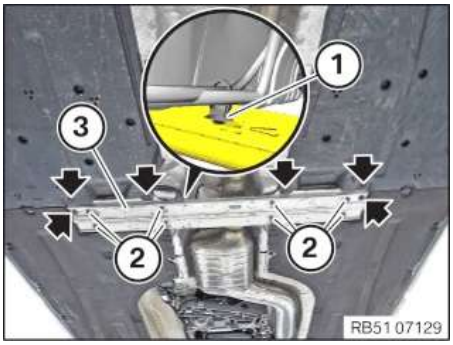
  Parts: Rivet
- Install and rivet damper (3).
- Tighten the screws (1).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

24 – Remove the connecting support from the tunnel

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- Remove screws (arrows).
- **If installed:** Loosen clamp (1).
- Loosen screws (2).
- Guide out and remove connecting support (3) on the tunnel.

25 – Remove complete exhaust system

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

CAUTION

Component with heavy weight.

Danger of injury!

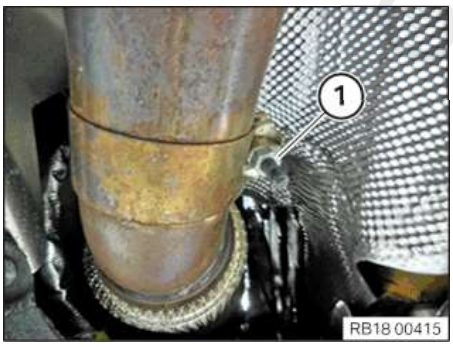
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

Heavy component.

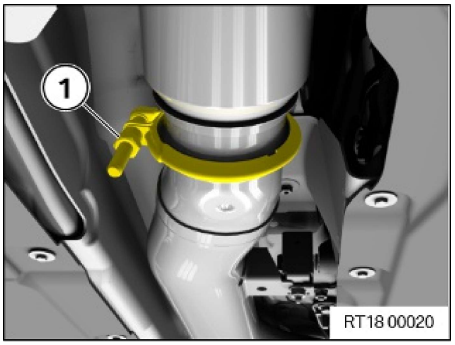
Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.



- **Equipment specification 1 (ribbon clamp)**

  Detach the ribbon clamp (1).



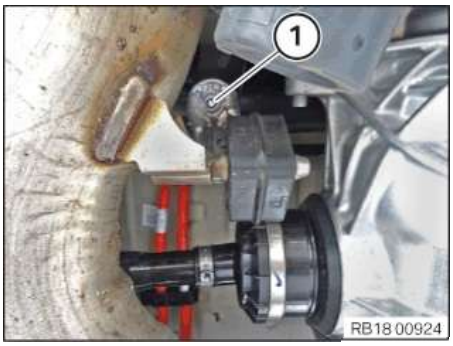
- **Equipment specification 2 (V-clips)**

  Unfasten clamp (1).

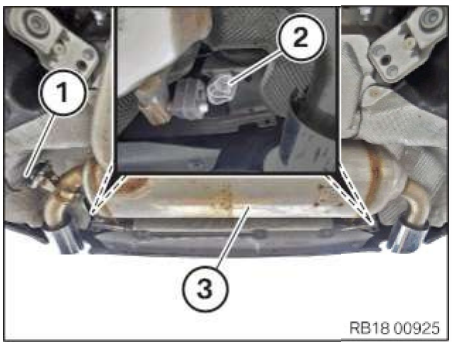
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- Loosen nut (1).

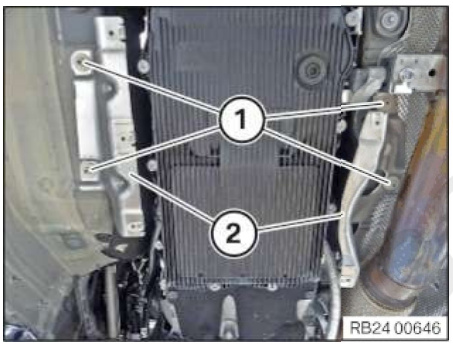


- Release nut (1) on the rear axle support.



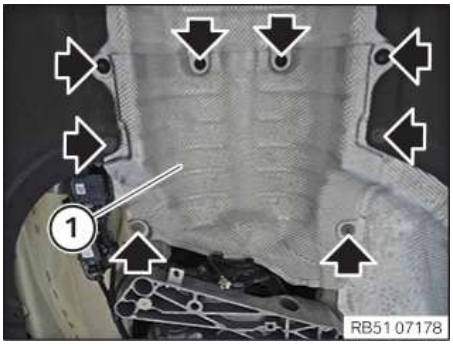
- Unlock plug connection (1) and disconnect.
- Loosen nuts (2).
- Lower and remove the exhaust system (3) with the assistance of a second person.

26 – Remove the retaining plates



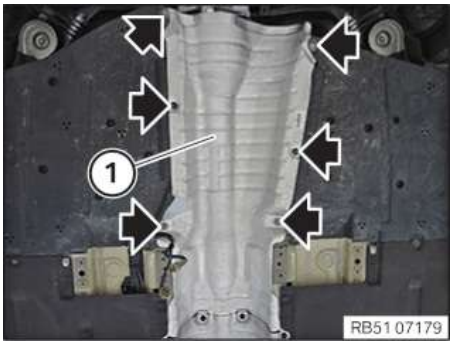
- Loosen nuts (1).
- Feed out retaining plates (2) and remove.

27 – Remove heat shields



- Loosen bolts and nuts (arrows).
- Remove heat shield (1).

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- Loosen bolts and nuts (arrows).
- Remove heat shield (1).

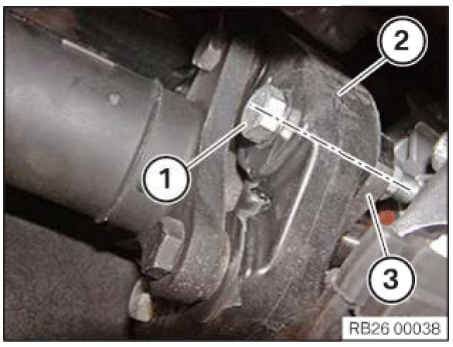
28 – Partially release propeller shaft

RISK OF DAMAGE

Damage to propeller shaft during removal.

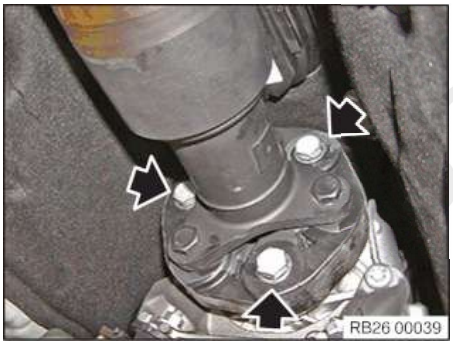
Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- Do not disassemble the three-hole flange, flexible disc and propeller shaft. The three-hole flange to the rear axle differential is balanced with the flexible disc and propeller shaft.
- Loosen the recessed nut against the direction of travel in clockwise direction. The propeller shaft must be loosened on the recessed nut only and exclusively in the direction of rotation otherwise the anti-twist lock of the bi-hexagonal flange nut is damaged.
- In the event of a damaged anti-twist lock on the bi-hexagonal flange nut: Replace the rear axle differential.

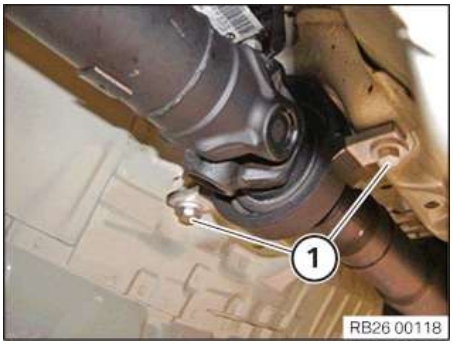


- Mark the installation position of the screw connection (1) of the flexible disc (2) and the three-hole flange (3).

  The mark makes it possible for the propeller shaft to be installed again in the same position. This should prevent a humming noise from the drive train during driving.



- Remove screws (arrows).

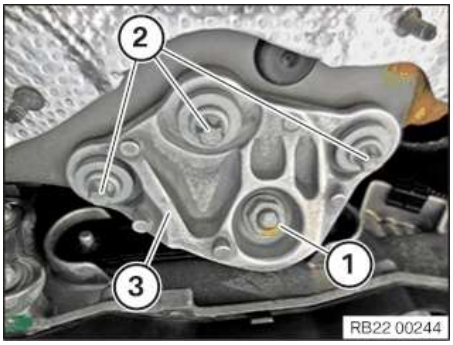


- Unscrew the bolts (1) on the centre mount and hold down the propeller shaft.

  Major deflection angles of the propeller shaft may damage the propeller shaft and/or the joints.
- Tie up propeller shaft to underbody.

29 – Remove transmission support bracket

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- Loosen nut (1).
- Loosen screws (2).
- Remove transmission support bracket (3).

30 – Removing the intake plenum

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

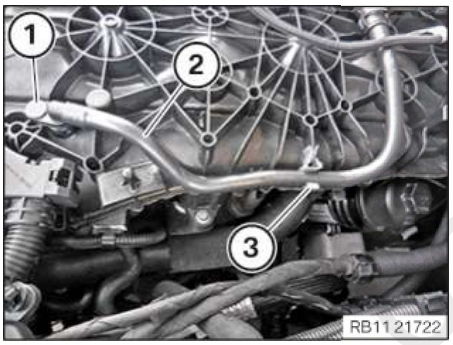
- Do not pull on the wires when disconnecting connectors and plug connections.

TECHNICAL INFORMATION

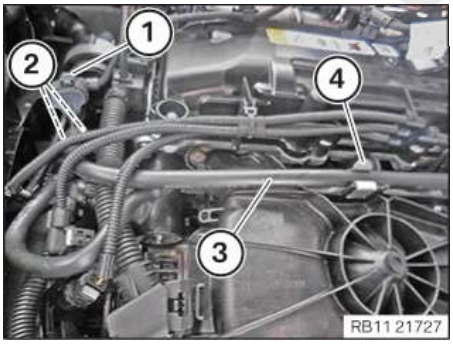
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

TECHNICAL INFORMATION

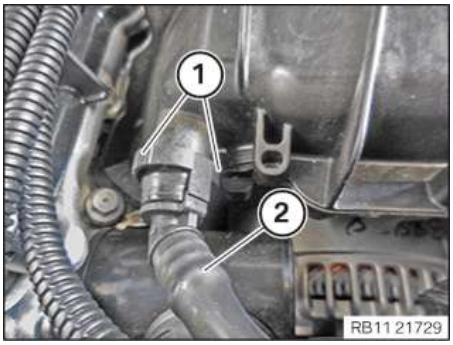
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen screw (1).
- Guide tank ventilation line (2) out of clamp (3) and remove it.

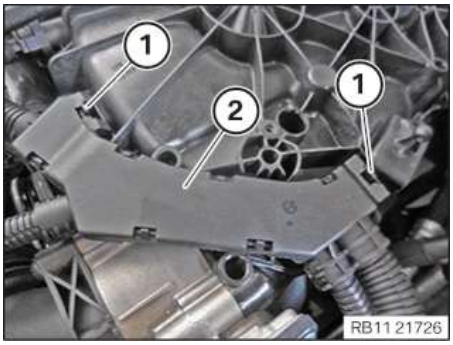


- Unlock and loosen connector (1).
- Unlock the locks (2).
- Guide tank ventilation line (3) out of clamp (4) and remove it.

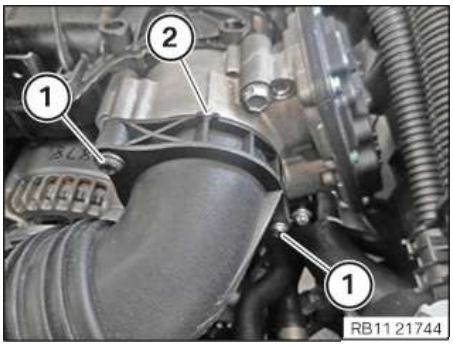


- Unlock the locks (1).
- Feed the tank ventilation line (2) out and set it aside.

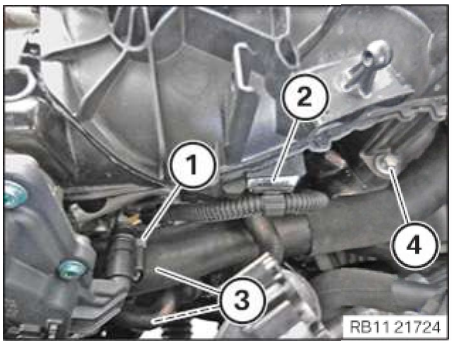
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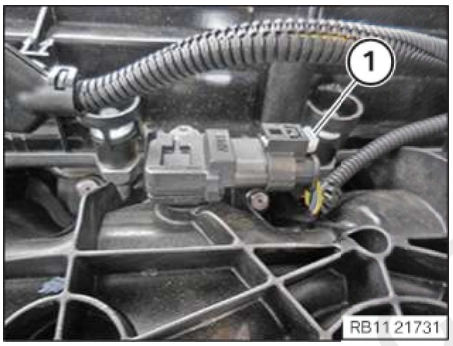
- Unlock the locks (1).
- Guide out the wiring harness section (2) for the sensor system **2** and place to one side.



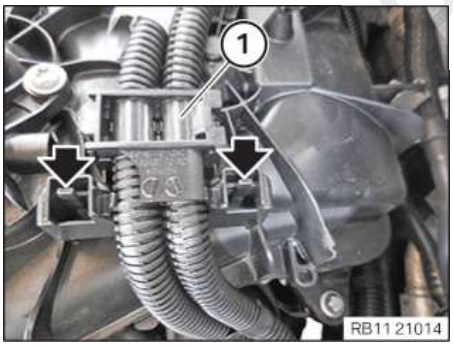
- Loosen screws (1).
- Feed out charge air line (2) and place to one side.



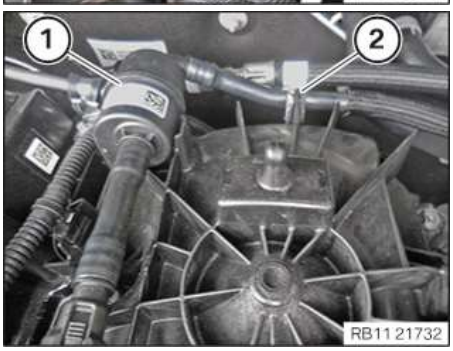
- Unlock and loosen connector (1).
- Loosen clamp (2).
- Thread off coolant line (3) and place to the side.
- Loosen screw (4).



- Unlock and loosen connector (1).

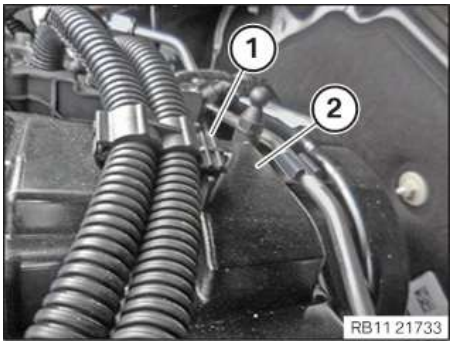


- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.



- Guide tank ventilation line (1) out of clamp (2) and place it aside.

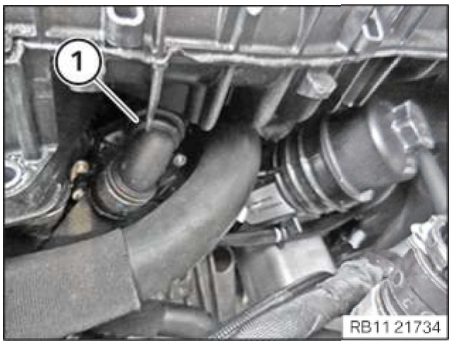
gardiagn.com



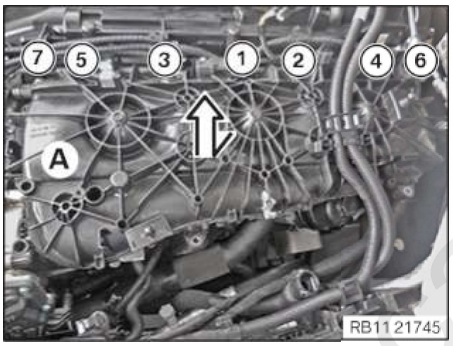
- Guide out the wiring harness section (1) for the injectors and ignition coils of the cylinder head cover (2) and set it aside.



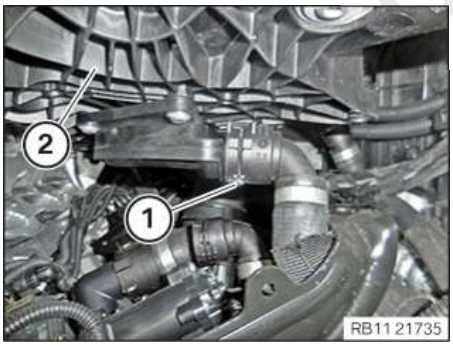
- Loosen screw (1).



- Unlock and loosen coolant line (1).
- Catch and dispose of escaping coolant.



- Loosen screws in the order (7) to (1).
- Slightly raise intake plenum (A) in direction of arrow.



TECHNICAL INFORMATION

Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

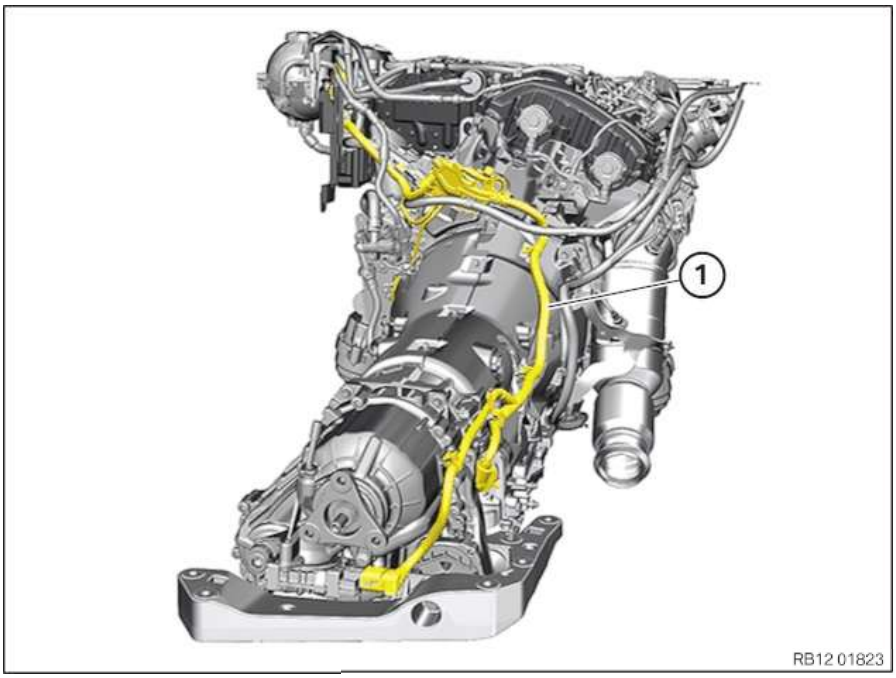
- Unlock and release coolant line (1) below the intake plenum (2).
- Catch and dispose of escaping coolant.
- Thread out intake plenum (2) and remove.

MAIN WORK

31 – Removing the wiring harness section of the transmission wiring harness

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Wiring harness section of transmission wiring harness



1 Wiring harness section of transmission wiring harness

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

RISK OF DAMAGE

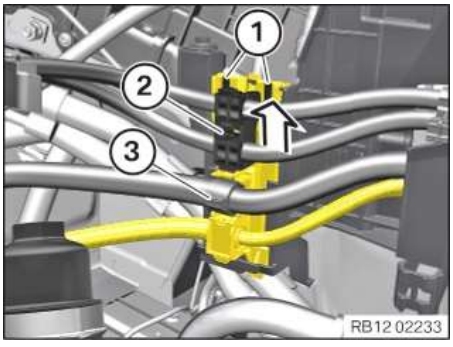
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

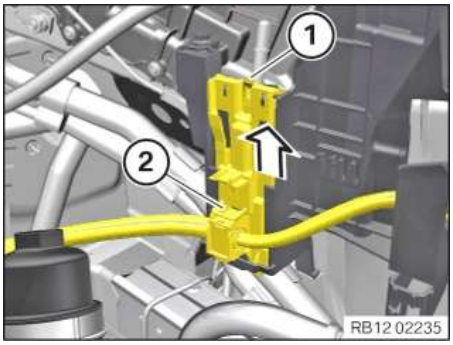
TECHNICAL INFORMATION

Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

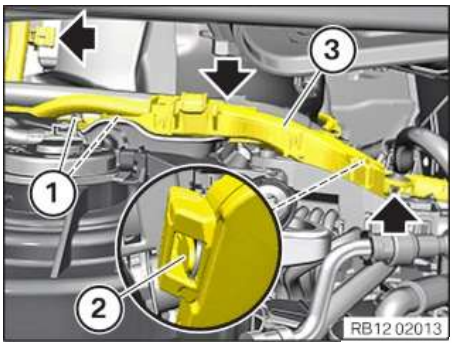


- Unlock the locks (1).
- Guide out the cable clip (2) in direction of arrow and set it aside.
- Unlock cable clip (3), feed out and place aside.

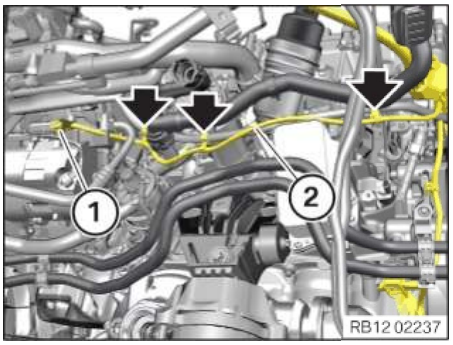
carsign.com



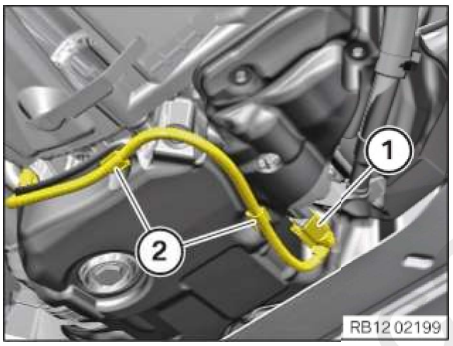
- Unlock lock (1).
- Guide out the cable clip (2) in direction of arrow and set it aside.



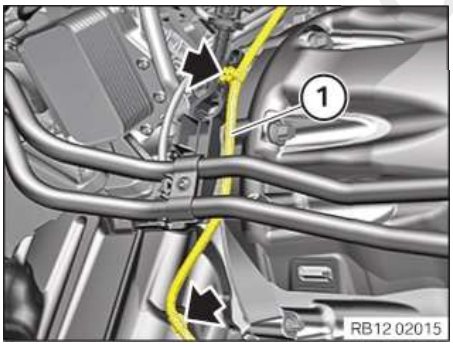
- Release clamps (Arrows) and place aside.
- Loosen screws (1).
- Unlock lock (2).
- Remove wiring harness section (3) of the transmission wiring harness and put to one side.



- Unlock plug connection (1) and disconnect.
- Loosen the clamp (arrow).
- Remove wiring harness section (2) of the transmission wiring harness and put to one side.



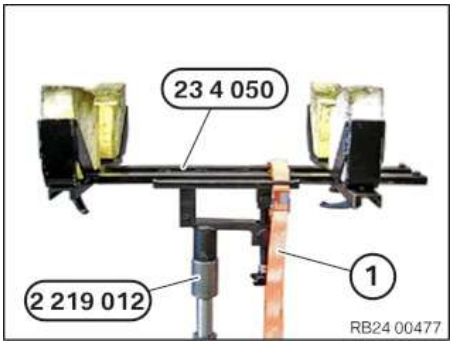
- Unlock plug connection (1) and disconnect.
- Loosen clamps (2).



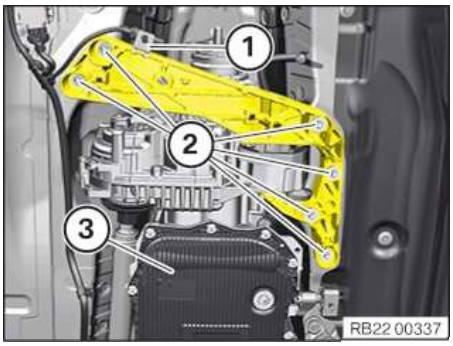
- Release the clamps (arrows).
- Remove wiring harness section (1) of the transmission wiring harness and put to one side.

▸ **Slightly lower the transmission**

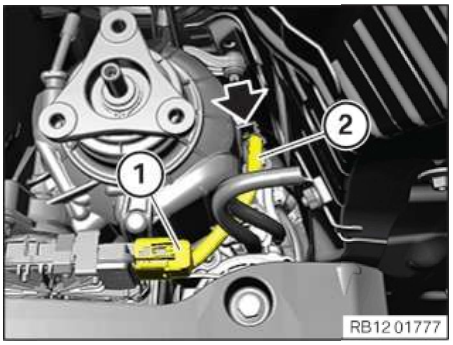
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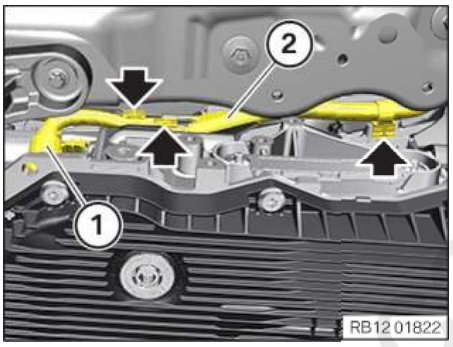
- Support the transmission using special tools 2 219 012 and 0 495 498 (23 4 050).
- Secure the transmission with the tensioning strap (1).



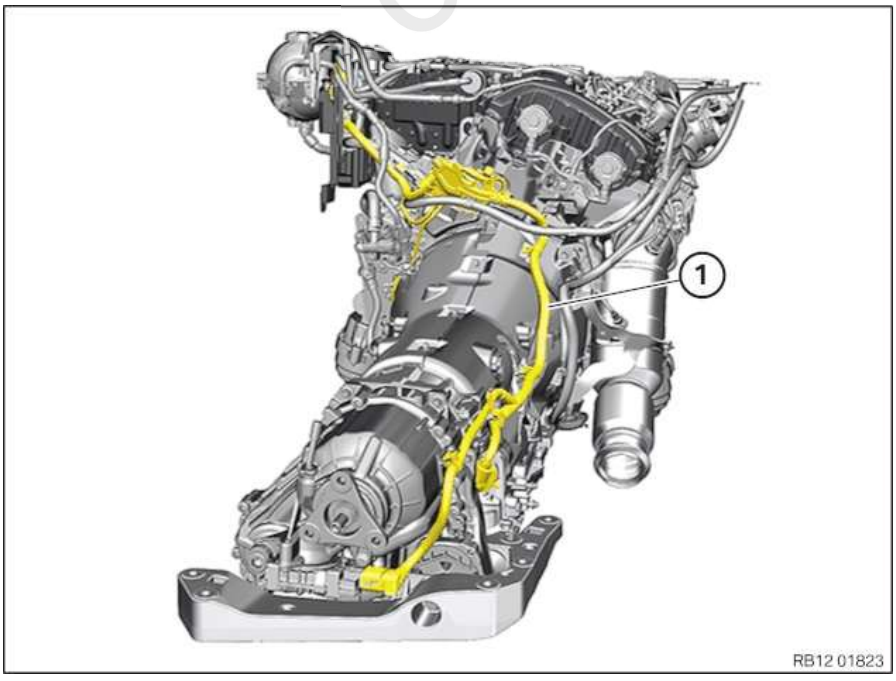
- Release clamp (1) and set it aside with the cable.
- Loosen screws (2).
- Slightly lower the transmission (3).



- Unlock plug connection (1) and disconnect.
- Loosen the clamp (arrow).
- Remove wiring harness section (2) of the supply module and set it aside.



- Unlock plug connection (1) and disconnect.
- Release the clamps (arrows).
- Remove wiring harness section (2) of the transmission wiring harness and put to one side.

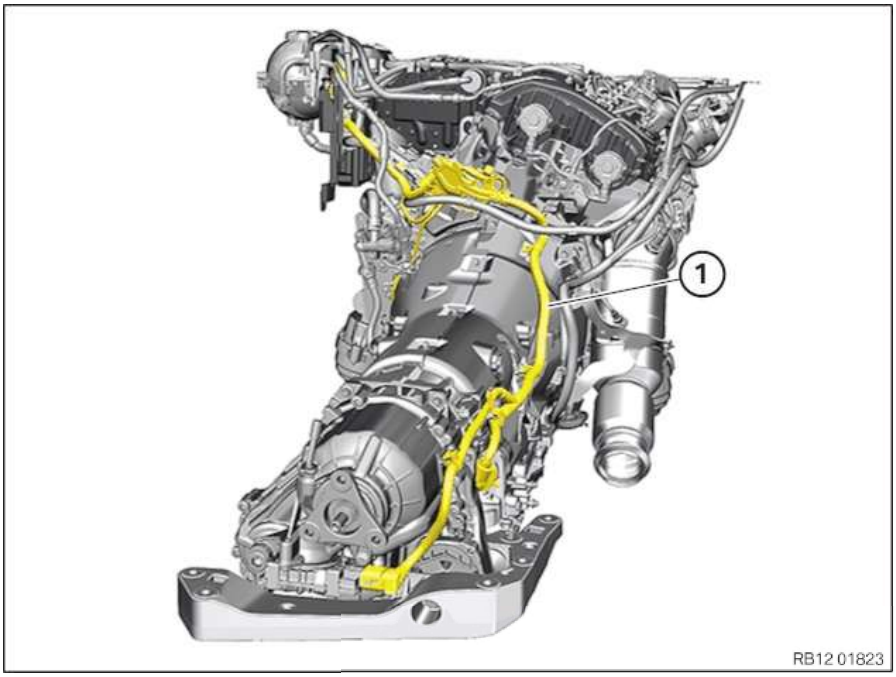


- Feed out and remove vehicle wiring harness engine of the transmission module (1).

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32 – Installing the wiring harness section of the transmission wiring harness

Wiring harness section of transmission wiring harness



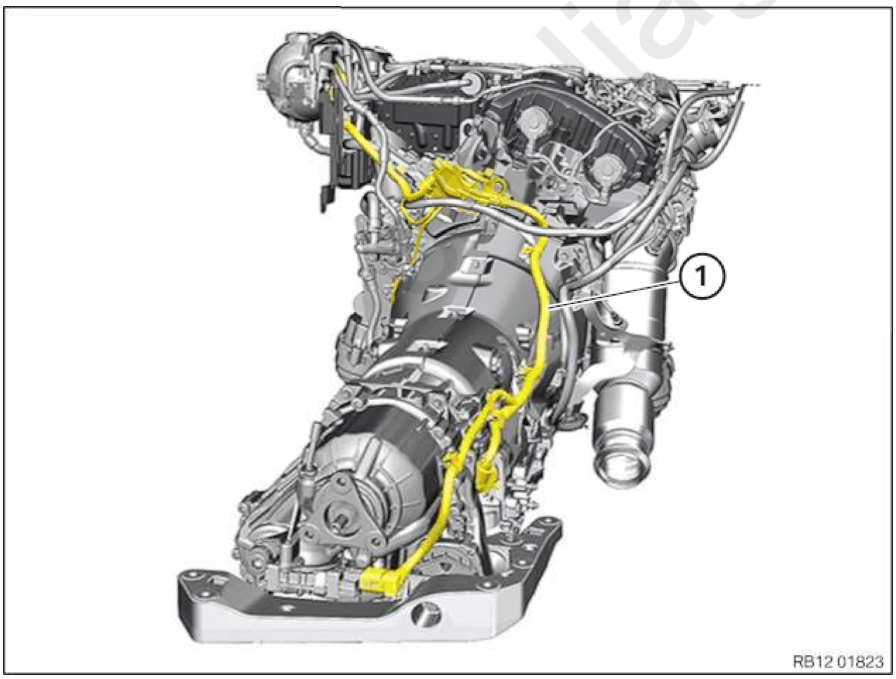
1 Wiring harness section of transmission wiring harness

RISK OF DAMAGE

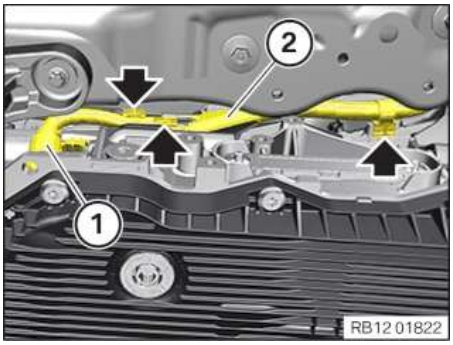
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.

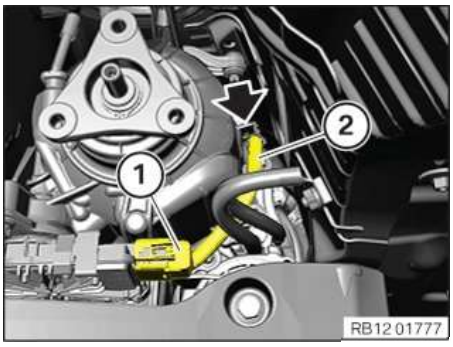


- Insert and install wiring harness (1) of the transmission module.



- Thread in the wiring harness section (2) of the transmission wiring harness and install.
- Secure the clamps (arrows).
- Connect connectors (1) and lock.

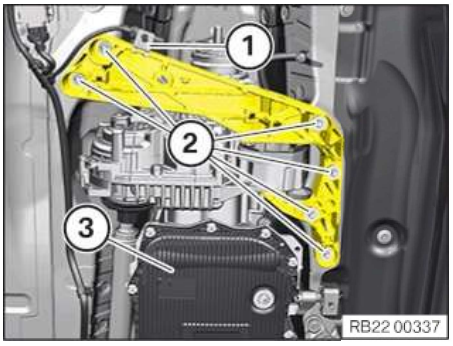
  The connector (1) must engage audibly.



- Thread in the wiring harness section (2) of the supply module and install.
- Secure clamp (arrow).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

▸ **Fasten the transmission**



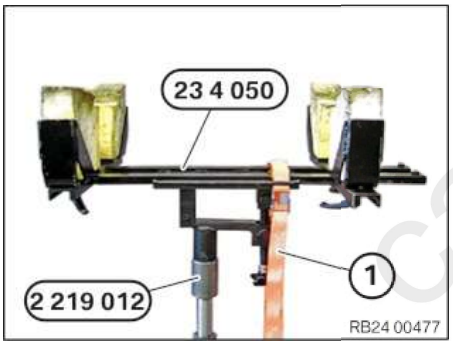
- Lift the transmission (3) in the installation location.
- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

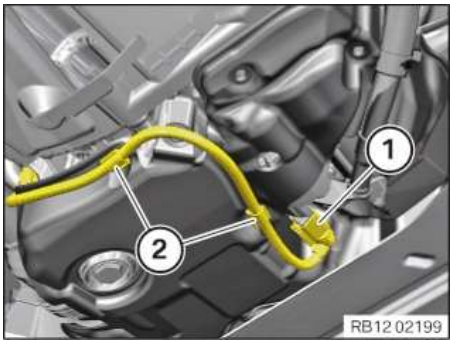
Transmission cross member to body

M8	Renew screws.	Tightening torque	19 Nm

- Secure the cable with the clamp (1).



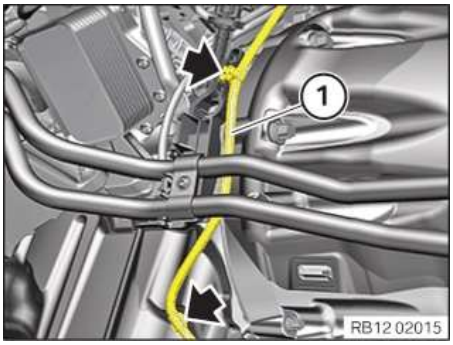
- Loosening the tensioning strap (1).
- Remove special tools 2 219 012 and 0 495 498 (23 4 050).



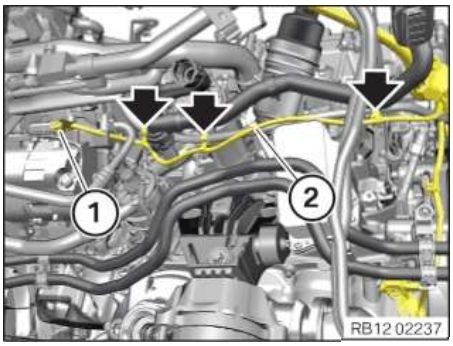
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

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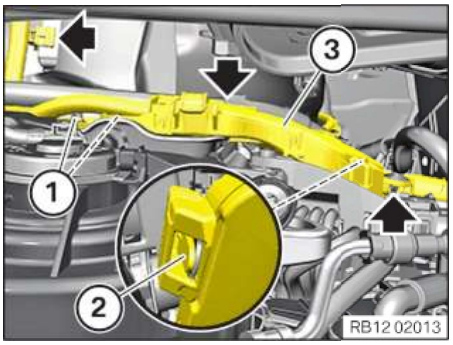


- Thread in the wiring harness section (1) of the transmission wiring harness and install.
- Secure the clamps (arrows).



- Thread in the wiring harness section (2) of the transmission wiring harness and install.
- Secure clamp (arrow).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

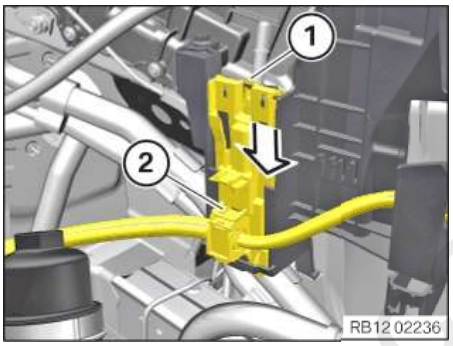


- Thread in the wiring harness section (3) of the transmission wiring harness and install.
- Ensure that lock (2) engages correctly.
- Tighten the screws (1).

Cable routing to cylinder head, rear

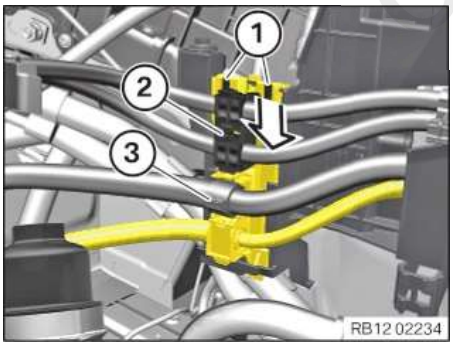
M6 x 20		Tightening torque	8 Nm

- Secure the clamps (arrows).



- Feed in and install the cable clip (2) in the direction of arrow.

  The lock (1) must audibly engage.



- Insert and lock the cable holder (3).

  The cable holder (3) must engage audibly.
- Feed in and install the cable clip (2) in the direction of arrow.

  The locks (1) must engage audibly.

POSTPROCESSES

33 – Installing the intake plenum

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RISK OF DAMAGE

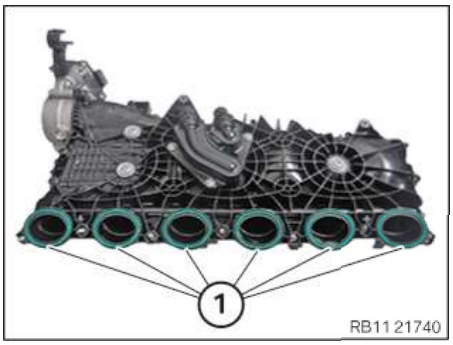
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.

TECHNICAL INFORMATION

Make sure that the connections are locked correctly. The locks must engage audibly.

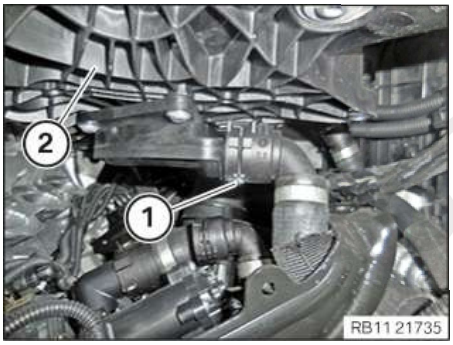


- Renew gaskets (1).

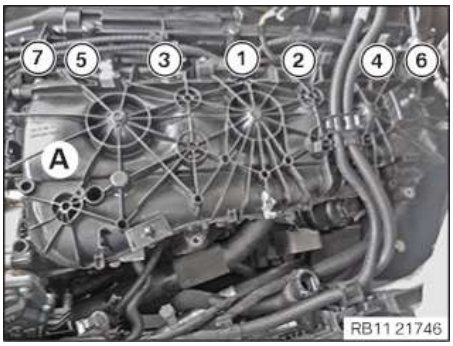
  Parts: Seals



- Clean contact surface (1).



- Feed in and position intake plenum (2).
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



TECHNICAL INFORMATION

Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

- Position the intake plenum (A).
- Tighten screws in the order (1) to (7).

Note: Tighten the bolts in 360 degree steps.

Intake plenum to cylinder head

M6		Tightening torque	10 Nm

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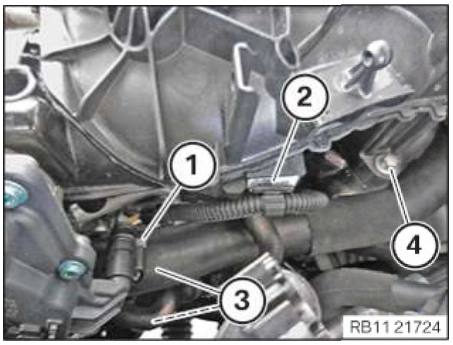
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



- Tighten down screw 1.

Intake plenum to support

M6X25		Tightening torque	8 Nm

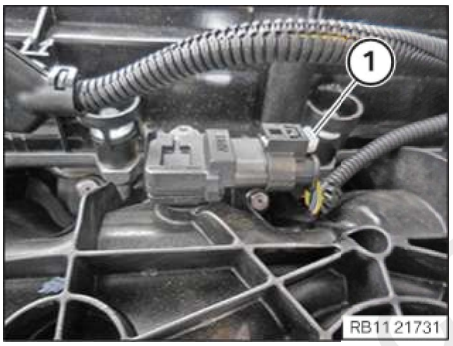


- Tighten down screw (4).

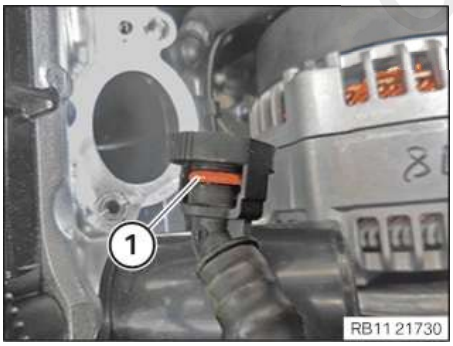
Intake plenum to support

M6X25		Tightening torque	8 Nm

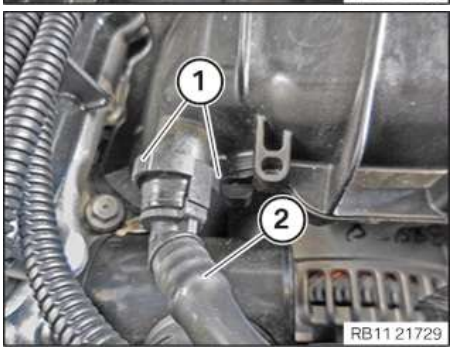
- Thread in and install coolant line (3).
- Secure clamps (2).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

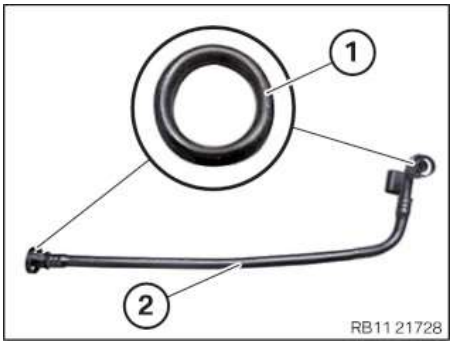


- Check sealing ring (1) for damage and renew tank ventilation line if necessary.

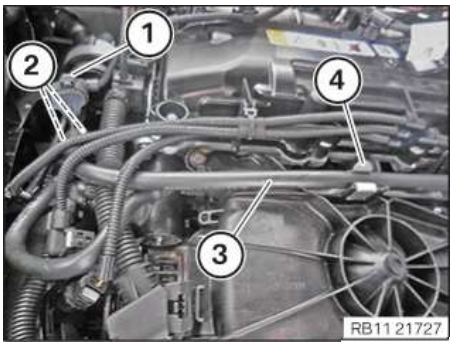


- Insert and install the tank ventilation line (2).
- Ensure that the locks (1) engage audibly.

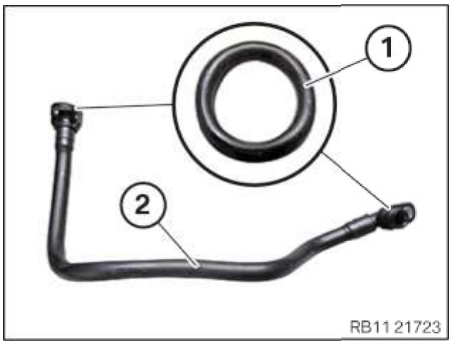
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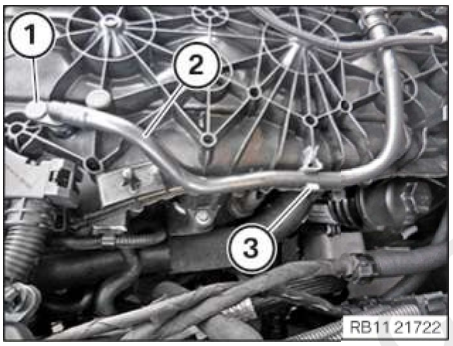
- Check sealing ring (1) for damage and renew tank ventilation line (2) if necessary.



- Insert and install the tank ventilation line (3).
- Ensure that the locks (2) engage audibly.
- Secure the tank ventilation line (3) to the clamp (4).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



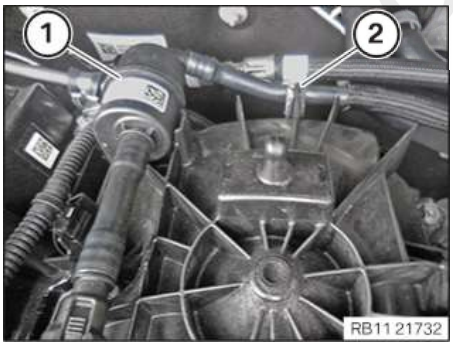
- Check sealing ring (1) for damage and renew tank ventilation line (2) if necessary.



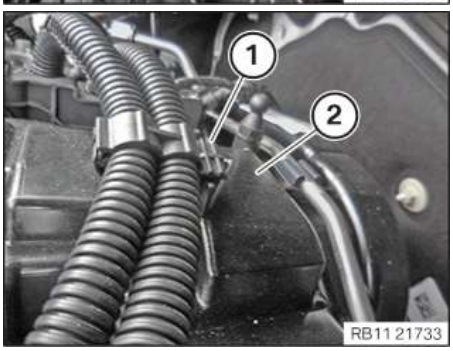
- Insert and install the tank ventilation line (2).
- Secure the tank ventilation line (2) to the clamp (3).
- Tighten down screw (1).

Tank ventilation line to intake plenum

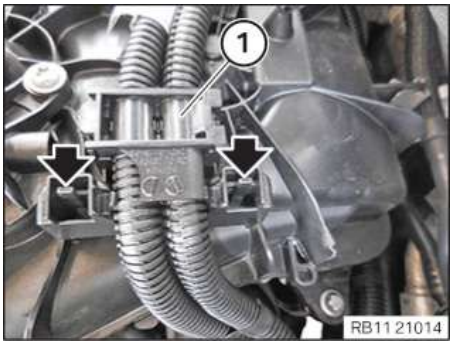
Oval-head screw		Tightening torque	3 Nm



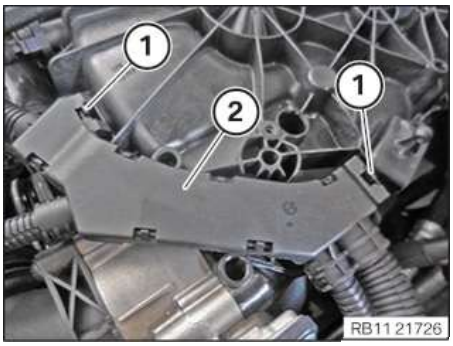
- Insert and install the tank ventilation line (1).
- Secure the tank ventilation line (1) to the clamp (2).



- Secure the wiring harness section(1) for the injectors and ignition coils on the cylinder head cover (2).



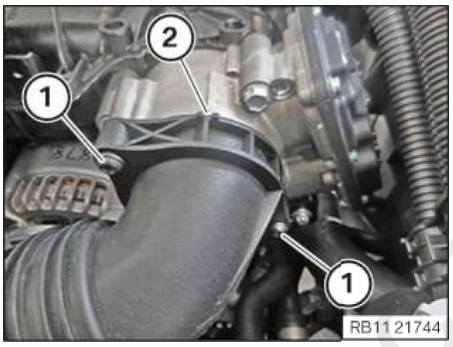
- Insert and install the wiring harness section (1) for the injectors and ignition coils.
  The locks (arrows) must engage audibly.



- Feed in and install wiring harness section (2) for sensor system **2**.
- Ensure that the locks (1) engage audibly.



- Check the sealing ring (1) for damage and renew the sealing ring (1) as needed.

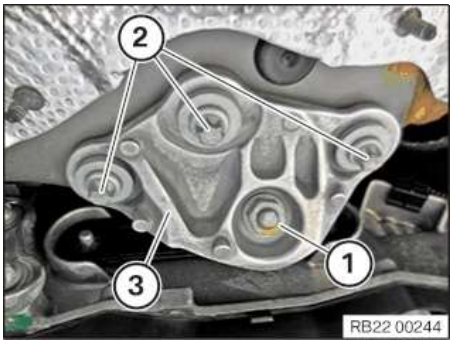


- Insert and install charge air line (2).
- Tighten the screws (1).

Charge air line to throttle valve

M6x30		Tightening torque	8 Nm

34 – Installing the transmission bearing support



- Install transmission support bracket (3).
- Tighten the screws (2).

Transmission bearing support to body

M8	Renew screws.	Tightening torque	19 Nm

- Tighten nut (1).

Rubber mount to transmission bearing support

M8	Renew nut.	Tightening torque	19 Nm

35 – Partially installing the propeller shaft

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- Check centring (1) for damage; renew if necessary.

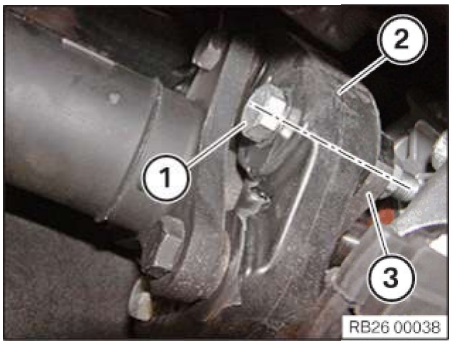


- Apply a thin coat of grease to the soft centring (1), if necessary.

  Do not grease the hard centring (2).

Expendable materials

Lubricating grease Olistamoly 2 LN 584 LO	100 g, Tube	83 19 0 447 919

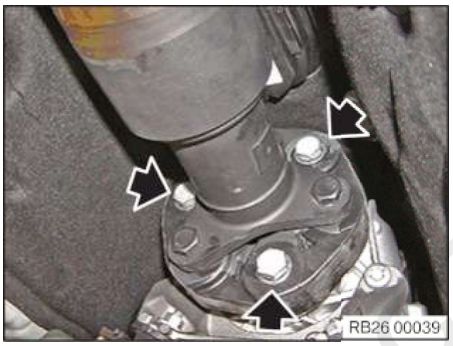


- Renew screws and the self-locking nuts.

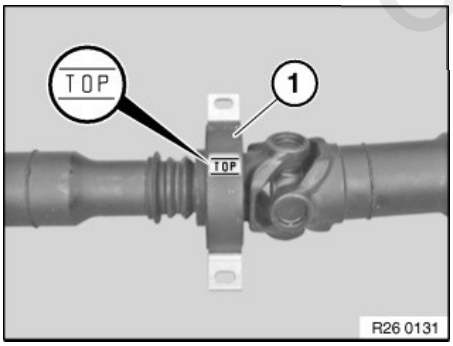
  Parts: Screws, self-locking nuts

- Assemble the screw connections (1) of the flexible disc (2) and the three-hole flange (3) according to the self-affixed identification.

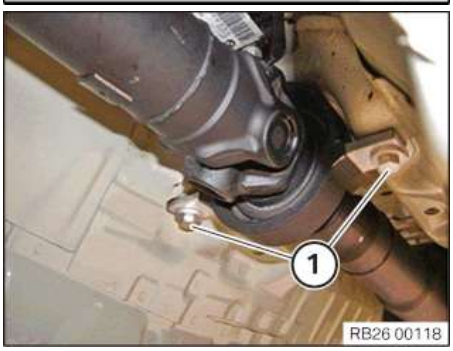
  This should prevent a humming noise from the drive train during driving.



- Hand-tighten the screws and nuts (arrows), but do not tighten fully.



- **Centre mount with TOP marking:**
- The centre mount (1) must be installed with the TOP marking at the top in the gearbox tunnel.



- Position centre mount.
- Hand-tighten the bolts (1), but do not tighten fully.

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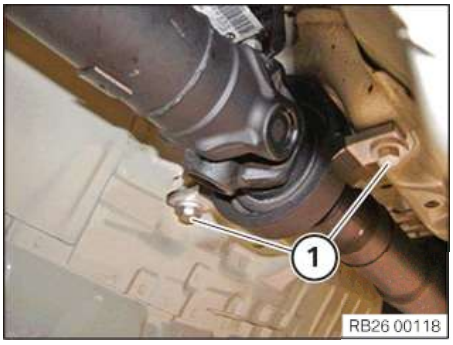
- Renew screws.

  Parts: Bolts
- Provide counter support for the bolts of the flexible disc on the nut and tighten with the bolts.

Front flexible disc to propeller shaft

M12	Renew screws. Comply with jointing torque and angle of rotation. Tightening via screw.	Jointing torque Angle of rotation	55 Nm 90 °

- Secure the special tool 0 490 504 (00 9 120) with the special tool on the vehicle underbody and continue to screw it in according to the angle of rotation.

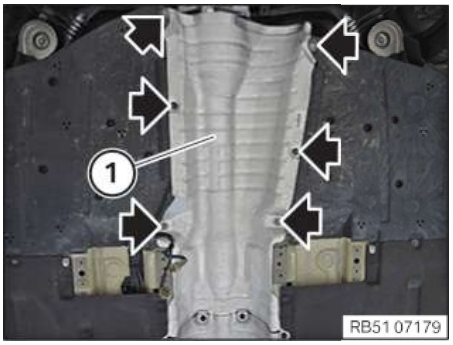


- Tighten the screws (1).

Centre mount to body

M8		Tightening torque	19 Nm

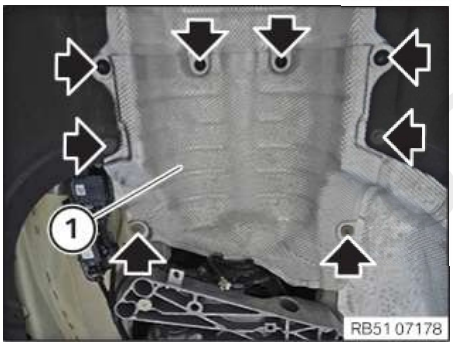
36 – Install the heat shields



- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

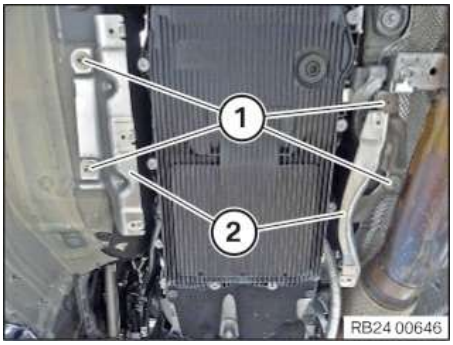


- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

37 – Install the retaining plates



- Feed in retaining plate (2) and install.
- Tighten nuts (1).

Retaining plates for vehicle underbody cover

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

38 – Installing the complete exhaust system

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CAUTION

Component with heavy weight.

Danger of injury!

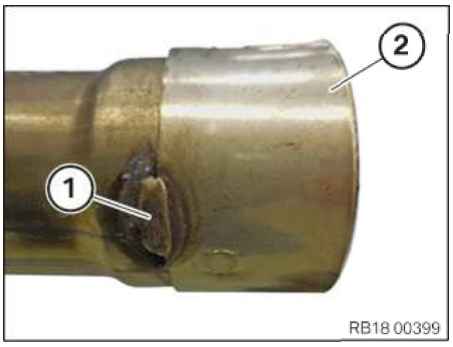
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

Heavy component.

Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.



CAUTION

Swarf resulting from sawing or grinding components.

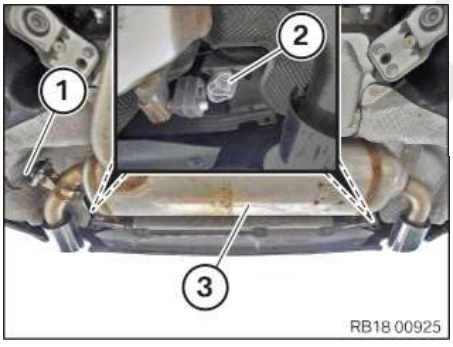
Danger of injury!

- Conduct all work in appropriate personal protective equipment only.
- Wear safety goggles and protective gloves.

- **Equipment specification 1 (ribbon clamp)**

  Open the weld seam (1) with a conventional tool.
- Remove ribbon clamp (2).
- Renew the (2) ribbon clamp.

  Parts: Ribbon cable clamp



- Feed in and install the exhaust system (3) with a second person.
- Renew nuts (2).

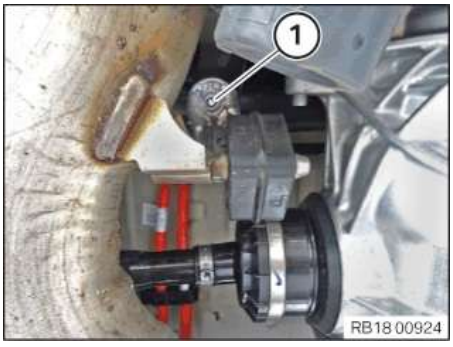
  Parts: Nuts
- Tighten nuts (2).

Rear silencer to body / bumper support

M8	Replace nuts.	Tightening torque	19 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Renew nut (1).

  Parts: Nut
- Tighten the bolt (1) on the rear axle support.

Exhaust system to rear axle carrier

Nut M8	Renew nut.	Tightening torque	19 Nm



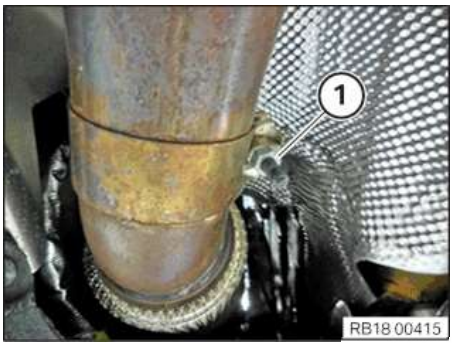
- Renew nut (1).

  Parts: Nut

- Tighten nut (1).

Front pipe / petrol particulate filter on transmission holder

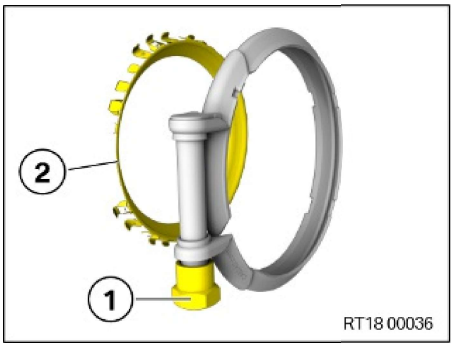
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

Ribbon cable clamp	Renew flat band clip.	Tightening torque	26 Nm

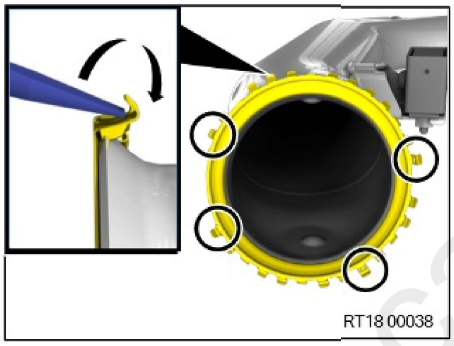


- **Equipment specification 2 (V-clips)**

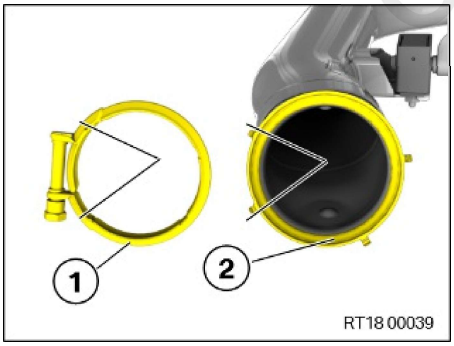
  Renew V-band clamp.

  Parts: V-band clamp

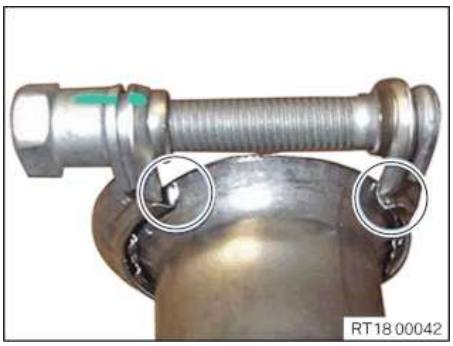
  Unscrew the nut (1) and remove the sealing ring (2).



- Bend all sheet metal tabs over with a suitable tool, except those in the marked areas.

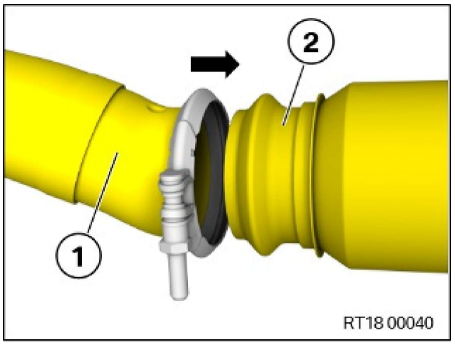


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

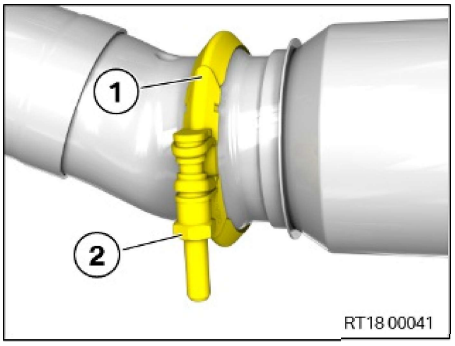


- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.

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- Connect the exhaust system (1) with the catalytic converter (2) and position it correctly (arrow).

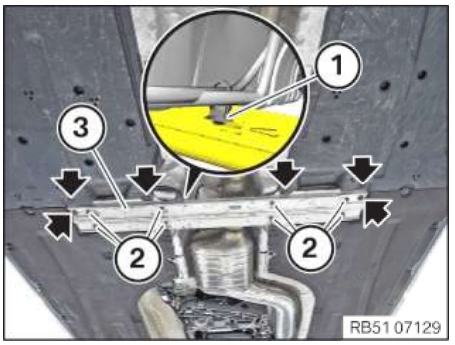


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm

39 – Install the connecting supports on the tunnel



- Guide in and install connecting support (3) on the tunnel.
- Tighten the screws (2).

Connecting support to tunnel

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

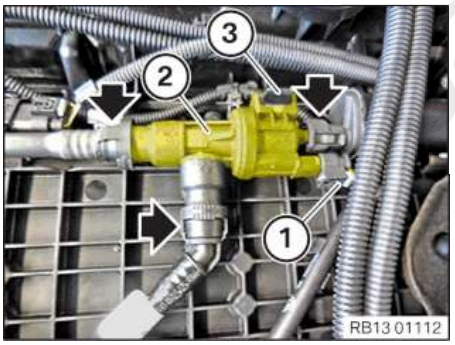
- Tighten screws (arrows).

Connecting support to tunnel

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

- **If installed:** Secure clamps (1).

40 – Installing the tank vent valve

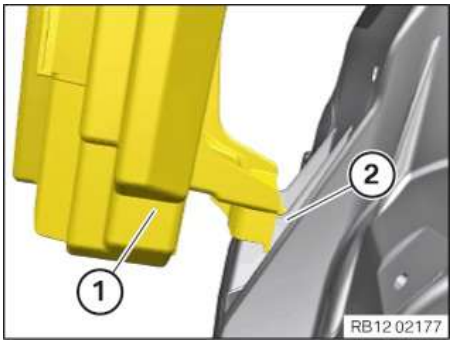


- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).

  The tank ventilation lines (arrows) must audibly engage.
- Connect connectors (1) and lock.

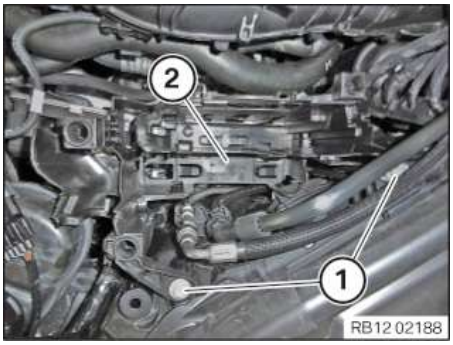
  The connector (1) must engage audibly.

41 – Installing the control unit holder



- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).

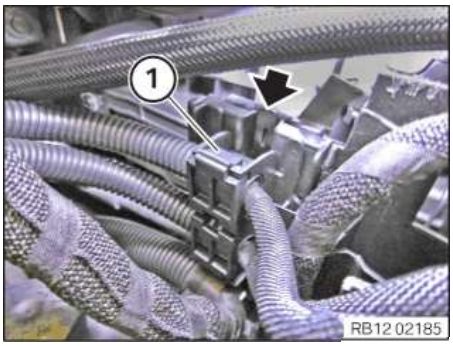
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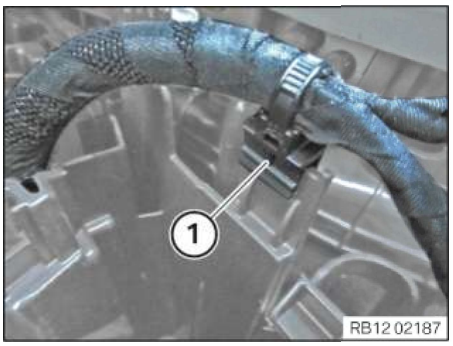
- Guide in and install control unit holder (2).
- Tighten the screws (1).

Control unit holder on spring strut dome

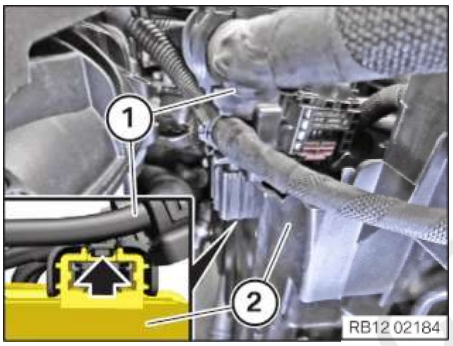
Hexagon screw		Tightening torque	8 Nm



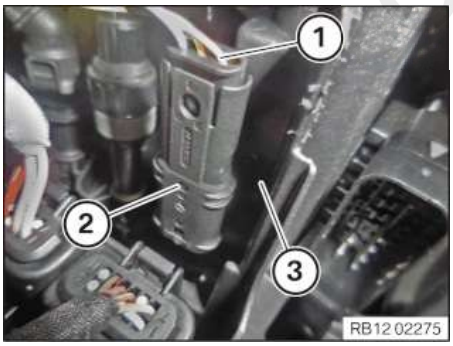
- Feed in and install the cable clip (1).
  Lock (arrow) must audibly engage.



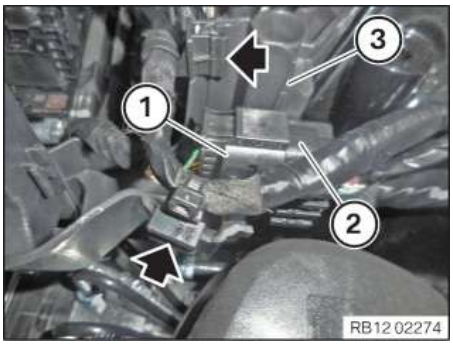
- Secure clamps (1).



- Connect the cable clip (1) with the control unit holder (2) and lock it.
  Lock (arrow) must audibly engage.



- Connect connector (2) to the control unit holder (3) and lock it.
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.



- Connect and lock the connector (2) with the control unit holder (3).
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.
- Secure the clamps (arrows).

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42 – Installing the integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

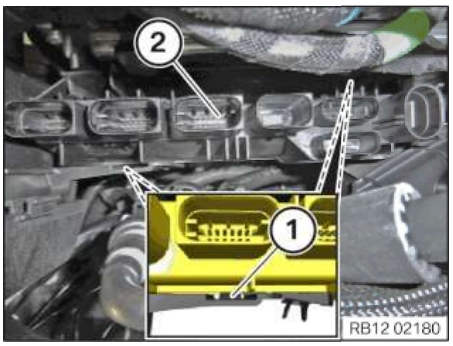
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

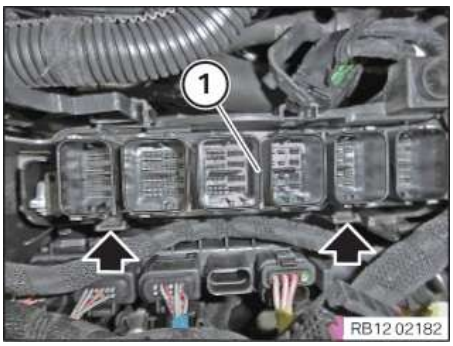


- Insert and install the integrated supply module (PDM) (2).
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



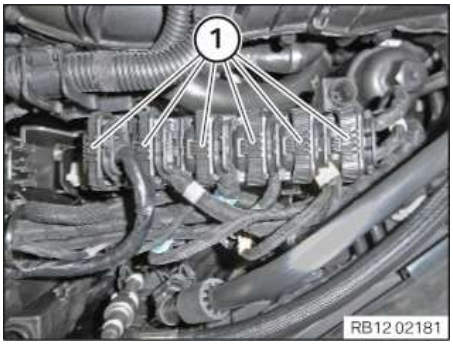
- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.

43 – Installing the DME control unit



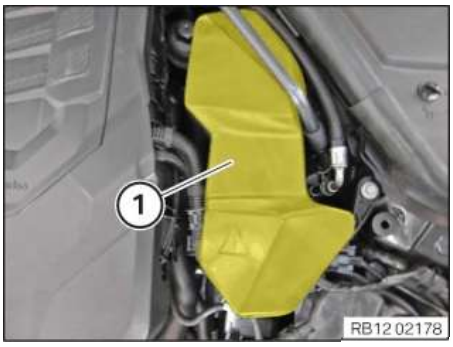
- Feed in and install DME control unit (1).
  The locks (arrows) must engage audibly.

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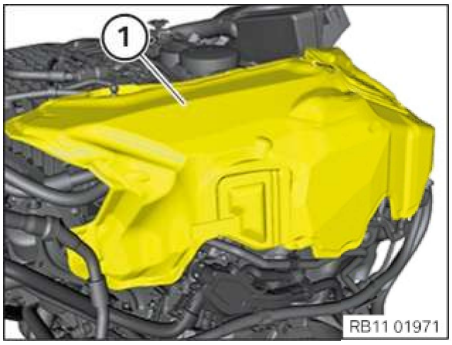
- Connect connectors (1) and lock.

  All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

44 – Installing acoustic cover at rear



- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



- Install the acoustic cover (1) from the top and clip it in into the marked areas.

45 – Install acoustic cover

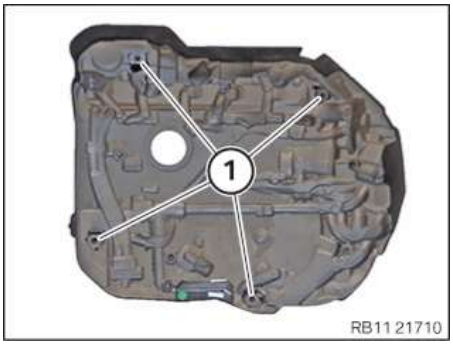
RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.

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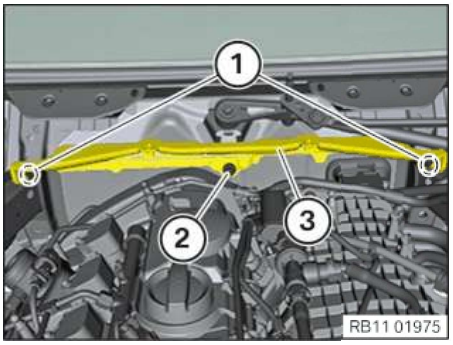


- Check the rubber mount (1) for correct fit in the acoustic cover.



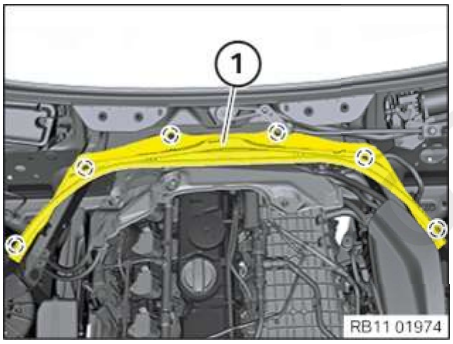
- Install acoustic cover (1) and fix in the rubber mounts (marks).

46 – Installing centre bulkhead lower section



- Position the centre bulkhead lower part (3).
- Tighten nut (2) and screws (1).

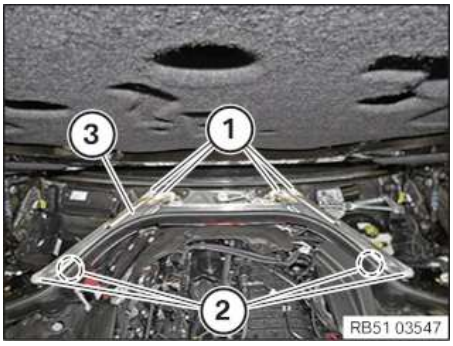
47 – Installing the centre bulkhead upper part



- Position the centre bulkhead upper part (1).
- Tighten the bolts in the marked areas.

Bulkhead upper part to bottom bulkhead

	Tightening torque	3 Nm



- **If installed:** Install tension strut on spring strut dome.
- Install the tension strut (3) on the spring strut dome.
- Tighten the screws (1).

Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

Tension strut to spring strut dome

Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

48 – Installing cowl panel cover

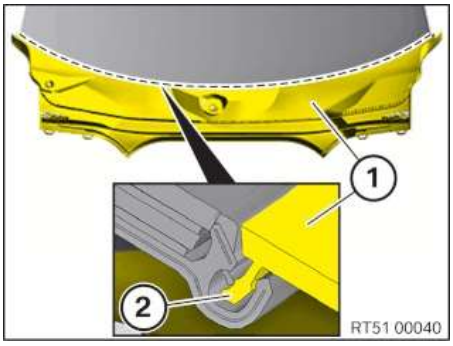
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RISK OF DAMAGE

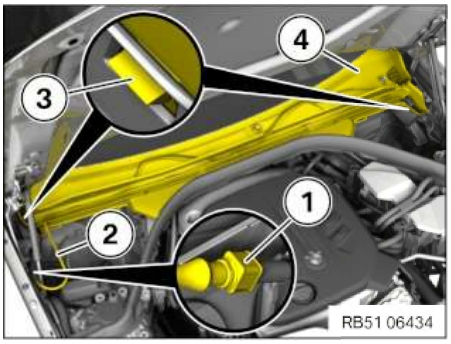
Damage caused by water ingress into the vehicle.

Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

- Ensure correct installation of the components.
- Only use undamaged components.



- Push the cowl panel cover (1) into the latch mechanism (2) beginning on the side.



- Clip cowl panel cover (4)in by means of the latch mechanisms (3).
- Position windscreen wash hose (2) and connect windscreen wash hose (1)quick lock.

49 – Installing both wiper arms

NOTICE

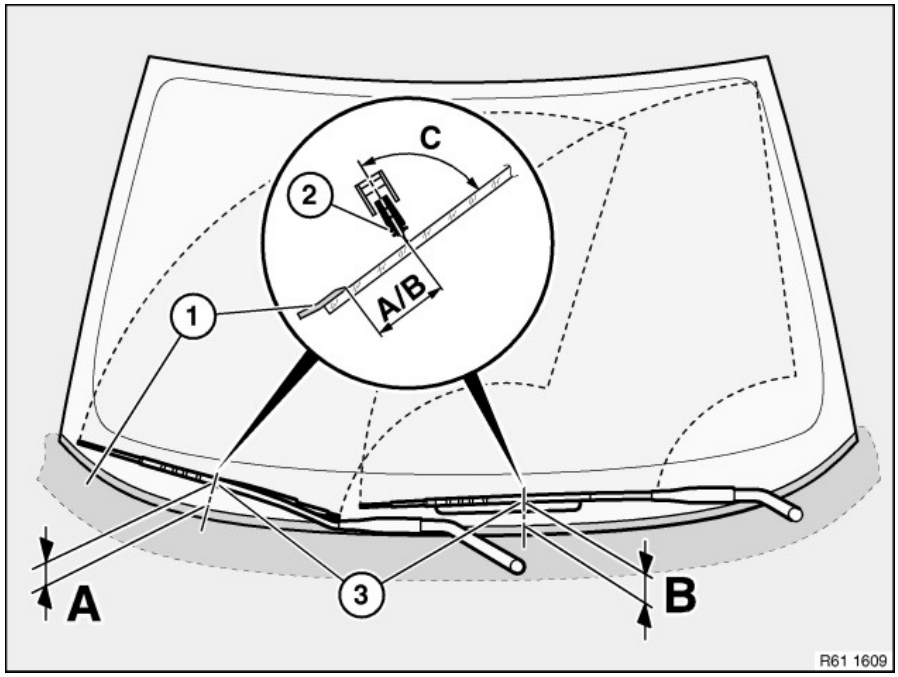
Description is for left component only. Procedure on the right side is identical.

▸ Install the wiper arm

TECHNICAL INFORMATION

The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.

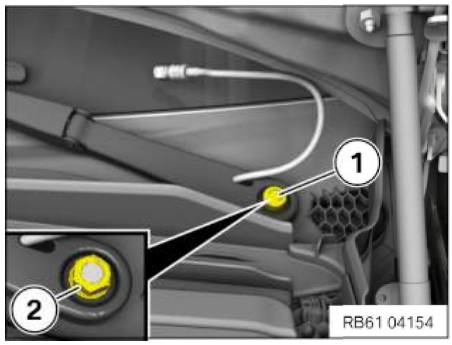
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- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

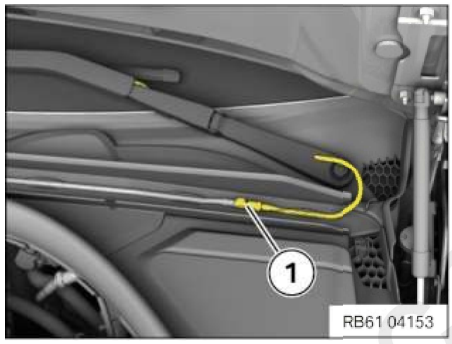


- Tighten nut (2).

Windscreen wiper arm

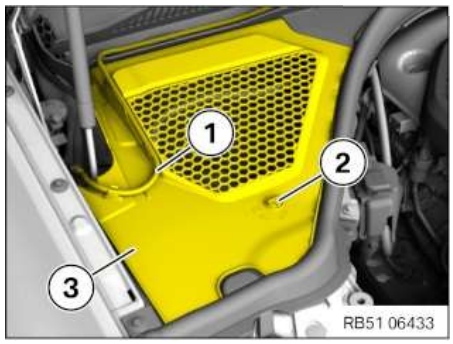
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Insert windscreen wash hose (1) into the cowl and connect at the separating point.

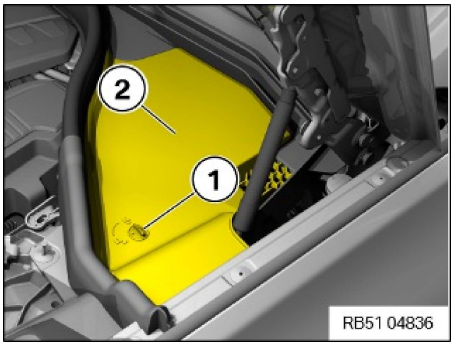
50 – Install the rear right engine compartment cover



- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

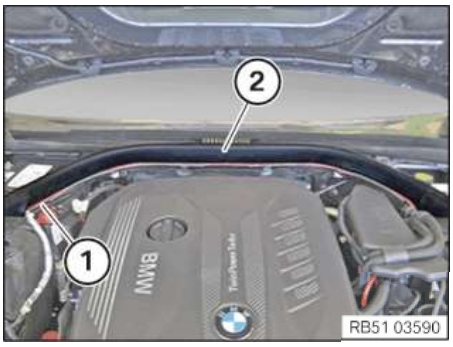
51 – Install the cover of the engine compartment on the rear left

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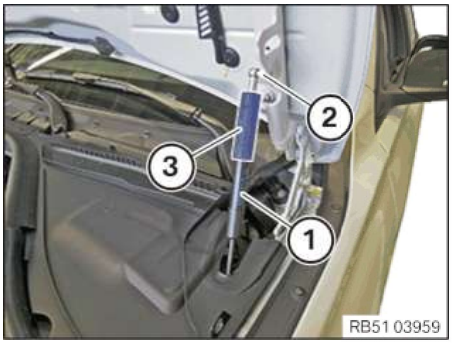
- Position the engine compartment cover at the rear left (2) .
- Close lock (1).

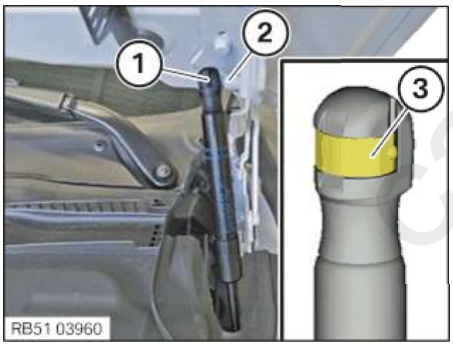
52 – Install the seal for the bonnet



- Press the rear bonnet seal (2) into the guide.
- Feed in cable (1) into the brackets.
- Check that the rear bonnet seal (2) and the cable (1) are seated correctly.

53 – Take bonnet out of the service position





- Support the bonnet by hand.
- Remove the special tool (3) from the ball pin (2).
- Pull off the special tool (3) from the gas pressure spring (1).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.

CAUTION

Shutting bonnet or tailgate.

Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.

- Check the clamp (3) is fitted correctly.
- Connect ball socket (1) to ball pin (2).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.

54 – Disconnecting all battery earth leads



- See additional information.

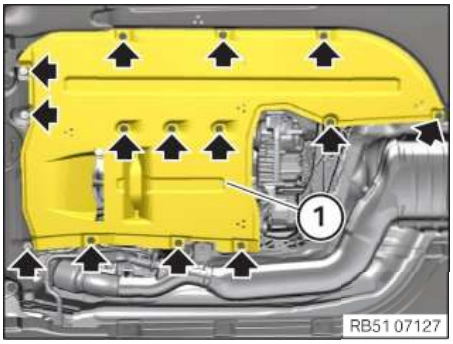
55 – Filling and bleed the low-temperature coolant circuit

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- See additional information.

56 – Installing underbody protection at rear



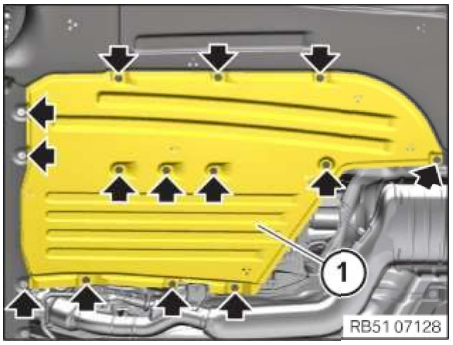
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

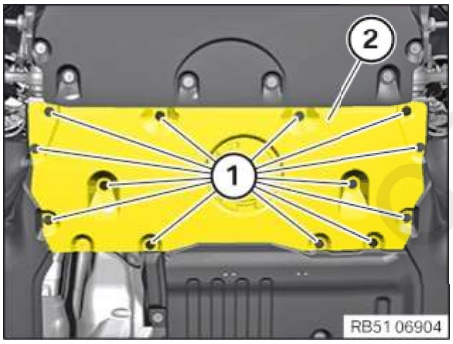
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

57 – Installing the centre underbody protection



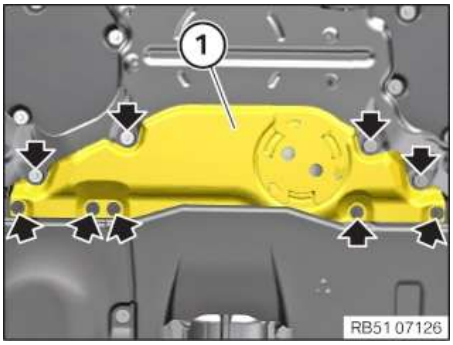
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version with all-wheel drive:**

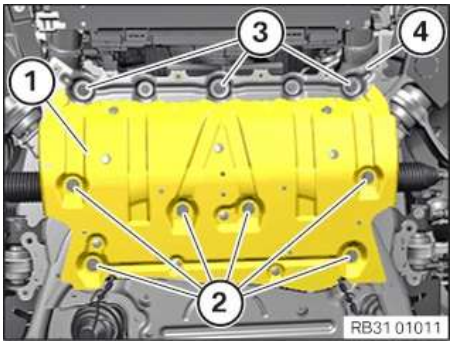
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

58 – Installing the stiffening plate

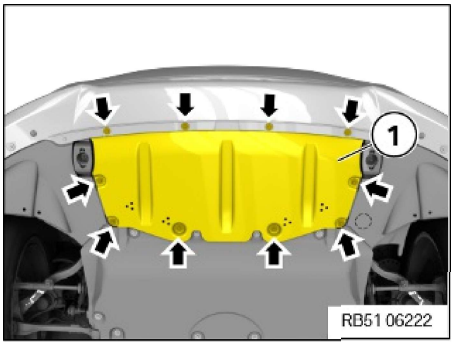


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

59 – Installing the front underbody protection



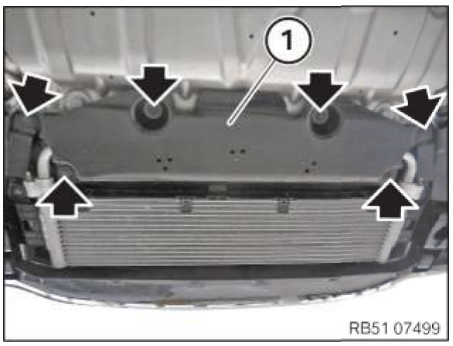
- **Version 1:**

  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



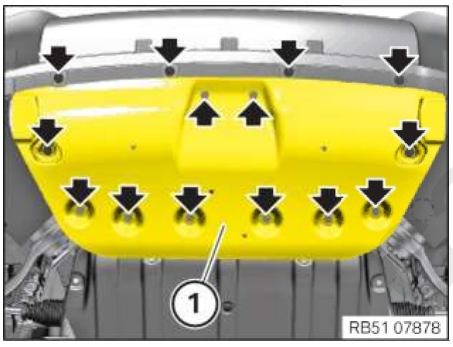
- **Version 2:**

  Feed in and position the front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



- **Version 3:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Additional Information

Overview of Tightening Torques

Cover, front bottom on side — Used in step 2223

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Engine oil cooler to bumper support — Used in step 23

M6X25		Tightening torque	8 Nm

Transmission cross member to body — Used in step 32

M8	Renew screws.	Tightening torque	19 Nm

Cable routing to cylinder head, rear — Used in step 32

M6 x 20		Tightening torque	8 Nm

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Intake plenum to cylinder head — Used in step 33

M6		Tightening torque	10 Nm

Intake plenum to support — Used in step 33

M6X25		Tightening torque	8 Nm

Tank ventilation line to intake plenum — Used in step 33

Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle valve — Used in step 33

M6x30		Tightening torque	8 Nm

Transmission bearing support to body — Used in step 34

M8	Renew screws.	Tightening torque	19 Nm

Rubber mount to transmission bearing support — Used in step 34

M8	Renew nut.	Tightening torque	19 Nm

Front flexible disc to propeller shaft — Used in step 35

M12	Renew screws. Comply with jointing torque and angle of rotation. Tightening via screw.	Jointing torque Angle of rotation	55 Nm 90 °

Centre mount to body — Used in step 35

M8		Tightening torque	19 Nm

Heat shield to vehicle underbody — Used in step 36

Screws and nuts		Tightening torque	3 Nm

Retaining plates for vehicle underbody cover — Used in step 37

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

Rear silencer to body / bumper support — Used in step 38

M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier — Used in step 38

Nut M8	Renew nut.	Tightening torque	19 Nm

Front pipe / petrol particulate filter on transmission holder — Used in step 38

M8	Renew nut.	Tightening torque	19 Nm

Exhaust system to catalytic converter — Used in step 38

Ribbon cable clamp	Renew flat band clip.	Tightening torque	26 Nm

V-clip to catalytic converter — Used in step 38

V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm

Connecting support to tunnel — Used in step 39

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

Control unit holder on spring strut dome — Used in step 41

Hexagon screw		Tightening torque	8 Nm

Bulkhead upper part to bottom bulkhead — Used in step 47

		Tightening torque	3 Nm

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Tension strut on bulkhead			Used in step 47
M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome			Used in step 47
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 49
Combination hexagon nut		Tightening torque	35 Nm

Underbody protection			Used in step 5657
Hexagon screw		Tightening torque	3 Nm

Stiffening plate to front axle support			Used in step 58
M10		Tightening torque	56 Nm

Underbody protection front			Used in step 59
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

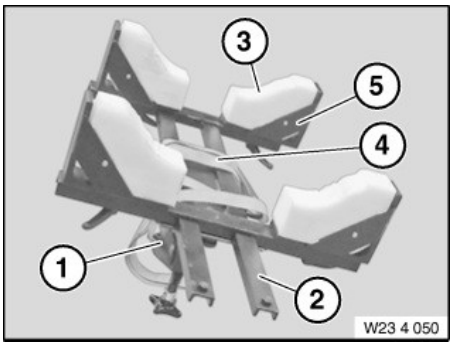
2 219 012 Hydraulic lifter



Common		Used in step 3132
Usage	For raising and lowering various vehicle components.	
Included in the tool or work		
Storage location		
Replaced by		
In connection with		
SI-Number	01 05 90 (207)	

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0 495 498 (23 4 050) Support



Common Used in step 3132

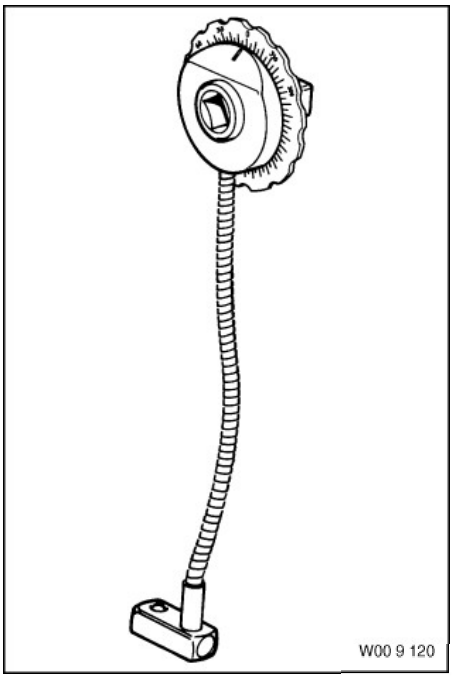
Usage	(universal gearbox holder) Support for removing and installing manual gearboxes and automatic transmissions for BMW & RR.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 06 (256)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
3	0 495 549 (23 4 053)		**Insert** (Foam material insert (1 set = 4 pieces)) deleted, can be ordered only via tool set	
1	0 495 547 (23 4 051)		**Joint** Available only as a complete tool set 23 4 050 (83 30 0 495 498) - as of 16.07.12.	
2	0 495 548 (23 4 052)		**Frame** (Basic frame) Available only as a complete tool set 23 4 050 (83 30 0 495 498) - as of 16.07.12.	
4	0 495 550 (23 4 054)		**Belt** (Tensioning strap) Available only as a complete tool set 23 4 050 (83 30 0 495 498) - as of 16.07.12.	
5	0 496 018 (23 4 055)		**Support** (Fixture for foam insert) Available only as a complete tool set 23 4 050 (83 30 0 495 498) - as of 16.07.12.	

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0 490 504 (00 9 120) Torque angle measuring dial



Common	Used in step 35
Usage	For torsion angle adjustment of cylinder head bolts (all engines) And reinforcement plate front axle support E46
Included in the tool or work	
Storage location	A4
Replaced by	
In connection with	
SI-Number	

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 49
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	1343

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	154
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	154
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154

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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 20 900 Disconnecting and connecting battery earth lead	154
61 35 ... Notes on ESD protection (Electro Static Discharge)	1213143142
61 13 ... Unlocking and disconnecting different plug connections	31
61 00 730 Encode/program control unit(s) (after vehicle test)	43
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	55
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Venting cooling system and checking on watertightness	55
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	55
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	55
17 00 040 Bleeding lower-temperature cooling system (B48)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 011 Draining and topping up coolant circuit for low temperature	55
17 00 040 Bleed the low-temperature cooling system and check for watertightness (coolant circuit for low temperature)	55
17 00 040 Bleeding and filling low temperature cooling system using vacuum filler device (B48)	55
17 00 011 Draining and topping up low-temperature coolant circuit	55
17 00 011 Draining and topping up low-temperature coolant circuit	55
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	55
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	55
17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	55
17 00 011 Draining and topping up low-temperature coolant circuit	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	55

carflash.com

12 51 210 Replacing the wiring harness section for injectors and ignition coils

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

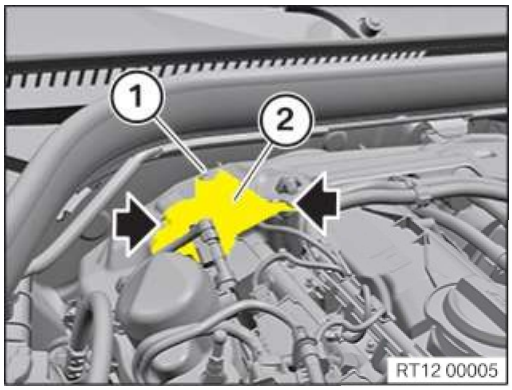
- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.

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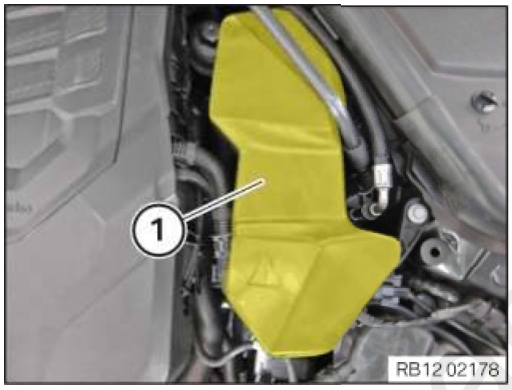
- Release the acoustic cover (1) towards the top from the rubber mounts (marks).

3 – Release the service opening of the sound insulation at the top of the engine



- Detach the service opening (2) in the marked areas (arrows) and twist it to the side at the pivot point (1).

4 – Remove the cover of the DME control unit



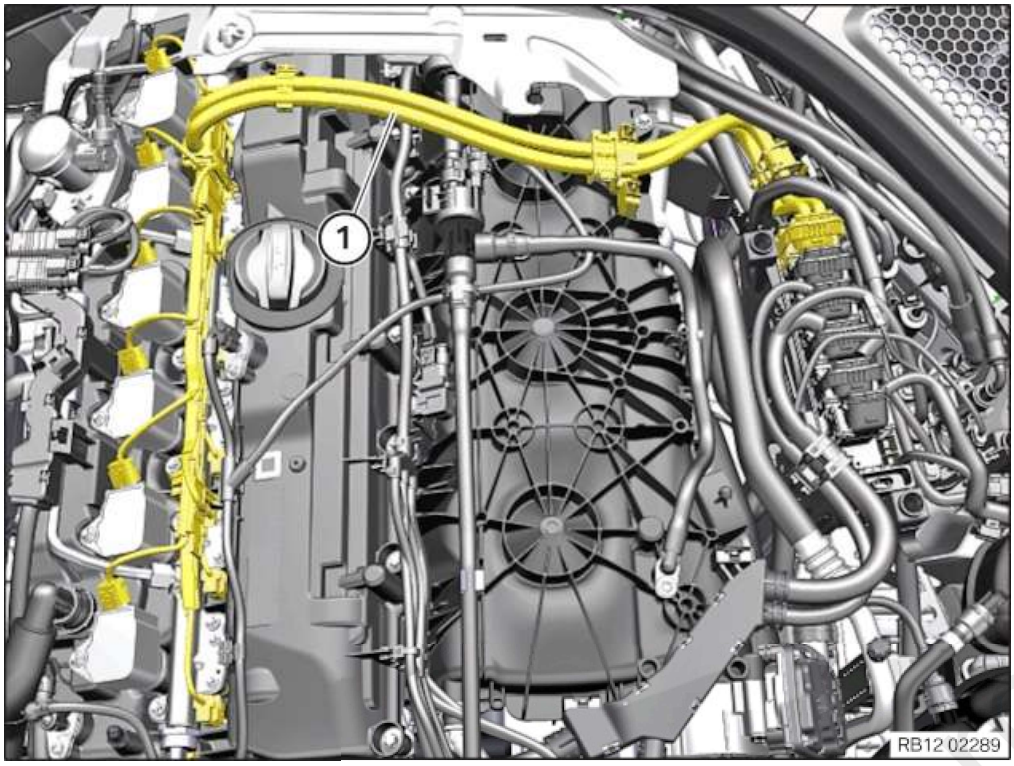
- Pull the cover (1) toward the top and remove.

MAIN WORK

5 – Removing the wiring harness section for the ignition and injectors

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Overview: Wiring harness for injectors and ignition coils



1 Wiring harness for injectors and ignition coils.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

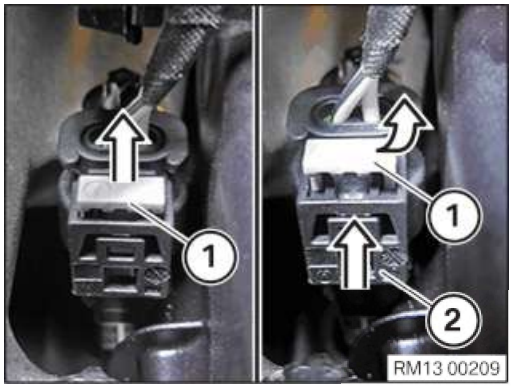
TECHNICAL INFORMATION

Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

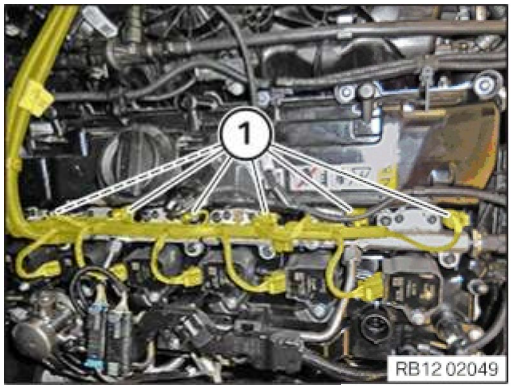
carlagn.com



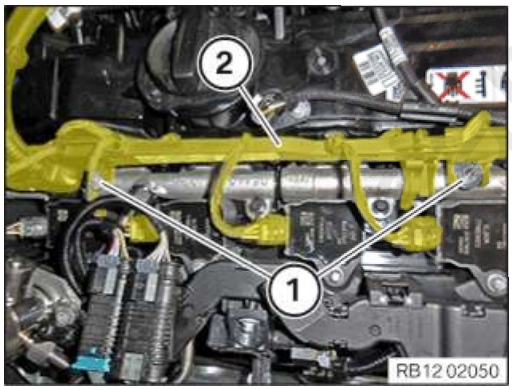
- Unlock and disconnect plug connections (1).



- Unlock lock (1) in direction of arrow from the top.
- Press lock (1) together and release.



- Unlock and disconnect plug connections (1).

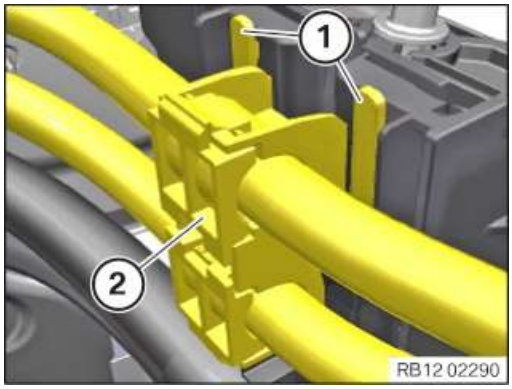


- Loosen nuts (1).
- Remove the wiring harness section (2) and put to one side.

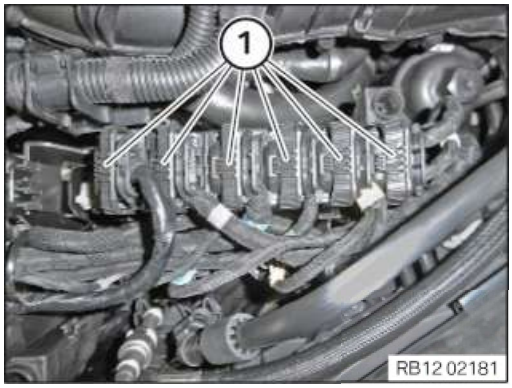


- Loosen clamp (1).
- Unlock and loosen holder (2).
- Remove the wiring harness section (3) and put to one side.

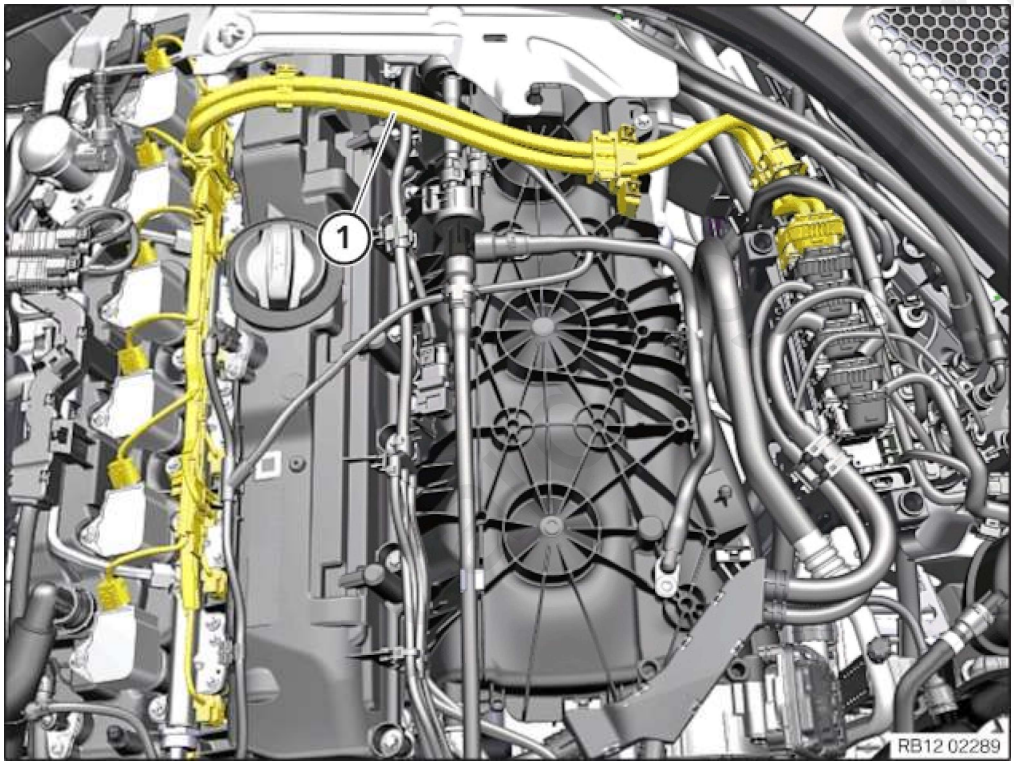
rdiagn.com



- Unlock the locks (1).
- Remove the wiring harness section (2) and put to one side.



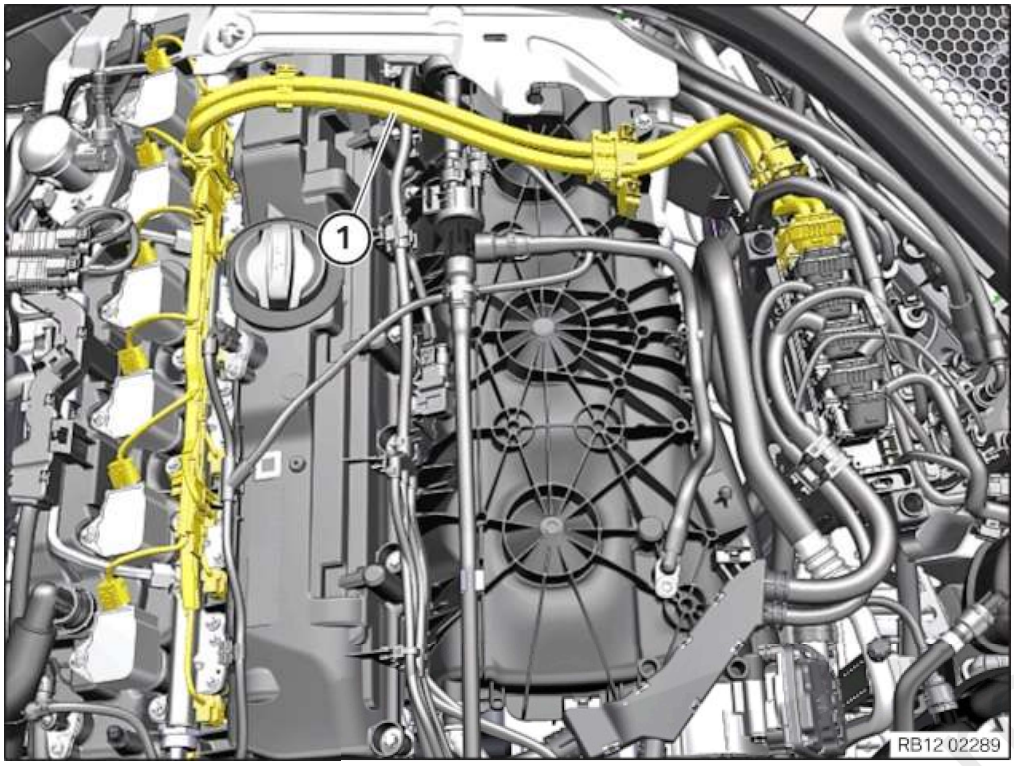
- Unlock and disconnect plug connections (1).



- Slide wiring harness (1) for injectors and ignition coils out and remove.

6 – Installing the wiring harness section for the ignition and injectors

Overview: Wiring harness for injectors and ignition coils



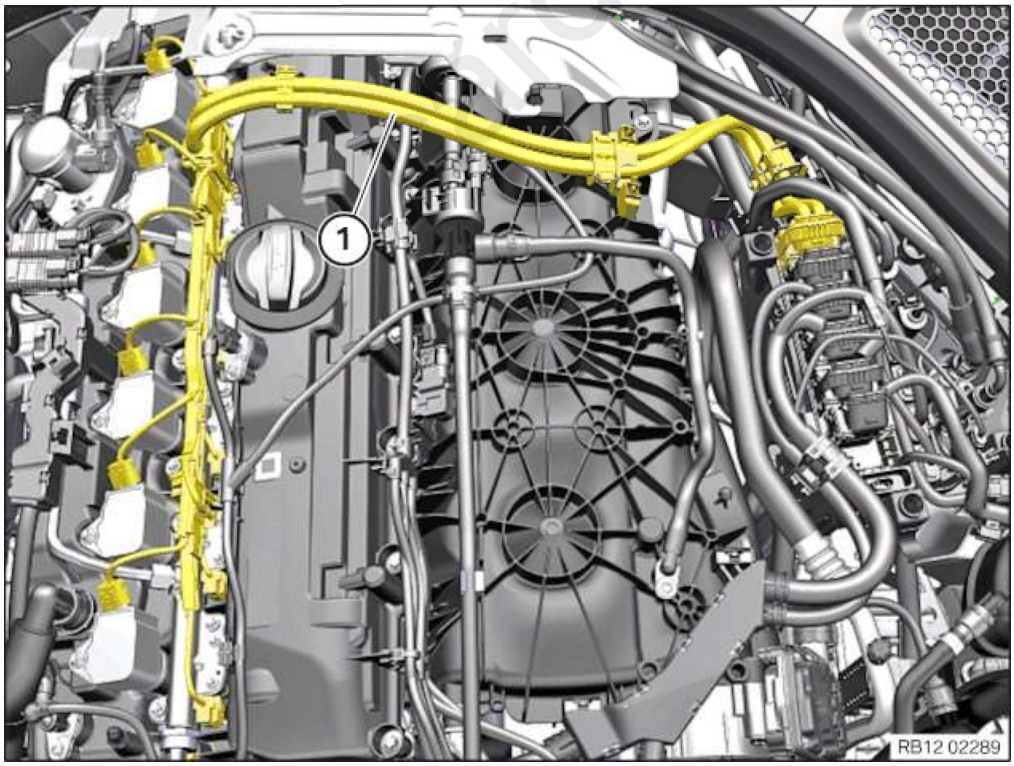
1 Wiring harness for injectors and ignition coils.

RISK OF DAMAGE

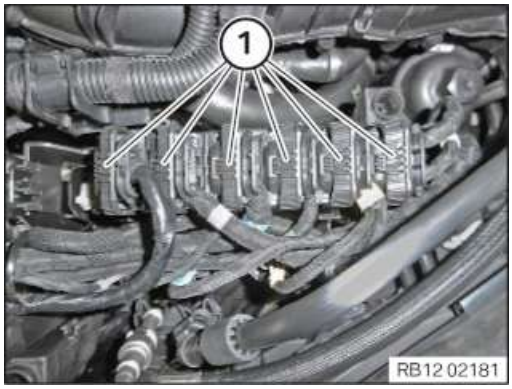
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

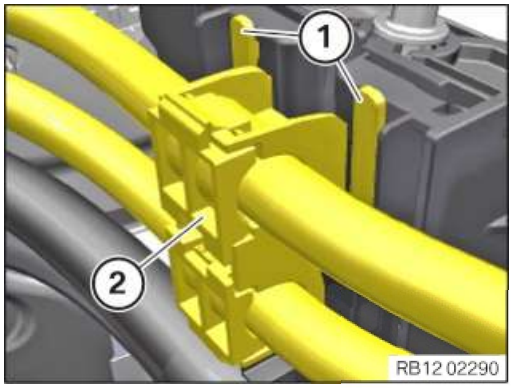
- Route all cables without abrasions, do not trap and crush.



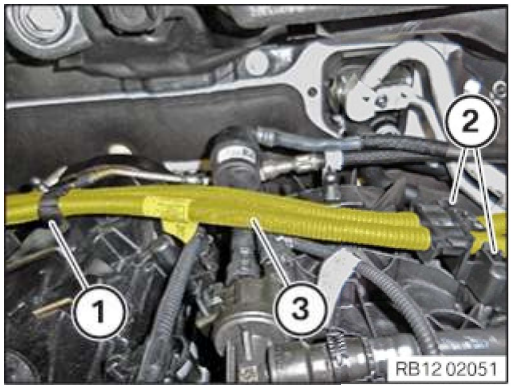
- Guide in and install wiring harness (1) for the injectors and the ignition coils.



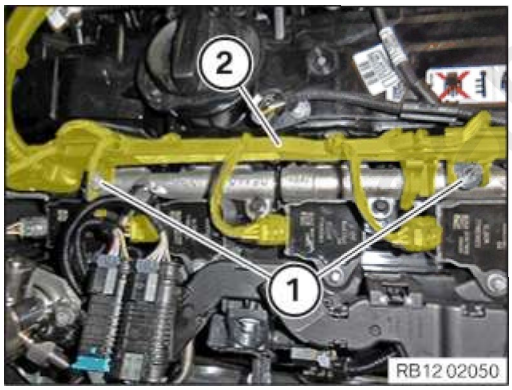
- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.



- Guide in the wiring harness section (2) and install.
- Ensure that locks (1) engage correctly.



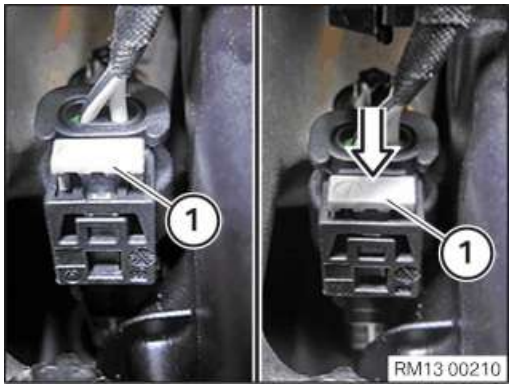
- Insert and install the wiring harness (3).
- Connect the holder (2) and lock.
  The holder (2) must engage audibly.
- Secure clamps (1).



- Guide in the wiring harness section (2) and install.
- Tighten nuts (1).

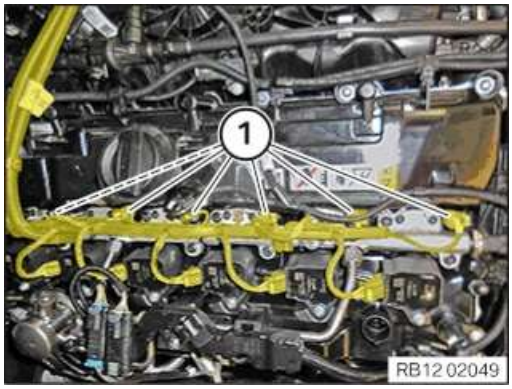
Ground cable to rail

M6			5 Nm



- Connect connector (1) with the injectors.
  The connector must engage audibly.
- Engage the lock in the direction of the arrow.

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- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

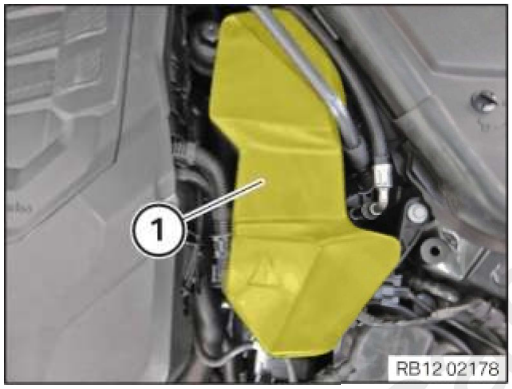


- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

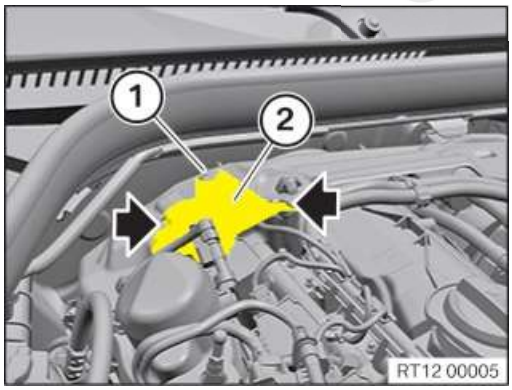
POSTPROCESSES

7 – Installing the cover of the DME control unit



- Insert and install cover (1) into guides.

8 – Mounting the service opening in sound insulation on top of engine



- Turn the sound insulation (2) at the pivot point (1) to the installation position and guide it in where marked (arrows).

9 – Install acoustic cover

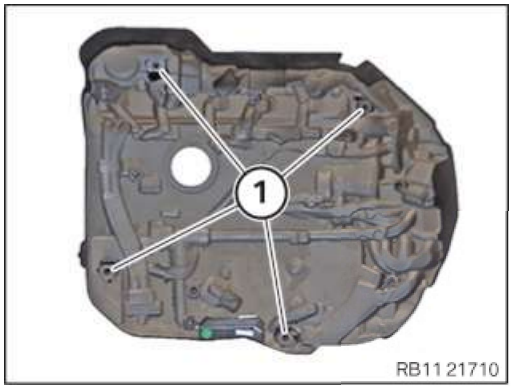
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RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the rubber mount (1) for correct fit in the acoustic cover.



- Install acoustic cover (1) and fix in the rubber mounts (marks).

10 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Ground cable to rail Used in step 6

M6			5 Nm

Links

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Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
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61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
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61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 35 ... Notes on ESD protection (Electro Static Discharge)	5

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61 00 ... Safety information on handling hybrid cars

1. *Qualification:*
   All repair work on high-voltage components may **only be performed by specially trained personnel** (qualification: Work on high-voltage inherently save vehicles) must be performed by qualified technicians. Each hybrid car requires additional vehicle specific training with training achievement controls.
   Required training is offered by the BMW Training Academy.
2. *Identification:*
   Observe **warning notices** on high-voltage components. When replacing individual high-voltage components, check if warning stickers are present. Independently attaching warnings is only allowed on the locations provided for them. Use only approved and appropriately identified original new parts.
3. *Rules of conduct/protective measures:*
   - Note operating instructions for handling high-voltage battery units.
   - Do not under any circumstances touch open high-voltage cables and high-voltage components on damaged vehicle before shutting down the high-voltage electrical system.
   - In the event of damage (mechanical, thermal) transition metal oxides, carbon, electrolyte solvents and their products of decomposition may be released.
     Suitable acid-resistant protective clothing/equipment must therefore be used when handling the vehicle!
     - Hand protection: Gloves
     - Eye protection: Safety goggles

     Damaged high-voltage battery units must be stored in an acid-resistant pan in a location in the open that is protected against the weather (sun, rain) and secured against unauthorised access. Do not inhale escaping gasses.
   - Prevent escaping substances from entering drains, pits and the sewer system.
   - Collect any material that is discharged and have it disposed of according to the work instruction, wear acid-resistant protective clothing when doing so.
   - Notify the fire brigade if fire breaks out, clear the area immediately and make accident scene safe. Attempt to extinguish the fire without putting persons in danger (suitable extinguishant: water and water foam).
   - A cut 2nd emergency separation point must be repaired with a butt connector.
4. *Measures before starting work:*
   - Each job on the vehicle must be assigned by appropriately trained personnel. Before work is started, this electrician must place the vehicle in the operating condition required to perform the relevant activity. The qualified personnel's instructions and directions absolutely must be followed. **No work may be carried out without this qualified personnel being consulted first.**
   - It is **not** permitted to work on the high voltage system or on high voltage components while the engine is running.
   - The readiness to drive must be ended before shutting off the voltage of the high-voltage system. The readiness to drive is ended when the driver is absent only under the following conditions:
     1. seat belt buckle unlocked **and**
     2. the driver's door is open **and**
     3. no brake activated **and**
     4. the accelerator pedal is not activated **and**
     5. speed < 3 km/h (2 mph)
   - Work on live high-voltage components is expressly prohibited. Before each operation on the high-voltage system, the system must be isolated from the power supply by qualified personnel (high-voltage safety connector Off) and secured against unauthorised recommissioning (padlock).
   - After each deactivation of the high-voltage system, it is essential to observe a **waiting period** of at least **10 seconds** prior to further work.
   - Before beginning work, it is mandatory to check that the equipment is de-energised and is protected against being energised again.
     Work is only permitted to begin if:
     1. Corresponding display in the KOMBI **High-voltage system deactivated** or

     When a high-voltage warning is active (indicator light, Check Control, etc.), it is essential to determine and eliminate the cause of this warning via the diagnosis system before continuing with any other work.
     If it cannot be definitively established that the equipment is de-energised, work is not permitted to begin. **Danger to life!** Before work begins, a qualified electrician (1000 V AC) must verify that the

system is de-energised using appropriate measuring devices and procedures.
=> In this case, Technical Support must be contacted!

- Do not perform any work on the vehicle while it is charging. Before starting work, disconnect the charging cable from the vehicle.
  Battery charging may result in heating of the high-voltage battery unit. This heating may lead to sporadic launches of the electric fan (switch-on request from the electric fan). Therefore, work in the vicinity of the electric fan during the charging procedure is prohibited. Ensure freedom of movement of the battery charge lines in the vicinity of the electric fan.

5. *Measures during/after activities:*
   - Identifiable mechanical damage to or tampering with high-voltage components must be reported immediately to the qualified personnel in charge.
   - When carrying out any work on the high-voltage system, it is prohibited to drive externally all the drivetrain components (wheels, gearbox, drive shafts, etc.).
   - *E72 only:* When the "Power Electronic Box Cover" is removed, the high-voltage system is not permitted to be activated. The high-voltage service disconnect must only be used when the "Power Electronics Box Cover" is completely installed.
   - High-voltage cables (orange coating) and their connectors and stop parts **may not** be repaired. If damaged, a cable must always be replaced completely.
   - When working in the vicinity of high-voltage components (identified accordingly with warning stickers and orange-coloured coating), protect these components against damage.
   - The specified work steps in the repair instructions must be adhered to exactly.
   - High-voltage components and their holders must be screwed/bolted to the defined tightening torque. Tightening torques and tightening specifications must be observed.
   - Connecting high-voltage components to body ground is crucial to safety for reasons of equipotential bonding. For this reason, it is prohibited to operate any high-voltage components without them being correctly connected to body ground. The measurements (insulation/potential equalisation measurement) are performed automatically by the vehicle. Manual measurement is not therefore necessary.
     For a correct earthing connection, the retaining elements of high-voltage components must not be painted. Follow further painting notes.
   - Removed high-boltage battery units must be stored in a manner that protects them from misuse and damage.
   - Damaged or warning stickers that are no longer legible on high-voltage components must always be replaced.
6. *Potential compensation:*
   Equipotential bonding lines, high-voltage cables and the battery negative lead to the EME are fitted with safety screws.
   - Clean contact faces and have then checked by a second person.
   - Tighten down screws/bolts to specified torque.
   - Have tightening torque checked by a second person.
   - Both persons must document that the work has been carried out correctly in the vehicle records.

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