11 40 000 Checking engine oil pressure

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

WARNING

Hot surfaces.

Risk of burning!

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

TECHNICAL INFORMATION

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

PRELIMINARY WORK

1 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

2 – 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).

3 – Removing the oil filter element

WARNING

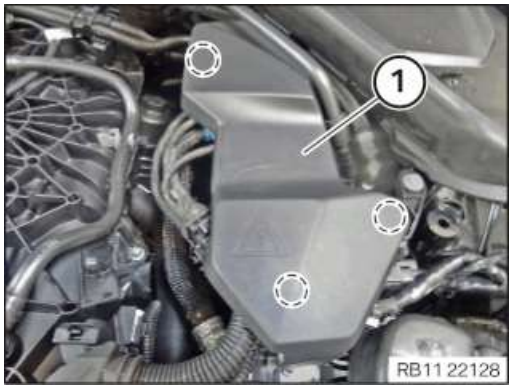
Hot surfaces.

Risk of burning!

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

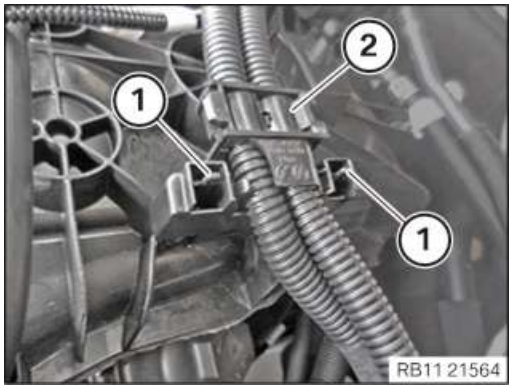
TECHNICAL INFORMATION

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



- Guide cover (1) out of the **marked** area and remove it.

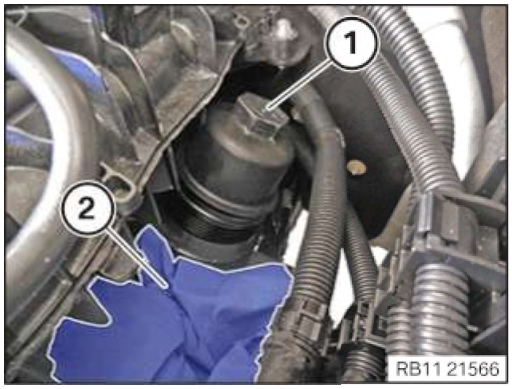
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- Unlock and loosen the locks (1).
- Thread out the wiring harness section (2) for the injectors and ignition coils and set it aside.



- Release oil filter cover (1) with a conventional tool.



- Guide out and remove the oil filter cover with oil filter element (1).
- Collect escaping engine oil with a lint-free cloth (2) as needed.

MAIN WORK

4 – Checking engine oil pressure

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

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- Have special tools ready.

Number	Description
11 4 310	Adapter
2 420 355	Adapter
2 410 238	Measuring adapter



- Guide the oil filter element (1) in the **direction of arrow** out of the oil filter cover (2) and remove.



- Guide in and install the oil filter element (1) in **direction of arrow into** the special tool 2 410 238.

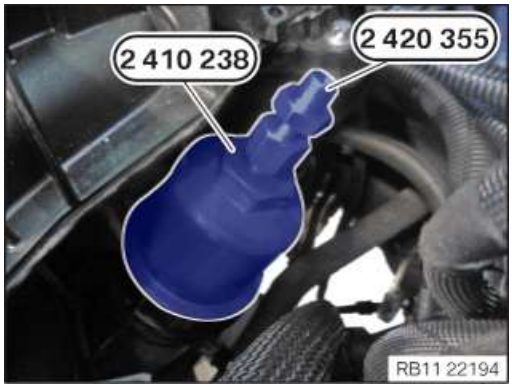
  The oil filter element (1) must engage audibly.



- Install and tighten the special tool 2 410 238.

Special tool to measure the pressure on the oil filter module

O-ring lightly oiled.	Tightening torque	25 Nm



- Install special tool 2 420 355 on special tool 2 410 238 and tighten.

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- Install special tool 0 496 623 (11 4 310) on special tool 2 420 355 and tighten.
- Lightly oil sealing ring on the 100 bar sensor.

  Standard tools:
- Screw 100 bar sensor hand-tight into the special tool 0 496 623 (11 4 310).
- Connect the 100 bar pressure sensor to the Integrated Measurement Interface Box (IMIB) using the connecting cable.

  Standard tools:



- Check engine oil pressure.
- Observe diagnosis instructions.



- Remove special tools 0 496 623 (11 4 310), 2 420 355 and 2 410 238.
- Release the oil filter element (1) from the special tool 2 410 238 in the **direction of arrow**.



- Renew sealing ring (1).

  Parts: Sealing ring
- Renew sealing ring (1) on the oil filter cover (2).



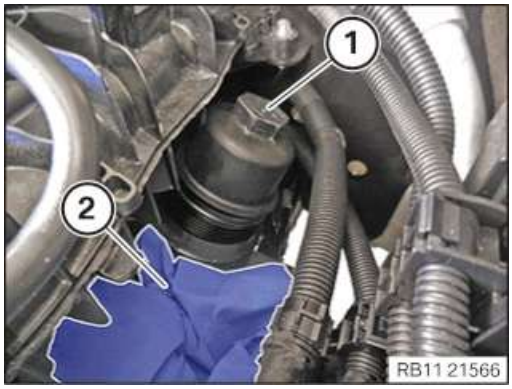
- Insert and install the oil filter element (2) on the oil filter cover (1) in the **direction of arrow**.

  The oil filter element (2) must engage audibly.

POSTPROCESSES

5 – Installing the oil filter element

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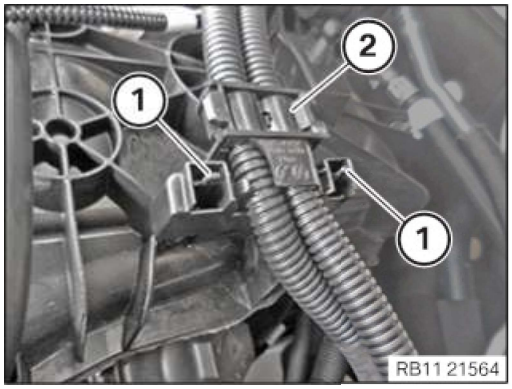
- Guide in and install the oil filter cover with oil filter element (1).
- Replace lint-free rag (2).



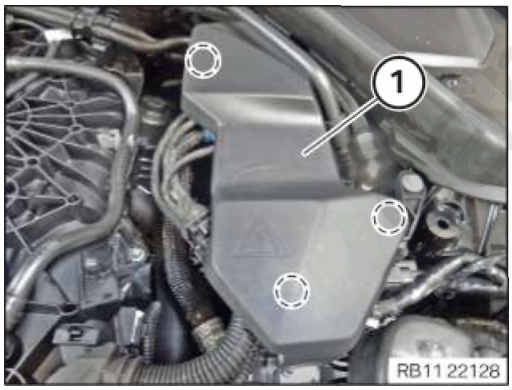
- Tighten the oil filter cover (1).

Oil filter cover to oil filter module

O-ring lightly oiled.	Tightening torque	25 Nm



- Insert and install the wiring harness section (2) for the injectors and ignition coils.
- Ensure that the locks (1) engage audibly.



- Guide in and install cover (1).
- The cover (1) must engage audibly in this **marked** area.

6 – Install acoustic cover

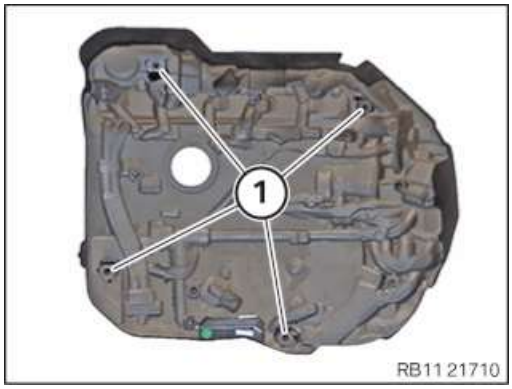
RISK OF DAMAGE

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.

mdiagn.com



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



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

7 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

Additional Information

Overview of Tightening Torques

Special tool to measure the pressure on the oil filter module Used in step 4

O-ring lightly oiled.	Tightening torque	25 Nm

Oil filter cover to oil filter module Used in step 5

O-ring lightly oiled.	Tightening torque	25 Nm

Overview of Special Tools

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2 410 238 Measuring adapter



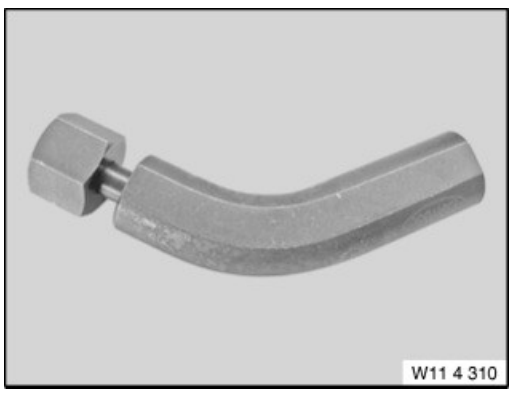
Common	Used in step 4
Usage	For oil pressure metering on the oil module. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B55
Replaced by	
In connection with	2420355
SI-Number	01 23 15 (280)

2 420 355 Adapter



Common	Used in step 4
Usage	For oil pressure metering on the oil module.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	2410238
SI-Number	01 23 15 (280)

0 496 623 (11 4 310) Adapter



Common	Used in step 4
Usage	For fuel pressure check. For variable camshaft timing control VANOS with Integrated Measurement Interface Box IMIB (100 bar sensor in delivery specification). In combination with 11 5 360.
Included in the tool or work	
Storage location	B26
Replaced by	
In connection with	11 5 360 = 0495130
SI-Number	01 27 09 (598)

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Overview Technical Data

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11 41 115 Removing and installing/replacing hydraulic valve for oil-pressure control

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

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

PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

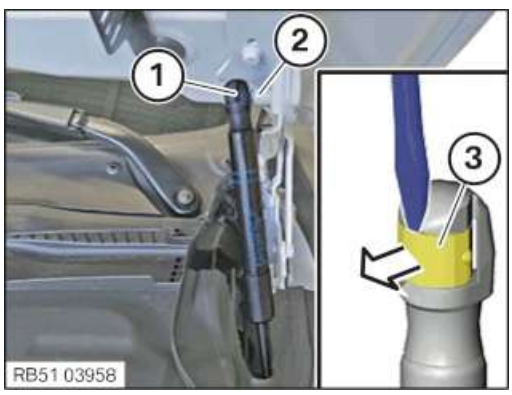
Engine compartment lid is open.

CAUTION

Shutting bonnet or tailgate.

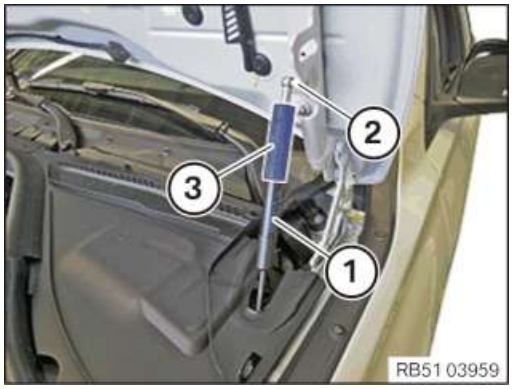
Danger of injury!

- 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.

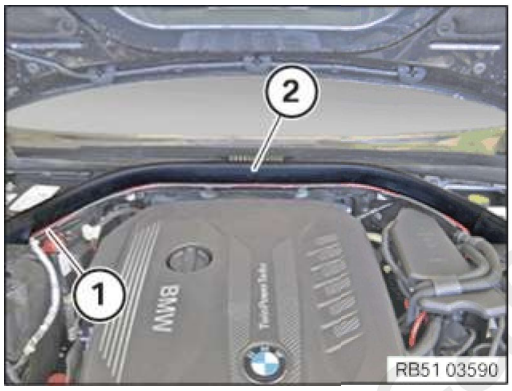
- Remove the bonnet support and open the bonnet further.
- Push special tool or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

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 – 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.

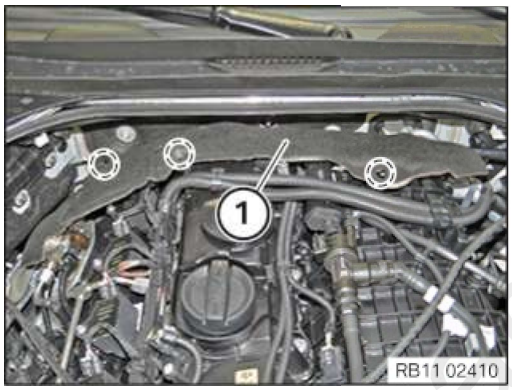
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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).

5 – Removing acoustic cover at rear



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

6 – Remove tank vent valve

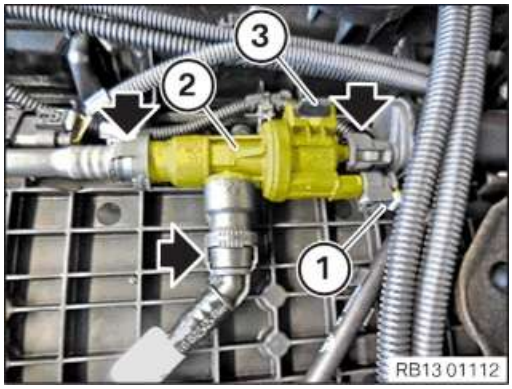
RISK OF DAMAGE

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.

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- 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).

7 – 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

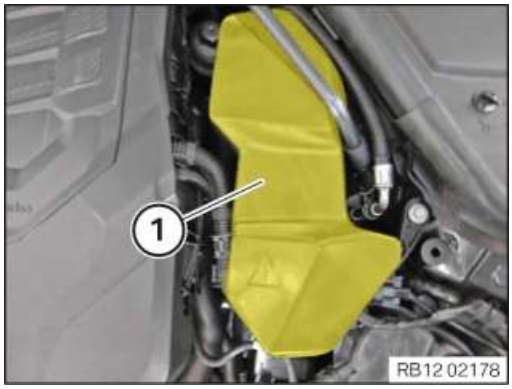
Control unit must be programmed after it is replaced.

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

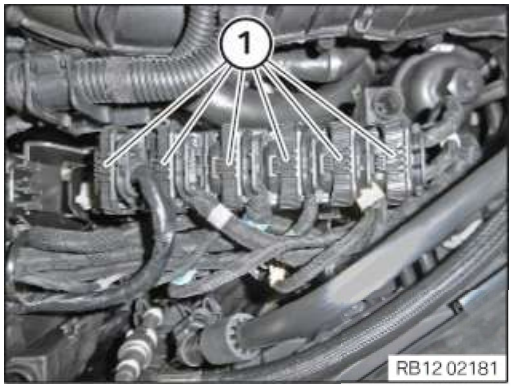
TECHNICAL INFORMATION

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

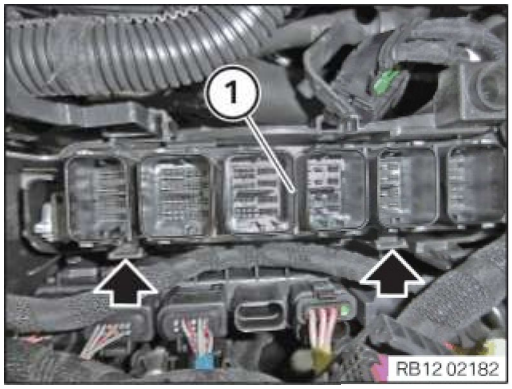
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- Pull the cover (1) towards the top and feed out.



- Unlock and disconnect the plug connection (1).



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

8 – 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.

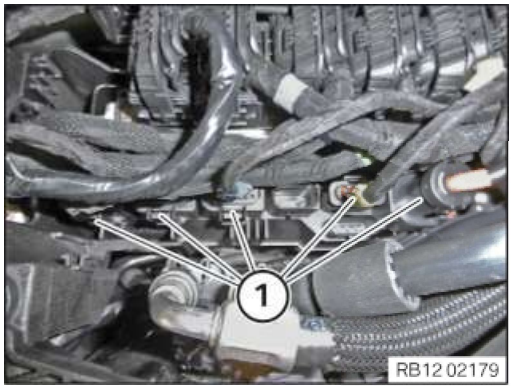
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RISK OF DAMAGE

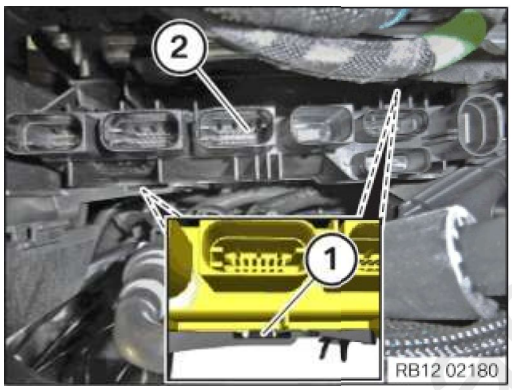
Electrostatic discharge.

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.

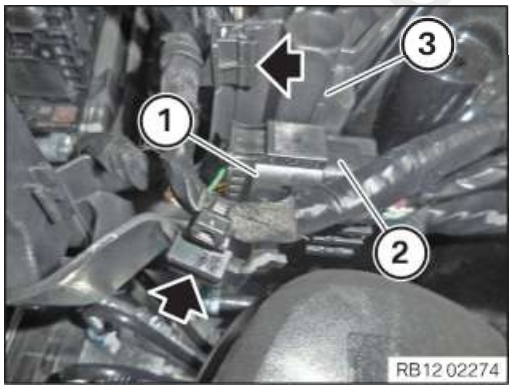


- Unlock and disconnect plug connections (1).



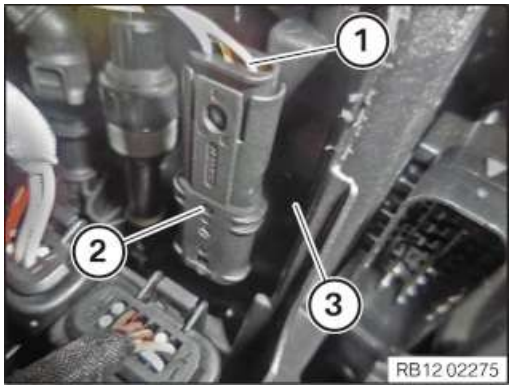
- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

9 – Removing the control unit holder

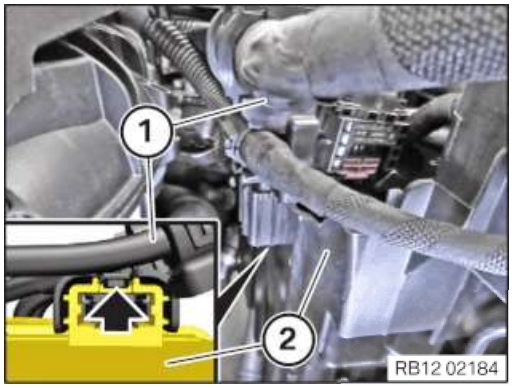


- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the control unit holder (3).
- Release the clamps (arrows).

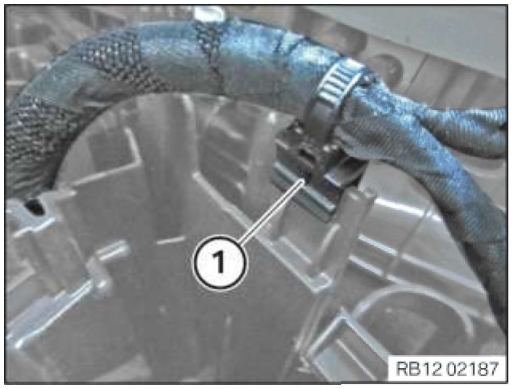
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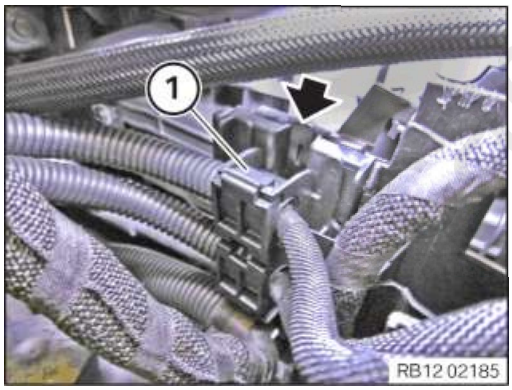
- Unlock plug connection (1) and disconnect.
- Unlock the connector and disconnect from the control unit holder (3).



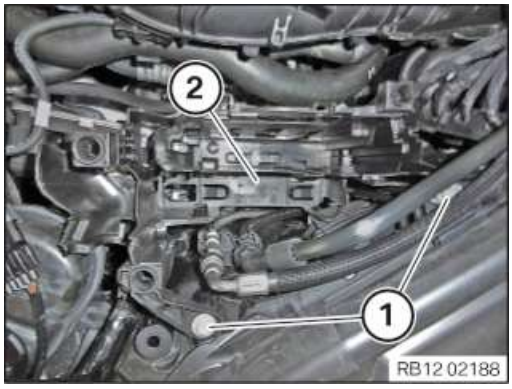
- Unlock the lock (arrow).
- Disconnect the cable holder (1) upwards from the control unit holder (2).



- Loosen clamp (1).

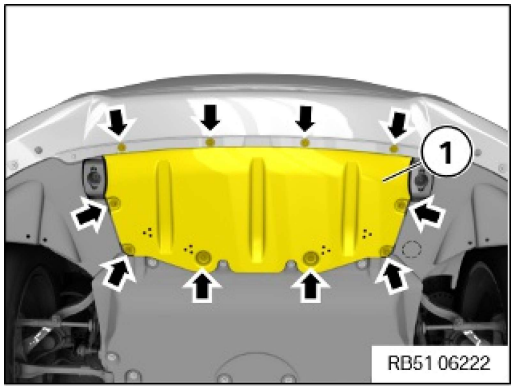


- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



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

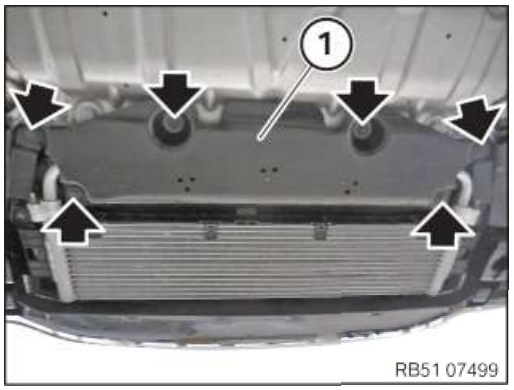
10 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

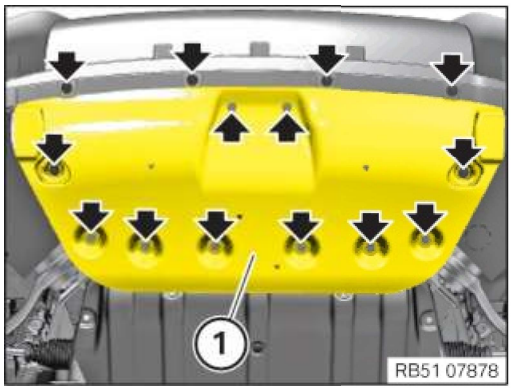
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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



- **Version 3:**

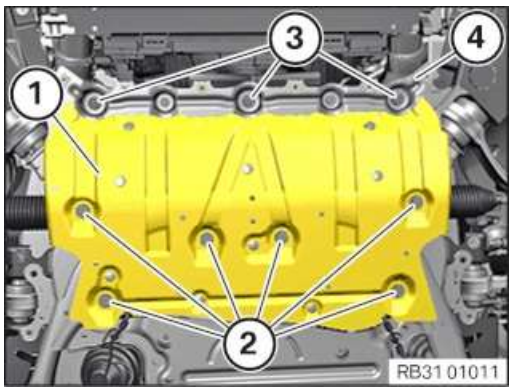
  Remove screws (arrows).

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

11 – Removing the stiffening plate

TECHNICAL INFORMATION

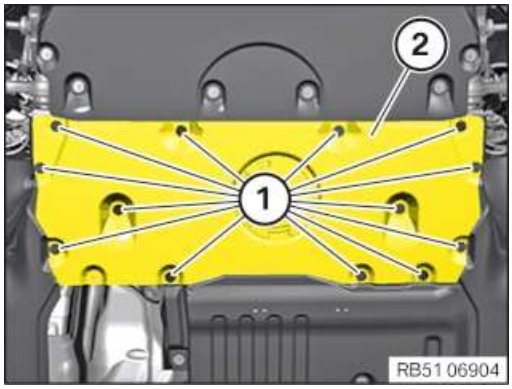
Driving without stiffening plate is not permissible.



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

12 – Removing the centre underbody protection

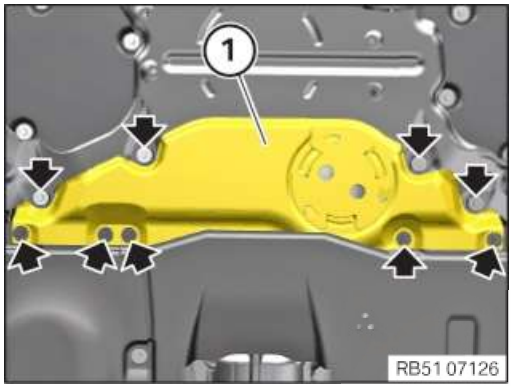
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- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .



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

  Remove screws (arrows).

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

13 – If installed: Partially release the engine oil cooler

WARNING

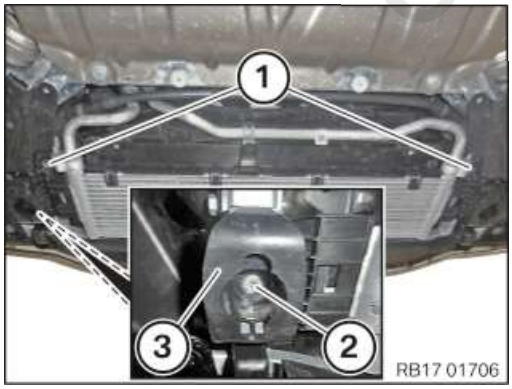
Hot surfaces.

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.

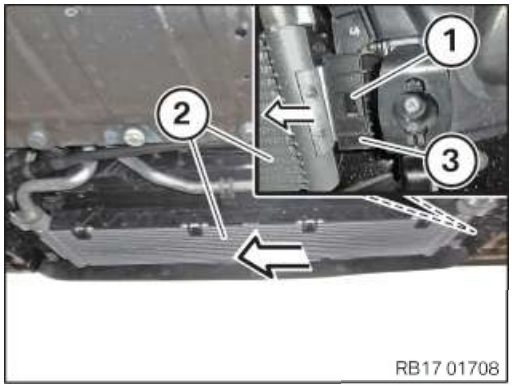


- Loosen screws (1).
- Drill out rivet on the left (2).
- Remove the left-hand damper (3).

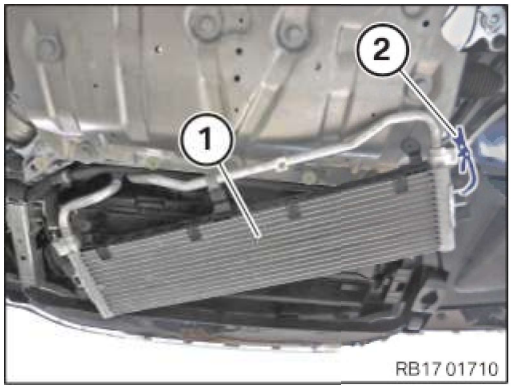
cardiagn.com



- 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.

14 – 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.

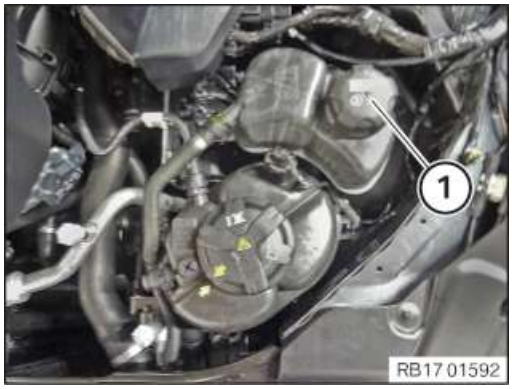
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

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.

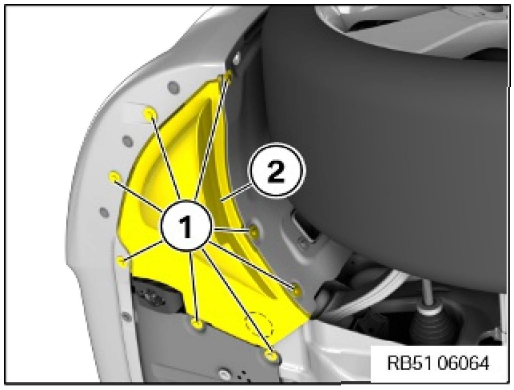
cardiagn.com

TECHNICAL INFORMATION

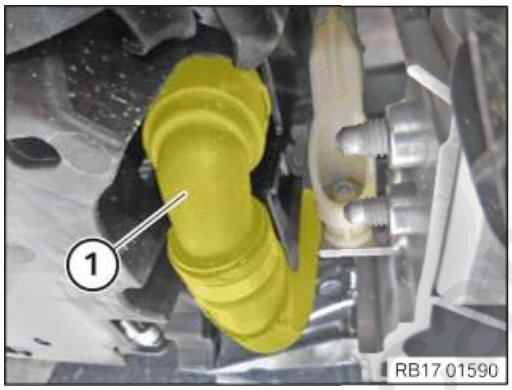
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen sealing cap (1).



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

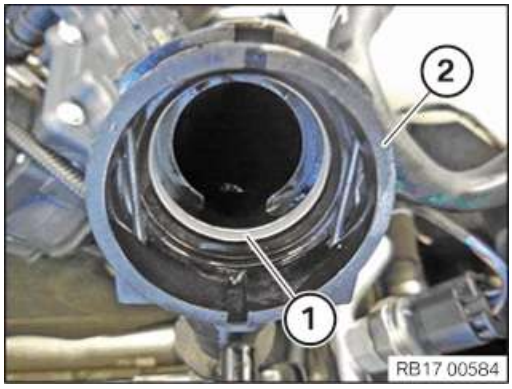


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

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

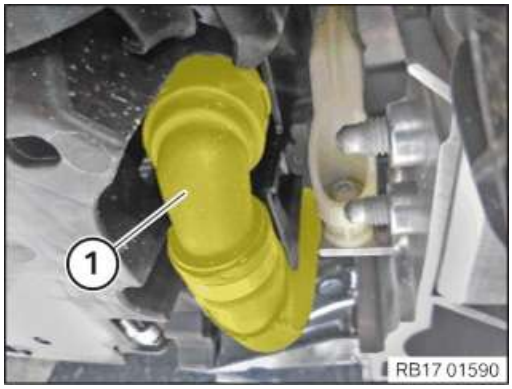
TECHNICAL INFORMATION

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



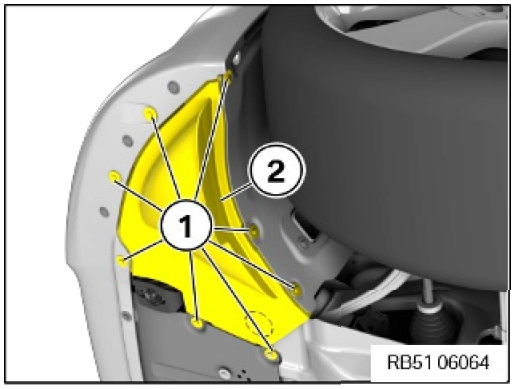
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

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- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.

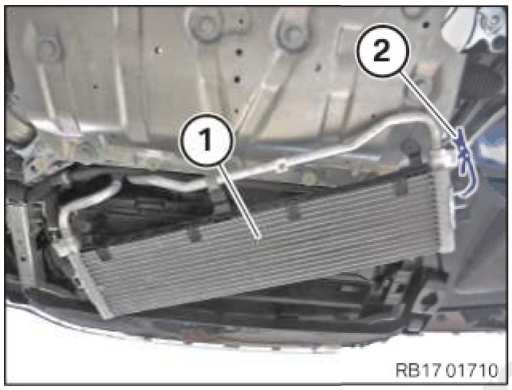


- Feed in and install cover (2) at the bottom front left.
- Tighten the screws (1).

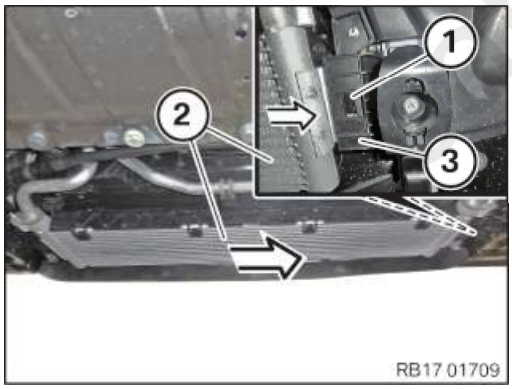
Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

16 – 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.

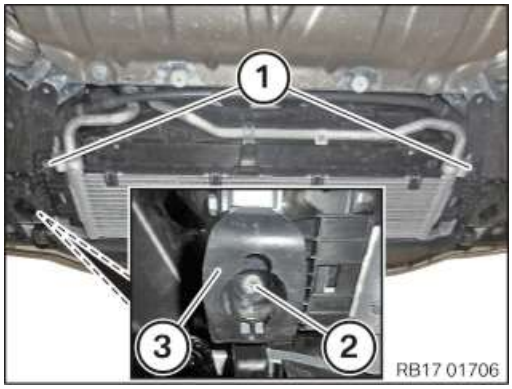


- Tighten down screw (1).

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

17 – Removing the intake plenum

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

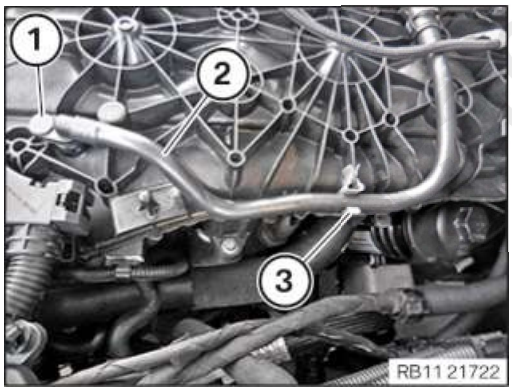
- Do not pull on the wires when disconnecting connectors and plug connections.

TECHNICAL INFORMATION

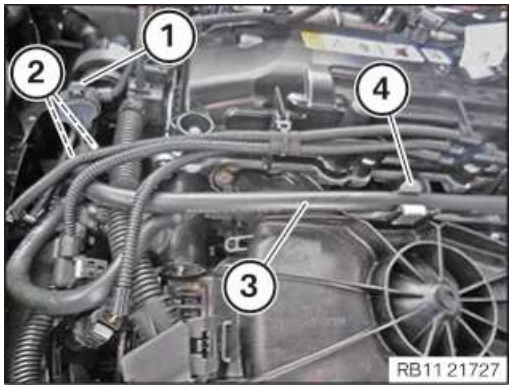
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

TECHNICAL INFORMATION

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

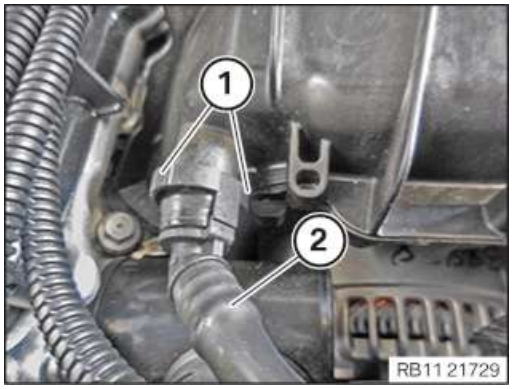


- Loosen screw (1).
- Guide tank ventilation line (2) out of clamp (3) and remove it.

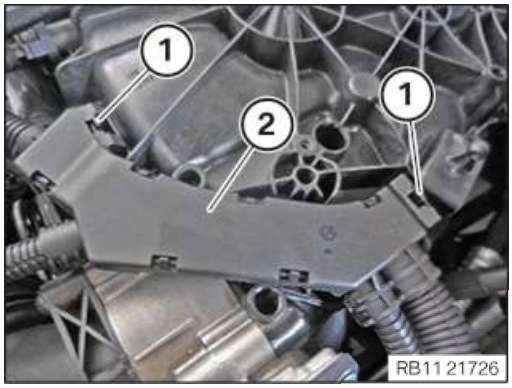


- Unlock and loosen connector (1).
- Unlock the locks (2).
- Guide tank ventilation line (3) out of clamp (4) and remove it.

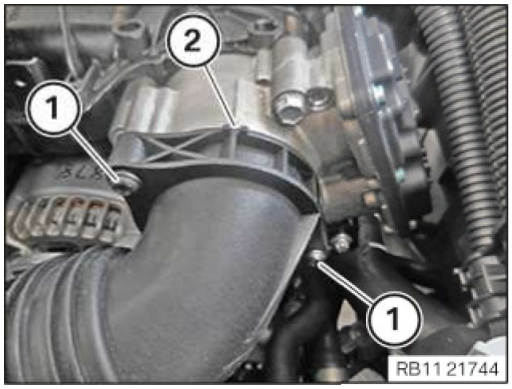
mdiagn.com



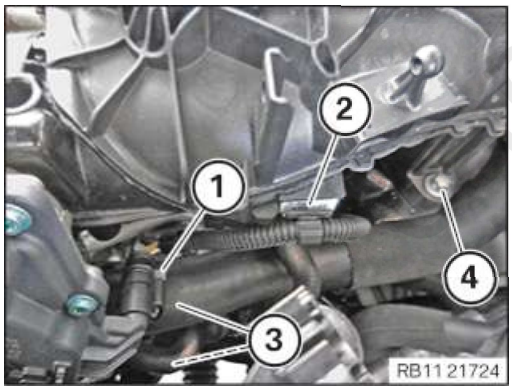
- Unlock the locks (1).
- Feed the tank ventilation line (2) out and set it aside.



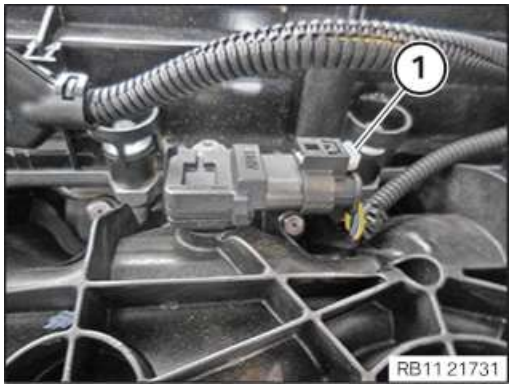
- Unlock the locks (1).
- Guide out the wiring harness section (2) for the sensor system **2** and place to one side.



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

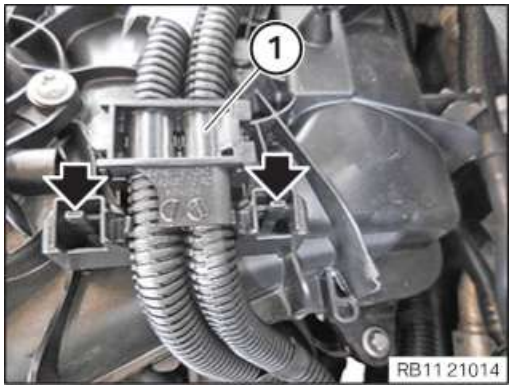


- Unlock and loosen connector (1).
- Loosen clamp (2).
- Thread off coolant line (3) and place to the side.
- Loosen screw (4).

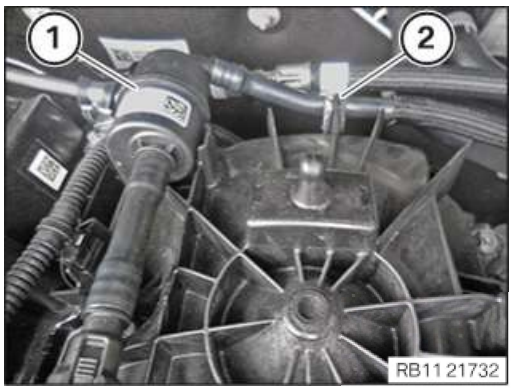


- Unlock and loosen connector (1).

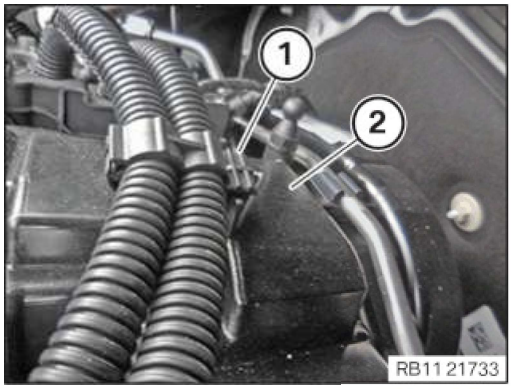
rdiagn.com



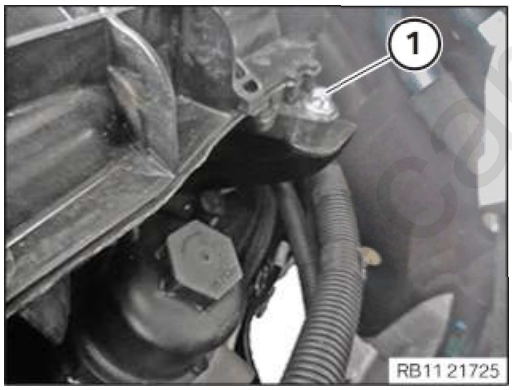
- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.



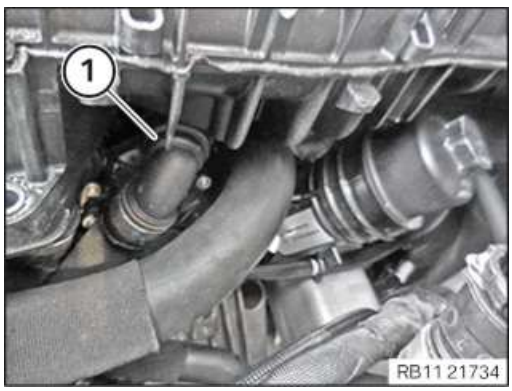
- Guide tank ventilation line (1) out of clamp (2) and place it aside.



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

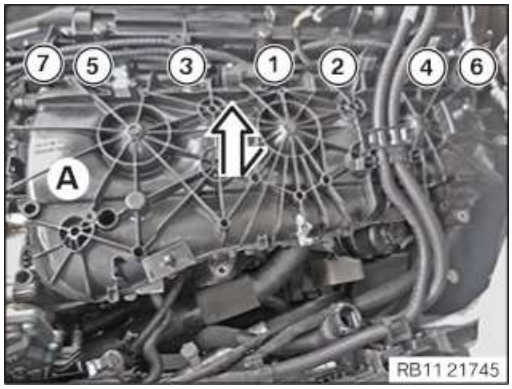


- Loosen screw (1).

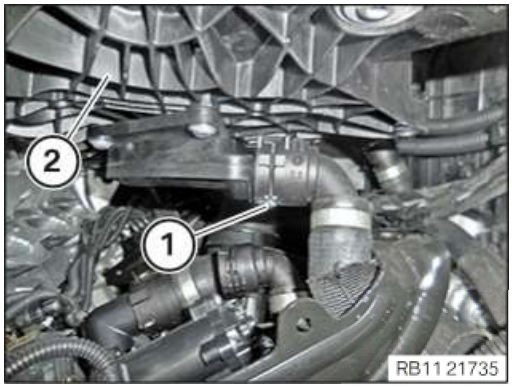


- Unlock and loosen coolant line (1).
- Catch and dispose of escaping coolant.

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- 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

18 – Removing the hydraulic valve for the oil pressure control

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.

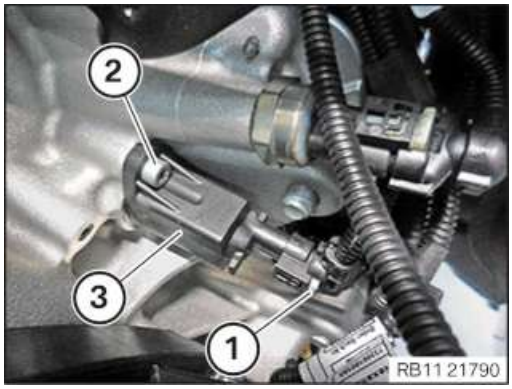
RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

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- Unlock and loosen connector (1).
- Loosen screw (2).
- Guide out and remove the hydraulic valve (2).

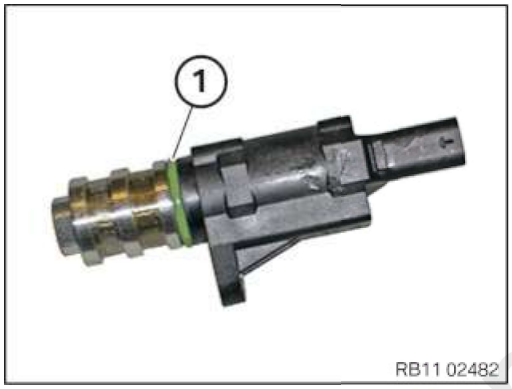
19 – Installing the hydraulic valve for the oil pressure control

RISK OF DAMAGE

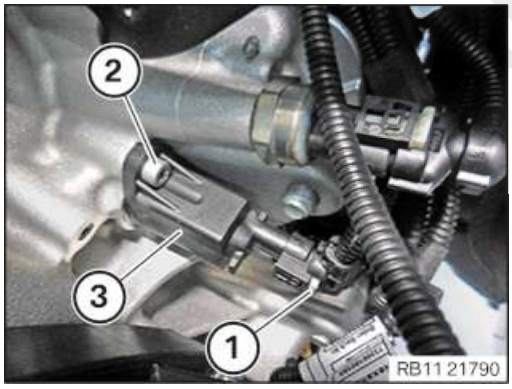
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.



- Check the O-ring (1) for damage and renew the hydraulic valve for the oil pressure control as needed.



- Feed in and install the hydraulic valve (3).
- Tighten down screw (2).

Hydraulic valve to crankcase

M6 x 18		Tightening torque	8 Nm

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

POSTPROCESSES

20 – Installing the intake plenum

RISK OF DAMAGE

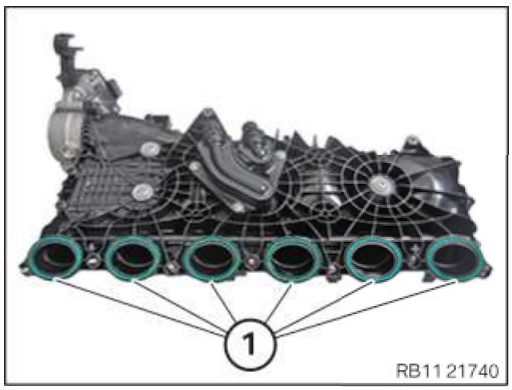
Improper routing of cables and wiring harnesses.

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.

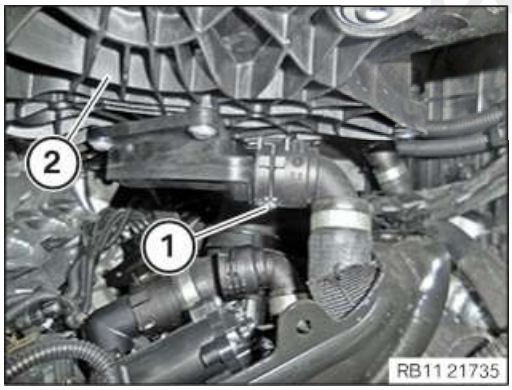


- Renew gaskets (1).

  Parts: Seals

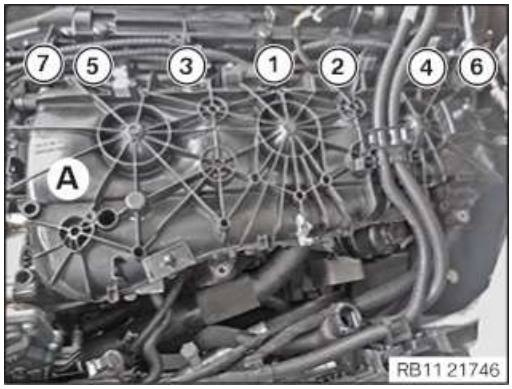


- Clean contact surface (1).



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

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TECHNICAL INFORMATION

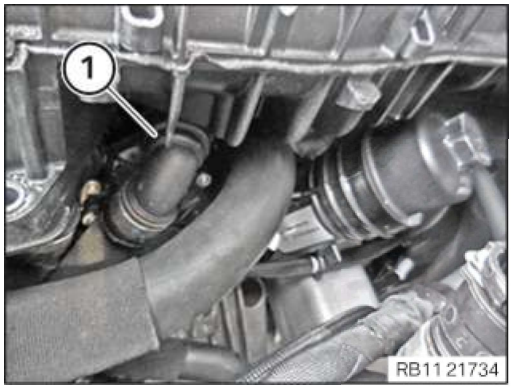
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

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

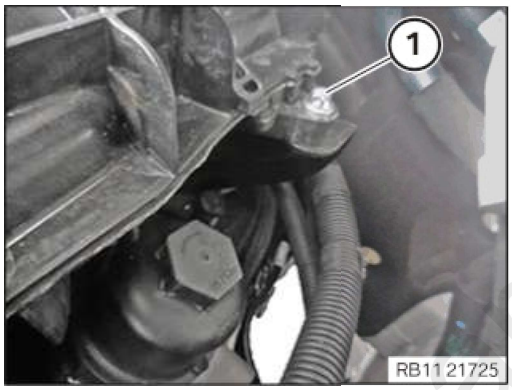
Note: Tighten the bolts in 360 degree steps.

Intake plenum to cylinder head

M6		Tightening torque	10 Nm



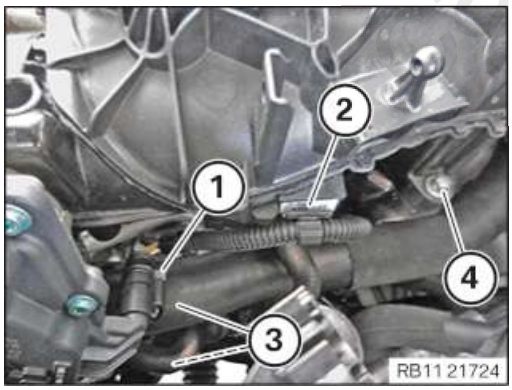
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



- Tighten down screw 1.

Intake plenum to support

M6X25	Tightening torque	8 Nm



- Tighten down screw (4).

Intake plenum to support

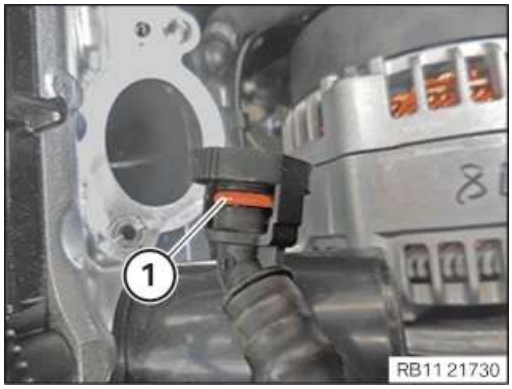
M6X25		Tightening torque	8 Nm

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

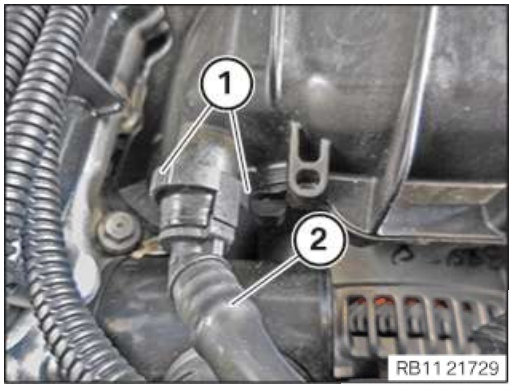


- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

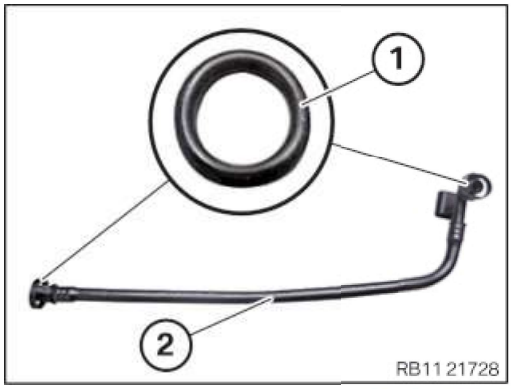
mdiagn.com



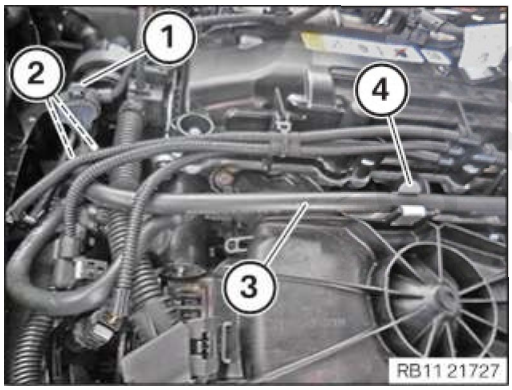
- Check sealing ring (1) for damage and renew tank ventilation line if necessary.



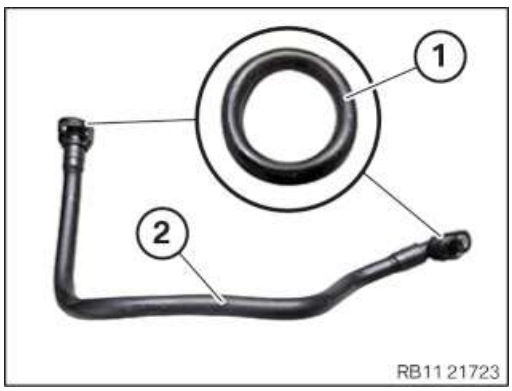
- Insert and install the tank ventilation line (2).
- Ensure that the locks (1) engage audibly.



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

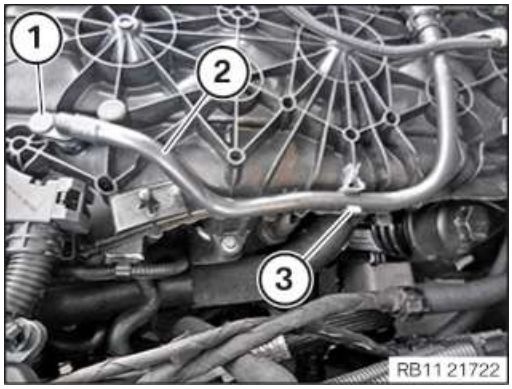


- Insert and install the tank ventilation line (3).
- Ensure that the locks (2) engage audibly.
- Secure the tank ventilation line (3) to the clamp (4).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



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

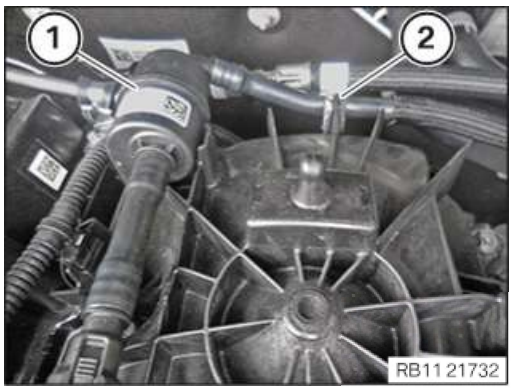
rdiagn.com



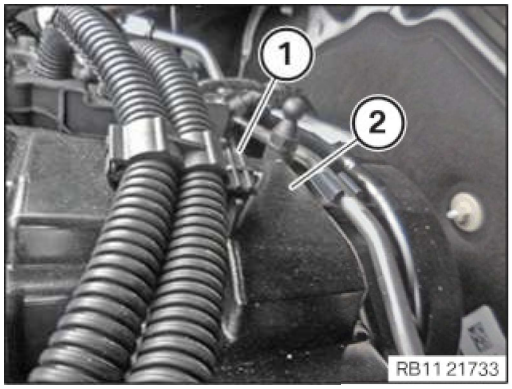
- Insert and install the tank ventilation line (2).
- Secure the tank ventilation line (2) to the clamp (3).
- Tighten down screw (1).

Tank ventilation line to intake plenum

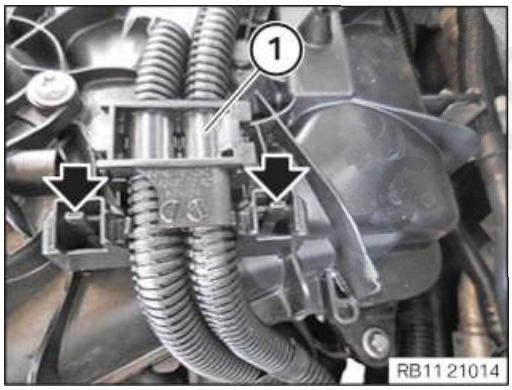
Oval-head screw		Tightening torque	3 Nm



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

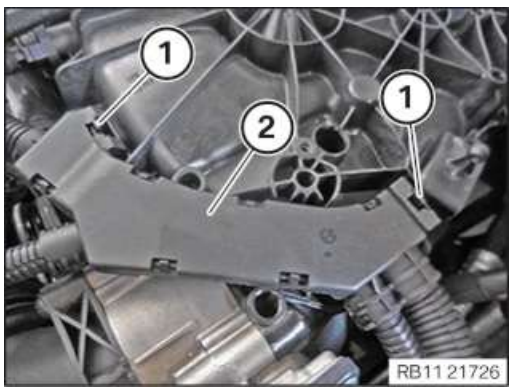


- Secure the wiring harness section(1) for the injectors and ignition coils on the cylinder head cover (2).



- Insert and install the wiring harness section (1) for the injectors and ignition coils.

  The locks (arrows) must engage audibly.

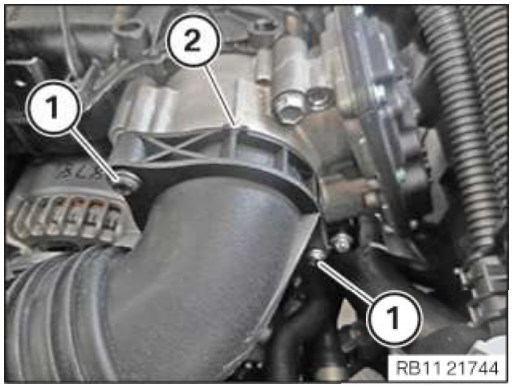


- Feed in and install wiring harness section (2) for sensor system **2**.
- Ensure that the locks (1) engage audibly.

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

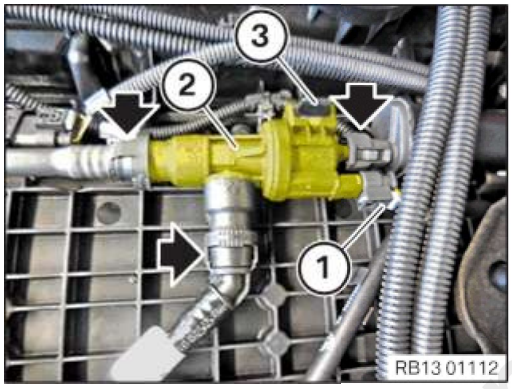


- Insert and install charge air line (2).
- Tighten the screws (1).

Charge air line to throttle valve

M6x30		Tightening torque	8 Nm

21 – Installing the tank vent valve

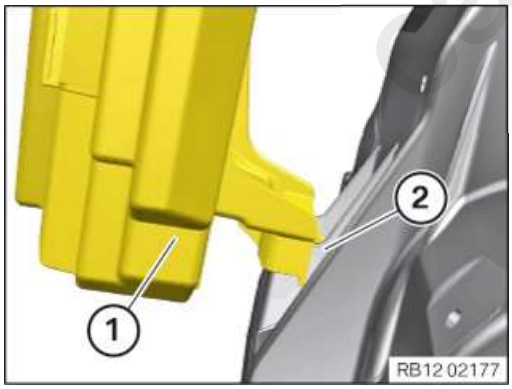


- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).

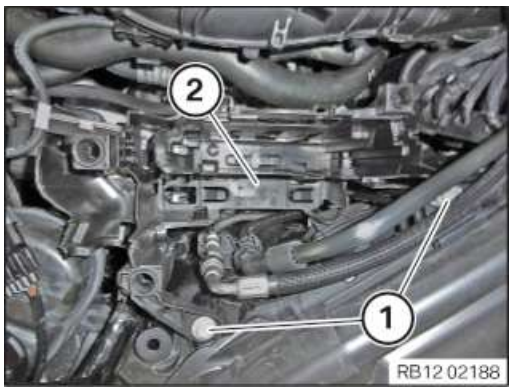
  The tank ventilation lines (arrows) must audibly engage.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

22 – Installing the control unit holder



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

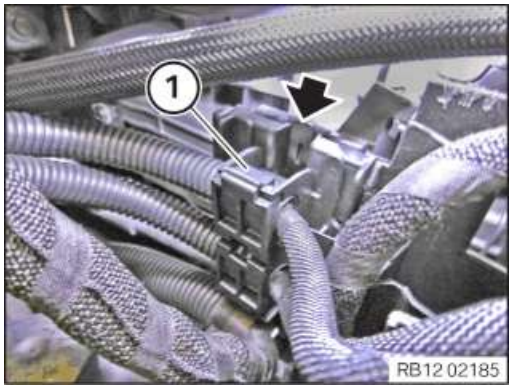


- Guide in and install control unit holder (2).
- Tighten the screws (1).

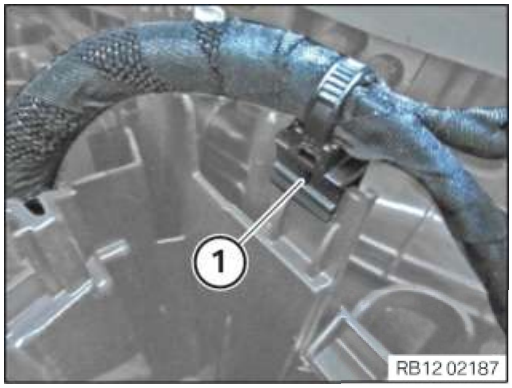
Control unit holder on spring strut dome

Hexagon screw		Tightening torque	8 Nm

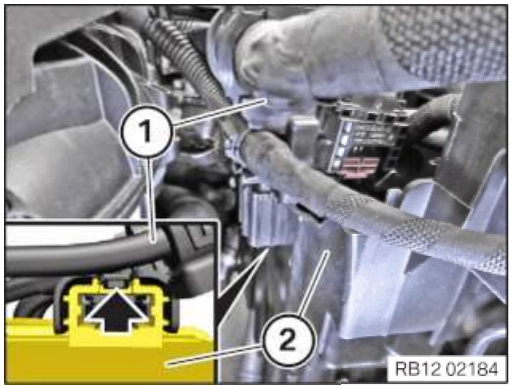
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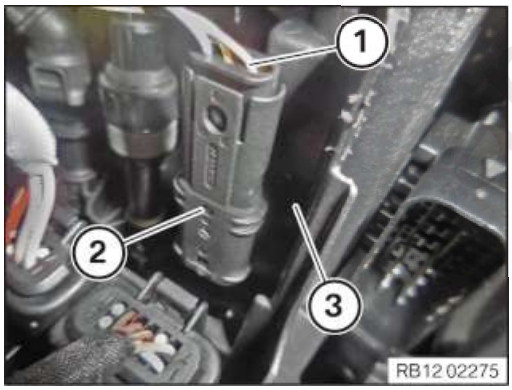
- Feed in and install the cable clip (1).
  Lock (arrow) must audibly engage.



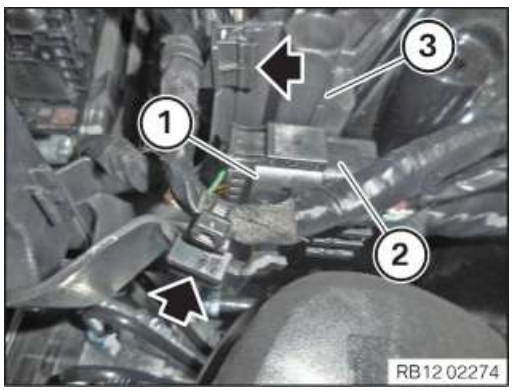
- Secure clamps (1).



- 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).

23 – Installing the integrated supply module (PDM)

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WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

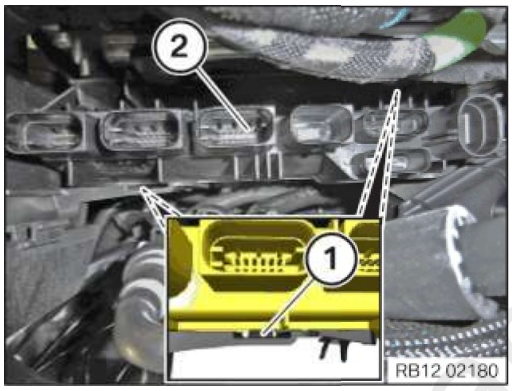
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

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).

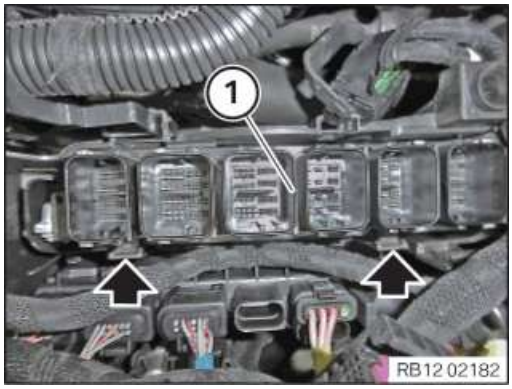
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



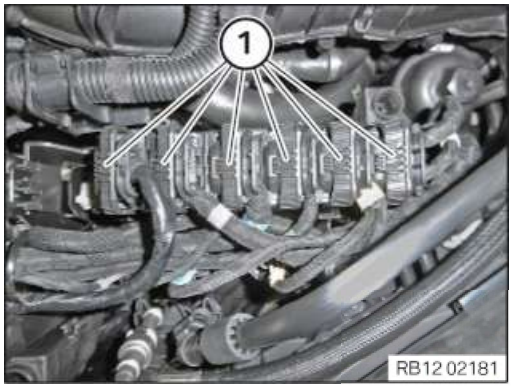
- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

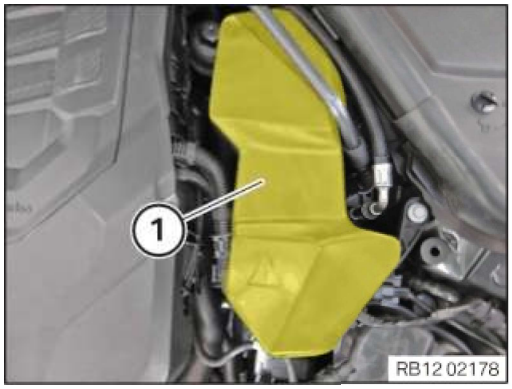
24 – Installing the DME control unit



- 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.

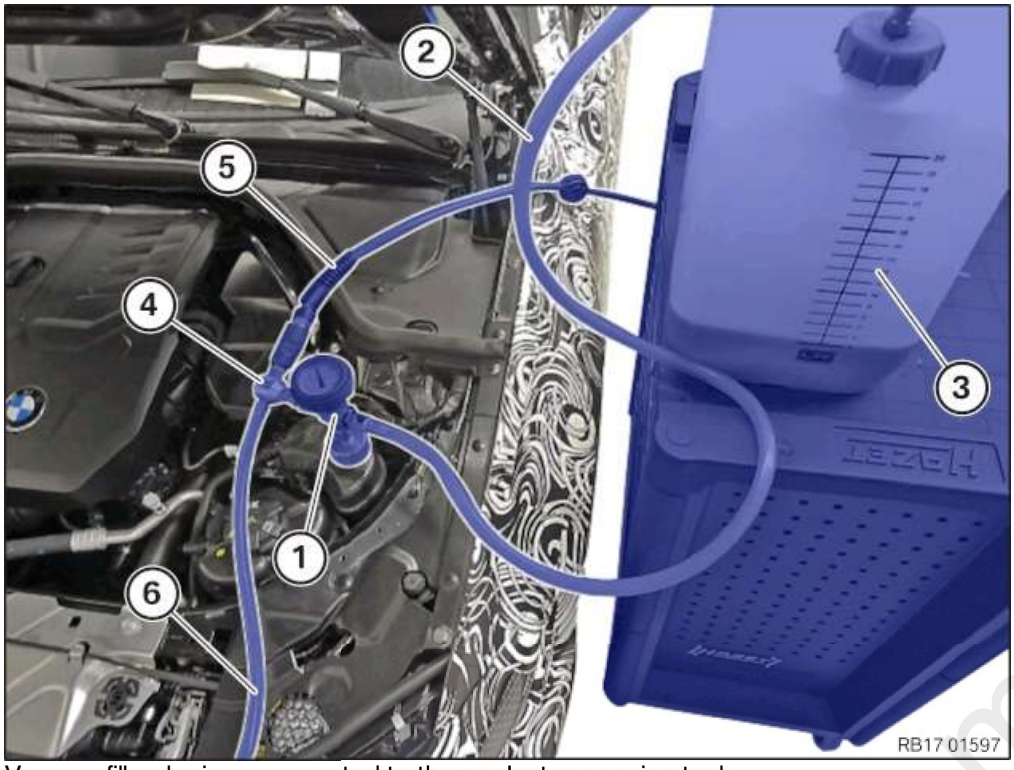


- Insert and install cover (1) into guides.

25 – Filling the low-temperature cooling system with the vacuum filler device

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Vacuum filler device



Vacuum filler device - connected to the coolant expansion tank

1 Vacuum filler device with pressure gauge and shutoff valves

2 Filling hose

3 Fluid tank with coolant

4 Venturi nozzle

5 Compressed air connection (maximum of 6 bar)

6 Out-going hose (lead out-going hose into a collecting vessel)

Prerequisite

The coolant expansion tank for the cooling system must be empty. The fluid tank of the vacuum filler device must have a sufficient quantity of premixed coolant, 1 l to 2 l more than the specified capacity for the vehicle. The fluid tank of the vacuum filler device must be positioned at the same height as the coolant expansion tank. The compressed air connection must have a pressure of 6 bar. Ignition is switched off.

TECHNICAL INFORMATION

Follow notes for repair work on the cooling system.

For additional information see:

Main group 17

17 00 ... Notes for working on the cooling system

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

Mixing different coolants is not permitted.

TECHNICAL INFORMATION

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

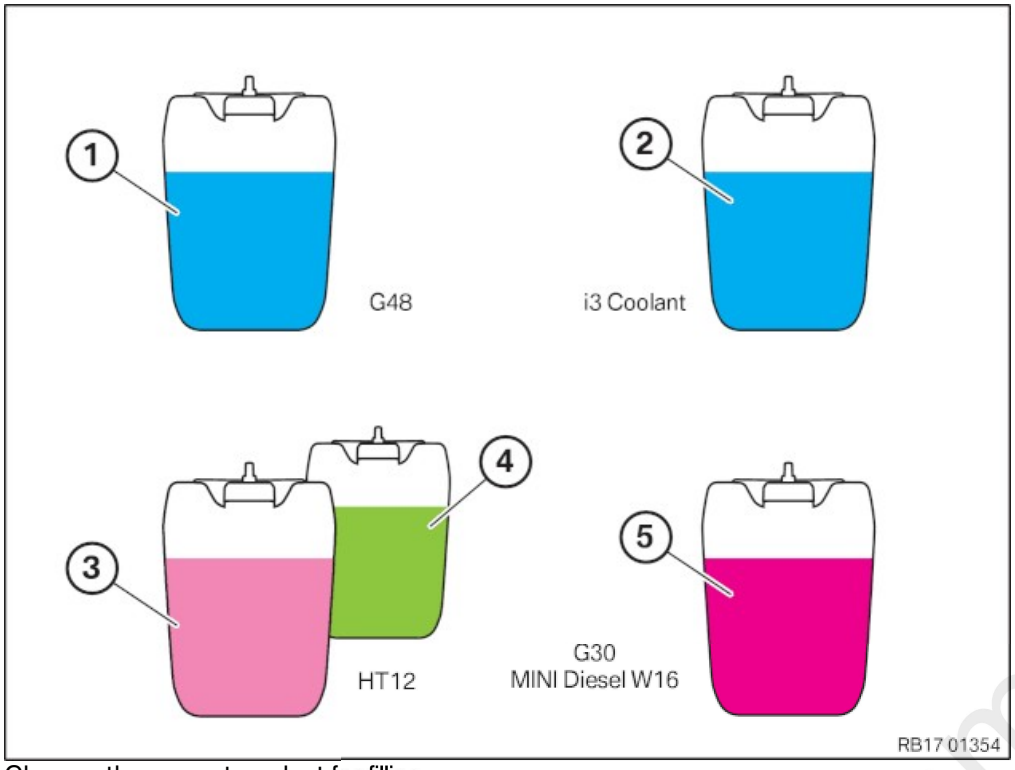
TECHNICAL INFORMATION

Make sure that the ignition (terminal 15) is switched off prior to creating the vacuum with the vacuum filler device.

▸ **Observe the coolant type**

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Coolant in the vacuum filler device container



Choose the correct coolant for filling

A vehicle must be filled with the coolant with which it is delivered ex works

1. G48 (Blue) G48 must not be mixed with the i3Coolant or the G30 MINI diesel fuelW16.

2. i3 coolant (blue) is used only for the i3 heater circuit. i3 coolant must not be filled in the other coolant circuits or mixed with the other coolants.

3. HT12 (Pink) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

4. HT12 (Green) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

5. G30 (Pink) must be used only for the **MINI diesel fuel W16**. G30 must not be filled in the other coolant circuits or mixed with the other coolants.

RISK OF DAMAGE

Damage to the engine.

The use of an incorrect coolant may lead to corrosion or gelling in the engine.

- Use only approved coolants for the specific vehicle.
- Fill the vehicle only with the coolant with which it was delivered ex works.
- Mix only compatible coolants. The colour does not allow any assessment about the compatibility of coolants.
- Selection of the correct coolant only by means of the part number.

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- Select a suitable adapter (Y) from the set of special tools 0 494 417 (17 0 100):

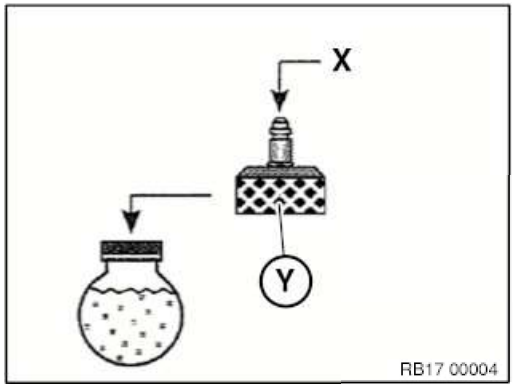
Type	Engine	Adapter (Y) from 17 0 100
G20/G29	B46 / B48 /B58	17 0 109

- The fluid tank of the vacuum filler device must be filled with 1 l to 2 l more than the specified capacity of coolant for the vehicle.

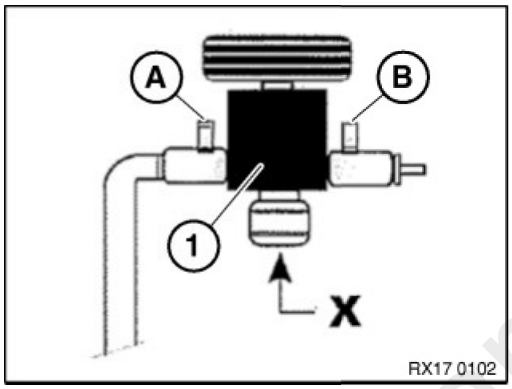
Capacity of low-temperature coolant circuit G20/G29

B58B30O1	4,5 l

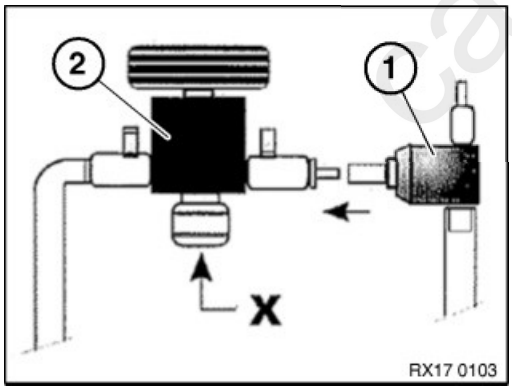
Expendable materials: Technically suitable antifreeze and corrosion inhibitor



- Connect the selected adapter (Y) to the coolant expansion tank.
- Connect vacuum filler device to connection (X) of the adapter.

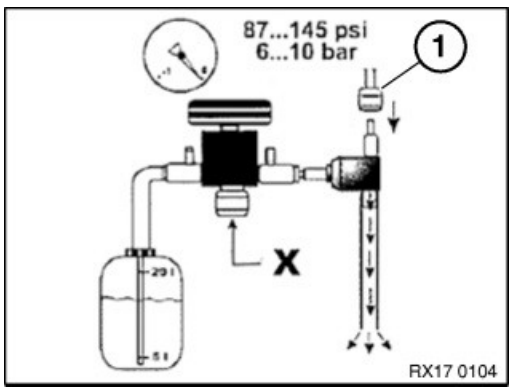


- Check that shutoff valves (A) and (B) of the vacuum filler device (1) are closed.
- Connect and lock connection (X) to the coolant expansion tank.



- Connect Venturi nozzle (1) to the vacuum filler device (2).

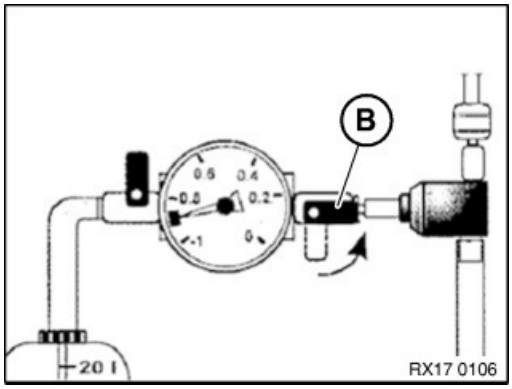
  (X)is the connection on the coolant expansion tank.



- Connect compressed air (1).

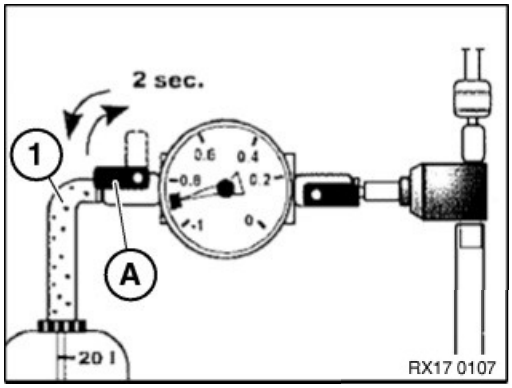
  (X)is the connection on the coolant expansion tank.

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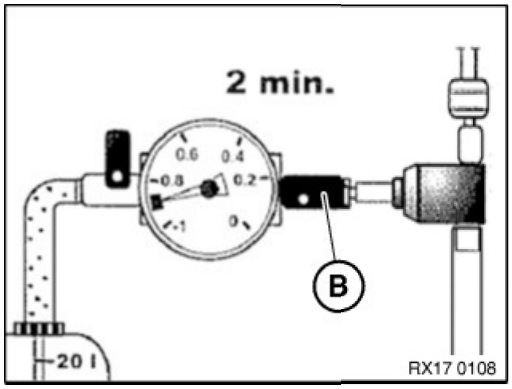
- Open shut-off valve (B).

  The venturi nozzle produces a flow noise.



- Open shutoff valve (A) until the fuel filling hose (1) is full without bubbles.
- Close shutoff valve (A) again.

» The filling hose (1) has now been bled.

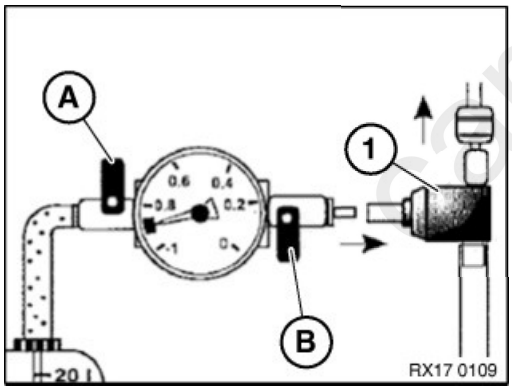


- Check the coolant hoses for porosity and renew porous coolant hoses as required.

TECHNICAL INFORMATION

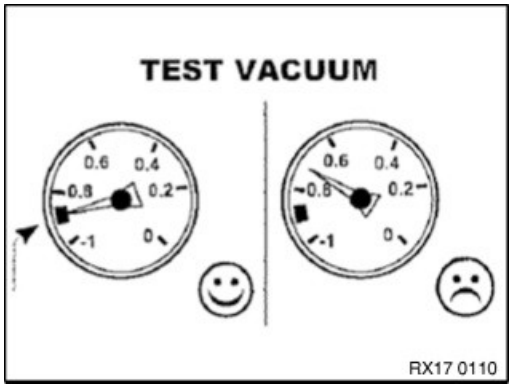
The coolant hoses contract during vacuum build-up.

- After a vacuum of -0.7 to -0.95 bar has been created in the coolant circuit (duration approx. 2 min), shut the shutoff valve (B).



- Check whether the shutoff valves (A) and (B) are closed.
- Disconnect the Venturi nozzle (1).

Check



- The vacuum in the coolant circuit must be maintained for at least 30 seconds.

Result

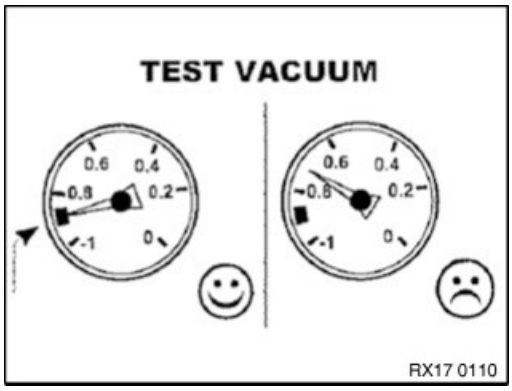
» Vacuum drops.

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Measure

- Look for the leak, repair it and start the filling procedure from the beginning.

Check



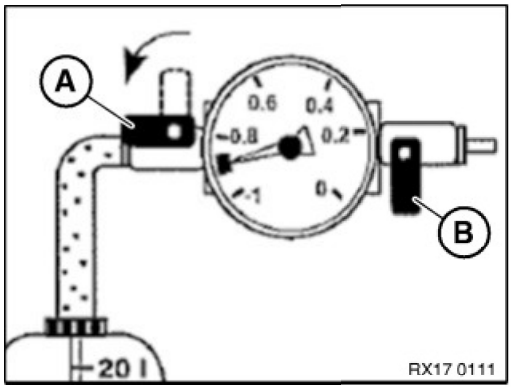
- The vacuum in the coolant circuit must be maintained for at least 30 seconds.

Result

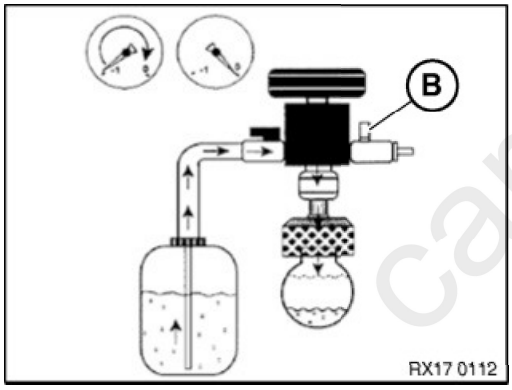
» Vacuum remains constant.

Measure

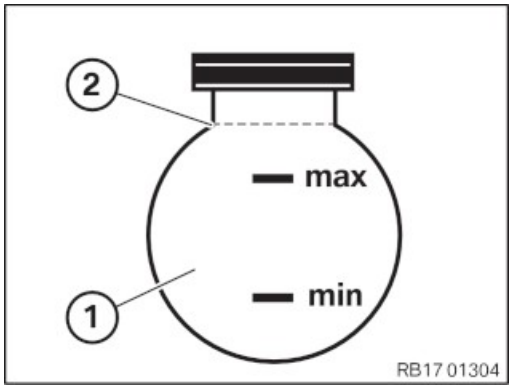
- Continue with filling.



- Keep shutoff valve (B) closed during the filling process.
- To fill the cooling system, open the shutoff valve (A) to the fluid tank of the vacuum filler device.



- Stop the filling procedure when the needle in the pressure measuring device is on 0 bar or it no longer drops.
- If necessary, reduce remaining vacuum. In order to do so, open shutoff valve (B).



- Remove the vacuum filler device with the adapter from the low-temperature coolant expansion tank (1).
- Adjust the coolant level in the low-temperature coolant expansion tank (1) up to the lower edge of the coolant filler neck (2) of the low-temperature coolant expansion tank (1).
- After filling the cooling system with the vacuum filler device, **also** run the cooling system bleeding routine.

26 – Disconnecting all battery earth leads

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- See additional information.

27 – Bleeding the low-temperature cooling system

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

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

TECHNICAL INFORMATION

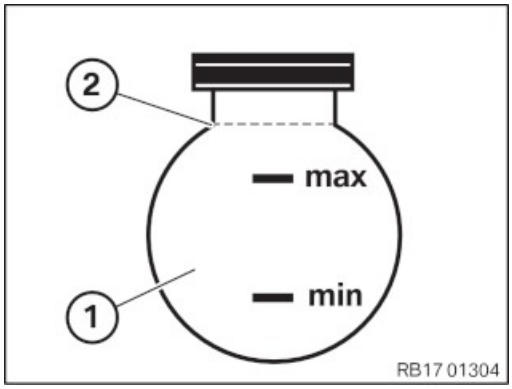
Before starting the automatic cooling system bleeding routine, make sure that **all coolant circuits** are **filled**. If the cooling system bleeding routine is started while one of the coolant circuits is empty, there is a risk of damage to the electric coolant pump when running it dry.

Make sure that terminal 15 is not disconnected for the bleeding procedure. Switch on low-beam headlights and hazard warning lights. If the low-beam headlights and hazard warning lights are not switched on, the ignition (terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.

TECHNICAL INFORMATION

The driving experience switch must not be set to the ECO PRO switch position.

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- Adjust the coolant level in the low-temperature coolant expansion tank (1) up to lower edge (2) of the coolant filler neck of low-temperature coolant expansion tank (1).
- Close the sealing cap on the coolant expansion tank of the low-temperature coolant circuit.
- Ensure that the bonnet is **open**.
- Connect battery charger.
- Switch on the ignition and ensure that it remains **switched on** (for example, activate the low-beam headlight and the hazard warning lights **at the same time**).
- If the low-beam headlight and the hazard warning light are **not** switched on, the ignition (**terminal 15**) will switch off automatically after some time and interrupts the bleeding procedure.
- Ensure that the Driving Experience Control is **not** in the **"ECO-PRO"** switch position.
- Adjust the heating to **maximum** temperature and adjust the blower to the **lowest** stage.
- Hold the accelerator pedal down to the limit position for at least **10 s** and do **not** press on the brake pedal.
- Do **not** start engine.

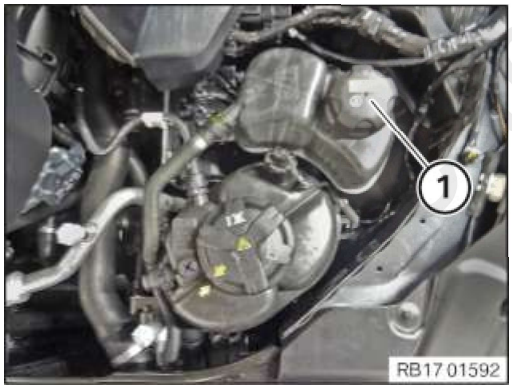
  The cooling system bleeding routine will start.

  The electric coolant pump in the low-temperature coolant circuit is activated for 11 minutes according to a cooling system bleeding routine.

  The cooling system bleeding routine ends after 11 minutes.

  The electric coolant pump is **no** longer activated.
- Note the display in the instrument cluster (KOMBI).

  If the service function is interrupted, the cooling system bleeding routine **must** be repeated.
- Allow the coolant temperature to cool down to **< 50°C**.



- Loosen sealing cap (1).



TECHNICAL INFORMATION

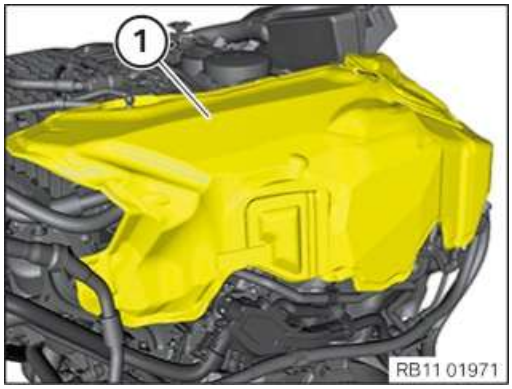
After the cooling system bleeding routine, the cooling system is topped up above the maximum mark.

Overfilling the cooling system serves to balance the remaining air in the cooling system.

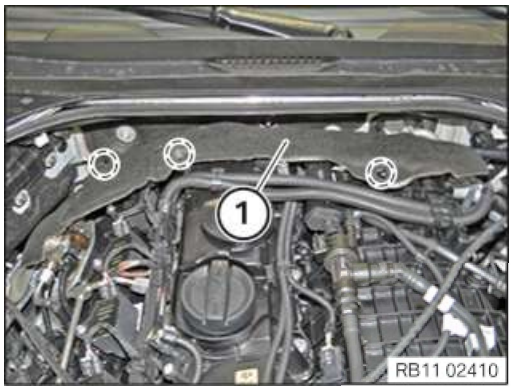
The normal filling level of the coolant is reached while driving.

- Adjust the filling level in coolant expansion tank (2) of the low-temperature coolant circuit to **100 ml** above the **maximum mark** (1) .
- Close sealing cap (1).

28 – Installing acoustic cover at rear

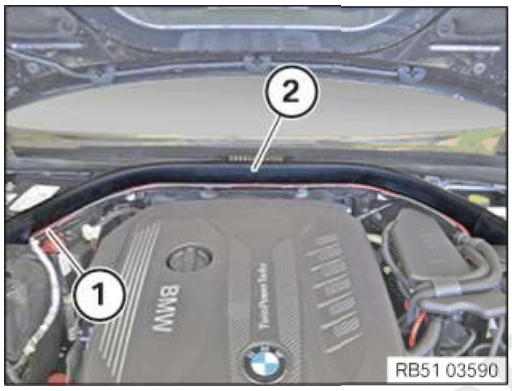


- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



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

29 – 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.

30 – Install acoustic cover

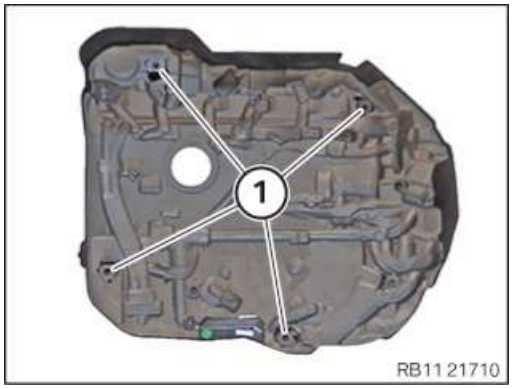
RISK OF DAMAGE

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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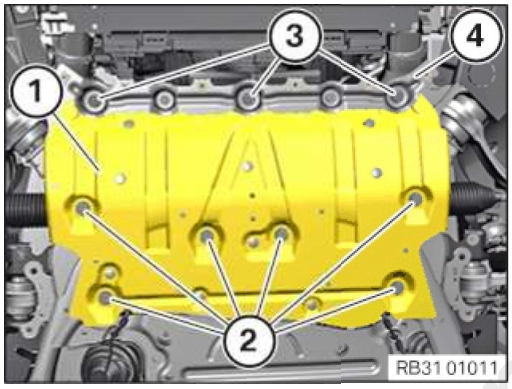


- Check the rubber mount (1) for correct fit in the acoustic cover.



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

31 – Installing the stiffening plate

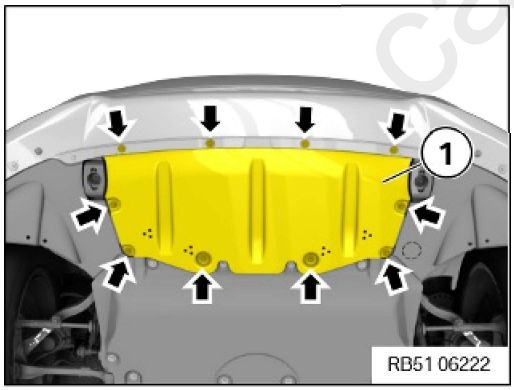


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

32 – Installing the front underbody protection



- **Version 1:**

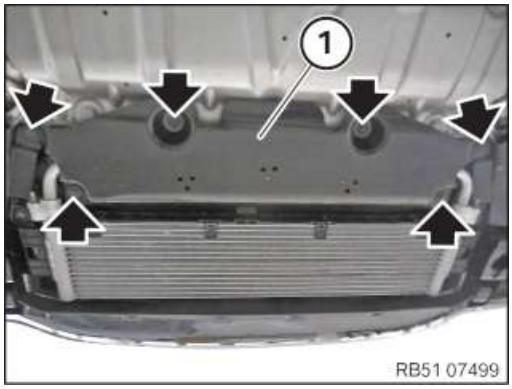
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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

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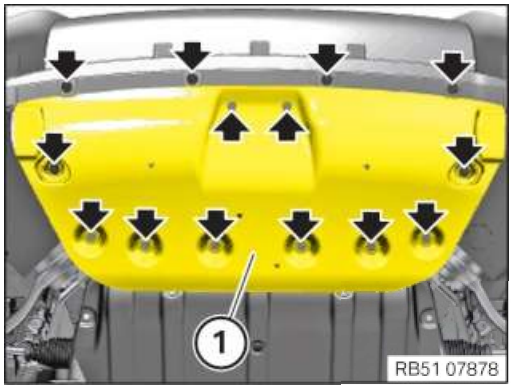
- **Version 2:**

  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:**

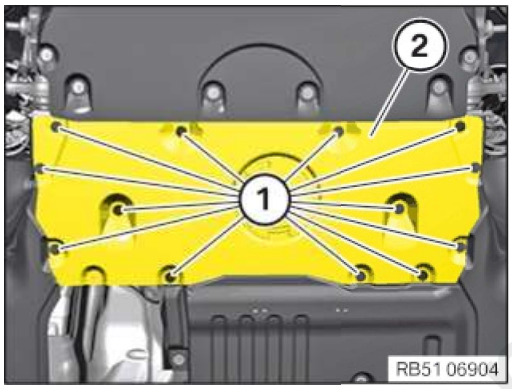
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

33 – Installing the centre underbody protection



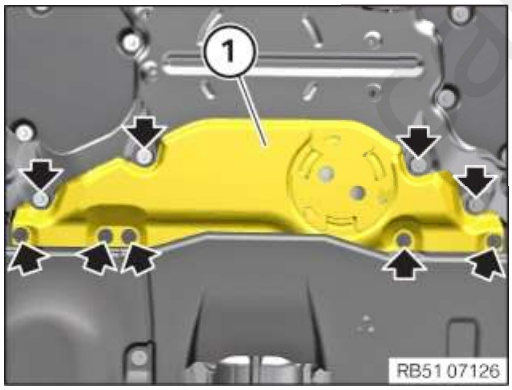
- **Version with rear-wheel drive:**

  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).

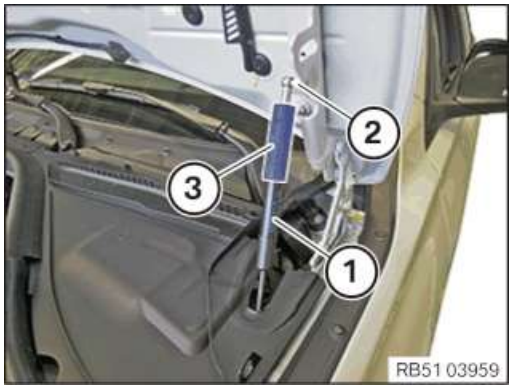
Underbody protection

Hexagon screw		Tightening torque	3 Nm

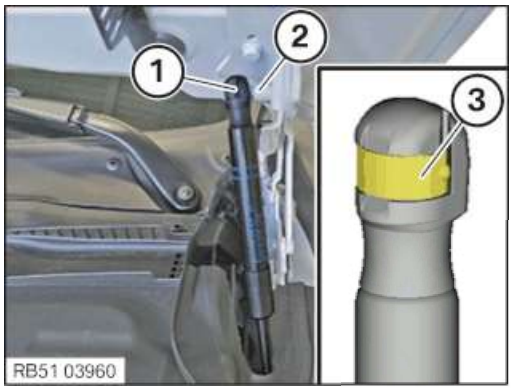
34 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

35 – 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 1516

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Engine oil cooler to bumper support — Used in step 16

M6X25		Tightening torque	8 Nm

Hydraulic valve to crankcase — Used in step 19

M6 x 18		Tightening torque	8 Nm

Intake plenum to cylinder head — Used in step 20

M6		Tightening torque	10 Nm

Intake plenum to support — Used in step 20

M6X25		Tightening torque	8 Nm

Tank ventilation line to intake plenum — Used in step 20

Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle valve — Used in step 20

M6x30		Tightening torque	8 Nm

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Control unit holder on spring strut dome			Used in step 22
Hexagon screw		Tightening torque	8 Nm

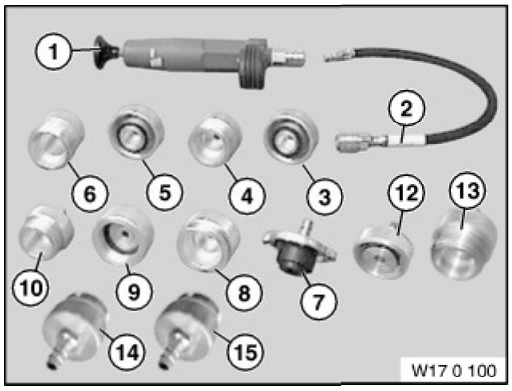
Stiffening plate to front axle support			Used in step 31
M10		Tightening torque	56 Nm

Underbody protection front			Used in step 32
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Underbody protection			Used in step 33
Hexagon screw		Tightening torque	3 Nm

Overview of Special Tools

0 494 417 (17 0 100) Tester



Common		Used in step 25
Usage	For checking engine cooling system on watertightness. For checking radiator cap.	
Included in the tool or work		
Storage location	Individual	
Replaced by		
In connection with		
SI-Number	01 07 02 (884)	

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
5	0 494 422 (17 0 105)		**Adapter** For radiator cap (sawtooth thread)	
10	0 494 427 (17 0 111)		**Adapter** For radiator cap R53/W11, R50/W17 adapter replaced 17 0 052.	
1	0 494 418 (17 0 101)		**Pump**	
2	0 494 419 (17 0 102)		**Hose** (hose with quick-release coupling)	
3	0 494 420 (17 0 103)		**Adapter** For radiator cap (normal thread)	
4	0 494 421 (17 0 104)		**Adapter** For radiator cap (normal thread)	
6	0 494 423 (17 0 106)		**Adapter** For radiator cap (sawtooth thread)	

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7	0 494 424 (17 0 107)		**Adapter** For radiator cap R50 / W10	
8	0 494 425 (17 0 108)		**Adapter** For radiator cap R50 / W10	
9	0 494 426 (17 0 109)		**Adapter** For radiator connection R53/W11, R50/W17 adapter corresponds to 17 0 051	
11	0 494 428 (17 0 112)		**Case**	
12	0 494 642 (17 0 113)		**Adapter** For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)	
13	0 494 643 (17 0 114)		**Adapter** For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)	
14	0 495 889 (17 0 115)		**Adapter** For radiator cap Model series: N12, N14	

Overview Technical Data

Capacity of low-temperature coolant circuit G20/G29	Used in step 25
B58B30O1	4,5 l

Expendable materials: Technically suitable antifreeze and corrosion inhibitor

Links

General repair instructions	**Used in step**
12 00 ... Instructions for removal and replacement of control units	724

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	226
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	226
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226

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61 20 900 Disconnecting and connecting battery earth lead	226
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61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 20 900 Disconnecting and connecting battery earth lead	226
61 35 ... Notes on ESD protection (Electro Static Discharge)	6781823
61 00 730 Encode/program control unit(s) (after vehicle test)	24
17 00 ... Notes for working on cooling system.	25

Operating materials	**Used in step**
Main group 17	25

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This documentation refers to special tools that were not yet available when going to press.

11 41 000 Removing and installing/replacing oil pump

WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.

WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.

WARNING

Motor vehicle may slip off the vehicle hoist if the weight is distributed unevenly.

Danger! Life-threatening injuries!

- Ensure there is a specific weight compensation on the motor vehicle.

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.

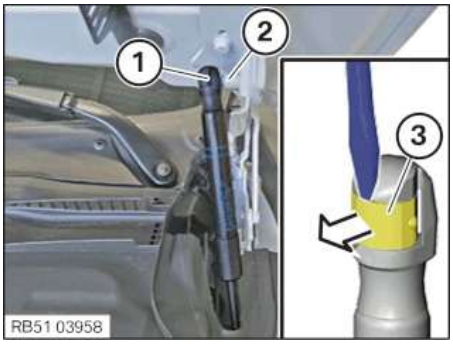
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CAUTION

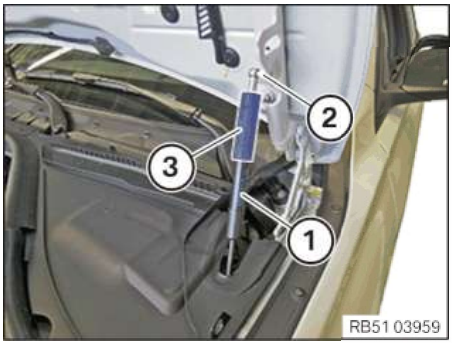
Shutting bonnet or tailgate.

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.

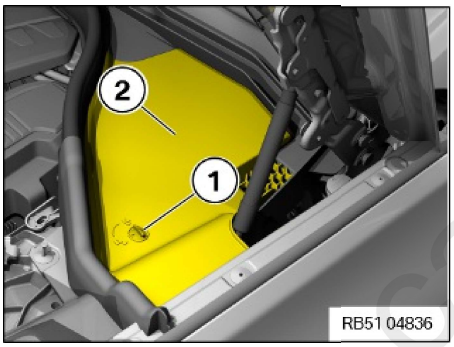


TECHNICAL INFORMATION

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

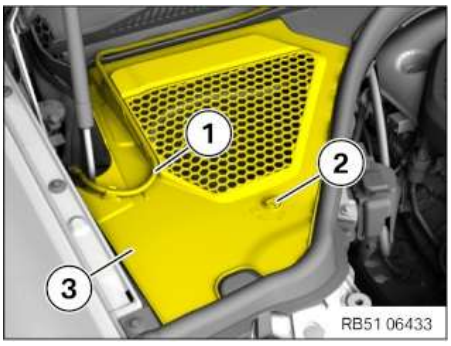
- Remove the bonnet support and open the bonnet further.
- Push special tool or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

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



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

4 – 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).

5 – Remove the seal for the rear bonnet

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

6 – 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.



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

7 – Removing both wiper arms

NOTICE

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

▸ **Remove the wiper arm**

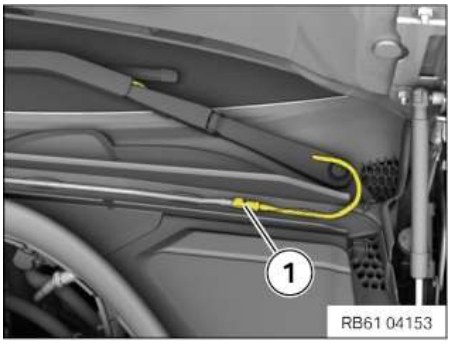
RISK OF DAMAGE

Damage to wiper console

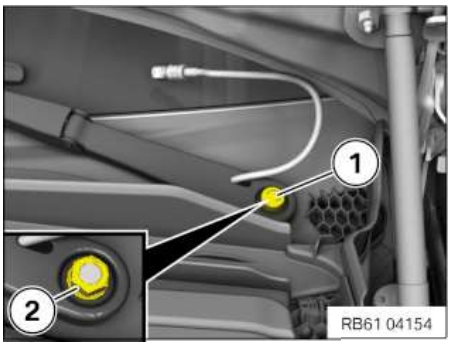
While removing the wiper arms without using special tool, the wiper console can break.

- 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.

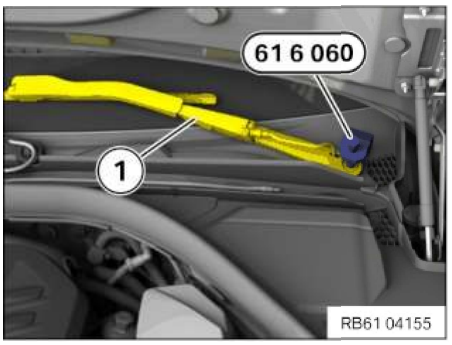
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- Disconnect the windscreen wash hose(1) at the separation point and remove from the cowl guide.

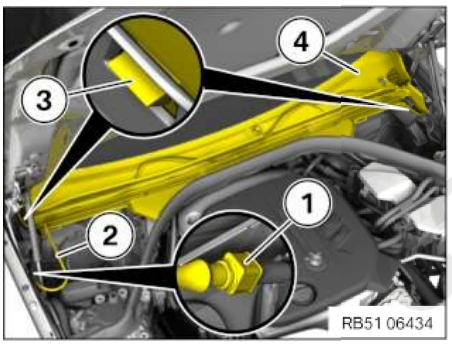


- Remove the protective cap (1).
- Loosen nut (2).

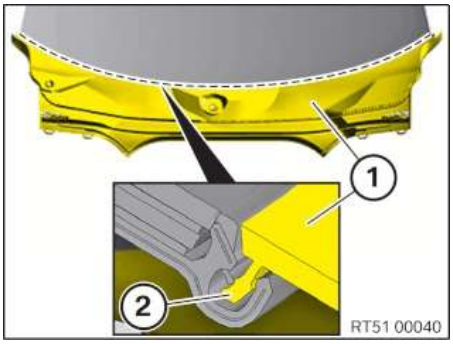


- Pull off the wiper arm (1) using special tool .

8 – 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).



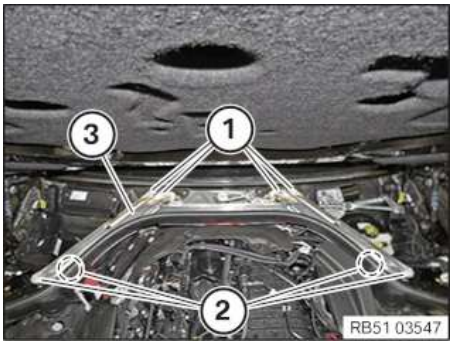
- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

9 – Removing the centre bulkhead upper part

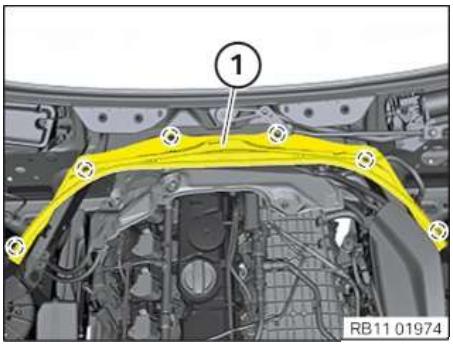
TECHNICAL INFORMATION

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

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

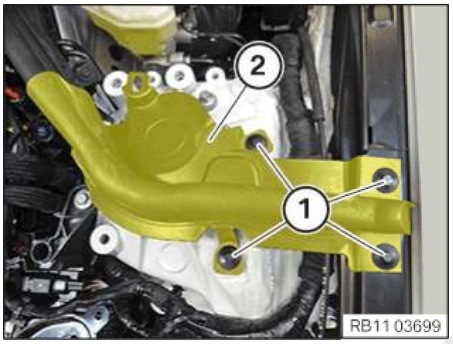


- Unscrew the bolts in the marked areas.
- Remove the centre bulkhead upper part (1).

10 – Removing side bonnet gaskets

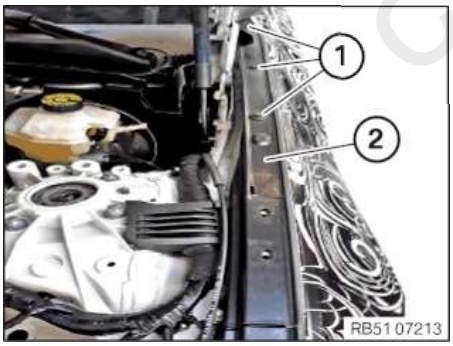
NOTICE

Perform the operations on the left and right side.



- Loosen the rivet (1).
- Remove side bonnet seal (2) from spring strut dome.

11 – Remove sealing of the side panel

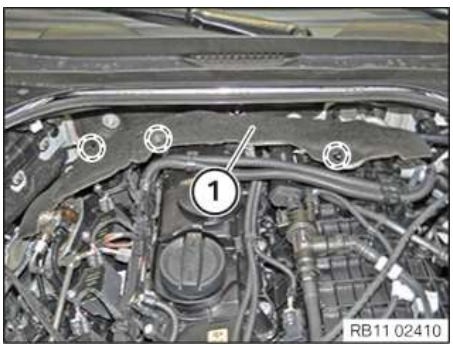


NOTICE

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

- Loosen the expanding rivet (1).
- Guide out seal (2) and remove.

12 – Removing acoustic cover at rear



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

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13 – Remove all ignition coils.

NOTICE

The description is for one component only. The procedure is identical for all further components.

▸ **Removing the ignition coil**

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the ignition coil.

The silicone hose of the ignition coil must not be contaminated by fuel as this can lead to failure of the ignition coil.

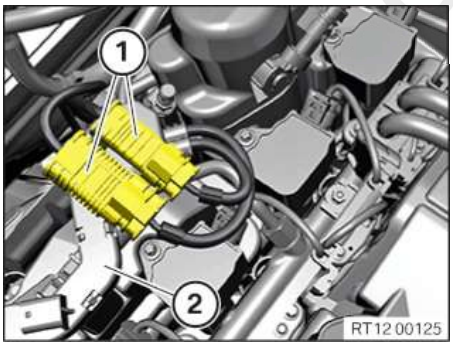
- Cover ignition coils using suitable covers when working on the fuel system, if necessary remove them.
- Do not oil or grease the silicone tube of the spark plug connector. The silicone tube is coated with talc to reduce the pulling forces.

RISK OF DAMAGE

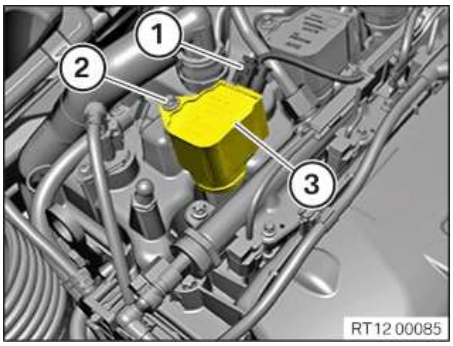
Electrostatic discharge.

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.



- Disconnect the connector (1) of the front oxygen sensor and the monitoring oxygen sensor from the cable channel (2) and set aside.



- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Remove ignition coil (3).

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14 – Remove fuel delivery line

WARNING

Working on fuel system.

Risk of fire! Danger of explosion!

- When working on the fuel system, make sure that the workbay is sufficiently ventilated, e.g. using extraction unit.
- Tightly seal off open lines and connections; collect any escaping fuel directly at the point of exit.
- No fire, sparks, open flames or smoking.

CAUTION

On releasing high pressure line, fuel may emerge at high speed.

Danger of injury!

- Wear suitable personal protective equipment.
- Allow the cooling system to cool down to a temperature below 40°C before starting installation work.
- Note warnings on cylinder head cover.

RISK OF DAMAGE

Damage to the ignition coil.

The silicone hose of the ignition coil must not be contaminated by fuel as this can lead to failure of the ignition coil.

- Cover ignition coils using suitable covers when working on the fuel system, if necessary remove them.
- Do not oil or grease the silicone tube of the spark plug connector. The silicone tube is coated with talc to reduce the pulling forces.

RISK OF DAMAGE

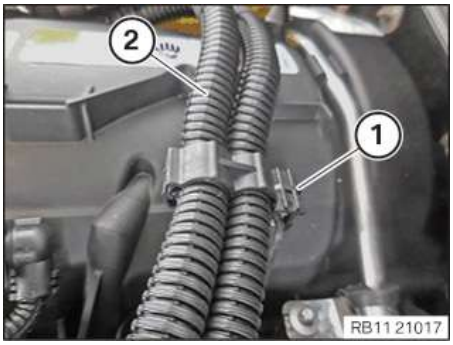
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

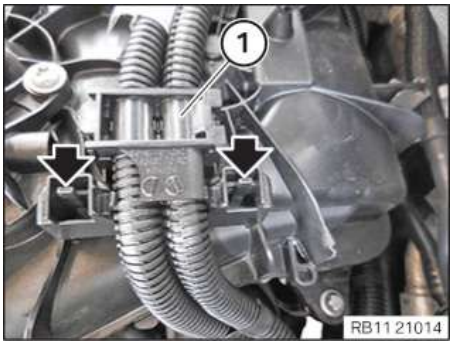
TECHNICAL INFORMATION

Reset special tool in early to avoid bending pressure lines.

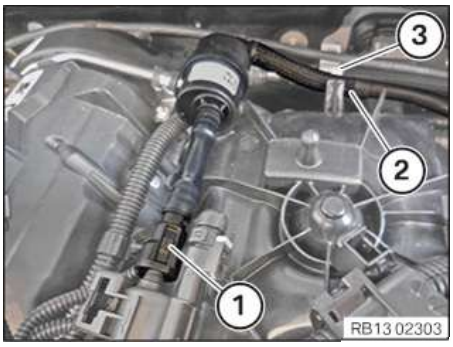


- Loosen clamp (1).
- Guide out wiring harness section (2) for the injectors and ignition coils and place it aside.

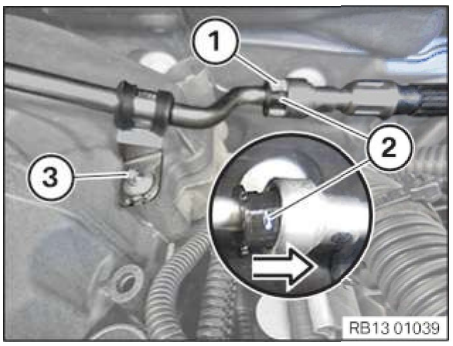
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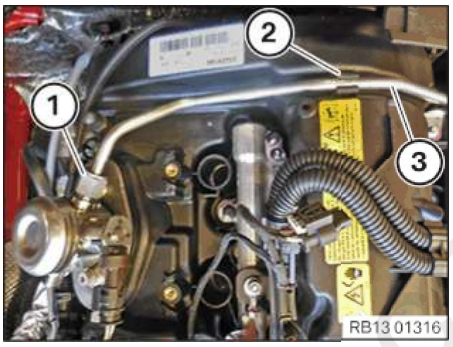
- Unlock the locks (arrows).
- Guide out wiring harness section (1) for the injectors and ignition coils and place it aside.



- Unlock and loosen lock (1).
- Guide tank ventilation line (2) out of clamp (3) and place it aside.



- Unlock and loosen clamp (1).
- Unlock and remove the snap fastener (2) in the direction of the arrow.
- Catch and dispose of escaping fuel.
- Seal the fuel lines with special tools 0 496 567 (13 5 161) and 0 496 568 (13 5 162) from the set of special tools 0 496 565 (13 5 160).
- Loosen screw (3).



- Slacken the union nut (1) on the high pressure pump.
- Catch and dispose of escaping fuel.
- Seal all openings with the special tool .
- Guide the fuel feed line (3) out and remove.
- Make sure that the rubber damper (2) is not lost.

15 – 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.

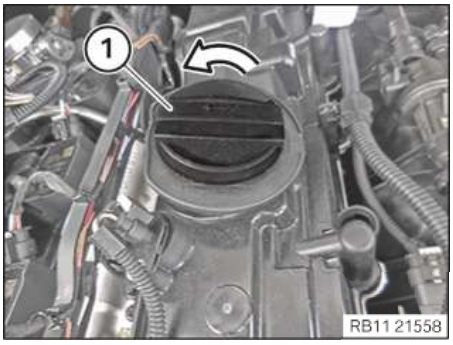
- Do not lift upper section of intake filter housing by force.
- Unfasten clamp.
- Remove upper section of intake filter housing completely.

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- 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.

16 – Removing the oil filler cap



- Open the oil filler cap (1) in the direction of arrow.

17 – Removing both front wheels

▸ **Removing the wheel**



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.



- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

18 – Remove the rear section of the wheel arch cover on the front left and right

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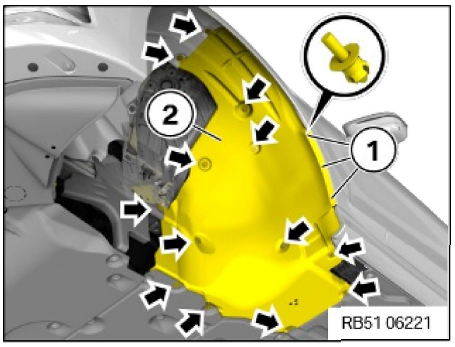
NOTICE

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

▸ **Removing the rear section of the front wheel arch cover front**

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Loosen the expanding rivet (1).
- Remove screws (arrows).
- Remove the rear section of the front wheel arch cover (2).

19 – Removing the front section of the front left wheel arch cover

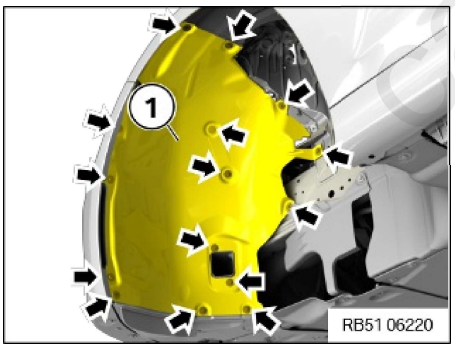
NOTICE

Perform the operations on the left and right side.

▸ **Removing the front section of the front wheel arch cover**

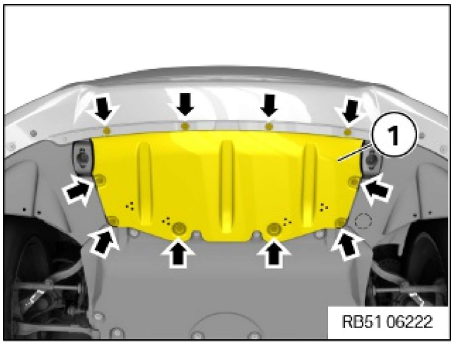
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Remove screws (arrows).
- Remove front section of the front wheel arch cover (1).

20 – Removing the front underbody protection

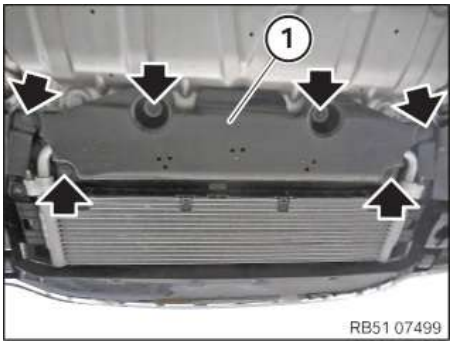


- **Version 1:**

  Remove screws (arrows).

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

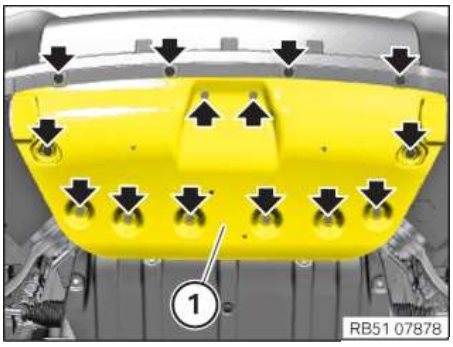
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- **Version 2:**

  Remove screws (arrows).

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



- **Version 3:**

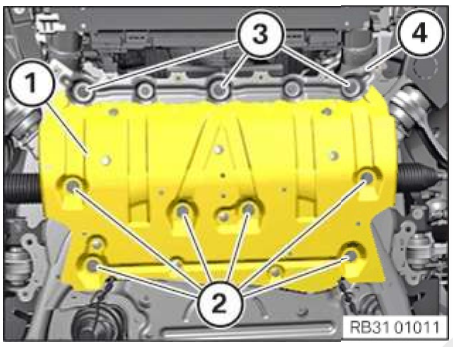
  Remove screws (arrows).

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

21 – Removing the stiffening plate

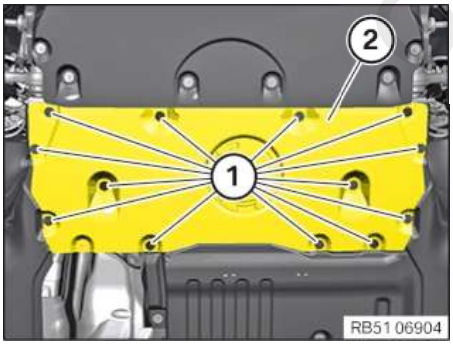
TECHNICAL INFORMATION

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).

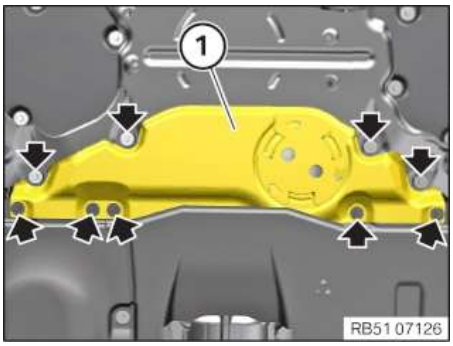
22 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .



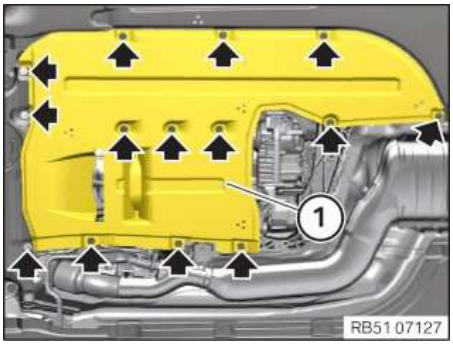
- **Version with all-wheel drive:**

  Remove screws (arrows).

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

23 – Remove rear underbody protection

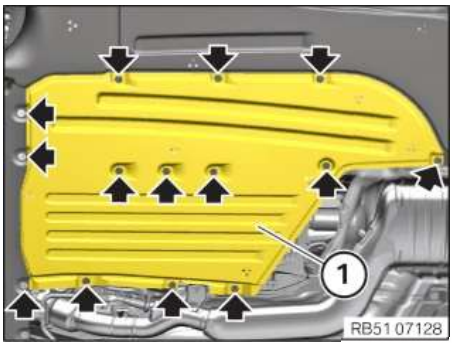
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- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



- **Version 2:**

  Remove screws (arrows).

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

24 – Releasing the oil drain plug

WARNING

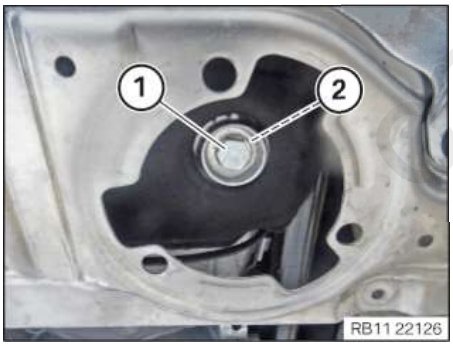
Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

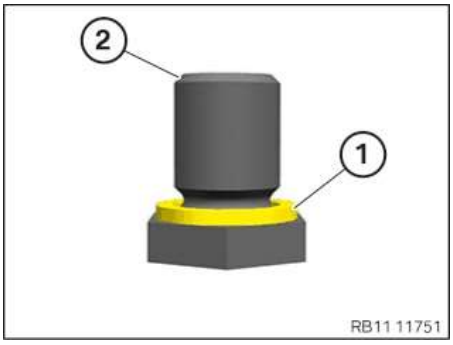
TECHNICAL INFORMATION

Catch and dispose of drained engine oil in a suitable collecting vessel. Observe country-specific waste disposal regulations.



- Release oil drain plug (1).
- Feed out the oil drain plug (1) using sealing ring (2) and remove.
- Allow the engine oil to drain out fully.

25 – Tightening the oil drain plug



- Renew sealing ring (1) on the oil drain plug (2).

  Parts: Sealing ring

- Guide in the sealing ring (1) on the oil drain plug (2) and install.

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- Feed in the oil drain plug (1) with the sealing ring (2) and install.
- Tighten oil drain plug (1).

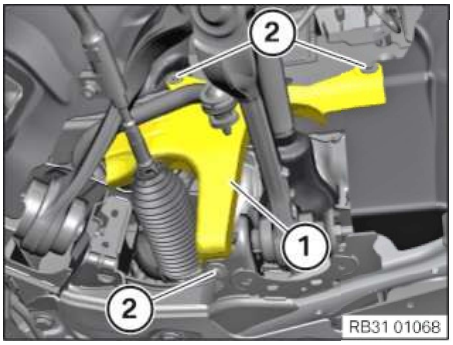
Oil drain plug

M12x16	Replace sealing ring.	Tightening torque	25 Nm

26 – Remove the cover of the steering assembly on the left and right

NOTICE

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



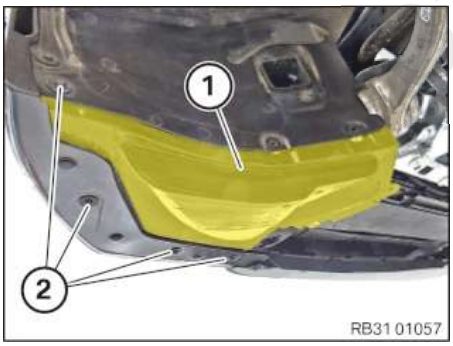
▸ **Remove the cover of the steering assembly**

- Loosen screws (2).
- Remove the cover (1).

27 – Removing the bottom left and right wheel arch cover

NOTICE

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



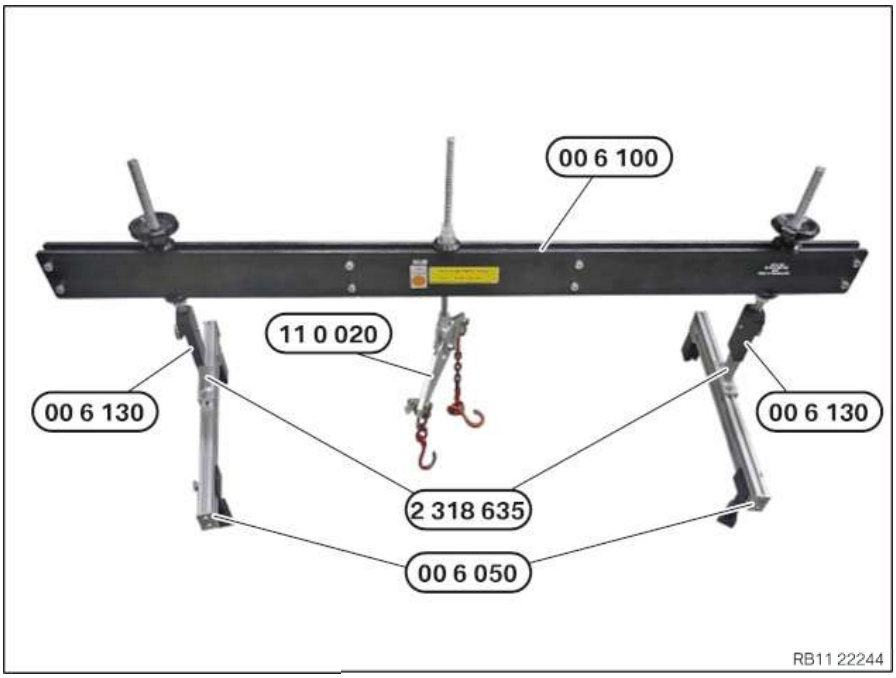
▸ **Remove bottom wheel arch cover**

- Loosen screws (2).
- Remove bottom wheel arch cover (1)

28 – Securing engine in installation position

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Overview: prepared engine bridge



CAUTION

Components connected to the engine joint or cross member.

Danger of injury!

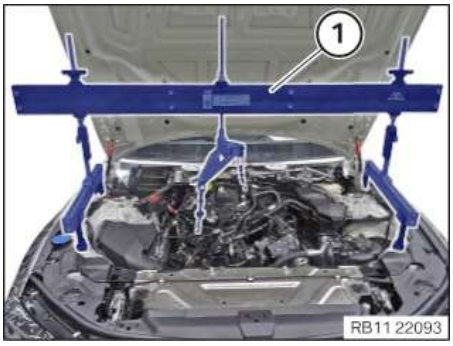
- Check lifting eyes and engine mounting brackets for damage, e.g. cracks.
- Attach the component to correctly mounted engine joints or cross members only.
- Exclusively lift the component, do not move it forwards, backwards or in transverse direction.



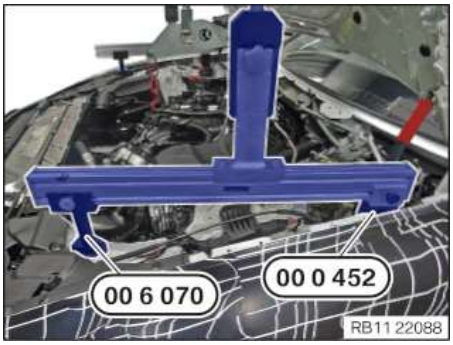
- Guide in and position special tool on cylinder head.
- Tighten the screws (1) of special tool .

Special tool to cylinder head

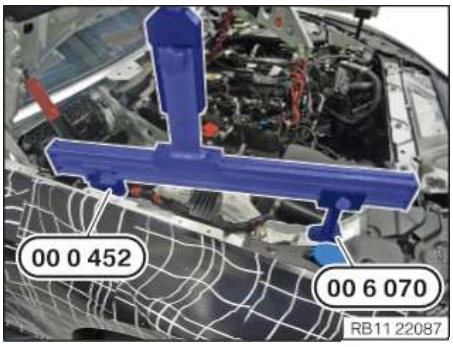
M8		Tightening torque	21,5 Nm



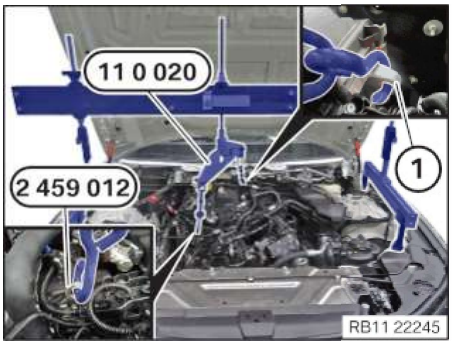
- **Carefully** position engine bridge (1) with help from an auxiliary person.



- Make sure that special tool on the left is **correctly** positioned on the front end.
- Make sure that special tool 0 495 850 (00 0 452) on the left is **correctly** positioned on the carrier support.



- Make sure that special tool on the right is **correctly** positioned on the front end.
- Make sure that special tool 0 495 850 (00 0 452) on the right is **correctly** positioned on the carrier support.



- Align the engine bridge by moving it on the profile strips of the special tool above the engine mounting bracket and screw it down.
- Connect special tool 0 490 567 (11 0 020) to special tool .
- Connect the special tool 0 490 567 (11 0 020) above the engine mounting bracket (1) at the rear.



- Check whether the special tool on the right is **correctly** positioned on the front end.



- Check whether the special tool 0 495 850 (00 0 452) on the right is **correctly** positioned on the carrier support.



- Check whether the special tool on the left is **correctly** positioned on the front end.

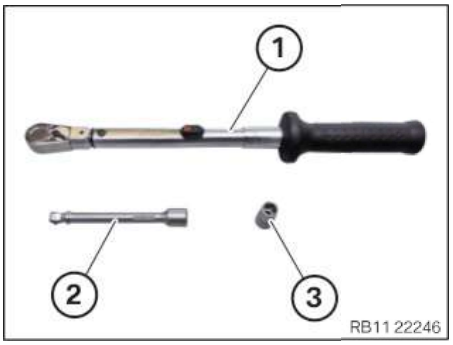
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- Check whether the special tool 0 495 850 (00 0 452) on the left is **correctly** positioned on the carrier support.

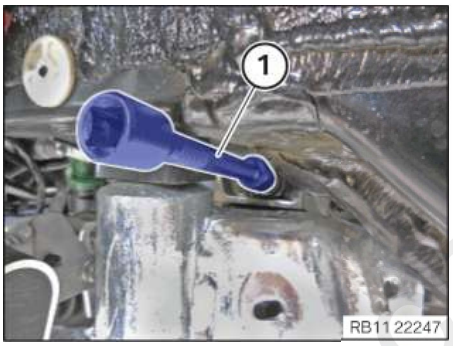


- Release screw (1) on the right engine mount from the top with a commercially available tool.

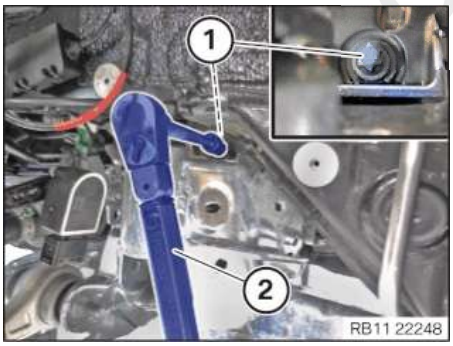


- Have all suitable tools ready.

Number	Description
1	Commercial available torque spanner
2	Swivel mounted extension
3	External Torx E14



- Position the suitable tool (1).



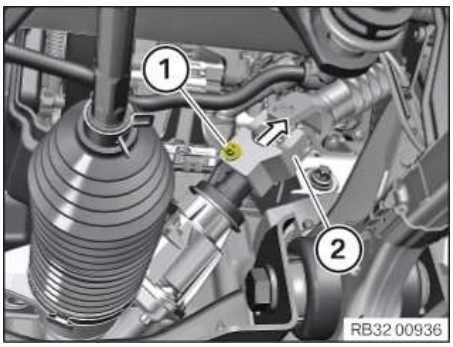
- Release screw (1) of the left engine mount with standard tool (2) sideways.



- Raise the engine by turning the special tool 2 361 506 (00 6 103) (spindle) by 10 mm.

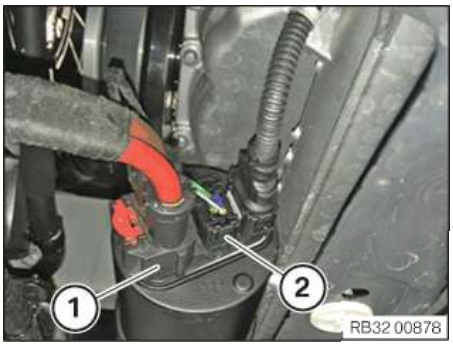
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29 – Releasing lower steering shaft from steering gear

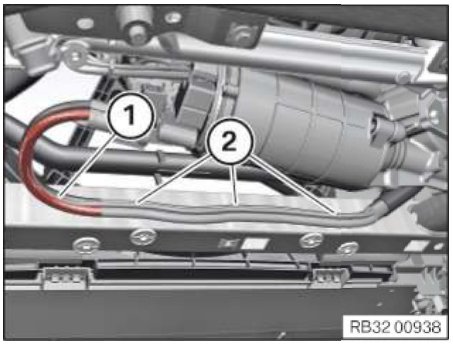


- Loosen screw (1).
- Pull off lower steering shaft (2) from steering gear in direction of arrow.

30 – Detach the wiring harness of the EPS from the front axle support

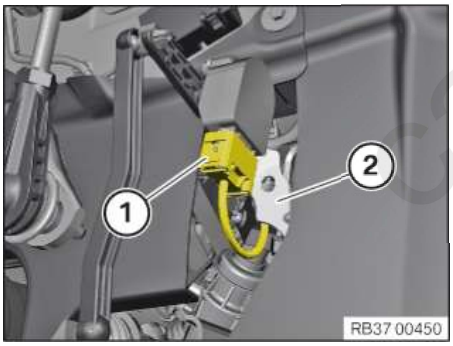


- Unlock and disconnect the plug connections (1) and (2).



- Loosen the holder (2).
- Place wiring harness (1) to one side.

31 – Detach the line connection of the ride height sensor



- Unlock plug connection (1) and disconnect.
- Unclip the line from holder (2).

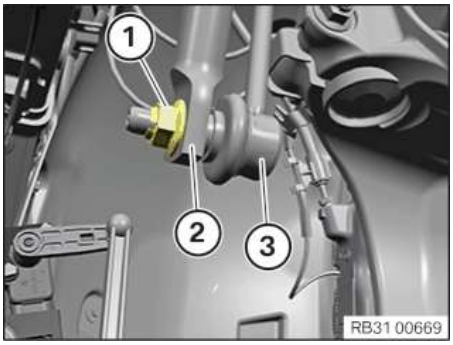
32 – Release the left and right anti-roll bar link from the anti-roll bar

NOTICE

Perform the operations on the left and right side.

▸ **Loosening the anti-roll bar link from the anti-roll bar**

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- Loosen nut (1).

Note: Use the Torx socket for counter support.

- Loosen the anti-roll bar link (3) from the anti-roll bar (2).

33 – Releasing output shaft at right and left from wheel bearing

NOTICE

Perform the operations on the left and right side.

▸ **Loosen the output shaft from the wheel bearing**



- Press brake pedal.
- Loosen the collar bolt (1).

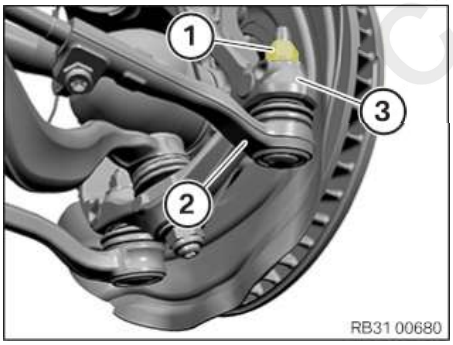
Note: Do not leave the output shaft hanging on the joint (or tie up output shaft if applicable).

34 – Loosening the track rod on the left and right from the swivel bearing

NOTICE

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

▸ **Loosening the track rod from the swivel bearing**



- Loosen nut (1).

Note: If necessary, counter-hold at the Torx socket.

- Detach the track rod (2) from the swivel bearing (3).

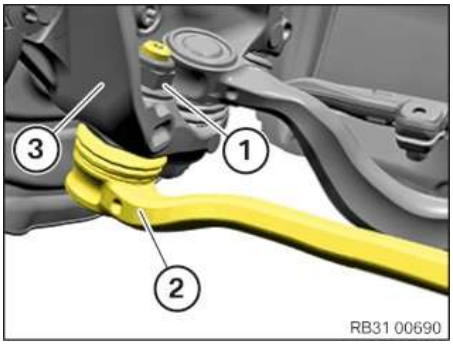
35 – Release the left and right wishbone from the swivel bearing

NOTICE

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

▸ **Release the wishbone from the swivel bearing**

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- Loosen nut (1).

Note: Use the Torx socket for counter support.

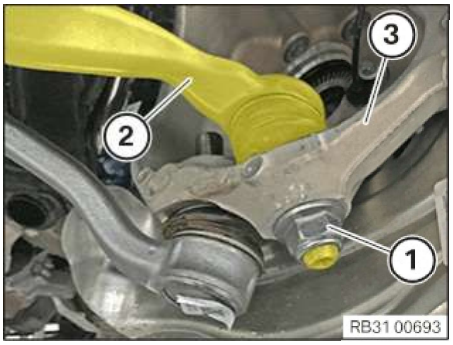
- Release wishbone (2) from swivel bearing (3).

36 – Releasing the left and right tension strut from the swivel bearing

NOTICE

Perform the operations on the left and right side.

▸ **Releasing the tension strut from the swivel bearing**



- Unfasten nut (1).

Note: Use the Torx socket for counter support.

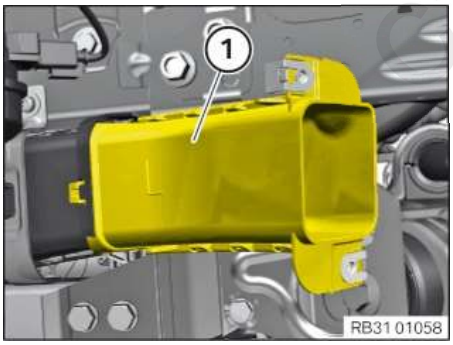
- Release the tension strut (2) from the swivel bearing (3).

37 – Removing the left and right brake air duct partially

NOTICE

Perform the operations on the left and right side.

▸ **Removing brake air duct partially**



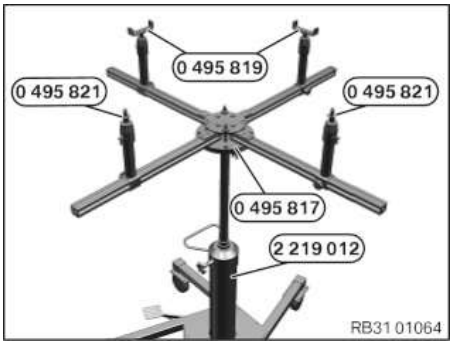
- Unclip and remove air duct (1).

38 – Preparing the special tool

TECHNICAL INFORMATION

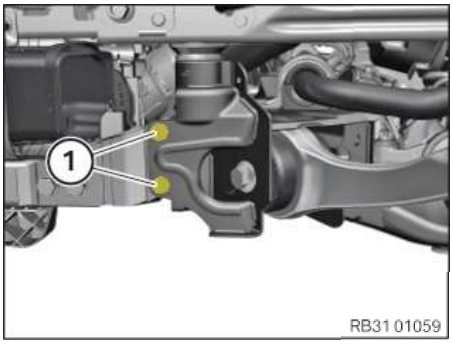
In a profile rail pair, two profile rails are connected to one another by gearing.

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- Fit the special tool completely on the universal jack 2 219 012 with the help of an auxiliary person.
- Insert special tools in telescopic supports of a profile rail pair.
- Insert special tools in telescopic supports of other profile rail pair.

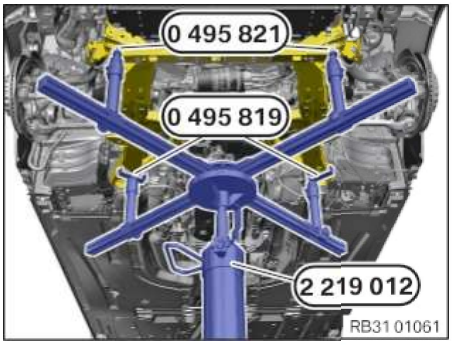
39 – Remove front axle carrier



NOTICE

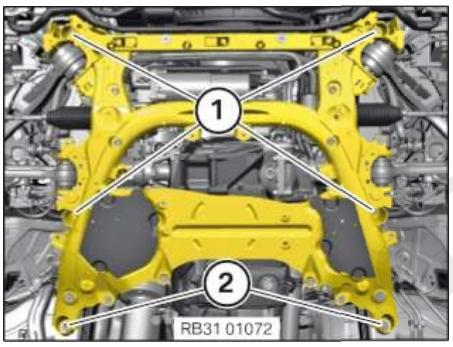
Perform the operations on the left and right side.

- Loosen screws (1).

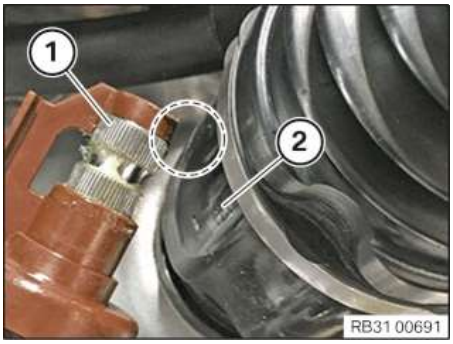


- Position the universal jack 2 219 012 with the special tools and on the front axle support.

  The centre of gravity of the front axle must be centred over the universal jack 2 219 012 !
- Support the front axle support with the universal jack 2 219 012.
- Secure the front axle support on the special tool with a tensioning strap.

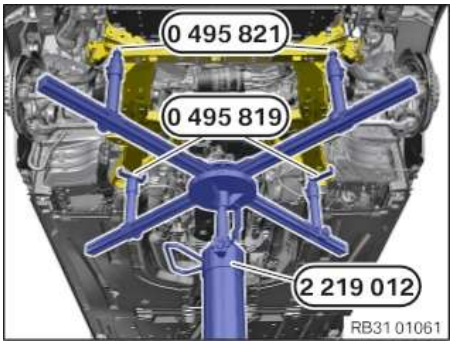


- Loosen screws (1) and (2).



- When lowering the front axle support, ensure sufficient distance between the steering gear (1) and the output shaft (2).

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- Carefully lower and remove the front axle support with the universal jack 2 219 012.

40 – Loosening front propeller shaft from front axle differential



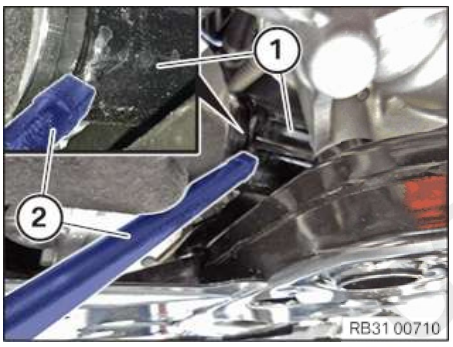
- Release screws (arrows) of the propeller shaft at the front on the front axle transmission.
- Tie up the propeller shaft at the front with special tool 2 413 317.

41 – Removing output shaft, left and right

NOTICE

Perform the operations on the left and right side.

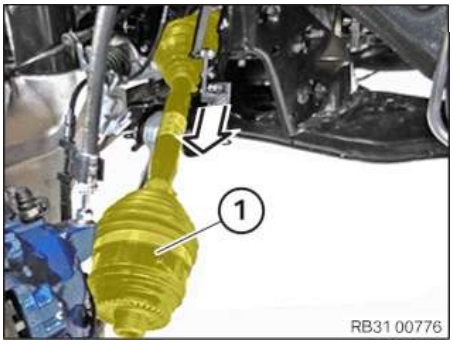
▸ **Remove output shaft**



TECHNICAL INFORMATION

Secure component against falling.

- Position aluminium drift (2) at the output shaft (1).
- Knock out the output shaft (1) out of the front axle differential or the bearing support with the aluminium drift (2).

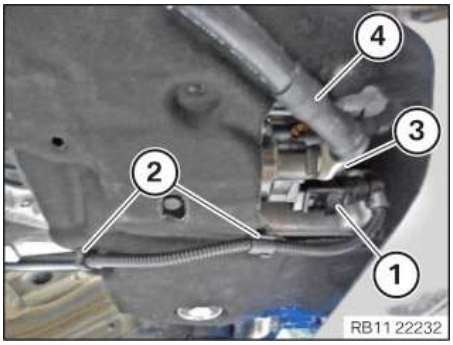


- Guide out and remove the output shaft (1) in the direction of the arrow.

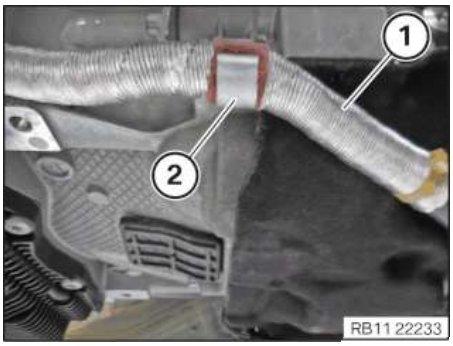
42 – Removing the acoustic cover of the oil sump

Prerequisite

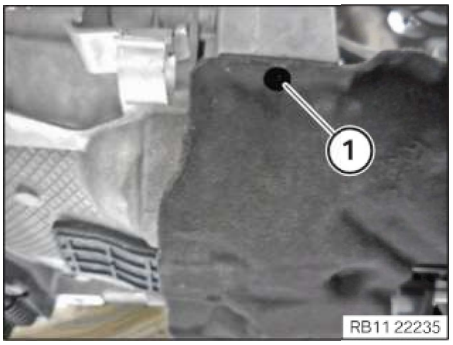
Disconnect all negative battery cables.



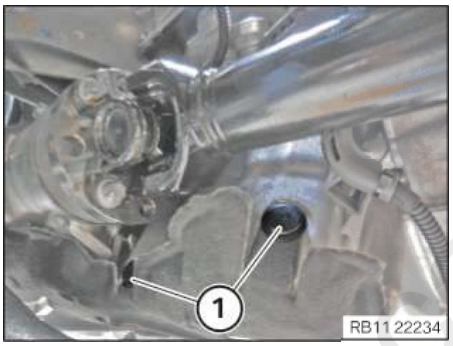
- Unlock plug connection (1) and disconnect.
- Unlock and loosen the clamps (2).
- Loosen nut (3).
- Feed out positive battery cable (4) and set it aside.



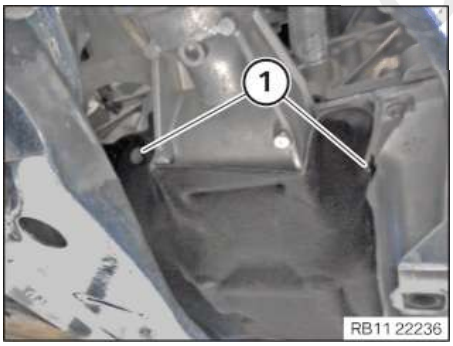
- Guide the positive battery cable (1) out of the clamp (2) and lay to one side.



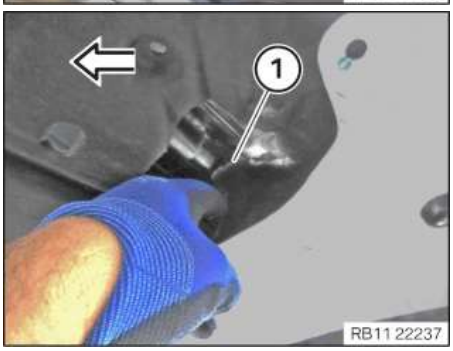
- Undo fir tree clip (1).



- Loosen the expanding rivet (1).



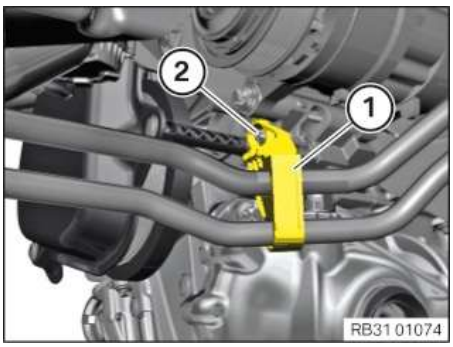
- Loosen the expanding rivet (1).



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

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43 – Releasing holder of the front transmission oil line

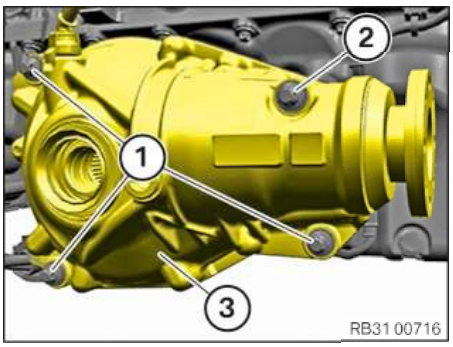


- Release the screw (2) from the bracket of the transmission oil lines (1).

44 – Remove front axle differential

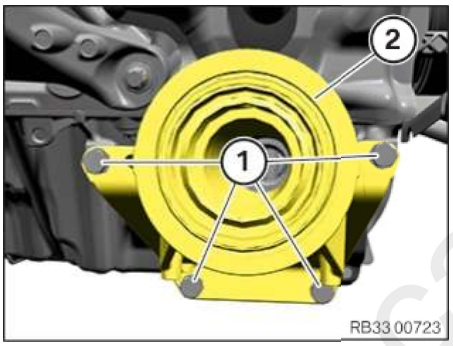
TECHNICAL INFORMATION

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



- Mark installation location of the screws (1) and (2).
  - Screws (1) M12x55
  - Screw (2) M12x105
- Loosen screws (1) and (2).
- Remove front axle differential (3).

45 – Remove bearing support



- Loosen screws (1).
- Remove the bearing support (2).

46 – Removing starter motor

Prerequisite

Oil sump acoustic cover removed.

WARNING

Hot surfaces.

Risk of burning!

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

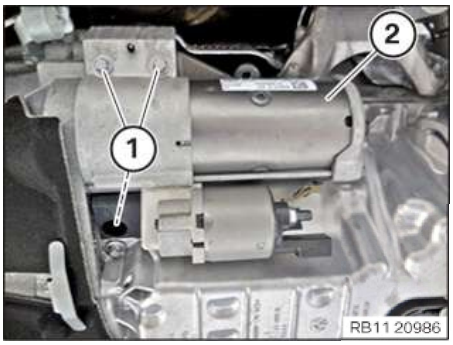
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RISK OF DAMAGE

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.



- Loosen screws (1).
- Guide out and remove starter (2).

47 – Remove oil sump

RISK OF DAMAGE

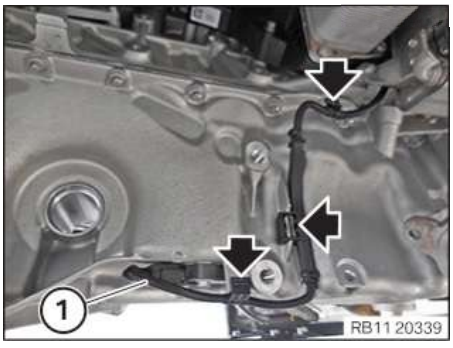
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

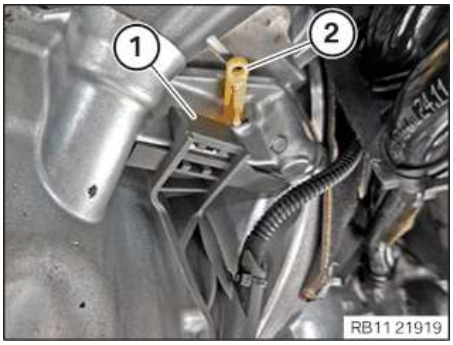
TECHNICAL INFORMATION

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



- Unlock clamps (arrows) and disconnect.
- Unlock and loosen connector (1).

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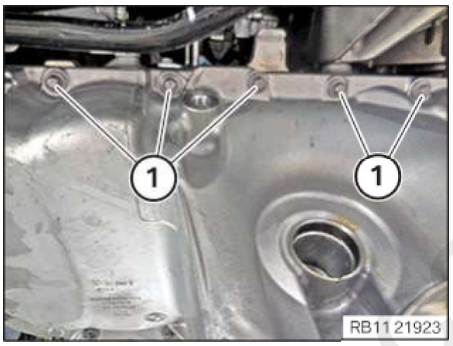
- Loosen clamp (1).
- Thread the sealing cap (2) out and remove.



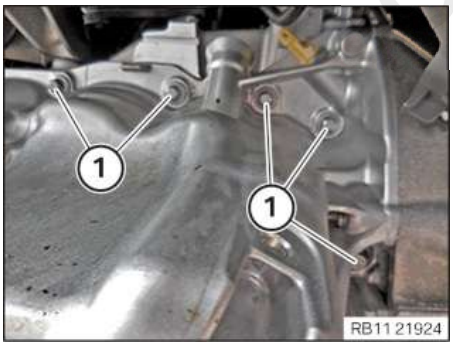
- Unscrew the transmission bolts (1).



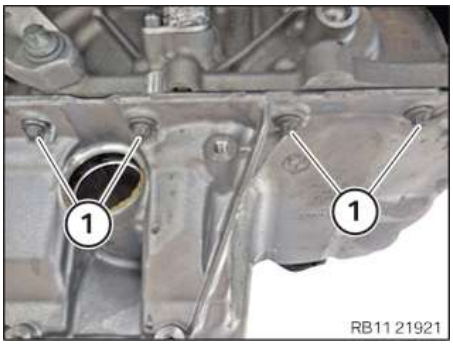
- Loosen screws (1).



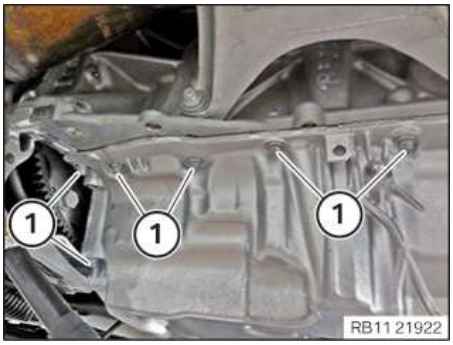
- Loosen screws (1).



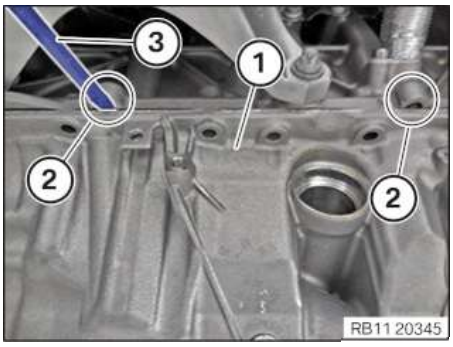
- Loosen screws (1).



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- Loosen screws (1).



TECHNICAL INFORMATION

Increased force may be necessary during disassembly because the component is bonded with liquid sealing compound.

- Release the oil sump (1) in the **marked** areas (2) using suitable tools (3).
- Guide out the oil sump (1) downwards to the rear and remove.

MAIN WORK

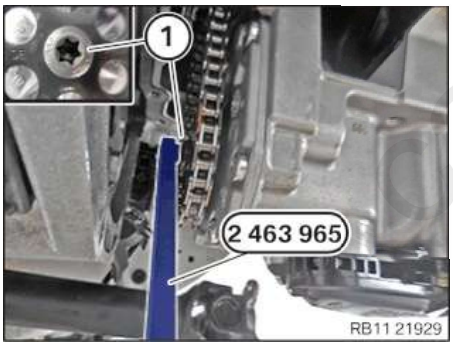
48 – Remove oil vacuum pump

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

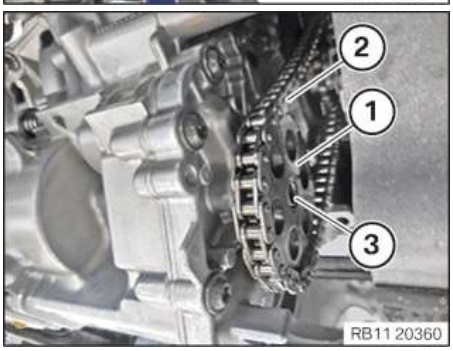
- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.



TECHNICAL INFORMATION

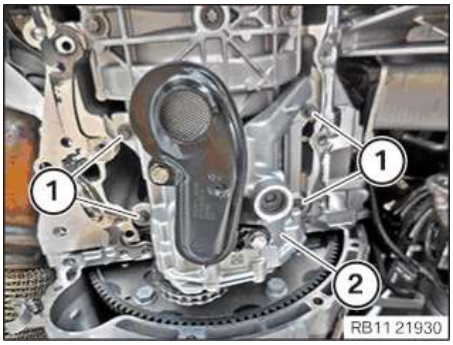
The thread is a left-hand thread.

- Release the screw (1) using the special tool 2 463 965.
- Thread out the bolt (1) and remove it.



- Release the camshaft sprocket (1) from the oil vacuum pump (3).
- Feed the camshaft sprocket (1) out of the drive chain (2) and remove it.

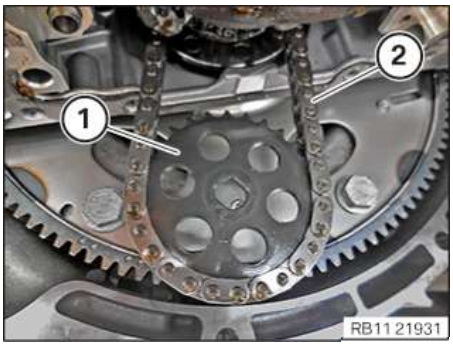
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TECHNICAL INFORMATION

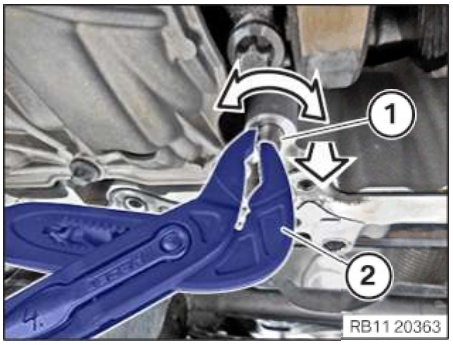
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Release screws (1) on the oil vacuum pump (2).
- Feed out the oil vacuum pump (2) and remove it.



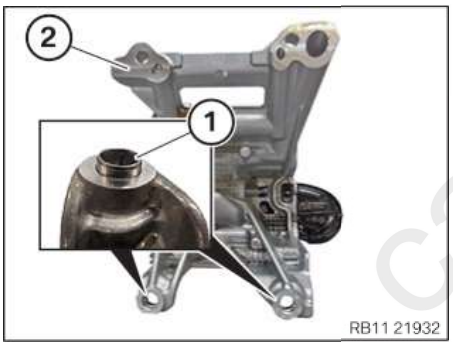
- Feed the camshaft sprocket (1) out of the drive chain (2) and remove it.

49 – Install the oil vacuum pump

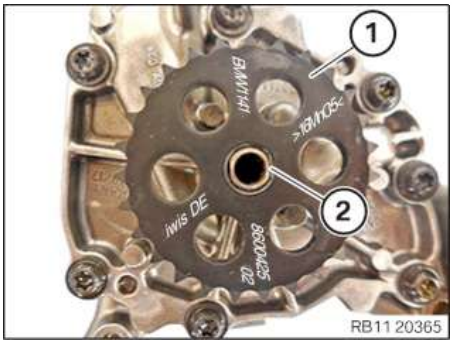


- Work centring sleeves (1) out of the crankcase in the direction of the arrow using conventional tools (2) and remove.
- Renew the centring sleeves (1).

  Parts: Centring sleeves



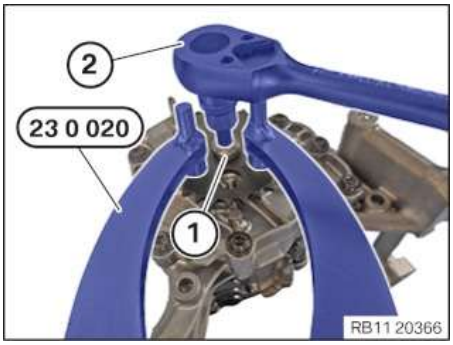
- Insert and install centring sleeves (1) at the oil vacuum pump (2).



- Position the camshaft sprocket (1) at the oil vacuum pump (2).

  The labelling on the camshaft sprocket (1) must face away from the oil vacuum pump (2).

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- Renew the screw (1).

  Parts: Screw

TECHNICAL INFORMATION

The thread is a left-hand thread.

- Insert bolt (1) and fit.

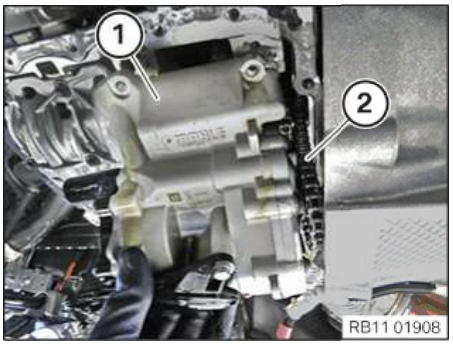
TECHNICAL INFORMATION

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

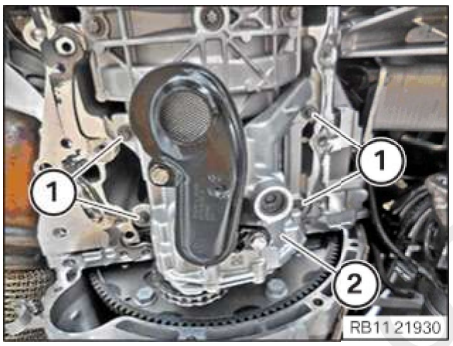
- Hold camshaft sprocket with special tool 0 491 440 (23 0 020) and tighten bolt (1) with conventional tools (2).

Camshaft sprocket to oil vacuum pump

M8	Important - left-hand thread Renew screw.	1. Jointing torque 2. Angle of rotation	5 Nm 90 °



- Insert and position the oil vacuum pump (1) in the drive chain (2).



- Renew screws (1).

  Parts: Bolts

- Tighten the screws (1).

Oil vacuum pump to crankcase

M8	Renew screw.	1. Tightening torque 2. Angle of rotation	15 Nm 45 °

POSTPROCESSES

50 – Refitting sump

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

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RISK OF DAMAGE

Damage to the surface.

The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.



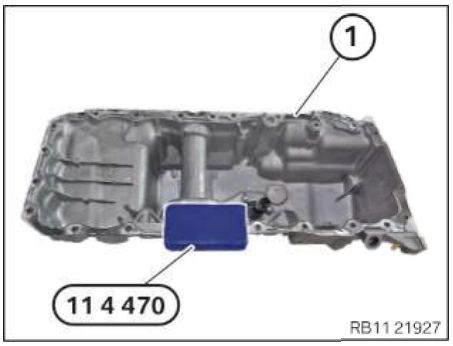
TECHNICAL INFORMATION

The sealing surfaces must be free from oils, grease and cleaning agents.

- Remove the coarse sealing residue on sealing surface (1) on the crankcase with special tool 0 495 102 (11 4 470).
- Clean sealing surface (1) with brake cleaner.

Expendable materials

Brake cleaner2.0	500 ml, Spray can	83192365214
	20 , Canister	83192365215



TECHNICAL INFORMATION

The sealing surfaces must be free from oils, grease and cleaning agents.

- Remove the fine seal remains on the sealing surface (1) of the oil sump with the special tool 0 495 102 (11 4 470).
- Clean sealing surface (1) with brake cleaner.

Expendable materials

Brake cleaner2.0	500 ml, Spray can	83192365214
	20 , Canister	83192365215



- Have the special tool ready.



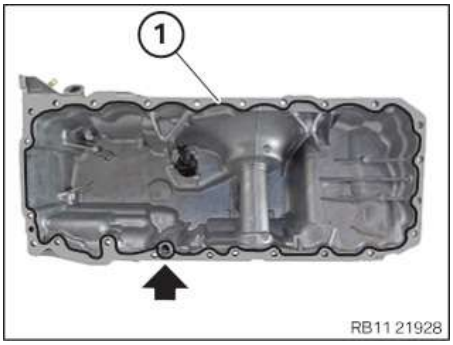
TECHNICAL INFORMATION

For more information see: 11 00 ... Overview of consumables in Electronic Parts Catalogue

- Position the sealing compound (1) on special tool as shown.

  Parts: Sealing compound

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TECHNICAL INFORMATION

The maximum application time of the liquid sealing compound is 12 minutes.

- Apply sealing bead (1) with the sealing compound in the **marked** area along the inner edge.

Sealing compound

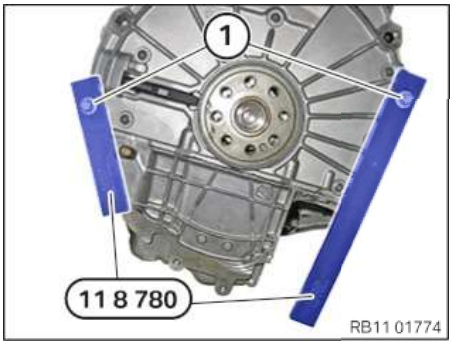
Loctite 5970 liquid sealing compound	50 ml, Cartridge	83190404517

Overview of consumables (Electronic Parts Catalogue)

Height of the sealing bead

2,0 mm ... 2,5 mm

- Completely encircle the oil return orifice (arrow) with the sealing compound.



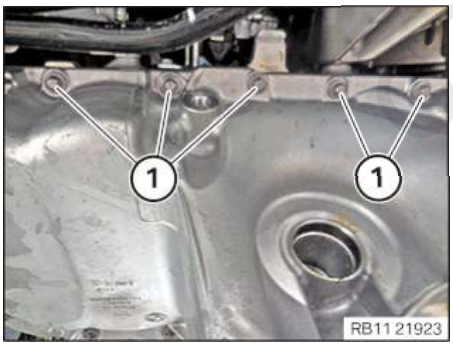
TECHNICAL INFORMATION

The special tool 11 8 780 is only required when the transmission is removed.

- Position the special tool 0 496 120 (11 8 780) with the transmission bolts (1) so that the oil sump is exactly flush with the timing case cover.
- Renew the centring sleeves where required.



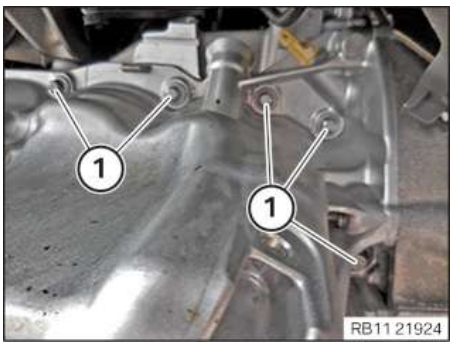
- Insert oil sump (1) upwards and forwards and position.



- Tighten the screws (1).

Oil sump to crankcase

M8 x 30		Tightening torque	24 Nm



- Tighten the screws (1).

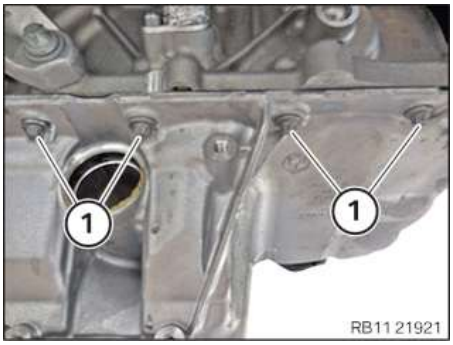
Oil sump to crankcase

M8 x 30		Tightening torque	24 Nm

Oil sump to crankcase

M8 x 110		Tightening torque	24 Nm

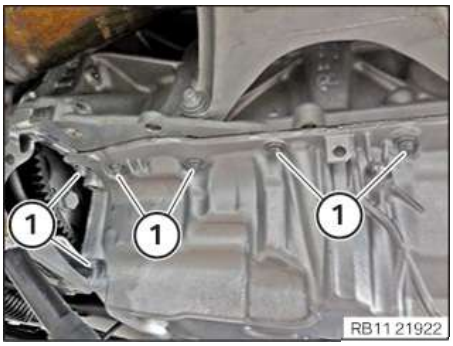
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- Tighten the screws (1).

Oil sump to crankcase

M8 x 30		Tightening torque	24 Nm



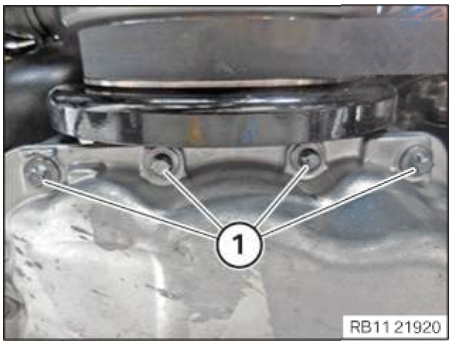
- Tighten the screws (1).

Oil sump to crankcase

M8 x 30		Tightening torque	24 Nm

Oil sump to crankcase

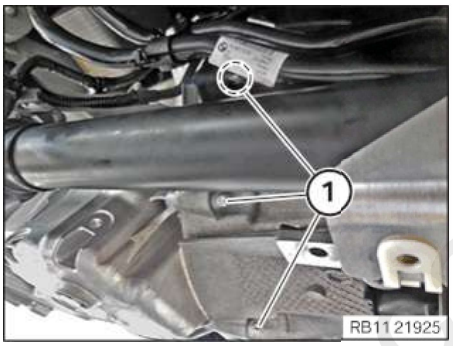
M8 x 110		Tightening torque	24 Nm



- Tighten the screws (1).

Oil sump to crankcase

M8 x 30		Tightening torque	24 Nm



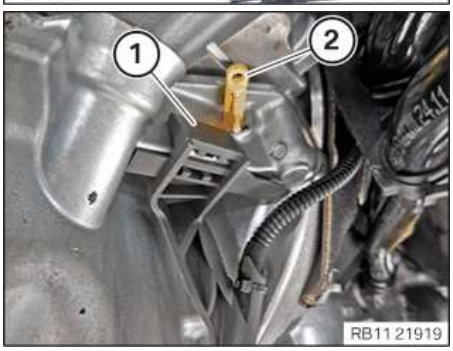
- Tighten transmission screws (1).

Transmission to oil sump (manual gearbox and automatic transmission)

M8 x 50		Tightening torque	19 Nm



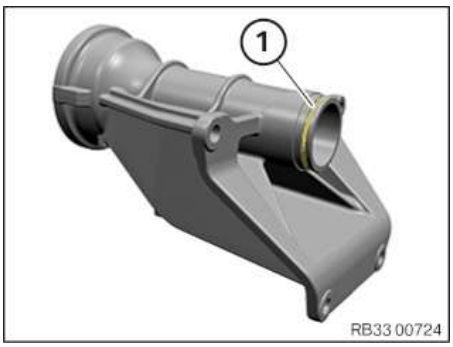
- Secure the clamps (arrows).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



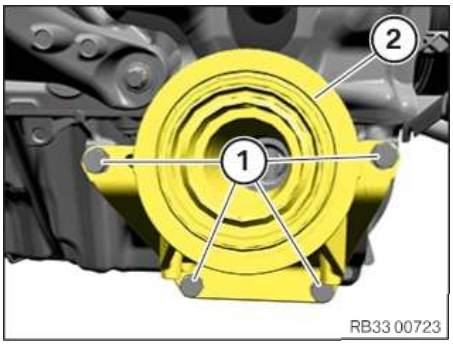
- Secure clamps (1).
- Guide in and install sealing cap (2).

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51 – Install bearing support



- Coat the O-ring (1) with front axle transmission oil.

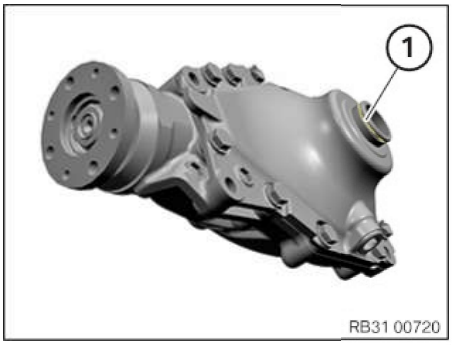


- Position the bearing support (2) at the engine oil sump.
- Tighten the screws (1).

Bearing support to oil sump

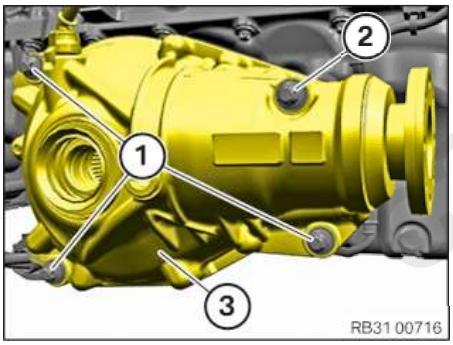
M8		Tightening torque	19 Nm

52 – Install front axle differential



- Renew O-ring (1).

  Parts: O-ring
- Coat the O-ring (1) with front axle transmission oil.



- Position front axle differential (3).

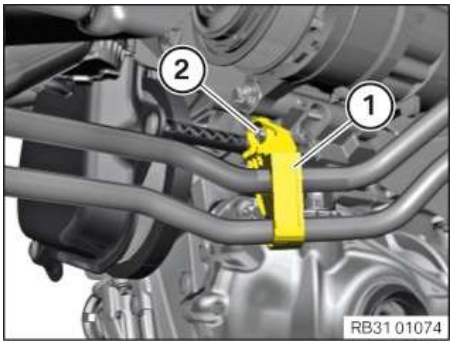
  Make sure marked screws are installed in correct installation locations:

  - Screws (1) M12x55
  - Screw (2) M12x105
- Tighten down screws (1) and (2).

Front axle final drive to engine oil pan

M12		Tightening torque	140 Nm

53 – Secure holder of front transmission oil line



- Position the holder of the transmission oil lines (1).
- Tighten down screw (2).

Holder for front transmission oil cooler line

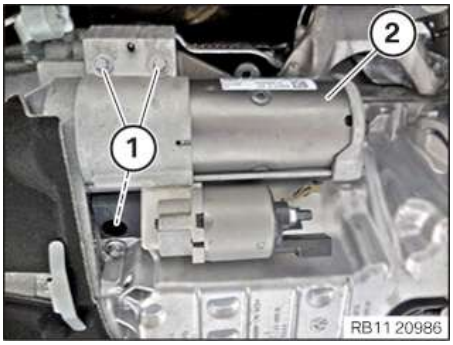
M6x18		Tightening torque	12 Nm

54 – Installing starter motor

Prerequisite

Acoustic cover of oil sump removed.

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- Insert and install the starter motor (2).
- Tighten the screws (1).

Starter motor to crankcase

M8x60		Tightening torque	19 Nm

55 – Renew the radial shaft seal on the left and right

NOTICE

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

▶ **Renew the radial shaft seal**

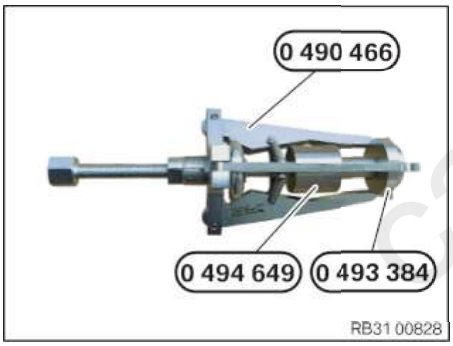
TECHNICAL INFORMATION

Radial shaft seal ring are equipped with an installation protection ring. The installation protection ring is used to protect the sealing lip when installing the output shaft.

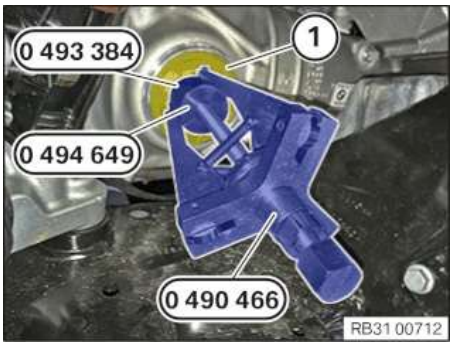
NOTICE

The figure shows the procedure for the front axle differential. The procedure for the bearing support is identical.

▷ **Removing the radial shaft seal**



- Prepare the special tool with the special tools 0 494 649 (21 2 230) (without the screw) and .



- Pull out and remove the radial shaft seal (1) with the special tools , 0 494 649 (21 2 230)and .

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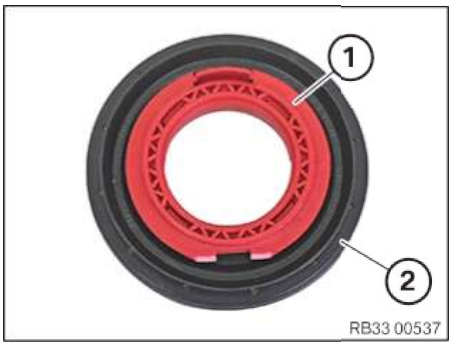
- Remove the installation protection ring (1) from the radial shaft seal (2).

▷ **Install the radial shaft seal**



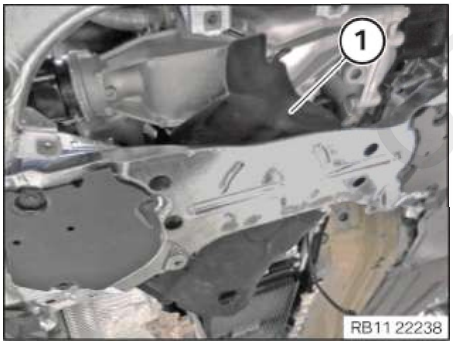
- Coat the housing sheet metal flange of the radial shaft seal with the approved front axle transmission oil.
- Drive in the radial shaft seal up to the limit position using special tool .
- Remove special tool .

◁

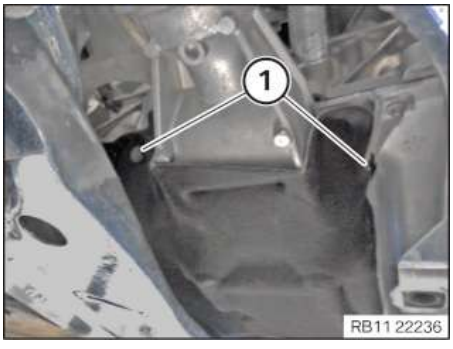


- Reinstall the installation protection ring (1) into the radial shaft seal (2).

56 – Installing the acoustic cover for the oil sump

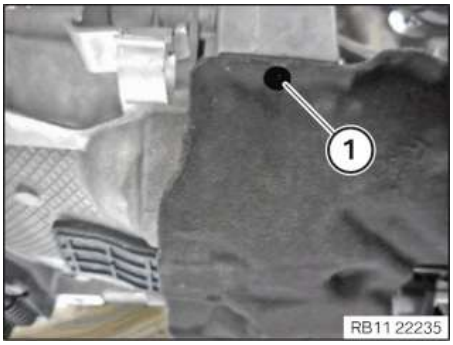


- Thread in and position the acoustic cover (1).



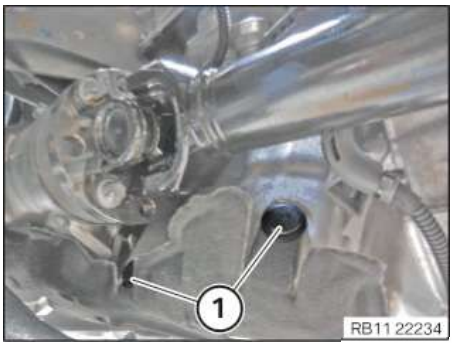
- Secure expanding rivet (1).

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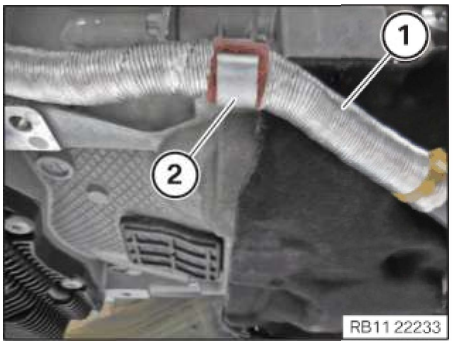


- Check the fir tree clip (1) for damage and renew if necessary.

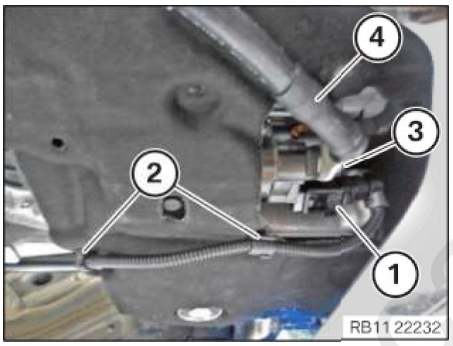
  Parts: Fir tree clip



- Secure expanding rivet (1).

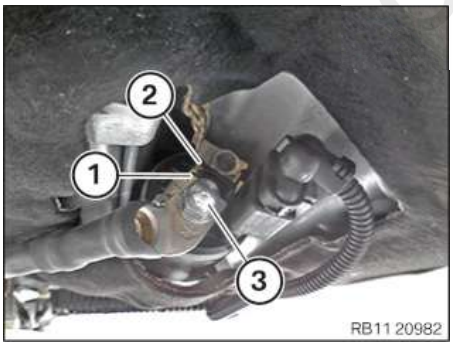


- Secure positive battery cable (1) at the clamp (2).



- 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.



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

57 – Installing output shaft at right and left

NOTICE

Perform the operations on the left and right side.

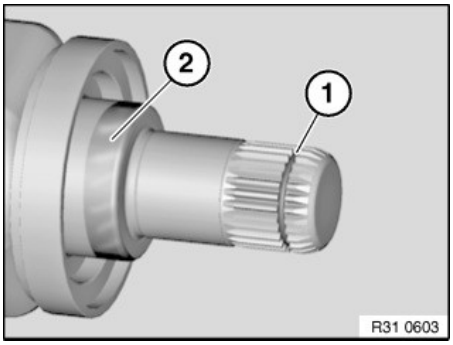
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▶ **Installing the output shaft**

▷ **If reusing: Check the gearing of output shaft and renew circlip.**

TECHNICAL INFORMATION

It is essential to renew the circlip of the output shaft.



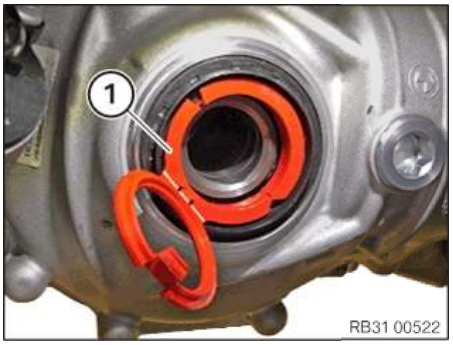
TECHNICAL INFORMATION

Extreme force being required during installation is an indication that the component is damaged or deformed. Check the component; replace if necessary.

- Check the gearing of the output shaft for damage and renew damaged parts if necessary.
- Check the gaiter for damage and replace damaged parts as needed.
- Renew the circlip (1).

  Parts: Circlip
- Coat the contact surfaces (2) using approved final drive transmission oil.

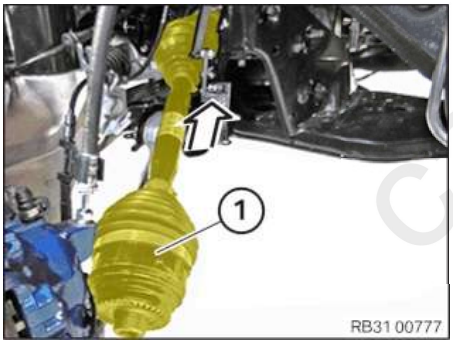
◁



NOTICE

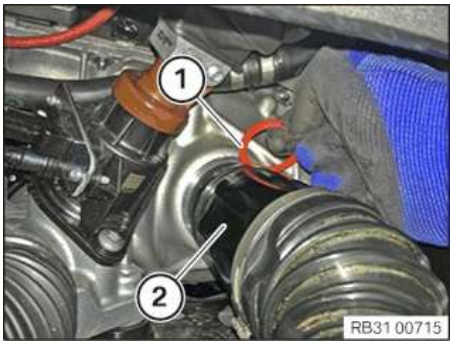
The figure shows the procedure for the front axle differential. The procedure for the bearing support is identical.

- Fold open the assembly protection ring (1).



- Guide the output shaft (1) in direction of arrow into the front axle transmission or the bearing support.

  Do not allow the output shaft (1) to engage in the front axle transmission or the bearing support!



- Pull on the tab of the installation protection ring (1) until one of the two predetermined breaking points breaks.
- Pull out and dispose of the installation protection ring (1).
- Slide the output shaft (2) into front axle differential or bearing support up to the limit position.

  The output shaft (2) must engage noticeably and audibly.

58 – Secure the propeller shaft in front on the front axle differential

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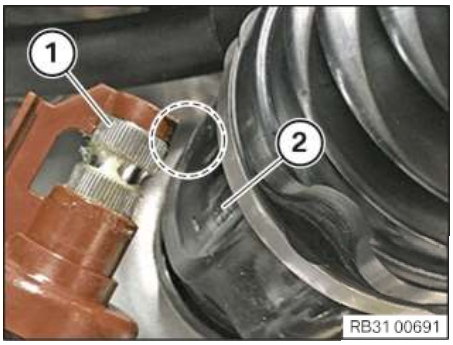
- Release special tool 2 413 317.
- Position the front propeller shaft on the front axle transmission.
- Renew screws.

  Parts: Bolts
- Tighten screws (arrows).

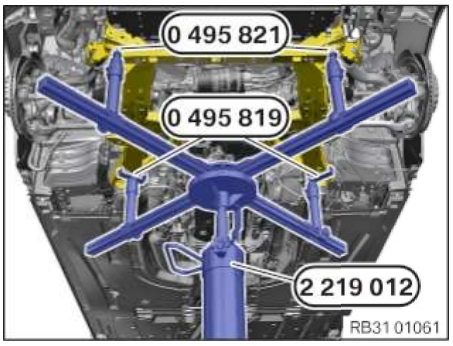
Propeller shaft before the front axle differential

Renew screws.	Tightening torque	25 Nm
Jointing torque and angle of rotation must be observed without fail.	Angle of rotation	45 °

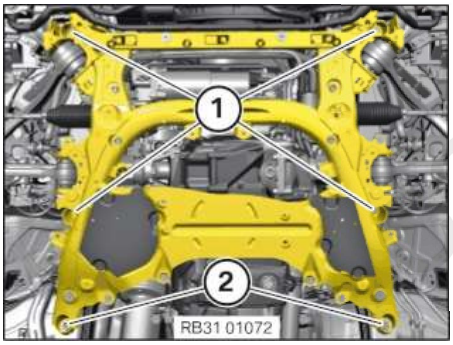
59 – Install front axle support



- When lifting the front axle support, ensure sufficient distance between the steering gear (1) and the output shaft (2).



- Carefully lift the front axle support with the universal jack 2 219 012 and position on the body.



- Replace the screws (1).

  Parts: Bolts
- Tighten the screws (1).

Front axle support to front/centre of body

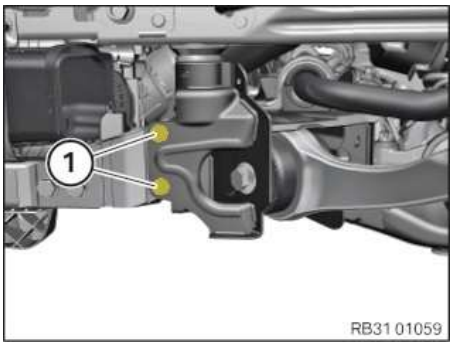
M12	Renew screws.	Jointing torque	108 Nm

- Replace the screws (2).

  Parts: Bolts
- Tighten the screws (2).

Front axle carrier to body, rear

M14	Renew screws.	Tightening torque	175 Nm

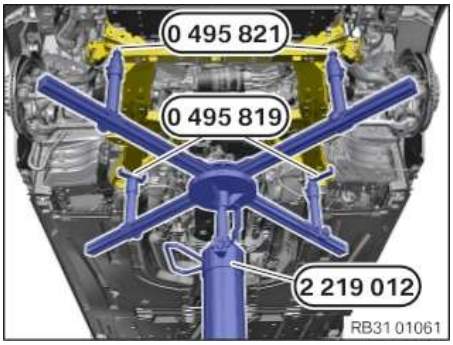


- Position the adapter for the front axle support on the front axle support .
- Tighten the screws (1).

Adapter, front axle support to front axle support

M8x70		Tightening torque	19 Nm

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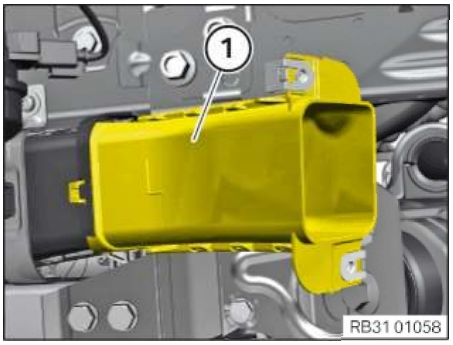
- Loosen tensioning strap.
- Lower the universal jack 2 219 012 and place to one side.

60 – Partially installing the left and right brake air duct

NOTICE

Perform the operations on the left and right side.

▸ **Installing the brake air duct partially**



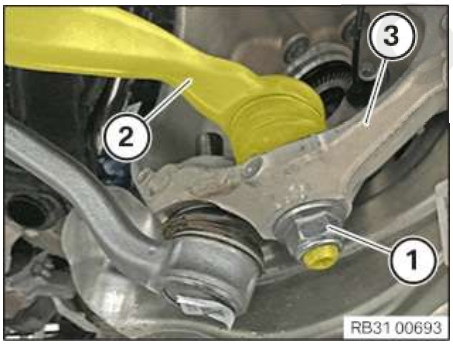
- Position and clip in air duct (1).

61 – Securing the left and right tension strut to the swivel bearing

NOTICE

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

▸ **Securing tension strut on swivel bearing**



- Position tension strut (2) on swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Tension strut to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

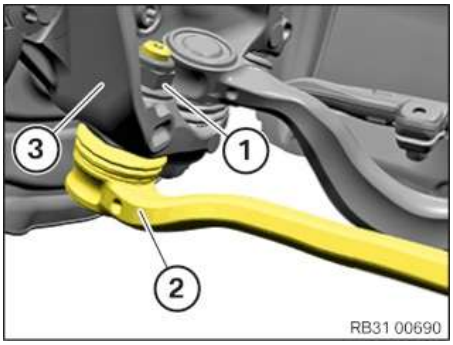
62 – Secure left and right wishbone onto swivel bearing

NOTICE

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

▸ **Mounting the wishbone on the swivel bearing**

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- Position the wishbone (2) on the swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

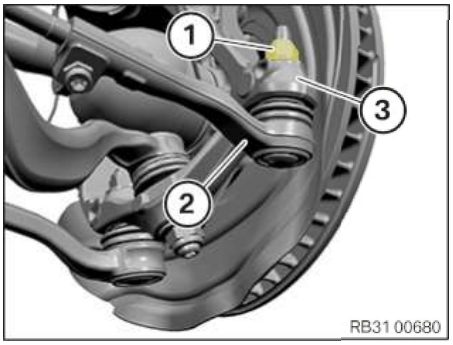
Wishbone to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

63 – Securing the track rod on the left and right to the swivel bearing

NOTICE

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



▸ **Securing the track rod on the swivel bearing**

- Position the track rod (2) on the swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1).

Note: If necessary, counter-hold at the Torx socket.

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

64 – Securing the right and left output shaft on the wheel bearing

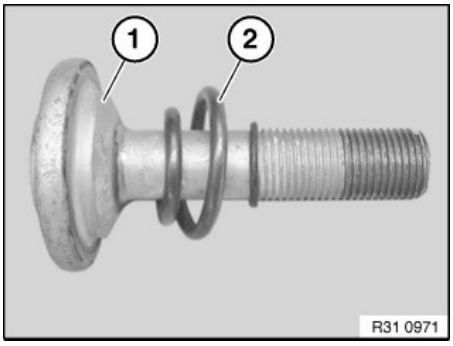
NOTICE

Perform the operations on the left and right side.

▸ **Securing the output shaft on the wheel bearing**

TECHNICAL INFORMATION

The installation note for front gearing must be observed at all times.



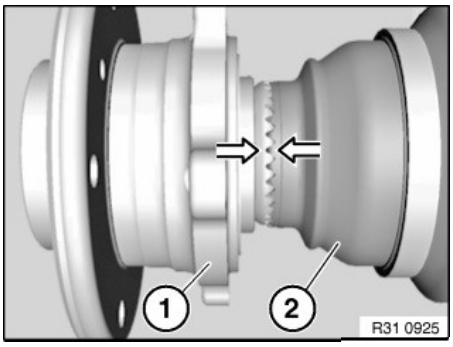
- Renew the collar bolt (2) and the compression spring (1).

  Parts: Collar bolt and compression spring
- Note installation position of compression spring (2).
- Keep the collar bolt (1) and the front gearing of the wheel bearing and the output shaft clean and free of grease.

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- Hand-tighten the collar bolt (1) with the compression spring.



TECHNICAL INFORMATION

The front gearing of the wheel bearing and output shaft must be installed in an interlocking position (tooth-in-tooth).

- Check whether front gearing is locked tooth in tooth (arrows) by reciprocally rotating the wheel bearing (1) and the output shaft (2).
- Verify positive locking.
- Press brake pedal.
- Tighten the collar bolt.

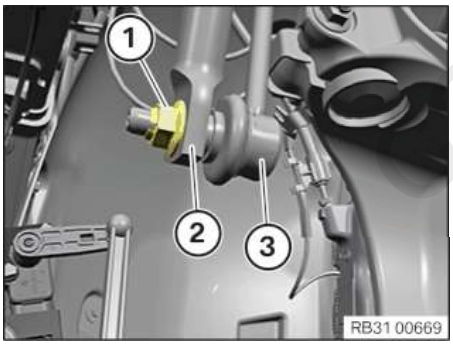
Output shaft to wheel bearing

M16	Replace collar bolt and spring.	Jointing torque	210 Nm
		Angle of rotation	90 °

65 – Securing the anti-roll bar link to the left and right anti-roll bar

NOTICE

Perform the operations on the left and right side.



▸ **Securing the anti-roll bar link to the anti-roll bar**

- Position the anti-roll bar link (3) on the anti-roll bar (2).
- Renew nut (1).

Parts: Nut

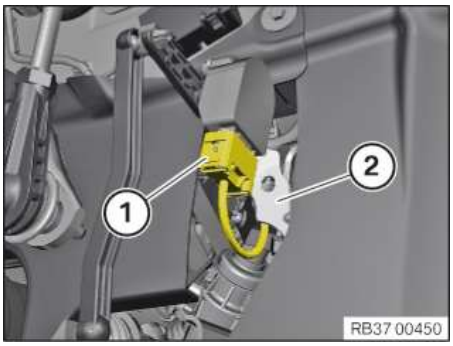
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Front anti-roll bar link to anti-roll bar/spring strut

M10	Renew nut.	Tightening torque	56 Nm

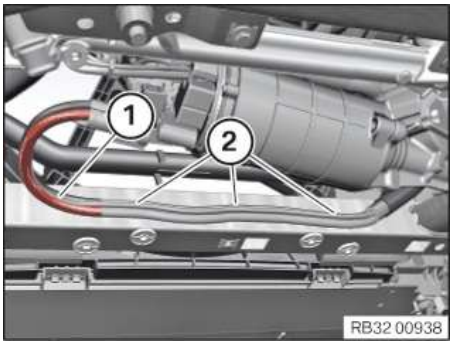
66 – Attach the line connection of the ride height sensor



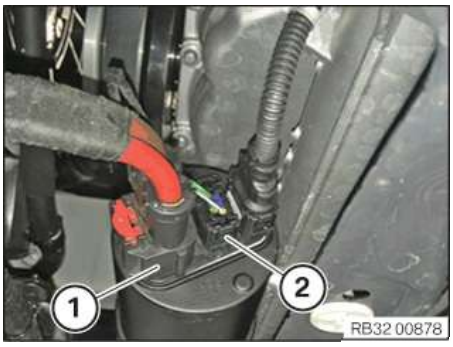
- Position the line .
- Clip in line on holder (2) .
- Connect connectors (1) and lock.

67 – Secure the wiring harness for the EPS on the front axle support

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- Position the EPS wiring harness (1) from the front axle support.
- Secure the holder (2).

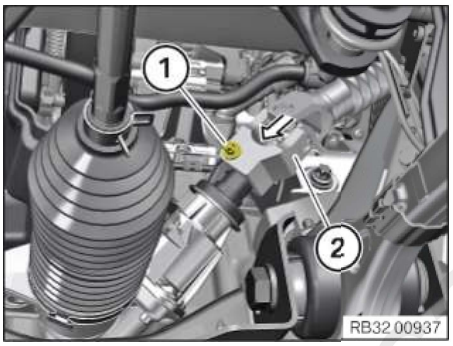


- Connect connectors (1) and (2) lock.

68 – Securing the steering shaft at the bottom on the steering gear

TECHNICAL INFORMATION

The universal joint can only be installed in one position.
The universal joint and the bottom steering gear and/or steering shaft are encoded with each other.
The clamping bolt must e positioned in the groove of the steering gear groove or the steering shaft.



- Clean the screw threads to remove all remnants of screw locking adhesive.
- Slide the lower steering shaft (2) onto the steering gear in the direction of the arrow.
- Renew the clamping bolt (1).

  Parts: Clamping bolt
- Tighten the clamping bolt (1).

Universal joint to steering box

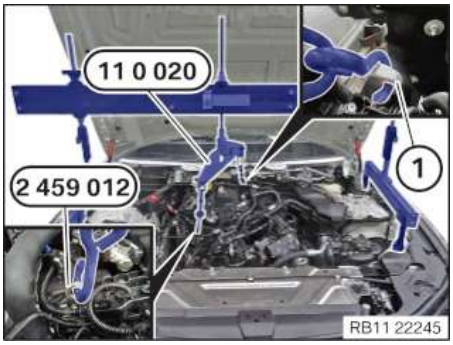
M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

69 – Loosen the attachment of the engine in installation position



- Lower engine by turning the spindle 2 361 506 (00 6 103) until the engine lies completely on the engine supports.

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- Feed out special tool 0 490 567 (11 0 020) on the special tool and set aside.
- Feed out special tool 0 490 567 (11 0 020) on the engine mounting bracket (1) and set aside.



TECHNICAL INFORMATION

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

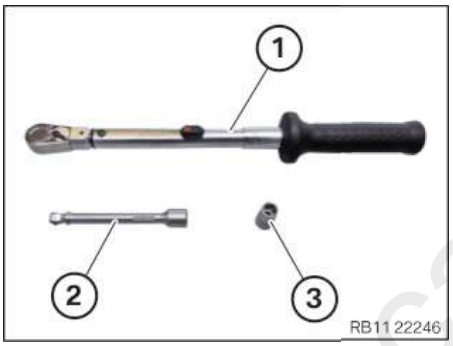
- Remove the engine bridge (1) with an auxiliary person.



- Tighten bolt (1) of the right engine mount from the top using a standard tool.

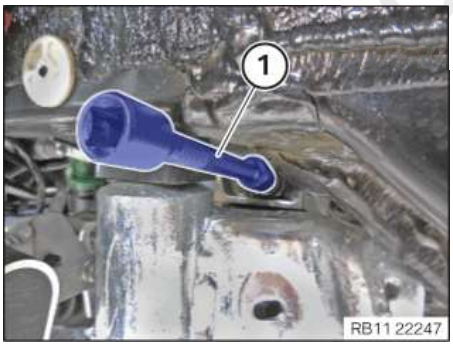
Engine mount to engine mounting bracket

M12		Tightening torque	100 Nm

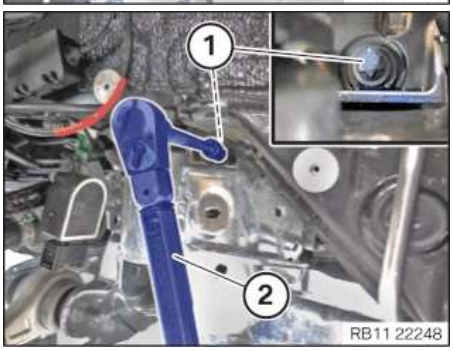


- Have all suitable tools available.

Number	Description
1	Commercial available torque spanner
2	Swivelling extension
3	External TorxE14



- Position suitable tools (1).



- Tighten bolt (1) of the left engine mount using a standard tool (2) sideways.

Engine mount to engine mounting bracket

M12		Tightening torque	100 Nm

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- Unscrew the bolts (1) of the special tool .
- Feed out the special tool at the cylinder head and remove.

70 – Check/add front axle transmission oil

RISK OF DAMAGE

Damage to the front axle differential.

Failure to comply with the oil specifications can result in serious damage to the front axle differential.

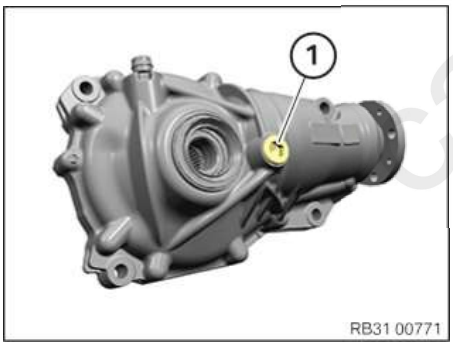
- Use only the approved front axle transmission oil.

TECHNICAL INFORMATION

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



- Use special tool 0 493 337 (00 2 080) to top up the front axle transmission oil.



- Release the screw plug (1).
- Check front axle differential oil level.
- If necessary, top up the front axle transmission oil to the lower edge of the opening for the screw plug (1).

Transmission oil

Technically suitable front axle transmission oils	

Main group 31

- Renew the screw plug (1).

  Parts: Plug
- Tighten the screw plug (1).

Screw plug to front axle transmission

M22	Renew screw plug with O-ring.	Tightening torque	60 Nm

71 – Install the rear section of the front wheel arch cover on the left and right

NOTICE

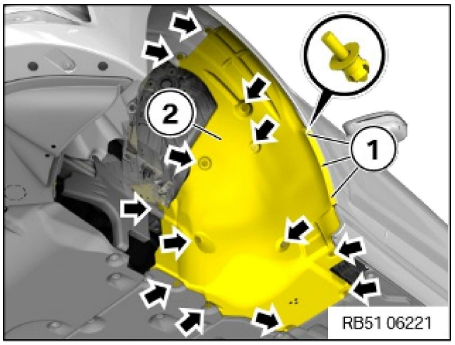
Description is for left component only. Procedure on the right side is identical.

▸ **Install the rear section of the front wheel arch cover**

cardiagn.com

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Install the rear section of the front wheel arch cover(2) .
- Tighten screws (arrows).

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

- Secure expanding rivet (1).

72 – Installing the front section of the wheel arch cover on the front left and right

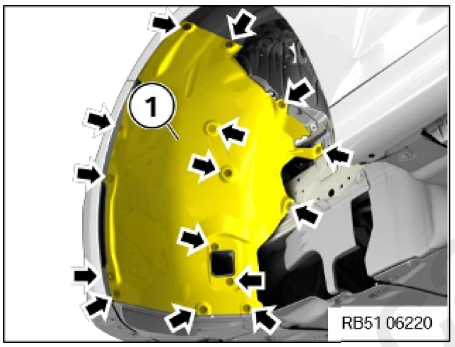
NOTICE

Perform the operations on the left and right side.

▸ **Install the front section of the front wheel arch cover**

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Install the front section of the front wheel arch cover (1).
- Tighten screws (arrows).

Wheel arch trim panel, front

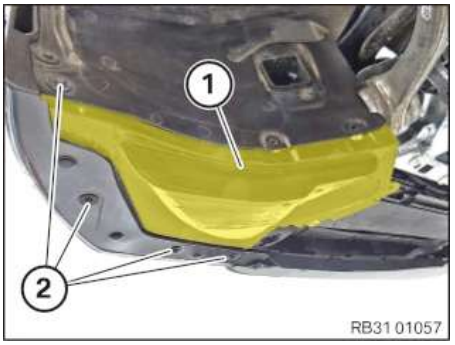
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

73 – Installing the bottom left and right wheel arch cover

NOTICE

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

▸ **Installing the bottom wheel arch cover**



- Position the bottom wheel arch cover (1).
- Tighten the screws (2).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

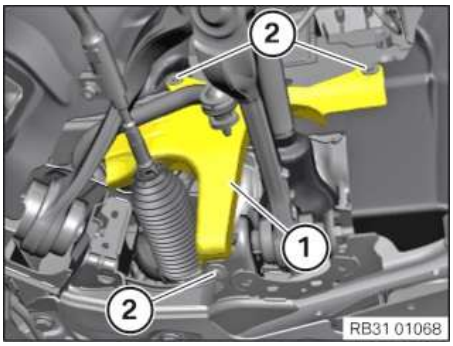
74 – Install the cover of the steering assembly on the left and right

carmanuals.com

NOTICE

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

▶ **Install the cover of the steering assembly**

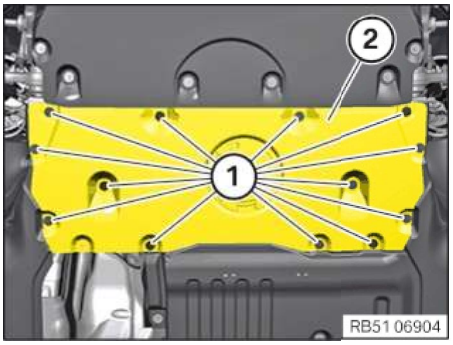


- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

75 – Installing the centre underbody protection



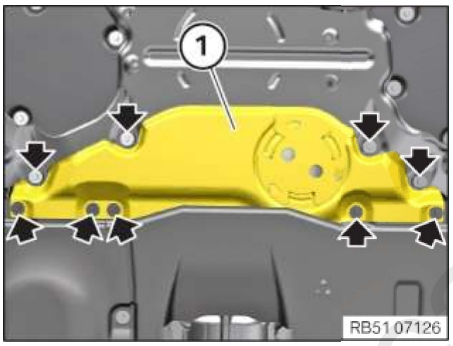
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

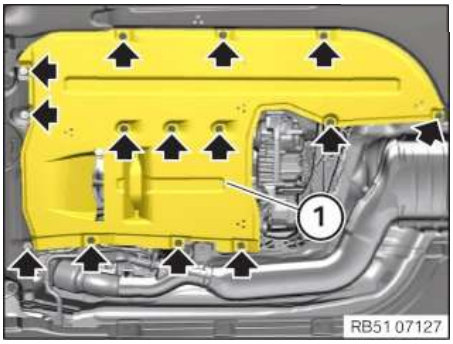
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

76 – Installing underbody protection at rear



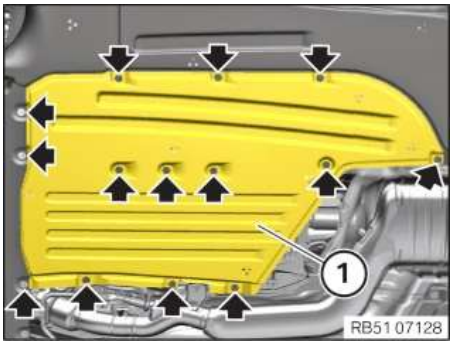
- **Version 1:**

  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).

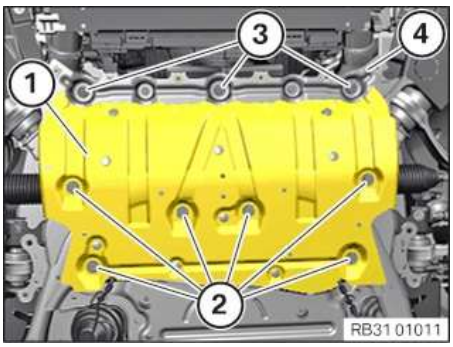
  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

cardiagn.com

77 – Installing the stiffening plate

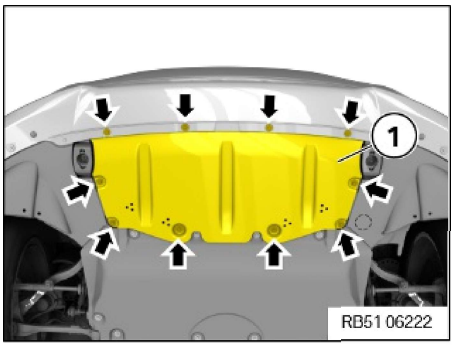


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

78 – Installing the front underbody protection



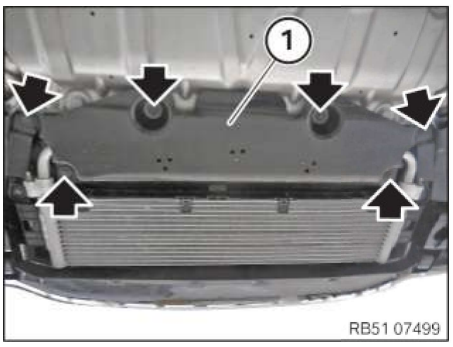
- **Version 1:**

  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



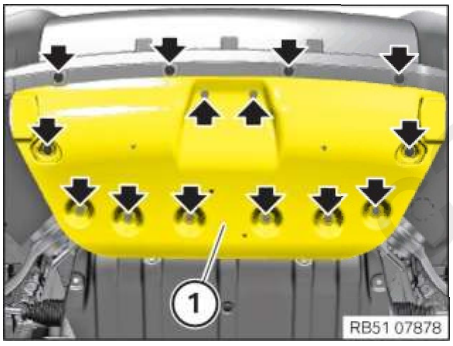
- **Version 2:**

  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

79 – Installing both front wheels



▶ **Mounting the wheel**

TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

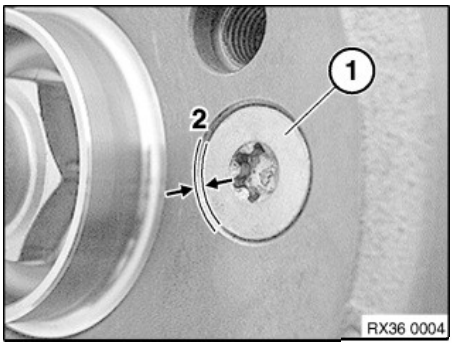
  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.

bmwdiagn.com



- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).



- Check that the mounting bolt (1) for the brake disc is securely seated.

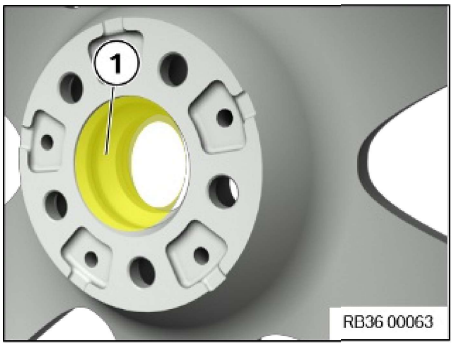
  The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

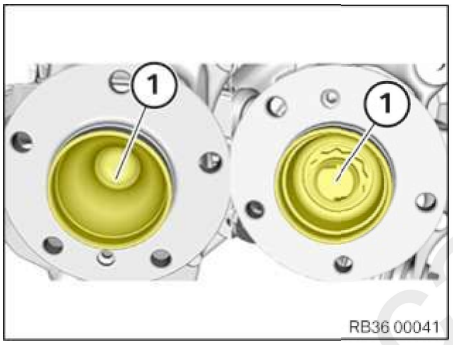
M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

carsign.com



TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

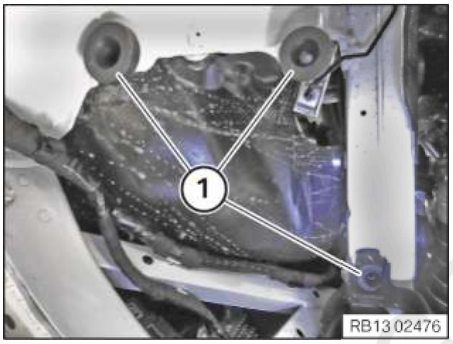
- Renew corroded wheel bolts.

  Parts: Wheel bolts
- Clean the wheel bolts.
- Check wheel bolts and threads for damage, renew the wheel bolts if necessary.
- Join and tighten the wheel bolts (arrows).

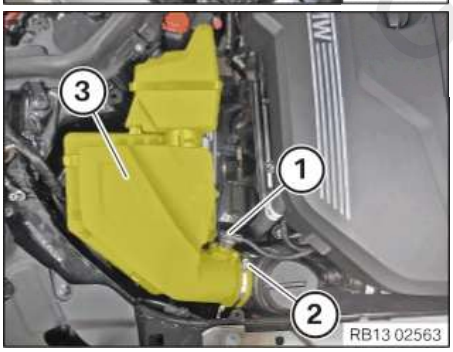
Wheel bolts

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence.	Check	140 Nm
	Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.		

80 – Installing intake silencer housing



- 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

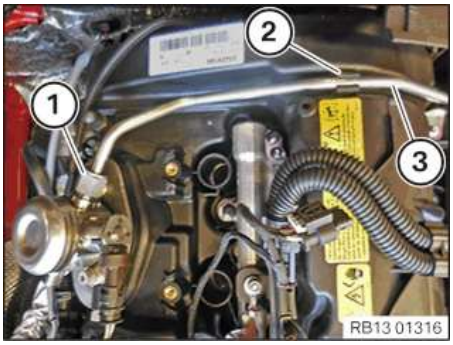
Clamp		Tightening torque	3 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

81 – Installing fuel delivery line

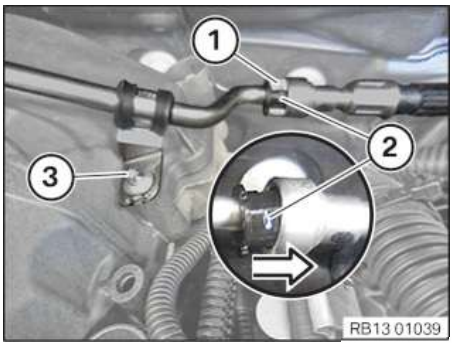
cardiagn.com



- Guide the fuel delivery line (3) in and install.
- Install rubber damper (2).
- Check the rubber damper (2) for the correct fit.
- Tighten the union nut (1) hand-tight.
- Tighten union nut (1).

Fuel delivery line to high pressure pump

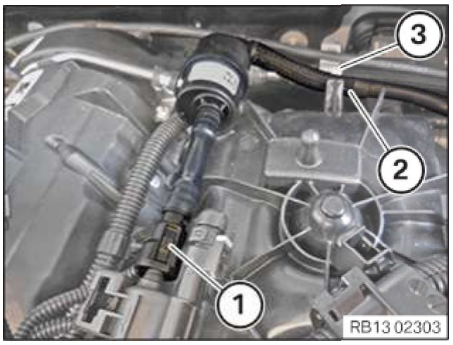
M14		Tightening torque	31 Nm



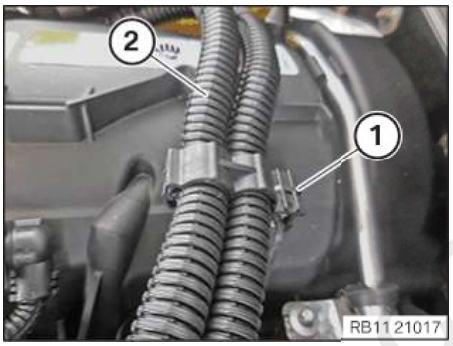
- Slide in and lock the fuel feed line in the direction of the arrow in the snap fastener (2).
  The fuel feed line must be audibly engage in the snap fastener (2).
- Secure clamps (1).
- Tighten down screw (3).

Fuel line to cylinder head cover

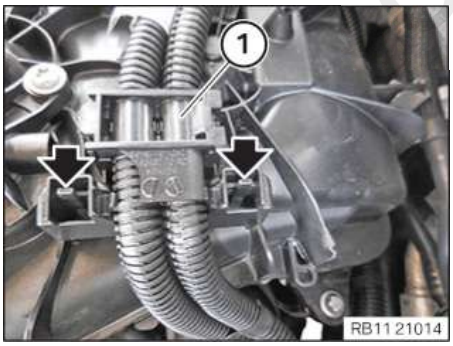
6x18		Tightening torque	6,5 Nm



- Insert and install the tank ventilation line (2).
- Lock (1) must engage audibly.
- Secure the tank ventilation line (2) to the clamp (3).



- Insert and install wiring harness section (2) for injectors and ignition coils.
- Secure clamps (1).



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

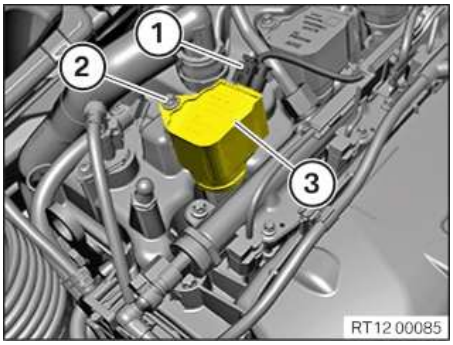
82 – Install all ignition coils

NOTICE

The description is for one component only. The procedure is identical for all further components.

▸ **Install ignition coil.**

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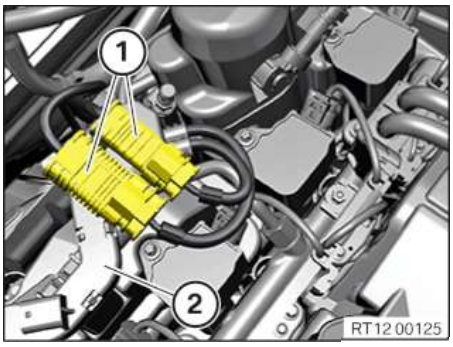
- Install ignition coil (3).
- Tighten down screw (2).

Ignition coil

Screw		Tightening torque	8 Nm

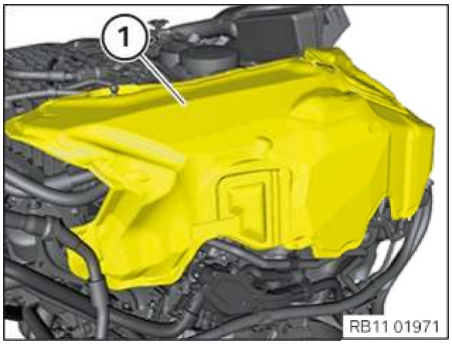
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Connect the connector (1) of the front oxygen sensor and the monitoring oxygen sensor on the cable shaft (2).

83 – Installing acoustic cover at rear

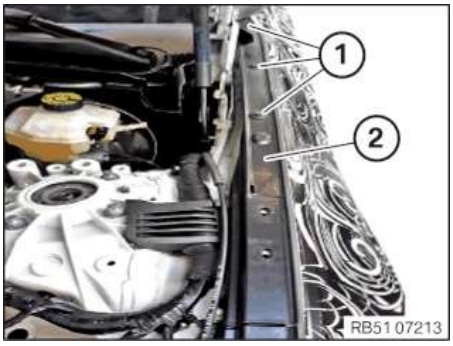


- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



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

84 – Installation of side panel sealing.



NOTICE

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

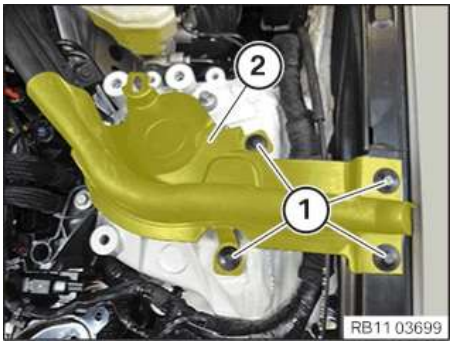
- Guide the sealing (2) in and install it.
- Mount the expanding rivets (1).

85 – Install side bonnet seals

NOTICE

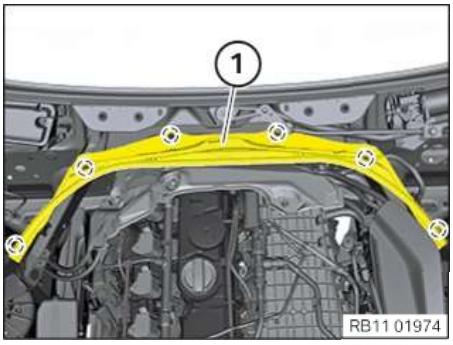
Perform the operations on the left and right side.

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- Position the side bonnet seal (2) on the spring strut dome.
- Secure the rivet (1).

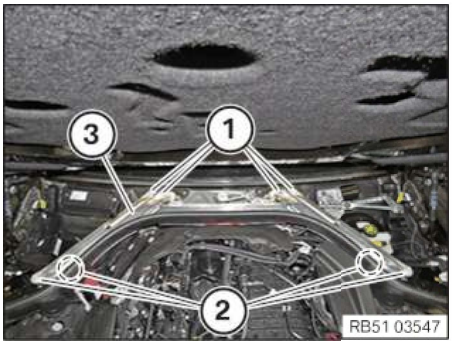
86 – Installing the centre bulkhead upper part



- 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 °

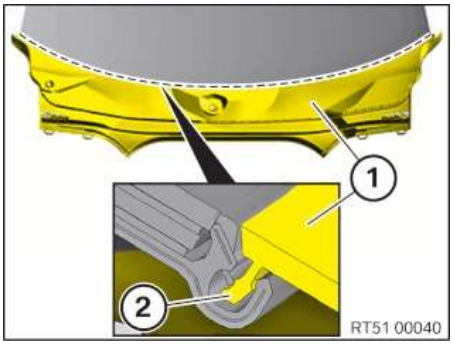
87 – Installing cowl panel cover

RISK OF DAMAGE

Damage caused by water ingress into the vehicle.

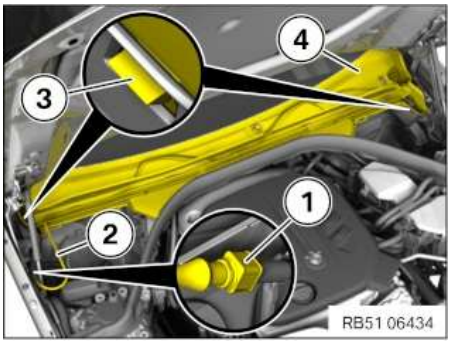
Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

- 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.

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- 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.

88 – Installing both wiper arms

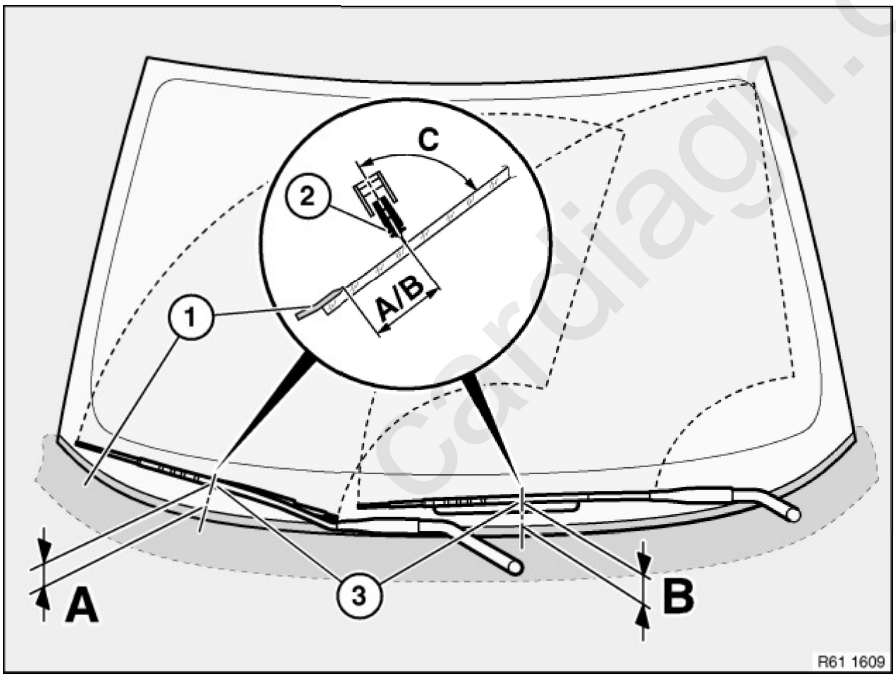
NOTICE

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

▸ **Install the wiper arm**

TECHNICAL INFORMATION

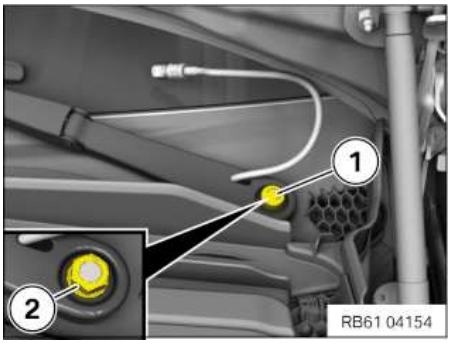
The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.



- 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



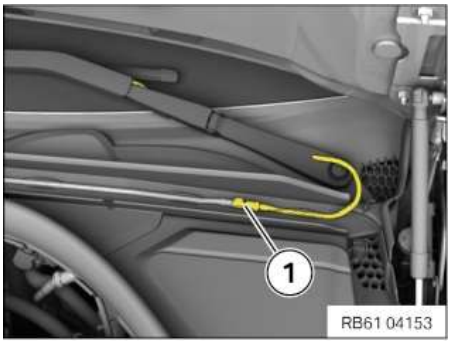
- Tighten nut (2).

Windscreen wiper arm

Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).

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

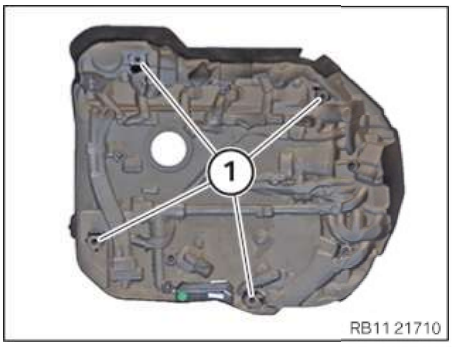
89 – Install acoustic cover

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).

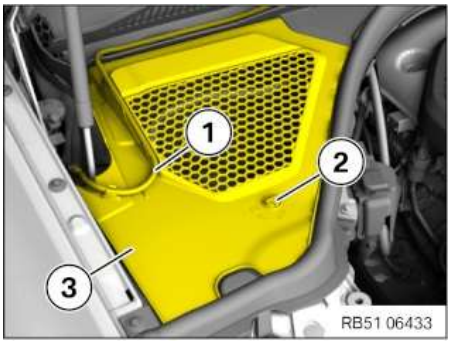
90 – Install the seal for the bonnet



- 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.

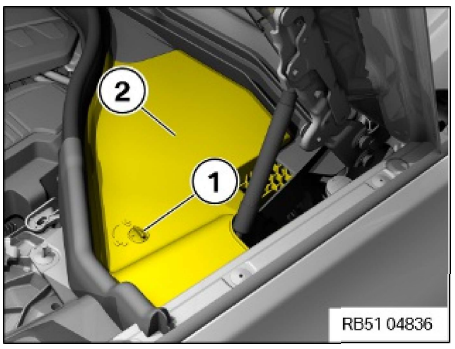
91 – Install the rear right engine compartment cover

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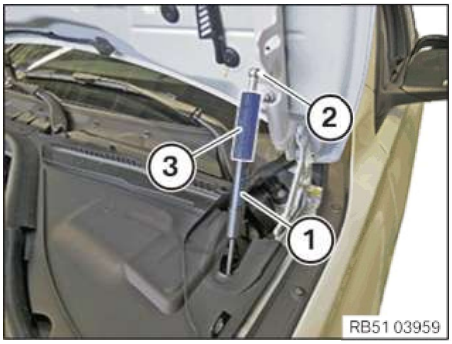
- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

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

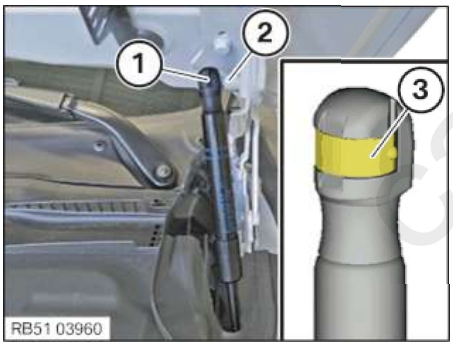


- Position the engine compartment cover at the rear left (2) .
- Close lock (1).

93 – 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.

94 – Topping up the engine oil

RISK OF DAMAGE

Damage to the petrol particulate filter.

Vehicles equipped with a petrol particulate filter must be operated with low-ash engine oil only.

- Use BMW Longlife-04 , BMW Longlife-12 FE or BMW Longlife-17 FE+ engine oils or engine oils approved by BMW matching the same specifications only.
- For additional information see: Overview of approved engine oils for BMW Group engines.

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RISK OF DAMAGE

Engine damage caused by excessively filling the engine with engine oil.

Filling an excessive quantity of engine oil may cause engine damage.

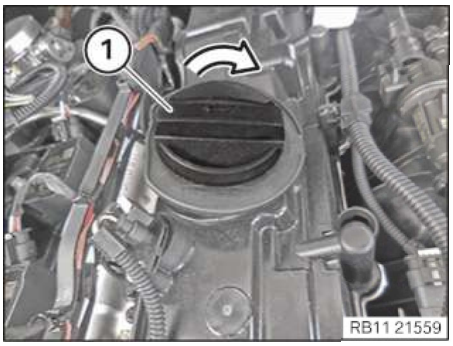
- Observe the exact engine oil filling capacity.
- Drain the engine oil.

- Pour in engine oil.

Engine oil B58B30M1/B58B30O1

Filling capacity, engine oil change with oil filter element	6,50 l
Engine oil: Technically suitable engine oils for BMW Group engines	

95 – Installing the oil filler cap



- Close oil filler cap (1) in direction of arrow.
- Make sure that the sealing cap (1) engages audibly.

96 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Oil drain plug — Used in step 25

M12x16	Replace sealing ring.	Tightening torque	25 Nm

Special tool to cylinder head — Used in step 28

M8		Tightening torque	21,5 Nm

Camshaft sprocket to oil vacuum pump — Used in step 49

M8	Important - left-hand thread Renew screw.	1. Jointing torque 2. Angle of rotation	5 Nm 90 °

Oil vacuum pump to crankcase — Used in step 49

M8	Renew screw.	1. Tightening torque 2. Angle of rotation	15 Nm 45 °

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Oil sump to crankcase — Used in step 50

M8 x 30		Tightening torque	24 Nm

Oil sump to crankcase — Used in step 50

M8 x 110		Tightening torque	24 Nm

Transmission to oil sump (manual gearbox and automatic transmission) — Used in step 50

M8 x 50		Tightening torque	19 Nm

Bearing support to oil sump — Used in step 51

M8		Tightening torque	19 Nm

Front axle final drive to engine oil pan — Used in step 52

M12		Tightening torque	140 Nm

Holder for front transmission oil cooler line — Used in step 53

M6x18		Tightening torque	12 Nm

Starter motor to crankcase — Used in step 54

M8x60		Tightening torque	19 Nm

Battery positive lead to starter — Used in step 56

M8		Tightening torque	13,5 Nm

Propeller shaft before the front axle differential — Used in step 58

Renew screws. Jointing torque and angle of rotation must be observed without fail.		Tightening torque Angle of rotation	25 Nm 45 °

Front axle support to front/centre of body — Used in step 59

M12	Renew screws.	Jointing torque	108 Nm

Front axle carrier to body, rear — Used in step 59

M14	Renew screws.	Tightening torque	175 Nm

Adapter, front axle support to front axle support — Used in step 59

M8x70		Tightening torque	19 Nm

Tension strut to swivel bearing — Used in step 61

M14	Renew nut.	Tightening torque	175 Nm

Wishbone to swivel bearing — Used in step 62

M14	Renew nut.	Tightening torque	175 Nm

Track rod end to swivel bearing — Used in step 63

M14	Renew nut.	Tightening torque	175 Nm

Output shaft to wheel bearing — Used in step 64

M16	Replace collar bolt and spring.	Jointing torque Angle of rotation	210 Nm 90 °

Front anti-roll bar link to anti-roll bar/spring strut — Used in step 65

M10	Renew nut.	Tightening torque	56 Nm

Universal joint to steering box — Used in step 68

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

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Engine mount to engine mounting bracket — Used in step 69

M12		Tightening torque	100 Nm

Screw plug to front axle transmission — Used in step 70

M22	Renew screw plug with O-ring.	Tightening torque	60 Nm

Wheel arch trim panel, front — Used in step 7172

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Cover, front bottom on side — Used in step 73

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Cover, steering unit — Used in step 74

Screw		Tightening torque	3 Nm

Underbody protection — Used in step 7576

Hexagon screw		Tightening torque	3 Nm

Stiffening plate to front axle support — Used in step 77

M10		Tightening torque	56 Nm

Underbody protection front — Used in step 78

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

Brake disc to front wheel hub — Used in step 79

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 79

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 79

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim. Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Tightening torque Check	140 Nm 140 Nm

Clean air pipe to upper section of intake filter housing — Used in step 80

Clamp		Tightening torque	3 Nm

Fuel delivery line to high pressure pump — Used in step 81

M14		Tightening torque	31 Nm

Fuel line to cylinder head cover — Used in step 81

6x18		Tightening torque	6,5 Nm

Ignition coil — Used in step 82

Screw		Tightening torque	8 Nm

Bulkhead upper part to bottom bulkhead — Used in step 86

		Tightening torque	3 Nm

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Tension strut on bulkhead — Used in step 86

M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome — Used in step 86

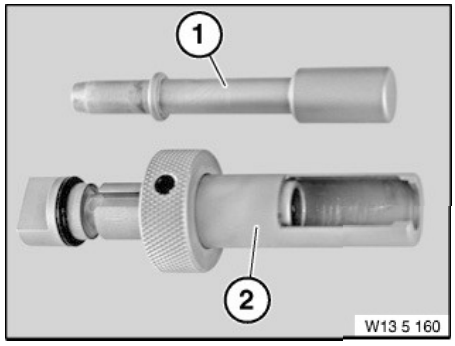
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm — Used in step 88

Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

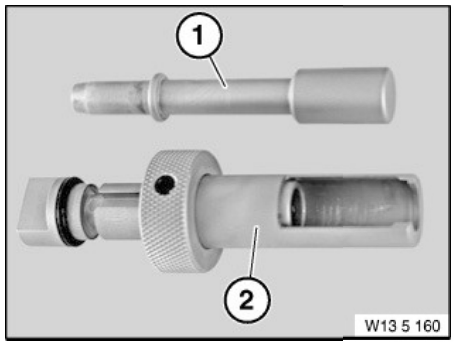
0 496 567 (13 5 161) Fastener



Common — Used in step 14

Usage	(Cap (2 piece)) For sealing the quick connectors Deletion, only available via tool set
Included in the tool or work	0 496 565
Storage location	
Replaced by	
In connection with	
SI-Number	

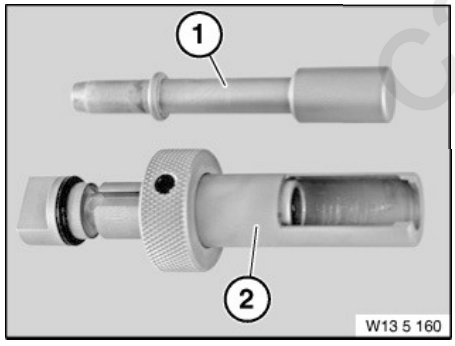
0 496 568 (13 5 162) Fastener



Common — Used in step 14

Usage	(Cap (2 x)) To close off the fuel lines. Discontinued, can only be ordered using complete tool
Included in the tool or work	0 496 565
Storage location	
Replaced by	
In connection with	
SI-Number	

0 496 565 (13 5 160) Fastener



Common — Used in step 14

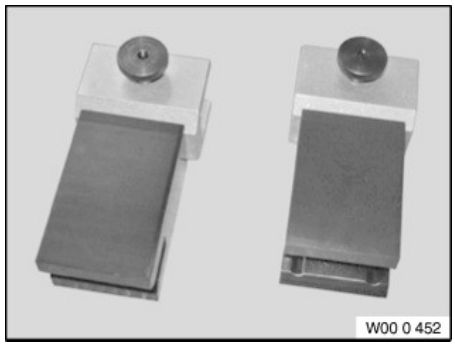
Usage	(Caps (2x)) To close off the fuel lines when removing and installing the engine.
Included in the tool or work	
Storage location	B26
Replaced by	
In connection with	
SI-Number	01 22 08 (498)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 496 567 (13 5 161)		**Fastener** (Cap (2 piece)) For sealing the quick connectors Deletion, only available via tool set	
2	0 496 568 (13 5 162)		**Fastener** (Cap (2 x)) To close off the fuel lines. Discontinued, can only be ordered using complete tool	

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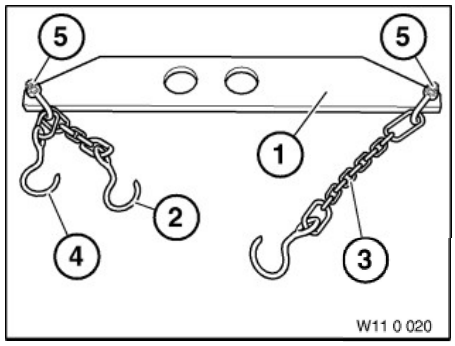
0 495 850 (00 0 452) Upholstery



Common Used in step 28

Usage	(Pads (2 x)) Series: E70 Replaced by 00 6 042
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 22 06 (307)

0 490 567 (11 0 020) Lifting gear



Common Used in step 2869

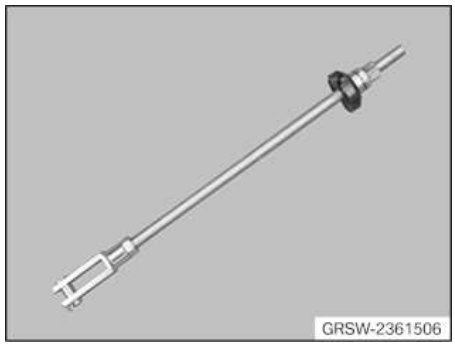
Usage	For removing and installing the engines. 08/2011 only available as a complete set. Delivered with TÜV inspection certificate and operating instructions. No delivery of separate parts.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 13 94 (888)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
5	0 490 572 (11 0 029)		**Shackle** (Shackle) 2 pieces As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TÜV inspection certificate and operating instructions.	
1	0 490 568 (11 0 021)		**Lifting gear** (Cross member) As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TÜV inspection certificate and operating instructions.	
2	0 490 569 (11 0 022)		**Chain** (Chain) As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TÜV inspection certificate and operating instructions.	
3	0 490 570 (11 0 023)		**Chain** (Chain) Version: long As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TÜV inspection certificate and operating instructions.	
4	0 490 571 (11 0 024)		**Chain** (Chain) Version: short As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TÜV inspection certificate and operating instructions.	

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2 361 506 (00 6 103) Spindle



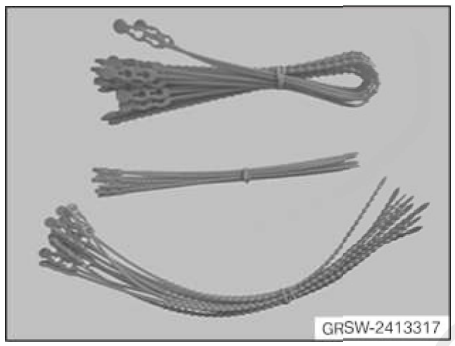
Common	Used in step 2869
Usage	Spindle (central spindle) for Traverse 00 6 100.
Included in the tool or work	0 496 852
Storage location	
Replaced by	
In connection with	
SI-Number	01 17 10 (659)

2 219 012 Hydraulic lifter



Common	Used in step 383959
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)

2 413 317 Cable strap



Common	Used in step 4058
Usage	The "Cable ties" parts set consists of 3 items as follows: ABV232 Length: 320 mm colour: RedABV250 Length: 500 mm colour: RedABVS270 Length: 665 mm colour: Red
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 47 15 (332)

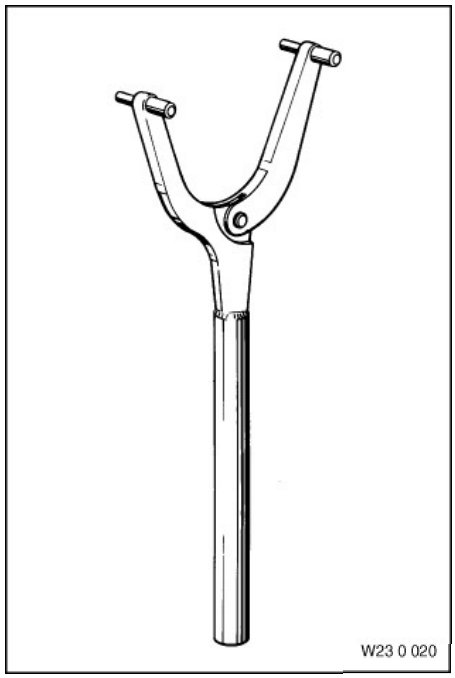
2 463 965 Socket wrench



Common	Used in step 48
Usage	with T30, T40 and torx 45
Included in the tool or work	
Storage location	B6
Replaced by	
In connection with	
SI-Number	01 07 17 (487)

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0 491 440 (23 0 020) Holder

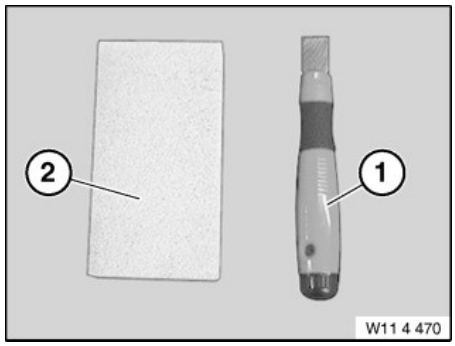


Common Used in step 49

Usage	(counter support) For all three- and four-hole flanges when releasing and tightening down
Included in the tool or work	
Storage location	B4
Replaced by	
In connection with	
SI-Number	

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0 495 102 (11 4 470) Tool



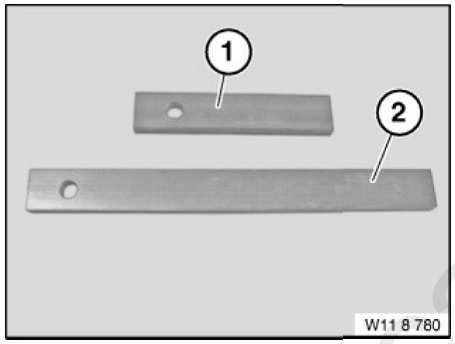
Common Used in step 50

Usage	(cleaning kit) For cleaning sealing surfaces on magnesium crankcase/cylinder head.
Included in the tool or work	
Storage location	C52
Replaced by	
In connection with	
SI-Number	01 17 04 (130)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 103 (11 4 471)		**Scraper**	
2	0 495 104 (11 4 472)		**Extractor** (grindstone)	

0 496 120 (11 8 780) Plate



Common Used in step 50

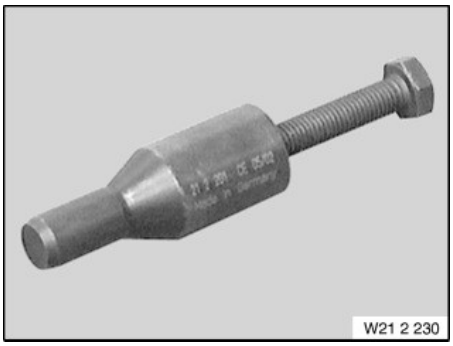
Usage	(Mounting plates) For securing transmission oil sump when gearbox is removed.
Included in the tool or work	
Storage location	B24
Replaced by	
In connection with	
SI-Number	01 05 07 (353)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 496 121 (11 8 781)		**Plate** (Mounting plate, short)Discontinued; only available via set 11 8 780 = 0496120.	
2	0 496 122 (11 8 782)		**Plate** (Mounting plate, long) Discontinued; only available via set 11 8 780 = 0496120.	

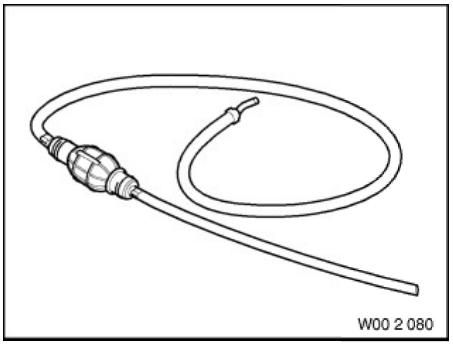
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0 494 649 (21 2 230) Mandrel



Common	Used in step 55
Usage	(clutch centring drift) With screw M10 (G transmission)
Included in the tool or work	
Storage location	C45
Replaced by	
In connection with	
SI-Number	01 03 03 (960)

0 493 337 (00 2 080) Pump



Common	Used in step 70
Usage	(Hand pump) For lifetime oil filling
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 01 98 (294)

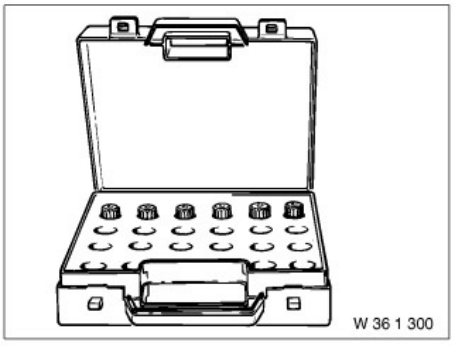
2 344 011 Tool



Common	Used in step 79
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	08 08 12 (872)

Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common	Used in step 17
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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0 495 224 (36 1 326) Wheel stud



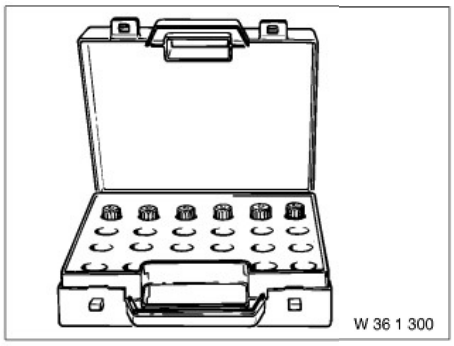
Common	Used in step 17
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 225 (36 1 327) Wheel stud



Common	Used in step 17
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 226 (36 1 328) Wheel stud



Common	Used in step 17
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 227 (36 1 329) Wheel stud



Common	Used in step 17
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

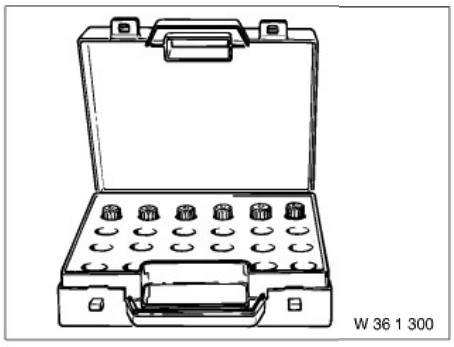
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0 495 228 (36 1 331) Wheel stud



Common	Used in step 17
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 229 (36 1 332) Wheel stud



Common	Used in step 17
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 230 (36 1 333) Wheel stud



Common	Used in step 17
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Overview Technical Data

Height of the sealing bead	Used in step 50
	2,0 mm ... 2,5 mm

Distance from window pane edge to wiper blade	Used in step 88
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

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Filling capacity, engine oil change with oil filter element	6,50 l

Engine oil: Technically suitable engine oils for BMW Group engines

Links

General repair instructions	Used in step
11 00 ... Overview of consumables (Electronic Parts Catalogue)	50

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	196
61 20 900 Disconnecting and connecting battery earth lead	196
61 20 900 Disconnecting and connecting battery earth lead	196
61 20 900 Disconnecting and connecting battery earth lead	196
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	196
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	196
61 20 900 Disconnecting and connecting battery earth lead	196
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	196
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	196
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61 35 ... Notes on ESD protection (Electro Static Discharge)	1346
00 .. ... Raising the vehicle using a vehicle hoist	

Operating materials	Used in step
3.0 Technically appropriate engine oils for BMW Group engines	94

Operating materials	Used in step
Main group 31	70

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11 42 020 Removing and installing/replacing full-flow oil filter completely

WARNING

Hot surfaces.

Risk of burning!

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

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

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

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PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

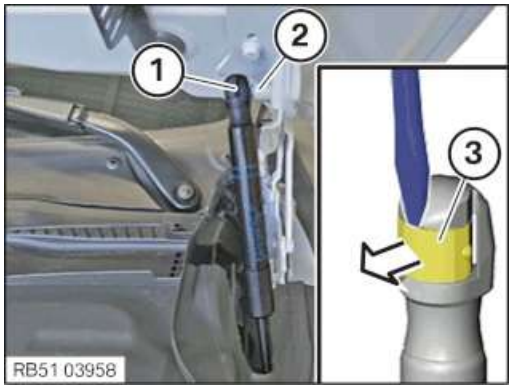
Engine compartment lid is open.

CAUTION

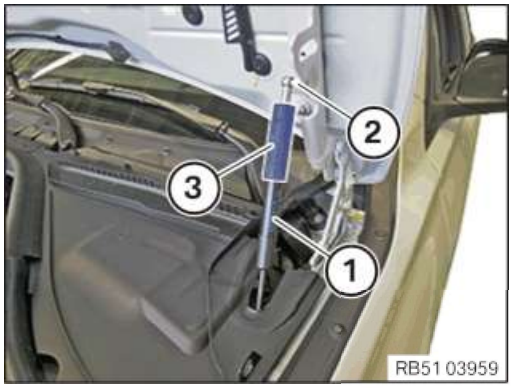
Shutting bonnet or tailgate.

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.



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 – Removing the acoustic cover

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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.



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

5 – Removing acoustic cover at rear



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

6 – Removing intake silencer housing

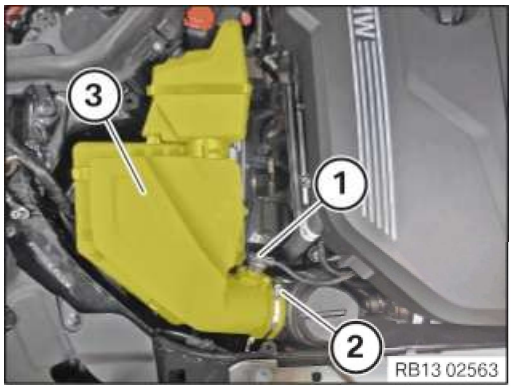
rdiagn.com

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.

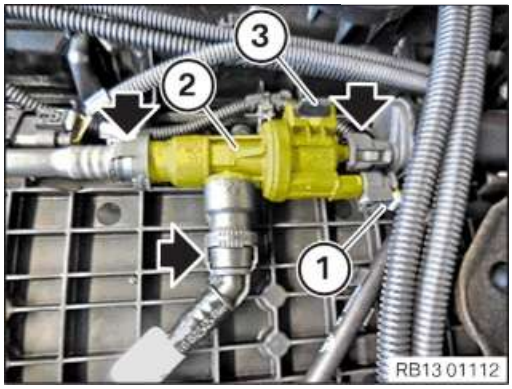
7 – Remove tank vent valve

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).

8 – 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.

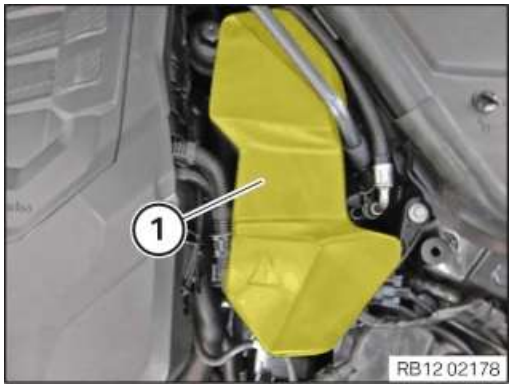
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

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

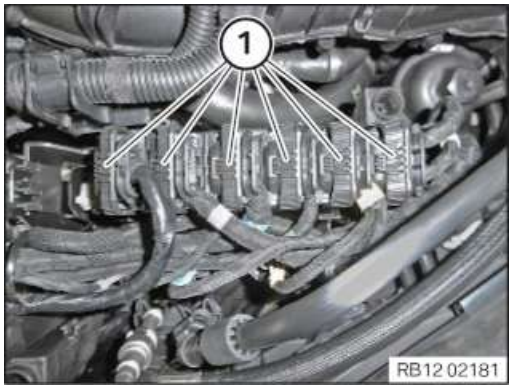
TECHNICAL INFORMATION

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

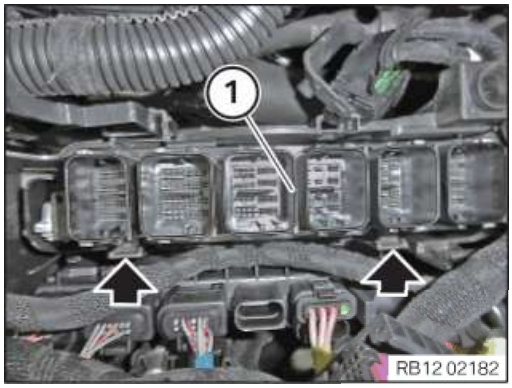


- Pull the cover (1) towards the top and feed out.

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- Unlock and disconnect the plug connection (1).



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

9 – 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.

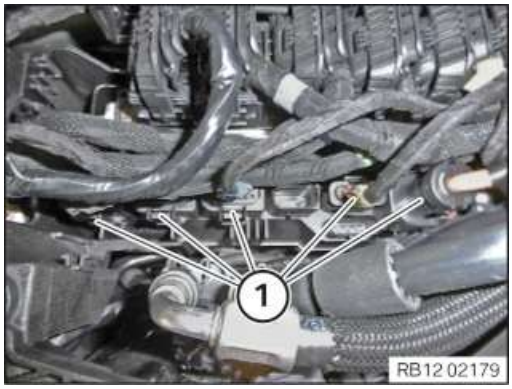
RISK OF DAMAGE

Electrostatic discharge.

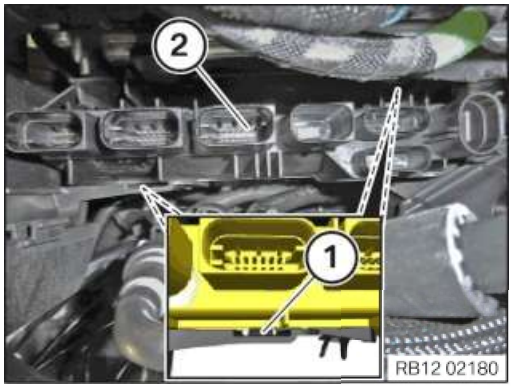
Damage to or destruction of electrical components.

- 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.

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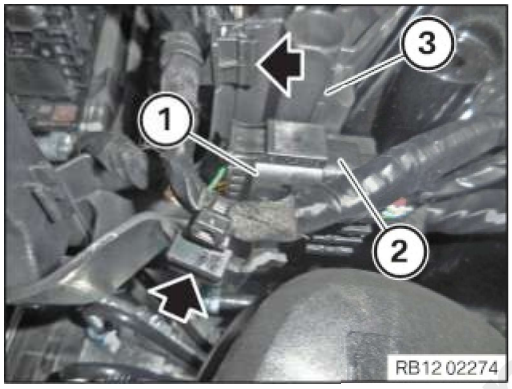


- Unlock and disconnect plug connections (1).

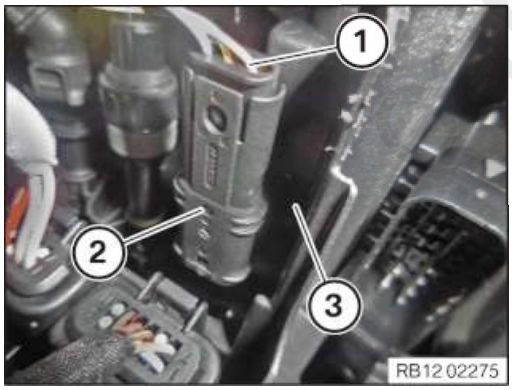


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

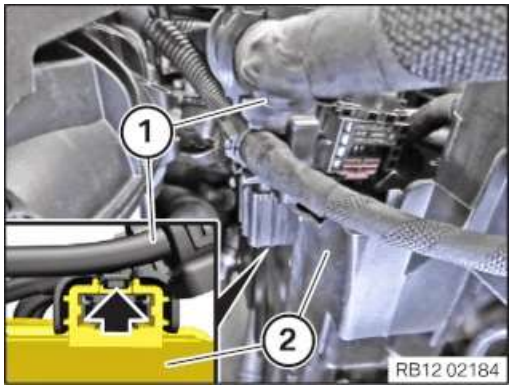
10 – Removing the control unit holder



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

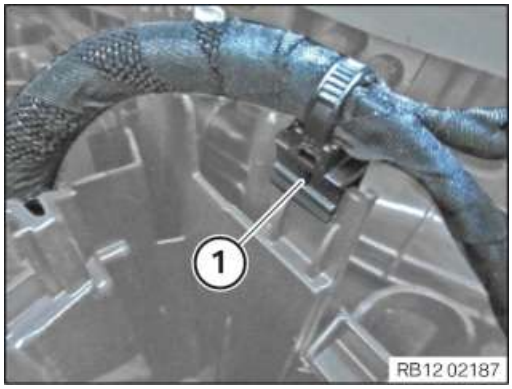


- Unlock plug connection (1) and disconnect.
- Unlock the connector and disconnect from the control unit holder (3).

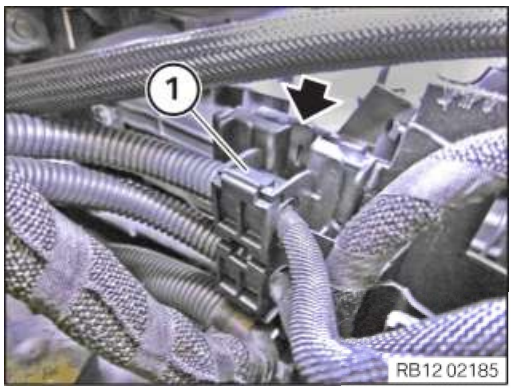


- Unlock the lock (arrow).
- Disconnect the cable holder (1) upwards from the control unit holder (2).

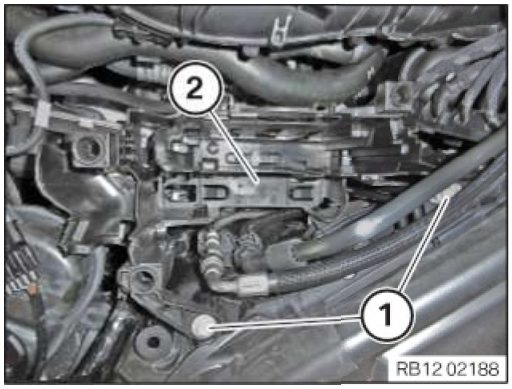
.com



- Loosen clamp (1).

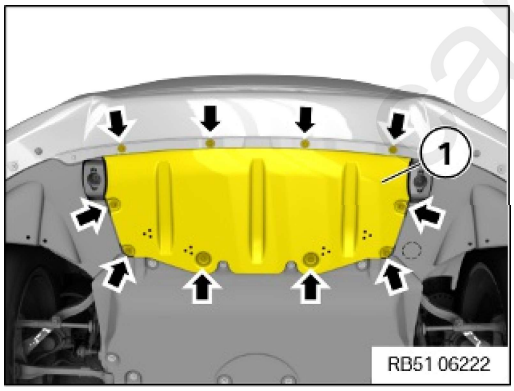


- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



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

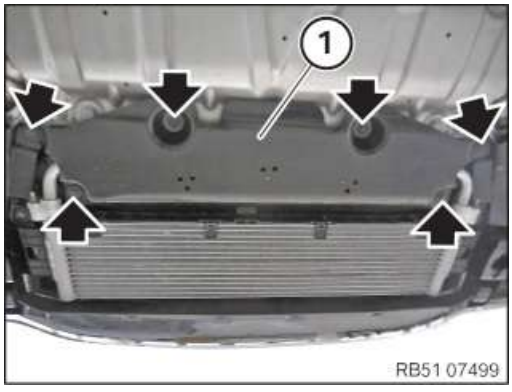
11 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

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

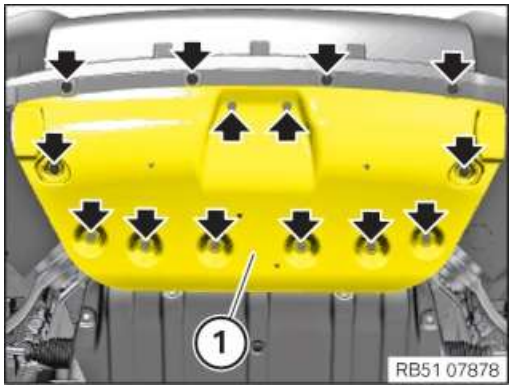


- **Version 2:**

  Remove screws (arrows).

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

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- **Version 3:**

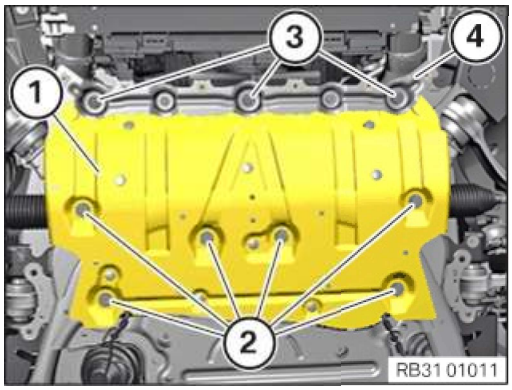
  Remove screws (arrows).

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

12 – Removing the stiffening plate

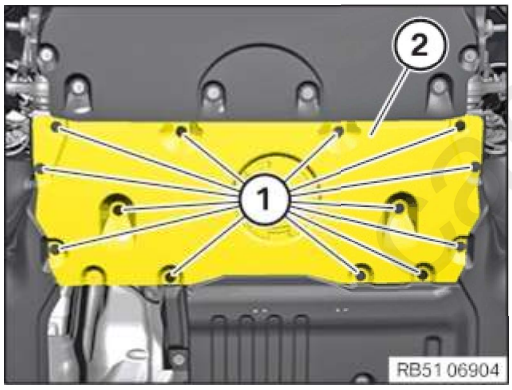
TECHNICAL INFORMATION

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).

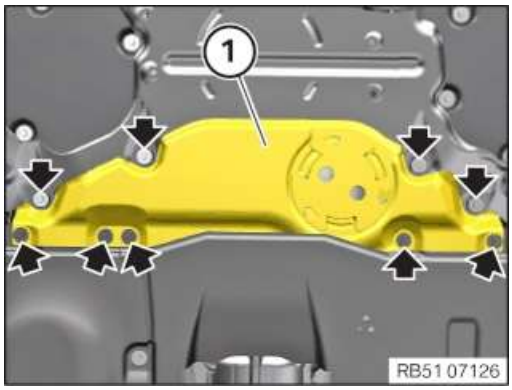
13 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .



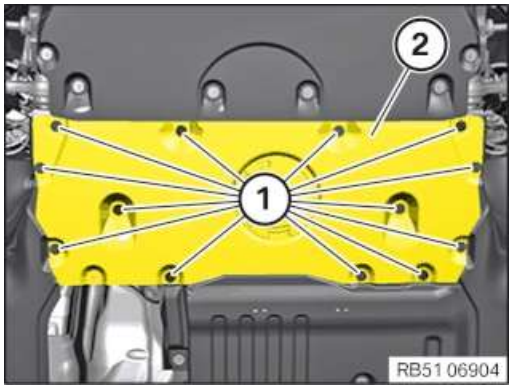
- **Version with all-wheel drive:**

  Remove screws (arrows).

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

14 – Removing the centre underbody protection

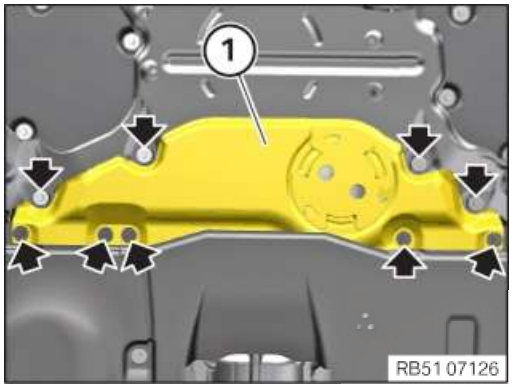
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- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .



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

  Remove screws (arrows).

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

15 – Releasing the oil drain plug

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

TECHNICAL INFORMATION

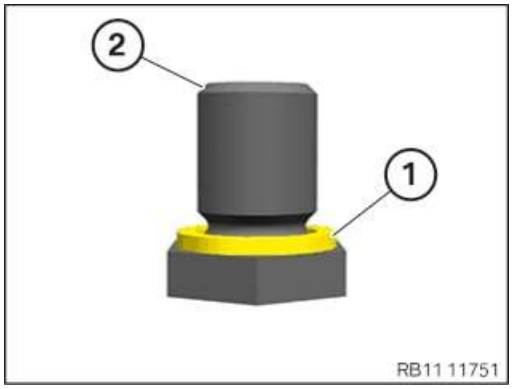
Catch and dispose of drained engine oil in a suitable collecting vessel. Observe country-specific waste disposal regulations.



- Release oil drain plug (1).
- Feed out the oil drain plug (1) using sealing ring (2) and remove.
- Allow the engine oil to drain out fully.

16 – Tightening the oil drain plug

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- Renew sealing ring (1) on the oil drain plug (2).

  Parts: Sealing ring
- Guide in the sealing ring (1) on the oil drain plug (2) and install.



- Feed in the oil drain plug (1) with the sealing ring (2) and install.
- Tighten oil drain plug (1).

Oil drain plug

M12x16	Replace sealing ring.	Tightening torque	25 Nm

17 – If installed: Partially release the engine oil cooler

WARNING

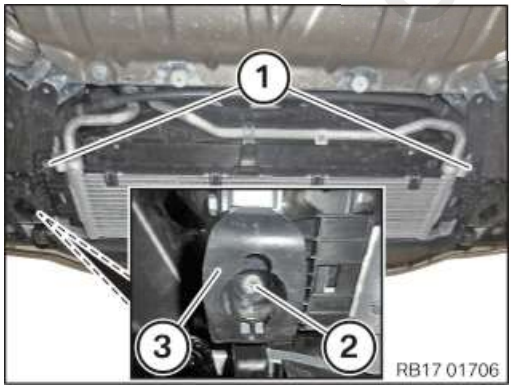
Hot surfaces.

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.

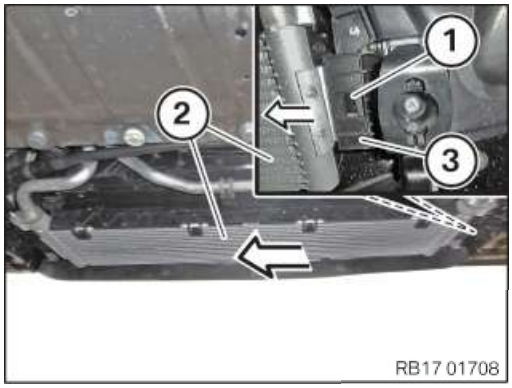


- Loosen screws (1).
- Drill out rivet on the left (2).
- Remove the left-hand damper (3).

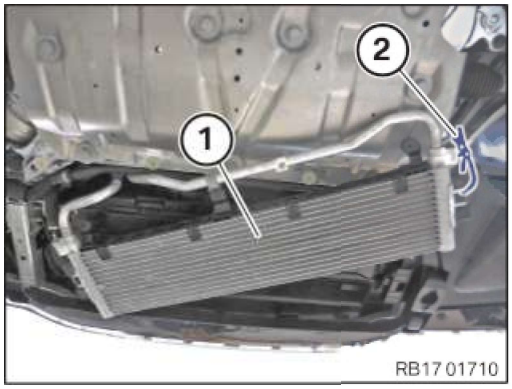
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- Loosen screw (1).



- 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.

18 – 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.

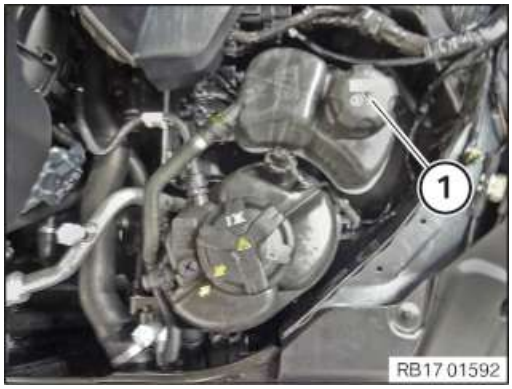
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

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.

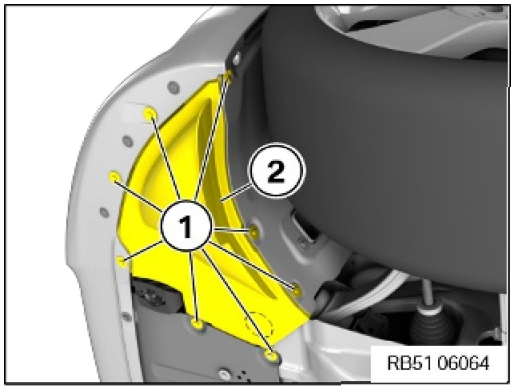
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TECHNICAL INFORMATION

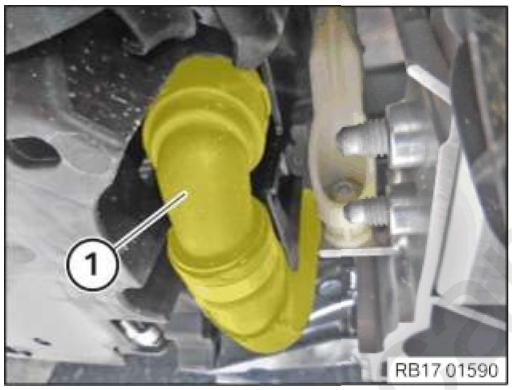
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen sealing cap (1).



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

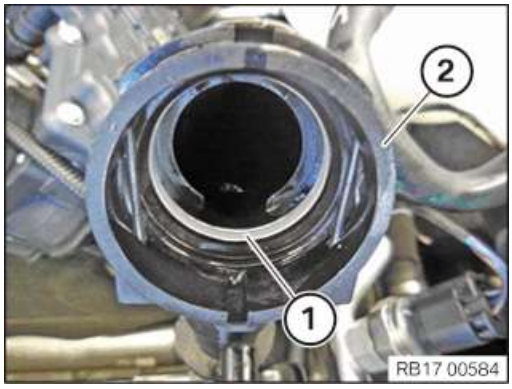


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

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

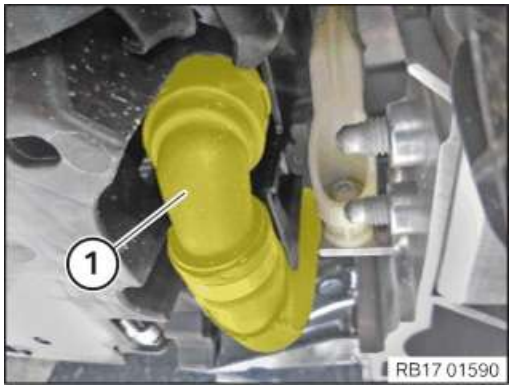
TECHNICAL INFORMATION

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



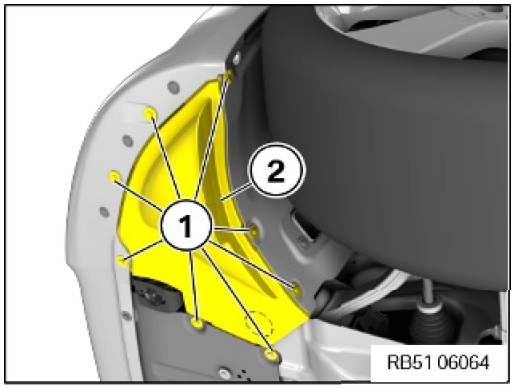
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

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- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.

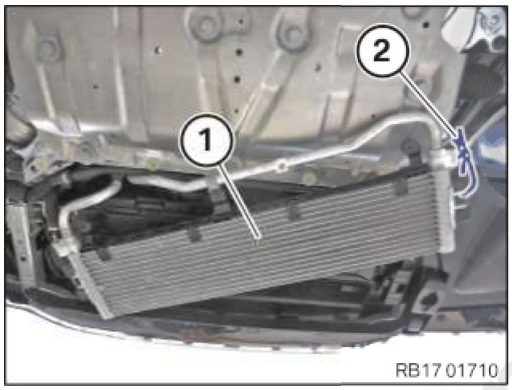


- Feed in and install cover (2) at the bottom front left.
- Tighten the screws (1).

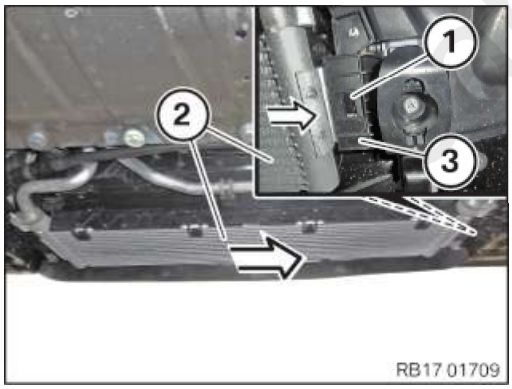
Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

20 – 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.

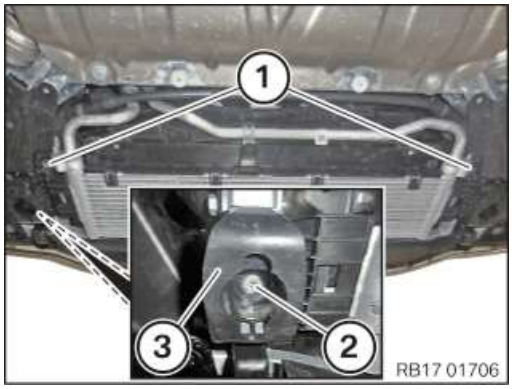


- Tighten down screw (1).

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

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

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

TECHNICAL INFORMATION

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



- Loosen sealing cap (1).

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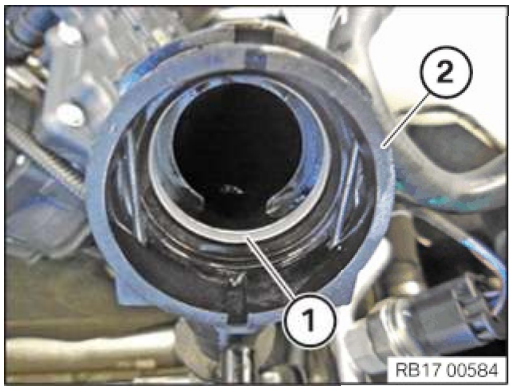


- Unlock lower right coolant hose (1) on the high-temperature coolant radiator and pull it off.
- Catch and dispose of escaping coolant.

22 – Connecting coolant hose to high-temperature coolant radiator

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 coolant hose (1), bottom right to the high-temperature coolant radiator and lock it audibly.

23 – 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.

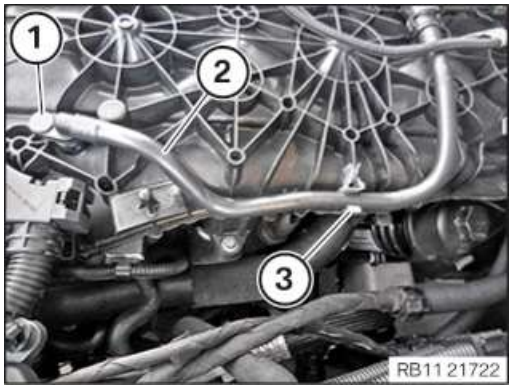
TECHNICAL INFORMATION

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

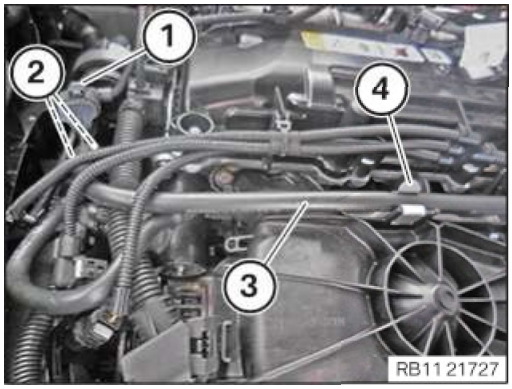
autodiagn.com

TECHNICAL INFORMATION

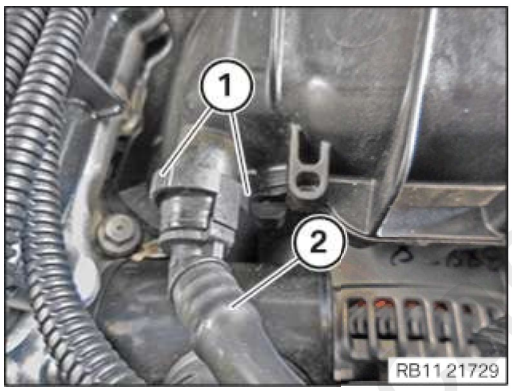
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



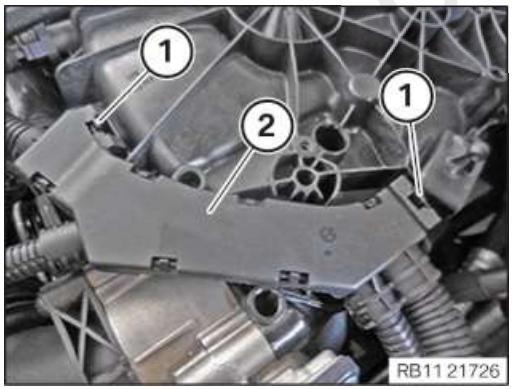
- Loosen screw (1).
- Guide tank ventilation line (2) out of clamp (3) and remove it.



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

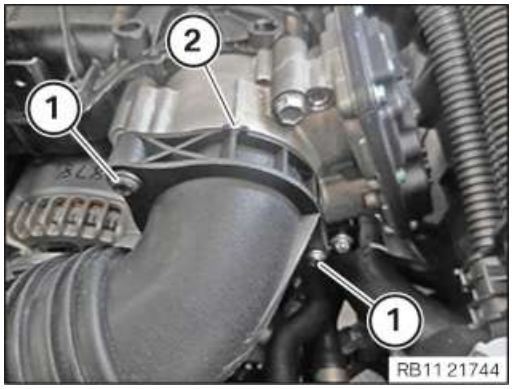


- Unlock the locks (1).
- Feed the tank ventilation line (2) out and set it aside.

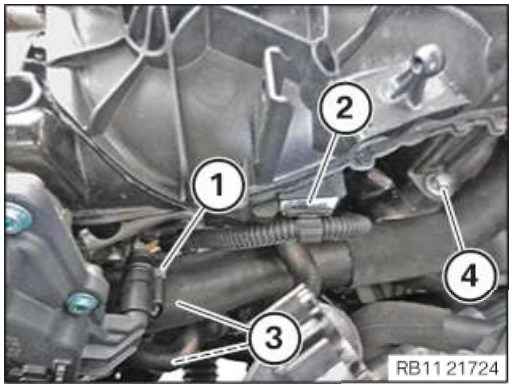


- Unlock the locks (1).
- Guide out the wiring harness section (2) for the sensor system **2** and place to one side.

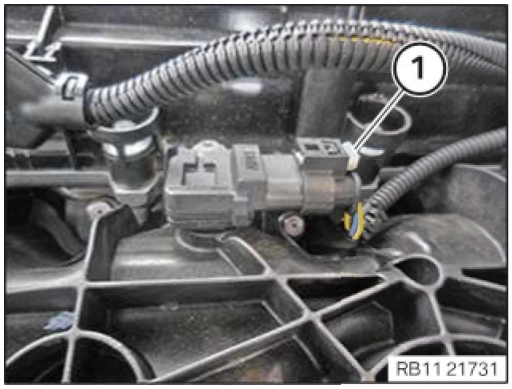
fdiag.com



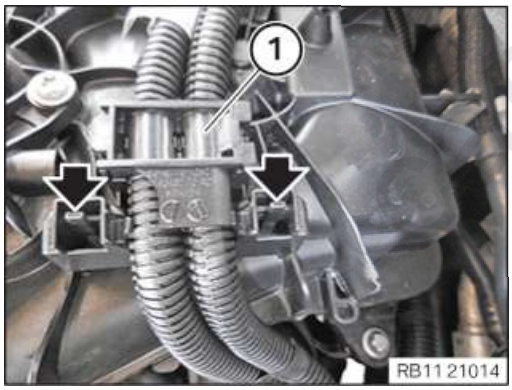
- Loosen screws (1).
- Feed out charge air line (2) and place to one side.



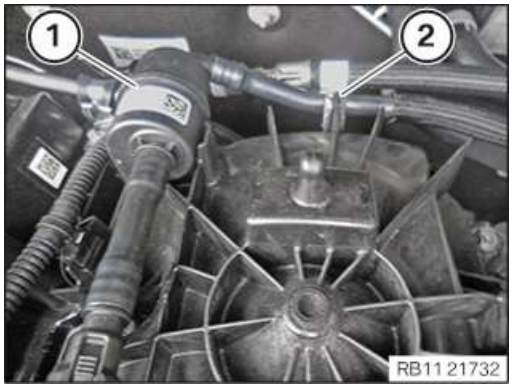
- Unlock and loosen connector (1).
- Loosen clamp (2).
- Thread off coolant line (3) and place to the side.
- Loosen screw (4).



- Unlock and loosen connector (1).

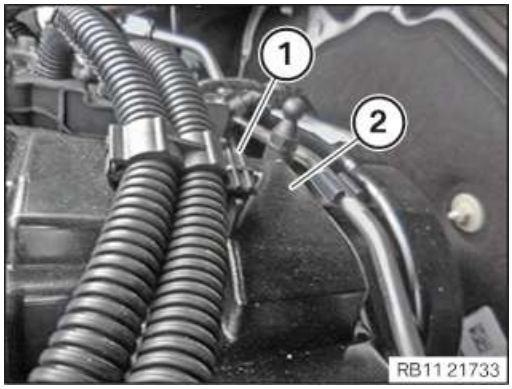


- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.



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

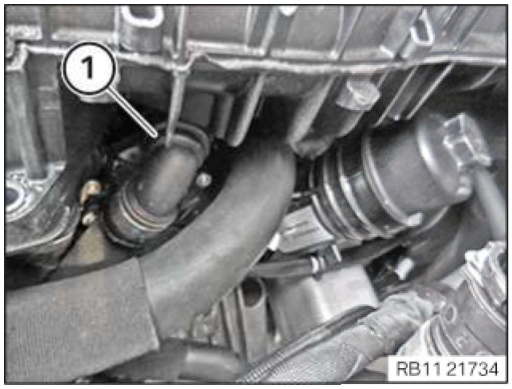
ardiagn.com



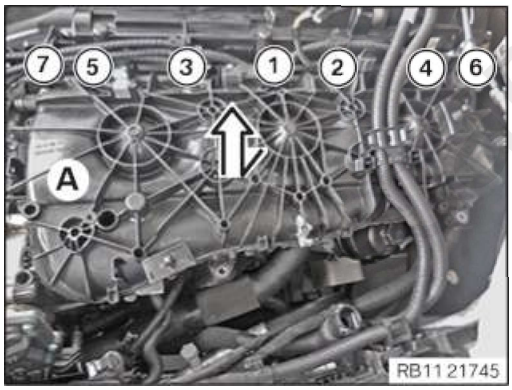
- Guide out the wiring harness section (1) for the injectors and ignition coils of the cylinder head cover (2) and set it aside.



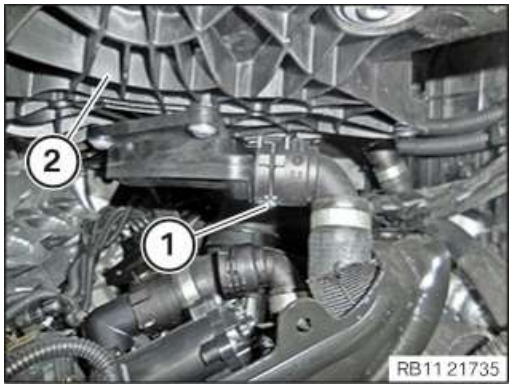
- Loosen screw (1).



- 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.

24 – Remove heat management module

rdiagn.com

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

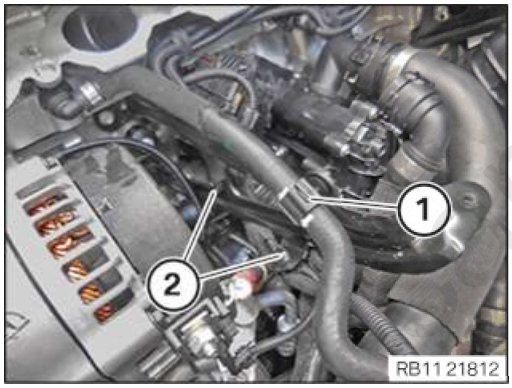
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

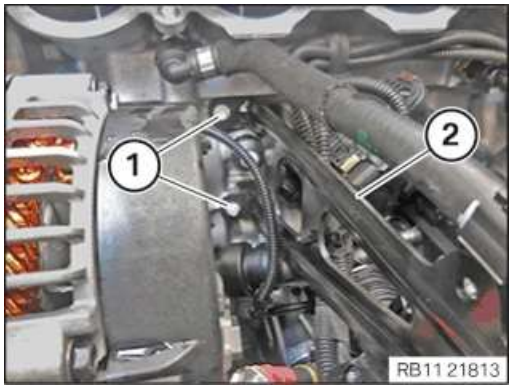
- Do not pull on the wires when disconnecting connectors and plug connections.

TECHNICAL INFORMATION

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

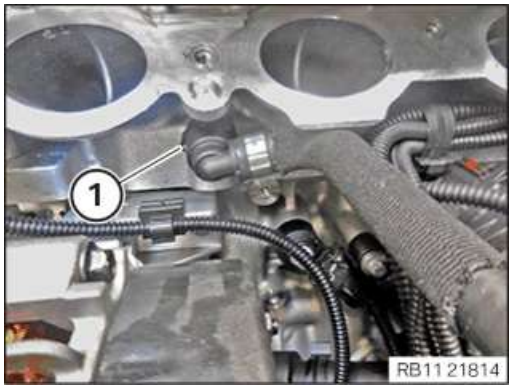


- Loosen clamp (1).
- Loosen clamps (2).

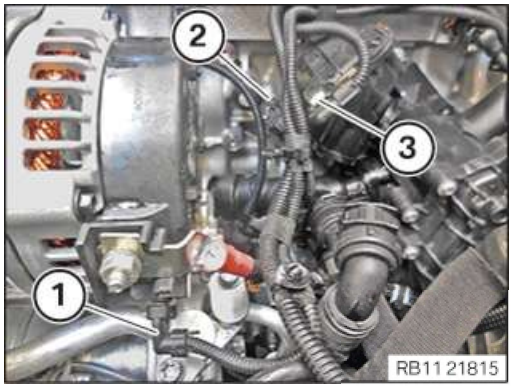


- Loosen screws (2).
- Feed out and remove support (2) for intake plenum.

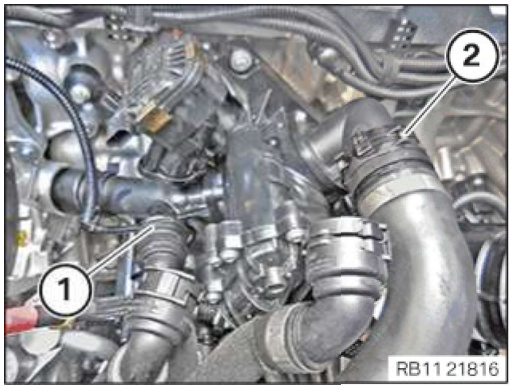
manualdiagn.com



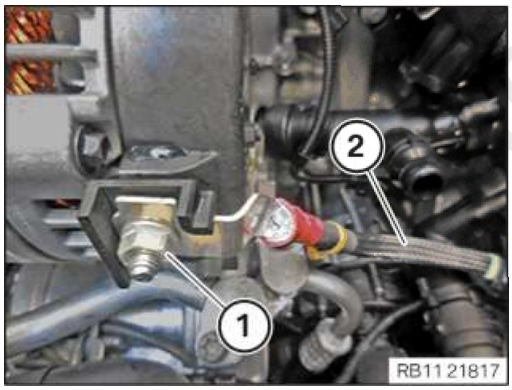
- Unlock and loosen coolant line (1).
- Catch and dispose of escaping coolant.



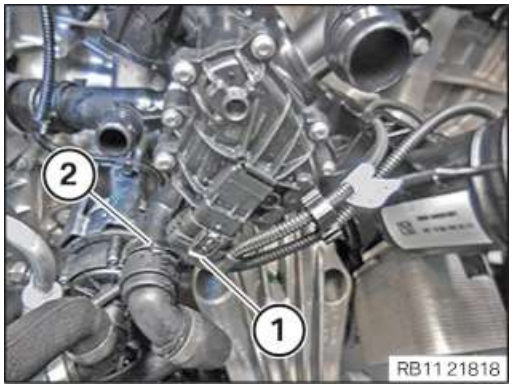
- Unlock and release the connector (1) for the alternator.
- Unlock and release the connector (2) for the knock sensor.
- Unlock and release the connector (3) for the heat management module.



- Unlock and loosen coolant line (1).
- Unlock and loosen coolant line (2).



- Loosen nut (1).
- Feed out positive battery cable (2) and put to one side.

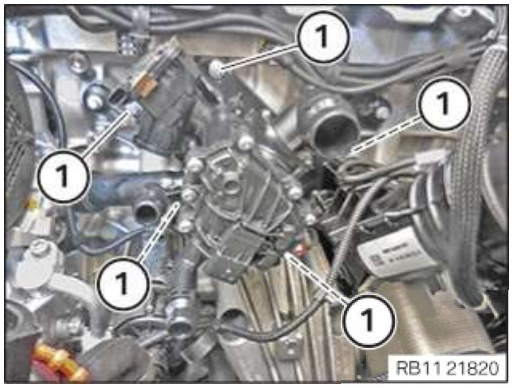


- Unlock and loosen connector (1).
- Unlock and loosen coolant line (2).
- Catch and dispose of escaping coolant.

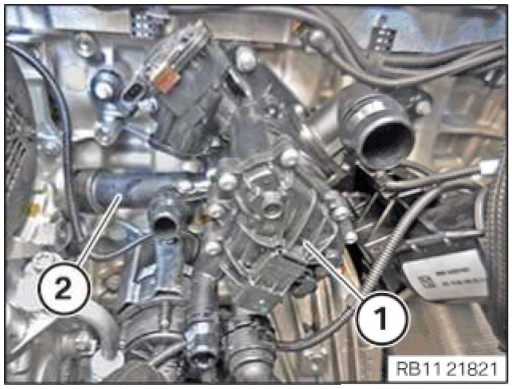
rdiagn.com



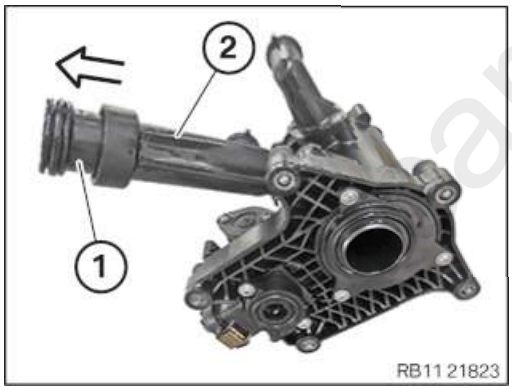
- Loosen clamps (1).



- Loosen screws (1).



- Feed out and remove the heat management module (1) with the connecting pipe (2).
- Catch and dispose of escaping coolant.



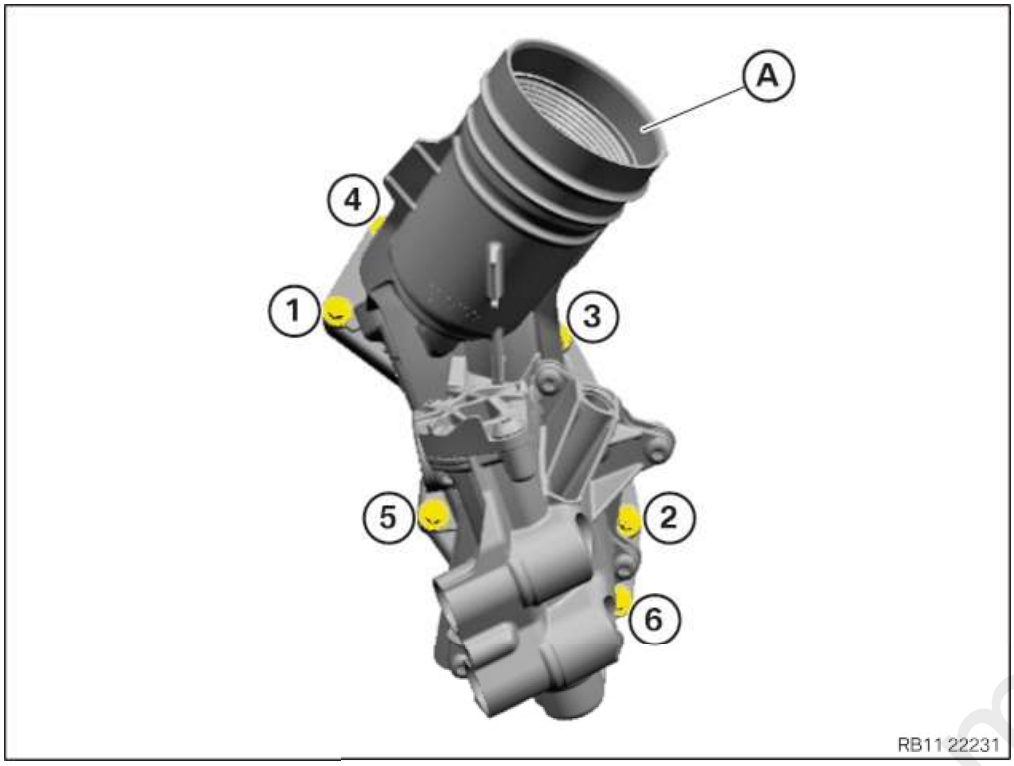
- Feed out and connecting pipe (1) in **direction of arrow** from the heat management module (2).

MAIN WORK

25 – Remove full-flow oil filter.

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Full-flow oil filter



A Full-flow oil filter

1 to 6 Bolts

RISK OF DAMAGE

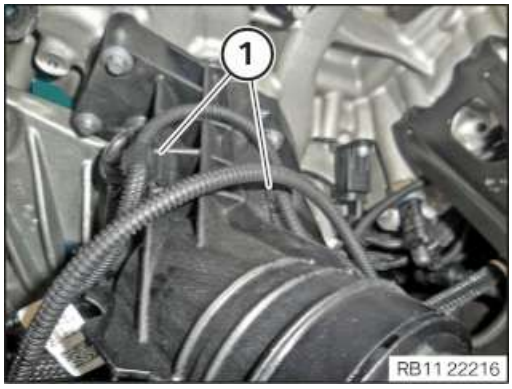
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

TECHNICAL INFORMATION

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



- Loosen clamps (1).

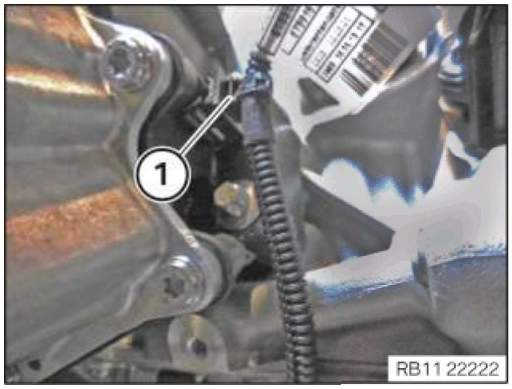
cardiagn.com



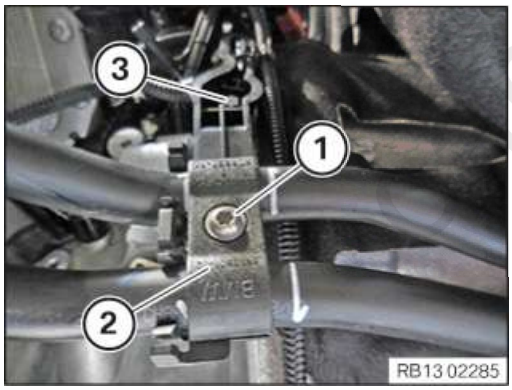
- Loosen clamps (1).



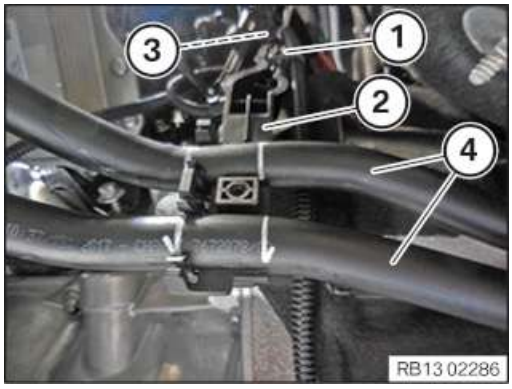
- Thread out transmission oil line (1) and set aside.
- Loosen clamp (2).



- Loosen clamp (1).

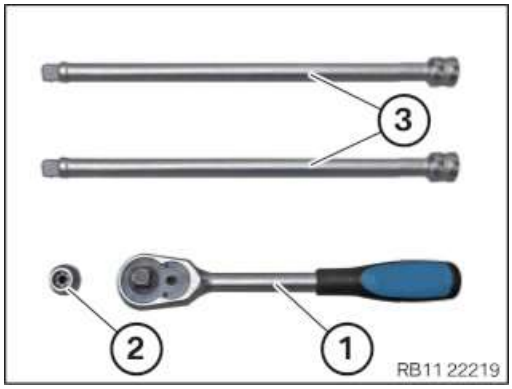


- Loosen screw (1).
- Guide out and remove holder (2).
- Loosen screw (3).



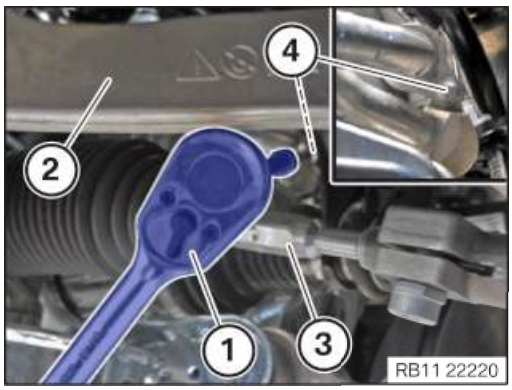
- Loosen clamp (1).
- Pull holder (2) out of guide (3).
- Pull holder (2) out of transmission oil lines (4) and remove it.

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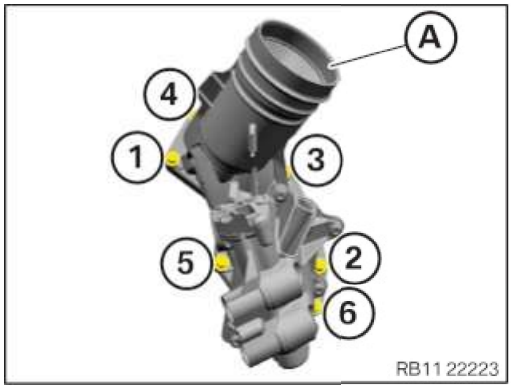


- Have the suitable tool ready.

Number	Description
1	Reversible ratchet
2	Torx socket E10
3	Reversible ratchet extension

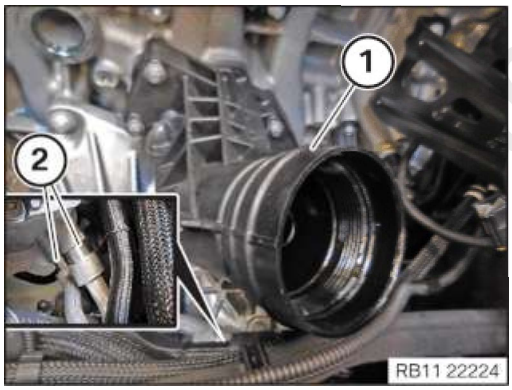


- Position the suitable tools (1) between the tension strut (2) and the track rod (3).
- Loosen screw (4).



- Release full-flow oil filter bolts (A) in the sequence (6) to (1).

Note: Release the bolts in 360 degrees steps.



- Feed full-flow oil filter (1) out of engine oil pipes (2) and remove it.
- Collect and dispose of emerging fluids.

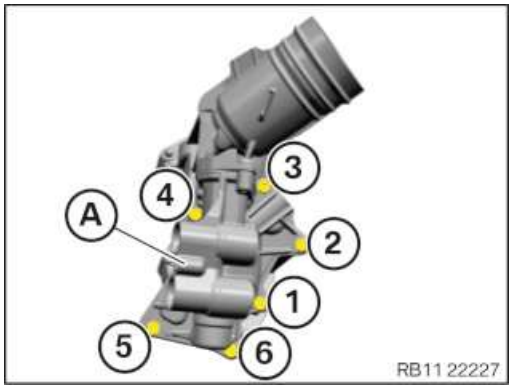
26 – For full-flow oil filter replacements: Remount cover plate

TECHNICAL INFORMATION

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

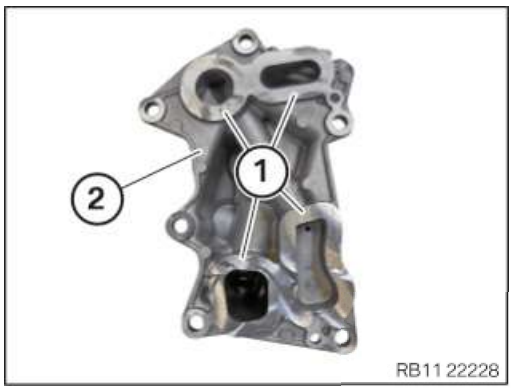
TECHNICAL INFORMATION

Make sure that there are no particles or impurities in the medium openings. Coolant or foreign substances in the oil can cause engine damage such as damage to the connecting rod bearing.



- Release screws at the cover plate (A) in the sequence (6) to (1).

Note: Release the bolts in 360 degrees steps.



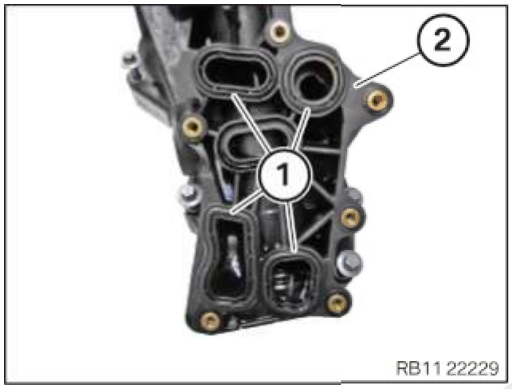
RISK OF DAMAGE

Damage to the surface.

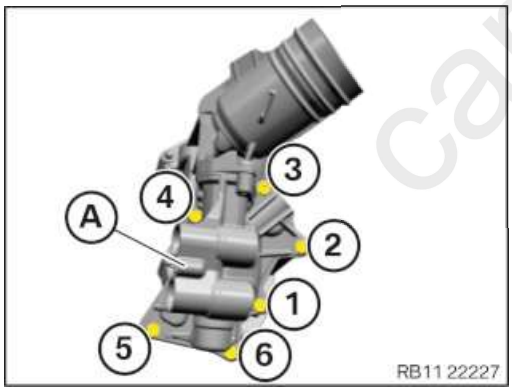
The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

- Clean any sealing residue on the sealing surface (1) of the cover plate (2) with the special tool 0 495 102 (11 4 470).



- Guide in and install sealing rings (1) on full-flow oil filter (2).



- Tighten screws at the cover plate (A) in the sequence (1) to (6).

Note: Tighten the bolts in 360 degree steps.

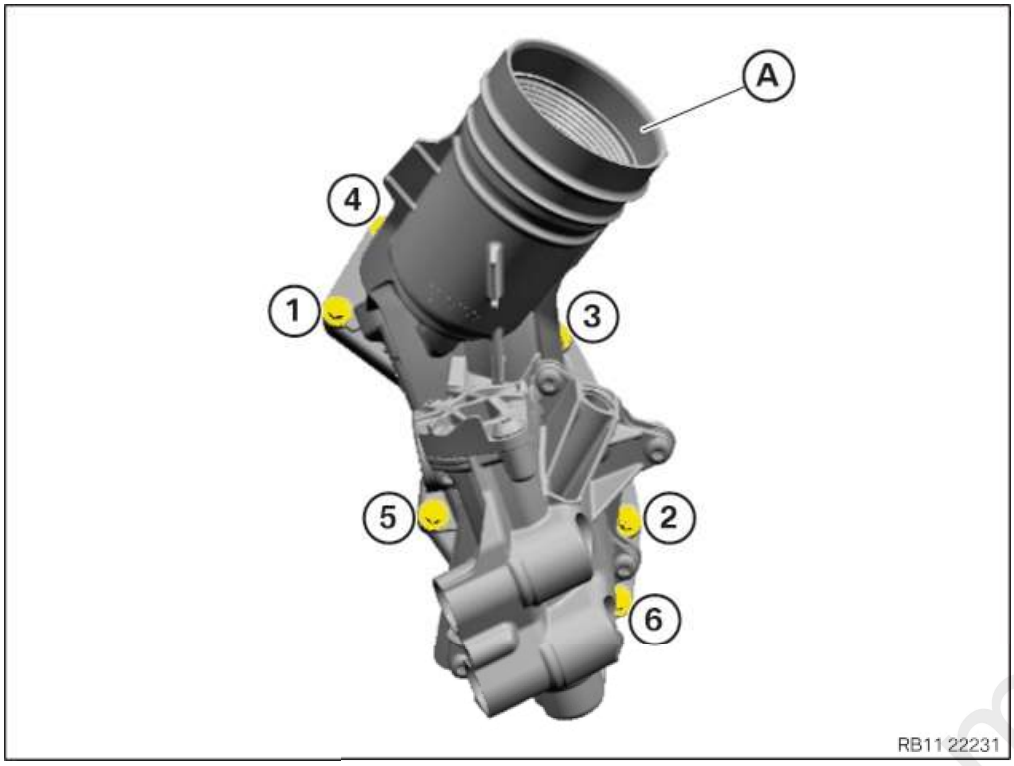
Cover plate on full-flow oil filter

Bolts	Observe tightening sequence.	Tightening torque	10 Nm
		Tightening torque	10 Nm

27 – Install full-flow oil filter

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Full-flow oil filter

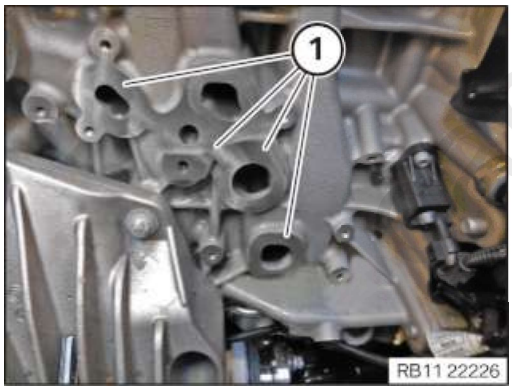


A Full-flow oil filter

1 to 6 Bolts

TECHNICAL INFORMATION

The sealing surfaces must be free from oils, grease and cleaning agents.



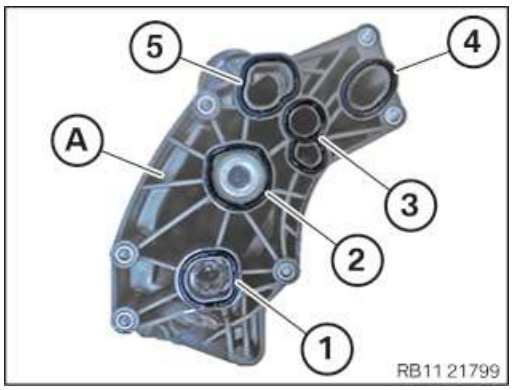
RISK OF DAMAGE

Damage to the surface.

The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

- Clean any sealing residue on sealing surfaces (1) on the crankcase with the special tool 0 495 102 (11 4 470).



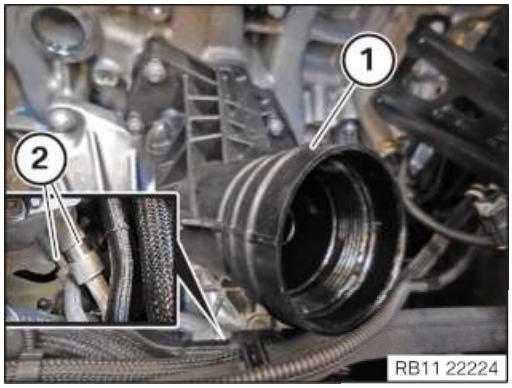
- Renew seals (1) to (5) on full-flow oil filter (A).

  Parts: Seals

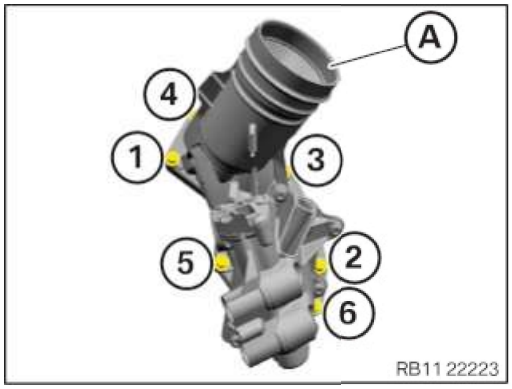


- Renew the sealing rings (1) with the special tool 0 496 714 (00 9 030).

  Parts: Sealing ring



- Guide full-flow oil filter (1) into engine oil pipes (2) and position it.

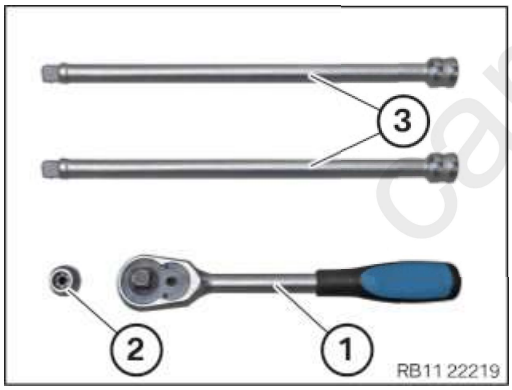


- Tighten the screws of full-flow oil filter (A) in the order (1) to (6).

Note: Tighten the bolts in 360 degree steps.

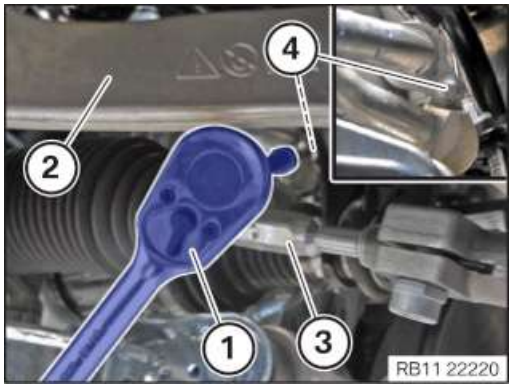
Full-flow oil filter to crankcase

Captive screw M6	*Observe tightening sequence.*	Jointing torque Tightening torque	4 Nm 10 Nm



- Lay out the commercially available tools.

Number	Description
1	Reversible ratchet
2	Torx socket E10
3	Extension of reversible ratchet



- Position commercially available tools (1) between tension strut (2) and track rod (3).
- Tighten down screw (4).

Engine oil pipes to cover plate

M6X35		Tightening torque	8 Nm

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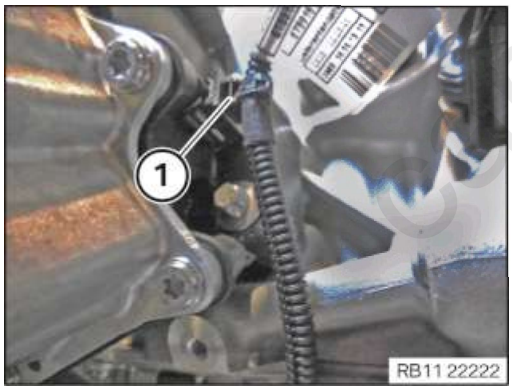
- Secure clamps (1).



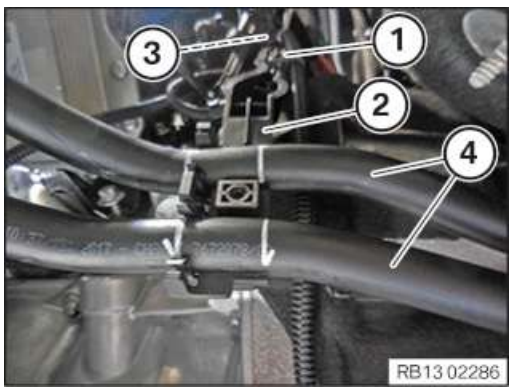
- Secure clamps (2).
- Guide in and position transmission oil line (1).



- Secure clamps (1).

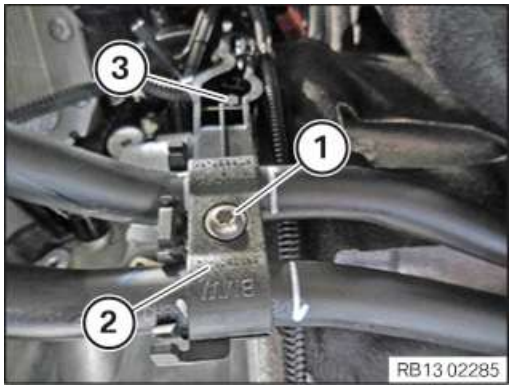


- Secure clamps (1).



- Insert and install the holder (2).
- Make sure that holder (2) is installed correctly in guide (3).
- Position transmission oil line (4) on holder (2).
- Secure clamps (1).

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- Tighten down screw (3).

Holder to end cover

M6X16		Tightening torque	8 Nm

- Insert and position the holders (2).
- Tighten down screw (1).

Holder for transmission oil line

Screw	*Renew screw.*	Tightening torque	5 Nm

POSTPROCESSES

28 – Install heat management module

CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

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

RISK OF DAMAGE

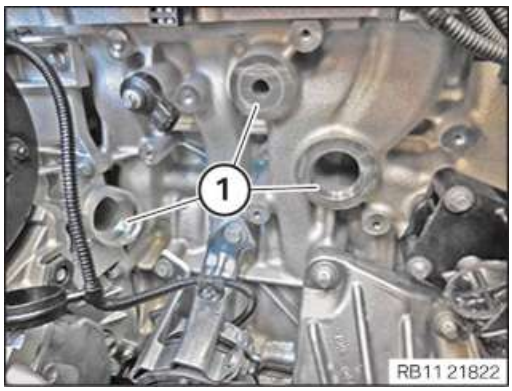
Improper routing of cables and wiring harnesses.

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

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

TECHNICAL INFORMATION

The sealing surfaces must be free from oils, grease and cleaning agents.



RISK OF DAMAGE

Damage to the surface.

The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

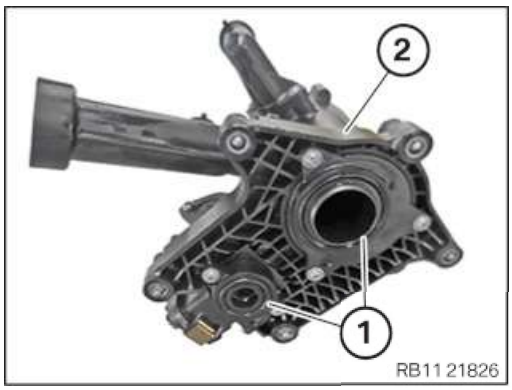
- Do not use any metal-cutting tools.

- Clean sealing surfaces (1).

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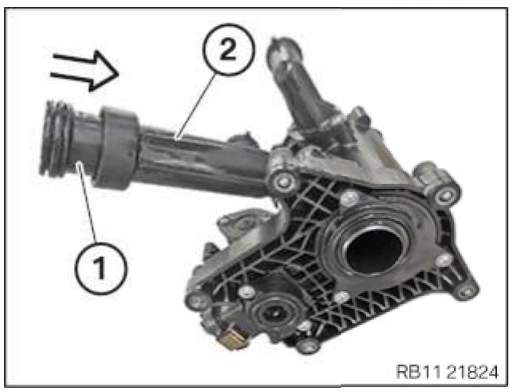


- Replace the sealing rings (1) on connecting pipe (2).
- **Parts:** Sealing ring
- Coat sealing rings (1) with coolant before installing.

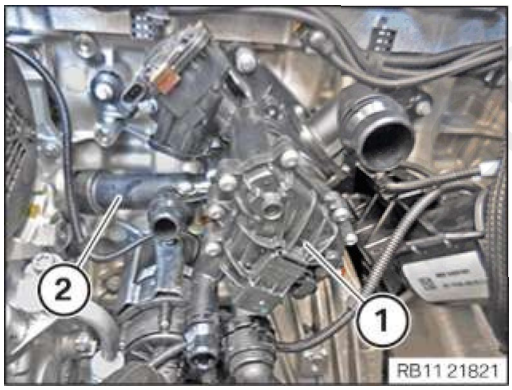


- Replace the sealing rings (1) on heat management module (2).

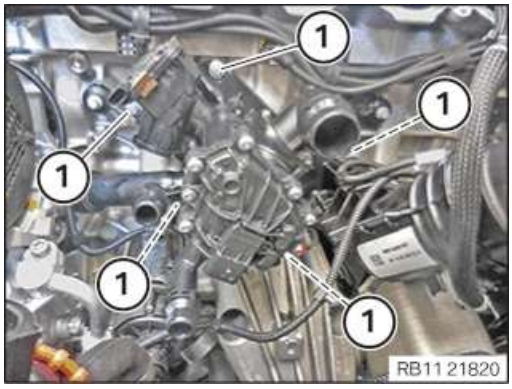
  Parts: Sealing ring
- Coat the sealing rings (1) on the heat management module (2) with coolant before installing.



- Feed in and install connecting pipe (1) in **the direction of arrow** on heat management module (2).



- Insert and install the heat management module (1) with the connecting pipe (2).
- Make sure that the connecting pipe (2) is **installed** correctly.



- Tighten the screws (1).

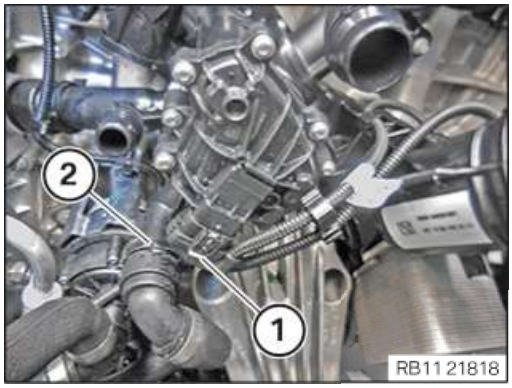
Heat exchange module to crankcase

M6		Tightening torque	9 Nm

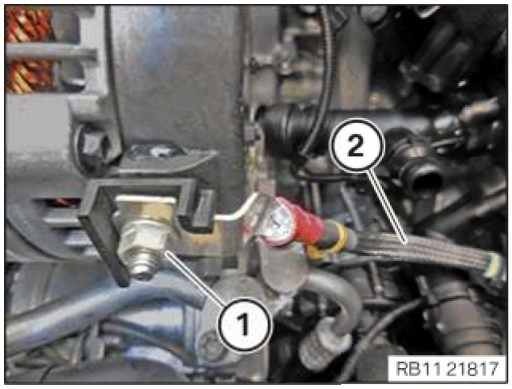
.com



- Secure clamps (1).



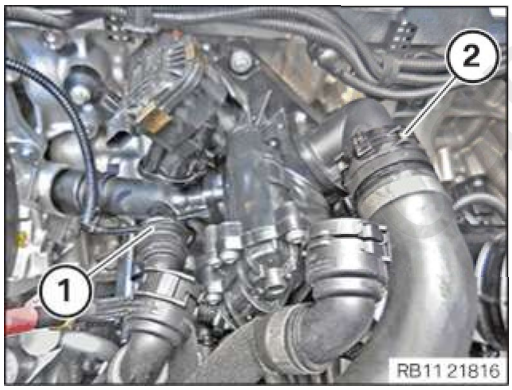
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.
- Feed in and install coolant line (2).
- Make sure that the cooling line (2) engages audibly.



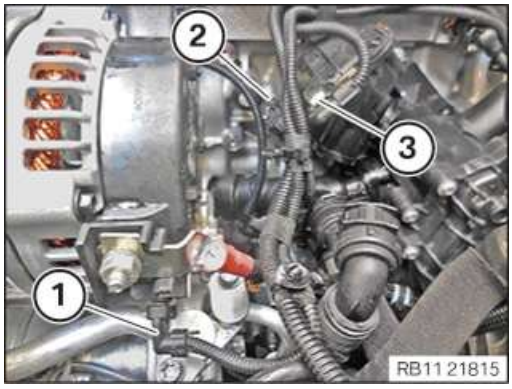
- Insert and install the positive battery cable (2).
- Tighten nut (1).

Positive battery cable to the alternator

M8		Tightening torque	19 Nm

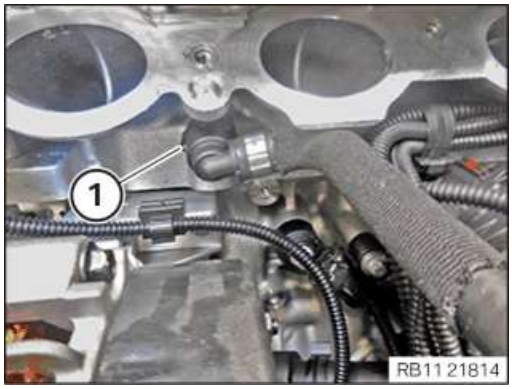


- Connect and lock coolant lines (1) and (2).
- Make sure that you can hear coolant lines (1) and (2) engage.

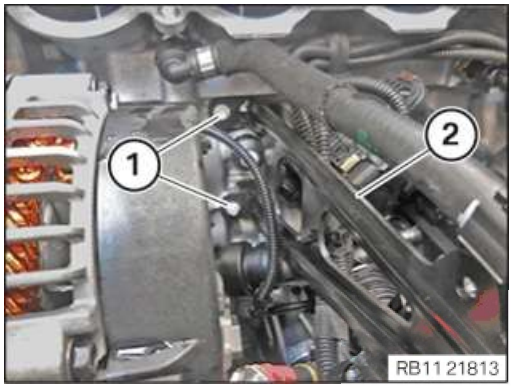


- Connect connector (3) to the heat management module and lock it.
- Connect connector (2) to the knock sensor and lock it.
- Connect and lock the connector (1) to the alternator.
- Ensure that the connectors (1) (2) and (3) are engaged audibly.

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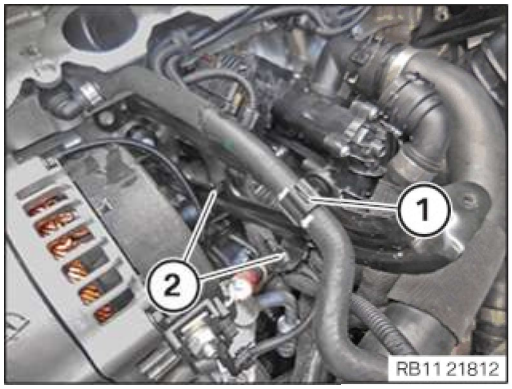
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



- Guide in and install support (2) for intake plenum.
- Tighten the screws (1).

Support to cylinder head

M6X16		Tightening torque	8 Nm



- Secure clamps (1).
- Secure clamps (2).

29 – Installing the intake plenum

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

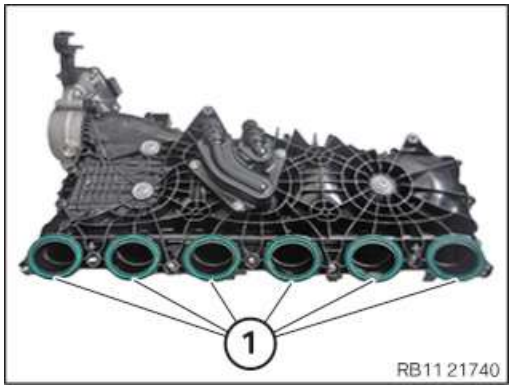
Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- 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.

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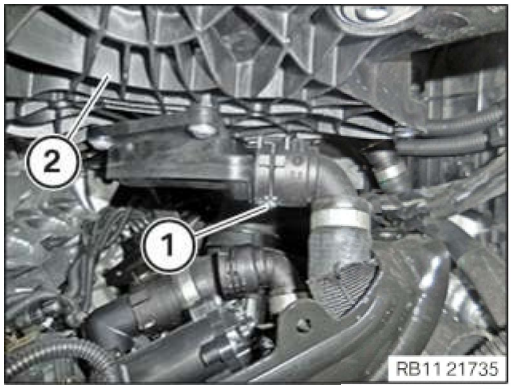


- Renew gaskets (1).

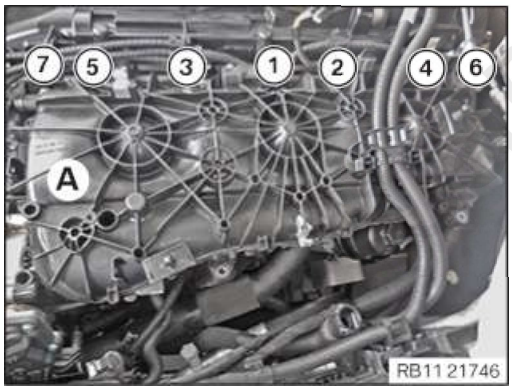
  Parts: Seals



- 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

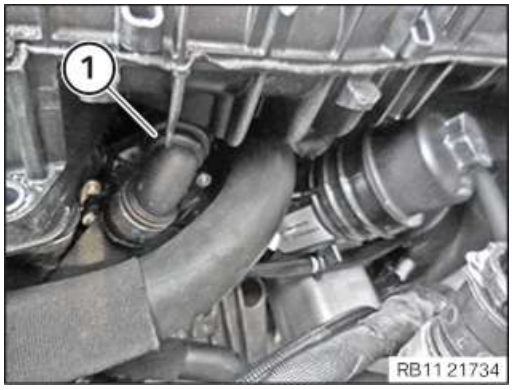
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

- 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



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

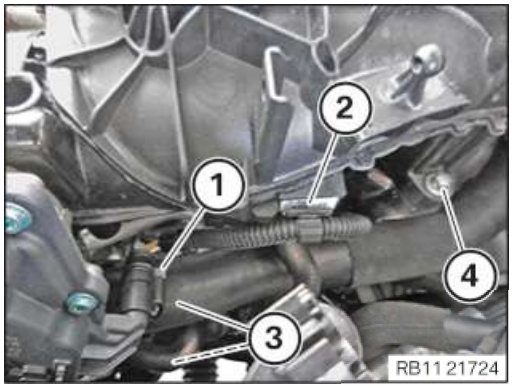
.diagn.com



- Tighten down screw 1.

Intake plenum to support

M6X25		Tightening torque	8 Nm

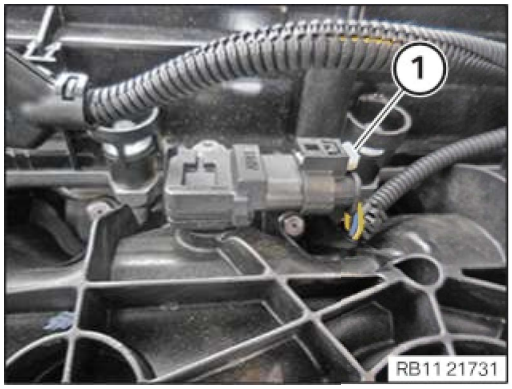


- Tighten down screw (4).

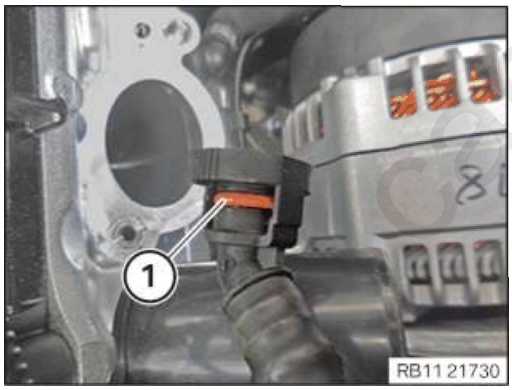
Intake plenum to support

M6X25		Tightening torque	8 Nm

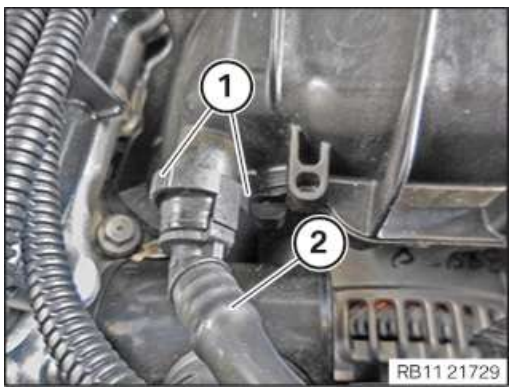
- Thread in and install coolant line (3).
- Secure clamps (2).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



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

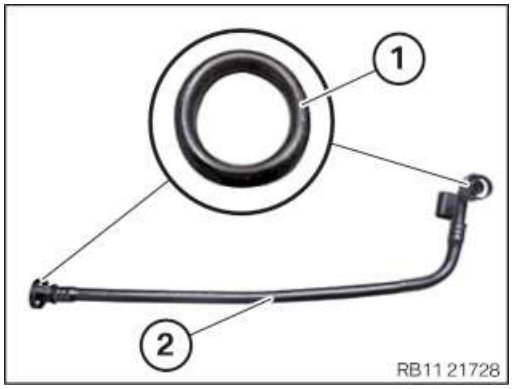


- Check sealing ring (1) for damage and renew tank ventilation line if necessary.

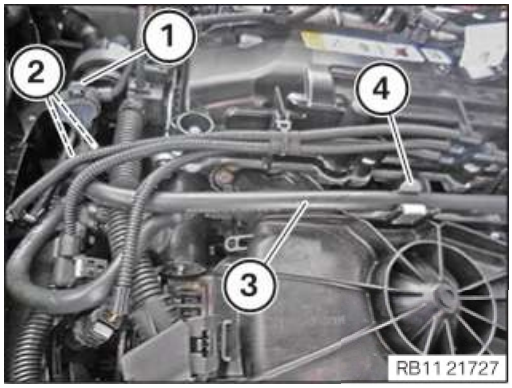


- Insert and install the tank ventilation line (2).
- Ensure that the locks (1) engage audibly.

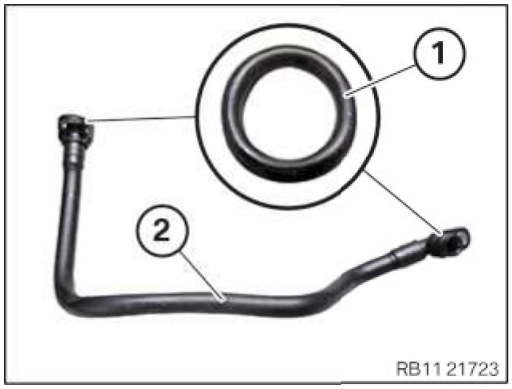
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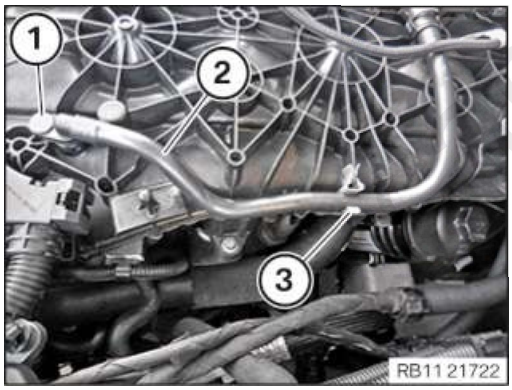
- Check sealing ring (1) for damage and renew tank ventilation line (2) if necessary.



- 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.



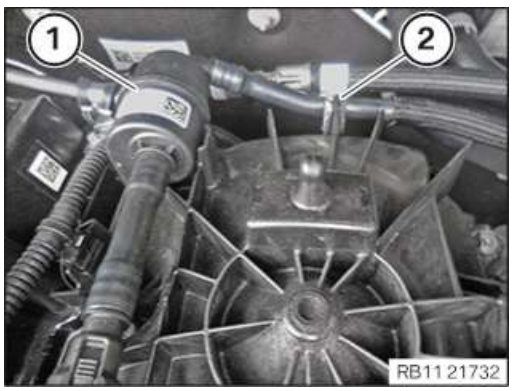
- Check sealing ring (1) for damage and renew tank ventilation line (2) if necessary.



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

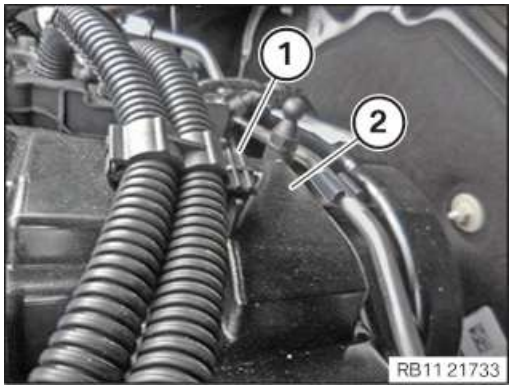
Tank ventilation line to intake plenum

Oval-head screw		Tightening torque	3 Nm

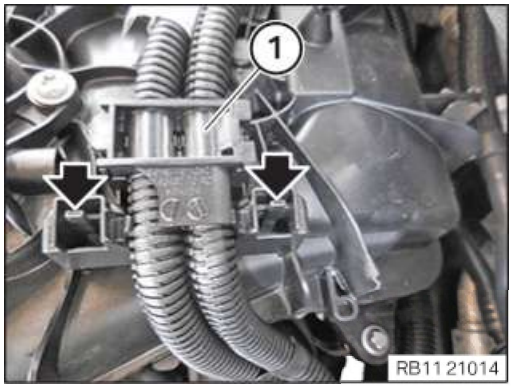


- Insert and install the tank ventilation line (1).
- Secure the tank ventilation line (1) to the clamp (2).

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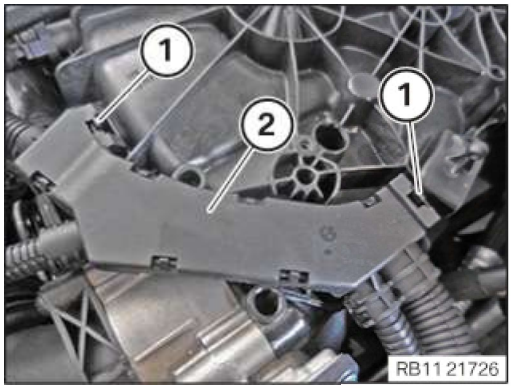


- Secure the wiring harness section(1) for the injectors and ignition coils on the cylinder head cover (2).



- Insert and install the wiring harness section (1) for the injectors and ignition coils.

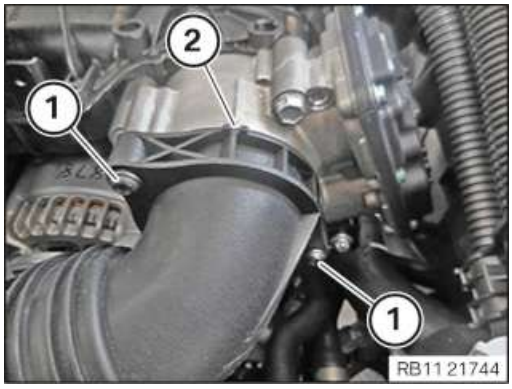
  The locks (arrows) must engage audibly.



- 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.



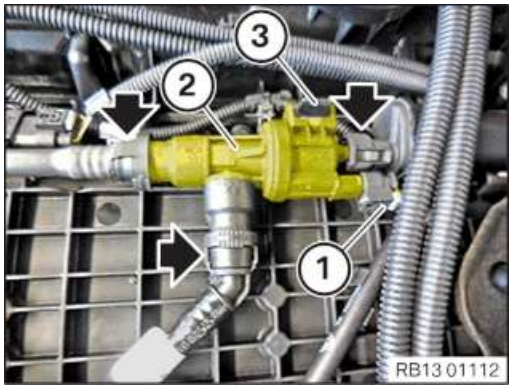
- Insert and install charge air line (2).
- Tighten the screws (1).

Charge air line to throttle valve

M6x30		Tightening torque	8 Nm

30 – Installing the tank vent valve

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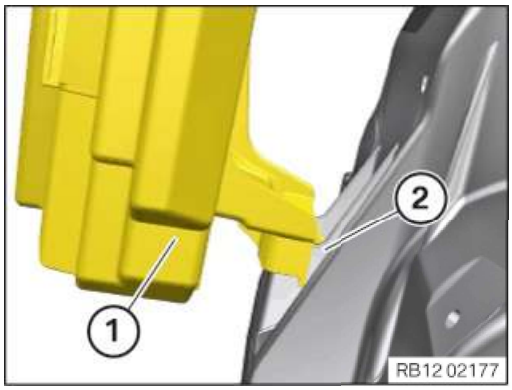


- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).

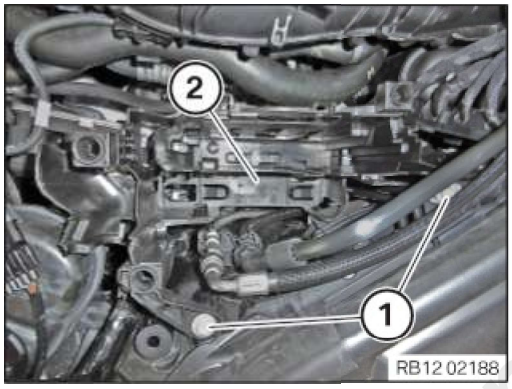
  The tank ventilation lines (arrows) must audibly engage.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

31 – Installing the control unit holder



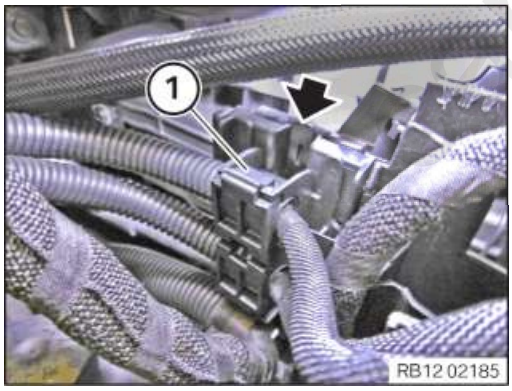
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



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

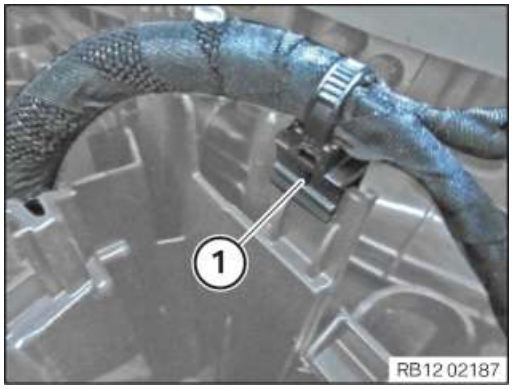
Control unit holder on spring strut dome

Hexagon screw	Tightening torque	8 Nm



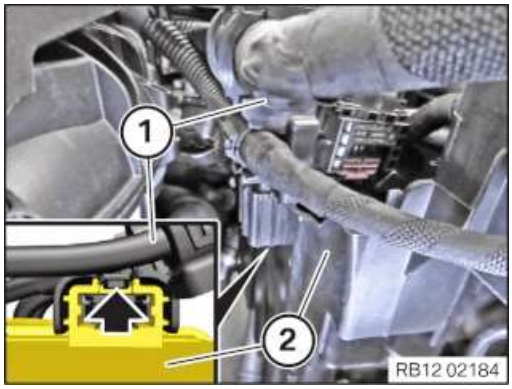
- Feed in and install the cable clip (1).

  Lock (arrow) must audibly engage.

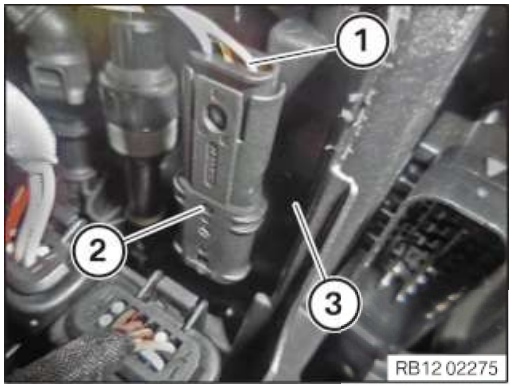


- Secure clamps (1).

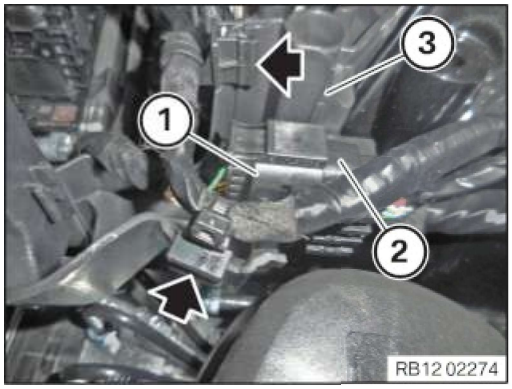
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- Connect the cable clip (1) with the control unit holder (2) and lock it.
  Lock (arrow) must audibly engage.



- 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).

32 – 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.

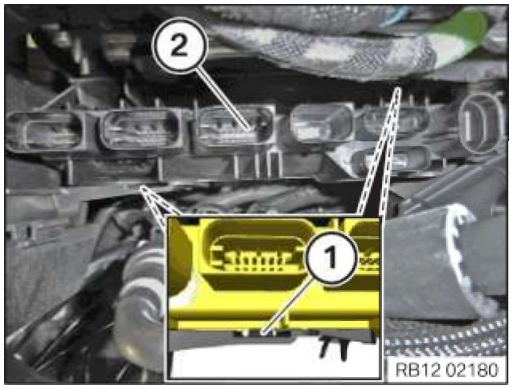
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RISK OF DAMAGE

Electrostatic discharge.

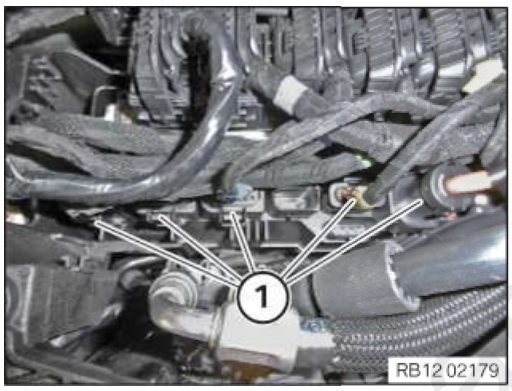
Damage to or destruction of electrical components.

- 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.



- Insert and install the integrated supply module (PDM) (2).

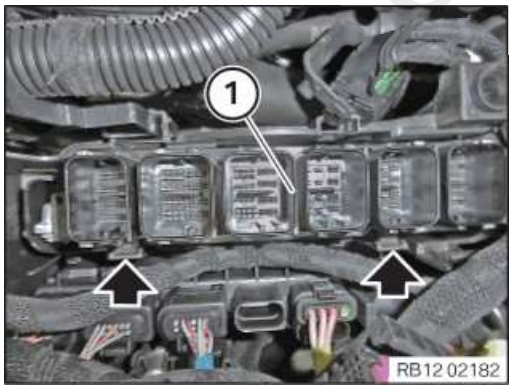
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

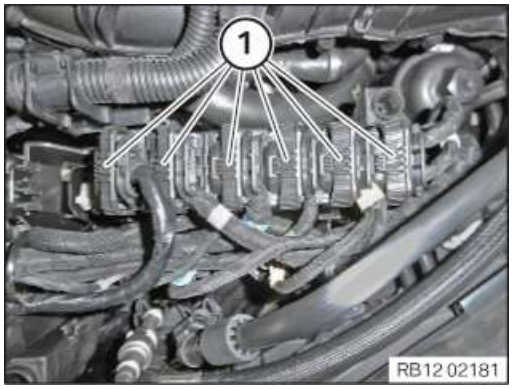
33 – Installing the DME control unit



- Feed in and install DME control unit (1).

  The locks (arrows) must engage audibly.

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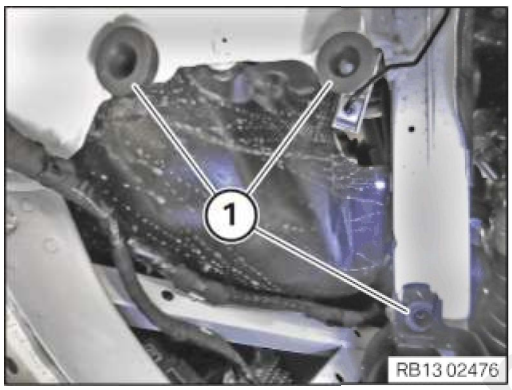
- Connect connectors (1) and lock.

  All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

34 – Installing intake silencer housing



- 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.

35 – Topping up the engine oil

RISK OF DAMAGE

Damage to the petrol particulate filter.

Vehicles equipped with a petrol particulate filter must be operated with low-ash engine oil only.

- Use BMW Longlife-04 , BMW Longlife-12 FE or BMW Longlife-17 FE+ engine oils or engine oils approved by BMW matching the same specifications only.
- For additional information see: Overview of approved engine oils for BMW Group engines.

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RISK OF DAMAGE

Engine damage caused by excessively filling the engine with engine oil.

Filling an excessive quantity of engine oil may cause engine damage.

- Observe the exact engine oil filling capacity.
- Drain the engine oil.

- Pour in engine oil.

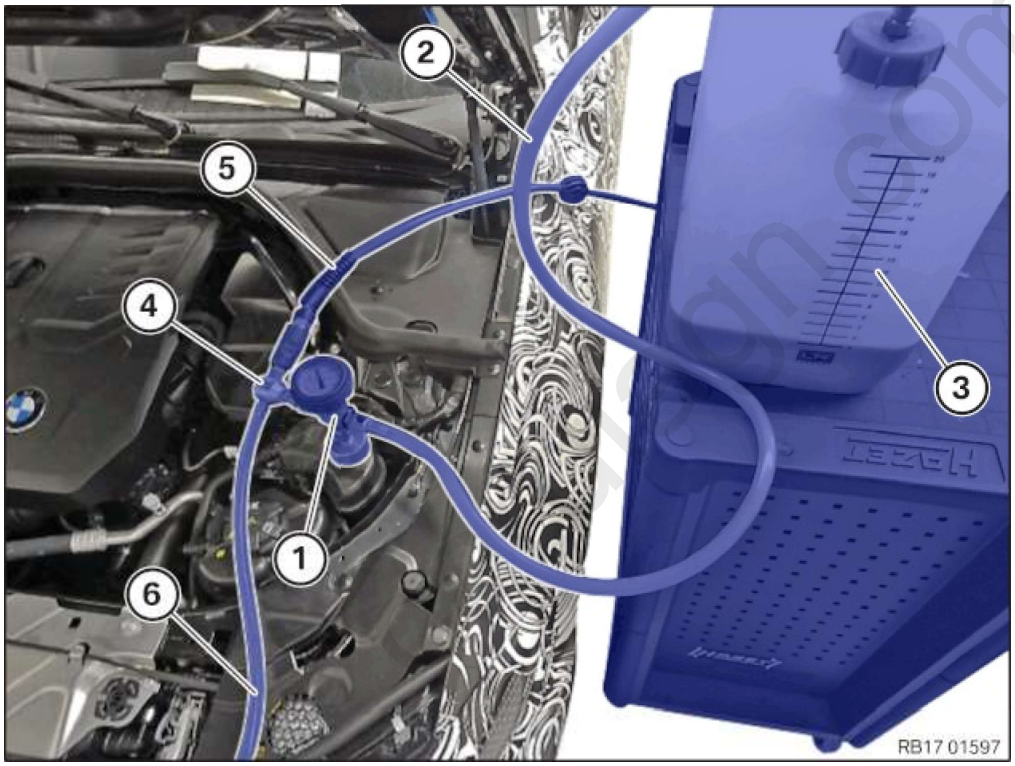
Engine oil B58B30M1/B58B30O1

Filling capacity, engine oil change with oil filter element	6,50 l

Engine oil: Technically suitable engine oils for BMW Group engines

36 – Filling the low-temperature cooling system with the vacuum filler device

Vacuum filler device



Vacuum filler device - connected to the coolant expansion tank

1 Vacuum filler device with pressure gauge and shutoff valves

2 Filling hose

3 Fluid tank with coolant

4 Venturi nozzle

5 Compressed air connection (maximum of 6 bar)

6 Out-going hose (lead out-going hose into a collecting vessel)

Prerequisite

The coolant expansion tank for the cooling system must be empty. The fluid tank of the vacuum filler device must have a sufficient quantity of premixed coolant, 1 l to 2 l more than the specified capacity for the vehicle. The fluid tank of the vacuum filler device must be positioned at the same height as the coolant expansion tank. The compressed air connection must have a pressure of 6 bar. Ignition is switched off.

TECHNICAL INFORMATION

Follow notes for repair work on the cooling system.

For additional information see:

Main group 17

17 00 ... Notes for working on the cooling system

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

Mixing different coolants is not permitted.

TECHNICAL INFORMATION

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

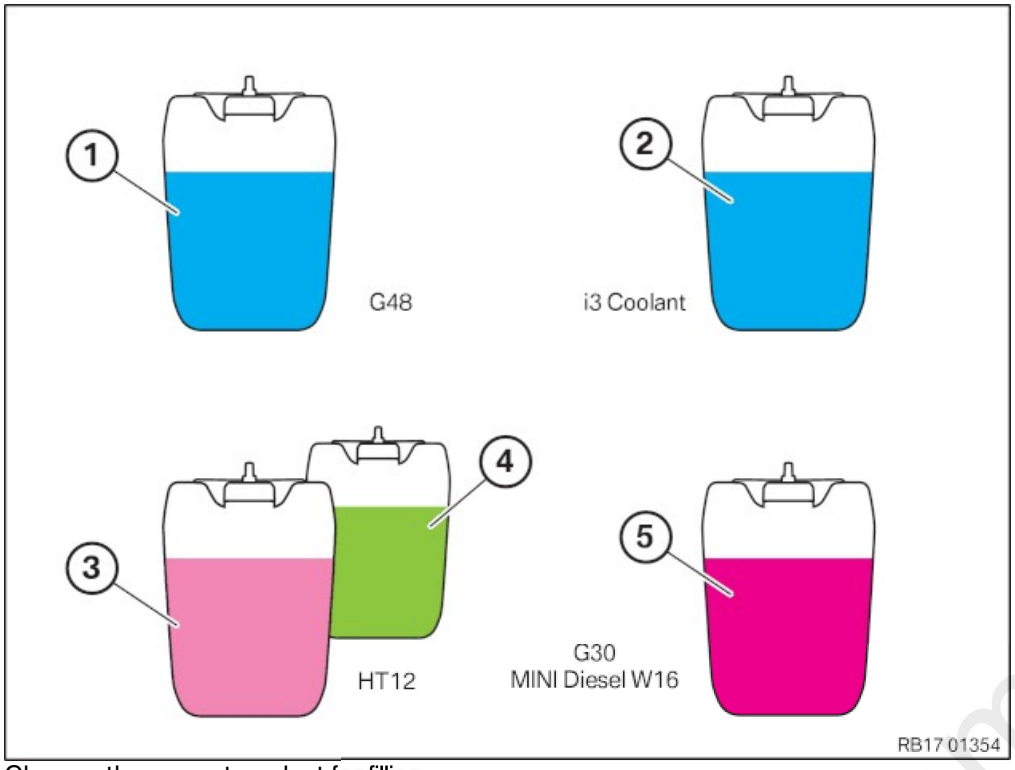
TECHNICAL INFORMATION

Make sure that the ignition (terminal 15) is switched off prior to creating the vacuum with the vacuum filler device.

▸ **Observe the coolant type**

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Coolant in the vacuum filler device container



Choose the correct coolant for filling

A vehicle must be filled with the coolant with which it is delivered ex works

1. G48 (Blue) G48 must not be mixed with the i3Coolant or the G30 MINI diesel fuelW16.

2. i3 coolant (blue) is used only for the i3 heater circuit. i3 coolant must not be filled in the other coolant circuits or mixed with the other coolants.

3. HT12 (Pink) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

4. HT12 (Green) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

5. G30 (Pink) must be used only for the **MINI diesel fuel W16**. G30 must not be filled in the other coolant circuits or mixed with the other coolants.

RISK OF DAMAGE

Damage to the engine.

The use of an incorrect coolant may lead to corrosion or gelling in the engine.

- Use only approved coolants for the specific vehicle.
- Fill the vehicle only with the coolant with which it was delivered ex works.
- Mix only compatible coolants. The colour does not allow any assessment about the compatibility of coolants.
- Selection of the correct coolant only by means of the part number.

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- Select a suitable adapter (Y) from the set of special tools 0 494 417 (17 0 100):

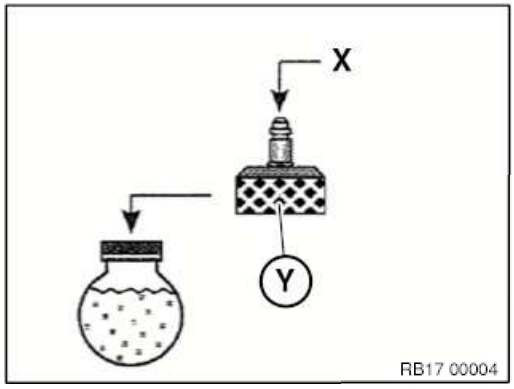
Type	Engine	Adapter (Y) from 17 0 100
G20/G29	B46 / B48 /B58	17 0 109

- The fluid tank of the vacuum filler device must be filled with 1 l to 2 l more than the specified capacity of coolant for the vehicle.

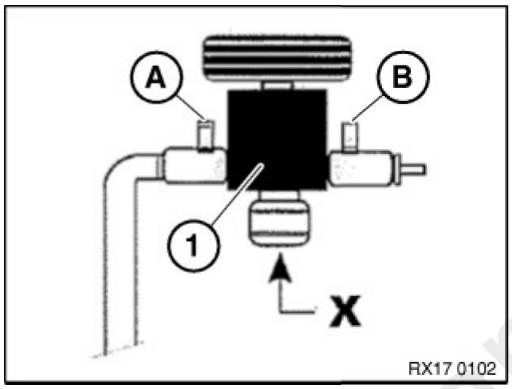
Capacity of low-temperature coolant circuit G20/G29

B58B30O1	4,5 l

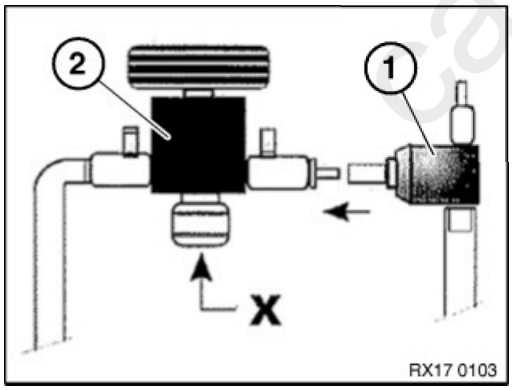
Expendable materials: Technically suitable antifreeze and corrosion inhibitor



- Connect the selected adapter (Y) to the coolant expansion tank.
- Connect vacuum filler device to connection (X) of the adapter.

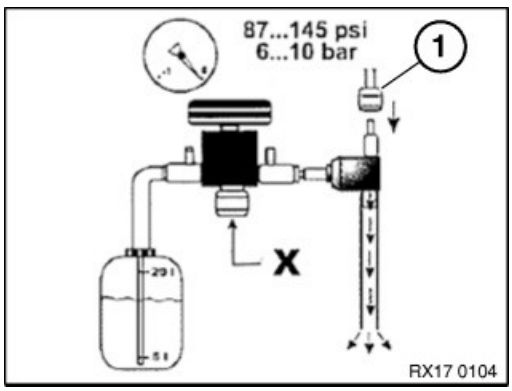


- Check that shutoff valves (A) and (B) of the vacuum filler device (1) are closed.
- Connect and lock connection (X) to the coolant expansion tank.



- Connect Venturi nozzle (1) to the vacuum filler device (2).

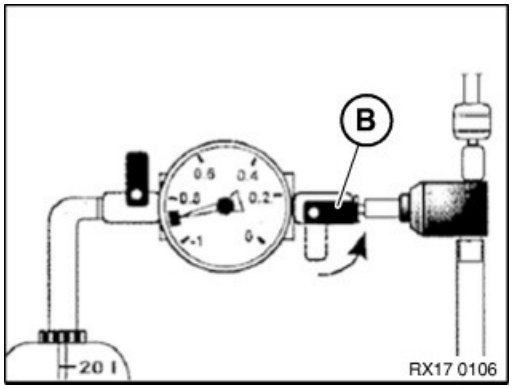
  (X)is the connection on the coolant expansion tank.



- Connect compressed air (1).

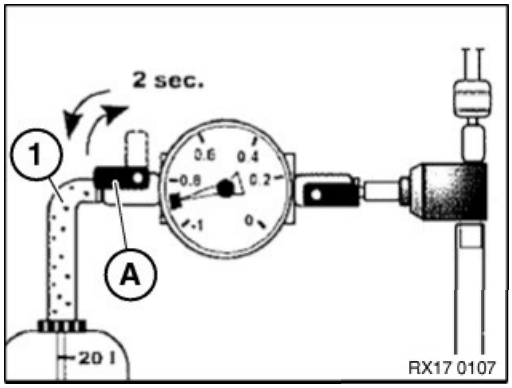
  (X)is the connection on the coolant expansion tank.

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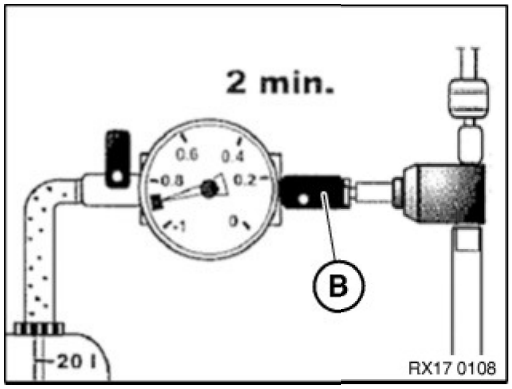
- Open shut-off valve (B).

  The venturi nozzle produces a flow noise.



- Open shutoff valve (A) until the fuel filling hose (1) is full without bubbles.
- Close shutoff valve (A) again.

» The filling hose (1) has now been bled.

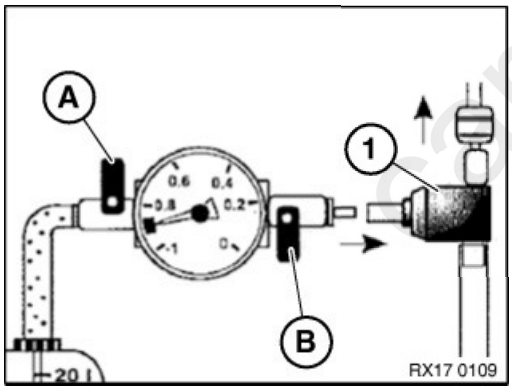


- Check the coolant hoses for porosity and renew porous coolant hoses as required.

TECHNICAL INFORMATION

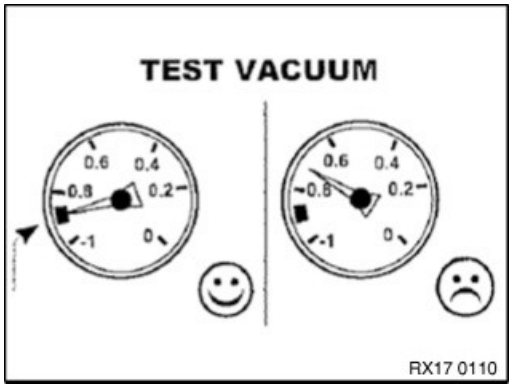
The coolant hoses contract during vacuum build-up.

- After a vacuum of -0.7 to -0.95 bar has been created in the coolant circuit (duration approx. 2 min), shut the shutoff valve (B).



- Check whether the shutoff valves (A) and (B) are closed.
- Disconnect the Venturi nozzle (1).

Check



- The vacuum in the coolant circuit must be maintained for at least 30 seconds.

Result

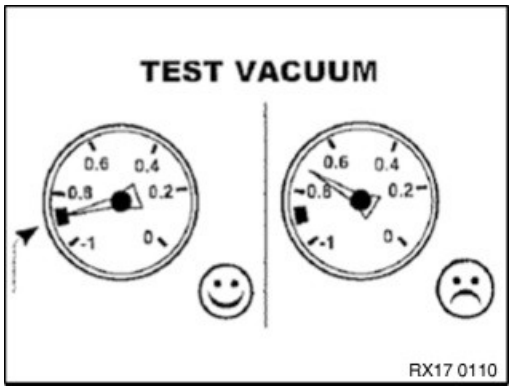
» Vacuum drops.

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Measure

- Look for the leak, repair it and start the filling procedure from the beginning.

Check



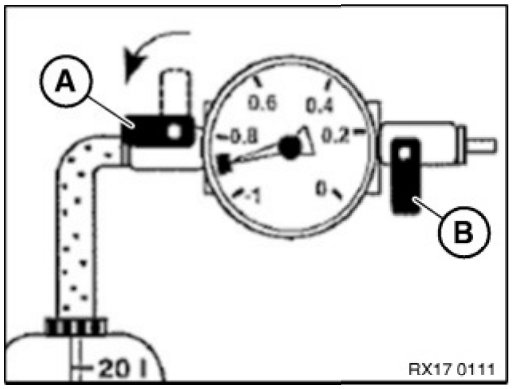
- The vacuum in the coolant circuit must be maintained for at least 30 seconds.

Result

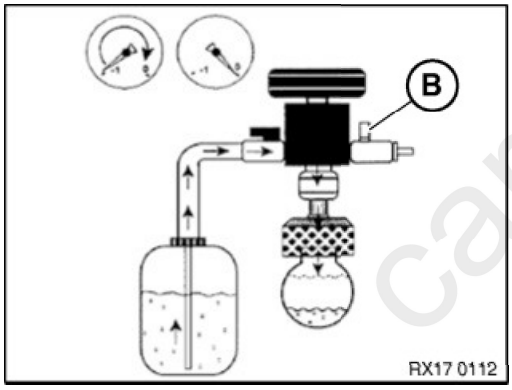
» Vacuum remains constant.

Measure

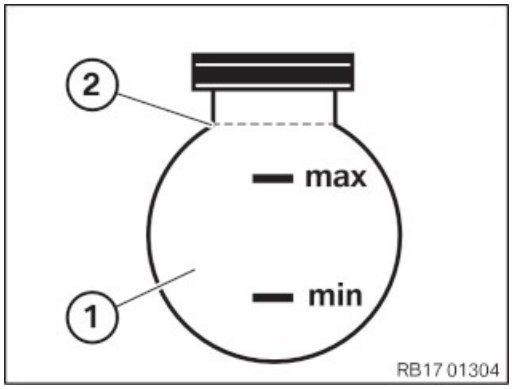
- Continue with filling.



- Keep shutoff valve (B) closed during the filling process.
- To fill the cooling system, open the shutoff valve (A) to the fluid tank of the vacuum filler device.



- Stop the filling procedure when the needle in the pressure measuring device is on 0 bar or it no longer drops.
- If necessary, reduce remaining vacuum. In order to do so, open shutoff valve (B).

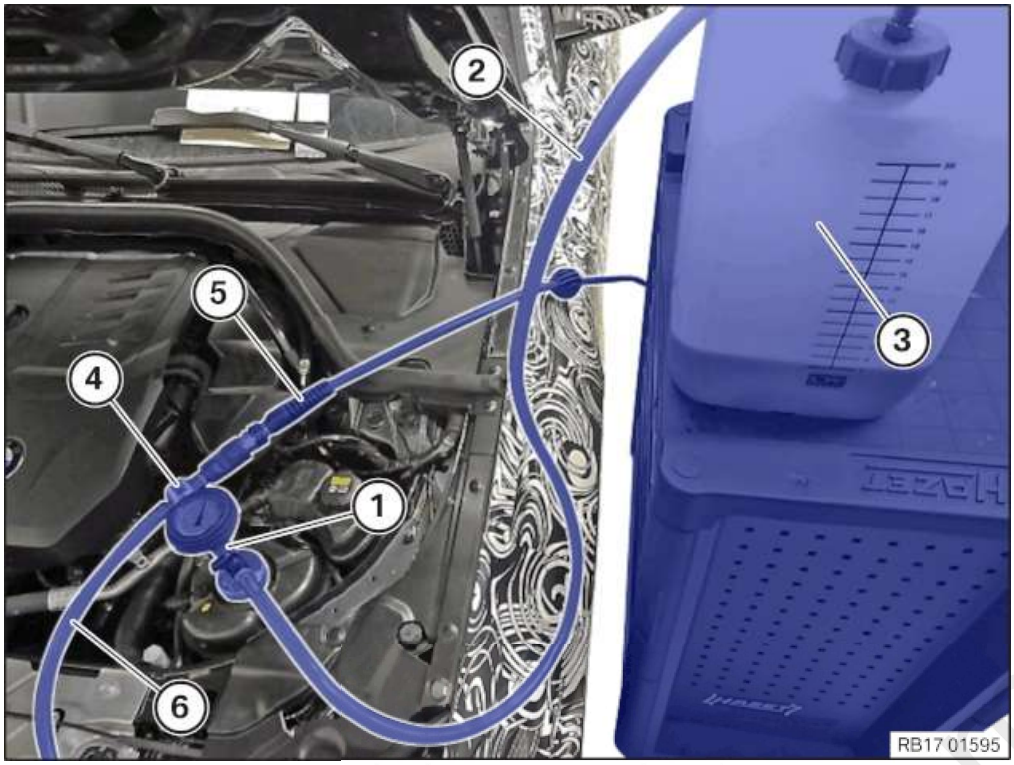


- Remove the vacuum filler device with the adapter from the low-temperature coolant expansion tank (1).
- Adjust the coolant level in the low-temperature coolant expansion tank (1) up to the lower edge of the coolant filler neck (2) of the low-temperature coolant expansion tank (1).
- After filling the cooling system with the vacuum filler device, **also** run the cooling system bleeding routine.

37 – Fill the high-temperature cooling system with the vacuum filler device

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Vacuum filler device



Vacuum filler device - connected to the coolant expansion tank

1 Vacuum filler device with pressure gauge and shutoff valves

2 Filling hose

3 Fluid tank with coolant

4 Venturi nozzle

5 Compressed air connection (maximum of 6 bar)

6 Out-going hose (lead out-going hose into a collecting vessel)

Prerequisite

The coolant expansion tank for the cooling system must be empty. The fluid tank of the vacuum filler device must have a sufficient quantity of premixed coolant, 1 l to 2 l more than the specified capacity for the vehicle. The fluid tank of the vacuum filler device must be positioned at the same height as the coolant expansion tank. The compressed air connection must have a pressure of 6 bar. Ignition is switched off.

TECHNICAL INFORMATION

Follow notes for repair work on the cooling system.

For additional information see:

Main group 17

17 00 ... Notes for working on the cooling system

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

Mixing different coolants is not permitted.

TECHNICAL INFORMATION

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

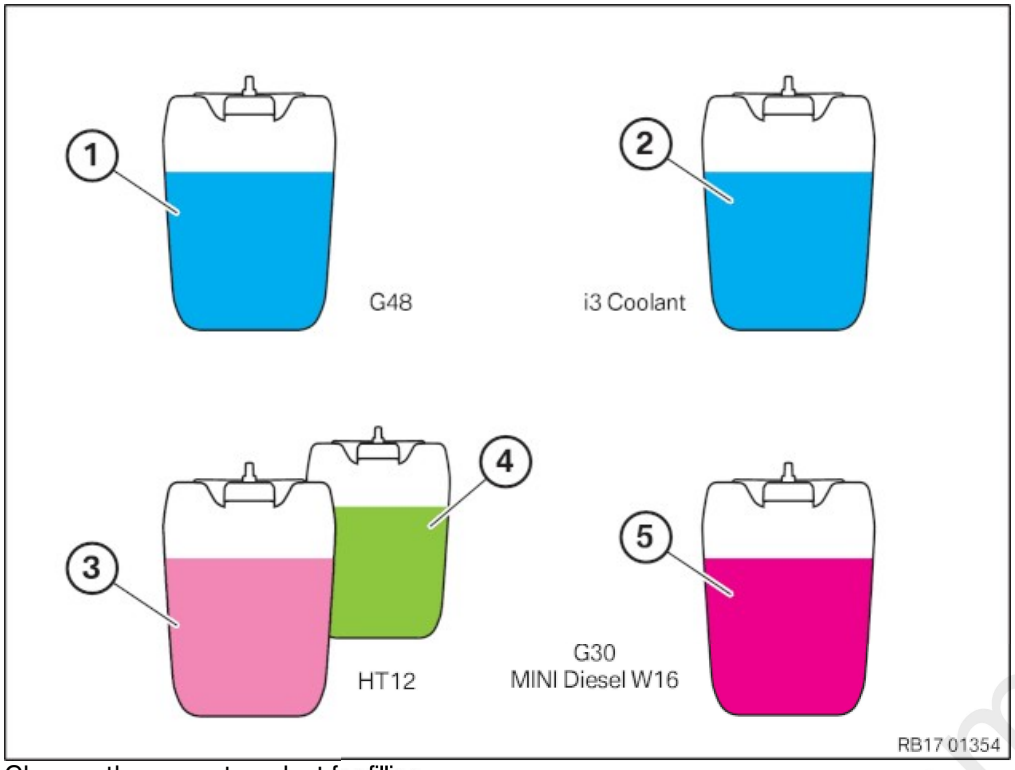
TECHNICAL INFORMATION

Make sure that the ignition (terminal 15) is switched off prior to creating the vacuum with the vacuum filler device.

▸ **Observe the coolant type**

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Coolant in the vacuum filler device container



Choose the correct coolant for filling

A vehicle must be filled with the coolant with which it is delivered ex works

1. G48 (Blue) G48 must not be mixed with the i3Coolant or the G30 MINI diesel fuelW16.

2. i3 coolant (blue) is used only for the i3 heater circuit. i3 coolant must not be filled in the other coolant circuits or mixed with the other coolants.

3. HT12 (Pink) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

4. HT12 (Green) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

5. G30 (Pink) must be used only for the **MINI diesel fuel W16**. G30 must not be filled in the other coolant circuits or mixed with the other coolants.

RISK OF DAMAGE

Damage to the engine.

The use of an incorrect coolant may lead to corrosion or gelling in the engine.

- Use only approved coolants for the specific vehicle.
- Fill the vehicle only with the coolant with which it was delivered ex works.
- Mix only compatible coolants. The colour does not allow any assessment about the compatibility of coolants.
- Selection of the correct coolant only by means of the part number.

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- Select a suitable adapter (Y) from the set of special tools 0 494 417 (17 0 100):

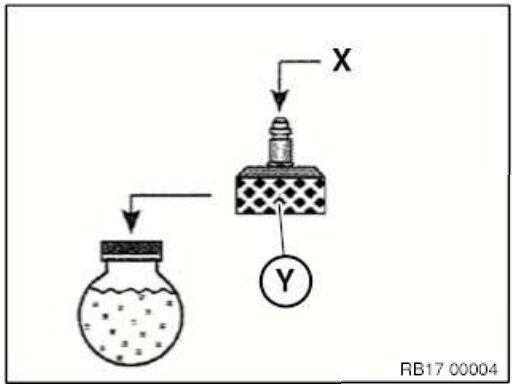
Type	Engine	Adapter (Y) from 17 0 100
G20/G29	B46 / B48 /B58	17 0 113

- The fluid tank of the vacuum filler device must be filled with 1 l to 2 l more than the specified capacity of coolant for the vehicle.

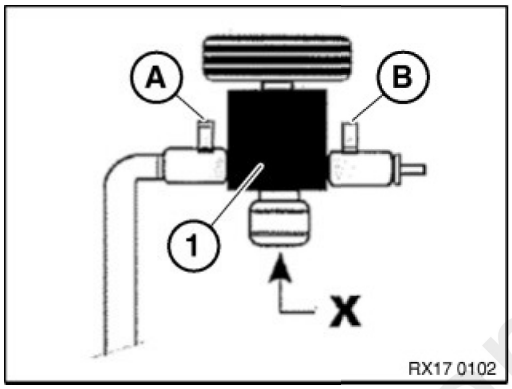
Capacity of high-temperature coolant circuit G20/G29

B58B30O1	10,5 l

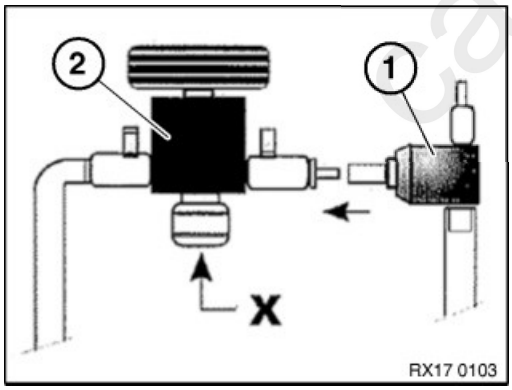
Expendable materials: Technically suitable antifreeze and corrosion inhibitor



- Connect the selected adapter (Y) to the coolant expansion tank.
- Connect vacuum filler device to connection (X) of the adapter.

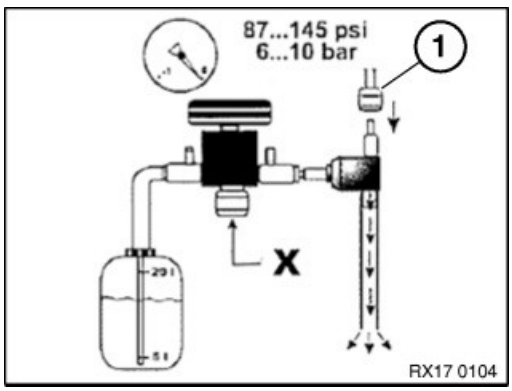


- Check whether shut-off valves (A) and (B) of the vacuum filler device (1) are closed.
- Connect and lock connection (X) to the coolant expansion tank.



- Connect Venturi nozzle (1) to the vacuum filler device (2).

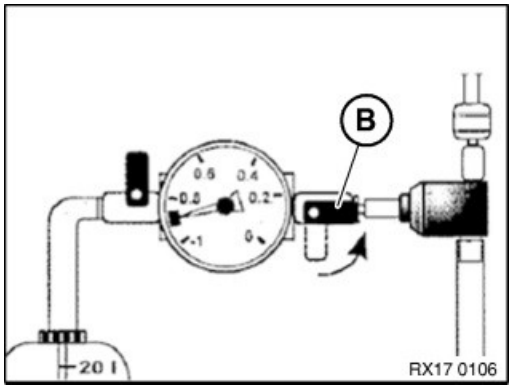
  (X)is the connection on the coolant expansion tank.



- Connect compressed air (1).

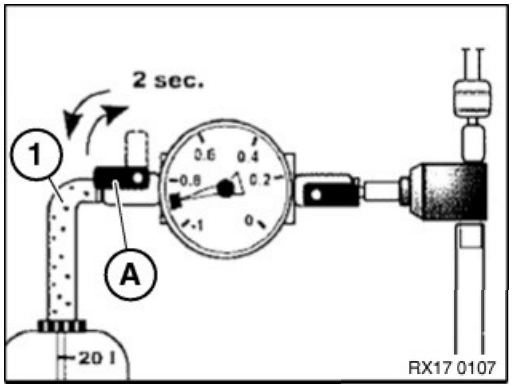
  (X)is the connection on the coolant expansion tank.

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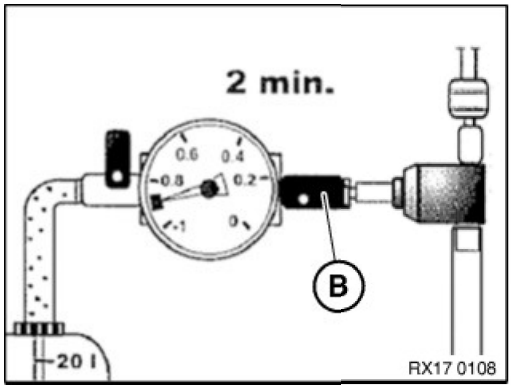
- Open shut-off valve (B).

  The venturi nozzle produces a flow noise.



- Open shutoff valve (A) until the fuel filling hose (1) is full without bubbles.
- Close shutoff valve (A) again.

» The filling hose (1) has now been bled.

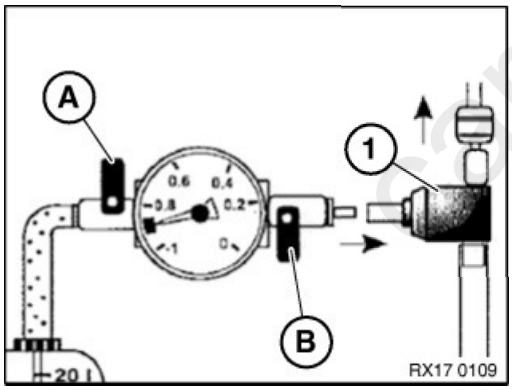


- Check the coolant hoses for porosity and renew porous coolant hoses as required.

TECHNICAL INFORMATION

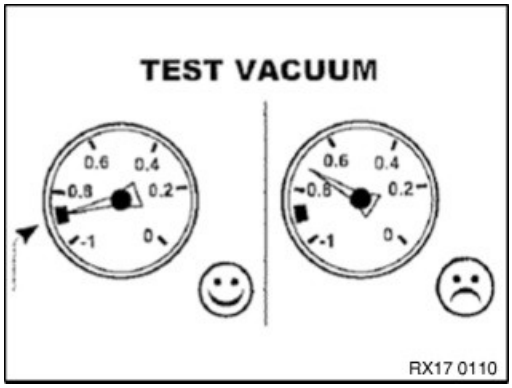
The coolant hoses contract during vacuum build-up.

- After having established a vacuum in the coolant circuit of between -0.7 to -0.95 bar (duration approximately 2 min), close the shut-off valve (B).



- Check whether the shutoff valves (A) and (B) are closed.
- Disconnect the Venturi nozzle (1).

Check



- Make sure the vacuum in the coolant circuit is maintained for at least 30 seconds.

Result

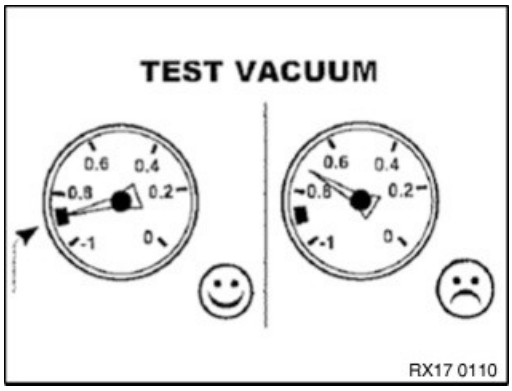
» Vacuum drops.

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Measure

- Look for the leak, repair it and start the filling procedure from the beginning.

Check



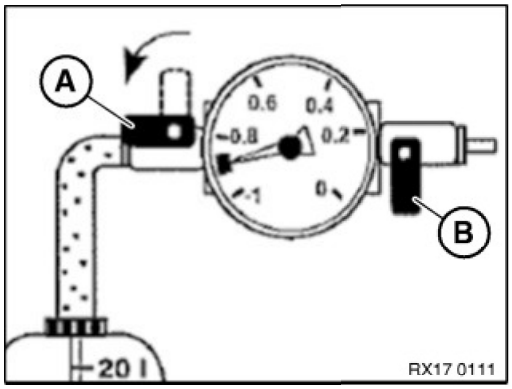
- Make sure the vacuum in the coolant circuit is maintained for at least 30 seconds.

Result

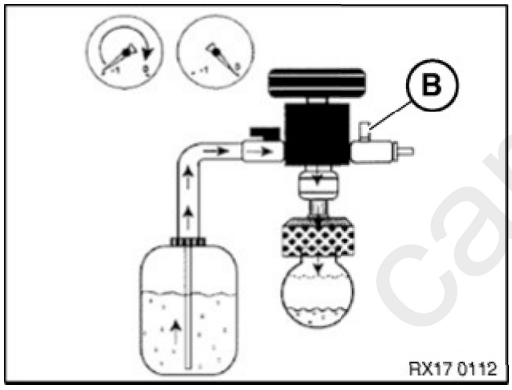
» Vacuum remains constant.

Measure

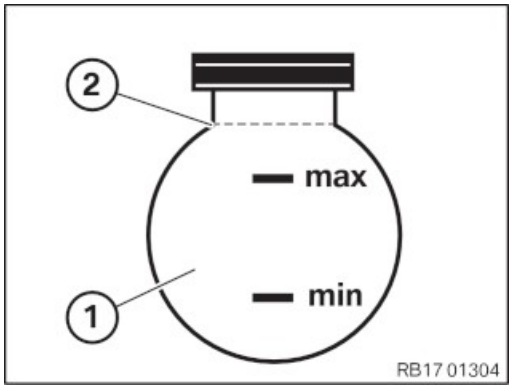
- Continue with filling.



- Keep shutoff valve (B) closed during the filling process.
- To fill the cooling system, open the shutoff valve (A) to the fluid tank of the vacuum filler device.



- Stop the filling procedure when the needle in the pressure measuring device is on 0 bar or it no longer drops.
- If necessary, reduce remaining vacuum. In order to do so, open shutoff valve (B).



- Remove the vacuum filler device with the adapter from the high temperature coolant expansion tank (1).
- Top up the coolant level in the high temperature coolant expansion tank (1) to the lower edge of the coolant filler neck (2) in the high temperature coolant expansion tank (1).
- After filling the cooling system with the vacuum filler device, **also** run the cooling system bleeding routine.

38 – Disconnecting all battery earth leads

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- See additional information.

39 – Bleed the high-temperature coolant circuit

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

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

TECHNICAL INFORMATION

Before starting the automatic cooling system bleeding routine, make sure that **all coolant circuits** are **filled**. If the cooling system bleeding routine is started while one of the coolant circuits is empty, there is a risk of damage to the electric coolant pump when running it dry.

Make sure that terminal 15 is not disconnected for the bleeding procedure. Switch on low-beam headlights and hazard warning lights. If the low-beam headlights and hazard warning lights are not switched on, the ignition (terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.

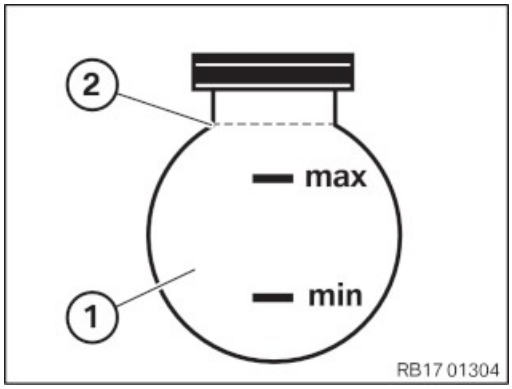
TECHNICAL INFORMATION

The electrical fan is activated during the entire cooling system bleeding routine.

TECHNICAL INFORMATION

The driving experience switch must not be set to the ECO PRO switch position.

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- Open the bleeder screw on the coolant expansion tank for the high-temperature coolant circuit and close it again after approx. **10 s**.

  You can close the bleeder screw prior to expiry of the 10 s once coolant escapes.
- Adjust the coolant level in the high temperature coolant expansion tank (1) to the lower edge (2) of the coolant filler neck of the the high temperature coolant expansion tank (1) .
- Close the sealing cap on the coolant expansion tank of the high--temperature cooling circuit.
- Make sure the bonnet is **closed**.
- Make sure that the wheels touch the ground.
- Engage the parking brake.
- Do not engage any gear in manual-shift gearbox, and engage the gear to "P" or "N" automatic transmission.
- Connect battery charger.
- Switch on the ignition and make sure that it remains **switched on** (for example, activate the low-beam headlight and the **hazard warning light at the same time**).

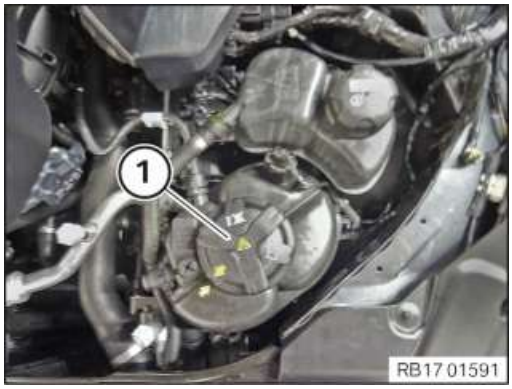
  If the low-beam headlight and the hazard warning light are **not** switched on, the ignition (**terminal 15**) will switch off automatically after some time and interrupts the bleeding procedure.
- Check that the driving experience control is **not** in the **"ECO-PRO"** switch position.
- Adjust the heating to **maximum** temperature and adjust the blower to the **lowest** stage.
- Hold the accelerator pedal down to the limit position for at least **10 s** and do **no** kick the brake pedal.
- Start engine.
- Start the cooling system bleeding routine, pay attention to the display on the instrument cluster (KOMBI). ("Service function started")

  The engine speed (up to 3500 rpm) and the actuators in the cooling system are activated **automatically** for 11 minutes according to a cooling system bleeding routine.

  The cooling system bleeding routine ends approx. 11 min **after** the engine starts.

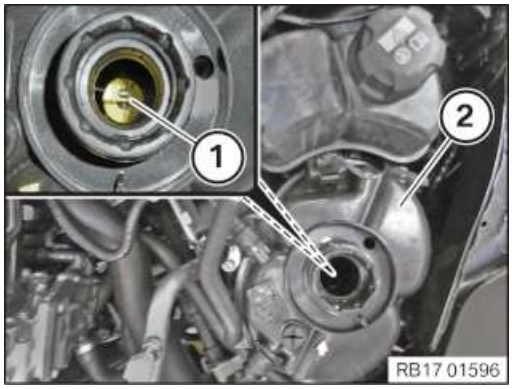
  The engine speed **drops** to the idle speed.
- Observe the display *in the instrument cluster* (KOMBI).

  If the service function is interrupted, the cooling system bleeding routine **must** be repeated.
- Switch off engine.
- Allow the coolant temperature to cool down to **< 50°C**.



- Loosen sealing cap (1).

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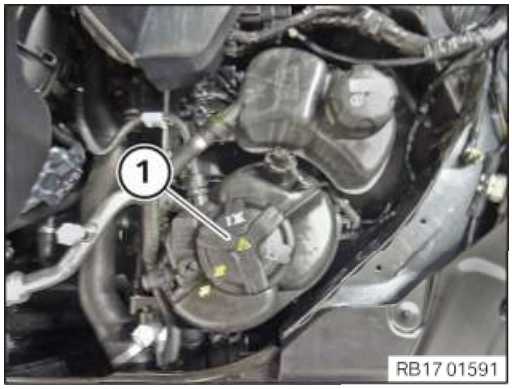
TECHNICAL INFORMATION

After the cooling system bleeding routine, the cooling system is topped up above the maximum mark.

Overfilling the cooling system serves to balance the remaining air in the cooling system.

The normal filling level of the coolant is reached while driving.

- Adjust the filling level in the coolant expansion tank (2) of the high-temperature coolant circuit to **200 ml** over the **maximum mark**(1) .



- Close sealing cap (1).
- Close the sealing cap (1) until the **arrows** are flush.

40 – Bleeding the low-temperature cooling system

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

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

TECHNICAL INFORMATION

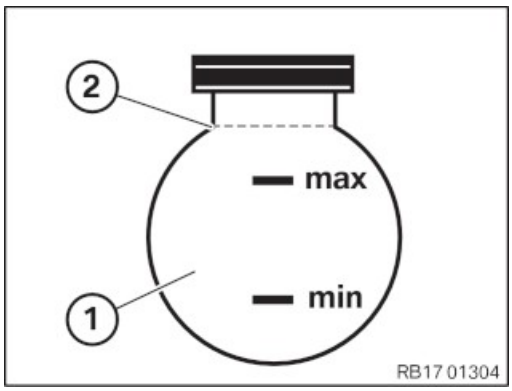
Before starting the automatic cooling system bleeding routine, make sure that **all coolant circuits** are **filled**. If the cooling system bleeding routine is started while one of the coolant circuits is empty, there is a risk of damage to the electric coolant pump when running it dry.

Make sure that terminal 15 is not disconnected for the bleeding procedure. Switch on low-beam headlights and hazard warning lights. If the low-beam headlights and hazard warning lights are not switched on, the ignition (terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.

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TECHNICAL INFORMATION

The driving experience switch must not be set to the ECO PRO switch position.



- Adjust the coolant level in the low-temperature coolant expansion tank (1) up to lower edge (2) of the coolant filler neck of low-temperature coolant expansion tank (1).
- Close the sealing cap on the coolant expansion tank of the low-temperature coolant circuit.
- Ensure that the bonnet is **open**.
- Connect battery charger.
- Switch on the ignition and ensure that it remains **switched on** (for example, activate the low-beam headlight and the hazard warning lights **at the same time**).
- If the low-beam headlight and the hazard warning light are **not** switched on, the ignition (**terminal 15**) will switch off automatically after some time and interrupts the bleeding procedure.
- Ensure that the Driving Experience Control is **not** in the **"ECO-PRO"** switch position.
- Adjust the heating to **maximum** temperature and adjust the blower to the **lowest** stage.
- Hold the accelerator pedal down to the limit position for at least **10 s** and do **not** press on the brake pedal.
- Do **not** start engine.

  The cooling system bleeding routine will start.

  The electric coolant pump in the low-temperature coolant circuit is activated for 11 minutes according to a cooling system bleeding routine.

  The cooling system bleeding routine ends after 11 minutes.

  The electric coolant pump is **no** longer activated.
- Note the display in the instrument cluster (KOMBI).

  If the service function is interrupted, the cooling system bleeding routine **must** be repeated.
- Allow the coolant temperature to cool down to **< 50°C**.



- Loosen sealing cap (1).

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TECHNICAL INFORMATION

After the cooling system bleeding routine, the cooling system is topped up above the maximum mark.

Overfilling the cooling system serves to balance the remaining air in the cooling system.

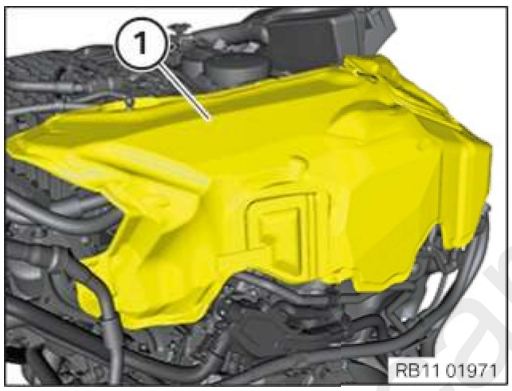
The normal filling level of the coolant is reached while driving.

- Adjust the filling level in coolant expansion tank (2) of the low-temperature coolant circuit to **100 ml** above the **maximum mark** (1) .
- Close sealing cap (1).

41 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

42 – 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.

43 – Install the seal for the bonnet

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- 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.

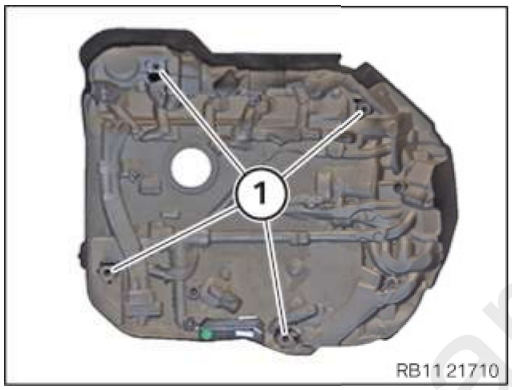
44 – Install acoustic cover

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.



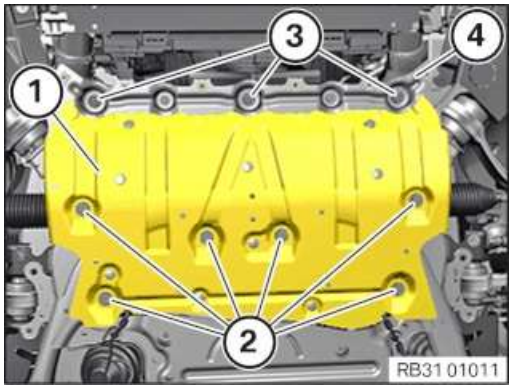
- Check the rubber mount (1) for correct fit in the acoustic cover.



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

45 – Installing the stiffening plate

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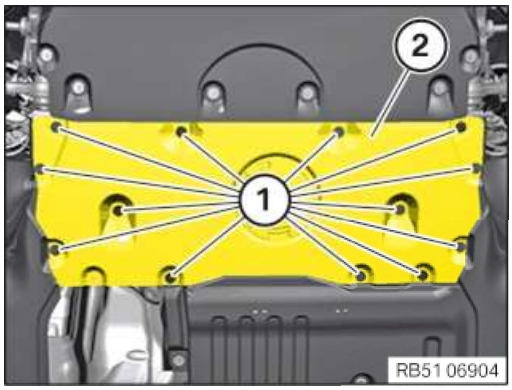


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

46 – Installing the centre underbody protection



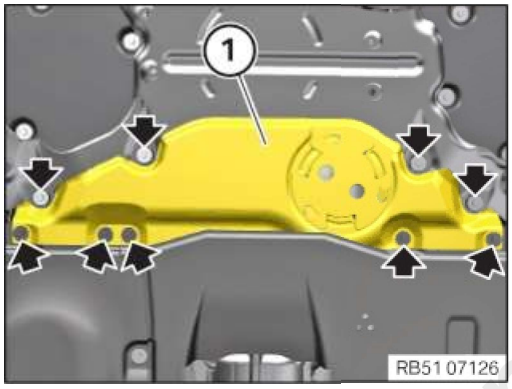
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

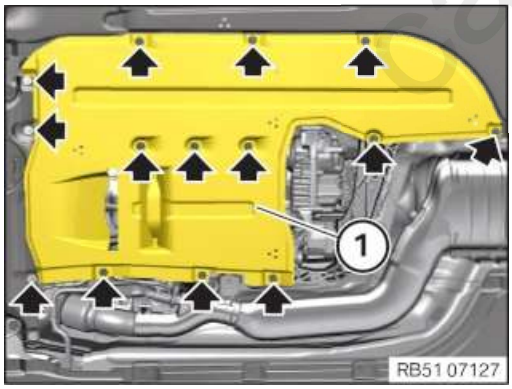
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

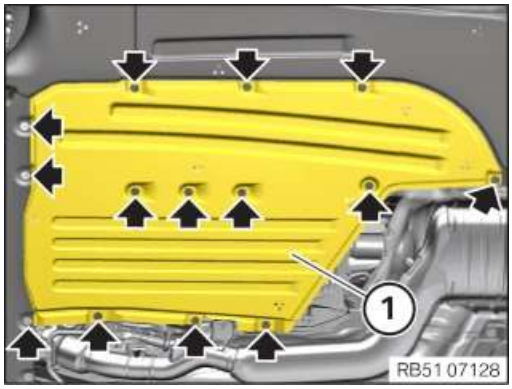
47 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



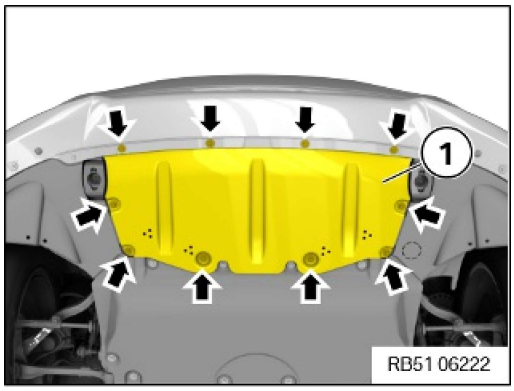
- **Version 2:**

  Remove screws (arrows).

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

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48 – Installing the front underbody protection



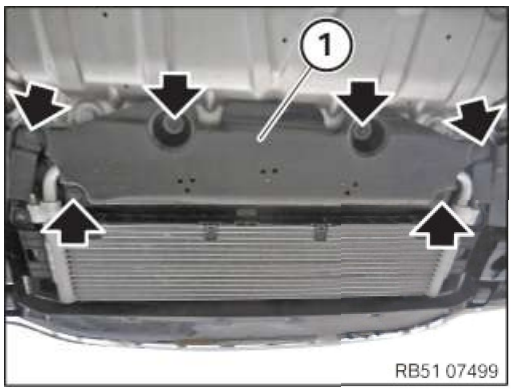
- **Version 1:**

  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



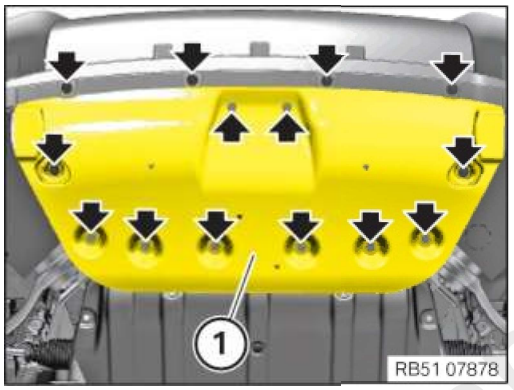
- **Version 2:**

  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:**

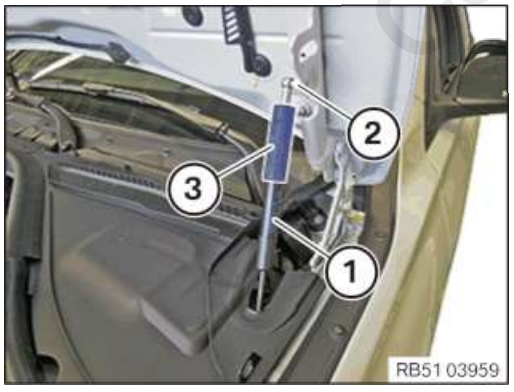
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

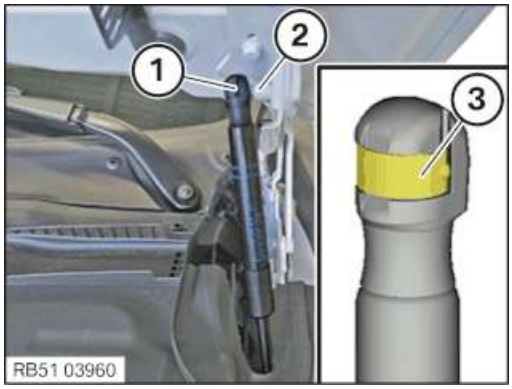
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

49 – 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.

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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

Oil drain plug — Used in step 16

M12x16	Replace sealing ring.	Tightening torque	25 Nm

Cover, front bottom on side — Used in step 1920

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Engine oil cooler to bumper support — Used in step 20

M6X25		Tightening torque	8 Nm

Cover plate on full-flow oil filter — Used in step 26

Bolts	Observe tightening sequence.	Tightening torque	10 Nm
		Tightening torque	10 Nm

Full-flow oil filter to crankcase — Used in step 27

Captive screw M6	*Observe tightening sequence.*	Jointing torque	4 Nm
		Tightening torque	10 Nm

Engine oil pipes to cover plate — Used in step 27

M6X35		Tightening torque	8 Nm

Holder to end cover — Used in step 27

M6X16		Tightening torque	8 Nm

Holder for transmission oil line — Used in step 27

Screw	*Renew screw.*	Tightening torque	5 Nm

Heat exchange module to crankcase — Used in step 28

M6		Tightening torque	9 Nm

Positive battery cable to the alternator — Used in step 28

M8		Tightening torque	19 Nm

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Support to cylinder head			Used in step 28
M6X16		Tightening torque	8 Nm

Intake plenum to cylinder head			Used in step 29
M6		Tightening torque	10 Nm

Intake plenum to support			Used in step 29
M6X25		Tightening torque	8 Nm

Tank ventilation line to intake plenum			Used in step 29
Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle valve			Used in step 29
M6x30		Tightening torque	8 Nm

Control unit holder on spring strut dome			Used in step 31
Hexagon screw		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 34
Clamp		Tightening torque	3 Nm

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

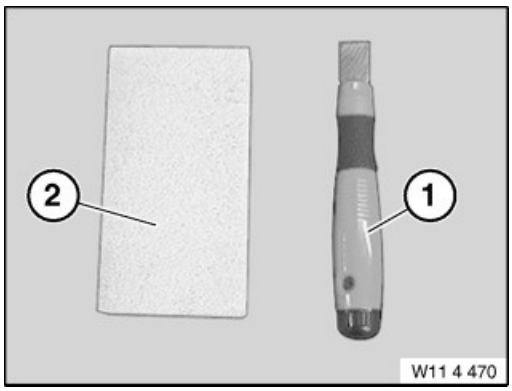
Underbody protection			Used in step 46
Hexagon screw		Tightening torque	3 Nm

Underbody protection front			Used in step 48
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

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0 495 102 (11 4 470) Tool



Common Used in step 2627

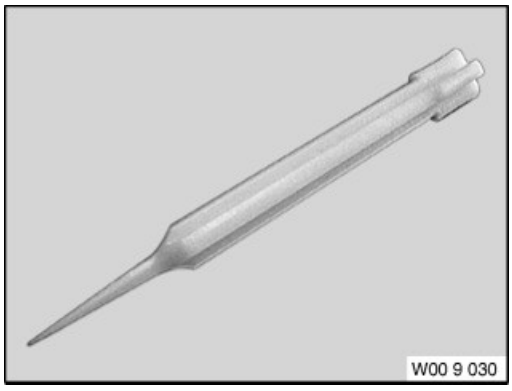
Usage	(cleaning kit) For cleaning sealing surfaces on magnesium crankcase/cylinder head.
Included in the tool or work	
Storage location	C52
Replaced by	
In connection with	
SI-Number	01 17 04 (130)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 103 (11 4 471)		**Scraper**	
2	0 495 104 (11 4 472)		**Extractor** (grindstone)	

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0 496 714 (00 9 030) Wedge

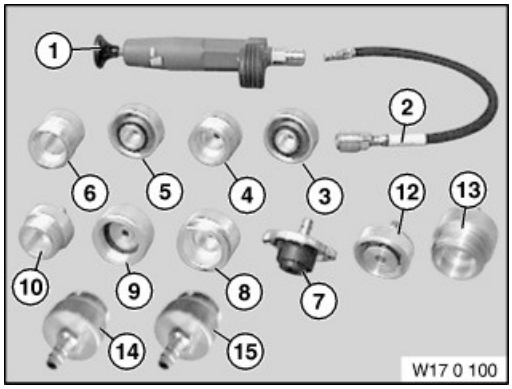


Common Used in step 27

Usage	For dismantling O-rings, gaskets and trim panels. This special tool replaces special tool 00 9 316.
Included in the tool or work	
Storage location	A50
Replaced by	
In connection with	
SI-Number	01 20 09 (581)

0 494 417 (17 0 100) Tester

Common Used in step 3637



Usage	For checking engine cooling system on watertightness. For checking radiator cap.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 02 (884)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
5	0 494 422 (17 0 105)		**Adapter** For radiator cap (sawtooth thread)	
10	0 494 427 (17 0 111)		**Adapter** For radiator cap R53/W11, R50/W17 adapter replaced 17 0 052.	
1	0 494 418 (17 0 101)		**Pump**	
2	0 494 419 (17 0 102)		**Hose** (hose with quick-release coupling)	
3	0 494 420 (17 0 103)		**Adapter** For radiator cap (normal thread)	
4	0 494 421 (17 0 104)		**Adapter** For radiator cap (normal thread)	
6	0 494 423 (17 0 106)		**Adapter** For radiator cap (sawtooth thread)	
7	0 494 424 (17 0 107)		**Adapter** For radiator cap R50 / W10	
8	0 494 425 (17 0 108)		**Adapter** For radiator cap R50 / W10	
9	0 494 426 (17 0 109)		**Adapter** For radiator connection R53/W11, R50/W17 adapter corresponds to 17 0 051	
11	0 494 428 (17 0 112)		**Case**	
12	0 494 642 (17 0 113)		**Adapter** For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)	

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13	0 494 643 (17 0 114)		**Adapter** For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)	
14	0 495 889 (17 0 115)		**Adapter** For radiator cap Model series: N12, N14	

Overview Technical Data

Engine oil B58B30M1/B58B30O1 Used in step 35

Filling capacity, engine oil change with oil filter element	6,50 l

Engine oil: Technically suitable engine oils for BMW Group engines

Capacity of low-temperature coolant circuit G20/G29 Used in step 36

B58B30O1	4,5 l

Expendable materials: Technically suitable antifreeze and corrosion inhibitor

Capacity of high-temperature coolant circuit G20/G29 Used in step 37

B58B30O1	10,5 l

Expendable materials: Technically suitable antifreeze and corrosion inhibitor

Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	833

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	238
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	238
61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	238
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	238
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61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting battery earth lead	238
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	238
61 20 900 Disconnecting and connecting battery earth lead	238
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61 35 ... Notes on ESD protection (Electro Static Discharge)	7892432
17 11 035 Removing and installing/replacing fan cowl with electric fan	27
61 00 730 Encode/program control unit(s) (after vehicle test)	33
17 00 ... Notes for working on cooling system.	3637

Operating materials	**Used in step**
3.0 Technically appropriate engine oils for BMW Group engines	35

Operating materials	**Used in step**
Main group 17	3637

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11 42 200 Removing and installing/sealing or replacing oil feed line for exhaust turbocharger

WARNING

Hot surfaces.

Risk of burning!

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

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

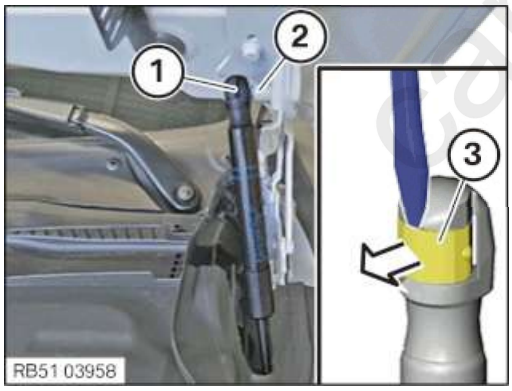
Engine compartment lid is open.

CAUTION

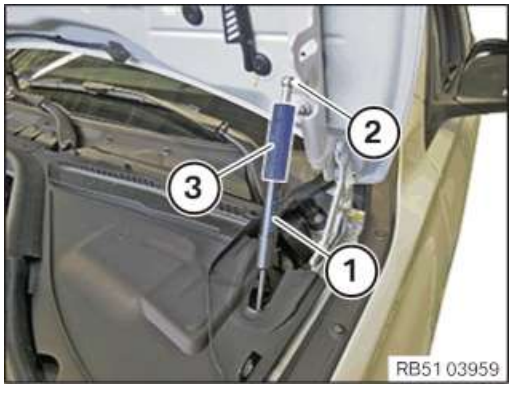
Shutting bonnet or tailgate.

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.



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 – Remove the seal for the rear bonnet

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2 – 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.

3 – 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.



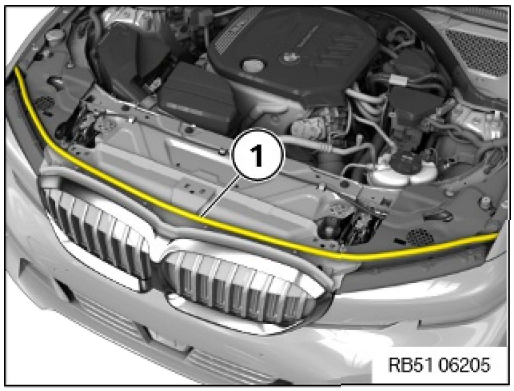
- Release the acoustic cover (1) towards the top from the rubber mounts (marks).

4 – Removing acoustic cover at rear



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

5 – Remove the seal for the bonnet in front



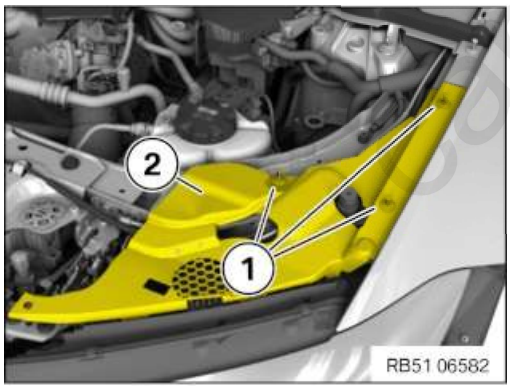
- Pull off front bonnet seal (1) upwards.

6 – Partially remove the top left and right cover in the engine compartment

NOTICE

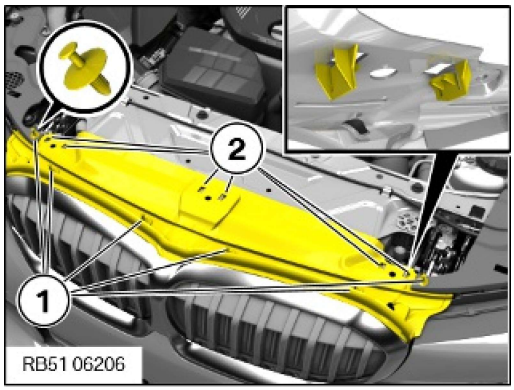
Description is for left component only. Procedure on the right side is identical.

▸ **Removing the cover in the engine compartment on top partially**



- Loosen the expanding rivet (1).
- Remove the cover in the engine compartment on top (2) partially.

7 – Removing the centre engine compartment cover



- Detach all expanding rivets (1).
- Release the cover of the centre engine compartment with the latch mechanisms (2) .
- Feed the cover for the centre engine compartment out to the rear.

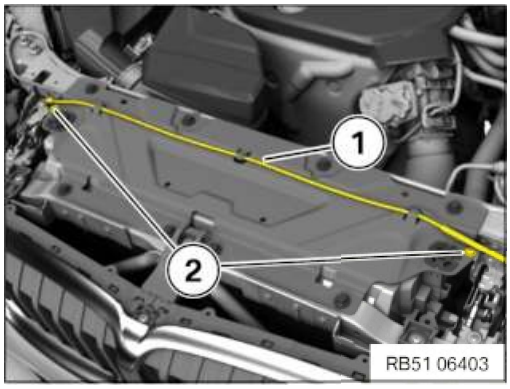
8 – Removing the top cross connection

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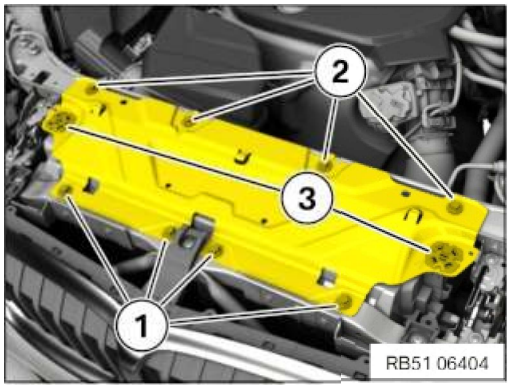
8 – Removing the top cross connection



- Release the housing for the coupling of the Bowden cables (1) from the body.

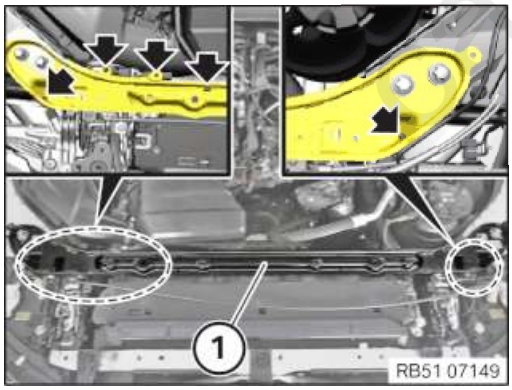


- Detach Bowden cable (1) at the top cross connection.
- Loosen screws (2).

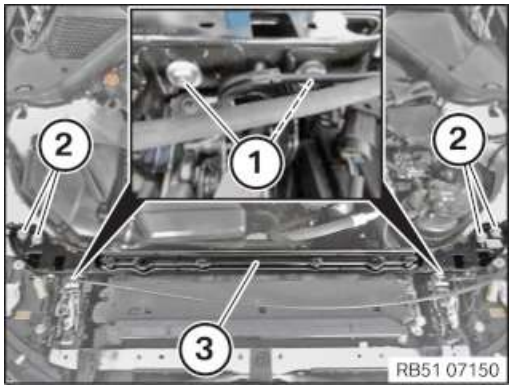


- Loosen screws (1) and (2).
- Remove the top cross connection with the holders(3) towards the top.

9 – Remove the rear top cross connection



- Release the clips (arrows) in the marked areas from the top rear cross connection (1).



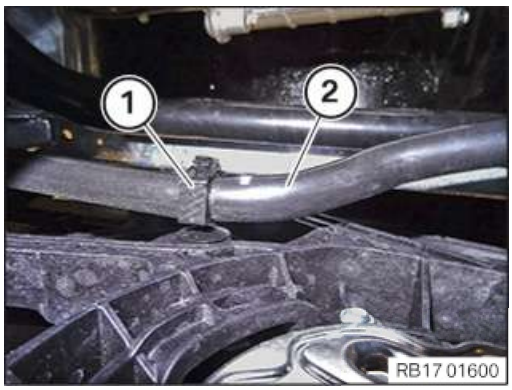
- Loosen screws (1).
- Loosen screws (2).
- Guide out and remove top rear cross connection (3).

10 – Remove fan cowl.

10 – Remove fan cowl.

TECHNICAL INFORMATION

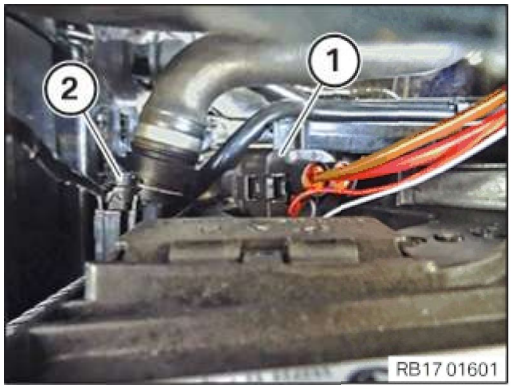
- When the engine is stopped after the end of the journey, it may be necessary to run the electric fan. In rare cases, operation of the electric fan can last up to 11 min. This protects the components. In this case, replacing the electric fan will not remedy the problem!



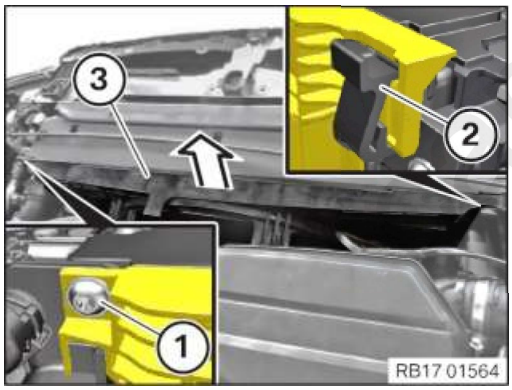
- **If installed:** Release transmission oil line (2).

  Unlock the holder (1).

  Thread out transmission oil line (2) and set aside.



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



- Loosen screw (1).
- Unlock lock (2).
- Guide out and remove fan cowl (3) **carefully** in the direction of the arrow.

11 – 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.

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- 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.

12 – Removing engine ventilation line

WARNING

Hot surfaces.

Risk of burning!

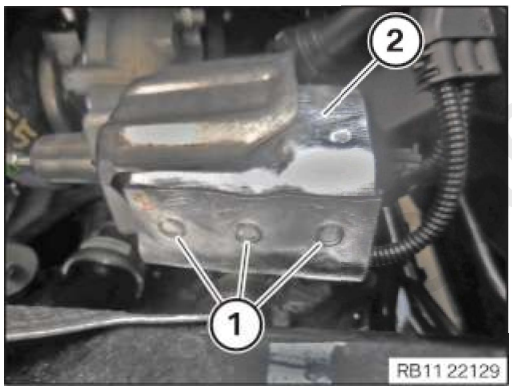
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

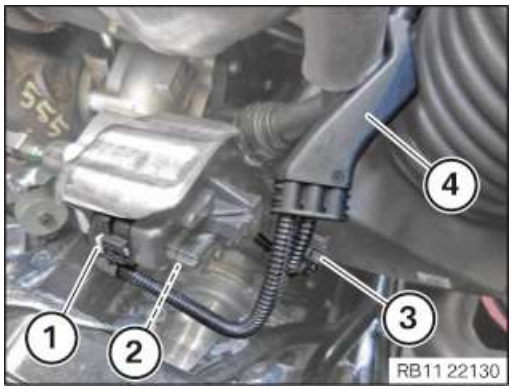
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

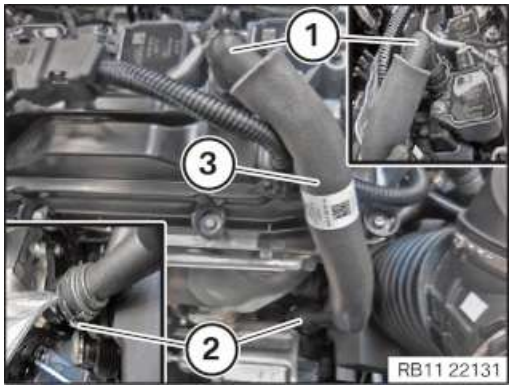
- Do not pull on the wires when disconnecting connectors and plug connections.



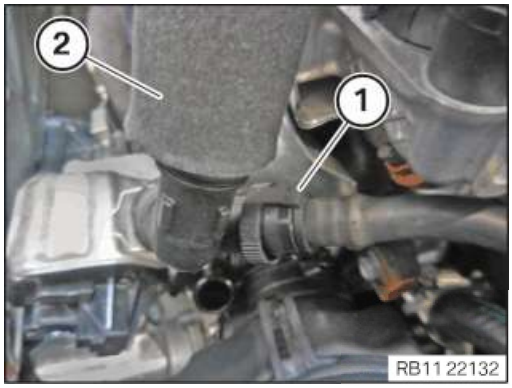
- Unlock the locks (1).
- Feed out and remove heat protection (2).



- 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.



- 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 clean air pipe

WARNING

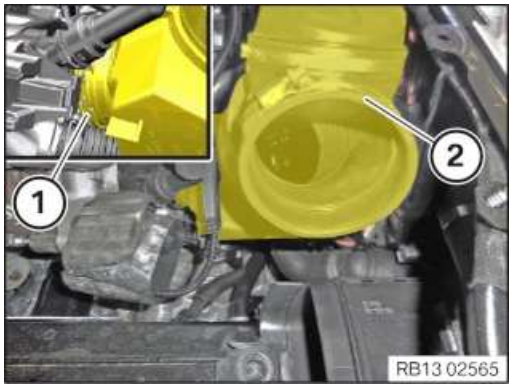
Hot surfaces.

Risk of burning!

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

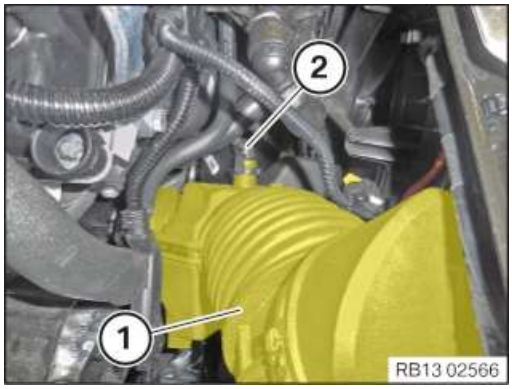


- Loosen clamp (1).



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

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

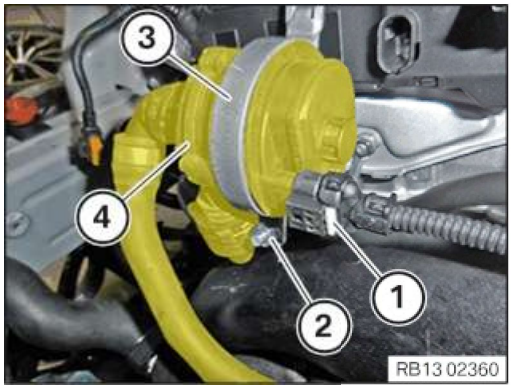
14 – Remove charge air line

WARNING

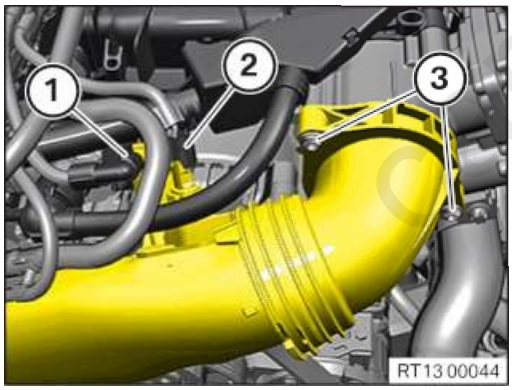
Hot surfaces.

Risk of burning!

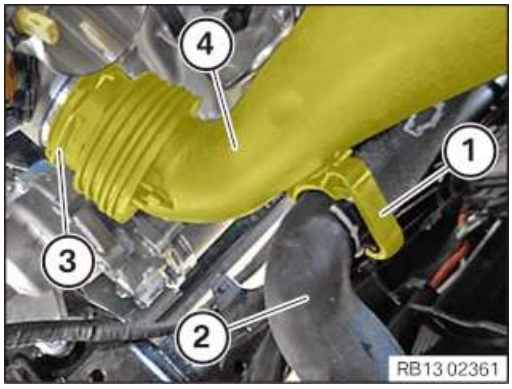
- Perform all work only on components that have cooled down.



- 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 plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.
- Loosen screws (3).



- Unlock the clamp (1).
- Feed out the coolant hose (2) and set it aside.
- Unlock the clamp (3).
- Feed the charge air line (4) out upwards and remove it.

15 – Remove the adapter for engine ventilation line with heating element on exhaust turbocharger

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WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

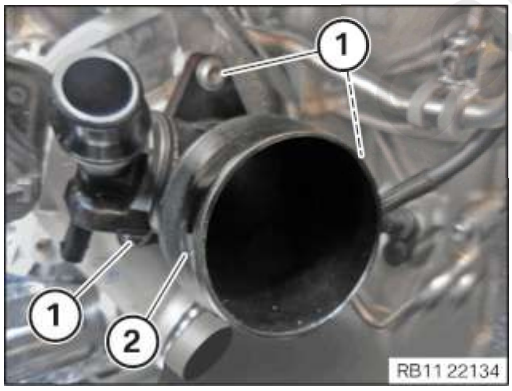
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

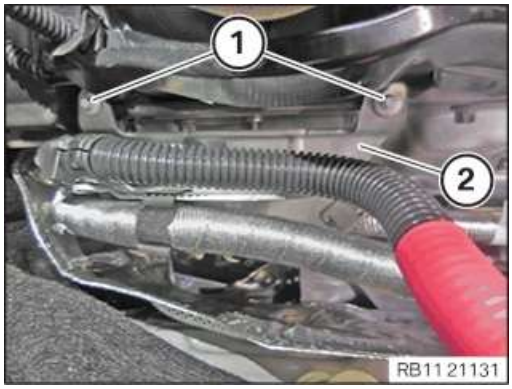
- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.



- Loosen screws (1).
- Feed out the connecting branch (2) with heating element on the exhaust turbocharger and remove.

16 – Partially release the holder on the positive battery cable

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- Loosen screws (1).
- Feed out the bracket (2) of the positive battery cable and set it aside.

17 – Remove the monitoring oxygen sensor

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

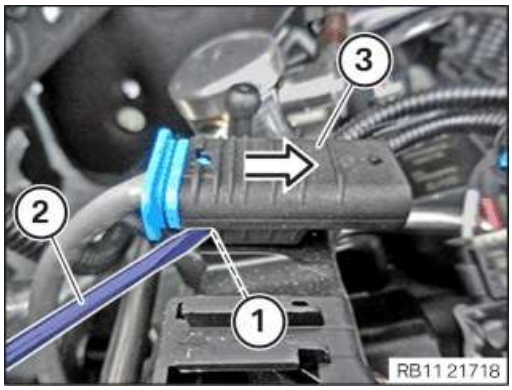
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

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

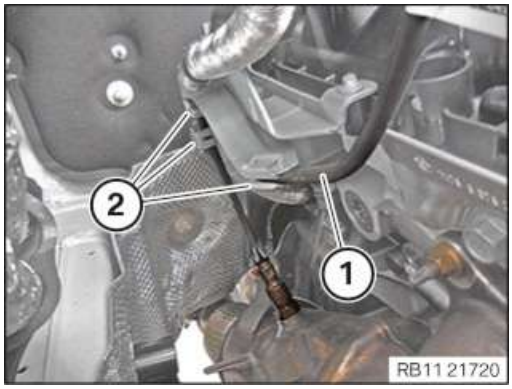


- Unlock and loosen connector (1).

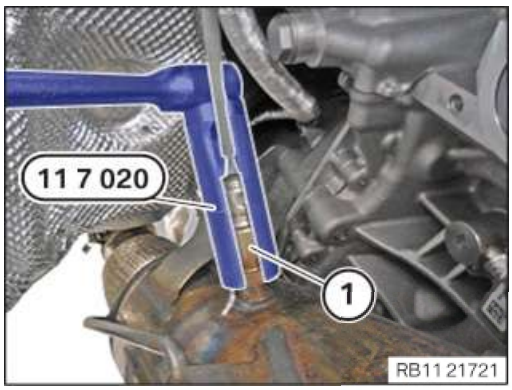


- Unlock the lock (1) with a suitable screwdriver (2).
- Feed out the connector (3) in the direction of the **arrow** and set it aside.

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- Detach the line of the monitoring oxygen sensor (1) from the holder (2).



- Release the monitoring oxygen sensor (1) using special tool .
- Remove the monitoring sensor (1).

18 – Remove the front oxygen sensor

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.

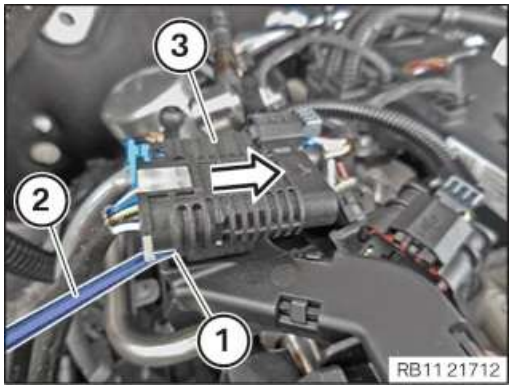
Sheared wires can cause a short circuit.

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

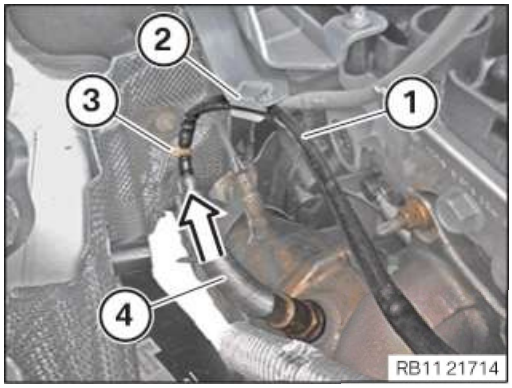


- Unlock and loosen connector (1).

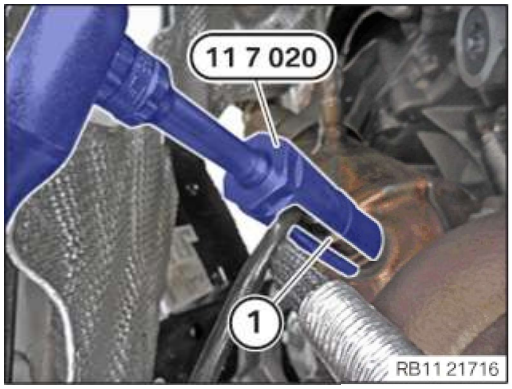
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- Unlock the locks (1) with a conventional screwdriver (2) and release.
- Feed out the connector (3) in **the direction of arrow** and set aside.

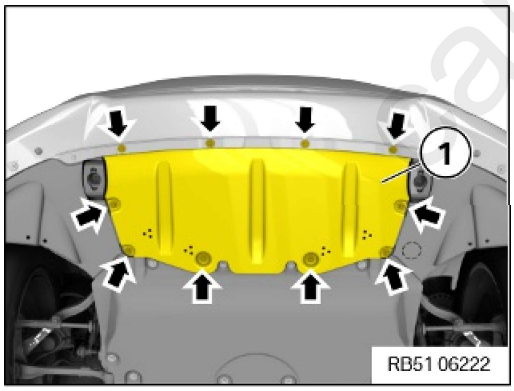


- Detach the line of the front oxygen sensor (1) from the holder (2).
- Unfasten cable strap (3).
- Feed out the heat shield (4) **in direction of arrow** and set it aside.



- Release and remove the control sensor (1) with the special tool .

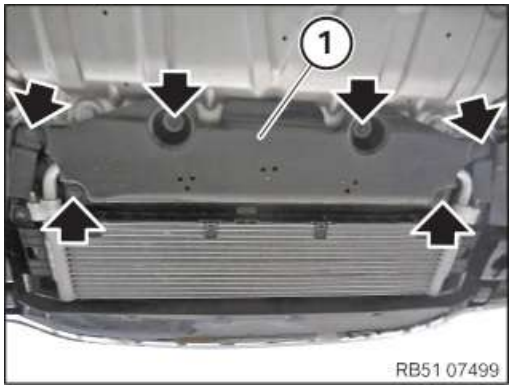
19 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

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

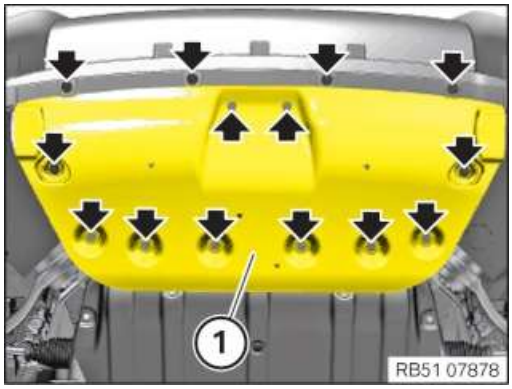


- **Version 2:**

  Remove screws (arrows).

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

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- **Version 3:**

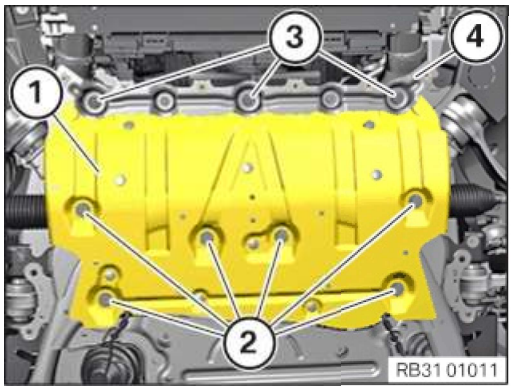
  Remove screws (arrows).

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

20 – Removing the stiffening plate

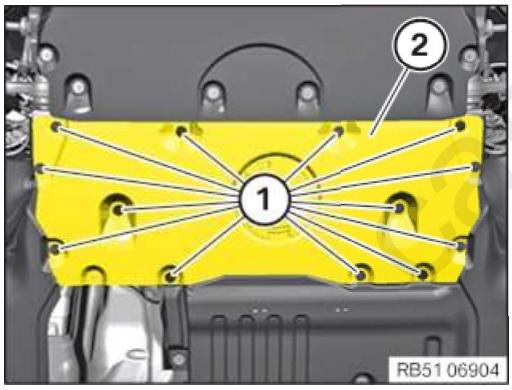
TECHNICAL INFORMATION

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).

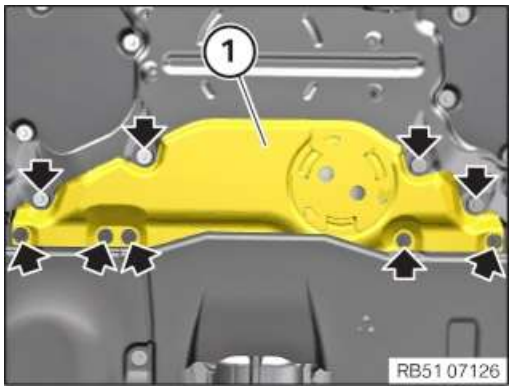
21 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .



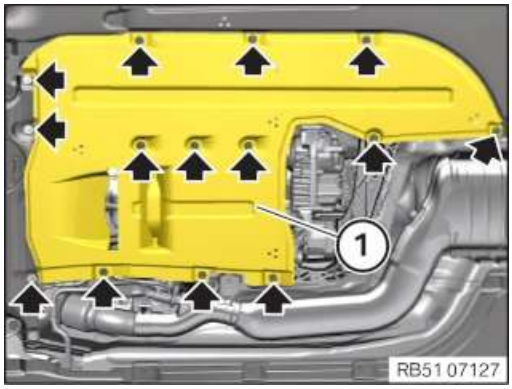
- **Version with all-wheel drive:**

  Remove screws (arrows).

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

22 – Remove rear underbody protection

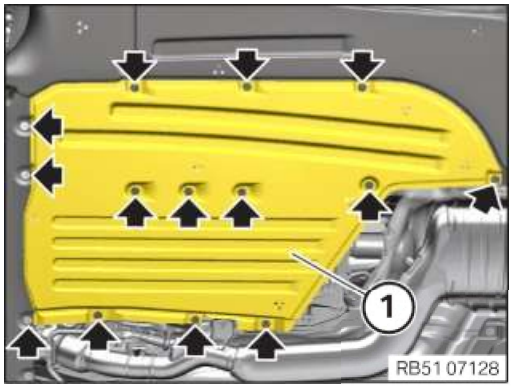
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- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

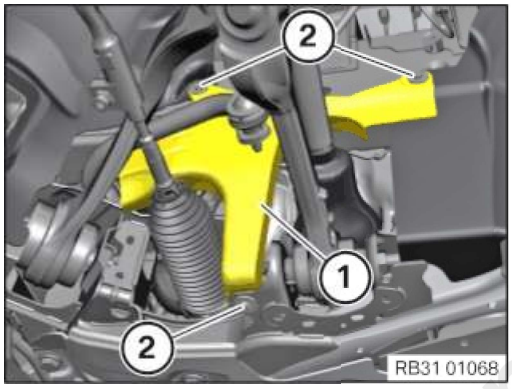


- **Version 2:**

  Remove screws (arrows).

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

23 – Remove the cover of the steering assembly

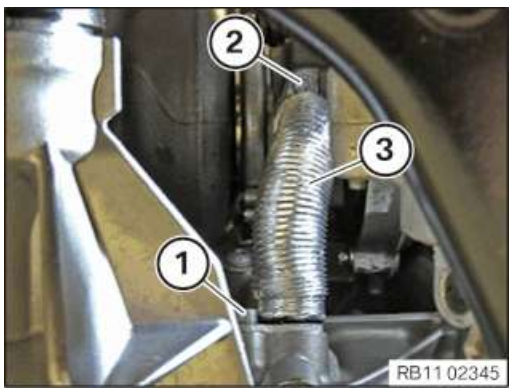


- Loosen screws (2).
- Remove the cover (1).

24 – Removing the oil return line for the exhaust turbocharger

TECHNICAL INFORMATION

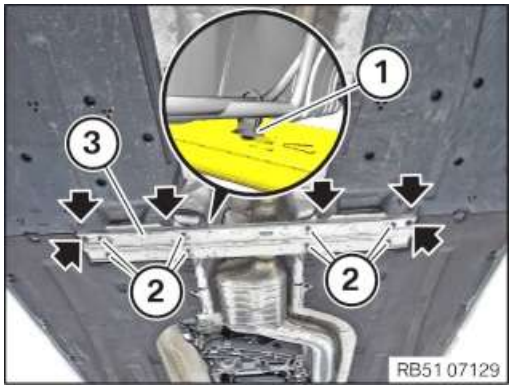
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Have cleaning rags ready for any escaping engine oil.
- Loosen screws (1) and (2).
- Guide out and remove the oil return line (3).

25 – 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.

26 – 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.

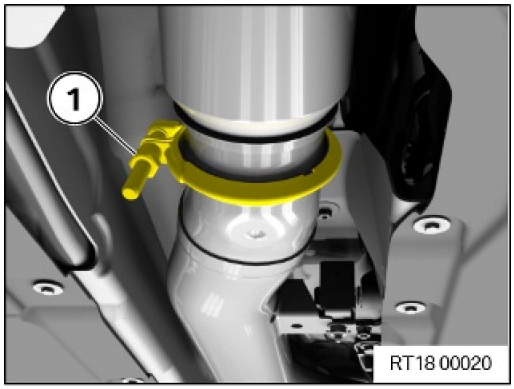
- Remove and install heavy components with the aid of another person/other persons.



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

  Detach the ribbon clamp (1).

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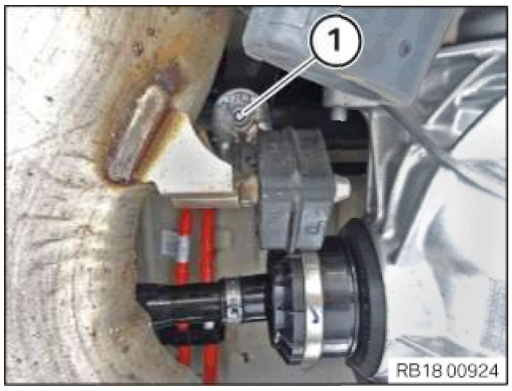


- **Equipment specification 2 (V-clips)**

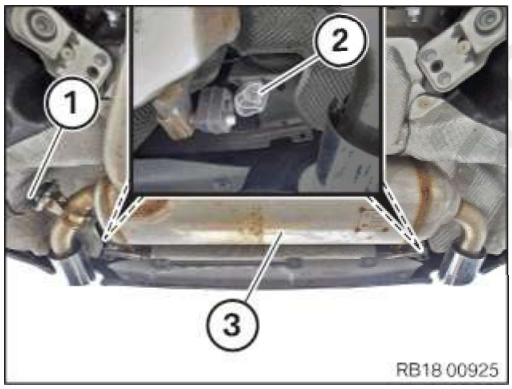
  Unfasten clamp (1).



- 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.

27 – Remove catalytic converter

WARNING

Hot surfaces.

Risk of burning!

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

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CAUTION

Heavy component.

Heavy components can lead to injury or damage.

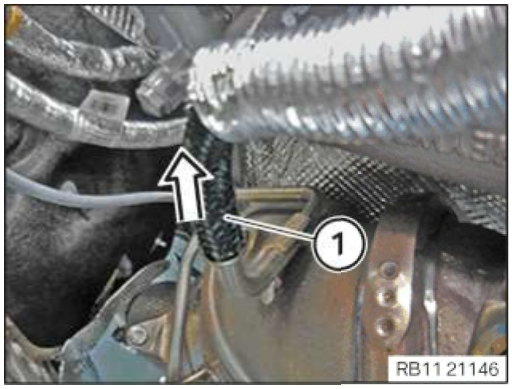
- Remove and install heavy components with the aid of another person/other persons.

CAUTION

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.

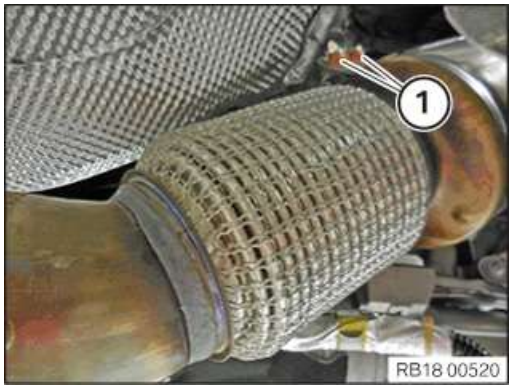


- **If installed: Disconnect pressure hose.**

  Pull off pressure hose (1) in direction of arrow and set it aside.



- Loosen V-band clamp (1).



- Loosen nuts (1).

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- Unlock and loosen clamp (1).
- Feed out catalytic converter and remove.

28 – Draining the coolant from the high-temperature cooling system

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

TECHNICAL INFORMATION

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



- Loosen sealing cap (1).

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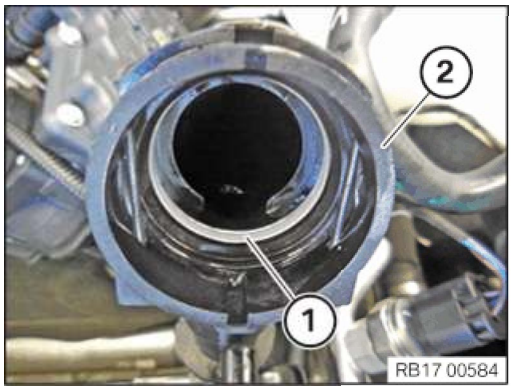


- Unlock lower right coolant hose (1) on the high-temperature coolant radiator and pull it off.
- Catch and dispose of escaping coolant.

29 – Connecting coolant hose to high-temperature coolant radiator

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.

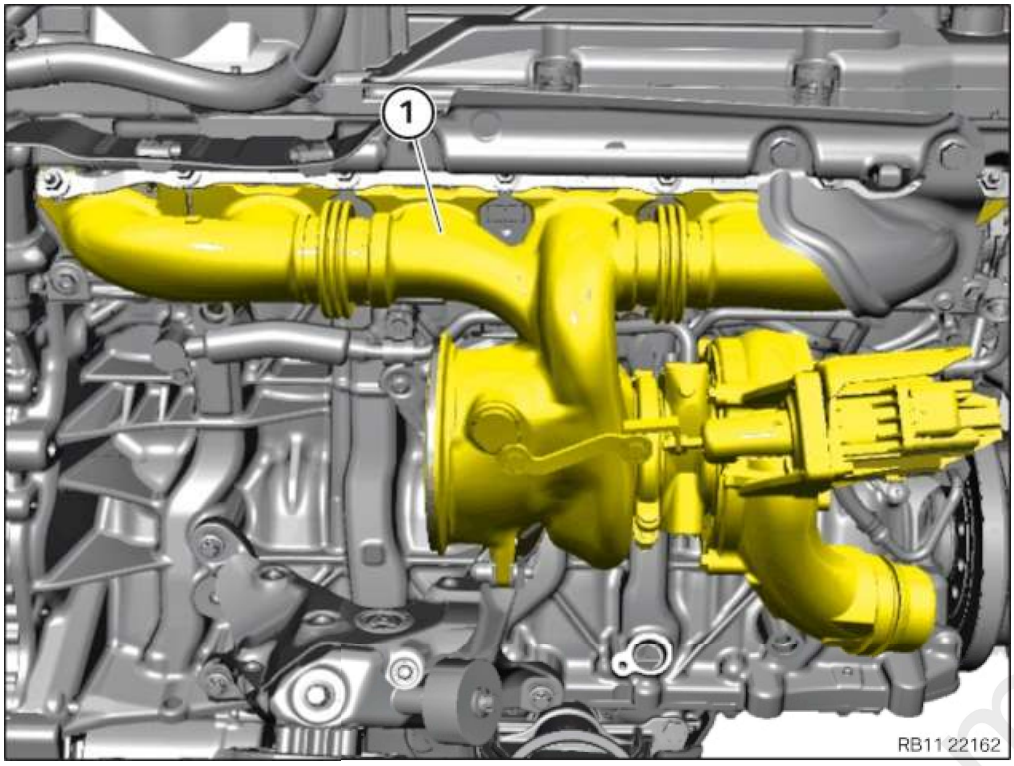


- Connect coolant hose (1), bottom right to the high-temperature coolant radiator and lock it audibly.

30 – Remove exhaust turbocharger

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Exhaust turbocharger



1 Exhaust turbocharger

CAUTION

Heavy component.

Heavy components can lead to injury or damage.

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

RISK OF DAMAGE

Damage to the electrical wastegate valve controller.

The electrical wastegate valve controller may be damaged as a result of the excessive forces required when removing and installing a jammed exhaust turbocharger.

- Do not pull on the electrical wastegate valve controller.
- Apply force to the turbine housing and exhaust manifold only.
  - Do not pull on the compressor housing.

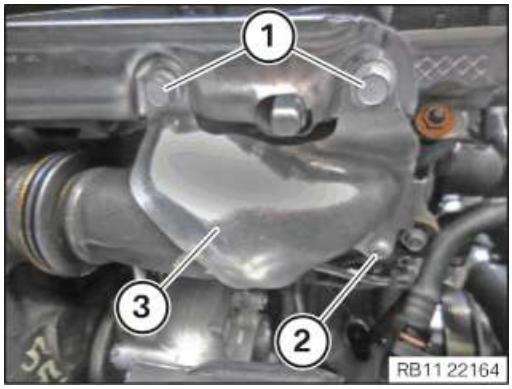
TECHNICAL INFORMATION

Do not damage the thermal compensating elements. The disassembly and installation including intermediate storage of the exhaust turbocharger is only permitted with mounted special tool 2 466 919 .

TECHNICAL INFORMATION

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

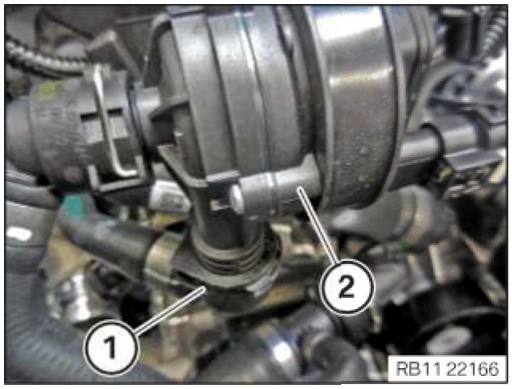
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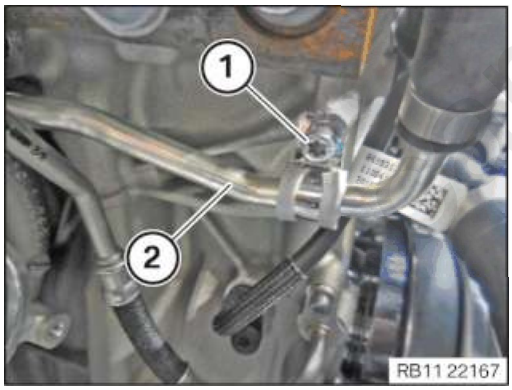
- Loosen screws (1).
- Loosen screw (2).
- Feed out and remove the heat shield (3).



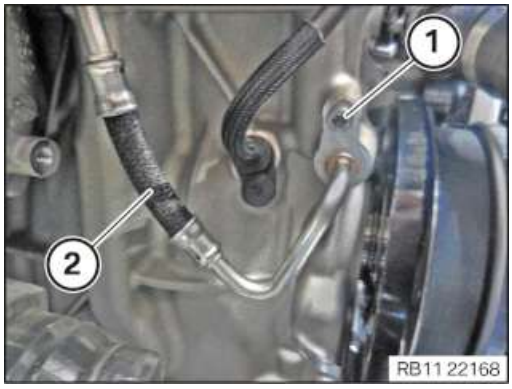
- Loosen screws (1).
- Feed out and remove the heat shield (2).



- Unlock and release the coolant return line (1) on the coolant pump (2) for the exhaust turbocharger.
- Catch and dispose of escaping coolant.

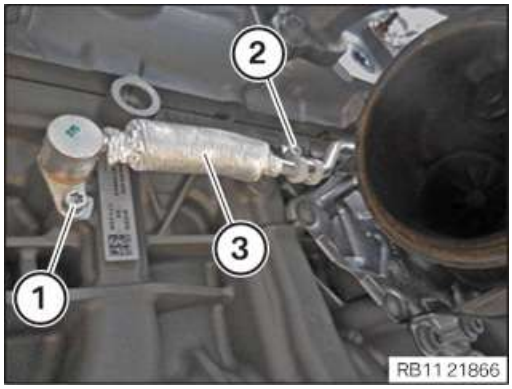


- Release screw (1) at coolant return line (2).

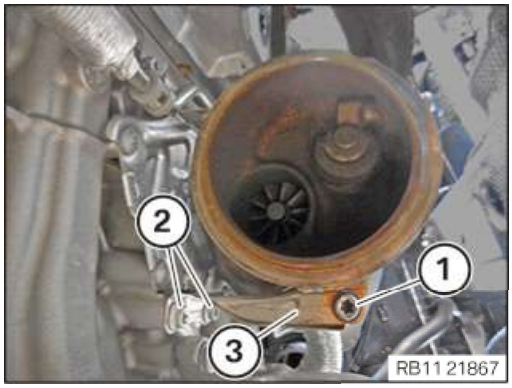


- Loosen screw (1).
- Guide out oil feed line (2) for the exhaust turbocharger and place it aside.
- Catch and dispose of emerging engine oil.

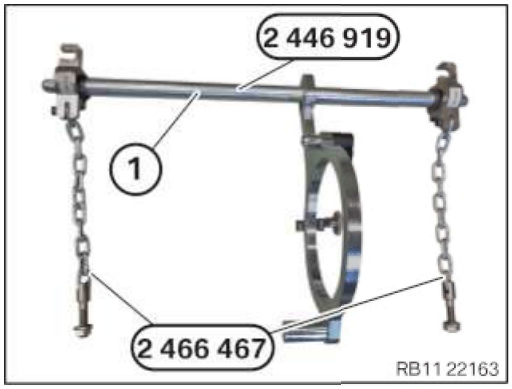
rdiagn.com



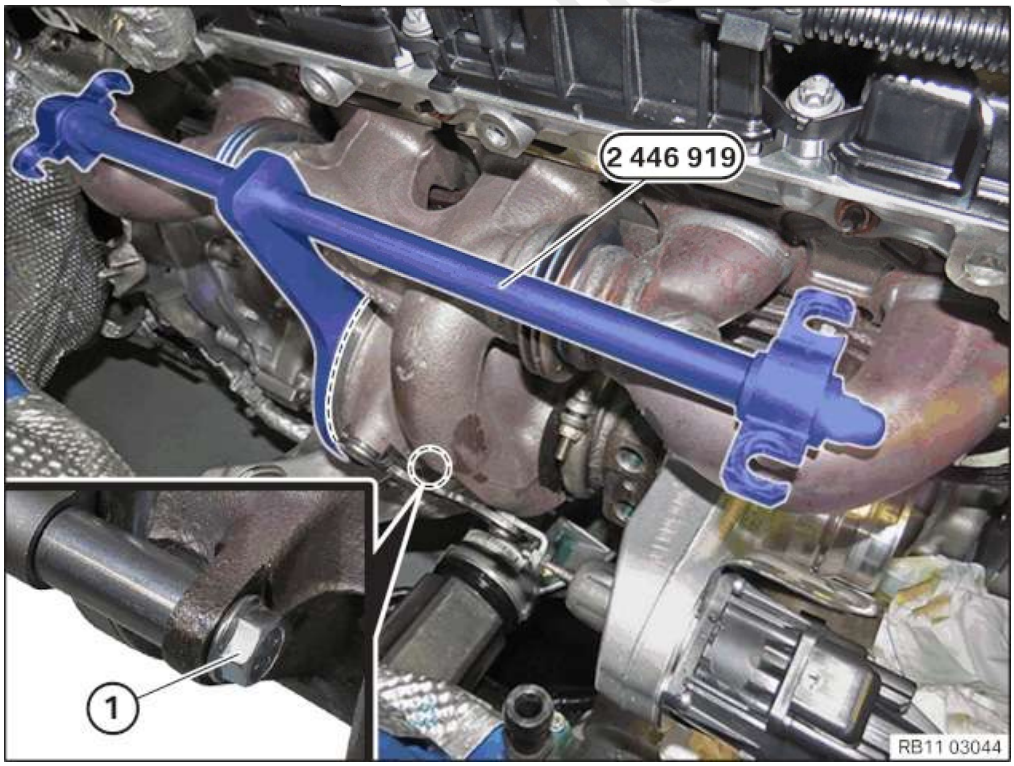
- Loosen screws (1) and (2).
- Guide the coolant feed line for exhaust turbocharger (3) from the crankcase and place it aside.
- Catch and dispose of escaping coolant.



- Loosen screws (1) and (2).
- Feed the support (3) out and remove.

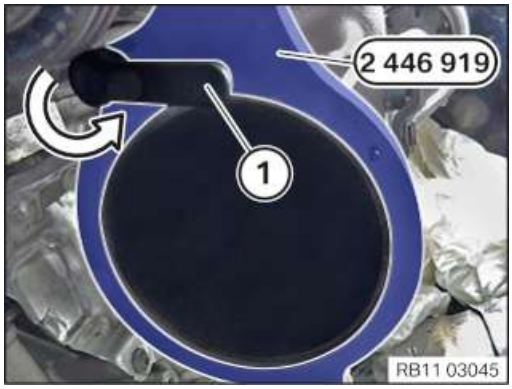


- Have the special tool 2 446 919 and the special tool 2 466 467 ready.



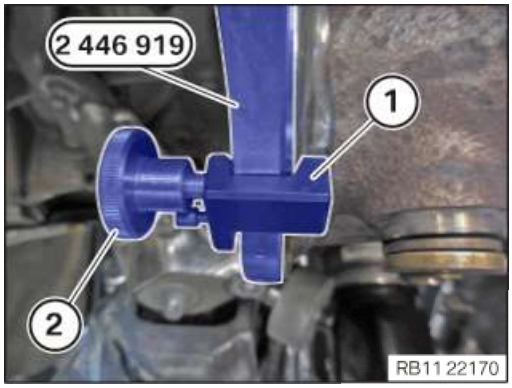
- Install the special tool 2 446 919 on the exhaust turbocharger and secure it with the bolt (1).
- Make sure that the special tool 2 446 919 is flush with the exhaust turbocharger in the **marked area**.

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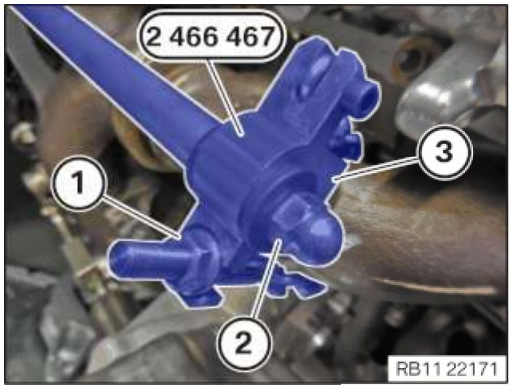
- Fix the special tool 2 446 919 by turning the clamping lever (1) in the **direction** of the arrow.

Note: The clamping lever that is shown in the graphic is already in its end position.

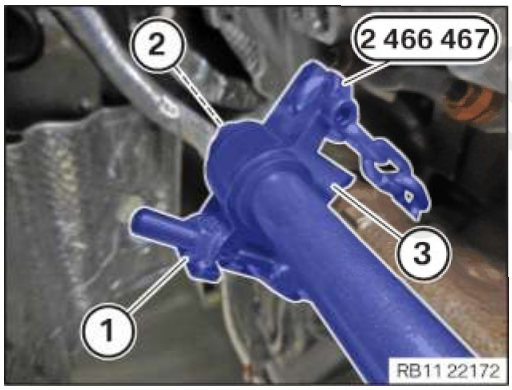


- Position the holder (1) and fasten it with the bolt (2).

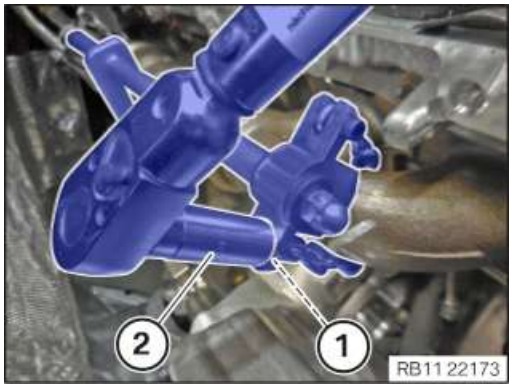
Note: The holder is used for the final mounting of the special tool 2 446 919.



- Tighten the nut (1) hand-tight.
- Tighten the nut (2) hand-tight.
- Ensure that the special tool 2 466 467 rests correctly on the exhaust turbocharger (3).



- Tighten the nut (1) hand-tight.
- Tighten the nut (2) hand-tight.
- Ensure that the special tool 2 466 467 rests correctly on the exhaust turbocharger (3).

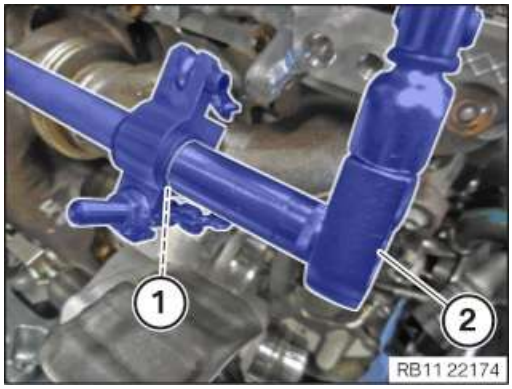


- Tighten the nut (1) using commercially available tools (2).

Special tool 2 466 467 to special tool 2 446 919

M8		Tightening torque	5 Nm

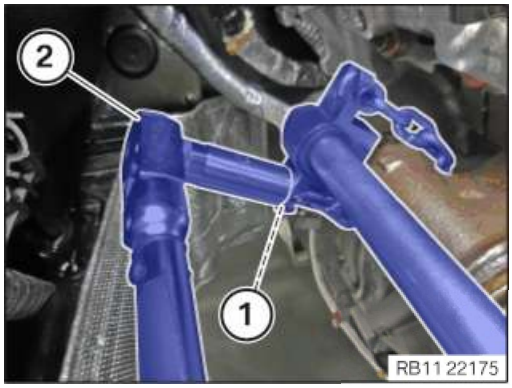
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- Tighten the nut (1) using commercially available tools (2).

Special tool 2 466 467 to special tool 2 446 919

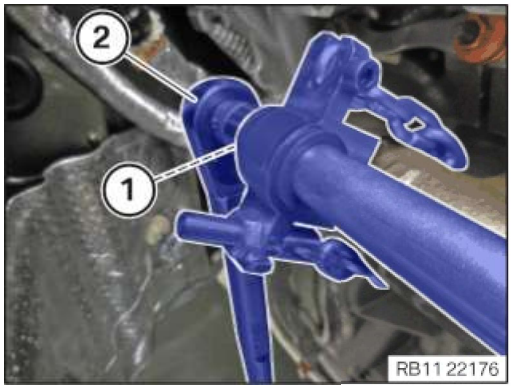
M8		Tightening torque	5 Nm



- Tighten the nut (1) using commercially available tools (2).

Special tool 2 466 467 to special tool 2 446 919

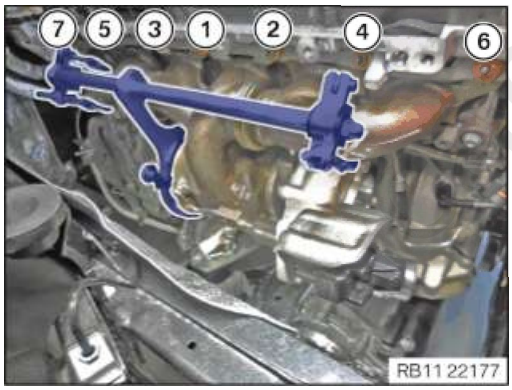
M8		Tightening torque	5 Nm



- Tighten the nut (1) using commercially available tools (2).

Special tool 2 466 467 to special tool 2 446 919

M8		Tightening torque	5 Nm



TECHNICAL INFORMATION

Exhaust manifold/exhaust turbocharger is not bolted to the underside, but clamped instead. When removing/replacing the exhaust manifold/exhaust turbocharger, the clamping strip remains screwed on.

- Unscrew the nuts in sequence (7) to (1).
- Secure exhaust turbocharger against falling down.



- Slide the slide rail (1) out and remove.



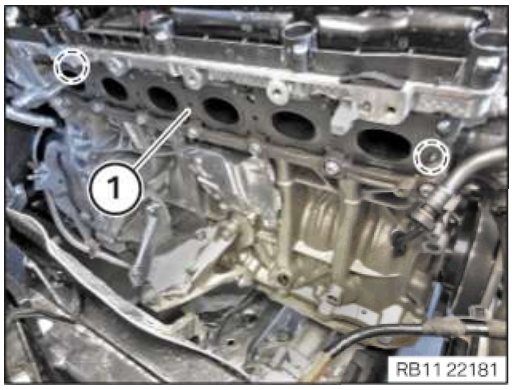
CAUTION

Heavy component.

Heavy components can lead to injury or damage.

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

- Carefully guide out and remove the exhaust turbocharger (1).
- Thermal compensating elements of the exhaust turbocharger (1) or exhaust manifold should **not** be bent or deformed.



- Feed out and remove seal (1) in the **marked area.**

31 – Remove the coolant return line for the exhaust turbocharger

RISK OF DAMAGE

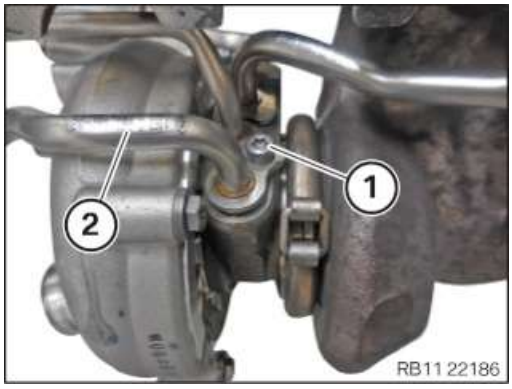
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

TECHNICAL INFORMATION

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



- Loosen screw (1).
- Feed the coolant return line (2) out and remove it.

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32 – Remove the oil feed line for the exhaust turbocharger

RISK OF DAMAGE

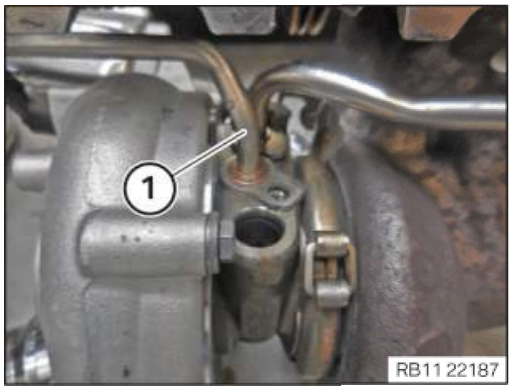
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

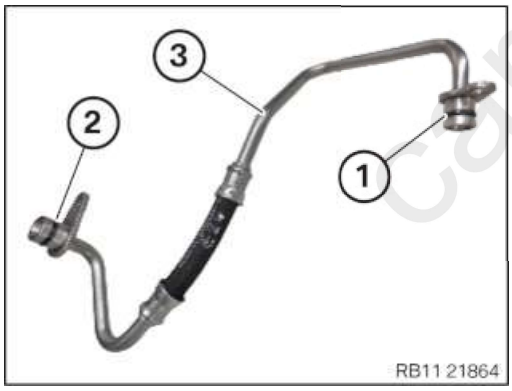
TECHNICAL INFORMATION

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



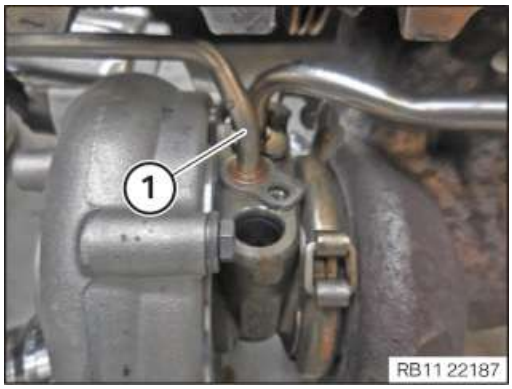
- Feed out and remove the oil feed line (1).

33 – Install the oil feed line for the exhaust turbocharger



- Renew sealing rings (1) and (2) on the oil feed line (3) for the exhaust turbocharger with the special tool 0 496 714 (00 9 030).

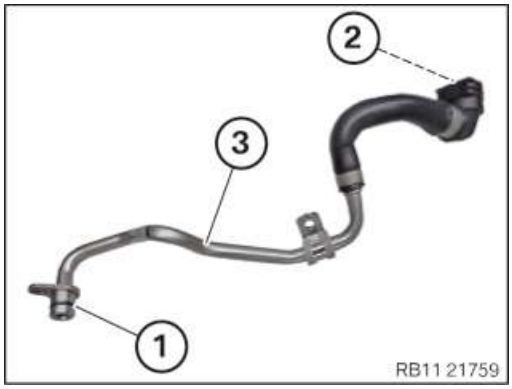
  Parts: Sealing ring



- Insert and install the oil feed line (1).

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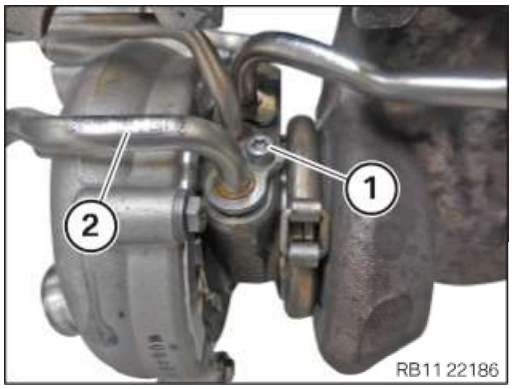
34 – Install the coolant return line for the exhaust turbocharger



- Renew sealing ring (1) on the coolant return line (3) with the special tool 0 496 714 (00 9 030).

  Parts: Sealing ring

- Check the sealing ring (2) on the coolant return line (3) for damage and if required, renew the coolant return line (3).



- Guide in and install the coolant return line (2).
- Tighten down screw (1).

Coolant return line/oil feed line to exhaust turbocharger

M6 x 12		Tightening torque	8 Nm

35 – Installing exhaust turbocharger

CAUTION

Heavy component.

Heavy components can lead to injury or damage.

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

RISK OF DAMAGE

Damage to the electrical wastegate valve controller.

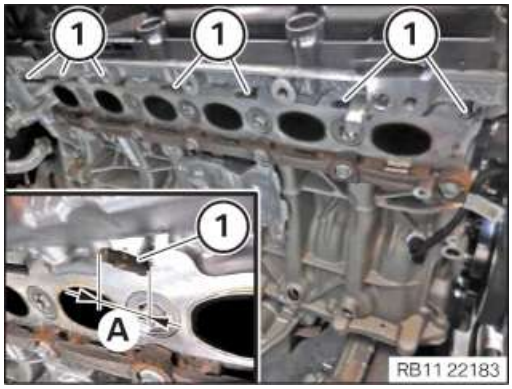
The electrical wastegate valve controller may be damaged as a result of the excessive forces required when removing and installing a jammed exhaust turbocharger.

- Do not pull on the electrical wastegate valve controller.
- Apply force to the turbine housing and exhaust manifold only.
  - Do not pull on the compressor housing.

TECHNICAL INFORMATION

Do not damage the thermal compensating elements. The disassembly and installation including intermediate storage of the exhaust turbocharger is only permitted with mounted special tool 2 466 919 .

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- Check screw-in depth (A) of the upper stud bolt (1) .

Screw-in depth of upper stud bolt on cylinder head

Dimension A	30 mm

- If necessary, screw the stud bolts in further or unscrew.



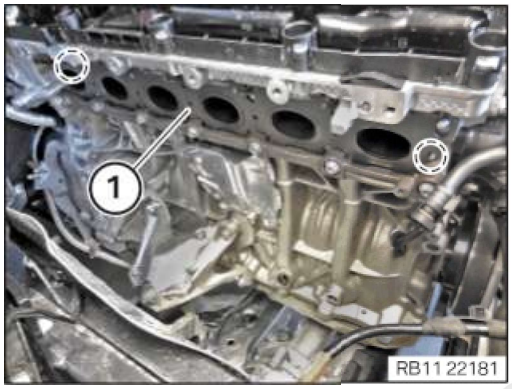
RISK OF DAMAGE

Damage to the surface.

The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

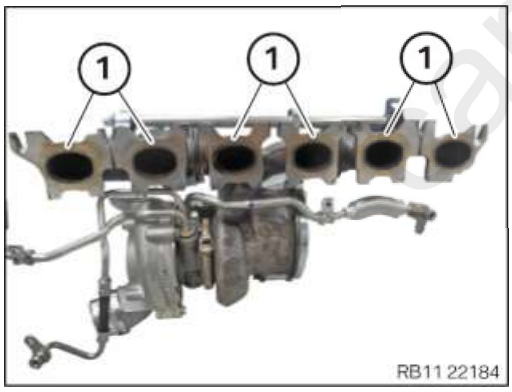
- Clean the sealing surfaces (1) on the cylinder head using special tool 0 495 102 (11 4 470).



- Renew the gasket (1).

  Parts: Gasket

- Guide seal (1) into the **marked area** and install it.



RISK OF DAMAGE

Damage to the surface.

The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

- Clean the sealing surfaces (1) on the exhaust turbocharger using the special tool 0 495 102 (11 4 470).

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CAUTION

Heavy component.

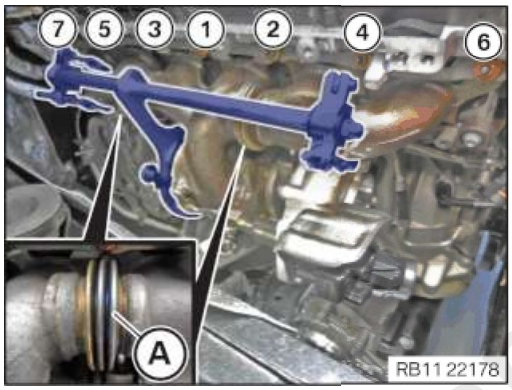
Heavy components can lead to injury or damage.

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

- Insert and install the exhaust turbocharger (1).
- Thermal compensating element of the exhaust turbocharger (1) or the exhaust manifold should **not** be bent or deformed.



- Feed in and install the sliding rail (1).
- Install sliding bar (1) so that the part number is **visible**.

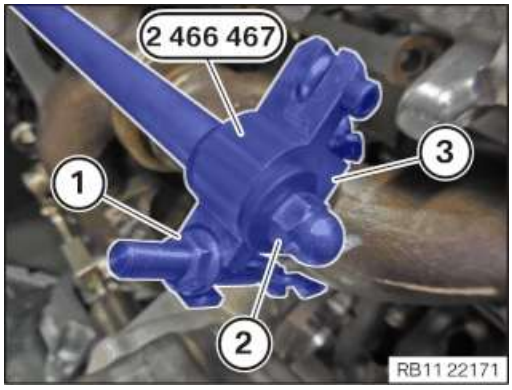


- Tighten nuts in sequence (1) to (7).

Exhaust manifold to cylinder head

Flange nutM7	*Replace flange nuts*	1. Jointing torque	10 Nm
		2. Jointing torque	10 Nm
		3. Jointing torque	16 Nm
		4. Jointing torque	16 Nm
		5. Jointing torque	16 Nm

- Make sure the thermal compensating elements (A) have **not** been damaged.

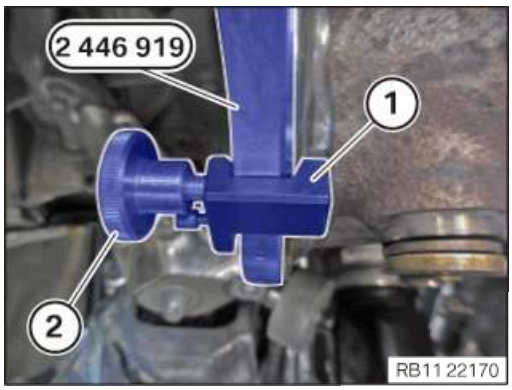


- Loosen nuts (1) and (2).
- Pull out special tool 2 466 467 at the exhaust turbocharger (3) and remove.

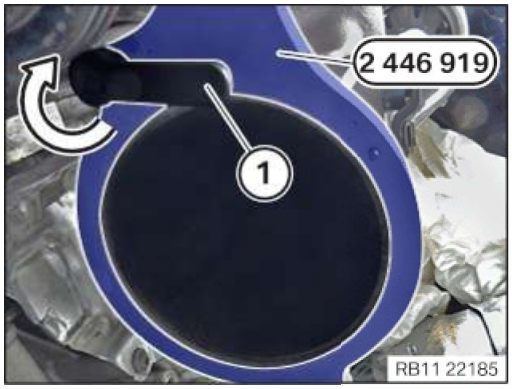
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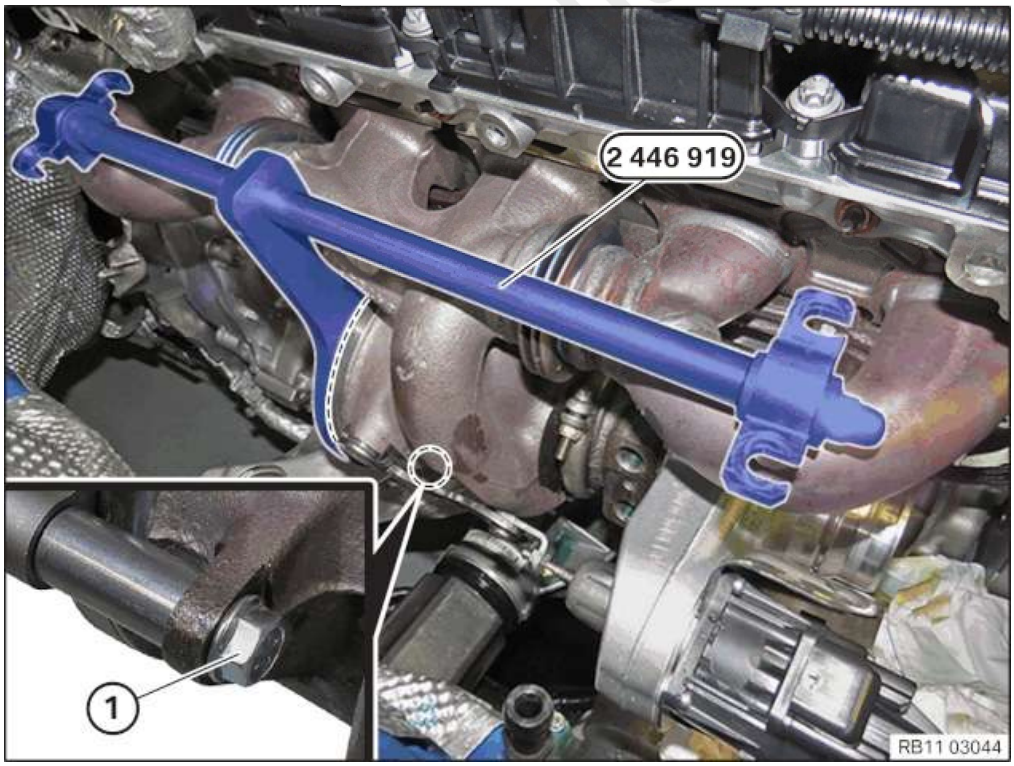
- Release the nut (1) and (2).
- Pull out special tool 2 466 467 at the exhaust turbocharger (3) and remove.



- Loosen screw (2).
- Feed out the bracket (1) of the special tool 2 446 919 and set it aside.

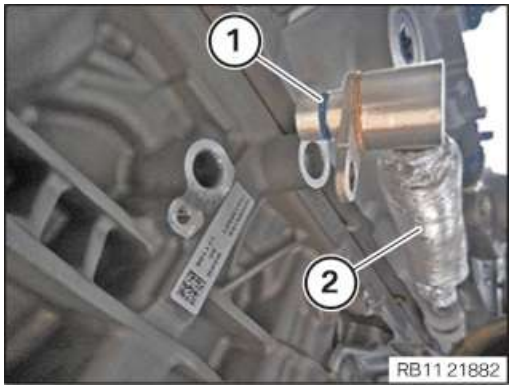


- Release clamping lever (1) of the special tool 2 446 919 in the **direction of arrow**.



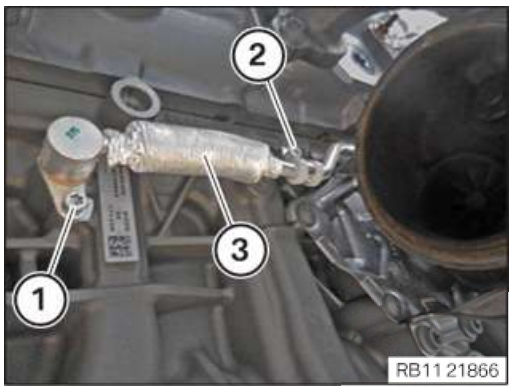
- Loosen screw (1).
- Pull out special tool 2 446 919 at the exhaust turbocharger and remove.

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- Replace sealing rings (1) at the coolant feed line (2) for the exhaust turbocharger using the special tool 0 496 714 (00 9 030).

  Parts: Sealing ring



- Feed in and install coolant feed line for the exhaust turbocharger (3).
- Tighten down screw (1).

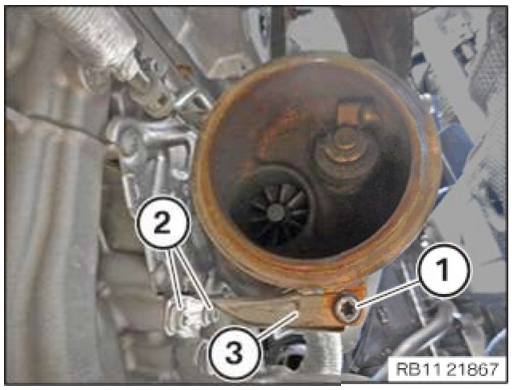
Coolant feed line to crankcase

M6X12		Tightening torque	8 Nm

- Tighten down screw (2).

Coolant feed line to crankcase

M6X12		Tightening torque	8 Nm



- Renew screws (1) and (2).

  Parts: Bolts
- Feed in and install the support (3).
- Tighten the screws (2).

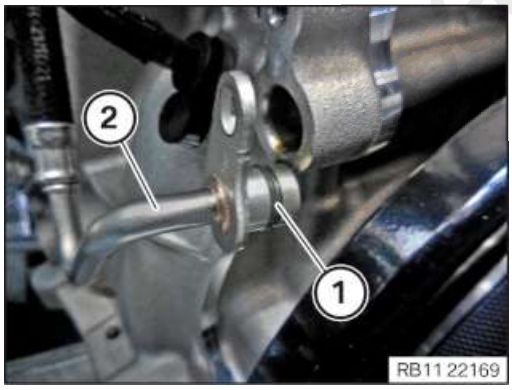
Exhaust turbocharger support to crankcase

M8 x 20	Renew screws.	19 Nm

- Tighten the screws (1).

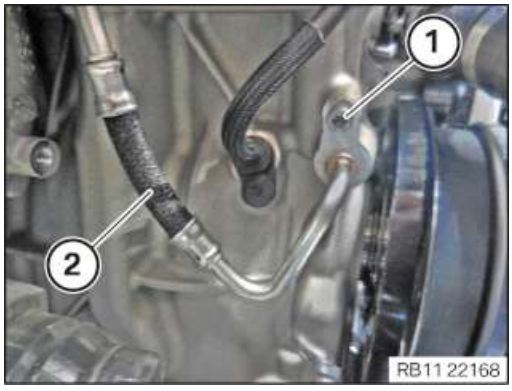
Exhaust turbocharger to support

M8 x 25	Renew screw.	19 Nm



- Replace sealing rings (1) at the oil feed line (2) for the exhaust turbocharger using the special tool 0 496 714 (00 9 030).

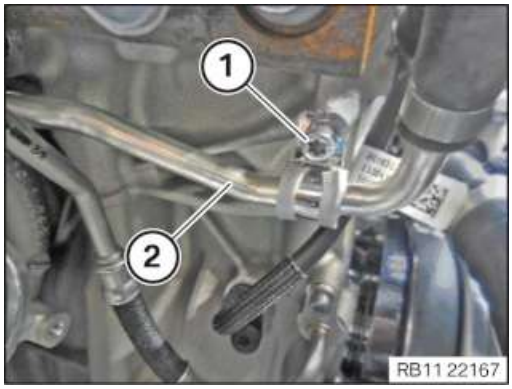
  Parts: Sealing ring



- Feed in and install the oil feed line (2) for the exhaust turbocharger.
- Tighten down screw (1).

Oil feed line for exhaust turbocharger to crankcase

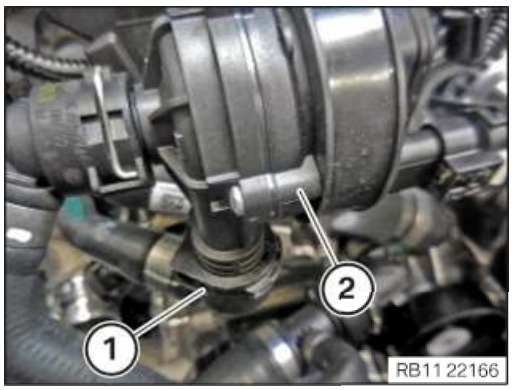
M6 x 12	Replace sealing ring.	Tightening torque	8 Nm



- Tighten screw (1) at the coolant return line (2) .

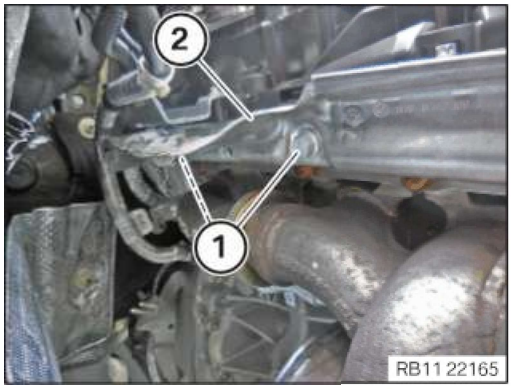
Coolant return line holder bracket to crankcase

M6X12		Tightening torque	8 Nm



- Connect coolant return line (1) to the coolant pump (2) for the exhaust turbocharger and lock.

  The coolant return line (1) must audibly engage.



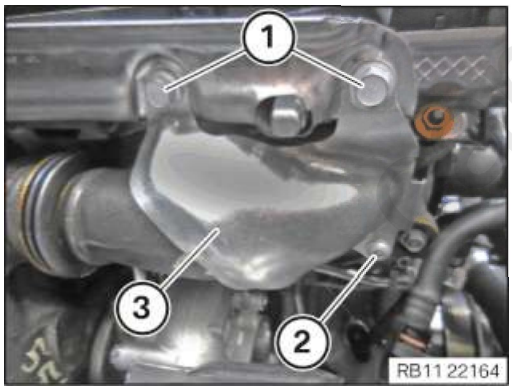
- Feed in and install the heat shield (2).
- Renew screws (1).

  Parts: Bolts

  Tighten the screws (1).

Heat shield to cylinder head

M8X12	Renew screws.	Tightening torque	19 Nm



- Feed in and install the heat shield (3).
- Renew screws (1).

  Parts: Bolts

  Tighten the screws (1).

Heat shield to cylinder head

M8X12	Renew screws.	Tightening torque	19 Nm

- Renew the screw (2) .

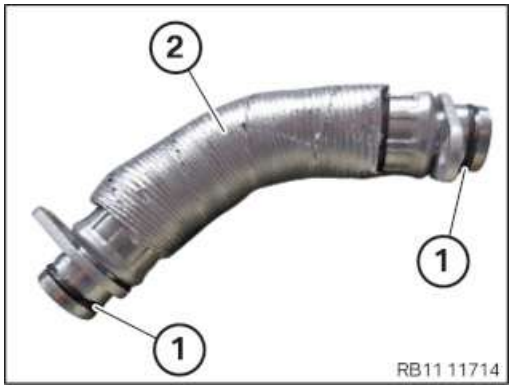
  Parts: Screw

  Tighten down screw (2).

Heat shield to clamping strip

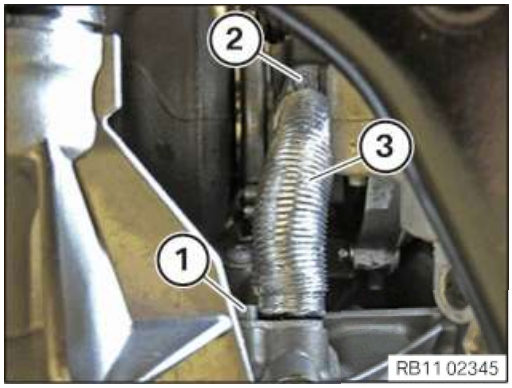
M6X16	Renew screw.	Tightening torque	8 Nm

36 – Installing the oil return line for the exhaust turbocharger



- Renew the sealing rings (1) on the oil return line (2).

  Parts: Sealing ring



- Feed in and install the oil return line (3).
- Tighten down screw (2).

Oil return line to turbocharger

M6 x 12		8 Nm

- Tighten down screw (1).

Oil return line to crankcase

M6 x 12		8 Nm

37 – Install catalytic converter



- Renew the V-clip (1).

  Parts: V-band clamp



- Renew the gasket (1).

  Parts: Gasket



- Feed in and install catalytic converter.
- Lock clamp (1).

  The clamp (1) must engage audibly.

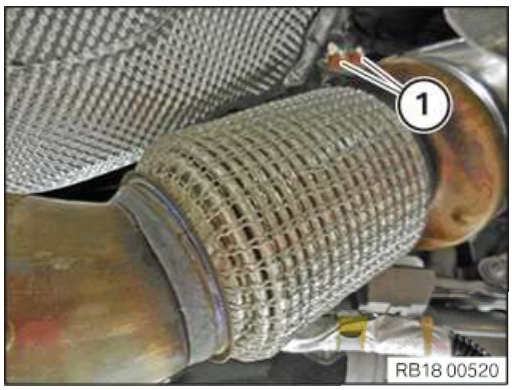
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- Tighten V-band clamp (1).

Catalytic converter to turbocharger

V-band clamp	Replace V-band clamp.	Tightening torque	19 Nm

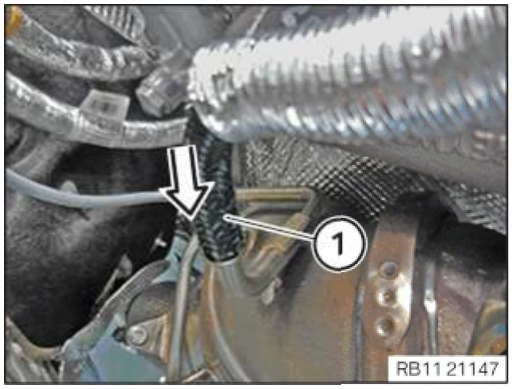


- Renew nuts (1).

  Parts: Nuts
- Tighten nuts (1).

Catalytic converter to holder

M8 nut	Renew nut.	Tightening torque	28 Nm



- **If installed: Connect pressure hose.**

  Renew pressure hose (1).

  Parts: Pressure hose
- Connect the pressure hose (1) in direction of arrow to the limit position.

38 – Installing the complete exhaust system

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.

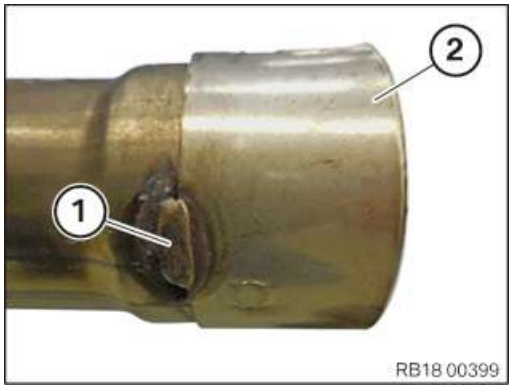
CAUTION

Heavy component.

Heavy components can lead to injury or damage.

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

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CAUTION

Swarf resulting from sawing or grinding components.

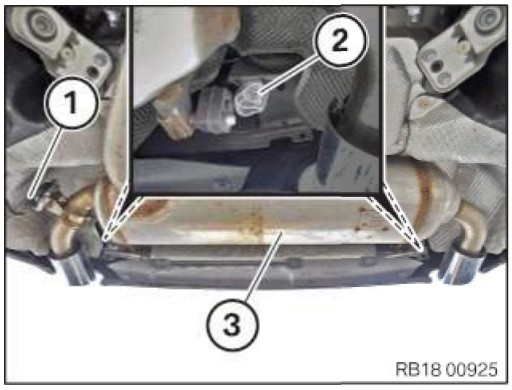
Danger of injury!

- 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).

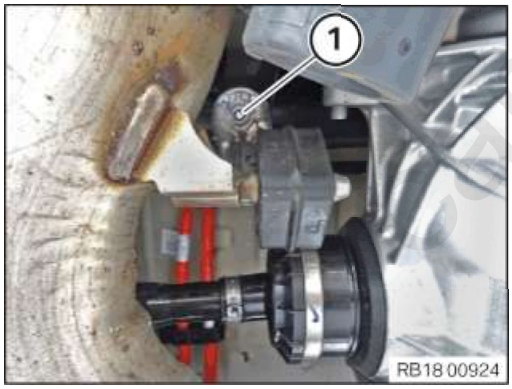
  Parts: Nuts
- Tighten nuts (2).

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

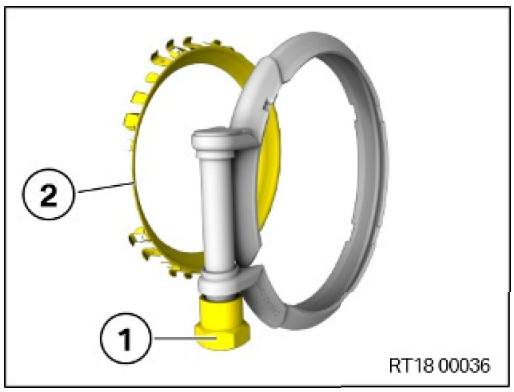
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

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

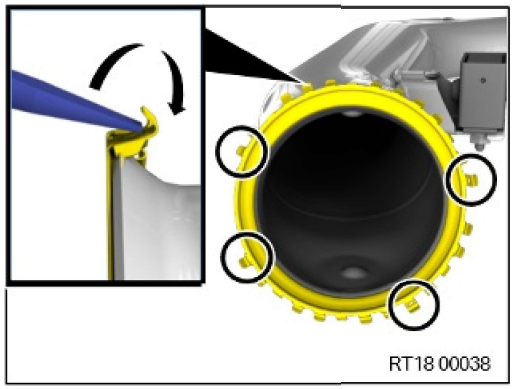


- **Equipment specification 2 (V-clips)**

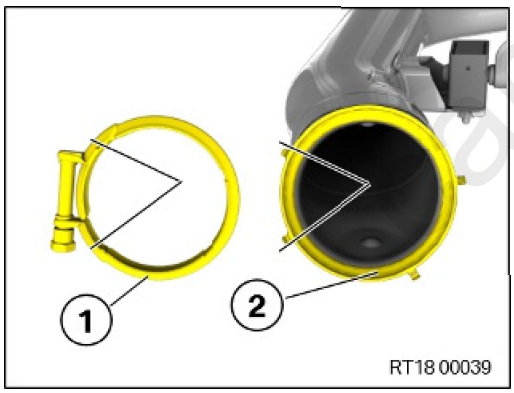
  Renew V-band clamp.

  Parts: V-band clamp

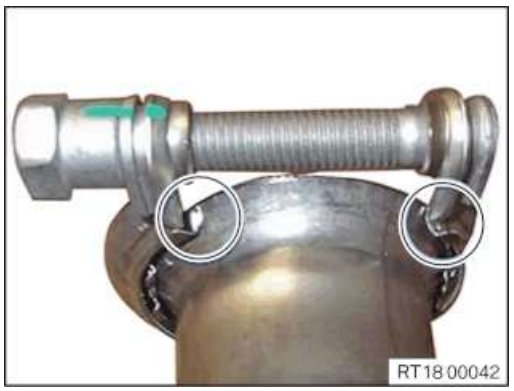
  Unscrew the nut (1) and remove the sealing ring (2).



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

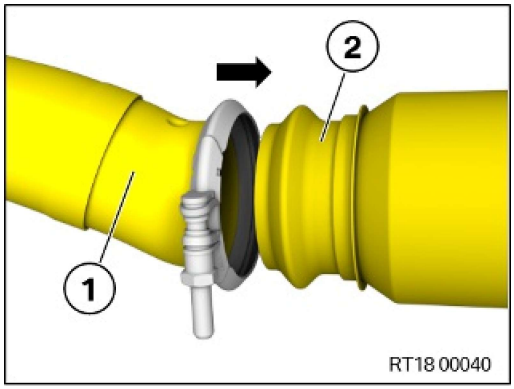


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

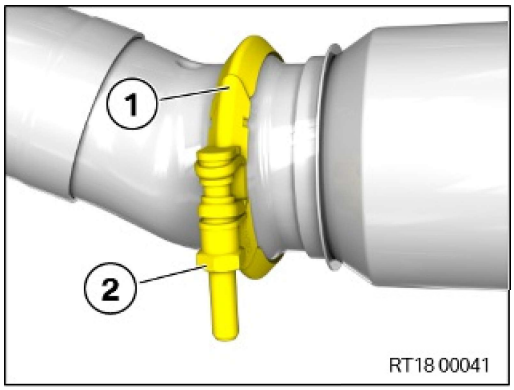


- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.

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

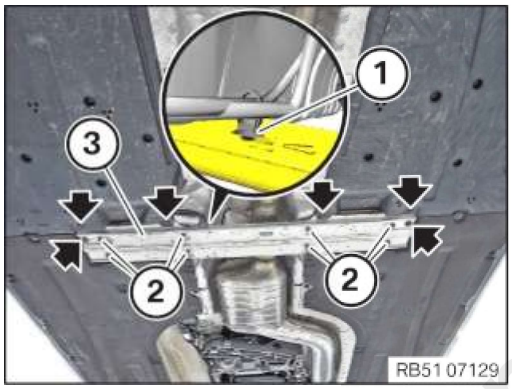


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

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 – Install the monitoring oxygen sensor

TECHNICAL INFORMATION

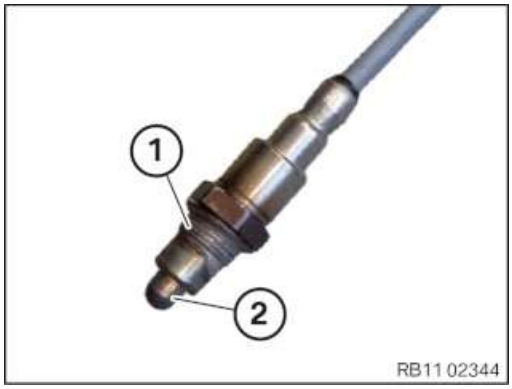
New oxygen sensors are to be greased lightly and evenly on the thread.

For oxygen sensors that are reused, the following should be observed:

Lightly and evenly grease the oxygen sensor only on the thread. Do not clean and grease that part of the oxygen sensor which protrudes in the exhaust branch (sensor ceramics).

For additional information see: 11 00 ... Overview of consumables in Electronic Parts Catalogue

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- Prepare the oxygen sensor.

  Do not damage the sensor ceramics.

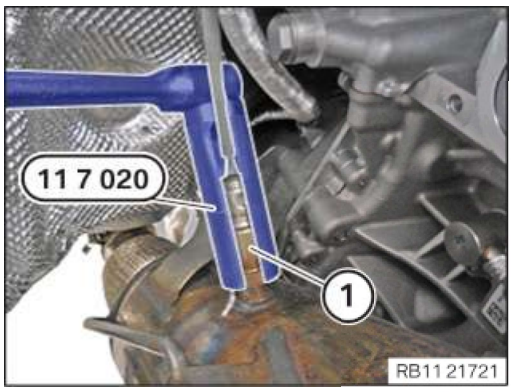
  (1) = Thread

  (2) = Sensor ceramics

- Grease the thread (1) of the Lambda monitoring oxygen sensor thinly and evenly.

Expendable materials

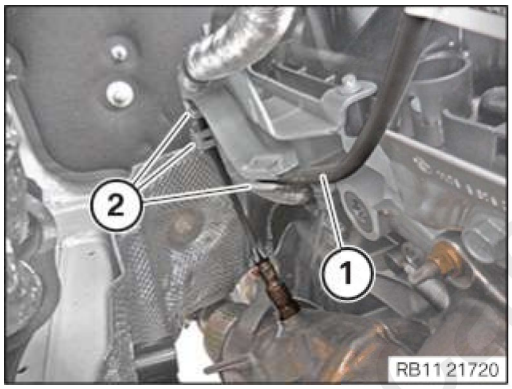
Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



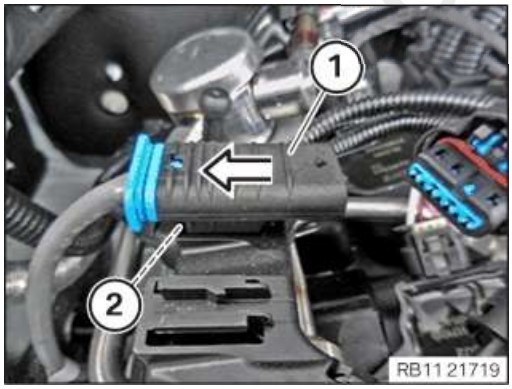
- Feed in the monitoring oxygen sensor (1) and install.
- Tighten monitoring oxygen sensor (1) using special tools 0 493 751 (11 9 150) and 0 491 075 (11 7 030) .

Monitoring oxygen sensor to catalytic converter

M18X1.5		Tightening torque	50 Nm



- Guide monitoring oxygen sensor line (1) into holder (2) and install it.



- Insert and install the connector (1) in the **direction of arrow**.
- Ensure that the lock (2)engages audibly.

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

41 – Install the front oxygen sensor

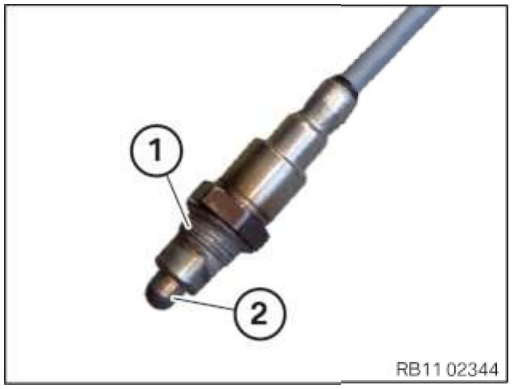
TECHNICAL INFORMATION

New oxygen sensors are to be greased lightly and evenly on the thread.

For oxygen sensors that are reused, the following should be observed:

Lightly and evenly grease the oxygen sensor only on the thread. Do not clean and grease that part of the oxygen sensor which protrudes in the exhaust branch (sensor ceramics).

For additional information see: 11 00 ... Overview of consumables in Electronic Parts Catalogue



- Prepare the oxygen sensor.

  Do not damage the sensor ceramics.

  (1) = Thread

  (2) = Sensor ceramics
- Apply a thin and even coat of grease to the thread (1) of the front oxygen sensor.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

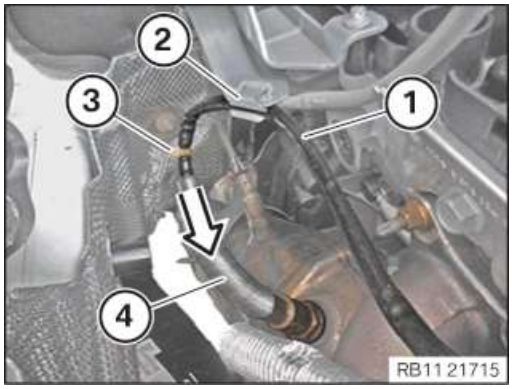


- Screw the control sensor (1) in and tighten it with the special tool .

Front oxygen sensor to catalytic converter

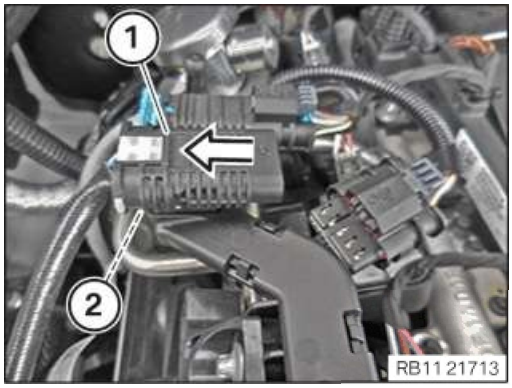
M18X1.5		Tightening torque	50 Nm

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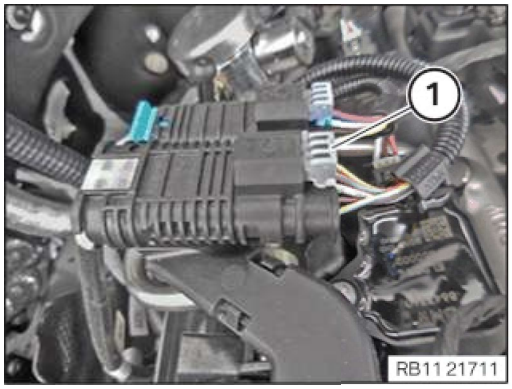


- Guide in the heat protection (4) in the **direction of arrow** and install.
- Renew the cable straps (3).

  Parts: Cable strap
- Guide in and install the cable strap (3).
- Feed in and install the line of the front oxygen sensor (1) in the holder (2).

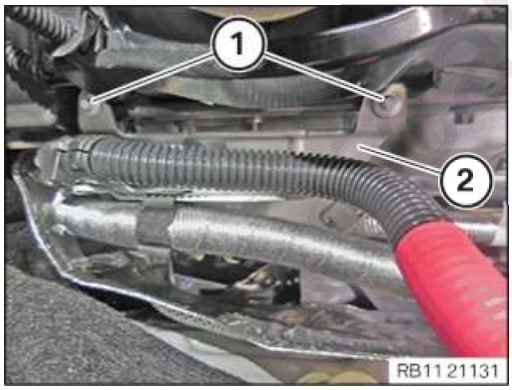


- Insert and install the connector (1) in the **direction of arrow**.
- Ensure that the lock (2)engages audibly.



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

42 – Secure holder for positive battery cable



CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

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

- Guide in and install holder (2) of the positive battery cable.
- Tighten the screws (1).

Holder, positive battery cable to cylinder head cover

6X18		Tightening torque	6 Nm

43 – Install engine ventilation line adapter with heating element on the exhaust turbocharger

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RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

RISK OF DAMAGE

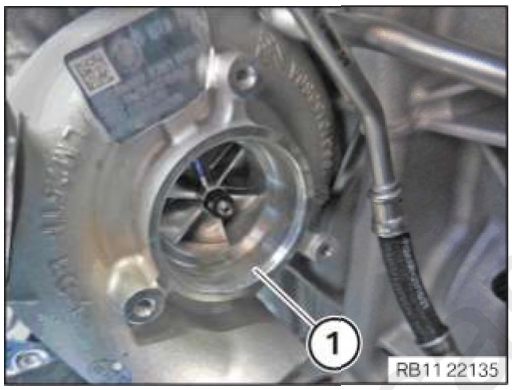
Damage to the surface.

The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

TECHNICAL INFORMATION

The sealing surfaces must be free from oils, grease and cleaning agents.



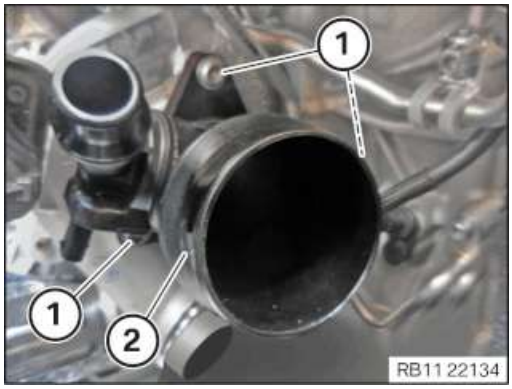
- Clean sealing surface (1).



- Renew the seal (1) using the special tool 0 496 714 (00 9 030).

  Parts: Gasket

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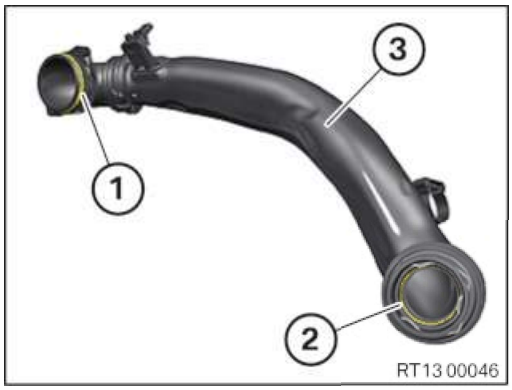


- Feed in and install connecting branch with heating element (2) on exhaust turbocharger.
- Tighten the screws (1).

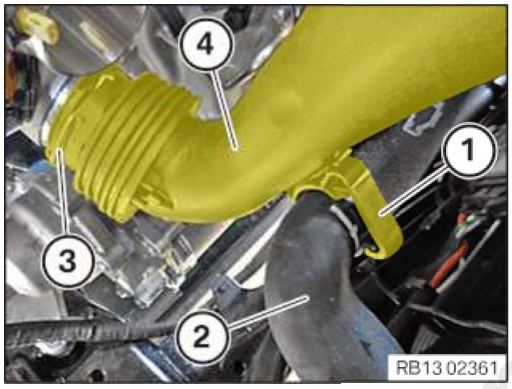
Engine ventilation line adapter with heating element to exhaust turbocharger

M6x26 screw		Tightening torque	8 Nm

44 – Install charge air line

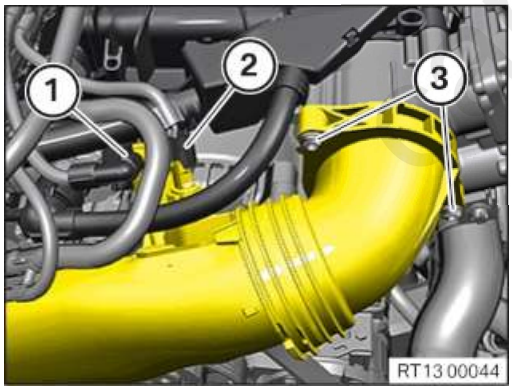


- Check the sealing ring (1) on the charge air line (3) for damage and renew it with the special tool 0 496 714 (00 9 030), if necessary.
- Check the sealing ring (2) on the charge air line (3) for damage and renew it with the special tool 0 496 714 (00 9 030), if necessary.



- Insert and install charge air line (4).
- Lock clamp (3).

  The clamp (3) must engage audibly.
- Insert and install the coolant hose (2).
- Lock clamp (1).



- Tighten the screws (3).

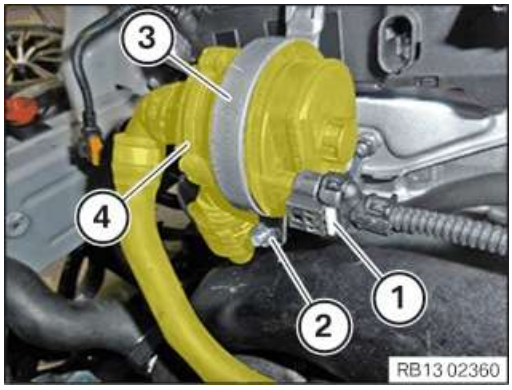
Charge air line to throttle valve

M6x30		Tightening torque	8 Nm

- Connect connectors (2) and lock.

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

  The connector (1) must engage audibly.



- Insert and position the additional coolant pump (4).
- Insert and position the 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.

45 – Installing clean air pipe

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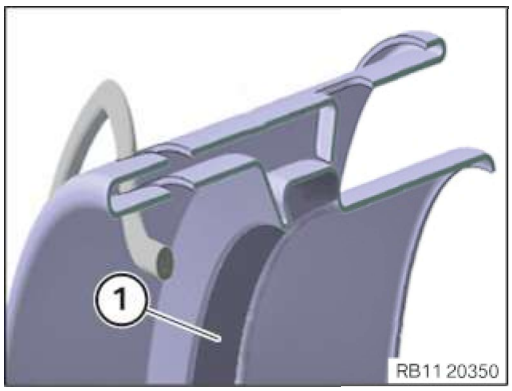


- Check the seal (1) for damage and renew if necessary.

▶ **Replace damaged gasket**

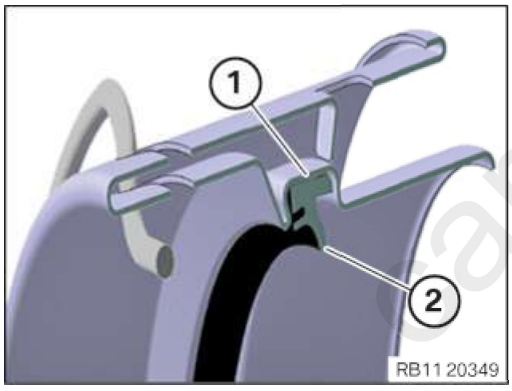
TECHNICAL INFORMATION

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.



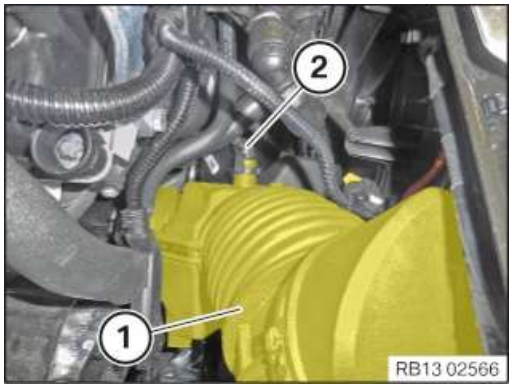
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

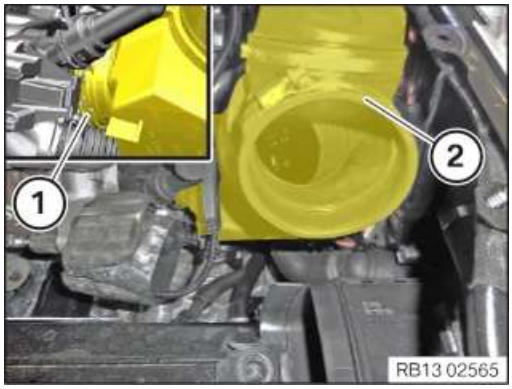
- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).



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

  The engine ventilation line (2) must engage audibly.

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

  The clamp (1) must engage audibly.



- Secure clamps (1).

46 – Install engine ventilation line

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.

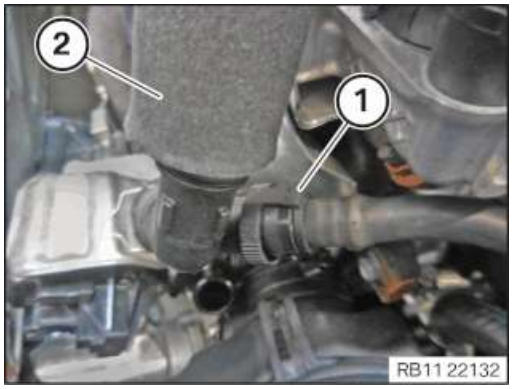
TECHNICAL INFORMATION

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



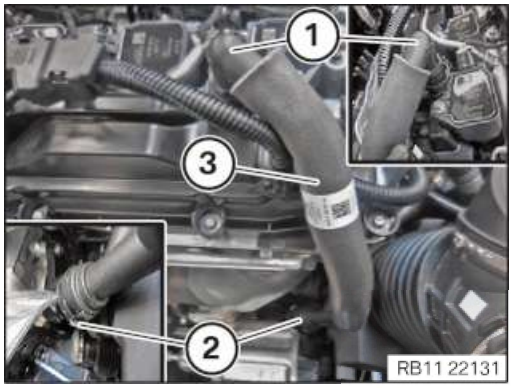
- Check sealing ring (1) for damage and renew tank ventilation line if necessary.

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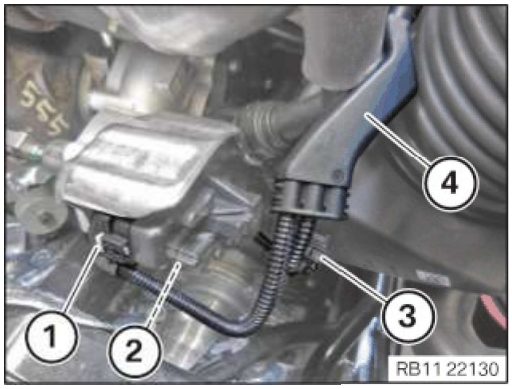


- Insert and position the engine ventilation line (2).
- Insert and install the tank ventilation line (1).

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

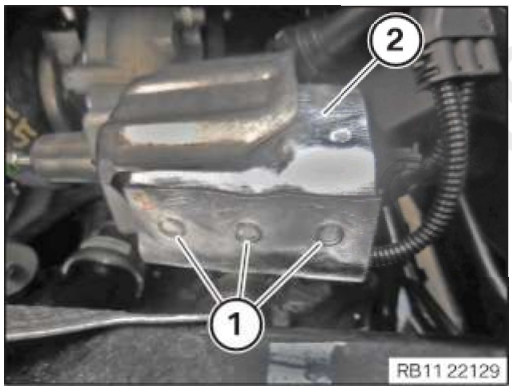


- Insert and install the engine ventilation line (3).
- Make sure you can hear the locks (1) and (2) engage.



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

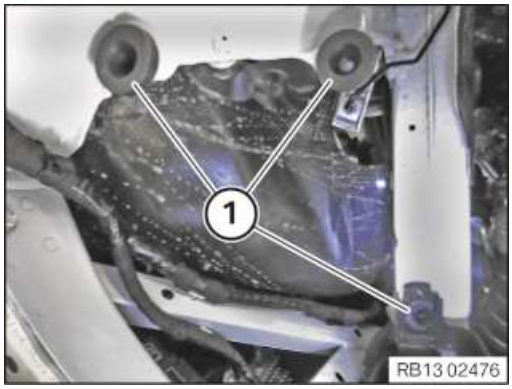
  The connectors (1) and (2) must audibly engage.
- Secure clamps (3).



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

  Locks (1) must engage audibly.

47 – Installing intake silencer housing



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

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

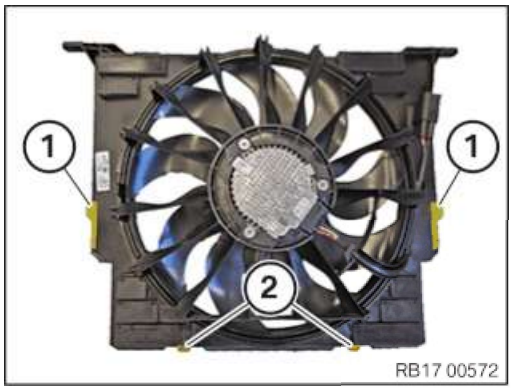
Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

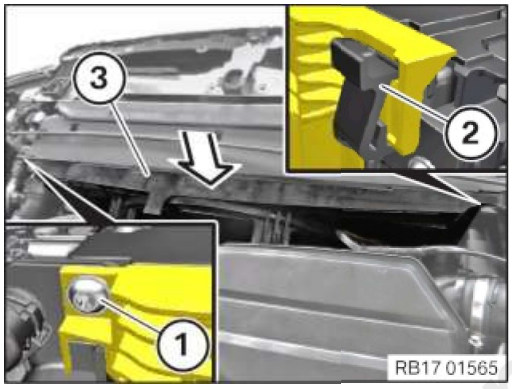
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

48 – Install fan cowl



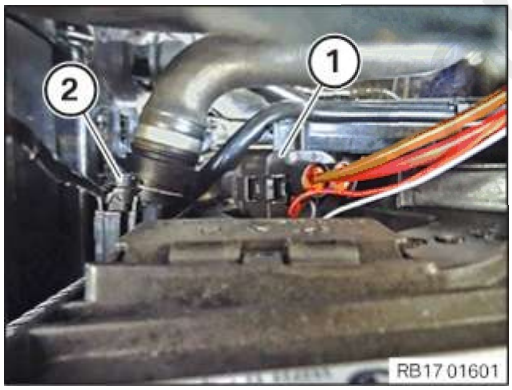
- Feed guides (1) into the radiator.
- Feed guides (2) into the charge air cooler.



- Guide in and install fan cowl (3) **carefully** in the direction of the arrow.
- Ensure that the lock (2)engages audibly.
- Tighten down screw (1).

Fan cowl with electric fan on radiator

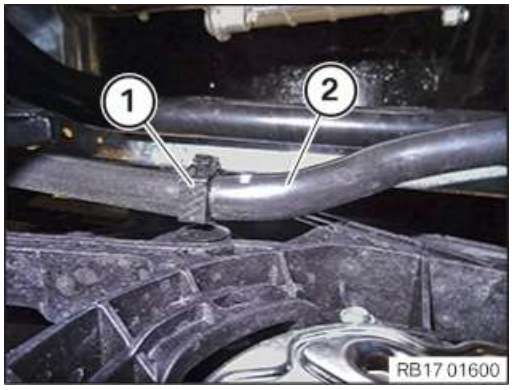
TS6x20		Tightening torque	6,5 Nm



- Connect connectors (2) and lock.

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

  The connector (1) must engage audibly.

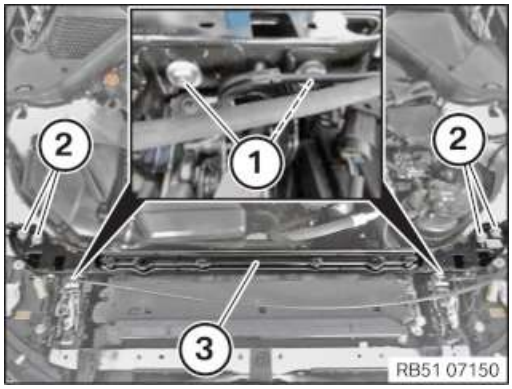


- **If installed:** Secure the transmission oil line (2).

  Insert and install the transmission oil line (2).

  Lock holder (1).

49 – Install the rear top cross connection



- Guide in and position the top rear cross connection (3).
- Tighten the screws (1).

Top rear cross connection to bonnet catch support

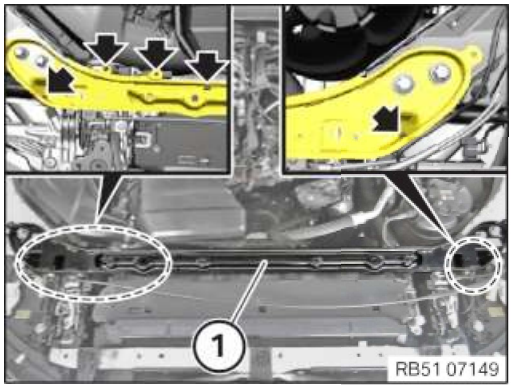
Flat-head screw M6x20		Tightening torque	11,8 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

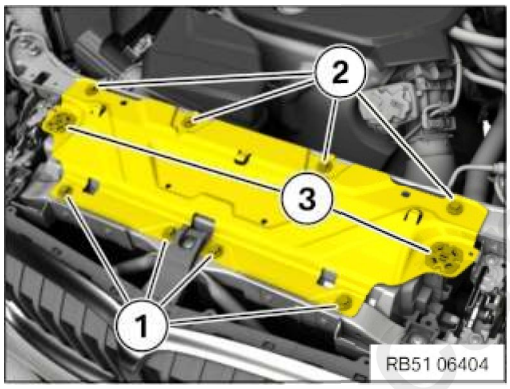
Rear top cross connection to wheel arch carrier support

M10x20 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °



- Secure the clips (arrows) in the marked areas to the top rear cross connection (1).

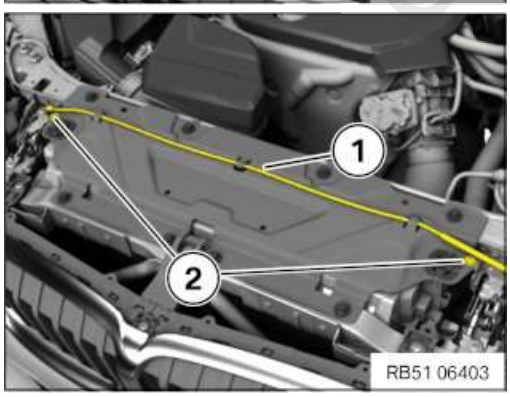
50 – Installing the top cross connection



- Set and position upper cross connection with holders (3) from above.
- Tighten down screws (1) and (2).

Cross connection, top

M8x20		Tightening torque	28 Nm



- Tighten down screws (2).

Cross connection, top

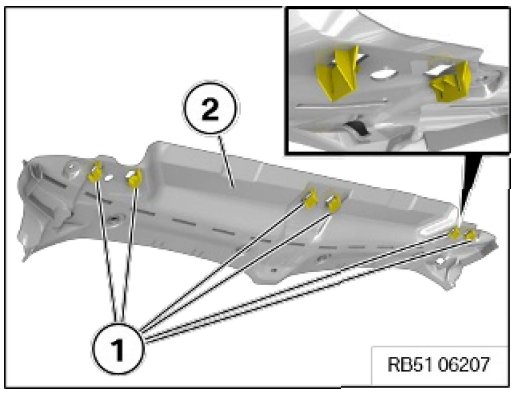
M6x20		Tightening torque	11,8 Nm

- Attach Bowden cable (1) on the upper cross connection.



- Clip in the housing for the coupling of the Bowden cables (1).

51 – Installing cover for engine compartment centre



Check

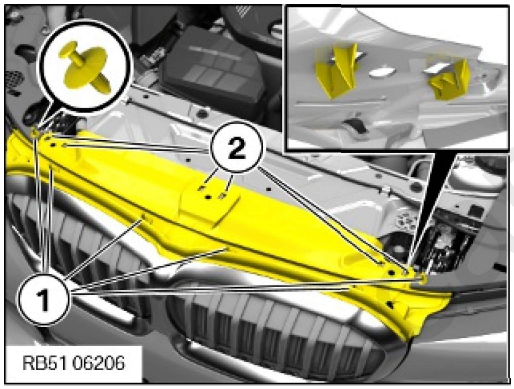
- Check latch mechanisms (1) of cover for engine compartment centre (2) for damage.

Result

» The latch mechanism (1) is damaged.

Measure

- Renew cover for engine compartment centre (2).



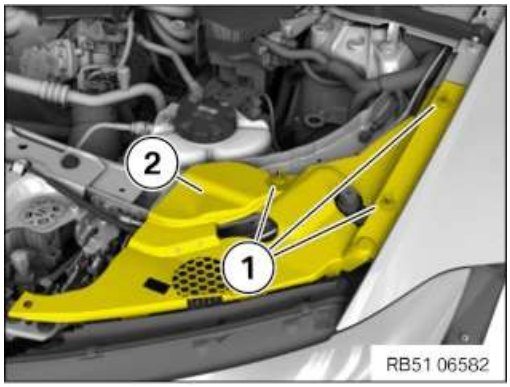
- Guide in the cover for the engine compartment centre from the rear and position it.
- Clip in the cover for the engine compartment centre with latch mechanisms (2).
- Mount all expanding rivets (1).

52 – Install the cover in the engine compartment at top left and right partially

NOTICE

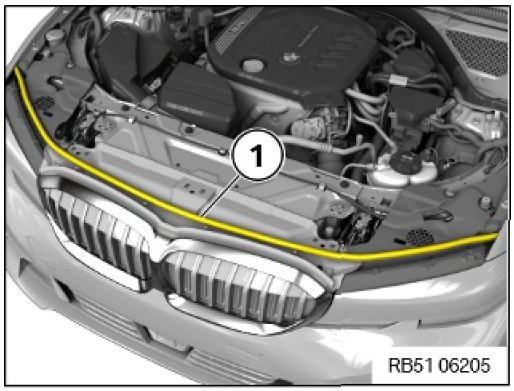
Description is for left component only. Procedure on the right side is identical.

▸ **Installing the cover in the engine compartment on top partially**



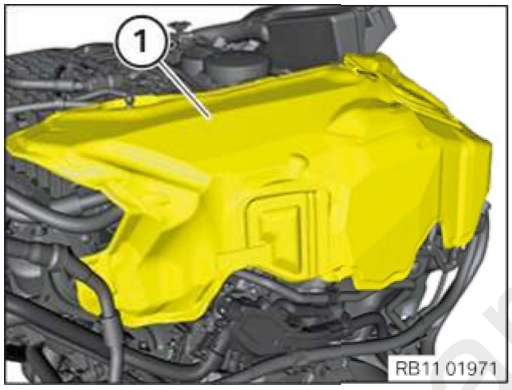
- Install the cover in the engine compartment on top (2).
- Secure expanding rivet (1).

53 – Install the seal for the front bonnet



- Position the bonnet seal(1) and connect it on the mounting on the bumper and on the headlights.

54 – 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.

55 – Install the seal for the bonnet

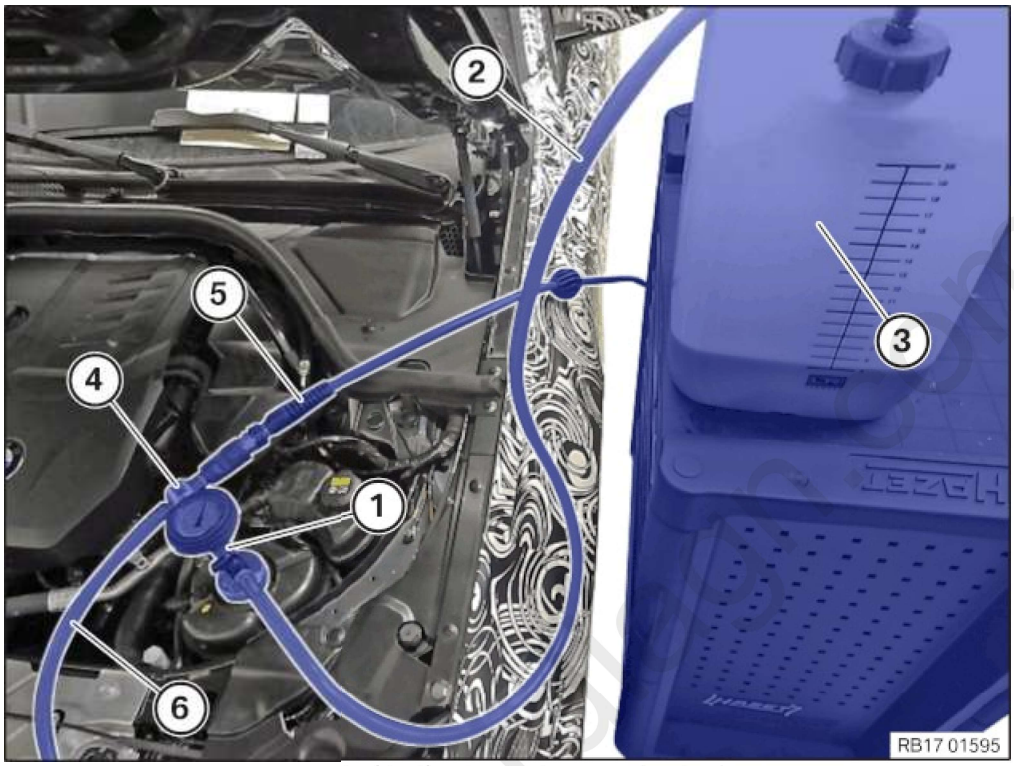
rdiagn.com



- 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.

56 – Fill the high-temperature cooling system with the vacuum filler device

Vacuum filler device



Vacuum filler device - connected to the coolant expansion tank

1 Vacuum filler device with pressure gauge and shutoff valves

2 Filling hose

3 Fluid tank with coolant

4 Venturi nozzle

5 Compressed air connection (maximum of 6 bar)

6 Out-going hose (lead out-going hose into a collecting vessel)

Prerequisite

The coolant expansion tank for the cooling system must be empty. The fluid tank of the vacuum filler device must have a sufficient quantity of premixed coolant, 1 l to 2 l more than the specified capacity for the vehicle. The fluid tank of the vacuum filler device must be positioned at the same height as the coolant expansion tank. The compressed air connection must have a pressure of 6 bar. Ignition is switched off.

TECHNICAL INFORMATION

Follow notes for repair work on the cooling system.

For additional information see:

Main group 17

17 00 ... Notes for working on the cooling system

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

Mixing different coolants is not permitted.

TECHNICAL INFORMATION

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

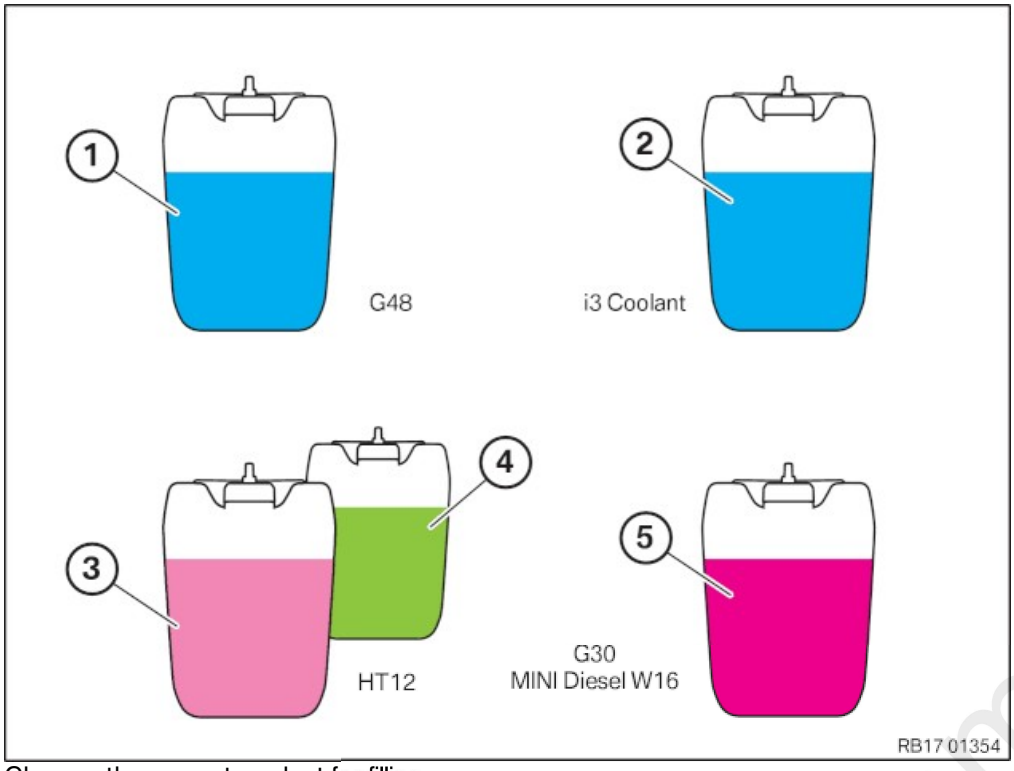
TECHNICAL INFORMATION

Make sure that the ignition (terminal 15) is switched off prior to creating the vacuum with the vacuum filler device.

▸ **Observe the coolant type**

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Coolant in the vacuum filler device container



Choose the correct coolant for filling

A vehicle must be filled with the coolant with which it is delivered ex works

1. G48 (Blue) G48 must not be mixed with the i3Coolant or the G30 MINI diesel fuelW16.

2. i3 coolant (blue) is used only for the i3 heater circuit. i3 coolant must not be filled in the other coolant circuits or mixed with the other coolants.

3. HT12 (Pink) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

4. HT12 (Green) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

5. G30 (Pink) must be used only for the **MINI diesel fuel W16**. G30 must not be filled in the other coolant circuits or mixed with the other coolants.

RISK OF DAMAGE

Damage to the engine.

The use of an incorrect coolant may lead to corrosion or gelling in the engine.

- Use only approved coolants for the specific vehicle.
- Fill the vehicle only with the coolant with which it was delivered ex works.
- Mix only compatible coolants. The colour does not allow any assessment about the compatibility of coolants.
- Selection of the correct coolant only by means of the part number.

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- Select a suitable adapter (Y) from the set of special tools 0 494 417 (17 0 100):

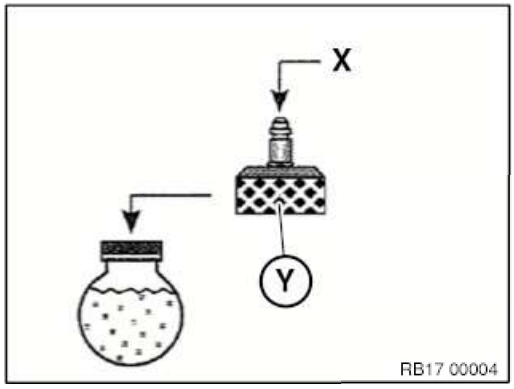
Type	Engine	Adapter (Y) from 17 0 100
G20/G29	B46 / B48 /B58	17 0 113

- The fluid tank of the vacuum filler device must be filled with 1 l to 2 l more than the specified capacity of coolant for the vehicle.

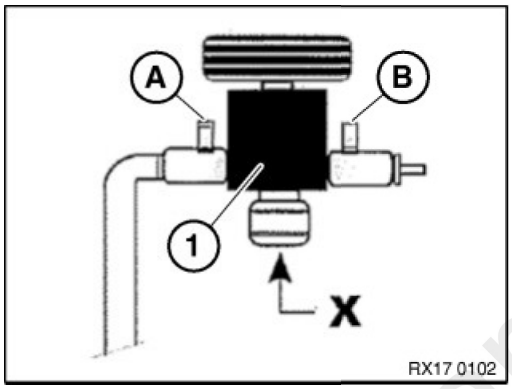
Capacity of high-temperature coolant circuit G20/G29

B58B30O1	10,5 l

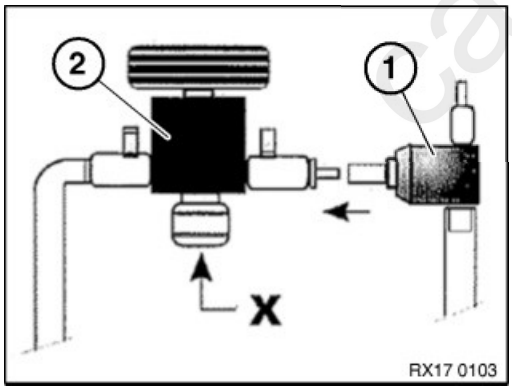
Expendable materials: Technically suitable antifreeze and corrosion inhibitor



- Connect the selected adapter (Y) to the coolant expansion tank.
- Connect vacuum filler device to connection (X) of the adapter.

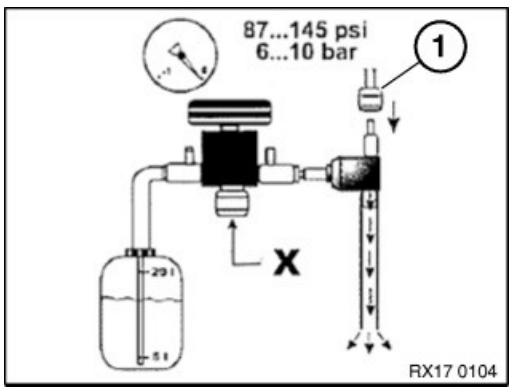


- Check whether shut-off valves (A) and (B) of the vacuum filler device (1) are closed.
- Connect and lock connection (X) to the coolant expansion tank.



- Connect Venturi nozzle (1) to the vacuum filler device (2).

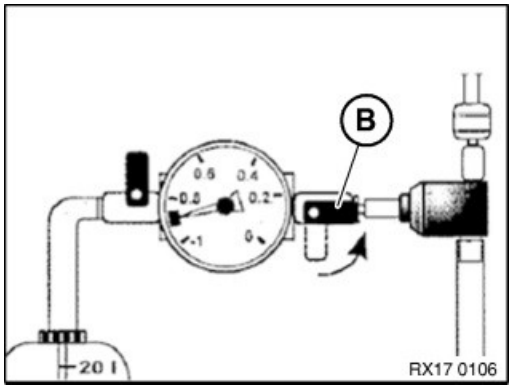
  (X)is the connection on the coolant expansion tank.



- Connect compressed air (1).

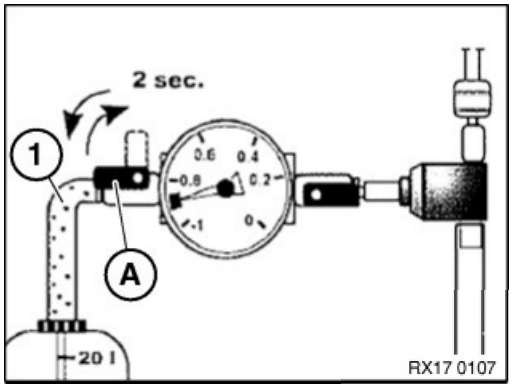
  (X)is the connection on the coolant expansion tank.

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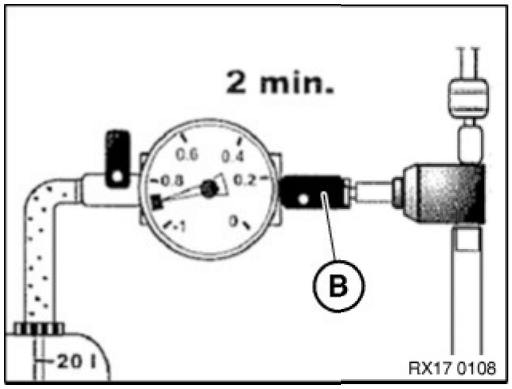
- Open shut-off valve (B).

  The venturi nozzle produces a flow noise.



- Open shutoff valve (A) until the fuel filling hose (1) is full without bubbles.
- Close shutoff valve (A) again.

» The filling hose (1) has now been bled.

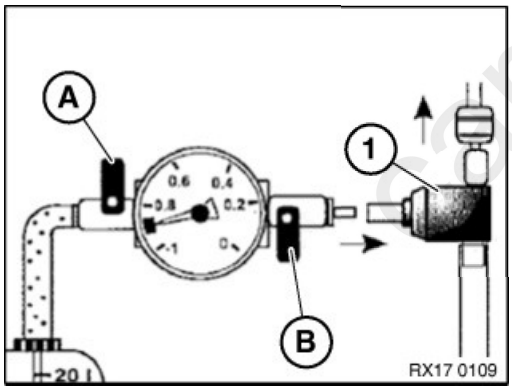


- Check the coolant hoses for porosity and renew porous coolant hoses as required.

TECHNICAL INFORMATION

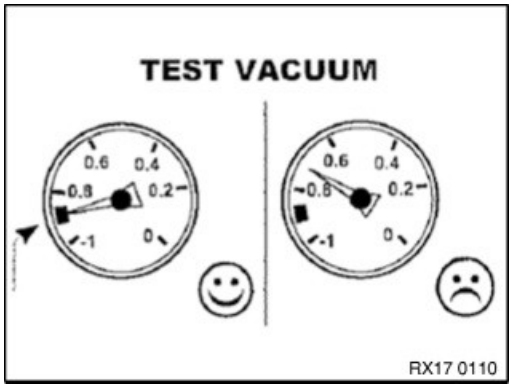
The coolant hoses contract during vacuum build-up.

- After having established a vacuum in the coolant circuit of between -0.7 to -0.95 bar (duration approximately 2 min), close the shut-off valve (B).



- Check whether the shutoff valves (A) and (B) are closed.
- Disconnect the Venturi nozzle (1).

Check



- Make sure the vacuum in the coolant circuit is maintained for at least 30 seconds.

Result

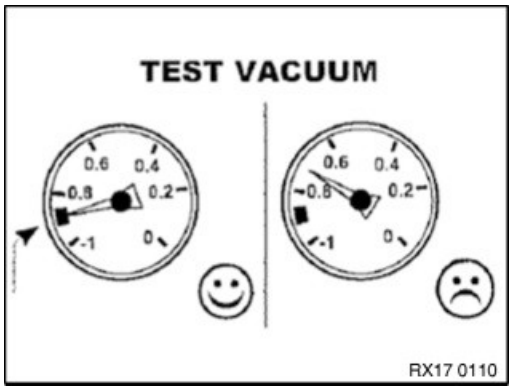
» Vacuum drops.

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Measure

- Look for the leak, repair it and start the filling procedure from the beginning.

Check



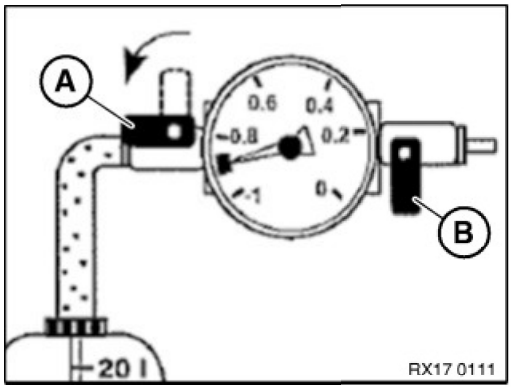
- Make sure the vacuum in the coolant circuit is maintained for at least 30 seconds.

Result

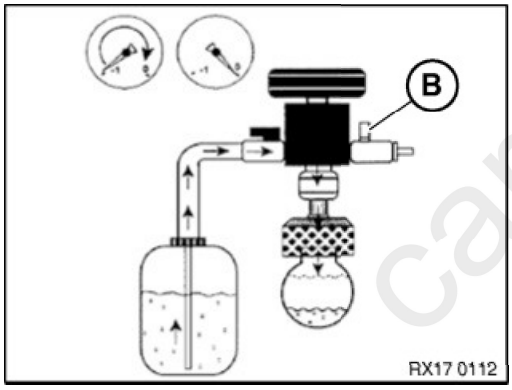
» Vacuum remains constant.

Measure

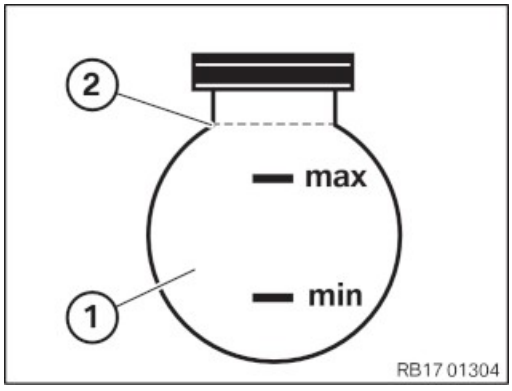
- Continue with filling.



- Keep shutoff valve (B) closed during the filling process.
- To fill the cooling system, open the shutoff valve (A) to the fluid tank of the vacuum filler device.



- Stop the filling procedure when the needle in the pressure measuring device is on 0 bar or it no longer drops.
- If necessary, reduce remaining vacuum. In order to do so, open shutoff valve (B).



- Remove the vacuum filler device with the adapter from the high temperature coolant expansion tank (1).
- Top up the coolant level in the high temperature coolant expansion tank (1) to the lower edge of the coolant filler neck (2) in the high temperature coolant expansion tank (1).
- After filling the cooling system with the vacuum filler device, **also** run the cooling system bleeding routine.

57 – Bleed the high-temperature coolant circuit

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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

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

TECHNICAL INFORMATION

Before starting the automatic cooling system bleeding routine, make sure that **all coolant circuits** are **filled**. If the cooling system bleeding routine is started while one of the coolant circuits is empty, there is a risk of damage to the electric coolant pump when running it dry.

Make sure that terminal 15 is not disconnected for the bleeding procedure. Switch on low-beam headlights and hazard warning lights. If the low-beam headlights and hazard warning lights are not switched on, the ignition (terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.

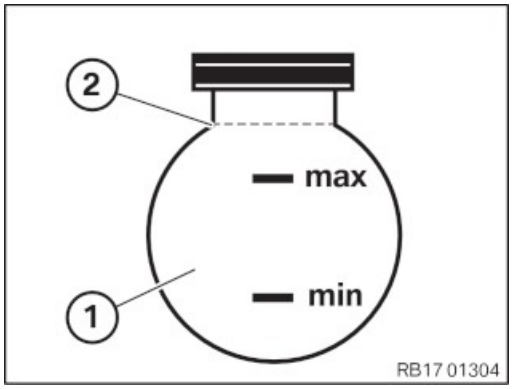
TECHNICAL INFORMATION

The electrical fan is activated during the entire cooling system bleeding routine.

TECHNICAL INFORMATION

The driving experience switch must not be set to the ECO PRO switch position.

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- Open the bleeder screw on the coolant expansion tank for the high-temperature coolant circuit and close it again after approx. **10 s**.

  You can close the bleeder screw prior to expiry of the 10 s once coolant escapes.
- Adjust the coolant level in the high temperature coolant expansion tank (1) to the lower edge (2) of the coolant filler neck of the the high temperature coolant expansion tank (1) .
- Close the sealing cap on the coolant expansion tank of the high--temperature cooling circuit.
- Make sure the bonnet is **closed**.
- Make sure that the wheels touch the ground.
- Engage the parking brake.
- Do not engage any gear in manual-shift gearbox, and engage the gear to "P" or "N" automatic transmission.
- Connect battery charger.
- Switch on the ignition and make sure that it remains **switched on** (for example, activate the low-beam headlight and the **hazard warning light at the same time**).

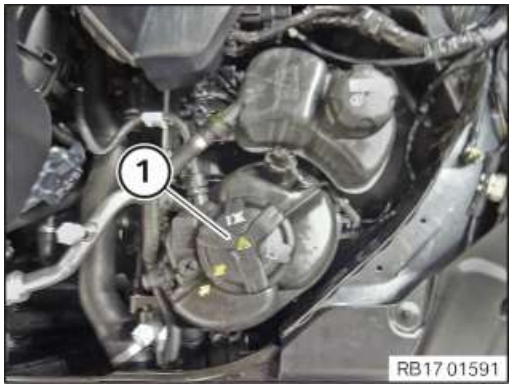
  If the low-beam headlight and the hazard warning light are **not** switched on, the ignition (**terminal 15**) will switch off automatically after some time and interrupts the bleeding procedure.
- Check that the driving experience control is **not** in the **"ECO-PRO"** switch position.
- Adjust the heating to **maximum** temperature and adjust the blower to the **lowest** stage.
- Hold the accelerator pedal down to the limit position for at least **10 s** and do **no** kick the brake pedal.
- Start engine.
- Start the cooling system bleeding routine, pay attention to the display on the instrument cluster (KOMBI). ("Service function started")

  The engine speed (up to 3500 rpm) and the actuators in the cooling system are activated **automatically** for 11 minutes according to a cooling system bleeding routine.

  The cooling system bleeding routine ends approx. 11 min **after** the engine starts.

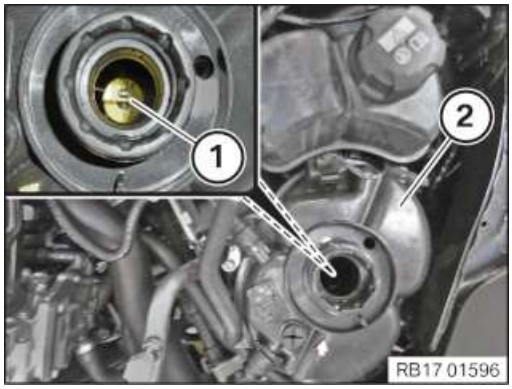
  The engine speed **drops** to the idle speed.
- Observe the display *in the instrument cluster* (KOMBI).

  If the service function is interrupted, the cooling system bleeding routine **must** be repeated.
- Switch off engine.
- Allow the coolant temperature to cool down to **< 50°C**.



- Loosen sealing cap (1).

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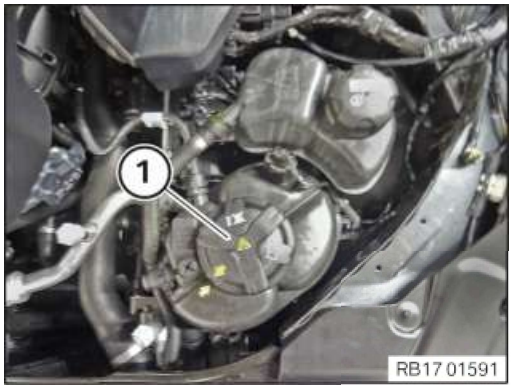
TECHNICAL INFORMATION

After the cooling system bleeding routine, the cooling system is topped up above the maximum mark.

Overfilling the cooling system serves to balance the remaining air in the cooling system.

The normal filling level of the coolant is reached while driving.

- Adjust the filling level in the coolant expansion tank (2) of the high-temperature coolant circuit to **200 ml** over the **maximum mark**(1) .



- Close sealing cap (1).
- Close the sealing cap (1) until the **arrows** are flush.

58 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

59 – Install acoustic cover

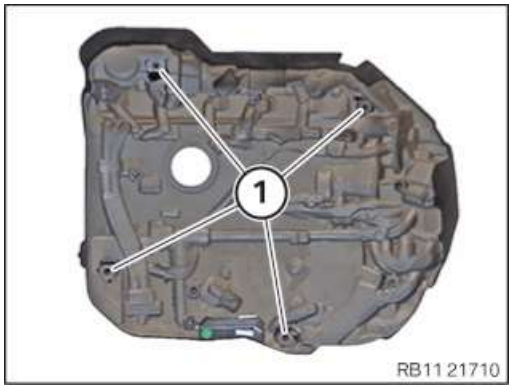
RISK OF DAMAGE

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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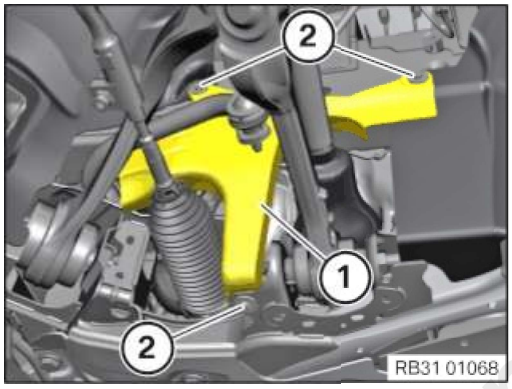


- Check the rubber mount (1) for correct fit in the acoustic cover.



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

60 – Install the cover of the steering assembly

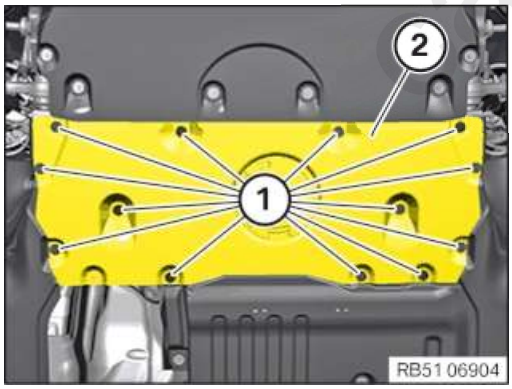


- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

61 – Installing the centre underbody protection



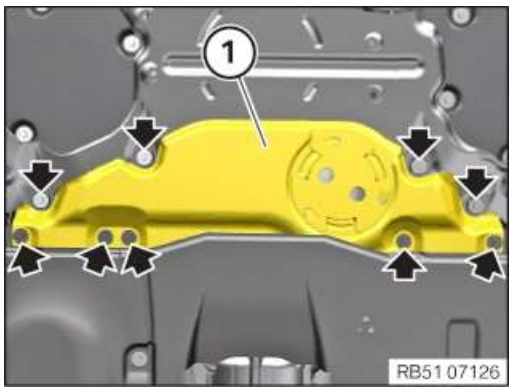
- **Version with rear-wheel drive:**

  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).

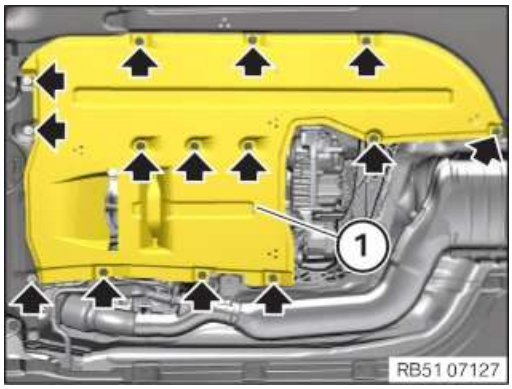
  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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62 – Installing underbody protection at rear



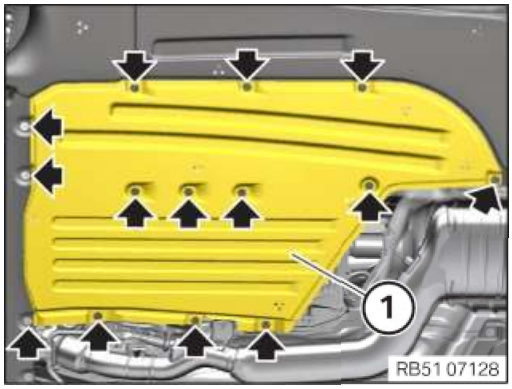
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

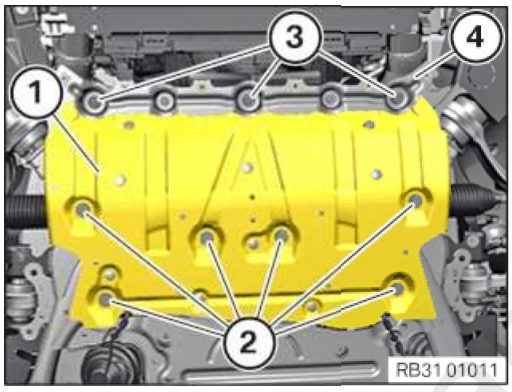
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

63 – Installing the stiffening plate

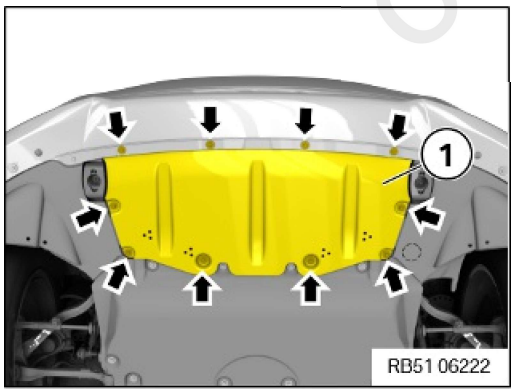


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

64 – Installing the front underbody protection



- **Version 1:**

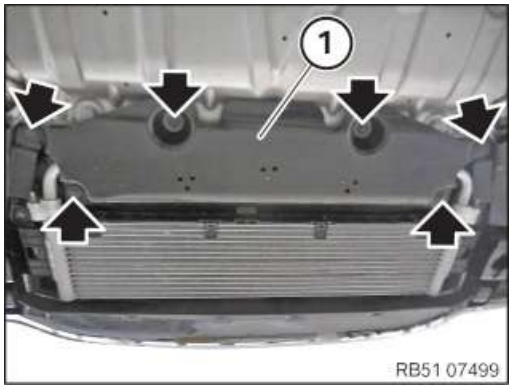
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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

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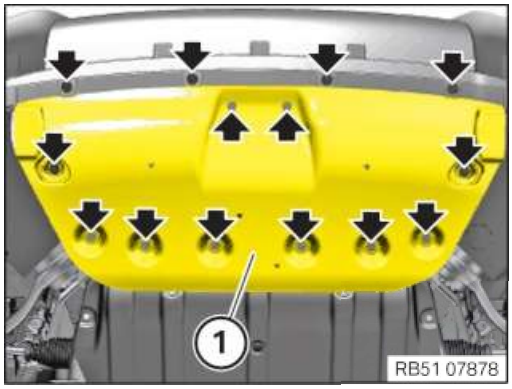
- **Version 2:**

  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:**

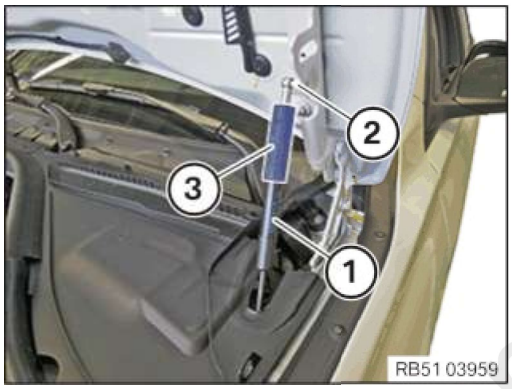
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

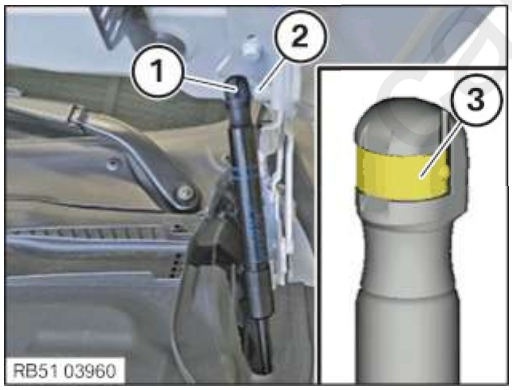
Underbody protection front

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

65 – 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

Special tool 2 466 467 to special tool 2 446 919 Used in step 30

M8		Tightening torque	5 Nm

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Coolant return line/oil feed line to exhaust turbocharger — Used in step 34

M6 x 12		Tightening torque	8 Nm

Exhaust manifold to cylinder head — Used in step 35

Flange nutM7	*Replace flange nuts*	1. Jointing torque	10 Nm
		2. Jointing torque	10 Nm
		3. Jointing torque	16 Nm
		4. Jointing torque	16 Nm
		5. Jointing torque	16 Nm

Coolant feed line to crankcase — Used in step 35

M6X12		Tightening torque	8 Nm

Exhaust turbocharger support to crankcase — Used in step 35

M8 x 20	Renew screws.		19 Nm

Exhaust turbocharger to support — Used in step 35

M8 x 25	Renew screw.		19 Nm

Oil feed line for exhaust turbocharger to crankcase — Used in step 35

M6 x 12	Replace sealing ring.	Tightening torque	8 Nm

Coolant return line holder bracket to crankcase — Used in step 35

M6X12		Tightening torque	8 Nm

Heat shield to cylinder head — Used in step 35

M8X12	Renew screws.	Tightening torque	19 Nm

Heat shield to clamping strip — Used in step 35

M6X16	Renew screw.	Tightening torque	8 Nm

Oil return line to turbocharger — Used in step 36

M6 x 12			8 Nm

Oil return line to crankcase — Used in step 36

M6 x 12			8 Nm

Catalytic converter to turbocharger — Used in step 37

V-band clamp	Replace V-band clamp.	Tightening torque	19 Nm

Catalytic converter to holder — Used in step 37

M8 nut	Renew nut.	Tightening torque	28 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

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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

Monitoring oxygen sensor to catalytic converter — Used in step 40

M18X1.5		Tightening torque	50 Nm

Front oxygen sensor to catalytic converter — Used in step 41

M18X1.5		Tightening torque	50 Nm

Holder, positive battery cable to cylinder head cover — Used in step 42

6X18		Tightening torque	6 Nm

Engine ventilation line adapter with heating element to exhaust turbocharger — Used in step 43

M6x26 screw		Tightening torque	8 Nm

Charge air line to throttle valve — Used in step 44

M6x30		Tightening torque	8 Nm

Electric coolant pump to holder — Used in step 44

M6		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing — Used in step 47

Clamp		Tightening torque	3 Nm

Fan cowl with electric fan on radiator — Used in step 48

TS6x20		Tightening torque	6,5 Nm

Top rear cross connection to bonnet catch support — Used in step 49

Flat-head screw M6x20		Tightening torque	11,8 Nm

Rear top cross connection to wheel arch carrier support — Used in step 49

M10x20 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °

Cross connection, top — Used in step 50

M8x20		Tightening torque	28 Nm

Cross connection, top — Used in step 50

M6x20		Tightening torque	11,8 Nm

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Cover, steering unit			Used in step 60
Screw		Tightening torque	3 Nm

Underbody protection			Used in step 6162
Hexagon screw		Tightening torque	3 Nm

Stiffening plate to front axle support			Used in step 63
M10		Tightening torque	56 Nm

Underbody protection front			Used in step 64
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

2 446 919 Locating fixture



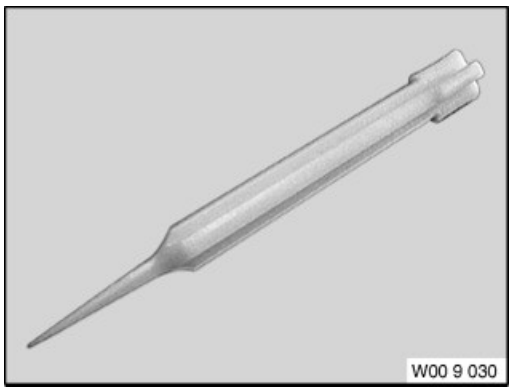
Common	Used in step 3035
Usage	For installation and de-installation of the exhaust turbocharger module. Engine: B58.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 08 16 (383)

2 466 467 Device



Common	Used in step 3035
Usage	For removing and installing the exhaust turbocharger. Engine: B58O1.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 18 (545)

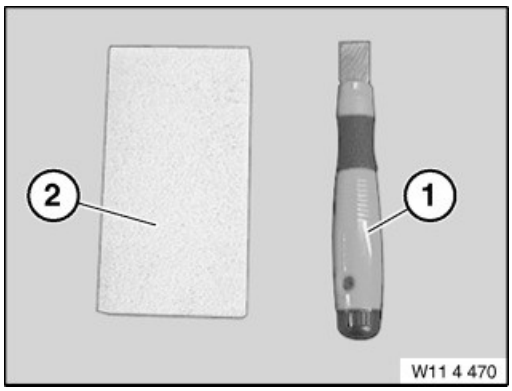
0 496 714 (00 9 030) Wedge



Common	Used in step 3334354344
Usage	For dismantling O-rings, gaskets and trim panels. This special tool replaces special tool 00 9 316.
Included in the tool or work	
Storage location	A50
Replaced by	
In connection with	
SI-Number	01 20 09 (581)

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0 495 102 (11 4 470) Tool



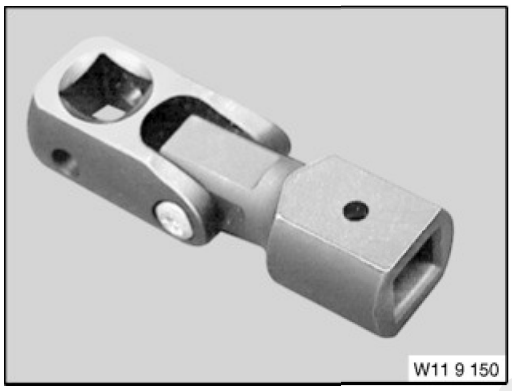
Common Used in step 35

Usage	(cleaning kit) For cleaning sealing surfaces on magnesium crankcase/cylinder head.
Included in the tool or work	
Storage location	C52
Replaced by	
In connection with	
SI-Number	01 17 04 (130)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 103 (11 4 471)		**Scraper**	
2	0 495 104 (11 4 472)		**Extractor** (grindstone)	

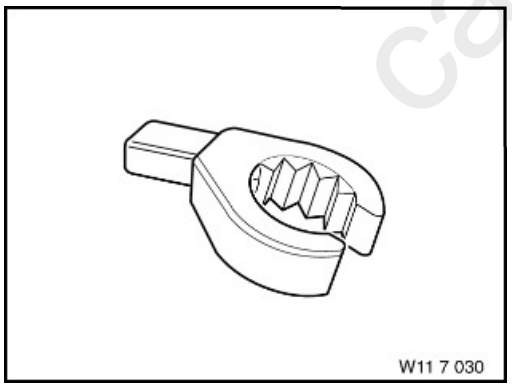
0 493 751 (11 9 150) Extension



Common Used in step 40

Usage	(Socket wrench extension) For loosening and tightening the oxygen sensor
Included in the tool or work	
Storage location	C41
Replaced by	
In connection with	
SI-Number	01 15 00 (609)

0 491 075 (11 7 030) Socket wrench insert



Common Used in step 40

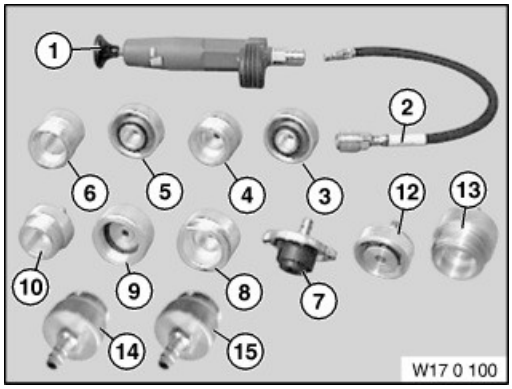
Usage	(Socket wrench insert 22 mm) For loosening and tightening the oxygen sensor
Included in the tool or work	
Storage location	A9
Replaced by	
In connection with	
SI-Number	01 06 95 (963)

0 494 417 (17 0 100) Tester

Common Used in step 56

Usage	For checking engine cooling system on watertightness. For checking radiator cap.
Included in the tool or work	
Storage location	Individual
Replaced by	

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In connection with	
SI-Number	01 07 02 (884)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
5	0 494 422 (17 0 105)		**Adapter** For radiator cap (sawtooth thread)	
10	0 494 427 (17 0 111)		**Adapter** For radiator cap R53/W11, R50/W17 adapter replaced 17 0 052.	
1	0 494 418 (17 0 101)		**Pump**	
2	0 494 419 (17 0 102)		**Hose** (hose with quick-release coupling)	
3	0 494 420 (17 0 103)		**Adapter** For radiator cap (normal thread)	
4	0 494 421 (17 0 104)		**Adapter** For radiator cap (normal thread)	
6	0 494 423 (17 0 106)		**Adapter** For radiator cap (sawtooth thread)	
7	0 494 424 (17 0 107)		**Adapter** For radiator cap R50 / W10	
8	0 494 425 (17 0 108)		**Adapter** For radiator cap R50 / W10	
9	0 494 426 (17 0 109)		**Adapter** For radiator connection R53/W11, R50/W17 adapter corresponds to 17 0 051	
11	0 494 428 (17 0 112)		**Case**	
12	0 494 642 (17 0 113)		**Adapter** For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)	
13	0 494 643 (17 0 114)		**Adapter** For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)	
14	0 495 889 (17 0 115)		**Adapter** For radiator cap Model series: N12, N14	

Overview Technical Data

Capacity of high-temperature coolant circuit G20/G29

Used in step 56

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B58B30O1	10,5 l

Expendable materials: Technically suitable antifreeze and corrosion inhibitor

Screw-in depth of upper stud bolt on cylinder head Used in step 35

Dimension A	30 mm

Links

General repair instructions	Used in step
11 00 ... Overview of consumables (Electronic Parts Catalogue)	4041

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	15
17 00 ... Notes for working on cooling system.	56

Operating materials	Used in step
Main group 17	56

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11 42 210 Removing and installing/sealing or replacing oil return line for exhaust turbocharger

WARNING

Hot surfaces.

Risk of burning!

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

WARNING

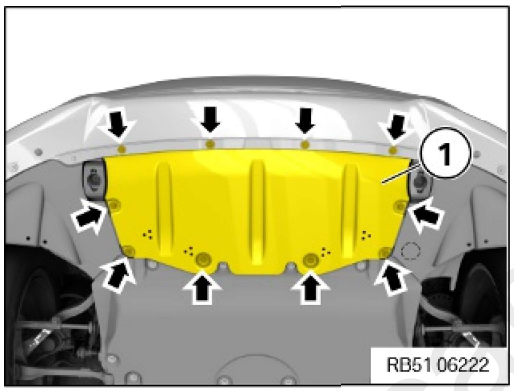
Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

PRELIMINARY WORK

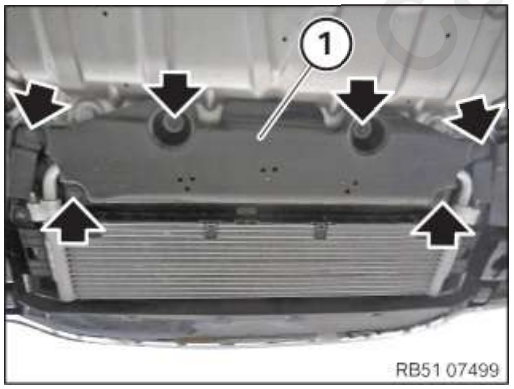
1 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

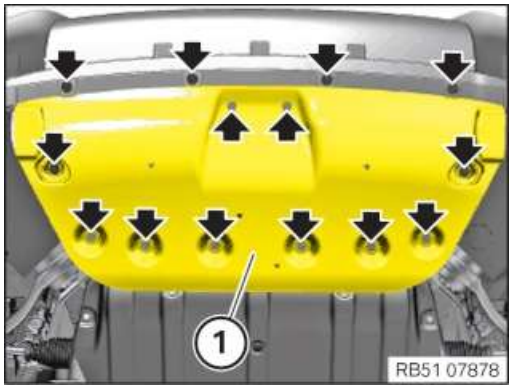
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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



- **Version 3:**

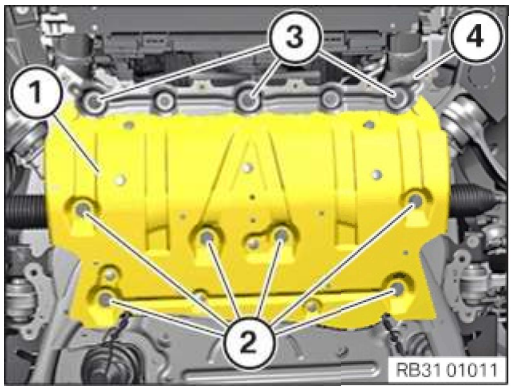
  Remove screws (arrows).

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

2 – Removing the stiffening plate

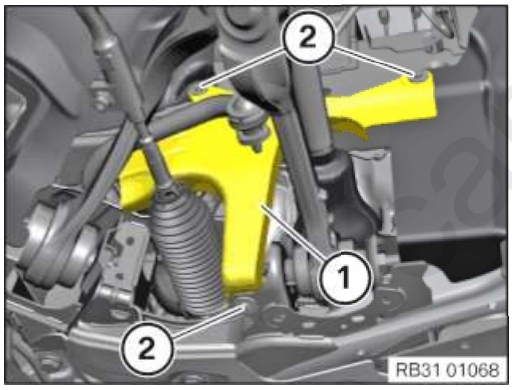
TECHNICAL INFORMATION

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).

3 – Remove the cover of the steering assembly



- Loosen screws (2).
- Remove the cover (1).

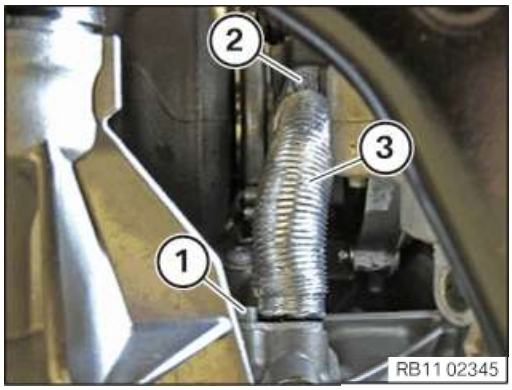
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MAIN WORK

4 – Removing the oil return line for the exhaust turbocharger

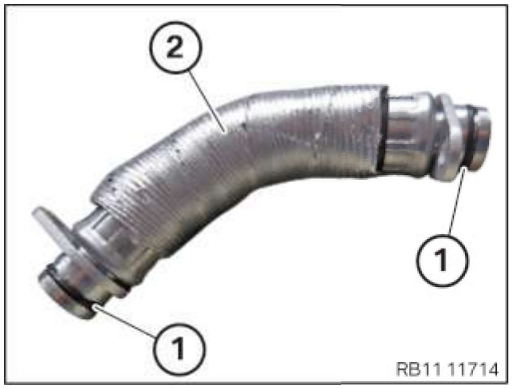
TECHNICAL INFORMATION

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



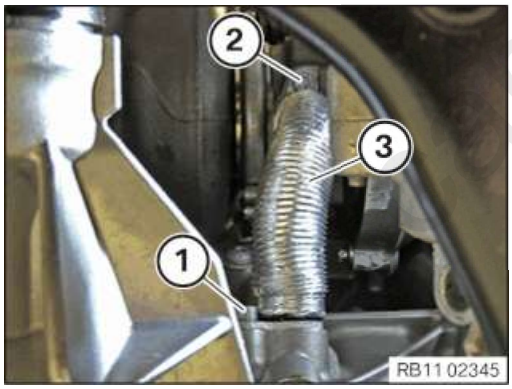
- Have cleaning rags ready for any escaping engine oil.
- Loosen screws (1) and (2).
- Guide out and remove the oil return line (3).

5 – Installing the oil return line for the exhaust turbocharger



- Renew the sealing rings (1) on the oil return line (2).

  Parts: Sealing ring



- Feed in and install the oil return line (3).
- Tighten down screw (2).

Oil return line to turbocharger

M6 x 12		8 Nm

- Tighten down screw (1).

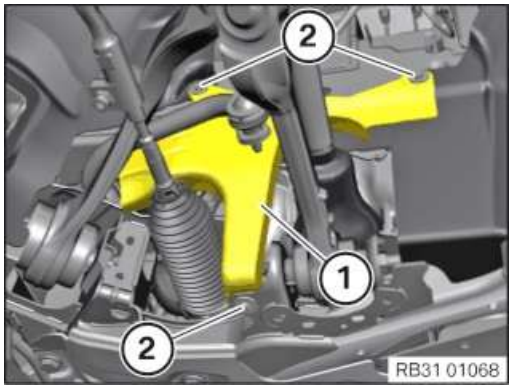
Oil return line to crankcase

M6 x 12		8 Nm

POSTPROCESSES

6 – Install the cover of the steering assembly

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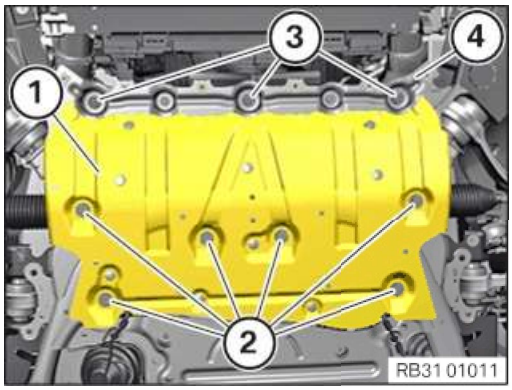


- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

7 – Installing the stiffening plate

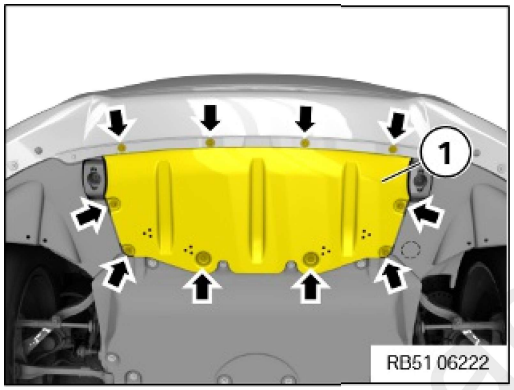


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

8 – Installing the front underbody protection



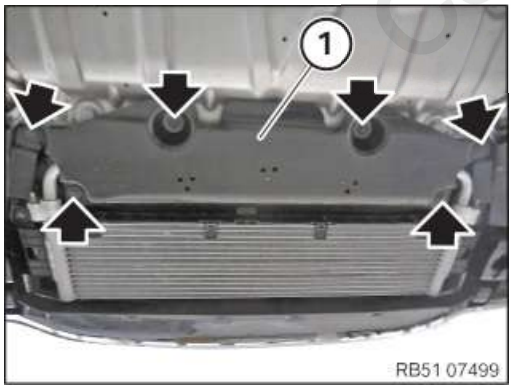
- **Version 1:**

  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:**

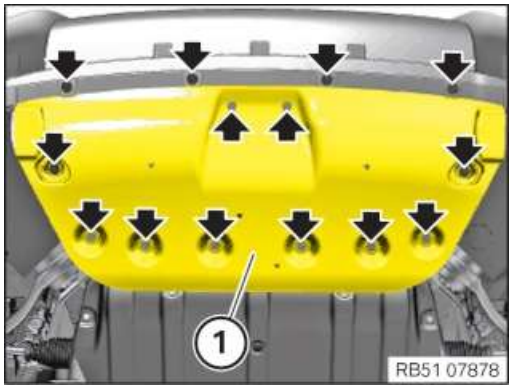
  Feed in and position the front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

carlogon.com



- **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

9 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

Additional Information

Overview of Tightening Torques

Oil return line to turbocharger — Used in step 5

M6 x 12			8 Nm

Oil return line to crankcase — Used in step 5

M6 x 12			8 Nm

Cover, steering unit — Used in step 6

Screw		Tightening torque	3 Nm

Stiffening plate to front axle support — Used in step 7

M10		Tightening torque	56 Nm

Underbody protection front — Used in step 8

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

Overview Technical Data

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11 42 041 Removing and installing/sealing or replacing the full-flow oil filter cover plate

WARNING

Hot surfaces.

Risk of burning!

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

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

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

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PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

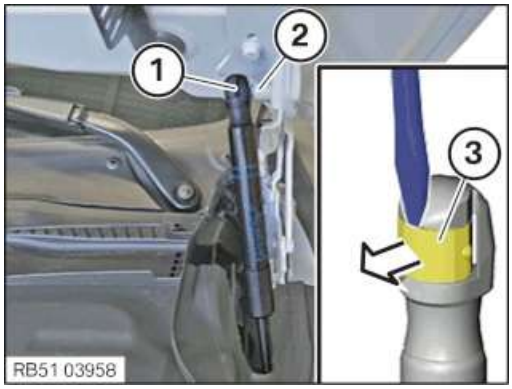
Engine compartment lid is open.

CAUTION

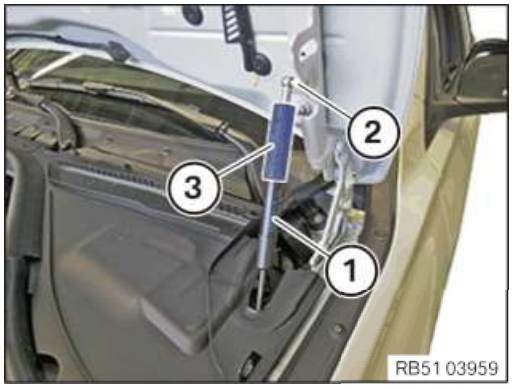
Shutting bonnet or tailgate.

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.



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 – Removing the acoustic cover

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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.



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

5 – Removing acoustic cover at rear



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

6 – Removing intake silencer housing

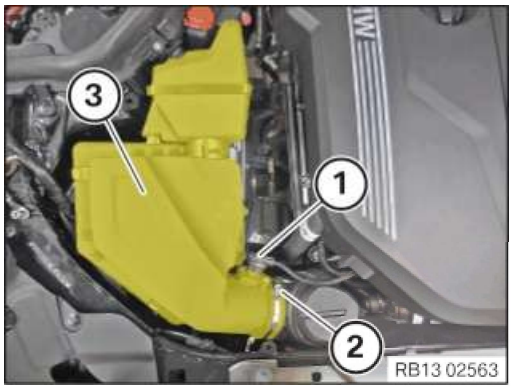
rdiagn.com

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.

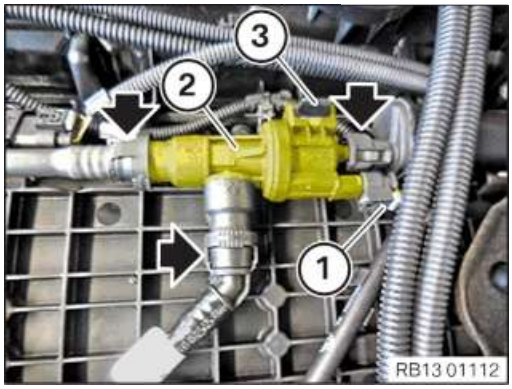
7 – Remove tank vent valve

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).

8 – 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.

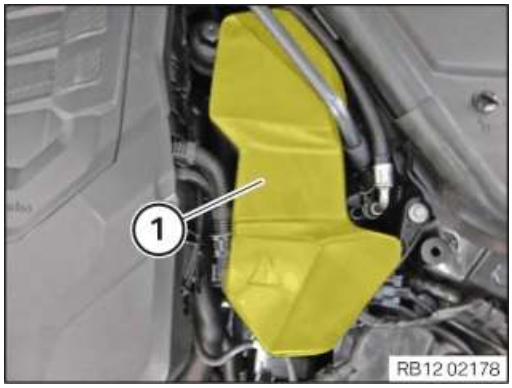
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

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

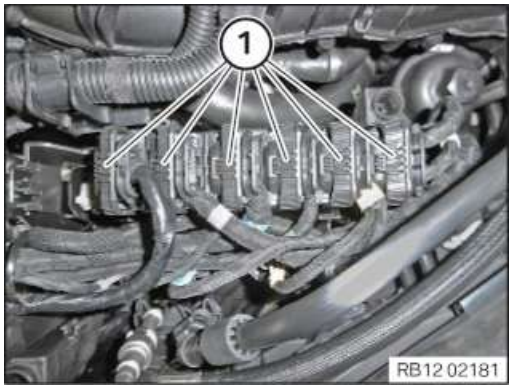
TECHNICAL INFORMATION

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

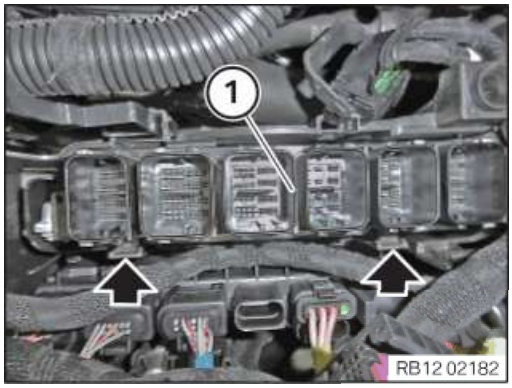


- Pull the cover (1) towards the top and feed out.

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- Unlock and disconnect the plug connection (1).



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

9 – 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.

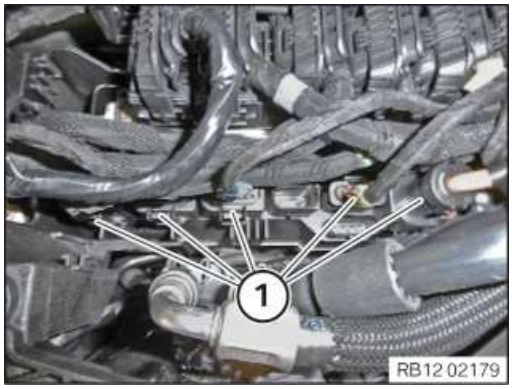
RISK OF DAMAGE

Electrostatic discharge.

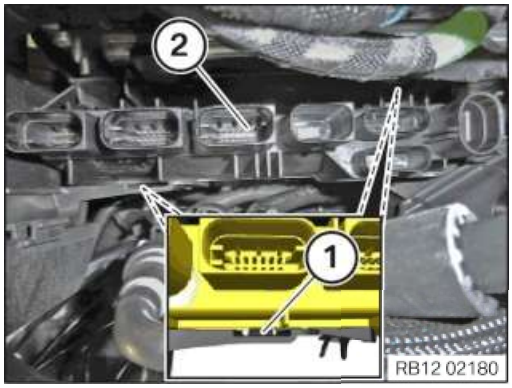
Damage to or destruction of electrical components.

- 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.

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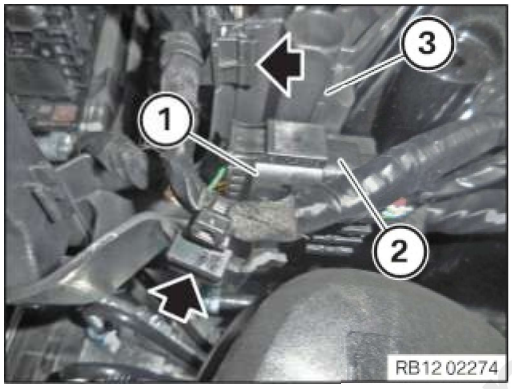


- Unlock and disconnect plug connections (1).

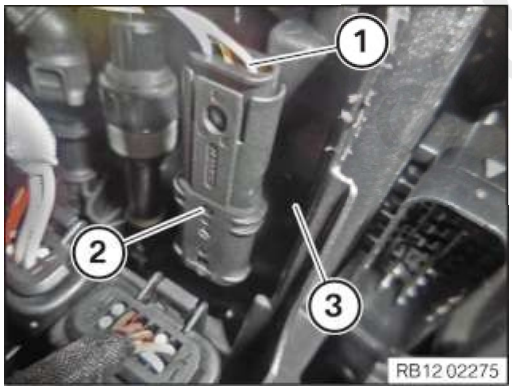


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

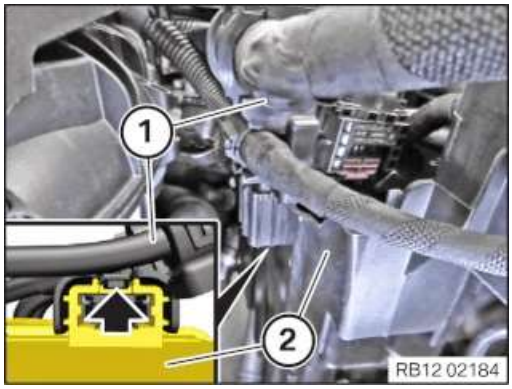
10 – Removing the control unit holder



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

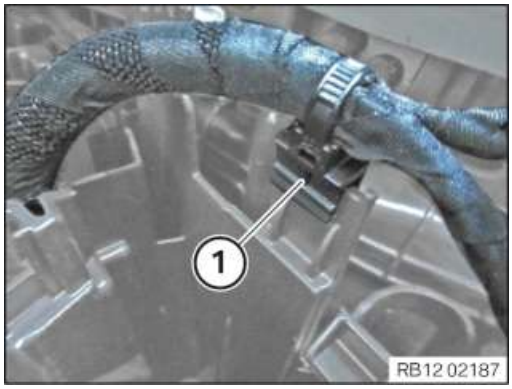


- Unlock plug connection (1) and disconnect.
- Unlock the connector and disconnect from the control unit holder (3).

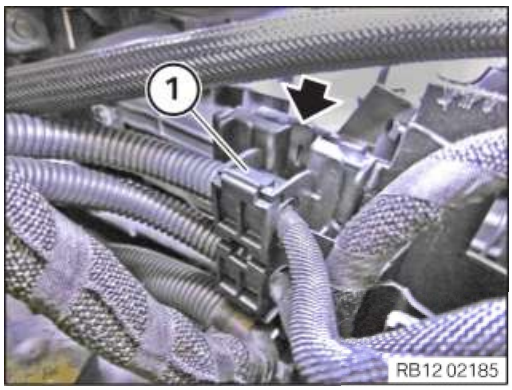


- Unlock the lock (arrow).
- Disconnect the cable holder (1) upwards from the control unit holder (2).

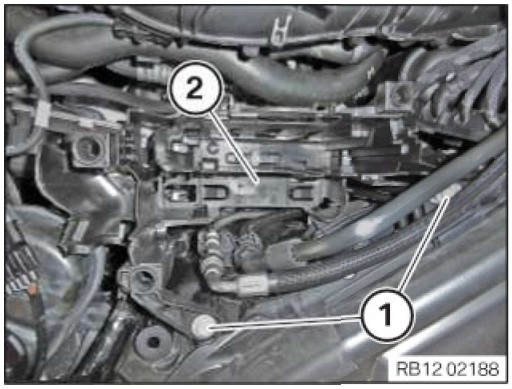
.com



- Loosen clamp (1).

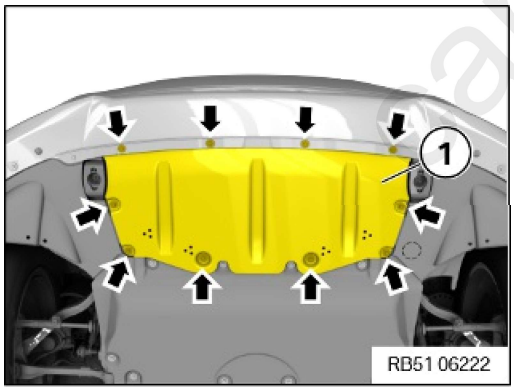


- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



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

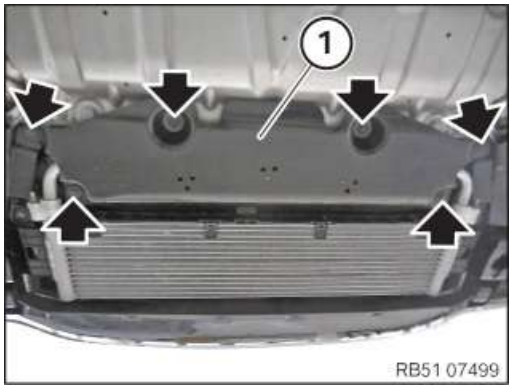
11 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

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

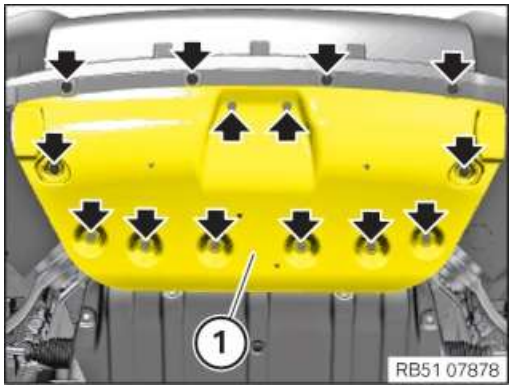


- **Version 2:**

  Remove screws (arrows).

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

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- **Version 3:**

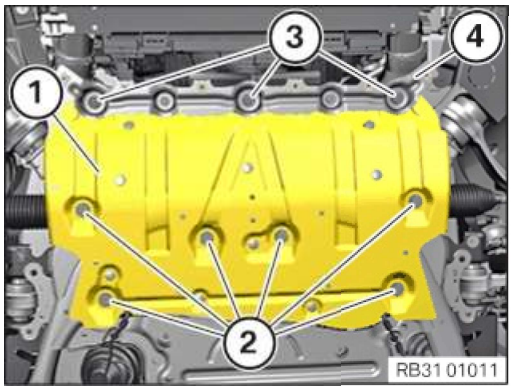
  Remove screws (arrows).

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

12 – Removing the stiffening plate

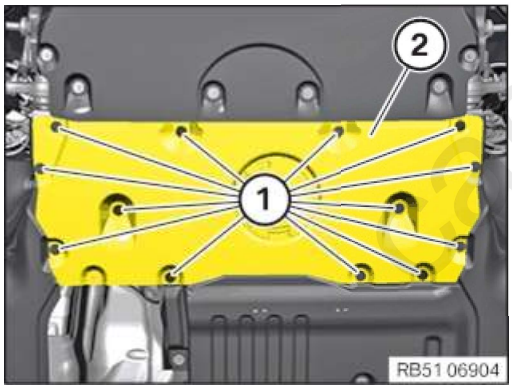
TECHNICAL INFORMATION

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).

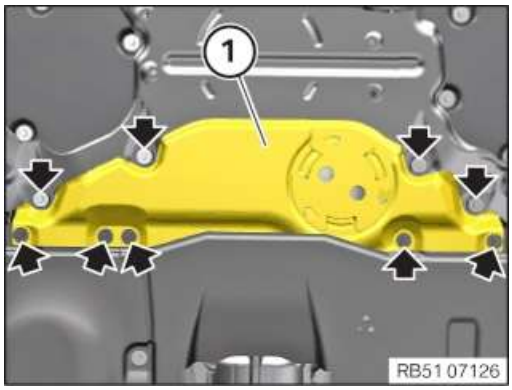
13 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .



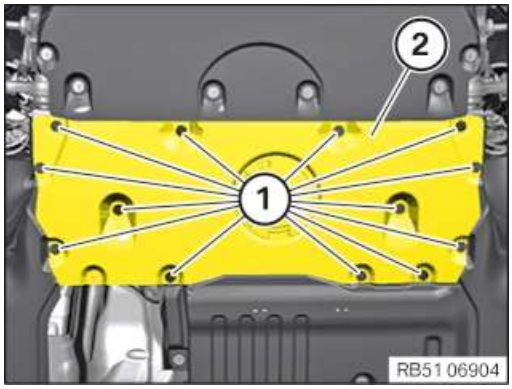
- **Version with all-wheel drive:**

  Remove screws (arrows).

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

14 – Removing the centre underbody protection

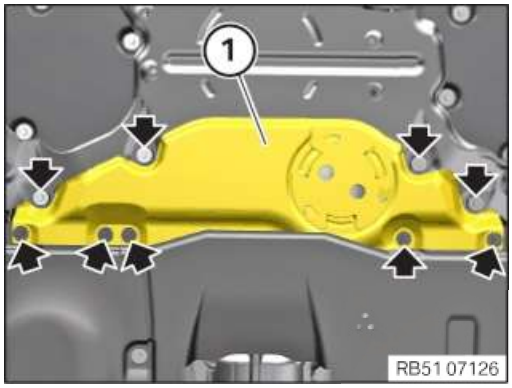
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- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .



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

  Remove screws (arrows).

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

15 – Releasing the oil drain plug

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

TECHNICAL INFORMATION

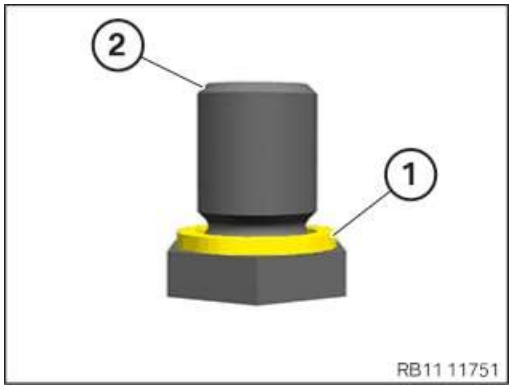
Catch and dispose of drained engine oil in a suitable collecting vessel. Observe country-specific waste disposal regulations.



- Release oil drain plug (1).
- Feed out the oil drain plug (1) using sealing ring (2) and remove.
- Allow the engine oil to drain out fully.

16 – Tightening the oil drain plug

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- Renew sealing ring (1) on the oil drain plug (2).

  Parts: Sealing ring
- Guide in the sealing ring (1) on the oil drain plug (2) and install.



- Feed in the oil drain plug (1) with the sealing ring (2) and install.
- Tighten oil drain plug (1).

Oil drain plug

M12x16	Replace sealing ring.	Tightening torque	25 Nm

17 – If installed: Partially release the engine oil cooler

WARNING

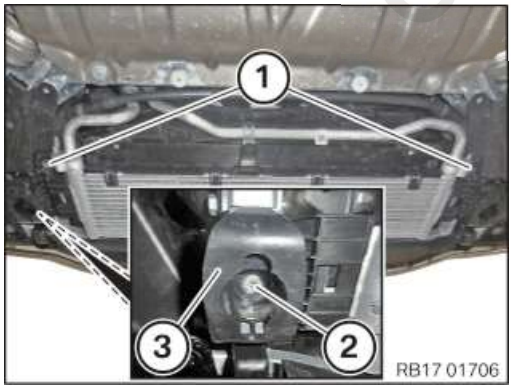
Hot surfaces.

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.

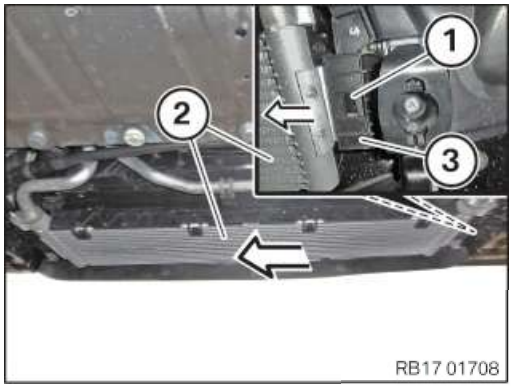


- Loosen screws (1).
- Drill out rivet on the left (2).
- Remove the left-hand damper (3).

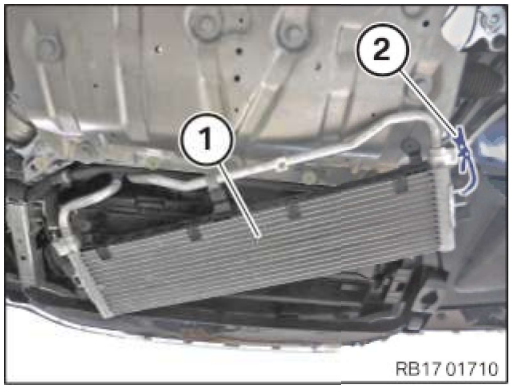
cardiagn.com



- 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.

18 – 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.

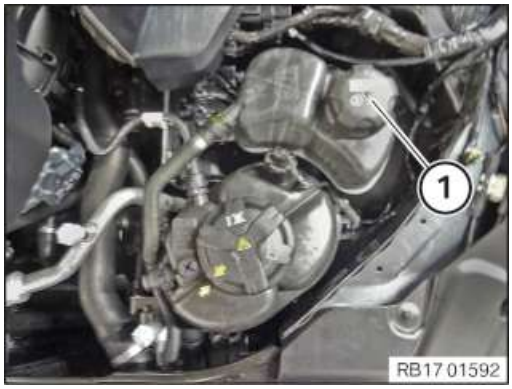
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

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.

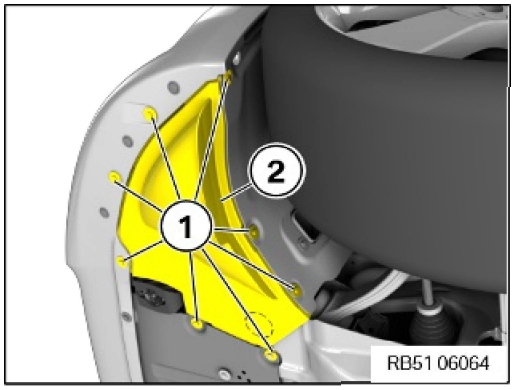
cardiagn.com

TECHNICAL INFORMATION

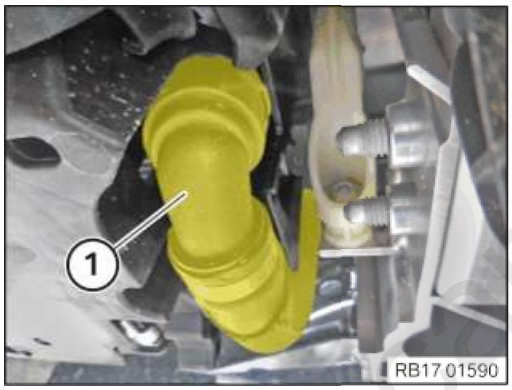
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen sealing cap (1).



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

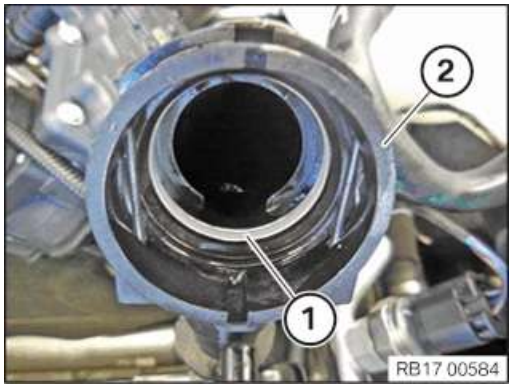


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

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

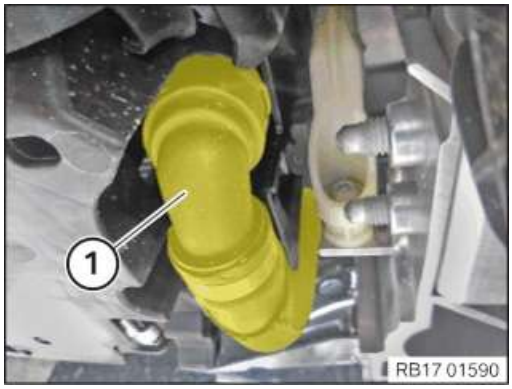
TECHNICAL INFORMATION

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



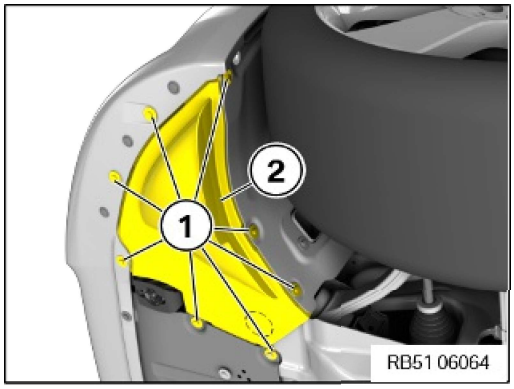
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

carldiagn.com



- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.

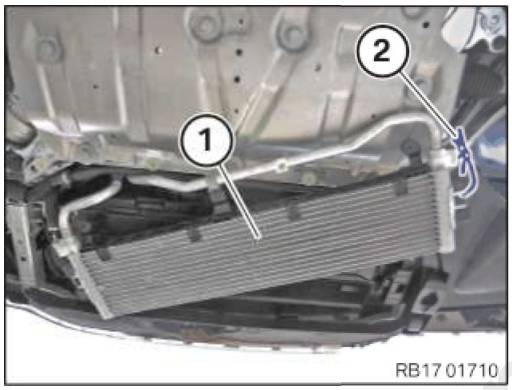


- Feed in and install cover (2) at the bottom front left.
- Tighten the screws (1).

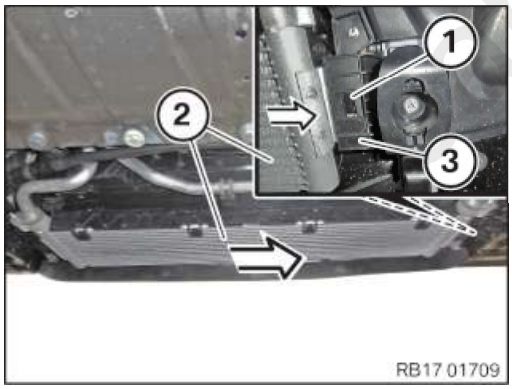
Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

20 – 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.

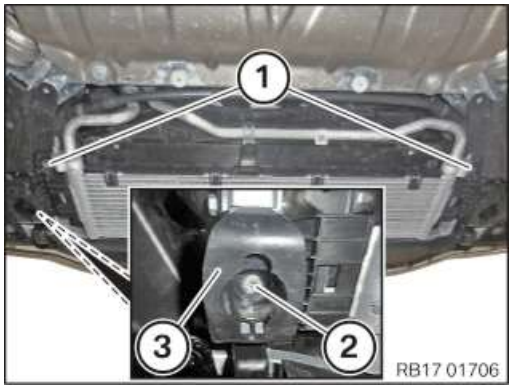


- Tighten down screw (1).

Engine oil cooler to bumper support

M6X25		Tightening torque	8 Nm

diagn.com



- 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

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

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

TECHNICAL INFORMATION

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



- Loosen sealing cap (1).

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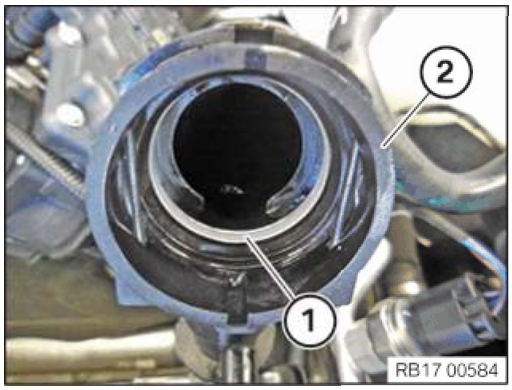


- Unlock lower right coolant hose (1) on the high-temperature coolant radiator and pull it off.
- Catch and dispose of escaping coolant.

22 – Connecting coolant hose to high-temperature coolant radiator

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 coolant hose (1), bottom right to the high-temperature coolant radiator and lock it audibly.

23 – 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.

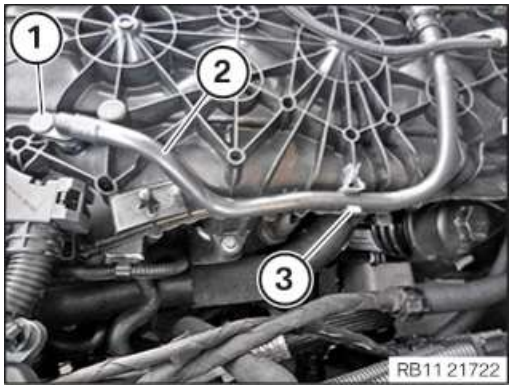
TECHNICAL INFORMATION

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

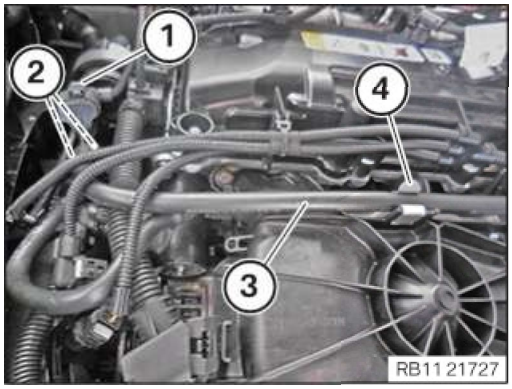
autodiagn.com

TECHNICAL INFORMATION

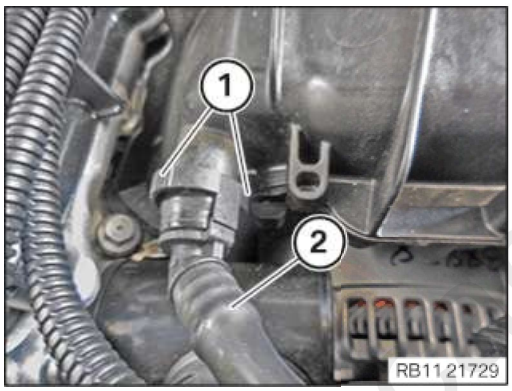
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



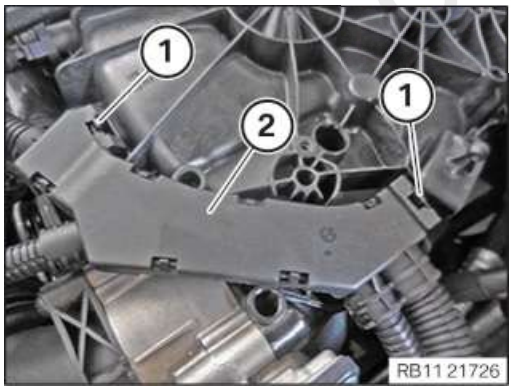
- Loosen screw (1).
- Guide tank ventilation line (2) out of clamp (3) and remove it.



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

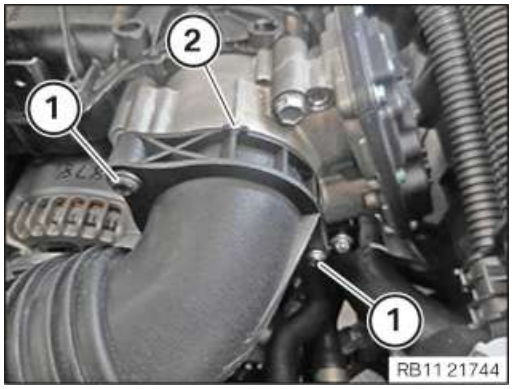


- Unlock the locks (1).
- Feed the tank ventilation line (2) out and set it aside.

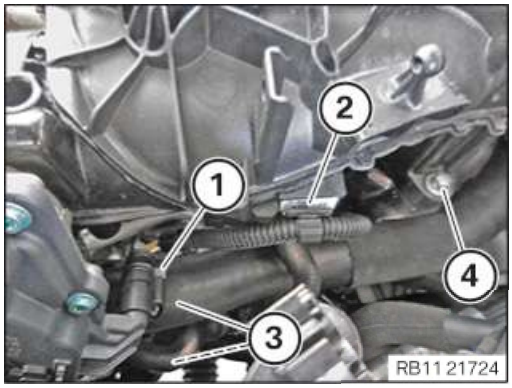


- Unlock the locks (1).
- Guide out the wiring harness section (2) for the sensor system **2** and place to one side.

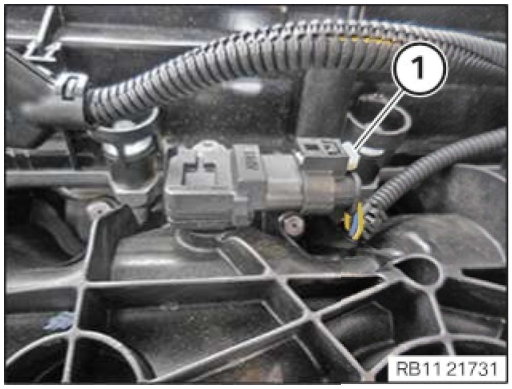
fdiag.com



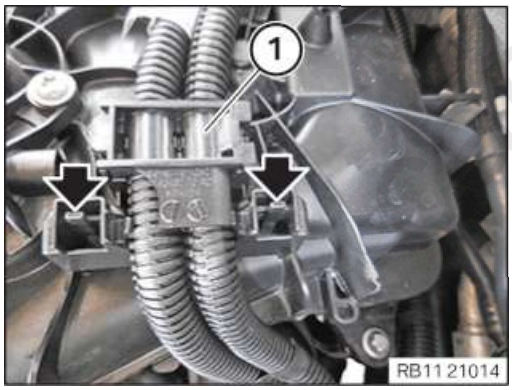
- Loosen screws (1).
- Feed out charge air line (2) and place to one side.



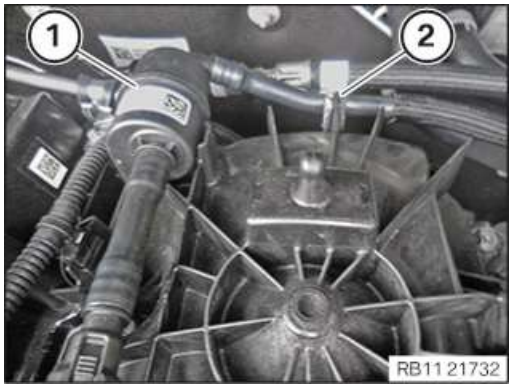
- Unlock and loosen connector (1).
- Loosen clamp (2).
- Thread off coolant line (3) and place to the side.
- Loosen screw (4).



- Unlock and loosen connector (1).

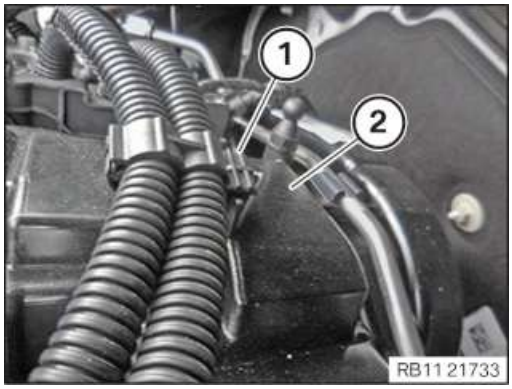


- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.



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

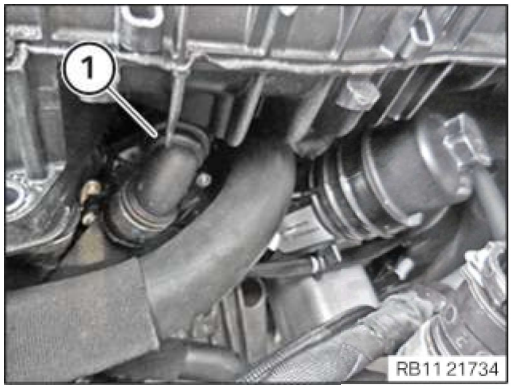
ardiagn.com



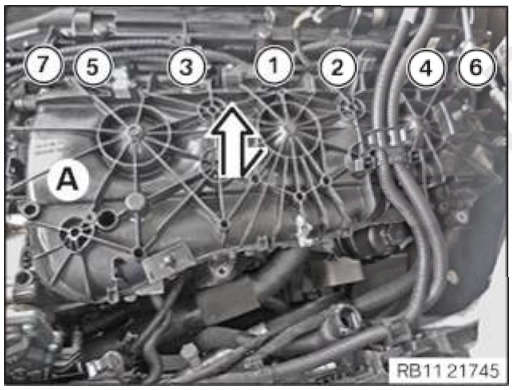
- Guide out the wiring harness section (1) for the injectors and ignition coils of the cylinder head cover (2) and set it aside.



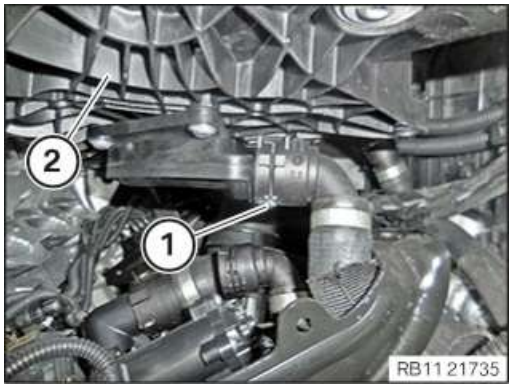
- Loosen screw (1).



- 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.

24 – Remove heat management module

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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.

RISK OF DAMAGE

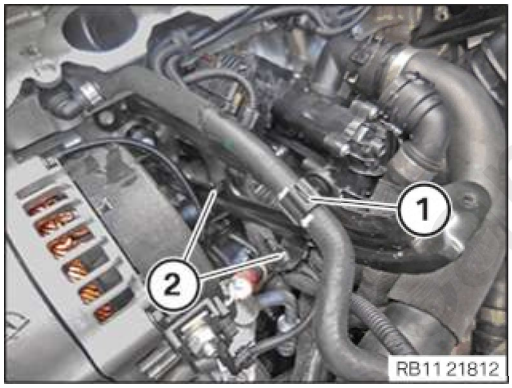
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

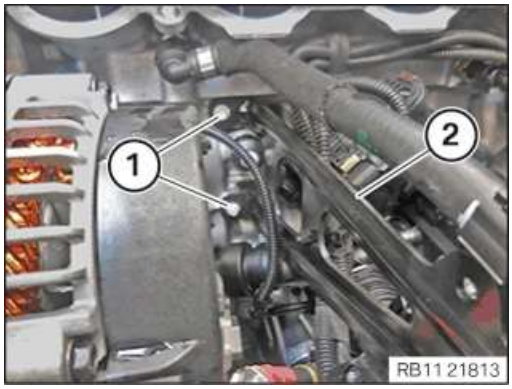
- Do not pull on the wires when disconnecting connectors and plug connections.

TECHNICAL INFORMATION

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

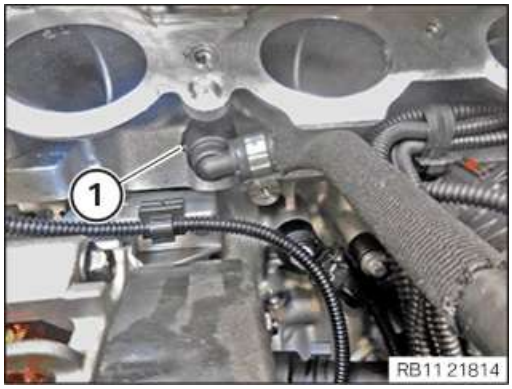


- Loosen clamp (1).
- Loosen clamps (2).

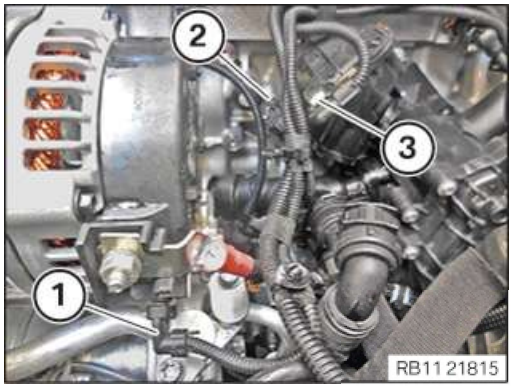


- Loosen screws (2).
- Feed out and remove support (2) for intake plenum.

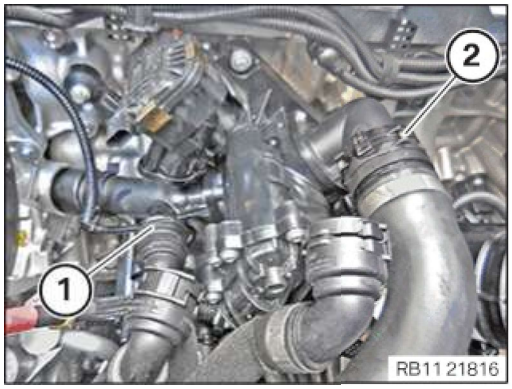
manualdiagn.com



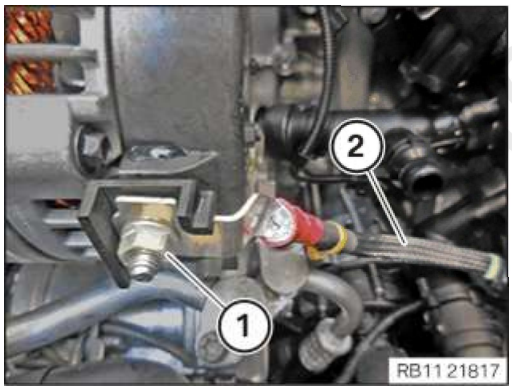
- Unlock and loosen coolant line (1).
- Catch and dispose of escaping coolant.



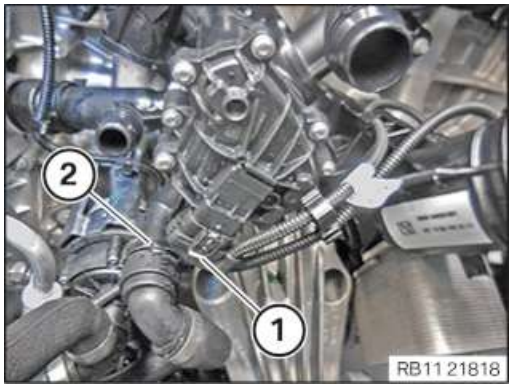
- Unlock and release the connector (1) for the alternator.
- Unlock and release the connector (2) for the knock sensor.
- Unlock and release the connector (3) for the heat management module.



- Unlock and loosen coolant line (1).
- Unlock and loosen coolant line (2).



- Loosen nut (1).
- Feed out positive battery cable (2) and put to one side.

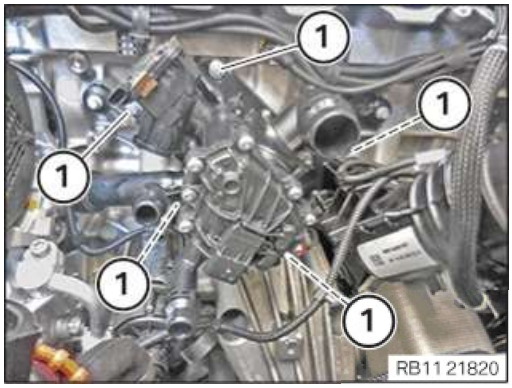


- Unlock and loosen connector (1).
- Unlock and loosen coolant line (2).
- Catch and dispose of escaping coolant.

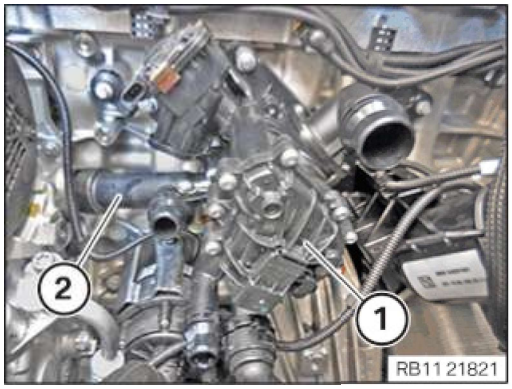
rdiagn.com



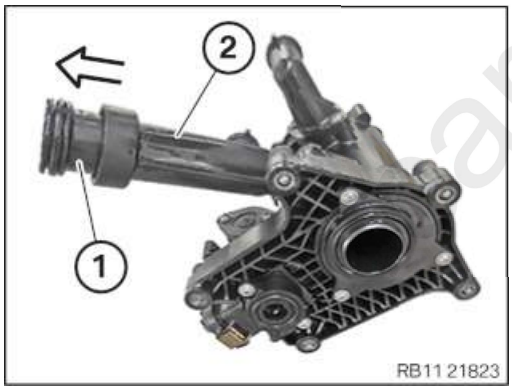
- Loosen clamps (1).



- Loosen screws (1).



- Feed out and remove the heat management module (1) with the connecting pipe (2).
- Catch and dispose of escaping coolant.

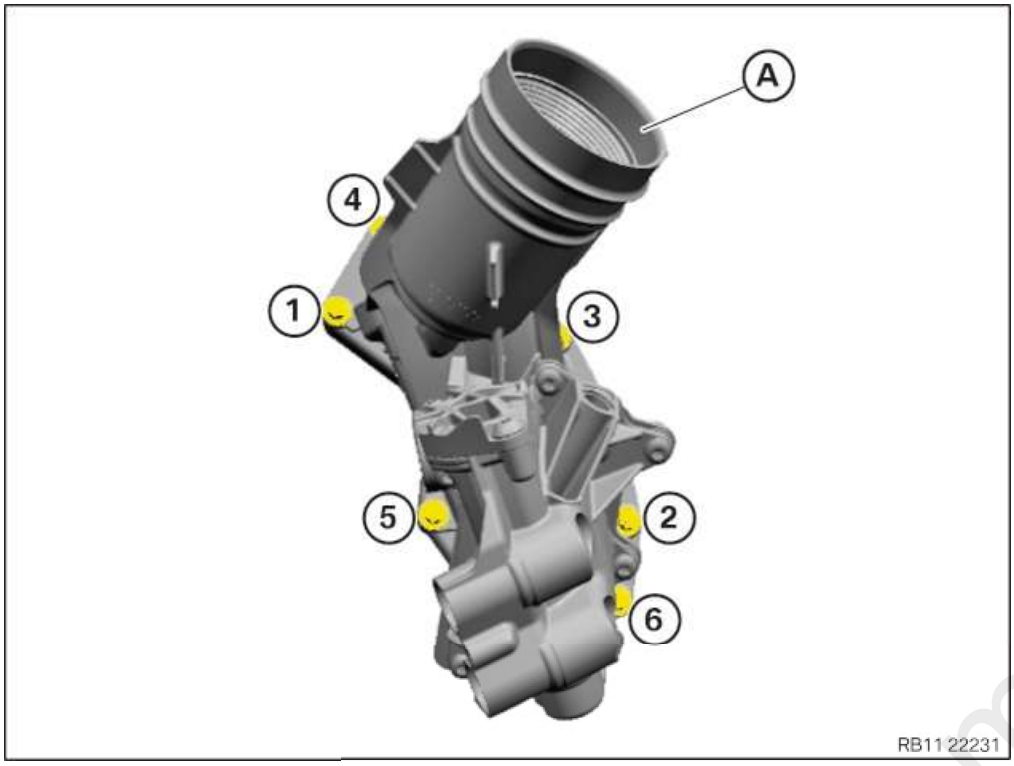


- Feed out and connecting pipe (1) in **direction of arrow** from the heat management module (2).

25 – Remove full-flow oil filter.

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Full-flow oil filter



A Full-flow oil filter

1 to 6 Bolts

RISK OF DAMAGE

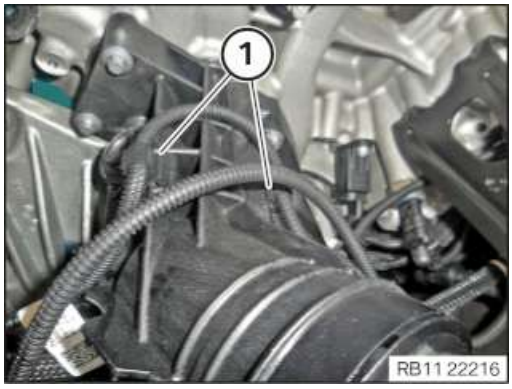
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

TECHNICAL INFORMATION

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



- Loosen clamps (1).

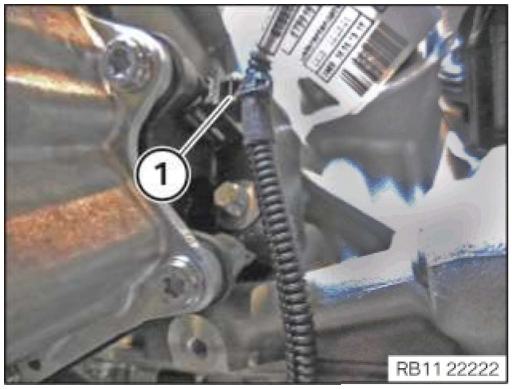
cardiagn.com



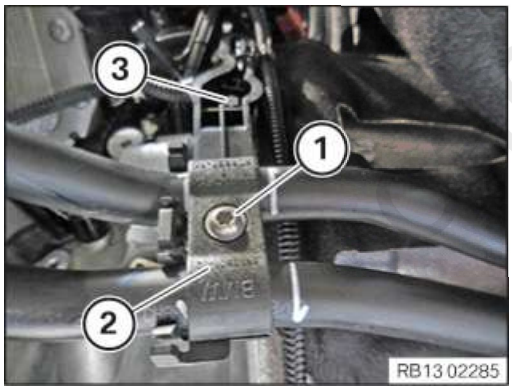
- Loosen clamps (1).



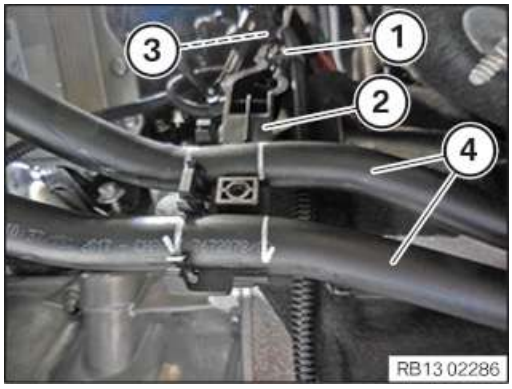
- Thread out transmission oil line (1) and set aside.
- Loosen clamp (2).



- Loosen clamp (1).

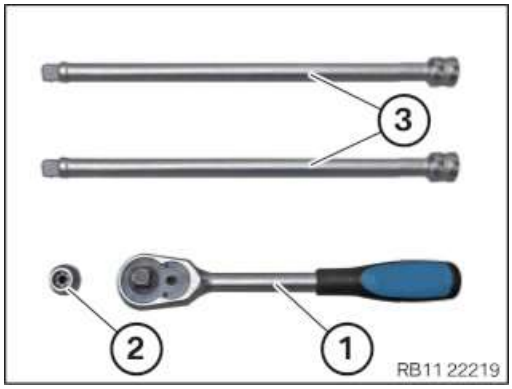


- Loosen screw (1).
- Guide out and remove holder (2).
- Loosen screw (3).



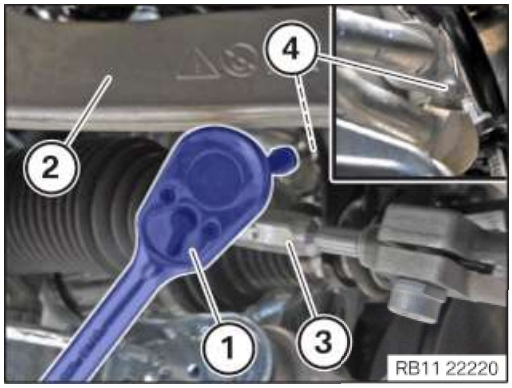
- Loosen clamp (1).
- Pull holder (2) out of guide (3).
- Pull holder (2) out of transmission oil lines (4) and remove it.

rdiagn.com

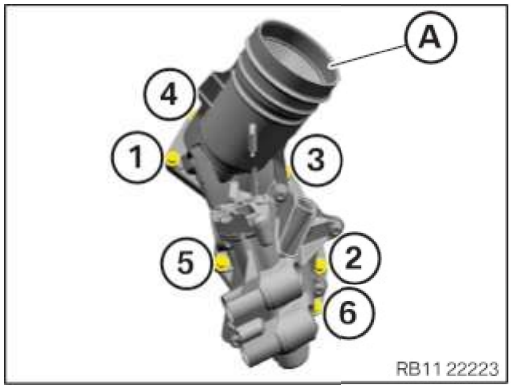


- Have the suitable tool ready.

Number	Description
1	Reversible ratchet
2	Torx socket E10
3	Reversible ratchet extension

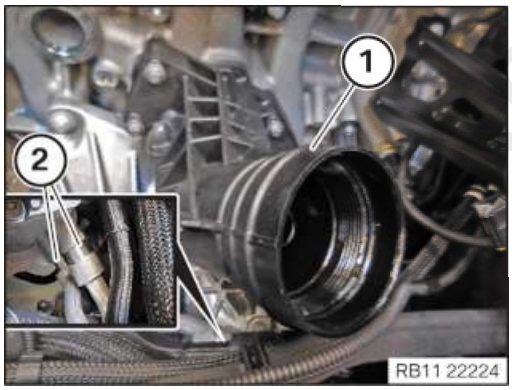


- Position the suitable tools (1) between the tension strut (2) and the track rod (3).
- Loosen screw (4).



- Release full-flow oil filter bolts (A) in the sequence (6) to (1).

Note: Release the bolts in 360 degrees steps.

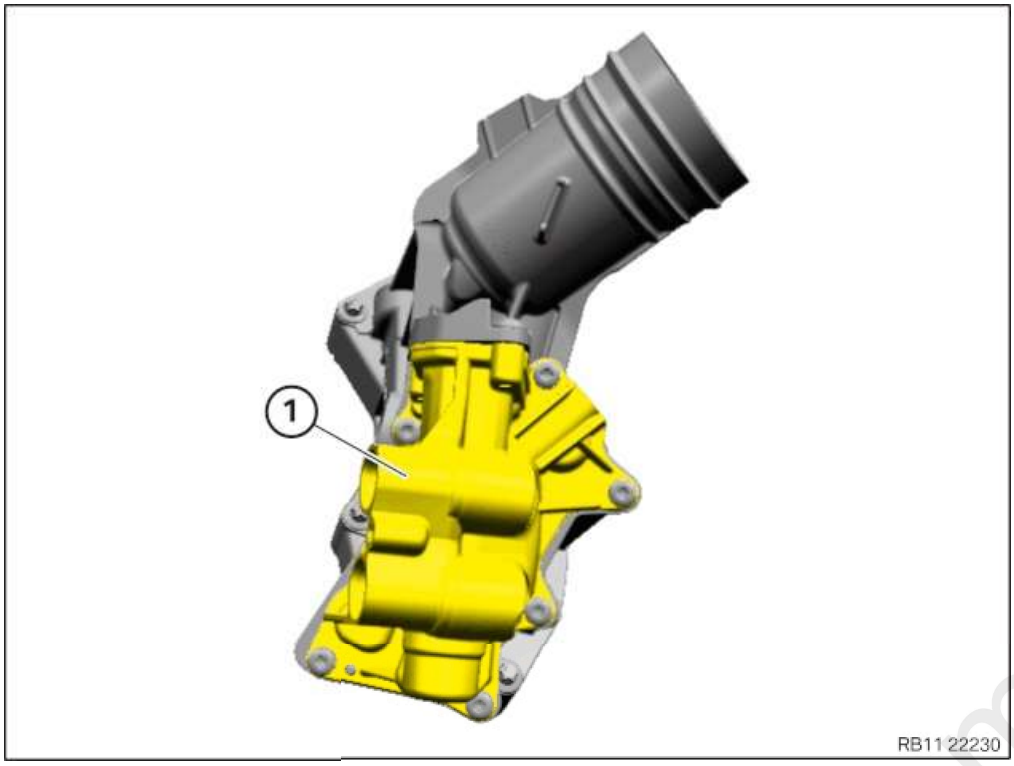


- Feed full-flow oil filter (1) out of engine oil pipes (2) and remove it.
- Collect and dispose of emerging fluids.

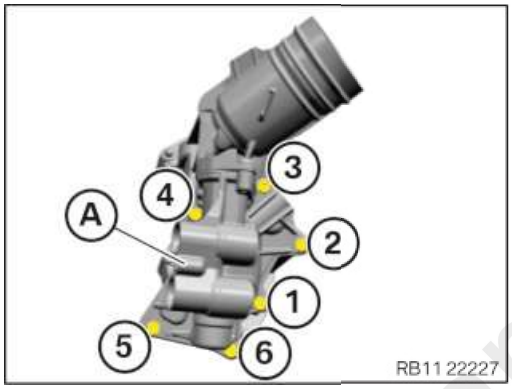
MAIN WORK

26 – Removing the cover plate

Cover plate



1 Cover plate



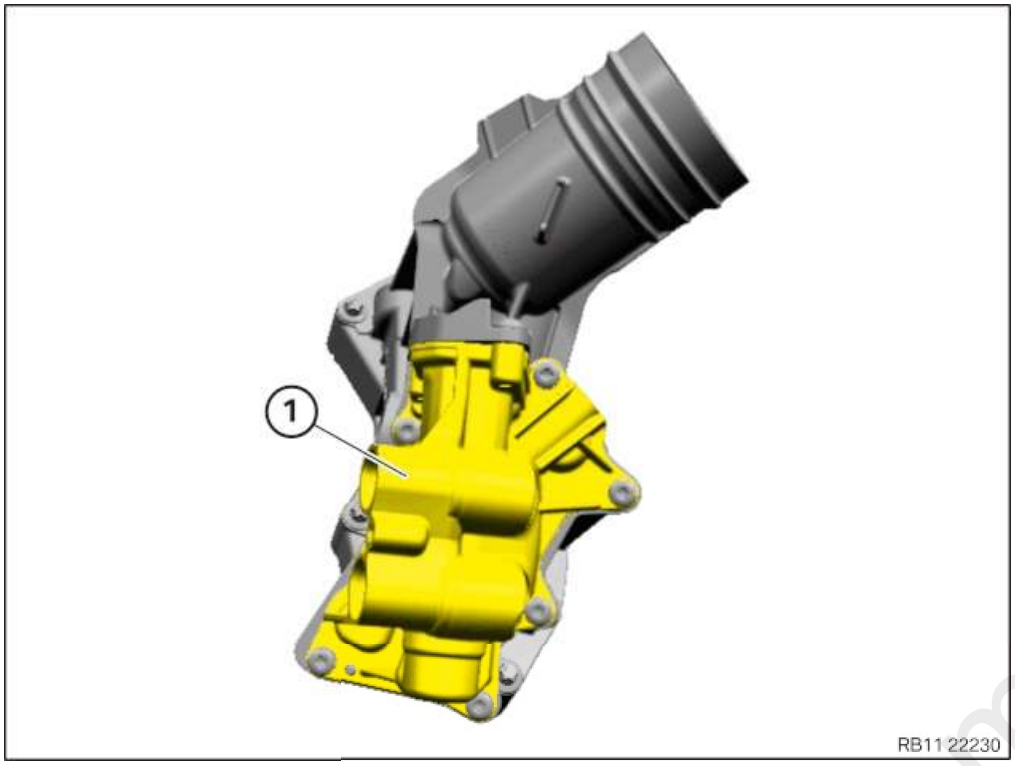
27 – Installing cover plate

- Release the screws on the cover plate (A) in the sequence (6) to (1).

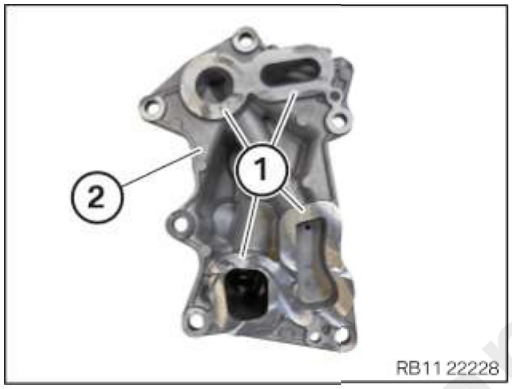
Note: Release the bolts in 360 degrees steps.

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Cover plate



1 Cover plate



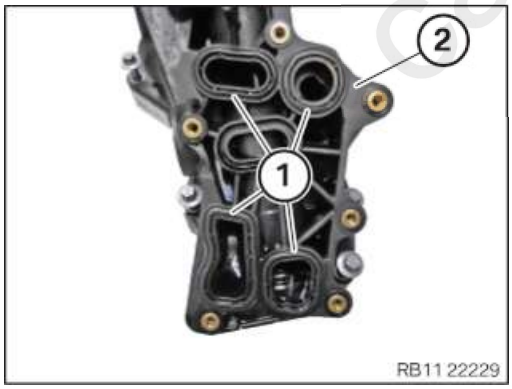
RISK OF DAMAGE

Damage to the surface.

The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

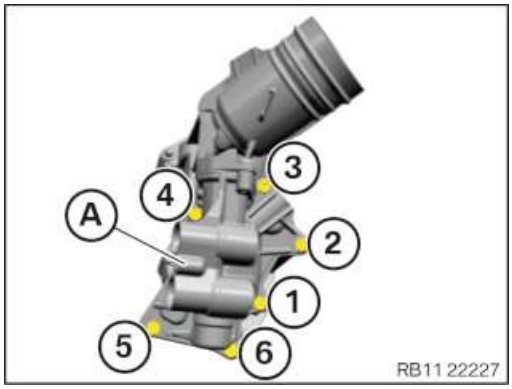
- Do not use any metal-cutting tools.

- Clean any sealing residue on sealing surface (1) of the cover plate (2)with the special tool 0 495 102 (11 4 470).



- Renew sealing rings (1) on full-flow oil filter (2).

  Parts: Sealing ring



- Tighten screws on cover plate (A) in the sequence (1) to (6).

Note: Tighten the bolts in 360 degree steps.

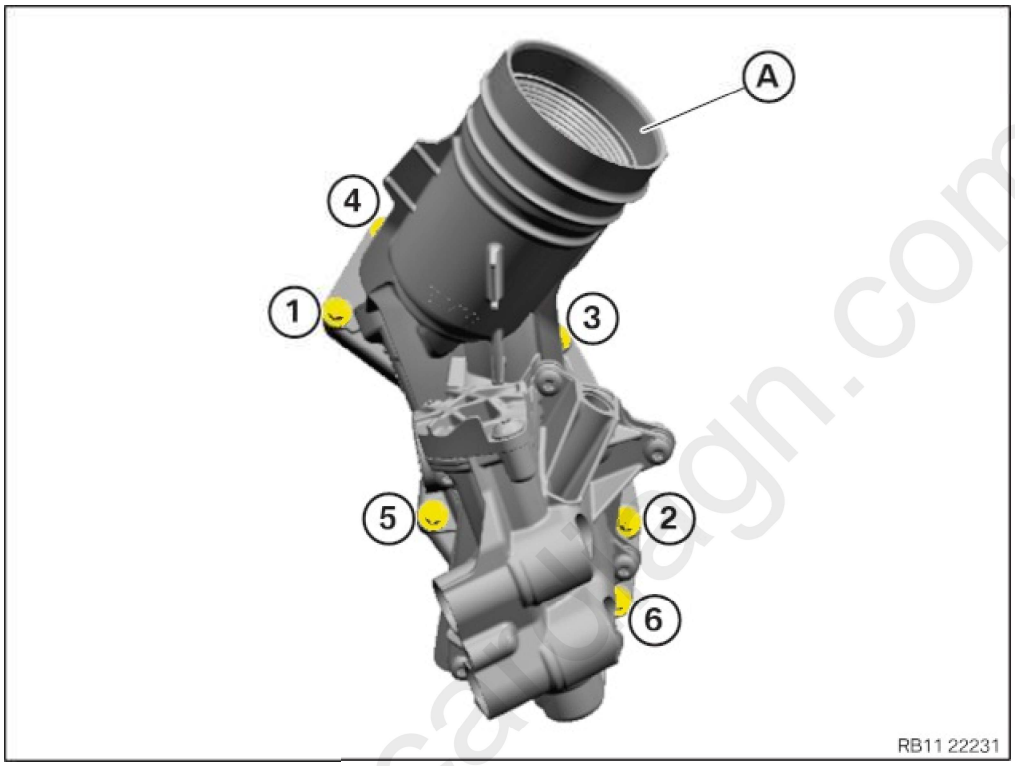
Cover plate on full-flow oil filter

Bolts	Observe tightening sequence.	Tightening torque	10 Nm
		Tightening torque	10 Nm

POSTPROCESSES

28 – Install full-flow oil filter

Full-flow oil filter

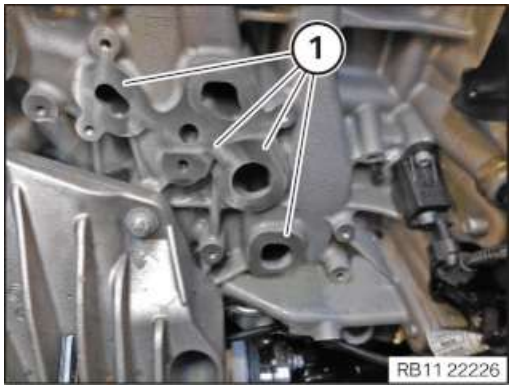


A Full-flow oil filter

1 to 6 Bolts

TECHNICAL INFORMATION

The sealing surfaces must be free from oils, grease and cleaning agents.



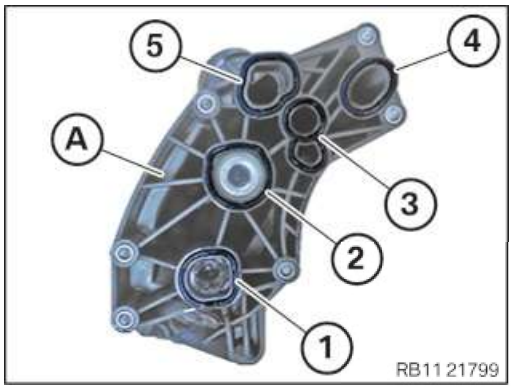
RISK OF DAMAGE

Damage to the surface.

The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

- Clean any sealing residue on sealing surfaces (1) on the crankcase with the special tool 0 495 102 (11 4 470).



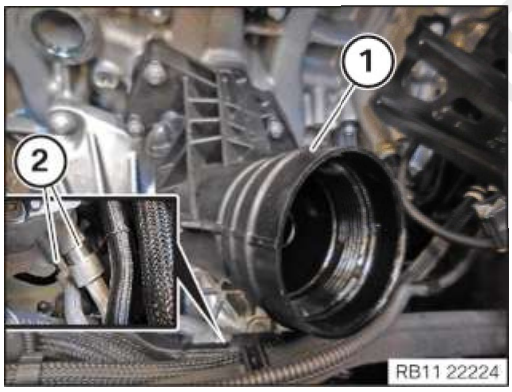
- Renew seals (1) to (5) on full-flow oil filter (A).

  Parts: Seals

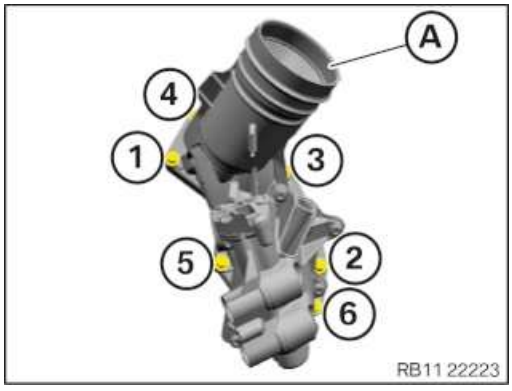


- Renew the sealing rings (1) with the special tool 0 496 714 (00 9 030).

  Parts: Sealing ring



- Guide full-flow oil filter (1) into engine oil pipes (2) and position it.



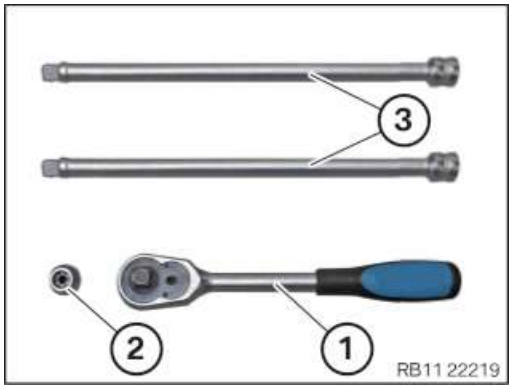
- Tighten the screws of full-flow oil filter (A) in the order (1) to (6).

Note: Tighten the bolts in 360 degree steps.

Full-flow oil filter to crankcase

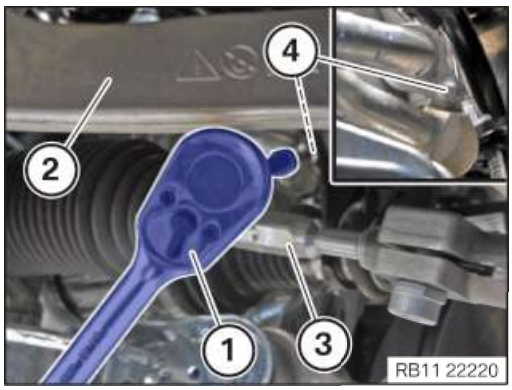
Captive screw M6	*Observe tightening sequence.*	Jointing torque Tightening torque	4 Nm 10 Nm

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- Lay out the commercially available tools.

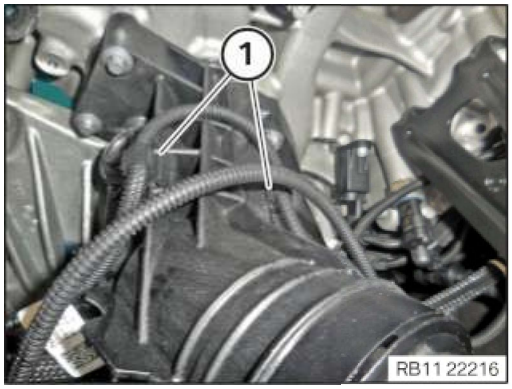
Number	Description
1	Reversible ratchet
2	Torx socket E10
3	Extension of reversible ratchet



- Position commercially available tools (1) between tension strut (2) and track rod (3).
- Tighten down screw (4).

Engine oil pipes to cover plate

M6X35		Tightening torque	8 Nm



- Secure clamps (1).

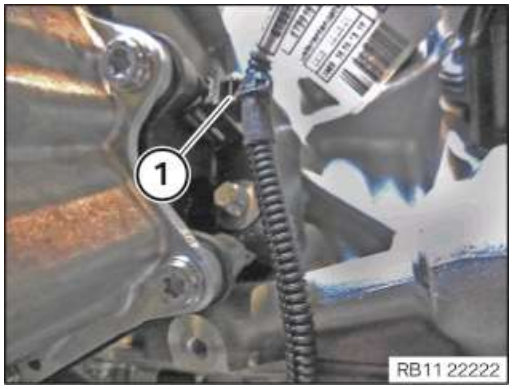


- Secure clamps (2).
- Guide in and position transmission oil line (1).

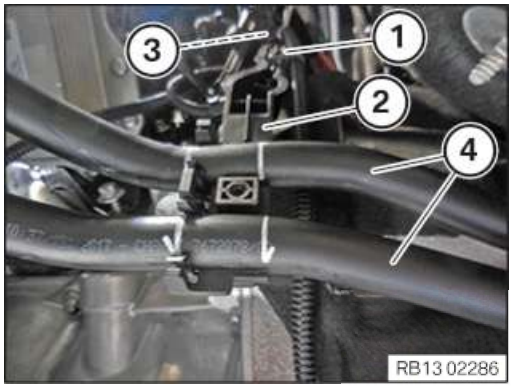


- Secure clamps (1).

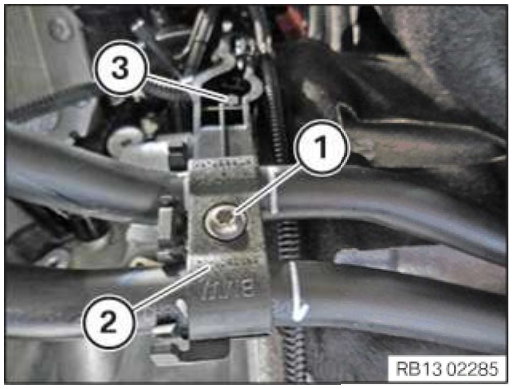
ardiagn.com



- Secure clamps (1).



- Insert and install the holder (2).
- Make sure that holder (2) is installed correctly in guide (3).
- Position transmission oil line (4) on holder (2).
- Secure clamps (1).



- Tighten down screw (3).

Holder to end cover

M6X16		Tightening torque	8 Nm

- Insert and position the holders (2).
- Tighten down screw (1).

Holder for transmission oil line

Screw	*Renew screw.*	Tightening torque	5 Nm

29 – Install heat management module

CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

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

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

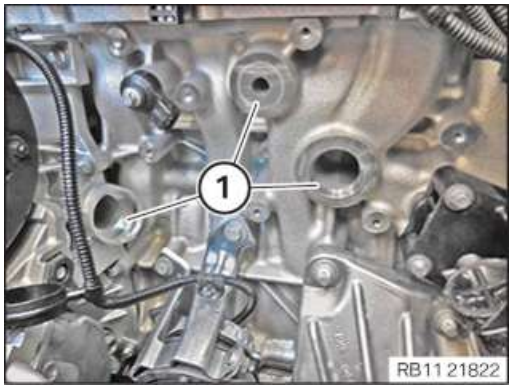
Trapped, crushed or damaged cables may cause short circuits and malfunctions.

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

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TECHNICAL INFORMATION

The sealing surfaces must be free from oils, grease and cleaning agents.



RISK OF DAMAGE

Damage to the surface.

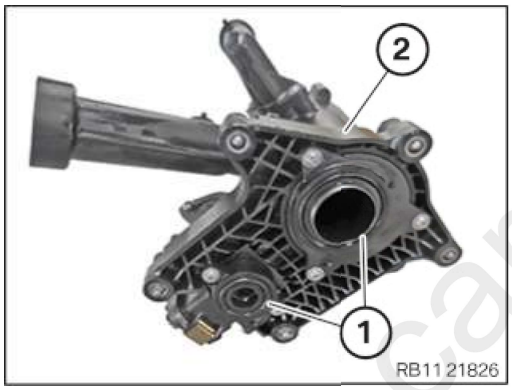
The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

- Clean sealing surfaces (1).

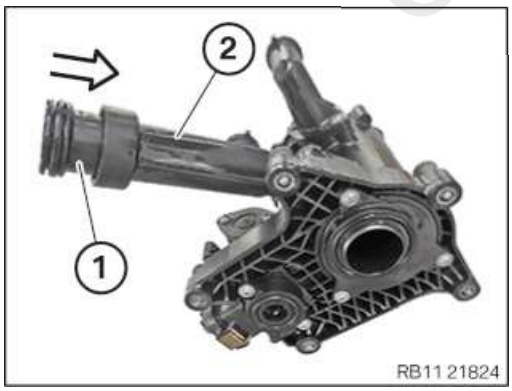


- Replace the sealing rings (1) on connecting pipe (2).
- **Parts:** Sealing ring
- Coat sealing rings (1) with coolant before installing.



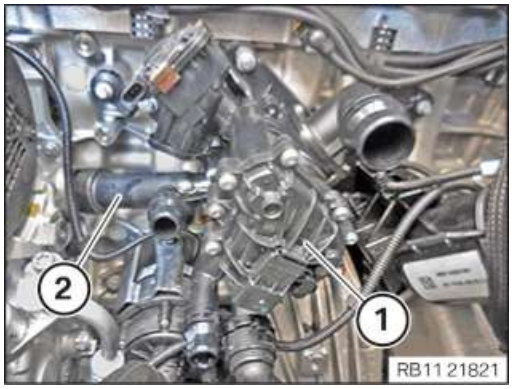
- Replace the sealing rings (1) on heat management module (2).

  Parts: Sealing ring
- Coat the sealing rings (1) on the heat management module (2) with coolant before installing.

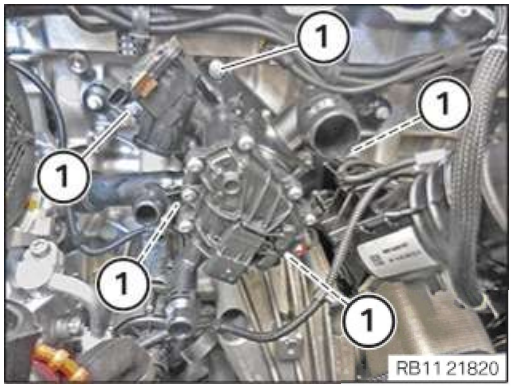


- Feed in and install connecting pipe (1) in **the direction of arrow** on heat management module (2).

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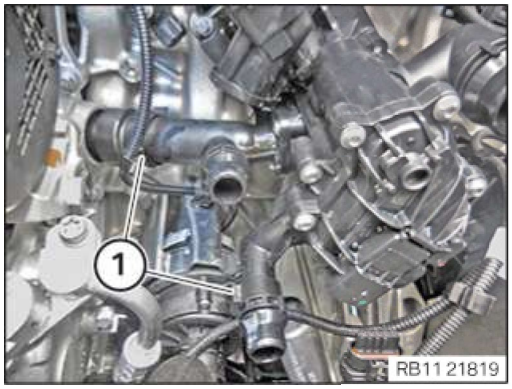
- Insert and install the heat management module (1) with the connecting pipe (2).
- Make sure that the connecting pipe (2) is **installed** correctly.



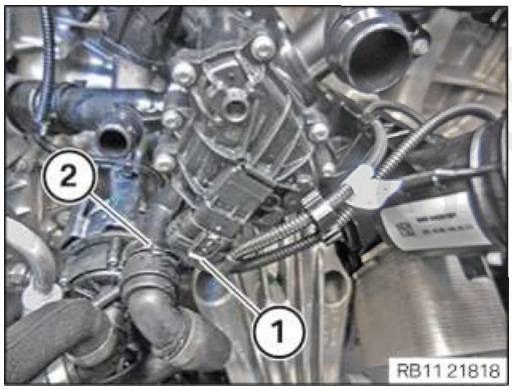
- Tighten the screws (1).

Heat exchange module to crankcase

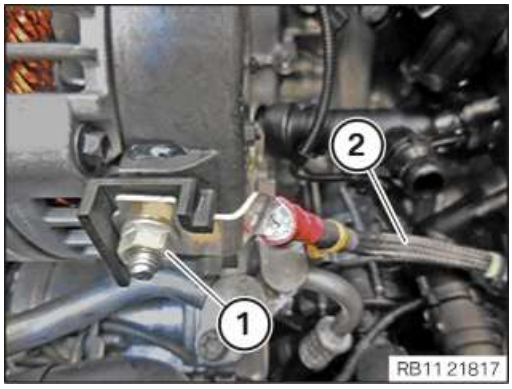
M6		Tightening torque	9 Nm



- Secure clamps (1).



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

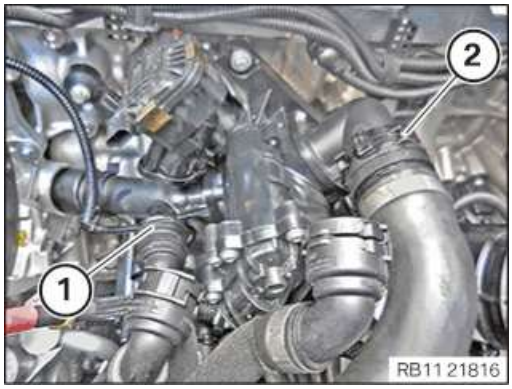


- Insert and install the positive battery cable (2).
- Tighten nut (1).

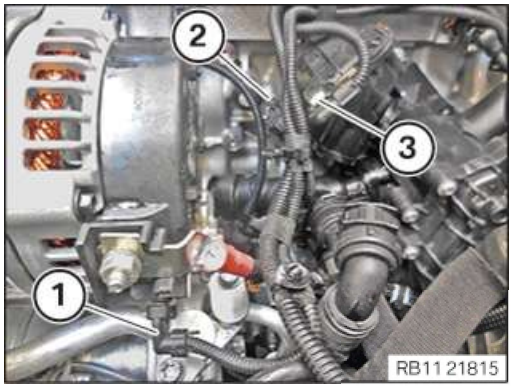
Positive battery cable to the alternator

M8		Tightening torque	19 Nm

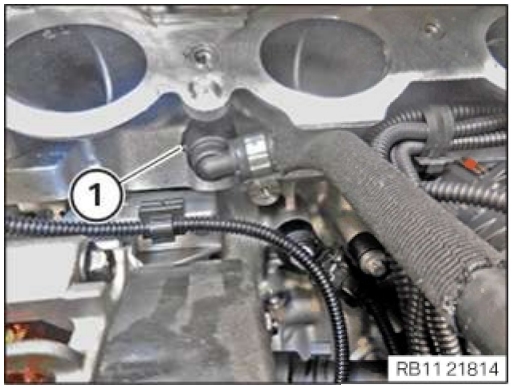
rdiagn.com



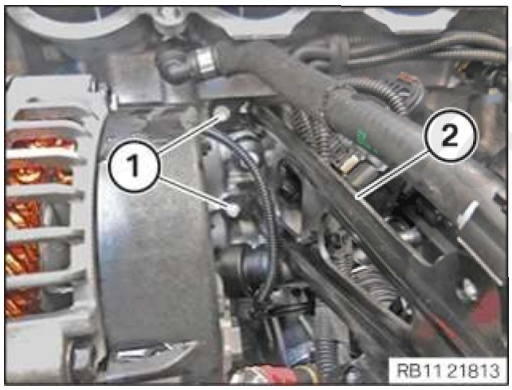
- Connect and lock coolant lines (1) and (2).
- Make sure that you can hear coolant lines (1) and (2) engage.



- Connect connector (3) to the heat management module and lock it.
- Connect connector (2) to the knock sensor and lock it.
- Connect and lock the connector (1) to the alternator.
- Ensure that the connectors (1) (2) and (3) are engaged audibly.



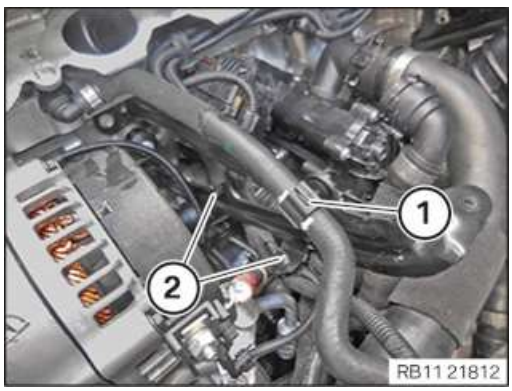
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



- Guide in and install support (2) for intake plenum.
- Tighten the screws (1).

Support to cylinder head

M6X16		Tightening torque	8 Nm



- Secure clamps (1).
- Secure clamps (2).

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RISK OF DAMAGE

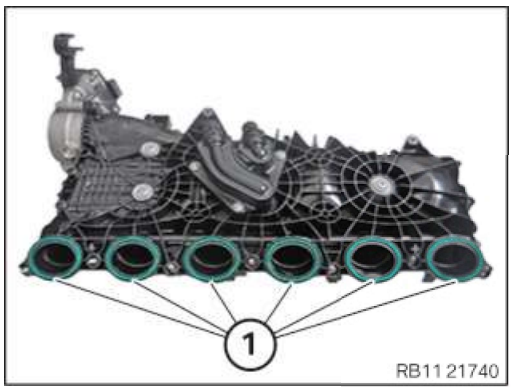
Improper routing of cables and wiring harnesses.

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.

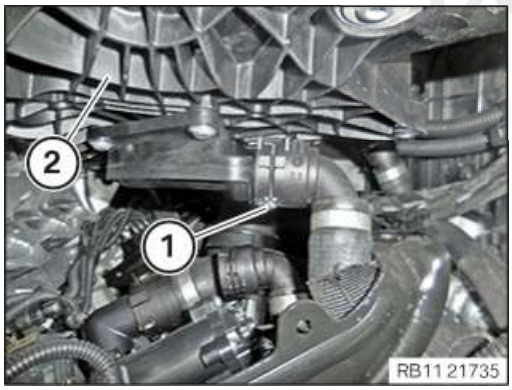


- Renew gaskets (1).

  Parts: Seals

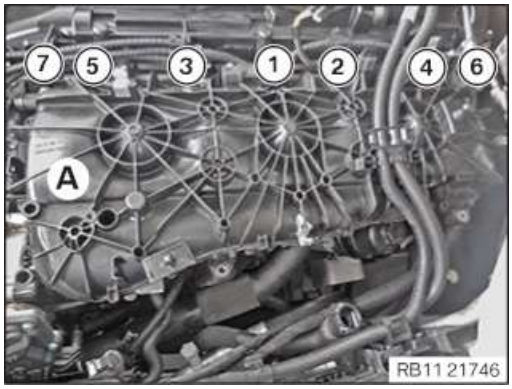


- Clean contact surface (1).



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

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TECHNICAL INFORMATION

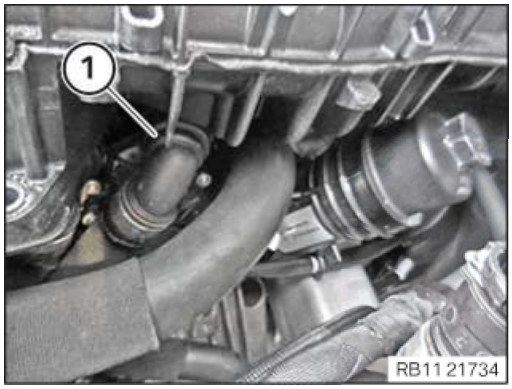
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

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

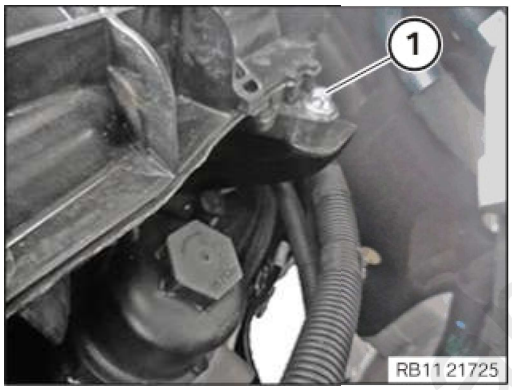
Note: Tighten the bolts in 360 degree steps.

Intake plenum to cylinder head

M6		Tightening torque	10 Nm



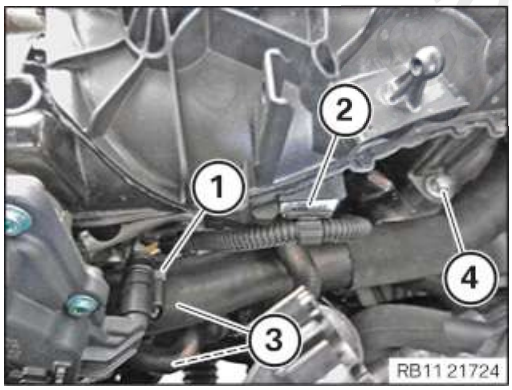
- Connect and lock coolant line (1).
- Make sure that the cooling line (1) engages audibly.



- Tighten down screw 1.

Intake plenum to support

M6X25	Tightening torque	8 Nm



- Tighten down screw (4).

Intake plenum to support

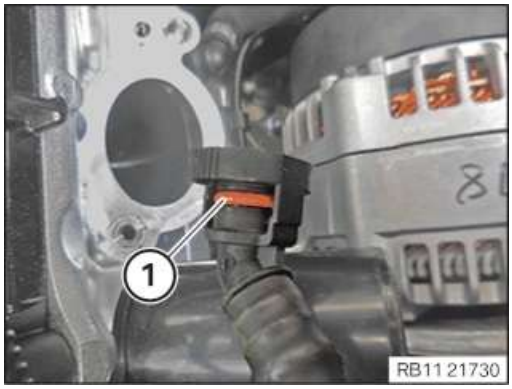
M6X25		Tightening torque	8 Nm

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

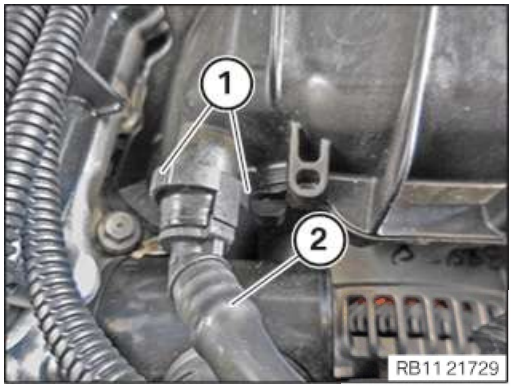


- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

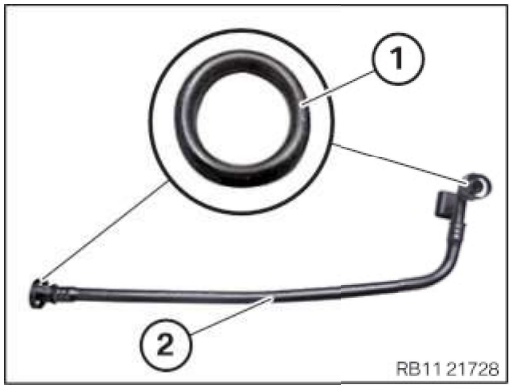
cardiagn.com



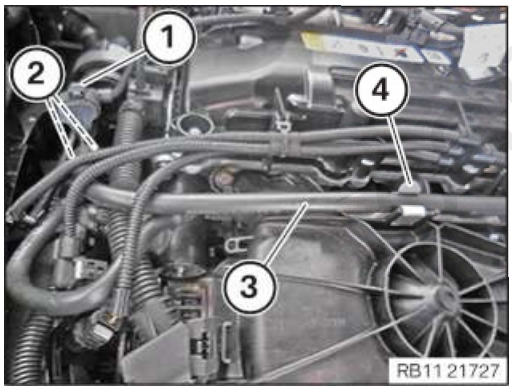
- Check sealing ring (1) for damage and renew tank ventilation line if necessary.



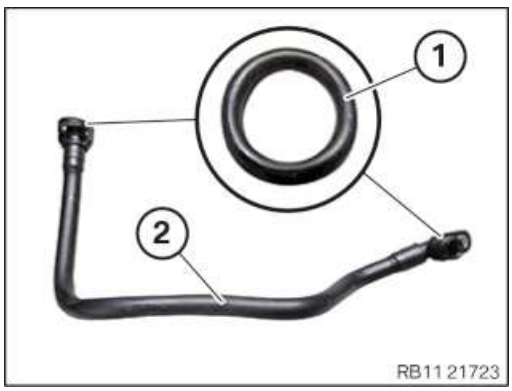
- Insert and install the tank ventilation line (2).
- Ensure that the locks (1) engage audibly.



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

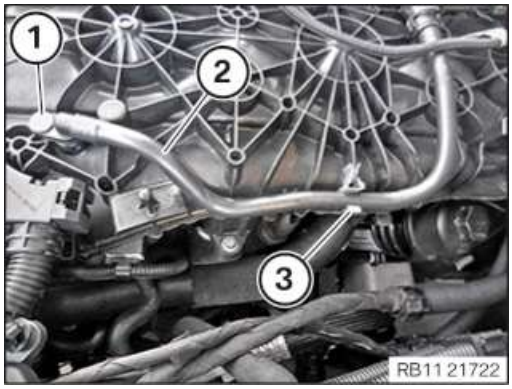


- Insert and install the tank ventilation line (3).
- Ensure that the locks (2) engage audibly.
- Secure the tank ventilation line (3) to the clamp (4).
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.



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

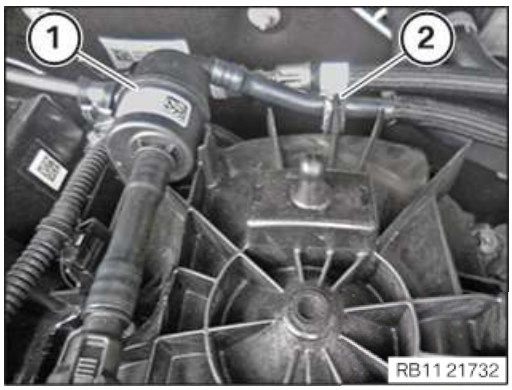
rdiagn.com



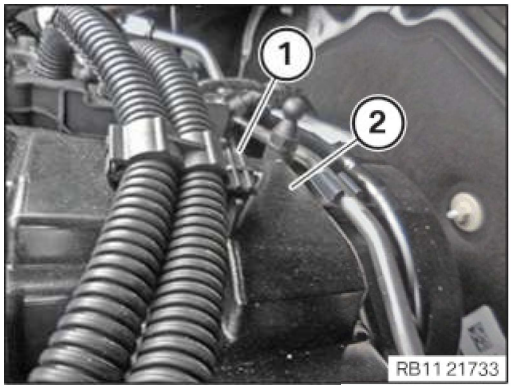
- Insert and install the tank ventilation line (2).
- Secure the tank ventilation line (2) to the clamp (3).
- Tighten down screw (1).

Tank ventilation line to intake plenum

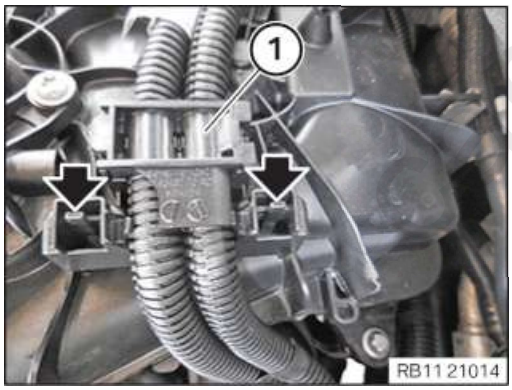
Oval-head screw		Tightening torque	3 Nm



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

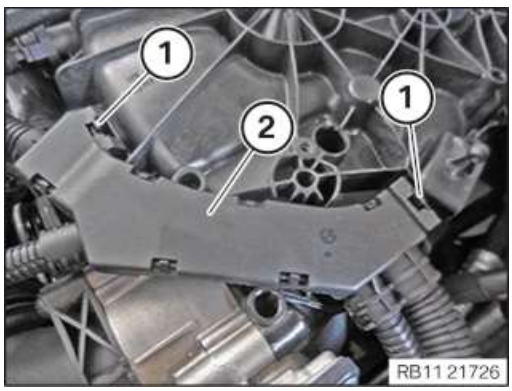


- Secure the wiring harness section(1) for the injectors and ignition coils on the cylinder head cover (2).



- Insert and install the wiring harness section (1) for the injectors and ignition coils.

  The locks (arrows) must engage audibly.

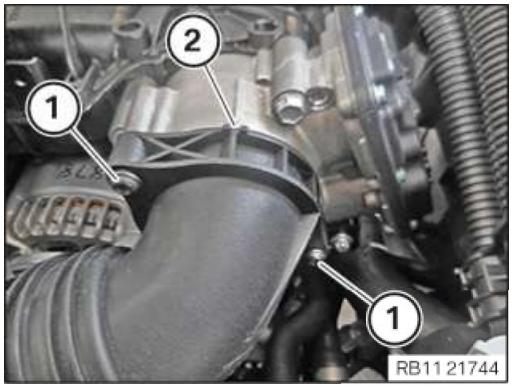


- Feed in and install wiring harness section (2) for sensor system **2**.
- Ensure that the locks (1) engage audibly.

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

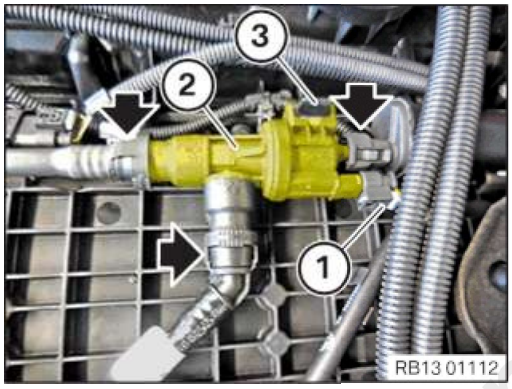


- Insert and install charge air line (2).
- Tighten the screws (1).

Charge air line to throttle valve

M6x30		Tightening torque	8 Nm

31 – Installing the tank vent valve

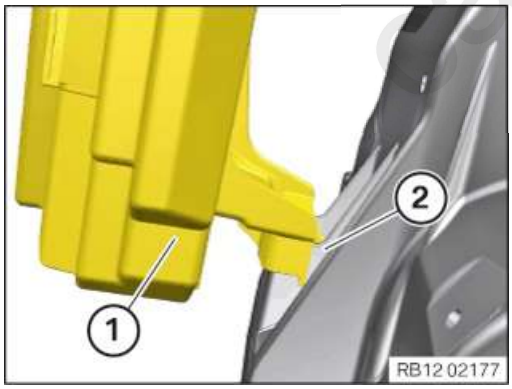


- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).

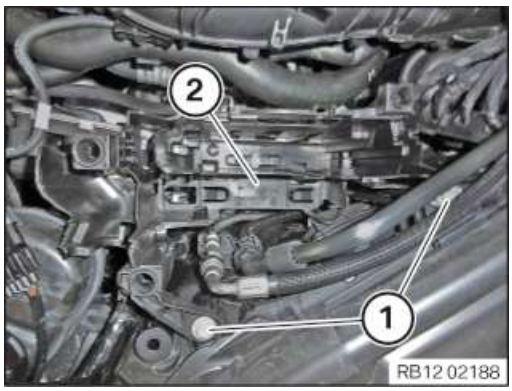
  The tank ventilation lines (arrows) must audibly engage.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

32 – Installing the control unit holder



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

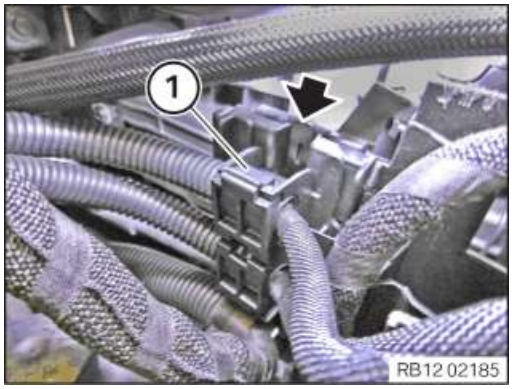


- Guide in and install control unit holder (2).
- Tighten the screws (1).

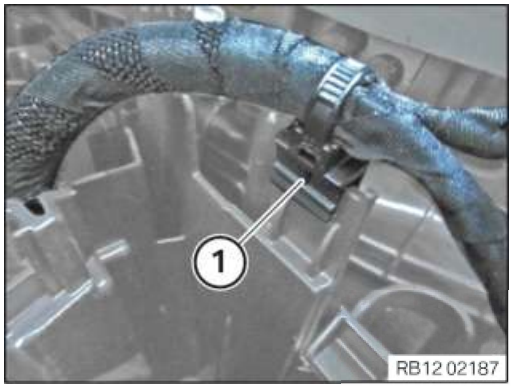
Control unit holder on spring strut dome

Hexagon screw		Tightening torque	8 Nm

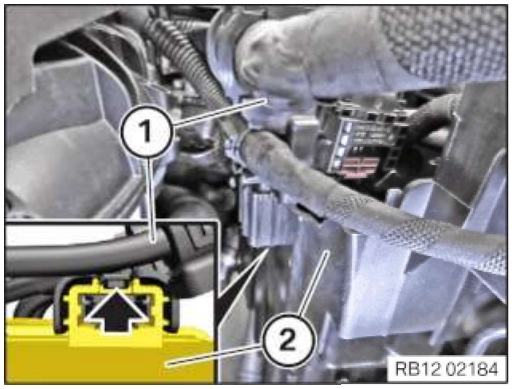
cardiagn.com



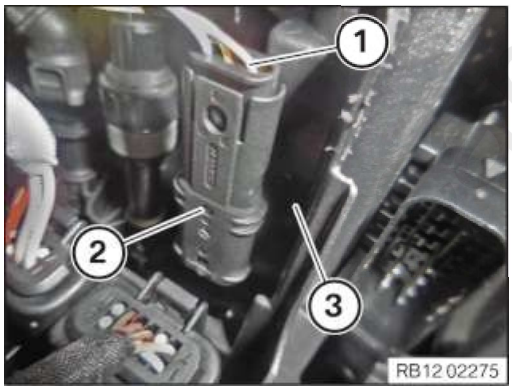
- Feed in and install the cable clip (1).
  Lock (arrow) must audibly engage.



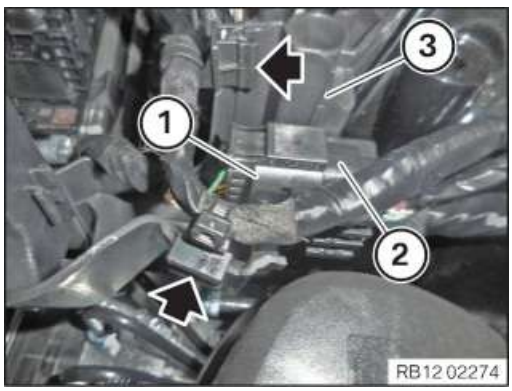
- Secure clamps (1).



- 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).

33 – Installing the integrated supply module (PDM)

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WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

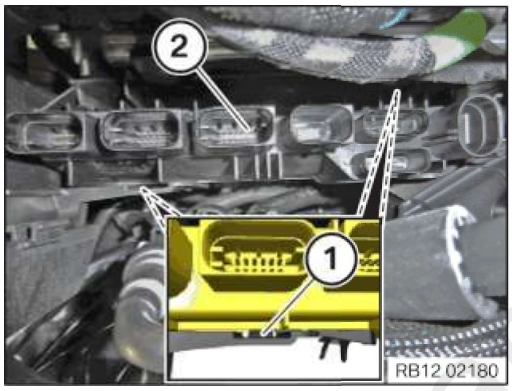
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

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).

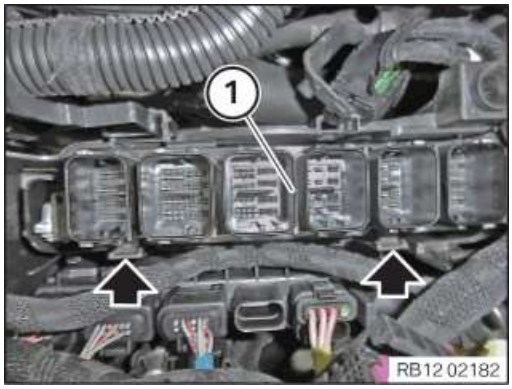
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



- Connect connectors (1) and lock.

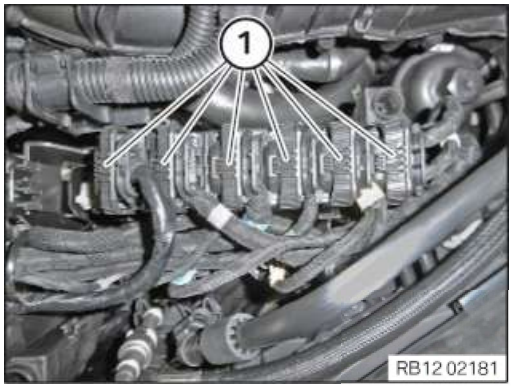
  The connectors (1) must engage audibly.

34 – Installing the DME control unit



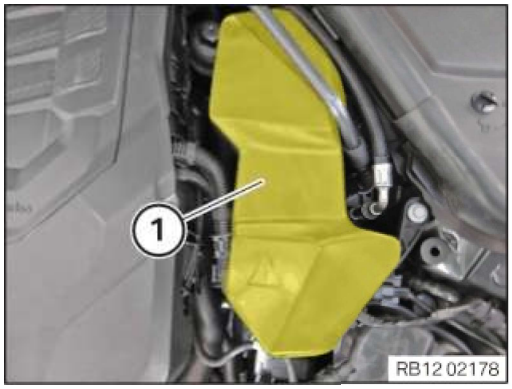
- Feed in and install DME control unit (1).

  The locks (arrows) must engage audibly.



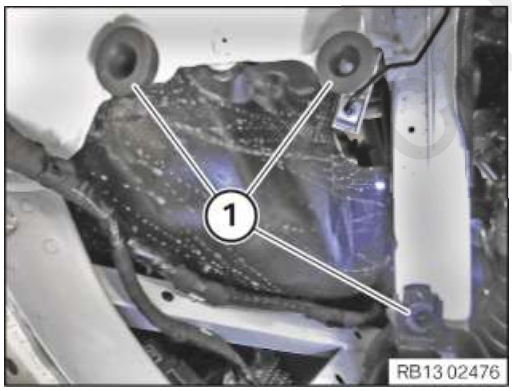
- Connect connectors (1) and lock.

  All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

35 – Installing intake silencer housing



- 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.

36 – Topping up the engine oil

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RISK OF DAMAGE

Damage to the petrol particulate filter.

Vehicles equipped with a petrol particulate filter must be operated with low-ash engine oil only.

- Use BMW Longlife-04 , BMW Longlife-12 FE or BMW Longlife-17 FE+ engine oils or engine oils approved by BMW matching the same specifications only.
- For additional information see: Overview of approved engine oils for BMW Group engines.

RISK OF DAMAGE

Engine damage caused by excessively filling the engine with engine oil.

Filling an excessive quantity of engine oil may cause engine damage.

- Observe the exact engine oil filling capacity.
- Drain the engine oil.

- Pour in engine oil.

Engine oil B58B30M1/B58B30O1

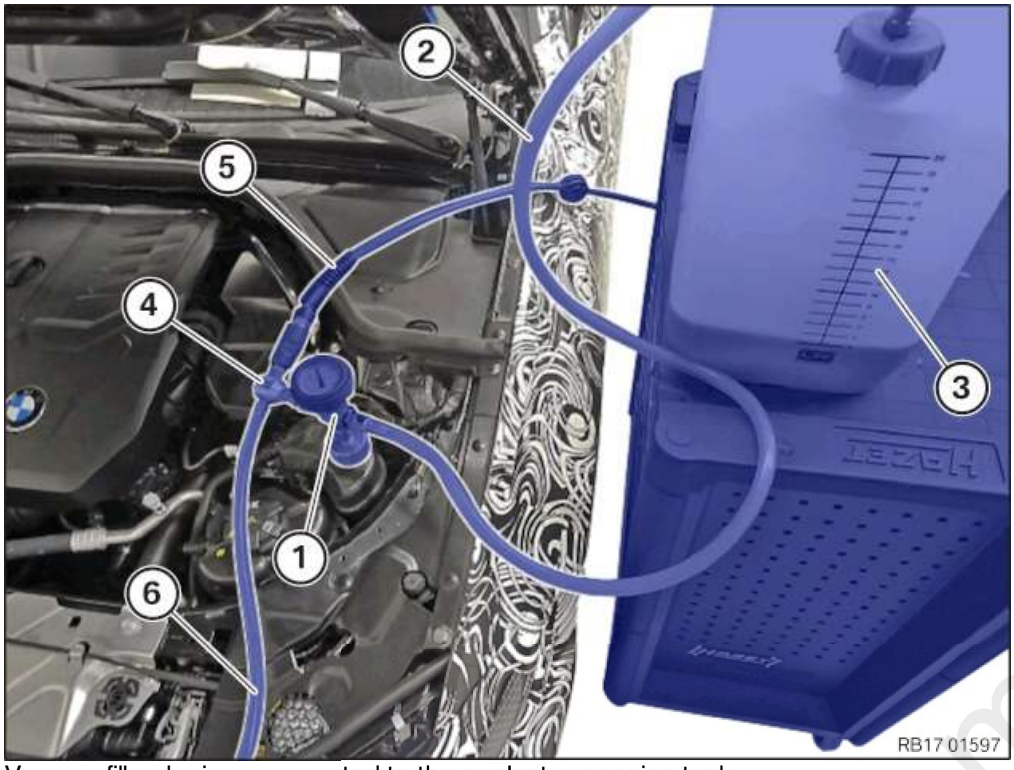
Filling capacity, engine oil change with oil filter element	6,50 l

Engine oil: Technically suitable engine oils for BMW Group engines

37 – Filling the low-temperature cooling system with the vacuum filler device

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Vacuum filler device



Vacuum filler device - connected to the coolant expansion tank

1 Vacuum filler device with pressure gauge and shutoff valves

2 Filling hose

3 Fluid tank with coolant

4 Venturi nozzle

5 Compressed air connection (maximum of 6 bar)

6 Out-going hose (lead out-going hose into a collecting vessel)

Prerequisite

The coolant expansion tank for the cooling system must be empty. The fluid tank of the vacuum filler device must have a sufficient quantity of premixed coolant, 1 l to 2 l more than the specified capacity for the vehicle. The fluid tank of the vacuum filler device must be positioned at the same height as the coolant expansion tank. The compressed air connection must have a pressure of 6 bar. Ignition is switched off.

TECHNICAL INFORMATION

Follow notes for repair work on the cooling system.

For additional information see:

Main group 17

17 00 ... Notes for working on the cooling system

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

Mixing different coolants is not permitted.

TECHNICAL INFORMATION

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

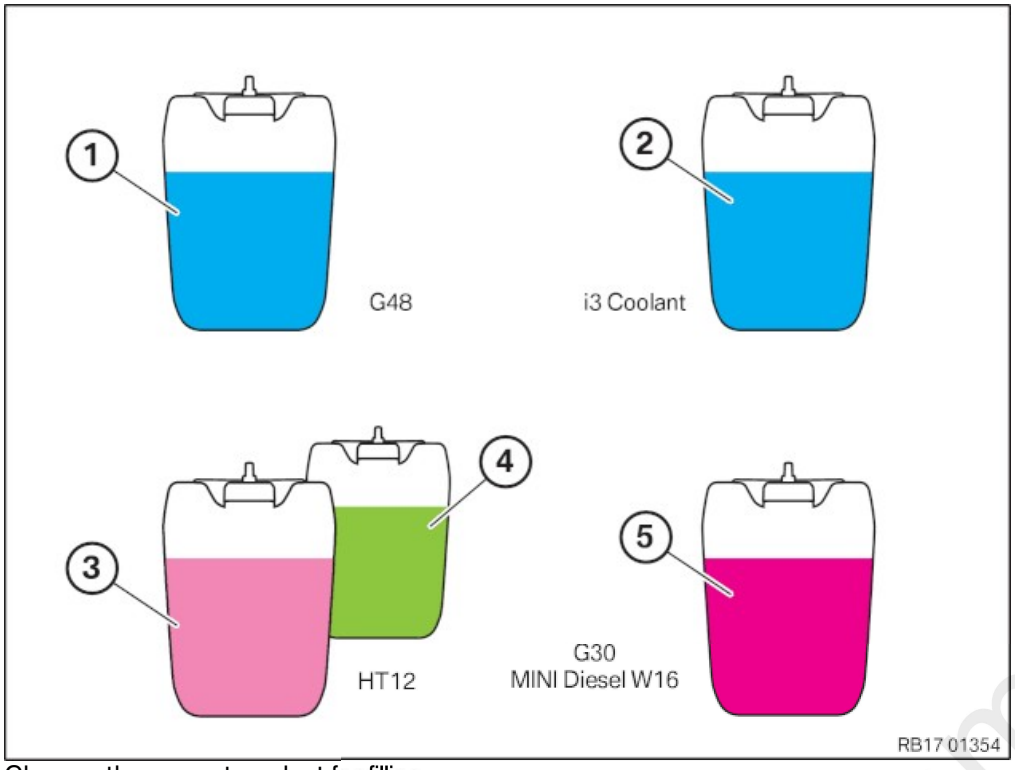
TECHNICAL INFORMATION

Make sure that the ignition (terminal 15) is switched off prior to creating the vacuum with the vacuum filler device.

▸ **Observe the coolant type**

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Coolant in the vacuum filler device container



Choose the correct coolant for filling

A vehicle must be filled with the coolant with which it is delivered ex works

1. G48 (Blue) G48 must not be mixed with the i3Coolant or the G30 MINI diesel fuelW16.

2. i3 coolant (blue) is used only for the i3 heater circuit. i3 coolant must not be filled in the other coolant circuits or mixed with the other coolants.

3. HT12 (Pink) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

4. HT12 (Green) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

5. G30 (Pink) must be used only for the **MINI diesel fuel W16**. G30 must not be filled in the other coolant circuits or mixed with the other coolants.

RISK OF DAMAGE

Damage to the engine.

The use of an incorrect coolant may lead to corrosion or gelling in the engine.

- Use only approved coolants for the specific vehicle.
- Fill the vehicle only with the coolant with which it was delivered ex works.
- Mix only compatible coolants. The colour does not allow any assessment about the compatibility of coolants.
- Selection of the correct coolant only by means of the part number.

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- Select a suitable adapter (Y) from the set of special tools 0 494 417 (17 0 100):

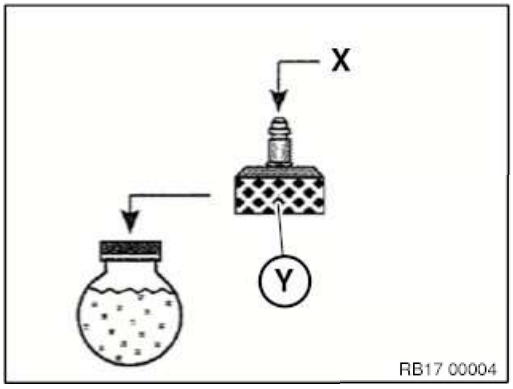
Type	Engine	Adapter (Y) from 17 0 100
G20/G29	B46 / B48 /B58	17 0 109

- The fluid tank of the vacuum filler device must be filled with 1 l to 2 l more than the specified capacity of coolant for the vehicle.

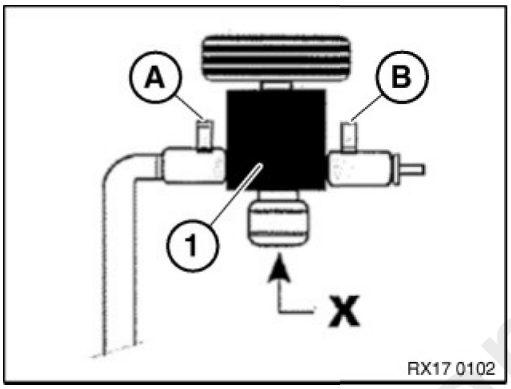
Capacity of low-temperature coolant circuit G20/G29

B58B30O1	4,5 l

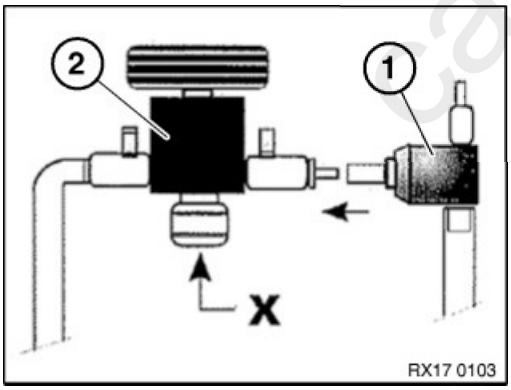
Expendable materials: Technically suitable antifreeze and corrosion inhibitor



- Connect the selected adapter (Y) to the coolant expansion tank.
- Connect vacuum filler device to connection (X) of the adapter.

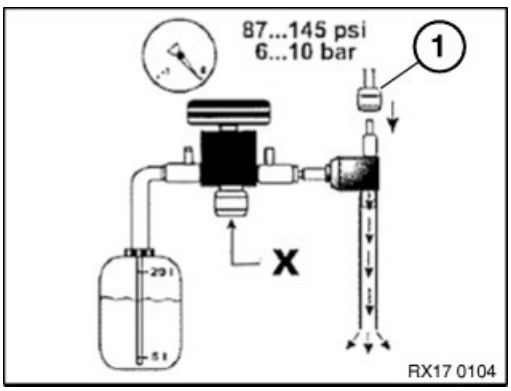


- Check that shutoff valves (A) and (B) of the vacuum filler device (1) are closed.
- Connect and lock connection (X) to the coolant expansion tank.



- Connect Venturi nozzle (1) to the vacuum filler device (2).

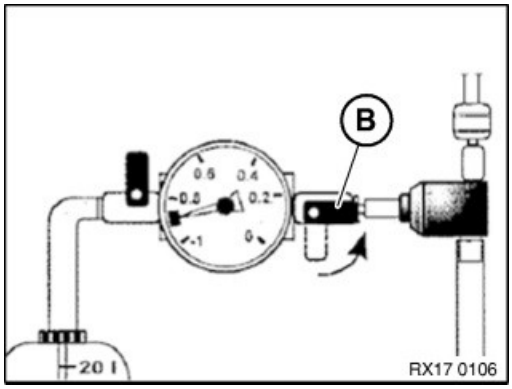
  (X)is the connection on the coolant expansion tank.



- Connect compressed air (1).

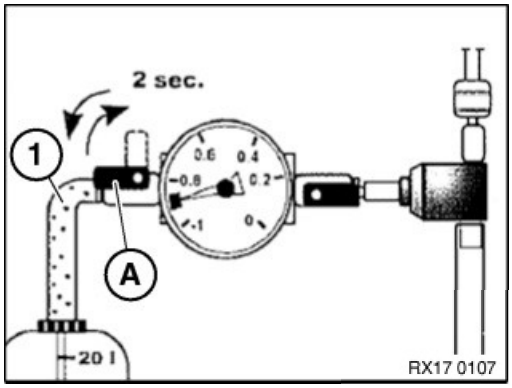
  (X)is the connection on the coolant expansion tank.

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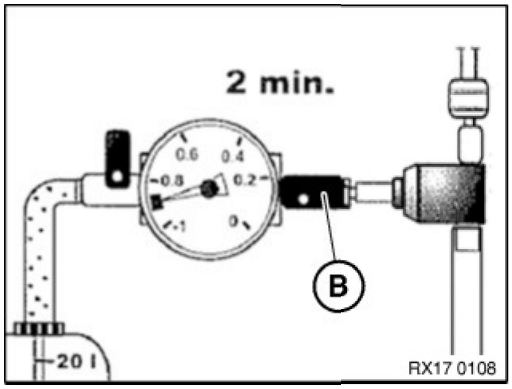
- Open shut-off valve (B).

  The venturi nozzle produces a flow noise.



- Open shutoff valve (A) until the fuel filling hose (1) is full without bubbles.
- Close shutoff valve (A) again.

» The filling hose (1) has now been bled.

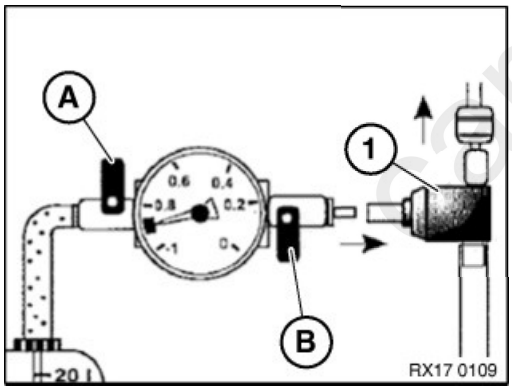


- Check the coolant hoses for porosity and renew porous coolant hoses as required.

TECHNICAL INFORMATION

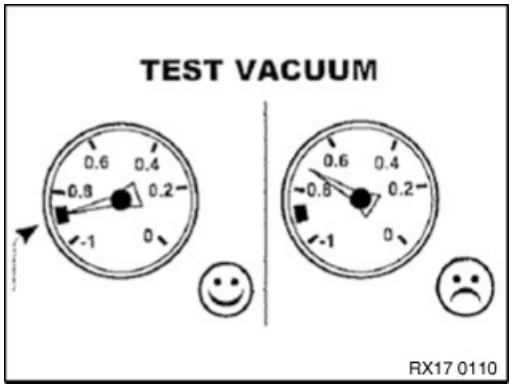
The coolant hoses contract during vacuum build-up.

- After a vacuum of -0.7 to -0.95 bar has been created in the coolant circuit (duration approx. 2 min), shut the shutoff valve (B).



- Check whether the shutoff valves (A) and (B) are closed.
- Disconnect the Venturi nozzle (1).

Check



- The vacuum in the coolant circuit must be maintained for at least 30 seconds.

Result

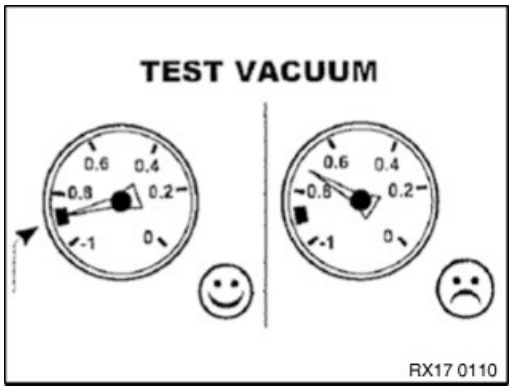
» Vacuum drops.

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Measure

- Look for the leak, repair it and start the filling procedure from the beginning.

Check



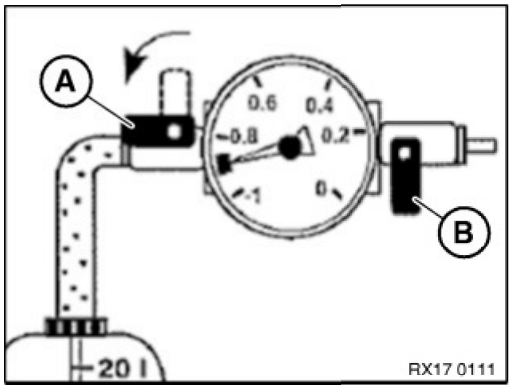
- The vacuum in the coolant circuit must be maintained for at least 30 seconds.

Result

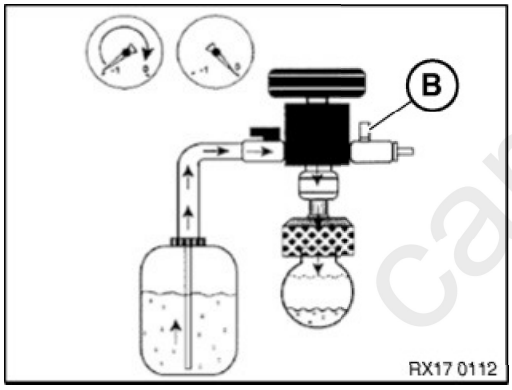
» Vacuum remains constant.

Measure

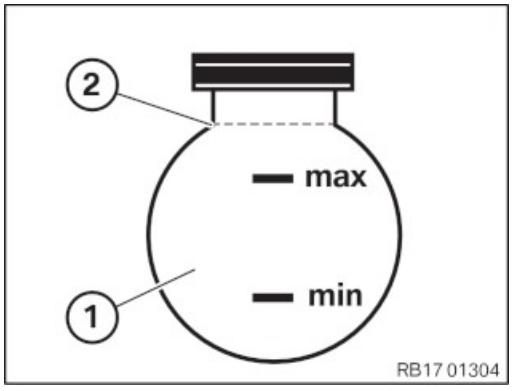
- Continue with filling.



- Keep shutoff valve (B) closed during the filling process.
- To fill the cooling system, open the shutoff valve (A) to the fluid tank of the vacuum filler device.



- Stop the filling procedure when the needle in the pressure measuring device is on 0 bar or it no longer drops.
- If necessary, reduce remaining vacuum. In order to do so, open shutoff valve (B).

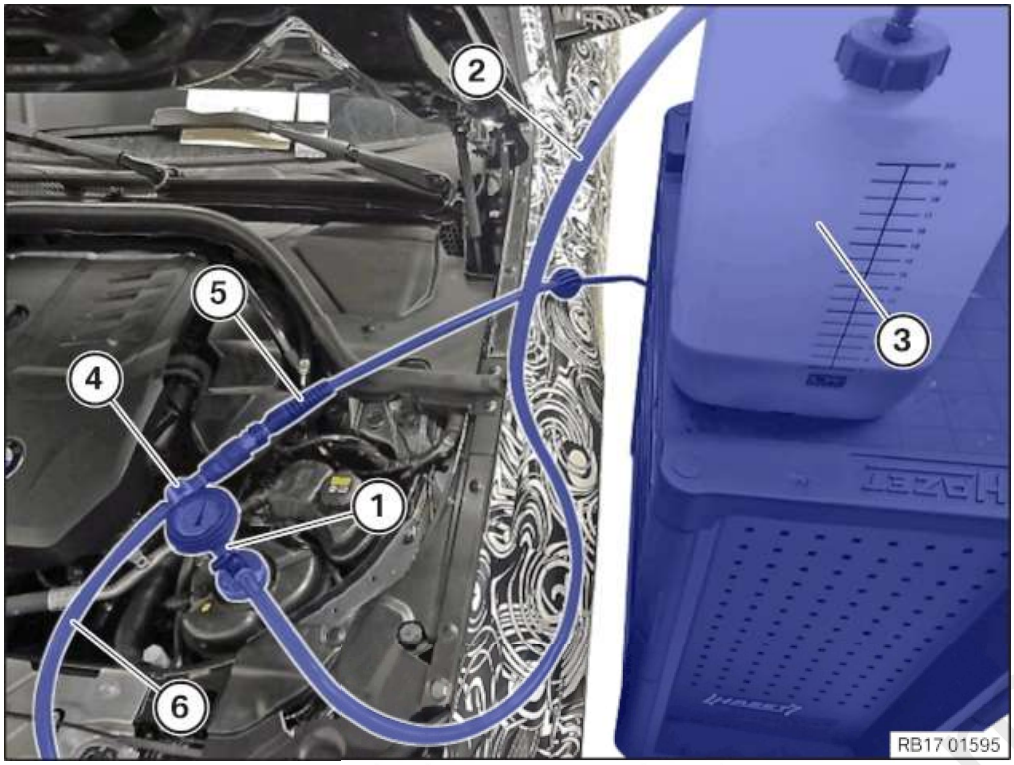


- Remove the vacuum filler device with the adapter from the low-temperature coolant expansion tank (1).
- Adjust the coolant level in the low-temperature coolant expansion tank (1) up to the lower edge of the coolant filler neck (2) of the low-temperature coolant expansion tank (1).
- After filling the cooling system with the vacuum filler device, **also** run the cooling system bleeding routine.

38 – Fill the high-temperature cooling system with the vacuum filler device

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Vacuum filler device



Vacuum filler device - connected to the coolant expansion tank

1 Vacuum filler device with pressure gauge and shutoff valves

2 Filling hose

3 Fluid tank with coolant

4 Venturi nozzle

5 Compressed air connection (maximum of 6 bar)

6 Out-going hose (lead out-going hose into a collecting vessel)

Prerequisite

The coolant expansion tank for the cooling system must be empty. The fluid tank of the vacuum filler device must have a sufficient quantity of premixed coolant, 1 l to 2 l more than the specified capacity for the vehicle. The fluid tank of the vacuum filler device must be positioned at the same height as the coolant expansion tank. The compressed air connection must have a pressure of 6 bar. Ignition is switched off.

TECHNICAL INFORMATION

Follow notes for repair work on the cooling system.

For additional information see:

Main group 17

17 00 ... Notes for working on the cooling system

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

Mixing different coolants is not permitted.

TECHNICAL INFORMATION

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

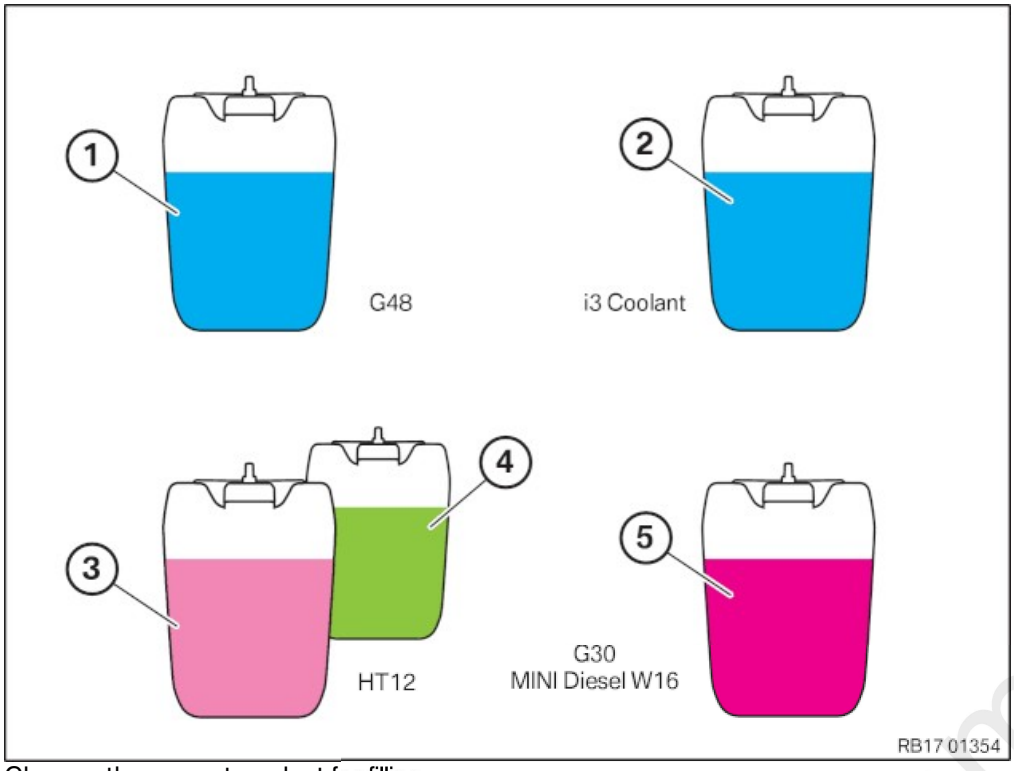
TECHNICAL INFORMATION

Make sure that the ignition (terminal 15) is switched off prior to creating the vacuum with the vacuum filler device.

▸ **Observe the coolant type**

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Coolant in the vacuum filler device container



Choose the correct coolant for filling

A vehicle must be filled with the coolant with which it is delivered ex works

1. G48 (Blue) G48 must not be mixed with the i3Coolant or the G30 MINI diesel fuelW16.

2. i3 coolant (blue) is used only for the i3 heater circuit. i3 coolant must not be filled in the other coolant circuits or mixed with the other coolants.

3. HT12 (Pink) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

4. HT12 (Green) HT12 must not be mixed with the i3 coolant or the G30 MINI diesel fuel W16.

5. G30 (Pink) must be used only for the **MINI diesel fuel W16**. G30 must not be filled in the other coolant circuits or mixed with the other coolants.

RISK OF DAMAGE

Damage to the engine.

The use of an incorrect coolant may lead to corrosion or gelling in the engine.

- Use only approved coolants for the specific vehicle.
- Fill the vehicle only with the coolant with which it was delivered ex works.
- Mix only compatible coolants. The colour does not allow any assessment about the compatibility of coolants.
- Selection of the correct coolant only by means of the part number.

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- Select a suitable adapter (Y) from the set of special tools 0 494 417 (17 0 100):

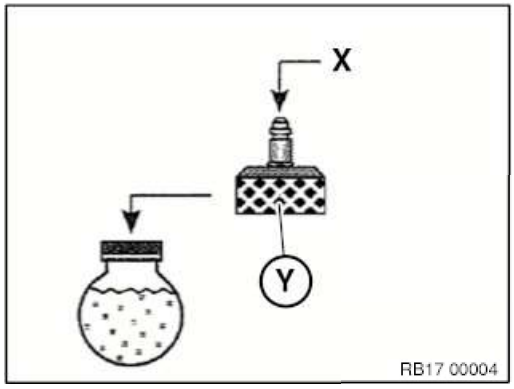
Type	Engine	Adapter (Y) from 17 0 100
G20/G29	B46 / B48 /B58	17 0 113

- The fluid tank of the vacuum filler device must be filled with 1 l to 2 l more than the specified capacity of coolant for the vehicle.

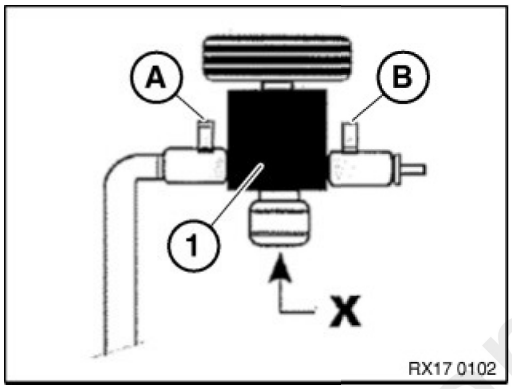
Capacity of high-temperature coolant circuit G20/G29

B58B30O1	10,5 l

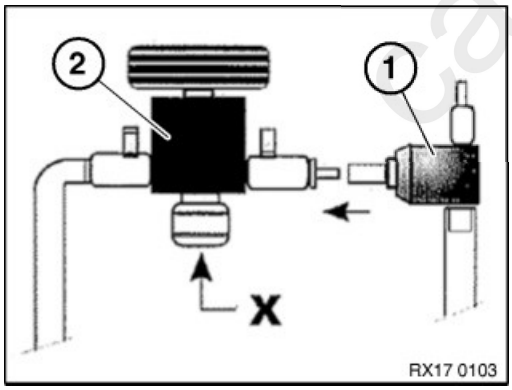
Expendable materials: Technically suitable antifreeze and corrosion inhibitor



- Connect the selected adapter (Y) to the coolant expansion tank.
- Connect vacuum filler device to connection (X) of the adapter.

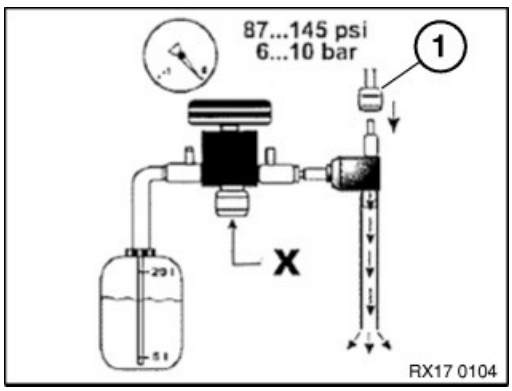


- Check whether shut-off valves (A) and (B) of the vacuum filler device (1) are closed.
- Connect and lock connection (X) to the coolant expansion tank.



- Connect Venturi nozzle (1) to the vacuum filler device (2).

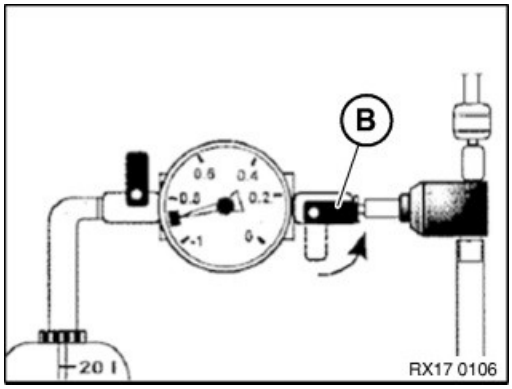
  (X)is the connection on the coolant expansion tank.



- Connect compressed air (1).

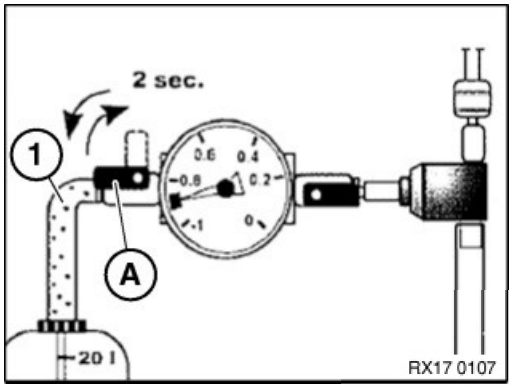
  (X)is the connection on the coolant expansion tank.

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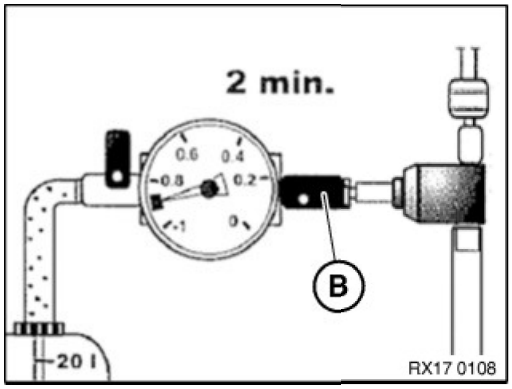
- Open shut-off valve (B).

  The venturi nozzle produces a flow noise.



- Open shutoff valve (A) until the fuel filling hose (1) is full without bubbles.
- Close shutoff valve (A) again.

» The filling hose (1) has now been bled.

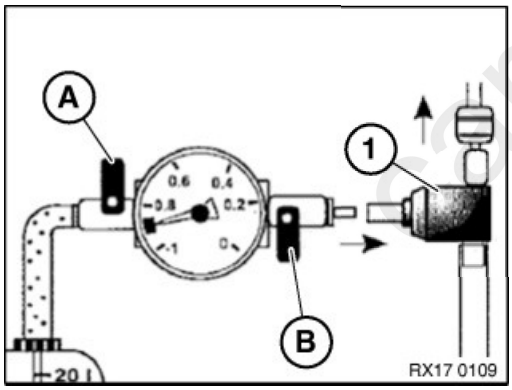


- Check the coolant hoses for porosity and renew porous coolant hoses as required.

TECHNICAL INFORMATION

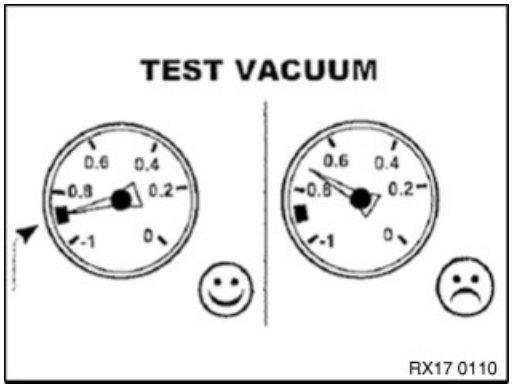
The coolant hoses contract during vacuum build-up.

- After having established a vacuum in the coolant circuit of between -0.7 to -0.95 bar (duration approximately 2 min), close the shut-off valve (B).



- Check whether the shutoff valves (A) and (B) are closed.
- Disconnect the Venturi nozzle (1).

Check



- Make sure the vacuum in the coolant circuit is maintained for at least 30 seconds.

Result

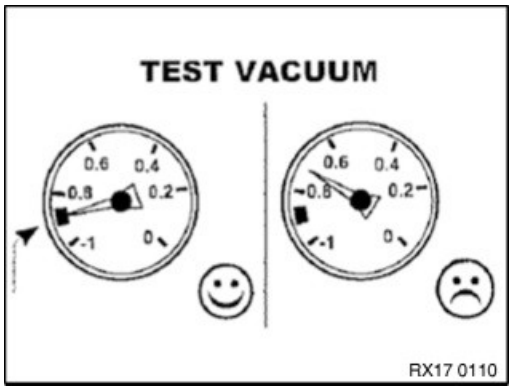
» Vacuum drops.

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Measure

- Look for the leak, repair it and start the filling procedure from the beginning.

Check



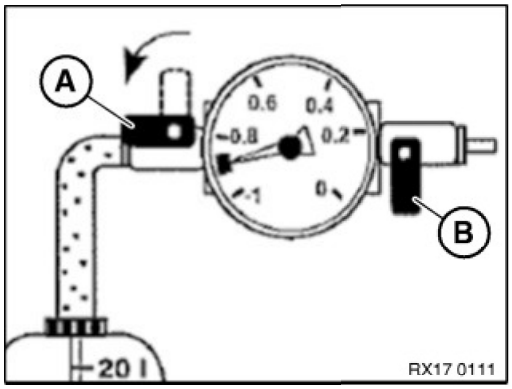
- Make sure the vacuum in the coolant circuit is maintained for at least 30 seconds.

Result

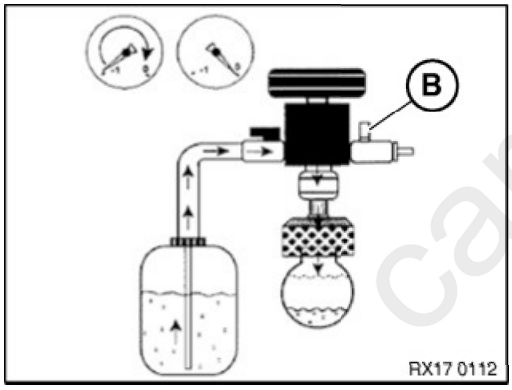
» Vacuum remains constant.

Measure

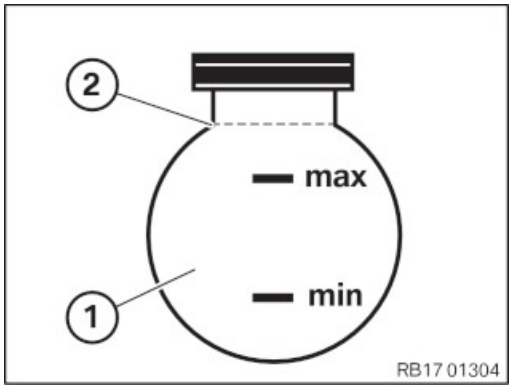
- Continue with filling.



- Keep shutoff valve (B) closed during the filling process.
- To fill the cooling system, open the shutoff valve (A) to the fluid tank of the vacuum filler device.



- Stop the filling procedure when the needle in the pressure measuring device is on 0 bar or it no longer drops.
- If necessary, reduce remaining vacuum. In order to do so, open shutoff valve (B).



- Remove the vacuum filler device with the adapter from the high temperature coolant expansion tank (1).
- Top up the coolant level in the high temperature coolant expansion tank (1) to the lower edge of the coolant filler neck (2) in the high temperature coolant expansion tank (1).
- After filling the cooling system with the vacuum filler device, **also** run the cooling system bleeding routine.

39 – Disconnecting all battery earth leads

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- See additional information.

40 – Bleed the high-temperature coolant circuit

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

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

TECHNICAL INFORMATION

Before starting the automatic cooling system bleeding routine, make sure that **all coolant circuits** are **filled**. If the cooling system bleeding routine is started while one of the coolant circuits is empty, there is a risk of damage to the electric coolant pump when running it dry.

Make sure that terminal 15 is not disconnected for the bleeding procedure. Switch on low-beam headlights and hazard warning lights. If the low-beam headlights and hazard warning lights are not switched on, the ignition (terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.

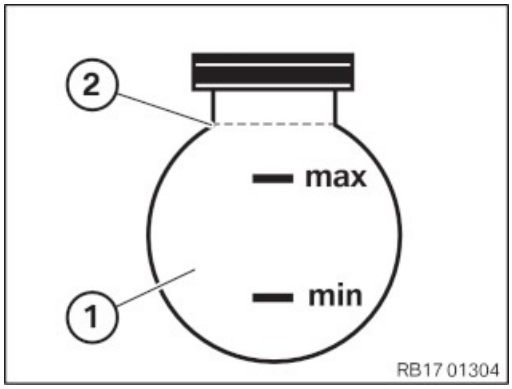
TECHNICAL INFORMATION

The electrical fan is activated during the entire cooling system bleeding routine.

TECHNICAL INFORMATION

The driving experience switch must not be set to the ECO PRO switch position.

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- Open the bleeder screw on the coolant expansion tank for the high-temperature coolant circuit and close it again after approx. **10 s**.

  You can close the bleeder screw prior to expiry of the 10 s once coolant escapes.
- Adjust the coolant level in the high temperature coolant expansion tank (1) to the lower edge (2) of the coolant filler neck of the the high temperature coolant expansion tank (1) .
- Close the sealing cap on the coolant expansion tank of the high--temperature cooling circuit.
- Make sure the bonnet is **closed**.
- Make sure that the wheels touch the ground.
- Engage the parking brake.
- Do not engage any gear in manual-shift gearbox, and engage the gear to "P" or "N" automatic transmission.
- Connect battery charger.
- Switch on the ignition and make sure that it remains **switched on** (for example, activate the low-beam headlight and the **hazard warning light at the same time**).

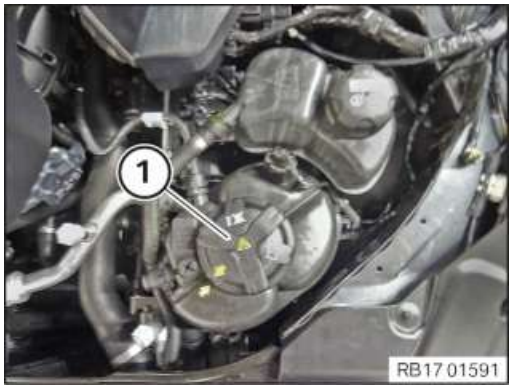
  If the low-beam headlight and the hazard warning light are **not** switched on, the ignition (**terminal 15**) will switch off automatically after some time and interrupts the bleeding procedure.
- Check that the driving experience control is **not** in the **"ECO-PRO"** switch position.
- Adjust the heating to **maximum** temperature and adjust the blower to the **lowest** stage.
- Hold the accelerator pedal down to the limit position for at least **10 s** and do **no** kick the brake pedal.
- Start engine.
- Start the cooling system bleeding routine, pay attention to the display on the instrument cluster (KOMBI). ("Service function started")

  The engine speed (up to 3500 rpm) and the actuators in the cooling system are activated **automatically** for 11 minutes according to a cooling system bleeding routine.

  The cooling system bleeding routine ends approx. 11 min **after** the engine starts.

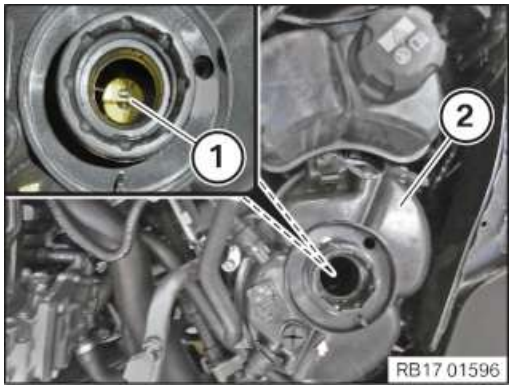
  The engine speed **drops** to the idle speed.
- Observe the display *in the instrument cluster* (KOMBI).

  If the service function is interrupted, the cooling system bleeding routine **must** be repeated.
- Switch off engine.
- Allow the coolant temperature to cool down to **< 50°C**.



- Loosen sealing cap (1).

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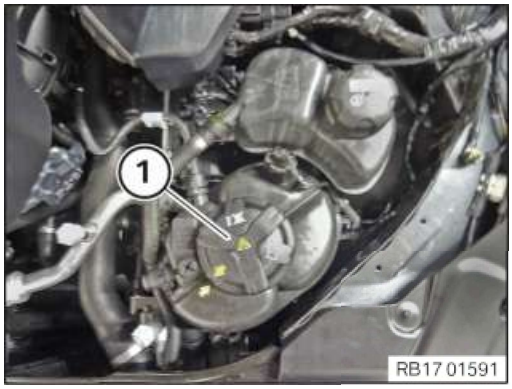
TECHNICAL INFORMATION

After the cooling system bleeding routine, the cooling system is topped up above the maximum mark.

Overfilling the cooling system serves to balance the remaining air in the cooling system.

The normal filling level of the coolant is reached while driving.

- Adjust the filling level in the coolant expansion tank (2) of the high-temperature coolant circuit to **200 ml** over the **maximum mark**(1) .



- Close sealing cap (1).
- Close the sealing cap (1) until the **arrows** are flush.

41 – Bleeding the low-temperature cooling system

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

Filling **without** the vacuum filler device (watering can filling) is **not permitted**.

Non-compliance will result in danger of component damage and/or engine damage.

Filling specification **absolutely must** be adhered to.

The operation of the vehicle is not permitted unless the filling procedure has been completed. Otherwise, functional limitations (degradation) and/or overheating may occur.

A bleeding procedure is required after a part has been exchanged in the cooling system and/or after refilling the cooling system.

TECHNICAL INFORMATION

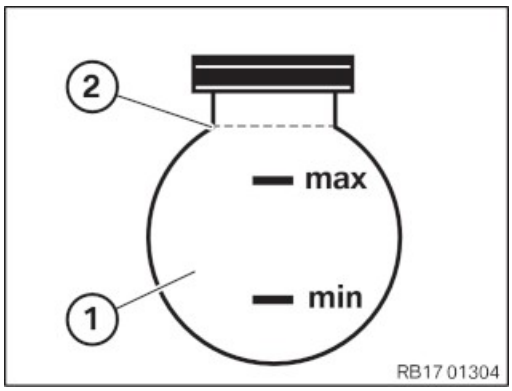
Before starting the automatic cooling system bleeding routine, make sure that **all coolant circuits** are **filled**. If the cooling system bleeding routine is started while one of the coolant circuits is empty, there is a risk of damage to the electric coolant pump when running it dry.

Make sure that terminal 15 is not disconnected for the bleeding procedure. Switch on low-beam headlights and hazard warning lights. If the low-beam headlights and hazard warning lights are not switched on, the ignition (terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.

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TECHNICAL INFORMATION

The driving experience switch must not be set to the ECO PRO switch position.



- Adjust the coolant level in the low-temperature coolant expansion tank (1) up to lower edge (2) of the coolant filler neck of low-temperature coolant expansion tank (1).
- Close the sealing cap on the coolant expansion tank of the low-temperature coolant circuit.
- Ensure that the bonnet is **open**.
- Connect battery charger.
- Switch on the ignition and ensure that it remains **switched on** (for example, activate the low-beam headlight and the hazard warning lights **at the same time**).
- If the low-beam headlight and the hazard warning light are **not** switched on, the ignition (**terminal 15**) will switch off automatically after some time and interrupts the bleeding procedure.
- Ensure that the Driving Experience Control is **not** in the **"ECO-PRO"** switch position.
- Adjust the heating to **maximum** temperature and adjust the blower to the **lowest** stage.
- Hold the accelerator pedal down to the limit position for at least **10 s** and do **not** press on the brake pedal.
- Do **not** start engine.

  The cooling system bleeding routine will start.

  The electric coolant pump in the low-temperature coolant circuit is activated for 11 minutes according to a cooling system bleeding routine.

  The cooling system bleeding routine ends after 11 minutes.

  The electric coolant pump is **no** longer activated.
- Note the display in the instrument cluster (KOMBI).

  If the service function is interrupted, the cooling system bleeding routine **must** be repeated.
- Allow the coolant temperature to cool down to **< 50°C**.



- Loosen sealing cap (1).

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TECHNICAL INFORMATION

After the cooling system bleeding routine, the cooling system is topped up above the maximum mark.

Overfilling the cooling system serves to balance the remaining air in the cooling system.

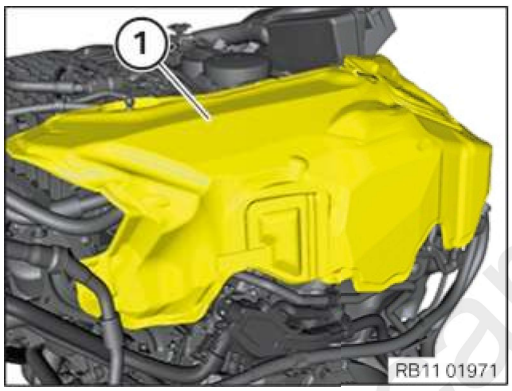
The normal filling level of the coolant is reached while driving.

- Adjust the filling level in coolant expansion tank (2) of the low-temperature coolant circuit to **100 ml** above the **maximum mark** (1) .
- Close sealing cap (1).

42 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

43 – 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.

44 – Install the seal for the bonnet

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- 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.

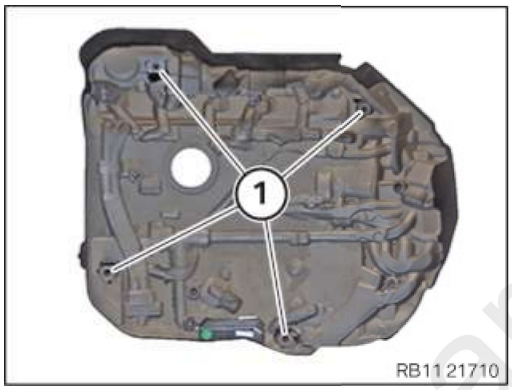
45 – Install acoustic cover

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.



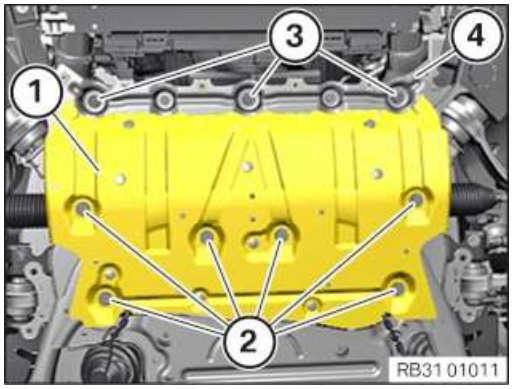
- Check the rubber mount (1) for correct fit in the acoustic cover.



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

46 – Installing the stiffening plate

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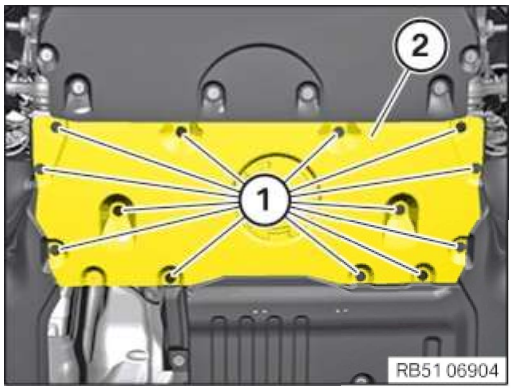


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

47 – Installing the centre underbody protection



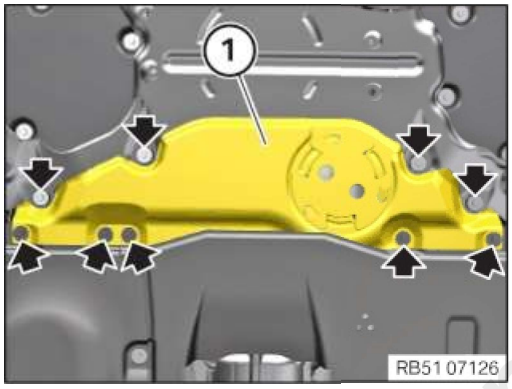
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

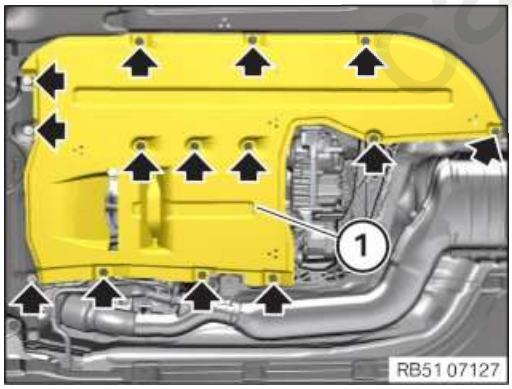
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

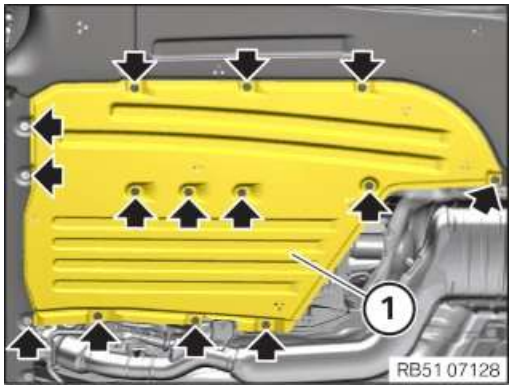
48 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



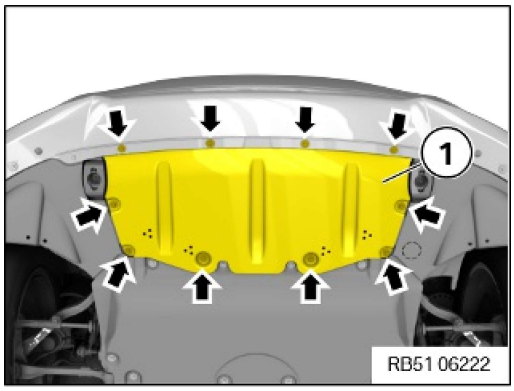
- **Version 2:**

  Remove screws (arrows).

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

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49 – Installing the front underbody protection



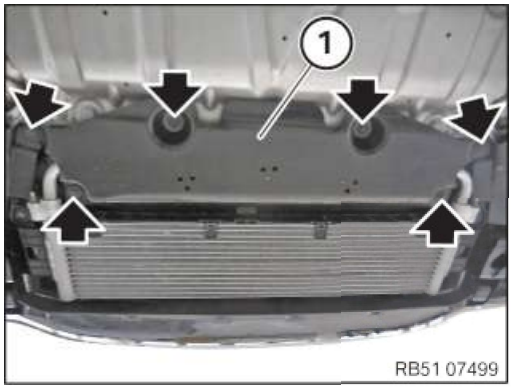
- **Version 1:**

  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



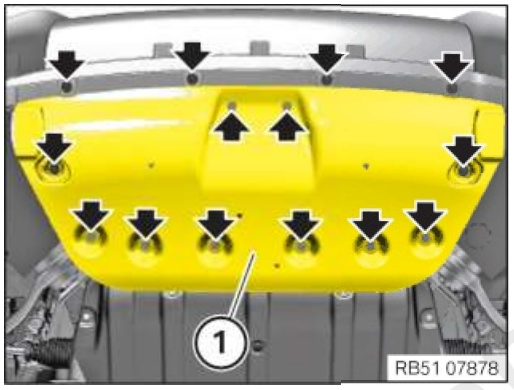
- **Version 2:**

  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:**

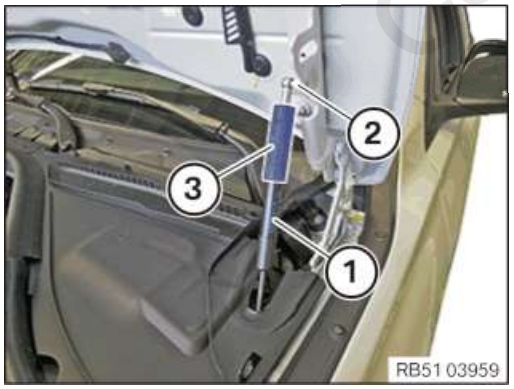
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

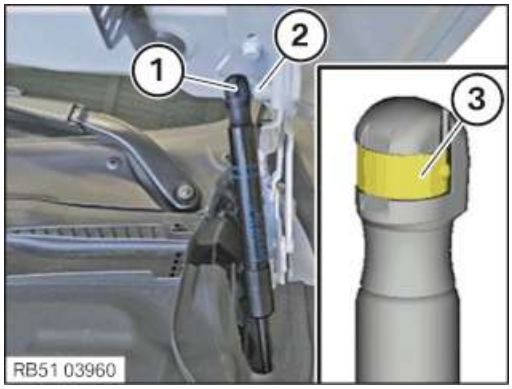
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

50 – 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.

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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

Oil drain plug — Used in step 16

M12x16	Replace sealing ring.	Tightening torque	25 Nm

Cover, front bottom on side — Used in step 1920

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Engine oil cooler to bumper support — Used in step 20

M6X25		Tightening torque	8 Nm

Cover plate on full-flow oil filter — Used in step 27

Bolts	Observe tightening sequence.	Tightening torque	10 Nm
		Tightening torque	10 Nm

Full-flow oil filter to crankcase — Used in step 28

Captive screw M6	*Observe tightening sequence.*	Jointing torque	4 Nm
		Tightening torque	10 Nm

Engine oil pipes to cover plate — Used in step 28

M6X35		Tightening torque	8 Nm

Holder to end cover — Used in step 28

M6X16		Tightening torque	8 Nm

Holder for transmission oil line — Used in step 28

Screw	*Renew screw.*	Tightening torque	5 Nm

Heat exchange module to crankcase — Used in step 29

M6		Tightening torque	9 Nm

Positive battery cable to the alternator — Used in step 29

M8		Tightening torque	19 Nm

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Support to cylinder head			Used in step 29
M6X16		Tightening torque	8 Nm

Intake plenum to cylinder head			Used in step 30
M6		Tightening torque	10 Nm

Intake plenum to support			Used in step 30
M6X25		Tightening torque	8 Nm

Tank ventilation line to intake plenum			Used in step 30
Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle valve			Used in step 30
M6x30		Tightening torque	8 Nm

Control unit holder on spring strut dome			Used in step 32
Hexagon screw		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 35
Clamp		Tightening torque	3 Nm

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

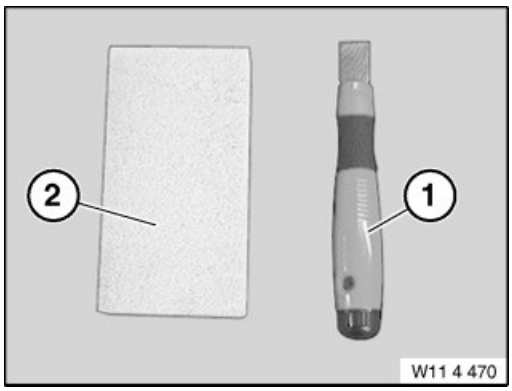
Underbody protection			Used in step 47
Hexagon screw		Tightening torque	3 Nm

Underbody protection front			Used in step 49
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

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0 495 102 (11 4 470) Tool



Common Used in step 2728

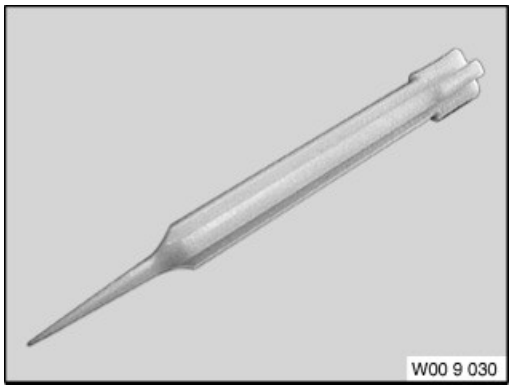
Usage	(cleaning kit) For cleaning sealing surfaces on magnesium crankcase/cylinder head.
Included in the tool or work	
Storage location	C52
Replaced by	
In connection with	
SI-Number	01 17 04 (130)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 103 (11 4 471)		**Scraper**	
2	0 495 104 (11 4 472)		**Extractor** (grindstone)	

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0 496 714 (00 9 030) Wedge

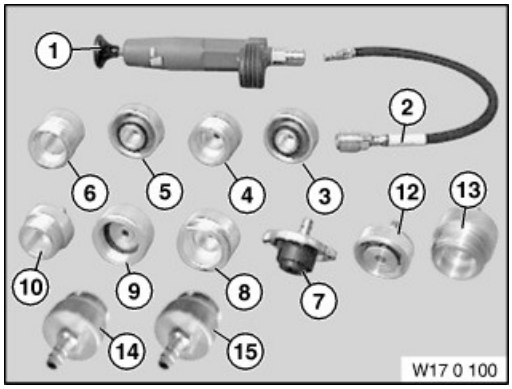


Common Used in step 28

Usage	For dismantling O-rings, gaskets and trim panels. This special tool replaces special tool 00 9 316.
Included in the tool or work	
Storage location	A50
Replaced by	
In connection with	
SI-Number	01 20 09 (581)

0 494 417 (17 0 100) Tester

Common Used in step 3738



Usage	For checking engine cooling system on watertightness. For checking radiator cap.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 02 (884)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
5	0 494 422 (17 0 105)		**Adapter** For radiator cap (sawtooth thread)	
10	0 494 427 (17 0 111)		**Adapter** For radiator cap R53/W11, R50/W17 adapter replaced 17 0 052.	
1	0 494 418 (17 0 101)		**Pump**	
2	0 494 419 (17 0 102)		**Hose** (hose with quick-release coupling)	
3	0 494 420 (17 0 103)		**Adapter** For radiator cap (normal thread)	
4	0 494 421 (17 0 104)		**Adapter** For radiator cap (normal thread)	
6	0 494 423 (17 0 106)		**Adapter** For radiator cap (sawtooth thread)	
7	0 494 424 (17 0 107)		**Adapter** For radiator cap R50 / W10	
8	0 494 425 (17 0 108)		**Adapter** For radiator cap R50 / W10	
9	0 494 426 (17 0 109)		**Adapter** For radiator connection R53/W11, R50/W17 adapter corresponds to 17 0 051	
11	0 494 428 (17 0 112)		**Case**	
12	0 494 642 (17 0 113)		**Adapter** For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)	

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13	0 494 643 (17 0 114)		**Adapter** For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)	
14	0 495 889 (17 0 115)		**Adapter** For radiator cap Model series: N12, N14	

Overview Technical Data

Engine oil B58B30M1/B58B30O1 Used in step 36

Filling capacity, engine oil change with oil filter element	6,50 l

Engine oil: Technically suitable engine oils for BMW Group engines

Capacity of low-temperature coolant circuit G20/G29 Used in step 37

B58B30O1	4,5 l

Expendable materials: Technically suitable antifreeze and corrosion inhibitor

Capacity of high-temperature coolant circuit G20/G29 Used in step 38

B58B30O1	10,5 l

Expendable materials: Technically suitable antifreeze and corrosion inhibitor

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Operating materials	**Used in step**
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