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.

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

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.
- Allow engine oil to drip off when draining.

TECHNICAL INFORMATION

Make sure the vehicle is at operating temperature for engine oil service (engine oil temperature > 70 °C).

TECHNICAL INFORMATION

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

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1 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

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

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



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

2 – Remove oil filter



- Loosen the oil filter cover (1).



TECHNICAL INFORMATION

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

- Guide out and remove the oil filter cover (1) with oil filter element.
- Catch and dispose of emerging engine oil.

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3 – Checking engine oil pressure



- Remount the oil filter element (1) in the special tool 2 289 603.
- If necessary, remount the gasket (2).



- Install and tighten the special tool 2 289 603.

Special tool to measure the pressure on the oil filter module

O-ring lightly oiled.	Tightening torque	25 Nm

- Connect special tool 2 289 603 to special tool 0 496 623 (11 4 310).
- Gasket on the pressure sensor **(part number: 81 31 2 357 801 and 81 38 0 431 592)**.
- Pressure sensor **(part number: 81 31 2 357 801 and 81 38 0 431 592)** in the special tool 0 496 623 (11 4 310).
- Use the connecting cable to connect the pressure sensor **(part number: 81 31 2 357 801 or 81 38 0 431 592)** with the Integrated Measurement Interface Box (IMIB) (81 38 2 295 937).



- Check oil pressure.
- Observe diagnosis instructions.



- Pressure sensor **(part number:** Detach **81 31 2 357 801 and/or 81 38 0 431 592)** at the special tool 0 496 623 (11 4 310).
- Remove special tools 0 496 623 (11 4 310) and 2 289 603.



- Loosen the oil filter element (1) from the special tool 2 289 603.
- If necessary, remount the gasket (2).

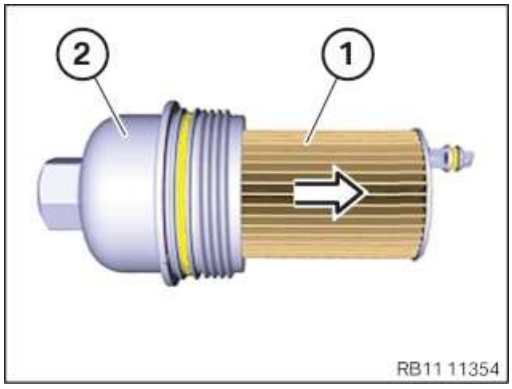
4 – Replace oil filter element

RISK OF DAMAGE

Contaminant or foreign body.

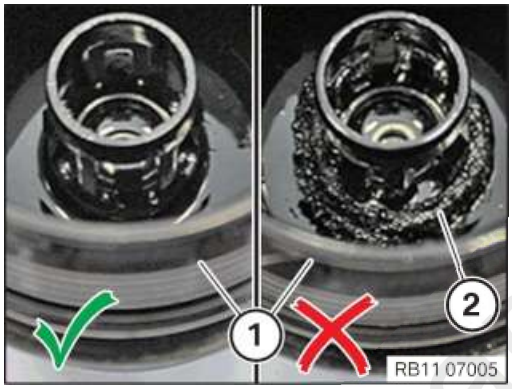
Contamination can result in malfunctions, operating failure or leaks.

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

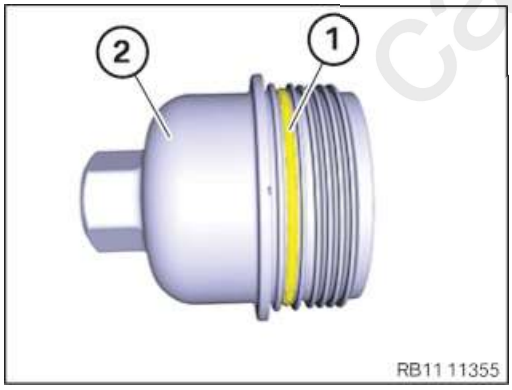


- Guide the fuel filter element (1) out of the fuel filter cover (2) in the direction of the arrow and remove.

▸ **Checking the inner oil filter cover for filter residues**

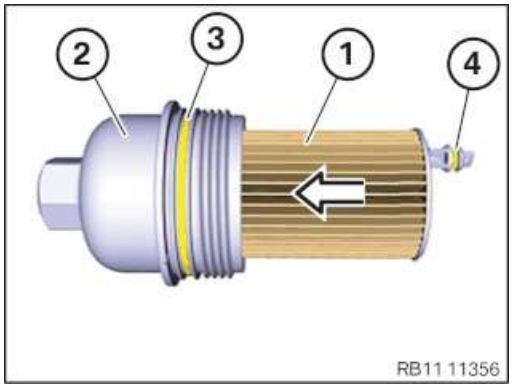


- Check whether there are residues (2) of the previous oil filter on the inside of oil filter cover (1) and, if necessary, remove filter residues (2).



- Guide the sealing ring (1) out at the oil filter cover (2) and remove.
- Renew sealing ring (1).

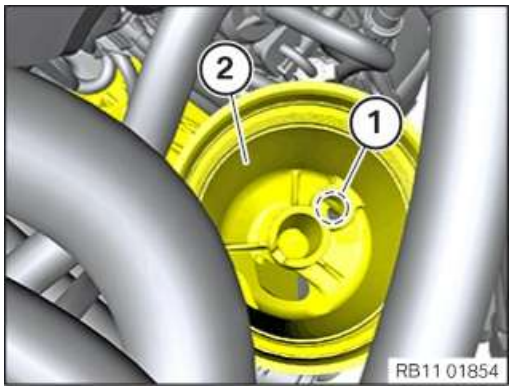
  Parts: Sealing ring
- Feed in sealing ring (1) on oil filter cover (2) and install.



- Insert and install the oil filter element (1) on the oil filter cover (2) in the direction of the arrow.
- Make sure the oil filter element (1) engages audibly at the oil filter cover (2).
- Coat sealing rings (3) and (4) with engine oil.

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5 – Install the oil filter



- Position the oil filter cover with the oil filter element correctly in the guide bore hole (1) in the oil filter housing (2).



- Feed in and install the oil filter cover (1) with the oil filter element.



- Tighten the oil filter cover (1).

Oil filter cover to oil filter module

O-ring lightly oiled.	Tightening torque	25 Nm

6 – Check engine oil level

Prerequisite

Vehicle is in a horizontal position.

TECHNICAL INFORMATION

Please comply with instructions in Owner's Handbook.

- Carry out an electronic oil measurement.
- Top up engine oil if necessary.

▸ **Check engine oil level**

TECHNICAL INFORMATION

Always check the engine oil level when the engine is at operating temperature (engine oil temperature > 70°C).

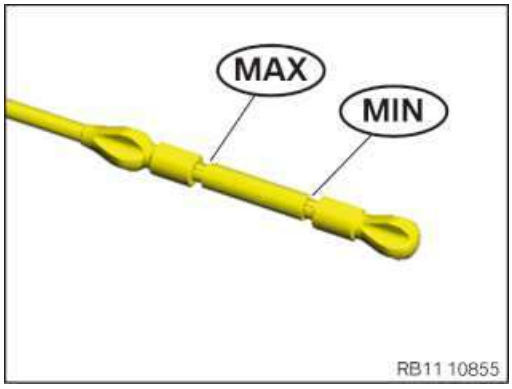
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- Park vehicle on a horizontal surface.
- Stop the engine and wait for 5 minutes.
- Pull out the oil dipstick and wipe off using a lint-free cloth.

TECHNICAL INFORMATION

Do not pull out or insert the oil dipstick into the guide tube too quickly or slowly.

- Push the oil dipstick into the guide tube up to the limit position and pull it out again.



TECHNICAL INFORMATION

The engine oil level must be between the minimum mark and the maximum mark of the oil dipstick.

- Read the engine oil level on the oil dipstick.
- Top up engine oil if necessary.

Oil quantity between the two markings MIN and MAX of the oil dipstick
1.0 l

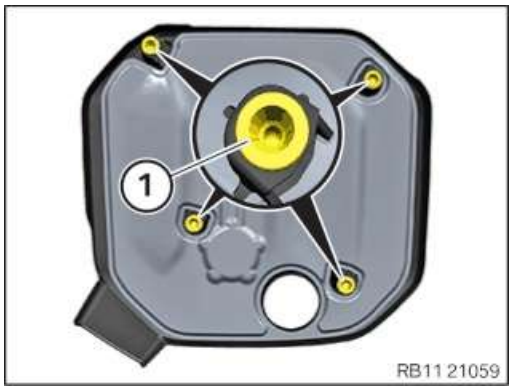
7 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

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

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



- Check the acoustic cover for correct fit of the rubber mounts (1).

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- Clip in the acoustic cover (1) into the holders in the indicated areas.

Additional Information

Overview of Tightening Torques

Special tool to measure the pressure on the oil filter module		Used in step 3
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

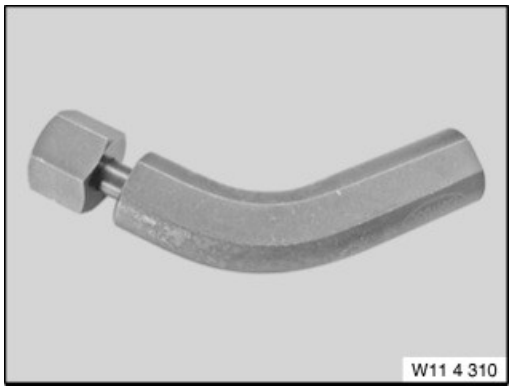
Overview of Special Tools

2 289 603 Adapter



Common	Used in step 3
Usage	For oil pressure metering on the oil filter housing. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).
Included in the tool or work	
Storage location	A56
Replaced by	
In connection with	13 3 060 = 0491259
SI-Number	01 04 14 (071)

0 496 623 (11 4 310) Adapter



Common	Used in step 3
Usage	For fuel pressure check. For variable camshaft timing control VANOS with Integrated Measurement Interface Box IMIB (100 bar sensor in delivery specification). In connection 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

Oil quantity between the two markings MIN and MAX of the oil dipstick	Used in step 6
	1.0 l

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11 42 240 Attaching and detaching/sealing or replacing the oil return line for the high pressure exhaust turbocharger

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 ... Notes for ESD protection (electrostatic discharge)

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.

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PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

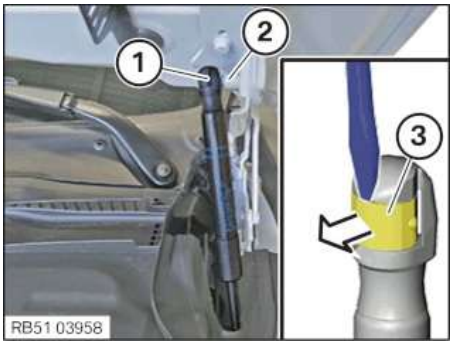
Engine compartment lid is open.

CAUTION

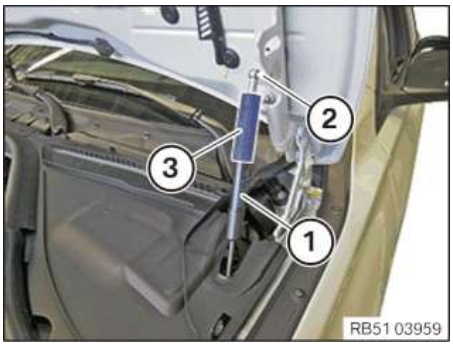
Shutting bonnet or tailgate.

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.

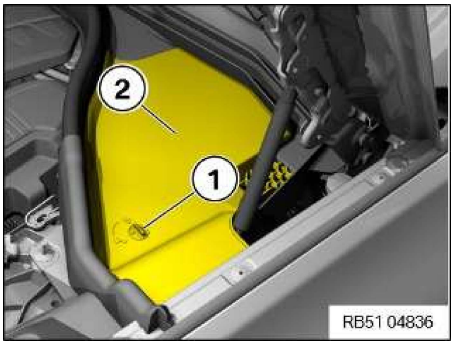


TECHNICAL INFORMATION

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

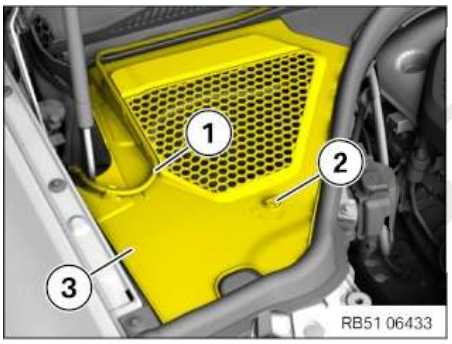
- Remove the bonnet support and open the bonnet further.
- Pull special tool or or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

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



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

3 – Remove the cover of the rear right engine compartment



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

4 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

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WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

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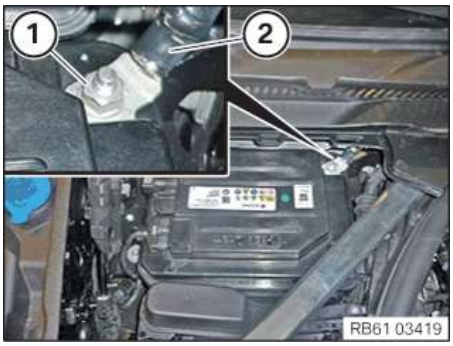
Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

5 – Disconnecting all battery earth leads



- See additional information.

6 – Removing the wiper arm on the left and right

NOTICE

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

▸ **Remove the wiper arm**

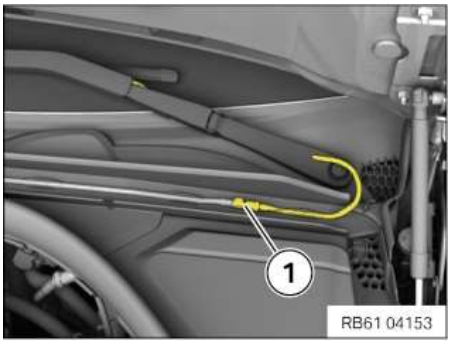
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RISK OF DAMAGE

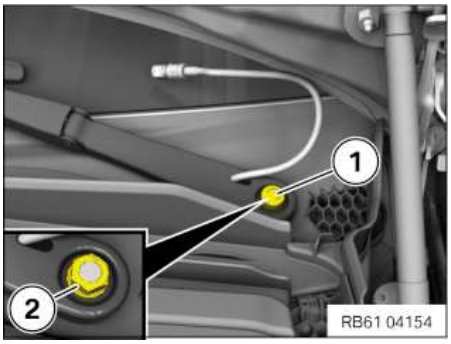
Damage to wiper console.

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

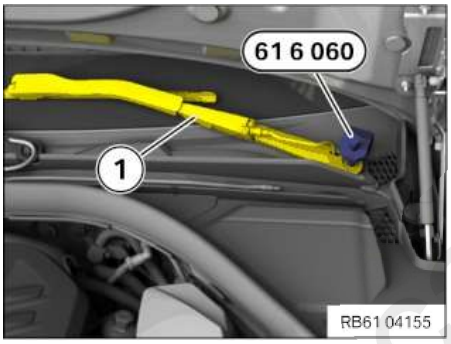
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do **not** lever off the wiper arm because otherwise the wiper console may break at the predetermined breaking point for active pedestrian protection.



- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.

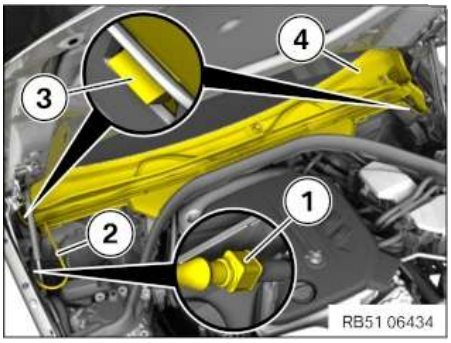


- Remove the protective cap (1).
- Loosen nut (2).



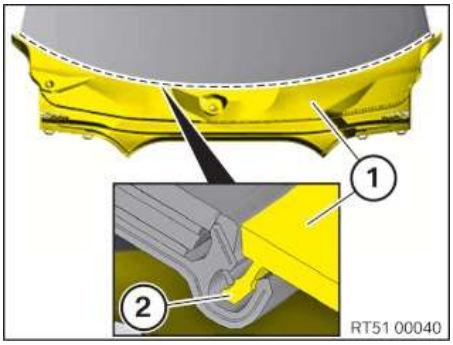
- Pull off the wiper arm (1) using special tool .

7 – Remove cowl panel cover



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

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

8 – Remove the seal for the rear bonnet

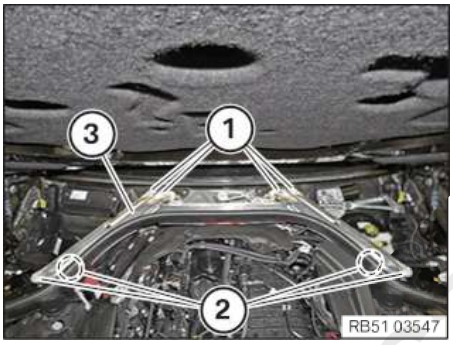


- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

9 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

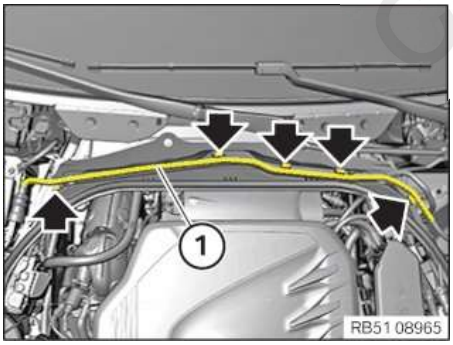
Driving without the strut brace/front-end strut or tension strut is not permitted.



NOTICE

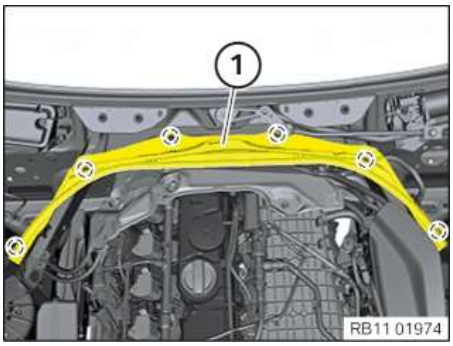
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.



- **Version with mild hybrid technology:**

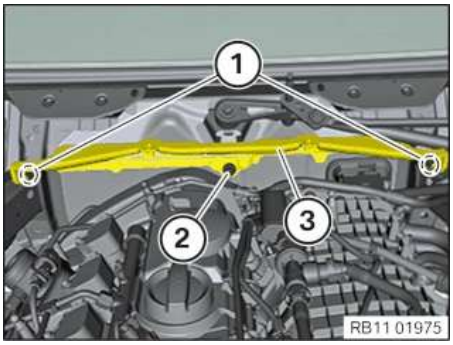
  Unclip the wire (1) at the holders (arrows).



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

10 – Removing the centre bulkhead lower section

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

11 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

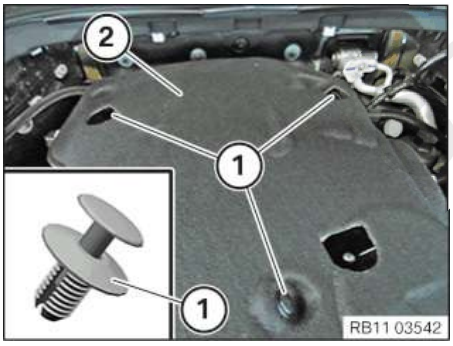
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

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



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

12 – Remove the acoustic cover for the injectors



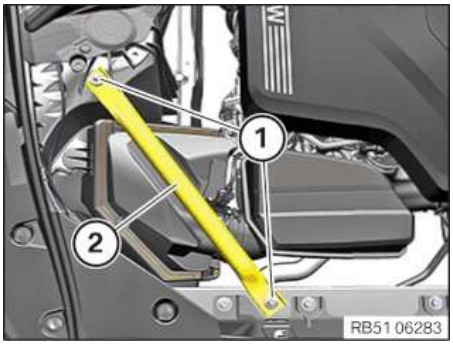
- **If installed:** Release the expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

13 – Remove right front-end strut

TECHNICAL INFORMATION

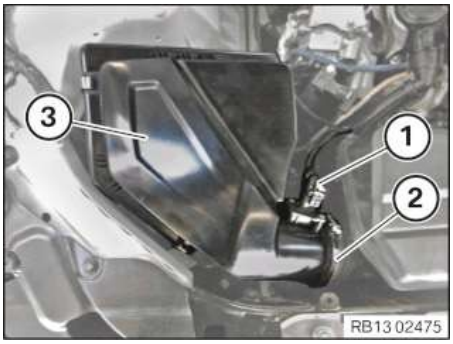
Driving without the strut brace/front-end strut or tension strut is not permitted.

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- Loosen screws (1).
- Remove the front-end strut (2).

14 – Removing intake silencer housing



- 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.

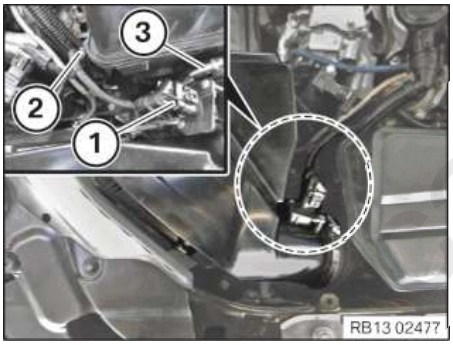
15 – Removing the clean air pipe with the resonator

WARNING

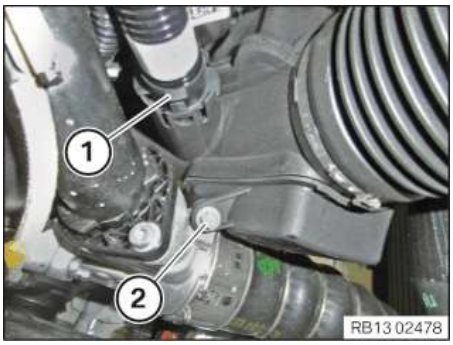
Hot surfaces.

Risk of burning!

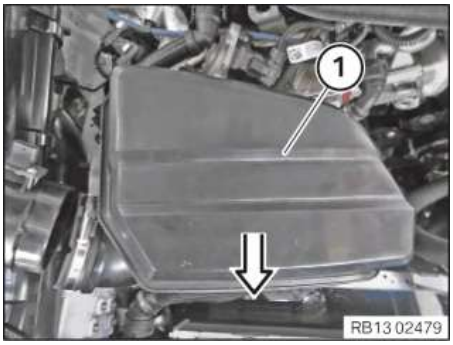
- Perform all work only on components that have cooled down.



- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

16 – Remove differential pressure sensor for the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

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

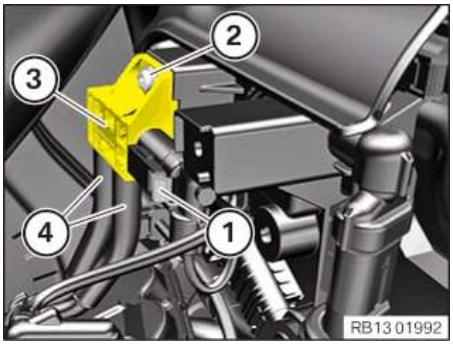
RISK OF DAMAGE

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 ... Notes for ESD protection (electrostatic discharge)

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- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Pull off pressure hose (4).
- Feed out differential pressure sensor (3) and remove.

17 – Remove the exhaust temperature sensor on the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

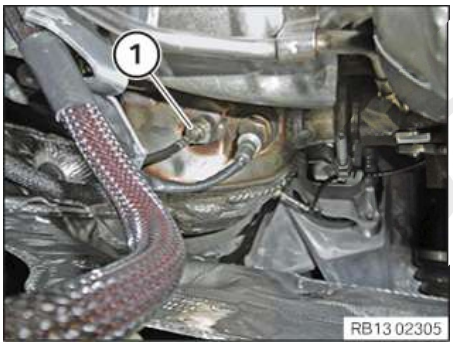
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

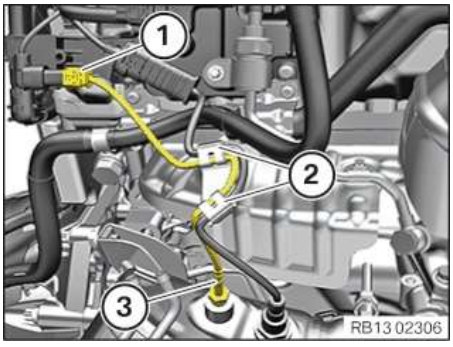
Electrostatic discharge.

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 ... Notes for ESD protection (electrostatic discharge)



- Release exhaust temperature sensor (1) using special tool .



- Unlock plug connection (1) and disconnect.
- Remove the exhaust temperature sensor (3) from the clamps (2).
- Feed out and remove exhaust temperature sensor (3).

18 – Removing the front oxygen sensor on the diesel particulate filter on top

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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.

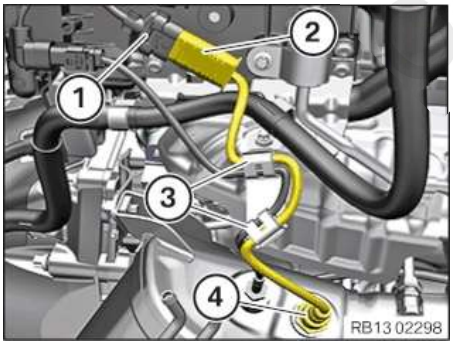
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock plug connection (1) and disconnect.
- Unlock and disconnect connector (2).
- Pull the front oxygen sensor (4) out from the clamps (3) and remove it.



- Release the front oxygen sensor (1) with the standard tools and remove it.

19 – Removing the exhaust temperature sensor for the exhaust system downstream the catalytic converter at the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

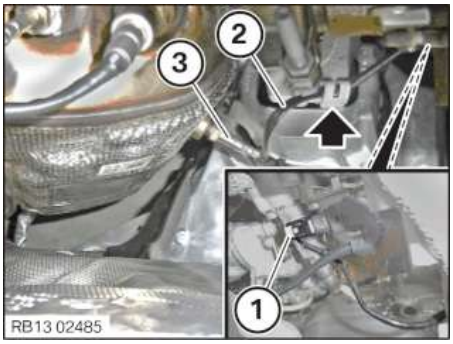
- Perform all work only on components that have cooled down.

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 ... Notes for ESD protection (electrostatic discharge)



- Unlock plug connection (1) and disconnect.

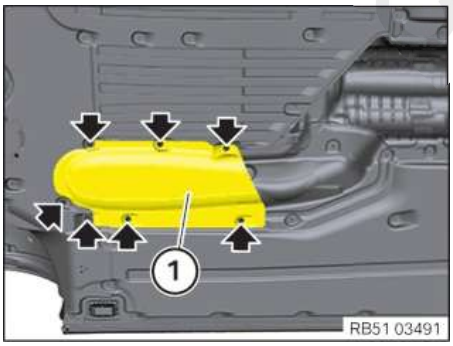
Note: The exhaust temperature sensor is located near the right engine mount.

- Release cable (2) from the clamps (arrow).
- Loosen exhaust temperature sensor (3).
- Feed out and remove exhaust temperature sensor (3).

20 – Remove the underbody panelling of the transmission on the side

NOTICE

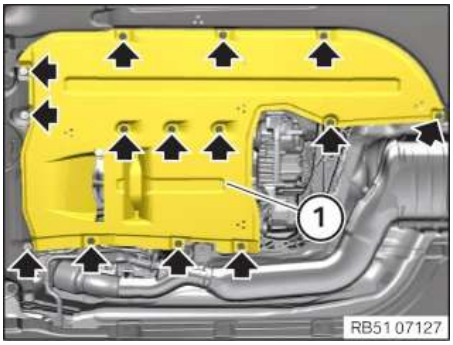
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.



- Remove screws (arrows).
- Remove the underbody panelling (1).

21 – Remove rear underbody protection

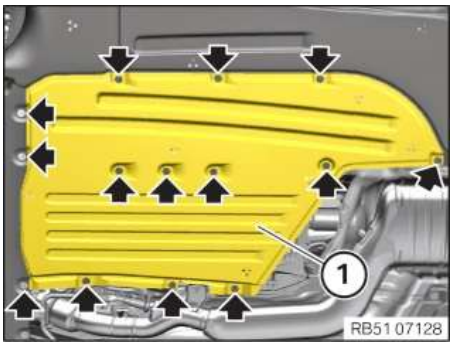
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- **Version A:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

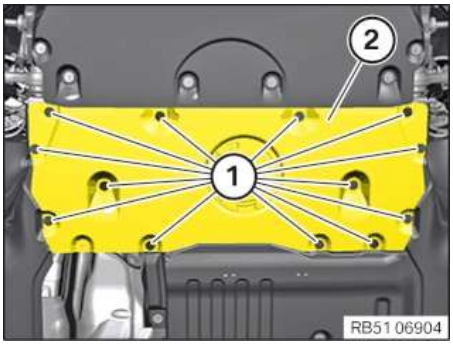


- **Version B:**

  Remove screws (arrows).

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

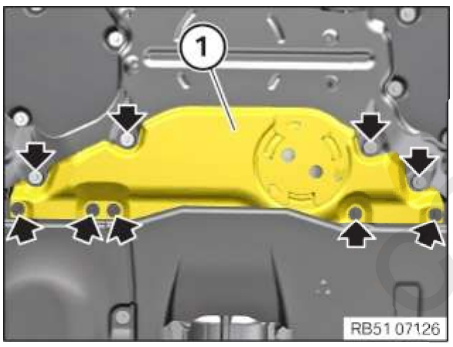
22 – Removing the centre underbody protection



- **Variant with rear wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

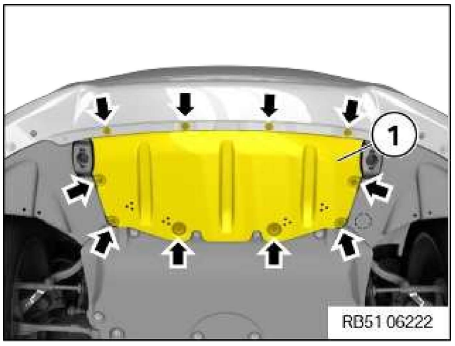


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

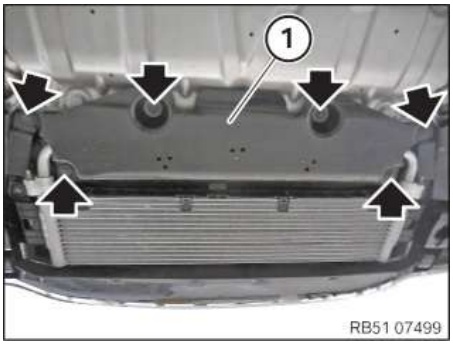
23 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

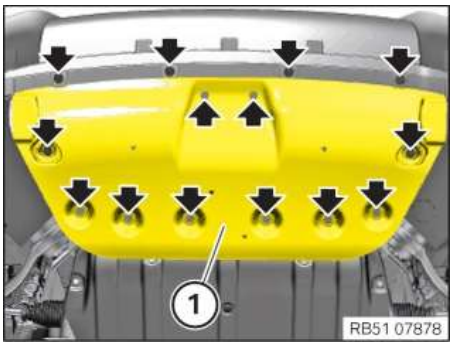
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

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

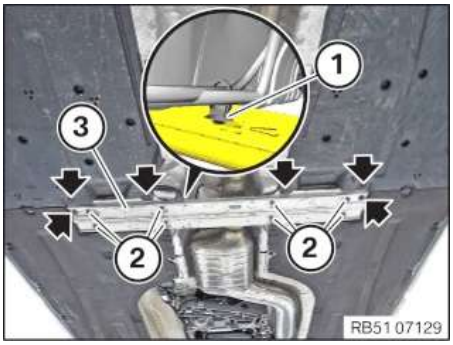


- **Version C:**

  Remove screws (arrows).

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

24 – Remove the connecting support from the tunnel



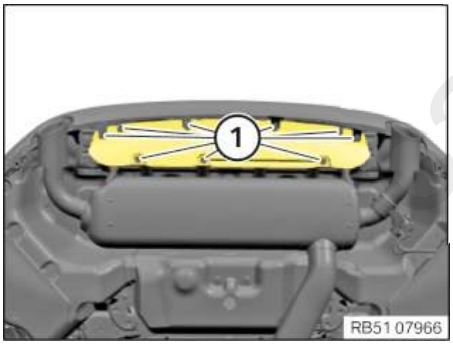
- Remove screws (arrows).

NOTICE

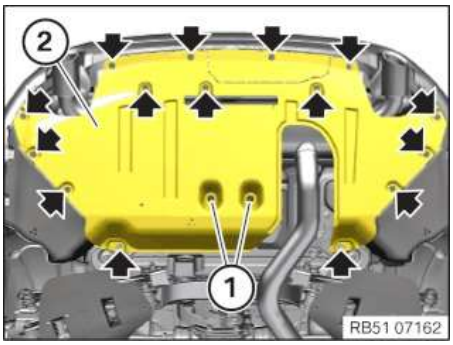
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen clamp (1).
- Loosen screws (2).
- Guide out and remove connecting support (3) on the tunnel.

25 – Removing the rear diffuser



- **Version 1:**
- Release the screws and nuts (1).
- Remove the diffuser.



- **Version 2:**
- Loosen nuts (1).
- Remove screws (arrows).
- Guide out and remove rear diffuser (2).

26 – Remove exhaust system

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WARNING

Hot surfaces.

Risk of burning!

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

CAUTION

Component with heavy weight.

Danger of injury!

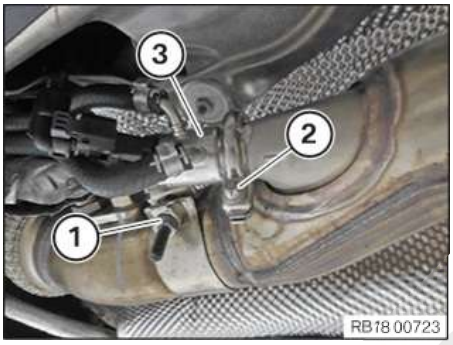
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

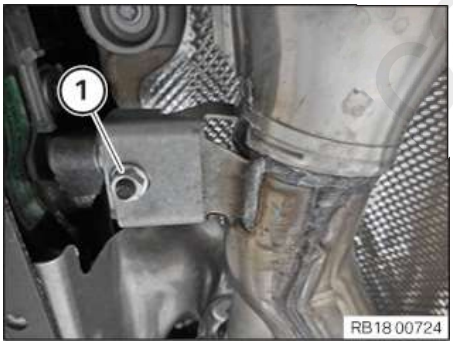
Heavy component.

Heavy components can lead to injury or damage.

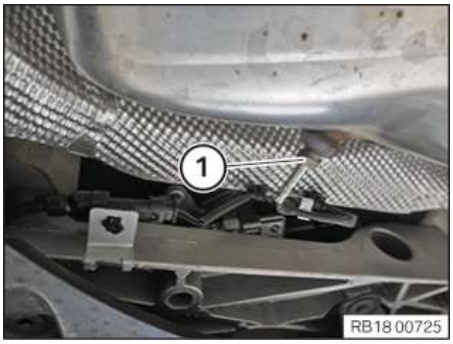
- Remove and install heavy components with the aid of another person/other persons.



- Unfasten clamp (1).
- Detach the clamp (2) of the SCR metering module (3).
- Detach the SCR metering module (3)from the exhaust system and place to one side.

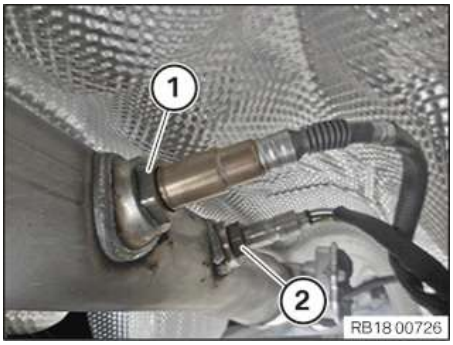


- Loosen nut (1).

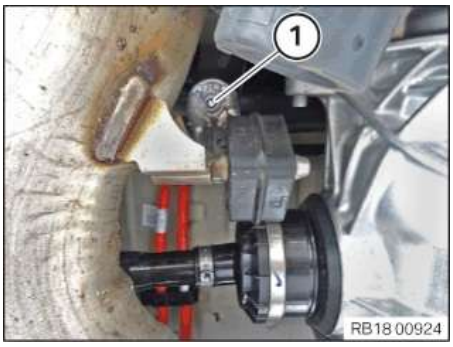


- Detach the exhaust temperature sensor (1) from the exhaust system.

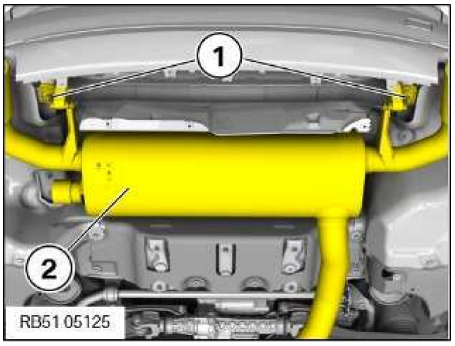
eardiagn.com



- Release the diesel particulate sensor (1) from the exhaust system and place to one side.
- Release the nitrogen oxide sensor (2) from the exhaust system and place to one side.



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



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

27 – Removing the monitoring oxygen sensor after the diesel particulate filter

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 ... Notes for ESD protection (electrostatic discharge)

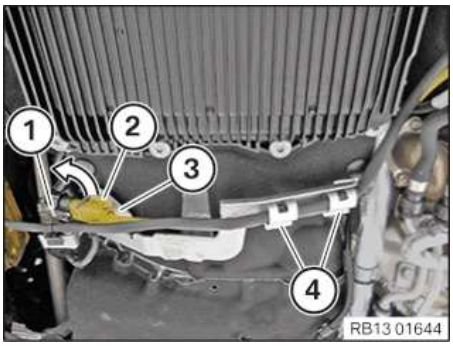
cardiagn.com

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
- The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock and loosen connector (1).
- Loosen connector (2) from the holder (3) in direction of arrow.
- Release the monitoring oxygen sensor from the clamps (4).



- Release the monitoring oxygen sensor (1) with the standard tools.



- Thread out the monitoring oxygen sensor (1) and remove it.

28 – Removing the nitrogen oxide sensor before SCR catalytic converter

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.

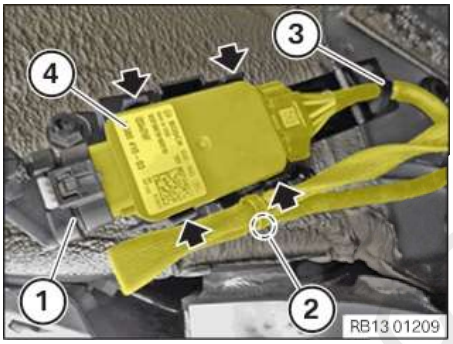
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

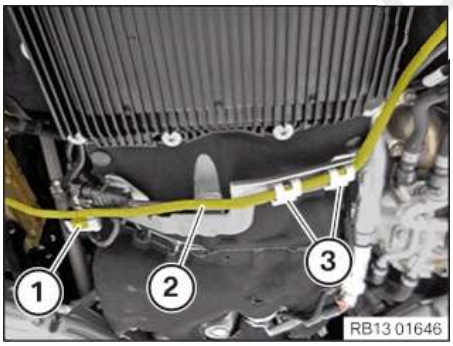
Damage to the nitrogen oxide sensor.

Failure of the nitrogen oxide sensor due to contamination or preliminary mechanical damage.

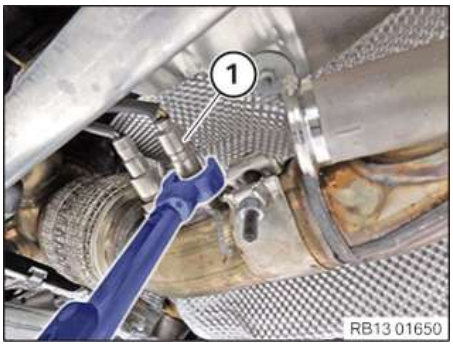
- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock plug connection (1) and disconnect.
- Release cable clip in area (2).
- Release line from the holder (3).
- Unclip control unit (4).

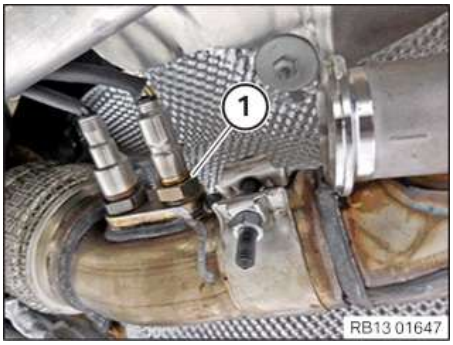


- Loosen clamp (1).
- Loosen the cables (2) from the clamps (3).



- Loosen the nitrogen oxide sensor (1) using commercially available tools.

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- Feed out and remove the nitrogen oxide sensor (1).

29 – Removing the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

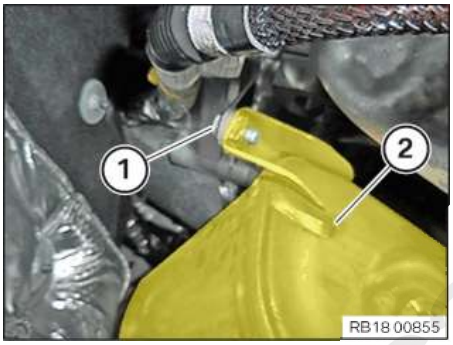
- Perform all work only on components that have cooled down.

CAUTION

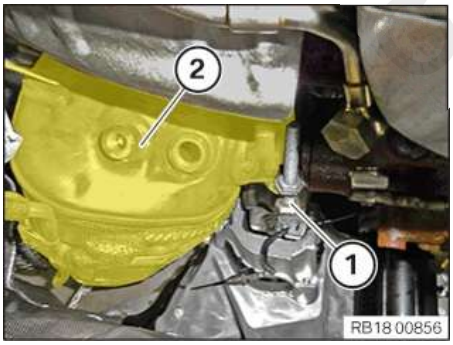
Heavy component.

Heavy components can lead to injury or damage.

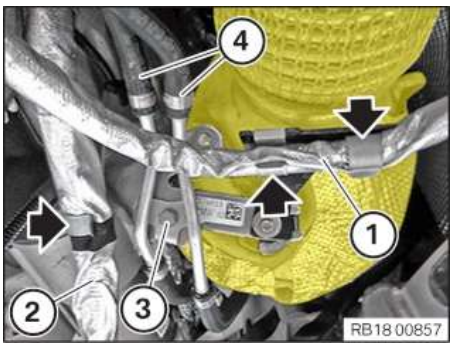
- Remove and install heavy components with the aid of another person/other persons.



- Release bolt (1) from the holder of diesel particulate filter (2).

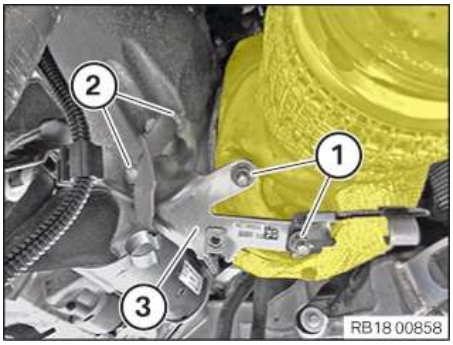


- Loosen V-band clamp (1).
- Feed V-clip (1) out from diesel particulate filter (2) and remove.

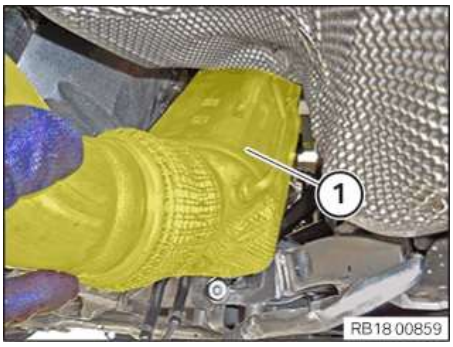


- Release the metering line (1) from clamps (Arrows).
- Release positive battery cable (2) from starter motor from clamp (Arrow).
- Loosen screw (3).
- Thread off coolant line (4) and place to the side.

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



- Guide out and remove diesel particulate filter (1).

30 – Remove front right wheel

▸ **Removing the wheel**



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

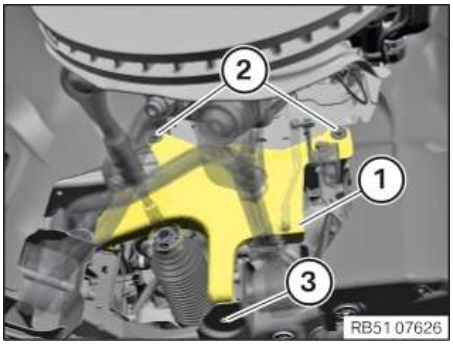
  This process is intended to prevent damage to the brake disc.



- If several wheels are removed at the same time: 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 the correct adapter from the set of special tools .

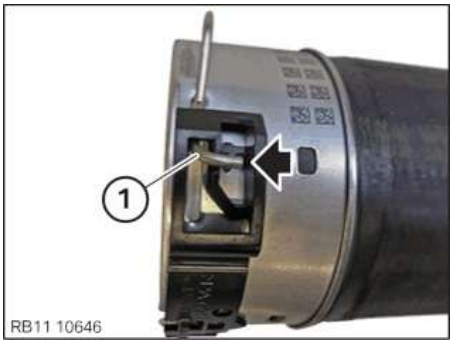
31 – Remove the cover of the steering assembly

obdiagn.com



- Loosen screws (2) and (3).
- Remove the cover (1).

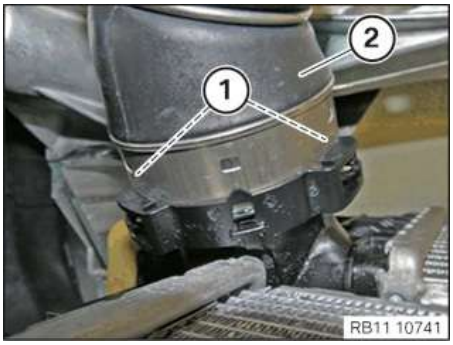
32 – Remove pressure pipe between exhaust turbocharger and charge air cooler



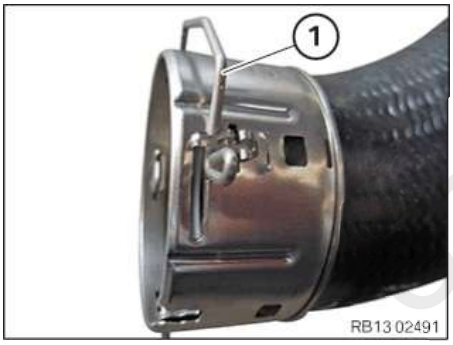
- **Version A:**

  Unlock lock (1).

  The lock (1) must snap audibly into place when unlocked (see arrow).

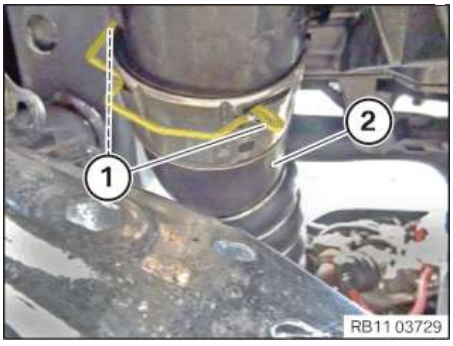


- Unlock the locks (1) on both sides and snap into place.
- Pull off pressure pipe (2) from charge air cooler.



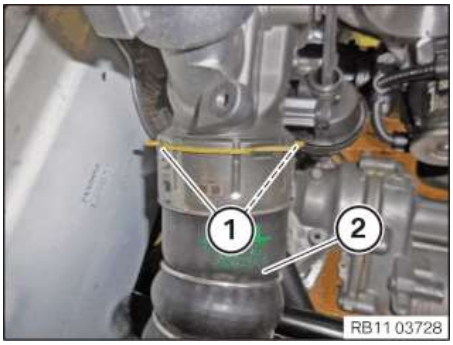
- **Version B:**

  Unlock clamp (1) and engage in this position.



- Unlock the locks (1) and snap into place.
- Pull off pressure pipe (2) from charge air cooler.

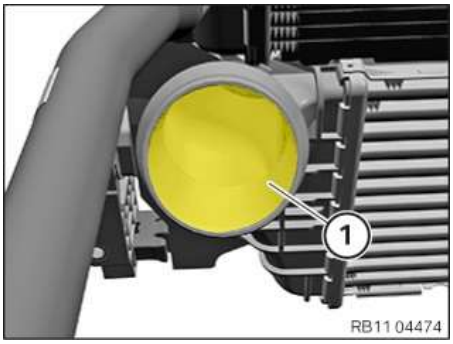
gardiagn.com



- Unlock the lock (1) and engage.
- Pull off pressure pipe (2) from the compressor bypass.



- Remove pressure pipe (1) in upward direction.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Lock the opening (1) of the charge air cooler with a suitable auxiliary material.

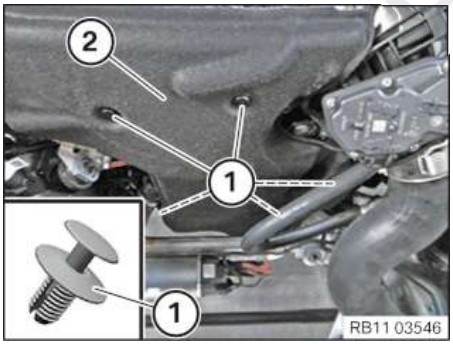
33 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

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



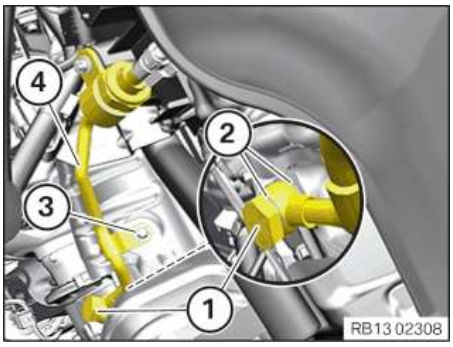
- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

34 – Remove the exhaust gas pressure pipe

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



- Unscrew the banjo bolt (1).
- Feed out and remove the sealing rings (2).
- Loosen screw (3).
- Feed out and remove the exhaust gas pressure pipe (4).

35 – Removing the sensor bracket on the cylinder head cover

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

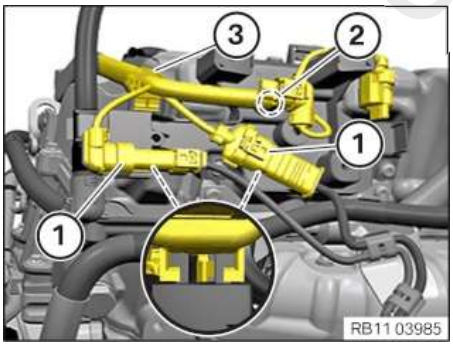
- Do not pull on the wires when disconnecting connectors and plug connections.

RISK OF DAMAGE

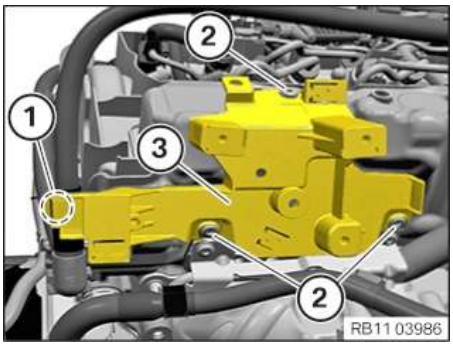
Contaminant or foreign body.

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.



- Unlock plug connection (1) and disconnect.
- Unlock the plug connection (1) and release it from the sensor bracket.
- Release the cable clip in the area (2) from the sensor bracket.
- Release the clamps (3) and set the wiring harness section aside.

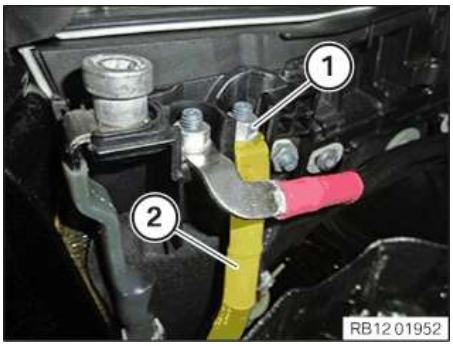


- Release the positive battery cable in the area (1) from the clamp and set it aside.
- Loosen screws (2).
- Feed out holder (3) for the sensor system and remove.

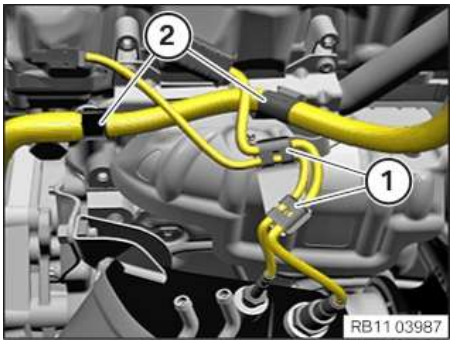
cardiagn.com



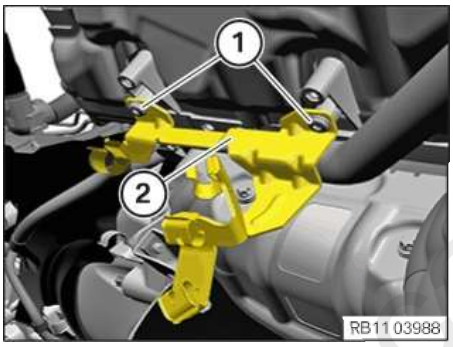
- Unlock the locks (1).
- Guide and remove cover (2) in direction of arrow.



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

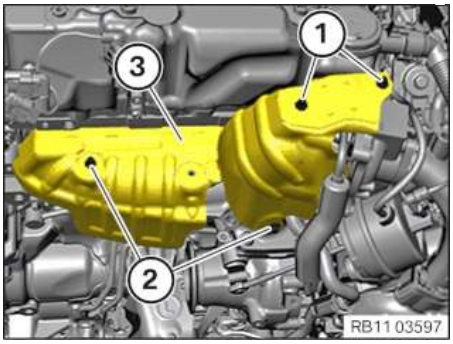


- Release the cable of the exhaust gas sensor system from the clamps (1).
- Release the positive battery cable from the clamps (2).



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

36 – Removing heat shield



- Loosen screws (1).
- Loosen screws (2).
- Feed out and remove the heat shield (3).

37 – Removing the high-pressure stage exhaust turbocharger and low-pressure stage turbocharger

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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.

TECHNICAL INFORMATION

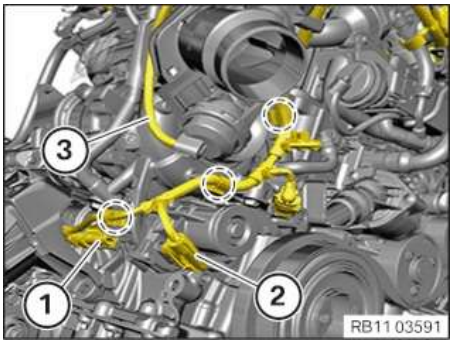
Prior to replacing the exhaust turbocharger: Observe the notes on troubleshooting on the exhaust turbocharger.

For additional information see: FUB-FUB-FB-130003-A10 Troubleshooting on the exhaust turbocharger

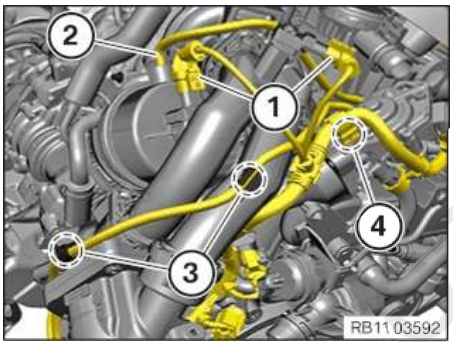
TECHNICAL INFORMATION

With exhaust turbocharger damage, it is imperative to observe the additional information.

For additional information see: 11 65 020 Exhaust turbocharger damage due to plugged oil supply lines



- Release plug connection in area (1) from holder.
- Unlock plug connection (2) and disconnect.
- Release the wiring harness in the marked areas from the exhaust turbochargers.
- Pull off the vacuum hose (3).



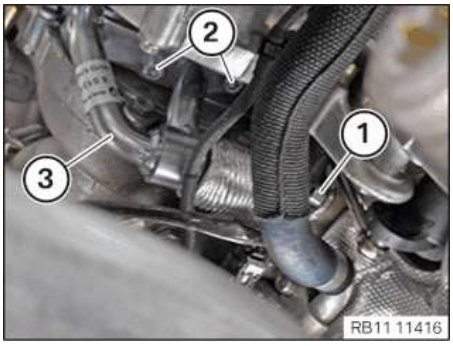
- Unlock plug connections (1) and disconnect.
- Pull off the vacuum hose (2).
- Release the vacuum hose in marked areas (3) from the exhaust turbochargers.
- Release the wiring harness in area (4) from the exhaust-gas recirculation cooler and set it aside.



TECHNICAL INFORMATION

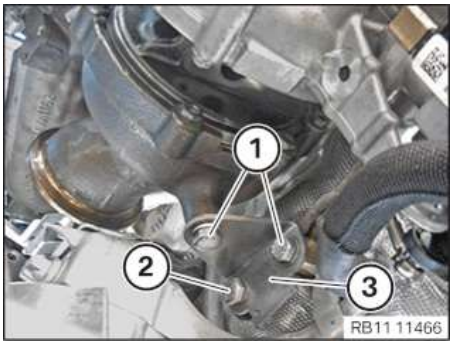
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Release the screws of the oil return line on the crankcase from the right wheel arch.

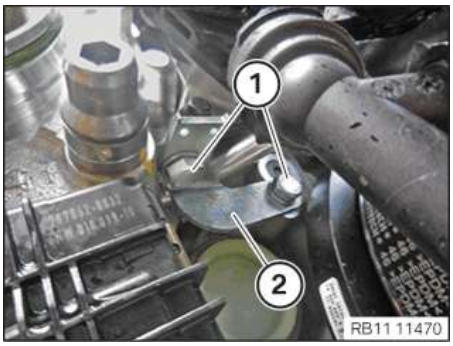


- Release the screw (1).
- Loosen screws (2).
- Remove oil return line (3) from the crankcase.
- Catch and dispose of emerging engine oil.

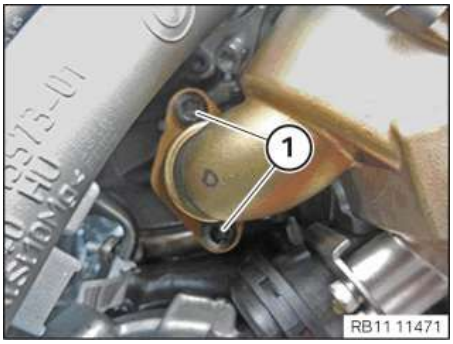
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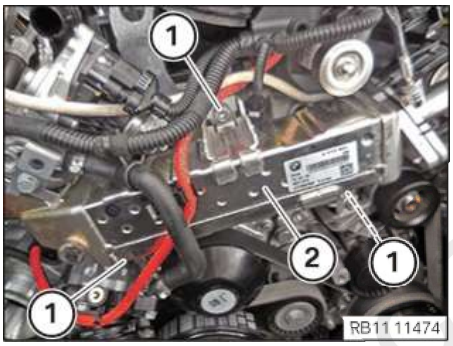
- Unscrew and remove the bolts (1) on the holder (3).
- Slacken screw (2) on holder (3), but do **not** remove.



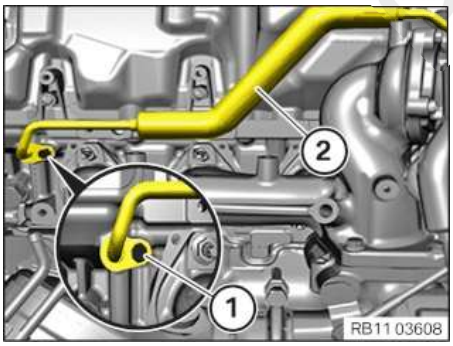
- Loosen screws (1).
- Guide out and remove holder (2).



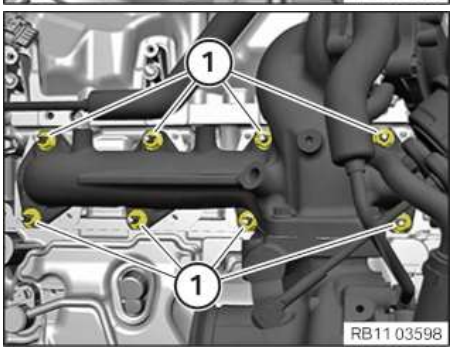
- Loosen screws (1).



- Slacken screws (1), but do **not** remove.
- Release exhaust-gas recirculation cooler (2) slightly.



- Loosen screw (1).
- Remove oil feed line (2) for the high-pressure stage exhaust turbocharger from the cylinder head and set it aside.
- Catch and dispose of emerging engine oil.

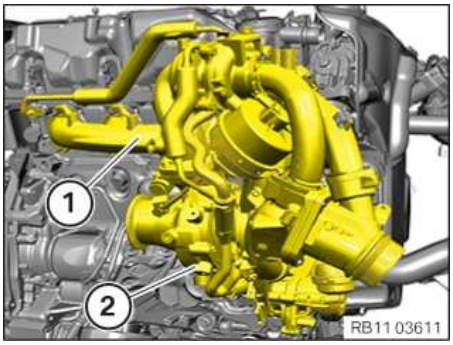


TECHNICAL INFORMATION

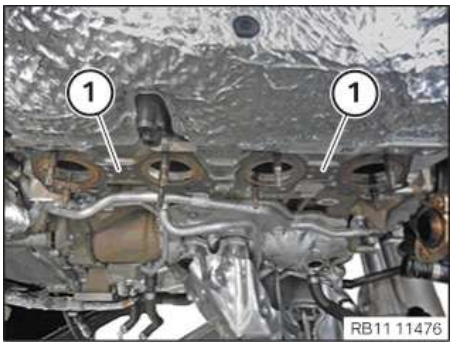
Conduct the following operation with the assistance of a second person.

- Loosen nuts (1).

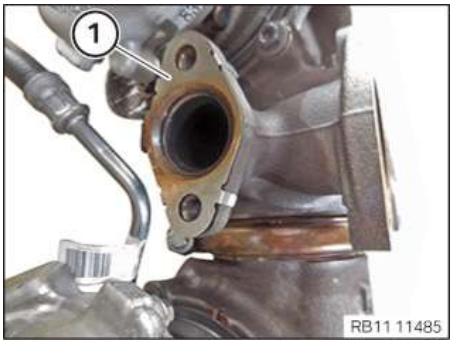
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- Guide out exhaust manifold (1) with the high-pressure stage exhaust turbocharger and the low-pressure stage exhaust turbocharger (2) forward towards the top and remove.



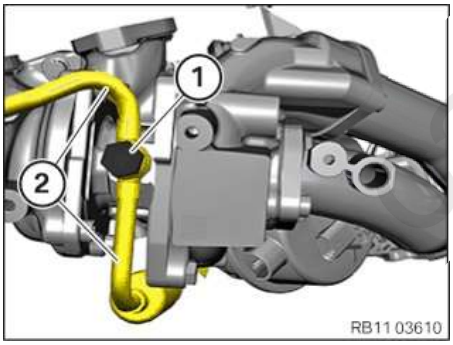
- Guide out and remove gaskets (1).



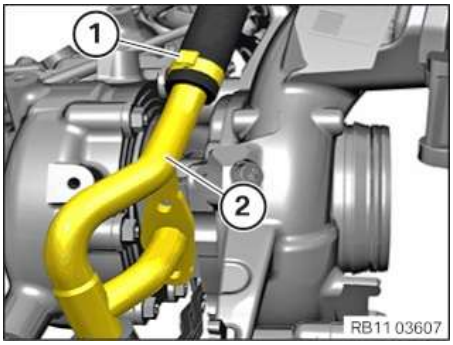
- Guide out and remove gasket (1).

MAIN WORK

38 – Replace the oil return line for the high-pressure stage exhaust turbocharger

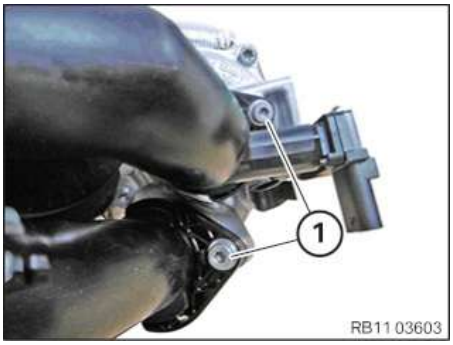


- Loosen screw (1).
- Place oil feed lines (2) to one side.

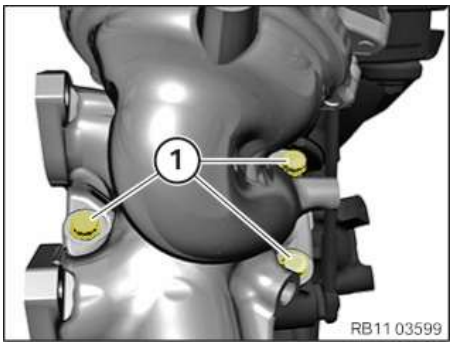


- Unfasten clamp (1).
- Feed out and remove the oil return line (2) for the low-pressure stage turbocharger.

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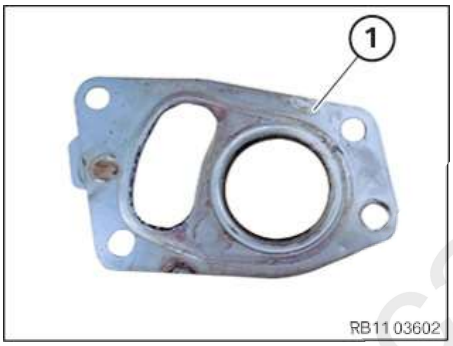
- Release screws (1) of the connecting pipe to the high-pressure stage exhaust turbocharger.



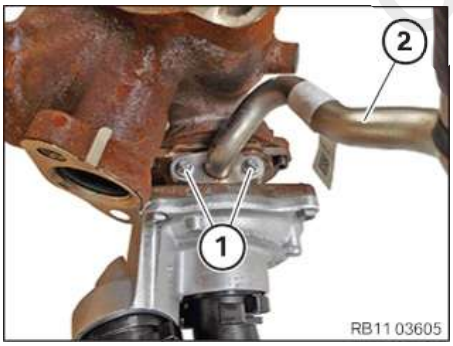
- Loosen screws (1).



- Loosen screw (1).
- Disconnect exhaust turbocharger.



- Remove seal (1).



- Loosen screws (1).
- Guide out and remove the oil return line (2).

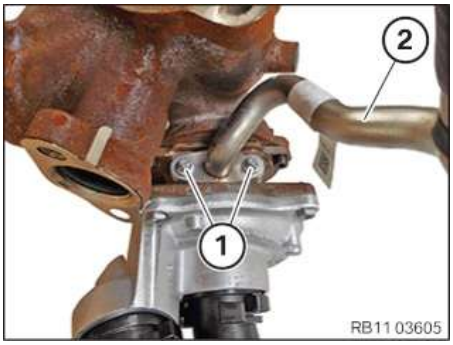


- Renew the oil return line for the high-pressure stage exhaust turbocharger.

  Parts: Oil return line for the high-pressure stage exhaust turbocharger
- Renew the seal (1).

  Parts: Gasket

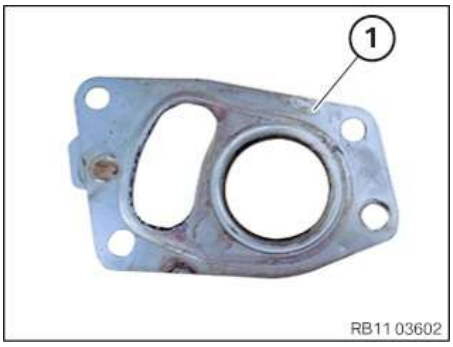
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- Position oil return line (2) with the seal on the high-pressure stage exhaust turbocharger.
- Tighten the screws (1).

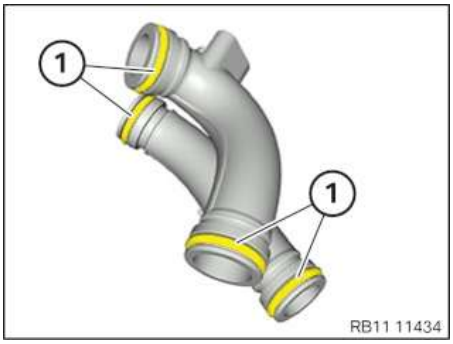
Oil return line to turbocharger

M6x12	Renew gasket.	Tightening torque	8 Nm



- Renew the seal (1).

  Parts: Gasket



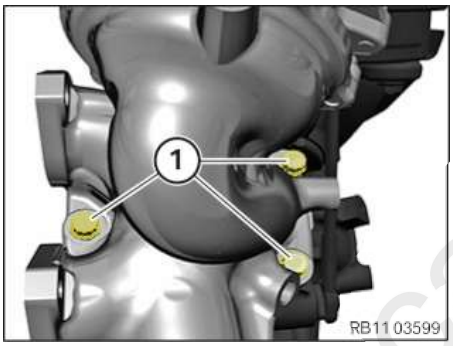
- Renew the sealing rings (1) on the connecting pipes with the special tool 0 496 714 (00 9 030).

  Parts: Sealing ring
- Grease sealing rings (1) with lubricating grease.

Expendable materials

Lubricating grease SYNTHESO GLEP 1	100 g, Tube	83239407778

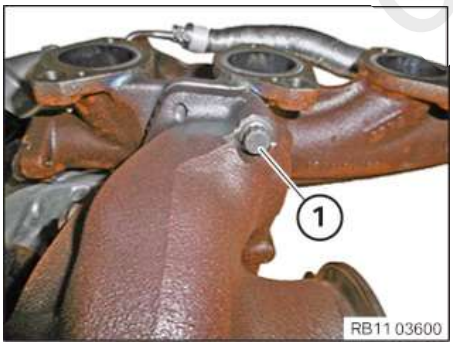
Overview of consumables (Electronic Parts Catalogue)



- Feed in the connecting pipes while positioning the exhaust turbocharger.
- Position the exhaust turbocharger with the seal.
- Tighten the screws (1).

High-pressure stage exhaust turbocharger to exhaust manifold

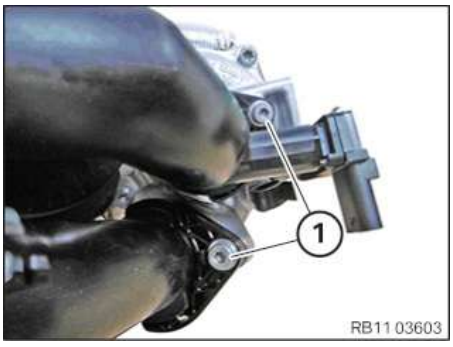
M8x20		Tightening torque	25 Nm



- Tighten down screw (1).

High-pressure stage exhaust turbocharger to exhaust manifold

M8x20		Tightening torque	25 Nm

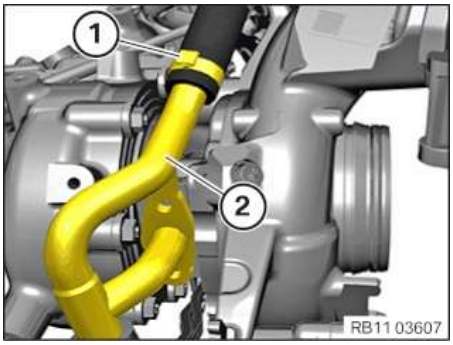


- Tighten screws (1) of the connecting pipe to the high-pressure stage exhaust turbocharger.

Connecting pipe with bypass flap to exhaust turbocharger low-pressure stage / high-pressure stage

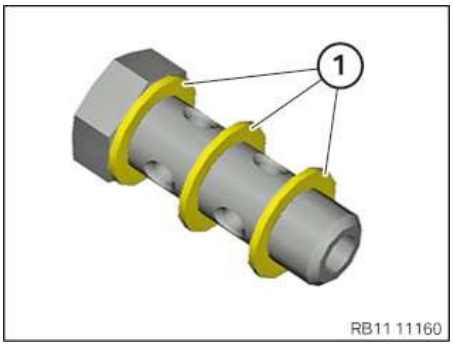
M6		Tightening torque	8 Nm

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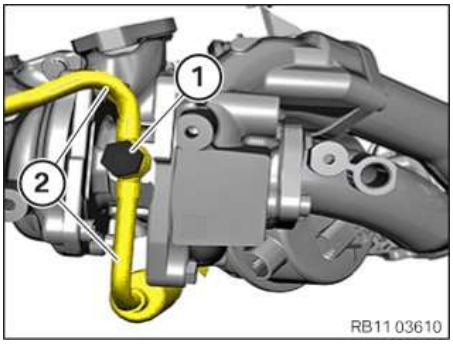
- If necessary, renew clamp (1).

  Parts: Clamp
- Connect and position oil return line (2) for the low-pressure stage exhaust turbocharger with the clamp.
- Fasten clamp (1).



- Renew banjo bolt and sealing rings (1).

  Parts: Sealing rings, banjo bolt



- Connect oil feed lines (2) with the sealing rings and the banjo bolt on the high-pressure stage exhaust turbocharger.
- Position oil feed lines (2) as illustrated.
- Tighten down screw (1).

Oil feed line for the exhaust turbocharger high-pressure stage

Hollow bolt		Jointing torque	10 Nm
		Angle of rotation	70 °

POSTPROCESSES

39 – Installing the high-pressure stage exhaust turbocharger and the low-pressure stage 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 surface.

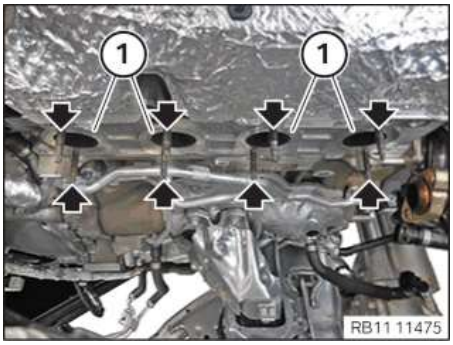
The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

TECHNICAL INFORMATION

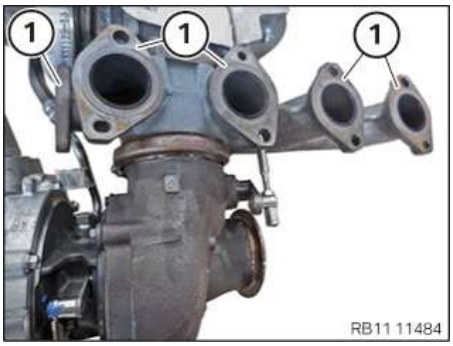
The sealing surfaces must be free from oils, grease and cleaning agents.

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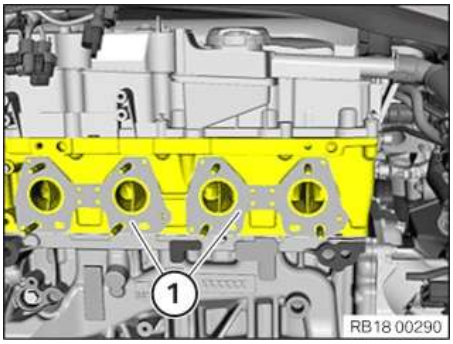


- Check the stud bolts (arrows) on the cylinder head for **correct** fit.
- Clean the connection points (1) with the special tool 0 495 102 (11 4 470).
- Renew gaskets.

  Parts: Seals



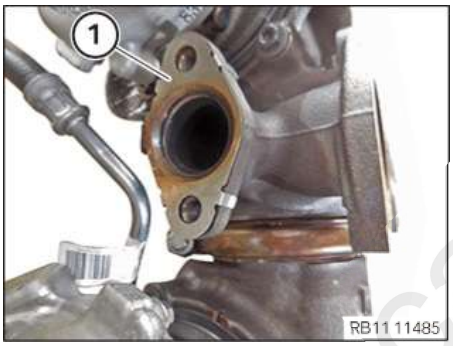
- Clean the connection points (1) on the exhaust manifold with the special tool 0 495 102 (11 4 470).



TECHNICAL INFORMATION

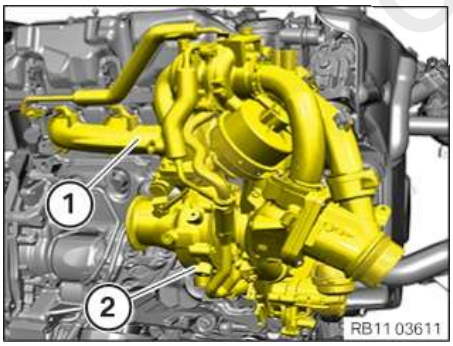
The **coated side** of the seal must be on the side of the exhaust manifold.

- Insert and install the gaskets (1).



- Renew the seal (1).

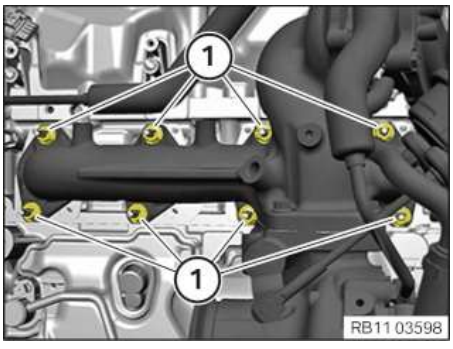
  Parts: Gasket
- Insert and install the seal (1).



TECHNICAL INFORMATION

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

- Feed in the exhaust manifold (1) with the high-pressure stage exhaust turbocharger and the low-pressure stage turbocharger (2) from the top front and install.



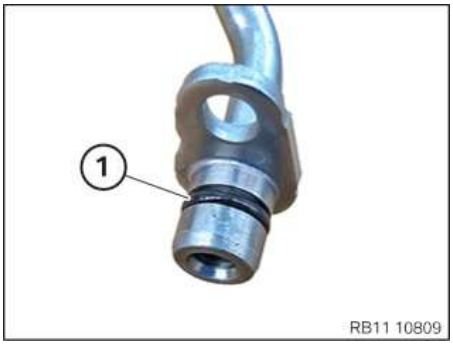
- Renew nuts (1).

  Parts: Nuts
- Tighten the nuts (1) evenly from the inside out.

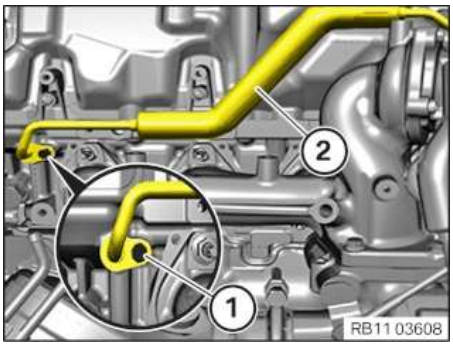
Exhaust manifold to cylinder head

M7	**If necessary, renew loose stud bolts.**	Tightening torque	11 Nm
	Renew nuts.	Tightening torque	13 Nm

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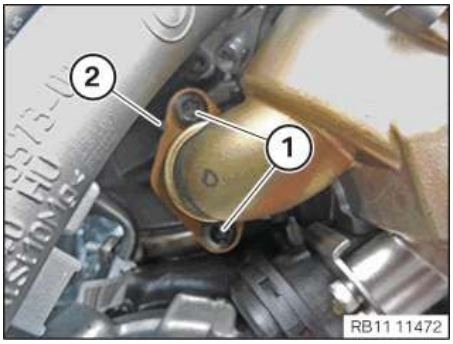
- Check the seal (1) for damage, if necessary, renew the oil feed line.



- Feed in and install the oil feed line (2) for the high-pressure stage exhaust turbocharger.
- Tighten down screw (1).

Oil feed line on cylinder head

M6x12		Tightening torque	8 Nm

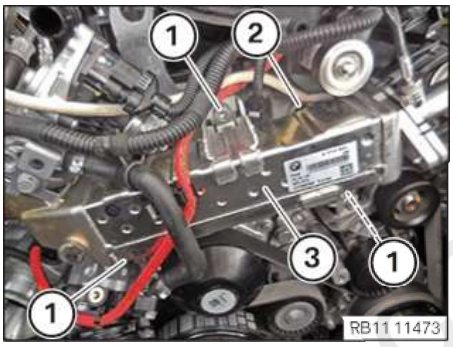


- Tighten the screws (1).

Exhaust-gas recirculation cooler to exhaust manifold

M8x28	Replace screws	Tightening torque	32 Nm

- Ensure that seal (2) is installed.



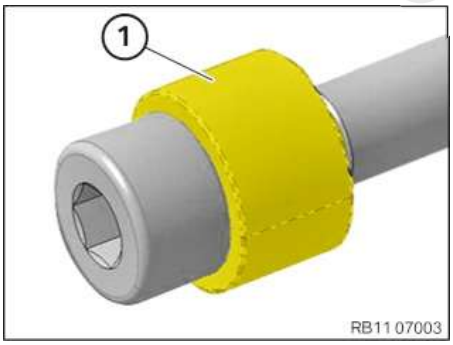
- Position the exhaust-gas recirculation cooler (3).
- Make sure the pipe neck (2) is fitted correctly.
- Tighten the screws (1).

Exhaust-gas recirculation cooler to cylinder head

M8x20 / M8x28		Tightening torque	19 Nm

Check

- Check whether the screws **with the** sleeves (1) (10 mm) are available.



Result

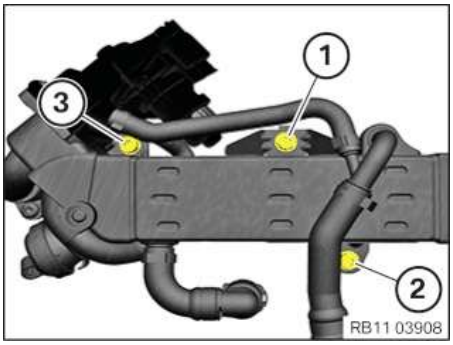
» Screws **without** sleeves (1) are available.

Measure

- Renew screws.

  Parts: Screws (part number 9 886 429)

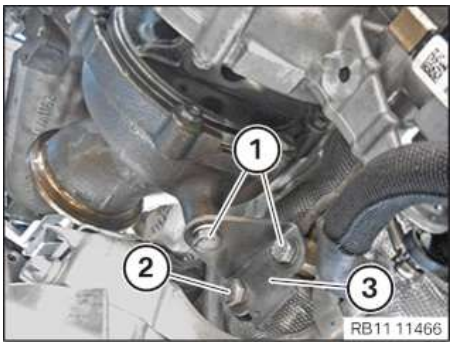
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- Tighten the screws (1) to (3).

Exhaust-gas recirculation cooler to cylinder head

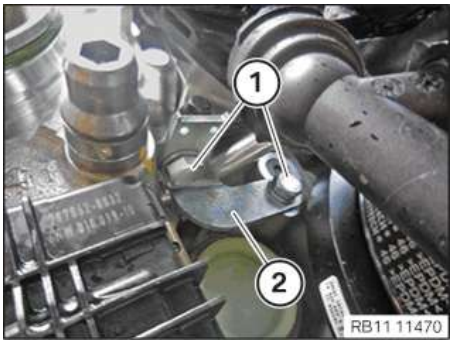
M8x20 / M8x28		Tightening torque	19 Nm



- Tighten the bolts (1) and (2) on the bracket (3).

Exhaust turbocharger low-pressure stage to crankcase

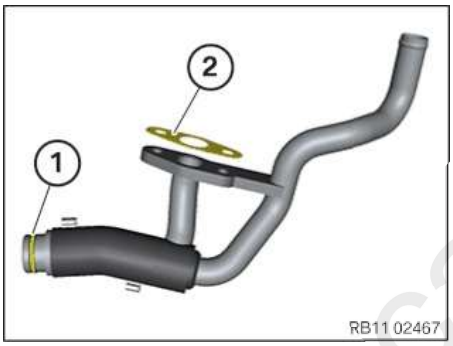
M8X16		Tightening torque	22 Nm



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

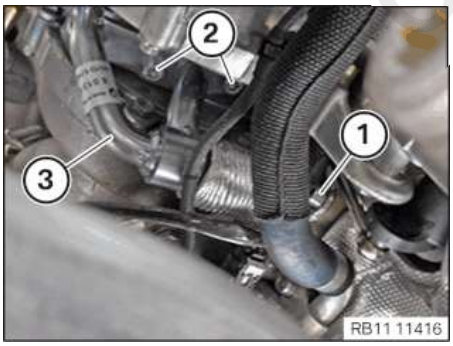
Exhaust turbocharger low-pressure stage to crankcase

M8X16		Tightening torque	22 Nm



- Renew the gasket (2).

  Parts: Gasket
- Check the O-ring (1) for damage and renew the oil return line as needed.



- Install oil return line (3) into crankcase.
- Position oil return line (3) with the seal on the low-pressure stage exhaust turbocharger.
- Tighten the screws (2).

Oil return line to turbocharger

M6x12	Renew gasket.	Tightening torque	8 Nm

- Install the bolt (1).

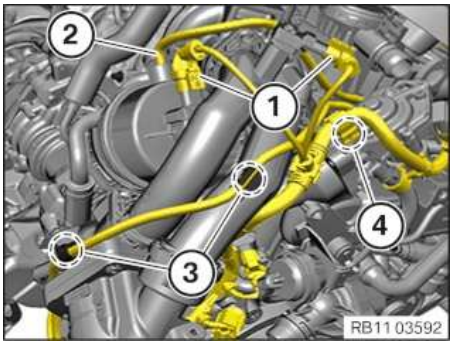


- Tighten the screws of the oil return line on the crankcase from the right wheel arch.

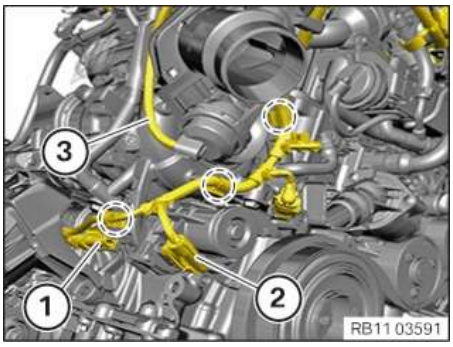
Oil return line to crankcase

M6x12	Check gasket. Renew the seal or line if necessary.	Tightening torque	8 Nm

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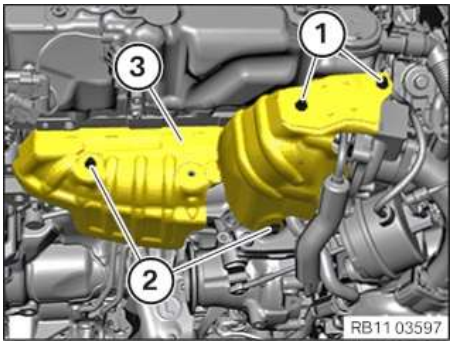


- Secure the vehicle wiring harness in area (4) to the exhaust-gas recirculation cooler.
- Secure the vacuum hose in the marked areas (3) to the exhaust turbochargers.
- Connect vacuum hose (2).
- Connect all connectors (1) and lock audibly.



- Connect vacuum hose (3).
- Secure the wiring harness in the marked areas to the exhaust turbochargers.
- Plug in the connector (2) and lock audibly.
- Secure the connector in area (1) to the holder.

40 – Installing heat shield



- Feed in and install the heat shield (3).
- Tighten down screws (1) and (2).

Heat shield to exhaust manifold

M6x12			10 Nm

41 – Installing the sensor bracket on the cylinder head cover

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.

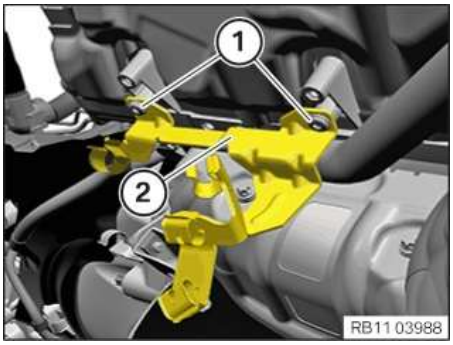
RISK OF DAMAGE

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.

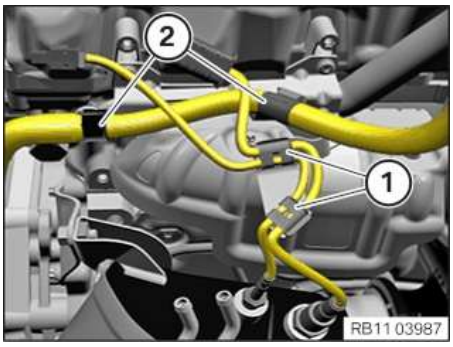
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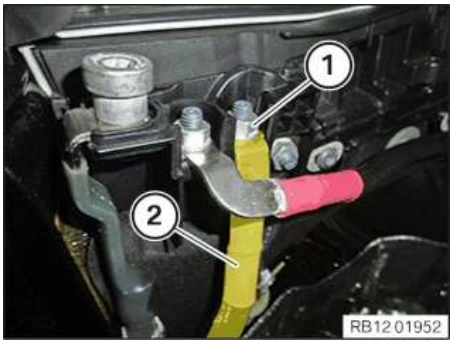
- Insert and install the holder (2).
- Tighten the screws (1).

Bracket on cylinder head cover

	Tightening torque	5 Nm



- Secure the positive battery cable in the clamps (2).
- Mount the cable of the exhaust gas sensor system in the clamps (1).



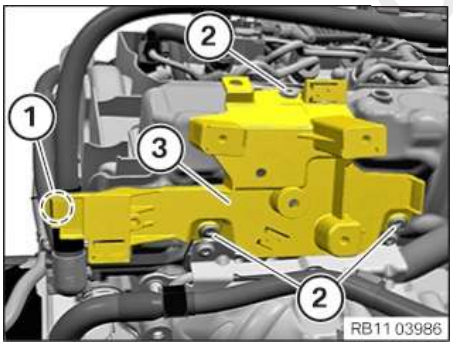
- Insert the positive battery cable (2) and install it.
- Tighten nut (1).

Battery positive lead to battery positive terminal

M8		Tightening torque	19 Nm



- Insert and install the cover (2) in the direction of the arrow.
  The locks (1) must engage audibly.

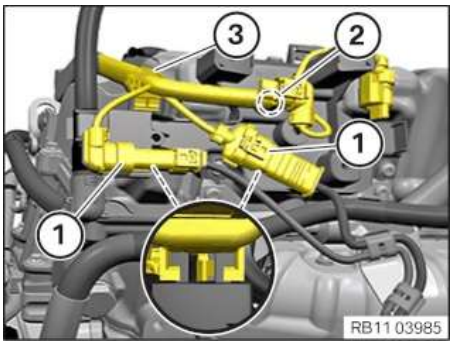


- Feed in and install the sensor bracket (3).
- Tighten the screws (2).

Bracket on cylinder head cover

	Tightening torque	5 Nm

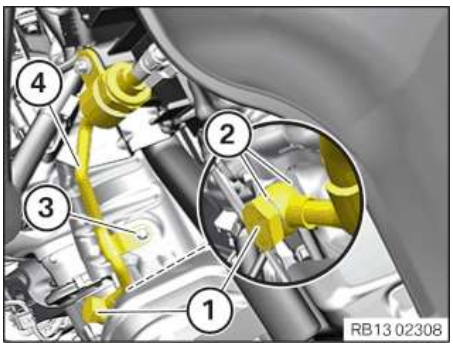
- Fasten the positive battery cable in the area (1) in the clamp.



- Feed in the wiring harness section and fasten it with the clamp (3).
- Fasten the cable clip in the area (2) in the sensor bracket.
- Feed in the connector (1) into the sensor bracket and lock it audibly.
- Plug in the connector (1) and lock audibly.

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42 – Install the exhaust gas pressure pipe



- Insert and install the exhaust gas pressure pipe (4).
- Replace the sealing rings (2).

  Parts: Sealing ring
- Apply the banjo bolt (1) hand-tight.
- Tighten down screw (3).

Heat shield to exhaust manifold

M6x12		Tightening torque	10 Nm

- Tighten the banjo bolt (1).

Banjo bolt for exhaust pressure pipe to exhaust manifold

Hollow bolt	Renew sealing rings.	Tightening torque	30 Nm



- Tighten down screw (2).

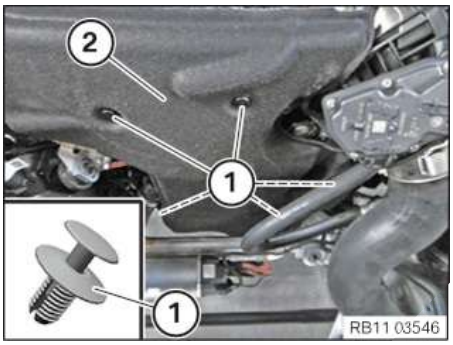
Exhaust gas pressure pipe to sensor system holder

TS6x20		Tightening torque	5,7 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

43 – Install acoustic cover for the engine, front



- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

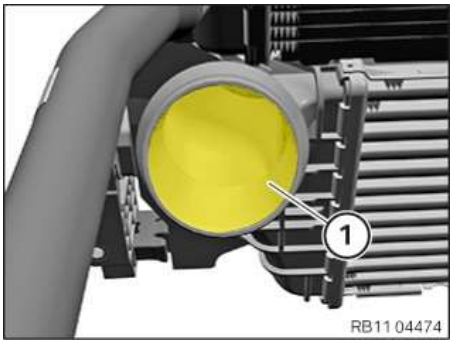
44 – Install pressure pipe between exhaust turbocharger and charge air cooler

RISK OF DAMAGE

Damage to the exhaust turbocharger.

A leak at the pressure pipe can damage the exhaust turbocharger.

- Replace the gaskets and pressure pipe if necessary.



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.

- Remove the auxiliary materials for sealing the opening (1) of the charge air cooler.

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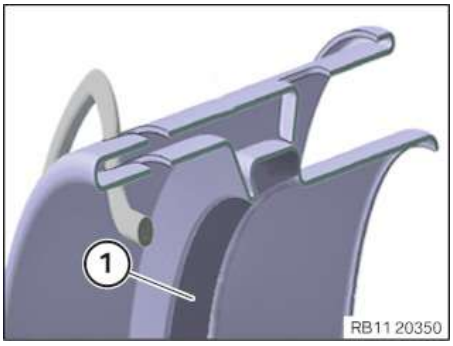
- Check the seal (1) for damage and renew if necessary.

  Parts: Gasket

▸ **Replacing damaged seal**

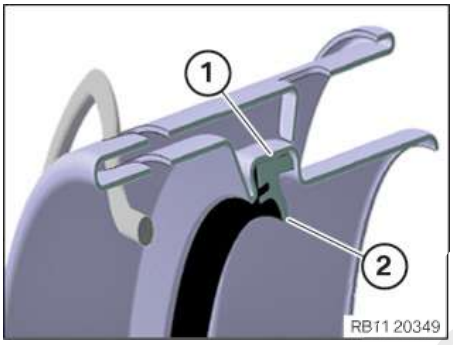
TECHNICAL INFORMATION

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.



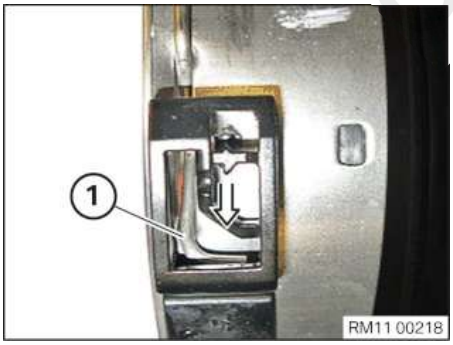
- Renew gasket.

  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 directed inwards as shown.



- **Version A:**

  Lock the lock (1).

  The lock (1) on the pressure pipe must engage audibly.



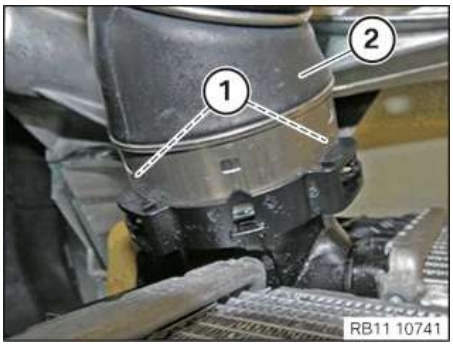
- Pay attention to the installation position:

  The pressure pipe fits on charge air cooler in one installation position only.

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- Install the pressure pipe (1) from the top.



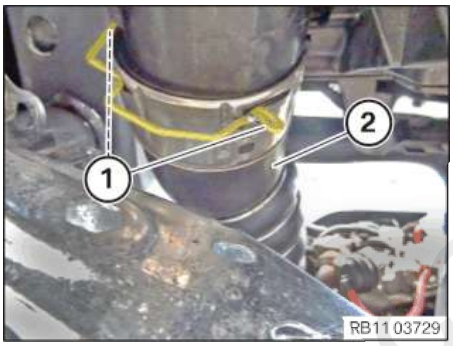
- Connect pressure pipe (2) to charge air cooler.
- Lock the lock (1) on both sides.



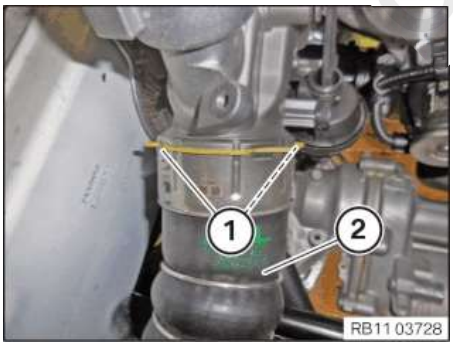
- **Version B:**

  Lock the lock (1).

  The lock (1) on the pressure pipe must engage audibly.



- Attach the pressure pipe (2) to the charge air cooler until the lock (1) engages on both sides.



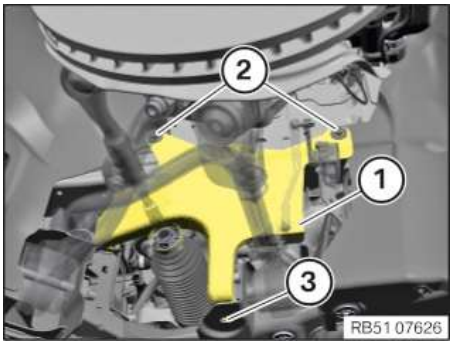
- Place the pressure pipe (2) onto the compressor bypass and ensure that the lock (1) engages audibly.

45 – Install the cover of the steering assembly

TECHNICAL INFORMATION

When tightening the screws, the cover can twist and cause chafe marks on the anti-roll bar (risk of corrosion).
Hold the cover while tightening the screws. Then check the position of the cover.

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- Position the cover (1).
- Tighten down screws (2) and (3).

Cover, steering unit

Screw		Tightening torque	3 Nm

46 – Installing the front right wheel

▸ **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.

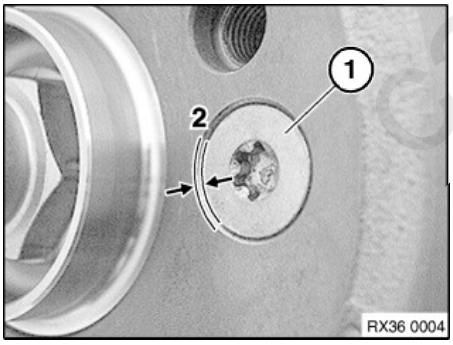
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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.



- 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 on the contact surface (2) between the brake disc and the wheel rim.

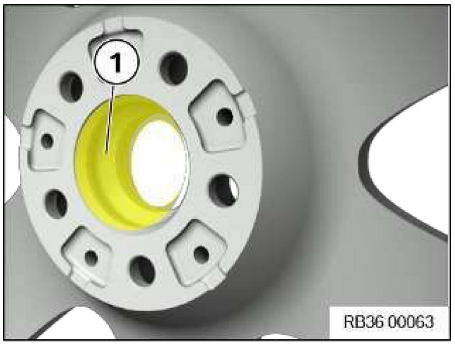
Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm

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TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- 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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against 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



TECHNICAL INFORMATION

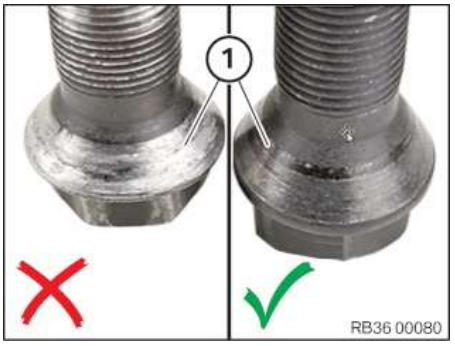
A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

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

Check

- **Check wheel bolts for wear.**



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Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts



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 the corroded wheel bolts (arrows).

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

47 – Prepare for the installation of the diesel particulate filter



- Renew the V-clip (1).

  Parts: V-band clamp



- Renew gasket (1).

  Parts: Gasket

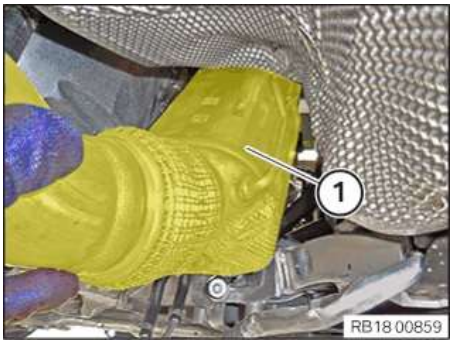
48 – Installing the diesel particulate filter

CAUTION

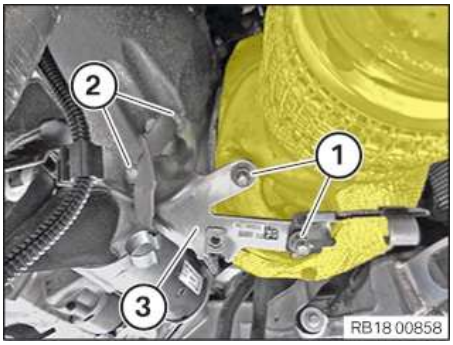
Heavy component.

Heavy components can lead to injury or damage.

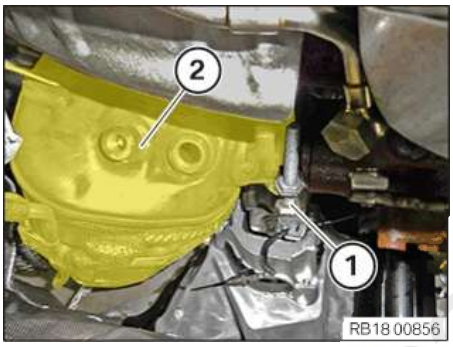
- Remove and install heavy components with the aid of another person/other persons.



- Insert and install the diesel particulate filter (1).



- Insert and install the holder (3).
- **Hand-tighten** the bolts (2).
- Apply the nuts (1) **hand-tight**.

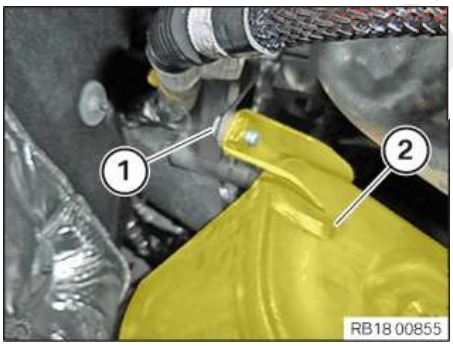


- Renew the V-clip (1).

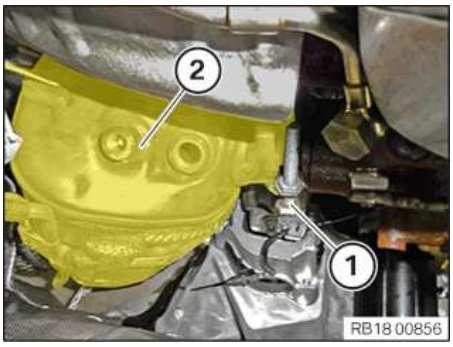
  Parts: V-band clamp
- Feed in and install V-band clamp (1).

Note: Make sure that the seal between the diesel particulate filter and the exhaust turbocharger is installed correctly.

- Position the diesel particulate filter (2) on the exhaust turbocharger .
- Position V-clip (1).
- Apply the V-clip (1) **hand-tight**.



- Feed in screw (1) on the holder of the diesel particulate filter (2) and tighten **hand-tight**.

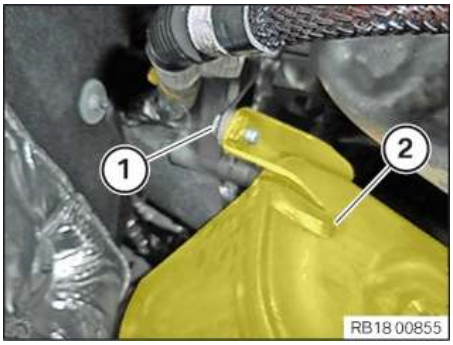


- Tighten the V-clip (1) of the diesel particulate filter (2).

Diesel particulate filter V-clip to exhaust turbocharger

V-band clamp	Renew V-band clamp.	Tightening torque	15 Nm

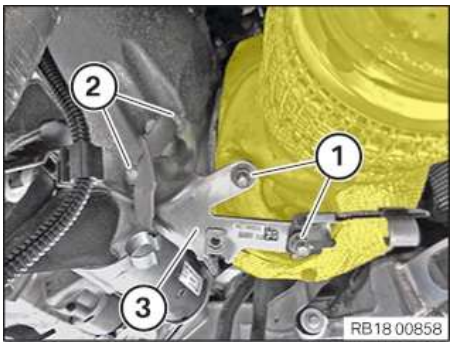
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- Tighten the bolt (1) on the bracket of the diesel particulate filter (2).

Bracket to diesel particulate filter top

M8		Tightening torque	19 Nm



- Tighten the screws (2) on the holder (3).

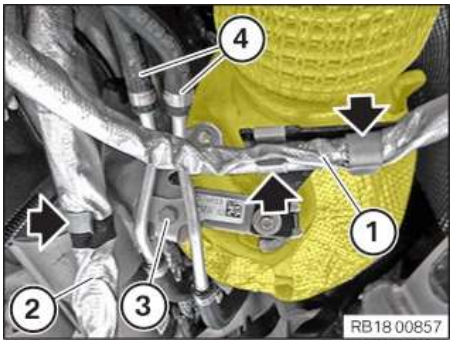
Bracket to transmission for diesel particulate filter holder bottom

M8X20		Tightening torque	19 Nm

- Tighten the nuts (1) on the holder (3).

Lower holder to diesel particulate filter

M8		Tightening torque	19 Nm



- Thread in and install coolant line (4).
- Tighten down screw (3).

Coolant lines for SCR metering module

M6X16		Tightening torque	8 Nm

- Secure the positive battery cable (2) of the starter motor at the clamp (arrow).
- Fasten the metering line (1) on the clamps (arrows).

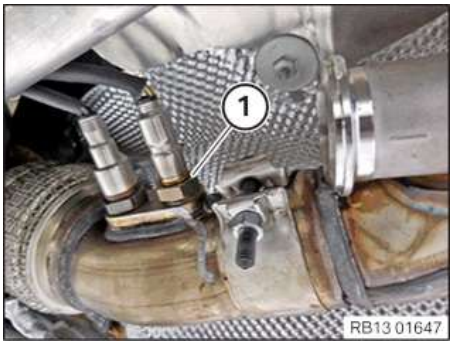
49 – Installing the nitrogen oxide sensor upstream of SCR catalytic converter

RISK OF DAMAGE

Damage to the nitrogen oxide sensor.

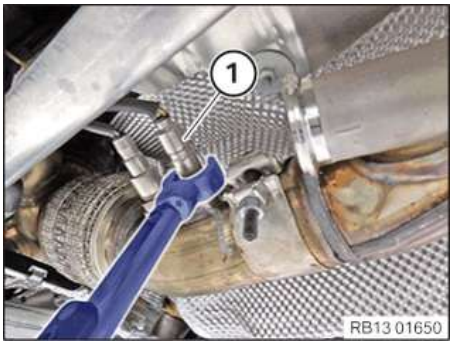
Failure of the nitrogen oxide sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Feed in and install the nitrogen oxide sensor (1).

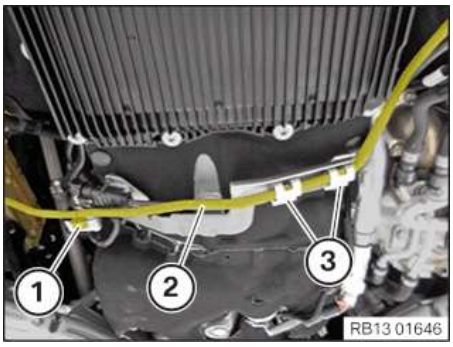
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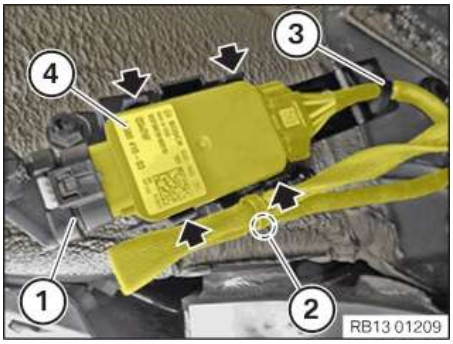
- Tighten the nitrogen oxide sensor (1) using commercially available tools.

Nitrogen oxide sensor before SCR catalytic converter

Sensor		Tightening torque	50 Nm



- Secure the cables (2) to the clamps (3).
- Secure clamps (1).



- Clip in the control unit (4) (arrows).
- Fasten the cable in the holder (3).
- Secure the cable holder (2).
- Plug in the connector (1) and lock audibly.

50 – Installing the monitoring oxygen sensor after the diesel particulate filter

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.

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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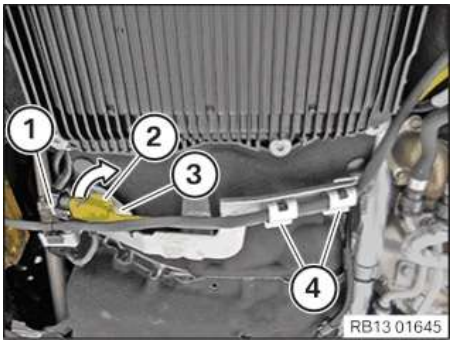
- Insert the monitoring oxygen sensor (1) and install it.



- Tighten the monitoring oxygen sensor (1) with standard tools.

Monitoring oxygen sensor

Sensor		Tightening torque	50 Nm



- Fasten the monitoring oxygen sensor to the clamps (4).
- Secure the connector (2) on the holder (3) in direction of arrow.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

51 – Installing the 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.

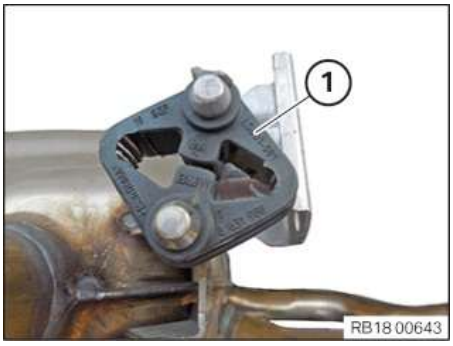
Heavy components can lead to injury or damage.

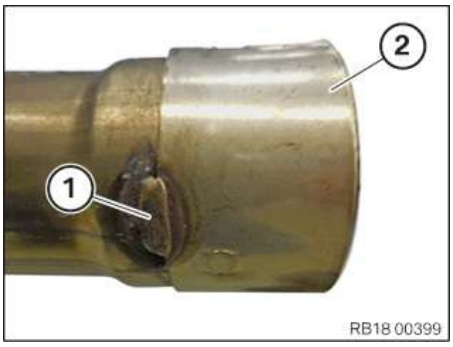
- Remove and install heavy components with the aid of another person/other persons.

TECHNICAL INFORMATION

Mount the exhaust system in voltage-free state, maintaining the tightening sequence from the rear silencer towards the exhaust manifold.

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NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Check all the rubber mounts (1) of the exhaust system for damage.
- Replaced damaged rubber mounts.

  Parts: Rubber mount

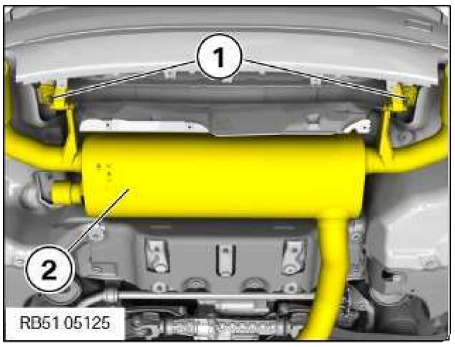
CAUTION

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.

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

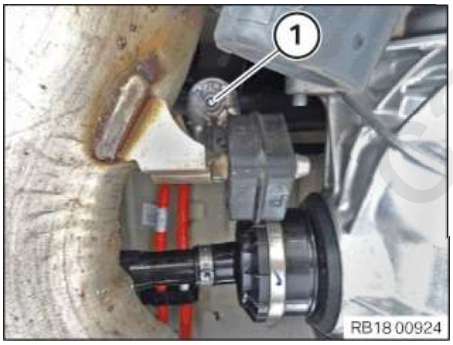


- Insert and install the exhaust system (2).
- Renew nuts (1).

  Parts: Nuts
- Tighten nuts (1).

Rear silencer to body / bumper support

M8	Replace nuts.	Tightening torque	19 Nm

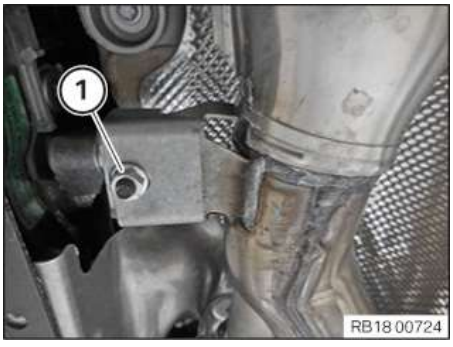


- Renew nut (1) on the rear axle support.

  Parts: Nut
- Tighten nut (1).

Exhaust system to rear axle carrier

M8 nut		Tightening torque	19 Nm

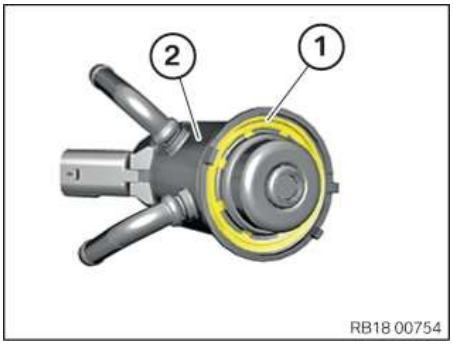


- Tighten nut (1).

Exhaust system to transmission

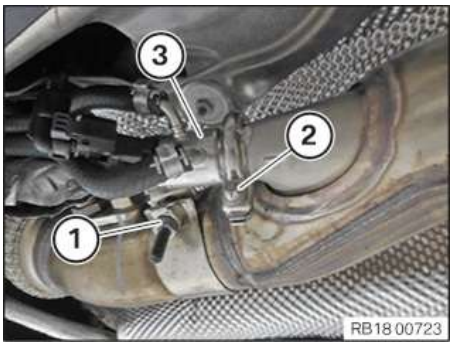
M8		Tightening torque	19 Nm

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- Renew sealing ring (1) of the SCR metering module (2).

  Parts: Sealing ring



- If necessary, renew clamp (1).

  Parts: Clamp
- Tighten clamp (1).

Exhaust system to diesel particle filter

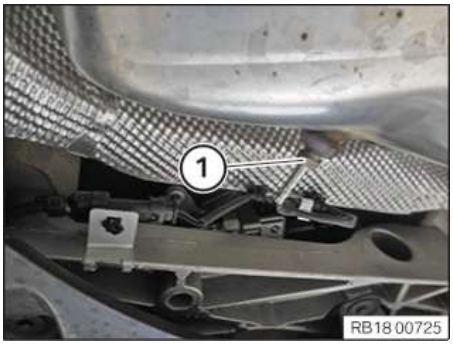
M8	If necessary, renew clamp.	Tightening torque	26 ±2 Nm

- Renew the V-clip (2).

  Parts: V-band clamp
- Install the SCR metering module (3) in the exhaust system.
- Tighten the V-clip (2) of the SCR metering module (3).

SCR metering module V-clip to exhaust system

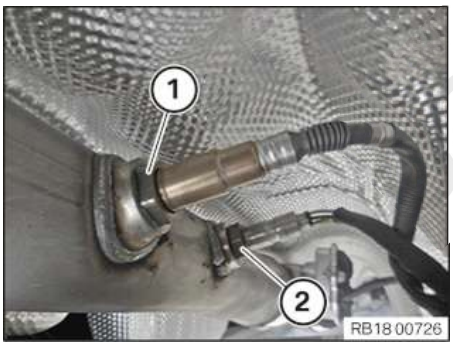
V-band clamp	Renew V-band clamp.	Tightening torque	8 Nm



- Install the exhaust temperature sensor (1) in the exhaust system and tighten.

Exhaust-gas temperature sensor upstream of SCR catalytic converter

Sensor		Tightening torque	30 Nm



- Install the diesel particulate sensor (1) in the exhaust system and tighten.

Diesel particulate sensor to exhaust system

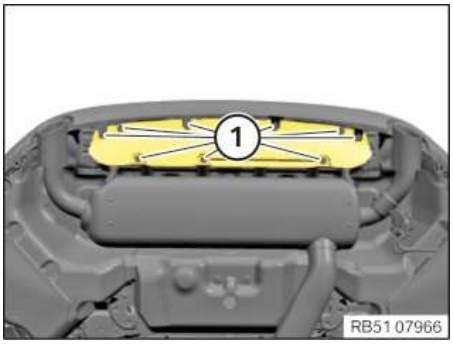
Sensor		Tightening torque	50 Nm

- Install the nitrogen oxide sensor (2) in the exhaust system and tighten.

Nitrogen oxide sensor downstream of SCR catalytic converter

Sensor		Tightening torque	55 Nm

52 – Installing the rear diffuser

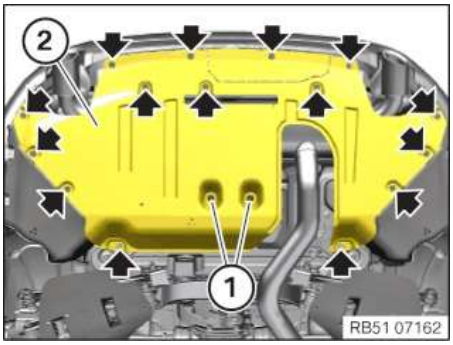


- **Version 1:**
- Install the diffuser and tighten the nuts (1).

Diffuser / underbody panelling

Nuts and screws		Tightening torque	3 Nm

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- **Version 2:**
- Feed in and position the diffuser (2)
- Tighten screws (arrows).

Diffuser / underbody panelling

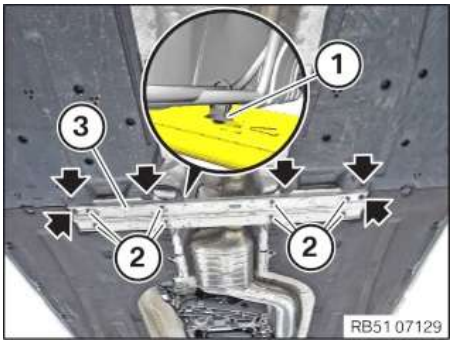
Nuts and screws		Tightening torque	3 Nm

- Tighten nuts (1).

Diffuser / underbody panelling

Nuts and screws		Tightening torque	3 Nm

53 – Install the connecting supports on the tunnel



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

Connecting support to tunnel

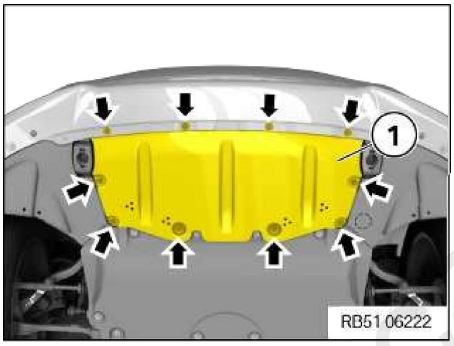
M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Secure the clamp (1).

54 – Installing the front underbody protection



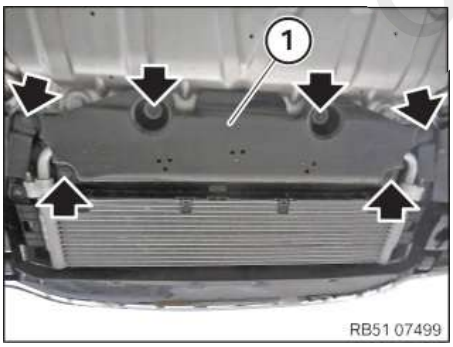
- **Version A:**

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



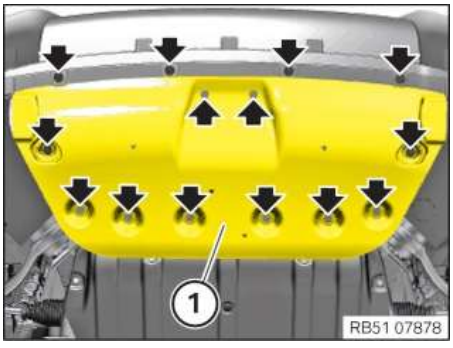
- **Version B:**

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 C:**

Feed in and install front underbody protection (1).

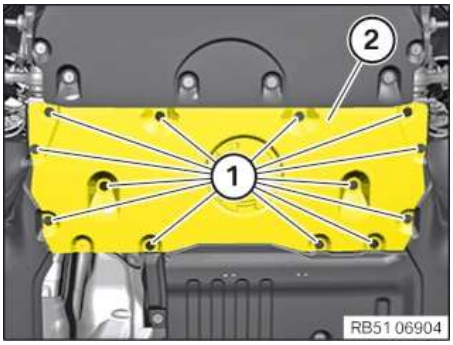
Tighten screws (arrows).

Underbody protection front

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

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55 – Installing the centre underbody protection



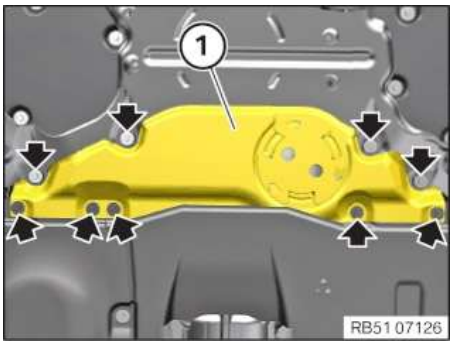
- **Variant with rear wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

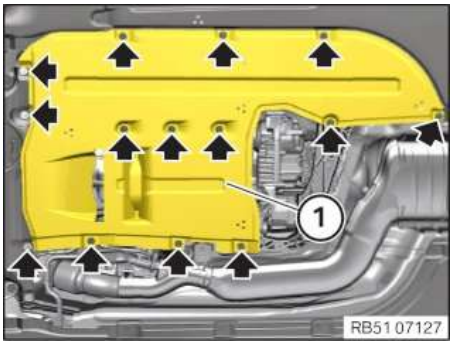
  Guide in centre underbody protection (1) and install.

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

56 – Installing underbody protection at rear



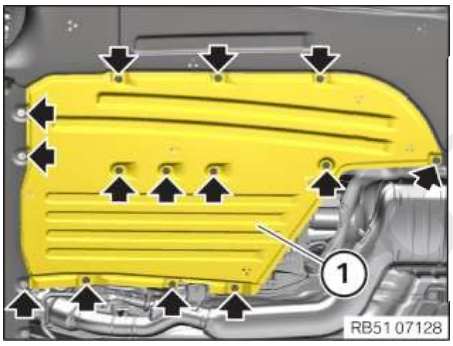
- **Version A:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version B:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

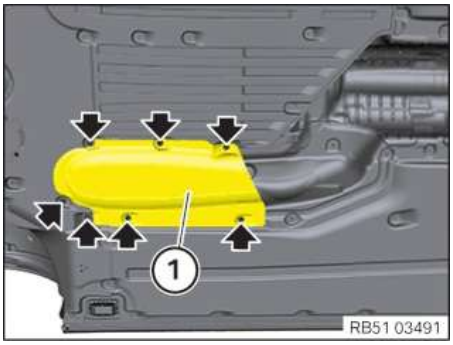
Underbody protection

Hexagon screw		Tightening torque	3 Nm

57 – Install the underbody panelling of the transmission on the side

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

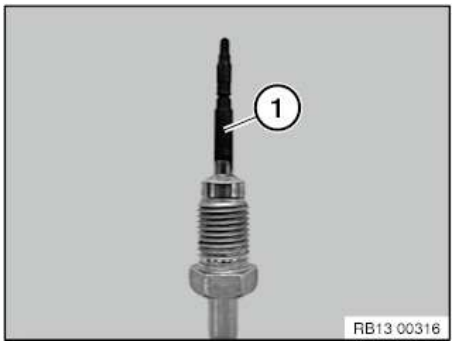


- Insert the underbody panelling (1).
- Tighten screws (arrows).

Underbody panelling

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

58 – Installing the exhaust temperature sensor for the exhaust system downstream the catalytic converter on the diesel particulate filter



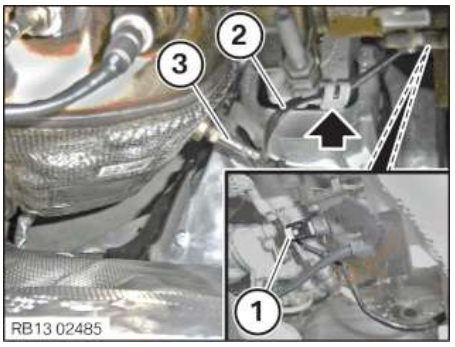
RISK OF DAMAGE

Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

- Make sure that the gauge tip is not damaged.

- Check the gauge tip (1) for damage.



- Feed in and install the exhaust temperature sensor (3).
- Tighten the exhaust temperature sensor (3).

Exhaust temperature sensor for the exhaust system after catalytic converter before diesel particulate filter

Sensor		Tightening torque	30 Nm

- Secure cable (2) to the clamp (arrow).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

59 – Installing the front oxygen sensor on the diesel particulate filter

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
- The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.

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

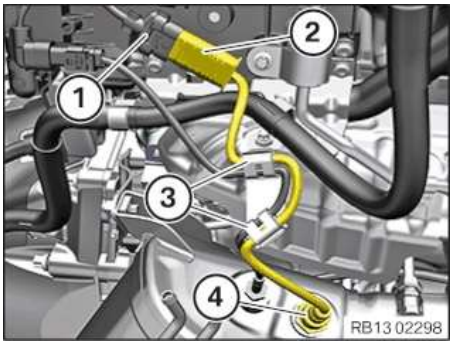


- Insert and install the front oxygen sensor (1).
- Tighten the front oxygen sensor (1) with standard tools.

Front oxygen sensor to top of diesel particulate filter

Sensor		Tightening torque	50 Nm

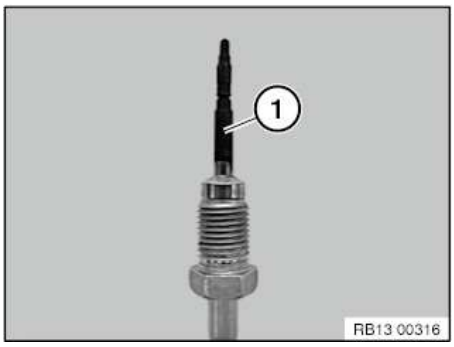
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- Fasten the front oxygen sensor (4) to the clamps (3).
- Connect connectors (2) and lock.
- Connect connectors (1) and lock.

  The connectors (1) and (2) must audibly engage.

60 – Install the exhaust-gas temperature sensor on the diesel particulate filter



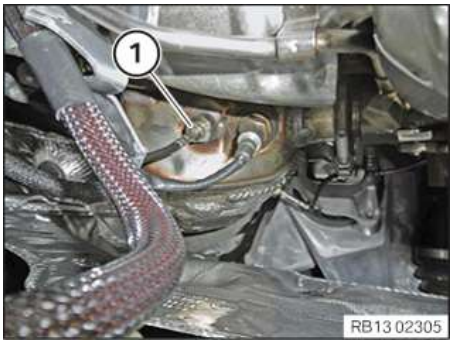
RISK OF DAMAGE

Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

- Make sure that the gauge tip is not damaged.

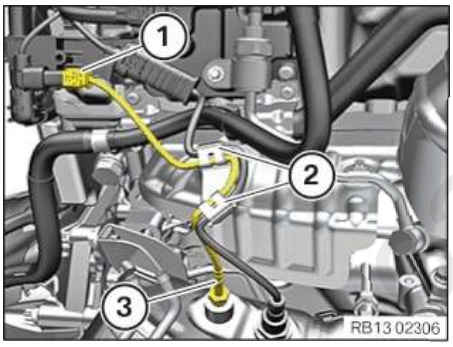
- Check gauge tip (1) for damage.



- Feed in and install the exhaust temperature sensor (1).
- Tighten the exhaust temperature sensor (1) with the special tool .

Exhaust-gas temperature sensor to diesel particulate filter

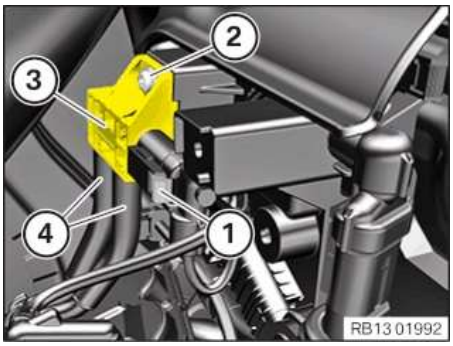
Sensor		Tightening torque	30 Nm



- Secure the exhaust temperature sensor (3) to the clamp (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

61 – Installing the differential pressure sensor for the diesel particulate filter



- Feed in and install the differential pressure sensor (3).
- Tighten down screw (2).

Differential pressure sensor of diesel particulate filter on cylinder head cover

TS5x20		Tightening torque	4 Nm

- Check the pressure hoses (4) for hardening and damage, renew if necessary.
- Connect the pressure hoses (4) and secure them using 15 mm to 19 mm screw clamps.

Clamp for the pressure hose on the differential pressure sensor

Clamp 15–19mm		Tightening torque	3 Nm

- Connect connectors (1) and lock.

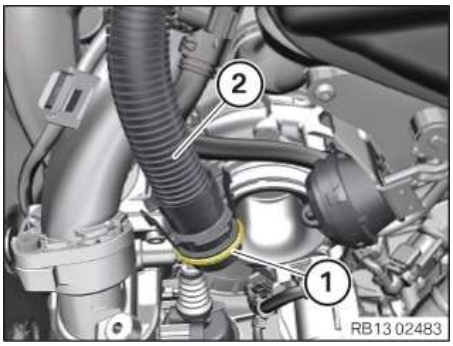
  The connector (1) must engage audibly.

62 – Installing the clean air pipe with resonator

carsign.com



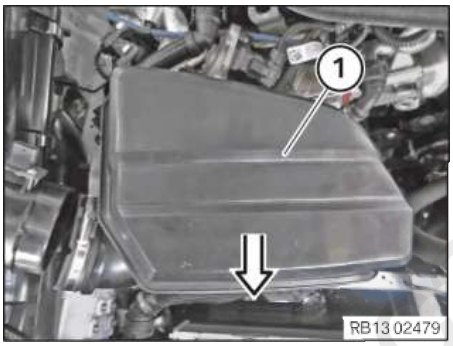
- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.



- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

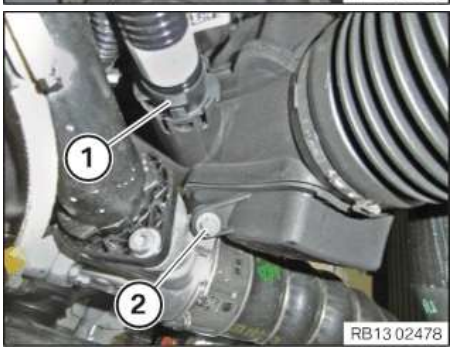


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

  The clamp (1) must engage audibly.

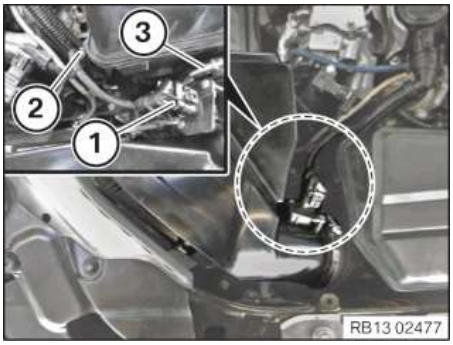


- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm

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- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

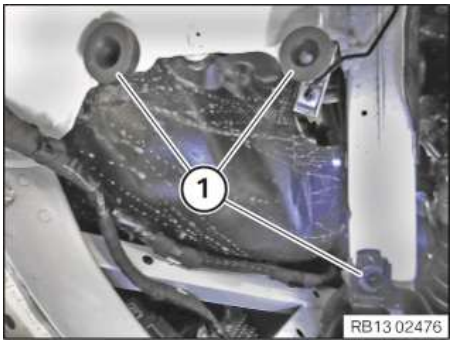
Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

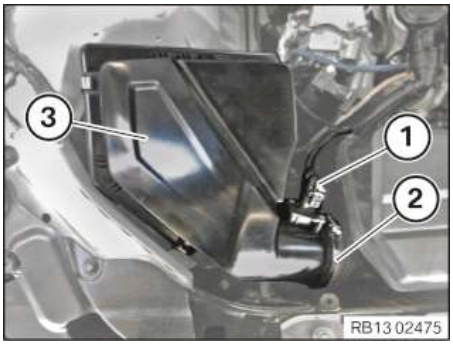
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

63 – 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

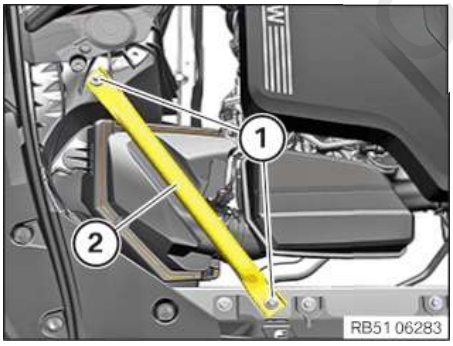
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

64 – Install the right front-end strut

TECHNICAL INFORMATION

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



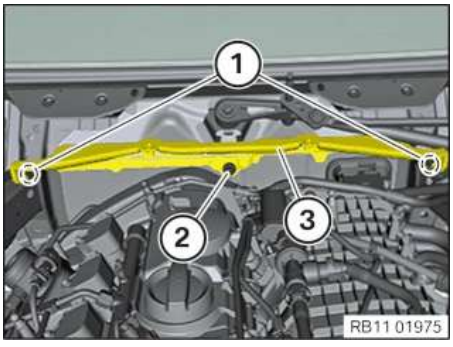
- Install the front-end strut (2).
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Front end strut

Screw		Tightening torque	56 Nm

65 – Installing centre bulkhead lower section



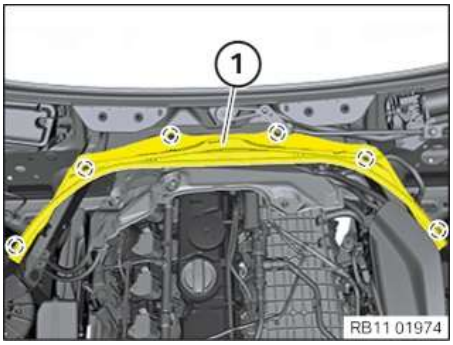
- Position the centre bulkhead lower part (3).
- Tighten nut (2) and screws (1).

Bulkhead lower part to body

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

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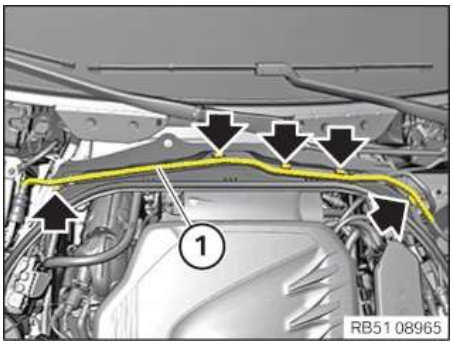
66 – Installing the centre bulkhead upper part



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

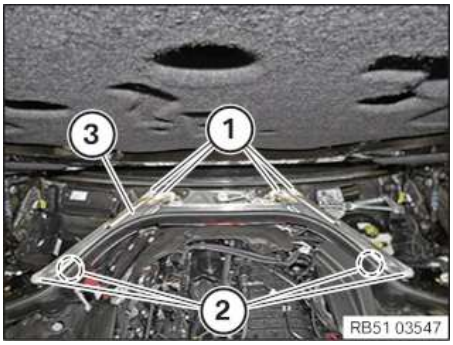
Bulkhead upper part to bottom bulkhead

	Tightening torque	3 Nm



- **Version with mild hybrid technology:**

  Clip in the wire (1) into the holders (arrows).



NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- 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: Screws
- Tighten the screws (2).

Tension strut to spring strut dome

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

67 – 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.

68 – Installing cowl panel cover

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RISK OF DAMAGE

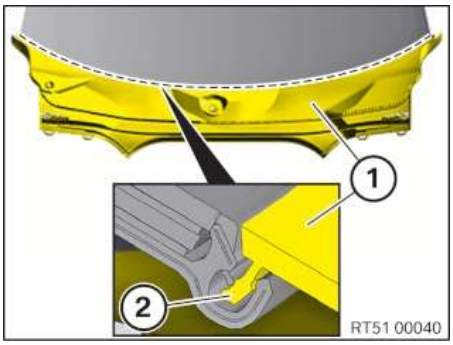
Damage caused by water ingress into the vehicle.

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

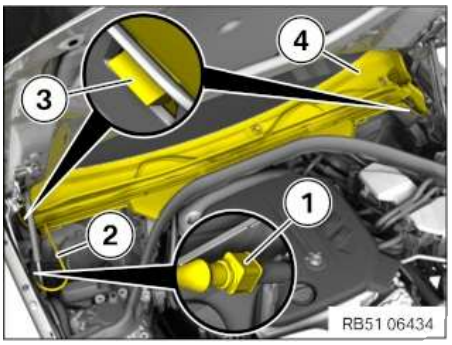
- Ensure correct installation of the components.
- Only use undamaged components.

TECHNICAL INFORMATION

Before installing the cowl panel cover it is **mandatory** to check that the 48 V line is routed correctly and fitted tightly.
An incorrectly laid or attached 48 V line can be damaged by the wiper kinematics.



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



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

69 – Install left and right wiper arm

NOTICE

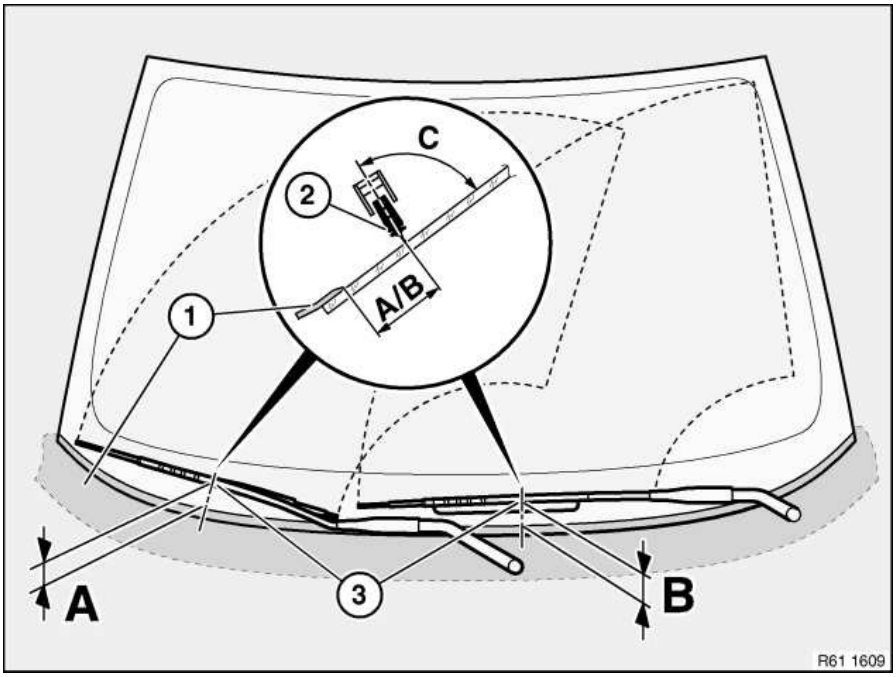
Description is for left component only. Procedure on the right side is identical.

▸ **Installing left and right wiper arm**

TECHNICAL INFORMATION

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

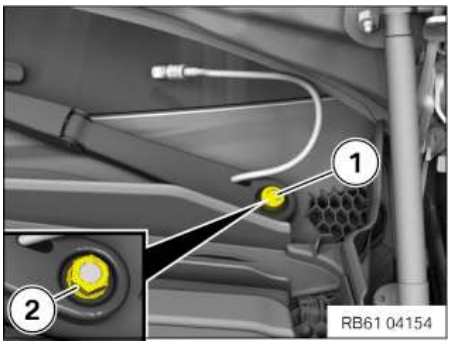
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- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

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

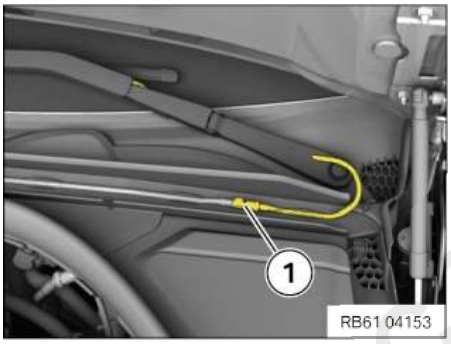


- Tighten nut (2).

Windscreen wiper arm

Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Feed washer fluid hose (1) into the cowl panel guide and connect at the separation point.

70 – Connecting all battery earth leads



- See additional information.

71 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm

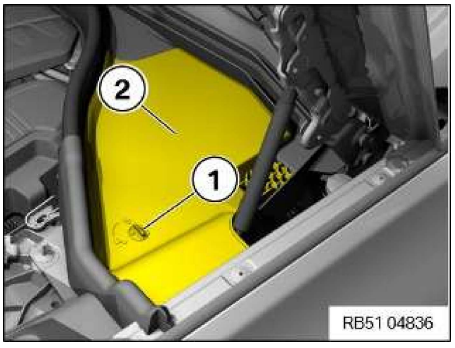


- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

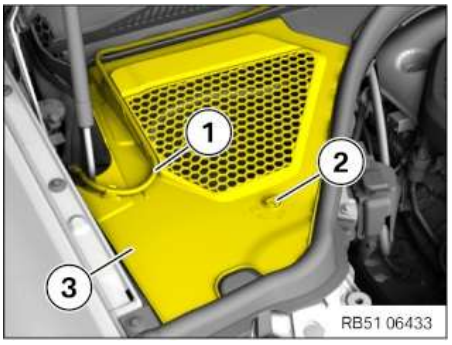
72 – Install the cover of the engine compartment on the rear left



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

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73 – Install the rear right engine compartment cover



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

74 – Check engine oil level

Prerequisite

Vehicle is in a horizontal position.

TECHNICAL INFORMATION

Please comply with instructions in Owner's Handbook.

- Carry out an electronic oil measurement.
- Top up engine oil if necessary.

▸ **Check engine oil level**

TECHNICAL INFORMATION

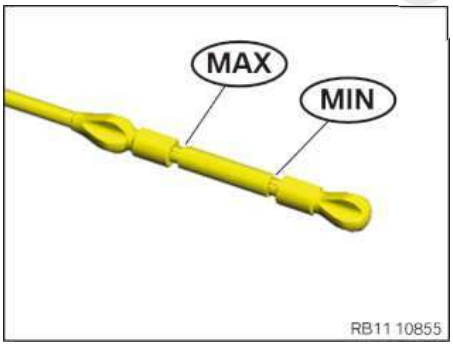
Always check the engine oil level when the engine is at operating temperature (engine oil temperature > 70°C).

- Park vehicle on a horizontal surface.
- Stop the engine and wait for 5 minutes.
- Pull out the oil dipstick and wipe off using a lint-free cloth.

TECHNICAL INFORMATION

Do not pull out or insert the oil dipstick into the guide tube too quickly or slowly.

- Push the oil dipstick into the guide tube up to the limit position and pull it out again.



TECHNICAL INFORMATION

The engine oil level must be between the minimum mark and the maximum mark of the oil dipstick.

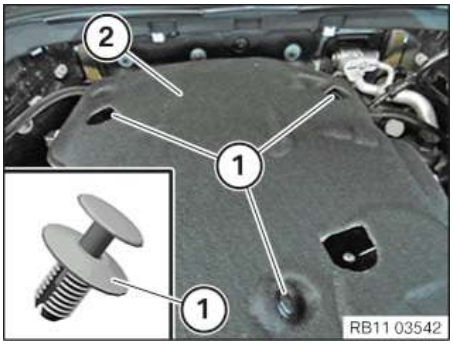
- Read the engine oil level on the oil dipstick.
- Top up engine oil if necessary.

Oil quantity between the two markings MIN and MAX of the oil dipstick

1.0 l

75 – Install the acoustic cover for the injectors

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- Feed the acoustic cover (2) in and install.
- **If installed:** Secure the acoustic cover (2) with the expanding rivets (1) .

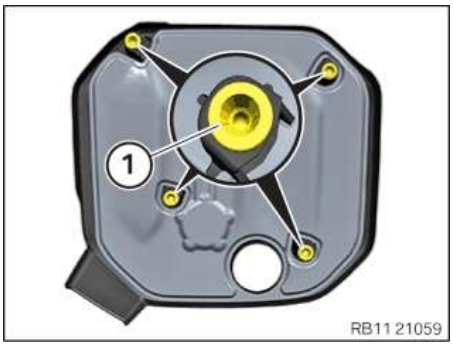
76 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

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

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



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

77 – Take bonnet out of the service position

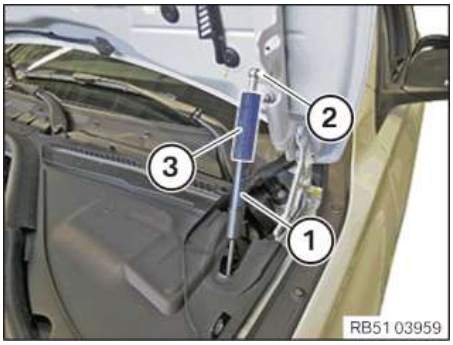
CAUTION

Shutting bonnet or tailgate.

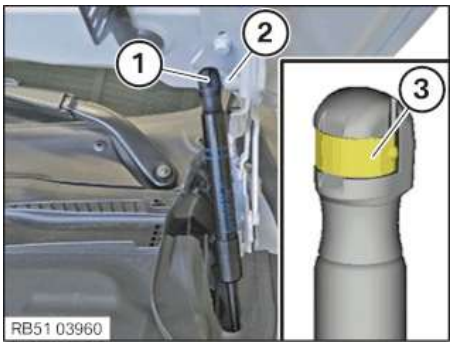
Danger of injury!

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

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- 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.



- 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 return line to turbocharger			Used in step 3839
M6x12	Renew gasket.	Tightening torque	8 Nm

High-pressure stage exhaust turbocharger to exhaust manifold			Used in step 38
M8x20		Tightening torque	25 Nm

Connecting pipe with bypass flap to exhaust turbocharger low-pressure stage / high-pressure stage			Used in step 38
M6		Tightening torque	8 Nm

Oil feed line for the exhaust turbocharger high-pressure stage			Used in step 38
Hollow bolt		Jointing torque	10 Nm
		Angle of rotation	70 °

Exhaust manifold to cylinder head			Used in step 39
M7	**If necessary, renew loose stud bolts.**	Tightening torque	11 Nm
	Renew nuts.	Tightening torque	13 Nm

Oil feed line on cylinder head			Used in step 39
M6x12		Tightening torque	8 Nm

Exhaust-gas recirculation cooler to exhaust manifold			Used in step 39
M8x28	Replace screws	Tightening torque	32 Nm

Exhaust-gas recirculation cooler to cylinder head			Used in step 39
M8x20 / M8x28		Tightening torque	19 Nm

Exhaust turbocharger low-pressure stage to crankcase			Used in step 39
M8X16		Tightening torque	22 Nm

Oil return line to crankcase			Used in step 39
M6x12	Check gasket. Renew the seal or line if necessary.	Tightening torque	8 Nm

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Heat shield to exhaust manifold			Used in step 40
M6x12			10 Nm

Bracket on cylinder head cover			Used in step 41
		Tightening torque	5 Nm

Battery positive lead to battery positive terminal			Used in step 41
M8		Tightening torque	19 Nm

Heat shield to exhaust manifold			Used in step 42
M6x12		Tightening torque	10 Nm

Banjo bolt for exhaust pressure pipe to exhaust manifold			Used in step 42
Hollow bolt	Renew sealing rings.	Tightening torque	30 Nm

Exhaust gas pressure pipe to sensor system holder			Used in step 42
TS6x20		Tightening torque	5,7 Nm

Cover, steering unit			Used in step 45
Screw		Tightening torque	3 Nm

Brake disc to front wheel hub			Used in step 46
M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub			Used in step 46
M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts			Used in step 46
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

Diesel particulate filter V-clip to exhaust turbocharger			Used in step 48
V-band clamp	Renew V-band clamp.	Tightening torque	15 Nm

Bracket to diesel particulate filter top			Used in step 48
M8		Tightening torque	19 Nm

Bracket to transmission for diesel particulate filter holder bottom			Used in step 48
M8X20		Tightening torque	19 Nm

Lower holder to diesel particulate filter			Used in step 48
M8		Tightening torque	19 Nm

Coolant lines for SCR metering module			Used in step 48
M6X16		Tightening torque	8 Nm

Nitrogen oxide sensor before SCR catalytic converter			Used in step 49
Sensor		Tightening torque	50 Nm

Monitoring oxygen sensor			Used in step 50
Sensor		Tightening torque	50 Nm

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Rear silencer to body / bumper support			Used in step 51
M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier			Used in step 51
M8 nut		Tightening torque	19 Nm

Exhaust system to transmission			Used in step 51
M8		Tightening torque	19 Nm

Exhaust system to diesel particle filter			Used in step 51
M8	If necessary, renew clamp.	Tightening torque	26 ±2 Nm

SCR metering module V-clip to exhaust system			Used in step 51
V-band clamp	Renew V-band clamp.	Tightening torque	8 Nm

Exhaust-gas temperature sensor upstream of SCR catalytic converter			Used in step 51
Sensor		Tightening torque	30 Nm

Diesel particulate sensor to exhaust system			Used in step 51
Sensor		Tightening torque	50 Nm

Nitrogen oxide sensor downstream of SCR catalytic converter			Used in step 51
Sensor		Tightening torque	55 Nm

Diffuser / underbody panelling			Used in step 52
Nuts and screws		Tightening torque	3 Nm

Connecting support to tunnel			Used in step 53
M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

Underbody protection front			Used in step 54
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Underbody protection			Used in step 5556
Hexagon screw		Tightening torque	3 Nm

Underbody panelling			Used in step 57
Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

Exhaust temperature sensor for the exhaust system after catalytic converter before diesel particulate filter			Used in step 58
Sensor		Tightening torque	30 Nm

Front oxygen sensor to top of diesel particulate filter			Used in step 59
Sensor		Tightening torque	50 Nm

Exhaust-gas temperature sensor to diesel particulate filter			Used in step 60
Sensor		Tightening torque	30 Nm

Differential pressure sensor of diesel particulate filter on cylinder head cover			Used in step 61
TS5x20		Tightening torque	4 Nm

Clamp for the pressure hose on the differential pressure sensor			Used in step 61
Clamp 15–19mm		Tightening torque	3 Nm

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Clean air pipe to exhaust turbocharger — Used in step 62

M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing — Used in step 6263

Clamp		Tightening torque	3 Nm

Front end strut — Used in step 64

Screw		Tightening torque	56 Nm

Bulkhead lower part to body — Used in step 65

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

Bulkhead upper part to bottom bulkhead — Used in step 66

		Tightening torque	3 Nm

Tension strut on bulkhead — Used in step 66

M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome — Used in step 66

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

Windscreen wiper arm — Used in step 69

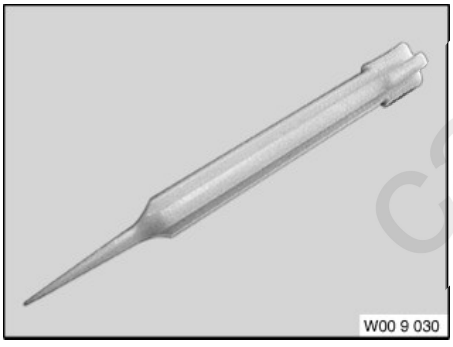
Combination hexagon nut		Tightening torque	35 Nm

Negative battery cable to 48-V battery — Used in step 71

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

0 496 714 (00 9 030) Wedge

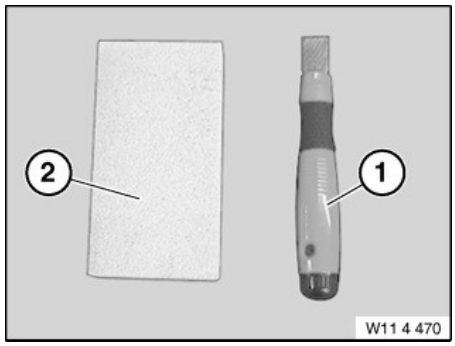


Common — Used in step 38

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 39
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)	

2 344 011 Tool



Common	Used in step 46
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 30
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	

0 495 224 (36 1 326) Wheel stud



Common	Used in step 30
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	

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0 495 225 (36 1 327) Wheel stud



Common	Used in step 30
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 30
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 30
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	

0 495 228 (36 1 331) Wheel stud



Common	Used in step 30
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	

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0 495 229 (36 1 332) Wheel stud



Common	Used in step 30
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 30
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	

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Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 69
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Oil quantity between the two markings MIN and MAX of the oil dipstick	Used in step 74
	1.0 l

Links

Functional descriptions	Used in step
Troubleshooting on the exhaust turbocharger	

Repair instructions (PRE)	Used in step
Notes on 48-V battery	471

General repair instructions	Used in step

Repair instructions	Used in step

61 35 ... Notes on ESD protection (Electro Static Discharge)	161718192728
61 35 ... Notes on ESD protection (Electro Static Discharge)	161718192728
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting battery earth lead	570
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	570
61 20 900 Disconnecting and connecting battery earth lead	570
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61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting battery earth lead	570
00 02 001 Raising the vehicle using a vehicle lift	3046

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11 65 020 Turbocharger damage due to blocked oil supply lines

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11 42 230 Removing and installing/sealing or replacing oil feed line for high-pressure exhaust turbocharger

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

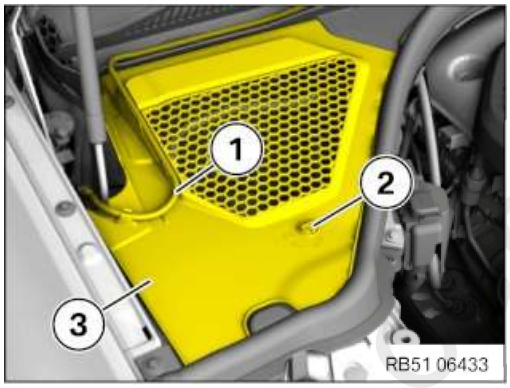
Damage to battery terminal, the safety battery terminal or the intelligent battery sensor (IBS).

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.

PRELIMINARY WORK

1 – Remove the cover of the rear right engine compartment



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

2 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

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Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

3 – Disconnecting all battery earth leads



- See additional information.

4 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

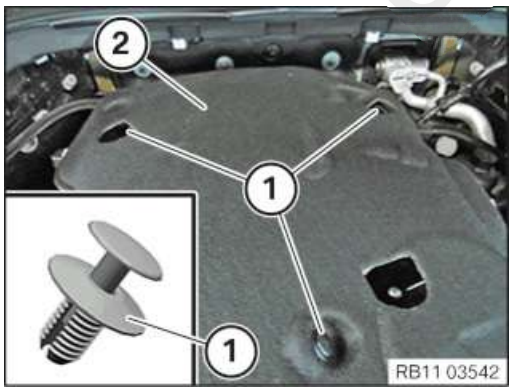
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

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



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

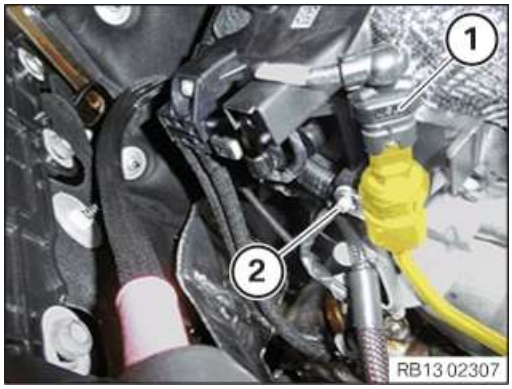
5 – Remove the acoustic cover for the injectors



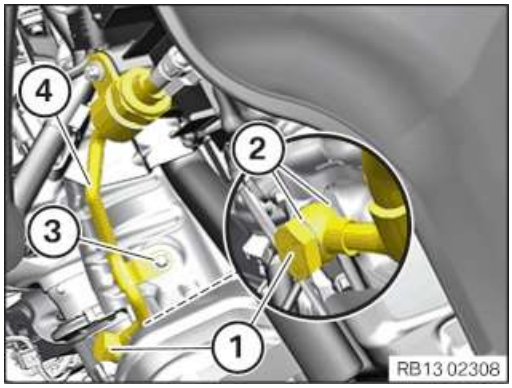
- **If installed:** Release the expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

6 – Remove the exhaust gas pressure pipe

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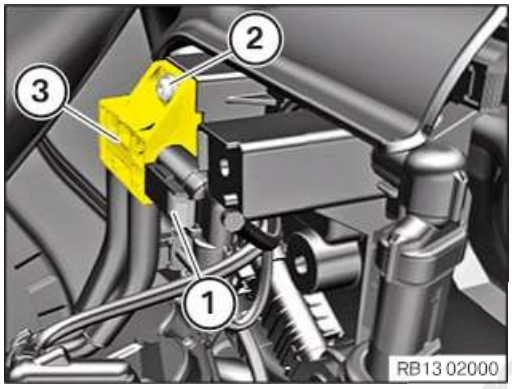


- Unlock plug connection (1) and disconnect.
- Loosen screw (2).



- Unscrew the banjo bolt (1).
- Feed out and remove the sealing rings (2).
- Loosen screw (3).
- Feed out and remove the exhaust gas pressure pipe (4).

7 – Releasing the differential pressure sensor for the diesel particulate filter



- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Remove the differential pressure sensor (3) and put it to one side.

8 – Removing the sensor bracket on the cylinder head cover

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.

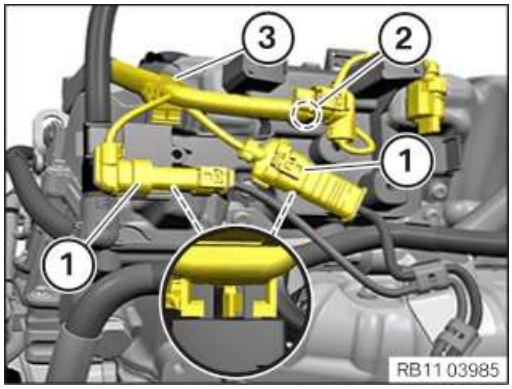
RISK OF DAMAGE

Contaminant or foreign body.

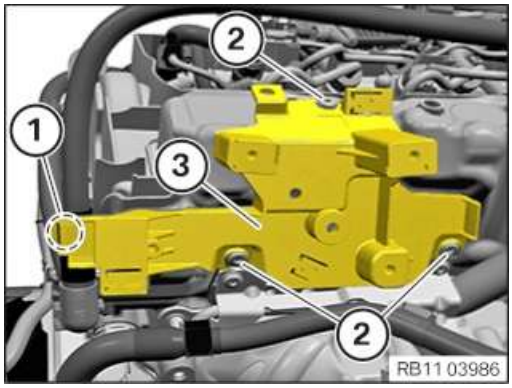
Contamination can result in malfunctions, operating failure or leaks.

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

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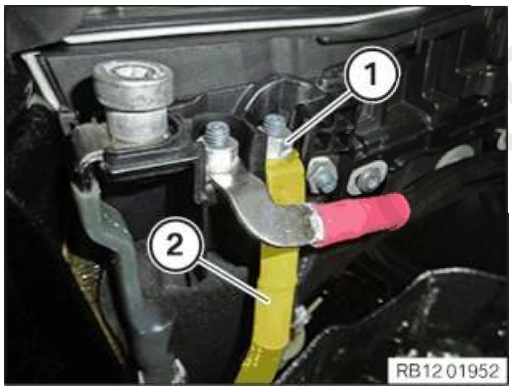
- Unlock plug connection (1) and disconnect.
- Unlock the plug connection (1) and release it from the sensor bracket.
- Release the cable clip in the area (2) from the sensor bracket.
- Release the clamps (3) and set the wiring harness section aside.



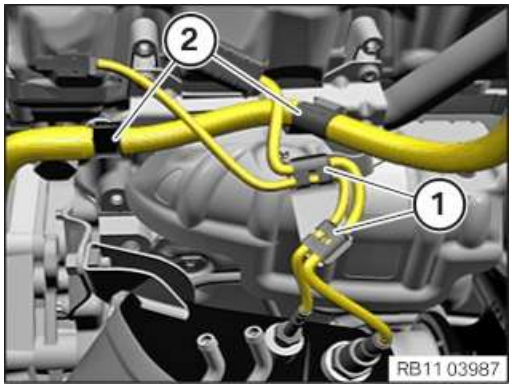
- Release the positive battery cable in the area (1) from the clamp and set it aside.
- Loosen screws (2).
- Feed out holder (3) for the sensor system and remove.



- Unlock the locks (1).
- Guide and remove cover (2) in direction of arrow.

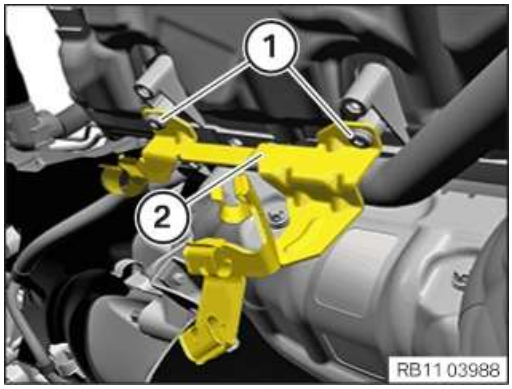


- Loosen nut (1).
- Feed out positive battery cable (2) and put to one side.



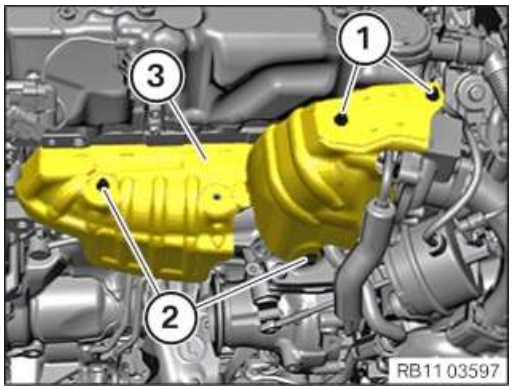
- Release the cable of the exhaust gas sensor system from the clamps (1).
- Release the positive battery cable from the clamps (2).

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

9 – Removing heat shield



- Loosen screws (1).
- Loosen screws (2).
- Feed out and remove the heat shield (3).

MAIN WORK

10 – Remove the oil feed line for the high-pressure stage exhaust turbocharger

RISK OF DAMAGE

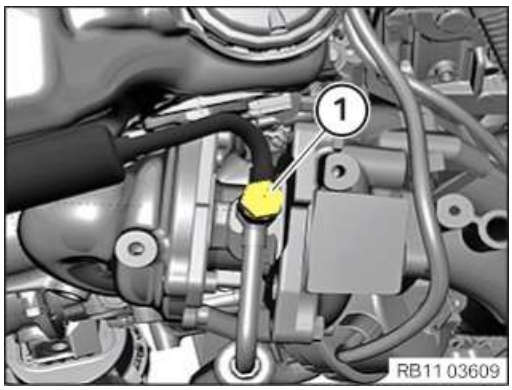
Contaminant or foreign body.

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.

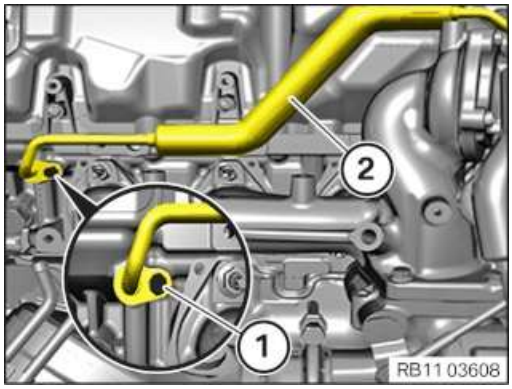
TECHNICAL INFORMATION

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



- Unscrew the banjo bolt (1).
- Remove sealing rings .
- Catch and dispose of emerging engine oil.

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- Loosen screw (1).
- Feed out and remove the oil feed line (2) for the high-pressure stage exhaust turbocharger.
- Catch and dispose of emerging engine oil.

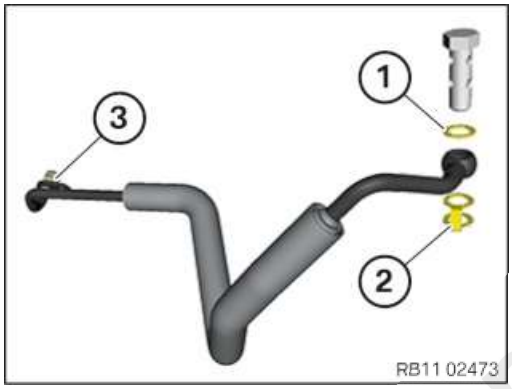
11 – Install the oil feed line for the high-pressure stage exhaust turbocharger

RISK OF DAMAGE

Contaminant or foreign body.

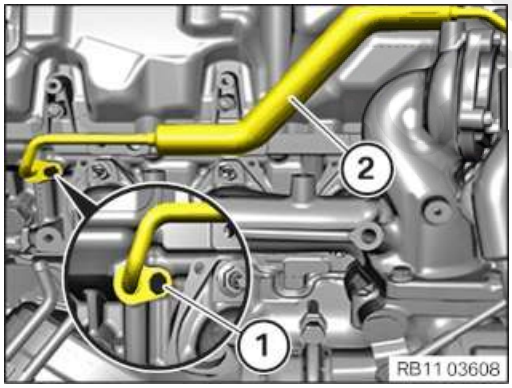
Contamination can result in malfunctions, operating failure or leaks.

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



- Replace banjo bolt.
- Replace the sealing ring (1).
- Replace the sealing ring (2).

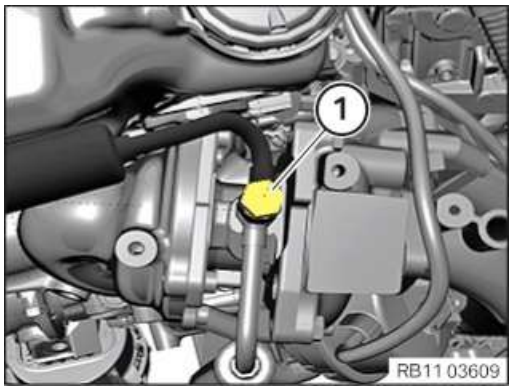
  Parts: Sealing rings, banjo bolt
- Check the sealing ring (3) for damage, replace the oil feed line for the high-pressure stage exhaust turbocharger if applicable.



- Feed in and install the oil feed line (2) for the high-pressure stage exhaust turbocharger.
- Tighten down screw (1).

Oil feed line on cylinder head

M6x12		Tightening torque	8 Nm



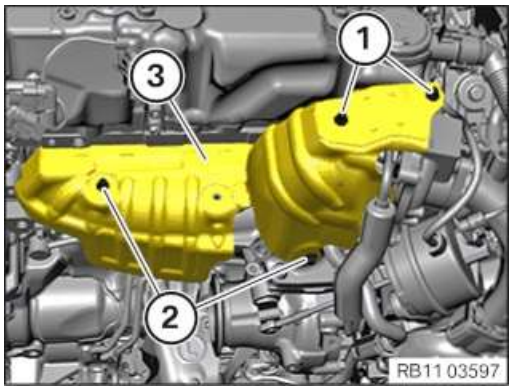
- Position the oil feed lines with the new sealing rings on the high-pressure stage exhaust turbocharger.
- Tighten the banjo bolt (1).

Oil feed line for the exhaust turbocharger high-pressure stage

Hollow bolt		Jointing torque	10 Nm
		Angle of rotation	70 °

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12 – Installing heat shield



- Feed in and install the heat shield (3).
- Tighten down screws (1) and (2).

Heat shield to exhaust manifold

M6x12			10 Nm

13 – Installing the sensor bracket on the cylinder head cover

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

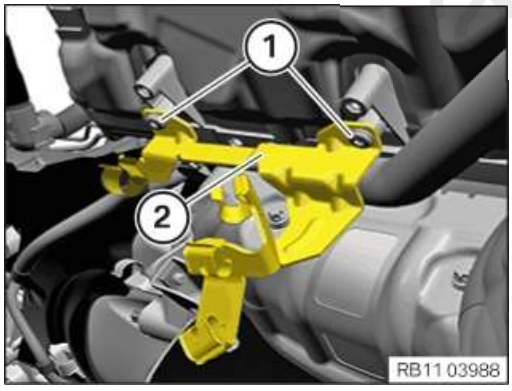
- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

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

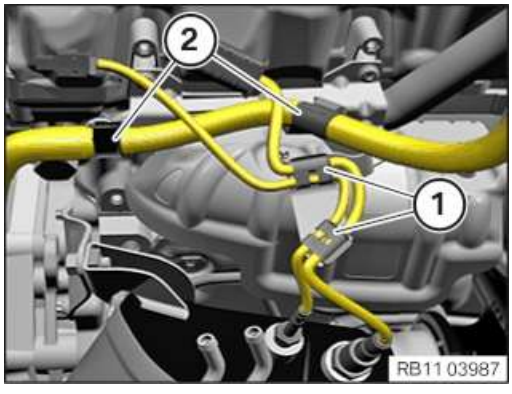
- Route all cables without abrasions, do not trap and crush.



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

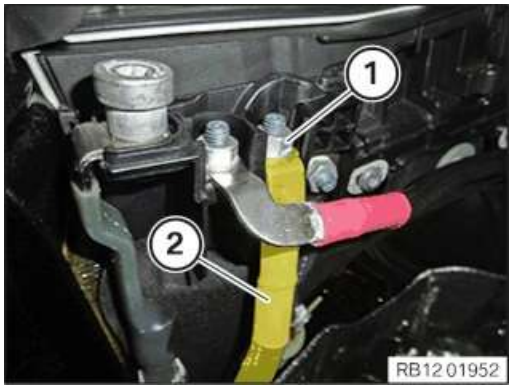
Bracket on cylinder head cover

	Tightening torque	5 Nm



- Secure the positive battery cable in the clamps (2).
- Mount the cable of the exhaust gas sensor system in the clamps (1).

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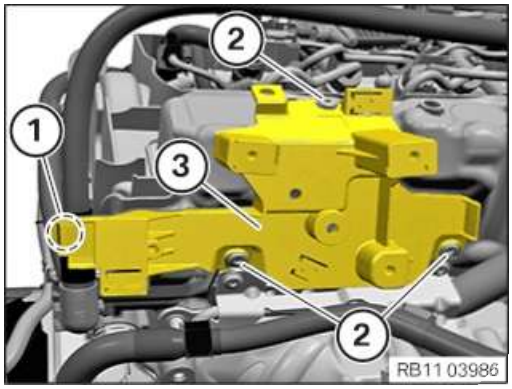
- Insert the positive battery cable (2) and install it.
- Tighten nut (1).

Battery positive lead to battery positive terminal

M8		Tightening torque	19 Nm



- Insert and install the cover (2) in the direction of the arrow.
  The locks (1) must engage audibly.

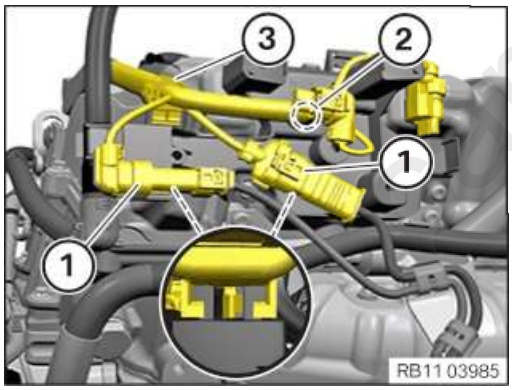


- Feed in and install the sensor bracket (3).
- Tighten the screws (2).

Bracket on cylinder head cover

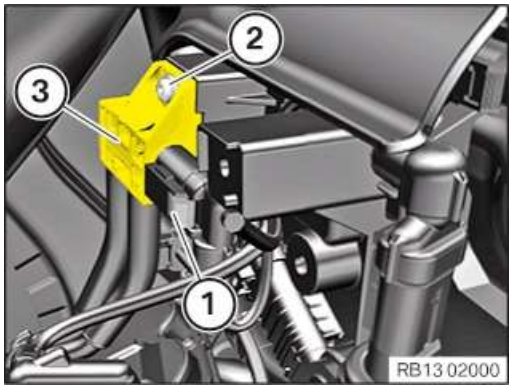
		Tightening torque	5 Nm

- Fasten the positive battery cable in the area (1) in the clamp.



- Feed in the wiring harness section and fasten it with the clamp (3).
- Fasten the cable clip in the area (2) in the sensor bracket.
- Feed in the connector (1) into the sensor bracket and lock it audibly.
- Plug in the connector (1) and lock audibly.

14 – Securing the differential pressure sensor for the diesel particulate filter



- Feed in and install the differential pressure sensor (3).
- Tighten down screw (2).

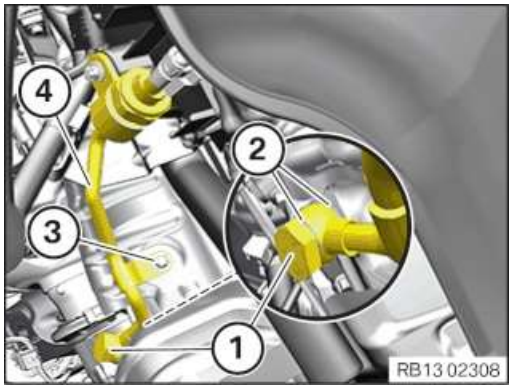
Differential pressure sensor of diesel particulate filter on cylinder head cover

TS5x20		Tightening torque	4 Nm

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

15 – Install the exhaust gas pressure pipe

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- Insert and install the exhaust gas pressure pipe (4).
- Replace the sealing rings (2).

  Parts: Sealing ring
- Apply the banjo bolt (1) hand-tight.
- Tighten down screw (3).

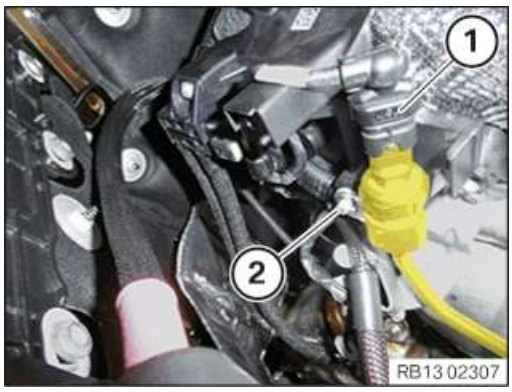
Heat shield to exhaust manifold

M6x12		Tightening torque	10 Nm

- Tighten the banjo bolt (1).

Banjo bolt for exhaust pressure pipe to exhaust manifold

Hollow bolt	Renew sealing rings.	Tightening torque	30 Nm



- Tighten down screw (2).

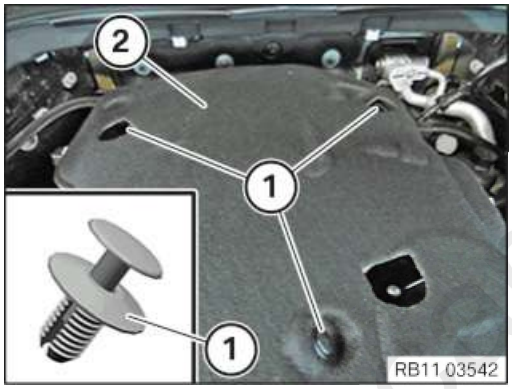
Exhaust gas pressure pipe to sensor system holder

TS6x20		Tightening torque	5,7 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

16 – Install the acoustic cover for the injectors



- Feed the acoustic cover (2) in and install.
- **If installed:** Secure the acoustic cover (2) with the expanding rivets (1) .

17 – Install acoustic cover

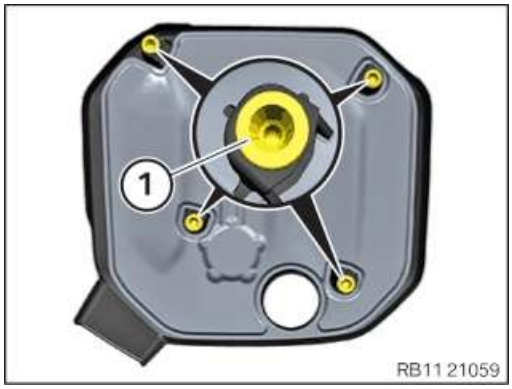
RISK OF DAMAGE

Damage to the acoustic cover/design cover.

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

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

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- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

18 – Connecting all battery earth leads



- See additional information.

19 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

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- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



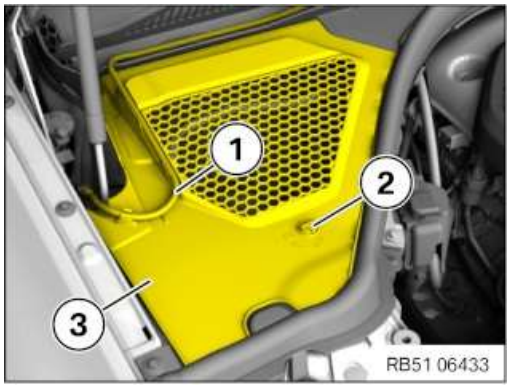
- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

20 – Install the rear right engine compartment cover



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

21 – Check engine oil level

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Prerequisite

Vehicle is in a horizontal position.

TECHNICAL INFORMATION

Please comply with instructions in Owner's Handbook.

- Carry out an electronic oil measurement.
- Top up engine oil if necessary.

▶ **Check engine oil level**

TECHNICAL INFORMATION

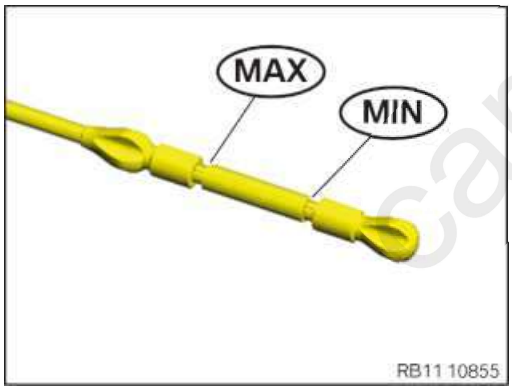
Always check the engine oil level when the engine is at operating temperature (engine oil temperature > 70°C).

- Park vehicle on a horizontal surface.
- Stop the engine and wait for 5 minutes.
- Pull out the oil dipstick and wipe off using a lint-free cloth.

TECHNICAL INFORMATION

Do not pull out or insert the oil dipstick into the guide tube too quickly or slowly.

- Push the oil dipstick into the guide tube up to the limit position and pull it out again.



TECHNICAL INFORMATION

The engine oil level must be between the minimum mark and the maximum mark of the oil dipstick.

- Read the engine oil level on the oil dipstick.
- Top up engine oil if necessary.

Oil quantity between the two markings MIN and MAX of the oil dipstick

1.0 l

Additional Information

Overview of Tightening Torques

Oil feed line on cylinder head — Used in step 11

M6x12		Tightening torque	8 Nm

Oil feed line for the exhaust turbocharger high-pressure stage — Used in step 11

Hollow bolt		Jointing torque	10 Nm
		Angle of rotation	70 °

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Heat shield to exhaust manifold			Used in step 12
M6x12			10 Nm

Bracket on cylinder head cover			Used in step 13
		Tightening torque	5 Nm

Battery positive lead to battery positive terminal			Used in step 13
M8		Tightening torque	19 Nm

Differential pressure sensor of diesel particulate filter on cylinder head cover			Used in step 14
TS5x20		Tightening torque	4 Nm

Heat shield to exhaust manifold			Used in step 15
M6x12		Tightening torque	10 Nm

Banjo bolt for exhaust pressure pipe to exhaust manifold			Used in step 15
Hollow bolt	Renew sealing rings.	Tightening torque	30 Nm

Exhaust gas pressure pipe to sensor system holder			Used in step 15
TS6x20		Tightening torque	5,7 Nm

Negative battery cable to 48-V battery			Used in step 19
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Overview Technical Data

Oil quantity between the two markings MIN and MAX of the oil dipstick	Used in step 21
1.0 l	

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	219

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	318
61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting battery earth lead	318
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61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	318
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61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	318
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	318
61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting battery earth lead	318
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	318
61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting battery earth lead	318

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11 42 235 Removing and installing/sealing or replacing oil feed line for low pressure exhaust turbocharger

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 ... Notes for ESD protection (electrostatic discharge)

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.

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PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

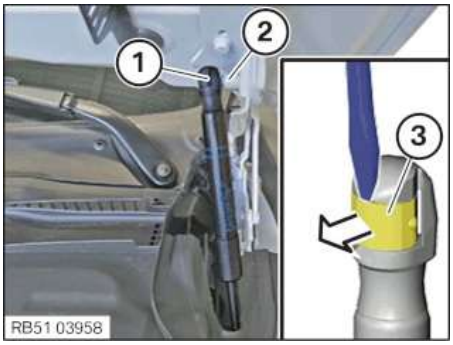
Engine compartment lid is open.

CAUTION

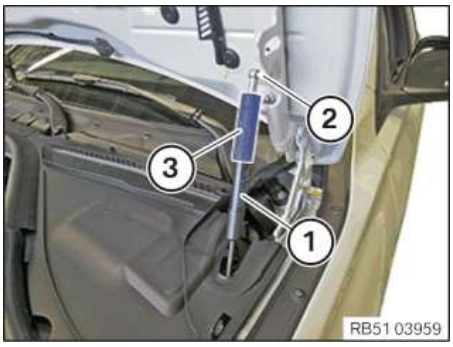
Shutting bonnet or tailgate.

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.

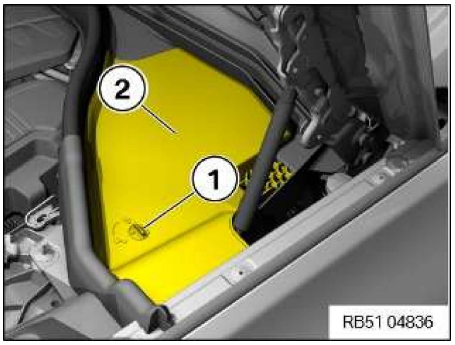


TECHNICAL INFORMATION

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

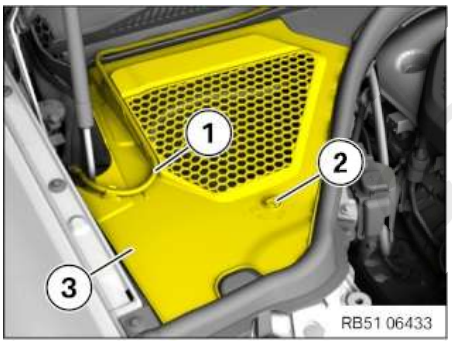
- Remove the bonnet support and open the bonnet further.
- Pull special tool or or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

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



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

3 – Remove the cover of the rear right engine compartment



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

4 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

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WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

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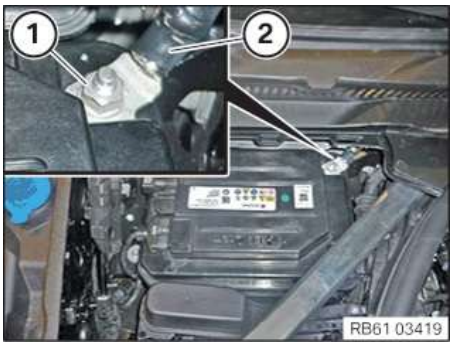
Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

5 – Disconnecting all battery earth leads



- See additional information.

6 – Removing the wiper arm on the left and right

NOTICE

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

▸ **Remove the wiper arm**

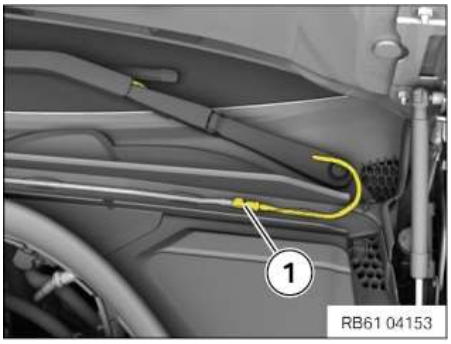
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RISK OF DAMAGE

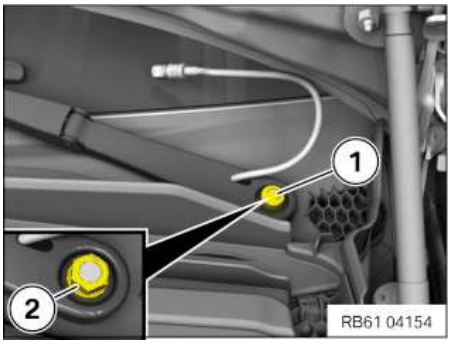
Damage to wiper console.

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

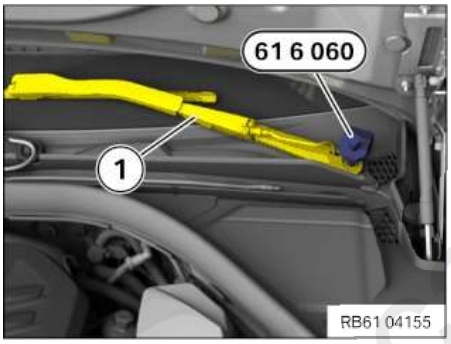
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do **not** lever off the wiper arm because otherwise the wiper console may break at the predetermined breaking point for active pedestrian protection.



- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.

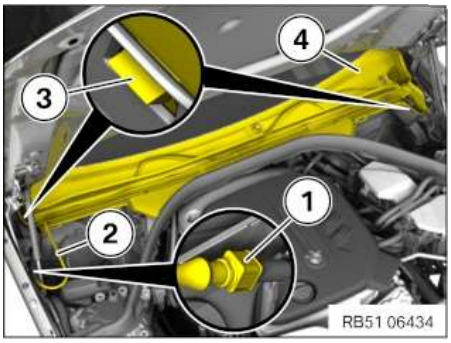


- Remove the protective cap (1).
- Loosen nut (2).



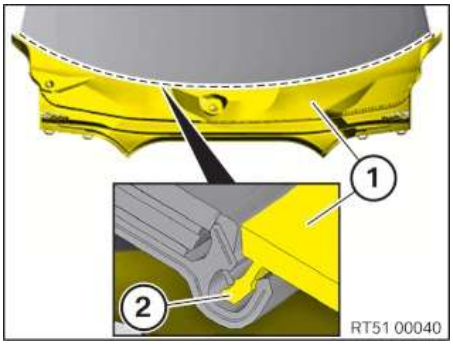
- Pull off the wiper arm (1) using special tool .

7 – Remove cowl panel cover



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

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

8 – Remove the seal for the rear bonnet

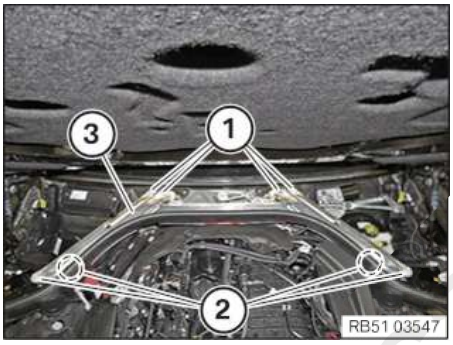


- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

9 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

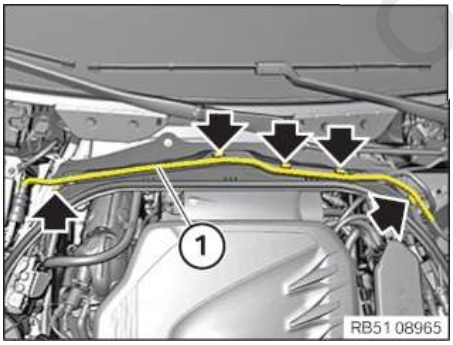
Driving without the strut brace/front-end strut or tension strut is not permitted.



NOTICE

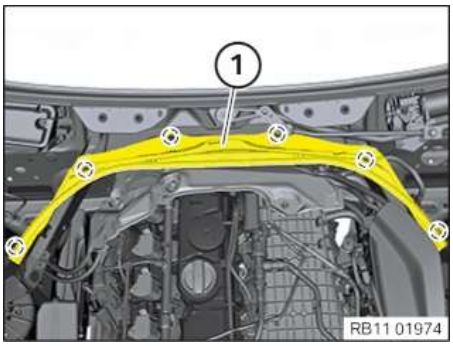
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.



- **Version with mild hybrid technology:**

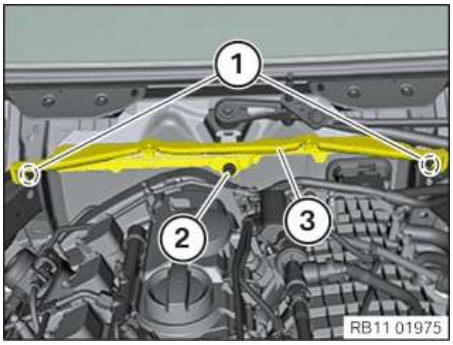
  Unclip the wire (1) at the holders (arrows).



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

10 – Removing the centre bulkhead lower section

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

11 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

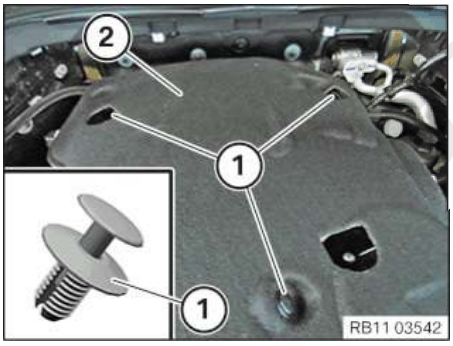
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

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



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

12 – Remove the acoustic cover for the injectors



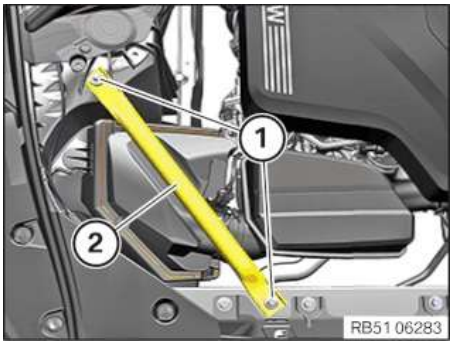
- **If installed:** Release the expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

13 – Remove right front-end strut

TECHNICAL INFORMATION

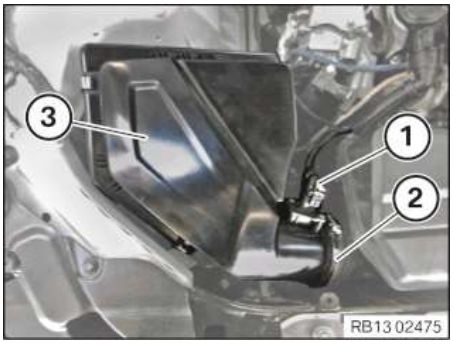
Driving without the strut brace/front-end strut or tension strut is not permitted.

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- Loosen screws (1).
- Remove the front-end strut (2).

14 – Removing intake silencer housing



- 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.

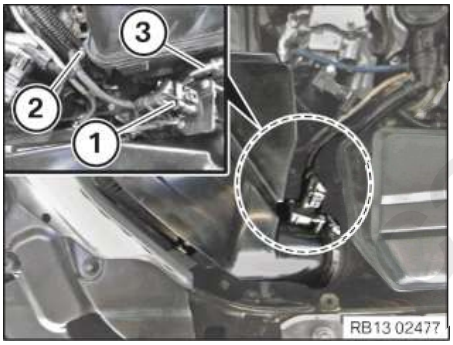
15 – Removing the clean air pipe with the resonator

WARNING

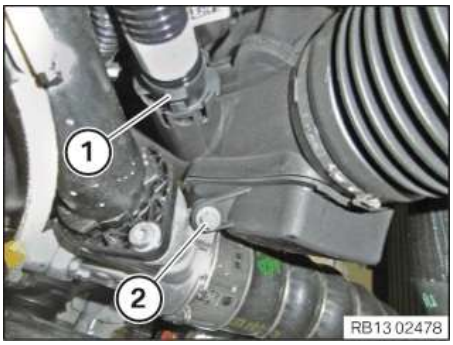
Hot surfaces.

Risk of burning!

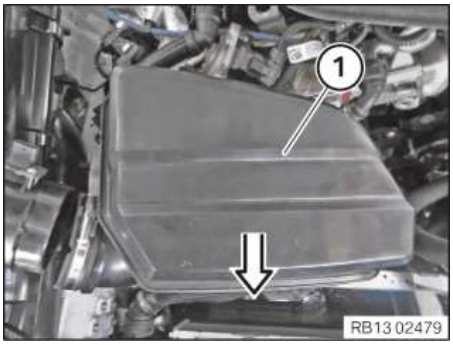
- Perform all work only on components that have cooled down.



- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

16 – Remove differential pressure sensor for the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

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

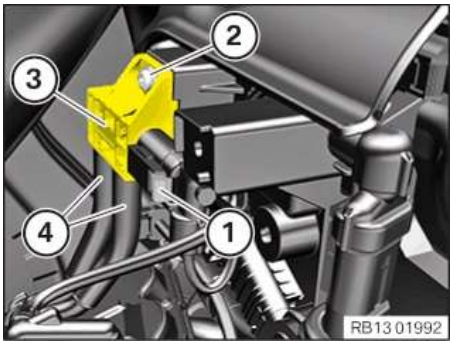
RISK OF DAMAGE

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 ... Notes for ESD protection (electrostatic discharge)

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- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Pull off pressure hose (4).
- Feed out differential pressure sensor (3) and remove.

17 – Remove the exhaust temperature sensor on the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

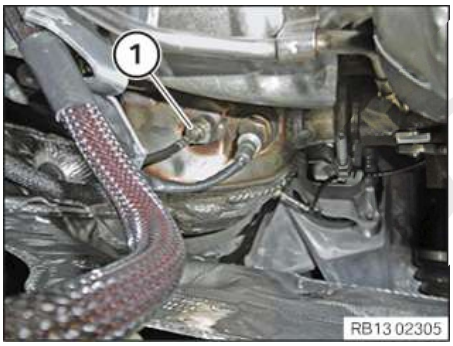
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

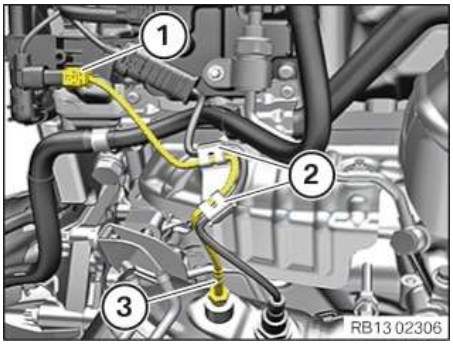
Electrostatic discharge.

Damage to or destruction of electrical components.

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- 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 ... Notes for ESD protection (electrostatic discharge)



- Release exhaust temperature sensor (1) using special tool .



- Unlock plug connection (1) and disconnect.
- Remove the exhaust temperature sensor (3) from the clamps (2).
- Feed out and remove exhaust temperature sensor (3).

18 – Removing the front oxygen sensor on the diesel particulate filter on top

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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.

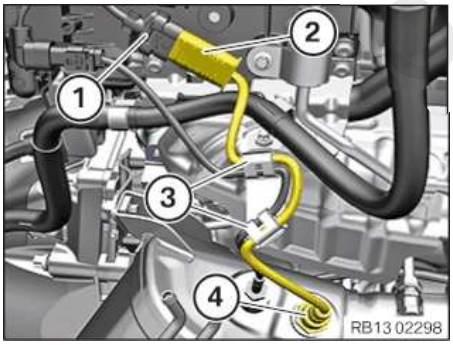
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock plug connection (1) and disconnect.
- Unlock and disconnect connector (2).
- Pull the front oxygen sensor (4) out from the clamps (3) and remove it.



- Release the front oxygen sensor (1) with the standard tools and remove it.

19 – Removing the exhaust temperature sensor for the exhaust system downstream the catalytic converter at the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

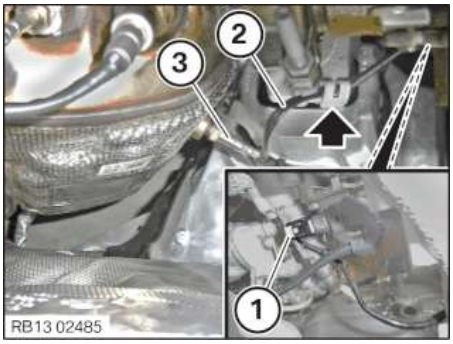
- Perform all work only on components that have cooled down.

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 ... Notes for ESD protection (electrostatic discharge)



- Unlock plug connection (1) and disconnect.

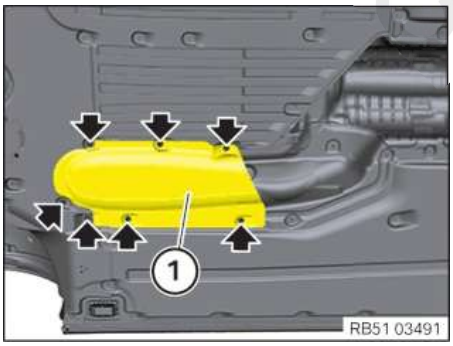
Note: The exhaust temperature sensor is located near the right engine mount.

- Release cable (2) from the clamps (arrow).
- Loosen exhaust temperature sensor (3).
- Feed out and remove exhaust temperature sensor (3).

20 – Remove the underbody panelling of the transmission on the side

NOTICE

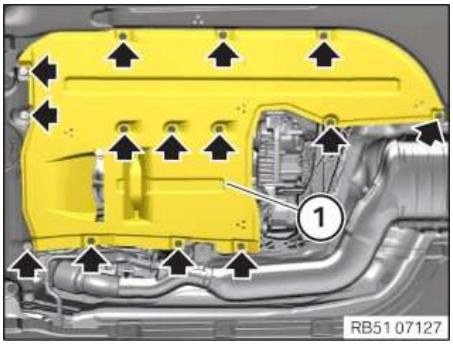
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.



- Remove screws (arrows).
- Remove the underbody panelling (1).

21 – Remove rear underbody protection

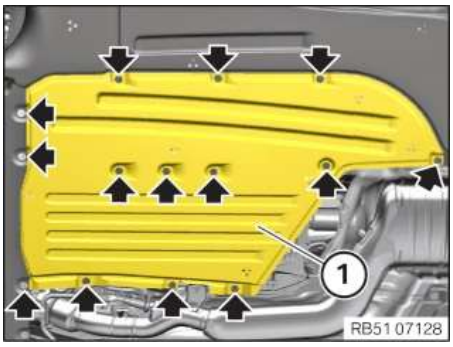
cardiagn.com



- **Version A:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

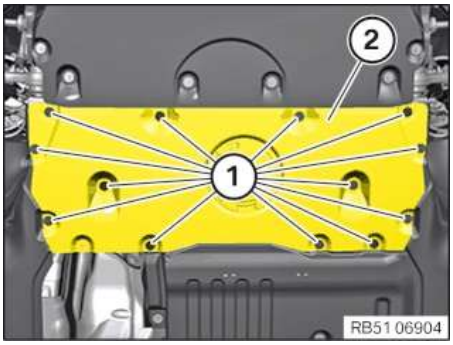


- **Version B:**

  Remove screws (arrows).

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

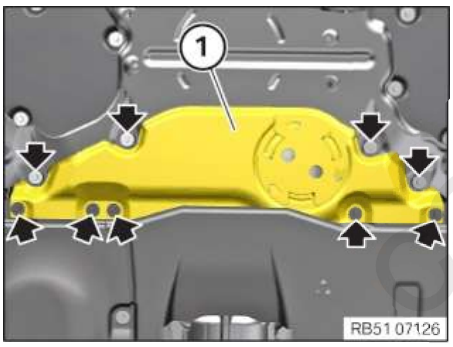
22 – Removing the centre underbody protection



- **Variant with rear wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

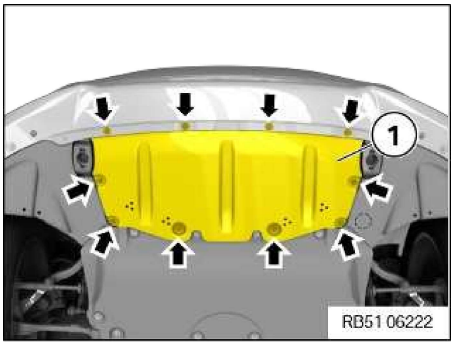


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

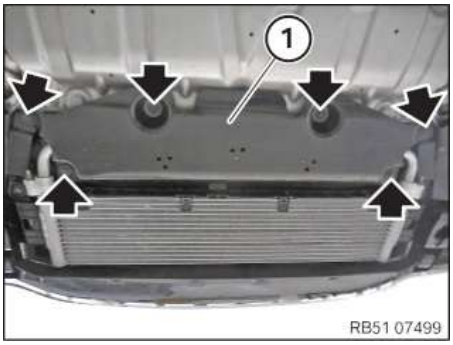
23 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

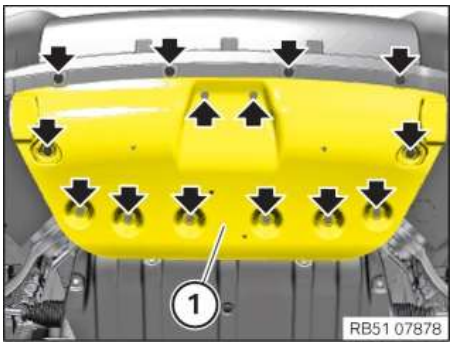
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

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

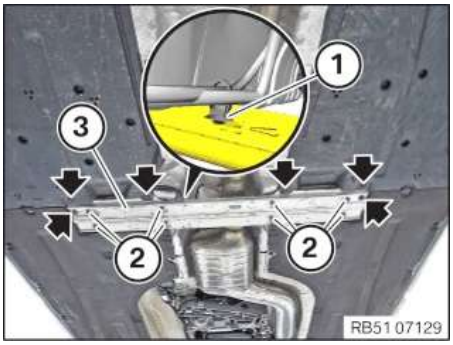


- **Version C:**

  Remove screws (arrows).

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

24 – Remove the connecting support from the tunnel



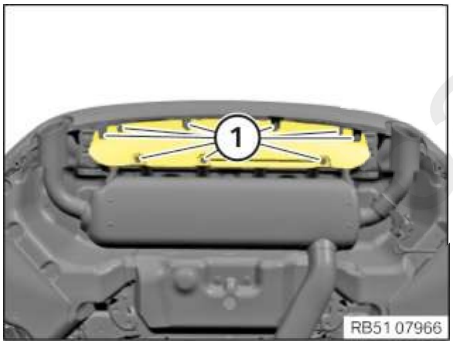
- Remove screws (arrows).

NOTICE

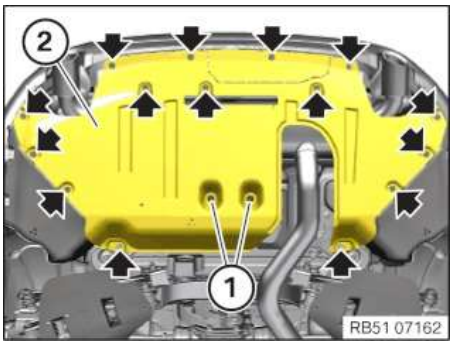
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen clamp (1).
- Loosen screws (2).
- Guide out and remove connecting support (3) on the tunnel.

25 – Removing the rear diffuser



- **Version 1:**
- Release the screws and nuts (1).
- Remove the diffuser.



- **Version 2:**
- Loosen nuts (1).
- Remove screws (arrows).
- Guide out and remove rear diffuser (2).

26 – Remove exhaust system

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WARNING

Hot surfaces.

Risk of burning!

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

CAUTION

Component with heavy weight.

Danger of injury!

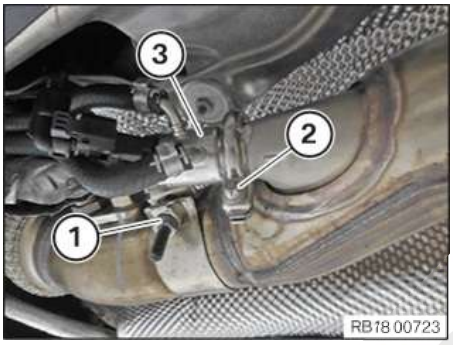
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

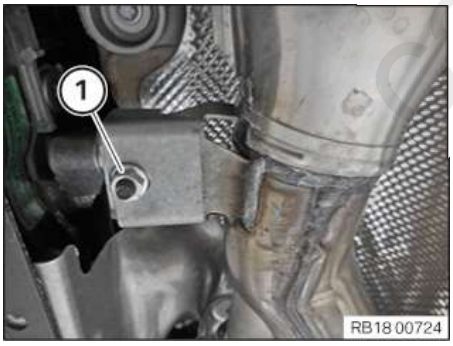
Heavy component.

Heavy components can lead to injury or damage.

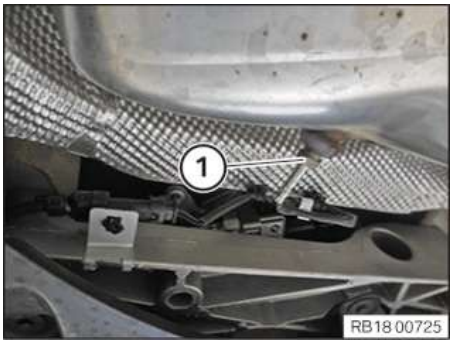
- Remove and install heavy components with the aid of another person/other persons.



- Unfasten clamp (1).
- Detach the clamp (2) of the SCR metering module (3).
- Detach the SCR metering module (3)from the exhaust system and place to one side.

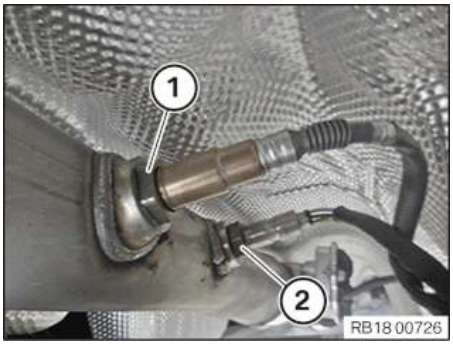


- Loosen nut (1).

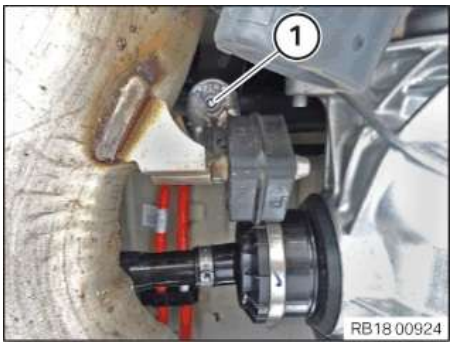


- Detach the exhaust temperature sensor (1) from the exhaust system.

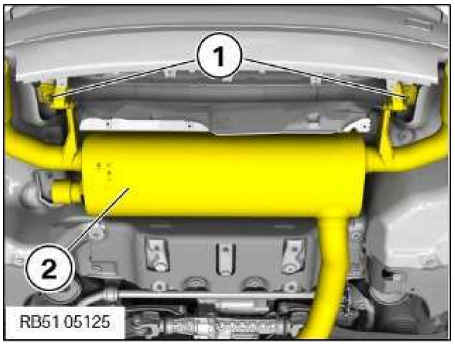
eardiagn.com



- Release the diesel particulate sensor (1) from the exhaust system and place to one side.
- Release the nitrogen oxide sensor (2) from the exhaust system and place to one side.



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



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

27 – Removing the monitoring oxygen sensor after the diesel particulate filter

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 ... Notes for ESD protection (electrostatic discharge)

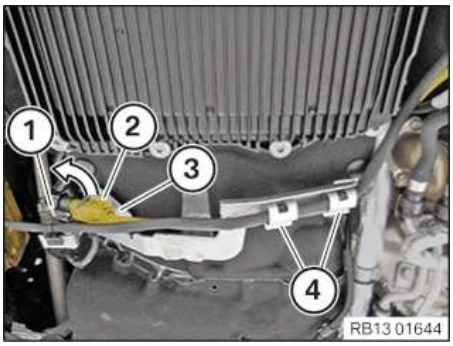
cardiagn.com

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
- The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock and loosen connector (1).
- Loosen connector (2) from the holder (3) in direction of arrow.
- Release the monitoring oxygen sensor from the clamps (4).



- Release the monitoring oxygen sensor (1) with the standard tools.



- Thread out the monitoring oxygen sensor (1) and remove it.

28 – Removing the nitrogen oxide sensor before SCR catalytic converter

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.

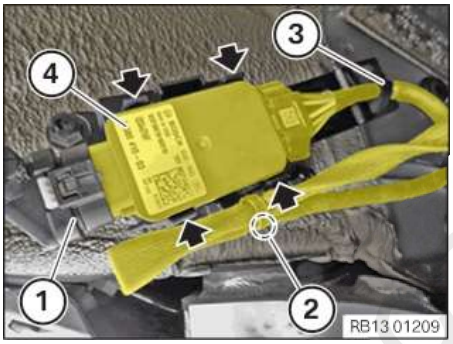
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

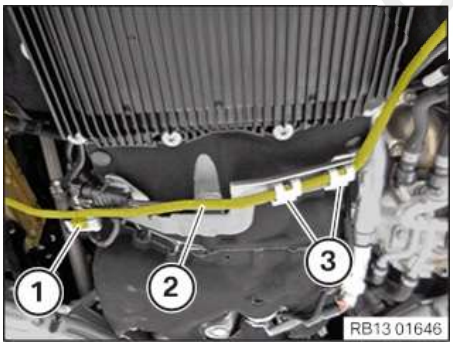
Damage to the nitrogen oxide sensor.

Failure of the nitrogen oxide sensor due to contamination or preliminary mechanical damage.

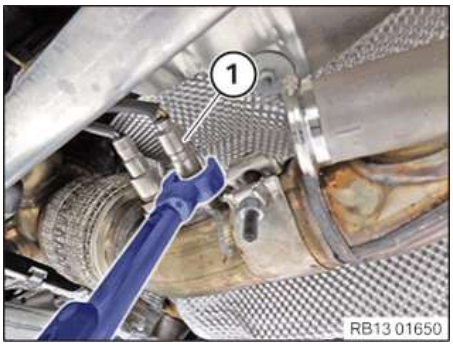
- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock plug connection (1) and disconnect.
- Release cable clip in area (2).
- Release line from the holder (3).
- Unclip control unit (4).

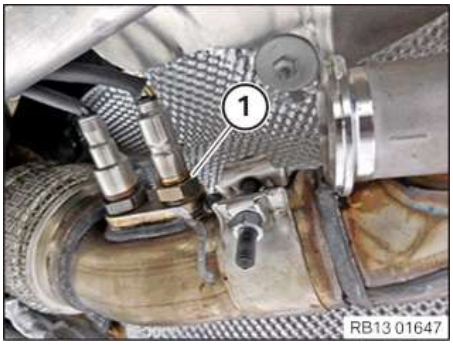


- Loosen clamp (1).
- Loosen the cables (2) from the clamps (3).



- Loosen the nitrogen oxide sensor (1) using commercially available tools.

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- Feed out and remove the nitrogen oxide sensor (1).

29 – Removing the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

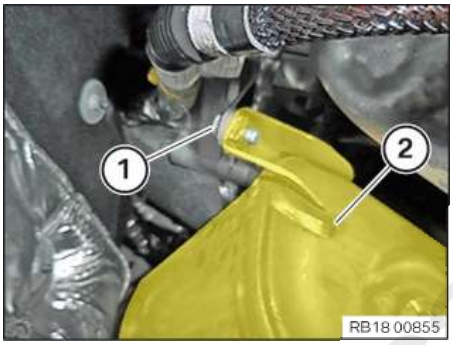
- Perform all work only on components that have cooled down.

CAUTION

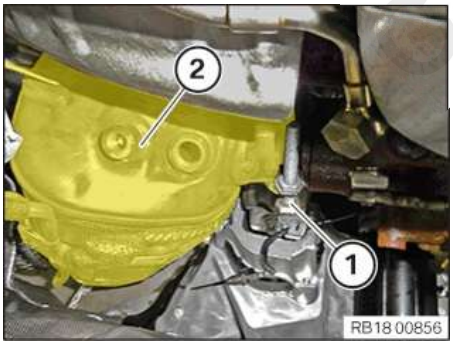
Heavy component.

Heavy components can lead to injury or damage.

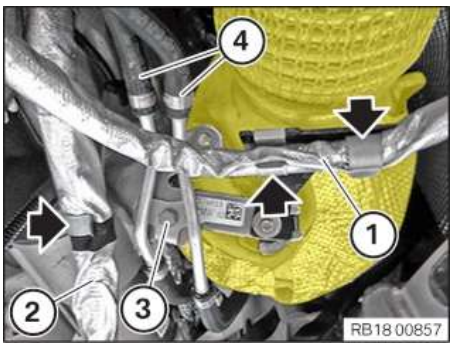
- Remove and install heavy components with the aid of another person/other persons.



- Release bolt (1) from the holder of diesel particulate filter (2).

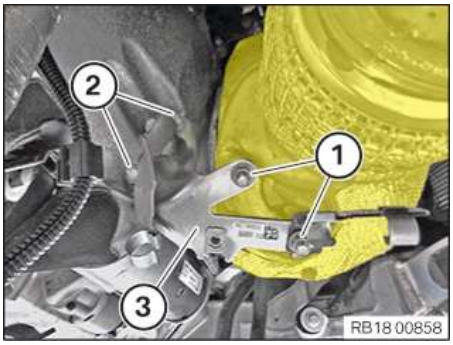


- Loosen V-band clamp (1).
- Feed V-clip (1) out from diesel particulate filter (2) and remove.

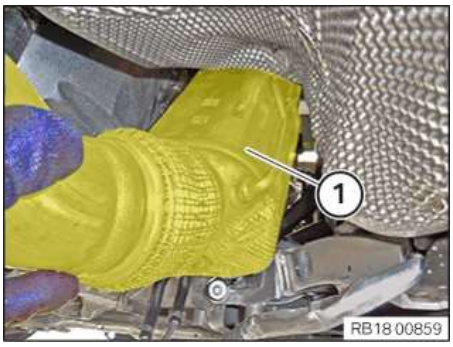


- Release the metering line (1) from clamps (Arrows).
- Release positive battery cable (2) from starter motor from clamp (Arrow).
- Loosen screw (3).
- Thread off coolant line (4) and place to the side.

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



- Guide out and remove diesel particulate filter (1).

30 – Remove front right wheel

▸ **Removing the wheel**



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

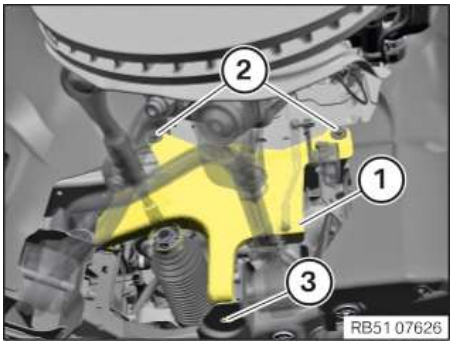
  This process is intended to prevent damage to the brake disc.



- If several wheels are removed at the same time: 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 the correct adapter from the set of special tools .

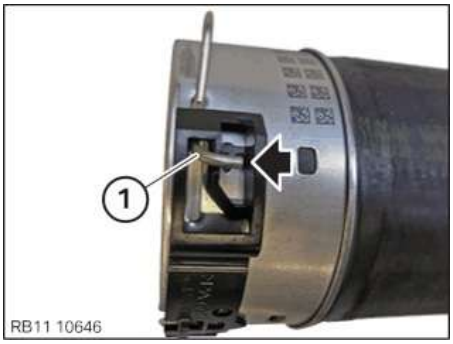
31 – Remove the cover of the steering assembly

obdiagn.com



- Loosen screws (2) and (3).
- Remove the cover (1).

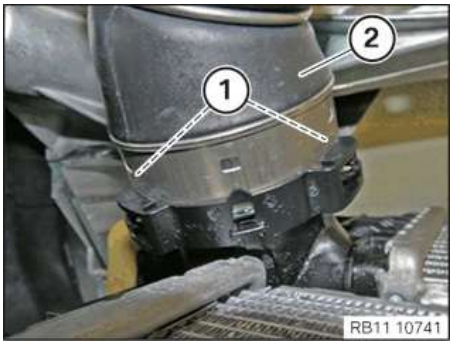
32 – Remove pressure pipe between exhaust turbocharger and charge air cooler



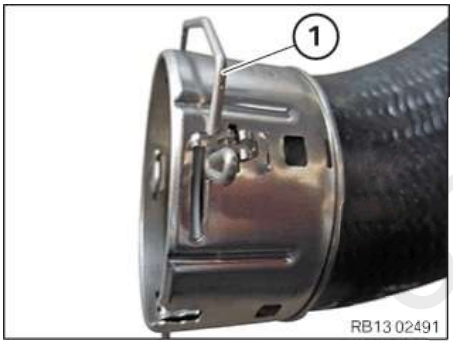
- **Version A:**

  Unlock lock (1).

  The lock (1) must snap audibly into place when unlocked (see arrow).

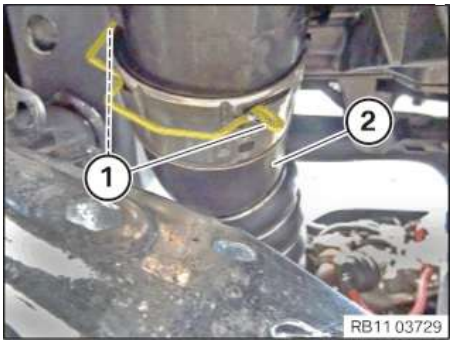


- Unlock the locks (1) on both sides and snap into place.
- Pull off pressure pipe (2) from charge air cooler.



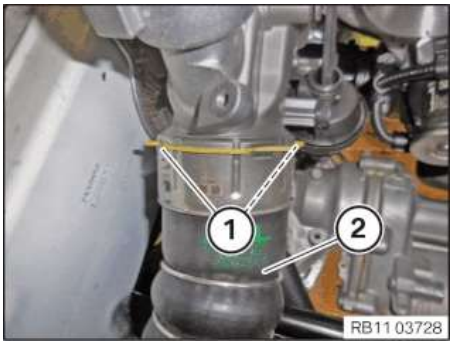
- **Version B:**

  Unlock clamp (1) and engage in this position.



- Unlock the locks (1) and snap into place.
- Pull off pressure pipe (2) from charge air cooler.

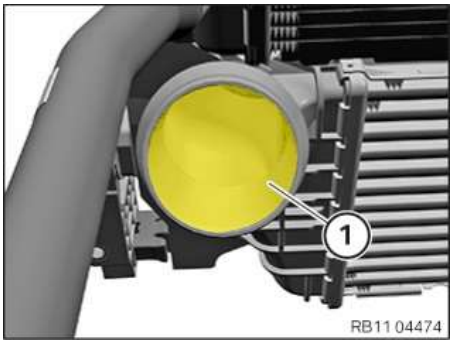
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- Unlock the lock (1) and engage.
- Pull off pressure pipe (2) from the compressor bypass.



- Remove pressure pipe (1) in upward direction.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Lock the opening (1) of the charge air cooler with a suitable auxiliary material.

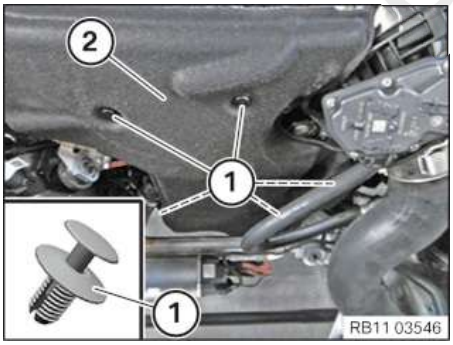
33 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

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



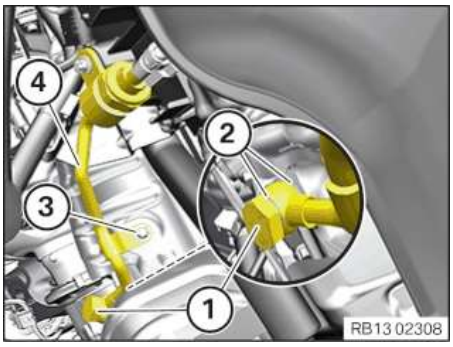
- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

34 – Remove the exhaust gas pressure pipe

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



- Unscrew the banjo bolt (1).
- Feed out and remove the sealing rings (2).
- Loosen screw (3).
- Feed out and remove the exhaust gas pressure pipe (4).

35 – Removing the sensor bracket on the cylinder head cover

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

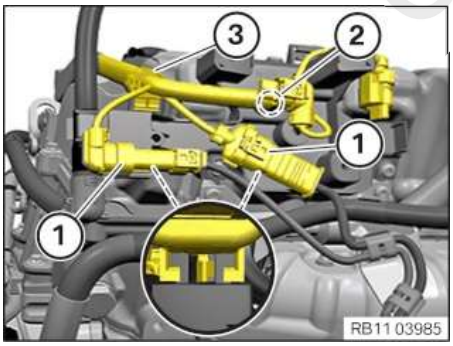
- Do not pull on the wires when disconnecting connectors and plug connections.

RISK OF DAMAGE

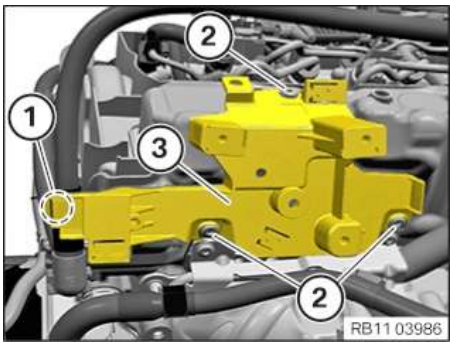
Contaminant or foreign body.

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.



- Unlock plug connection (1) and disconnect.
- Unlock the plug connection (1) and release it from the sensor bracket.
- Release the cable clip in the area (2) from the sensor bracket.
- Release the clamps (3) and set the wiring harness section aside.

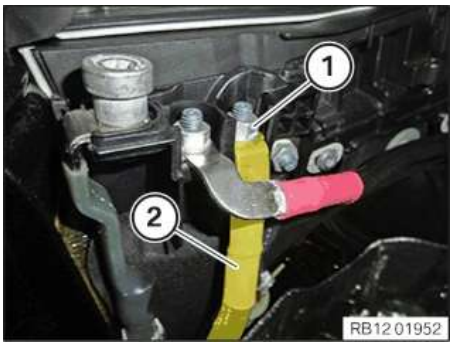


- Release the positive battery cable in the area (1) from the clamp and set it aside.
- Loosen screws (2).
- Feed out holder (3) for the sensor system and remove.

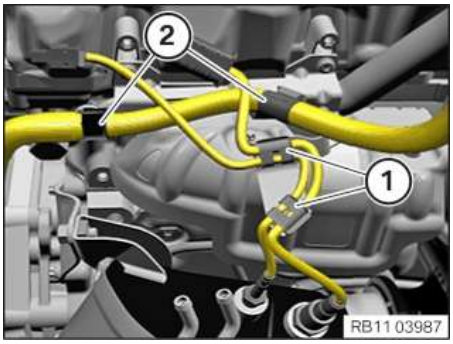
cardiagn.com



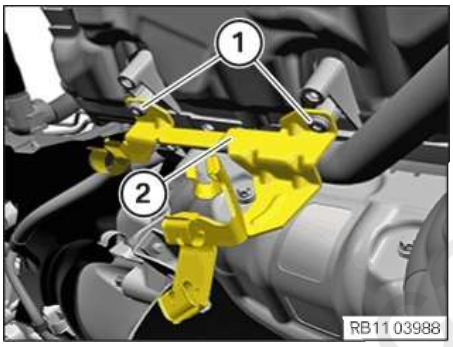
- Unlock the locks (1).
- Guide and remove cover (2) in direction of arrow.



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

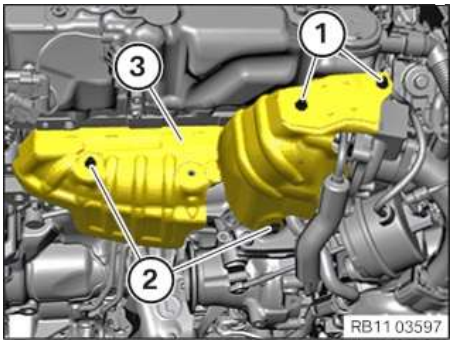


- Release the cable of the exhaust gas sensor system from the clamps (1).
- Release the positive battery cable from the clamps (2).



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

36 – Removing heat shield



- Loosen screws (1).
- Loosen screws (2).
- Feed out and remove the heat shield (3).

37 – Removing the high-pressure stage exhaust turbocharger and low-pressure stage turbocharger

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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.

TECHNICAL INFORMATION

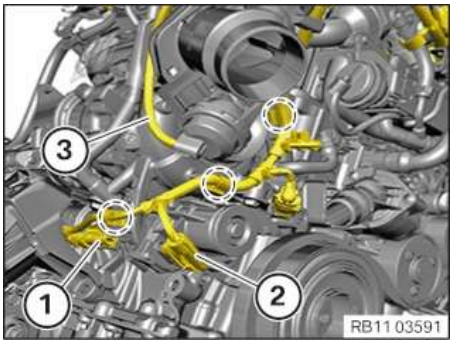
Prior to replacing the exhaust turbocharger: Observe the notes on troubleshooting on the exhaust turbocharger.

For additional information see: FUB-FUB-FB-130003-A10 Troubleshooting on the exhaust turbocharger

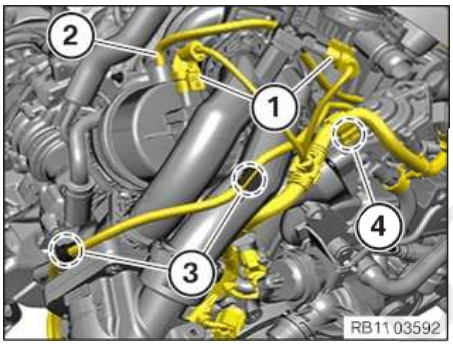
TECHNICAL INFORMATION

With exhaust turbocharger damage, it is imperative to observe the additional information.

For additional information see: 11 65 020 Exhaust turbocharger damage due to plugged oil supply lines



- Release plug connection in area (1) from holder.
- Unlock plug connection (2) and disconnect.
- Release the wiring harness in the marked areas from the exhaust turbochargers.
- Pull off the vacuum hose (3).



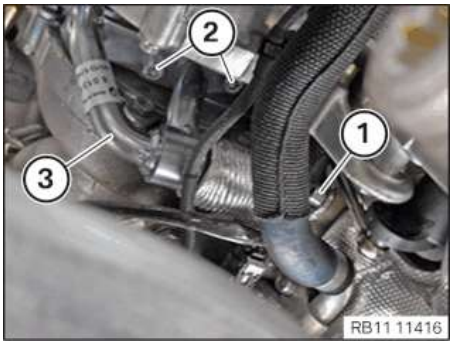
- Unlock plug connections (1) and disconnect.
- Pull off the vacuum hose (2).
- Release the vacuum hose in marked areas (3) from the exhaust turbochargers.
- Release the wiring harness in area (4) from the exhaust-gas recirculation cooler and set it aside.



TECHNICAL INFORMATION

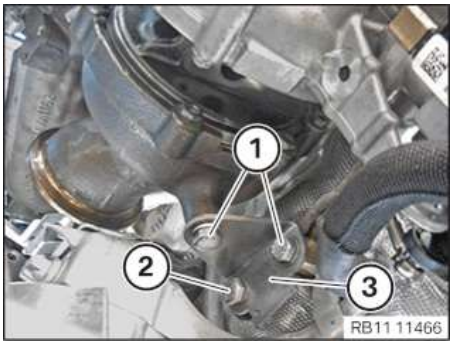
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Release the screws of the oil return line on the crankcase from the right wheel arch.

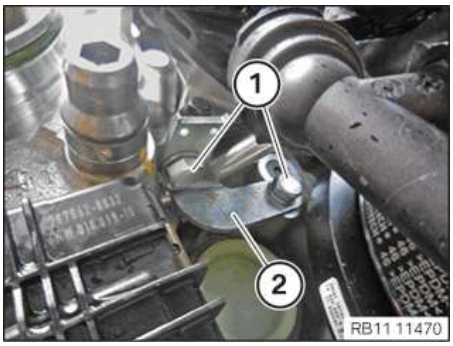


- Release the screw (1).
- Loosen screws (2).
- Remove oil return line (3) from the crankcase.
- Catch and dispose of emerging engine oil.

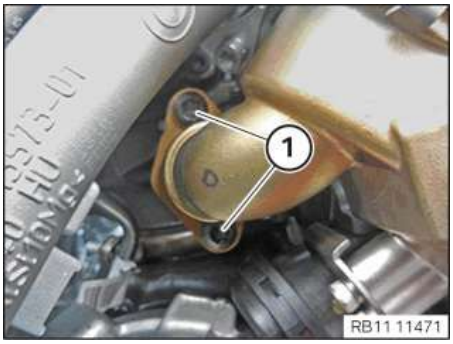
cardiagn.com



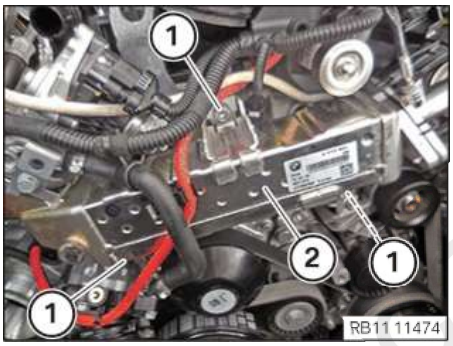
- Unscrew and remove the bolts (1) on the holder (3).
- Slacken screw (2) on holder (3), but do **not** remove.



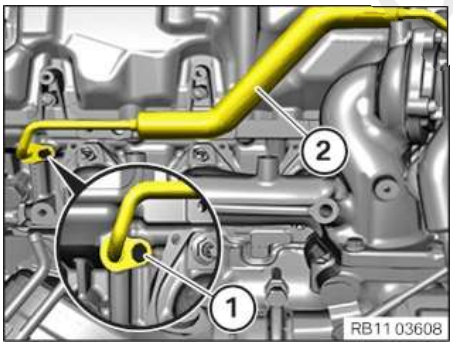
- Loosen screws (1).
- Guide out and remove holder (2).



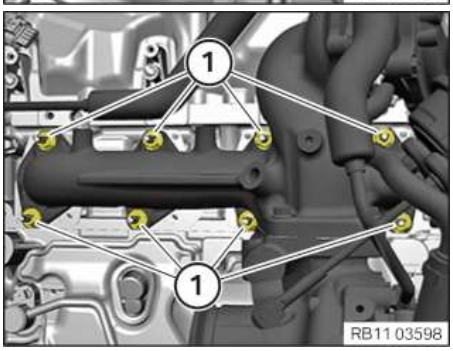
- Loosen screws (1).



- Slacken screws (1), but do **not** remove.
- Release exhaust-gas recirculation cooler (2) slightly.



- Loosen screw (1).
- Remove oil feed line (2) for the high-pressure stage exhaust turbocharger from the cylinder head and set it aside.
- Catch and dispose of emerging engine oil.

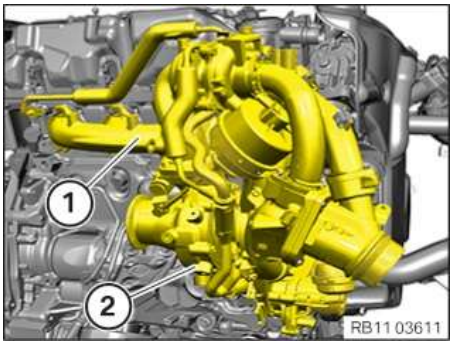


TECHNICAL INFORMATION

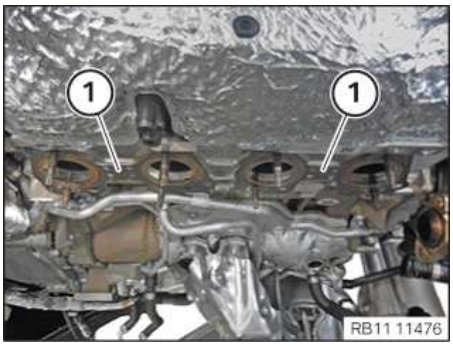
Conduct the following operation with the assistance of a second person.

- Loosen nuts (1).

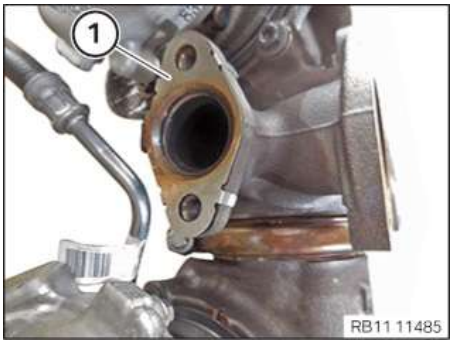
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- Guide out exhaust manifold (1) with the high-pressure stage exhaust turbocharger and the low-pressure stage exhaust turbocharger (2) forward towards the top and remove.



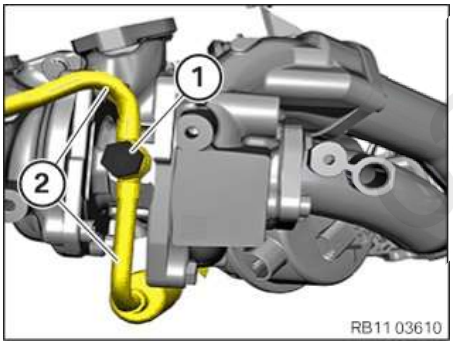
- Guide out and remove gaskets (1).



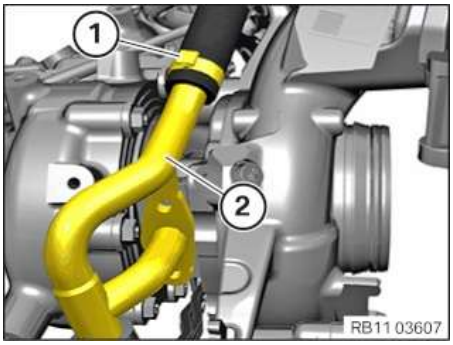
- Guide out and remove gasket (1).

MAIN WORK

38 – Replacing the oil feed line for the low-pressure stage turbocharger

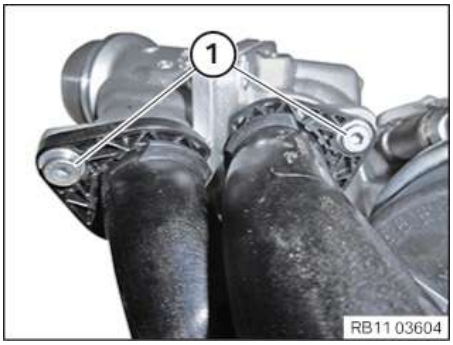


- Loosen screw (1).
- Place oil feed lines (2) to one side.

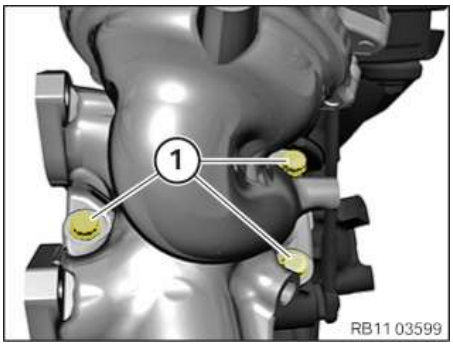


- Unfasten clamp (1).
- Guide out oil return line (2) for low-pressure stage exhaust turbocharger and remove.

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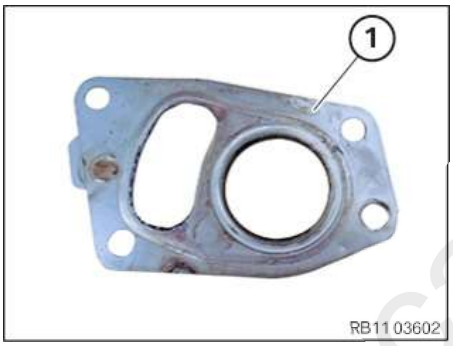
- Release screws (1) of the connecting pipe to the high-pressure stage exhaust turbocharger.



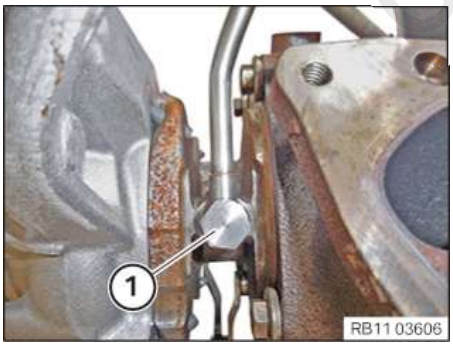
- Loosen screws (1).



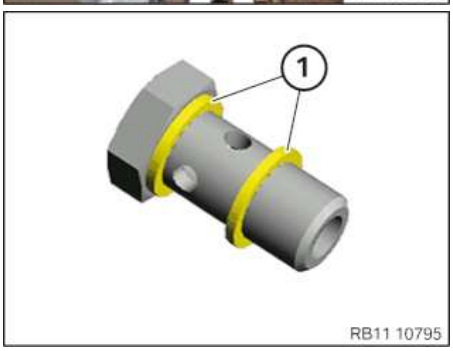
- Loosen screw (1).
- Disconnect exhaust turbocharger.



- Remove seal (1).



- Loosen screw (1).

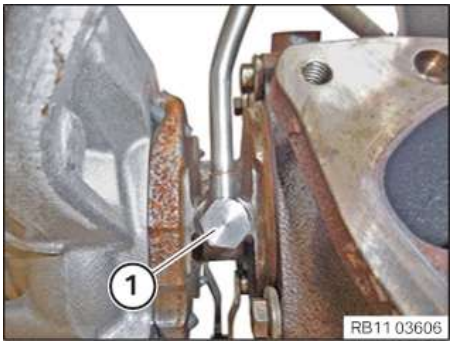


- Renew oil feed line for the low-pressure stage exhaust turbocharger.

  Parts: Oil feed line for low-pressure stage exhaust turbocharger
- Renew the sealing rings (1).

  Parts: Sealing ring

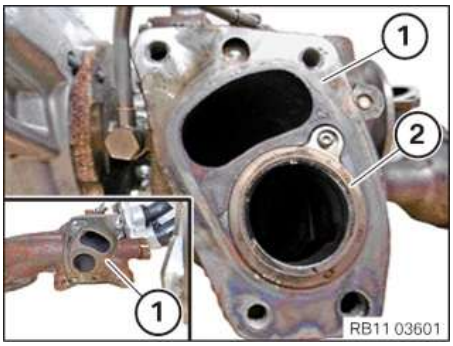
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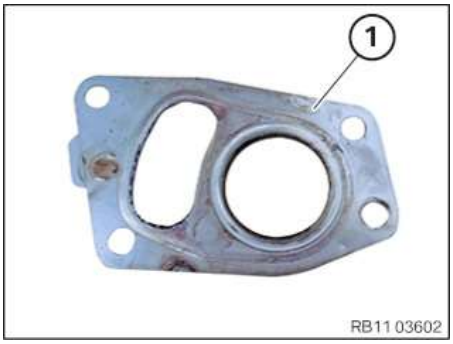
- Connect the oil feed line to the sealing rings on the low-pressure stage turbocharger.
- Position the oil return lines as shown.
- Tighten down screw (1).

Oil feed line to exhaust turbocharger

Hollow bolt	Renew sealing rings.	Jointing torque	10 Nm
		Angle of rotation	45 °

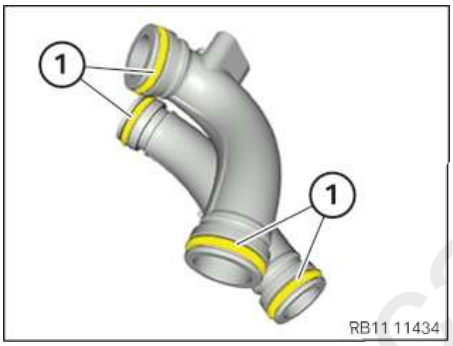


- Check the spacer ring (2) for correct fit.
- Clean sealing surface (1).



- Renew the seal (1).

  Parts: Gasket



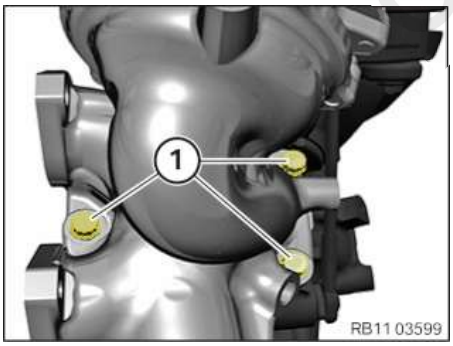
- Renew the sealing rings (1) on the connecting pipes with the special tool 0 496 714 (00 9 030).

  Parts: Sealing ring
- Grease sealing rings (1) with lubricating grease.

Expendable materials

Lubricating grease SYNTHESO GLEP 1	100 g, Tube	83239407778

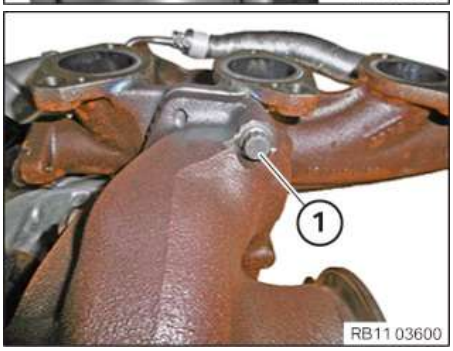
Overview of consumables (Electronic Parts Catalogue)



- Feed in the connecting pipes while positioning the exhaust turbocharger.
- Position the exhaust turbocharger with the seal.
- Tighten the screws (1).

High-pressure stage exhaust turbocharger to exhaust manifold

M8x20		Tightening torque	25 Nm

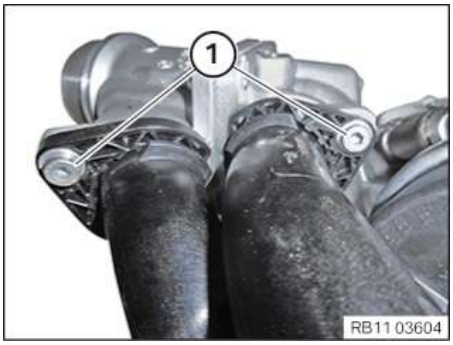


- Tighten down screw (1).

High-pressure stage exhaust turbocharger to exhaust manifold

M8x20		Tightening torque	25 Nm

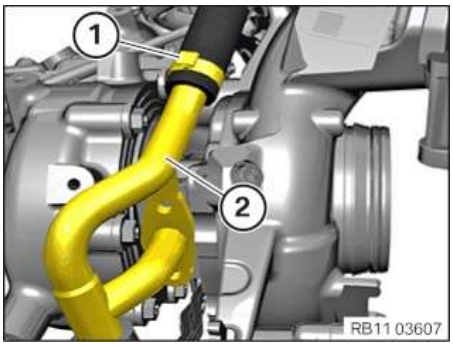
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- Tighten screws (1) of the connecting pipe to the high-pressure stage exhaust turbocharger.

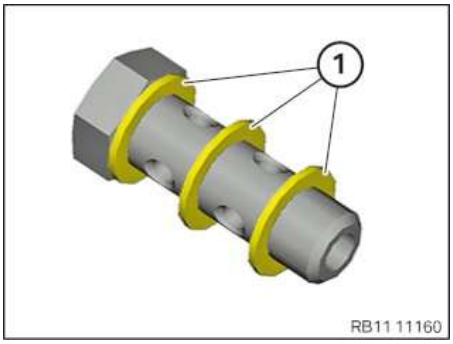
Connecting pipe with bypass flap to exhaust turbocharger low-pressure stage / high-pressure stage

M6		Tightening torque	8 Nm



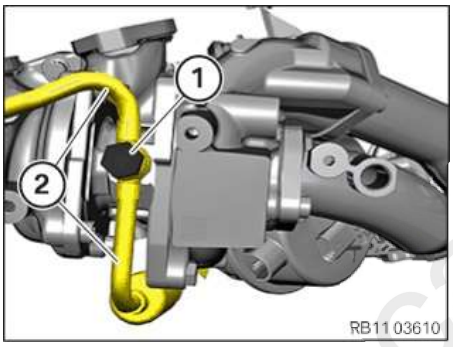
- If necessary, renew clamp (1).

  Parts: Clamp
- Connect and position oil return line (2) for the low-pressure stage exhaust turbocharger with the clamp.
- Fasten clamp (1).



- Renew banjo bolt and sealing rings (1).

  Parts: Sealing rings, banjo bolt



- Connect oil feed lines (2) with the sealing rings and the banjo bolt on the high-pressure stage exhaust turbocharger.
- Position oil feed lines (2) as illustrated.
- Tighten down screw (1).

Oil feed line for the exhaust turbocharger high-pressure stage

Hollow bolt		Jointing torque	10 Nm
		Angle of rotation	70 °

POSTPROCESSES

39 – Installing the high-pressure stage exhaust turbocharger and the low-pressure stage 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 surface.

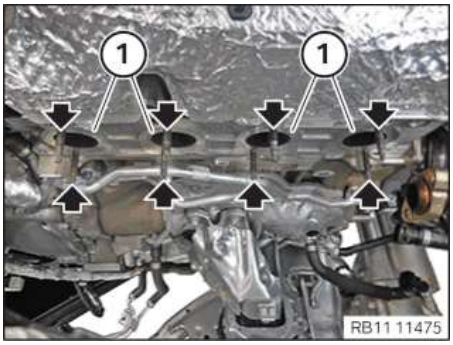
The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

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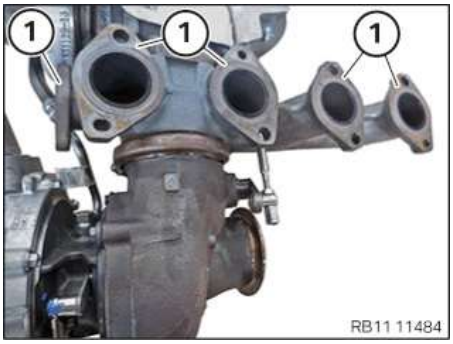
TECHNICAL INFORMATION

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

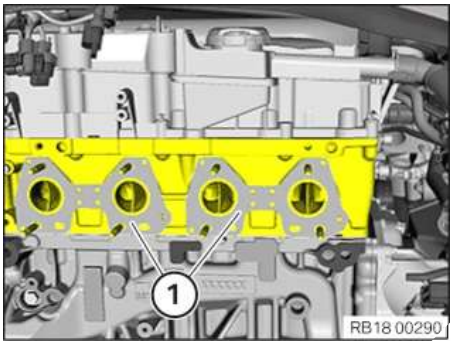


- Check the stud bolts (arrows) on the cylinder head for **correct** fit.
- Clean the connection points (1) with the special tool 0 495 102 (11 4 470).
- Renew gaskets.

  Parts: Seals



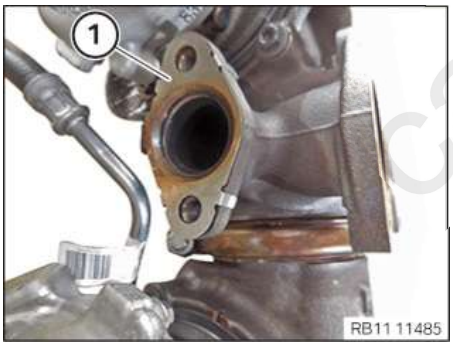
- Clean the connection points (1) on the exhaust manifold with the special tool 0 495 102 (11 4 470).



TECHNICAL INFORMATION

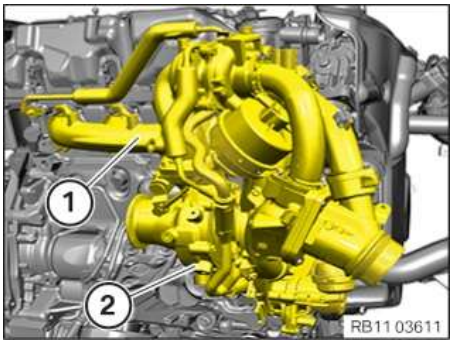
The **coated side** of the seal must be on the side of the exhaust manifold.

- Insert and install the gaskets (1).



- Renew the seal (1).

  Parts: Gasket
- Insert and install the seal (1).

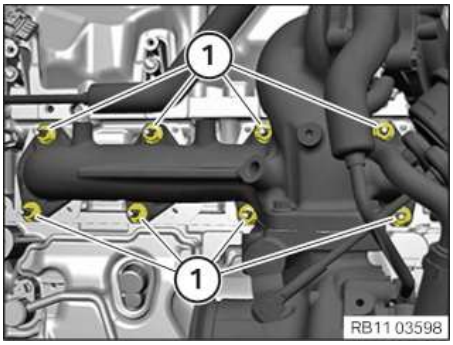


TECHNICAL INFORMATION

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

- Feed in the exhaust manifold (1) with the high-pressure stage exhaust turbocharger and the low-pressure stage turbocharger (2) from the top front and install.

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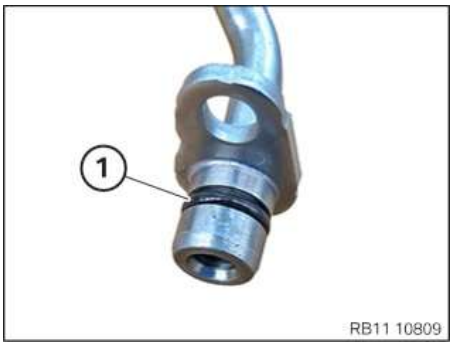
- Renew nuts (1).

  Parts: Nuts

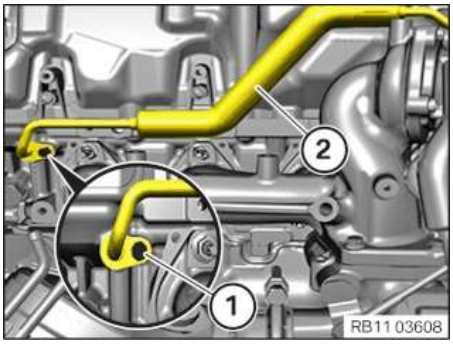
- Tighten the nuts (1) evenly from the inside out.

Exhaust manifold to cylinder head

M7	**If necessary, renew loose stud bolts.**	Tightening torque	11 Nm
	Renew nuts.	Tightening torque	13 Nm



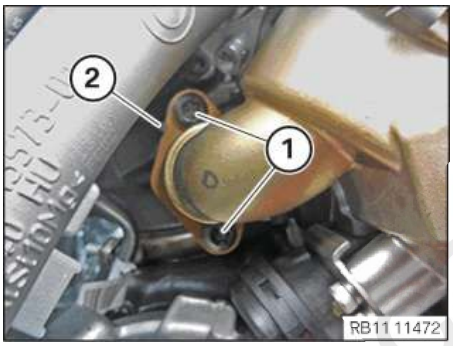
- Check the seal (1) for damage, if necessary, renew the oil feed line.



- Feed in and install the oil feed line (2) for the high-pressure stage exhaust turbocharger.
- Tighten down screw (1).

Oil feed line on cylinder head

M6x12		Tightening torque	8 Nm

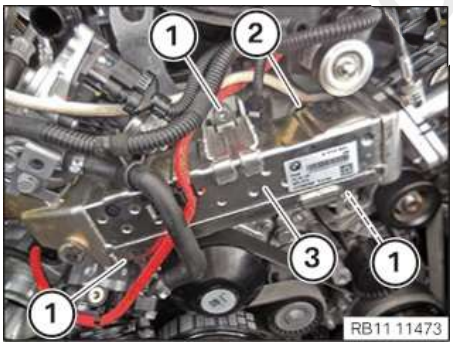


- Tighten the screws (1).

Exhaust-gas recirculation cooler to exhaust manifold

M8x28	Replace screws	Tightening torque	32 Nm

- Ensure that seal (2) is installed.

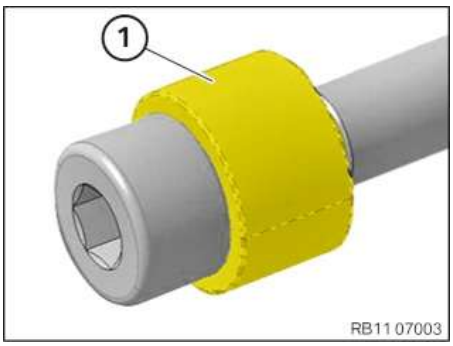


- Position the exhaust-gas recirculation cooler (3).
- Make sure the pipe neck (2) is fitted correctly.
- Tighten the screws (1).

Exhaust-gas recirculation cooler to cylinder head

M8x20 / M8x28		Tightening torque	19 Nm

Check



- Check whether the screws **with the** sleeves (1) (10 mm) are available.

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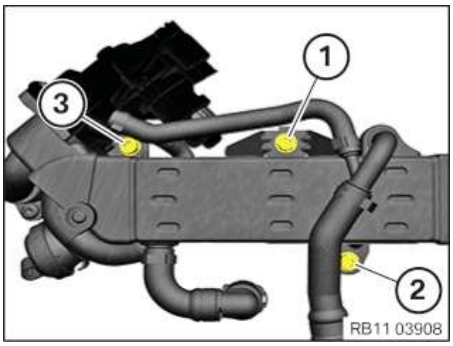
Result

» Screws **without** sleeves (1) are available.

Measure

- Renew screws.

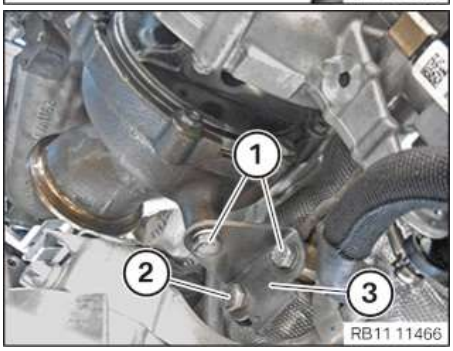
  Parts: Screws (part number 9 886 429)



- Tighten the screws (1) to (3).

Exhaust-gas recirculation cooler to cylinder head

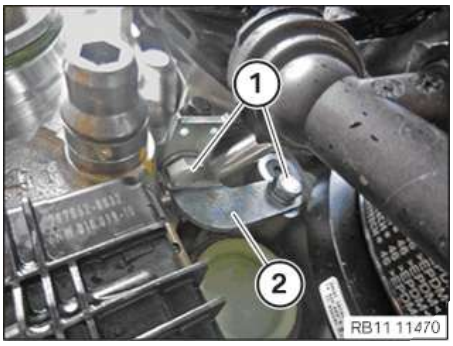
M8x20 / M8x28		Tightening torque	19 Nm



- Tighten the bolts (1) and (2) on the bracket (3).

Exhaust turbocharger low-pressure stage to crankcase

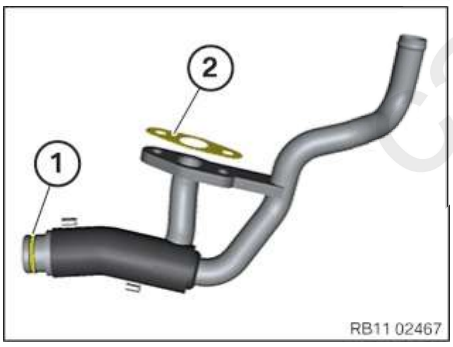
M8X16		Tightening torque	22 Nm



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

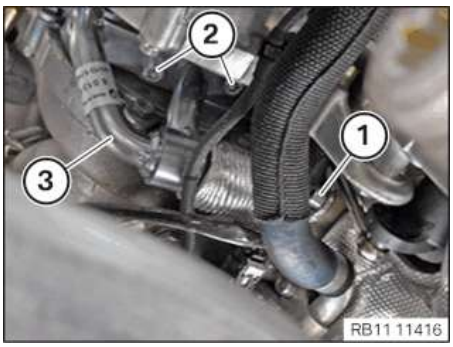
Exhaust turbocharger low-pressure stage to crankcase

M8X16		Tightening torque	22 Nm



- Renew the gasket (2).

  Parts: Gasket
- Check the O-ring (1) for damage and renew the oil return line as needed.



- Install oil return line (3) into crankcase.
- Position oil return line (3) with the seal on the low-pressure stage exhaust turbocharger.
- Tighten the screws (2).

Oil return line to turbocharger

M6x12	Renew gasket.	Tightening torque	8 Nm

- Install the bolt (1).

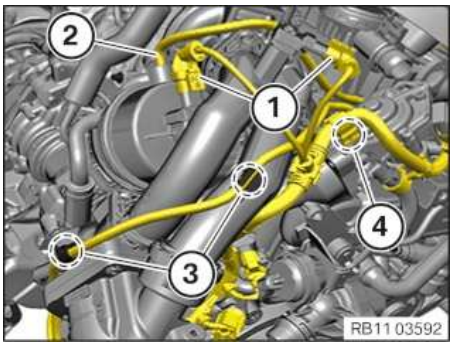
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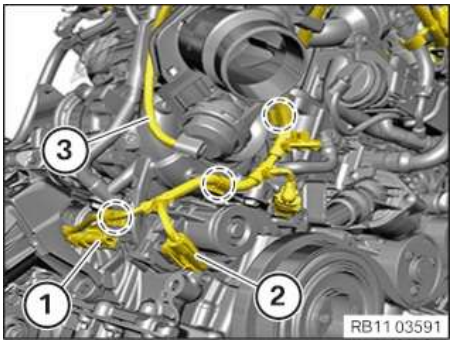
- Tighten the screws of the oil return line on the crankcase from the right wheel arch.

Oil return line to crankcase

M6x12	Check gasket. Renew the seal or line if necessary.	Tightening torque	8 Nm

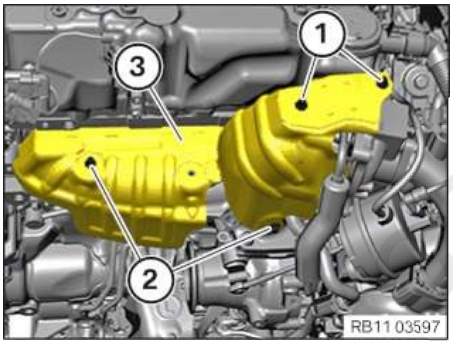


- Secure the vehicle wiring harness in area (4) to the exhaust-gas recirculation cooler.
- Secure the vacuum hose in the marked areas (3) to the exhaust turbochargers.
- Connect vacuum hose (2).
- Connect all connectors (1) and lock audibly.



- Connect vacuum hose (3).
- Secure the wiring harness in the marked areas to the exhaust turbochargers.
- Plug in the connector (2) and lock audibly.
- Secure the connector in area (1) to the holder.

40 – Installing heat shield



- Feed in and install the heat shield (3).
- Tighten down screws (1) and (2).

Heat shield to exhaust manifold

M6x12			10 Nm

41 – Installing the sensor bracket on the cylinder head cover

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.

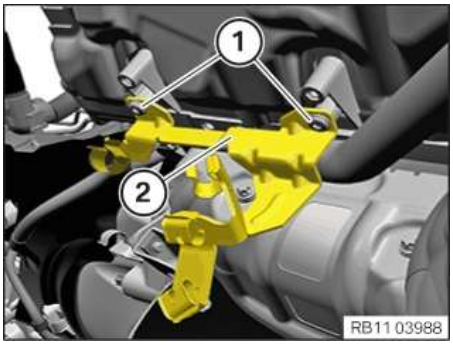
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RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

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

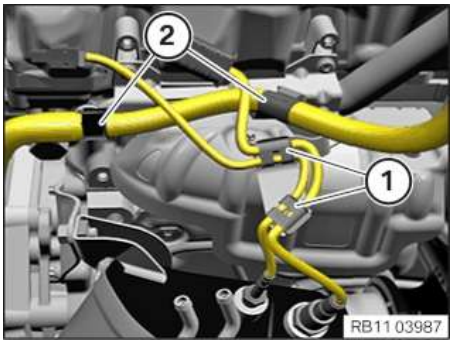
- Route all cables without abrasions, do not trap and crush.



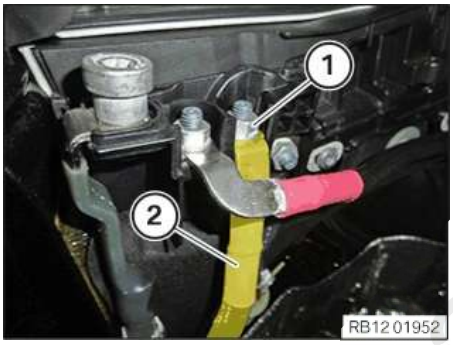
- Insert and install the holder (2).
- Tighten the screws (1).

Bracket on cylinder head cover

	Tightening torque	5 Nm



- Secure the positive battery cable in the clamps (2).
- Mount the cable of the exhaust gas sensor system in the clamps (1).



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

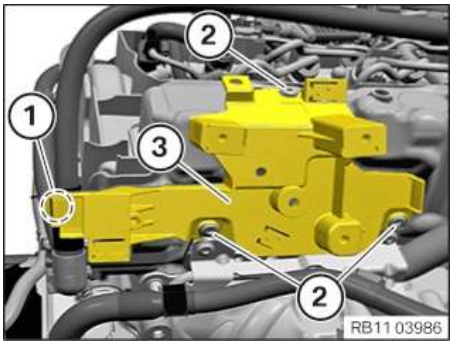
Battery positive lead to battery positive terminal

M8	Tightening torque	19 Nm



- Insert and install the cover (2) in the direction of the arrow.

  The locks (1) must engage audibly.



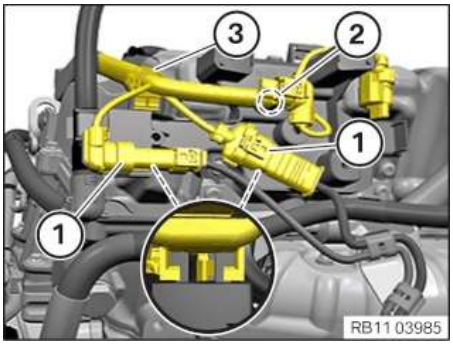
- Feed in and install the sensor bracket (3).
- Tighten the screws (2).

Bracket on cylinder head cover

	Tightening torque	5 Nm

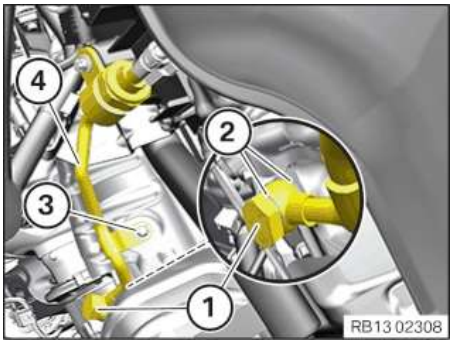
- Fasten the positive battery cable in the area (1) in the clamp.

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- Feed in the wiring harness section and fasten it with the clamp (3).
- Fasten the cable clip in the area (2) in the sensor bracket.
- Feed in the connector (1) into the sensor bracket and lock it audibly.
- Plug in the connector (1) and lock audibly.

42 – Install the exhaust gas pressure pipe



- Insert and install the exhaust gas pressure pipe (4).
- Replace the sealing rings (2).

  Parts: Sealing ring
- Apply the banjo bolt (1) hand-tight.
- Tighten down screw (3).

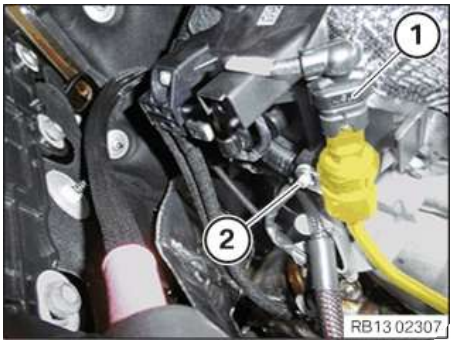
Heat shield to exhaust manifold

M6x12		Tightening torque	10 Nm

- Tighten the banjo bolt (1).

Banjo bolt for exhaust pressure pipe to exhaust manifold

Hollow bolt	Renew sealing rings.	Tightening torque	30 Nm



- Tighten down screw (2).

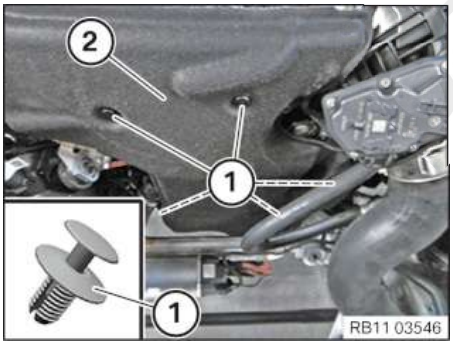
Exhaust gas pressure pipe to sensor system holder

TS6x20		Tightening torque	5,7 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

43 – Install acoustic cover for the engine, front



- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

44 – Install pressure pipe between exhaust turbocharger and charge air cooler

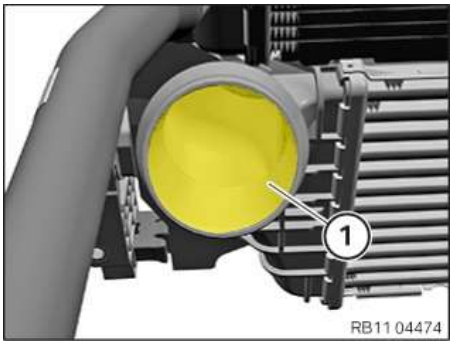
RISK OF DAMAGE

Damage to the exhaust turbocharger.

A leak at the pressure pipe can damage the exhaust turbocharger.

- Replace the gaskets and pressure pipe if necessary.

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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.

- Remove the auxiliary materials for sealing the opening (1) of the charge air cooler.



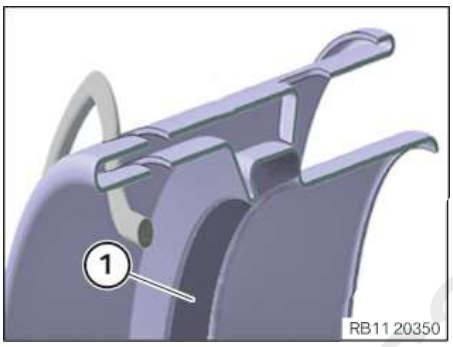
- Check the seal (1) for damage and renew if necessary.

  Parts: Gasket

▸ **Replacing damaged seal**

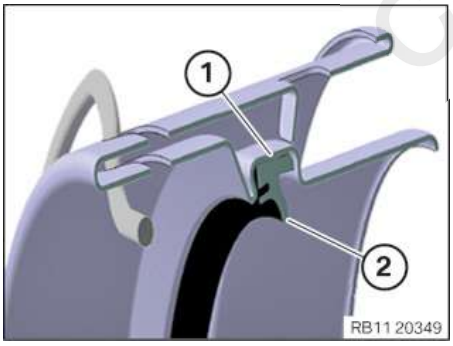
TECHNICAL INFORMATION

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.

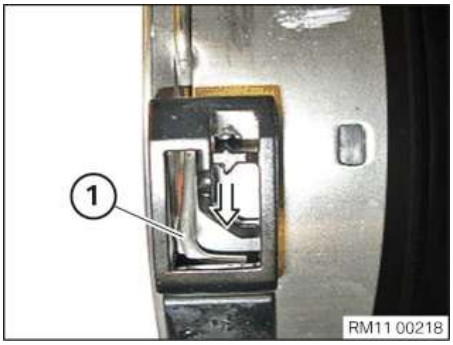
  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

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 directed inwards as shown.

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- **Version A:**

  Lock the lock (1).

  The lock (1) on the pressure pipe must engage audibly.

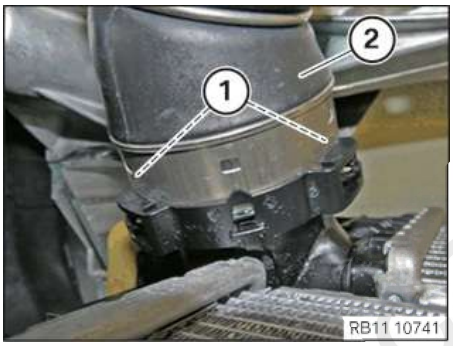


- Pay attention to the installation position:

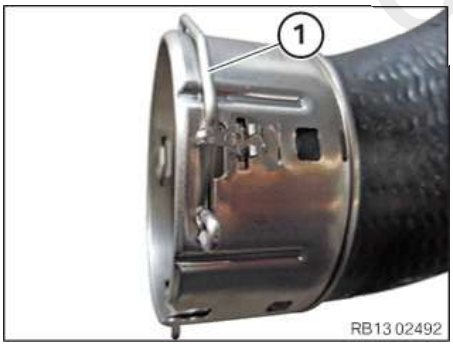
  The pressure pipe fits on charge air cooler in one installation position only.



- Install the pressure pipe (1) from the top.



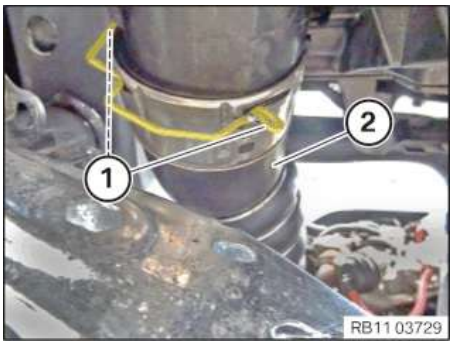
- Connect pressure pipe (2) to charge air cooler.
- Lock the lock (1) on both sides.



- **Version B:**

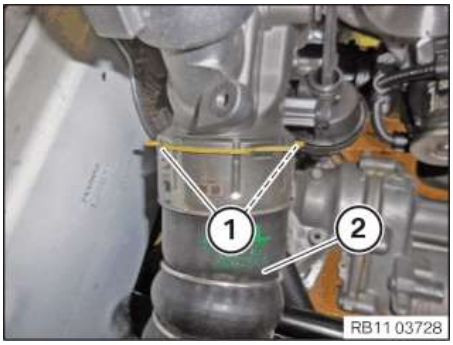
  Lock the lock (1).

  The lock (1) on the pressure pipe must engage audibly.



- Attach the pressure pipe (2) to the charge air cooler until the lock (1) engages on both sides.

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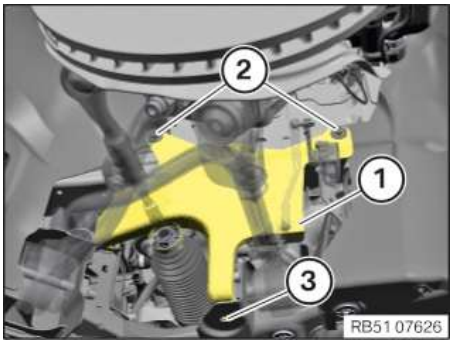


- Place the pressure pipe (2) onto the compressor bypass and ensure that the lock (1) engages audibly.

45 – Install the cover of the steering assembly

TECHNICAL INFORMATION

When tightening the screws, the cover can twist and cause chafe marks on the anti-roll bar (risk of corrosion).
Hold the cover while tightening the screws. Then check the position of the cover.



- Position the cover (1).
- Tighten down screws (2) and (3).

Cover, steering unit

Screw		Tightening torque	3 Nm

46 – Installing the front right wheel

▸ **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.

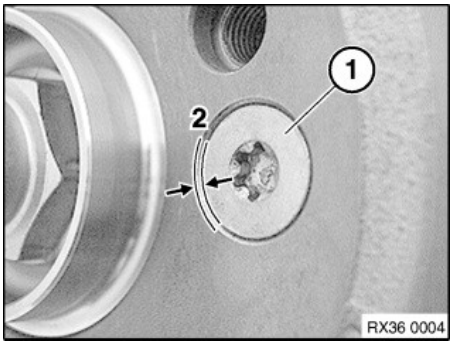
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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.



- 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.

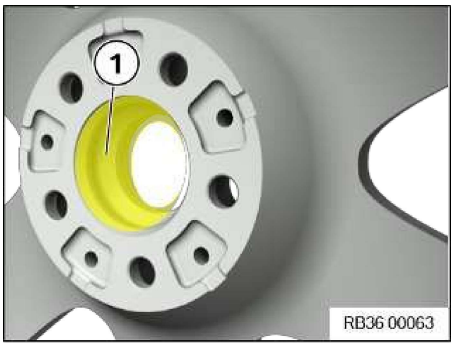
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- 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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against 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



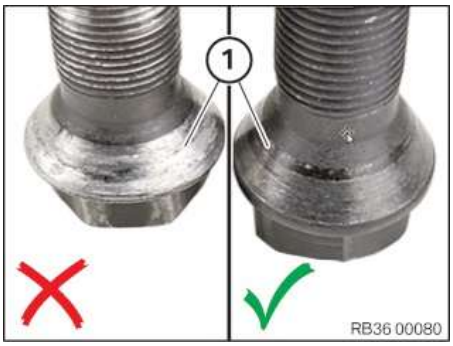
TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

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

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Check

- **Check wheel bolts for wear.**

Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts



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 the corroded wheel bolts (arrows).

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

47 – Prepare for the installation of the diesel particulate filter



- Renew the V-clip (1).

  Parts: V-band clamp

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- Renew gasket (1).

  Parts: Gasket

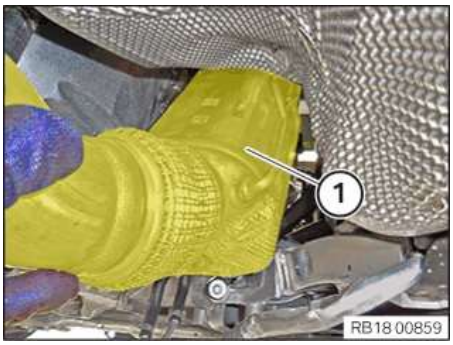
48 – Installing the diesel particulate filter

CAUTION

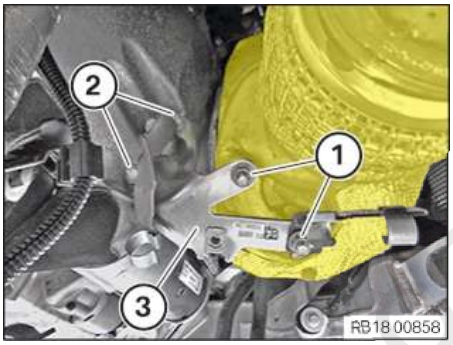
Heavy component.

Heavy components can lead to injury or damage.

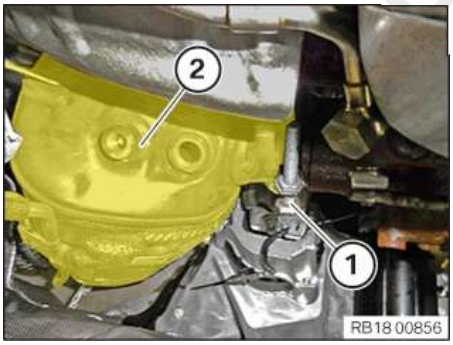
- Remove and install heavy components with the aid of another person/other persons.



- Insert and install the diesel particulate filter (1).



- Insert and install the holder (3).
- **Hand-tighten** the bolts (2).
- Apply the nuts (1) **hand-tight**.

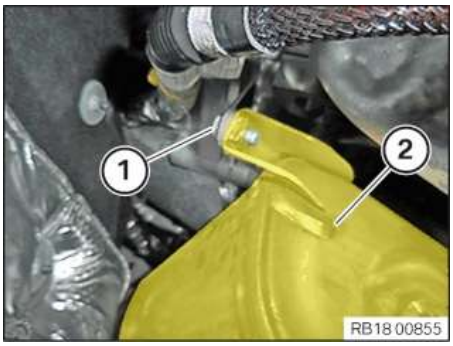


- Renew the V-clip (1).

  Parts: V-band clamp
- Feed in and install V-band clamp (1).

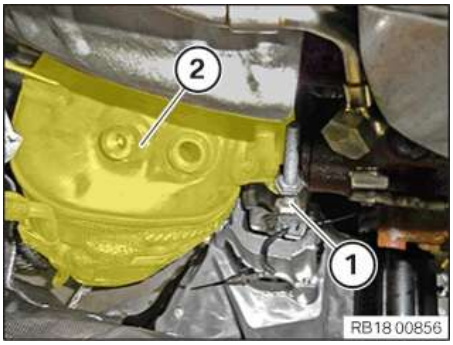
Note: Make sure that the seal between the diesel particulate filter and the exhaust turbocharger is installed correctly.

- Position the diesel particulate filter (2) on the exhaust turbocharger .
- Position V-clip (1).
- Apply the V-clip (1) **hand-tight**.



- Feed in screw (1) on the holder of the diesel particulate filter (2) and tighten **hand-tight**.

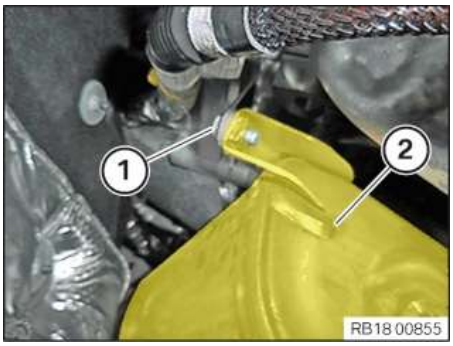
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- Tighten the V-clip (1) of the diesel particulate filter (2).

Diesel particulate filter V-clip to exhaust turbocharger

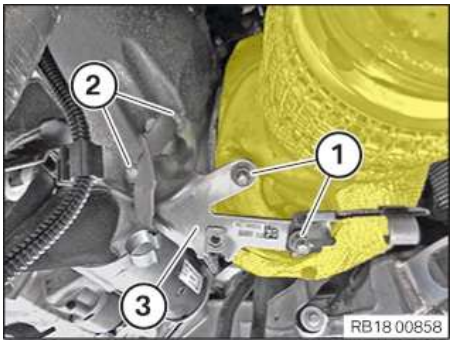
V-band clamp	Renew V-band clamp.	Tightening torque	15 Nm



- Tighten the bolt (1) on the bracket of the diesel particulate filter (2).

Bracket to diesel particulate filter top

M8		Tightening torque	19 Nm



- Tighten the screws (2) on the holder (3).

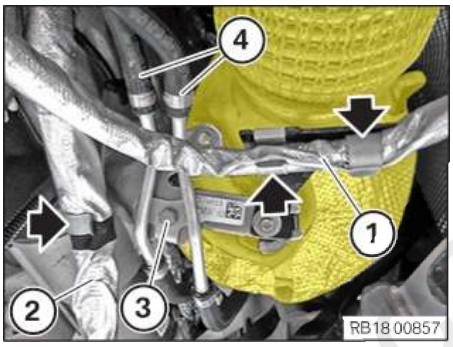
Bracket to transmission for diesel particulate filter holder bottom

M8X20		Tightening torque	19 Nm

- Tighten the nuts (1) on the holder (3).

Lower holder to diesel particulate filter

M8		Tightening torque	19 Nm



- Thread in and install coolant line (4).
- Tighten down screw (3).

Coolant lines for SCR metering module

M6X16		Tightening torque	8 Nm

- Secure the positive battery cable (2) of the starter motor at the clamp (arrow).
- Fasten the metering line (1) on the clamps (arrows).

49 – Installing the nitrogen oxide sensor upstream of SCR catalytic converter

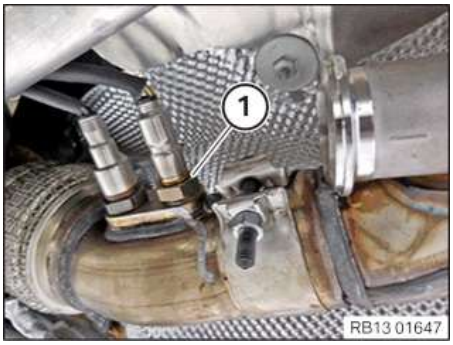
RISK OF DAMAGE

Damage to the nitrogen oxide sensor.

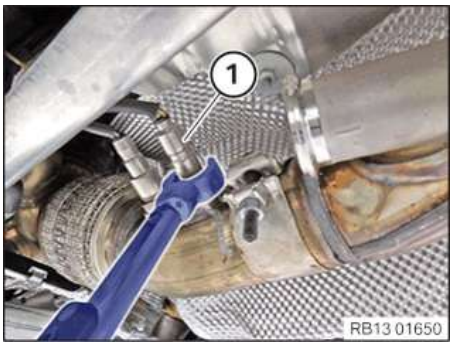
Failure of the nitrogen oxide sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
- The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.

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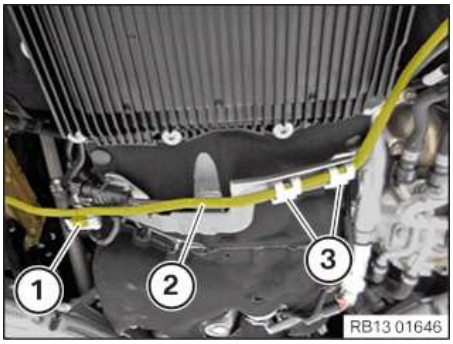
- Feed in and install the nitrogen oxide sensor (1).



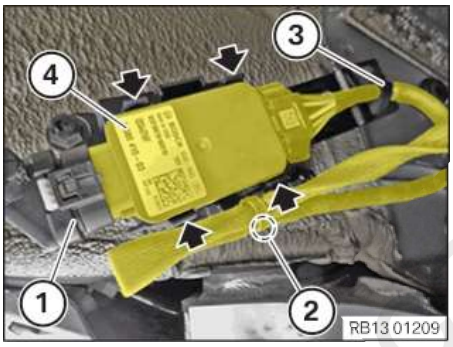
- Tighten the nitrogen oxide sensor (1) using commercially available tools.

Nitrogen oxide sensor before SCR catalytic converter

Sensor		Tightening torque	50 Nm



- Secure the cables (2) to the clamps (3).
- Secure clamps (1).



- Clip in the control unit (4) (arrows).
- Fasten the cable in the holder (3).
- Secure the cable holder (2).
- Plug in the connector (1) and lock audibly.

50 – Installing the monitoring oxygen sensor after the diesel particulate filter

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.

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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



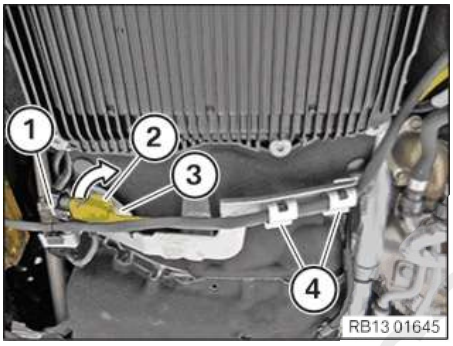
- Insert the monitoring oxygen sensor (1) and install it.



- Tighten the monitoring oxygen sensor (1) with standard tools.

Monitoring oxygen sensor

Sensor		Tightening torque	50 Nm



- Fasten the monitoring oxygen sensor to the clamps (4).
- Secure the connector (2) on the holder (3) in direction of arrow.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

51 – Installing the 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.

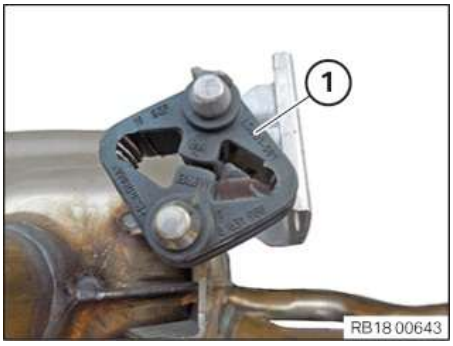
Heavy components can lead to injury or damage.

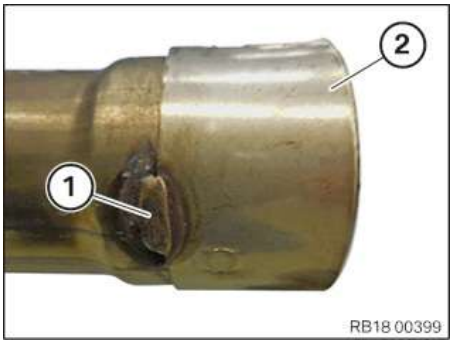
- Remove and install heavy components with the aid of another person/other persons.

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TECHNICAL INFORMATION

Mount the exhaust system in voltage-free state, maintaining the tightening sequence from the rear silencer towards the exhaust manifold.





NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Check all the rubber mounts (1) of the exhaust system for damage.
- Replaced damaged rubber mounts.

  Parts: Rubber mount

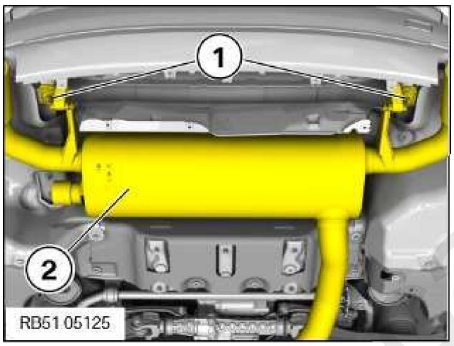
CAUTION

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.

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

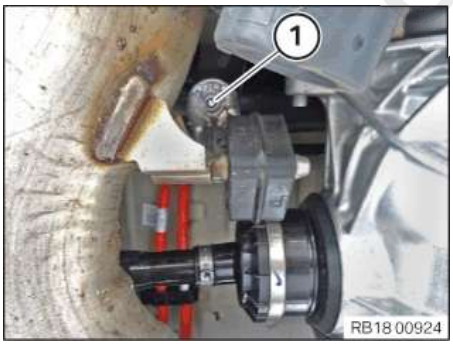


- Insert and install the exhaust system (2).
- Renew nuts (1).

  Parts: Nuts
- Tighten nuts (1).

Rear silencer to body / bumper support

M8	Replace nuts.	Tightening torque	19 Nm

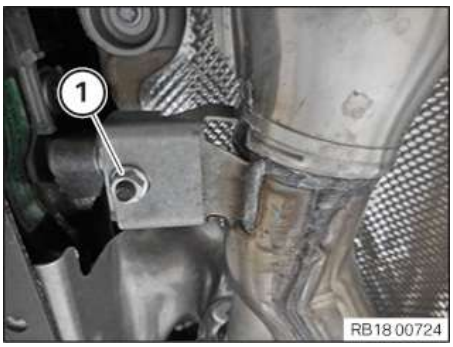


- Renew nut (1) on the rear axle support.

  Parts: Nut
- Tighten nut (1).

Exhaust system to rear axle carrier

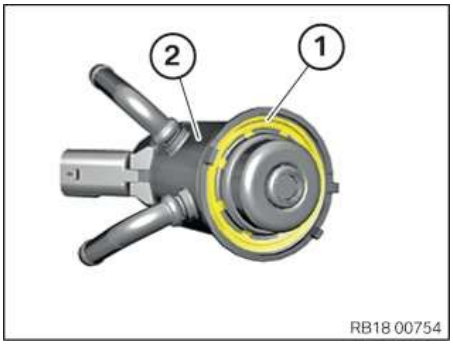
M8 nut		Tightening torque	19 Nm



- Tighten nut (1).

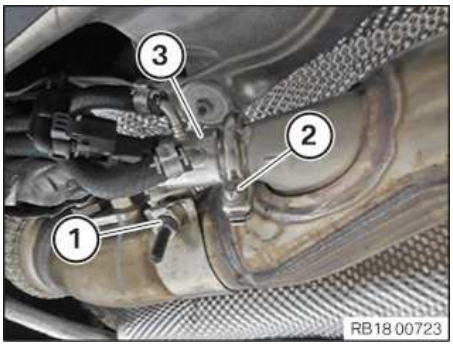
Exhaust system to transmission

M8		Tightening torque	19 Nm



- Renew sealing ring (1) of the SCR metering module (2).

  Parts: Sealing ring



- If necessary, renew clamp (1).

  Parts: Clamp
- Tighten clamp (1).

Exhaust system to diesel particle filter

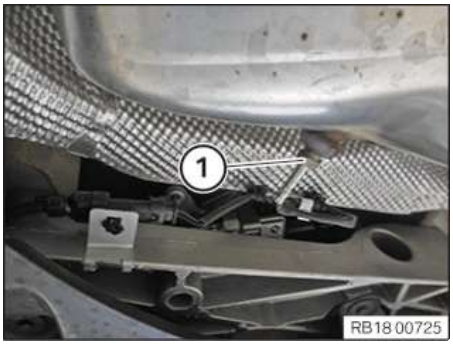
M8	If necessary, renew clamp.	Tightening torque	26 ±2 Nm

- Renew the V-clip (2).

  Parts: V-band clamp
- Install the SCR metering module (3) in the exhaust system.
- Tighten the V-clip (2) of the SCR metering module (3).

SCR metering module V-clip to exhaust system

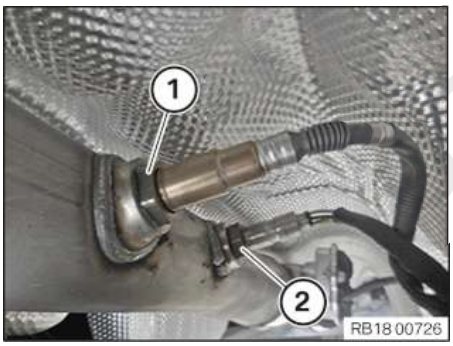
V-band clamp	Renew V-band clamp.	Tightening torque	8 Nm



- Install the exhaust temperature sensor (1) in the exhaust system and tighten.

Exhaust-gas temperature sensor upstream of SCR catalytic converter

Sensor		Tightening torque	30 Nm



- Install the diesel particulate sensor (1) in the exhaust system and tighten.

Diesel particulate sensor to exhaust system

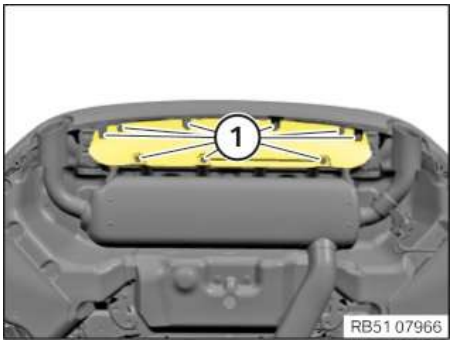
Sensor		Tightening torque	50 Nm

- Install the nitrogen oxide sensor (2) in the exhaust system and tighten.

Nitrogen oxide sensor downstream of SCR catalytic converter

Sensor		Tightening torque	55 Nm

52 – Installing the rear diffuser

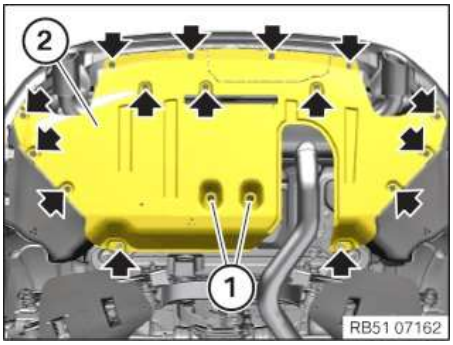


- **Version 1:**
- Install the diffuser and tighten the nuts (1).

Diffuser / underbody panelling

Nuts and screws		Tightening torque	3 Nm

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- **Version 2:**
- Feed in and position the diffuser (2)
- Tighten screws (arrows).

Diffuser / underbody panelling

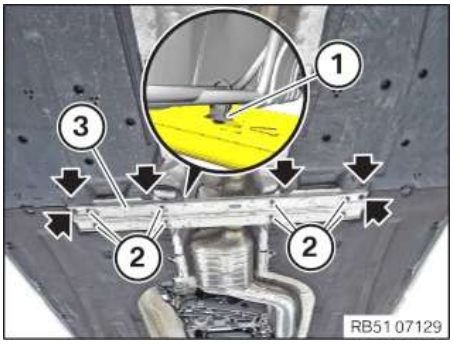
Nuts and screws		Tightening torque	3 Nm

- Tighten nuts (1).

Diffuser / underbody panelling

Nuts and screws		Tightening torque	3 Nm

53 – Install the connecting supports on the tunnel



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

Connecting support to tunnel

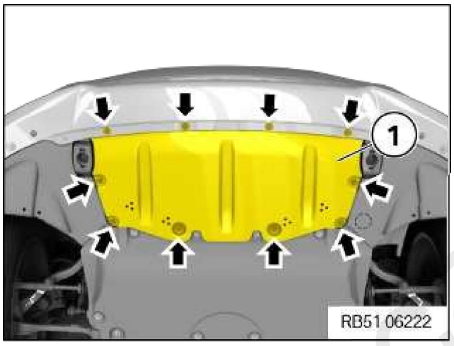
M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Secure the clamp (1).

54 – Installing the front underbody protection



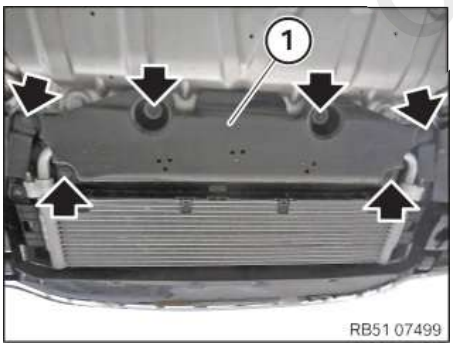
- **Version A:**

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



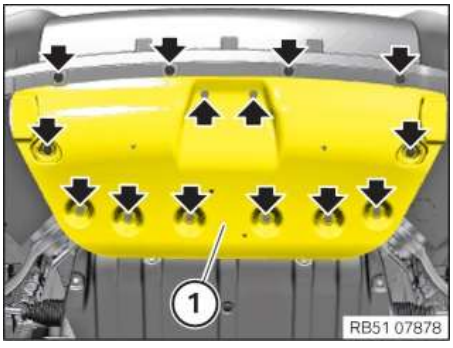
- **Version B:**

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 C:**

Feed in and install front underbody protection (1).

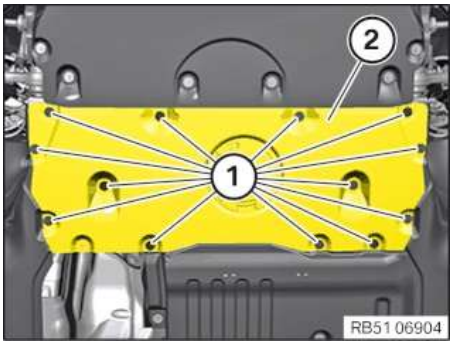
Tighten screws (arrows).

Underbody protection front

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

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55 – Installing the centre underbody protection



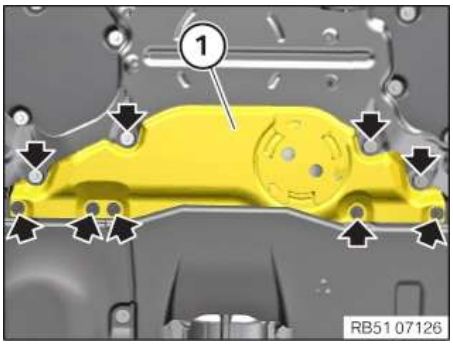
- **Variant with rear wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

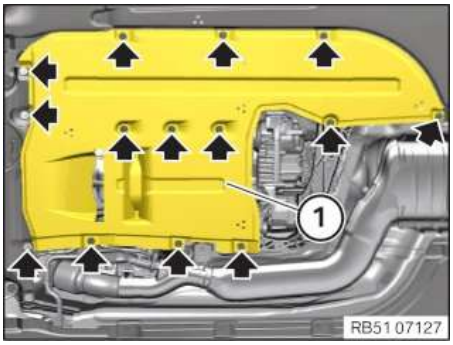
  Guide in centre underbody protection (1) and install.

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

56 – Installing underbody protection at rear



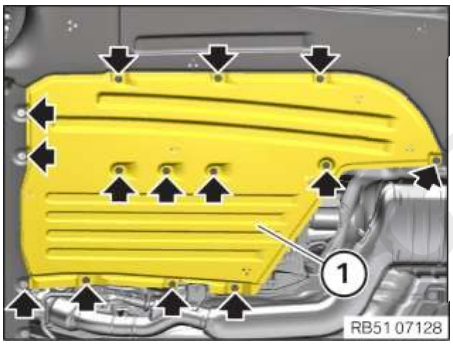
- **Version A:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version B:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

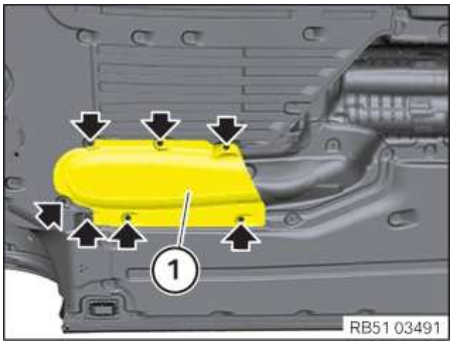
Underbody protection

Hexagon screw		Tightening torque	3 Nm

57 – Install the underbody panelling of the transmission on the side

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

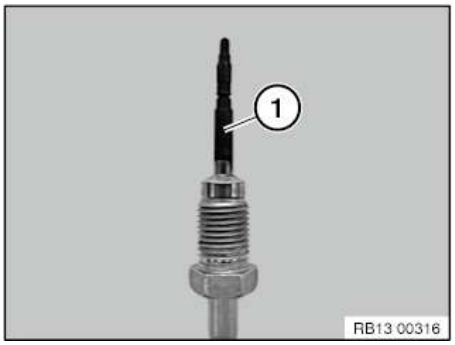


- Insert the underbody panelling (1).
- Tighten screws (arrows).

Underbody panelling

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

58 – Installing the exhaust temperature sensor for the exhaust system downstream the catalytic converter on the diesel particulate filter



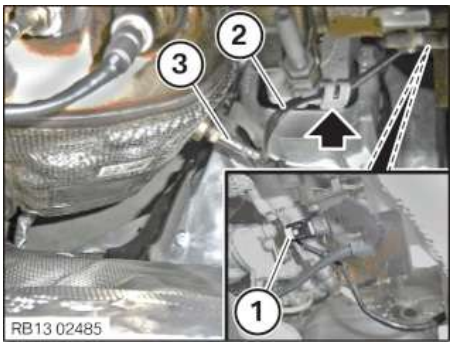
RISK OF DAMAGE

Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

- Make sure that the gauge tip is not damaged.

- Check the gauge tip (1) for damage.



- Feed in and install the exhaust temperature sensor (3).
- Tighten the exhaust temperature sensor (3).

Exhaust temperature sensor for the exhaust system after catalytic converter before diesel particulate filter

Sensor		Tightening torque	30 Nm

- Secure cable (2) to the clamp (arrow).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

59 – Installing the front oxygen sensor on the diesel particulate filter

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
- The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.

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

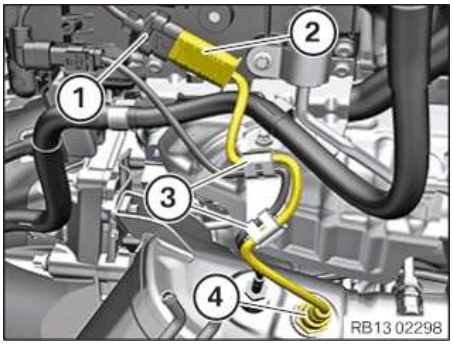


- Insert and install the front oxygen sensor (1).
- Tighten the front oxygen sensor (1) with standard tools.

Front oxygen sensor to top of diesel particulate filter

Sensor		Tightening torque	50 Nm

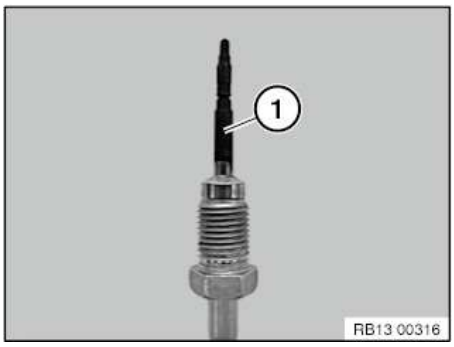
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- Fasten the front oxygen sensor (4) to the clamps (3).
- Connect connectors (2) and lock.
- Connect connectors (1) and lock.

  The connectors (1) and (2) must audibly engage.

60 – Install the exhaust-gas temperature sensor on the diesel particulate filter



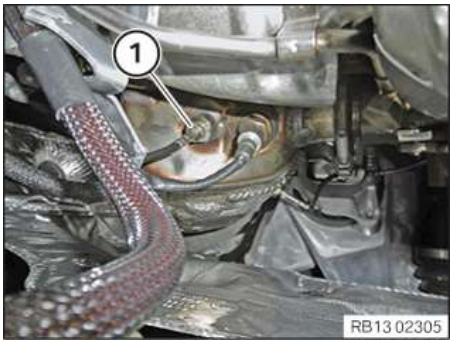
RISK OF DAMAGE

Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

- Make sure that the gauge tip is not damaged.

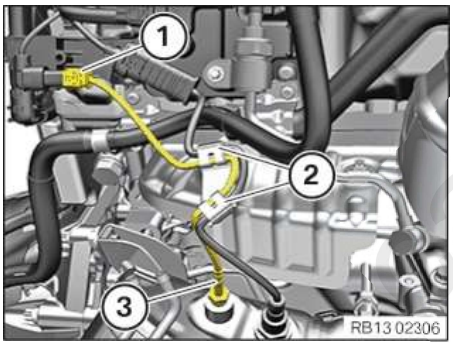
- Check gauge tip (1) for damage.



- Feed in and install the exhaust temperature sensor (1).
- Tighten the exhaust temperature sensor (1) with the special tool .

Exhaust-gas temperature sensor to diesel particulate filter

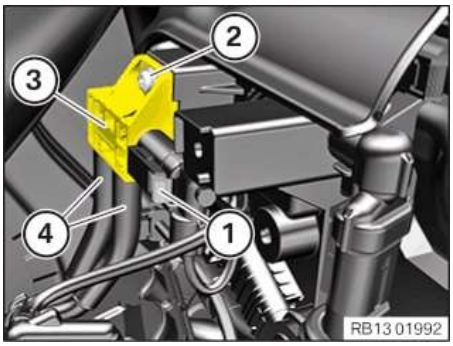
Sensor		Tightening torque	30 Nm



- Secure the exhaust temperature sensor (3) to the clamp (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

61 – Installing the differential pressure sensor for the diesel particulate filter



- Feed in and install the differential pressure sensor (3).
- Tighten down screw (2).

Differential pressure sensor of diesel particulate filter on cylinder head cover

TS5x20		Tightening torque	4 Nm

- Check the pressure hoses (4) for hardening and damage, renew if necessary.
- Connect the pressure hoses (4) and secure them using 15 mm to 19 mm screw clamps.

Clamp for the pressure hose on the differential pressure sensor

Clamp 15–19mm		Tightening torque	3 Nm

- Connect connectors (1) and lock.

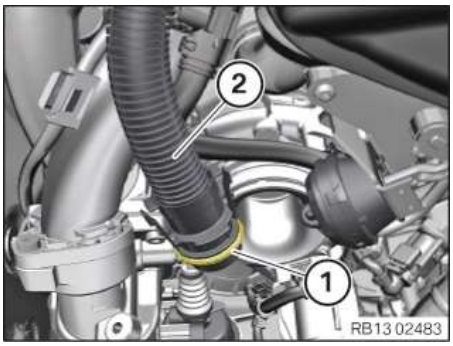
  The connector (1) must engage audibly.

62 – Installing the clean air pipe with resonator

carsign.com



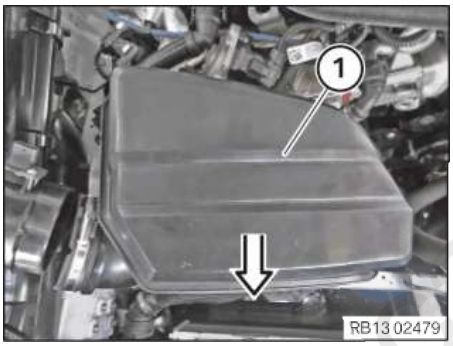
- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.



- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

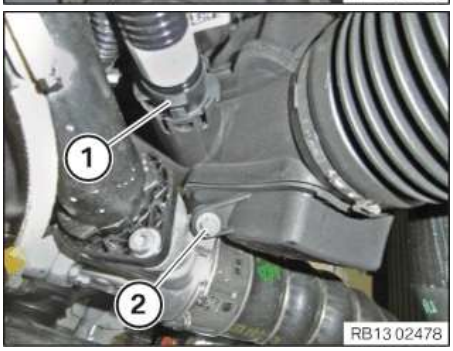


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

  The clamp (1) must engage audibly.

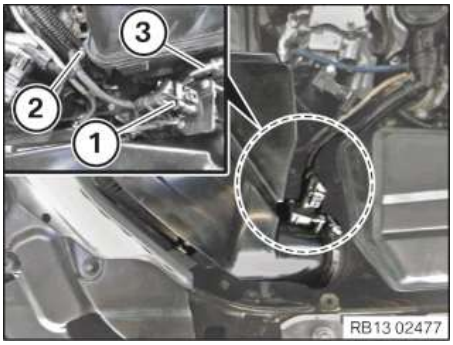


- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm

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- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

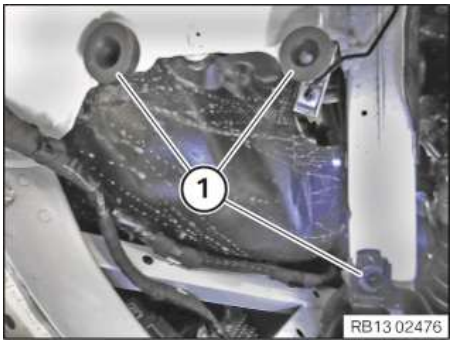
Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

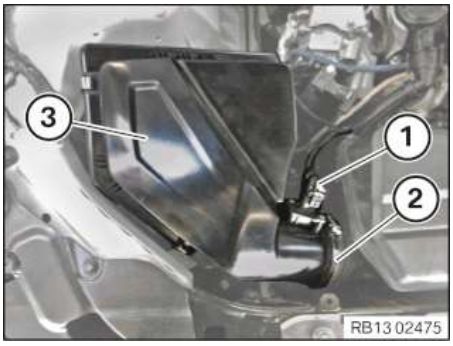
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

63 – 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

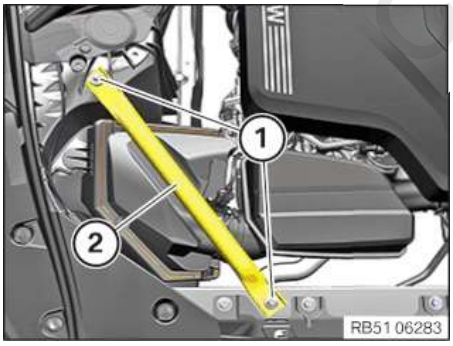
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

64 – Install the right front-end strut

TECHNICAL INFORMATION

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



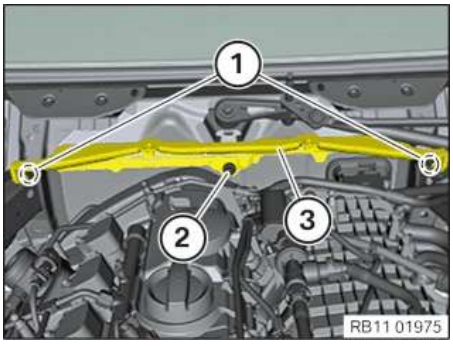
- Install the front-end strut (2).
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Front end strut

Screw		Tightening torque	56 Nm

65 – Installing centre bulkhead lower section



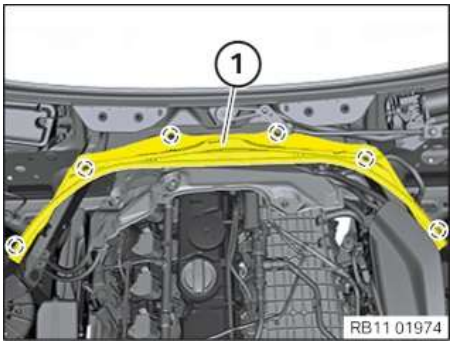
- Position the centre bulkhead lower part (3).
- Tighten nut (2) and screws (1).

Bulkhead lower part to body

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

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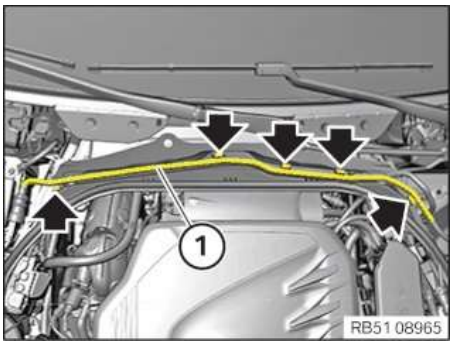
66 – Installing the centre bulkhead upper part



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

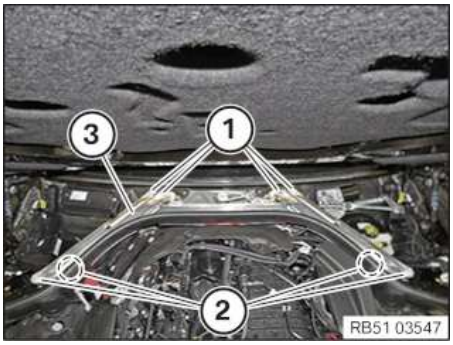
Bulkhead upper part to bottom bulkhead

	Tightening torque	3 Nm



- **Version with mild hybrid technology:**

  Clip in the wire (1) into the holders (arrows).



NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- 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: Screws
- Tighten the screws (2).

Tension strut to spring strut dome

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

67 – 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.

68 – Installing cowl panel cover

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RISK OF DAMAGE

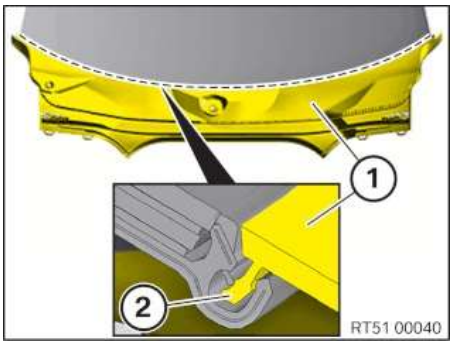
Damage caused by water ingress into the vehicle.

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

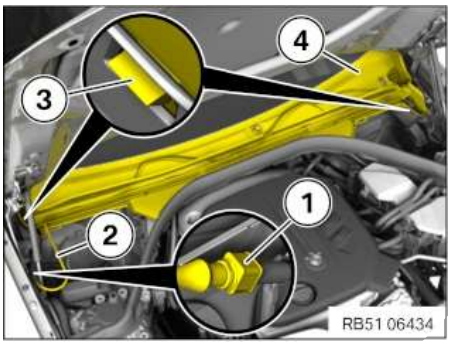
- Ensure correct installation of the components.
- Only use undamaged components.

TECHNICAL INFORMATION

Before installing the cowl panel cover it is **mandatory** to check that the 48 V line is routed correctly and fitted tightly.
An incorrectly laid or attached 48 V line can be damaged by the wiper kinematics.



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



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

69 – Install left and right wiper arm

NOTICE

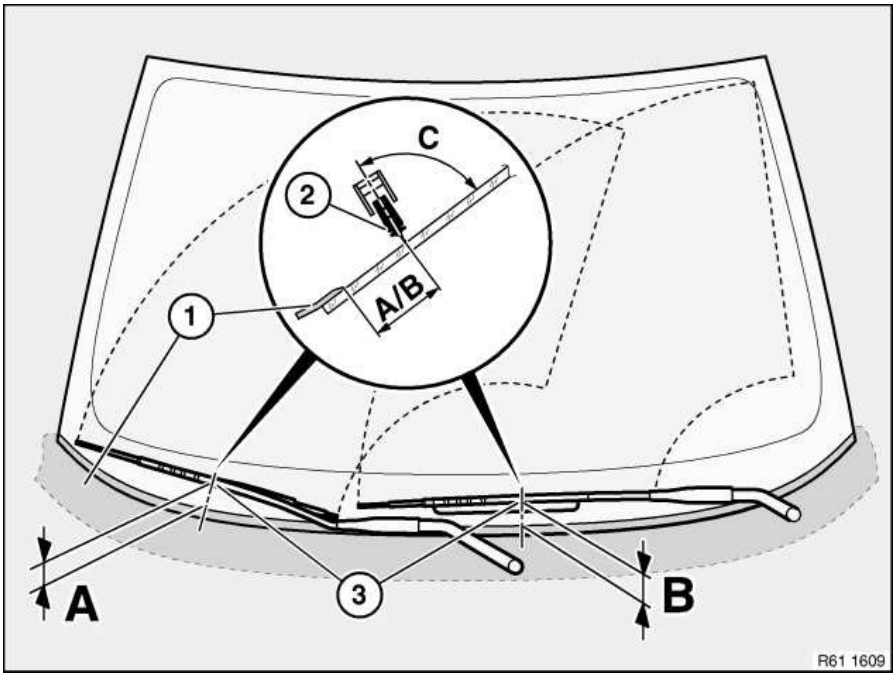
Description is for left component only. Procedure on the right side is identical.

▸ **Installing left and right wiper arm**

TECHNICAL INFORMATION

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

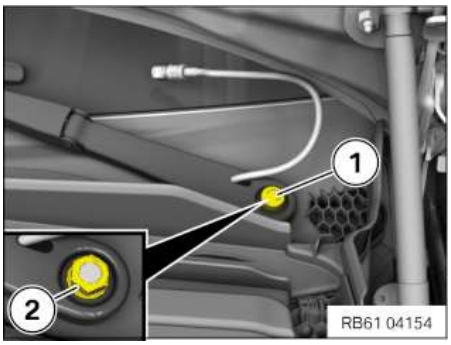
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- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

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

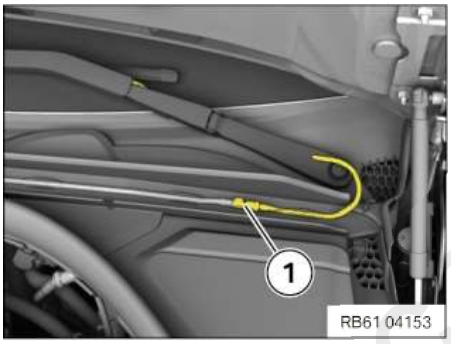


- Tighten nut (2).

Windscreen wiper arm

Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Feed washer fluid hose (1) into the cowl panel guide and connect at the separation point.

70 – Connecting all battery earth leads



- See additional information.

71 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm

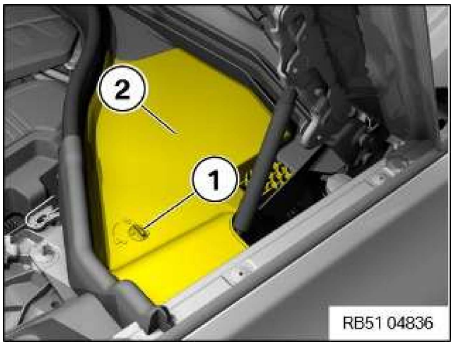


- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

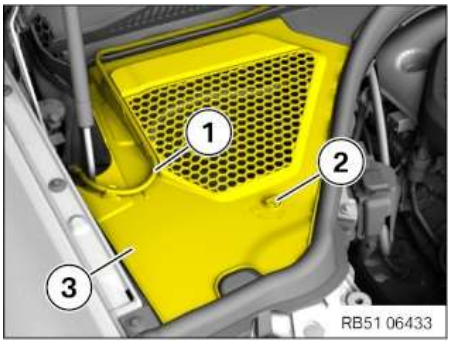
72 – Install the cover of the engine compartment on the rear left



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

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73 – Install the rear right engine compartment cover



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

74 – Check engine oil level

Prerequisite

Vehicle is in a horizontal position.

TECHNICAL INFORMATION

Please comply with instructions in Owner's Handbook.

- Carry out an electronic oil measurement.
- Top up engine oil if necessary.

▸ **Check engine oil level**

TECHNICAL INFORMATION

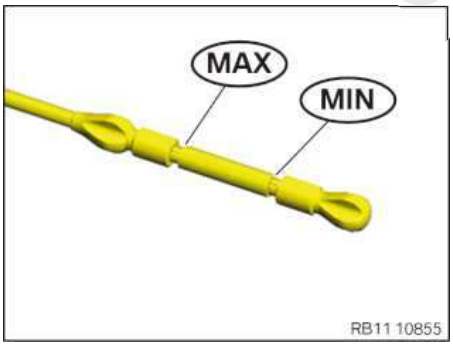
Always check the engine oil level when the engine is at operating temperature (engine oil temperature > 70°C).

- Park vehicle on a horizontal surface.
- Stop the engine and wait for 5 minutes.
- Pull out the oil dipstick and wipe off using a lint-free cloth.

TECHNICAL INFORMATION

Do not pull out or insert the oil dipstick into the guide tube too quickly or slowly.

- Push the oil dipstick into the guide tube up to the limit position and pull it out again.



TECHNICAL INFORMATION

The engine oil level must be between the minimum mark and the maximum mark of the oil dipstick.

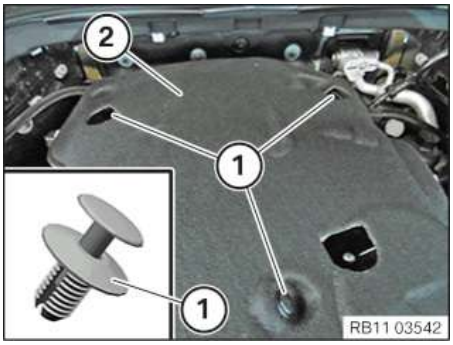
- Read the engine oil level on the oil dipstick.
- Top up engine oil if necessary.

Oil quantity between the two markings MIN and MAX of the oil dipstick

1.0 l

75 – Install the acoustic cover for the injectors

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- Feed the acoustic cover (2) in and install.
- **If installed:** Secure the acoustic cover (2) with the expanding rivets (1) .

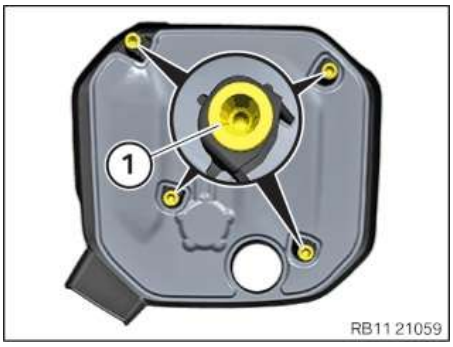
76 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

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

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



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

77 – Take bonnet out of the service position

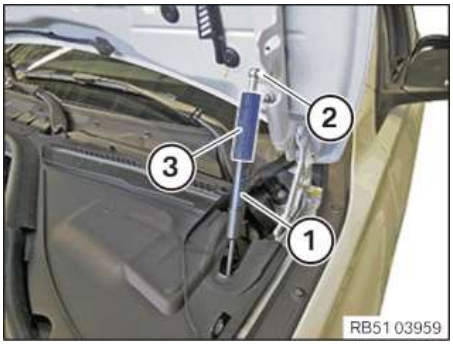
CAUTION

Shutting bonnet or tailgate.

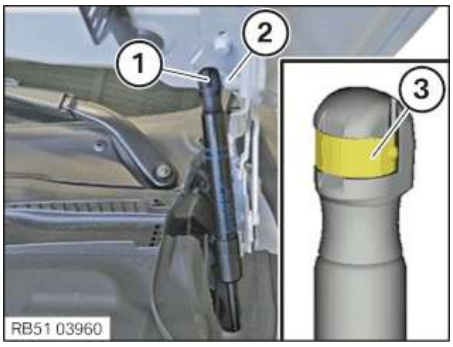
Danger of injury!

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

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- 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.



- 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 feed line to exhaust turbocharger			Used in step 38
Hollow bolt	Renew sealing rings.	Jointing torque	10 Nm
		Angle of rotation	45 °

High-pressure stage exhaust turbocharger to exhaust manifold			Used in step 38
M8x20		Tightening torque	25 Nm

Connecting pipe with bypass flap to exhaust turbocharger low-pressure stage / high-pressure stage			Used in step 38
M6		Tightening torque	8 Nm

Oil feed line for the exhaust turbocharger high-pressure stage			Used in step 38
Hollow bolt		Jointing torque	10 Nm
		Angle of rotation	70 °

Exhaust manifold to cylinder head			Used in step 39
M7	**If necessary, renew loose stud bolts.**	Tightening torque	11 Nm
	Renew nuts.	Tightening torque	13 Nm

Oil feed line on cylinder head			Used in step 39
M6x12		Tightening torque	8 Nm

Exhaust-gas recirculation cooler to exhaust manifold			Used in step 39
M8x28	Replace screws	Tightening torque	32 Nm

Exhaust-gas recirculation cooler to cylinder head			Used in step 39
M8x20 / M8x28		Tightening torque	19 Nm

Exhaust turbocharger low-pressure stage to crankcase			Used in step 39
M8X16		Tightening torque	22 Nm

Oil return line to turbocharger			Used in step 39
M6x12	Renew gasket.	Tightening torque	8 Nm

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Oil return line to crankcase			Used in step 39
M6x12	Check gasket. Renew the seal or line if necessary.	Tightening torque	8 Nm

Heat shield to exhaust manifold			Used in step 40
M6x12			10 Nm

Bracket on cylinder head cover			Used in step 41
		Tightening torque	5 Nm

Battery positive lead to battery positive terminal			Used in step 41
M8		Tightening torque	19 Nm

Heat shield to exhaust manifold			Used in step 42
M6x12		Tightening torque	10 Nm

Banjo bolt for exhaust pressure pipe to exhaust manifold			Used in step 42
Hollow bolt	Renew sealing rings.	Tightening torque	30 Nm

Exhaust gas pressure pipe to sensor system holder			Used in step 42
TS6x20		Tightening torque	5,7 Nm

Cover, steering unit			Used in step 45
Screw		Tightening torque	3 Nm

Brake disc to front wheel hub			Used in step 46
M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub			Used in step 46
M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts			Used in step 46
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

Diesel particulate filter V-clip to exhaust turbocharger			Used in step 48
V-band clamp	Renew V-band clamp.	Tightening torque	15 Nm

Bracket to diesel particulate filter top			Used in step 48
M8		Tightening torque	19 Nm

Bracket to transmission for diesel particulate filter holder bottom			Used in step 48
M8X20		Tightening torque	19 Nm

Lower holder to diesel particulate filter			Used in step 48
M8		Tightening torque	19 Nm

Coolant lines for SCR metering module			Used in step 48
M6X16		Tightening torque	8 Nm

Nitrogen oxide sensor before SCR catalytic converter			Used in step 49
Sensor		Tightening torque	50 Nm

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Monitoring oxygen sensor			Used in step 50
Sensor		Tightening torque	50 Nm

Rear silencer to body / bumper support			Used in step 51
M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier			Used in step 51
M8 nut		Tightening torque	19 Nm

Exhaust system to transmission			Used in step 51
M8		Tightening torque	19 Nm

Exhaust system to diesel particle filter			Used in step 51
M8	If necessary, renew clamp.	Tightening torque	26 ±2 Nm

SCR metering module V-clip to exhaust system			Used in step 51
V-band clamp	Renew V-band clamp.	Tightening torque	8 Nm

Exhaust-gas temperature sensor upstream of SCR catalytic converter			Used in step 51
Sensor		Tightening torque	30 Nm

Diesel particulate sensor to exhaust system			Used in step 51
Sensor		Tightening torque	50 Nm

Nitrogen oxide sensor downstream of SCR catalytic converter			Used in step 51
Sensor		Tightening torque	55 Nm

Diffuser / underbody panelling			Used in step 52
Nuts and screws		Tightening torque	3 Nm

Connecting support to tunnel			Used in step 53
M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

Underbody protection front			Used in step 54
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Underbody protection			Used in step 5556
Hexagon screw		Tightening torque	3 Nm

Underbody panelling			Used in step 57
Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

Exhaust temperature sensor for the exhaust system after catalytic converter before diesel particulate filter			Used in step 58
Sensor		Tightening torque	30 Nm

Front oxygen sensor to top of diesel particulate filter			Used in step 59
Sensor		Tightening torque	50 Nm

Exhaust-gas temperature sensor to diesel particulate filter			Used in step 60
Sensor		Tightening torque	30 Nm

Differential pressure sensor of diesel particulate filter on cylinder head cover			Used in step 61
TS5x20		Tightening torque	4 Nm

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Clamp for the pressure hose on the differential pressure sensor — Used in step 61

Clamp 15–19mm		Tightening torque	3 Nm

Clean air pipe to exhaust turbocharger — Used in step 62

M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing — Used in step 6263

Clamp		Tightening torque	3 Nm

Front end strut — Used in step 64

Screw		Tightening torque	56 Nm

Bulkhead lower part to body — Used in step 65

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

Bulkhead upper part to bottom bulkhead — Used in step 66

		Tightening torque	3 Nm

Tension strut on bulkhead — Used in step 66

M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome — Used in step 66

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

Windscreen wiper arm — Used in step 69

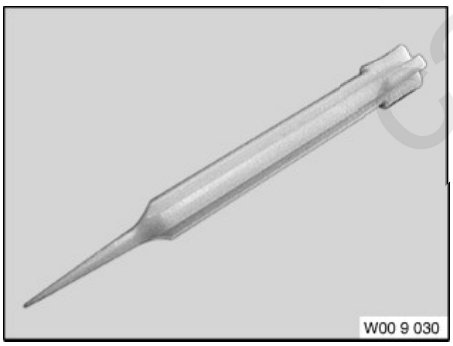
Combination hexagon nut		Tightening torque	35 Nm

Negative battery cable to 48-V battery — Used in step 71

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

0 496 714 (00 9 030) Wedge

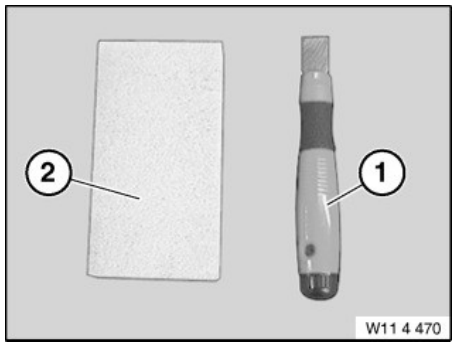


Common — Used in step 38

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 39
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)	

2 344 011 Tool



Common	Used in step 46
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 30
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 30
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 30
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 30
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	

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0 495 227 (36 1 329) Wheel stud



Common	Used in step 30
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	

0 495 228 (36 1 331) Wheel stud



Common	Used in step 30
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 30
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	

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0 495 230 (36 1 333) Wheel stud



Common	Used in step 30
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

Distance from window pane edge to wiper blade	Used in step 69
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Oil quantity between the two markings MIN and MAX of the oil dipstick	Used in step 74
	1.0 l

Links

Functional descriptions	Used in step
Troubleshooting on the exhaust turbocharger	

Repair instructions (PRE)	Used in step
Notes on 48-V battery	471

General repair instructions	Used in step

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	161718192728
61 35 ... Notes on ESD protection (Electro Static Discharge)	161718192728
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting battery earth lead	570
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570

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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
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61 20 900 Disconnecting and connecting battery earth lead	570
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	570
61 20 900 Disconnecting and connecting battery earth lead	570
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61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting battery earth lead	570
61 20 900 Disconnecting and connecting battery earth lead	570
00 02 001 Raising the vehicle using a vehicle lift	3046
11 65 020 Turbocharger damage due to blocked oil supply lines	

cardiagn.com

11 42 245 Removing and installing/sealing or replacing the oil return line for low pressure exhaust turbocharger

WARNING

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

Danger! Life-threatening injuries!

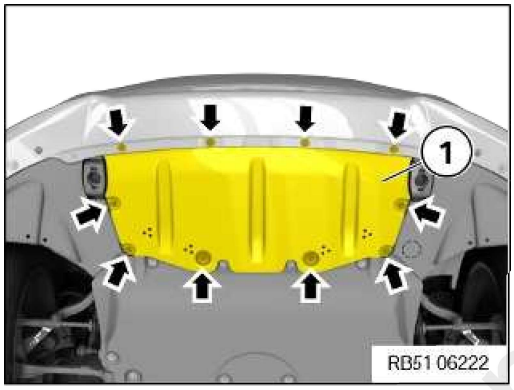
- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raise the vehicle using a vehicle lift.

TECHNICAL INFORMATION

Driving without stiffening plate is not permissible.

PRELIMINARY WORK

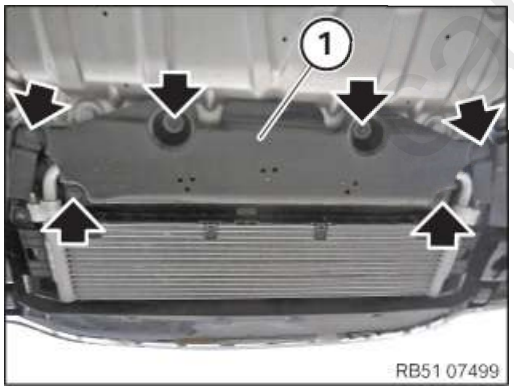
1 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

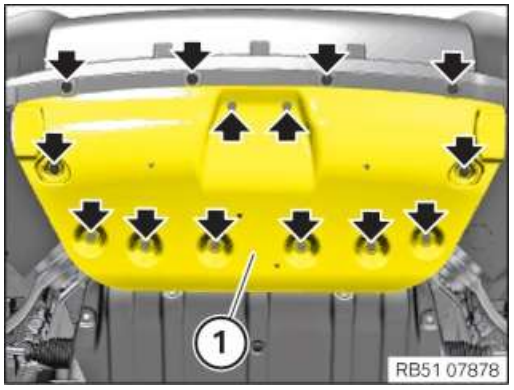
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

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

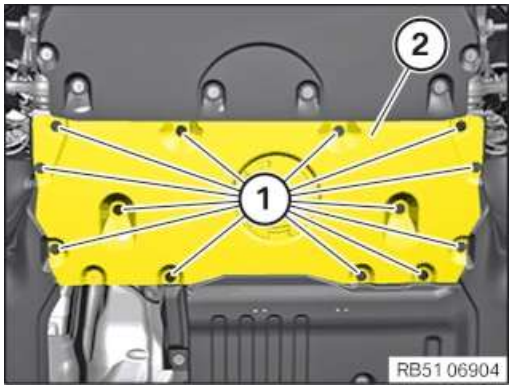


- **Version C:**

  Remove screws (arrows).

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

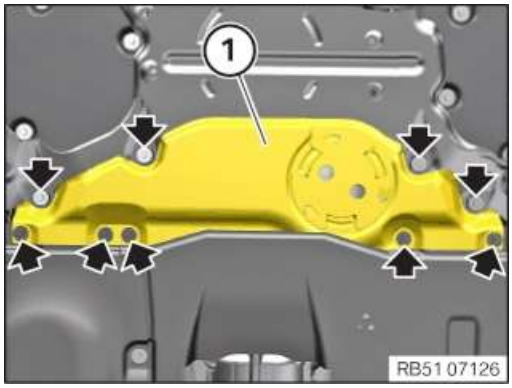
2 – Removing the centre underbody protection



- **Variant with rear wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

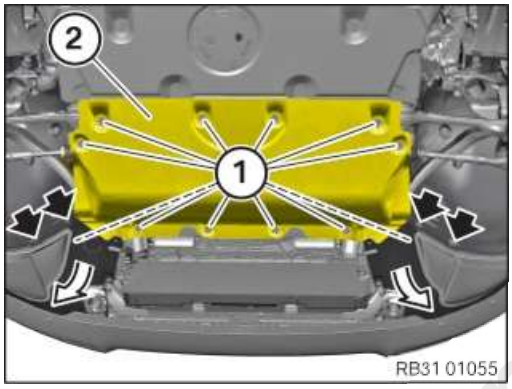


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

3 – Remove the underbody protection of the steering gear



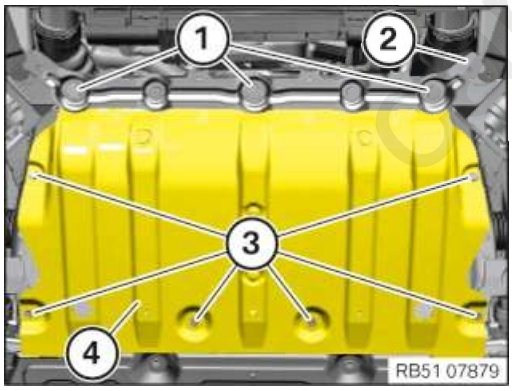
- **Version A:**

  Unscrew the screws (arrows) of the wheel arch cover on the wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove the underbody protection (2) of the steering gear.



- **Version B:**

  Loosen screws (1).

  Remove the holder (2) for the underride protection.

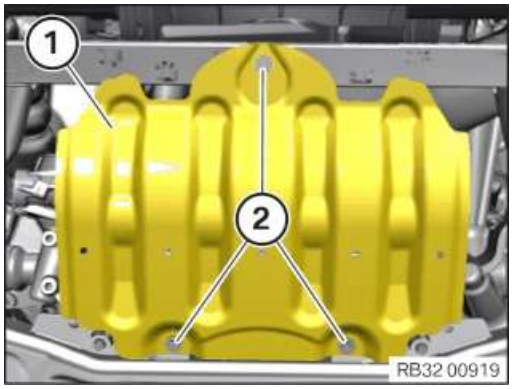
  Loosen screws (3).

  Feed out and remove the underbody protection (4) of the steering gear.

4 – If installed: Removing the steering underbody protection

Prerequisite

Front underbody protection has been removed.



- Loosen screws (2).
- Remove underbody protection (1).

5 – Remove front right wheel

▸ **Removing the wheel**



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

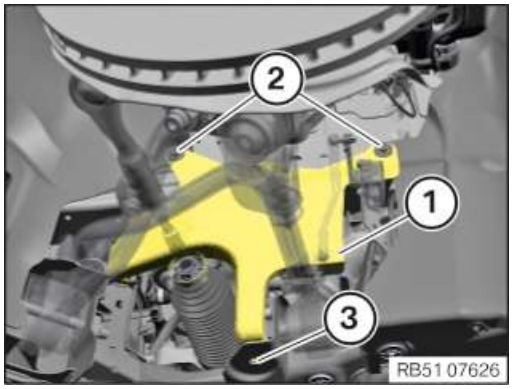
  This process is intended to prevent damage to the brake disc.



- If several wheels are removed at the same time: 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 the correct adapter from the set of special tools .

6 – Remove the cover of the steering assembly

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- Loosen screws (2) and (3).
- Remove the cover (1).

MAIN WORK

7 – Remove the oil return line for the low-pressure stage turbocharger

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

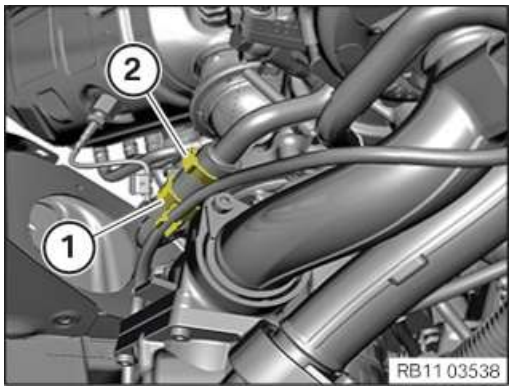
Contaminant or foreign body.

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.

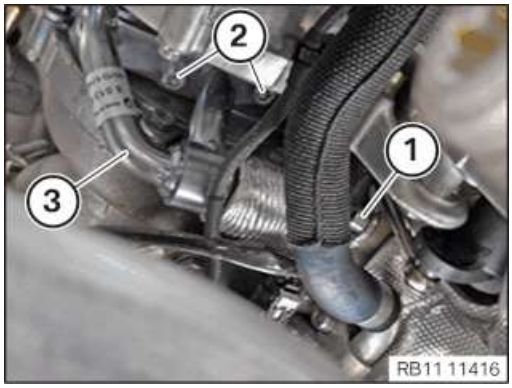


- Release cable clip (1) from the oil return line.
- Loosen clamp (2) and remove.

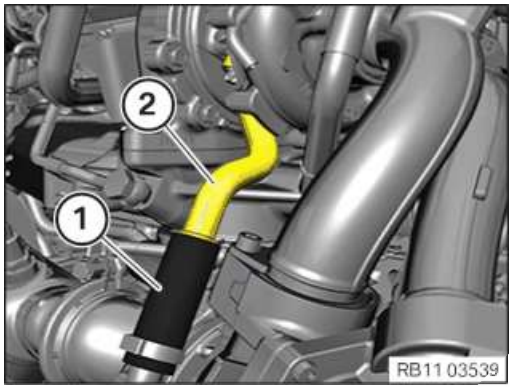
cardiagn.com



- Release the screws of the oil return line on the crankcase from the right wheel arch.



- Remove the screw (1).
- Loosen screws (2).
- Remove oil return line (3) from the crankcase.
- Catch and dispose of emerging engine oil.



- Release connecting hose (1) from return line (2).
- Remove the return line of the low-pressure stage turbocharger with connecting hose (1).

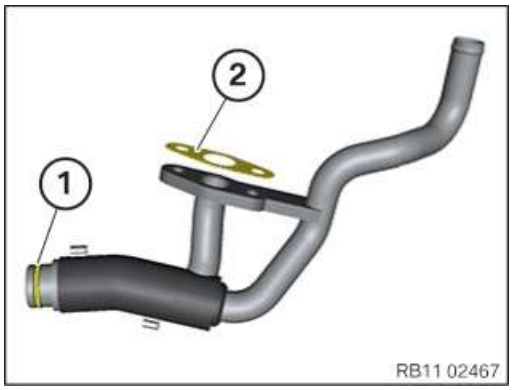
8 – Install the oil return line for the low-pressure stage turbocharger

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

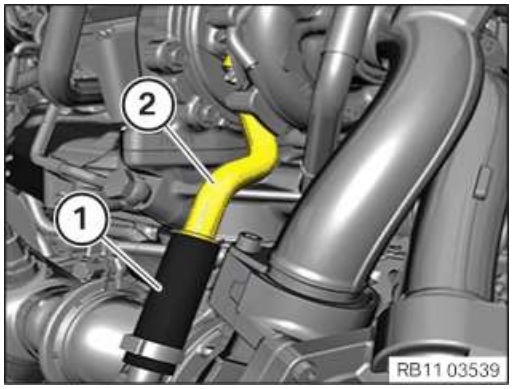
- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.



- Renew the gasket (2).

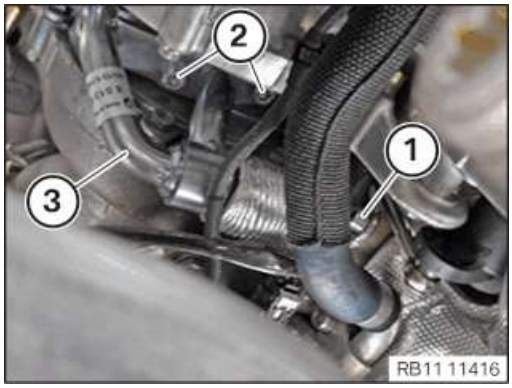
  Parts: Gasket
- Check the O-ring (1) for damage and replace the oil return line as needed.

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- Fix the new clamp on the connecting hose.

  Parts: Clamp
- Guide in return line of the low-pressure stage turbocharger with connecting hose (1).
- Connect connecting hose (1) to the return line of the high-pressure stage exhaust turbocharger.



- Install oil return line (3) into crankcase.
- Position the oil return line (3) with a new seal on the low-pressure stage turbocharger.
- Tighten down screws (2).

Oil return line to turbocharger

M6x12	Renew gasket.	Tightening torque	8 Nm

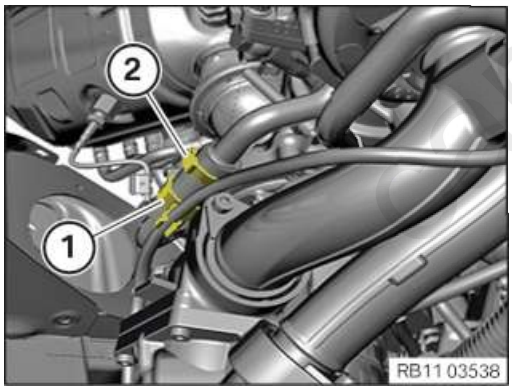
- Install the screw (1).



- Tighten the screws of the oil return line on the crankcase from the right wheel arch.

Oil return line to crankcase

M6x12	Check gasket. Renew the seal or line if necessary.	Tightening torque	8 Nm



- Position and secure the clamp (2).
- Secure cable clip (1) to the oil return line.

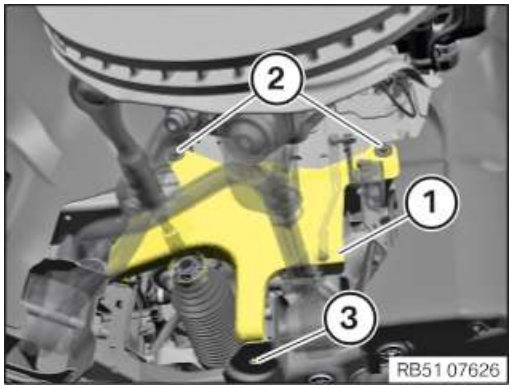
POSTPROCESSES

9 – Install the cover of the steering assembly

TECHNICAL INFORMATION

When tightening the screws, the cover can twist and cause chafe marks on the anti-roll bar (risk of corrosion).
Hold the cover while tightening the screws. Then check the position of the cover.

rdiagn.com



- Position the cover (1).
- Tighten down screws (2) and (3).

Cover, steering unit

Screw		Tightening torque	3 Nm

10 – Installing the front right wheel

▸ **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.

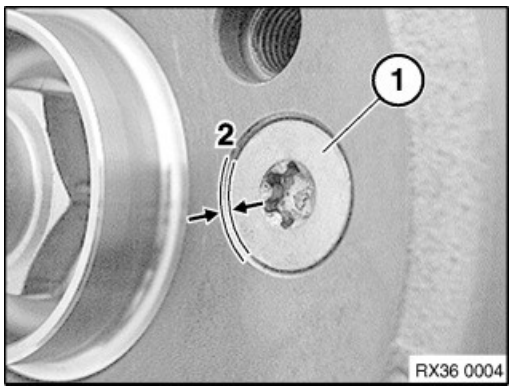
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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.



- 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.

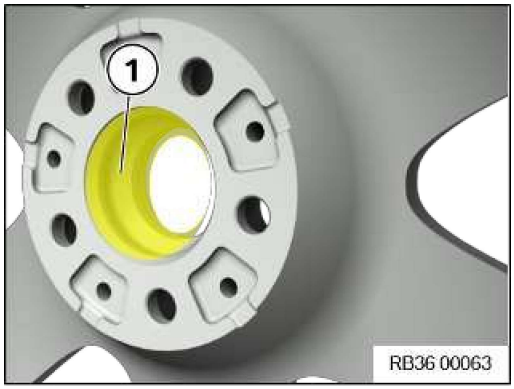
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- 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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against 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



TECHNICAL INFORMATION

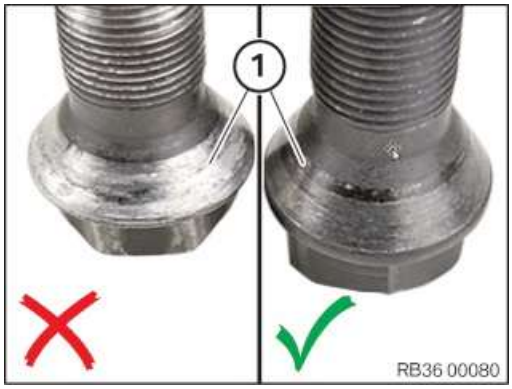
A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

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

Check

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- **Check wheel bolts for wear.**

Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts



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 the corroded wheel bolts (arrows).

  Parts: Wheel bolts

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

Wheel bolts

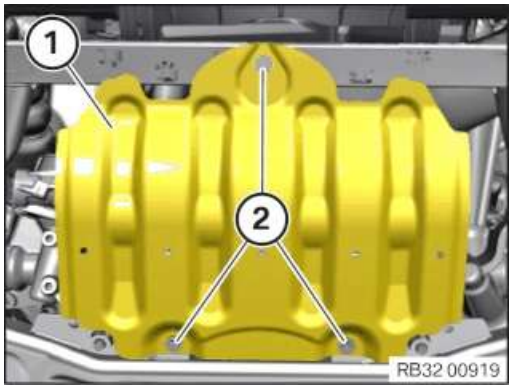
M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence.	Check	140 Nm
	Check all the wheel bolts in the same order or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

11 – If installed: Install underbody protection of the steering

Prerequisite

Front underbody protection has been removed.

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- Position underbody protection (1).
- Tighten the screws (2).

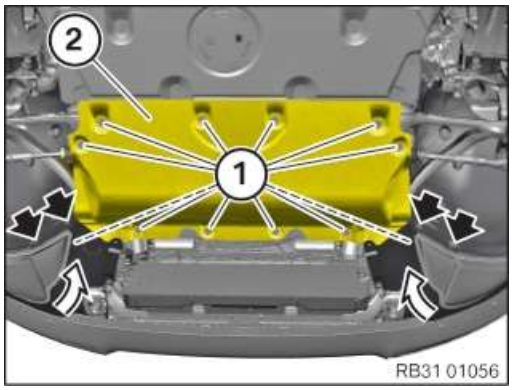
Underbody protection, steering, to front axle support

Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support

Hexagon bolt M6		Tightening torque	8 Nm

12 – Install the underbody protection of the steering gear



- **Version A:**

  Position the underbody protection (2) of the steering gear.

  Tighten the screws (1).

Underbody protection of the steering gear

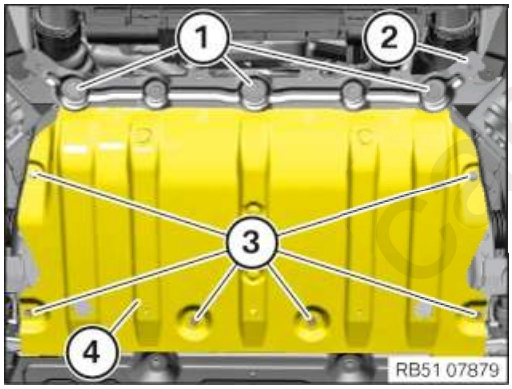
Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.

  Tighten the screws (arrows) of the lower wheel arch cover on the wheel arch cover.

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm



- **Version B:**

  Feed in the underbody protection (4) of steering gear and install it.

  Tighten the screws (3).

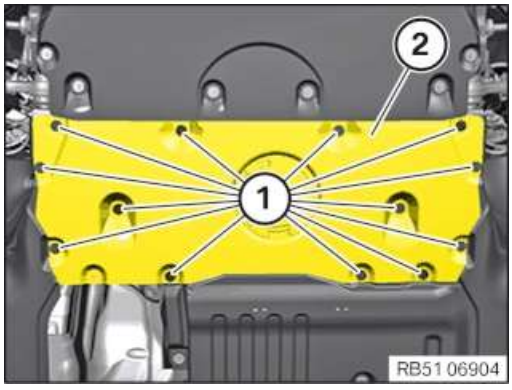
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

- Position the holder (2) for the underride protection.

  Tighten the screws (1).

13 – Installing the centre underbody protection



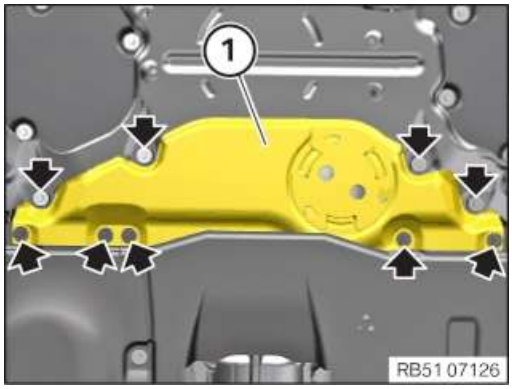
- **Variant with rear wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

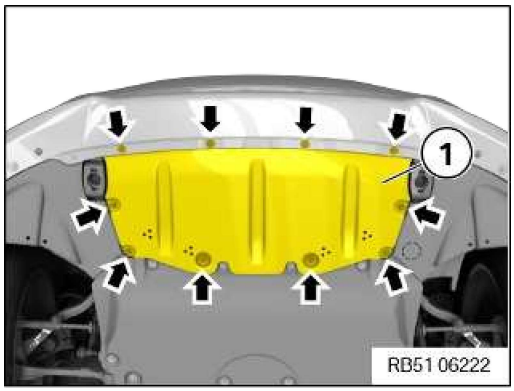
  Guide in centre underbody protection (1) and install.

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

14 – Installing the front underbody protection



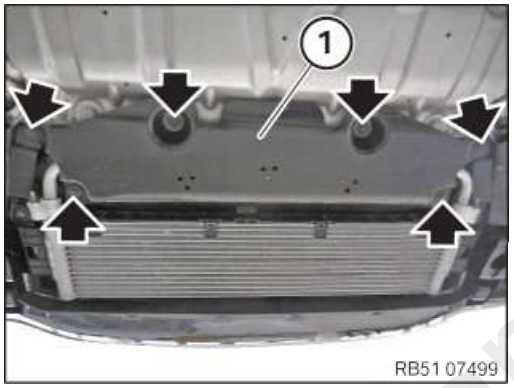
- **Version A:**

  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



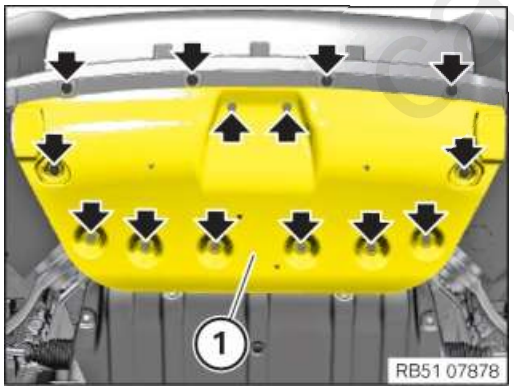
- **Version B:**

  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 C:**

  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

15 – Check engine oil level

Prerequisite

Vehicle is in a horizontal position.

TECHNICAL INFORMATION

Please comply with instructions in Owner's Handbook.

- Carry out an electronic oil measurement.
- Top up engine oil if necessary.

▶ **Check engine oil level**

TECHNICAL INFORMATION

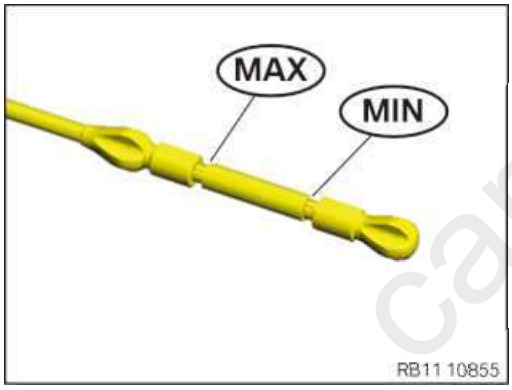
Always check the engine oil level when the engine is at operating temperature (engine oil temperature > 70°C).

- Park vehicle on a horizontal surface.
- Stop the engine and wait for 5 minutes.
- Pull out the oil dipstick and wipe off using a lint-free cloth.

TECHNICAL INFORMATION

Do not pull out or insert the oil dipstick into the guide tube too quickly or slowly.

- Push the oil dipstick into the guide tube up to the limit position and pull it out again.



TECHNICAL INFORMATION

The engine oil level must be between the minimum mark and the maximum mark of the oil dipstick.

- Read the engine oil level on the oil dipstick.
- Top up engine oil if necessary.

Oil quantity between the two markings MIN and MAX of the oil dipstick

1.0 l

Additional Information

Overview of Tightening Torques

Oil return line to turbocharger — Used in step 8

M6x12	Renew gasket.	Tightening torque	8 Nm

Oil return line to crankcase — Used in step 8

M6x12	Check gasket. Renew the seal or line if necessary.	Tightening torque	8 Nm

Cover, steering unit — Used in step 9

Screw		Tightening torque	3 Nm

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Brake disc to front wheel hub — Used in step 10

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 10

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 10

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

Underbody protection, steering, to front axle support — Used in step 11

Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support — Used in step 11

Hexagon bolt M6		Tightening torque	8 Nm

Underbody protection of the steering gear — Used in step 12

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

Wheel arch trim panel, front — Used in step 12

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Underbody protection — Used in step 13

Hexagon screw		Tightening torque	3 Nm

Underbody protection front — Used in step 14

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

Overview of Special Tools

2 344 011 Tool



Common — Used in step 10

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)

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Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common	Used in step 5
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	

0 495 224 (36 1 326) Wheel stud



Common	Used in step 5
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 5
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 5
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	

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0 495 227 (36 1 329) Wheel stud



Common	Used in step 5
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	

0 495 228 (36 1 331) Wheel stud



Common	Used in step 5
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 5
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 5
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	

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Overview Technical Data

Oil quantity between the two markings MIN and MAX of the oil dipstick	Used in step 15
	1.0 l

Links

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	510

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11 42 827 Replace control valve of central piston cooling

PRELIMINARY WORK

1 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

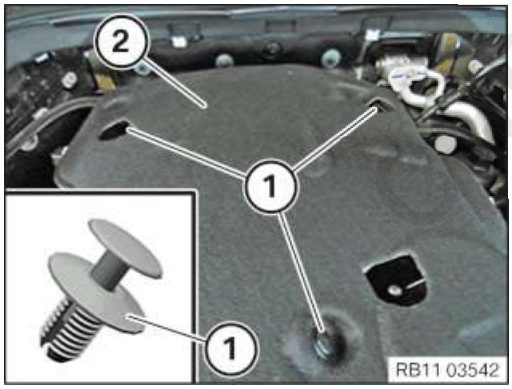
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

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



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

2 – Remove the acoustic cover for the injectors



- **If installed:** Release the expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

3 – Removing the clean air pipe with the resonator

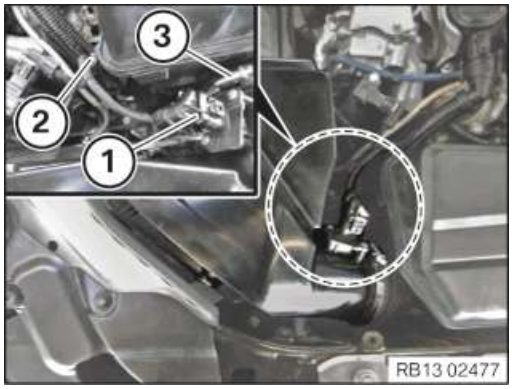
WARNING

Hot surfaces.

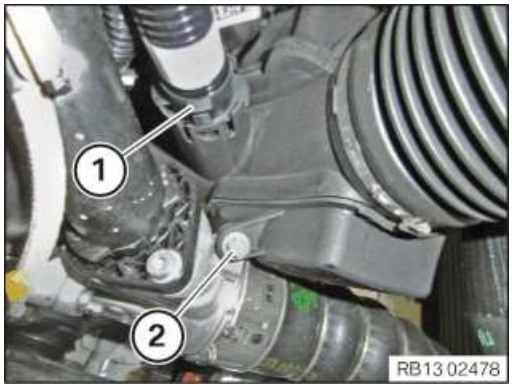
Risk of burning!

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

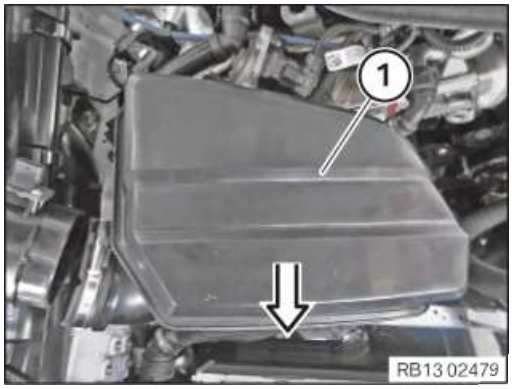
mdiagn.com



- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

4 – Remove acoustic cover of the front engine

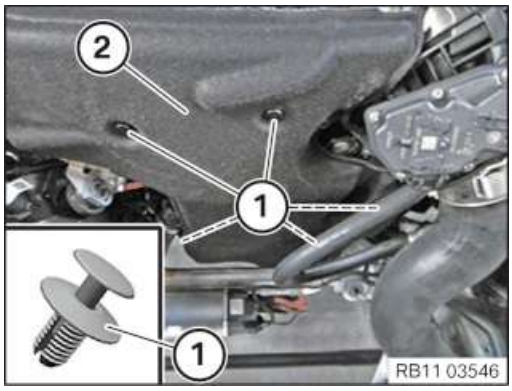
rdiagn.com

WARNING

Hot surfaces.

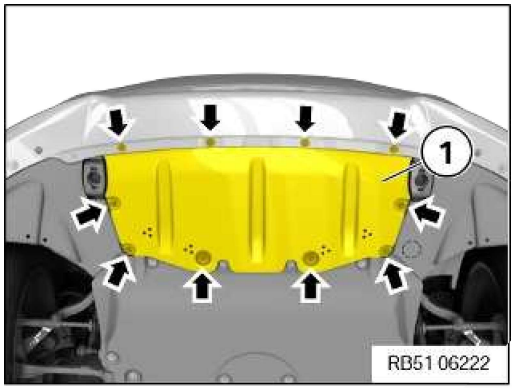
Risk of burning!

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



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

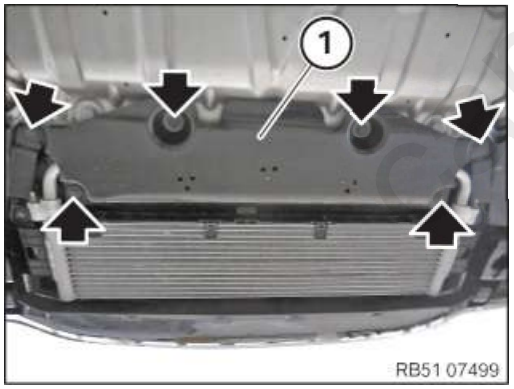
5 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

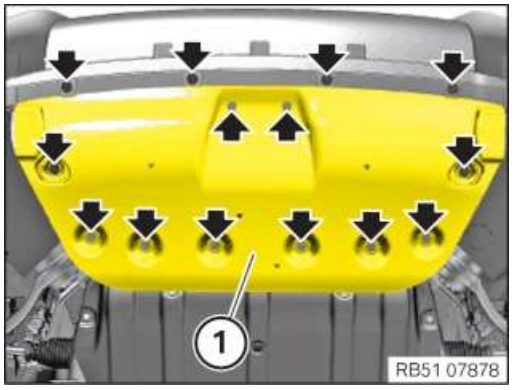
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

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

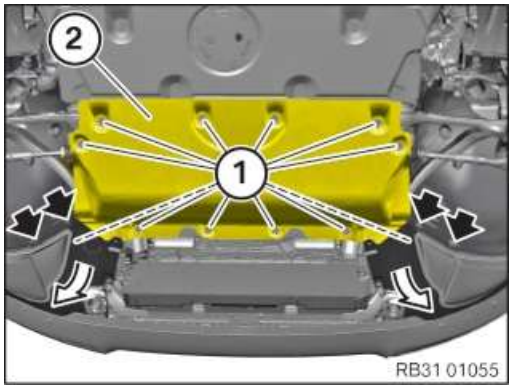


- **Version C:**

  Remove screws (arrows).

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

6 – Remove the underbody protection of the steering gear



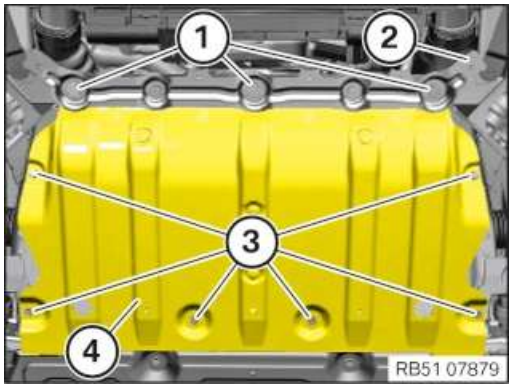
- **Version A:**

  Unscrew the screws (arrows) of the wheel arch cover on the wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove the underbody protection (2) of the steering gear.



- **Version B:**

  Loosen screws (1).

  Remove the holder (2) for the underride protection.

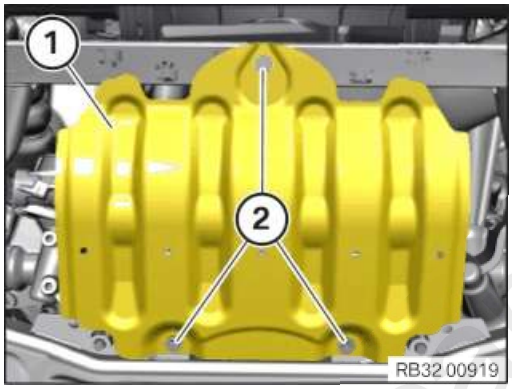
  Loosen screws (3).

  Feed out and remove the underbody protection (4) of the steering gear.

7 – If installed: Removing the steering underbody protection

Prerequisite

Front underbody protection has been removed.



- Loosen screws (2).
- Remove underbody protection (1).

8 – 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.

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TECHNICAL INFORMATION

Life-long fill of coolant!

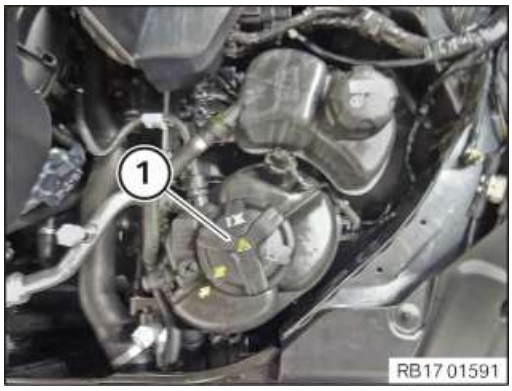
Do not reuse used coolant.

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

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

TECHNICAL INFORMATION

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



- Loosen sealing cap (1).

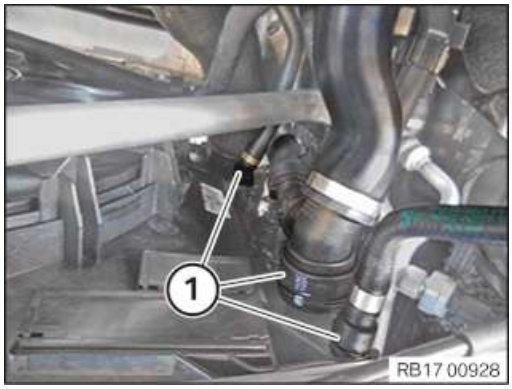
▸ **Avoiding damage to the starter generator due to escaping coolant**

RISK OF DAMAGE

Escaping coolant on the starter generator.

Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Unlock all coolant lines (1) and detach.
- Catch and dispose of escaping coolant.

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

9 – Removing the exhaust-gas recirculation cooler

▸ **Avoiding damage to the starter generator due to escaping coolant**

RISK OF DAMAGE

Escaping coolant on the starter generator.

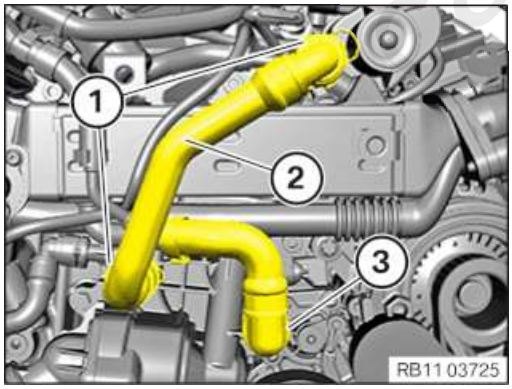
Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.



- **Version A:**

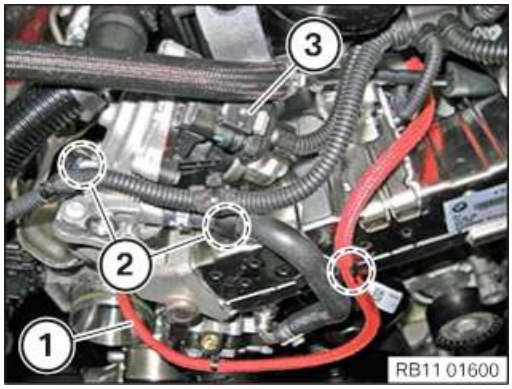
  Unlock and pull off coolant lines (1).



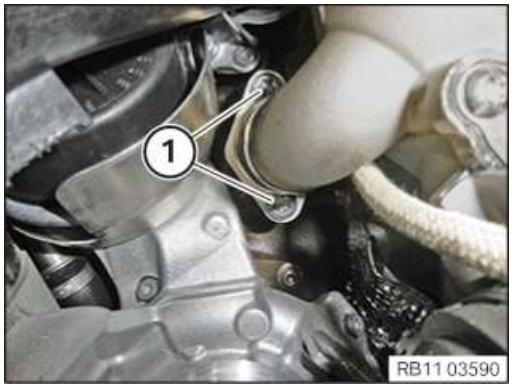
- **Version B:**

  Unlock locks (1) and remove thee coolant line (2).

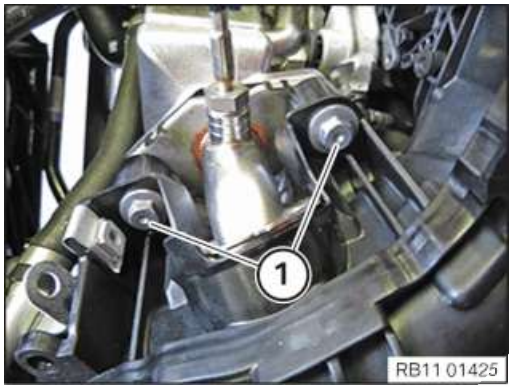
  Unlock coolant line (3) and pull it off the thermostat.



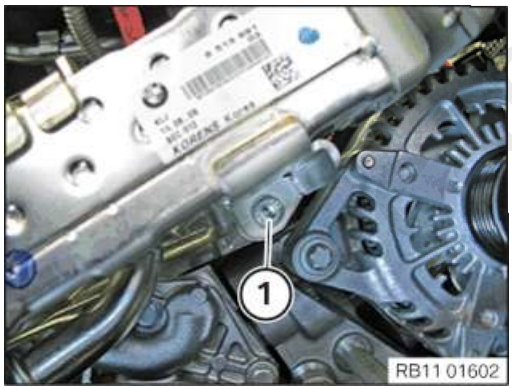
- Loosen the vacuum line (1) from the exhaust-gas recirculation cooler and detach in the highlighted area.
- Loosen the vehicle wiring harness from the exhaust-gas recirculation valve and the coolant line at the clips (2).
- Unlock and disconnect the connector (3) at the exhaust-gas recirculation valve.



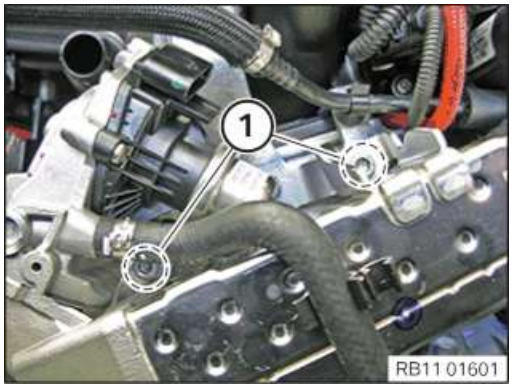
- Release the bolts (1) from the exhaust-gas recirculation cooler.



- Loosen the screws (1) on the intake system.



- Loosen the screw (1) below the exhaust-gas recirculation cooler.



- Loosen screws (1).
- Remove exhaust-gas recirculation cooler.

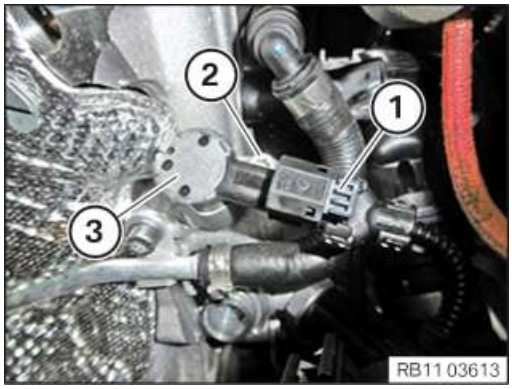
mdiagn.com

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.



- Unlock and disconnect plug connections (1).
- Loosen screw (2).

TECHNICAL INFORMATION

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

- Remove the control valve (3) for central piston cooling.

11 – Installing the control valve for central piston cooling

NOTICE

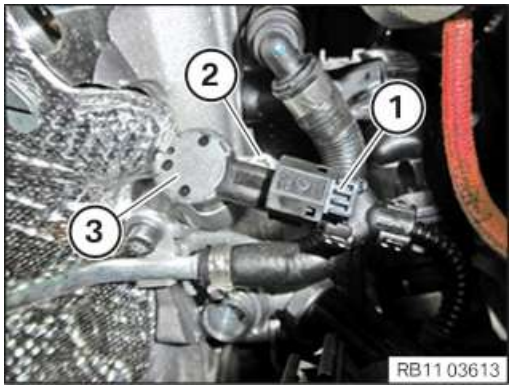
Schematic diagram is for example purposes. Some parts may differ in certain details.



- Renew the control valve for central piston cooling.

  Parts: Control valve for central piston cooling
- Lightly oil sealing ring (1).

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- Clean sealing surface.

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.

- Install the control valve (3) for central piston cooling.
- Tighten down screw (2).

Central piston cooling valve to crankcase

M6x16		Tightening torque	8 Nm

- Connect the connector (1) and audibly lock it.

POSTPROCESSES

12 – Installing the exhaust-gas recirculation cooler

▸ **Avoiding damage to the starter generator due to escaping coolant**

RISK OF DAMAGE

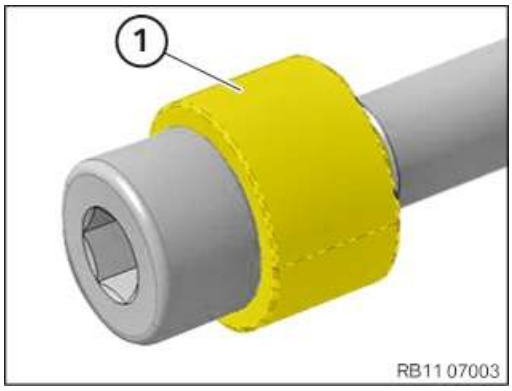
Escaping coolant on the starter generator.

Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.

▸ **Installing the exhaust-gas recirculation cooler**

Check



- Check whether the screws **with 10mm** sleeves (1) are available.

Result

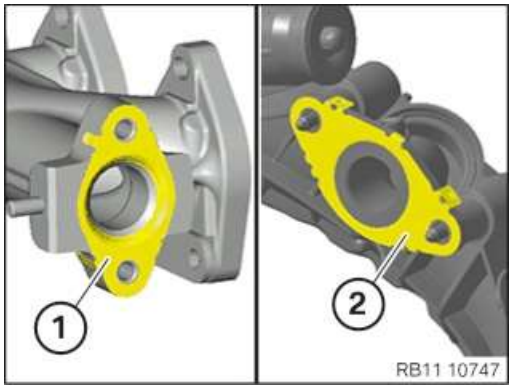
» Screws **without** sleeves (1) are available.

Measure

- Renew screws.

  Parts: Screws (part number 9 886 429)

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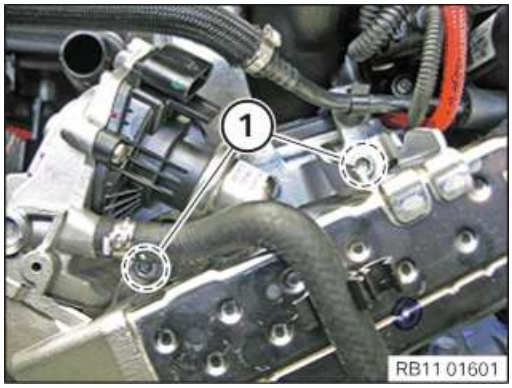


- Renew the seal (1) between the exhaust manifold and the exhaust-gas recirculation cooler.

  Parts: Gasket

- Renew the seal (2) between exhaust-gas recirculation cooler and intake air plenum.

  Parts: Gasket



TECHNICAL INFORMATION

When assembling, it is essential to observe screwing sequences and tightening torques.

Non-observance of these requirements may result in leaks and damage.

- Tighten the screws (1) and subsequently release them again.

Exhaust-gas recirculation cooler to cylinder head

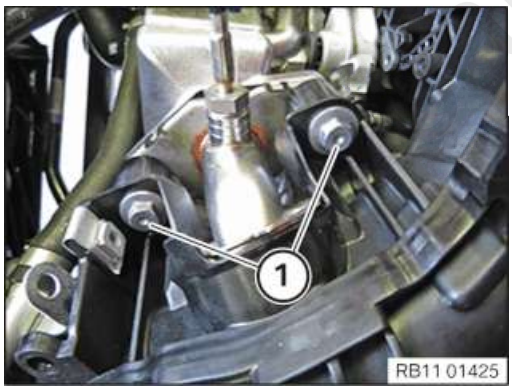
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °



- Tighten the screw (1) under the exhaust-gas recirculation cooler and then release again.

Exhaust-gas recirculation cooler to cylinder head

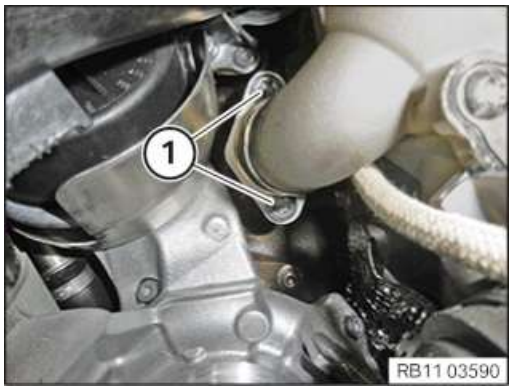
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °



- Tighten the screws (1).

Exhaust-gas recirculation cooler to intake plenum

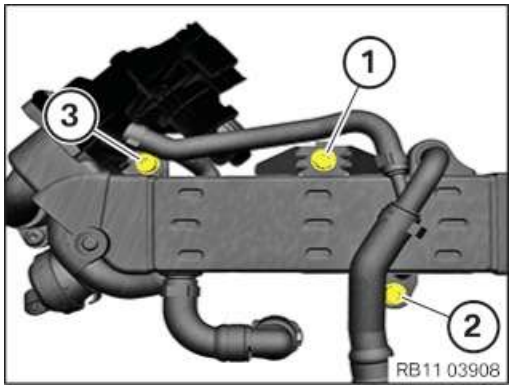
		Tightening torque	10 Nm



- Tighten the screws (1).

Exhaust-gas recirculation cooler to exhaust manifold

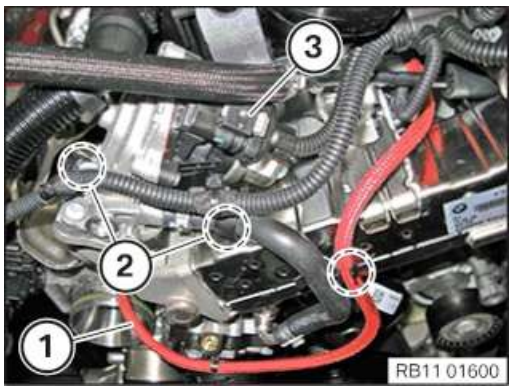
M8x28	Replace screws	Tightening torque	32 Nm



- Tighten screws in the order (1) to (3).

Exhaust-gas recirculation cooler to cylinder head

M8x20 / M8x28		Tightening torque	19 Nm



- Connect the connector (3) to the exhaust-gas recirculation valve.
- Attach the vehicle wiring harness to the clips (2) at the exhaust-gas recirculation valve and at the coolant line.
- Connect the vacuum line (1) to the exhaust-gas recirculation cooler and attach in the highlighted area.

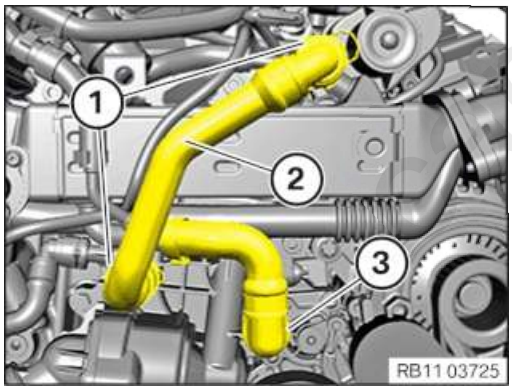


TECHNICAL INFORMATION

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

- **Version A:**

  Connect and audibly lock coolant lines (1).



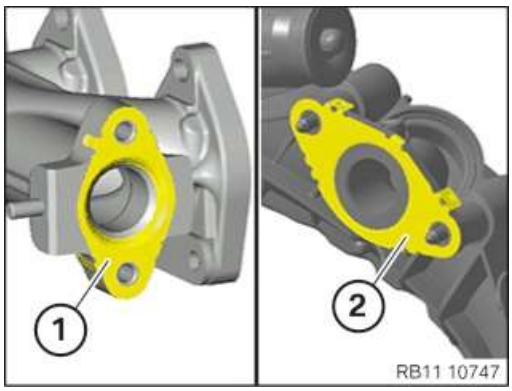
TECHNICAL INFORMATION

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

- **Version B:**

  Connect and audibly lock coolant lines (3).
- Install the coolant line (2).
- Audibly lock the locks (1).

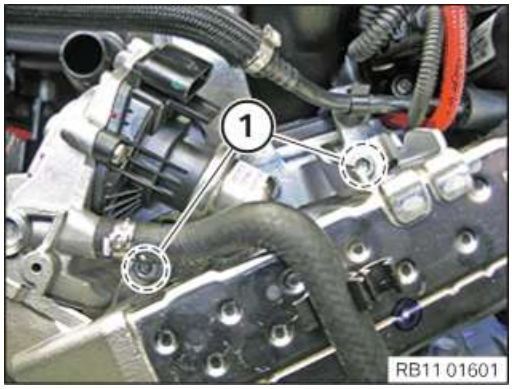
▸ Installing the exhaust-gas recirculation cooler



- Renew the seal (1) between the exhaust manifold and the exhaust-gas recirculation cooler.

  Parts: Gasket
- Renew the seal (2) between exhaust-gas recirculation cooler and intake air plenum.

  Parts: Gasket



TECHNICAL INFORMATION

When assembling, it is essential to observe screwing sequences and tightening torques.

Non-observance of these requirements may result in leaks and damage.

- Install the exhaust-gas recirculation cooler and fasten with screws (1).
- Tighten the screws (1) and subsequently release them again.

Exhaust-gas recirculation cooler to cylinder head

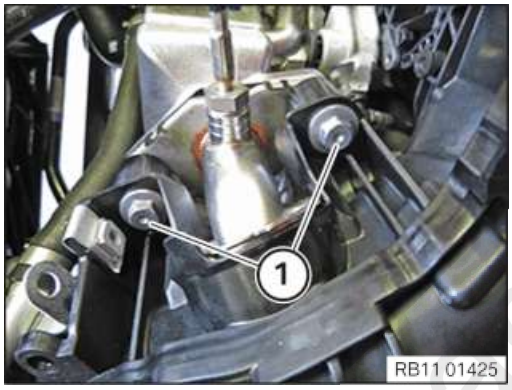
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °



- Tighten the screw (1) under the exhaust-gas recirculation cooler and then release again.

Exhaust-gas recirculation cooler to cylinder head

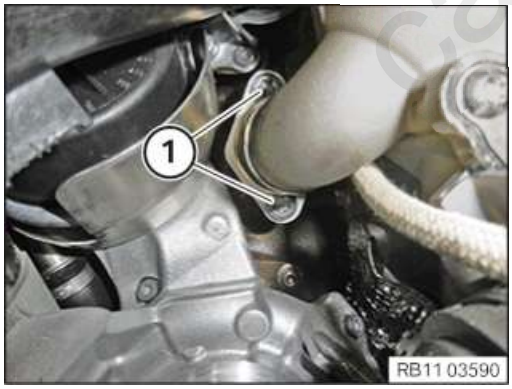
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °



- Tighten the screws (1).

Exhaust-gas recirculation cooler to intake plenum

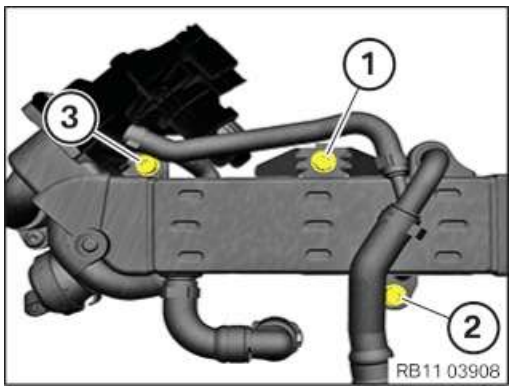
		Tightening torque	10 Nm



- Tighten the screws (1).

Exhaust-gas recirculation cooler to exhaust manifold

M8x28	Replace screws	Tightening torque	32 Nm

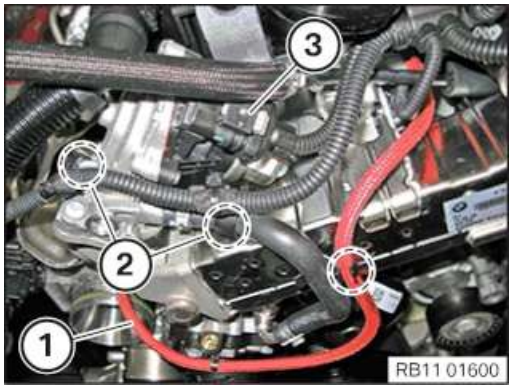


- Tighten screws in the order (1) to (3).

Exhaust-gas recirculation cooler to cylinder head

M8x20 / M8x28		Tightening torque	19 Nm

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- Connect the connector (3) to the exhaust-gas recirculation valve.
- Attach the vehicle wiring harness to the clips (2) at the exhaust-gas recirculation valve and at the coolant line.
- Connect the vacuum line (1) to the exhaust-gas recirculation cooler and attach in the highlighted area.

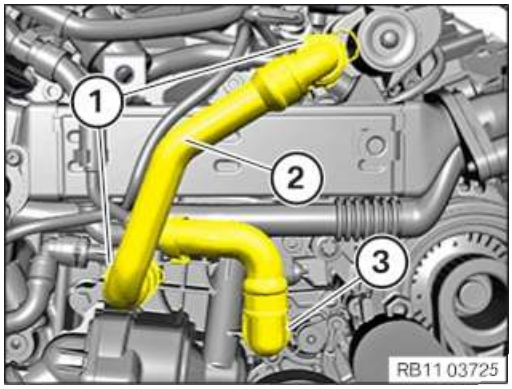


TECHNICAL INFORMATION

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

- **Version A:**

  Connect and audibly lock coolant lines (1).



TECHNICAL INFORMATION

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

- **Version B:**

  Connect and audibly lock coolant lines (3).

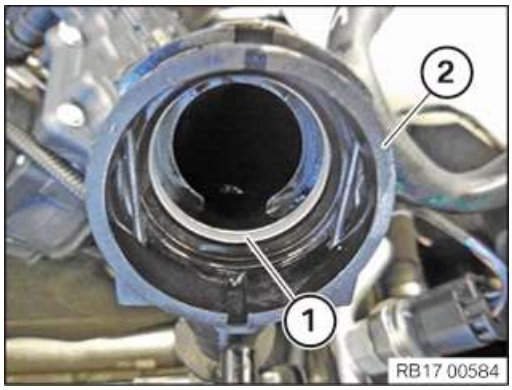
  Install the coolant line (2).

  Audibly lock the locks (1).

13 – Connecting the coolant lines

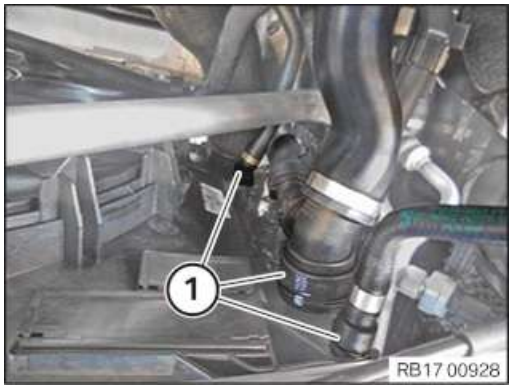
TECHNICAL INFORMATION

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



- Check the sealing ring (1) of the coolant line (2) for damage and renew where required.

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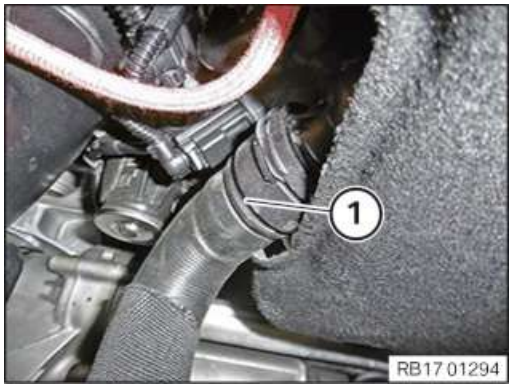


NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Connect and lock the coolant lines (1).

  The coolant lines (1) must engage audibly.



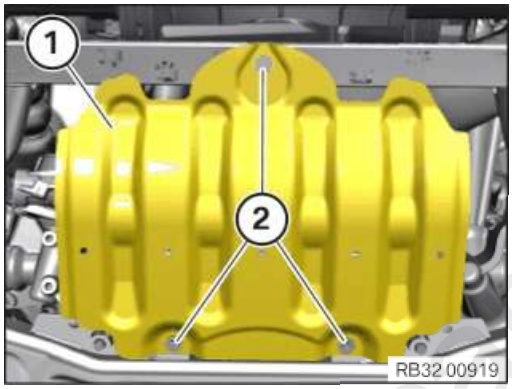
- Connect and lock coolant line (1).

  The coolant line (1) must audibly engage.

14 – If installed: Install underbody protection of the steering

Prerequisite

Front underbody protection has been removed.



- Position underbody protection (1).
- Tighten the screws (2).

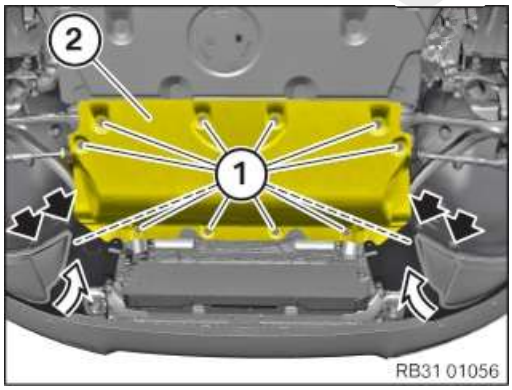
Underbody protection, steering, to front axle support

Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support

Hexagon bolt M6		Tightening torque	8 Nm

15 – Install the underbody protection of the steering gear



- **Version A:**

  Position the underbody protection (2) of the steering gear.

  Tighten the screws (1).

Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

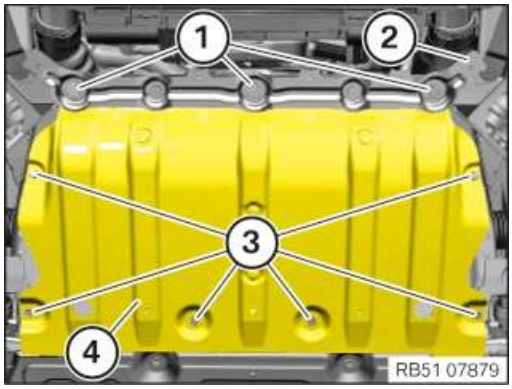
- Position the bottom wheel arch cover.

  Tighten the screws (arrows) of the lower wheel arch cover on the wheel arch cover.

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

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- **Version B:**

  Feed in the underbody protection (4) of steering gear and install it.

  Tighten the screws (3).

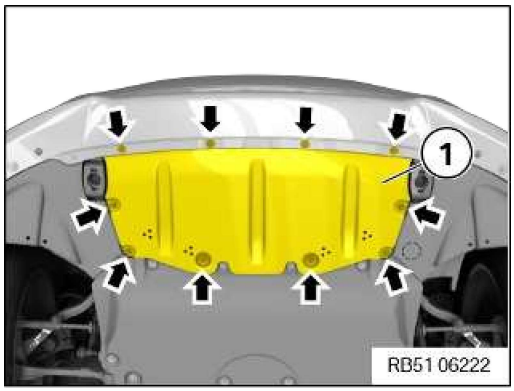
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

- Position the holder (2) for the underride protection.

  Tighten the screws (1).

16 – Installing the front underbody protection



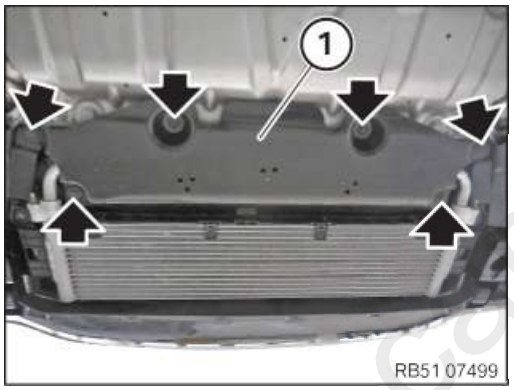
- **Version A:**

  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



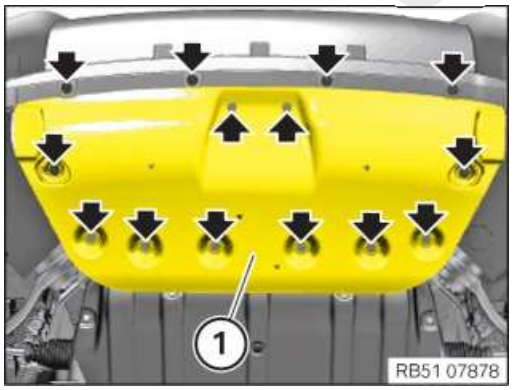
- **Version B:**

  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 C:**

  Feed in and install front underbody protection (1).

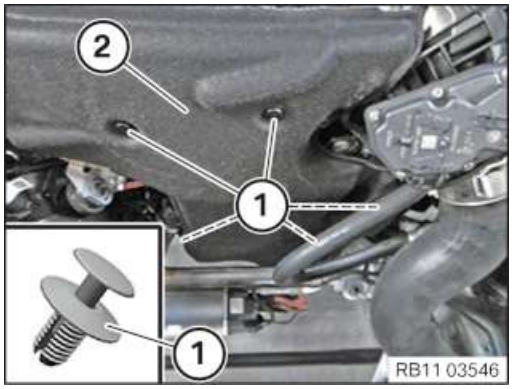
  Tighten screws (arrows).

Underbody protection front

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

17 – Install acoustic cover for the engine, front

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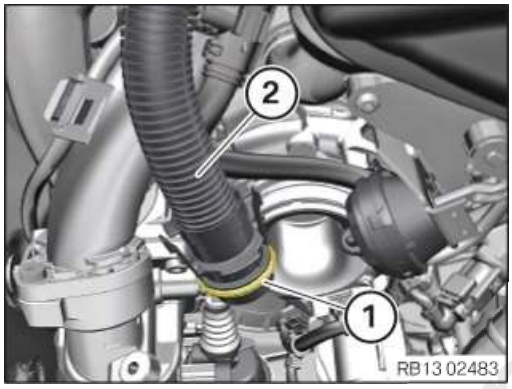


- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

18 – Installing the clean air pipe with resonator



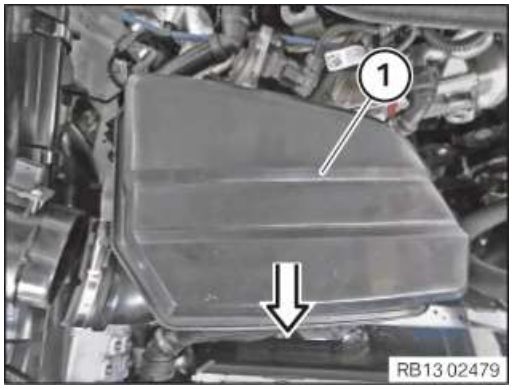
- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.



- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.



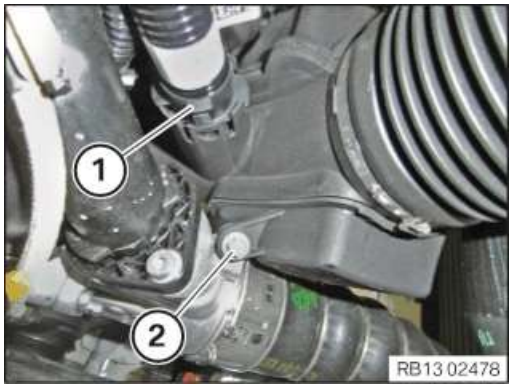
- Press and hold clean air pipe with resonator (1) in the direction of the arrow.

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- Attach and lock the clamp (1).

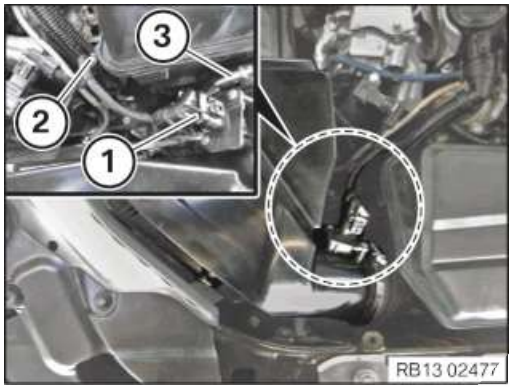
  The clamp (1) must engage audibly.



- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

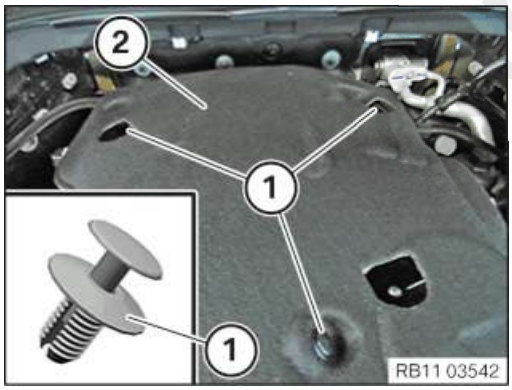
Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

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

  The connector (1) must engage audibly.

19 – Install the acoustic cover for the injectors



- Feed the acoustic cover (2) in and install.
- **If installed:** Secure the acoustic cover (2) with the expanding rivets (1) .

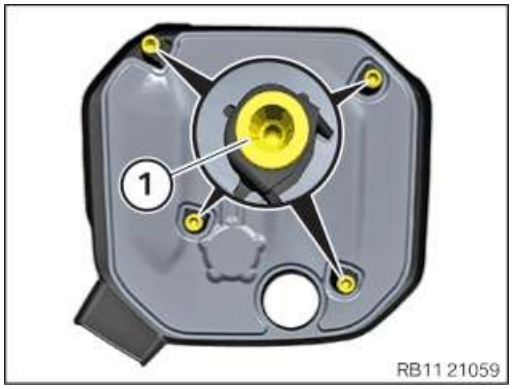
20 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

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

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



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

21 – Filling and bleed the high-temperature coolant circuit



TECHNICAL INFORMATION

It is **mandatory** to fill the cooling system before bleeding.
Fill **both** the circuits for high and low-temperature coolant circuits.

- See additional information.

Additional Information

Overview of Tightening Torques

Central piston cooling valve to crankcase Used in step 11

M6x16		Tightening torque	8 Nm

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Exhaust-gas recirculation cooler to cylinder head			Used in step 12
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °

Exhaust-gas recirculation cooler to intake plenum			Used in step 12
		Tightening torque	10 Nm

Exhaust-gas recirculation cooler to exhaust manifold			Used in step 12
M8x28	Replace screws	Tightening torque	32 Nm

Exhaust-gas recirculation cooler to cylinder head			Used in step 12
M8x20 / M8x28		Tightening torque	19 Nm

Underbody protection, steering, to front axle support			Used in step 14
Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support			Used in step 14
Hexagon bolt M6		Tightening torque	8 Nm

Underbody protection of the steering gear			Used in step 15
Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

Wheel arch trim panel, front			Used in step 15
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Underbody protection front			Used in step 16
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Clean air pipe to exhaust turbocharger			Used in step 18
M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 18
Clamp		Tightening torque	3 Nm

Links

Repair instructions	Used in step
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21

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17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
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17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleeding the cooling system (B36, B38, B46, B48)	21
17 00 039 Bleeding cooling system (B37, B47)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Filling and bleeding the high-temperature cooling system vacuum filler device (B48)	21
17 00 008 Draining and topping up the high-temperature coolant circuit	21
17 00 008 Draining and topping up the high-temperature coolant circuit	21
17 00 016 Draining and topping up coolant circuit for Range Extender \PREMIUM	21
17 00 008 Draining and topping up the high-temperature coolant circuit	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21

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17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
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17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 009 Check the cooling system for watertightness with a special tool (with a tester)	21
17 00 009 Check the cooling system for watertightness with a special tool (with a tester)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21

Parts

Parts required

Designation	Used in step
Seal of central piston cooling control valve to crankcase	11

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11 42 827 Replace control valve of central piston cooling

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 ... Notes for ESD protection (electrostatic discharge)

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.

PRELIMINARY WORK

1 – Removing the acoustic cover

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RISK OF DAMAGE

Damage to the acoustic cover/design cover.

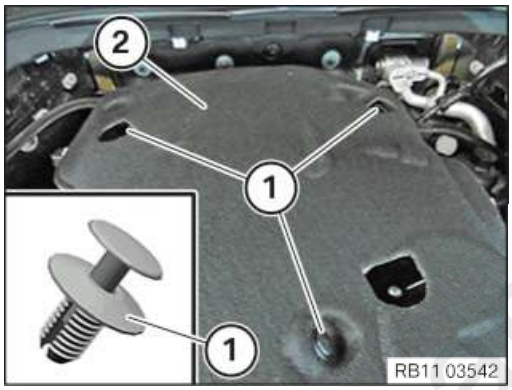
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

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



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

2 – Remove the acoustic cover for the injectors



- **If installed:** Release the expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

3 – Removing the clean air pipe with the resonator

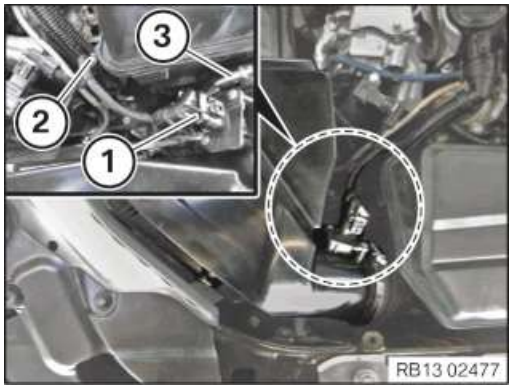
WARNING

Hot surfaces.

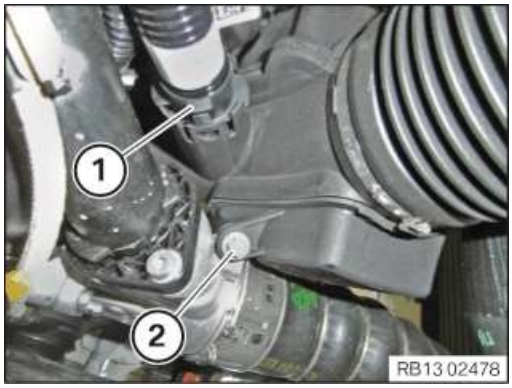
Risk of burning!

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

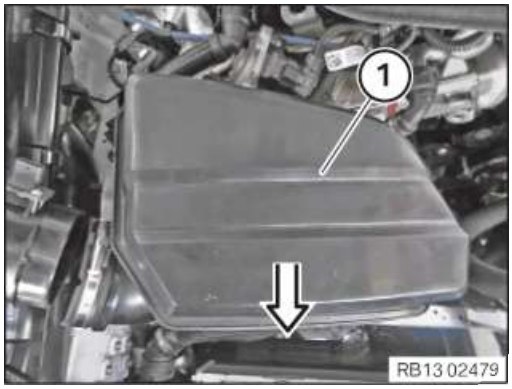
cardiagn.com



- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

4 – Remove acoustic cover of the front engine

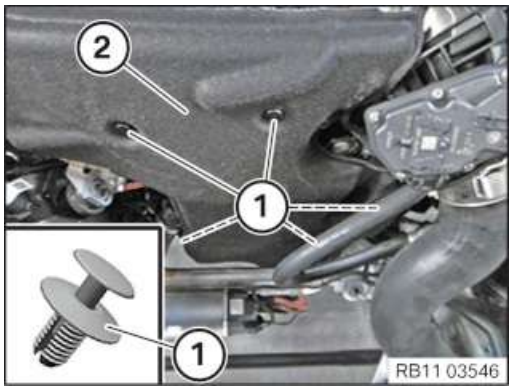
rdiagn.com

WARNING

Hot surfaces.

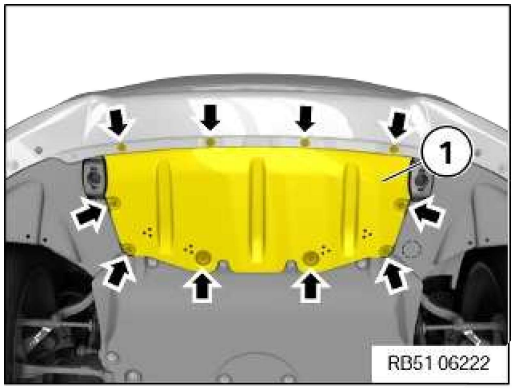
Risk of burning!

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



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

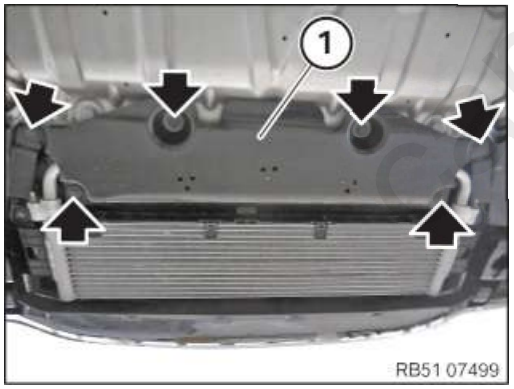
5 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

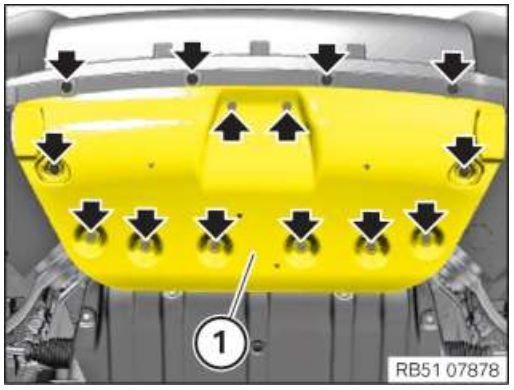
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

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

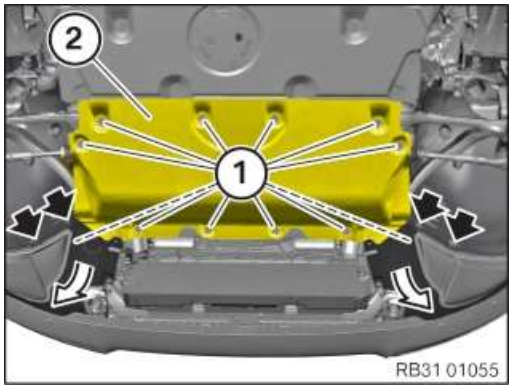


- **Version C:**

  Remove screws (arrows).

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

6 – Remove the underbody protection of the steering gear



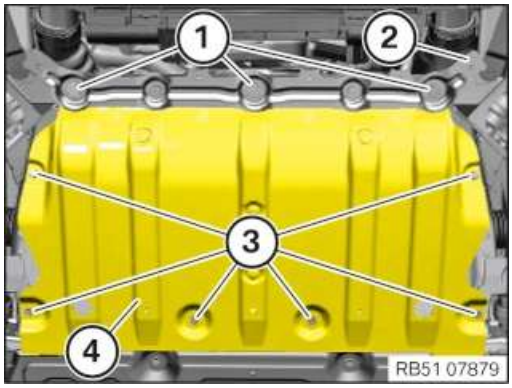
- **Version A:**

  Unscrew the screws (arrows) of the wheel arch cover on the wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove the underbody protection (2) of the steering gear.



- **Version B:**

  Loosen screws (1).

  Remove the holder (2) for the underride protection.

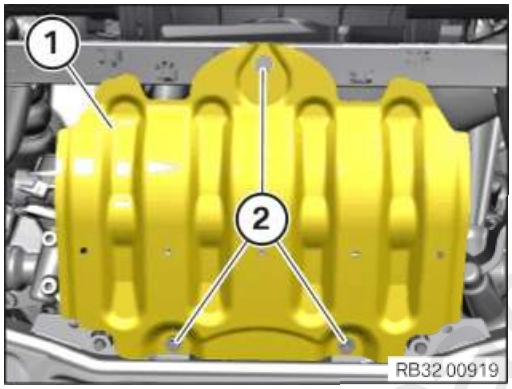
  Loosen screws (3).

  Feed out and remove the underbody protection (4) of the steering gear.

7 – If installed: Removing the steering underbody protection

Prerequisite

Front underbody protection has been removed.



- Loosen screws (2).
- Remove underbody protection (1).

8 – Draining coolant

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.

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TECHNICAL INFORMATION

Life-long fill of coolant!

Do not reuse used coolant.

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

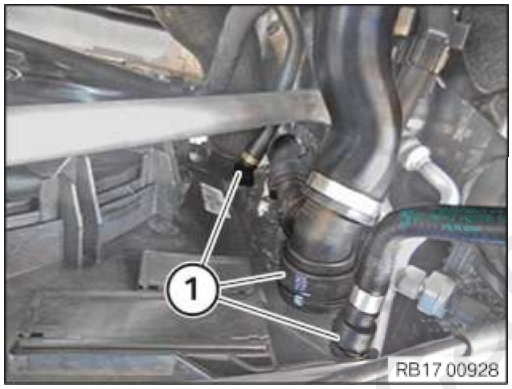
In the case of other removal work involving the draining of part quantities of coolant, the coolant level must be topped up with new coolant.

TECHNICAL INFORMATION

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



- Loosen sealing cap (1) from the coolant expansion tank.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Unlock all coolant lines (1) and detach.
- Catch and dispose of escaping coolant.



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

9 – Removing the exhaust-gas recirculation cooler

▸ **Avoiding damage to the starter generator due to escaping coolant**

RISK OF DAMAGE

Escaping coolant on the starter generator.

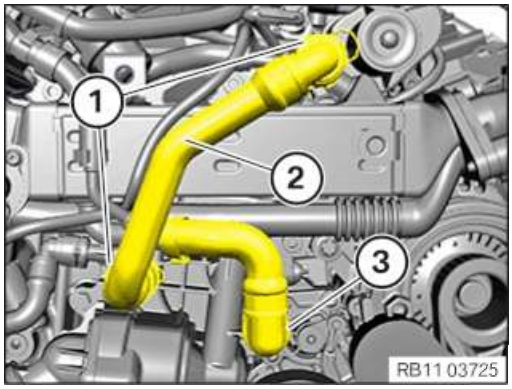
Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.



- **Version A:**

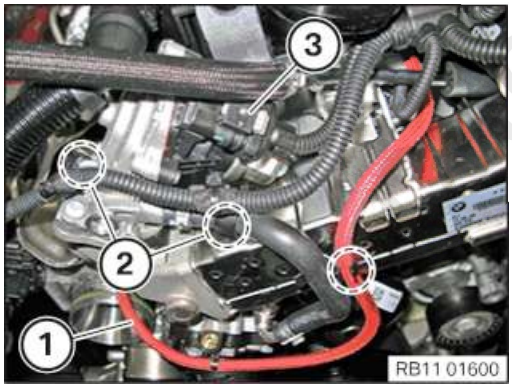
  Unlock and pull off coolant lines (1).



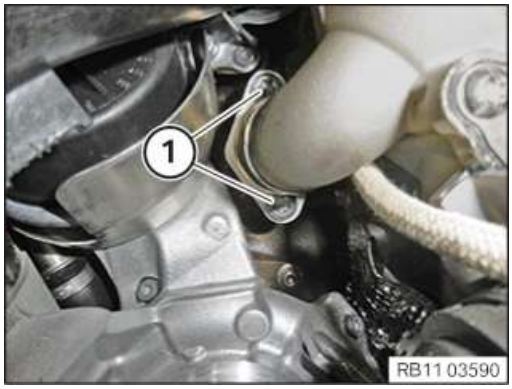
- **Version B:**

  Unlock locks (1) and remove thee coolant line (2).

  Unlock coolant line (3) and pull it off the thermostat.

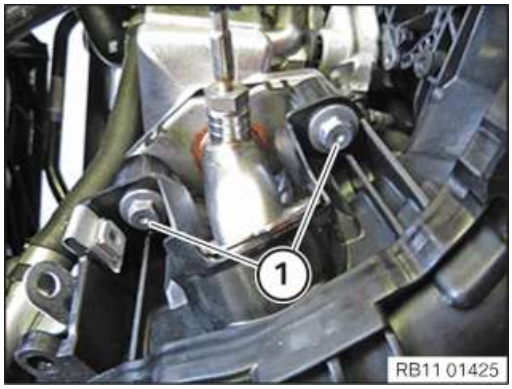


- Loosen the vacuum line (1) from the exhaust-gas recirculation cooler and detach in the highlighted area.
- Loosen the vehicle wiring harness from the exhaust-gas recirculation valve and the coolant line at the clips (2).
- Unlock and disconnect the connector (3) at the exhaust-gas recirculation valve.



- Release the bolts (1) from the exhaust-gas recirculation cooler.

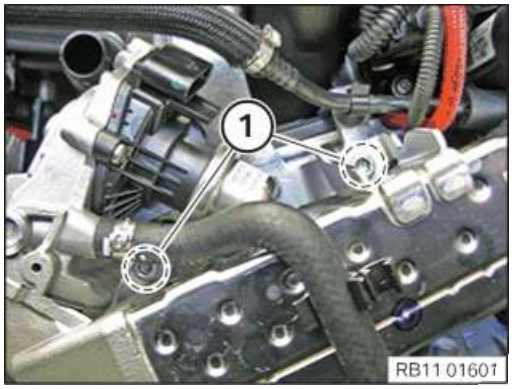
fordiagn.com



- Loosen the screws (1) on the intake system.



- Loosen the screw (1) below the exhaust-gas recirculation cooler.



- Loosen screws (1).
- Remove exhaust-gas recirculation cooler.

MAIN WORK

10 – Removing the control valve for central piston cooling

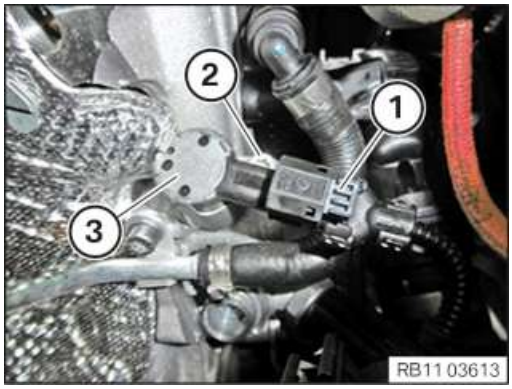
RISK OF DAMAGE

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 disconnect plug connections (1).
- Loosen screw (2).

TECHNICAL INFORMATION

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

- Remove the control valve (3) for central piston cooling.

11 – Installing the control valve for central piston cooling

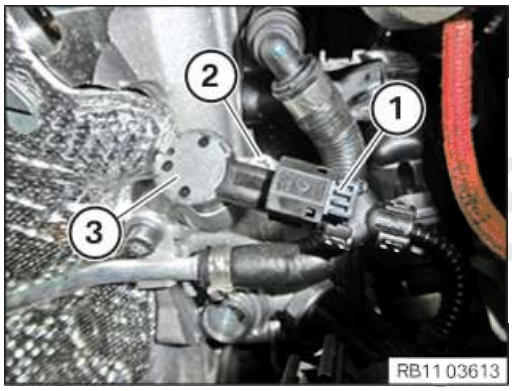
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Renew the control valve for central piston cooling.

  Parts: Control valve for central piston cooling
- Lightly oil sealing ring (1).



- Clean sealing surface.

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.

- Install the control valve (3) for central piston cooling.
- Tighten down screw (2).

Central piston cooling valve to crankcase

M6x16		Tightening torque	8 Nm

- Connect the connector (1) and audibly lock it.

POSTPROCESSES

12 – Installing the exhaust-gas recirculation cooler

▸ **Avoiding damage to the starter generator due to escaping coolant**

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RISK OF DAMAGE

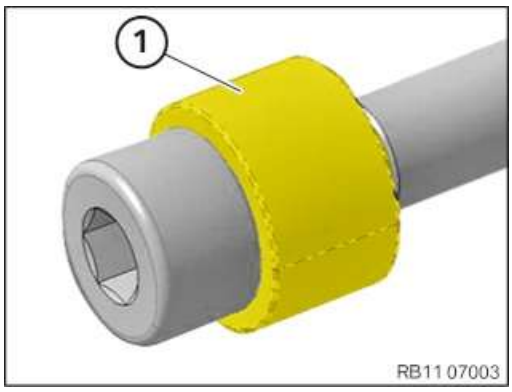
Escaping coolant on the starter generator.

Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.

▸ **Installing the exhaust-gas recirculation cooler**

Check



- Check whether the screws **with 10mm** sleeves (1) are available.

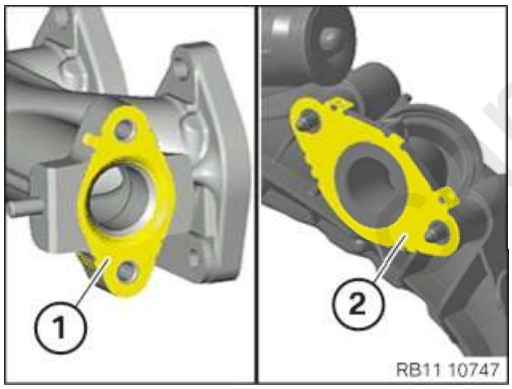
Result

» Screws **without** sleeves (1) are available.

Measure

- Renew screws.

  Parts: Screws (part number 9 886 429)

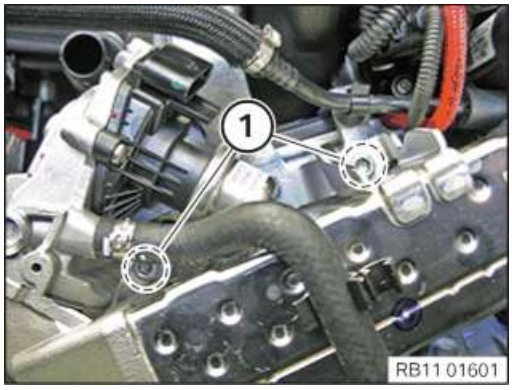


- Renew the seal (1) between the exhaust manifold and the exhaust-gas recirculation cooler.

  Parts: Gasket

- Renew the seal (2) between exhaust-gas recirculation cooler and intake air plenum.

  Parts: Gasket



TECHNICAL INFORMATION

When assembling, it is essential to observe screwing sequences and tightening torques.

Non-observance of these requirements may result in leaks and damage.

- Tighten the screws (1) and subsequently release them again.

Exhaust-gas recirculation cooler to cylinder head

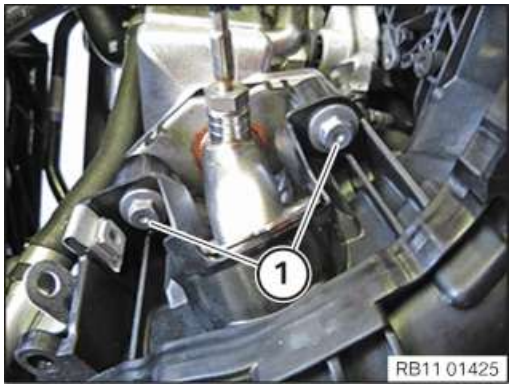
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °



- Tighten the screw (1) under the exhaust-gas recirculation cooler and then release again.

Exhaust-gas recirculation cooler to cylinder head

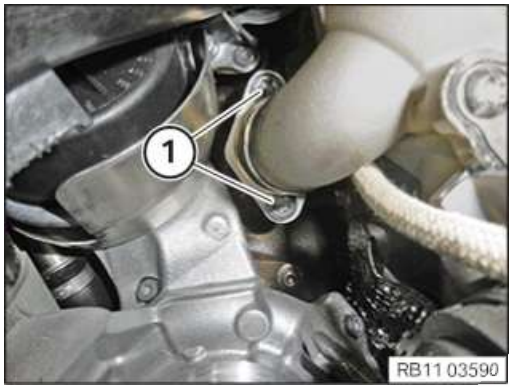
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °



- Tighten the screws (1).

Exhaust-gas recirculation cooler to intake plenum

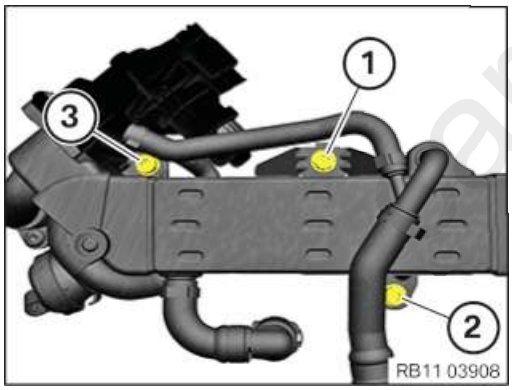
		Tightening torque	10 Nm



- Tighten the screws (1).

Exhaust-gas recirculation cooler to exhaust manifold

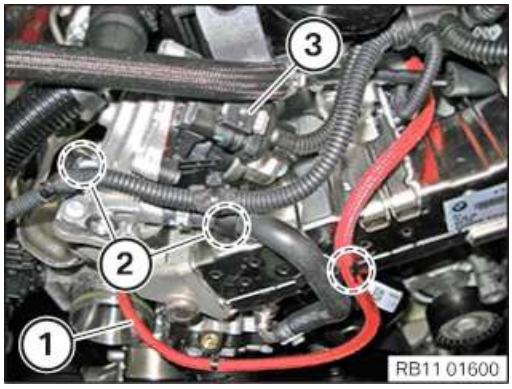
M8x28	Replace screws	Tightening torque	32 Nm



- Tighten screws in the order (1) to (3).

Exhaust-gas recirculation cooler to cylinder head

M8x20 / M8x28		Tightening torque	19 Nm



- Connect the connector (3) to the exhaust-gas recirculation valve.
- Attach the vehicle wiring harness to the clips (2) at the exhaust-gas recirculation valve and at the coolant line.
- Connect the vacuum line (1) to the exhaust-gas recirculation cooler and attach in the highlighted area.

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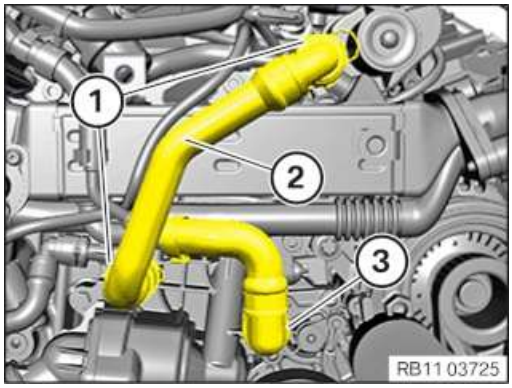


TECHNICAL INFORMATION

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

- **Version A:**

  Connect and audibly lock coolant lines (1).



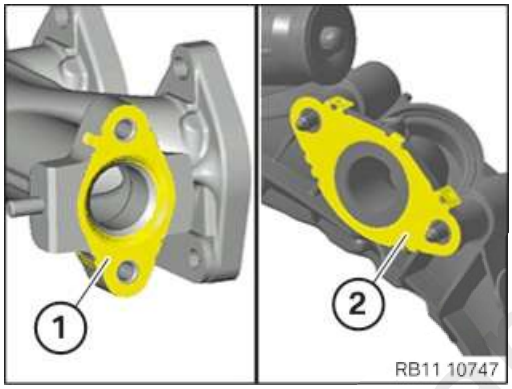
TECHNICAL INFORMATION

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

- **Version B:**

  Connect and audibly lock coolant lines (3).
- Install the coolant line (2).
- Audibly lock the locks (1).

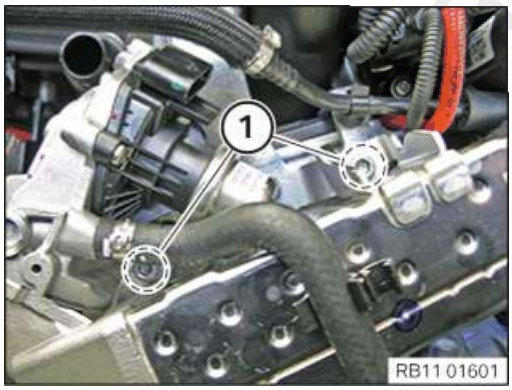
▸ **Installing the exhaust-gas recirculation cooler**



- Renew the seal (1) between the exhaust manifold and the exhaust-gas recirculation cooler.

  Parts: Gasket
- Renew the seal (2) between exhaust-gas recirculation cooler and intake air plenum.

  Parts: Gasket



TECHNICAL INFORMATION

When assembling, it is essential to observe screwing sequences and tightening torques.

Non-observance of these requirements may result in leaks and damage.

- Install the exhaust-gas recirculation cooler and fasten with screws (1).
- Tighten the screws (1) and subsequently release them again.

Exhaust-gas recirculation cooler to cylinder head

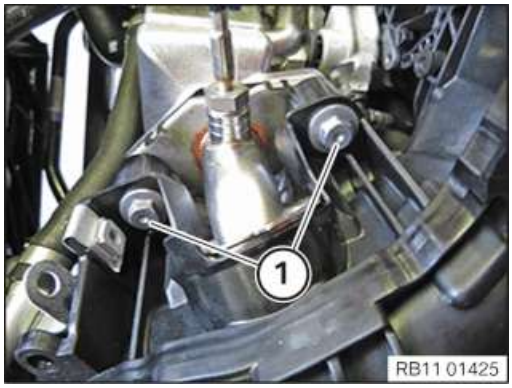
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °



- Tighten the screw (1) under the exhaust-gas recirculation cooler and then release again.

Exhaust-gas recirculation cooler to cylinder head

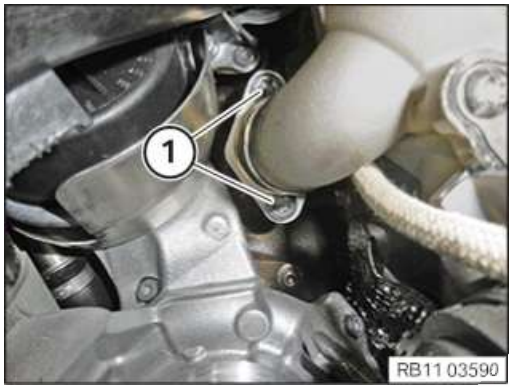
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °



- Tighten the screws (1).

Exhaust-gas recirculation cooler to intake plenum

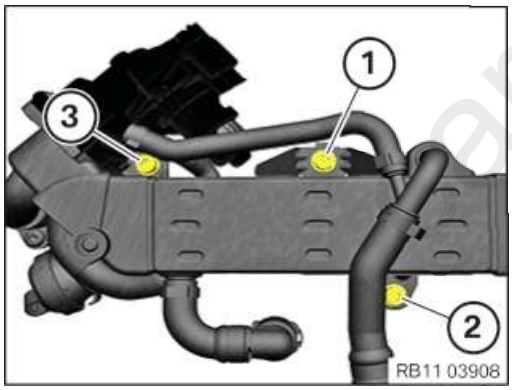
		Tightening torque	10 Nm



- Tighten the screws (1).

Exhaust-gas recirculation cooler to exhaust manifold

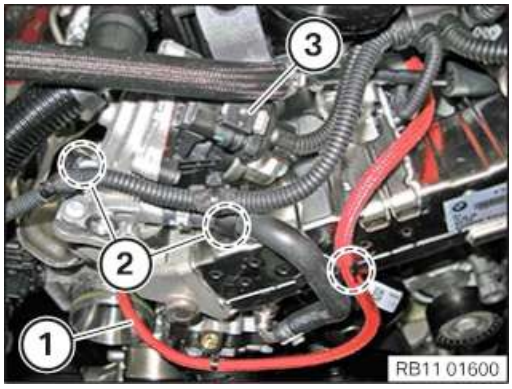
M8x28	Replace screws	Tightening torque	32 Nm



- Tighten screws in the order (1) to (3).

Exhaust-gas recirculation cooler to cylinder head

M8x20 / M8x28		Tightening torque	19 Nm



- Connect the connector (3) to the exhaust-gas recirculation valve.
- Attach the vehicle wiring harness to the clips (2) at the exhaust-gas recirculation valve and at the coolant line.
- Connect the vacuum line (1) to the exhaust-gas recirculation cooler and attach in the highlighted area.

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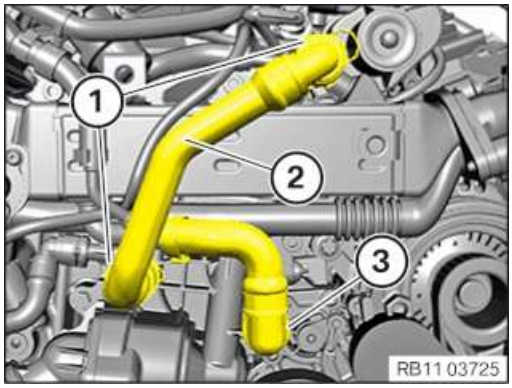


TECHNICAL INFORMATION

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

- **Version A:**

  Connect and audibly lock coolant lines (1).



TECHNICAL INFORMATION

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

- **Version B:**

  Connect and audibly lock coolant lines (3).

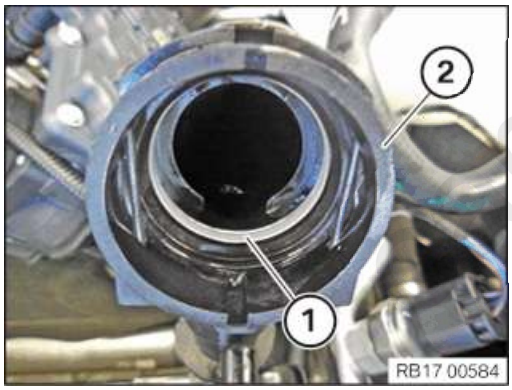
  Install the coolant line (2).

  Audibly lock the locks (1).

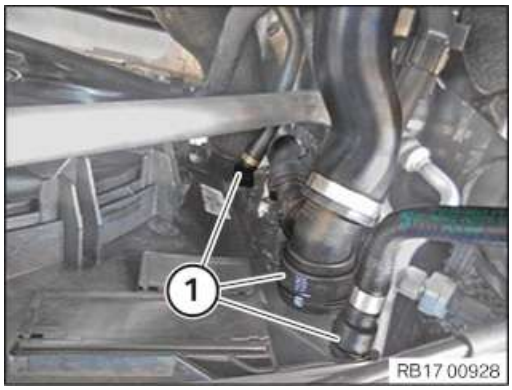
13 – Connecting the coolant lines

TECHNICAL INFORMATION

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



- Check the sealing ring (1) of the coolant line (2) for damage and renew where required.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Connect and lock the coolant lines (1).

  The coolant lines (1) must engage audibly.

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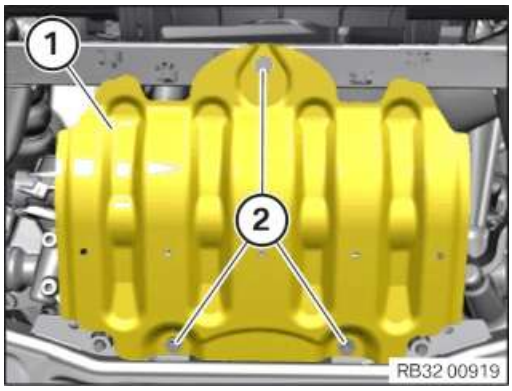
- Connect and lock coolant line (1).

  The coolant line (1) must audibly engage.

14 – If installed: Install underbody protection of the steering

Prerequisite

Front underbody protection has been removed.



- Position underbody protection (1).
- Tighten the screws (2).

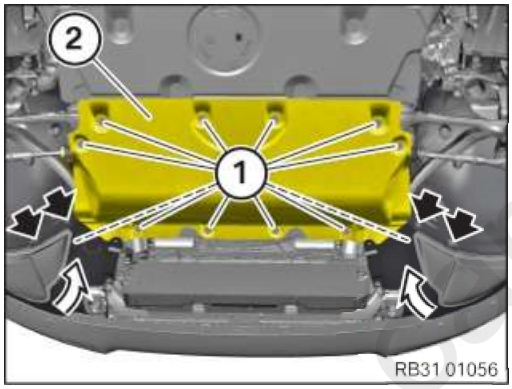
Underbody protection, steering, to front axle support

Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support

Hexagon bolt M6		Tightening torque	8 Nm

15 – Install the underbody protection of the steering gear



- **Version A:**

  Position the underbody protection (2) of the steering gear.

  Tighten the screws (1).

Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

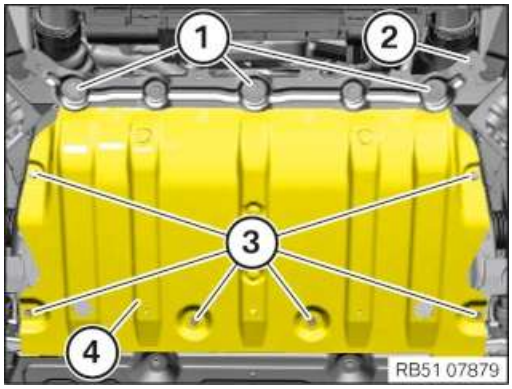
- Position the bottom wheel arch cover.

  Tighten the screws (arrows) of the lower wheel arch cover on the wheel arch cover.

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

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- **Version B:**

  Feed in the underbody protection (4) of steering gear and install it.

  Tighten the screws (3).

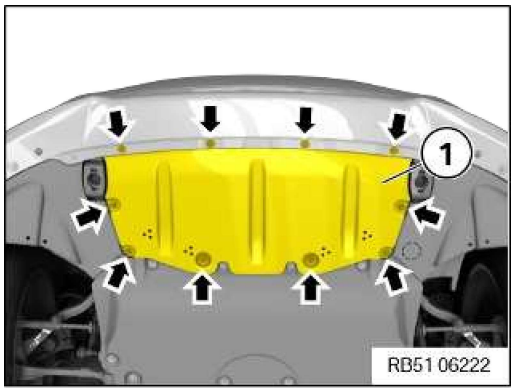
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

- Position the holder (2) for the underride protection.

  Tighten the screws (1).

16 – Installing the front underbody protection



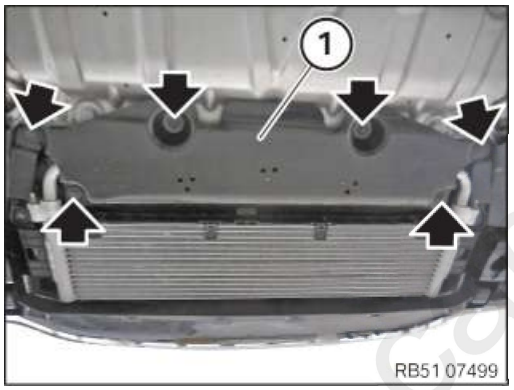
- **Version A:**

  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



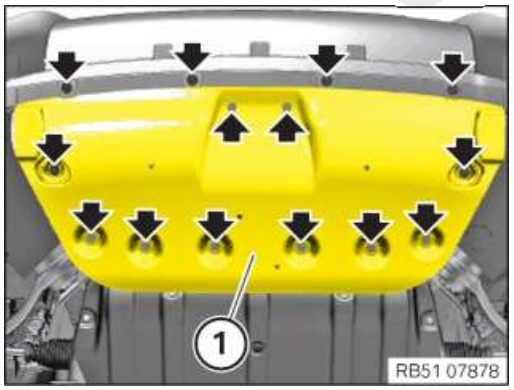
- **Version B:**

  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 C:**

  Feed in and install front underbody protection (1).

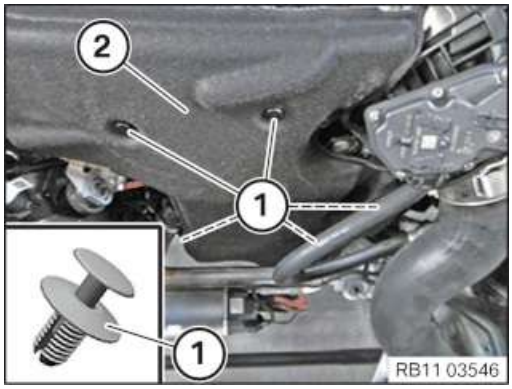
  Tighten screws (arrows).

Underbody protection front

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

17 – Install acoustic cover for the engine, front

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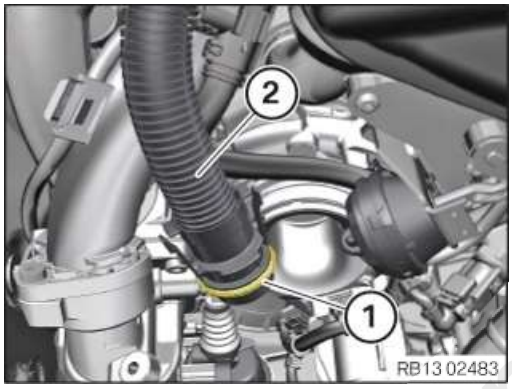


- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

18 – Installing the clean air pipe with resonator



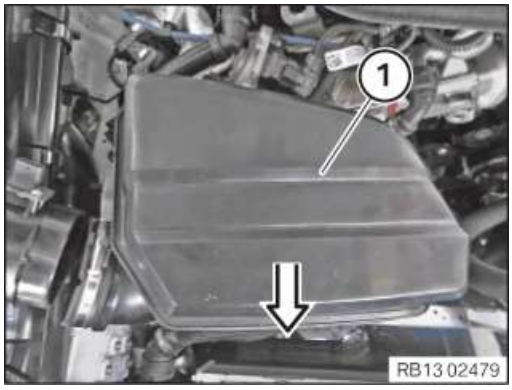
- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.



- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.



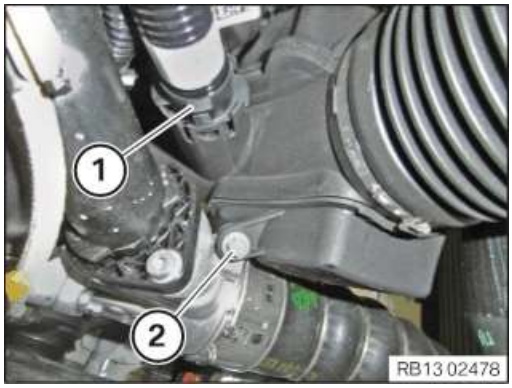
- Press and hold clean air pipe with resonator (1) in the direction of the arrow.

.diagn.com



- Attach and lock the clamp (1).

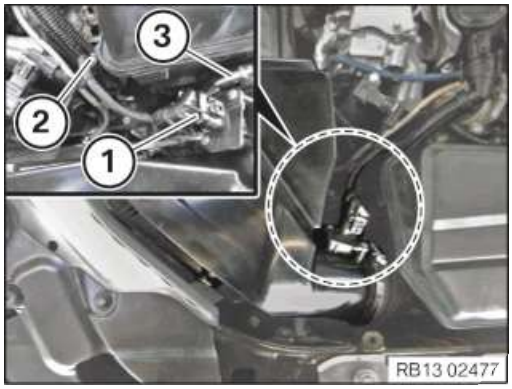
  The clamp (1) must engage audibly.



- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

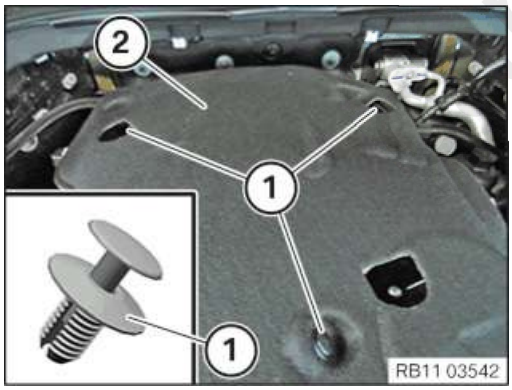
Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

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

  The connector (1) must engage audibly.

19 – Install the acoustic cover for the injectors



- Feed the acoustic cover (2) in and install.
- **If installed:** Secure the acoustic cover (2) with the expanding rivets (1) .

20 – Install acoustic cover

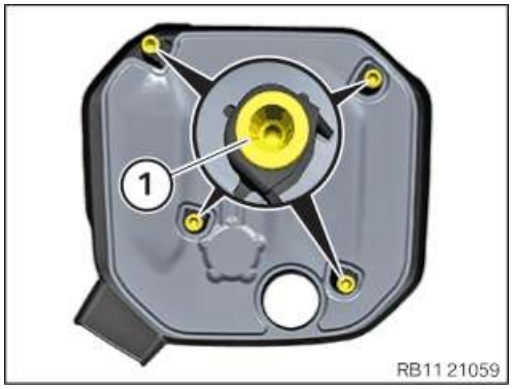
rdiagn.com

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

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

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



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

21 – Filling and bleed the high-temperature coolant circuit



TECHNICAL INFORMATION

It is **mandatory** to fill the cooling system before bleeding.
Fill **both** the circuits for high and low-temperature coolant circuits.

- See additional information.

Additional Information

Overview of Tightening Torques

Central piston cooling valve to crankcase Used in step 11

M6x16		Tightening torque	8 Nm

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Exhaust-gas recirculation cooler to cylinder head			Used in step 12
M8x20 / M8x28		Tightening torque	5 Nm
		Release angle	90 °

Exhaust-gas recirculation cooler to intake plenum			Used in step 12
		Tightening torque	10 Nm

Exhaust-gas recirculation cooler to exhaust manifold			Used in step 12
M8x28	Replace screws	Tightening torque	32 Nm

Exhaust-gas recirculation cooler to cylinder head			Used in step 12
M8x20 / M8x28		Tightening torque	19 Nm

Underbody protection, steering, to front axle support			Used in step 14
Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support			Used in step 14
Hexagon bolt M6		Tightening torque	8 Nm

Underbody protection of the steering gear			Used in step 15
Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

Wheel arch trim panel, front			Used in step 15
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Underbody protection front			Used in step 16
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Clean air pipe to exhaust turbocharger			Used in step 18
M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 18
Clamp		Tightening torque	3 Nm

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	
61 35 ... Notes on ESD protection (Electro Static Discharge)	
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21

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17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleeding the cooling system (B36, B38, B46, B48)	21
17 00 039 Bleeding cooling system (B37, B47)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Filling and bleeding the high-temperature cooling system vacuum filler device (B48)	21
17 00 008 Draining and topping up the high-temperature coolant circuit	21
17 00 008 Draining and topping up the high-temperature coolant circuit	21
17 00 016 Draining and topping up coolant circuit for Range Extender \PREMIUM	21
17 00 008 Draining and topping up the high-temperature coolant circuit	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21

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17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 039 Bleeding the cooling system and checking watertightness using a special tool (coolant circuit for high temperatures)	21
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17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 009 Check the cooling system for watertightness with a special tool (with a tester)	21
17 00 009 Check the cooling system for watertightness with a special tool (with a tester)	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
17 00 008 Draining and topping up coolant for high-temperature circuit	21
17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
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17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21
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17 00 039 Bleed the cooling system and check it for watertightness with the special tool	21

Parts

Parts required

Designation	Used in step
Seal of central piston cooling control valve to crankcase	11

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11 42 826 Replace switch valve of central piston cooling

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 ... Notes for ESD protection (electrostatic discharge)

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.

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PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

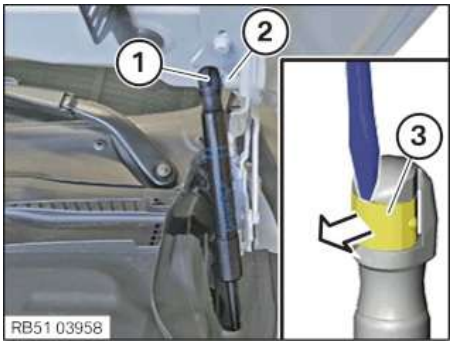
Engine compartment lid is open.

CAUTION

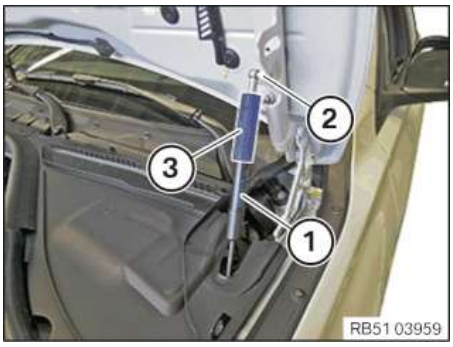
Shutting bonnet or tailgate.

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.

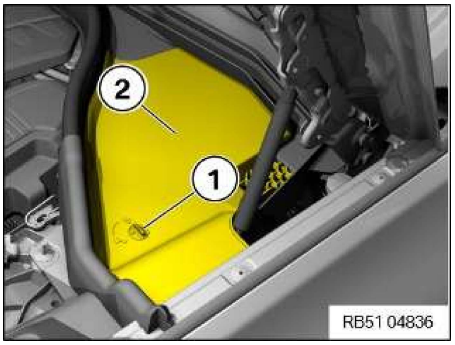


TECHNICAL INFORMATION

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

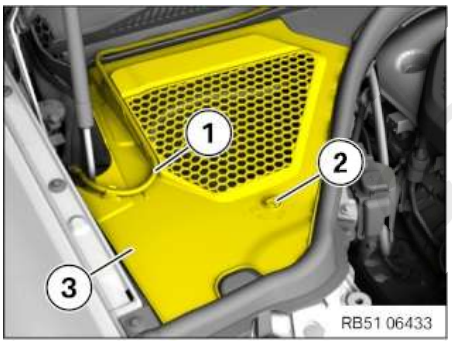
- Remove the bonnet support and open the bonnet further.
- Pull special tool or or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

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



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

3 – Remove the cover of the rear right engine compartment



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

4 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

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WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

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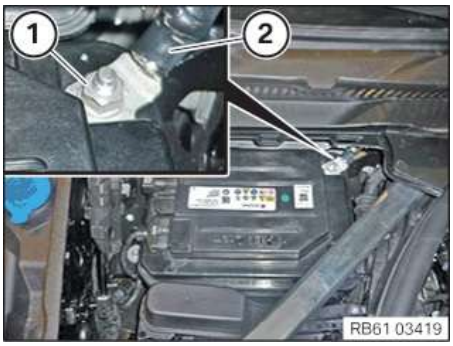
Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

5 – Disconnecting all battery earth leads



- See additional information.

6 – Removing the wiper arm on the left and right

NOTICE

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

▸ **Remove the wiper arm**

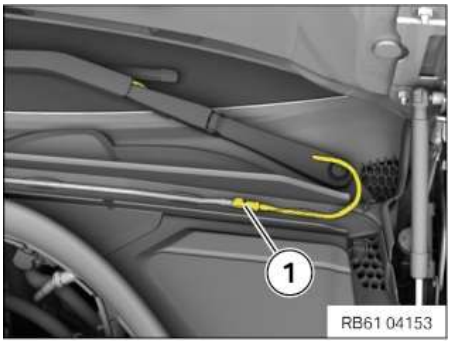
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RISK OF DAMAGE

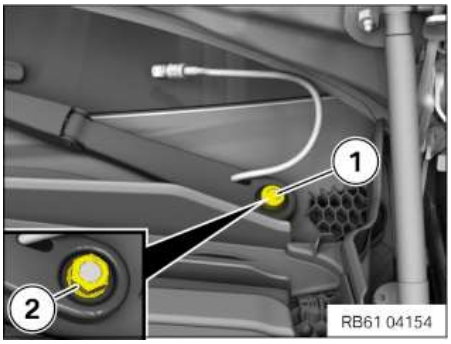
Damage to wiper console.

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

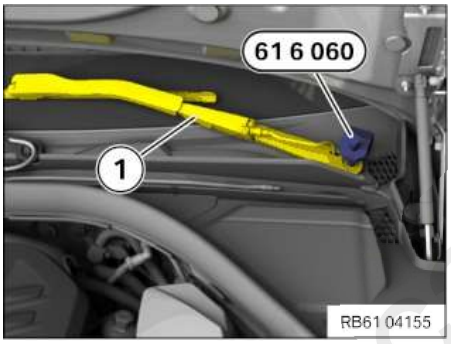
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do **not** lever off the wiper arm because otherwise the wiper console may break at the predetermined breaking point for active pedestrian protection.



- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.

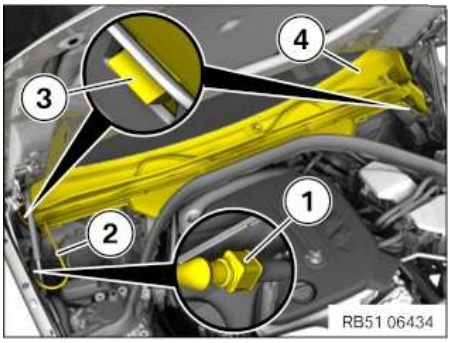


- Remove the protective cap (1).
- Loosen nut (2).



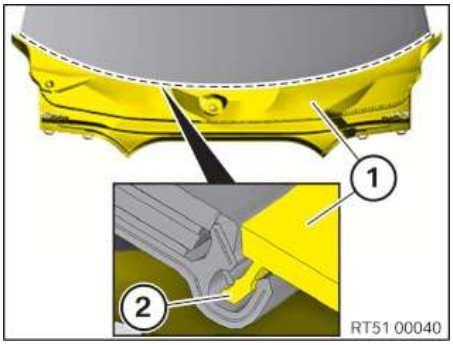
- Pull off the wiper arm (1) using special tool .

7 – Remove cowl panel cover



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

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

8 – Remove the seal for the rear bonnet

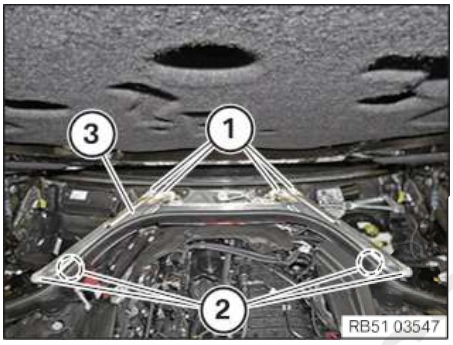


- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

9 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

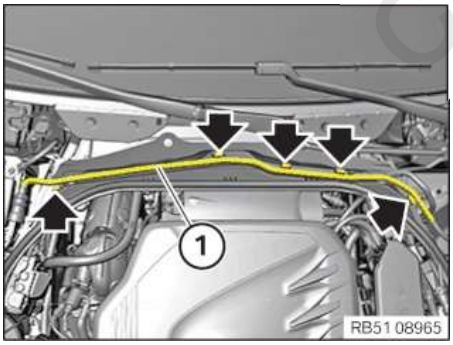
Driving without the strut brace/front-end strut or tension strut is not permitted.



NOTICE

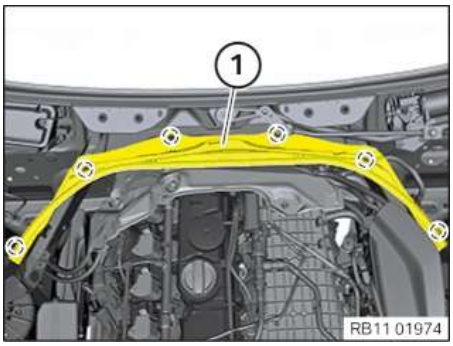
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.



- **Version with mild hybrid technology:**

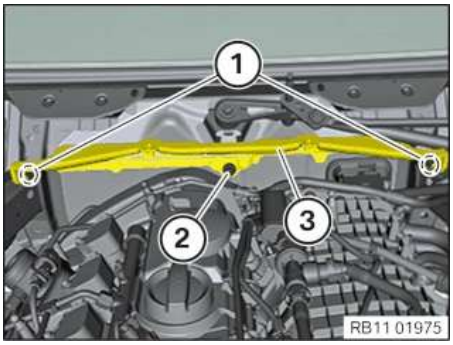
  Unclip the wire (1) at the holders (arrows).



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

10 – Removing the centre bulkhead lower section

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

11 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

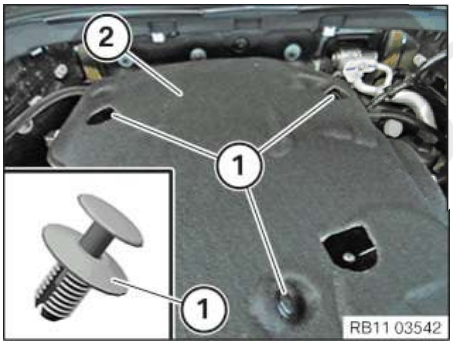
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

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



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

12 – Remove the acoustic cover for the injectors



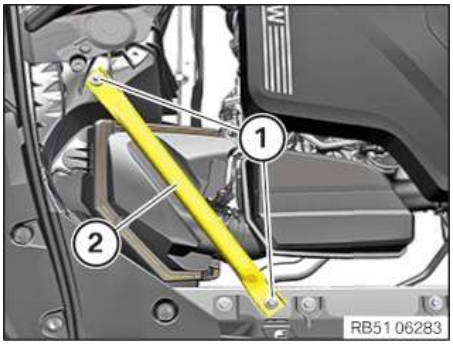
- **If installed:** Release the expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

13 – Remove right front-end strut

TECHNICAL INFORMATION

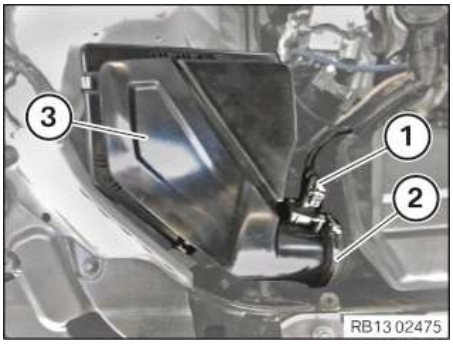
Driving without the strut brace/front-end strut or tension strut is not permitted.

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- Loosen screws (1).
- Remove the front-end strut (2).

14 – Removing intake silencer housing



- 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.

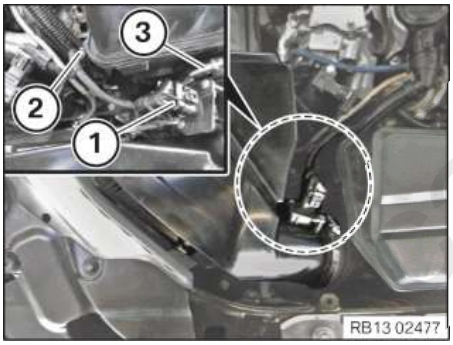
15 – Removing the clean air pipe with the resonator

WARNING

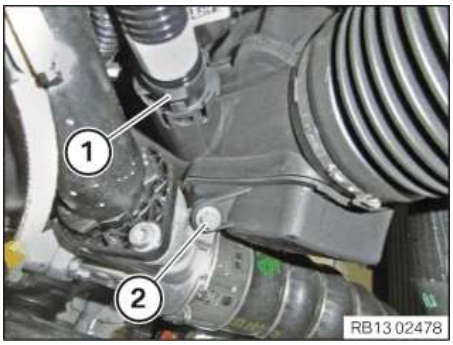
Hot surfaces.

Risk of burning!

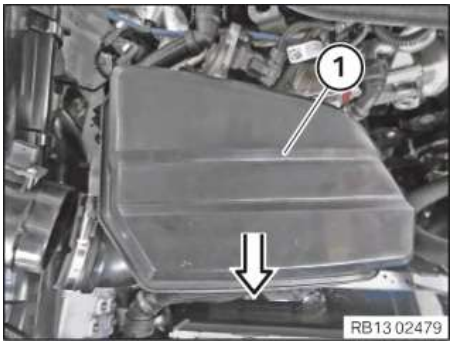
- Perform all work only on components that have cooled down.



- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

16 – Remove differential pressure sensor for the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

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

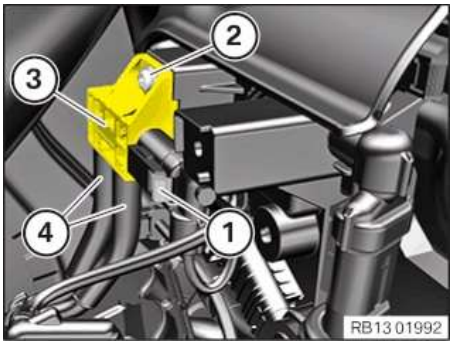
RISK OF DAMAGE

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 ... Notes for ESD protection (electrostatic discharge)

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- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Pull off pressure hose (4).
- Feed out differential pressure sensor (3) and remove.

17 – Remove the exhaust temperature sensor on the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

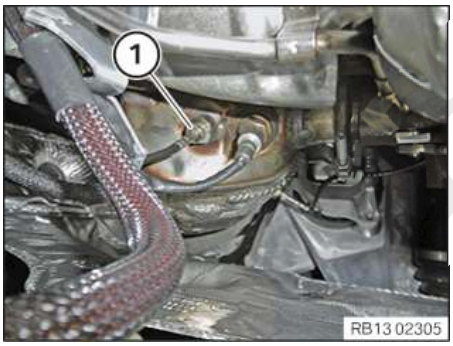
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

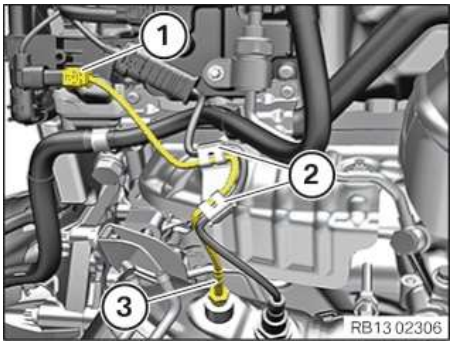
Electrostatic discharge.

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 ... Notes for ESD protection (electrostatic discharge)



- Release exhaust temperature sensor (1) using special tool .



- Unlock plug connection (1) and disconnect.
- Remove the exhaust temperature sensor (3) from the clamps (2).
- Feed out and remove exhaust temperature sensor (3).

18 – Removing the front oxygen sensor on the diesel particulate filter on top

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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.

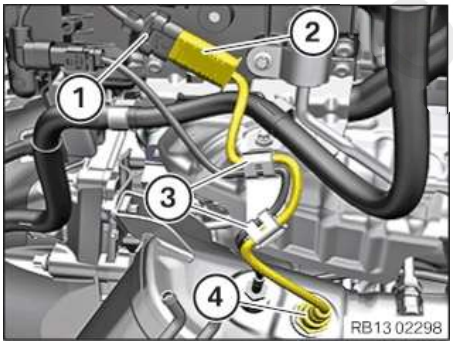
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock plug connection (1) and disconnect.
- Unlock and disconnect connector (2).
- Pull the front oxygen sensor (4) out from the clamps (3) and remove it.



- Release the front oxygen sensor (1) with the standard tools and remove it.

19 – Removing the exhaust temperature sensor for the exhaust system downstream the catalytic converter at the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

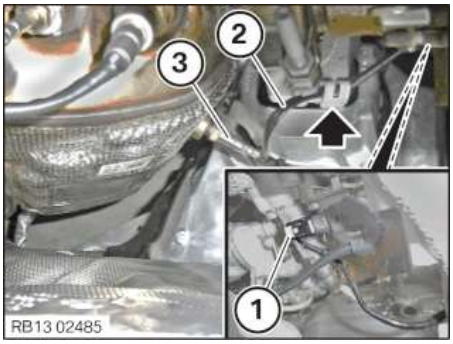
- Perform all work only on components that have cooled down.

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 ... Notes for ESD protection (electrostatic discharge)



- Unlock plug connection (1) and disconnect.

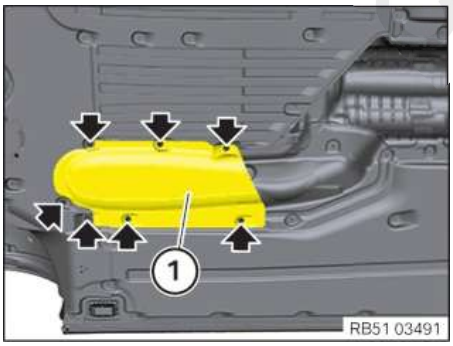
Note: The exhaust temperature sensor is located near the right engine mount.

- Release cable (2) from the clamps (arrow).
- Loosen exhaust temperature sensor (3).
- Feed out and remove exhaust temperature sensor (3).

20 – Remove the underbody panelling of the transmission on the side

NOTICE

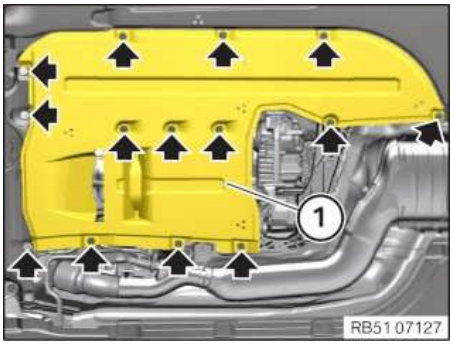
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.



- Remove screws (arrows).
- Remove the underbody panelling (1).

21 – Remove rear underbody protection

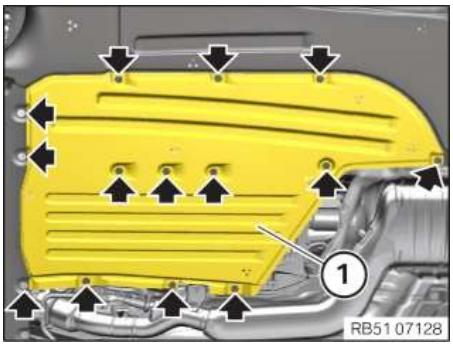
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- **Version A:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

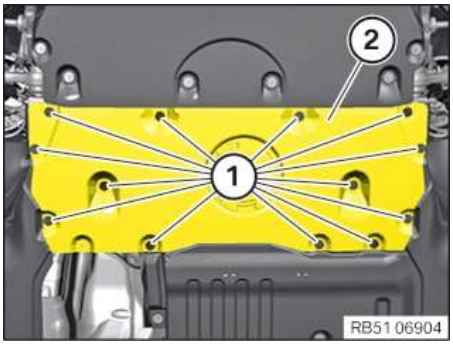


- **Version B:**

  Remove screws (arrows).

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

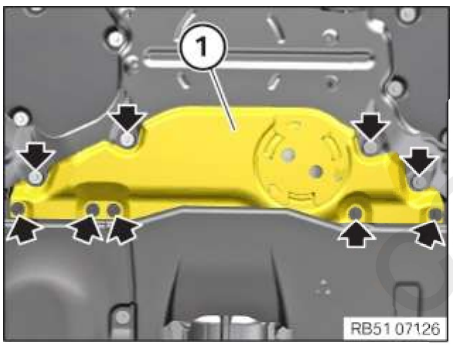
22 – Removing the centre underbody protection



- **Variant with rear wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

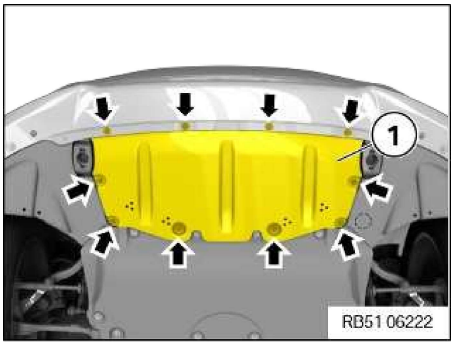


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

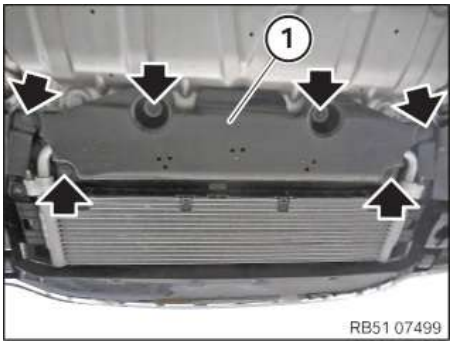
23 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

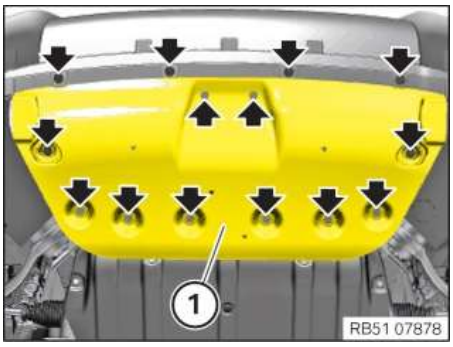
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

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

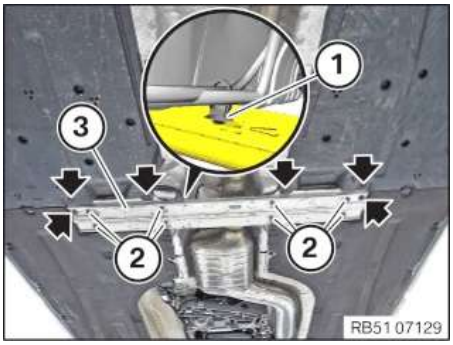


- **Version C:**

  Remove screws (arrows).

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

24 – Remove the connecting support from the tunnel



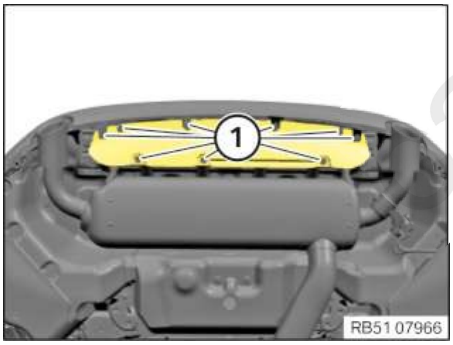
- Remove screws (arrows).

NOTICE

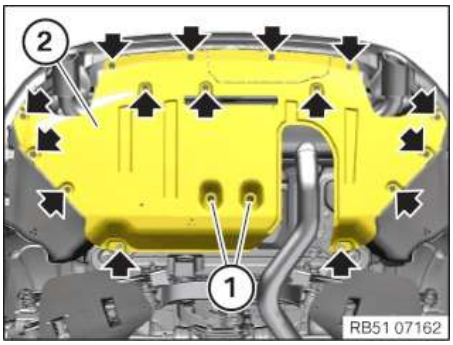
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen clamp (1).
- Loosen screws (2).
- Guide out and remove connecting support (3) on the tunnel.

25 – Removing the rear diffuser



- **Version 1:**
- Release the screws and nuts (1).
- Remove the diffuser.



- **Version 2:**
- Loosen nuts (1).
- Remove screws (arrows).
- Guide out and remove rear diffuser (2).

26 – Remove exhaust system

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WARNING

Hot surfaces.

Risk of burning!

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

CAUTION

Component with heavy weight.

Danger of injury!

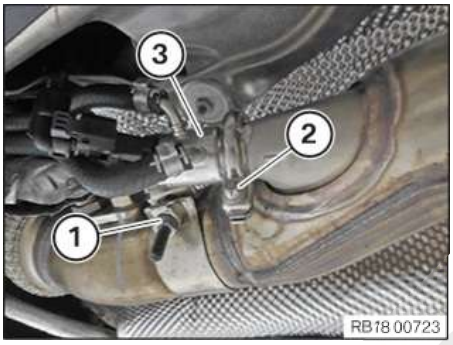
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

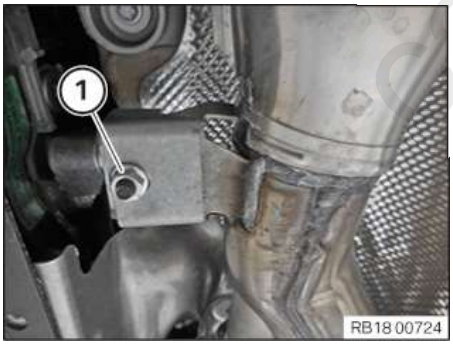
Heavy component.

Heavy components can lead to injury or damage.

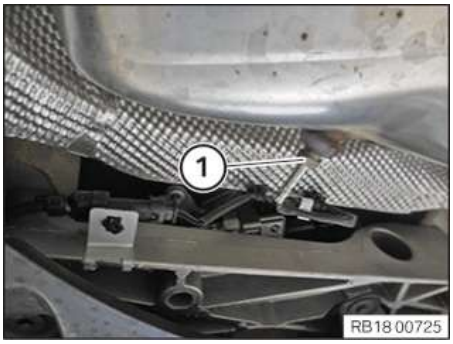
- Remove and install heavy components with the aid of another person/other persons.



- Unfasten clamp (1).
- Detach the clamp (2) of the SCR metering module (3).
- Detach the SCR metering module (3)from the exhaust system and place to one side.

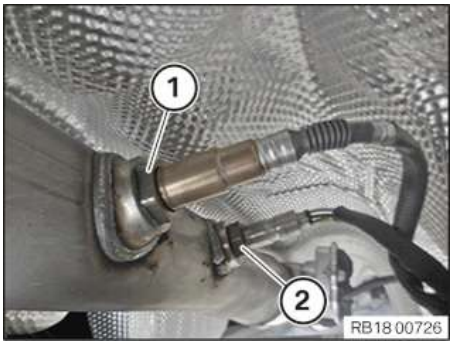


- Loosen nut (1).

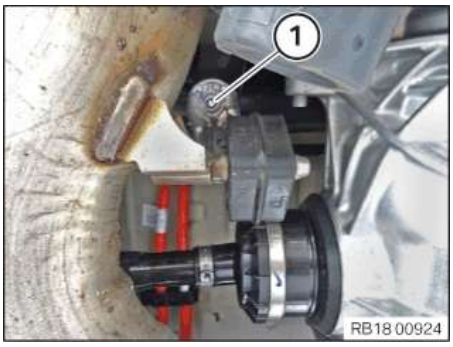


- Detach the exhaust temperature sensor (1) from the exhaust system.

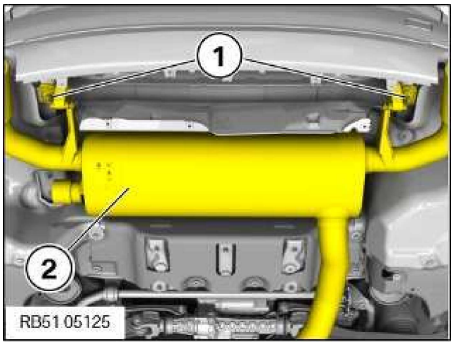
eardiagn.com



- Release the diesel particulate sensor (1) from the exhaust system and place to one side.
- Release the nitrogen oxide sensor (2) from the exhaust system and place to one side.



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



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

27 – Removing the monitoring oxygen sensor after the diesel particulate filter

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 ... Notes for ESD protection (electrostatic discharge)

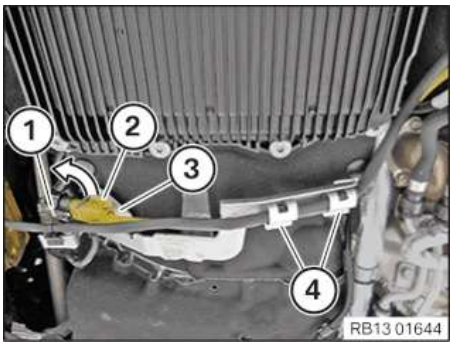
cardiagn.com

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
- The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock and loosen connector (1).
- Loosen connector (2) from the holder (3) in direction of arrow.
- Release the monitoring oxygen sensor from the clamps (4).



- Release the monitoring oxygen sensor (1) with the standard tools.



- Thread out the monitoring oxygen sensor (1) and remove it.

28 – Removing the nitrogen oxide sensor before SCR catalytic converter

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.

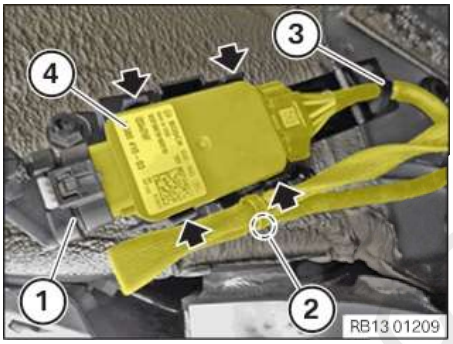
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

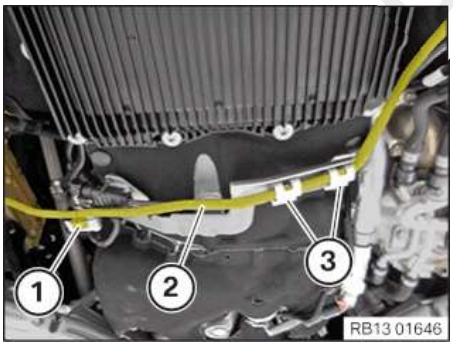
Damage to the nitrogen oxide sensor.

Failure of the nitrogen oxide sensor due to contamination or preliminary mechanical damage.

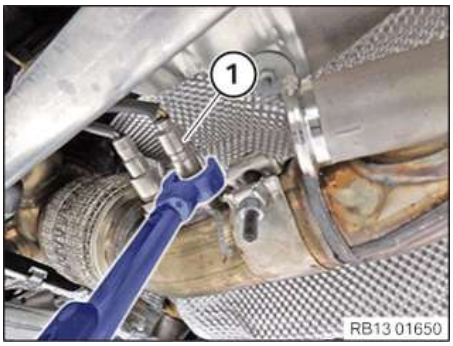
- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



- Unlock plug connection (1) and disconnect.
- Release cable clip in area (2).
- Release line from the holder (3).
- Unclip control unit (4).

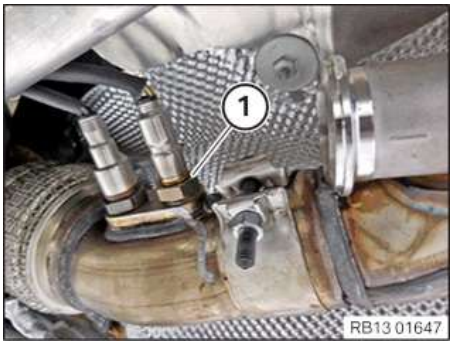


- Loosen clamp (1).
- Loosen the cables (2) from the clamps (3).



- Loosen the nitrogen oxide sensor (1) using commercially available tools.

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- Feed out and remove the nitrogen oxide sensor (1).

29 – Removing the diesel particulate filter

WARNING

Hot surfaces.

Risk of burning!

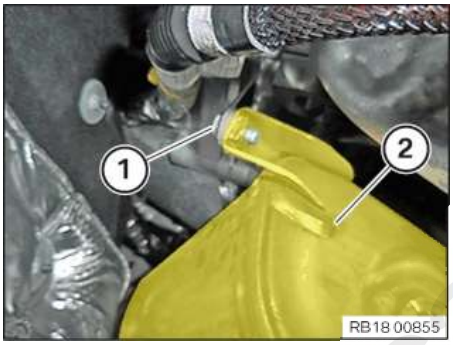
- Perform all work only on components that have cooled down.

CAUTION

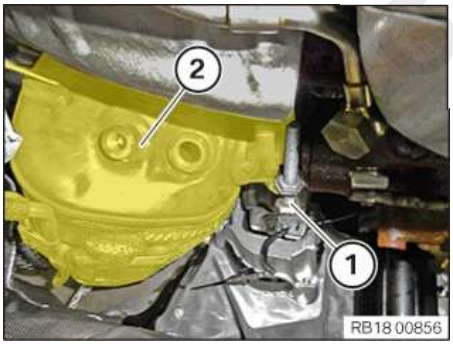
Heavy component.

Heavy components can lead to injury or damage.

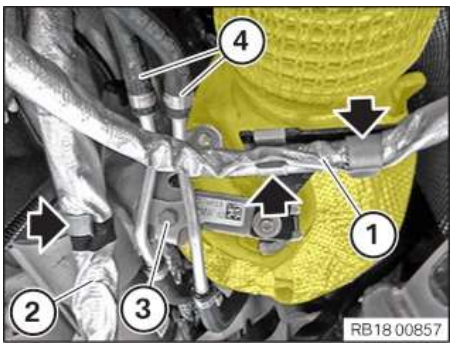
- Remove and install heavy components with the aid of another person/other persons.



- Release bolt (1) from the holder of diesel particulate filter (2).

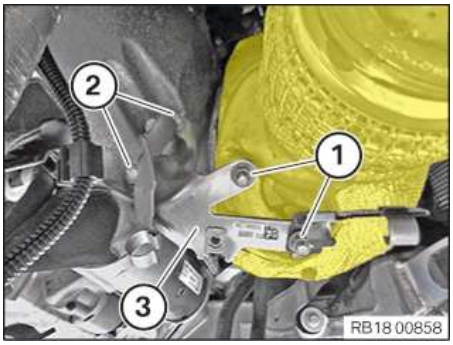


- Loosen V-band clamp (1).
- Feed V-clip (1) out from diesel particulate filter (2) and remove.

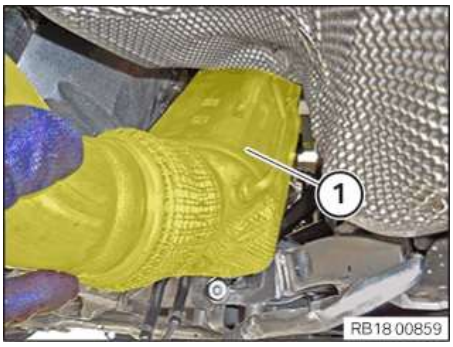


- Release the metering line (1) from clamps (Arrows).
- Release positive battery cable (2) from starter motor from clamp (Arrow).
- Loosen screw (3).
- Thread off coolant line (4) and place to the side.

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



- Guide out and remove diesel particulate filter (1).

30 – Remove front right wheel

▸ **Removing the wheel**



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

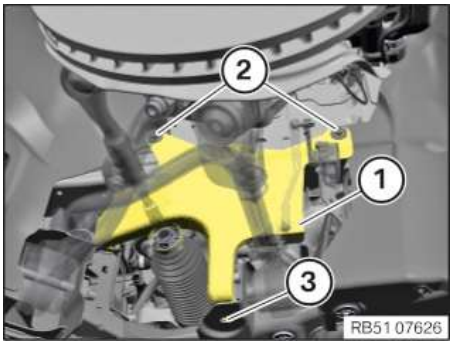
  This process is intended to prevent damage to the brake disc.



- If several wheels are removed at the same time: 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 the correct adapter from the set of special tools .

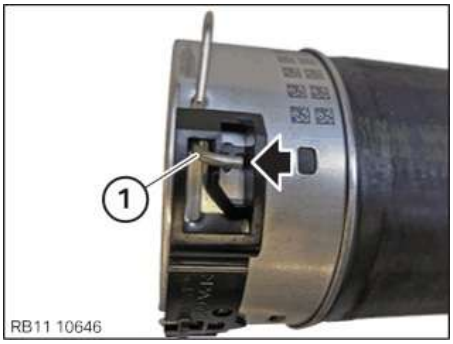
31 – Remove the cover of the steering assembly

obdiagn.com



- Loosen screws (2) and (3).
- Remove the cover (1).

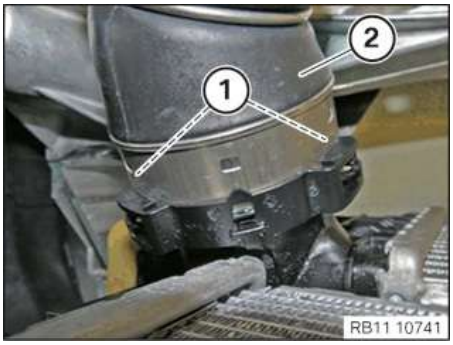
32 – Remove pressure pipe between exhaust turbocharger and charge air cooler



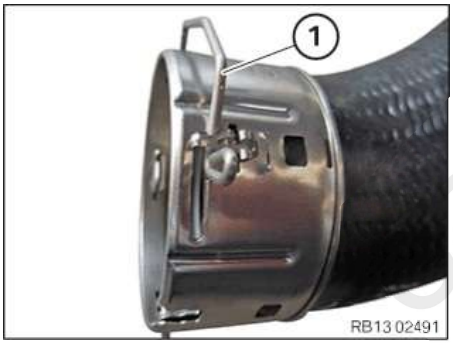
- **Version A:**

  Unlock lock (1).

  The lock (1) must snap audibly into place when unlocked (see arrow).

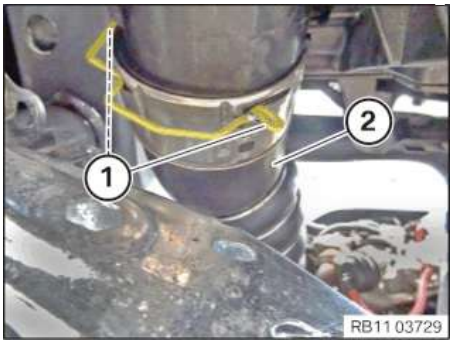


- Unlock the locks (1) on both sides and snap into place.
- Pull off pressure pipe (2) from charge air cooler.



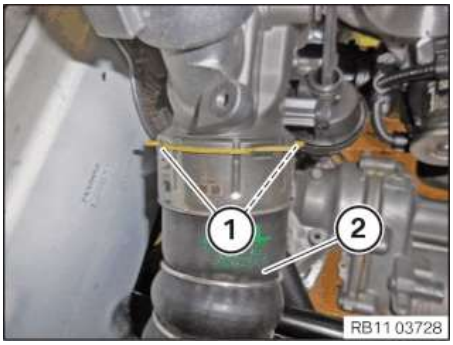
- **Version B:**

  Unlock clamp (1) and engage in this position.



- Unlock the locks (1) and snap into place.
- Pull off pressure pipe (2) from charge air cooler.

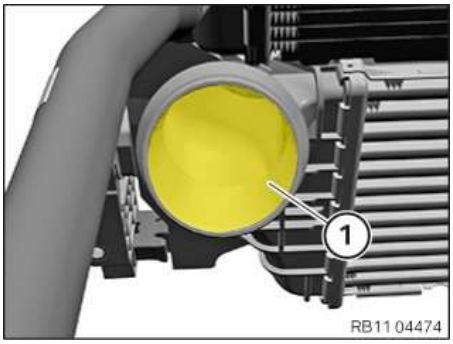
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- Unlock the lock (1) and engage.
- Pull off pressure pipe (2) from the compressor bypass.



- Remove pressure pipe (1) in upward direction.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Lock the opening (1) of the charge air cooler with a suitable auxiliary material.

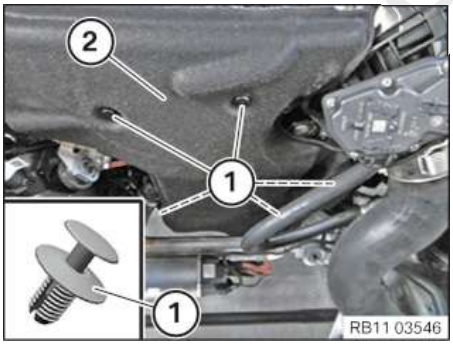
33 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

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



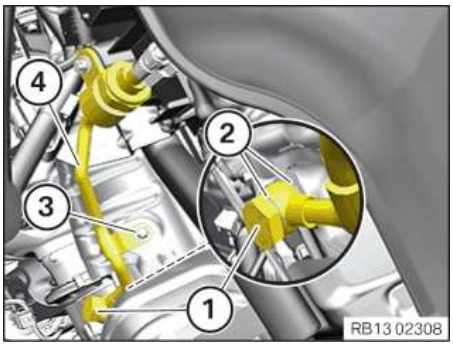
- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

34 – Remove the exhaust gas pressure pipe

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



- Unscrew the banjo bolt (1).
- Feed out and remove the sealing rings (2).
- Loosen screw (3).
- Feed out and remove the exhaust gas pressure pipe (4).

35 – Removing the sensor bracket on the cylinder head cover

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

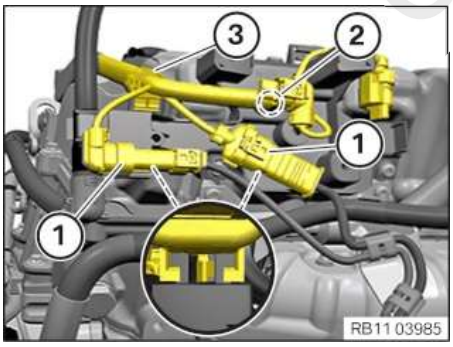
- Do not pull on the wires when disconnecting connectors and plug connections.

RISK OF DAMAGE

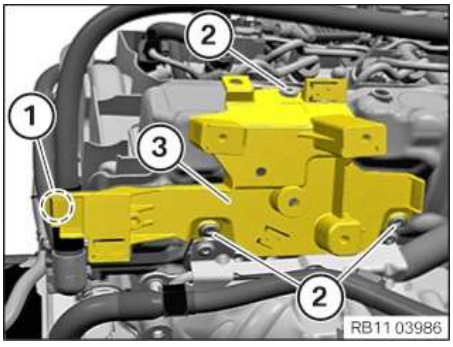
Contaminant or foreign body.

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.



- Unlock plug connection (1) and disconnect.
- Unlock the plug connection (1) and release it from the sensor bracket.
- Release the cable clip in the area (2) from the sensor bracket.
- Release the clamps (3) and set the wiring harness section aside.

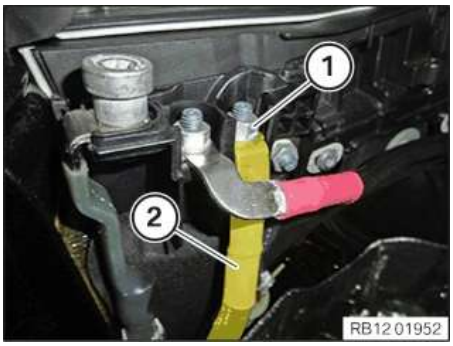


- Release the positive battery cable in the area (1) from the clamp and set it aside.
- Loosen screws (2).
- Feed out holder (3) for the sensor system and remove.

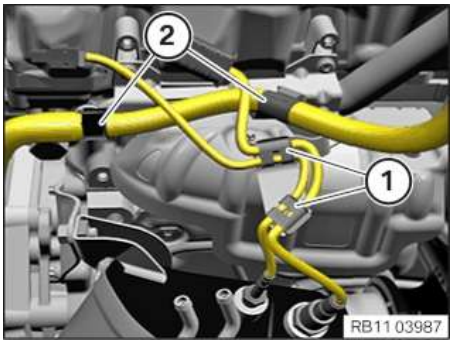
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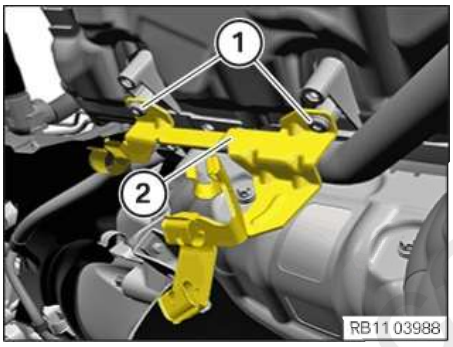
- Unlock the locks (1).
- Guide and remove cover (2) in direction of arrow.



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

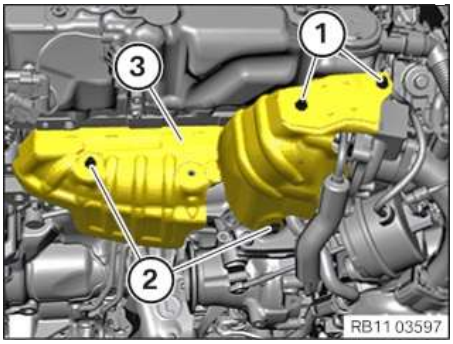


- Release the cable of the exhaust gas sensor system from the clamps (1).
- Release the positive battery cable from the clamps (2).



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

36 – Removing heat shield



- Loosen screws (1).
- Loosen screws (2).
- Feed out and remove the heat shield (3).

37 – Removing the high-pressure stage exhaust turbocharger and low-pressure stage turbocharger

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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.

TECHNICAL INFORMATION

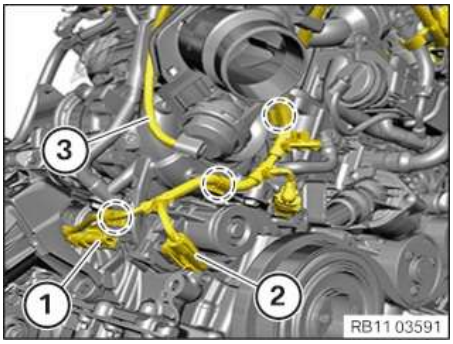
Prior to replacing the exhaust turbocharger: Observe the notes on troubleshooting on the exhaust turbocharger.

For additional information see: FUB-FUB-FB-130003-A10 Troubleshooting on the exhaust turbocharger

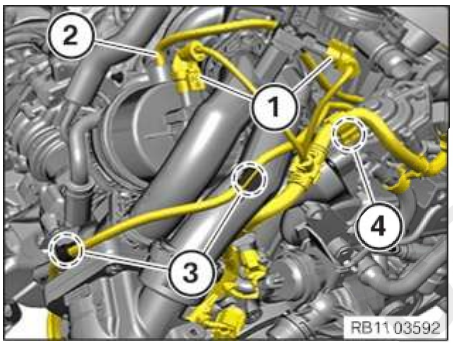
TECHNICAL INFORMATION

With exhaust turbocharger damage, it is imperative to observe the additional information.

For additional information see: 11 65 020 Exhaust turbocharger damage due to plugged oil supply lines



- Release plug connection in area (1) from holder.
- Unlock plug connection (2) and disconnect.
- Release the wiring harness in the marked areas from the exhaust turbochargers.
- Pull off the vacuum hose (3).



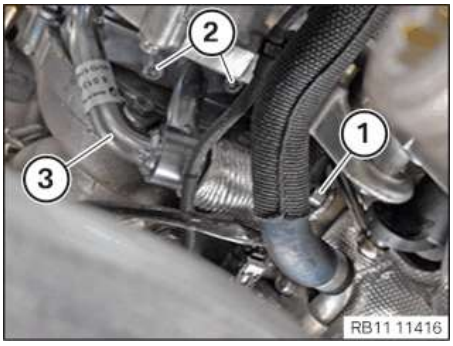
- Unlock plug connections (1) and disconnect.
- Pull off the vacuum hose (2).
- Release the vacuum hose in marked areas (3) from the exhaust turbochargers.
- Release the wiring harness in area (4) from the exhaust-gas recirculation cooler and set it aside.



TECHNICAL INFORMATION

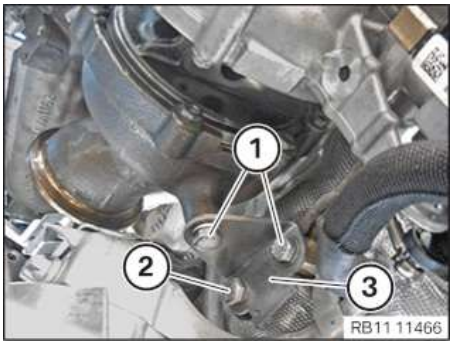
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Release the screws of the oil return line on the crankcase from the right wheel arch.

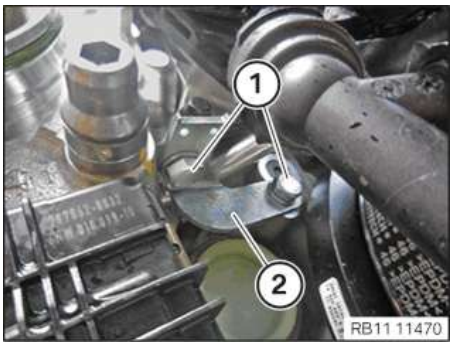


- Release the screw (1).
- Loosen screws (2).
- Remove oil return line (3) from the crankcase.
- Catch and dispose of emerging engine oil.

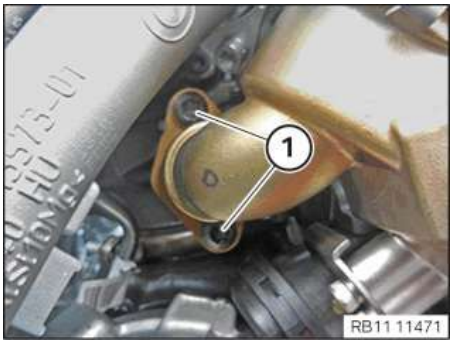
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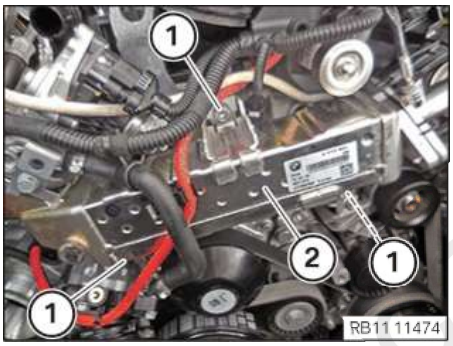
- Unscrew and remove the bolts (1) on the holder (3).
- Slacken screw (2) on holder (3), but do **not** remove.



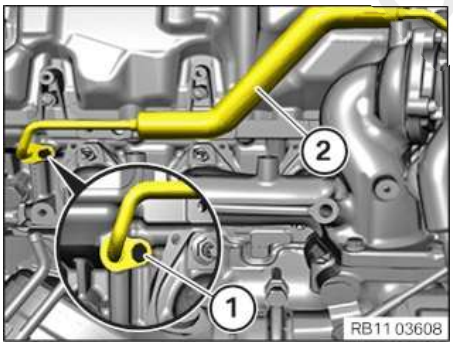
- Loosen screws (1).
- Guide out and remove holder (2).



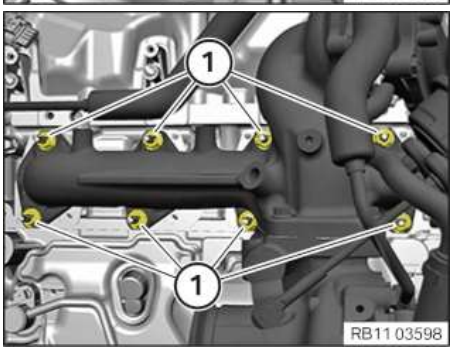
- Loosen screws (1).



- Slacken screws (1), but do **not** remove.
- Release exhaust-gas recirculation cooler (2) slightly.



- Loosen screw (1).
- Remove oil feed line (2) for the high-pressure stage exhaust turbocharger from the cylinder head and set it aside.
- Catch and dispose of emerging engine oil.

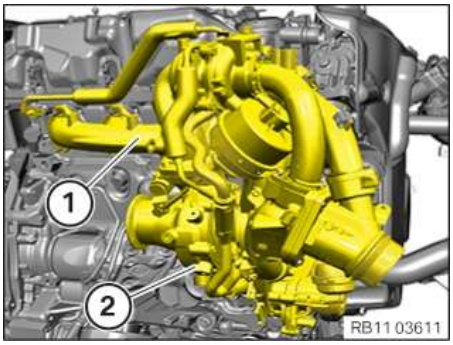


TECHNICAL INFORMATION

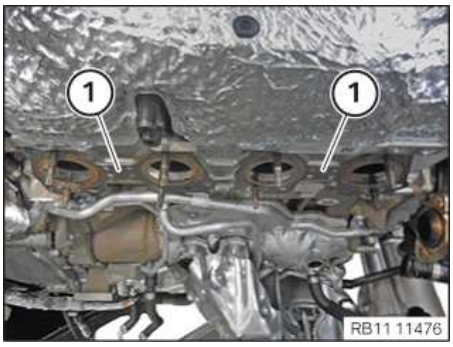
Conduct the following operation with the assistance of a second person.

- Loosen nuts (1).

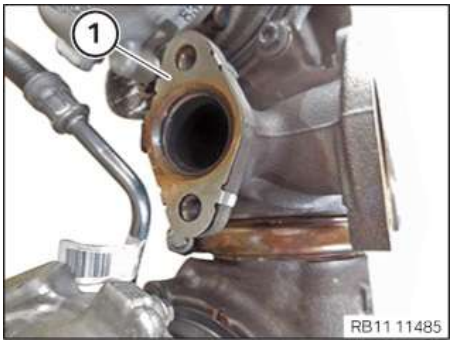
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- Guide out exhaust manifold (1) with the high-pressure stage exhaust turbocharger and the low-pressure stage exhaust turbocharger (2) forward towards the top and remove.



- Guide out and remove gaskets (1).



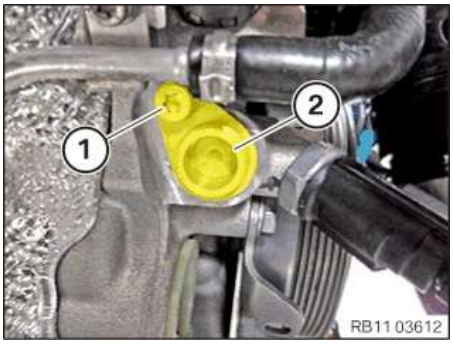
- Guide out and remove gasket (1).

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38 – Removing the central piston cooling relay valve

TECHNICAL INFORMATION

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



- Loosen screw (1).

RISK OF DAMAGE

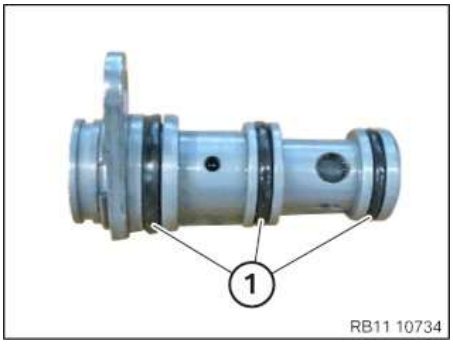
Contaminant or foreign body.

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.

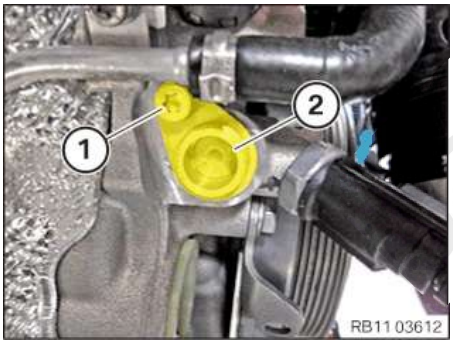
- Remove the relay valve (2) for the central piston cooling.

39 – Installing the relay valve for central piston cooling



- Renew relay valve for the central piston cooling.

  Parts: Relay valve for central piston cooling
- Apply light coat of oil to sealing rings (1).



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.

- Clean sealing surface.
- Install the relay valve (2) for central piston cooling.
- Tighten down screw (1).

Central piston cooling valve to crankcase

M6x16		Tightening torque	8 Nm

40 – Installing the high-pressure stage exhaust turbocharger and the low-pressure stage 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

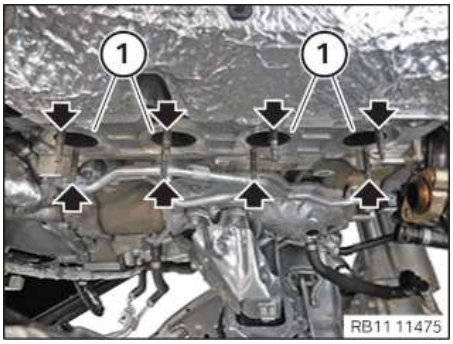
Damage to the surface.

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.

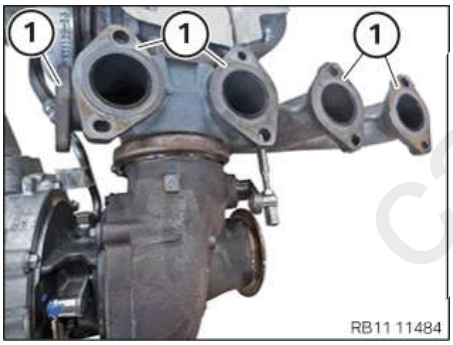
TECHNICAL INFORMATION

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

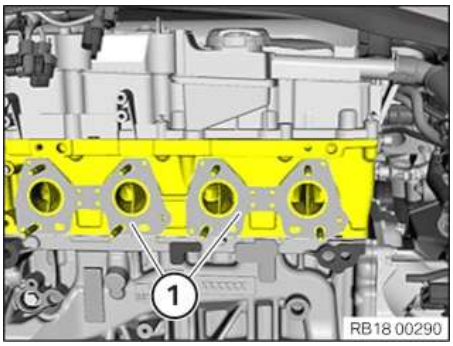


- Check the stud bolts (arrows) on the cylinder head for **correct** fit.
- Clean the connection points (1) with the special tool 0 495 102 (11 4 470).
- Renew gaskets.

  Parts: Seals



- Clean the connection points (1) on the exhaust manifold with the special tool 0 495 102 (11 4 470).

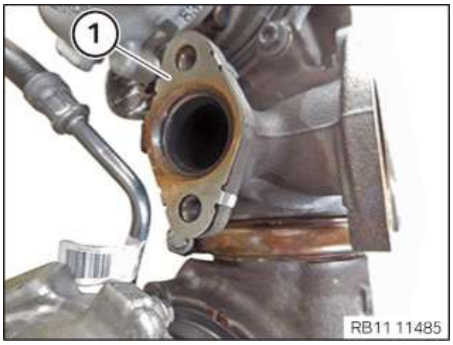


TECHNICAL INFORMATION

The **coated side** of the seal must be on the side of the exhaust manifold.

- Insert and install the gaskets (1).

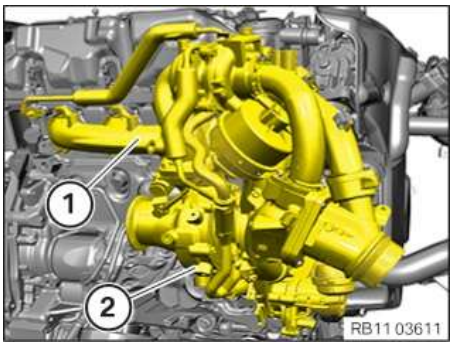
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- Renew the seal (1).

  Parts: Gasket

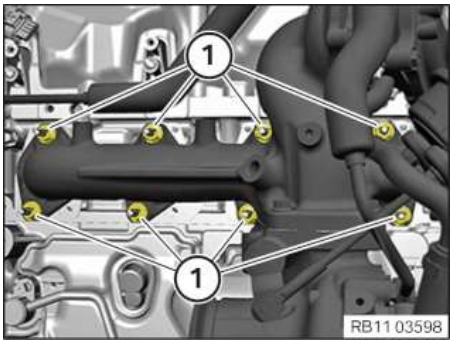
- Insert and install the seal (1).



TECHNICAL INFORMATION

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

- Feed in the exhaust manifold (1) with the high-pressure stage exhaust turbocharger and the low-pressure stage turbocharger (2) from the top front and install.



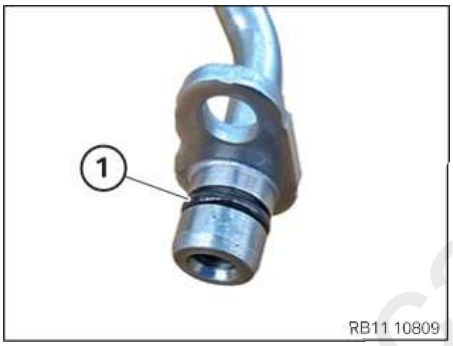
- Renew nuts (1).

  Parts: Nuts

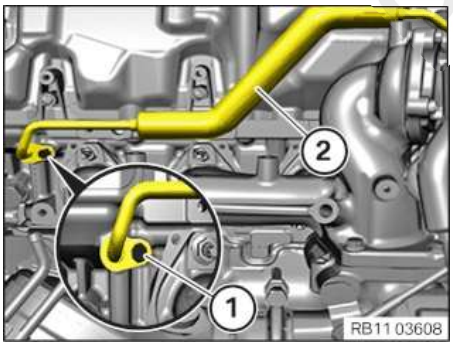
- Tighten the nuts (1) evenly from the inside out.

Exhaust manifold to cylinder head

M7	**If necessary, renew loose stud bolts.** Renew nuts.	Tightening torque Tightening torque	11 Nm 13 Nm



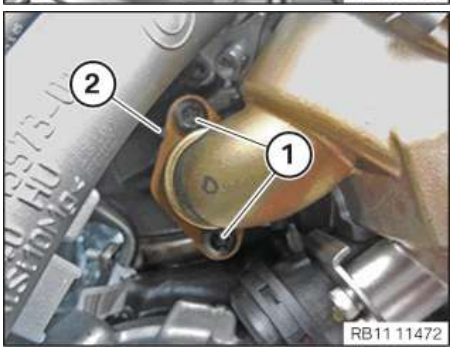
- Check the seal (1) for damage, if necessary, renew the oil feed line.



- Feed in and install the oil feed line (2) for the high-pressure stage exhaust turbocharger.
- Tighten down screw (1).

Oil feed line on cylinder head

M6x12		Tightening torque	8 Nm



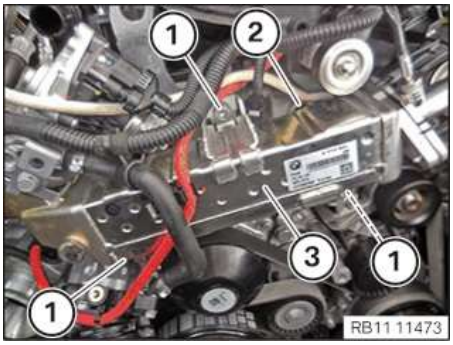
- Tighten the screws (1).

Exhaust-gas recirculation cooler to exhaust manifold

M8x28	Replace screws	Tightening torque	32 Nm

- Ensure that seal (2) is installed.

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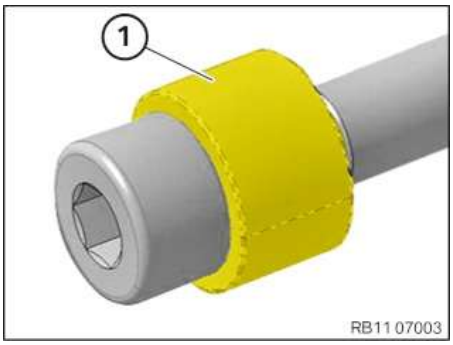


- Position the exhaust-gas recirculation cooler (3).
- Make sure the pipe neck (2) is fitted correctly.
- Tighten the screws (1).

Exhaust-gas recirculation cooler to cylinder head

M8x20 / M8x28		Tightening torque	19 Nm

Check



- Check whether the screws **with the** sleeves (1) (10 mm) are available.

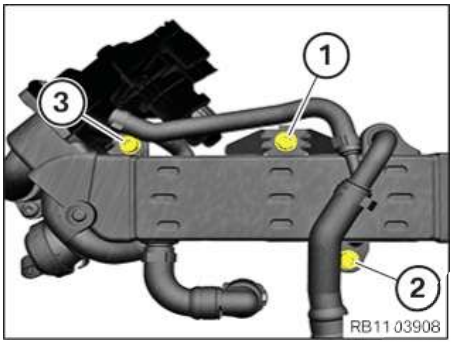
Result

» Screws **without** sleeves (1) are available.

Measure

- Renew screws.

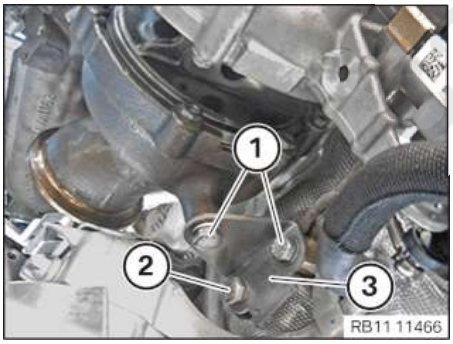
  Parts: Screws (part number 9 886 429)



- Tighten the screws (1) to (3).

Exhaust-gas recirculation cooler to cylinder head

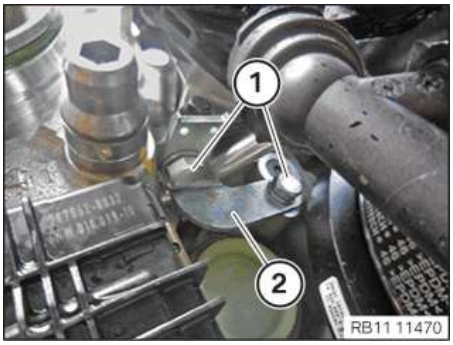
M8x20 / M8x28		Tightening torque	19 Nm



- Tighten the bolts (1) and (2) on the bracket (3).

Exhaust turbocharger low-pressure stage to crankcase

M8X16		Tightening torque	22 Nm

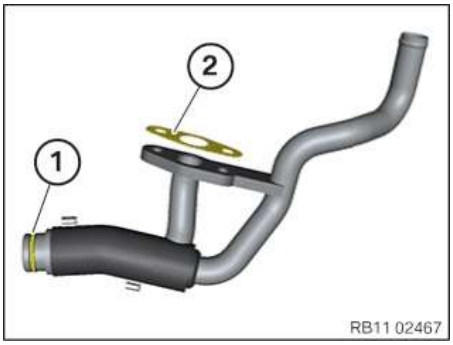


- Insert and install the holder (2).
- Tighten the screws (1).

Exhaust turbocharger low-pressure stage to crankcase

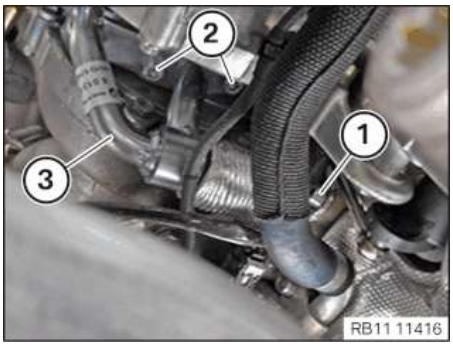
M8X16		Tightening torque	22 Nm

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- Renew the gasket (2).

  Parts: Gasket
- Check the O-ring (1) for damage and renew the oil return line as needed.



- Install oil return line (3) into crankcase.
- Position oil return line (3) with the seal on the low-pressure stage exhaust turbocharger.
- Tighten the screws (2).

Oil return line to turbocharger

M6x12	Renew gasket.	Tightening torque	8 Nm

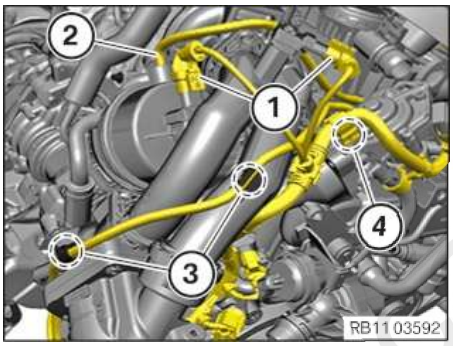
- Install the bolt (1).



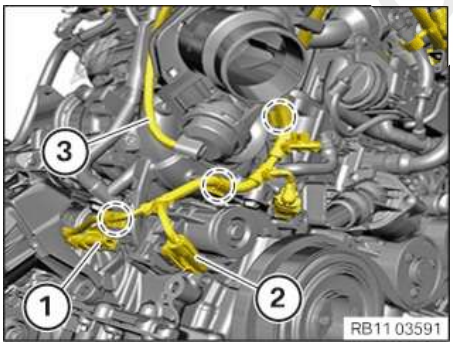
- Tighten the screws of the oil return line on the crankcase from the right wheel arch.

Oil return line to crankcase

M6x12	Check gasket. Renew the seal or line if necessary.	Tightening torque	8 Nm



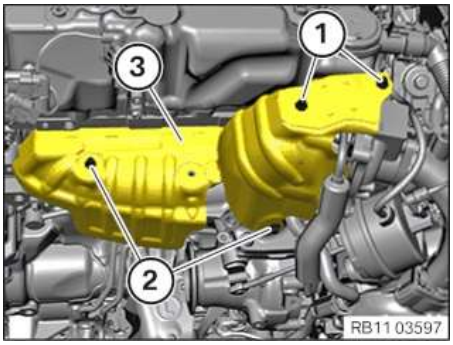
- Secure the vehicle wiring harness in area (4) to the exhaust-gas recirculation cooler.
- Secure the vacuum hose in the marked areas (3) to the exhaust turbochargers.
- Connect vacuum hose (2).
- Connect all connectors (1) and lock audibly.



- Connect vacuum hose (3).
- Secure the wiring harness in the marked areas to the exhaust turbochargers.
- Plug in the connector (2) and lock audibly.
- Secure the connector in area (1) to the holder.

41 – Installing heat shield

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- Feed in and install the heat shield (3).
- Tighten down screws (1) and (2).

Heat shield to exhaust manifold

M6x12			10 Nm

42 – Installing the sensor bracket on the cylinder head cover

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

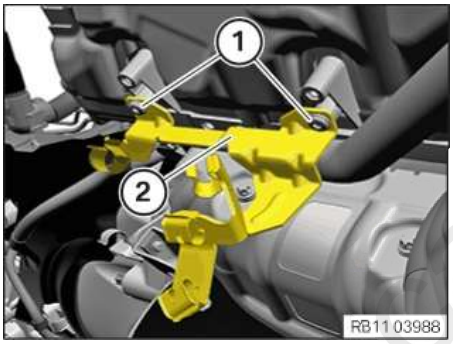
- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

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

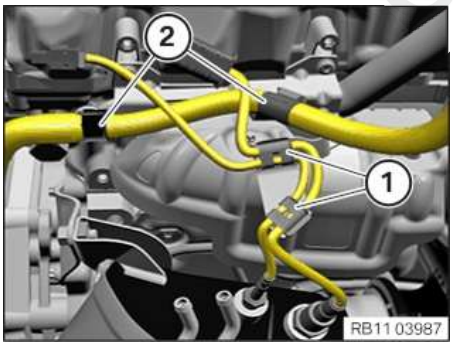
- Route all cables without abrasions, do not trap and crush.



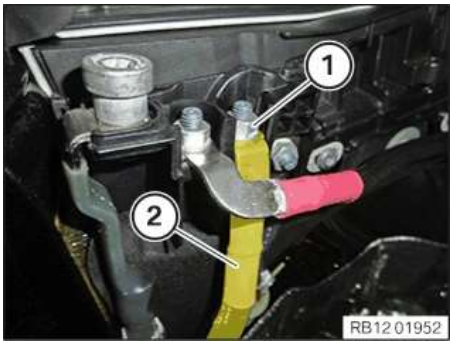
- Insert and install the holder (2).
- Tighten the screws (1).

Bracket on cylinder head cover

		Tightening torque	5 Nm



- Secure the positive battery cable in the clamps (2).
- Mount the cable of the exhaust gas sensor system in the clamps (1).



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

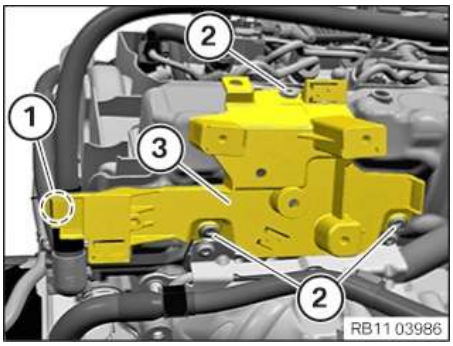
Battery positive lead to battery positive terminal

M8		Tightening torque	19 Nm

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- Insert and install the cover (2) in the direction of the arrow.
  The locks (1) must engage audibly.

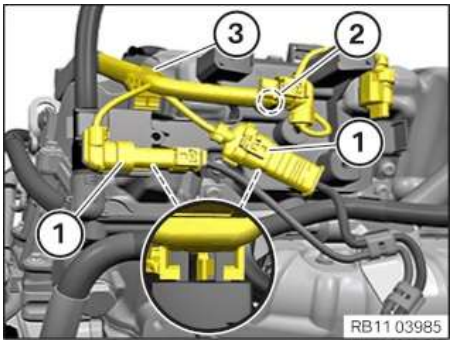


- Feed in and install the sensor bracket (3).
- Tighten the screws (2).

Bracket on cylinder head cover

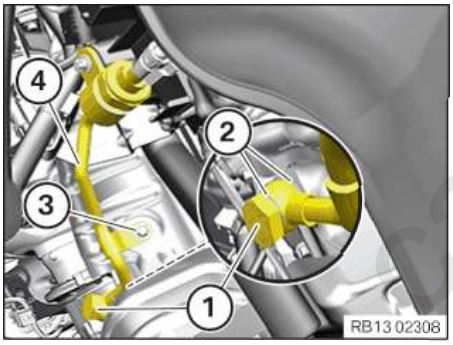
	Tightening torque	5 Nm

- Fasten the positive battery cable in the area (1) in the clamp.



- Feed in the wiring harness section and fasten it with the clamp (3).
- Fasten the cable clip in the area (2) in the sensor bracket.
- Feed in the connector (1) into the sensor bracket and lock it audibly.
- Plug in the connector (1) and lock audibly.

43 – Install the exhaust gas pressure pipe



- Insert and install the exhaust gas pressure pipe (4).
- Replace the sealing rings (2).
  Parts: Sealing ring
- Apply the banjo bolt (1) hand-tight.
- Tighten down screw (3).

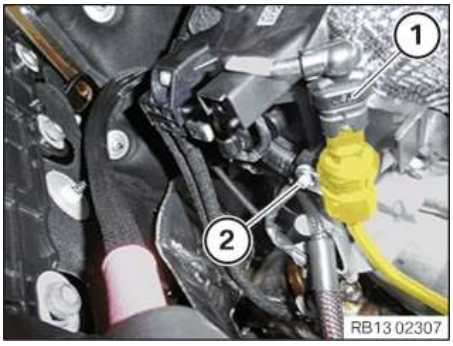
Heat shield to exhaust manifold

M6x12		Tightening torque	10 Nm

- Tighten the banjo bolt (1).

Banjo bolt for exhaust pressure pipe to exhaust manifold

Hollow bolt	Renew sealing rings.	Tightening torque	30 Nm



- Tighten down screw (2).

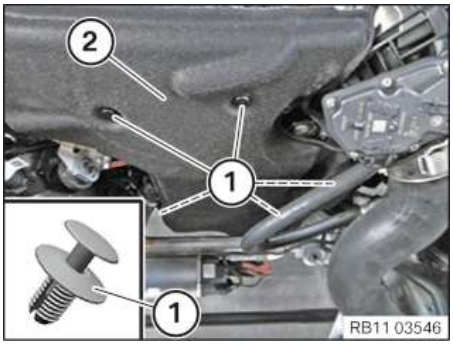
Exhaust gas pressure pipe to sensor system holder

TS6x20		Tightening torque	5,7 Nm

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

44 – Install acoustic cover for the engine, front

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- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

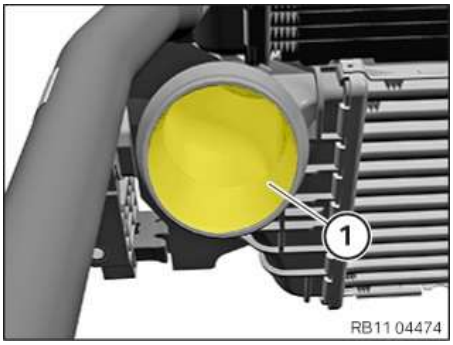
45 – Install pressure pipe between exhaust turbocharger and charge air cooler

RISK OF DAMAGE

Damage to the exhaust turbocharger.

A leak at the pressure pipe can damage the exhaust turbocharger.

- Replace the gaskets and pressure pipe if necessary.



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.

- Remove the auxiliary materials for sealing the opening (1) of the charge air cooler.
- Check the seal (1) for damage and renew if necessary.

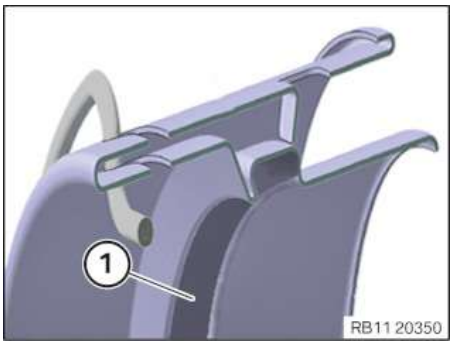
  Parts: Gasket



▸ **Replacing damaged seal**

TECHNICAL INFORMATION

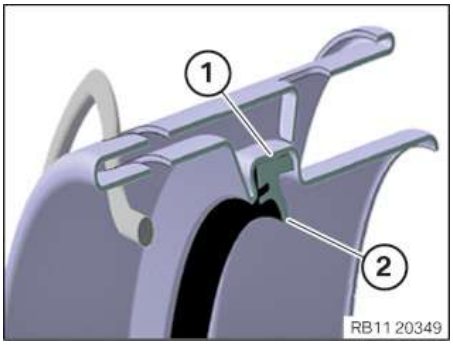
Do not use pointed or sharp-edged tools for the installation and/or removal.



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

  The gasket groove (1) must be clean.

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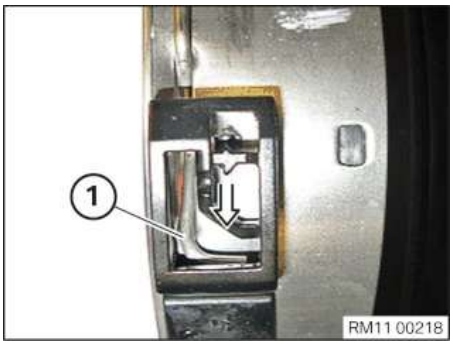
- Renew gasket.

  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 directed inwards as shown.



- **Version A:**

  Lock the lock (1).

  The lock (1) on the pressure pipe must engage audibly.

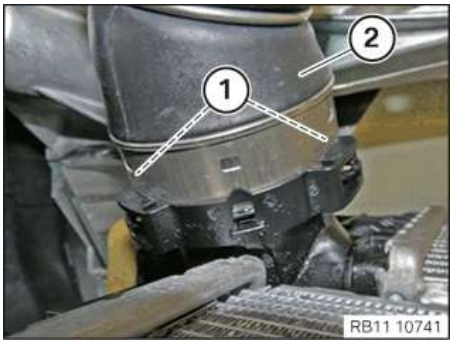


- Pay attention to the installation position:

  The pressure pipe fits on charge air cooler in one installation position only.



- Install the pressure pipe (1) from the top.



- Connect pressure pipe (2) to charge air cooler.
- Lock the lock (1) on both sides.

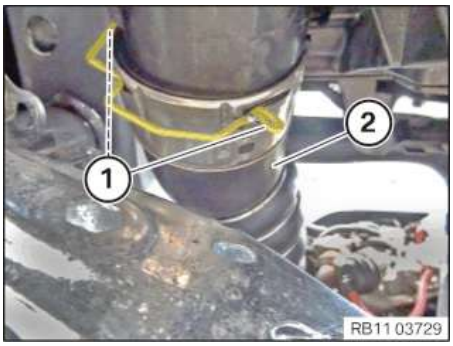
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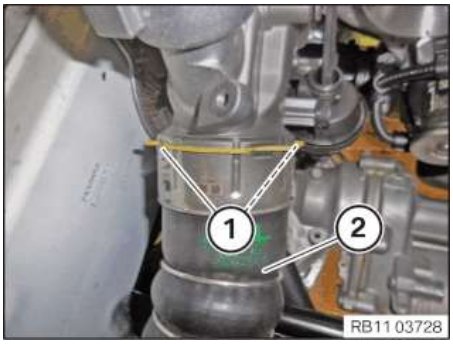
- **Version B:**

  Lock the lock (1).

  The lock (1) on the pressure pipe must engage audibly.



- Attach the pressure pipe (2) to the charge air cooler until the lock (1) engages on both sides.

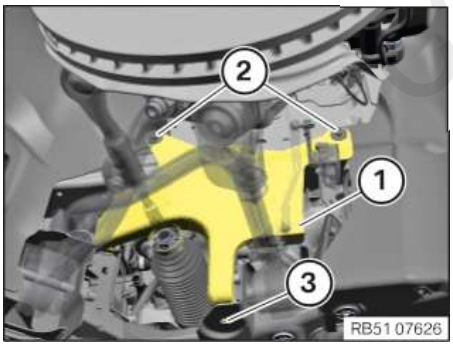


- Place the pressure pipe (2) onto the compressor bypass and ensure that the lock (1) engages audibly.

46 – Install the cover of the steering assembly

TECHNICAL INFORMATION

When tightening the screws, the cover can twist and cause chafe marks on the anti-roll bar (risk of corrosion).
Hold the cover while tightening the screws. Then check the position of the cover.



- Position the cover (1).
- Tighten down screws (2) and (3).

Cover, steering unit

Screw		Tightening torque	3 Nm

47 – Installing the front right wheel

▸ **Mounting the wheel**

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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.

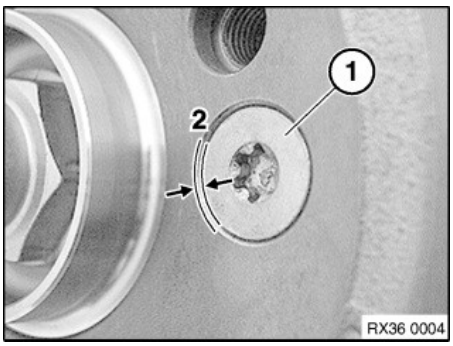
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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.



- 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.

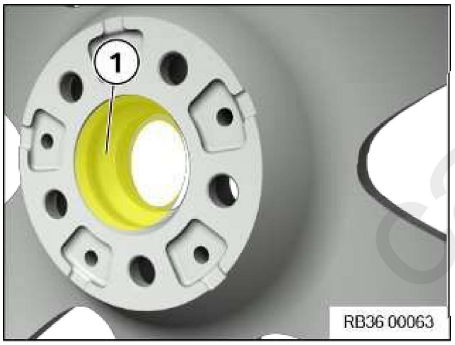
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- 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

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TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against 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



TECHNICAL INFORMATION

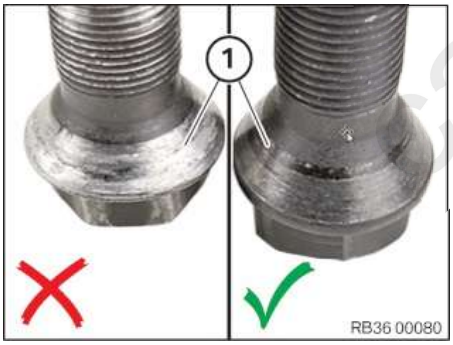
A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

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

Check

- **Check wheel bolts for wear.**



Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts

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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 the corroded wheel bolts (arrows).

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

48 – Prepare for the installation of the diesel particulate filter



- Renew the V-clip (1).

  Parts: V-band clamp



- Renew gasket (1).

  Parts: Gasket

49 – Installing the diesel particulate filter

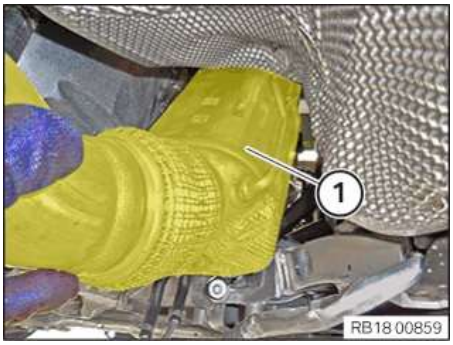
CAUTION

Heavy component.

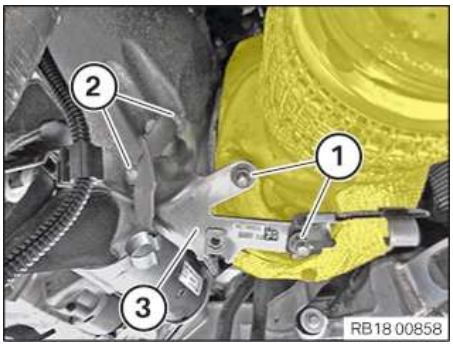
Heavy components can lead to injury or damage.

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

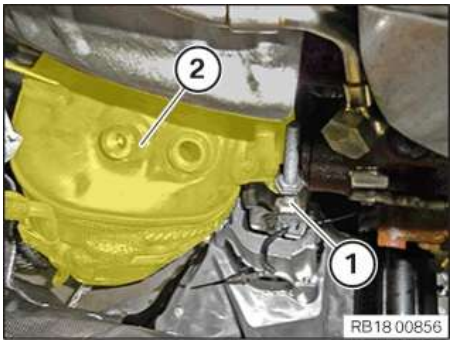
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- Insert and install the diesel particulate filter (1).



- Insert and install the holder (3).
- **Hand-tighten** the bolts (2).
- Apply the nuts (1) **hand-tight**.

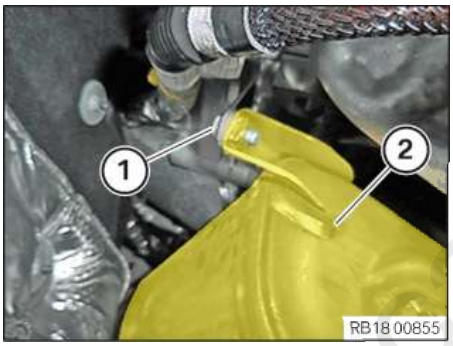


- Renew the V-clip (1).

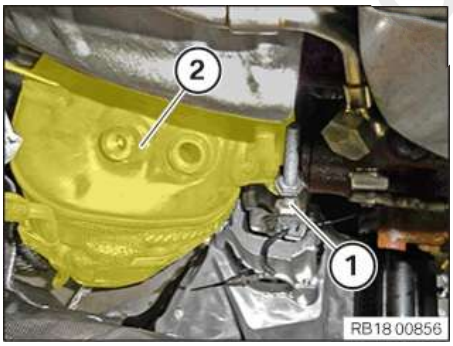
  Parts: V-band clamp
- Feed in and install V-band clamp (1).

Note: Make sure that the seal between the diesel particulate filter and the exhaust turbocharger is installed correctly.

- Position the diesel particulate filter (2) on the exhaust turbocharger .
- Position V-clip (1).
- Apply the V-clip (1) **hand-tight**.



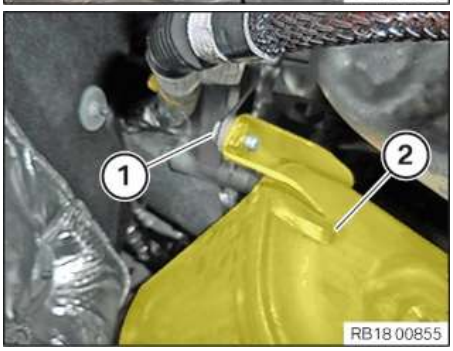
- Feed in screw (1) on the holder of the diesel particulate filter (2) and tighten **hand-tight**.



- Tighten the V-clip (1) of the diesel particulate filter (2).

Diesel particulate filter V-clip to exhaust turbocharger

V-band clamp	Renew V-band clamp.	Tightening torque	15 Nm

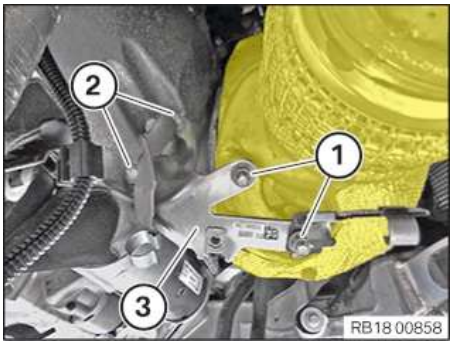


- Tighten the bolt (1) on the bracket of the diesel particulate filter (2).

Bracket to diesel particulate filter top

M8		Tightening torque	19 Nm

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- Tighten the screws (2) on the holder (3).

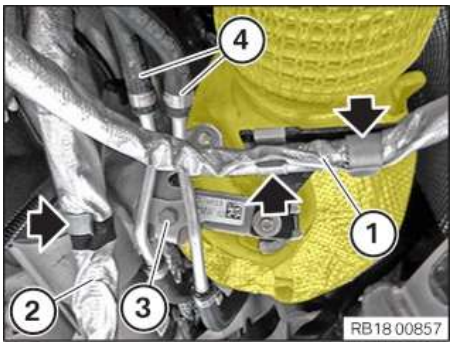
Bracket to transmission for diesel particulate filter holder bottom

M8X20		Tightening torque	19 Nm

- Tighten the nuts (1) on the holder (3).

Lower holder to diesel particulate filter

M8		Tightening torque	19 Nm



- Thread in and install coolant line (4).
- Tighten down screw (3).

Coolant lines for SCR metering module

M6X16		Tightening torque	8 Nm

- Secure the positive battery cable (2) of the starter motor at the clamp (arrow).
- Fasten the metering line (1) on the clamps (arrows).

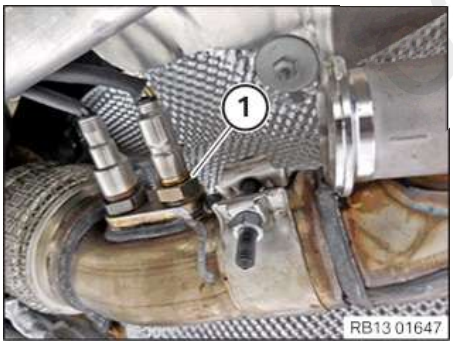
50 – Installing the nitrogen oxide sensor upstream of SCR catalytic converter

RISK OF DAMAGE

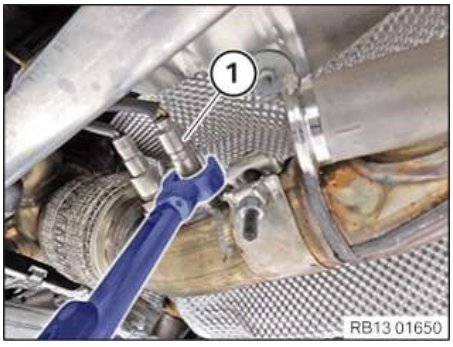
Damage to the nitrogen oxide sensor.

Failure of the nitrogen oxide sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.



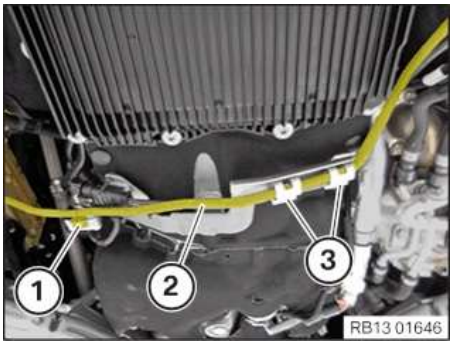
- Feed in and install the nitrogen oxide sensor (1).



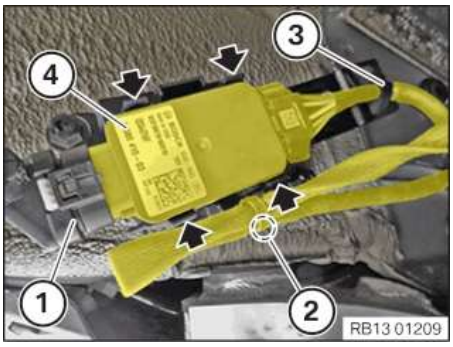
- Tighten the nitrogen oxide sensor (1) using commercially available tools.

Nitrogen oxide sensor before SCR catalytic converter

Sensor		Tightening torque	50 Nm



- Secure the cables (2) to the clamps (3).
- Secure clamps (1).



- Clip in the control unit (4) (arrows).
- Fasten the cable in the holder (3).
- Secure the cable holder (2).
- Plug in the connector (1) and lock audibly.

51 – Installing the monitoring oxygen sensor after the diesel particulate filter

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
  - The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.

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



- Insert the monitoring oxygen sensor (1) and install it.

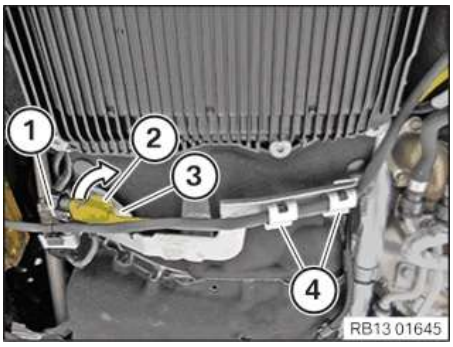
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- Tighten the monitoring oxygen sensor (1) with standard tools.

Monitoring oxygen sensor

Sensor		Tightening torque	50 Nm



- Fasten the monitoring oxygen sensor to the clamps (4).
- Secure the connector (2) on the holder (3) in direction of arrow.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

52 – Installing the 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

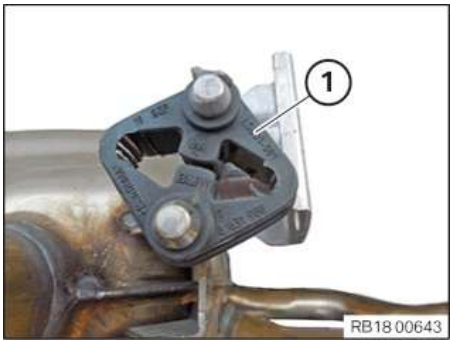
Heavy component.

Heavy components can lead to injury or damage.

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

TECHNICAL INFORMATION

Mount the exhaust system in voltage-free state, maintaining the tightening sequence from the rear silencer towards the exhaust manifold.



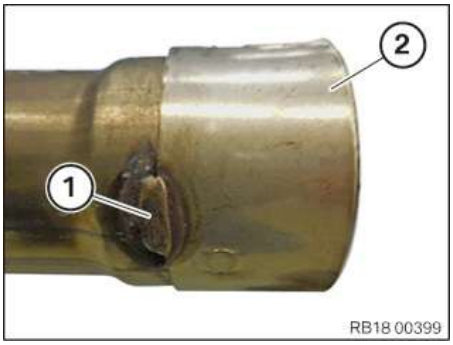
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Check all the rubber mounts (1) of the exhaust system for damage.
- Replaced damaged rubber mounts.

  Parts: Rubber mount

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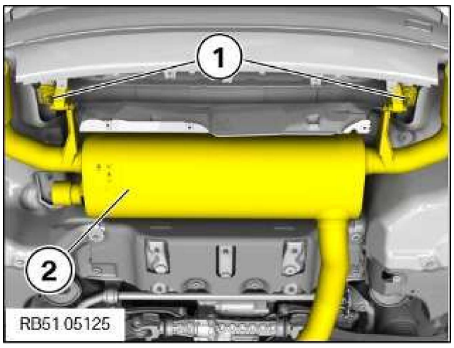
CAUTION

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.

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

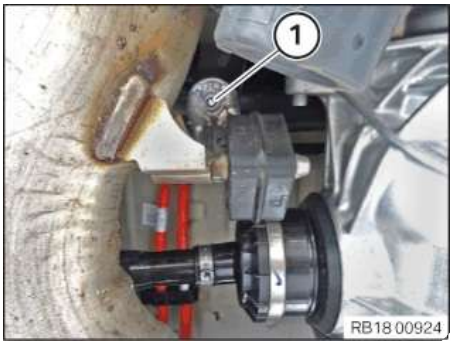


- Insert and install the exhaust system (2).
- Renew nuts (1).

  Parts: Nuts
- Tighten nuts (1).

Rear silencer to body / bumper support

M8	Replace nuts.	Tightening torque	19 Nm

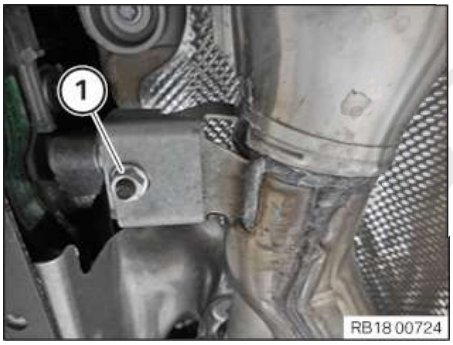


- Renew nut (1) on the rear axle support.

  Parts: Nut
- Tighten nut (1).

Exhaust system to rear axle carrier

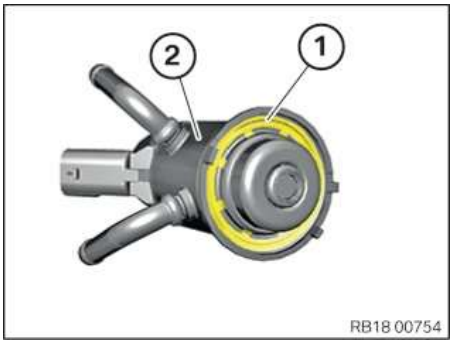
M8 nut		Tightening torque	19 Nm



- Tighten nut (1).

Exhaust system to transmission

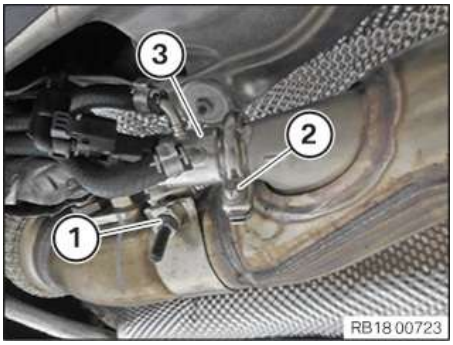
M8		Tightening torque	19 Nm



- Renew sealing ring (1) of the SCR metering module (2).

  Parts: Sealing ring

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- If necessary, renew clamp (1).

  Parts: Clamp
- Tighten clamp (1).

Exhaust system to diesel particle filter

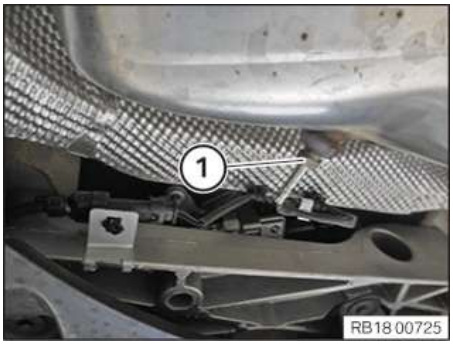
M8	If necessary, renew clamp.	Tightening torque	26 ±2 Nm

- Renew the V-clip (2).

  Parts: V-band clamp
- Install the SCR metering module (3) in the exhaust system.
- Tighten the V-clip (2) of the SCR metering module (3).

SCR metering module V-clip to exhaust system

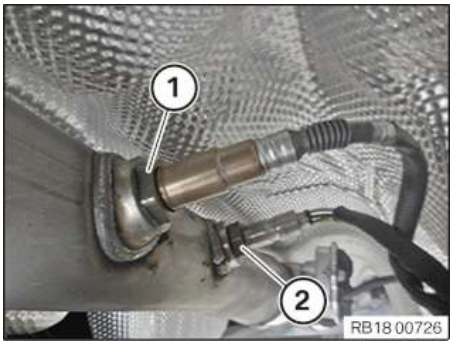
V-band clamp	Renew V-band clamp.	Tightening torque	8 Nm



- Install the exhaust temperature sensor (1) in the exhaust system and tighten.

Exhaust-gas temperature sensor upstream of SCR catalytic converter

Sensor		Tightening torque	30 Nm



- Install the diesel particulate sensor (1) in the exhaust system and tighten.

Diesel particulate sensor to exhaust system

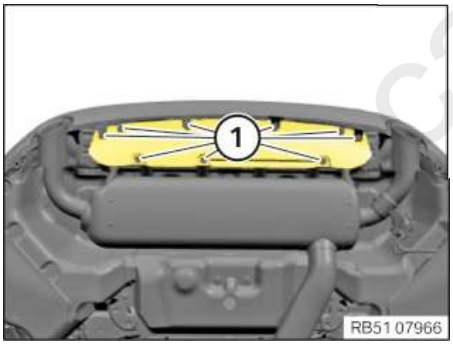
Sensor		Tightening torque	50 Nm

- Install the nitrogen oxide sensor (2) in the exhaust system and tighten.

Nitrogen oxide sensor downstream of SCR catalytic converter

Sensor		Tightening torque	55 Nm

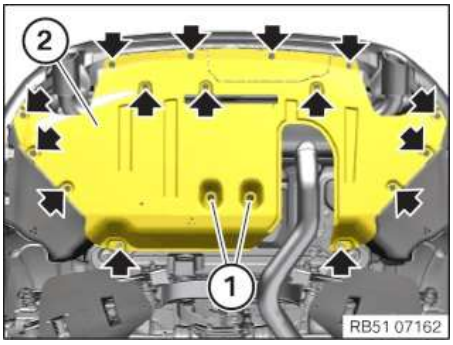
53 – Installing the rear diffuser



- **Version 1:**
- Install the diffuser and tighten the nuts (1).

Diffuser / underbody panelling

Nuts and screws		Tightening torque	3 Nm



- **Version 2:**
- Feed in and position the diffuser (2)
- Tighten screws (arrows).

Diffuser / underbody panelling

Nuts and screws		Tightening torque	3 Nm

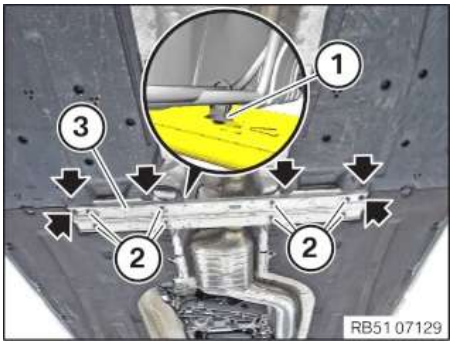
- Tighten nuts (1).

Diffuser / underbody panelling

Nuts and screws		Tightening torque	3 Nm

54 – Install the connecting supports on the tunnel

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

Connecting support to tunnel

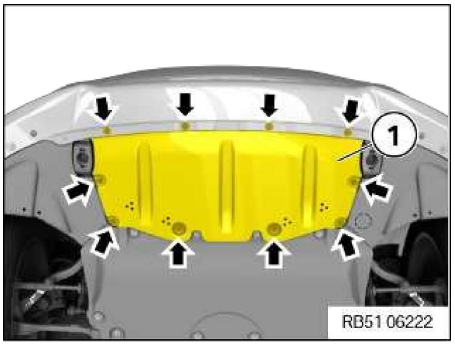
M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Secure the clamp (1).

55 – Installing the front underbody protection



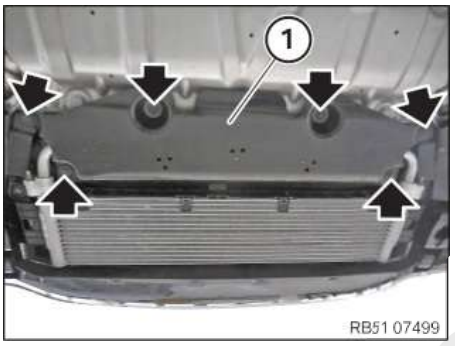
- **Version A:**

  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



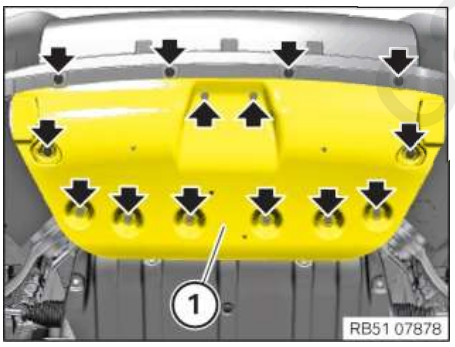
- **Version B:**

  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 C:**

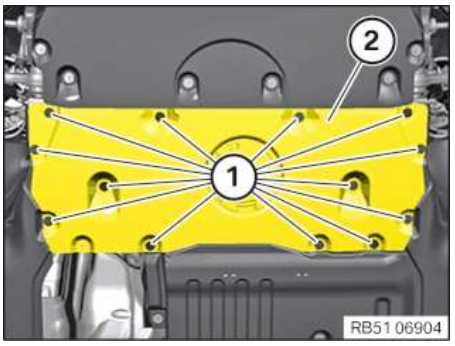
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

56 – Installing the centre underbody protection



- **Variant with rear wheel drive:**

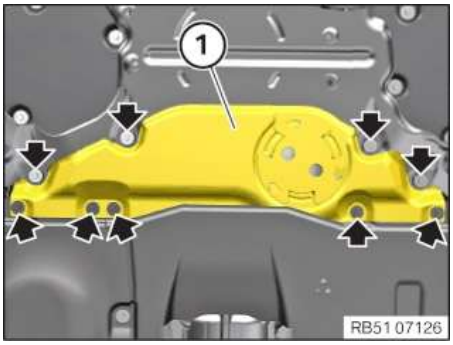
  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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

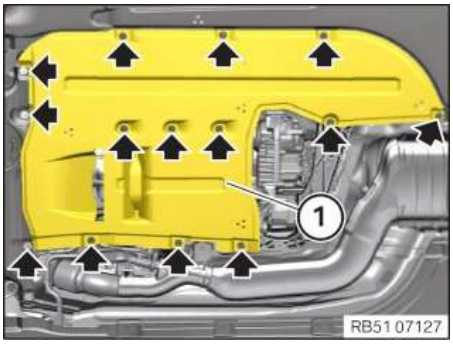
  Guide in centre underbody protection (1) and install.

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

57 – Installing underbody protection at rear



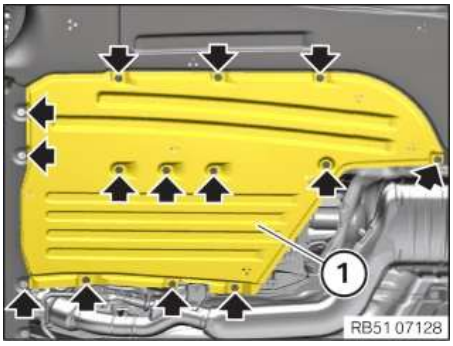
- **Version A:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version B:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

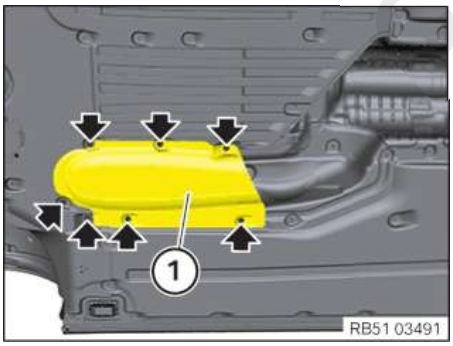
Underbody protection

Hexagon screw		Tightening torque	3 Nm

58 – Install the underbody panelling of the transmission on the side

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.



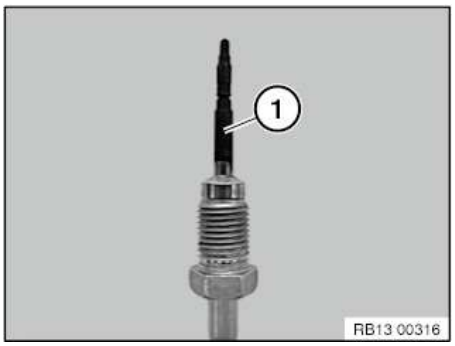
- Insert the underbody panelling (1).
- Tighten screws (arrows).

Underbody panelling

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

59 – Installing the exhaust temperature sensor for the exhaust system downstream the catalytic converter on the diesel particulate filter

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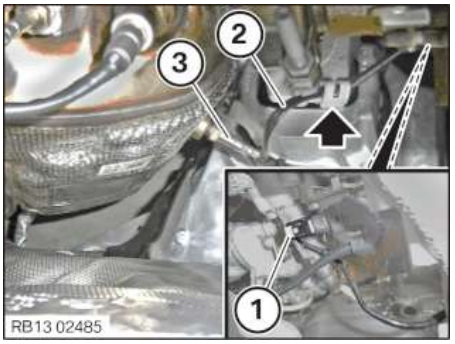
RISK OF DAMAGE

Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

- Make sure that the gauge tip is not damaged.

- Check the gauge tip (1) for damage.



- Feed in and install the exhaust temperature sensor (3).
- Tighten the exhaust temperature sensor (3).

Exhaust temperature sensor for the exhaust system after catalytic converter before diesel particulate filter

Sensor		Tightening torque	30 Nm

- Secure cable (2) to the clamp (arrow).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

60 – Installing the front oxygen sensor on the diesel particulate filter

RISK OF DAMAGE

Damage to the front oxygen sensor or monitoring oxygen sensor.

Failure of the front oxygen sensor or monitoring oxygen sensor due to contamination or preliminary mechanical damage.

- Remove the protective cap on the sensor only when screwing the sensor on to the exhaust system.
- Do not use mounting aids, cleaning agents, gaseous and liquid agents in workplaces, storage areas and during transport.
- Contaminations (particles, dust exposure, moisture, etc.) in the area of the plug and socket connection and the sensor must be avoided.
- Mechanical loads (impacts on the sensor or the control unit, tensile loads on the cable, etc.) must be avoided.
- Do not continue using component if these specifications are deviated from.
- The installation location (exhaust system) must be dry. If necessary, dry the installation location with compressed air.

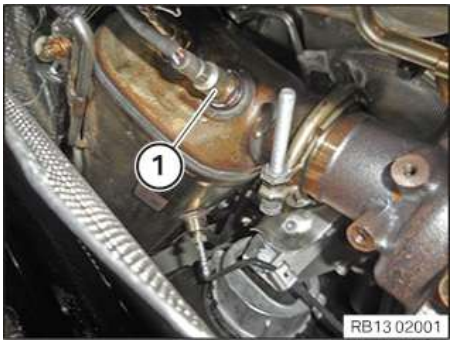
TECHNICAL INFORMATION

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

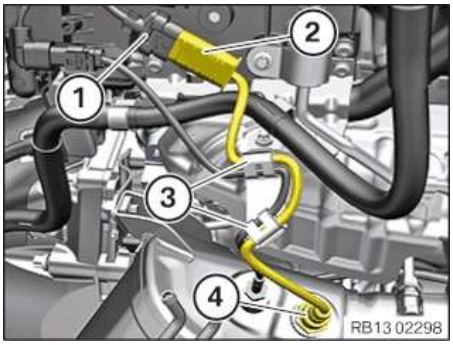


- Insert and install the front oxygen sensor (1).
- Tighten the front oxygen sensor (1) with standard tools.

Front oxygen sensor to top of diesel particulate filter

Sensor		Tightening torque	50 Nm

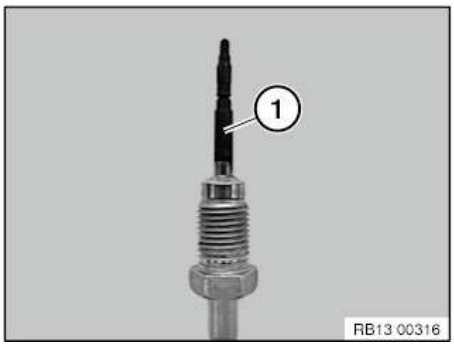
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- Fasten the front oxygen sensor (4) to the clamps (3).
- Connect connectors (2) and lock.
- Connect connectors (1) and lock.

  The connectors (1) and (2) must audibly engage.

61 – Install the exhaust-gas temperature sensor on the diesel particulate filter



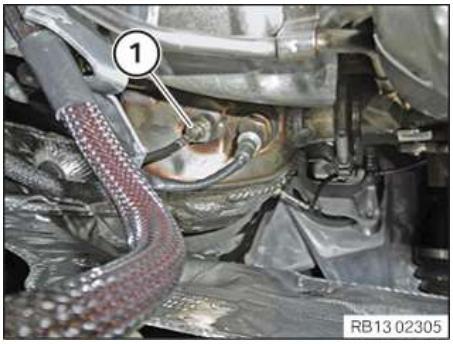
RISK OF DAMAGE

Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

- Make sure that the gauge tip is not damaged.

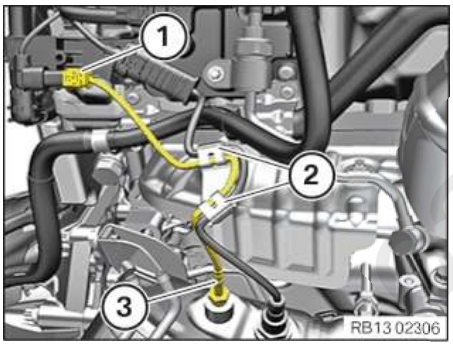
- Check gauge tip (1) for damage.



- Feed in and install the exhaust temperature sensor (1).
- Tighten the exhaust temperature sensor (1) with the special tool .

Exhaust-gas temperature sensor to diesel particulate filter

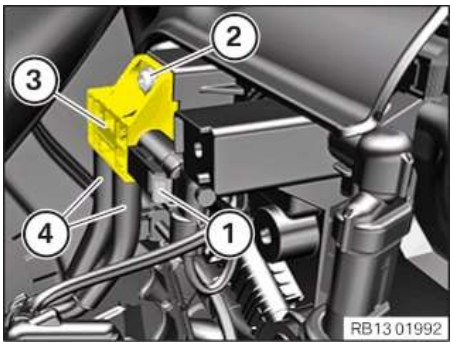
Sensor		Tightening torque	30 Nm



- Secure the exhaust temperature sensor (3) to the clamp (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

62 – Installing the differential pressure sensor for the diesel particulate filter



- Feed in and install the differential pressure sensor (3).
- Tighten down screw (2).

Differential pressure sensor of diesel particulate filter on cylinder head cover

TS5x20		Tightening torque	4 Nm

- Check the pressure hoses (4) for hardening and damage, renew if necessary.
- Connect the pressure hoses (4) and secure them using 15 mm to 19 mm screw clamps.

Clamp for the pressure hose on the differential pressure sensor

Clamp 15–19mm		Tightening torque	3 Nm

- Connect connectors (1) and lock.

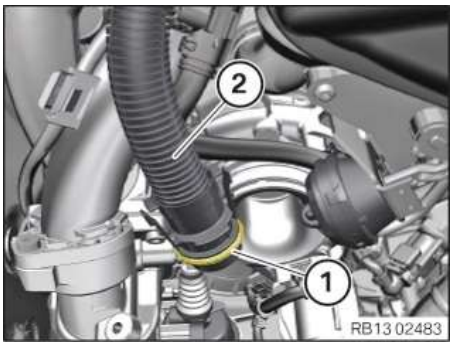
  The connector (1) must engage audibly.

63 – Installing the clean air pipe with resonator

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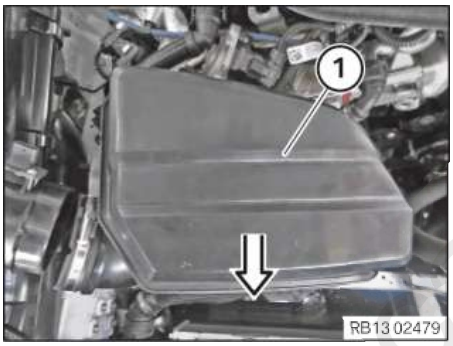
- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.



- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

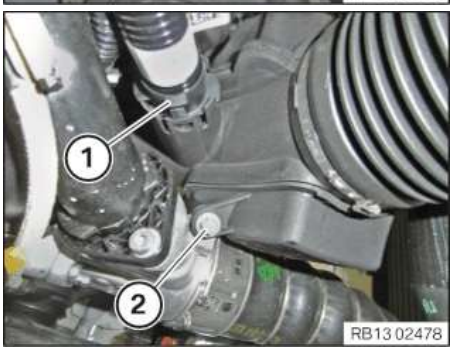


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

  The clamp (1) must engage audibly.

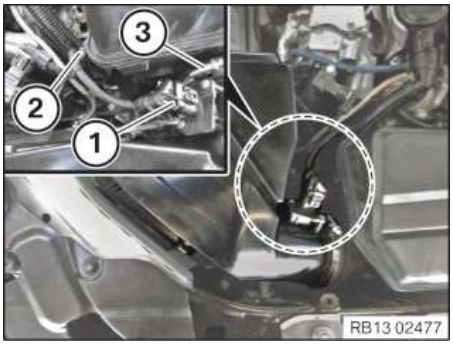


- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm

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- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

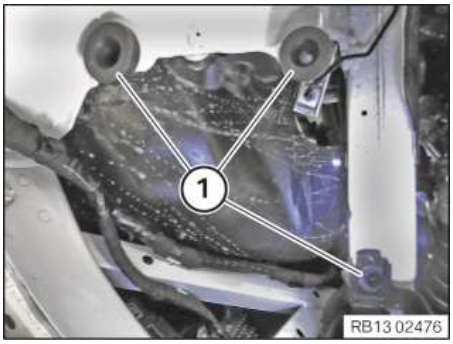
Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

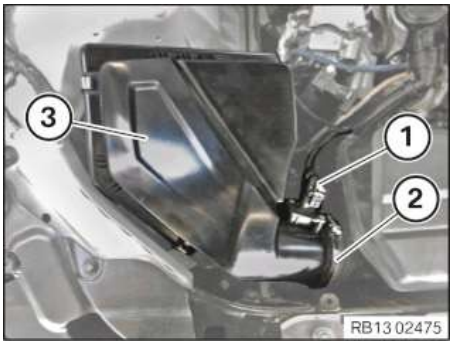
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

64 – 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

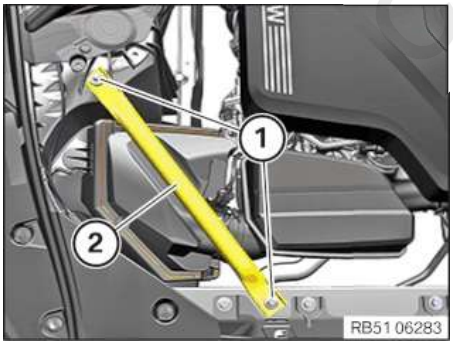
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

65 – Install the right front-end strut

TECHNICAL INFORMATION

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



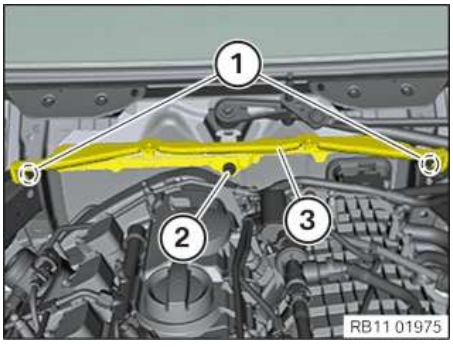
- Install the front-end strut (2).
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Front end strut

Screw		Tightening torque	56 Nm

66 – Installing centre bulkhead lower section



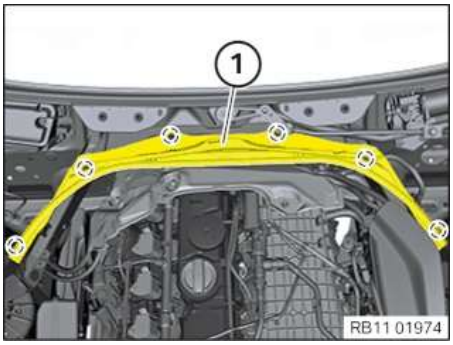
- Position the centre bulkhead lower part (3).
- Tighten nut (2) and screws (1).

Bulkhead lower part to body

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

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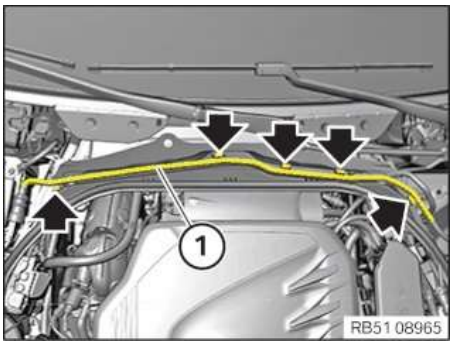
67 – Installing the centre bulkhead upper part



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

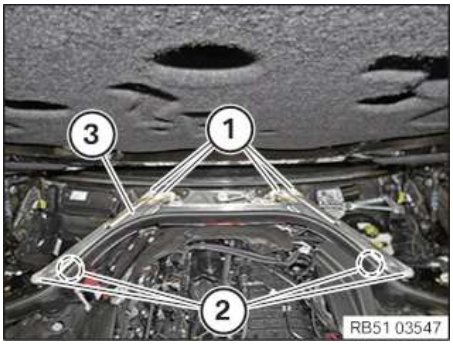
Bulkhead upper part to bottom bulkhead

	Tightening torque	3 Nm



- **Version with mild hybrid technology:**

  Clip in the wire (1) into the holders (arrows).



NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- 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: Screws
- Tighten the screws (2).

Tension strut to spring strut dome

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

68 – 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.

69 – Installing cowl panel cover

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RISK OF DAMAGE

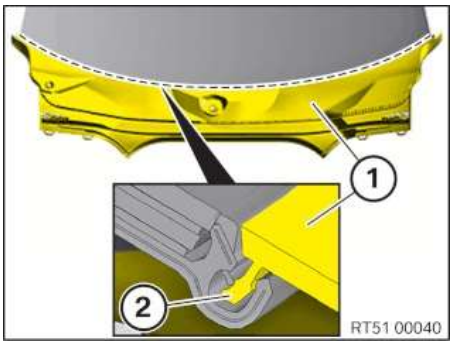
Damage caused by water ingress into the vehicle.

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

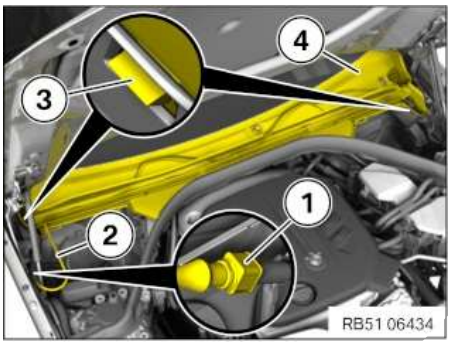
- Ensure correct installation of the components.
- Only use undamaged components.

TECHNICAL INFORMATION

Before installing the cowl panel cover it is **mandatory** to check that the 48 V line is routed correctly and fitted tightly.
An incorrectly laid or attached 48 V line can be damaged by the wiper kinematics.



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



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

70 – Install left and right wiper arm

NOTICE

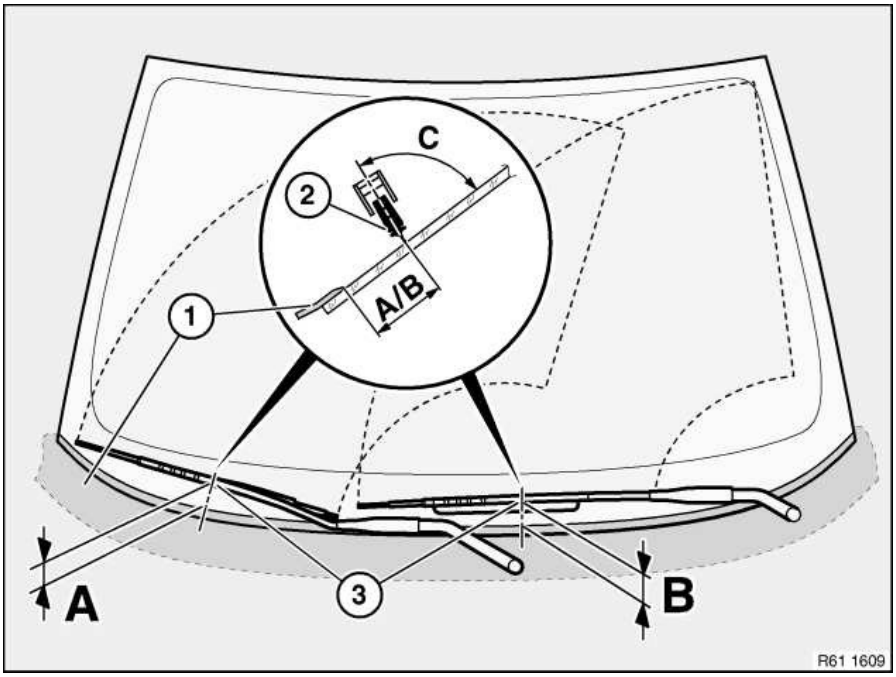
Description is for left component only. Procedure on the right side is identical.

▸ **Installing left and right wiper arm**

TECHNICAL INFORMATION

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

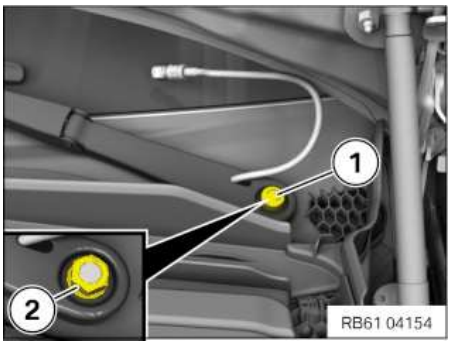
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- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

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

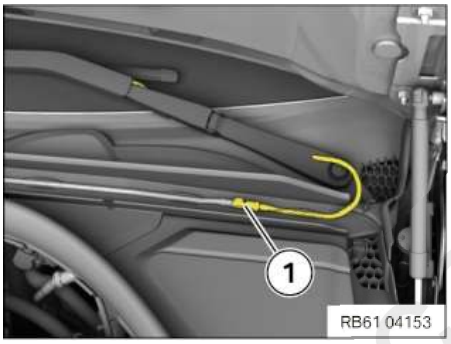


- Tighten nut (2).

Windscreen wiper arm

Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Feed washer fluid hose (1) into the cowl panel guide and connect at the separation point.

71 – Connecting all battery earth leads



- See additional information.

72 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm

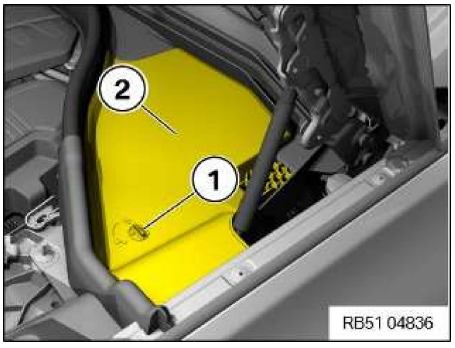


- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

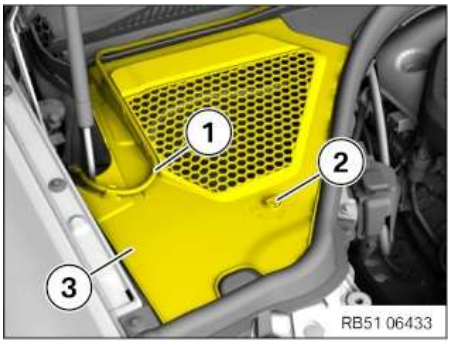
73 – Install the cover of the engine compartment on the rear left



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

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74 – Install the rear right engine compartment cover



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

75 – Check engine oil level

Prerequisite

Vehicle is in a horizontal position.

TECHNICAL INFORMATION

Please comply with instructions in Owner's Handbook.

- Carry out an electronic oil measurement.
- Top up engine oil if necessary.

▸ **Check engine oil level**

TECHNICAL INFORMATION

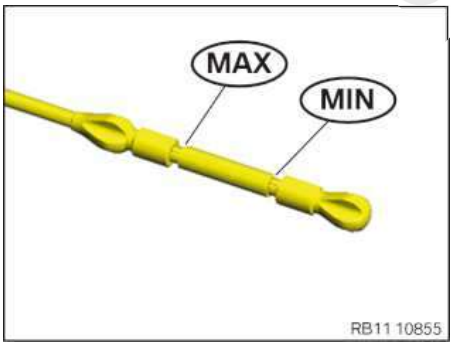
Always check the engine oil level when the engine is at operating temperature (engine oil temperature > 70°C).

- Park vehicle on a horizontal surface.
- Stop the engine and wait for 5 minutes.
- Pull out the oil dipstick and wipe off using a lint-free cloth.

TECHNICAL INFORMATION

Do not pull out or insert the oil dipstick into the guide tube too quickly or slowly.

- Push the oil dipstick into the guide tube up to the limit position and pull it out again.



TECHNICAL INFORMATION

The engine oil level must be between the minimum mark and the maximum mark of the oil dipstick.

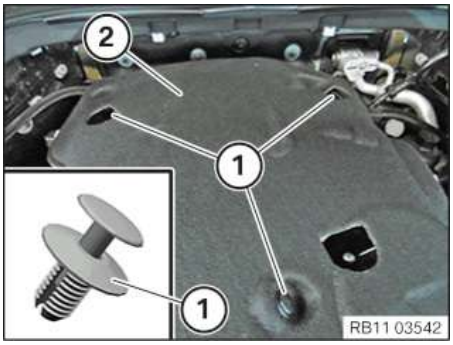
- Read the engine oil level on the oil dipstick.
- Top up engine oil if necessary.

Oil quantity between the two markings MIN and MAX of the oil dipstick

1.0 l

76 – Install the acoustic cover for the injectors

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- Feed the acoustic cover (2) in and install.
- **If installed:** Secure the acoustic cover (2) with the expanding rivets (1) .

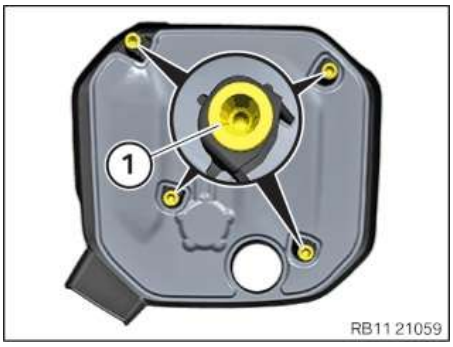
77 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

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

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



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

78 – Take bonnet out of the service position

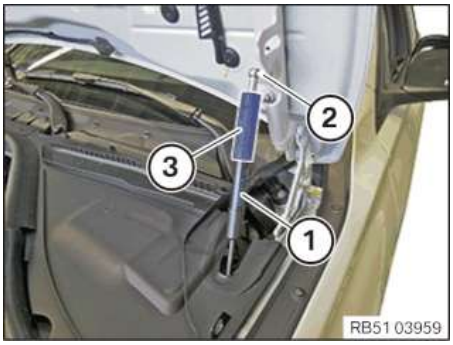
CAUTION

Shutting bonnet or tailgate.

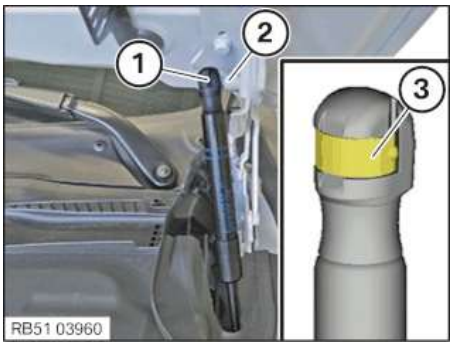
Danger of injury!

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

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- 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.



- 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

Central piston cooling valve to crankcase			Used in step 39
M6x16		Tightening torque	8 Nm

Exhaust manifold to cylinder head			Used in step 40
M7	**If necessary, renew loose stud bolts.**	Tightening torque	11 Nm
	Renew nuts.	Tightening torque	13 Nm

Oil feed line on cylinder head			Used in step 40
M6x12		Tightening torque	8 Nm

Exhaust-gas recirculation cooler to exhaust manifold			Used in step 40
M8x28	Replace screws	Tightening torque	32 Nm

Exhaust-gas recirculation cooler to cylinder head			Used in step 40
M8x20 / M8x28		Tightening torque	19 Nm

Exhaust turbocharger low-pressure stage to crankcase			Used in step 40
M8X16		Tightening torque	22 Nm

Oil return line to turbocharger			Used in step 40
M6x12	Renew gasket.	Tightening torque	8 Nm

Oil return line to crankcase			Used in step 40
M6x12	Check gasket. Renew the seal or line if necessary.	Tightening torque	8 Nm

Heat shield to exhaust manifold			Used in step 41
M6x12			10 Nm

Bracket on cylinder head cover			Used in step 42
		Tightening torque	5 Nm

Battery positive lead to battery positive terminal			Used in step 42
M8		Tightening torque	19 Nm

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Heat shield to exhaust manifold — Used in step 43

M6x12		Tightening torque	10 Nm

Banjo bolt for exhaust pressure pipe to exhaust manifold — Used in step 43

Hollow bolt	Renew sealing rings.	Tightening torque	30 Nm

Exhaust gas pressure pipe to sensor system holder — Used in step 43

TS6x20		Tightening torque	5,7 Nm

Cover, steering unit — Used in step 46

Screw		Tightening torque	3 Nm

Brake disc to front wheel hub — Used in step 47

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 47

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 47

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

Diesel particulate filter V-clip to exhaust turbocharger — Used in step 49

V-band clamp	Renew V-band clamp.	Tightening torque	15 Nm

Bracket to diesel particulate filter top — Used in step 49

M8		Tightening torque	19 Nm

Bracket to transmission for diesel particulate filter holder bottom — Used in step 49

M8X20		Tightening torque	19 Nm

Lower holder to diesel particulate filter — Used in step 49

M8		Tightening torque	19 Nm

Coolant lines for SCR metering module — Used in step 49

M6X16		Tightening torque	8 Nm

Nitrogen oxide sensor before SCR catalytic converter — Used in step 50

Sensor		Tightening torque	50 Nm

Monitoring oxygen sensor — Used in step 51

Sensor		Tightening torque	50 Nm

Rear silencer to body / bumper support — Used in step 52

M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier — Used in step 52

M8 nut		Tightening torque	19 Nm

Exhaust system to transmission — Used in step 52

M8		Tightening torque	19 Nm

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Exhaust system to diesel particle filter			Used in step 52
M8	If necessary, renew clamp.	Tightening torque	26 ±2 Nm

SCR metering module V-clip to exhaust system			Used in step 52
V-band clamp	Renew V-band clamp.	Tightening torque	8 Nm

Exhaust-gas temperature sensor upstream of SCR catalytic converter			Used in step 52
Sensor		Tightening torque	30 Nm

Diesel particulate sensor to exhaust system			Used in step 52
Sensor		Tightening torque	50 Nm

Nitrogen oxide sensor downstream of SCR catalytic converter			Used in step 52
Sensor		Tightening torque	55 Nm

Diffuser / underbody panelling			Used in step 53
Nuts and screws		Tightening torque	3 Nm

Connecting support to tunnel			Used in step 54
M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

Underbody protection front			Used in step 55
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

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

Underbody panelling			Used in step 58
Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

Exhaust temperature sensor for the exhaust system after catalytic converter before diesel particulate filter			Used in step 59
Sensor		Tightening torque	30 Nm

Front oxygen sensor to top of diesel particulate filter			Used in step 60
Sensor		Tightening torque	50 Nm

Exhaust-gas temperature sensor to diesel particulate filter			Used in step 61
Sensor		Tightening torque	30 Nm

Differential pressure sensor of diesel particulate filter on cylinder head cover			Used in step 62
TS5x20		Tightening torque	4 Nm

Clamp for the pressure hose on the differential pressure sensor			Used in step 62
Clamp 15–19mm		Tightening torque	3 Nm

Clean air pipe to exhaust turbocharger			Used in step 63
M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 6364
Clamp		Tightening torque	3 Nm

Front end strut			Used in step 65
Screw		Tightening torque	56 Nm

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Bulkhead lower part to body — Used in step 66

Screw		Tightening torque	2,6 Nm
Plastic nut		Tightening torque	2,6 Nm

Bulkhead upper part to bottom bulkhead — Used in step 67

		Tightening torque	3 Nm

Tension strut on bulkhead — Used in step 67

M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome — Used in step 67

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

Windscreen wiper arm — Used in step 70

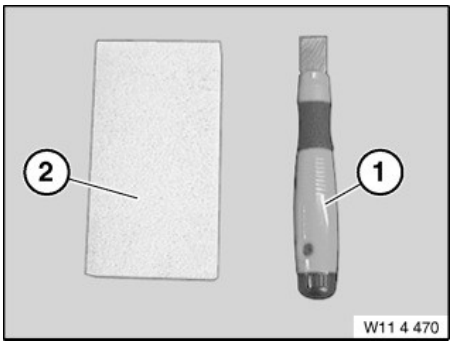
Combination hexagon nut		Tightening torque	35 Nm

Negative battery cable to 48-V battery — Used in step 72

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

0 495 102 (11 4 470) Tool



Common — Used in step 40

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)	

2 344 011 Tool



Common — Used in step 47

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:

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0 495 221 (36 1 323) Wheel stud



Common	Used in step 30
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	

0 495 224 (36 1 326) Wheel stud



Common	Used in step 30
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 30
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 30
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	

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0 495 227 (36 1 329) Wheel stud



Common	Used in step 30
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	

0 495 228 (36 1 331) Wheel stud



Common	Used in step 30
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 30
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	

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0 495 230 (36 1 333) Wheel stud



Common	Used in step 30
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

Distance from window pane edge to wiper blade	Used in step 70
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Oil quantity between the two markings MIN and MAX of the oil dipstick	Used in step 75
	1.0 l

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	472

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	161718192728
61 35 ... Notes on ESD protection (Electro Static Discharge)	161718192728
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	571
61 20 900 Disconnecting and connecting battery earth lead	571
61 20 900 Disconnecting and connecting battery earth lead	571
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61 20 900 Disconnecting and connecting battery earth lead	571
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61 20 900 Disconnecting and connecting battery earth lead	571
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	571
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	571
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	571
61 20 900 Disconnecting and connecting battery earth lead	571
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	571
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	571
61 20 900 Disconnecting and connecting battery earth lead	571
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	571
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	571
61 20 900 Disconnecting and connecting battery earth lead	571
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61 20 900 Disconnecting and connecting battery earth lead	571
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	571
61 20 900 Disconnecting and connecting battery earth lead	571
61 20 900 Disconnecting and connecting battery earth lead	571
61 20 900 Disconnecting and connecting battery earth lead	571
00 02 001 Raising the vehicle using a vehicle lift	3047

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Parts

Parts required

Designation	Used in step
Seal, shift valve, central piston cooling to crankcase	39