00 Safety information for working on vehicles with automatic engine start-stop function (MSA)



Warning!

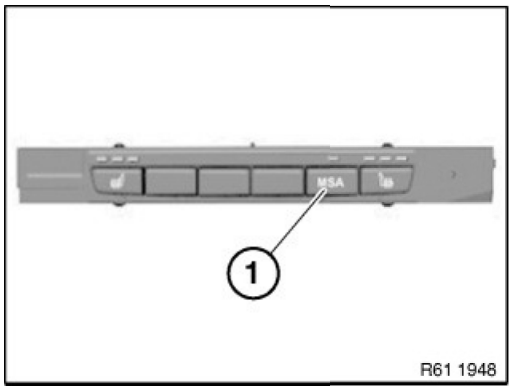
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

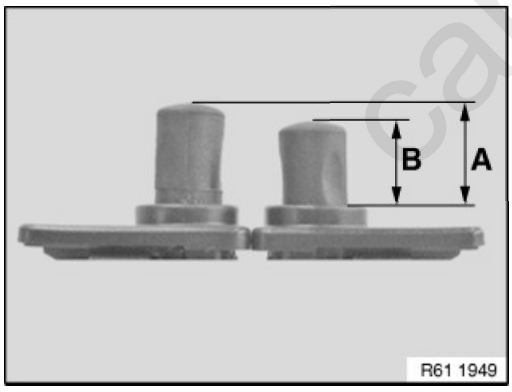
Observe safety precautions when working on MSA vehicles.

Before carrying out practical work on the engine, always ensure that the MSA functionality is deactivated so as to prevent automatic engine starting while work is being carried out in the engine compartment.

MSA function is deactivated by:



- Deactivate MSA by means of button (1) in passenger compartment
- Open seat belt buckle and driver's door



- Open engine bonnet/hood and ensure that engine hood/bonnet contact is not in workshop mode
  - Workshop mode

    A = 10 mm
  - Basic setting (engine hood/bonnet open)

    B = 7 mm

  To make sure that the engine hood/bonnet contact is at the basic setting, if necessary press the hood/bonnet contact up to the limit position before starting work and slowly release.



When working with diagnosis tools:

- Observe instructions in diagnosis tool

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Note:
For further information on automatic engine start-stop function (MSA):

- Refer to the Service Information (bulletin) (for manual transmissions) Service Information (bulletin) 61 01 07 335
- Refer to the Service Information (bulletin) (for automatic transmissions or twin-clutch gearboxes) Service Information (bulletin) 61 01 10 629

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13 31 ... Notes regarding the fuel pressure test (reference pressure: surrounding area)

The characteristic of this version with ambient pressure:

The connection for the vacuum hose of the fuel pressure regulator is located between the throttle valve and the air cleaner and/or on the air cleaner.

Test prerequisite:

The correct fuel pressure regulator has been installed.

- Use the Electronic Parts Catalogue to check whether the correct fuel pressure regulator has been installed for the vehicle:

  Connect test adapter.

The regulating function of the fuel pressure regulator must be ensured under all operating conditions. The fuel pump must always be able to generate a fuel pressure that is higher than the pressure that is adjusted by the pressure regulator.

The DME controls the injection period for which the injection rate is adjusted.

The fuel return line is depressurised at engine standstill and ignition key position 0.The pressure regulator will close at engine standstill and ignition key position 0. The fuel pressure in the feed will be maintained for an extended period of time. A non-return valve will close in the fuel pump. This measure will maintain the fuel pressure in the fuel system. Extended start times are thereby prevented.

- Let the engine run at idle and measure the fuel pressure.

When the measured value is less than the nominal value - 0.2 bar:

- The line cross-sections in the fuel feed are constricted or the fuel filter is plugged,

  or

- The voltage supply to the fuel pump function is not OK: For example, as a result of high contact resistance (corrosion) in the plug connection between the wiring harness and the fuel pump.

When the measured value exceeds the nominal value + 0.2 bar:

- Stop the engine and then monitor the measured value.
- When the measured value drops to the nominal value, the line cross-sections in the fuel return line are constricted or plugged.
- Check the fuel lines for kinks.

If no kinks are visible:

- Replace the return lines.

When the measured value remains too high, the pressure regulator is most likely faulty.

Attention:

There is a low probability that the return line is completely closed due to obstruction. Fuel would then leak out under pressure when the pressure regulator is removed!

- Have a cleaning rag ready and catch and dispose of escaping fuel.
- Do not replace the pressure regulator. Replace the return line instead.
- Let the engine run briefly at idle and then stop the engine.
- Write down the measured value at engine standstill.
- Read the measured value again after about 20 to 30 minutes at engine standstill.

The following check requires special tool 13 3 010 (hose clip).

If the measured value dropped by more than 0.5 bar:

- Start the engine and wait briefly for stable pressure build-up

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- Stop the engine and immediately disconnect the feed line just before the pressure gauge with special tool 13 3 010
- Write down the measured value
- Read the measured value again after about 20 to 30 minutes at engine standstill

The following faults may be present if the measured value now dropped less than 0.5 bar:

- Fault in the feed lines
- Fault in the internal tank feed hose
- Faulty pressure-maintaining stop valve in the fuel pump

Check components. Replace faulty components.

If the measured value dropped again by more than 0.5 bar:

- Replace the pressure regulator

- All fuel hoses and their hose clamps that were loosened during the checks must be replaced.
- Read out fault memory of DME control unit. Check stored fault messages. Rectify fault. Clear diagnostic fault entries from fault memory.

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13 31 035 Removing and installing/replacing the fuel feed line

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

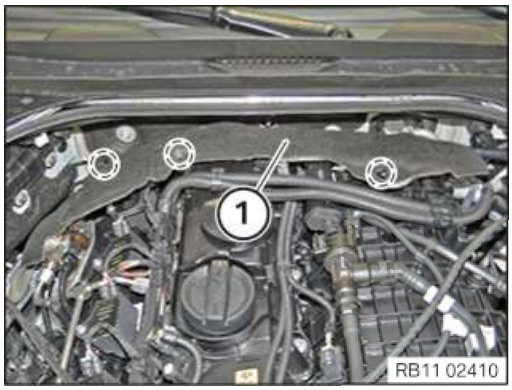
3 – Remove the seal for the rear bonnet

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

4 – Removing acoustic cover at rear



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

5 – Remove all ignition coils.

NOTICE

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

▸ **Removing the ignition coil**

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the ignition coil.

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

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

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RISK OF DAMAGE

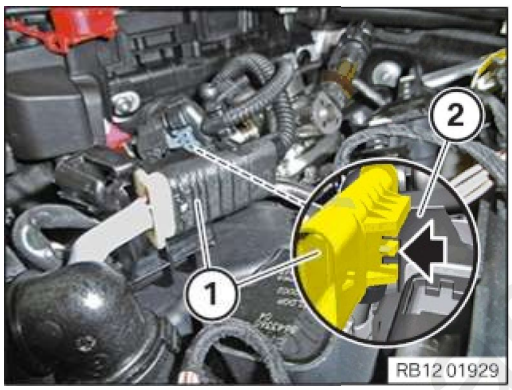
Electrostatic discharge.

Damage to or destruction of electrical components.

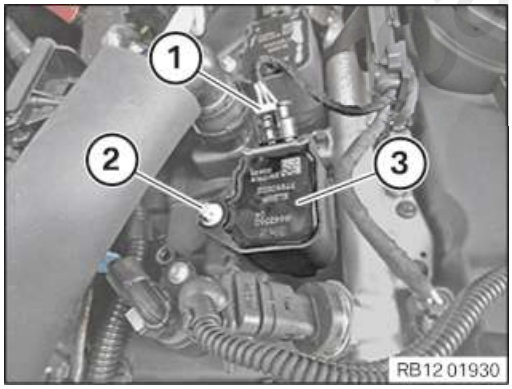
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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



- Unlock plug connection (1) and disconnect.



- Unlock connector (1) (arrow) and disconnect it from holder (2).



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

MAIN WORK

6 – Remove fuel delivery line

WARNING

Working on fuel system.

Risk of fire! Danger of explosion!

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

CAUTION

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

Danger of injury!

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

RISK OF DAMAGE

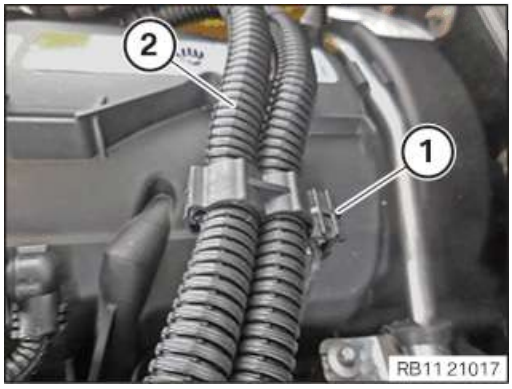
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

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

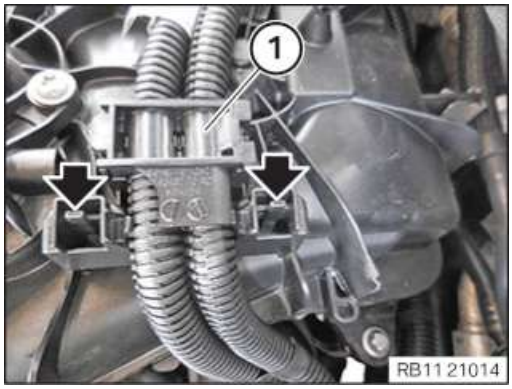
TECHNICAL INFORMATION

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

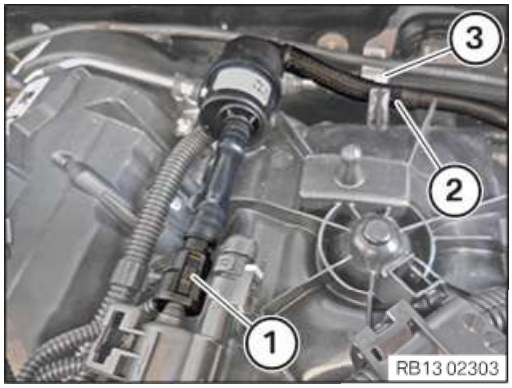


- Loosen clamp (1).
- Guide out wiring harness section (2) for the injectors and ignition coils and place it aside.

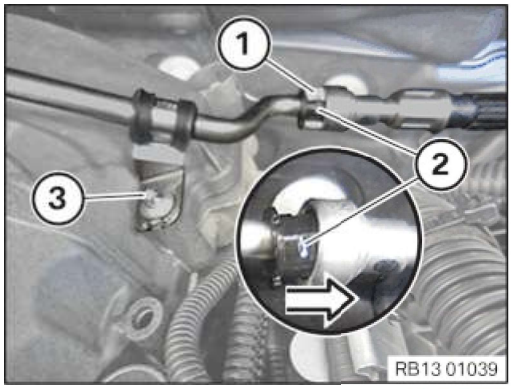
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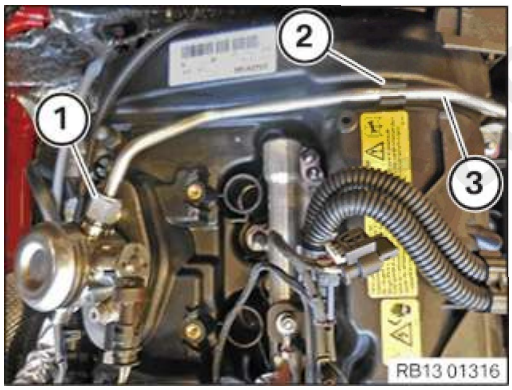
- Unlock the locks (arrows).
- Guide out wiring harness section (1) for the injectors and ignition coils and place it aside.



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



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



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

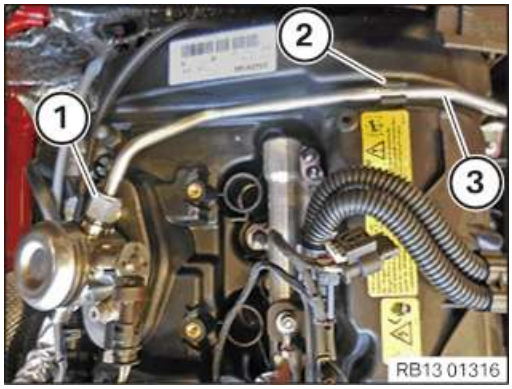
7 – Installing fuel delivery line

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

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

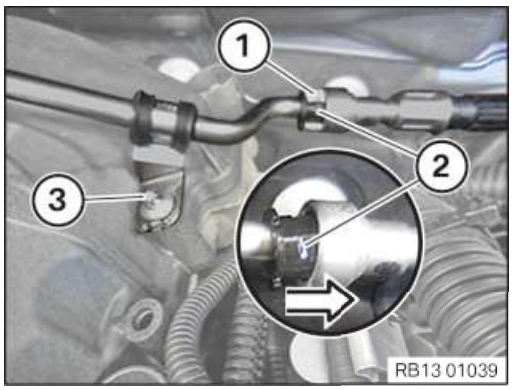
- Route all cables without abrasions, do not trap and crush.



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

Fuel delivery line to high pressure pump

M14		Tightening torque	31 Nm

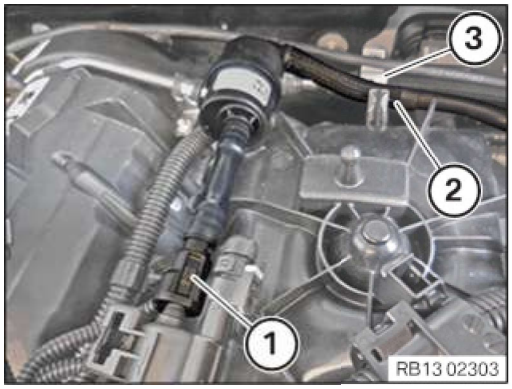


- Slide in and lock the fuel feed line in the direction of the arrow in the snap fastener (2).

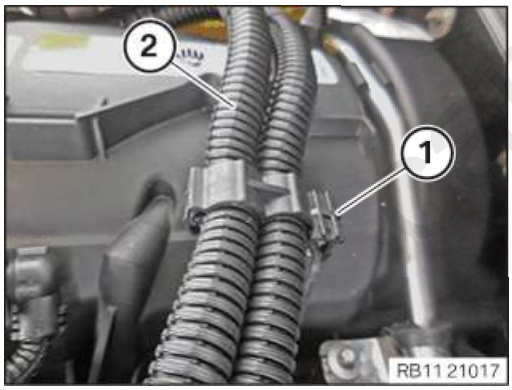
  The fuel feed line must be audibly engage in the snap fastener (2).
- Secure the clamp (1).
- Tighten down screw (3).

Fuel delivery line to cylinder head cover

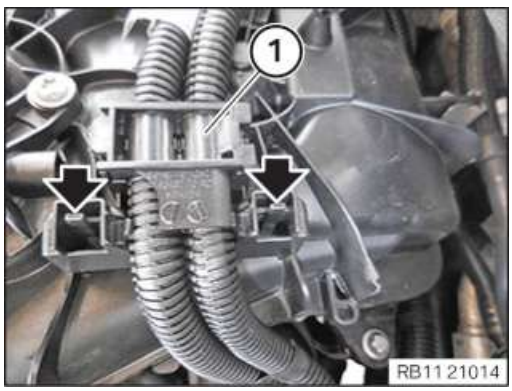
M6 screw		Tightening torque	6,5 Nm



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



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



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

POSTPROCESSES

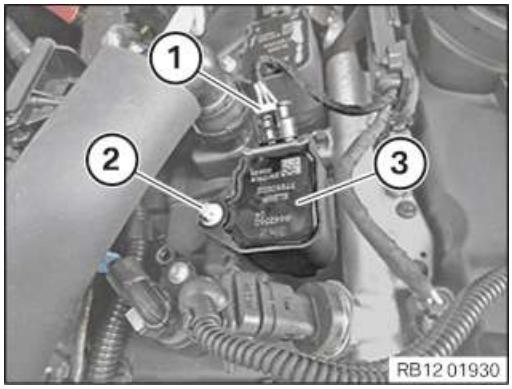
8 – Install all ignition coils

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NOTICE

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

▶ **Install ignition coil.**



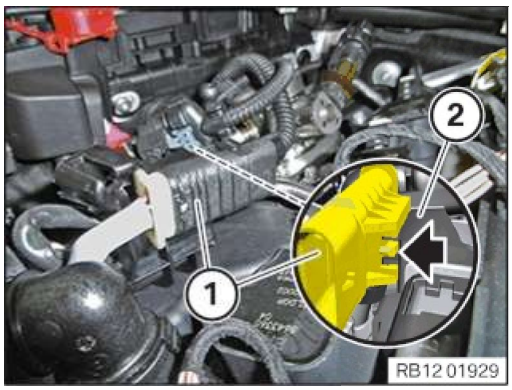
- Install ignition coil (3).
- Tighten down screw (2).

Ignition coil

Screw		Tightening torque	8 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Connect and lock connector (1) with holder (2) (arrow).

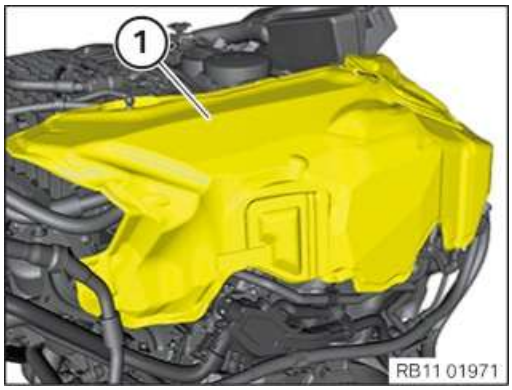
  The connector (1) must engage audibly.



- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

9 – Installing acoustic cover at rear



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

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

10 – 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.

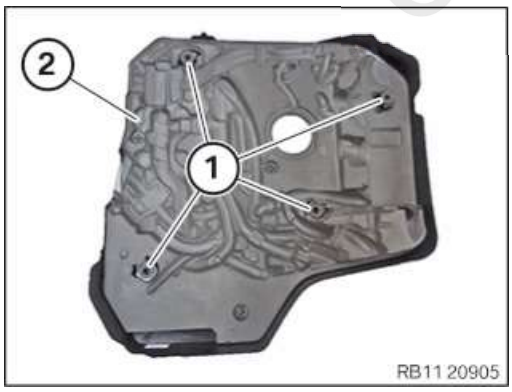
11 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.

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

  The acoustic cover (1) must audibly engage into place.

12 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

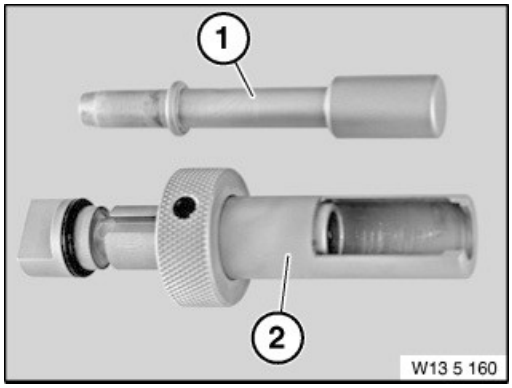
Fuel delivery line to high pressure pump			Used in step 7
M14		Tightening torque	31 Nm

Fuel delivery line to cylinder head cover			Used in step 7
M6 screw		Tightening torque	6,5 Nm

Ignition coil			Used in step 8
Screw		Tightening torque	8 Nm

Overview of Special Tools

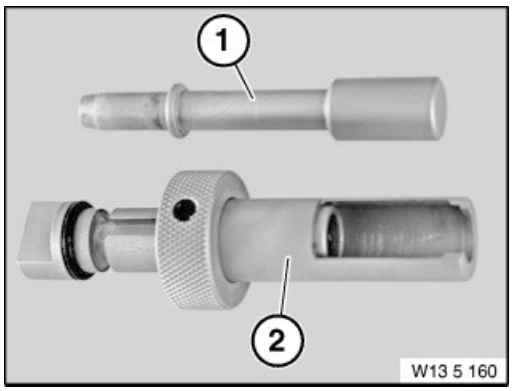
0 496 567 (13 5 161) Fastener



Common	Used in step 6
Usage	(Cap (2 piece)) For sealing the quick connectors Deletion, only available via tool set
Included in the tool or work	0 496 565
Storage location	
Replaced by	
In connection with	
SI-Number	

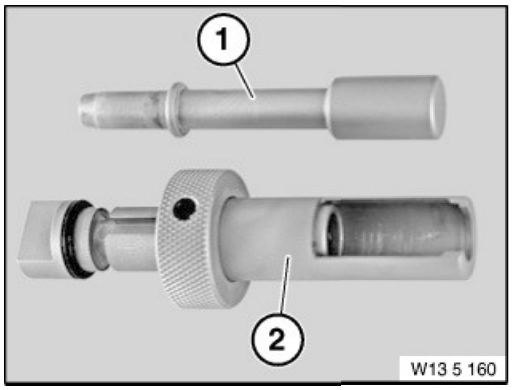
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0 496 568 (13 5 162) Fastener



Common	Used in step 6
Usage	(Cap (2 x)) To close off the fuel lines. Discontinued, can only be ordered using complete tool
Included in the tool or work	0 496 565
Storage location	
Replaced by	
In connection with	
SI-Number	

0 496 565 (13 5 160) Fastener



Common	Used in step 6
Usage	(Caps (2x)) To close off the fuel lines when removing and installing the engine.
Included in the tool or work	
Storage location	B26
Replaced by	
In connection with	
SI-Number	01 22 08 (498)

Consisting of

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

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112

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61 20 900 Disconnecting and connecting battery earth lead 112
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 112
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 112
61 20 900 Disconnecting and connecting battery earth lead 112
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 112
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle) 112
61 20 900 Disconnecting and connecting battery earth lead 112
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61 20 900 Disconnecting and connecting battery earth lead 112
61 20 900 Disconnecting and connecting battery earth lead 112
61 20 900 Disconnecting and connecting battery earth lead 112
61 20 900 Disconnecting and connecting battery earth lead 112
61 35 ... Notes on ESD protection (Electro Static Discharge) 5

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13 51 017 Removing and installing high pressure pump

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

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

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

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

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RISK OF DAMAGE

Damage to the acoustic cover.

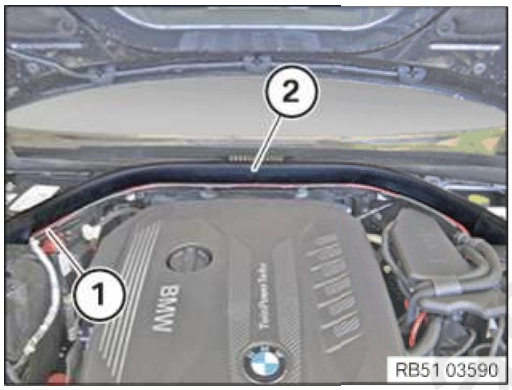
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

3 – Remove the seal for the rear bonnet



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

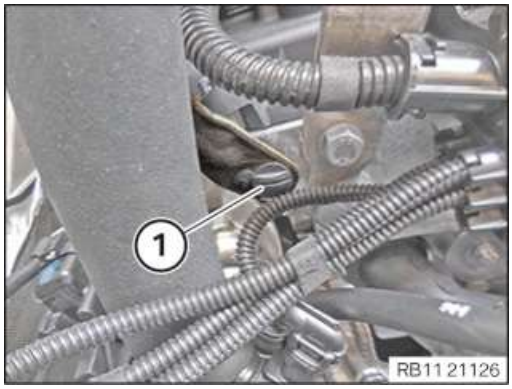
4 – Removing acoustic cover at rear



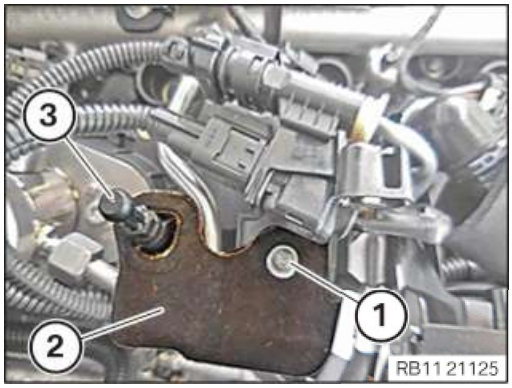
- Unclip the acoustic cover (1) in the marked areas and remove it to the top.

5 – Removing the cylinder head cover acoustic cover

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- Loosen clip (1).



- Loosen screw (1).
- Guide the acoustic cover (2) out of the ball pin (3) and remove.

6 – Remove all ignition coils.

NOTICE

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

▸ **Removing the ignition coil**

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the ignition coil.

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

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

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RISK OF DAMAGE

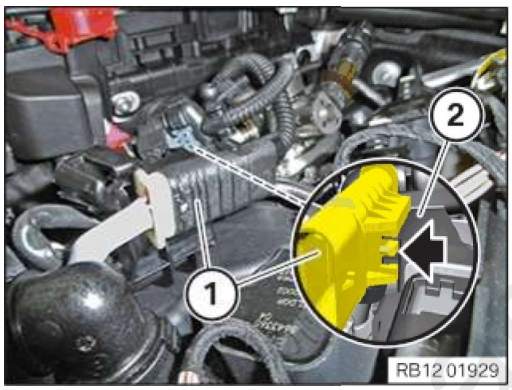
Electrostatic discharge.

Damage to or destruction of electrical components.

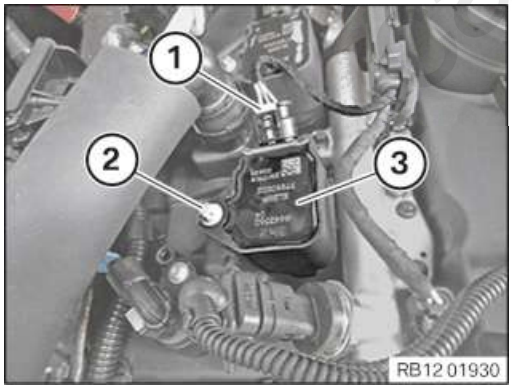
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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



- Unlock plug connection (1) and disconnect.



- Unlock connector (1) (arrow) and disconnect it from holder (2).



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

7 – Remove fuel delivery line

WARNING

Working on fuel system.

Risk of fire! Danger of explosion!

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

CAUTION

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

Danger of injury!

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

RISK OF DAMAGE

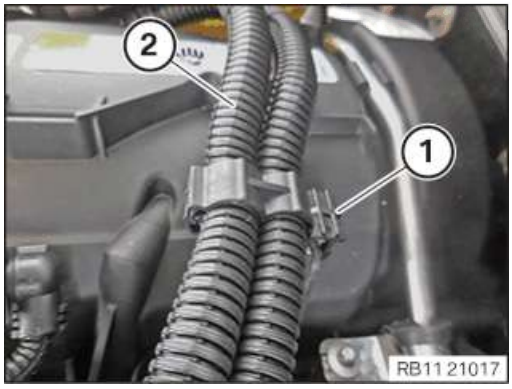
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

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

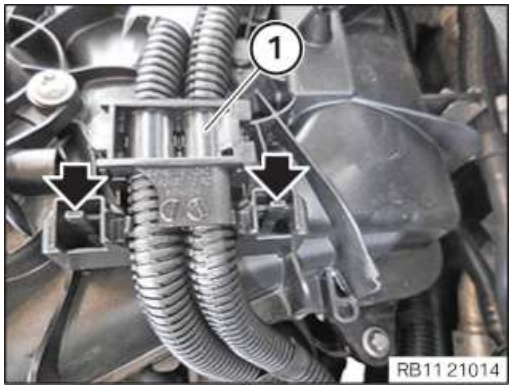
TECHNICAL INFORMATION

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

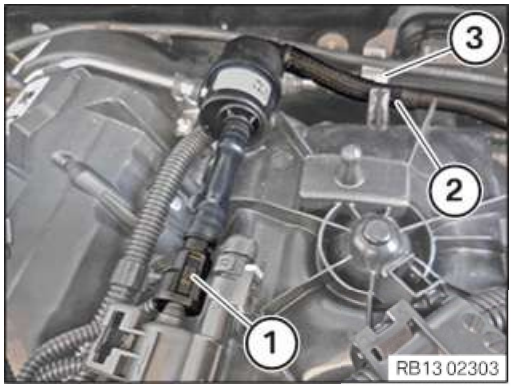


- Loosen clamp (1).
- Guide out wiring harness section (2) for the injectors and ignition coils and place it aside.

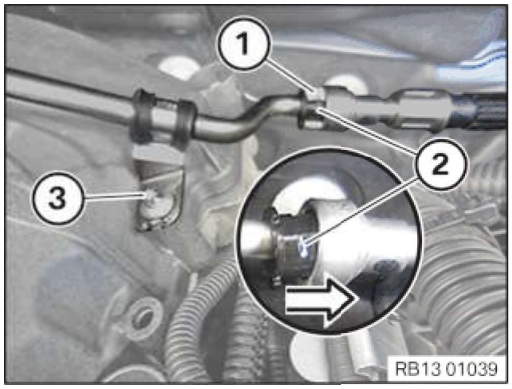
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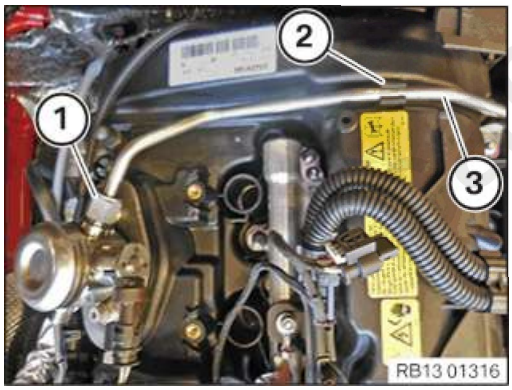
- Unlock the locks (arrows).
- Guide out wiring harness section (1) for the injectors and ignition coils and place it aside.



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



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



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

8 – Remove the high pressure line between the high pressure pump and the rail

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Working on fuel system.

Risk of fire! Danger of explosion!

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

CAUTION

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

Danger of injury!

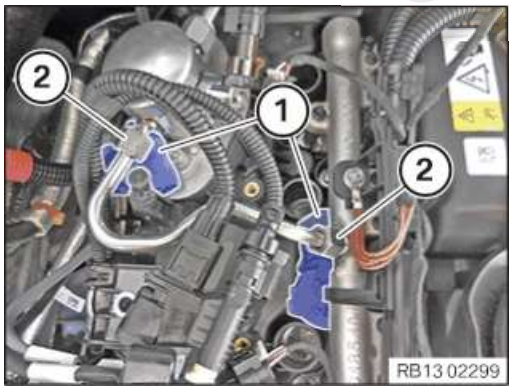
- Wear suitable personal protective equipment.
- Allow the cooling system to cool down to a temperature below 40°C before starting installation work.
- Note warnings on cylinder head cover.

TECHNICAL INFORMATION

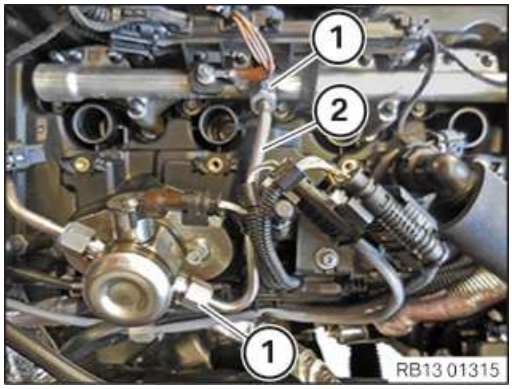
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Have the special tool ready.



- Position a lint-free cleaning cloth (1) on the union nuts (2).
- Release union nuts (2).
- Catch and dispose of escaping fuel.
- Feed out and dispose of the lint-free cleaning clothes (1).



- Release the union nuts (1) completely.
- Feed the high pressure line (2) out and remove.



- Seal all openings with the special tool .

9 – Removing the clean air pipe with the resonator

WARNING

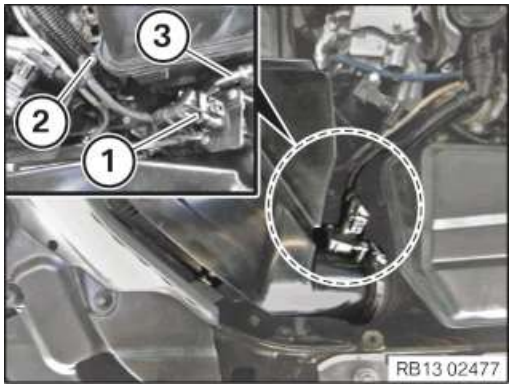
Hot surfaces.

Risk of burning!

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

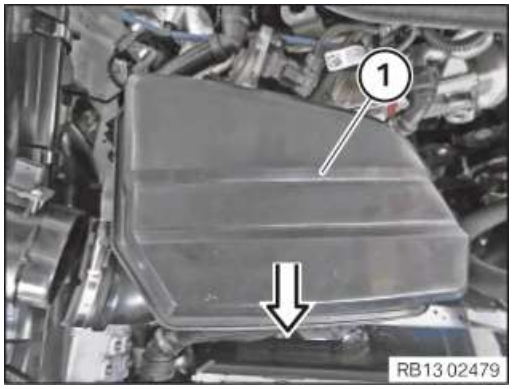


- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.

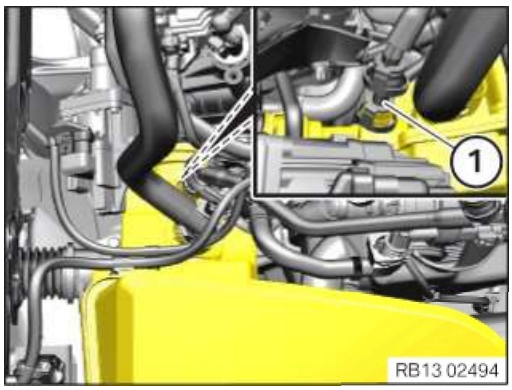


- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.

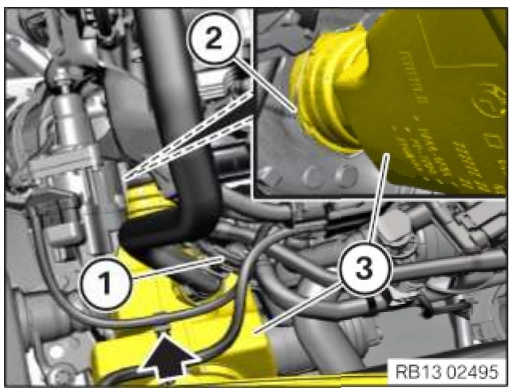
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- Press and hold clean air pipe with resonator (1) in the direction of the arrow.

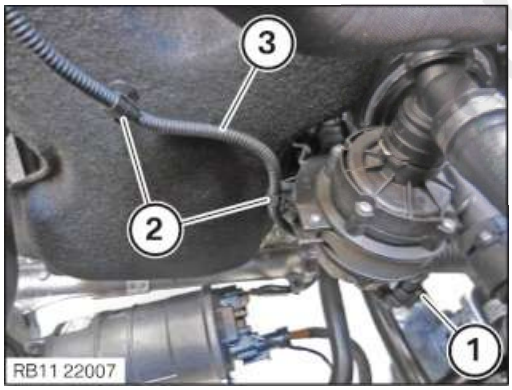


- Unlock and disconnect the tank ventilation line (1).

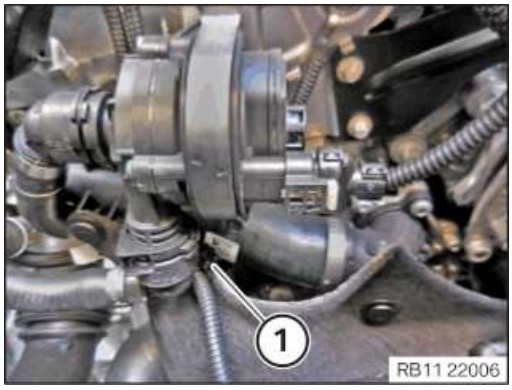


- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

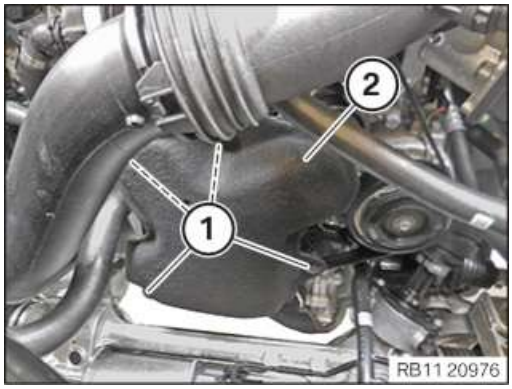
10 – Removing the acoustic cover for the engine at the front



- Unlock plug connection (1) and disconnect.
- Loosen clamps (2).
- Remove the wiring harness section (3) and put to one side.



- Loosen clamp (1).



- Detach all expanding rivets (1).
- Guide the acoustic cover (2) out and remove.

MAIN WORK

11 – Remove high pressure pump

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

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

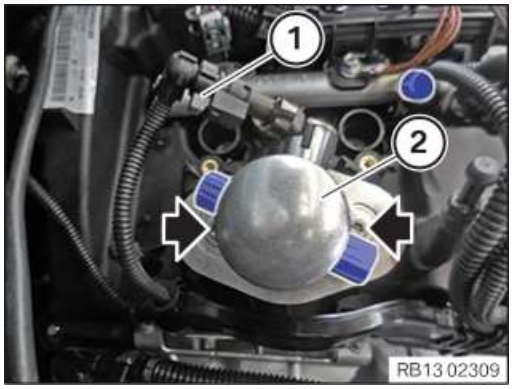
TECHNICAL INFORMATION

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

TECHNICAL INFORMATION

The high pressure pump can be pre-tensioned by camshaft cams. If when loosening the screws, the high pressure pump is forced out, the engine will have to be turned to bring the camshafts to a different position.

Before installing the high pressure pump, the cam of the high pressure pump drive must be turned to BDC. To do this, twist the engine if necessary in the direction of engine rotation to the central bolt of the crankshaft. Otherwise, it will not be possible to install the high-pressure pump.



- Unlock plug connection (1) and disconnect.
- Unscrew the bolts (arrows) **in alternating order**.
- Have a rag ready and catch any engine oil that may emerge.
- Feed out high pressure pump (2) and remove.

12 – Install high pressure pump

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RISK OF DAMAGE

Damage to the engine.

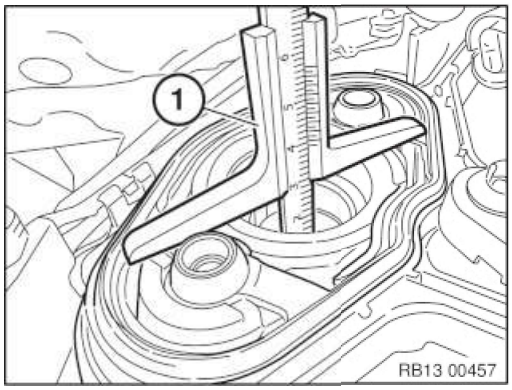
The engine may be damaged if it is manually rotated in the wrong direction.

- Always rotate the engine in the correct direction of rotation by hand: a) Clockwise, facing the vibration damper or b) Counter-clockwise, facing the chain drive. (b) only applies when the rear timing chain is installed.

TECHNICAL INFORMATION

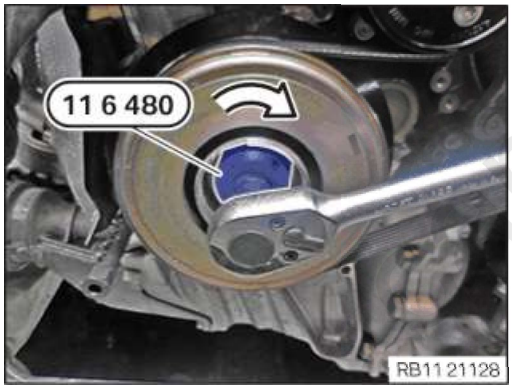
The high pressure pump can be pre-tensioned by camshaft cams. If when loosening the screws, the high pressure pump is forced out, the engine will have to be turned to bring the camshafts to a different position.

Before installing the high pressure pump, the cam of the high pressure pump drive must be turned to BDC. To do this, twist the engine if necessary in the direction of engine rotation to the central bolt of the crankshaft. Otherwise, it will not be possible to install the high-pressure pump.



- Place the depth gauge (1) flat onto the high pressure pump flange.
- Turn the engine at the central bolt in the direction of engine rotation until the BDC position of the camshaft is reached.

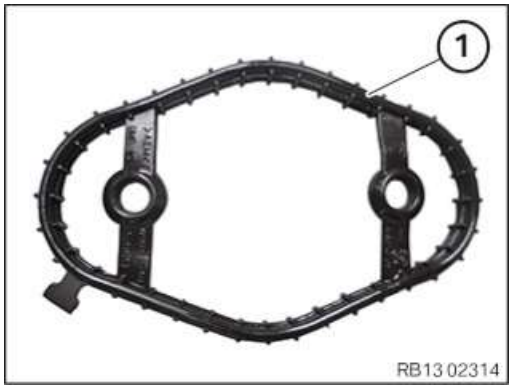
  The depth gauge (1) is in the deepest position.



- Rotate the engine with the special tool 0 493 380 (11 6 480) in the **direction of the arrow** until the cam of the high pressure pump drive is at the **BDC position** .



- Guide out and remove gasket (1).



- Renew the gasket (1).

  Parts: Gasket



TECHNICAL INFORMATION

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

- Check the threads (1) on the high pressure pump flange for sealing compound residue: Remove sealing compound residue as needed.
- Clean the thread (1) with a thread cutter **M6**.
- Make sure that no contamination enters the engine.
- Cover opening at the high pressure pump flange with suitable materials.



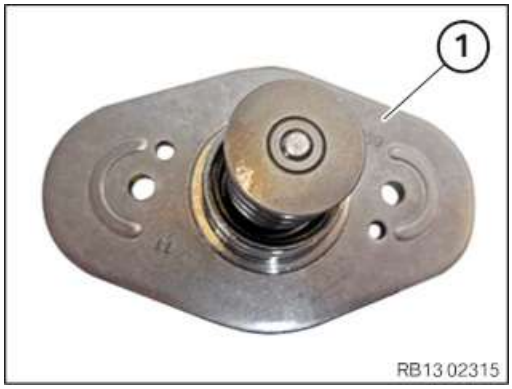
TECHNICAL INFORMATION

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

- Clean sealing surface (1).



- Insert and install the gasket (1).
- Make sure the seal (1) has been correctly positioned in the **highlighted** area.



RISK OF DAMAGE

Damage to the surface.

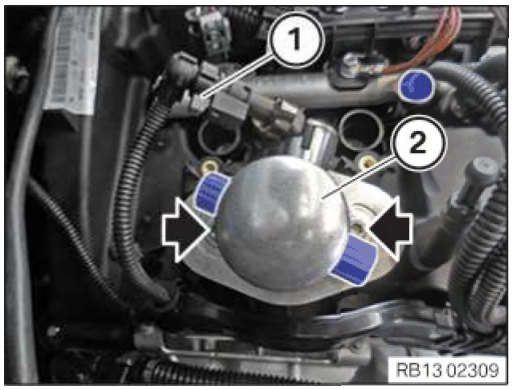
The use of metal-cutting tools (e.g. emery cloth) to clean the surfaces can damage them and lead to leaks or engine damage.

- Do not use any metal-cutting tools.

TECHNICAL INFORMATION

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

- Clean sealing surface (1).



- Feed in and install high pressure pump (2).
- Renew the bolts (arrows).

  Parts: Bolts
- Position screws (arrows) of the high pressure pump (2) and tighten **in alternating order** in **90°** increments.

  Compliance with this specification is imperative to make sure that the piston will not break due to twisting.

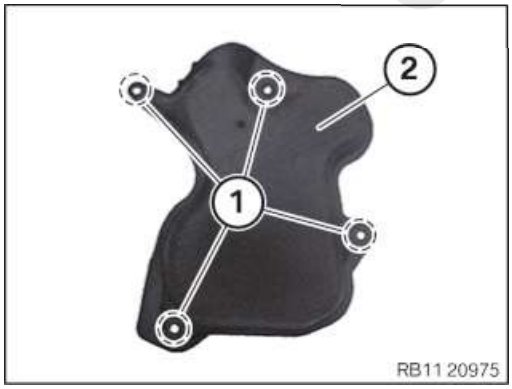
High pressure pump to high pressure pump flange

M6x25	*Renew screws.*	Jointing torque	12 Nm
		Tightening torque	90 °

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

POSTPROCESSES

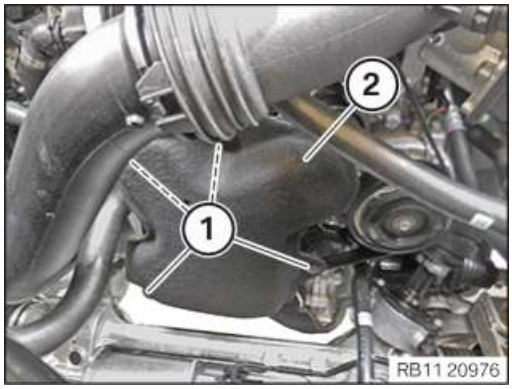
13 – Install the acoustic cover for the engine at the front



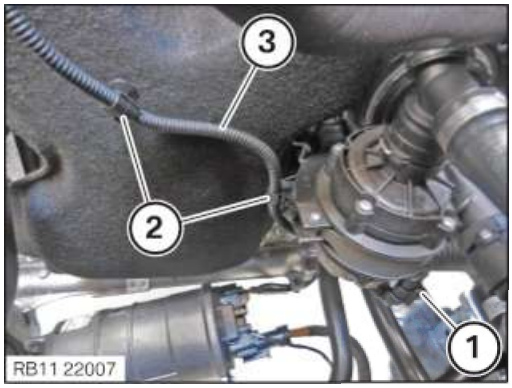
- Check if acoustic cover (2) in marked area (1) is damaged and replace acoustic cover (2) if necessary.

  Parts: Acoustic cover

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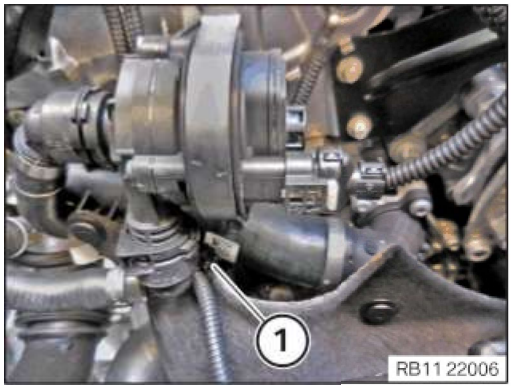


- Thread in and position the acoustic cover (2).
- Mount all expanding rivets (1).



- Feed in and position wiring harness section (3).
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Secure clamps (1).

14 – Installing the clean air pipe with resonator



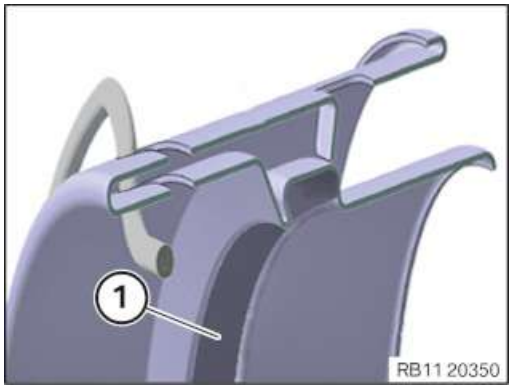
- Check the seal (1) for damages, replace if necessary.

▶ **Replace damaged gasket**

TECHNICAL INFORMATION

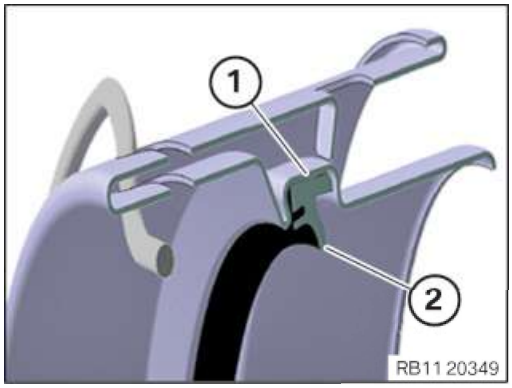
Do not use pointed or sharp-edged tools for the installation and/or removal.

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

  The gasket groove (1) must be clean.



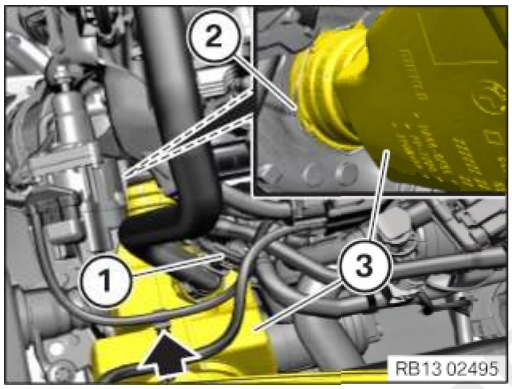
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

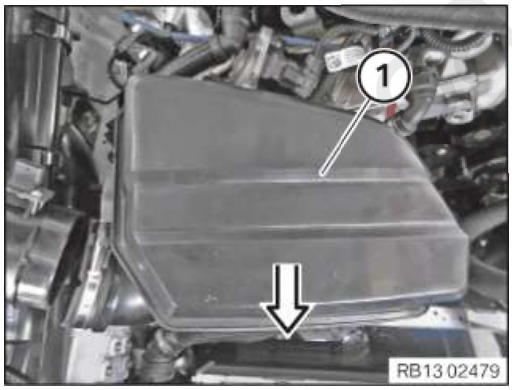
- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).



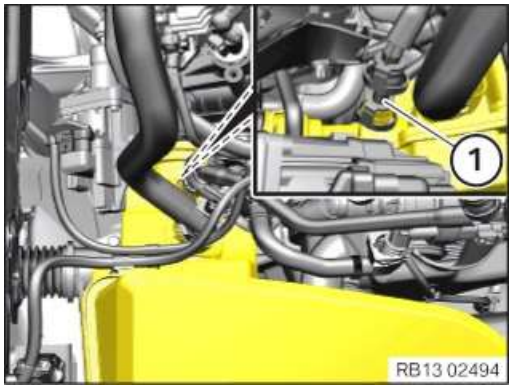
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

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

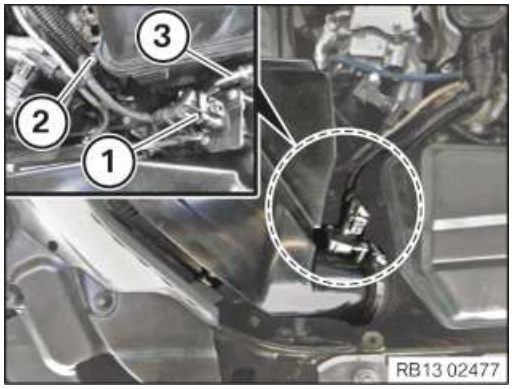
  The connector (1) must engage audibly.
- Secure clamp (arrow).



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



- Connect and lock the tank ventilation line (1).



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

  The connector (1) must engage audibly.

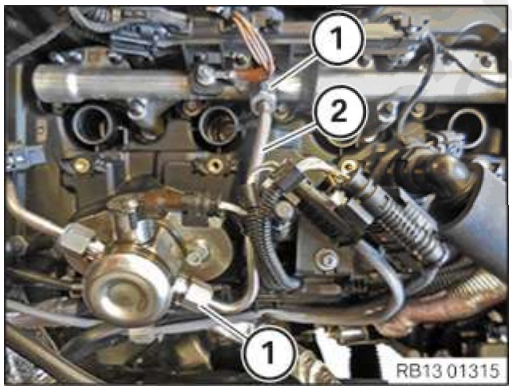


- Insert and install the engine ventilation line (2).
- Ensure that the locks (1) engage audibly.

15 – Installing high pressure line between rail and high pressure pump



- Guide the special tool out and remove.



- Thread in and install the high pressure line (2).
- Tighten union nut (1) hand tight.
- Tighten union nut (1).

High pressure line between high pressure pump and high pressure rail

M14		Tightening torque	33 Nm

16 – Installing fuel delivery line

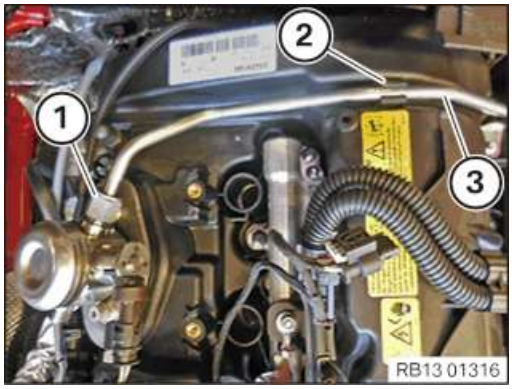
RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

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

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

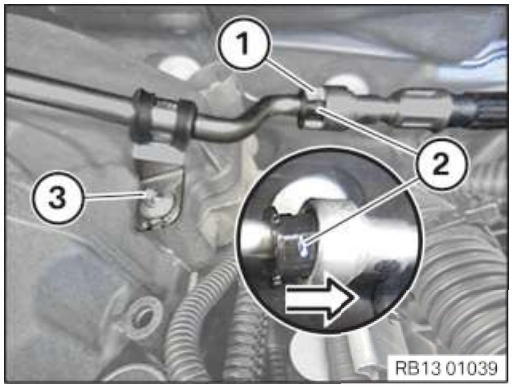
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- Guide the fuel delivery line (3) in and install.
- Install rubber damper (2).
- Check the rubber damper (2) for the correct fit.
- Tighten the union nut (1) hand-tight.
- Tighten union nut (1).

Fuel delivery line to high pressure pump

M14		Tightening torque	31 Nm

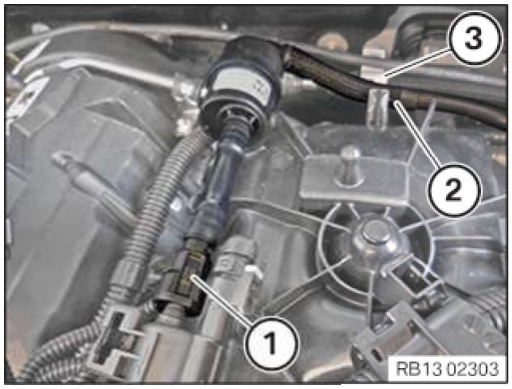


- Slide in and lock the fuel feed line in the direction of the arrow in the snap fastener (2).

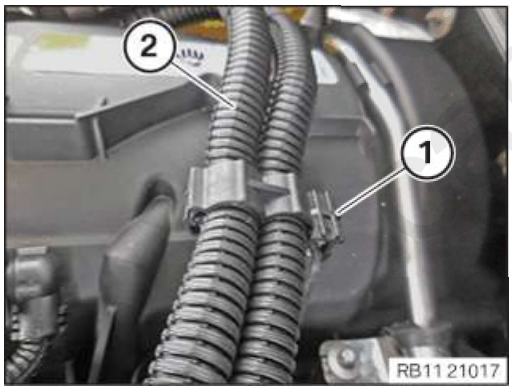
  The fuel feed line must be audibly engage in the snap fastener (2).
- Secure the clamp (1).
- Tighten down screw (3).

Fuel delivery line to cylinder head cover

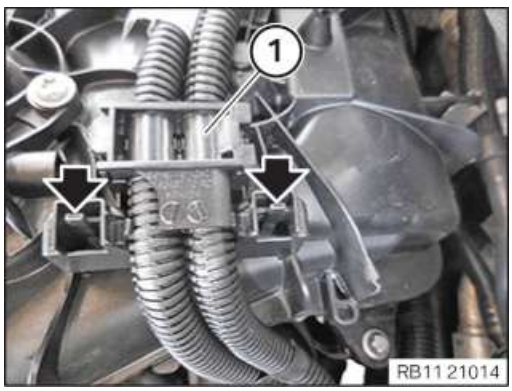
M6 screw		Tightening torque	6,5 Nm



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

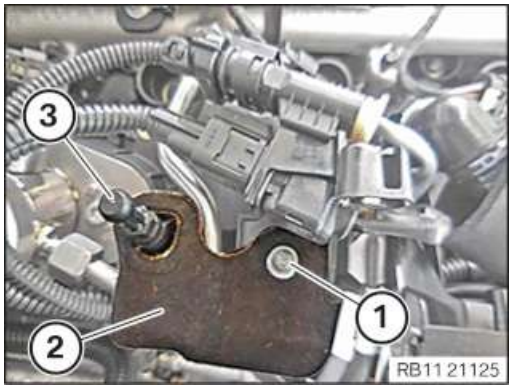


- Insert and install wiring harness section (2) for injectors and ignition coils.
- Secure the clamp (1).



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

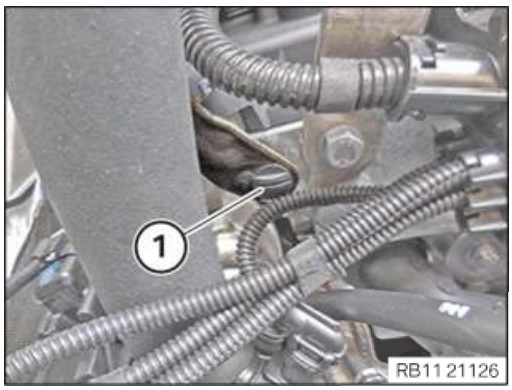
17 – Install the cylinder head cover acoustic cover



- Guide in and position the acoustic cover (2) on the ball pin (3).
- Tighten down screw (1).

Acoustic cover (side) to cylinder head cover

TS6 x 20		8 Nm



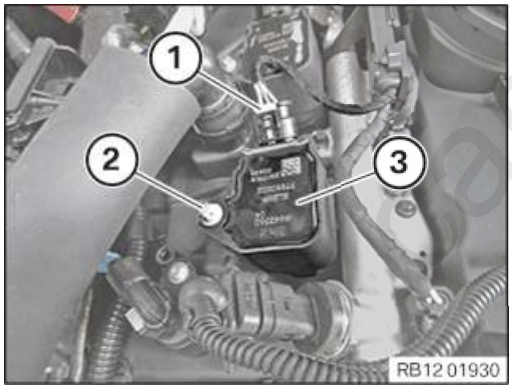
- Secure the clip (1).

18 – Install all ignition coils

NOTICE

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

▶ **Install ignition coil.**



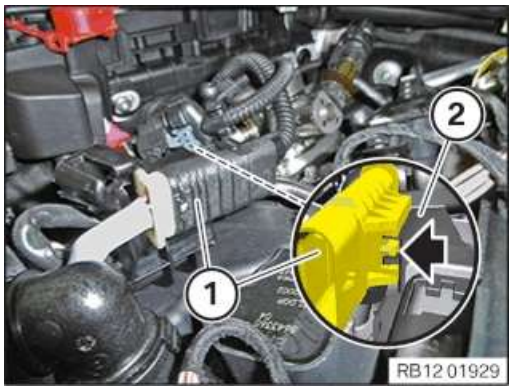
- Install ignition coil (3).
- Tighten down screw (2).

Ignition coil

Screw		Tightening torque	8 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Connect and lock connector (1) with holder (2) (arrow).

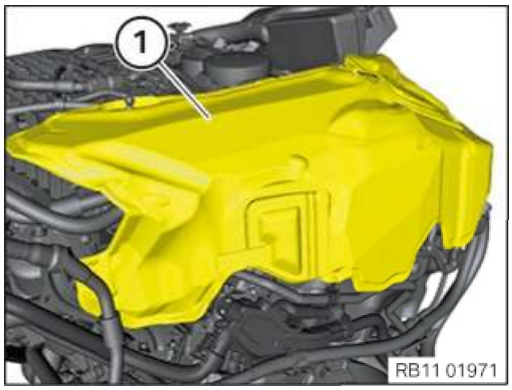
  The connector (1) must engage audibly.



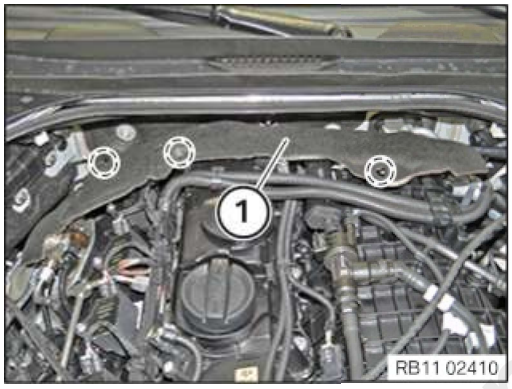
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

19 – Installing acoustic cover at rear



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



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

20 – 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.

21 – Install acoustic cover

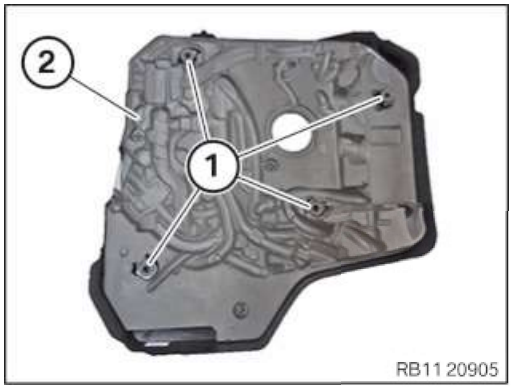
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RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

22 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

High pressure pump to high pressure pump flange Used in step 12

M6x25	*Renew screws.*	Jointing torque	12 Nm
		Tightening torque	90 °

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Clean air pipe to upper section of intake filter housing			Used in step 14
Clamp		Tightening torque	3 Nm

High pressure line between high pressure pump and high pressure rail			Used in step 15
M14		Tightening torque	33 Nm

Fuel delivery line to high pressure pump			Used in step 16
M14		Tightening torque	31 Nm

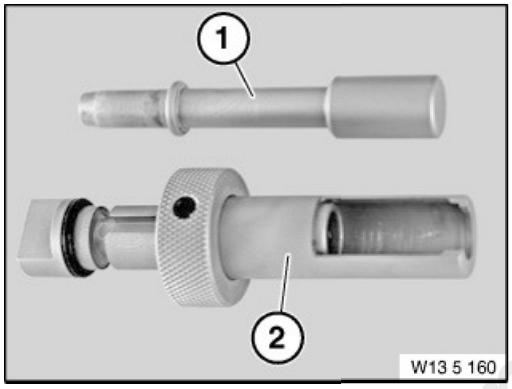
Fuel delivery line to cylinder head cover			Used in step 16
M6 screw		Tightening torque	6,5 Nm

Acoustic cover (side) to cylinder head cover			Used in step 17
TS6 x 20			8 Nm

Ignition coil			Used in step 18
Screw		Tightening torque	8 Nm

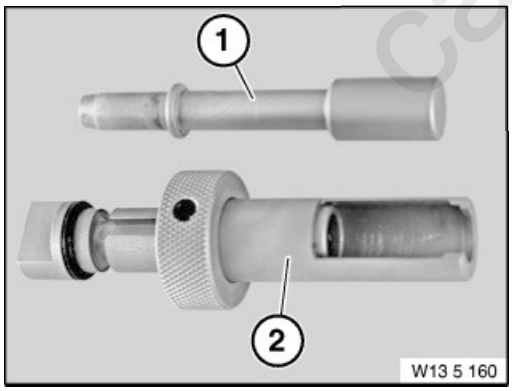
Overview of Special Tools

0 496 567 (13 5 161) Fastener



Common		Used in step 7
Usage	(Cap (2 piece)) For sealing the quick connectors Deletion, only available via tool set	
Included in the tool or work	0 496 565	
Storage location		
Replaced by		
In connection with		
SI-Number		

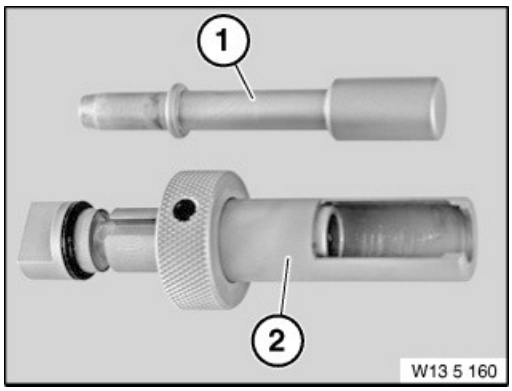
0 496 568 (13 5 162) Fastener



Common		Used in step 7
Usage	(Cap (2 x)) To close off the fuel lines. Discontinued, can only be ordered using complete tool	
Included in the tool or work	0 496 565	
Storage location		
Replaced by		
In connection with		
SI-Number		

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0 496 565 (13 5 160) Fastener



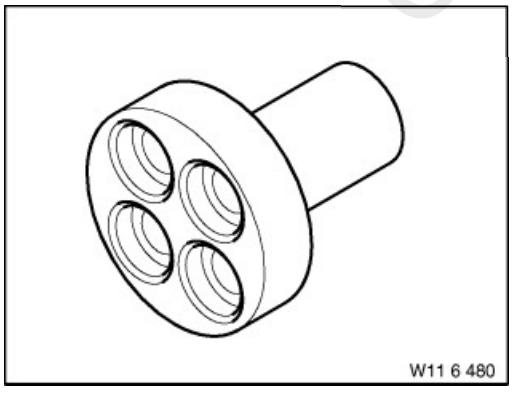
Common Used in step 7

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

Consisting of

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

0 493 380 (11 6 480) Connector



Common Used in step 12

Usage	For turning over engine at crankshaft hub (vibration absorber) when adjusting valve timing
Included in the tool or work	
Storage location	B2
Replaced by	
In connection with	
SI-Number	01 11 98 (338)

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	122
61 20 900 Disconnecting and connecting battery earth lead	122

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61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 122
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 122
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle) 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting battery earth lead 122
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61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 20 900 Disconnecting and connecting battery earth lead 122
61 35 ... Notes on ESD protection (Electro Static Discharge) 6

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13 53 ... Clean the cylinder heads in the area of injectors to prevent sand/dust contamination.

Special tools required:

- 2 302 630

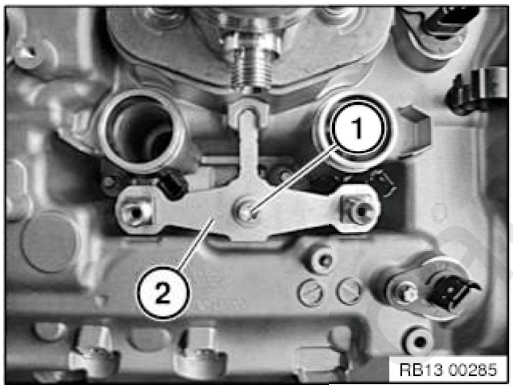
Required tools:

- Commercial vacuum cleaner with a narrow / sharp nozzle

Under dusty/sandy operating conditions, dust and sand settle in columns, joints and cavities on the cylinder head in the area of the injectors. The consequences of non-compliance are malfunctions, damage and early wear / failure of the engine!

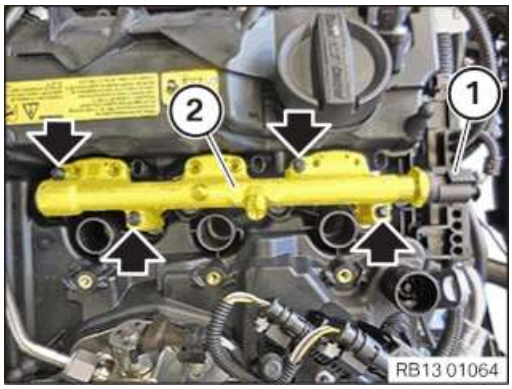
Necessary preliminary work:

- Removing the hold-down device of the injectors or rail



Release screw (1).

Remove holding-down element (2).



Unlock and disconnect plugs (1).

Loosen M6x70 screws (arrows).

Remove rail (2) upwards.

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Protect / Seal all the exposed openings / connections from the entry of any foreign bodies / contamination! Close all the windows and doors of the vehicle. If necessary, check other vehicles and persons in the immediate surroundings.



Wear safety goggles.

Dirt particles may get into your eyes!



Use a vacuum cleaner and compressed air (air gun with a lance) to draw off / blow out any contamination in the area of the injectors thoroughly.

Remove the spark plug in the affected cylinder according to the repair instructions.

Turn the crankshaft at the central screw in the direction of rotation and set the piston on the firing TDC. If necessary, use TDC Finder of pressure tester 81 39 2 302 630 .



Risk of damage – do not turn the crankshaft in reverse.

- Screw in the hose of the pressure loss tester in the spark plug bore and connect it to the pressure loss tester.
- Adjust the pressure loss tester to a low pressure and connect it with compressed air.
- Switch on and keep the vacuum cleaner ready.
- Pull out the injector from the injector bore hole according to the repair instructions and draw off the dust / dirt immediately so that it cannot enter the combustion chamber.
- Deactivate the compressed air only when all the contamination in the cylinder head is removed from the injector bore hole
- Prepare the injector according to the repair instructions and insert it in the cylinder head.
- Install the spark plug according to the repair instructions



It must be ensured that there is no contamination in other openings / bore holes, clean if necessary.

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13 53 318 Remove and install all injectors in the injection system

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

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

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

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

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RISK OF DAMAGE

Damage to the acoustic cover.

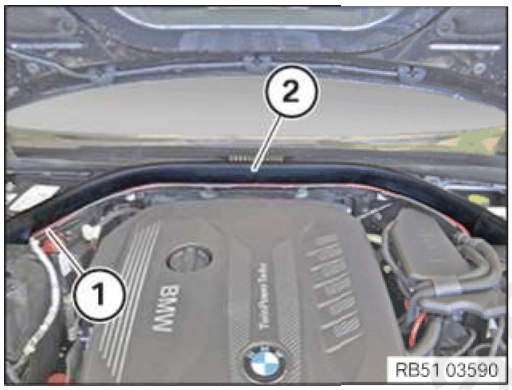
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

3 – Remove the seal for the rear bonnet



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

4 – Removing acoustic cover at rear



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

5 – Remove all ignition coils.

NOTICE

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

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▶ **Removing the ignition coil**

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the ignition coil.

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

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

RISK OF DAMAGE

Electrostatic discharge.

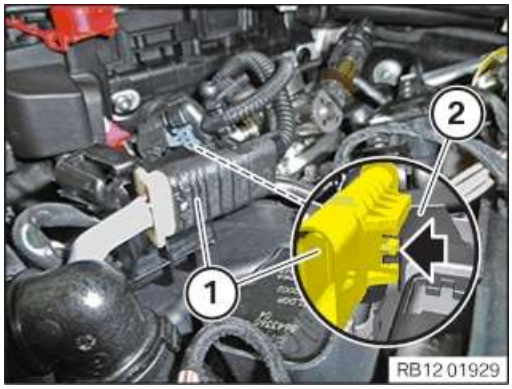
Damage to or destruction of electrical components.

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

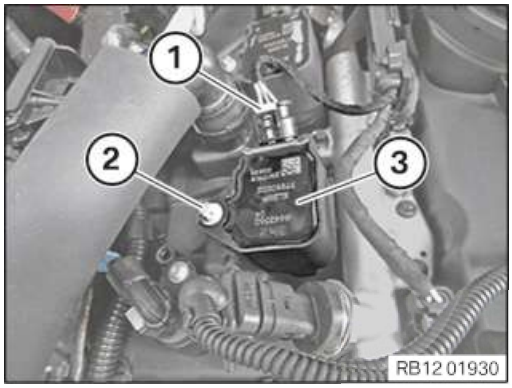


- Unlock plug connection (1) and disconnect.

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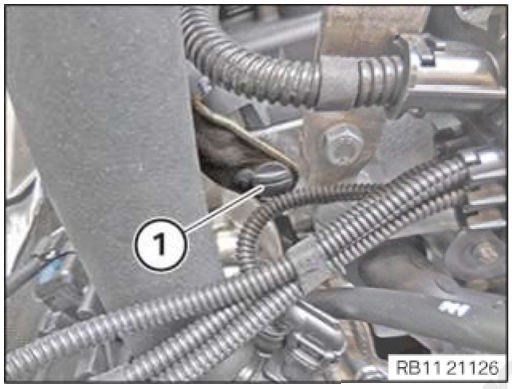


- Unlock connector (1) (arrow) and disconnect it from holder (2).

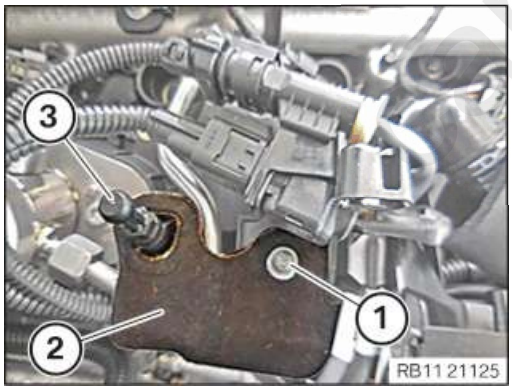


- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Remove ignition coil (3).

6 – Removing the cylinder head cover acoustic cover



- Loosen clip (1).



- Loosen screw (1).
- Guide the acoustic cover (2) out of the ball pin (3) and remove.

7 – Remove the high pressure line between the high pressure pump and the rail

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

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WARNING

Working on fuel system.

Risk of fire! Danger of explosion!

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

CAUTION

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

Danger of injury!

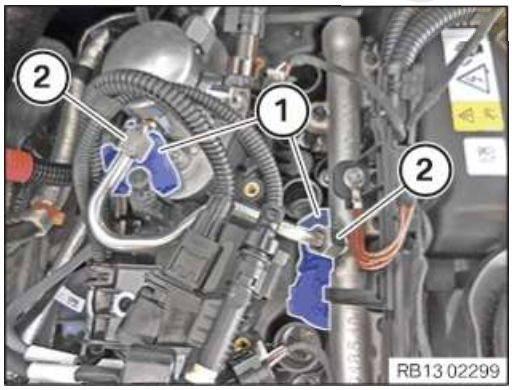
- Wear suitable personal protective equipment.
- Allow the cooling system to cool down to a temperature below 40°C before starting installation work.
- Note warnings on cylinder head cover.

TECHNICAL INFORMATION

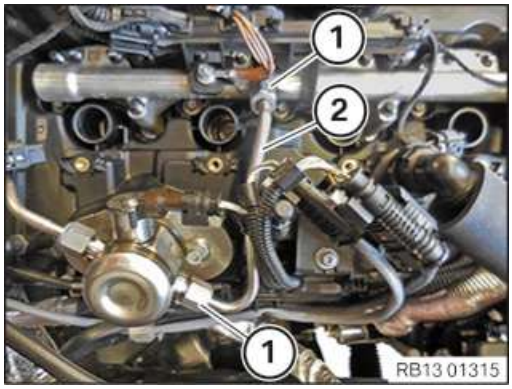
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Have the special tool ready.



- Position a lint-free cleaning cloth (1) on the union nuts (2).
- Release union nuts (2).
- Catch and dispose of escaping fuel.
- Feed out and dispose of the lint-free cleaning clothes (1).



- Release the union nuts (1) completely.
- Feed the high pressure line (2) out and remove.



- Seal all openings with the special tool .

MAIN WORK

8 – Removing the rail with injectors

RISK OF DAMAGE

Damage to injectors.

Excessive force may damage the injector and this means having to renew the injector.

- Twist the injectors with a maximum torsional movement of 13 Nm.

RISK OF DAMAGE

Damage to the injector tips and Teflon ring.

Improper handling of the injector tips and Teflon ring can lead to malfunctioning of the injector.

- Avoid mechanical contact with injector tip.
- When exchanging Teflon ring, hands and work surface must be clean and free of oil. Do not use any lubricating agents.
- Do not use fingernails to slide Teflon ring on.

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

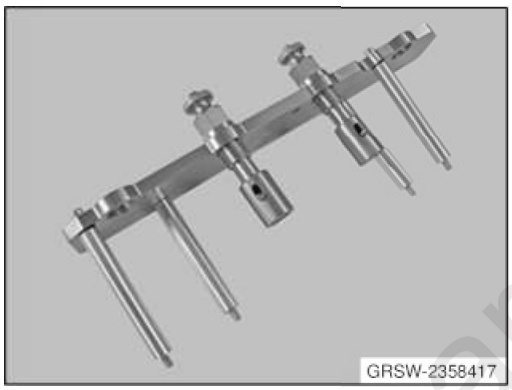
Electrostatic discharge.

Damage to or destruction of electrical components.

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



- Prepare special tool .



- Prepare special tool 2 358 417.

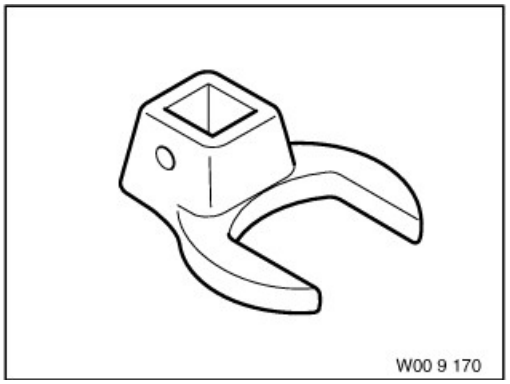


- Prepare special tool .

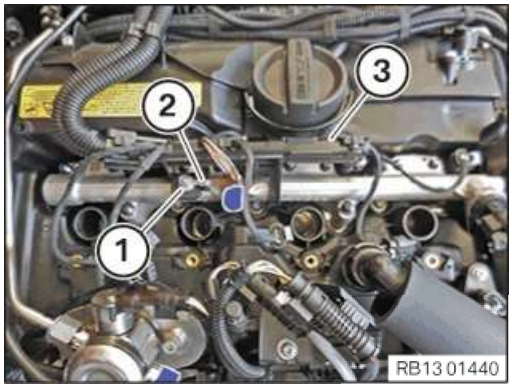


- Prepare special tool 0 496 106 (11 8 720).

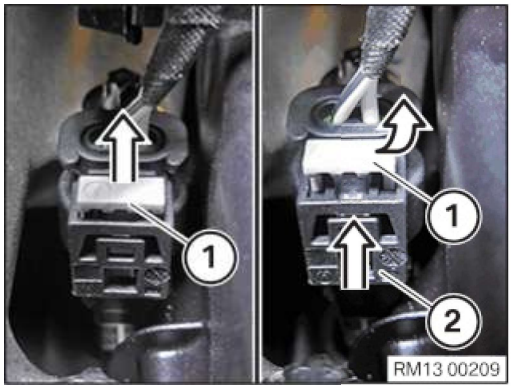
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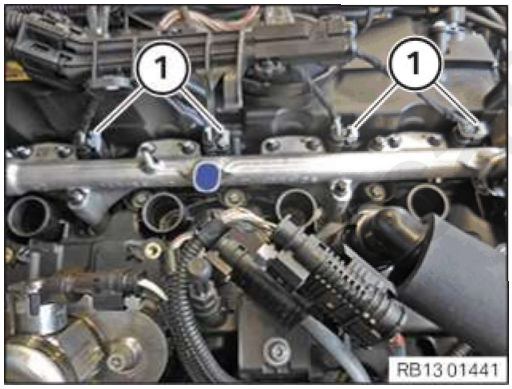
- Prepare special tool .



- Loosen nut (1).
- Feed out ground cable (2) and set it aside.
- Feed out cable channel (3) and set it aside.



- Unlock lock (1) in direction of arrow from the top.
- Press lock (1) together and release.
- Pull off connector (2) from the injectors.



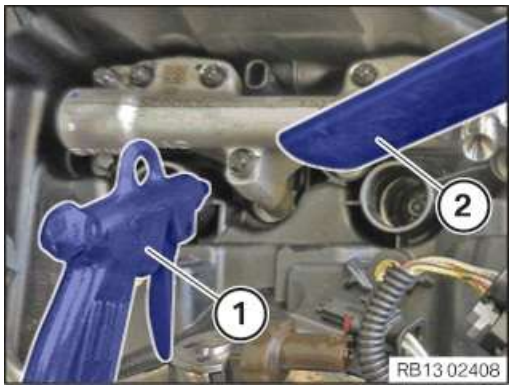
RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

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

- Unlock and release all connectors (1) of the injectors.



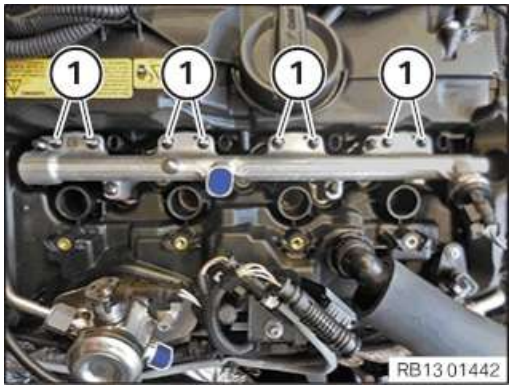
TECHNICAL INFORMATION

In case of dusty / sandy operating conditions of the vehicle, the injector shafts must be cleaned before removal.

For additional information see: 13 53 ... Cleaning the cylinder head in the area of the injectors in case of sandy / dusty contamination

- Before releasing the high pressure lines: Blow out the injector shafts with air gun (1) with a little pressure.
- At the same time, use an **explosion-proof** vacuum cleaner (2) to draw off the dirt particles.

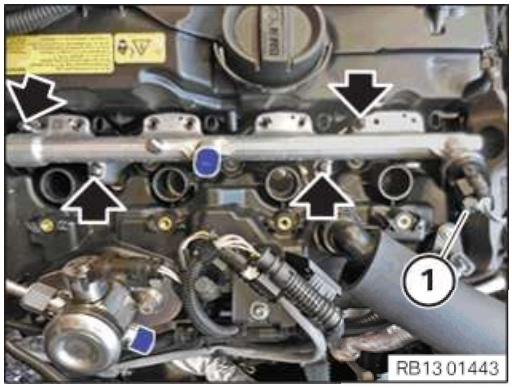
.com



- Unscrew and remove the screws (M5x30) (1).

  Do **not** reuse screws (M5x30) (1).
- Renew the bolts (M5x30) (1).

  Parts: Screws (M5x30)
- Catch and dispose of escaping fuel with suitable materials.

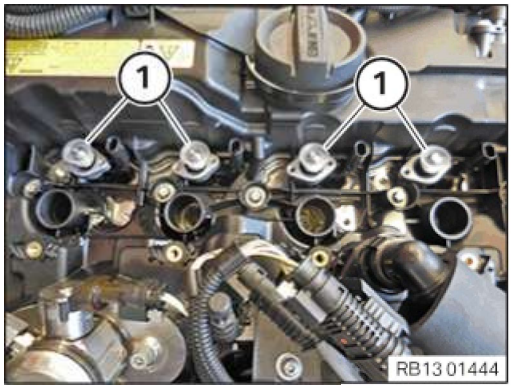


- Unscrew and remove screws (M6x70) (arrows).

  Do **not** reuse the screws (M6x70) (arrows).
- Renew the screws (M6x70) (arrows).

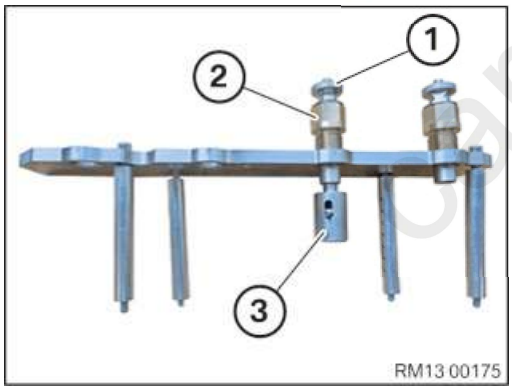
  Parts: Screws (M6x70)
- Unlock plug connection (1) and disconnect.
- Remove the rail in upward direction.

  The injectors remain in the cylinder head.



- Remove the gaskets (1).

  The seals (1) are only needed for the initial assembly at the plant and will **not** be reinstalled.



RISK OF DAMAGE

Damage to injectors.

Excessive force may damage the injector and this means having to renew the injector.

- Twist the injectors with a maximum torsional movement of 13 Nm.

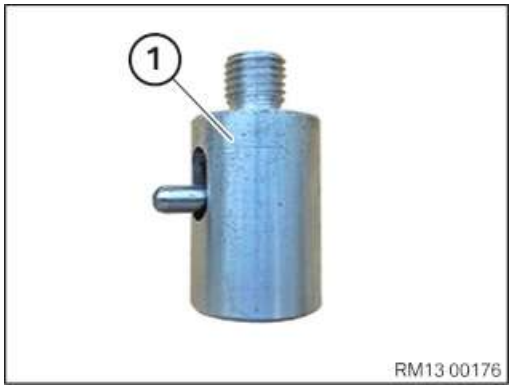
- In the event that the specified value for the tensile force is exceeded: Replace injectors.
- Use special tool 2 358 417 with special tool (spacer sleeves) to remove the injectors.

  Special tool 2 358 417 and spacer sleeves are used to ensure that the tensile force is not exceeded.

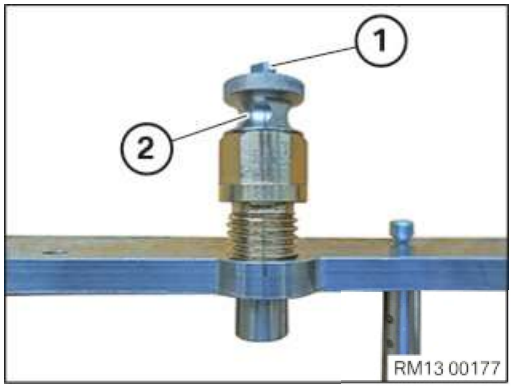
  The special tool 2 358 417 consists of:

  - (1) Threaded sleeves
  - (2) Pull-out thread (left-hand thread)
  - (3) Fixture for the injector

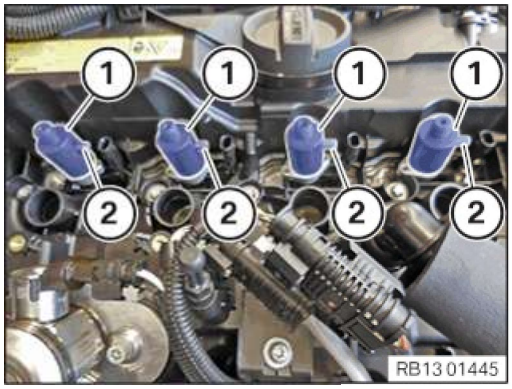
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- Unscrew the fixture for the injectors (1) from the special tool 2 358 417.

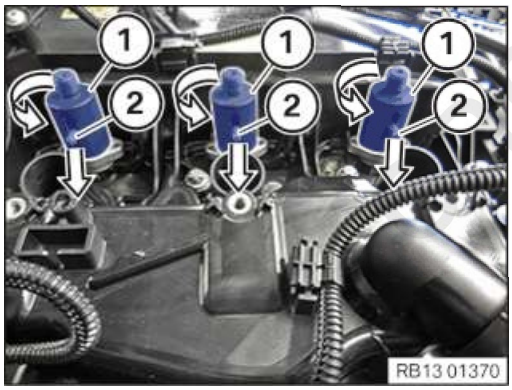


- Press the lock (1) in and remove threaded sleeve (2) from the special tool 2 358 417.

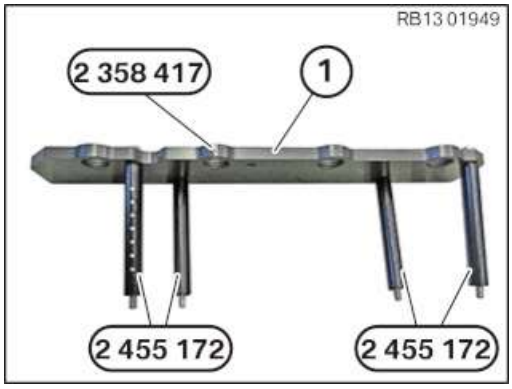


- Install all fixtures (1) for the injectors.

  The fixtures (1) are not locked when the levers (2) are up.

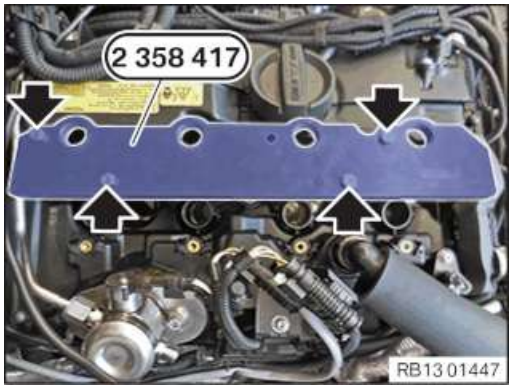


- Turn the fixtures (1) in the direction of the arrow by **90°** and lock the levers (2) downward.



- Prepare panel (1) from special tool 2 358 417 with spacer sleeves .

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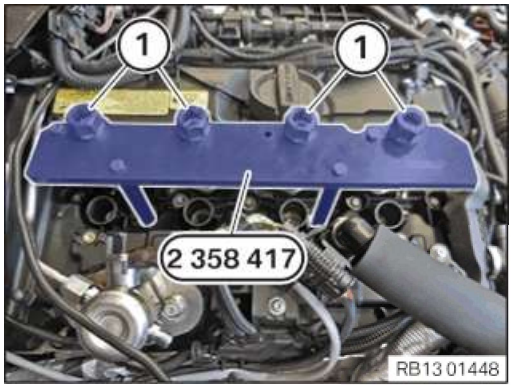
RISK OF DAMAGE

Damage to injectors.

Excessive force may damage the injector and this means having to renew the injector.

- Do not use the puller plate as a support.

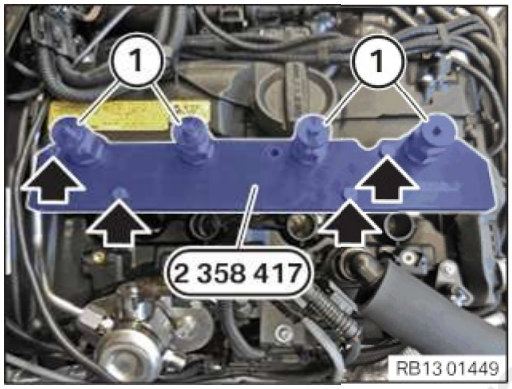
- Attach special tool 2 358 417 with spacer sleeves on the cylinder head.
- Hand-tighten the bolts (arrows).



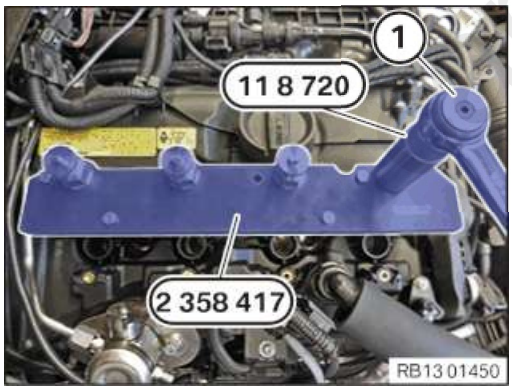
TECHNICAL INFORMATION

The extraction thread is a left-hand thread.

- Screw in pull-out thread (1) on the special tool 2 358 417fully.



- Insert the threaded sleeves (1) again and screw threaded sleeves completely onto the fixtures for the injectors.
- Tighten the screws (arrows) on the special tool 2 358 417 to 5 Nm.



- Adjust torque wrench (1) to 13 Nm **by turning it clockwise** .
- Turn torque wrench (1) in **clockwise** direction with special tool 0 496 106 (11 8 720) until the injectors of **cylinder 1,3,4** are pulled out.

TECHNICAL INFORMATION

If the torque wrench makes a cracking noise when the injector is pulled out, **the injector must be renewed.**

- Disassemble all injectors individually.



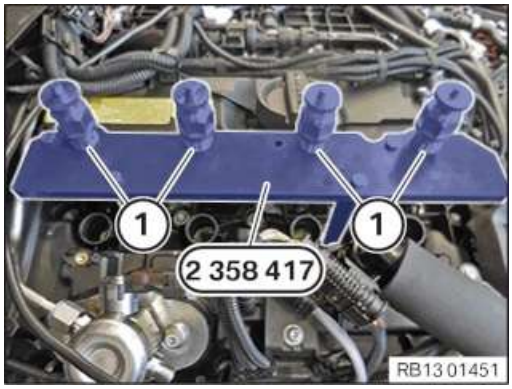
- Adjust torque wrench (1) to 13 Nm **by turning it clockwise** .
- Turn torque wrench (1) in **clockwise** direction with special tool until the injector of **cylinder 2** is pulled out.

TECHNICAL INFORMATION

If the torque wrench makes a cracking noise when the injector is pulled out, **the injector must be renewed.**

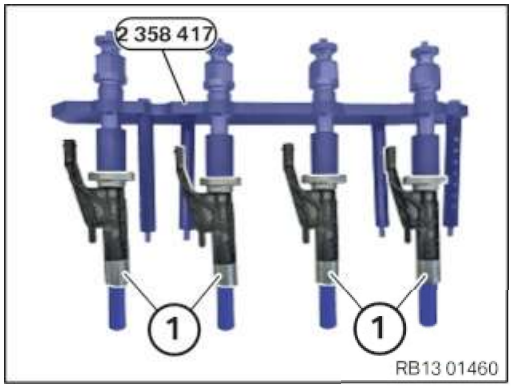
- Disassemble all injectors individually.

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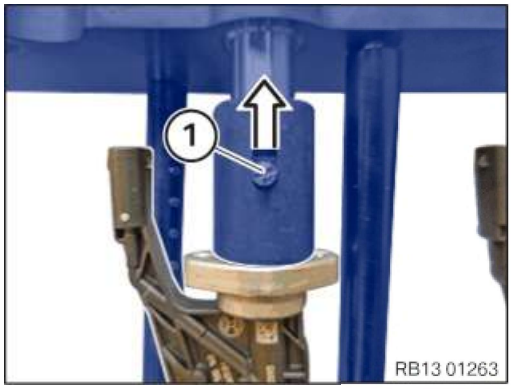


- Before removing the special tool 2 358 417 with the injectors, check if all the injectors were completely pulled out of the cylinder head.

  The threads of the pull-out thread must be completely visible.
- Loosen screws on special tool 2 358 417.



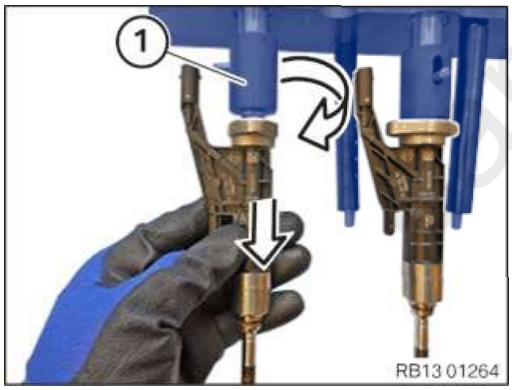
- Carefully remove special tool 2 358 417 with injectors (1) vertically upwards from the cylinder head.
- Place the combination of the special tool 2 358 417 and the injectors (1) flat onto a clean table.



NOTICE

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

- Unlock the fixture lock (1) from the top.



- Turn the unlocked fixture (1) by **90°**.
- Release and remove the injector downwards.

9 – Prepare the injectors for installation

RISK OF DAMAGE

Damage to the injector tips and Teflon ring.

Improper handling of the injector tips and Teflon ring can lead to malfunctioning of the injector.

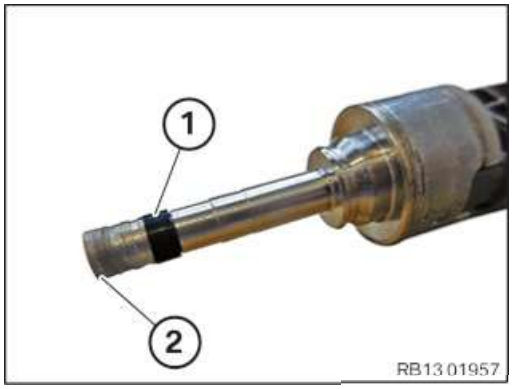
- Avoid mechanical contact with injector tip.
- When exchanging Teflon ring, hands and work surface must be clean and free of oil. Do not use any lubricating agents.
- Do not use fingernails to slide Teflon ring on.

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TECHNICAL INFORMATION

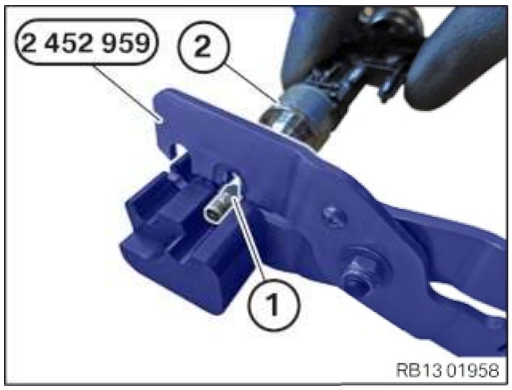
Before re-installing the injector, the Teflon ring must be renewed. Once a Teflon ring has been installed, it may not be re-used. New injectors are supplied with a new Teflon ring.

After the installation of a new Teflon ring on the injectors, the injector must be installed in the cylinder head within 10 minutes or protected with protective caps; otherwise, the Teflon ring will swell.

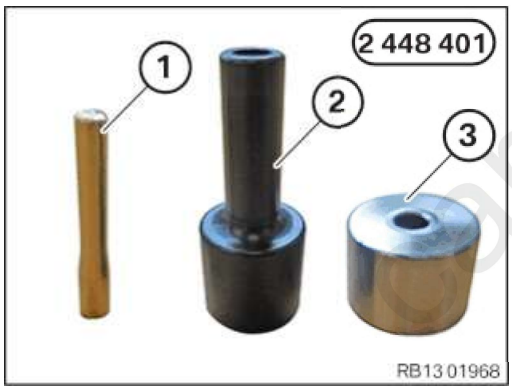


- Before installing the injectors: Renew the Teflon rings (1).

  Parts: Teflon rings
- Avoid mechanical contact with injector tip (2).



- Remove Teflon ring (1) by using special tool 2 452 959 from injector (2).
- If necessary, use a lint-free cloth to clean the cylindrical part of the injector tip. Do not use ultrasonic sound or other auxiliary materials.
- Do **not** clean the injector tip.

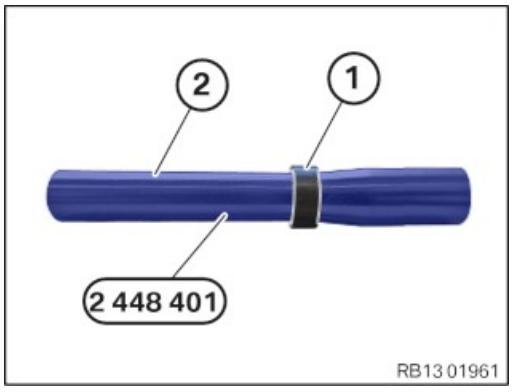


- For the installation of the new Teflon rings: Use the set of special tools 2 448 401:

  (1) Installation cone

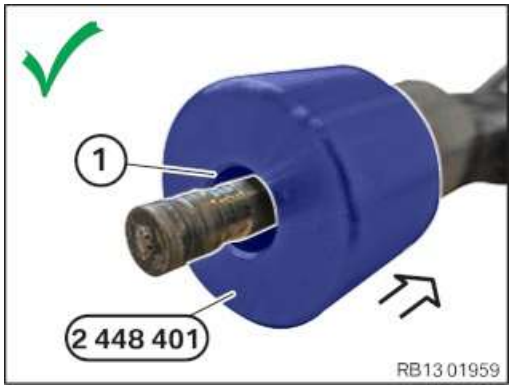
  (2) Sliding sleeve

  (3) Assembly sleeve



- Slide the new Teflon ring (1) onto the installation cone (2) from the set of special tools 2 448 401.

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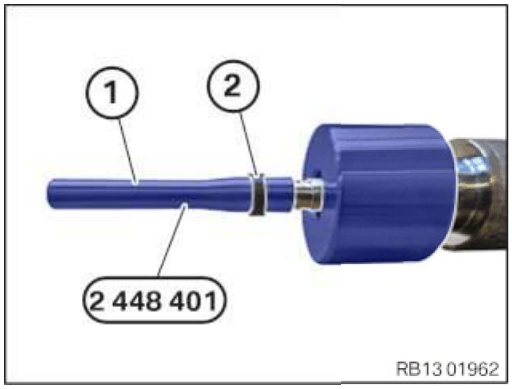
- Make sure the installation position of the assembly sleeve (1) from the set of special tools 2 448 401 is correct:

  The larger diameter of the assembly sleeve (1) must point to the injector tip.

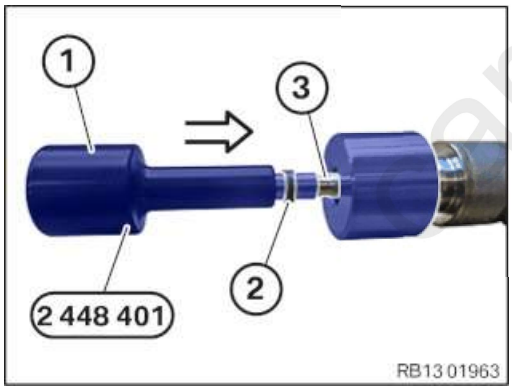


- Make sure the installation position of the assembly sleeve (1) from the set of special tools 2 448 401 is correct:

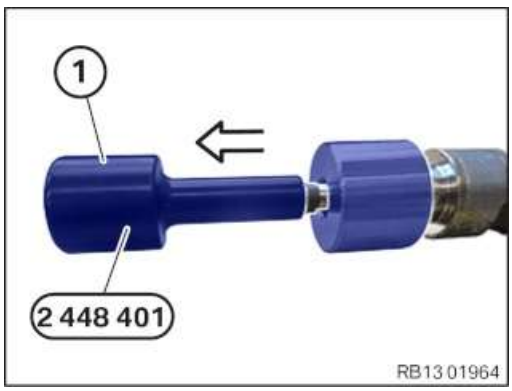
  The assembly sleeve (1) is **not** mounted correctly when the smaller diameter points to the injector tip.



- Mount the Teflon ring (2) with the installation cone (1) from the set of special tools 2 448 401 on the injector tip .

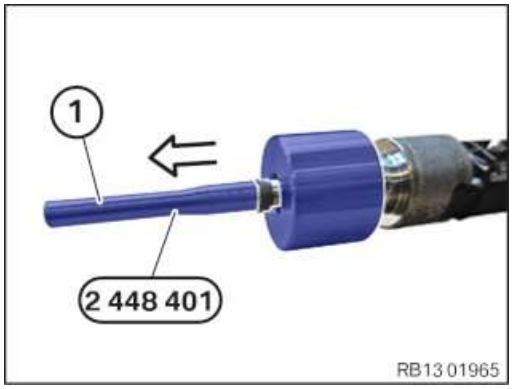


- Use the sliding sleeve (1) from the set of special tools 2 448 401 to push the Teflon ring (2) into the groove (3) on the injector in the direction of the arrow.

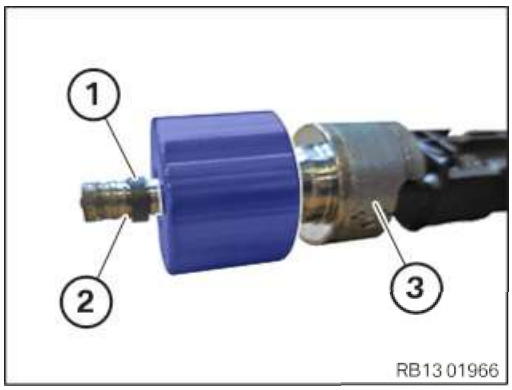


- Thread out the sliding sleeve (1) from the set of special tools 2 448 401 in the direction of the arrow and remove.

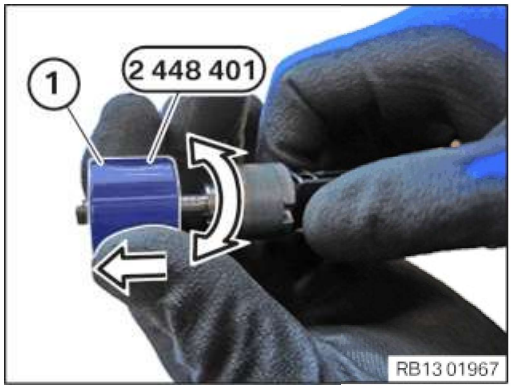
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- Thread out the installation cone (1) from the set of special tools 2 448 401 in the direction of the arrow and remove.

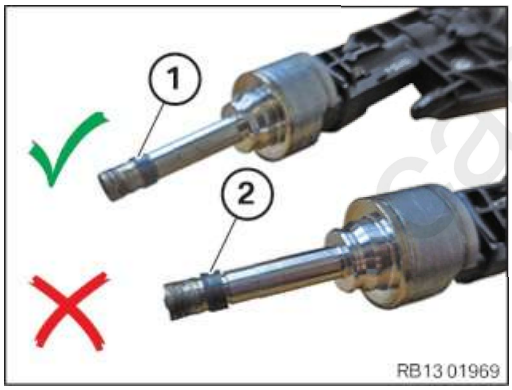


- Make sure that the expanded Teflon ring (1) is properly inserted in the groove (2) of the injector (3) and can be moved easily with your fingers.



- Calibrate the expanded Teflon ring with the assembly sleeve (1) from the set of special tools 2 448 401 to the installation dimension in the direction of the arrow.
- Perform **rotational movements** in increments of 180° synchronous to the **pull-off movement**. Perform the movements slowly and **not** jerky.

  This calibrates the Teflon ring (1) to the installation dimension.
- Thread out and remove the assembly sleeve (1).

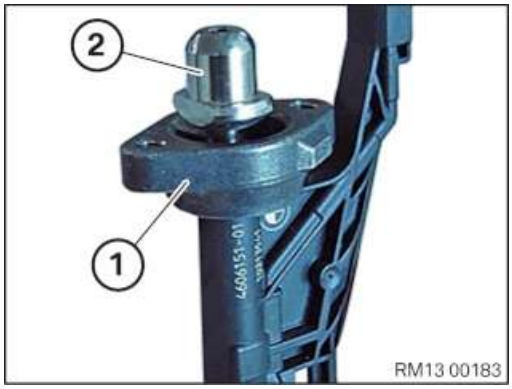


- Check the correct installation dimension of the Teflon ring (1):
  - (1) indicates a correct installation dimension of the Teflon ring.
  - (2) indicates an incorrect installation dimension of the Teflon ring.

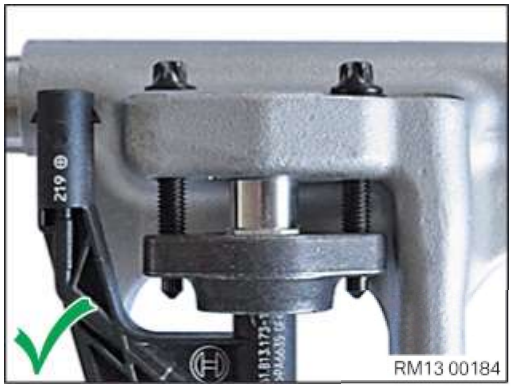
10 – Installing the rail with injectors

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.

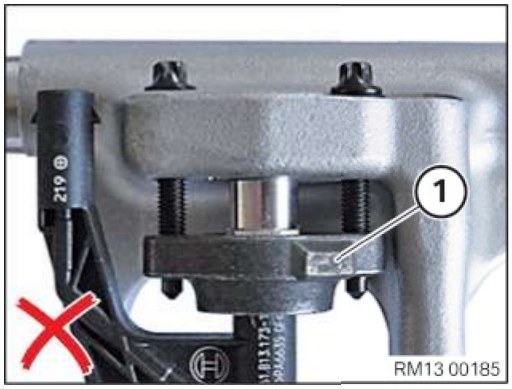


- Mount the holder (1) above the bayonet fitting (2) on the injector.
- **If the holder** (1) **has a cast lug:** Make sure that the holder is installed in the correct position.



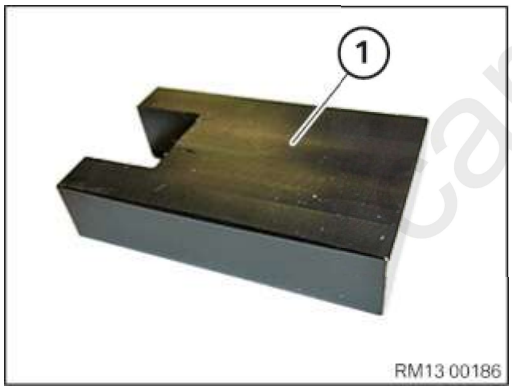
- If applicable, note the position of the cast lug:

  The holder is mounted **correctly** when the cast lug is located at the rear.



- If applicable, note the position of the cast lug:

  The holder is mounted **incorrectly** when the cast lug (1) is in front.



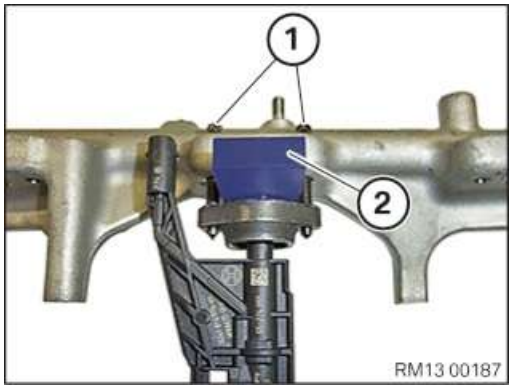
RISK OF DAMAGE

Damage to injectors.

Weld seams on the injector may tear due to incorrect distances between the rail and injector so that the injector must be renewed.

- Insertion of the distance gauge is compulsory.
- Replace distance gauge, if a thickness of 8.5 mm is no longer given in the distance gauge.

- Use the special tool (distance gauge) 2 358 022 (1).

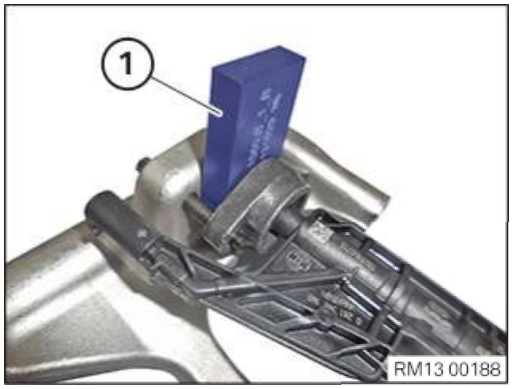


- Mount the injectors with holders and the **new** screws (M5x30) to the rail.

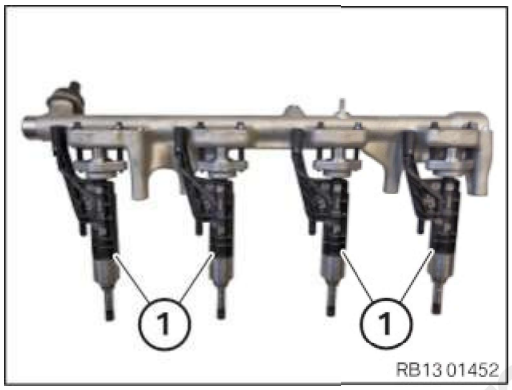
  Parts: Screws (M5x30)
- Keep the rail on a clean table in such a way that the openings on the rail for the injectors point upwards.

  The electrical injector connections must point to the fuel pressure sensor.
- Slide the special tool (distance gauge) 2 358 022 (2) between the holders and the rail onto the injector head.
- Make sure that the special tool (distance gauge) 2 358 022 (2) rests flat on the retaining bridge.
- Hand-tighten both screws (M5x30) (1) uniformly until the special tool (distance gauge) 2 358 022 (2) rests flat against the rail and the holder.

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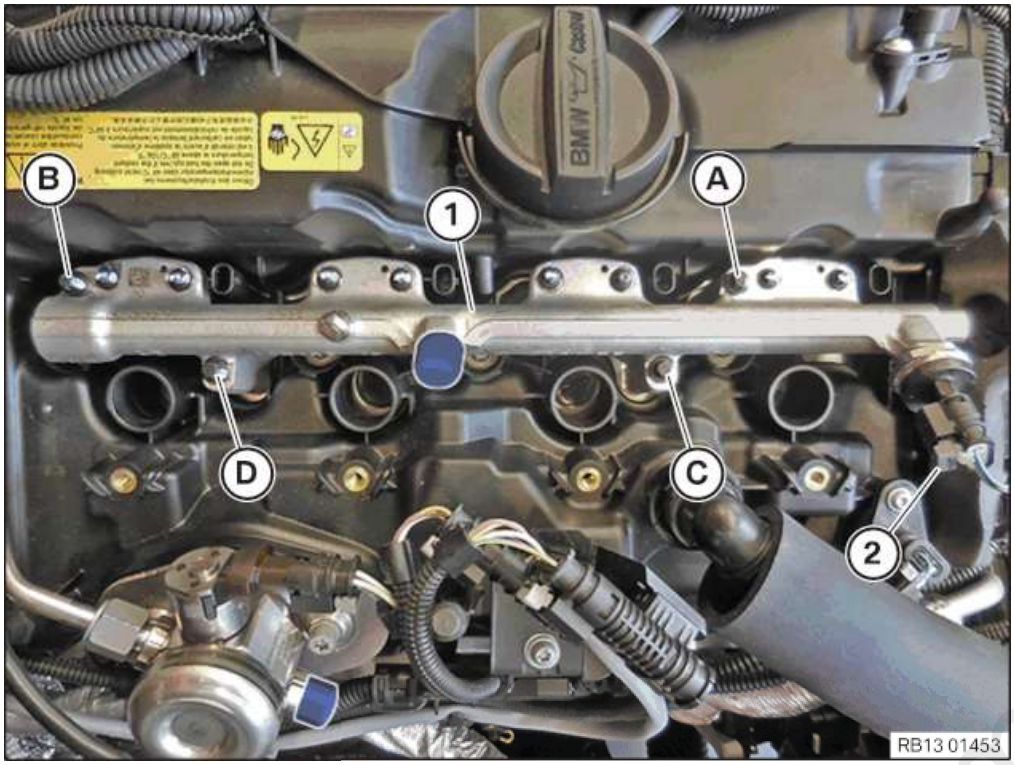
- Remove the special tool (distance gauge) 2 358 022 (1).
- Repeat this operation for all injectors.



- Check injectors (1) for loose fit at the rail.
- Align the electrical injector connections parallel to the rail.

  The injectors (1) must move freely.

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- Attach the rail (1) with the injectors to the cylinder head from the top.
- Make sure the injector tips catch the corresponding holes for the injectors in the cylinder head.
- Make sure the guides on the injector are properly inserted into the guide bores in the cylinder head.
- As soon as resistance can be felt when pressing down, position and hand-tighten the screws (M6x70) (A) and (B).
- Set the torque wrench to 2 Nm.
- Tighten the screws (A) and (B) in alternating order by **180°** each with the torque wrench until the rail is positioned flush on the cylinder head.
- If the tightening torque (2 Nm) is reached before the rail is positioned on the cylinder head: Disassemble the rail and restart the installation procedure.
- Renew the injectors after 3 failed attempts.
- Insert bolts (C) and (D).

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.

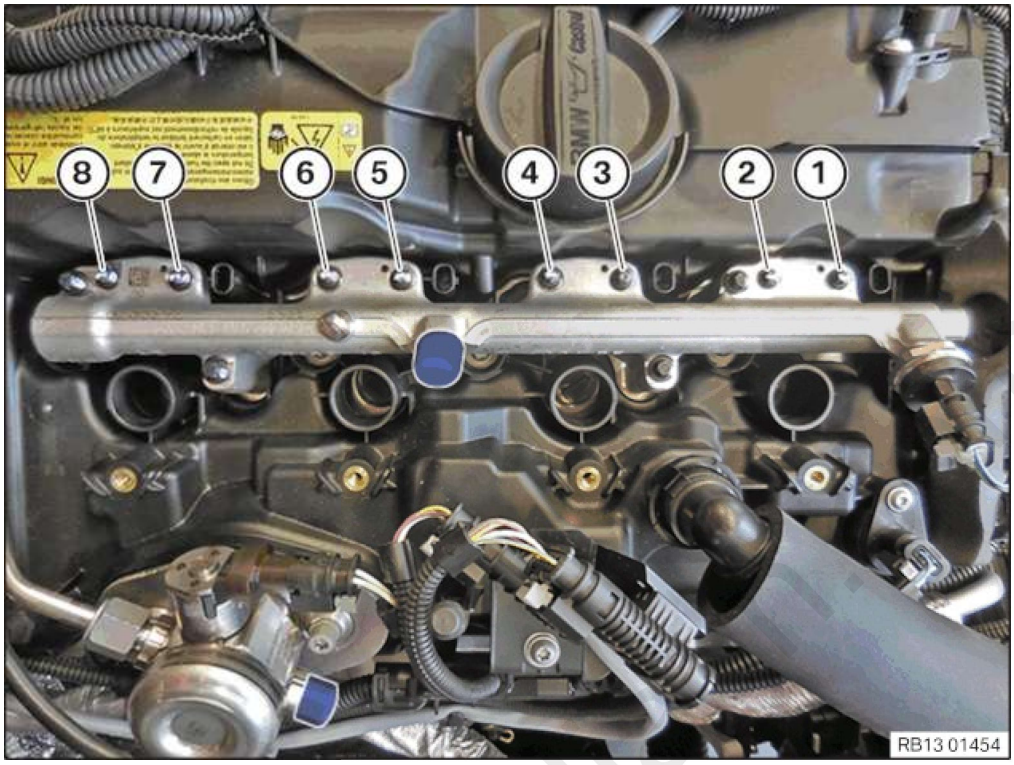
- Tighten bolt (A) to 5 Nm.
- Tighten bolt (D) to 5 Nm.
- Tighten bolt (B) to 5 Nm.
- Tighten bolt (C) to 5 Nm.
- Connect connectors (2) and lock.

  The connector (2) must engage audibly.

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- Make sure that the rail (1) rests flat against the cylinder head.



- Attach a socket to an extension.

  Do not use a reversible ratchet or torque wrench.
- Apply the screws (M5x30) in pairs (1) with (2), (3) with (4), (5) with (6),(7) with (8) in alternating order to **90° hand-tight**.
- Set the torque wrench to 5 Nm.

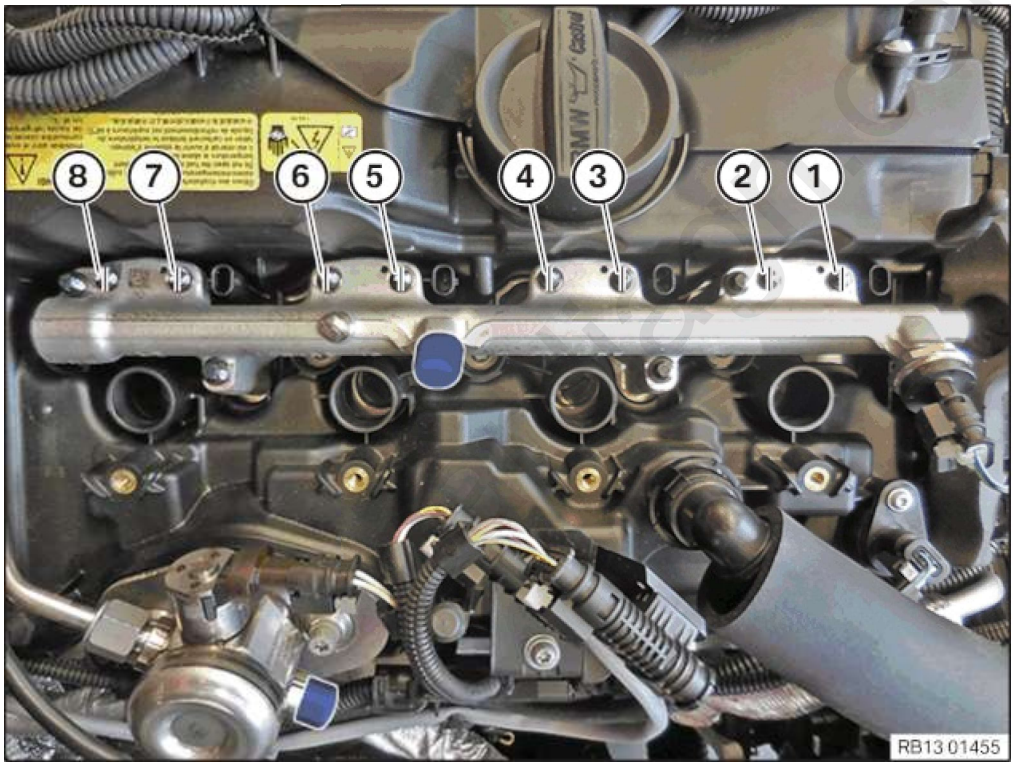
TECHNICAL INFORMATION

When assembling, it is essential to observe screwing sequences and tightening torques.

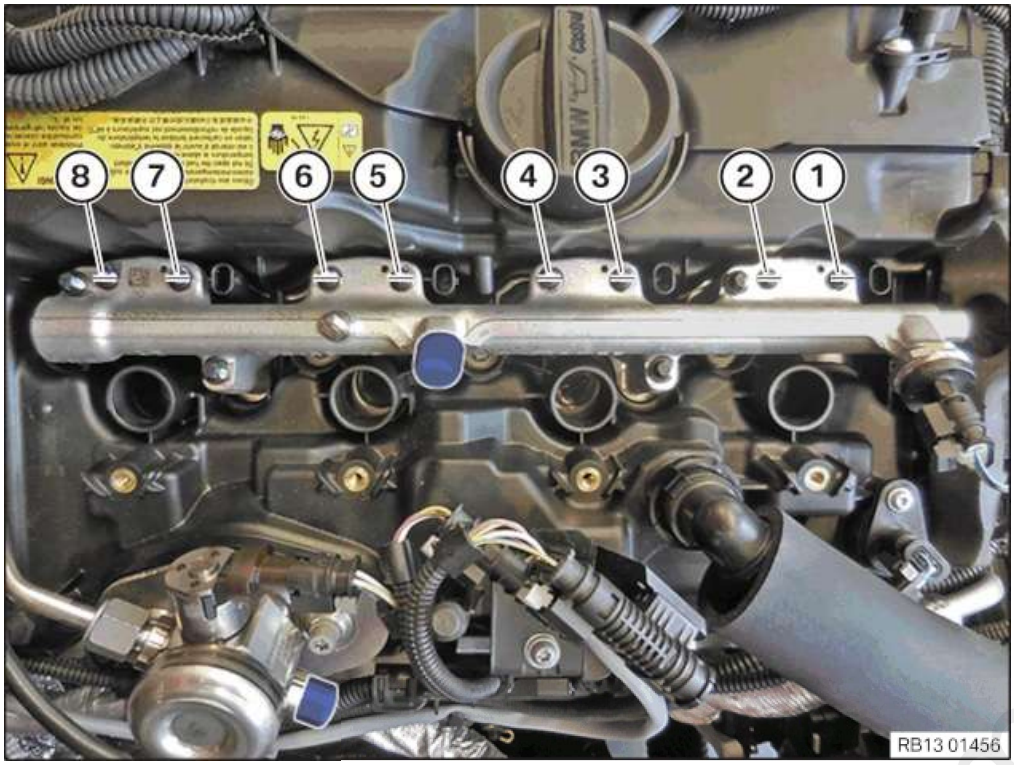
Non-observance of these requirements may result in leaks and damage.

- **Screw the M5x30 screws according to the following plan:**
  - **Fuel injector 1:**
  - Tighten the bolt (1) at an angle of rotation of 90° with the torque wrench.
  - Tighten the bolt (2) at an angle of rotation of 90° with the torque wrench.
  - Repeat the operations for bolts (1) and (2) until both bolts reach a torque of 5 Nm.
  - **Fuel injector 2:**
  - Tighten the bolt (3) at an angle of rotation of 90° with the torque wrench.
  - Tighten the bolt (4) at an angle of rotation of 90° with the torque wrench.
  - Repeat the operations for bolts (3) and (4) until both bolts reach a torque of 5 Nm.

- **Fuel injector 3:**
- Tighten the bolt (5) at an angle of rotation of 90° with the torque wrench.
- Tighten the bolt (6) at an angle of rotation of 90° with the torque wrench.
- Repeat the operations for bolts (5) and (6) until both bolts have reached a torque of 5 Nm.
- **Fuel injector 4:**
- Tighten the bolt (7) at an angle of rotation of 90° with the torque wrench.
- Tighten the bolt (8) at an angle of rotation of 90° with the torque wrench.
- Repeat the operations for bolts (7) and (8) until both bolts reach a torque of 5 Nm.

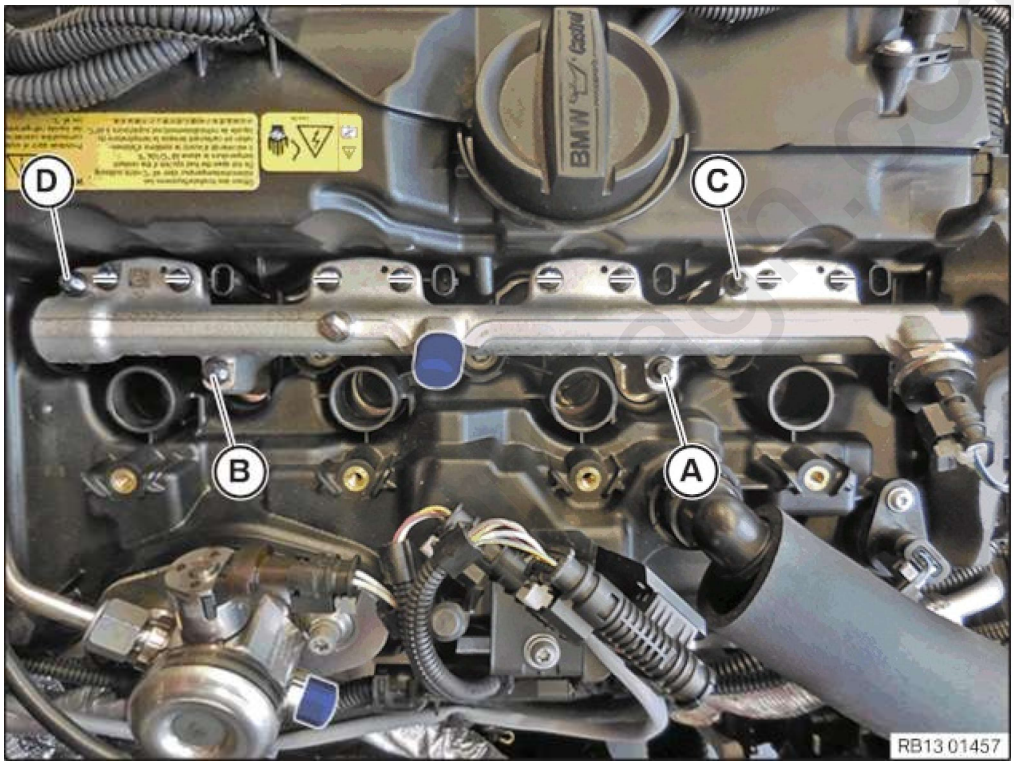


- Mark all bolts (1) to (8) with a vertical line (see figure).
- **Tighten screws using an angle of rotation.**
  - Tighten the bolt (1) with an angle of rotation of 90°.
  - Tighten the bolt (2) with an angle of rotation of 90°.
  - Tighten the bolt (3) with an angle of rotation of 90°.
  - Tighten the bolt (4) with an angle of rotation of 90°.
  - Tighten the bolt (5) with an angle of rotation of 90°.
  - Tighten the bolt (6) with an angle of rotation of 90°.
  - Tighten the bolt (7) with an angle of rotation of 90°.
  - Tighten the bolt (8) with an angle of rotation of 90°.



- Check if all bolts (1) to (8) have been tightened with a 90° angle of rotation.

  The marks (lines) must be horizontal (see figure).



- Unscrew the bolts (M6x70) (A) to (D).

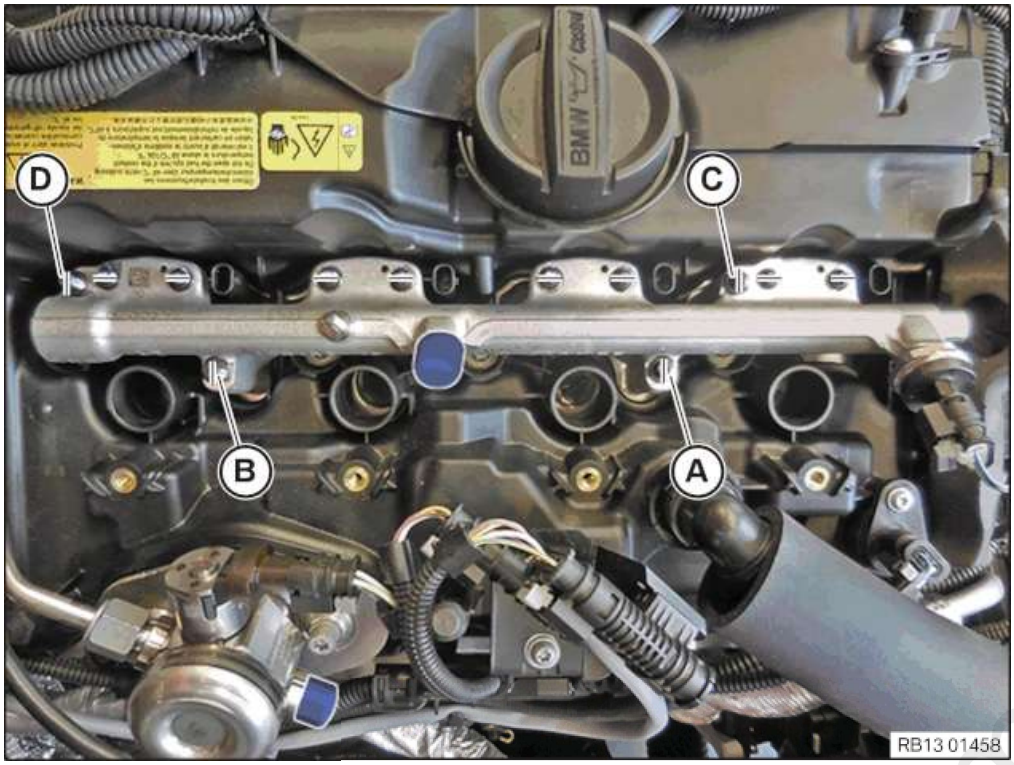
  It is imperative that the bolts are unscrewed.

TECHNICAL INFORMATION

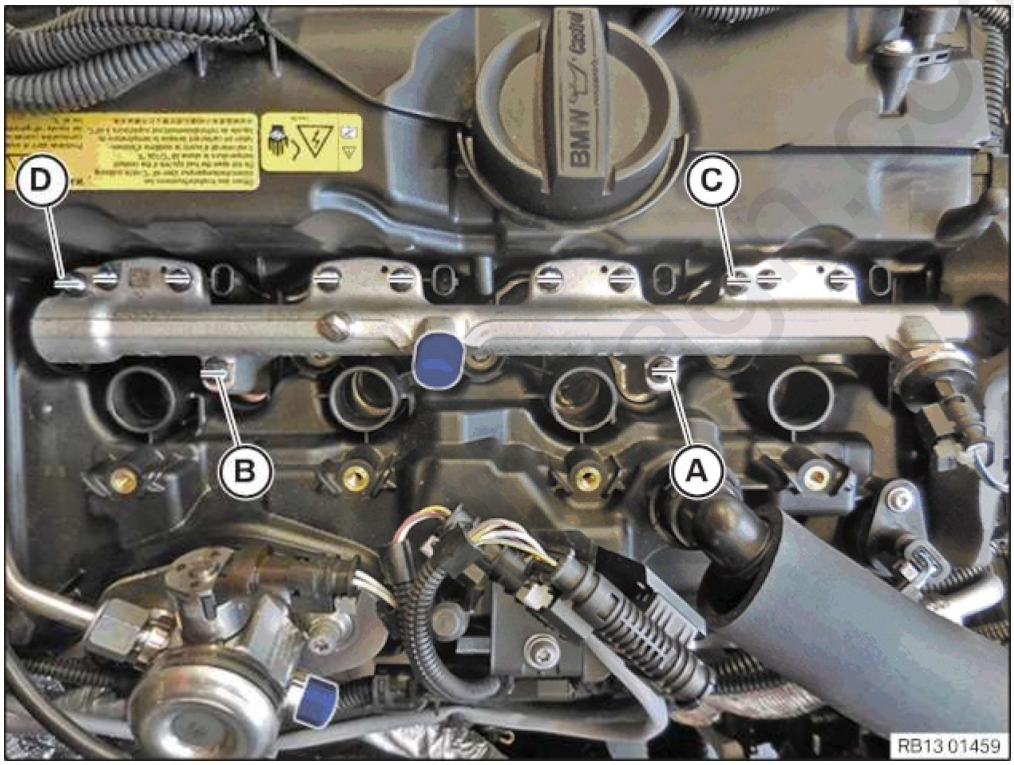
When assembling, it is essential to observe screwing sequences and tightening torques.

Non-observance of these requirements may result in leaks and damage.

- Tighten bolt (A) to 5 Nm.
- Tighten bolt (D) to 5 Nm.
- Tighten bolt (B) to 5 Nm.
- Tighten bolt (C) to 5 Nm.

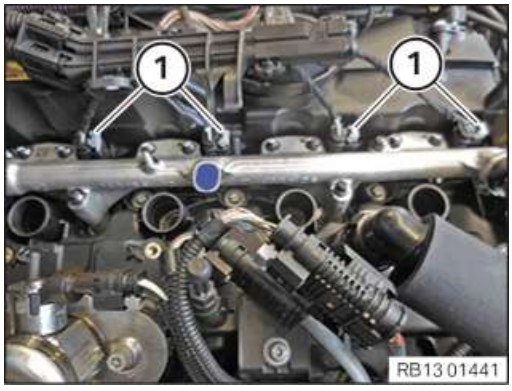


- Mark bolts (A)to (D) with a vertical line (see figure).
- Tighten the bolts (M6x70) (A) to (D) to a rotational angle **of 90°**.



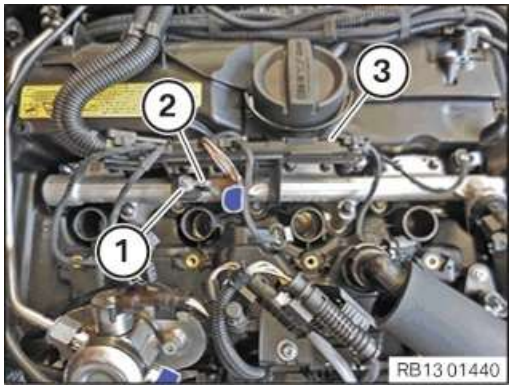
- Check if the bolts (A) to (D) have been tightened with a **90°** angle of rotation.

  The marks (lines) must be horizontal (see figure).



- Connect and lock all connectors (1) to the injectors.

  All connectors (1) must engage audibly.



- Thread in cable channel (3) and install.
- Thread in ground cable (2) and install.
- Tighten nut (1).

Ground cable to rail

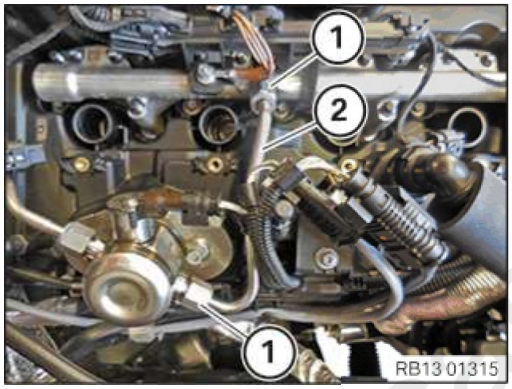
M6		Tightening torque	5 Nm

POSTPROCESSES

11 – Installing high pressure line between rail and high pressure pump



- Guide the special tool out and remove.



- Thread in and install the high pressure line (2).
- Tighten union nut (1) hand tight.
- Tighten union nut (1).

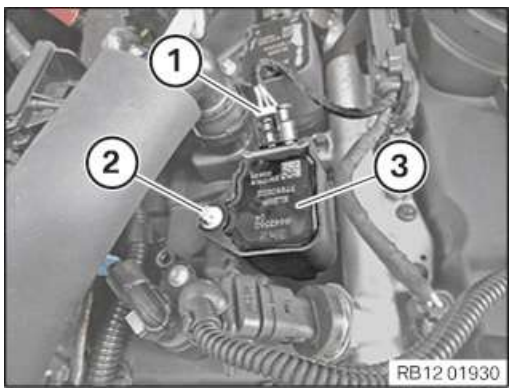
High pressure line between high pressure pump and high pressure rail

M14		Tightening torque	33 Nm

12 – Install all ignition coils

NOTICE

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



▸ **Install ignition coil.**

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

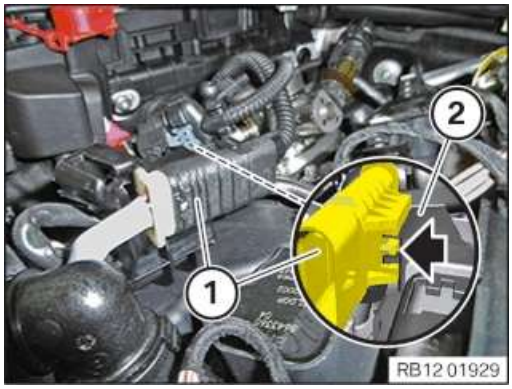
Ignition coil

Screw		Tightening torque	8 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

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- Connect and lock connector (1) with holder (2) (arrow).

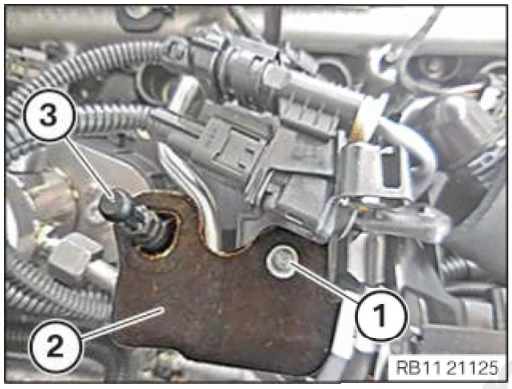
  The connector (1) must engage audibly.



- Connect connectors (1) and lock.

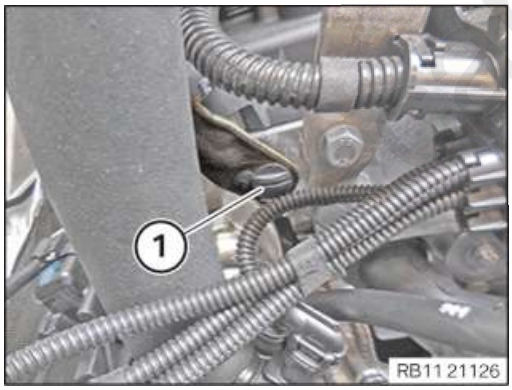
  The connector (1) must engage audibly.

13 – Install the cylinder head cover acoustic cover



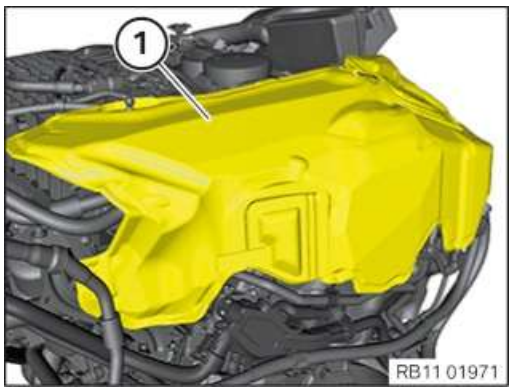
- Guide in and position the acoustic cover (2) on the ball pin (3).
- Tighten down screw (1).

Acoustic cover (side) to cylinder head cover	
TS6 x 20	8 Nm



- Secure the clip (1).

14 – Installing acoustic cover at rear



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



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

15 – 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.

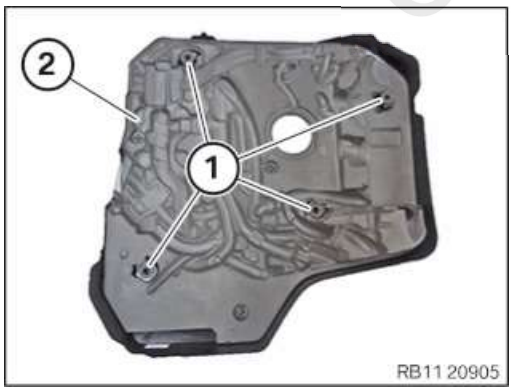
16 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.

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

  The acoustic cover (1) must audibly engage into place.

17 – Disconnecting all battery earth leads



- See additional information.

18 – Reset ultra-small quantity adaptation

TECHNICAL INFORMATION

If the DME control unit or an injector is renewed, minimum quantity adaptation must be reset. If an injector has been replaced on cylinder side, the minimum quantity adaptation must also be reset.



- Connect the diagnosis system to reset the minimum quantity adaptation:
  - Read out vehicle data
  - Identification without vehicle test
  - Start vehicle test
  - Vehicle handling
  - Service functions
  - Power train
  - Engine electronics
  - Adjustment functions
  - Delete adaptations
  - Reset adaptation values
  - Reset ultra-small quantity adaptation

Additional Information

Overview of Tightening Torques

Ground cable to rail Used in step 10

M6		Tightening torque	5 Nm

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High pressure line between high pressure pump and high pressure rail — Used in step 11

M14		Tightening torque	33 Nm

Ignition coil — Used in step 12

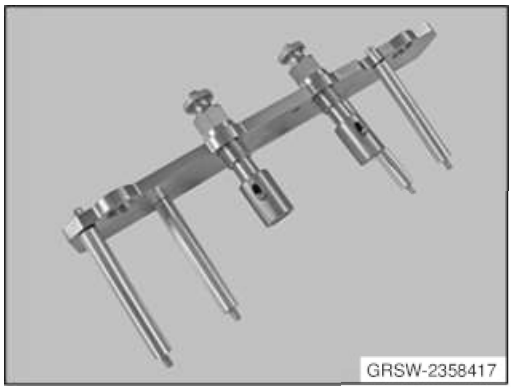
Screw		Tightening torque	8 Nm

Acoustic cover (side) to cylinder head cover — Used in step 13

TS6 x 20		8 Nm

Overview of Special Tools

2 358 417 Device



Common — Used in step 8

Usage	For removing and installing injectors. 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	A57
Replaced by	
In connection with	
SI-Number	01 13 14 (098)

0 496 106 (11 8 720) Socket WAF 46



Common — Used in step 8

Usage	(Long socket SW24) For removal and installation of oil pressure sensor. (Stahlwille or HAZET)
Included in the tool or work	
Storage location	C20
Replaced by	
In connection with	
SI-Number	01 04 07 (352)

2 452 959 Pliers



Common — Used in step 9

Usage	For disassembly of the PTFE sealing rings on the injector HDEV5 & HDEV6. Replaces 0495757 (SWZ number 13 0 191). 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	A5
Replaced by	
In connection with	
SI-Number	01 07 17 (487)

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2 448 401 Fitting aid



Common	Used in step 9
Usage	For installation of PTFE rings on injector. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C55
Replaced by	
In connection with	
SI-Number	01 07 17 (487)

2 358 022 Gauge



Common	Used in step 10
Usage	To position the injector during installation. 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	
SI-Number	01 13 14 (098)

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	117
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	117
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117

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61 20 900 Disconnecting and connecting battery earth lead	117
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61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 20 900 Disconnecting and connecting battery earth lead	117
61 35 ... Notes on ESD protection (Electro Static Discharge)	58
13 53 ... Clean the cylinder head around the injectors due to grit / dust	8
61 13 ... Unlocking and disconnecting different plug connections	8

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13 53 180 Replace pressure line

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Working on fuel system.

Risk of fire! Danger of explosion!

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

CAUTION

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

Danger of injury!

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

RISK OF DAMAGE

Damage to 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 – Disconnecting all battery earth leads

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- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

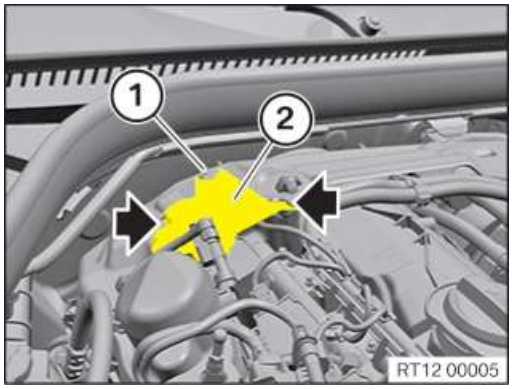
- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

3 – When working on the last cylinder: Release the service opening of the sound insulation at the top of the engine

▸ Release the service opening of the sound insulation at the top of the engine



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

4 – Remove all ignition coils.

NOTICE

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

▸ **Removing the ignition coil**

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the ignition coil.

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

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

RISK OF DAMAGE

Electrostatic discharge.

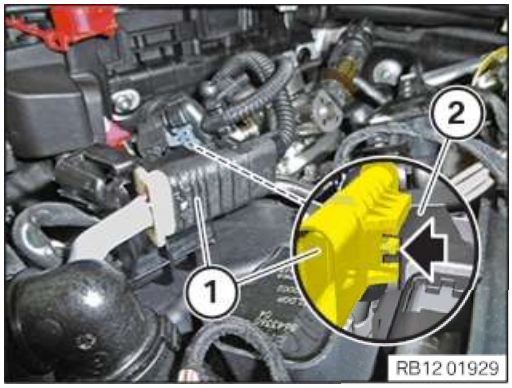
Damage to or destruction of electrical components.

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

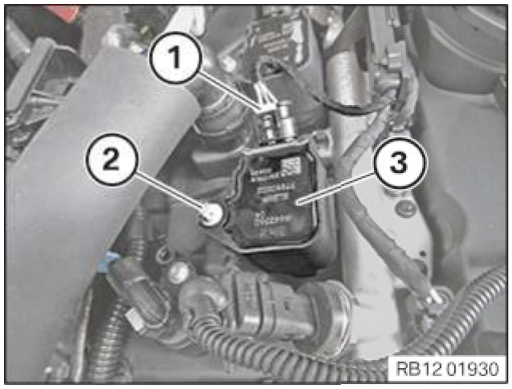
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- Unlock plug connection (1) and disconnect.

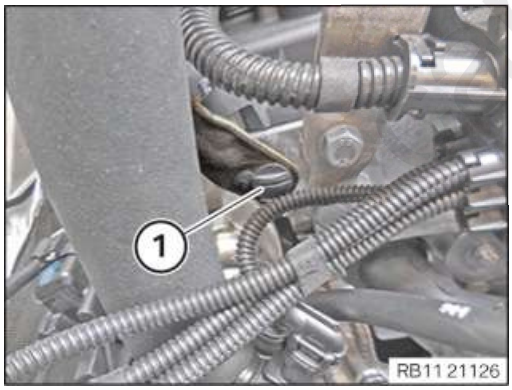


- Unlock connector (1) (arrow) and disconnect it from holder (2).

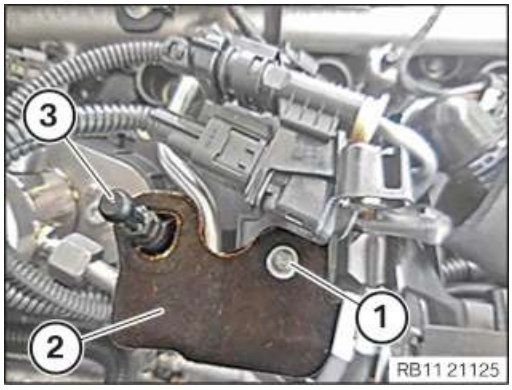


- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Remove ignition coil (3).

5 – Removing the cylinder head cover acoustic cover



- Loosen clip (1).



- Loosen screw (1).
- Guide the acoustic cover (2) out of the ball pin (3) and remove.

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6 – Remove the high pressure line between the high pressure pump and the rail

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Working on fuel system.

Risk of fire! Danger of explosion!

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

CAUTION

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

Danger of injury!

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

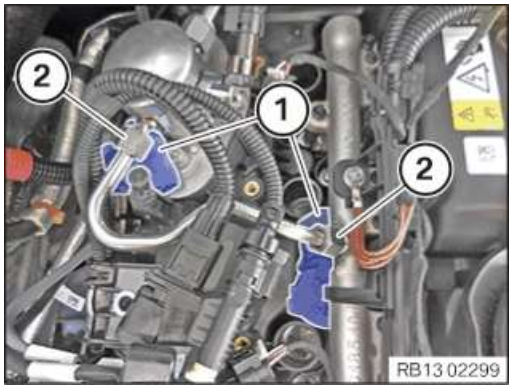
TECHNICAL INFORMATION

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

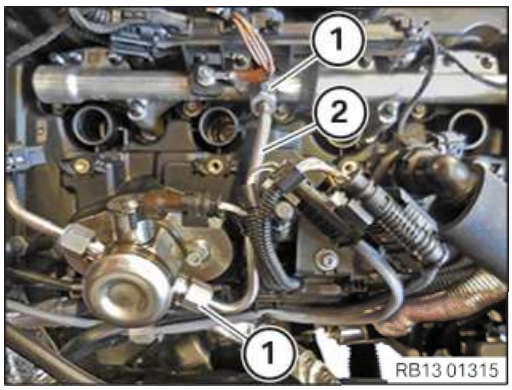


- Have the special tool ready.

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- Position a lint-free cleaning cloth (1) on the union nuts (2).
- Release union nuts (2).
- Catch and dispose of escaping fuel.
- Feed out and dispose of the lint-free cleaning clothes (1).



- Release the union nuts (1) completely.
- Feed the high pressure line (2) out and remove.

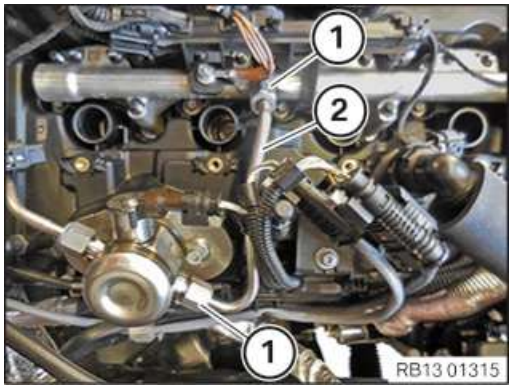


- Seal all openings with the special tool .

7 – Installing high pressure line between rail and high pressure pump



- Guide the special tool out and remove.



- Thread in and install the high pressure line (2).
- Tighten union nut (1) hand tight.
- Tighten union nut (1).

High pressure line between high pressure pump and high pressure rail

M14		Tightening torque	33 Nm

POSTPROCESSES

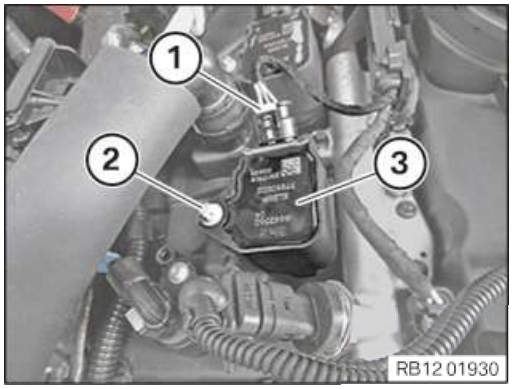
mdiagn.com

8 – Install all ignition coils

NOTICE

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

▶ **Install ignition coil.**



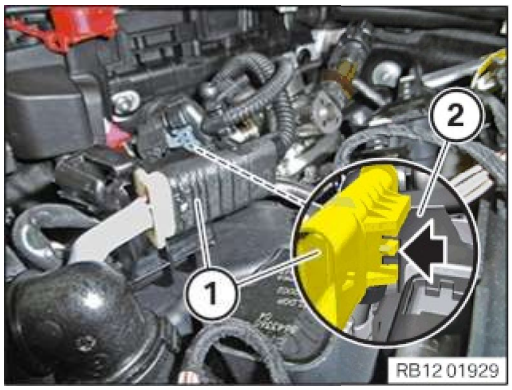
- Install ignition coil (3).
- Tighten down screw (2).

Ignition coil

Screw		Tightening torque	8 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Connect and lock connector (1) with holder (2) (arrow).

  The connector (1) must engage audibly.

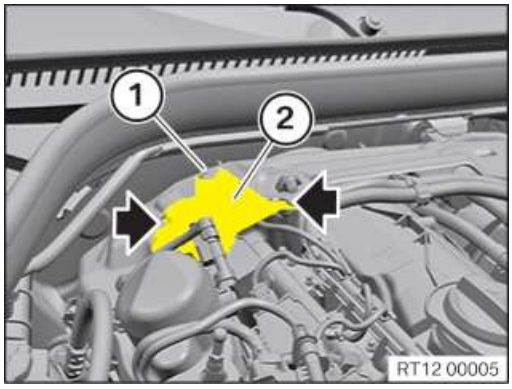


- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

9 – When working on the last cylinder: Mounting service opening of the sound insulation on top of the engine

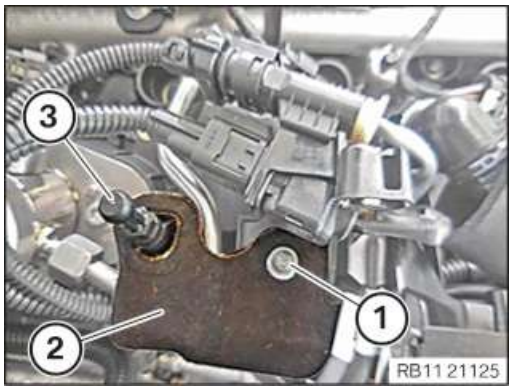
▶ **Mounting the service opening in sound insulation on top of engine**



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

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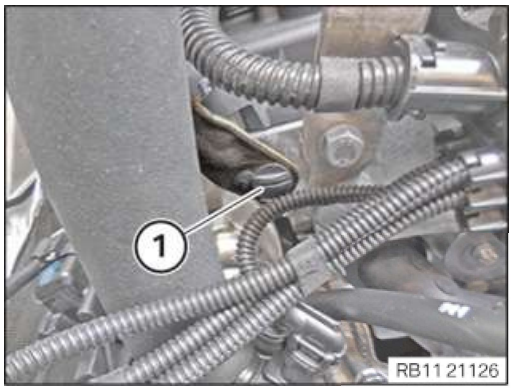
10 – Install the cylinder head cover acoustic cover



- Guide in and position the acoustic cover (2) on the ball pin (3).
- Tighten down screw (1).

Acoustic cover (side) to cylinder head cover

TS6 x 20		8 Nm



- Secure the clip (1).

11 – Disconnecting all battery earth leads



- See additional information.

12 – Install acoustic cover

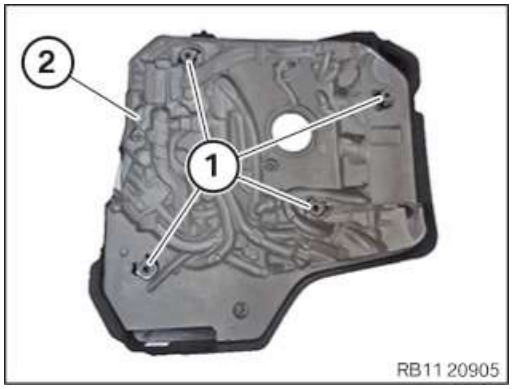
RISK OF DAMAGE

Damage to the acoustic cover.

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

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

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- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



- Clip in the acoustic cover (1) into the holders in the **marked** areas.
  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

High pressure line between high pressure pump and high pressure rail			Used in step 7
M14		Tightening torque	33 Nm

Ignition coil			Used in step 8
Screw		Tightening torque	8 Nm

Acoustic cover (side) to cylinder head cover			Used in step 10
TS6 x 20			8 Nm

Overview of Special Tools

Links

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	111
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	111
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	111

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61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
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61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 20 900 Disconnecting and connecting battery earth lead	111
61 35 ... Notes on ESD protection (Electro Static Discharge)	4

cardiagn.com

13 53 596 Replacing the high-pressure fuel sensor

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

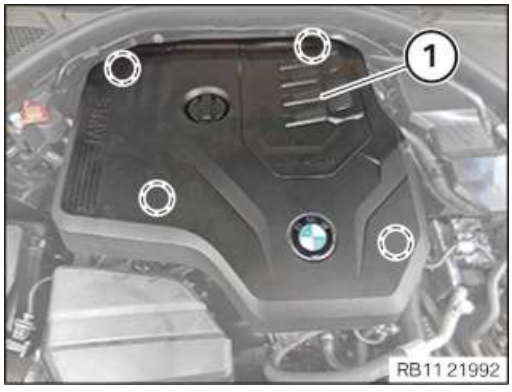
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

3 – Remove the ignition coil of the first cylinder

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WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the ignition coil.

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

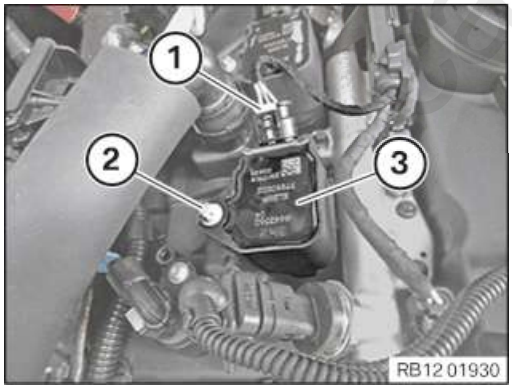
- Cover ignition coils using suitable covers when working on the fuel system, if necessary remove them.
- Do not oil or grease the silicone tube of the spark plug connector. The silicone tube is coated with talc to reduce the pulling forces.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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



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

MAIN WORK

4 – Remove the rail pressure sensor

WARNING

Working on fuel system.

Risk of fire! Danger of explosion!

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

CAUTION

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

Danger of injury!

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

RISK OF DAMAGE



Electrostatic discharge.

Damage to or destruction of electrical components.

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

RISK OF DAMAGE

Contaminant or foreign body.

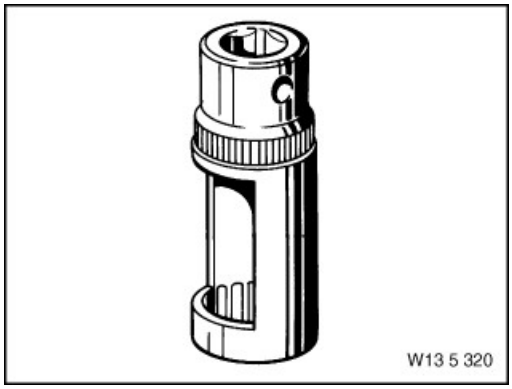
Contamination can result in malfunctions, operating failure or leaks.

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

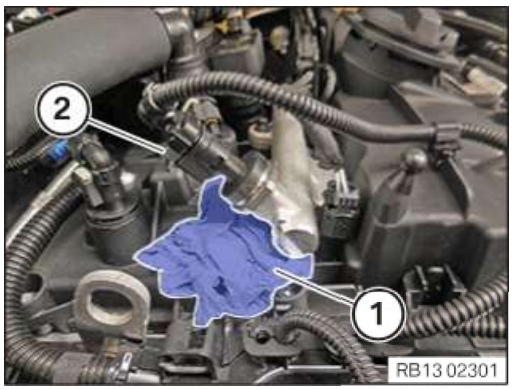
TECHNICAL INFORMATION

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

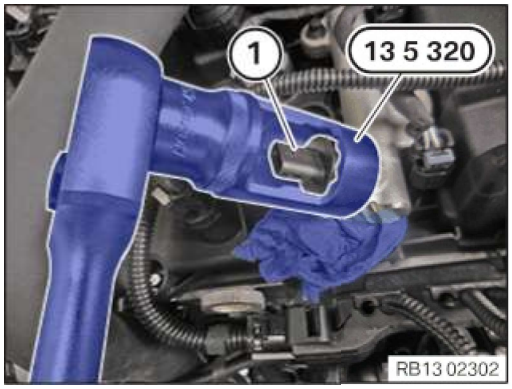
carlign.com



- Have the special tool ready.

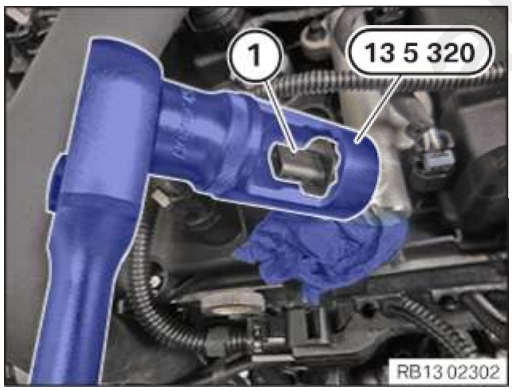


- Position a lint-free rag (1).
- Unlock and loosen connector (2).



- Release the rail pressure sensor (1) with the special tool .
- Catch and dispose of escaping fuel.

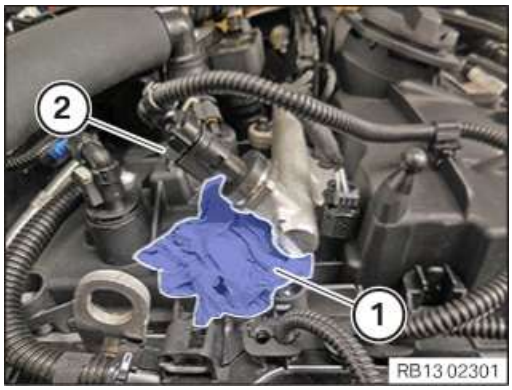
5 – Install the rail pressure sensor



- Insert and install the rail pressure sensor (1).
- Tighten rail pressure sensor (1) with the special tool .

Rail pressure sensor to rail

M14x1,5		Tightening torque	32,5 Nm

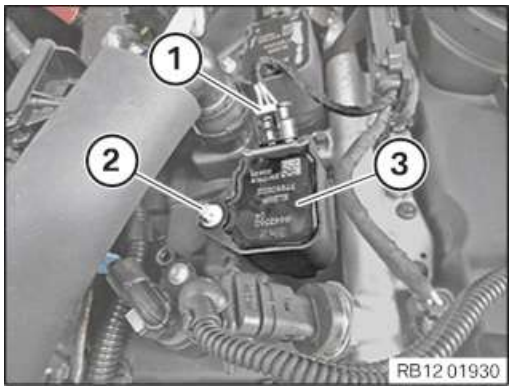


- Connect and lock the connector (2).

  The connector (2) must engage audibly.
- Remove and dispose of the lint-free rag (1).
- Check rail pressure sensor for tightness.

rdiagn.com

6 – Install the ignition coil of the first cylinder



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

Ignition coil

Screw		Tightening torque	8 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

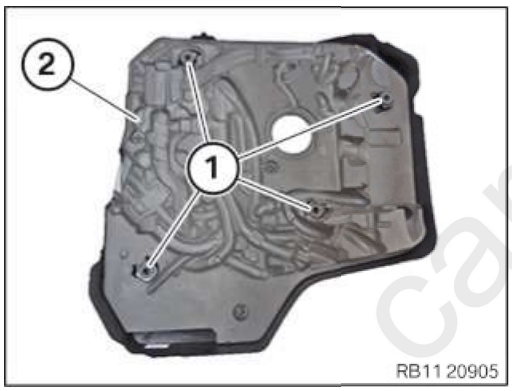
7 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

8 – Disconnecting all battery earth leads

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- See additional information.

Additional Information

Overview of Tightening Torques

Rail pressure sensor to rail			Used in step 5
M14x1,5		Tightening torque	32,5 Nm

Ignition coil			Used in step 6
Screw		Tightening torque	8 Nm

Overview of Special Tools

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	18
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	18
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
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61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	18

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61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 35 ... Notes on ESD protection (Electro Static Discharge)	4

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13 54 030 Remove and install/seal throttle body

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

MAIN WORK

2 – Removing the throttle body

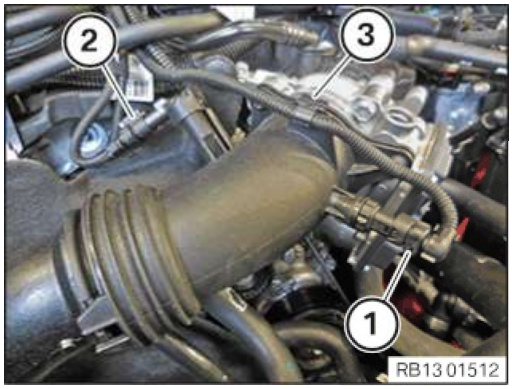
carmanualsdiagram.com

RISK OF DAMAGE

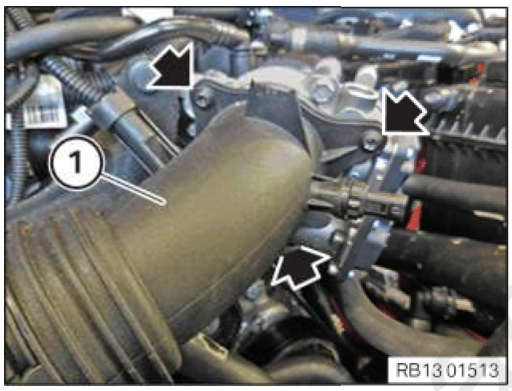
Electrostatic discharge.

Damage to or destruction of electrical components.

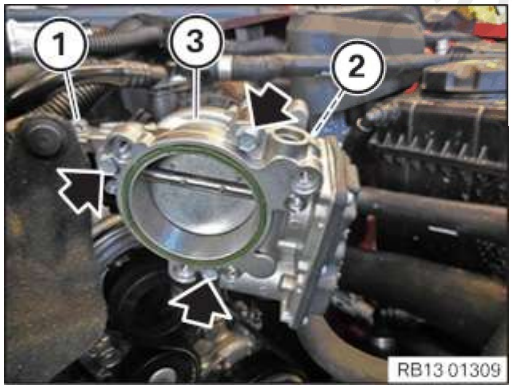
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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



- Unlock and loosen connector (1).
- Unlock and loosen connector (2).
- Unlock and loosen clamp (3).

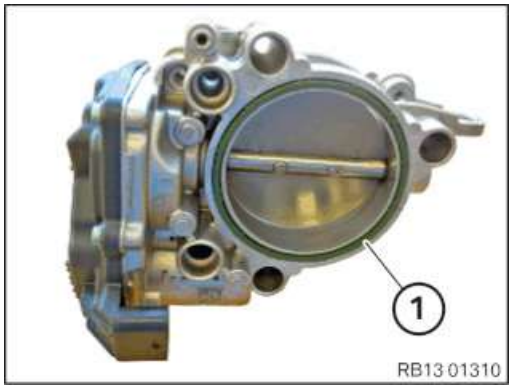


- Remove screws (arrows).
- Feed out charge air line (1) and place to one side.



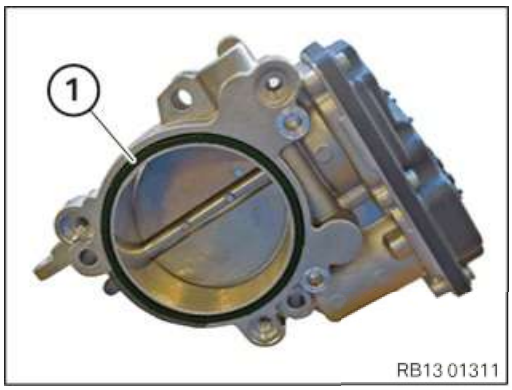
- Loosen screw (1).
- Remove screws (arrows).
- Unlock and loosen connector (2).
- Remove the throttle bodies (3).

3 – Installing the throttle body



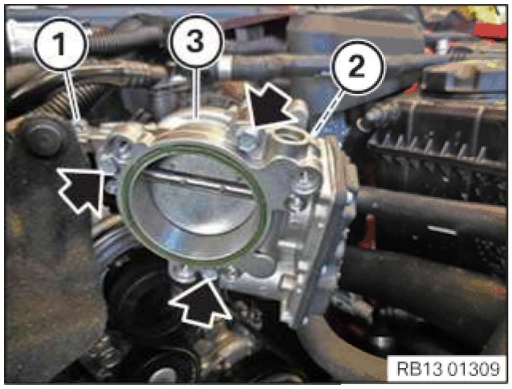
- Renew sealing ring (1).

  Parts: Sealing ring



- Renew sealing ring (1).

  Parts: Sealing ring



- Feed in and install the throttle body (3).
- Connect and lock the connector (2).
- Tighten screws (arrows).

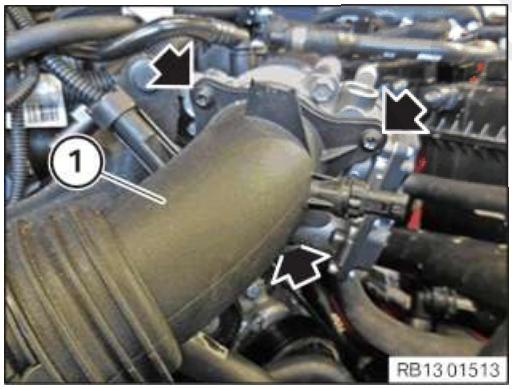
Throttle body to intake plenum

M6X50		Tightening torque	7 Nm

- Tighten down screw (1).

Throttle body to holder

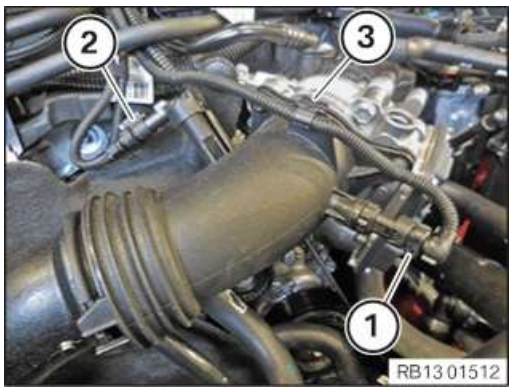
M6X25		Tightening torque	8 Nm



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

Charge air line to throttle body

M6		Tightening torque	8 Nm



- Connect and lock the connector (1).
- Connect and lock the connector (2).
- Secure clamps (3).

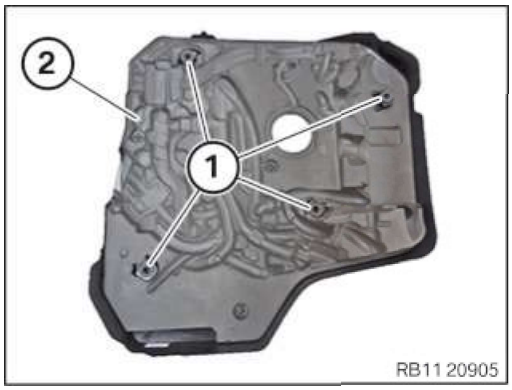
4 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Throttle body to intake plenum — Used in step 3

M6X50		Tightening torque	7 Nm

Throttle body to holder — Used in step 3

M6X25		Tightening torque	8 Nm

Charge air line to throttle body — Used in step 3

M6		Tightening torque	8 Nm

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	2
61 35 ... Notes on ESD protection (Electro Static Discharge)	2

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13 62 560 Remove and install/replace hot film air mass meter

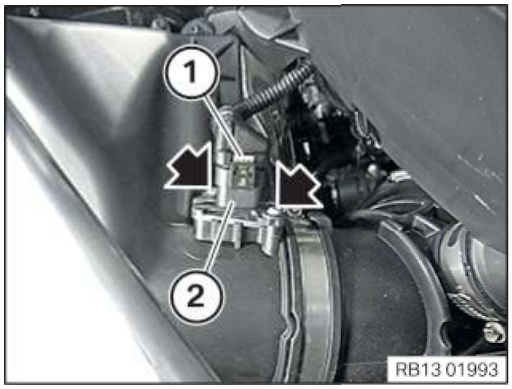
1 – Removing hot film air mass meter

RISK OF DAMAGE

Electrostatic discharge.

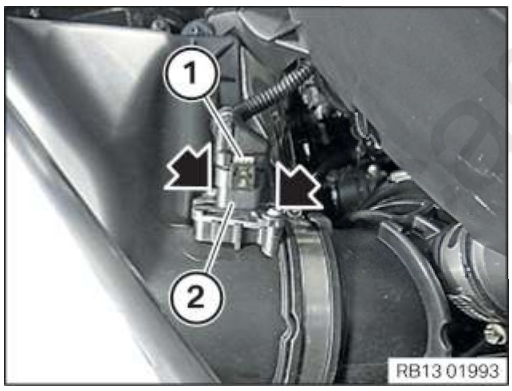
Damage to or destruction of electrical components.

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



- Unlock plug connection (1) and disconnect.
- Remove screws (arrows).
- Remove the hot film air mass meter (2).

2 – Installing hot film air mass meter



- Insert and install the hot film air mass meter (2).
- Tighten screws (arrows).

Hot film air mass meter to intake silencer

Screw TS 4x16		Tightening torque	1,5 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

3 – When replacing the hot film air mass metre: Reset adaptation value

- Reset the adaptation value for the air mass system with the diagnosis system.

Additional Information

Overview of Tightening Torques

Hot film air mass meter to intake silencer Used in step 2

Screw TS 4x16		Tightening torque	1,5 Nm

erdiagn.com

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	1

cardiagn.com

13 62 538 Replace charge air temperature sensor

1 – Remove charge air temperature sensor

WARNING

Hot surfaces.

Risk of burning!

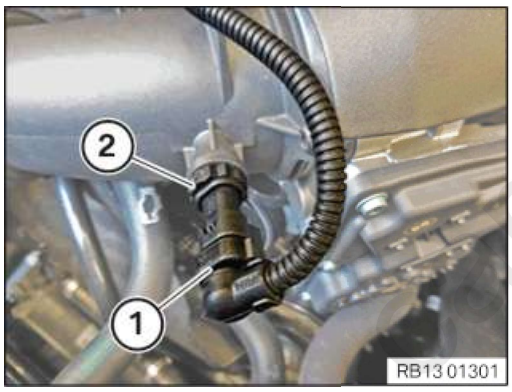
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

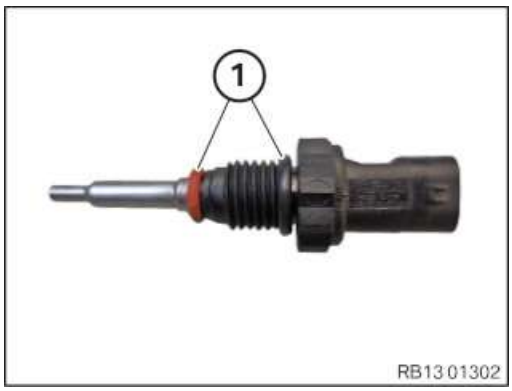
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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



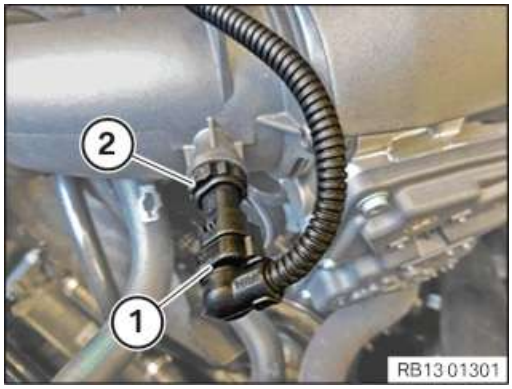
- Unlock and loosen connector (1).
- Release charge air temperature sensor(2).
- Take out and remove charge air temperature sensor (2).

2 – Install charge air temperature sensor

▶ **Prepare the charge-air temperature sensor**



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



- (2)Insert and install the charge air temperature sensor.
- Tighten charge air temperature sensor (2).

Charge air temperature sensor on charge air line

M12x1.5		Tightening torque	2 Nm

- Connect and lock the connector (1).

  The connector (1) must engage audibly.

Additional Information

Overview of Tightening Torques

Charge air temperature sensor on charge air line Used in step 2

M12x1.5		Tightening torque	2 Nm

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	1
61 35 ... Notes on ESD protection (Electro Static Discharge)	

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13 62 537 Replace coolant temperature sensor

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

2 – Removing the clean air pipe with the resonator

WARNING

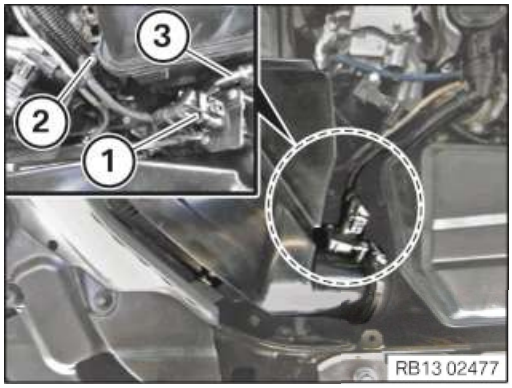
Hot surfaces.

Risk of burning!

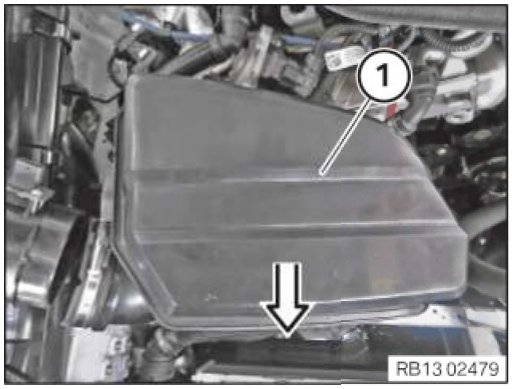
- Perform all work only on components that have cooled down.



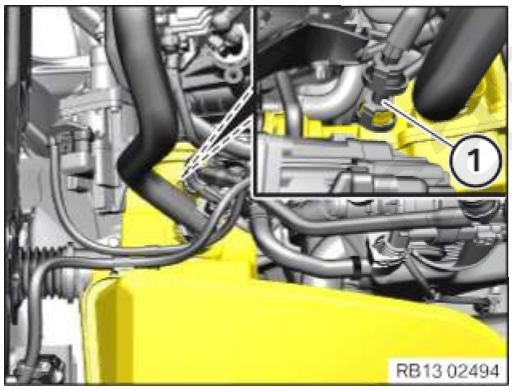
- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.



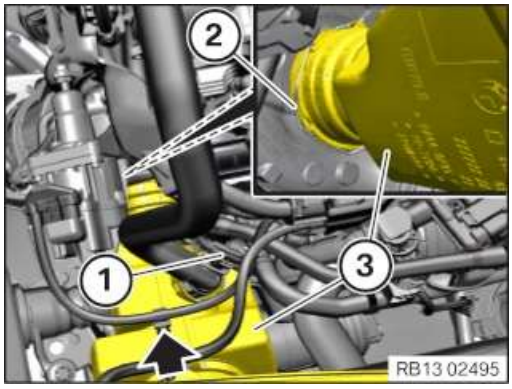
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



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



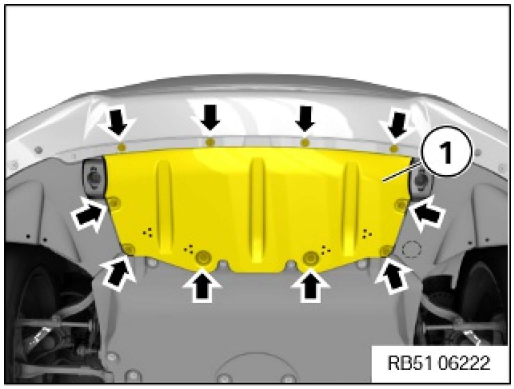
- Unlock and disconnect the tank ventilation line (1).



- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

3 – Removing the front underbody protection

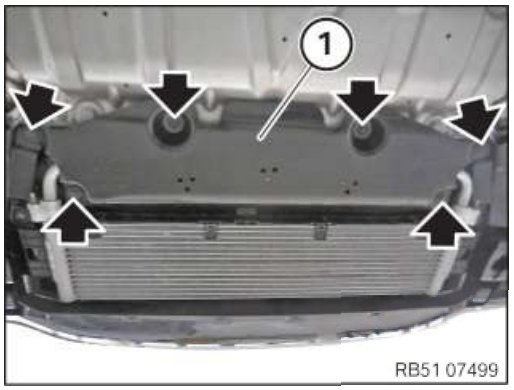
rdiagn.com



- **Version 1:**

  Remove screws (arrows).

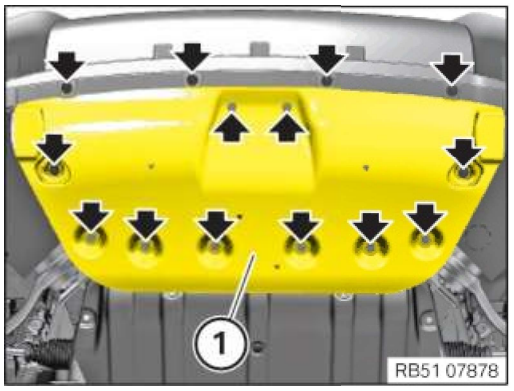
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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

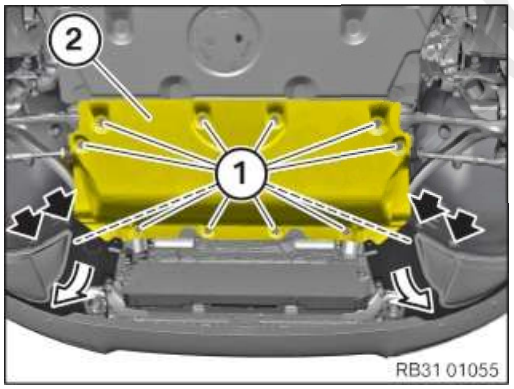


- **Version 3:**

  Remove screws (arrows).

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

4 – Remove the underbody protection of the steering gear



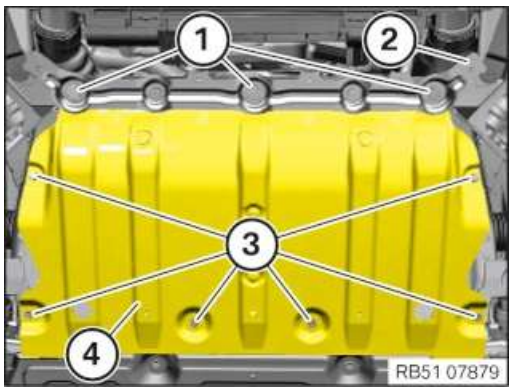
- **Version 1:**

  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).



- **Version 2:**

  Loosen screws (1).

  Remove the holder of the underride protection (2).

  Loosen screws (3).

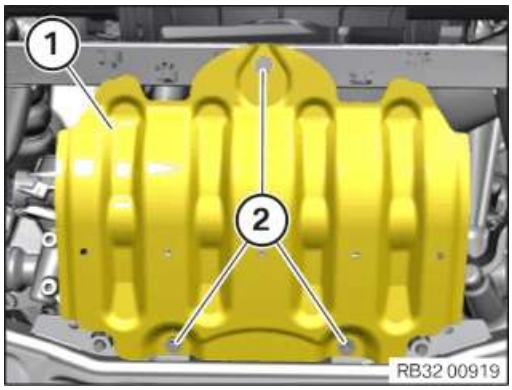
  Slide the steering gear underbody protection (4) out and remove.

5 – If installed: Removing the steering start protection

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Prerequisite

The front underbody protection is removed.



- Loosen screws (2).
- Remove guard (1).

MAIN WORK

6 – Remove the coolant temperature sensor from the coolant radiator

WARNING

Hot fluids.

Risk of scalding!

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

RISK OF DAMAGE

Electrostatic discharge.

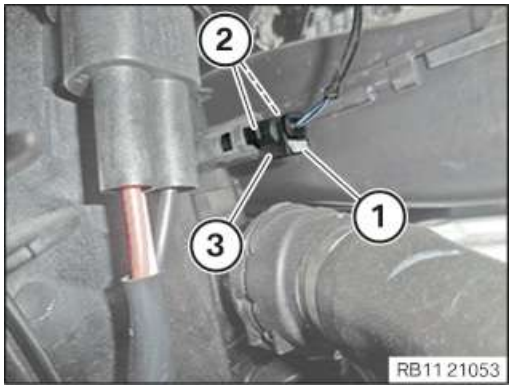
Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

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

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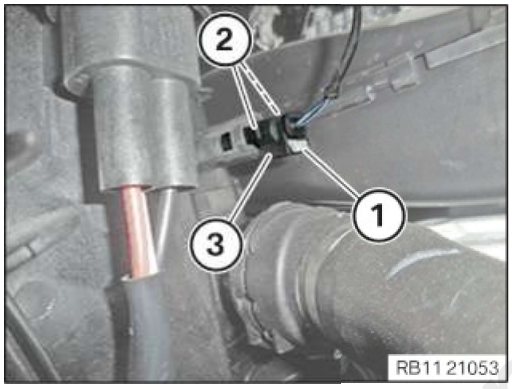


- Unlock plug connection (1) and disconnect.
- Unlock the locks (2).
- Guide out and remove the coolant temperature sensor (3).
- Catch and dispose of escaping coolant.

7 – Install the coolant temperature sensor on the coolant radiator



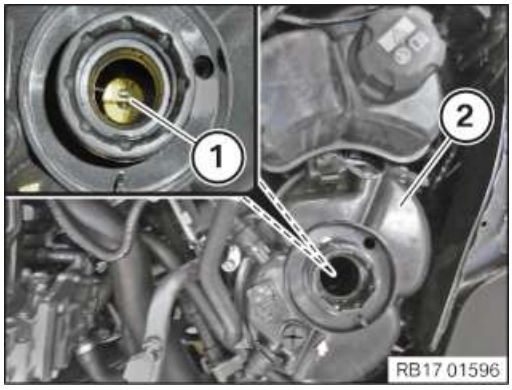
- Check sealing ring (1) for damage, renew if necessary.



- Insert and install the coolant temperature sensor (3).
- Ensure that the locks (2) engage audibly.
- Connect connectors (1) and lock.
- Make sure the connector (1) engages audibly.



- Loosen sealing cap (1).

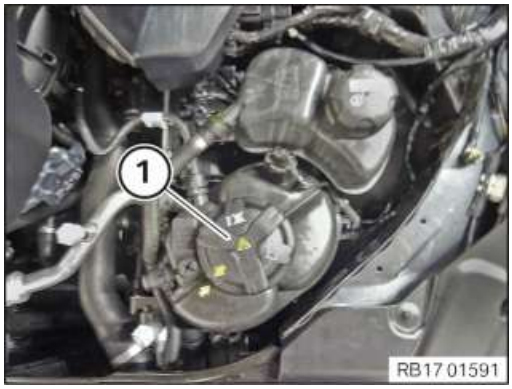


TECHNICAL INFORMATION

Follow notes for repair work on the cooling system.
For additional information see:
Main group 17
17 00 ... Notes for working on the cooling system

- Adjust the coolant level to the **maximum mark** (1) in the coolant expansion tank for high temperature (2).

partdiagram.com



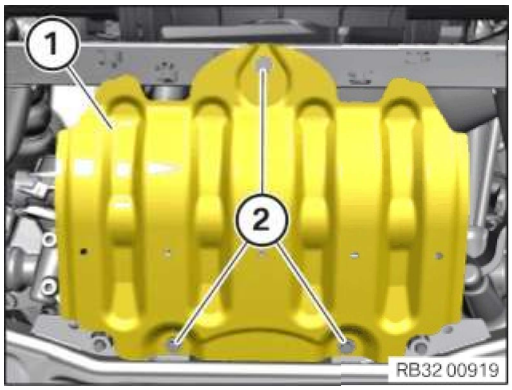
- Shut sealing cap (1).

POSTPROCESSES

8 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

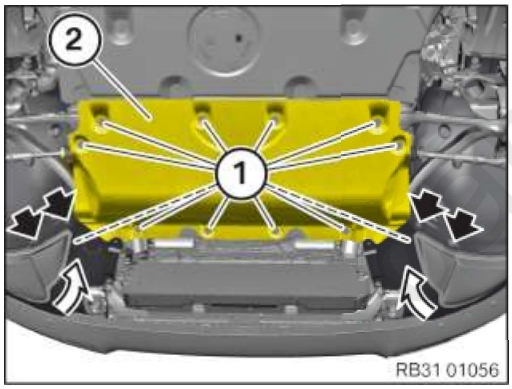


- Remove guard (1).
- Tighten the screws (2).

Bumper buffer device steering on front axle support

M10		Tightening torque	56 Nm

9 – Install the underbody protection of the steering gear



- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

Underbody protection of the steering gear

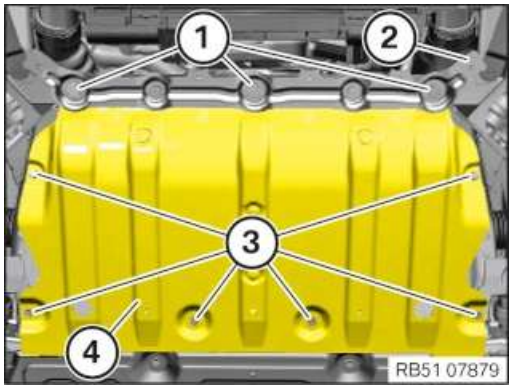
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm

ardiagn.com



- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

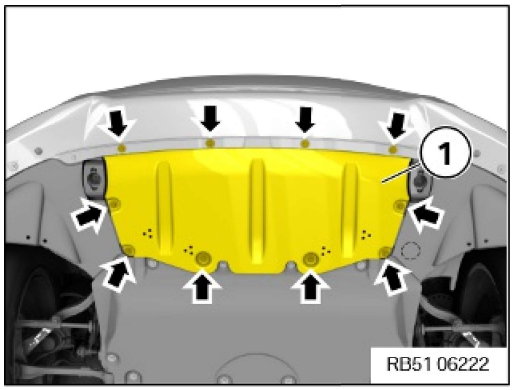
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

10 – Installing the front underbody protection



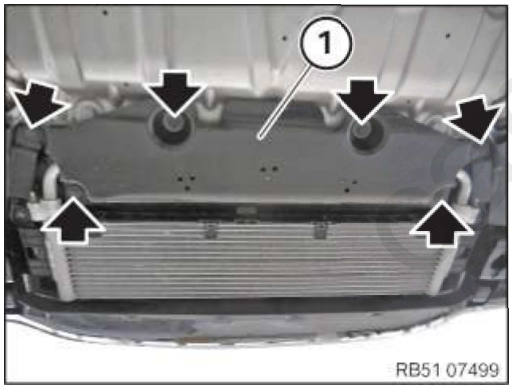
- **Version 1:**

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

  Tighten screws (arrows).

Underbody protection front

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



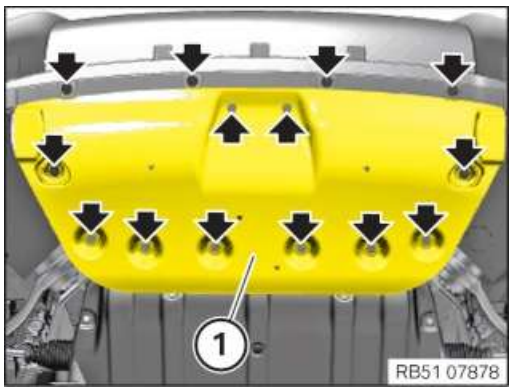
- **Version 2:**

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

  Tighten screws (arrows).

Underbody protection front

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



- **Version 3:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

11 – Installing the clean air pipe with resonator

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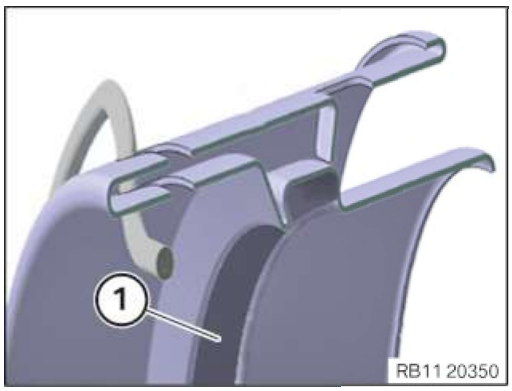


- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

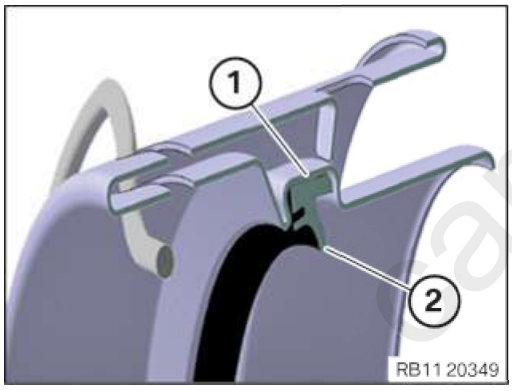
TECHNICAL INFORMATION

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



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

  The gasket groove (1) must be clean.



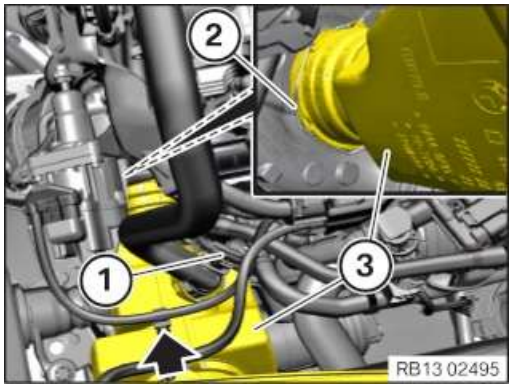
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

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

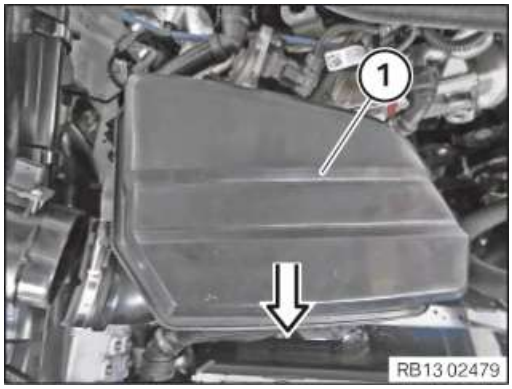


- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

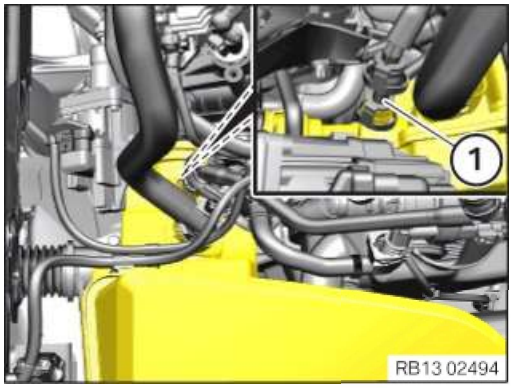
  The clamp (2) must engage audibly.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.
- Secure clamp (arrow).

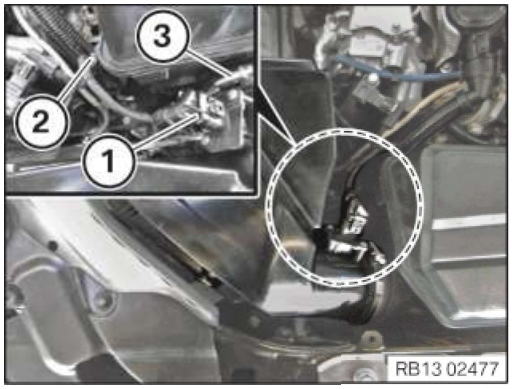
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- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Connect and lock the tank ventilation line (1).



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

  The connector (1) must engage audibly.



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

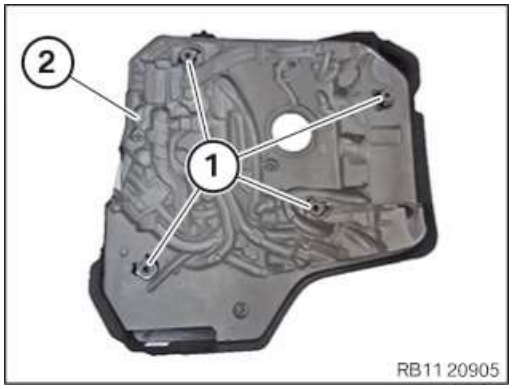
12 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Bumper buffer device steering on front axle support			Used in step 8
M10		Tightening torque	56 Nm

Underbody protection of the steering gear			Used in step 9
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws)			Used in step 9
Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support			Used in step 9
M10		Tightening torque	56 Nm

Underbody protection front			Used in step 10
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 11
Clamp		Tightening torque	3 Nm

Links

Repair instructions	**Used in step**
61 35 ... Notes on ESD protection (Electro Static Discharge)	6

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Operating materials	Used in step
Main group 17	7

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13 62 531 Replace coolant temperature sensor

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

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

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

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Remove the seal for the rear bonnet



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

3 – Removing the acoustic cover

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WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

4 – Removing acoustic cover at rear



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

5 – Removing the DME control unit

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RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

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

TECHNICAL INFORMATION

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

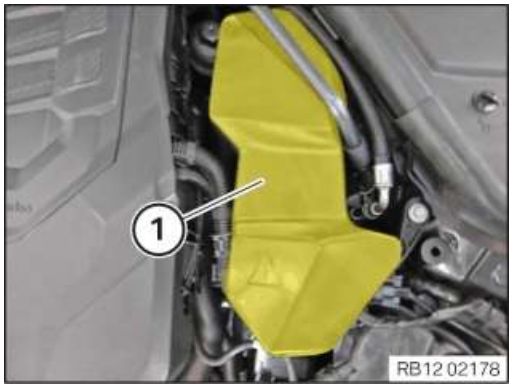
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

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

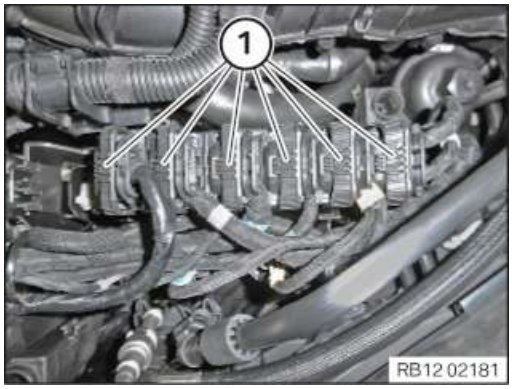
TECHNICAL INFORMATION

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

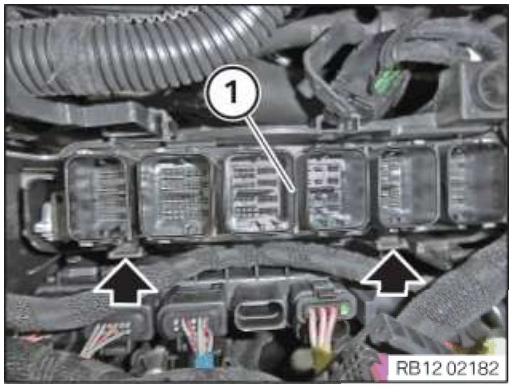


- Pull the cover (1) towards the top and feed out.

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- Unlock and disconnect the plug connection (1).



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

6 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

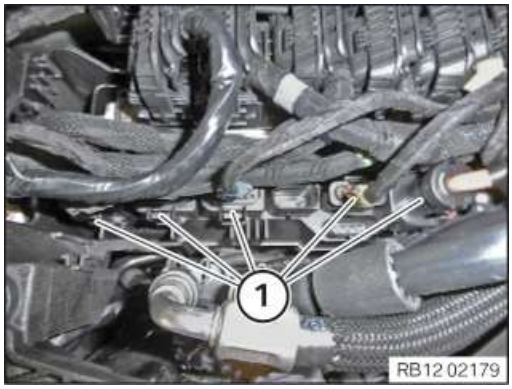
RISK OF DAMAGE

Electrostatic discharge.

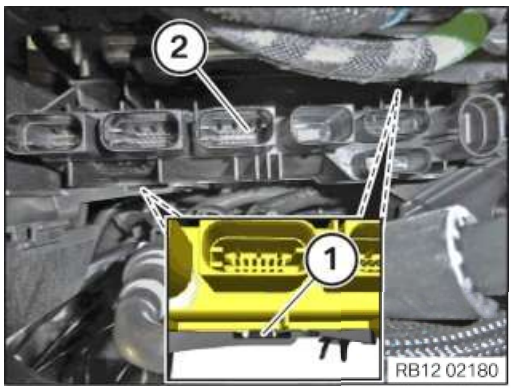
Damage to or destruction of electrical components.

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

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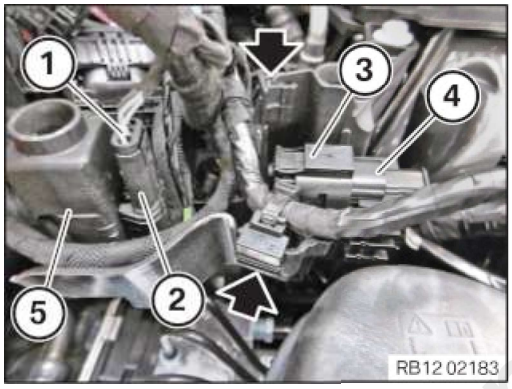


- Unlock and disconnect plug connections (1).

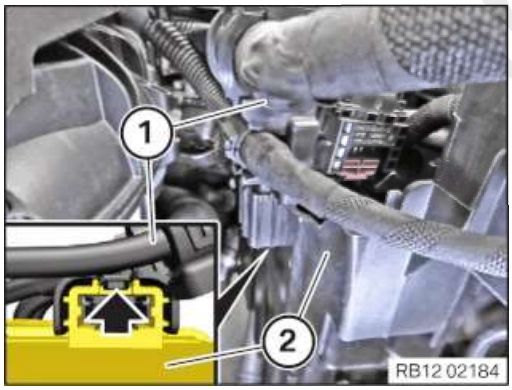


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

7 – Removing the control unit holder



- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the starter (5).
- Unlock plug connection (3) and disconnect.
- Unlock the connector (4) and disconnect from the starter (5).
- Release the clamps (arrows).

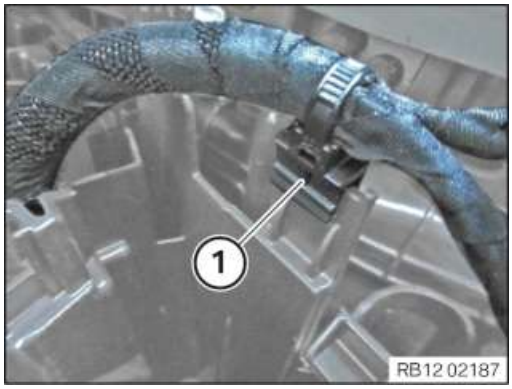


- Unlock the lock (arrow).
- Disconnect the cable plug (1) upwards from the control unit holder (2).

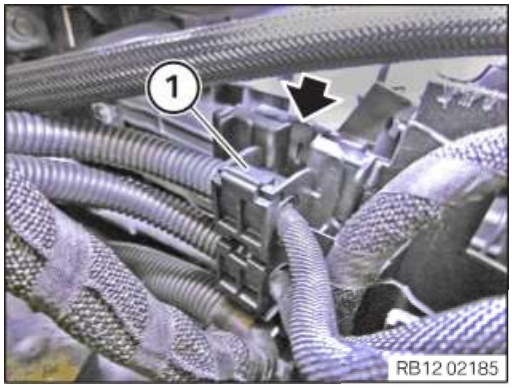


- Loosen clamp (1).

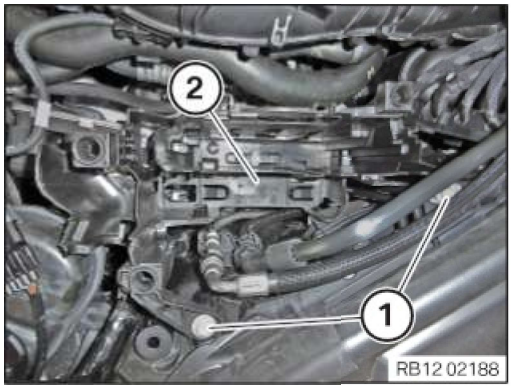
mdiagn.com



- Loosen clamp (1).



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



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

8 – Remove tank vent valve

WARNING

Hot surfaces.

Risk of burning!

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

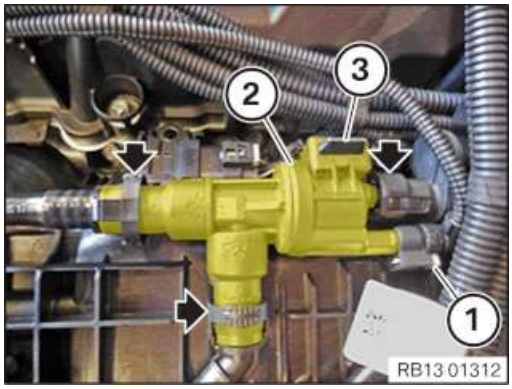
RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

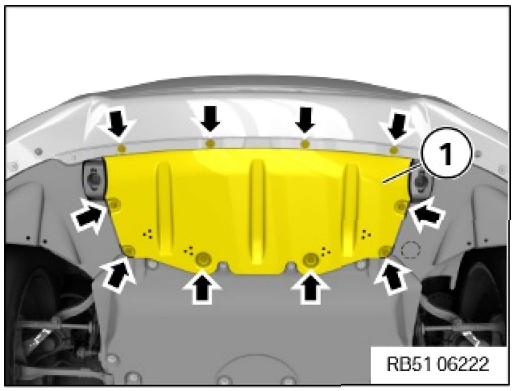
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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

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

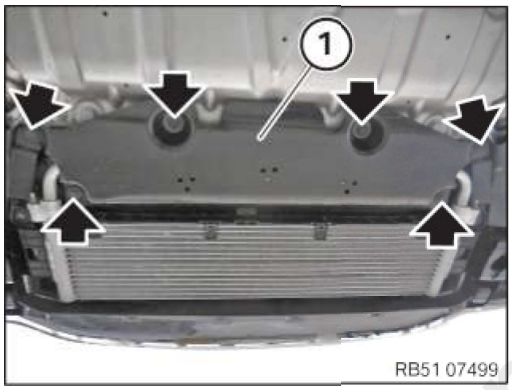
9 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

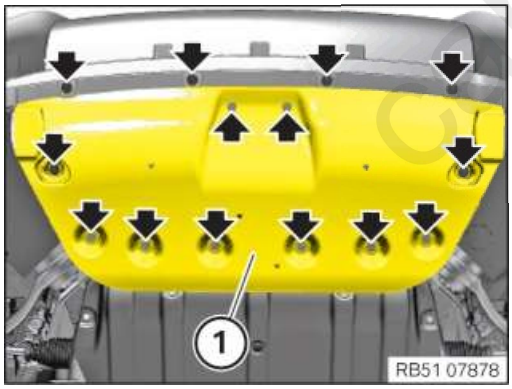
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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

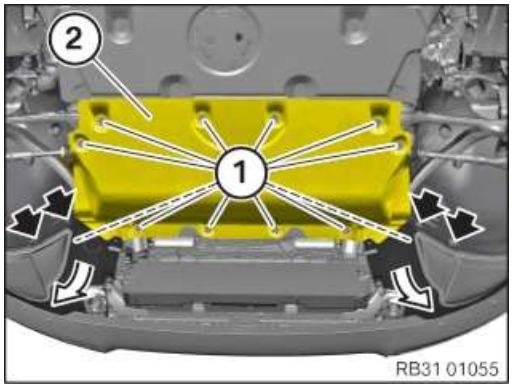


- **Version 3:**

  Remove screws (arrows).

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

10 – Remove the underbody protection of the steering gear



- **Version 1:**

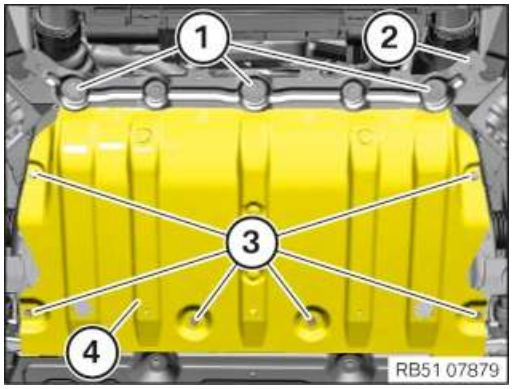
  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).

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- **Version 2:**

  Loosen screws (1).

  Remove the holder of the underride protection (2).

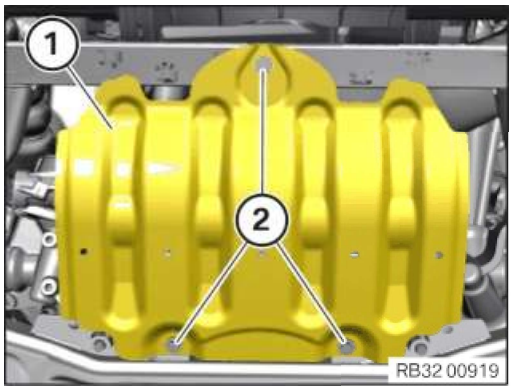
  Loosen screws (3).

  Slide the steering gear underbody protection (4) out and remove.

11 – If installed: Removing the steering start protection

Prerequisite

The front underbody protection is removed.



- Loosen screws (2).
- Remove guard (1).

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

WARNING

Hot surfaces.

Risk of burning!

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

TECHNICAL INFORMATION

Life-long fill of coolant!

Do not reuse used coolant.

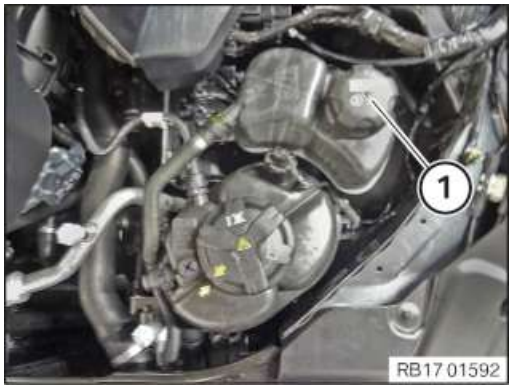
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

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

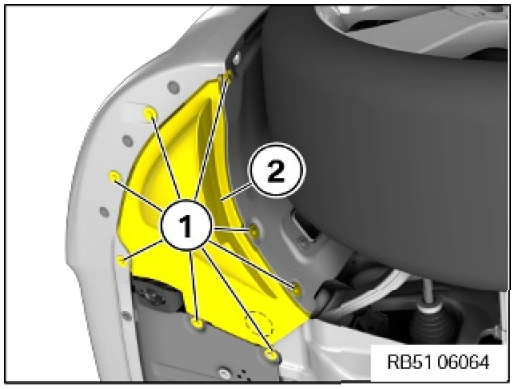
TECHNICAL INFORMATION

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

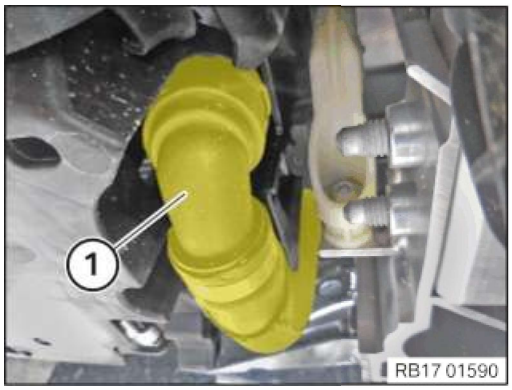
cardiagn.com



- Loosen sealing cap (1).



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

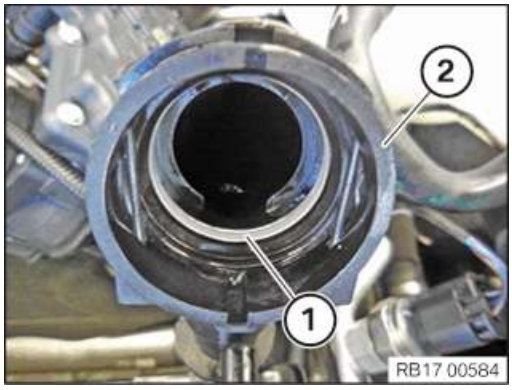


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

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

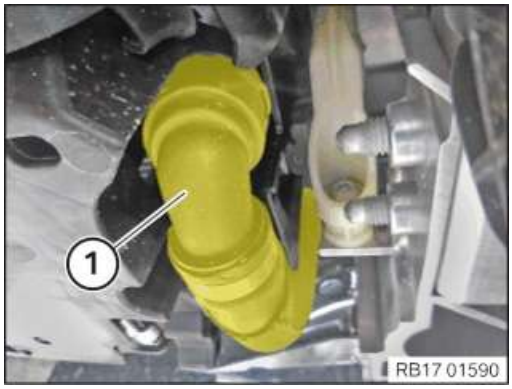
TECHNICAL INFORMATION

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



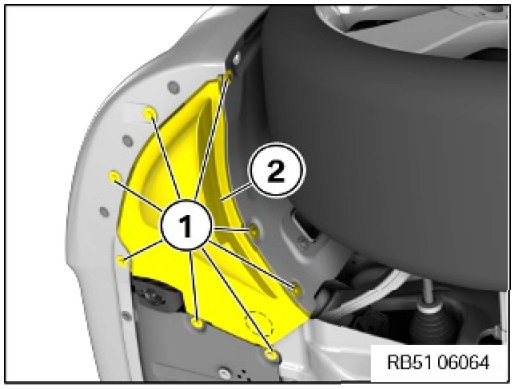
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

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- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.



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

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

14 – Removing the intake plenum

RISK OF DAMAGE

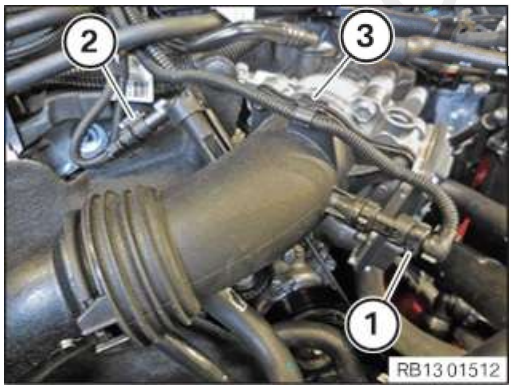
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

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

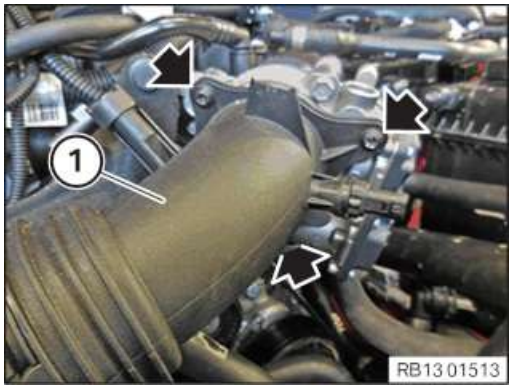
TECHNICAL INFORMATION

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

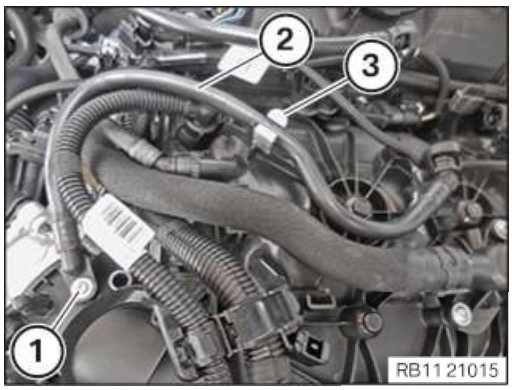


- Unlock plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.
- Unlock and loosen clamp (3).

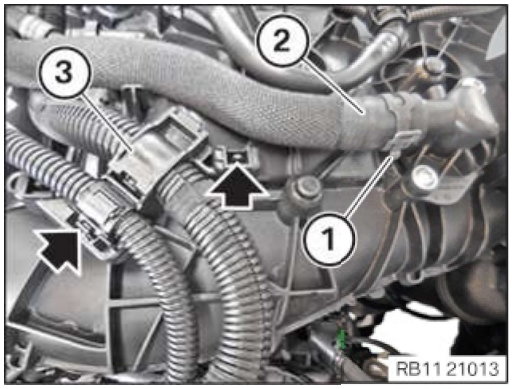
cardiagn.com



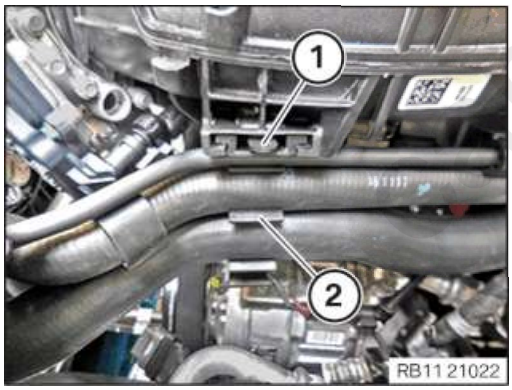
- Remove screws (arrows).
- Feed out charge air line (1) and place to one side.



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



- Release the clamping collar (1) with the special tool 0 495 794 (17 2 050).
- Guide the coolant hose (2) out and remove.
- Catch and dispose of escaping coolant.
- Unlock the locks (arrows).
- Guide out the wiring harness section (3) for sensor system 2 and place to one side.

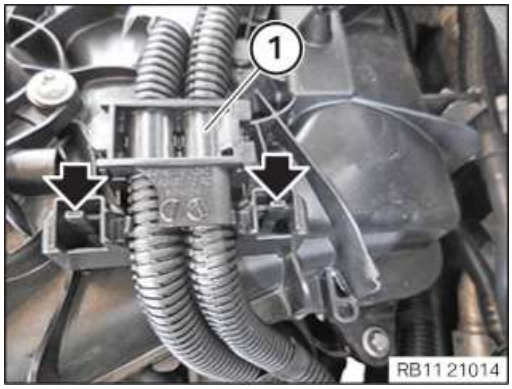


- Unlock the lock (1).
- Thread out holder (2) and set aside.

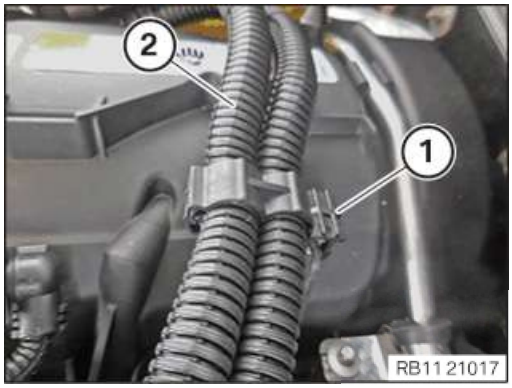


- Unlock plug connection (1) and disconnect.
- Loosen screw (2).

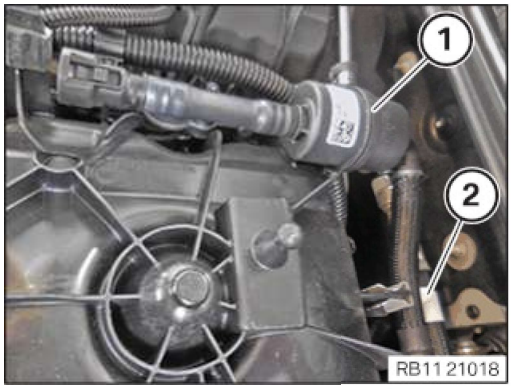
obdiagn.com



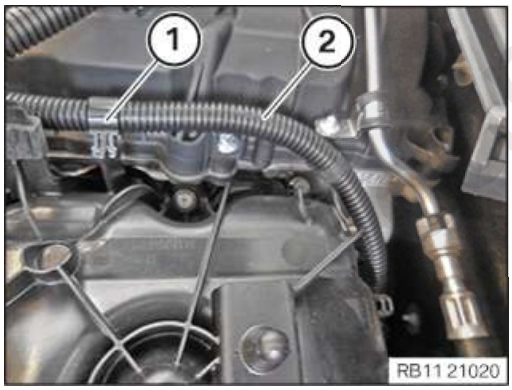
- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.



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



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

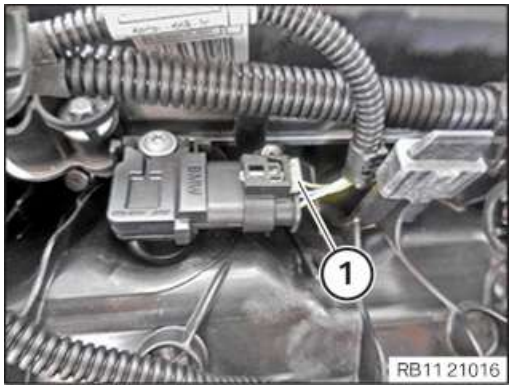


- Loosen clamp (1).
- Guide out the wiring harness section (2) for the sensor system 1 and place to one side.

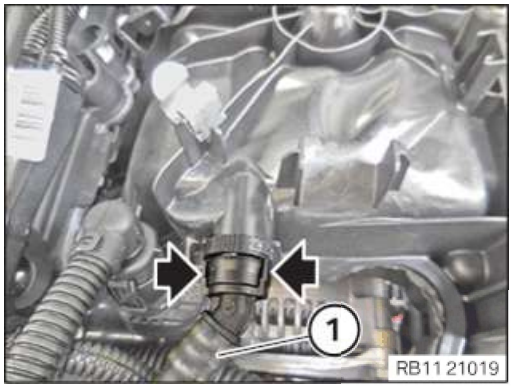


- Loosen screw (1).

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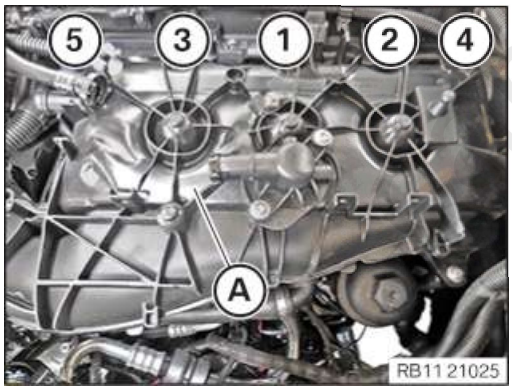
- Unlock plug connection (1) and disconnect.



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



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



TECHNICAL INFORMATION

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

- Loosen screws in the order (5) to (1).
- Thread out intake plenum (A) and remove.

MAIN WORK

15 – Remove coolant temperature sensor

WARNING

Hot fluids.

Risk of scalding!

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

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RISK OF DAMAGE

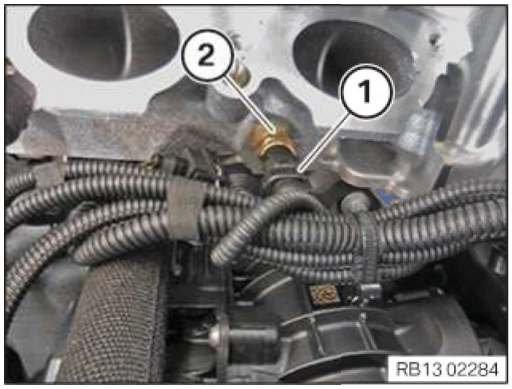
Electrostatic discharge.

Damage to or destruction of electrical components.

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

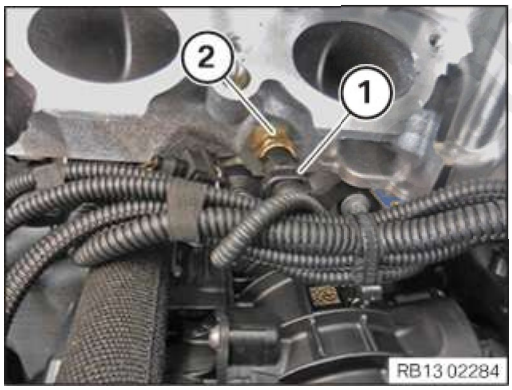
TECHNICAL INFORMATION

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



- Unlock and loosen connector (1).
- Loosen the coolant temperature sensor (2).
- Guide out and remove the coolant temperature sensor (2).
- Catch and dispose of escaping coolant.

16 – Install coolant temperature sensor

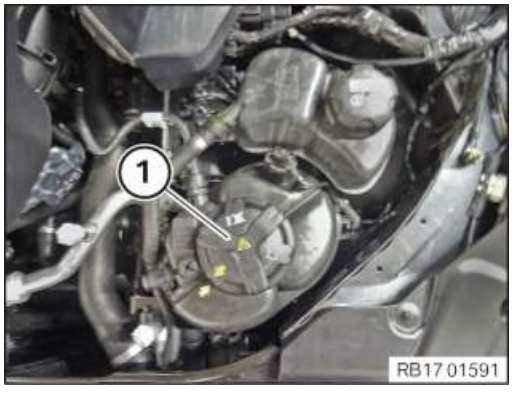


- Insert and install the coolant temperature sensor (2).
- Tighten the coolant temperature sensor (2).

Coolant temperature sensor at cylinder head

Sensor		Tightening torque	13,5 Nm

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

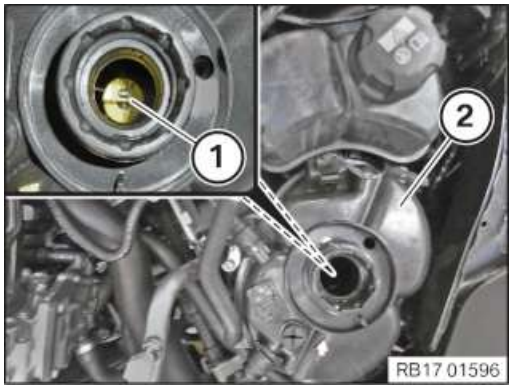


TECHNICAL INFORMATION

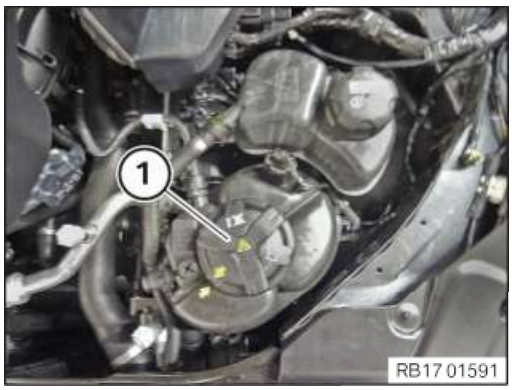
Follow notes for repair work on the cooling system.
For additional information see:
Main group 17
17 00 ... Notes for working on the cooling system

- Loosen sealing cap (1).

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- Adjust the coolant level to the **maximum mark** (1) in the coolant expansion tank for high-temperature coolant circuit(2).



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

POSTPROCESSES

17 – Installing the intake plenum

RISK OF DAMAGE

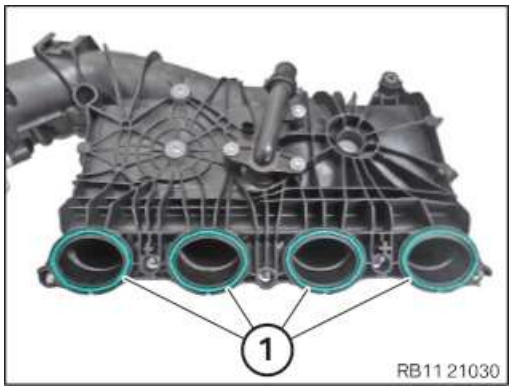
Improper routing of cables and wiring harnesses.

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

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

TECHNICAL INFORMATION

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



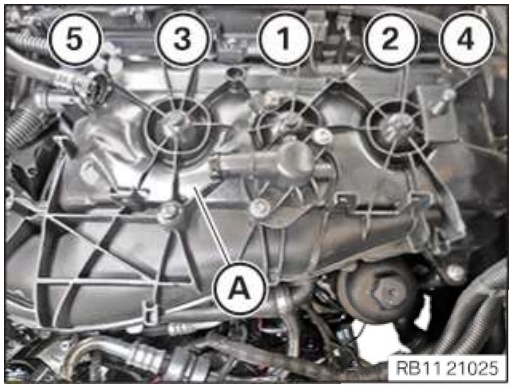
- Renew gaskets (1).

  Parts: Seals

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- Clean contact surface (1).



TECHNICAL INFORMATION

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

- Guide in and position intake plenum (A) on the cylinder head.
- Tighten screws in the order (1) to (5).

Note: Tighten the bolts in 360 degree steps.

Intake plenum to cylinder head

M6		Tightening torque	10 Nm



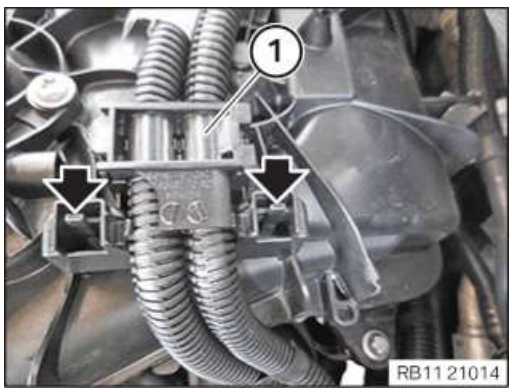
- Connect and lock coolant feed line (1).
- Make sure that coolant feed line (1) engages audibly.



- Tighten down screw (1).

Intake plenum to support

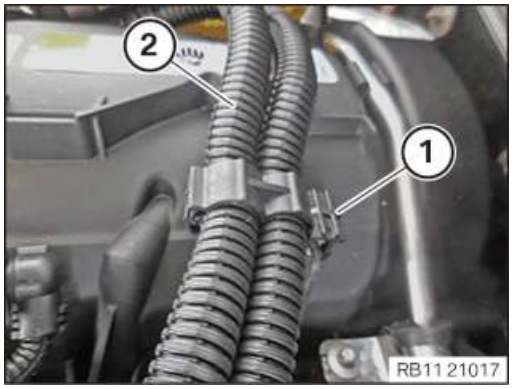
M6X25		Tightening torque	8 Nm



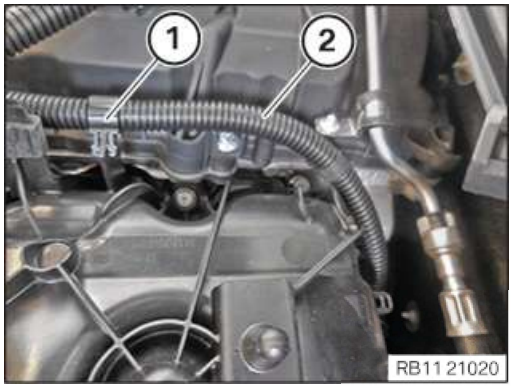
- Insert and install the wiring harness section (1) for the injectors and ignition coils.

  The locks (arrows) must engage audibly.

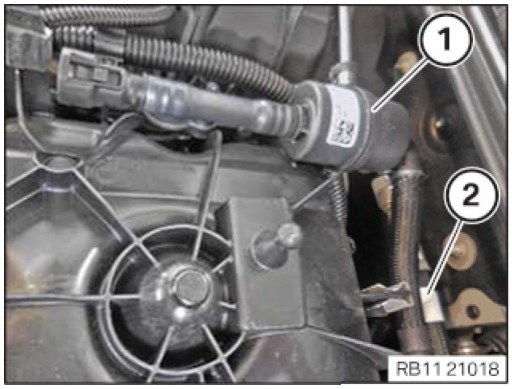
cardiagn.com



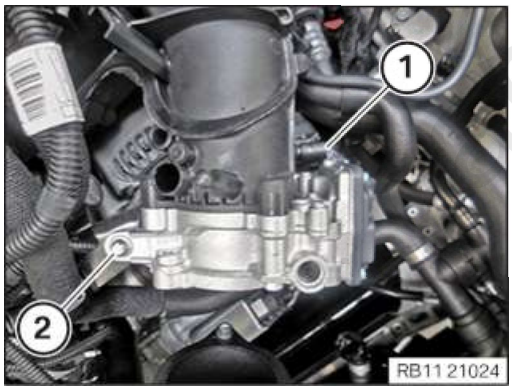
- Insert and install the wiring harness section (2) for the injectors and ignition coils.
- Secure clamps (1).



- Guide in and install wiring harness section (2) for sensor system 1.
- Secure clamps (1).



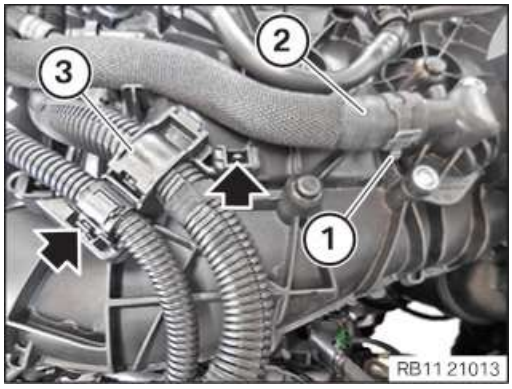
- Insert and install the tank ventilation line (1).
- Secure the tank ventilation line (1) to the clamp (2).



- Connect connectors (1) and lock.
- Make sure the connector (1) engages audibly.
- Tighten down screw (2).

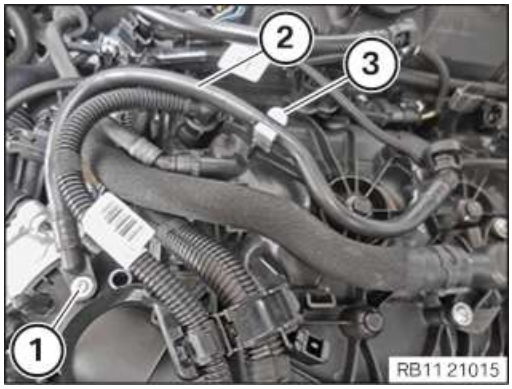
Throttle body to holder

M6X25		Tightening torque	8 Nm



- Insert and install the coolant hose (2).
- Secure clamping collar (1) with the special tool 0 495 794 (17 2 050).
- Guide in and install wiring harness section (3) for sensor system 2.
- Make sure that you can hear the locks (arrows) engage.

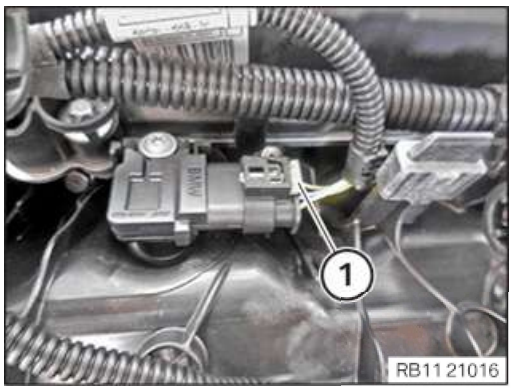
rdiagn.com



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

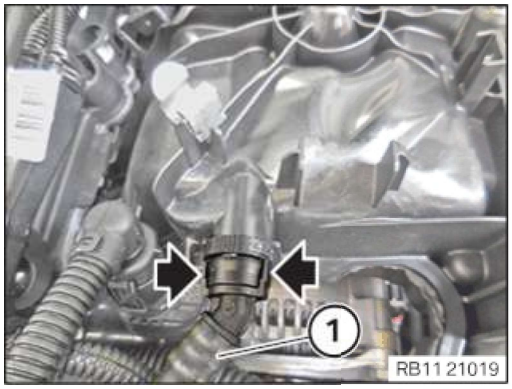
Tank ventilation line to intake plenum

Oval-head screw		Tightening torque	3 Nm



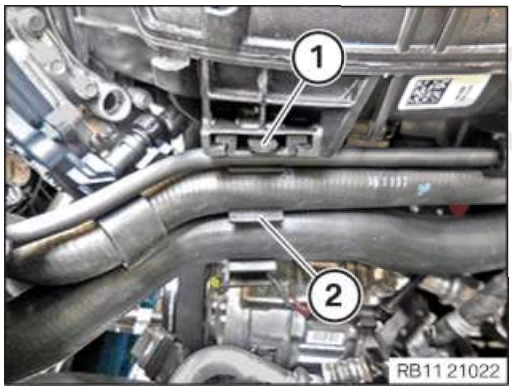
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

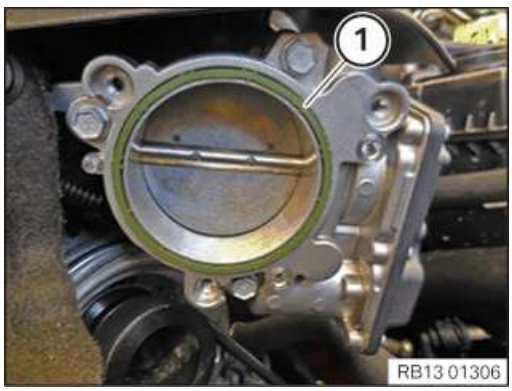


- Insert and install the tank ventilation line (1).

  The locks (arrows) must engage audibly.



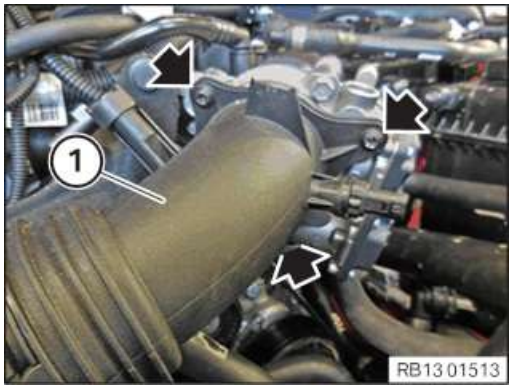
- Insert and install the holder (2).
- Ensure that the lock (1)engages audibly.



- Renew the gasket (1).

  Parts: Gasket

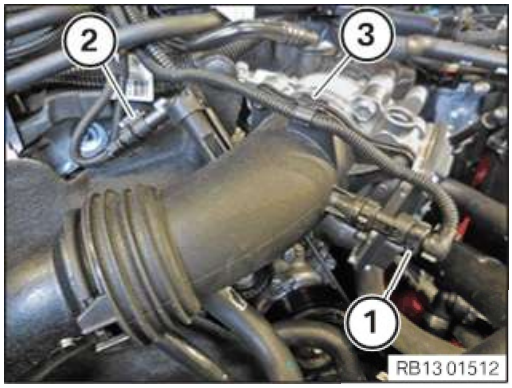
rdiagn.com



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

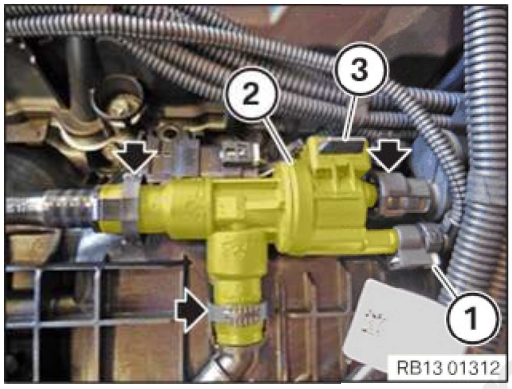
Charge air line to throttle body

M6		Tightening torque	8 Nm



- Connect connectors (1) and lock.
- Connect connectors (2) and lock.
- Make sure you can hear the connectors (1) and (2) engage.
- Secure clamps (3).

18 – Installing the tank vent valve

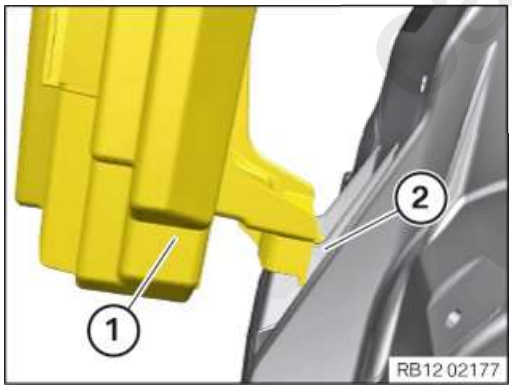


- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).

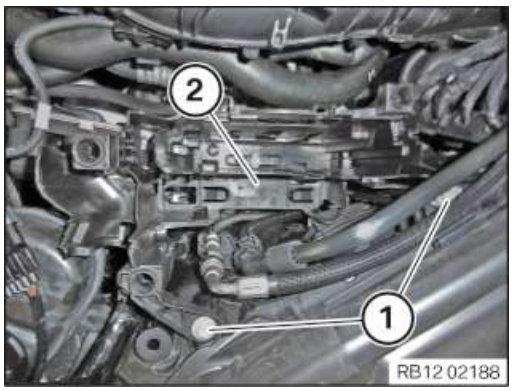
  The tank ventilation lines (arrows) must audibly engage.
- Connect and lock the connector (1).

  The connector (1) must engage audibly.

19 – Installing the control unit holder



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

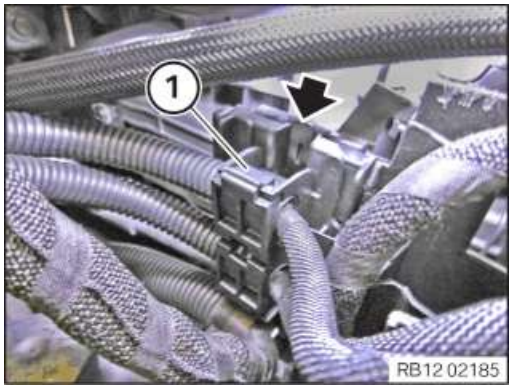


- Guide in and install control unit holder (2).
- Tighten the screws (1).

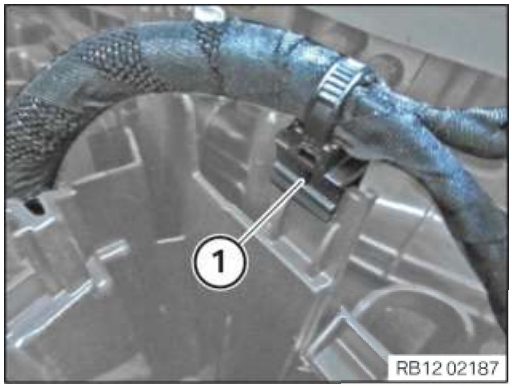
Control unit holder on spring strut dome

Hexagon screw		Tightening torque	8 Nm

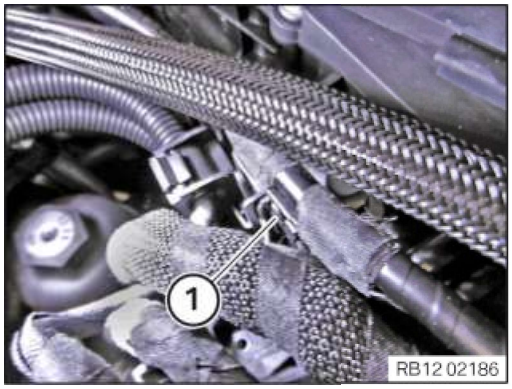
cardiagn.com



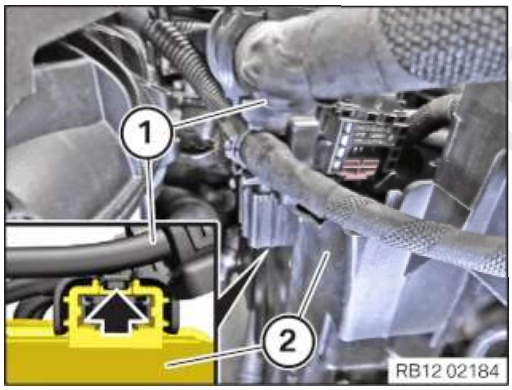
- Feed in and install the cable clip (1).
  Lock (arrow) must audibly engage.



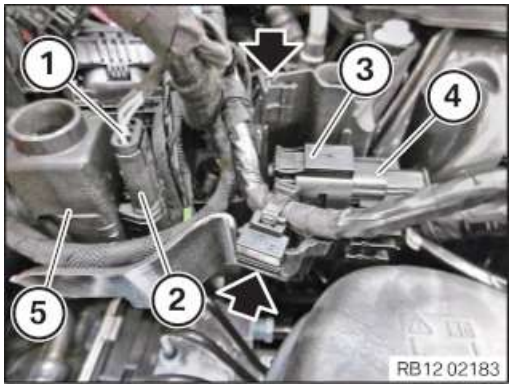
- Secure clamps (1).



- Secure clamps (1).



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



- Connect and lock the connector (4) with the control unit holder (5).
  The connector (4) must engage audibly.
- Connect connectors (3) and lock.
  The connector (3) must engage audibly.
- Connect and lock the connector (2) with the control unit holder (5).
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.
- Secure the clamps (arrows).

20 – Installing the integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

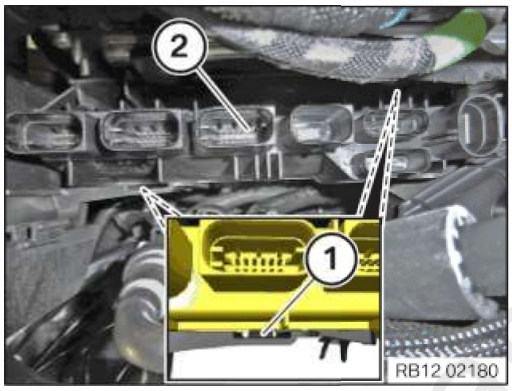
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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



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

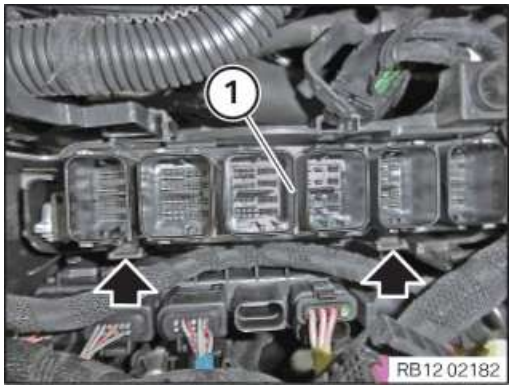
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



- Connect connectors (1) and lock.

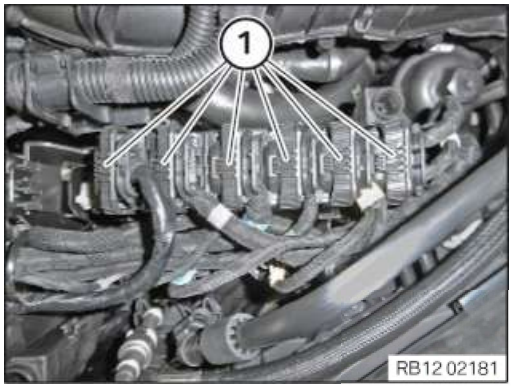
  The connectors (1) must engage audibly.

21 – Installing the DME control unit



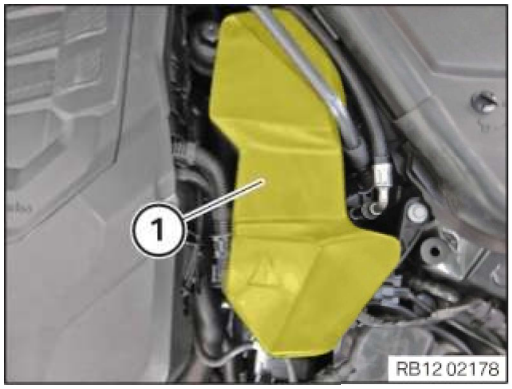
- Feed in and install DME control unit (1).

  The locks (arrows) must engage audibly.



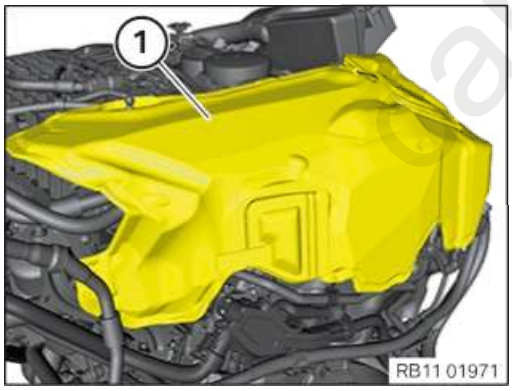
- Connect connectors (1) and lock.

  All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

22 – Installing acoustic cover at rear



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



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

23 – Install acoustic cover

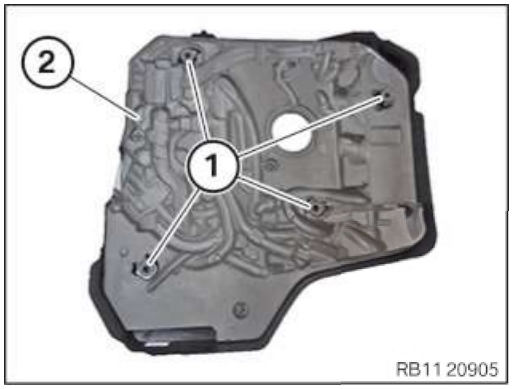
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RISK OF DAMAGE

Damage to the acoustic cover.

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

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



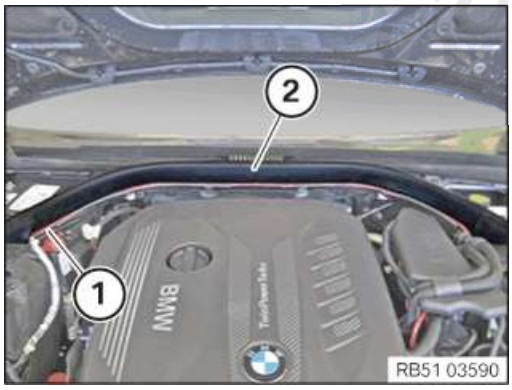
- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

24 – 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.

25 – Disconnecting all battery earth leads

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- See additional information.

26 – Filling and bleed the low-temperature coolant circuit

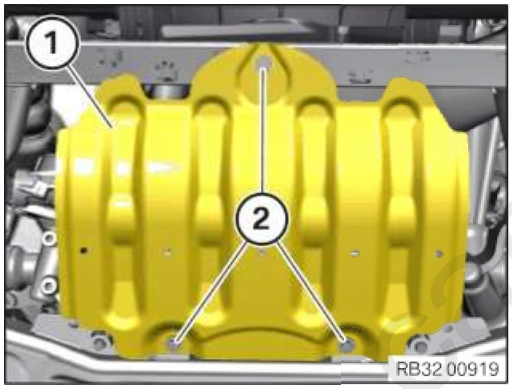


- See additional information.

27 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

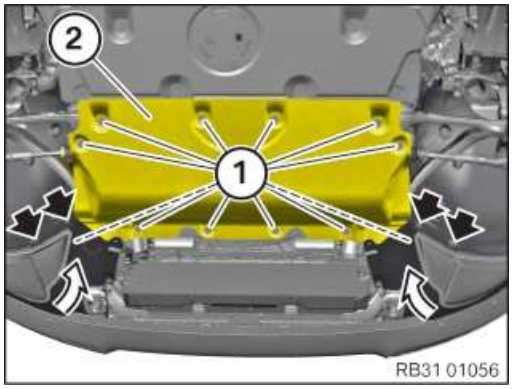


- Remove guard (1).
- Tighten the screws (2).

Bumper buffer device steering on front axle support

M10		Tightening torque	56 Nm

28 – Install the underbody protection of the steering gear



- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

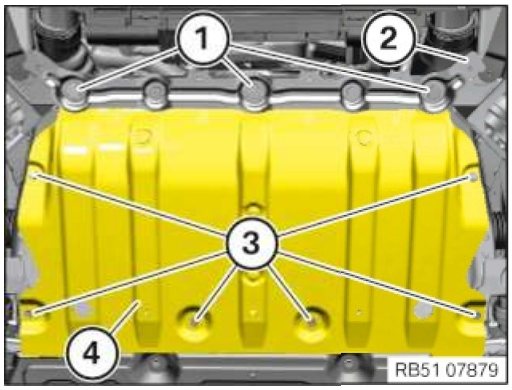
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm



- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

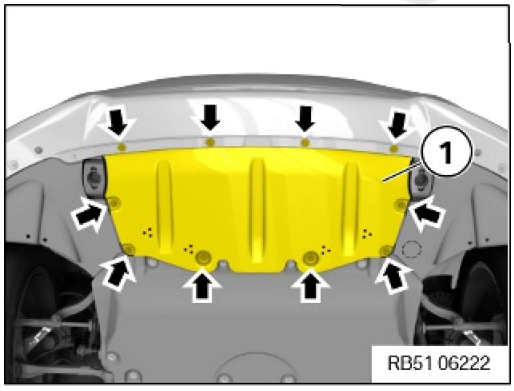
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

29 – Installing the front underbody protection



- **Version 1:**

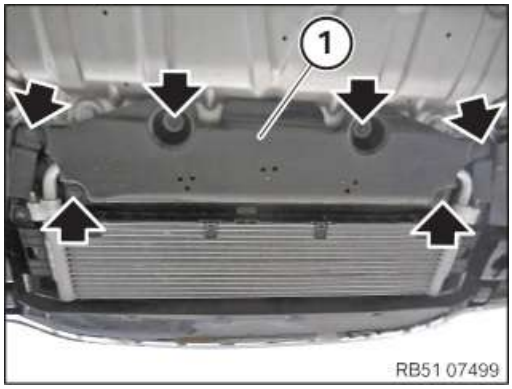
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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

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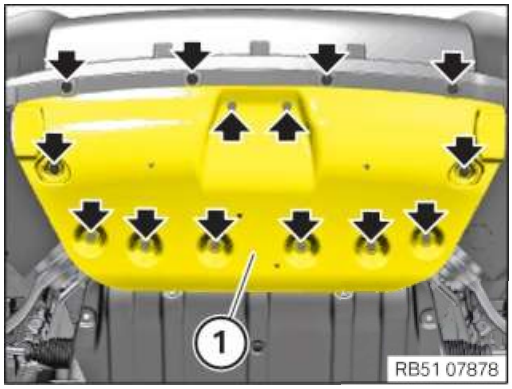
- **Version 2:**

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

  Tighten screws (arrows).

Underbody protection front

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



- **Version 3:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

Additional Information

Overview of Tightening Torques

Cover, front bottom on side — Used in step 13

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Coolant temperature sensor at cylinder head — Used in step 16

Sensor		Tightening torque	13,5 Nm

Intake plenum to cylinder head — Used in step 17

M6		Tightening torque	10 Nm

Intake plenum to support — Used in step 17

M6X25		Tightening torque	8 Nm

Throttle body to holder — Used in step 17

M6X25		Tightening torque	8 Nm

Tank ventilation line to intake plenum — Used in step 17

Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle body — Used in step 17

M6		Tightening torque	8 Nm

Control unit holder on spring strut dome — Used in step 19

Hexagon screw		Tightening torque	8 Nm

Bumper buffer device steering on front axle support — Used in step 27

M10		Tightening torque	56 Nm

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Underbody protection of the steering gear Used in step 28

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws) Used in step 28

Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support Used in step 28

M10		Tightening torque	56 Nm

Underbody protection front Used in step 29

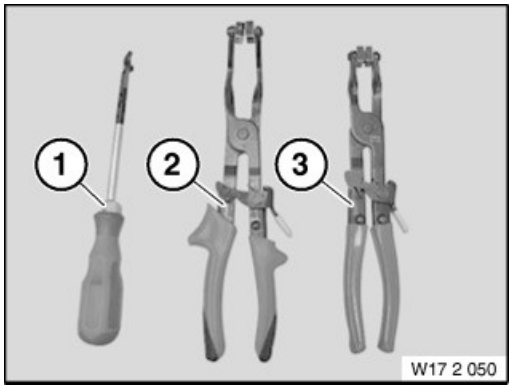
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

0 495 794 (17 2 050) Pliers

Used in step 1417

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Common

Usage	(Set of pliers) For assembling and disassembling the spring band clamps (Coolant hoses)
Included in the tool or work	
Storage location	B85
Replaced by	
In connection with	
SI-Number	01 26 06 (321)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 795 (17 2 051)		**Release tool** Remaining inventories will be sold off and then no longer available individually, but as part of complete tool set 17 2 050 = 0495794 only.	
2	0 495 796 (17 2 052)		**Pliers** (Pliers (curved version) Remaining inventories will be sold off and then no longer available as individual parts, but as part of complete tool set 17 2 050 = 0495794 only.	
3	0 495 797 (17 2 053)		**Pliers** (Pliers (straight version) Remaining inventories will be sold off and then no longer available as individual parts, but as part of complete tool set 17 2 050 = 0495794 only.	

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Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	521

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125

61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	125
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	125
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
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61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Venting cooling system and checking on watertightness	26
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	26
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	26
17 00 040 Bleeding lower-temperature cooling system (B48)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26

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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 011 Draining and topping up coolant circuit for low temperature	26
17 00 040 Bleed the low-temperature cooling system and check for watertightness (coolant circuit for low temperature)	26
17 00 040 Bleeding and filling low temperature cooling system using vacuum filler device (B48)	26
17 00 011 Draining and topping up low-temperature coolant circuit	26
17 00 011 Draining and topping up low-temperature coolant circuit	26
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	26
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	26
17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	26
17 00 011 Draining and topping up low-temperature coolant circuit	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26

Operating materials	**Used in step**
Main group 17	16

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13 62 679 Replacing the coolant/oil temperature sensor

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

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

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

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Remove the seal for the rear bonnet



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

3 – Removing the acoustic cover

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WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

4 – Removing acoustic cover at rear



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

5 – Removing the DME control unit

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RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

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

TECHNICAL INFORMATION

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

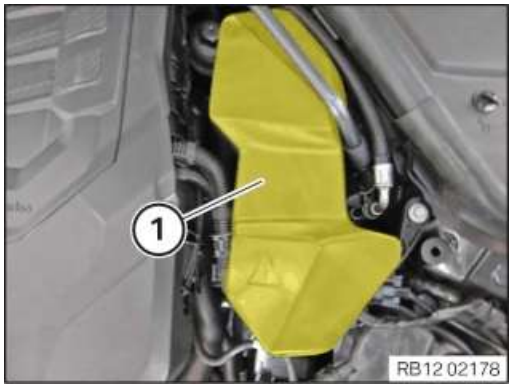
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

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

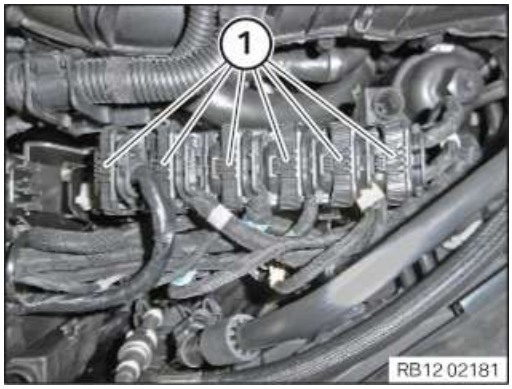
TECHNICAL INFORMATION

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

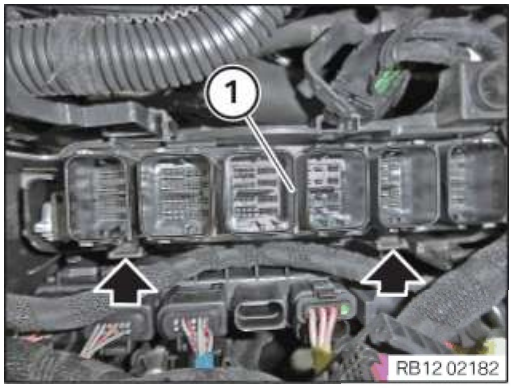


- Pull the cover (1) towards the top and feed out.

cardiagn.com



- Unlock and disconnect the plug connection (1).



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

6 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

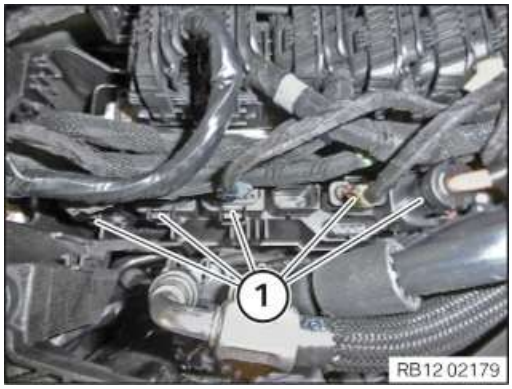
RISK OF DAMAGE

Electrostatic discharge.

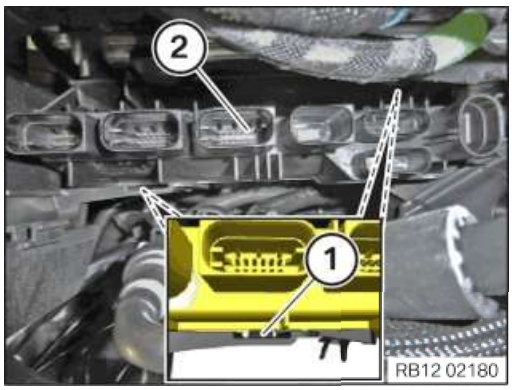
Damage to or destruction of electrical components.

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

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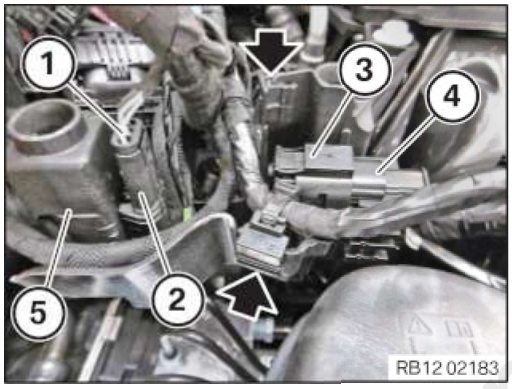


- Unlock and disconnect plug connections (1).

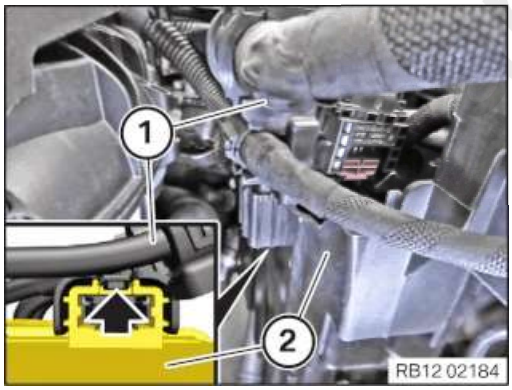


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

7 – Removing the control unit holder



- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the starter (5).
- Unlock plug connection (3) and disconnect.
- Unlock the connector (4) and disconnect from the starter (5).
- Release the clamps (arrows).

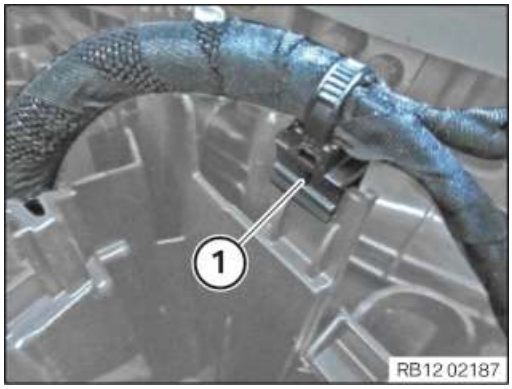


- Unlock the lock (arrow).
- Disconnect the cable plug (1) upwards from the control unit holder (2).

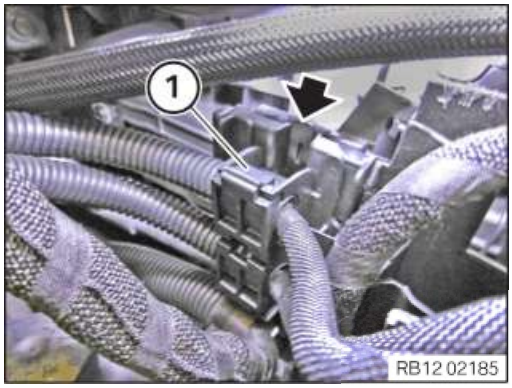


- Loosen clamp (1).

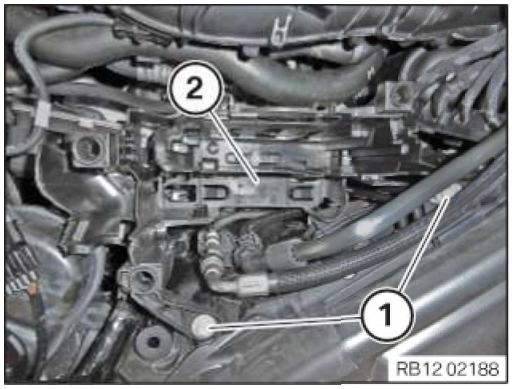
mdiagn.com



- Loosen clamp (1).



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



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

8 – Remove tank vent valve

WARNING

Hot surfaces.

Risk of burning!

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

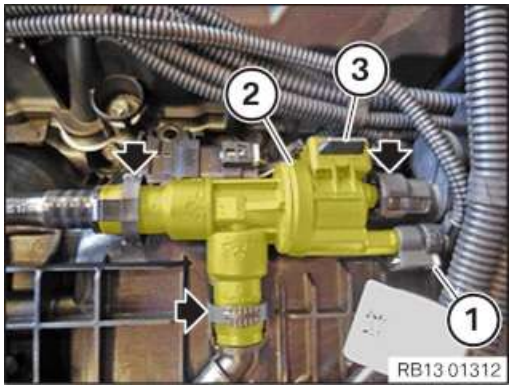
RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

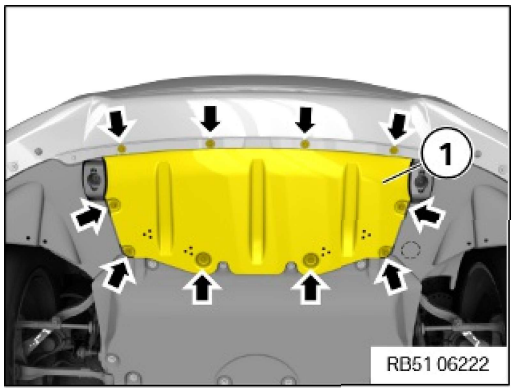
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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

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

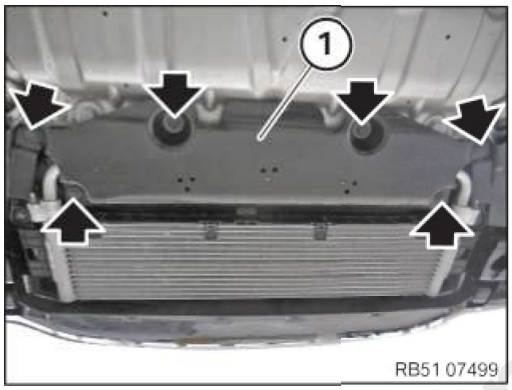
9 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

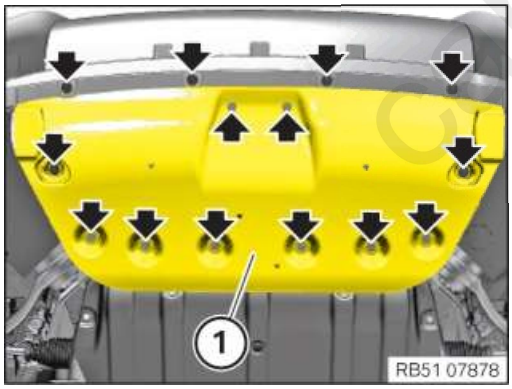
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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

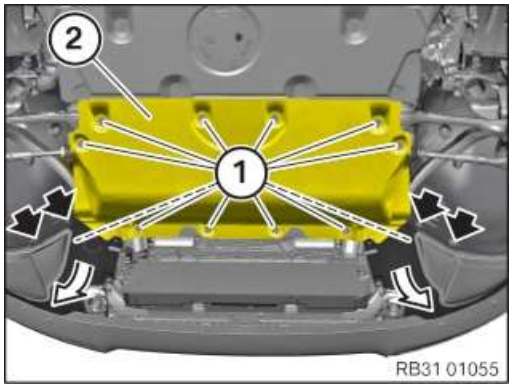


- **Version 3:**

  Remove screws (arrows).

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

10 – Remove the underbody protection of the steering gear



- **Version 1:**

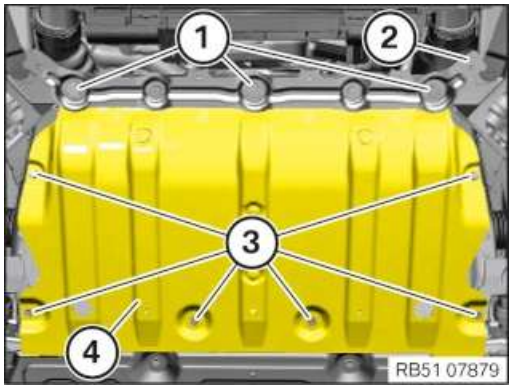
  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).

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- **Version 2:**

  Loosen screws (1).

  Remove the holder of the underride protection (2).

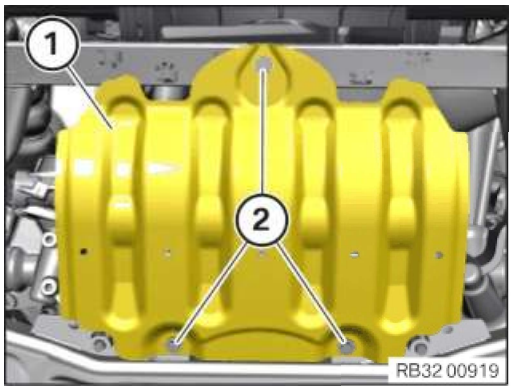
  Loosen screws (3).

  Slide the steering gear underbody protection (4) out and remove.

11 – If installed: Removing the steering start protection

Prerequisite

The front underbody protection is removed.



- Loosen screws (2).
- Remove guard (1).

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

WARNING

Hot surfaces.

Risk of burning!

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

TECHNICAL INFORMATION

Life-long fill of coolant!

Do not reuse used coolant.

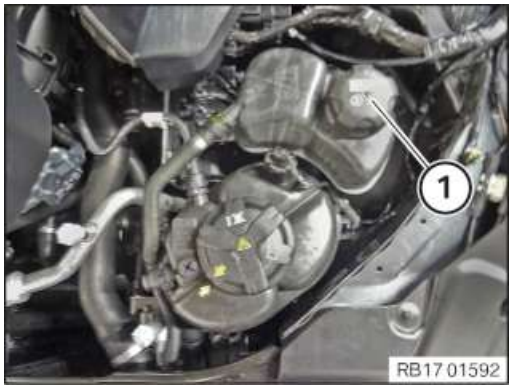
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

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

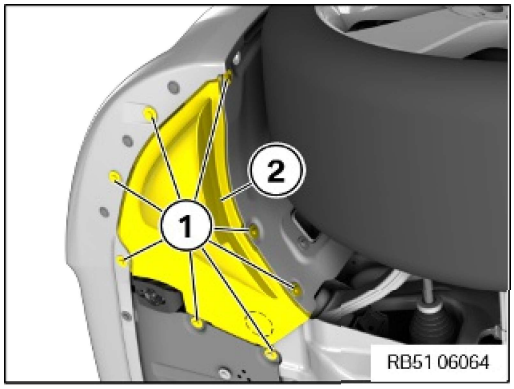
TECHNICAL INFORMATION

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

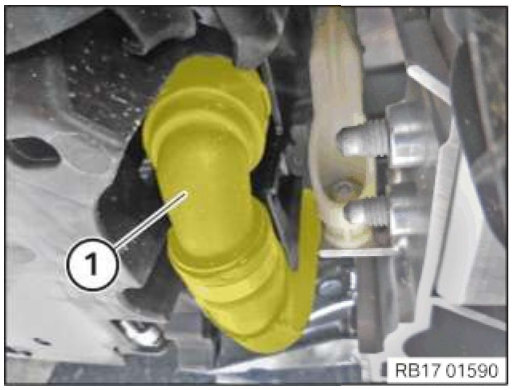
cardiagn.com



- Loosen sealing cap (1).



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

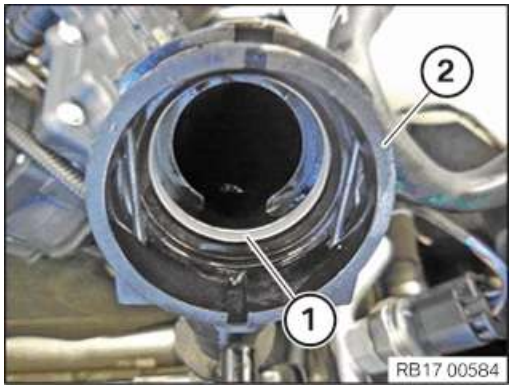


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

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

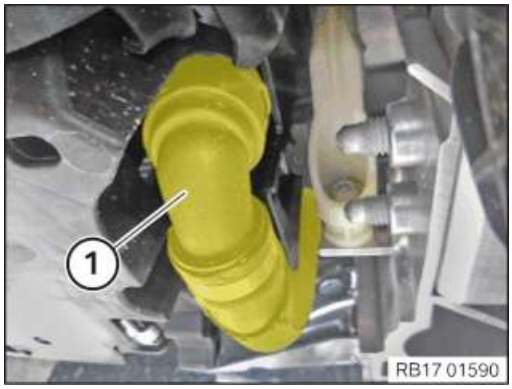
TECHNICAL INFORMATION

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



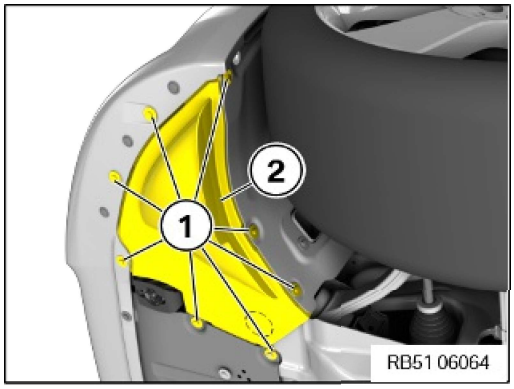
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

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- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.



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

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

14 – Removing the intake plenum

RISK OF DAMAGE

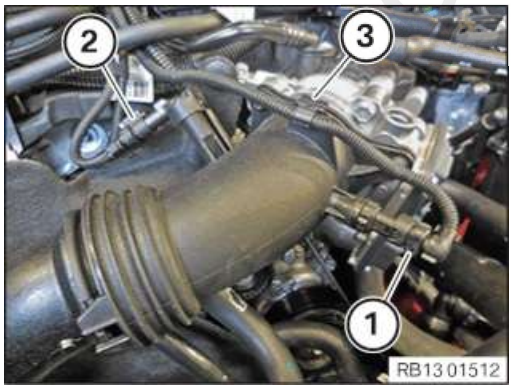
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

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

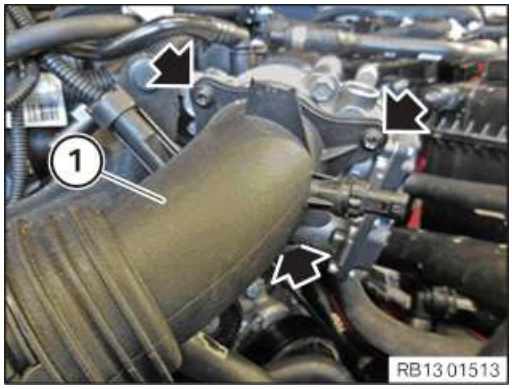
TECHNICAL INFORMATION

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

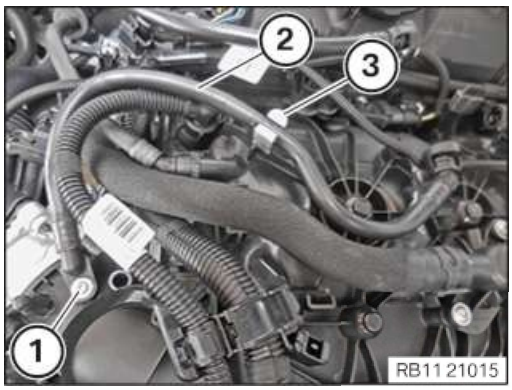


- Unlock plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.
- Unlock and loosen clamp (3).

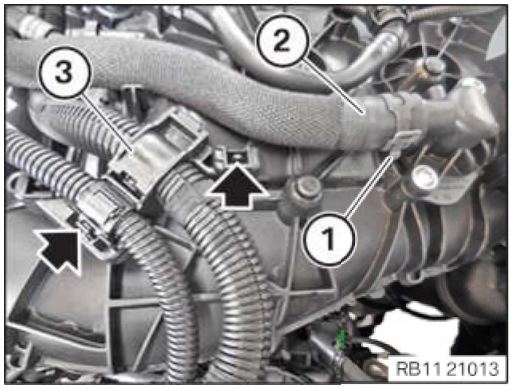
cardiagn.com



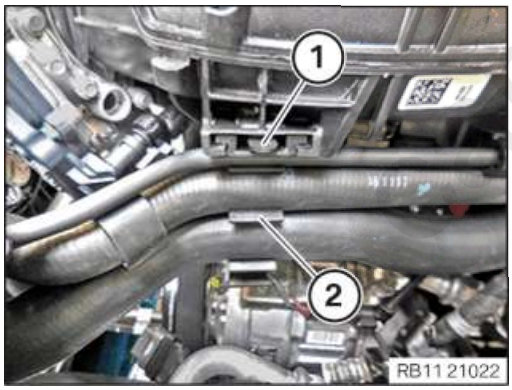
- Remove screws (arrows).
- Feed out charge air line (1) and place to one side.



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



- Release the clamping collar (1) with the special tool 0 495 794 (17 2 050).
- Guide the coolant hose (2) out and remove.
- Catch and dispose of escaping coolant.
- Unlock the locks (arrows).
- Guide out the wiring harness section (3) for sensor system 2 and place to one side.

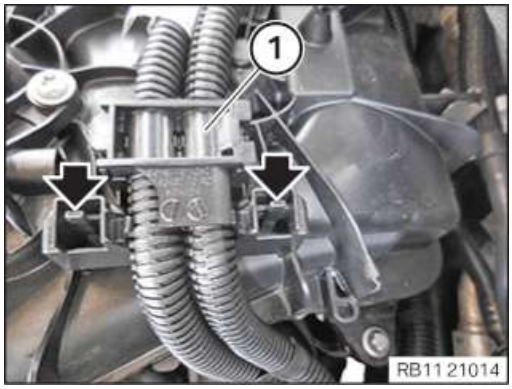


- Unlock the lock (1).
- Thread out holder (2) and set aside.

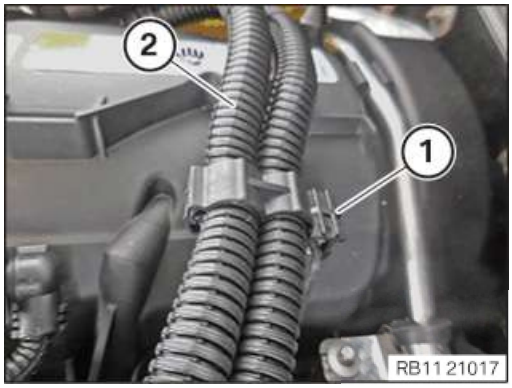


- Unlock plug connection (1) and disconnect.
- Loosen screw (2).

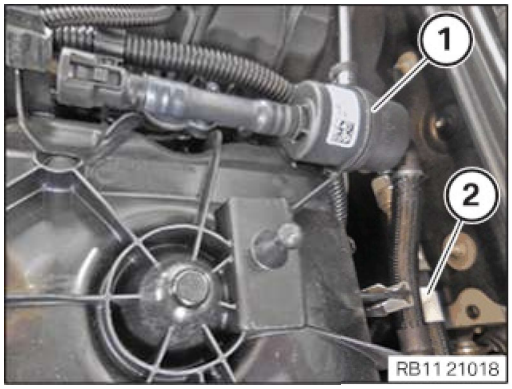
obdiagn.com



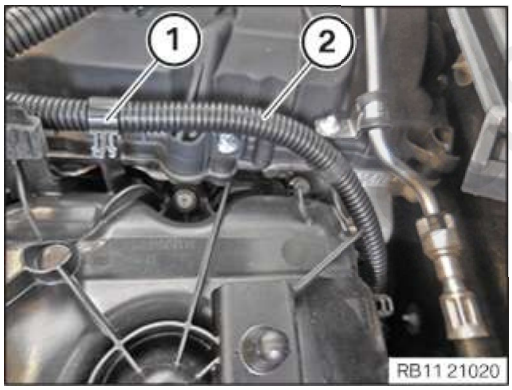
- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.



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



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

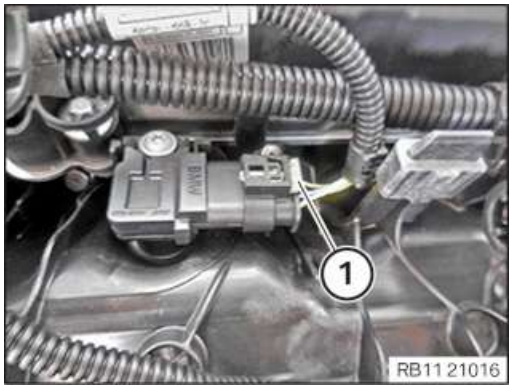


- Loosen clamp (1).
- Guide out the wiring harness section (2) for the sensor system 1 and place to one side.

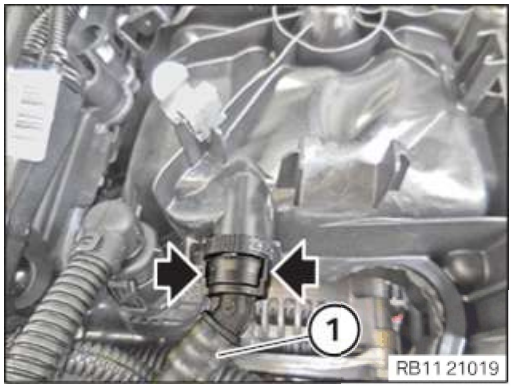


- Loosen screw (1).

rdiagn.com



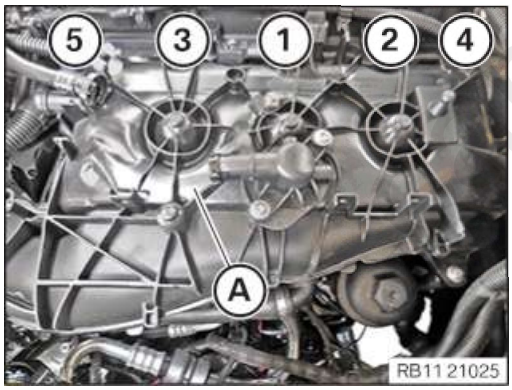
- Unlock plug connection (1) and disconnect.



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



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



TECHNICAL INFORMATION

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

- Loosen screws in the order (5) to (1).
- Thread out intake plenum (A) and remove.

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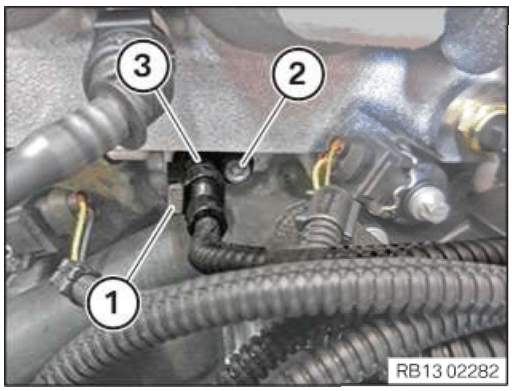
15 – Remove the temperature sensor on the crankcase

RISK OF DAMAGE

Electrostatic discharge.

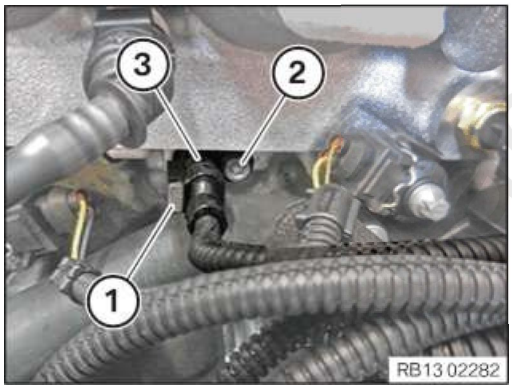
Damage to or destruction of electrical components.

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



- Unlock and loosen connector (1).
- Loosen screw (2).
- Feed out the temperature sensor (3) on the crankcase and remove it.

16 – Install the temperature sensor on the crankcase



- Insert and install the temperature sensor (3) on the crankcase.
- Tighten down screw (2).

Temperature sensor on crankcase

M6x18		Tightening torque	8 Nm

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

mobilediagn.com

POSTPROCESSES

17 – Installing the intake plenum

RISK OF DAMAGE

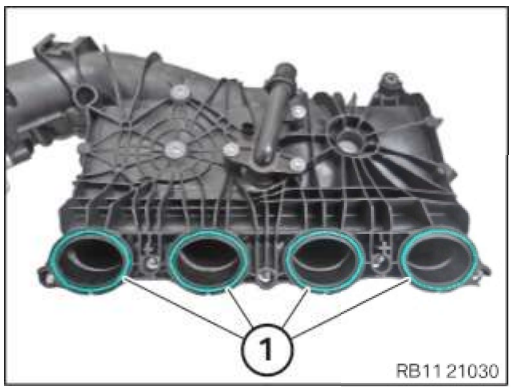
Improper routing of cables and wiring harnesses.

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

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

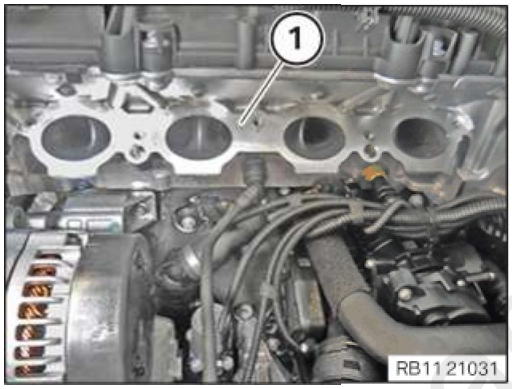
TECHNICAL INFORMATION

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

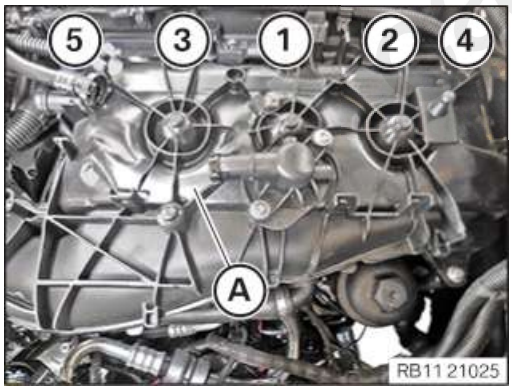


- Renew gaskets (1).

  Parts: Seals



- Clean contact surface (1).



TECHNICAL INFORMATION

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

- Guide in and position intake plenum (A) on the cylinder head.
- Tighten screws in the order (1) to (5).

Note: Tighten the bolts in 360 degree steps.

Intake plenum to cylinder head

M6		Tightening torque	10 Nm

autodiag.com



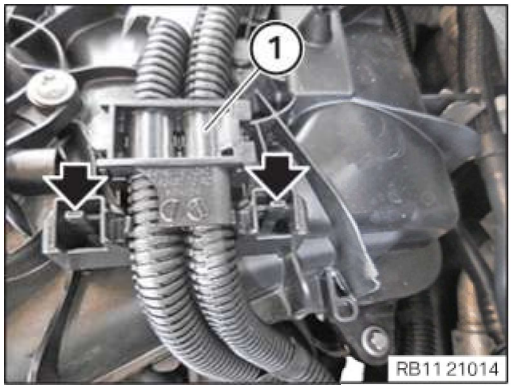
- Connect and lock coolant feed line (1).
- Make sure that coolant feed line (1) engages audibly.



- Tighten down screw (1).

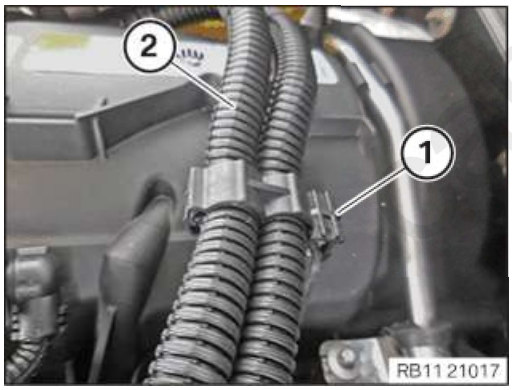
Intake plenum to support

M6X25		Tightening torque	8 Nm

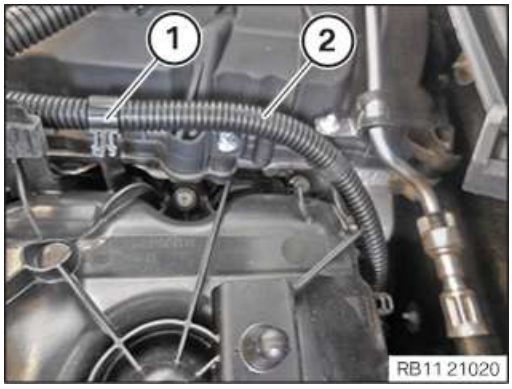


- Insert and install the wiring harness section (1) for the injectors and ignition coils.

  The locks (arrows) must engage audibly.



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



- Guide in and install wiring harness section (2) for sensor system 1.
- Secure clamps (1).

fordiagn.com



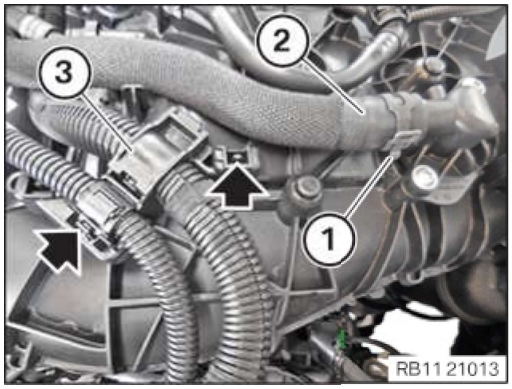
- Insert and install the tank ventilation line (1).
- Secure the tank ventilation line (1) to the clamp (2).



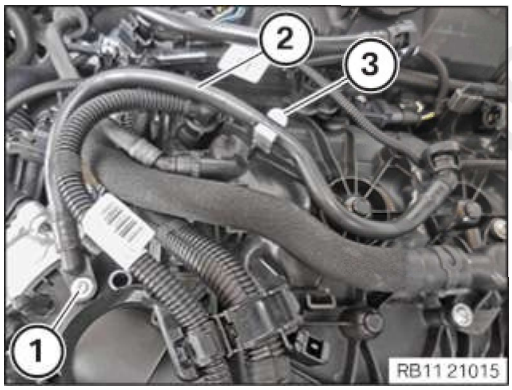
- Connect connectors (1) and lock.
- Make sure the connector (1) engages audibly.
- Tighten down screw (2).

Throttle body to holder

M6X25		Tightening torque	8 Nm



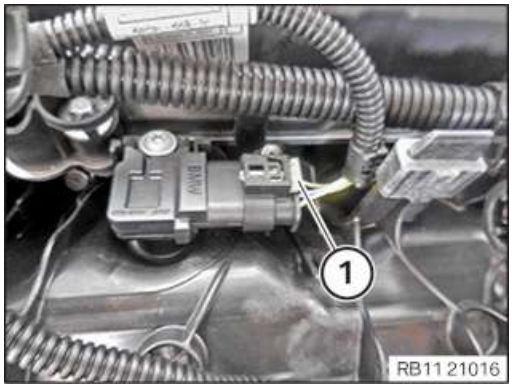
- Insert and install the coolant hose (2).
- Secure clamping collar (1) with the special tool 0 495 794 (17 2 050).
- Guide in and install wiring harness section (3) for sensor system 2.
- Make sure that you can hear the locks (arrows) engage.



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

Tank ventilation line to intake plenum

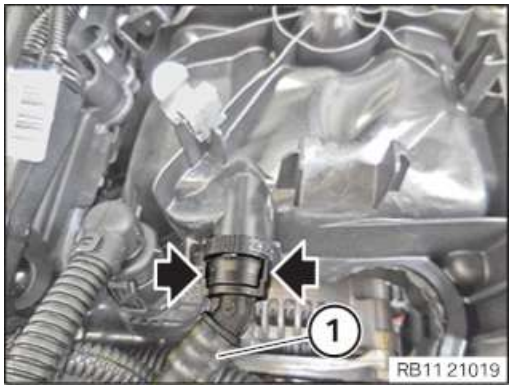
Oval-head screw		Tightening torque	3 Nm



- Connect connectors (1) and lock.

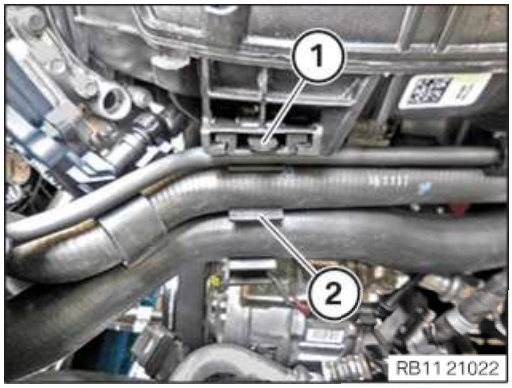
  The connector (1) must engage audibly.

obdiagn.com

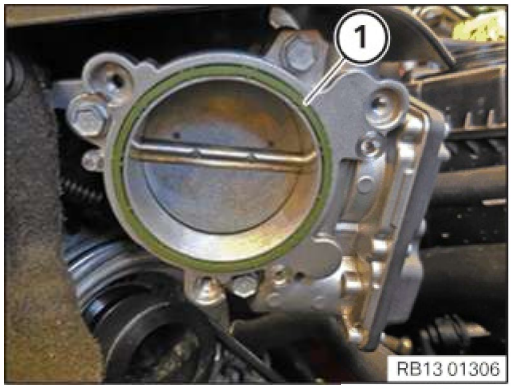


- Insert and install the tank ventilation line (1).

  The locks (arrows) must engage audibly.

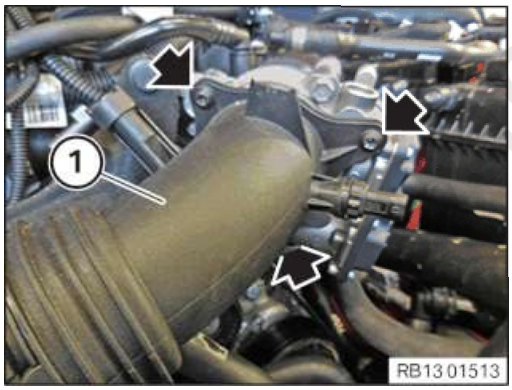


- Insert and install the holder (2).
- Ensure that the lock (1)engages audibly.



- Renew the gasket (1).

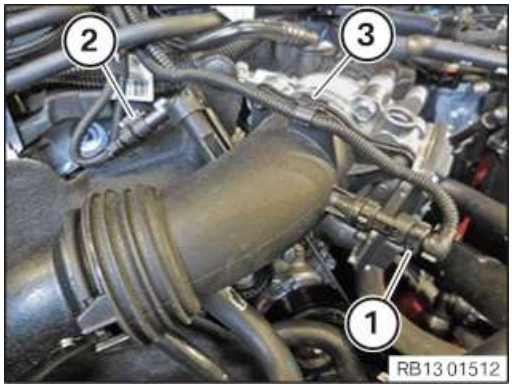
  Parts: Gasket



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

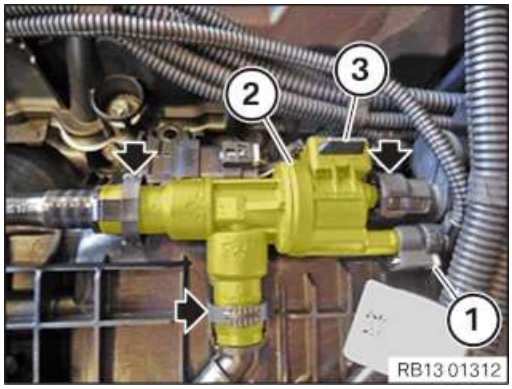
Charge air line to throttle body

M6		Tightening torque	8 Nm



- Connect connectors (1) and lock.
- Connect connectors (2) and lock.
- Make sure you can hear the connectors (1) and (2) engage.
- Secure clamps (3).

18 – Installing the tank vent valve

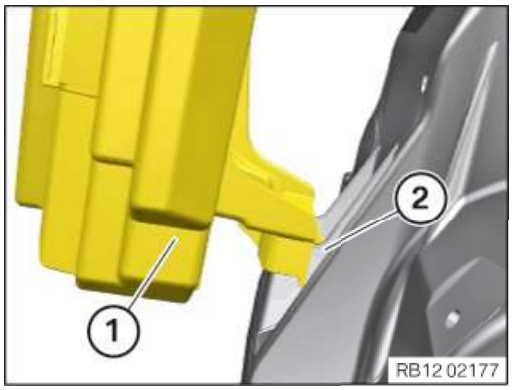


- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).

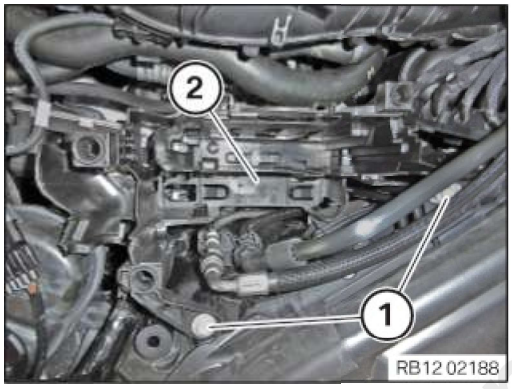
  The tank ventilation lines (arrows) must audibly engage.
- Connect and lock the connector (1).

  The connector (1) must engage audibly.

19 – Installing the control unit holder



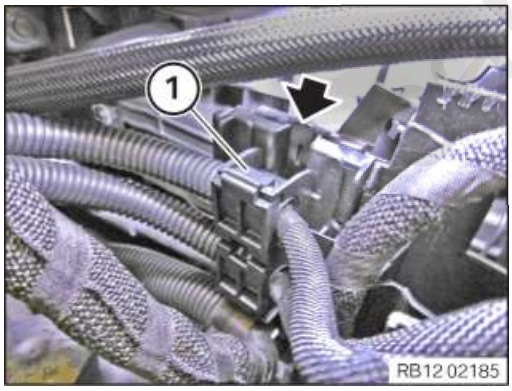
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



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

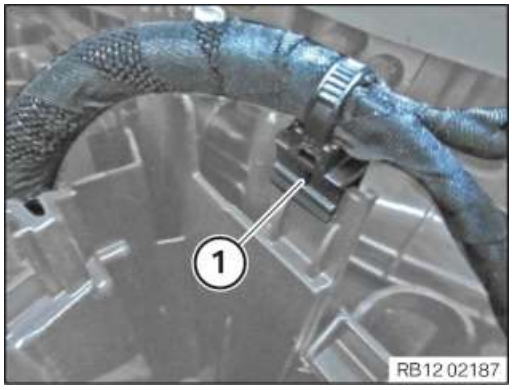
Control unit holder on spring strut dome

Hexagon screw	Tightening torque	8 Nm



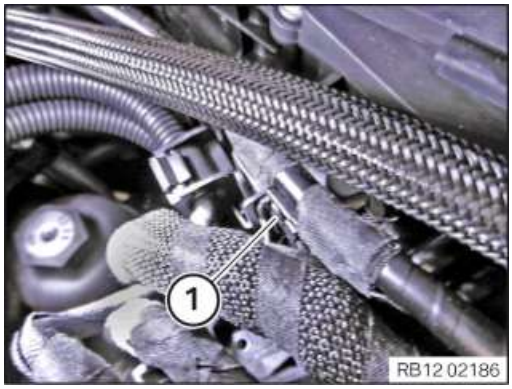
- Feed in and install the cable clip (1).

  Lock (arrow) must audibly engage.

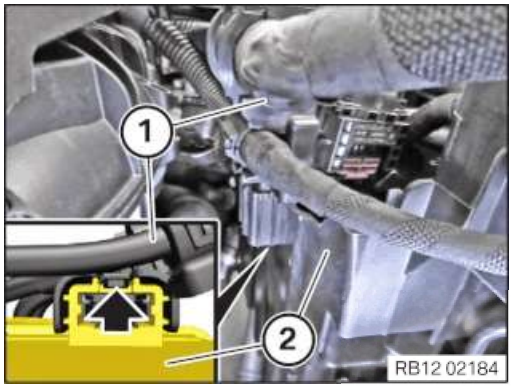


- Secure clamps (1).

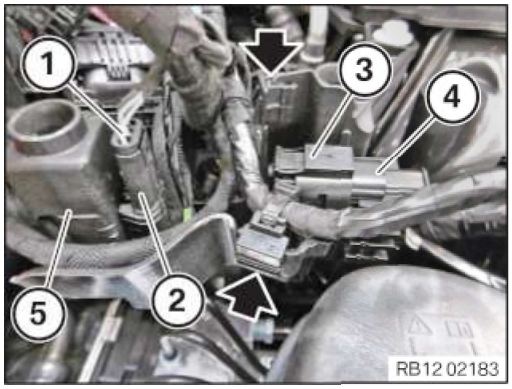
mydiagn.com



- Secure clamps (1).



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



- Connect and lock the connector (4) with the control unit holder (5).
  The connector (4) must engage audibly.
- Connect connectors (3) and lock.
  The connector (3) must engage audibly.
- Connect and lock the connector (2) with the control unit holder (5).
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.
- Secure the clamps (arrows).

20 – Installing the integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

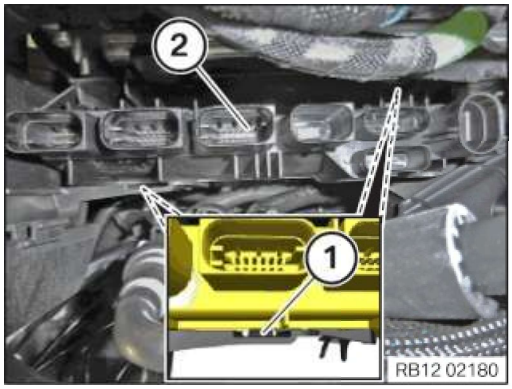
cardiagn.com

RISK OF DAMAGE

Electrostatic discharge.

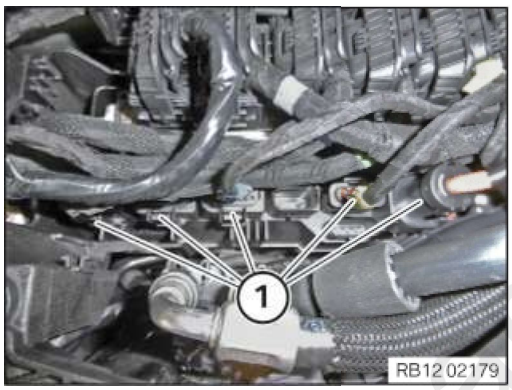
Damage to or destruction of electrical components.

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



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

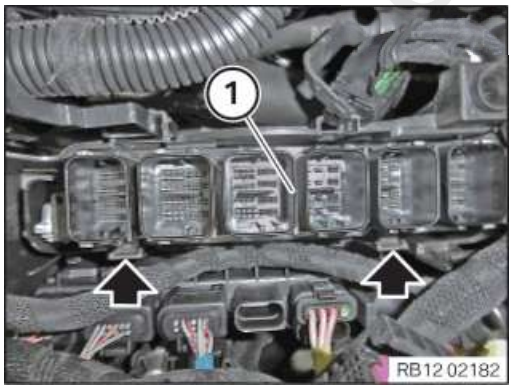
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

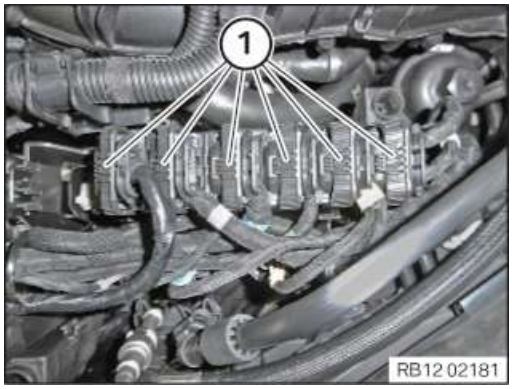
21 – Installing the DME control unit



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

  The locks (arrows) must engage audibly.

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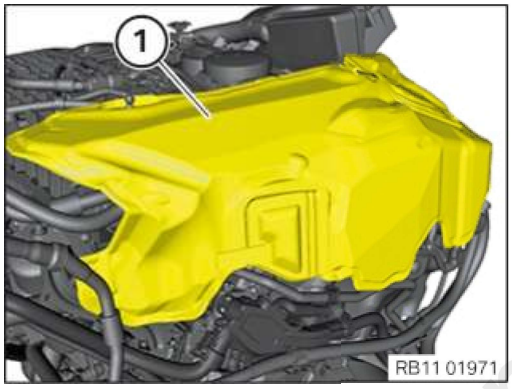
- Connect connectors (1) and lock.

  All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

22 – Installing acoustic cover at rear



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



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

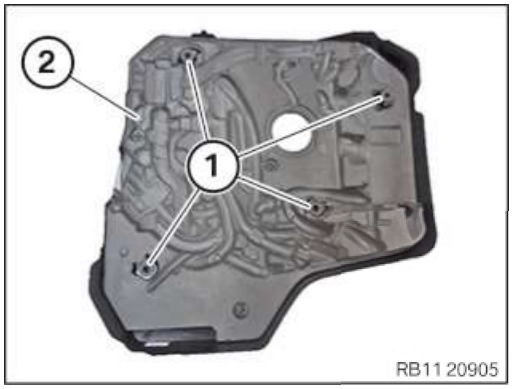
23 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



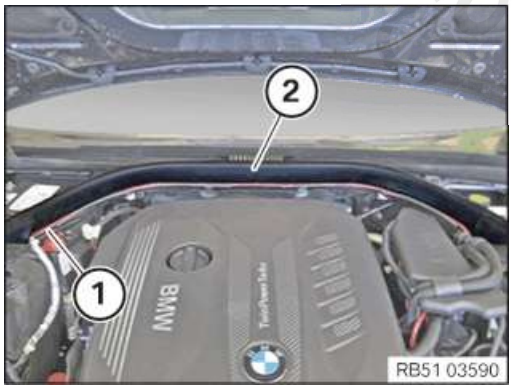
- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

24 – 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.

25 – Disconnecting all battery earth leads

ardiagn.com



- See additional information.

26 – Filling and bleed the low-temperature coolant circuit

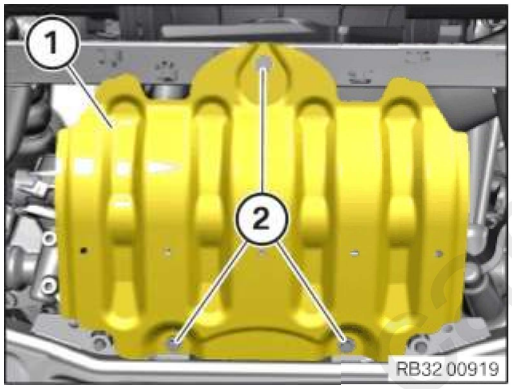


- See additional information.

27 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

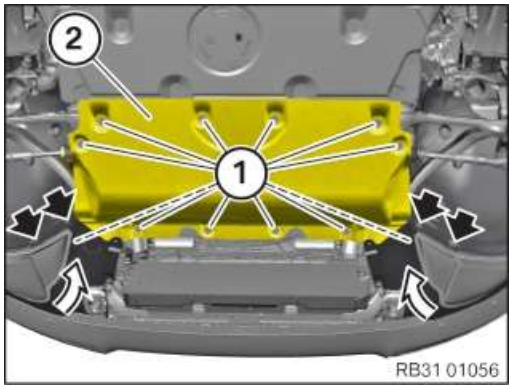


- Remove guard (1).
- Tighten the screws (2).

Bumper buffer device steering on front axle support

M10		Tightening torque	56 Nm

28 – Install the underbody protection of the steering gear



- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

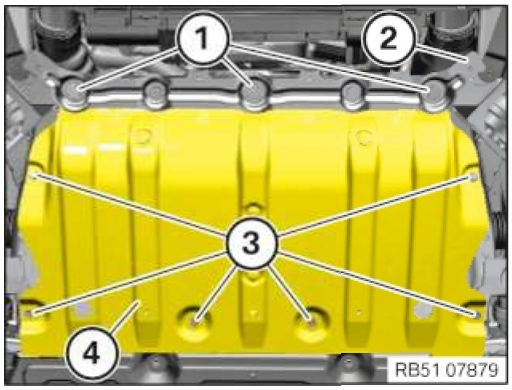
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm



- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

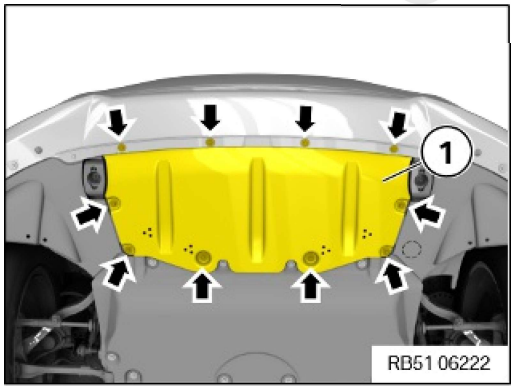
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

29 – Installing the front underbody protection



- **Version 1:**

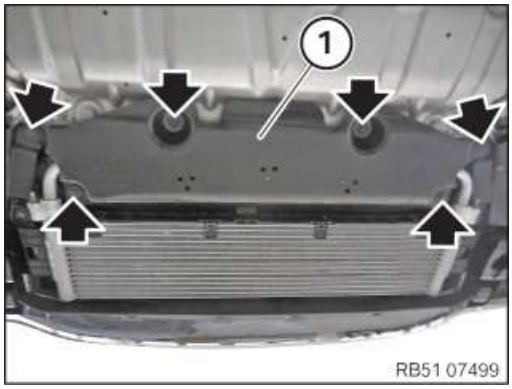
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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

carmagn.com



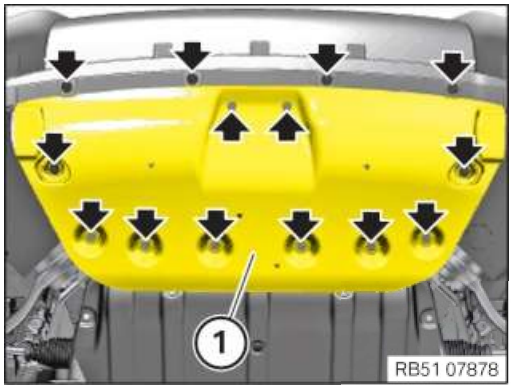
- **Version 2:**

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

  Tighten screws (arrows).

Underbody protection front

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



- **Version 3:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

Additional Information

Overview of Tightening Torques

Cover, front bottom on side — Used in step 13

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Temperature sensor on crankcase — Used in step 16

M6x18		Tightening torque	8 Nm

Intake plenum to cylinder head — Used in step 17

M6		Tightening torque	10 Nm

Intake plenum to support — Used in step 17

M6X25		Tightening torque	8 Nm

Throttle body to holder — Used in step 17

M6X25		Tightening torque	8 Nm

Tank ventilation line to intake plenum — Used in step 17

Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle body — Used in step 17

M6		Tightening torque	8 Nm

Control unit holder on spring strut dome — Used in step 19

Hexagon screw		Tightening torque	8 Nm

Bumper buffer device steering on front axle support — Used in step 27

M10		Tightening torque	56 Nm

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Underbody protection of the steering gear Used in step 28

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws) Used in step 28

Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support Used in step 28

M10		Tightening torque	56 Nm

Underbody protection front Used in step 29

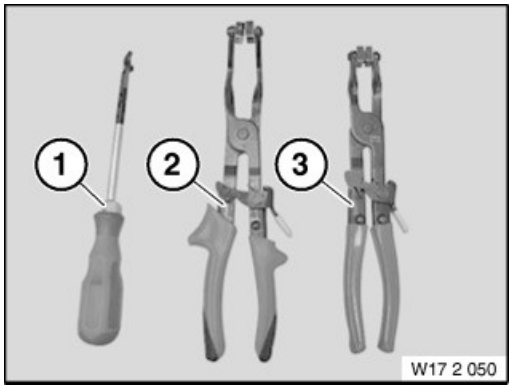
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

0 495 794 (17 2 050) Pliers

Used in step 1417

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Common

Usage	(Set of pliers) For assembling and disassembling the spring band clamps (Coolant hoses)
Included in the tool or work	
Storage location	B85
Replaced by	
In connection with	
SI-Number	01 26 06 (321)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 795 (17 2 051)		**Release tool** Remaining inventories will be sold off and then no longer available individually, but as part of complete tool set 17 2 050 = 0495794 only.	
2	0 495 796 (17 2 052)		**Pliers** (Pliers (curved version) Remaining inventories will be sold off and then no longer available as individual parts, but as part of complete tool set 17 2 050 = 0495794 only.	
3	0 495 797 (17 2 053)		**Pliers** (Pliers (straight version) Remaining inventories will be sold off and then no longer available as individual parts, but as part of complete tool set 17 2 050 = 0495794 only.	

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Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	521

Repair instructions	Used in step
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61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125

61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	125
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	125
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	125
61 20 900 Disconnecting and connecting battery earth lead	125
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61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
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61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
61 20 900 Disconnecting and connecting battery earth lead	125
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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26

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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
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17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	26
17 00 011 Draining and topping up low-temperature coolant circuit	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	26

cardiagn.com

13 62 596 Replacing the differential pressure sensor for the petrol particulate filter

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

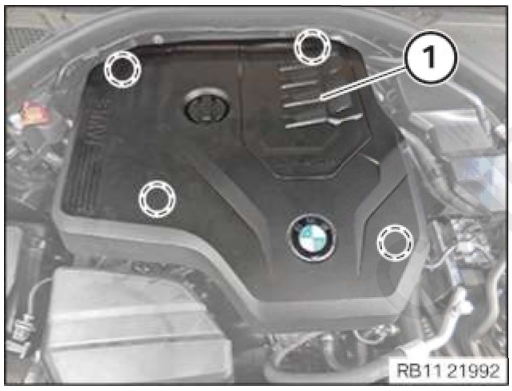
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

MAIN WORK

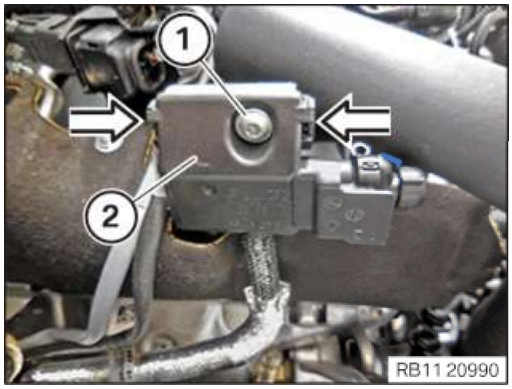
2 – Remove differential pressure sensor

RISK OF DAMAGE

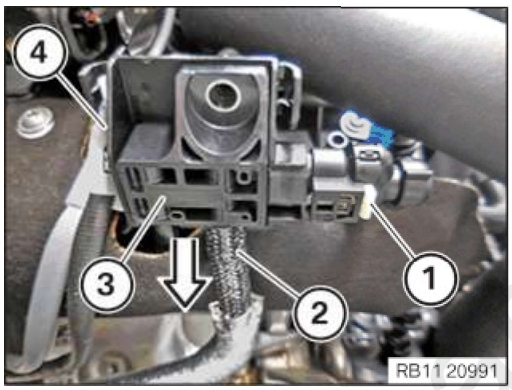
Electrostatic discharge.

Damage to or destruction of electrical components.

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



- Loosen screw (1).
- Release the locks (arrows).
- Guide out and remove the cover (2).

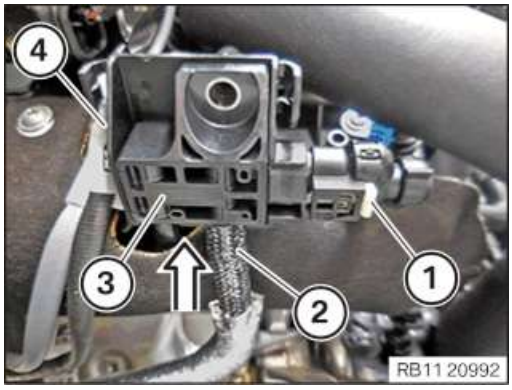


- Unlock plug connection (1) and disconnect.
- Pull off the pressure hose (2) from the differential pressure sensor (3) in the direction of arrow and place it to one side.
- Guide the differential pressure sensor (3) out of the holder (4) and remove.

3 – Install differential pressure sensor

TECHNICAL INFORMATION

Check the pressure hose on the pressure sensor and/or the differential pressure sensor. Replace hardened pressure hose. Check connection on pressure pipe and pressure sensor for leaks.



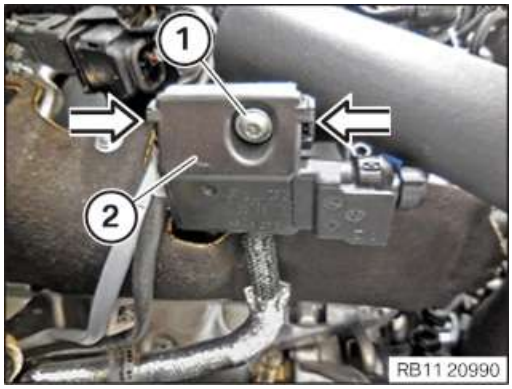
- Thread in differential pressure sensor (3) on the holder (4) and install.

  Differential pressure sensor (3) must engage audibly.
- Renew pressure hose (2).

  Parts: Pressure hose
- Connect the pressure hose (2) to the differential pressure sensor (3) in the direction of arrow until the limit position.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

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- Guide in and install cover (2).

  Cover (2) must engage audibly in the locks (arrows).
- Tighten down screw (1).

Differential pressure sensor to holder

TS6X20		Tightening torque	4 Nm

cardiagn.com

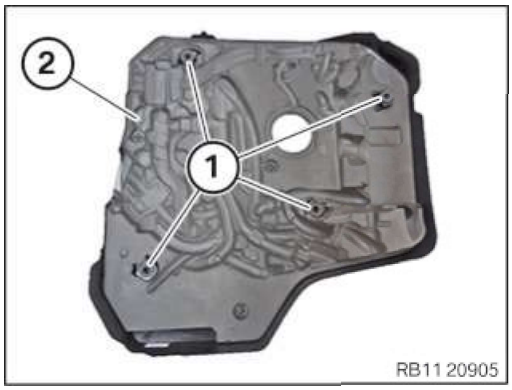
4 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

5 – Replacement: Reset adaptation values

- Reset the adaptation values with the diagnosis system:
  - Power train
  - DDE / DME
  - Reset adaptations
  - Delete adaptations

Additional Information

Overview of Tightening Torques

carsdiagn.com

Overview of Tightening Torques

Differential pressure sensor to holder Used in step 3

TS6X20		Tightening torque	4 Nm

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	2

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13 62 590 Replacing the pressure sensor

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

MAIN WORK

2 – Remove the charging pressure sensor on the charge air line

WARNING

Hot surfaces.

Risk of burning!

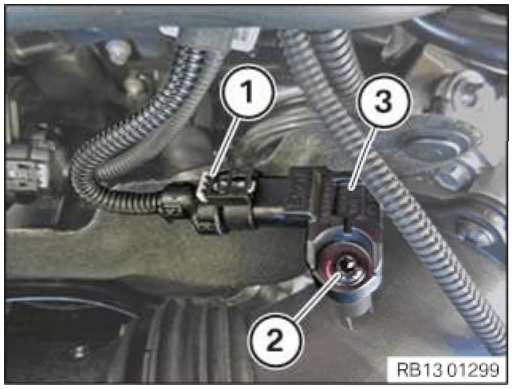
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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



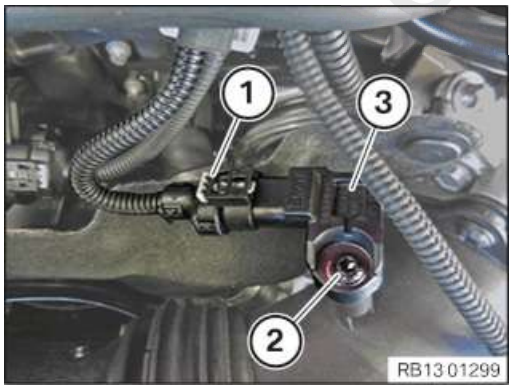
- Unlock and loosen connector (1).
- Loosen screw (2).
- Remove the charging pressure sensor (3).

3 – Install the charging pressure sensor on the charge air line



- Check sealing ring (1) for damage, renew if necessary.

  Parts: Sealing ring
- Apply a thin coat of lubricant to the sealing ring (1) of the charging pressure sensor.



- Insert and install the charging pressure sensor (3).
- Tighten down screw (2).

Charging pressure sensor to charge air line

TS5x20		Tightening torque	4 Nm

- Connect and lock connector (1).

  The connector (1) must engage audibly.

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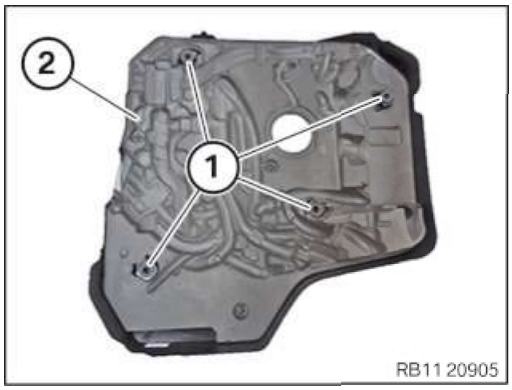
4 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Charging pressure sensor to charge air line — Used in step 3

TS5x20		Tightening torque	4 Nm

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	2

carldiagn.com

13 62 592 Replacing the pressure sensor

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

MAIN WORK

2 – Removing the charging pressure sensor from the intake plenum

WARNING

Hot surfaces.

Risk of burning!

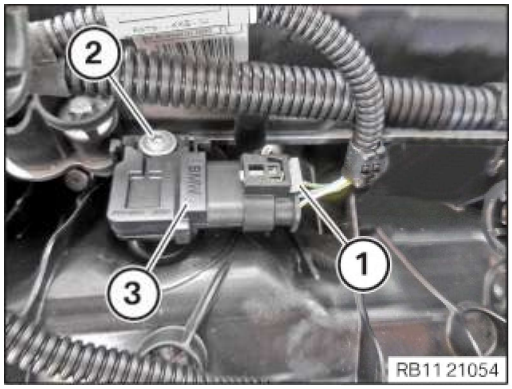
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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



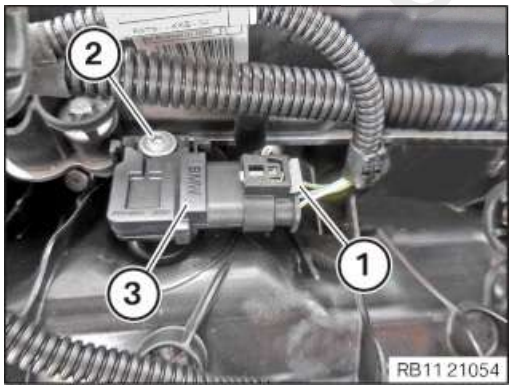
- Unlock and loosen connector (1).
- Loosen screw (2).
- Remove the charging pressure sensor (3).

3 – Installing the charging pressure sensor on the intake plenum



- Check sealing ring (1) for damage, renew if necessary.

  Parts: Sealing ring
- Apply a thin coat of lubricant to the sealing ring (1) of the charging pressure sensor.



- Insert and install the charging pressure sensor (3).
- Tighten down screw (2).

Charging pressure sensor to intake plenum

TS6X20		Tightening torque	4 Nm

- Connect and lock the connector (1).

  The connector (1) must engage audibly.

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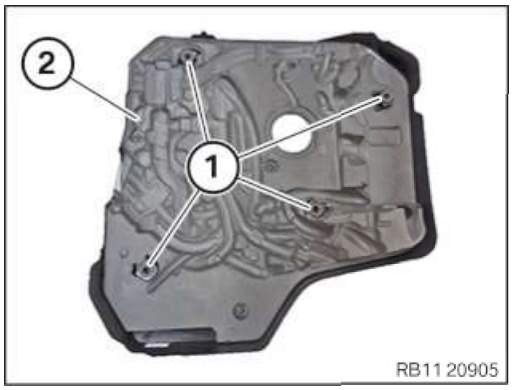
4 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Charging pressure sensor to intake plenum — Used in step 3

TS6X20		Tightening torque	4 Nm

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	2

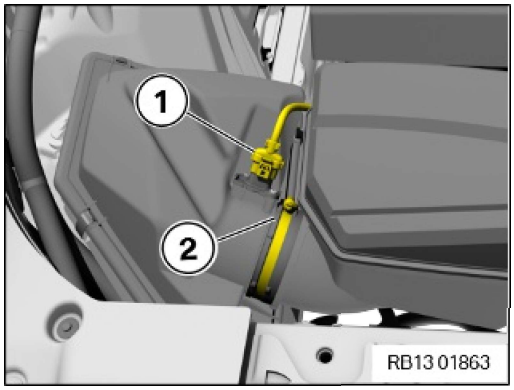
carsdiagn.com

13 71 000 Remove and install intake silencer housing

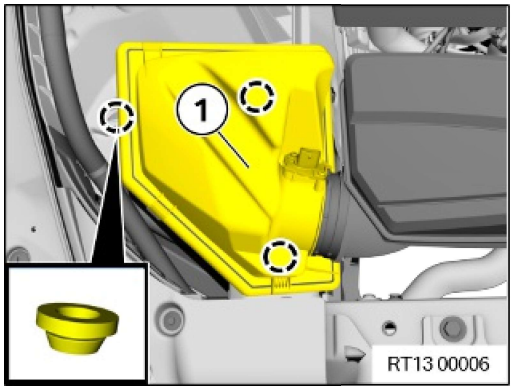
1 – Removing intake silencer housing

NOTICE

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



- Unlock plug connection (1) and disconnect.
- Unfasten clamp (2).

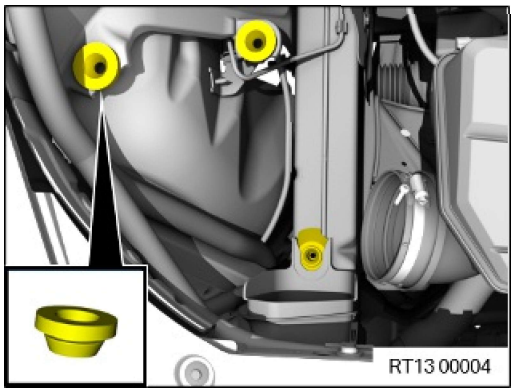


- Detach the intake filter housing (1) from the rubber mounts (marks) toward the top.

2 – Installing intake silencer housing

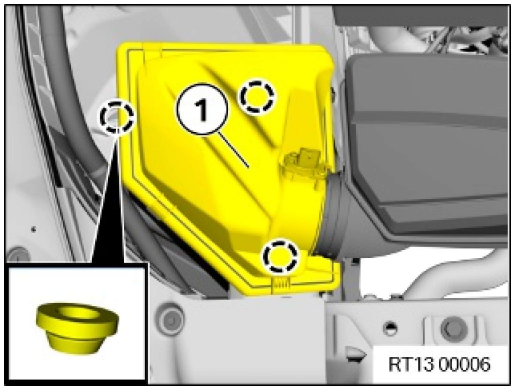
NOTICE

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

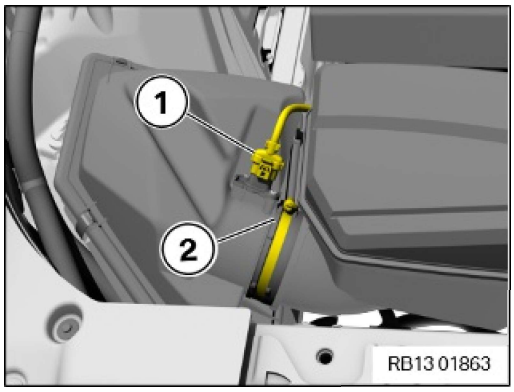


- Check that the rubber mount is at the right position.

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- Feed the intake filter housing (1) in and engage it in the rubber mounts (marks).



- Connect connectors (1) and lock.

TECHNICAL INFORMATION

- Note the installation position of the component. The component may be installed in *various* installation positions.

- Tighten clamp (2).

Resonator to intake filter housing

Clamp		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Resonator to intake filter housing Used in step 2

Clamp		Tightening torque	3 Nm

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13 71 000 Remove and install intake silencer housing

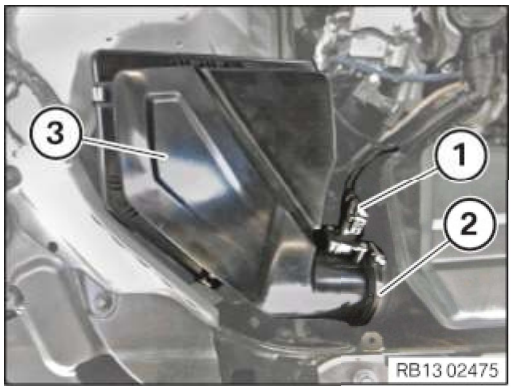
WARNING

Hot surfaces.

Risk of burning!

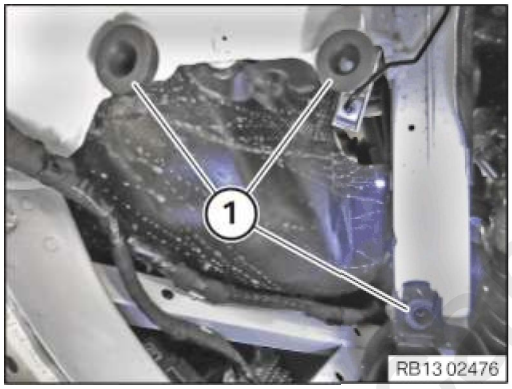
- Perform all work only on components that have cooled down.

1 – Removing intake silencer housing

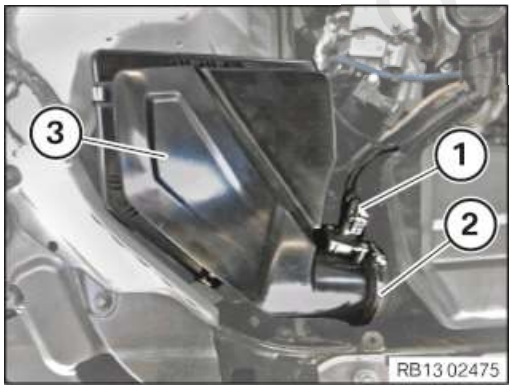


- Unlock plug connection (1) and disconnect.
- Unfasten clamp (2).
- Pull out and remove the intake silencer housing (3) from the rubber mounts towards the top.

2 – 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.

Additional Information

Overview of Tightening Torques

Clean air pipe to upper section of intake filter housing Used in step 2

Clamp		Tightening torque	3 Nm

13 71 044 Removing and installing/replacing charge air line

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

2 – Removing the clean air pipe with the resonator

WARNING

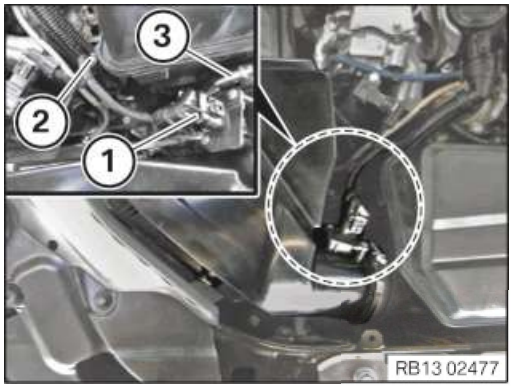
Hot surfaces.

Risk of burning!

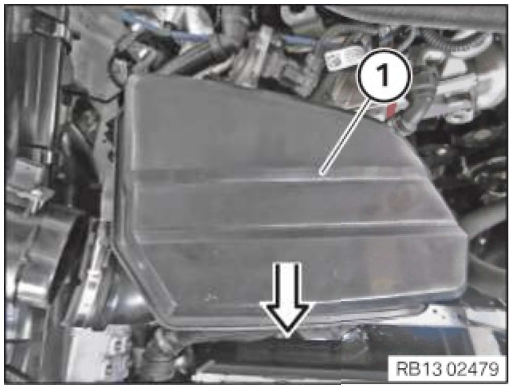
- Perform all work only on components that have cooled down.



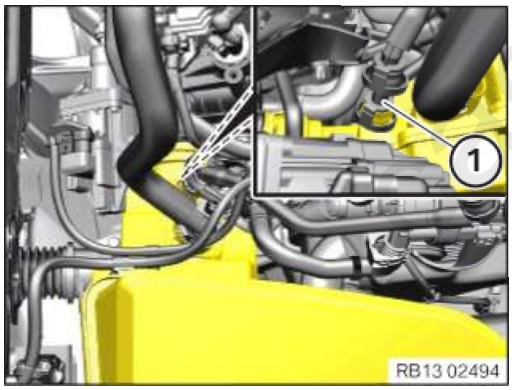
- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.



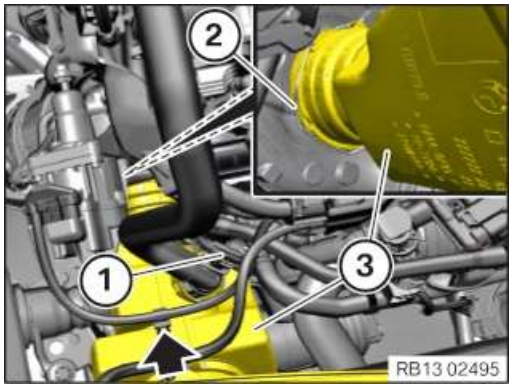
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



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



- Unlock and disconnect the tank ventilation line (1).



- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

MAIN WORK

3 – Remove charge air line

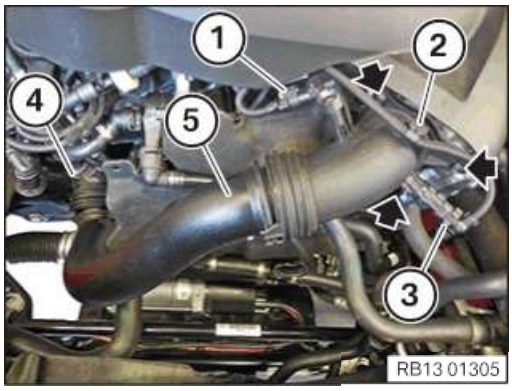
rdiagn.com

WARNING

Hot surfaces.

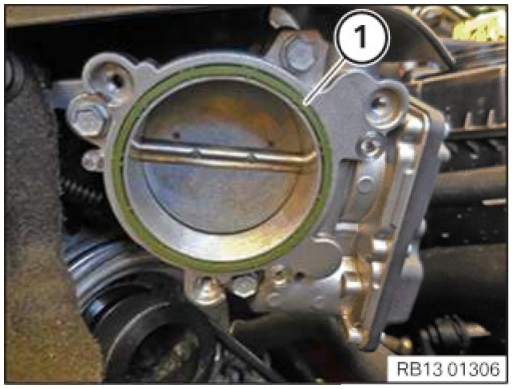
Risk of burning!

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



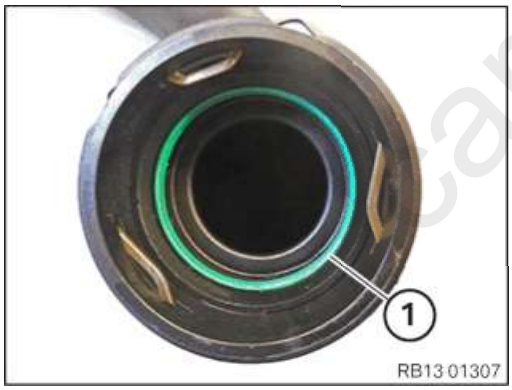
- Unlock and loosen the connector (1) on the charging pressure sensor.
- Unlock and loosen clamp (2).
- Unlock and disconnect the connector (3) from the charge-air temperature sensor.
- Remove screws (arrows).
- Unlock and loosen the clamp (4) on the exhaust turbocharger.
- Guide out and remove charge air line (5).

4 – Install charge air line



- Renew the sealing ring (1) on the throttle valve.

  Parts: Sealing ring



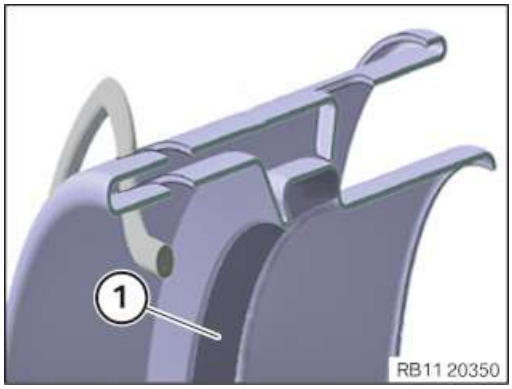
- Check the sealing ring (1) on the charge air line for damage and renew, if necessary.

▸ **Replace damaged gasket**

TECHNICAL INFORMATION

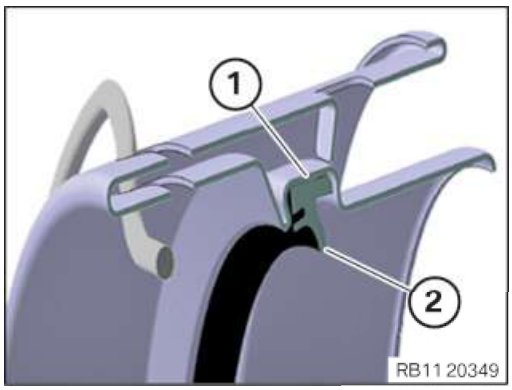
Do not use pointed or sharp-edged tools for the installation and/or removal.

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

  The gasket groove (1) must be clean.



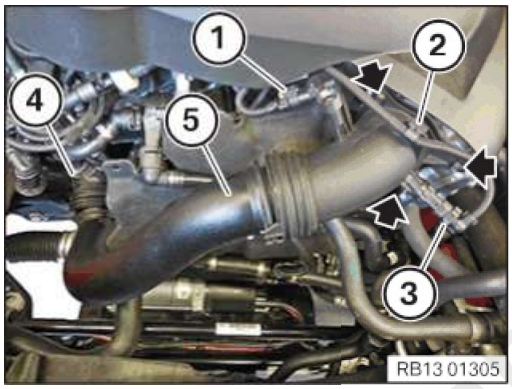
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

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



- Insert and install charge air line (5).
- Lock the clamp (4) on the exhaust turbocharger.

  The clamp (4) must engage audibly.
- Tighten screws (arrows).

Charge air line to throttle body

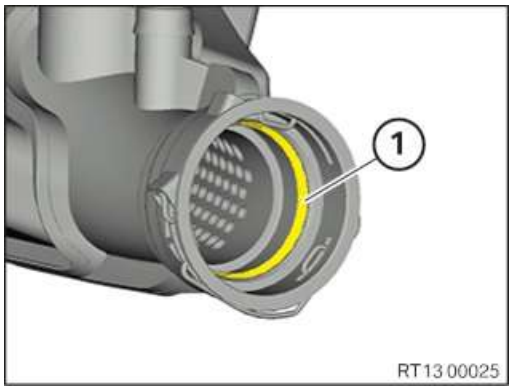
M6		Tightening torque	8 Nm

- Connect and lock the connector (3) on the charge-air pressure sensor.
- Connect and lock the connector (1) on the charging pressure sensor.

  All connectors must audibly engage.
- Secure clamps (2).

POSTPROCESSES

5 – Installing the clean air pipe with resonator



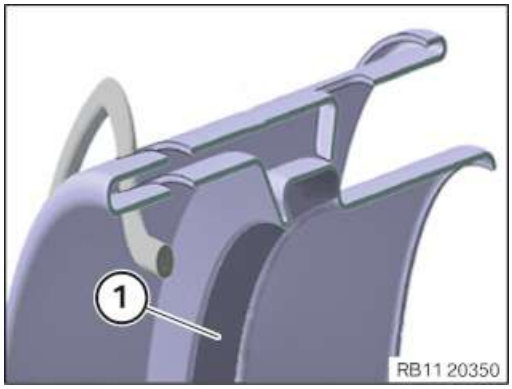
- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

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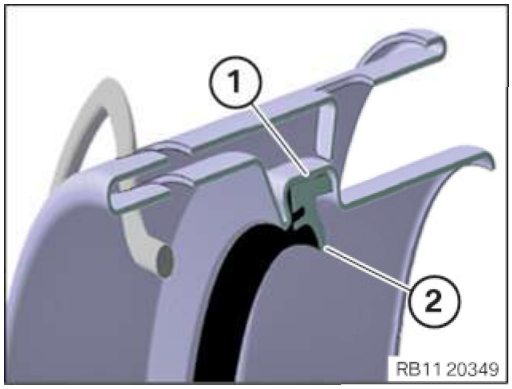
TECHNICAL INFORMATION

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



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

  The gasket groove (1) must be clean.



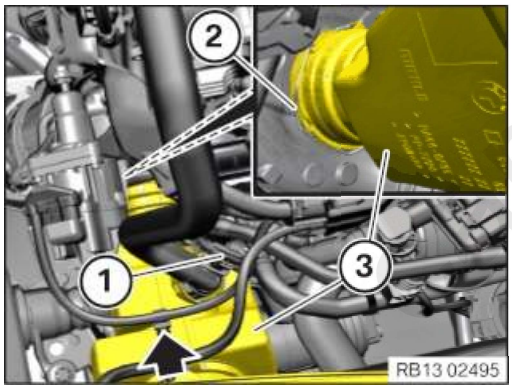
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

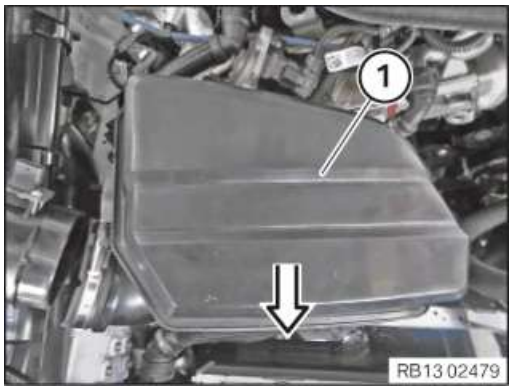
- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).



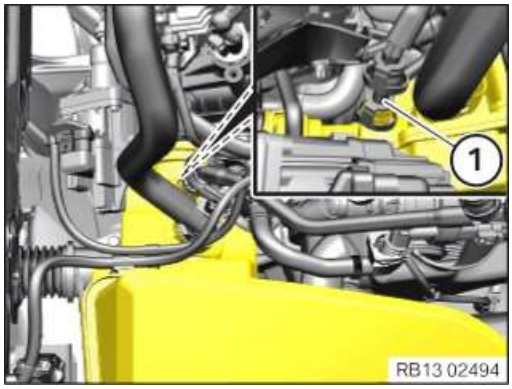
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

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

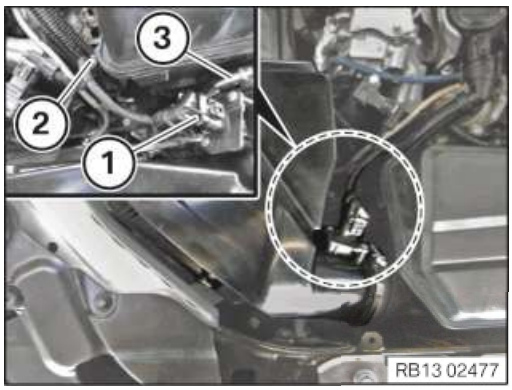
  The connector (1) must engage audibly.
- Secure clamp (arrow).



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



- Connect and lock the tank ventilation line (1).



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

  The connector (1) must engage audibly.



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

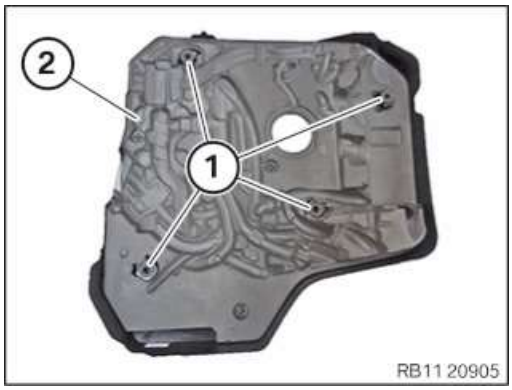
6 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.

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

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Charge air line to throttle body — Used in step 4

M6		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing — Used in step 5

Clamp		Tightening torque	3 Nm

cardiagn.com

13 71 035 Removing and installing/replacing clean air pipe

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

MAIN WORK

2 – Removing the clean air pipe with the resonator

WARNING

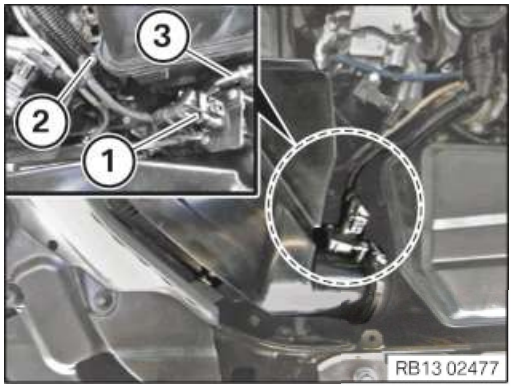
Hot surfaces.

Risk of burning!

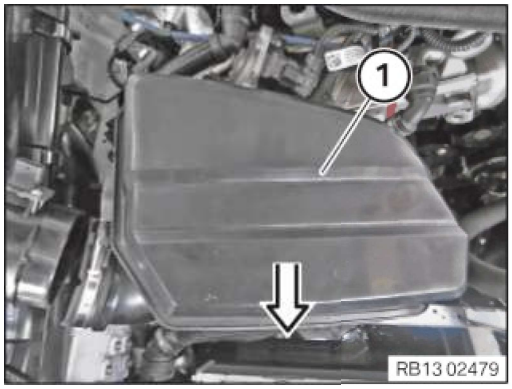
- Perform all work only on components that have cooled down.



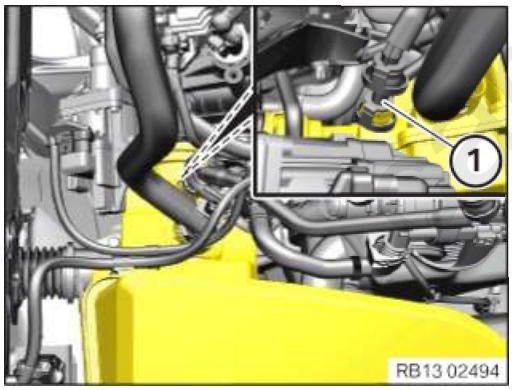
- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.



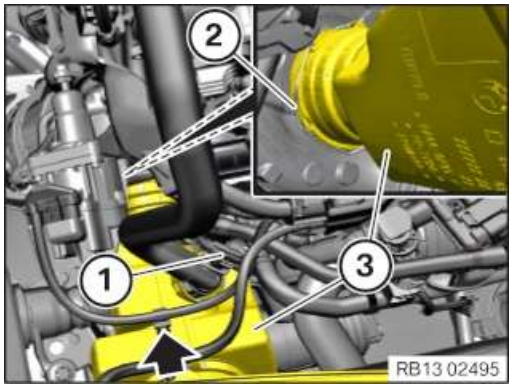
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



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



- Unlock and disconnect the tank ventilation line (1).



- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

3 – Installing the clean air pipe with resonator

rdiagn.com

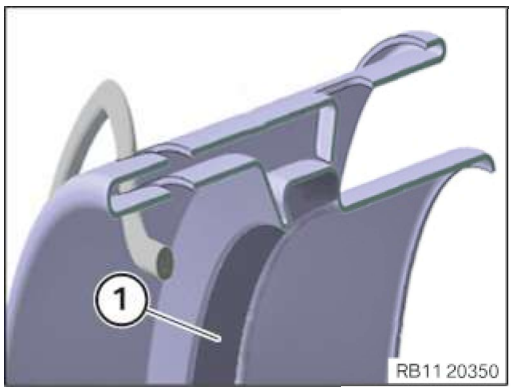


- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

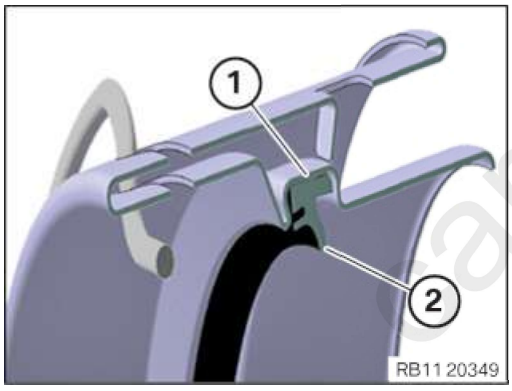
TECHNICAL INFORMATION

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



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

  The gasket groove (1) must be clean.



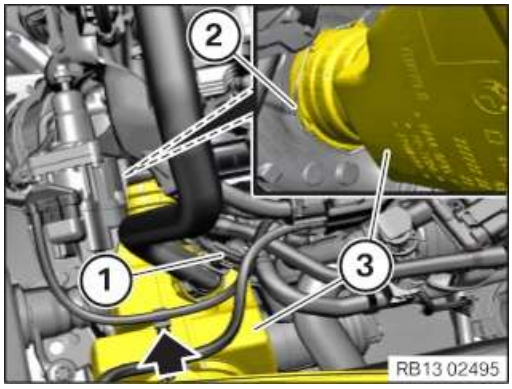
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

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

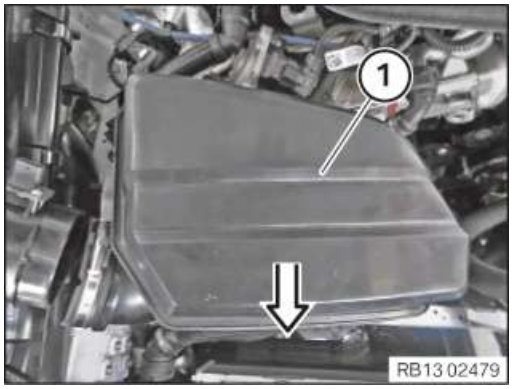


- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

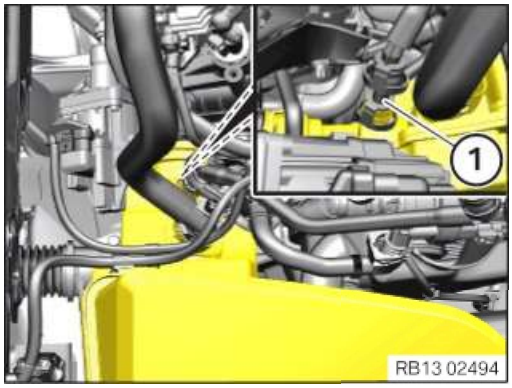
  The clamp (2) must engage audibly.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.
- Secure clamp (arrow).

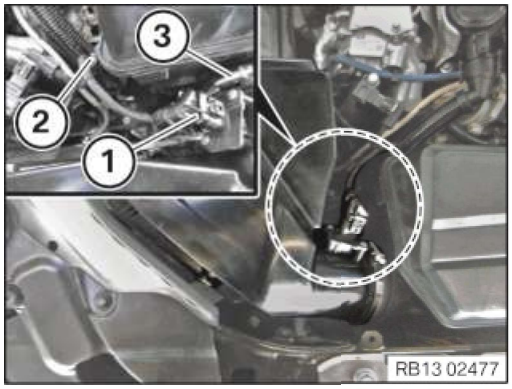
carlagn.com



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



- Connect and lock the tank ventilation line (1).



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

  The connector (1) must engage audibly.



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

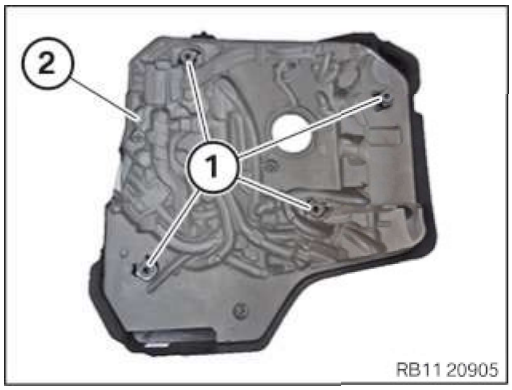
4 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

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Additional Information

Overview of Tightening Torques

Clean air pipe to upper section of intake filter housing Used in step 3

Clamp		Tightening torque	3 Nm

13 72 001 Replacing air filter element

WARNING

Hot surfaces.

Risk of burning!

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

1 – Removing air filter element

Prerequisite

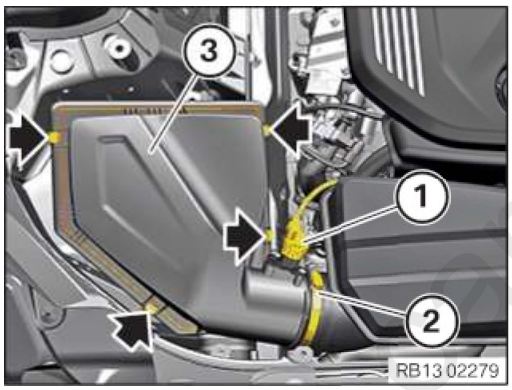
Ignition is switched off.

RISK OF DAMAGE

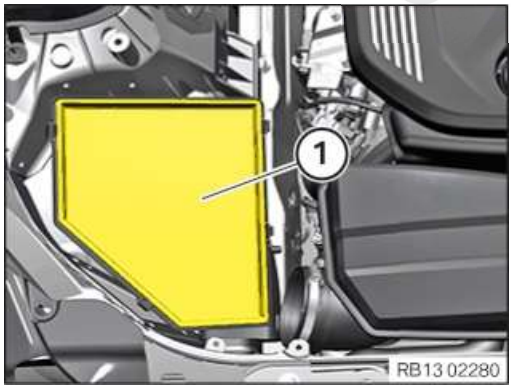
Damage to the clean air line. Damage to the air filter.

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

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



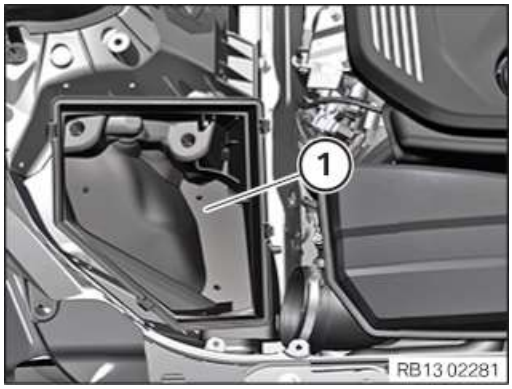
- Unlock and loosen connector (1).
- Unfasten clamp (2).
- Unlock clamps (arrows).
- Remove the upper section of the intake filter housing (3).



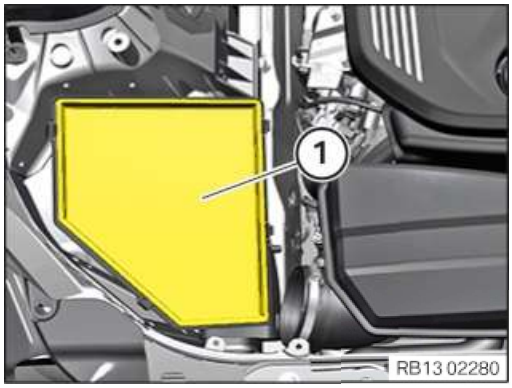
- Remove the air filter element (1).

2 – Installing the air filter element

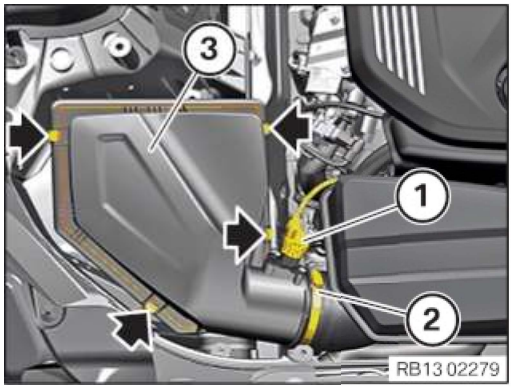
carmanualsdiagn.com



- Clean lower section of intake filter housing (1).



- Install the air filter element (1).



- Lock clamps (arrows).

  The clamps (arrows) must engage audibly.
- 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.

Additional Information

Overview of Tightening Torques

Clean air pipe to upper section of intake filter housing Used in step 2

Clamp		Tightening torque	3 Nm

cardiagn.com

13 90 500 Replace the tank vent valve

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

bmwdiagn.com

2 – Remove tank vent valve

WARNING

Hot surfaces.

Risk of burning!

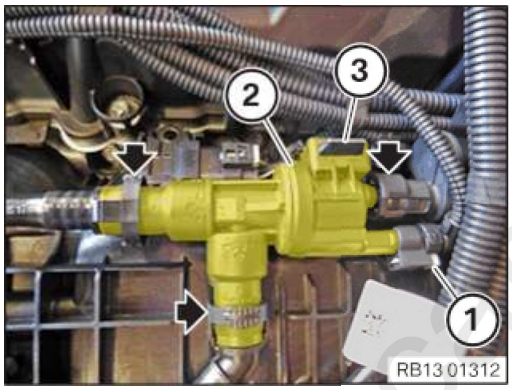
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Electrostatic discharge.

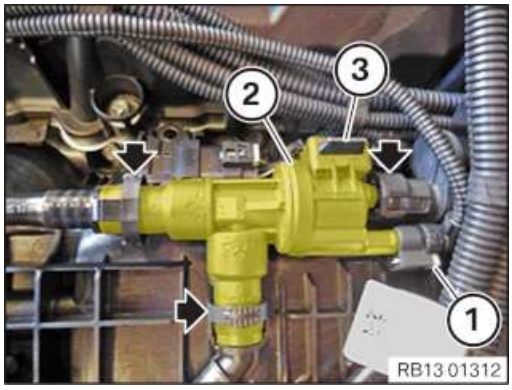
Damage to or destruction of electrical components.

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



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

3 – Installing the tank vent valve



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

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

  The connector (1) must engage audibly.

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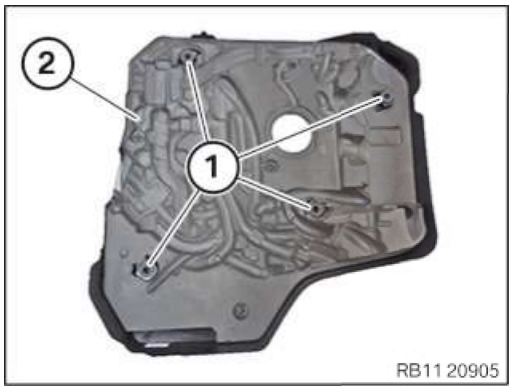
4 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

carsdiagn.com

Additional Information

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	2
61 35 ... Notes on ESD protection (Electro Static Discharge)	2