12 12 011 Removing and installing/renewing all spark plugs

Overview of Activities

Additional Information

Preliminary Work

1 Disconnecting all battery earth leads

2 Remove the cover of the master DME control unit

3 Removing cover of slave DME control unit

4 Removing the acoustic cover

5 Remove holder of the DME control unit for cylinders 5 to 8

6 Removing the control unit holder for cylinders 1 to 4

7 Remove coolant expansion tank

8 Remove the cable duct on cylinder bank 2

Main Work

9 Replace the spark plugs of cylinder bank 1 

10 Replace spark plugs of cylinder bank 2 

Postprocesses

11 Installing the cable duct in bank 2

12 Installing coolant expansion tank

13 Installing the control unit holder for cylinders 1 to 4

14 Install holder of the DME control unit for cylinders 5 to 8

15 Installing the cover of slave DME control unit

16 Install the cover of the master DME control unit

17 Install acoustic cover

18 Disconnecting all battery earth leads

General information

PRELIMINARY WORK

1–Disconnecting all battery earth leads

Additional information is available.

- See additional information.

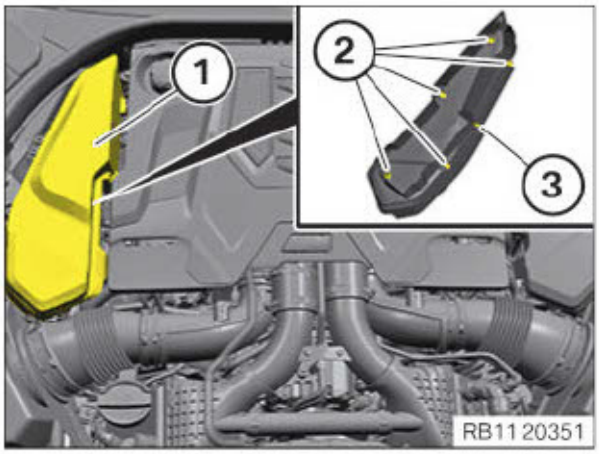
2–Remove the cover of the master DME control unit

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.



- Disengage the cover of the master DME control unit (1) upward from the clamps (2) and the guide pins (3).
- Remove the cover of the master DME control unit (1).

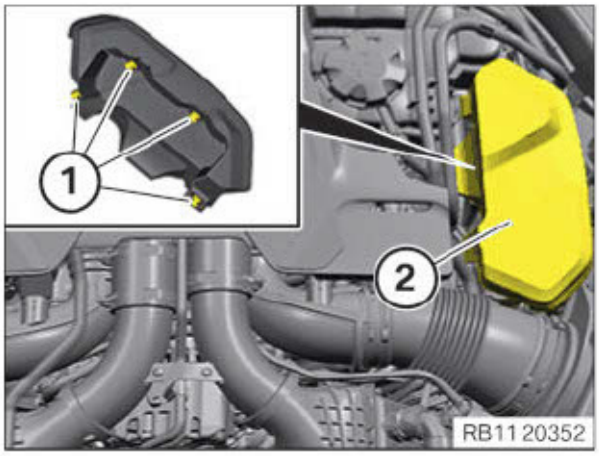
3–Removing cover of slave DME control unit

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.



- Disengage cover of the slave DME control unit (2) upwards out of the clamps (1).
- Remove the cover of slave DME control unit (2).

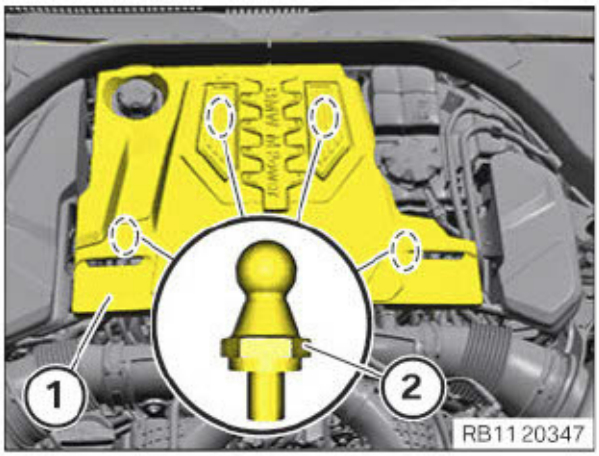
4–Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

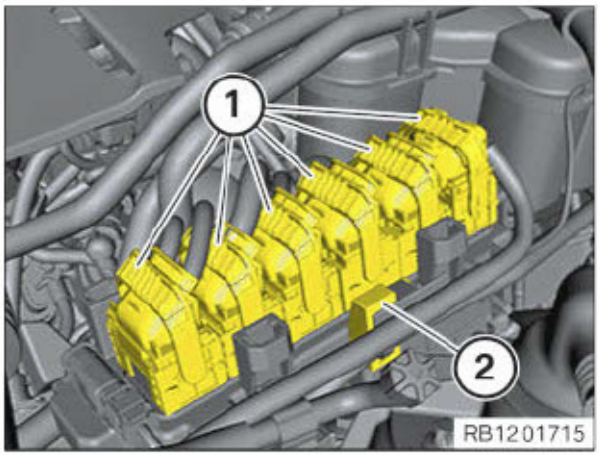
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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.

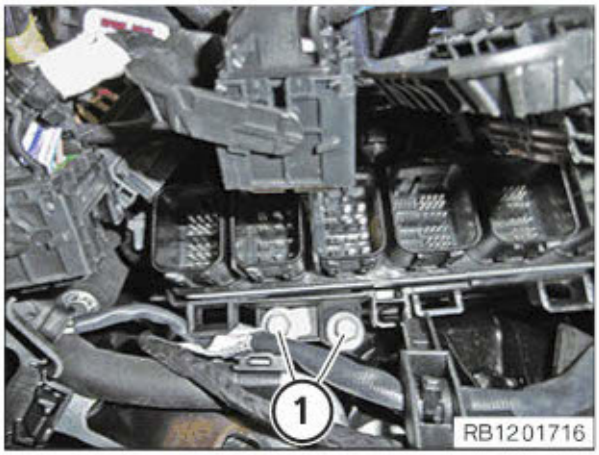


- Unclip the acoustic cover (1) from the latch mechanisms (2) toward the top.
- Remove the acoustic cover (1).

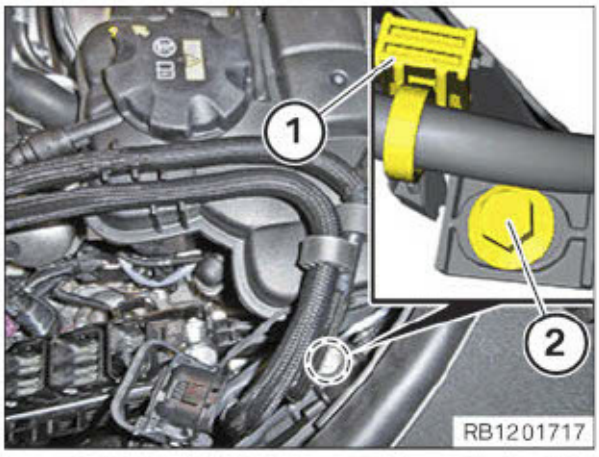
5–Remove holder of the DME control unit for cylinders 5 to 8



- Unlock and disconnect plug connections (1).
- Disengage the cable clip (2) in an upward direction from the adapter plate.

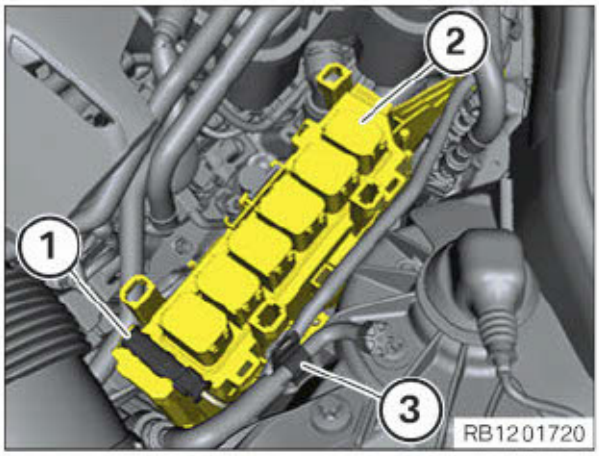


- Loosen screws (1).

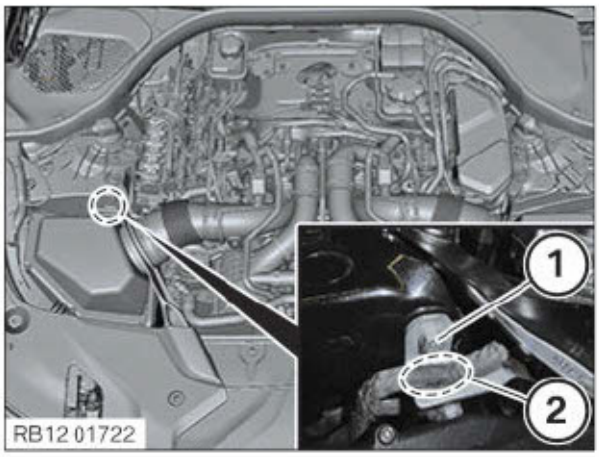


- Loosen the cable clip (1).
- Loosen screw (2).

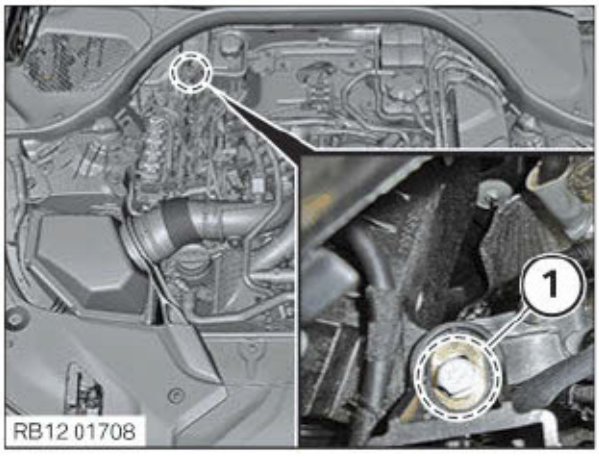
- Disengage connector holder (1) upwards.
- Carefully press the refrigerant line bracket (3) to one side.
- Thread out holder with the DME control unit of cylinders 5 to 8 (2) and remove.



6–Removing the control unit holder for cylinders 1 to 4



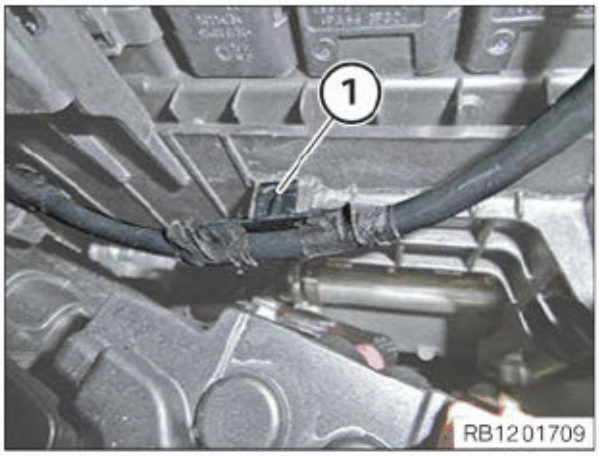
- Loosen screw (1).
- Loosen the cable clip (2).



- Loosen screw (1).
- Disengage the wires and connectors (1) on the adapter plate in an upward direction.

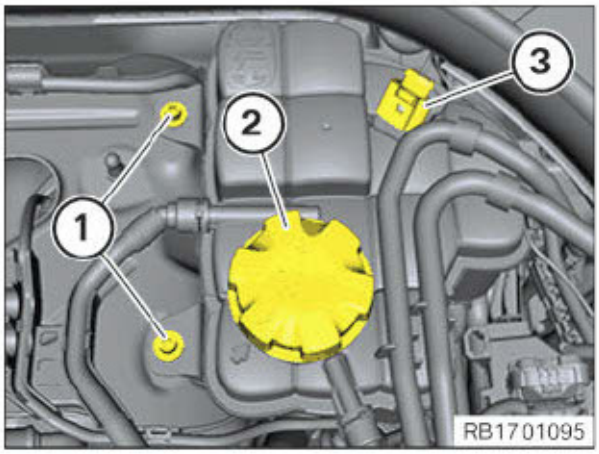
- Unlock and disconnect plug connections (1).

- Unlock and disconnect plug connections (1).
- Loosen the cable clip (1).



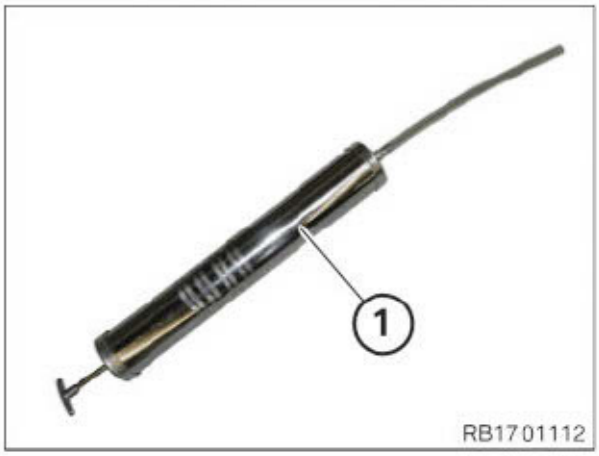
- Guide out and remove the control unit holder (1) with the control units upwards.

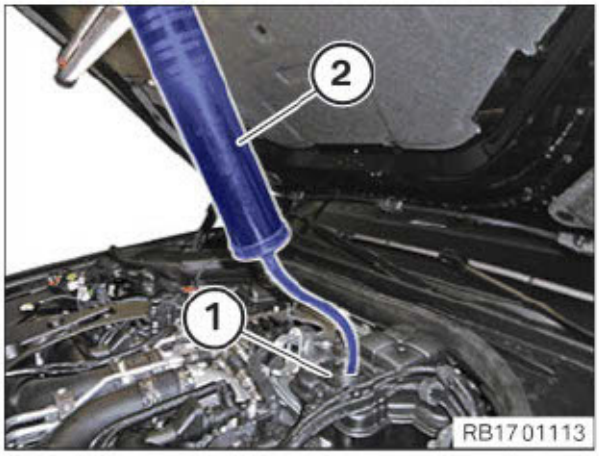
7–Remove coolant expansion tank



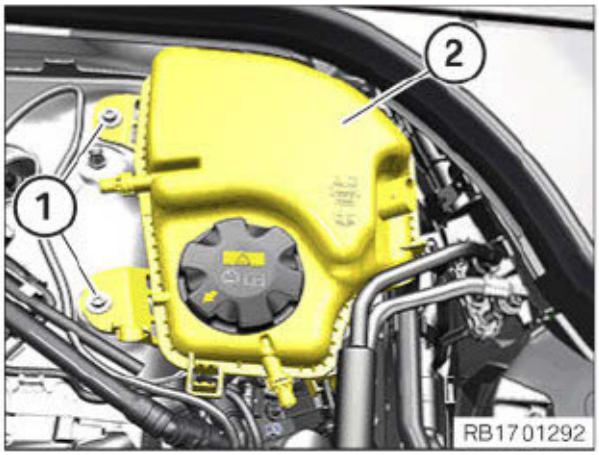
- Loosen screws (1).
- Release lid (2) of coolant expansion tank and remove.
- Unlock plug connection (3) and disconnect.

- Use commercially available syringe (1) or suitable tool to draw off coolant expansion tank.





- Draw off coolant from the coolant expansion tank (1) with commercially available syringe (2) or a suitable tool and dispose.

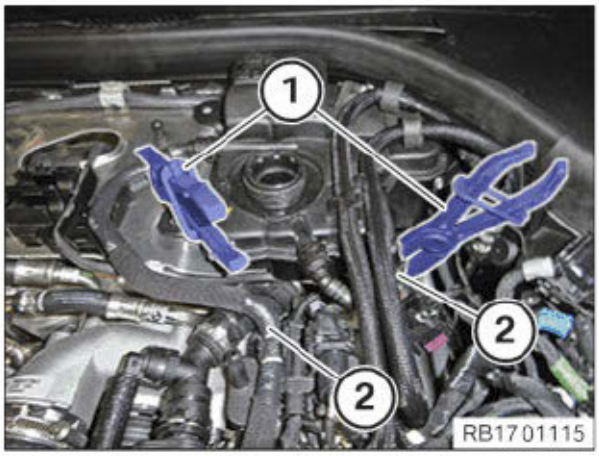


- Loosen screws (1).
- Thread out coolant expansion tank (2) and remove.

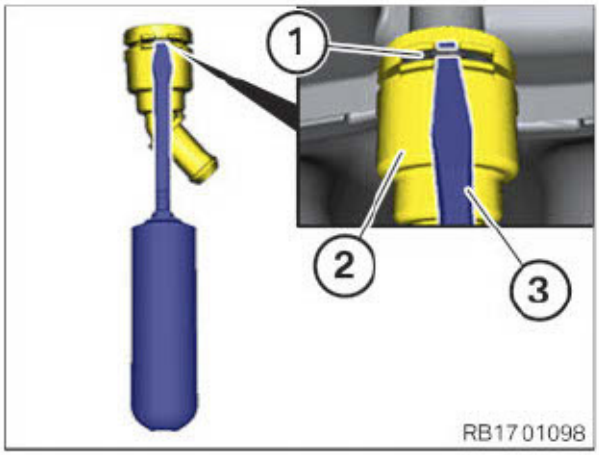
i TECHNICAL INFORMATION

Only flexible hose pipes may be disconnected.

- Clamp off coolant lines (2) with clamping pliers (1).



▸ Unlocking the coolant line flange



- Unlock the retaining clip (1) on the flange (2) of the coolant line with a suitable screwdriver (3) in an upwards direction.
- Pull off the flange (2) of the coolant line towards the rear.

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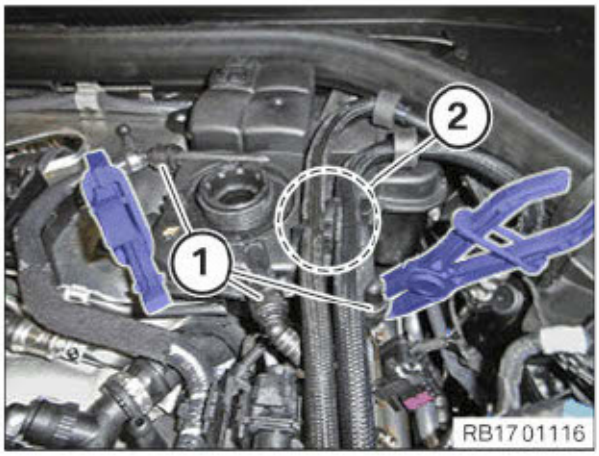
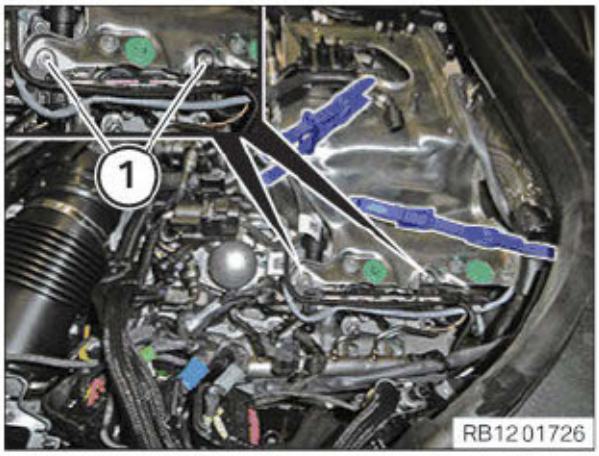
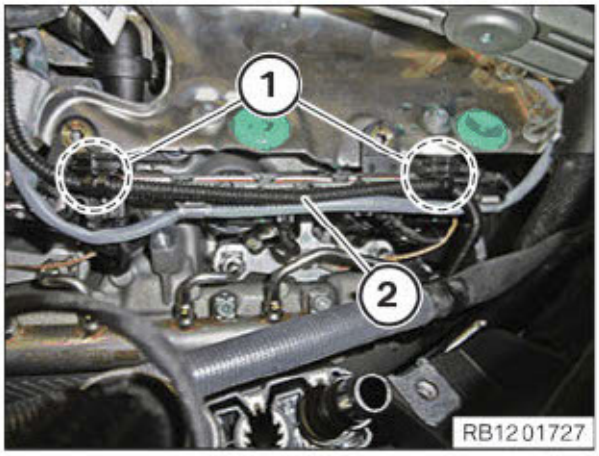


- Disconnect coolant lines (1).
- Disengage hose pipes in the area (2) and place to side.
- Remove coolant expansion tank.

8–Remove the cable duct on cylinder bank 2

- Loosen screws (1).





- Unclip wiring harness (2) from clamps (1).
- Keep wiring harness (2) aside.

MAIN WORK

9–Replace the spark plugs of cylinder bank 1

▸ **Remove ignition coils of cylinder bank 1**

RISK OF DAMAGE

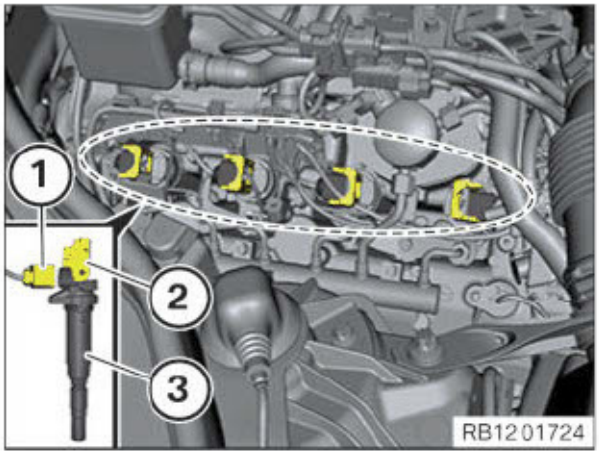
Damage to the ignition coil.

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.

NOTICE

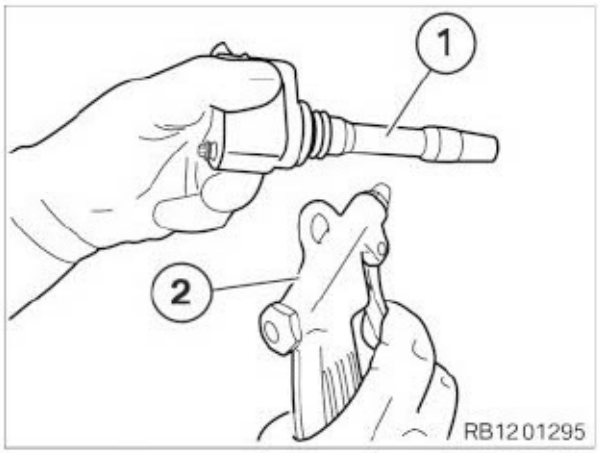
The description is for one component only. The procedure is identical for all further components.



- Unlock the connector fastener (2) of the ignition coil and disconnect the connector (1).

  If necessary, cable duct on heat shield must be pressed upwards slightly.
- Ensure that cables are not crushed or damaged.
- Repair damaged cables.
- Slowly pull the ignition coil (3) up and take out without jerking it.

  The silicone hose may fracture as a result of pulling out the ignition coil (3) with jerking movements.



- After removing the ignition coils: Blow off the silicone hose (1) of the ignition coils with an air gun (2).

  The ignition coils must be free of oil and fuel residue.

◂

▸ Remove spark plugs of cylinder bank 1

⚠ WARNING

Hot surfaces.

Risk of burning!

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

⚠ CAUTION

Swirling dirt particles caused by compressed air.

Danger of injury!

- Collect dirt particles, e.g. when blowing out, use cloth to do so.
- Wear safety goggles.

i TECHNICAL INFORMATION

Clean spark plug slot with compressed air.

The spark plug shaft must be cleaned using compressed air after having removed the ignition coils and before removing the spark plugs. After having removed the spark plugs, once again check the sealing surface for contamination and (if necessary) clean using a moist cloth or clean using compressed air.

Deposits that are not removed according to instructions may enter the combustion chamber and lead to uncontrolled combustion. Remaining deposits on the spark plug sealing surfaces may lead to leaks and the spark plugs may come loose during engine operation.

Spark plug threads must not be greased or oiled. Insufficiently tightened spark plugs may cause leaks and the sparks plugs may come loose during engine operation.

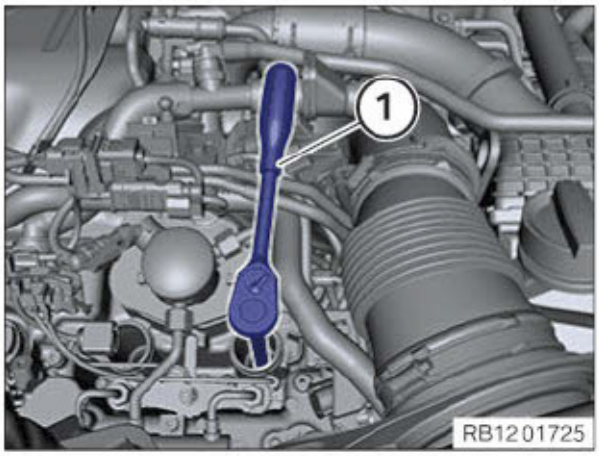
NOTICE

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

- Unscrew the spark plugs with the special tool **0 495 560 (12 1 220)** and an extension with joint.

  Flexible ratchet extensions must always be used. If rigid mounting tools are used, there is a risk of insulator breakages.

  Do not use a variable plug connection with locking capability as this also poses a risk of insulator breakage.



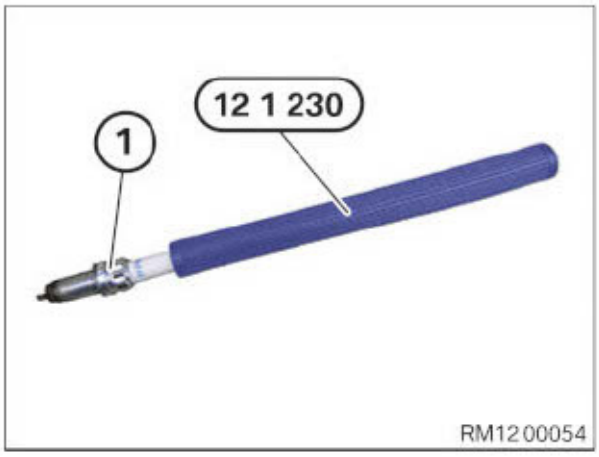
- Unscrew the spark plugs with the special tool **0 495 560 (12 1 220)** and an extension with joint.

◀

▸ Install spark plugs of cylinder bank 1

NOTICE

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

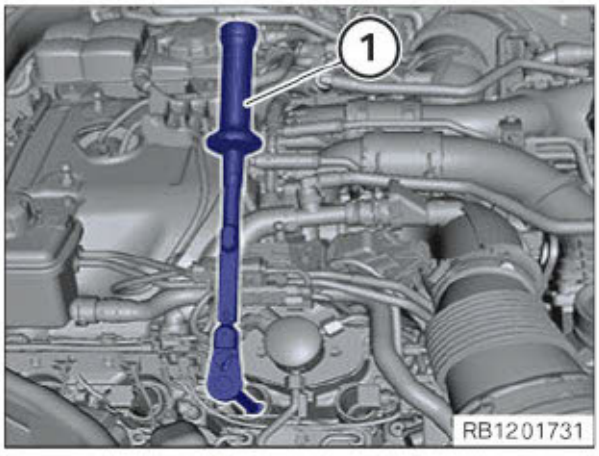


- Insert spark plug (1) into special tool **0 496 065 (12 1 230)**.

i TECHNICAL INFORMATION

Do not drop spark plug into spark plug shaft! This can lead to a reduction of the electrode gap and can thus impair smooth running of the engine, especially in idle position.

- Make sure the spark plug does not fall into the spark plug shaft.
- Screw the spark plugs into the engine hand-tight with special tool **0 496 065 (12 1 230)**.



i TECHNICAL INFORMATION

Exclusively swivelling extensions may be used for the reversible ratchet. Rigid mounting tool and variable plug connections with rigid option may not be used; there is a risk that the insulator breaks.

- Tighten spark plugs with a torque wrench, the special tool **0 496 065 (12 1 230)** and an extension with joint.

Spark plugs

M12x1.25		Tightening torque	23 Nm

◄

▸ Install ignition coils of cylinder bank 1

RISK OF DAMAGE

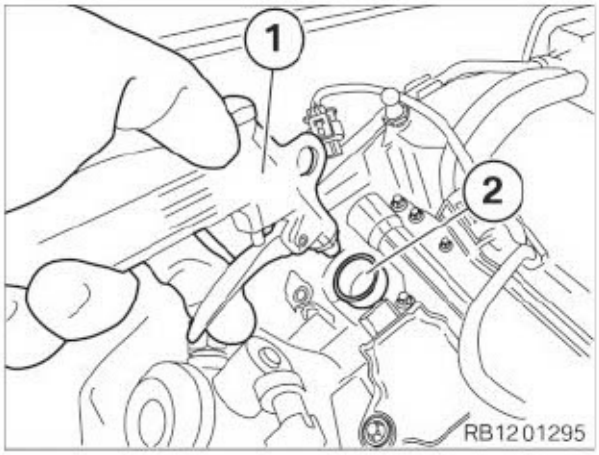
Damage to the ignition coil.

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

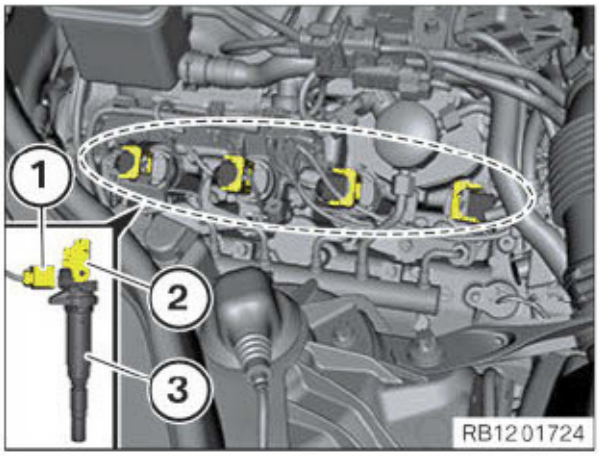
- Cover ignition coils using suitable covers when working on the fuel system, if necessary remove them.
- Do not oil or grease the silicone tube of the spark plug connector. The silicone tube is coated with talc to reduce the pulling forces.

NOTICE

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



- Before installing the ignition coils: Blow the spark plug shafts (2) out with an air gun (1).

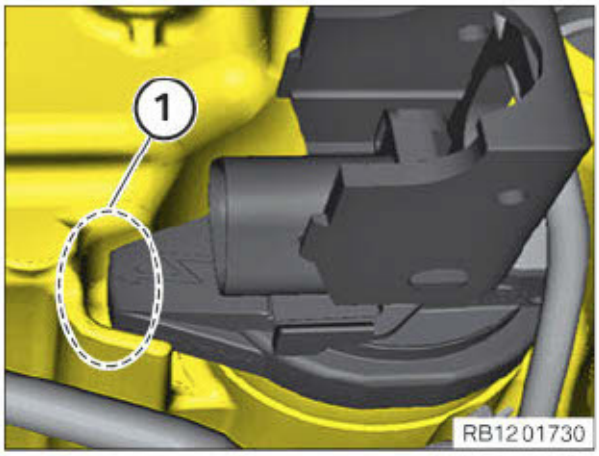


- Position the ignition coil and gently push it to the limit position, if necessary by twisting it back and forth slightly.

  If necessary, cable duct on heat shield must be pressed upwards slightly.
- Push connector (1) onto the ignition coil with the connector fastener (2) open.
- Carefully fold together the connector fastener (2).

  When closing the locking lever, the connector (1) must rest against the counter-piece nearly gap-free. In the process, the crank webs of the locking lever are positioned inside of the counter piece.
- Ensure that cables are not crushed or damaged.

  The connector fastener must snap into place without great effort.
- Repair damaged cables.
- Check the anti-twist lock (1).



The rubber seal of the ignition coil must completely enclose the opening for the spark plug on the cylinder head cover.

◄

10–Replace spark plugs of cylinder bank 2

► **Remove the ignition coils of cylinder bank 2**

RISK OF DAMAGE

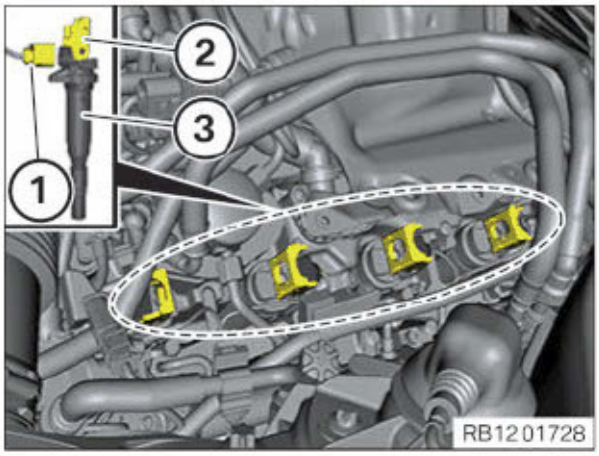
Damage to the ignition coil.

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.

NOTICE

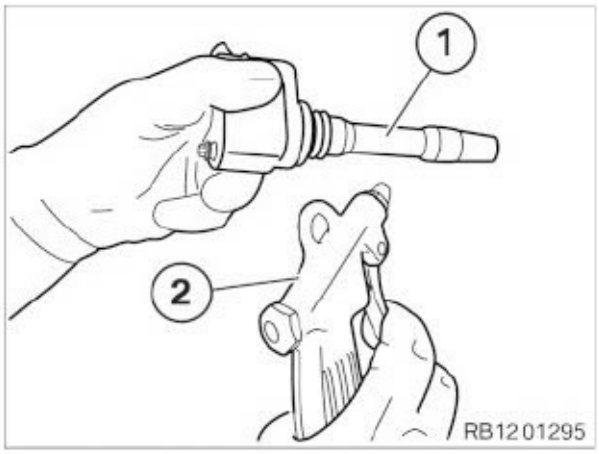
The description is for one component only. The procedure is identical for all further components.



- Unlock the connector fastener (2) of the ignition coil and disconnect the connector (1).
- Ensure that cables are not crushed or damaged.
- Repair damaged cables.
- Slowly pull the ignition coil (3) up and take out without jerking it.

  The silicone hose may fracture as a result of pulling out the ignition coil (3) with jerking movements.

- After removing the ignition coils: Blow off the silicone hose (1) of the ignition coils with an air gun (2).



The ignition coils must be free from oil, fuel residue and coolant residue.

◄

▸ **Remove the spark plugs of cylinder bank 2**

⚠ WARNING

Hot surfaces.

Risk of burning!

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

⚠ CAUTION

Swirling dirt particles caused by compressed air.

Danger of injury!

- Collect dirt particles, e.g. when blowing out, use cloth to do so.
- Wear safety goggles.

i TECHNICAL INFORMATION

Clean spark plug slot with compressed air.

The spark plug shaft must be cleaned using compressed air after having removed the ignition coils and before removing the spark plugs. After having removed the spark plugs, once again check the sealing surface for contamination and (if necessary) clean using a moist cloth or clean using compressed air.

Deposits that are not removed according to instructions may enter the combustion chamber and lead to uncontrolled combustion. Remaining deposits on the spark plug sealing surfaces may lead to leaks and the spark plugs may come loose during engine operation.

Spark plug threads must not be greased or oiled. Insufficiently tightened spark plugs may cause leaks and the sparks plugs may come loose during engine operation.

NOTICE

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

- Unscrew the spark plugs with the special tool **0 495 560 (12 1 220)** and an extension with joint.

  Flexible ratchet extensions must always be used. If rigid mounting tools are used, there is a risk of insulator breakages.

  Also, do not use a variable plug connection with locking capability as this poses a risk of insulator breakage.

- Unscrew the spark plugs with the special tool **0 495 560 (12 1 220)** and an extension with joint.

◀

▸ Install spark plugs of cylinder bank 2

NOTICE

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

- Insert spark plug (1) into special tool **0 496 065 (12 1 230)**.

TECHNICAL INFORMATION

Do not drop spark plug into spark plug shaft! This can lead to a reduction of the electrode gap and can thus impair smooth running of the engine, especially in idle position.

- Make sure the spark plug does not fall into the spark plug shaft.

NOTICE

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

- Unscrew the spark plugs with the special tool **0 495 560 (12 1 220)** and an extension with joint.

  Flexible ratchet extensions must always be used. If rigid mounting tools are used, there is a risk of insulator breakages.

  Also, do not use a variable plug connection with locking capability as this poses a risk of insulator breakage.

- Unscrew the spark plugs with the special tool **0 495 560 (12 1 220)** and an extension with joint.

◀

▸ Install spark plugs of cylinder bank 2

NOTICE

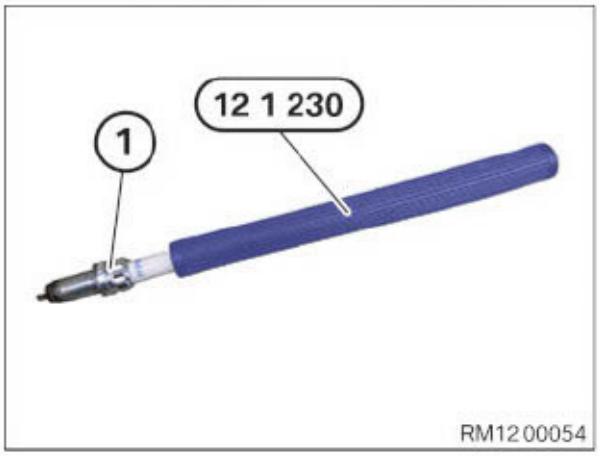
The description is for one component only. The procedure is identical for all further components.

- Insert spark plug (1) into special tool **0 496 065 (12 1 230)**.

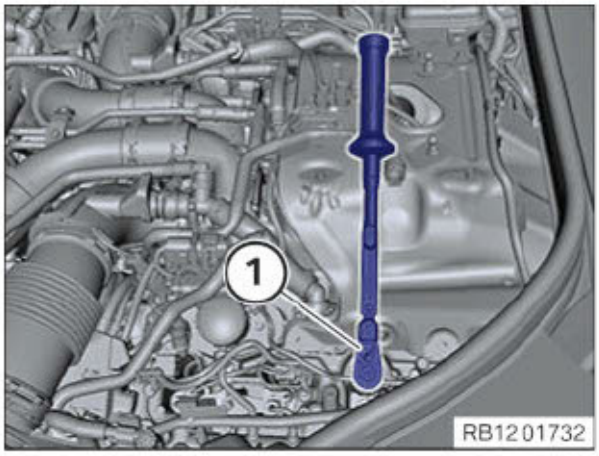
TECHNICAL INFORMATION

Do not drop spark plug into spark plug shaft! This can lead to a reduction of the electrode gap and can thus impair smooth running of the engine, especially in idle position.

- Make sure the spark plug does not fall into the spark plug shaft.



- Screw the spark plugs into the engine hand-tight with special tool **0 496 065 (12 1 230)**.



i TECHNICAL INFORMATION

Exclusively swivelling extensions may be used for the reversible ratchet. Rigid mounting tool and variable plug connections with rigid option may not be used; there is a risk that the insulator breaks.

- Tighten spark plugs with a torque wrench, the special tool **0 496 065 (12 1 230)** and an extension with joint.

Spark plugs			
M12x1.25		Tightening torque	23 Nm

◄

▸ Install the ignition coils of cylinder bank 2

RISK OF DAMAGE

Damage to the ignition coil.

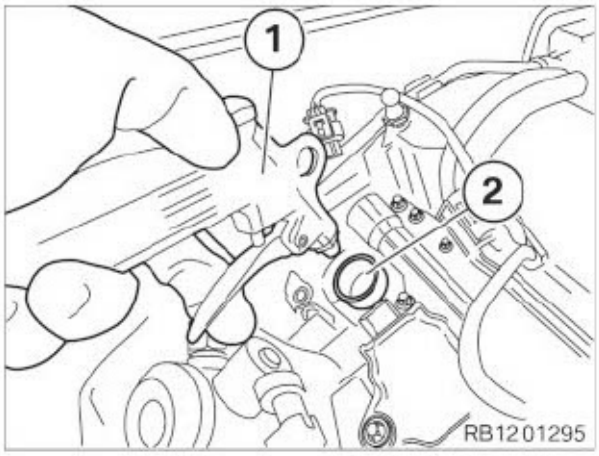
The silicone hose of the ignition coil must not be contaminated by fuel as this can lead to failure of the ignition coil.

- 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.

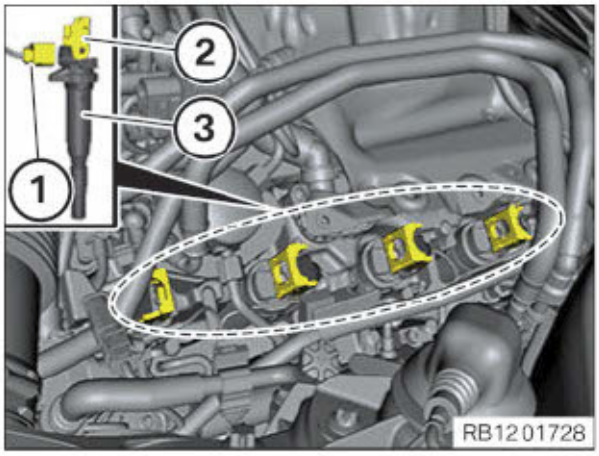
NOTICE

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

- Before installing the ignition coils: Blow the spark plug shafts (2) out with an air gun (1).



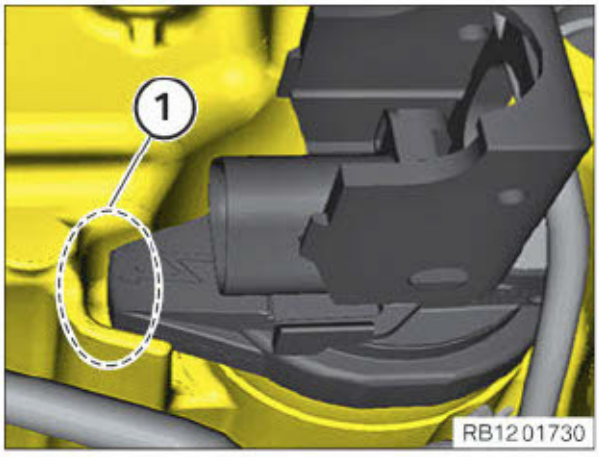
The spark plug shafts must be free from oil, fuel residue and coolant residue.



- Position the ignition coil and gently push it to the limit position, if necessary by twisting it back and forth slightly.
- Push connector (1) onto the ignition coil with the connector fastener (2) open.
- Carefully fold together the connector fastener (2).

  When closing the locking lever, the connector (1) must rest against the counter-piece nearly gap-free. In the process, the crank webs of the locking lever are positioned inside of the counter piece.
- Ensure that cables are not crushed or damaged.

  The connector fastener must snap into place without great effort.
- Repair damaged cables.



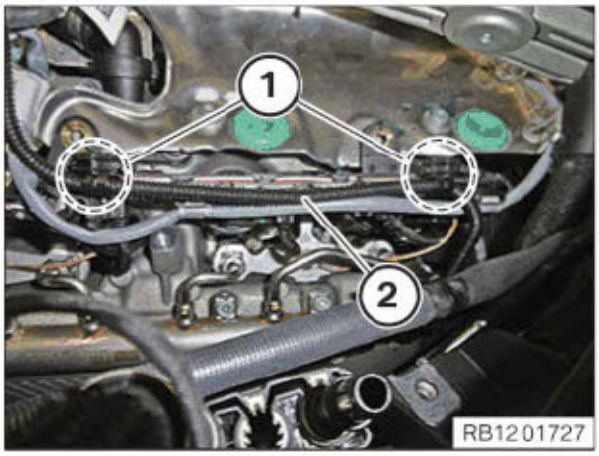
- Check the anti-twist lock (1).

  The rubber seal of the ignition coil must completely enclose the opening for the spark plug on the cylinder head cover.

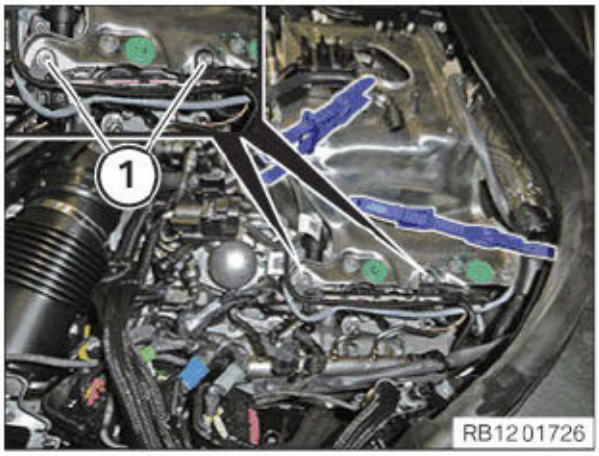
◀

POSTPROCESSES

11–Installing the cable duct in bank 2



- Clip in the wiring harness (2) into the clamps (1).

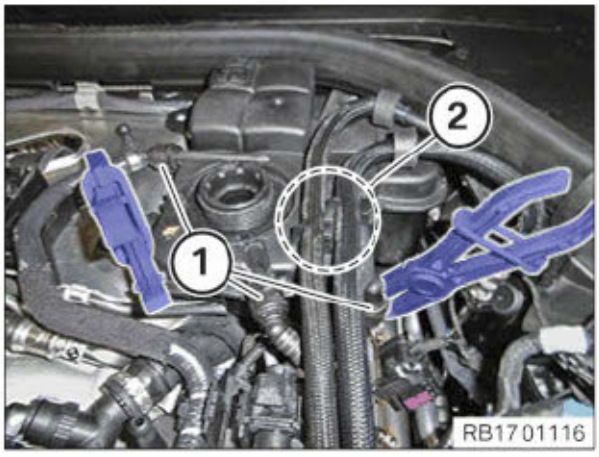


- Position the cable duct.
- Tighten the screws (1).

Cable channel

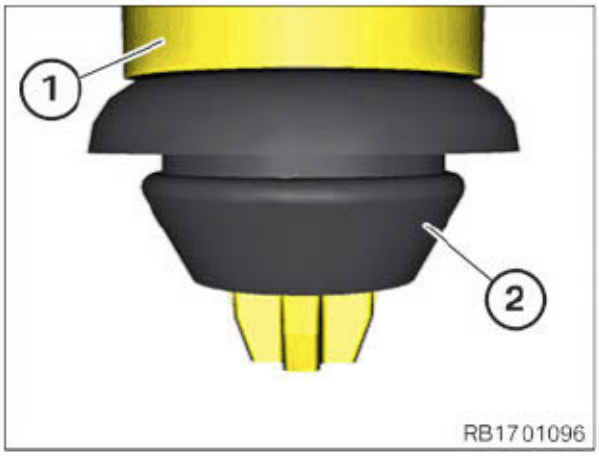
M6x16 screw		Tightening torque	10 Nm

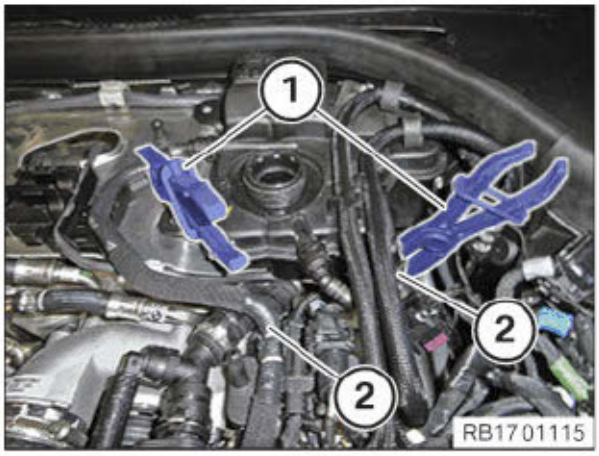
12–Installing coolant expansion tank



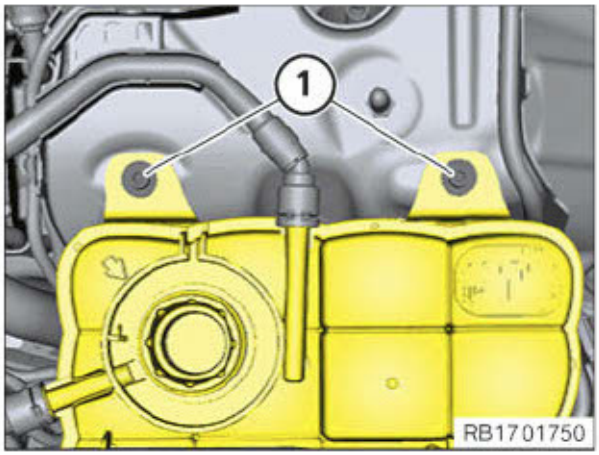
- Connect and lock the coolant lines (1) to the coolant expansion tank .

  The coolant lines (1) must engage audibly.
- Position and engage hose pipes in the area (2).
- Thread in and position coolant expansion tank (1) downwards in the decoupling elements (2).





- Remove the clamping pliers (1) from the coolant lines (2).
- Top up the coolant to the **maximum mark**.

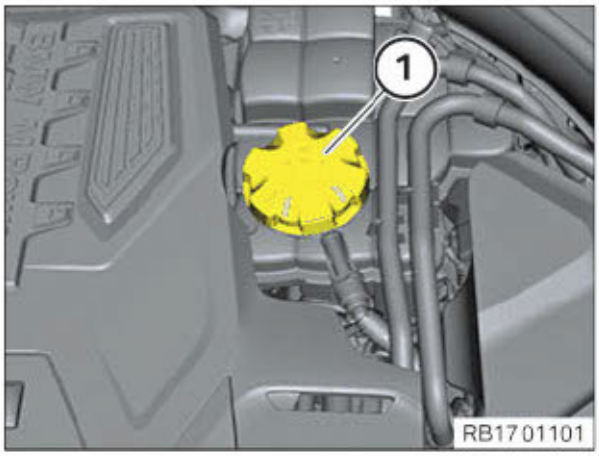


- Tighten the screws (1).

Coolant expansion tank

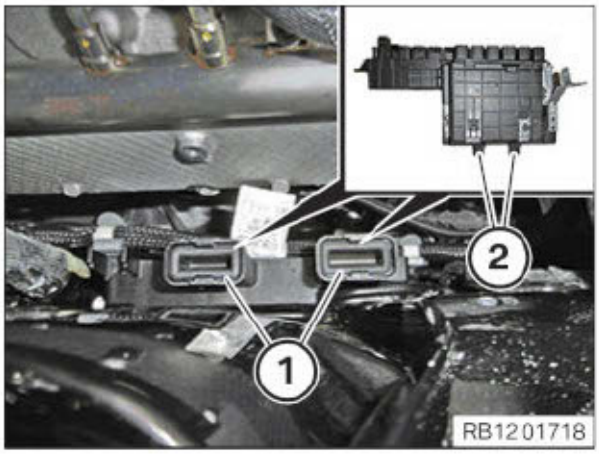
M6x20 screw		Tightening torque	11 Nm

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



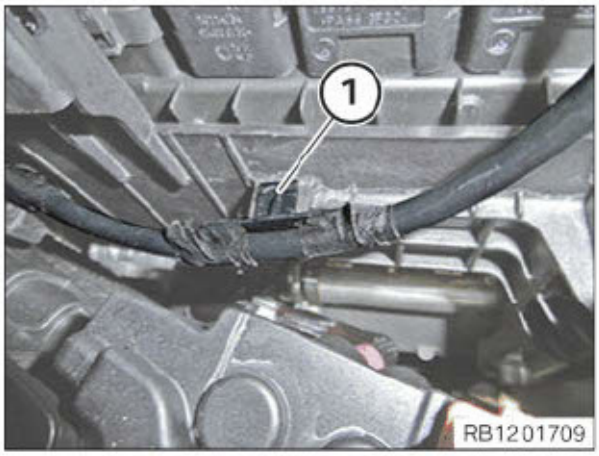
13–Installing the control unit holder for cylinders 1 to 4

- Insert control unit holders (1) with the control units and position.



- Make sure that centering pins (2) are in rubber mounts (1).

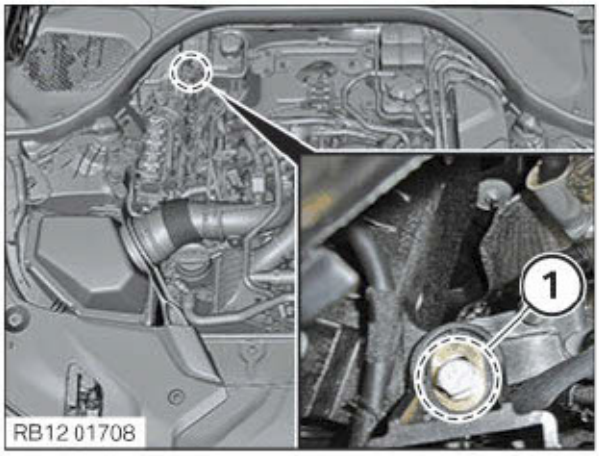
- Engage the cable clip (1).



- Connect connectors (1) and lock.

- Connect connectors (1) and lock.

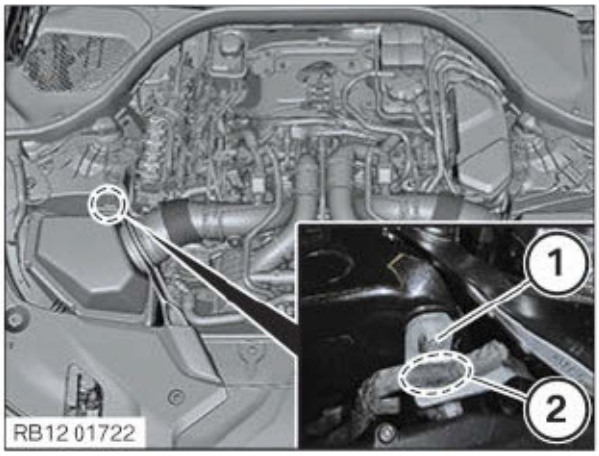
- Engage the wires and connectors (1) on the adapter plate.



- Tighten down screw (1).

DME control unit holder

Screw		Tightening torque	8 Nm



- Tighten down screw (1).

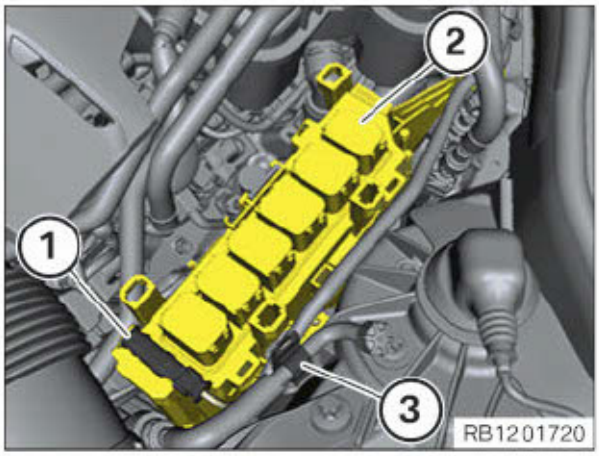
DME control unit holder

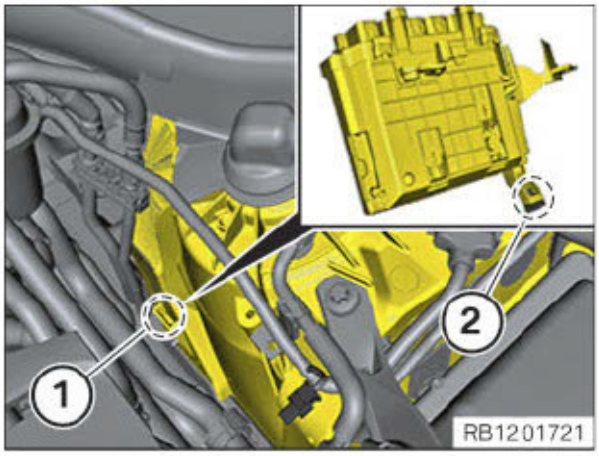
Screw		Tightening torque	8 Nm

- Engage the cable clip (2).

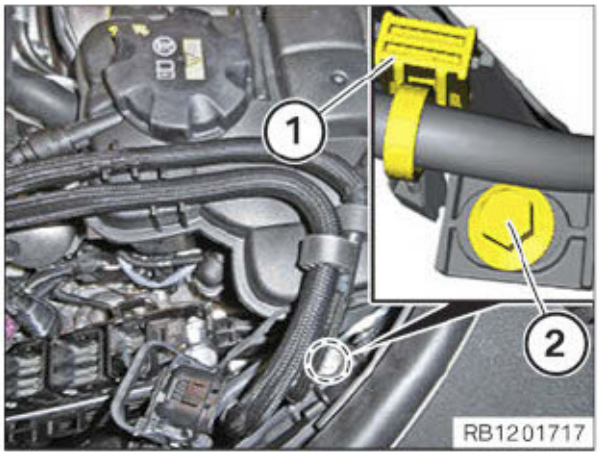
14–Install holder of the DME control unit for cylinders 5 to 8

- Carefully press the refrigerant line bracket (3) to one side.
- Thread in and position holder with the DME control unit of cylinders 5 to 8 (2).
- Engage the connector holder (1).





- Make sure the centering pin (2) is located in the tab (1) at the left-hand spring support.



- Engage the cable clip (1).
- Tighten down screw (2).

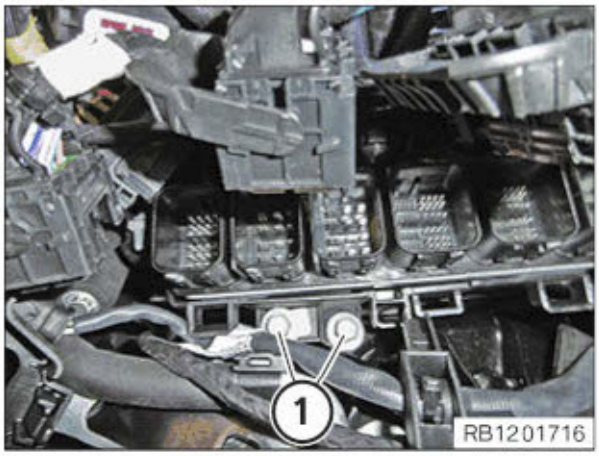
DME control unit holder

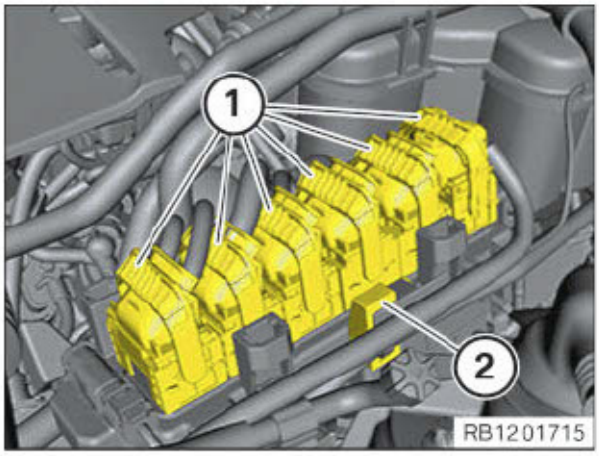
Screw		Tightening torque	8 Nm

- Tighten the screws (1).

DME control unit holder

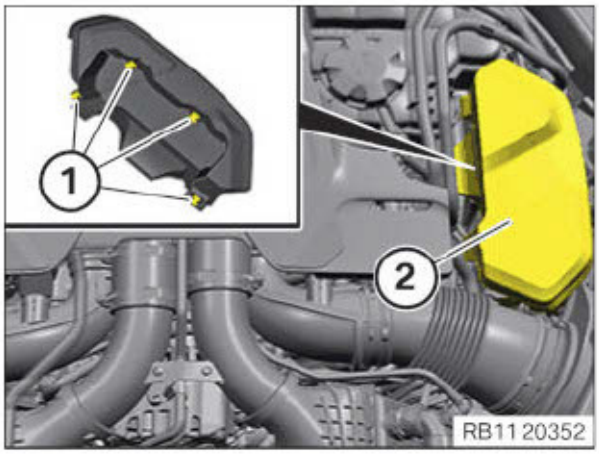
Screw		Tightening torque	8 Nm





- Connect connectors (1) and lock.
- Engage the cable clip (2) with the adapter plate.

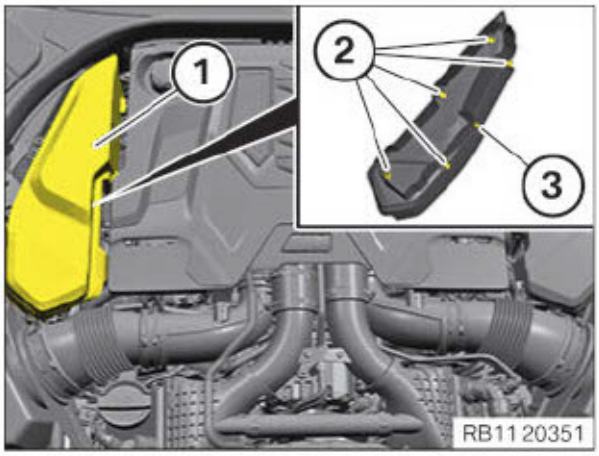
15–Installing the cover of slave DME control unit



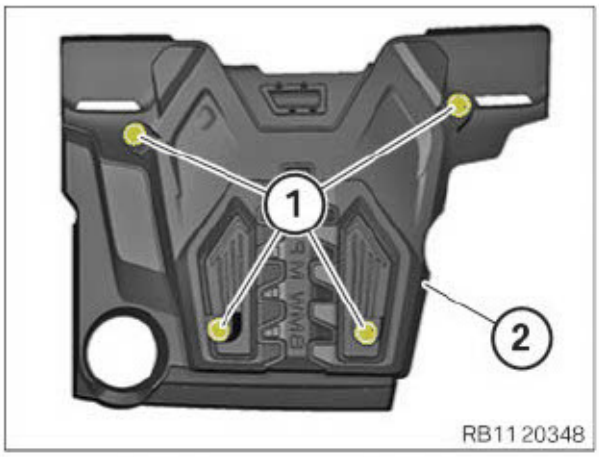
- Position the cover of slave DME control unit (2).
- Engage cover of the slave DME control unit (2) downward into carrier plate of the DME with the clamps (1).

16–Install the cover of the master DME control unit

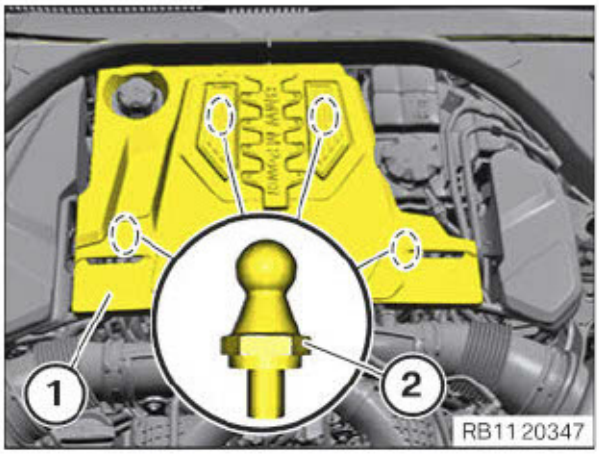
- Position the cover of the master DME control unit (1).
- Engage the cover of the master DME control unit (1) downward with the clamps (2) and the guide pins (3) in the carrier plate of the DME.



17–Install acoustic cover



- Make sure all rubber mounts (1) are correctly installed in the acoustic cover (2).

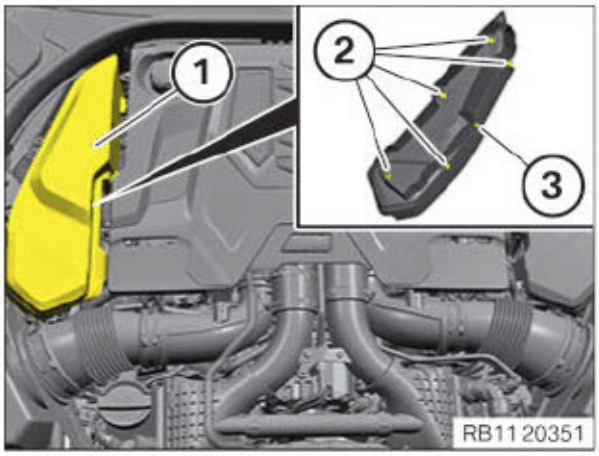


- Position the acoustic cover (1).
- Clip in the acoustic cover (1) toward the bottom at the latch mechanisms (2).

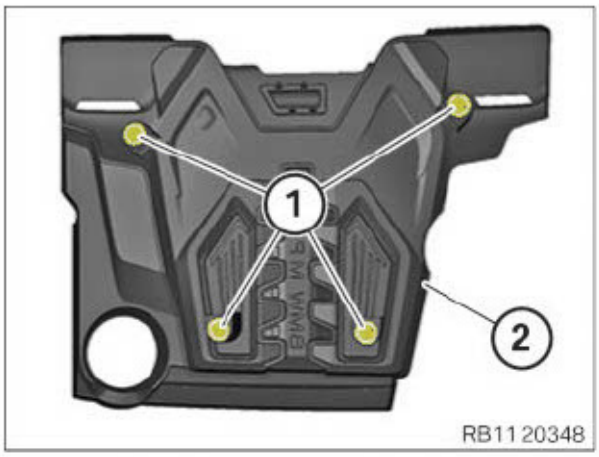
18–Disconnecting all battery earth leads

Additional information is available.

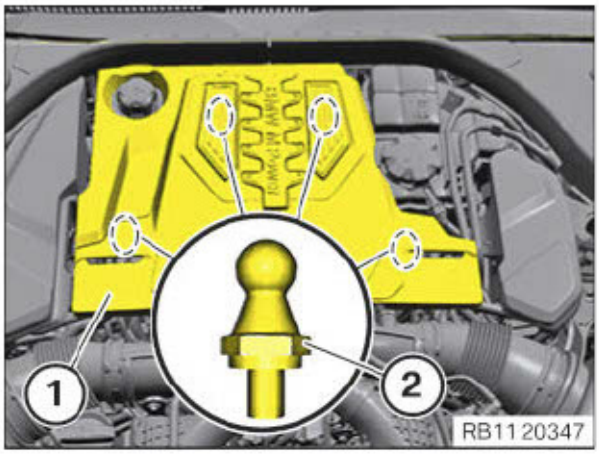
- See additional information.



17–Install acoustic cover



- Make sure all rubber mounts (1) are correctly installed in the acoustic cover (2).



- Position the acoustic cover (1).
- Clip in the acoustic cover (1) toward the bottom at the latch mechanisms (2).

18–Disconnecting all battery earth leads

Additional information is available.

- See additional information.