11 00 ... Handling components after flood damage

Flood damage can occur if the permissible fording depth of a vehicle is exceeded. Ingress of water can cause damage to the engine (water shock) or components.

Because dirt particles generally enter into the component with the water (e.g. starter motor, wiring harness), the components need to be thoroughly inspected.

Residual moisture in the components leads to corrosion (increased contact resistance in the component), which can lead to a component failure at a later time.

If water ingress into the electrical components cannot be ruled out, it is recommended to replace the component to ensure correct functioning through the vehicle lifetime.

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61 00 ... Information on removing, connecting and changing the battery

Observe safety informations for handling vehicle battery.

Disconnecting the battery

Before disconnecting battery:

Turn off the ignition and other electrical loads/consumers to prevent sparking when reconnecting.

Note:

If the ignition is not turned off when the battery is disconnected, fault memories may be set in some control units.

Important!

- There is a danger of mixing up battery cables: If the battery positive and negative leads are the same colour and you are in doubt, follow the polarity to the battery, then mark and cover the leads.
- The on-board computer and clock may lose your data.

General notes on disconnecting battery:

- Do not disconnect battery leads and leads from alternator and starter motor while engine is running.
- Disconnect terminal of battery earth lead from the battery. Cover battery negative terminal(s) and secure.
- Disconnect both battery earth leads in versions with an auxiliary battery. Cover battery negative terminal(s) and secure.
- When work is carried out on the electrical system, faults may be caused in the fault memories of some control units when the battery is connected.
- When installing battery terminal: Tightening torque 61 21 1AZ.

AGM battery only:

- On vehicles with IBS at negative battery terminal:
  Do not under any circumstances pull/lever off pole shoes by force.
  Do not under any circumstances release the hexagon socket screw of the IBS.

Connected battery

After connecting battery:

Important!

The scope of application of some systems may be restricted after an open circuit.

Personal Profiles may also be lost.

Settings or activations must be carried out, depending on the equipment specification.

For example:

- Activate slide/tilt sunroof, if necessary
- Activate power window, if necessary

Refer to the diagnosis system for further vehicle-specific information.

Battery replacement

A vehicle battery is constructed for the installation location and the individual power requirements of the particular vehicle. These individual power requirements depend on the motorisation and different types of

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equipment. The individually assigned vehicle battery is the ideal compromise between the power requirements of the vehicle electrical system and the weight and service life of the vehicle battery.

Vehicles with the automatic engine start-stop function or particular engine types and optional equipment are equipped with a special vehicle battery (AGM battery), since only this battery type can provide elevated power requirements over the extended service life. Installing a different vehicle battery can cause problems with vehicle electronics, can reduce functions or can cause leakage of battery acid.

In the event of an accident where the airbags are deployed in vehicles with a vehicle battery in the luggage compartment, the electrical connection between the vehicle battery and the trigger is automatically disconnected through pyrotechnics. This prevents possible short-circuiting.

Proper operation of all of these safety and convenience functions requires a battery that conforms with specifications and that is properly registered in vehicles with energy management systems (IBS, power module).

Vehicles with energy management systems (IBS, power module): Register battery replacement.

The vehicle electrical system is informed about the vehicle battery characteristic data, such as type, size, age and current power capacity. Therefore, there will always be only one work scope provided that is permitted by the current status of information.

If performance readiness drops below a defined minimum, a Check Control message will be generated to advise the driver that the battery must be replaced.

When installing a new vehicle battery, the battery must be registered and thus must also be registered with the vehicle electrical system.

Note:

> Only this registration/logon will ensure that the corresponding Check Control message will go out again.

Diagnosis system:

Registering the battery replacement:

- Service functions
- Body
- Voltage supply
- Register battery replacement

When retrofitting, a more powerful battery may be used. Standard batteries may always be replaced by AGM batteries with the same specifications.

When installing a battery of a different size or a different battery type, this change in vehicle data must be programmed into the vehicle data in accordance with specifications.

Programming system:

- Battery retrofitting

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12 00 ... Instructions for removal and replacement of control units

Important!

- Disconnecting the vehicle battery will cancel the fault memories of control units. Consequently, before disconnecting the car's battery, always interrogate the fault memories. Investigate stored faults and, once any faults have been remedied, cancel the fault memory.
- Control unit plugs should only ever be connected and disconnected while the ignition is turned off.
- The removal and installation of components, relays, fuses etc. can cause faults to be stored in fault memories capable of self diagnosis. Always interrogate the fault memories after completing work on the electrical system.
- Investigate stored faults and, once any faults have been remedied, cancel the fault memory.
- If necessary, initialise power window regulator Initialise power window regulator

On replacement of the DME/DDE control unit note the following:

- In every case use the diagnosis system to read out the hardware/software version of the corresponding control unit.
  Comply with the diagnosis system instructions for the encoding and programming work operations.
  On vehicles with an electronic immobiliser, comply with the diagnosis system instructions.
- In every control unit certain mean values are stored that are the basic values. The control unit receives different input values according to the engine condition. The teachable system compares the input values against the stored basic values and then forms the associated control commands. The control commands are forwarded to the corresponding actuators.
- When the DME control unit is de-energized for a long period (over one hour), the teachable system then loses the stored values. When a deleted control unit is returned to service or a new control unit is installed, the teachable system itself must read in and store the input value of the associated engine as new basic values.
- This process may cause uneven idle and faults in coasting mode after starting. Depending on the engine characteristics, it may take some time until all values have been compared with the engine condition.
- Therefore, comply with the following procedure before replacement or reinstallation of a DME/ DDE control unit is carried out:
  1. If possible, bring the engine up to its operating temperature prior to replacement of the control unit.
  2. Change control units and drive the vehicle with changing engine speeds.

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12 00 ... Instructions for working on the ignition system

Caution!

Always switch off ignition before working on ignition system.

Use only test leads which have been approved and belong to these testing instruments (e.g. DIS Tester).

Comply with operating instructions of the respective testing instrument used.

Comply with the country-specific safety regulations.

Never touch components under current with engine running!

Comply with instructions of DIS tester.

Do not connect any suppression capacitors or inspection lamps to terminal 1 on the ignition coil.

Terminal 1 of ignition coil must not be connected to ground or battery positive lead.

If an alarm system is subsequently installed, lead of terminal 1 must not be used for start prevention.

When working on ignition system, always disconnect supply leads to ignition coils.

High tension! - High tension! Important!

Hazardous voltages occur at:

- Ignition lead
- spark-plug connectors
- spark plugs
- Ignition coil (high voltage at terminal 4 is approx. 40 kV)
- Lead of terminal 1 from ignition coil to DME control unit (high voltage approx. 350 V)

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61 00 ... Notes on handling wiring harnesses and cables



The following applies in general:

To avoid damage, observe the following instructions:

- Avoid compressive and tensile loads
- To ensure professional repairs, perform repair work only with BMW-approved or recommended special tools and spare parts
- Make sure cables are laid without kinks or abrasions
- Ensure non-contacting routing at sharp-edged body parts; use edge protection if necessary
- Secure additionally laid cables/leads with cable ties

The following additionally applies:

Shielded lines

Interference radiation and interference resistance can lead to neutral zones at contact points in the shielding. Consequently, distinctions have to be drawn between the following types:

Coaxial lines

- Shielded coaxial cables RTK031 may only be repaired with a special crimping tool.
- For aerial lines only the bushing contact may be repaired.
- RG174 Lines and the bushing contact may not be repaired.

CVBS lines

- CVBS cables may not be repaired.
- CVBS cables must be replaced in their entirety.

HSD lines

- HSD cables may not be repaired.
- HSD cables must be replaced in their entirety.

Optical fibre cable:

Note:
Fibre-optic cables are coloured differently as follows:

- Green = **MOST** (**M**edia **O**riented **S**ystems **T**ransport) optical fibres
- Yellow = **ISIS** (**I**ntelligent **S**afety and **I**ntegration **S**ystem) optical fibres
- Orange=repair fibre-optic cables

Attention!

- Optical fibres are permitted to show only one junction point (bridge). Replace optical fibres if necessary
- Smallest permissible bending radius is 25 mm
- Avoid effects of heat ≥ 85 °

Treating cables and fibre-optic cables

FlexRay (twisted cables):

It is possible to repair the FlexRay. In the event of damage, the cables can be joined with conventional butt connectors and heat-shrink tubing.

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Note:

- FlexRay lines may only reveal one separation point (bride); renew complete line if necessary.
- If possible, maintain twisted cable after repair.
- After repairs, twist cables as close as possible to the connector/separation point.
- Twisting must be as symmetrical as possible.

Airbag lines:

Repairing airbag cables

Ribbon cables:

Repairing ribbon cables

Replacing wiring harnesses

Repair wiring harnesses mainly cover the full equipment of the vehicle. If certain optional equipment is not installed in the vehicle, note the following:

- If necessary, secure the remaining connectors.
- If necessary, seal the remaining connectors outside the vehicle interior, for example, with butyl tape in such a way that moisture ingress can be eliminated permanently.
- If necessary, repin the connector of the repair wiring harness.

Note:
Repair wiring harnesses can be equipped with an **additional socket housing** (30-pin, for example), **which was not provided on the previous vehicle-side wiring harness**. This socket housing also cannot be found in the wiring diagram.

Procedure

The separation point between the vehicle-side wiring harness and the repair wiring harness is located **in the vehicle interior** (in the footwell, for example):

- Cut the additional socket housing and connect the lines to the vehicle-side wiring harness using a butt connector.
- Alternatively, a suitable pin housing can be fitted on the vehicle-side wiring harness and connected to the additional socket housing.

  However, this is permitted only if the following conditions are met:

  - Carpets must not protrude visibly or become deformed due to the installation of the additional plug connection.
  - It must be possible to install the adjacent components (for example, trims, trim panels, etc.) correctly after installing the additional plug connection.
  - All the attachment points of the adjacent components (for example, trims, trim panels, etc.) must engage correctly.
  - There must be no rattling noise due to the installation of the additional plug connection.
  - The additional plug connection must not damage the adjacent components/wiring harnesses, etc..

The separation point between the vehicle-side wiring harness and the repair wiring harness is located **outside the vehicle interior** (in the

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wheel arch, for example):

- Cut the additional socket housing and connect the lines to the vehicle-side wiring harness using a butt connector.
- **Using the additional socket housing is not permitted with a separation point outside the vehicle interior.**

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12 00 ... Notes/information on start assistance (jump starting)

Do not start the engine with help of starting sprays.

Preparation:

Conform with the following when starting the engine with a jump starting cable.

- Ensure that the jump starting cable wires are of appropriate cross-section size.
- Only use fuse-protected jump starting cables.
- Check whether the current-supplying battery has 12 V voltage.
- If the engine is started from the battery of another vehicle, ensure that there is no contact between the bodies of both vehicles.

Important!

> Never touch electrically live ignition system components: high voltage - danger of injury!

If the battery in the vehicle supplying power is weak, start the engine of this vehicle and let it run at idling speed.

Operation:

It is essential to conform to the procedures so as to avoid injury to persons or damage to parts.

- Automatic transmission: select drive position ”P”, apply parking brake.
- Manual transmission: move gear lever to neutral position, apply parking brake.
- Ensure that the jump leads cannot get caught in rotating parts, e.g. fan.
- First connect both positive poles of the batteries with one jump starting cable (red).
- Use the battery positive terminal in the engine compartment for vehicles with the battery in the luggage compartment.
- Then use the second jump starting cable (black) to connect the negative post of the current-supplying battery with the earth/ground point (not the negative pole or the body) of the vehicle to be started.

Important!

> Do not connect the second jump starting cable (black) with the negative pole of the battery in the vehicle to be started. Produced gas could be ignited by sparks.

Risk of explosion!

After the engine of the vehicle to be started has fired, first disconnect the jump starting cable between the negative pole and the earth/ground point. Then remove the starting cable from the positive poles.

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



Warning!

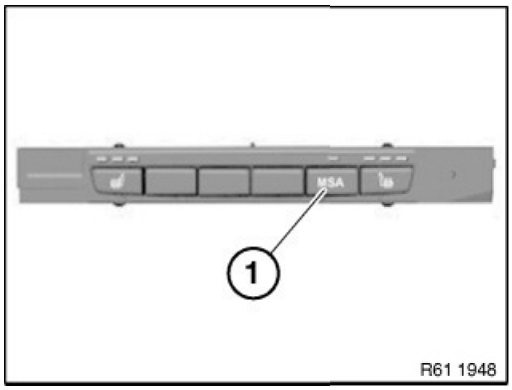
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

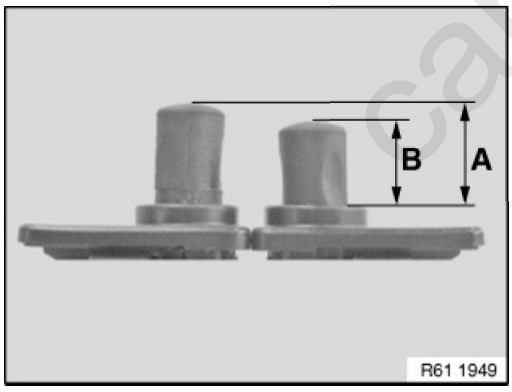
Observe safety precautions when working on MSA vehicles.

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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61 00 ... Safety information on handling hybrid cars

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

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

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

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

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

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

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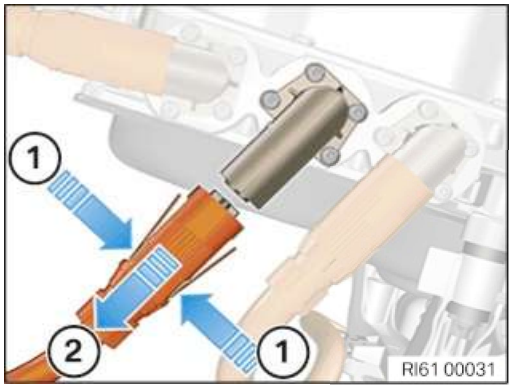
61 13 ... Unlocking and disconnecting various plug connections in electrical and hybrid vehicles



Attention!

Observe the following instructions for handling high-voltage plug connections:

- Damaged high-voltage plug connections must be replaced completely. Repair is not permitted.
- Dirt contamination must be removed before opening the plug connection.



Disconnect the Hirschmann high-voltage connector:

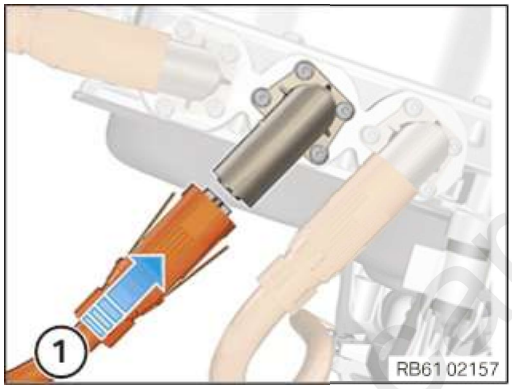
Press the lock (1) on the left and right on the connector in the direction of the arrow.

Pull off connector (2) in direction of arrow.

Attention!

Connector (2) is difficult to pull off.

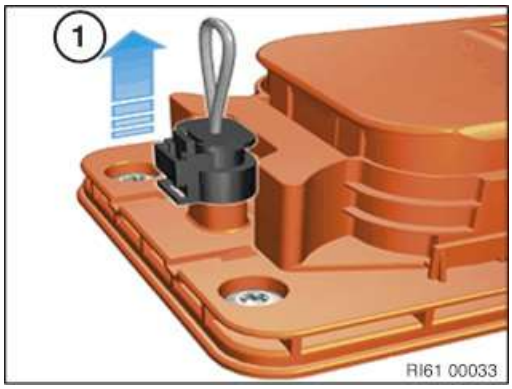
In the event of damage to high-voltage connector (2), the complete high-voltage cable must be replaced!



Connect the Hirschmann high-voltage connectors:

Slide the connector (1) on in the direction of the arrow.

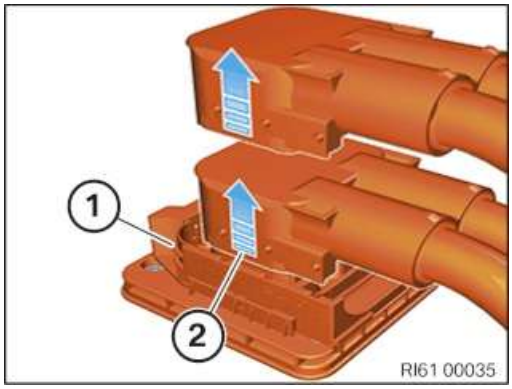
Note:
Connector (2) must lock audibly.



Disconnect the Kostal high-voltage connector:

Unlock and disconnect high-voltage interlock loop (1).

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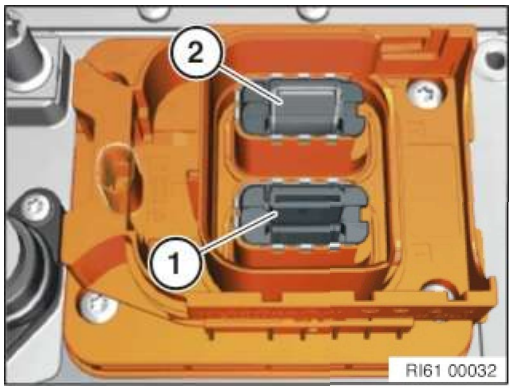
Push the lock (1) fully to the front.

Lift the connector (2) and remove it entirely.

Attention!

Plug connection (3) is difficult to pull off.

The connector (2) must be completely pulled off the opposite housing in one step. Damage may be caused to contact protection if connector is only partly pulled off and then closed again!



Check the Kostal high-voltage connector and connection for damage:

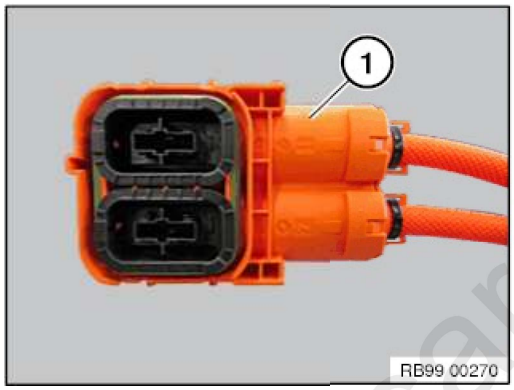
Check the touch protection for damage and correct positioning (1).

Warning!

Do not touch unprotected connector (2)!

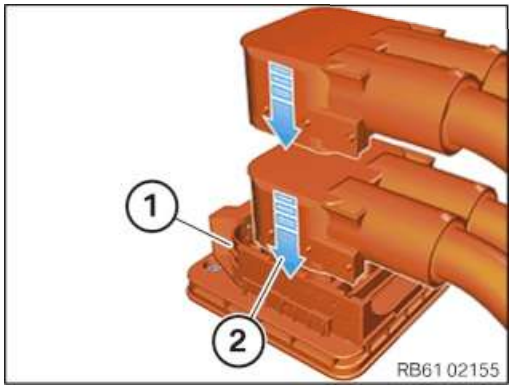
If the contact protection (1) has been pushed to the bottom (2), the high-voltage connector must be refitted.

If contact protection (1) remains in bottom position (2) after reinstallation, the contact protection is faulty and the component must be replaced!



Check the high-voltage connector (1) for damage.**Warning!**

In the event of damage to the high-voltage connector (1), the complete high-voltage cable must be replaced!



Connect the Kostal high-voltage connector:

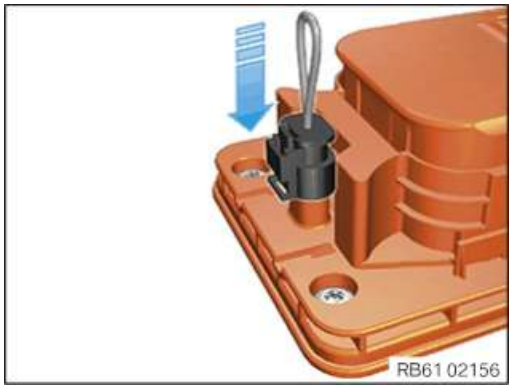
Connect the connector (2) in one single movement to the counter-housing.

Push the lock (1) fully to the rear.

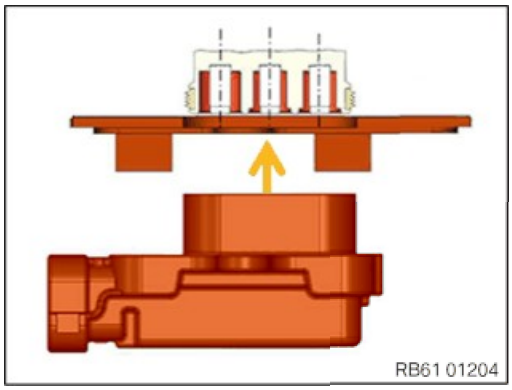
Attention!

Plug connection (3) must be correctly locked by lock (2), otherwise there is a risk of damage.

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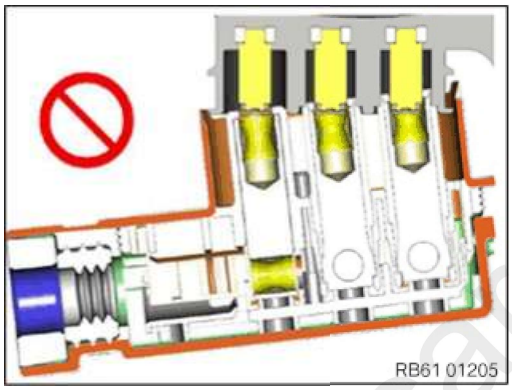


Connect the connector for the high-voltage interlock.



Three-phase high-voltage connector:

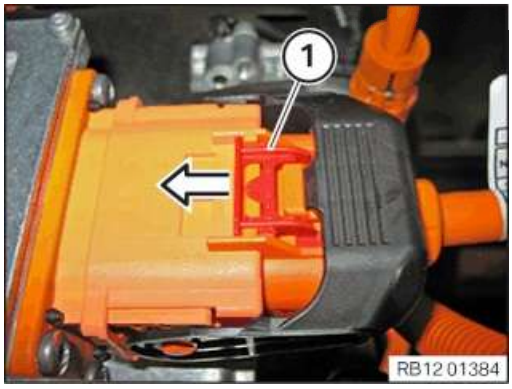
Connect and disconnect the connector straight.



Attention!

The system is designed to only offer limited protection against damage caused by connectors that are inserted at an angle.

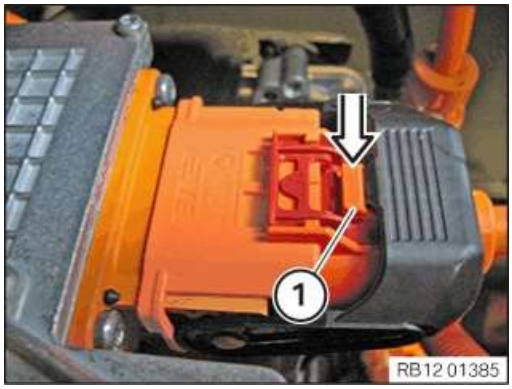
Increased tilted connections will increase the connecting force and the risk of danger.



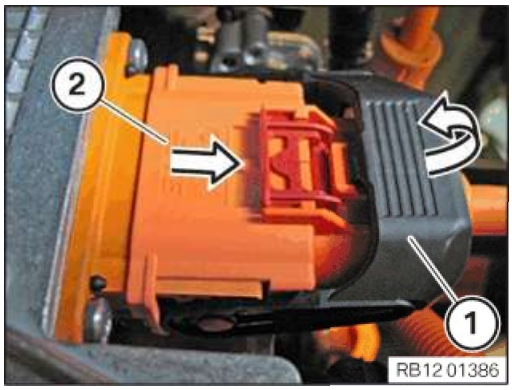
Disconnect the high-voltage connector from the high-voltage connection of the KLE:

Slide lock (1) in direction of arrow up to stop.

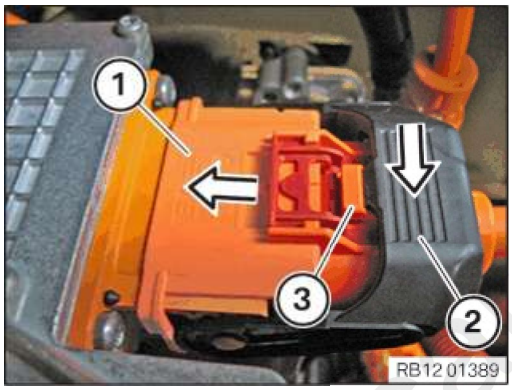
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Press lock (1).



Open the lock (1) completely and disconnect the connector (2).



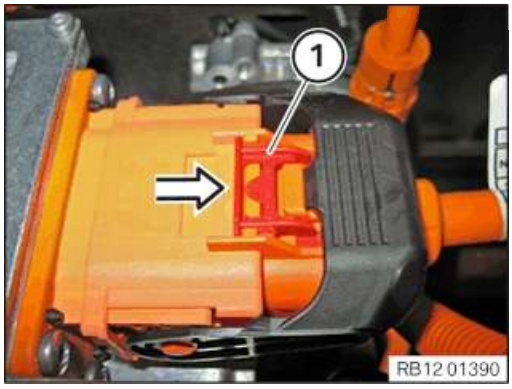
Connect the high-voltage connector to the high-voltage connection of the KLE:

Connect the connector (1) to the limit position and close the lock (2).

Attention!

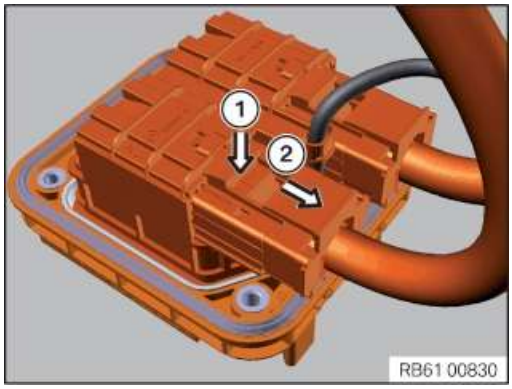
Lock (2) must snap audibly into place.

The retaining lug of the lock (2) must be positioned completely under the lock (2).



Slide the lock (1) on to the stop in the direction of the arrow.

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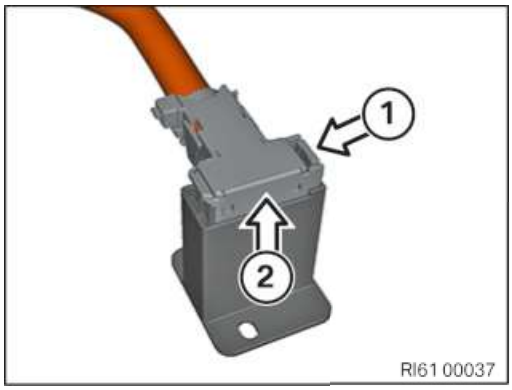
High-voltage connector on the high-voltage connection of the high-voltage battery unit:

Press down unlocking (1) in direction of arrow and pull off connector in direction of arrow (2).

Attention!

Contact protection is no longer provided in the event of a damaged connector housing.

In this case, contact technical support.



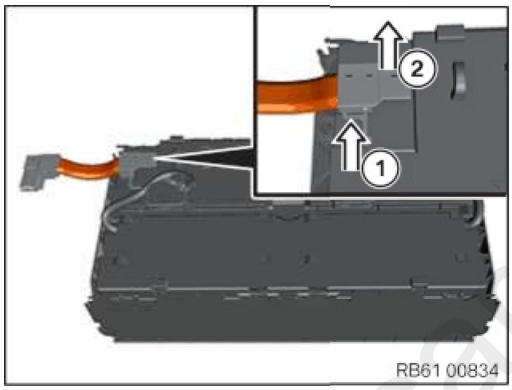
High-voltage connector on the cell module I01:

Press unlocking device (1) together and pull off connector upwards (2).

Attention!

Contact protection is no longer provided in the event of a damaged connector housing.

In this case, contact technical support.



High-voltage connector on the cell module (cell module connecting line):

Press unlocking (1) in direction of arrow and pull off connector in direction of arrow (2).

Attention!

Contact protection is no longer provided in the event of a damaged connector housing.

In this case, contact technical support.

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12 12 011 Removing and installing/renewing all spark plugs

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.

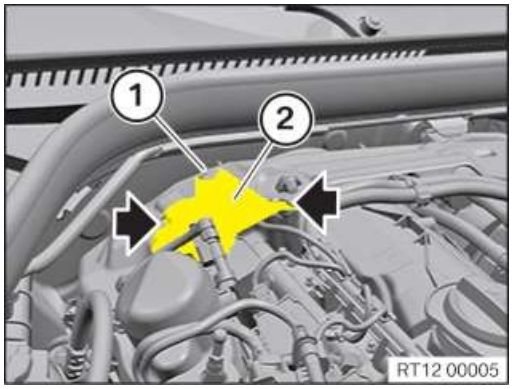
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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 – 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).

3 – Remove all ignition coils.

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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.

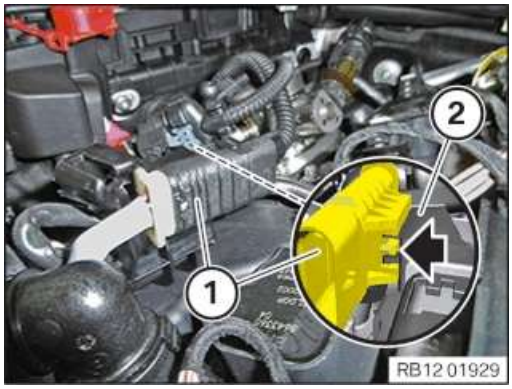
Damage to or destruction of electrical components.

- 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.

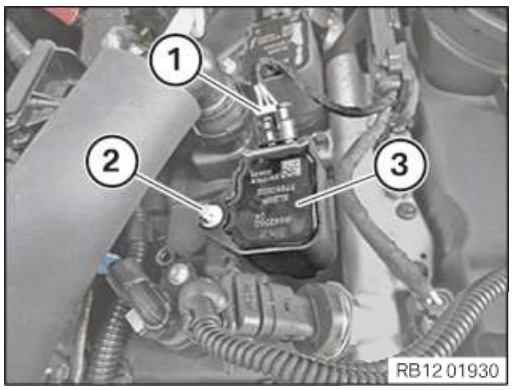


- Unlock plug connection (1) and disconnect.

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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).

MAIN WORK

4 – Removing all spark plugs

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.

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TECHNICAL INFORMATION

Clean spark plug slot with compressed air.

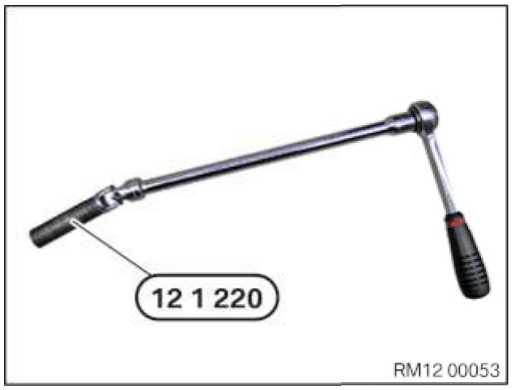
The spark plug shaft must be cleaned using compressed air after having removed the ignition coils and before removing the spark plugs. After having removed the spark plugs, once again check the sealing surface for contamination and (if necessary) clean using a moist cloth or clean using compressed air.

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.



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.

- Mount the special tool 0 495 560 (12 1 220) on a pivoting extension.

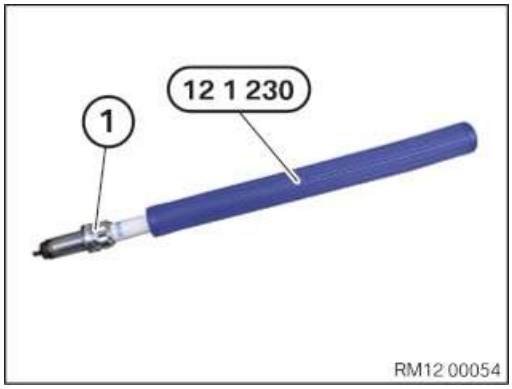


- Unscrew spark plugs with the special tool 0 495 560 (12 1 220) and a pivoting extension.

5 – Installing all spark plugs

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.

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



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 the spark plugs with the torque wrench, the special tool 0 495 560 (12 1 220) and a swivelling extension.

Spark plugs

M12x1.25		Tightening torque	23 Nm

POSTPROCESSES

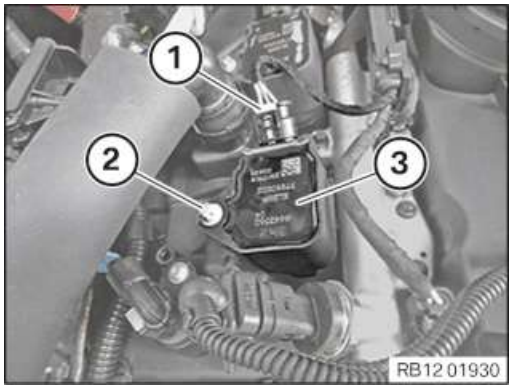
6 – Install all ignition coils

NOTICE

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

▶ **Install ignition coil.**

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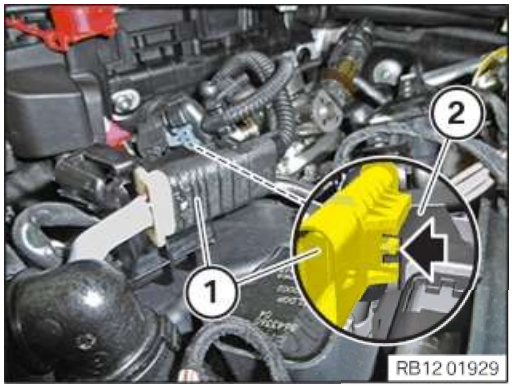
- Install ignition coil (3).
- Tighten down screw (2).

Ignition coil

Screw		Tightening torque	8 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



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

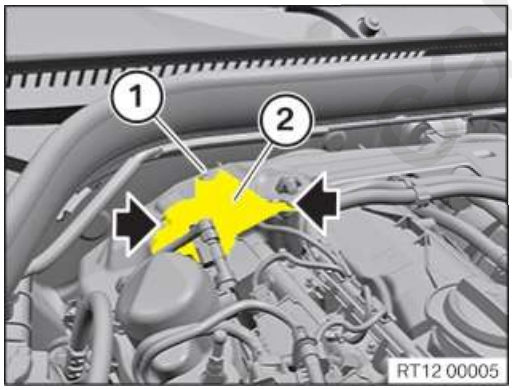
  The connector (1) must engage audibly.



- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

7 – 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).

8 – Install acoustic cover

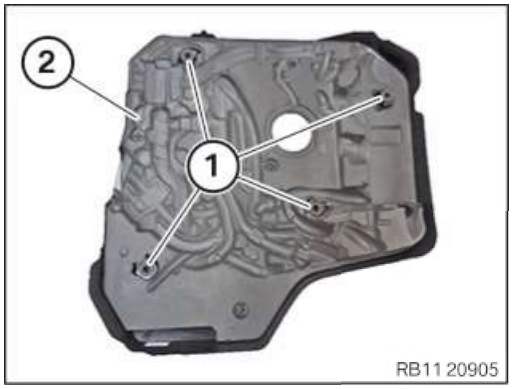
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RISK OF DAMAGE

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.

Additional Information

Overview of Tightening Torques

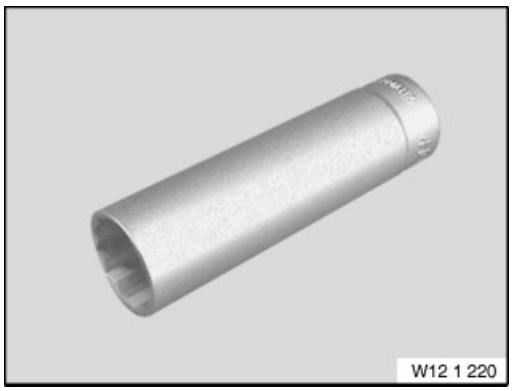
Spark plugs			Used in step 5
M12x1.25		Tightening torque	23 Nm

Ignition coil			Used in step 6
Screw		Tightening torque	8 Nm

Overview of Special Tools

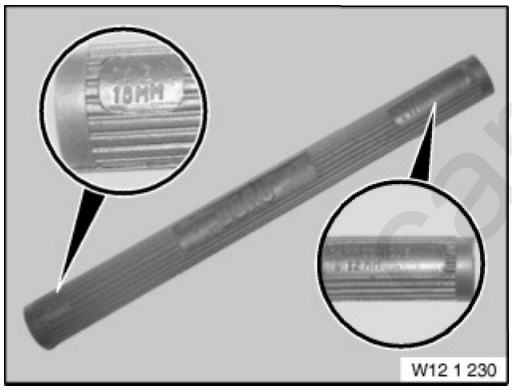
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0 495 560 (12 1 220) Socket



Common	Used in step 45
Usage	For removing and installing the spark plugs (WAF 14 bihexal).
Included in the tool or work	
Storage location	C18
Replaced by	
In connection with	
SI-Number	01 20 06 (299)

0 496 065 (12 1 230) Fitting aid



Common	Used in step 5
Usage	Fitting aid for spark plug installation. Original BERU ZMH 001 rubber hose 0 890 00 001.
Included in the tool or work	
Storage location	individual
Replaced by	
In connection with	
SI-Number	01 04 07 (352)

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	3

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12 13 511 Replacing an ignition coil

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.

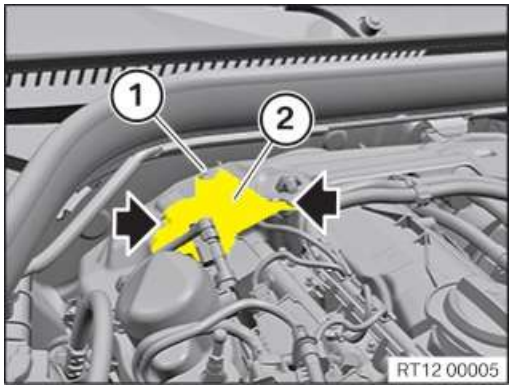
- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



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

2 – 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).

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3 – 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.

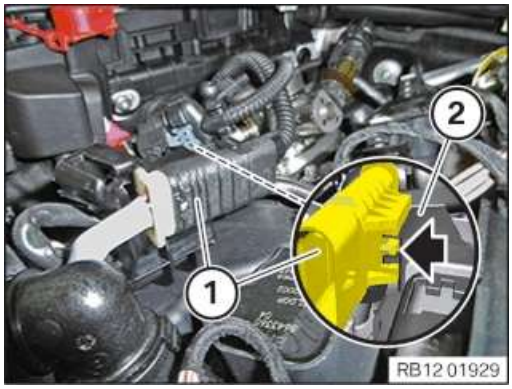
Damage to or destruction of electrical components.

- 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.

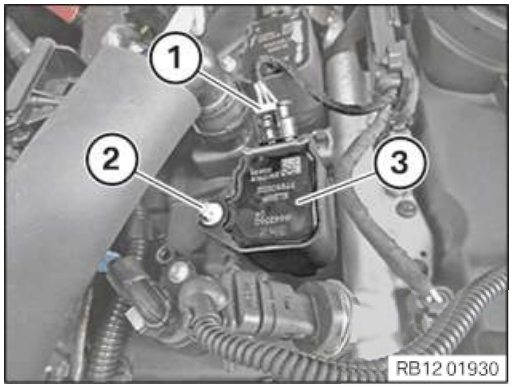


- Unlock plug connection (1) and disconnect.

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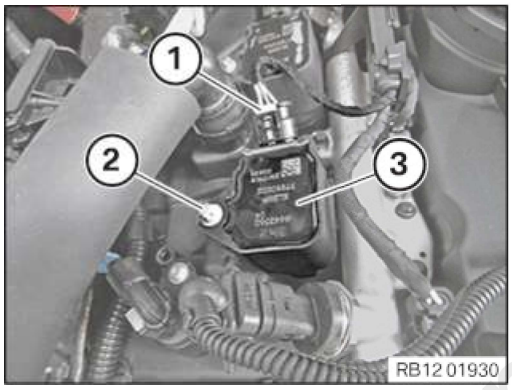


- Unlock connector (1) (arrow) and disconnect it from holder (2).



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

4 – Install ignition coil.



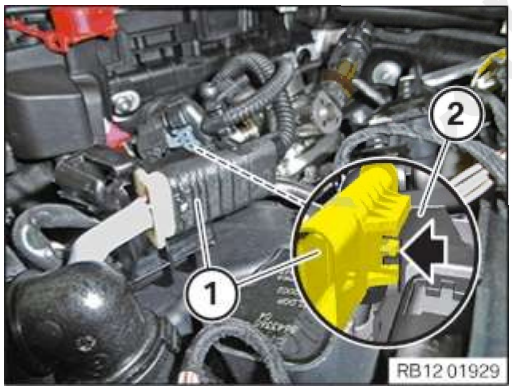
- Install ignition coil (3).
- Tighten down screw (2).

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.



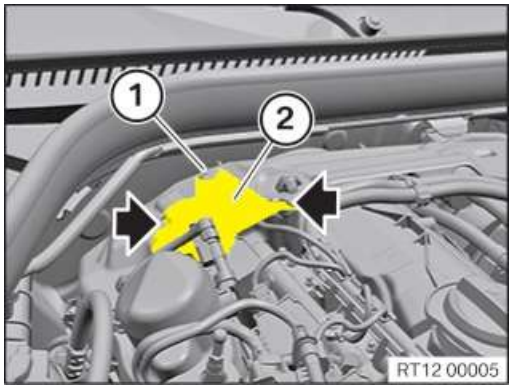
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

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5 – 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).

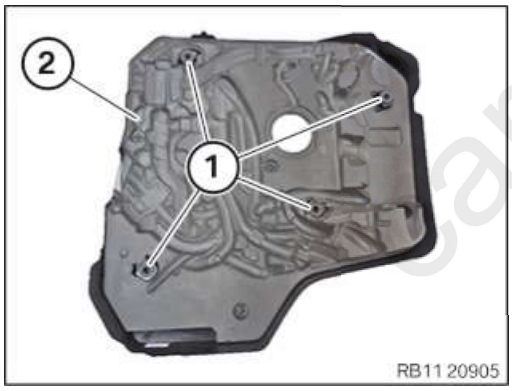
6 – Install acoustic cover

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.



- 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

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Overview of Tightening Torques

Ignition coil			Used in step 4
Screw		Tightening torque	8 Nm

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	3

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12 14 700 Encoding the control unit (DME/DDE)

Switch off ignition.



Connect diagnosis system.

Switch the ignition on.

Select "encoding" program.

Follow the instructions in the diagnosis system.

Adjust the following control units:

- EWS (electronic immobiliser)
- DME (Digital Motor Electronics) or
- DDE (Digital Diesel Electronics)

Follow Service Information "Diagnosis and Encoding" on the topic of encoding.

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12 14 705 Programming the control unit (DME/DDE)

Switch off ignition.



Connect diagnosis system.

Switch the ignition on.

Select "Programming".

Follow the instructions in the diagnosis system.

Adjust the following control units:

- EWS (electronic immobiliser)
- DME (Digital Motor Electronics) or
- DDE (Digital Diesel Electronics)

Follow Service Information "Diagnosis and Encoding" on the topic of programming.

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12 14 521 Replace crankshaft sensor

WARNING

Hot surfaces.

Risk of burning!

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

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.

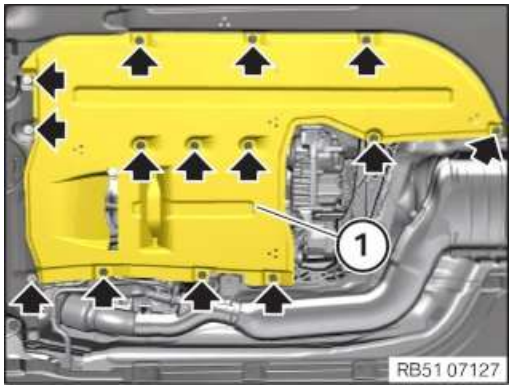
- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



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

2 – Remove rear underbody protection

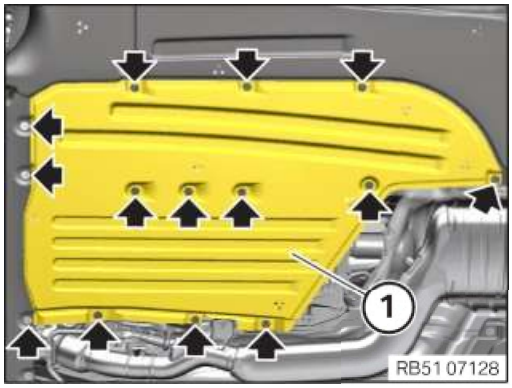
cardiagn.com



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

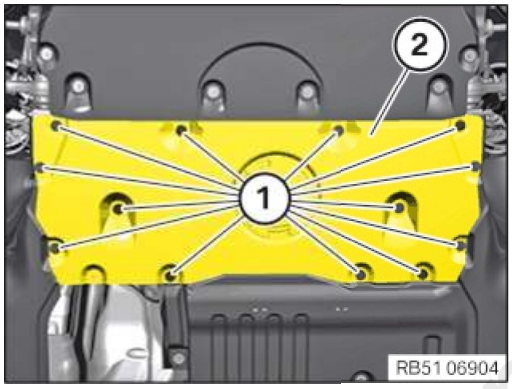


- **Version 2:**

  Remove screws (arrows).

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

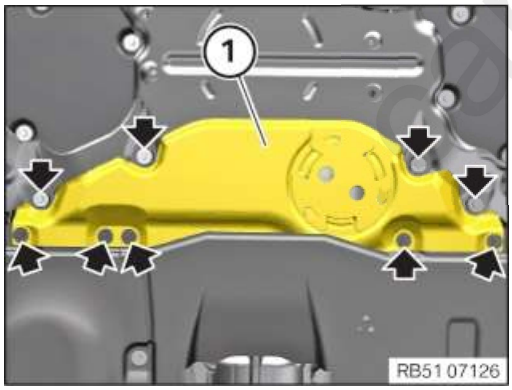
3 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .



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

  Remove screws (arrows).

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

MAIN WORK

4 – Removing the crankshaft sensor

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RISK OF DAMAGE

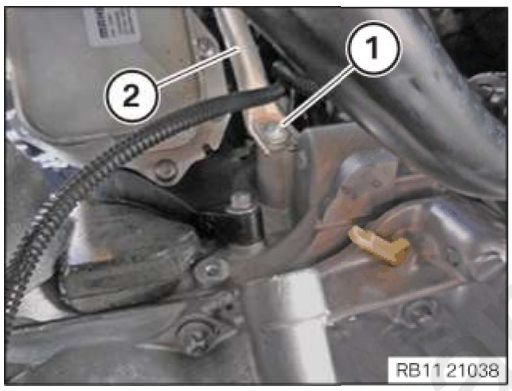
Electrostatic discharge.

Damage to or destruction of electrical components.

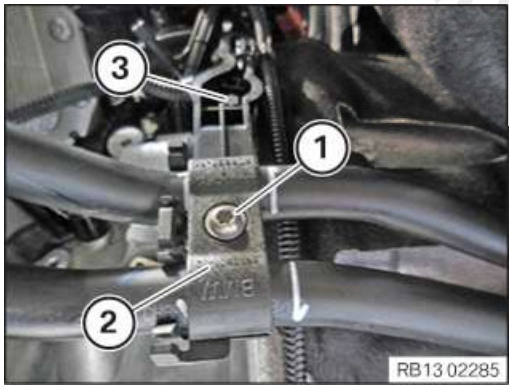
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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



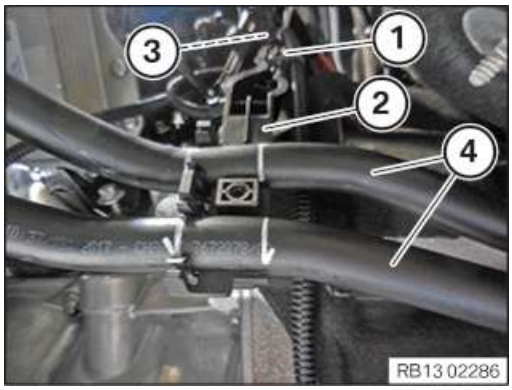
- Loosen screw (1).



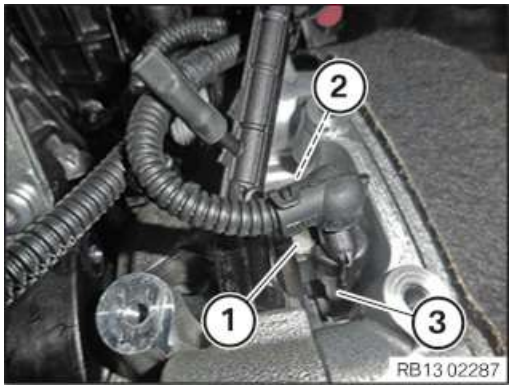
- Loosen screw (1).
- Guide out and remove manifold support (2).



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

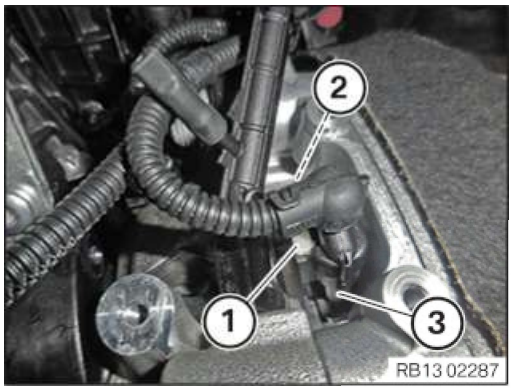


- Loosen clamp (1).
- Pull holder (2) out of guide (3).
- Pull holder (2) out of transmission oil lines (4) and remove it.



- Unlock connector (1) and pull off.
- Loosen screw (2).
- Guide out and remove crankshaft sensor (3).

5 – Installing the crankshaft sensor



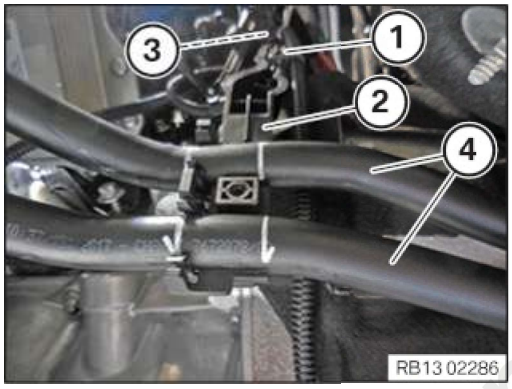
- Feed in and install the crankshaft sensor (3).
- Tighten down screw (2).

Crankshaft sensor to crankcase

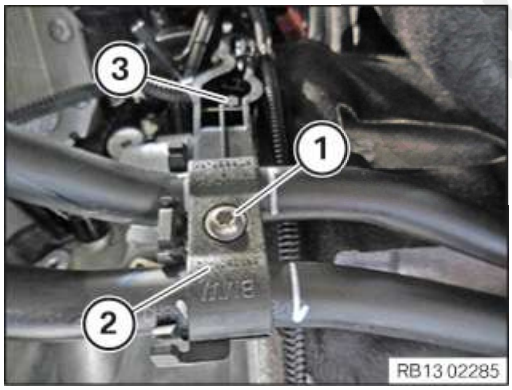
Crankshaft sensor		Tightening torque	4,5 Nm

- Connect and lock the connector (1).

  The connector (1) must engage audibly.



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



- Tighten down screw (3).

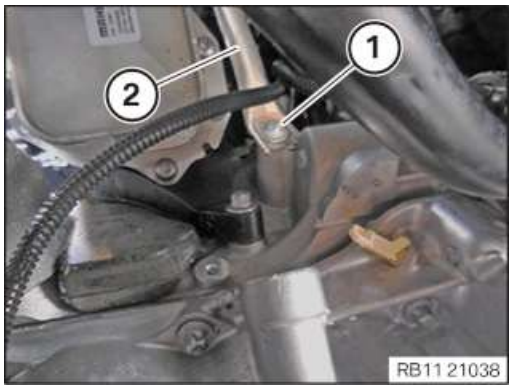
Holder to end cover

M6X16		Tightening torque	8 Nm

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

Holder for transmission oil line

Screw	*Renew screw.*	Tightening torque	5 Nm



- Guide in and position manifold support (2).
- Hand-tighten the bolts (1).



- Tighten the screws (1).

Manifold support to intake plenum

M6x25		Tightening torque	8 Nm



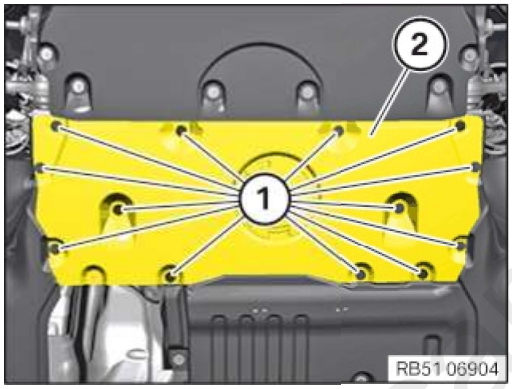
- Tighten screws (1) on manifold supports (2).

Manifold support to crankcase

M6x16		Tightening torque	8 Nm

POSTPROCESSES

6 – Installing the centre underbody protection



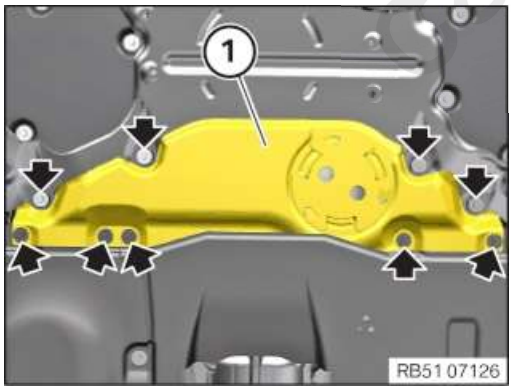
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

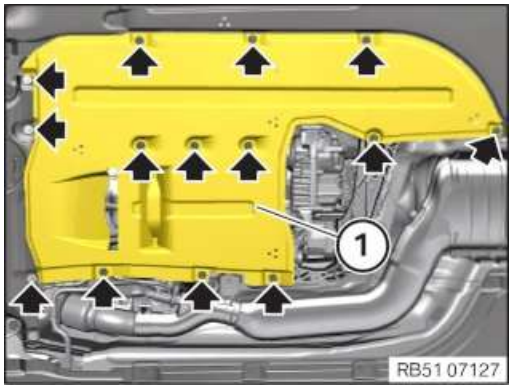
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

7 – Installing underbody protection at rear



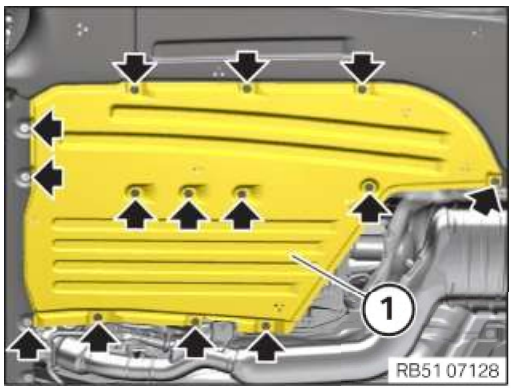
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

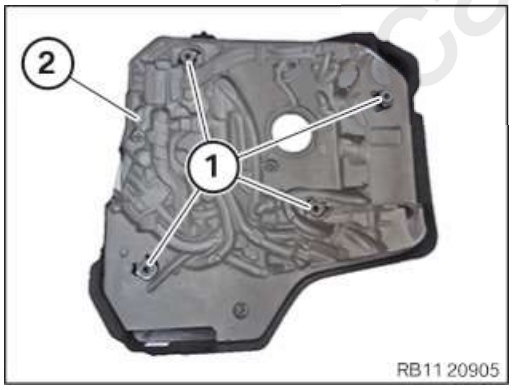
8 – Install acoustic cover

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

Crankshaft sensor to crankcase			Used in step 5
Crankshaft sensor		Tightening torque	4,5 Nm

Holder to end cover			Used in step 5
M6X16		Tightening torque	8 Nm

Holder for transmission oil line			Used in step 5
Screw	*Renew screw.*	Tightening torque	5 Nm

Manifold support to intake plenum			Used in step 5
M6x25		Tightening torque	8 Nm

Manifold support to crankcase			Used in step 5
M6x16		Tightening torque	8 Nm

Underbody protection			Used in step 67
Hexagon screw		Tightening torque	3 Nm

Links

Repair instructions	**Used in step**
61 35 ... Notes on ESD protection (Electro Static Discharge)	4

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12 14 602 Replacing knock sensor

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

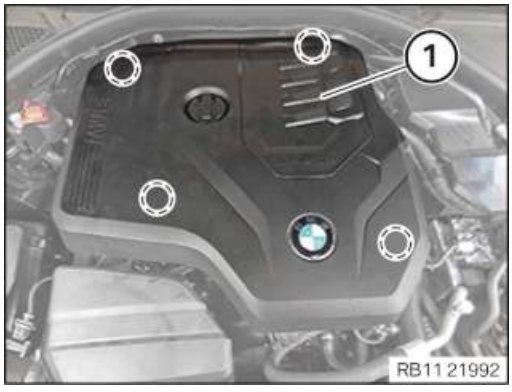
- Perform all work only on components that have cooled down.

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 – Removing the clean air pipe with the resonator

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WARNING

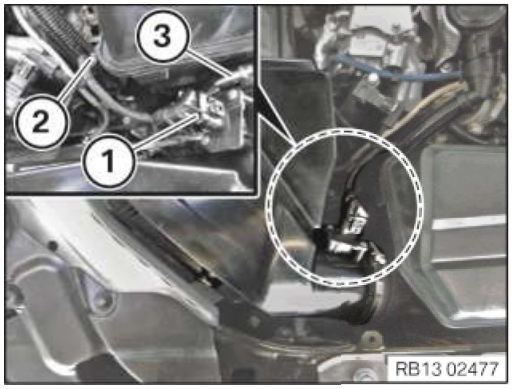
Hot surfaces.

Risk of burning!

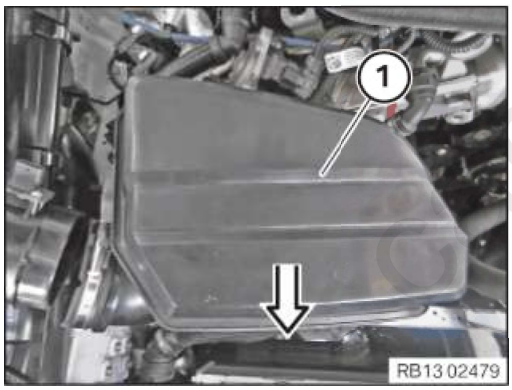
- Perform all work only on components that have cooled down.



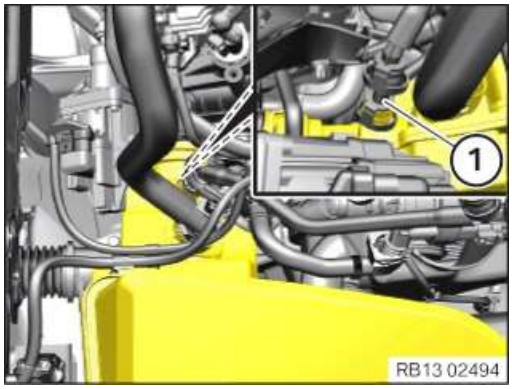
- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.



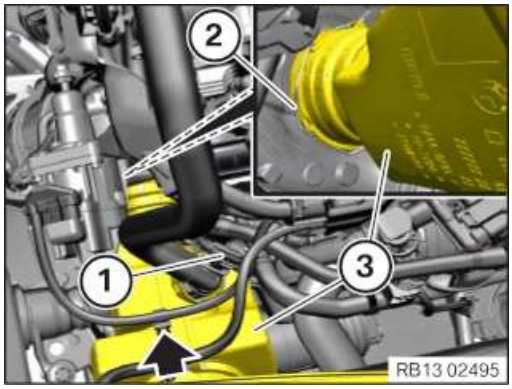
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- 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.

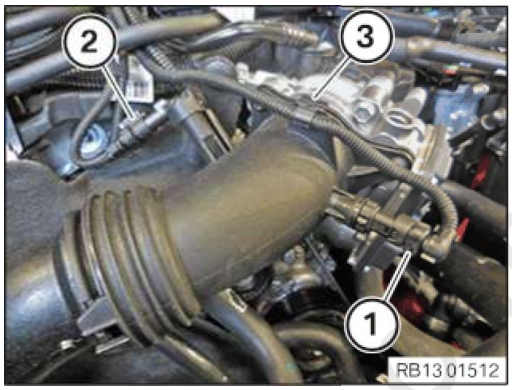
4 – Removing the throttle body

RISK OF DAMAGE

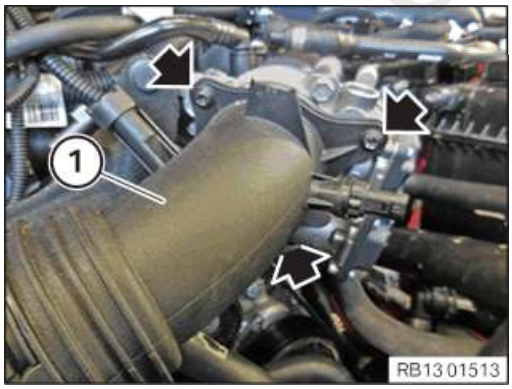
Electrostatic discharge.

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.

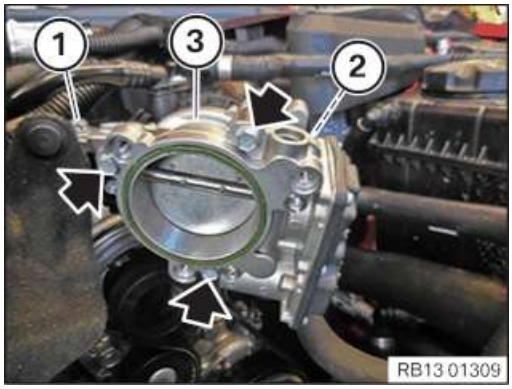


- Unlock and loosen connector (1).
- Unlock and loosen connector (2).
- Unlock and loosen clamp (3).



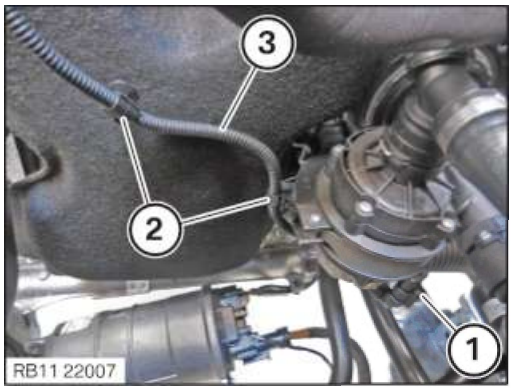
- Remove screws (arrows).
- Feed out charge air line (1) and place to one side.

mfdiag.com

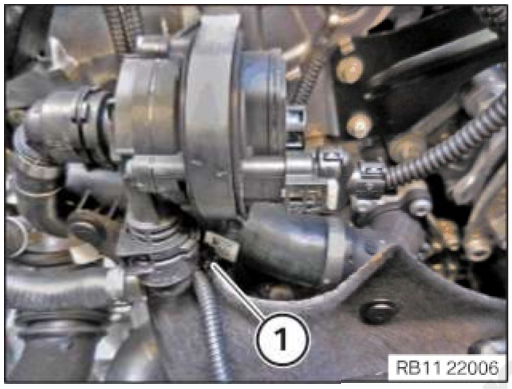


- Loosen screw (1).
- Remove screws (arrows).
- Unlock and loosen connector (2).
- Remove the throttle bodies (3).

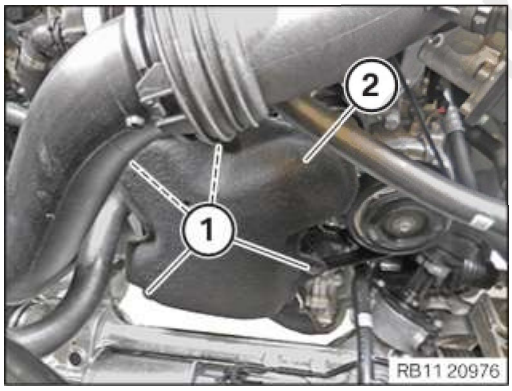
5 – Removing the acoustic cover for the engine at the front



- 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.

6 – Releasing the electrical auxiliary coolant pump for the charge air cooler or the air conditioning condenser

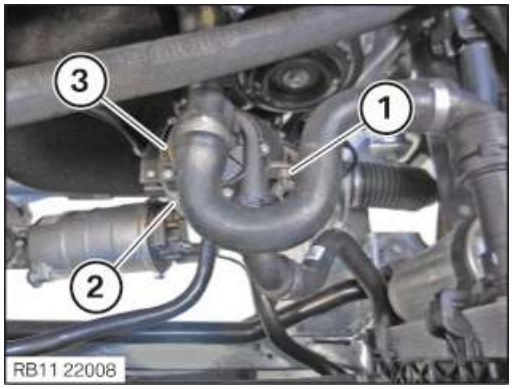
RISK OF DAMAGE

Non-visible damage to the coolant pump.

Forcibly removing, installing or dropping the coolant pump down will damage it.

- Remove and install the coolant pump without damaging it and without applying external force.
- Avoid impacts/knocks to the coolant pump (e.g.. by tools, falling down, hard contact with base).
- Renew coolant pump after being dropped or hard impacts/knocks.

diagn.com



- Loosen nut (1).
- Thread out holder (2) and set aside.
- Guide out the electrical auxiliary coolant pump (3) and set it aside.

7 – Removing the drive belt for alternator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.



- Increase the preload on the belt tensioner in **the direction of the arrow** using standard tools (1).
- Secure the belt tensioner with the special tool 0 496 268 (11 0 390).
- Guide out the drive belt for the alternator (2) and remove it.

8 – Removing the alternator

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WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Hot surfaces.

Risk of burning!

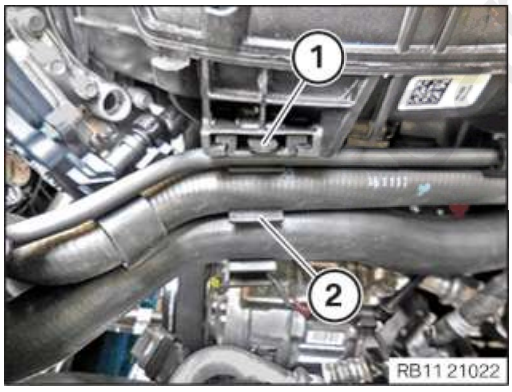
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

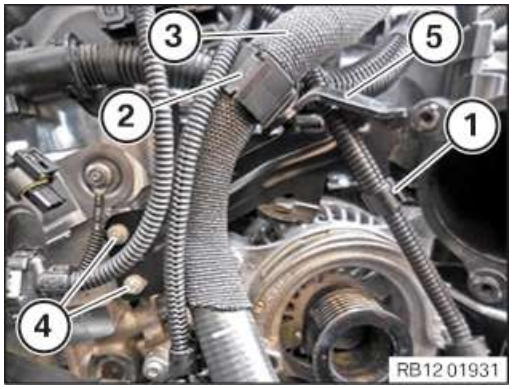
Electrostatic discharge.

Damage to or destruction of electrical components.

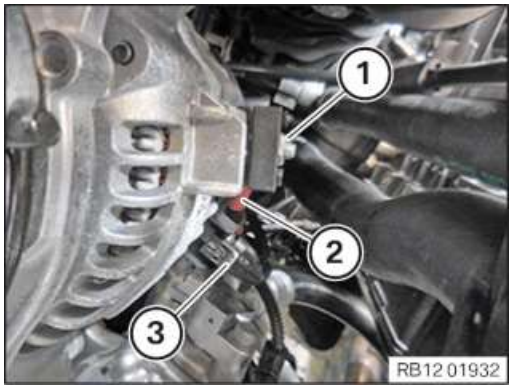
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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



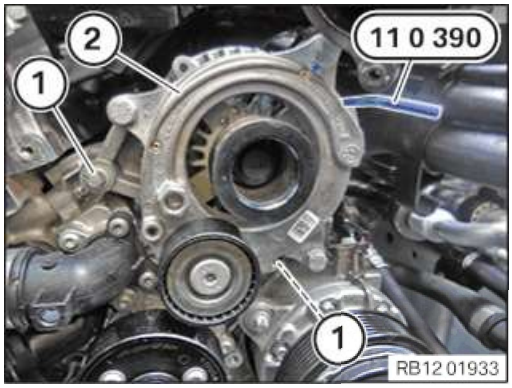
- Unlock the lock (1).
- Thread out holder (2) and set aside.



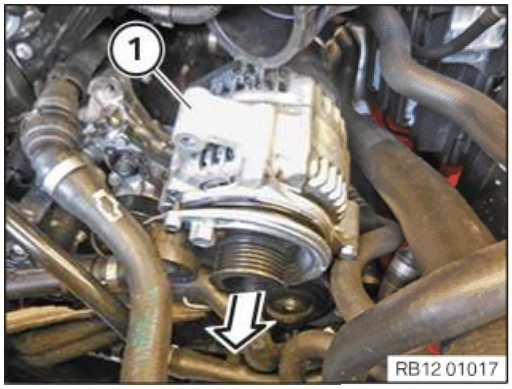
- Loosen clamp (1).
- Loosen clamp (2).
- Feed out coolant line (3) and place to one side.
- Loosen screws (4).
- Thread out holder (5) and set aside.



- Unfasten nut (1).
- Thread out positive battery cable (2) and set it aside.
- Unlock and loosen connector (3).



- Make sure that the special tool 0 496 268 (11 0 390) is fitted correctly.
- Loosen screws (1).
- Disconnect the alternator (2).



- Feed the alternator (1) out toward the front in the direction of the arrow.

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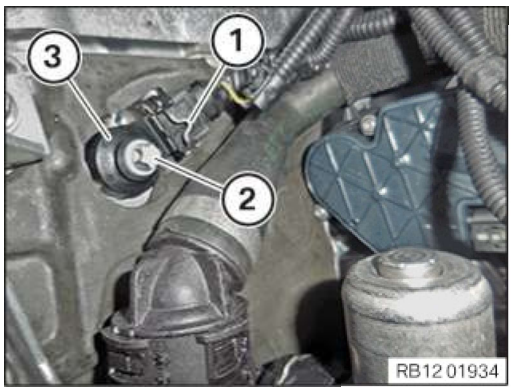
9 – Remove the knock sensors for cylinders 1 to 2

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

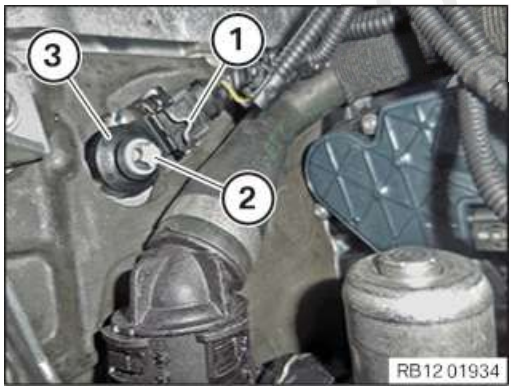


- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Remove the knock sensor (3).

10 – Install the knock sensor for cylinders 1 to 2

TECHNICAL INFORMATION

When installing the knock sensors, the tightening torque must be observed.
Non-compliance with the tightening torque can lead to malfunction.



- Clean the contact surface of the knock sensor at the crankcase.
- Install knock sensor (3).
- Tighten down screw (2).

Knock sensor to crankcase

M8x30	Observe tightening torque without fail!	Tightening torque	21,5 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

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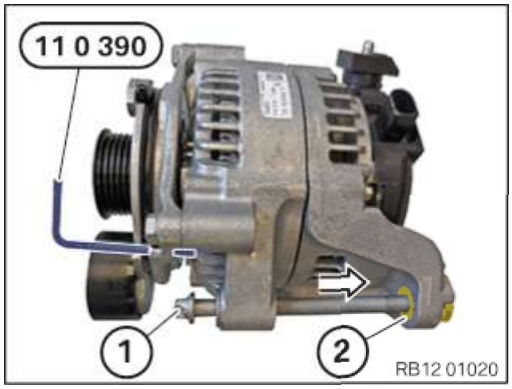
11 – Installing the alternator

WARNING

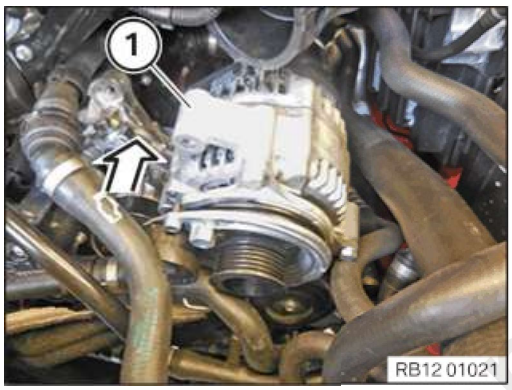
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

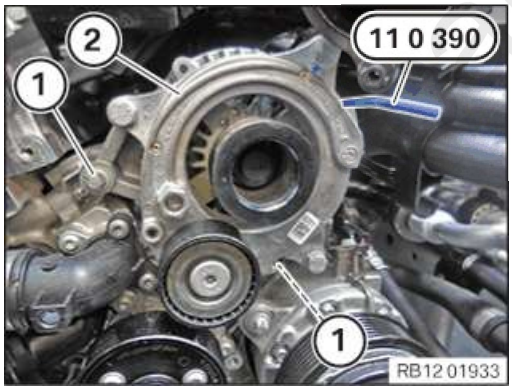
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.



- Make sure that the special tool 0 496 268 (11 0 390) is fitted correctly.
- Slightly push back the threaded support sleeve (2) in the direction of the arrow to facilitate the installation of the alternator.
- Screw the screw (1) into the threaded support sleeve (2).
- Press back the threaded support sleeve (2) using the bolt (1).
- Once again unscrew the screw (1) from the threaded support sleeve (2).



- Guide in alternator (1) in the direction of the arrow and position it.

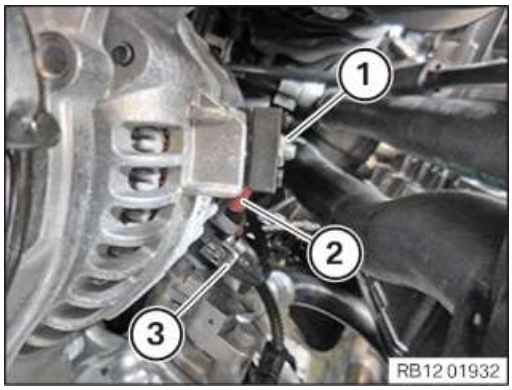


- Install the alternator (2).
- Tighten the screws (1).

Alternator to component carrier

M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm

- Make sure that the special tool 0 496 268 (11 0 390) is fitted correctly.

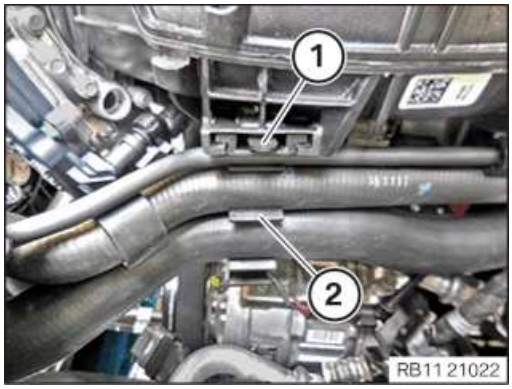


- Insert and install the positive battery cable (2).
- Tighten nut (1).

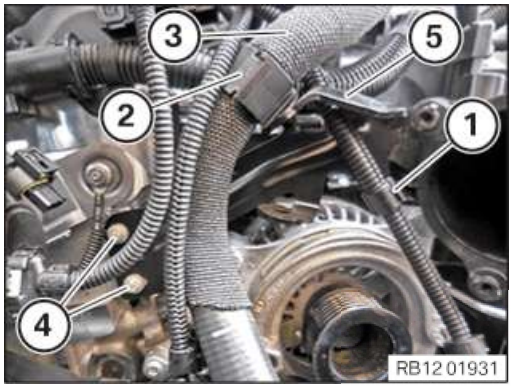
Positive battery cable to the alternator

M8		Tightening torque	19 Nm

- Connect and lock the connector (3).
- The connector (3) must engage audibly.



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



- Insert and position the holders (5).
- Tighten down screws (4).

Manifold support for intake air to cylinder head

M6X16		Tightening torque	8 Nm

- Guide coolant line (3) into clamp (2) and install it.
- Secure clamps (2).
- Secure the clamp (1).

12 – Installing the drive belt for alternator

Overview of drive belt for alternator



1. Drive belt for alternator

TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

TECHNICAL INFORMATION

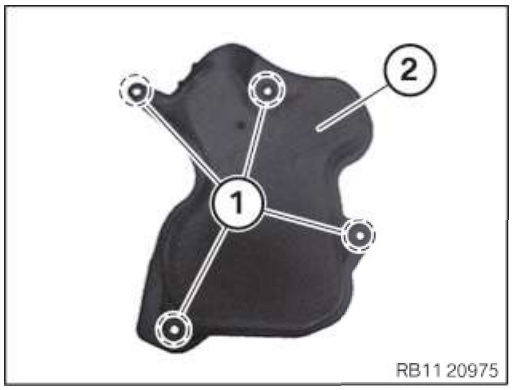
The drive belt must be replaced if contaminated with coolant- and oil residues.

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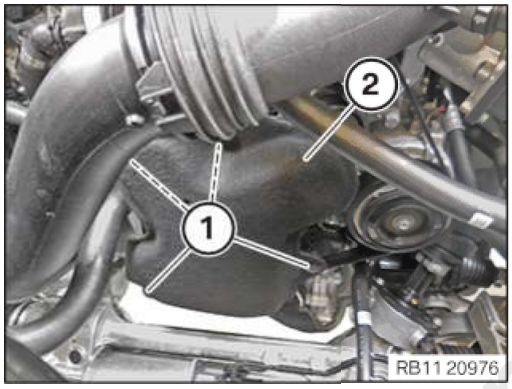
- Position the drive belt for alternator (2) on the ancillary components.
- Increase the preload on the belt tensioner in **the direction of the arrow** using standard tools (1).
- Feed the special tool 0 496 268 (11 0 390) out of the belt tensioner and remove it.

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

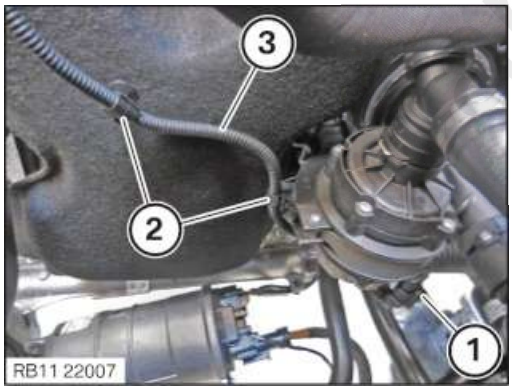


- Check if acoustic cover (2) in marked area (1) is damaged and replace acoustic cover (2) if necessary.

  Parts: Acoustic cover

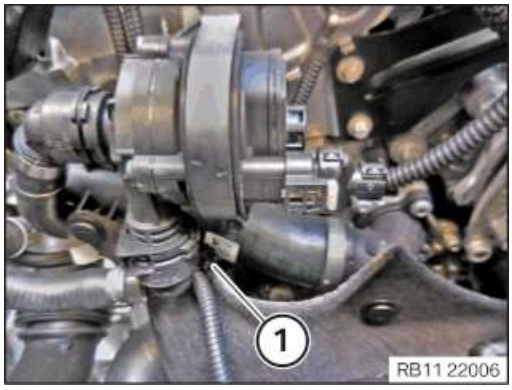


- Thread in and position the acoustic cover (2).
- Mount all expanding rivets (1).



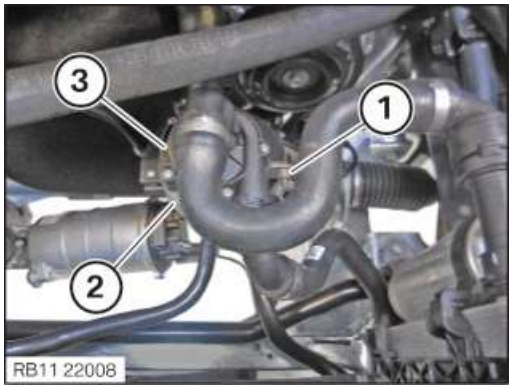
- Feed in and position wiring harness section (3).
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Secure clamps (1).

14 – Mounting the electrical auxiliary coolant pump for the charge air cooler/air conditioning condenser

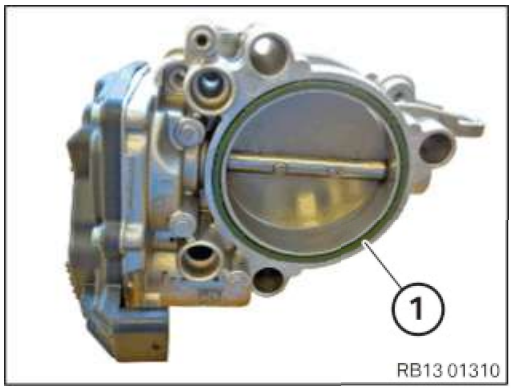


- Feed in and position the electrical auxiliary coolant pump (3).
- Insert and install the holder (2).
- Tighten nut (1).

Electric coolant pump to holder

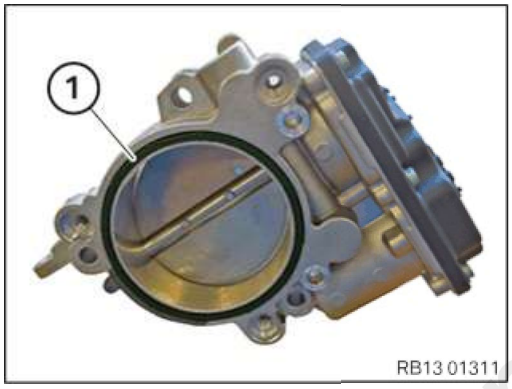
M6		Tightening torque	8 Nm

15 – Installing the throttle body



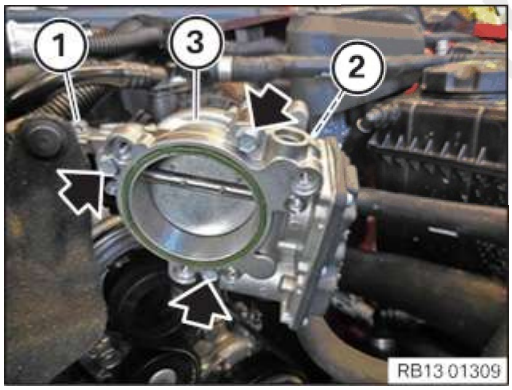
- Renew sealing ring (1).

  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

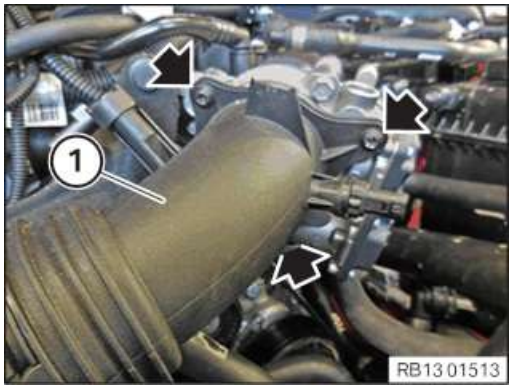
M6X50		Tightening torque	7 Nm

- Tighten down screw (1).

Throttle body to holder

M6X25		Tightening torque	8 Nm

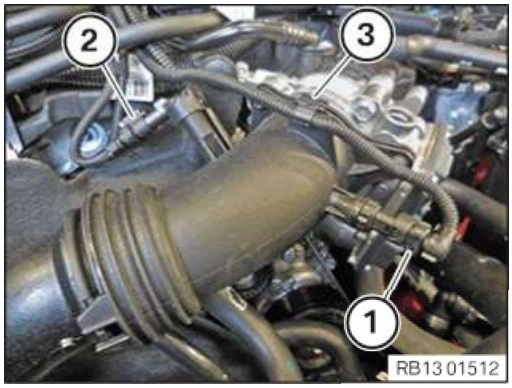
.diagn.com



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

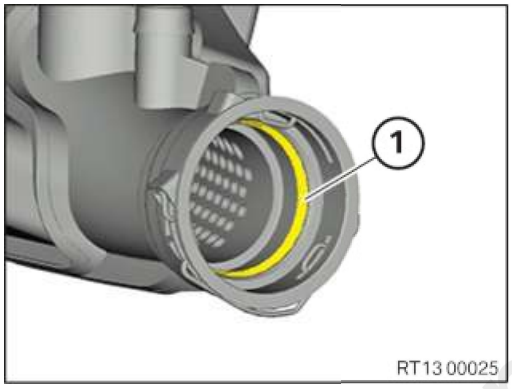
Charge air line to throttle body

M6		Tightening torque	8 Nm



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

16 – Installing the clean air pipe with resonator

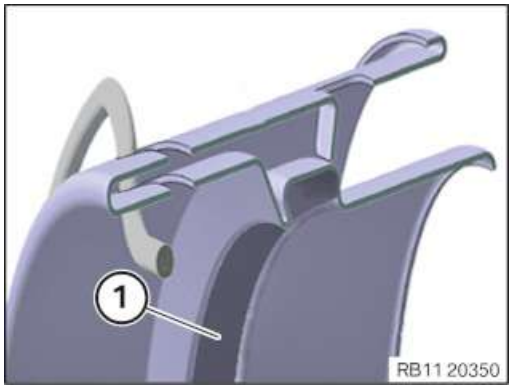


- Check the seal (1) for damages, replace if necessary.

▶ **Replace damaged gasket**

TECHNICAL INFORMATION

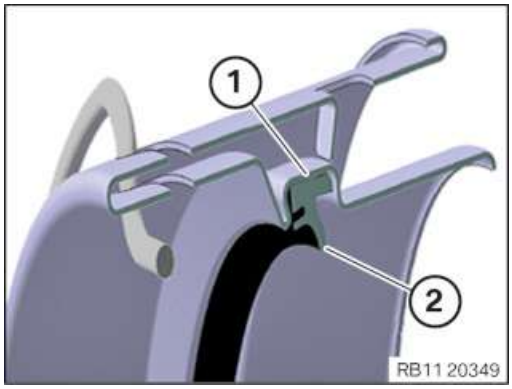
Do not use pointed or sharp-edged tools for the installation and/or removal.



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

  The gasket groove (1) must be clean.

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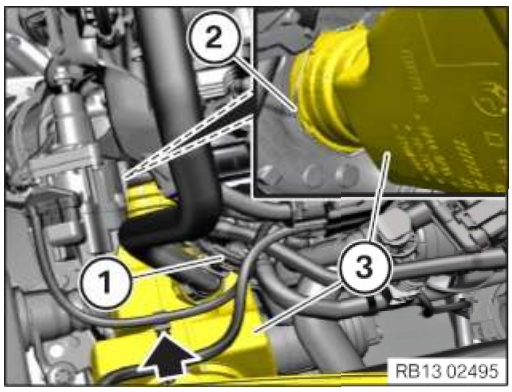
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

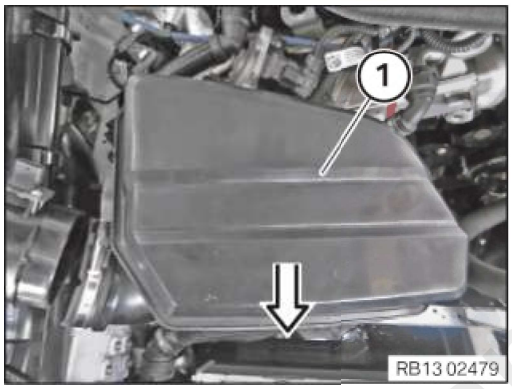
- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).



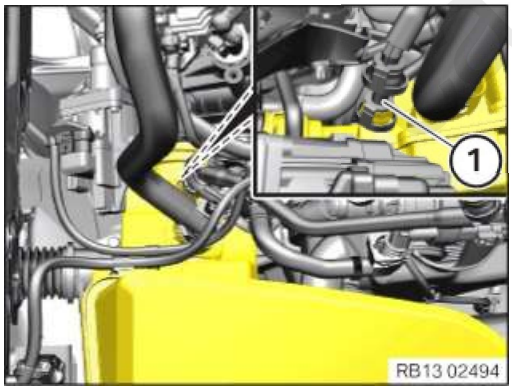
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

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

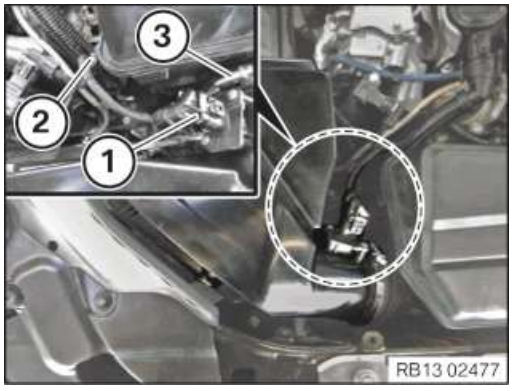
  The connector (1) must engage audibly.
- Secure clamp (arrow).



- 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.

diag.com



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

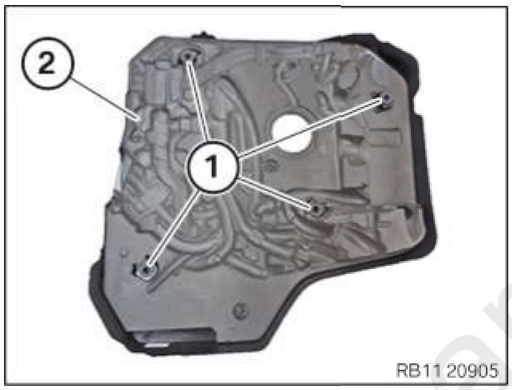
17 – Install acoustic cover

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.

18 – Disconnecting all battery earth leads

ardiagn.com



- See additional information.

Additional Information

Overview of Tightening Torques

Knock sensor to crankcase			Used in step 10
M8x30	Observe tightening torque without fail!	Tightening torque	21,5 Nm

Alternator to component carrier			Used in step 11
M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm

Positive battery cable to the alternator			Used in step 11
M8		Tightening torque	19 Nm

Manifold support for intake air to cylinder head			Used in step 11
M6X16		Tightening torque	8 Nm

Electric coolant pump to holder			Used in step 14
M6		Tightening torque	8 Nm

Throttle body to intake plenum			Used in step 15
M6X50		Tightening torque	7 Nm

Throttle body to holder			Used in step 15
M6X25		Tightening torque	8 Nm

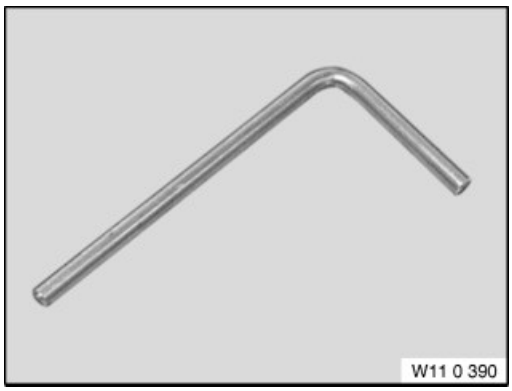
Charge air line to throttle body			Used in step 15
M6		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 16
Clamp		Tightening torque	3 Nm

Overview of Special Tools

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0 496 268 (11 0 390) Pin



Common	Used in step 781112
Usage	(roll pin) For securing new tensioning pulley (poly-V belt)
Included in the tool or work	
Storage location	B24
Replaced by	
In connection with	
SI-Number	01 15 07 (390)

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Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	118
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	118
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
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61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	118
61 20 900 Disconnecting and connecting battery earth lead	118
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61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 20 900 Disconnecting and connecting battery earth lead	118
61 35 ... Notes on ESD protection (Electro Static Discharge)	4
61 35 ... Notes on ESD protection (Electro Static Discharge)	4689

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12 14 604 Replacing knock 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

rdiagn.com

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

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.

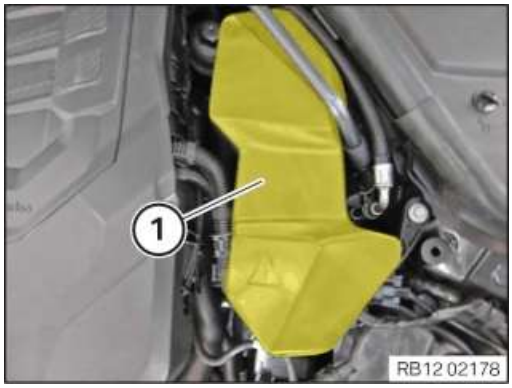
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

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

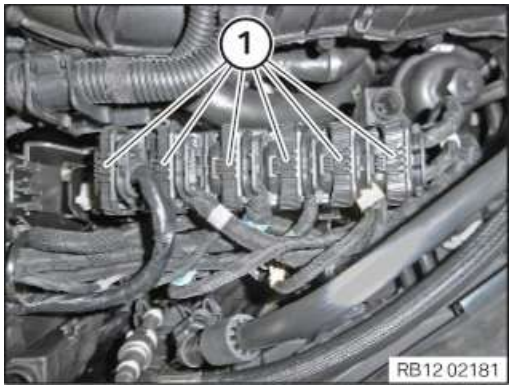
TECHNICAL INFORMATION

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

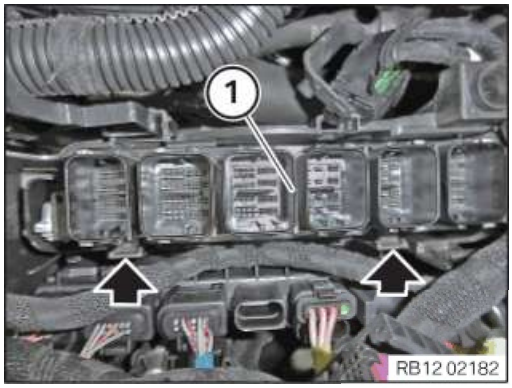


- Pull the cover (1) towards the top and feed out.

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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.

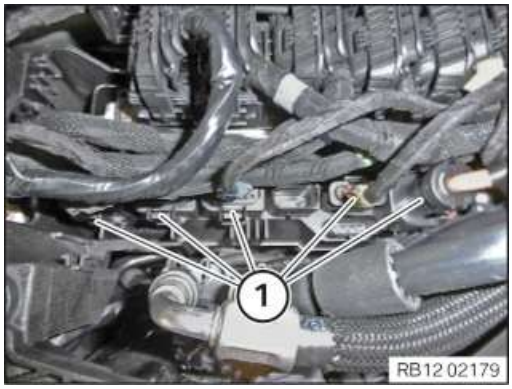
RISK OF DAMAGE

Electrostatic discharge.

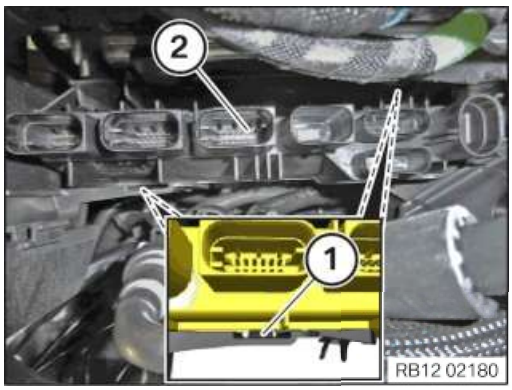
Damage to or destruction of electrical components.

- 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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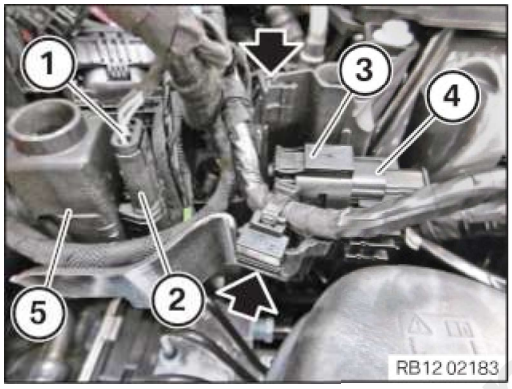


- Unlock and disconnect plug connections (1).

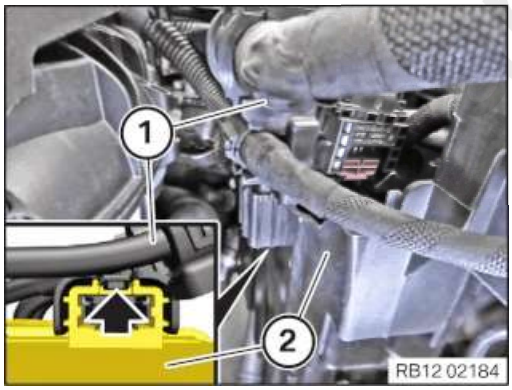


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

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).

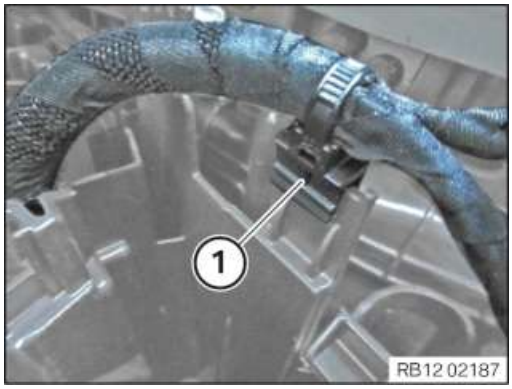


- Unlock the lock (arrow).
- Disconnect the cable plug (1) upwards from the control unit holder (2).

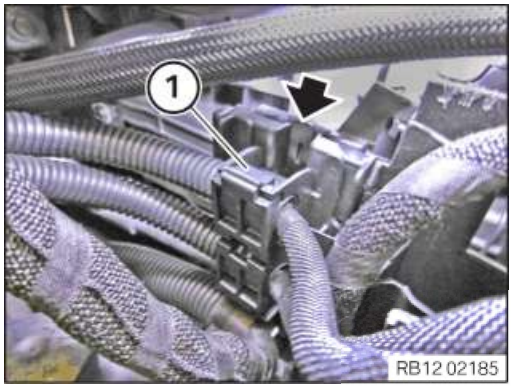


- Loosen clamp (1).

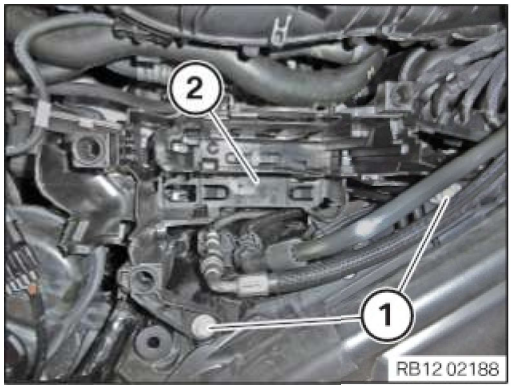
mdiagn.com



- 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.

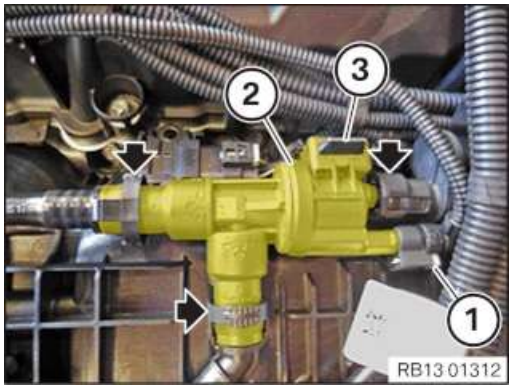
RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

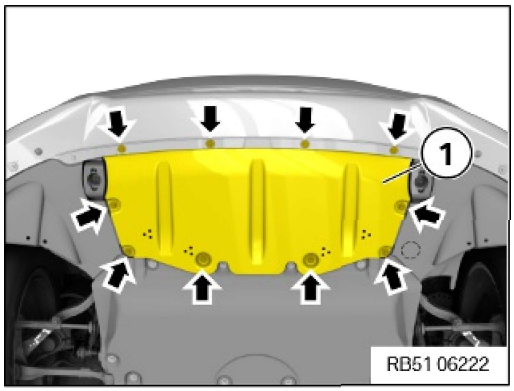
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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

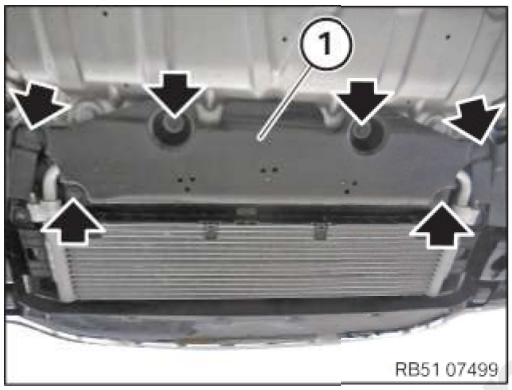
9 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

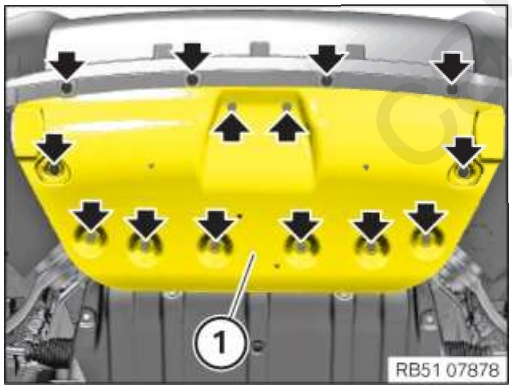
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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

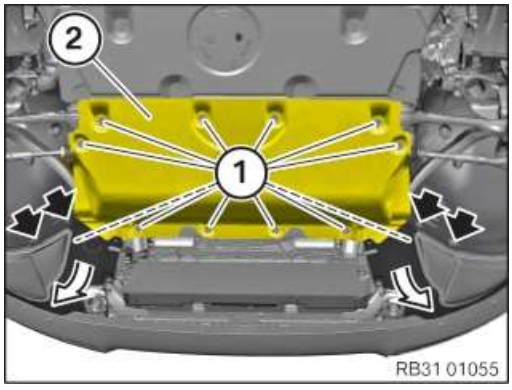


- **Version 3:**

  Remove screws (arrows).

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

10 – Remove the underbody protection of the steering gear



- **Version 1:**

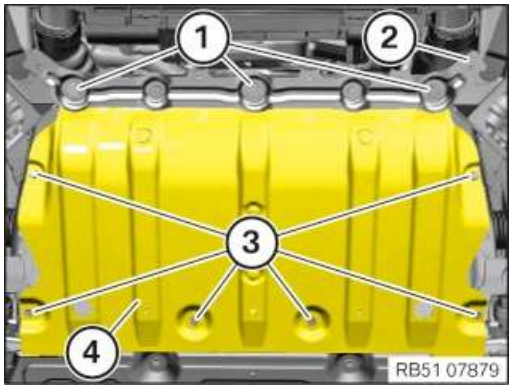
  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  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).

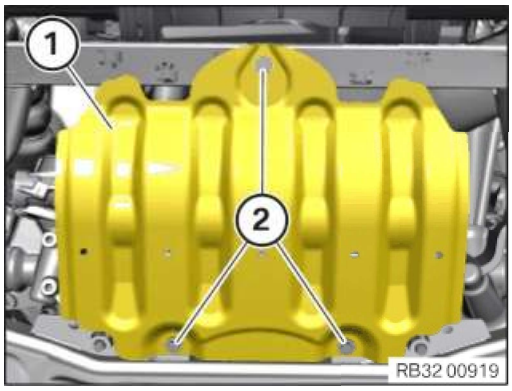
  Loosen screws (3).

  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.

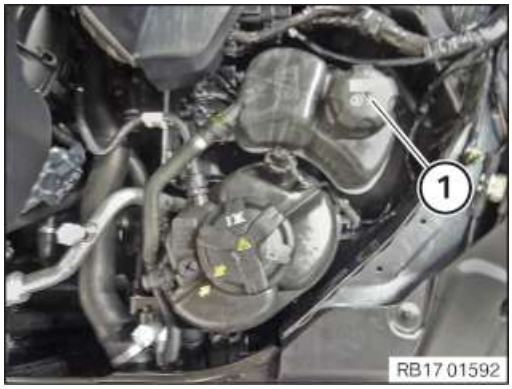
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

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.

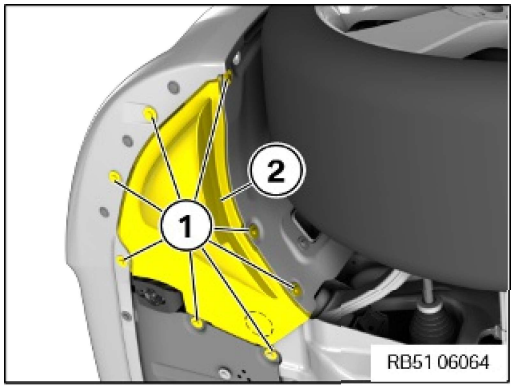
TECHNICAL INFORMATION

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

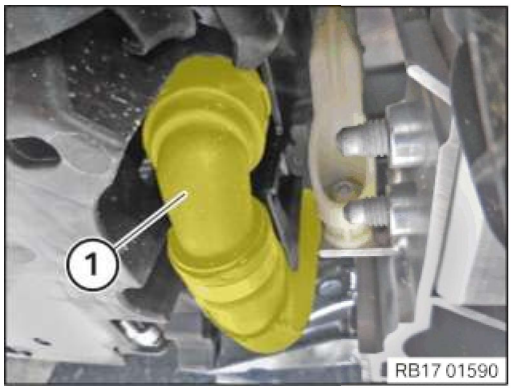
cardiagn.com



- Loosen sealing cap (1).



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

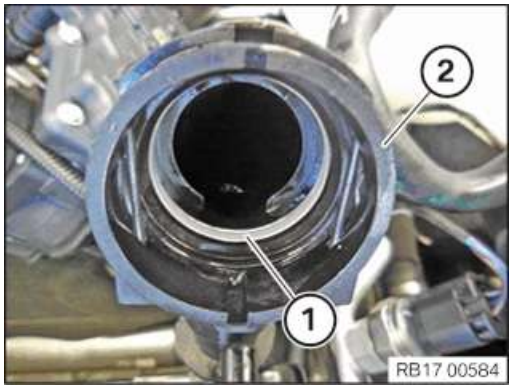


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

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

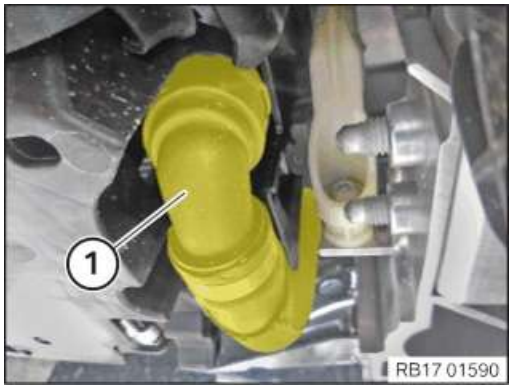
TECHNICAL INFORMATION

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



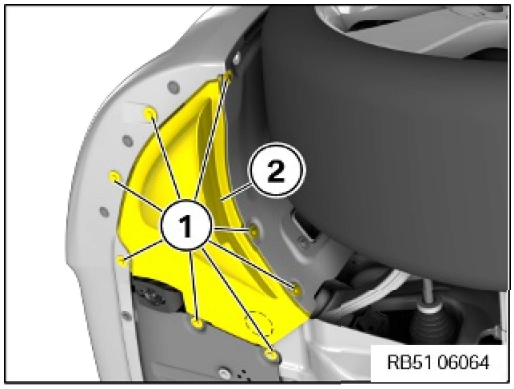
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

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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

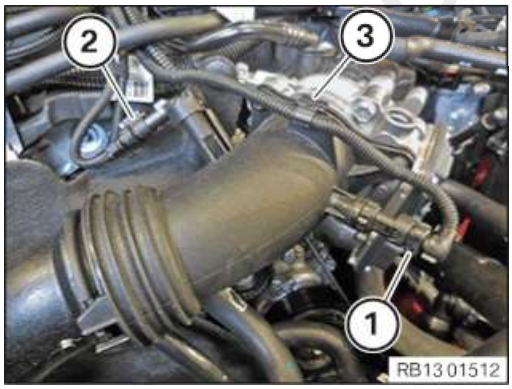
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

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

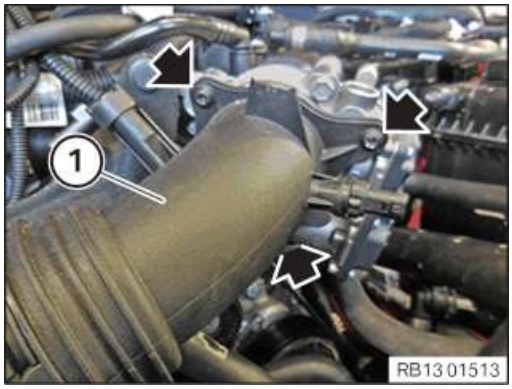
TECHNICAL INFORMATION

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

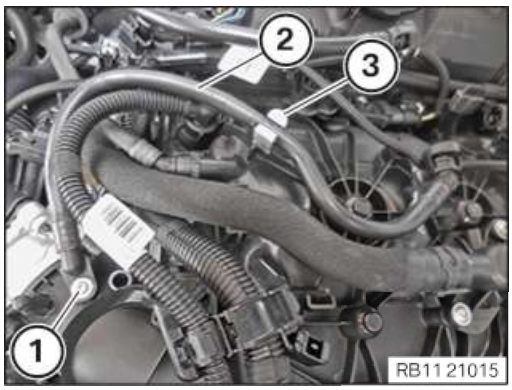


- Unlock plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.
- Unlock and loosen clamp (3).

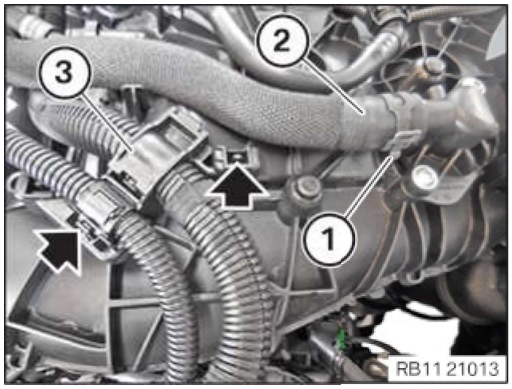
cardiagn.com



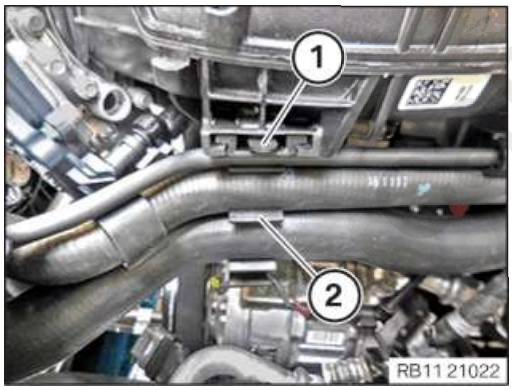
- Remove screws (arrows).
- Feed out charge air line (1) and place to one side.



- 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.

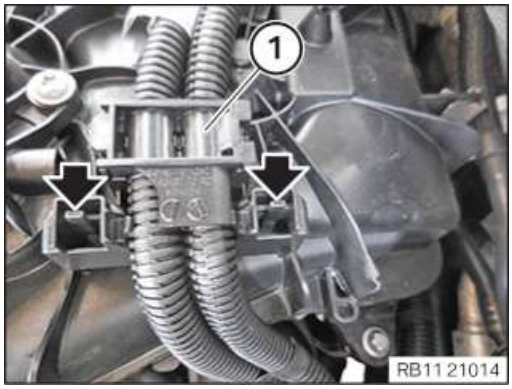


- Unlock the lock (1).
- Thread out holder (2) and set aside.

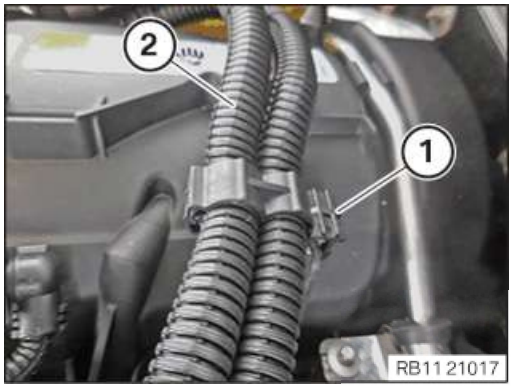


- Unlock plug connection (1) and disconnect.
- Loosen screw (2).

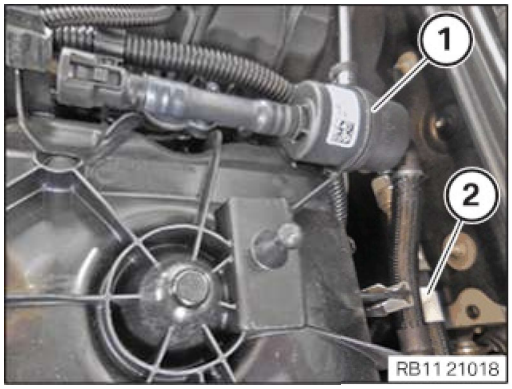
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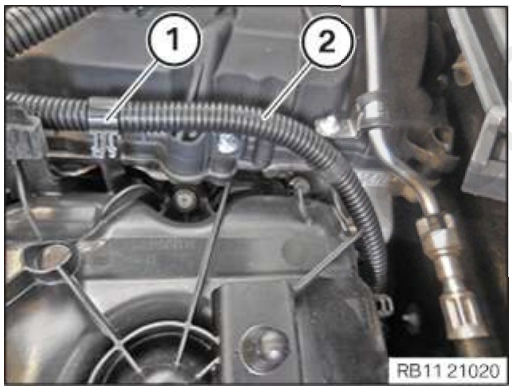
- Unlock the locks (arrows).
- Thread out the wiring harness section (1) for the injectors and ignition coils and set it aside.



- 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.

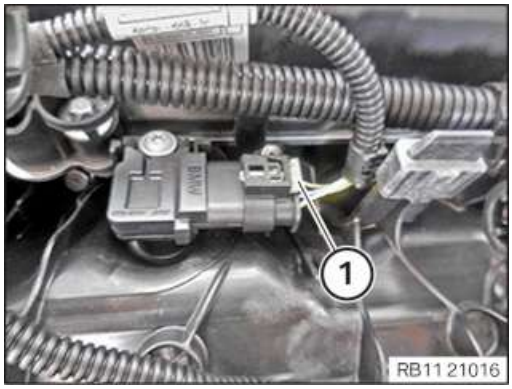


- Loosen clamp (1).
- Guide out the wiring harness section (2) for the sensor system 1 and place to one side.

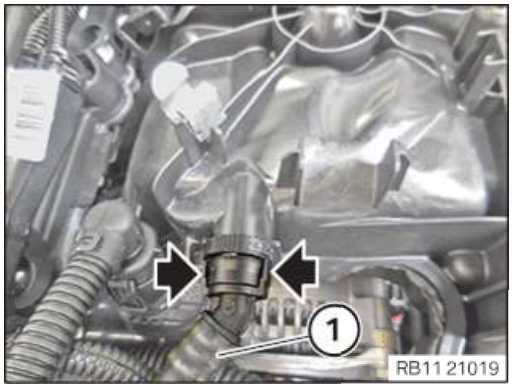


- Loosen screw (1).

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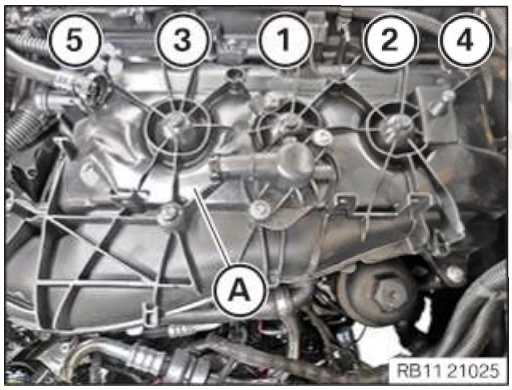
- Unlock plug connection (1) and disconnect.



- 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

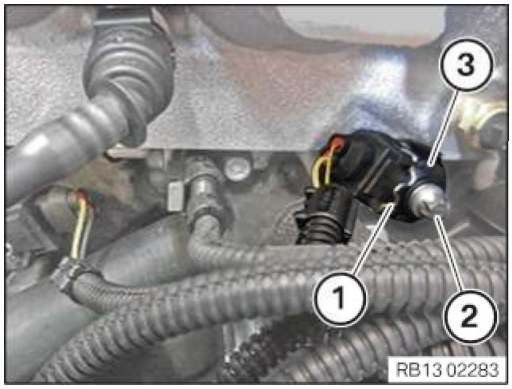
15 – Remove the knock sensors for cylinders 3 to 4

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.

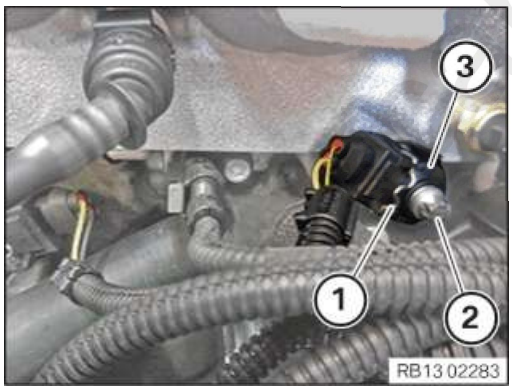


- Unlock and loosen connector (1).
- Loosen screw (2).
- Remove the knock sensor (3).

16 – Install the knock sensors for cylinders 3 to 4

TECHNICAL INFORMATION

When installing the knock sensors, the tightening torque must be observed.
Non-compliance with the tightening torque can lead to malfunction.



- Clean the contact surface of the knock sensor at the crankcase.
- Install knock sensor (3).
- Tighten down screw (2).

Knock sensor to crankcase

M8x30	Observe tightening torque without fail!	Tightening torque	21,5 Nm

- Connect and lock the connector (1).

  The connector (1) must engage audibly.

POSTPROCESSES

17 – Installing the intake plenum

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RISK OF DAMAGE

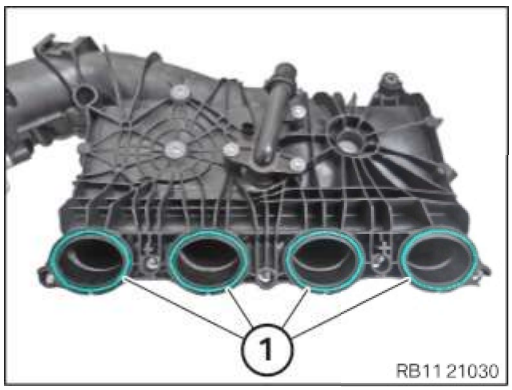
Improper routing of cables and wiring harnesses.

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

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

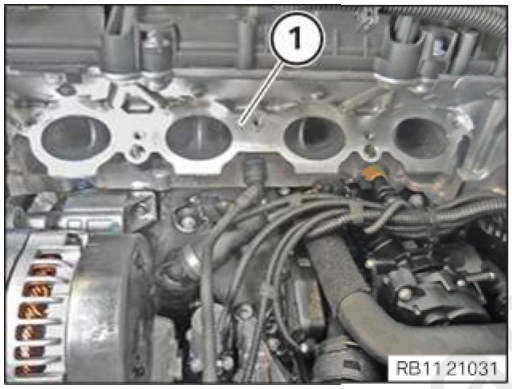
TECHNICAL INFORMATION

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

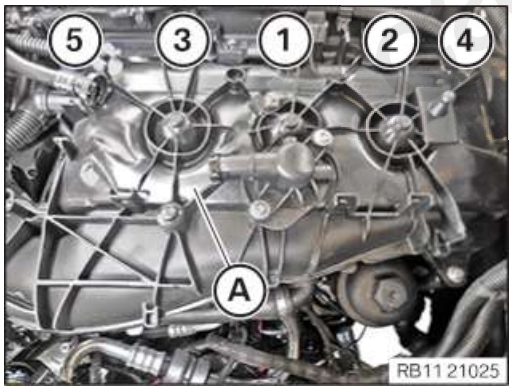


- Renew gaskets (1).

  Parts: Seals



- Clean contact surface (1).



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

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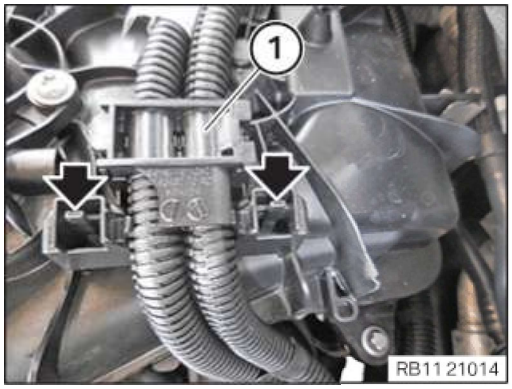
- Connect and lock coolant feed line (1).
- Make sure that coolant feed line (1) engages audibly.



- Tighten down screw (1).

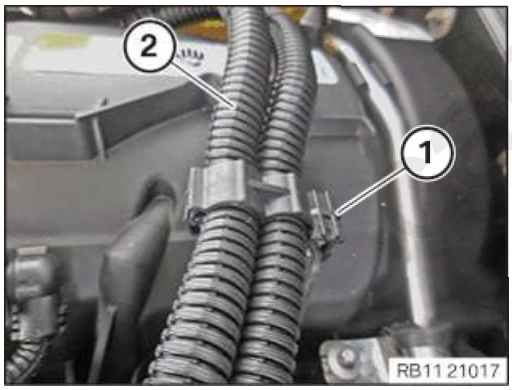
Intake plenum to support

M6X25		Tightening torque	8 Nm

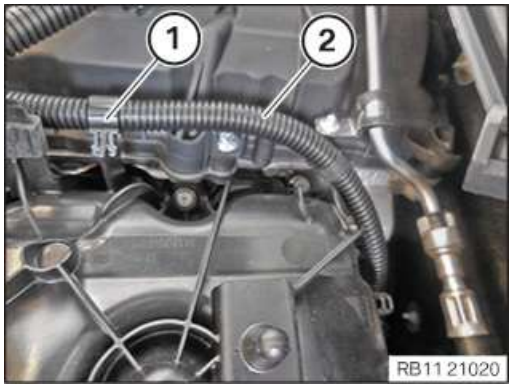


- Insert and install the wiring harness section (1) for the injectors and ignition coils.

  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).

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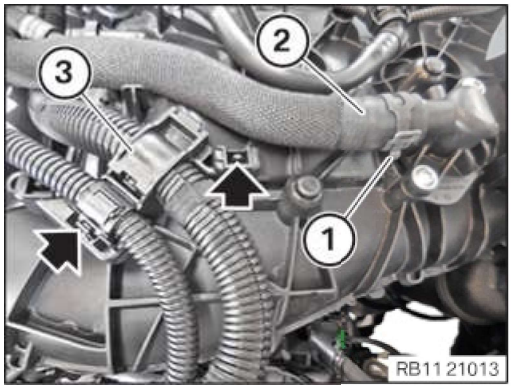
- Insert and install the tank ventilation line (1).
- Secure the tank ventilation line (1) to the clamp (2).



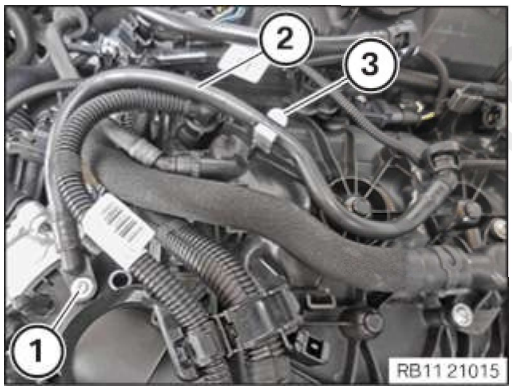
- Connect connectors (1) and lock.
- Make sure the connector (1) engages audibly.
- Tighten down screw (2).

Throttle body to holder

M6X25		Tightening torque	8 Nm



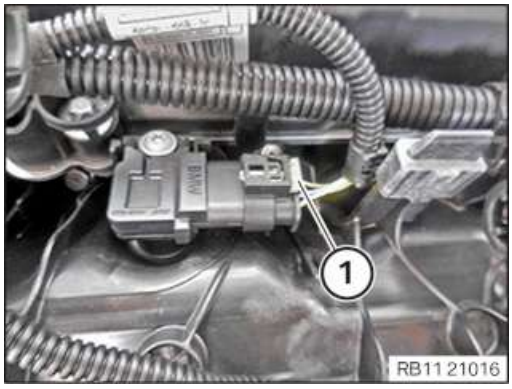
- Insert and install the coolant hose (2).
- Secure clamping collar (1) with the special tool 0 495 794 (17 2 050).
- Guide in and install wiring harness section (3) for sensor system 2.
- Make sure that you can hear the locks (arrows) engage.



- 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

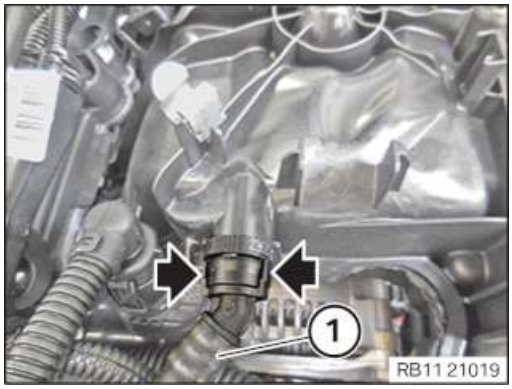
Oval-head screw		Tightening torque	3 Nm



- Connect connectors (1) and lock.

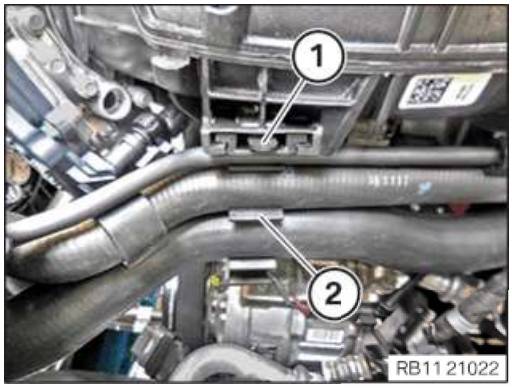
  The connector (1) must engage audibly.

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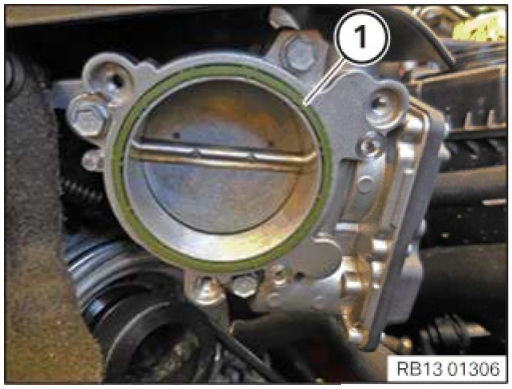


- Insert and install the tank ventilation line (1).

  The locks (arrows) must engage audibly.

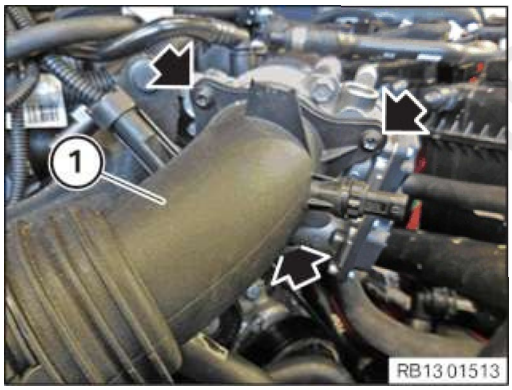


- Insert and install the holder (2).
- Ensure that the lock (1)engages audibly.



- Renew the gasket (1).

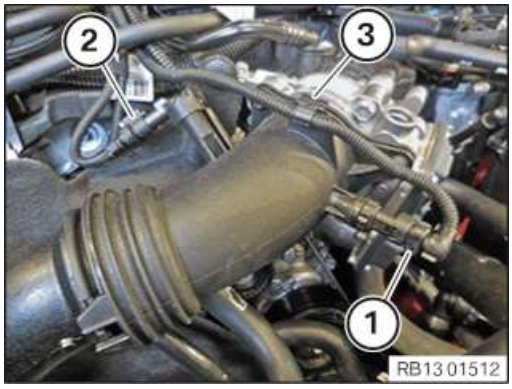
  Parts: Gasket



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

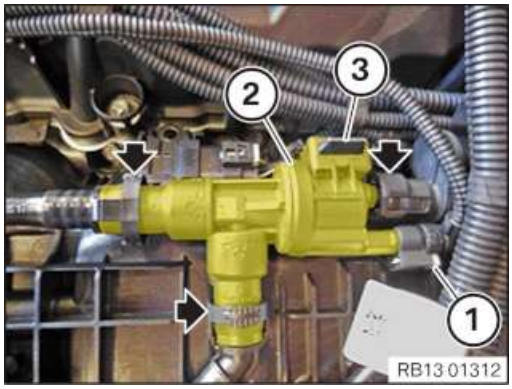
Charge air line to throttle body

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

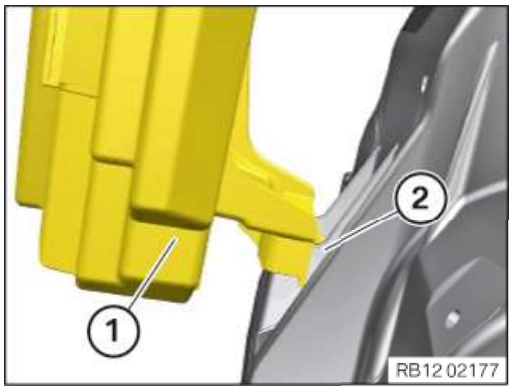


- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).

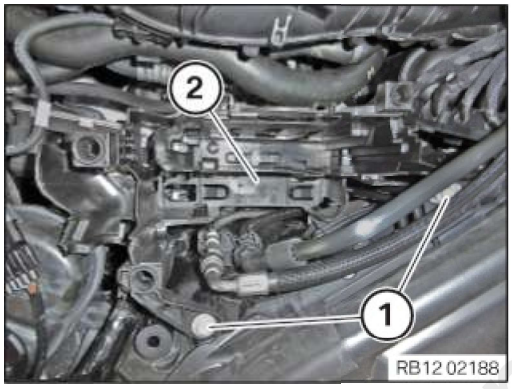
  The tank ventilation lines (arrows) must audibly engage.
- Connect and lock the connector (1).

  The connector (1) must engage audibly.

19 – Installing the control unit holder



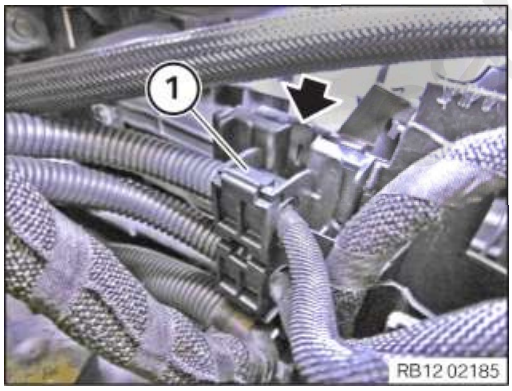
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



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

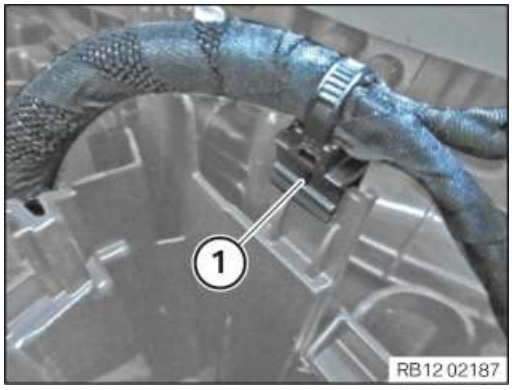
Control unit holder on spring strut dome

Hexagon screw	Tightening torque	8 Nm



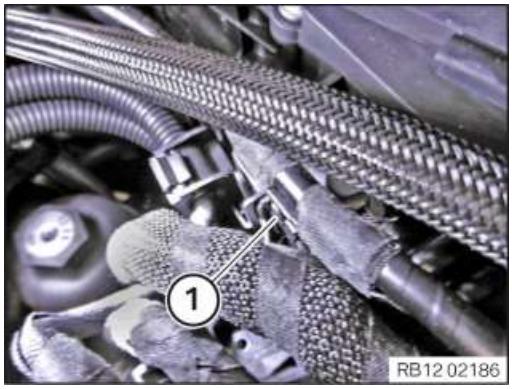
- Feed in and install the cable clip (1).

  Lock (arrow) must audibly engage.

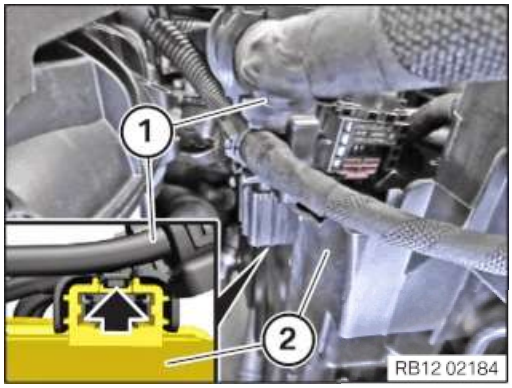


- Secure clamps (1).

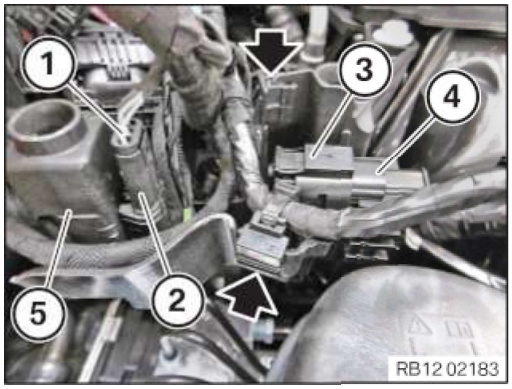
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- Secure clamps (1).



- 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.

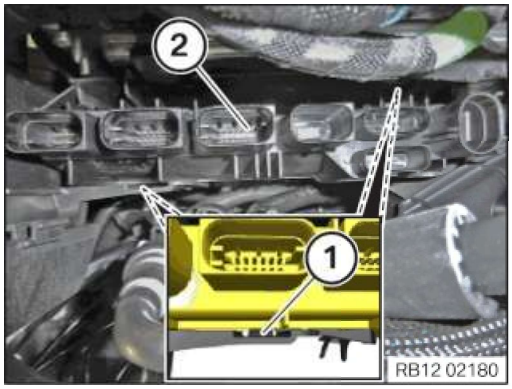
cardiagn.com

RISK OF DAMAGE

Electrostatic discharge.

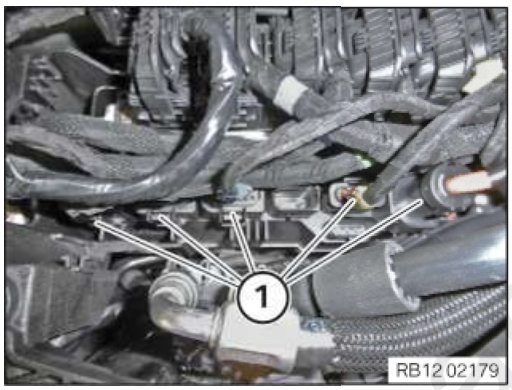
Damage to or destruction of electrical components.

- 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).

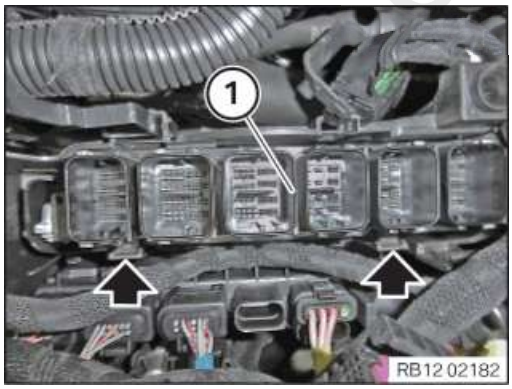
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

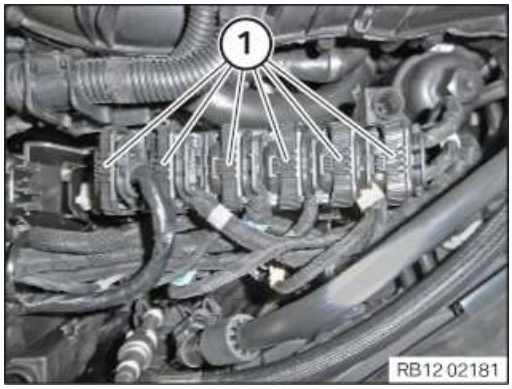
21 – Installing the DME control unit



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

  The locks (arrows) must engage audibly.

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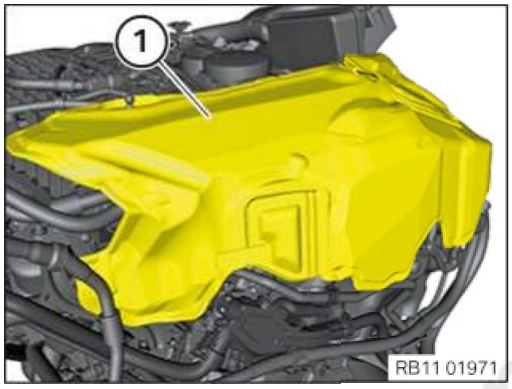
- Connect connectors (1) and lock.

  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.

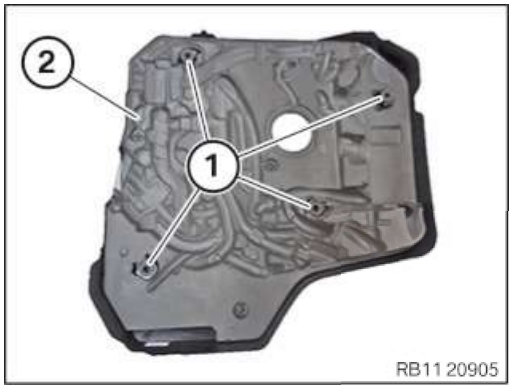
23 – Install acoustic cover

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.



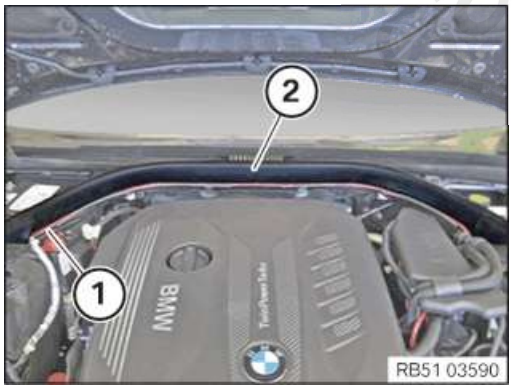
- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



- 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

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- See additional information.

26 – Filling and bleed the low-temperature coolant circuit

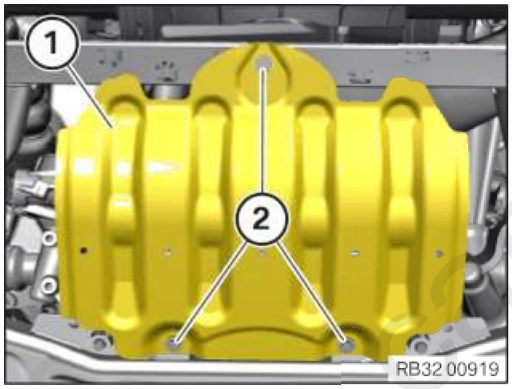


- See additional information.

27 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

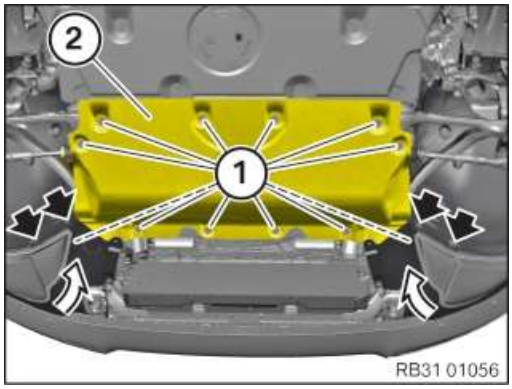


- Remove guard (1).
- Tighten the screws (2).

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).

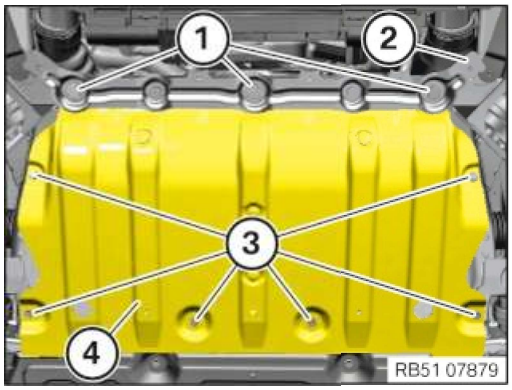
Underbody protection of the steering gear

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

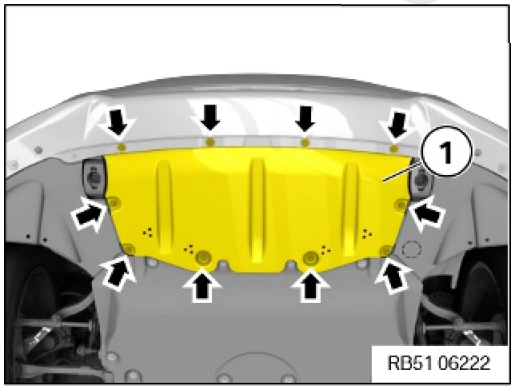
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- 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:**

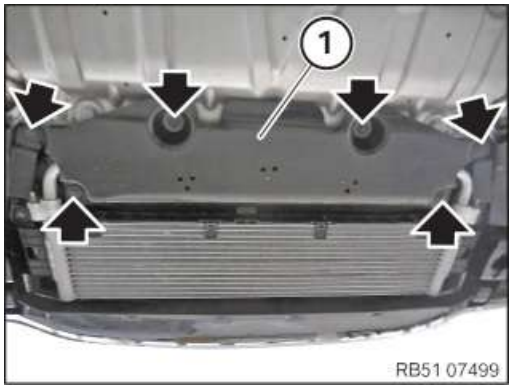
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  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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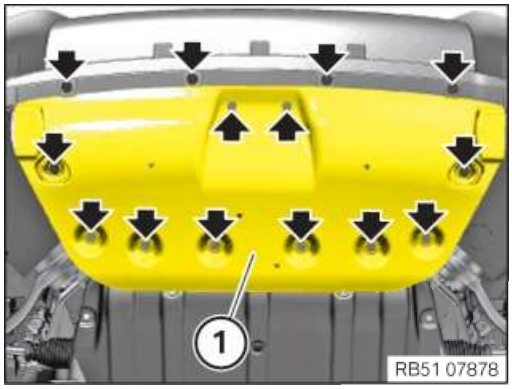
- **Version 2:**

  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

Knock sensor to crankcase — Used in step 16

M8x30	Observe tightening torque without fail!	Tightening torque	21,5 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

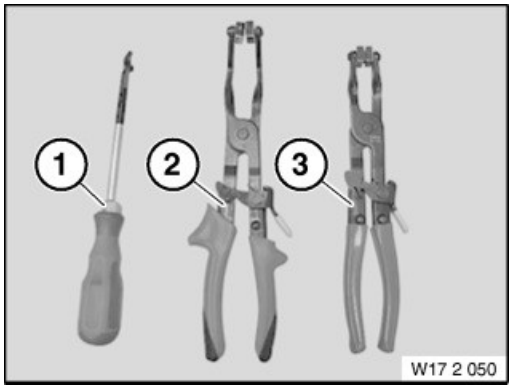
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

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
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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 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
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61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	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
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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

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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
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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
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12 14 524 Replacing the camshaft sensor of the exhaust camshaft

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 camshaft sensor of the exhaust camshaft

WARNING

Hot surfaces.

Risk of burning!

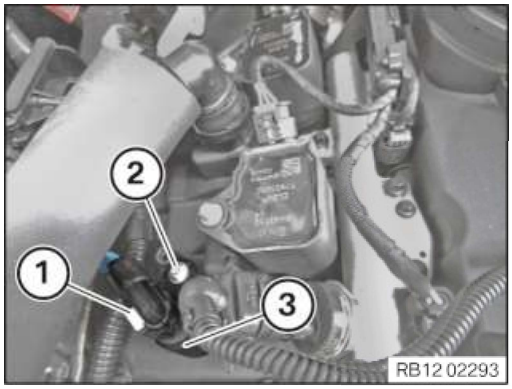
- Perform all work only on components that have cooled down.

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.

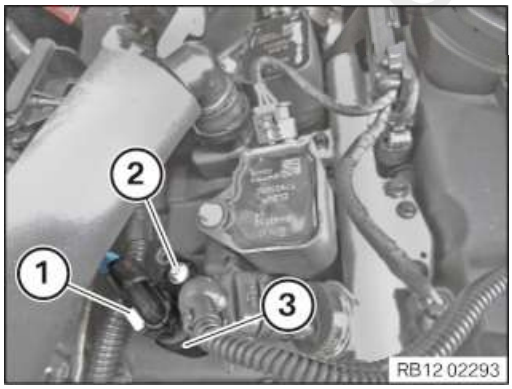


- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Feed out and remove the camshaft sensor (3).

3 – Install the camshaft sensor of the exhaust camshaft



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



- Install the camshaft sensor (3).
- Tighten down screw (2).

Camshaft sensor for exhaust camshaft on cylinder head cover

TS5x20		Tightening torque	4 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

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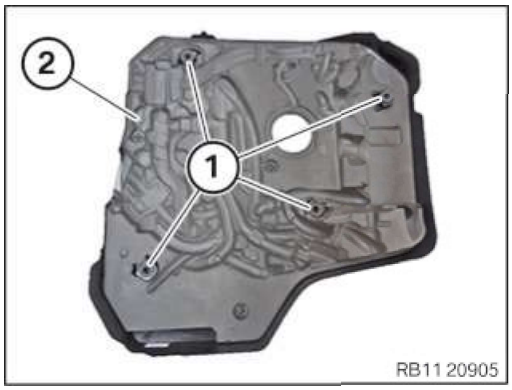
4 – Install acoustic cover

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

Camshaft sensor for exhaust camshaft on cylinder head cover — 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

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12 14 523 Replacing the camshaft sensor of the intake camshaft

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 camshaft sensor of intake camshaft

WARNING

Hot surfaces.

Risk of burning!

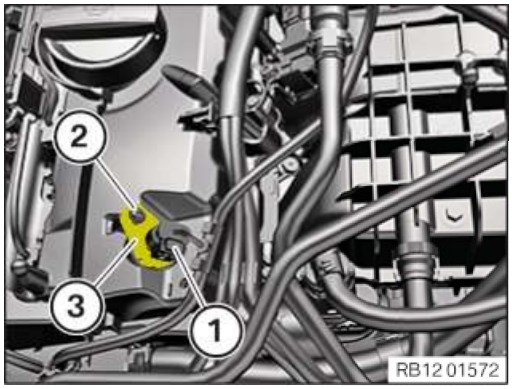
- Perform all work only on components that have cooled down.

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.



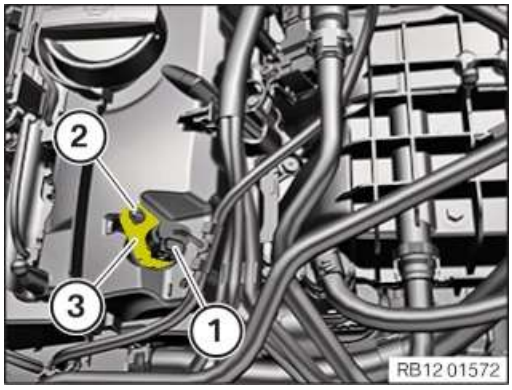
- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Feed out and remove the camshaft sensor (3).

3 – Install camshaft sensor of intake camshaft

▸ **Prepare the camshaft sensor**



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



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

Camshaft sensor for intake camshaft on cylinder head cover

TS5x20		Tightening torque	4 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

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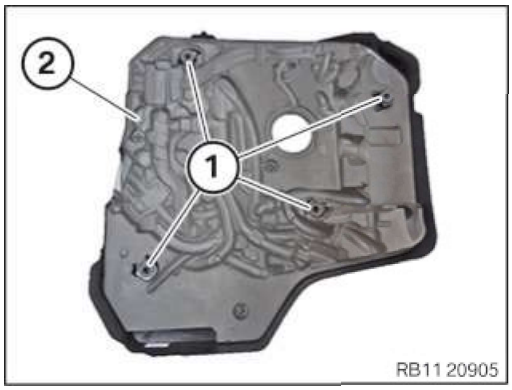
4 – Install acoustic cover

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

Camshaft sensor for intake camshaft on cylinder head cover — 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

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12 14 550 Replacing the control unit of the Digital Motor Electronics

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.

MAIN WORK

3 – Removing the DME control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

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

TECHNICAL INFORMATION

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

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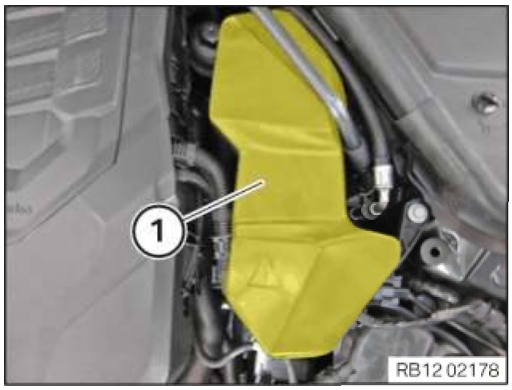
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

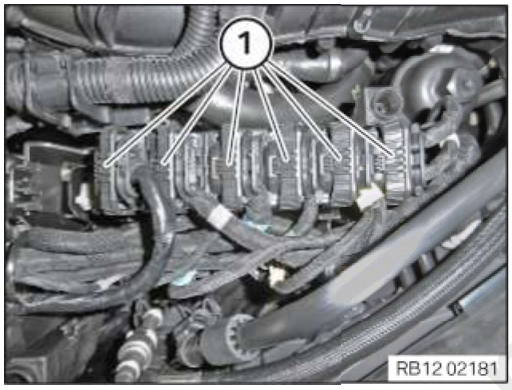
For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

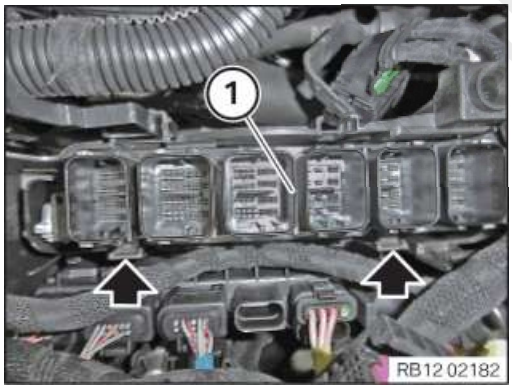
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



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



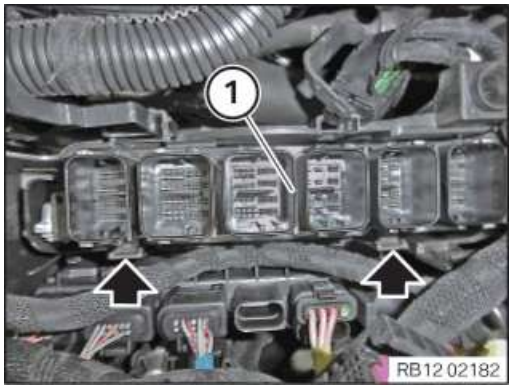
- Unlock and disconnect the plug connection (1).



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

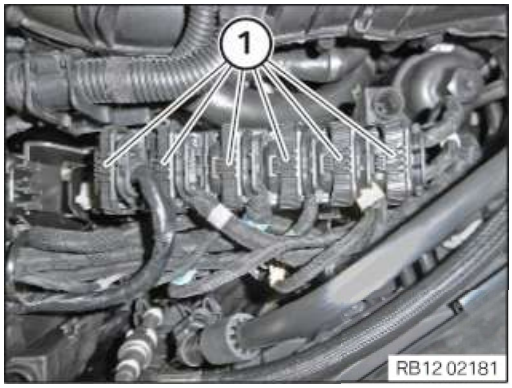
4 – Installing the DME control unit

bmwdiagn.com



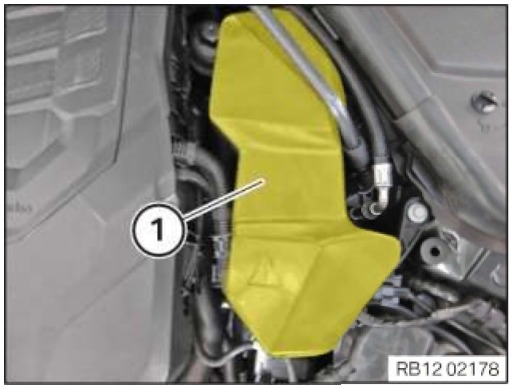
- Feed in and install DME control unit (1).

  The locks (arrows) must engage audibly.



- Connect connectors (1) and lock.

  All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

POSTPROCESSES

5 – Install acoustic cover

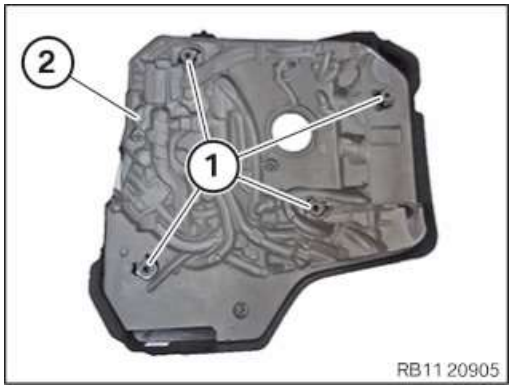
RISK OF DAMAGE

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.

6 – Disconnecting all battery earth leads



- See additional information.

7 – If the DME control unit is replaced: Program/encode the DME control unit

▸ **Encode/program control unit(s)**

Prerequisite

Replacement of component.

TECHNICAL INFORMATION

Use the most recent software version to prevent faults during programming/encoding.
The battery voltage must not fall below 13.0 V during programming.
Use only chargers for a low volt-vehicle electrical system that are recommended by BMW.

TECHNICAL INFORMATION

No high-voltage switch off is required in electric vehicles or hybrid vehicles for programming/encoding.
The high-voltage system will be automatically switched off by the programming system.

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- Connect the battery charger to the vehicle.
- Connect the programming system with the vehicle.
- Determine the action plan.
- Accept and fully process the measures plan.
- If applicable, connect the workshop system to the vehicle, depending on the reworking list.
- Carry out vehicle test.
- Delete the fault memory.
- The information about programming the workshop system and the corresponding notes in the user documentation must be observed.
- Wait until programming/encoding has been completed.
- Disconnect the programming system from the vehicle.
- Disconnect the battery charger from the vehicle.

▸ **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

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Additional Information

Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	34

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16

61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	16
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	16
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
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61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 35 ... Notes on ESD protection (Electro Static Discharge)	3
61 00 730 Encode/program control unit(s) (after vehicle test)	4

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12 31 020 Removing and installing/replacing alternator

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

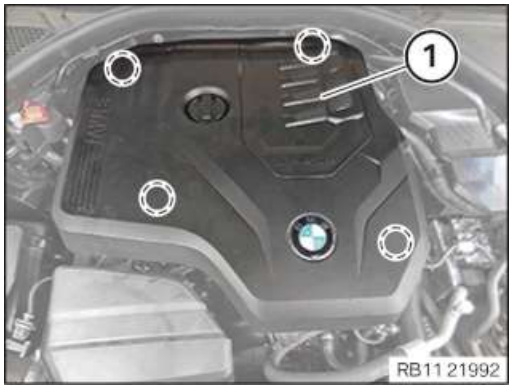
- Perform all work only on components that have cooled down.

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 – Removing the clean air pipe with the resonator

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WARNING

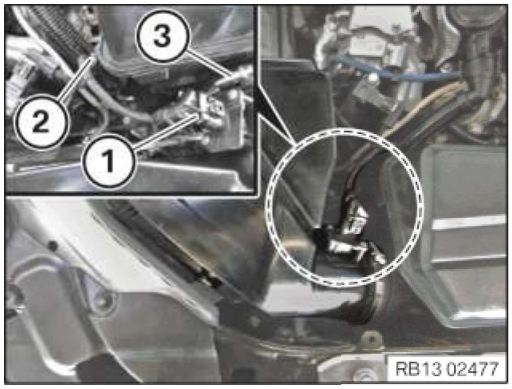
Hot surfaces.

Risk of burning!

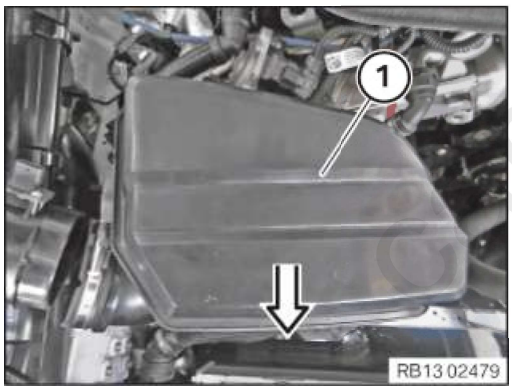
- Perform all work only on components that have cooled down.



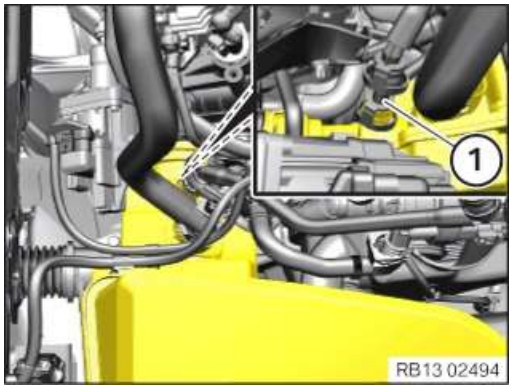
- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.



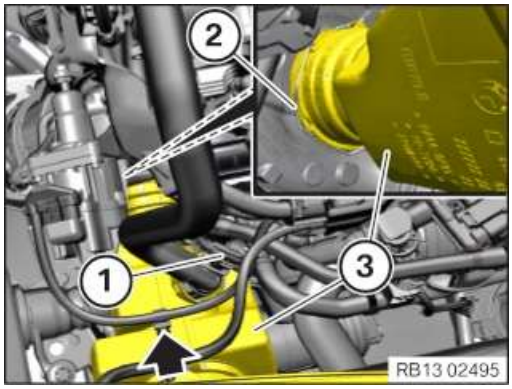
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- 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.

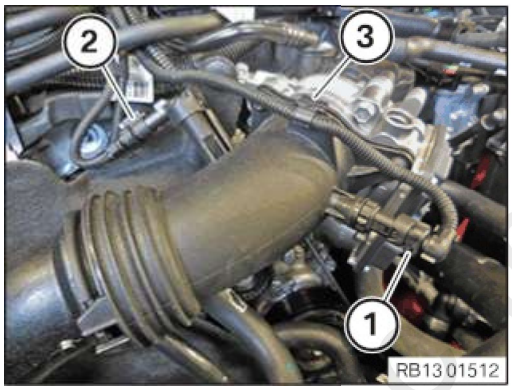
4 – Removing the throttle body

RISK OF DAMAGE

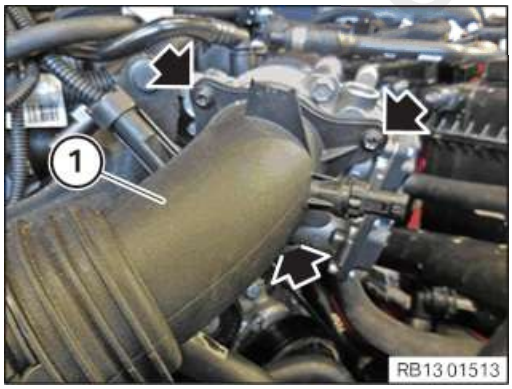
Electrostatic discharge.

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.

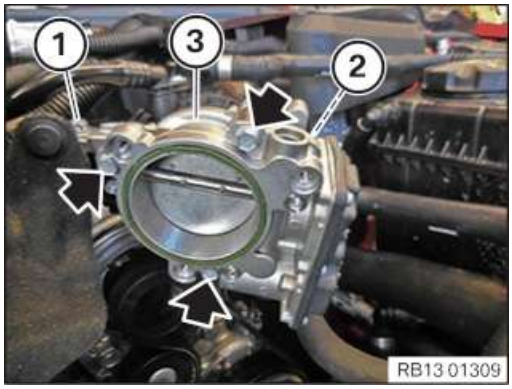


- Unlock and loosen connector (1).
- Unlock and loosen connector (2).
- Unlock and loosen clamp (3).



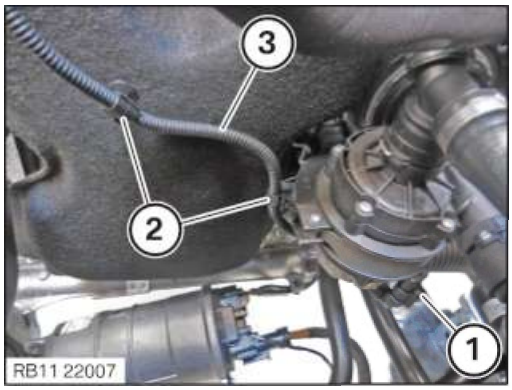
- Remove screws (arrows).
- Feed out charge air line (1) and place to one side.

mfdiag.com

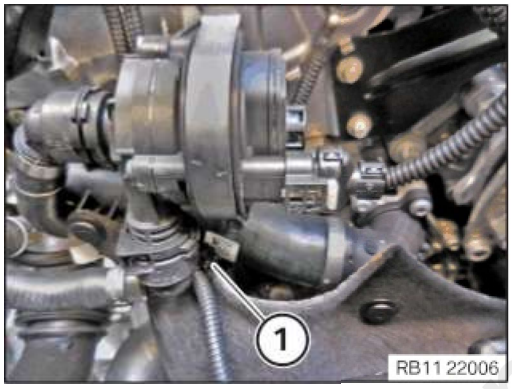


- Loosen screw (1).
- Remove screws (arrows).
- Unlock and loosen connector (2).
- Remove the throttle bodies (3).

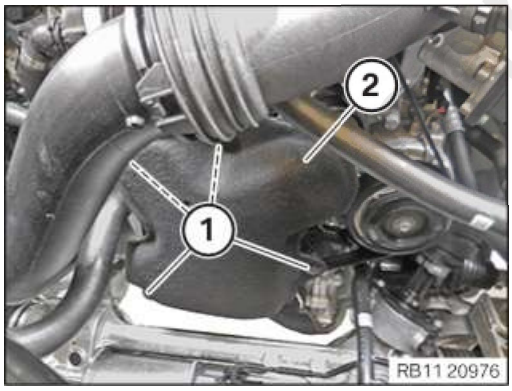
5 – Removing the acoustic cover for the engine at the front



- 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.

6 – Releasing the electrical auxiliary coolant pump for the charge air cooler or the air conditioning condenser

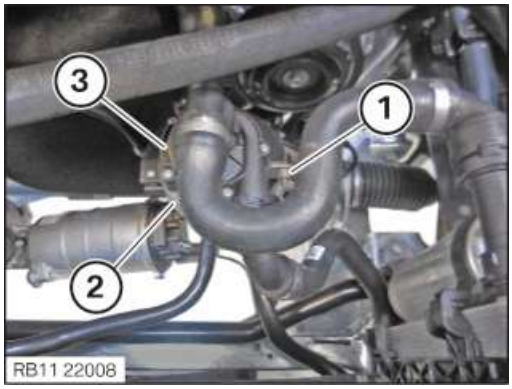
RISK OF DAMAGE

Non-visible damage to the coolant pump.

Forcibly removing, installing or dropping the coolant pump down will damage it.

- Remove and install the coolant pump without damaging it and without applying external force.
- Avoid impacts/knocks to the coolant pump (e.g.. by tools, falling down, hard contact with base).
- Renew coolant pump after being dropped or hard impacts/knocks.

diagn.com



- Loosen nut (1).
- Thread out holder (2) and set aside.
- Guide out the electrical auxiliary coolant pump (3) and set it aside.

7 – Removing the drive belt for alternator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.



- Increase the preload on the belt tensioner in **the direction of the arrow** using standard tools (1).
- Secure the belt tensioner with the special tool 0 496 268 (11 0 390).
- Guide out the drive belt for the alternator (2) and remove it.

MAIN WORK

8 – Removing the alternator

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– Removing the alternator

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

Hot surfaces.

Risk of burning!

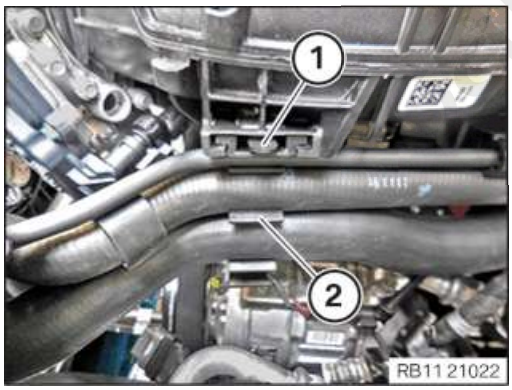
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

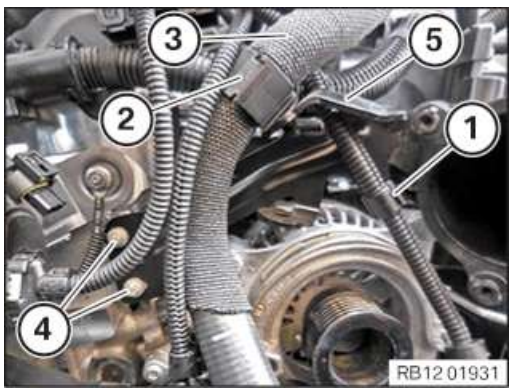
Electrostatic discharge.

Damage to or destruction of electrical components.

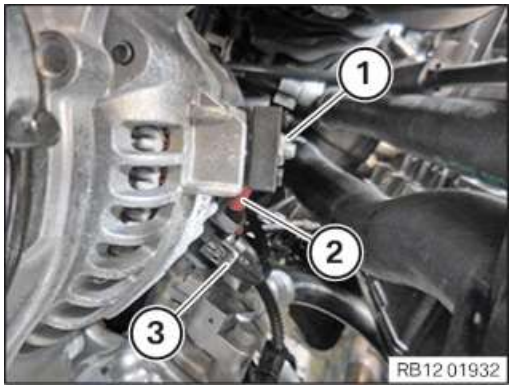
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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



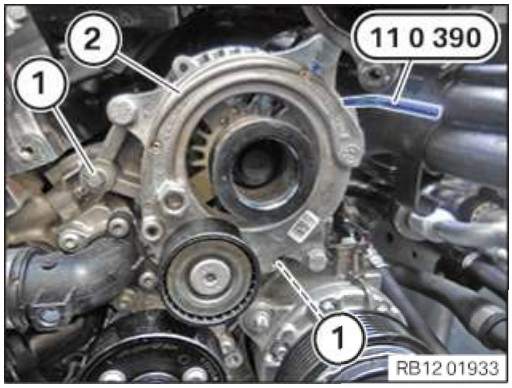
- Unlock the lock (1).
- Thread out holder (2) and set aside.



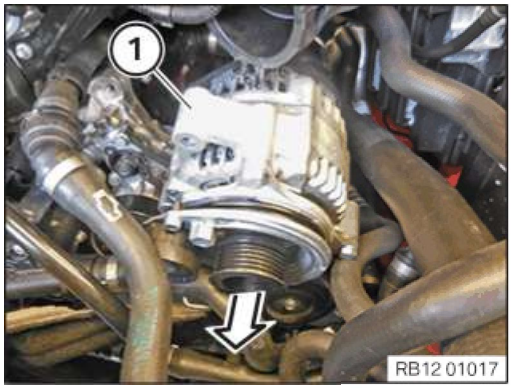
- Loosen clamp (1).
- Loosen clamp (2).
- Feed out coolant line (3) and place to one side.
- Loosen screws (4).
- Thread out holder (5) and set aside.



- Unfasten nut (1).
- Thread out positive battery cable (2) and set it aside.
- Unlock and loosen connector (3).



- Make sure that the special tool 0 496 268 (11 0 390) is fitted correctly.
- Loosen screws (1).
- Disconnect the alternator (2).



- Feed the alternator (1) out toward the front in the direction of the arrow.

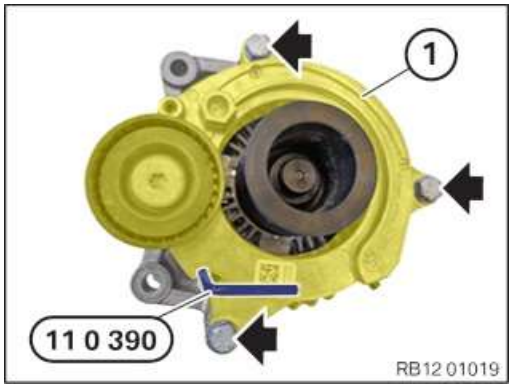
9 – Renew alternator

CAUTION

Component with preload.

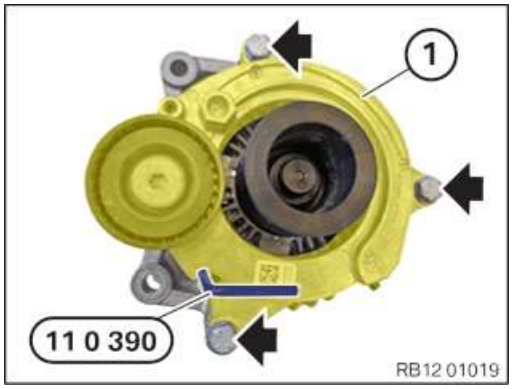
Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.



- Remove screws (arrows).
- Feed out and remove the tensioning device for the drive belt for alternator (1) on the alternator.

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- Feed in and install the tensioning device for the drive belt for alternator (1) on the alternator.
- Make sure that the special tool 0 496 268 (11 0 390) is fitted correctly.
- Tighten screws (arrows).

Belt tensioner to alternator

M8X30		Tightening torque	28 Nm

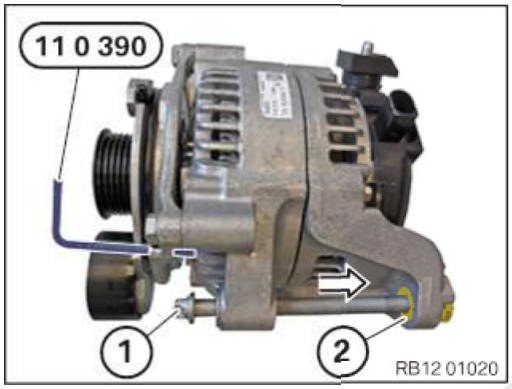
10 – Installing the alternator

WARNING

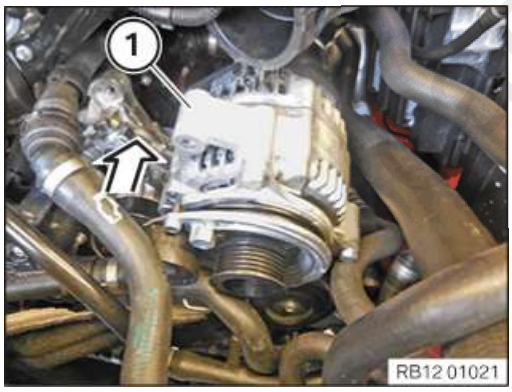
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

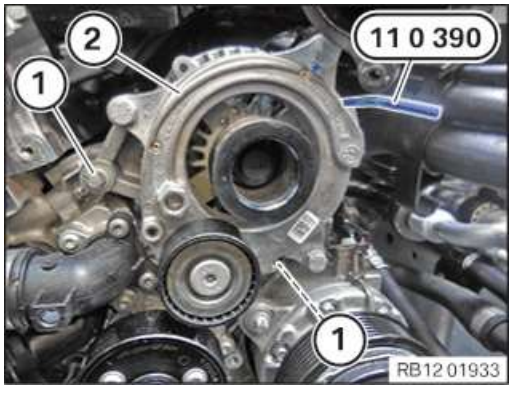
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.



- Make sure that the special tool 0 496 268 (11 0 390) is fitted correctly.
- Slightly push back the threaded support sleeve (2) in the direction of the arrow to facilitate the installation of the alternator.
- Screw the screw (1) into the threaded support sleeve (2).
- Press back the threaded support sleeve (2) using the bolt (1).
- Once again unscrew the screw (1) from the threaded support sleeve (2).



- Guide in alternator (1) in the direction of the arrow and position it.

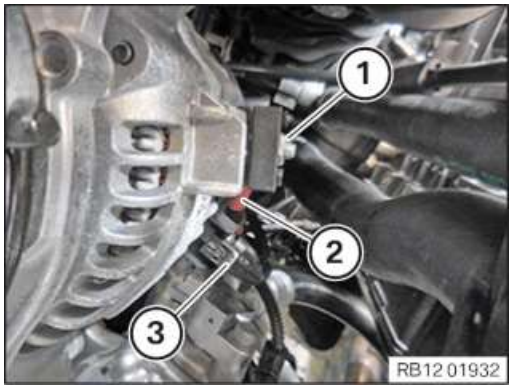


- Install the alternator (2).
- Tighten the screws (1).

Alternator to component carrier

M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm

- Make sure that the special tool 0 496 268 (11 0 390) is fitted correctly.

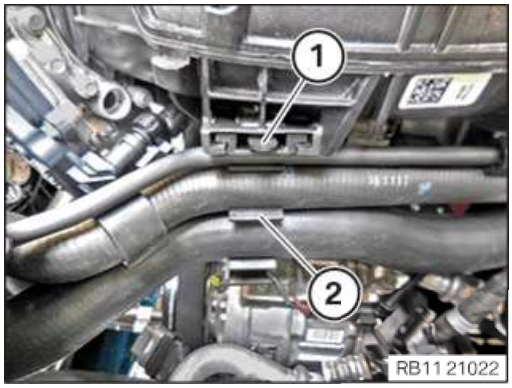


- Insert and install the positive battery cable (2).
- Tighten nut (1).

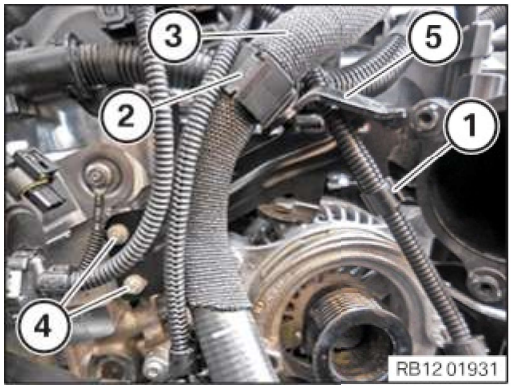
Positive battery cable to the alternator

M8		Tightening torque	19 Nm

- Connect and lock the connector (3).
- The connector (3) must engage audibly.



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



- Insert and position the holders (5).
- Tighten down screws (4).

Manifold support for intake air to cylinder head

M6X16		Tightening torque	8 Nm

- Guide coolant line (3) into clamp (2) and install it.
- Secure clamps (2).
- Secure the clamp (1).

POSTPROCESSES

11 – Installing the drive belt for alternator

Overview of drive belt for alternator



1. Drive belt for alternator

TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

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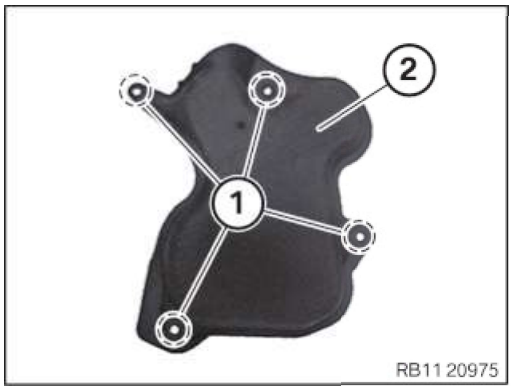
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.



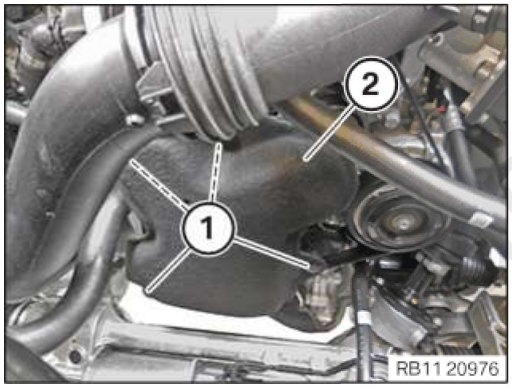
- Position the drive belt for alternator (2) on the ancillary components.
- Increase the preload on the belt tensioner in **the direction of the arrow** using standard tools (1).
- Feed the special tool 0 496 268 (11 0 390) out of the belt tensioner and remove it.

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

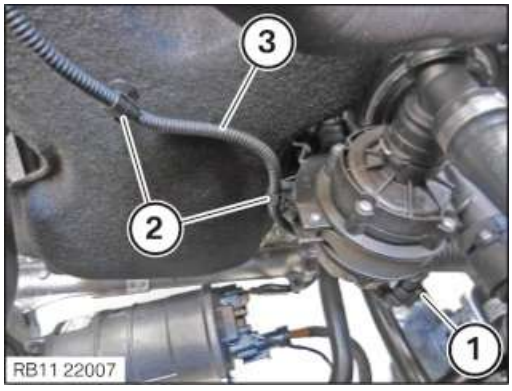


- Check if acoustic cover (2) in marked area (1) is damaged and replace acoustic cover (2) if necessary.

  Parts: Acoustic cover



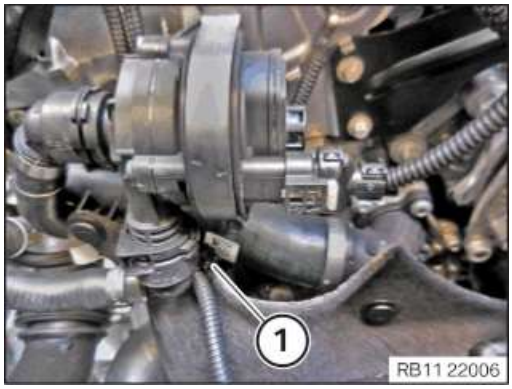
- Thread in and position the acoustic cover (2).
- Mount all expanding rivets (1).



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

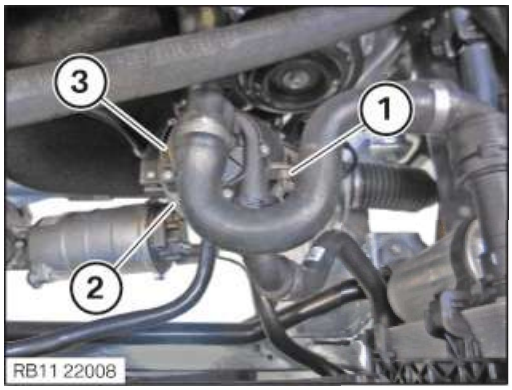
  The connector (1) must engage audibly.

mdiagn.com



- Secure clamps (1).

13 – Mounting the electrical auxiliary coolant pump for the charge air cooler/air conditioning condenser

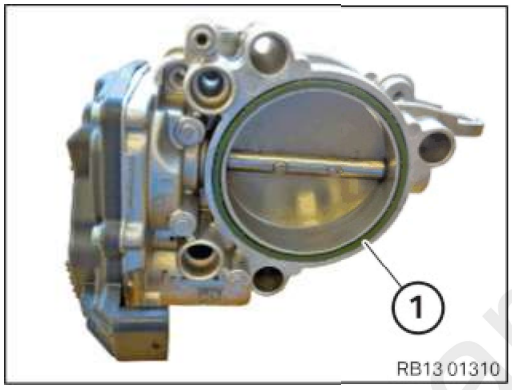


- Feed in and position the electrical auxiliary coolant pump (3).
- Insert and install the holder (2).
- Tighten nut (1).

Electric coolant pump to holder

M6		Tightening torque	8 Nm

14 – Installing the throttle body



- Renew sealing ring (1).

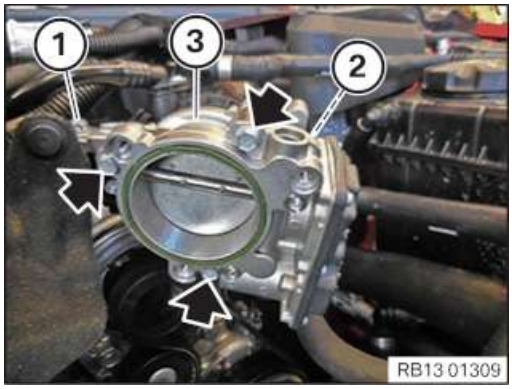
  Parts: Sealing ring



- Renew sealing ring (1).

  Parts: Sealing ring

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

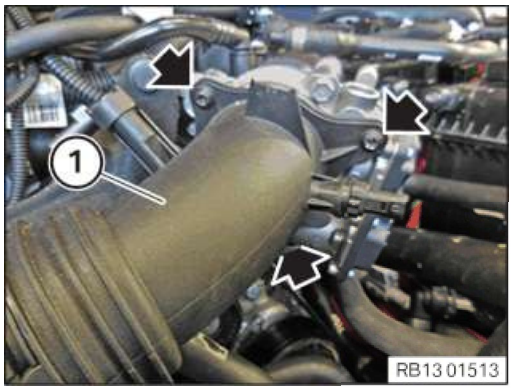
Throttle body to intake plenum

M6X50		Tightening torque	7 Nm

- Tighten down screw (1).

Throttle body to holder

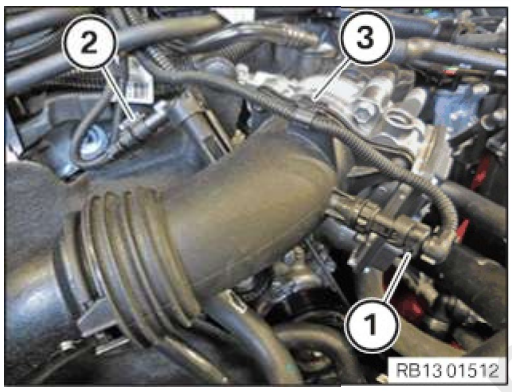
M6X25		Tightening torque	8 Nm



- 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).

15 – Installing the clean air pipe with resonator



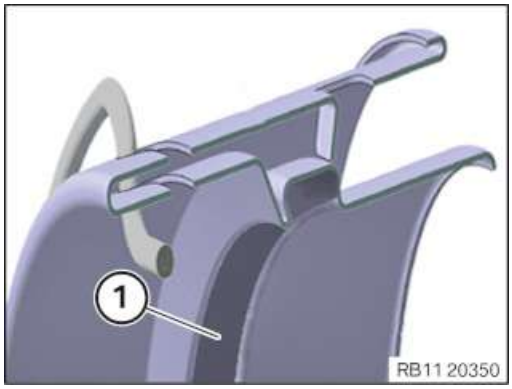
- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

TECHNICAL INFORMATION

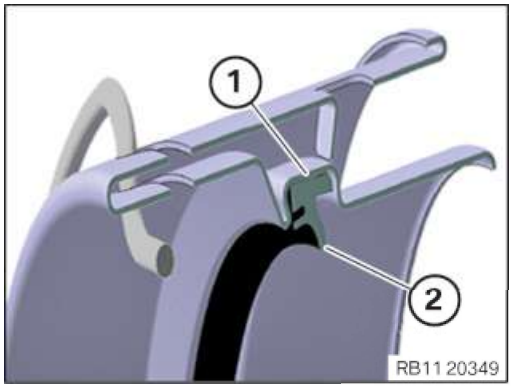
Do not use pointed or sharp-edged tools for the installation and/or removal.

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

  The gasket groove (1) must be clean.



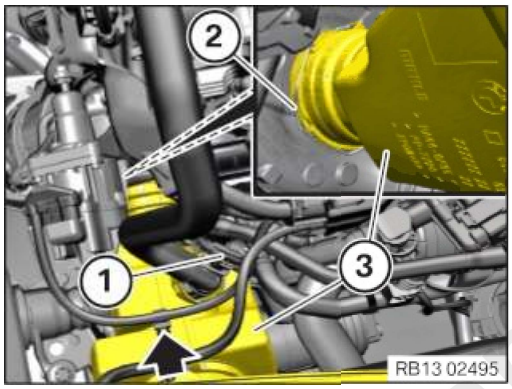
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

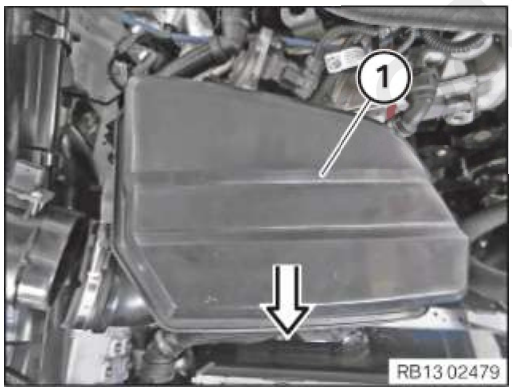
- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).



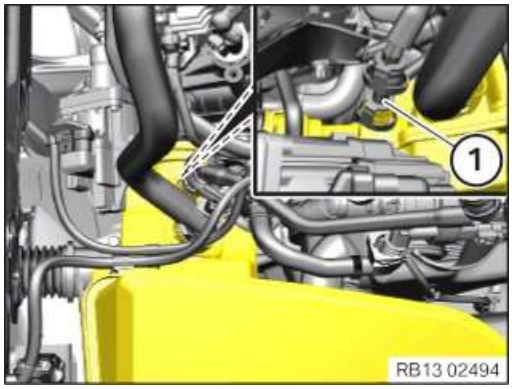
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

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

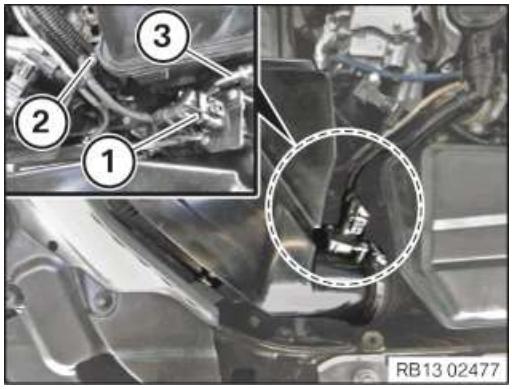
  The connector (1) must engage audibly.
- Secure clamp (arrow).



- 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.

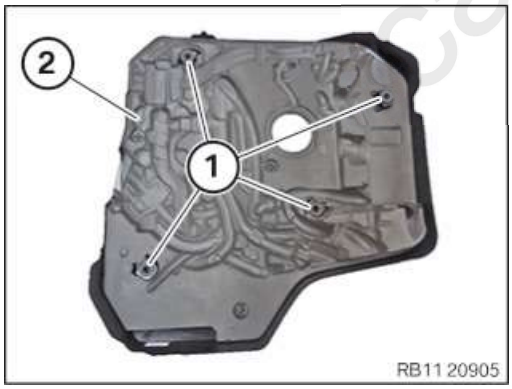
16 – Install acoustic cover

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.



- 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.

Additional Information

Overview of Tightening Torques

Belt tensioner to alternator			Used in step 9
M8X30		Tightening torque	28 Nm

Alternator to component carrier			Used in step 10
M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm

Positive battery cable to the alternator			Used in step 10
M8		Tightening torque	19 Nm

Manifold support for intake air to cylinder head			Used in step 10
M6X16		Tightening torque	8 Nm

Electric coolant pump to holder			Used in step 13
M6		Tightening torque	8 Nm

Throttle body to intake plenum			Used in step 14
M6X50		Tightening torque	7 Nm

Throttle body to holder			Used in step 14
M6X25		Tightening torque	8 Nm

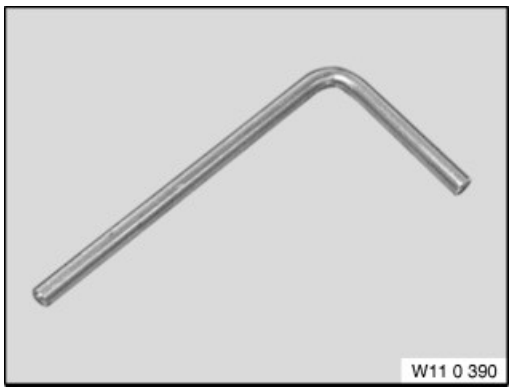
Charge air line to throttle body			Used in step 14
M6		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 15
Clamp		Tightening torque	3 Nm

Overview of Special Tools

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0 496 268 (11 0 390) Pin



Common	Used in step 7891011
Usage	(roll pin) For securing new tensioning pulley (poly-V belt)
Included in the tool or work	
Storage location	B24
Replaced by	
In connection with	
SI-Number	01 15 07 (390)

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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
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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)	4
61 35 ... Notes on ESD protection (Electro Static Discharge)	468

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11 00 ... Handling components after flood damage

Flood damage can occur if the permissible fording depth of a vehicle is exceeded. Ingress of water can cause damage to the engine (water shock) or components.

Because dirt particles generally enter into the component with the water (e.g. starter motor, wiring harness), the components need to be thoroughly inspected.

Residual moisture in the components leads to corrosion (increased contact resistance in the component), which can lead to a component failure at a later time.

If water ingress into the electrical components cannot be ruled out, it is recommended to replace the component to ensure correct functioning through the vehicle lifetime.

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12 41 020 Removing and installing/replacing starter motor

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.

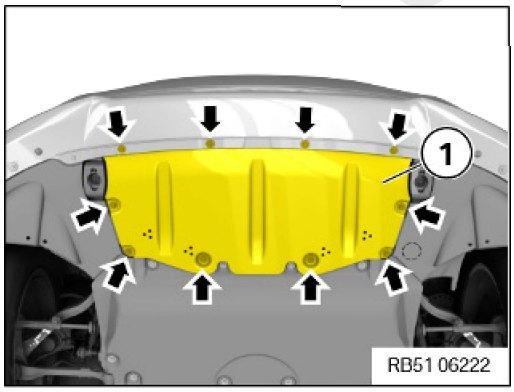
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the front underbody protection

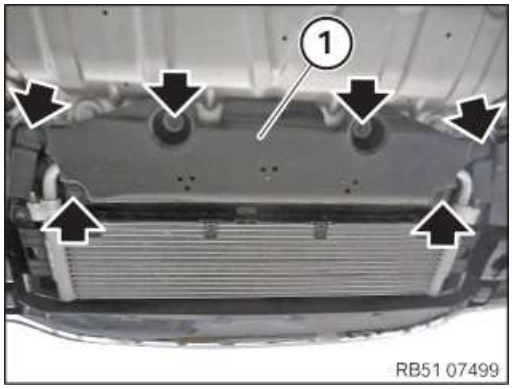


- **Version 1:**

  Remove screws (arrows).

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

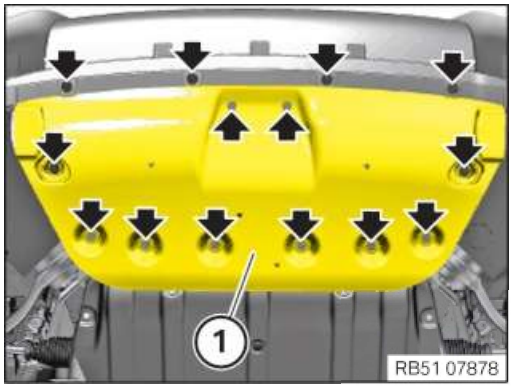
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- **Version 2:**

  Remove screws (arrows).

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

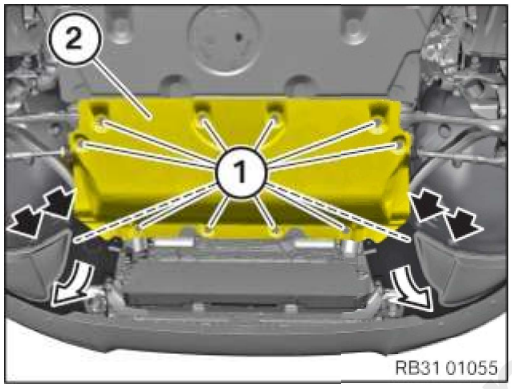


- **Version 3:**

  Remove screws (arrows).

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

3 – Remove the underbody protection of the steering gear



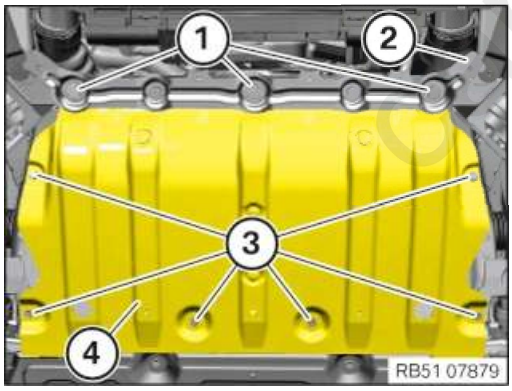
- **Version 1:**

  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:**

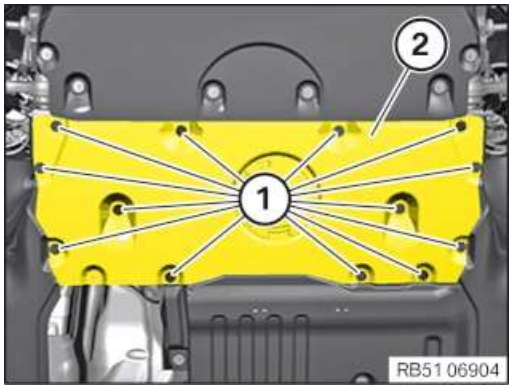
  Loosen screws (1).

  Remove the holder of the underride protection (2).

  Loosen screws (3).

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

4 – Removing the centre underbody protection

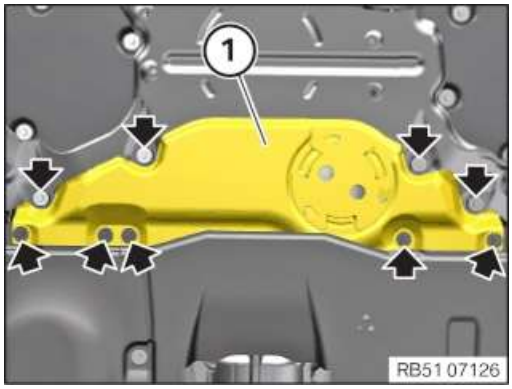


- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

carmanuals.com

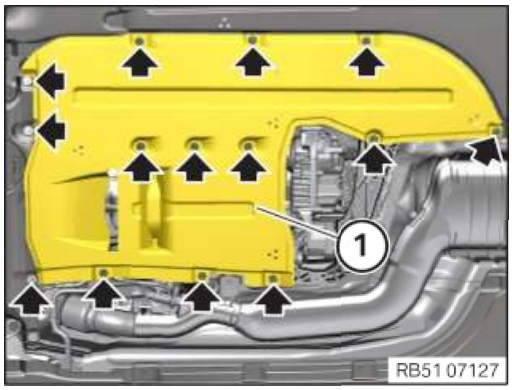


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

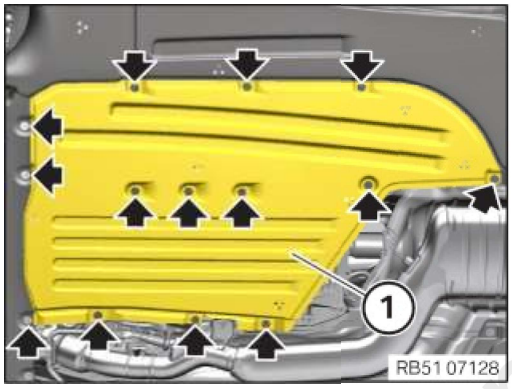
5 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



- **Version 2:**

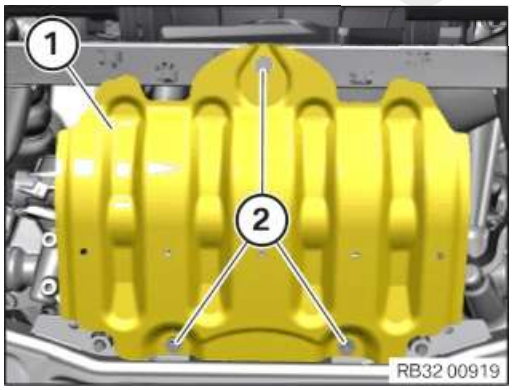
  Remove screws (arrows).

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

6 – If installed: Removing the steering start protection

Prerequisite

The front underbody protection is removed.



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

MAIN WORK

7 – Removing starter motor

Prerequisite

Battery earth leads are disconnected.

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WARNING

Hot surfaces.

Risk of burning!

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

WARNING

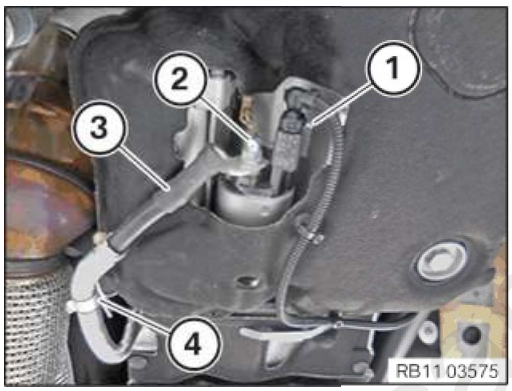
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

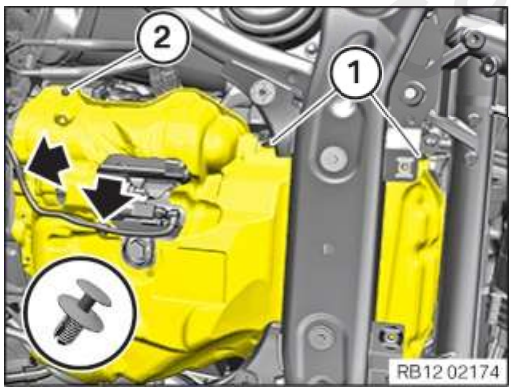
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

TECHNICAL INFORMATION

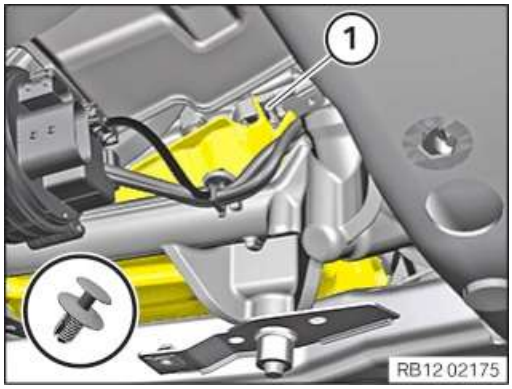
Make sure that the acoustic cover is **not** damaged while removing the starter motor.
A damaged lower acoustic cover can only be renewed when the front axle is lowered.



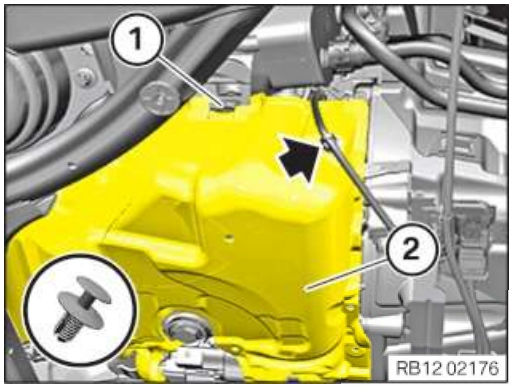
- Unlock plug connection (1) and disconnect.
- Loosen nuts (2).
- Release positive battery cable (3) from holder (4).



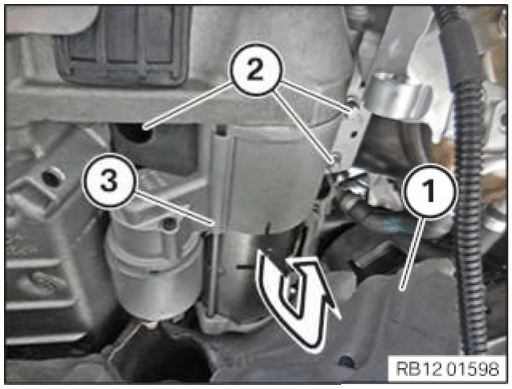
- Loosen the expanding rivet (1).
- Undo fir tree clip (2).
- Release the clamps (*arrows*).



- Loosen expanding rivet (1).
- Lower the acoustic cover of the oil sump.



- Loosen expanding rivet (1).
- Loosen the clamp (arrow).
- Lower acoustic cover (2).

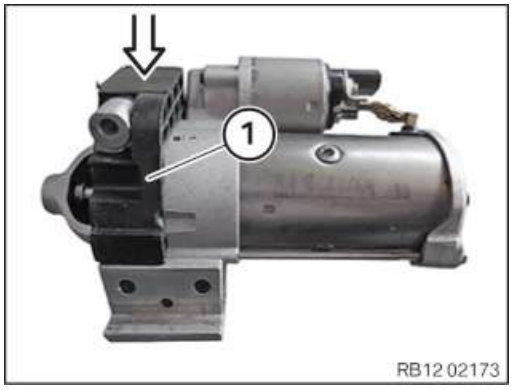


- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Loosen screws (2).
- Carefully guide out the starter motor (3) in direction of arrow and remove.

8 – Replace starter motor



- Remove noise damping plug (1) in the direction of the arrow.

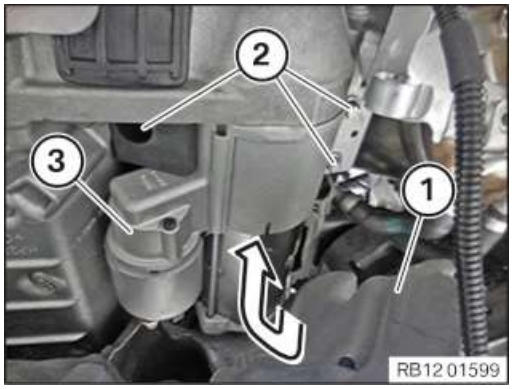


- Replace the starter motor.

  Parts: Starter motor
- Fit noise damping plug (1) in the direction of the arrow.

9 – Installing starter motor

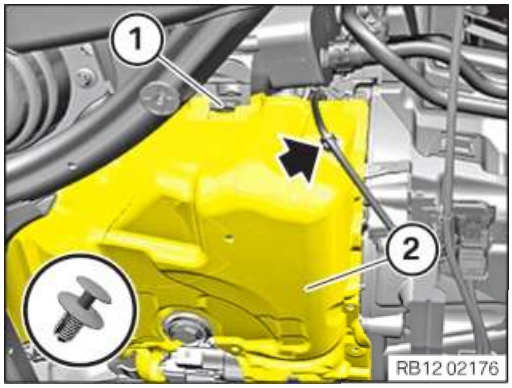
carsdiagn.com



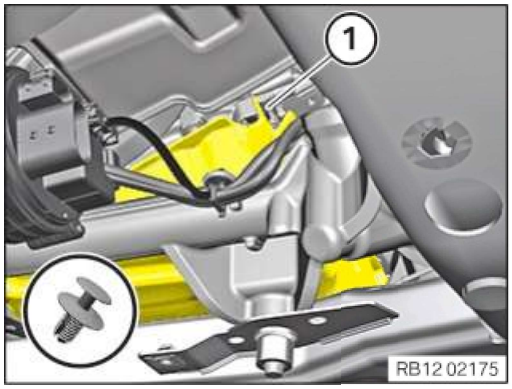
- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Feed in and install the starter motor (3) in the direction of the arrow.
- Tighten the screws (2).

Starter motor to engine

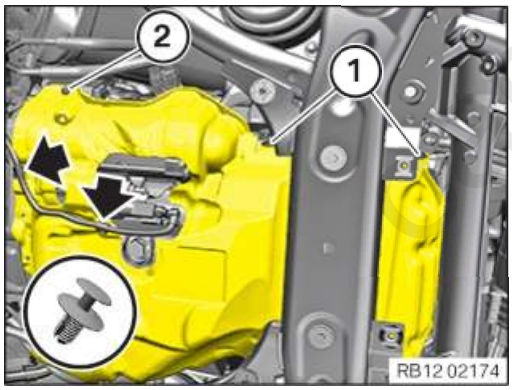
M8X60		Tightening torque	19 Nm



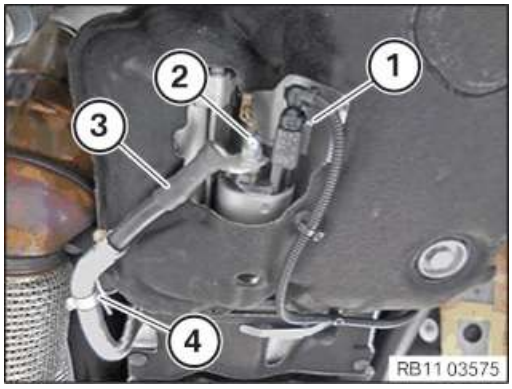
- Position the acoustic cover (2).
- Fasten expanding rivet (1).
- Secure clamp (arrow).



- Fasten expanding rivet (1).

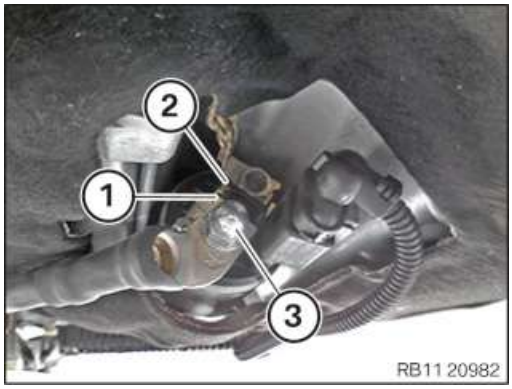


- Secure fir tree clip (2).
- Secure expanding rivet (1).
- Secure the clamps (arrows).



- Secure the positive battery cable (3) in the holder (4) and position it at the starter motor.
- Tighten the nut (2) hand-tight.
- Connect the connector (1) and audibly lock it.

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CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

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

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

Battery positive lead to starter

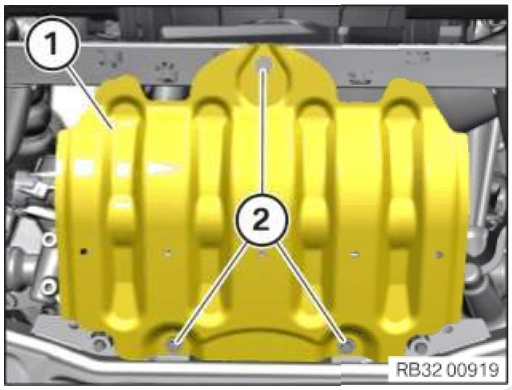
M8		Tightening torque	13,5 Nm

POSTPROCESSES

10 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

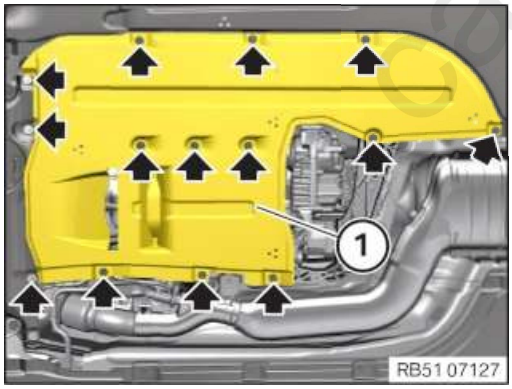


- Remove guard (1).
- Tighten the screws (2).

Bumper buffer device steering on front axle support

M10		Tightening torque	56 Nm

11 – Installing underbody protection at rear



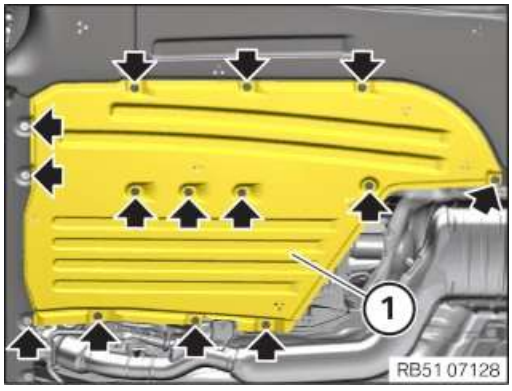
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

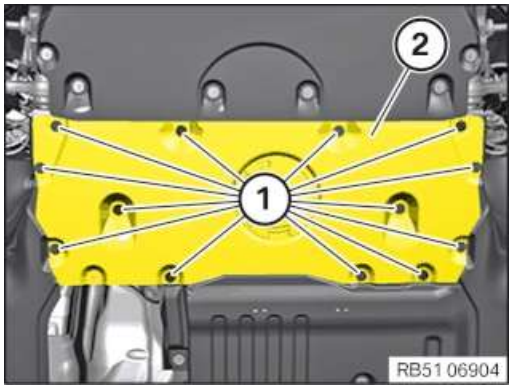
  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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12 – Installing the centre underbody protection



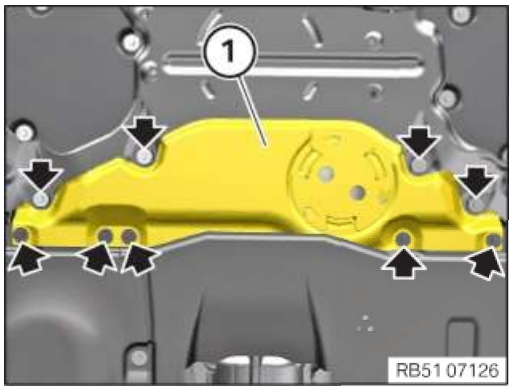
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

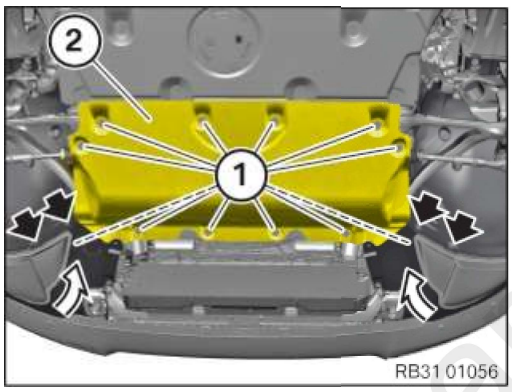
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

13 – 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

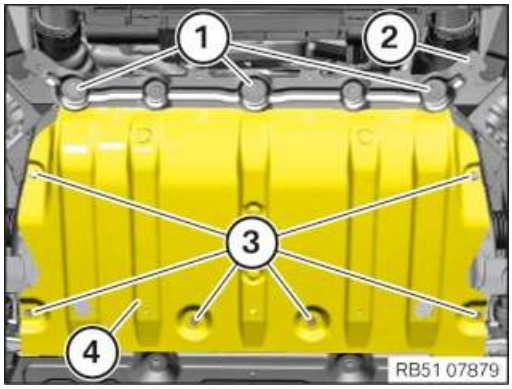
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- 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

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

Underbody protection of the steering gear

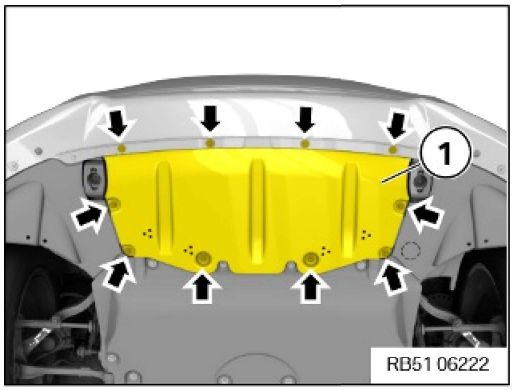
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

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

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

14 – Installing the front underbody protection



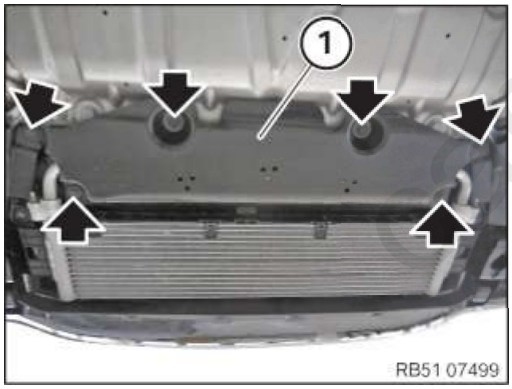
- **Version 1:**

  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



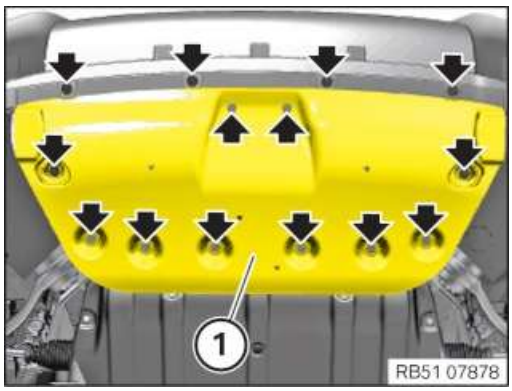
- **Version 2:**

  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

15 – Disconnecting all battery earth leads

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- See additional information.

Additional Information

Overview of Tightening Torques

Starter motor to engine			Used in step 9
M8X60		Tightening torque	19 Nm

Battery positive lead to starter			Used in step 9
M8		Tightening torque	13,5 Nm

Bumper buffer device steering on front axle support			Used in step 10
M10		Tightening torque	56 Nm

Underbody protection			Used in step 1112
Hexagon screw		Tightening torque	3 Nm

Underbody protection of the steering gear			Used in step 13
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws)			Used in step 13
Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support			Used in step 13
M10		Tightening torque	56 Nm

Underbody protection front			Used in step 14
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115

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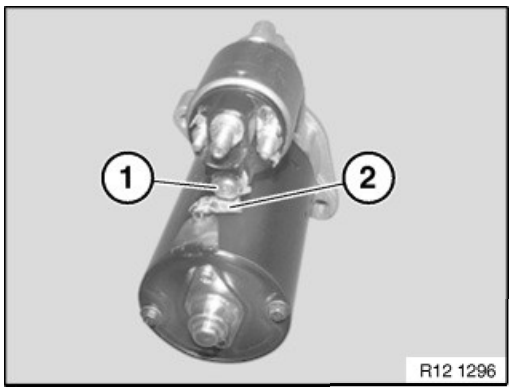
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
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61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting battery earth lead	115
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61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115

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12 41 041 Replacing the engagement solenoid switch

Necessary preliminary work:

- Switch off ignition.
- Remove starter motor.

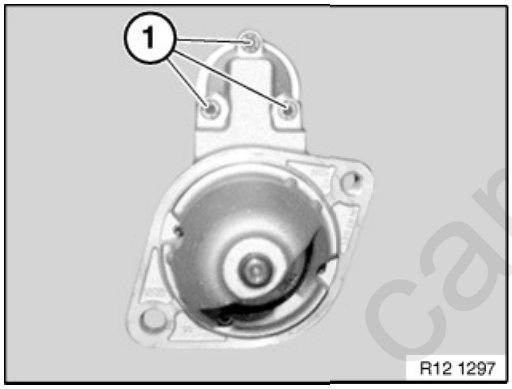


Slacken nut (1).

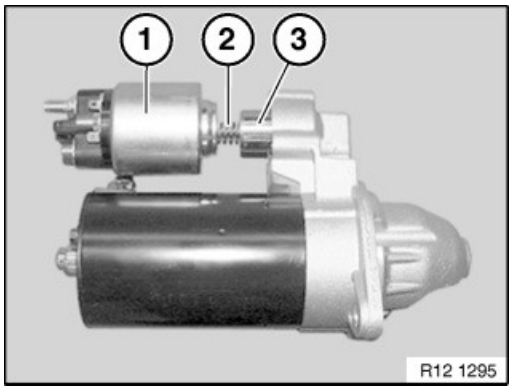
Remove the cable shoe (2).

Attention!
Do not twist the cable shoe (2) when tightening, risk of shorting to starter motor housing.

Tightening torque 12 41 1AZ.



Release screws (1).



Remove the solenoid switch (1) and the spring (2).

Detach the bolt (3).

Installation note:
Check the bolt (3) for wear and grease the bolt.

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12 42 651 Removing and installing/replacing the positive battery cable, remote positive terminal to alternator

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.

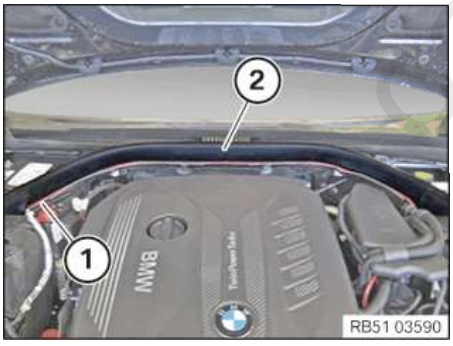
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



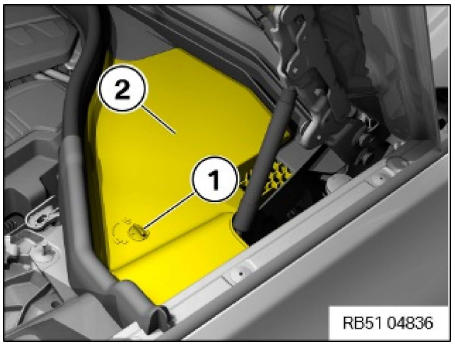
- See additional information.

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.

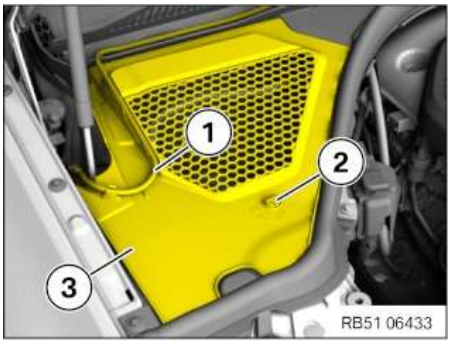
3 – Remove the cover of the engine compartment at the rear left



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

4 – Remove the cover of the rear right engine compartment

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

5 – Removing both wiper arms

NOTICE

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

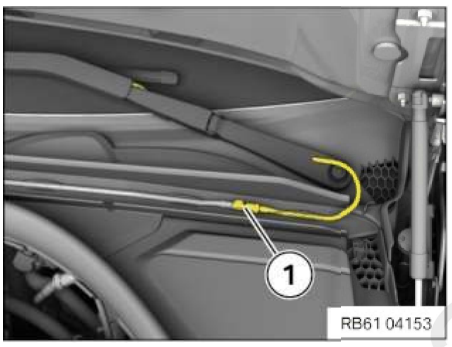
▶ **Remove the wiper arm**

RISK OF DAMAGE

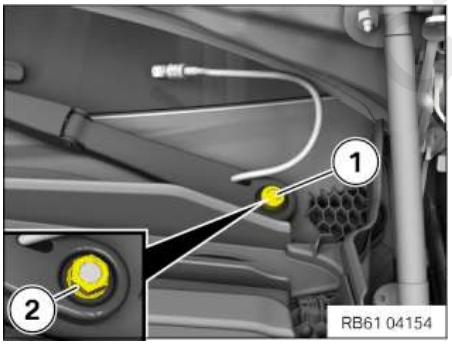
Damage to wiper console

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

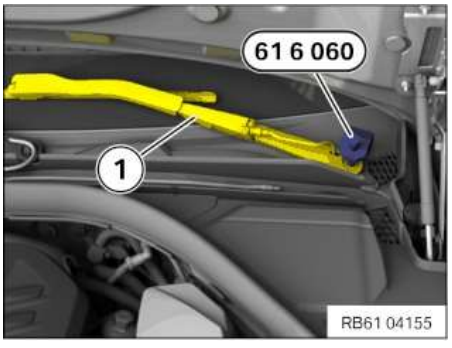
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.



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



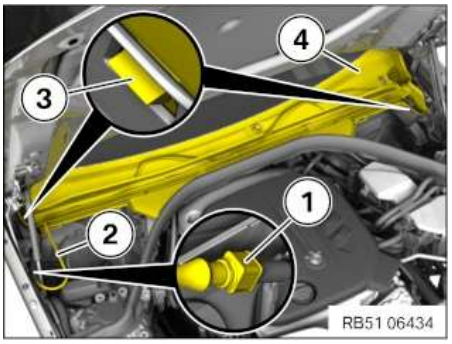
- Remove the protective cap (1).
- Loosen nut (2).



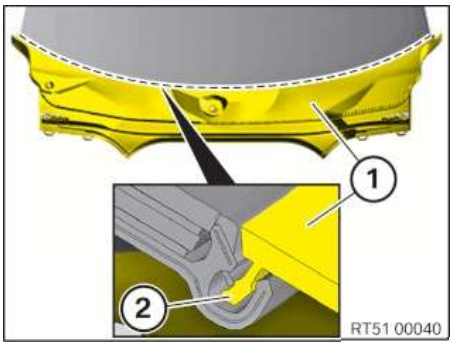
- Pull off the wiper arm (1) using special tool .

6 – Remove cowl panel cover

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

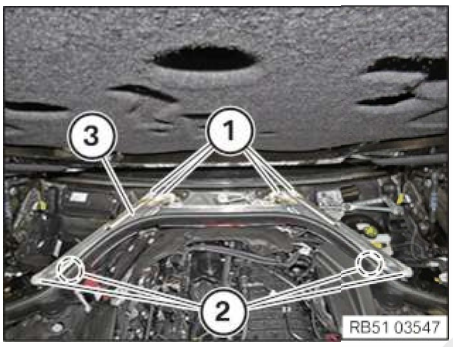


- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

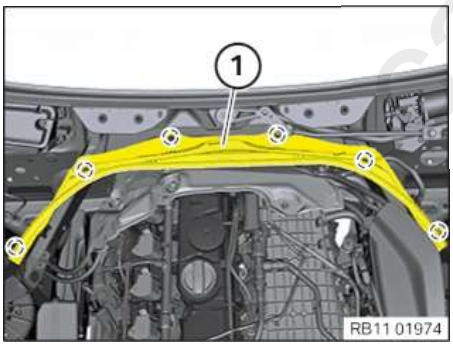
7 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

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



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



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

8 – 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.

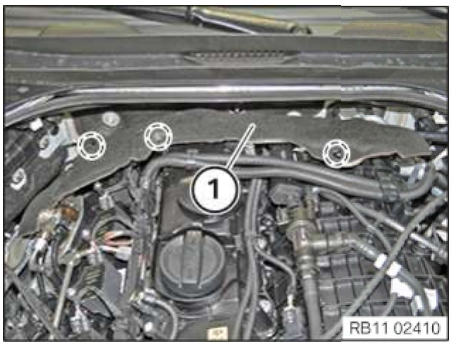
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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.

9 – Removing acoustic cover at rear



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

10 – Removing the DME control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

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

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TECHNICAL INFORMATION

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

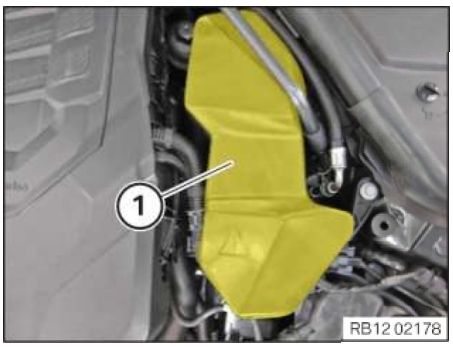
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

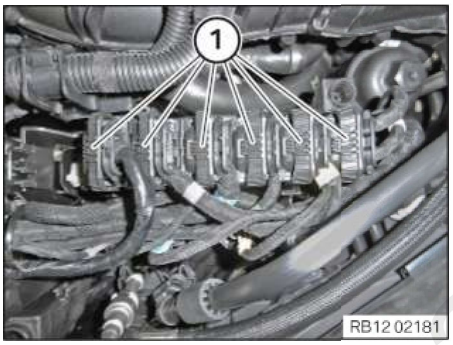
For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

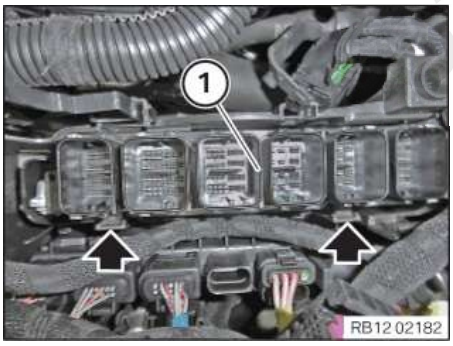
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



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



- Unlock and disconnect the plug connection (1).



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

11 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

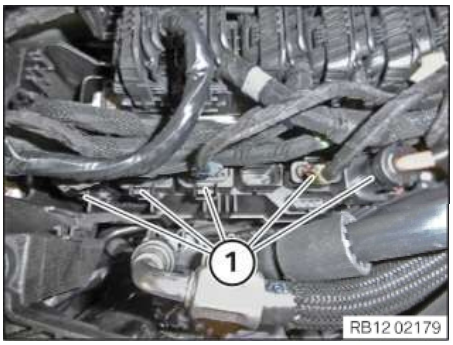
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RISK OF DAMAGE

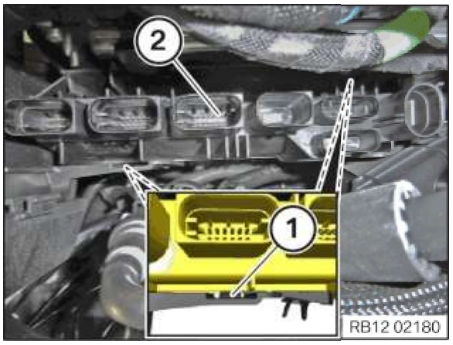
Electrostatic discharge.

Damage to or destruction of electrical components.

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

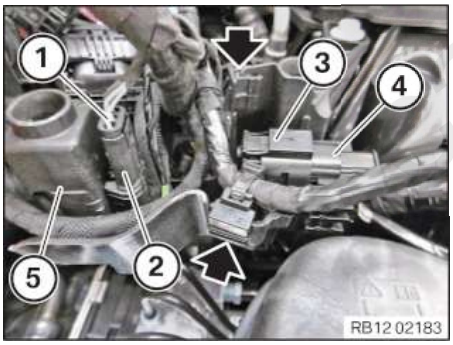


- Unlock and disconnect plug connections (1).

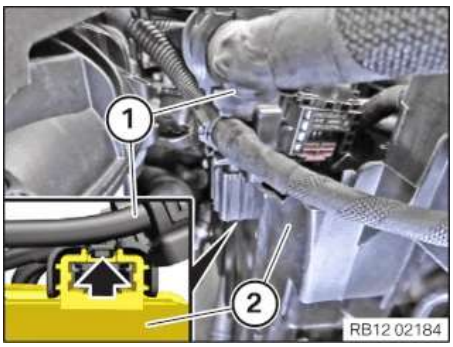


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

12 – Removing the control unit holder

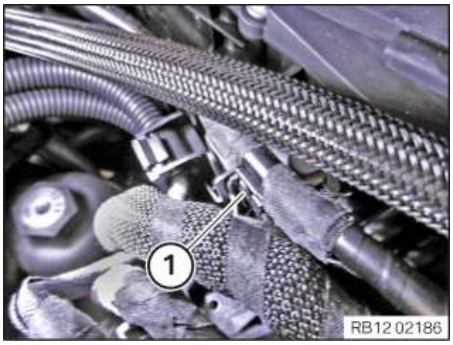


- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the starter (5).
- Unlock plug connection (3) and disconnect.
- Unlock the connector (4) and disconnect from the starter (5).
- Release the clamps (arrows).

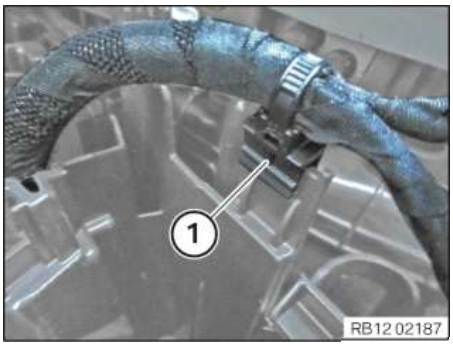


- Unlock the lock (arrow).
- Disconnect the cable plug (1) upwards from the control unit holder (2).

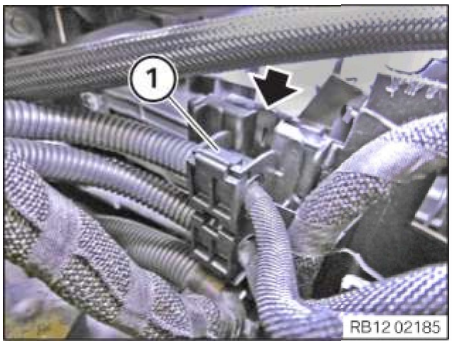
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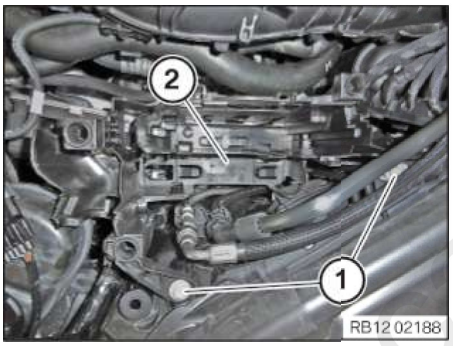
- Loosen clamp (1).



- Loosen clamp (1).



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



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

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MAIN WORK

13 – Removing the positive battery cable from the alternator to the positive battery connection point

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

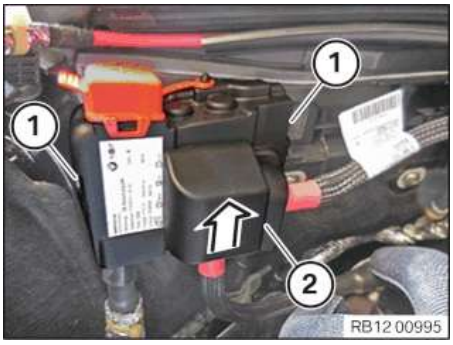
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

WARNING

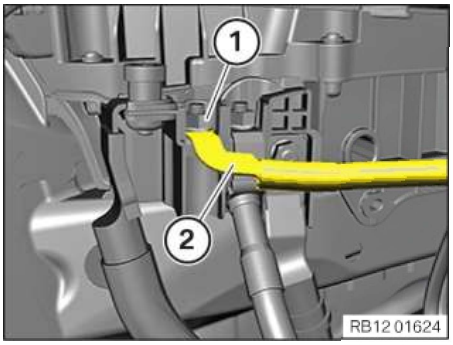
Hot surfaces.

Risk of burning!

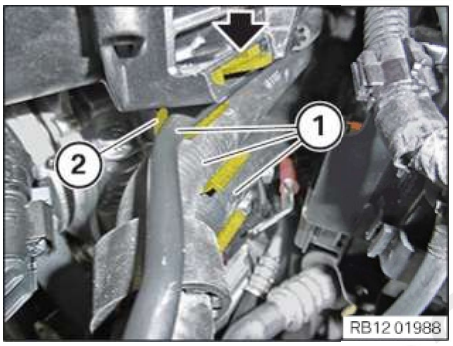
- Perform all work only on components that have cooled down.



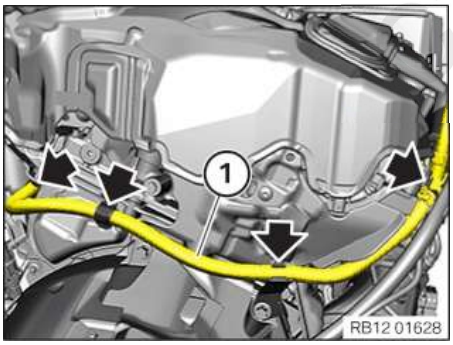
- Unlock the lock (1).
- Guide and remove cover (2) in direction of arrow.



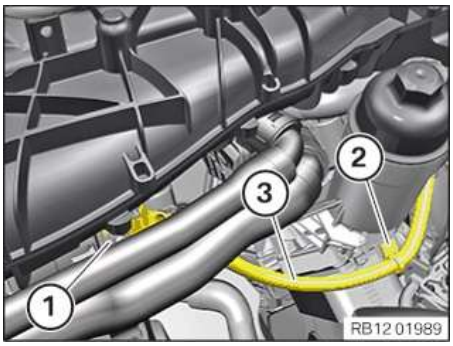
- Unfasten nut (1).
- Thread out positive battery cable (2) and set it aside.



- Feed the coolant hoses (1) out and set them aside.
- Unlock the lock (Arrow) and feed out holder(2) and remove.



- Detach the positive battery cable (1) from the holders (arrows) and set it aside.



- Unfasten nut (1).
- Loosen clamp (2).
- Remove positive battery cable (3) and remove.

14 – Installing the positive battery cable from the alternator to the positive battery connection point

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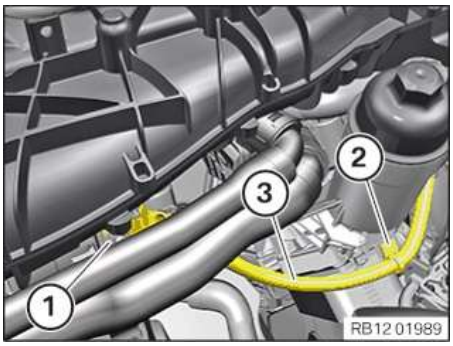
Prerequisite

CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

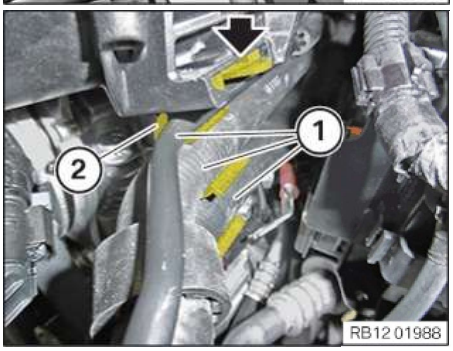
- Route the positive battery cable without abrasions and do not trap.



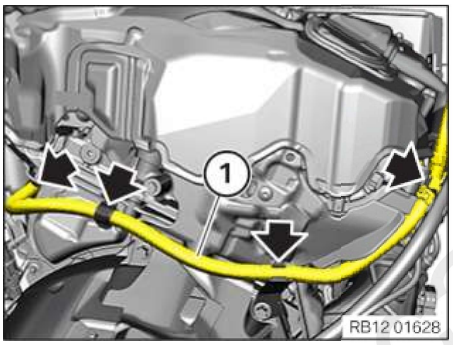
- Insert and install the positive battery cable (3).
- Secure clamps (2).
- Tighten nut (1).

Positive battery cable to the alternator

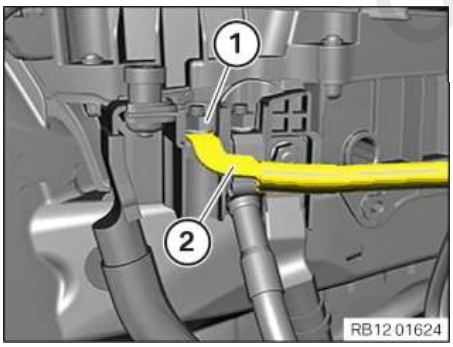
M8		Tightening torque	19 Nm



- Insert and install the holder (2).
- Ensure that the lock (arrow) engages correctly.
- Guide in coolant hoses (1).



- Fasten the positive battery cable (1) with the holders (arrows).



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

Battery positive lead to battery positive terminal

M8		Tightening torque	19 Nm

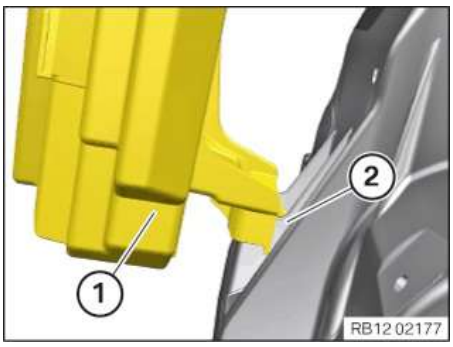


- Insert and install the cover (2) in the direction of the arrow.

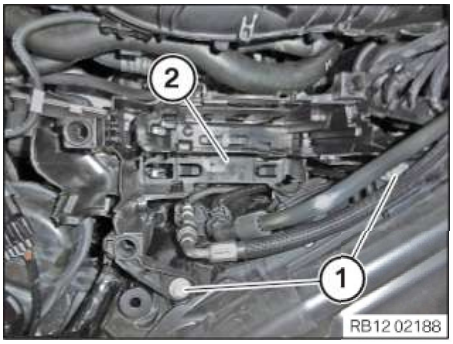
  The locks (1) must engage audibly.

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15 – Installing the control unit holder



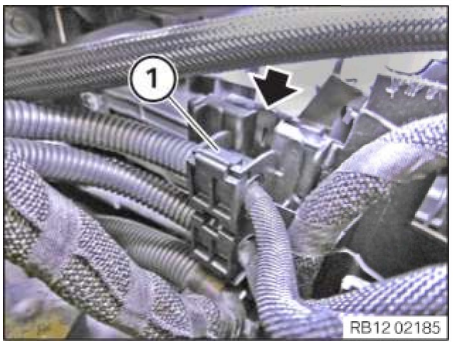
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



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

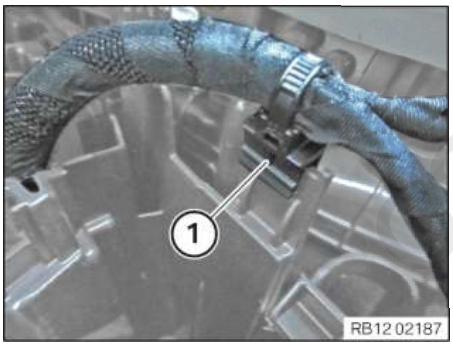
Control unit holder on spring strut dome

Hexagon screw		Tightening torque	8 Nm

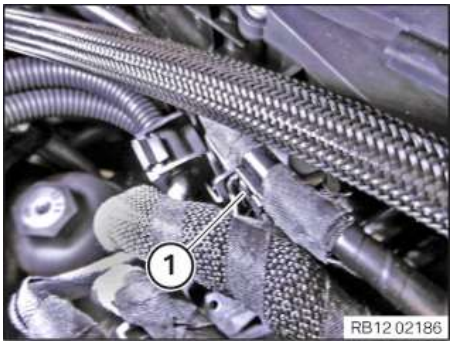


- Feed in and install the cable clip (1).

  Lock (arrow) must audibly engage.

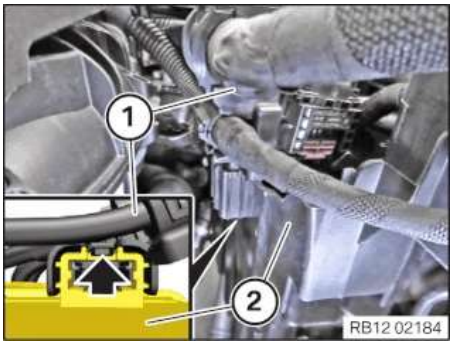


- Secure clamps (1).

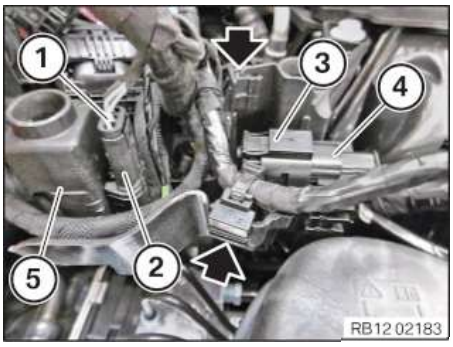


- Secure clamps (1).

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- 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).

16 – Installing the integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

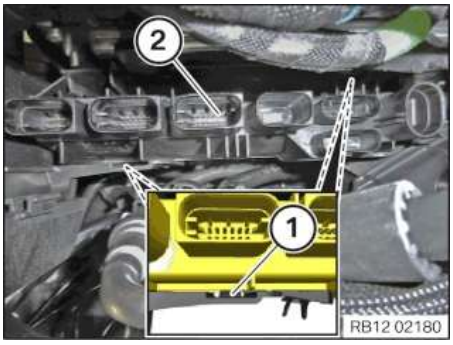
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Electrostatic discharge.

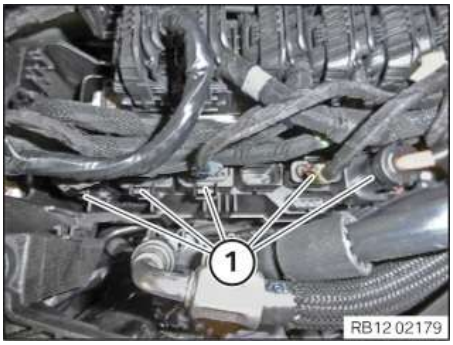
Damage to or destruction of electrical components.

- 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.



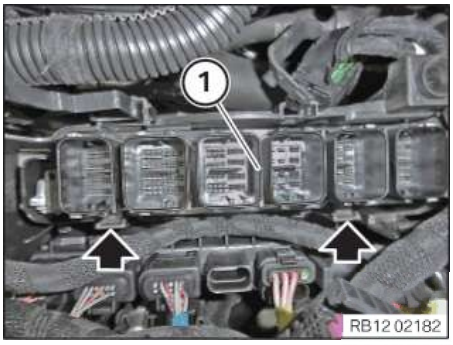
- Insert and install the integrated supply module (PDM) (2).
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).

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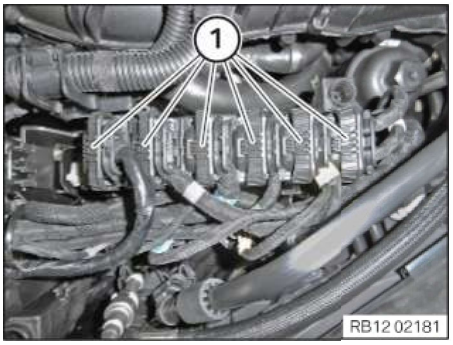


- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.

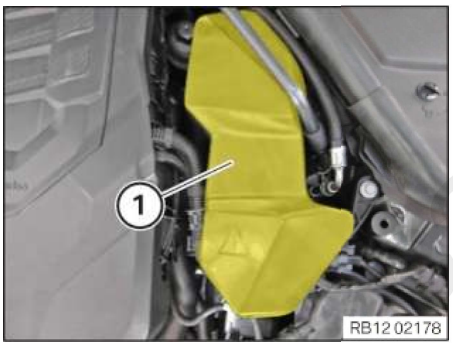
17 – Installing the DME control unit



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

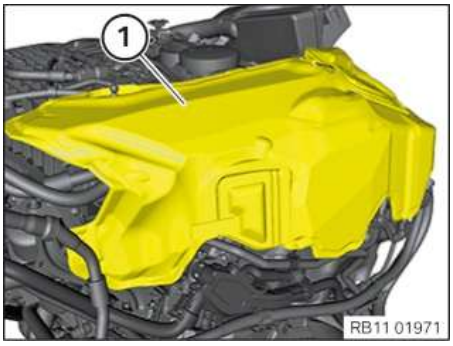


- Connect connectors (1) and lock.
  All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

18 – 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.

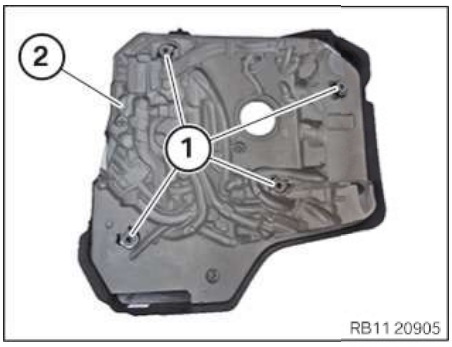
19 – Install acoustic cover

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.



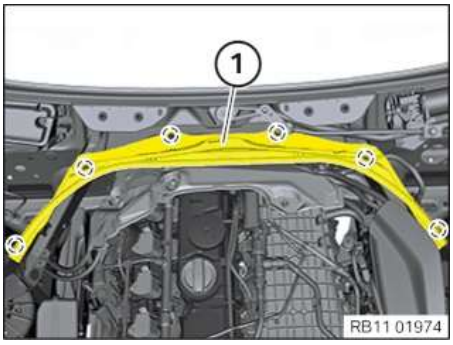
- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

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

20 – Installing the centre bulkhead upper part

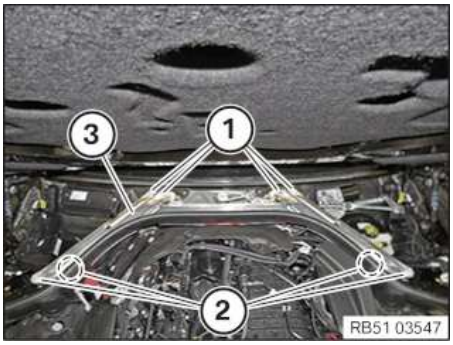


- Position the centre bulkhead upper part (1).
- Tighten the bolts in the marked areas.

Bulkhead upper part to bottom bulkhead

	Tightening torque	3 Nm

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

Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

Tension strut to spring strut dome

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

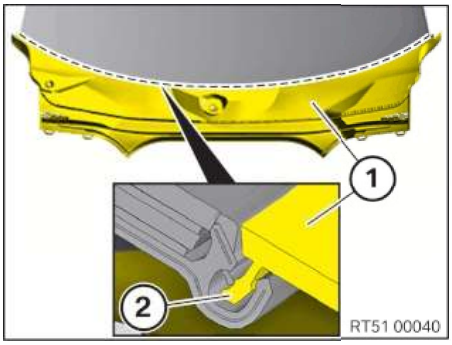
21 – Installing cowl panel cover

RISK OF DAMAGE

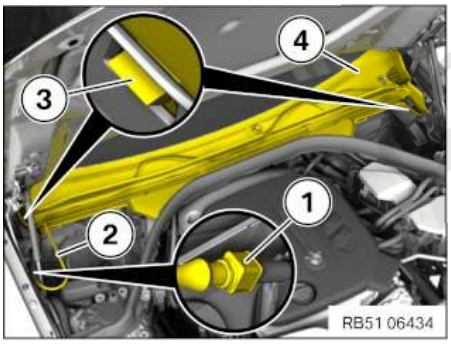
Damage caused by water ingress into the vehicle.

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

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



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



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

22 – Installing both wiper arms

NOTICE

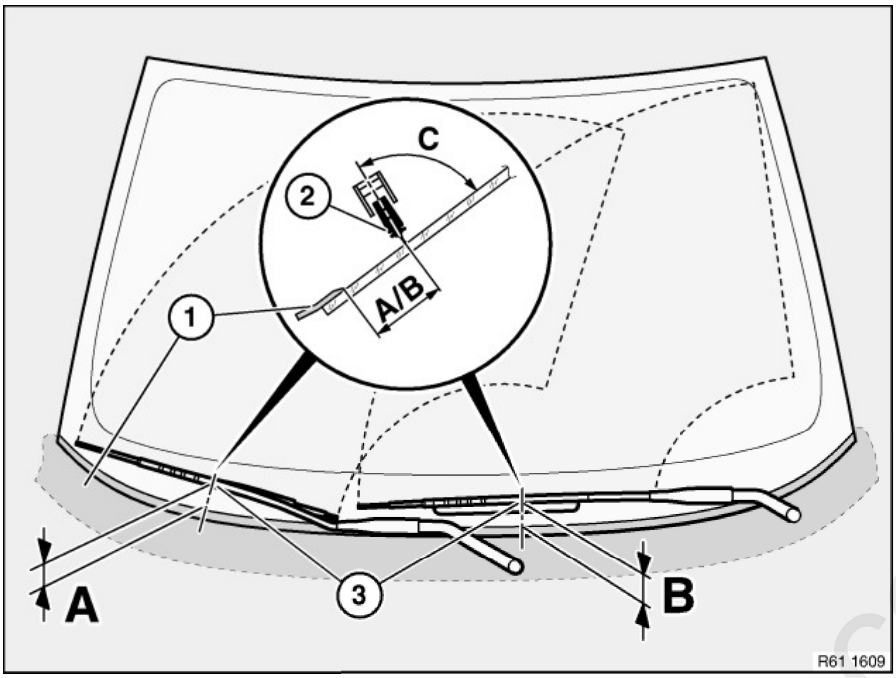
Description is for left component only. Procedure on the right side is identical.

▸ **Install the wiper arm**

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TECHNICAL INFORMATION

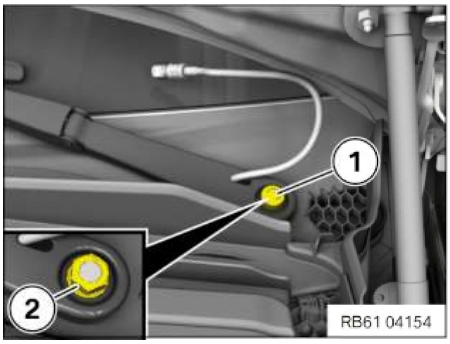
The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.



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

Distance from window pane edge to wiper blade

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

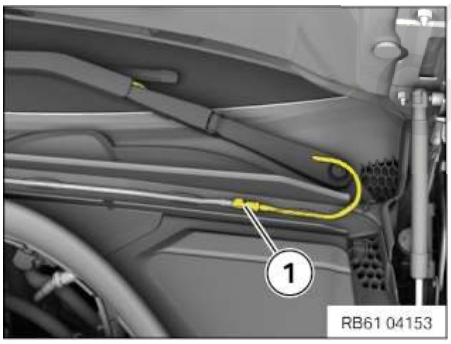


- Tighten nut (2).

Windscreen wiper arm

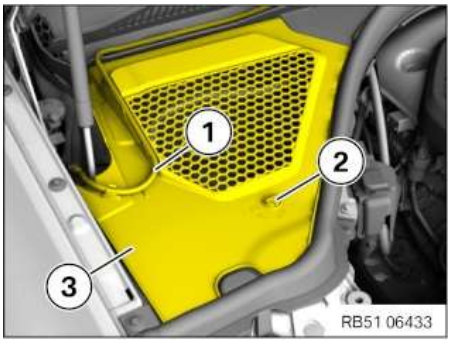
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



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

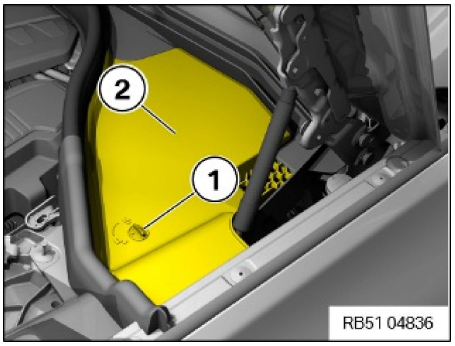
23 – Install the rear right engine compartment cover



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

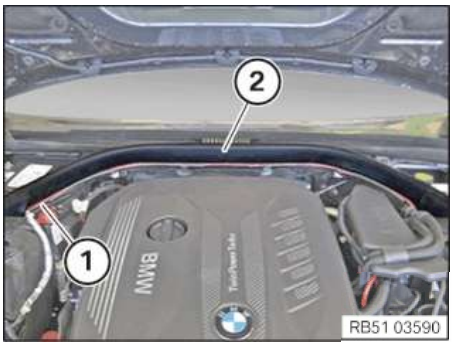
24 – Install the cover of the engine compartment on the rear left

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

25 – 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.

26 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Positive battery cable to the alternator			Used in step 14
M8		Tightening torque	19 Nm

Battery positive lead to battery positive terminal			Used in step 14
M8		Tightening torque	19 Nm

Control unit holder on spring strut dome			Used in step 15
Hexagon screw		Tightening torque	8 Nm

Bulkhead upper part to bottom bulkhead			Used in step 20
		Tightening torque	3 Nm

Tension strut on bulkhead			Used in step 20
M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome			Used in step 20
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 22
Combination hexagon nut		Tightening torque	35 Nm

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Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 22
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	1017

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	126
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	126
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
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61 20 900 Disconnecting and connecting battery earth lead	126
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61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 20 900 Disconnecting and connecting battery earth lead	126
61 35 ... Notes on ESD protection (Electro Static Discharge)	101116
61 00 730 Encode/program control unit(s) (after vehicle test)	17

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12 42 652 Removing and installing/replacing the positive battery cable, remote positive terminal to starter motor

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

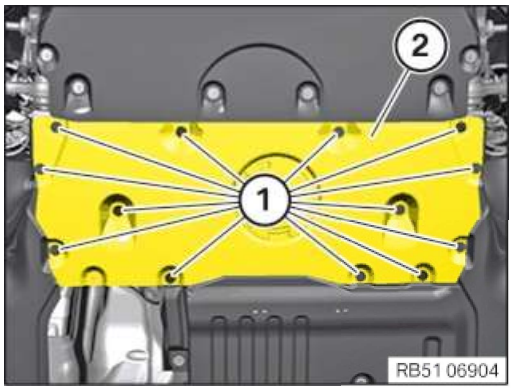
- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.

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

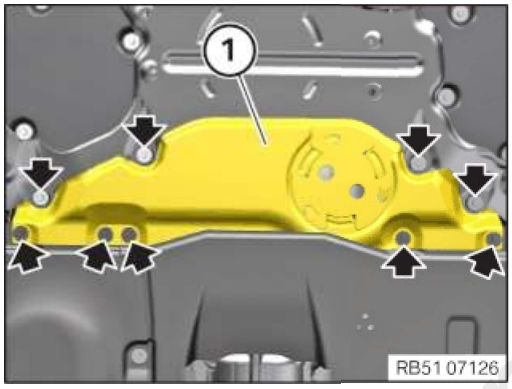
3 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .

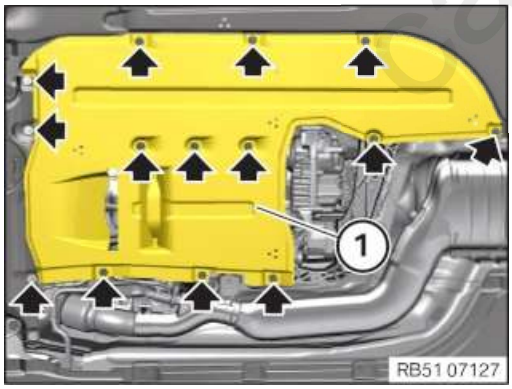


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

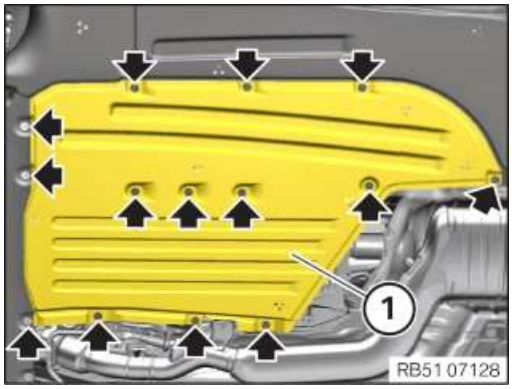
4 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



- **Version 2:**

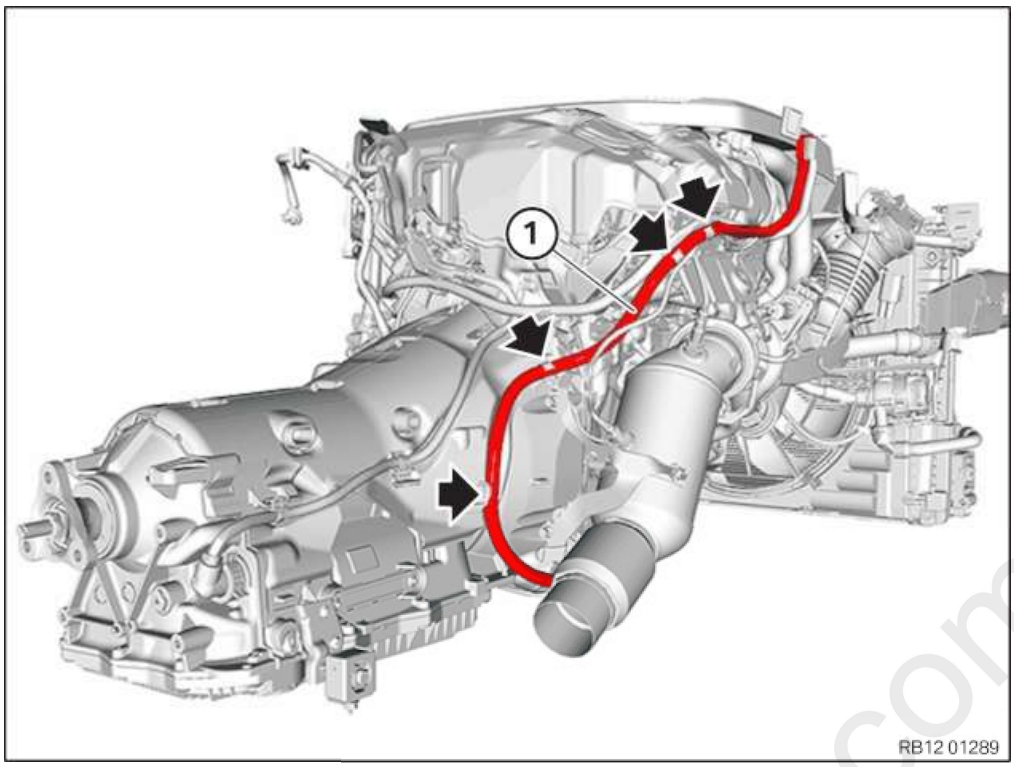
  Remove screws (arrows).

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

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5 – Removing the positive battery cable from the starter motor to the positive battery connection point

Positive battery cable from the starter motor to the battery connection point



Overview of the positive battery cable from the starter motor to the positive battery connection point

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

Hot surfaces.

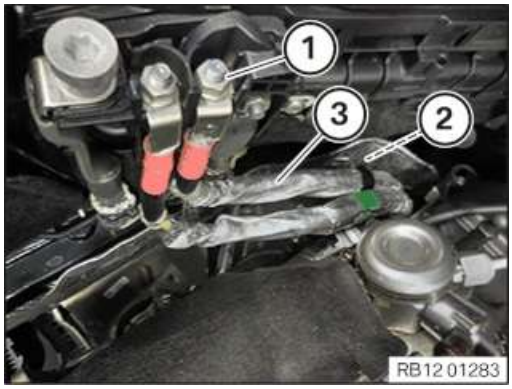
Risk of burning!

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

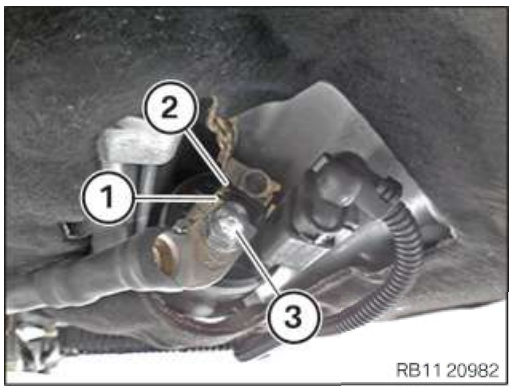


- Unlock lock (1).
- Guide and remove cover (2) in direction of arrow.

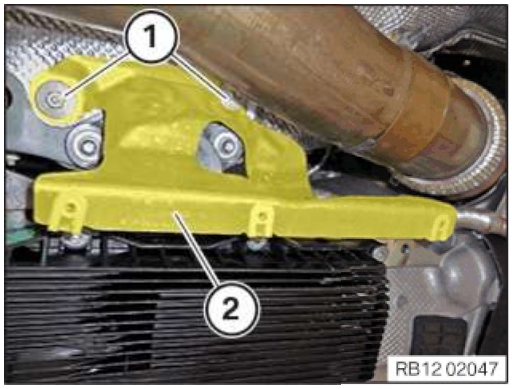
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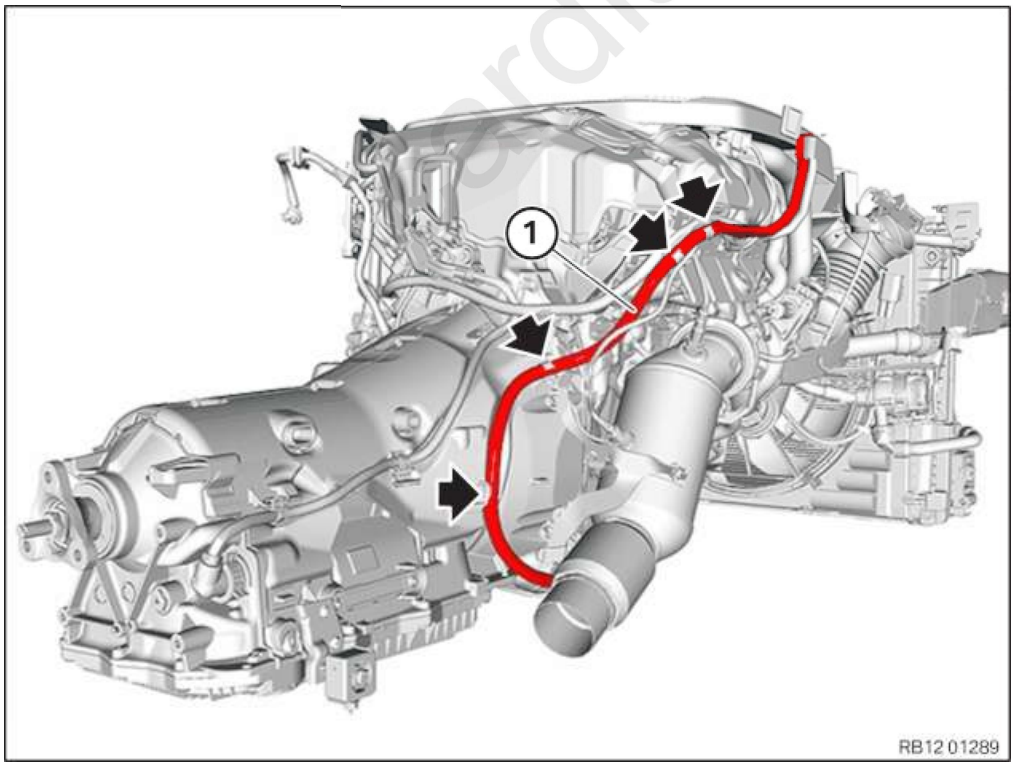
- Loosen nut (1).
- Loosen clamp (2).
- Feed out positive battery cable (3) and put to one side.



- Loosen nut (3).
- Feed out positive battery cable (1) and put to one side.



- Loosen nuts (1).
- Guide the heat shield (2) out and remove it.

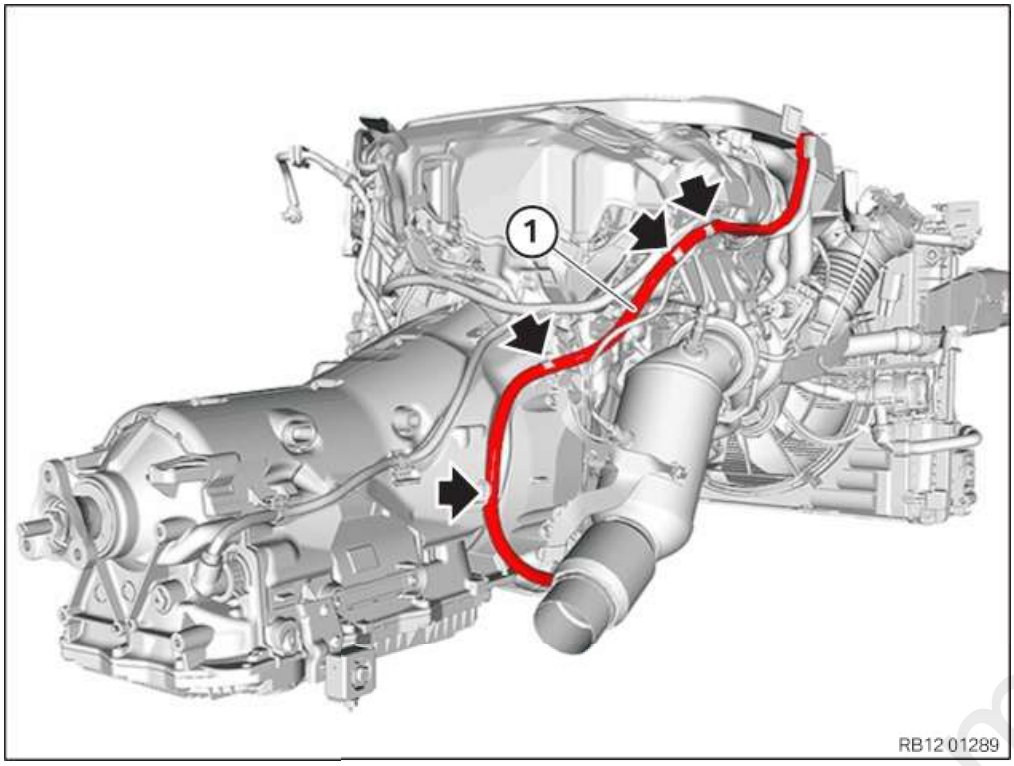


- Release the clamps (arrows).
- Remove positive battery cable (1) and remove.

6 – Installing the positive battery cable from the starter motor to the positive battery connection point

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Positive battery cable from the starter motor to the battery connection point



Overview of the positive battery cable from the starter motor to the positive battery connection point

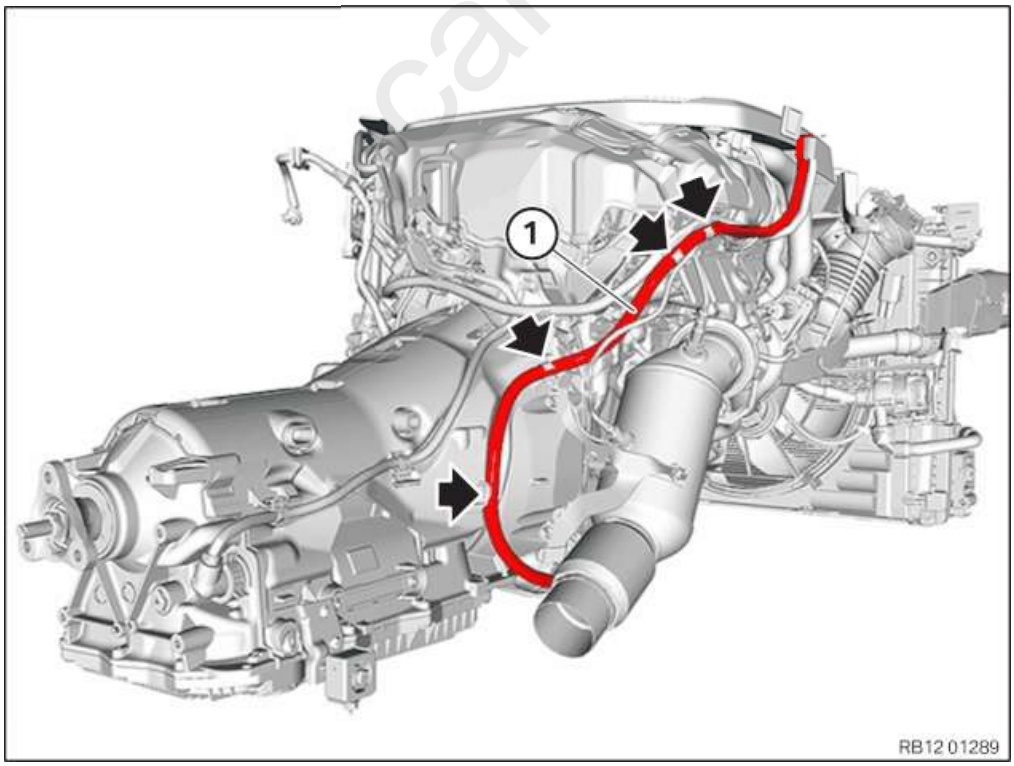
Prerequisite

CAUTION

Improper routing of the positive battery cable.

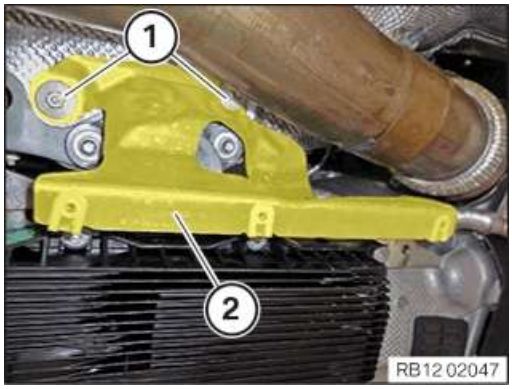
Risk of short circuits!

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



- Insert and install the positive battery cable (1).
- Secure the clamps (arrows).

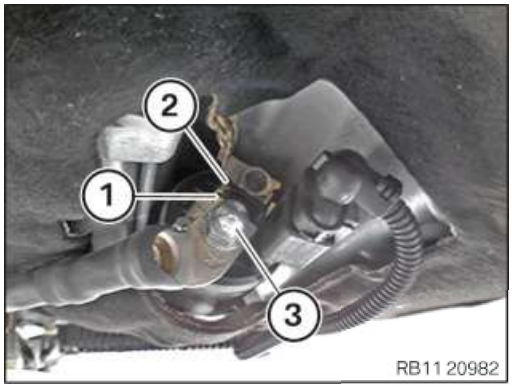
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- Insert and install the heat shield (2).
- Tighten nuts (1).

Heat shield to body

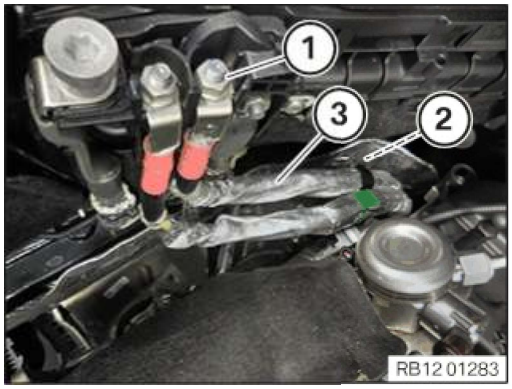
Nut		Tightening torque	3 Nm



- Connect the positive battery cable (1) to the starter motor.
- Bring positive battery cable (1) on anti-twist lock (2) to the limit position.
- Tighten nut (3).

Battery positive lead to starter

M8		Tightening torque	13,5 Nm



- Insert and install the positive battery cable (3).
- Secure clamps (2).
- Tighten nut (1).

Battery positive lead to battery positive terminal

M8		Tightening torque	19 Nm



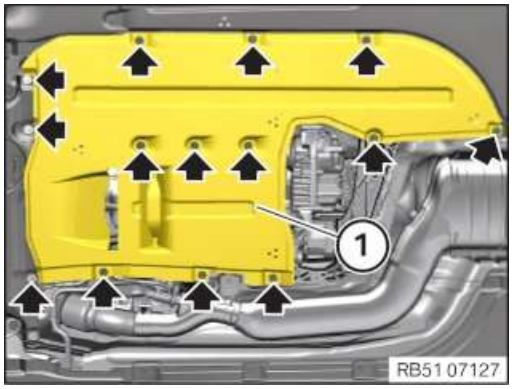
- Insert and install the cover (2) in the direction of the arrow.

  The locks (1) must engage audibly.

POSTPROCESSES

7 – Installing underbody protection at rear

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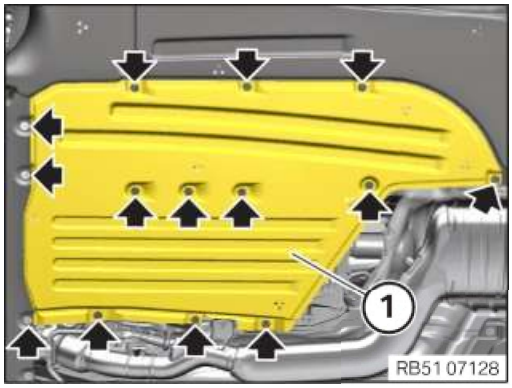
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

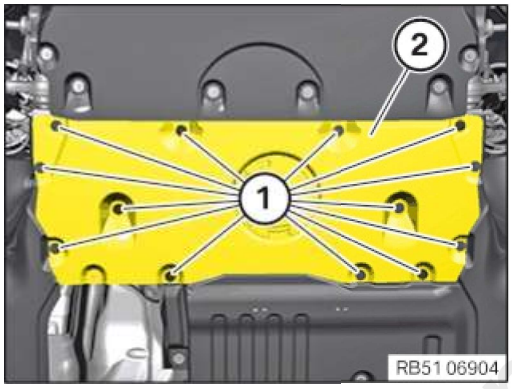
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

8 – Installing the centre underbody protection



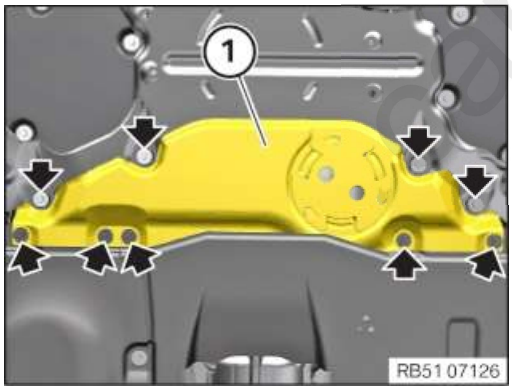
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

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

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

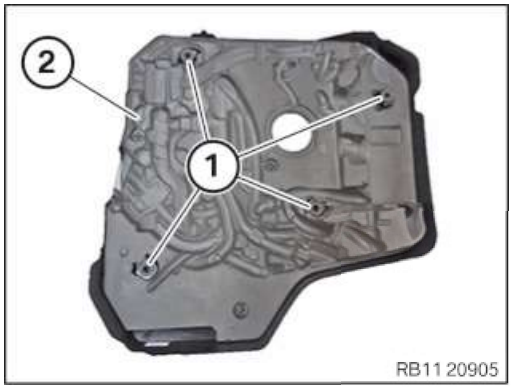
9 – Install acoustic cover

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.

10 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Heat shield to body Used in step 6

Nut		Tightening torque	3 Nm

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Battery positive lead to starter			Used in step 6
M8		Tightening torque	13,5 Nm

Battery positive lead to battery positive terminal			Used in step 6
M8		Tightening torque	19 Nm

Underbody protection			Used in step 78
Hexagon screw		Tightening torque	3 Nm

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
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61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting battery earth lead	110
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61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110

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12 42 540 Replacing safety battery terminal (SBK)

Caution!
Observe safety regulations.

Investigate cause of triggering of safety battery terminal.

To do so, read out fault memory of airbag control unit. Note fault messages stored in memory. Rectify faults. Then clear fault memory.

Use of safety battery terminal:

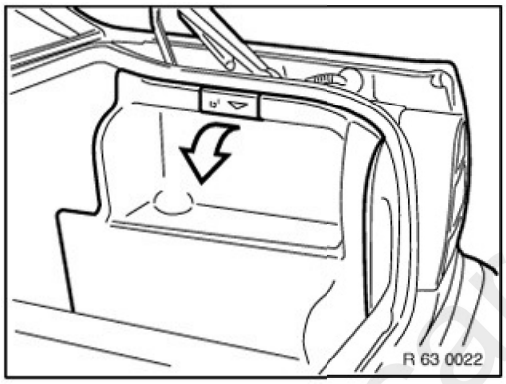
- From model year 1998 in Series E38, E39, E46
- From 4/99 in E36/Z3
- in each of following new Series

The different models have different installation locations:

Battery in engine compartment

Safety battery terminal is replaced with cable up to battery positive support point.

Safety battery terminal is omitted as from 03/2002 from all E46 LHD models with 4-cylinder engines.

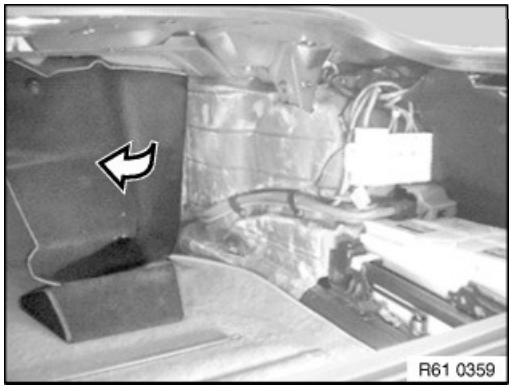


Battery in luggage compartment behind side trim panel

Remove side trim panel.

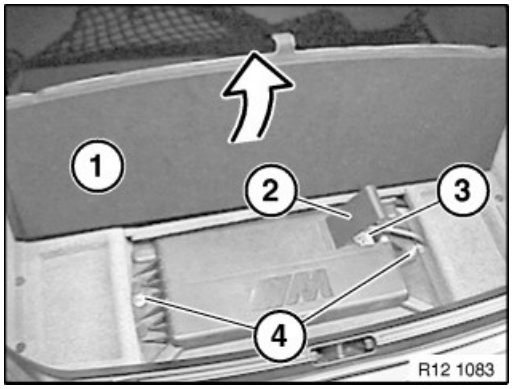
Follow instructions for disconnecting and connecting battery.

Disconnect and cover battery negative lead.



Release front side trim panel partly and fold forward.

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Battery in luggage compartment under floor trim panel

Follow instructions for disconnecting and connecting battery.

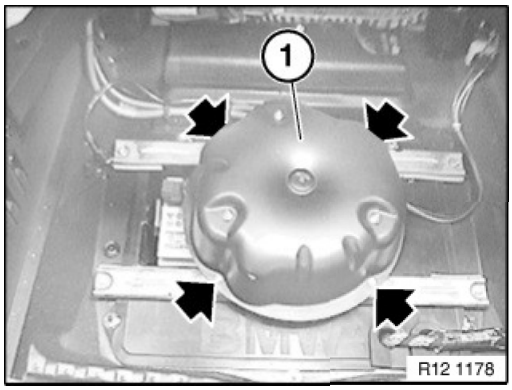
Fold back floor trim panel (1).

Lift cover (2) on battery negative lead.

Disconnect and cover battery negative lead (3).

Release nuts (4).

Remove battery cover.



Battery in luggage compartment under spare wheel

Remove spare wheel.

Release screws.

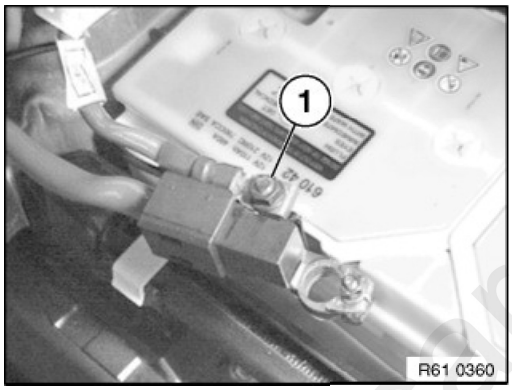
Caution!

Do not kink air pipes.

Set air supply system (1) to one side.

Follow instructions for disconnecting and connecting battery.

Disconnect battery negative lead.



Disconnect supply cable (1) for vehicle electrical system.**Installation:**

Remove faulty fuses and carry out troubleshooting.



Caution!

Pay attention to interface.

The repair cable is always a standard length.

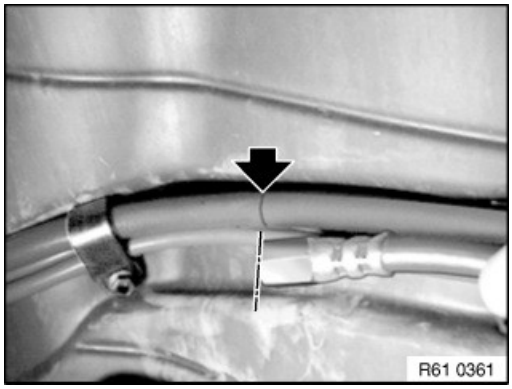
The heavy-current connector of the repair cable has a larger diameter than the battery positive lead.

In some Series (e.g. E46 touring), the heavy-current connector of the repair cable can lead to installation problems.

This is the case when the interface is in the area of the close-fitting trim panels.

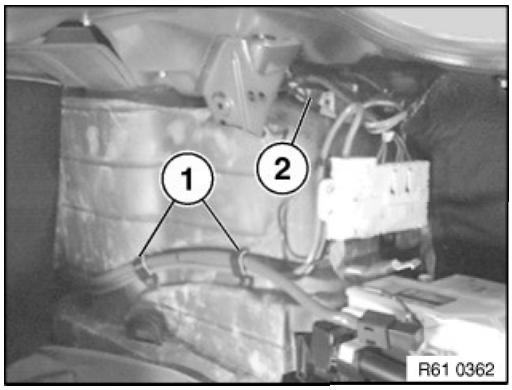
Find matching interface (e.g. approx. 10 cm behind rear seat backrest in E46 touring).

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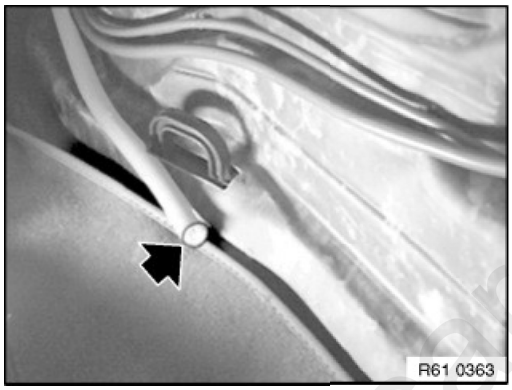
Lay repair cable parallel to battery positive lead.

Mark interface of battery positive lead at end of repair cable.



Release cable ties (1).

Disconnect plug connection (2).

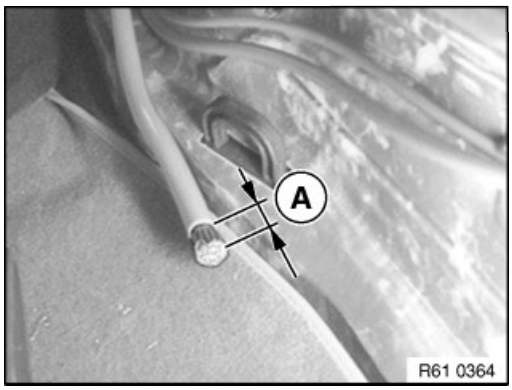


Caution!

Do not use bolt cutters or similar tools to cut through the cable.

A cable end that has been squashed flat will no longer fit into the clamping sleeve.

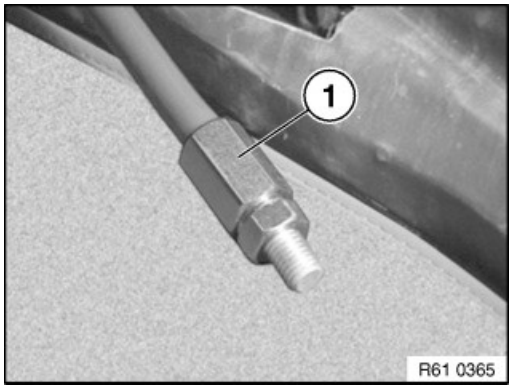
Saw through battery positive cable at marked point with an iron saw.



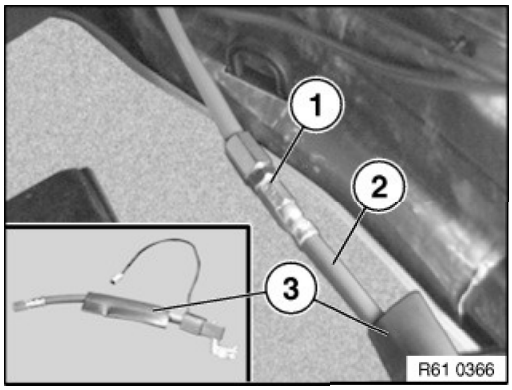
Strip insulation - length (A) - from cable end.

Distance (A) = 15 mm.

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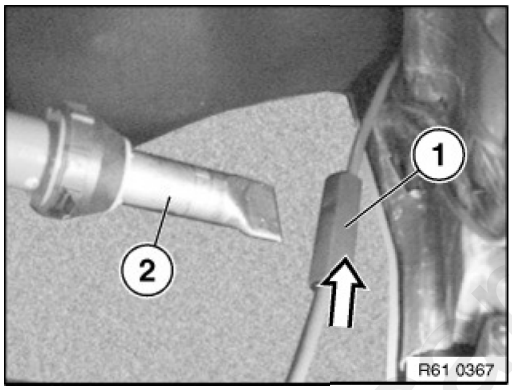


Push heavy-current connector (1) over stripped cable end and screw into position.

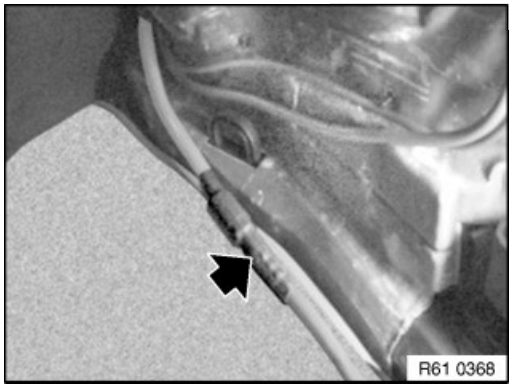


Push shrink-fit hose (3) over repair cable.

Screw threaded sleeve (1) of repair cable (2) to heavy-current connector.



Push shrink-fit hose (1) over connecting point and shrink on with a hot-air blower (2).



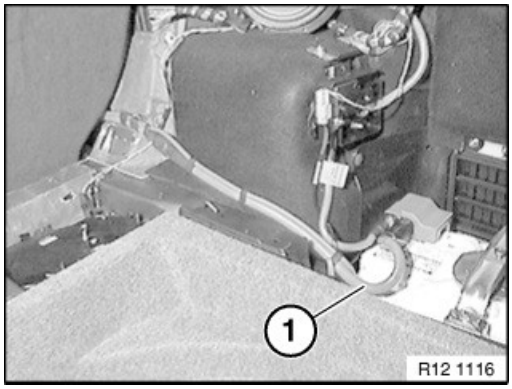
Note:

Heat up shrink-fit hose until it has settled completely around the connection point.

When laying the repaired battery positive cable, observe the following:

- The shrink-fit hose must not be scuffed during any movement.
- The repair cable must not cause any disturbing noises during driving operation.

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Note:

Offsetting cutting line by approx. 10 cm produces excess length of battery positive lead (1).

Lay battery positive lead (1) without kinks or abrasions.

(Shown on E46 touring.)

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

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

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

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

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

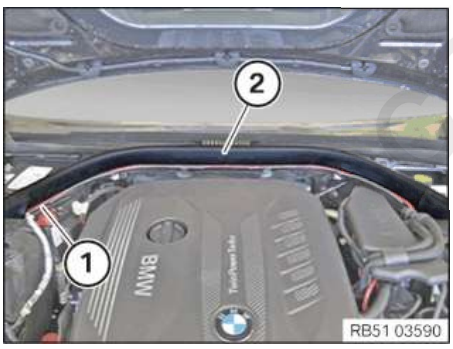
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



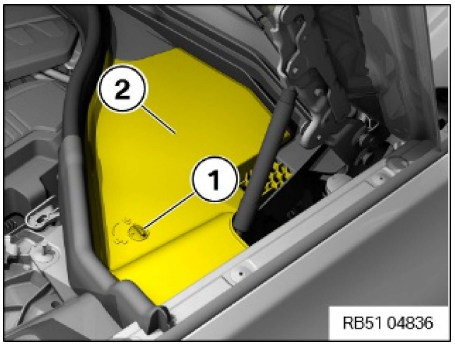
- See additional information.

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.

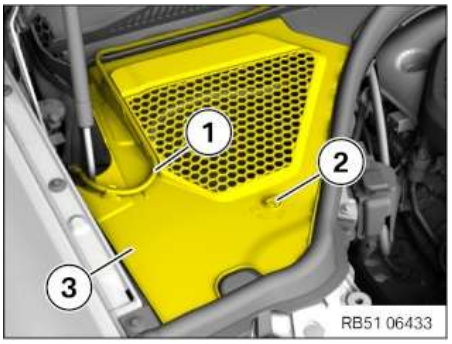
3 – Remove the cover of the engine compartment at the rear left



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

4 – Remove the cover of the rear right engine compartment

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

5 – Removing both wiper arms

NOTICE

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

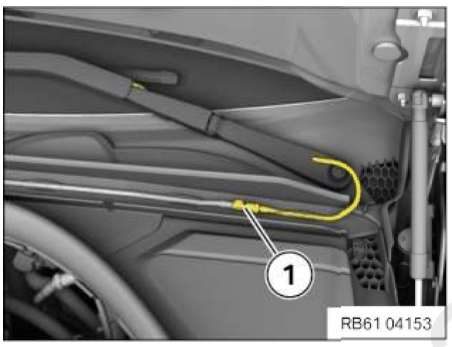
▶ **Remove the wiper arm**

RISK OF DAMAGE

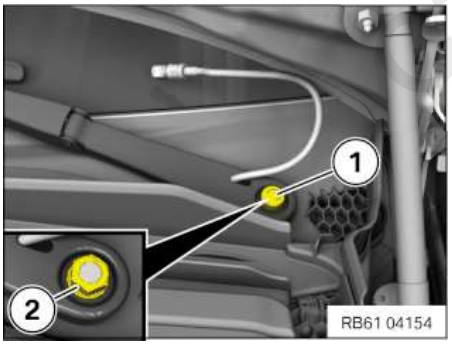
Damage to wiper console

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

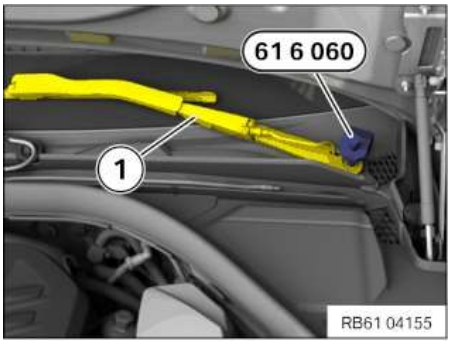
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.



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



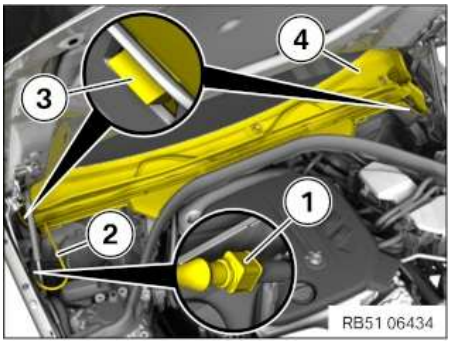
- Remove the protective cap (1).
- Loosen nut (2).



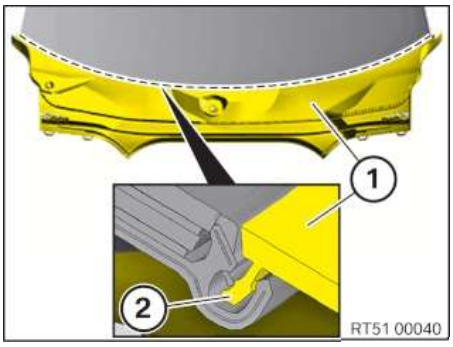
- Pull off the wiper arm (1) using special tool .

6 – Remove cowl panel cover

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

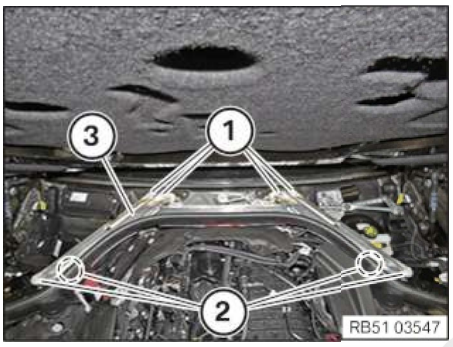


- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

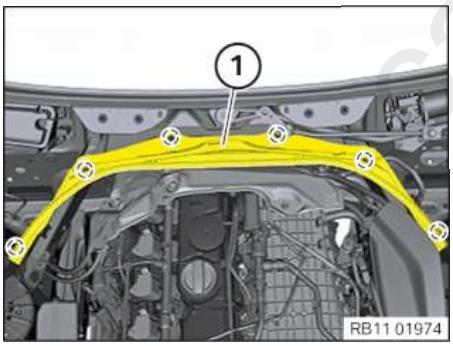
7 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

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



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



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

8 – 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.

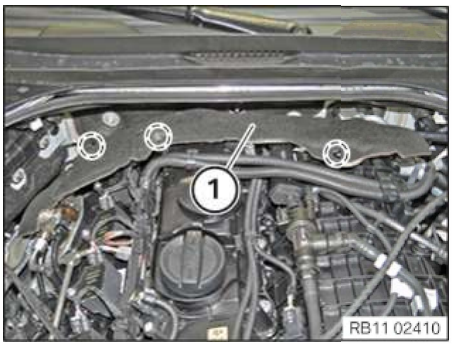
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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.

9 – Removing acoustic cover at rear



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

10 – Removing the DME control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

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

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TECHNICAL INFORMATION

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

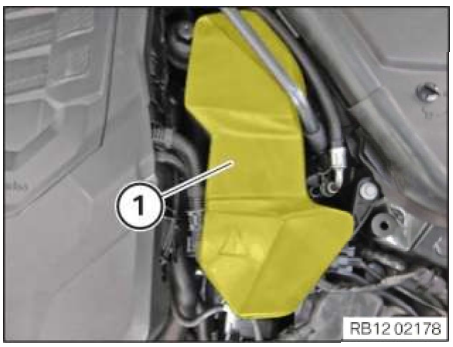
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

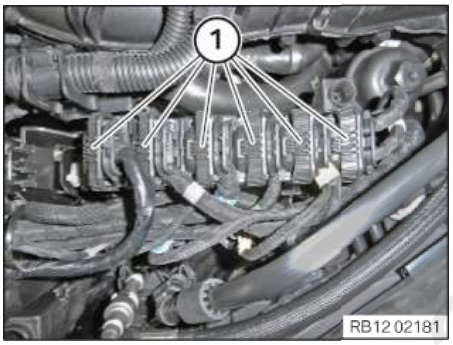
For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

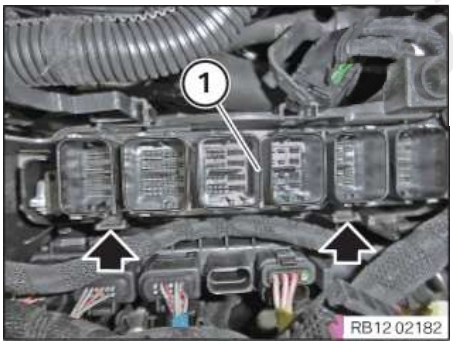
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



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



- Unlock and disconnect the plug connection (1).



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

11 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

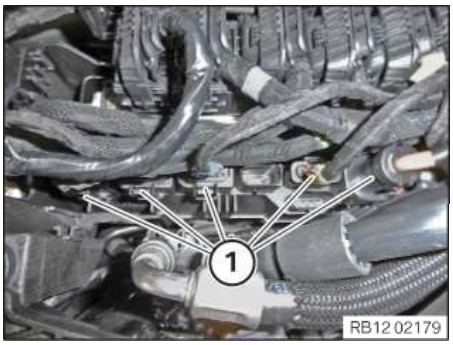
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RISK OF DAMAGE

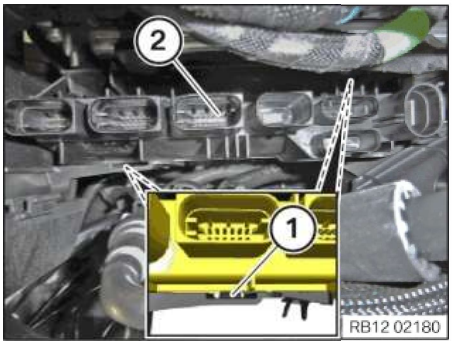
Electrostatic discharge.

Damage to or destruction of electrical components.

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

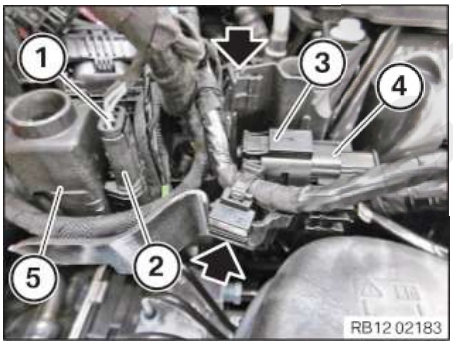


- Unlock and disconnect plug connections (1).

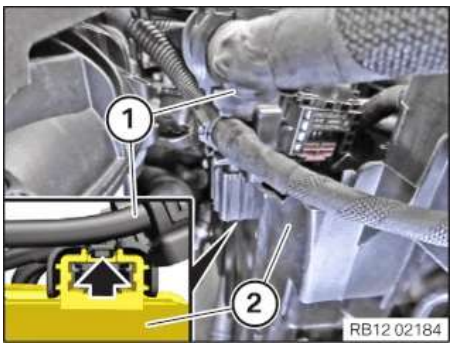


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

12 – Removing the control unit holder

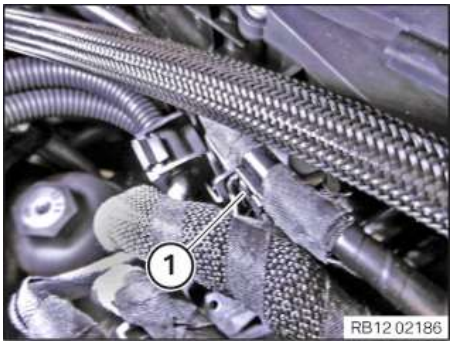


- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the starter (5).
- Unlock plug connection (3) and disconnect.
- Unlock the connector (4) and disconnect from the starter (5).
- Release the clamps (arrows).

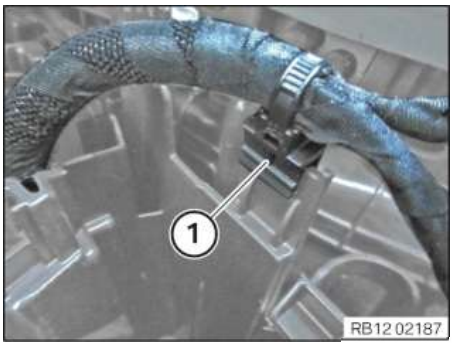


- Unlock the lock (arrow).
- Disconnect the cable plug (1) upwards from the control unit holder (2).

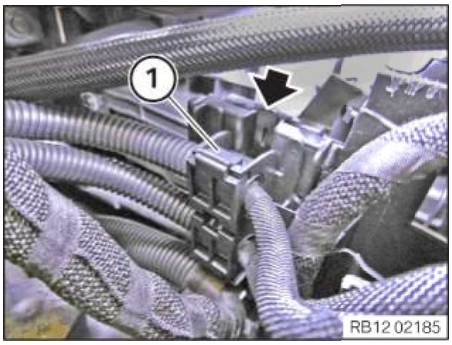
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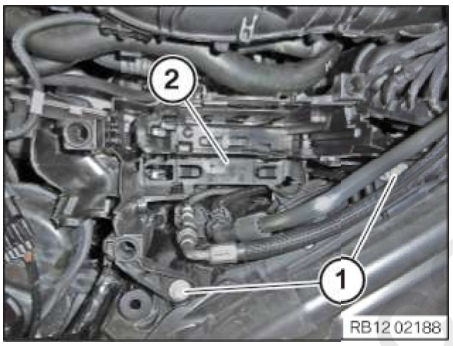
- Loosen clamp (1).



- 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).

13 – Remove tank vent valve

WARNING

Hot surfaces.

Risk of burning!

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

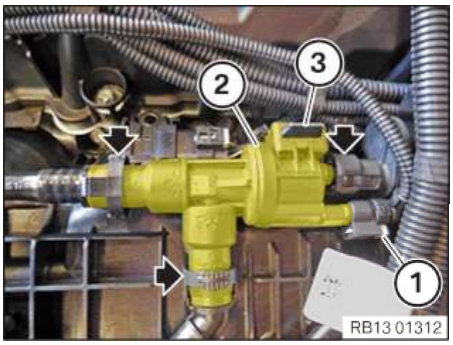
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RISK OF DAMAGE

Electrostatic discharge.

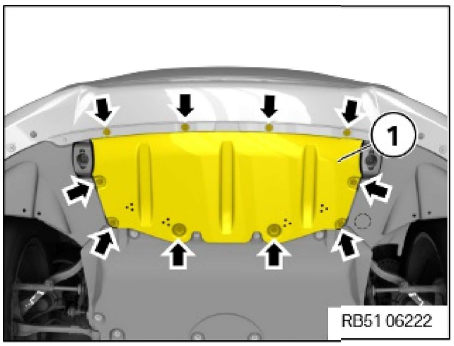
Damage to or destruction of electrical components.

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



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

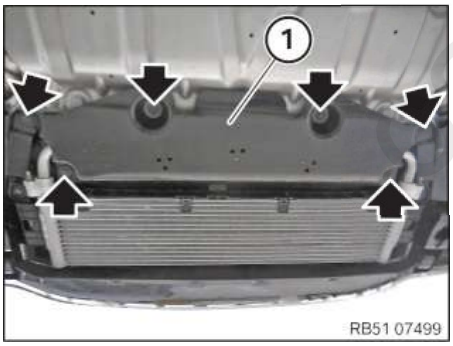
14 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

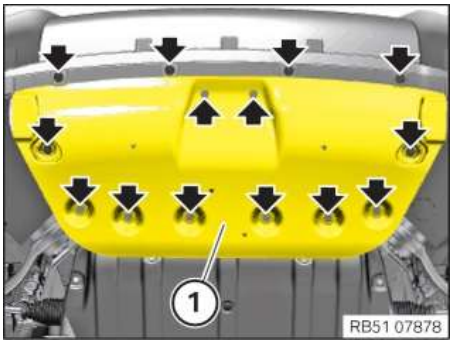
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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



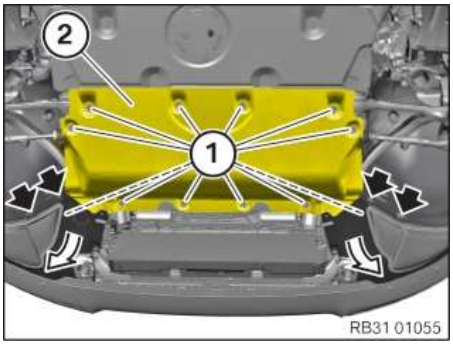
- **Version 3:**

  Remove screws (arrows).

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

15 – Remove the underbody protection of the steering gear

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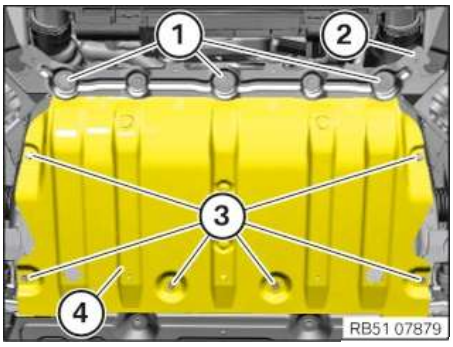
- **Version 1:**

  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).

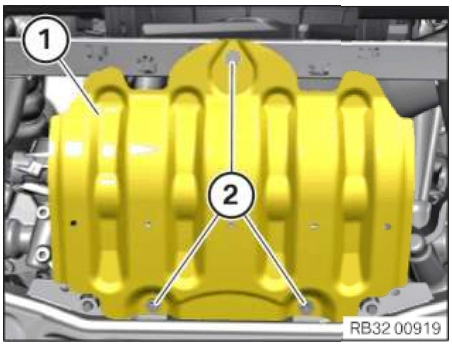
  Loosen screws (3).

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

16 – If installed: Removing the steering start protection

Prerequisite

The front underbody protection is removed.



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

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

WARNING

Hot surfaces.

Risk of burning!

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

TECHNICAL INFORMATION

Life-long fill of coolant!

Do not reuse used coolant.

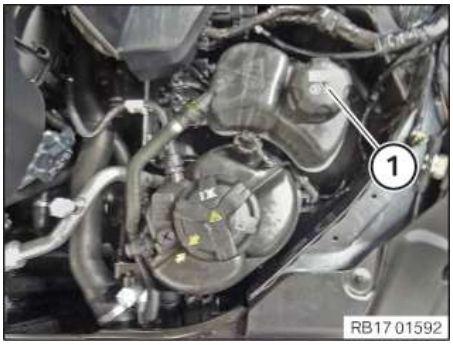
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

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

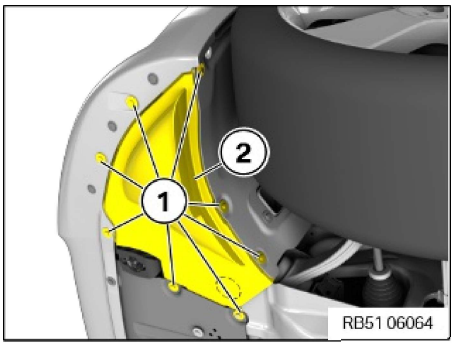
TECHNICAL INFORMATION

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

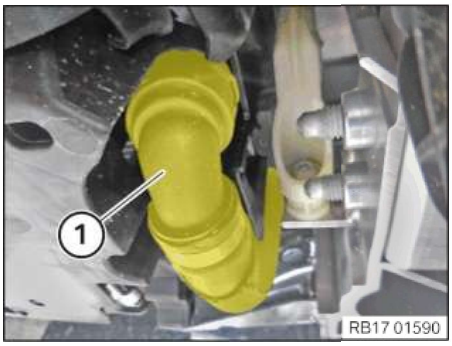
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- Loosen sealing cap (1).



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

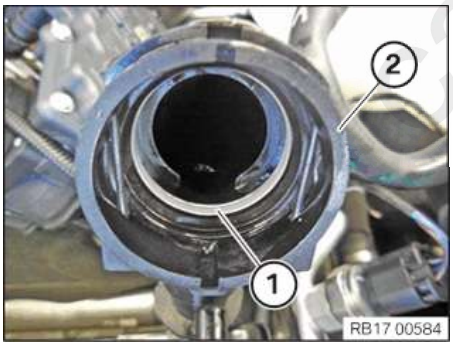


- Unlock and disconnect the coolant line (1).
- Catch and dispose of escaping coolant.

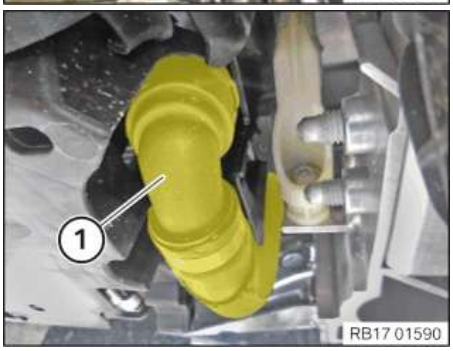
18 – Connecting the coolant lines for the low-temperature coolant circuit

TECHNICAL INFORMATION

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



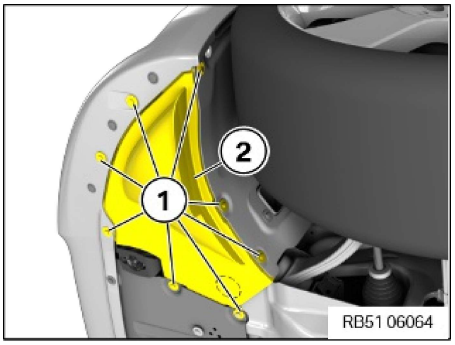
- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.



- Connect and lock the coolant line (1).

  The coolant line (1) must audibly engage.

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

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

19 – Removing the intake plenum

RISK OF DAMAGE

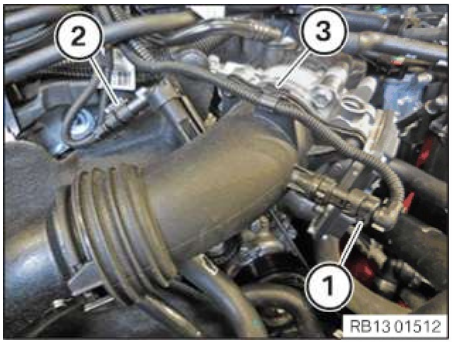
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

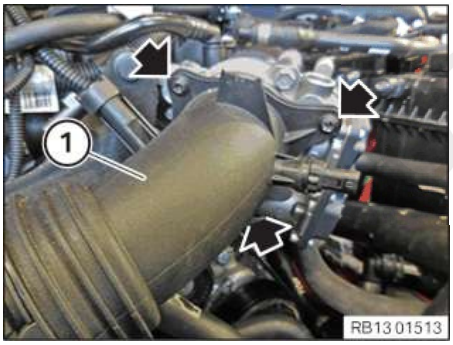
- Do not pull on the wires when disconnecting connectors and plug connections.

TECHNICAL INFORMATION

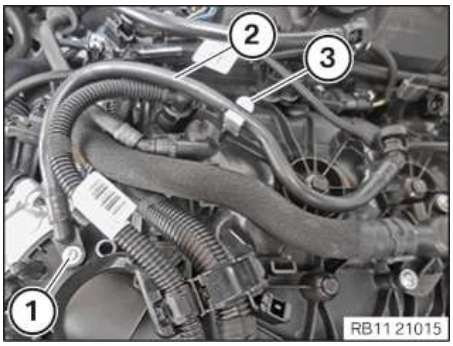
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



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

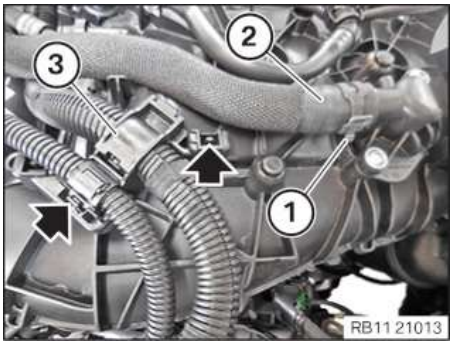


- Remove screws (arrows).
- Feed out charge air line (1) and place to one side.

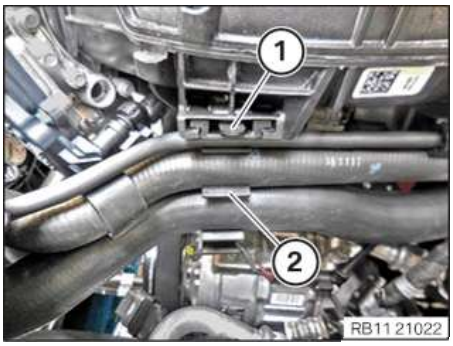


- Loosen screw (1).
- Guide tank ventilation line (2) out of clamp (3) and remove it.

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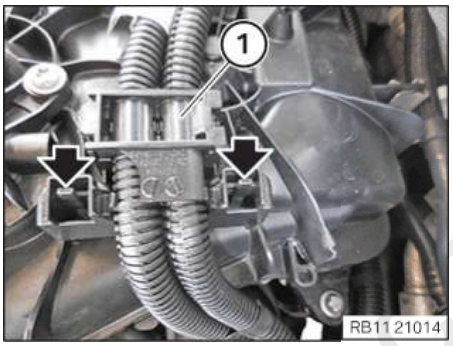
- Release the clamping collar (1) with the special tool 0 495 794 (17 2 050).
- Guide the coolant hose (2) out and remove.
- Catch and dispose of escaping coolant.
- Unlock the locks (arrows).
- Guide out the wiring harness section (3) for sensor system 2 and place to one side.



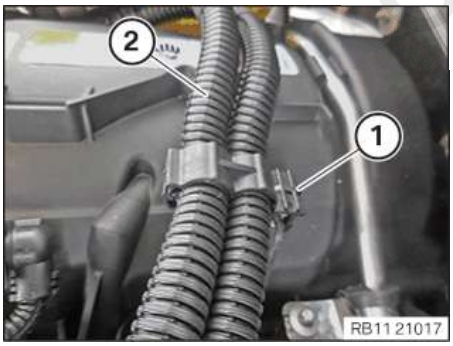
- Unlock the lock (1).
- Thread out holder (2) and set aside.



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



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

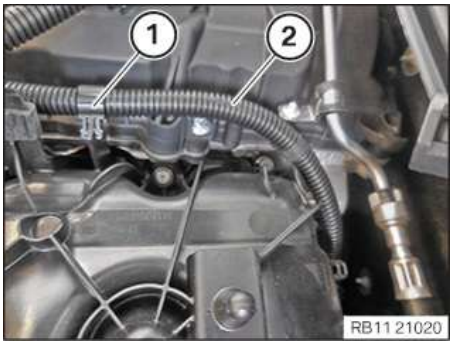


- Loosen clamp (1).
- Thread out the wiring harness section (2) for the injectors and ignition coils and set it aside.



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

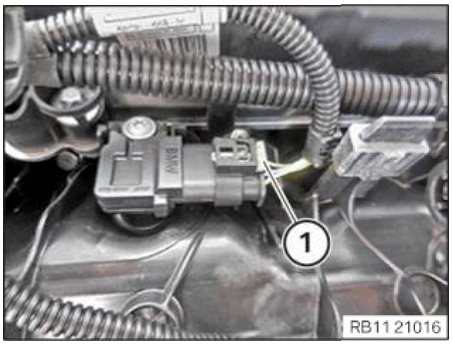
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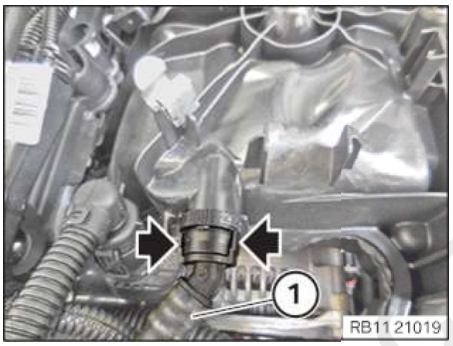
- Loosen clamp (1).
- Guide out the wiring harness section (2) for the sensor system 1 and place to one side.



- Loosen screw (1).



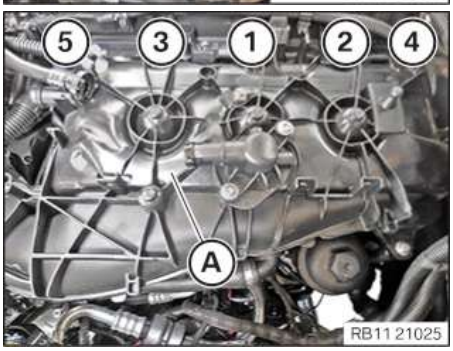
- Unlock plug connection (1) and disconnect.



- 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

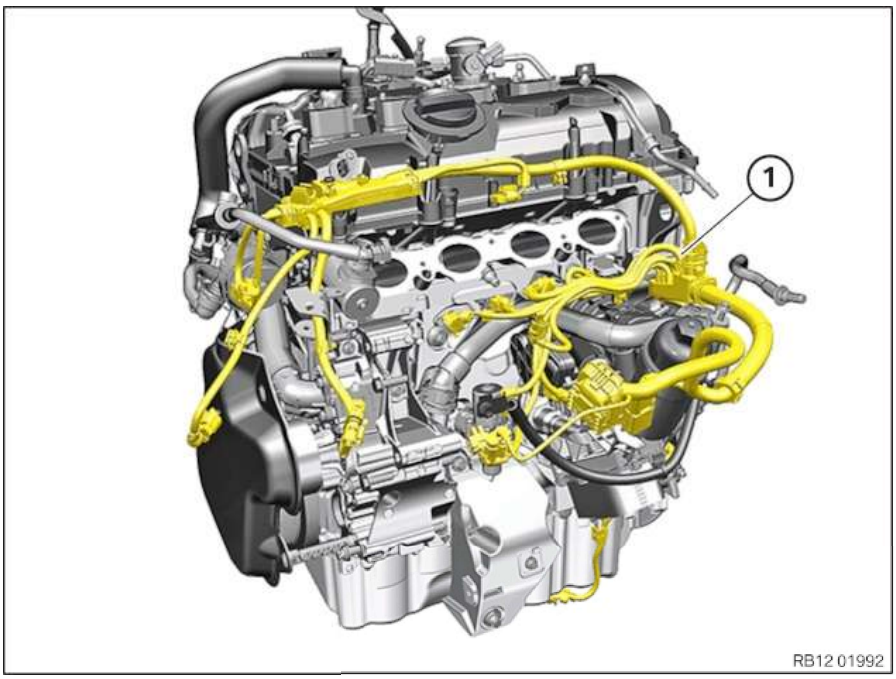
Additional coolant can escape. Make sure that no coolant enters the intake port of the cylinder head.

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

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20 – Remove the engine wiring harness for sensor system 1

Engine wiring harness for sensor system 1



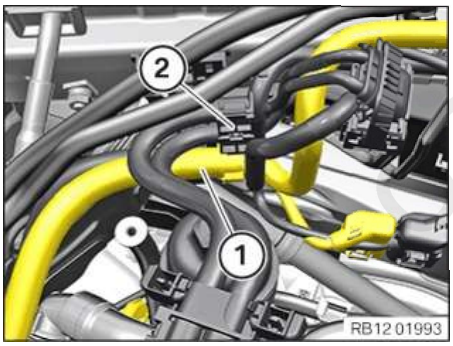
1 Engine wiring harness for sensor system 1

RISK OF DAMAGE

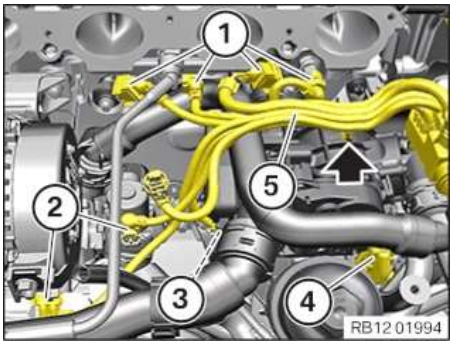
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

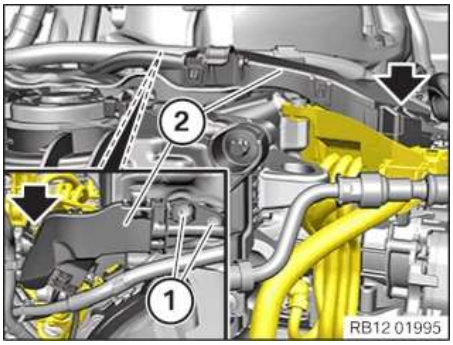
- Do not pull on the wires when disconnecting connectors and plug connections.



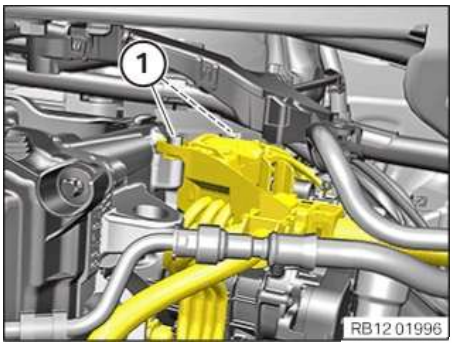
- Guide out the wiring harness section (1) for the sensor system 1 from the holder (2) and place to one side.



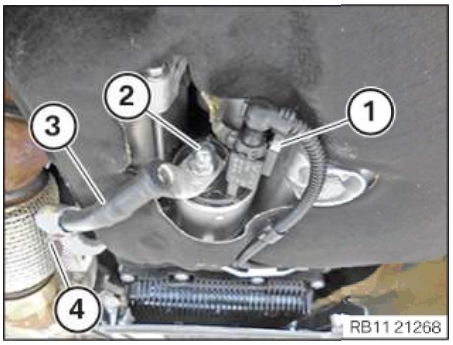
- Unlock and disconnect plug connections (1).
- Unlock and disconnect plug connections (2).
- Unlock plug connection (3) and disconnect.
- Unlock plug connection (4) and disconnect.
- Loosen the clamp (arrow).
- Guide out the wiring harness section (5) for sensor system 1 and place to one side.



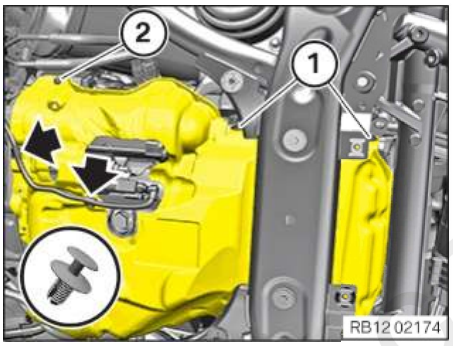
- Loosen screws (1).
- Unlock the lock (arrow).
- Feed out the wiring harness section (2) and put to one side.



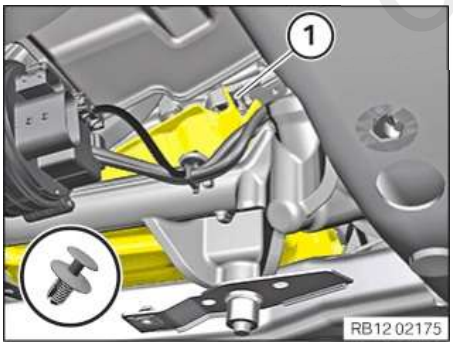
- Loosen screws (1).



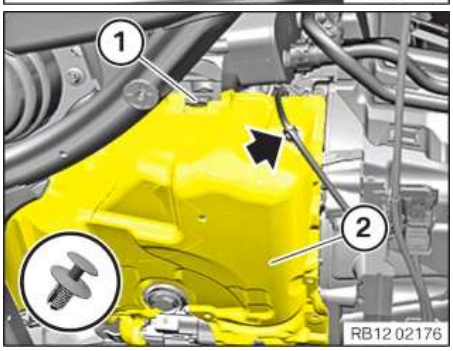
- Unlock plug connection (1) and disconnect.
- Loosen nut (2).
- Guide the positive battery cable (3) out of the clamp (4) and lay to one side.



- Loosen the expanding rivet (1).
- Undo fir tree clip (2).
- Release the clamps (arrows).

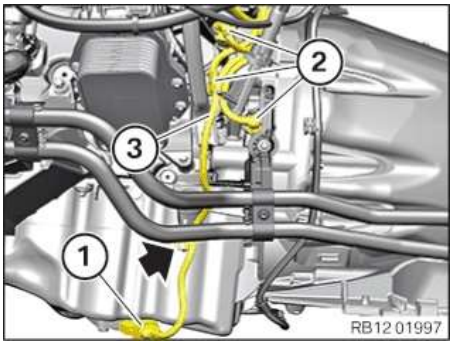


- Loosen expanding rivet (1).
- Lower the acoustic cover of the oil sump.

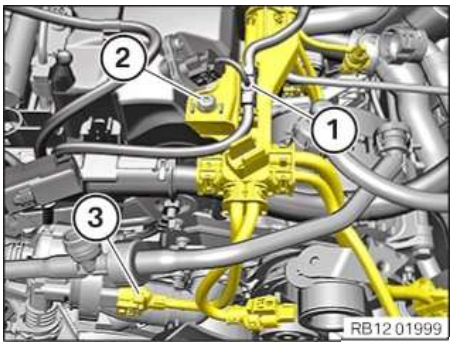


- Loosen expanding rivet (1).
- Loosen the clamp (arrow).
- Lower acoustic cover (2).

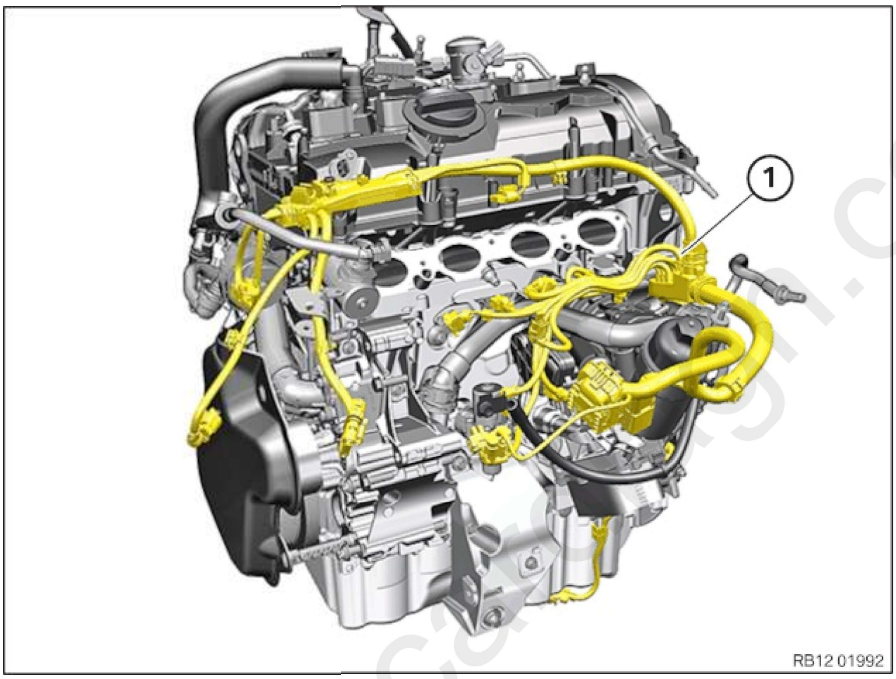
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- Unlock plug connection (1) and disconnect.
- Unlock and disconnect plug connections (2).
- Release the wiring harness section (3) for sensor system 1 from the clamp (arrow) and place to one side.



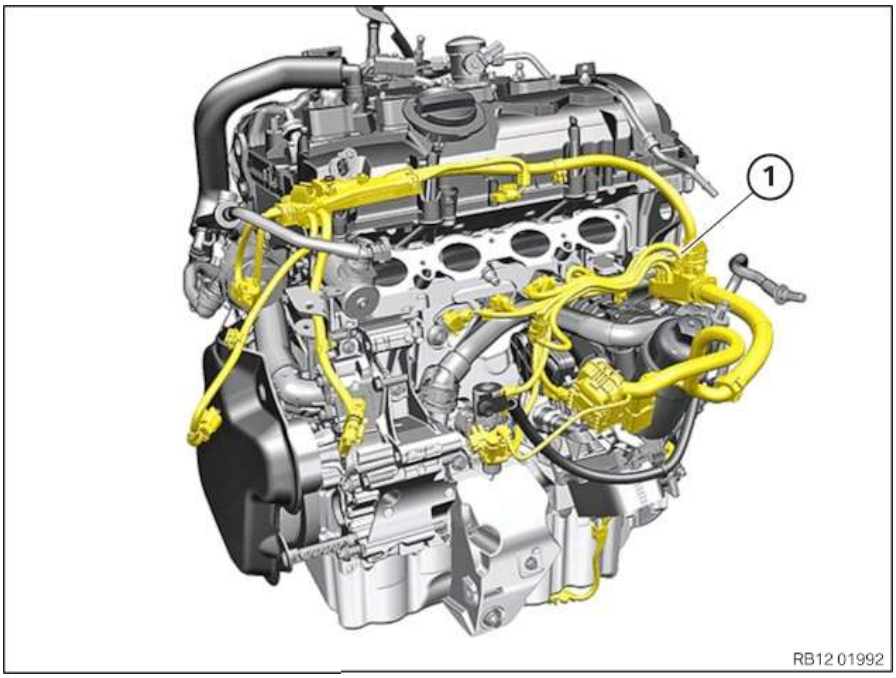
- Remove the wiring harness section (1) and put to one side.
- Loosen screw (2).
- Unlock plug connection (3) and disconnect.



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

21 – Install the engine wiring harness for sensor system 1

Engine wiring harness for sensor system 1



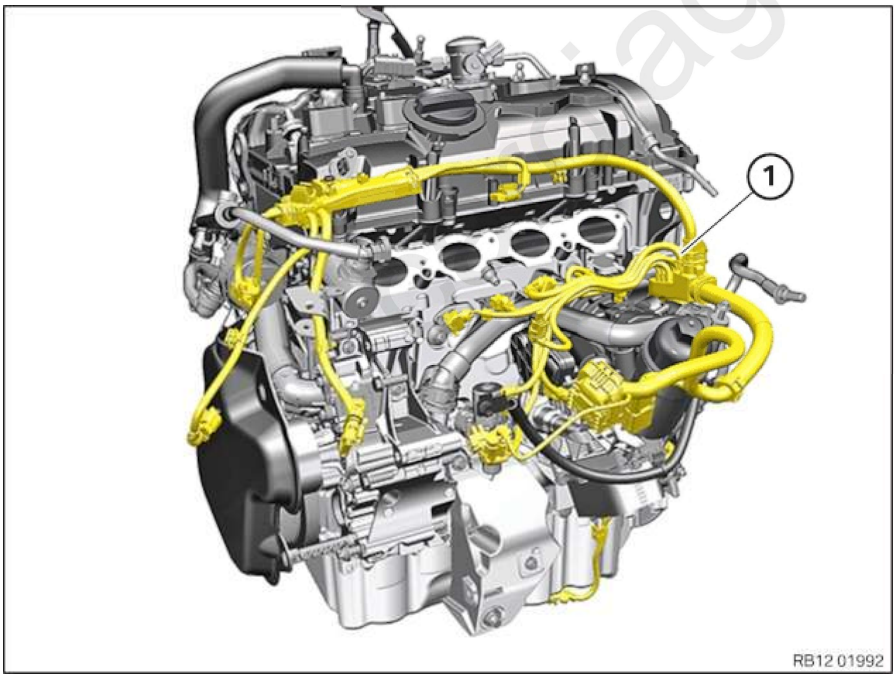
1 Engine wiring harness for sensor system 1

RISK OF DAMAGE

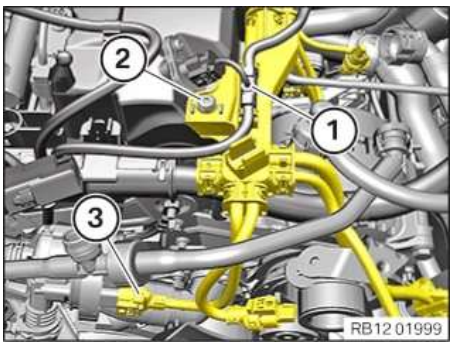
Improper routing of cables and wiring harnesses.

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

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



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



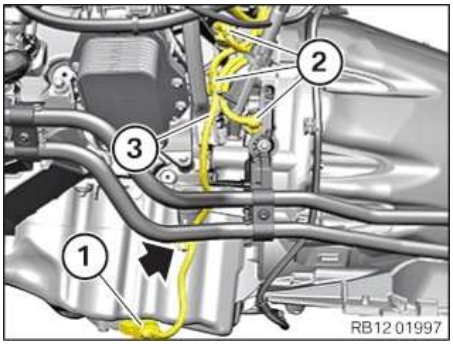
- Connect connectors (3) and lock.

  The connector (3) must engage audibly.
- Tighten down screw (2).

Wiring harness section of engine to cylinder head cover

M6		Tightening torque	8 Nm

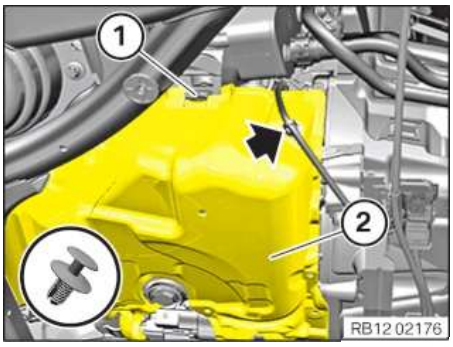
- Guide in and secure wiring harness section (1).



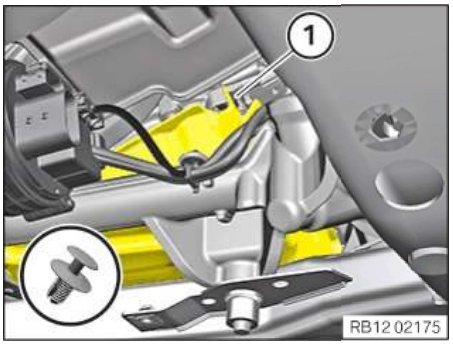
- Guide in and install wiring harness section (3) for sensor system 1.
- Connect connectors (2) and lock.

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

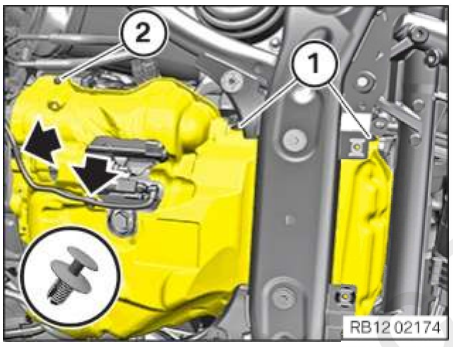
  The connector (1) must engage audibly.



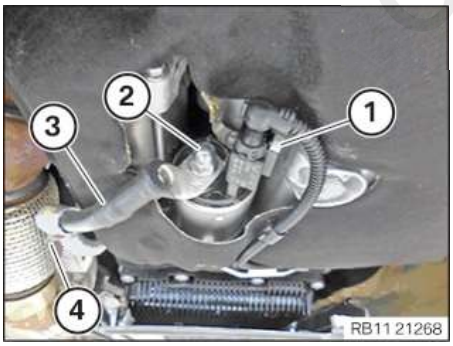
- Position the acoustic cover (2).
- Fasten expanding rivet (1).
- Secure clamp (arrow).



- Fasten expanding rivet (1).

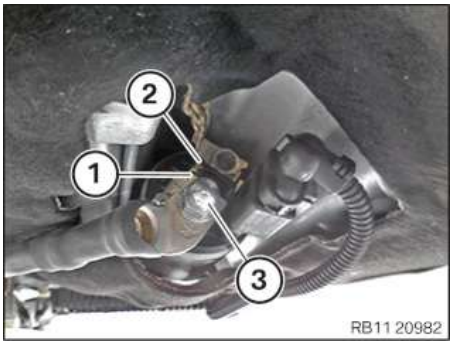


- Secure fir tree clip (2).
- Secure expanding rivet (1).
- Secure the clamps (arrows).



- Connect connectors (1) and lock.
- Make sure the connector (1) engages audibly.
- Insert and install the positive battery cable (3).
- Secure positive battery cable (3) at the clamp (4).
- Tighten the nut (2) hand-tight.

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CAUTION

Improper routing of the positive battery cable.

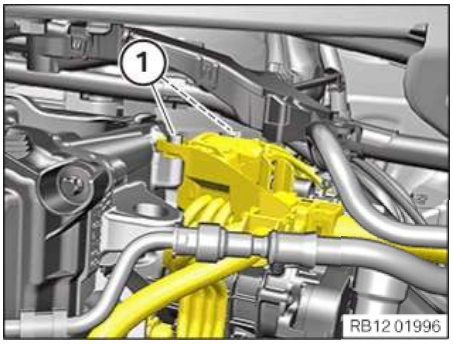
Risk of short circuits!

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

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

Battery positive lead to starter

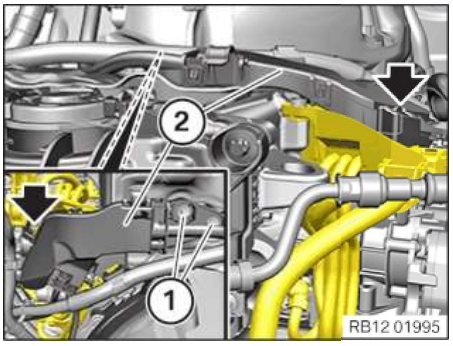
M8		Tightening torque	13,5 Nm



- Tighten the screws (1).

Cable routing to cylinder head, rear

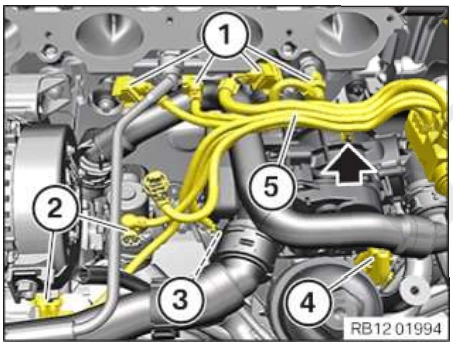
M6 x 20		Tightening torque	8 Nm



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

Cable routing to cylinder head, rear

M6 x 20		Tightening torque	8 Nm



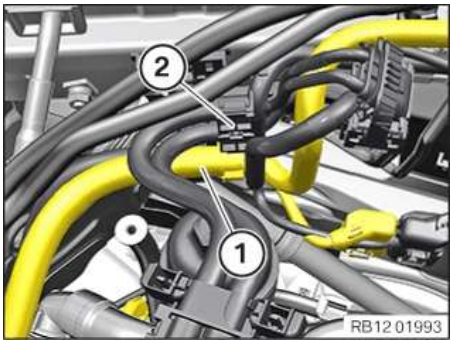
- Guide in and install wiring harness section (5) for sensor system 1.
- Secure clamp (arrow).
- Connect connectors (4) and lock.

  The connector (4) must engage audibly.
- Connect connectors (3) and lock.

  The connector (3) must engage audibly.
- Connect connectors (2) and lock.

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

  The connectors (1) must engage audibly.



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

POSTPROCESSES

22 – Installing the intake plenum

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RISK OF DAMAGE

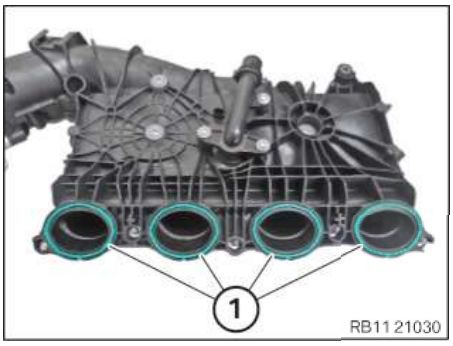
Improper routing of cables and wiring harnesses.

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

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

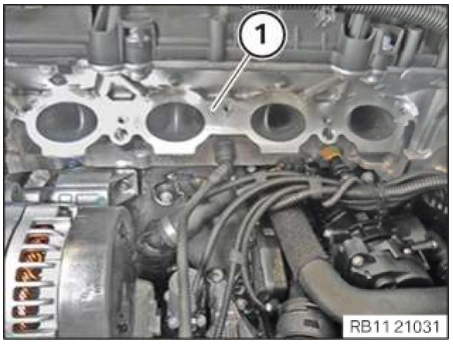
TECHNICAL INFORMATION

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

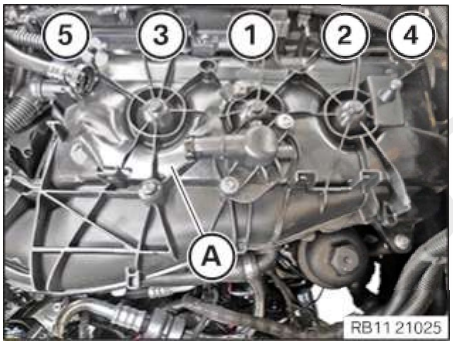


- Renew gaskets (1).

  Parts: Seals



- Clean contact surface (1).



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.

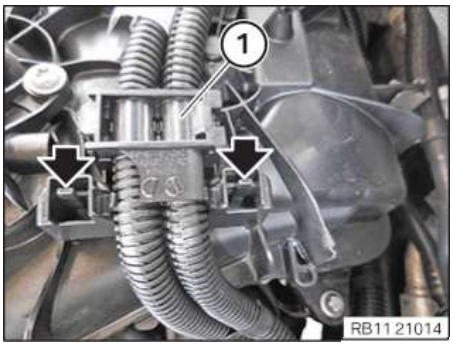
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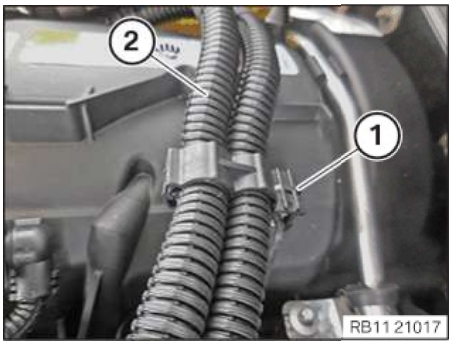
- Tighten down screw (1).

Intake plenum to support

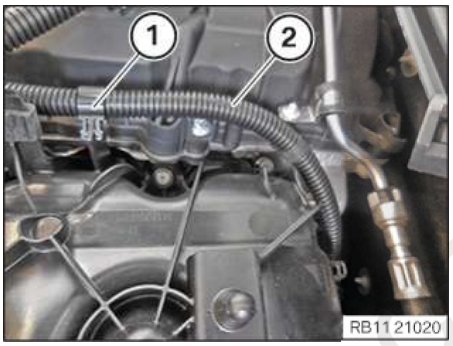
M6X25		Tightening torque	8 Nm



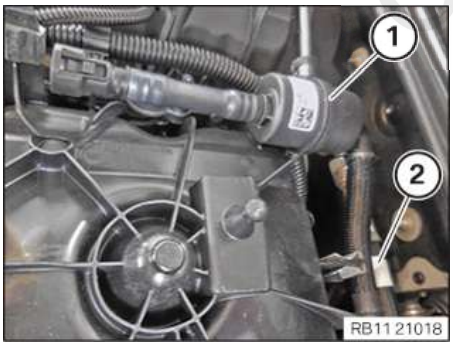
- Insert and install the wiring harness section (1) for the injectors and ignition coils.
  The locks (arrows) must engage audibly.



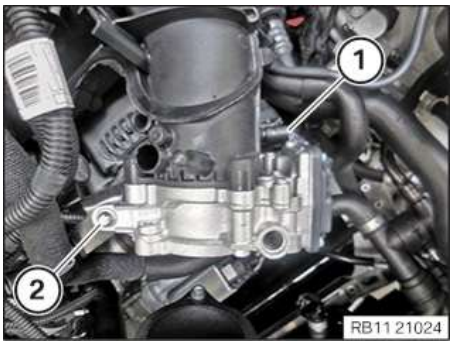
- Insert and install the wiring harness section (2) for the injectors and ignition coils.
- Secure clamps (1).



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



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

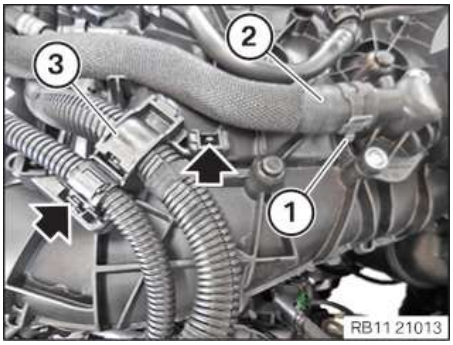


- Connect connectors (1) and lock.
- Make sure the connector (1) engages audibly.
- Tighten down screw (2).

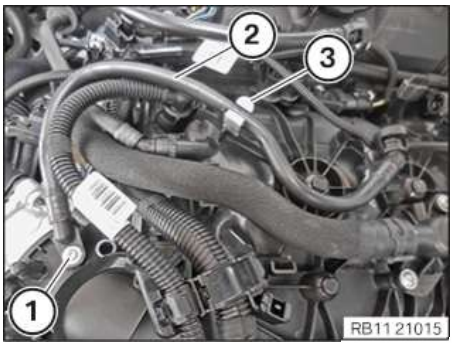
Throttle body to holder

M6X25		Tightening torque	8 Nm

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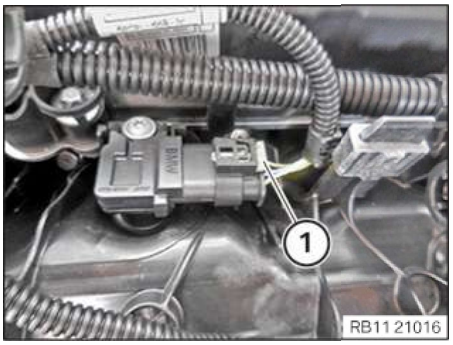
- Insert and install the coolant hose (2).
- Secure clamping collar (1) with the special tool 0 495 794 (17 2 050).
- Guide in and install wiring harness section (3) for sensor system 2.
- Make sure that you can hear the locks (arrows) engage.



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

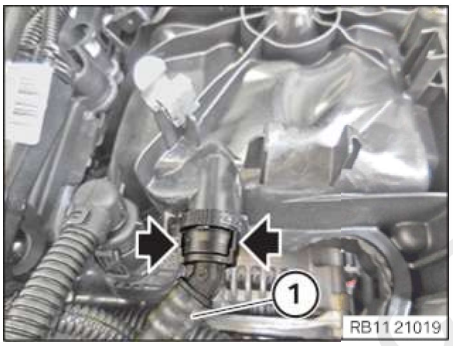
Tank ventilation line to intake plenum

Oval-head screw		Tightening torque	3 Nm



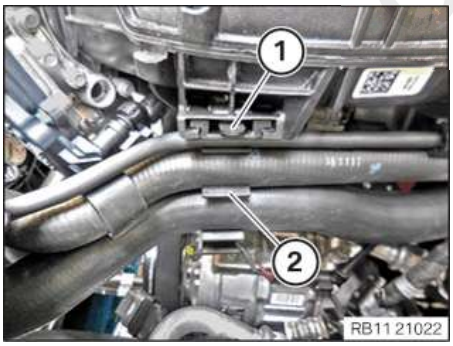
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

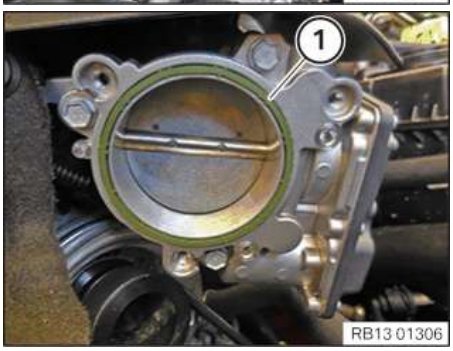


- Insert and install the tank ventilation line (1).

  The locks (arrows) must engage audibly.



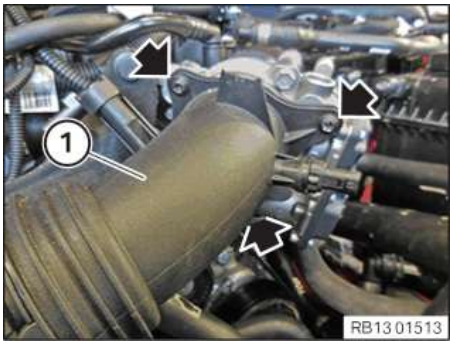
- Insert and install the holder (2).
- Ensure that the lock (1)engages audibly.



- Renew the gasket (1).

  Parts: Gasket

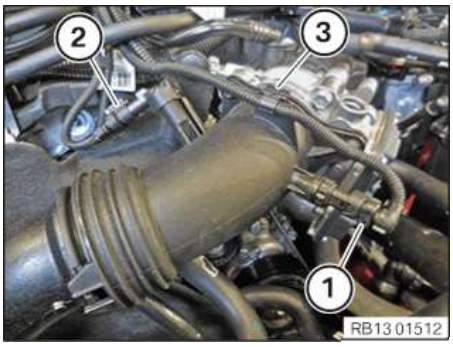
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- Insert and install charge air line (1).
- Tighten screws (arrows).

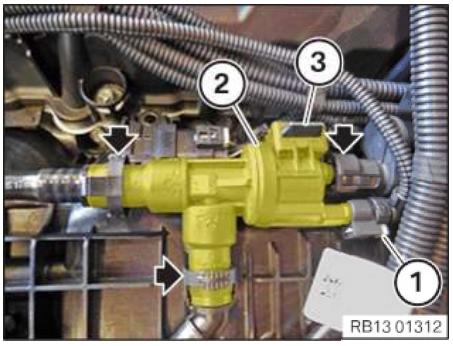
Charge air line to throttle body

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).

23 – Installing the tank vent valve

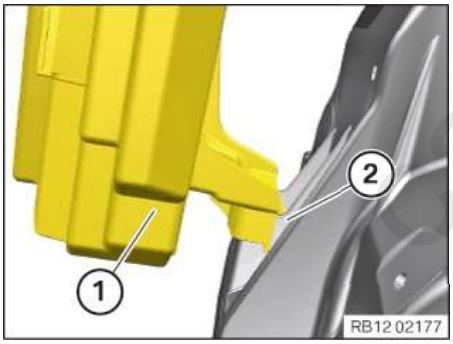


- Secure the tank vent valve (2) to the holder (3).
- Connect and lock the tank ventilation lines (arrows).

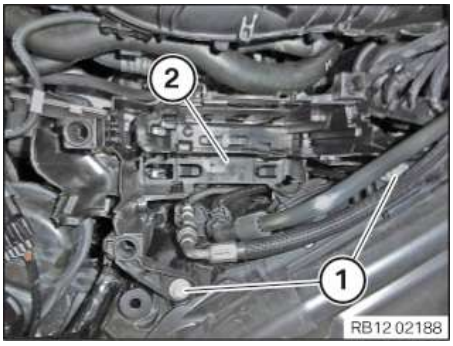
  The tank ventilation lines (arrows) must audibly engage.
- Connect and lock the connector (1).

  The connector (1) must engage audibly.

24 – Installing the control unit holder



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

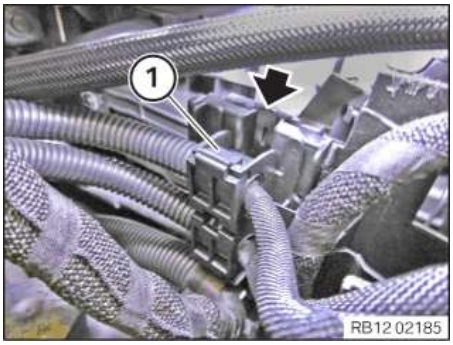


- Guide in and install control unit holder (2).
- Tighten the screws (1).

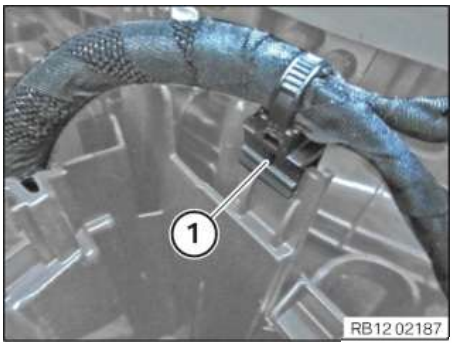
Control unit holder on spring strut dome

Hexagon screw		Tightening torque	8 Nm

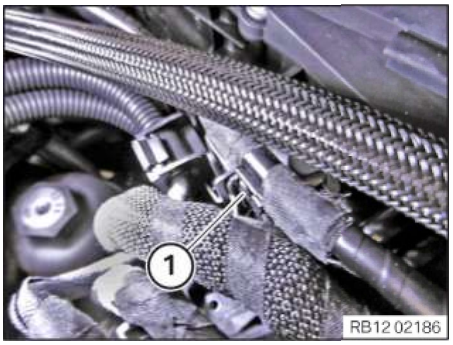
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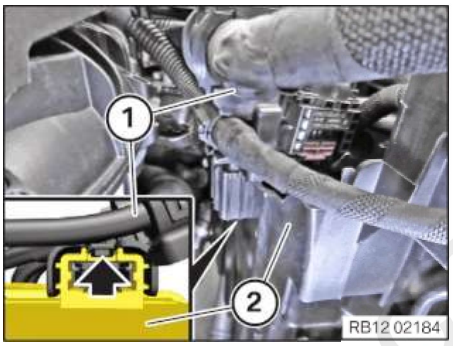
- Feed in and install the cable clip (1).
  Lock (arrow) must audibly engage.



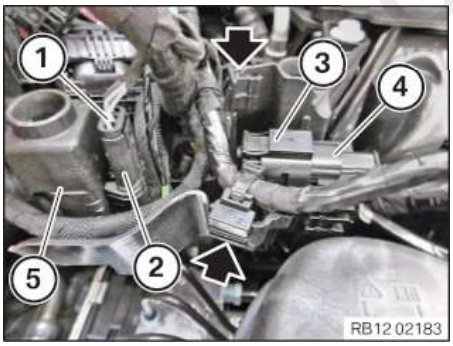
- Secure clamps (1).



- 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).

25 – Installing the integrated supply module (PDM)

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WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

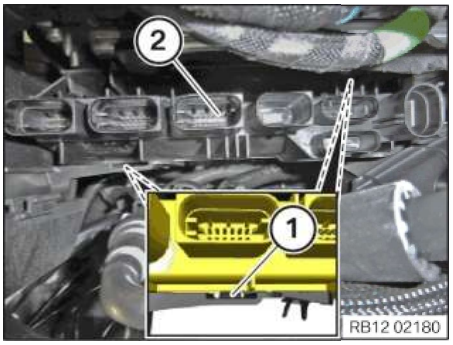
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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



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

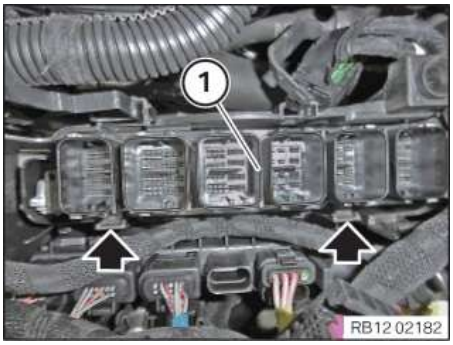
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

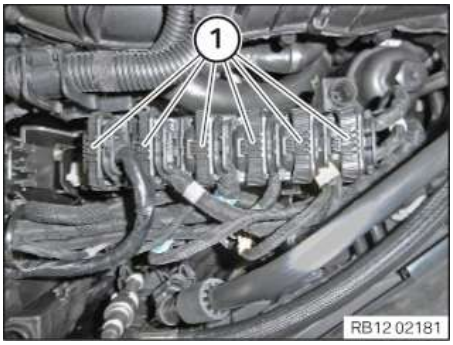
26 – Installing the DME control unit



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

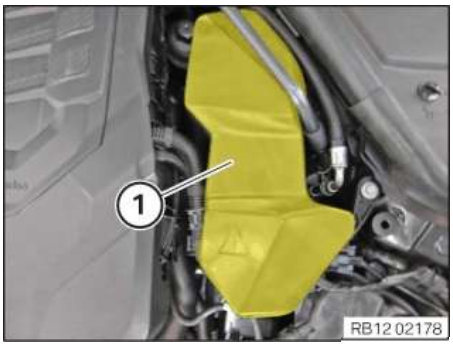
  The locks (arrows) must engage audibly.

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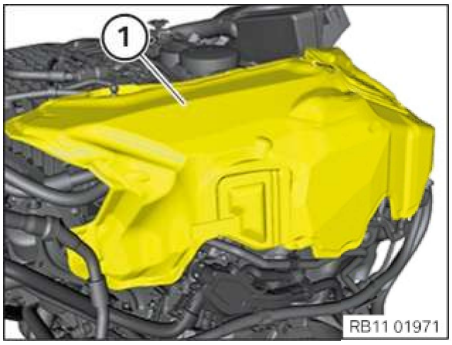
- Connect connectors (1) and lock.

  All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

27 – Installing acoustic cover at rear

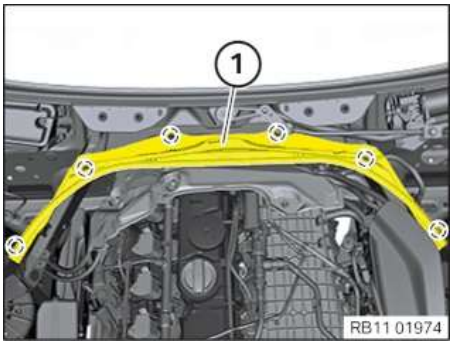


- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



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

28 – Installing the centre bulkhead upper part

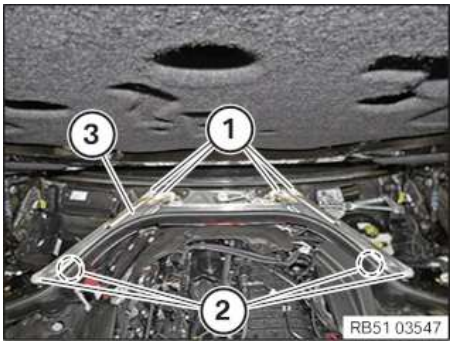


- Position the centre bulkhead upper part (1).
- Tighten the bolts in the marked areas.

Bulkhead upper part to bottom bulkhead

	Tightening torque	3 Nm

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

Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

Tension strut to spring strut dome

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

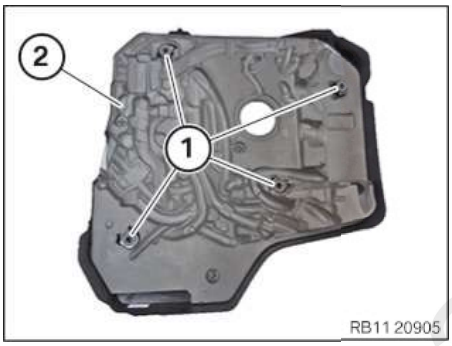
29 – Install acoustic cover

RISK OF DAMAGE

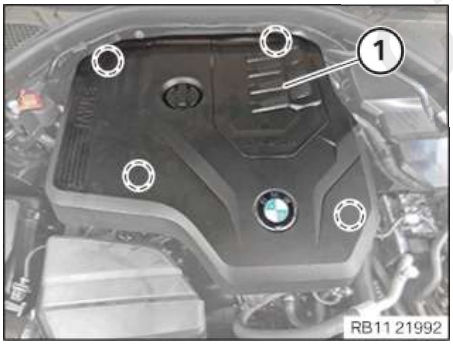
Damage to the acoustic cover.

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.

30 – Installing cowl panel cover

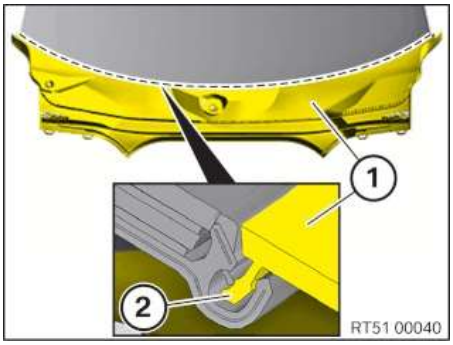
RISK OF DAMAGE

Damage caused by water ingress into the vehicle.

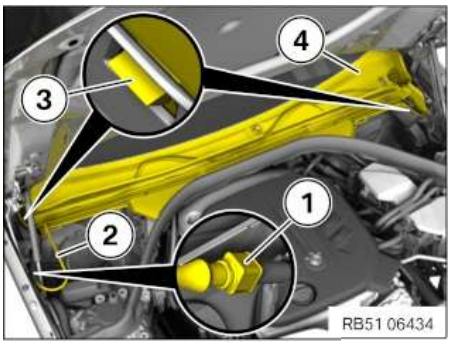
Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

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

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



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

31 – Installing both wiper arms

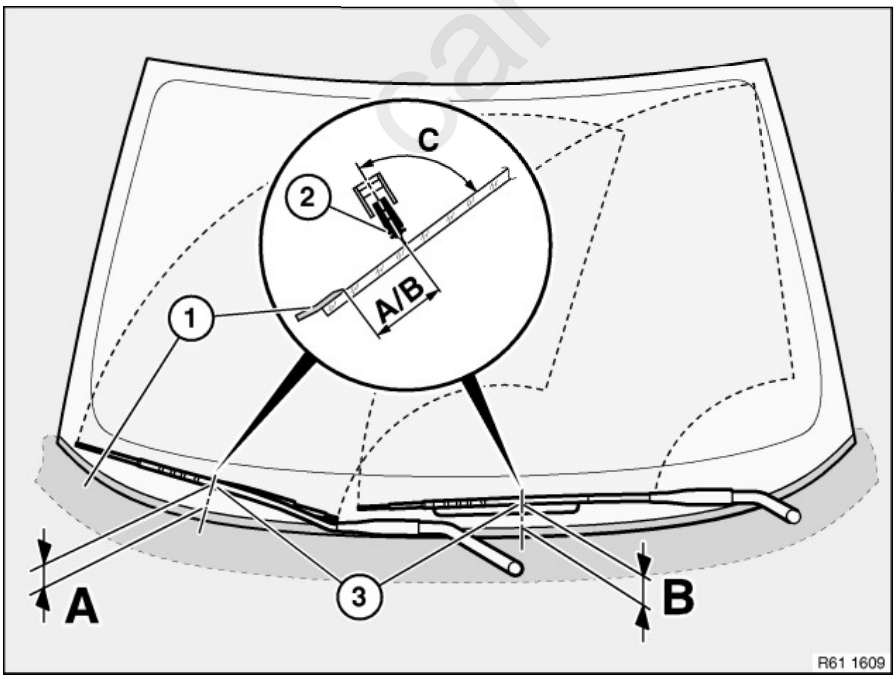
NOTICE

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

▸ **Install the wiper arm**

TECHNICAL INFORMATION

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

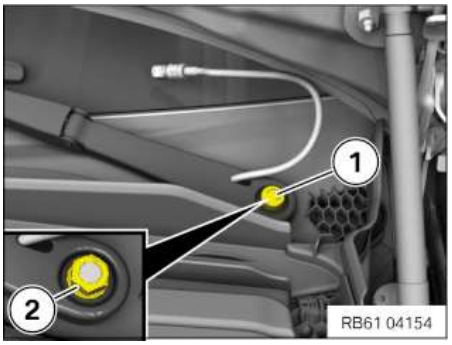


- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

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

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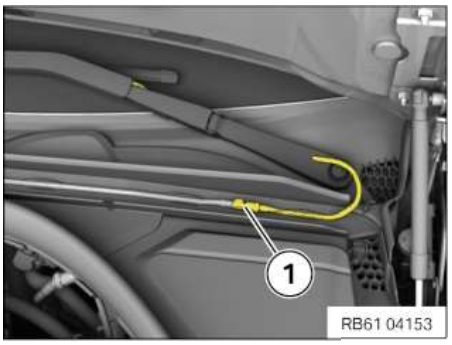


- Tighten nut (2).

Windscreen wiper arm

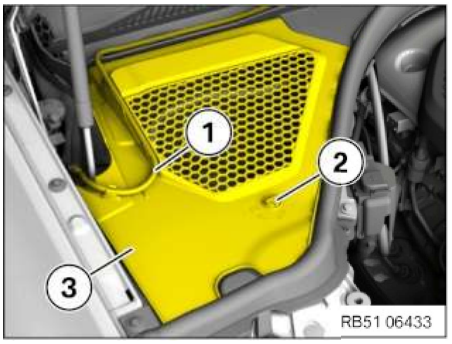
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



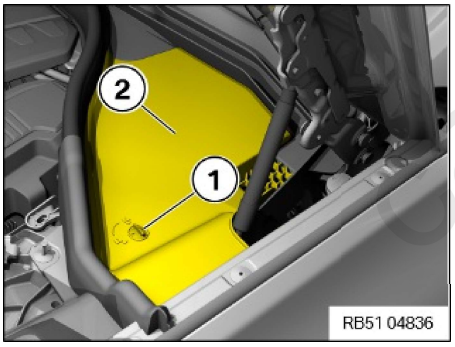
- Insert windscreen wash hose (1) into the cowl and connect at the separating point.

32 – Install the rear right engine compartment cover



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

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



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

34 – 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.

35 – Filling and bleed the low-temperature coolant circuit

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- See additional information.

36 – Disconnecting all battery earth leads

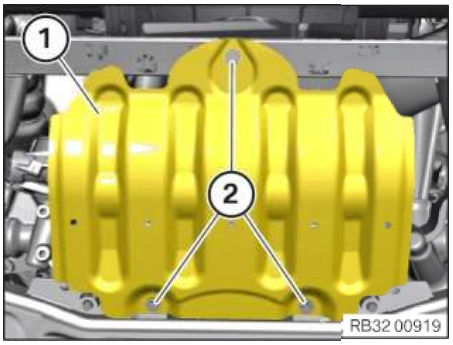


- See additional information.

37 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

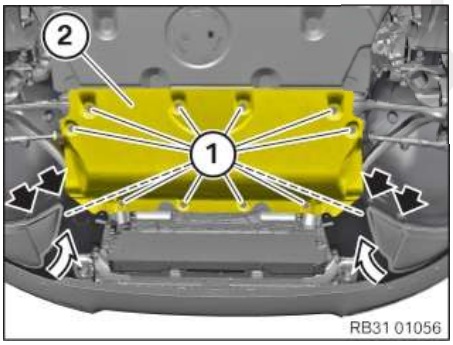


- Remove guard (1).
- Tighten the screws (2).

Bumper buffer device steering on front axle support

M10		Tightening torque	56 Nm

38 – 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

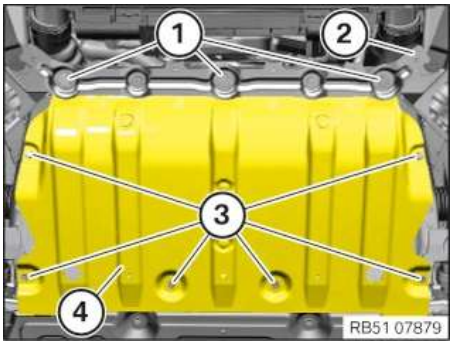
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- 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

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

Underbody protection of the steering gear

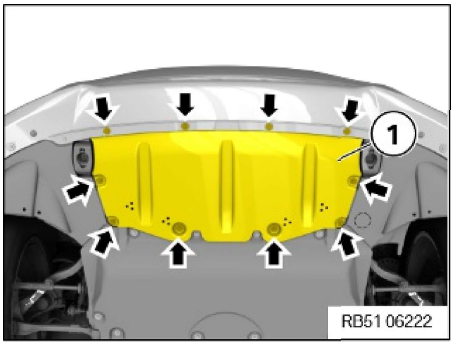
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

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

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

39 – Installing the front underbody protection



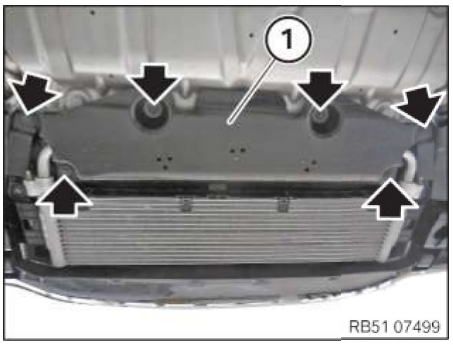
- **Version 1:**

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

  Tighten screws (arrows).

Underbody protection front

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



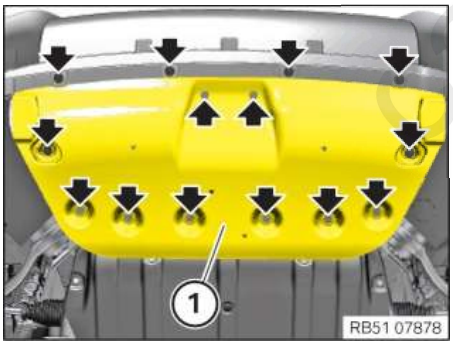
- **Version 2:**

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

  Tighten screws (arrows).

Underbody protection front

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



- **Version 3:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

Additional Information

Overview of Tightening Torques

Cover, front bottom on side Used in step 18

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Wiring harness section of engine to cylinder head cover Used in step 21

M6		Tightening torque	8 Nm

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Battery positive lead to starter			Used in step 21
M8		Tightening torque	13,5 Nm

Cable routing to cylinder head, rear			Used in step 21
M6 x 20		Tightening torque	8 Nm

Intake plenum to cylinder head			Used in step 22
M6		Tightening torque	10 Nm

Intake plenum to support			Used in step 22
M6X25		Tightening torque	8 Nm

Throttle body to holder			Used in step 22
M6X25		Tightening torque	8 Nm

Tank ventilation line to intake plenum			Used in step 22
Oval-head screw		Tightening torque	3 Nm

Charge air line to throttle body			Used in step 22
M6		Tightening torque	8 Nm

Control unit holder on spring strut dome			Used in step 24
Hexagon screw		Tightening torque	8 Nm

Bulkhead upper part to bottom bulkhead			Used in step 28
		Tightening torque	3 Nm

Tension strut on bulkhead			Used in step 28
M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome			Used in step 28
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 31
Combination hexagon nut		Tightening torque	35 Nm

Bumper buffer device steering on front axle support			Used in step 37
M10		Tightening torque	56 Nm

Underbody protection of the steering gear			Used in step 38
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws)			Used in step 38
Thermoplastic hexagon screw		Tightening torque	3 Nm

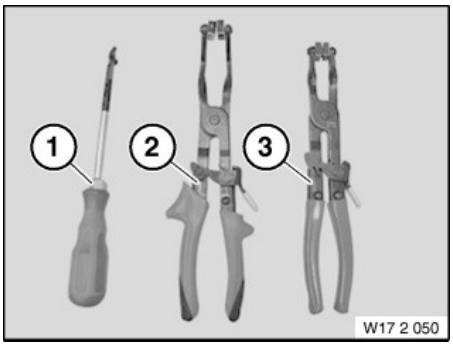
Holder underride guard to front axle support			Used in step 38
M10		Tightening torque	56 Nm

Underbody protection front			Used in step 39
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

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0 495 794 (17 2 050) Pliers



Common Used in step 1922

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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Distance from window pane edge to wiper blade	Used in step 31
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	1026

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	136
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	136
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 20 900 Disconnecting and connecting battery earth lead	136
61 35 ... Notes on ESD protection (Electro Static Discharge)	10111325
61 35 ... Notes on ESD protection (Electro Static Discharge)	13
61 00 730 Encode/program control unit(s) (after vehicle test)	26
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	35
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Venting cooling system and checking on watertightness	35
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	35
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	35
17 00 040 Bleeding lower-temperature cooling system (B48)	35

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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 011 Draining and topping up coolant circuit for low temperature	35
17 00 040 Bleed the low-temperature cooling system and check for watertightness (coolant circuit for low temperature)	35
17 00 040 Bleeding and filling low temperature cooling system using vacuum filler device (B48)	35
17 00 011 Draining and topping up low-temperature coolant circuit	35
17 00 011 Draining and topping up low-temperature coolant circuit	35
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	35
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	35
17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	35
17 00 011 Draining and topping up low-temperature coolant circuit	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	35

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

WARNING

Hot surfaces.

Risk of burning!

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

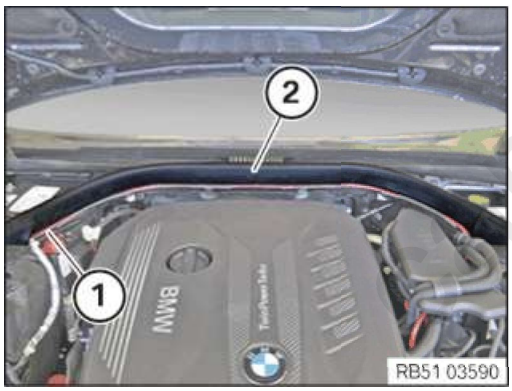
PRELIMINARY WORK

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

WARNING

Hot surfaces.

Risk of burning!

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

manualdiagn.com

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.

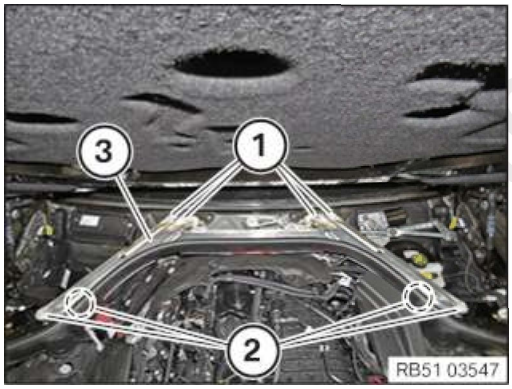


- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

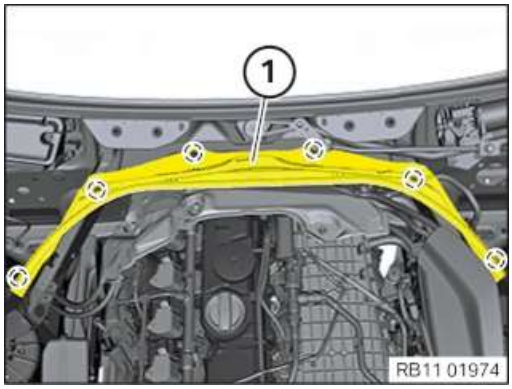
4 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

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



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



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

5 – Removing acoustic cover at rear



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

6 – Removing the clean air pipe with the resonator

WARNING

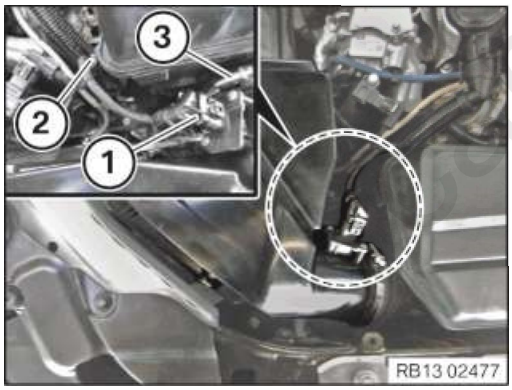
Hot surfaces.

Risk of burning!

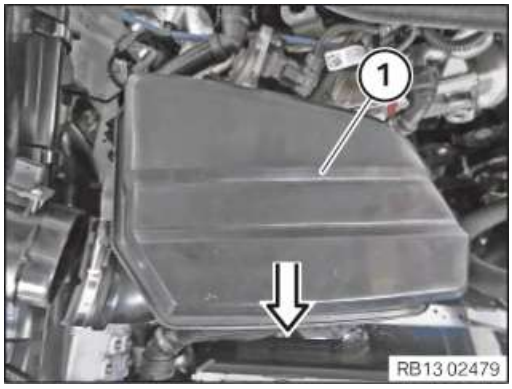
- Perform all work only on components that have cooled down.



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

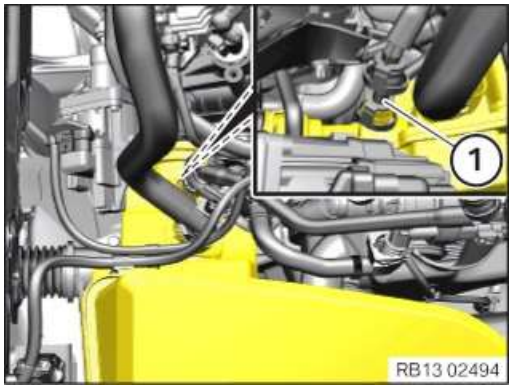


- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.

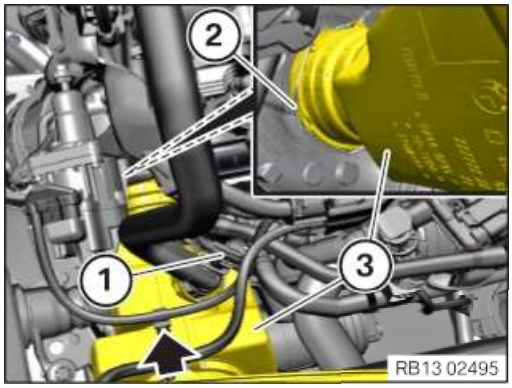


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.

cardiagn.com



- 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.

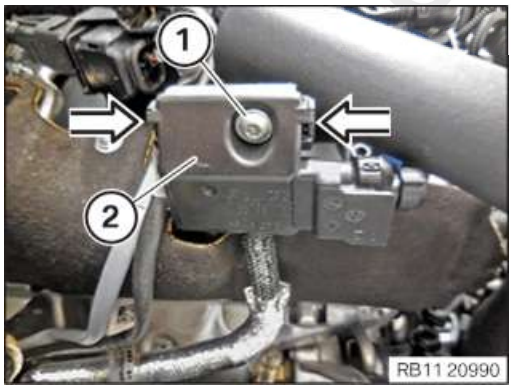
7 – Remove differential pressure sensor

RISK OF DAMAGE

Electrostatic discharge.

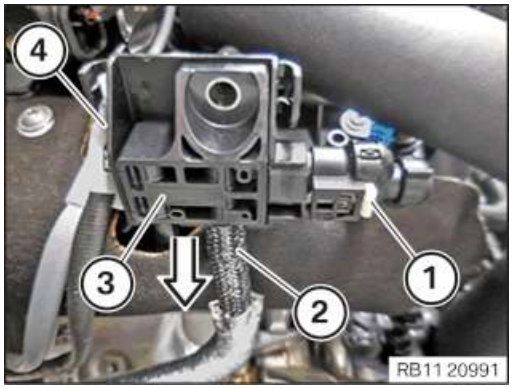
Damage to or destruction of electrical components.

- 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.



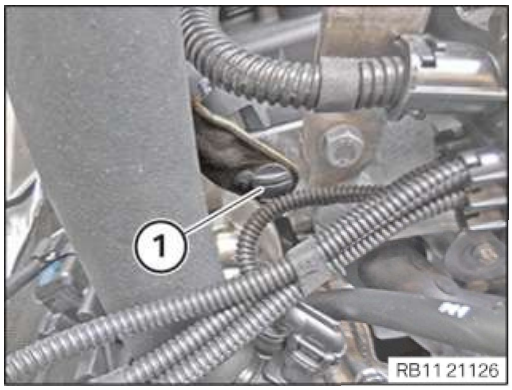
- Loosen screw (1).
- Release the locks (arrows).
- Guide out and remove the cover (2).

carlagn.com

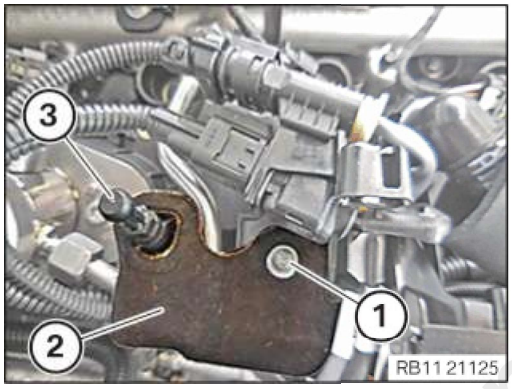


- Unlock plug connection (1) and disconnect.
- Pull off the pressure hose (2) from the differential pressure sensor (3) in the direction of arrow and place it to one side.
- Guide the differential pressure sensor (3) out of the holder (4) and remove.

8 – Removing the cylinder head cover acoustic cover

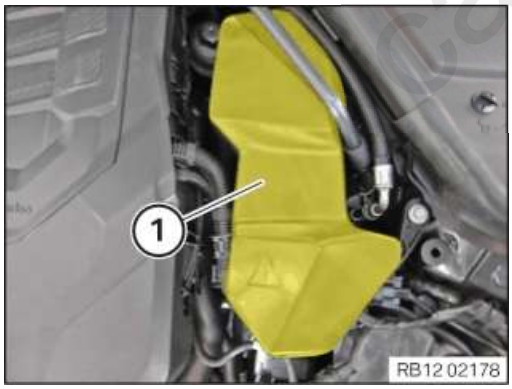


- Loosen clip (1).



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

9 – Remove the cover of the DME control unit



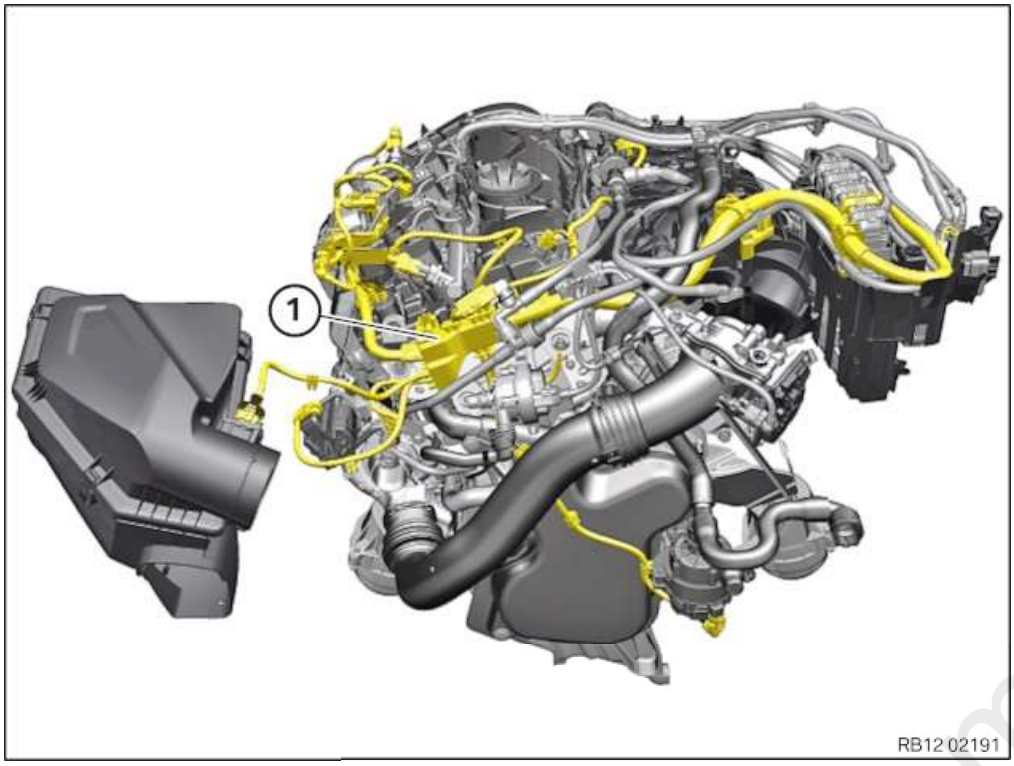
- Pull the cover (1) toward the top and remove.

MAIN WORK

10 – Removing the engine wiring harness for sensor system 2

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Engine wiring harness for sensor system 2



1 Engine wiring harness for sensor system 2

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

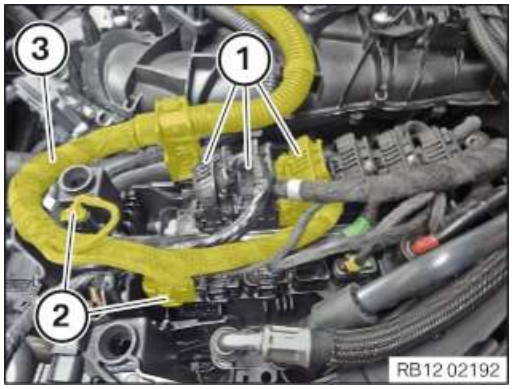
RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

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

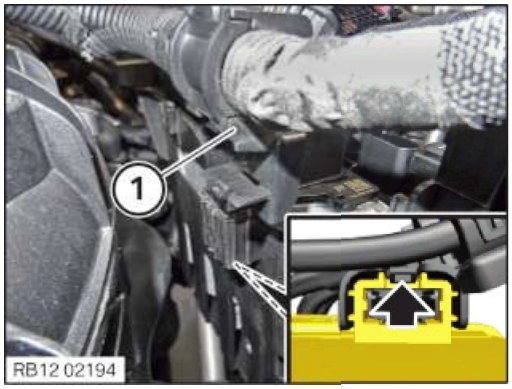
carlagn.com



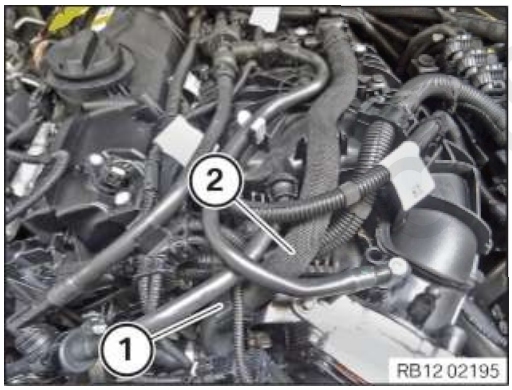
- Unlock and disconnect plug connections (1).
- Unlock and disconnect plug connections (2).
- Guide out the wiring harness section (3) for sensor system 2 and place to one side.



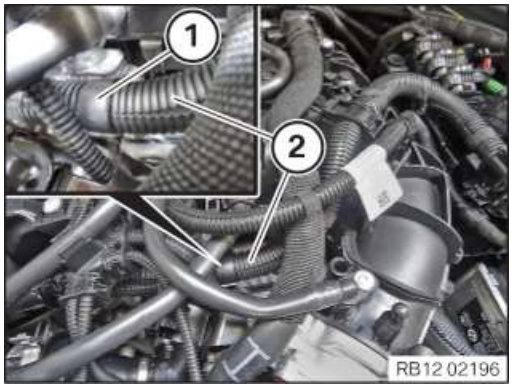
- Unlock the locks (arrows).
- Guide out the wiring harness section (1) for sensor system 2 and place to one side.



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

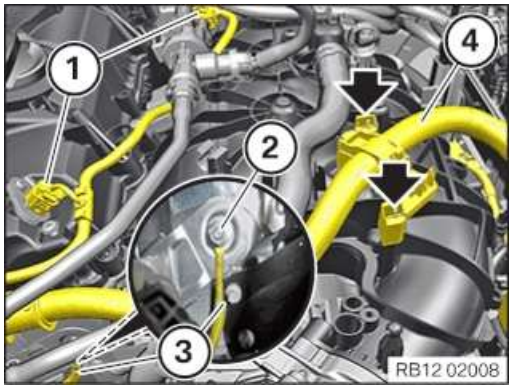


- Unlock the holder (1).
- Feed out coolant line (2) and place to one side.

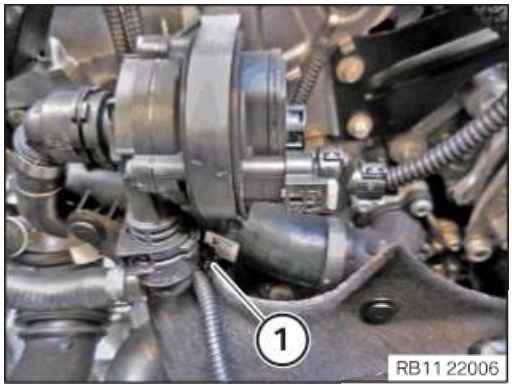


- Unlock the holder (1).
- Guide out the wiring harness section (2) for sensor system 2 and place to one side.

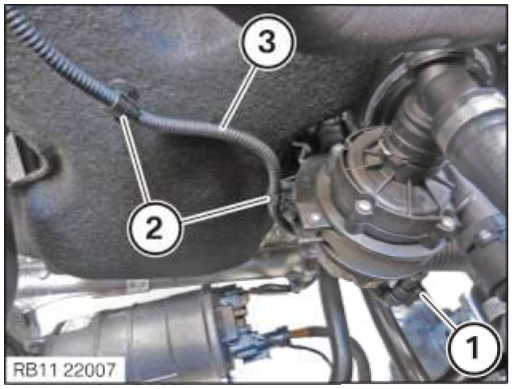
ardiagn.com



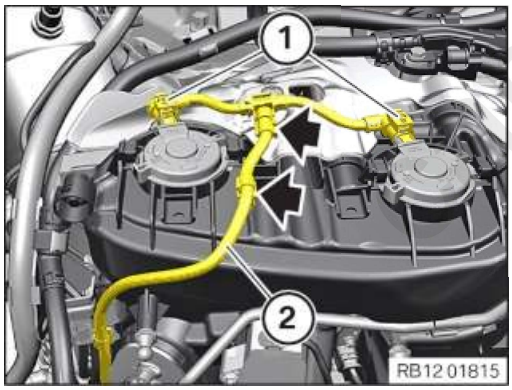
- Unlock and disconnect plug connections (1).
- Loosen nut (2).
- Feed out and remove the ground cable (3).
- Unlock the locking mechanisms (arrows) and feed out the wiring harness section(4) for sensor system 2 and place to one side.



- Loosen clamp (1).



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

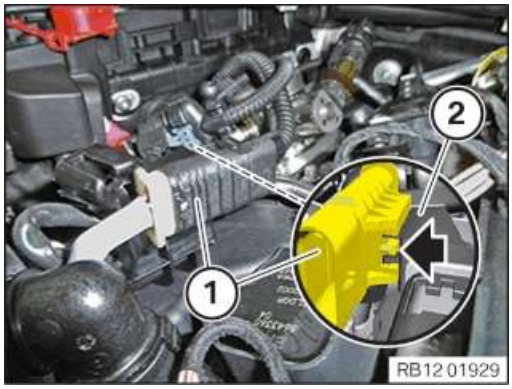


- Unlock and disconnect plug connections (1).
- Release the clamps (arrows).
- Guide out the wiring harness section (2) for sensor system 2 and place to one side.

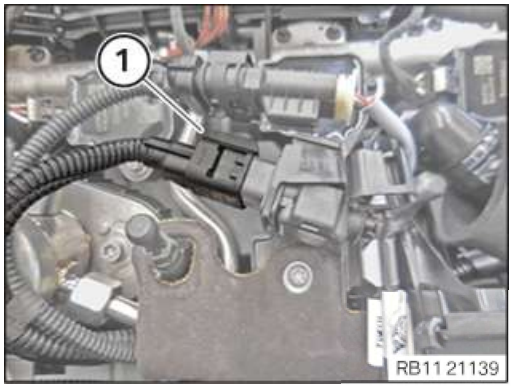


- Unlock plug connection (1) and disconnect.

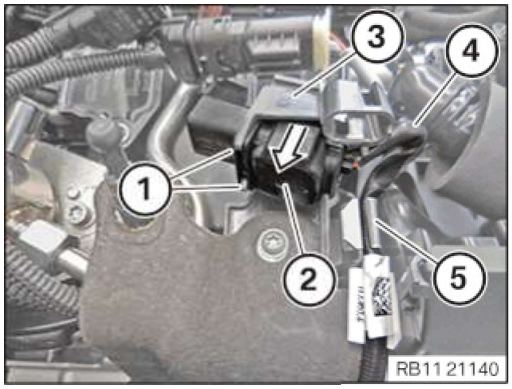
rdiagn.com



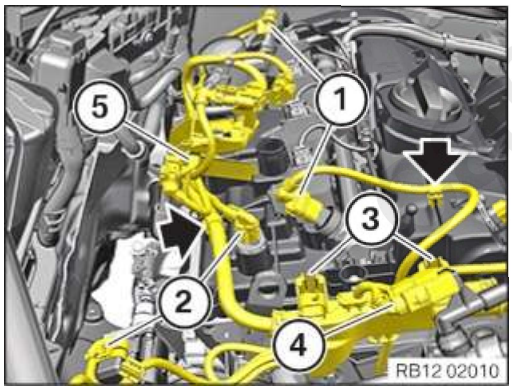
- Unlock plug connection (1)(arrow) and disconnect from the holder (2).



- Unlock plug connection (1) and disconnect.

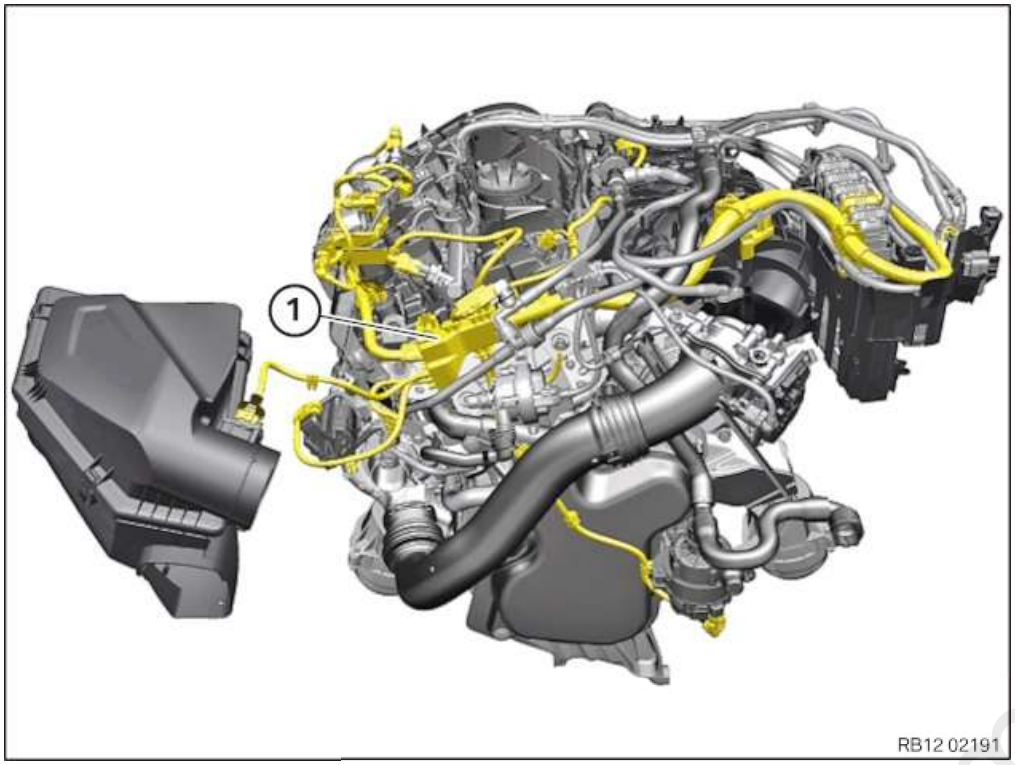


- Unlock the locks (1).
- Guide the connector (2) out of the bracket (3)in the **direction of the arrow** and set it aside.
- Release the cable (4) from the clamp (5).



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

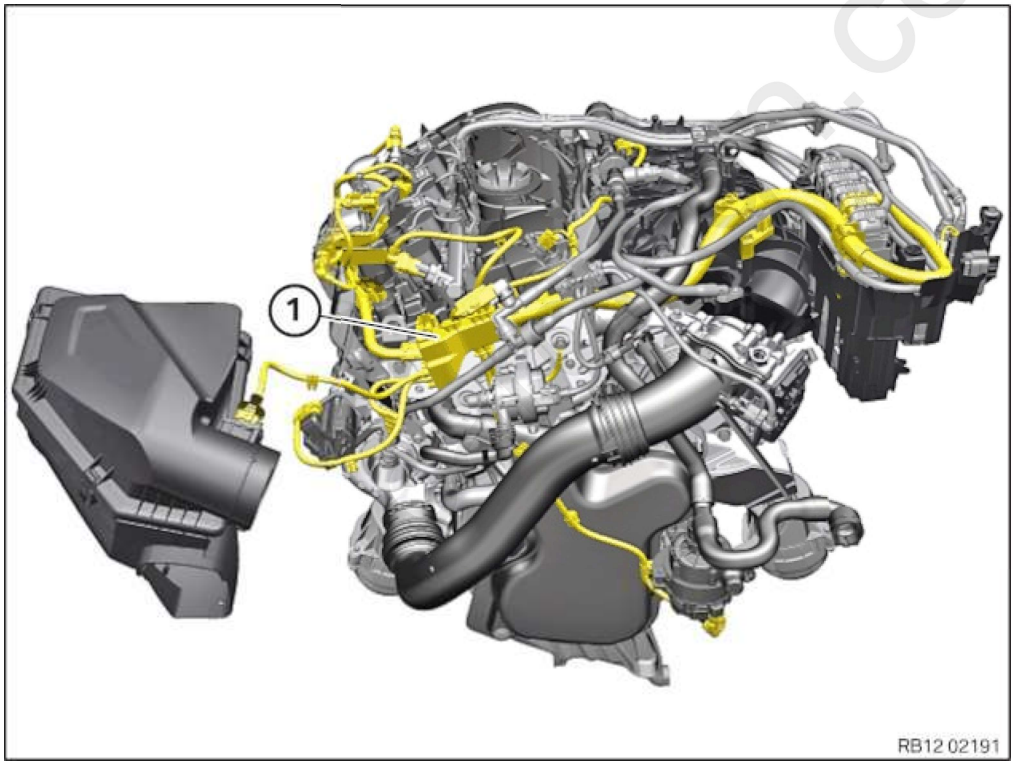
fdiagn.com



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

11 – Installing the engine wiring harness for sensor system 2

Engine wiring harness for sensor system 2



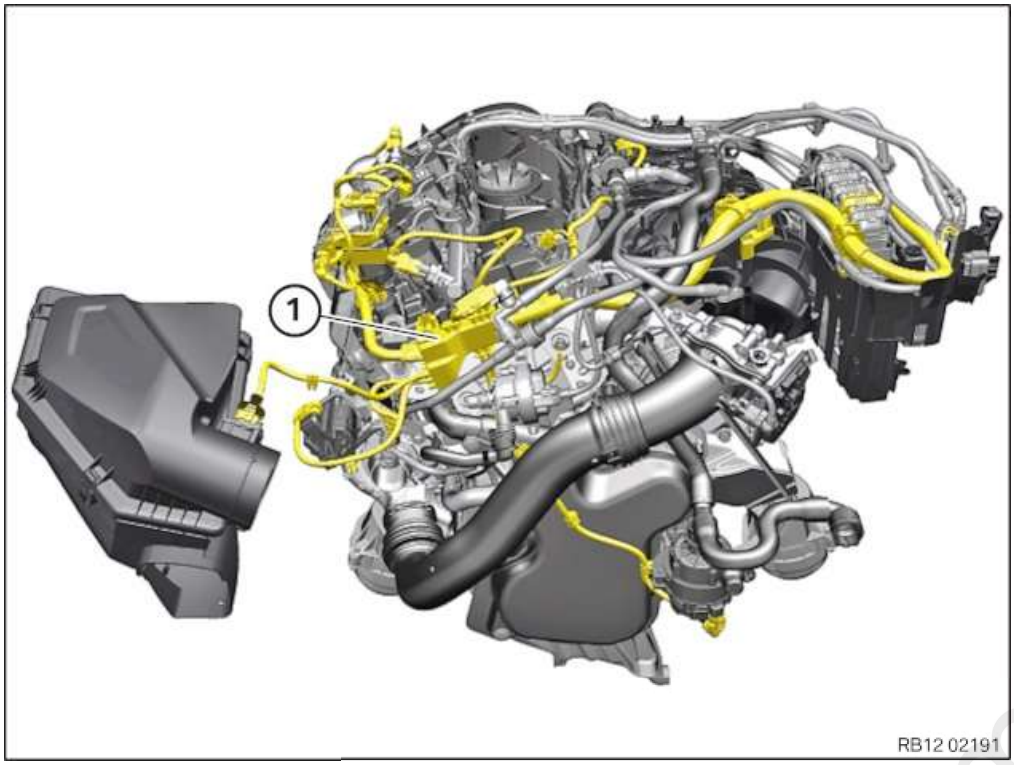
1 Engine wiring harness for sensor system 2

RISK OF DAMAGE

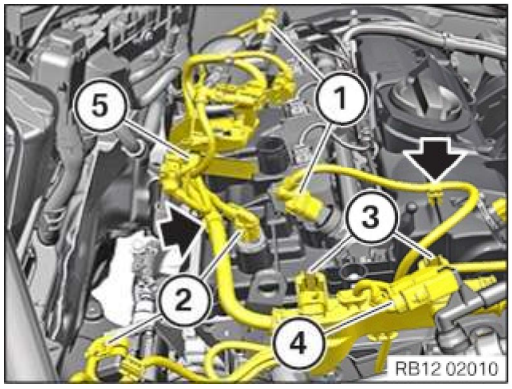
Improper routing of cables and wiring harnesses.

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

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



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

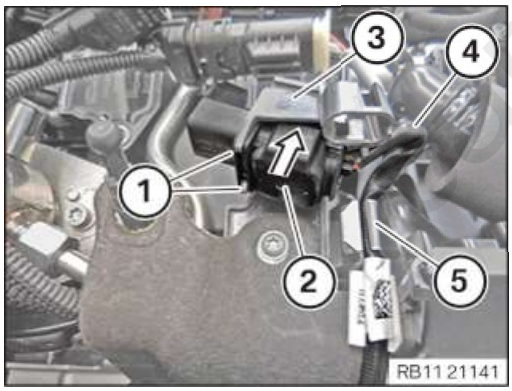


- Guide in and install wiring harness section (5) for sensor system 2.
- Connect connectors (4) and lock.

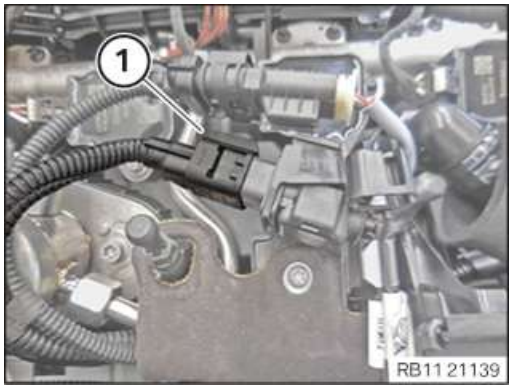
  The connector (4) must engage audibly.
- Install and lock locks (3).
- Secure the clamps (arrows).
- Connect connectors (2) and lock.

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

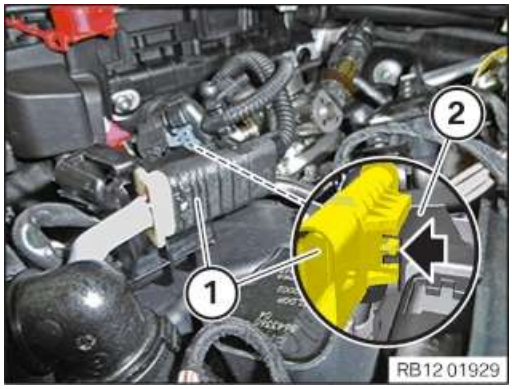
  The connectors (1) must engage audibly.



- Guide in the connector (2) in the direction of arrow at the carrier plate (3) and install.
- Ensure that locks (1) engage correctly.
- Secure cable (4) to the clamp (5).



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



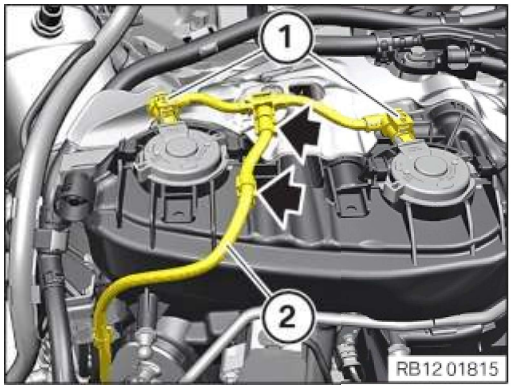
- Connect connector (1) to holder (2) and lock it (arrows).

  The connector (1) must engage audibly.



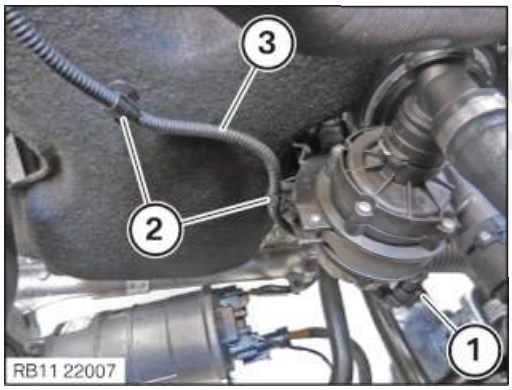
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



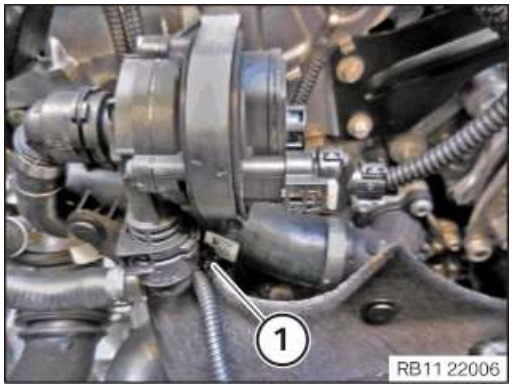
- Feed in and install the engine wiring harness (2) for sensor system 2.
- Secure the clamps (arrows).
- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.



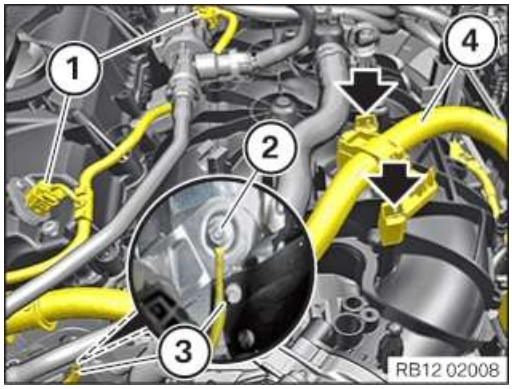
- Feed in and position wiring harness section (3).
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Secure clamps (1).

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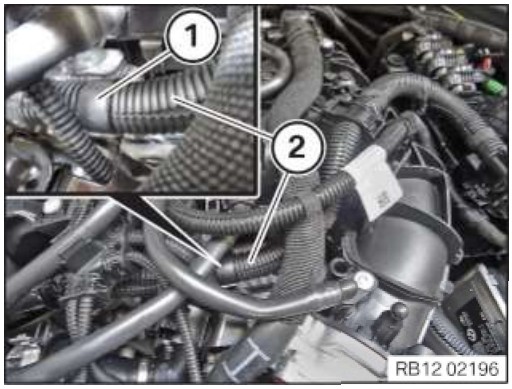
- Guide in and install wiring harness section (4) for sensor system 2.
- Ensure that the locks (arrows) engage correctly.
- Thread in ground cable (3) and install.
- Tighten nut (2).

Standard screw connection M6

M6		8 Nm

- Connect connectors (1) and lock.

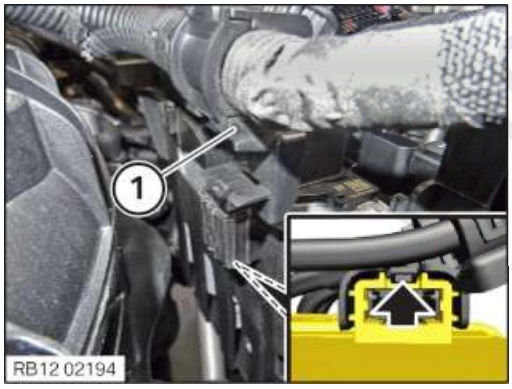
  The connectors (1) must engage audibly.



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



- Feed in and install coolant line (2).
- Lock holder (1).

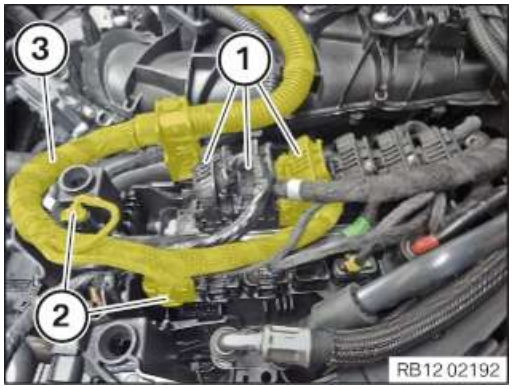


- Guide in and install wiring harness section (1) for sensor system 2.
- Ensure that the lock (arrow) engages audibly.



- Feed-in and lock wiring harness section (1) for sensor system 2 in holder.

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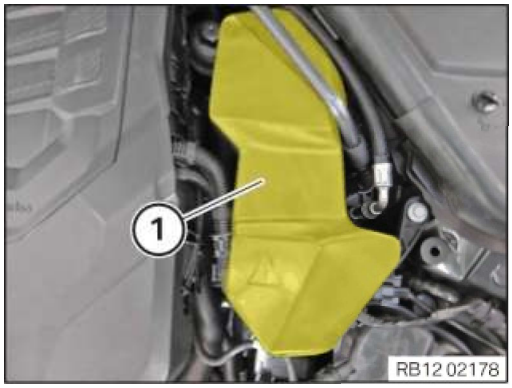
- Guide in and install wiring harness section (3) for sensor system 2.
- Connect connectors (2) and lock.

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

  The connectors (1) must engage audibly.

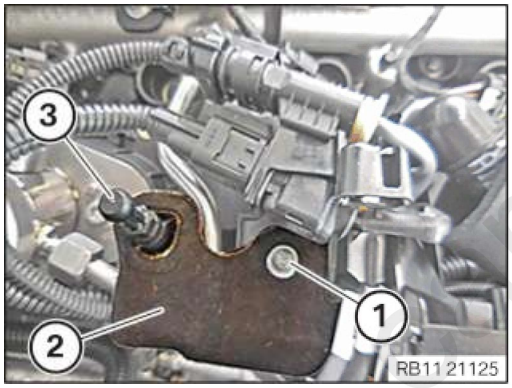
POSTPROCESSES

12 – Installing the cover of the DME control unit



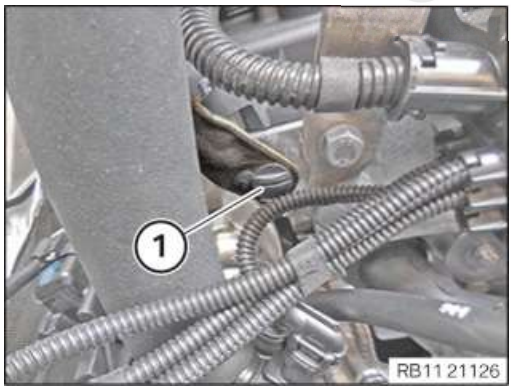
- Insert and install cover (1) into guides.

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



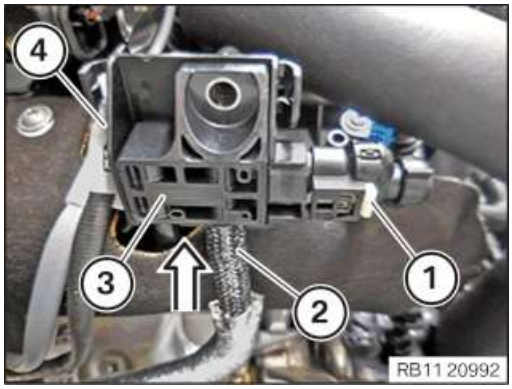
- Secure the clip (1).

14 – 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.

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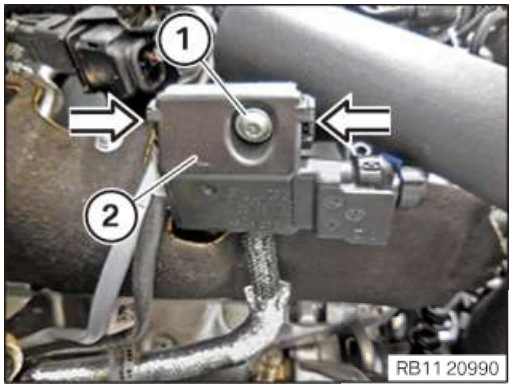


- Thread in differential pressure sensor (3) on the holder (4) and install.

  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.



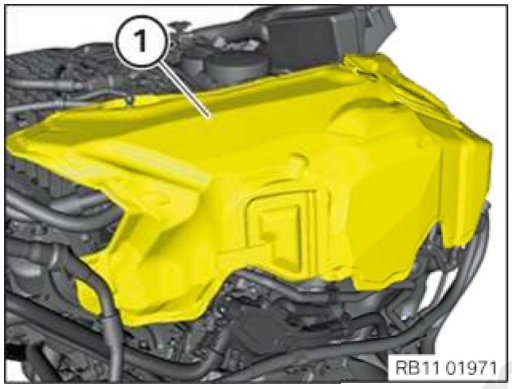
- Guide in and install cover (2).

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

Differential pressure sensor to holder

TS6X20		Tightening torque	4 Nm

15 – Installing acoustic cover at rear

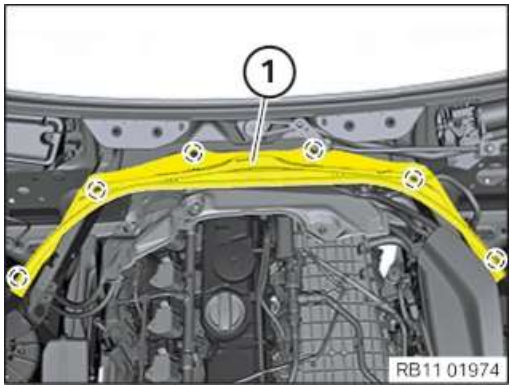


- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



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

16 – Installing the centre bulkhead upper part

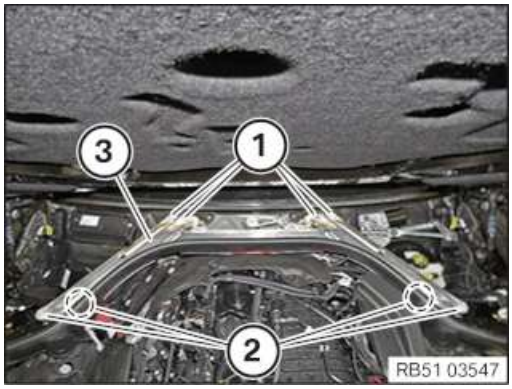


- Position the centre bulkhead upper part (1).
- Tighten the bolts in the marked areas.

Bulkhead upper part to bottom bulkhead

		Tightening torque	3 Nm

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

Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

Tension strut to spring strut dome

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

17 – Installing the clean air pipe with resonator

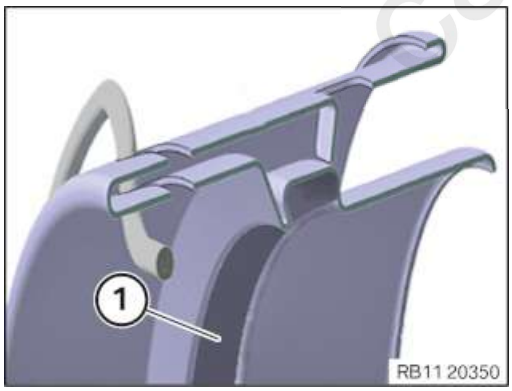


- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

TECHNICAL INFORMATION

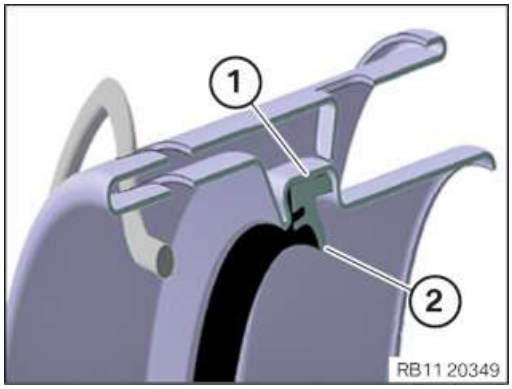
Do not use pointed or sharp-edged tools for the installation and/or removal.



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

  The gasket groove (1) must be clean.

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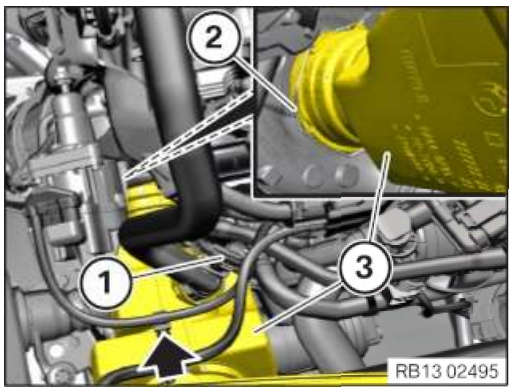
- Renew gasket.

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

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

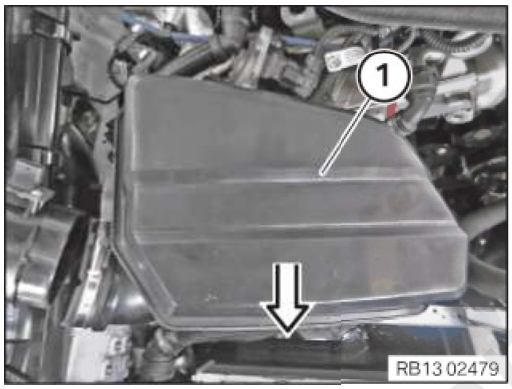
- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).



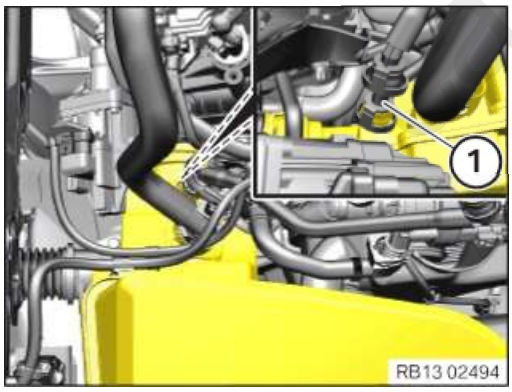
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

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

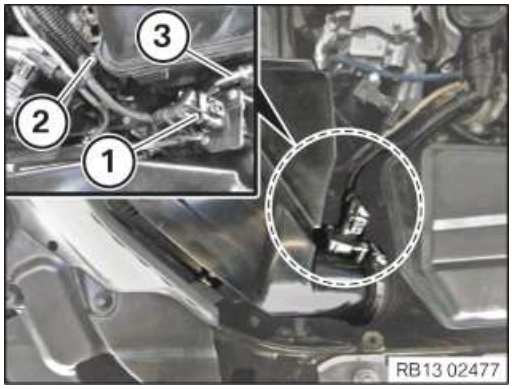
  The connector (1) must engage audibly.
- Secure clamp (arrow).



- 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.

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

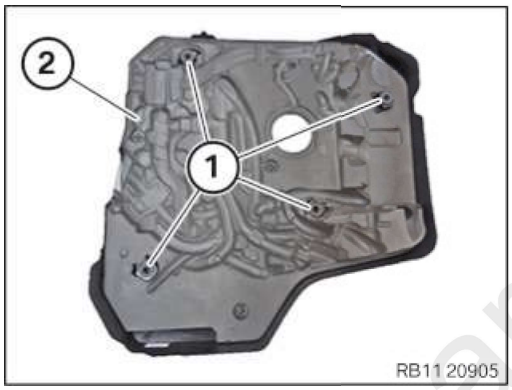
18 – Install acoustic cover

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.

19 – Install the seal for the bonnet

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

20 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Standard screw connection M6			Used in step 11
M6			8 Nm

Acoustic cover (side) to cylinder head cover			Used in step 13
TS6 x 20			8 Nm

Differential pressure sensor to holder			Used in step 14
TS6X20		Tightening torque	4 Nm

Bulkhead upper part to bottom bulkhead			Used in step 16
		Tightening torque	3 Nm

Tension strut on bulkhead			Used in step 16
M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome			Used in step 16
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Clean air pipe to upper section of intake filter housing			Used in step 17
Clamp		Tightening torque	3 Nm

Links

Repair instructions	**Used in step**

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61 20 900 Disconnecting and connecting battery earth lead	120
61 20 900 Disconnecting and connecting battery earth lead	120
61 20 900 Disconnecting and connecting battery earth lead	120
61 20 900 Disconnecting and connecting battery earth lead	120
61 20 900 Disconnecting and connecting battery earth lead	120
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	120
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	120
61 20 900 Disconnecting and connecting battery earth lead	120
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61 20 900 Disconnecting and connecting battery earth lead	120
61 20 900 Disconnecting and connecting battery earth lead	120
61 35 ... Notes on ESD protection (Electro Static Discharge)	710
61 13 ... Unlocking and disconnecting different plug connections	10

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12 51 245 Removing and installing/replacing transmission module engine wiring,

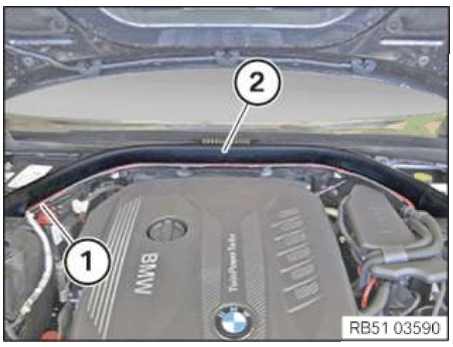
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



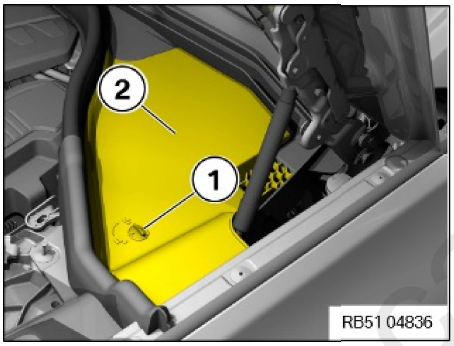
- See additional information.

2 – Remove the seal for the rear bonnet



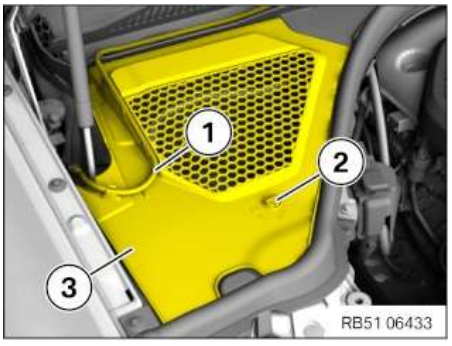
- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

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



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

4 – Remove the cover of the rear right engine compartment



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

5 – Removing both wiper arms

NOTICE

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

▸ **Remove the wiper arm**

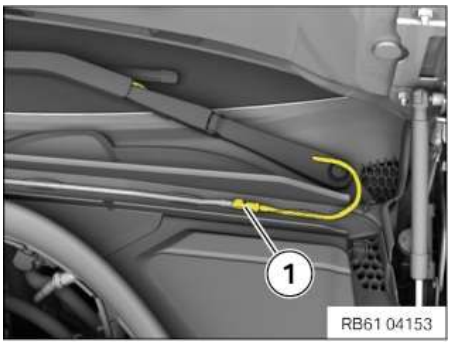
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RISK OF DAMAGE

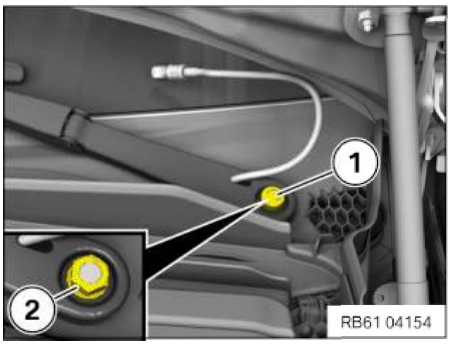
Damage to wiper console

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

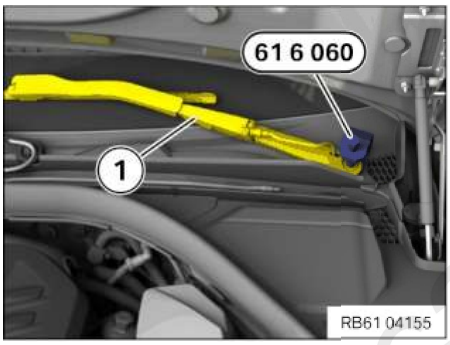
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.



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

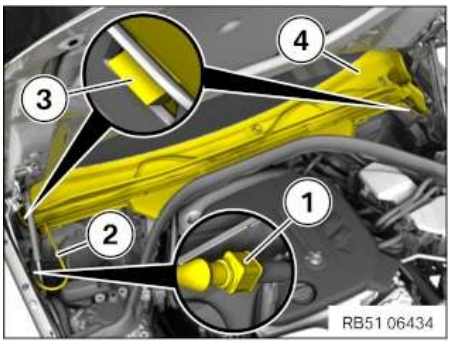


- Remove the protective cap (1).
- Loosen nut (2).



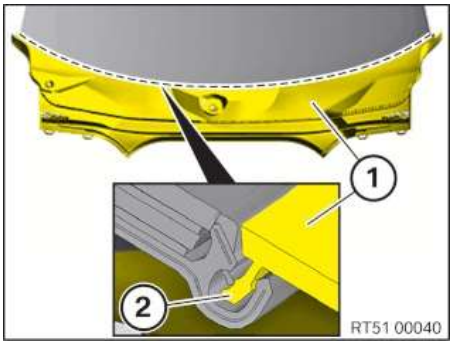
- Pull off the wiper arm (1) using special tool .

6 – Remove cowl panel cover



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

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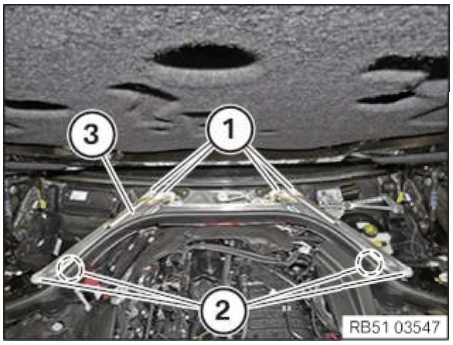


- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

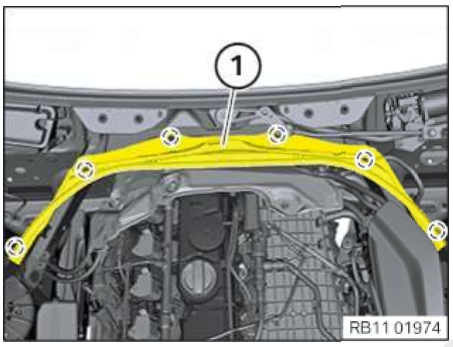
7 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

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



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



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

8 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Damage to the acoustic cover.

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

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

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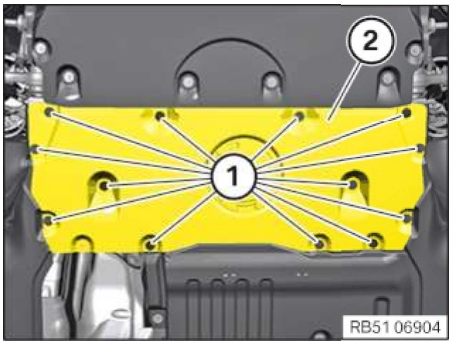
- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

9 – Removing acoustic cover at rear



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

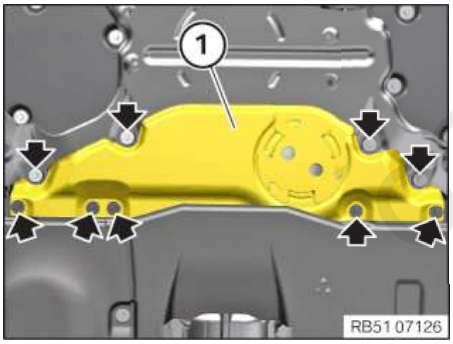
10 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .

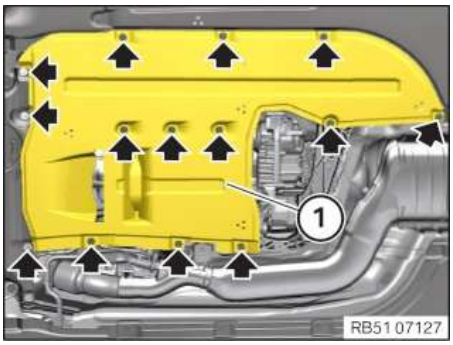


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

11 – Remove rear underbody protection

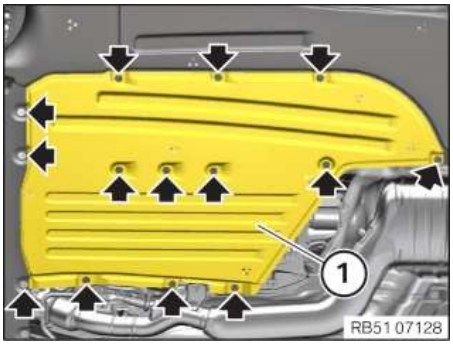


- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

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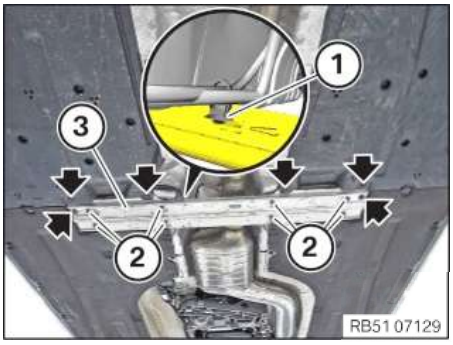


- **Version 2:**

  Remove screws (arrows).

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

12 – Remove the connecting support from the tunnel



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

13 – Remove complete exhaust system

WARNING

Hot surfaces.

Risk of burning!

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

CAUTION

Component with heavy weight.

Danger of injury!

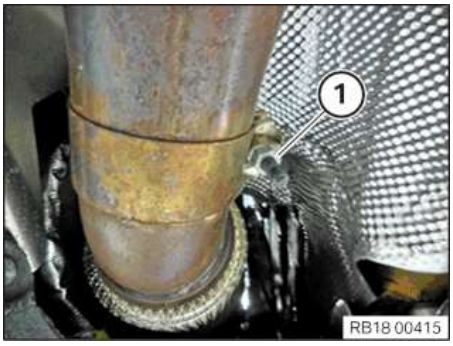
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

Heavy component.

Heavy components can lead to injury or damage.

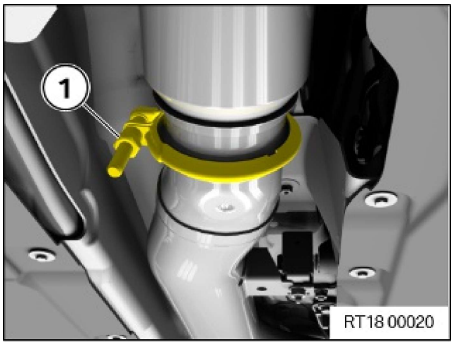
- Remove and install heavy components with the aid of another person/other persons.



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

  Detach the ribbon clamp (1).

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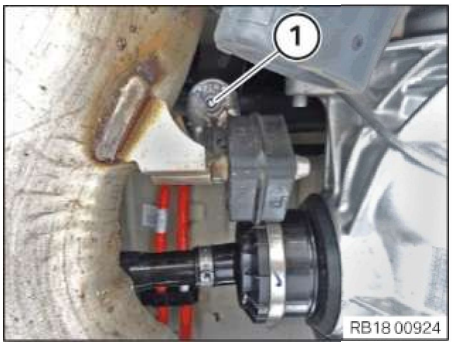


- **Equipment specification 2 (V-clips)**

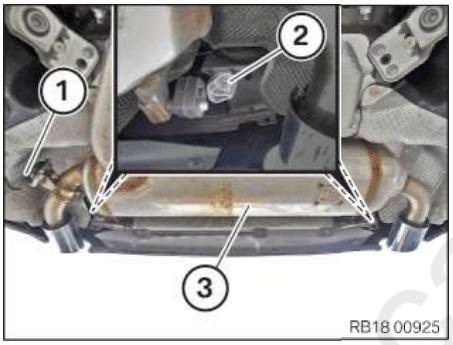
  Unfasten clamp (1).



- Loosen nut (1).

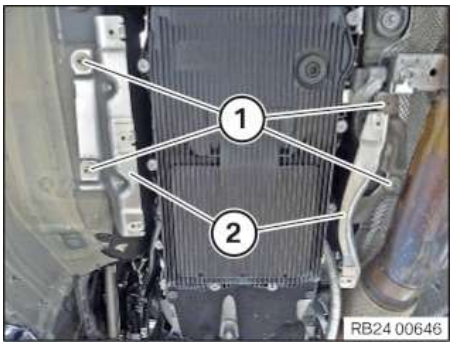


- Release nut (1) on the rear axle support.



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

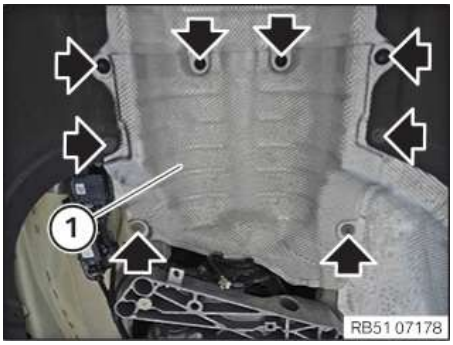
14 – Remove the retaining plates



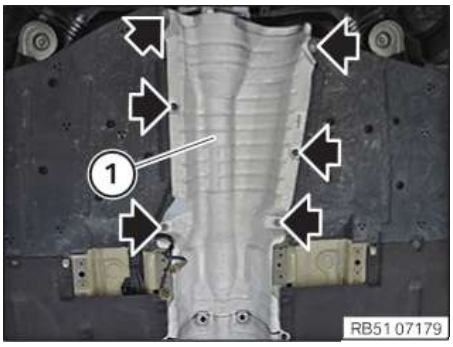
- Loosen nuts (1).
- Feed out retaining plates (2) and remove.

15 – Remove heat shields

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



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

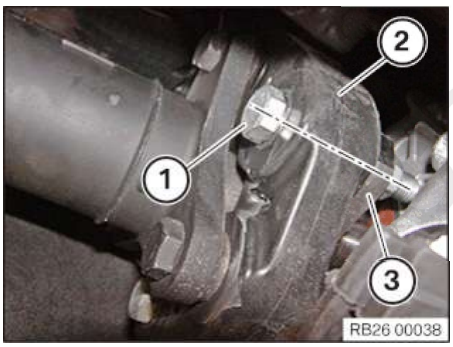
16 – Partially release propeller shaft

RISK OF DAMAGE

Damage to propeller shaft during removal.

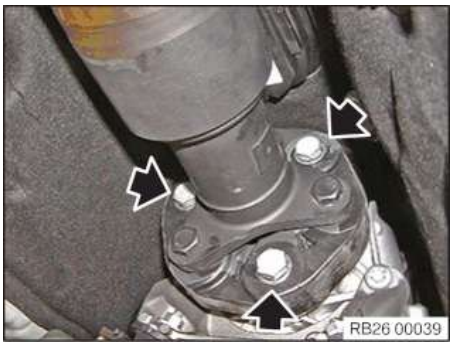
Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

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

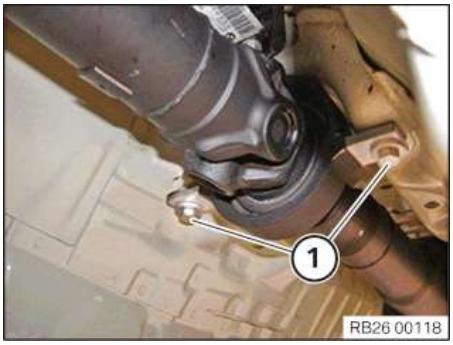


- Mark the installation position of the screw connection (1) of the flexible disc (2) and the three-hole flange (3).

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



- Remove screws (arrows).



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

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

17 – Removing the DME control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

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

TECHNICAL INFORMATION

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

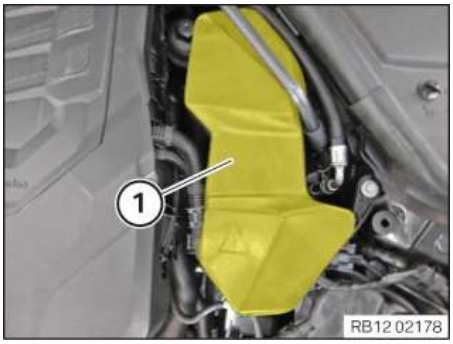
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

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

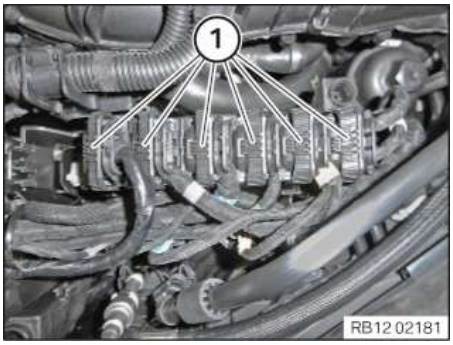
TECHNICAL INFORMATION

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

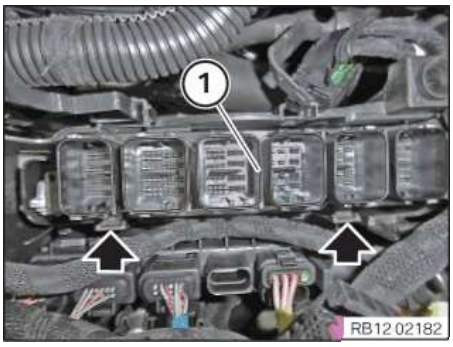


- Pull the cover (1) towards the top and feed out.

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- Unlock and disconnect the plug connection (1).



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

18 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

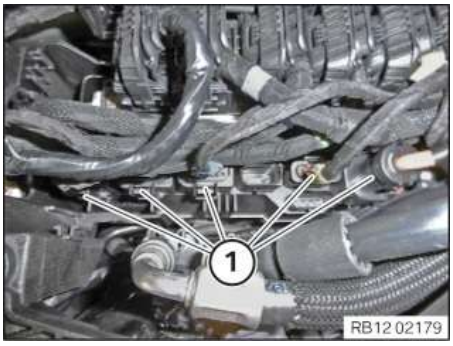
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Electrostatic discharge.

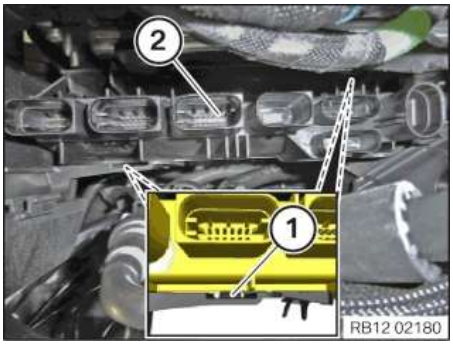
Damage to or destruction of electrical components.

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



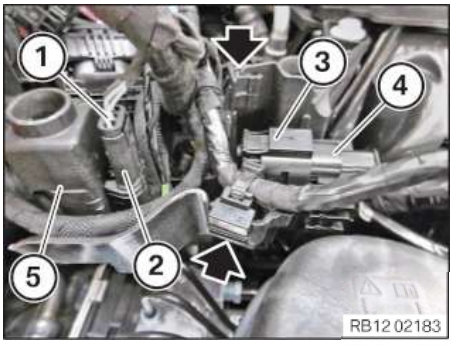
- Unlock and disconnect plug connections (1).

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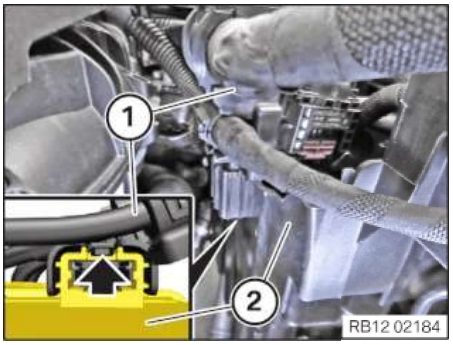


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

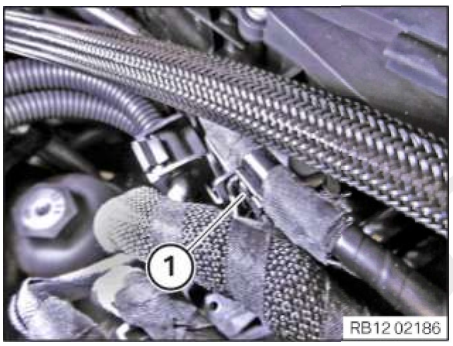
19 – Removing the control unit holder



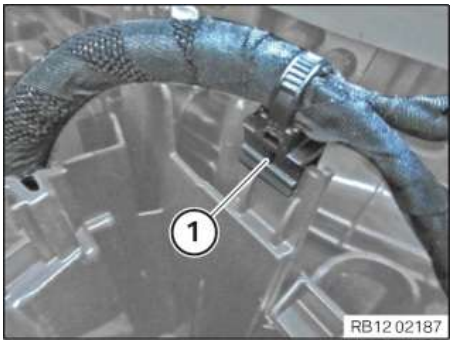
- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the starter (5).
- Unlock plug connection (3) and disconnect.
- Unlock the connector (4) and disconnect from the starter (5).
- Release the clamps (arrows).



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

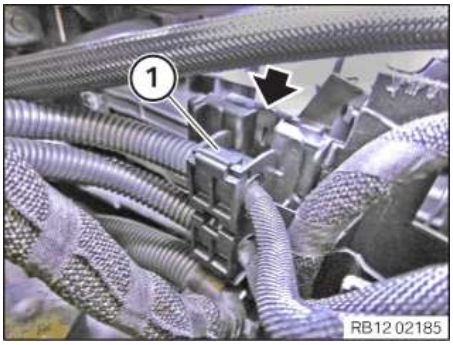


- Loosen clamp (1).

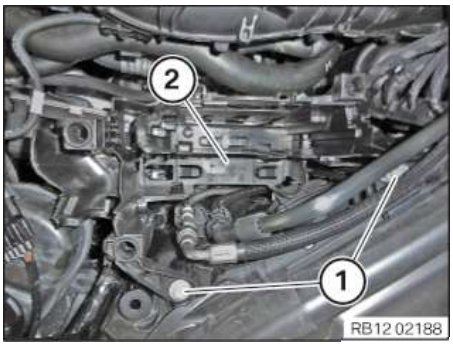


- Loosen clamp (1).

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

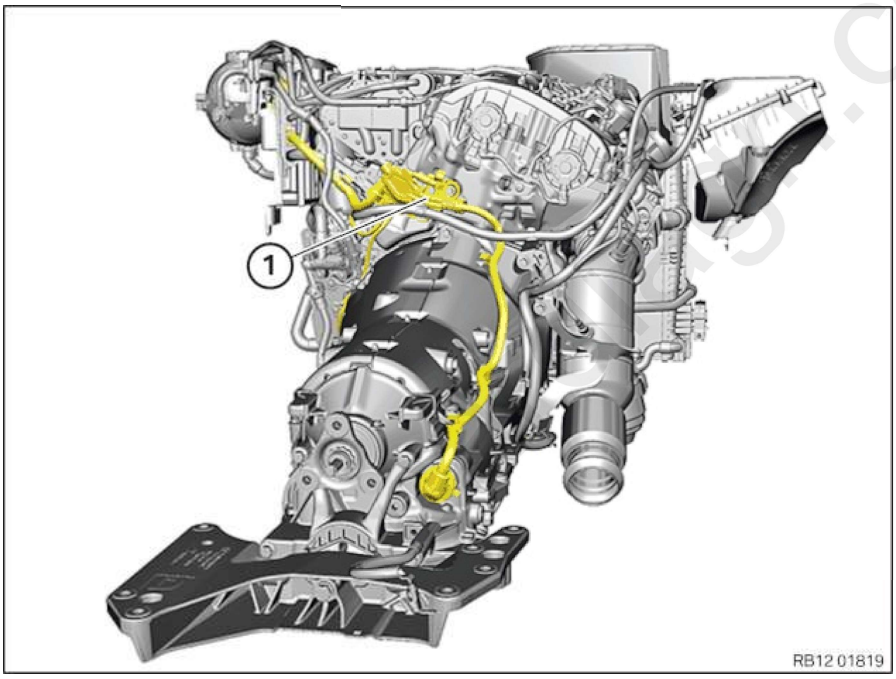


- Loosen screws (1).
- Guide out and remove the control unit holder (2).

MAIN WORK

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

Wiring harness section of transmission wiring harness



1 Wiring harness section of transmission wiring harness

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

RISK OF DAMAGE

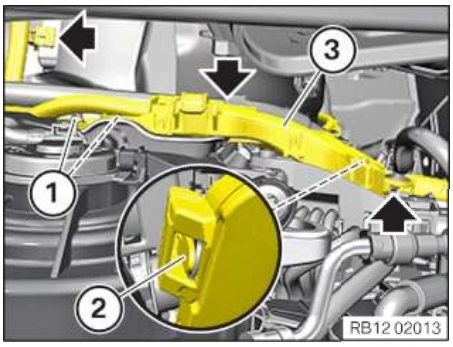
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

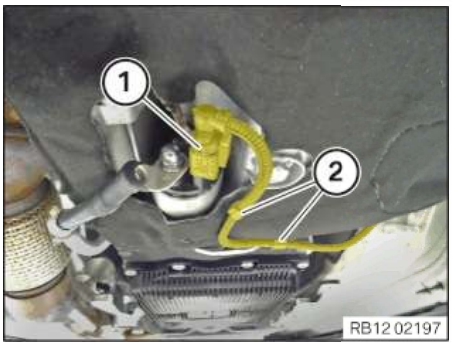
- Do not pull on the wires when disconnecting connectors and plug connections.

TECHNICAL INFORMATION

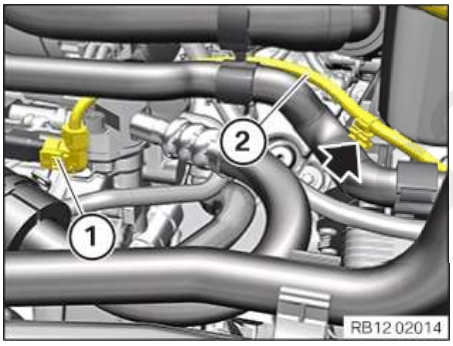
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



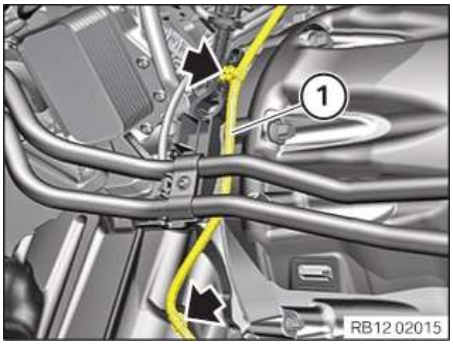
- Release clamps (Arrows) and place aside.
- Loosen screws (1).
- Unlock lock (2).
- Remove wiring harness section (3) of the transmission wiring harness and put to one side.



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



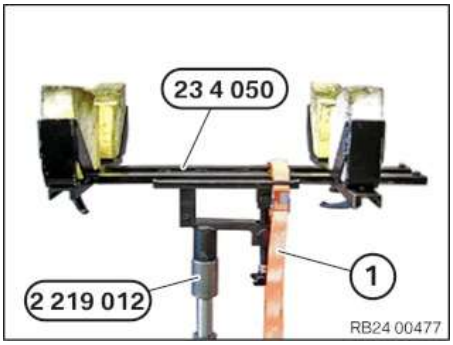
- Unlock plug connection (1) and disconnect.
- Loosen the clamp (arrow).
- Remove wiring harness section (2) of the transmission wiring harness and put to one side.



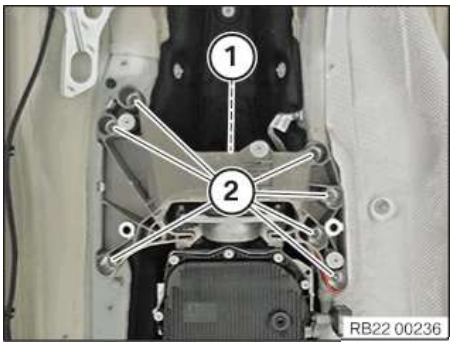
- Release the clamps (arrows).
- Remove wiring harness section (1) of the transmission wiring harness and put to one side.

▸ **Slightly lower the transmission**

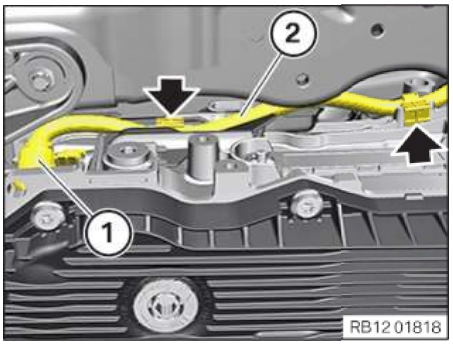
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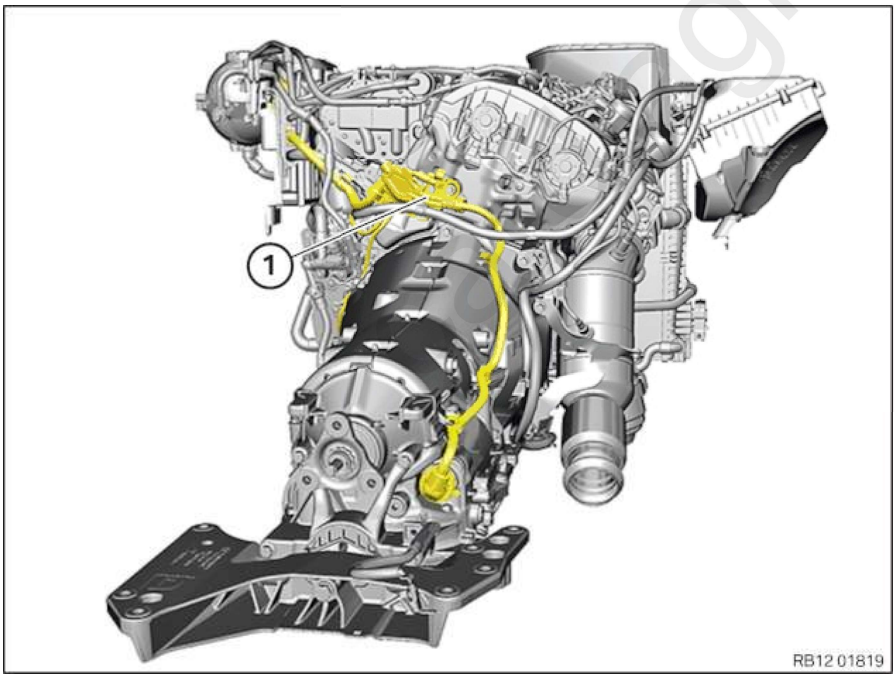
- Support the transmission using special tools 2 219 012 and 0 495 498 (23 4 050).
- Secure the transmission with the tensioning strap (1).



- Loosen screws (2).
- Lower the transmission cross member with the transmission (1) a little.



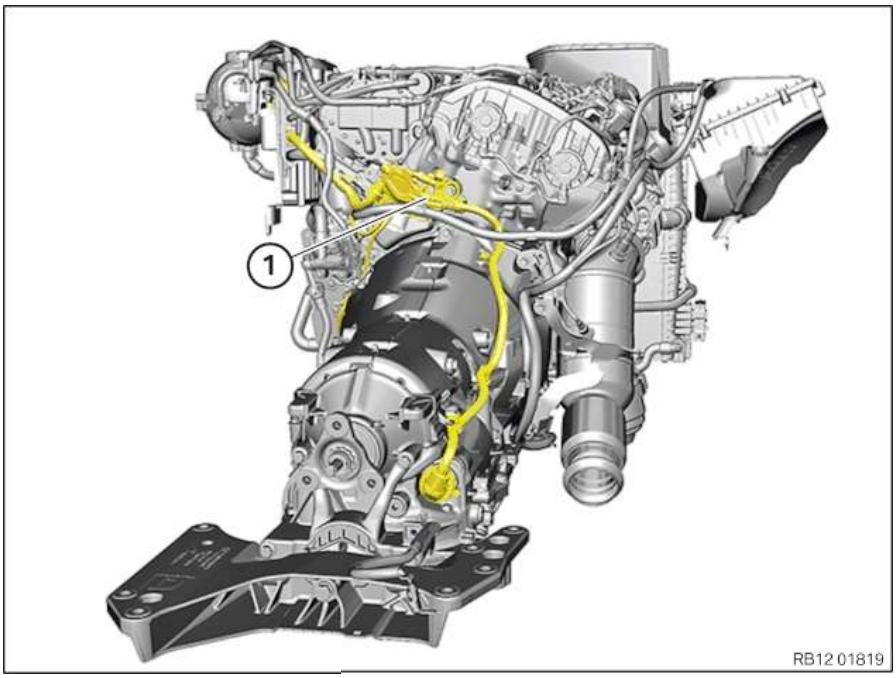
- Unlock plug connection (1) and disconnect.
- Release the clamps (arrows).
- Remove wiring harness section (2) of the transmission wiring harness and put to one side.



- Unthread and remove wiring harness section (1) of transmission wiring harness.

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

Wiring harness section of transmission wiring harness



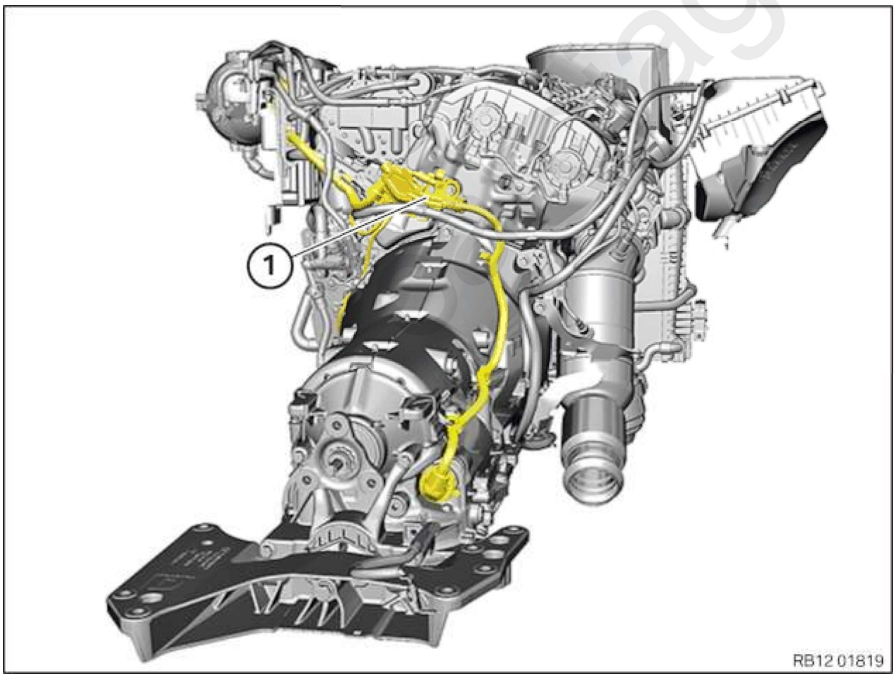
1 Wiring harness section of transmission wiring harness

RISK OF DAMAGE

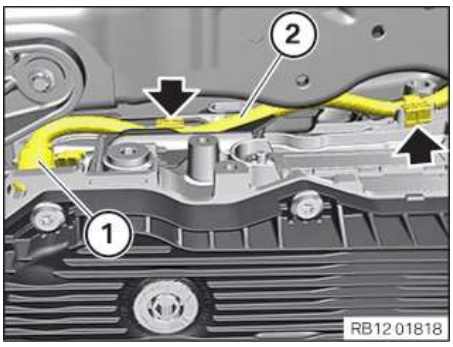
Improper routing of cables and wiring harnesses.

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

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



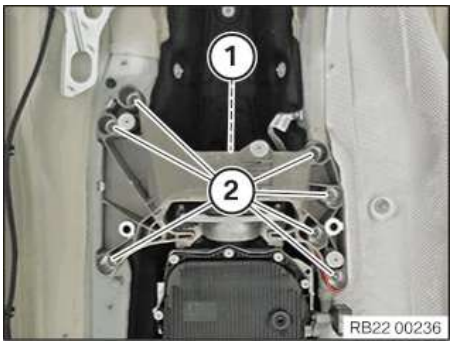
- Insert and install wiring harness (1) of the transmission module.



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

  The connector (1) must engage audibly.

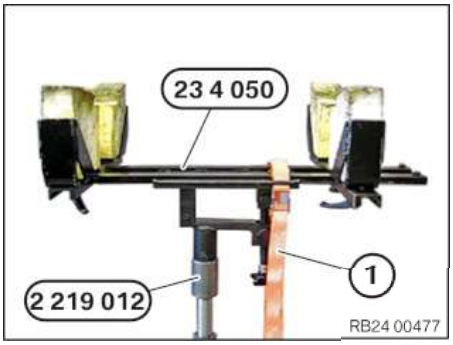
▶ **Fasten the transmission**



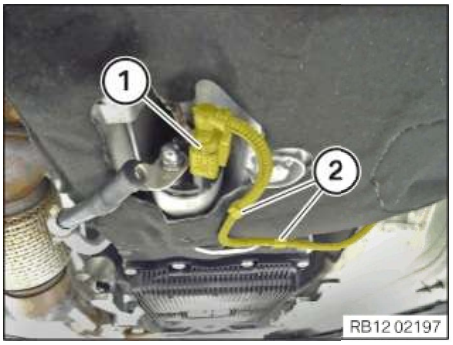
- Lift the transmission cross member with the transmission (1) into the mounting orientation.
- Tighten down screws (2).

Transmission cross member to body

M8	Renew screws.	Tightening torque	19 Nm

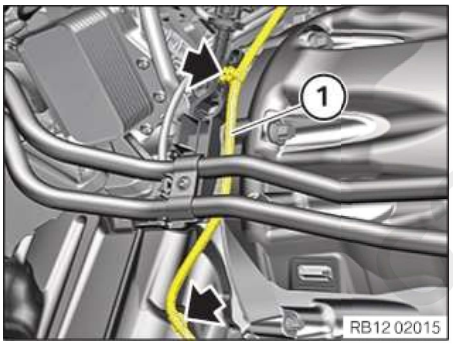


- Loosening the tensioning strap (1).
- Remove special tools 2 219 012 and 0 495 498 (23 4 050).

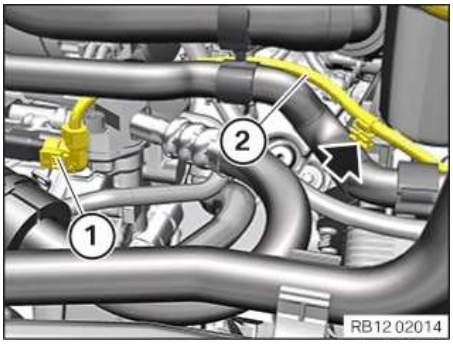


- Install the wiring harness section (3) and fasten it with the clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



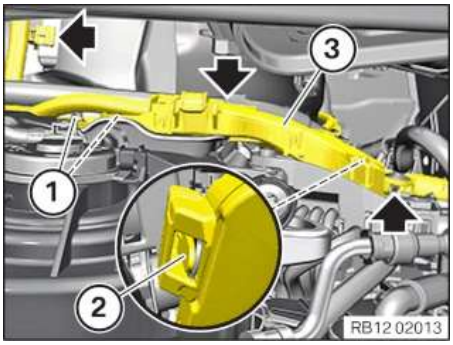
- Thread in the wiring harness section (1) of the transmission wiring harness and install.
- Secure the clamps (arrows).



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

  The connector (1) must engage audibly.

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

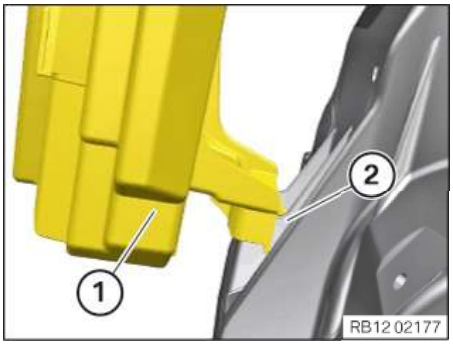
Cable routing to cylinder head, rear

M6 x 20		Tightening torque	8 Nm

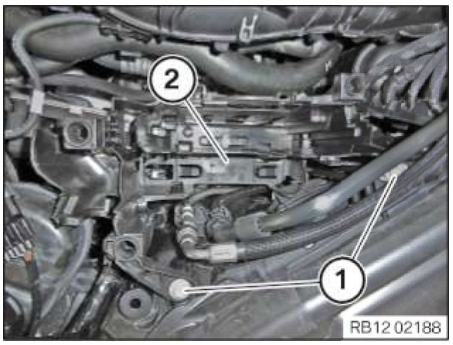
- Secure the clamps (arrows).

POSTPROCESSES

22 – Installing the control unit holder



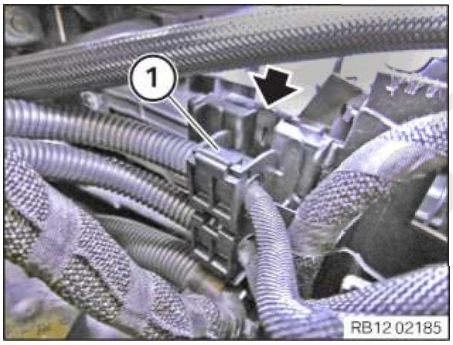
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



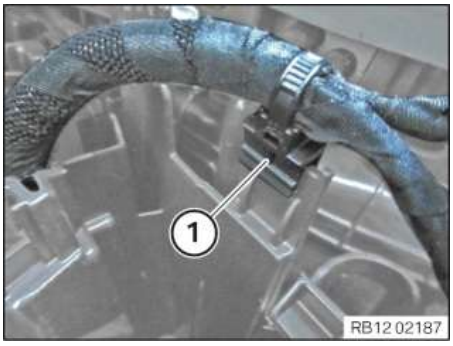
- Guide in and install control unit holder (2).
- Tighten the screws (1).

Control unit holder on spring strut dome

Hexagon screw		Tightening torque	8 Nm

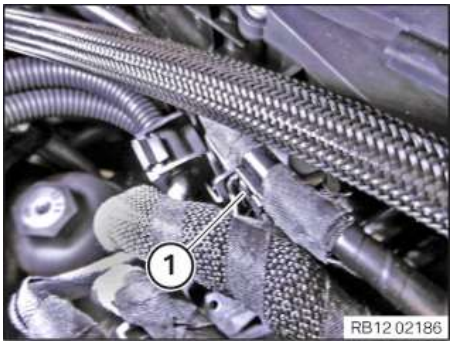


- Feed in and install the cable clip (1).
  Lock (arrow) must audibly engage.

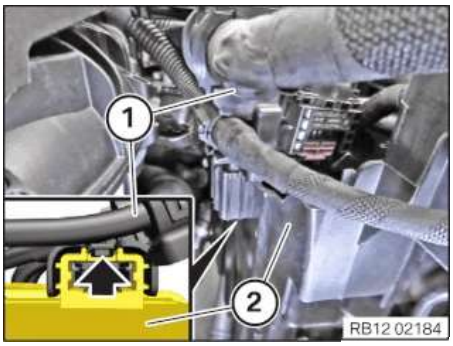


- Secure clamps (1).

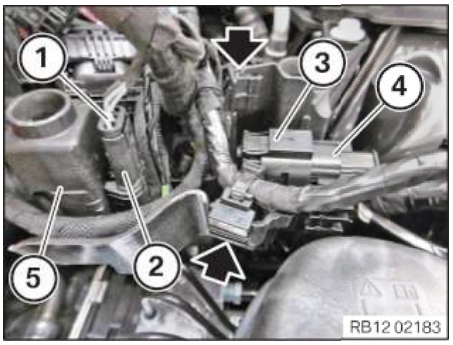
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- Secure clamps (1).



- 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).

23 – 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.

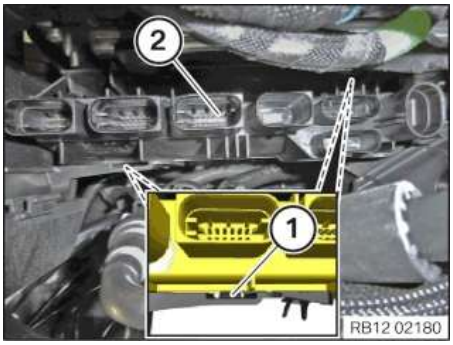
RISK OF DAMAGE

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.

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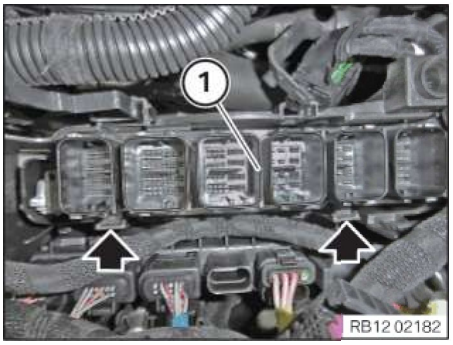


- Insert and install the integrated supply module (PDM) (2).
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).



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

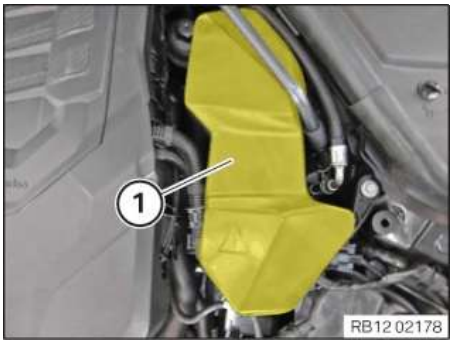
24 – Installing the DME control unit



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



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



- Insert and install cover (1) into guides.

25 – Partially installing the propeller shaft

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

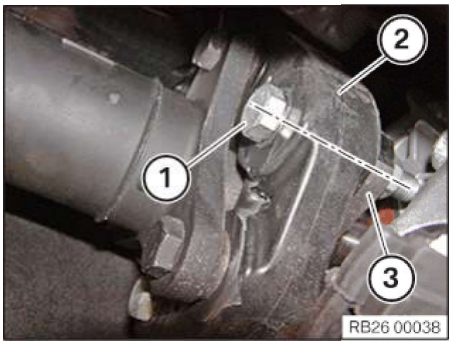


- Apply a thin coat of grease to the soft centring (1), if necessary.

  Do not grease the hard centring (2).

Expendable materials

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

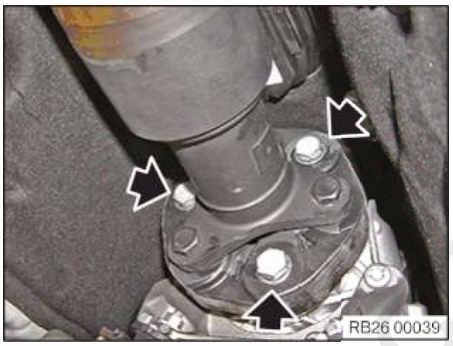


- Renew screws and the self-locking nuts.

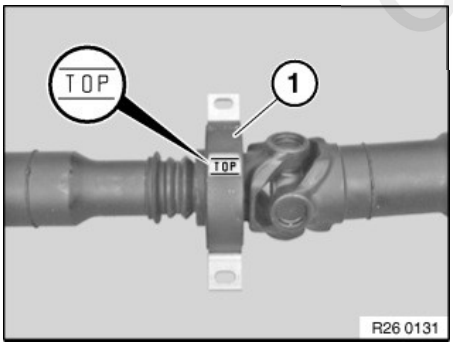
  Parts: Screws, self-locking nuts

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

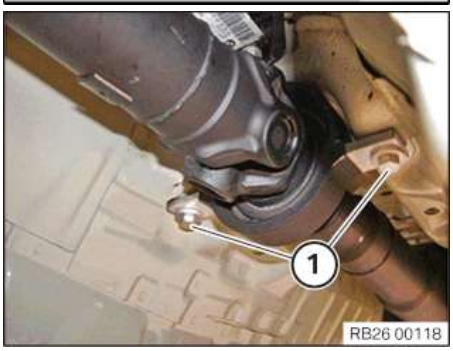
  This should prevent a humming noise from the drive train during driving.



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



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



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

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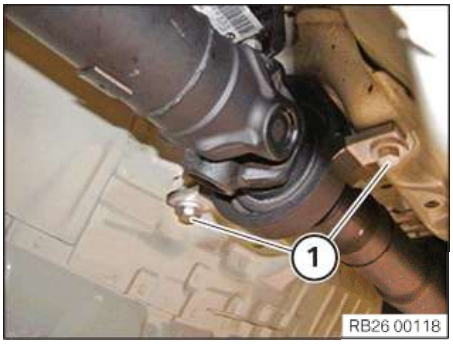
- Renew screws.

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

Front flexible disc to propeller shaft

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

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

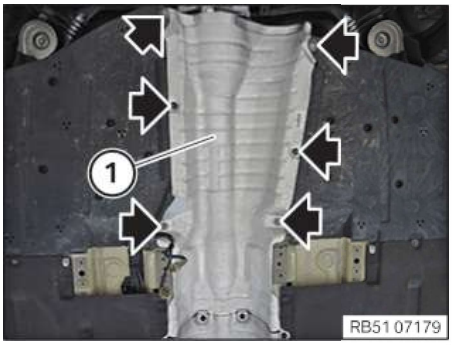


- Tighten the screws (1).

Centre mount to body

M8		Tightening torque	19 Nm

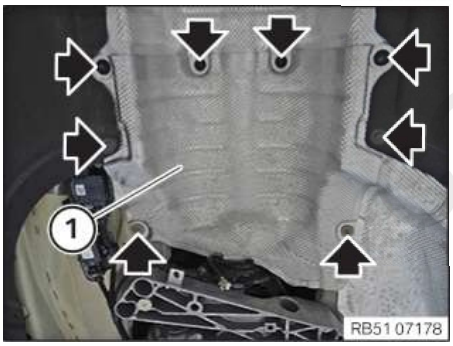
26 – Install the heat shields



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

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

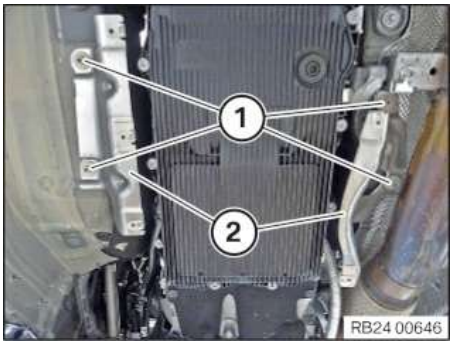


- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

27 – Install the retaining plates



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

Retaining plates for vehicle underbody cover

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

28 – Installing the complete exhaust system

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CAUTION

Component with heavy weight.

Danger of injury!

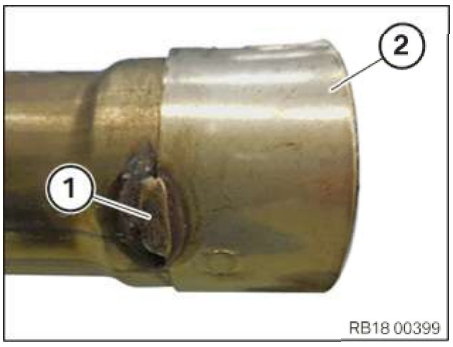
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

Heavy component.

Heavy components can lead to injury or damage.

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



CAUTION

Swarf resulting from sawing or grinding components.

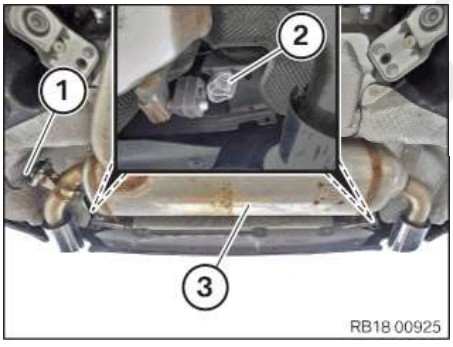
Danger of injury!

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

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

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

  Parts: Ribbon cable clamp



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

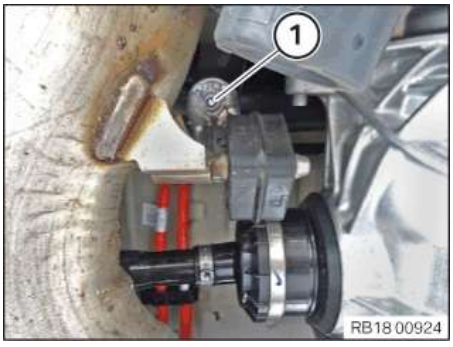
  Parts: Nuts
- Tighten nuts (2).

Rear silencer to body / bumper support

M8	Replace nuts.	Tightening torque	19 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Renew nut (1).

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

Exhaust system to rear axle carrier

Nut M8	Renew nut.	Tightening torque	19 Nm

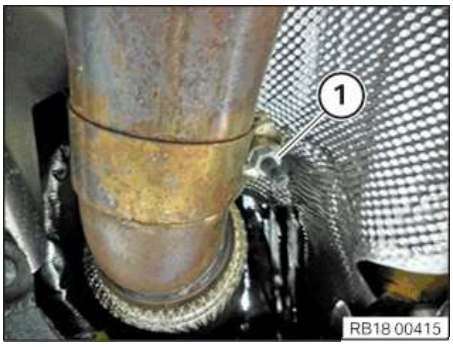


- Renew nut (1).

  Parts: Nut
- Tighten nut (1).

Front silencer / petrol particulate filter on transmission bracket

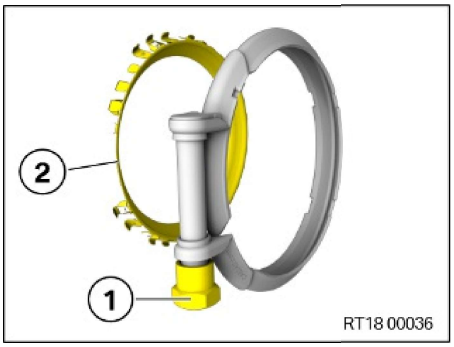
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

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

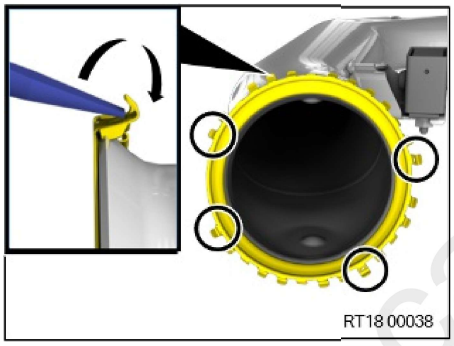


- **Equipment specification 2 (V-clips)**

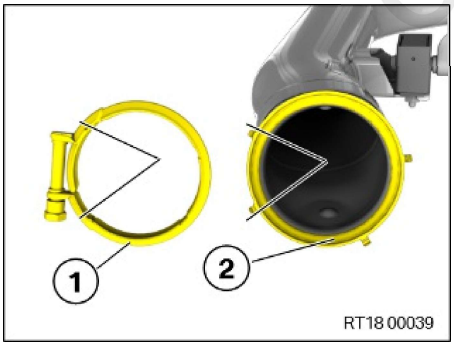
  Renew V-band clamp.

  Parts: V-band clamp

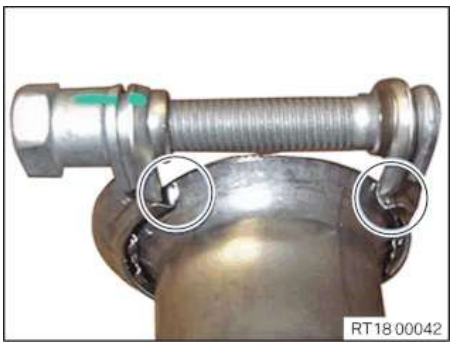
  Unscrew the nut (1) and remove the sealing ring (2).



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

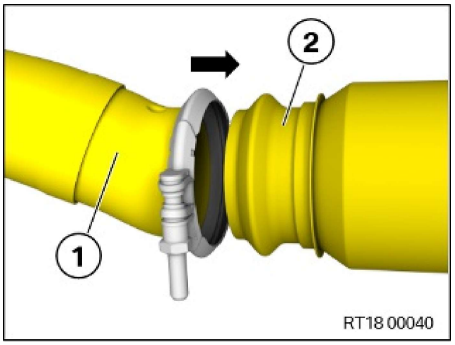


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

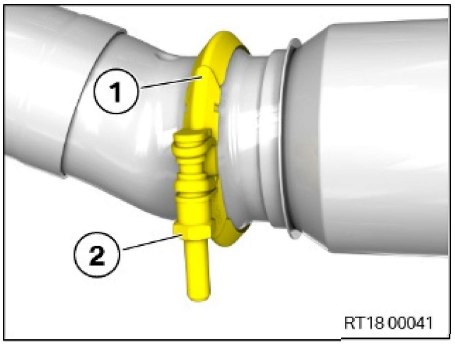


- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.

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

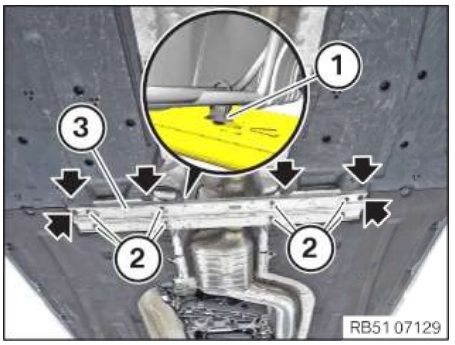


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

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

29 – Install the connecting supports on the tunnel



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

Connecting support to tunnel

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

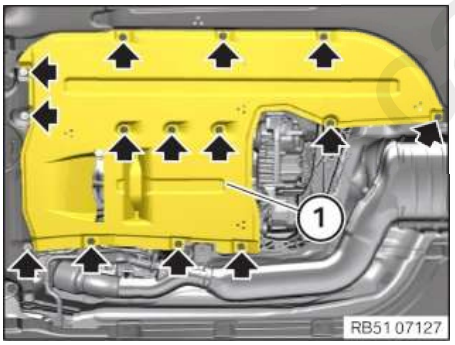
- Tighten screws (arrows).

Connecting support to tunnel

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

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

30 – Installing underbody protection at rear



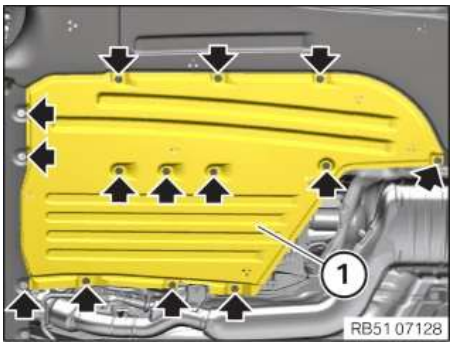
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

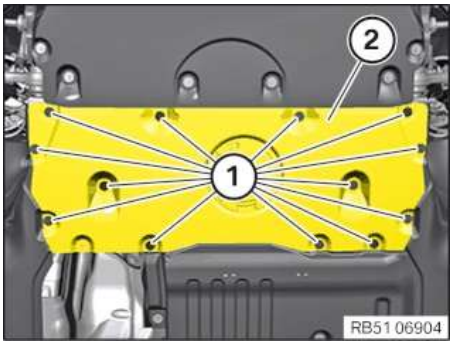
  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

31 – Installing the centre underbody protection

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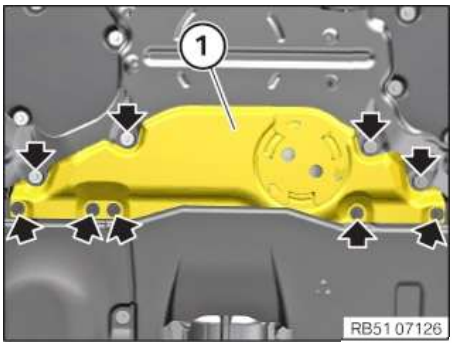
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

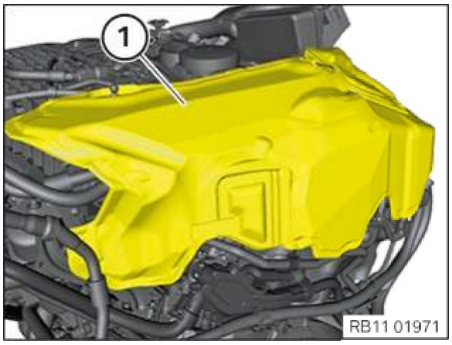
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

32 – Installing acoustic cover at rear



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



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

33 – Install acoustic cover

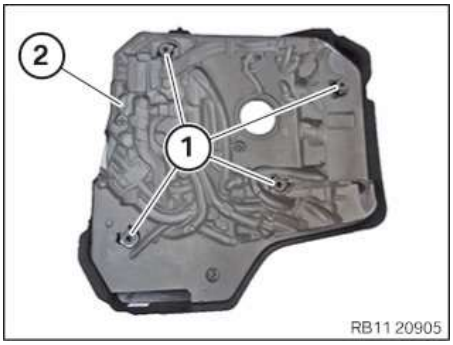
RISK OF DAMAGE

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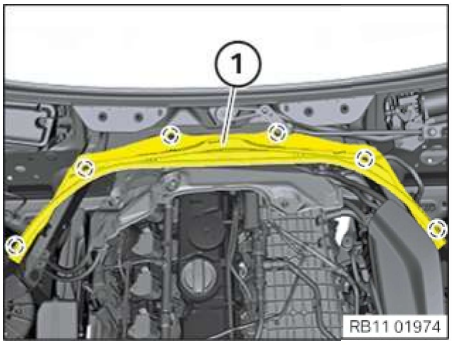
- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

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

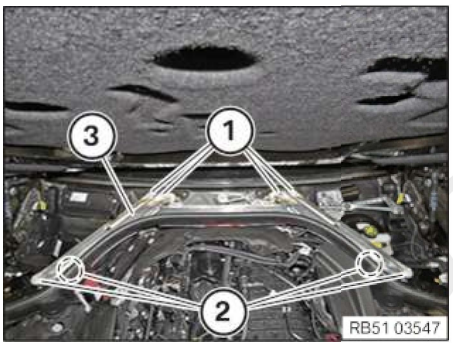
34 – Installing the centre bulkhead upper part



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

Bulkhead upper part to bottom bulkhead

		Tightening torque	3 Nm



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

Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

Tension strut to spring strut dome

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

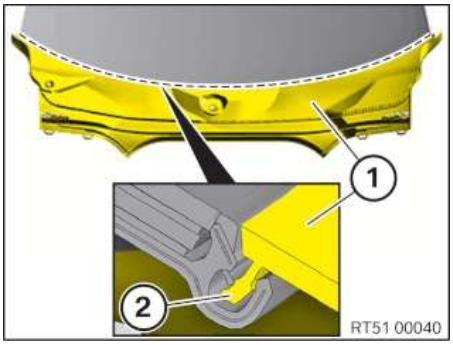
35 – Installing cowl panel cover

RISK OF DAMAGE

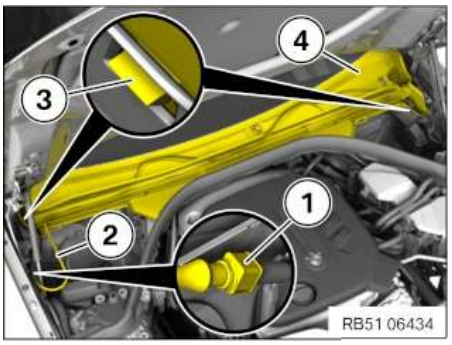
Damage caused by water ingress into the vehicle.

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

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



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



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

36 – Installing both wiper arms

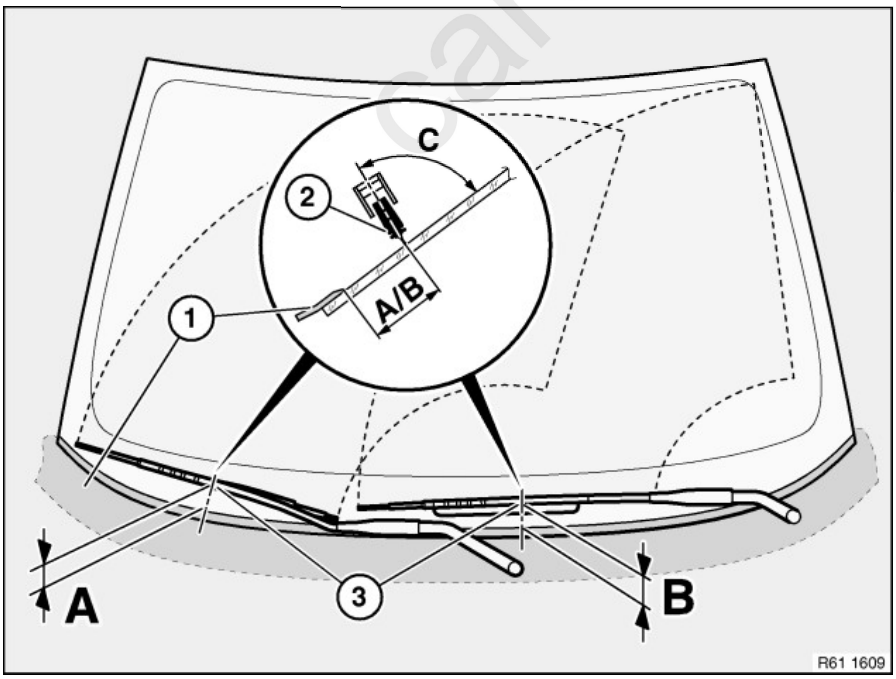
NOTICE

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

▸ **Install the wiper arm**

TECHNICAL INFORMATION

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

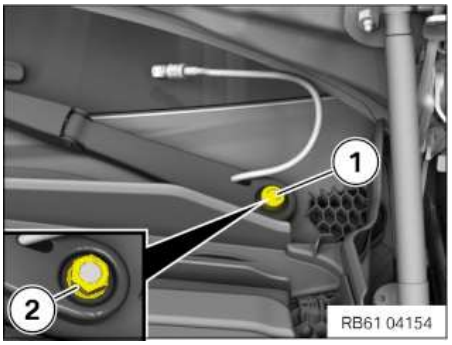


- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

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

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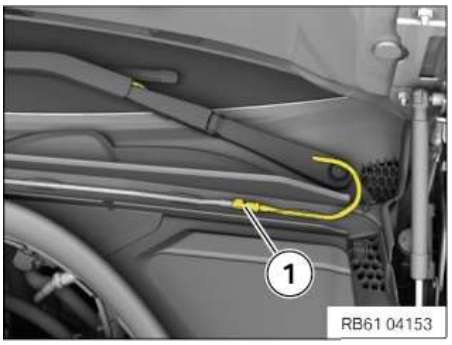


- Tighten nut (2).

Windscreen wiper arm

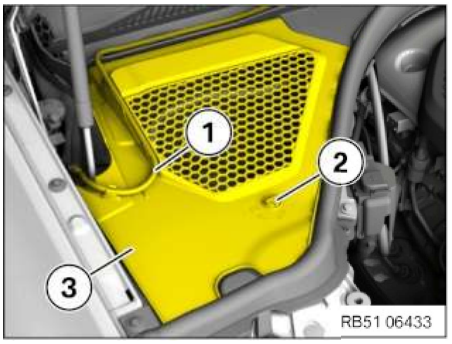
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



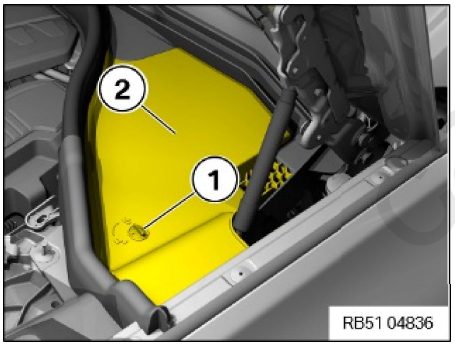
- Insert windscreen wash hose (1) into the cowl and connect at the separating point.

37 – Install the rear right engine compartment cover



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

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



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

39 – 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.

40 – Disconnecting all battery earth leads

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- See additional information.

Additional Information

Overview of Tightening Torques

Transmission cross member to body			Used in step 21
M8	Renew screws.	Tightening torque	19 Nm

Cable routing to cylinder head, rear			Used in step 21
M6 x 20		Tightening torque	8 Nm

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

Front flexible disc to propeller shaft			Used in step 25
M12	Renew screws. Comply with jointing torque and angle of rotation. Tightening via screw.	Jointing torque Angle of rotation	55 Nm 90 °

Centre mount to body			Used in step 25
M8		Tightening torque	19 Nm

Heat shield to vehicle underbody			Used in step 26
Screws and nuts		Tightening torque	3 Nm

Retaining plates for vehicle underbody cover			Used in step 27
Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

Rear silencer to body / bumper support			Used in step 28
M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier			Used in step 28
Nut M8	Renew nut.	Tightening torque	19 Nm

Front silencer / petrol particulate filter on transmission bracket			Used in step 28
M8	Renew nut.	Tightening torque	19 Nm

Exhaust system to catalytic converter			Used in step 28
Ribbon cable clamp	Renew flat band clip.	Tightening torque	26 Nm

V-clip to catalytic converter			Used in step 28
V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm

Connecting support to tunnel			Used in step 29
M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

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Underbody protection — Used in step 3031

Hexagon screw		Tightening torque	3 Nm

Bulkhead upper part to bottom bulkhead — Used in step 34

		Tightening torque	3 Nm

Tension strut on bulkhead — Used in step 34

M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome — Used in step 34

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

Windscreen wiper arm — Used in step 36

Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

2 219 012 Hydraulic lifter



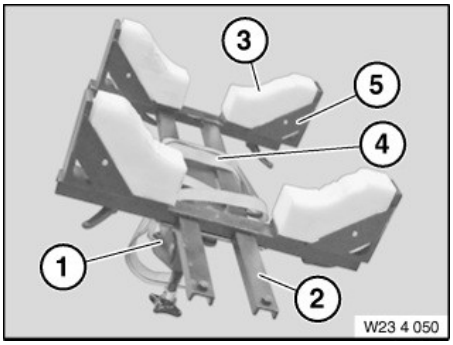
Common — Used in step 2021

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

0 495 498 (23 4 050) Support

Used in step 2021

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Common

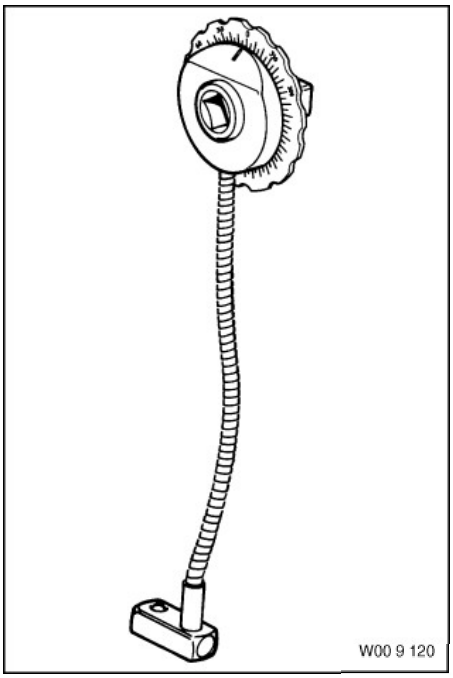
Usage	(universal gearbox holder) Support for removing and installing manual gearboxes and automatic transmissions for BMW & RR.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 06 (256)

Consisting of

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

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



Common	Used in step 25
Usage	For torsion angle adjustment of cylinder head bolts (all engines) And reinforcement plate front axle support E46
Included in the tool or work	
Storage location	A4
Replaced by	
In connection with	
SI-Number	

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Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 36
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	1724

Repair instructions	Used in step

61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	140
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	140
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
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61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 20 900 Disconnecting and connecting battery earth lead	140
61 35 ... Notes on ESD protection (Electro Static Discharge)	17182023
61 13 ... Unlocking and disconnecting different plug connections	20
61 00 730 Encode/program control unit(s) (after vehicle test)	24

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

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

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.

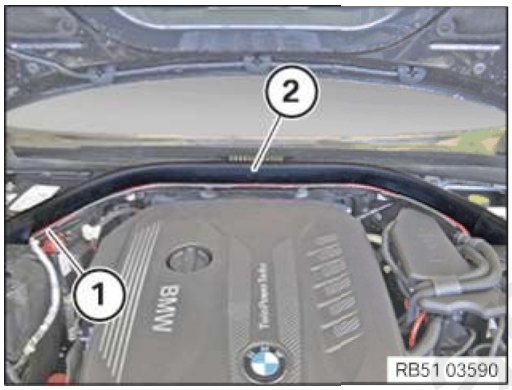
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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.

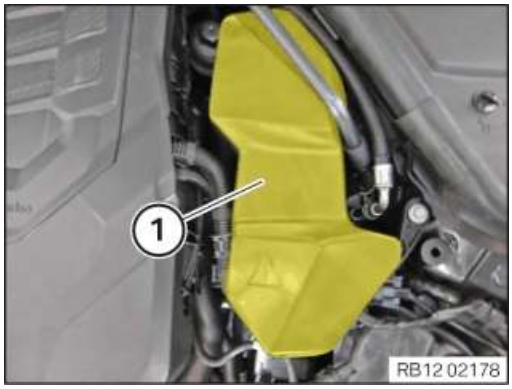
4 – Removing acoustic cover at rear



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

5 – Remove the cover of the DME control unit

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

MAIN WORK

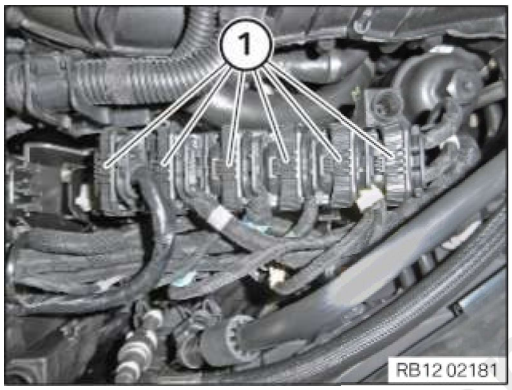
6 – Removing the wiring harness section for the ignition and injectors

RISK OF DAMAGE

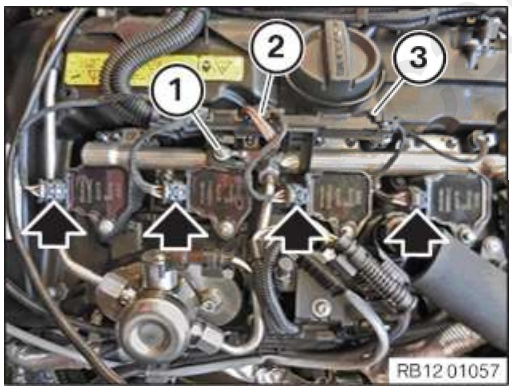
Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

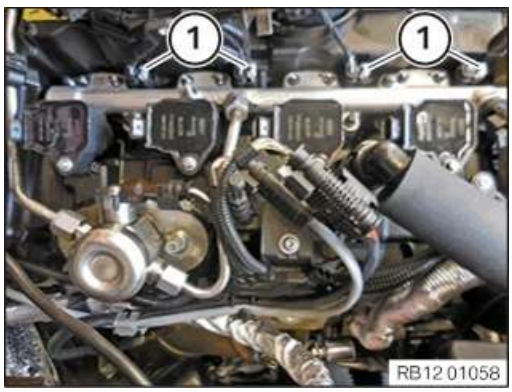
- Do not pull on the wires when disconnecting connectors and plug connections.



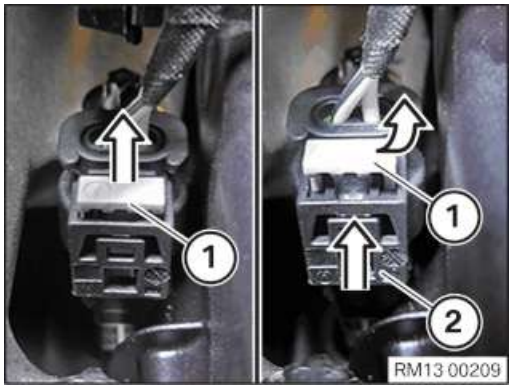
- Unlock and disconnect plug connections (1).



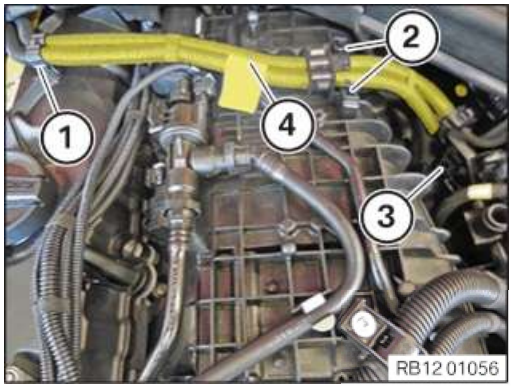
- Unlock and disconnect the plug connections (arrows).
- Loosen nut (1).
- Feed out ground cable (2) and set aside.
- Lift cable channel (3).



- Unlock and disconnect the plug connections (1) on the injectors.



- Unlock lock (1) in direction of arrow from the top.
- Press lock (1) together and release.
- Disconnect the plug connections (2) from the injectors.



- Loosen clamp (1).
- Unlock and loosen holder (2).
- Unlock and loosen holder (3).
- Guide the wiring harness section for the ignition and the injectors (4) out and remove them.

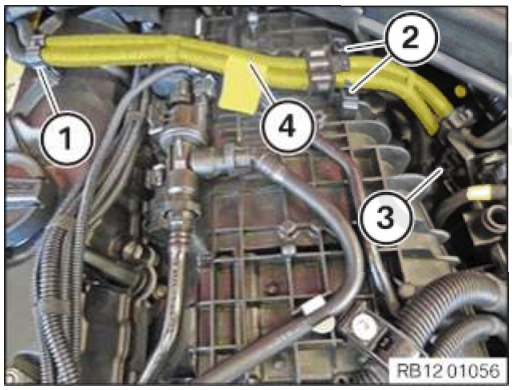
7 – Installing the wiring harness section for the ignition and injectors

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

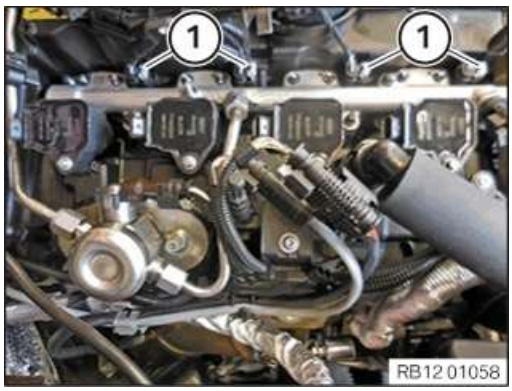
Trapped, crushed or damaged cables may cause short circuits and malfunctions.

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



- Guide in and Install the wiring harness section for the ignition and injectors(4).
- Connect and lock the holder (3).
- Connect and lock the holder (2).
- Secure clamps (1).

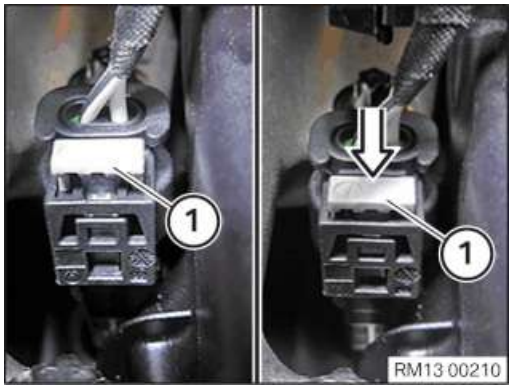
  The holder (3) and clamps (1) must be heard to engage.



- Connect and lock connector (1) on the injectors.

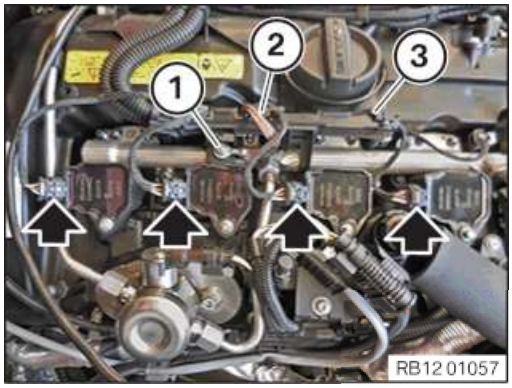
  The connectors (1) must engage audibly.

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- Connect the connector with the injectors.
- Lock the lock (1) in the direction of the arrow.

  The lock (1) must audibly engage.



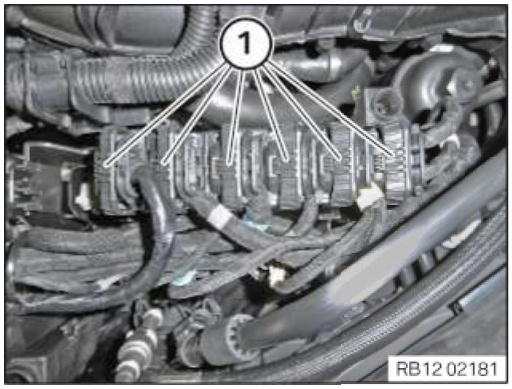
- Thread in cable channel (3) and install.
- Guide in and install ground cable (2).
- Tighten nut (1).

Ground cable to rail

M6		Tightening torque	5 Nm

- Connect and lock the connectors (arrows).

  The connectors (arrows) must engage audibly.

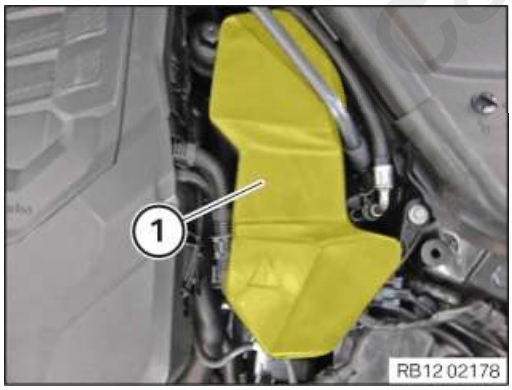


- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

POSTPROCESSES

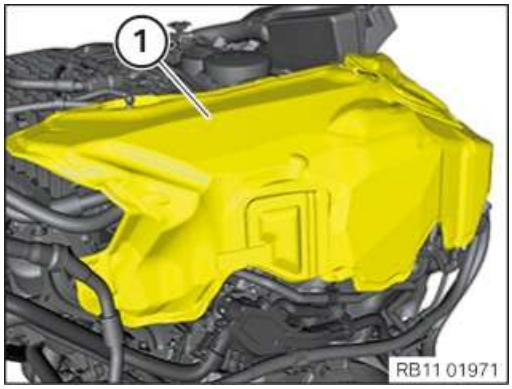
8 – Installing the cover of the DME control unit



- Insert and install cover (1) into guides.

9 – Installing acoustic cover at rear

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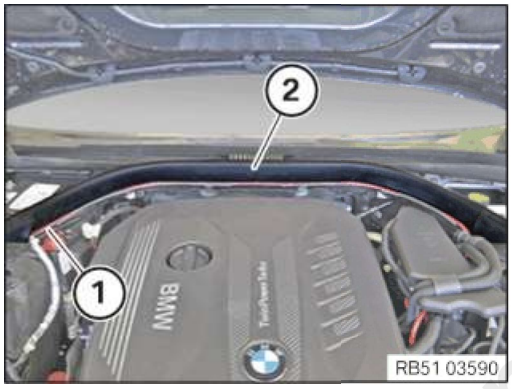


- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



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

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

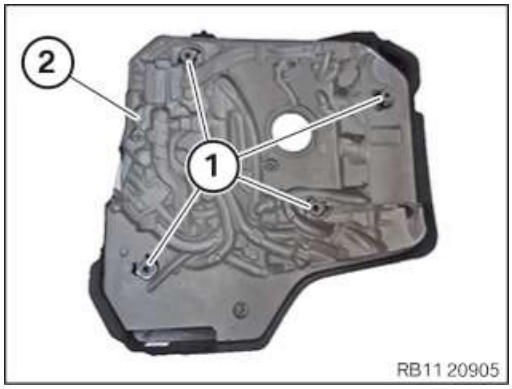
RISK OF DAMAGE

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.

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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.

12 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Ground cable to rail			Used in step 7
M6		Tightening torque	5 Nm

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
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

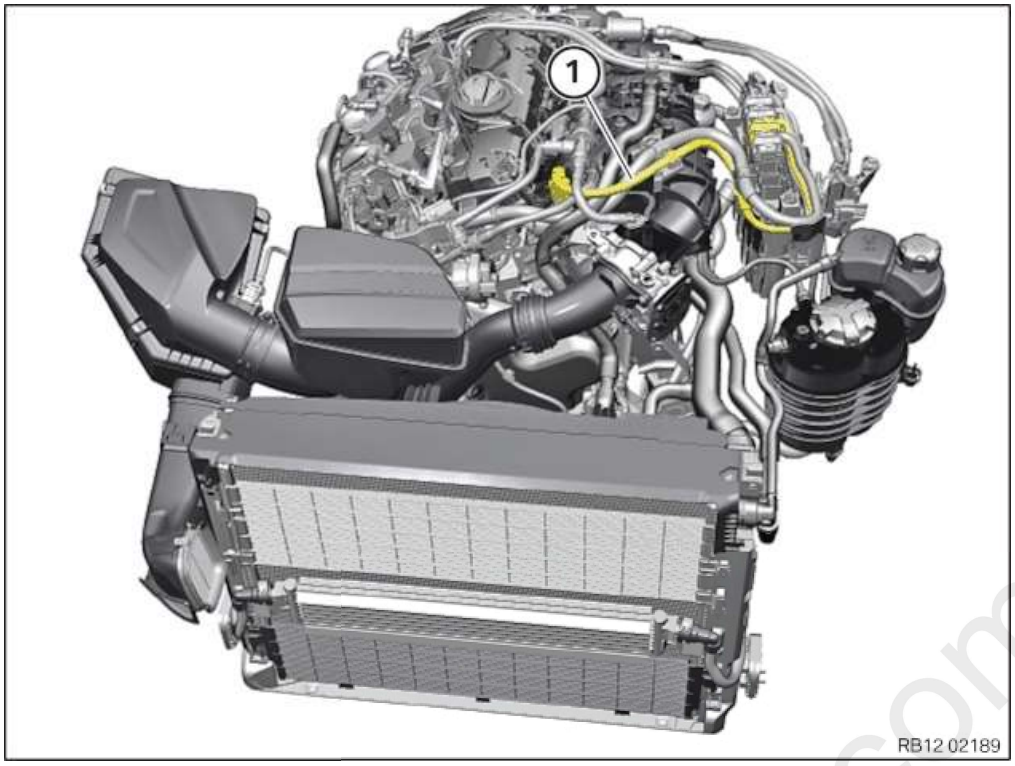
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61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	112
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	112
61 20 900 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
61 20 900 Disconnecting and connecting battery earth lead	112
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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 20 900 Disconnecting and connecting battery earth lead	112

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12 51 215 Replacing wiring harness section for Valvetronic actuator

Overview: Wiring harness section for the Valvetronic servomotor



1: Wiring harness section for the Valvetronic servomotor

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.

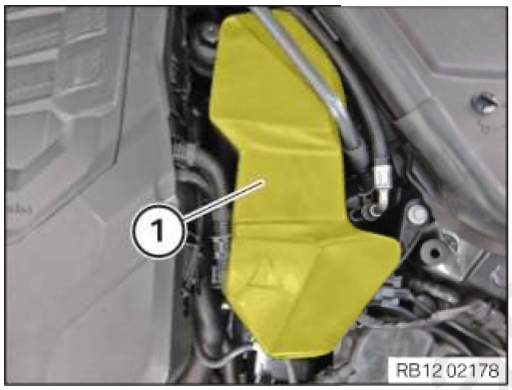
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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 cover of the DME control unit



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

MAIN WORK

4 – Removing the wiring harness section for the Valvetronic servomotor

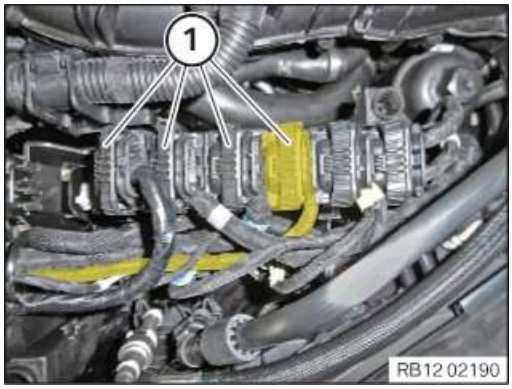
RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

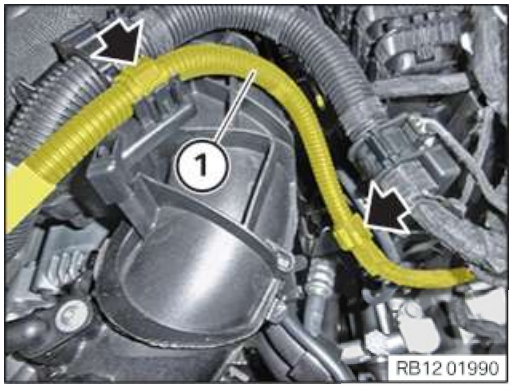
Sheared wires can cause a short circuit.

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

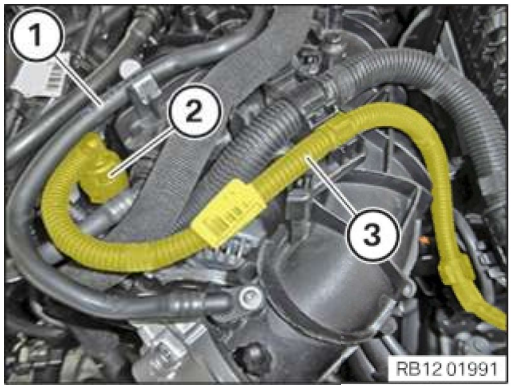
cardiagn.com



- Unlock and disconnect plug connections (1).
- Guide out the wiring harness section for Valvetronic servomotor (2) and set it aside.



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



- Feed the tank ventilation line (1) out and set it aside.
- Unlock plug connection (2) and disconnect.
- Remove the wiring harness section (3).

5 – Installing the wiring harness section for the Valvetronic servomotor

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

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

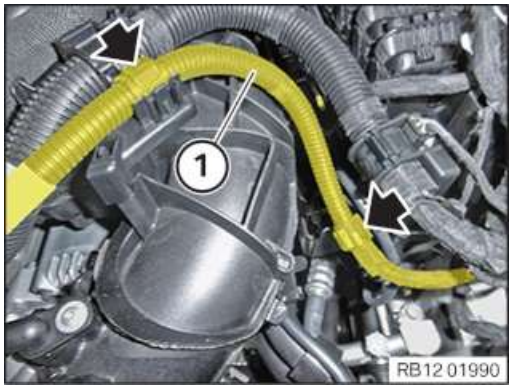
- Route all cables without abrasions, do not trap and crush.



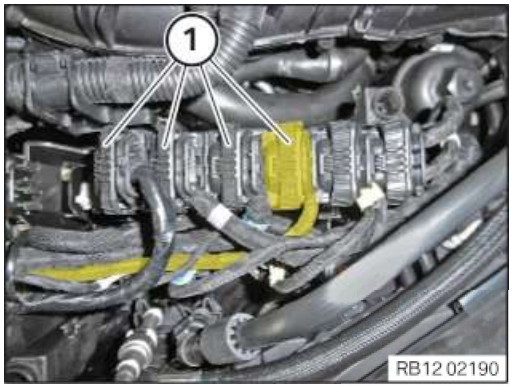
- Guide in the wiring harness section (3) and install.
- Connect connectors (2) and lock.

  The connector (2) must engage audibly.
- Insert and install the tank ventilation line (1).

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- Guide in the wiring harness section (1) and install.
- Secure the wiring harness mounting (Arrows).

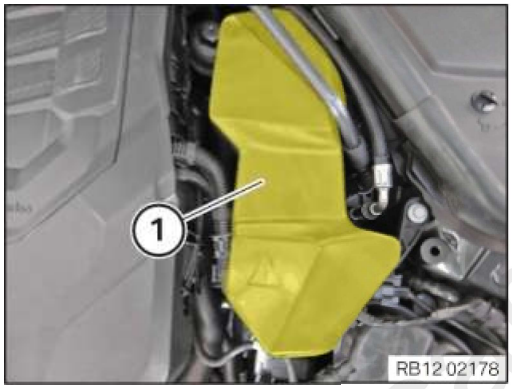


- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

POSTPROCESSES

6 – Installing the cover of the DME control unit



- Insert and install cover (1) into guides.

7 – Install acoustic cover

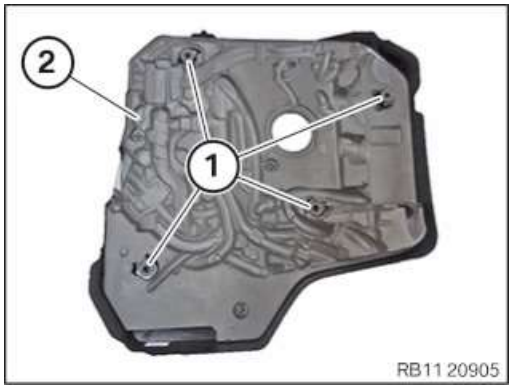
RISK OF DAMAGE

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.

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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.

8 – Disconnecting all battery earth leads



- See additional information.

Additional Information

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

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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 the battery earth lead (all battery earth leads)	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 battery earth lead	18

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61 00 ... Safety information on handling hybrid cars

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

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

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

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

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

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

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12 61 280 Removing and installing/replacing oil pressure switch

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.

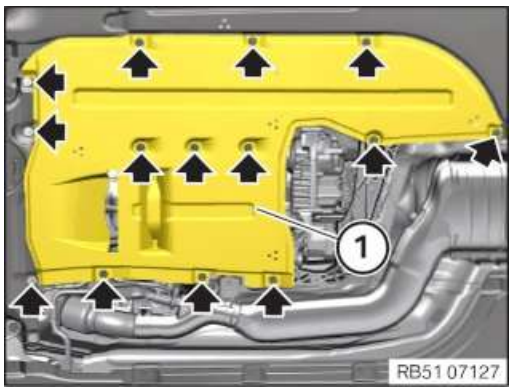
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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 – Remove rear underbody protection

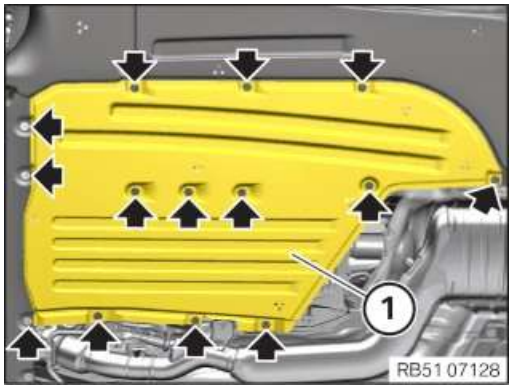


- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

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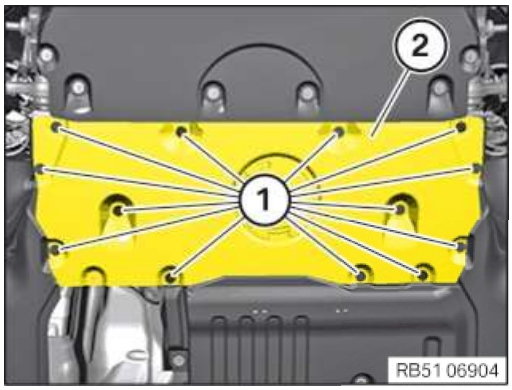


- **Version 2:**

  Remove screws (arrows).

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

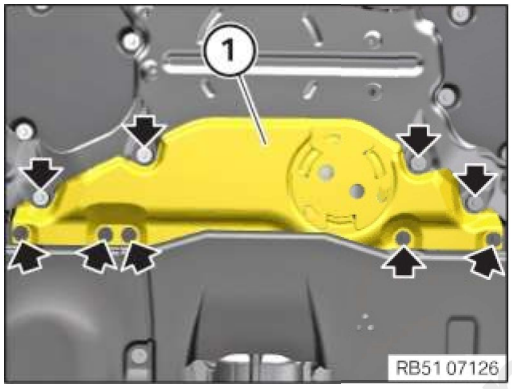
3 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .



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

  Remove screws (arrows).

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

MAIN WORK

4 – Removing the oil pressure switch

WARNING

Hot surfaces.

Risk of burning!

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

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RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

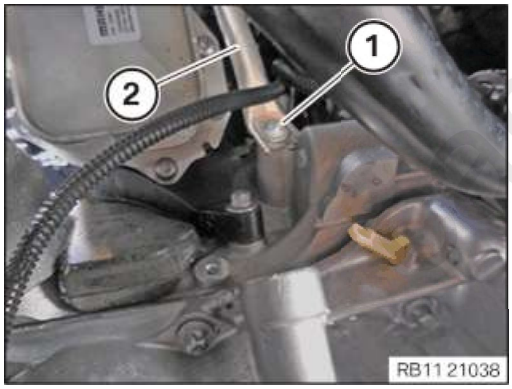
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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

TECHNICAL INFORMATION

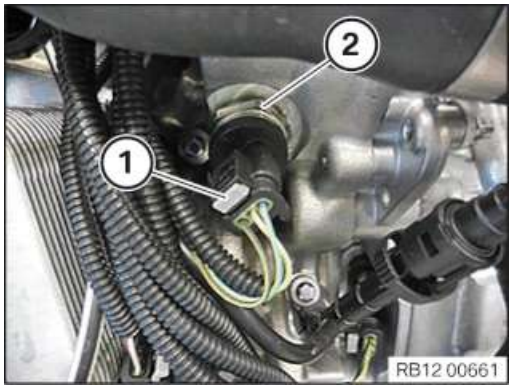
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen screw (1).

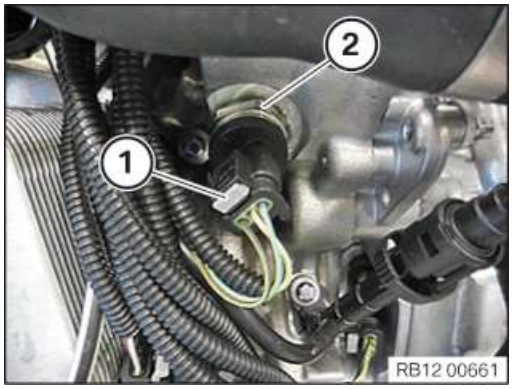


- Loosen screw (1).
- Guide out and remove manifold support (2).



- Unlock and loosen connector (1).
- Release and remove the oil pressure switch (2) with the special tool 0 496 106 (11 8 720).
- Catch and dispose of emerging engine oil.

5 – Installing the oil pressure switch



- Guide in and install oil pressure switch (2).
- Tighten oil pressure switch (2) with the special tool 0 496 106 (11 8 720).

Oil pressure switch to crankcase

Sensor		Tightening torque	16,5 Nm

- Connect and lock the connector (1).

  The connector (1) must engage audibly.



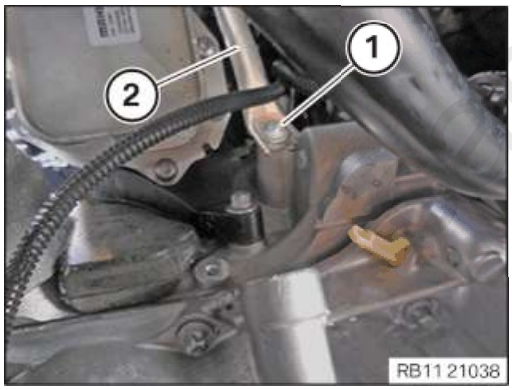
- Guide in and position manifold support (2).
- Hand-tighten the bolts (1).



- Tighten the screws (1).

Manifold support to intake plenum

M6x25		Tightening torque	8 Nm



- Tighten screws (1) on manifold supports (2).

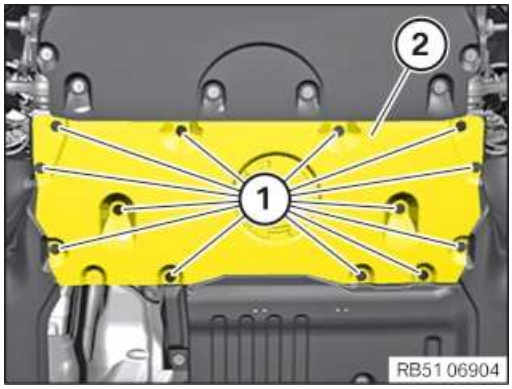
Manifold support to crankcase

M6x16		Tightening torque	8 Nm

POSTPROCESSES

6 – Installing the centre underbody protection

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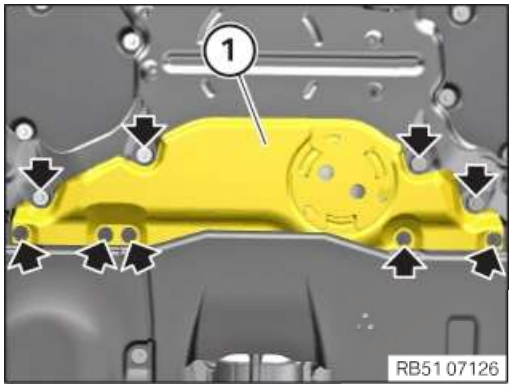
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

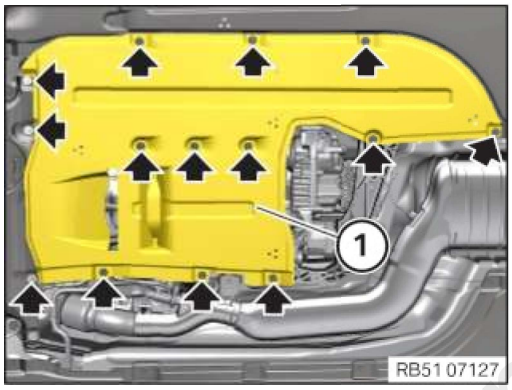
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

7 – Installing underbody protection at rear



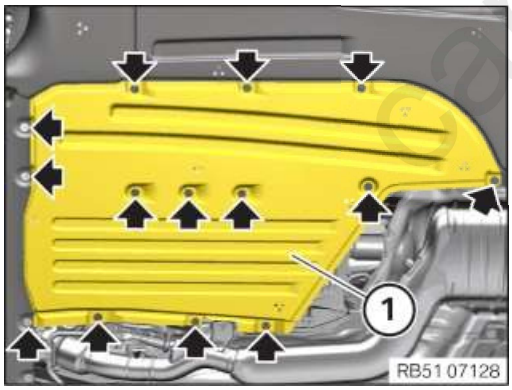
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

8 – Install acoustic cover

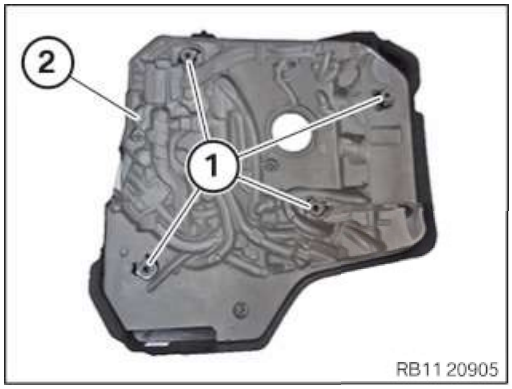
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RISK OF DAMAGE

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.

9 – Check engine oil level

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

Additional Information

Overview of Tightening Torques

Oil pressure switch to crankcase — Used in step 5

Sensor		Tightening torque	16,5 Nm

Manifold support to intake plenum — Used in step 5

M6x25		Tightening torque	8 Nm

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Manifold support to crankcase Used in step 5

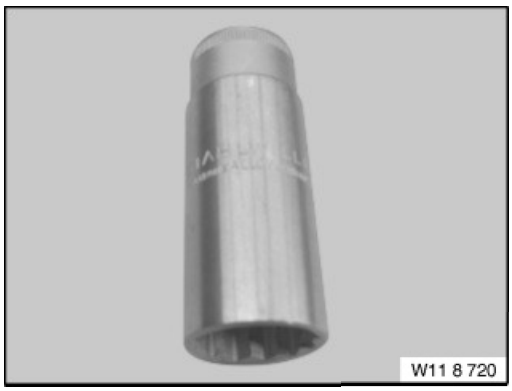
M6x16		Tightening torque	8 Nm

Underbody protection Used in step 67

Hexagon screw		Tightening torque	3 Nm

Overview of Special Tools

0 496 106 (11 8 720) Socket WAF 46



Common Used in step 45

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)

Overview Technical Data

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12 61 285 Replacing engine oil level sensor

WARNING

Hot fluids.

Risk of scalding!

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

WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

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

RISK OF DAMAGE

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

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

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

TECHNICAL INFORMATION

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

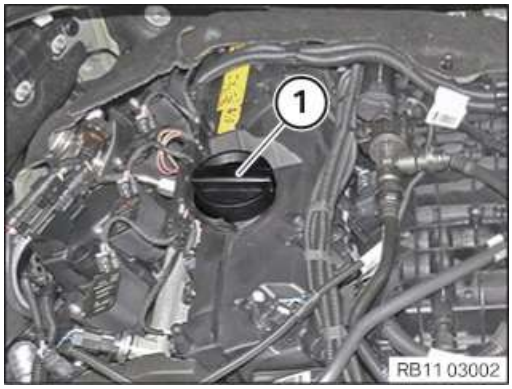
TECHNICAL INFORMATION

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

PRELIMINARY WORK

1 – Removing the oil filler cap

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- Open oil filler cap (1).

2 – Releasing the oil drain plug

WARNING

Hot fluids.

Risk of scalding!

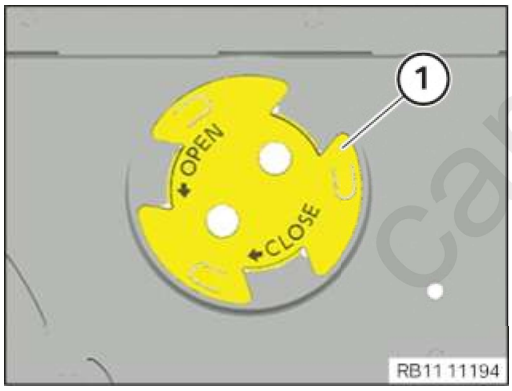
- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

WARNING

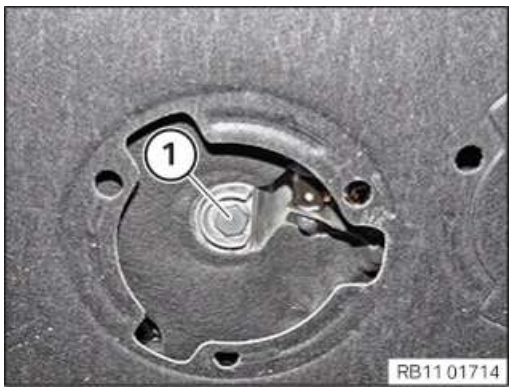
Hot surfaces.

Risk of burning!

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



- Turn and remove service cap (1).



- Open oil drain plug (1) from the oil sump.

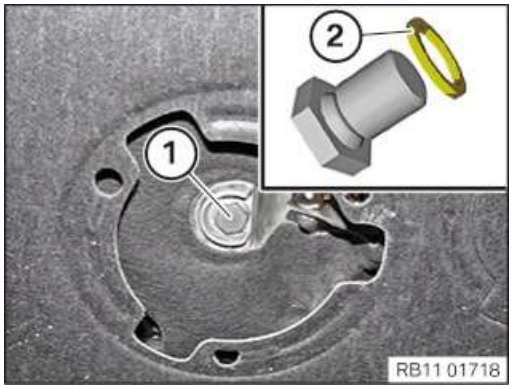
TECHNICAL INFORMATION

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

- Allow the engine oil to drain out fully.

3 – Tightening the oil drain plug

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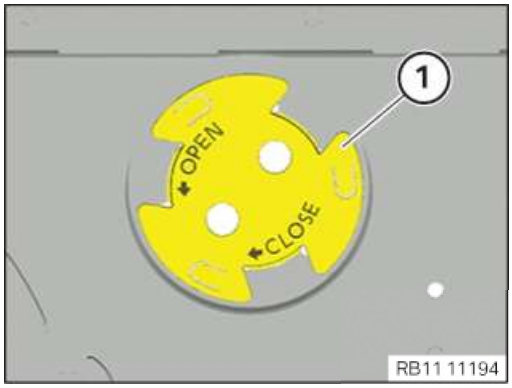


- Renew sealing ring (2).

  Parts: Sealing ring
- Position oil drain plug (1) on the oil sump and tighten.

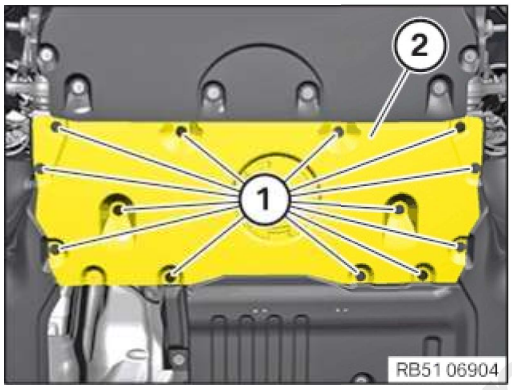
Oil drain plug

M12x16	Renew the sealing ring.	Tightening torque	25 Nm



- Install service cap (1).

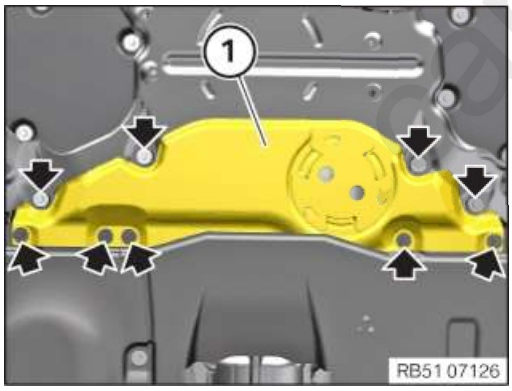
4 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .



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

  Remove screws (arrows).

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

MAIN WORK

5 – Removing the oil-level sensor

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WARNING

Hot surfaces.

Risk of burning!

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

RISK OF DAMAGE

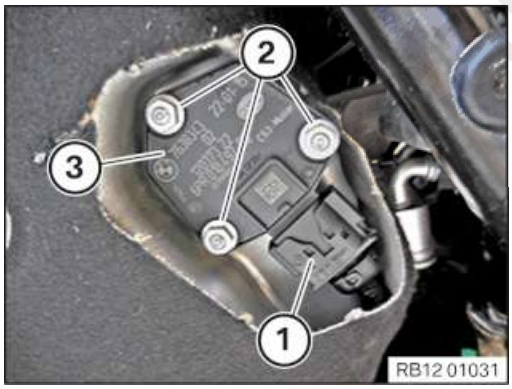
Electrostatic discharge.

Damage to or destruction of electrical components.

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

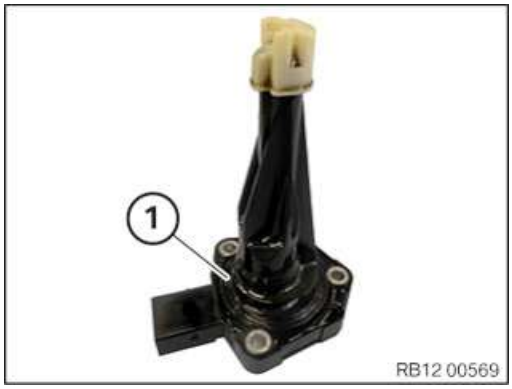


- Loosen cover (1).



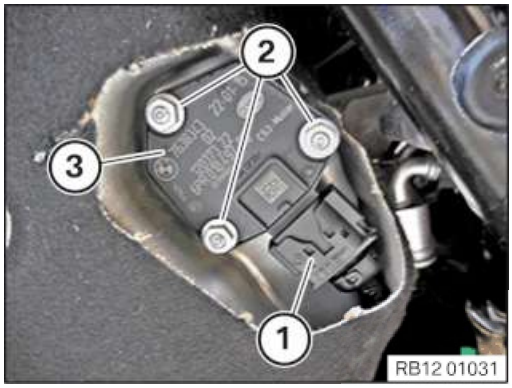
- Unlock plug connection (1) and disconnect.
- Release nut (2).
- Remove oil-level sensor (3).

6 – Installing the oil-level sensor



- Renew sealing ring (1).

  Parts: Sealing ring



- Install the oil-level sensor (3).
- Tighten nuts (2).

Oil level sensor to oil sump

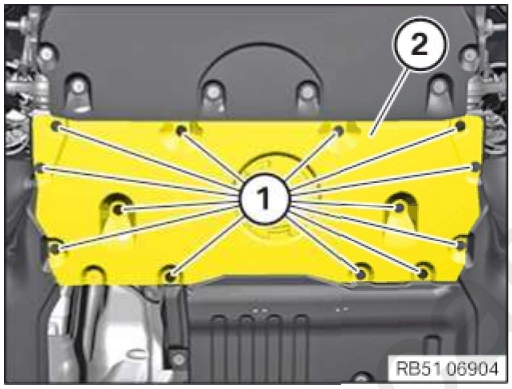
M6 hexagon nut		Jointing torque	2 Nm
		Tightening torque	8,5 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.
- Check the oil-level sensor (3) for tightness.

POSTPROCESSES

7 – Installing the centre underbody protection



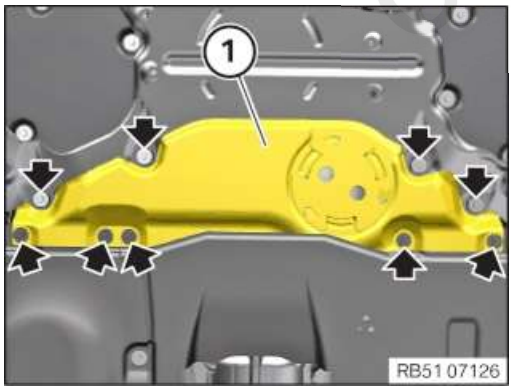
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

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

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

8 – Topping up the engine oil

RISK OF DAMAGE

Damage to the petrol particulate filter.

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

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

RISK OF DAMAGE

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

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

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

- Pour in engine oil.

Engine oil B48B20O1/B46B20O1

Filling capacity, engine oil change with oil filter element	5,25 l

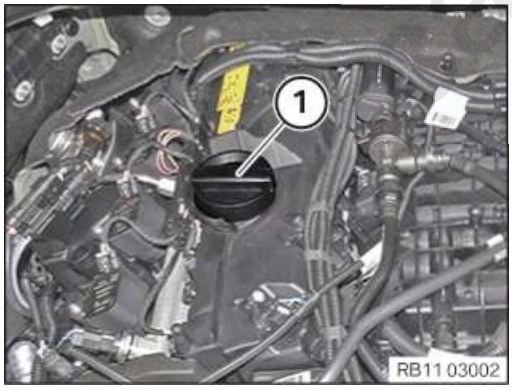
Engine oil: Technically suitable engine oils for BMW Group engines

Engine oil

Filling capacity, engine oil change with oil filter element	5,25 l

Engine oil: Technically suitable engine oils for BMW Group engines

9 – Installing the oil filler cap



- Close oil filler cap (1).

10 – Check engine oil level

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

Additional Information

Overview of Tightening Torques

Oil drain plug — Used in step 3

M12x16	Renew the sealing ring.	Tightening torque	25 Nm

Oil level sensor to oil sump — Used in step 6

M6 hexagon nut		Jointing torque	2 Nm
		Tightening torque	8,5 Nm

Underbody protection — Used in step 7

Hexagon screw		Tightening torque	3 Nm

Overview Technical Data

Engine oil B48B20O1/B46B20O1 — Used in step 8

Filling capacity, engine oil change with oil filter element	5,25 l

Engine oil: Technically suitable engine oils for BMW Group engines

Engine oil — Used in step 8

Filling capacity, engine oil change with oil filter element	5,25 l

Engine oil: Technically suitable engine oils for BMW Group engines

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	5

Operating materials	Used in step
3.0 Technically appropriate engine oils for BMW Group engines	8

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12 63 586 Replacing power distribution box

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.

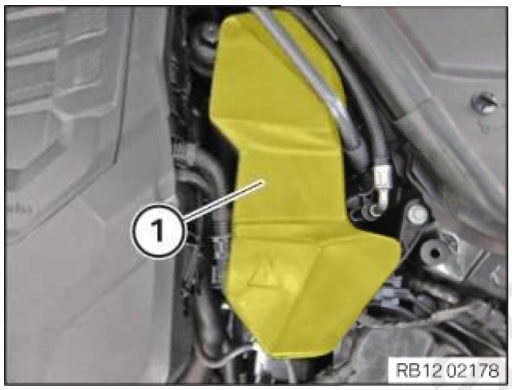
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- 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 cover of the DME control unit



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

MAIN WORK

4 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

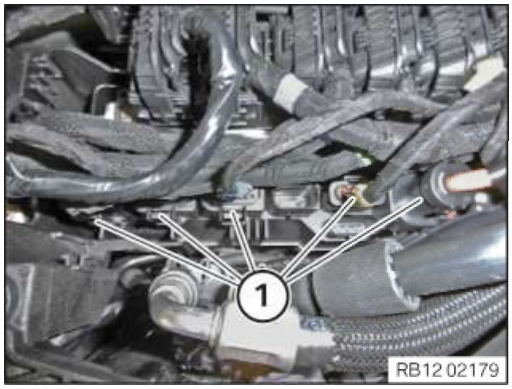
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RISK OF DAMAGE

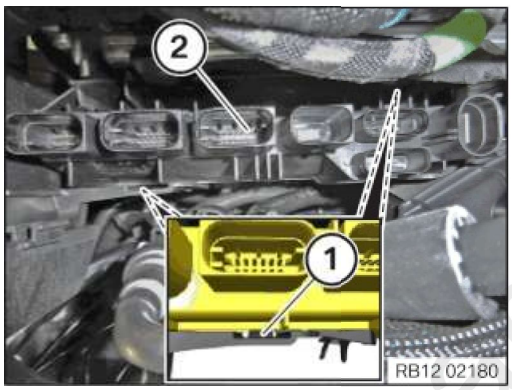
Electrostatic discharge.

Damage to or destruction of electrical components.

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



- Unlock and disconnect plug connections (1).



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

5 – 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.

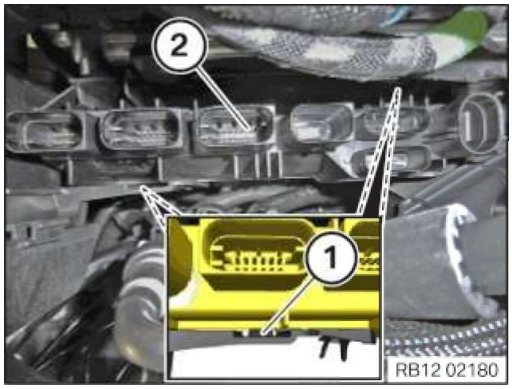
cardiagn.com

RISK OF DAMAGE

Electrostatic discharge.

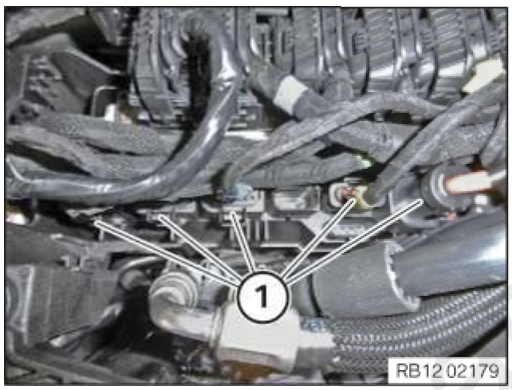
Damage to or destruction of electrical components.

- 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).

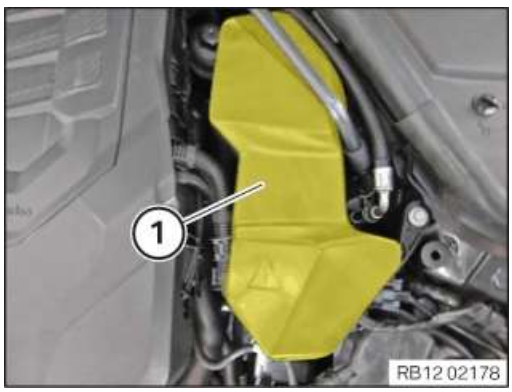


- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

POSTPROCESSES

6 – Installing the cover of the DME control unit



- Insert and install cover (1) into guides.

7 – Install acoustic cover

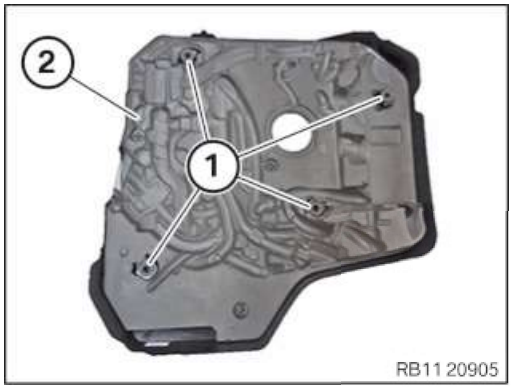
cardiagn.com

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



- See additional information.

Additional Information

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

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61 20 900 Disconnecting and connecting battery earth lead 18
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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
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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 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 battery earth lead 18
61 35 ... Notes on ESD protection (Electro Static Discharge) 45

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12 90 150 Remove and install/replace control unit box

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 – Removing the DME control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

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

TECHNICAL INFORMATION

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

n3rdiagn.com

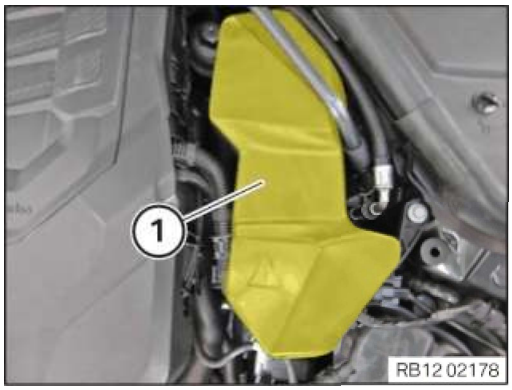
TECHNICAL INFORMATION

Control unit must be programmed after it is replaced.

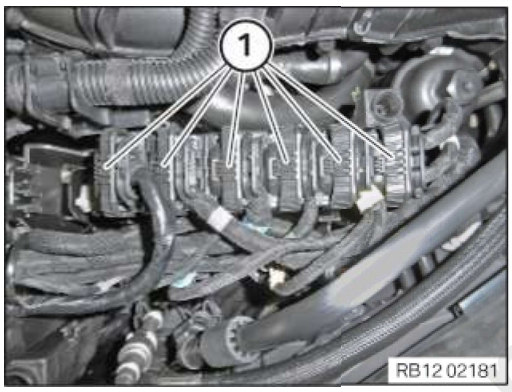
For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

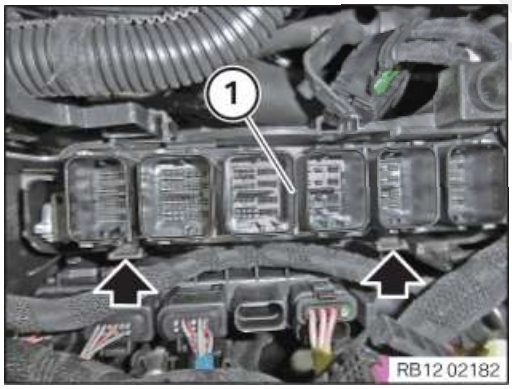
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



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



- Unlock and disconnect the plug connection (1).



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

4 – Removing integrated supply module (PDM)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

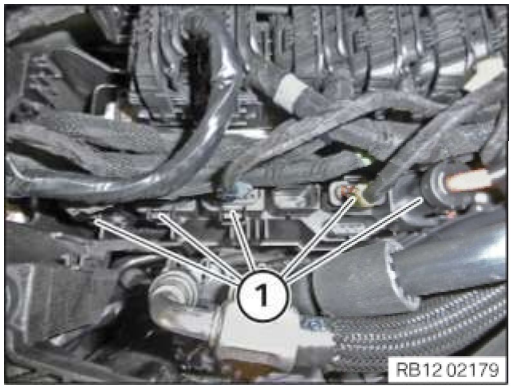
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

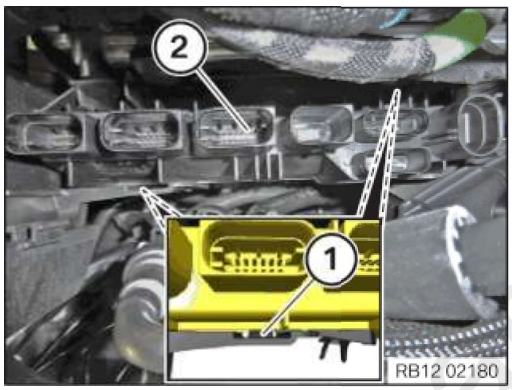
Electrostatic discharge.

Damage to or destruction of electrical components.

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



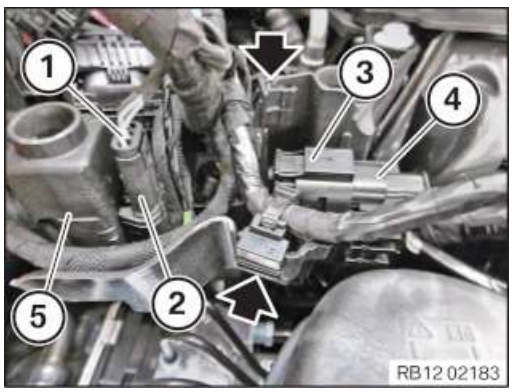
- Unlock and disconnect plug connections (1).



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

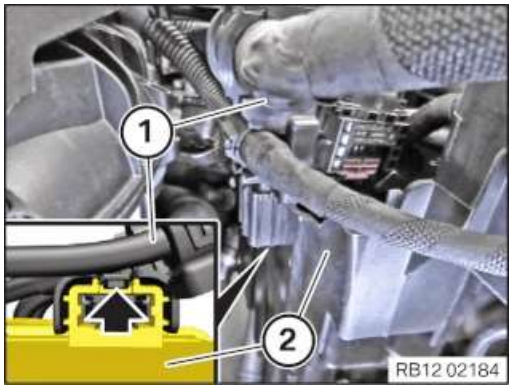
MAIN WORK

5 – Removing the control unit holder

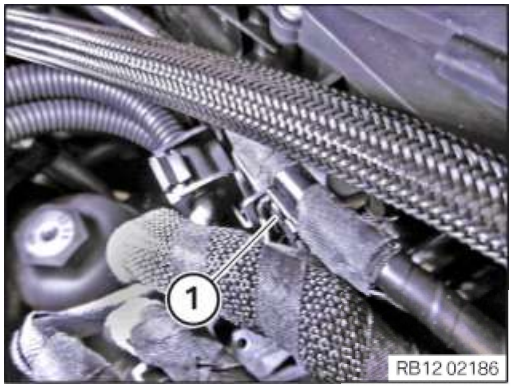


- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the starter (5).
- Unlock plug connection (3) and disconnect.
- Unlock the connector (4) and disconnect from the starter (5).
- Release the clamps (arrows).

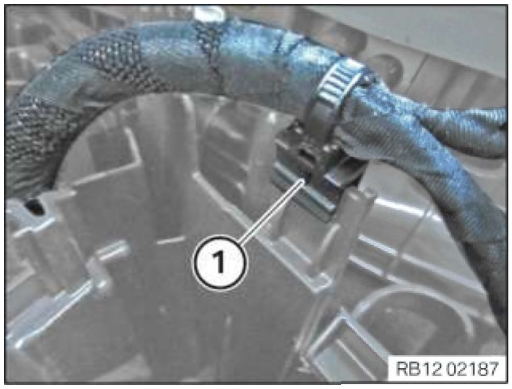
cardiagn.com



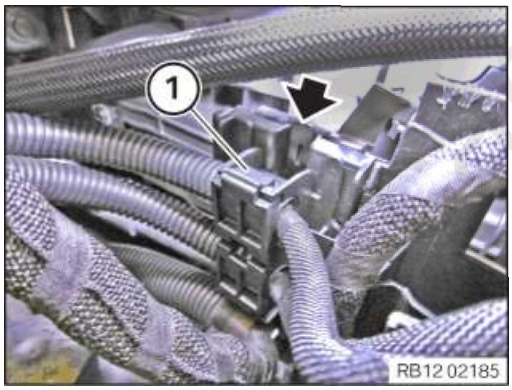
- Unlock the lock (arrow).
- Disconnect the cable plug (1) upwards from the control unit holder (2).



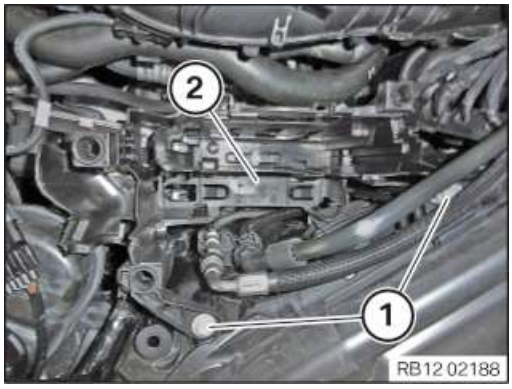
- Loosen clamp (1).



- Loosen clamp (1).



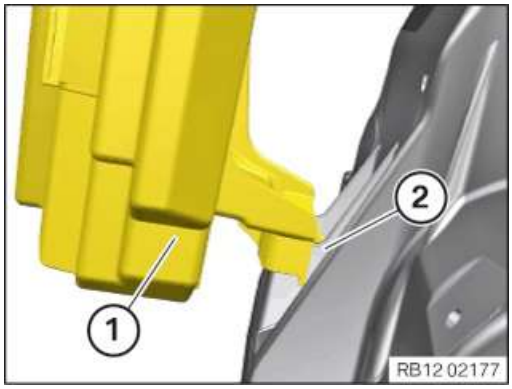
- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



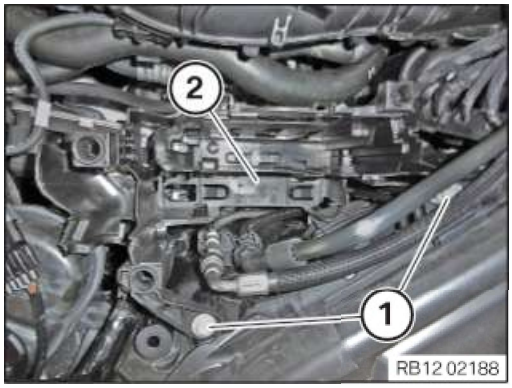
- Loosen screws (1).
- Guide out and remove the control unit holder (2).

6 – Installing the control unit holder

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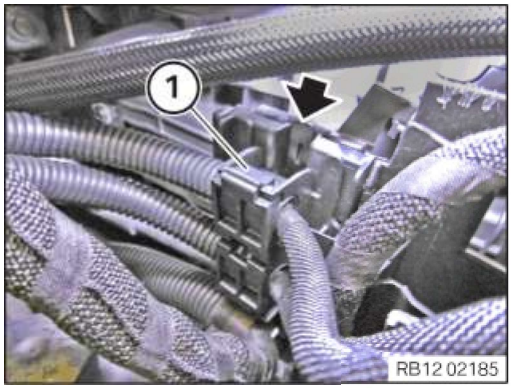
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



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

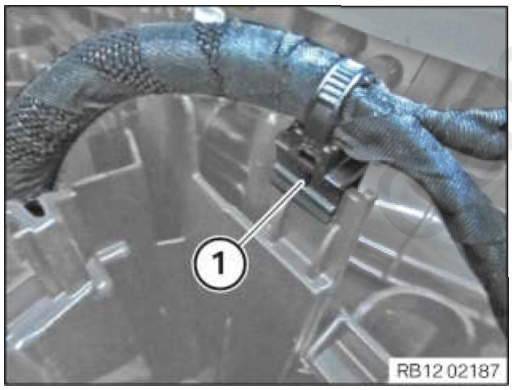
Control unit holder on spring strut dome

Hexagon screw		Tightening torque	8 Nm

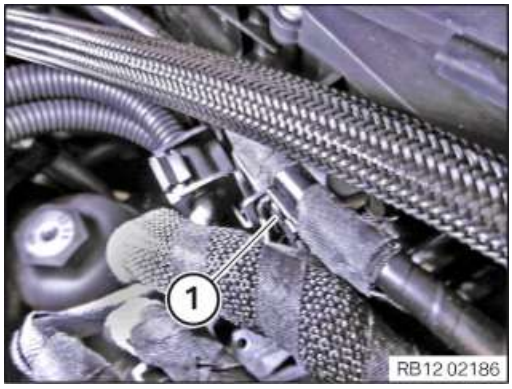


- Feed in and install the cable clip (1).

  Lock (arrow) must audibly engage.

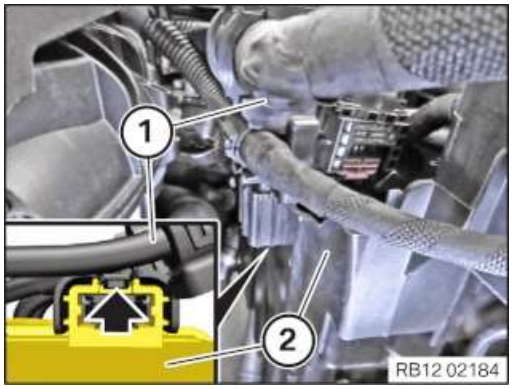


- Secure clamps (1).

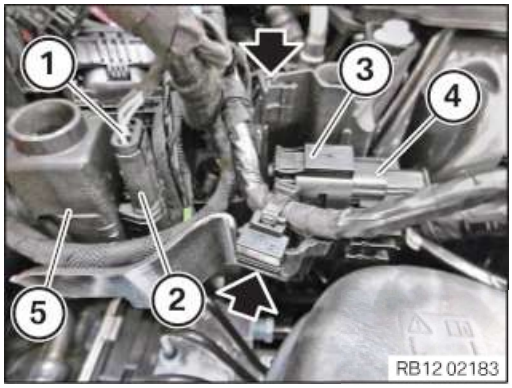


- Secure clamps (1).

bmwdiagn.com



- 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).

POSTPROCESSES

7 – 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.

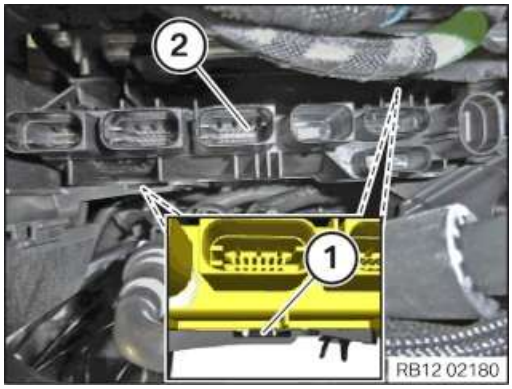
RISK OF DAMAGE

Electrostatic discharge.

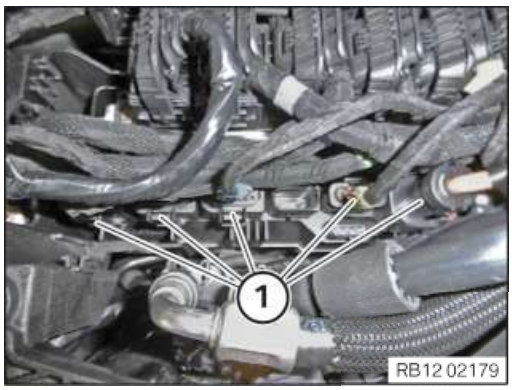
Damage to or destruction of electrical components.

- 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.

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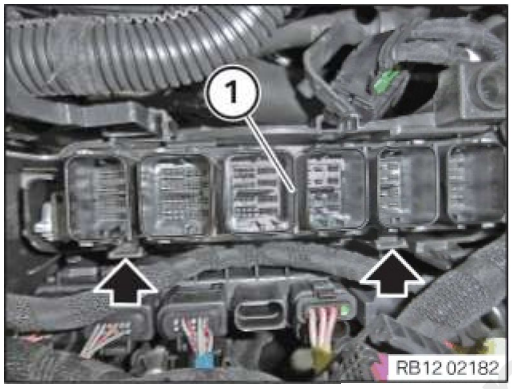


- Insert and install the integrated supply module (PDM) (2).
  The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).

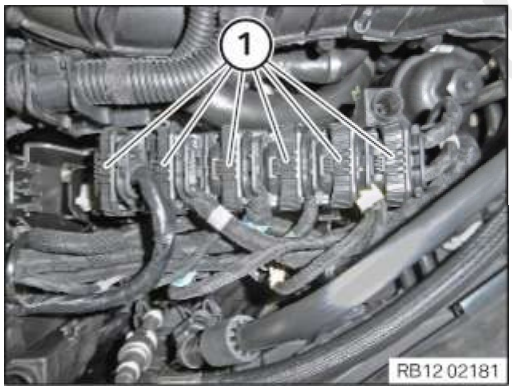


- Connect connectors (1) and lock.
  The connectors (1) must engage audibly.

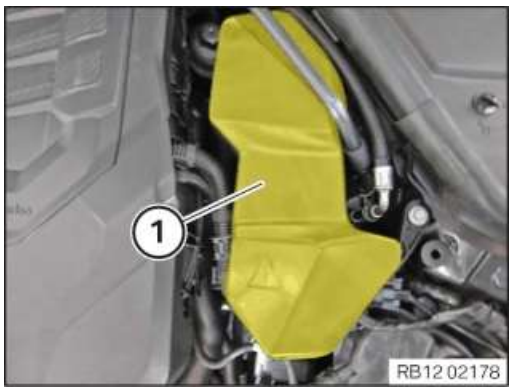
8 – Installing the DME control unit



- 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.

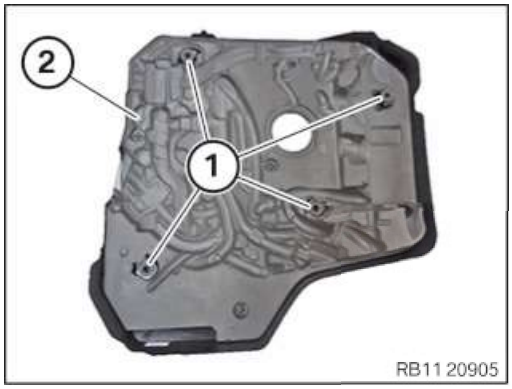
9 – Install acoustic cover

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.

10 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Control unit holder on spring strut dome Used in step 6

Hexagon screw		Tightening torque	8 Nm

Links

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General repair instructions	Used in step
12 00 ... Instructions for removal and replacement of control units	38

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
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61 20 900 Disconnecting and connecting battery earth lead	110
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61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 35 ... Notes on ESD protection (Electro Static Discharge)	347
61 00 730 Encode/program control unit(s) (after vehicle test)	8

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61 00 ... Parking-residing-driving

Vehicles of the G series feature a new type of terminal control:

Functional description of the parking-residing-driving terminal control

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