61 00 ... Battery charging calendar

Battery charging calendar 2016 (PDF file)

Battery charging calendar 2017 (PDF file)

Battery charging calendar 2018 (PDF file)

Battery charging calendar 2019 (PDF file)

Battery charging calendar 2020 (PDF file)

Battery charging calendar 2021 (PDF file)

Battery charging calendar 2022 (PDF file)

Information for the battery charging calendar

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61 12 ... Information on intelligent battery sensor (IBS)

Notice! Do not connect the charger to the 12 V charging socket

The 12 V charging socket is supplied with voltage by the rear power distribution box via relay. This relay drops out after terminal 15 OFF. This means that a trickle charger connected at the 12 V charging socket will be disconnected from the battery. Only charge the battery via the jump start terminal point. Only then can the voltage supply be registered by the vehicle.

Warning! Danger of destruction in event of mechanical strain

- Do not introduce any additional connections at the battery negative terminal.
- Do not modify the grounding cable. The ground cable also serves heat dissipation.
- Do not establish any connection between the IBS and the sensor screw.
- Do not use force when disconnecting the pole shoe from the battery terminal:
  - Do not pull on the ground cable.
  - Do not place any tools under the IBS to lever off the pole shoe.
- Do not use IBS connections as levers.
- Use a torque wrench and set tightening torque in accordance with repair instructions.
- Do not release or tighten down sensor screw (Torx screw).
- Avoid contact between IBS and ground.

Warning! Danger of destruction to IBS and wiring upon battery replacement

- The IBS and wiring can be destroyed by mechanical strain upon battery replacement. Therefore avoid mechanical strain.
- The size (capacity) of the battery required for the car is coded in the Car Access System (CAS).
- Use the battery size (capacity) installed as standard upon battery replacement.
- Recode the Car Access System (CAS) when installing a battery with a different capacity.
- Register battery replacement via Service functions in diagnosis system.
- Delete fault code entries in the Digital Engine Electronics (DME) associated with battery replacement.
- Always proceed in accordance with the repair instructions.

Note: Battery draining possible in spite of the intelligent battery sensor IBS being fault-free.

- A battery can be drained (e.g. with lights or radio switched on) even when the IBS functions perfectly in conjunction with power management.
- **For this reason, only exchange the IBS when there is a corresponding fault code entry!**

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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 equipment. The individually assigned vehicle battery is the ideal compromise between the power requirements of the vehicle

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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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61 00 ... Notes for disconnecting and connecting the vehicle battery

Observe safety informations for handling vehicle battery.

Before disconnecting vehicle battery:

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

Note:

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

Caution!

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

General notes on disconnecting the vehicle 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 version with 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 vehicle battery is connected.

Only lead AGM battery:

- 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.

Note the following after having connected the vehicle battery:

Caution!

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.

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61 00 ... Notes on handling optical fibres



Important!

To avoid damage when handling optical fibres, comply with the following points:

- The minimum permitted bending radius is 25 mm
- Do not subject optical fibres to compressive and tensile load
- Protect optical fibres against the effects of heat ≥85 °C (e.g. during welding work, drying work with infrared beams or hot air blower)
- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables if necessary



Note:
The optical fibres are coloured differently as follows:

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

Follow notes for processing cables and optical fibres.

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61 00 ... Notes on handling the high pressure cleaner



Warning!

Only used a high pressure cleaner approved by BMW!

Only specially trained persons of 16 years of age or older may work with the high pressure cleaner.

Check the high pressure cleaner and electrical wiring for visible damage.

Only use at a suitable location.



Attention!

Pay attention to following hazard warnings:

- Danger of injury due to water jet
- Contact with hazardous substances in spray
- Risk of skidding on wet floor
- Risk of stumbling due to hoses and cables
- Comply with notes and instructions on handling cleaning agents !
- Risk of scalding when cleaning with hot water.
- On electric or hybrid cars, the safety instructions for handling with hybrid cars are to be complied with.



Warning!

The following personal protective equipment is to be used:

- Safety goggles/face guard
- Suitable gloves
- Apron
- Rubber boots
- Ear protectors
- Safety shoes



Attention!

Notes on washing a vehicle with a high pressure cleaner:

- Do not wash directly on gaskets and control units during engine washes.
- A minimum distance of 30 cm must be adhered to for tyres and tyre valves.
- A minimum distance of 30 cm must be adhered to for the soft top and painted parts.
- Do not use if engine is still hot.
- Do not exceed maximum water temperature of 60 degrees.
- Do not spray directly onto cameras/sensors.

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Attention!

- For your own safety, we recommend that you do not wash on the high-voltage components in electric or hybrid vehicles.

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



The following applies in general:

To avoid damage, observe the following notes:

- 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 components; 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 cable

- 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 cables

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

HSD cables

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

Fibre-optic cables:

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

Caution!

- 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 optical fibres

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 wheel arch, for example):

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- 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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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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61 00 730 Programming/encoding the control unit (s) including deletion of fault memory (After vehicle test)

1 – Encode/program control unit(s)

Prerequisite

The control unit was replaced.

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.

Exception:

BMW I01: Note Product and Measures Management Aftersales measure 55176388.

- Connect the battery charger to the vehicle (activity not included in the flat rate unit).
- 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.

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61 00 ... Repairing airbag cables

Caution!

> **Only repair those cables which show visible signs of damage. In the event of visible damage, make sure there is only one cable repair in effect after the repair work. If no visible damage can be identified, the entire cable must be replaced. When carrying out repairs to the airbag wiring harness, you must use the spare parts offered in the Electronic Parts Catalogue (EPC).**

Safety regulations for handling components of airbag system.

Instructions for disconnecting and connecting battery.

In event of non-visible damage to wiring harness:

Disconnect plug connection on airbag module or on plug adapter. It is absolutely vital to disconnect the contacts in succession as there is a risk of mixing up (similar parts)! Cut through one cable after the other at an appropriate position, do not under any circumstances cut through both cables at the same time. Insulate cables remaining in wiring harness with insulating tape. Now disconnect the plug connection from the airbag control unit. Unpin contacts. Cut through one cable after the other at an appropriate position and insulate with insulating tape, do not under any circumstances cut through both cables at the same time. Pin the contacts of the repair cable for the airbag control unit into the control-unit connector, the allocation of the repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead. Now pin the contacts for the airbag module or the contacts of the plug adapter, the allocation of the repair cables is relevant. Cut off excess length of repair cable in proximity (visible area) of airbag module or of plug adapter. Twist open cables. With the butt connectors and heat-shrink tubings in the Electronic Parts Catalogue (EPC), reconnect the cables with the same cable colours. Twist cables again, open length (twist) must not exceed 40 mm. Secure interface (heat-shrink tubing) with insulating tape to prevent cables from twisting open.

In event of visible damage:

Expose cable at damaged areas. Cut through one cable after the other at an appropriate position and insulate cables no longer required in wiring harness with insulating tape, do not under any circumstances cut through both cables at the same time. Now, depending on the work scope, unpin the contacts either on the airbag control unit or on the airbag module or plug adapter. Cut off unpinned cables. Insulate cables remaining in wiring harness with insulating tape. Now pin in contacts of repair cable, assignment of repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead up to separation point. Cut off excess length of repair cable. Twist open cables. Connect cables with butt connectors and heat-shrink tubings in Electronic Parts Catalogue (EPC), assignment of repair cables is relevant. Twist cables again, open length (twist) must not exceed 40 mm. Secure interface (heat-shrink tubing) with insulating tape to prevent cables from twisting open.

Instructions for cutting off, insulating, crimping cables, installing and removing contacts:

Cutting off and insulating cables.

Repairing a plug connection using butt connectors.

Installing and removing contacts.

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

Warning!

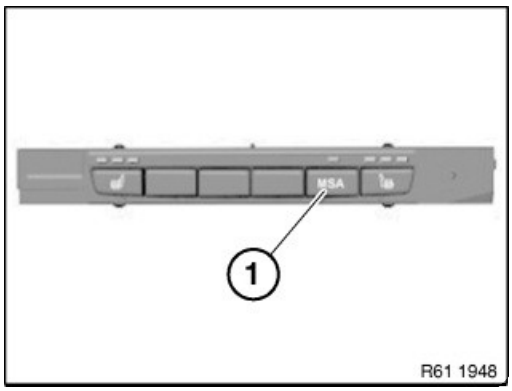
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

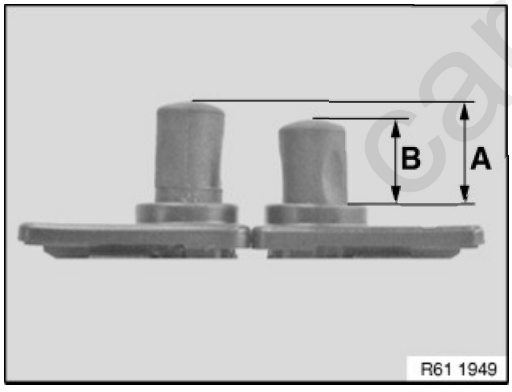
Observe safety precautions when working on MSA vehicles.

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

Please observe the current version. Safety information for handling electric and hybrid vehicles

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 prerequisites:
     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 instrument cluster **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.

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=> 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 notes on paintwork.
   - Removed high-voltage 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. *Equipotential bonding:*
   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 00 ... Safety instructions for handling vehicle battery

Do not allow any battery acid to come into contact with the eyes, the skin or clothing. Therefore wear protective clothing, gloves and eye protection.

Do not tilt the battery, acid may emerge from the vent hole.

If acid is splashed into the eyes, rinse them immediately for several minutes with clear water. You must then consult a doctor without delay.

If acid is splashed onto the skin or clothing, neutralise it immediately with a soap solutionand rinse with lots of water.

Seek medical attention immediately if battery acid is accidentally swallowed.

Strictly no flames, sparks, naked light or smoking!

A highly explosive detonating gas is created when batteries are charged. The rooms where charging is carried out must therefore always be well ventilated.

Avoid the formation of sparks when handling cables, wiring and electrical devices.

Turn the ignition lock to the 0 position before disconnecting or connecting the battery.

Do not place tools or any similar object on the battery (danger of short circuit and explosion hazard!).

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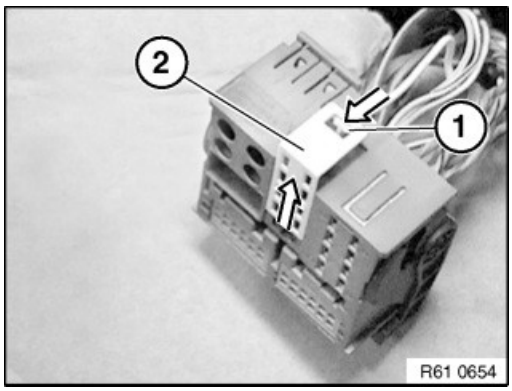
61 13 ... Socket housing (radio connector), Hybrid System MQS/MPQ

Special tools required:

- 61 0 314

Manufactured by AMP: The following contact types without strand sealing can be fitted in the connector housings:

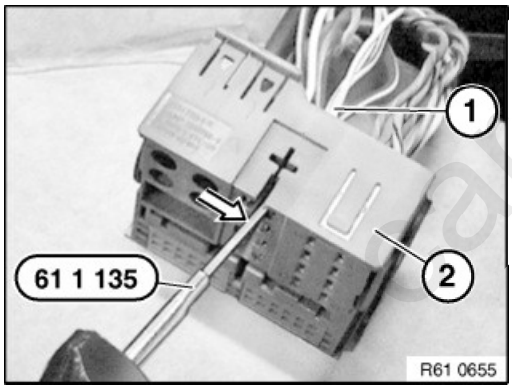
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



Removing MPQ contacts from radio connector:

Press lock (1) in direction of arrow.

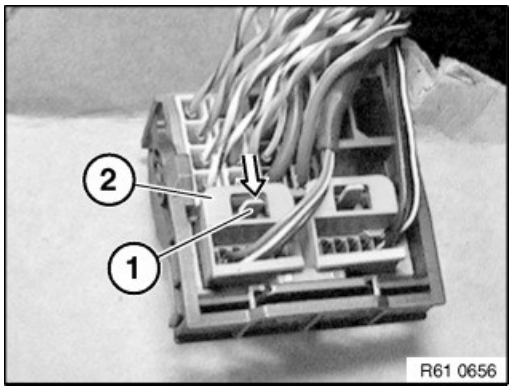
Detach secondary lock (2) from radio plug.



Feed special tool 61 0 314 (61 1 135) past side of contact.

Press special tool 61 0 314 (61 1 135) in direction of arrow.

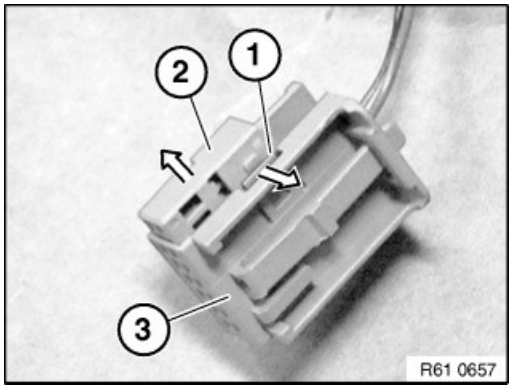
Pull wire (1) with socket contact out of radio connector (2).



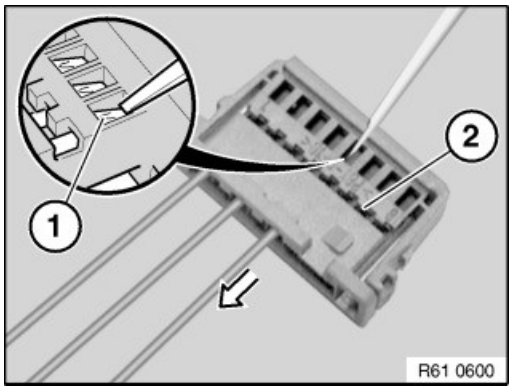
Removing MQS contacts from contact carrier:

Press lock (1) in direction of arrow and pull housing (2) out of radio connector.

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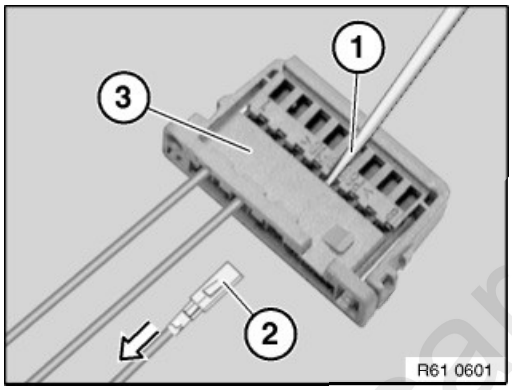
Press lock (1) in direction of arrow. Pull contact carrier (2) out of housing (3).*Note:*
When the contact carrier is pulled out, the secondary locks of the socket contacts are raised.



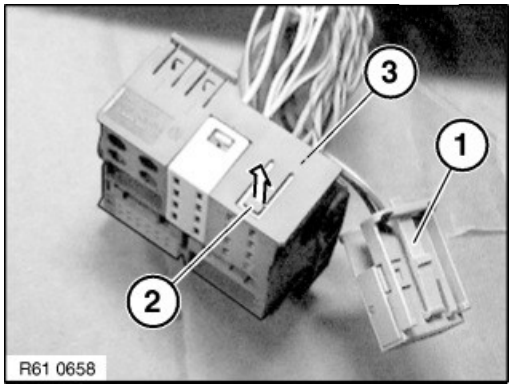
Note:
Schematic diagram shows the 8-pin socket housing by way of example.

Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

Pull wire with socket contact in direction of arrow as far as secondary lock (2).



Hold down retaining hook in secondary lock (1) again. Pull wire with socket contact (2) out of contact carrier (3).



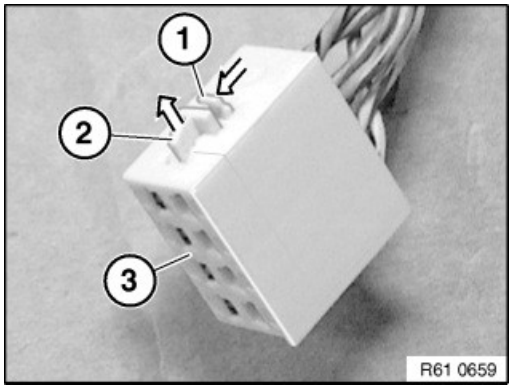
Removing MPQ contacts from contact carrier:

Remove contact carrier (1) with MQS contacts from radio connector.

Raise lock (2) on radio connector.

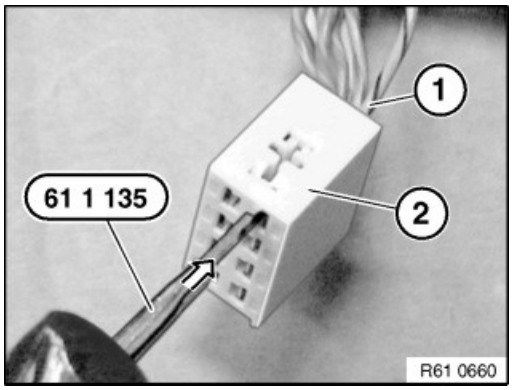
Pull contact carrier (3) out of radio connector.

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Press lock (1) in direction of arrow.

Pull secondary lock (2) in direction of arrow completely out of contact carrier (3).



Press special tool 61 0 314 (61 1 135) on inside of contact into contact carrier (2).

Pull wire with socket contact (1) out of contact carrier (2).

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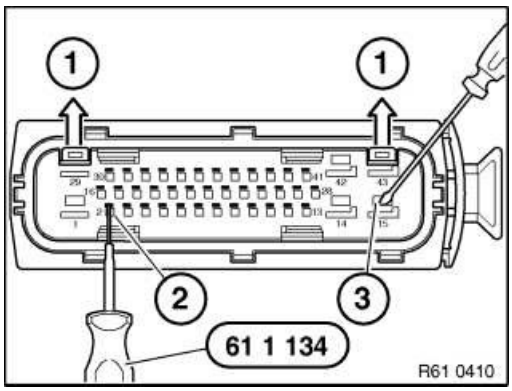
61 13 ... Socket housing 42-, 43-, 46-pin, Hybrid System MQS / MPQ

Special tools required:

- 61 0 312

Manufactured by AMP: The following contact types without strand sealing can be fitted in the socket housings:

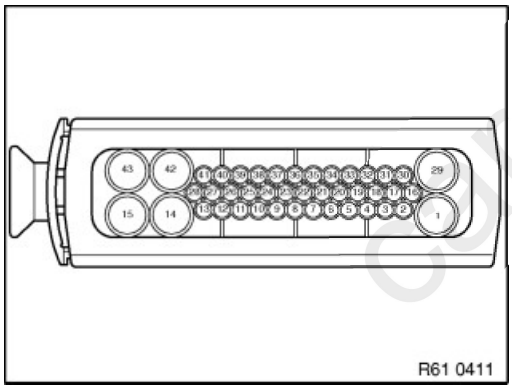
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



Open secondary locks (1) on socket housing.

Press back retaining hook of MQS contacts (2) with special tool 61 0 312 61 1 134 and pull out cable with contact.

Press back retaining hook of MPQ contacts (3) with screwdriver and pull out cable with contact.



Installation note:
Bend open retaining hook of contacts gently before inserting into connector housing.

For installation of contacts, observe chamber numbers on reverse side of socket housing.

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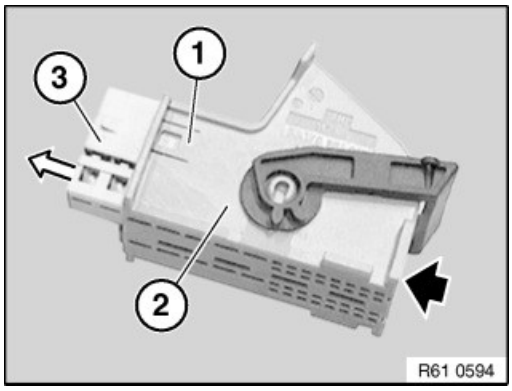
61 13 ... Socket housings, 2x21-, 2x27-pin, Hybrid Systems MQS/MPQ, Elo/Elo Power

Manufactured by AMP: The following contact types without strand sealing can be fitted in the socket housings:

- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)

Manufactured by Siemens: The following contact types without strand sealing can be fitted in the socket housings:

- Elo (electrical contact)
- Elo Power 2.8 mm width (electrical contact for heavy loads)
- Elo Power 5.2 mm width (electrical contact for heavy loads)

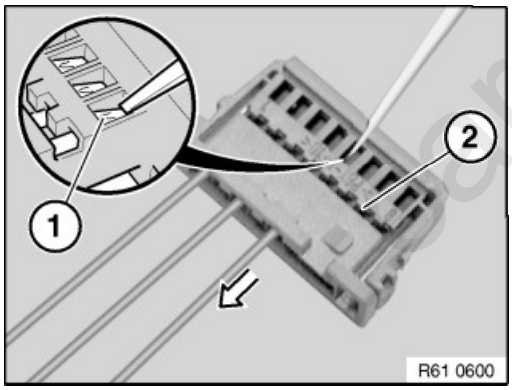


Raise lock (1) on housing (2).

Push contact carrier (3) from rear out of housing.

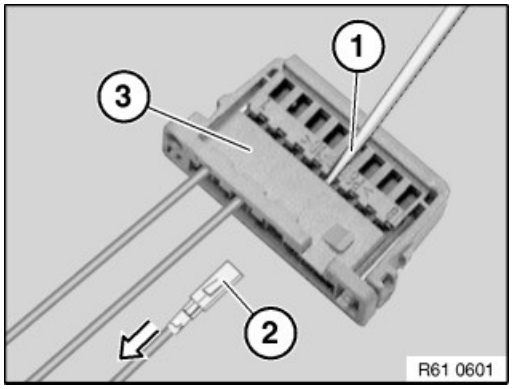
Note:
The second contact carrier is pushed out in the same way.

Pushing out the contact carrier releases the secondary locks of the socket contacts.



Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

Pull wire with socket contact in direction of arrow as far as secondary lock (2).



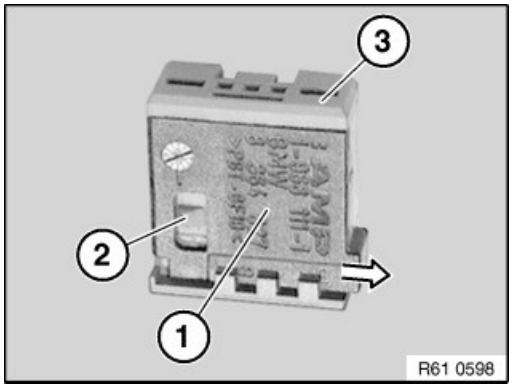
Hold down retaining hook in secondary lock (1) again and pull cable with socket contact (2) completely out of contact carrier (3).

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61 13 ... Socket housings, 5-pin, 8-pin, System MQS/MPQ

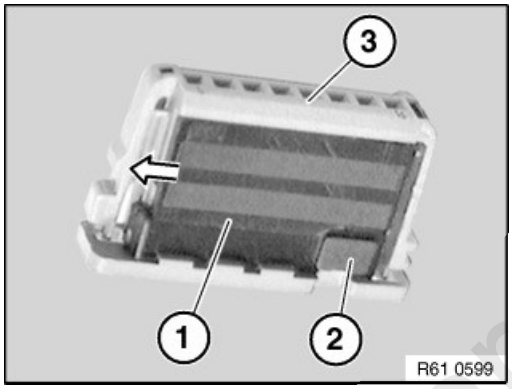
Manufactured by AMP: The following contact types without strand sealing can be fitted in the connector housings:

- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



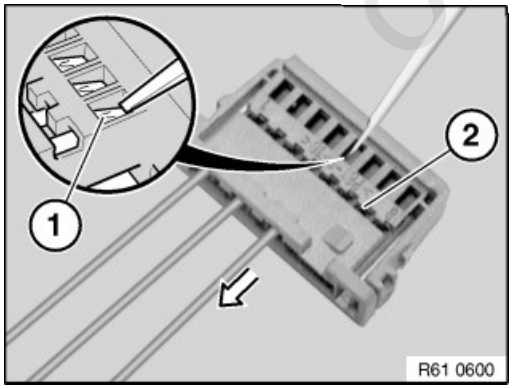
Socket housing, 5-pin (Hybrid System MQS/MPQ)

Raise fastener (1) over retaining lug (2) and pull off from contact carrier (3).



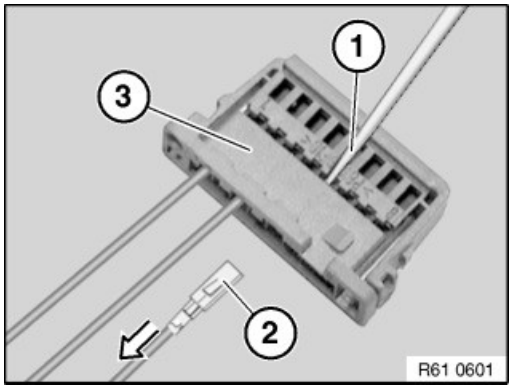
Socket housing, 8-pin (MQS):

Raise fastener (1) over retaining lug (2) and pull off from contact carrier (3).



Hold down retaining hook (1) of contact and pull cable with contact as far as secondary lock (2).

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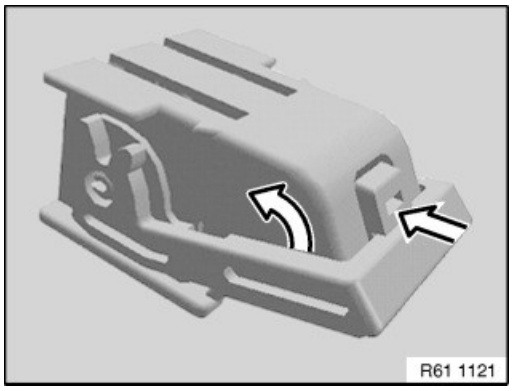
Hold down retaining hook in secondary lock (1) again and pull cable with contact (2) completely out of contact carrier (3).

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61 13 ... Unlocking and disconnecting different plug connections

Note:
The document describes unlocking and disconnecting different types of plug connections.

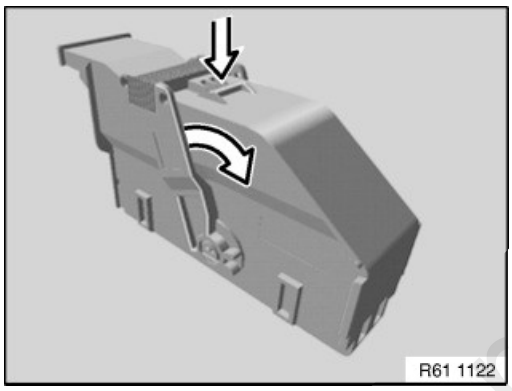
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

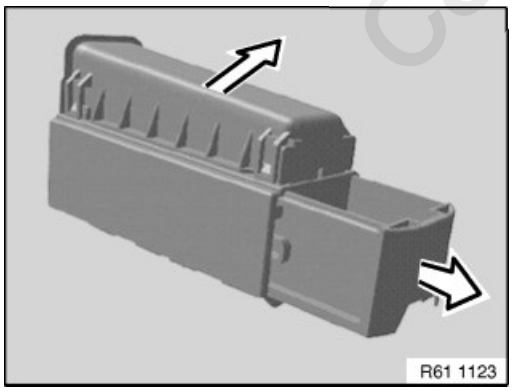
Disconnect plug connection.



2.

Press lock and open release clip in direction of arrow.

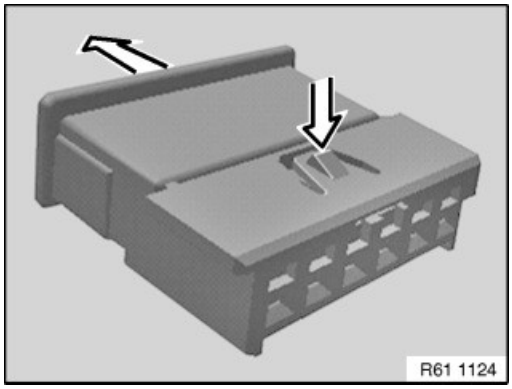
Disconnect plug connection.



3.

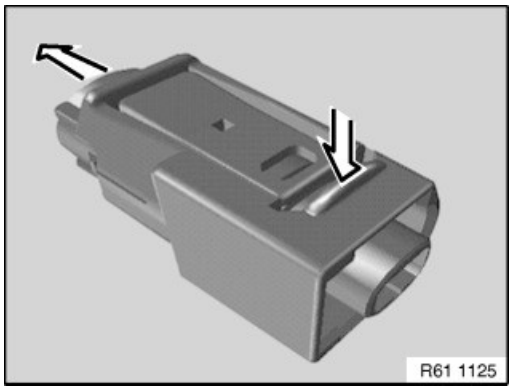
Open release clip in direction of arrow and disconnect plug connection in direction of arrow.

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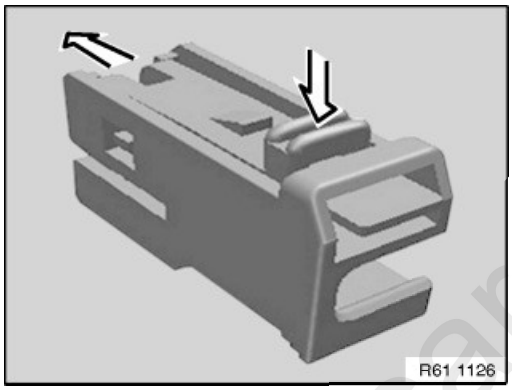
4.

Press lock and disconnect plug connection in direction of arrow.



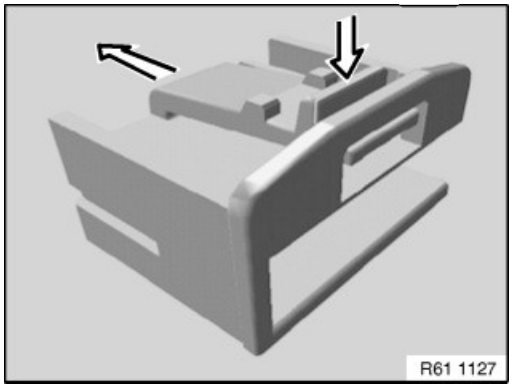
5.

Press lock and disconnect plug connection in direction of arrow.



6.

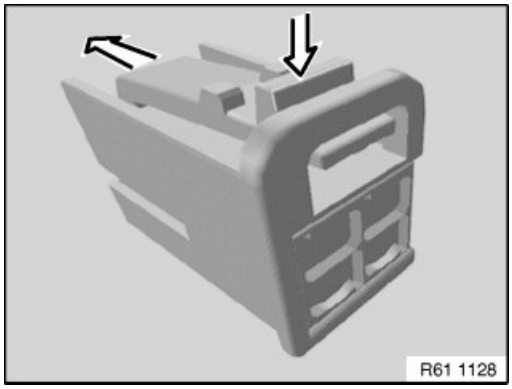
Press lock and disconnect plug connection in direction of arrow.



7.

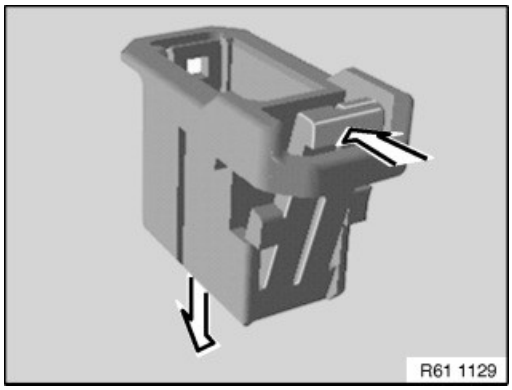
Press lock and disconnect plug connection in direction of arrow.

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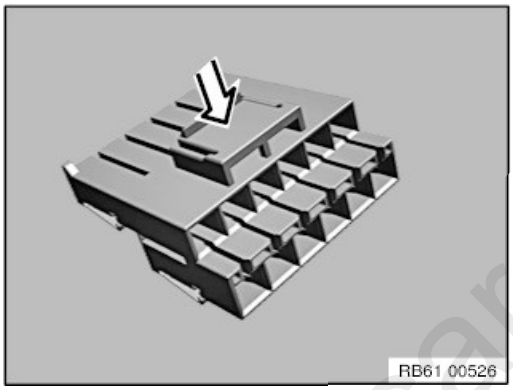
8.

Press lock and disconnect plug connection in direction of arrow.



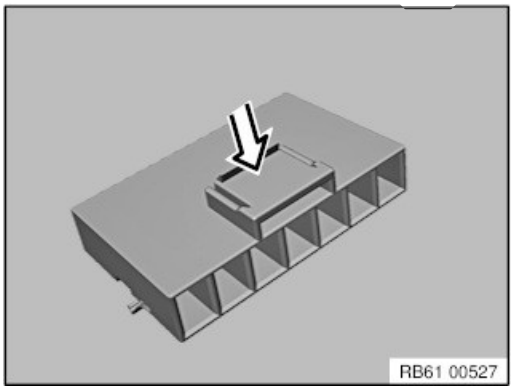
9.

Press lock and disconnect plug connection in direction of arrow.



10.

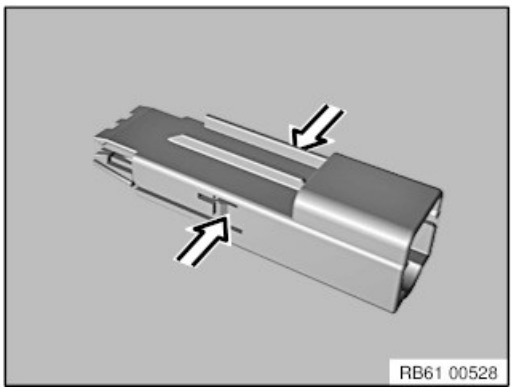
Press the lock and detach plug connection.



11.

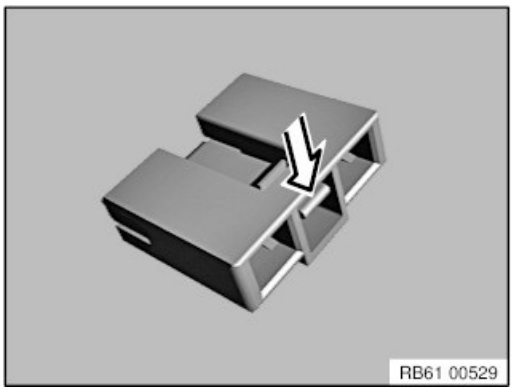
Press the lock and detach plug connection.

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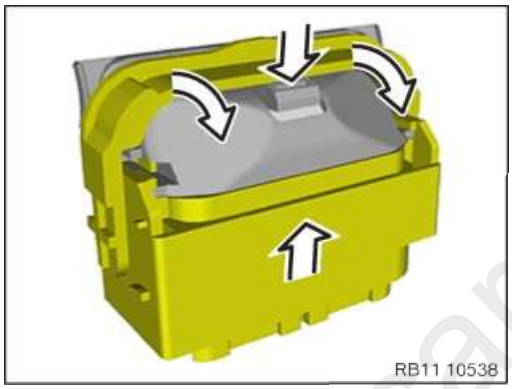
12.

Press the lock on both sides and detach plug connection.



13.

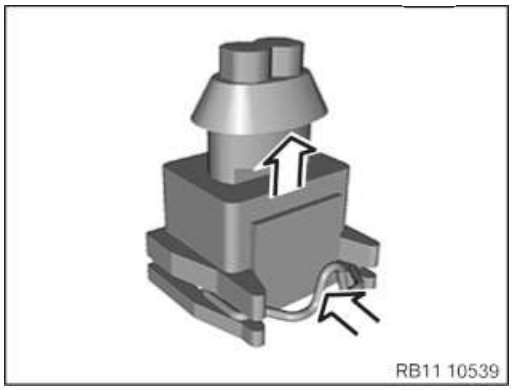
Press the lock and detach plug connection.



14.

Press lock and open release clip in direction of arrow.

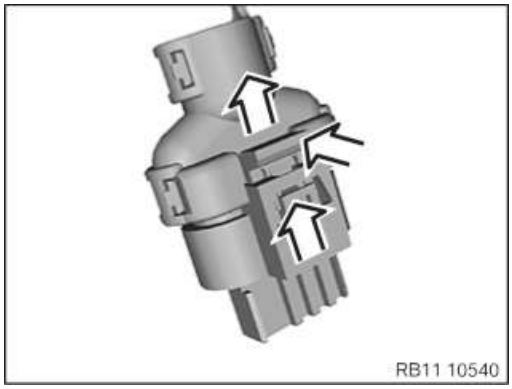
Disconnect plug connection.



15.

Press the lock and detach plug connection.

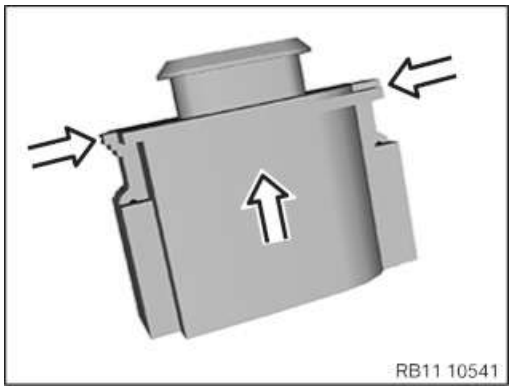
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16.

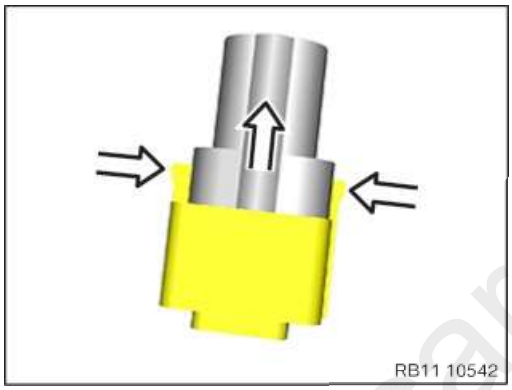
Pull out lock and press.

Disconnect plug connection.



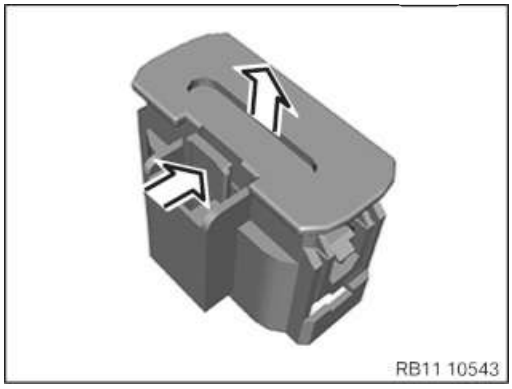
17.

Press the lock and detach plug connection.



18.

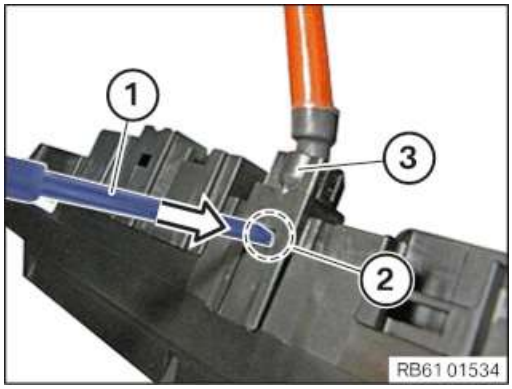
Press the lock and detach plug connection.



19.

Press the lock and detach plug connection.

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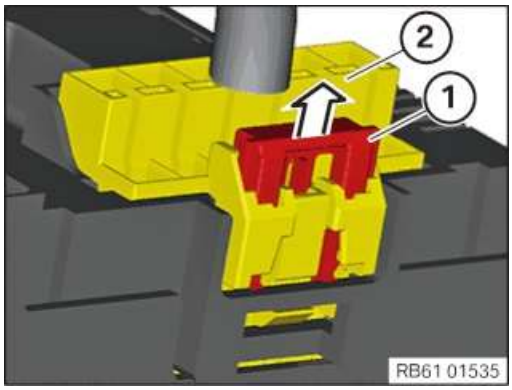


20.

Plug connection, e.g. on the power distribution box:

Press into the opening (2) using a suitable tool (1).

Pull off plug connection (3) upwards.



21.

Plug connection, e.g. on the power distribution box:

Lift lock (1) with a suitable tool.

Pull off plug connection (2) upwards.



22.

Vibration resistant high power engine contacts:

Caution!

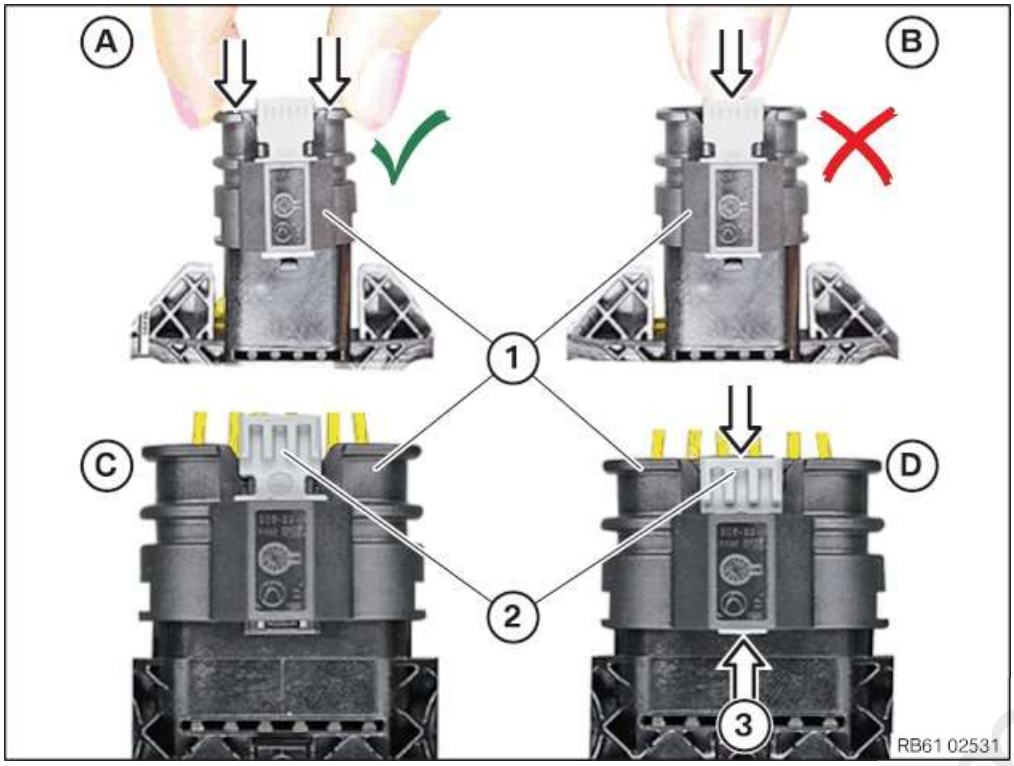
For this connector type, increased forces come into play when disconnecting and closing.

Disconnect:

Pull out lock (1) downward in direction of arrow first.

Then press lock (1) down in direction of arrow and pull off connector.

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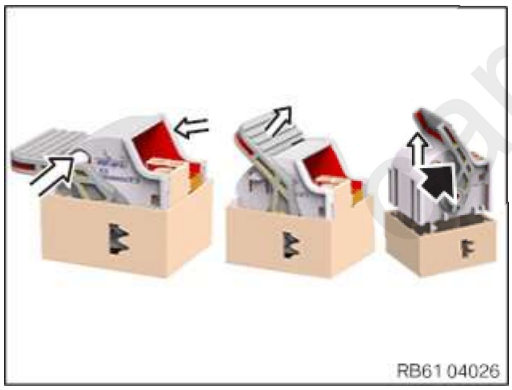


23.

Close:

A. Press the connector (1) down at the points indicated by the arrow **until it reaches the end position**
B. **Do** not press the connector (1) further than the lock
C. Connector (1) is in the end position, but lock (2) is not yet locked
D. Press lock (2) down in the direction of the arrow until the tip of lock (2) is visible at point (3)

Unlock / lock front light combination plug connection & replace housing after damage:

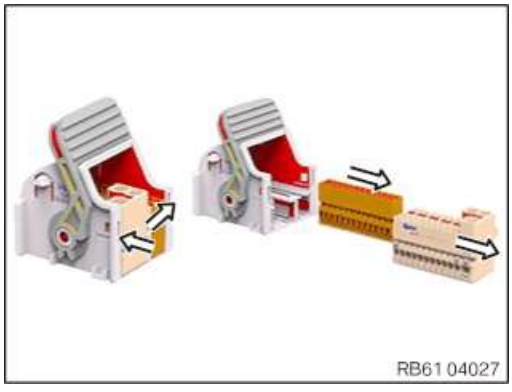


24.

Press in locking lever at both sides until the lever is unlocked and can be moved.

Move lever upwards until it latches into place in the end position.

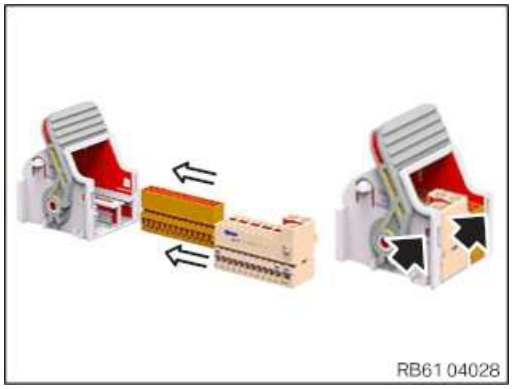
Once the lever is locked in the end position, remove plug connection upwards.



Unlock socket housing by lifting up each of the locking tabs.

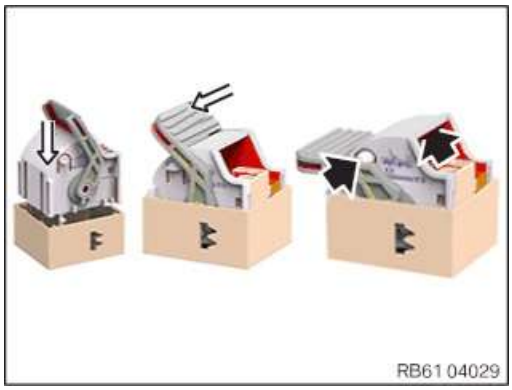
Slide out after unlocking the socket housing.

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Slide in socket housing up to limit position.

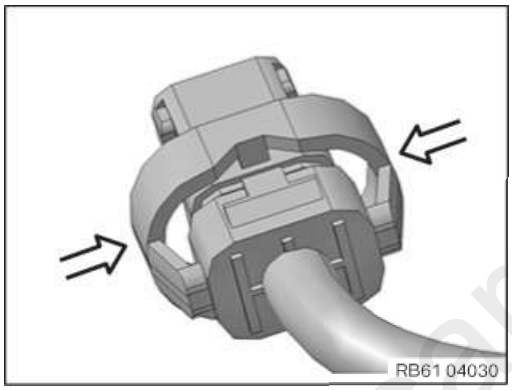
Lock socket housing into place in end position.



Sliding in up to limit position.

Activate plug-inn procedure by moving lever downwards.

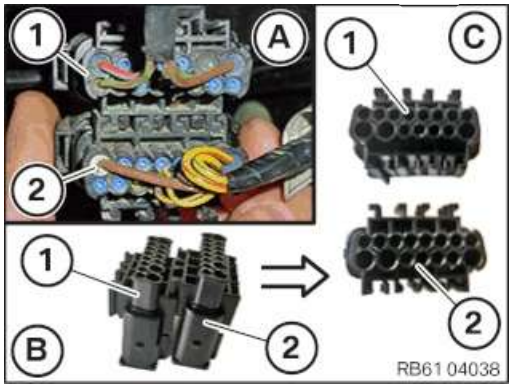
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.



25.

Rosenberger D4S20G-400A5-Y

Press to unlock on both sides.

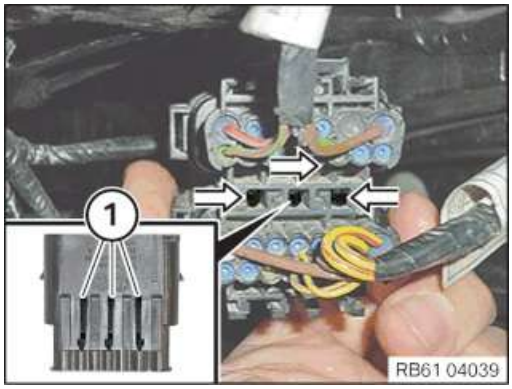


26.

Pin housing, 15-pinMLK1

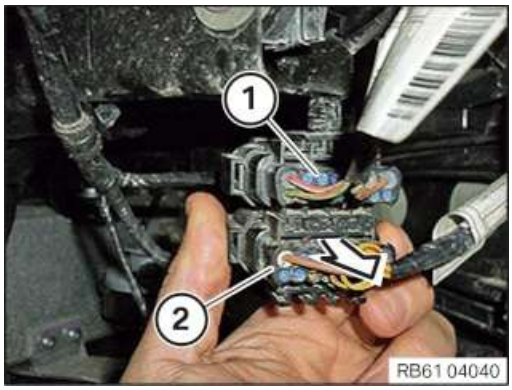
- A & B. To avoid any damage to individual connectors, the given connector assembly consisting of several individual connectors (1) & (2) must be released before disconnecting the plug connection.
- C: released connector assembly

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Disconnecting connector assembly:

Release retaining hooks (1) in direction of arrow (detail image shows retaining hooks of individual connector).



Release connector (2) in direction of arrow from connector (1).

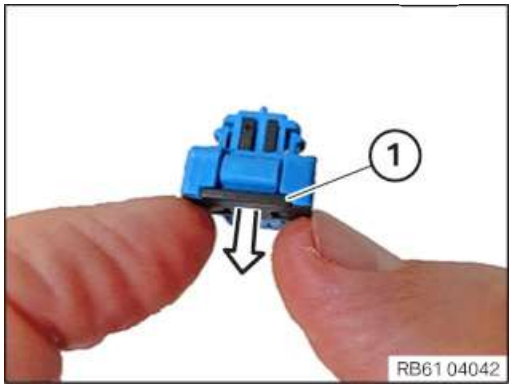


27.

Airbag ignition circuit connector

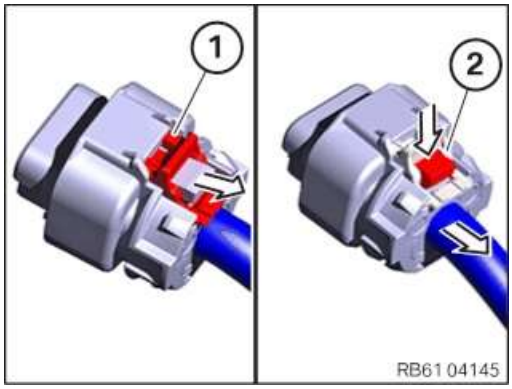
Warning!

Note the safety information for working on vehicles with airbag systems prior to disconnecting the plug connection.



Pull the cap (1) in the direction of the arrow to unlock

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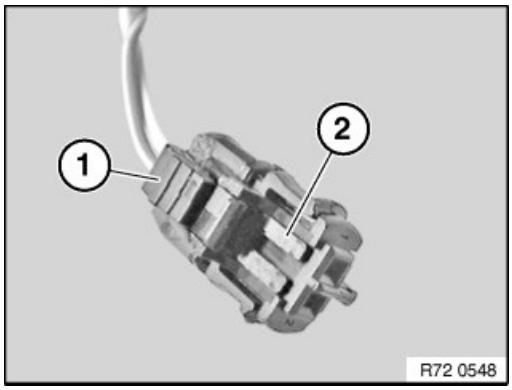


28.

Connector e.g. on front and rear lighting unit

Open safety catch (1) in direction of arrow using appropriate tool.

Push safety catch (2) in direction of arrow and disconnect plug connection.



29.

Plug, e.g. in airbag ignition circuits

Press the lock (1) and pull out the connector (2) up to initial engagement position.

Pull off connector (2).

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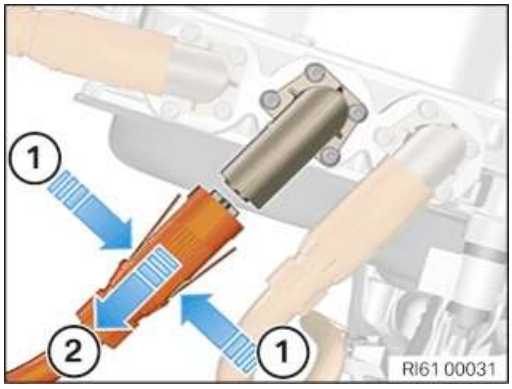
61 13 ... Unlocking and disconnecting various plug connections in electrical and hybrid vehicles



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:

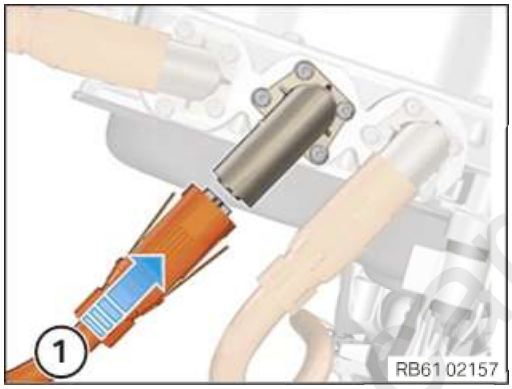
Press the lock (1) on the left and right on the connector in the direction of the arrow.

Pull off connector (2) in direction of arrow.

Attention!

Connector (2) is difficult to pull off.

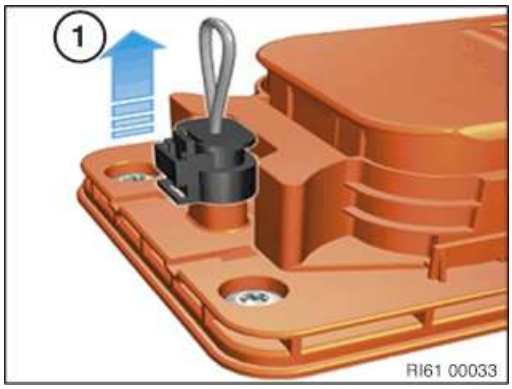
In the event of damage to high-voltage connector (2), the complete high-voltage cable must be replaced!



Connect the Hirschmann high-voltage connectors:

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

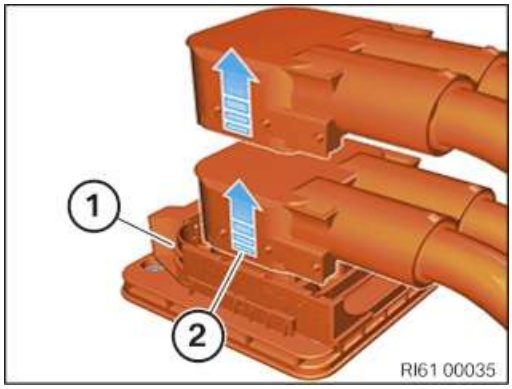
Note:
Connector (2) must lock audibly.



Disconnect the Kostal high-voltage connector:

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

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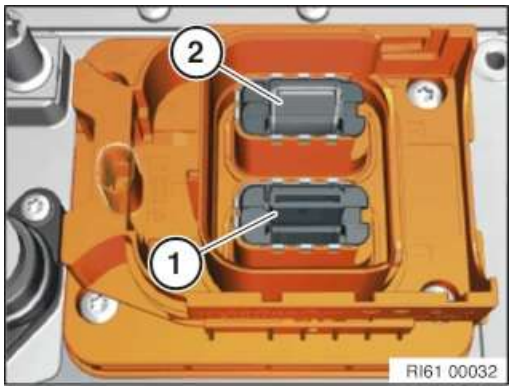
Push the lock (1) fully to the front.

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:

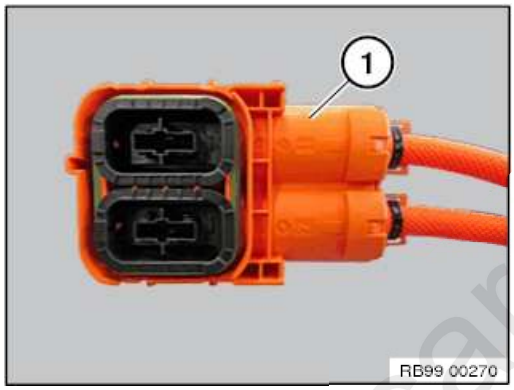
Check the touch protection for damage and correct positioning (1).

Warning!

Do not touch unprotected connector (2)!

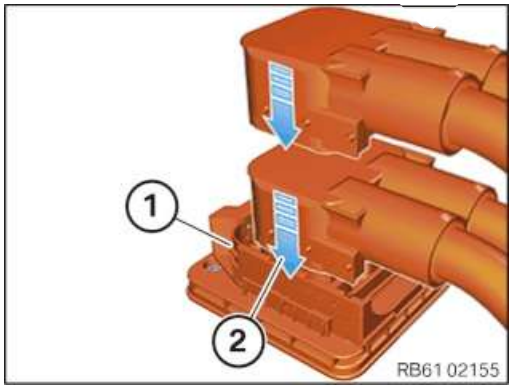
If the contact protection (1) has been pushed to the bottom (2), the high-voltage connector must be refitted.

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:

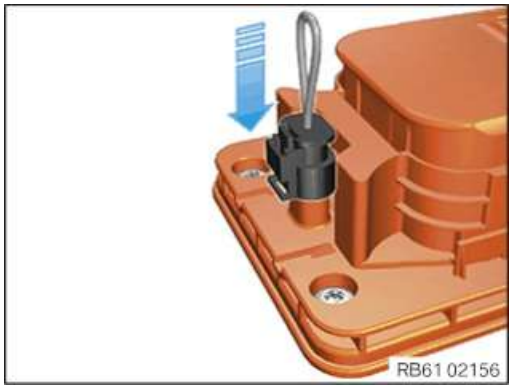
Connect the connector (2) in one single movement to the counter-housing.

Push the lock (1) fully to the rear.

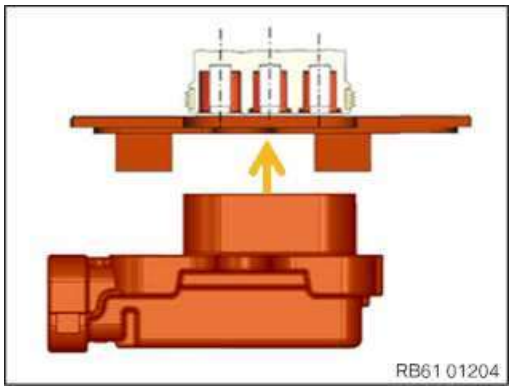
Attention!

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

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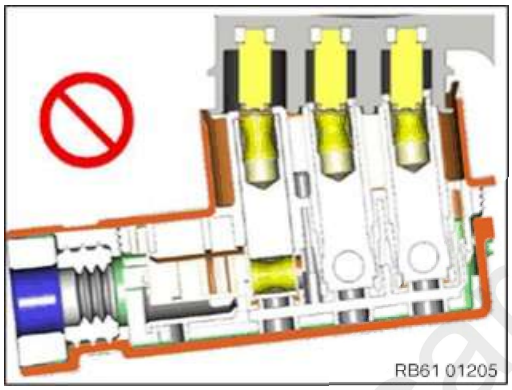


Connect the connector for the high-voltage interlock.



Three-phase high-voltage connector:

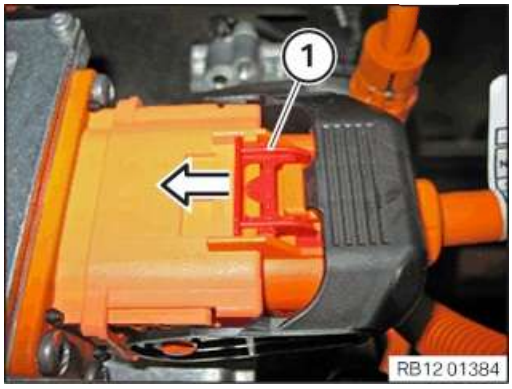
Connect and disconnect the connector straight.



Attention!

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

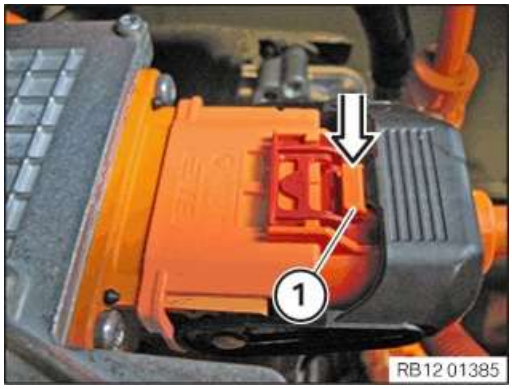
Increased tilted connections will increase the connecting force and the risk of danger.



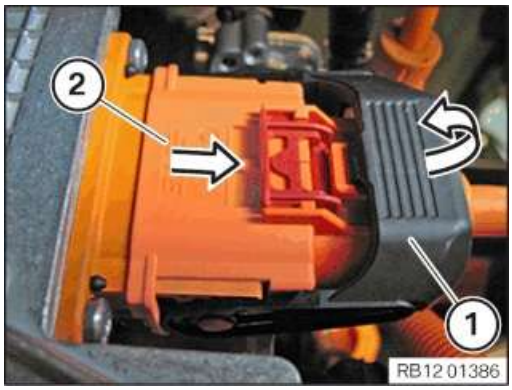
Disconnect the high-voltage connector from the high-voltage connection of the KLE:

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

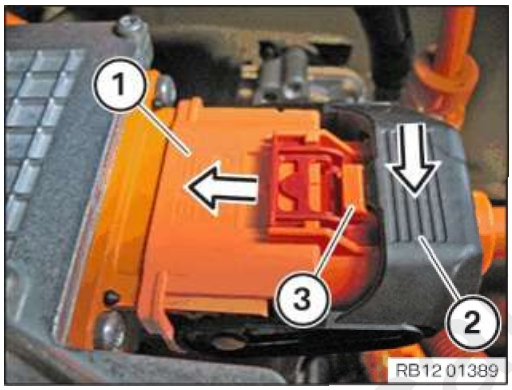
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Press lock (1).



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



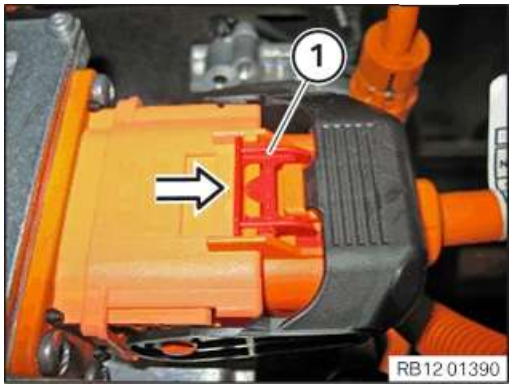
Connect the high-voltage connector to the high-voltage connection of the KLE:

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

Attention!

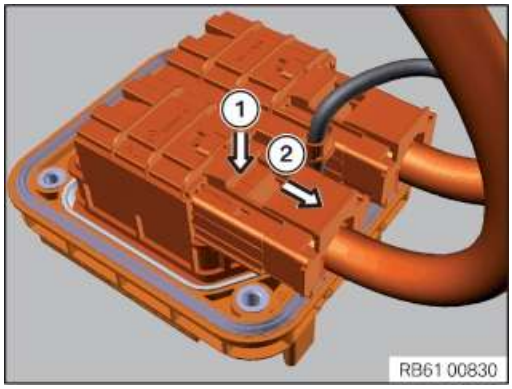
Lock (2) must snap audibly into place.

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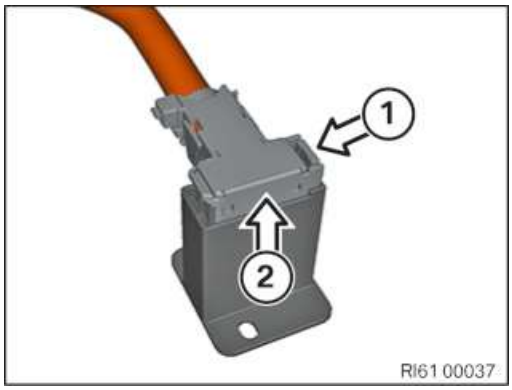
High-voltage connector on the high-voltage connection of the high-voltage battery unit:

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.



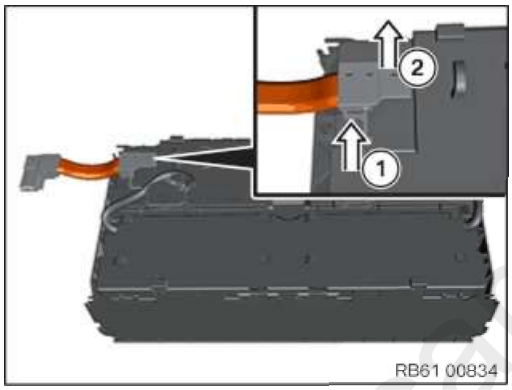
High-voltage connector on the cell module I01:

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



The following applies in general:

To avoid damage, observe the following notes:

- 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 components; 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 cable

- 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 cables

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

HSD cables

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

Fibre-optic cables:

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

Caution!

- 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 optical fibres

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 wheel arch, for example):

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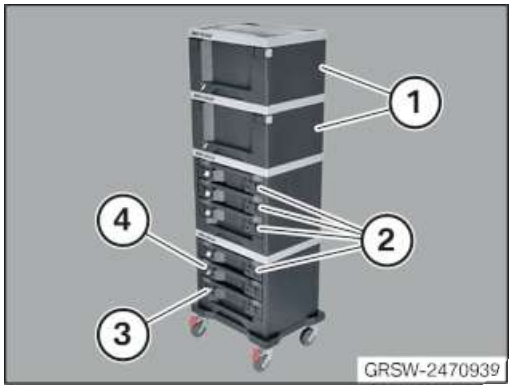
- Cut the additional socket housing and connect the lines to the vehicle-side wiring harness using a butt connector.
- **Using the additional socket housing is not permitted with a separation point outside the vehicle interior.**

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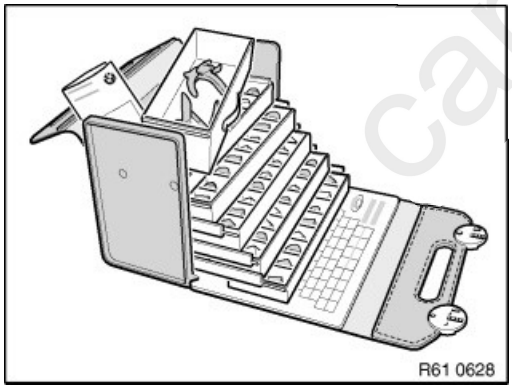
61 13 ... Special tools for wiring harness repairs

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100
- 61 4 320
- 61 0 200
- 61 0 210
- 61 0 220
- 61 0 230
- 61 0 240



Wiring harness repair case 4.0



Repair range, vehicle electrical system:

Single parts for wiring harness repairs*

* Sourcing reference: BMW Parts Department

Note:

- Refer to Service Information:
  SI 2 04 07 341

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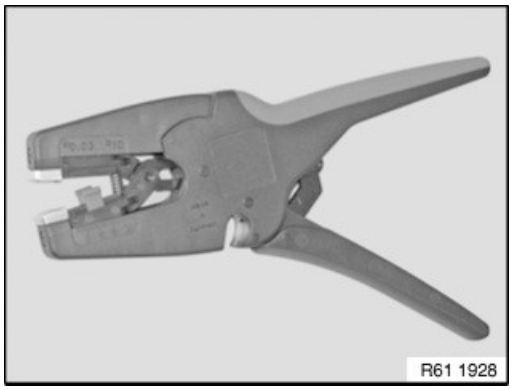


Release and press-out tool:

- Special tool 61 0 300
- Special tool 61 0 400 (MINI N12/N14)
- Special tool 61 1 100 (combustion engine)

Handling:

- Notes for opening contacts and locks of different connector contact systems



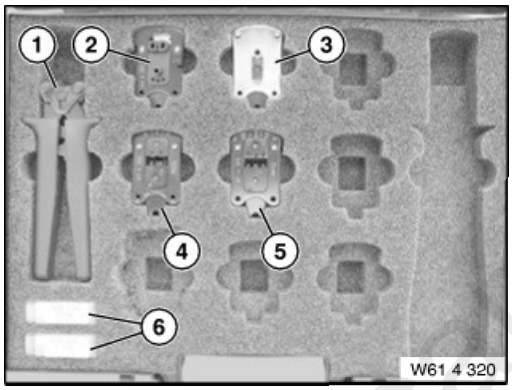
Cutting to length and stripping insulation from cables:

Wire stripper MultiStrip10*

*Sourcing reference BMW Workshop Equipment Catalogue

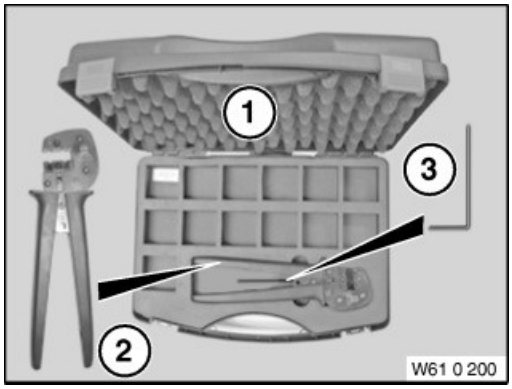
Handling:

- Cutting cables to length and strip insulation



Crimping stop parts (small contacts) and butt connectors:

- Special tool 61 4 320
  1. Tool without crimping head
  2. Crimping head (stripping insulation and cutting fibre-optic cables to length)
  3. Crimping head (crimping fibre-optic cable contacts)
  4. Crimping head (crimping MQS contacts)
  5. Crimping head (crimping MPQ contacts)
  6. Replacement blade (face-cutting fibre-optic cables)
  7. Replacement blade with tool (insulation stripping unit)
  8. Universal crimping head (SI 2 04 06 293)



Crimping stop parts (large contacts) and butt connectors:

- Special tool 61 0 200 (crimping kit)
- Special tool 61 0 210 (matrix set SLK 8)
- Special tool 61 0 220 (matrix set SLK 2.8)
- Special tool 61 0 230 (matrix set MAK 8 / DFK4)
- Special tool 61 0 240 (butt connector 4.0 - 6.0 mm²)

Handling:

- Refer to Service Information:
  SI 2 02 05 194
  SI 2 07 05 233

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61 12 ... Information on intelligent battery sensor (IBS)

Notice! Do not connect the charger to the 12 V charging socket

The 12 V charging socket is supplied with voltage by the rear power distribution box via relay. This relay drops out after terminal 15 OFF. This means that a trickle charger connected at the 12 V charging socket will be disconnected from the battery. Only charge the battery via the jump start terminal point. Only then can the voltage supply be registered by the vehicle.

Warning! Danger of destruction in event of mechanical strain

- Do not introduce any additional connections at the battery negative terminal.
- Do not modify the grounding cable. The ground cable also serves heat dissipation.
- Do not establish any connection between the IBS and the sensor screw.
- Do not use force when disconnecting the pole shoe from the battery terminal:
  - Do not pull on the ground cable.
  - Do not place any tools under the IBS to lever off the pole shoe.
- Do not use IBS connections as levers.
- Use a torque wrench and set tightening torque in accordance with repair instructions.
- Do not release or tighten down sensor screw (Torx screw).
- Avoid contact between IBS and ground.

Warning! Danger of destruction to IBS and wiring upon battery replacement

- The IBS and wiring can be destroyed by mechanical strain upon battery replacement. Therefore avoid mechanical strain.
- The size (capacity) of the battery required for the car is coded in the Car Access System (CAS).
- Use the battery size (capacity) installed as standard upon battery replacement.
- Recode the Car Access System (CAS) when installing a battery with a different capacity.
- Register battery replacement via Service functions in diagnosis system.
- Delete fault code entries in the Digital Engine Electronics (DME) associated with battery replacement.
- Always proceed in accordance with the repair instructions.

Note: Battery draining possible in spite of the intelligent battery sensor IBS being fault-free.

- A battery can be drained (e.g. with lights or radio switched on) even when the IBS functions perfectly in conjunction with power management.
- **For this reason, only exchange the IBS when there is a corresponding fault code entry!**

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61 12 002 Replacing positive battery cable (safety battery terminal) (From battery to rear B+ power distribution box)

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

2 – Removing the safety battery terminal

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

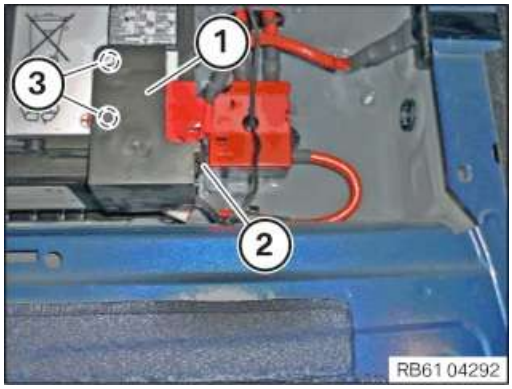
RISK OF DAMAGE

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

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

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

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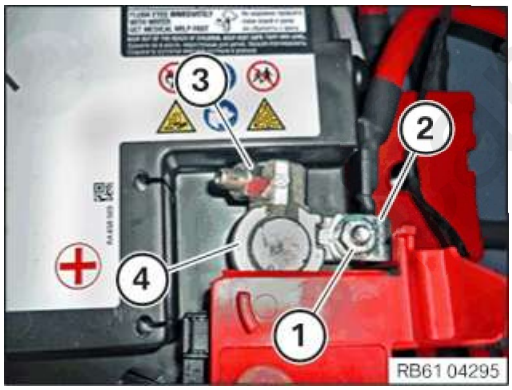
- Release latch mechanism (2) of the protective cap (1).
- Feed out the protective cap (1) upwards from the guides (3) and remove it.



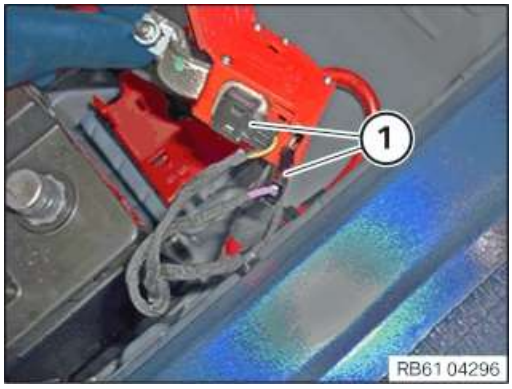
- Remove the cover for the positive battery terminal (1).



- Pull off the protective cap (1) in an upwards direction.

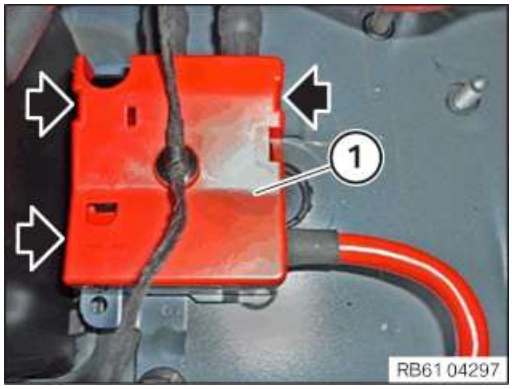


- Release the nut (1) and place the positive battery cable (2) to the side.
- Release the nut (3) and remove the safety battery terminal (4).

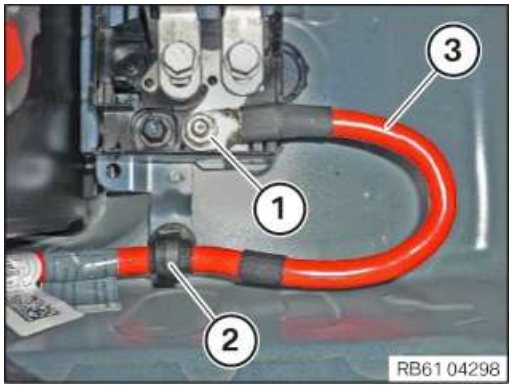


- Unlock plug connections (1) and disconnect.

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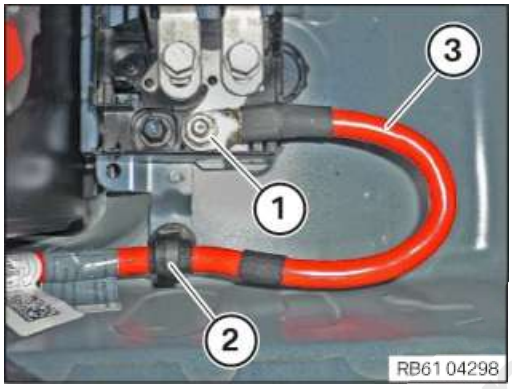


- Unclip the cover (1) (arrows) and remove it.



- Loosen nut (1).
- Unclip clip (2).
- Remove positive battery cable (3).

3 – Installing the safety battery terminal

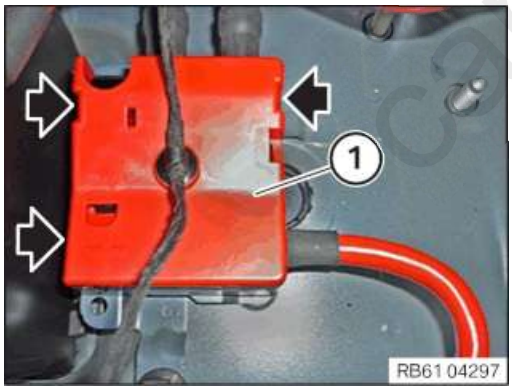


- Position the positive battery cable (3) on the power distribution box.
- Tighten nut (1).

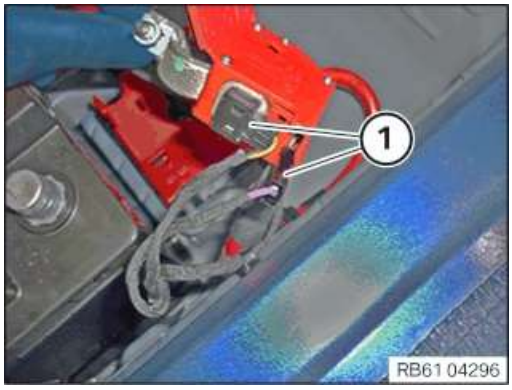
Positive battery cable to power distribution box

Flange nutM8	Tightening torque	15 Nm

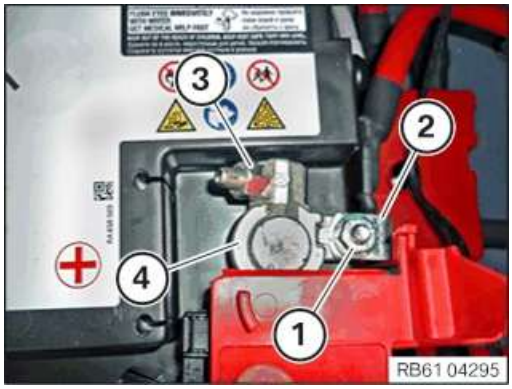
- Clip in clip (2).



- Position the cover (1) and clip it in (arrows).



- Connect connectors (1) and lock.



- Position the safety battery terminal (4) on the positive battery terminal.
- Tighten nut (3).

Positive battery terminal to battery

Nut		Tightening torque	5 Nm

- Position the positive battery cable (2) on the safety battery terminal.
- Tighten nut (1).

Positive battery cable to safety battery terminal

Flange nutM8		Tightening torque	15 Nm



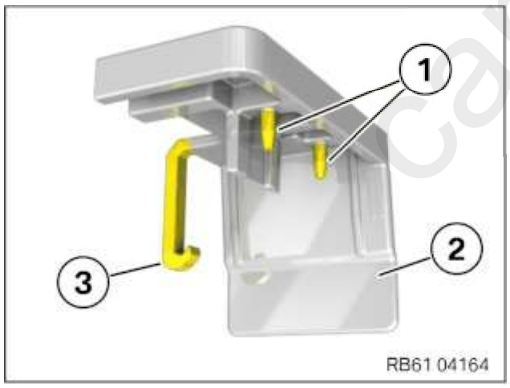
- Connect protective cap (1).



- Close the positive terminal cover (1).

Check

- Check guides (1) and latch mechanism (3) on protective cap (2) for damage.



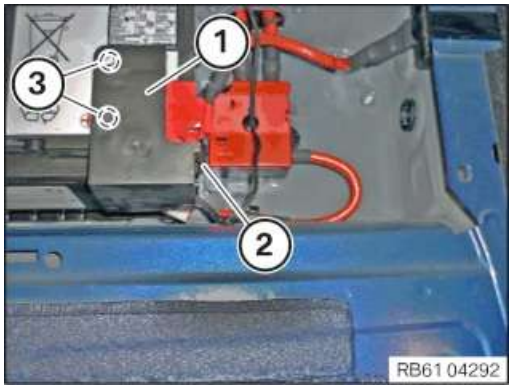
Result

» The guides (1) or the latch mechanism (3) are damaged.

Measure

- Renew protective cap (2).

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- Insert guides (3) of protective cap into the associated openings on the positive battery terminal.
- Clip in protective cap (1) with latch mechanism (2).

POSTPROCESSES

4 – Connecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Positive battery cable to power distribution box			Used in step 3
Flange nutM8		Tightening torque	15 Nm

Positive battery terminal to battery			Used in step 3
Nut		Tightening torque	5 Nm

Positive battery cable to safety battery terminal			Used in step 3
Flange nutM8		Tightening torque	15 Nm

Links

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14

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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14

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61 12 013 Replacing the battery earth lead

PRELIMINARY WORK

1 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

2 – Disconnecting all battery earth leads



- See additional information.

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MAIN WORK

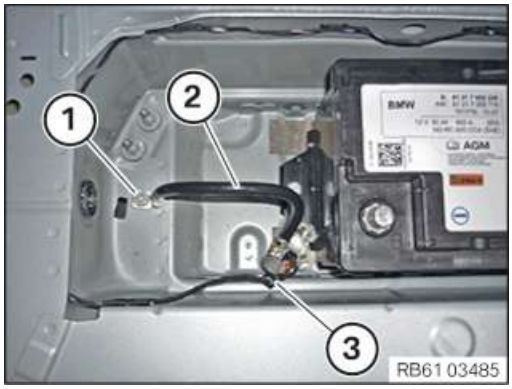
3 – Remove battery earth lead

WARNING

Deactivation of the 12 V vehicle electrical system.

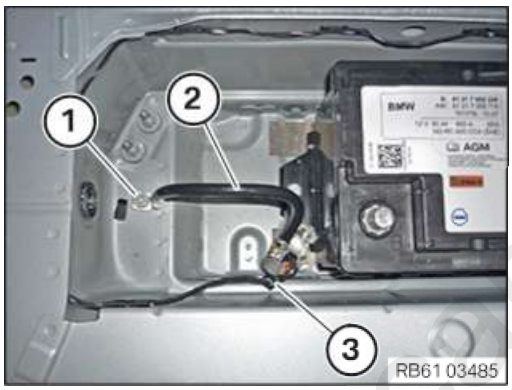
Risk of short circuits! Risk of fire!

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



- Unlock plug connection (3) and disconnect.
- Loosen nut (1).
- Remove the negative battery cable (2).

4 – Install battery earth lead



- Position the negative battery cable (2).
- Tighten nut (1).

Battery earth lead to body

Flange nutM8		Tightening torque	15 Nm

- Connect connectors (3) and lock.

POSTPROCESSES

5 – Connecting all battery earth leads



- See additional information.

6 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

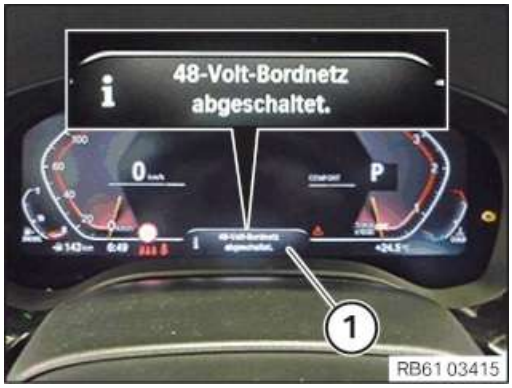
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.

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

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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

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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

Additional Information

Overview of Tightening Torques

Negative battery cable to 48-V battery			Used in step 1
Nut M8		Tightening torque	19 Nm

Battery earth lead to body			Used in step 4
Flange nutM8		Tightening torque	15 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	16

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25

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61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
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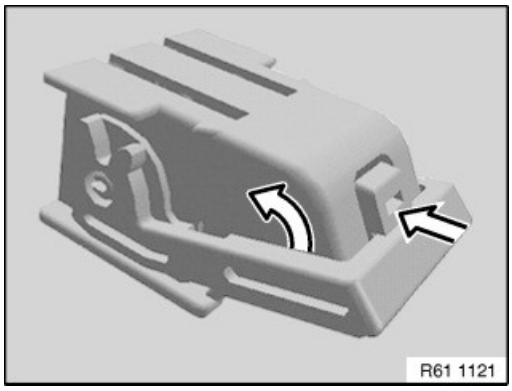
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61 13 ... Unlocking and disconnecting different plug connections

Note:
The document describes unlocking and disconnecting different types of plug connections.

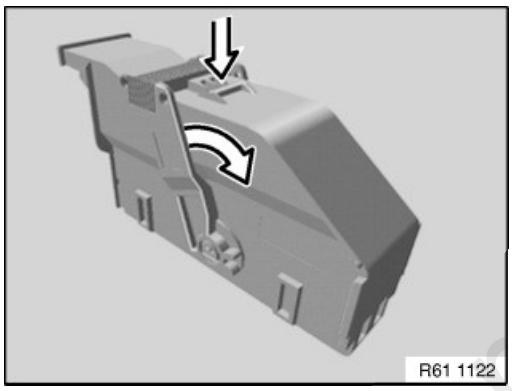
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

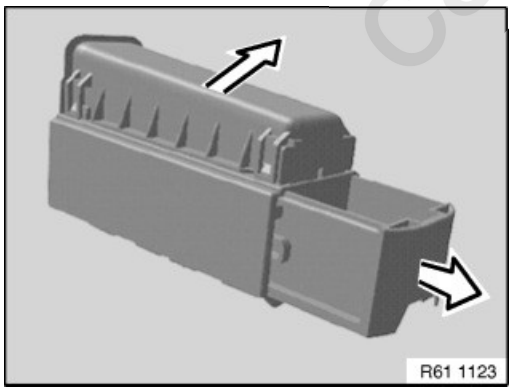
Disconnect plug connection.



2.

Press lock and open release clip in direction of arrow.

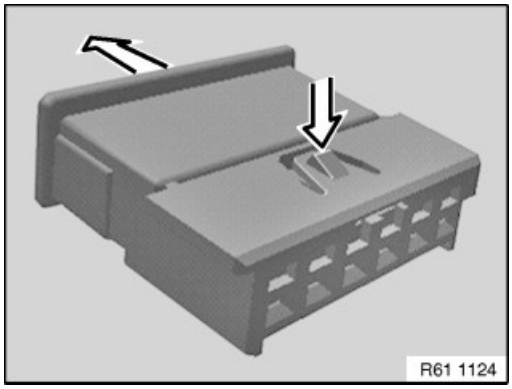
Disconnect plug connection.



3.

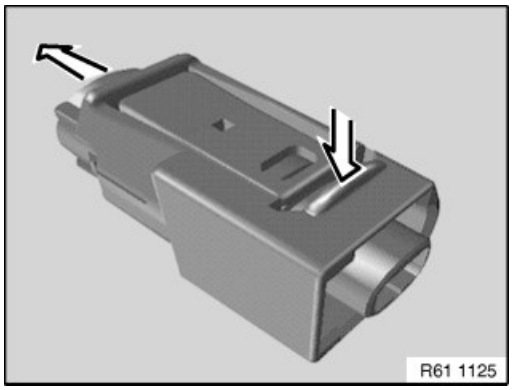
Open release clip in direction of arrow and disconnect plug connection in direction of arrow.

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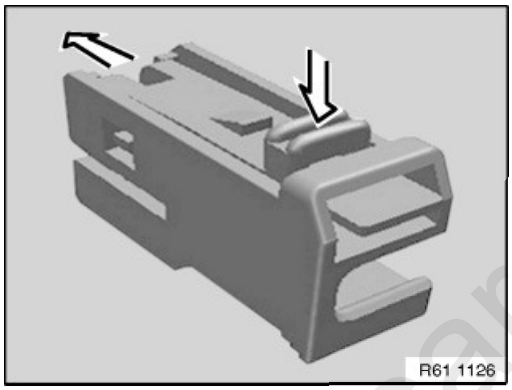
4.

Press lock and disconnect plug connection in direction of arrow.



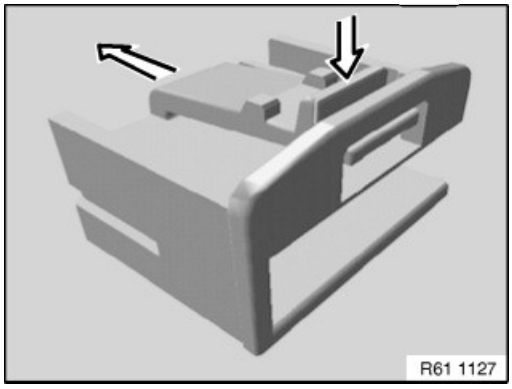
5.

Press lock and disconnect plug connection in direction of arrow.



6.

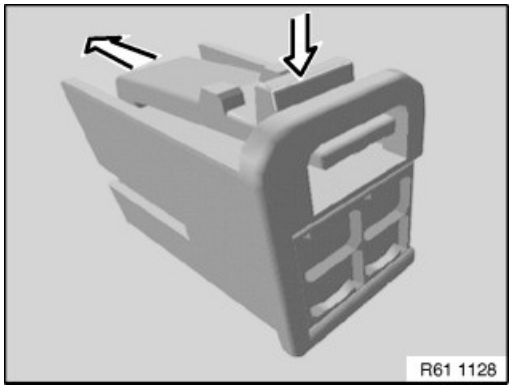
Press lock and disconnect plug connection in direction of arrow.



7.

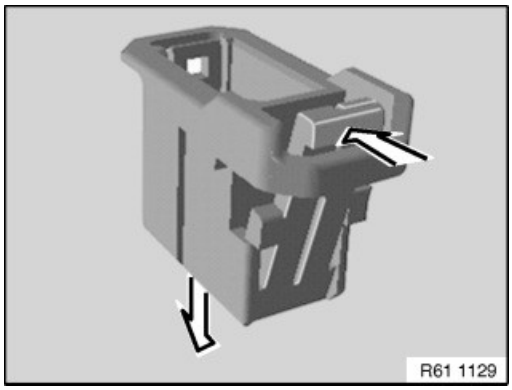
Press lock and disconnect plug connection in direction of arrow.

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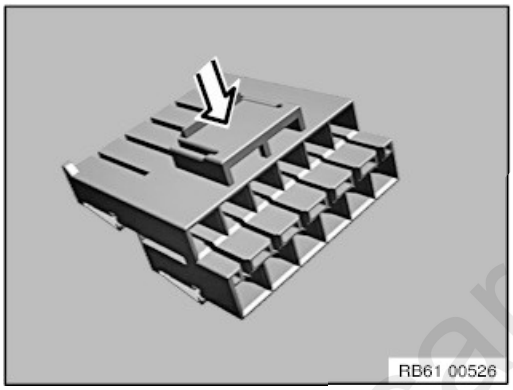
8.

Press lock and disconnect plug connection in direction of arrow.



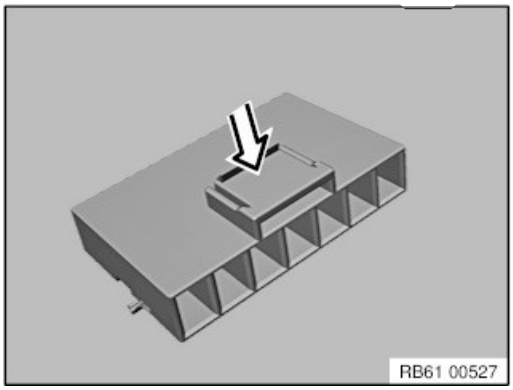
9.

Press lock and disconnect plug connection in direction of arrow.



10.

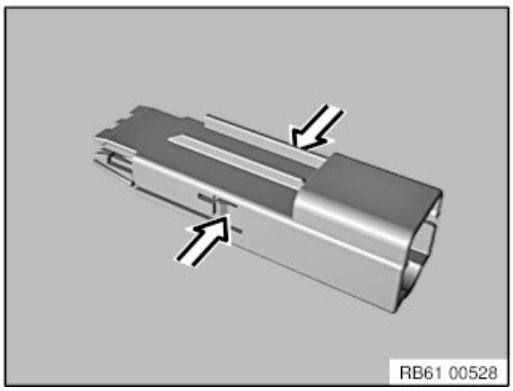
Press the lock and detach plug connection.



11.

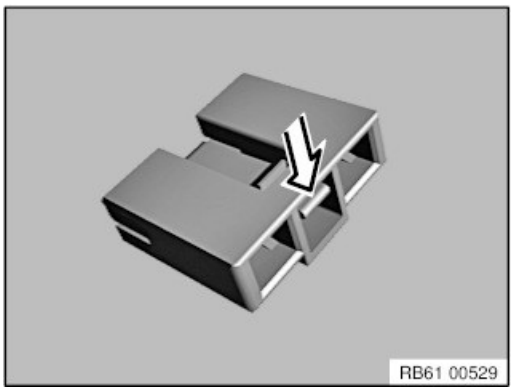
Press the lock and detach plug connection.

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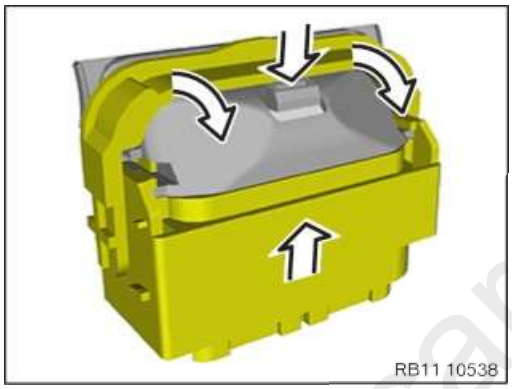
12.

Press the lock on both sides and detach plug connection.



13.

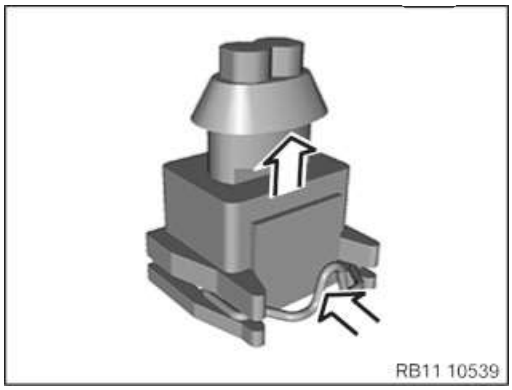
Press the lock and detach plug connection.



14.

Press lock and open release clip in direction of arrow.

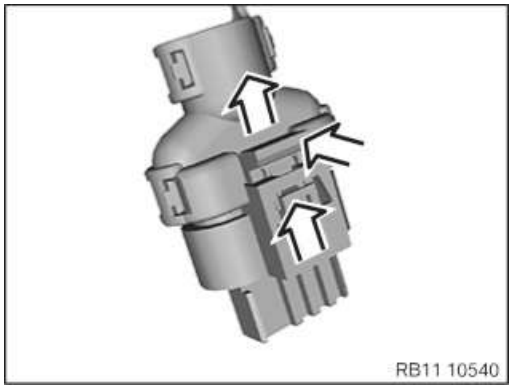
Disconnect plug connection.



15.

Press the lock and detach plug connection.

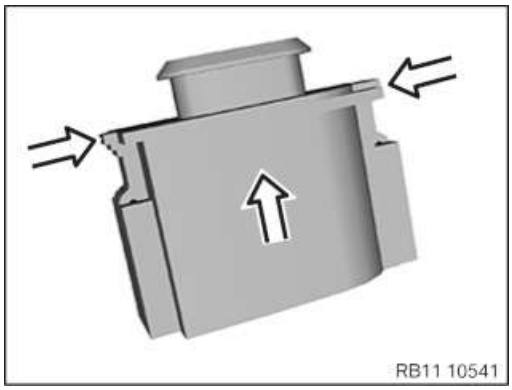
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16.

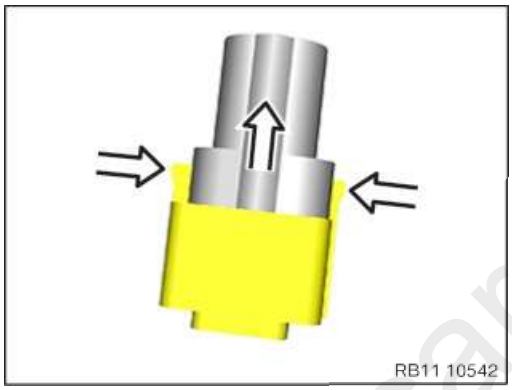
Pull out lock and press.

Disconnect plug connection.



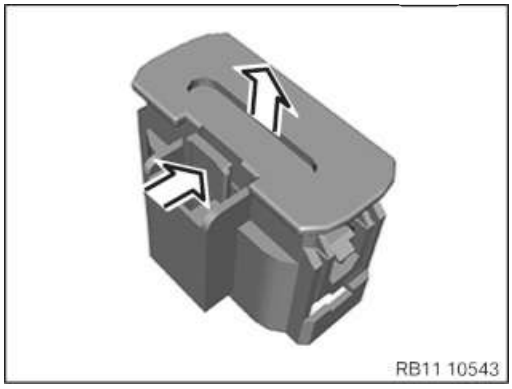
17.

Press the lock and detach plug connection.



18.

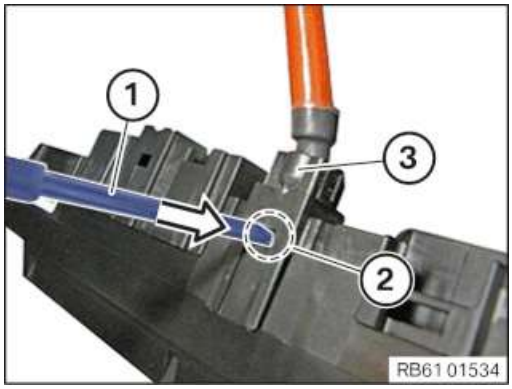
Press the lock and detach plug connection.



19.

Press the lock and detach plug connection.

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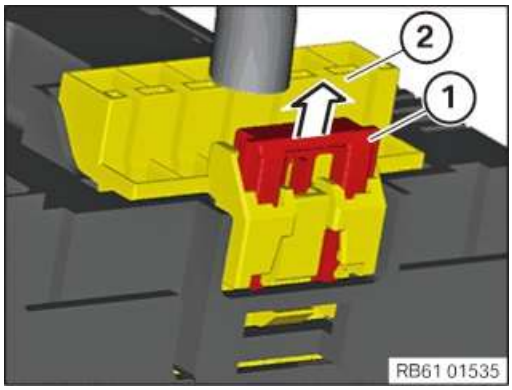


20.

Plug connection, e.g. on the power distribution box:

Press into the opening (2) using a suitable tool (1).

Pull off plug connection (3) upwards.



21.

Plug connection, e.g. on the power distribution box:

Lift lock (1) with a suitable tool.

Pull off plug connection (2) upwards.



22.

Vibration resistant high power engine contacts:

Caution!

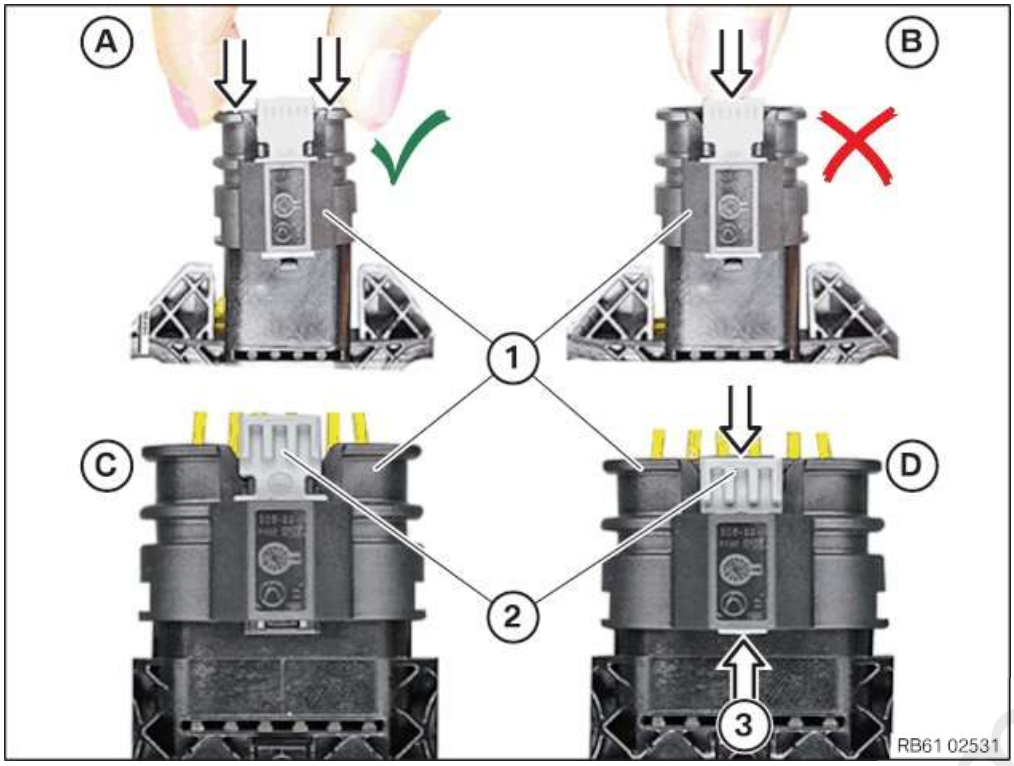
For this connector type, increased forces come into play when disconnecting and closing.

Disconnect:

Pull out lock (1) downward in direction of arrow first.

Then press lock (1) down in direction of arrow and pull off connector.

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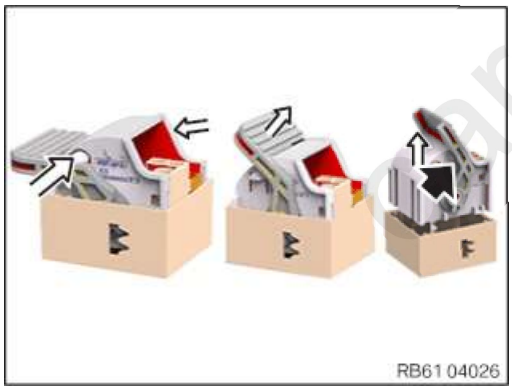


23.

Close:

A. Press the connector (1) down at the points indicated by the arrow **until it reaches the end position**
B. **Do** not press the connector (1) further than the lock
C. Connector (1) is in the end position, but lock (2) is not yet locked
D. Press lock (2) down in the direction of the arrow until the tip of lock (2) is visible at point (3)

Unlock / lock front light combination plug connection & replace housing after damage:

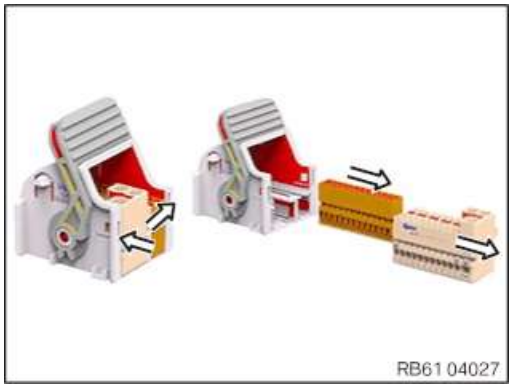


24.

Press in locking lever at both sides until the lever is unlocked and can be moved.

Move lever upwards until it latches into place in the end position.

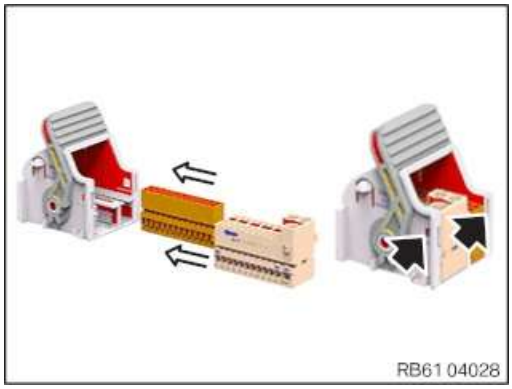
Once the lever is locked in the end position, remove plug connection upwards.



Unlock socket housing by lifting up each of the locking tabs.

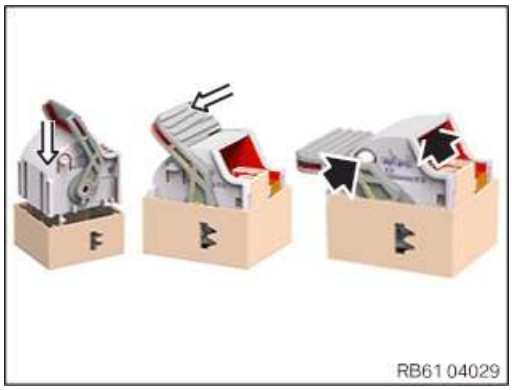
Slide out after unlocking the socket housing.

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Slide in socket housing up to limit position.

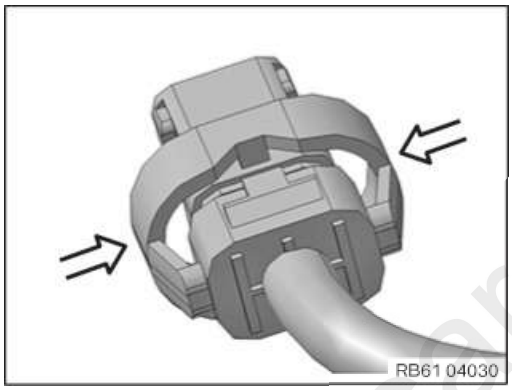
Lock socket housing into place in end position.



Sliding in up to limit position.

Activate plug-inn procedure by moving lever downwards.

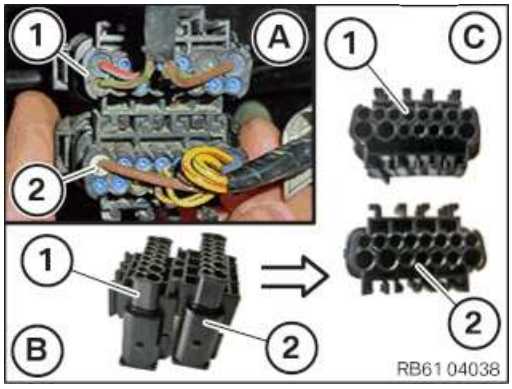
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.



25.

Rosenberger D4S20G-400A5-Y

Press to unlock on both sides.

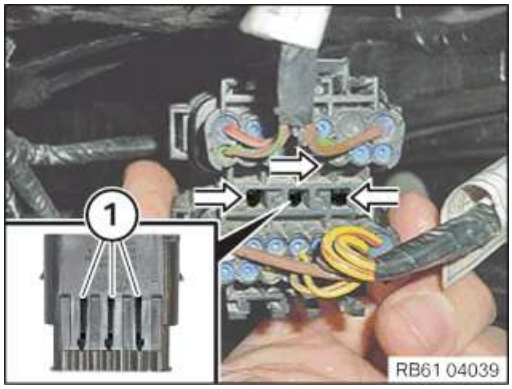


26.

Pin housing, 15-pinMLK1

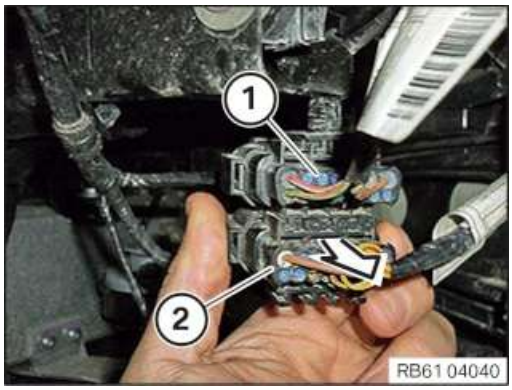
- A & B. To avoid any damage to individual connectors, the given connector assembly consisting of several individual connectors (1) & (2) must be released before disconnecting the plug connection.
- C: released connector assembly

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Disconnecting connector assembly:

Release retaining hooks (1) in direction of arrow (detail image shows retaining hooks of individual connector).



Release connector (2) in direction of arrow from connector (1).

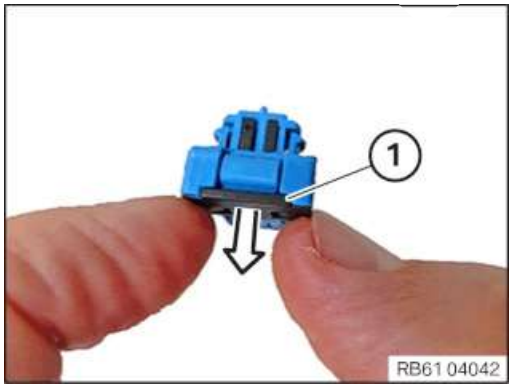


27.

Airbag ignition circuit connector

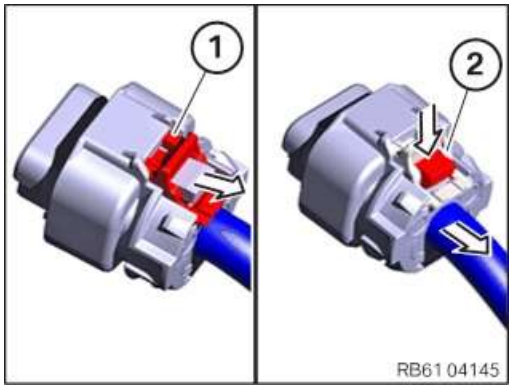
Warning!

Note the safety information for working on vehicles with airbag systems prior to disconnecting the plug connection.



Pull the cap (1) in the direction of the arrow to unlock

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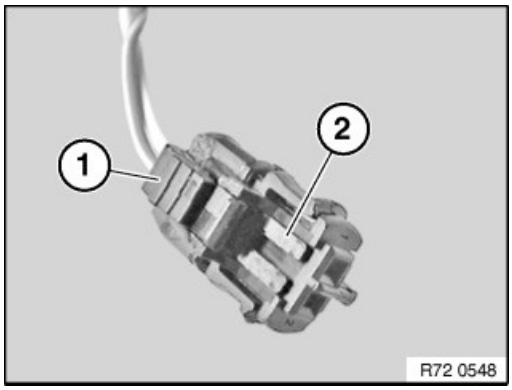


28.

Connector e.g. on front and rear lighting unit

Open safety catch (1) in direction of arrow using appropriate tool.

Push safety catch (2) in direction of arrow and disconnect plug connection.



29.

Plug, e.g. in airbag ignition circuits

Press the lock (1) and pull out the connector (2) up to initial engagement position.

Pull off connector (2).

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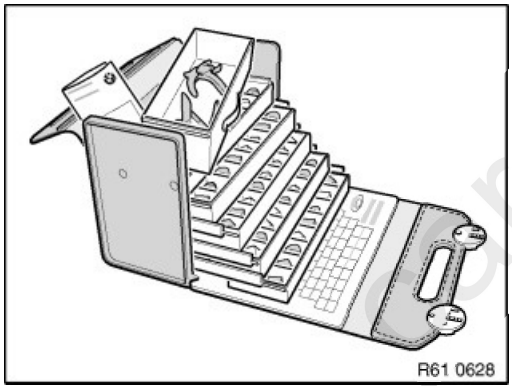
61 13 ... Butt connector for repairing a plug connection

Special tools required:

- 61 0 300
- 61 4 340
- 61 0 240

Caution!

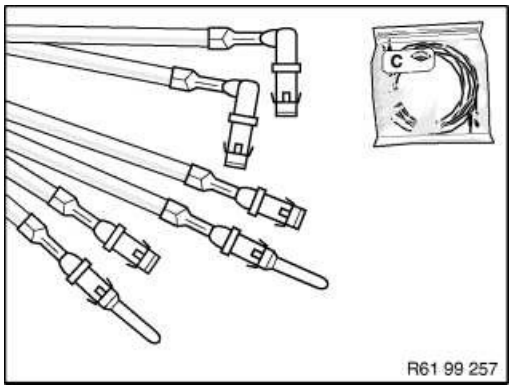
1. Identify cause of damage (e.g. sharp-edged body components, faulty electrical loads, jammed mechanisms, corrosion caused by ingress of water, etc.).
2. Reading out the fault memory
3. Eliminate cause of damage.
4. Disconnect battery negative terminal
5. Make sure that no safety-related system according to circuit diagram (e.g. antilock braking system, active rear-axle kinematics, airbags, etc.) are influenced. Otherwise replace faulty wiring harness or use repair cable (sourcing reference: BMW Parts Department)
6. Carry out function test and read out fault memories again
7. Eliminate new faults if applicable and clear fault memories



Note:
The repair range IV for vehicle electrical system contained the required special tools and individual parts for retrofitting and repair work with the aid of fan connectors.

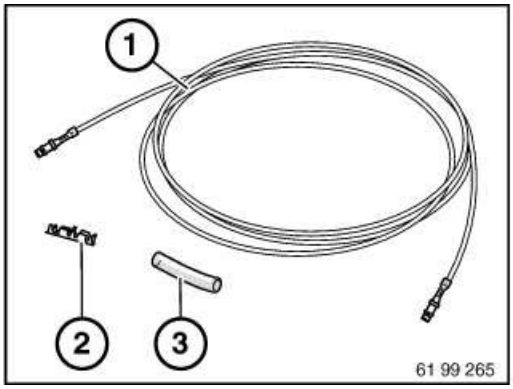
The case can no longer be ordered. Order individual parts for wiring harness repair through BMW Parts Department.

- Refer to Service Information:
  SI 02 04 07 341



Choose repair kit.

Example: Repair kit, circular connector system D 2.5.

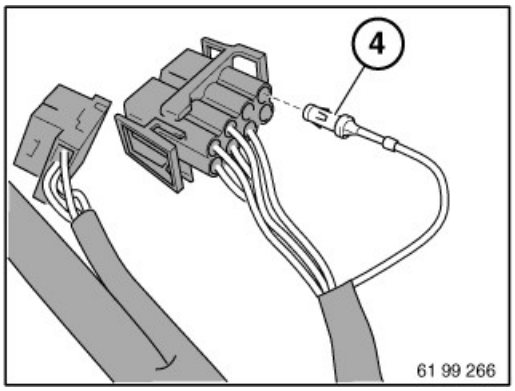


Remove following parts:

(1) Pre-packaged end of cable with requisite wire cross-section

(2) Crimp connector for selected wire cross-section

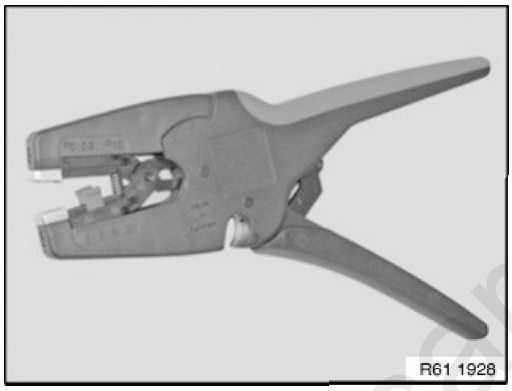
(3) Shrink-fit hose



Open secondary lock on housing.

Mark damaged contact (4) with socket number of housing and press it out of housing using appropriate special tool contained in special tool set 61 0 300).

See repair instructions
Notes for opening contacts and locks of different plug contact systems.



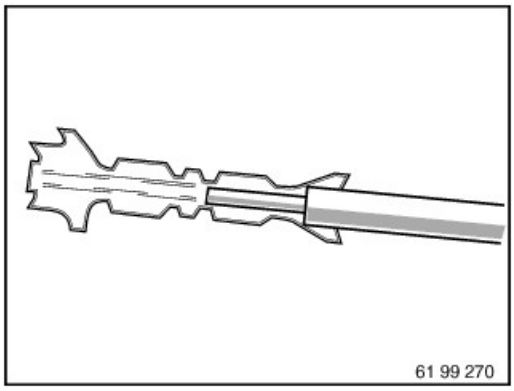
Caution!

- Check maximum length of repair cable
- If more than one wire is to be repaired, the individual interfaces must be offset so that the wiring harness is not too thick at the repaired point.

Adhere to following procedure:

- Cut off wire with faulty contact at point which is easily accessible
- Strip insulation from end of wire at wiring harness end
- Cut preassembled wire end to length and strip insulation

Refer also to repair instruction:
Cutting to length and stripping insulation from cables



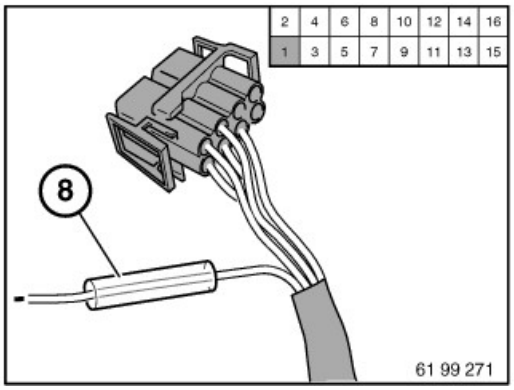
Crimp butt connector on preassembled wire end.

Special tools:

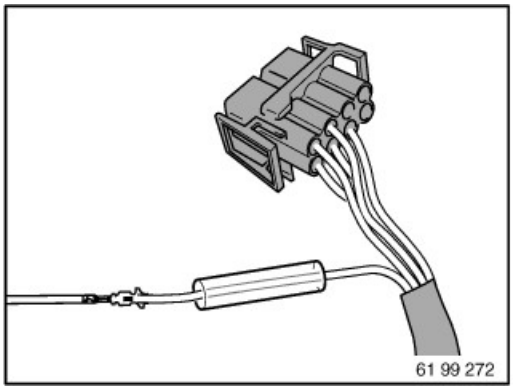
- 61 4 340 (0.35 - 2.5 sq mm)
- 61 0 240 (4.0 - 6.0 sq mm)

See repair instructions
Crimping on stop parts

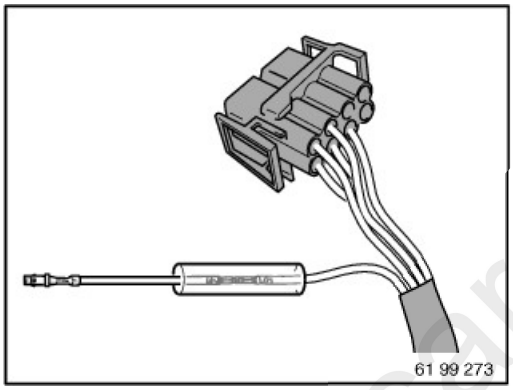
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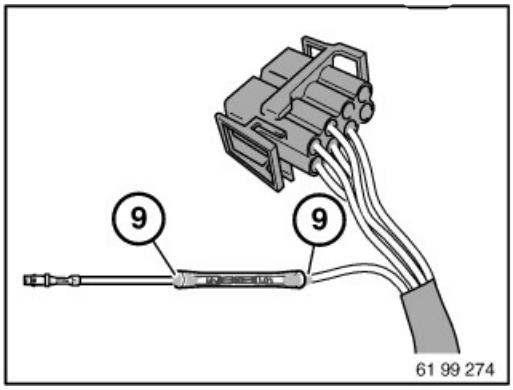
Push shrink-fit hose (8) onto free wire end.



Crimp unused wire end to butt connector.



Pull shrink-on sleeve over butt connector.



Caution!

Do not burn shrink-on sleeve.

With hot air blower, shrink the shrink-on sleeve on both sides (9) of shrink-fit hose until glue emerges uniformly all round.

Insert contact in housing.

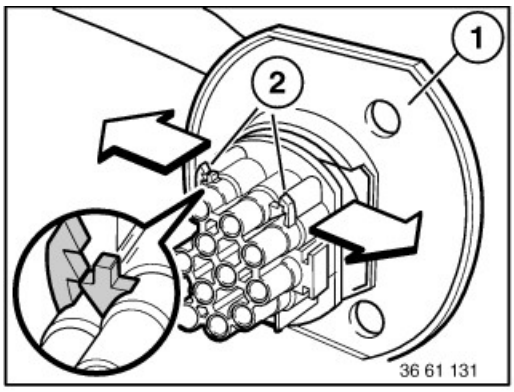
Close secondary lock on housing.

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61 13 ... Circular connector, 13-pin, system D2.5

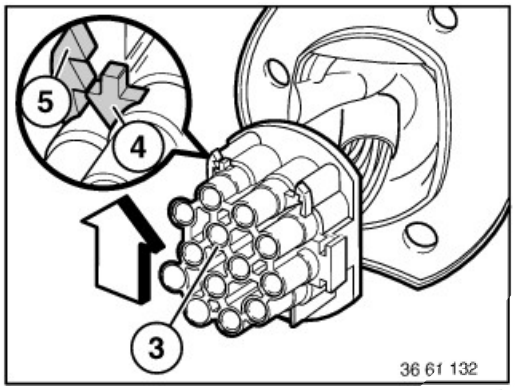
Special tools required:

- 61 0 303

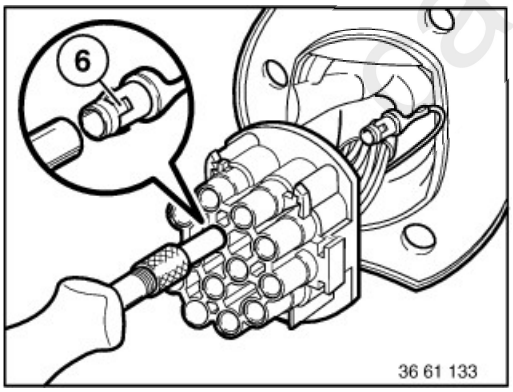


Pull off rubber grommet (1).

Carefully pull out lock (2) in direction of arrow.



Move lower section of connector (3) in direction of arrow until retaining lugs (4) snap into release groove (5).



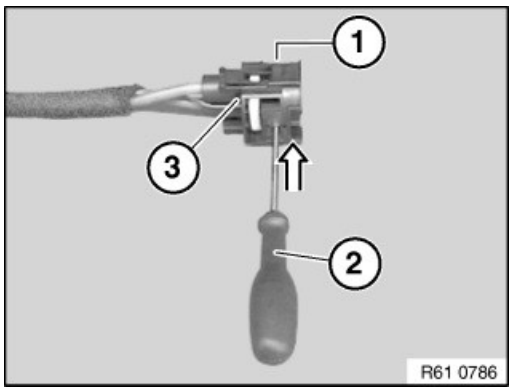
With special tool 61 0 303 , press down retaining lugs (6) of corresponding contact and pull out cable.

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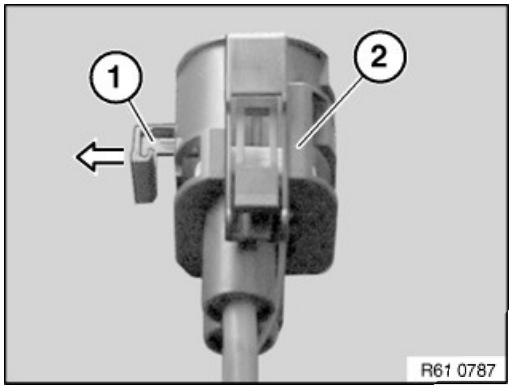
61 13 ... Connector housing, LCC contact (load current contact)

Special tools required:

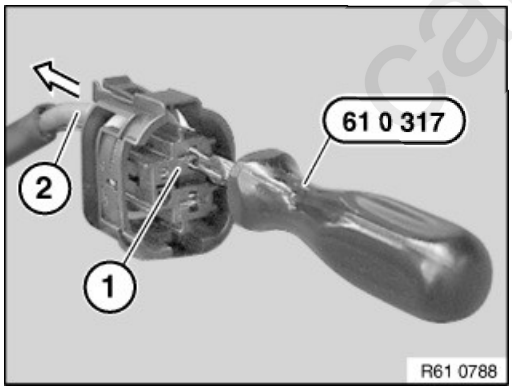
- 61 0 317



Socket housing:
Press lock (1) with suitable tool (2) in direction of arrow out of socket housing (3).

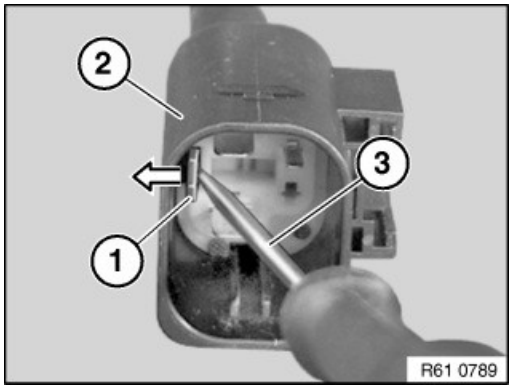


Pull lock (1) out of socket housing (2).

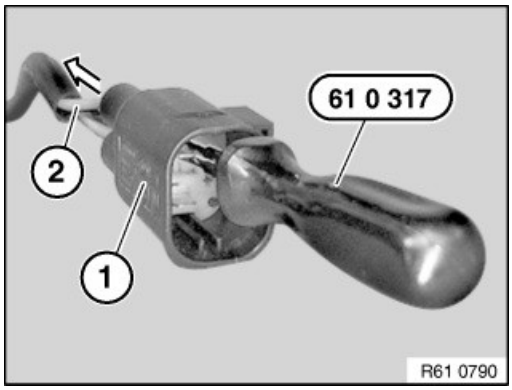


Insert special tool 61 0 317 into socket housing (1) and pull out wiring with LCC contact (2) in direction of arrow.

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Pin housing:
Unlock locking slide (1) of pin housing (2) with suitable tool (3) in direction of arrow.



Insert special tool 61 0 317 into pin housing (1) and pull out wiring with LCC contact (2) in direction of arrow.

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61 13 ... Crimping annular contacts



Special tools required:

- 61 4 320



Crimping annular contacts:

Special tool61 4 320

Handling:

Refer to Service Information:

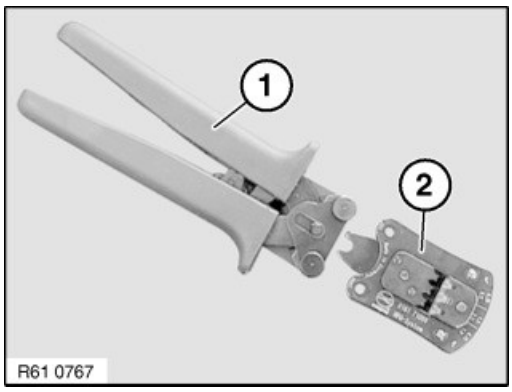
- SI 2 04 06 2939

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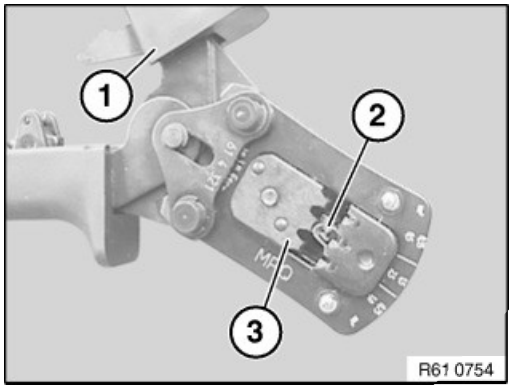
61 13 ... Crimping Micro Power Quadlock contacts (MPQ)

Special tools required:

- 61 4 320



To crimp MPQ contacts, use hand pliers 61 4 321 (1) in conjunction with crimping head 61 4 325 (2) from crimping set 61 4 320 .*Note:*
Hand pliers (1) open automatically until limit position when handles are pressed together.

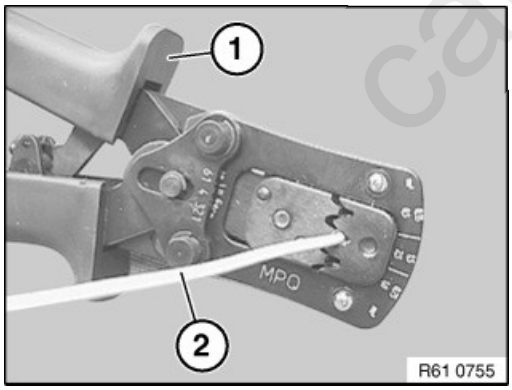


Open hand pliers (1).

Note:
Place contact (2) with utmost care in designated nest (observe line cross-section) in crimping head (3). Make sure it is exactly positioned.

Place MPQ contact (2) in crimping head (3).

Close hand pliers (1) one notch.



Note:
Follow procedure for cutting and stripping insulation from cables.

Insert stripped cable (2).

Close hand pliers (1) fully.

Open hand pliers (1) and remove cable (2).

Important!

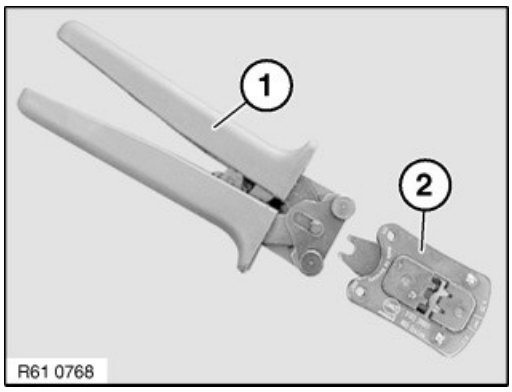
Check contact for correct crimping.

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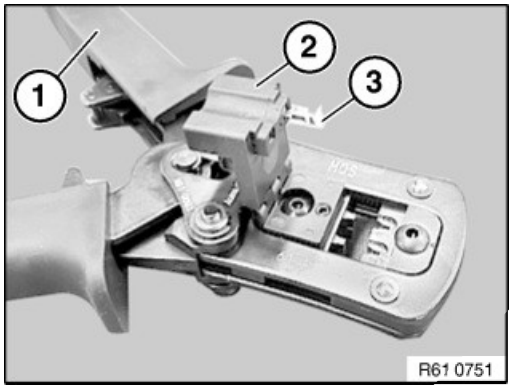
61 13 ... Crimping Micro Quadlock System contacts (MQS)

Special tools required:

- 61 4 320



To crimp MPQ contacts, use hand pliers 61 4 321 (1) in conjunction with crimping head 61 4 324 (2) from crimping set 61 4 320 .*Note:*
Hand pliers (1) open automatically until limit position when handles are pressed together.

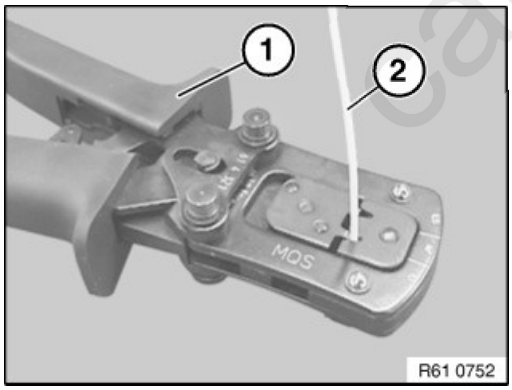


Open hand pliers (1).

Fold up contact carrier (2).

Insert MQS contact (3) in contact carrier (2).

Fold back contact carrier (2).



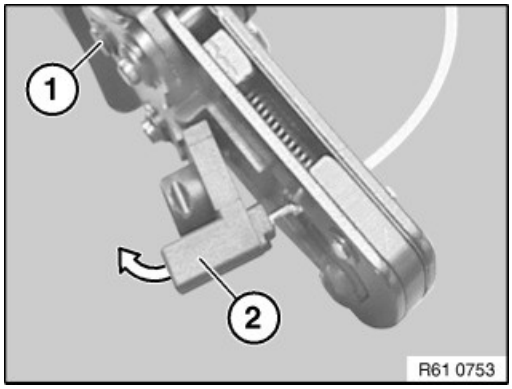
Note:
Follow procedure for cutting and stripping insulation from cables.

Close hand pliers (1) one notch.

Insert stripped cable (2).

Close hand pliers (1) fully.

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Open hand pliers (1).

Open contact carrier (2) gently and carefully remove MQS contact.

Important!

Check contact for correct crimping.

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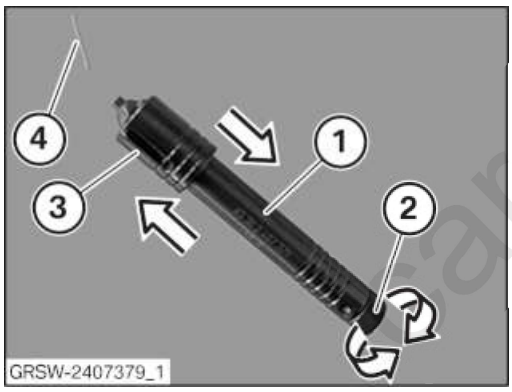
61 13 ... Crimping of NanoMQS contacts (MQS)

Special tools required:

- 2 407 379
- 2 407 378
- 0 496 833
- 0 494 159
- 0 496 849
- 0 494 158



Order number: 83 30 2 407 379 *Note:*
The storage location must be selected individually.



Application of tool to strip insulation

Using a tool, the cable with following cross-section can be stripped:

- 0.13 mm² - 0.17 mm²
- 0.22 mm² - 0.50 mm²

The enclosed operating instructions include instructions for the use of the tool.



Matrix

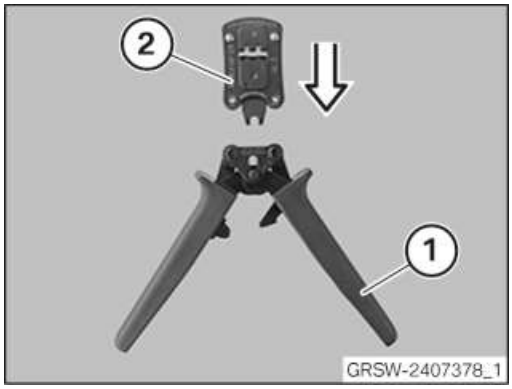
Order number: 83 30 2 407 378

Note:
Insert the matrix so that the BMW part number of the matrix and handle are on the same side!

Storage location of the matrix is the case for tool sets (83 30 0 496 833).

Correct operation is imperative because the components are very small.

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Matrix and handle

1. Handle
2. Matrix

The enclosed operating instructions include instructions for the use of the crimping pliers.

Note:
Use the matrix only in combination with one of the two existing handles (83 30 0 494 159 or 80 30 0 496 849) from tool kits (83 30 0 494 158 or 83 30 0 496 833).

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61 13 ... Cutting to length and stripping insulation from cables



Special tools required:

- 12 1 080
- 12 1 081
- 12 1 083
- 2 221 122
- 0 494 159
- 0 496 849
- 0 496 833
- 2 407 379
- 61 4 320
- 61 4 340
- 61 0 210
- 61 0 220
- 61 0 230



Spare parts for vehicle electronics (housing and contacts):

See Service Information 2 04 07 341



Use insulation strippers to cut and strip insulation of cables 2 221 122 .
Stripped length:

Wire cross-section (mm2)	Stripped length (mm)
0,35 ... 0,50	4.0
0,75 ... 1,00	4.5
1,00 ... 2,50	5.0



1. Crimping of NanoMQS stops (only G11; G12)

Crimping of NanoMQS contacts (MQS).

- Special tool handle 0 494 159 or 0 496 849
- Special tool matrix 0 496 833
- Stripping tool 2 407 379

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2. Crimping of stops up to 2.5 mm ^{2}

Crimping Micro Quadlock System contacts (MQS).

- Special tool 61 4 320

Crimping Micro Power Quadlock contacts (MPQ).

- Special tool 61 4 320

Crimping miscellaneous stops up to 2.5 mm^2

- Special tool 61 4 340

3. Crimping of stops from 2.5 mm ^{2}

Crimping load current contacts (LSK 8).

- Special tool 61 0 210

Crimping load current contact 2.8.

- Special tool 61 0 220

Crimping double spring contact (DFK 40)

Crimping MAK 8

- Special tool 61 0 230
- Refer to Service Information 2 07 05 233

4. Crimping butt connectors and contact sleeves for comb connectors up to 2.5 mm ^{2}

Refer to Service Information:

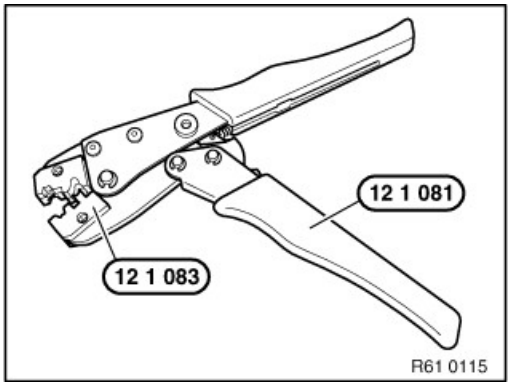
See Service Information 2 04 06 293

5. Crimping butt connectors and contact sleeves for comb connectors larger than 2.5 mm ^{2}

Refer to Service Information:

See Service Information 2 02 05 194

See Service Information 2 07 05 233



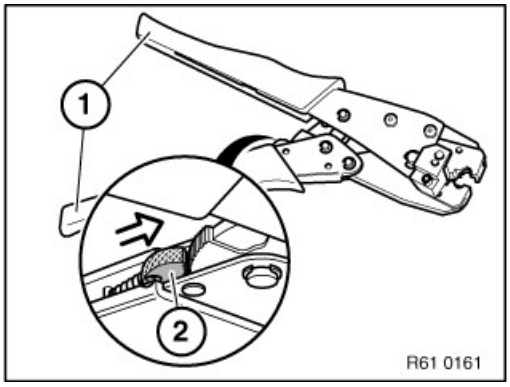
6. Crimping contact sleeves for 4 mm^2 comb connectors and ignition cable contacts

For connecting the ignition cable contacts and for crimping the 4 mm^2 contact sleeves for comb connectors, the special tool set 12 1 080 is used.

- 12 1 081 (hand pliers)
- 12 1 083 (nest)

See repair instructions
Special tools for wiring harness repairs.

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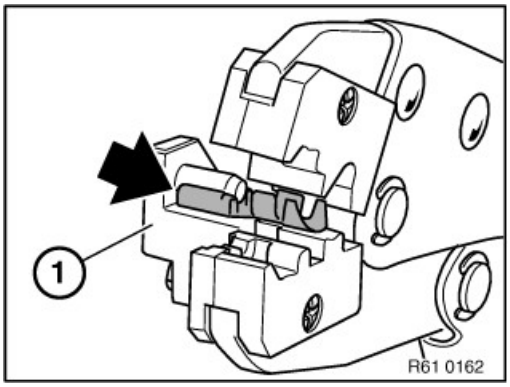


Unlock special tool 12 1 081 :

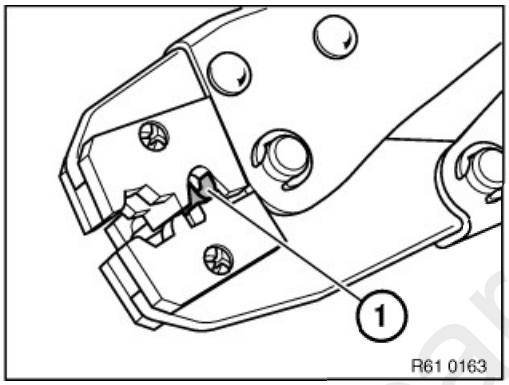
Squeeze grips (1) lightly and push release lever (2) in direction of arrow.

Or:

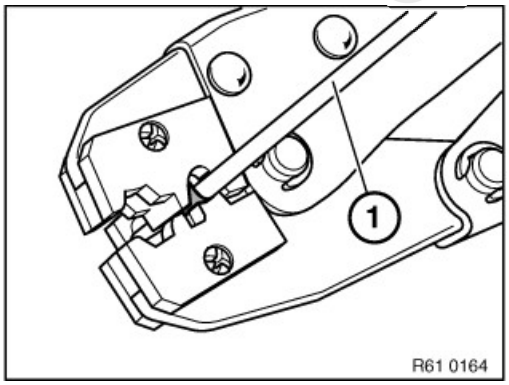
Compress handles until limit position, hand pliers unlock automatically.



Place 4 mm^2 contact sleeve in nest with anti-twist lock (1) up to the limit position.



Preload contact by squeezing matrix in crimping tool. Grip contact (1) firmly only, do not crimp.



Note:
Follow procedure for cutting and stripping insulation from cables.

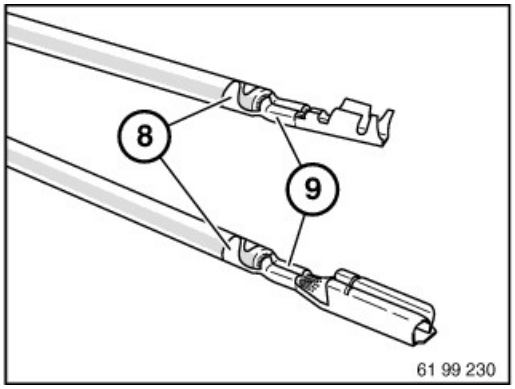
Insert stripped end of wire (7) in the contact. Ensure that the insulation and strip insulation wire end are correctly laid in contact.

Compress crimping tool to limit position.

Crimping tool unlocks automatically.

Take contact out of crimping tool.

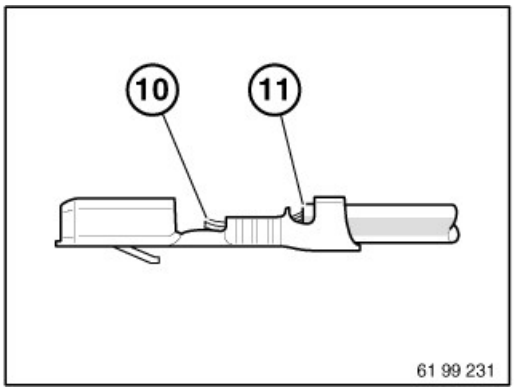
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7. Checking crimping

Check insulation crimping (8) and wire crimp (9) against following illustrations to ensure crimps are correctly located.

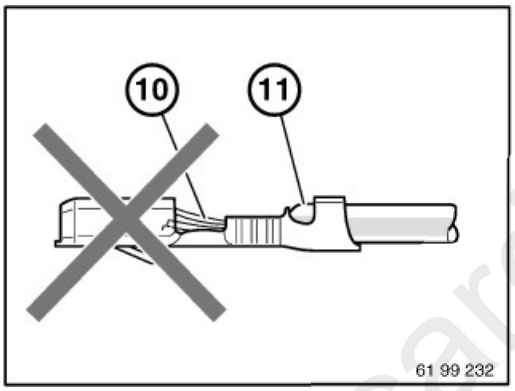
Note:
Illustration shows butt connectors and contact sleeves for comb connectors knocked on one side. The crimping procedure is identical here.



Correct crimping:

Visible conductor end (10).

Visible insulation end (11).

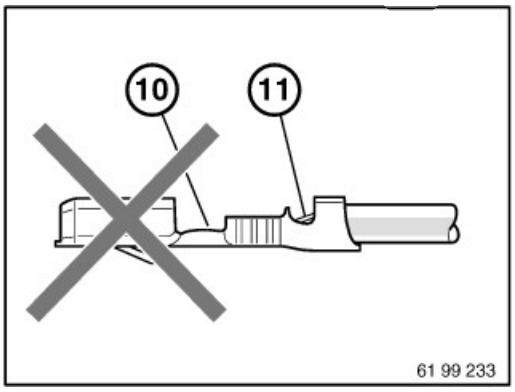


Incorrect crimping:

Conductor end (10) inserted too far.

Insulation end (11) in wire crimp.

If necessary, repeat crimping with a new contact.



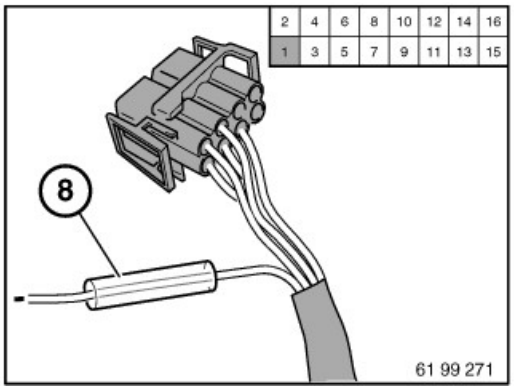
Incorrect crimping:

Conductor end (10) not visible.

Insulation end (11) not visible.

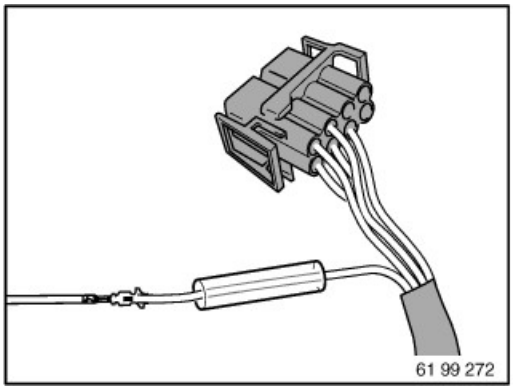
If necessary, repeat crimping with a new contact.

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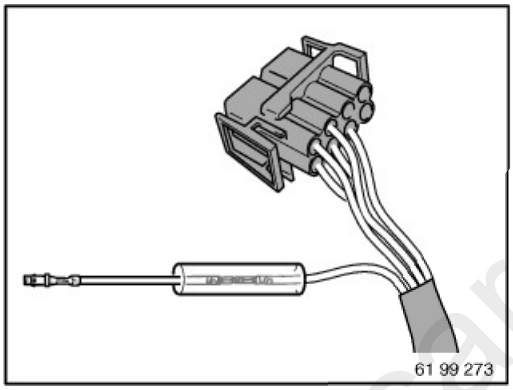


8. Insulating the crimp point with the heat-shrink tubing

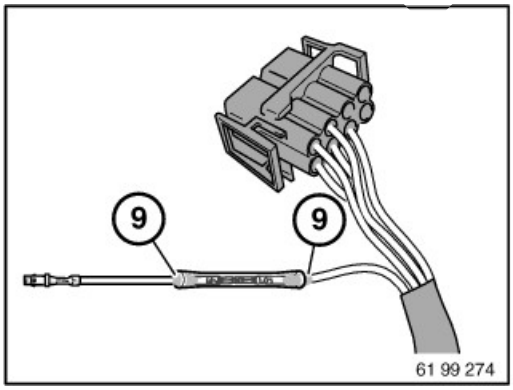
Push the heat-shrink tubing (8) onto the free wire end before crimping.



Crimp unused wire end using butt connector.



Position the heat-shrink tubing centrally over the butt connector.



Caution!

Do not burn shrink-on sleeve.

Mount the soldering shrink reflector on the hot air blower.

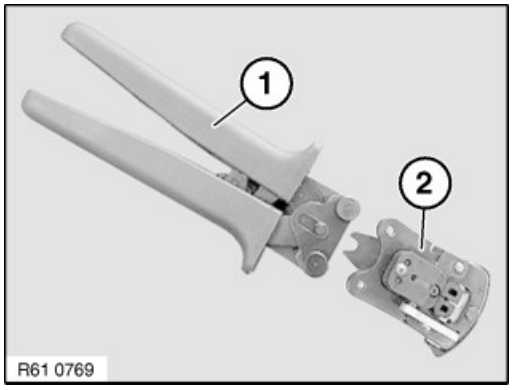
Using a hot air blower, shrink the heat-shrink tubing at 400°C until adhesive visibly escapes uniformly at both sides (9) of the heat-shrink tubing.

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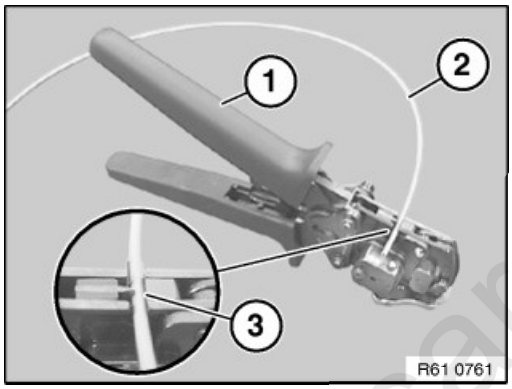
61 13 ... Cutting, strip insulation and crimping optical fibres

Special tools required:

- 61 4 321
- 61 4 329
- 61 4 320
- 61 4 323



The hand pliers 61 4 321 (1) in connection with the crimping head 61 4 329 (2) from crimp kit 61 4 320 are used for cutting, strip insulation and cutting optical fibres to size.*Note:*
Hand pliers (1) open automatically until limit position when handles are pressed together.

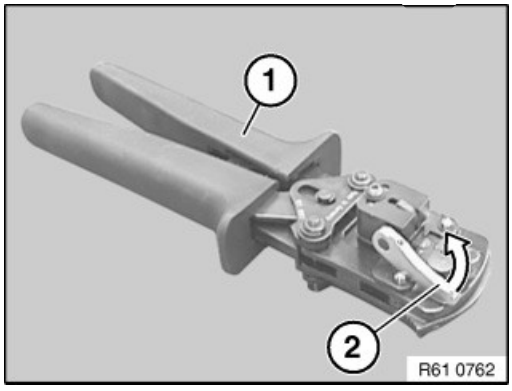


Cutting the optical fibre

Open hand pliers (1).

Place optical fibre (2) in cutting device (3).

Close pliers (1) and remove optical fibre (2).

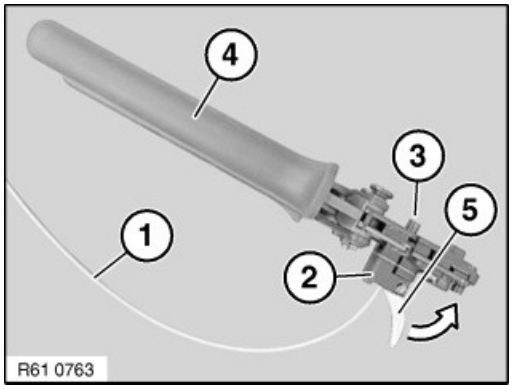


Stripping insulation from optical fibre

Open hand pliers (1).

Open lever (2) in direction of arrow.

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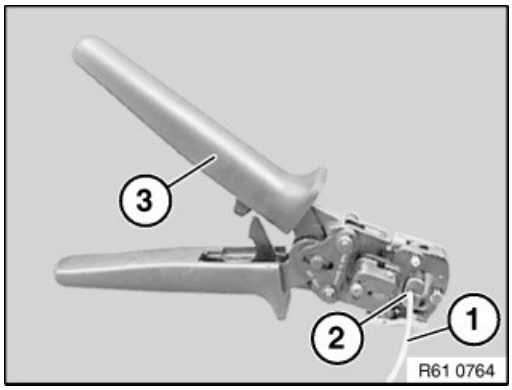
Push the optical fibre (1) into the strip insulation equipment (2) until it is flush in this area (3).

Close hand pliers (4) fully.

Close the operating lever (5) in the direction of the arrow.

Open hand pliers (4) by one tooth notch.

Re-open the operating lever (5) against the direction of the arrow and remove the optical fibre (1).



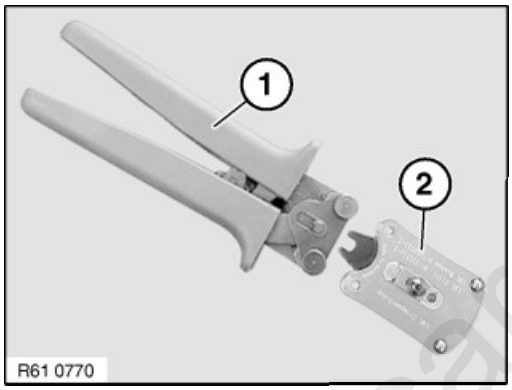
Cutting optical fibre to length

Open hand pliers (3).

Push the optical fibre (1) into the cutting equipment (2) until the insulation of the optical fibre (1) comes into contact with the clamping fixture.

Close hand pliers (3) fully and keep closed.

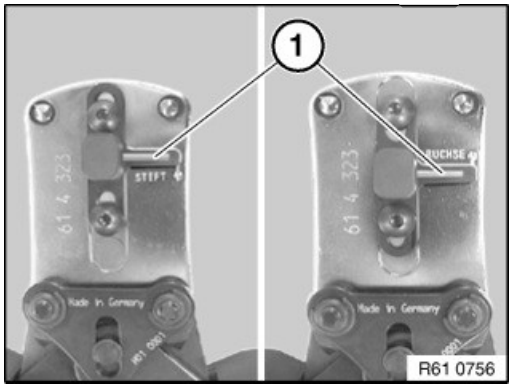
Remove optical fibre (1).



Crimp the optical fibre.

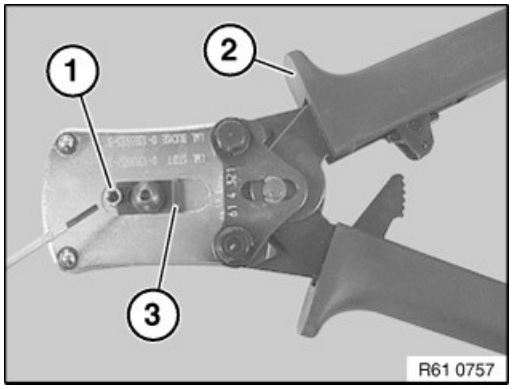
The hand pliers 61 4 321 (1) in connection with the crimping head 61 4 323 (2) from crimping kit 61 4 320 are used for cutting, strip insulation and cutting optical fibres to size.

Note:
Hand pliers (1) open automatically until limit position when handles are pressed together.



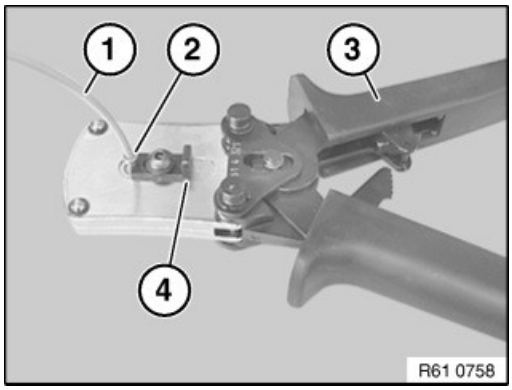
Move contact guide by means of stop lever (1) into corresponding position (pin contact or jack).

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Open hand pliers (2).

Place pin contact or jack (1) in crimping head and secure with locking lever (3).

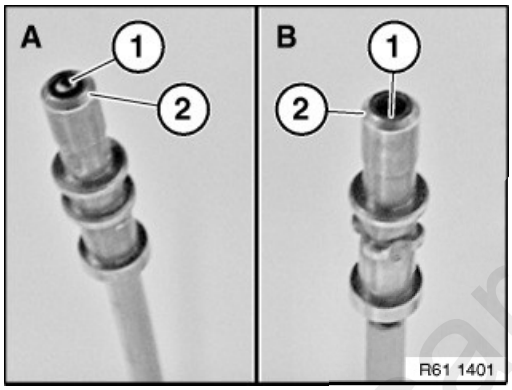


Insert stripped optical fibre(1) until limit position into pin contact or jack (2).

Close hand pliers (3) fully.

Open hand pliers (3) and locking lever (4).

Remove optical fibre (1).



Caution!

Make sure optical fibre is correctly seated in jack.

Right (A)

End of optical fibre (1) must be flush with tip of pin contact (2).

Wrong (B)

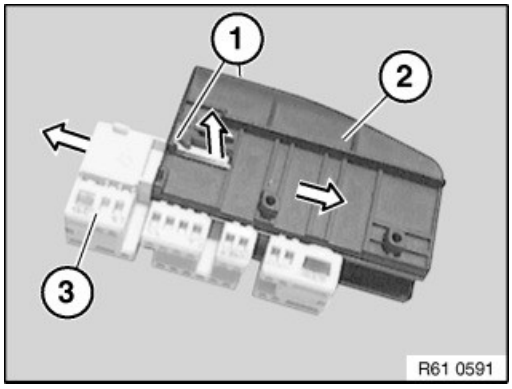
End of optical fibre (1) is not flush with tip of pin contact (2).

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61 13 ... In-line connectors, 24-/44-pin, Hybrid System MQS/MPQ

Manufactured by AMP: The following contact types without strand sealing can be fitted in the connector housings:

- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)

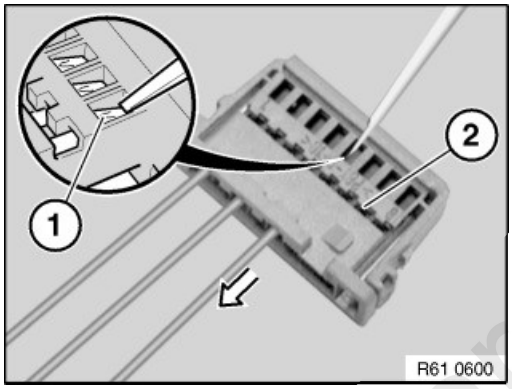


Socket housing:

Press locks (1) on protective cap (2) upwards on both sides.

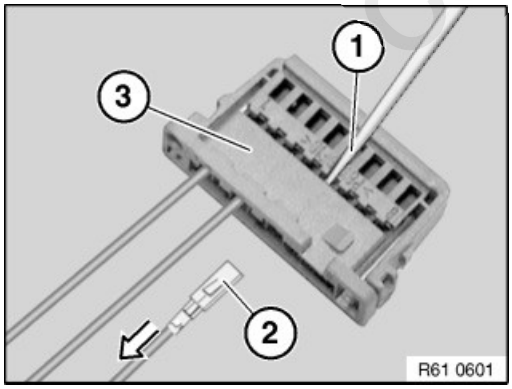
Detach protective cap from contact carrier (3).

Note:
Detaching the protective cap releases the secondary locks of the socket contacts.



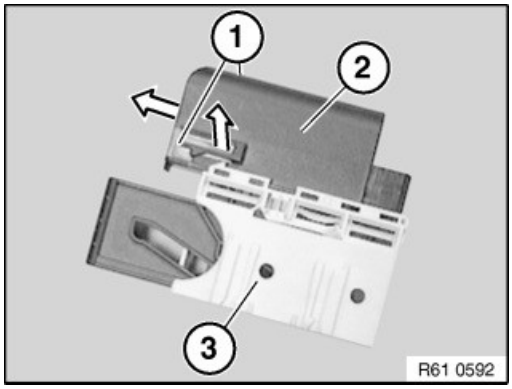
Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

Pull wire with socket contact in direction of arrow as far as secondary lock (2).



Hold down retaining hook in secondary lock (1) again and pull cable with socket contact (2) completely out of contact carrier (3).

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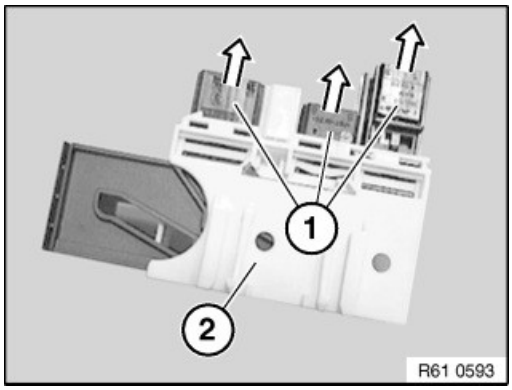


Pin housing:

Press locks (1) on protective cap (2) upwards on both sides.

Detach protective cap from housing carrier (3).

Note:
Detaching the protective cap releases the secondary locks of the pin contacts in the contact carriers.



Pull contact carrier (1) out of housing carrier (2).

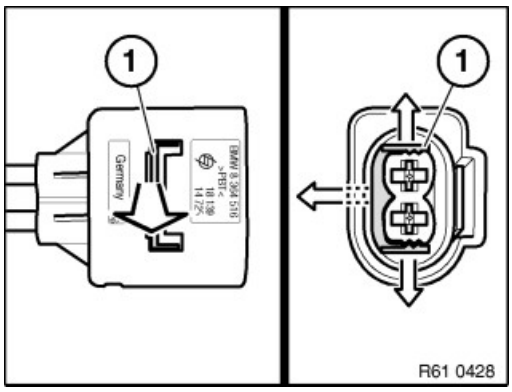
The pin contacts are pulled out of a contact carrier as described under ”Socket housing”.

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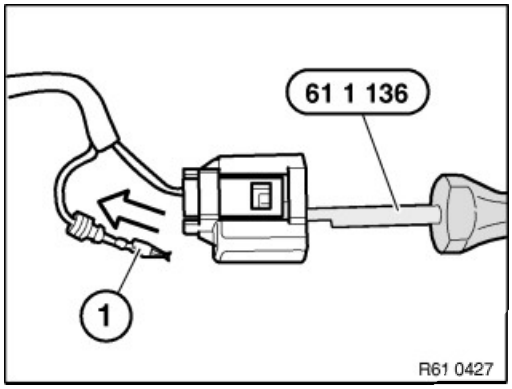
61 13 ... In-line plugs, 2-pin, System MDK 3 plus 2.8

Special tools required:

- 61 0 316



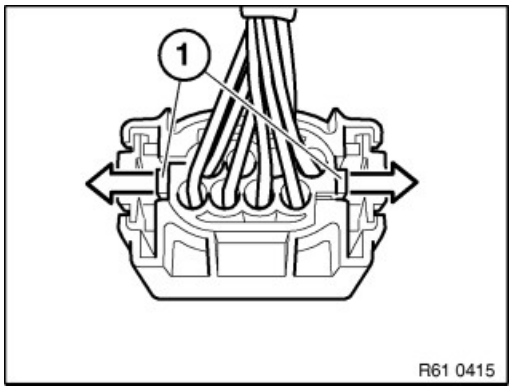
Unlock lock (1) on outside at retaining hook and slide out lock (1) to side.



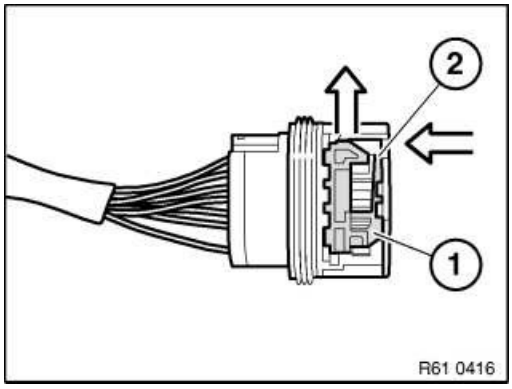
With special tool 61 0 316 (61 1 136), unlock contact and pull out cable with contact (1) towards rear.

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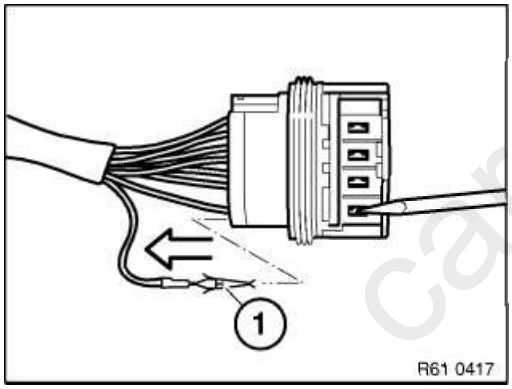
61 13 ... Inline connectors, 6-, 8-pin, System MQS



Press lock (1) in direction of arrow and slide connector forward.



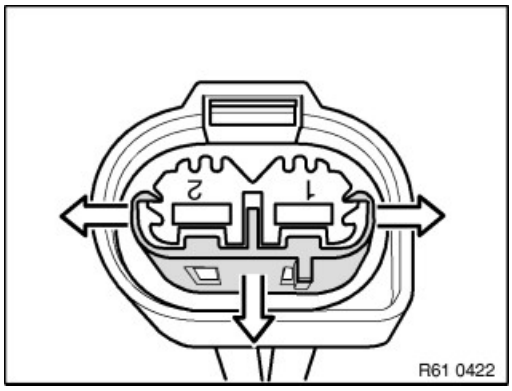
Press locking hook (2) downward and slide lock (1) out.



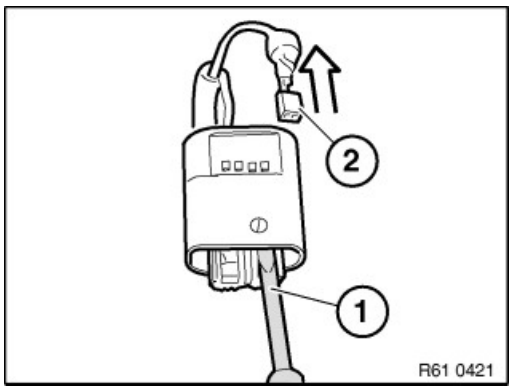
Press down retaining hook (1) with screwdriver and pull out cable with contact towards rear.

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61 13 ... Inline plugs, 2-pin, System MPQ 2.8



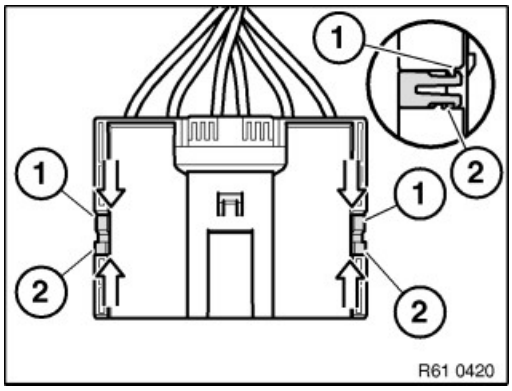
Press catch on outside in direction of arrow and remove towards top.



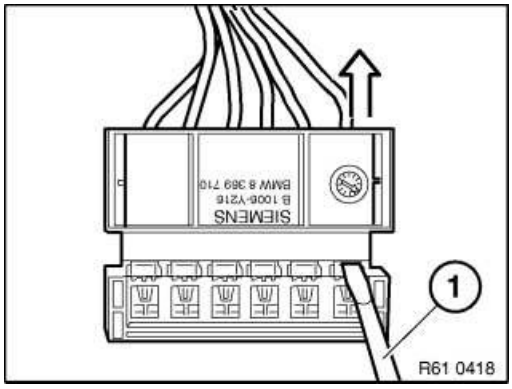
Press down retaining hook (1) with screwdriver and pull out cable and contact (2) towards rear.

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61 13 ... Inline plugs, 3-, 6-pin, System Elo-Power 2.8



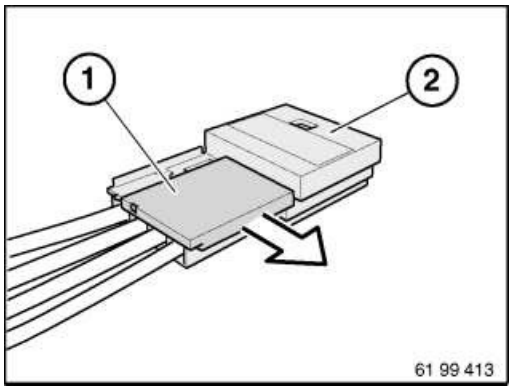
Press locking hook (1) in direction of arrow and disengage. Then unlock locking hook (2) and remove lock.



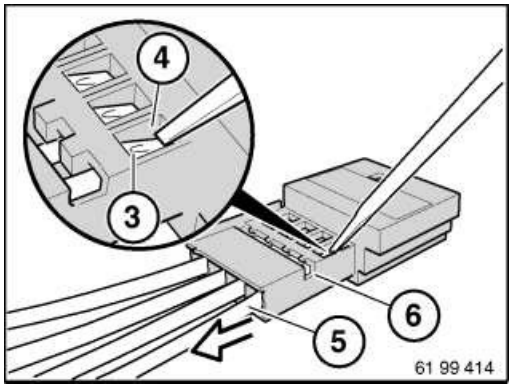
Press down retaining hook with screwdriver (1) and pull out cable with contact towards rear.

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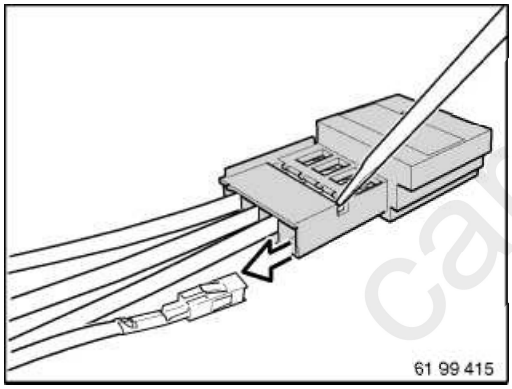
61 13 ... Inline plugs, 4-, 10-pin, System Elo



Detach fastener (1) from contact carrier (2).



Hold down retaining hook (3) of defective contact and pull cable and contact up to secondary lock (6).



Hold down retaining hook once again in secondary lock and pull cable and contact completely out of contact carrier.

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61 00 ... Notes on handling optical fibres



Important!

To avoid damage when handling optical fibres, comply with the following points:

- The minimum permitted bending radius is 25 mm
- Do not subject optical fibres to compressive and tensile load
- Protect optical fibres against the effects of heat ≥85 °C (e.g. during welding work, drying work with infrared beams or hot air blower)
- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables if necessary



Note:
The optical fibres are coloured differently as follows:

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

Follow notes for processing cables and optical fibres.

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



The following applies in general:

To avoid damage, observe the following notes:

- 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 components; 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 cable

- 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 cables

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

HSD cables

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

Fibre-optic cables:

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

Caution!

- 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 optical fibres

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 wheel arch, for example):

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- 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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61 00 ... Repairing airbag cables

Caution!

> **Only repair those cables which show visible signs of damage. In the event of visible damage, make sure there is only one cable repair in effect after the repair work. If no visible damage can be identified, the entire cable must be replaced. When carrying out repairs to the airbag wiring harness, you must use the spare parts offered in the Electronic Parts Catalogue (EPC).**

Safety regulations for handling components of airbag system.

Instructions for disconnecting and connecting battery.

In event of non-visible damage to wiring harness:

Disconnect plug connection on airbag module or on plug adapter. It is absolutely vital to disconnect the contacts in succession as there is a risk of mixing up (similar parts)! Cut through one cable after the other at an appropriate position, do not under any circumstances cut through both cables at the same time. Insulate cables remaining in wiring harness with insulating tape. Now disconnect the plug connection from the airbag control unit. Unpin contacts. Cut through one cable after the other at an appropriate position and insulate with insulating tape, do not under any circumstances cut through both cables at the same time. Pin the contacts of the repair cable for the airbag control unit into the control-unit connector, the allocation of the repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead. Now pin the contacts for the airbag module or the contacts of the plug adapter, the allocation of the repair cables is relevant. Cut off excess length of repair cable in proximity (visible area) of airbag module or of plug adapter. Twist open cables. With the butt connectors and heat-shrink tubings in the Electronic Parts Catalogue (EPC), reconnect the cables with the same cable colours. Twist cables again, open length (twist) must not exceed 40 mm. Secure interface (heat-shrink tubing) with insulating tape to prevent cables from twisting open.

In event of visible damage:

Expose cable at damaged areas. Cut through one cable after the other at an appropriate position and insulate cables no longer required in wiring harness with insulating tape, do not under any circumstances cut through both cables at the same time. Now, depending on the work scope, unpin the contacts either on the airbag control unit or on the airbag module or plug adapter. Cut off unpinned cables. Insulate cables remaining in wiring harness with insulating tape. Now pin in contacts of repair cable, assignment of repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead up to separation point. Cut off excess length of repair cable. Twist open cables. Connect cables with butt connectors and heat-shrink tubings in Electronic Parts Catalogue (EPC), assignment of repair cables is relevant. Twist cables again, open length (twist) must not exceed 40 mm. Secure interface (heat-shrink tubing) with insulating tape to prevent cables from twisting open.

Instructions for cutting off, insulating, crimping cables, installing and removing contacts:

Cutting off and insulating cables.

Repairing a plug connection using butt connectors.

Installing and removing contacts.

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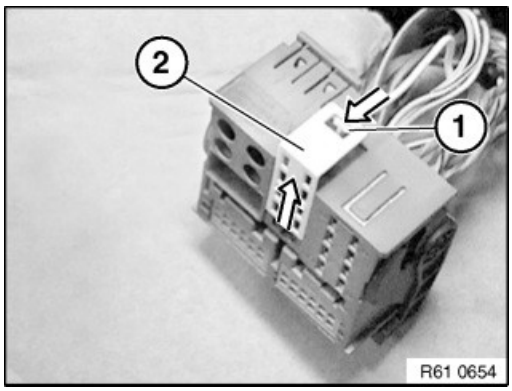
61 13 ... Socket housing (radio connector), Hybrid System MQS/MPQ

Special tools required:

- 61 0 314

Manufactured by AMP: The following contact types without strand sealing can be fitted in the connector housings:

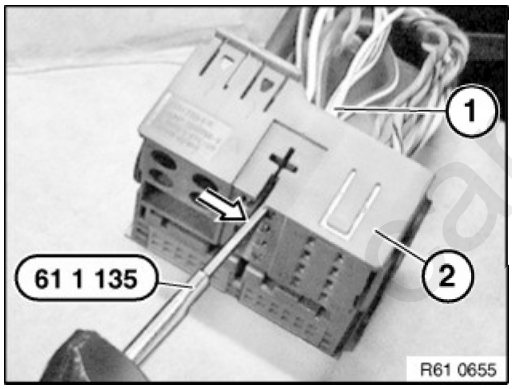
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



Removing MPQ contacts from radio connector:

Press lock (1) in direction of arrow.

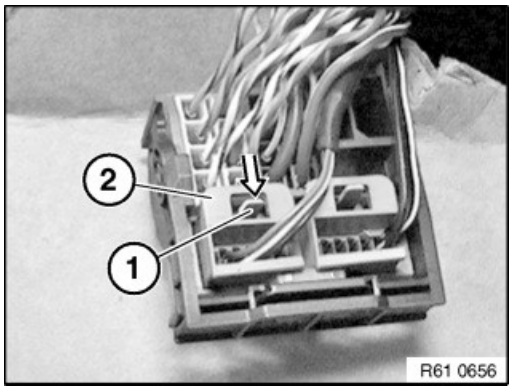
Detach secondary lock (2) from radio plug.



Feed special tool 61 0 314 (61 1 135) past side of contact.

Press special tool 61 0 314 (61 1 135) in direction of arrow.

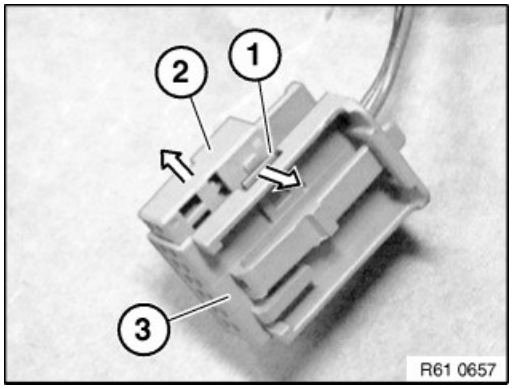
Pull wire (1) with socket contact out of radio connector (2).



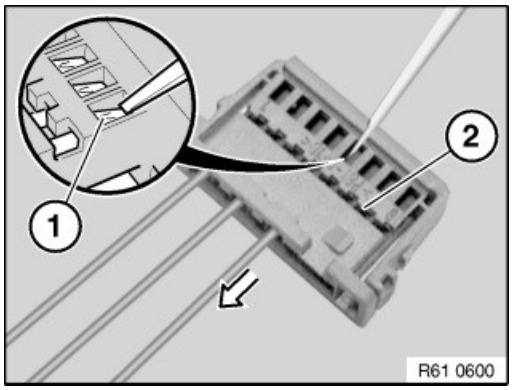
Removing MQS contacts from contact carrier:

Press lock (1) in direction of arrow and pull housing (2) out of radio connector.

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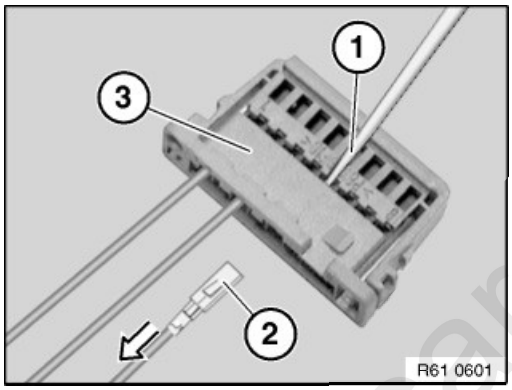
Press lock (1) in direction of arrow. Pull contact carrier (2) out of housing (3).*Note:*
When the contact carrier is pulled out, the secondary locks of the socket contacts are raised.



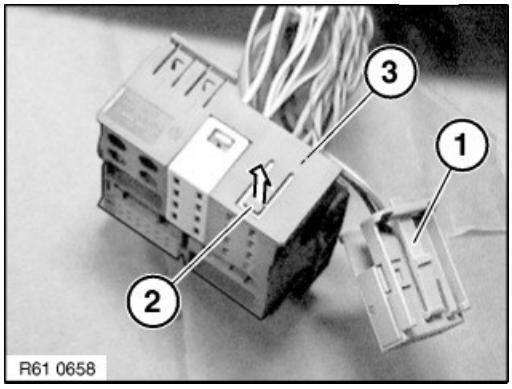
Note:
Schematic diagram shows the 8-pin socket housing by way of example.

Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

Pull wire with socket contact in direction of arrow as far as secondary lock (2).



Hold down retaining hook in secondary lock (1) again. Pull wire with socket contact (2) out of contact carrier (3).



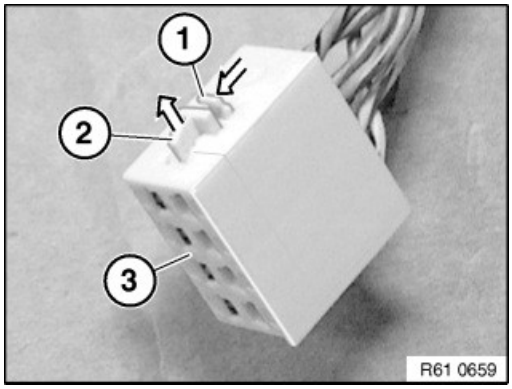
Removing MPQ contacts from contact carrier:

Remove contact carrier (1) with MQS contacts from radio connector.

Raise lock (2) on radio connector.

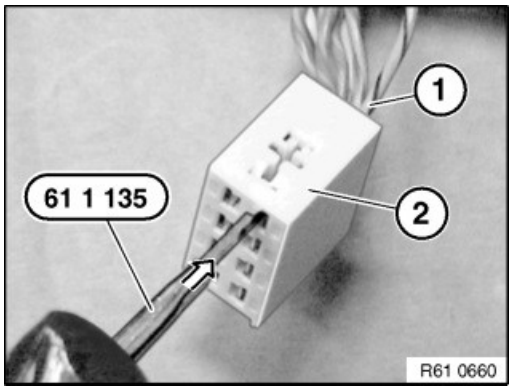
Pull contact carrier (3) out of radio connector.

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Press lock (1) in direction of arrow.

Pull secondary lock (2) in direction of arrow completely out of contact carrier (3).



Press special tool 61 0 314 (61 1 135) on inside of contact into contact carrier (2).

Pull wire with socket contact (1) out of contact carrier (2).

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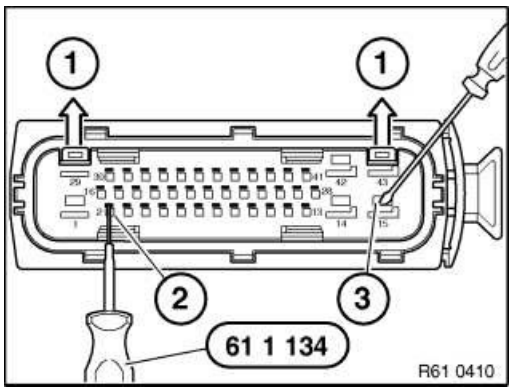
61 13 ... Socket housing 42-, 43-, 46-pin, Hybrid System MQS / MPQ

Special tools required:

- 61 0 312

Manufactured by AMP: The following contact types without strand sealing can be fitted in the socket housings:

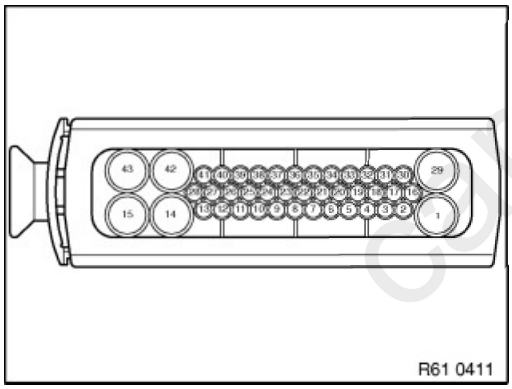
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



Open secondary locks (1) on socket housing.

Press back retaining hook of MQS contacts (2) with special tool 61 0 312 61 1 134 and pull out cable with contact.

Press back retaining hook of MPQ contacts (3) with screwdriver and pull out cable with contact.



Installation note:
Bend open retaining hook of contacts gently before inserting into connector housing.

For installation of contacts, observe chamber numbers on reverse side of socket housing.

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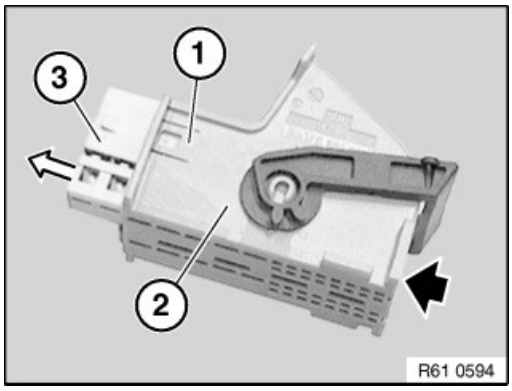
61 13 ... Socket housings, 2x21-, 2x27-pin, Hybrid Systems MQS/MPQ, Elo/Elo Power

Manufactured by AMP: The following contact types without strand sealing can be fitted in the socket housings:

- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)

Manufactured by Siemens: The following contact types without strand sealing can be fitted in the socket housings:

- Elo (electrical contact)
- Elo Power 2.8 mm width (electrical contact for heavy loads)
- Elo Power 5.2 mm width (electrical contact for heavy loads)

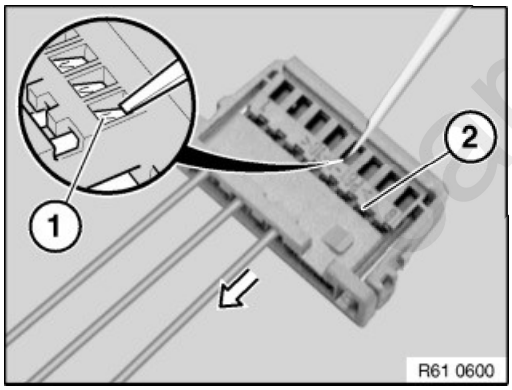


Raise lock (1) on housing (2).

Push contact carrier (3) from rear out of housing.

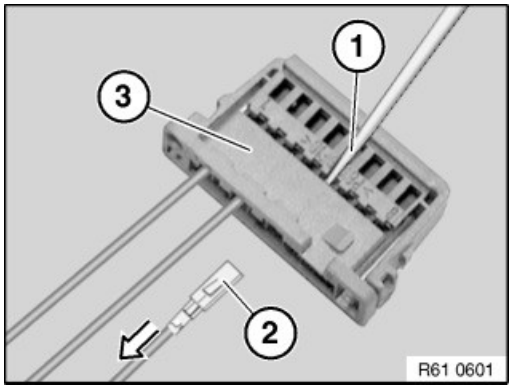
Note:
The second contact carrier is pushed out in the same way.

Pushing out the contact carrier releases the secondary locks of the socket contacts.



Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

Pull wire with socket contact in direction of arrow as far as secondary lock (2).



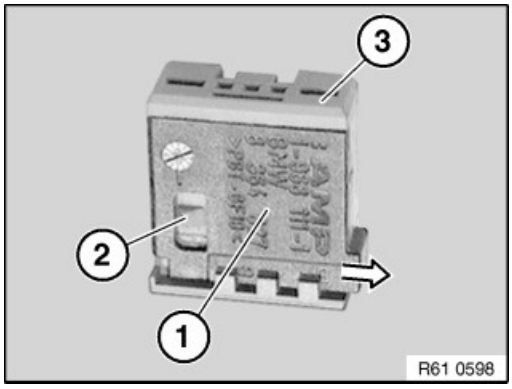
Hold down retaining hook in secondary lock (1) again and pull cable with socket contact (2) completely out of contact carrier (3).

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61 13 ... Socket housings, 5-pin, 8-pin, System MQS/MPQ

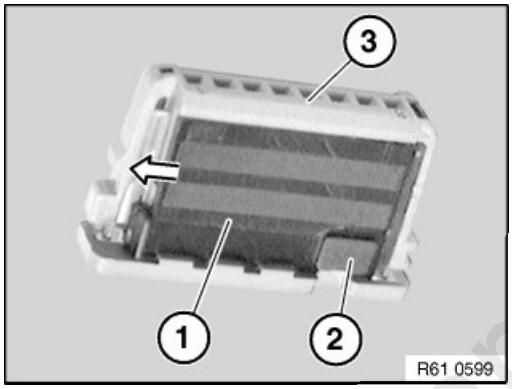
Manufactured by AMP: The following contact types without strand sealing can be fitted in the connector housings:

- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



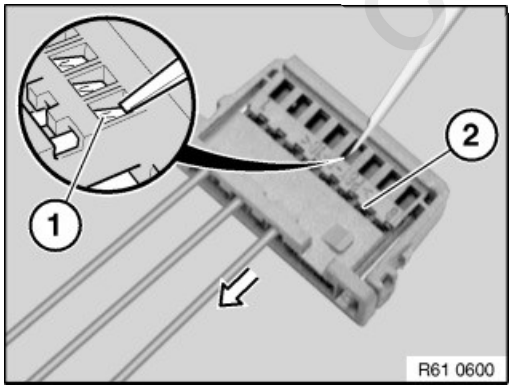
Socket housing, 5-pin (Hybrid System MQS/MPQ)

Raise fastener (1) over retaining lug (2) and pull off from contact carrier (3).



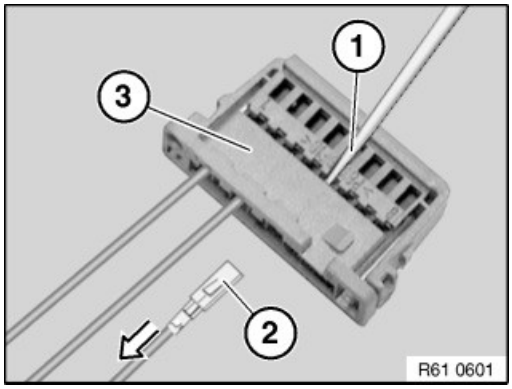
Socket housing, 8-pin (MQS):

Raise fastener (1) over retaining lug (2) and pull off from contact carrier (3).



Hold down retaining hook (1) of contact and pull cable with contact as far as secondary lock (2).

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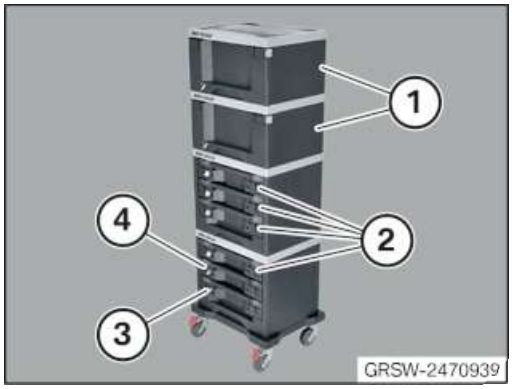
Hold down retaining hook in secondary lock (1) again and pull cable with contact (2) completely out of contact carrier (3).

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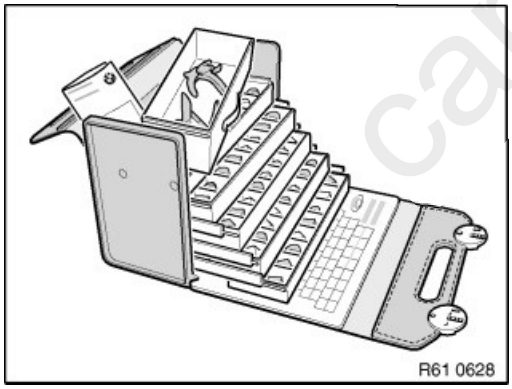
61 13 ... Special tools for wiring harness repairs

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100
- 61 4 320
- 61 0 200
- 61 0 210
- 61 0 220
- 61 0 230
- 61 0 240



Wiring harness repair case 4.0



Repair range, vehicle electrical system:

Single parts for wiring harness repairs*

* Sourcing reference: BMW Parts Department

Note:

- Refer to Service Information:
  SI 2 04 07 341

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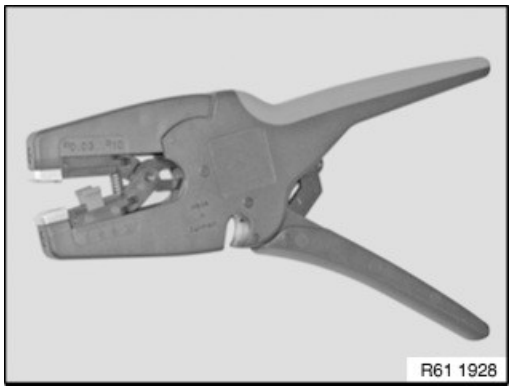


Release and press-out tool:

- Special tool 61 0 300
- Special tool 61 0 400 (MINI N12/N14)
- Special tool 61 1 100 (combustion engine)

Handling:

- Notes for opening contacts and locks of different connector contact systems



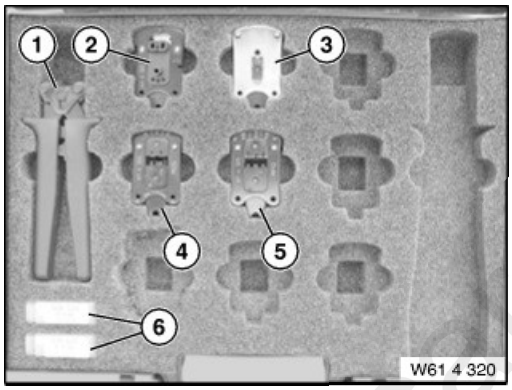
Cutting to length and stripping insulation from cables:

Wire stripper MultiStrip10*

*Sourcing reference BMW Workshop Equipment Catalogue

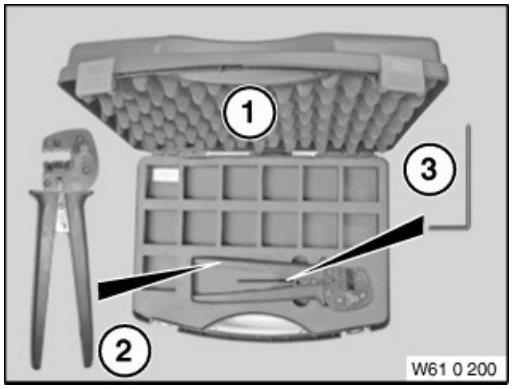
Handling:

- Cutting cables to length and strip insulation



Crimping stop parts (small contacts) and butt connectors:

- Special tool 61 4 320
  1. Tool without crimping head
  2. Crimping head (stripping insulation and cutting fibre-optic cables to length)
  3. Crimping head (crimping fibre-optic cable contacts)
  4. Crimping head (crimping MQS contacts)
  5. Crimping head (crimping MPQ contacts)
  6. Replacement blade (face-cutting fibre-optic cables)
  7. Replacement blade with tool (insulation stripping unit)
  8. Universal crimping head (SI 2 04 06 293)



Crimping stop parts (large contacts) and butt connectors:

- Special tool 61 0 200 (crimping kit)
- Special tool 61 0 210 (matrix set SLK 8)
- Special tool 61 0 220 (matrix set SLK 2.8)
- Special tool 61 0 230 (matrix set MAK 8 / DFK4)
- Special tool 61 0 240 (butt connector 4.0 - 6.0 mm²)

Handling:

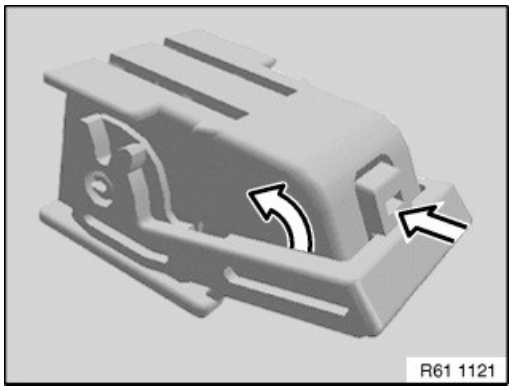
- Refer to Service Information:
  SI 2 02 05 194
  SI 2 07 05 233

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61 13 ... Unlocking and disconnecting different plug connections

Note:
The document describes unlocking and disconnecting different types of plug connections.

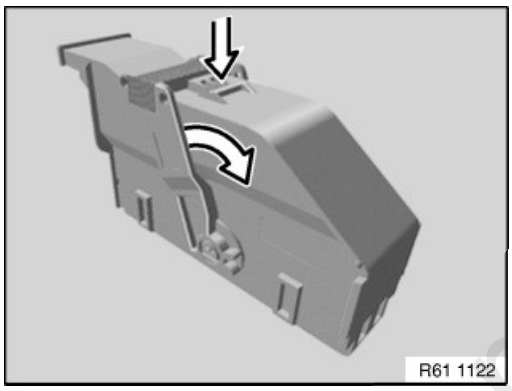
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

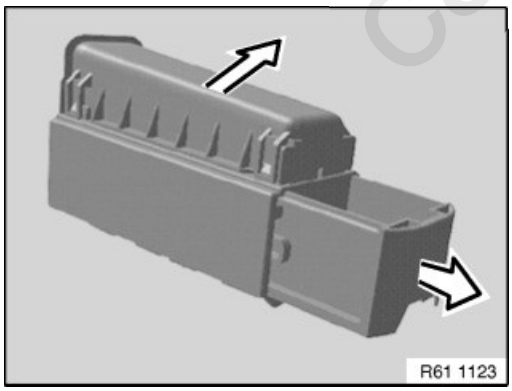
Disconnect plug connection.



2.

Press lock and open release clip in direction of arrow.

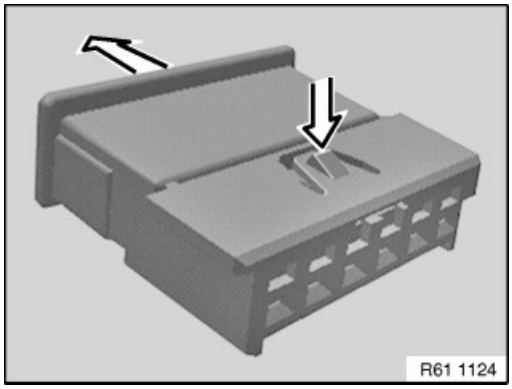
Disconnect plug connection.



3.

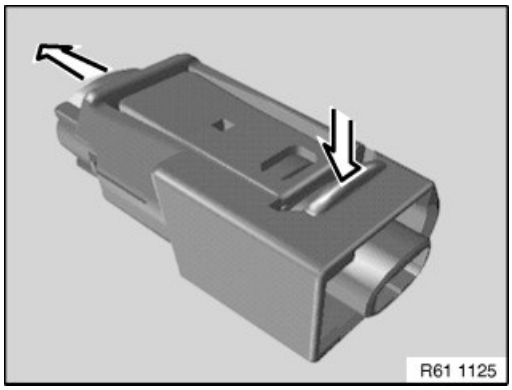
Open release clip in direction of arrow and disconnect plug connection in direction of arrow.

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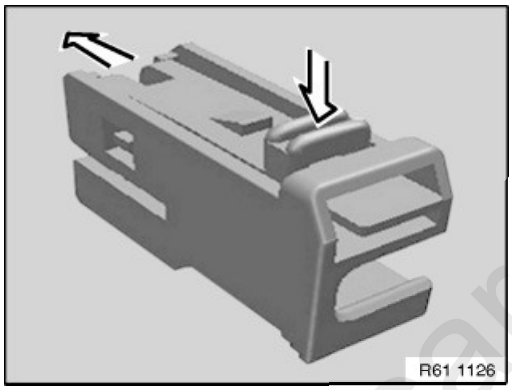
4.

Press lock and disconnect plug connection in direction of arrow.



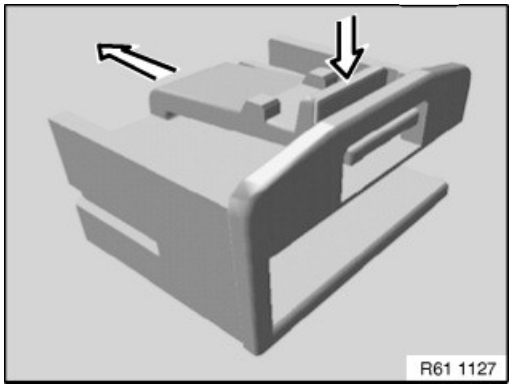
5.

Press lock and disconnect plug connection in direction of arrow.



6.

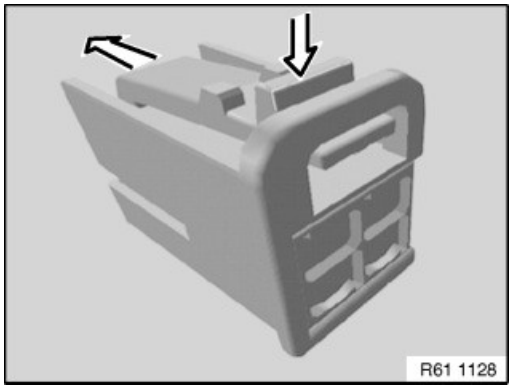
Press lock and disconnect plug connection in direction of arrow.



7.

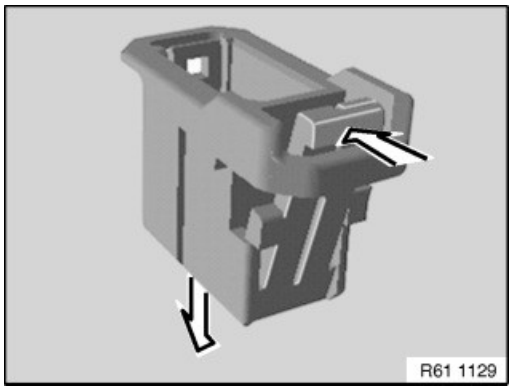
Press lock and disconnect plug connection in direction of arrow.

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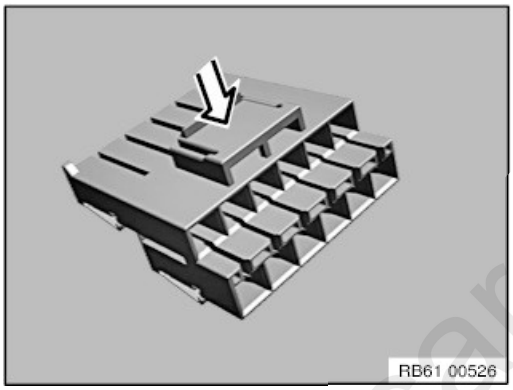
8.

Press lock and disconnect plug connection in direction of arrow.



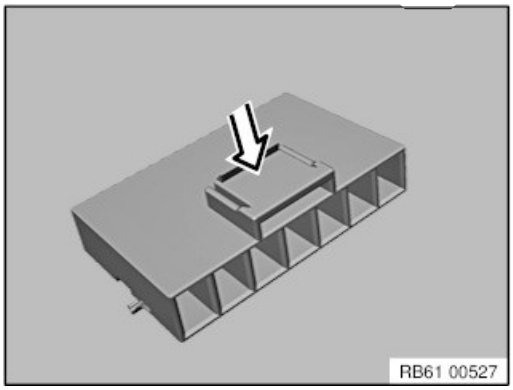
9.

Press lock and disconnect plug connection in direction of arrow.



10.

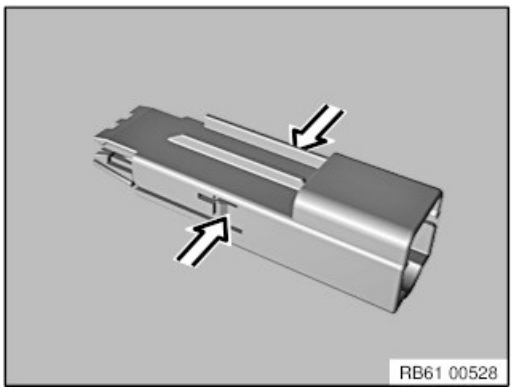
Press the lock and detach plug connection.



11.

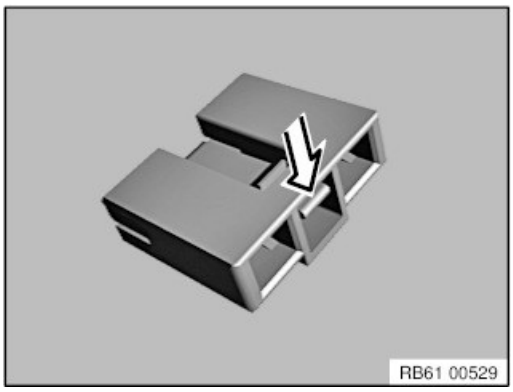
Press the lock and detach plug connection.

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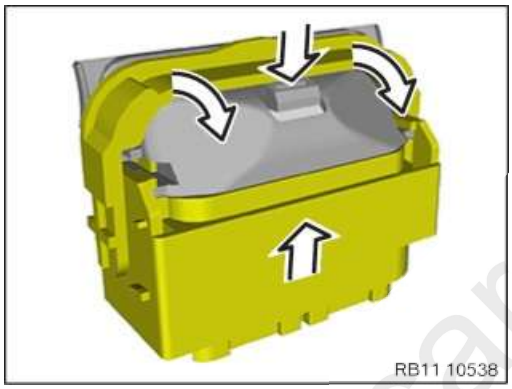
12.

Press the lock on both sides and detach plug connection.



13.

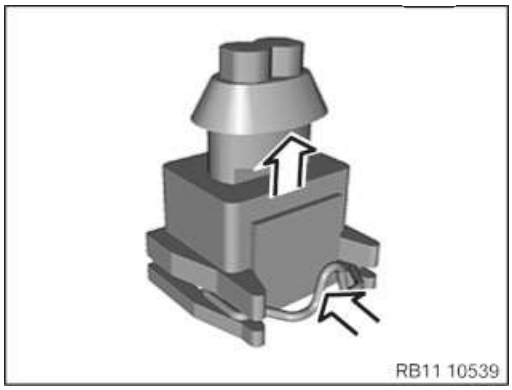
Press the lock and detach plug connection.



14.

Press lock and open release clip in direction of arrow.

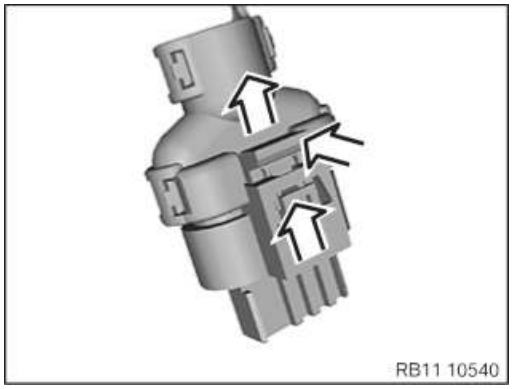
Disconnect plug connection.



15.

Press the lock and detach plug connection.

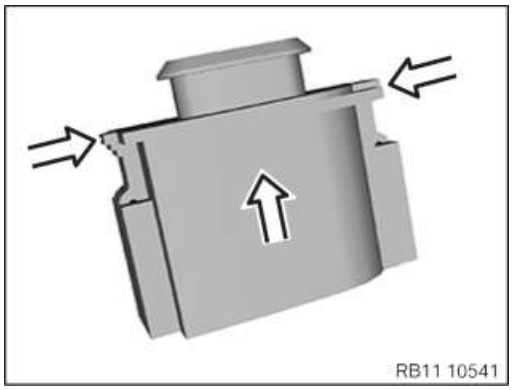
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16.

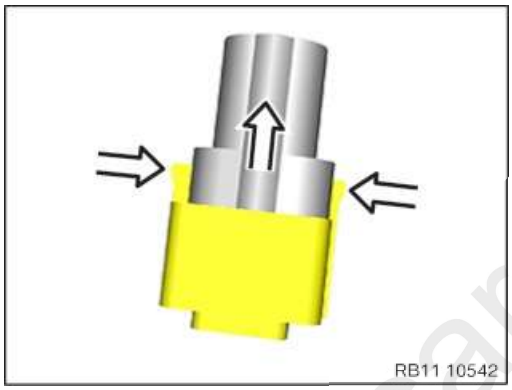
Pull out lock and press.

Disconnect plug connection.



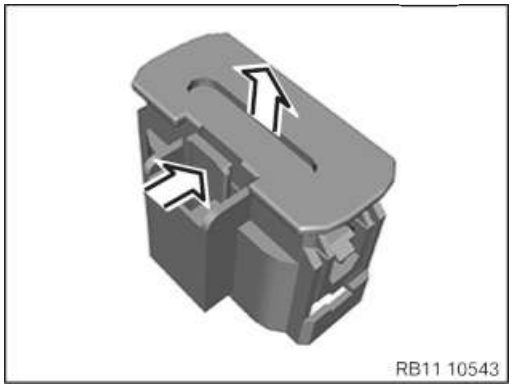
17.

Press the lock and detach plug connection.



18.

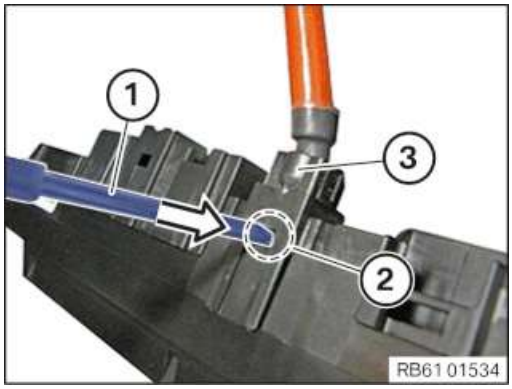
Press the lock and detach plug connection.



19.

Press the lock and detach plug connection.

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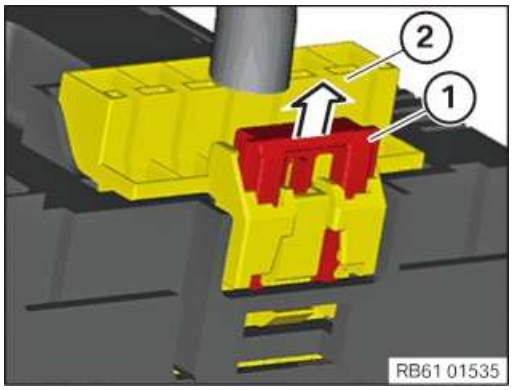


20.

Plug connection, e.g. on the power distribution box:

Press into the opening (2) using a suitable tool (1).

Pull off plug connection (3) upwards.



21.

Plug connection, e.g. on the power distribution box:

Lift lock (1) with a suitable tool.

Pull off plug connection (2) upwards.



22.

Vibration resistant high power engine contacts:

Caution!

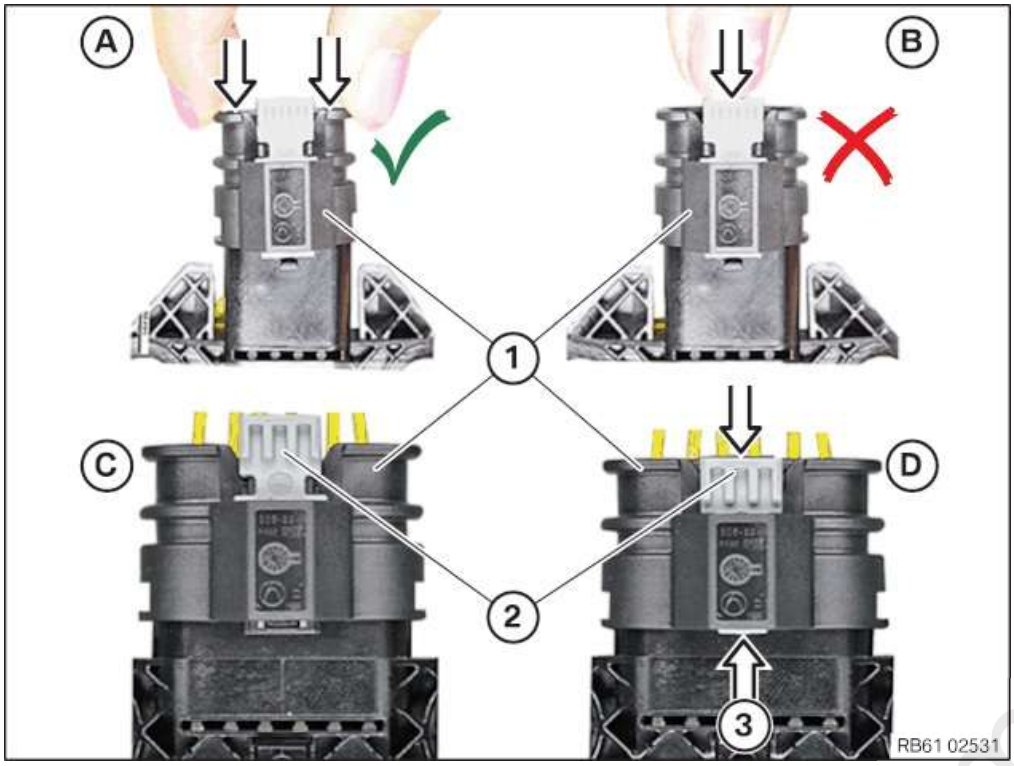
For this connector type, increased forces come into play when disconnecting and closing.

Disconnect:

Pull out lock (1) downward in direction of arrow first.

Then press lock (1) down in direction of arrow and pull off connector.

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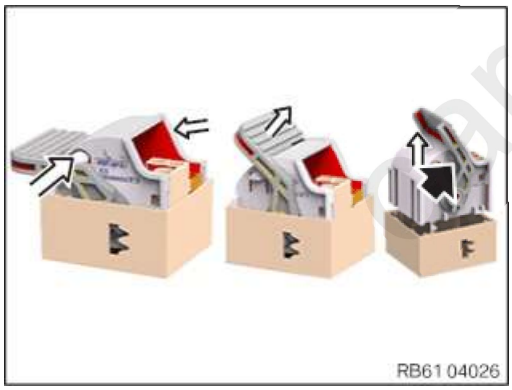


23.

Close:

A. Press the connector (1) down at the points indicated by the arrow **until it reaches the end position**
B. **Do** not press the connector (1) further than the lock
C. Connector (1) is in the end position, but lock (2) is not yet locked
D. Press lock (2) down in the direction of the arrow until the tip of lock (2) is visible at point (3)

Unlock / lock front light combination plug connection & replace housing after damage:

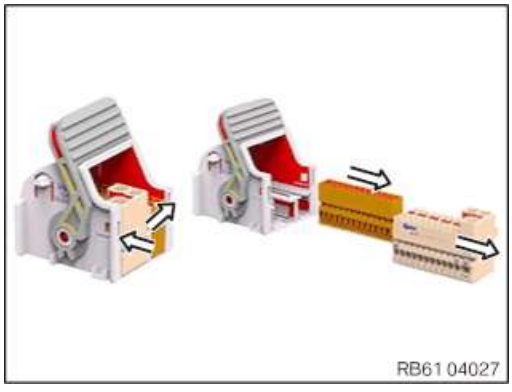


24.

Press in locking lever at both sides until the lever is unlocked and can be moved.

Move lever upwards until it latches into place in the end position.

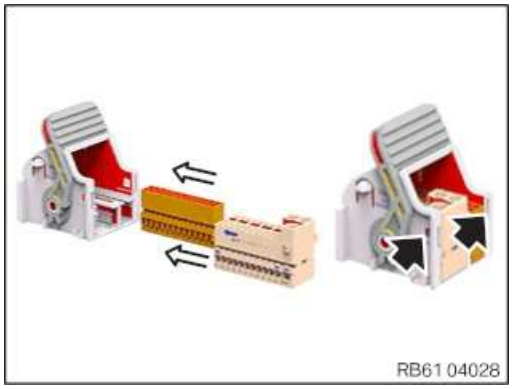
Once the lever is locked in the end position, remove plug connection upwards.



Unlock socket housing by lifting up each of the locking tabs.

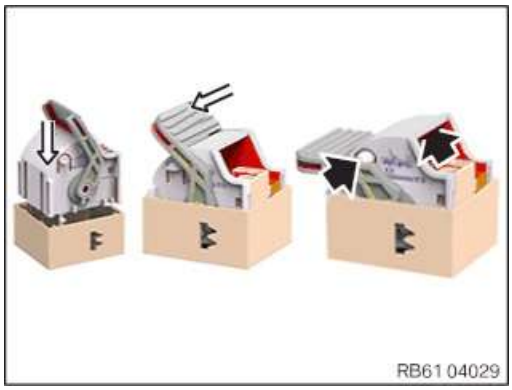
Slide out after unlocking the socket housing.

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Slide in socket housing up to limit position.

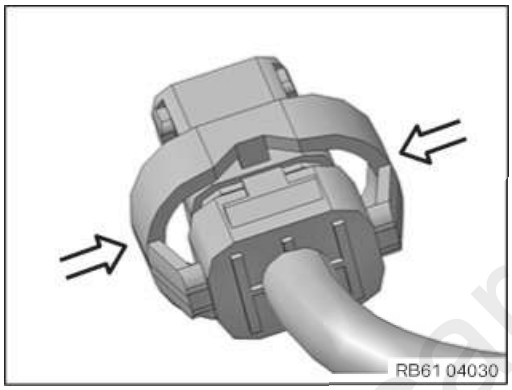
Lock socket housing into place in end position.



Sliding in up to limit position.

Activate plug-inn procedure by moving lever downwards.

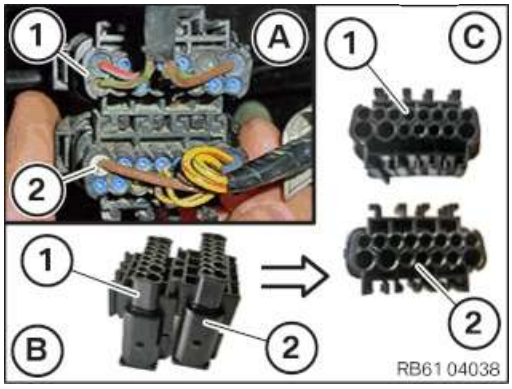
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.



25.

Rosenberger D4S20G-400A5-Y

Press to unlock on both sides.

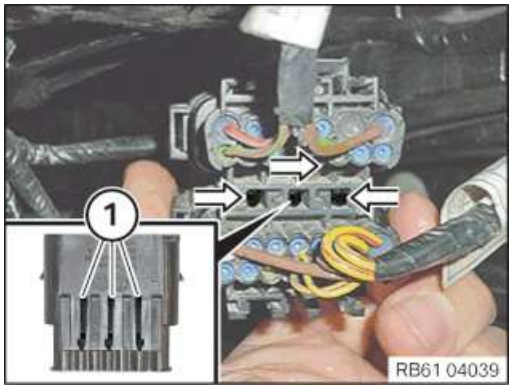


26.

Pin housing, 15-pinMLK1

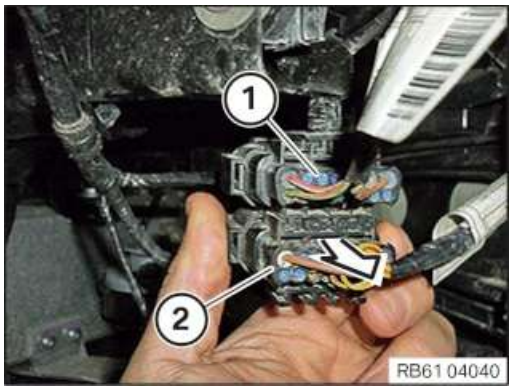
- A & B. To avoid any damage to individual connectors, the given connector assembly consisting of several individual connectors (1) & (2) must be released before disconnecting the plug connection.
- C: released connector assembly

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Disconnecting connector assembly:

Release retaining hooks (1) in direction of arrow (detail image shows retaining hooks of individual connector).



Release connector (2) in direction of arrow from connector (1).

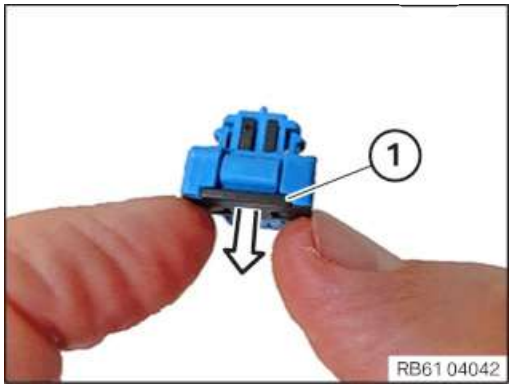


27.

Airbag ignition circuit connector

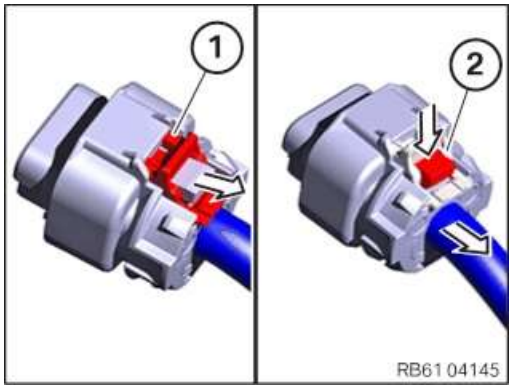
Warning!

Note the safety information for working on vehicles with airbag systems prior to disconnecting the plug connection.



Pull the cap (1) in the direction of the arrow to unlock

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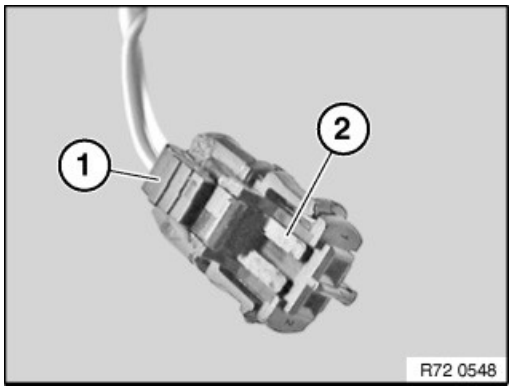


28.

Connector e.g. on front and rear lighting unit

Open safety catch (1) in direction of arrow using appropriate tool.

Push safety catch (2) in direction of arrow and disconnect plug connection.



29.

Plug, e.g. in airbag ignition circuits

Press the lock (1) and pull out the connector (2) up to initial engagement position.

Pull off connector (2).

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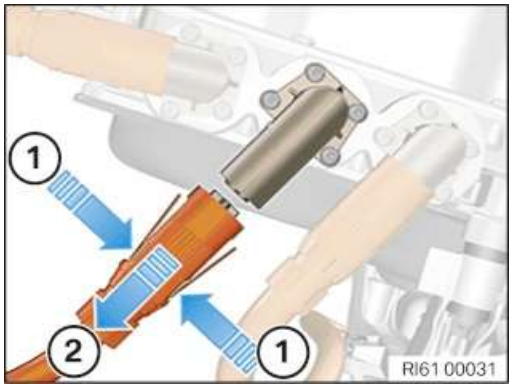
61 13 ... Unlocking and disconnecting various plug connections in electrical and hybrid vehicles



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:

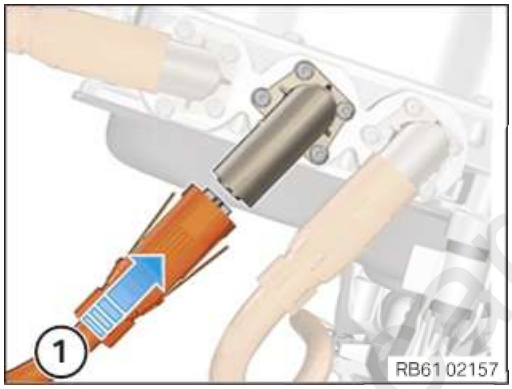
Press the lock (1) on the left and right on the connector in the direction of the arrow.

Pull off connector (2) in direction of arrow.

Attention!

Connector (2) is difficult to pull off.

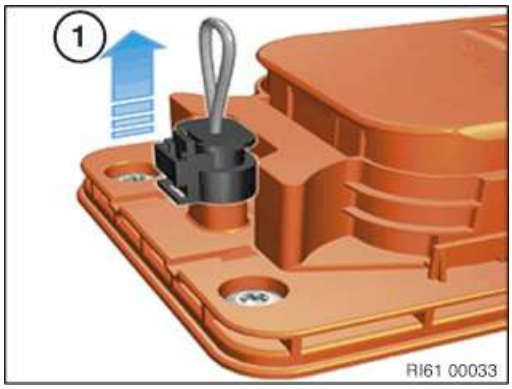
In the event of damage to high-voltage connector (2), the complete high-voltage cable must be replaced!



Connect the Hirschmann high-voltage connectors:

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

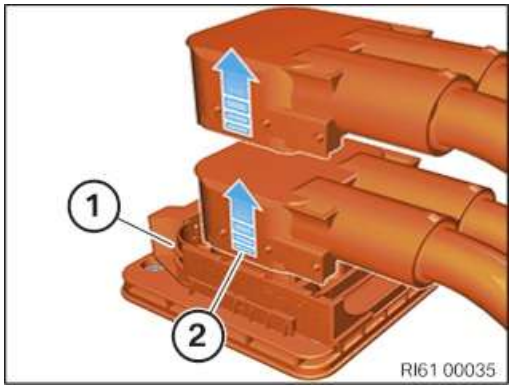
Note:
Connector (2) must lock audibly.



Disconnect the Kostal high-voltage connector:

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

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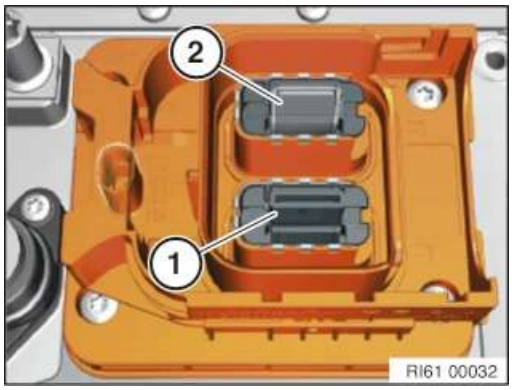
Push the lock (1) fully to the front.

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:

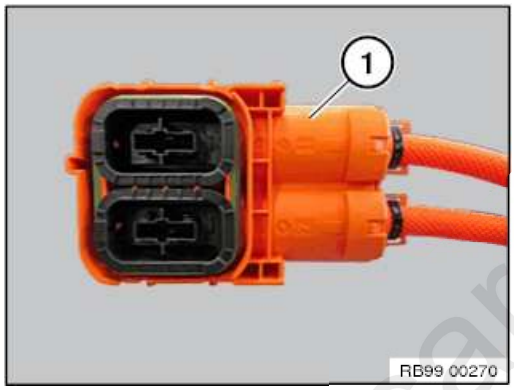
Check the touch protection for damage and correct positioning (1).

Warning!

Do not touch unprotected connector (2)!

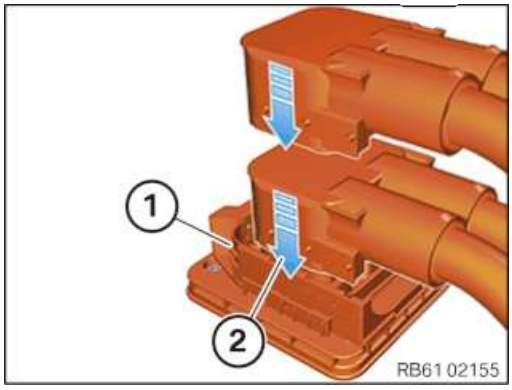
If the contact protection (1) has been pushed to the bottom (2), the high-voltage connector must be refitted.

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:

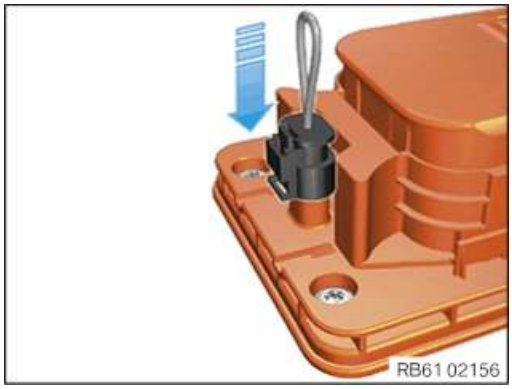
Connect the connector (2) in one single movement to the counter-housing.

Push the lock (1) fully to the rear.

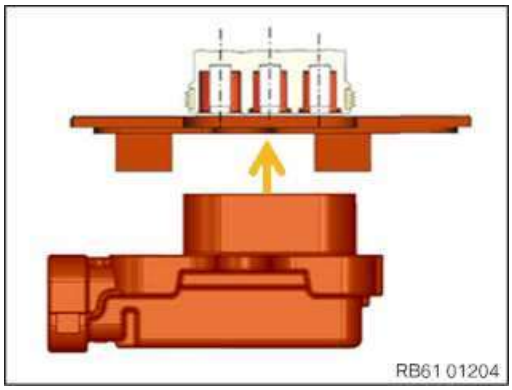
Attention!

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

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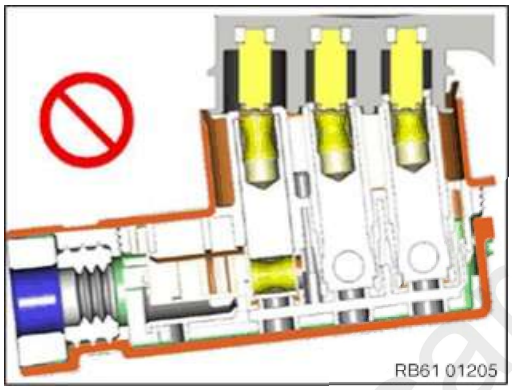


Connect the connector for the high-voltage interlock.



Three-phase high-voltage connector:

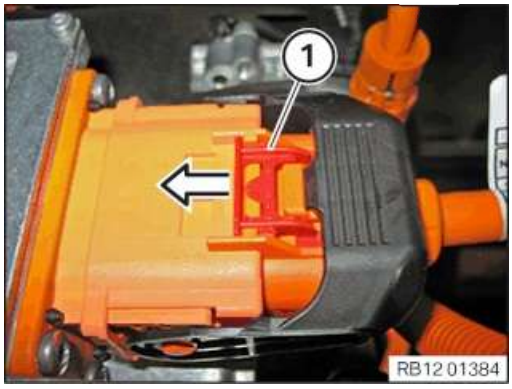
Connect and disconnect the connector straight.



Attention!

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

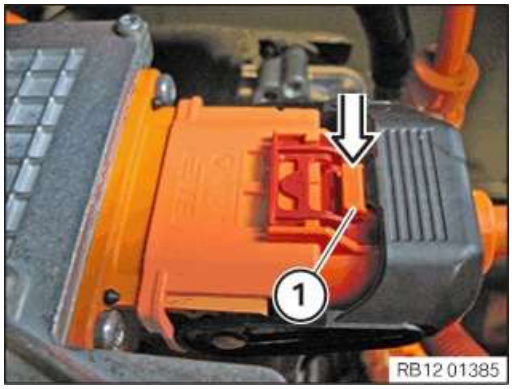
Increased tilted connections will increase the connecting force and the risk of danger.



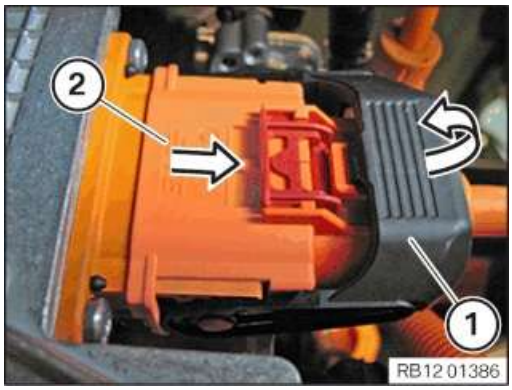
Disconnect the high-voltage connector from the high-voltage connection of the KLE:

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

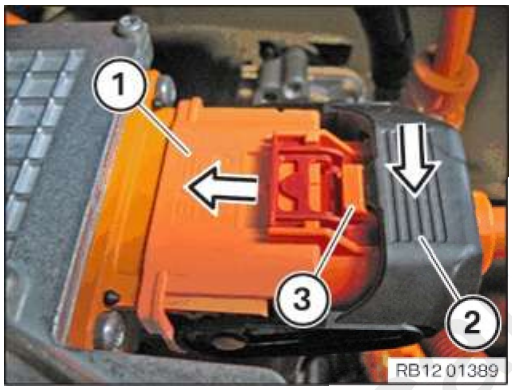
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Press lock (1).



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



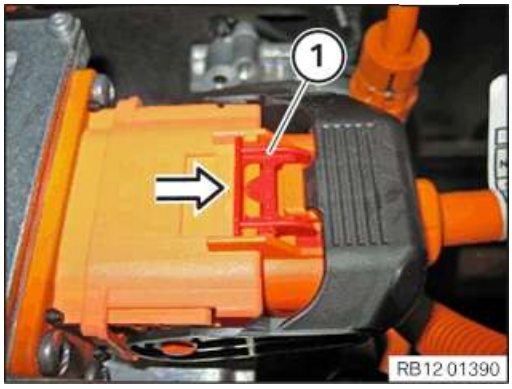
Connect the high-voltage connector to the high-voltage connection of the KLE:

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

Attention!

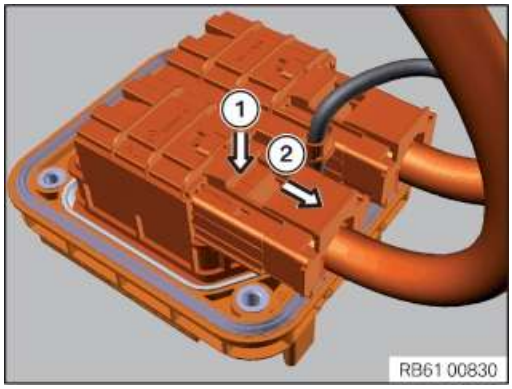
Lock (2) must snap audibly into place.

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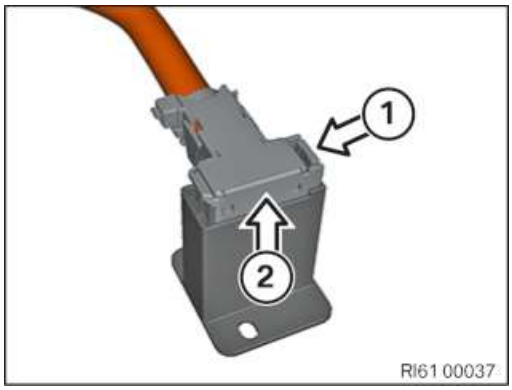
High-voltage connector on the high-voltage connection of the high-voltage battery unit:

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.



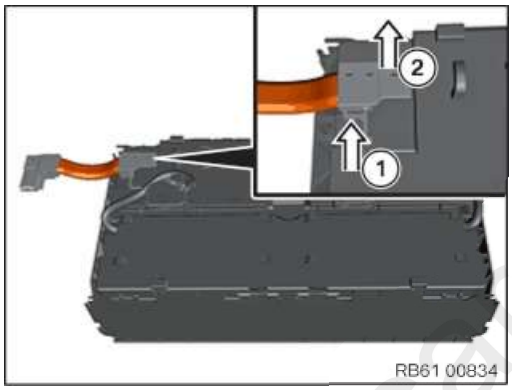
High-voltage connector on the cell module I01:

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!

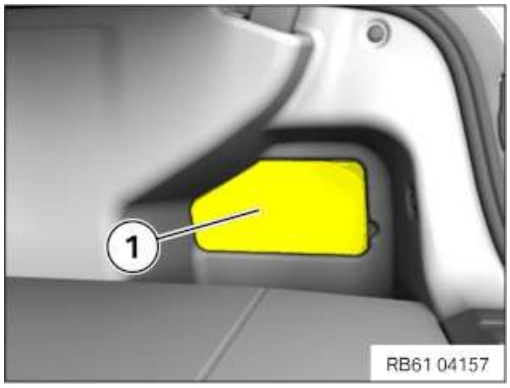
Contact protection is no longer provided in the event of a damaged connector housing.

In this case, contact technical support.

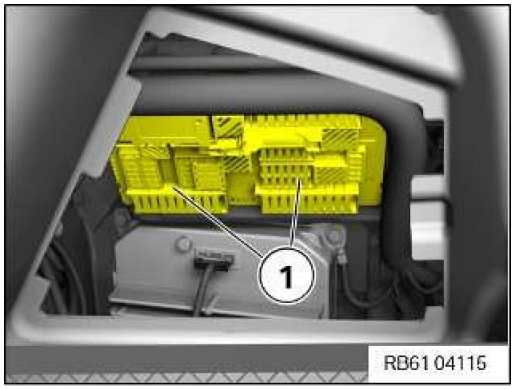
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61 14 002 Check/replace fuse

1 Checking the rear fuse on the power distribution box



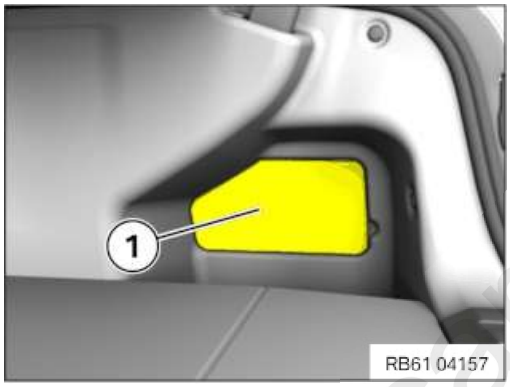
- Remove service flap (1) on the right side in the luggage compartment.



NOTICE

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

- Check and, if necessary, renew the rear fuse on power distribution box (1).



- Install the service flap (1).

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61 14 035 Rem.& install/replace power distribution box front positive battery cable

NOTICE

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

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

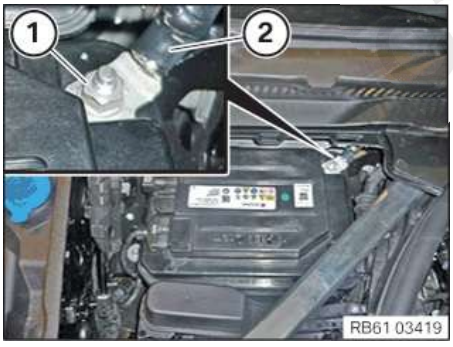
Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

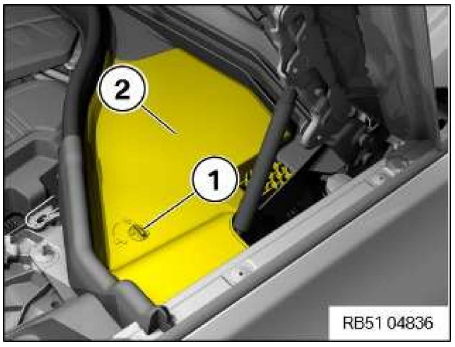
2 – Disconnecting all battery earth leads

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- See additional information.

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



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

4 – Removing the wiper arm on the left and right

NOTICE

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

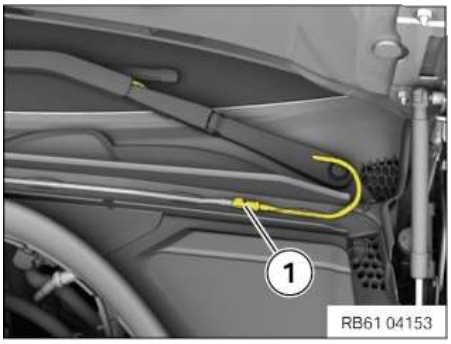
▶ **Remove the wiper arm**

RISK OF DAMAGE

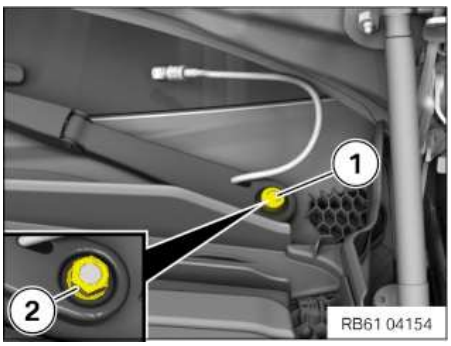
Damage to wiper console.

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

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

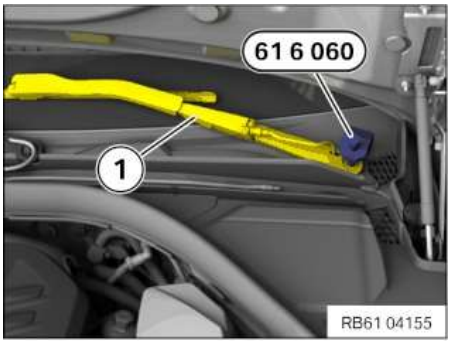


- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.



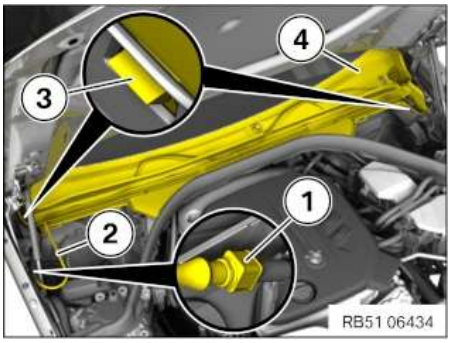
- Remove the protective cap (1).
- Loosen nut (2).

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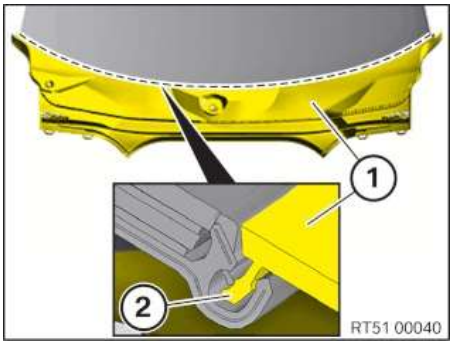


- Pull off the wiper arm (1) using special tool .

5 – Remove cowl panel cover



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



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

6 – Remove the seal for the rear bonnet



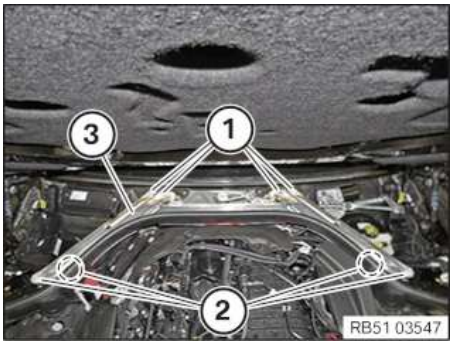
- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

7 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

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

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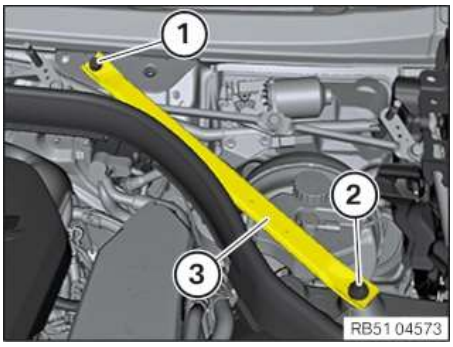
NOTICE

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

- Remove tension strut on spring strut dome.
- **Version A:**

  Loosen screws (1) and (2).

  Remove tension strut (3) in the spring strut dome upwards.



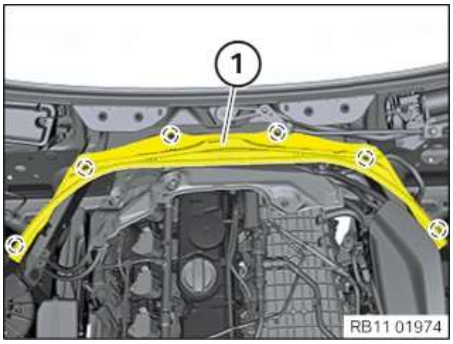
NOTICE

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

- Remove tension strut on spring strut dome.
- **Version B:**

  Loosen screws (1) and (2).

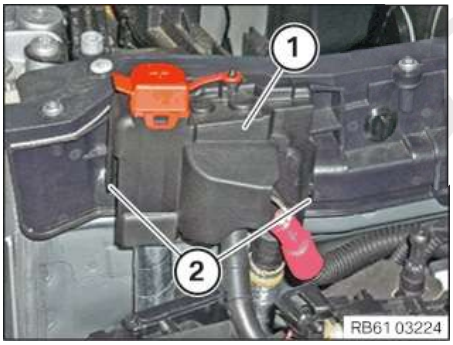
  Remove tension strut (3) in the spring strut dome upwards.



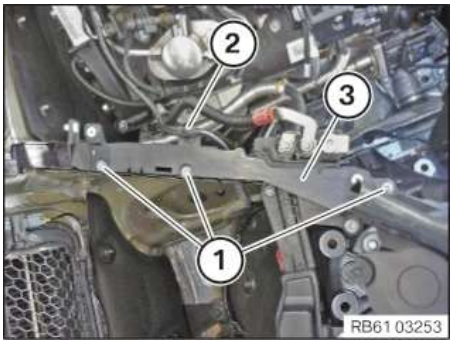
- Release the screws at the marked points.
- Remove the centre bulkhead upper part (1).

MAIN WORK

8 – Removing the power distribution box of the positive battery cable at the front

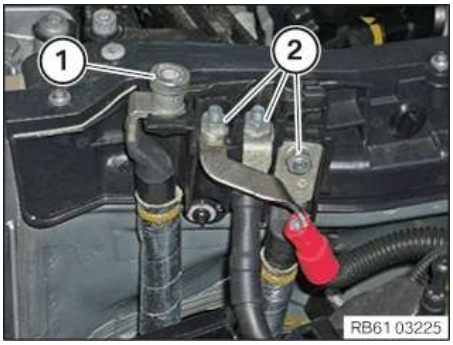


- Release cover (1) at the latch mechanisms (2).
- Remove the cover (1) in an upwards direction.

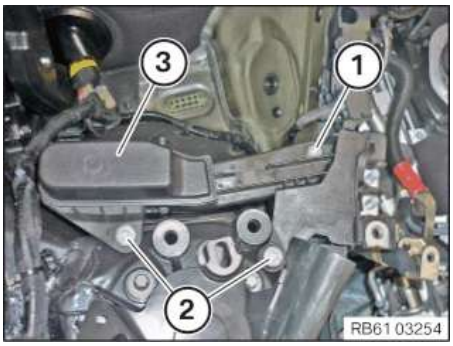


- Loosen screws (1).
- Loosen the cable clip (2).
- Remove the cover (3).

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- Release the screw (1) and feed out the corresponding cable.
- Release nuts (2) and feed out the corresponding cable.

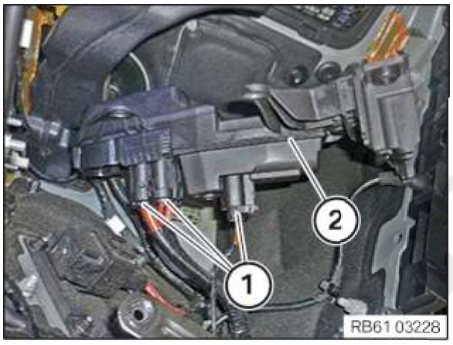


- Loosen screw (1).
- Loosen screws (2).
- Feed out the power distribution box (3) in an upwards direction.

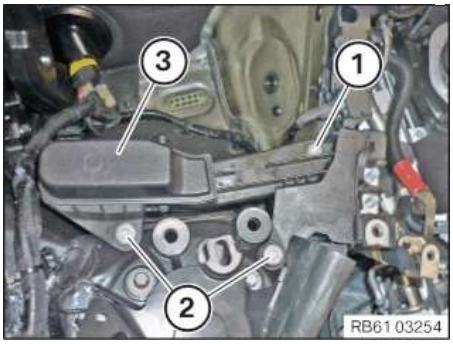


- Unlock plug connection (1) and disconnect.
- Remove power distribution box (2).

9 – Installing the front power distribution box



- Connect connector (1) to power distribution box (2) and lock.



- Position power distribution box (3) and thread in toward the bottom.
- Tighten the screws (2).

Power distribution box, front

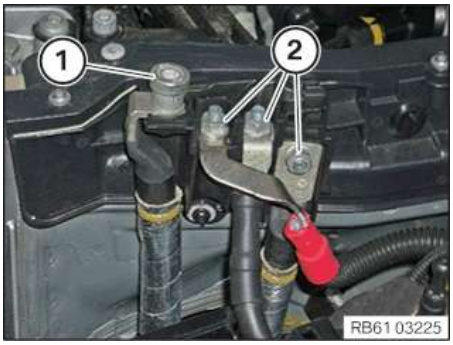
M8x35 screw		Tightening torque	13 Nm

- Tighten down screw (1).

Power distribution box, front

Screw TS5x16		2.5 Nm

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- Insert the corresponding cable and tighten the nuts (2).

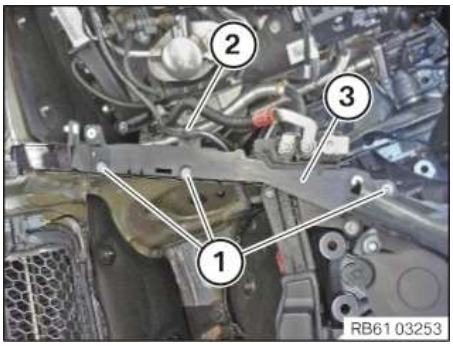
Positive battery cable

Flange nutM8		Tightening torque	15 Nm

- Insert the corresponding cable and tighten the bolt (1).

Positive battery connection point

Positive pole screw		Tightening torque	15 Nm

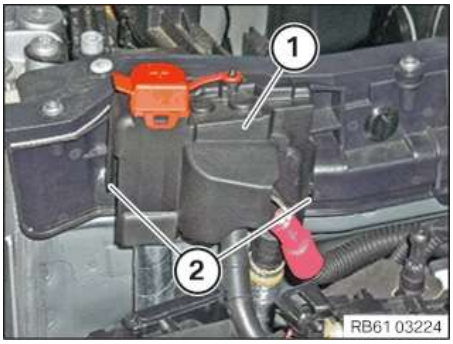


- Correctly position the cover (3) and tighten the screws (1).

Front power distribution box sealing frame

Bolt RF5x25		Tightening torque	2.5 Nm

- Secure the cable clips (2).



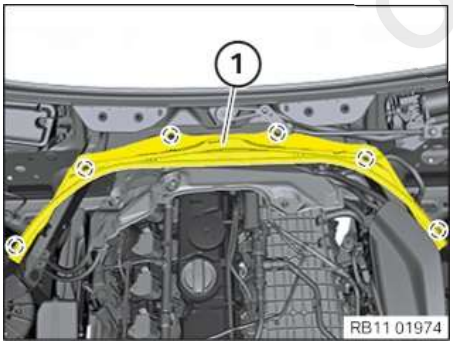
- Feed in the cover (2) in a downwards direction.
- The latch mechanisms (1) must be correctly locked.

POSTPROCESSES

10 – Installing the centre bulkhead upper part

TECHNICAL INFORMATION

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

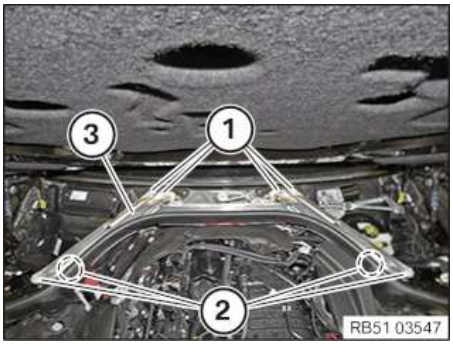


- Position the centre bulkhead upper part (1).
- Tighten the screws in the marked area.

Bulkhead upper part to bottom bulkhead

		Tightening torque	3 Nm

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NOTICE

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

- Install tension strut on spring strut dome.
- **Version A:**

  Install the tension strut (3) on the spring strut dome.

  Tighten the screws (1).

Tension strut on bulkhead

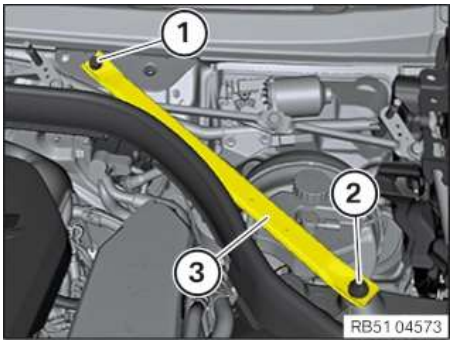
M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).

  Parts: Screws
- Tighten the screws (2).

Tension strut to spring strut dome

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



NOTICE

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

- Install tension strut on spring strut dome.
- **Version B:**

  Install tension strut on spring strut dome (3).

  Tighten down screw (1).

Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew the screw (2).

  Parts: Screw
- Tighten down screw (2).

Tension strut to spring strut dome

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

11 – 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.

12 – Installing cowl panel cover

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RISK OF DAMAGE

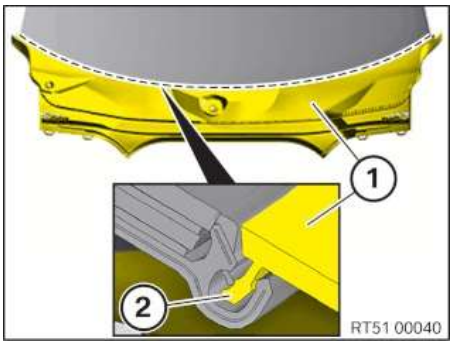
Damage caused by water ingress into the vehicle.

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

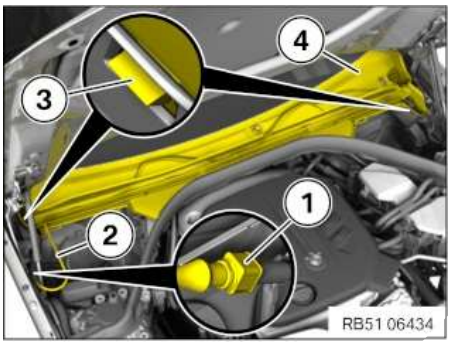
- Ensure correct installation of the components.
- Only use undamaged components.

TECHNICAL INFORMATION

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



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



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

13 – Install left and right wiper arm

NOTICE

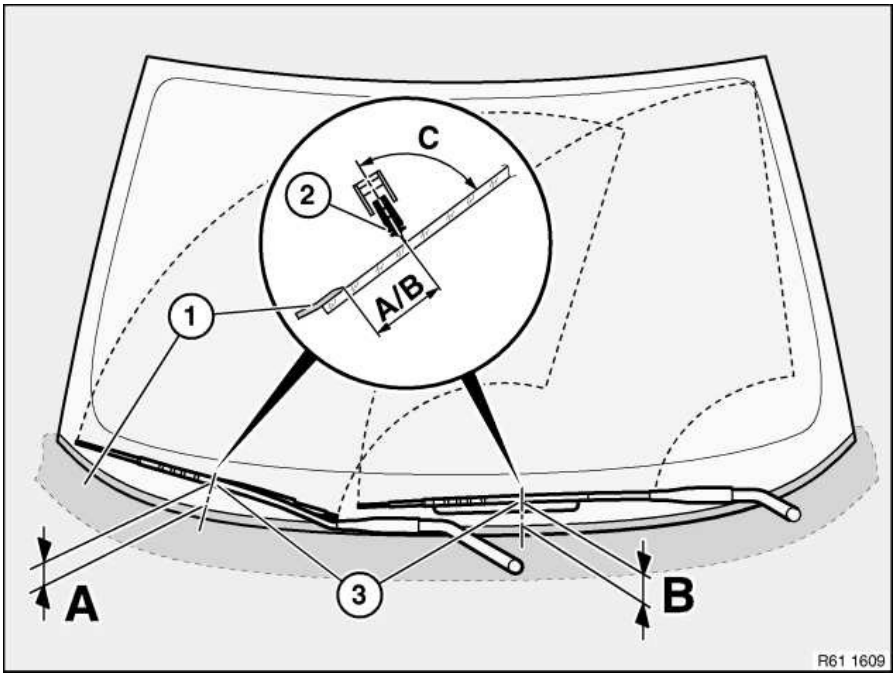
Description is for left component only. Procedure on the right side is identical.

▸ **Installing left and right wiper arm**

TECHNICAL INFORMATION

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

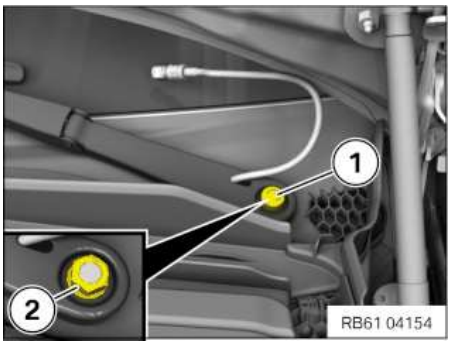
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- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

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

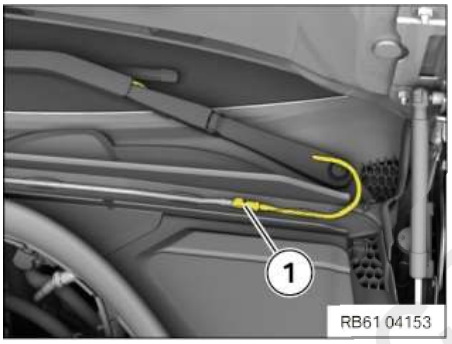


- Tighten nut (2).

Windscreen wiper arm

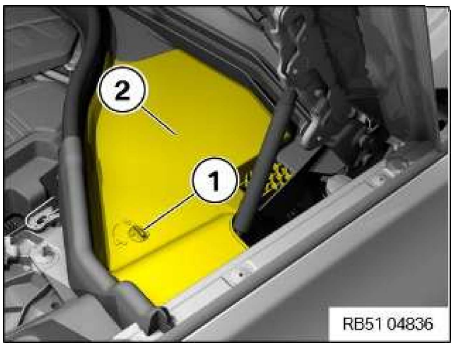
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



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

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



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

15 – Connecting all battery earth leads

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- See additional information.

16 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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

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

Additional Information

Overview of Tightening Torques

Power distribution box, front			Used in step 9
M8x35 screw		Tightening torque	13 Nm

Power distribution box, front			Used in step 9
Screw TS5x16			2.5 Nm

Positive battery cable			Used in step 9
Flange nutM8		Tightening torque	15 Nm

Positive battery connection point			Used in step 9
Positive pole screw		Tightening torque	15 Nm

Front power distribution box sealing frame			Used in step 9
Bolt RF5x25		Tightening torque	2.5 Nm

Bulkhead upper part to bottom bulkhead			Used in step 10
		Tightening torque	3 Nm

Tension strut on bulkhead			Used in step 10
M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome			Used in step 10
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 13
Combination hexagon nut		Tightening torque	35 Nm

Negative battery cable to 48-V battery			Used in step 16
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 13
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

Repair instructions (PRE)	**Used in step**

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Notes on 48-V battery	116

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	215
61 20 900 Disconnecting and connecting battery earth lead	215
61 20 900 Disconnecting and connecting battery earth lead	215
61 20 900 Disconnecting and connecting battery earth lead	215
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	215
61 20 900 Disconnecting and connecting battery earth lead	215
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	215
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	215
61 20 900 Disconnecting and connecting battery earth lead	215
61 20 900 Disconnecting and connecting battery earth lead	215
61 20 900 Disconnecting and connecting battery earth lead	215
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61 20 900 Disconnecting and connecting battery earth lead	215
61 20 900 Disconnecting and connecting battery earth lead	215

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61 14 010 Remove and install/replace power distribution box

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

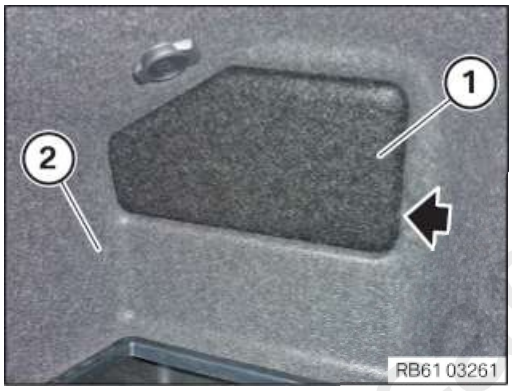
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing the flap in the luggage compartment wheel arch trim panel on the right



- Remove the flap (1) from the luggage compartment wheel arch trim panel on the right (2)

MAIN WORK

4 – Removing the rear power distribution box

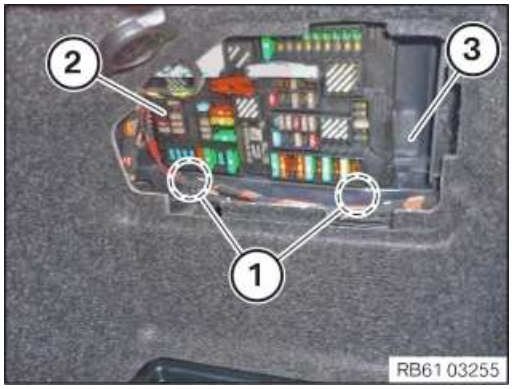
TECHNICAL INFORMATION

Fuses can come loose when unlocking the plug connections in the power distribution box. Use suitable means to prevent the fuses from falling out.

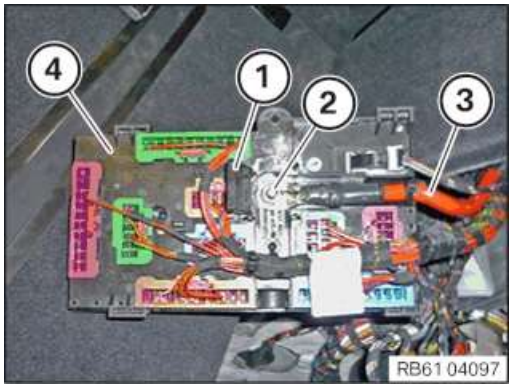
NOTICE

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

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- Unlock latch mechanisms (1) and remove power distribution box (2) from holder (3).

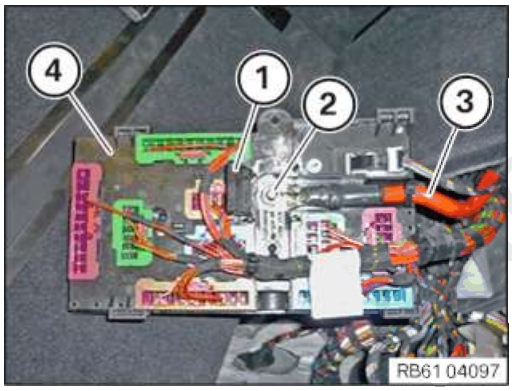


- Open the cover (1).
- Loosen nut (2).
- If applicable, loosen the cable strap on the positive battery cable (3).
- Remove positive battery cable (3).
- Unlock and disconnect all connectors.
- Remove power distribution box (4).

5 – Installing the rear power distribution box

NOTICE

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



- Position the positive battery cable (3) on the power distribution box (4).
- Tighten nut (2).

Positive battery cable

Flange nutM8		Tightening torque	15 Nm

- Close the cover (1).

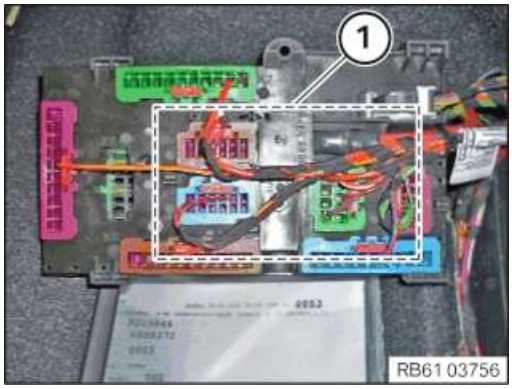
TECHNICAL INFORMATION

Fuses can be pushed out of their correct end positions when connecting the connector.

While connecting the connector, counter support it against the side of the fuses.

After locking the connector, check the fuse assignment for completeness and ensure the correct end position of the individual fuses.

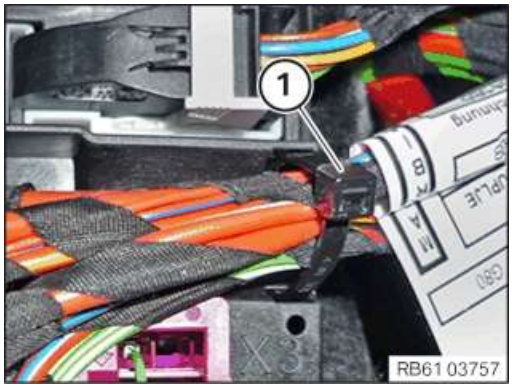
- Connect all connectors and lock.



TECHNICAL INFORMATION

Caution! Wiring harnesses must be laid and fixed in such a way that no tensile loads act on the wiring harness and its plug connections.

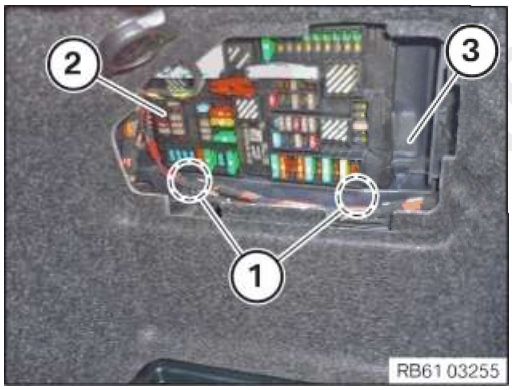
- Position the wiring harness (1) so that there is no tensile load on the connector and wiring harness.



- Feed in the new cable strap (1) through the two openings on the power distribution box and tighten it.



- Check all fuses for correct end position and lock correctly.

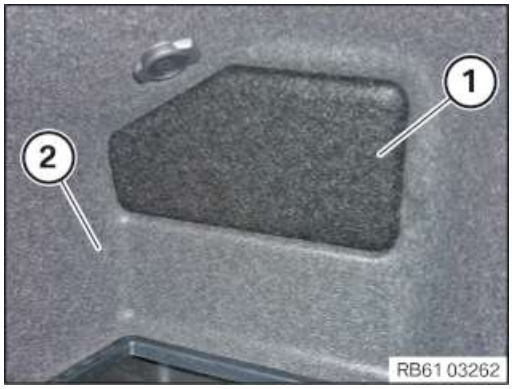


- Position power distribution box (2) correctly and engage it in bracket (3).

  The latch mechanisms (1) must engage correctly.

POSTPROCESSES

6 – Installing the flap in the luggage compartment wheel arch trim panel on the right



- Position the flap (1) correctly in the right luggage compartment wheel arch trim panel (2) and install.

7 – Connecting all battery earth leads



- See additional information.

8 – Activating the 48 V electrical system

Prerequisite

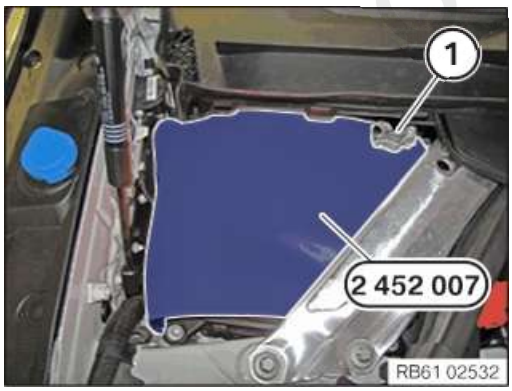
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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

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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Positive battery cable — Used in step 5

Flange nutM8		Tightening torque	15 Nm

Negative battery cable to 48-V battery — Used in step 8

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	18

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27

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61 20 900 Disconnecting and connecting battery earth lead	27
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61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	27
61 20 900 Disconnecting and connecting battery earth lead	27
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27

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61 14 040 Removing and installing/replacing rear power distribution box positive battery cable

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

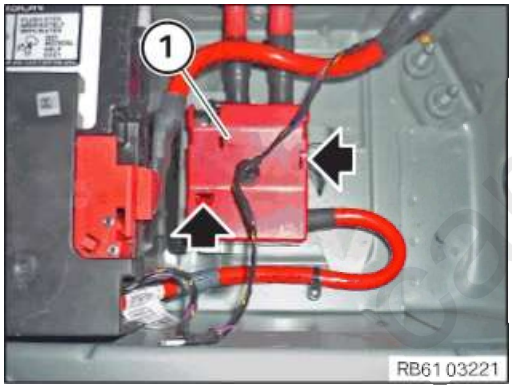
2 – Disconnecting all battery earth leads



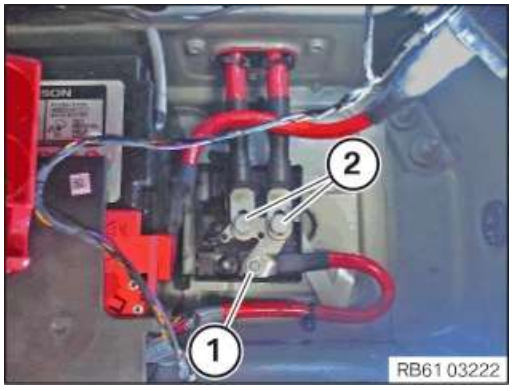
- See additional information.

MAIN WORK

3 – Removing the low power distribution box

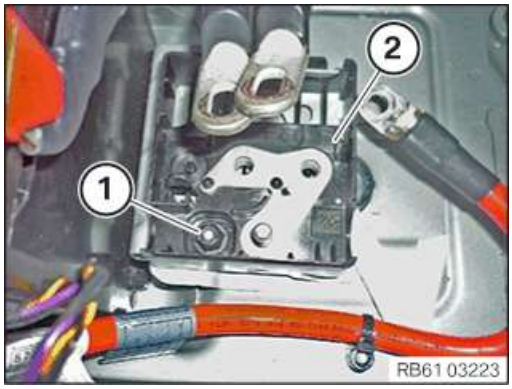


- Unclip the cover (1) from the latch mechanisms and put it aside.



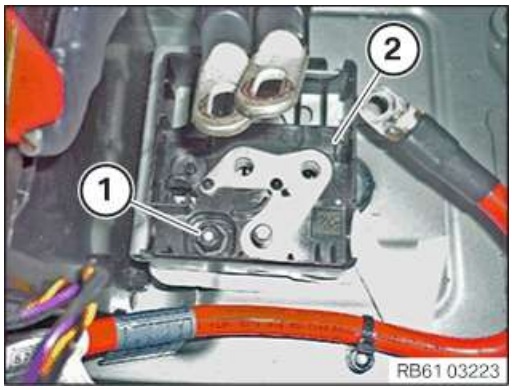
- Loosen nut (1).
- Remove positive battery cable and secure at side.
- Loosen screws (2).
- Remove positive battery cables and secure at side.

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- Release the plastic nut (1).
- Remove the power distribution box (2).

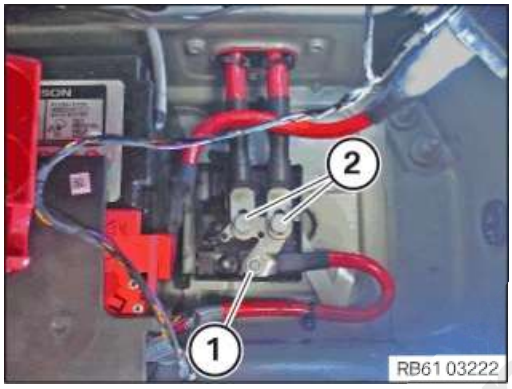
4 – Installing the low power distribution box



- Insert the power distribution box (2).
- Tighten plastic nut (1).

Power distribution box

Plastic nut with flange		Tightening torque	2,6 Nm



- Tighten the positive battery cable using the nut (1).

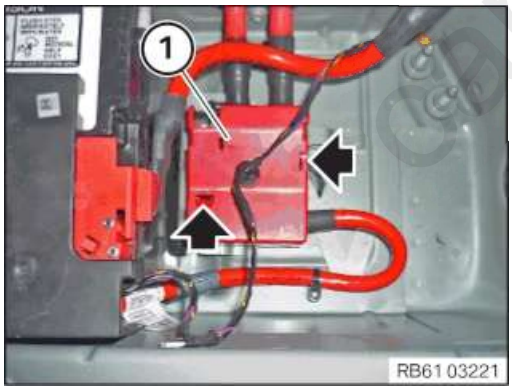
Positive battery cable

Positive pole screw		Tightening torque	15 Nm

- Tighten the positive battery cables using the screws (2).

Positive battery cable

M8x16 screw		Tightening torque	15 Nm



- Clip in the cover (1).

POSTPROCESSES

5 – Connecting all battery earth leads



- See additional information.

6 – Activating the 48 V electrical system

Prerequisite

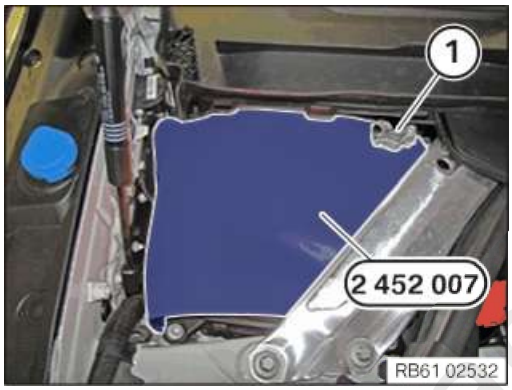
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

Additional Information

Overview of Tightening Torques

Power distribution box			Used in step 4
Plastic nut with flange		Tightening torque	2,6 Nm

Positive battery cable			Used in step 4
Positive pole screw		Tightening torque	15 Nm

Positive battery cable			Used in step 4
M8x16 screw		Tightening torque	15 Nm

Negative battery cable to 48-V battery			Used in step 6
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	**Used in step**
Notes on 48-V battery	16

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
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61 14 041 Removing and installing/replacing rear power distribution box positive battery cable

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing the luggage compartment floor trim panel

▸ **Removing the luggage compartment floor trim panel**

NOTICE

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

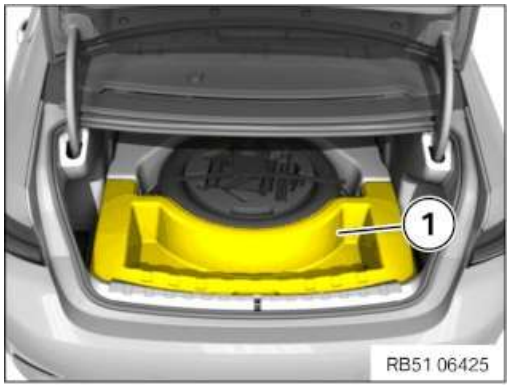


- Remove luggage compartment floor trim panel (1).

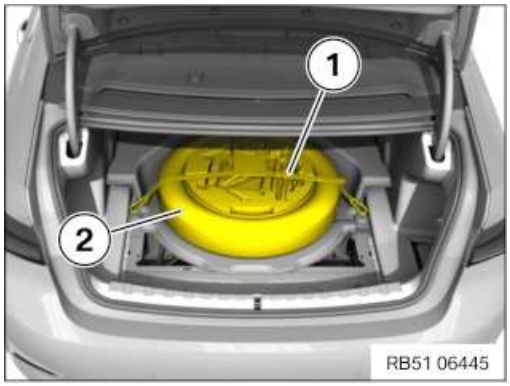
4 – If installed: Removing the compact spare wheel

▸ **Removing rear luggage compartment well**

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- Remove rear luggage compartment well (1).

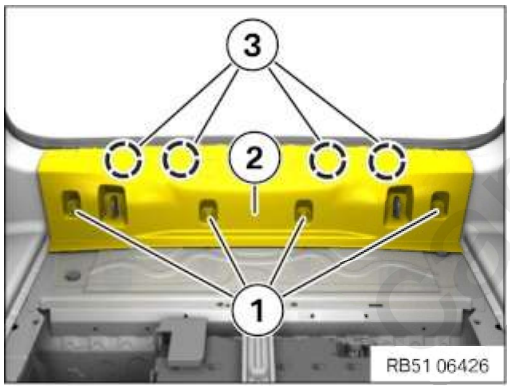


- Open buckle on seat belt strap (1) and set it aside.
- Remove emergency wheel (2) with the insert.

5 – Removing the loading edge trim

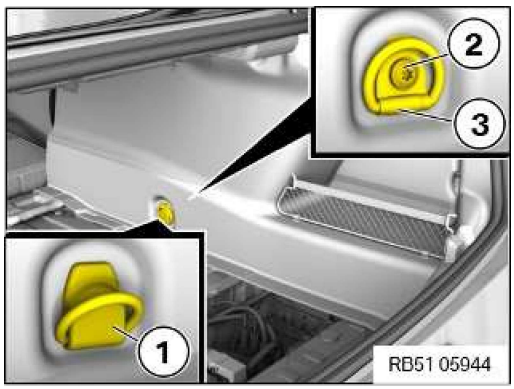
NOTICE

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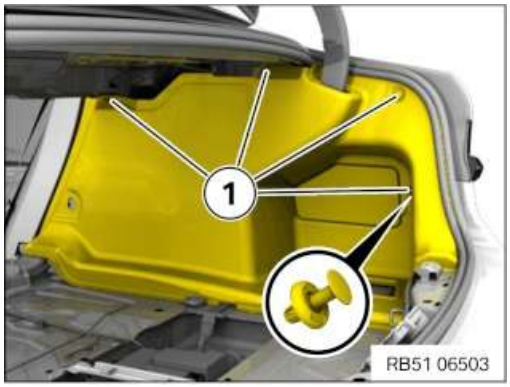


- Loosen the expanding rivet (1).
- Unclip loading edge trim(2) upwards from latch mechanisms (3).
- Guide out and remove loading edge trim (2) under the sealing lip of the tailgate seal.

6 – Removing right luggage compartment wheel arch trim panel

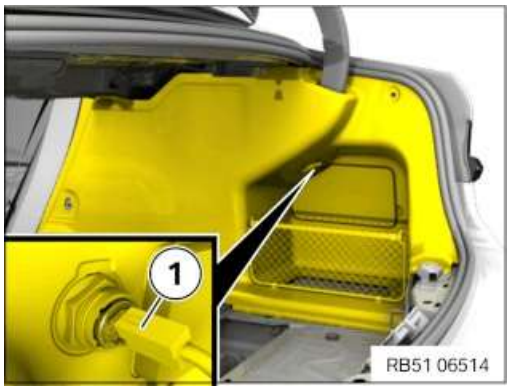


- Remove the cover (1).
- Loosen screw (2).
- Remove the lashing eye (3).

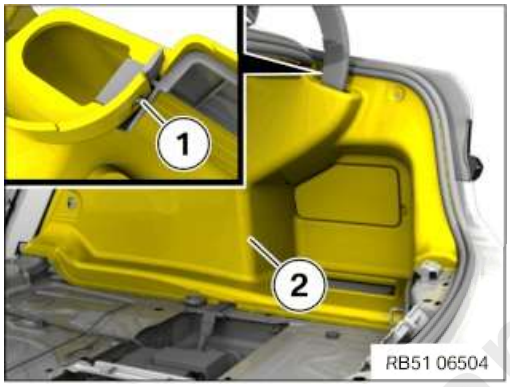


- Reposition the right rear seat backrest.
- Loosen the expanding rivet (1).

▸ If installed: Disconnect plug connection of the 12 V connection (additional work with storage package equipment specification)



- Unlock and disconnect the plug connection (1) of the 12 V power socket.

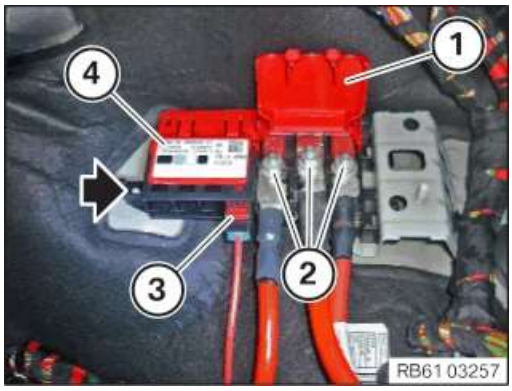


- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip for the tailgate and the side trim panel in the rear passenger compartment.
- Remove luggage compartment wheel arch trim panel (2).

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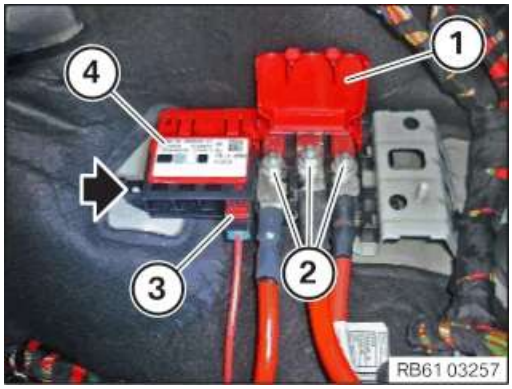
MAIN WORK

7 – Removing the power distribution box of the positive battery cables at the rear



- Open the cover (1).
- Release nuts (2) and remove the associated positive battery cables.
- Unlock plug connection (3) and disconnect.
- Release the latch mechanism (arrow) and remove the power distribution box (4).

8 – Installing the power distribution box for the positive battery cables at the rear



- Position the power distribution box (4) correctly and engage the latch mechanism (arrow).
- Connect connectors (3) and lock.
- Position the positive battery cables at the rear and tighten the nuts (2).

Positive battery cable

Positive pole screw		Tightening torque	15 Nm

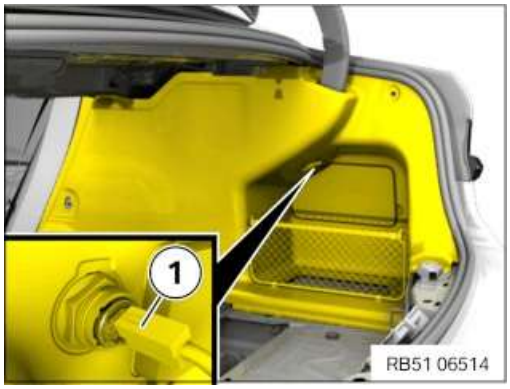
- Close the cover (1).

POSTPROCESSES

9 – Installing the luggage compartment wheel arch trim panel on the right

NOTICE

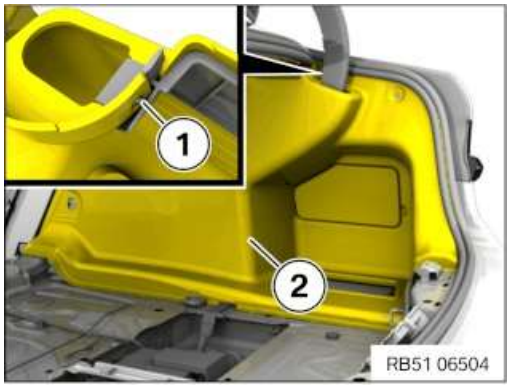
Schematic diagram is for example purposes. Some parts may differ in certain details.



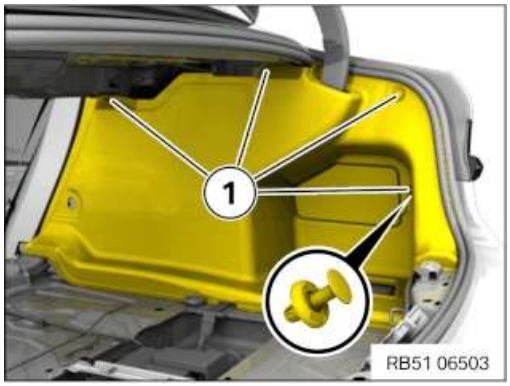
▸ If installed: Connecting plug of the 12 V power socket (additional work for equipment specification with storage package)

- Connect and lock connector (1) of the 12 V power socket.

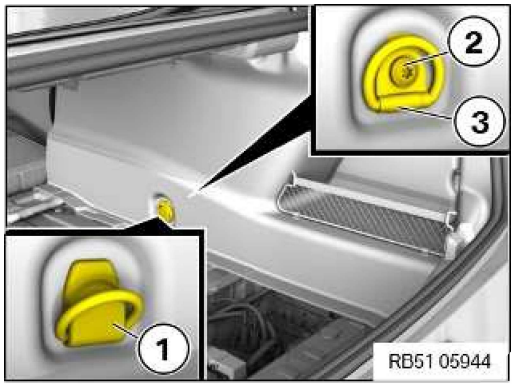
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- Feed luggage compartment wheel arch trim panel (2) under the side trim panel in the rear passenger compartment and the sealing lip for the tailgate.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).



- Secure expanding rivet (1).
- Raise the right rear seat backrest.



- Position the lashing eye (3).
- Tighten down screw (2).

Lashing eye to body

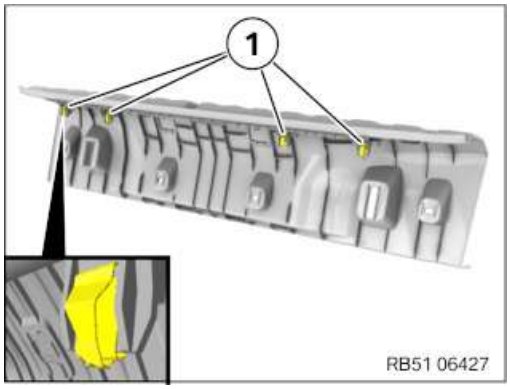
	Tightening torque	19 Nm

- Install the cover (1) .

10 – Installing loading edge trim

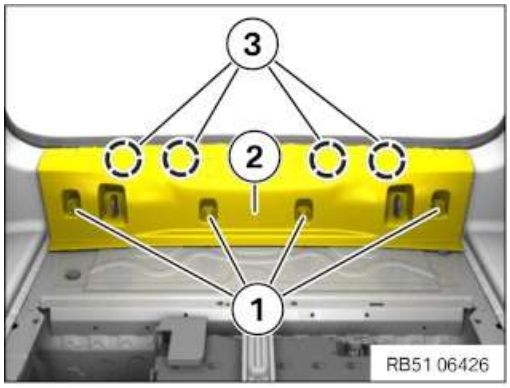
NOTICE

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



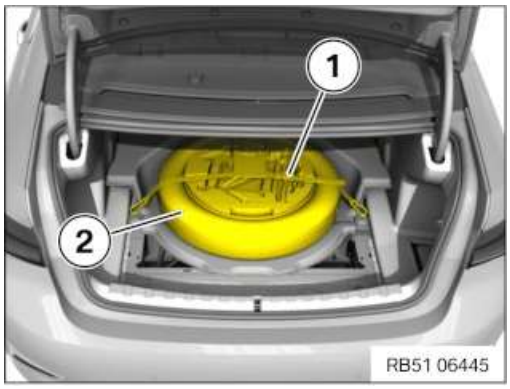
- Check the clamps (1) for damage and renew if necessary.

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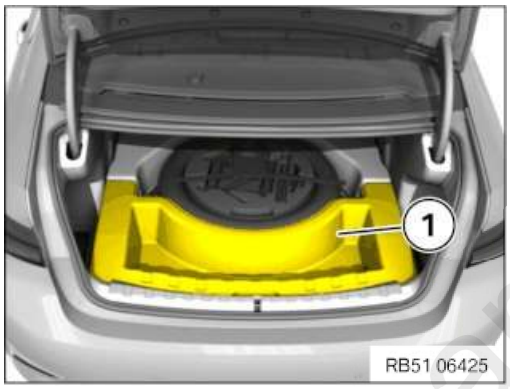
- Insert the loading edge trim (2) under the sealing lip of the tailgate seal.
- Fit the trim of the loading edge (2) at the latch mechanisms (3) and clip it in to the bottom.
- Secure expanding rivet (1).

11 – If installed: Install the emergency wheel



- Install the emergency wheel (2) with the insert.
- Position the seat belt strap above the emergency wheel and close the buckle on the seat belt strap (1).

▸ **Installing rear luggage compartment well**



- Install rear luggage compartment well (1).

12 – Installing the luggage compartment floor trim panel

▸ **Installing the luggage compartment floor trim panel**

NOTICE

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



- Insert the luggage compartment floor trim panel (1).

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13 – Connecting all battery earth leads



- See additional information.

14 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

Additional Information

Overview of Tightening Torques

Positive battery cable			Used in step 8
Positive pole screw		Tightening torque	15 Nm

Lashing eye to body			Used in step 9
		Tightening torque	19 Nm

Negative battery cable to 48-V battery			Used in step 14
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	**Used in step**
Notes on 48-V battery	114

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213

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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
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61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
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61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213

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61 25 ... Assessment of the transportability of the lithium ion starter/auxiliary battery in service workshops

Initiating:

For analysis and disposal purposes, it is necessary to transport the already used lithium-ion starter/auxiliary batteries. These lithium ion based batteries are to be classified as hazardous material according to UN 38.3, and may only be transported under particular prerequisites.

Obtaining the certified transportability between the assessment and delivery of the starter / auxiliary battery to the disposal/transportation company is the responsibility of a qualified person. For shipping one also needs to take into account the influence of the storage requirements and other possible occurring events for the determined transportability. If there is a possibility that previously certified transportability is no longer valid, it must be reassessed using the guideline.

The transport in the sense of the hazardous goods legislation is organised in three areas:

1. Assessment of the transportability
2. Transport preparation
3. Performing the transport

This document contains all the necessary information needed to assess the transportability of a used lithium ion starter/auxiliary battery. The transport preparation and execution is **not** an element of this document.

Further information on this can be found in the product information in the Aftersales Assistance Portal or S-Gate.

It will be explained which measures are necessary in order to assess the transportability.

How these measures are to be performed individually depends on the particular situation at the location and is not an element of this document. These procedures are to be defined according to the local regulations / laws and recorded as valid local work instructions.

Prerequisites from a security perspective:

It should be noted that working on the open battery is prohibited.

The analysis, assessment and certification of the transportability of the lithium ion starter/auxiliary battery is the responsibility of a qualified person.

The following specifications for work safety must also be observed:

Storage of the lithium ion starter / auxiliary battery

The following points should be noted for reasons work safety point:

The battery must always protected against short circuit (cover the terminals).

Further information on this can be found in the product information in the Aftersales Assistance Portal or S-Gate.

Note:
For better traceability, this document must be printed out and archived with the vehicle data.

Assessment of the lithium ion starter/auxiliary battery

Name	Date	Serial no.	VIN

Signature: ----------

The electrical assessment of the lithium ion starter/auxiliary battery takes place via the diagnosis and test module.

Transport preventing faults according to the diagnosis or the test module	Yes	No

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Visual assessment:

Smoke	Yes	No
Leakage of solid, liquid or gaseous substances	Yes	No
Evidence of fire damage	Yes	No
Heat development	Yes	No
Deformations, changes or damages to the battery housing, which indicate an increased application of force (scratches up to 0.5 mm in depth and a length of 5 cm are permitted)	Yes	No
Cracked or broken housing	Yes	No
Electrolyte odour	Yes	No
Noise generation	Yes	No
Loose connections, loose or damaged	Yes	No
Serial number/label safety information cannot be read	Yes	No
Data matrix code is not readable or no functional LIN bus communication can be established	Yes	No
Suspected water damage	Yes	No

The serial number must be clearly legible. If the type plate can no longer be read, the housing of the lithium ion starter/auxiliary battery must be clearly marked with the serial number.

The label of the safety information must be replaced if it is illegible.

The electrical and visual assessment must be set down in writing!

If one or more points is/are answered with yes, the next procedure must be clarified by Technical Support! Furthermore, the removed lithium ion starter/auxiliary battery must be blocked off with high-voltage barrier tapes. If a lithium ion starter/auxiliary battery is still located in the vehicle, the vehicle must be parked in the open.

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61 00 ... Battery charging calendar

Battery charging calendar 2016 (PDF file)

Battery charging calendar 2017 (PDF file)

Battery charging calendar 2018 (PDF file)

Battery charging calendar 2019 (PDF file)

Battery charging calendar 2020 (PDF file)

Battery charging calendar 2021 (PDF file)

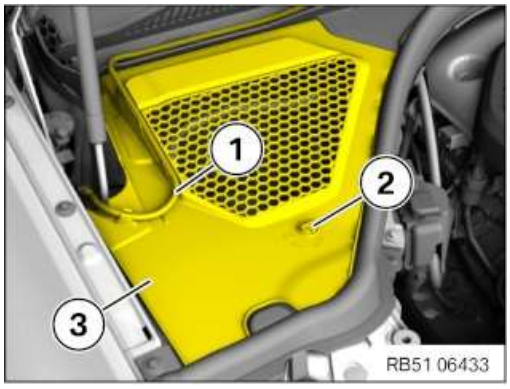
Battery charging calendar 2022 (PDF file)

Information for the battery charging calendar

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61 20 900 Disconnecting and connecting battery earth lead

1 – Remove the cover of the rear right engine compartment



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

2 – Disconnecting the negative auxiliary battery lead in the engine compartment

Check

- Check if an auxiliary battery is fitted in the engine compartment.

2 – Instructions for 12 V dual storage system

2 – Notes on 48-V battery

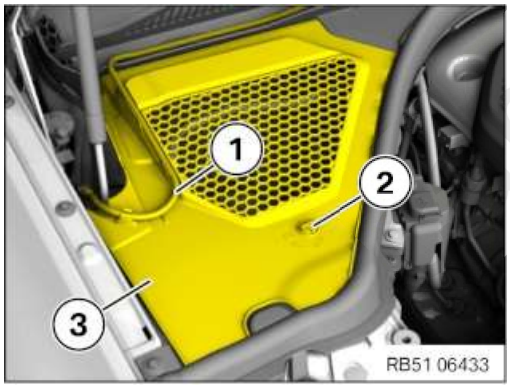
Result

» Auxiliary battery is not fitted in the engine compartment.

Measure

- Install the rear right engine compartment cover.

▸ 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.

Result

» The 48-V battery is installed.

Measure

- Disconnect the negative battery cable of the 48-V battery.

▸ Deactivating the 48V electrical system



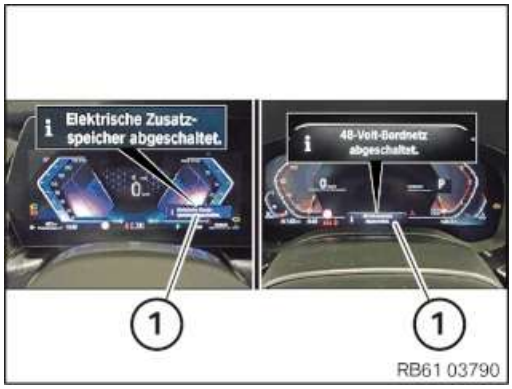
- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

▷ **Determining the absence of voltage in the 48V electrical system**

TECHNICAL INFORMATION

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



Check

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check that the instrument cluster (KOMBI) is de-energized in PAD mode.

desired state

- The Check Control message "48V vehicle electrical system switched off." Or "Electrical additional storage switched off." (1) is displayed.

Result

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

Measure

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

Only when the Check Control message "48V electrical system switched off." Or "Electrical additional storage switched off." (1) is displayed in the instrument cluster (KOMBI), may the 12 V battery be disconnected.

Result

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

Measure

- See additional information:

48V battery with fault code related to relay is stuck in closed position and de-energized

Result

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

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Measure

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

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

◁

▸ **Disconnecting the negative battery cable of the 48-V battery**

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

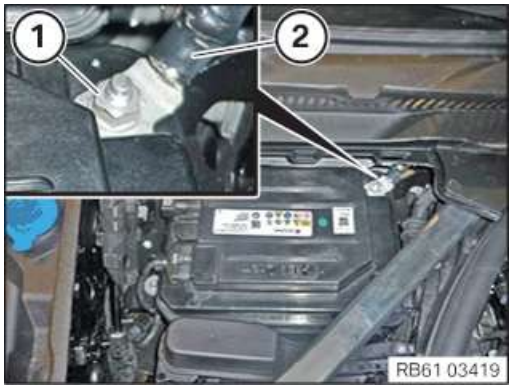
- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

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



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



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

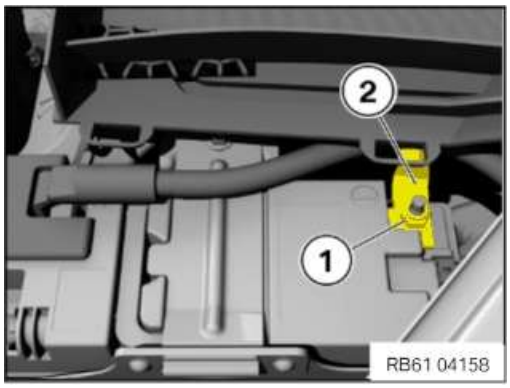
Result

» 12 V dual storage system is installed.

Measure

- Disconnect the negative battery cable of the 12V dual storage system.

▸ Disconnect the negative battery cable of the 12V dual storage system



TECHNICAL INFORMATION

Follow notes for 12 V dual storage system.

See additional information 6120 ... Notes on the 12 V dual storage system.

NOTICE

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

- Unfasten nut (1).

  The nut (1) is non-detachable and connected with the negative battery cable of the 12-V dual storage battery (2).

- Disconnect negative battery lead of the 12-V dual storage battery (2) from the negative battery terminal, set to one side and secure.

3 – Removing the luggage compartment floor trim panel

▸ Removing the luggage compartment floor trim panel

NOTICE

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

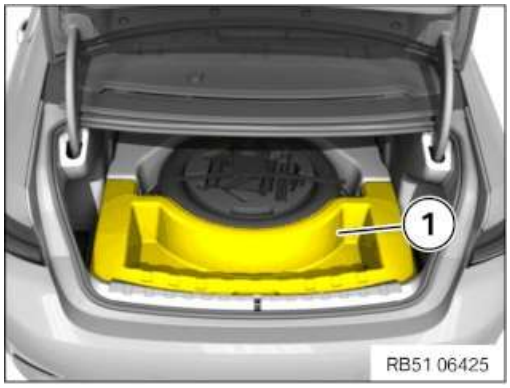


- Remove luggage compartment floor trim panel (1).

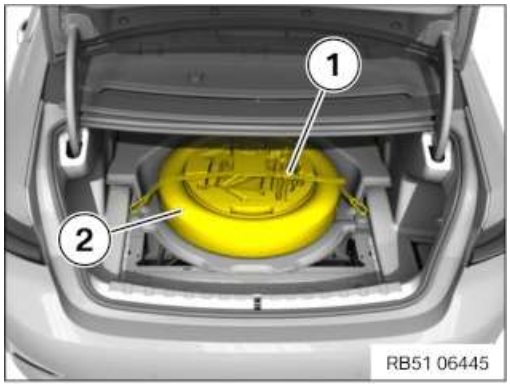
4 – If installed: Removing the compact spare wheel

▸ Removing rear luggage compartment well

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- Remove rear luggage compartment well (1).



- Open buckle on seat belt strap (1) and set it aside.
- Remove emergency wheel (2) with the insert.

5 – Disconnecting the negative battery cable of the system battery

Prerequisite

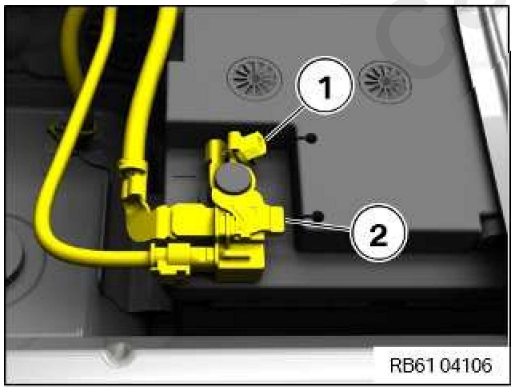
Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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



RISK OF DAMAGE

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

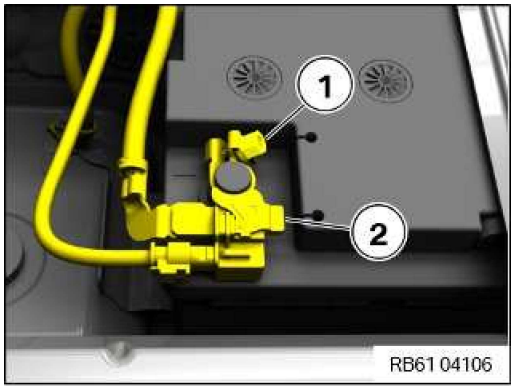
Damaged battery terminals can lead to malfunctions or vehicle electrical system faults.

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

- Loosen nut (1).
- Remove negative on-board electrical system battery lead (2) from the negative battery terminal, place to one side and secure.

6 – Connecting the negative battery cable of the system battery

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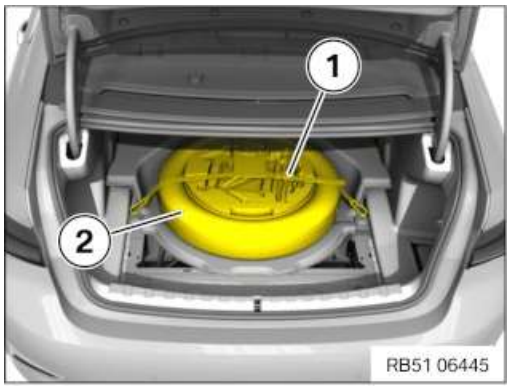


- Position negative battery cable of the system battery (2) on the negative battery terminal as shown.
- Tighten nut (1).

Negative battery terminal

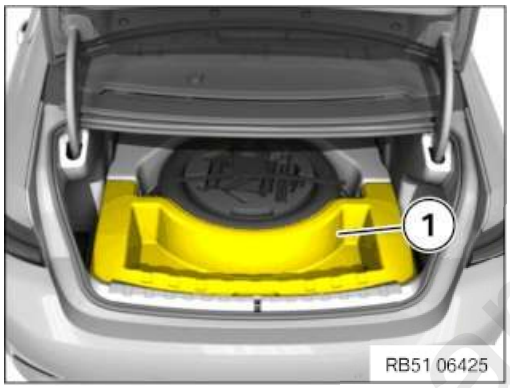
Nut		Tightening torque	5 Nm

7 – If installed: Install the emergency wheel



- Install the emergency wheel (2) with the insert.
- Position the seat belt strap above the emergency wheel and close the buckle on the seat belt strap (1).

▸ **Installing rear luggage compartment well**



- Install rear luggage compartment well (1).

8 – Installing the luggage compartment floor trim panel

▸ **Installing the luggage compartment floor trim panel**

NOTICE

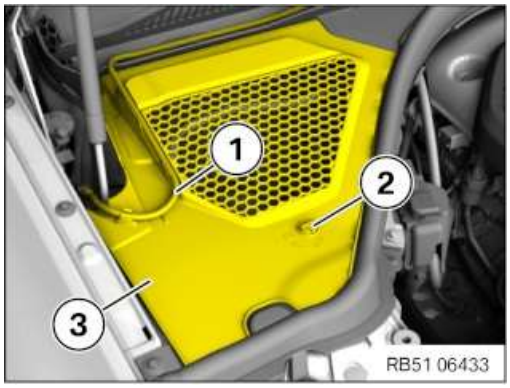
Schematic diagram is for example purposes. Some parts may differ in certain details.



- Insert the luggage compartment floor trim panel (1).

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9 – Remove the cover of the rear right engine compartment



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

10 – Connect the negative battery lead of the auxiliary battery in the engine compartment

Check

- Check if an auxiliary battery is fitted in the engine compartment.

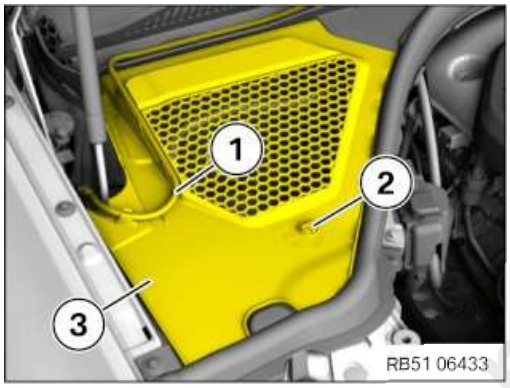
Result

» Auxiliary battery is not fitted in the engine compartment.

Measure

- Install the rear right engine compartment cover.

▸ **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.

Result

» 48-V battery is installed.

Measure

- Connect the negative battery cable of the 48-V battery.

▸ **Connecting the negative battery cable of the 48-V battery**

RISK OF DAMAGE

Damage to 48-V battery

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

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

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WARNING

Incorrect screw connection of the battery cable.

Risk of fire!

- Make sure that the battery cable is screwed together with the **correct** nut.

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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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

Result

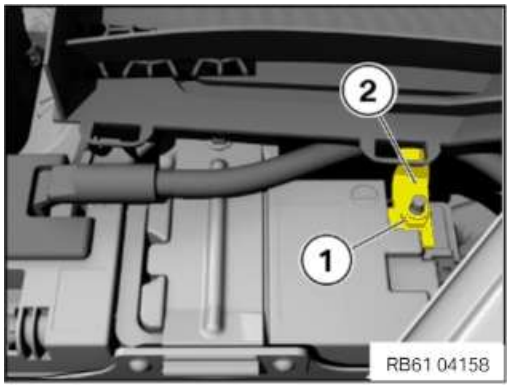
» 12 V dual storage system is installed.

Measure

- Connect negative battery cable of 12-V dual storage system.

▸ **Connecting negative battery cable of 12-V dual storage system**

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TECHNICAL INFORMATION

Follow notes for 12 V dual storage system.
See additional information 6120 ... Notes on the 12 V dual storage system.

NOTICE

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

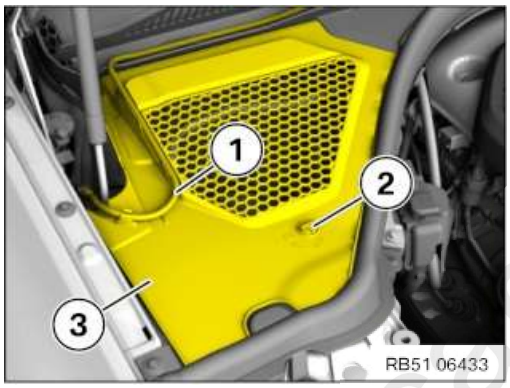
- Release negative battery cable of the 12-V-dual storage system (2) from the mount.
- Position the negative battery cable of 12-V dual storage system (2) as shown on the negative battery terminal.

  The nut (1) is connected to the negative battery cable of the dual storage battery (2) in a way that it cannot be lost.
- Tighten nut (1).

Negative battery terminal 12V dual storage system

Nut		Tightening torque	19 Nm

11 – 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.

12 – Activating the 48V electrical system



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

  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Negative battery terminal Used in step 6

Nut		Tightening torque	5 Nm

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Negative battery cable to 48-V battery			Used in step 10
Nut M8		Tightening torque	19 Nm

Negative battery terminal 12V dual storage system			Used in step 10
Nut		Tightening torque	19 Nm

Links

Repair instructions (PRE)	Used in step
Instructions for 12 V dual storage system	210
Notes on 48-V battery	2
48V battery with fault code related to relay is stuck in closed position and de-energized	2

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61 12 ... Information on intelligent battery sensor (IBS)

Notice! Do not connect the charger to the 12 V charging socket

The 12 V charging socket is supplied with voltage by the rear power distribution box via relay. This relay drops out after terminal 15 OFF. This means that a trickle charger connected at the 12 V charging socket will be disconnected from the battery. Only charge the battery via the jump start terminal point. Only then can the voltage supply be registered by the vehicle.

Warning! Danger of destruction in event of mechanical strain

- Do not introduce any additional connections at the battery negative terminal.
- Do not modify the grounding cable. The ground cable also serves heat dissipation.
- Do not establish any connection between the IBS and the sensor screw.
- Do not use force when disconnecting the pole shoe from the battery terminal:
  - Do not pull on the ground cable.
  - Do not place any tools under the IBS to lever off the pole shoe.
- Do not use IBS connections as levers.
- Use a torque wrench and set tightening torque in accordance with repair instructions.
- Do not release or tighten down sensor screw (Torx screw).
- Avoid contact between IBS and ground.

Warning! Danger of destruction to IBS and wiring upon battery replacement

- The IBS and wiring can be destroyed by mechanical strain upon battery replacement. Therefore avoid mechanical strain.
- The size (capacity) of the battery required for the car is coded in the Car Access System (CAS).
- Use the battery size (capacity) installed as standard upon battery replacement.
- Recode the Car Access System (CAS) when installing a battery with a different capacity.
- Register battery replacement via Service functions in diagnosis system.
- Delete fault code entries in the Digital Engine Electronics (DME) associated with battery replacement.
- Always proceed in accordance with the repair instructions.

Note: Battery draining possible in spite of the intelligent battery sensor IBS being fault-free.

- A battery can be drained (e.g. with lights or radio switched on) even when the IBS functions perfectly in conjunction with power management.
- **For this reason, only exchange the IBS when there is a corresponding fault code entry!**

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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 equipment. The individually assigned vehicle battery is the ideal compromise between the power requirements of the vehicle

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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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61 00 ... Notes for disconnecting and connecting the vehicle battery

Observe safety informations for handling vehicle battery.

Before disconnecting vehicle battery:

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

Note:

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

Caution!

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

General notes on disconnecting the vehicle 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 version with 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 vehicle battery is connected.

Only lead AGM battery:

- 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.

Note the following after having connected the vehicle battery:

Caution!

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.

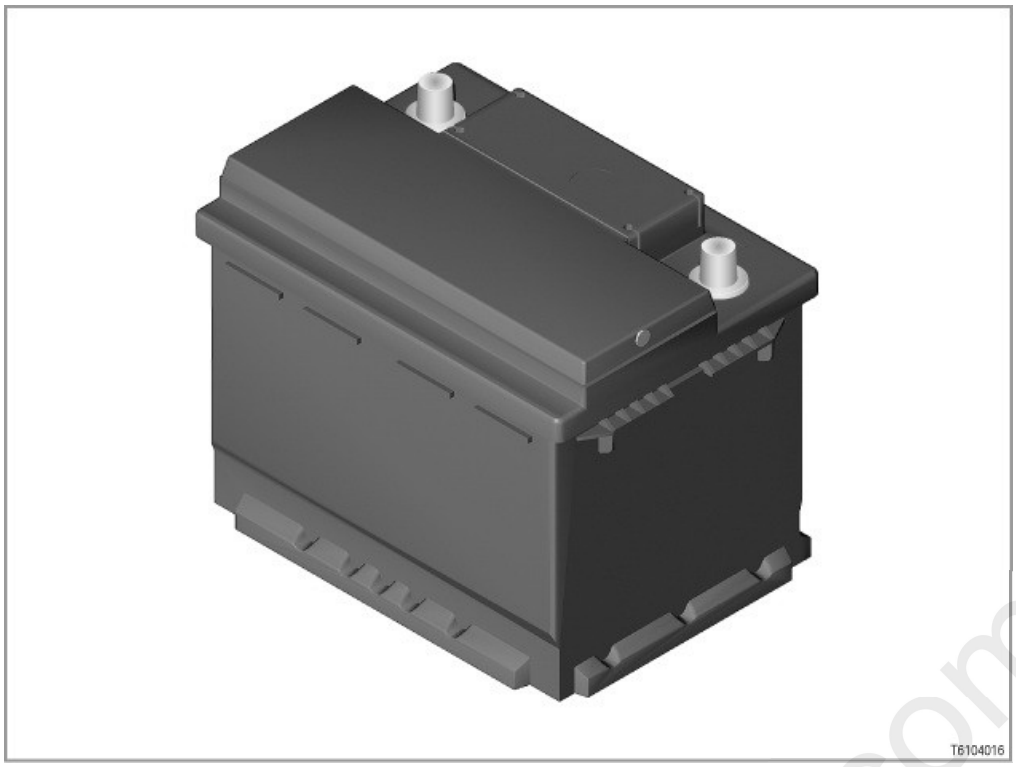
For example:

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

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

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61 20 ... Notes on AGM battery



Introduction

In September 2002, the first so-called VRLA batteries, better known as **AGM batteries** came into use. (VRLA stands for **V**alve **R**egulated **L**ead **A**cid, i.e. lead-acid battery with pressure relief valve; **AGM stands for A**bsorbent **G**lass **M**at, i.e. absorbent glass-fibre fleece).

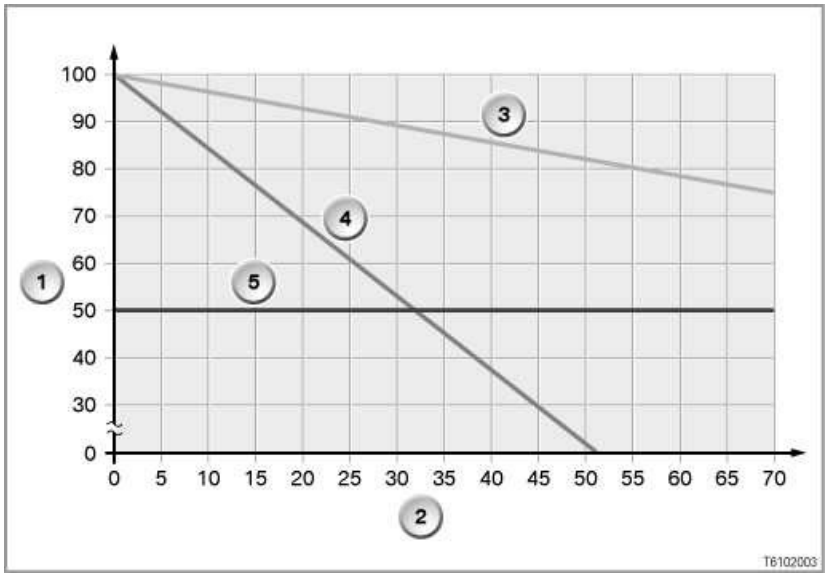
The constantly increasing energy demand of modern vehicle electrical systems calls for ever more powerful battery solutions. A modern luxury-class vehicle has some 100 actuator motors that have to be fed with electrical current. Added to these are safety, environmental and comfort elements which are increasingly becoming standard features, such as e.g. Antilock Brake System (ABS), Dynamic Stability Control (DSC), steering assistance (EPS), electronic chassis and suspension control, air conditioning and navigation system. Current consumption is considerable even when the vehicle is not in use.

The somewhat higher price compared with a battery of similar size is fully balanced by the following benefits:

- greatly longer service life
- improved starting reliability at low temperatures
- Safe starting of engines with high starting power requirements, for example high-performance diesel engines
- 100 % freedom from maintenance
- low risk in the event of an accident (reduced environmental risk)

Service life of AGM batteries

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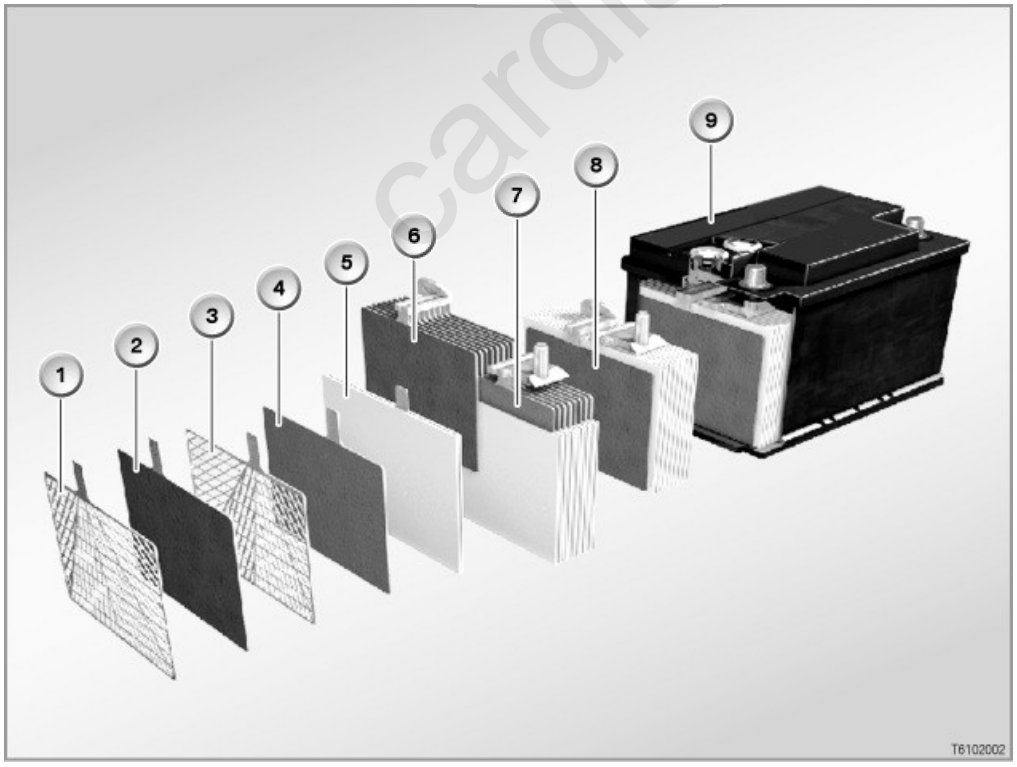


Index	Explanation	Index	Explanation
1	Available capacity [%]	2	Mileage [thousand km]
3	AGM battery	4	Lead-calcium battery
5	50 % capacity limit		

In contrast to conventional lead-calcium batteries, the sulphuric acid in a battery with fleece technology is not held freely in the battery housing. Rather, 100% of the sulphuric acid is bound into the mats of the glass-fibre fleece (separators). For this reason, no battery acid can escape if the battery housing is damaged. In addition, the AGM battery is sealed to be airtight. This is possible because the gases are converted back into water as a result of the separator permeability.

Brief component description

The AGM battery has a black housing and the so-called "Magic Eye" is missing.



Index	Explanation	Index	Explanation

1	Positive grille with silver alloy	2	Positive plate
3	Negative grille	4	Negative plate
5	Separator made of glass-fibre fleece	6	Set of positive plates
7	Set of negative plates	8	Block of plates
9	Block box with base strips		

Construction

The AGM battery differs from the conventional lead calcium battery as follows:

- larger plates: Larger plates allow a 25% larger power density.
- Separators made of glass-fibre fleece: These can cause an up to 3-times higher cycle stability to be reached. This improves the cold starting capability, the power consumption and service life.
- Airtight housing with pressure relief valve (please refer to ”How it works”):
  The inspection plugs are sealed and can not be opened.
- Battery acid bound in glass-fibre fleece: Battery acid is not found free in the housing as before, but is rather bound 100% in the glass-fibre fleece. This gives increased security against the acid escaping and thus reduces the environmental risk.

How it works

The AGM battery differs from conventional batteries in its non-polluting and substance-retaining behaviour during charging.

When a battery is charged, the electrolysis process emits the gases oxygen and hydrogen.

- In a conventional wet lead calcium battery, the two gases hydrogen and oxygen are dissipated into the atmosphere.
- In an AGM battery, the two gases are converted back into water: The oxygen which is created at the positive electrode during charging passes through the permeable glass fibre fleece to the negative electrode. At the negative electrode the oxygen reacts with the arriving hydrogen ions in the electrolyte to form water (oxygen cycle).

In this manner, the gas and thus also the electrolyte are not lost.

Only in the event of an excessively heavy build-up of gas, i.e. excessively high pressure build-up (20 to 200 mbar), does the pressure relief valve discharge the gas. In this process, the pressure relief valve does not allow any oxygen in the air to enter. Because the pressure in the battery is regulated by a valve, the AGM battery is also known as the VRLA battery (valve-regulated lead acid).

Notes for Service department

It is necessary when handling an AGM battery to observe some particular points pertaining to battery changing and installation location.

Charge

Warning! Do not charge the AGM battery with > 14.8 V. Do not use rapid-charging programs!

> When charging removed batteries (so-called stand-alone batteries), do not exceed the maximum charging voltage of 14.8 V at room temperature. Also, for charging via the external start connection point, the maximum charging voltage of 14.8 V at room temperature must not be exceeded. The battery can be damaged even if the AGM battery is only briefly charged with a charging voltage higher than 14.8 V. A charging voltage of more than 14.8 V is usually used in quick-charging routines.

Installation location

Warning! Do not install the AGM battery in the engine compartment.

> The AGM battery must not be installed in the engine compartment on account of the high spatial temperature differences, otherwise its service life will be significantly shortened.

Housing

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Warning! Do not open AGM batteries.

On no account may AGM batteries be opened, as the ingress of oxygen from the atmosphere would cause the battery to lose its chemical balance, rendering it unserviceable.

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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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61 00 ... Repairing airbag cables

Caution!

> **Only repair those cables which show visible signs of damage. In the event of visible damage, make sure there is only one cable repair in effect after the repair work. If no visible damage can be identified, the entire cable must be replaced. When carrying out repairs to the airbag wiring harness, you must use the spare parts offered in the Electronic Parts Catalogue (EPC).**

Safety regulations for handling components of airbag system.

Instructions for disconnecting and connecting battery.

In event of non-visible damage to wiring harness:

Disconnect plug connection on airbag module or on plug adapter. It is absolutely vital to disconnect the contacts in succession as there is a risk of mixing up (similar parts)! Cut through one cable after the other at an appropriate position, do not under any circumstances cut through both cables at the same time. Insulate cables remaining in wiring harness with insulating tape. Now disconnect the plug connection from the airbag control unit. Unpin contacts. Cut through one cable after the other at an appropriate position and insulate with insulating tape, do not under any circumstances cut through both cables at the same time. Pin the contacts of the repair cable for the airbag control unit into the control-unit connector, the allocation of the repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead. Now pin the contacts for the airbag module or the contacts of the plug adapter, the allocation of the repair cables is relevant. Cut off excess length of repair cable in proximity (visible area) of airbag module or of plug adapter. Twist open cables. With the butt connectors and heat-shrink tubings in the Electronic Parts Catalogue (EPC), reconnect the cables with the same cable colours. Twist cables again, open length (twist) must not exceed 40 mm. Secure interface (heat-shrink tubing) with insulating tape to prevent cables from twisting open.

In event of visible damage:

Expose cable at damaged areas. Cut through one cable after the other at an appropriate position and insulate cables no longer required in wiring harness with insulating tape, do not under any circumstances cut through both cables at the same time. Now, depending on the work scope, unpin the contacts either on the airbag control unit or on the airbag module or plug adapter. Cut off unpinned cables. Insulate cables remaining in wiring harness with insulating tape. Now pin in contacts of repair cable, assignment of repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead up to separation point. Cut off excess length of repair cable. Twist open cables. Connect cables with butt connectors and heat-shrink tubings in Electronic Parts Catalogue (EPC), assignment of repair cables is relevant. Twist cables again, open length (twist) must not exceed 40 mm. Secure interface (heat-shrink tubing) with insulating tape to prevent cables from twisting open.

Instructions for cutting off, insulating, crimping cables, installing and removing contacts:

Cutting off and insulating cables.

Repairing a plug connection using butt connectors.

Installing and removing contacts.

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61 20 908 Running vehicle battery "power reset"

1 Carrying out a voltage interruption of the 12-V battery

TECHNICAL INFORMATION

The voltage interruption is carried out with the diagnosis system via the specified path.

- 03 Body
- Voltage supply
- Activate rest state
- Power-down command

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61 00 ... Safety information on handling hybrid cars

Please observe the current version. Safety information for handling electric and hybrid vehicles

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 prerequisites:
     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 instrument cluster **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.

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=> 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 notes on paintwork.
   - Removed high-voltage 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. *Equipotential bonding:*
   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 00 ... Safety instructions for handling vehicle battery

Do not allow any battery acid to come into contact with the eyes, the skin or clothing. Therefore wear protective clothing, gloves and eye protection.

Do not tilt the battery, acid may emerge from the vent hole.

If acid is splashed into the eyes, rinse them immediately for several minutes with clear water. You must then consult a doctor without delay.

If acid is splashed onto the skin or clothing, neutralise it immediately with a soap solutionand rinse with lots of water.

Seek medical attention immediately if battery acid is accidentally swallowed.

Strictly no flames, sparks, naked light or smoking!

A highly explosive detonating gas is created when batteries are charged. The rooms where charging is carried out must therefore always be well ventilated.

Avoid the formation of sparks when handling cables, wiring and electrical devices.

Turn the ignition lock to the 0 position before disconnecting or connecting the battery.

Do not place tools or any similar object on the battery (danger of short circuit and explosion hazard!).

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61 20 503 Vehicle battery - closed-circuit current monitoring

Necessary preliminary tasks:

To access the battery earth lead, perform the necessary preliminary work described in the document Disconnecting battery earth lead.

Do not disconnect the battery earth lead!

Note:
If several 12 V batteries are installed in the vehicle:

Closed-circuit current check is possible **on the vehicle battery only**.



Connect diagnosis system.

Connect the clip-on probe to the battery earth lead of the vehicle battery. The arrow on the clip-on probe must point towards the vehicle battery.

Measure closed-circuit current.

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61 25 ... Assessment of the transportability of the lithium ion starter/auxiliary battery in service workshops

Initiating:

For analysis and disposal purposes, it is necessary to transport the already used lithium-ion starter/auxiliary batteries. These lithium ion based batteries are to be classified as hazardous material according to UN 38.3, and may only be transported under particular prerequisites.

Obtaining the certified transportability between the assessment and delivery of the starter / auxiliary battery to the disposal/transportation company is the responsibility of a qualified person. For shipping one also needs to take into account the influence of the storage requirements and other possible occurring events for the determined transportability. If there is a possibility that previously certified transportability is no longer valid, it must be reassessed using the guideline.

The transport in the sense of the hazardous goods legislation is organised in three areas:

1. Assessment of the transportability
2. Transport preparation
3. Performing the transport

This document contains all the necessary information needed to assess the transportability of a used lithium ion starter/auxiliary battery. The transport preparation and execution is **not** an element of this document.

Further information on this can be found in the product information in the Aftersales Assistance Portal or S-Gate.

It will be explained which measures are necessary in order to assess the transportability.

How these measures are to be performed individually depends on the particular situation at the location and is not an element of this document. These procedures are to be defined according to the local regulations / laws and recorded as valid local work instructions.

Prerequisites from a security perspective:

It should be noted that working on the open battery is prohibited.

The analysis, assessment and certification of the transportability of the lithium ion starter/auxiliary battery is the responsibility of a qualified person.

The following specifications for work safety must also be observed:

Storage of the lithium ion starter / auxiliary battery

The following points should be noted for reasons work safety point:

The battery must always protected against short circuit (cover the terminals).

Further information on this can be found in the product information in the Aftersales Assistance Portal or S-Gate.

Note:
For better traceability, this document must be printed out and archived with the vehicle data.

Assessment of the lithium ion starter/auxiliary battery

Name	Date	Serial no.	VIN

Signature: ----------

The electrical assessment of the lithium ion starter/auxiliary battery takes place via the diagnosis and test module.

Transport preventing faults according to the diagnosis or the test module	Yes	No

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Visual assessment:

Smoke	Yes	No
Leakage of solid, liquid or gaseous substances	Yes	No
Evidence of fire damage	Yes	No
Heat development	Yes	No
Deformations, changes or damages to the battery housing, which indicate an increased application of force (scratches up to 0.5 mm in depth and a length of 5 cm are permitted)	Yes	No
Cracked or broken housing	Yes	No
Electrolyte odour	Yes	No
Noise generation	Yes	No
Loose connections, loose or damaged	Yes	No
Serial number/label safety information cannot be read	Yes	No
Data matrix code is not readable or no functional LIN bus communication can be established	Yes	No
Suspected water damage	Yes	No

The serial number must be clearly legible. If the type plate can no longer be read, the housing of the lithium ion starter/auxiliary battery must be clearly marked with the serial number.

The label of the safety information must be replaced if it is illegible.

The electrical and visual assessment must be set down in writing!

If one or more points is/are answered with yes, the next procedure must be clarified by Technical Support! Furthermore, the removed lithium ion starter/auxiliary battery must be blocked off with high-voltage barrier tapes. If a lithium ion starter/auxiliary battery is still located in the vehicle, the vehicle must be parked in the open.

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61 00 ... Battery charging calendar

Battery charging calendar 2016 (PDF file)

Battery charging calendar 2017 (PDF file)

Battery charging calendar 2018 (PDF file)

Battery charging calendar 2019 (PDF file)

Battery charging calendar 2020 (PDF file)

Battery charging calendar 2021 (PDF file)

Battery charging calendar 2022 (PDF file)

Information for the battery charging calendar

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61 21 028 Charging battery



Warning!

Read and comply with safety informations pertaining to vehicle battery.



Attention!

Lead-acid battery, AGM battery:

To prevent the intelligent battery sensor from malfunctioning, use the charging points in the engine compartment.

Observe instructions on intelligent battery sensor/battery electronics.



Note:
Use BMW-recommended charging computers* to charge the battery.

*Sourcing reference BMW Workshop Equipment Catalogue



Pay attention when charging the lithium ion battery!

The charging voltage generated by existing chargers designed for the lead-acid or AGM batteries is **too high** for the lithium-ion battery.

In the event of excessive charging voltage, the Li-ion battery isolating switch can open, generating among things a ccm message in the cluster.

Before charging a lithium ion battery, adjust the charging voltage of existing charger adapters once.

Follow notes on lithium ion battery.

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61 21 006 Remove and install 48-V battery

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

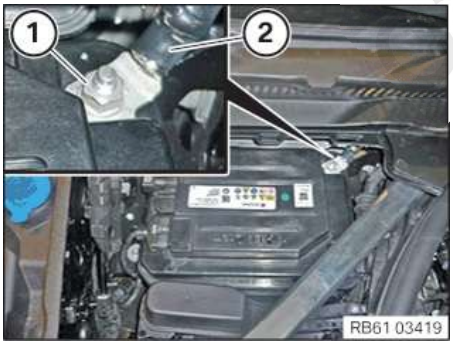
Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

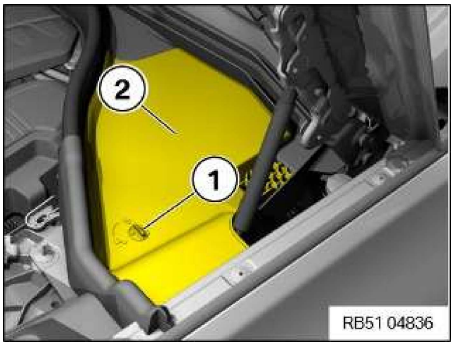
2 – Disconnecting all battery earth leads

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- See additional information.

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



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

4 – Removing the wiper arm on the left and right

NOTICE

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

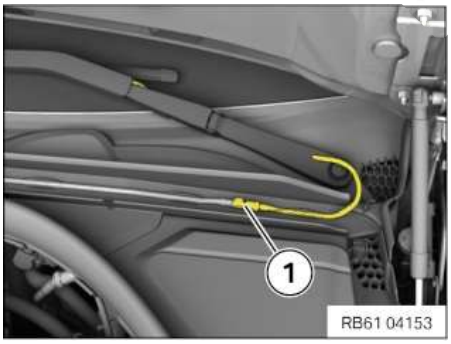
▶ **Remove the wiper arm**

RISK OF DAMAGE

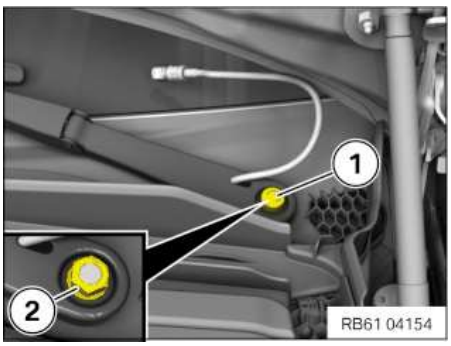
Damage to wiper console.

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

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

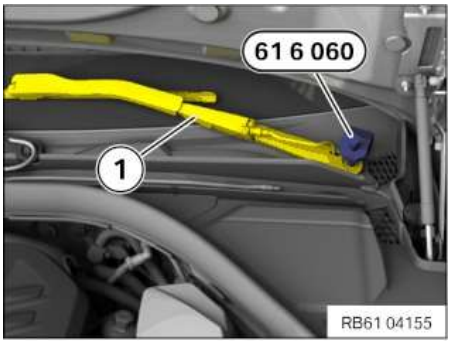


- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.



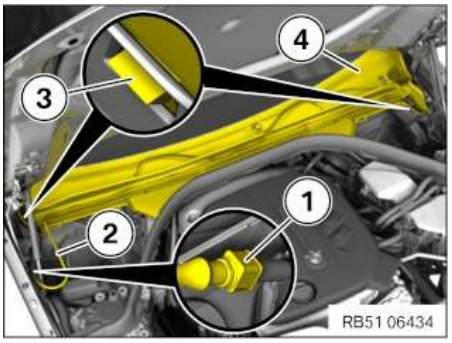
- Remove the protective cap (1).
- Loosen nut (2).

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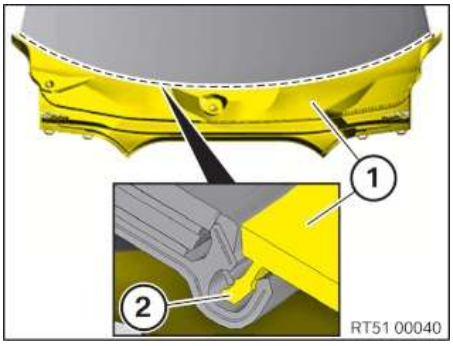


- Pull off the wiper arm (1) using special tool .

5 – Remove cowl panel cover



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

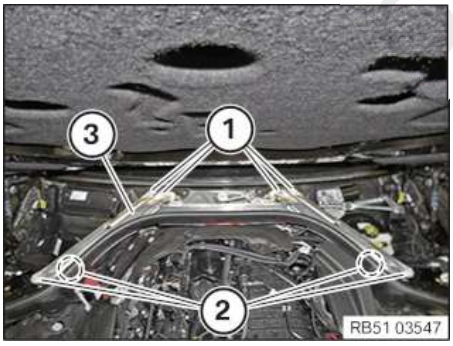


- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

6 – If installed: Removing the strut brace from the back of the engine compartment

TECHNICAL INFORMATION

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



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

MAIN WORK

7 – Removing the 48-V battery

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WARNING

Hot surfaces.

Risk of burning!

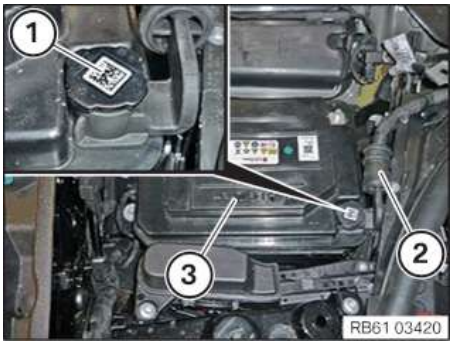
- Perform all work only on components that have cooled down.

TECHNICAL INFORMATION

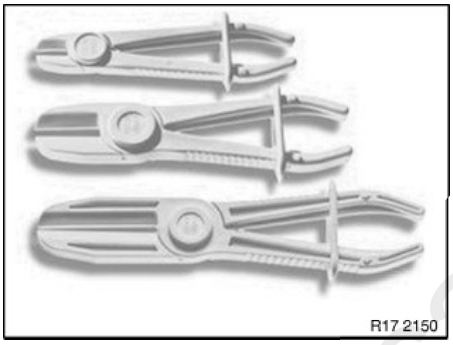
Use commercially available pinch-off tools to pinch off the coolant hoses.

TECHNICAL INFORMATION

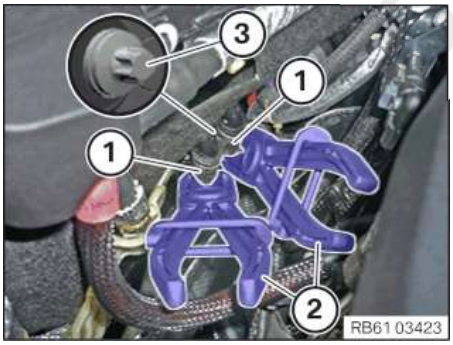
Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Release the positive terminal cover (1).
- Unscrew the nut below it.
- Pull off the positive battery cable (2) from the 48-V battery (3) and fix it on the side.



- Use commercially available disconnection tools to disconnect the coolant lines.

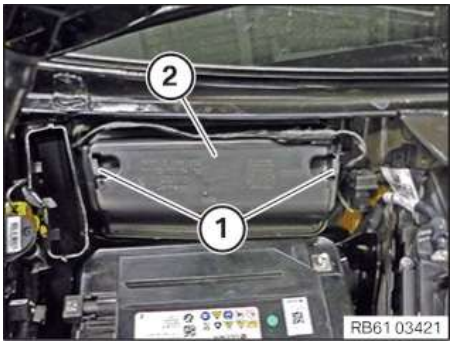


- Disconnect the coolant lines (1) with the disconnection tools (2).
- Release the screw (3).
- Release the coolant flange.

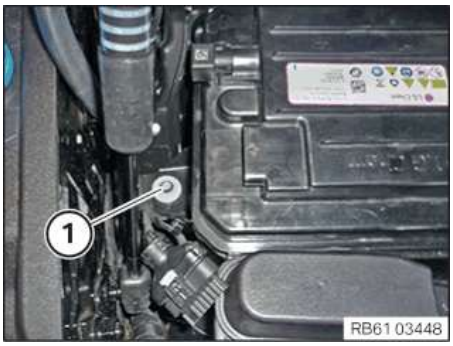


- Release the cover caps (1) by turning them.
- Release screws underneath.

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- Release the latch mechanisms (1) and remove the cover (2).



- Release the screw (1).



- Feed out the 48-V battery (1) with the battery tray.

8 – Installing the 48-V battery



- Feed in the 48-V battery (1) with the battery tray.

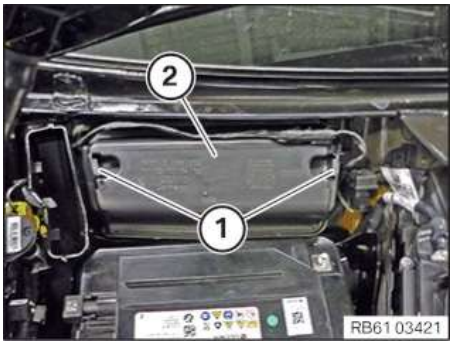


- Tighten down screw (1).

Battery carrier to body

M8 screw		Tightening torque	19 Nm

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- Install the cover (2).

  The latch mechanisms (1) must engage audibly.

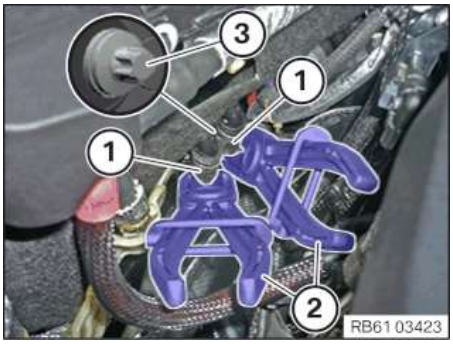


- Tighten the screws.

Battery carrier to body

M6 screw		Tightening torque	8 Nm

- Install cover caps (1) by turning.

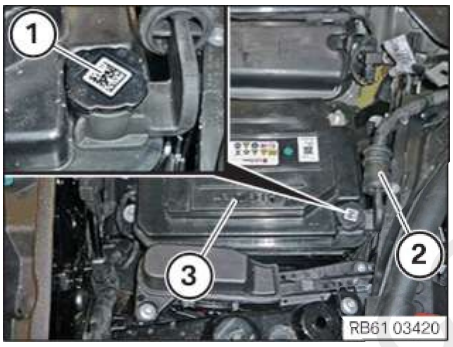


- Check the seals of the coolant flange for damage, renew if necessary.
- Position the coolant connection.
- Tighten down screw (3).

Coolant flange screw

M6x20 screw		Tightening torque	8 Nm

- Remove disconnection tool (2) from the coolant connecting lines(1).



WARNING

Incorrect screw connection of the battery cable.

Risk of fire!

- Make sure that the battery cable is screwed together with the **correct** nut.

- Position the positive battery cable (2) on the 48-V battery (3).
- Tighten the nuts on the positive battery cable (2).

Positive battery cable to 48-V battery

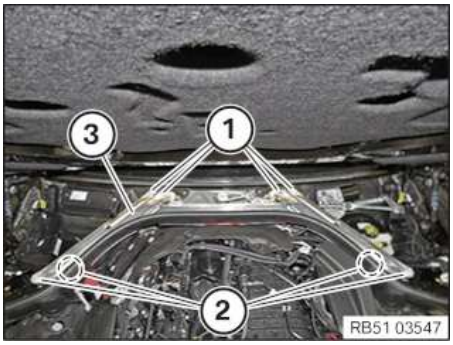
Nut M8		Tightening torque	19 Nm

- Mount positive terminal cover (1)

POSTPROCESSES

9 – If installed: Install strut brace in rear of engine compartment

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- Install the strut brace (3).
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Cross-brace to bulkhead

Hexagon screw M10x25	Renew screws.	Tightening torque Angle of rotation	56 Nm 90 °

- Renew screws (2).

  Parts: Screws
- Tighten the screws (2).

Cross-brace to spring strut dome

Hexagon screw M10x55	Renew screws.	Tightening torque Angle of rotation	56 Nm 90 °

10 – Installing cowl panel cover

RISK OF DAMAGE

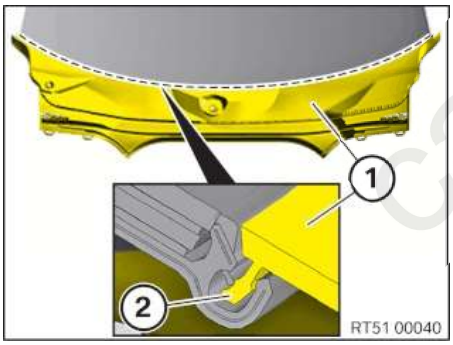
Damage caused by water ingress into the vehicle.

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

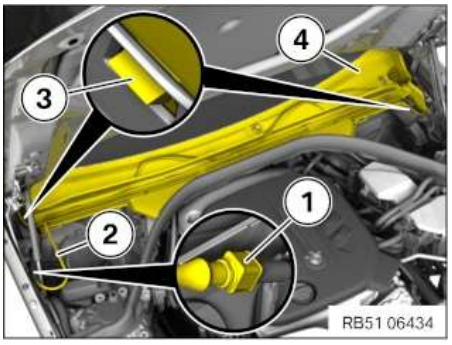
- Ensure correct installation of the components.
- Only use undamaged components.

TECHNICAL INFORMATION

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



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



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

11 – Install left and right wiper arm

NOTICE

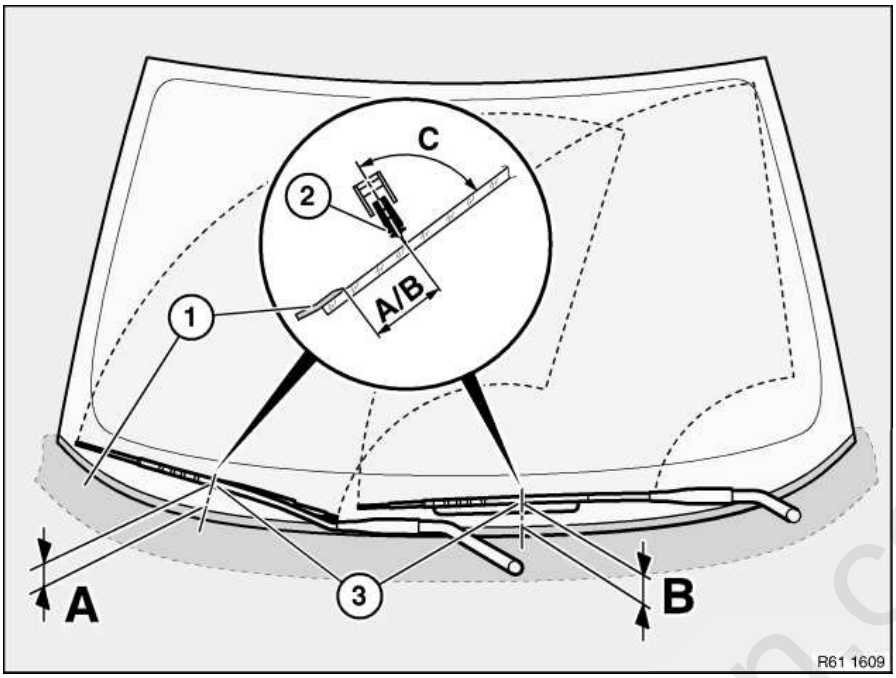
Description is for left component only. Procedure on the right side is identical.

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▸ **Installing left and right wiper arm**

TECHNICAL INFORMATION

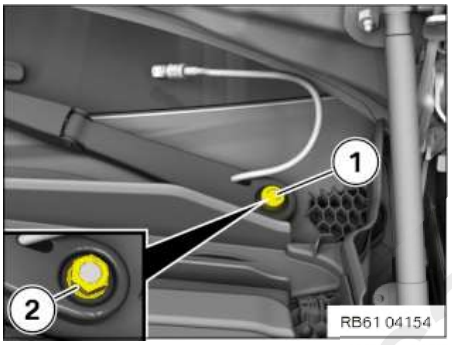
The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.



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

Distance from window pane edge to wiper blade

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

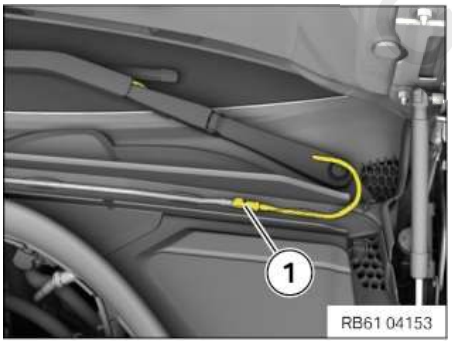


- Tighten nut (2).

Windscreen wiper arm

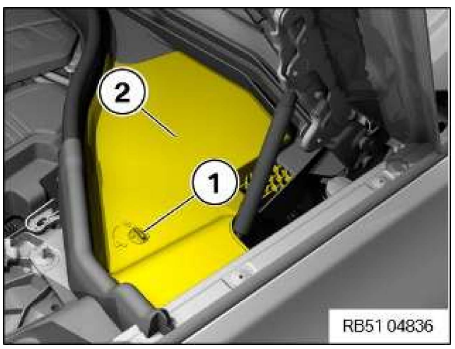
Combination hexagon nut	Tightening torque	35 Nm

- Connect the protective cap (1).



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

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



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

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13 – Connecting all battery earth leads



- See additional information.

14 – Filling and bleed the low-temperature coolant circuit



TECHNICAL INFORMATION

It is **mandatory** to fill the cooling system before bleeding.
Fill **both** the circuits for high and low-temperature coolant circuits.

- See additional information.

15 – Activating the 48 V electrical system

Prerequisite

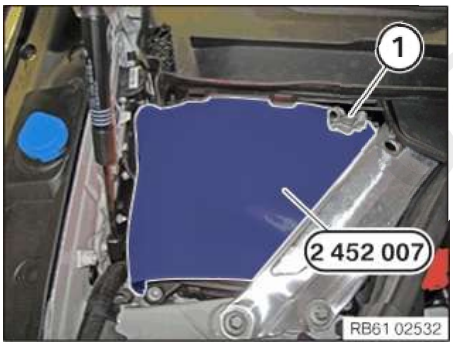
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

Additional Information

Overview of Tightening Torques

Battery carrier to body			Used in step 8
M8 screw		Tightening torque	19 Nm

Battery carrier to body			Used in step 8
M6 screw		Tightening torque	8 Nm

Coolant flange screw			Used in step 8
M6x20 screw		Tightening torque	8 Nm

Positive battery cable to 48-V battery			Used in step 8
Nut M8		Tightening torque	19 Nm

Cross-brace to bulkhead			Used in step 9
Hexagon screw M10x25	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Cross-brace to spring strut dome			Used in step 9
Hexagon screw M10x55	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 11
Combination hexagon nut		Tightening torque	35 Nm

Negative battery cable to 48-V battery			Used in step 15
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 11
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

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Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	115

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
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61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
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61 20 900 Disconnecting and connecting battery earth lead	213
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61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting battery earth lead	213
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	213
61 20 900 Disconnecting and connecting battery earth lead	213

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61 20 900 Disconnecting and connecting battery earth lead 213

61 20 900 Disconnecting and connecting battery earth lead 213

17 00 011 Draining and topping up the coolant for the low-temperature circuit 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit 14
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Venting cooling system and checking on watertightness 14
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive) 14
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive) 14
17 00 040 Bleeding lower-temperature cooling system (B48) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 011 Draining and topping up coolant circuit for low temperature 14
17 00 040 Bleed the low-temperature cooling system and check for watertightness (coolant circuit for low temperature) 14
17 00 040 Bleeding and filling low temperature cooling system using vacuum filler device (B48) 14
17 00 011 Draining and topping up low-temperature coolant circuit 14
17 00 011 Draining and topping up low-temperature coolant circuit 14
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness 14
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness 14
17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM 14
17 00 011 Draining and topping up low-temperature coolant circuit 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature) 14
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61 21 003 Removing and installing the 12-V dual storage battery

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads

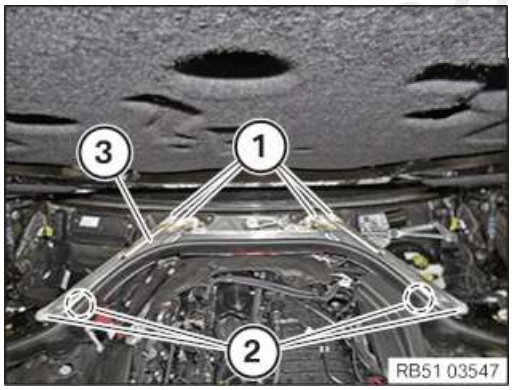


- See additional information.

2 – If installed: Removing the strut brace from the back of the engine compartment

TECHNICAL INFORMATION

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



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

MAIN WORK

3 – Removing 12 V dual storage system

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WARNING

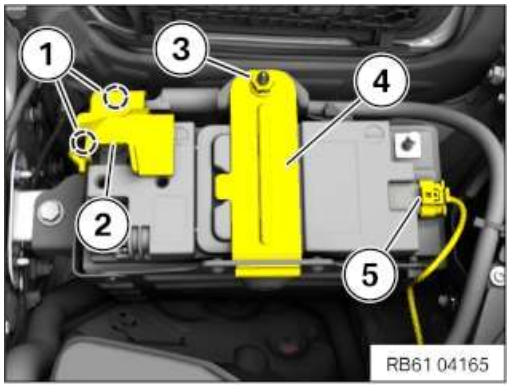
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

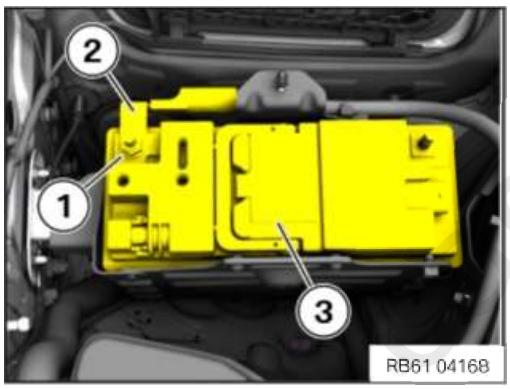
- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

TECHNICAL INFORMATION

Follow notes for 12 V dual storage system.
See additional information 6120 ... Notes on the 12 V dual storage system.



- Loosen the latch mechanisms (1).
- Remove positive terminal cover (2).
- Loosen nut (3).
- Remove battery rollover protection bracket (4).
- Unlock plug connection (5) and disconnect.



- Loosen nut (1).
- Pull off the positive battery cable (2) from the positive battery terminal and fix it at the side.

WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

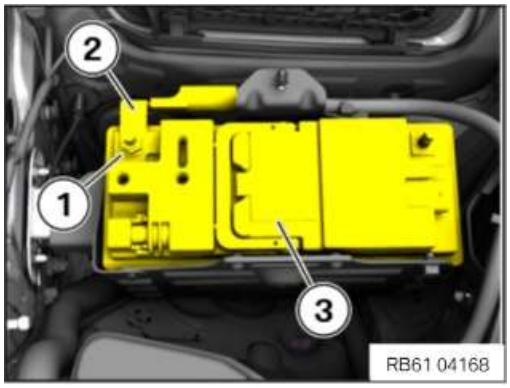
- Cover the vehicle battery.

- Fold back grab handle and remove the 12-V dual storage battery (3).

4 – Installing 12-V dual storage battery

TECHNICAL INFORMATION

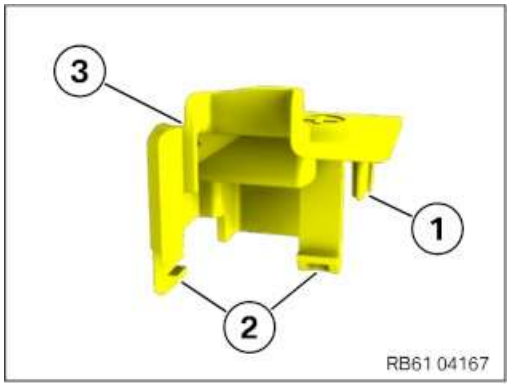
Follow notes for 12 V dual storage system.
See additional information 6120 ... Notes on the 12 V dual storage system.



- Install the 12 V dual storage system (3).
- Release the mounting of the positive battery cable (2).
- Position the positive battery cable (2) on the positive terminal.
- Tighten nut (1).

Positive battery terminal (dual storage battery)

Flange nutM8		Tightening torque	19 Nm



Check

- Check the guide (1) and the retaining lugs (2) on the positive terminal cover (3) for damage.

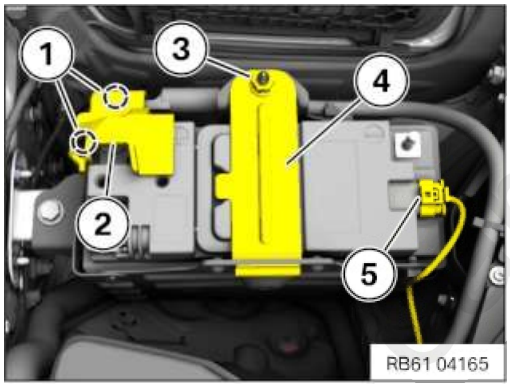
Result

» Guide (1) or retaining lugs (2) are damaged.

Measure

- Renew the positive terminal cover (3).

  Parts: Positive terminal cover



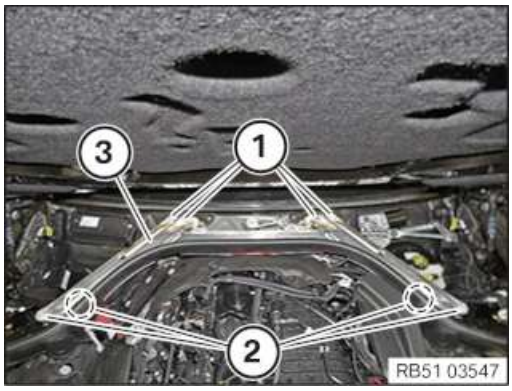
- Connect connectors (5) and lock.
- Install battery rollover protection bracket (4).
- Tighten nut (3).

Rollover protection bar auxiliary battery on holder

Nut M8		Tightening torque	15 Nm

- Insert positive terminal cover (2).
- Clip in latch mechanisms (1) on the positive terminal cover (2).

5 – If installed: Install strut brace in rear of engine compartment



- Install the strut brace (3).
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Cross-brace to bulkhead

Hexagon screw M10x25	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

- Renew screws (2).

  Parts: Screws
- Tighten the screws (2).

Cross-brace to spring strut dome

Hexagon screw M10x55	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

6 – Connecting all battery earth leads



- See additional information.

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Additional Information

Overview of Tightening Torques

Positive battery terminal (dual storage battery) Used in step 4

Flange nutM8		Tightening torque	19 Nm

Rollover protection bar auxiliary battery on holder			Used in step 4
Nut M8		Tightening torque	15 Nm

Cross-brace to bulkhead			Used in step 5
Hexagon screw M10x25	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Cross-brace to spring strut dome			Used in step 5
Hexagon screw M10x55	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Overview of Special Tools

Overview Technical Data

Links

Repair instructions (PRE)	Used in step
Instructions for 12 V dual storage system	34

Repair instructions	Used in step
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 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 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 the battery earth lead (all battery earth leads)	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 battery earth lead	16
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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

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61 20 900 Disconnecting and connecting 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
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 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 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 21 010 Removing and installing vehicle electrical system battery

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

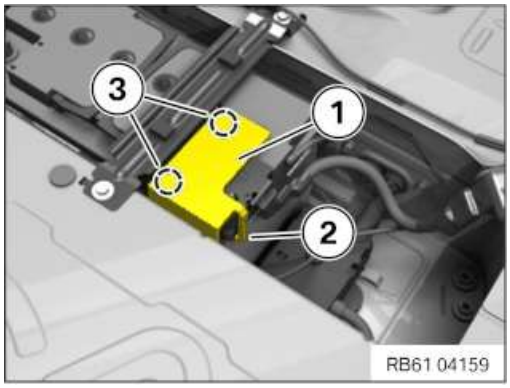
2 – Removing system battery

WARNING

Working on 12 V vehicle electrical system.

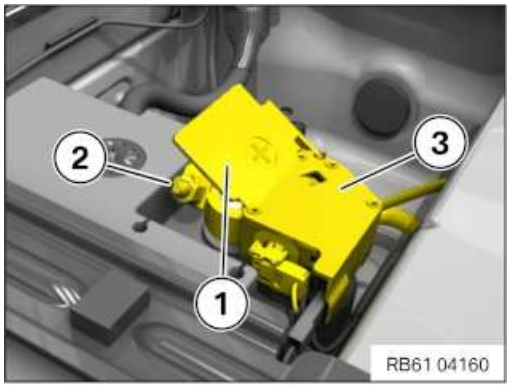
Risk of short circuits! Risk of fire!

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



- Release latch mechanism (2) of the protective cap (1).
- Feed out protective cap (1) to the top and remove it from the guides (3).

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- Remove the cover for the positive battery terminal (1).
- Loosen nut (2).

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.

- Pull off the positive battery terminal (3) from the positive battery terminal.

WARNING

Unprotected battery terminals.

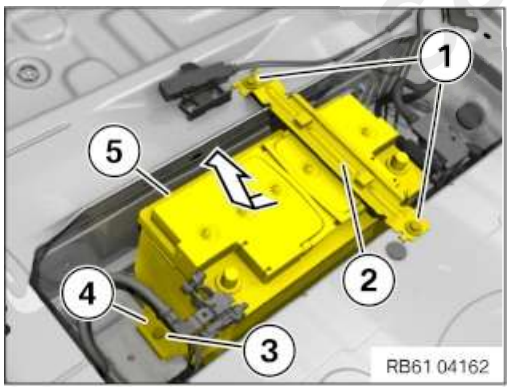
Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Locate positive battery terminal (3) laterally.

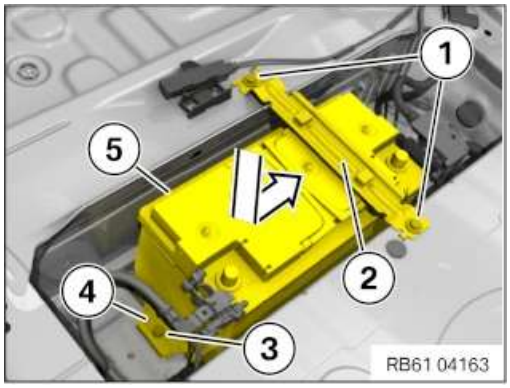


- Pull off vent hose (1) on the system battery.



- Loosen screws (1).
- Remove battery rollover protection bracket (2).
- Loosen screw (3).
- Remove the battery holder (4).
- Release vehicle battery (5) in direction of arrow and remove by the grab handles.

3 – Installing system battery



- Insert system battery (5) in the direction of the arrow.
- Install the battery holder (4).
- Tighten down screw (3).

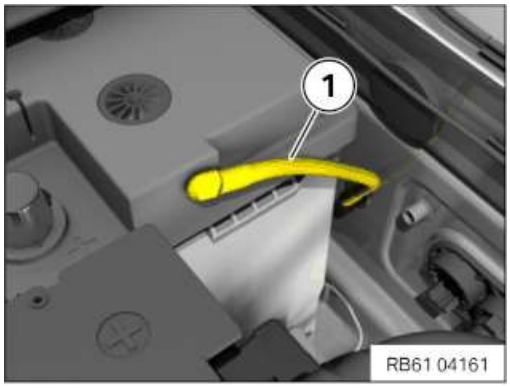
Battery holder to body

M8 screw		Tightening torque	15 Nm

- Position battery rollover protection bracket (2).
- Tighten the screws (1).

Battery rollover protection bracket to luggage compartment floor

Screw		Tightening torque	8 Nm



- Insert vent hose (1) in the opening on the system battery.

▸ **Check the vent holes of the battery**

WARNING

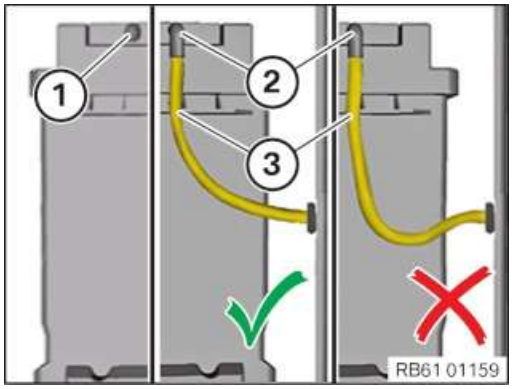
Gas emission.

Danger of injury! Danger of explosion!

- Assign the vent holes correctly.
- Route the vent hose correctly.

TECHNICAL INFORMATION

The battery has two vent holes, opposite:
One vent hole (1) must be closed correctly with a dummy plug.
The vent hose (3) must be correctly connected and routed at the other vent hole (2).



Check

- Check if the vent hole (1) is correctly closed with a dummy plug.

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Result

» No dummy plug.

Measure

- Close the vent hole (1) correctly with a dummy plug.

Check

- Check whether the vent hose (3) at the vent hole (2) has been connected correctly.

Result

» The vent hose (3) is not correctly connected.

Measure

- Connect the vent hose (3) with the vent hole (2) correctly.

Check

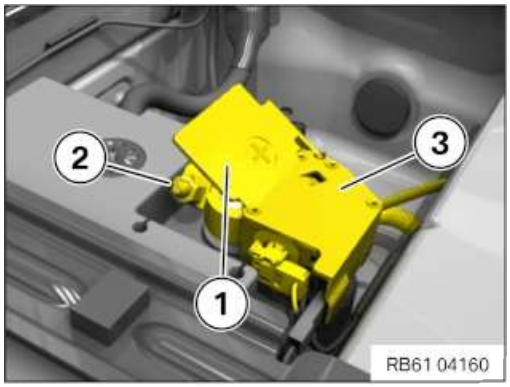
- Check whether the vent hose (3) is routed with a downhill gradient to the outside (**no siphon formation**).

Result

» The vent hose (3) is not routed correctly as shown at the right.

Measure

- Route the vent hose (3) correctly as shown in the centre.



- Position the positive battery cable (3) on the positive terminal.
- Tighten nut (2).

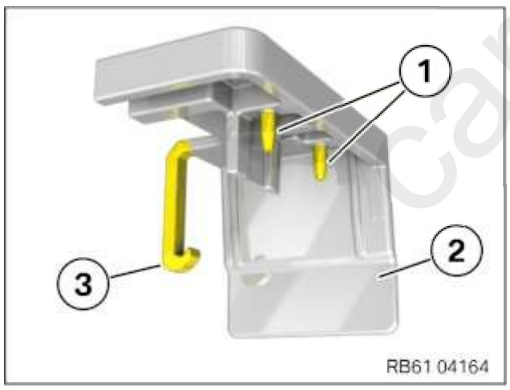
Positive battery terminal to battery

Nut		Tightening torque	5 Nm

- Close the positive terminal cover (1).

Check

- Check guides (1) and latch mechanism (3) on protective cap (2) for damage.



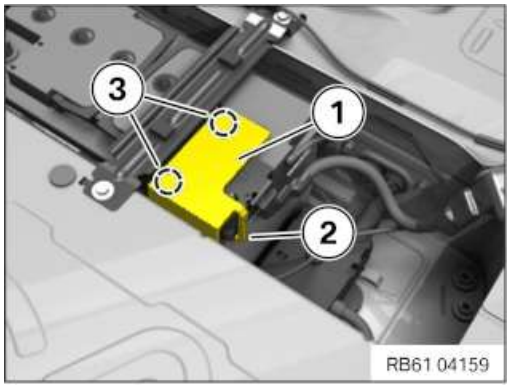
Result

» The guides (1) or the latch mechanism (3) are damaged.

Measure

- Renew protective cap (2).

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- Insert guides (3) of protective cap (1) into the associated openings on the positive battery terminal.
- Clip in protective cap (1) with latch mechanism (2).

POSTPROCESSES

4 – Connecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Battery holder to body			Used in step 3
M8 screw		Tightening torque	15 Nm

Battery rollover protection bracket to luggage compartment floor			Used in step 3
Screw		Tightening torque	8 Nm

Positive battery terminal to battery			Used in step 3
Nut		Tightening torque	5 Nm

Links

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle) 14
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61 20 900 Disconnecting and connecting battery earth lead 14
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61 21 007 Replace 48-V battery - register with battery replacement-

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

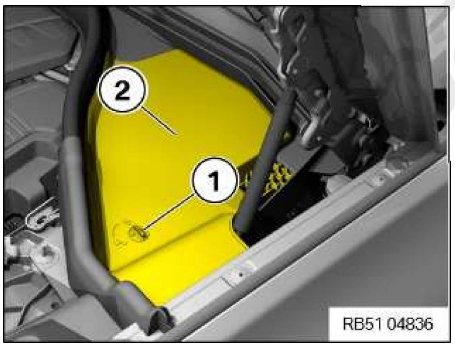
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

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



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

3 – Removing the wiper arm on the left and right

NOTICE

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

▸ **Remove the wiper arm**

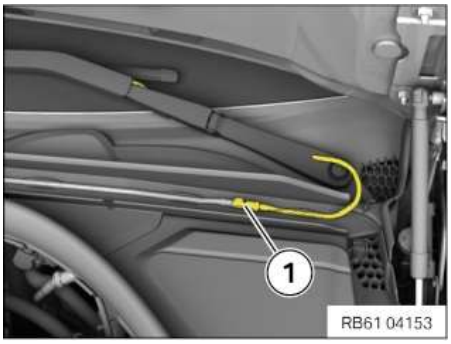
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RISK OF DAMAGE

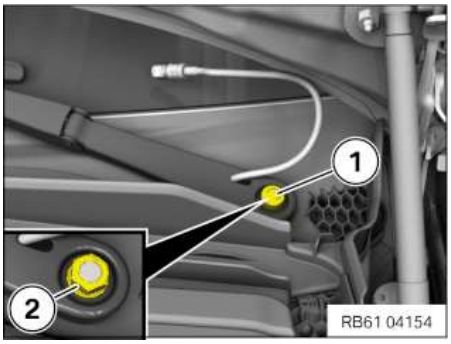
Damage to wiper console.

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

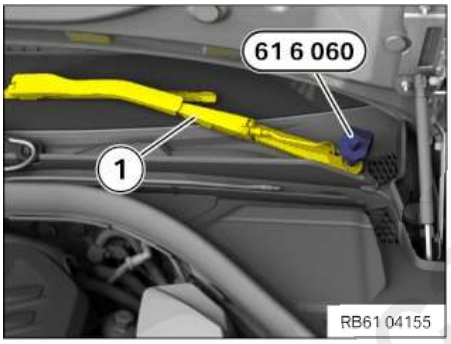
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do **not** lever off the wiper arm because otherwise the wiper console may break at the predetermined breaking point for active pedestrian protection.



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

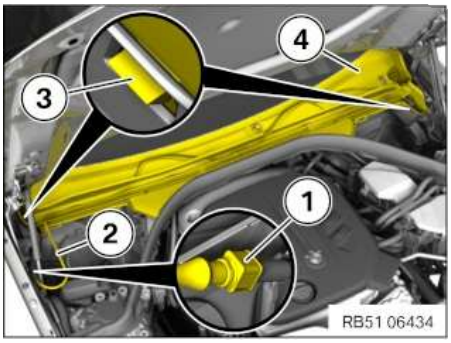


- Remove the protective cap (1).
- Loosen nut (2).



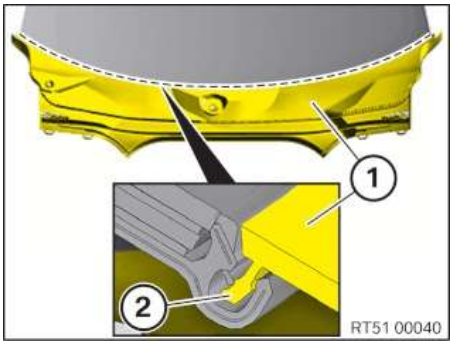
- Pull off the wiper arm (1) using special tool .

4 – Remove cowl panel cover



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

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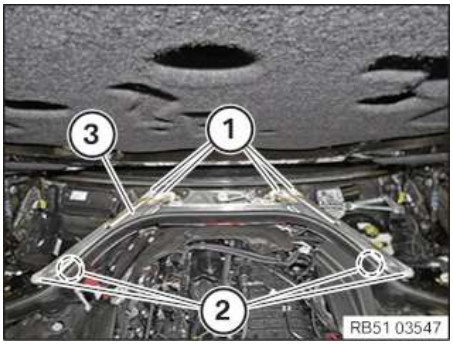


- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

5 – If installed: Removing the strut brace from the back of the engine compartment

TECHNICAL INFORMATION

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



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

MAIN WORK

6 – Removing the 48-V battery

WARNING

Hot surfaces.

Risk of burning!

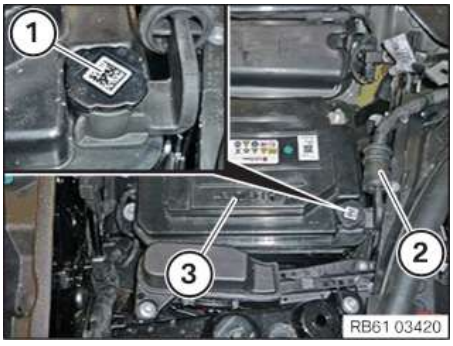
- Perform all work only on components that have cooled down.

TECHNICAL INFORMATION

Use commercially available pinch-off tools to pinch off the coolant hoses.

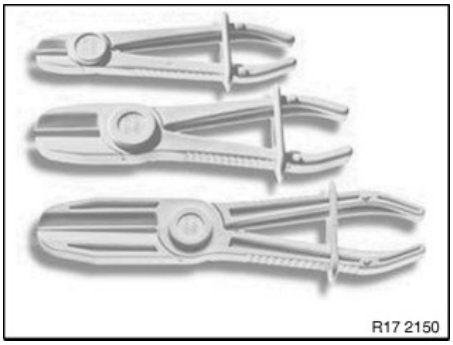
TECHNICAL INFORMATION

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

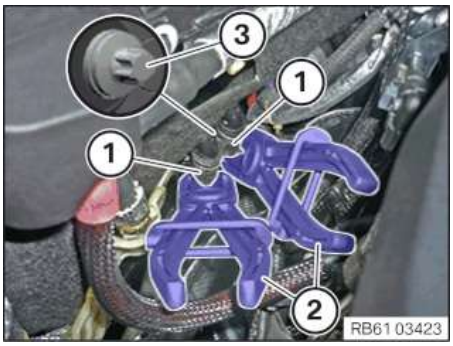


- Release the positive terminal cover (1).
- Unscrew the nut below it.
- Pull off the positive battery cable (2) from the 48-V battery (3) and fix it on the side.

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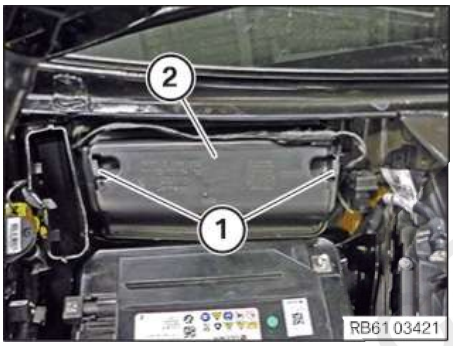
- Use commercially available disconnection tools to disconnect the coolant lines.



- Disconnect the coolant lines (1) with the disconnection tools (2).
- Release the screw (3).
- Release the coolant flange.



- Release the cover caps (1) by turning them.
- Release screws underneath.



- Release the latch mechanisms (1) and remove the cover (2).



- Release the screw (1).



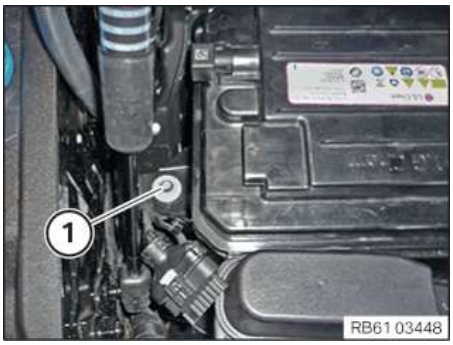
- Feed out the 48-V battery (1) with the battery tray.

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7 – Installing the 48-V battery



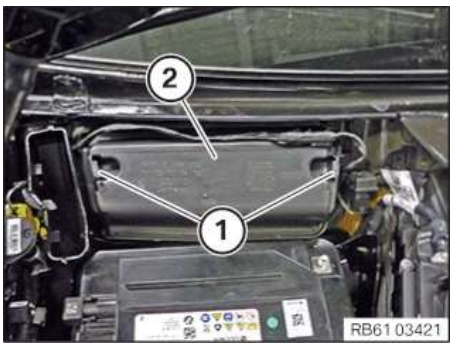
- Feed in the 48-V battery (1) with the battery tray.



- Tighten down screw (1).

Battery carrier to body

M8 screw		Tightening torque	19 Nm



- Install the cover (2).

  The latch mechanisms (1) must engage audibly.

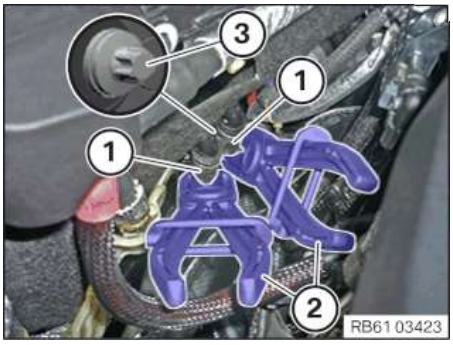


- Tighten the screws.

Battery carrier to body

M6 screw		Tightening torque	8 Nm

- Install cover caps (1) by turning.



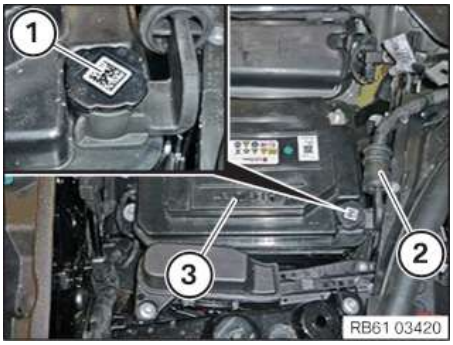
- Check the seals of the coolant flange for damage, renew if necessary.
- Position the coolant connection.
- Tighten down screw (3).

Coolant flange screw

M6x20 screw		Tightening torque	8 Nm

- Remove disconnection tool (2) from the coolant connecting lines(1).

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WARNING

Incorrect screw connection of the battery cable.

Risk of fire!

- Make sure that the battery cable is screwed together with the **correct** nut.

- Position the positive battery cable (2) on the 48-V battery (3).
- Tighten the nuts on the positive battery cable (2).

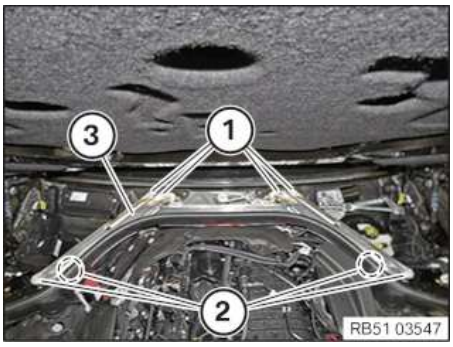
Positive battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm

- Mount positive terminal cover (1)

POSTPROCESSES

8 – If installed: Install strut brace in rear of engine compartment



- Install the strut brace (3).
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Cross-brace to bulkhead

Hexagon screw M10x25	Renew screws.	Tightening torque Angle of rotation	56 Nm 90 °

- Renew screws (2).

  Parts: Screws
- Tighten the screws (2).

Cross-brace to spring strut dome

Hexagon screw M10x55	Renew screws.	Tightening torque Angle of rotation	56 Nm 90 °

9 – Installing cowl panel cover

RISK OF DAMAGE

Damage caused by water ingress into the vehicle.

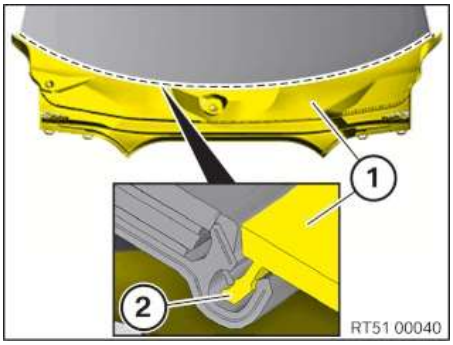
Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

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

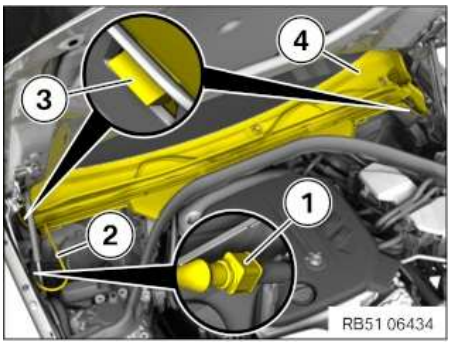
TECHNICAL INFORMATION

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

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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.

10 – Install left and right wiper arm

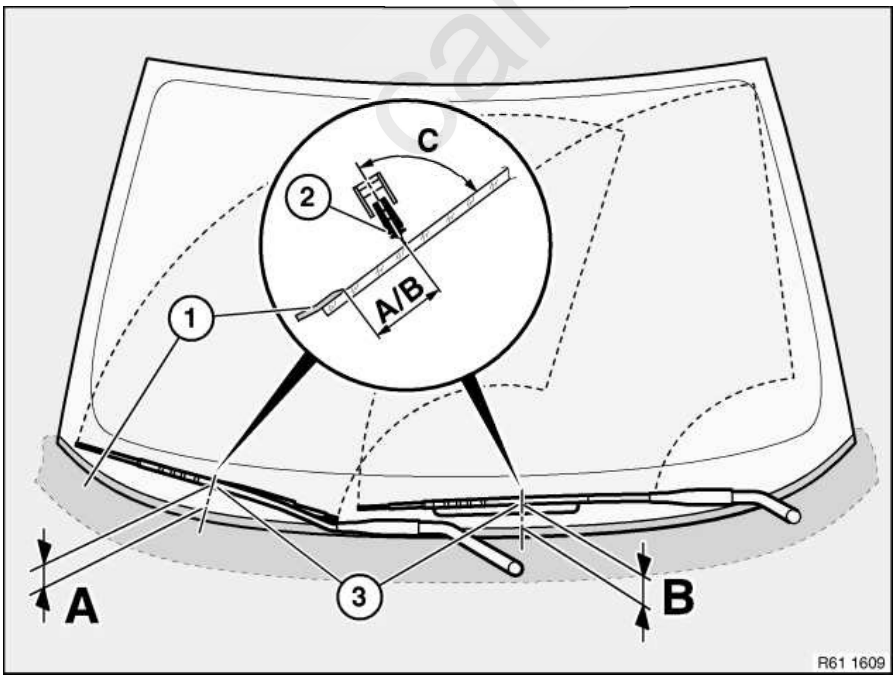
NOTICE

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

▸ **Installing left and right wiper arm**

TECHNICAL INFORMATION

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

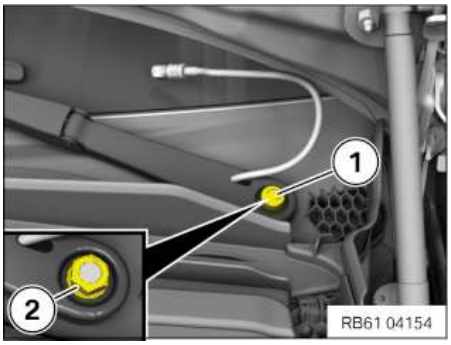


- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

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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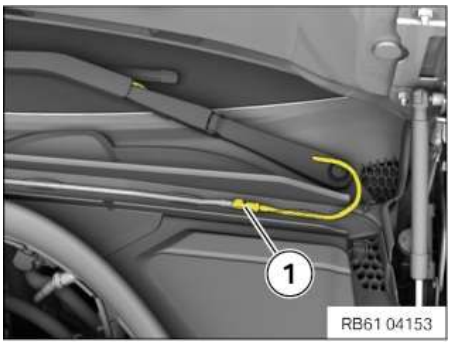


- Tighten nut (2).

Windscreen wiper arm

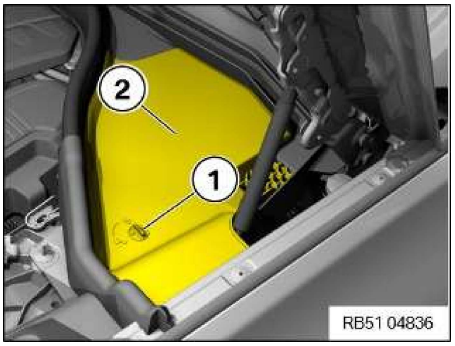
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



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

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



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

12 – Connecting all battery earth leads



- See additional information.

13 – Filling and bleed the low-temperature coolant circuit



TECHNICAL INFORMATION

It is **mandatory** to fill the cooling system before bleeding.
Fill **both** the circuits for high and low-temperature coolant circuits.

- See additional information.

14 – Register battery exchange



- After replacing the battery, register the battery exchange (see further information).

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Additional Information

Overview of Tightening Torques

Battery carrier to body			Used in step 7
M8 screw		Tightening torque	19 Nm

Battery carrier to body			Used in step 7
M6 screw		Tightening torque	8 Nm

Coolant flange screw			Used in step 7
M6x20 screw		Tightening torque	8 Nm

Positive battery cable to 48-V battery			Used in step 7
Nut M8		Tightening torque	19 Nm

Cross-brace to bulkhead			Used in step 8
Hexagon screw M10x25	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Cross-brace to spring strut dome			Used in step 8
Hexagon screw M10x55	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 10
Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 10
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

Repair instructions (PRE)	Used in step
Battery replacement information	14
Notes on 48-V battery	

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
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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 the battery earth lead (all battery earth leads)	112
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	112
61 20 900 Disconnecting and connecting 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
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
17 00 011 Draining and topping up the coolant for the low-temperature circuit	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	13
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 00 040 Venting cooling system and checking on watertightness	13
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	13
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	13
17 00 040 Bleeding lower-temperature cooling system (B48)	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 00 011 Draining and topping up coolant circuit for low temperature	13
17 00 040 Bleed the low-temperature cooling system and check for watertightness (coolant circuit for low temperature)	13
17 00 040 Bleeding and filling low temperature cooling system using vacuum filler device (B48)	13
17 00 011 Draining and topping up low-temperature coolant circuit	13
17 00 011 Draining and topping up low-temperature coolant circuit	13
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	13
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	13
17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	13
17 00 011 Draining and topping up low-temperature coolant circuit	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	13
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61 21 004 Replacing the 12-V dual storage battery – registering with battery exchange-

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads

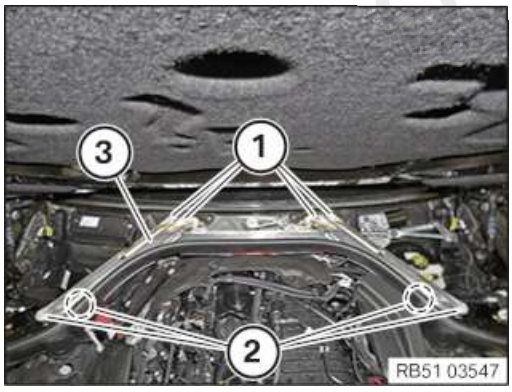


- See additional information.

2 – If installed: Removing the strut brace from the back of the engine compartment

TECHNICAL INFORMATION

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



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

MAIN WORK

3 – Removing 12 V dual storage system

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WARNING

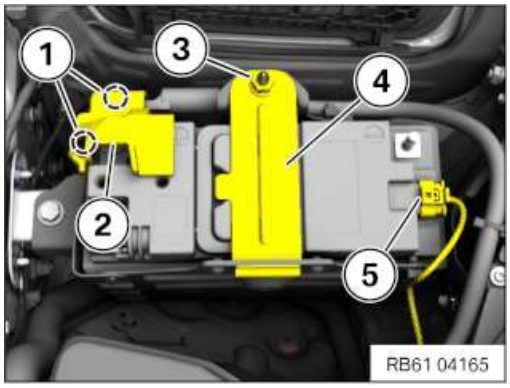
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

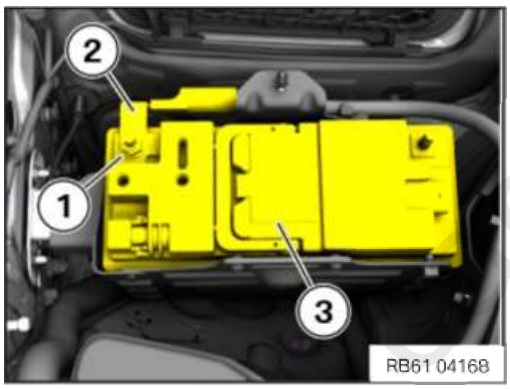
- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

TECHNICAL INFORMATION

Follow notes for 12 V dual storage system.
See additional information 6120 ... Notes on the 12 V dual storage system.



- Loosen the latch mechanisms (1).
- Remove positive terminal cover (2).
- Loosen nut (3).
- Remove battery rollover protection bracket (4).
- Unlock plug connection (5) and disconnect.



- Loosen nut (1).
- Pull off the positive battery cable (2) from the positive battery terminal and fix it at the side.

WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

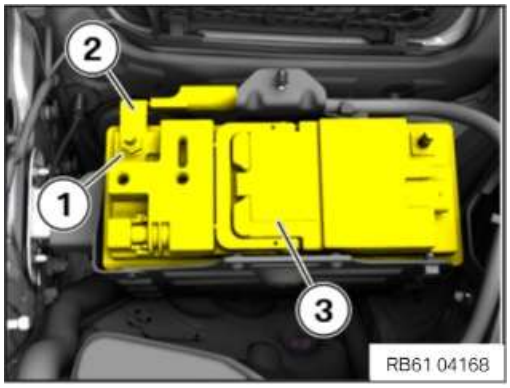
- Cover the vehicle battery.

- Fold back grab handle and remove the 12-V dual storage battery (3).

4 – Installing 12-V dual storage battery

TECHNICAL INFORMATION

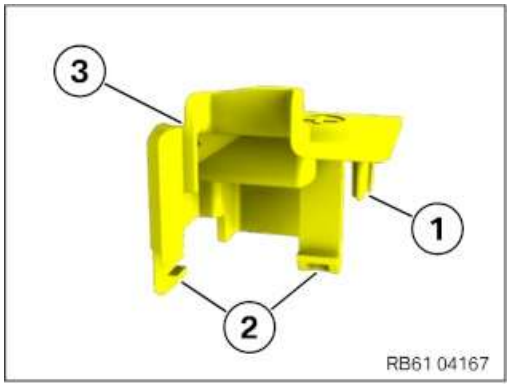
Follow notes for 12 V dual storage system.
See additional information 6120 ... Notes on the 12 V dual storage system.



- Install the 12 V dual storage system (3).
- Release the mounting of the positive battery cable (2).
- Position the positive battery cable (2) on the positive terminal.
- Tighten nut (1).

Positive battery terminal (dual storage battery)

Flange nutM8		Tightening torque	19 Nm



Check

- Check the guide (1) and the retaining lugs (2) on the positive terminal cover (3) for damage.

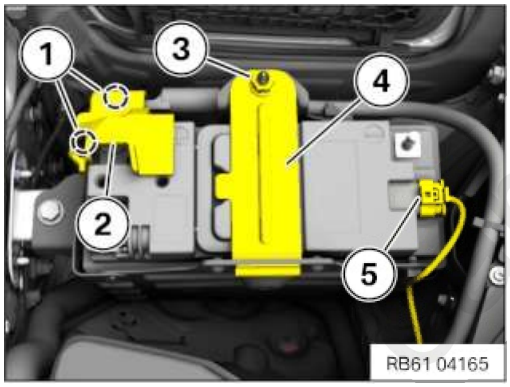
Result

» Guide (1) or retaining lugs (2) are damaged.

Measure

- Renew the positive terminal cover (3).

  Parts: Positive terminal cover



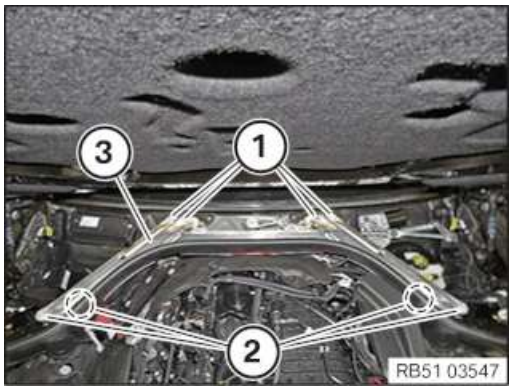
- Connect connectors (5) and lock.
- Install battery rollover protection bracket (4).
- Tighten nut (3).

Rollover protection bar auxiliary battery on holder

Nut M8		Tightening torque	15 Nm

- Insert positive terminal cover (2).
- Clip in latch mechanisms (1) on the positive terminal cover (2).

5 – If installed: Install strut brace in rear of engine compartment



- Install the strut brace (3).
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Cross-brace to bulkhead

Hexagon screw M10x25	Renew screws.	Tightening torque Angle of rotation	56 Nm 90 °

- Renew screws (2).

  Parts: Screws
- Tighten the screws (2).

Cross-brace to spring strut dome

Hexagon screw M10x55	Renew screws.	Tightening torque Angle of rotation	56 Nm 90 °

6 – Connecting all battery earth leads



- See additional information.

7 – Register battery exchange



- After replacing the battery, register the battery exchange (see further information).

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Additional Information

Overview of Tightening Torques

Positive battery terminal (dual storage battery)			Used in step 4
Flange nutM8		Tightening torque	19 Nm

Rollover protection bar auxiliary battery on holder			Used in step 4
Nut M8		Tightening torque	15 Nm

Cross-brace to bulkhead			Used in step 5
Hexagon screw M10x25	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Cross-brace to spring strut dome			Used in step 5
Hexagon screw M10x55	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Overview of Special Tools

Overview Technical Data

Links

Repair instructions (PRE)	Used in step
Instructions for 12 V dual storage system	34
Battery replacement information	7

Repair instructions	Used in step
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 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 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 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

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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 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 Disconnecting and connecting 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
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 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 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 21 017 Replacing vehicle electrical system battery - including registering battery replacement-

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

2 – Removing system battery

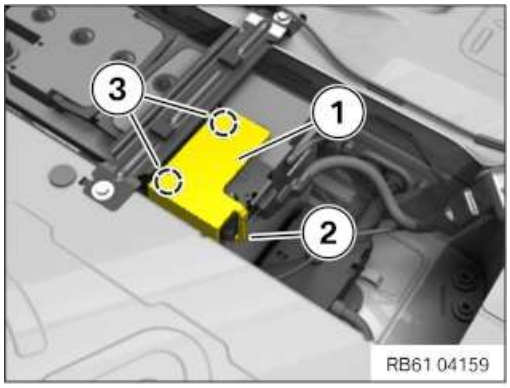
WARNING

Working on 12 V vehicle electrical system.

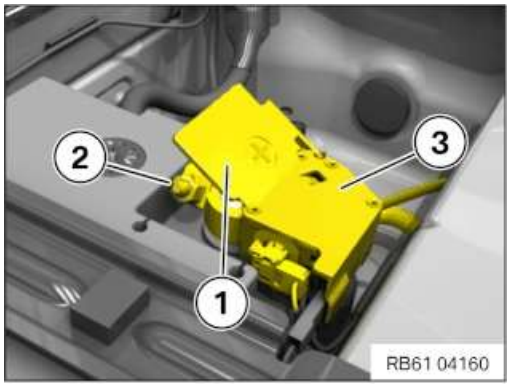
Risk of short circuits! Risk of fire!

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

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- Release latch mechanism (2) of the protective cap (1).
- Feed out protective cap (1) to the top and remove it from the guides (3).



- Remove the cover for the positive battery terminal (1).
- Loosen nut (2).

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.

- Pull off the positive battery terminal (3) from the positive battery terminal.

WARNING

Unprotected battery terminals.

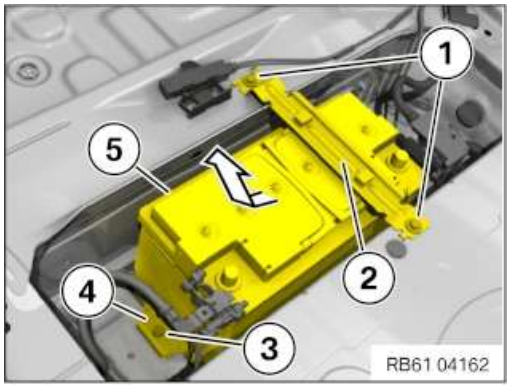
Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Locate positive battery terminal (3) laterally.

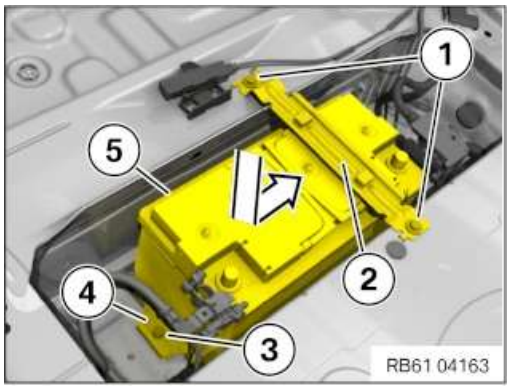


- Pull off vent hose (1) on the system battery.



- Loosen screws (1).
- Remove battery rollover protection bracket (2).
- Loosen screw (3).
- Remove the battery holder (4).
- Release vehicle battery (5) in direction of arrow and remove by the grab handles.

3 – Installing system battery



- Insert system battery (5) in the direction of the arrow.
- Install the battery holder (4).
- Tighten down screw (3).

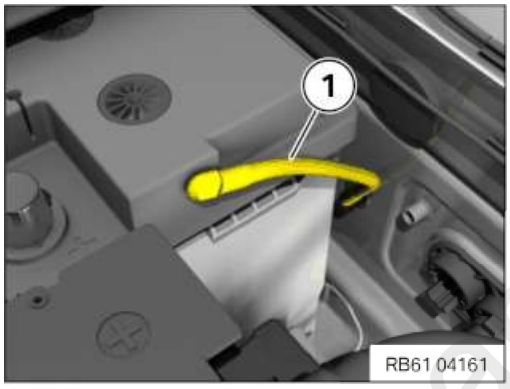
Battery holder to body

M8 screw		Tightening torque	15 Nm

- Position battery rollover protection bracket (2).
- Tighten the screws (1).

Battery rollover protection bracket to luggage compartment floor

Screw		Tightening torque	8 Nm



- Insert vent hose (1) in the opening on the system battery.

▸ **Check the vent holes of the battery**

WARNING

Gas emission.

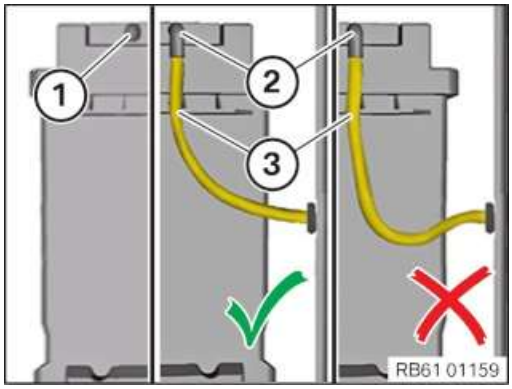
Danger of injury! Danger of explosion!

- Assign the vent holes correctly.
- Route the vent hose correctly.

TECHNICAL INFORMATION

The battery has two vent holes, opposite:
One vent hole (1) must be closed correctly with a dummy plug.
The vent hose (3) must be correctly connected and routed at the other vent hole (2).

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Check

- Check if the vent hole (1) is correctly closed with a dummy plug.

Result

» No dummy plug.

Measure

- Close the vent hole (1) correctly with a dummy plug.

Check

- Check whether the vent hose (3) at the vent hole (2) has been connected correctly.

Result

» The vent hose (3) is not correctly connected.

Measure

- Connect the vent hose (3) with the vent hole (2) correctly.

Check

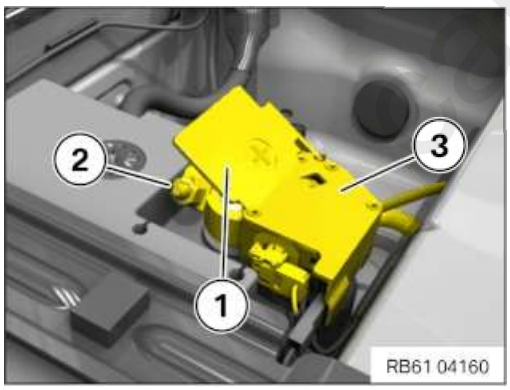
- Check whether the vent hose (3) is routed with a downhill gradient to the outside (**no siphon formation**).

Result

» The vent hose (3) is not routed correctly as shown at the right.

Measure

- Route the vent hose (3) correctly as shown in the centre.

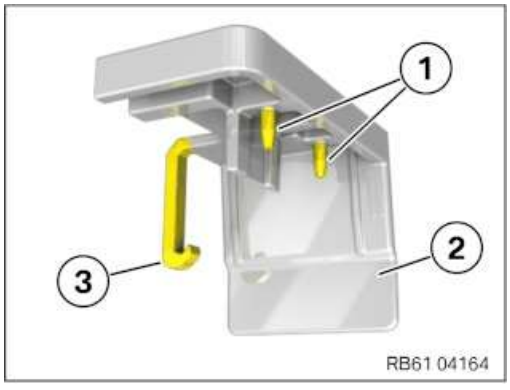


- Position the positive battery cable (3) on the positive terminal.
- Tighten nut (2).

Positive battery terminal to battery

Nut		Tightening torque	5 Nm

- Close the positive terminal cover (1).



Check

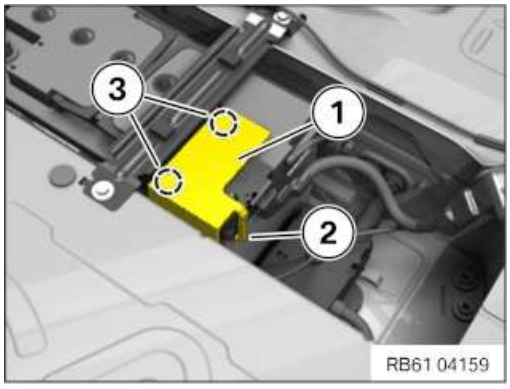
- Check guides (1) and latch mechanism (3) on protective cap (2) for damage.

Result

» The guides (1) or the latch mechanism (3) are damaged.

Measure

- Renew protective cap (2).



- Insert guides (3) of protective cap (1) into the associated openings on the positive battery terminal.
- Clip in protective cap (1) with latch mechanism (2).

POSTPROCESSES

4 – Connecting all battery earth leads



- See additional information.

5 – Register battery exchange



- After replacing the battery, register the battery exchange (see further information).

Additional Information

Overview of Tightening Torques

Battery holder to body			Used in step 3
M8 screw		Tightening torque	15 Nm

Battery rollover protection bracket to luggage compartment floor			Used in step 3
Screw		Tightening torque	8 Nm

Positive battery terminal to battery			Used in step 3
Nut		Tightening torque	5 Nm

Links

Repair instructions (PRE)	Used in step
Battery replacement information	5

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Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14

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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14

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61 00 ... Safety information on handling hybrid cars

Please observe the current version. Safety information for handling electric and hybrid vehicles

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 prerequisites:
     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 instrument cluster **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.

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=> 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 notes on paintwork.
   - Removed high-voltage 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. *Equipotential bonding:*
   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 21 028 Support voltage of the vehicle electrical system / recharge vehicle electrical system battery

1 – Charging battery

TECHNICAL INFORMATION

Observe the notes on handling the vehicle battery.

For additional information see:

61 00 ... Safety information on handling the vehicle battery

61 00 / 12 00 ... Notes on disconnecting and connecting the vehicle battery

61 12 ... Notes on the intelligent battery sensor (IBS)

TECHNICAL INFORMATION

For vehicles with a 48-V battery: Charge the battery only with the bonnet open.

▸ **Charging lead-acid batteries and AGM batteries**

- Make sure all the batteries are connected.
- Connect to a charger approved by BMW.
- If the battery is charged while it is still installed: always connect the charger to the jump start terminal point in the engine compartment.
- Fully charge the battery.

  The battery is fully loaded once the charge current drops below a certain value:

Battery temperature	Charge current
15° C - 25° C	<2.5 A
<15° C	<1.5 A

- Disconnect the charger after having completed charging.

▸ **Charging the lithium ion battery**

TECHNICAL INFORMATION

Comply with notes on handling lithium ion batteries.

For more information see:

08 08 14 (094) Charging parameters for lithium ion batteries

61 12 ... Notes regarding intelligent battery electronics (lithium ion battery)

- Ensure that all batteries are connected and attached.
- Adapt the charging voltage on the charger to the lithium ion batteries.

  Too high charging voltage can lead to opening of the electronic disconnect switch.
- Connect to a charger approved by BMW.
- Fully charge the battery.
- Disconnect the charger after having completed charging.

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Additional Information

Links

General repair instructions	Used in step
61 20 ... Notes on AGM battery	1
61 20 ... Notes regarding the lithium ion battery	1
61 12 ... Notes on intelligent battery sensor (IBS)	1
61 12 ... Notes regarding the battery electronics (lithium ion battery)	1

Special tool service information	Used in step
Description of the manual Li parameter setting for DEUTRONIC DBL800/1200/1600	1
Description of the manual Li parameter setting for ELEKTRON HS-1000	1
Description of the manual Li parameter setting for ELTEK MultiCharger 750/900/1500	1

Special tool service information	Used in step
Charging parameters for lithium ion batteries	1
Note for the workshop equipment catalogue BMW, MINI	1

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61 25 ... Assessment of the transportability of the lithium ion starter/auxiliary battery in service workshops

Initiating:

For analysis and disposal purposes, it is necessary to transport the already used lithium-ion starter/auxiliary batteries. These lithium ion based batteries are to be classified as hazardous material according to UN 38.3, and may only be transported under particular prerequisites.

Obtaining the certified transportability between the assessment and delivery of the starter / auxiliary battery to the disposal/transportation company is the responsibility of a qualified person. For shipping one also needs to take into account the influence of the storage requirements and other possible occurring events for the determined transportability. If there is a possibility that previously certified transportability is no longer valid, it must be reassessed using the guideline.

The transport in the sense of the hazardous goods legislation is organised in three areas:

1. Assessment of the transportability
2. Transport preparation
3. Performing the transport

This document contains all the necessary information needed to assess the transportability of a used lithium ion starter/auxiliary battery. The transport preparation and execution is **not** an element of this document.

Further information on this can be found in the product information in the Aftersales Assistance Portal or S-Gate.

It will be explained which measures are necessary in order to assess the transportability.

How these measures are to be performed individually depends on the particular situation at the location and is not an element of this document. These procedures are to be defined according to the local regulations / laws and recorded as valid local work instructions.

Prerequisites from a security perspective:

It should be noted that working on the open battery is prohibited.

The analysis, assessment and certification of the transportability of the lithium ion starter/auxiliary battery is the responsibility of a qualified person.

The following specifications for work safety must also be observed:

Storage of the lithium ion starter / auxiliary battery

The following points should be noted for reasons work safety point:

The battery must always protected against short circuit (cover the terminals).

Further information on this can be found in the product information in the Aftersales Assistance Portal or S-Gate.

Note:
For better traceability, this document must be printed out and archived with the vehicle data.

Assessment of the lithium ion starter/auxiliary battery

Name	Date	Serial no.	VIN

Signature: ----------

The electrical assessment of the lithium ion starter/auxiliary battery takes place via the diagnosis and test module.

Transport preventing faults according to the diagnosis or the test module	Yes	No

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Visual assessment:

Smoke	Yes	No
Leakage of solid, liquid or gaseous substances	Yes	No
Evidence of fire damage	Yes	No
Heat development	Yes	No
Deformations, changes or damages to the battery housing, which indicate an increased application of force (scratches up to 0.5 mm in depth and a length of 5 cm are permitted)	Yes	No
Cracked or broken housing	Yes	No
Electrolyte odour	Yes	No
Noise generation	Yes	No
Loose connections, loose or damaged	Yes	No
Serial number/label safety information cannot be read	Yes	No
Data matrix code is not readable or no functional LIN bus communication can be established	Yes	No
Suspected water damage	Yes	No

The serial number must be clearly legible. If the type plate can no longer be read, the housing of the lithium ion starter/auxiliary battery must be clearly marked with the serial number.

The label of the safety information must be replaced if it is illegible.

The electrical and visual assessment must be set down in writing!

If one or more points is/are answered with yes, the next procedure must be clarified by Technical Support! Furthermore, the removed lithium ion starter/auxiliary battery must be blocked off with high-voltage barrier tapes. If a lithium ion starter/auxiliary battery is still located in the vehicle, the vehicle must be parked in the open.

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61 00 ... Battery charging calendar

Battery charging calendar 2016 (PDF file)

Battery charging calendar 2017 (PDF file)

Battery charging calendar 2018 (PDF file)

Battery charging calendar 2019 (PDF file)

Battery charging calendar 2020 (PDF file)

Battery charging calendar 2021 (PDF file)

Battery charging calendar 2022 (PDF file)

Information for the battery charging calendar

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61 25 ... Notes on repair of high-voltage battery unit

1. Prerequisite

Various organisational prerequisites need to be fulfilled before the repair of a high-voltage battery unit is permitted and can be carried out in an expedient way. These prerequisites concern both, the commercial company and the service employee.

The repair of a high-voltage battery unit is intended to be carried out exclusively by commercial companies featuring the service format BMW i Service Extended Battery or BMW i Service Full.

A commercial company featuring the service format BMW i Service Basic is able to remove and install a high-voltage battery unit but cannot perform any repair work on or in the high-voltage battery unit. If a repair is required according to the test schedule in the diagnosis system, the vehicle or the high-voltage battery unit must be transported to a commercial company featuring the service format BMW i Service Extended Battery or BMW i Service Full. The repair is to be carried out in such a workshop.

The commercial company must make available the required special tools and a suitable workbay for the repair.

The most important special tools are the following:

- Mobile lift table MHT 1200 + set of adapters to remove and install the high-voltage battery unit
- Charger for cell blocks of high-voltage battery unit
- Diagnosis system for the repaired high-voltage battery unit
- Lifting tackle to remove and install cell blocks
- Panel wedges made of plastic to remove clips within the high-voltage battery unit
- Lifting traverse for the complete high-voltage battery unit
- High-voltage barrier tape
- Yellow cones relating to high-voltage recommended

Sourcing reference:

See Aftersales Assistance Portal (ASAP) - Service/Technical - Workshop Equipment (Start BMW) - Shop Workshop Equipment or at www.bmwgroup.com

Only service employees being qualified for the repair of the high-voltage battery unit may carry out this procedure.

This includes training for "experts for work on high-voltage-intrinsically safe vehicles".

Before removing and opening the high-voltage battery unit, troubleshooting is to be carried out by means of the relative diagnosis system. Only if determined by the test schedule and if the prerequisite „no mechanical damage on the outside“ is satisfied, the high-voltage battery unit may be opened and the faulty component identified by the test schedule can be replaced. No other repair work relating to the high-voltage battery unit than the replacement of faulty components is planned.

It is essential to observe the operational steps specified in the repair instructions very precisely in order to carry out the replacement of a faulty component. The use of the special tools listed therein is absolutely essential as well.

2. Safety rules

- The first step after opening the housing cover to repair the high-voltage battery unit is a visual inspection for mechanical damage.
- A thorough visual inspection of the components inside the working area is required during and/or before and after every operation. When removing one component, all other involved components being accessible need to be checked for damages. If the housing or other internal high-voltage components are damaged, a qualified electrician or Technical Support must be contacted. All repair works relating to the high-voltage battery unit must be stopped immediately for safety reasons
- Check the correct latch mechanism of the connector of the insulation monitoring line at the control unit of the high-voltage battery unit. If this is not fully locked, an isolation fault may not have been detected.
- The separation of the high-voltage cable between the two cell modules mounted on the inside of the housing (across from the connection side of the high-voltage battery unit) is to be always carried out before working on the opened high-voltage battery unit. This procedure ensures the interrupt of the series connection (additional safety)
- The workbay required for the repair of the high-voltage battery unit must be clean (free of grease, dirt and swarf), dry (no leaking fluid) and free of flying sparks. Therefore, avoid close vicinity to areas intended for cleaning of vehicles and to workbays intended for repair work relating to the body. Use movable walls for

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separation, if needed

- High-voltage barrier tape is required to secure the workbay against unauthorised access (insufficient qualification, customers, visitors, etc.). It is also required in case the high-voltage intrinsic safety is not established or the status is not determined yet. Placing yellow cones with lightning bolt to indicate high-voltage when leaving the working area is recommended
- Do not use tools or other objects with pointed and sharp blades/edges when working on high-voltage components or high-voltage cables and/or in their close vicinity. Diagonal cutting pliers, knives etc. are prohibited. Cable straps inside the low-voltage wiring harness may be opened by means of diagonal cutting pliers
  Allowed: Plastic wedges
- Cable straps relating to high-voltage cable may not be cut open. Damaged clips remain on the high-voltage cable. The remaining, damaged clip must be pushed to a position on the high-voltage line where the clip can not rub. A new clip must then be installed
- Defective or damaged high-voltage cables must be made unusable to ensure they are not reused
- No tools must be forgotten inside the high-voltage battery unit. Check whether all tools are present in the tool box before closing the housing cover
- It is absolutely essential to remove all small parts/screws that fell into the high-voltage battery unit. The use of magnetized screws is generally recommended in order not to lose any screws in the high-voltage battery unit during the repair
- When interruptions of work occur: Secure housing cover against unintended opening by screwing in several screws. Enclose the working area by means of high-voltage barrier tape
- Due to the very slim construction of the radiator, the risk of damage during disassembly and installation is high. Careful handling is absolutely necessary as the cooling of the cell blocks may not be guaranteed when the radiator is damaged (bent, dented). The consequence is a major loss of the electrical range and of the power of the vehicle. In extreme cases, even a breakdown may occur
- Very careful handling is necessary when disconnecting and connecting the insulation detector line at the control unit of the high-voltage battery unit (safety box coming) since high-voltage is present in the thin orange lines. Do not pull on the lines (e.g. to unplug the connector etc.)! The connector must be locked securely when plugged in
- Make sure the plastic lids of the modules are not removed when working on the cell modules (loosing screws, raising and lifting, …). The live cell contacting system is located thereunder. Continuing to work with the lid being removed is not permitted. A qualified electrician or Technical Support must be contacted
- A schematic diagram with limiting sample examples in the training is necessary to get to know the limits. These show when the further work for the "experts for intrinsically safe vehicles" is no longer possible due to absent intrinsic safety, and the Technical Support or a qualified electrician must be contacted
- Remove residual moisture and coarse contamination around the lid of the high-voltage battery unit before beginning the disassembly
- Clean gaskets and sealing surfaces (venting unit, high-voltage connector, signal connector, radiator connection) with a specified cleaning agent before reassembly
- If contamination is present in the high-voltage battery unit, check the cause and carefully clean the affected areas
  Approved cleaning agent:
  - Spirit
  - Windscreen cleaner
  - Glass cleaner
  - Distilled water
  - Vacuum cleaner with plastic top
- Visual inspection for contamination and damage of housing as well as of connections and degassing unit when installed (underfloor). A damaged diaphragm within the venting unit may indicate damaged storage cells. In this case, special carefulness is required when checking and opening the high-voltage battery unit
- Electrolyte
  The majority of the electrolyte is a mixture of lithium-nickel-manganese-cobalt oxide in bound state The quantity of free electrolyte in the high-voltage battery unit is very small. It is a noxious and irritant fluid. Absolutely avoid direct contact of skin with leaking fluid as acid burns may occur. In case of contact with eyes or skin, flush with plenty of clear water and consult a doctor immediately. Burning or evaporating electrolyte is also hazardous. CAREFUL: do not inhale! Ensure sufficient fresh air supply. If breathing ceases, apply artificial respiration and immediately consult a doctor. Notify fire brigade in case of fire. Clear the area immediately and make accident scene safe. Attempt to extinguish the fire without putting persons in danger and use suitable extinguishant, e.g. water

3. Repairing removed high-voltage battery units

- The high-voltage battery unit is a component of large dimensions and heavy weight. Only the combination of the housing and the cell blocks mounted therein provides the high-voltage battery unit with complete stability

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(rigidity), as required for driving. Therefore, it is necessary to ensure that the housing is positioned on the relative mounting/adapter of the lifting table during replacement and fixation of cell blocks. In this way, one can prevent the housing from bracing during the repair work and ensure the high-voltage battery unit is not installed in the BMW I01 in this condition

- It is extremely important to enter the serial numbers and the installation positions of the replaced components in the SME via the testing device, as well as to carry out the transmission into the diagnosis system. Otherwise, the new installation position will be assigned automatically by the SME. The consequence is an incorrect location data, as the SME does not set correct positions. For a renewed repair of the high-voltage battery unit, the diagnosed faults for the incorrect installation position will be displayed. The consequence is that replacement is done at the wrong location
- In diagnosis, it is not possible to enter the serial numbers of the cell supervision circuits. The serial numbers are transmitted from the cell supervision circuit to the SME using the CAN bus. The SME then sets a corresponding position assignment. This assignment is not always fault-free. That is why the serial number and installation position of the exchanged cell supervision circuit must be checked in the diagnosis after completed repair. If the positions do not match, a position change can be performed with diagnosis. A new serial number of a cell supervision circuit is not entered
- Attention: Do not use powered wrenches as the screws/threads located in the high-voltage battery unit may break due to the low torques!
- The seal must be renewed every time the housing cover is removed to guarantee tightness of the high-voltage battery unit
- The screws are thread-tapping, so pre-insert them manually before tightening them with a tool. Otherwise, the threads of the lower housing section may be damaged!

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61 00 ... Safety information on handling hybrid cars

Please observe the current version. Safety information for handling electric and hybrid vehicles

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 prerequisites:
     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 instrument cluster **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.

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=> 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 notes on paintwork.
   - Removed high-voltage 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. *Equipotential bonding:*
   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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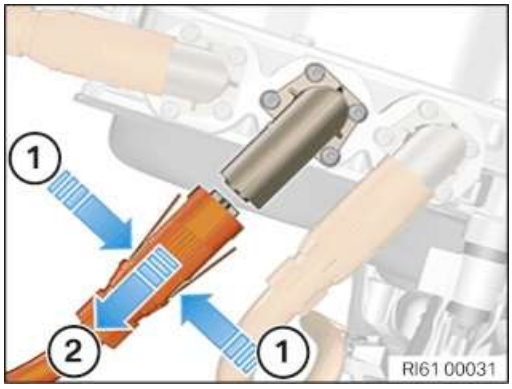
61 13 ... Unlocking and disconnecting various plug connections in electrical and hybrid vehicles



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:

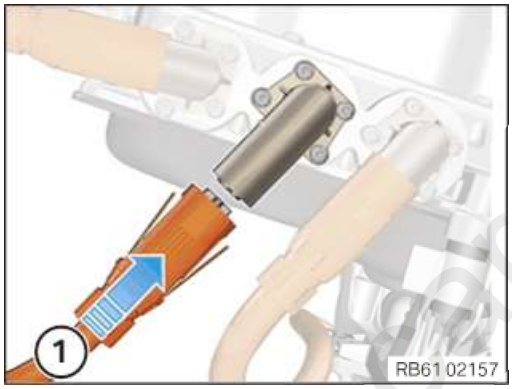
Press the lock (1) on the left and right on the connector in the direction of the arrow.

Pull off connector (2) in direction of arrow.

Attention!

Connector (2) is difficult to pull off.

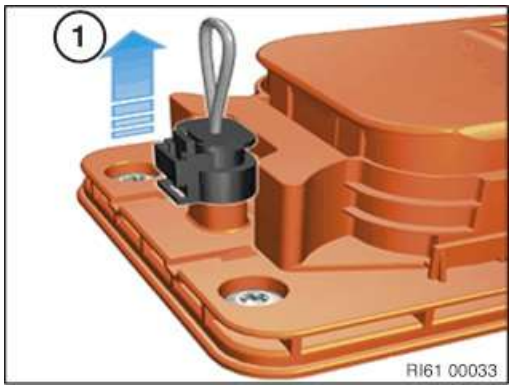
In the event of damage to high-voltage connector (2), the complete high-voltage cable must be replaced!



Connect the Hirschmann high-voltage connectors:

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

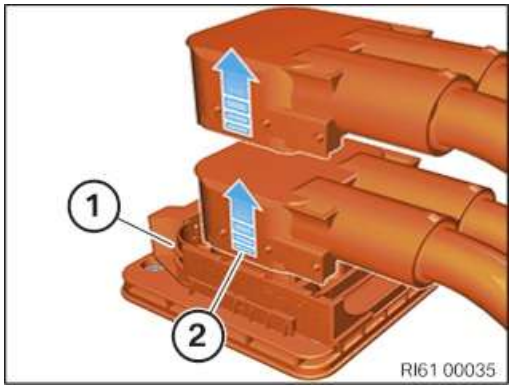
Note:
Connector (2) must lock audibly.



Disconnect the Kostal high-voltage connector:

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

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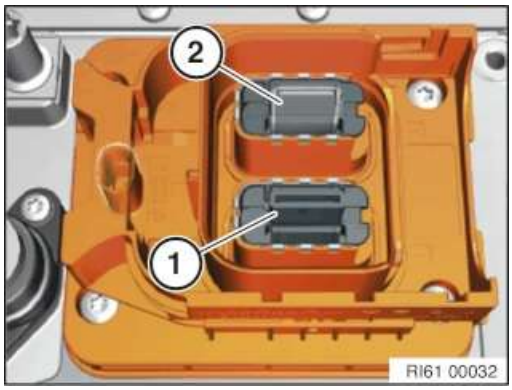
Push the lock (1) fully to the front.

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:

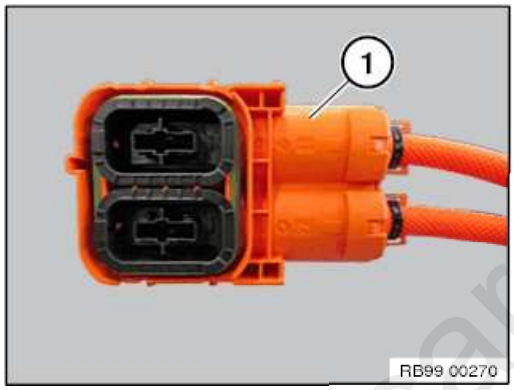
Check the touch protection for damage and correct positioning (1).

Warning!

Do not touch unprotected connector (2)!

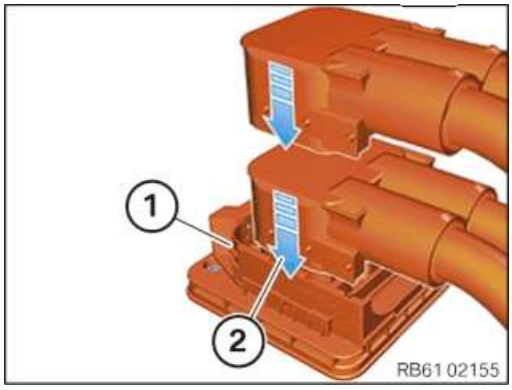
If the contact protection (1) has been pushed to the bottom (2), the high-voltage connector must be refitted.

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:

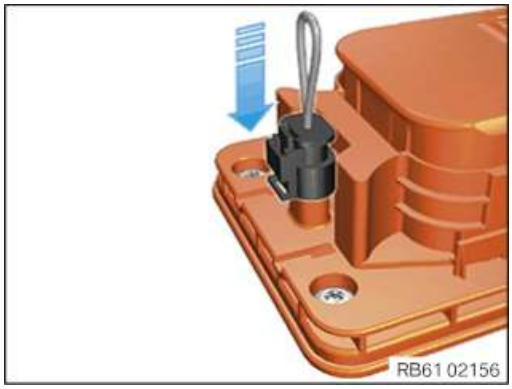
Connect the connector (2) in one single movement to the counter-housing.

Push the lock (1) fully to the rear.

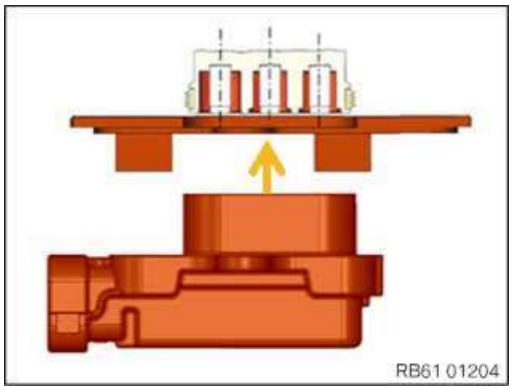
Attention!

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

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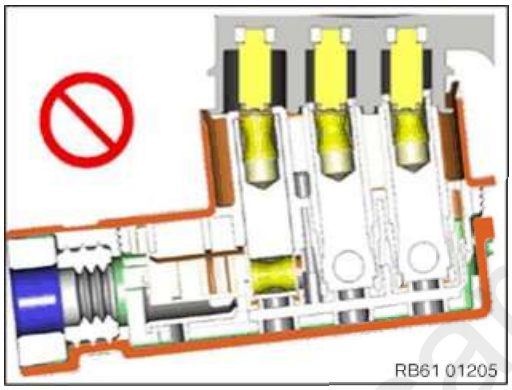


Connect the connector for the high-voltage interlock.



Three-phase high-voltage connector:

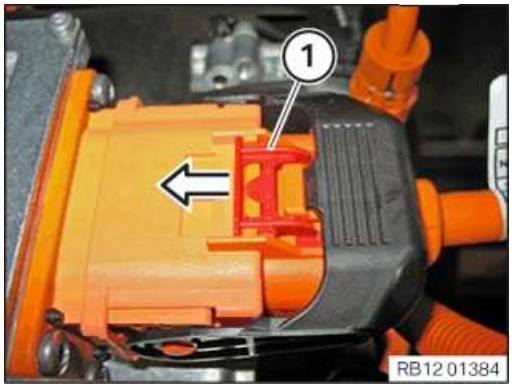
Connect and disconnect the connector straight.



Attention!

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

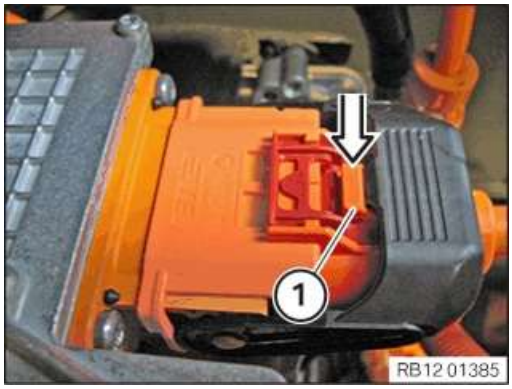
Increased tilted connections will increase the connecting force and the risk of danger.



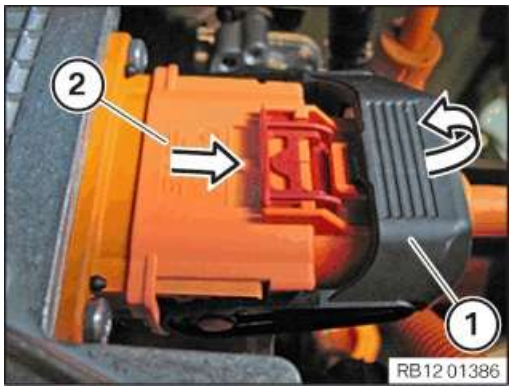
Disconnect the high-voltage connector from the high-voltage connection of the KLE:

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

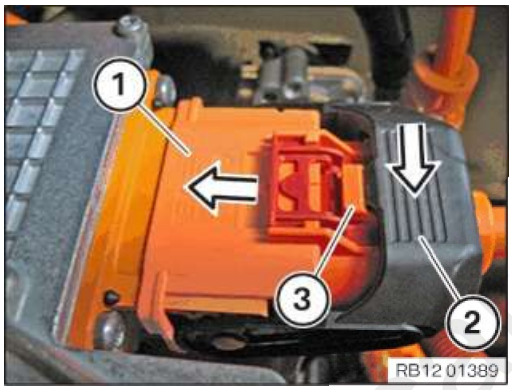
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Press lock (1).



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



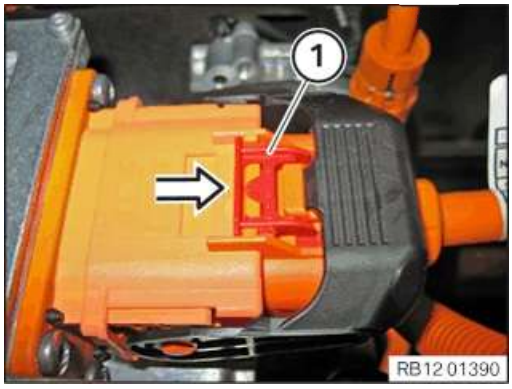
Connect the high-voltage connector to the high-voltage connection of the KLE:

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

Attention!

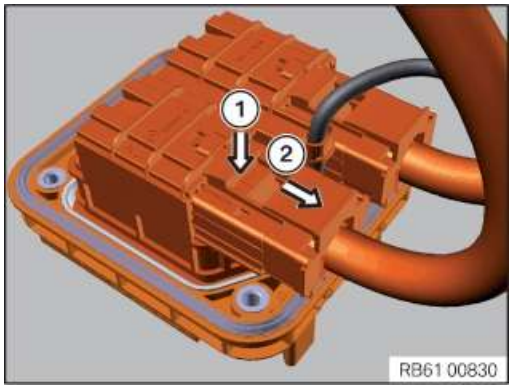
Lock (2) must snap audibly into place.

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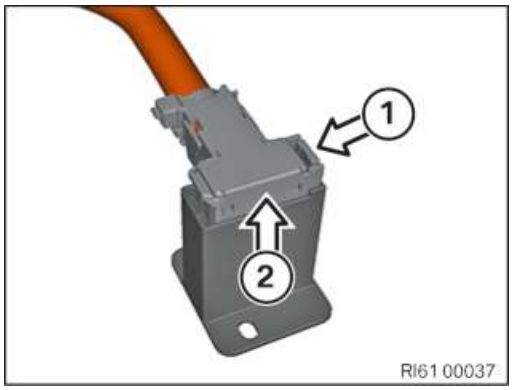
High-voltage connector on the high-voltage connection of the high-voltage battery unit:

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.



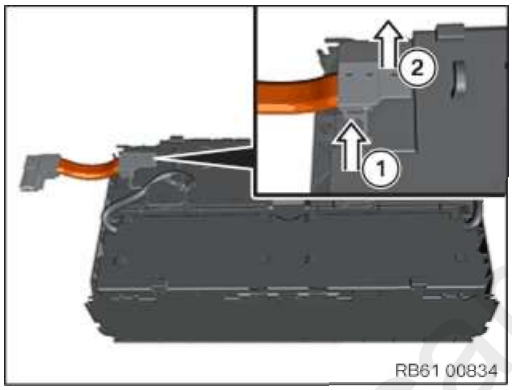
High-voltage connector on the cell module I01:

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!

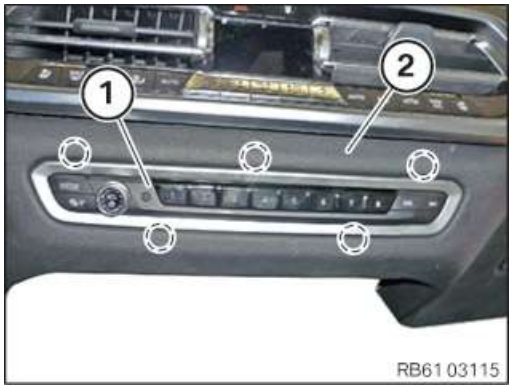
Contact protection is no longer provided in the event of a damaged connector housing.

In this case, contact technical support.

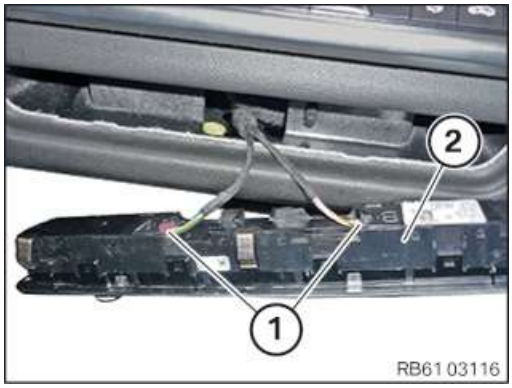
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61 31 251 Rem. & install audio operating facility

1 – Remove the audio operating unit

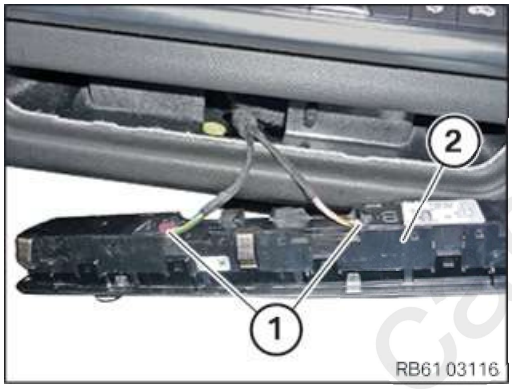


- Unclip the audio operating unit (1) from the instrument panel (2) at the points marked using special tool 0 496 571 (00 9 327).

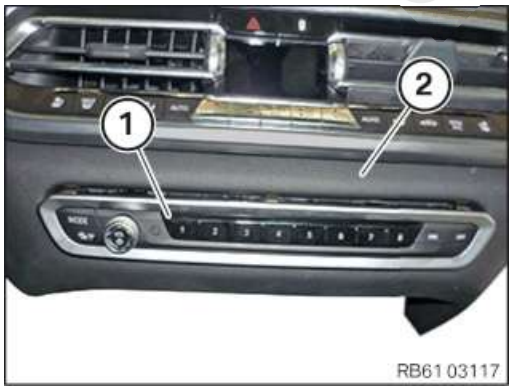


- Disconnect plug connections (1) and remove the audio operating unit (2).

2 – Install the audio operating unit



- Connect the connector (1) to the audio operating unit (2).



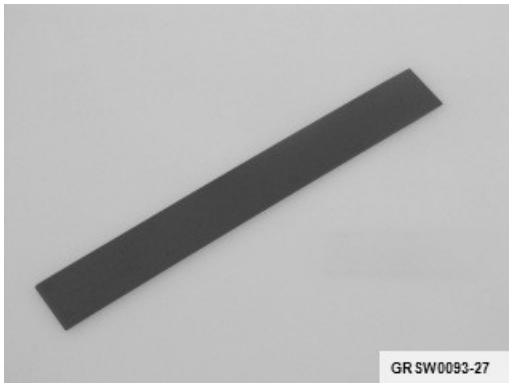
- Correctly position the audio operating unit (1) and install in the instrument panel(2).

Additional Information

Overview of Special Tools

cardiagn.com

0 496 571 (00 9 327) Wedge



Common	Used in step 1
Usage	(Cleaning wedge) From 11/2008 this special tool replaces panel wedge 00 9 323 (different material)
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

cardiagn.com

61 31 021 Remove and install/replace ring aerial

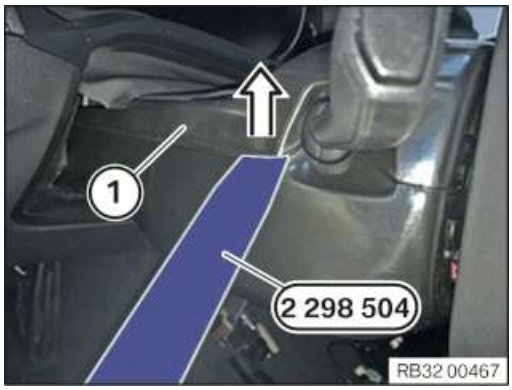
PRELIMINARY WORK

1 – Adjust the steering column position



- Adjust the length of the steering column to the maximum length in the direction of arrow (1).
- Move the steering column to the lowest steering column position in the direction of arrow (2).

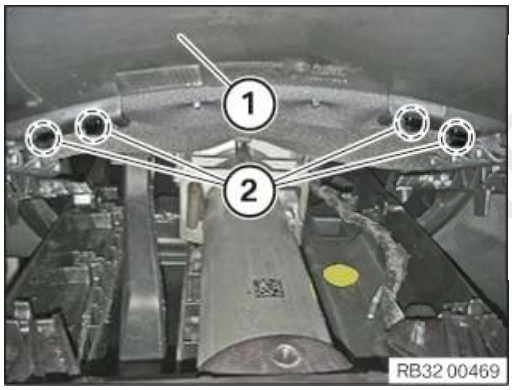
2 – Removing steering column shroud upper section



NOTICE

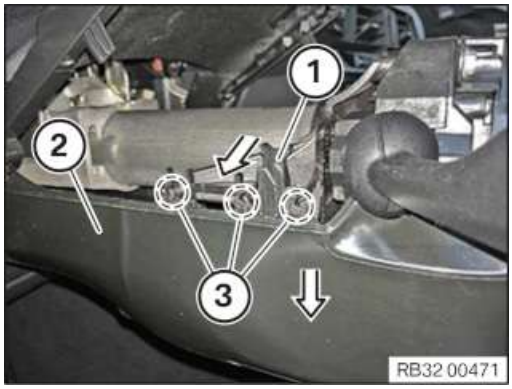
Perform the operations on the left and right side.

- Unlock the steering column shroud upper section (1) with the special tool 2 298 504 and fold up.



- Unclip the steering column shroud upper section (1) from the brackets (2).
- Remove the steering column shroud upper section (1).

3 – Removing steering column shroud lower section



NOTICE

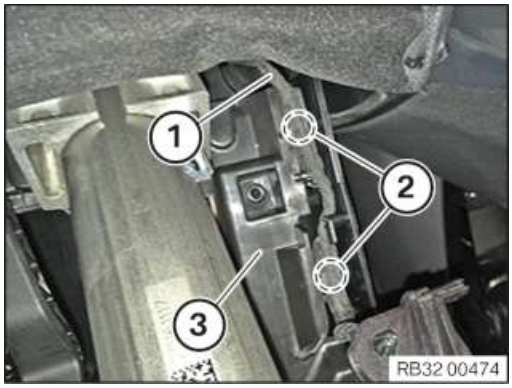
Perform the operations on the left and right side.

- Push the retaining lug (1) to the outside in the direction of the arrow and unclip the steering column shroud lower section (2) from the holders (3) in the direction of the arrow to the bottom at the same time.

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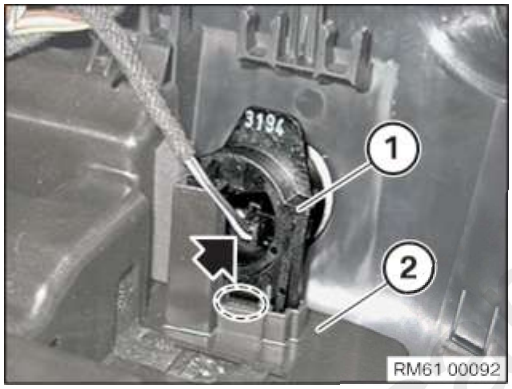
- Fold the steering column shroud lower section down.
- Unlock and disconnect connector (1).



- Detach the cable (1) from the brackets (2).
- Remove the steering column shroud lower section (3).

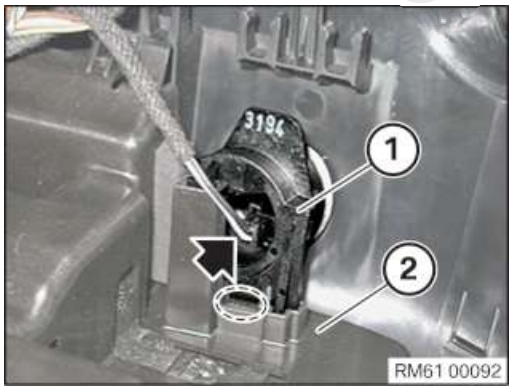
MAIN WORK

4 – Removing the ring aerial



- Unlock the plug connection (arrow) and disconnect it.
- Feed out the ring aerial (1) from the steering column shroud lower section (2).

5 – Installing the ring aerial

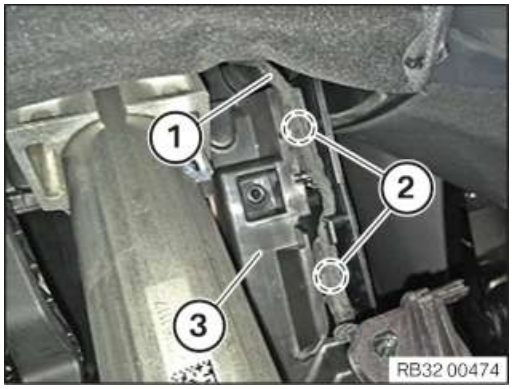


- Insert the ring aerial (1) in the steering column shroud lower section (2).
- Connect the connector (arrow).

POSTPROCESSES

6 – Install steering column shroud lower section

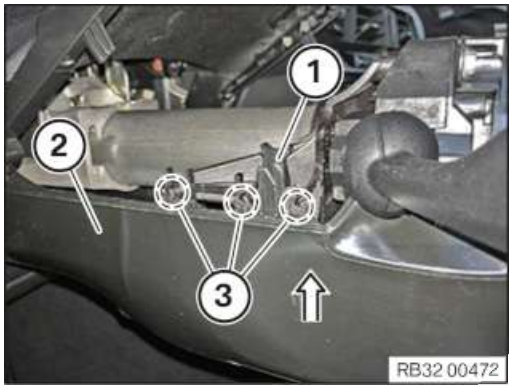
cardiagn.com



- Position the steering column shroud lower section (3).
- Secure the line (1) on the brackets (2).



- Connect the connector (1).

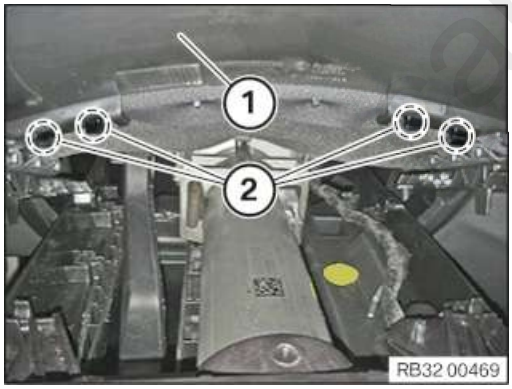


NOTICE

Perform the operations on the left and right side.

- Align the steering column shroud lower section (2) to the steering column using the retaining lug (1).
- Push the steering column shroud lower section (2) up in the direction of the arrow until the brackets (3) engage.

7 – Fit steering column shroud upper section



- Clip in the steering column shroud upper section (1) at the brackets (2).



NOTICE

Perform the operations on the left and right side.

- Clip in the steering column shroud upper section (1)into the guide (2).

ardiagn.com



NOTICE

Perform the operations on the left and right side.

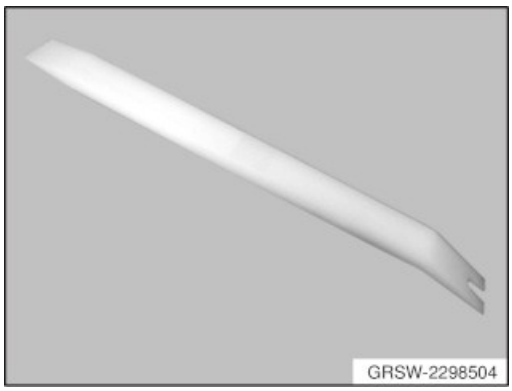
- Press the upper section of the steering column shroud (1) downwards in direction of arrow.

  The upper section of the steering column shroud must engage audibly and perceptibly.

Additional Information

Overview of Special Tools

2 298 504 Wedge



Common	Used in step 2
Usage	Wedge with angled lug
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

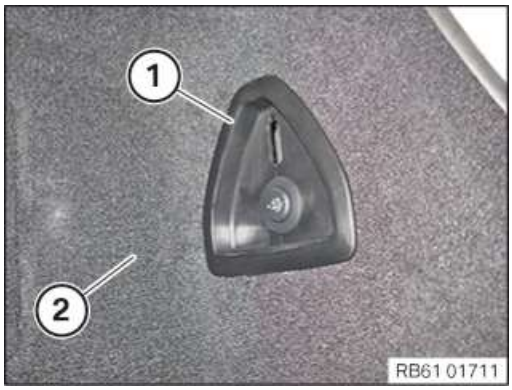
cardiagn.com

61 31 122 Removing and installing / replacing tow hitch switch

1 – Remove the switch for the automatic trailer tow hitch

Prerequisite

Tailgate is open.

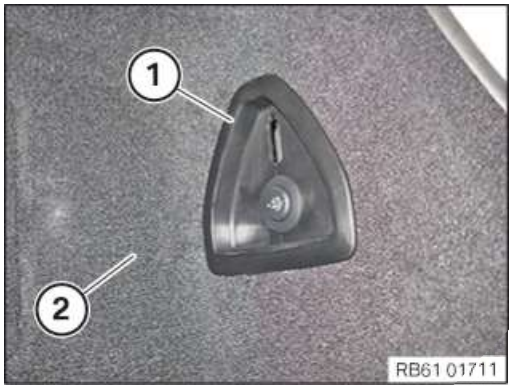


- Lever out the switch trim (1) with the special tool 0 496 571 (00 9 327) from the trim panel (2).
- Unlock and disconnect associated connector.

2 – Install the switch for the automatic trailer tow hitch

Prerequisite

Tailgate is open.

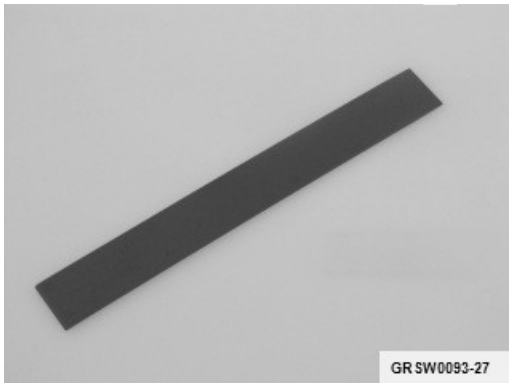


- Connect associated connector.
- Install the switch trim (1) in the trim panel (2).

Additional Information

Overview of Special Tools

0 496 571 (00 9 327) Wedge



Common	Used in step 1
Usage	(Cleaning wedge) From 11/2008 this special tool replaces panel wedge 00 9 323 (different material)
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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61 31 174 Removing and installing additional seat function operating unit (left or right)

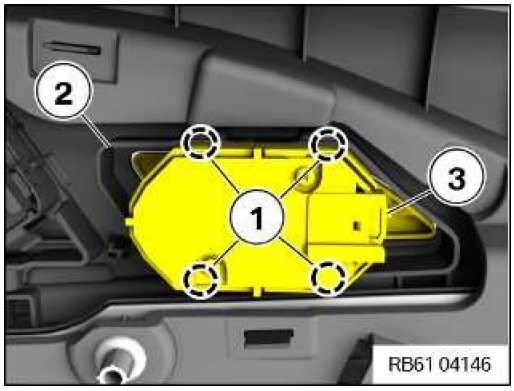
NOTICE

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

PRELIMINARY WORK

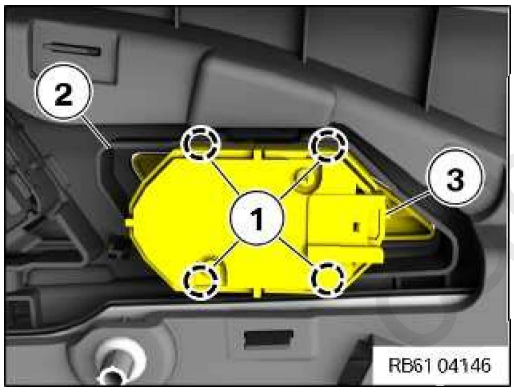
MAIN WORK

1 – Remove operating facility for additional seat functions



- Release latch mechanisms (1) on the decorative trim (2).
- Remove operating facility for additional seat function (3).

2 – Installing the operating facility for additional seat functions



- Install the additional seat function operating facility (3) into the decorative trim (2) and clip in the latch mechanisms (1).

POSTPROCESSES

Additional Information

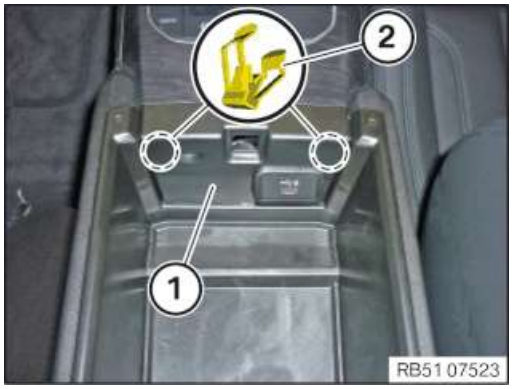
Overview of Tightening Torques

Overview of Special Tools

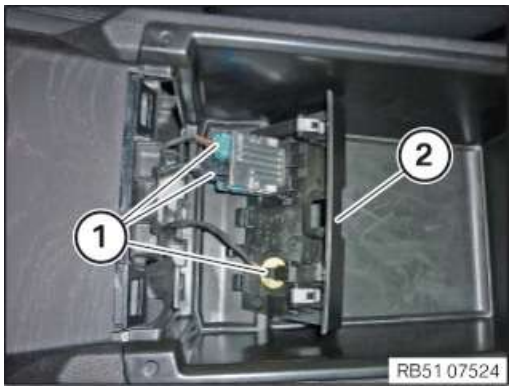
61 31 195 Removing and installing front controller

PRELIMINARY WORK

1 – Removing the trim in the storage compartment on the centre armrest



- Lever out the trim (1) with the special tool (2) toward the rear from the clamps 2 298 505.



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

2 – Remove the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



- Release and remove the centre console trim upwards (1) as shown using the special tool 2 298 505 from the latch mechanisms.

3 – Remove the operating facility in the centre console

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

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WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

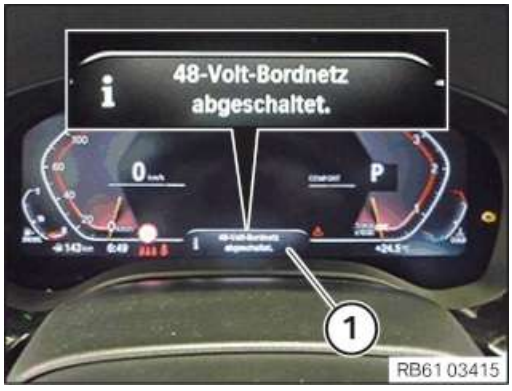
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



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

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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

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WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

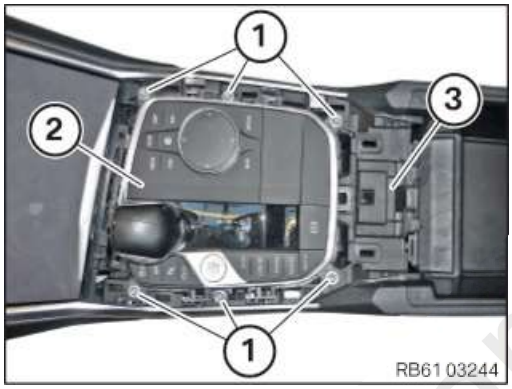
- Cover the vehicle battery.

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

▶ **Disconnecting all battery earth leads**



- See additional information.

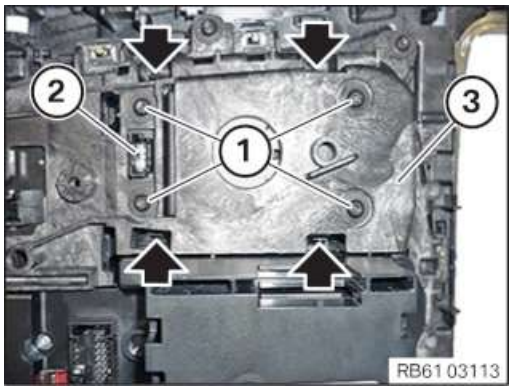


- Loosen screws (1).
- Remove the operating facility in the centre console (2) from the centre console (3).

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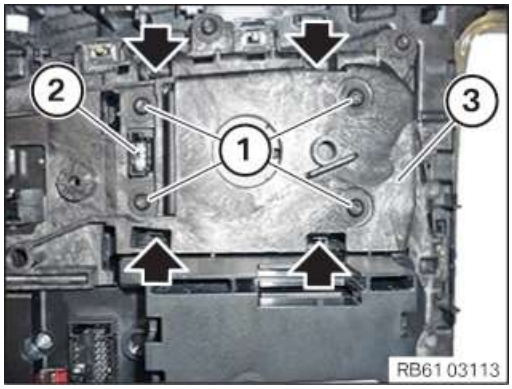
MAIN WORK

4 – Remove controller



- Loosen screws (1).
- Release the latch mechanisms (arrows).
- Remove controller (2) from the gear selector switch(GWS) (3).

5 – Install controller



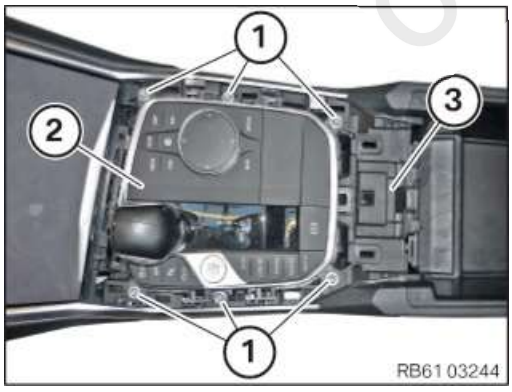
- Position the controller (2) on gear selector switch (GWS) (3) and engage in the latch mechanisms (arrow).
- Tighten the screws (1).

Controller to gear selector switch

Screw		Tightening torque	1,8 Nm

POSTPROCESSES

6 – Install the operating facility in the centre console



- Position the operating facility (2) in the centre console (3).
- Tighten the screws (1).

Gear selector switch to centre console trim

Screw		Tightening torque	1,8 Nm

▸ **Connecting all battery earth leads**

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- See additional information.

▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

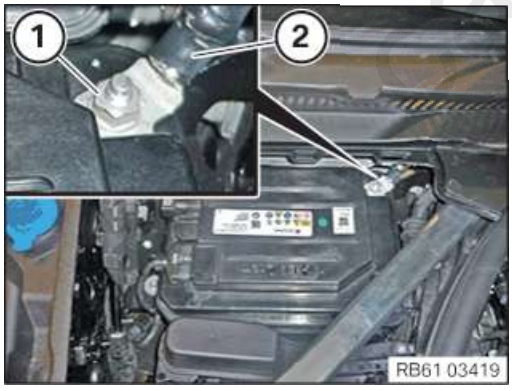
Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

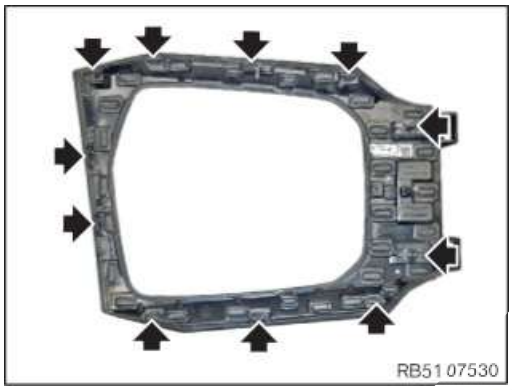
7 – Installing the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

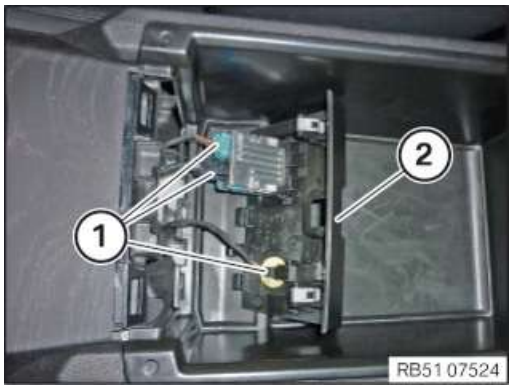


- Check all the latch mechanisms or clamps (arrows).
- In case the latch mechanisms or the clamps (arrows) are faulty, renew the centre console trim .



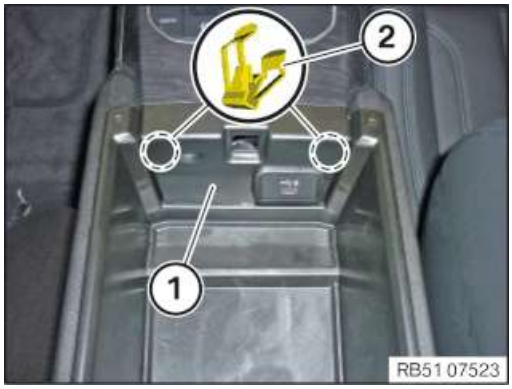
- Correctly position the centre console trim (1) and engage at the latch mechanisms.

8 – Installing the trim in the storage compartment of the centre armrest



- Mount the trim (2) and connect connector (1) and lock.

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- Correctly position trim (1) and snap into the clamps (2).

Additional Information

Overview of Tightening Torques

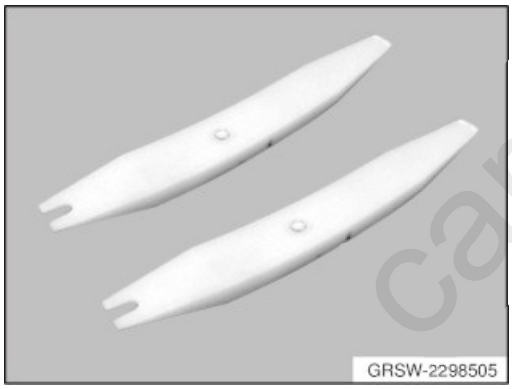
Controller to gear selector switch			Used in step 5
Screw		Tightening torque	1,8 Nm

Gear selector switch to centre console trim			Used in step 6
Screw		Tightening torque	1,8 Nm

Negative battery cable to 48-V battery			Used in step 6
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

2 298 505 Wedge



Common	Used in step 12
Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	36

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36

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61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
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61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36

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61 31 174 Removing and installing operating facility for additional seat functions

PRELIMINARY WORK

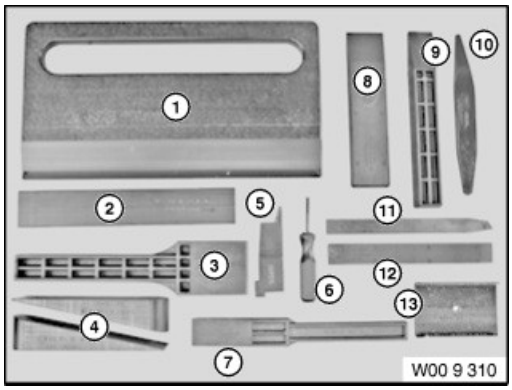
1 – Remove front door trim panel

RISK OF DAMAGE

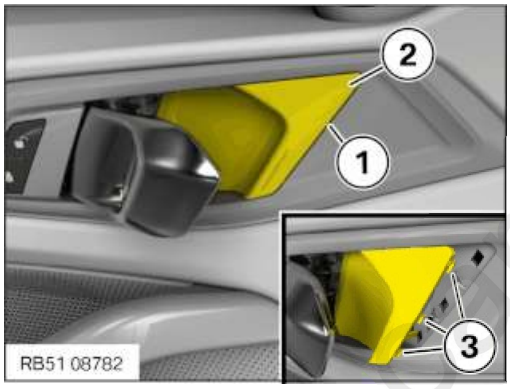
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

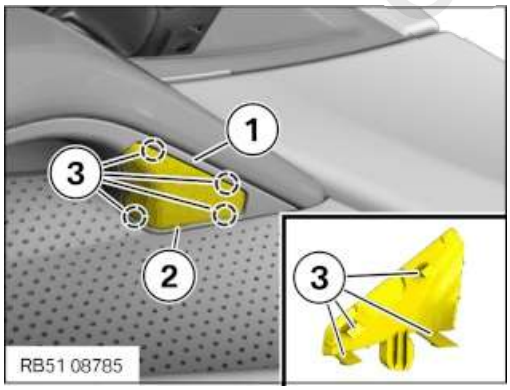
- Protect surfaces from damage.



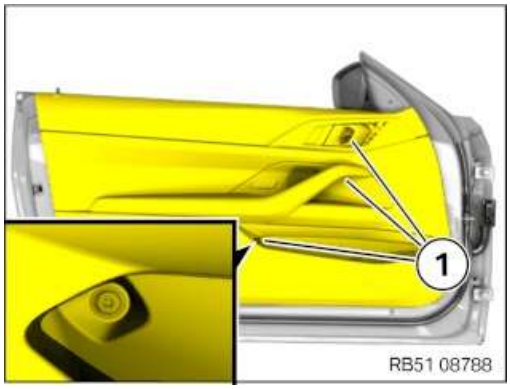
- Have the set of special tools 0 493 752 (00 9 329) ready.



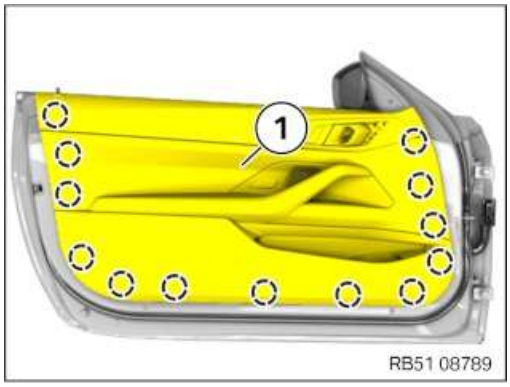
- Pull the door handle.
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover of the door handle (2) with the latch mechanisms (3).
- Feed out the cover of the door handle (2) from the latch mechanisms and remove it forwards.



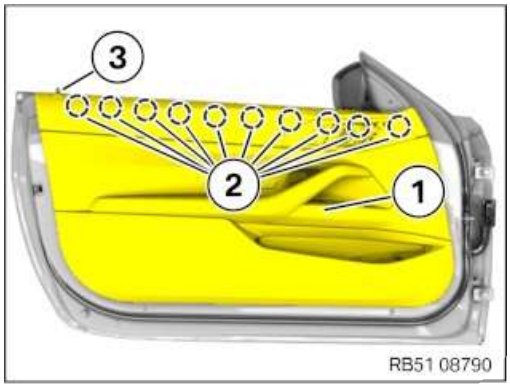
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover (2) with the latch mechanisms (3) and remove it downwards.



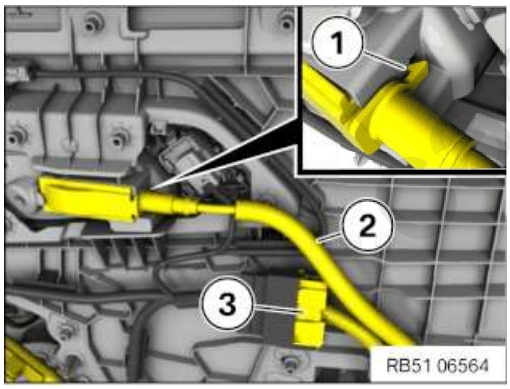
- Loosen screws (1).



- Unclip the door trim panel (1) with the suitable special tool at the marked places.



- Release the door trim panel (1) with the latch mechanisms (2).
- Lift the door trim panel (1) upwards over the operating rod (3).



NOTICE

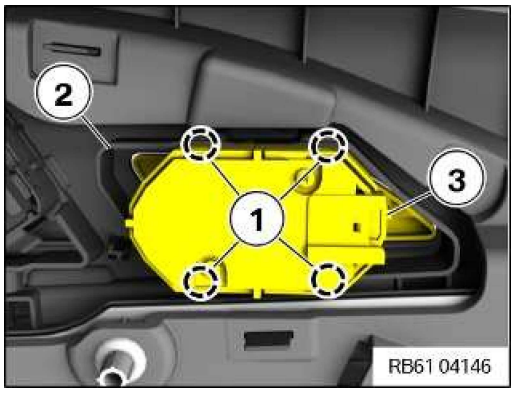
Schematic diagram is for example purposes. Some parts may differ in certain details.

- Release the latch mechanism (1) and feed out the Bowden cable for the inner door handle (2).

  While doing so, the Bowden cable for the inner door handle (2) is guided out independently from the door handle.
- Unlock the plug connection (3), disconnect and remove the door trim panel.

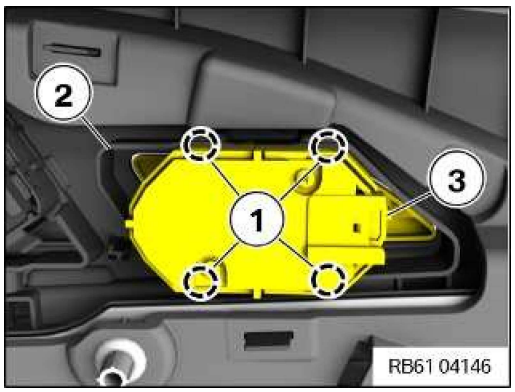
MAIN WORK

2 – Remove operating facility for additional seat functions



- Release latch mechanisms (1) on the decorative trim (2).
- Remove operating facility for additional seat function (3).

3 – Installing the operating facility for additional seat functions

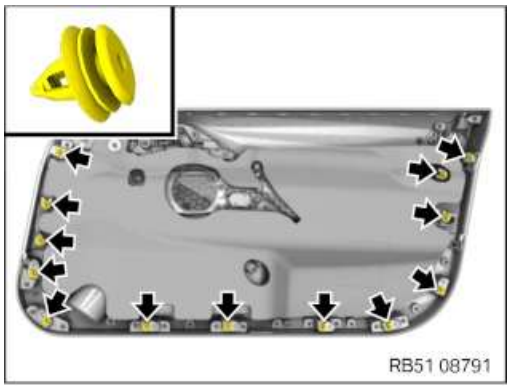


- Install the additional seat function operating facility (3) into the decorative trim (2) and clip in the latch mechanisms (1).

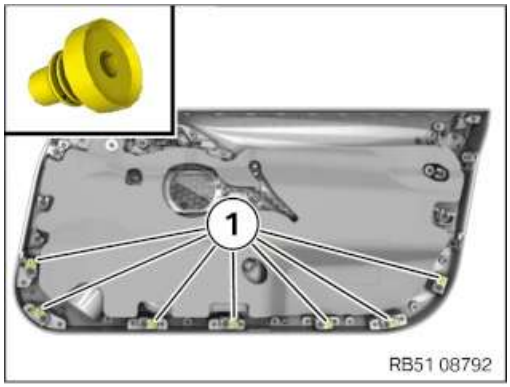
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POSTPROCESSES

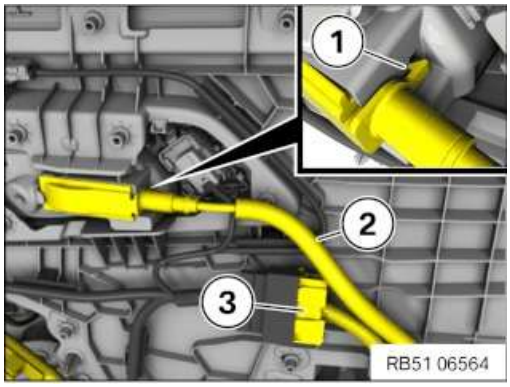
4 – Install front door trim panel



- Check clips (arrows) for damage and, if necessary, renew them.



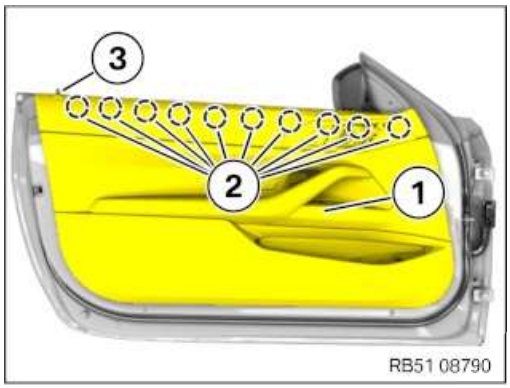
- Check the stop pad (1) for damage, renew if necessary.



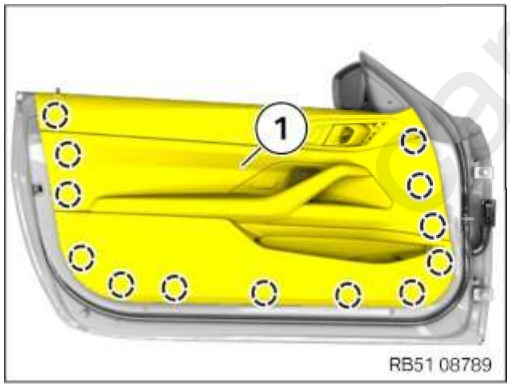
NOTICE

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

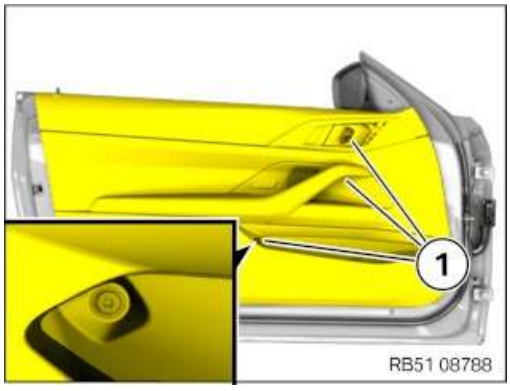
- Push the inner door opener in closed direction.
- Insert the Bowden cable for the door handle inside (2) and clip it in with the latch mechanism (1) .
- Connect connectors (3) and lock.



- Insert the front door trim panel (1) from the top over the operating rod (3) and clip it in with the latch mechanisms (2) .



- Clip in the door trim panel (1) at the marked places.



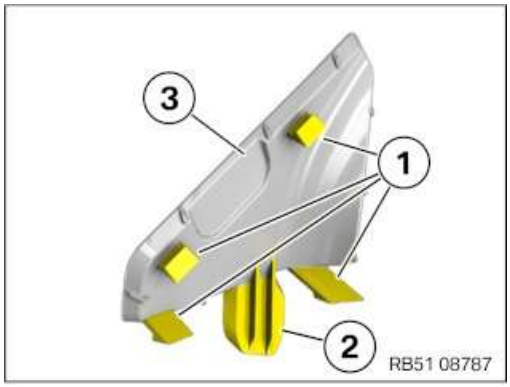
- Tighten the screws (1).

Door trim panel

Oval-head screw		Tightening torque	3 Nm

Check

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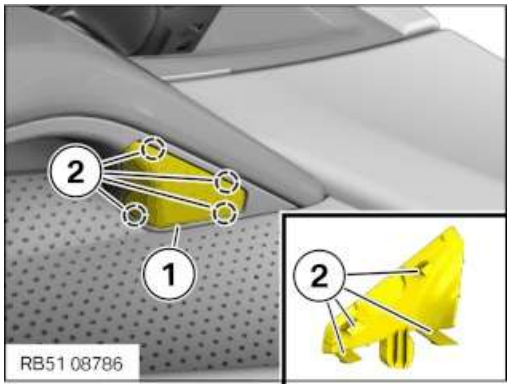
- Check the latch mechanisms (1) and the guide (2) at the cover (3) for damage.

Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

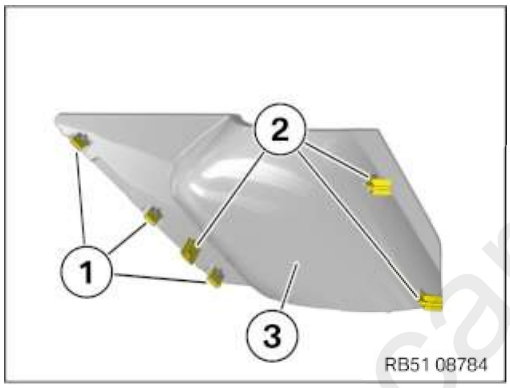
- Replace the cover (3).



- Position the cover (1) and clip it in with the latch mechanisms (2) .

Check

- Check the latch mechanisms (1) and the guides (2) at the cover of the door handle (3) for door handle.

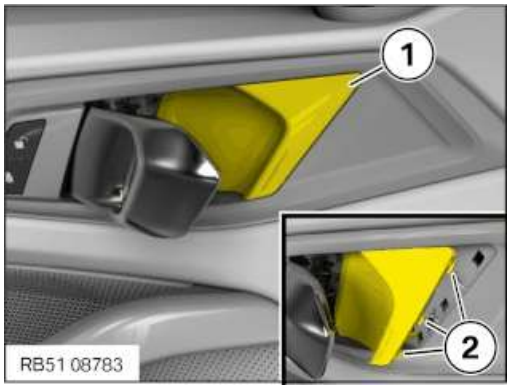


Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

- Replace door handle cover (3).



- Pull the door handle.
- Insert the cover of the door handle (1) with the guides and clip it in with the latch mechanisms (2) .

Additional Information

Overview of Tightening Torques

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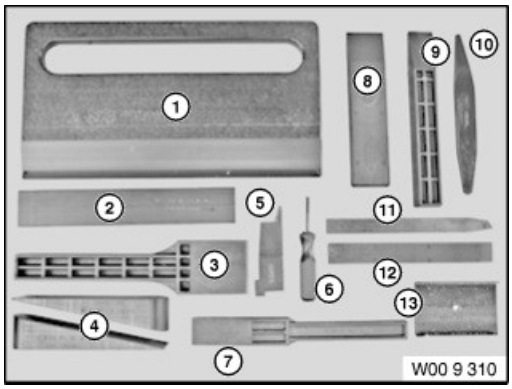
Overview of Tightening Torques

Door trim panel Used in step 4

Oval-head screw		Tightening torque	3 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common Used in step 1

Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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61 31 197 Removing and installing operating facility for centre console

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

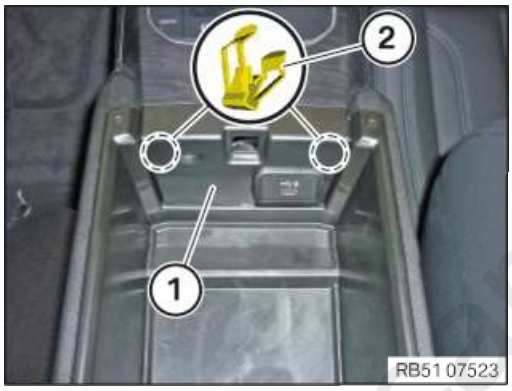
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads

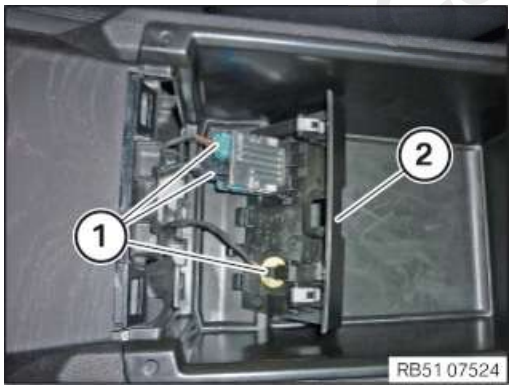


- See additional information.

3 – Removing the trim in the storage compartment on the centre armrest



- Lever out the trim (1) with the special tool (2) toward the rear from the clamps 2 298 505.



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

4 – Remove the centre console trim

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RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



- Release and remove the centre console trim upwards (1) as shown using the special tool 2 298 505 from the latch mechanisms.

MAIN WORK

5 – Remove the operating facility in the centre console

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

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RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

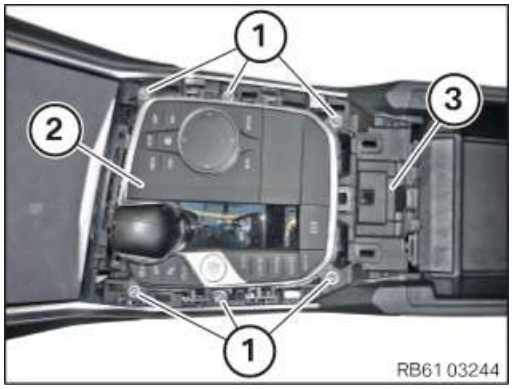
- Cover the vehicle battery.

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

▸ **Disconnecting all battery earth leads**

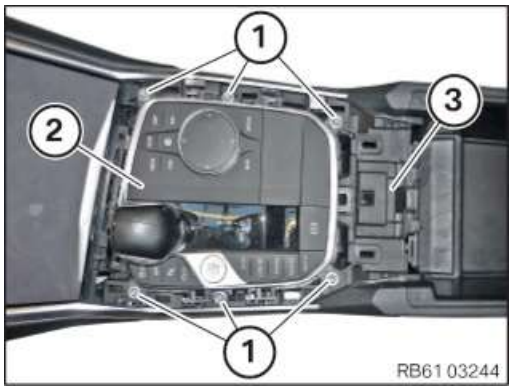


- See additional information.



- Loosen screws (1).
- Remove the operating facility in the centre console (2) from the centre console (3).

6 – Install the operating facility in the centre console



- Position the operating facility (2) in the centre console (3).
- Tighten the screws (1).

Gear selector switch to centre console trim

Screw		Tightening torque	1,8 Nm

▸ **Connecting all battery earth leads**



- See additional information.

▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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

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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

POSTPROCESSES

7 – Installing the centre console trim

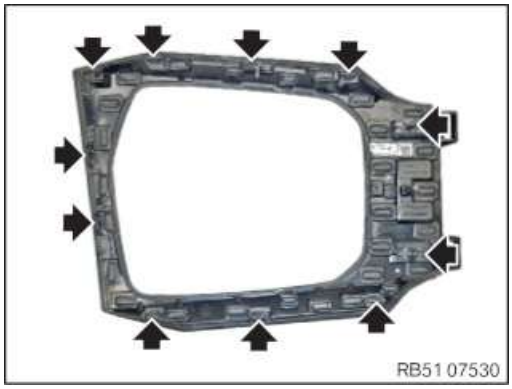
RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

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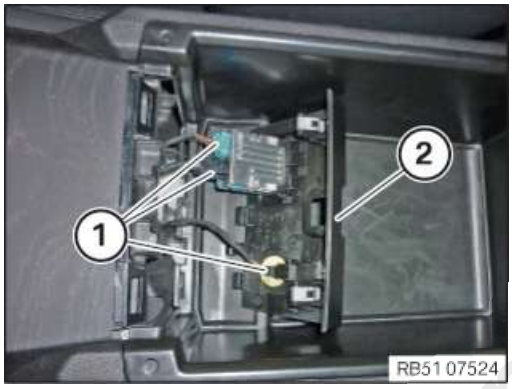


- Check all the latch mechanisms or clamps (arrows).
- In case the latch mechanisms or the clamps (arrows) are faulty, renew the centre console trim .

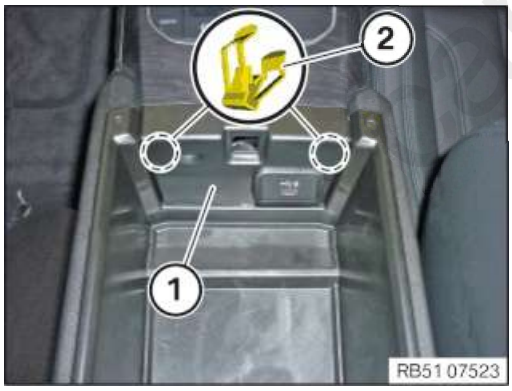


- Correctly position the centre console trim (1) and engage at the latch mechanisms.

8 – Installing the trim in the storage compartment of the centre armrest



- Mount the trim (2) and connect connector (1) and lock.



- Correctly position trim (1) and snap into the clamps (2).

9 – Connecting all battery earth leads



- See additional information.

.com

10 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

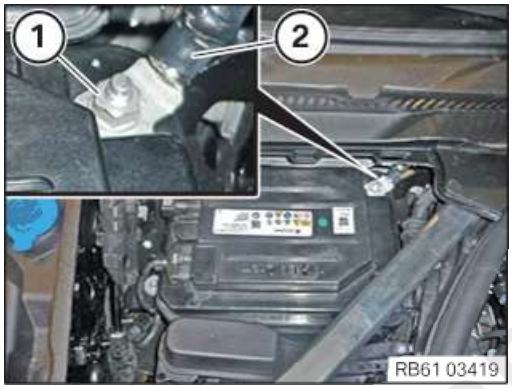
Damage to 48-V battery

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

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



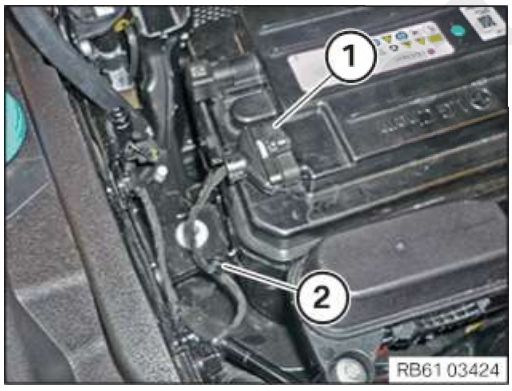
- Lift battery earth lead (1).
- Remove special tool .



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

Additional Information

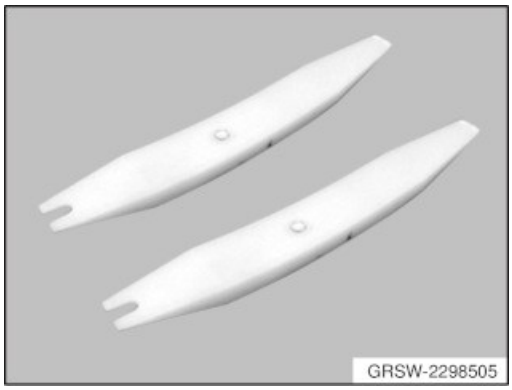
Overview of Tightening Torques

Gear selector switch to centre console trim			Used in step 6
Screw		Tightening torque	1,8 Nm

Negative battery cable to 48-V battery			Used in step 610
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

2 298 505 Wedge



Common	Used in step 34
Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	15610

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
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61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2569
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2569
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
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61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting battery earth lead	2569
61 20 900 Disconnecting and connecting battery earth lead	2569

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61 31 008 Removing and installing steering column switch cluster

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.

Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.

For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Adjust the steering column position



- Adjust the length of the steering column to the maximum length in the direction of arrow (1).
- Move the steering column to the lowest steering column position in the direction of arrow (2).

2 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

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WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

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

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

desired state

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

Result

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

ardiagn.com

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

3 – Disconnecting all battery earth leads



- See additional information.

4 – Removing the airbag unit

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▸ **Removing the airbag unit for sports steering wheel**



- Insert Torx screwdriver T25 (1) diagonally upwards in the hidden opening (2) on the rear side of the steering wheel until a spring resistance is felt.

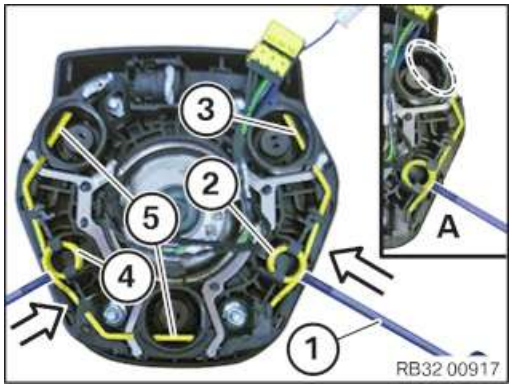
cardiagn.com



NOTICE

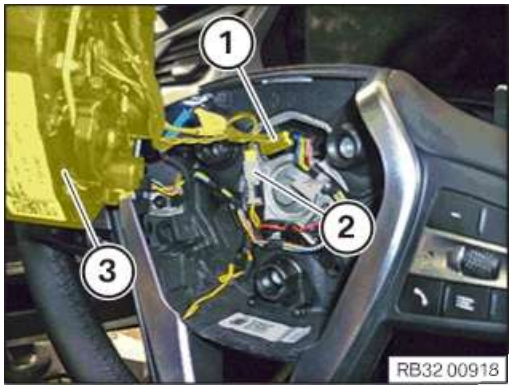
To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press Torx screwdriver T25 (1) diagonally upwards in the direction of the arrow to the centre of the steering wheel.



- Press the airbag unit over a large area of the steering wheel.
- Use Torx screwdriver T25 (1) to press wire spring clip (2) in the direction of the arrow towards the centre of the steering wheel and release lock (3).

  (A): Wire spring clip (2) is unlocked.
- Press wire spring clip (4) with Torx screwdriver T25 (1) in the direction of the arrow towards the centre of the steering wheel and release locks (5).
- Carefully raise the airbag unit.



- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

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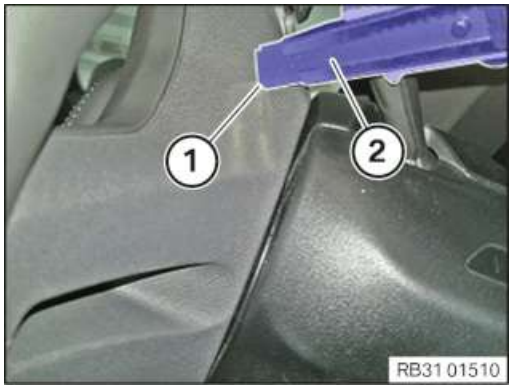
▸ Removing the airbag unit for M Sport steering wheel



NOTICE

Perform the operations on the left and right side.

- Locate the mark (1) for unlocking the airbag unit on the steering wheel by touching it.



NOTICE

Perform the operations on the left and right side.

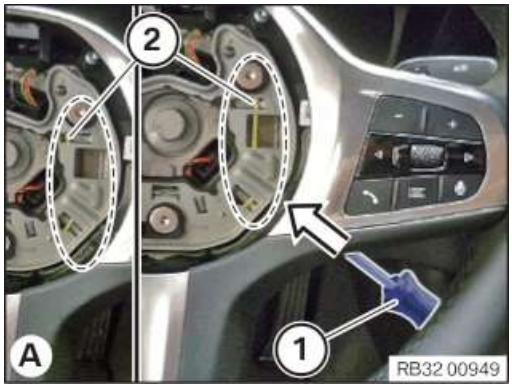
- Cut the mark (1) carefully with a knife (2) to an approx. length of 4 mm .



TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

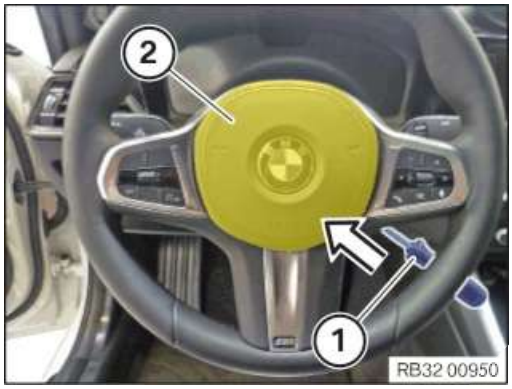
- In case of vehicles with shift paddles (2) made of carbon-fibre-reinforced plastic, use a Torx socket T15 (1) for unlocking the airbag unit.



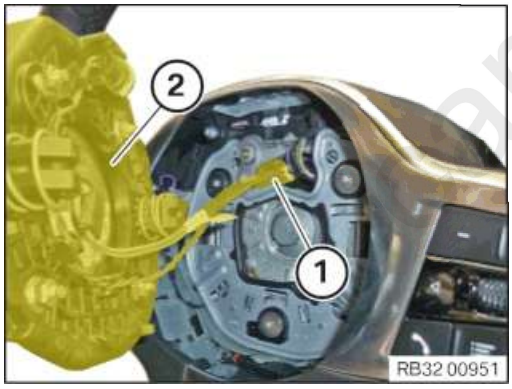
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- Insert the Torx socket T15 (1) diagonally upwards until a resilient resistance is felt.
- Press in Torx socket T15(1) straight in the direction of arrow towards the centre of the steering wheel in order to unlock the wire spring clip (2) or to unlock the airbag unit (A).



- Press in Torx screwdriver T15 (1) straight in direction of arrow towards the centre of the steering wheel and lift the airbag unit (2) on the unlocked side.
- Repeat procedure on left side and carefully release airbag unit (2) from the steering wheel.



- Unlock and disconnect the plug connection (1) and remove the airbag unit (2).

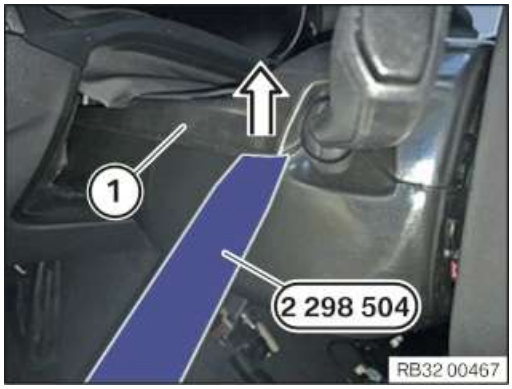
5 – Remove sports steering wheel



- Move the steering wheel and wheels to the straight-ahead position.
- Unlock plug connection (1) and disconnect.
- If installed: Unlock plug connection (2) and disconnect.
- Release the screw (3) and pull off and remove the steering wheel.

6 – Removing steering column shroud upper section

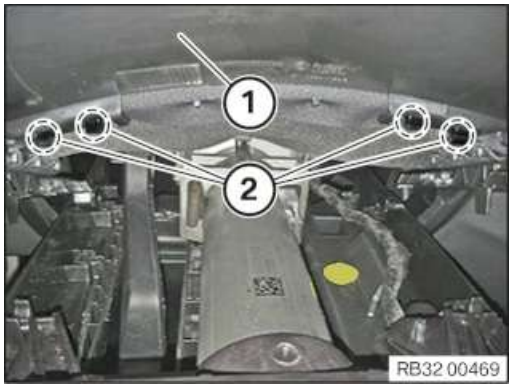
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NOTICE

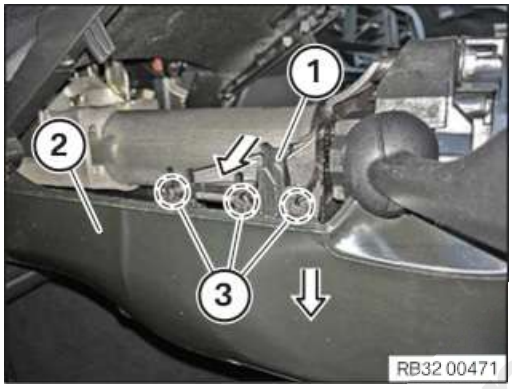
Perform the operations on the left and right side.

- Unlock the steering column shroud upper section (1) with the special tool 2 298 504 and fold up.



- Unclip the steering column shroud upper section (1) from the brackets (2).
- Remove the steering column shroud upper section (1).

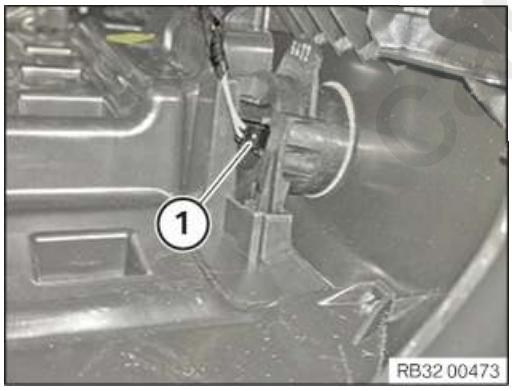
7 – Removing steering column shroud lower section



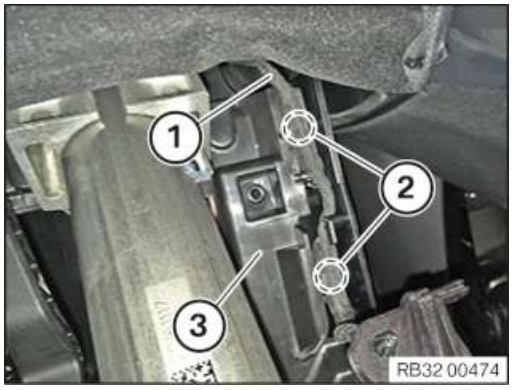
NOTICE

Perform the operations on the left and right side.

- Push the retaining lug (1) to the outside in the direction of the arrow and unclip the steering column shroud lower section (2) from the holders (3) in the direction of the arrow to the bottom at the same time.



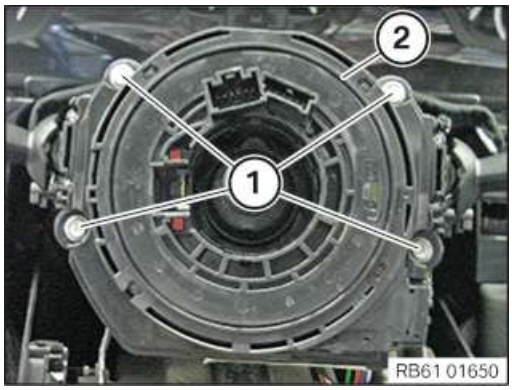
- Fold the steering column shroud lower section down.
- Unlock and disconnect connector (1).



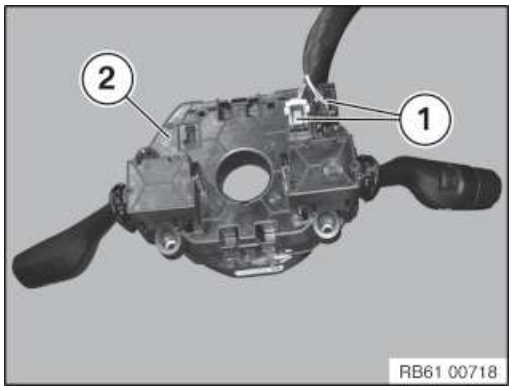
- Detach the cable (1) from the brackets (2).
- Remove the steering column shroud lower section (3).

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8 – Removing the steering column switch cluster (SZL)

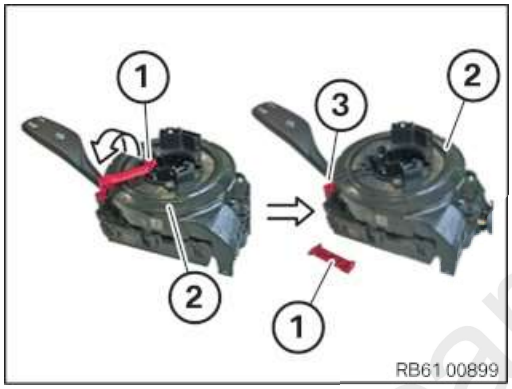


- Loosen screws (1).
- Remove the steering column switch cluster (SZL) (2).



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

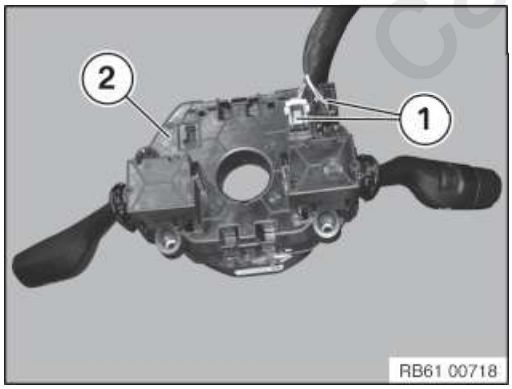
9 – Installing the steering column switch cluster (SZL)



- **Replacement:**

  Break off the transportation retainer (1) on the steering column switch cluster (SZL) (2) in direction of arrow.

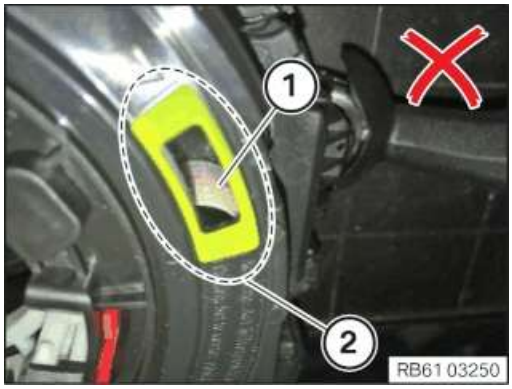
  The broken off piece (3) of the transportation retainer (1) remains in the steering column switch cluster (SZL) (2).



- Connect the connector (1) with the steering column switch cluster (SZL) (2).

Check

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- **Version A:**

  Check whether the correct marking (1) is seen in inspection glass (2).

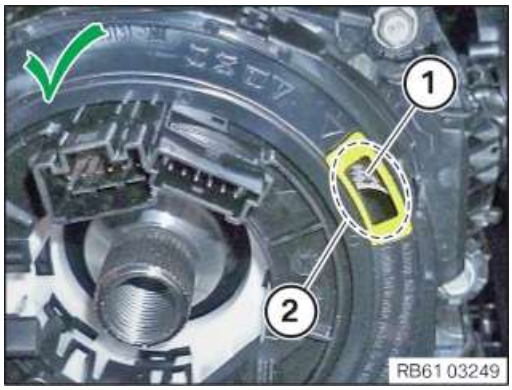
Result

» Ensure that no incorrect marking (1) is seen in inspection glass (2).

Measure

- Turn the coil spring cassette until the right mark (1) becomes visible in the inspection glass (2).

Check



- **Version A:**

  Check whether the correct marking (1) is seen in inspection glass (2).

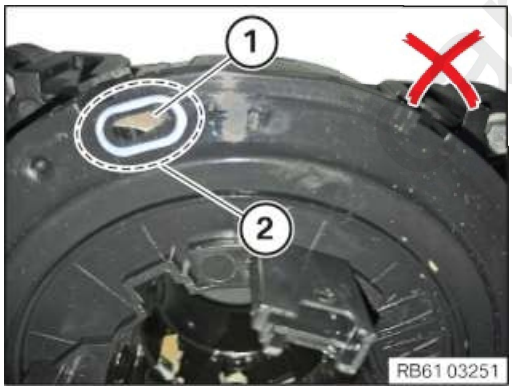
Result

» Correct marking (1) is seen in inspection glass (2).

Measure

- Continue with the next step.

Check



- **Version B:**

  Check whether the correct marking (1) is seen in inspection glass (2).

Result

» Ensure that no incorrect marking (1) is seen in inspection glass (2).

Measure

- Turn the coil spring cassette until the right mark (1) becomes visible in the inspection glass (2).

Check

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- **Version B:**

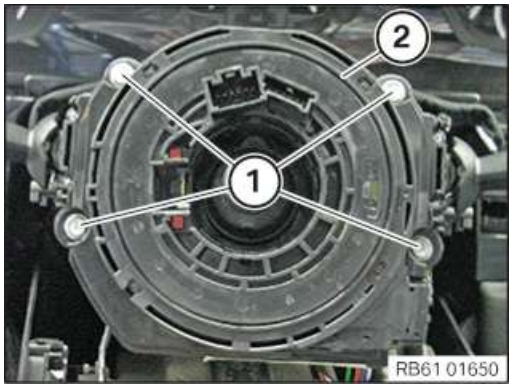
  Check if the correct mark (1) can be seen in the inspection glass (2).

Result

» Correct marking (1) is seen in inspection glass (2).

Measure

- Continue with the next work step.



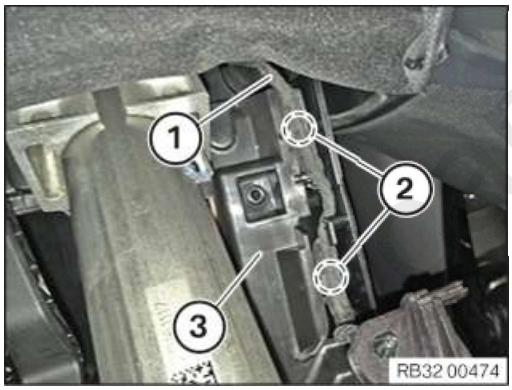
- Position the steering column switch cluster (SZL) (2).
- Tighten the screws (1).

Steering column switch cluster (SZL) on the steering column

Screw TS5x20		Tightening torque	3 Nm

POSTPROCESSES

10 – Install steering column shroud lower section

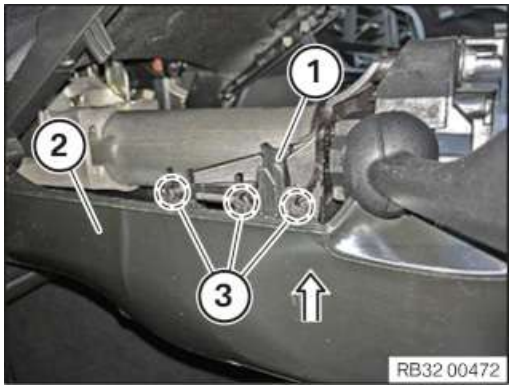


- Position the steering column shroud lower section (3).
- Secure the line (1) on the brackets (2).



- Connect the connector (1).

.com

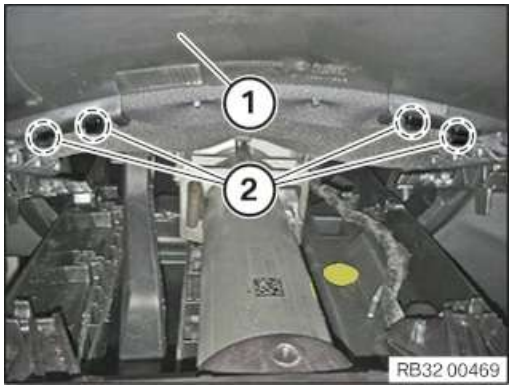


NOTICE

Perform the operations on the left and right side.

- Align the steering column shroud lower section (2) to the steering column using the retaining lug (1).
- Push the steering column shroud lower section (2) up in the direction of the arrow until the brackets (3) engage.

11 – Fit steering column shroud upper section



- Clip in the steering column shroud upper section (1) at the brackets (2).



NOTICE

Perform the operations on the left and right side.

- Clip in the steering column shroud upper section (1)into the guide (2).



NOTICE

Perform the operations on the left and right side.

- Press the upper section of the steering column shroud (1) downwards in direction of arrow.

  The upper section of the steering column shroud must engage audibly and perceptibly.

12 – Installing the sports steering wheel

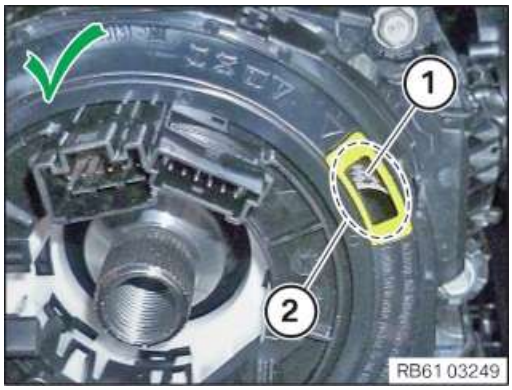
▸ **Check the neutral position of the clock spring**

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▹ **Version A: Checking the visibility of the marking on the coil spring**

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Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁

▷ **Version B: Checking the visibility of the marking on the coil spring**



Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁



Check

- Check if a microencapsulated screw (3) is installed.

Result

» Screw (3) is micro-encapsulated.

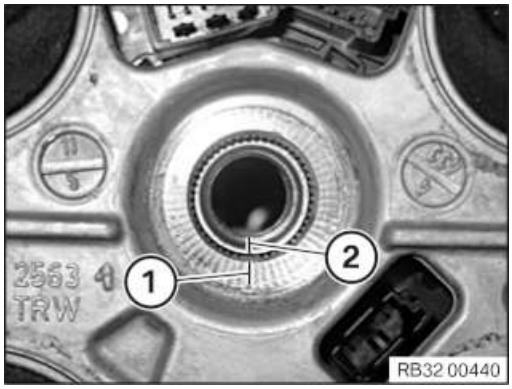
cardiagn.com

Measure

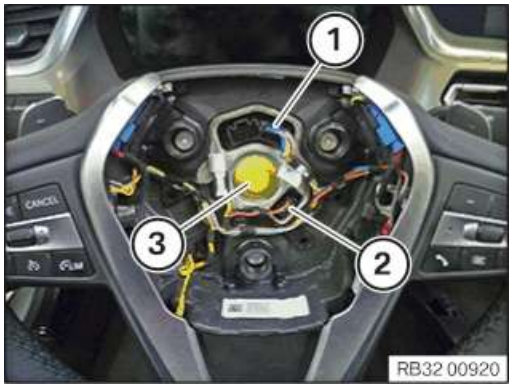
- Clean thread in the steering column.

  Renew the screw (3).

  Parts: Screw



- Align mark (1) on steering wheel to mark (2) on steering column.
- Connect steering wheel.



- Connect connectors (1) and lock.
- If installed: Connect connectors (2) and lock.
- Tighten screw (3) .

Steering wheel to steering column

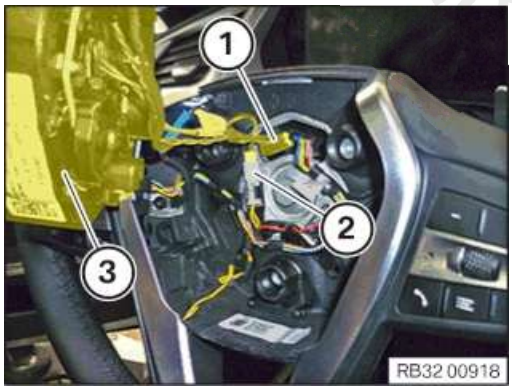
M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

13 – Installing the airbag unit

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▸ **Installing the airbag unit for the sports steering wheel**



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

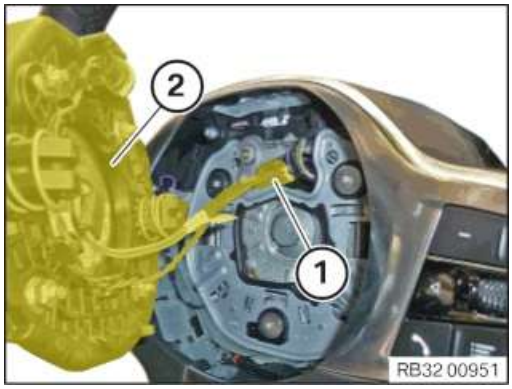
  The airbag unit (1) must engage audibly and perceptibly.

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▸ **Installing the airbag unit for M Sport steering wheel**

TECHNICAL INFORMATION

After replacing the airbag unit (M sport steering wheel) or after a possible conversion of standard steering wheel and airbag unit to M-sports steering wheel, a software update or a programming/encoding via ISTA must be performed!



- Connect and lock the connector (1) of the airbag unit (2).



- Press the airbag unit further (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

14 – Connecting all battery earth leads



- See additional information.

15 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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

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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

16 – Checking the airbag for function

Check

- Turn steering wheel in both directions to the limit position.

Result

» The airbag indicator light lights up.

Measure

- Renew the coil spring cassette.

Additional Information

Overview of Tightening Torques

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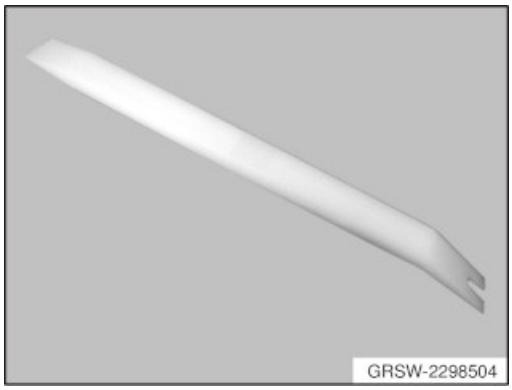
Steering column switch cluster (SZL) on the steering column			Used in step 9
Screw TS5x20		Tightening torque	3 Nm

Steering wheel to steering column			Used in step 12
M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

Negative battery cable to 48-V battery			Used in step 15
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

2 298 504 Wedge



Common		Used in step 6
Usage	Wedge with angled lug	
Included in the tool or work		
Storage location	C34	
Replaced by		
In connection with		
SI-Number	01 03 12 (792)	

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	215

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	4

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	314
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	314
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61 31 043 Removing and installing the FZD

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

TECHNICAL INFORMATION

With the optional equipment SA6UA, the camera for gesture control is integrated in the roof control module. Separate exchange of this camera in the event of a fault is not possible.

1 – Removing the roof function centre (FZD)



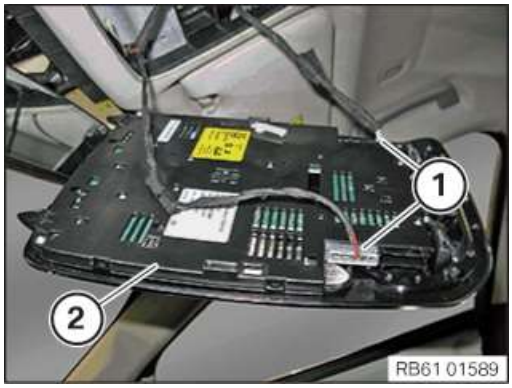
- Unclip the cover (1).



- Loosen screws (1).

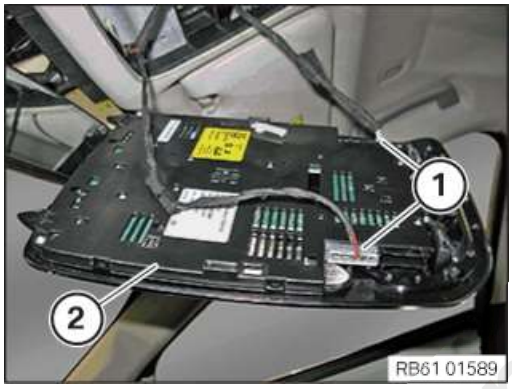


- Unclip the roof function centre (FZD) (1) from the clamps (2).
- Thread the roof function centre (FZD) (1) out of the guides (3).

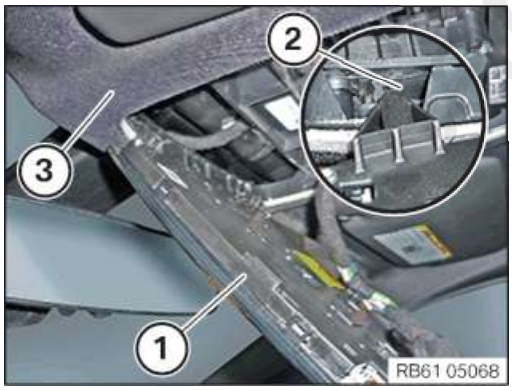


- Unlock and disconnect plug connections (1).
- Unclip the cable clip from roof function centre (FZD) (2) and remove the roof function centre (FZD) (2).

2 – Installing roof function centre (FZD)



- Connect connectors (1) and lock.
- Clip in the cable for the roof function centre (FZD) (2) in the cable clip.



- Insert the roof function centre (FZD) (1) as shown at a steep angle in the two guides (2) on the headlining (3).
- Make sure the headlining is not deformed during this operation.



- Clip the roof function centre (FZD) (1) upwards into the clamps (2).

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- Slide the special tool 2 298 505 in the direction of arrow between the FZD frame and the headlining along the dotted line to adjust the headlining correctly.



- Tighten the screws (1).

Roof function centre (FZD)

	Tightening torque	1.2 Nm



- Clip in the cover (1).

3 – Initialising glass slide/tilt sunroof

▸ Prerequisites for initialising the slide/tilt sunroof/panoramic glass sunroof

- The following prerequisites must be met for a trouble-free initialisation:

Interior temperature of the vehicle	15 °C - 30 °C
Vehicle voltage	12 V - 15 V
Vehicle condition	- The vehicle is standing on its own wheels
	- The vehicle is horizontal
	- Speed 0 km/h (the vehicle must not roll)
	- The radio-operated key is in the vehicle
	- Terminal 15 is switched on or the vehicle is in the Residing PFW state
Operating point	- FZD button
	- Diagnostic function: “Initialise slide/tilt sunroof”
Miscellaneous	No other work may be carried out on the vehicle during initialisation in order to avoid impacts or vibrations.

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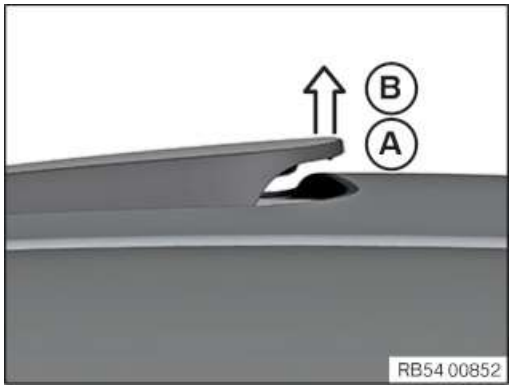
TECHNICAL INFORMATION

The following prerequisites are the basis for a correct initialisation and must be strictly observed.

For additional information see: 54 12 ... General prerequisites for initialising the slide/tilt sunroof or panoramic sunroof

- Press and hold the switch in the "Vent Position" direction.

  The glass slide/tilt sunroof moves to vent position.
- In the event of a delayed start or sudden stop of the glass slide/tilt sunroof, continue holding the switch in the "Vent position" direction.



- Continue to keep the switch pressed during the entire test module.
- Continue to operate the switch further after reaching the vent position (A) for approx. 30 s.

  Initialisation begins:

  - The glass slide/tilt sunroof moves from vent position (A) toward position (B).
  - Screen (sliding headliner) fully closes.
  - Screen (sliding headliner) fully opens.
  - Glass slide/tilt sunroof moves to "closed" position.
  - The glass slide/tilt sunroof moves to the "Open" position and immediately returns to the "Closed" position.
  - After a brief pause, the screen fully closes.

  The initialisation is completed once the glass slide/tilt sunroof and the screen have completely closed.
- Release the switch.

TECHNICAL INFORMATION

If the switch is released in the meantime, the initialisation must be repeated. Following successful initialisation, the corresponding messages in the Check Control and on the control display go out.

- Carry out function check (one-touch function, anti-trapping protection and, if necessary, comfort function).

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Additional Information

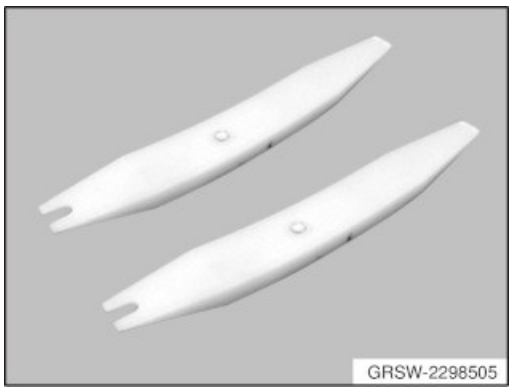
Overview of Tightening Torques

Roof function centre (FZD) — Used in step 2

	Tightening torque	1.2 Nm

Overview of Special Tools

2 298 505 Wedge



Common	Used in step 2
Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

Links

Repair instructions (PRE)	Used in step
Prerequisites for initialisation of the slide/panoramic sunroof	3

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

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61 31 362 Removing and installing the radio remote control receiver

RISK OF DAMAGE

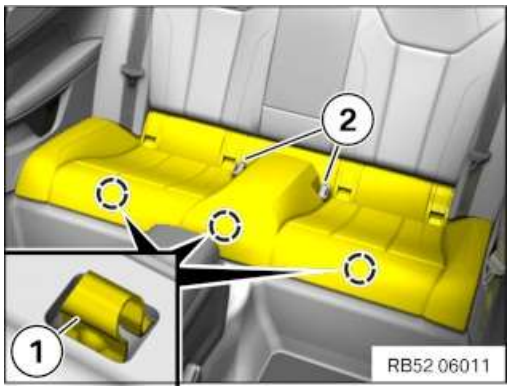
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.

PRELIMINARY WORK

1 – Remove rear seat bench



- Unclip the rear seat bench upwards from clamps (1) and guide out seat belt buckles (2).
- Remove the rear seat bench.

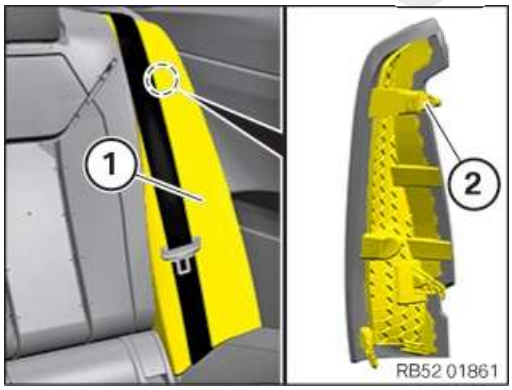
2 – Remove backrest side section on left and right

NOTICE

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

▶ **Remove armrest side section**

▷ **Remove armrest side section**



- Reach behind the backrest side section (1) from the top and unclip the backrest side section (1) from the mounting element (2) to the front.
- Remove backrest side section (1) in the upward direction from the guide.

◁

3 – Removing the C-pillar trim panel on the left and right

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NOTICE

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

▸ **Remove C-pillar trim panel**

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

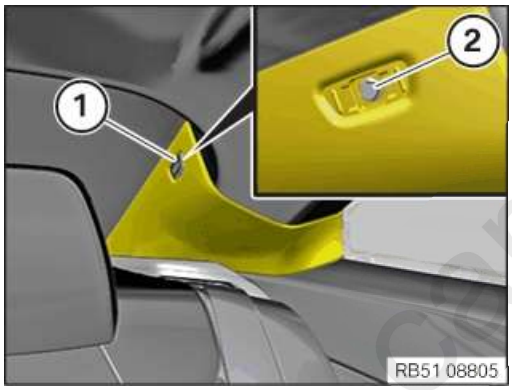
- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

RISK OF DAMAGE

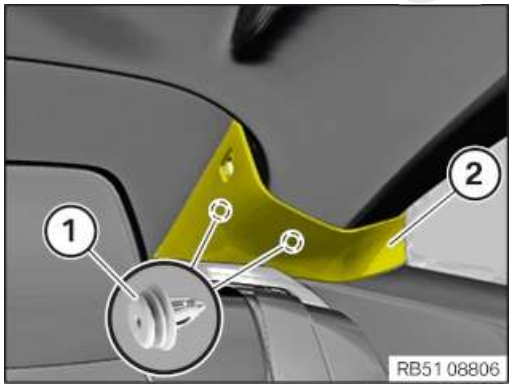
Damage to the head airbag.

Improper use of a tool when removing the trim panel may damage the head airbag.

- Do not use sharp-edged tools when removing the trim panel.



- Unclip cover (1) of the C-pillar trim panel.
- Release the screw (2).



- Unclip C-pillar trim panel (2) from clips (1) and guide it out.

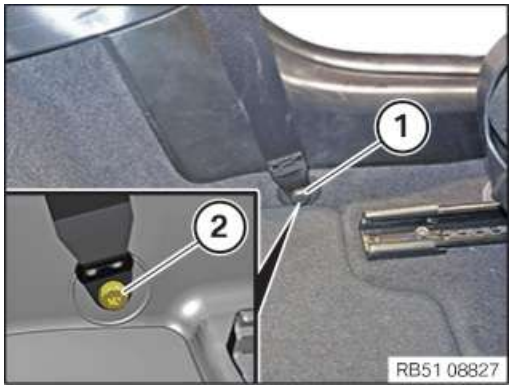
4 – Remove side trim panel, rear left and right

NOTICE

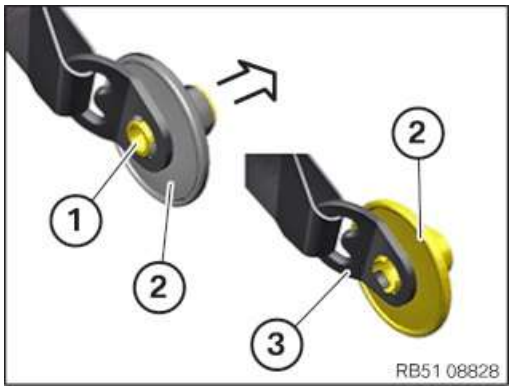
Description is for left component only. Procedure on the right side is identical.

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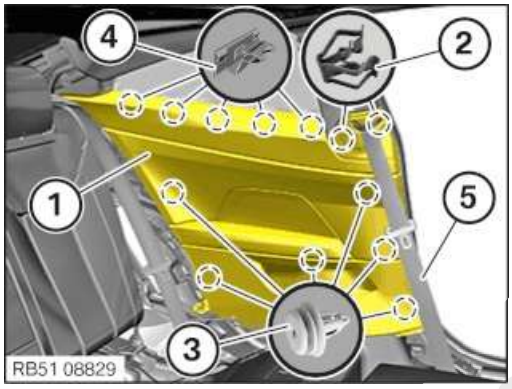
▸ **Remove rear side trim panel**



- Unclip the cover cap (1).
- Release the screw (2).

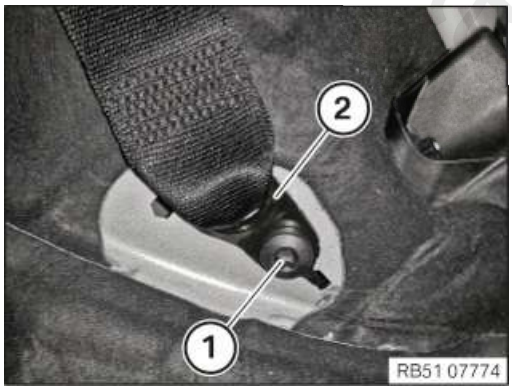


- Pull out the sleeve (1) from the cover (2) of the end fitting (3).
- Unclip the cover (2) of the end fitting (3) from the end fitting (3).



- Unclip the rear side trim panel (1) with a suitable tool at the clamps (2).
- Unclip the rear side trim panel (1) with a suitable tool at the clips (3).
- Release the rear side trim panel (1) at the clamps (4) and feed out at the edge protection.
- Unlock and disconnect all the plug connections at the rear side trim panel (1) of the wiring harness.
- Feed out the upper seat belt (5).

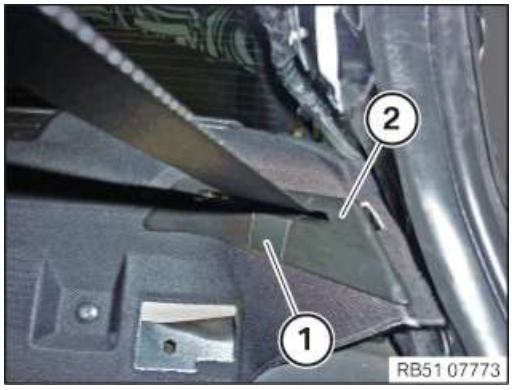
5 – Removing the trim panel for the storage shelf



NOTICE

Perform the operations on the left and right side.

- Release the screw (1) from the rear end fitting (2).
- Feed out the rear end fitting (2) from the body.

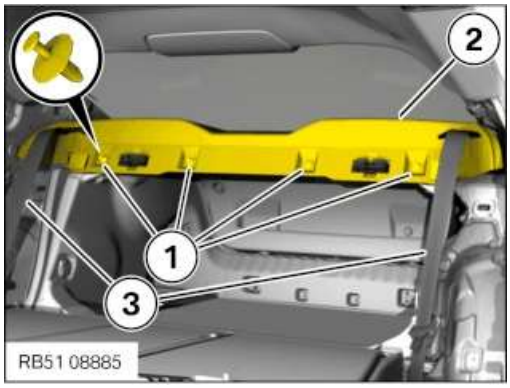


NOTICE

Perform the operations on the left and right side.

- Unclip the cover (1) to the front.
- Unclip the outer belt feed trim (2) starting from the front and remove it.

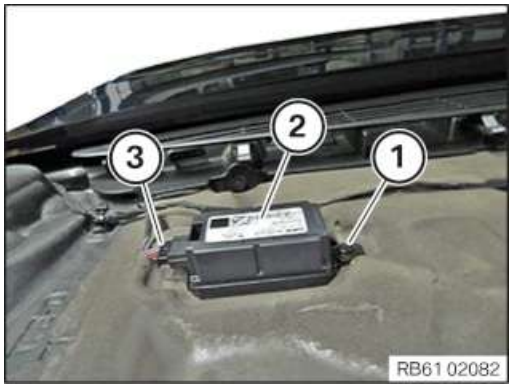
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- Release the expanding rivet (1).
- Unlock and disconnect the plug connections under the trim panel (2). Lift the trim panel (2) for that.
- Release the wiring harness with all holders from trim panel (2).
- Remove the trim panel (2) to the front and feed out the seat belts (3).

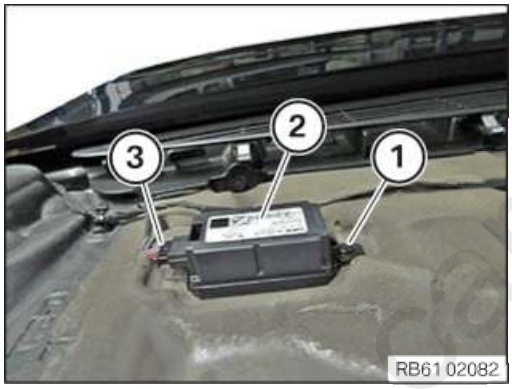
MAIN WORK

6 – Remove the remote control receiver



- Loosen expanding rivet (1).
- Remove the remote control receiver (2).
- Unlock plug connection (3) and disconnect.

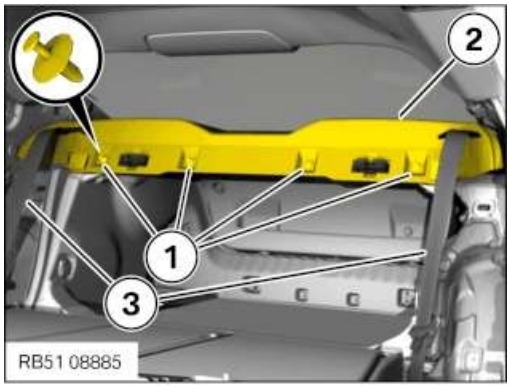
7 – Install the remote control receiver



- Connect connector (3).
- Position remote control receiver (2).
- Fasten expanding rivet (1).

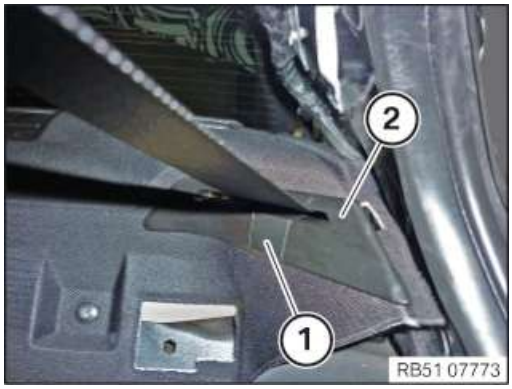
POSTPROCESSES

8 – Install the trim panel for the storage shelf



- Install the trim panel (2) and the feed in the seat belts (3).
- Clip in the wiring harness with all the holders to the trim panel for the storage shelf (2).
- Connect all connectors and lock.
- Feed in the trim panel (2) to the rear guides and position it correctly.
- Secure expanding rivet (1).

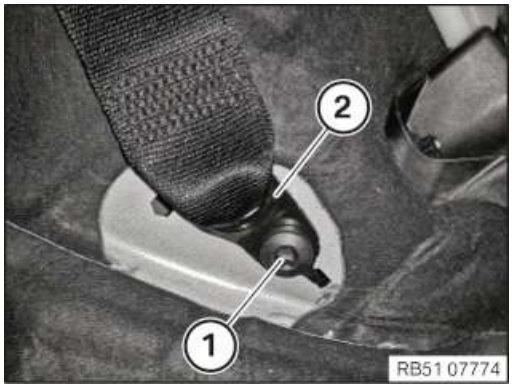
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NOTICE

Perform the operations on the left and right side.

- Feed in the belt feed trim (2).
- Clip in the cover (1).



NOTICE

Perform the operations on the left and right side.

- Feed the rear end fitting (2) into the body.
- Renew the screw (1).

  Part: Screw
- Tighten down screw (1).

End fitting to body

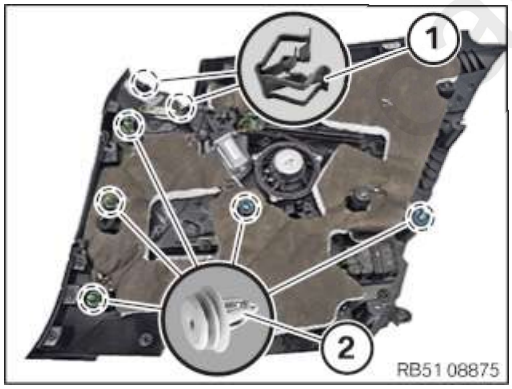
M10	Renew screw.	Tightening torque	42 Nm

9 – Install side trim panel, rear left and right

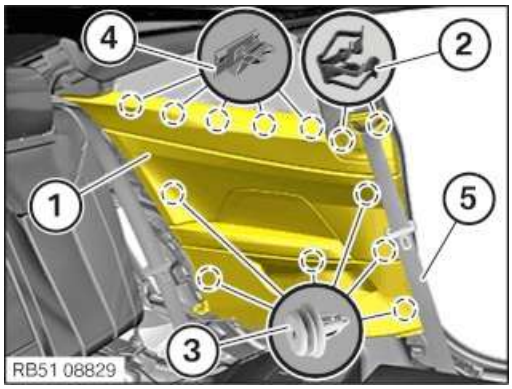
NOTICE

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

▸ **Install rear side trim panel**

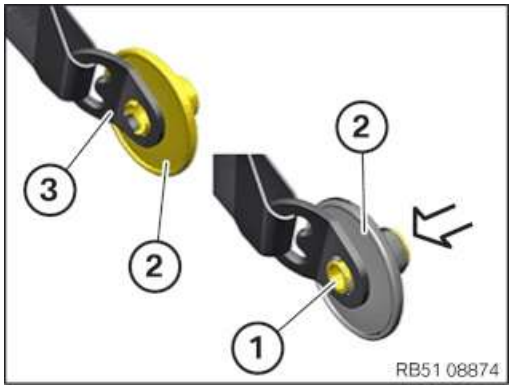


- Check clamps (1) for damage; renew them if necessary.
- Check clips (2) for damage, replace if necessary.

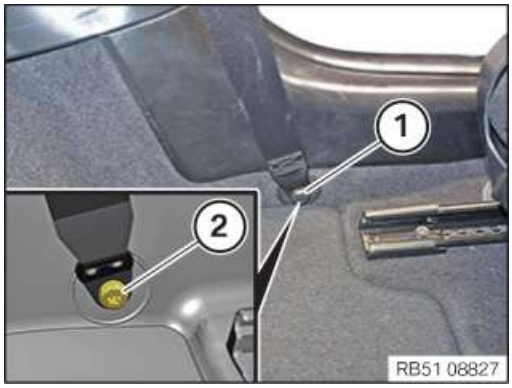


- Connect all the connectors to rear side trim panel (1) of the wiring harness and lock and disconnect them.
- Guide in upper seat belt (5).
- Position rear side trim panel (1) and clip it into clamps (4).
- Clip rear side trim panel (1) into clips (3).
- Clip rear side trim panel (1) into clamps (2).

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- Clip cover (2) of end fitting (3) into end fitting (3).
- Slide sleeve (1) into cover (2) of end fitting (3).



- Correctly position the seat belt end fitting.
- Tighten down screw (2).

End fitting to body

M10		Tightening torque	42 Nm

- Clip in cover cap (1).

10 – Installing the C-pillar trim panel on the left and right

NOTICE

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

▸ **Installing C-pillar trim panel**

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

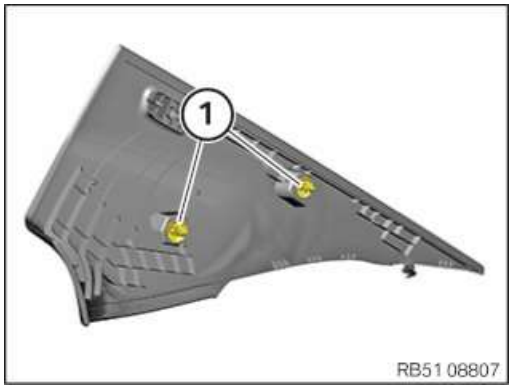
RISK OF DAMAGE

Damage to the head airbag.

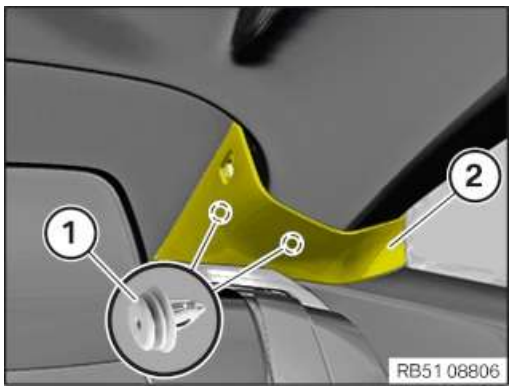
Improper use of a tool when removing the trim panel may damage the head airbag.

- Do not use sharp-edged tools when removing the trim panel.

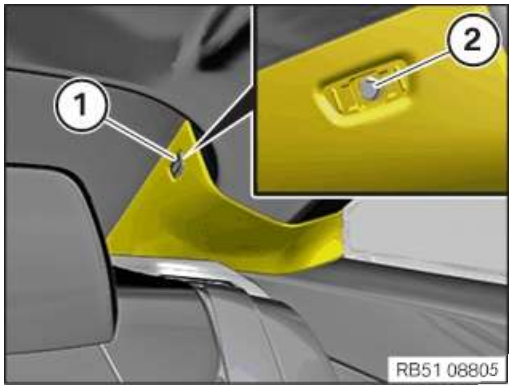
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- Check clips (1) for damage and, if necessary, renew them.



- Position C-pillar trim panel (2) and clip it onto clips (1).



- Tighten down screw (2).

C-pillar trim panel to body

Screw		Tightening torque	2,6 Nm

- Clip in cover (1) of the C-pillar trim panel.

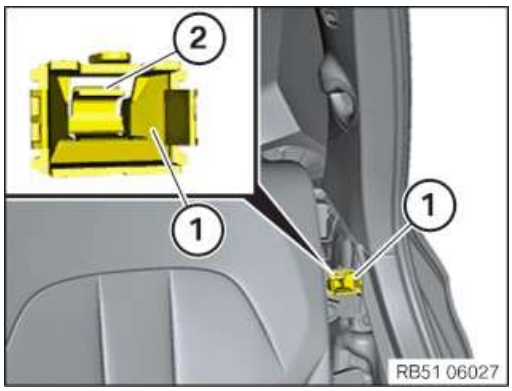
11 – Install the backrest side section on the left and right

NOTICE

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

▸ **Installing backrest side section**

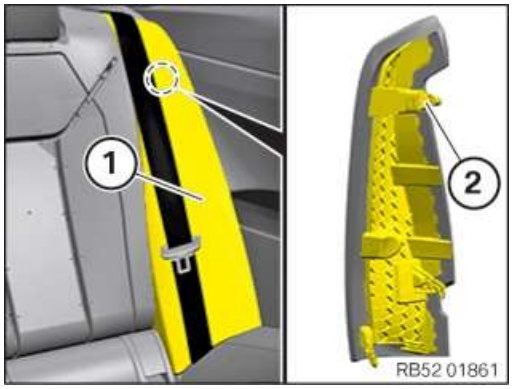
▹ **Installing backrest side section**



- Release mounting element (1) from latch mechanism (2) and remove it from the body.
- Check the mounting element (1) for damage, renew if necessary.

  The mounting element (1) must not be damaged or missing.
- Fit mounting element (1) on the backrest side section.

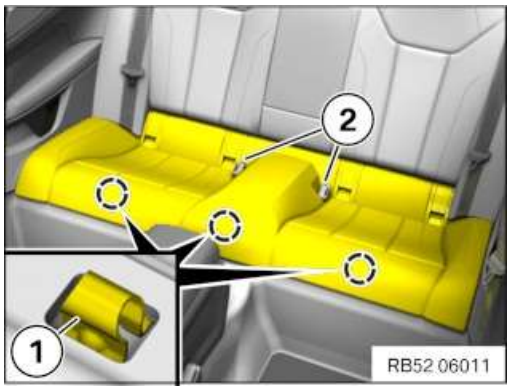
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- Insert lower backrest side section (1) into the guide and position it correctly.
- Clip in backrest side section (1) to mounting element (2).

◁

12 – Installing the rear seat bench



- Feed in the seat belt buckles (2).
- Position the rear seat bench and clip into the clamps (1).

Additional Information

Overview of Tightening Torques

End fitting to body			Used in step 8
M10	Renew screw.	Tightening torque	42 Nm

End fitting to body			Used in step 9
M10		Tightening torque	42 Nm

C-pillar trim panel to body			Used in step 10
Screw		Tightening torque	2,6 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	**Used in step**
Notes on 48-V battery	211

General repair instructions	**Used in step**
72 00 ... Safety regulations for handling components with gas generators	211

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211

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61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211

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61 31 221 Removing and installing/replacing both multifunction steering wheel switches

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.
Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.
For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

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RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing the airbag unit (sports steering wheel)

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

The procedure/sequence of the airbag module release function must be observed! First unlock the right side of the airbag module!

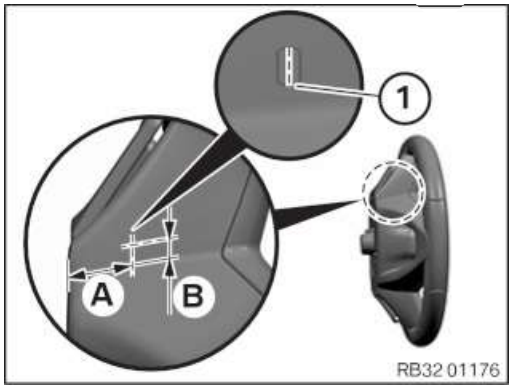


NOTICE

Perform the operations on the left and right side.

- Feel or measure the mark (1) to unlock the airbag unit (see following step).

  The mark (1) is difficult to detect.



NOTICE

Perform the operations on the left and right side.

- Cut the mark (1) carefully with a knife to 4 mm length.

  Dimension (A) = 2.5 cm

  Dimension (B) = 1.0 cm



- Insert the Torx screwdriver (1) T10 on the right diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until a springing resistance can be felt).
- While unlocking the right side, the airbag unit in the "4 O'CLOCK" area must be pressed lightly against the limit position (resistance point in the centre between the horn symbol and the "airbag" inscription).
- Press the Torx screwdriver (1) T10 on the right inwards in the direction of arrow until it audibly disengages twice.
- Let go of the airbag unit. The right side of the module is now unlocked.



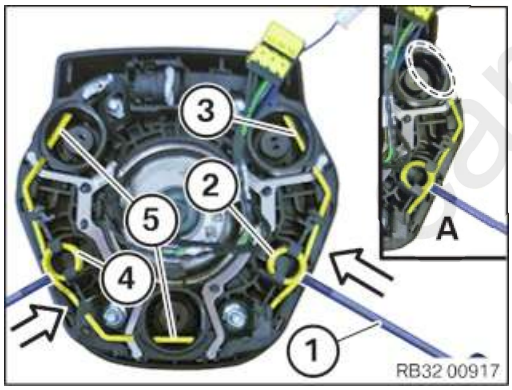
- Insert the Torx screwdriver (1) T10 on the left on the steering wheel diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until the springing resistance is felt).
- While unlocking the left side, the airbag unit in the "10 o'clock" area must be pressed lightly against the limit position with your free hand (resistance point in the area of the left horn symbol).
- Press the Torx screwdriver (1) T10 on the left inwards on the steering wheel in the direction of arrow until it audibly disengages once.
- Release the airbag module. Airbag module is not unlocked and can be removed:



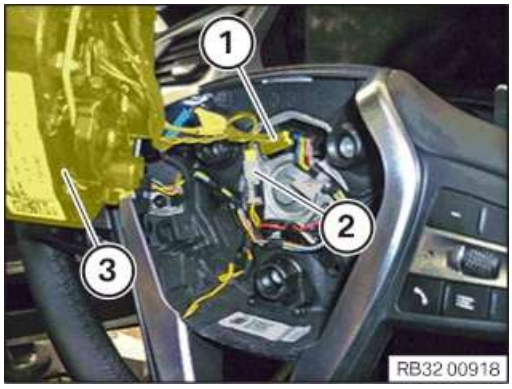
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press the Torx screwdriver T10 (1) diagonally upwards in the direction of arrow to the centre of steering wheel.



- With the Torx screwdriver T10 (1), press the wire spring clip (2) and (4) in the direction of arrow to the centre of steering wheel. Lock (3) and (5) unlocked.

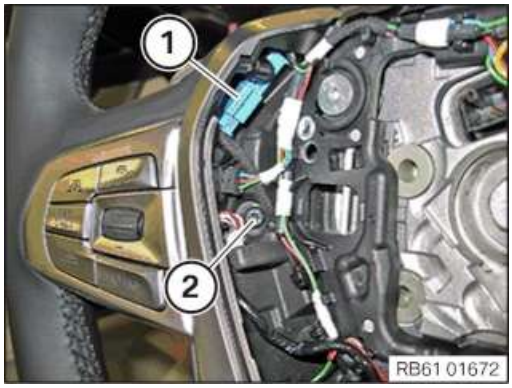


- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

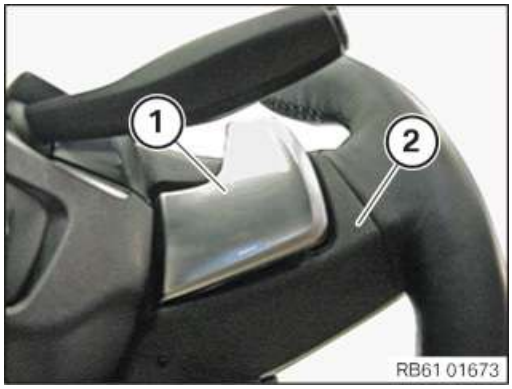
4 – Removing the shift paddle for the automatic transmission

NOTICE

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



- Disconnect connector (1) and remove cable to shift paddle.
- Loosen screw (2).



- Remove shift paddle (1) from steering wheel (2) and remove associated access line.

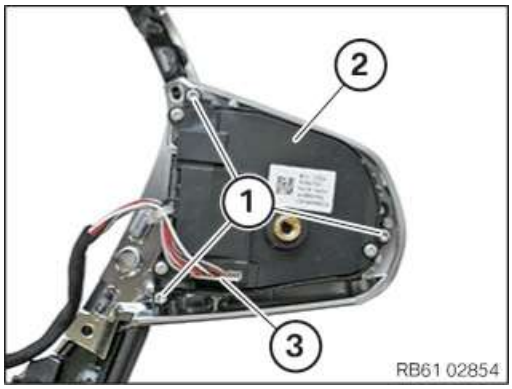
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MAIN WORK

5 – Remove both leather sports steering wheel switches

NOTICE

The operations shown only for one side must be carried out on both sides.

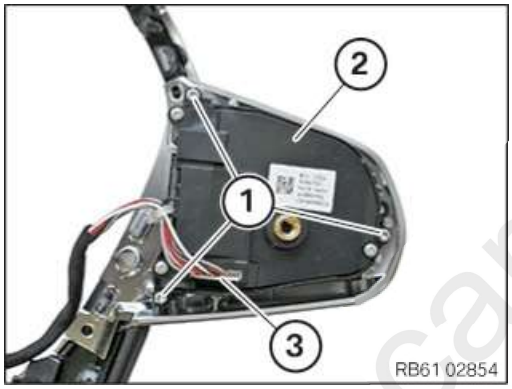


- Loosen screws (1) on the switch (2).
- Remove switch (2) from the design trim.
- Unlock plug connection (3) and disconnect.

6 – Install both sport leather steering wheel switches

NOTICE

The operations shown only for one side must be carried out on both sides.



- Position the switch (2) into design trim and tighten with screws (1).

MFL switch

Screw TS5x12		Tightening torque	1,5 Nm

- Connect connectors (3) and lock.

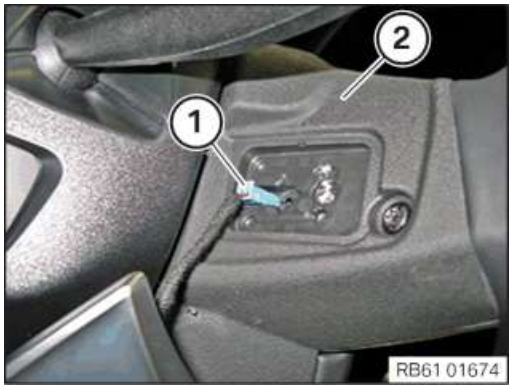
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POSTPROCESSES

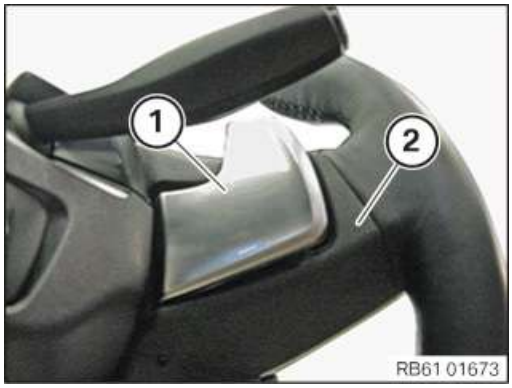
7 – Installing the shift paddle for the automatic transmission

NOTICE

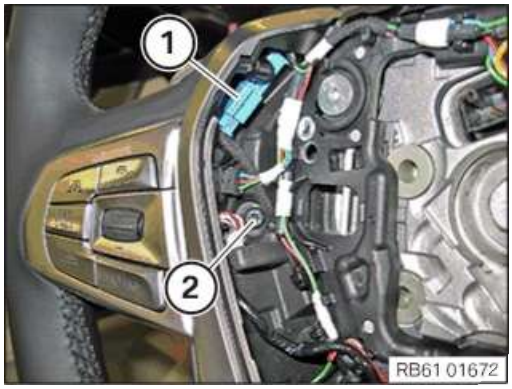
Description is for left component only. Procedure on the right side is identical.



- Insert the access line (1) into the rear of the steering wheel (2).



- Position the shift paddle (1) on the steering wheel (2).



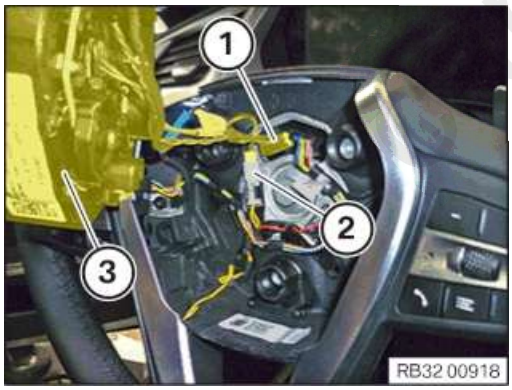
- Tighten down screw (2).

Shift paddle to steering wheel

Screw TS5x12		Tightening torque	2 Nm

- Insert the cable and connect the connector (1).

8 – Installing the airbag unit (sports steering wheel)



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

9 – Connecting all battery earth leads

bmwdiagn.com



- See additional information.

10 – Activating the 48 V electrical system

Prerequisite

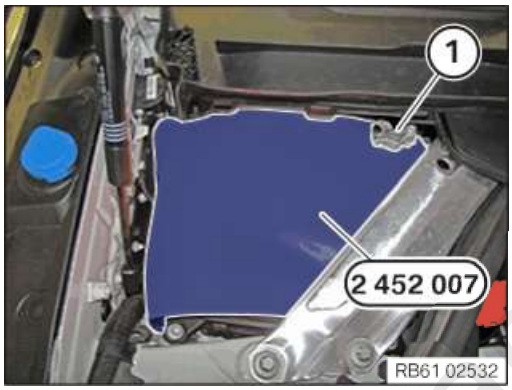
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

Additional Information

Overview of Tightening Torques

MFL switch			Used in step 6
Screw TS5x12		Tightening torque	1,5 Nm

Shift paddle to steering wheel			Used in step 7
Screw TS5x12		Tightening torque	2 Nm

Negative battery cable to 48-V battery			Used in step 10
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	110

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	3
72 12 ... Procedure after airbag deployment as result of an accident	

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	29
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29

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61 31 011 Removing and installing/replacing coil spring cassette

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.

Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.

For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Adjust the steering column position



- Adjust the length of the steering column to the maximum length in the direction of arrow (1).
- Move the steering column to the lowest steering column position in the direction of arrow (2).

2 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

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WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

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

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

desired state

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

Result

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

ardiagn.com

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

3 – Disconnecting all battery earth leads



- See additional information.

4 – Removing the airbag unit

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▸ **Removing the airbag unit for sports steering wheel**



- Insert Torx screwdriver T25 (1) diagonally upwards in the hidden opening (2) on the rear side of the steering wheel until a spring resistance is felt.

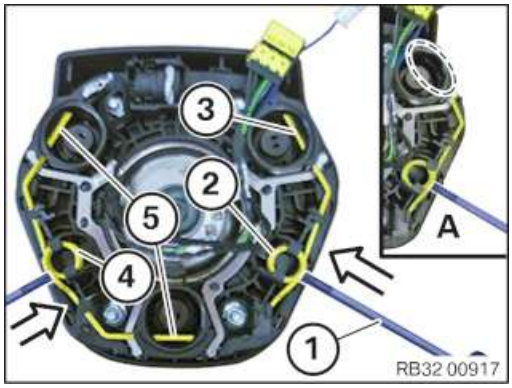
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NOTICE

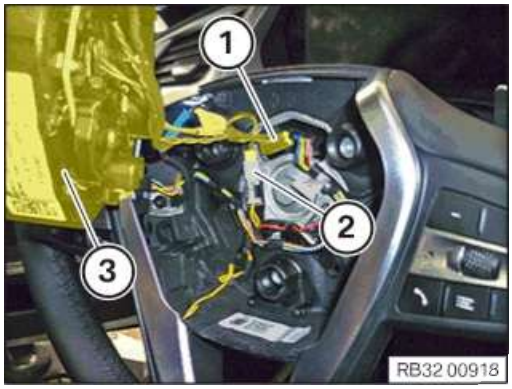
To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press Torx screwdriver T25 (1) diagonally upwards in the direction of the arrow to the centre of the steering wheel.



- Press the airbag unit over a large area of the steering wheel.
- Use Torx screwdriver T25 (1) to press wire spring clip (2) in the direction of the arrow towards the centre of the steering wheel and release lock (3).

  (A): Wire spring clip (2) is unlocked.
- Press wire spring clip (4) with Torx screwdriver T25 (1) in the direction of the arrow towards the centre of the steering wheel and release locks (5).
- Carefully raise the airbag unit.



- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

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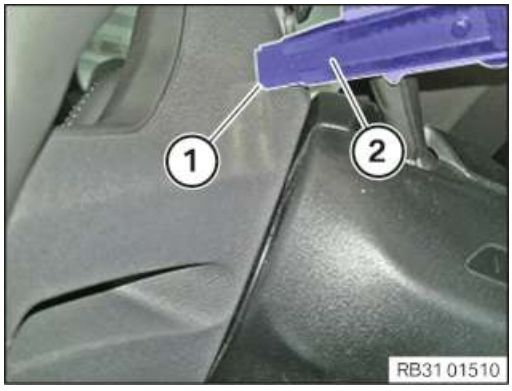
▸ Removing the airbag unit for M Sport steering wheel



NOTICE

Perform the operations on the left and right side.

- Locate the mark (1) for unlocking the airbag unit on the steering wheel by touching it.



NOTICE

Perform the operations on the left and right side.

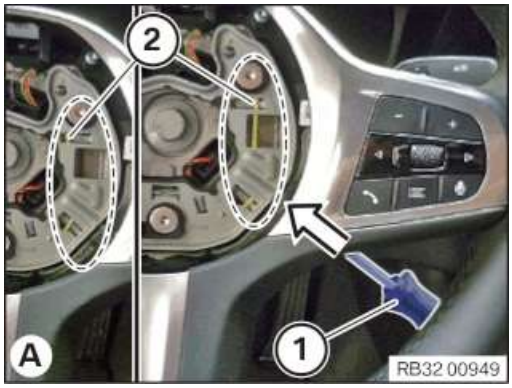
- Cut the mark (1) carefully with a knife (2) to an approx. length of 4 mm .



TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

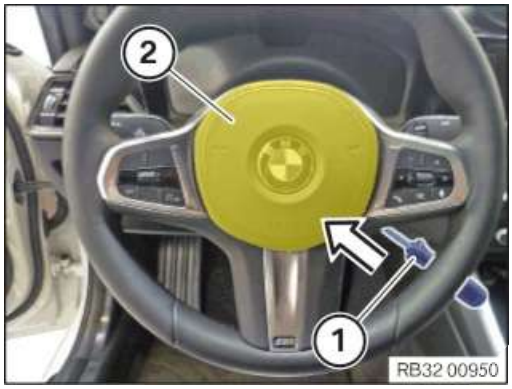
- In case of vehicles with shift paddles (2) made of carbon-fibre-reinforced plastic, use a Torx socket T15 (1) for unlocking the airbag unit.



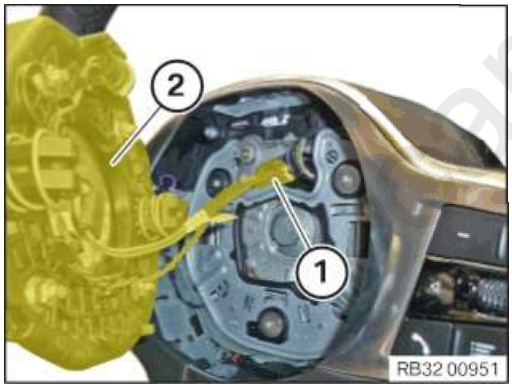
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- Insert the Torx socket T15 (1) diagonally upwards until a resilient resistance is felt.
- Press in Torx socket T15(1) straight in the direction of arrow towards the centre of the steering wheel in order to unlock the wire spring clip (2) or to unlock the airbag unit (A).



- Press in Torx screwdriver T15 (1) straight in direction of arrow towards the centre of the steering wheel and lift the airbag unit (2) on the unlocked side.
- Repeat procedure on left side and carefully release airbag unit (2) from the steering wheel.



- Unlock and disconnect the plug connection (1) and remove the airbag unit (2).

5 – Remove sports steering wheel



- Move the steering wheel and wheels to the straight-ahead position.
- Unlock plug connection (1) and disconnect.
- If installed: Unlock plug connection (2) and disconnect.
- Release the screw (3) and pull off and remove the steering wheel.

6 – Removing the steering wheel/M Sport steering wheel

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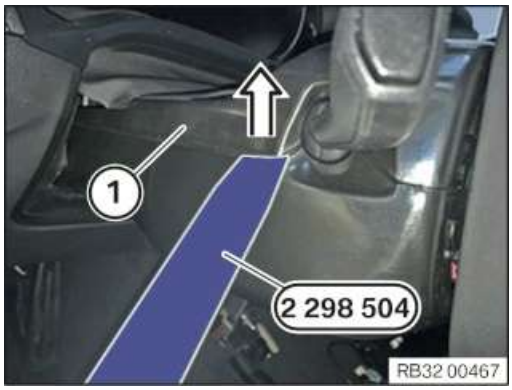


TECHNICAL INFORMATION

When releasing the screw, have an auxiliary person brace the steering wheel in order to reduce torque on the steering column!

- Move the steering wheel and wheels to the straight-ahead position.
- Loosen screw (1).
- Pull down the steering wheel and remove.

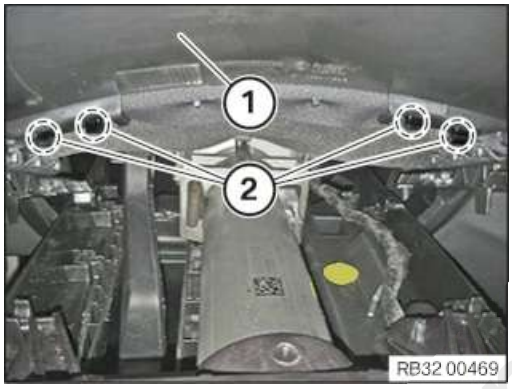
7 – Removing steering column shroud upper section



NOTICE

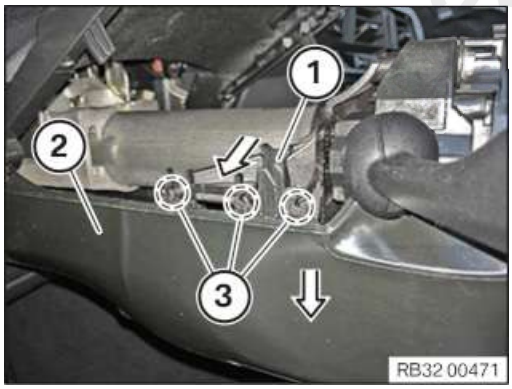
Perform the operations on the left and right side.

- Unlock the steering column shroud upper section (1) with the special tool 2 298 504 and fold up.



- Unclip the steering column shroud upper section (1) from the brackets (2).
- Remove the steering column shroud upper section (1).

8 – Removing steering column shroud lower section



NOTICE

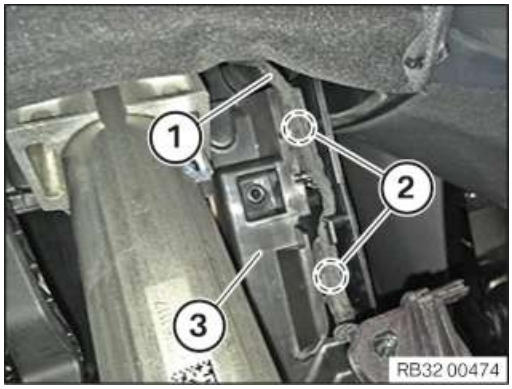
Perform the operations on the left and right side.

- Push the retaining lug (1) to the outside in the direction of the arrow and unclip the steering column shroud lower section (2) from the holders (3) in the direction of the arrow to the bottom at the same time.



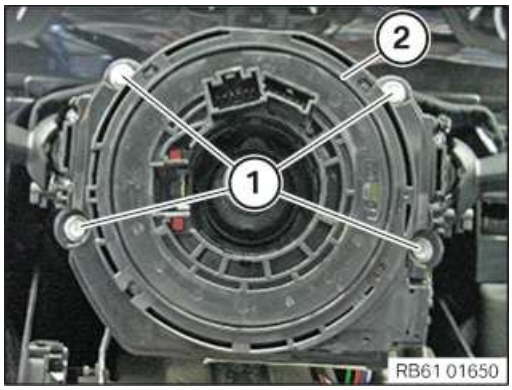
- Fold the steering column shroud lower section down.
- Unlock and disconnect connector (1).

eldiagn.com

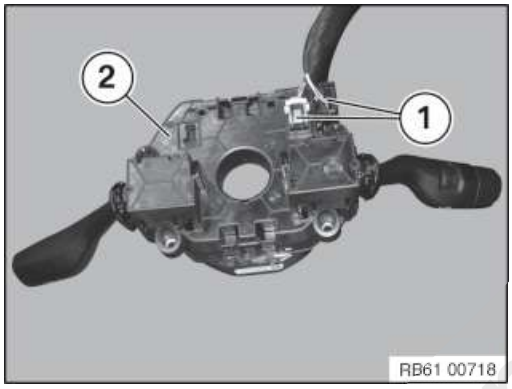


- Detach the cable (1) from the brackets (2).
- Remove the steering column shroud lower section (3).

9 – Removing the steering column switch cluster (SZL)



- Loosen screws (1).
- Remove the steering column switch cluster (SZL) (2).



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

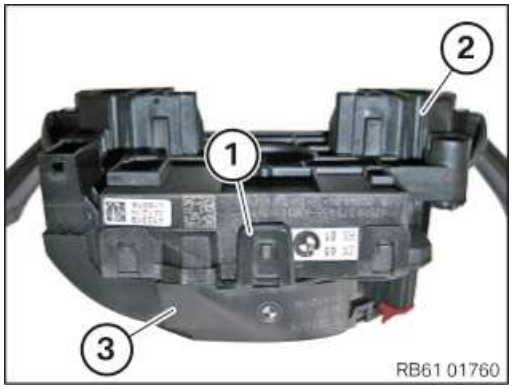
MAIN WORK

10 – Remove coil spring cassette



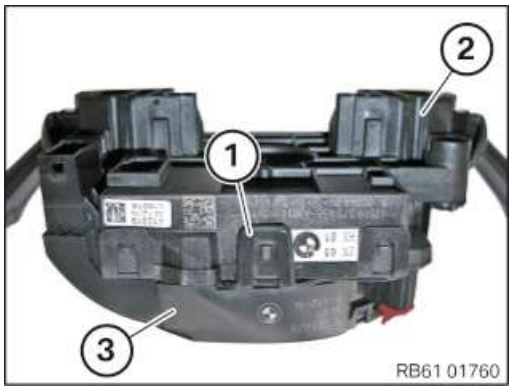
- Loosen both latch mechanisms (1) on the steering column switch cluster (2).

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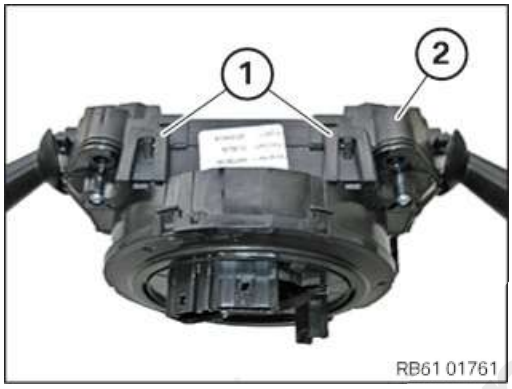


- Loosen the central latch mechanism (1) on the steering column switch cluster (2).
- Remove the coil spring cassette (3) from the steering column switch cluster (2).

11 – Installing the coil spring cassette



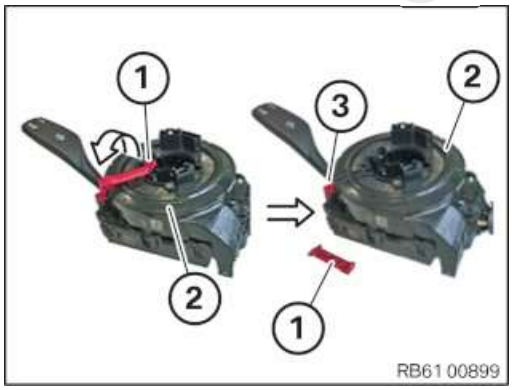
- Unclip the coil spring cassette (3) from the steering column switch cluster (sw/clsr) (2).
- Check central latch mechanism (1) on the steering column switch cluster (sw/clsr) (2).



- Check both latch mechanisms (1) on the steering column switch cluster (sw/clsr) (2).

POSTPROCESSES

12 – Installing the steering column switch cluster (SZL)

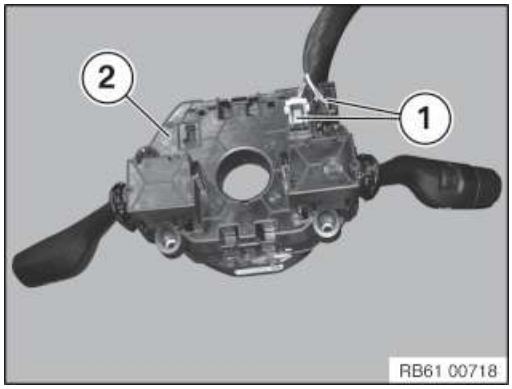


- **Replacement:**

  Break off the transportation retainer (1) on the steering column switch cluster (SZL) (2) in direction of arrow.

  The broken off piece (3) of the transportation retainer (1) remains in the steering column switch cluster (SZL) (2).

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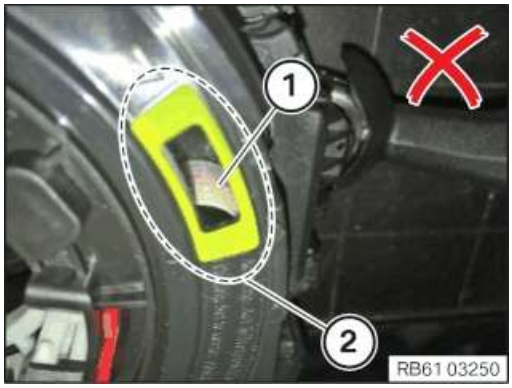


- Connect the connector (1) with the steering column switch cluster (SZL) (2).

Check

- **Version A:**

  Check whether the correct marking (1) is seen in inspection glass (2).



Result

» Ensure that no incorrect marking (1) is seen in inspection glass (2).

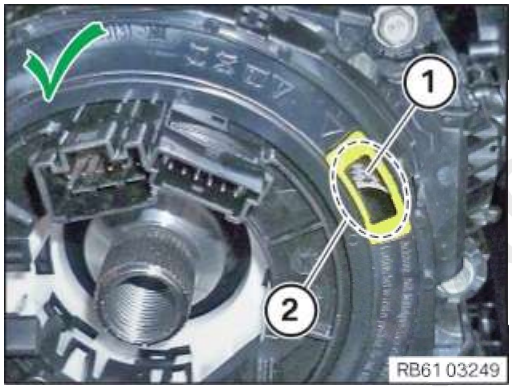
Measure

- Turn the coil spring cassette until the right mark (1) becomes visible in the inspection glass (2).

Check

- **Version A:**

  Check whether the correct marking (1) is seen in inspection glass (2).



Result

» Correct marking (1) is seen in inspection glass (2).

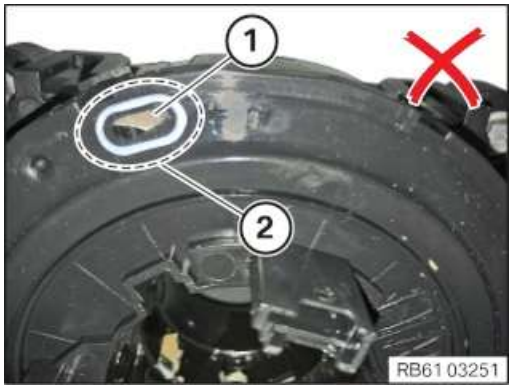
Measure

- Continue with the next step.

Check

- **Version B:**

  Check whether the correct marking (1) is seen in inspection glass (2).



Result

» Ensure that no incorrect marking (1) is seen in inspection glass (2).

Measure

- Turn the coil spring cassette until the right mark (1) becomes visible in the inspection glass (2).

Check



- **Version B:**

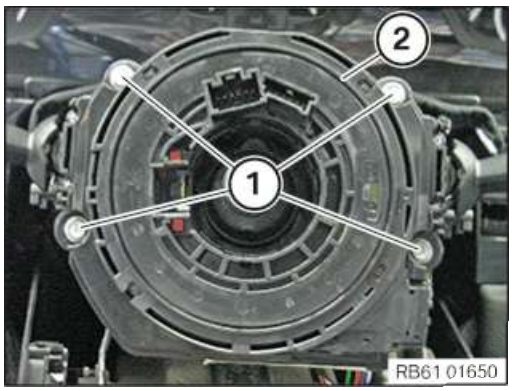
  Check if the correct mark (1) can be seen in the inspection glass (2).

Result

» Correct marking (1) is seen in inspection glass (2).

Measure

- Continue with the next work step.

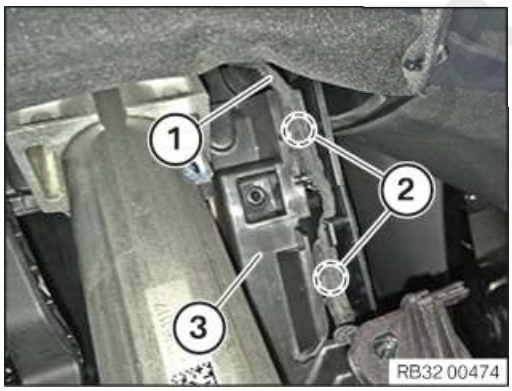


- Position the steering column switch cluster (SZL) (2).
- Tighten the screws (1).

Steering column switch cluster (SZL) on the steering column

Screw TS5x20		Tightening torque	3 Nm

13 – Install steering column shroud lower section

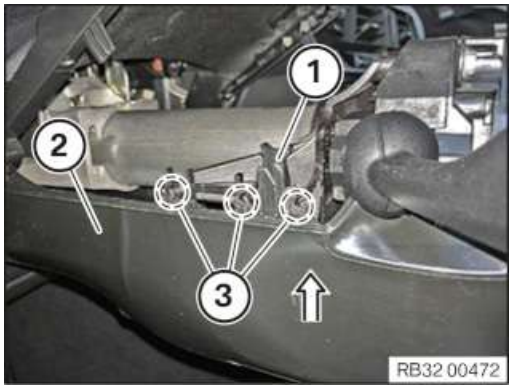


- Position the steering column shroud lower section (3).
- Secure the line (1) on the brackets (2).



- Connect the connector (1).

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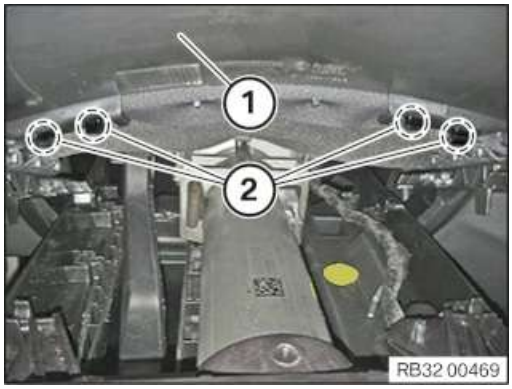


NOTICE

Perform the operations on the left and right side.

- Align the steering column shroud lower section (2) to the steering column using the retaining lug (1).
- Push the steering column shroud lower section (2) up in the direction of the arrow until the brackets (3) engage.

14 – Fit steering column shroud upper section



- Clip in the steering column shroud upper section (1) at the brackets (2).



NOTICE

Perform the operations on the left and right side.

- Clip in the steering column shroud upper section (1)into the guide (2).



NOTICE

Perform the operations on the left and right side.

- Press the upper section of the steering column shroud (1) downwards in direction of arrow.

  The upper section of the steering column shroud must engage audibly and perceptibly.

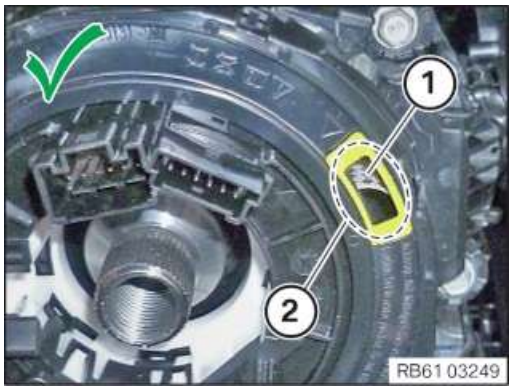
15 – Installing the steering wheel/M Sport steering wheel

▸ **Check the neutral position of the clock spring**

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▹ **Version A: Checking the visibility of the marking on the coil spring**



Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁

▷ **Version B: Checking the visibility of the marking on the coil spring**



Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

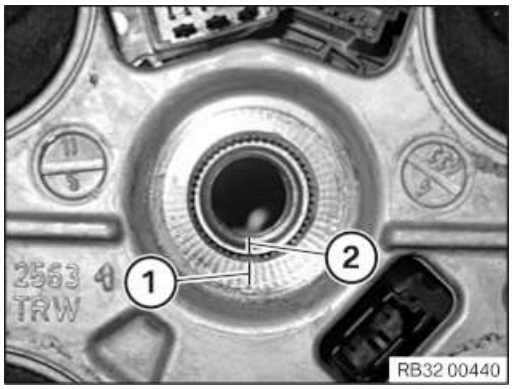
Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁



- Align mark (1) on steering wheel to mark (2) on steering column.
- Position the steering wheel.

Check

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- A micro-encapsulated screw (1) may be fitted.

  Check the screw connection.

Result

» Screw (1) is micro-encapsulated.

Measure

- Clean thread in the steering column.

  Renew the screw (1).

  Parts: Screw



- Tighten down screw (1).

Steering wheel to steering column

M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

16 – Installing the sports steering wheel

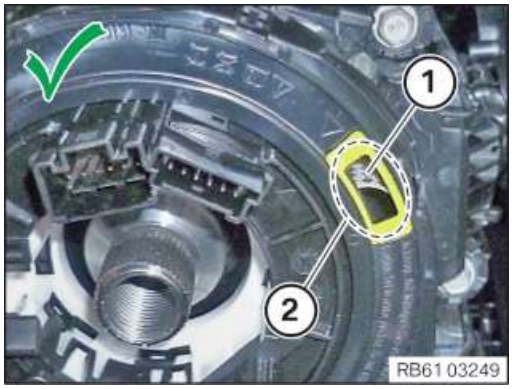
▸ **Check the neutral position of the clock spring**

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▹ **Version A: Checking the visibility of the marking on the coil spring**

Check



- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

» The mark (1) on the coil spring is not visible.

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Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁

▷ **Version B: Checking the visibility of the marking on the coil spring**

Check



- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

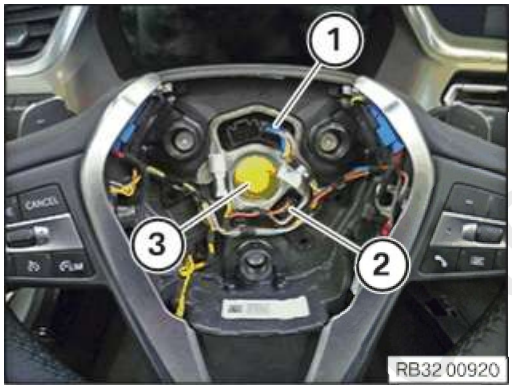
» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁

Check



- Check if a microencapsulated screw (3) is installed.

Result

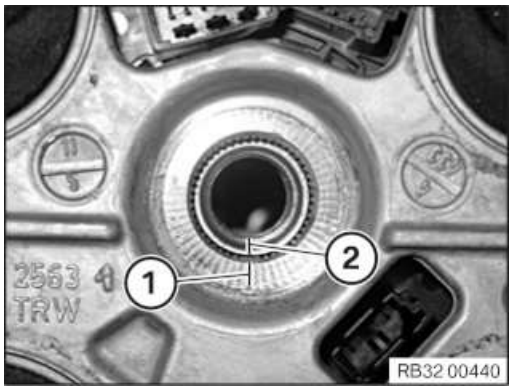
» Screw (3) is micro-encapsulated.

Measure

- Clean thread in the steering column.

  Renew the screw (3).

  Parts: Screw



- Align mark (1) on steering wheel to mark (2) on steering column.
- Connect steering wheel.

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- Connect connectors (1) and lock.
- If installed: Connect connectors (2) and lock.
- Tighten screw (3) .

Steering wheel to steering column

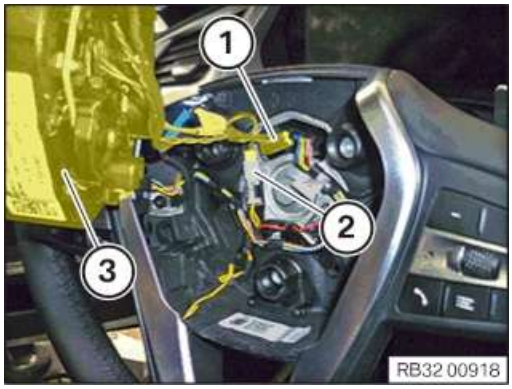
M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

17 – Installing the airbag unit

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▸ **Installing the airbag unit for the sports steering wheel**



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

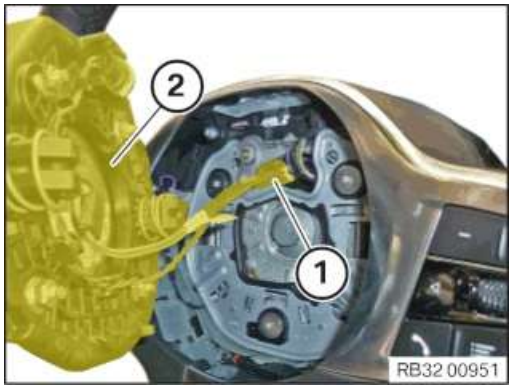
  The airbag unit (1) must engage audibly and perceptibly.

▸ **Installing the airbag unit for M Sport steering wheel**

TECHNICAL INFORMATION

After replacing the airbag unit (M sport steering wheel) or after a possible conversion of standard steering wheel and airbag unit to M-sports steering wheel, a software update or a programming/encoding via ISTA must be performed!

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- Connect and lock the connector (1) of the airbag unit (2).



- Press the airbag unit further (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

18 – Connecting all battery earth leads



- See additional information.

19 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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

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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

20 – Checking the airbag for function

Check

- Turn steering wheel in both directions to the limit position.

Result

» The airbag indicator light lights up.

Measure

- Renew the coil spring cassette.

Additional Information

Overview of Tightening Torques

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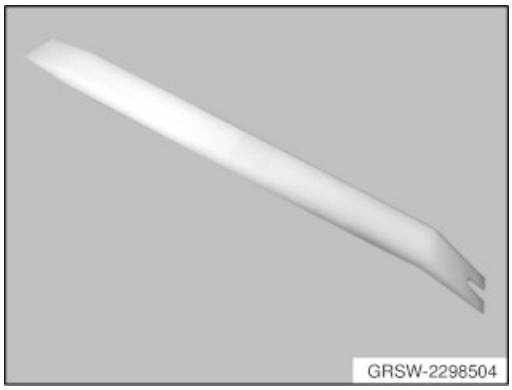
Steering column switch cluster (SZL) on the steering column			Used in step 12
Screw TS5x20		Tightening torque	3 Nm

Steering wheel to steering column			Used in step 1516
M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

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

Overview of Special Tools

2 298 504 Wedge



Common		Used in step 7
Usage	Wedge with angled lug	
Included in the tool or work		
Storage location	C34	
Replaced by		
In connection with		
SI-Number	01 03 12 (792)	

Links

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

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	4

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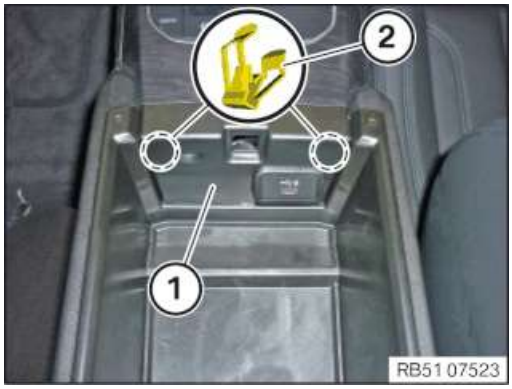
61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting battery earth lead	318
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61 20 900 Disconnecting and connecting battery earth lead	318
61 20 900 Disconnecting and connecting battery earth lead	318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

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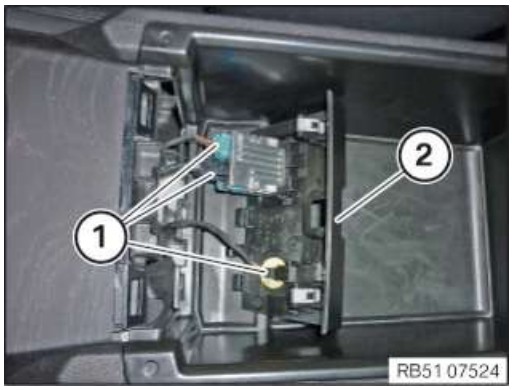
61 31 001 Removing and installing/replacing HDC button

PRELIMINARY WORK

1 – Removing the trim in the storage compartment on the centre armrest



- Lever out the trim (1) with the special tool (2) toward the rear from the clamps 2 298 505.



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

2 – Remove the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



- Release and remove the centre console trim upwards (1) as shown using the special tool 2 298 505 from the latch mechanisms.

3 – Remove the operating facility in the centre console

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

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WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

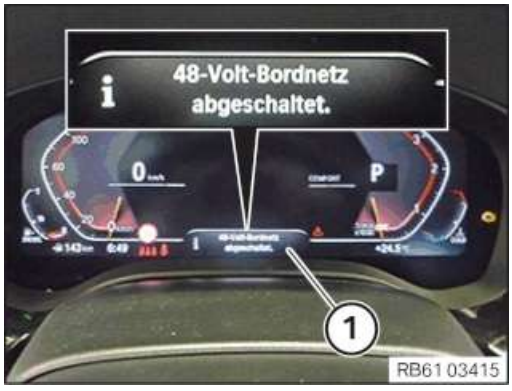
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



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

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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

tdiagn.com



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

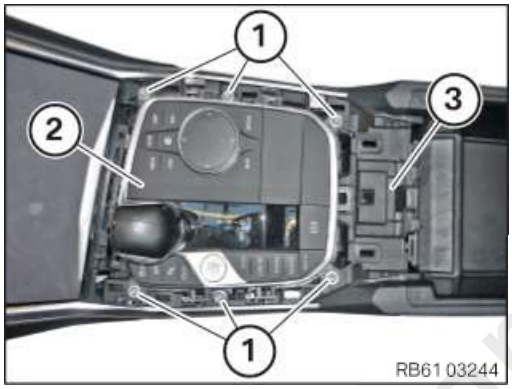
- Cover the vehicle battery.

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

▶ **Disconnecting all battery earth leads**



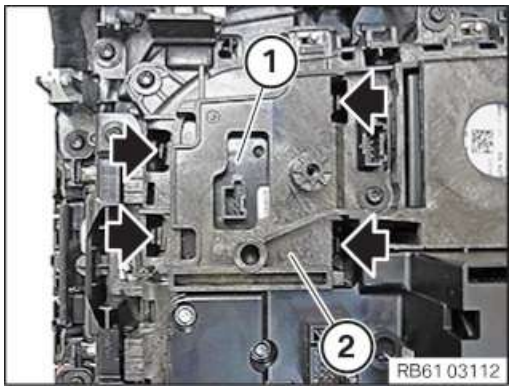
- See additional information.



- Loosen screws (1).
- Remove the operating facility in the centre console (2) from the centre console (3).

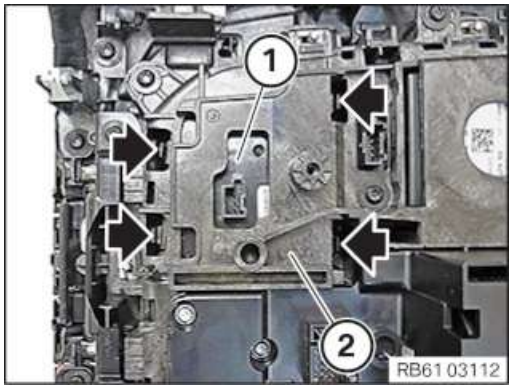
cardiagn.com

4 – Removing the HDC button



- Release the latch mechanisms (arrows).
- Remove the HDC button (1) from the gear selector switch (2).

5 – Installing the HDC button

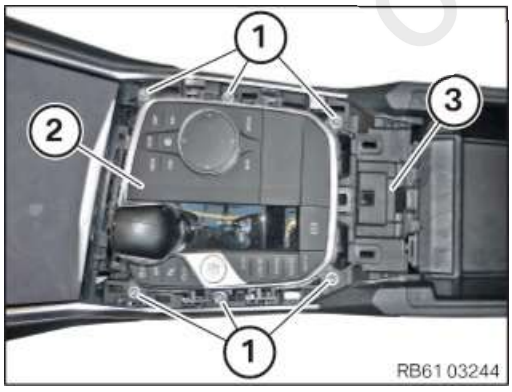


- Position the HDC button (1) on the gear selector switch (2).
  The latch mechanisms (arrows) must engage audibly.

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POSTPROCESSES

6 – Install the operating facility in the centre console



- Position the operating facility (2) in the centre console (3).
- Tighten the screws (1).

Gear selector switch to centre console trim

Screw		Tightening torque	1,8 Nm

▸ **Connecting all battery earth leads**



- See additional information.

▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

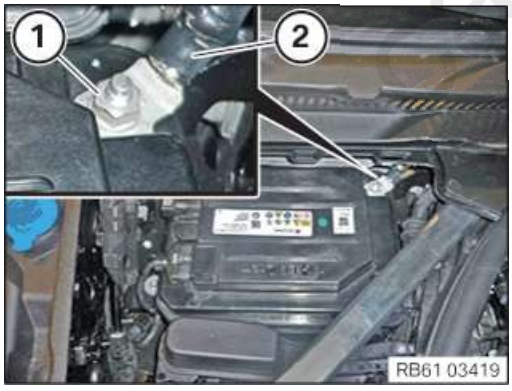
Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

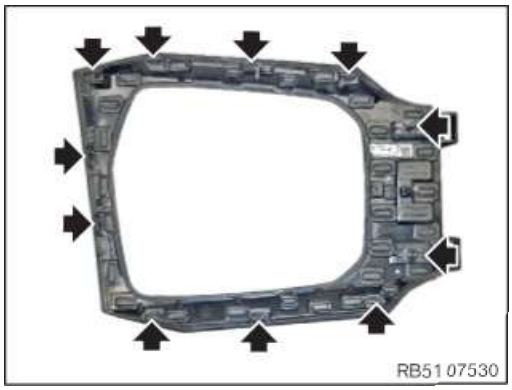
7 – Installing the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

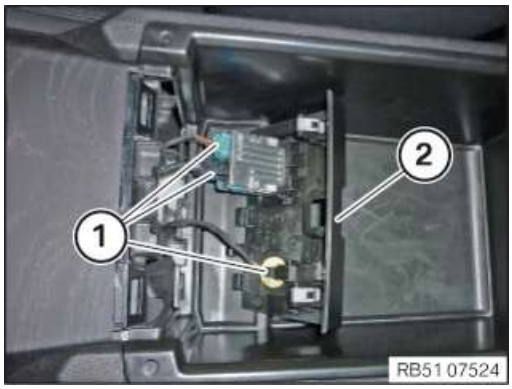


- Check all the latch mechanisms or clamps (arrows).
- In case the latch mechanisms or the clamps (arrows) are faulty, renew the centre console trim .



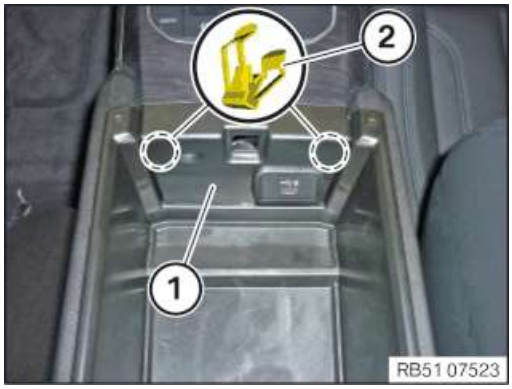
- Correctly position the centre console trim (1) and engage at the latch mechanisms.

8 – Installing the trim in the storage compartment of the centre armrest



- Mount the trim (2) and connect connector (1) and lock.

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- Correctly position trim (1) and snap into the clamps (2).

Additional Information

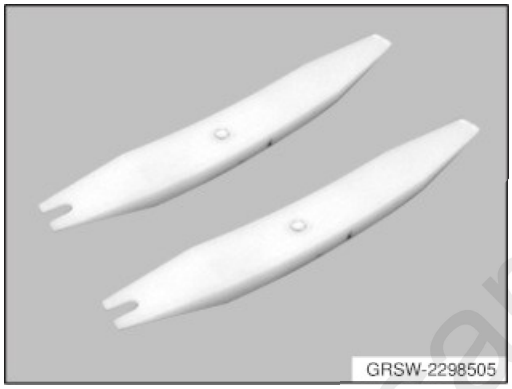
Overview of Tightening Torques

Gear selector switch to centre console trim			Used in step 6
Screw		Tightening torque	1,8 Nm

Negative battery cable to 48-V battery			Used in step 6
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

2 298 505 Wedge



Common	Used in step 12
Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	36

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36

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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
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61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
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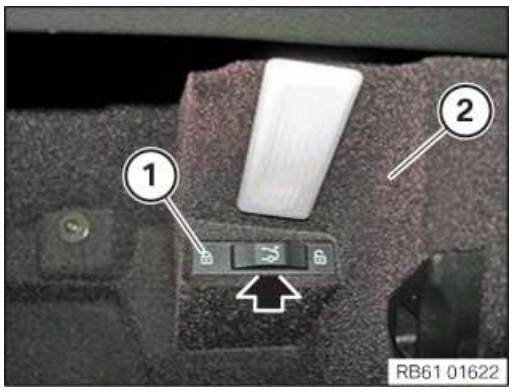
cardiagn.com

61 31 066 Removing and installing/replacing hotel position switch

Prerequisite

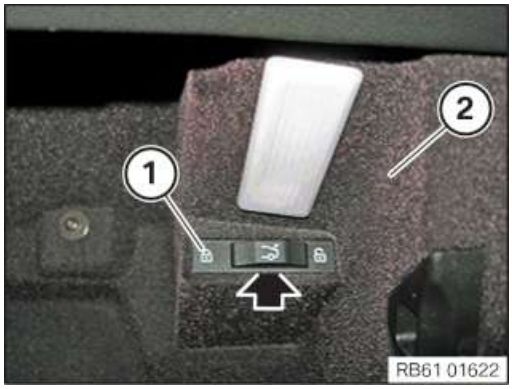
- Glove box open.

1 – Removing the hotel position switch



- Lever out the hotel position switch (1) using special tool 0 496 571 (00 9 327) from the housing (2) in the indicated area.
- Disconnect associated plug connection.

2 – Installing the hotel position switch

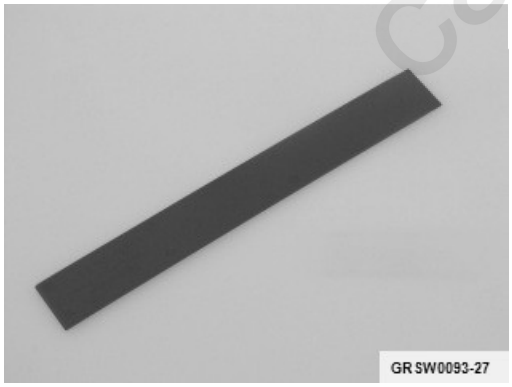


- Connect the connector with the hotel position switch (1).
- Install hotel position switch (1) in the housing (2).

Additional Information

Overview of Special Tools

0 496 571 (00 9 327) Wedge



Common	Used in step 1
Usage	(Cleaning wedge) From 11/2008 this special tool replaces panel wedge 00 9 323 (different material)
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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61 31 037 Removing and installing/replacing light control unit

RISK OF DAMAGE

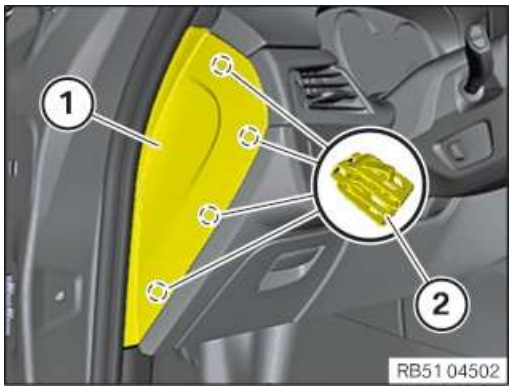
Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

PRELIMINARY WORK

1 – Remove the side panel on the left instrument panel



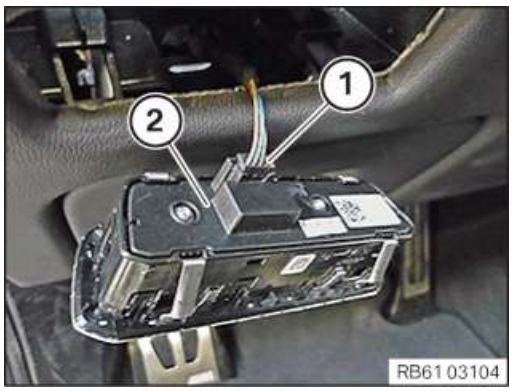
- Unclip and remove the side panel (1) towards the outside from the clamps (2).

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2 – Removing the light operating unit

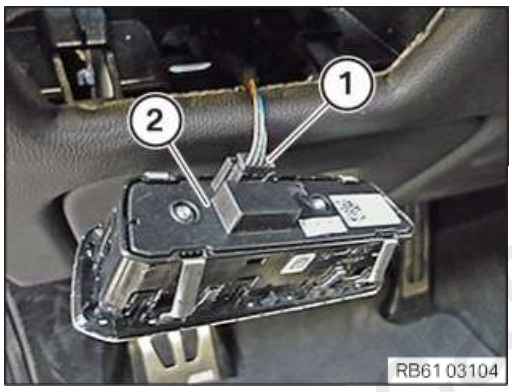


- Unclip light operating unit (1) at the marked positions of the rear.



- Unlock the plug connection (1) on the light operating unit (2) and disconnect it.

3 – Installing the light operating unit



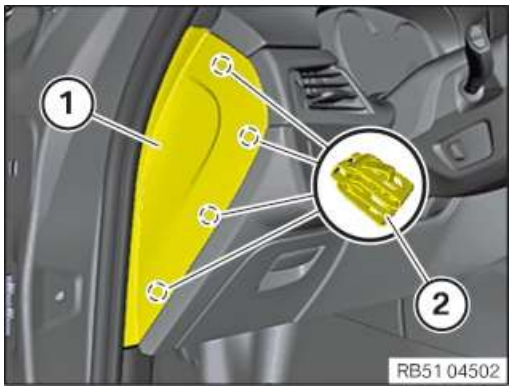
- Connect the connector (1) to the light operating unit (2).



- Correctly position the light operating unit (1) and clip in at the marked points.

rdiagn.com

4 – Install the side panel on left instrument panel



- Feed in the side panel (1) and clip it in at the clamps (2).

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61 31 118 Removing and installing/replacing power window switch on passenger's side

PRELIMINARY WORK

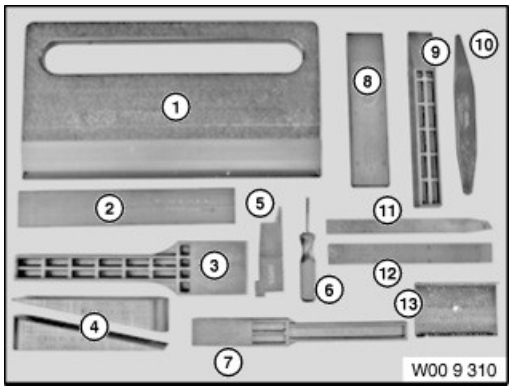
1 – Remove front door trim panel

RISK OF DAMAGE

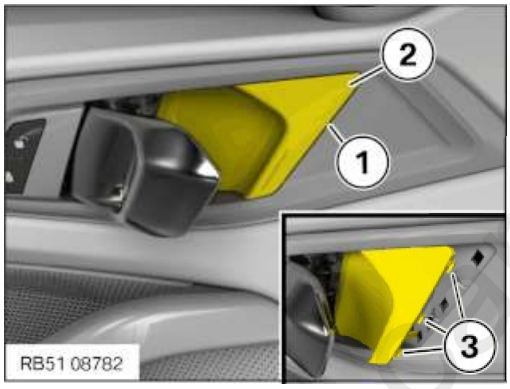
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

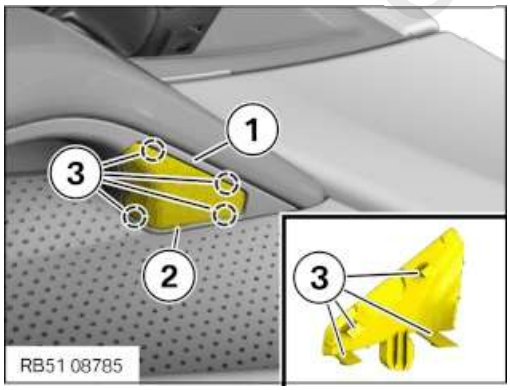
- Protect surfaces from damage.



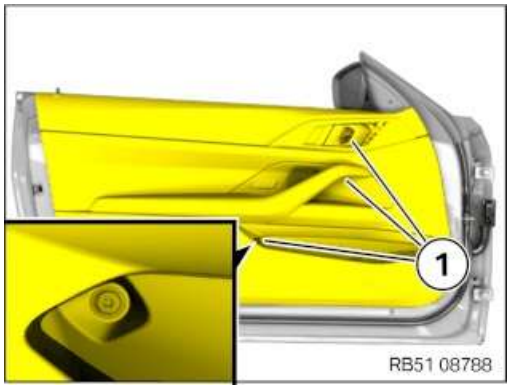
- Have the set of special tools 0 493 752 (00 9 329) ready.



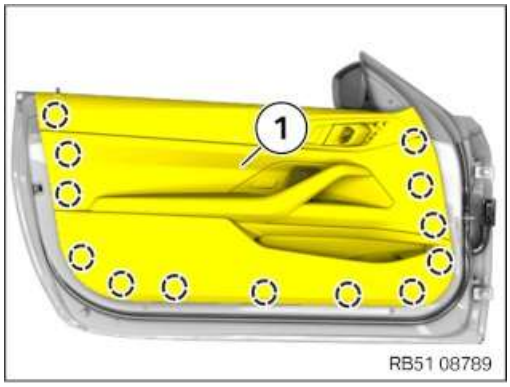
- Pull the door handle.
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover of the door handle (2) with the latch mechanisms (3).
- Feed out the cover of the door handle (2) from the latch mechanisms and remove it forwards.



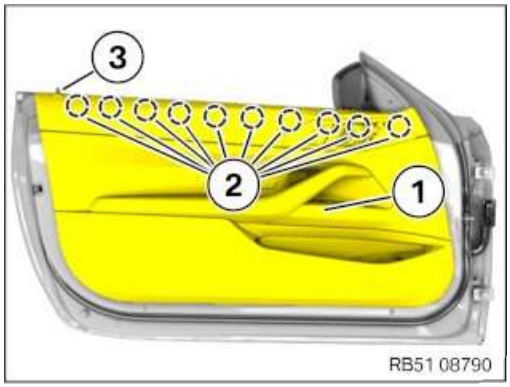
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover (2) with the latch mechanisms (3) and remove it downwards.



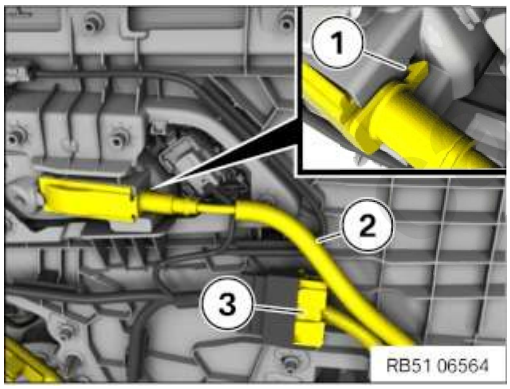
- Loosen screws (1).



- Unclip the door trim panel (1) with the suitable special tool at the marked places.



- Release the door trim panel (1) with the latch mechanisms (2).
- Lift the door trim panel (1) upwards over the operating rod (3).



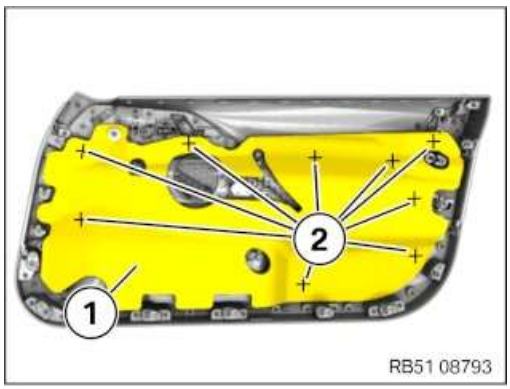
NOTICE

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

- Release the latch mechanism (1) and feed out the Bowden cable for the inner door handle (2).

  While doing so, the Bowden cable for the inner door handle (2) is guided out independently from the door handle.
- Unlock the plug connection (3), disconnect and remove the door trim panel.

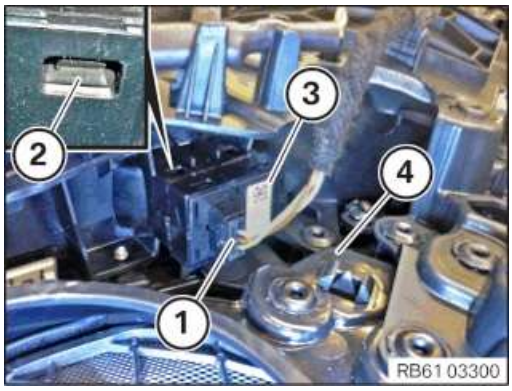
2 – Removing the sound insulation on the front door trim panel



- Detach and remove the sound insulation from the front door trim panel (1) at the mountings (2) .

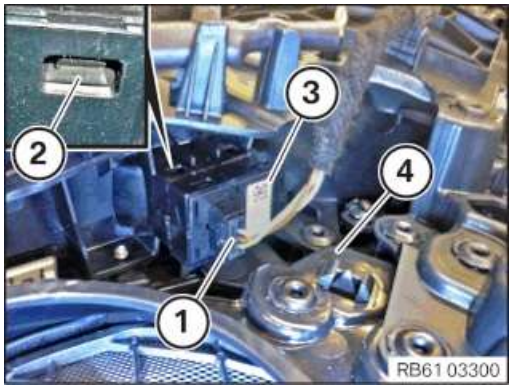
MAIN WORK

3 – Removing power window switch on the passenger's side



- Disconnect plug connection (1).
- Release latch mechanisms (2) and remove the power window switch (3) from the door trim panel (4).

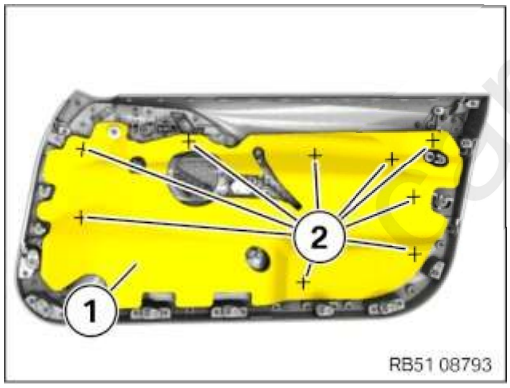
4 – Install the power window switch on the passenger's side



- Position power window switch (3) on the door trim panel (4) and engage in the latch mechanisms (2).
- Connect connector (1).

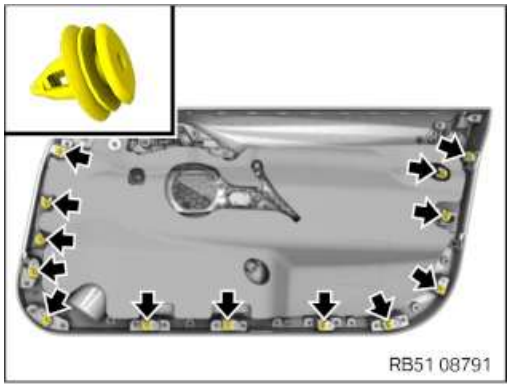
POSTPROCESSES

5 – Installing the sound insulation on front door trim panel



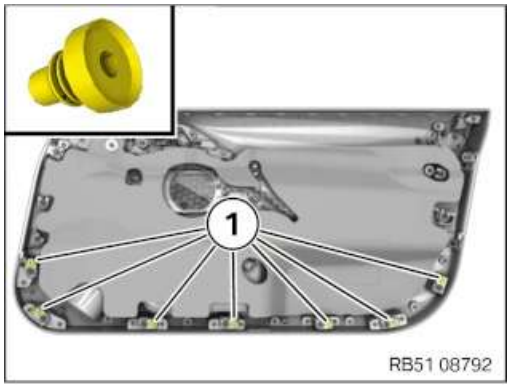
- Position the sound insulation on the front door trim panel (1) and attach to the mountings (2) .

6 – Install front door trim panel

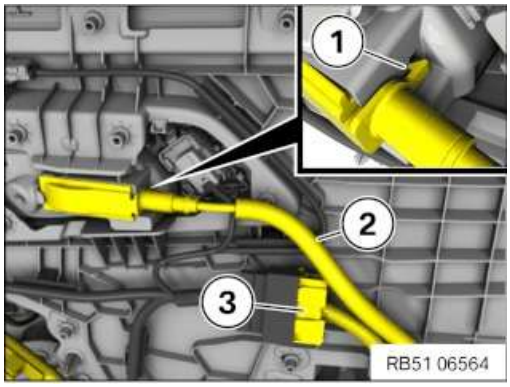


- Check clips (arrows) for damage and, if necessary, renew them.

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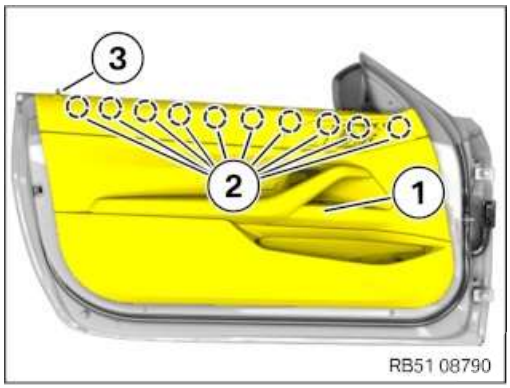
- Check the stop pad (1) for damage, renew if necessary.



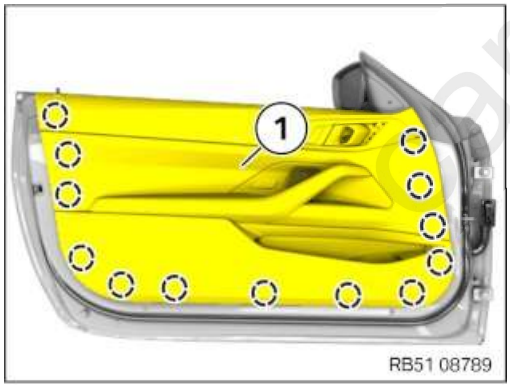
NOTICE

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

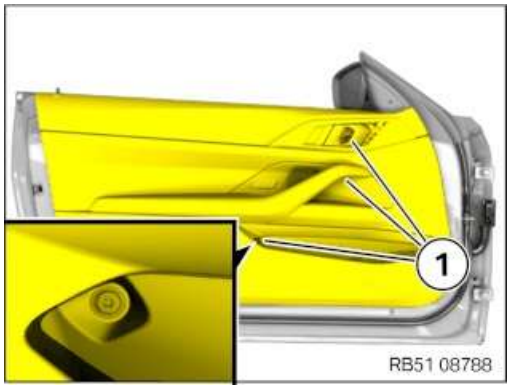
- Push the inner door opener in closed direction.
- Insert the Bowden cable for the door handle inside (2) and clip it in with the latch mechanism (1) .
- Connect connectors (3) and lock.



- Insert the front door trim panel (1) from the top over the operating rod (3) and clip it in with the latch mechanisms (2) .



- Clip in the door trim panel (1) at the marked places.



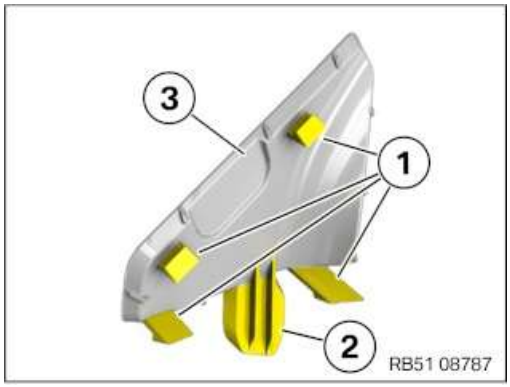
- Tighten the screws (1).

Door trim panel

Oval-head screw		Tightening torque	3 Nm

Check

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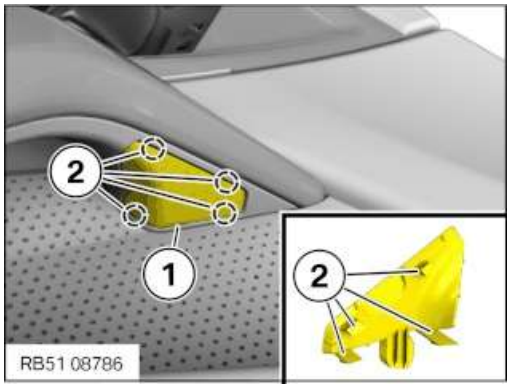
- Check the latch mechanisms (1) and the guide (2) at the cover (3) for damage.

Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

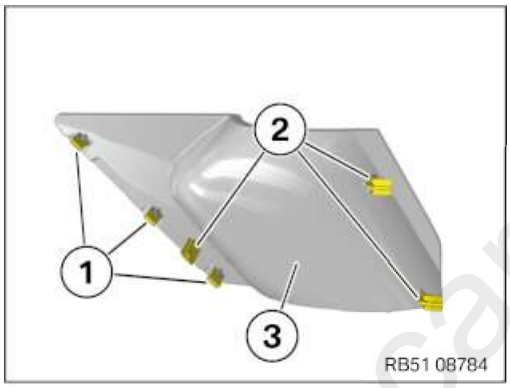
- Replace the cover (3).



- Position the cover (1) and clip it in with the latch mechanisms (2) .

Check

- Check the latch mechanisms (1) and the guides (2) at the cover of the door handle (3) for door handle.

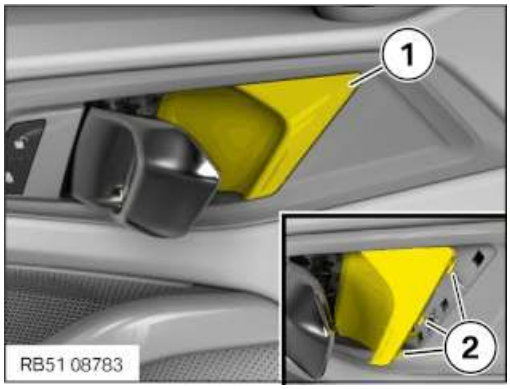


Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

- Replace door handle cover (3).



- Pull the door handle.
- Insert the cover of the door handle (1) with the guides and clip it in with the latch mechanisms (2) .

Additional Information

Overview of Tightening Torques

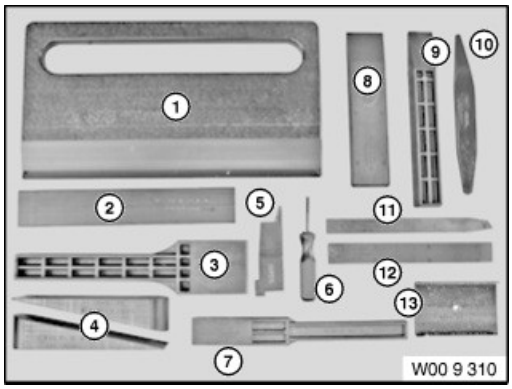
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Overview of Tightening Torques

Door trim panel			Used in step 6
Oval-head screw		Tightening torque	3 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common	Used in step 1
Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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61 31 117 Removing and installing/replacing power window switch, driver's side

PRELIMINARY WORK

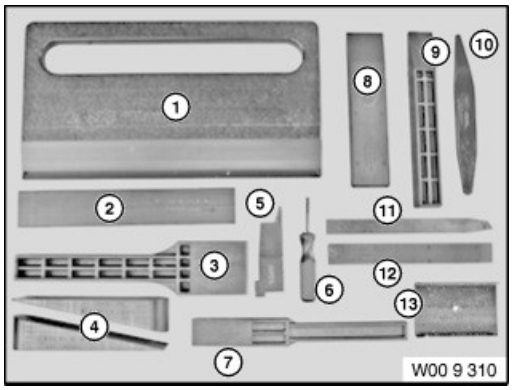
1 – Remove front door trim panel

RISK OF DAMAGE

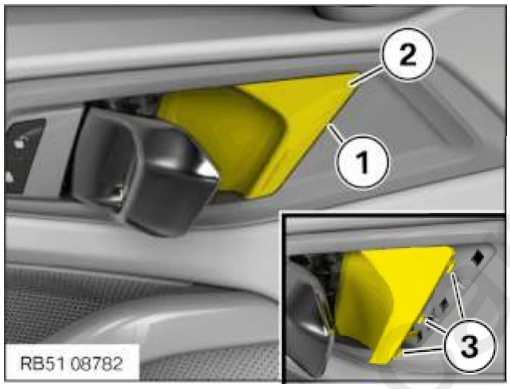
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

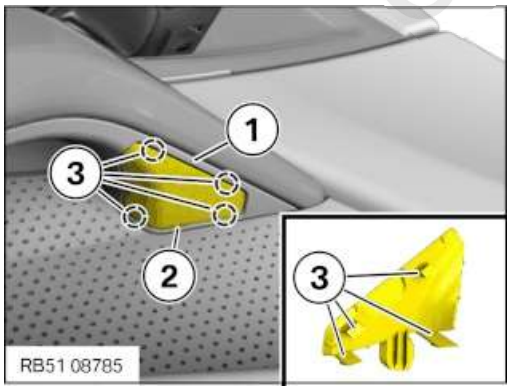
- Protect surfaces from damage.



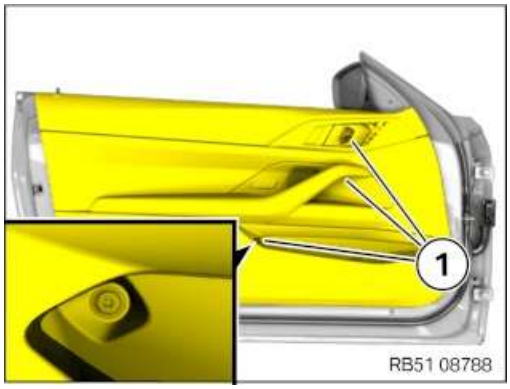
- Have the set of special tools 0 493 752 (00 9 329) ready.



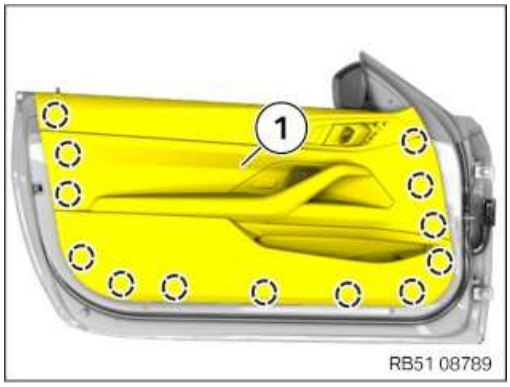
- Pull the door handle.
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover of the door handle (2) with the latch mechanisms (3).
- Feed out the cover of the door handle (2) from the latch mechanisms and remove it forwards.



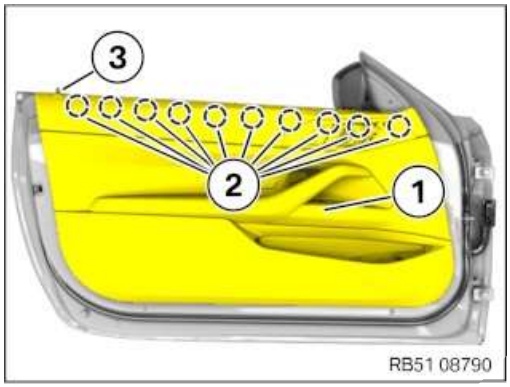
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover (2) with the latch mechanisms (3) and remove it downwards.



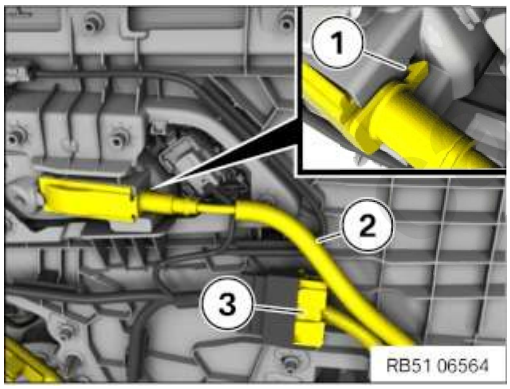
- Loosen screws (1).



- Unclip the door trim panel (1) with the suitable special tool at the marked places.



- Release the door trim panel (1) with the latch mechanisms (2).
- Lift the door trim panel (1) upwards over the operating rod (3).



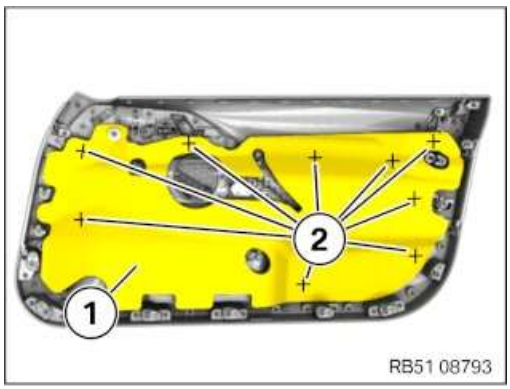
NOTICE

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

- Release the latch mechanism (1) and feed out the Bowden cable for the inner door handle (2).

  While doing so, the Bowden cable for the inner door handle (2) is guided out independently from the door handle.
- Unlock the plug connection (3), disconnect and remove the door trim panel.

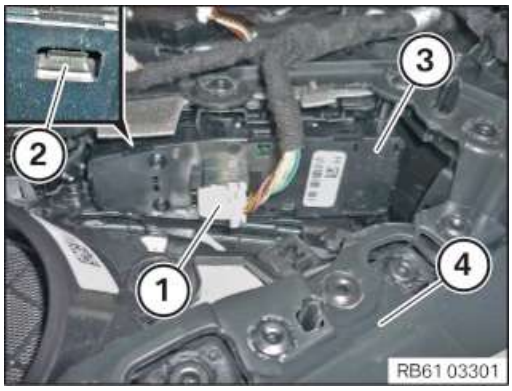
2 – Removing the sound insulation on the front door trim panel



- Detach and remove the sound insulation from the front door trim panel (1) at the mountings (2) .

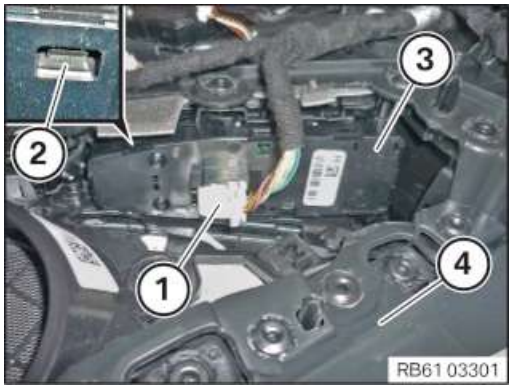
MAIN WORK

3 – Removing power window switch on the driver's side



- Unlock plug connection (1) and disconnect.
- Release latch mechanisms (2) and remove the power window switch (3) from the door trim panel (4).

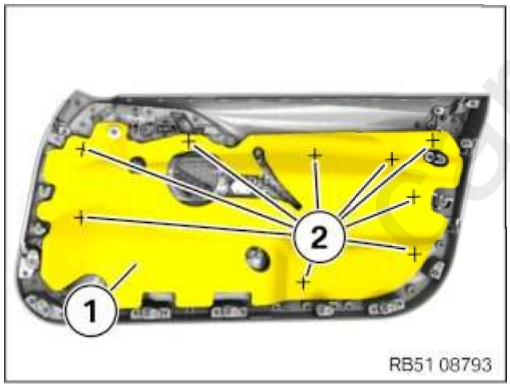
4 – Install the power window switch on the driver's side



- Position the power window switch (3) on the door trim panel (4) and engage it in all latch mechanisms (2).
- Connect connectors (1) and lock.

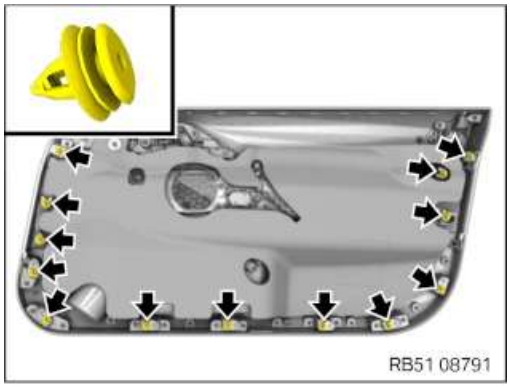
POSTPROCESSES

5 – Installing the sound insulation on front door trim panel



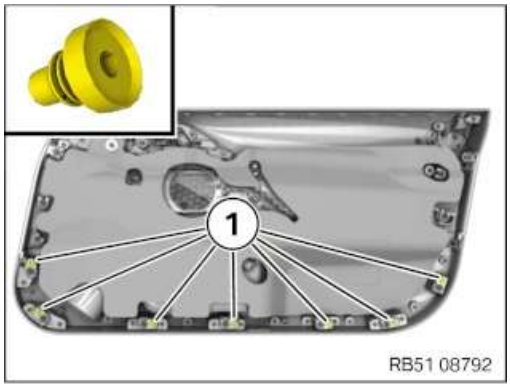
- Position the sound insulation on the front door trim panel (1) and attach to the mountings (2) .

6 – Install front door trim panel

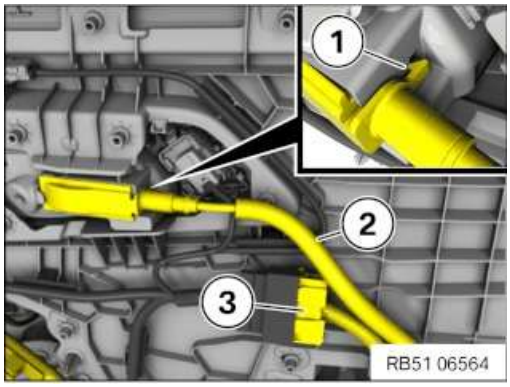


- Check clips (arrows) for damage and, if necessary, renew them.

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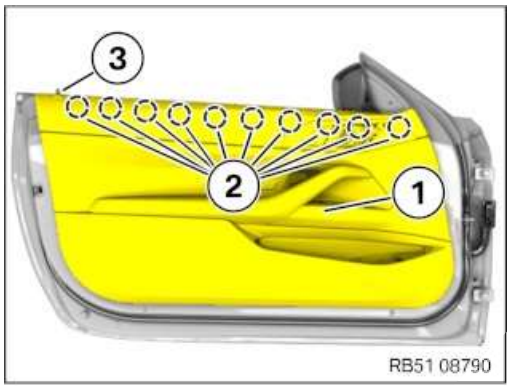
- Check the stop pad (1) for damage, renew if necessary.



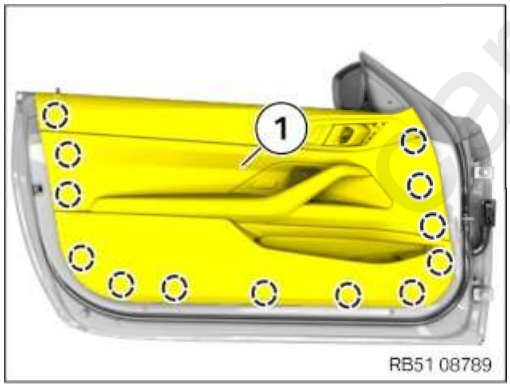
NOTICE

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

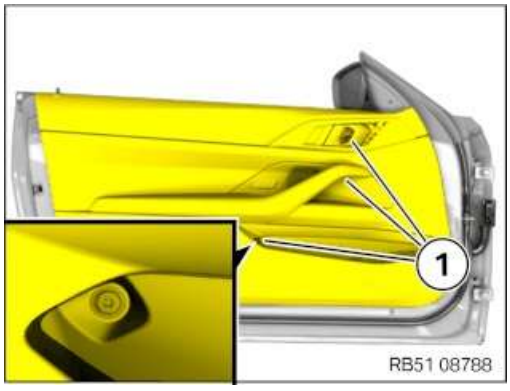
- Push the inner door opener in closed direction.
- Insert the Bowden cable for the door handle inside (2) and clip it in with the latch mechanism (1) .
- Connect connectors (3) and lock.



- Insert the front door trim panel (1) from the top over the operating rod (3) and clip it in with the latch mechanisms (2) .



- Clip in the door trim panel (1) at the marked places.



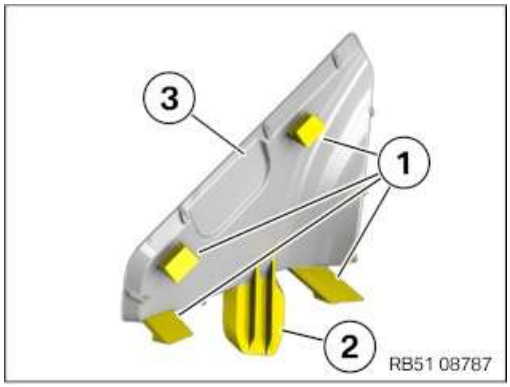
- Tighten the screws (1).

Door trim panel

Oval-head screw		Tightening torque	3 Nm

Check

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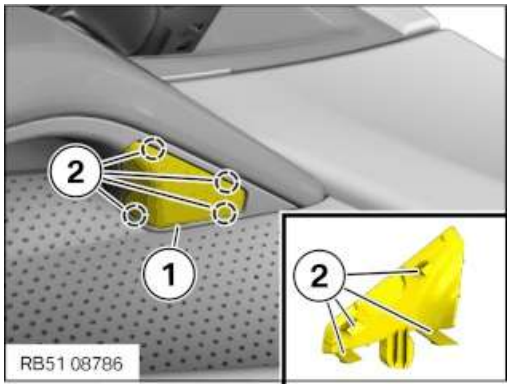
- Check the latch mechanisms (1) and the guide (2) at the cover (3) for damage.

Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

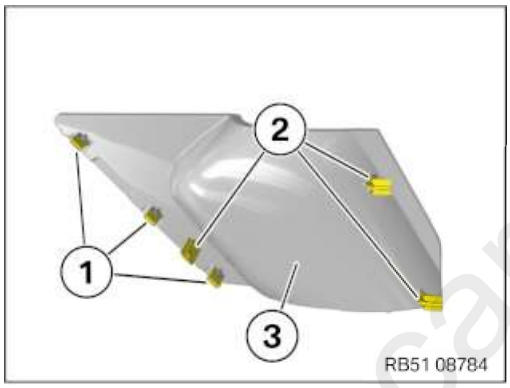
- Replace the cover (3).



- Position the cover (1) and clip it in with the latch mechanisms (2) .

Check

- Check the latch mechanisms (1) and the guides (2) at the cover of the door handle (3) for door handle.

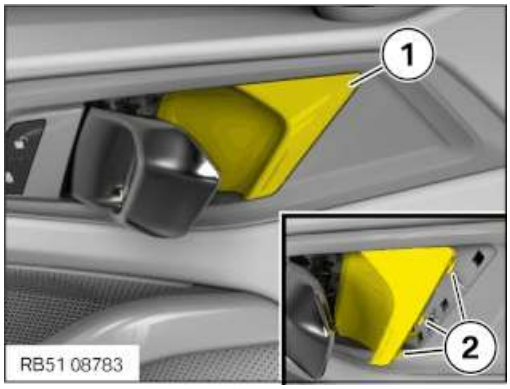


Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

- Replace door handle cover (3).



- Pull the door handle.
- Insert the cover of the door handle (1) with the guides and clip it in with the latch mechanisms (2) .

Additional Information

Overview of Tightening Torques

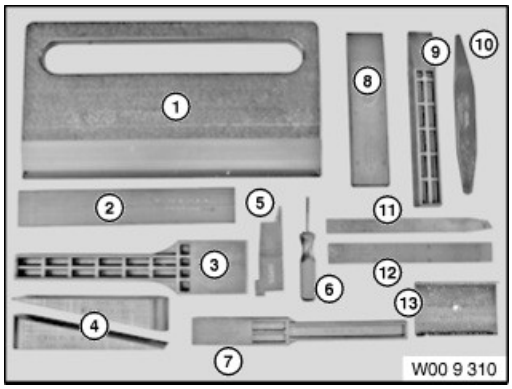
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Overview of Tightening Torques

Door trim panel			Used in step 6
Oval-head screw		Tightening torque	3 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common	Used in step 1
Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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61 31 231 Removing and installing/replacing steering wheel module control unit

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.
Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.
For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

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RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing the airbag unit (sports steering wheel)

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

The procedure/sequence of the airbag module release function must be observed! First unlock the right side of the airbag module!

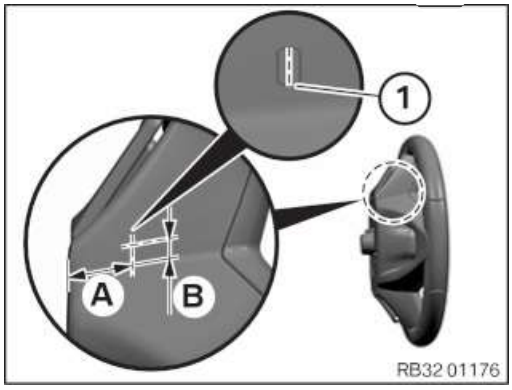


NOTICE

Perform the operations on the left and right side.

- Feel or measure the mark (1) to unlock the airbag unit (see following step).

  The mark (1) is difficult to detect.



NOTICE

Perform the operations on the left and right side.

- Cut the mark (1) carefully with a knife to 4 mm length.

  Dimension (A) = 2.5 cm

  Dimension (B) = 1.0 cm



- Insert the Torx screwdriver (1) T10 on the right diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until a springing resistance can be felt).
- While unlocking the right side, the airbag unit in the "4 O'CLOCK" area must be pressed lightly against the limit position (resistance point in the centre between the horn symbol and the "airbag" inscription).
- Press the Torx screwdriver (1) T10 on the right inwards in the direction of arrow until it audibly disengages twice.
- Let go of the airbag unit. The right side of the module is now unlocked.



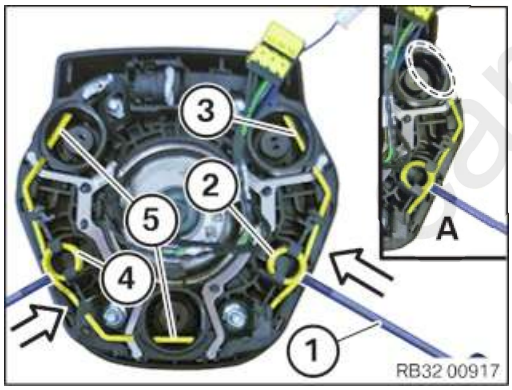
- Insert the Torx screwdriver (1) T10 on the left on the steering wheel diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until the springing resistance is felt).
- While unlocking the left side, the airbag unit in the "10 o'clock" area must be pressed lightly against the limit position with your free hand (resistance point in the area of the left horn symbol).
- Press the Torx screwdriver (1) T10 on the left inwards on the steering wheel in the direction of arrow until it audibly disengages once.
- Release the airbag module. Airbag module is not unlocked and can be removed:



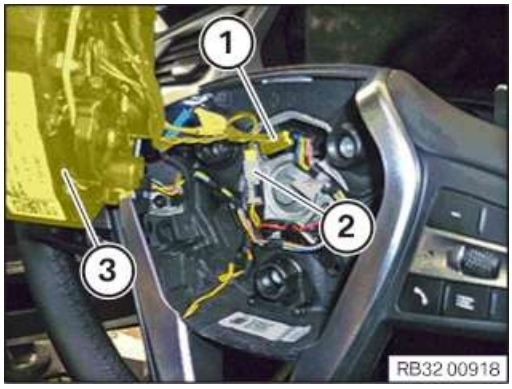
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press the Torx screwdriver T10 (1) diagonally upwards in the direction of arrow to the centre of steering wheel.



- With the Torx screwdriver T10 (1), press the wire spring clip (2) and (4) in the direction of arrow to the centre of steering wheel. Lock (3) and (5) unlocked.



- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

4 – If installed: Removing the shift paddles for the automatic transmission

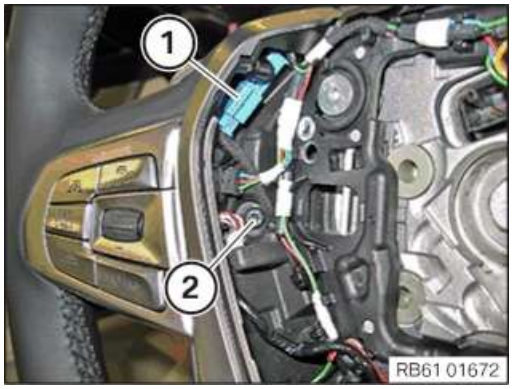
- For invoicing refer to 61 31 112

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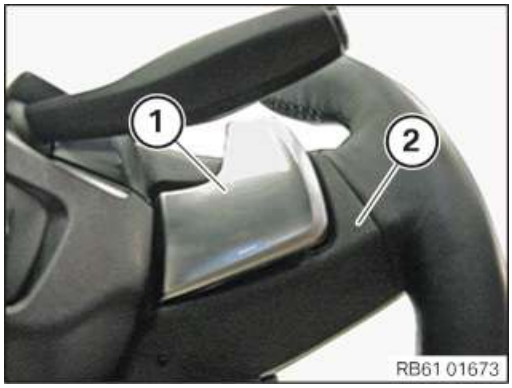
▸ **Removing the shift paddle for the automatic transmission**

NOTICE

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

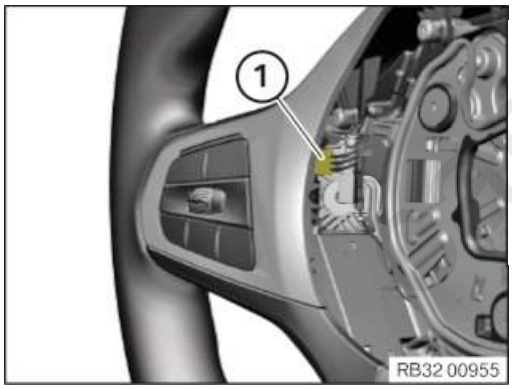


- Disconnect connector (1) and remove cable to shift paddle.
- Loosen screw (2).



- Remove shift paddle (1) from steering wheel (2) and remove associated access line.

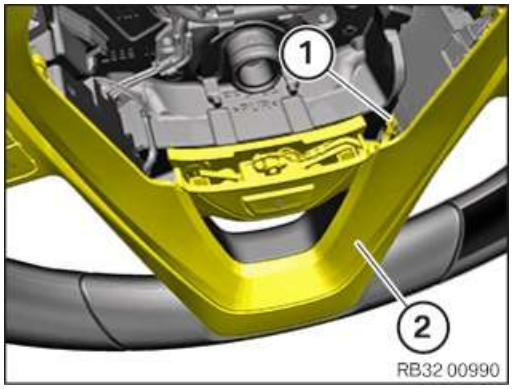
5 – Removing the cover for sports steering wheel



- Unlock plug connection (1) and disconnect.



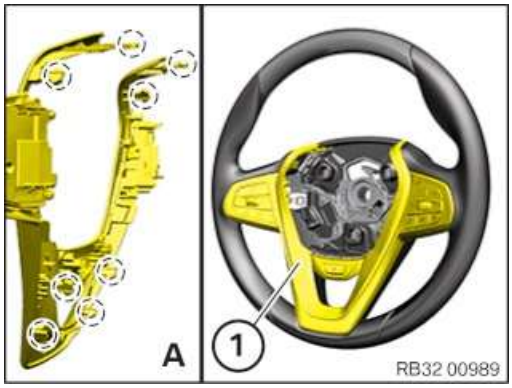
- Unscrew the screws (1) on the back of the steering wheel.



NOTICE

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

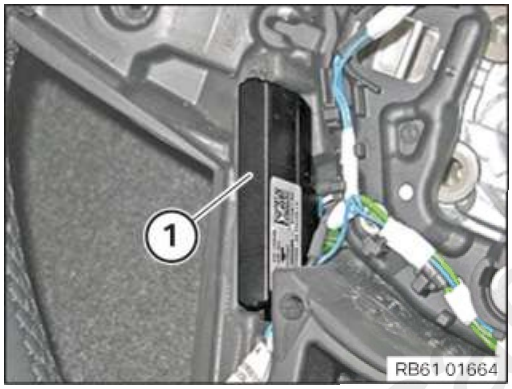
- After releasing the cover, release, unlock and disconnect the plug connection (1) for the steering wheel heating from the holder.



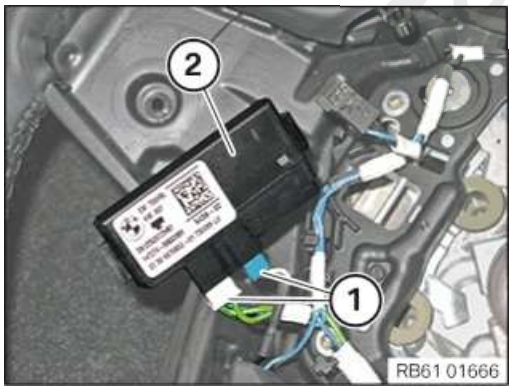
- Carefully release the cover (1) from the latch mechanisms (A).
- Remove the cover (2).

MAIN WORK

6 – Removing the control unit for the touch detection



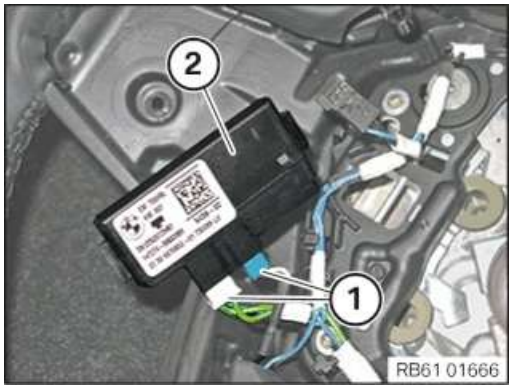
- Pull the control unit (1) out of the steering wheel.



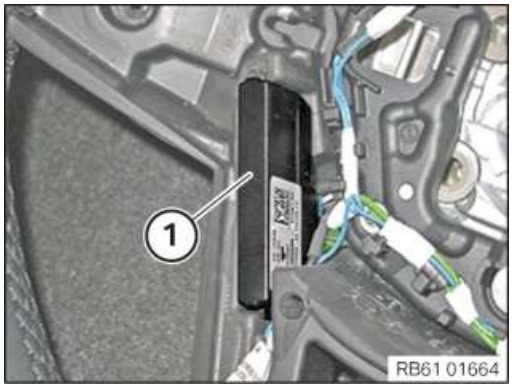
- Unlock and disconnect the two plug connections (1) on the control unit (2).

7 – Installing the control unit for touch detection

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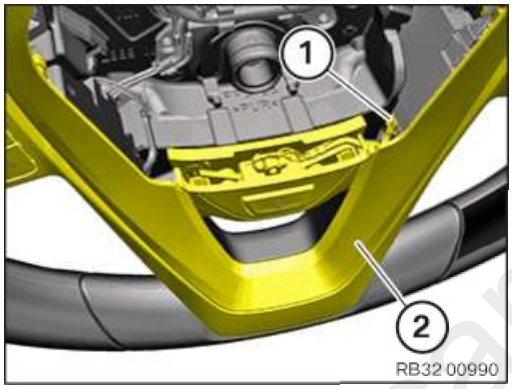
- Connect both connectors (1) to the control unit (2).



- Install the control unit (1) in the steering wheel.

POSTPROCESSES

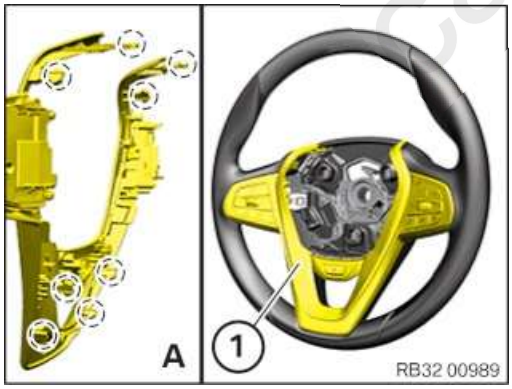
8 – Installing cover for the sport steering wheel



NOTICE

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

- Position the cover (2).
- Connect the connector (1) for the steering-wheel heating and lock it.
- Attach the connector (1) for the steering wheel heating to the holder.



- Check latch mechanisms (A) for damage.

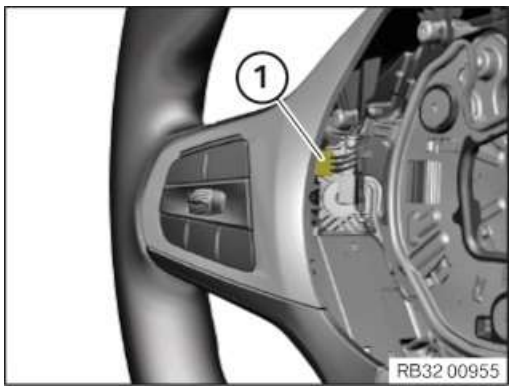
  The latch mechanisms (A) must not be damaged or missing.
- Carefully clip in cover (1) at catches (A).



- Tighten screws (1) on the back of the steering wheel.

Decorative trim to steering wheel

Screw TS5x12		Tightening torque	1,5 Nm



- Connect connectors (1) and lock.

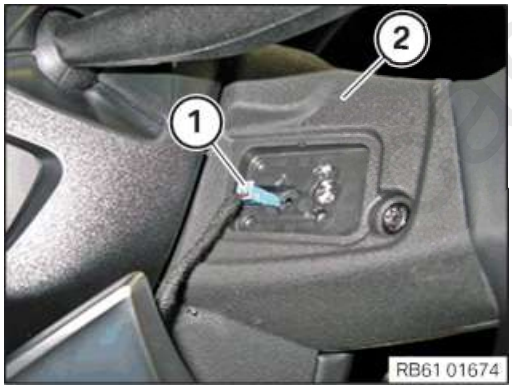
9 – If installed: Installing the shift paddles for the automatic transmission

- For invoicing refer to 61 31 112

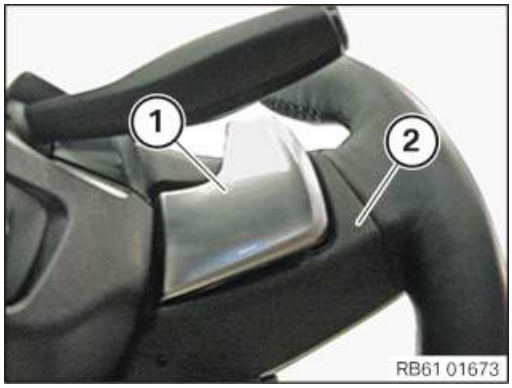
▸ **Installing the shift paddle for the automatic transmission**

NOTICE

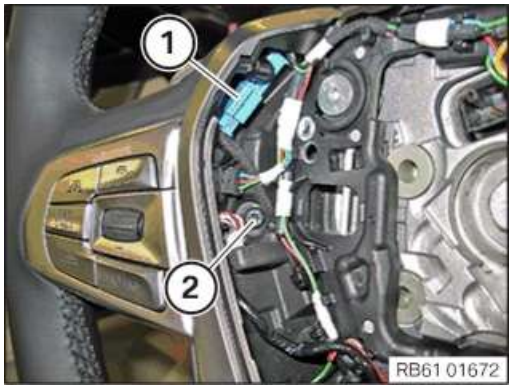
Description is for left component only. Procedure on the right side is identical.



- Insert the access line (1) into the rear of the steering wheel (2).



- Position the shift paddle (1) on the steering wheel (2).



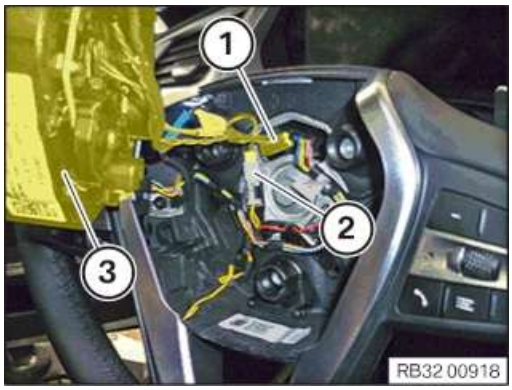
- Tighten down screw (2).

Shift paddle to steering wheel

Screw TS5x12		Tightening torque	2 Nm

- Insert the cable and connect the connector (1).

10 – Installing the airbag unit (sports steering wheel)



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

11 – Connecting all battery earth leads



- See additional information.

12 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

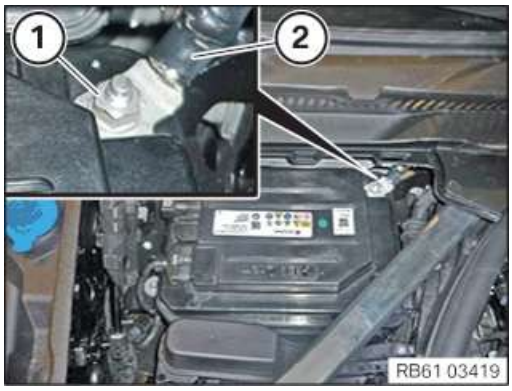
Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

13 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

- 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.

Additional Information

Overview of Tightening Torques

Decorative trim to steering wheel			Used in step 8
Screw TS5x12		Tightening torque	1,5 Nm

Shift paddle to steering wheel			Used in step 9
Screw TS5x12		Tightening torque	2 Nm

Negative battery cable to 48-V battery			Used in step 12
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	**Used in step**
Notes on 48-V battery	112

General repair instructions	**Used in step**
72 00 ... Safety regulations for handling components with gas generators	3

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Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	211
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61 20 900 Disconnecting and connecting battery earth lead	211
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61 31 082 Removing and installing/replacing switch for central locking system

PRELIMINARY WORK

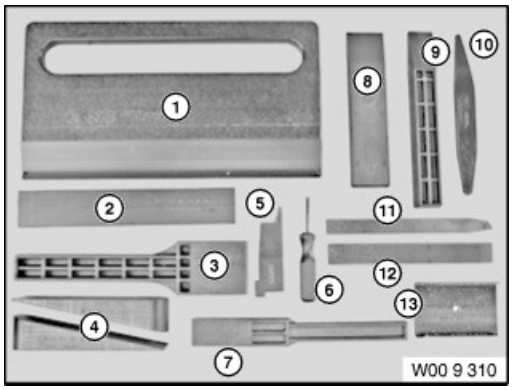
1 – Remove front door trim panel

RISK OF DAMAGE

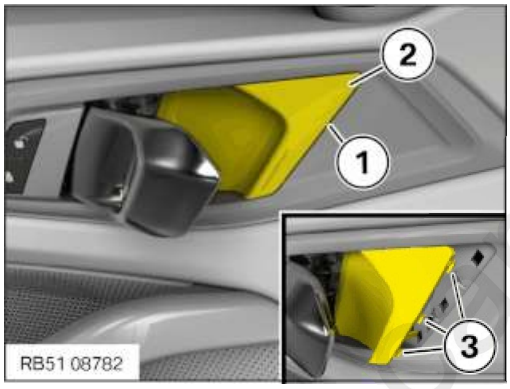
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

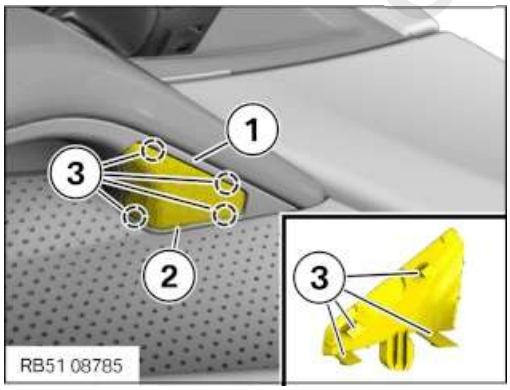
- Protect surfaces from damage.



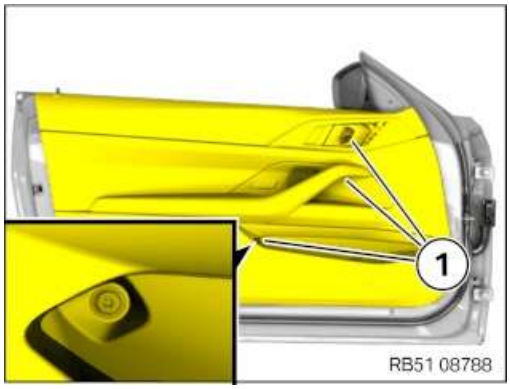
- Have the set of special tools 0 493 752 (00 9 329) ready.



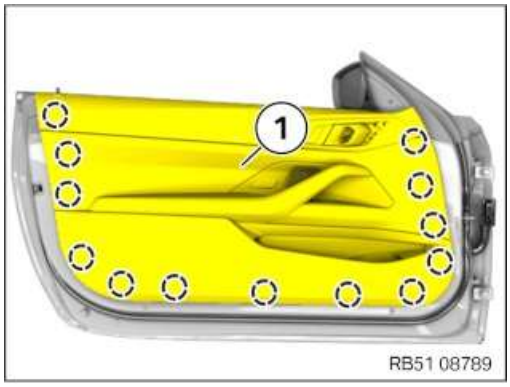
- Pull the door handle.
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover of the door handle (2) with the latch mechanisms (3).
- Feed out the cover of the door handle (2) from the latch mechanisms and remove it forwards.



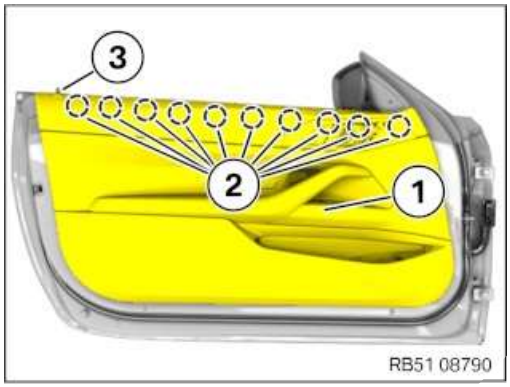
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover (2) with the latch mechanisms (3) and remove it downwards.



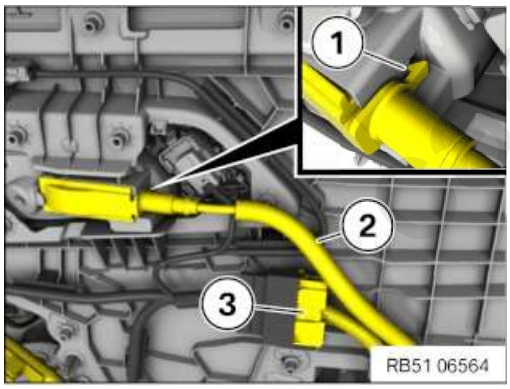
- Loosen screws (1).



- Unclip the door trim panel (1) with the suitable special tool at the marked places.



- Release the door trim panel (1) with the latch mechanisms (2).
- Lift the door trim panel (1) upwards over the operating rod (3).



NOTICE

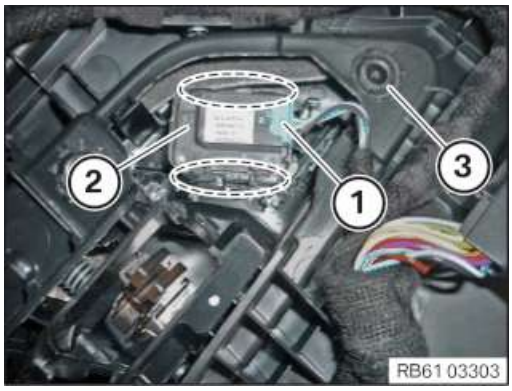
Schematic diagram is for example purposes. Some parts may differ in certain details.

- Release the latch mechanism (1) and feed out the Bowden cable for the inner door handle (2).

  While doing so, the Bowden cable for the inner door handle (2) is guided out independently from the door handle.
- Unlock the plug connection (3), disconnect and remove the door trim panel.

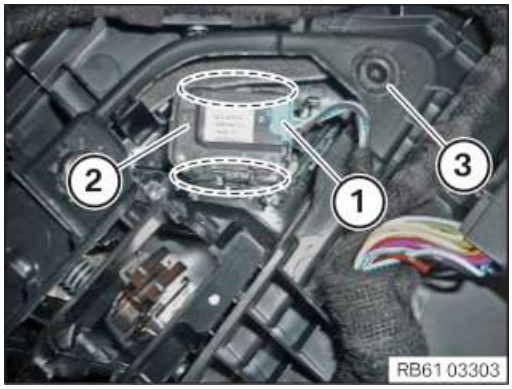
MAIN WORK

2 – Remove the central locking button



- Disconnect the connector (1) .
- Release the latch mechanisms in the marked areas.
- Remove the central locking button (2)from door trim panel (3).

3 – Install the central locking button

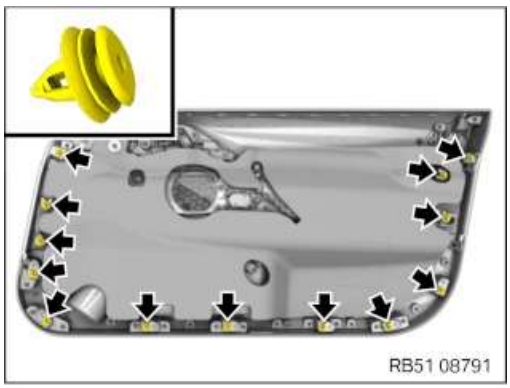


- Position central locking button (2) on door trim panel (3) and clip it in the latch mechanisms in the marked area.
- Connect connector (1).

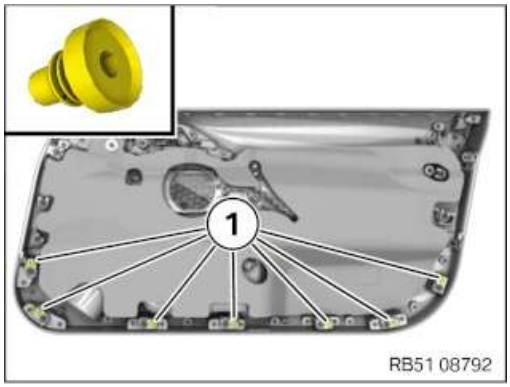
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POSTPROCESSES

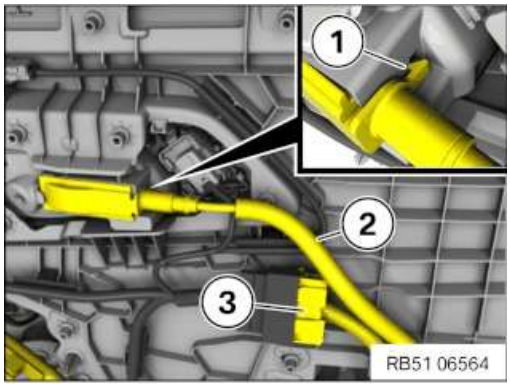
4 – Install front door trim panel



- Check clips (arrows) for damage and, if necessary, renew them.



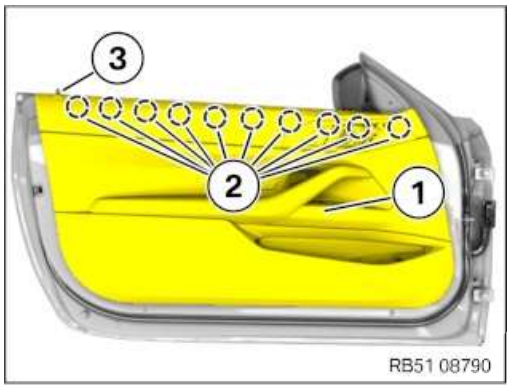
- Check the stop pad (1) for damage, renew if necessary.



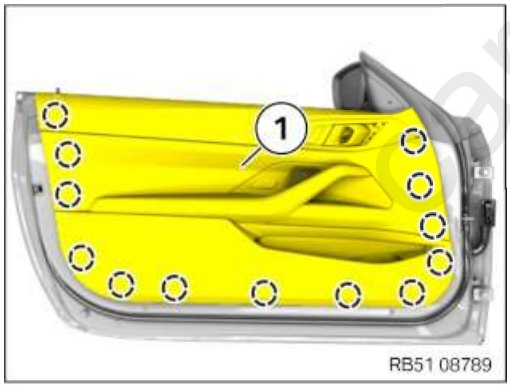
NOTICE

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

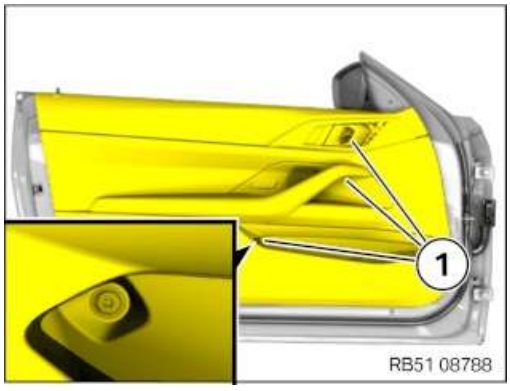
- Push the inner door opener in closed direction.
- Insert the Bowden cable for the door handle inside (2) and clip it in with the latch mechanism (1) .
- Connect connectors (3) and lock.



- Insert the front door trim panel (1) from the top over the operating rod (3) and clip it in with the latch mechanisms (2) .



- Clip in the door trim panel (1) at the marked places.



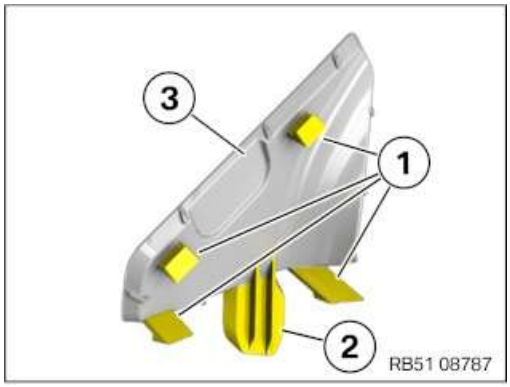
- Tighten the screws (1).

Door trim panel

Oval-head screw		Tightening torque	3 Nm

Check

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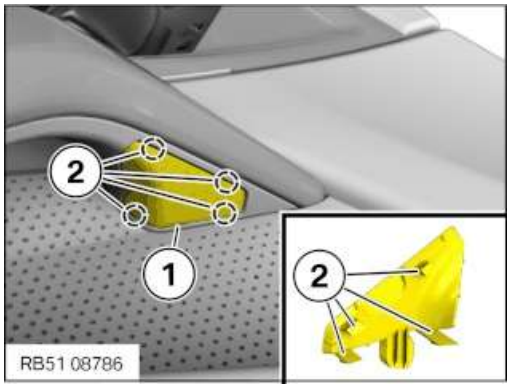
- Check the latch mechanisms (1) and the guide (2) at the cover (3) for damage.

Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

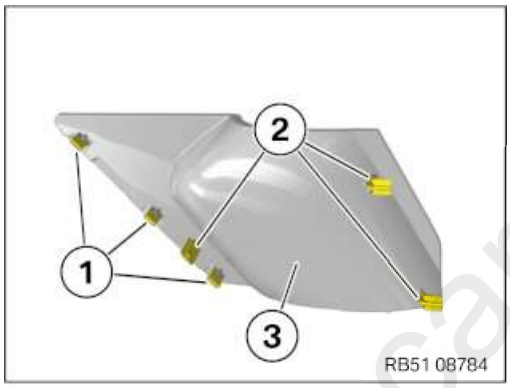
- Replace the cover (3).



- Position the cover (1) and clip it in with the latch mechanisms (2) .

Check

- Check the latch mechanisms (1) and the guides (2) at the cover of the door handle (3) for door handle.

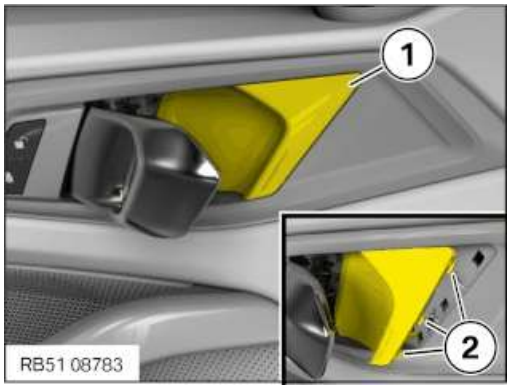


Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

- Replace door handle cover (3).



- Pull the door handle.
- Insert the cover of the door handle (1) with the guides and clip it in with the latch mechanisms (2) .

Additional Information

Overview of Tightening Torques

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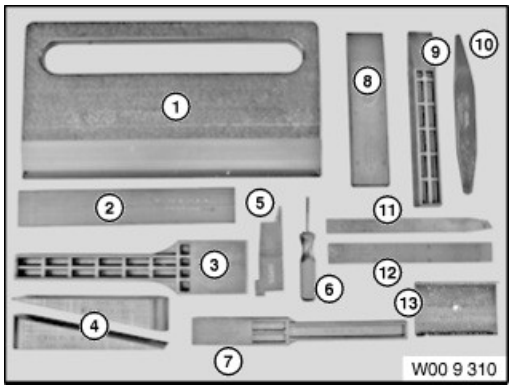
Overview of Tightening Torques

Door trim panel Used in step 4

Oval-head screw		Tightening torque	3 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common Used in step 1

Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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61 31 083 Removing and installing/replacing switch for unlocking tailgate

PRELIMINARY WORK

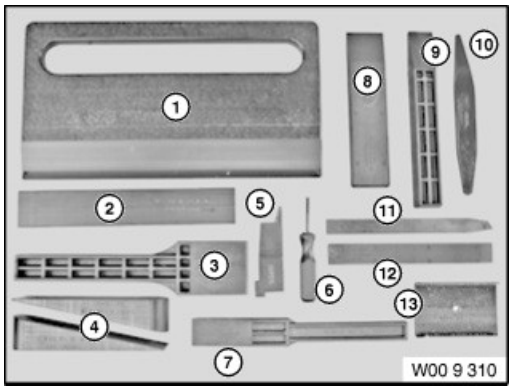
1 – Remove front door trim panel

RISK OF DAMAGE

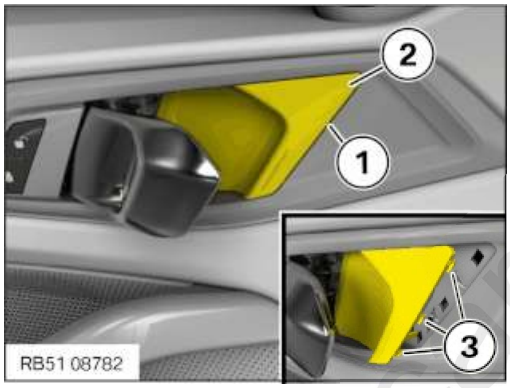
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

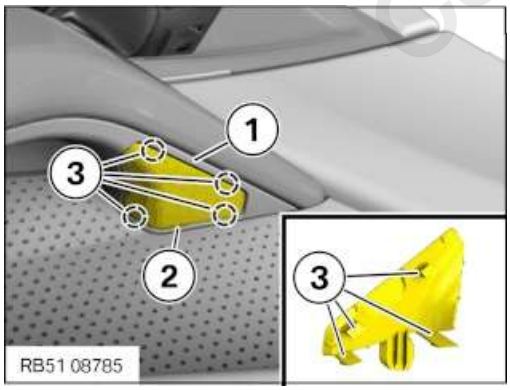
- Protect surfaces from damage.



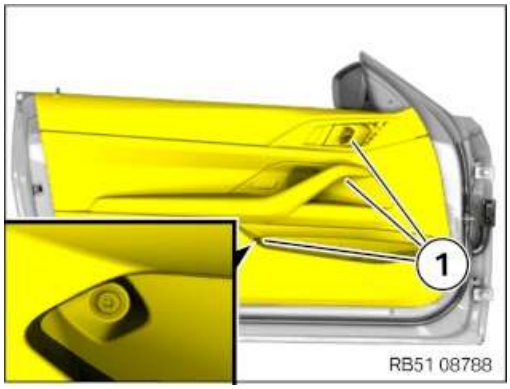
- Have the set of special tools 0 493 752 (00 9 329) ready.



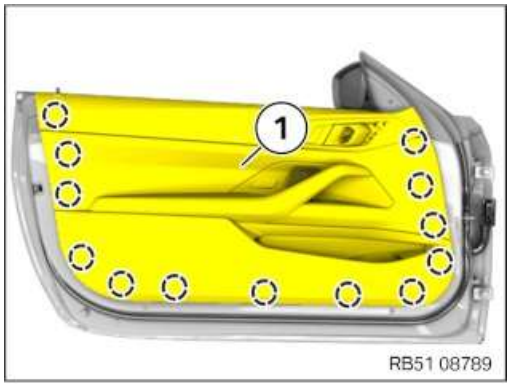
- Pull the door handle.
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover of the door handle (2) with the latch mechanisms (3).
- Feed out the cover of the door handle (2) from the latch mechanisms and remove it forwards.



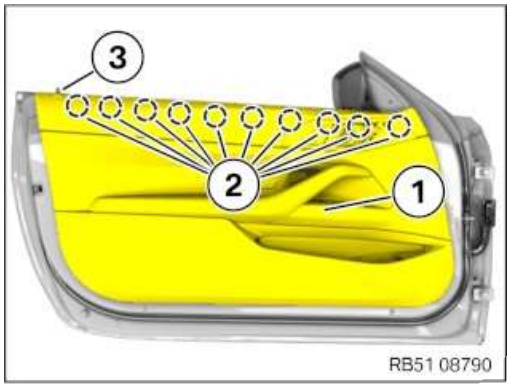
- Position suitable special tool on the recess in the area (1) .
- Unclip the cover (2) with the latch mechanisms (3) and remove it downwards.



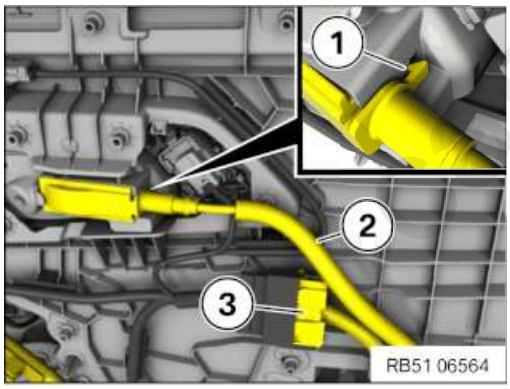
- Loosen screws (1).



- Unclip the door trim panel (1) with the suitable special tool at the marked places.



- Release the door trim panel (1) with the latch mechanisms (2).
- Lift the door trim panel (1) upwards over the operating rod (3).



NOTICE

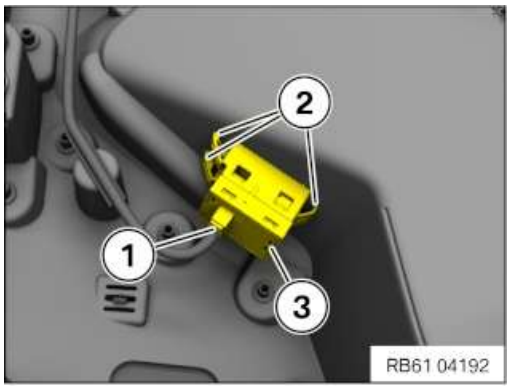
Schematic diagram is for example purposes. Some parts may differ in certain details.

- Release the latch mechanism (1) and feed out the Bowden cable for the inner door handle (2).

  While doing so, the Bowden cable for the inner door handle (2) is guided out independently from the door handle.
- Unlock the plug connection (3), disconnect and remove the door trim panel.

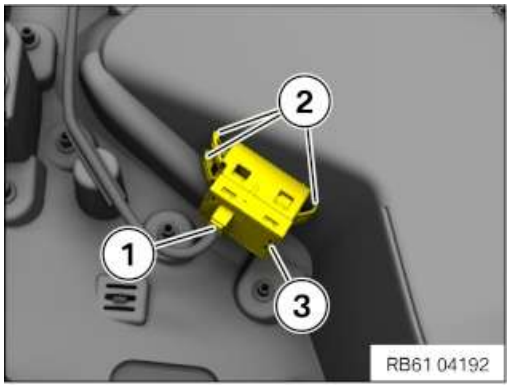
MAIN WORK

2 – Removing the switch for the tailgate release



- Unlock plug connection (1) and disconnect.
- Release the latch mechanisms (2) and remove the switch (3) from the front door trim panel.

3 – Installing the switch for the tailgate release

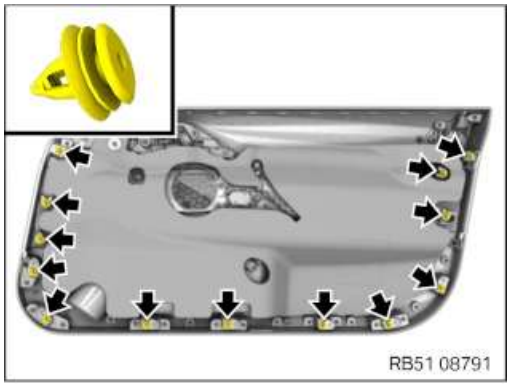


- Install the switch (3) in the front door trim panel and clip it in with the latch mechanisms (2).
- Connect connectors (1) and lock.

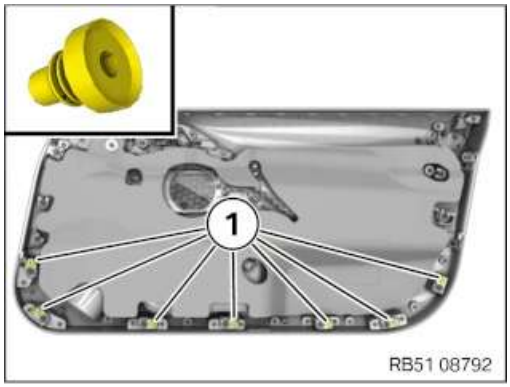
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POSTPROCESSES

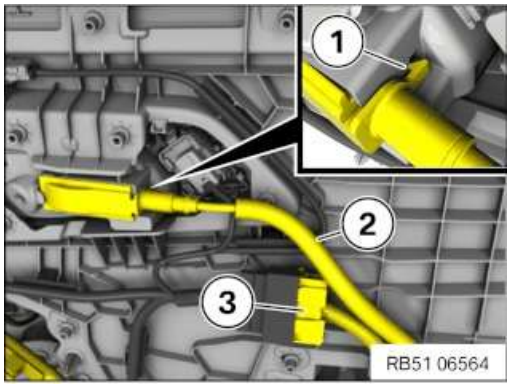
4 – Install front door trim panel



- Check clips (arrows) for damage and, if necessary, renew them.



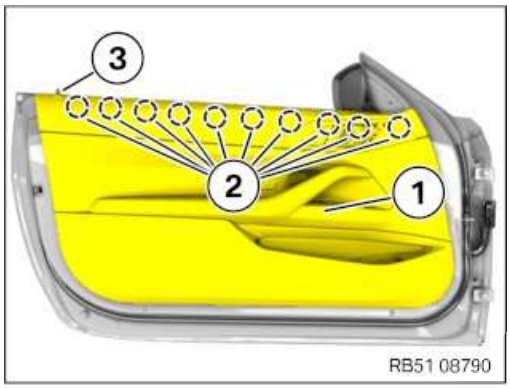
- Check the stop pad (1) for damage, renew if necessary.



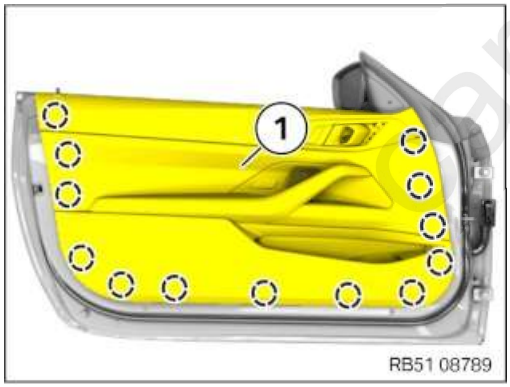
NOTICE

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

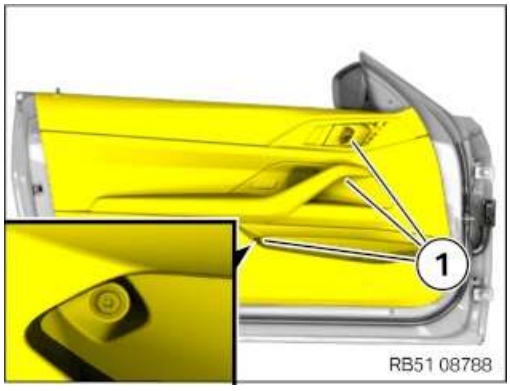
- Push the inner door opener in closed direction.
- Insert the Bowden cable for the door handle inside (2) and clip it in with the latch mechanism (1) .
- Connect connectors (3) and lock.



- Insert the front door trim panel (1) from the top over the operating rod (3) and clip it in with the latch mechanisms (2) .



- Clip in the door trim panel (1) at the marked places.



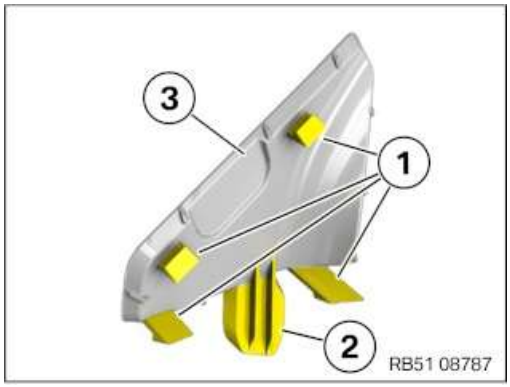
- Tighten the screws (1).

Door trim panel

Oval-head screw		Tightening torque	3 Nm

Check

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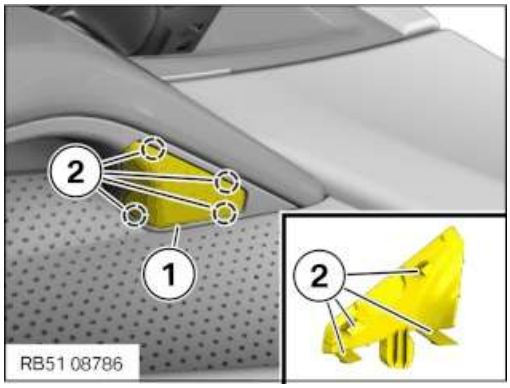
- Check the latch mechanisms (1) and the guide (2) at the cover (3) for damage.

Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

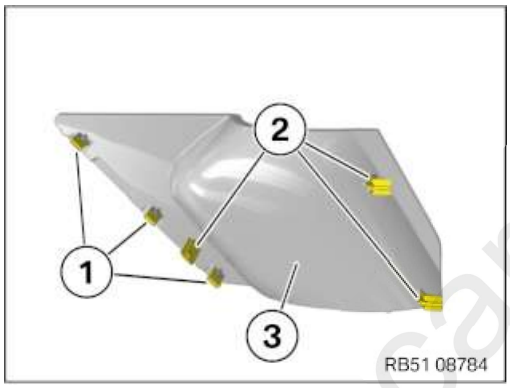
- Replace the cover (3).



- Position the cover (1) and clip it in with the latch mechanisms (2) .

Check

- Check the latch mechanisms (1) and the guides (2) at the cover of the door handle (3) for door handle.

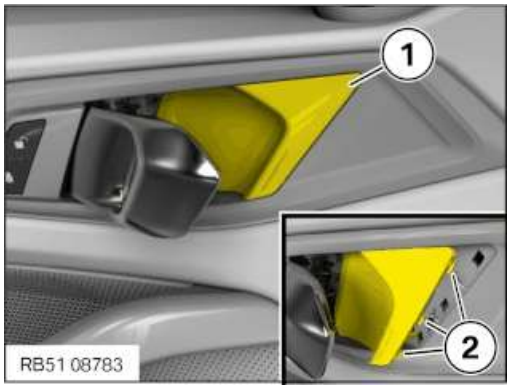


Result

» The latch mechanisms (1) or the guides (2) are damaged.

Measure

- Replace door handle cover (3).



- Pull the door handle.
- Insert the cover of the door handle (1) with the guides and clip it in with the latch mechanisms (2) .

Additional Information

Overview of Tightening Torques

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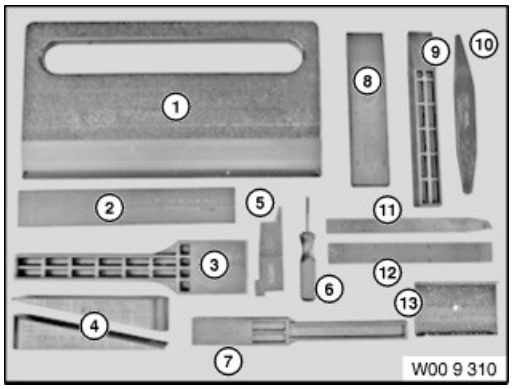
Overview of Tightening Torques

Door trim panel Used in step 4

Oval-head screw		Tightening torque	3 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common Used in step 1

Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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61 31 327 Removing and installing/replacing the shift knob of gear selector switch

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

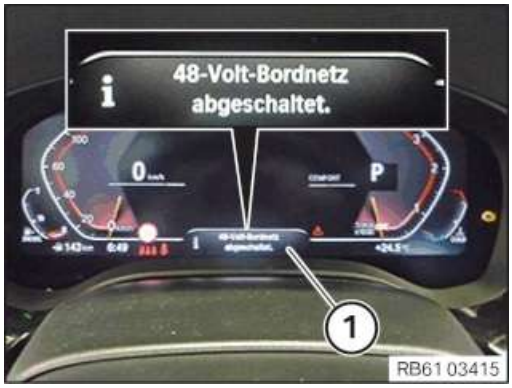
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.

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

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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

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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

2 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

3 – Removing the selector lever

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RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

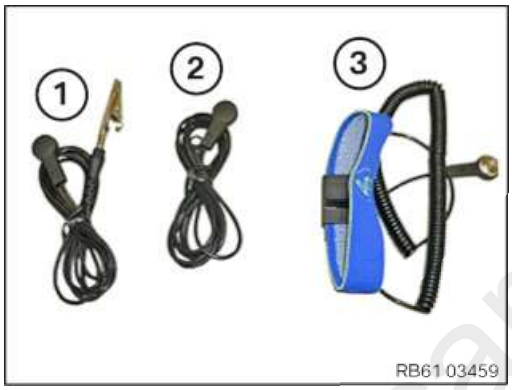
RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

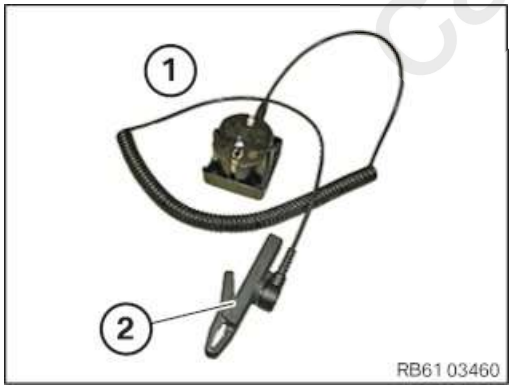
- Protect surfaces from damage.

▶ **Preventing control unit damage caused by electrostatic discharge**



- Have the special tool (3) from the set of special tools 0 495 054 (12 7 060) ready.

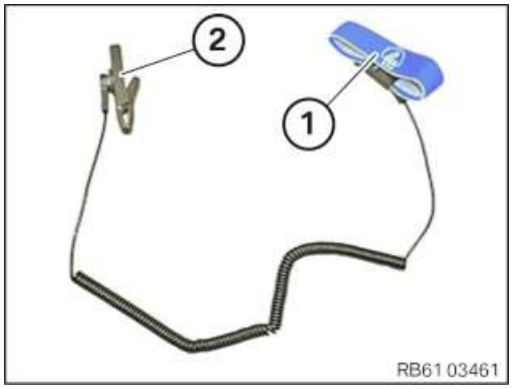
The set of special tools consists of:
1. Earth cable for the antistatic mat
2. Earth cable for the component
3. Wrist cuff



- Have the special tool (2) from the set of special tools ready.

The set of special tools consists of:
1. Earth cable
2. Terminal

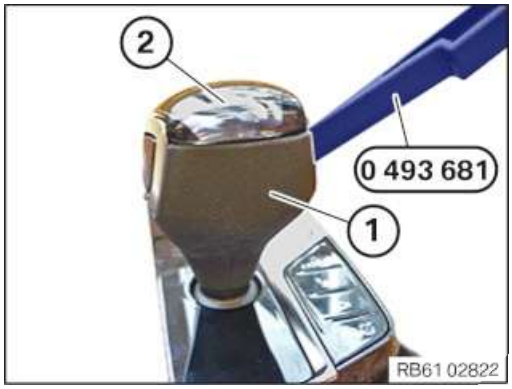
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- Connect the wrist cuff (1) with the clamp (2).



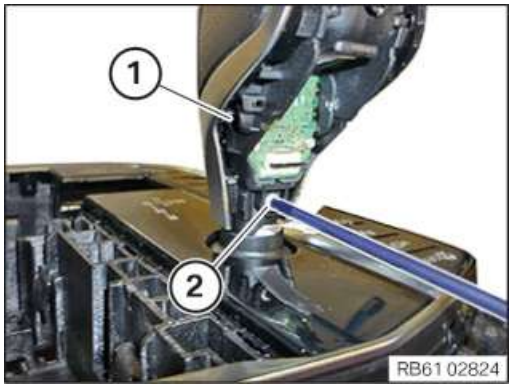
- Fasten the wrist cuff to the wrist or to the striker (2) using clamp (1).



- Lever out trim (1) with the special tool 0 493 681 (64 1 020) on both sides of the selector lever (2).



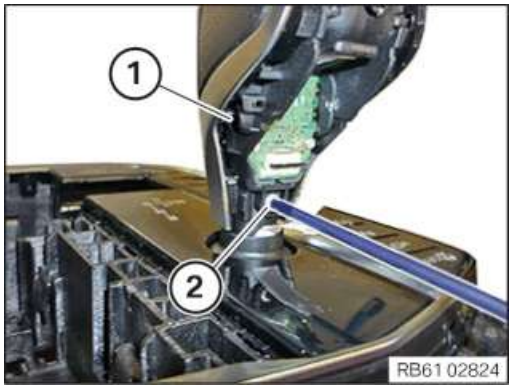
- Unlock the plug connection (1) in the direction of arrow.
- Thread out the ribbon cable (2).



- Loosen screw (2).
- Remove selector lever (1) upwards.

4 – Installing the selector lever

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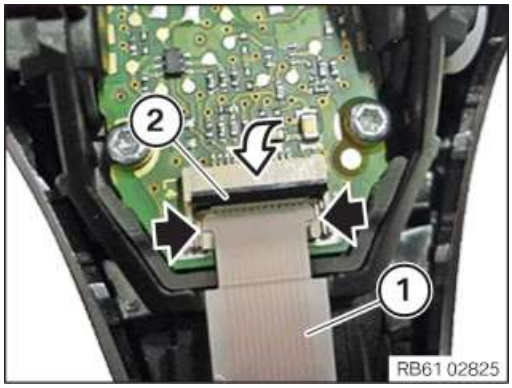


- Position the selector lever (1).
- Renew the screw (2).

  Parts: Screw
- Tighten down screw (2).

Selector lever on gear selector switch

Screw	Renew screw.	Tightening torque	0,8 Nm



- Position the ribbon cable (1) on selector lever (arrow).
- Lock the connector (2) in the direction of the arrow.



- Renew the trim (1).

  Parts: trim
- Position the trim (1) on the selector lever (2) and lock.

  Retaining lugs must audibly snap into place.

POSTPROCESSES

5 – Connecting all battery earth leads



- See additional information.

6 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

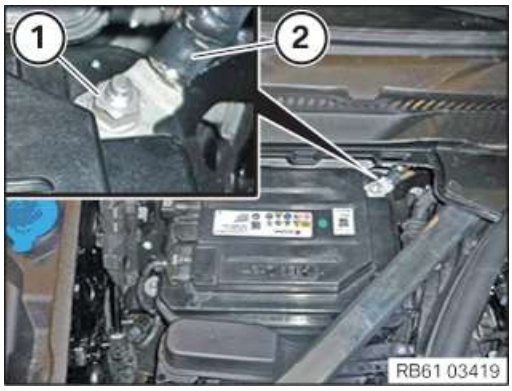
Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

Additional Information

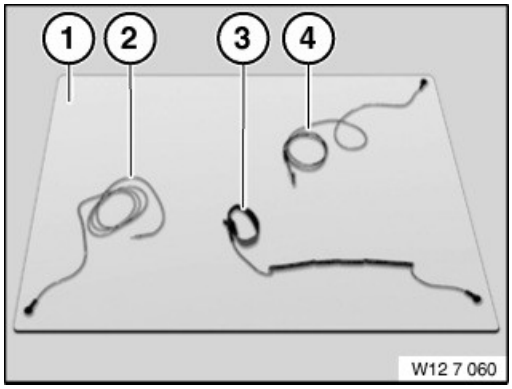
Overview of Tightening Torques

Selector lever on gear selector switch			Used in step 4
Screw	Renew screw.	Tightening torque	0,8 Nm

Negative battery cable to 48-V battery			Used in step 6
Nut M8		Tightening torque	19 Nm

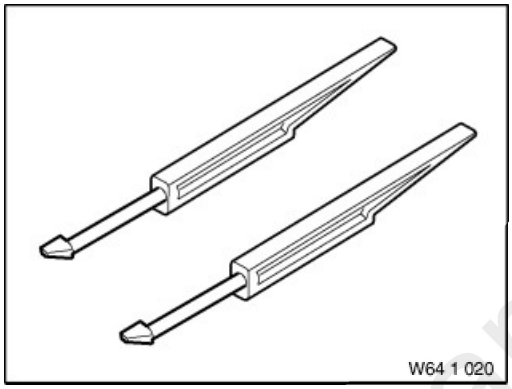
Overview of Special Tools

0 495 054 (12 7 060) Antistatic mat



Common	Used in step 3
Usage	(Antistatic mat) ESD (Electronic Static Discharge) = electrostatic discharge For protection against ESD during repairs to electronic components. (Replaces the sub-number 12 7 192 from Eprom tool kit 12 7 190)
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	02 06 04 (128)

0 493 681 (64 1 020) Hook



Common	Used in step 3
Usage	(release hook) For releasing and removing fresh air grille. For removing various covers.
Included in the tool or work	
Storage location	C2
Replaced by	
In connection with	
SI-Number	01 15 99 (483)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	16

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
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61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	25
61 20 900 Disconnecting and connecting battery earth lead	25
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 35 ... Notes on ESD protection (Electro Static Discharge)	3
61 35 ... Notes on ESD protection (Electro Static Discharge)	3

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61 31 068 Removing and installing/replacing the switch for front passenger airbag deactivation

RISK OF DAMAGE

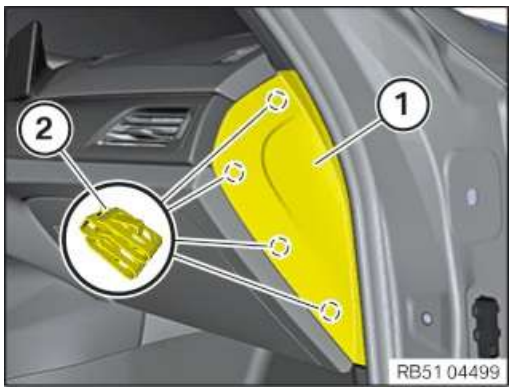
Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

PRELIMINARY WORK

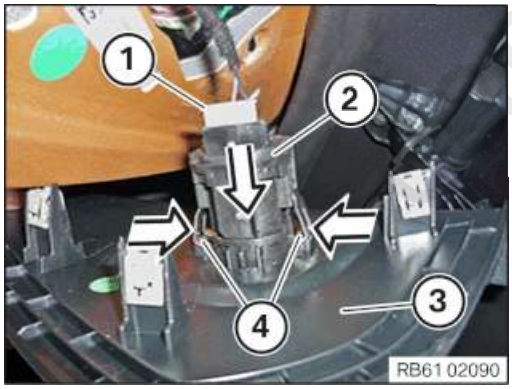
1 – Remove the side panel on the right instrument panel



- Unclip and remove the side panel (1) towards the outside from the clamps (2).
- If necessary, unlock associated plug connection and disconnect.

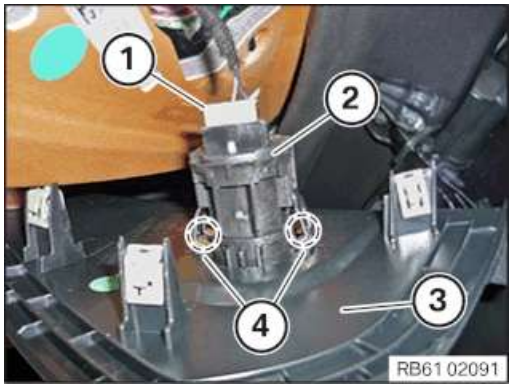
MAIN WORK

2 – Removing the switch for the front passenger airbag deactivation



- Unlock plug connection (1) and disconnect.
- Unlock the latch mechanisms (4) in the direction of arrow.
- Feed out the switch for the front passenger airbag deactivation (2) from the side panel (3) of the instrument panel in the direction of arrow.

3 – Installing the switch for the front passenger airbag deactivation

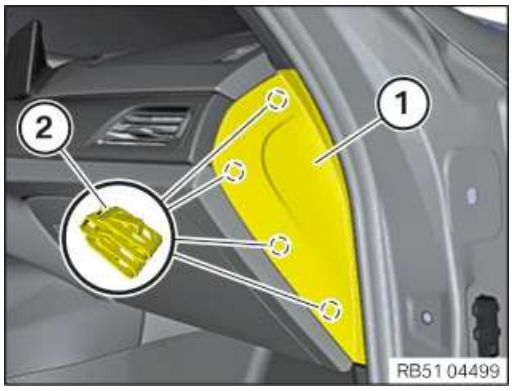


- Install the switch for the front passenger airbag deactivation (2) in the side panel (3) of the instrument panel.

  The latch mechanism (4) must engage audibly.
- Connect the connector (1) with the switch for the front passenger airbag deactivation (2) and lock it.

.com

4 – Install the side panel on instrument panel on the right

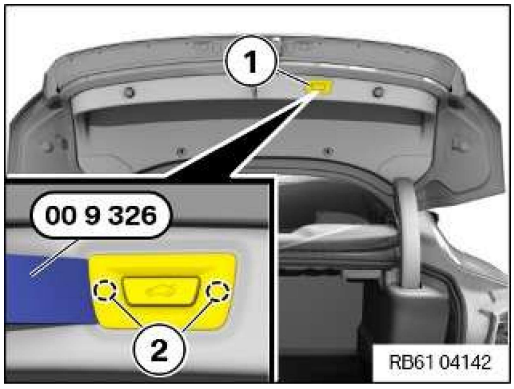


- If required, connect the associated connector.
- Feed in the side panel (1) and clip it in at the clamps (2).

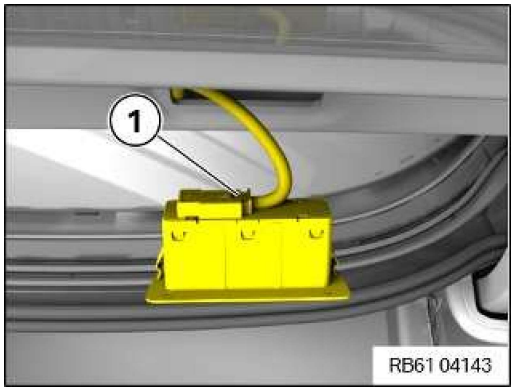
cardiagn.com

61 31 084 Removing and installing/replacing the switch for the automatic operation of tailgate

1 – Removing the tailgate lift switch

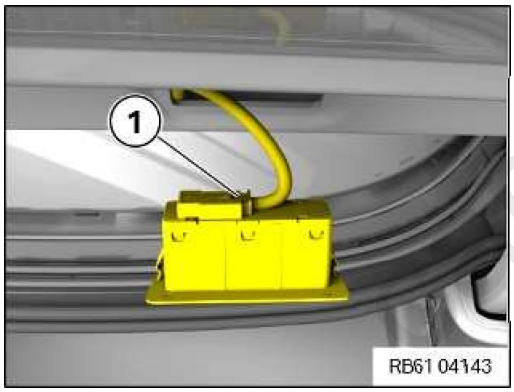


- Unclip the switch (1) for the automatic tailgate operation with the special tool 0 496 570 (00 9 326) on the side latch mechanisms (2).

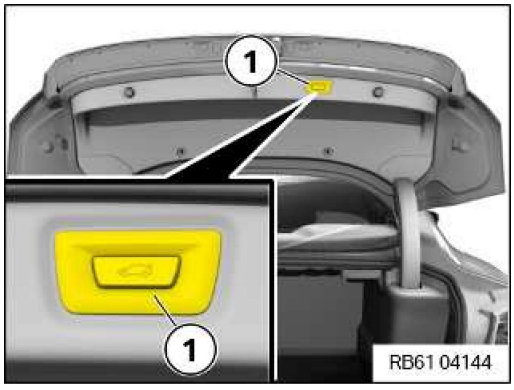


- Unlock plug connection (1) and disconnect.

2 – Install the tailgate lift switch



- Connect connectors (1) and lock.

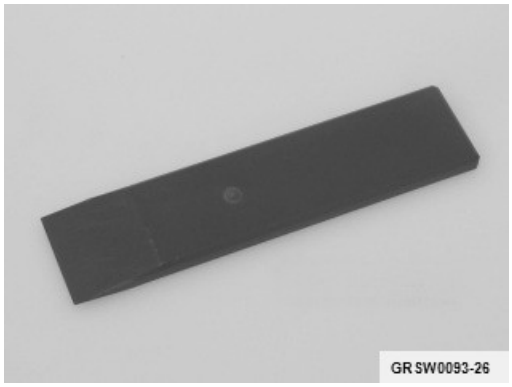


- Clip in the switch for automatic tailgate operation (1).

Additional Information

Overview of Special Tools

0 496 570 (00 9 326) Wedge



Common	Used in step 1
Usage	(Universal wedge) From 11/2008 this special tool replaces panel wedge 00 9 318 (different material)
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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61 31 349 Replace the cap for the electromechanical parking brake and cover below the gear selector switch

RISK OF DAMAGE



Electrostatic discharge.

Damage to or destruction of electrical components.

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

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

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RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing the selector lever

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

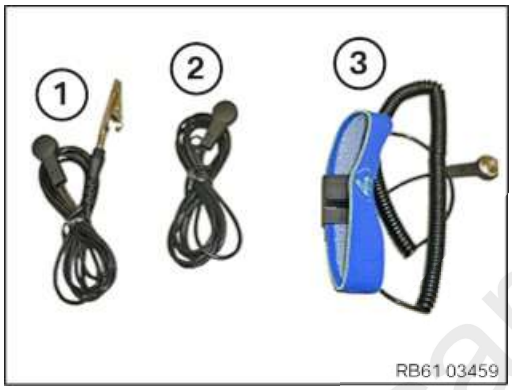
RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

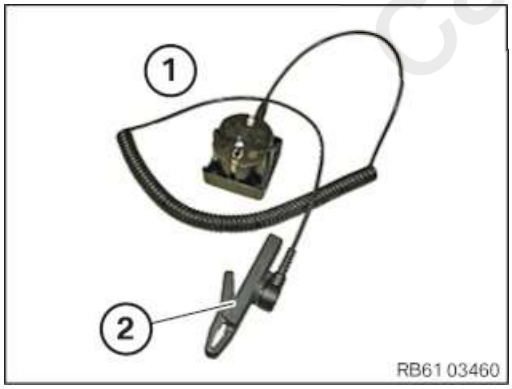
- Protect surfaces from damage.

▶ **Preventing control unit damage caused by electrostatic discharge**



- Have the special tool (3) from the set of special tools 0 495 054 (12 7 060) ready.

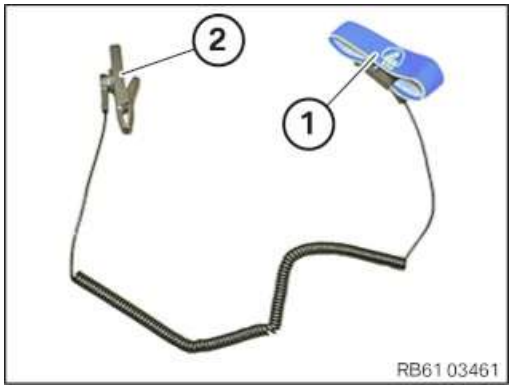
The set of special tools consists of:
1. Earth cable for the antistatic mat
2. Earth cable for the component
3. Wrist cuff



- Have the special tool (2) from the set of special tools ready.

The set of special tools consists of:
1. Earth cable
2. Terminal

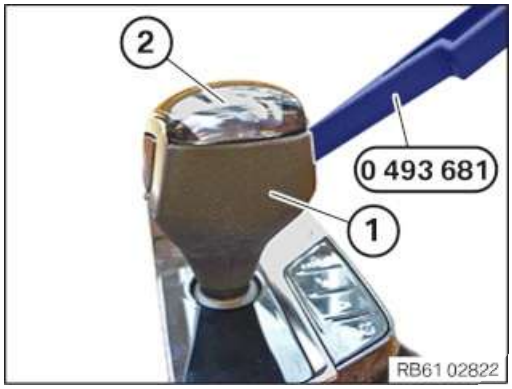
carlogic.com



- Connect the wrist cuff (1) with the clamp (2).



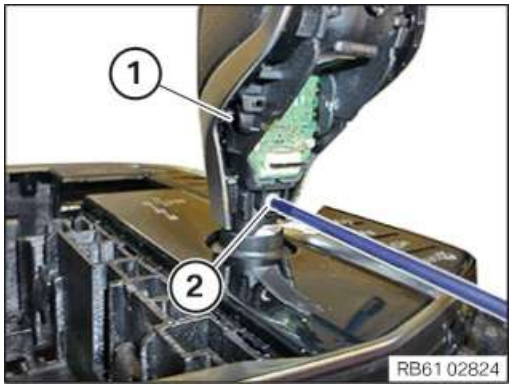
- Fasten the wrist cuff to the wrist or to the striker (2) using clamp (1).



- Lever out trim (1) with the special tool 0 493 681 (64 1 020) on both sides of the selector lever (2).



- Unlock the plug connection (1) in the direction of arrow.
- Thread out the ribbon cable (2).



- Loosen screw (2).
- Remove selector lever (1) upwards.

MAIN WORK

4 – Removing trim on the operating unit in the centre console

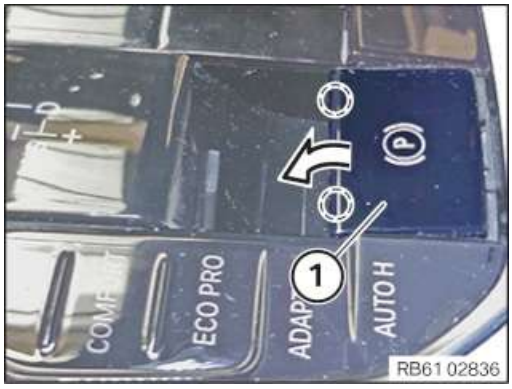
cardiagn.com

RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.



- Press the parking brake button trim (1) forwards and downwards in the direction of arrow.

Note: The trim of the parking brake button comes loose when it is pressed vigorously out of the catches (markings).



- Unclip the trim with the special tool 0 493 681 (64 1 020) in the marked area .

5 – Installing trims on the operating facility in the centre console



- Disengage and renew the swivel (1).

  Parts: Swivel

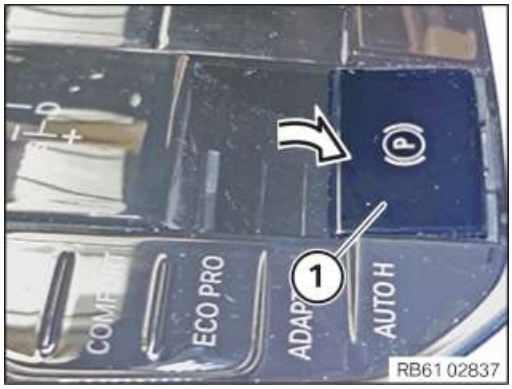
- Position ribbon cable (2) correctly through swivel (1).



- Engage the trim (1) in the marked area.
- Clip in the trim (1) in the direction of the arrow.

  The trim (1) must engage audibly.

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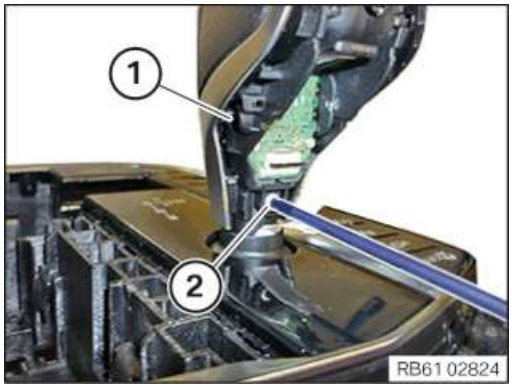


- Lock the trim (1) for the parking brake button and in the direction of the arrow.

  The trim (1) must lock audibly.

POSTPROCESSES

6 – Installing the selector lever

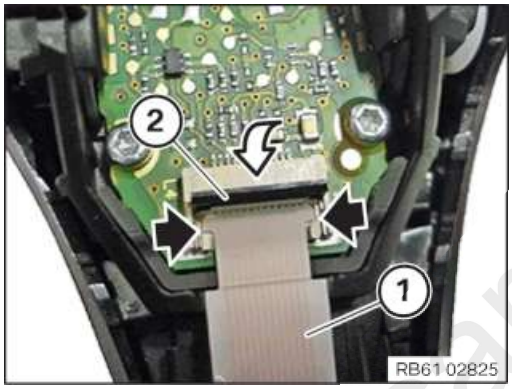


- Position the selector lever (1).
- Renew the screw (2).

  Parts: Screw
- Tighten down screw (2).

Selector lever on gear selector switch

Screw	Renew screw.	Tightening torque	0,8 Nm



- Position the ribbon cable (1) on selector lever (arrow).
- Lock the connector (2) in the direction of the arrow.



- Renew the trim (1).

  Parts: trim
- Position the trim (1) on the selector lever (2) and lock.

  Retaining lugs must audibly snap into place.

7 – Connecting all battery earth leads

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- See additional information.

8 – Activating the 48 V electrical system

Prerequisite

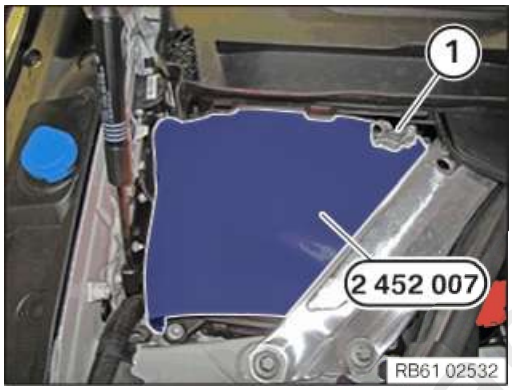
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

Additional Information

Overview of Tightening Torques

Selector lever on gear selector switch — Used in step 6

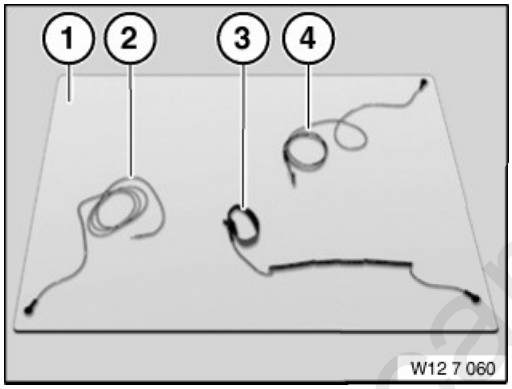
Screw	Renew screw.	Tightening torque	0,8 Nm

Negative battery cable to 48-V battery — Used in step 8

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

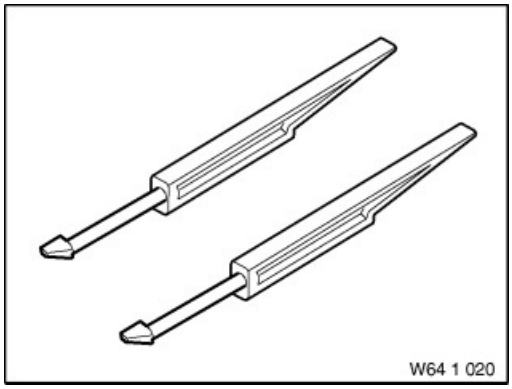
0 495 054 (12 7 060) Antistatic mat



Common — Used in step 3

Usage	(Antistatic mat) ESD (Electronic Static Discharge) = electrostatic discharge For protection against ESD during repairs to electronic components. (Replaces the sub-number 12 7 192 from Eprom tool kit 12 7 190)
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	02 06 04 (128)

0 493 681 (64 1 020) Hook



Common — Used in step 34

Usage	(release hook) For releasing and removing fresh air grille. For removing various covers.
Included in the tool or work	
Storage location	C2
Replaced by	
In connection with	
SI-Number	01 15 99 (483)

Links

Repair instructions (PRE) — **Used in step**

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Notes on 48-V battery	18

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	3
61 35 ... Notes on ESD protection (Electro Static Discharge)	3
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
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61 20 900 Disconnecting and connecting battery earth lead	27
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
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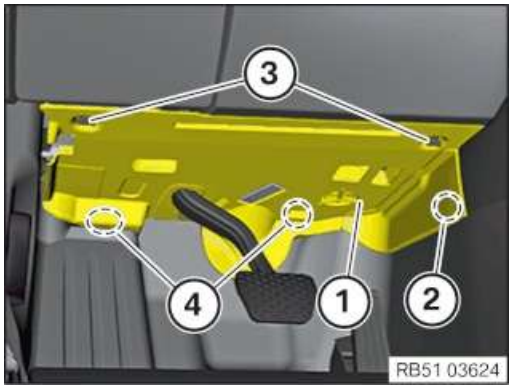
61 20 900 Disconnecting and connecting battery earth lead 27
61 20 900 Disconnecting and connecting battery earth lead 27
61 20 900 Disconnecting and connecting battery earth lead 27
61 20 900 Disconnecting and connecting battery earth lead 27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 27
61 20 900 Disconnecting and connecting battery earth lead 27
61 20 900 Disconnecting and connecting battery earth lead 27
61 20 900 Disconnecting and connecting battery earth lead 27

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61 31 310 Replacing brake light switch

PRELIMINARY WORK

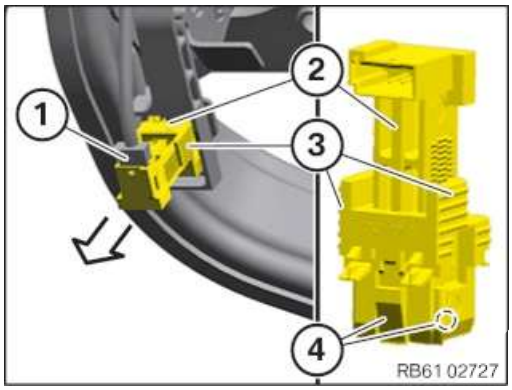
1 – Removing the trim panel for pedal mechanism



- Unclip the trim panel for the pedal mechanism (1) towards the inside in this area (2).
- Turn the locks (3) by 90°.
- Detach the trim panel for the pedal mechanism (1) inwards out of the guides (4).
- Unlock associated plug connection and disconnect.

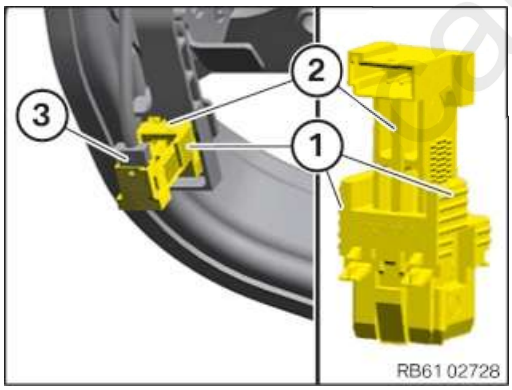
MAIN WORK

2 – Remove the brake light switch



- Unlock plug connection (1) and disconnect.
- Operate and hold brake pedal
- Pull the brake light switch (2) from the holder (3) in the direction of the arrow.
- Press together the latch mechanisms (4) and unclip the holder (3) from the brake pedal.

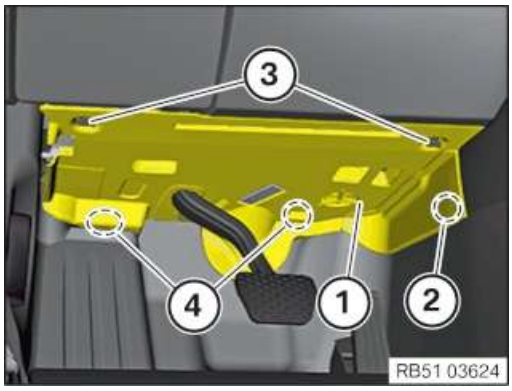
3 – Install brake light switch



- Clip the holder for the brake light switch (1) into the brake pedal.
- Press the brake pedal completely.
- Push the brake light switch (2) up to the limit position into the holder (1).
- Counter support the holder (1) and move back the brake pedal slowly again to the initial position.
- Connect connector (3).

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4 – Installing the trim panel for the pedal mechanism



- Connect associated connector.
- Attach the trim panel for the pedal mechanism (1) in the guides (4) and fold it up.
- Clip the trim panel for the pedal mechanism (1) into the centre console in this area (2).

TECHNICAL INFORMATION

It is **imperative** that the screws caps of the trim panel be correctly locked. This is the only way to ensure that the trim panel does not come loose and potentially tilt into the pedal area.

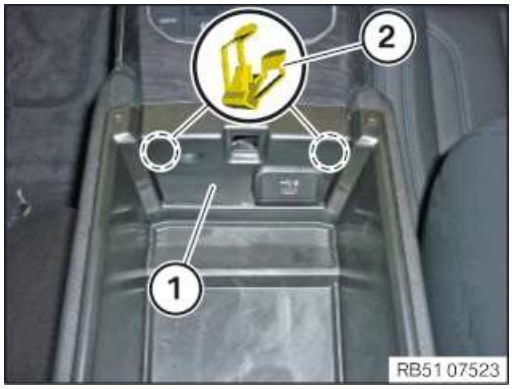
- Insert screw caps (3) correctly and turn by 90° to lock.

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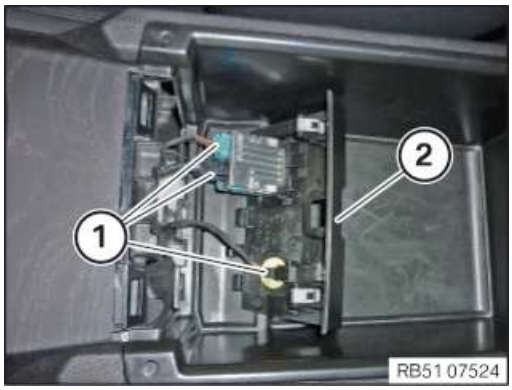
61 31 696 Replacing front controller

PRELIMINARY WORK

1 – Removing the trim in the storage compartment on the centre armrest



- Lever out the trim (1) with the special tool (2) toward the rear from the clamps 2 298 505.



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

2 – Remove the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



- Release and remove the centre console trim upwards (1) as shown using the special tool 2 298 505 from the latch mechanisms.

3 – Remove the operating facility in the centre console

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

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WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

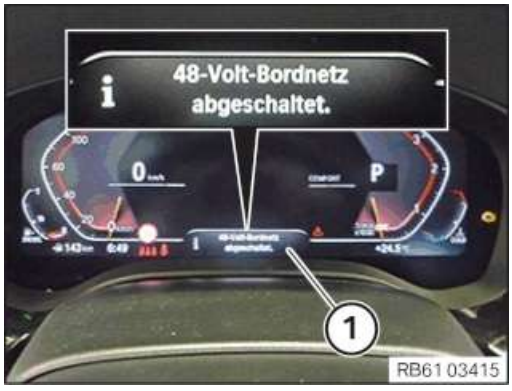
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



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

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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

tdiagn.com



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

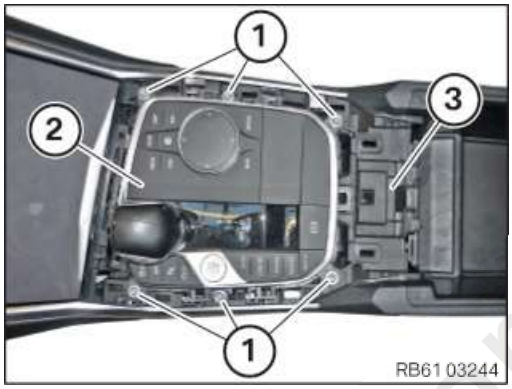
- Cover the vehicle battery.

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

▶ **Disconnecting all battery earth leads**



- See additional information.

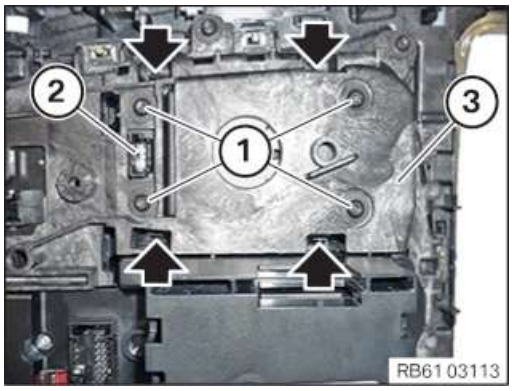


- Loosen screws (1).
- Remove the operating facility in the centre console (2) from the centre console (3).

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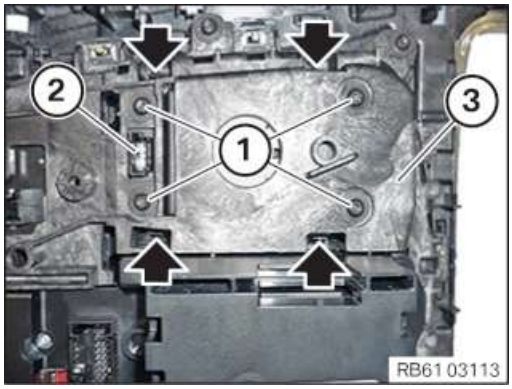
MAIN WORK

4 – Remove controller



- Loosen screws (1).
- Release the latch mechanisms (arrows).
- Remove controller (2) from the gear selector switch(GWS) (3).

5 – Install controller



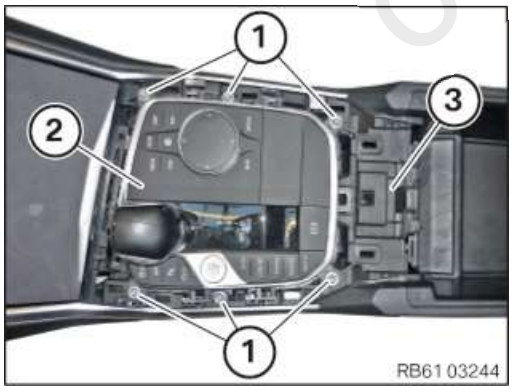
- Position the controller (2) on gear selector switch (GWS) (3) and engage in the latch mechanisms (arrow).
- Tighten the screws (1).

Controller to gear selector switch

Screw		Tightening torque	1,8 Nm

POSTPROCESSES

6 – Install the operating facility in the centre console



- Position the operating facility (2) in the centre console (3).
- Tighten the screws (1).

Gear selector switch to centre console trim

Screw		Tightening torque	1,8 Nm

▸ **Connecting all battery earth leads**

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- See additional information.

▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

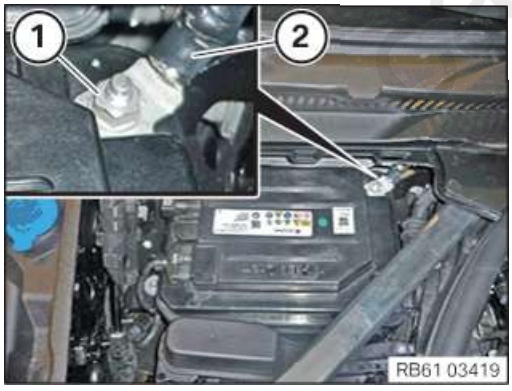
Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

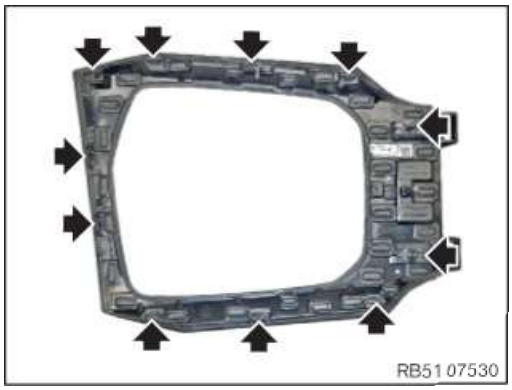
7 – Installing the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

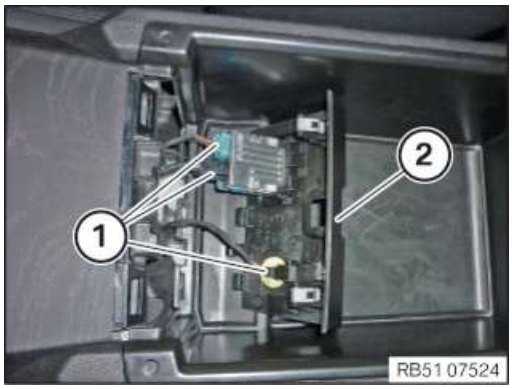


- Check all the latch mechanisms or clamps (arrows).
- In case the latch mechanisms or the clamps (arrows) are faulty, renew the centre console trim .



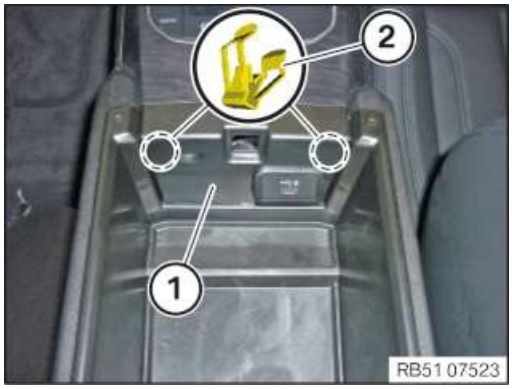
- Correctly position the centre console trim (1) and engage at the latch mechanisms.

8 – Installing the trim in the storage compartment of the centre armrest



- Mount the trim (2) and connect connector (1) and lock.

bmwdiagn.com



- Correctly position trim (1) and snap into the clamps (2).

9 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

- 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.

Additional Information

Overview of Tightening Torques

Controller to gear selector switch — Used in step 5

Screw		Tightening torque	1,8 Nm

Gear selector switch to centre console trim — Used in step 6

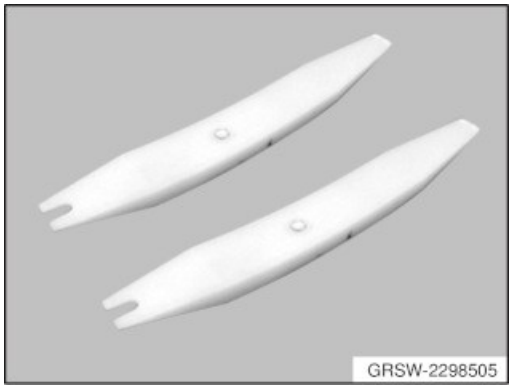
Screw		Tightening torque	1,8 Nm

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Negative battery cable to 48-V battery			Used in step 6
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

2 298 505 Wedge



Common		Used in step 12
Usage	Set (delivery of 2 pieces)	
Included in the tool or work		
Storage location	C34	
Replaced by		
In connection with		
SI-Number	01 03 12 (792)	

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	36

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36

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61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36
61 20 900 Disconnecting and connecting battery earth lead	36

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61 31 204 Replacing operating unit for seat adjustment

Prerequisite

- Move front seat completely towards the front top.

NOTICE

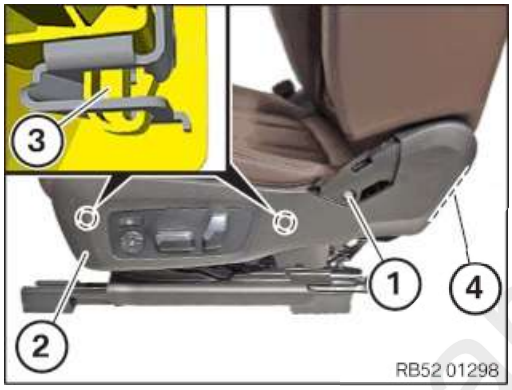
For a better overview the removed condition is shown here.

PRELIMINARY WORK

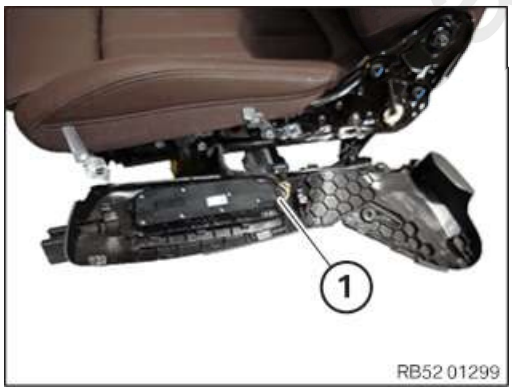
1 – Remove outer cover on front seat



- Unclip the cover (1).



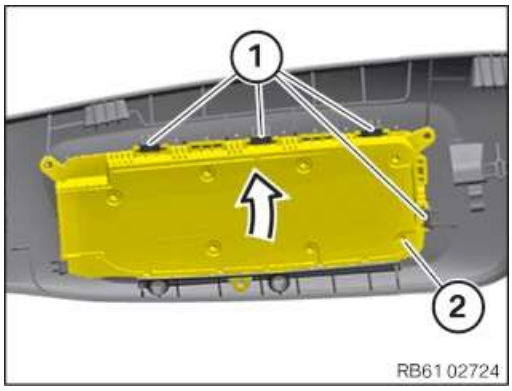
- Loosen screw (1).
- Disengage the cover (2) at the latch mechanisms (3) toward the top.
- Guide out and remove the cover (2) in the area (4).



- Disconnect plug connection (1) and, if necessary, unclip the cable clip.

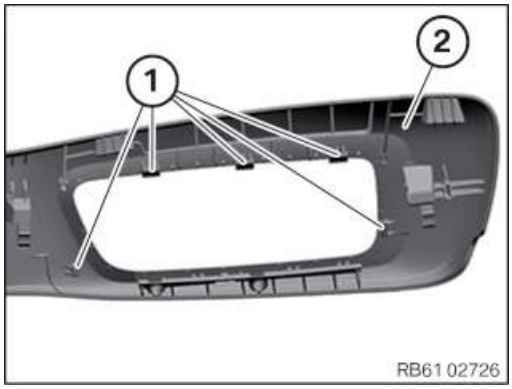
erdiagn.com

2 – Removing operating unit for seat adjustment

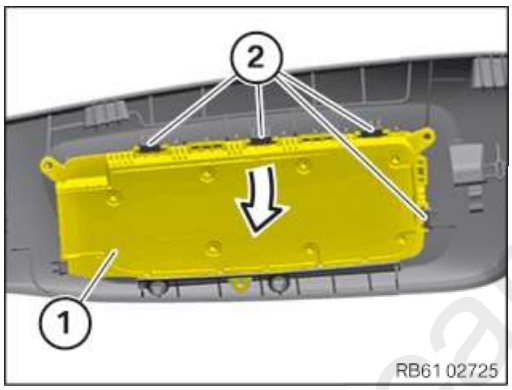


- Loosen latch mechanism (1).
- Remove the operating unit (2) in the direction of the arrow.

3 – Installing the operating unit for the seat adjustment



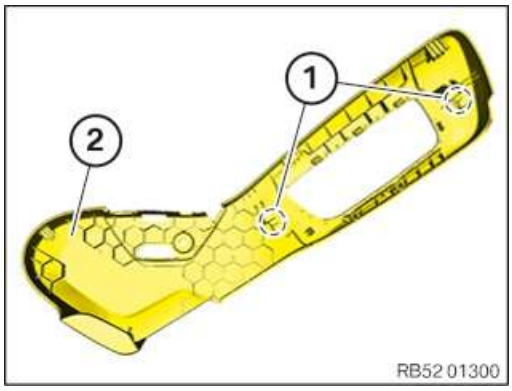
- Check the retaining lugs (1) for damage and renew the seat trim (2) if necessary.



- Install the operating unit (1) in the direction of the arrow.
- Check the correct fit of the latch mechanisms (2).

cardiagn.com

4 – Install outer cover on front seat



- Check the locking units (1) for damages, and replace the cover if necessary (2).



- Connect the connector (1) and if necessary clip the cable holder in.



- Insert the cover (2) in the area (4) and position it.
- Engage the cover (2) at the latch mechanisms (3).
- Tighten down screw (1).

Seat trim to seat frame

Sheet metal screw		Tightening torque	2.5 Nm

Outer seat trim to seat frame

Screw		Tightening torque	3.5 Nm



- Clip in the cover (1).

carmagn.com

Additional Information

Overview of Tightening Torques

Seat trim to seat frame Used in step 4

Sheet metal screw		Tightening torque	2.5 Nm

Outer seat trim to seat frame Used in step 4

Screw		Tightening torque	3.5 Nm

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61 31 329 Replacing START-STOP button cover

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

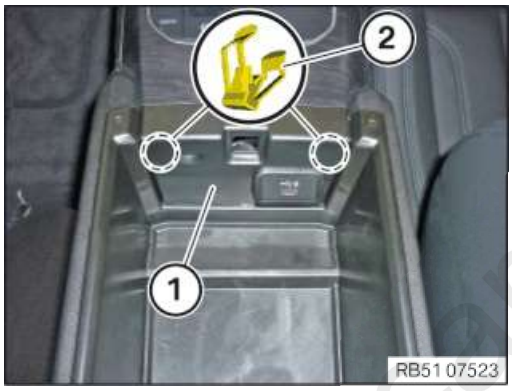
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads

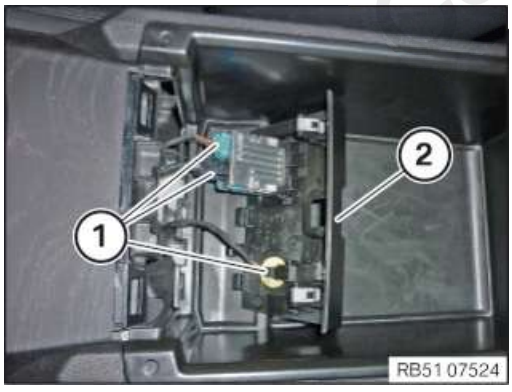


- See additional information.

3 – Removing the trim in the storage compartment on the centre armrest



- Lever out the trim (1) with the special tool (2) toward the rear from the clamps 2 298 505.



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

4 – Remove the centre console trim

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RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



- Release and remove the centre console trim upwards (1) as shown using the special tool 2 298 505 from the latch mechanisms.

5 – Remove the operating facility in the centre console

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

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TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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

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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

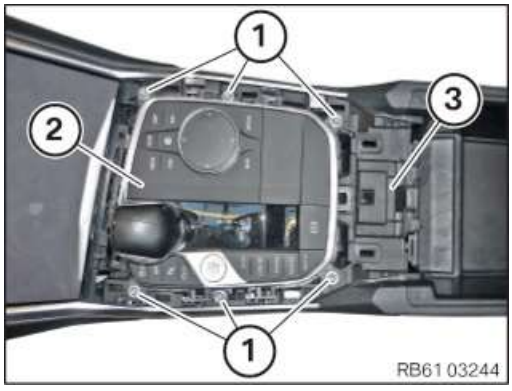
- Cover the vehicle battery.

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

▸ **Disconnecting all battery earth leads**

- See additional information.

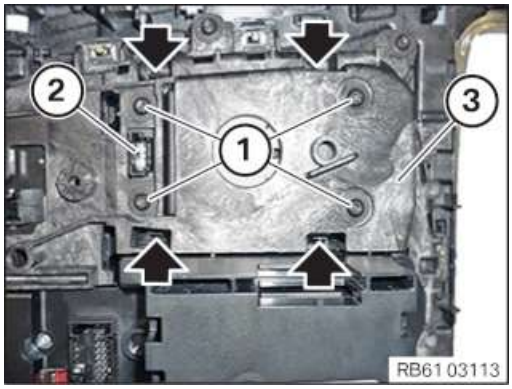




- Loosen screws (1).
- Remove the operating facility in the centre console (2) from the centre console (3).

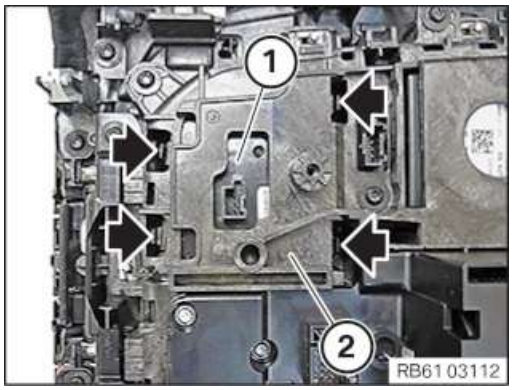
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6 – Remove controller



- Loosen screws (1).
- Release the latch mechanisms (arrows).
- Remove controller (2) from the gear selector switch(GWS) (3).

7 – Removing the HDC button



- Release the latch mechanisms (arrows).
- Remove the HDC button (1) from the gear selector switch (2).

8 – Removing the selector lever

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

RISK OF DAMAGE

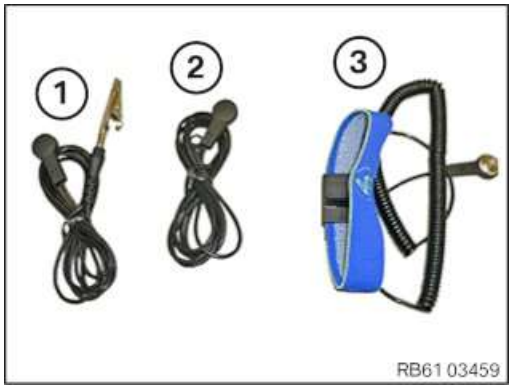
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.

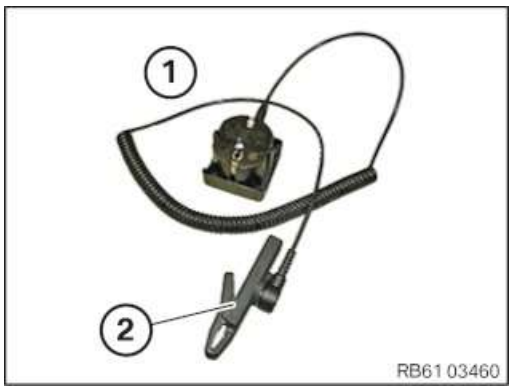
▸ **Preventing control unit damage caused by electrostatic discharge**

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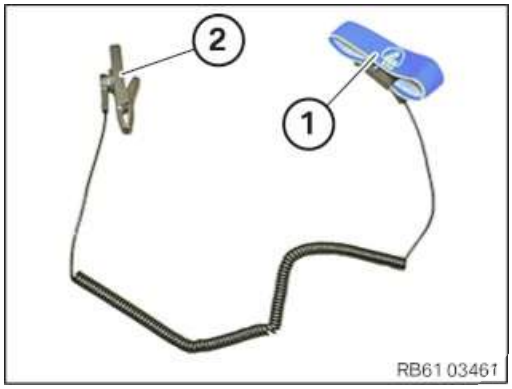
- Have the special tool (3) from the set of special tools 0 495 054 (12 7 060) ready.

The set of special tools consists of:
1. Earth cable for the antistatic mat
2. Earth cable for the component
3. Wrist cuff



- Have the special tool (2) from the set of special tools ready.

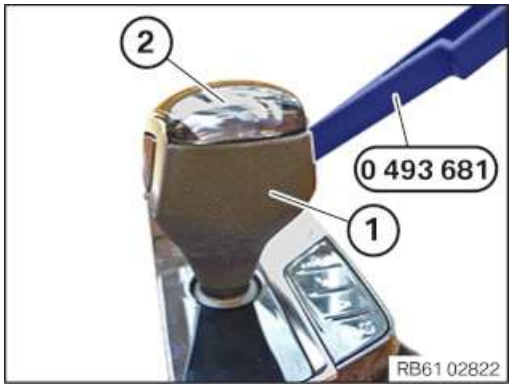
The set of special tools consists of:
1. Earth cable
2. Terminal



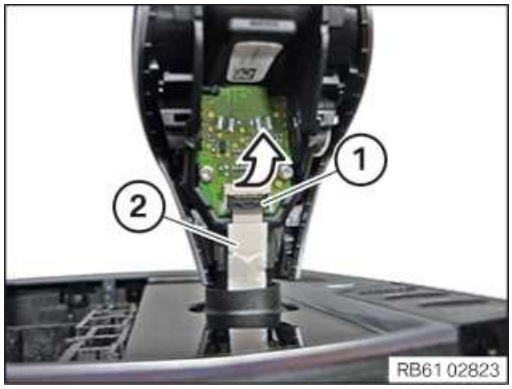
- Connect the wrist cuff (1) with the clamp (2).



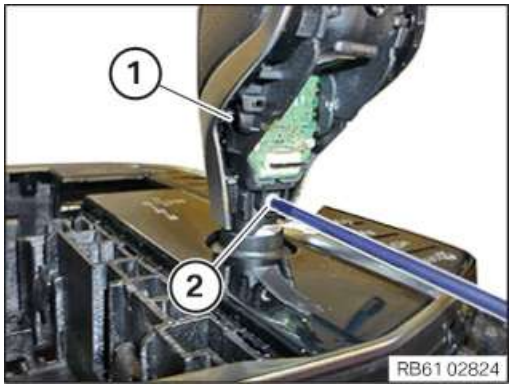
- Fasten the wrist cuff to the wrist or to the striker (2) using clamp (1).



- Lever out trim (1) with the special tool 0 493 681 (64 1 020) on both sides of the selector lever (2).



- Unlock the plug connection (1) in the direction of arrow.
- Thread out the ribbon cable (2).



- Loosen screw (2).
- Remove selector lever (1) upwards.

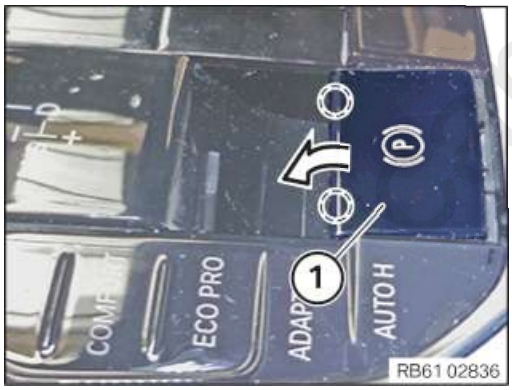
9 – Removing trims on the operating facility in the centre console

RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.

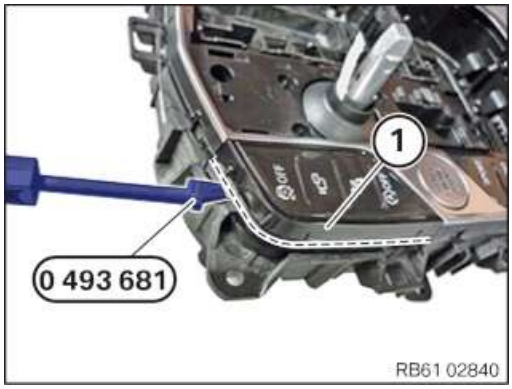


- Press the parking brake button trim (1) forwards and downwards in the direction of arrow.

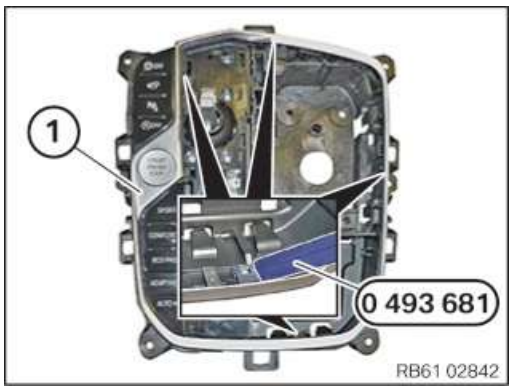
Note: The parking brake button trim can be loosened by pressing vigorously out of the catch mechanisms.



- Lever out the trim (2) with the special tool 0 493 681 (64 1 020).



- Lever out the trim (1) with the special tool 0 493 681 (64 1 020).



- Lever out the trim (1) with special tool 0 493 681 (64 1 020) at the marked positions.

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10 – Replacing the START-STOP button trim

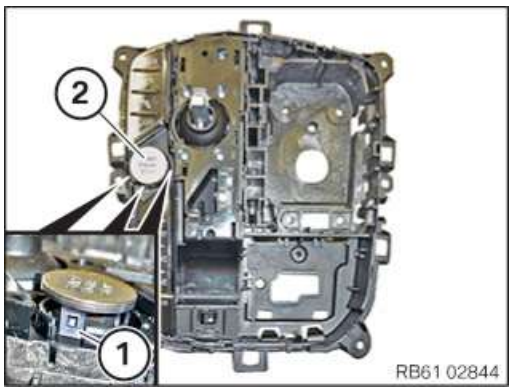
▸ **Remove the START-STOP button trim**

RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.



- Release all the latch mechanisms (1) and remove the trim (2) of the START-STOP button.

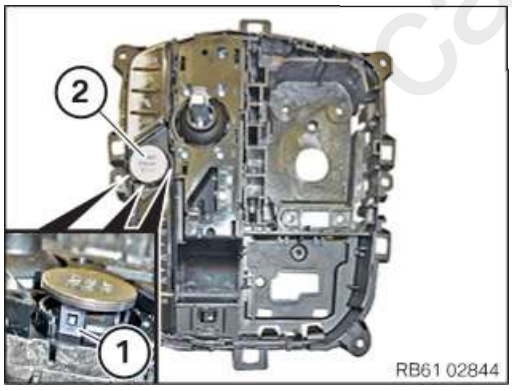
▸ **Installing the START-STOP button cover**

RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.



- Position trim (2) on the START-STOP button and engage it.

  All retaining lugs (1) must engage audibly.

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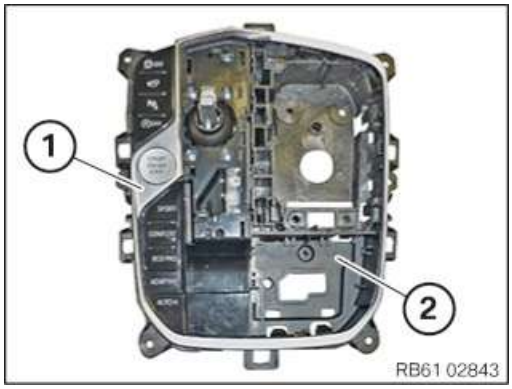
11 – Installing trims on the operating facility in the centre console

RISK OF DAMAGE

Damage of high-quality surfaces.

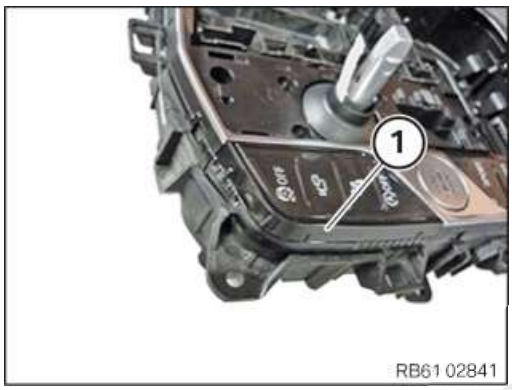
Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.



- Position trim (1) on the operating unit in the centre console (2) and clip into place.

  All retaining lugs must engage audibly.

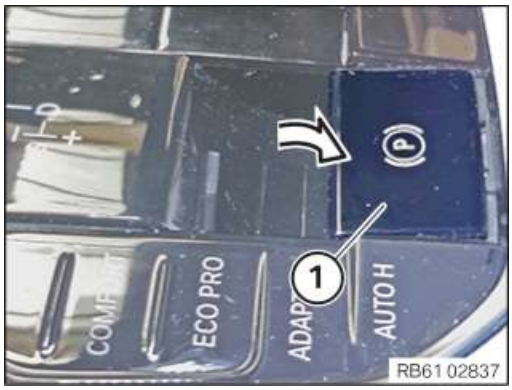


- Position and clip in trim (1).



- Position trim (1) on the operating facility in the centre console (2) and engage it.

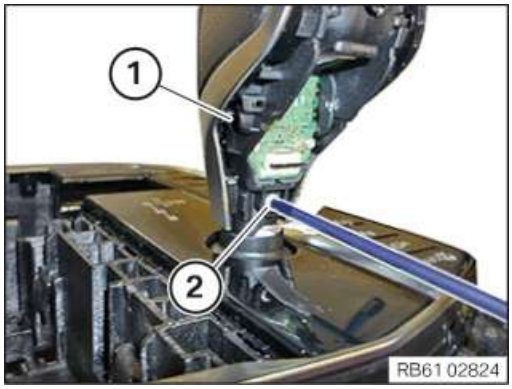
  All retaining lugs must engage audibly.



- Lock the trim (1) for the parking brake button and in the direction of the arrow.

  The trim of the parking brake button (1) must lock audibly.

12 – Installing the selector lever

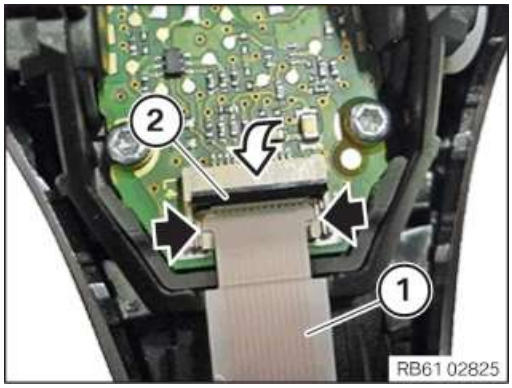


- Position the selector lever (1).
- Renew the screw (2).

  Parts: Screw
- Tighten down screw (2).

Selector lever on gear selector switch

Screw	Renew screw.	Tightening torque	0,8 Nm



- Position the ribbon cable (1) on selector lever (arrow).
- Lock the connector (2) in the direction of the arrow.

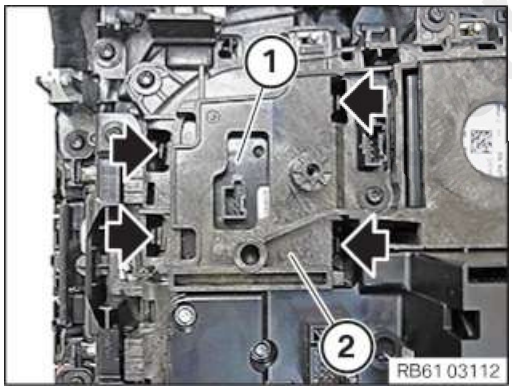


- Renew the trim (1).

  Parts: trim
- Position the trim (1) on the selector lever (2) and lock.

  Retaining lugs must audibly snap into place.

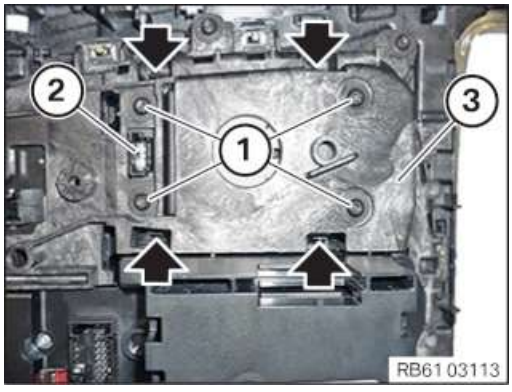
13 – Installing the HDC button



- Position the HDC button (1) on the gear selector switch (2).

  The latch mechanisms (arrows) must engage audibly.

14 – Install controller



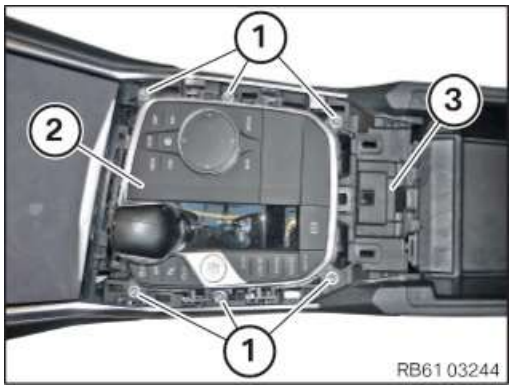
- Position the controller (2) on gear selector switch (GWS) (3) and engage in the latch mechanisms (arrow).
- Tighten the screws (1).

Controller to gear selector switch

Screw		Tightening torque	1,8 Nm

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15 – Install the operating facility in the centre console



- Position the operating facility (2) in the centre console (3).
- Tighten the screws (1).

Gear selector switch to centre console trim

Screw		Tightening torque	1,8 Nm

▸ **Connecting all battery earth leads**



- See additional information.

▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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

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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

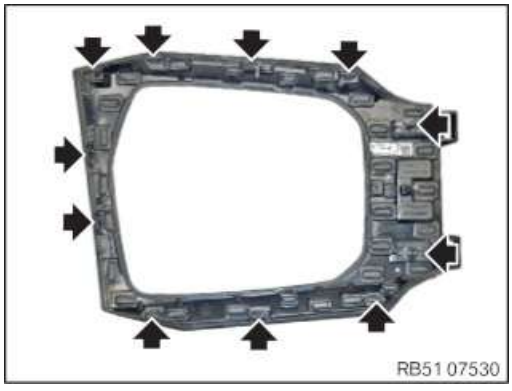
16 – Installing the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



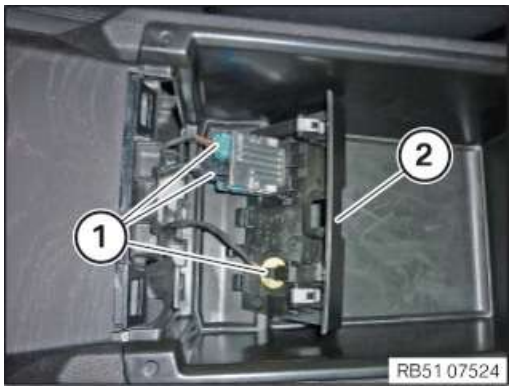
- Check all the latch mechanisms or clamps (arrows).
- In case the latch mechanisms or the clamps (arrows) are faulty, renew the centre console trim .

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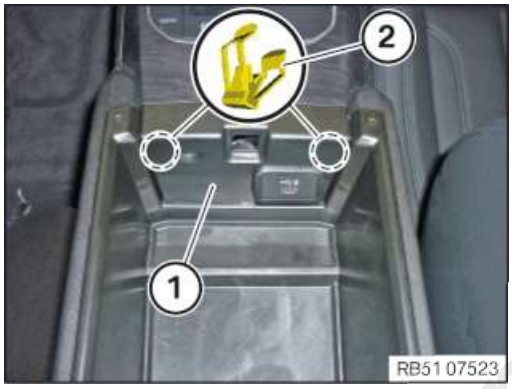


- Correctly position the centre console trim (1) and engage at the latch mechanisms.

17 – Installing the trim in the storage compartment of the centre armrest



- Mount the trim (2) and connect connector (1) and lock.



- Correctly position trim (1) and snap into the clamps (2).

18 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

19 – Connecting all battery earth leads



- See additional information.

20 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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



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

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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Selector lever on gear selector switch Used in step 12

Screw	Renew screw.	Tightening torque	0,8 Nm

Controller to gear selector switch Used in step 14

Screw		Tightening torque	1,8 Nm

Gear selector switch to centre console trim Used in step 15

Screw		Tightening torque	1,8 Nm

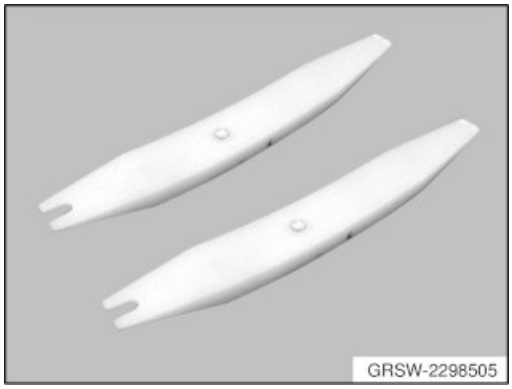
Negative battery cable to 48-V battery Used in step 1520

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

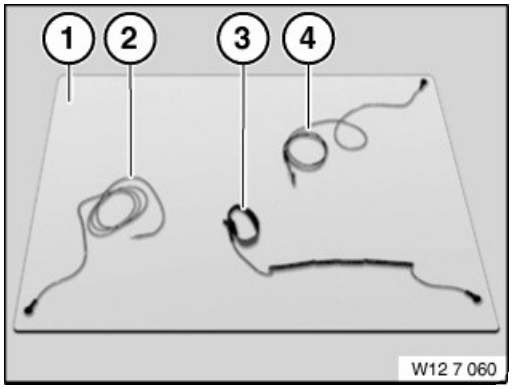
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2 298 505 Wedge



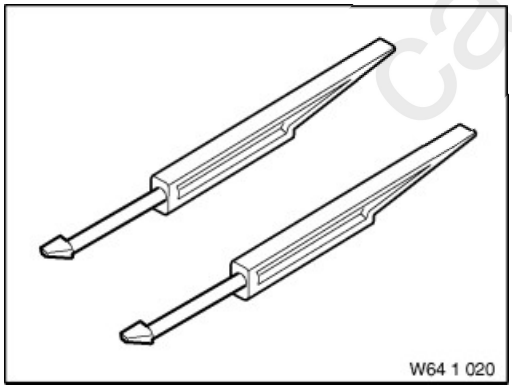
Common	Used in step 34
Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

0 495 054 (12 7 060) Antistatic mat



Common	Used in step 8
Usage	(Antistatic mat) ESD (Electronic Static Discharge) = electrostatic discharge For protection against ESD during repairs to electronic components. (Replaces the sub-number 12 7 192 from Eprom tool kit 12 7 190)
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	02 06 04 (128)

0 493 681 (64 1 020) Hook



Common	Used in step 89
Usage	(release hook) For releasing and removing fresh air grille. For removing various covers.
Included in the tool or work	
Storage location	C2
Replaced by	
In connection with	
SI-Number	01 15 99 (483)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	151520

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251519
61 20 900 Disconnecting and connecting battery earth lead	251519

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61 20 900 Disconnecting and connecting battery earth lead	251519
61 20 900 Disconnecting and connecting battery earth lead	251519
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251519
61 20 900 Disconnecting and connecting battery earth lead	251519
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251519
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	251519
61 20 900 Disconnecting and connecting battery earth lead	251519
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61 20 900 Disconnecting and connecting battery earth lead	251519
61 20 900 Disconnecting and connecting battery earth lead	251519

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61 20 900 Disconnecting and connecting battery earth lead	251519
61 35 ... Notes on ESD protection (Electro Static Discharge)	8
61 35 ... Notes on ESD protection (Electro Static Discharge)	8

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61 31 513 Replacing steering column switch cluster

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.

Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.

For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Adjust the steering column position



- Adjust the length of the steering column to the maximum length in the direction of arrow (1).
- Move the steering column to the lowest steering column position in the direction of arrow (2).

2 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

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WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

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

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

desired state

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

Result

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

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Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

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

3 – Disconnecting all battery earth leads



- See additional information.

4 – Removing the airbag unit

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▸ **Removing the airbag unit for sports steering wheel**



- Insert Torx screwdriver T25 (1) diagonally upwards in the hidden opening (2) on the rear side of the steering wheel until a spring resistance is felt.

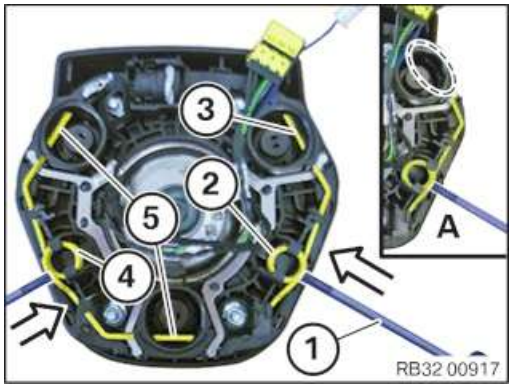
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NOTICE

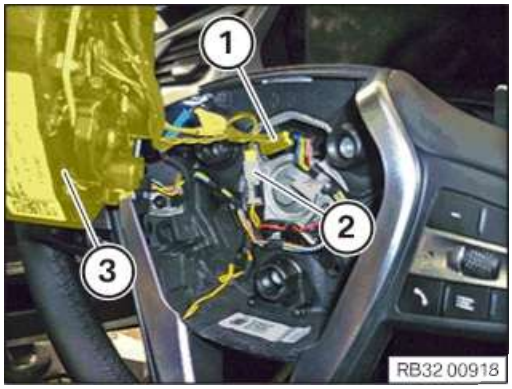
To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press Torx screwdriver T25 (1) diagonally upwards in the direction of the arrow to the centre of the steering wheel.



- Press the airbag unit over a large area of the steering wheel.
- Use Torx screwdriver T25 (1) to press wire spring clip (2) in the direction of the arrow towards the centre of the steering wheel and release lock (3).

  (A): Wire spring clip (2) is unlocked.
- Press wire spring clip (4) with Torx screwdriver T25 (1) in the direction of the arrow towards the centre of the steering wheel and release locks (5).
- Carefully raise the airbag unit.



- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

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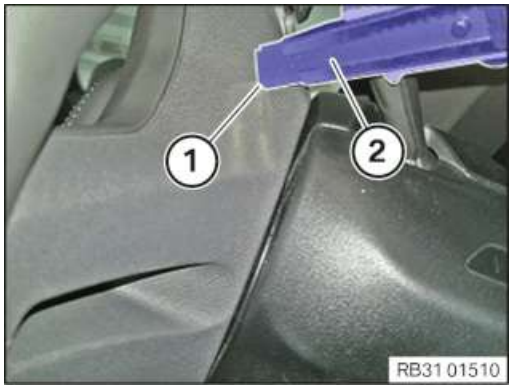
▸ Removing the airbag unit for M Sport steering wheel



NOTICE

Perform the operations on the left and right side.

- Locate the mark (1) for unlocking the airbag unit on the steering wheel by touching it.



NOTICE

Perform the operations on the left and right side.

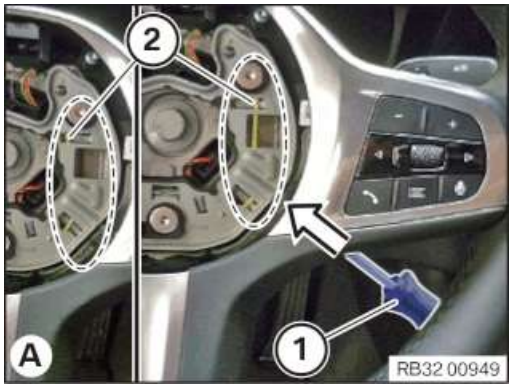
- Cut the mark (1) carefully with a knife (2) to an approx. length of 4 mm .



TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

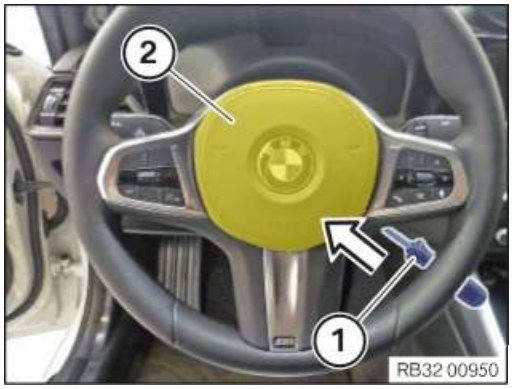
- In case of vehicles with shift paddles (2) made of carbon-fibre-reinforced plastic, use a Torx socket T15 (1) for unlocking the airbag unit.



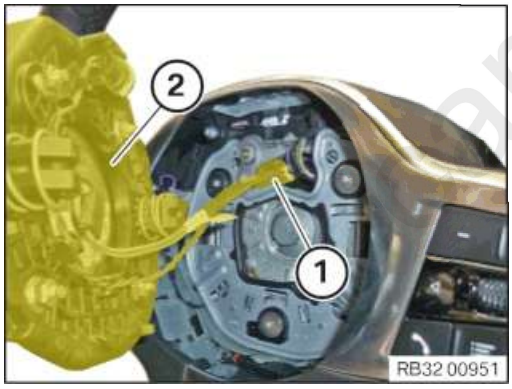
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- Insert the Torx socket T15 (1) diagonally upwards until a resilient resistance is felt.
- Press in Torx socket T15(1) straight in the direction of arrow towards the centre of the steering wheel in order to unlock the wire spring clip (2) or to unlock the airbag unit (A).



- Press in Torx screwdriver T15 (1) straight in direction of arrow towards the centre of the steering wheel and lift the airbag unit (2) on the unlocked side.
- Repeat procedure on left side and carefully release airbag unit (2) from the steering wheel.



- Unlock and disconnect the plug connection (1) and remove the airbag unit (2).

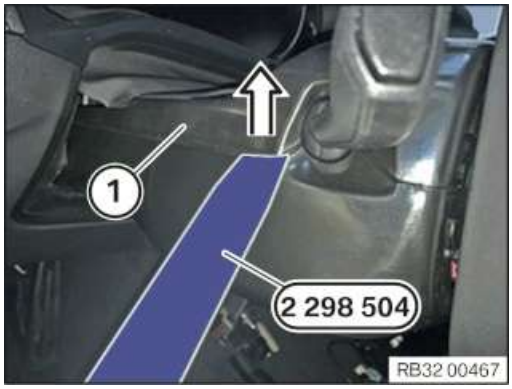
5 – Remove sports steering wheel



- Move the steering wheel and wheels to the straight-ahead position.
- Unlock plug connection (1) and disconnect.
- If installed: Unlock plug connection (2) and disconnect.
- Release the screw (3) and pull off and remove the steering wheel.

6 – Removing steering column shroud upper section

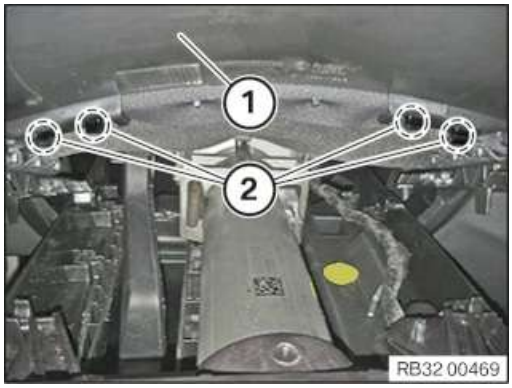
ardiagn.com



NOTICE

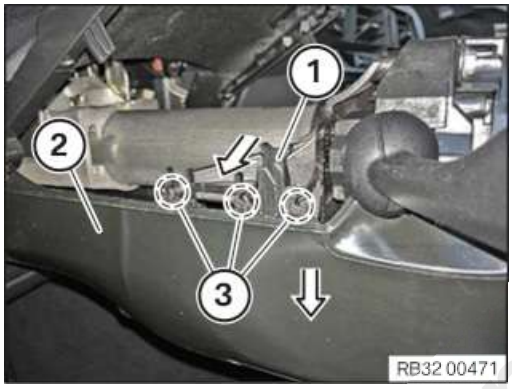
Perform the operations on the left and right side.

- Unlock the steering column shroud upper section (1) with the special tool 2 298 504 and fold up.



- Unclip the steering column shroud upper section (1) from the brackets (2).
- Remove the steering column shroud upper section (1).

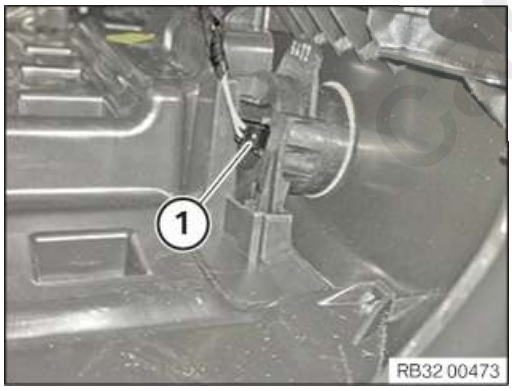
7 – Removing steering column shroud lower section



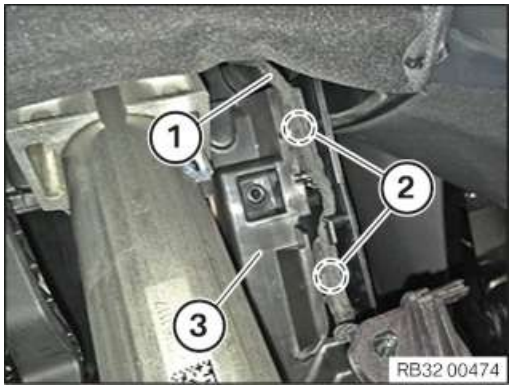
NOTICE

Perform the operations on the left and right side.

- Push the retaining lug (1) to the outside in the direction of the arrow and unclip the steering column shroud lower section (2) from the holders (3) in the direction of the arrow to the bottom at the same time.



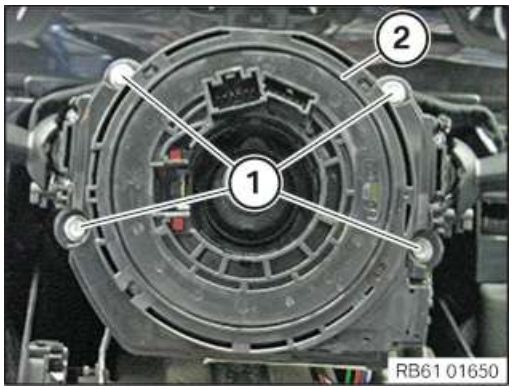
- Fold the steering column shroud lower section down.
- Unlock and disconnect connector (1).



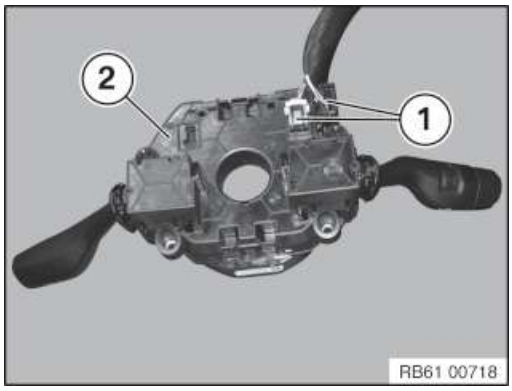
- Detach the cable (1) from the brackets (2).
- Remove the steering column shroud lower section (3).

carlion.com

8 – Removing the steering column switch cluster (SZL)

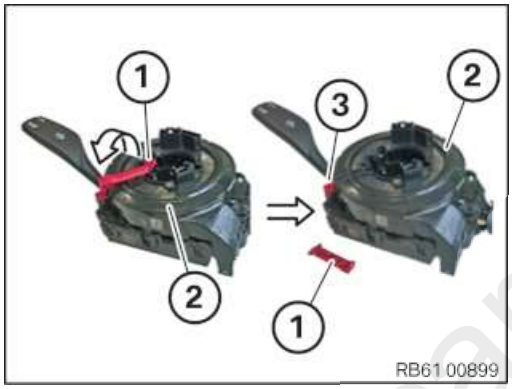


- Loosen screws (1).
- Remove the steering column switch cluster (SZL) (2).



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

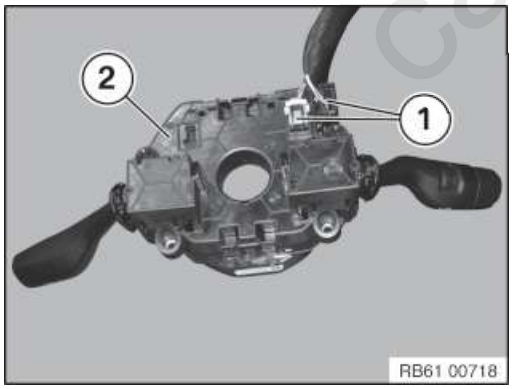
9 – Installing the steering column switch cluster (SZL)



- **Replacement:**

  Break off the transportation retainer (1) on the steering column switch cluster (SZL) (2) in direction of arrow.

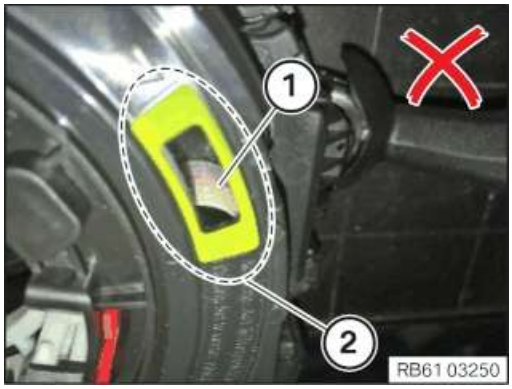
  The broken off piece (3) of the transportation retainer (1) remains in the steering column switch cluster (SZL) (2).



- Connect the connector (1) with the steering column switch cluster (SZL) (2).

Check

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- **Version A:**

  Check whether the correct marking (1) is seen in inspection glass (2).

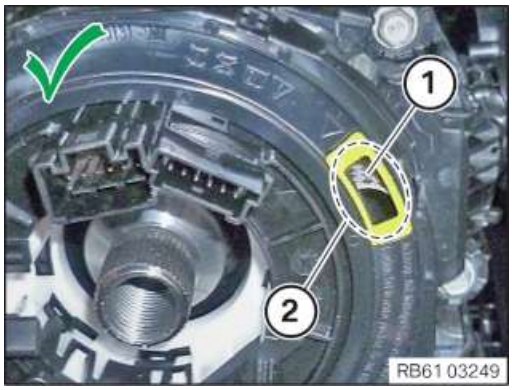
Result

» Ensure that no incorrect marking (1) is seen in inspection glass (2).

Measure

- Turn the coil spring cassette until the right mark (1) becomes visible in the inspection glass (2).

Check



- **Version A:**

  Check whether the correct marking (1) is seen in inspection glass (2).

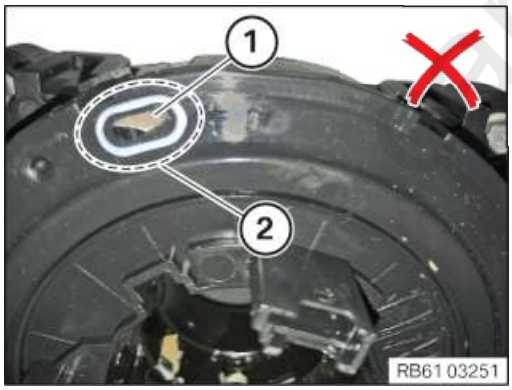
Result

» Correct marking (1) is seen in inspection glass (2).

Measure

- Continue with the next step.

Check



- **Version B:**

  Check whether the correct marking (1) is seen in inspection glass (2).

Result

» Ensure that no incorrect marking (1) is seen in inspection glass (2).

Measure

- Turn the coil spring cassette until the right mark (1) becomes visible in the inspection glass (2).

Check

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- **Version B:**

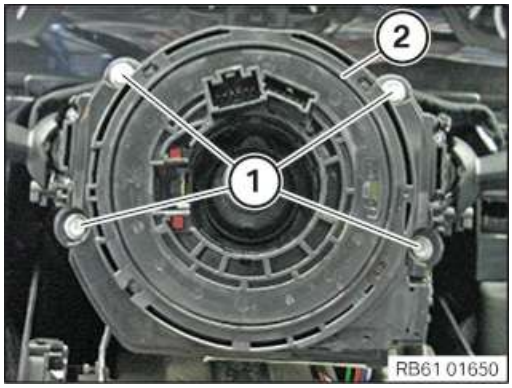
  Check if the correct mark (1) can be seen in the inspection glass (2).

Result

» Correct marking (1) is seen in inspection glass (2).

Measure

- Continue with the next work step.



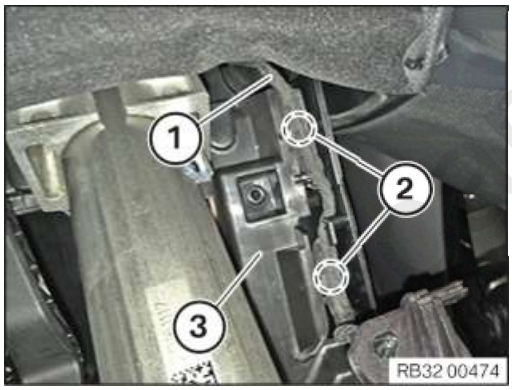
- Position the steering column switch cluster (SZL) (2).
- Tighten the screws (1).

Steering column switch cluster (SZL) on the steering column

Screw TS5x20		Tightening torque	3 Nm

POSTPROCESSES

10 – Install steering column shroud lower section

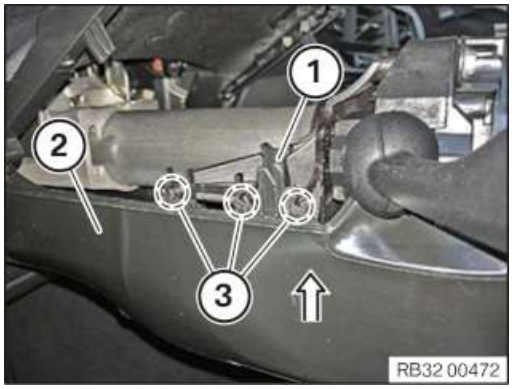


- Position the steering column shroud lower section (3).
- Secure the line (1) on the brackets (2).



- Connect the connector (1).

.com

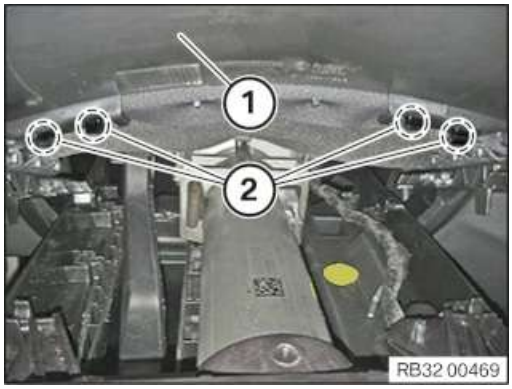


NOTICE

Perform the operations on the left and right side.

- Align the steering column shroud lower section (2) to the steering column using the retaining lug (1).
- Push the steering column shroud lower section (2) up in the direction of the arrow until the brackets (3) engage.

11 – Fit steering column shroud upper section



- Clip in the steering column shroud upper section (1) at the brackets (2).



NOTICE

Perform the operations on the left and right side.

- Clip in the steering column shroud upper section (1)into the guide (2).



NOTICE

Perform the operations on the left and right side.

- Press the upper section of the steering column shroud (1) downwards in direction of arrow.

  The upper section of the steering column shroud must engage audibly and perceptibly.

12 – Installing the sports steering wheel

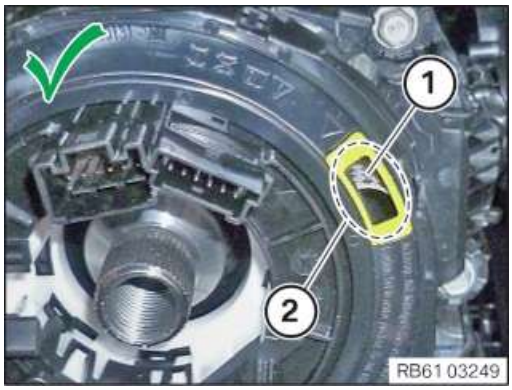
▸ **Check the neutral position of the clock spring**

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▹ **Version A: Checking the visibility of the marking on the coil spring**

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Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁

▷ **Version B: Checking the visibility of the marking on the coil spring**



Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁



Check

- Check if a microencapsulated screw (3) is installed.

Result

» Screw (3) is micro-encapsulated.

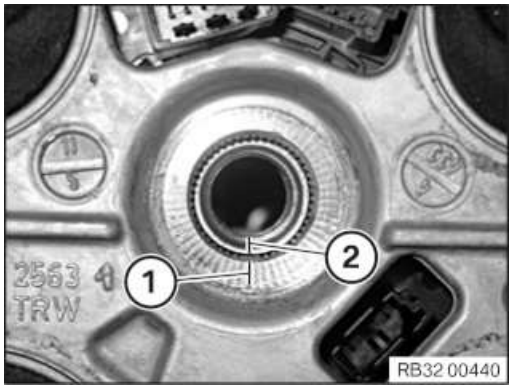
cardiagn.com

Measure

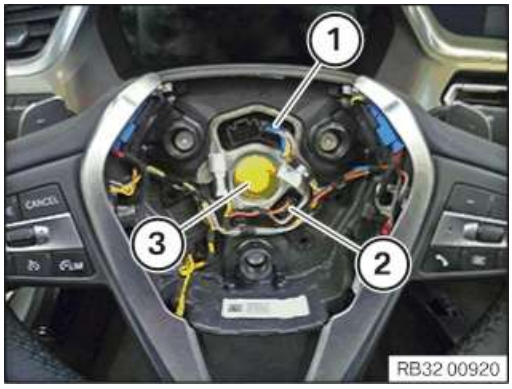
- Clean thread in the steering column.

  Renew the screw (3).

  Parts: Screw



- Align mark (1) on steering wheel to mark (2) on steering column.
- Connect steering wheel.



- Connect connectors (1) and lock.
- If installed: Connect connectors (2) and lock.
- Tighten screw (3) .

Steering wheel to steering column

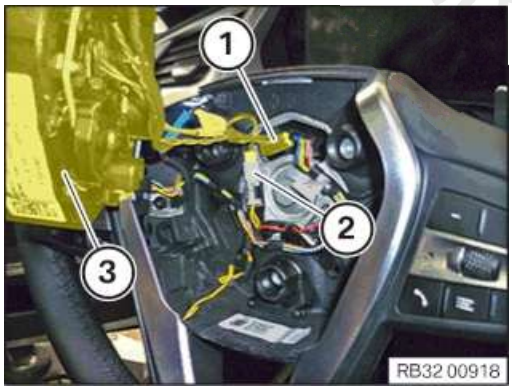
M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

13 – Installing the airbag unit

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▸ **Installing the airbag unit for the sports steering wheel**



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

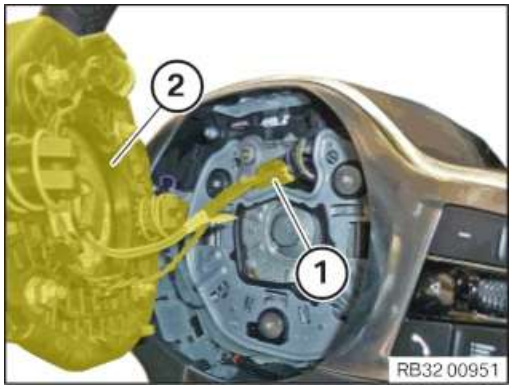
  The airbag unit (1) must engage audibly and perceptibly.

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▸ **Installing the airbag unit for M Sport steering wheel**

TECHNICAL INFORMATION

After replacing the airbag unit (M sport steering wheel) or after a possible conversion of standard steering wheel and airbag unit to M-sports steering wheel, a software update or a programming/encoding via ISTA must be performed!



- Connect and lock the connector (1) of the airbag unit (2).



- Press the airbag unit further (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

14 – Connecting all battery earth leads



- See additional information.

15 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

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

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

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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

16 – Checking the airbag for function

Check

- Turn steering wheel in both directions to the limit position.

Result

» The airbag indicator light lights up.

Measure

- Renew the coil spring cassette.

Additional Information

Overview of Tightening Torques

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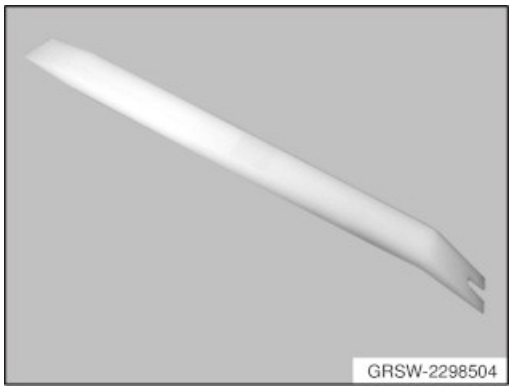
Steering column switch cluster (SZL) on the steering column			Used in step 9
Screw TS5x20		Tightening torque	3 Nm

Steering wheel to steering column			Used in step 12
M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

Negative battery cable to 48-V battery			Used in step 15
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

2 298 504 Wedge



Common		Used in step 6
Usage	Wedge with angled lug	
Included in the tool or work		
Storage location	C34	
Replaced by		
In connection with		
SI-Number	01 03 12 (792)	

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	215

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	4

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	314
61 20 900 Disconnecting and connecting battery earth lead	314
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	314
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting battery earth lead	314
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting battery earth lead	314
61 20 900 Disconnecting and connecting battery earth lead	314

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61 31 704 Replacing the centre console operating facility

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

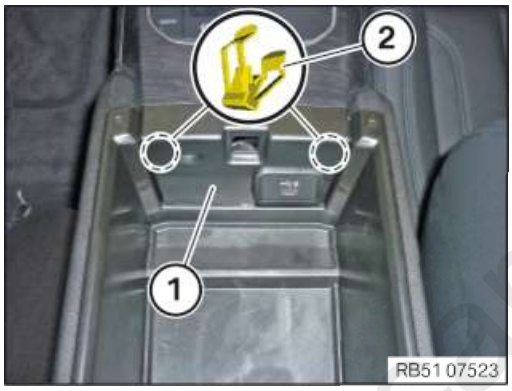
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads

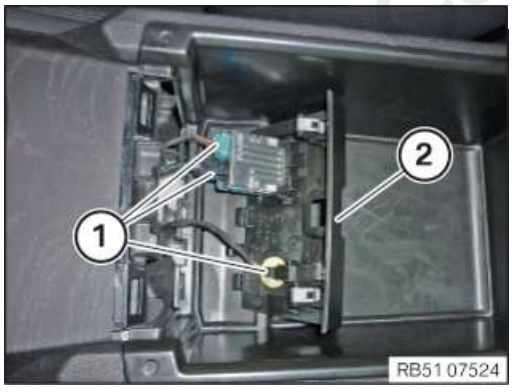


- See additional information.

3 – Removing the trim in the storage compartment on the centre armrest



- Lever out the trim (1) with the special tool (2) toward the rear from the clamps 2 298 505.



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

4 – Remove the centre console trim

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RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



- Release and remove the centre console trim upwards (1) as shown using the special tool 2 298 505 from the latch mechanisms.

MAIN WORK

5 – Remove the operating facility in the centre console

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

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

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RISK OF DAMAGE

Damage to 48-V battery

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

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

TECHNICAL INFORMATION

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



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

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

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

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

desired state

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

Result

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

Measure

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

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

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

Result

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

Measure

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

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



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



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



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

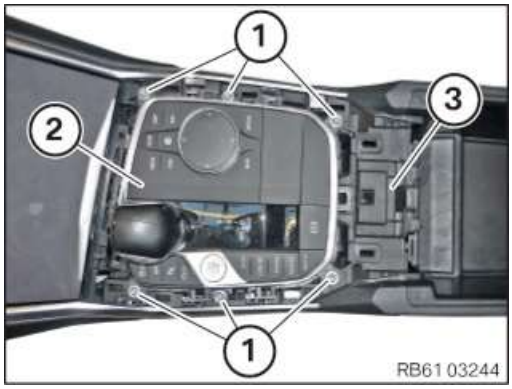
- Cover the vehicle battery.

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

▸ **Disconnecting all battery earth leads**

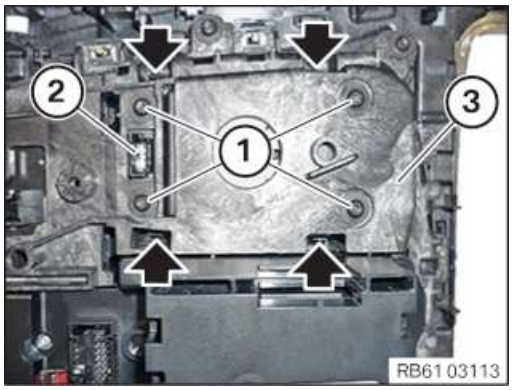


- See additional information.



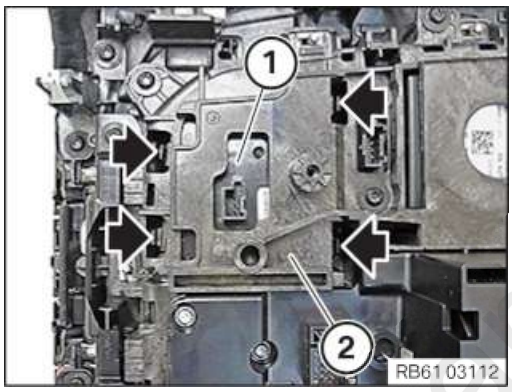
- Loosen screws (1).
- Remove the operating facility in the centre console (2) from the centre console (3).

6 – Remove controller



- Loosen screws (1).
- Release the latch mechanisms (arrows).
- Remove controller (2) from the gear selector switch(GWS) (3).

7 – Removing the HDC button



- Release the latch mechanisms (arrows).
- Remove the HDC button (1) from the gear selector switch (2).

8 – Removing the selector lever

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

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

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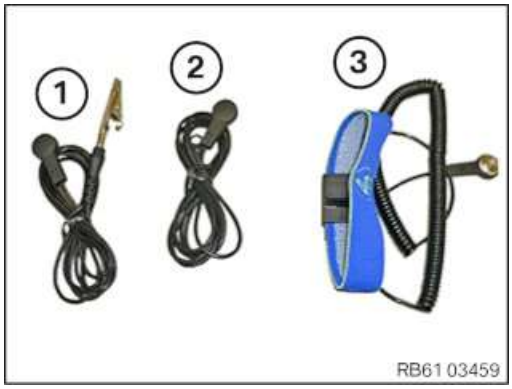
RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

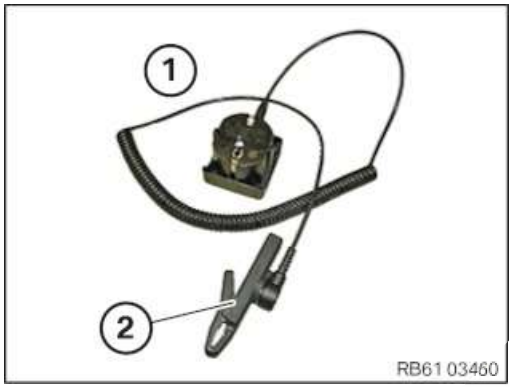
- Protect surfaces from damage.

▸ **Preventing control unit damage caused by electrostatic discharge**



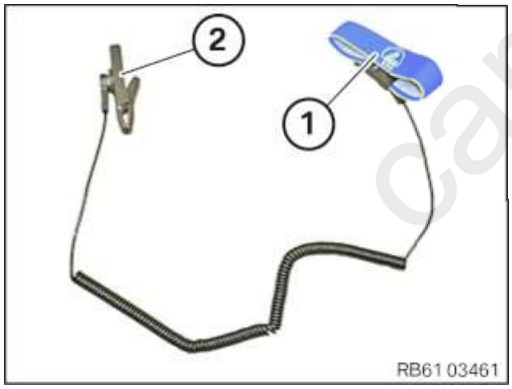
- Have the special tool (3) from the set of special tools 0 495 054 (12 7 060) ready.

The set of special tools consists of:
1. Earth cable for the antistatic mat
2. Earth cable for the component
3. Wrist cuff



- Have the special tool (2) from the set of special tools ready.

The set of special tools consists of:
1. Earth cable
2. Terminal

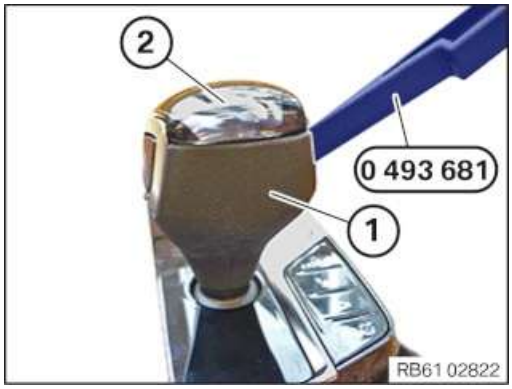


- Connect the wrist cuff (1) with the clamp (2).



- Fasten the wrist cuff to the wrist or to the striker (2) using clamp (1).

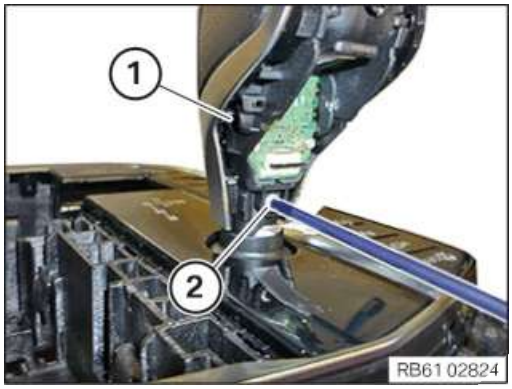
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- Lever out trim (1) with the special tool 0 493 681 (64 1 020) on both sides of the selector lever (2).

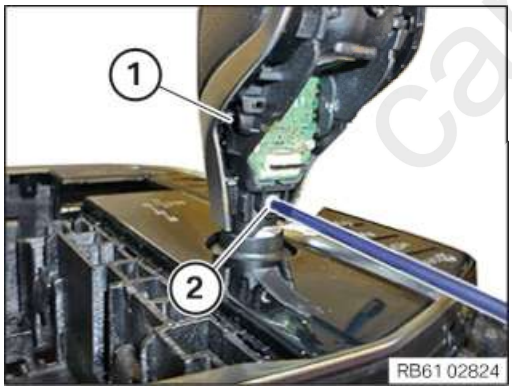


- Unlock the plug connection (1) in the direction of arrow.
- Thread out the ribbon cable (2).



- Loosen screw (2).
- Remove selector lever (1) upwards.

9 – Installing the selector lever

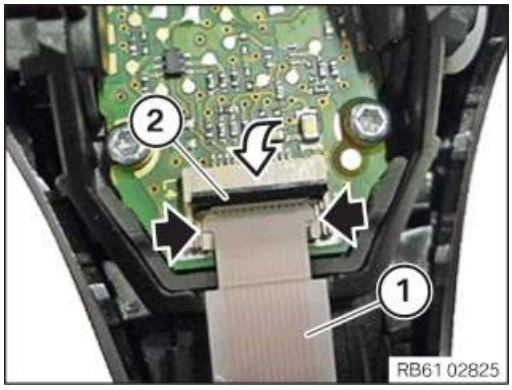


- Position the selector lever (1).
- Renew the screw (2).

  Parts: Screw
- Tighten down screw (2).

Selector lever on gear selector switch

Screw	Renew screw.	Tightening torque	0,8 Nm



- Position the ribbon cable (1) on selector lever (arrow).
- Lock the connector (2) in the direction of the arrow.

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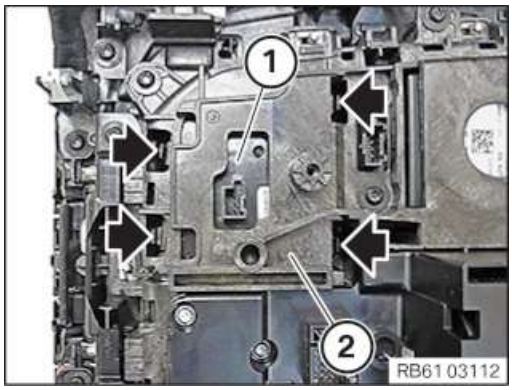


- Renew the trim (1).

  Parts: trim
- Position the trim (1) on the selector lever (2) and lock.

  Retaining lugs must audibly snap into place.

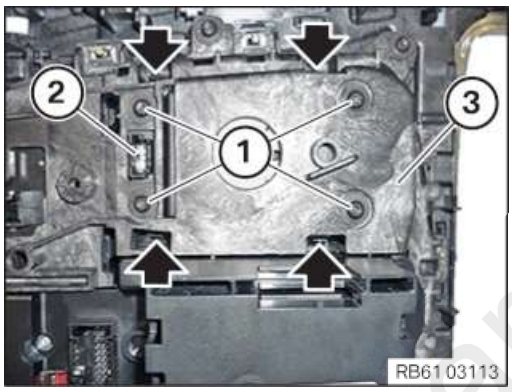
10 – Installing the HDC button



- Position the HDC button (1) on the gear selector switch (2).

  The latch mechanisms (arrows) must engage audibly.

11 – Install controller

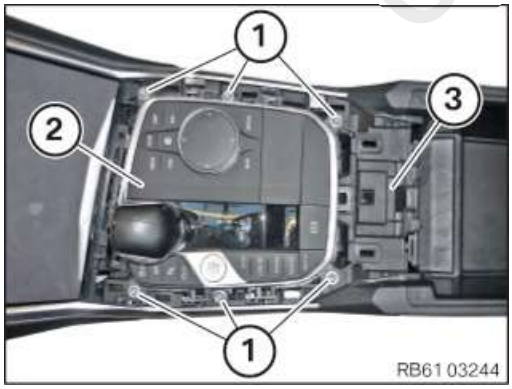


- Position the controller (2) on gear selector switch (GWS) (3) and engage in the latch mechanisms (arrow).
- Tighten the screws (1).

Controller to gear selector switch

Screw		Tightening torque	1,8 Nm

12 – Install the operating facility in the centre console



- Position the operating facility (2) in the centre console (3).
- Tighten the screws (1).

Gear selector switch to centre console trim

Screw		Tightening torque	1,8 Nm

▸ **Connecting all battery earth leads**

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- See additional information.

▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

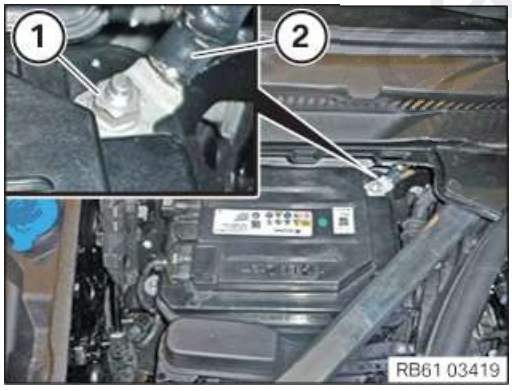
Damage to 48-V battery

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

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



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



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

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



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



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

  The activation takes place automatically.

POSTPROCESSES

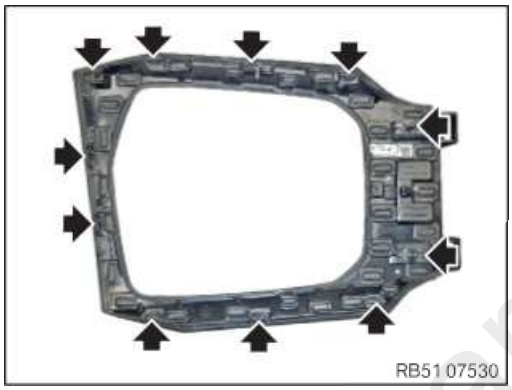
13 – Installing the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

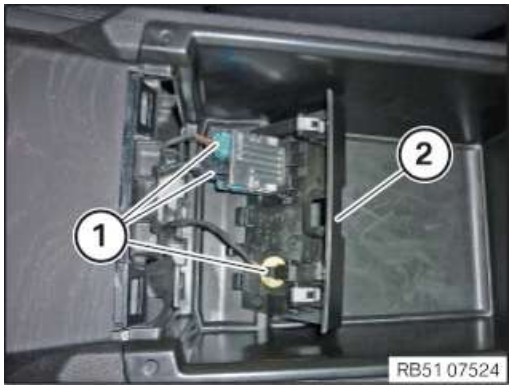


- Check all the latch mechanisms or clamps (arrows).
- In case the latch mechanisms or the clamps (arrows) are faulty, renew the centre console trim .

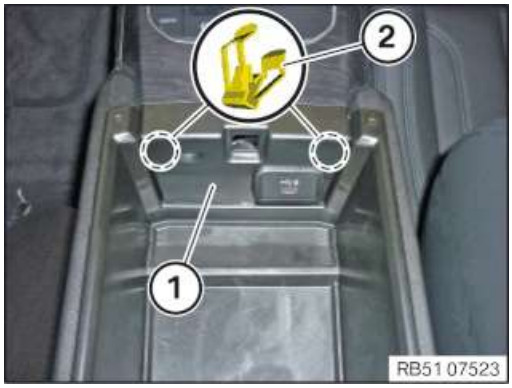


- Correctly position the centre console trim (1) and engage at the latch mechanisms.

14 – Installing the trim in the storage compartment of the centre armrest



- Mount the trim (2) and connect connector (1) and lock.



- Correctly position trim (1) and snap into the clamps (2).

15 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

- 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.

16 – Connecting all battery earth leads

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16 – Connecting all battery earth leads



- See additional information.

17 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

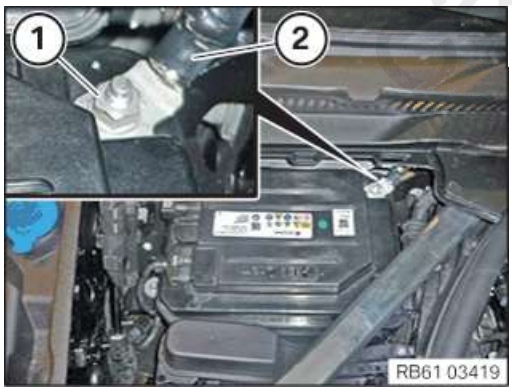
Damage to 48-V battery

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

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



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).

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- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Selector lever on gear selector switch — Used in step 9

Screw	Renew screw.	Tightening torque	0,8 Nm

Controller to gear selector switch — Used in step 11

Screw		Tightening torque	1,8 Nm

Gear selector switch to centre console trim — Used in step 12

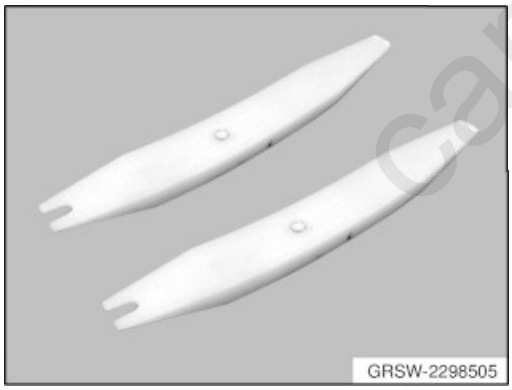
Screw		Tightening torque	1,8 Nm

Negative battery cable to 48-V battery — Used in step 1217

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

2 298 505 Wedge

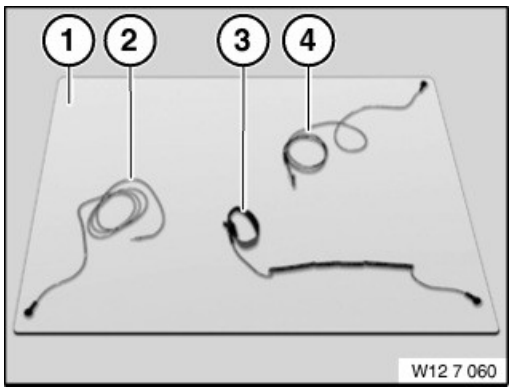


Common — Used in step 34

Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

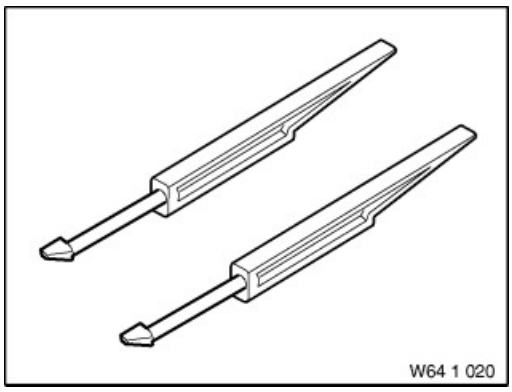
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0 495 054 (12 7 060) Antistatic mat



Common	Used in step 8
Usage	(Antistatic mat) ESD (Electronic Static Discharge) = electrostatic discharge For protection against ESD during repairs to electronic components. (Replaces the sub-number 12 7 192 from Eprom tool kit 12 7 190)
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	02 06 04 (128)

0 493 681 (64 1 020) Hook



Common	Used in step 8
Usage	(release hook) For releasing and removing fresh air grille. For removing various covers.
Included in the tool or work	
Storage location	C2
Replaced by	
In connection with	
SI-Number	01 15 99 (483)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	151217

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251216
61 20 900 Disconnecting and connecting battery earth lead	251216
61 20 900 Disconnecting and connecting battery earth lead	251216
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61 20 900 Disconnecting and connecting battery earth lead	251216
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251216
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251216
61 20 900 Disconnecting and connecting battery earth lead	251216
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251216
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	251216
61 20 900 Disconnecting and connecting battery earth lead	251216
61 20 900 Disconnecting and connecting battery earth lead	251216
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61 20 900 Disconnecting and connecting battery earth lead	251216
61 20 900 Disconnecting and connecting battery earth lead	251216
61 20 900 Disconnecting and connecting battery earth lead	251216
61 35 ... Notes on ESD protection (Electro Static Discharge)	8
61 35 ... Notes on ESD protection (Electro Static Discharge)	8

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61 31 346 Replacing trim on gear selector switch and all trim of the operating facility in the centre console

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

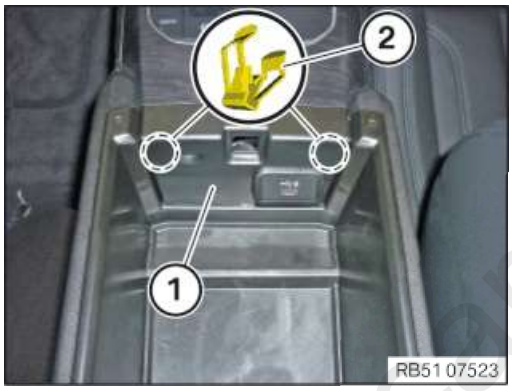
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads

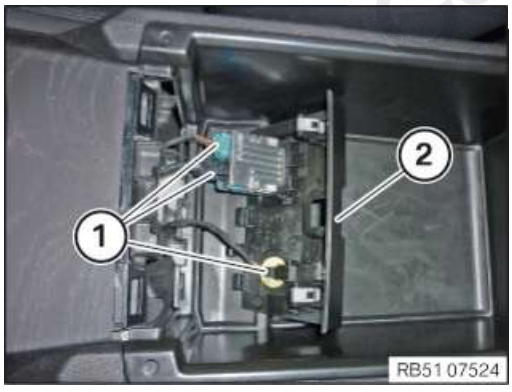


- See additional information.

3 – Removing the trim in the storage compartment on the centre armrest



- Lever out the trim (1) with the special tool (2) toward the rear from the clamps 2 298 505.



- Unlock and disconnect the plug connections (1) and remove the trim (2) .

4 – Remove the centre console trim

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RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



- Release and remove the centre console trim upwards (1) as shown using the special tool 2 298 505 from the latch mechanisms.

5 – Remove the operating facility in the centre console

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

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TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.

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- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

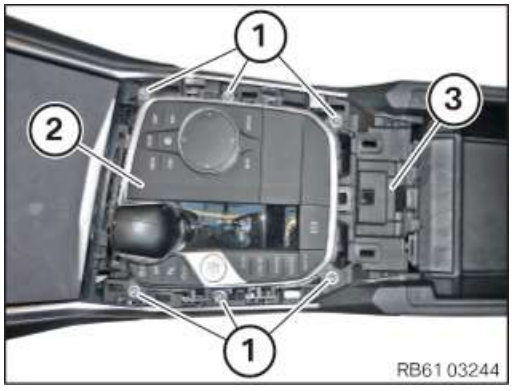
- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

▸ **Disconnecting all battery earth leads**

- See additional information.

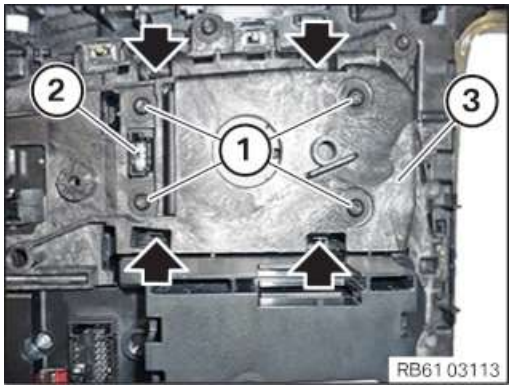




- Loosen screws (1).
- Remove the operating facility in the centre console (2) from the centre console (3).

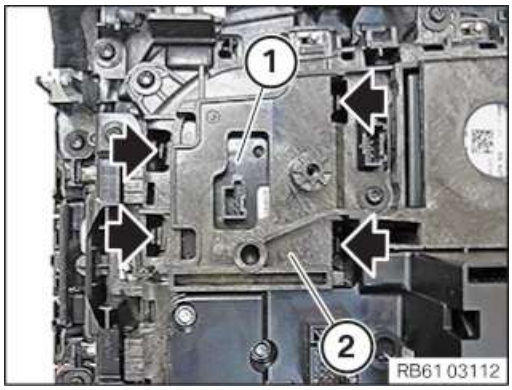
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6 – Remove controller



- Loosen screws (1).
- Release the latch mechanisms (arrows).
- Remove controller (2) from the gear selector switch(GWS) (3).

7 – Removing the HDC button



- Release the latch mechanisms (arrows).
- Remove the HDC button (1) from the gear selector switch (2).

8 – Removing the selector lever

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

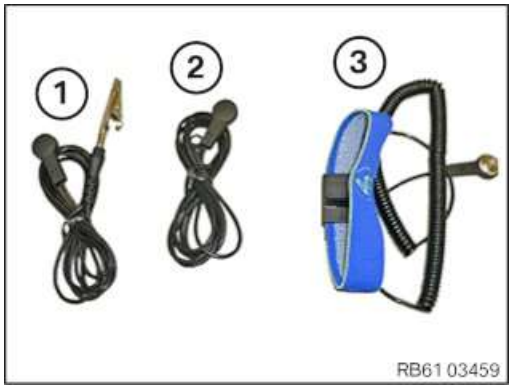
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.

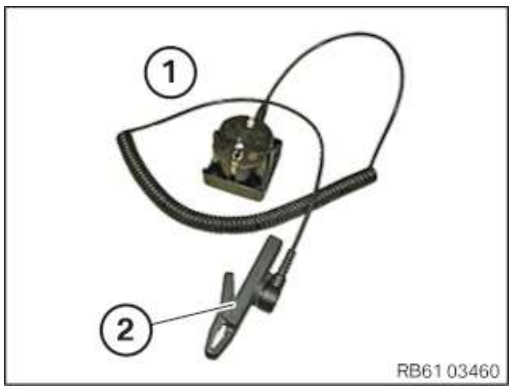
▸ **Preventing control unit damage caused by electrostatic discharge**

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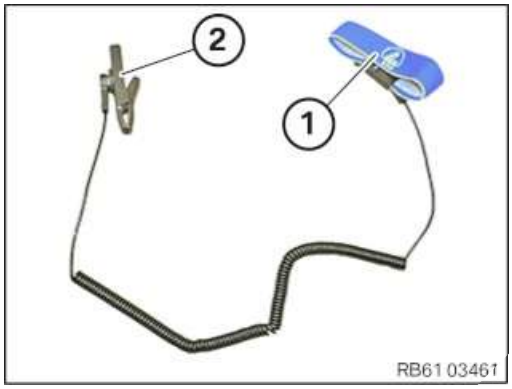
- Have the special tool (3) from the set of special tools 0 495 054 (12 7 060) ready.

The set of special tools consists of:
1. Earth cable for the antistatic mat
2. Earth cable for the component
3. Wrist cuff



- Have the special tool (2) from the set of special tools ready.

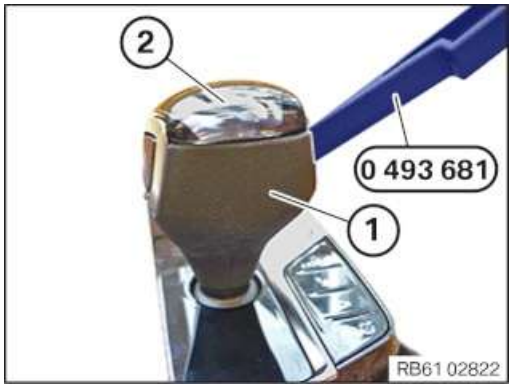
The set of special tools consists of:
1. Earth cable
2. Terminal



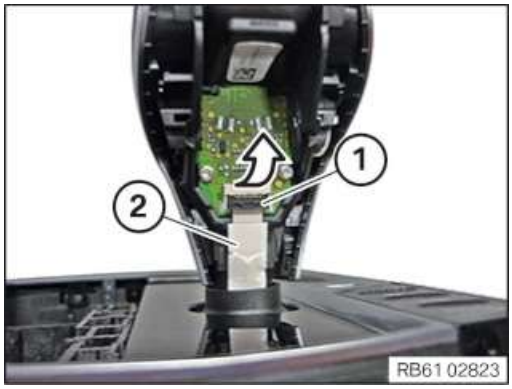
- Connect the wrist cuff (1) with the clamp (2).



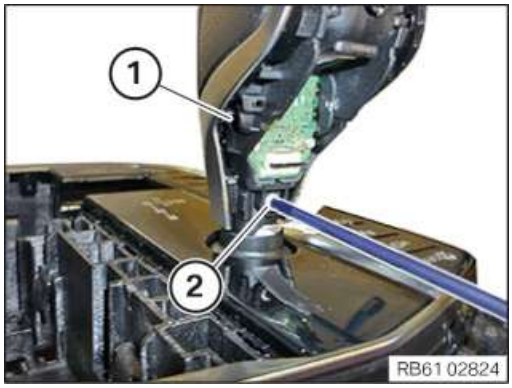
- Fasten the wrist cuff to the wrist or to the striker (2) using clamp (1).



- Lever out trim (1) with the special tool 0 493 681 (64 1 020) on both sides of the selector lever (2).



- Unlock the plug connection (1) in the direction of arrow.
- Thread out the ribbon cable (2).



- Loosen screw (2).
- Remove selector lever (1) upwards.

MAIN WORK

9 – Replacing selector lever trim

▸ **Removing selector lever trim**

RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.

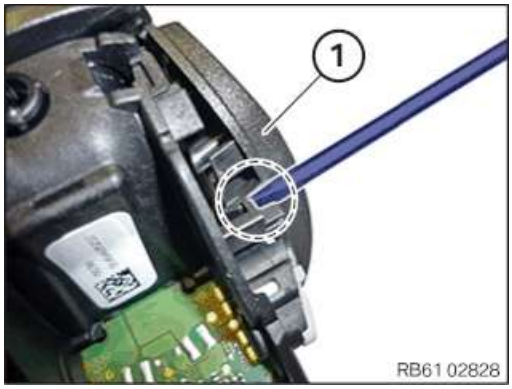
NOTICE

The operations shown only for one side must be carried out on both sides.

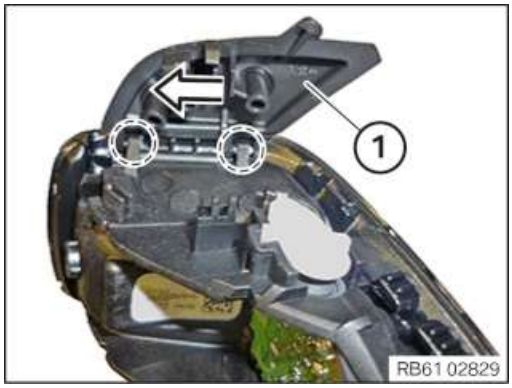


- Lever out the chrome inlay (1) with special tool 0 493 681 (64 1 020) from the selector lever (2).

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- Lever out button (1) with a flat-head screwdriver in the marked area.



- Slightly lift the button (1) and remove it in the direction of the arrow.

- Renew selector lever covers.

  Parts: Selector lever covers

▸ **Installing the selector lever trim**

RISK OF DAMAGE

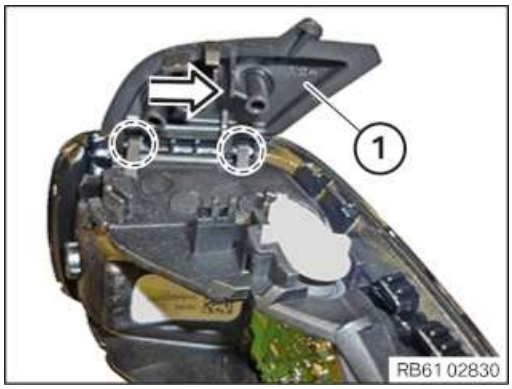
Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.

NOTICE

The operations shown only for one side must be carried out on both sides.



- Insert unlock button (1) in the area marked in the direction of the arrow.

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- Fold down unlock button (1) and clip into place in the area marked.



- Position the chrome barrette trim (1) on the selector lever (2) and clip in.

10 – Replacing trims on the operating facility in the centre console

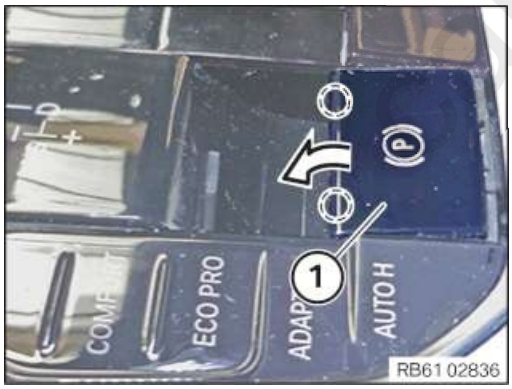
▸ Removing trims on the operating facility in the centre console

RISK OF DAMAGE

Damage of high-quality surfaces.

Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.

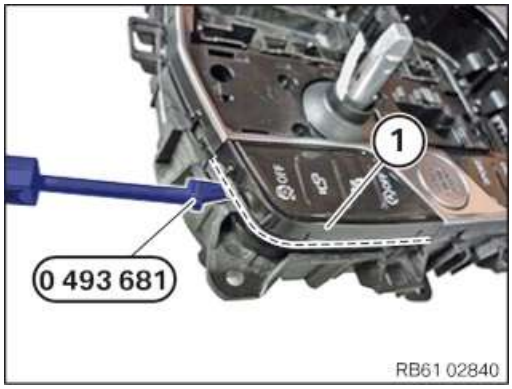


- Press the parking brake button trim (1) forwards and downwards in the direction of arrow.

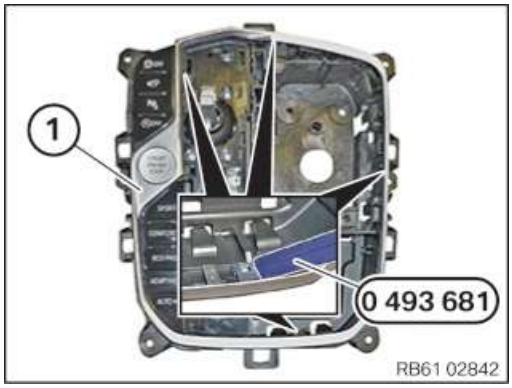
Note: The parking brake button trim can be loosened by pressing vigorously out of the catch mechanisms.



- Lever out the trim (2) with the special tool 0 493 681 (64 1 020).



- Lever out the trim (1) with the special tool 0 493 681 (64 1 020).



- Lever out the trim (1) with special tool 0 493 681 (64 1 020) at the marked positions.

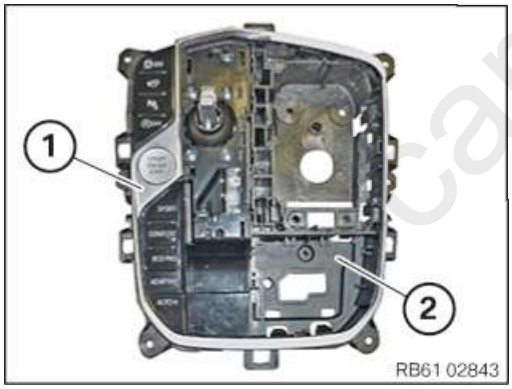
▸ **Installing trims on the operating facility in the centre console**

RISK OF DAMAGE

Damage of high-quality surfaces.

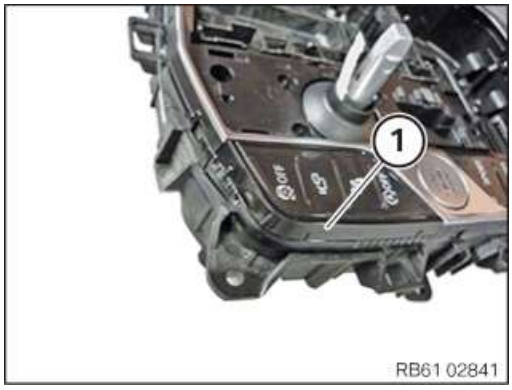
Plastic wedges can damage high-quality surfaces.

- Protect surfaces from damage.



- Position trim (1) on the operating unit in the centre console (2) and clip into place.

  All retaining lugs must engage audibly.



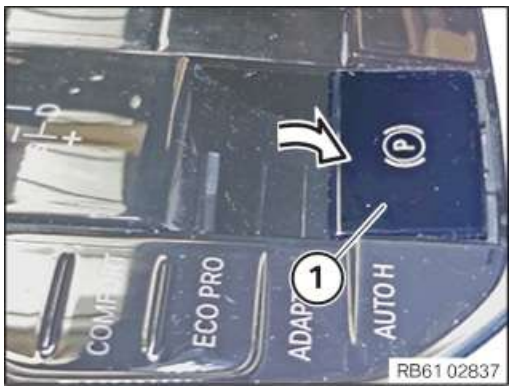
- Position and clip in trim (1).

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- Position trim (1) on the operating facility in the centre console (2) and engage it.

  All retaining lugs must engage audibly.

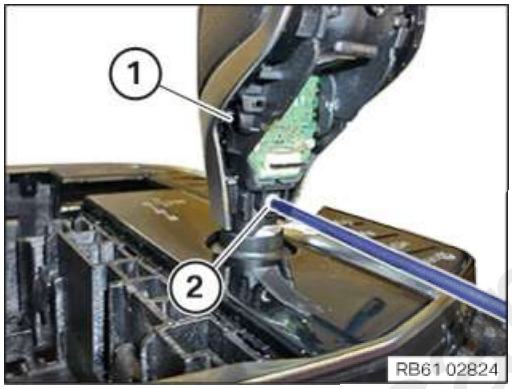


- Lock the trim (1) for the parking brake button and in the direction of the arrow.

  The trim of the parking brake button (1) must lock audibly.

POSTPROCESSES

11 – Installing the selector lever

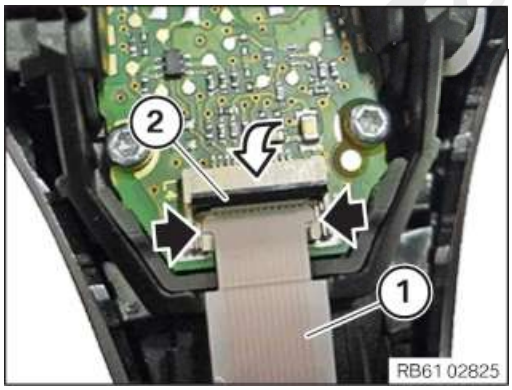


- Position the selector lever (1).
- Renew the screw (2).

  Parts: Screw
- Tighten down screw (2).

Selector lever on gear selector switch

Screw	Renew screw.	Tightening torque	0,8 Nm



- Position the ribbon cable (1) on selector lever (arrow).
- Lock the connector (2) in the direction of the arrow.

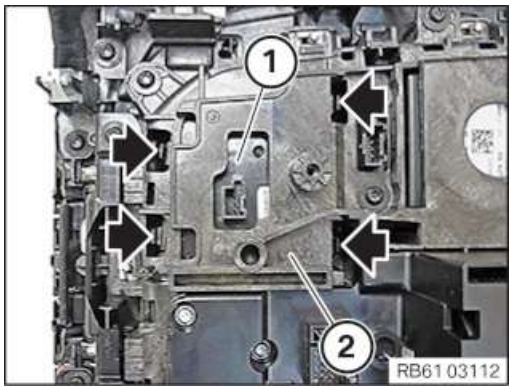


- Renew the trim (1).

  Parts: trim
- Position the trim (1) on the selector lever (2) and lock.

  Retaining lugs must audibly snap into place.

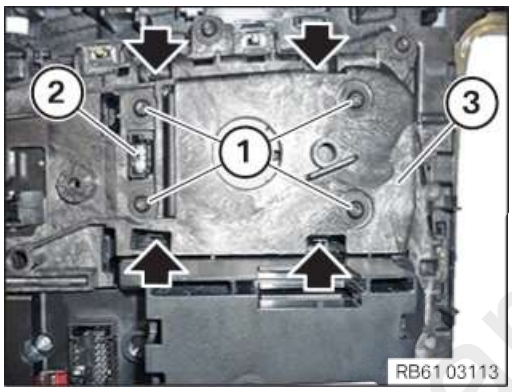
12 – Installing the HDC button



- Position the HDC button (1) on the gear selector switch (2).

  The latch mechanisms (arrows) must engage audibly.

13 – Install controller

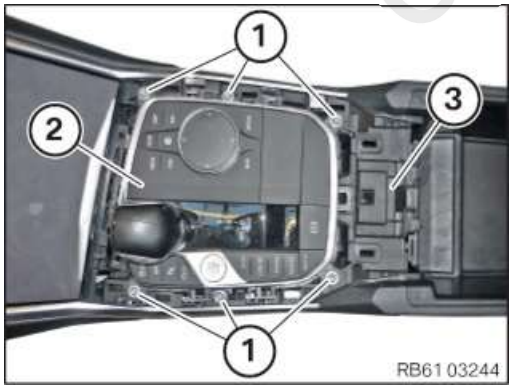


- Position the controller (2) on gear selector switch (GWS) (3) and engage in the latch mechanisms (arrow).
- Tighten the screws (1).

Controller to gear selector switch

Screw		Tightening torque	1,8 Nm

14 – Install the operating facility in the centre console



- Position the operating facility (2) in the centre console (3).
- Tighten the screws (1).

Gear selector switch to centre console trim

Screw		Tightening torque	1,8 Nm

▸ **Connecting all battery earth leads**

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- See additional information.

▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

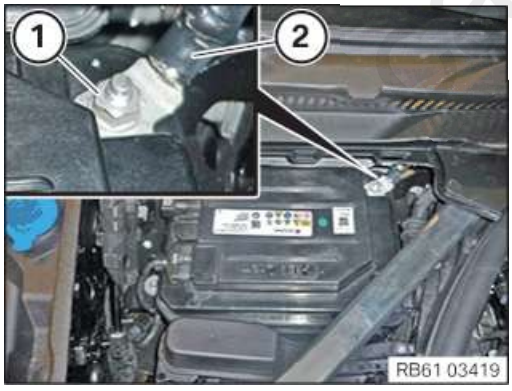
Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

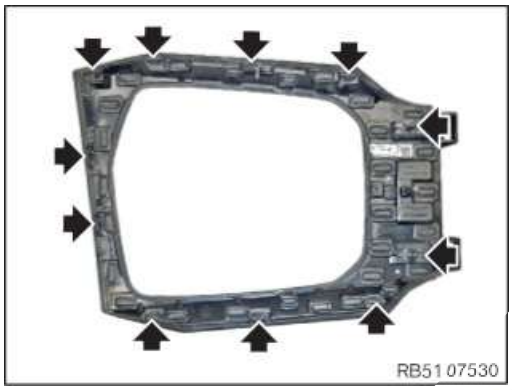
15 – Installing the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

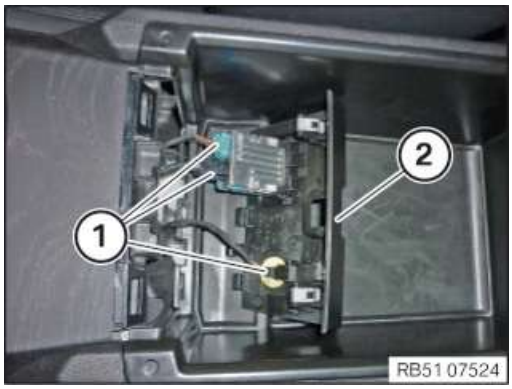


- Check all the latch mechanisms or clamps (arrows).
- In case the latch mechanisms or the clamps (arrows) are faulty, renew the centre console trim .



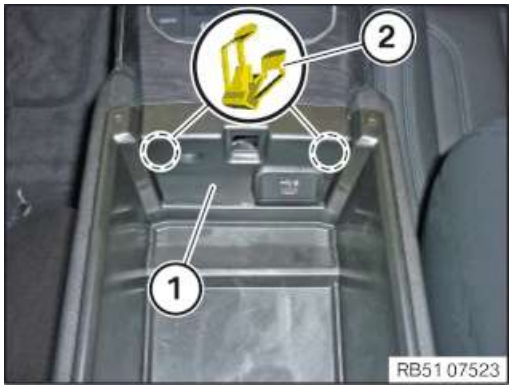
- Correctly position the centre console trim (1) and engage at the latch mechanisms.

16 – Installing the trim in the storage compartment of the centre armrest



- Mount the trim (2) and connect connector (1) and lock.

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- Correctly position trim (1) and snap into the clamps (2).

17 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

- 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.

18 – Connecting all battery earth leads

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- See additional information.

19 – Activating the 48 V electrical system

Prerequisite

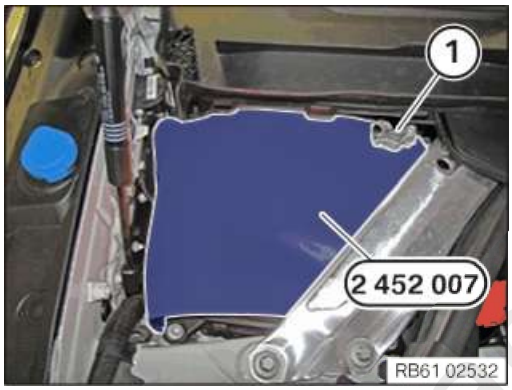
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Selector lever on gear selector switch — Used in step 11

Screw	Renew screw.	Tightening torque	0,8 Nm

Controller to gear selector switch — Used in step 13

Screw		Tightening torque	1,8 Nm

Gear selector switch to centre console trim — Used in step 14

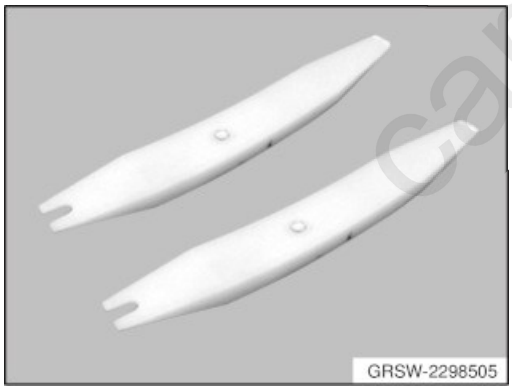
Screw		Tightening torque	1,8 Nm

Negative battery cable to 48-V battery — Used in step 1419

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

2 298 505 Wedge

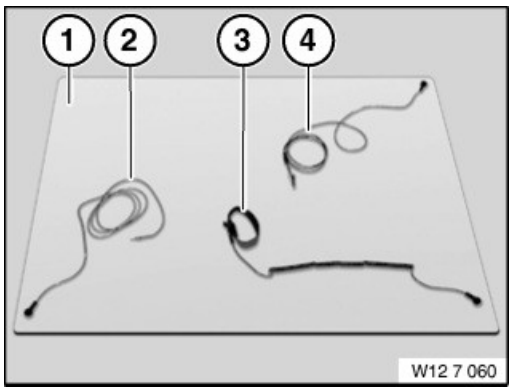


Common — Used in step 34

Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

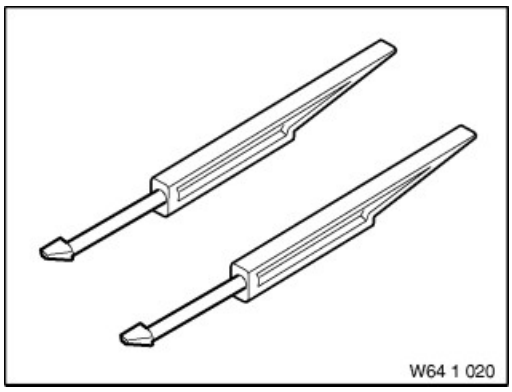
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0 495 054 (12 7 060) Antistatic mat



Common	Used in step 8
Usage	(Antistatic mat) ESD (Electronic Static Discharge) = electrostatic discharge For protection against ESD during repairs to electronic components. (Replaces the sub-number 12 7 192 from Eprom tool kit 12 7 190)
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	02 06 04 (128)

0 493 681 (64 1 020) Hook



Common	Used in step 8910
Usage	(release hook) For releasing and removing fresh air grille. For removing various covers.
Included in the tool or work	
Storage location	C2
Replaced by	
In connection with	
SI-Number	01 15 99 (483)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	151419

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
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61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 20 900 Disconnecting and connecting battery earth lead	251418
61 35 ... Notes on ESD protection (Electro Static Discharge)	8
61 35 ... Notes on ESD protection (Electro Static Discharge)	8

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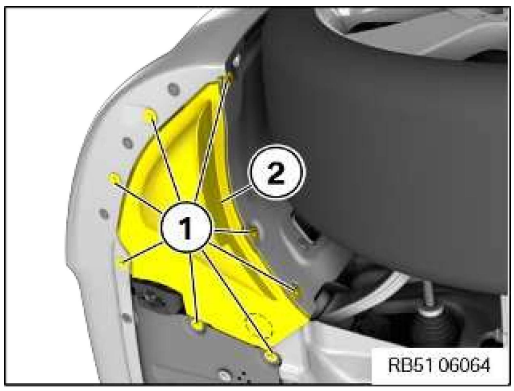
61 33 060 Removing and installing/replacing both fanfare horns

PRELIMINARY WORK

1 – Remove the lower front cover at the left and right side

NOTICE

Description is for left component only. Procedure on the right side is identical.



▸ **Removing the lower front cover at the side**

- Loosen screws (1).
- Removing the lower front cover at the side (2).

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2 – Removing the left and right fanfare

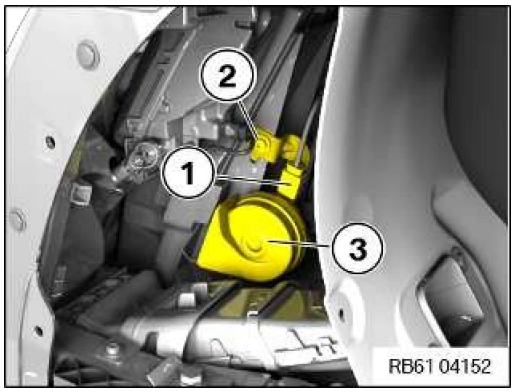
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing the fanfare**

TECHNICAL INFORMATION

Replace the fanfare only complete with the holder.



- Unlock plug connection (1) and disconnect.
- Release the screw (2) and remove the fanfare (3) with the holder.

3 – Installing the left and right fanfare

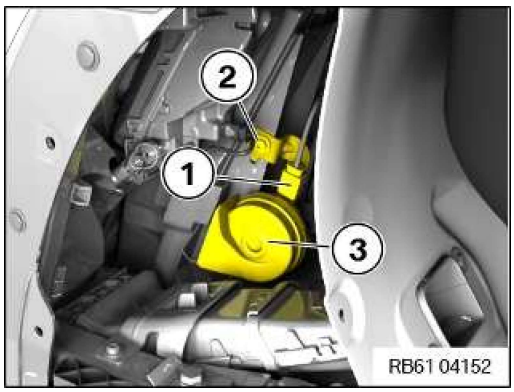
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Installing the fanfare**

TECHNICAL INFORMATION

Replace the fanfare only complete with the holder.



- Position the fanfare (3) correctly and tighten the screw (2) .

Fanfare to support for bumper panel

M6x20 screw		Tightening torque	8,8 Nm

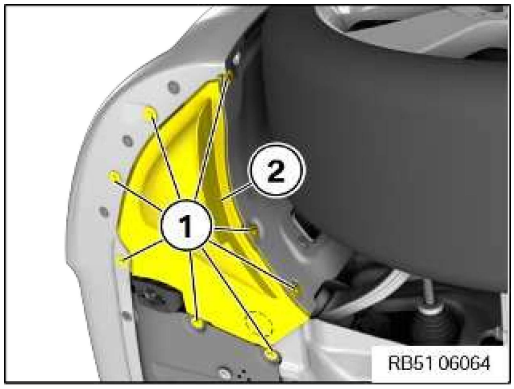
- Connect connectors (1) and lock.

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4 – Install the lower front cover at the left and right side

NOTICE

Description is for left component only. Procedure on the right side is identical.



▸ **Install the lower front cover at the side**

- Install front bottom side cover(2).
- Tighten the screws (1).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Fanfare to support for bumper panel Used in step 3

M6x20 screw		Tightening torque	8,8 Nm

Cover, front bottom on side Used in step 4

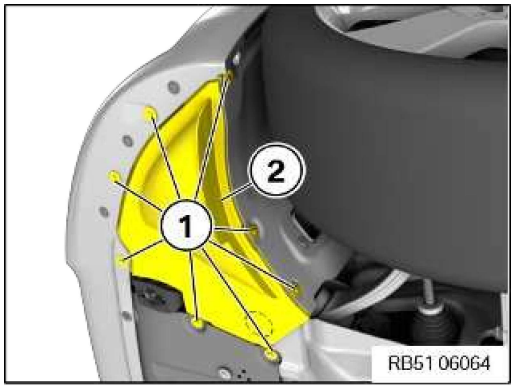
Hexagon screw for thermoplastic		Tightening torque	3 Nm

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61 33 050 Removing and installing/replacing left fanfare horn

PRELIMINARY WORK

1 – Removing the lower front cover at the side



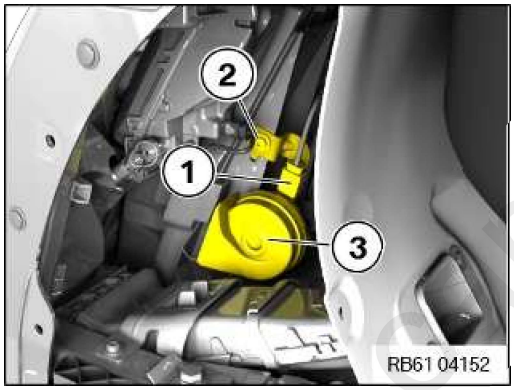
- Loosen screws (1).
- Removing the lower front cover at the side (2).

MAIN WORK

2 – Removing the fanfare

TECHNICAL INFORMATION

Replace the fanfare only complete with the holder.

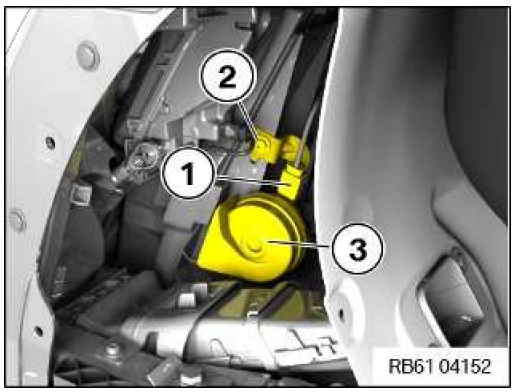


- Unlock plug connection (1) and disconnect.
- Release the screw (2) and remove the fanfare (3) with the holder.

3 – Installing the fanfare

TECHNICAL INFORMATION

Replace the fanfare only complete with the holder.



- Position the fanfare (3) correctly and tighten the screw (2) .

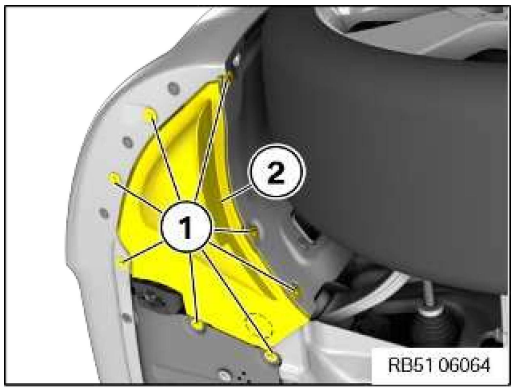
Fanfare to support for bumper panel

M6x20 screw		Tightening torque	8,8 Nm

- Connect connectors (1) and lock.

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4 – Install the lower front cover at the side



- Install front bottom side cover(2).
- Tighten the screws (1).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Fanfare to support for bumper panel — Used in step 3

M6x20 screw		Tightening torque	8,8 Nm

Cover, front bottom on side — Used in step 4

Hexagon screw for thermoplastic		Tightening torque	3 Nm

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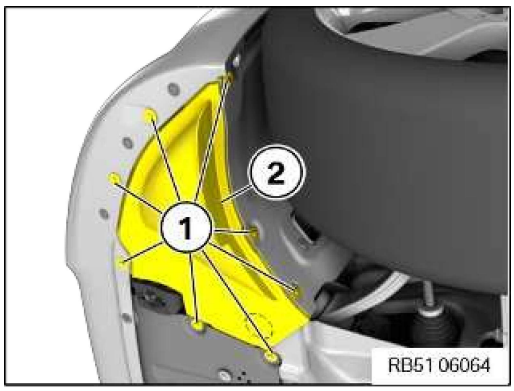
61 33 055 Removing and installing/replacing right fanfare horn

PRELIMINARY WORK

1 – Removing the front right cover below

NOTICE

Description is for left component only. Procedure on the right side is identical.



▸ **Removing the lower front cover at the side**

- Loosen screws (1).
- Removing the lower front cover at the side (2).

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2 – Remove fanfare, right

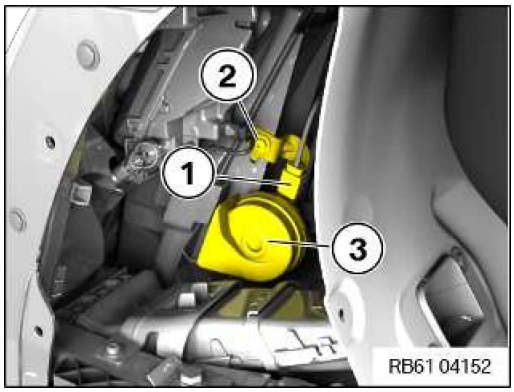
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing the fanfare**

TECHNICAL INFORMATION

Replace the fanfare only complete with the holder.



- Unlock plug connection (1) and disconnect.
- Release the screw (2) and remove the fanfare (3) with the holder.

3 – Install fanfare, right

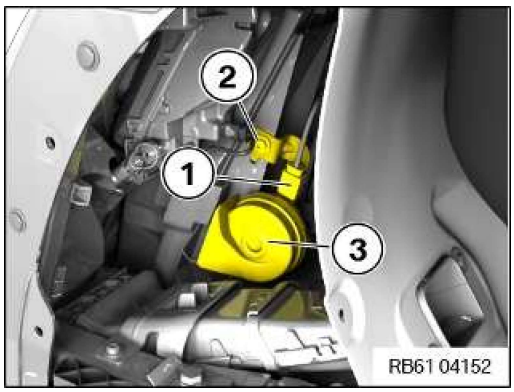
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Installing the fanfare**

TECHNICAL INFORMATION

Replace the fanfare only complete with the holder.



- Position the fanfare (3) correctly and tighten the screw (2) .

Fanfare to support for bumper panel

M6x20 screw		Tightening torque	8,8 Nm

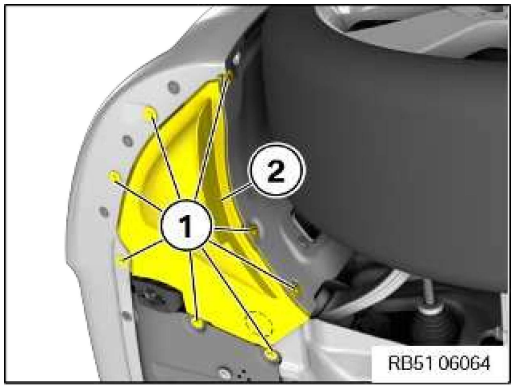
- Connect connectors (1) and lock.

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4 – Installing the cover at the front right, at the bottom

NOTICE

Description is for left component only. Procedure on the right side is identical.



▸ **Install the lower front cover at the side**

- Install front bottom side cover(2).
- Tighten the screws (1).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Fanfare to support for bumper panel — Used in step 3

M6x20 screw		Tightening torque	8,8 Nm

Cover, front bottom on side — Used in step 4

Hexagon screw for thermoplastic		Tightening torque	3 Nm

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61 35 ... Notes on ESD protection (Electro Static Discharge)

Special tools required:

- 12 7 060

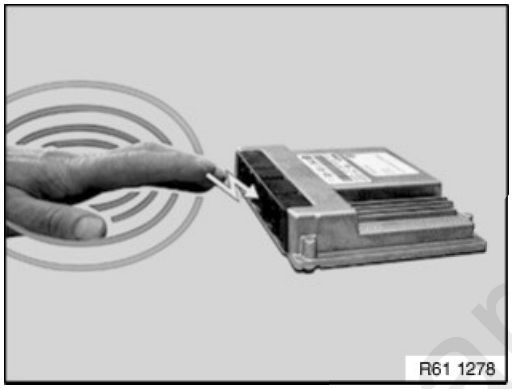
Note:
Electrical components which are particularly sensitive to electrostatic discharge (electronic control units, sensors, etc.) are marked with the ESD warning symbol.

E-Electro

S-Static

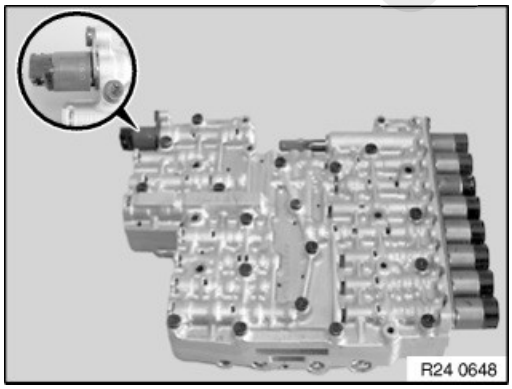
D-Discharge

Caution!
Refer to Service Information.



Statically charged persons can discharge themselves when they touch electrical components.*Note:*
Humans can only detect a discharge starting from a level of approx. 3000 V.

The danger threshold for electrical components already starts from a level of approx. 100 V.



Example:

Mechatronics control unit.

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Caution!
Do not touch pins and multi-pin connectors directly!

Only touch the housings of electrical components.

Caution!

To avoid damaging or destroying electrical components as a result of electrostatic discharge, it is absolutely essential to observe the following instructions:

- When replacing electrical components, leave the replacement components in their original packaging until immediately before they are to be installed
- If necessary, always return a removed component in its original packaging (always pack the component away immediately)
- Read and comply with user information on using the associated special tool. 12 7 060



Personal protective equipment:

Electrically conducting clothing (high wool content, antistatic shoes required).

These can primarily be identified by the logo on the side.

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61 35 ... Overview of additional work for the removal and installation or replacement of electronic components in the body area/windscreen

Component	**Removal and installation** Calibration/Initialisation required **(diagnosis system must be connected)**	**Removal and installation** Use of the Special tool necessary	**Replacement** Programming/encoding Calibration/Initialisation required **(diagnosis system must be connected)**	**Replacement** Use of the Special tool necessary	Remarks
Front section: (including bumper panel)					
ACC sensor	Yes	Yes	Yes	Yes	
Night vision camera	No	No	Yes	Yes*	*conventional workshop headlight adjusting device
PDC ultrasonic sensor	No	No	No	No	
PMA ultrasonic sensor	No	No	No	No	
Sensor, lane change warning	no*	No	Yes	No	*Required after a body repair in the surrounding area of the sensor. **Comply with the regulations for repainting!**
Sensor for active pedestrian protection	No	No	No	No	Must be replaced after the active pedestrian protection has been activated! **Impact absorber** must also be replaced!
Actuator for active pedestrian protection	No	No	No	No	Must be replaced after the active pedestrian protection has been activated!
Front camera	No	No	Yes	No	

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Side section:					
Top view camera (in the exterior mirror)	No	No	Yes	No	
Rear area: (including bumper panel):					
reversing camera (with Surround View)	No	No	Yes	No	
reversing camera (without Surround View)	No	No	Yes	No	
PDC ultrasonic sensor	No	No	No	No	
PMA ultrasonic sensor	No	No	No	No	
Sensor, lane change warning	no*	No	Yes	No	*Required after a body repair in the surrounding area of the sensor. **Comply with the regulations for repainting!**
Windscreen:					
Camera-based driver support systems camera	no*	No	Yes	No	*Necessary after **replacement of the windscreen**
Rain sensor (separate document)					

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61 35 ... Overview, rain sensor (additional work when replacing the windscreen / sensor replacement)

BMW G series:

Sensor type/ Sensor shape	With windscreen replacement replacement sensor required	When replacing the sensor Programming/encoding necessary	When replacing the sensor Initialisation required	Connecting the diagnosis system required
all types approximately ø 35 mm	No	No	No	No

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61 35 278 Remove and install Body Domain Controller (BDC) control unit

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

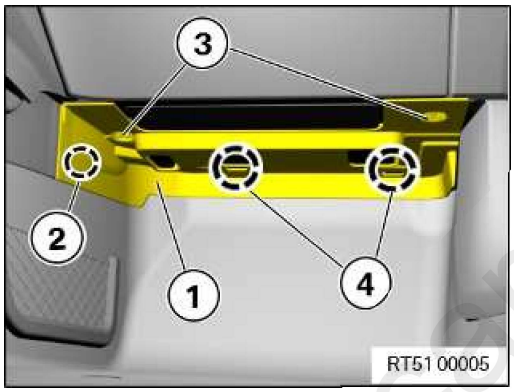
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Remove the right footwell trim



- Turn the locks (3) by 90°.
- Feed the footwell trim (1) out of the guide (2).
- Detach the footwell trim (1) inward out of the guides (4).
- Unlock associated plug connection and disconnect.

4 – Removing inner right door sill cover strip

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing the inner door sill cover strip**

RISK OF DAMAGE

Bending of plastic parts.

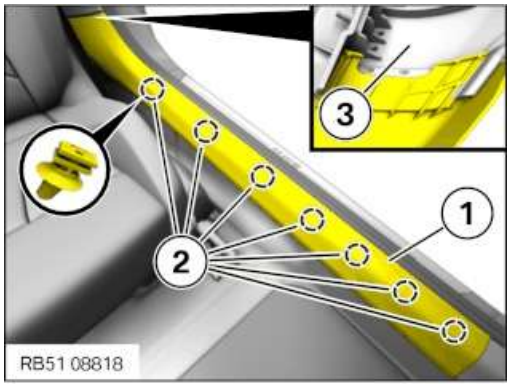
Application of too much force can lead to bending of plastic parts.

- Place special tool directly beside the mounting clip.
- Continue unclipping the part without using the tool if possible.

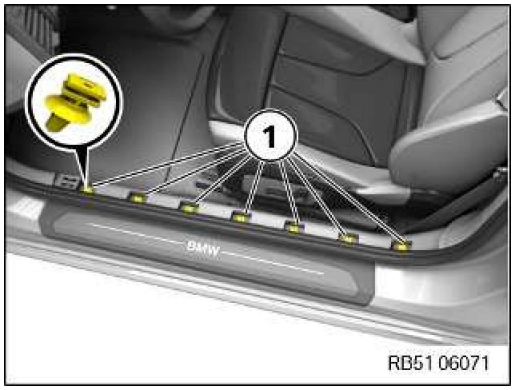
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NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

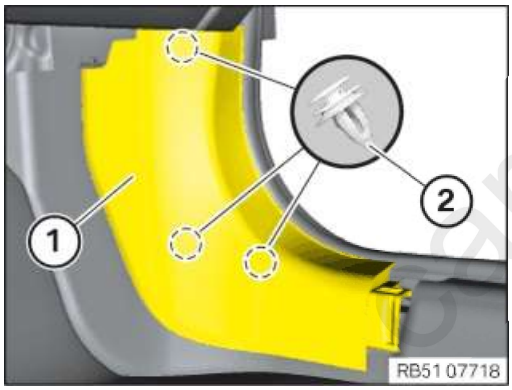


- Release door sill cover strip (1) with clips (2) starting from the front using a suitable special tool from the set of special tools 0 493 752 (00 9 329).
- Guide out and remove door sill cover strip (1) under the rear side trim panel (3) .



- If necessary, remove clips (1) and connect them to the door sill cover strip.

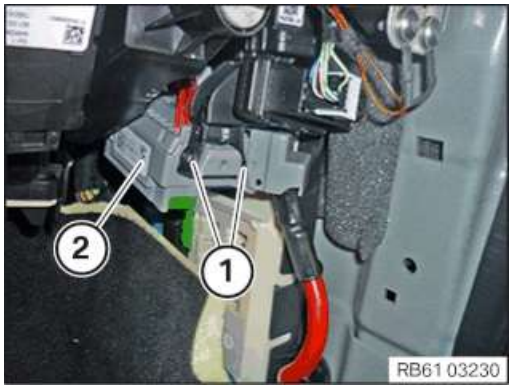
5 – Removing the side trim panel in the footwell at the right-hand A-pillar



- Loosen the side trim panel (1) at the clips (2) and remove it toward the inside.

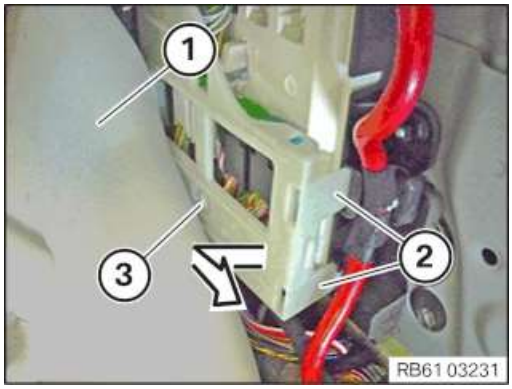
MAIN WORK

6 – Remove the BDC control unit

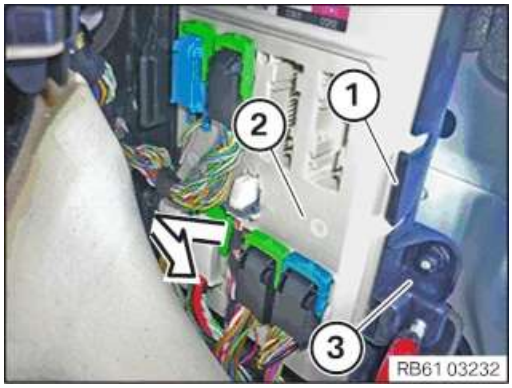


- Unlock the latch mechanisms (1) and remove the power distribution box (2) downwards.

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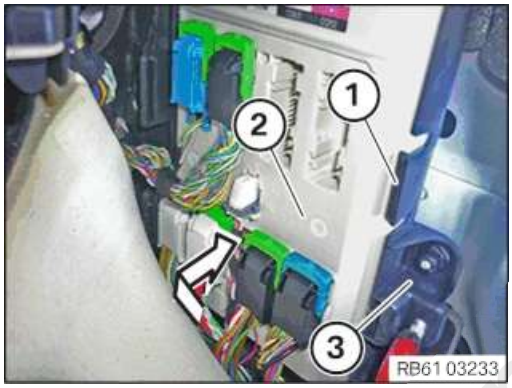


- Fold the carpet (1) to the side.
- Loosen the latch mechanisms (2).
- Guide cover (3) out in direction of arrow.

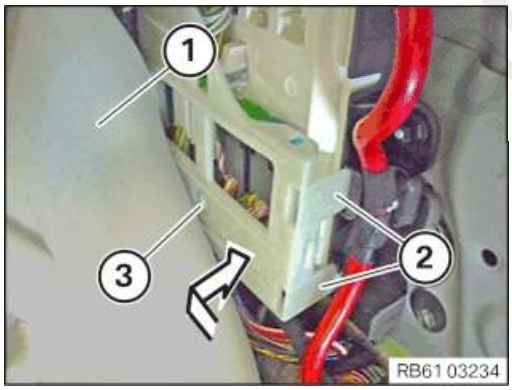


- Unlock all plug connections and disconnect.
- Loosen latch mechanism (1).
- Guide out the BDC control unit (2) from the bracket(3) in the direction of the arrow.

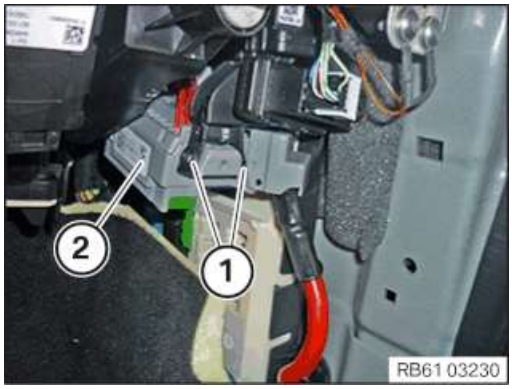
7 – Install the BDC control unit



- Guide in the BDC control unit (2) in the holder (3) in the direction of the arrow.
- Engage the BDC control unit (2) in the latch mechanism (1).
- Connect all connectors and lock.



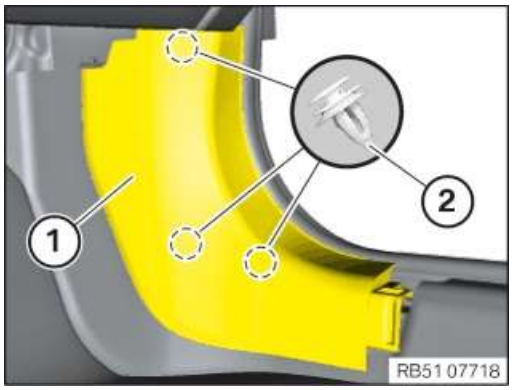
- Feed in the cover (3) in the direction of arrow and engage it in the latch mechanisms (2).
- Position the carpet (1).



- Guide in the power distribution box (2) upwards and engage it correctly in the latch mechanisms (1).

POSTPROCESSES

8 – Installing side trim panel in footwell on right A-pillar



- Check the clips (2) for damage.

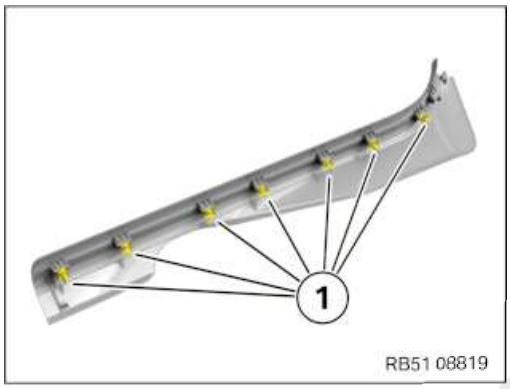
  Renew damaged or missing clips (2).
- Correctly position the side trim panel (1) and clip in to the clips (2).
- Make sure that the side trim panel (1) is correctly fitted against edge protection.

9 – Installing inner right door sill cover strip

NOTICE

Description is for left component only. Procedure on the right side is identical.

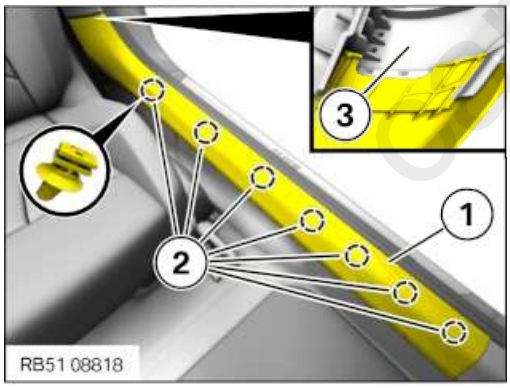
▸ **Installing the inner door sill cover strip**



NOTICE

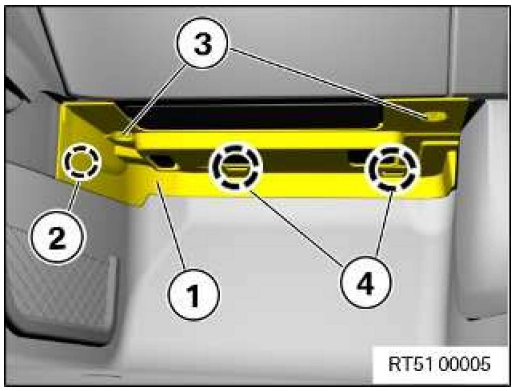
Schematic diagram is for example purposes. Some parts may differ in certain details.

- Check the clips (1) for damage and renew if necessary.



- Insert the door sill cover strip (1) below the rear side trim panel (3).
- Clip the door sill cover strip (1) in with the clips (2).

10 – Install the right footwell trim panel



- Connect associated connector.
- Attach the footwell trim (1) to the guides (4) and fold up.
- Guide the footwell trim (1) into the guide (2) of the centre console.
- Position the locks (3) correctly and turn by 90°.

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11 – Connecting all battery earth leads



- See additional information.

12 – Activating the 48 V electrical system

Prerequisite

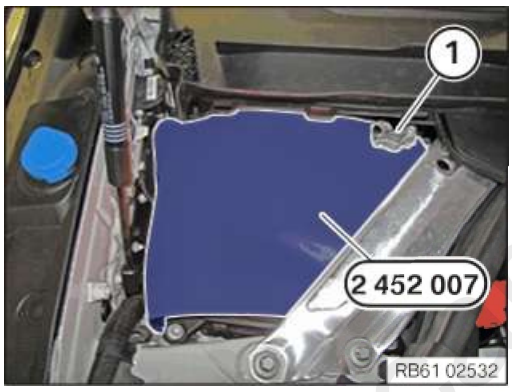
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

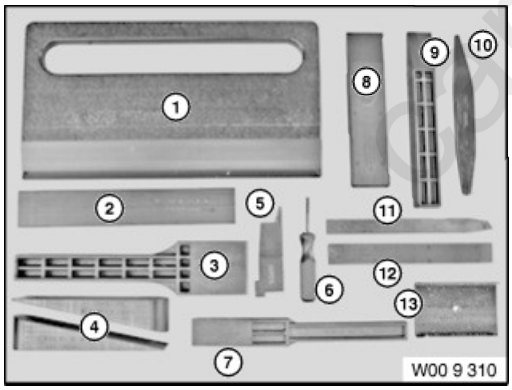
Additional Information

Overview of Tightening Torques

Negative battery cable to 48-V battery			Used in step 12
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common	Used in step 4
Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	112

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211

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61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211

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61 35 013 Remove and install LIN power distribution box

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

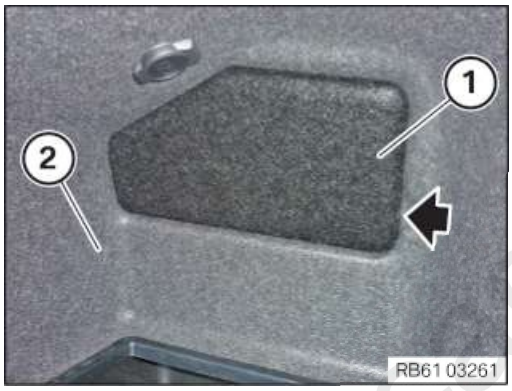
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

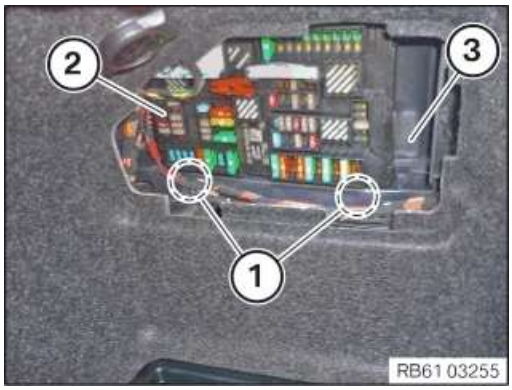
3 – Removing the flap in the luggage compartment wheel arch trim panel on the right



- Remove the flap (1) from the luggage compartment wheel arch trim panel on the right (2)

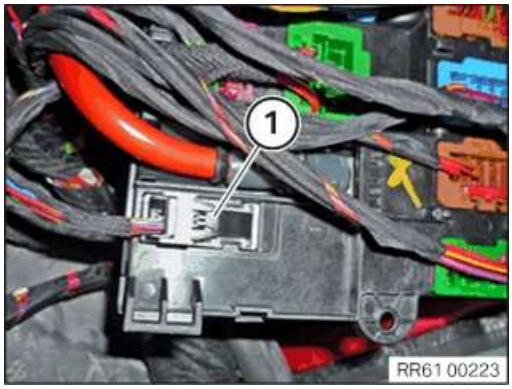
MAIN WORK

4 – Remove the LIN power distribution box

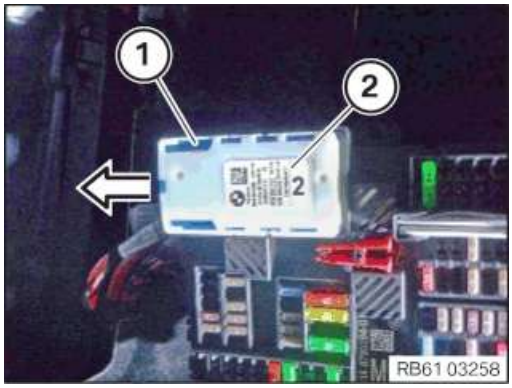


- Unlock latch mechanisms (1) and feed out power distribution box (2) from holder (3).

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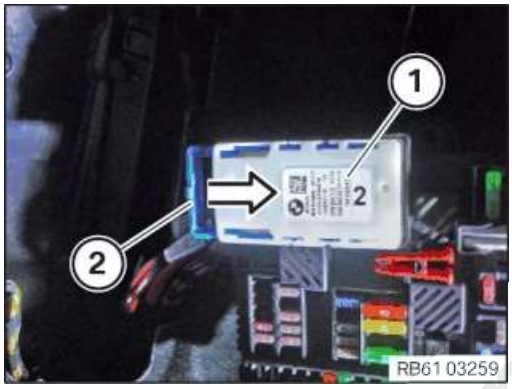


- Unlock plug connection (1) and disconnect.

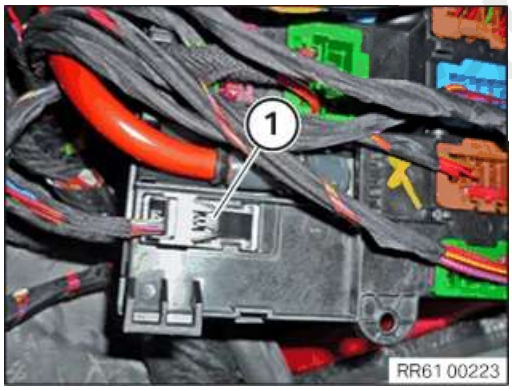


- Loosen the lock (1) in the direction of the arrow.
- Remove the LIN power distribution box (2).

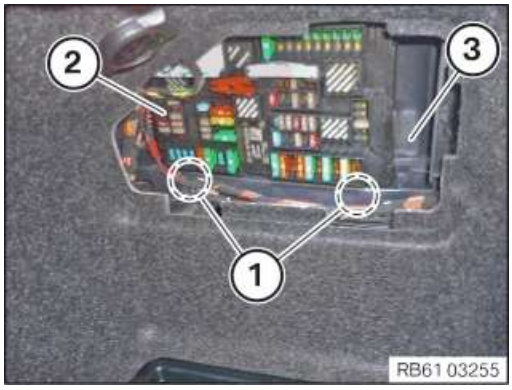
5 – Install the LIN power distribution box



- Correctly position the LIN power distribution box (1) and move the lock (2) in the direction of the arrow.



- Connect connectors (1) and lock.



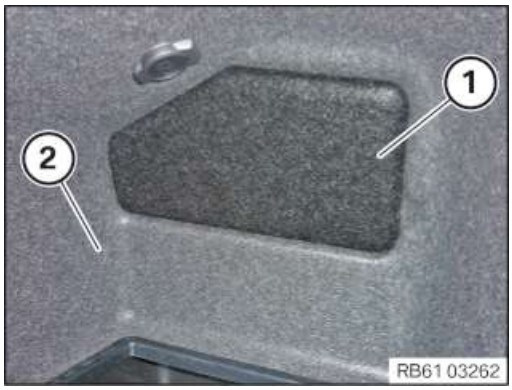
- Position power distribution box (2) correctly and engage it in bracket (3).

  The latch mechanisms (1) must engage correctly.

POSTPROCESSES

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6 – Installing the flap in the luggage compartment wheel arch trim panel on the right



- Position the flap (1) correctly in the right luggage compartment wheel arch trim panel (2) and install.

7 – Connecting all battery earth leads



- See additional information.

8 – Activating the 48 V electrical system

Prerequisite

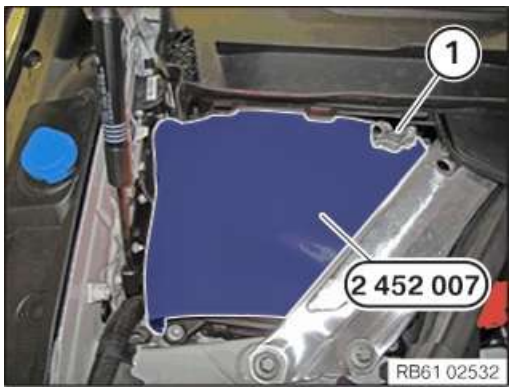
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .

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- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Negative battery cable to 48-V battery Used in step 8

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	18

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
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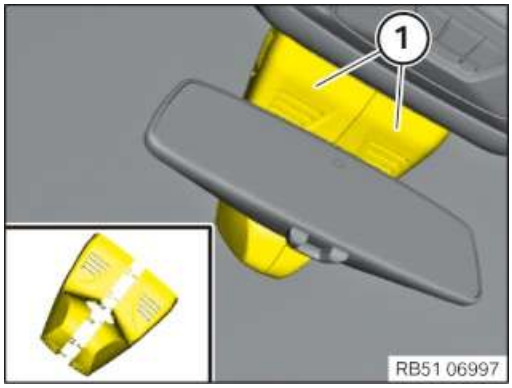
cardiagn.com

61 35 177 Remove and install rain-light sensor

PRELIMINARY WORK

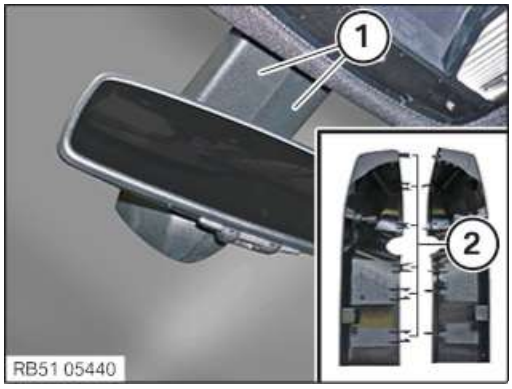
1 – Removing the covers for the interior mirror

- **Version A:**



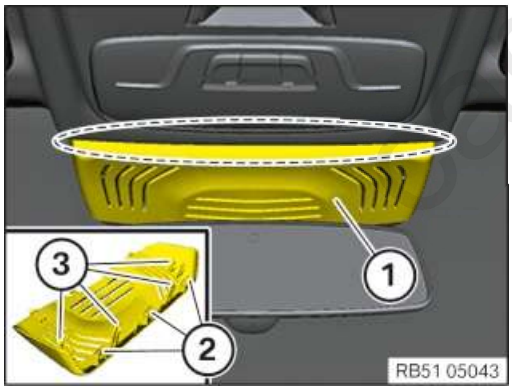
- Release cover (1) in the middle with a suitable plastic wedge from the latch mechanisms and remove.

- **Version B:**

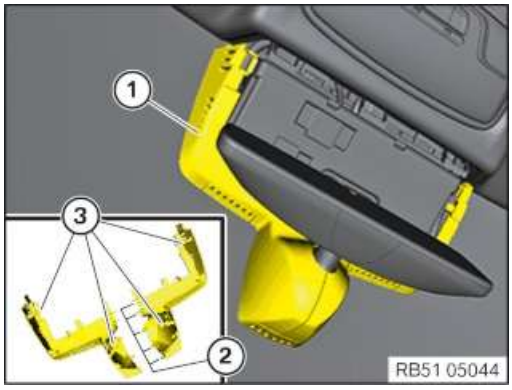


- Release the cover (1) from the latch mechanisms (2) with a suitable plastic wedge and remove sideways.

- **Version C:**



- Detach cover (1) from the clamps (2) in the marked area using a suitable plastic wedge and pull down a certain distance.
- Release cover (1) at the retaining lugs (3) and remove from the guides to the rear.



- Release cover (1) from the latch mechanisms (2) and (3) and remove sideways.
- Remove cover (1) from mirror base (2).

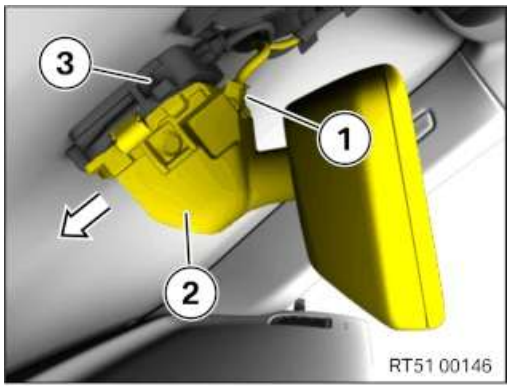
- **Version D:**

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- Release covers (1) and (2) using a suitable plastic wedge at the separation point (3) and remove from the side.

2 – Remove inside mirror



TECHNICAL INFORMATION

Carry out the work at temperatures between 18 °C and 23 °C only.

- Unlock plug connection (1) and disconnect.

RISK OF DAMAGE

Damage to the component.

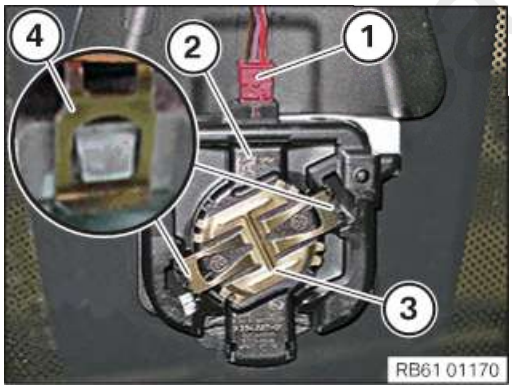
Excessive force may damage the component.

- Handle component carefully.

- Jerk and pull off the interior mirror (2) in the direction of the arrow from the mirror base (3).

MAIN WORK

3 – Remove driving light sensor



RISK OF DAMAGE

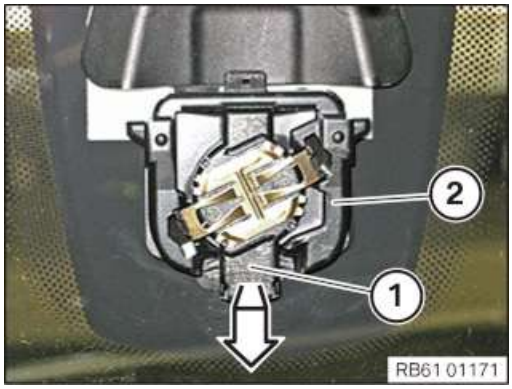
Damage to silicone surface.

A damaged silicone surface can lead to malfunctioning of the rain-light-solar-condensation sensor.

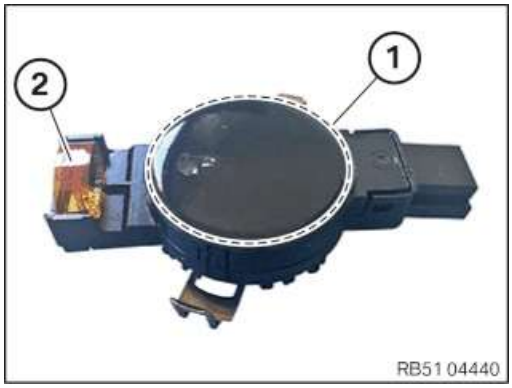
- Do not touch or damage the silicone-coated surface on the rain-light-solar-condensation sensor.
- After releasing lock, wait approx. 30 min. at 20°C for silicone surface to relax.

- Disconnect the connector (1) .
- Push in retaining spring (3) on both sides and unlock the lock (4) by means of a screwdriver.
- Release driving light sensor.

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- Slowly pull the driving light sensor (1) in direction of arrow from the holder (2).



RISK OF DAMAGE

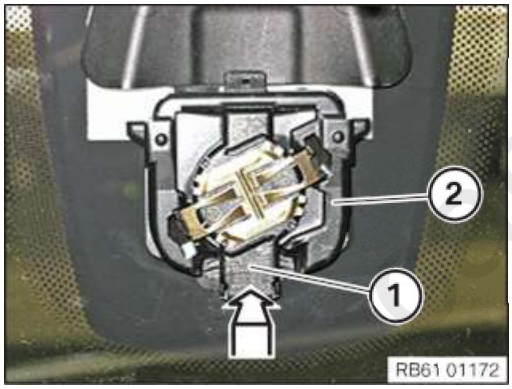
Damage to silicone surface.

A damaged silicone surface can lead to malfunctioning of the rain-light-solar-condensation sensor.

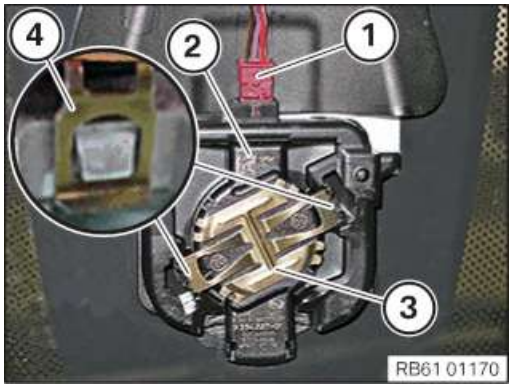
- Do not touch or damage the silicone-coated surface on the rain-light-solar-condensation sensor.
- After releasing lock, wait approx. 30 min. at 20°C for silicone surface to relax.

- Check the silicone-coated surface (1) and the printed circuit board (2) on the driving light sensor for damage.
- When replacing windscreen: Immediately install the driving light sensor on the new windscreen.

4 – Installing driving light sensor

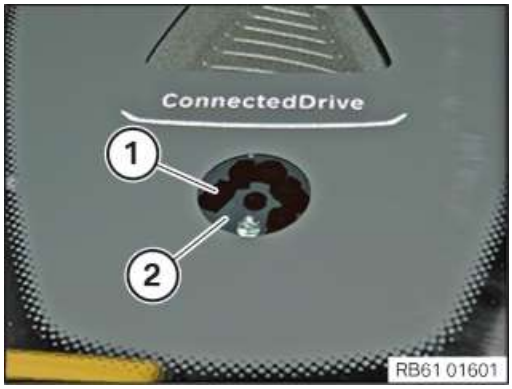


- Thread in the driving light sensor (1) in direction of arrow into the holder (2).



- Press on the driving light sensor (2) on the retaining spring (3) in the centre.
- Successively press down the retaining springs (4) on each side to lock it.
- Connect connector (1).

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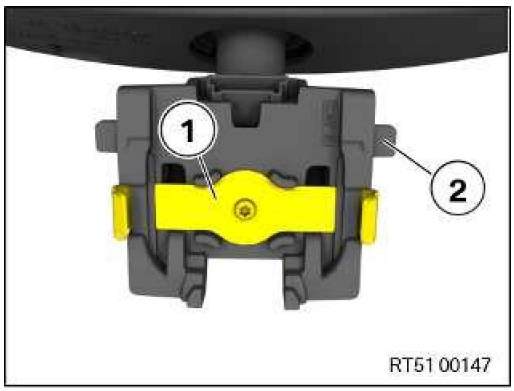


- Check if air pockets are visible.

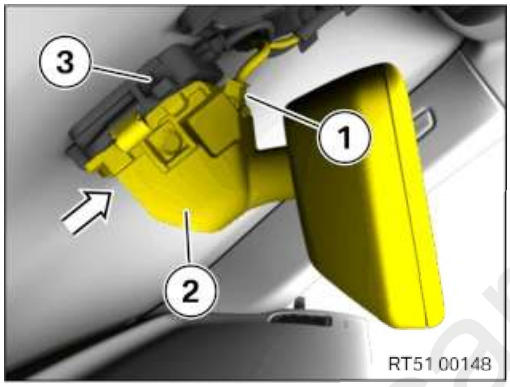
  Visible shades (1) and (2) are not air pockets but rather the optical element of the sensor. The shades do not represent any functional limitation.

POSTPROCESSES

5 – Install interior mirror



- Check the clamp (1) on both sides of the mirror base (2) for damage and renew as needed.



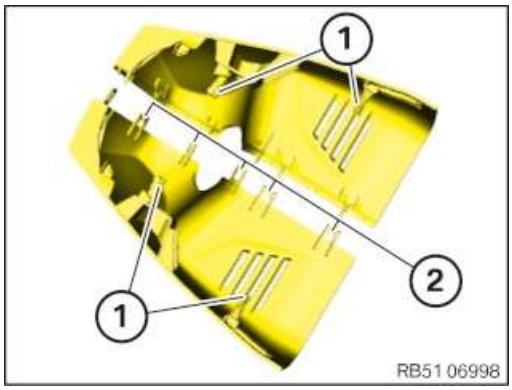
TECHNICAL INFORMATION

Carry out the work at temperatures between 18 °C and 23 °C only.

- Position the interior mirror (2) at the mirror base and slide it on in direction of the arrow.
- Check the correct installation position of the interior mirror (2) at the mirror base (3).
- Connect connectors (1) and lock.

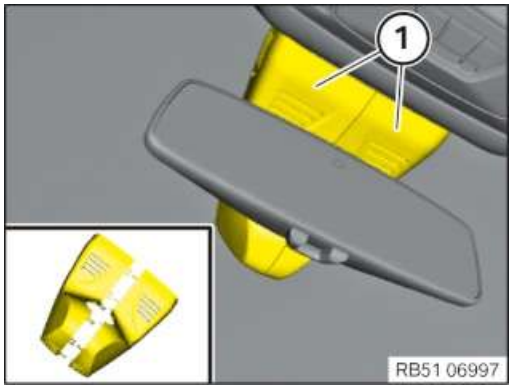
6 – Installing the covers for the interior mirror

- **Version A:**



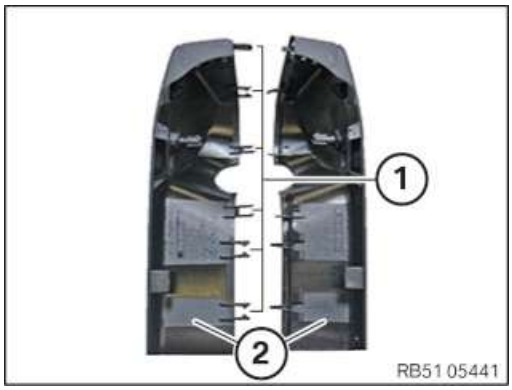
- Check latch mechanisms (1) and (2).
- If the latch mechanisms (1) or (2) are faulty, renew the covers.

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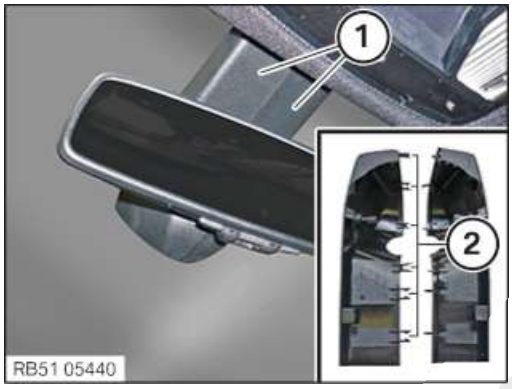
- Feed cover (1) in and lock.

- **Version B:**



- Check the latch mechanisms (1) on the two covers (2) for damage, renew the covers (2) if necessary.

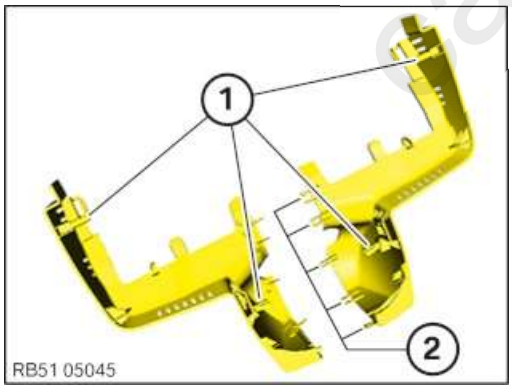
  The covers (2) must not be damaged or missing.



- Position the covers (1) correctly on the mirror and engage with the latch mechanisms (2).

- **Version C:**

Check



- Check the latch mechanisms (1) and (2) of the covers for damage.

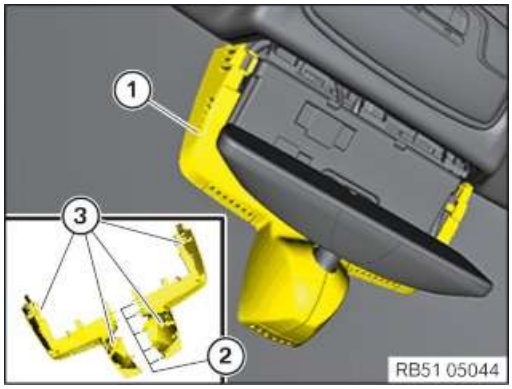
Result

» The latch mechanism is damaged.

Measure

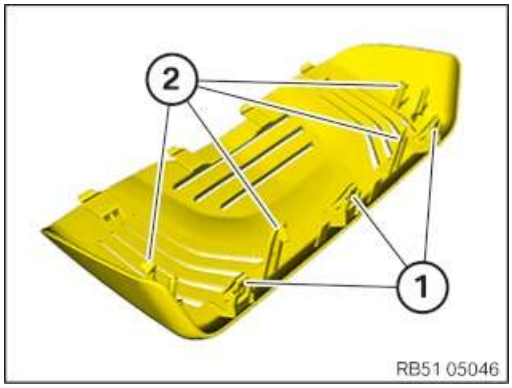
- Renew the cover.

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- Guide in cover (1) on left and right and engage using latch mechanisms (2) and (3).

Check



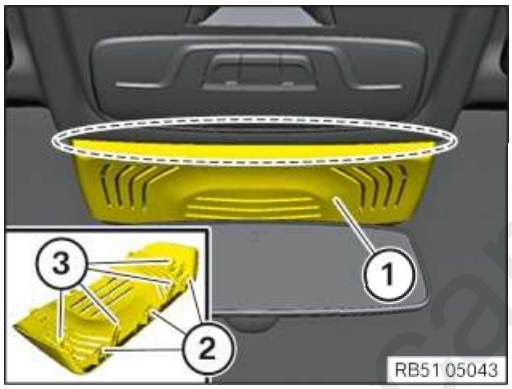
- Check clamps (1) for damage; renew if necessary.
- Check latch mechanisms (2) for damage.

Result

» The latch mechanism is damaged.

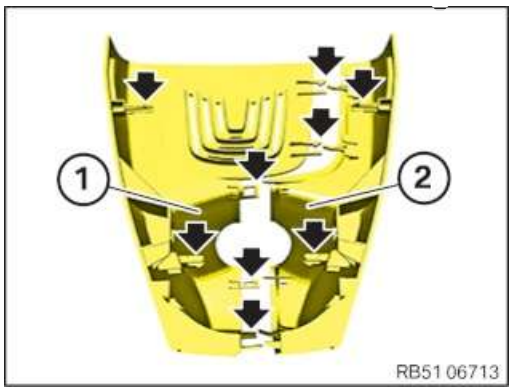
Measure

- Renew the cover.



- Guide cover (1) into front guides and engage using retaining lugs (3) and clamps (2).

- **Version D:**



- Check the latch mechanisms (arrows) on covers (1) and (2) for damage and, if necessary, renew covers (1) and (2).

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- Position covers (1) and (2) correctly on the mirror and engage at the separation point (3).

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61 35 245 Remove and install sensor line for bottom CA

RISK OF DAMAGE

Mechanical effects.

Paint damage.

- Mask those working areas at risk with yellow plastic adhesive tape.
- Remove and install heavy or bulky components with the aid of another person/other persons.

TECHNICAL INFORMATION

To guarantee the quality of the driver assistance functions in vehicles with concealed radar sensors installed, the component may only be repainted by observing the repair specifications described in the document "Standards for repair painting with sensor systems".

Sourcing reference:

https://colorsystem-paint.com/

Aftersales Information Research (AIR) - Repair and service messages - HG99 - ColorSystem

ISTA - HG99 - ColorSystem

No stickers or foils (transparent or coloured) may be attached in the radiation areas of the radar sensors.

The component may be painted if no radar sensors have been installed.

The following features can be used to identify whether radar sensors are installed on the vehicle:

Radar sensors are installed at the rear if the triangular warning light is located on the exterior mirror (in the mirror glass or on the mirror frame).

Radar sensors are installed at the front and rear if the triangular warning light is located on the exterior mirror (in the mirror glass or on the mirror frame) in conjunction with the optional equipment S5ATA or S5AUA.

PRELIMINARY WORK

1 – Removing the luggage compartment floor trim panel

▶ **Removing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



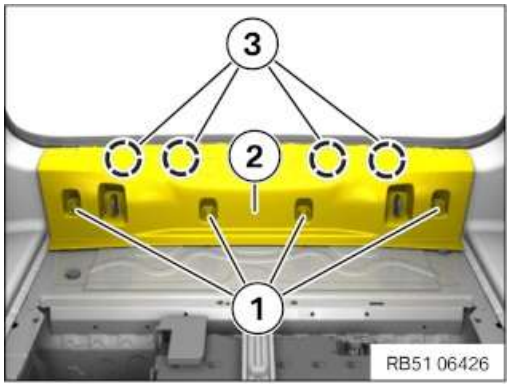
- Remove luggage compartment floor trim panel (1).

2 – Removing the loading edge trim

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NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



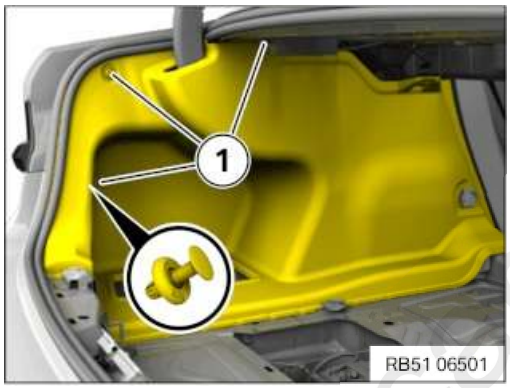
- Loosen the expanding rivet (1).
- Unclip loading edge trim(2) upwards from latch mechanisms (3).
- Guide out and remove loading edge trim (2) under the sealing lip of the tailgate seal.

3 – Removing part of the luggage compartment wheel arch trim panel on the left and right

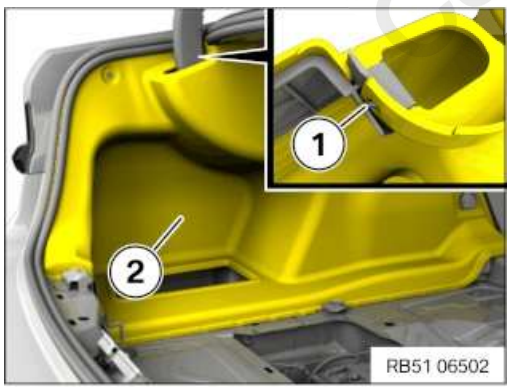
▸ **Partially remove luggage compartment wheel arch panel on left**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Loosen the expanding rivet (1).



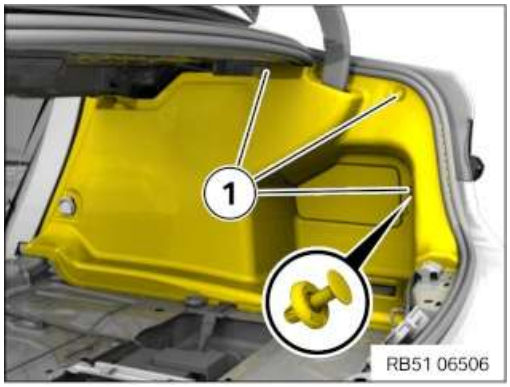
- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip of the tailgate seal and release it in the rear area.

▸ **Partially remove luggage compartment wheel arch panel on right**

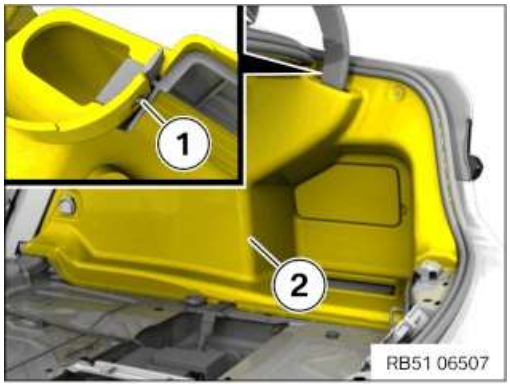
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

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- Loosen the expanding rivet (1).



- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip of the tailgate seal and release it in the rear area.

4 – Removing trim from water channel on left and right

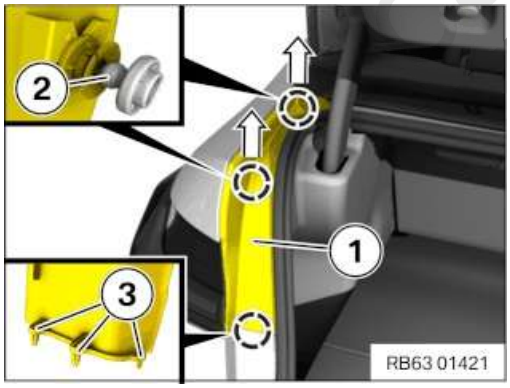
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing trim from water channel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Unclip trim (1) in upward direction from ball pins (2).
- Release trim (1) from guides (3) and remove.

5 – Removing the rear light on the left and right side panels

NOTICE

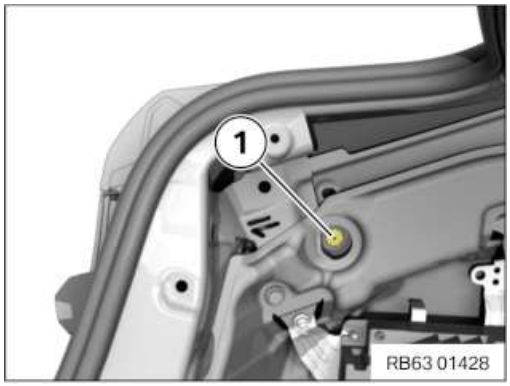
Description is for left component only. Procedure on the right side is identical.

▸ **Removing the rear light on the side panel**

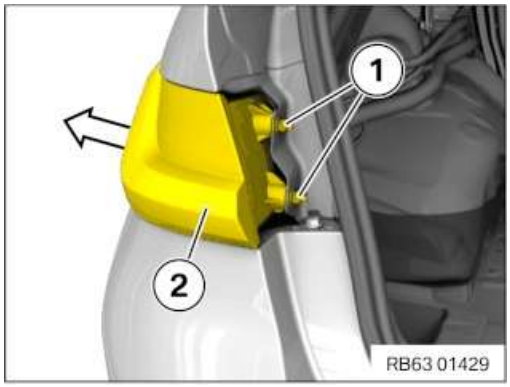
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NOTICE

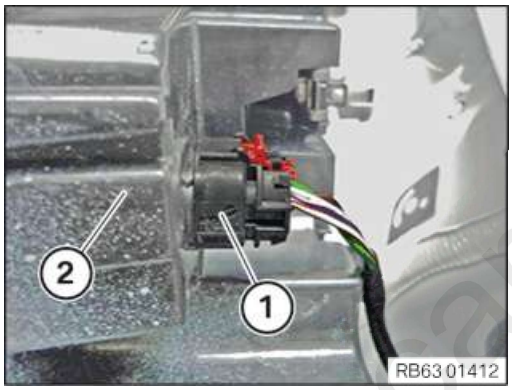
Schematic diagram is for example purposes. Some parts may differ in certain details.



- Loosen nut (1).



- Release the nuts (1) and feed out the rear light on the side panel (2) in the direction of arrow.



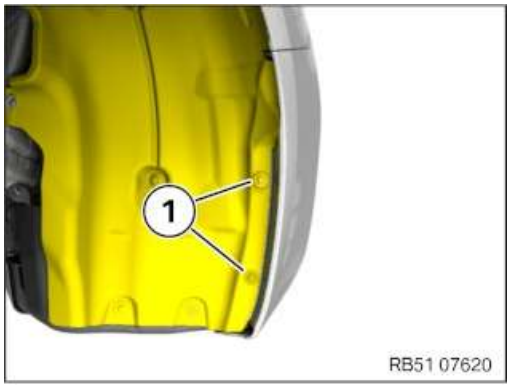
TECHNICAL INFORMATION

Observe note on unlocking and disconnecting plug connections.

For additional information see: 6113 ... Unlocking and disconnecting different plug connections

- Unlock plug connection (1) and disconnect.
- Remove the rear light on the side panel (2).

6 – Remove rear bumper panel



NOTICE

Perform the operations on the left and right side.

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

- Loosen screws (1).

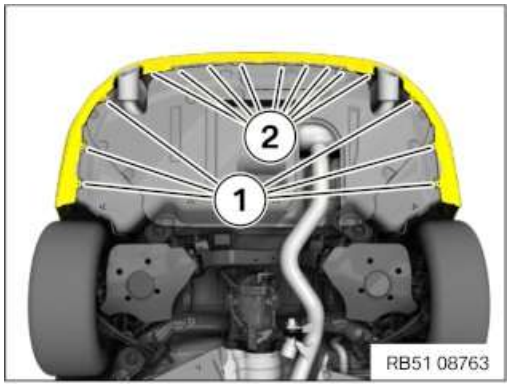
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NOTICE

Perform the operations on the left and right side.

- Release the screw (1).



- Loosen screws (1).
- Release the bumper panel at the latch mechanisms (2).



NOTICE

Perform the operations on the left and right side.

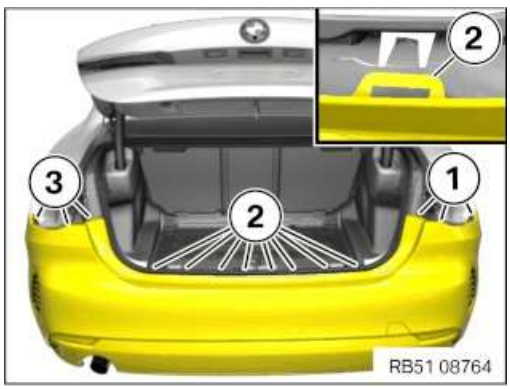
- Release the screw (1).



NOTICE

Perform the operations on the left and right side.

- Release the bumper panel with the latch mechanisms (1).



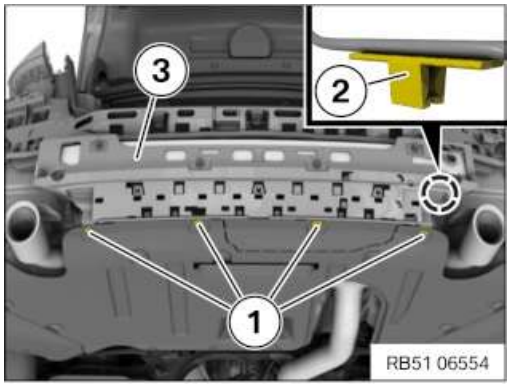
- Release the bumper panel with the latch mechanisms (1).
- Release the bumper panel from the latch mechanisms (2) starting from the right.
- Release the bumper panel from the latch mechanisms (3)



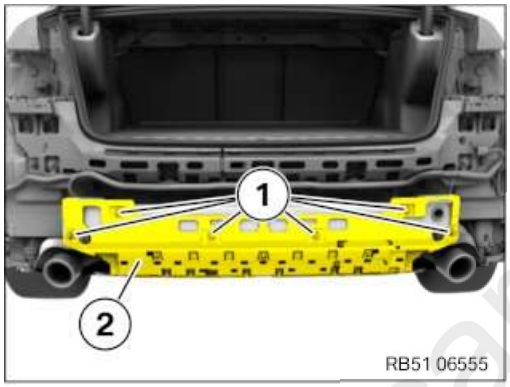
- Unlock plug connection and disconnect.
- Remove bumper panel.

MAIN WORK

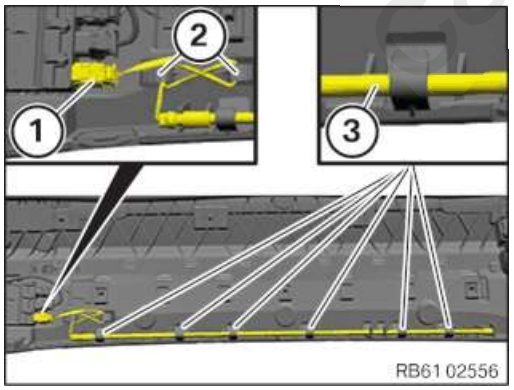
7 – Remove the sensor line for the contactless tailgate opening (bottom)



- Loosen screws (1).
- Unclip the cable clip (2) on the inside of the brace for the rear bumper (3).

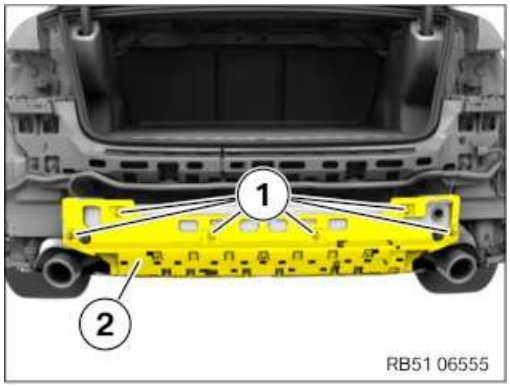


- Open the expanding rivets (1) and remove the brace for the rear bumper (2).

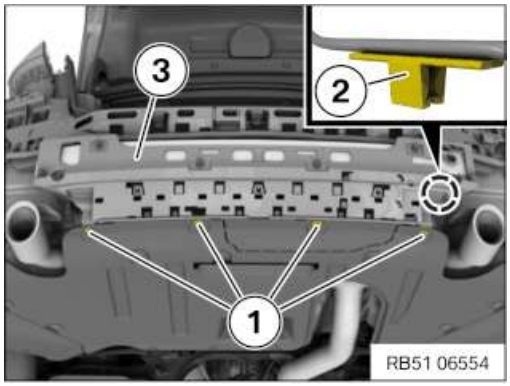


- Unlock and disconnect connector (1).
- Release cable from holder (2).
- Unclip the bottom sensor line (3)towards the top.

8 – Install the sensor line for the contactless tailgate opening (bottom)



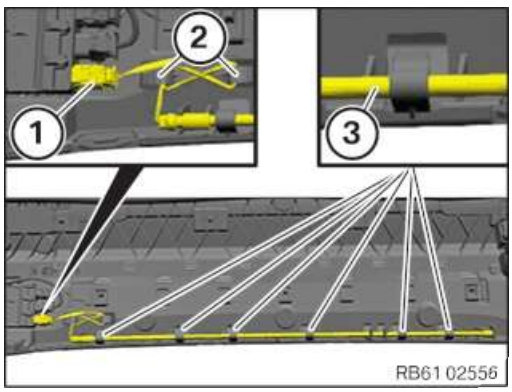
- Position brace for the rear bumper (2) on the support.
- Mount the expanding rivets (1).



- Clip in the cable clip (2) on the inside of the brace for the rear bumper (3).
- Tighten the screws (1).

Mounting for rear bumper panel on support for rear bumper panel

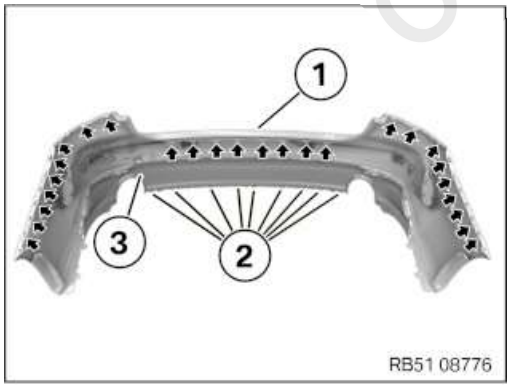
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm



- Clip lower sensor cable (3) from above.
- Secure cable to holder (2).
- Connect connector (1).

POSTPROCESSES

9 – Install rear bumper panel



Check

- Check the latch mechanisms (arrows) on the bumper panel (1) for damage.

  Check the latch mechanisms (2) on the bumper trim (3) for damage.

Result

» Latch mechanisms (arrows) are damaged.

Measure

- Renew the bumper panel (1).

Result

» Latch mechanisms (2) are damaged.

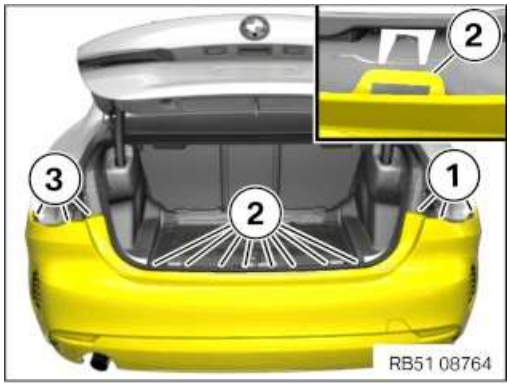
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Measure

- Renew the bumper trim (3).



- Position the bumper panel.
- Connect connectors (1) and lock.



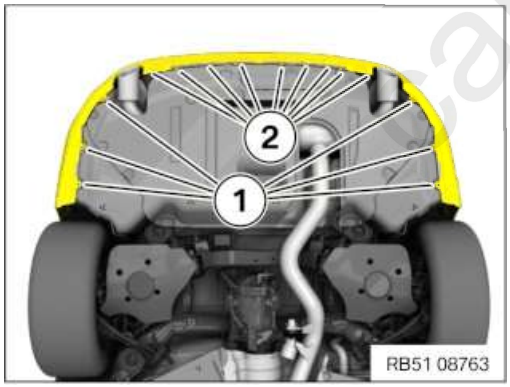
- Clip in the bumper panel with the latch mechanisms (1),(2) and (3).



NOTICE

Perform the operations on the left and right side.

- Clip in the bumper panel with latch mechanisms (1).



- Clip in the bumper panel with latch mechanisms (2).
- Tighten the screws (1).

Rear bumper trim panel to guide

Hexagon screw		Tightening torque	2.5 Nm



NOTICE

Perform the operations on the left and right side.

- Tighten down screw (1).

Rear bumper trim panel to guide

Hexagon screw		Tightening torque	2.5 Nm

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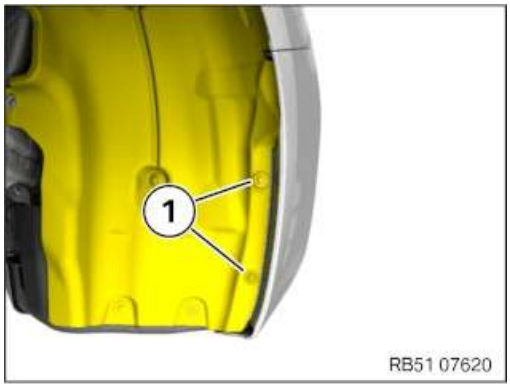
NOTICE

Perform the operations on the left and right side.

- Tighten down screw (1).

Lower bumper panel to body

Oval-head screw		Tightening torque	2.5 Nm



NOTICE

Perform the operations on the left and right side.

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

- Tighten the screws (1).

Rear wheel arch cover to bumper trim panel

Hexagon screw		Tightening torque	2,6 Nm

10 – Installing the rear light on the left and right side panels

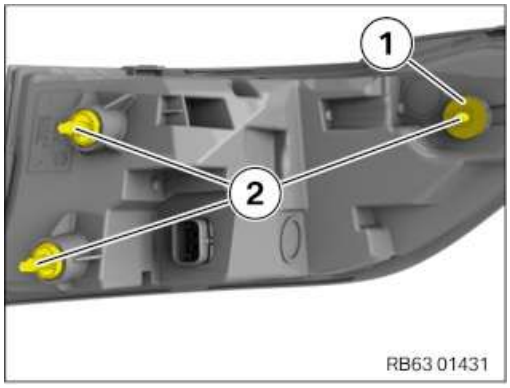
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Install the rear light on the side panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



Check

- Check the seal (1) for damage and renew if necessary.
- Check the threaded inserts (2) for damage.

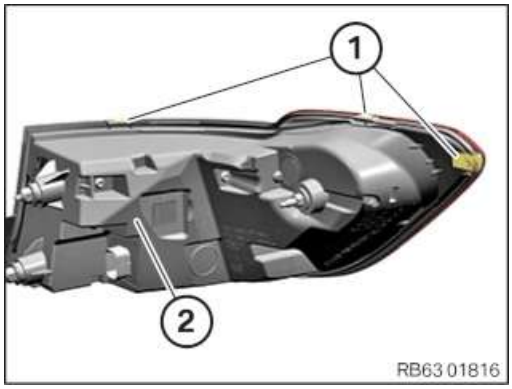
cardiagn.com

Result

» The threaded inserts are damaged.

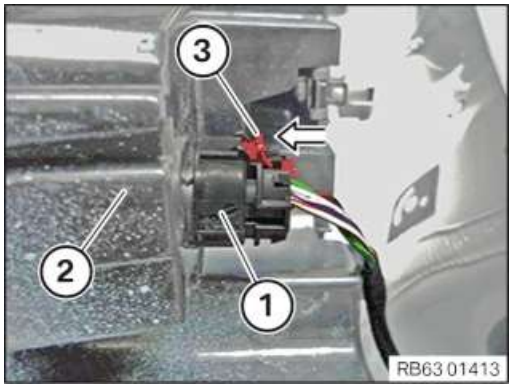
Measure

- Replace rear light.



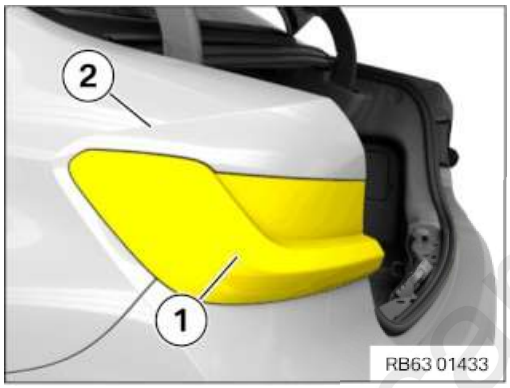
- Contact surfaces (1) on rear light (2) must not be damaged or missing.

  Missing contact surfaces (1) could cause paintwork damage.

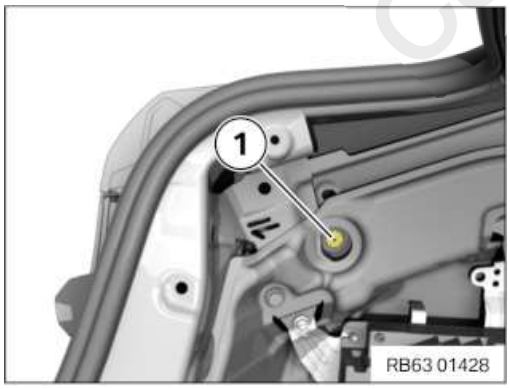


- Connect the connector (1) to the rear light on the side panel (2).

  The connector (1) must engage audibly.
- Lock the lock in direction of arrow (3).

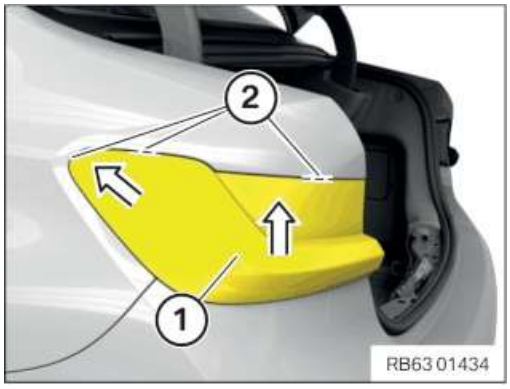


- Position the rear light on the side panel (1) on the side panel (2).

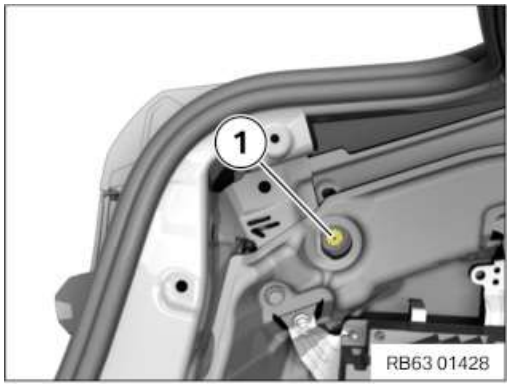


- Position the nut (1).

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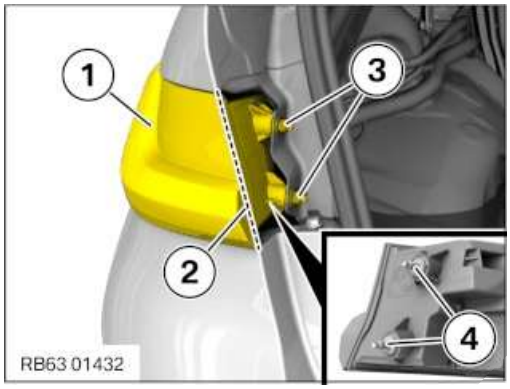
- Position the rear light on the side panel (1) to the front at the top.
- Move the contact surfaces (2) of the rear light on the side panel (1) upwards (arrow) so that they are in place.
- Hold the rear light on the side panel (1) in position.



- Tighten nut (1).

Rear light to side panel to body

Combination hexagon nut		Tightening torque	4 Nm



- Position nuts (3).
- Align rear light on the side panel (1) with the connecting line (2).

  The alignment is done through threaded inserts (4) on the rear light on the side panel (2).
- If necessary, correct the position of the rear light on the side panel (1) by twisting threaded inserts (4).
- Tighten nuts (3).

Rear light to side panel to body

Combination hexagon nut		Tightening torque	4 Nm

11 – Installing trim in water channel on left and right

NOTICE

Description is for left component only. Procedure on the right side is identical.

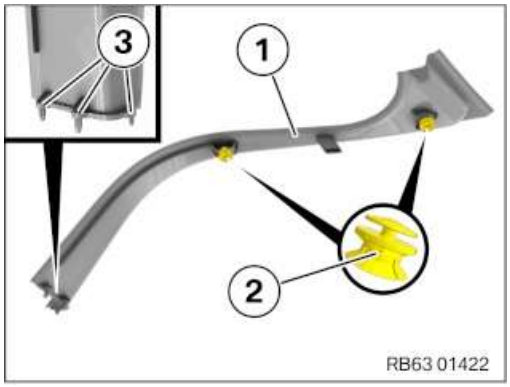
▸ Installing trim in water channel

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

Check

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- Check clips (2) for damage and renew if necessary.
- Check guides (3) for damage.

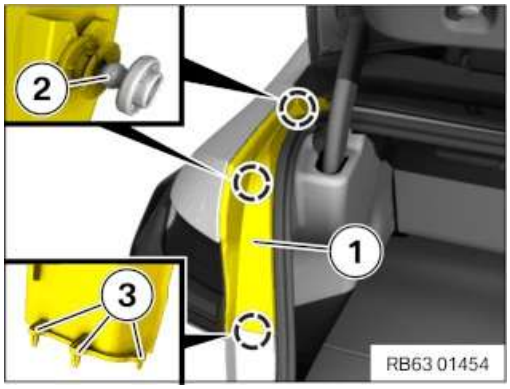
Result

» The guides are damaged.

Measure

- Renew the trim .

  Parts: trim



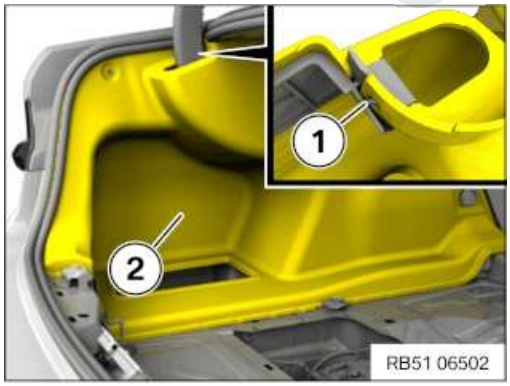
- Insert trim (1) in guides (3).
- Clip trim (1) from above into ball pins (2).

12 – Partially installing the luggage compartment wheel arch trim panel on the left and right

▸ Partially installing the left luggage compartment wheel arch trim panel

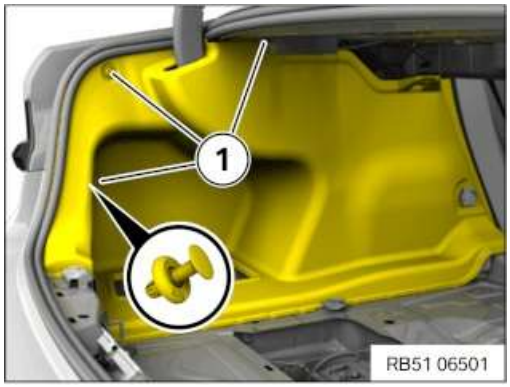
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Feed the luggage compartment wheel arch trim panel (2) into the rear area under the sealing lip of the tailgate seal.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).

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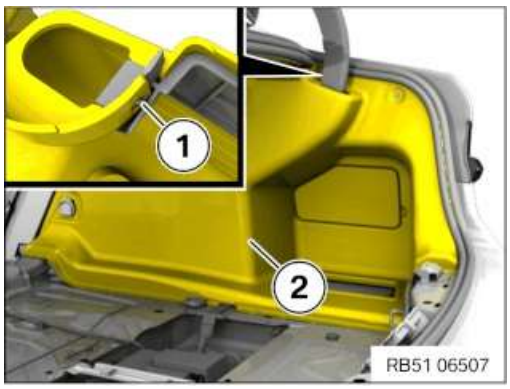


- Secure expanding rivet (1).

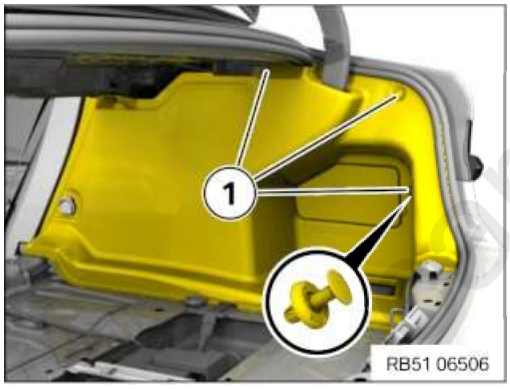
▸ **Partially installing right luggage compartment wheel arch trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Guide luggage compartment wheel arch trim panel (2) into the rear area under the sealing lip of the tailgate seal.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).

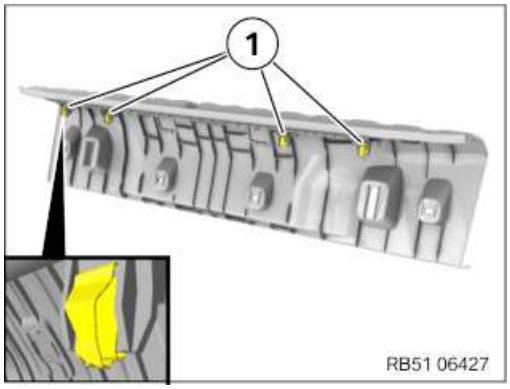


- Secure expanding rivet (1).

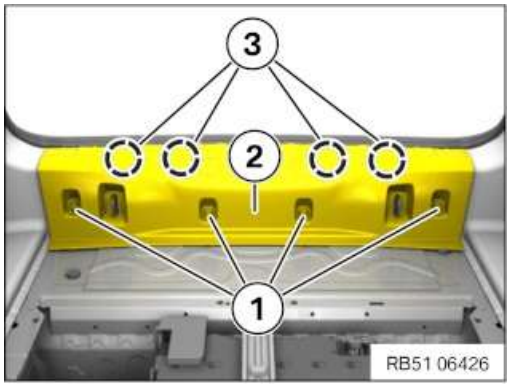
13 – Installing loading edge trim

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Check the clamps (1) for damage and renew if necessary.



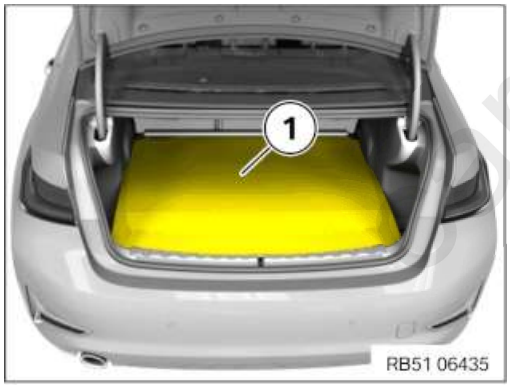
- Insert the loading edge trim (2) under the sealing lip of the tailgate seal.
- Fit the trim of the loading edge (2) at the latch mechanisms (3) and clip it in to the bottom.
- Secure expanding rivet (1).

14 – Installing the luggage compartment floor trim panel

▸ **Installing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Insert the luggage compartment floor trim panel (1).

Additional Information

Overview of Tightening Torques

Mounting for rear bumper panel on support for rear bumper panel — Used in step 8

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm

Rear bumper trim panel to guide — Used in step 9

Hexagon screw		Tightening torque	2.5 Nm

Lower bumper panel to body — Used in step 9

Oval-head screw		Tightening torque	2.5 Nm

Rear wheel arch cover to bumper trim panel			Used in step 9
Hexagon screw		Tightening torque	2,6 Nm

Rear light to side panel to body			Used in step 10
Combination hexagon nut		Tightening torque	4 Nm

Links

Repair instructions	Used in step
61 13 ... Unlocking and disconnecting different plug connections	5

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61 35 953 Remove and install/replace interior aerial for Comfort Access

PRELIMINARY WORK

1 – Remove cupholder

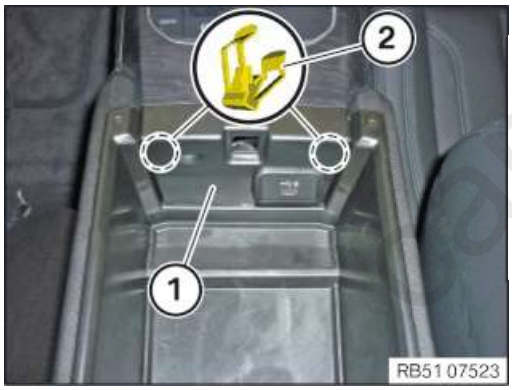


- Remove the insert (1).

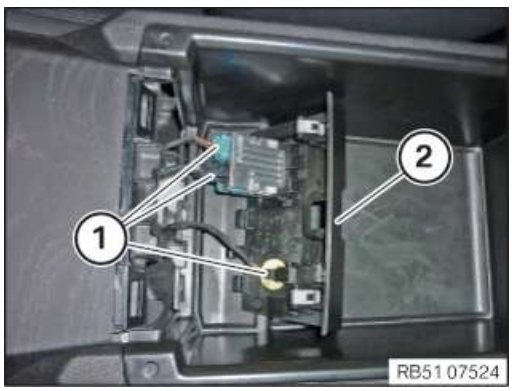


- Loosen screws (1).
- Feed the cup holder (2) out to the top.
- Unlock associated plug connections and disconnect.

2 – Removing the trim in the storage compartment on the centre armrest



- Lever out the trim (1) with the special tool (2) toward the rear from the clamps 2 298 505.



- Unlock and disconnect the plug connections (1) and remove the trim (2) .

3 – Remove the centre console trim

RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



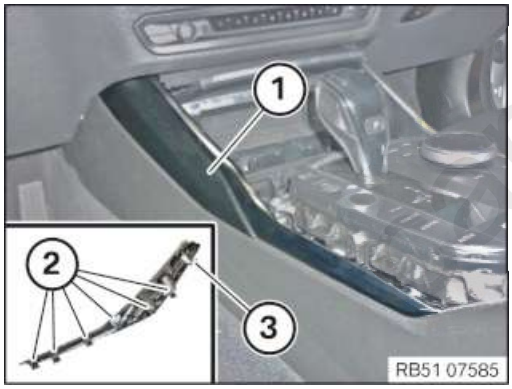
- Release and remove the centre console trim upwards (1) as shown using the special tool 2 298 505 from the latch mechanisms.

4 – Removing the decorative trim on the centre console on the left and right

▸ **Remove the decorative trim from the centre console**

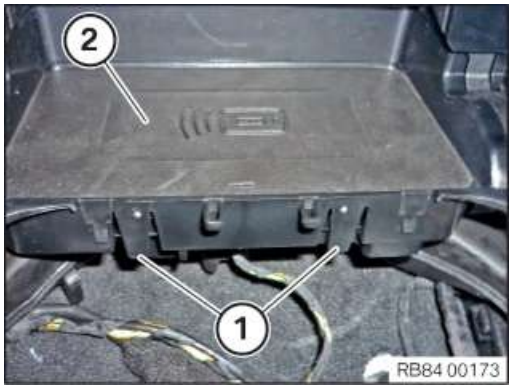
NOTICE

Description is for left component only. Procedure on the right side is identical.

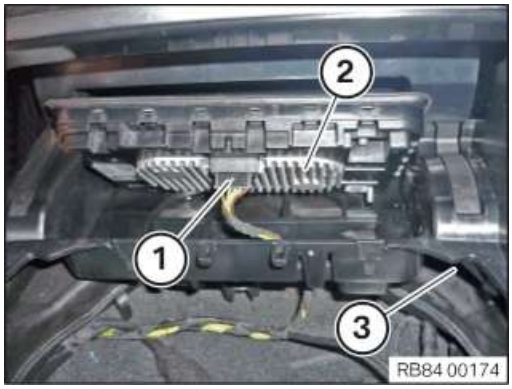


- Lever out the rear decorative trim (1) from the latch mechanisms (2) starting from the top.
- Feed out the decorative trim (1) backwards out of the guide (3) and remove.

5 – Removing the wireless charging station



- Loosen the latch mechanisms (1) and push out the wireless charging station (2) upwards.



- Unlock and disconnect the plug connection (1) and remove the wireless charging tray (2) from the centre console (3).

6 – Remove the operating facility in the centre console

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

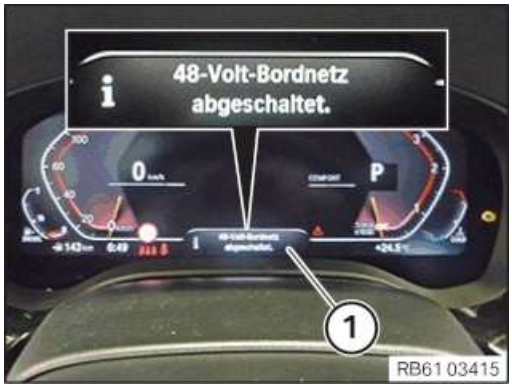
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.

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- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.

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- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

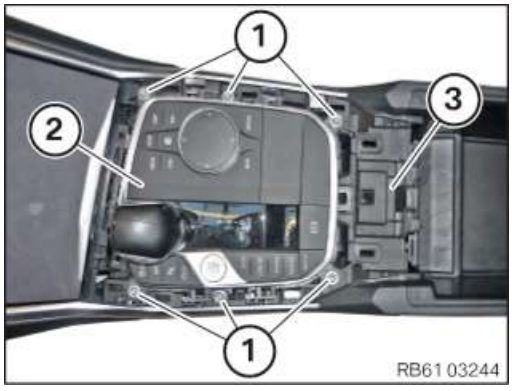
- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

▸ **Disconnecting all battery earth leads**

- See additional information.

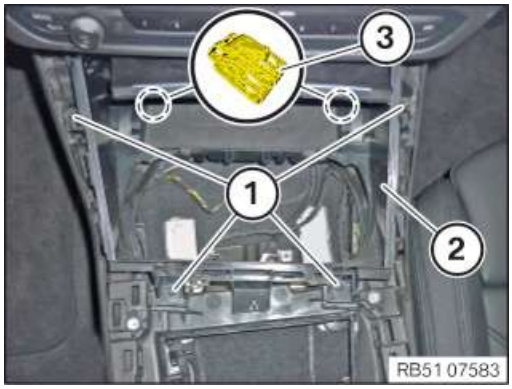




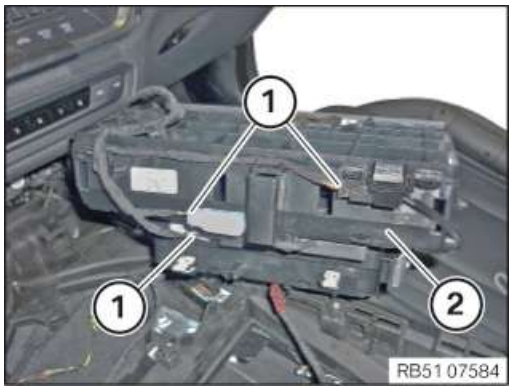
- Loosen screws (1).
- Remove the operating facility in the centre console (2) from the centre console (3).

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7 – Removing the storage compartment in the front centre console



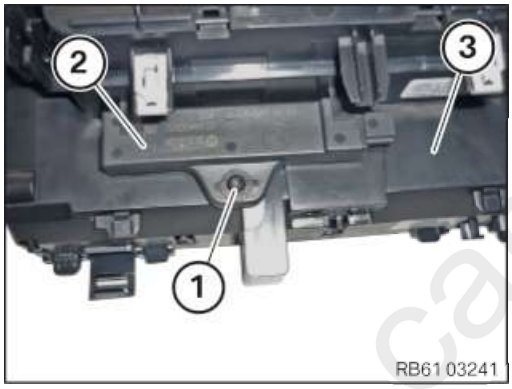
- Loosen screws (1).
- Pull the storage compartment in front centre console (2) backwards from the clamps (3).



- Unlock and disconnect the plug connections (1) and remove the storage compartment in centre console (2).

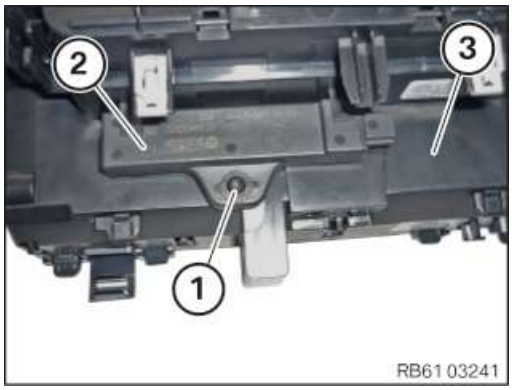
MAIN WORK

8 – Removing interior aerial on the front storage compartment



- Loosen screw (1).
- Detach the interior aerial (2) from the storage compartment (3) and remove.

9 – Install front interior aerial on storage compartment



- Position the interior aerial (2) on storage compartment (3) and tighten the screw (1).

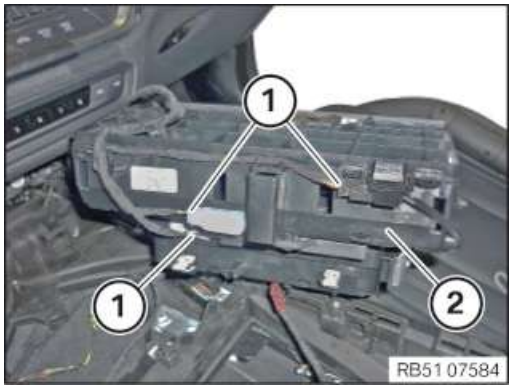
Interior aerial

Screw		Tightening torque	2.3 Nm

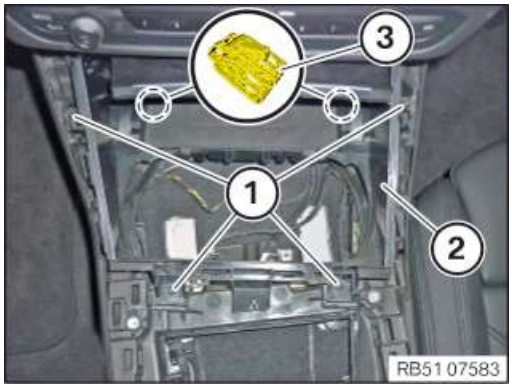
POSTPROCESSES

10 – Installing the storage compartment in the centre console in the front

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- Mount the storage compartment in the centre console in the front (2) and connect and lock connectors (1).

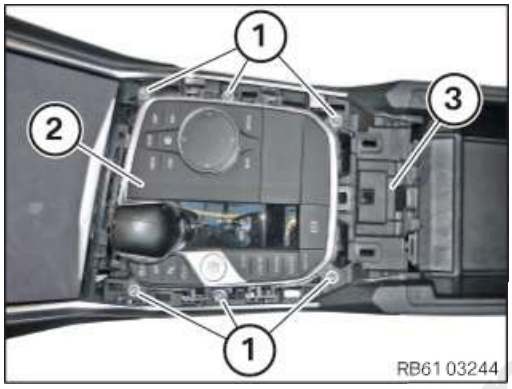


- Engage the storage compartment in the centre console in the front (2) into clamps (3) in the rear.
- Tighten the screws (1).

Storage compartment in centre console

Oval-head screw		Tightening torque	1,8 Nm

11 – Install the operating facility in the centre console



- Position the operating facility (2) in the centre console (3).
- Tighten the screws (1).

Gear selector switch to centre console trim

Screw		Tightening torque	1,8 Nm

▸ **Connecting all battery earth leads**



- See additional information.

▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

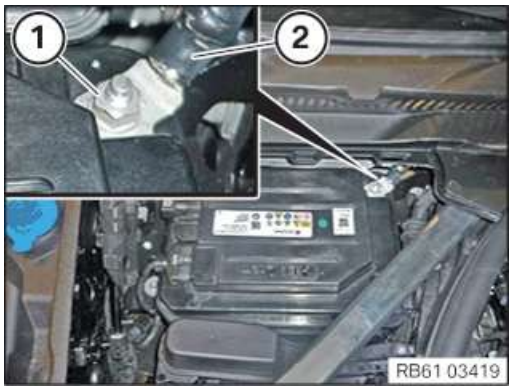
Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



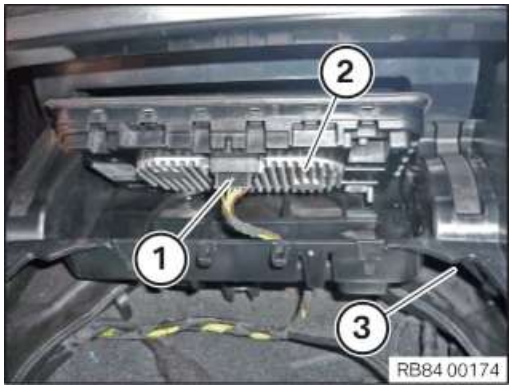
- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



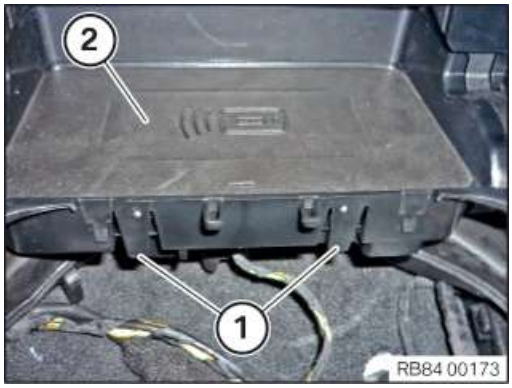
- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

12 – Installing the wireless charging station



- Connect connectors (1) and lock.
- Position the wireless charging station (2) in the centre console (3).



- Push the wireless charging tray (2) down.

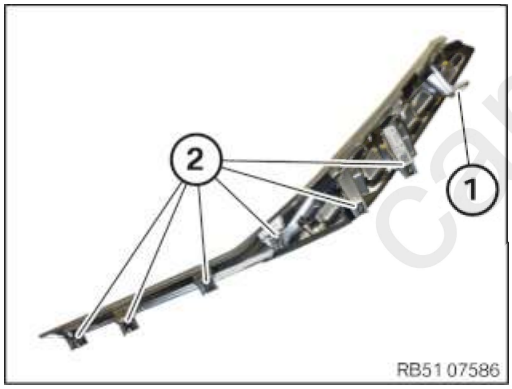
  The latch mechanisms (1) must engage correctly.

13 – Installing the decorative trim on the centre console on the left and right

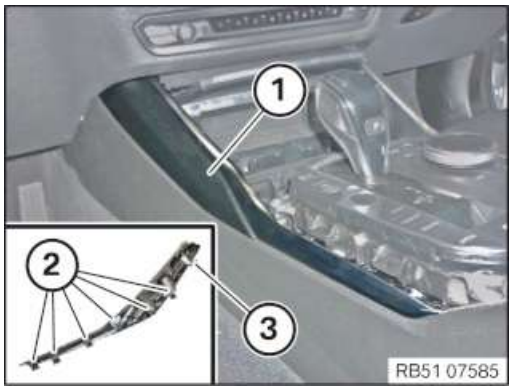
▸ **Installing the decorative trim on the centre console**

NOTICE

Description is for left component only. Procedure on the right side is identical.



- Check the guide (1) and the latch mechanisms (2) for damage, renew the decorative trim if necessary.



- Feed in the decorative trim (1) forward in the guide (3).
- Engage decorative trim (1) in latch mechanisms (2).

14 – Installing the centre console trim

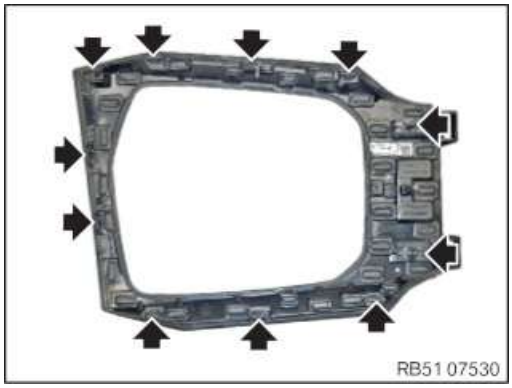
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RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

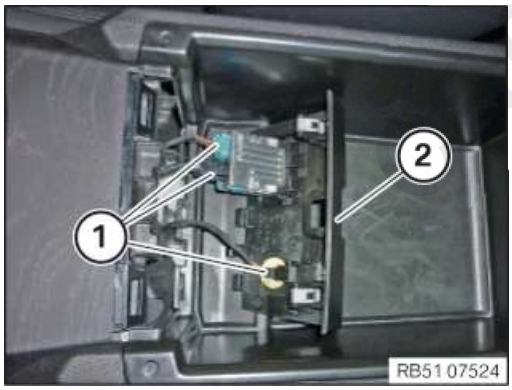


- Check all the latch mechanisms or clamps (arrows).
- In case the latch mechanisms or the clamps (arrows) are faulty, renew the centre console trim .

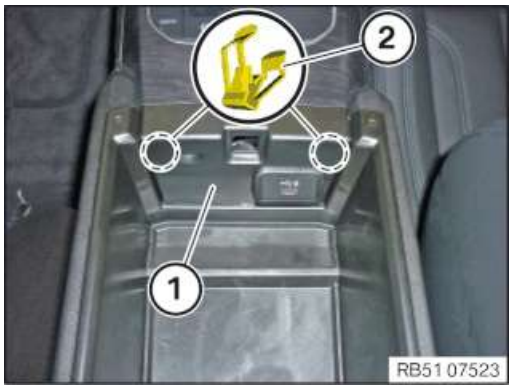


- Correctly position the centre console trim (1) and engage at the latch mechanisms.

15 – Installing the trim in the storage compartment of the centre armrest



- Mount the trim (2) and connect connector (1) and lock.



- Correctly position trim (1) and snap into the clamps (2).

16 – Install the cup holder



- Fix the cup holder (2) and the belonging connectors.
- Correctly position the cup holder (2).
- Tighten the screws (1).

Cup holder to centre console

Oval-head screw		Tightening torque	1,8 Nm



- Insert the insert (1).

Additional Information

Overview of Tightening Torques

Interior aerial Used in step 9

Screw		Tightening torque	2.3 Nm

Storage compartment in centre console Used in step 10

Oval-head screw		Tightening torque	1,8 Nm

Gear selector switch to centre console trim Used in step 11

Screw		Tightening torque	1,8 Nm

Negative battery cable to 48-V battery Used in step 11

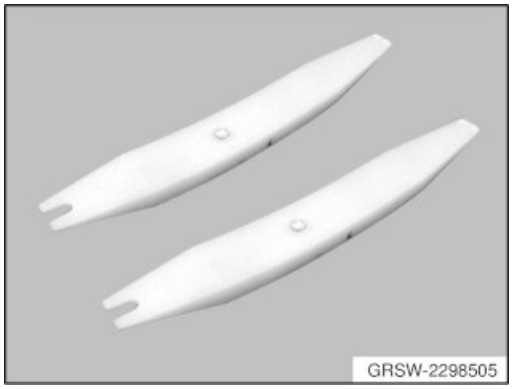
Nut M8		Tightening torque	19 Nm

Cup holder to centre console Used in step 16

Oval-head screw		Tightening torque	1,8 Nm

Overview of Special Tools

2 298 505 Wedge



Common Used in step 23

Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

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Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	611

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
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61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	611
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	611
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
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61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611
61 20 900 Disconnecting and connecting battery earth lead	611

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61 35 954 Remove and install/replace interior aerial for Comfort Access

PRELIMINARY WORK

1 – Removing the rear centre console trim

RISK OF DAMAGE

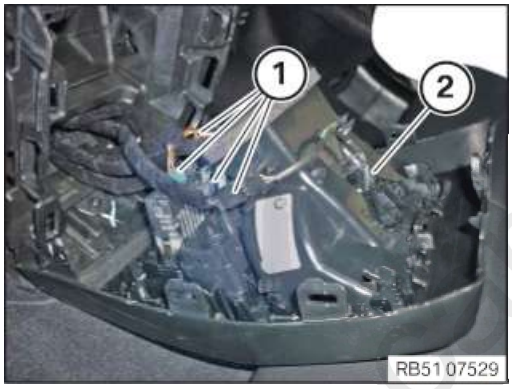
Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.



- Release centre console trim (1) backwards from the latch mechanisms at the side and remove it slightly at the back.

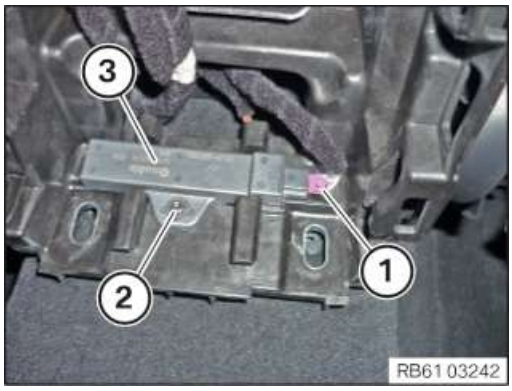


- Unlock and disconnect plug connections (1).
- Remove the centre console trim (2).

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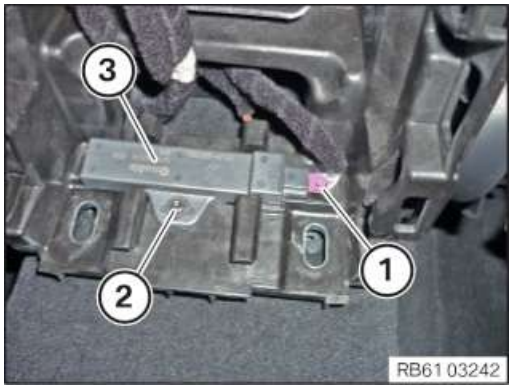
MAIN WORK

2 – Removing the interior aerial from the rear centre console



- Disconnect plug connection (1).
- Loosen screw (2).
- Remove the interior aerial (3).

3 – Install the interior aerial on the rear centre console



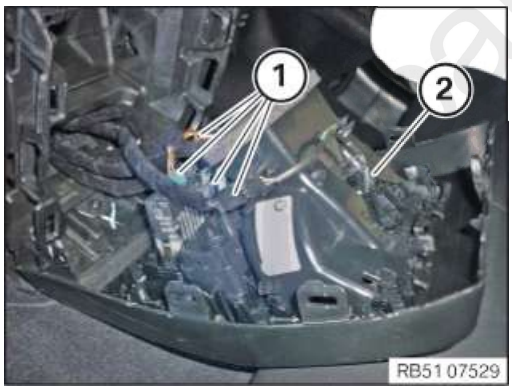
- Connect connector (1).
- Position interior aerial (3) correctly and tighten the screw (2).

Interior aerial

Screw		Tightening torque	2.3 Nm

POSTPROCESSES

4 – Installing the rear centre console trim



- Install the centre console trim (2).
- Connect connectors (1) and lock.



- Position centre console trim (1) and engage at the latch mechanisms at the side.

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Additional Information

Overview of Tightening Torques

Interior aerial Used in step 3

Screw		Tightening torque	2.3 Nm

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61 35 021 Remove and install/replace near-field communication storage tray

Prerequisite

- The lid of the front storage compartment is open.

PRELIMINARY WORK

1 – Remove cupholder



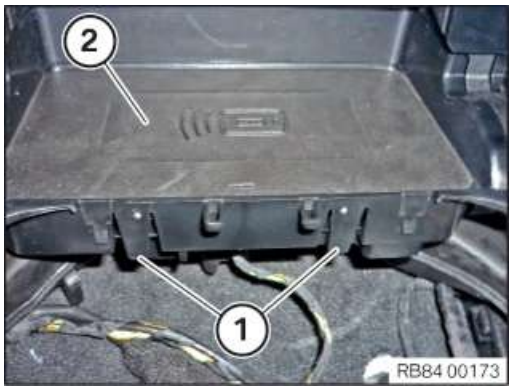
- Remove the insert (1).



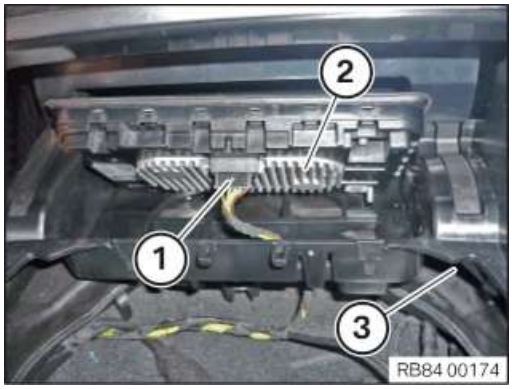
- Loosen screws (1).
- Feed the cup holder (2) out to the top.
- Unlock associated plug connections and disconnect.

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2 – Removing the storage tray for Near Field Communication

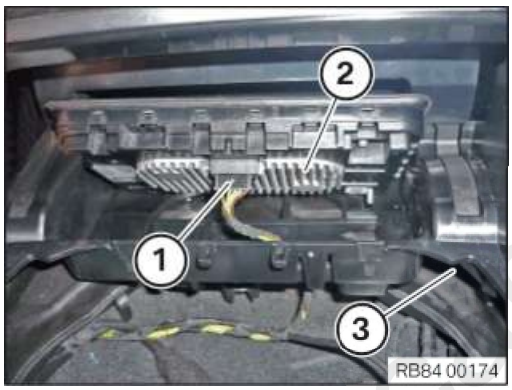


- Release the latch mechanisms (1) and push put the storage tray (2) to the top.

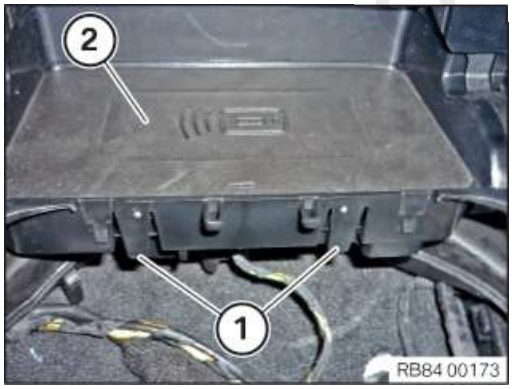


- Disconnect the plug connection (1) and remove the storage tray (2) from the centre console (3).

3 – Installing the Near Field Communication storage tray



- Connect connector (1).
- Position the storage tray (2) in the centre console (3).



- Insert the storage tray (2) until the latch mechanisms (1) engage correctly.

mdiagn.com

4 – Install the cup holder



- Fix the cup holder (2) and the belonging connectors.
- Correctly position the cup holder (2).
- Tighten the screws (1).

Cup holder to centre console

Oval-head screw		Tightening torque	1,8 Nm



- Insert the insert (1).

Additional Information

Overview of Tightening Torques

Cup holder to centre console Used in step 4

Oval-head screw		Tightening torque	1,8 Nm

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61 35 196 Removing and installing control unit for automatic tailgate operation

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads

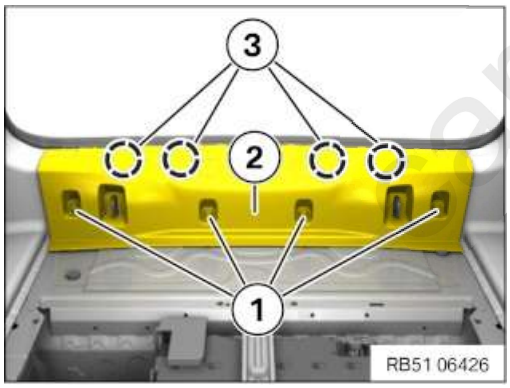


- See additional information.

3 – Removing the loading edge trim

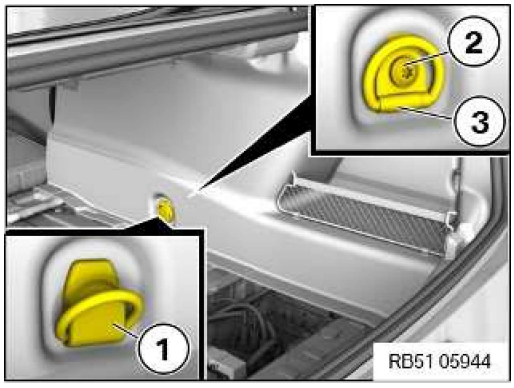
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

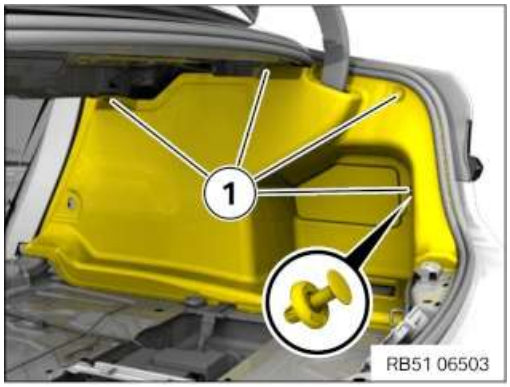


- Loosen the expanding rivet (1).
- Unclip loading edge trim(2) upwards from latch mechanisms (3).
- Guide out and remove loading edge trim (2) under the sealing lip of the tailgate seal.

4 – Removing right luggage compartment wheel arch trim panel

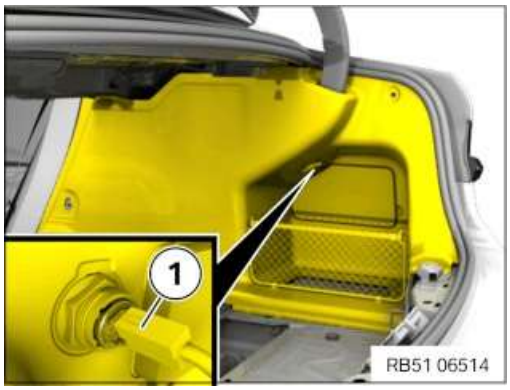


- Remove the cover (1).
- Loosen screw (2).
- Remove the lashing eye (3).

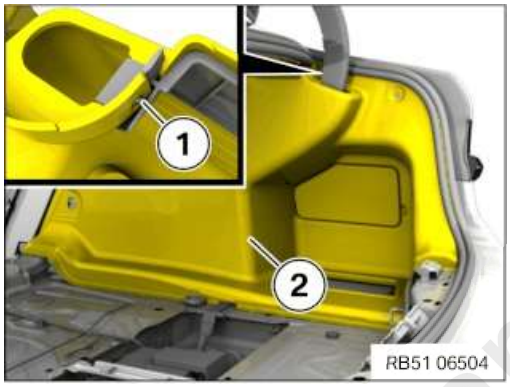


- Reposition the right rear seat backrest.
- Loosen the expanding rivet (1).

▸ If installed: Disconnect plug connection of the 12 V connection (additional work with storage package equipment specification)



- Unlock and disconnect the plug connection (1) of the 12 V power socket.

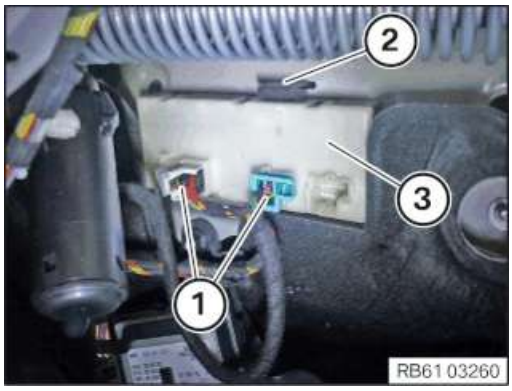


- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip for the tailgate and the side trim panel in the rear passenger compartment.
- Remove luggage compartment wheel arch trim panel (2).

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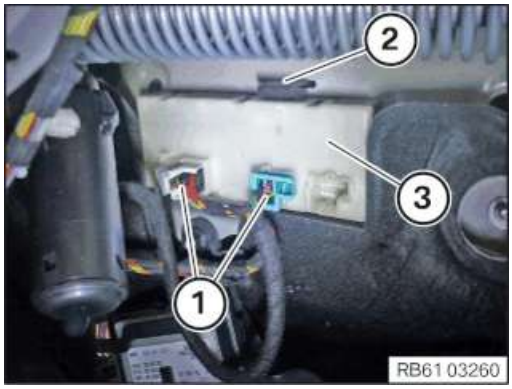
MAIN WORK

5 – Remove the control unit for the automatic tailgate operation



- Unlock and disconnect plug connections (1).
- Unlock the latch mechanism (2) and remove the control unit (3).

6 – Install the control unit for the automatic tailgate operation



- Position the control unit (3) correctly and engage it in the latch mechanism (2).
- Connect connectors (1) and lock.

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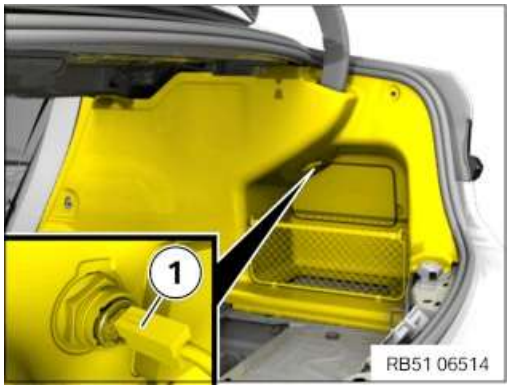
POSTPROCESSES

7 – Installing the luggage compartment wheel arch trim panel on the right

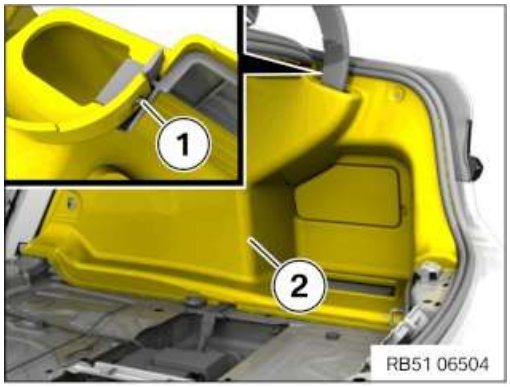
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

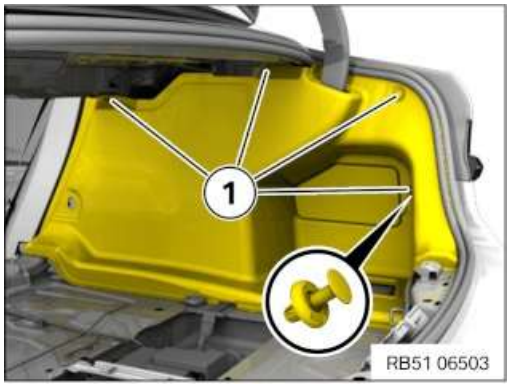
▸ If installed: Connecting plug of the 12 V power socket (additional work for equipment specification with storage package)



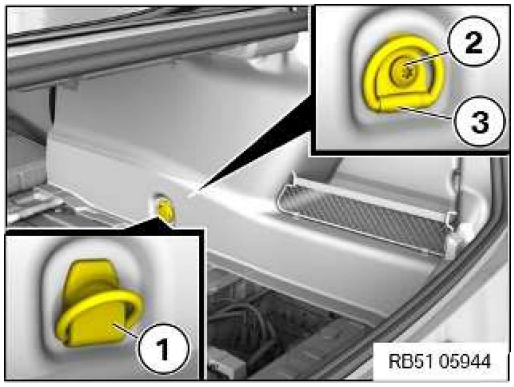
- Connect and lock connector (1) of the 12 V power socket.



- Feed luggage compartment wheel arch trim panel (2) under the side trim panel in the rear passenger compartment and the sealing lip for the tailgate.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).



- Secure expanding rivet (1).
- Raise the right rear seat backrest.



- Position the lashing eye (3).
- Tighten down screw (2).

Lashing eye to body

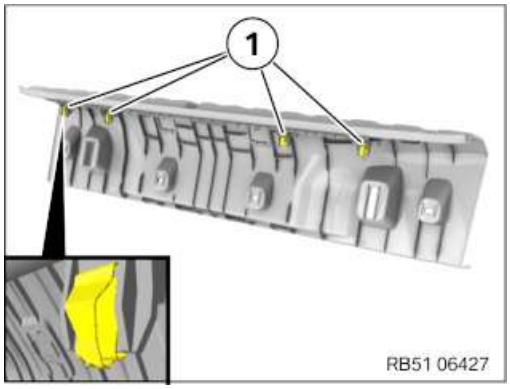
	Tightening torque	19 Nm

- Install the cover (1) .

8 – Installing loading edge trim

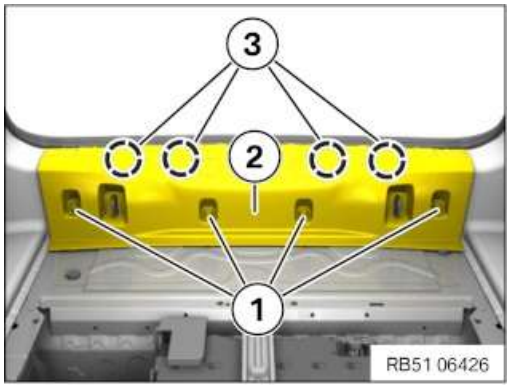
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Check the clamps (1) for damage and renew if necessary.

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- Insert the loading edge trim (2) under the sealing lip of the tailgate seal.
- Fit the trim of the loading edge (2) at the latch mechanisms (3) and clip it in to the bottom.
- Secure expanding rivet (1).

9 – Connecting all battery earth leads



- See additional information.

10 – Activating the 48 V electrical system

Prerequisite

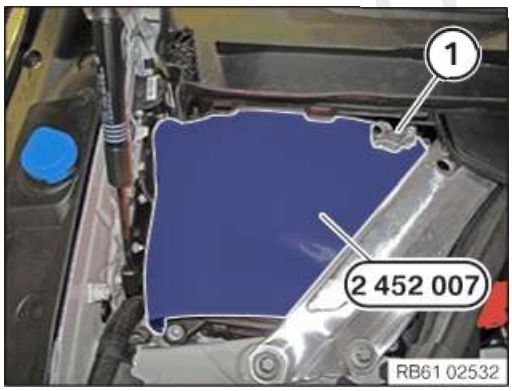
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .

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- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Lashing eye to body Used in step 7

	Tightening torque	19 Nm

Negative battery cable to 48-V battery Used in step 10

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	110

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29

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61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29

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61 35 095 Removing and installing control unit/module for seat heating

RISK OF DAMAGE



Electrostatic discharge.

Damage to or destruction of electrical components.

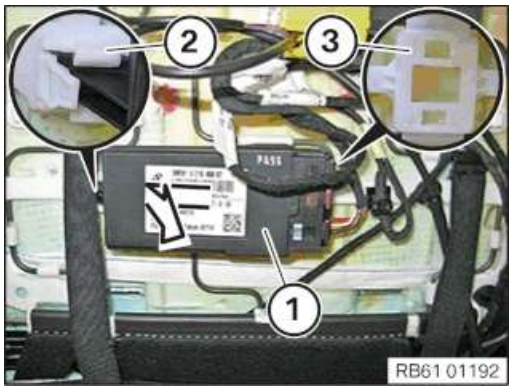
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

NOTICE

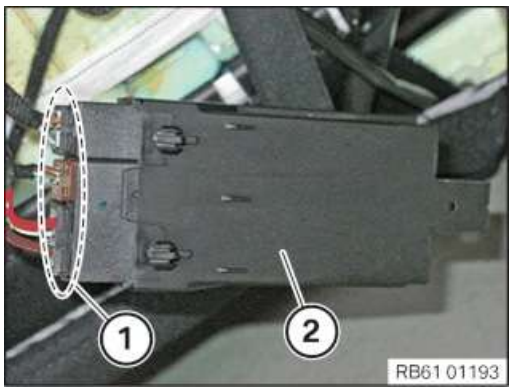
Description is for left component only. Procedure on the right side is identical.

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1 – Remove the seat-heating electronics

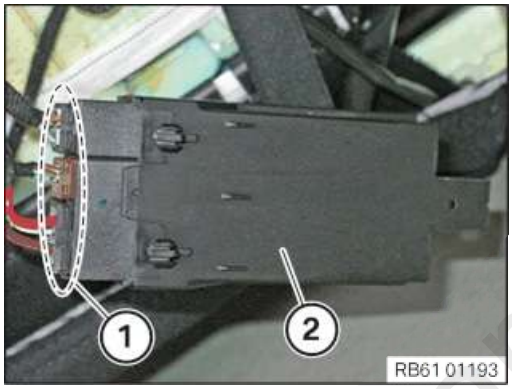


- Release the seat-heating electronics (1) in the direction of the arrow from the holder (3) and the guide (2) and remove.

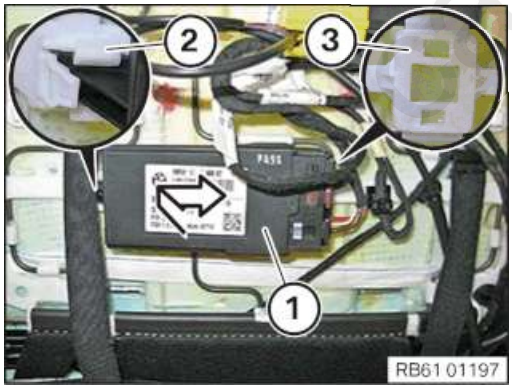


- Unlock all connectors (1) at seat-heating electronics (2) and disconnect.

2 – Install the seat-heating electronics



- Connect all connectors (1) on the seat-heating electronics (2).



- Insert the seat-heating electronics (1) in direction of arrow in the guide (2) and holder (3).

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Additional Information

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	
61 35 ... Notes on ESD protection (Electro Static Discharge)	

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61 35 080 Removing and installing the control unit/module for the left or right seat adjustment

NOTICE

Description is for left component only. Procedure on the right side is identical.

PRELIMINARY WORK

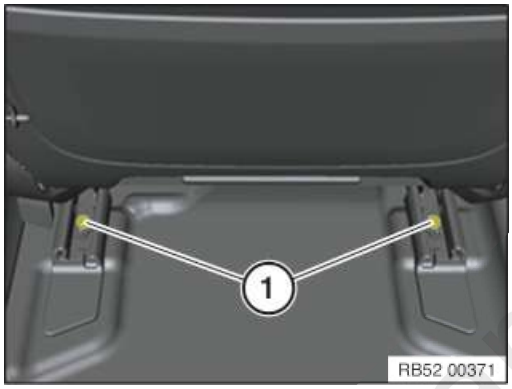
1 – Remove front seat

WARNING

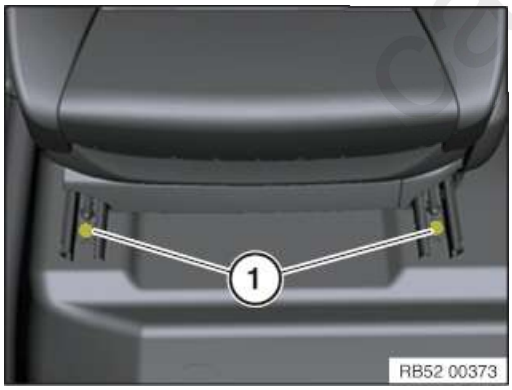
Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.



- Loosen screws (1).



- Loosen screws (1).
- Adjust the front seat to the centre position.
- **When removing the driver's seat:**

  Completely retract the steering column

  Adjust the steering column completely upwards.

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

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WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

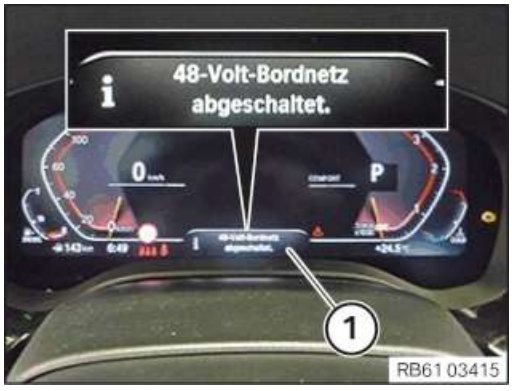
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.

tdiagn.com



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

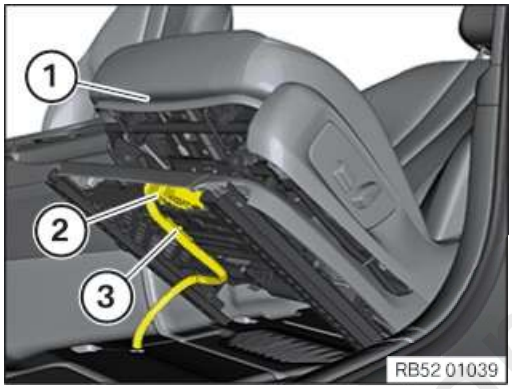
- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

▸ **Disconnecting all battery earth leads**



- See additional information.



RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

- Cover the door sill using protective covers.
- Place front seat (1) to the rear.
- Unlock plug connection (2) and disconnect.
- Loosen the cable clip (3).

RISK OF DAMAGE

Heavy component.

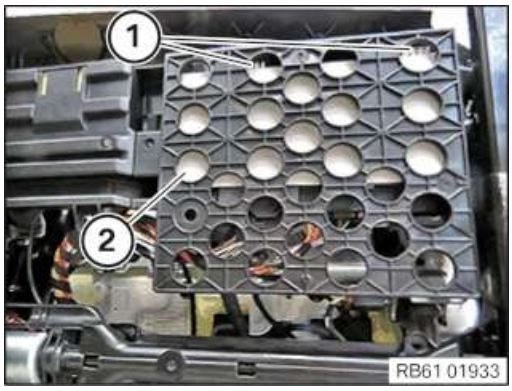
Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.

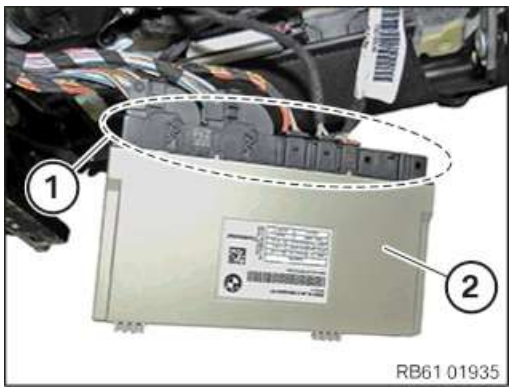
- Lift out front seat (1) with the assistance of a second person.

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2 – Removing the driver's seat module (SMFA)

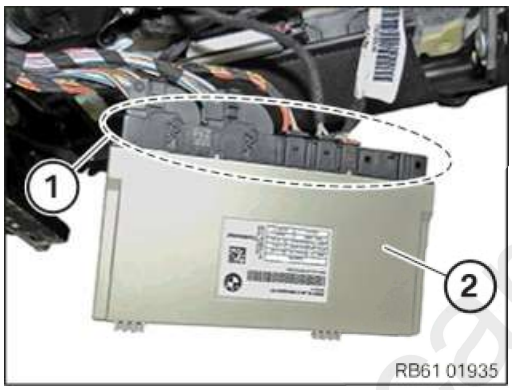


- Unlock the retaining lugs (1).
- Pull the driver's seat module (SMFA) (2) forwards.

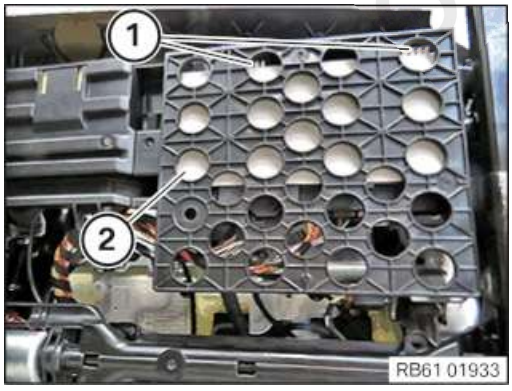


- Unlock plug connection (1) and disconnect.
- Remove the driver's seat module (SMFA) (2) from the holder.

3 – Installing the driver's seat module (SMFA)



- Connect connector (1).
- Position the driver's seat module (SMFA) (2) in the holder.



- Press the driver's seat module (SMFA) (2) in the holder until the retaining lugs (1) engage.

POSTPROCESSES

4 – Install front seat

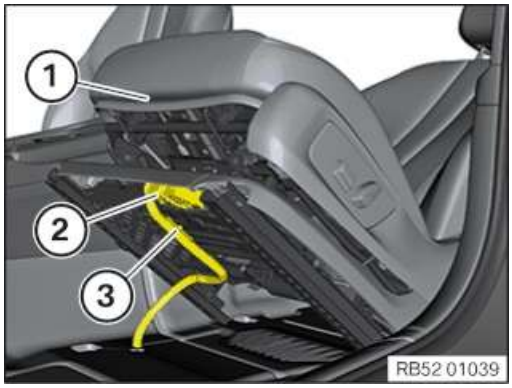
carsdiagn.com

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.



RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

- Cover the door sill using protective covers.

RISK OF DAMAGE

Heavy component.

Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.

- Lift front seat (1) into the vehicle with the assistance of a second person.
- Place front seat (1) to the rear.
- Connect connectors (2) and lock.
- Attach the cable clip (3).

▸ **Connecting all battery earth leads**

- See additional information.



▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

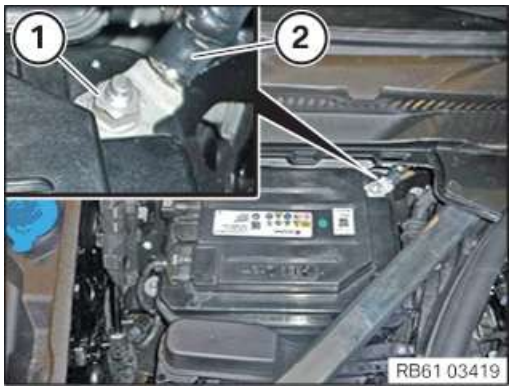
Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm

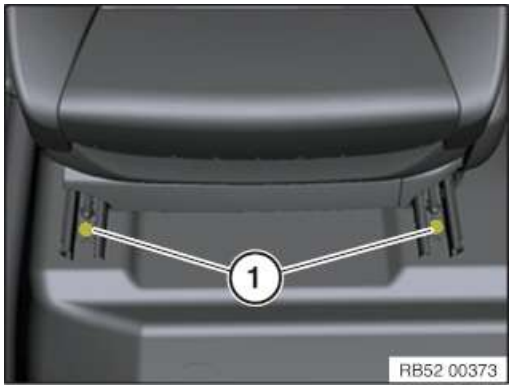


- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

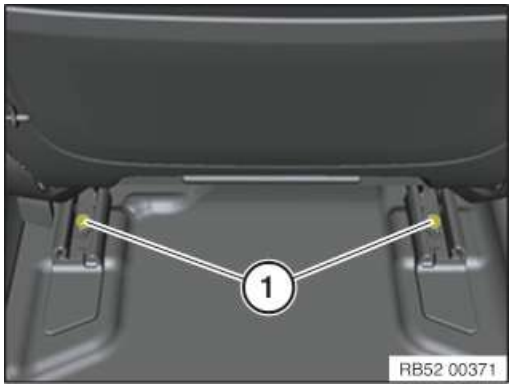


- Move front seat rearwards.
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Seat to body

Cheese head screw with collar	Renew screw.	Tightening torque	42 Nm



- Move front seat forwards.
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Seat to body

Cheese head screw with collar	Renew screw.	Tightening torque	42 Nm

Additional Information

Overview of Tightening Torques

Negative battery cable to 48-V battery Used in step 4

Nut M8		Tightening torque	19 Nm

Seat to body Used in step 4

Cheese head screw with collar	Renew screw.	Tightening torque	42 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	14

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	14

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14

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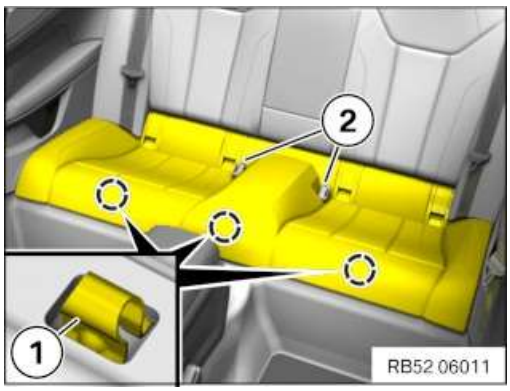
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14

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61 35 097 Removing and installing the control unit/module for the left or right seat heating

PRELIMINARY WORK

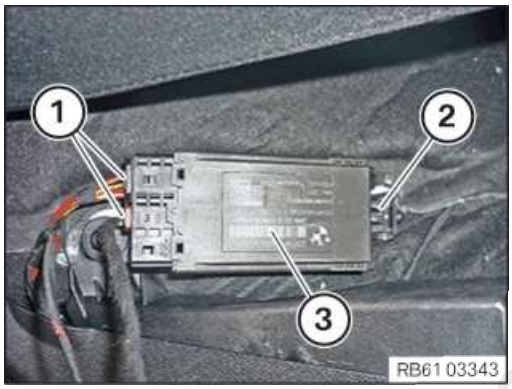
1 – Remove rear seat bench



- Unclip the rear seat bench upwards from clamps (1) and guide out seat belt buckles (2).
- Remove the rear seat bench.

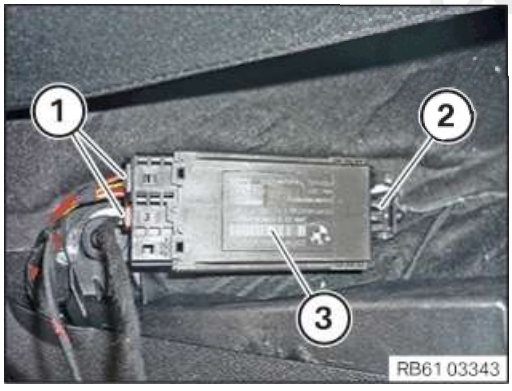
MAIN WORK

2 – Remove the seat-heating electronics for the rear seat



- Unlock plug connection (1) and disconnect.
- Release latch mechanism (2) and remove seat-heating electronics (3).

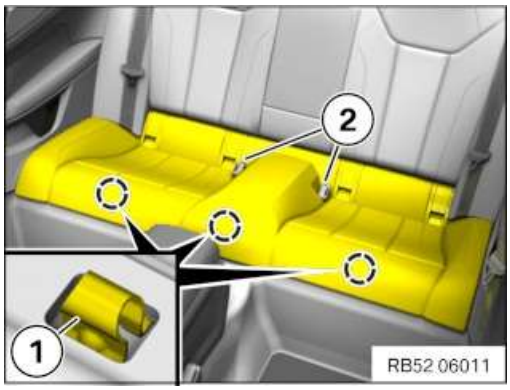
3 – Install the seat-heating electronics for the rear seat



- Position the seat-heating electronics (3) and engage in the latch mechanism (2).
- Connect connector (1).

ardiagn.com

4 – Installing the rear seat bench



- Feed in the seat belt buckles (2).
- Position the rear seat bench and clip into the clamps (1).

cardiagn.com

61 35 240 Removing and installing the non-contact tailgate opening control unit

RISK OF DAMAGE

Mechanical effects.

Paint damage.

- Mask those working areas at risk with yellow plastic adhesive tape.
- Remove and install heavy or bulky components with the aid of another person/other persons.

TECHNICAL INFORMATION

To guarantee the quality of the driver assistance functions in vehicles with concealed radar sensors installed, the component may only be repainted by observing the repair specifications described in the document "Standards for repair painting with sensor systems".

Sourcing reference:

https://colorsystem-paint.com/

Aftersales Information Research (AIR) - Repair and service messages - HG99 - ColorSystem

ISTA - HG99 - ColorSystem

No stickers or foils (transparent or coloured) may be attached in the radiation areas of the radar sensors.

The component may be painted if no radar sensors have been installed.

The following features can be used to identify whether radar sensors are installed on the vehicle:

Radar sensors are installed at the rear if the triangular warning light is located on the exterior mirror (in the mirror glass or on the mirror frame).

Radar sensors are installed at the front and rear if the triangular warning light is located on the exterior mirror (in the mirror glass or on the mirror frame) in conjunction with the optional equipment S5ATA or S5AUA.

PRELIMINARY WORK

1 – Removing the luggage compartment floor trim panel

▸ **Removing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



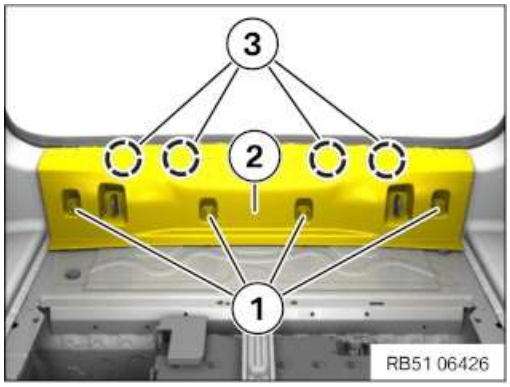
- Remove luggage compartment floor trim panel (1).

2 – Removing the loading edge trim

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NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



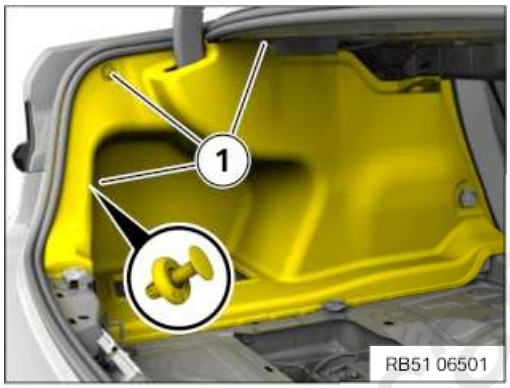
- Loosen the expanding rivet (1).
- Unclip loading edge trim(2) upwards from latch mechanisms (3).
- Guide out and remove loading edge trim (2) under the sealing lip of the tailgate seal.

3 – Removing part of the luggage compartment wheel arch trim panel on the left and right

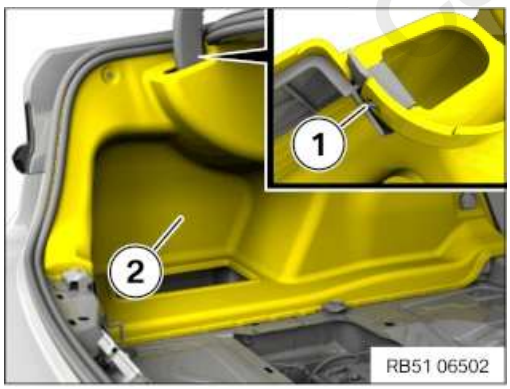
▸ **Partially remove luggage compartment wheel arch panel on left**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Loosen the expanding rivet (1).



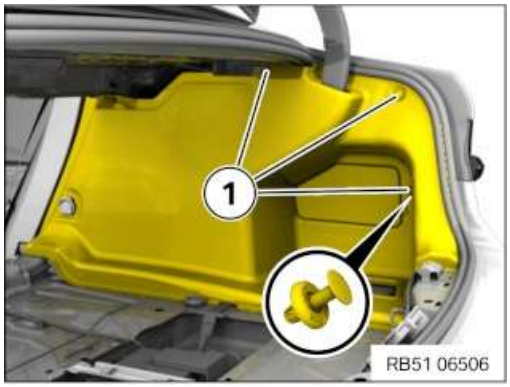
- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip of the tailgate seal and release it in the rear area.

▸ **Partially remove luggage compartment wheel arch panel on right**

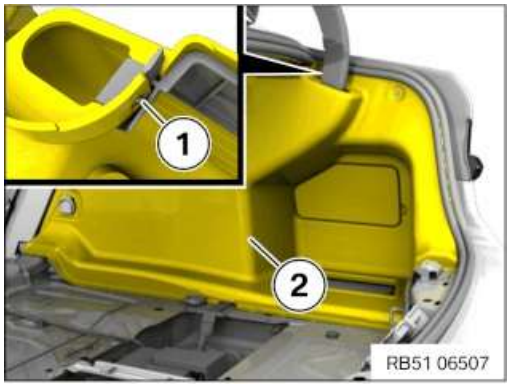
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

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- Loosen the expanding rivet (1).



- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip of the tailgate seal and release it in the rear area.

4 – Removing trim from water channel on left and right

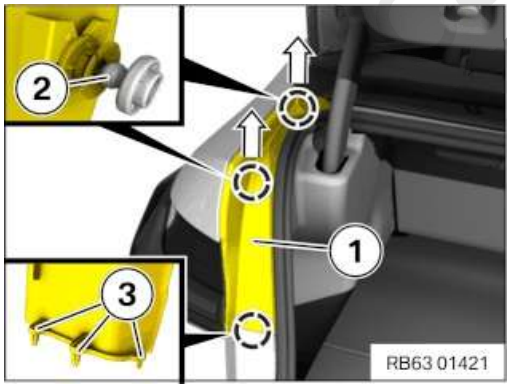
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing trim from water channel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Unclip trim (1) in upward direction from ball pins (2).
- Release trim (1) from guides (3) and remove.

5 – Removing the rear light on the left and right side panels

NOTICE

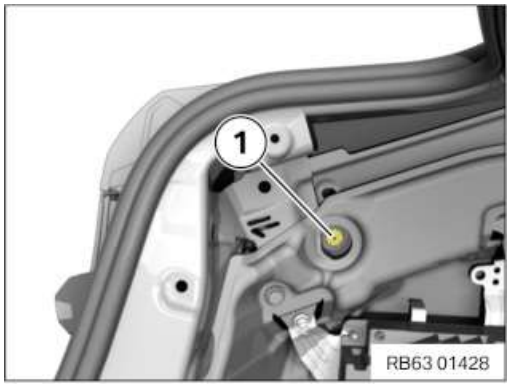
Description is for left component only. Procedure on the right side is identical.

▸ **Removing the rear light on the side panel**

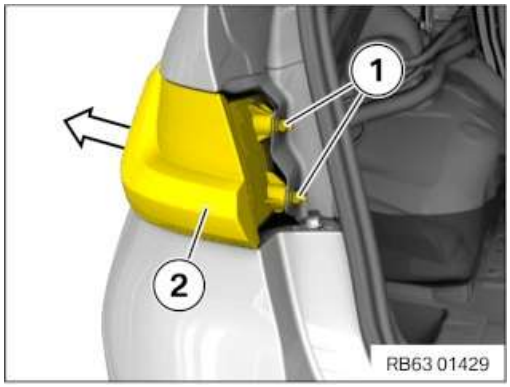
cardiagn.com

NOTICE

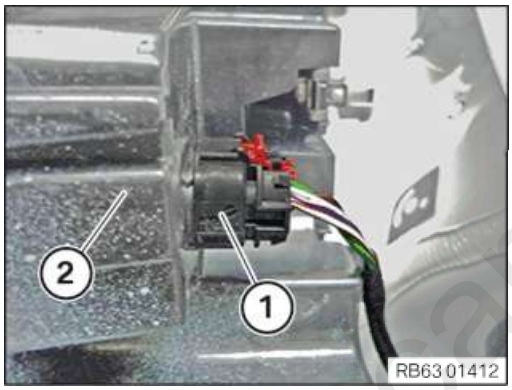
Schematic diagram is for example purposes. Some parts may differ in certain details.



- Loosen nut (1).



- Release the nuts (1) and feed out the rear light on the side panel (2) in the direction of arrow.



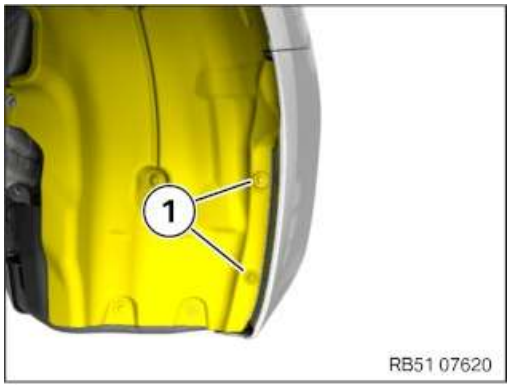
TECHNICAL INFORMATION

Observe note on unlocking and disconnecting plug connections.

For additional information see: 6113 ... Unlocking and disconnecting different plug connections

- Unlock plug connection (1) and disconnect.
- Remove the rear light on the side panel (2).

6 – Remove rear bumper panel



NOTICE

Perform the operations on the left and right side.

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

- Loosen screws (1).

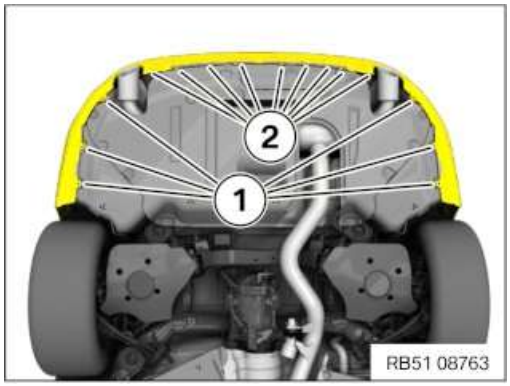
carlogn.com



NOTICE

Perform the operations on the left and right side.

- Release the screw (1).



- Loosen screws (1).
- Release the bumper panel at the latch mechanisms (2).



NOTICE

Perform the operations on the left and right side.

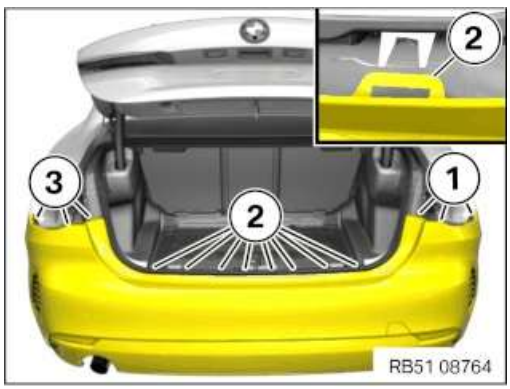
- Release the screw (1).



NOTICE

Perform the operations on the left and right side.

- Release the bumper panel with the latch mechanisms (1).



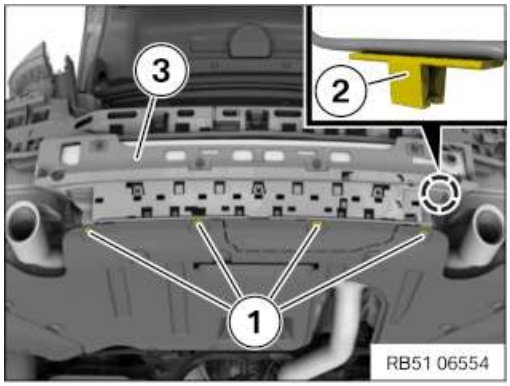
- Release the bumper panel with the latch mechanisms (1).
- Release the bumper panel from the latch mechanisms (2) starting from the right.
- Release the bumper panel from the latch mechanisms (3)



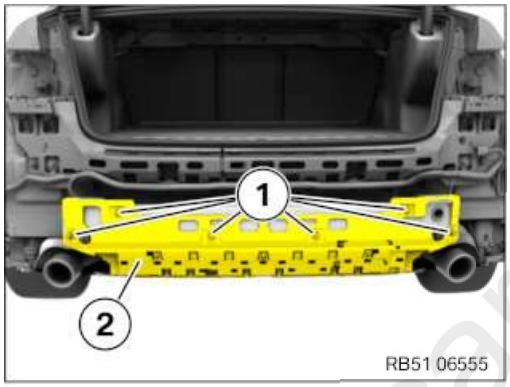
- Unlock plug connection and disconnect.
- Remove bumper panel.

MAIN WORK

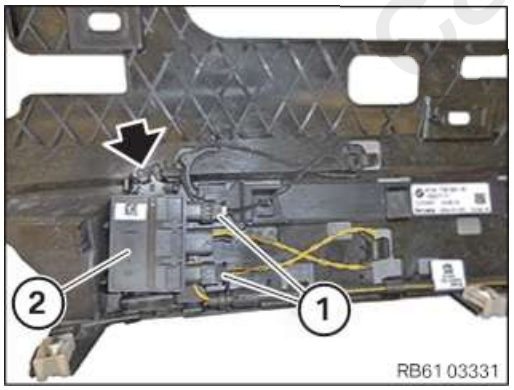
7 – Remove the control unit for the contactless tailgate opening



- Loosen screws (1).
- Unclip the cable clip (2) on the inside of the brace for the rear bumper (3).



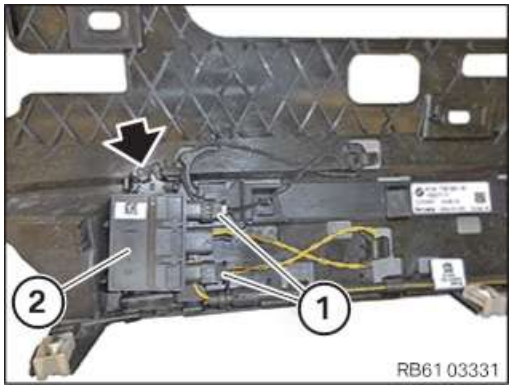
- Release expanding rivets (1) and remove brace for rear bumper (2).



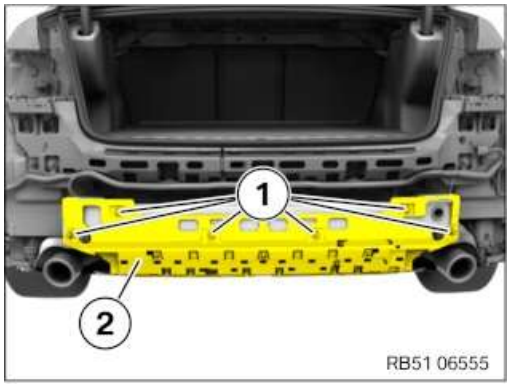
- Unlock and disconnect connector (1).
- Release latch mechanism (arrow) and remove control unit (2).

8 – Install the control unit for the contactless tailgate opening

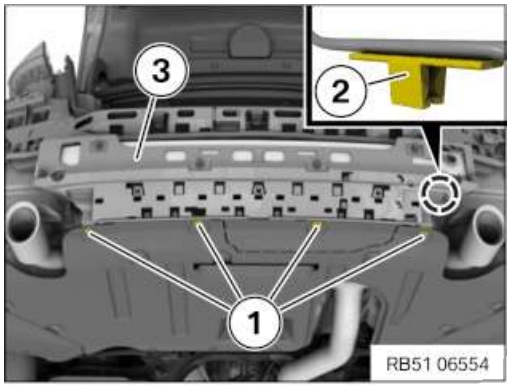
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- Position control unit (2) and clip into latch mechanism (arrow).
- Insert and connect the connector (1).



- Position brace for the rear bumper (2) on the support.
- Install the expanding rivet (1).



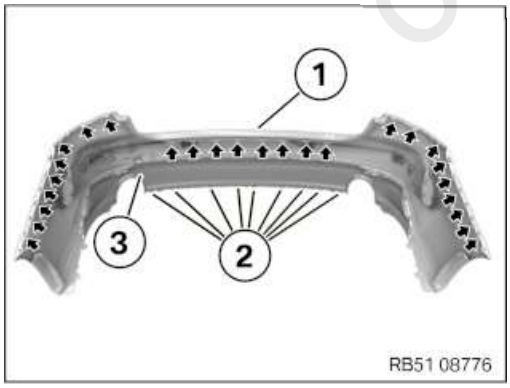
- Clip in the cable clip (2) on the inside of the brace for the rear bumper (3).
- Tighten the screws (1).

Mounting for rear bumper panel on support for rear bumper panel

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm

POSTPROCESSES

9 – Install rear bumper panel



Check

- Check the latch mechanisms (arrows) on the bumper panel (1) for damage.

  Check the latch mechanisms (2) on the bumper trim (3) for damage.

Result

» Latch mechanisms (arrows) are damaged.

Measure

- Renew the bumper panel (1).

Result

» Latch mechanisms (2) are damaged.

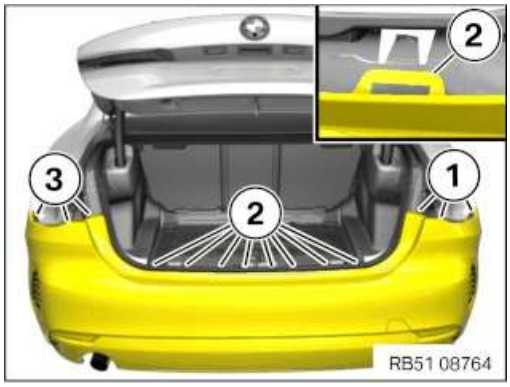
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Measure

- Renew the bumper trim (3).



- Position the bumper panel.
- Connect connectors (1) and lock.



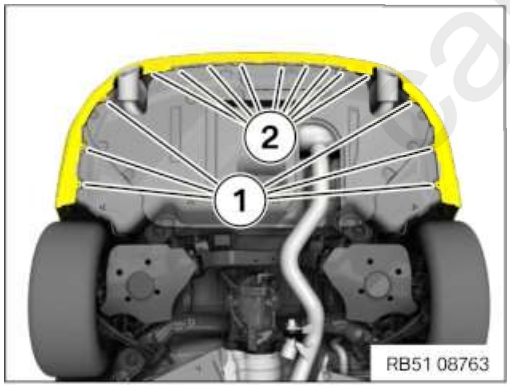
- Clip in the bumper panel with the latch mechanisms (1),(2) and (3).



NOTICE

Perform the operations on the left and right side.

- Clip in the bumper panel with latch mechanisms (1).



- Clip in the bumper panel with latch mechanisms (2).
- Tighten the screws (1).

Rear bumper trim panel to guide

Hexagon screw		Tightening torque	2.5 Nm



NOTICE

Perform the operations on the left and right side.

- Tighten down screw (1).

Rear bumper trim panel to guide

Hexagon screw		Tightening torque	2.5 Nm

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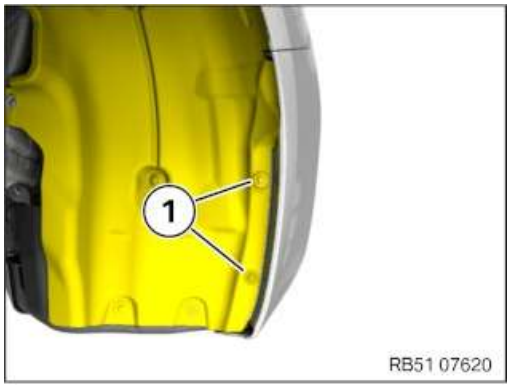
NOTICE

Perform the operations on the left and right side.

- Tighten down screw (1).

Lower bumper panel to body

Oval-head screw		Tightening torque	2.5 Nm



NOTICE

Perform the operations on the left and right side.

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

- Tighten the screws (1).

Rear wheel arch cover to bumper trim panel

Hexagon screw		Tightening torque	2,6 Nm

10 – Installing the rear light on the left and right side panels

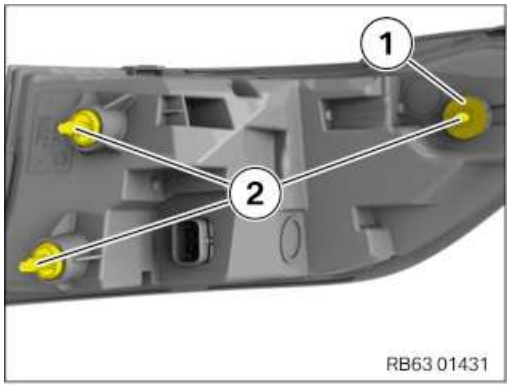
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Install the rear light on the side panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



Check

- Check the seal (1) for damage and renew if necessary.
- Check the threaded inserts (2) for damage.

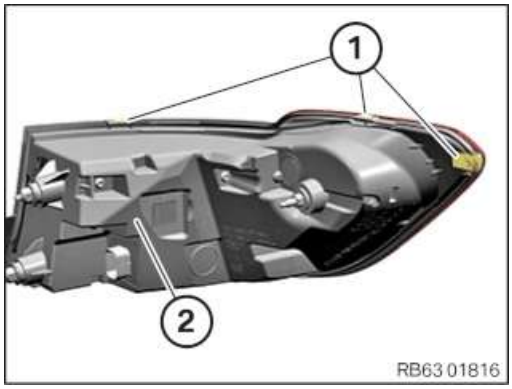
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Result

» The threaded inserts are damaged.

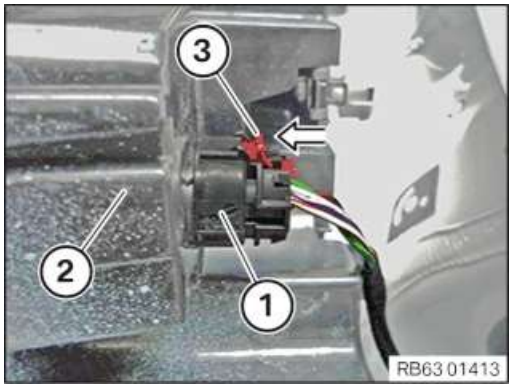
Measure

- Replace rear light.



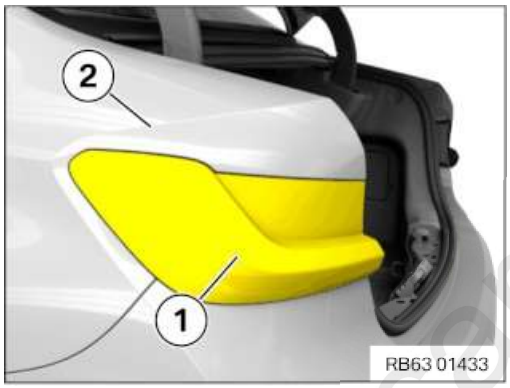
- Contact surfaces (1) on rear light (2) must not be damaged or missing.

  Missing contact surfaces (1) could cause paintwork damage.

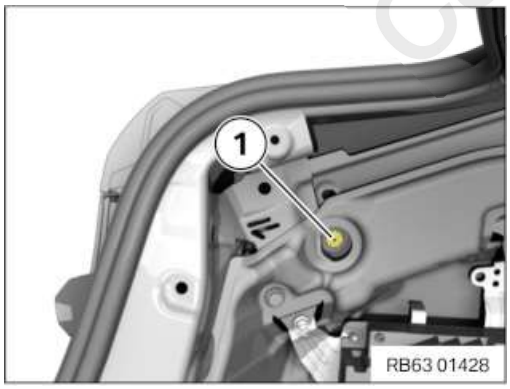


- Connect the connector (1) to the rear light on the side panel (2).

  The connector (1) must engage audibly.
- Lock the lock in direction of arrow (3).

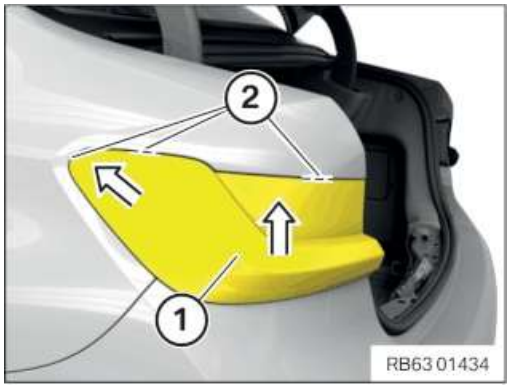


- Position the rear light on the side panel (1) on the side panel (2).

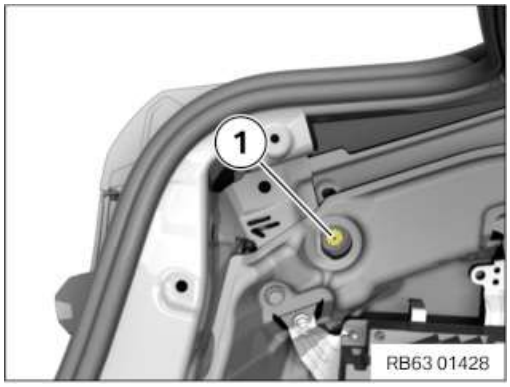


- Position the nut (1).

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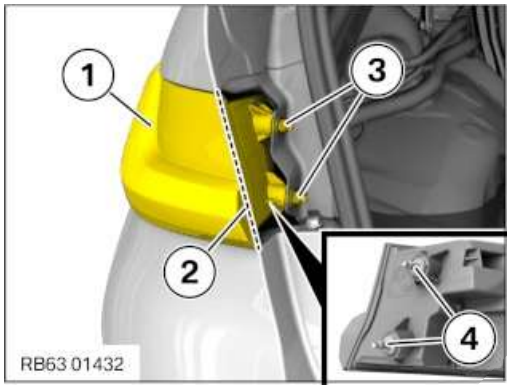
- Position the rear light on the side panel (1) to the front at the top.
- Move the contact surfaces (2) of the rear light on the side panel (1) upwards (arrow) so that they are in place.
- Hold the rear light on the side panel (1) in position.



- Tighten nut (1).

Rear light to side panel to body

Combination hexagon nut		Tightening torque	4 Nm



- Position nuts (3).
- Align rear light on the side panel (1) with the connecting line (2).

  The alignment is done through threaded inserts (4) on the rear light on the side panel (2).
- If necessary, correct the position of the rear light on the side panel (1) by twisting threaded inserts (4).
- Tighten nuts (3).

Rear light to side panel to body

Combination hexagon nut		Tightening torque	4 Nm

11 – Installing trim in water channel on left and right

NOTICE

Description is for left component only. Procedure on the right side is identical.

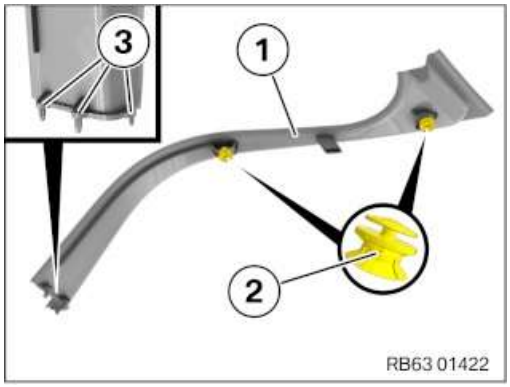
▸ Installing trim in water channel

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

Check

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- Check clips (2) for damage and renew if necessary.
- Check guides (3) for damage.

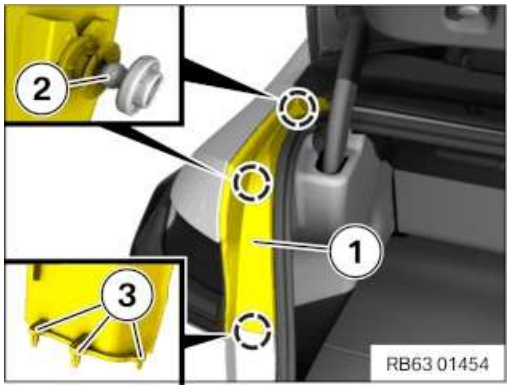
Result

» The guides are damaged.

Measure

- Renew the trim .

  Parts: trim



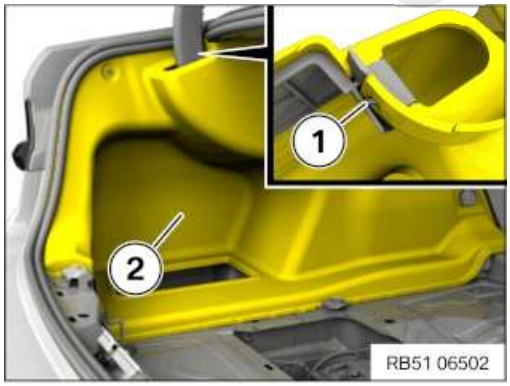
- Insert trim (1) in guides (3).
- Clip trim (1) from above into ball pins (2).

12 – Partially installing the luggage compartment wheel arch trim panel on the left and right

▸ Partially installing the left luggage compartment wheel arch trim panel

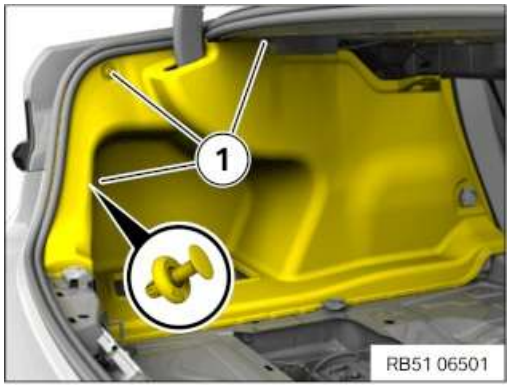
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Feed the luggage compartment wheel arch trim panel (2) into the rear area under the sealing lip of the tailgate seal.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).

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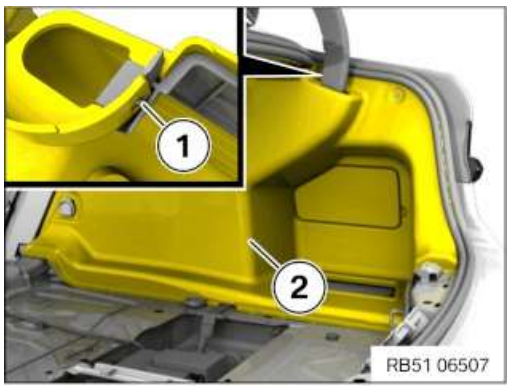


- Secure expanding rivet (1).

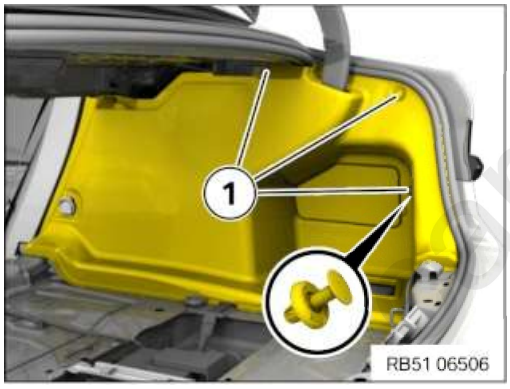
▸ **Partially installing right luggage compartment wheel arch trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Guide luggage compartment wheel arch trim panel (2) into the rear area under the sealing lip of the tailgate seal.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).

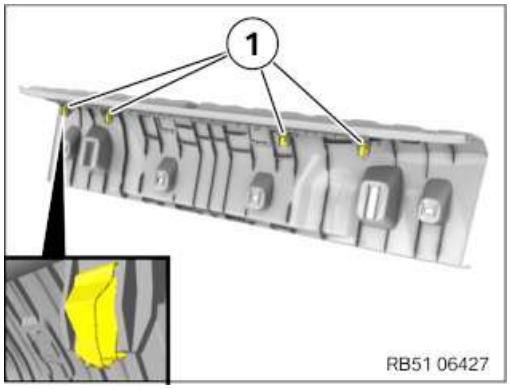


- Secure expanding rivet (1).

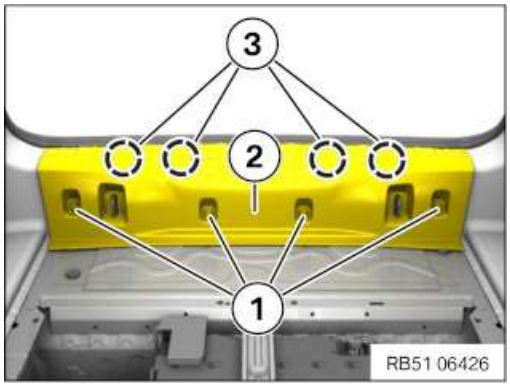
13 – Installing loading edge trim

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Check the clamps (1) for damage and renew if necessary.



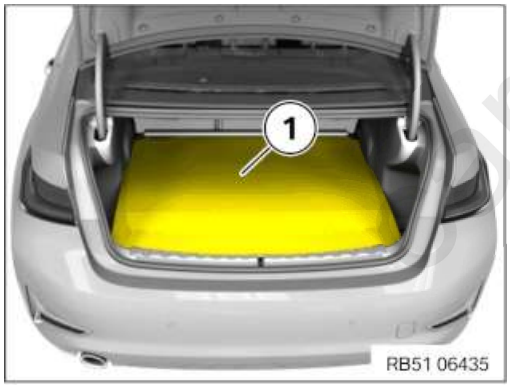
- Insert the loading edge trim (2) under the sealing lip of the tailgate seal.
- Fit the trim of the loading edge (2) at the latch mechanisms (3) and clip it in to the bottom.
- Secure expanding rivet (1).

14 – Installing the luggage compartment floor trim panel

▸ **Installing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Insert the luggage compartment floor trim panel (1).

Additional Information

Overview of Tightening Torques

Mounting for rear bumper panel on support for rear bumper panel — Used in step 8

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm

Rear bumper trim panel to guide — Used in step 9

Hexagon screw		Tightening torque	2.5 Nm

Lower bumper panel to body — Used in step 9

Oval-head screw		Tightening torque	2.5 Nm

Rear wheel arch cover to bumper trim panel			Used in step 9
Hexagon screw		Tightening torque	2,6 Nm

Rear light to side panel to body			Used in step 10
Combination hexagon nut		Tightening torque	4 Nm

Links

Repair instructions	Used in step
61 13 ... Unlocking and disconnecting different plug connections	5

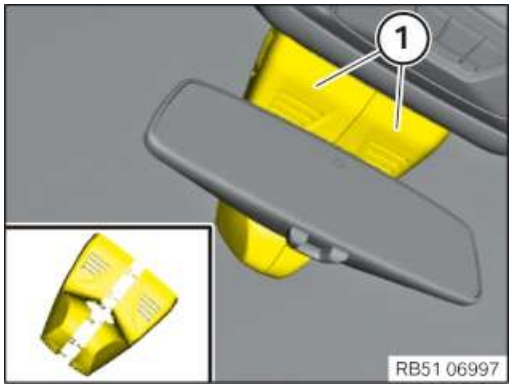
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61 35 179 Removing and installing the rain-light-solar-condensation sensor

PRELIMINARY WORK

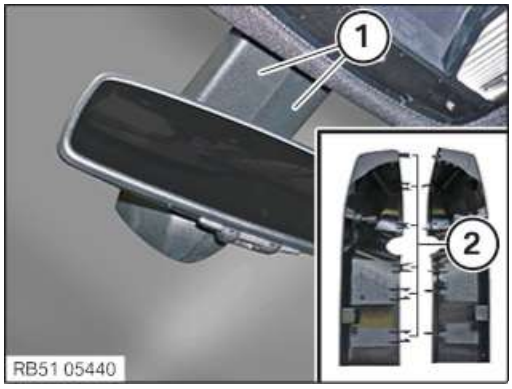
1 – Removing the covers for the interior mirror

- **Version A:**



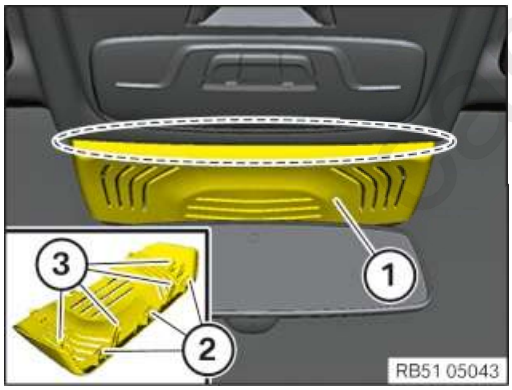
- Release cover (1) in the middle with a suitable plastic wedge from the latch mechanisms and remove.

- **Version B:**

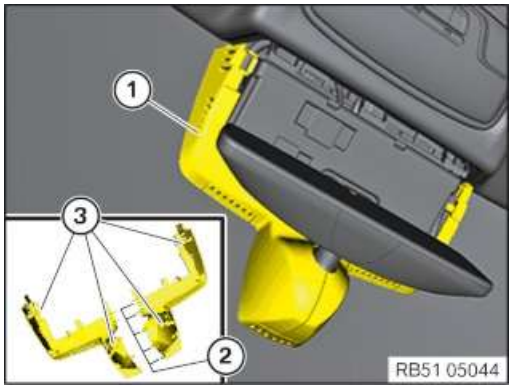


- Release the cover (1) from the latch mechanisms (2) with a suitable plastic wedge and remove sideways.

- **Version C:**



- Detach cover (1) from the clamps (2) in the marked area using a suitable plastic wedge and pull down a certain distance.
- Release cover (1) at the retaining lugs (3) and remove from the guides to the rear.



- Release cover (1) from the latch mechanisms (2) and (3) and remove sideways.
- Remove cover (1) from mirror base (2).

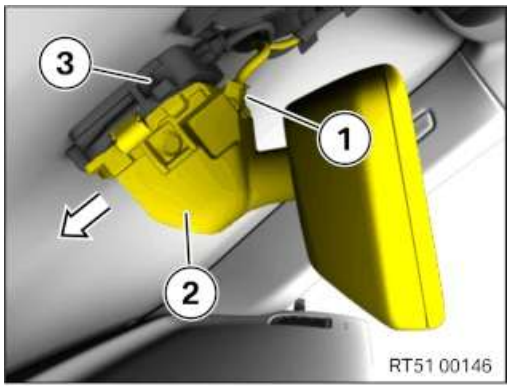
- **Version D:**

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- Release covers (1) and (2) using a suitable plastic wedge at the separation point (3) and remove from the side.

2 – Remove inside mirror



TECHNICAL INFORMATION

Carry out the work at temperatures between 18 °C and 23 °C only.

- Unlock plug connection (1) and disconnect.

RISK OF DAMAGE

Damage to the component.

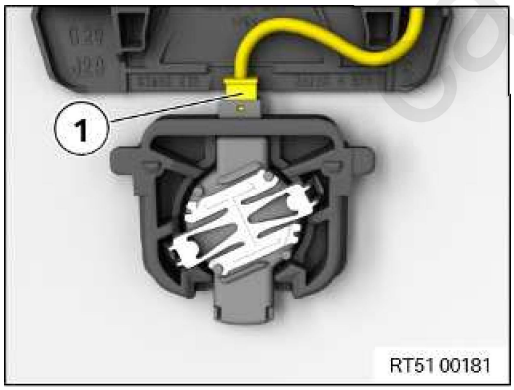
Excessive force may damage the component.

- Handle component carefully.

- Jerk and pull off the interior mirror (2) in the direction of the arrow from the mirror base (3).

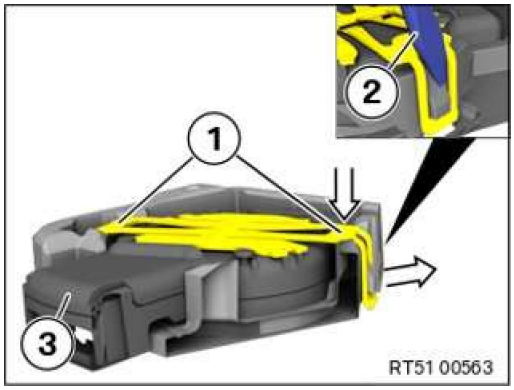
MAIN WORK

3 – Remove rain-light-solar-condensation sensor



- Unlock plug connection (1) and disconnect.

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- Push in retaining springs (1) on both sides and unlock the lock by means of a screwdriver (2) in the direction of the arrow.

RISK OF DAMAGE

Damage to silicone surface.

A damaged silicone surface can lead to malfunctioning of the rain-light-solar-condensation sensor.

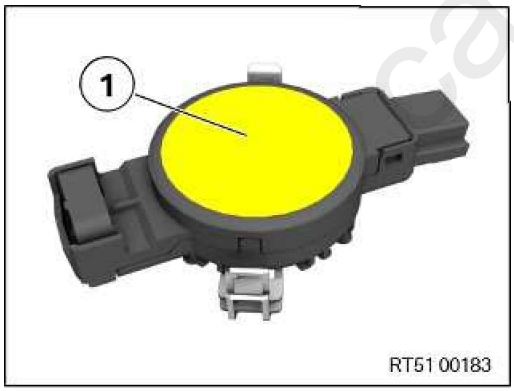
- Do not touch or damage the silicone-coated surface on the rain-light-solar-condensation sensor.
- After releasing lock, wait approx. 30 min. at 20°C for silicone surface to relax.

- Pull the rain-light-solar-condensation sensor (3) slowly off the windscreen. At the same time, monitor the release of the silicone area from outside.

  The silicone surface must evenly loosen from the windscreen, if applicable, lower the pull-off force.
- Feed the rain-light-solar-condensation sensor (3) out of the holder.
- When replacing windscreen: Immediately install the rain-light-solar-condensation sensor on the new windscreen.

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4 – Installing the rain-light-solar-condensation sensor



Check

RISK OF DAMAGE

Damage to silicone surface.

A damaged silicone surface can lead to malfunctioning of the rain-light-solar-condensation sensor.

- Do not touch or damage the silicone-coated surface on the rain-light-solar-condensation sensor.
- After releasing lock, wait approx. 30 min. at 20°C for silicone surface to relax.

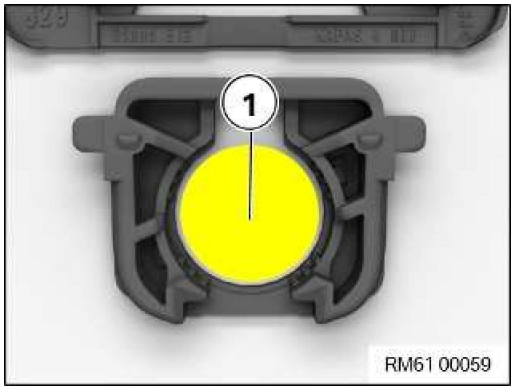
- Check the silicone surface (1) for damage.

Result

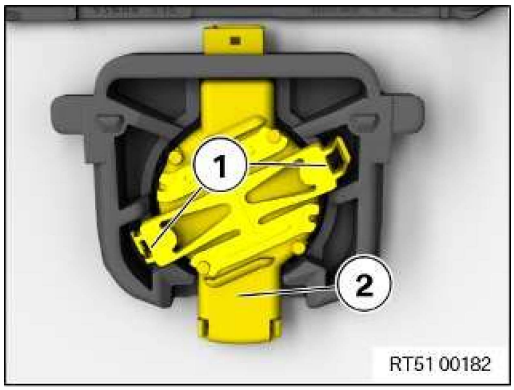
» Silicone surface (1) is damaged.

Measure

- Replace rain-light-solar-condensation sensor.

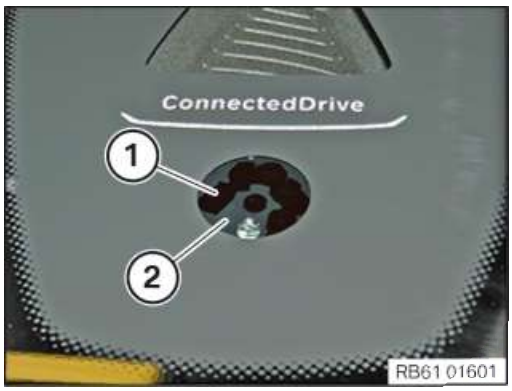


- Carefully clean windscreen in the contact area (1) of rain-light-solar-condensation sensor.



- Insert the rain-light-solar-condensation sensor (2) into the holder and press on centred on the retaining springs (1).
- Press down retaining springs (1) successively on each side to lock in place.

Check



- Check contact surfaces for air pockets from the outside.

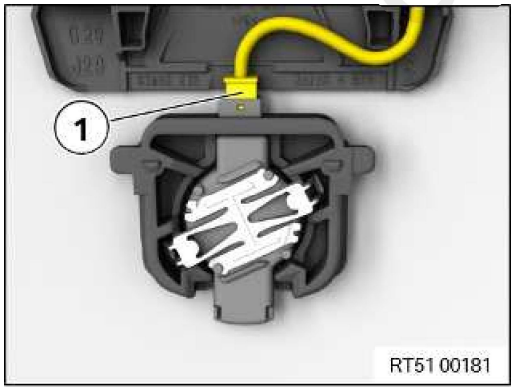
  Visible shadows (1) are not air pockets, but the optical element of the rain-light-solar-condensation sensor (2). The shadows (1) do not represent any functional limitation.

Result

» Contact surface has air pockets.

Measure

- Remove the rain-light-solar-condensation sensor and install again.

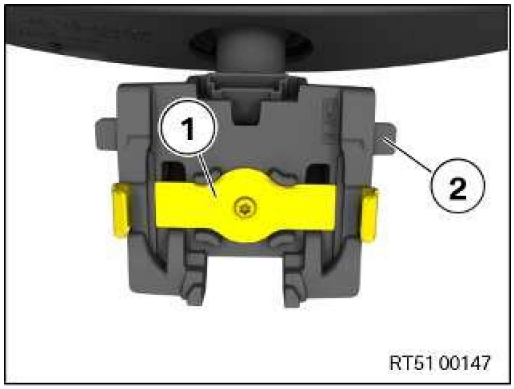


- Connect connectors (1) and lock.

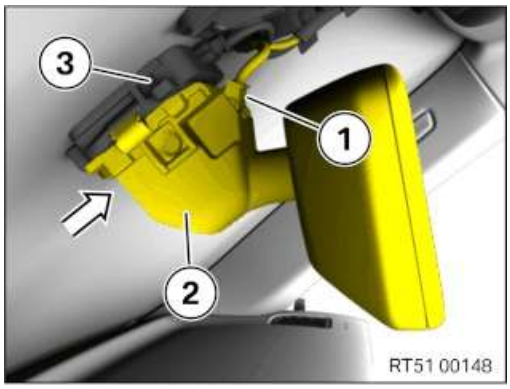
POSTPROCESSES

5 – Install interior mirror

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- Check the clamp (1) on both sides of the mirror base (2) for damage and renew as needed.



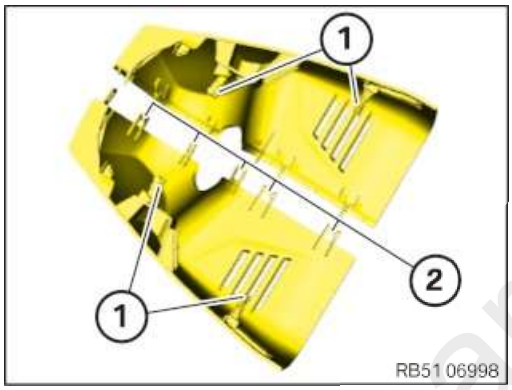
TECHNICAL INFORMATION

Carry out the work at temperatures between 18 °C and 23 °C only.

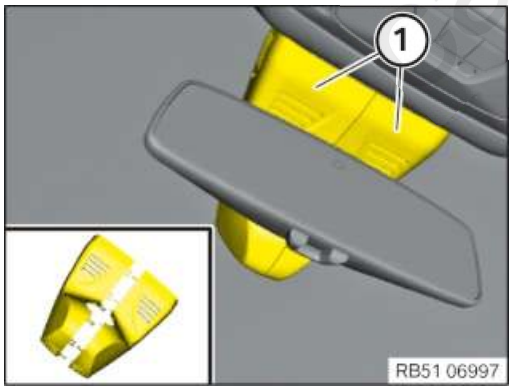
- Position the interior mirror (2) at the mirror base and slide it on in direction of the arrow.
- Check the correct installation position of the interior mirror (2) at the mirror base (3).
- Connect connectors (1) and lock.

6 – Installing the covers for the interior mirror

- **Version A:**

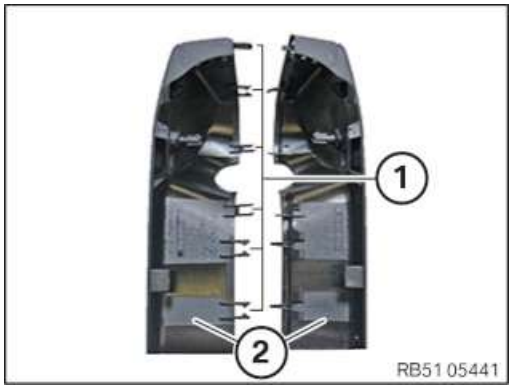


- Check latch mechanisms (1) and (2).
- If the latch mechanisms (1) or (2) are faulty, renew the covers.



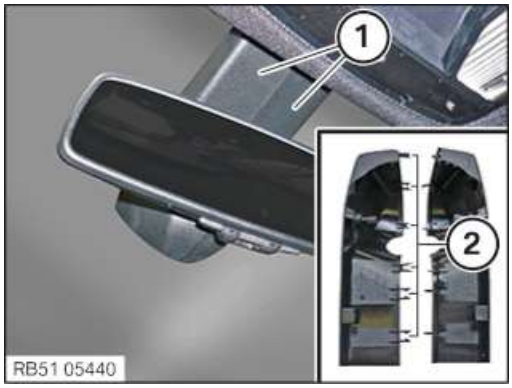
- Feed cover (1) in and lock.
- **Version B:**

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- Check the latch mechanisms (1) on the two covers (2) for damage, renew the covers (2) if necessary.

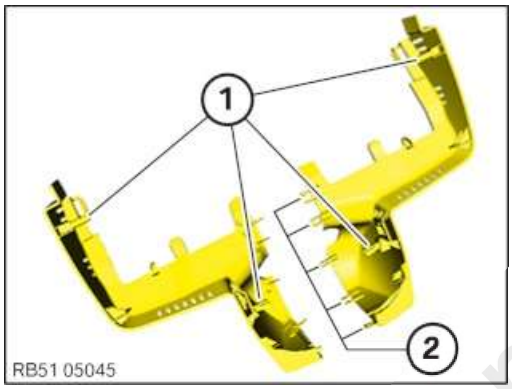
  The covers (2) must not be damaged or missing.



- Position the covers (1) correctly on the mirror and engage with the latch mechanisms (2).

- **Version C:**

Check



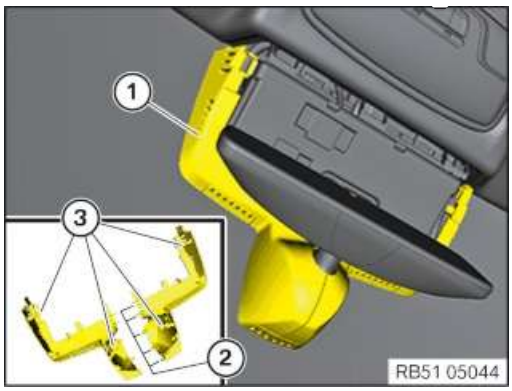
- Check the latch mechanisms (1) and (2) of the covers for damage.

Result

» The latch mechanism is damaged.

Measure

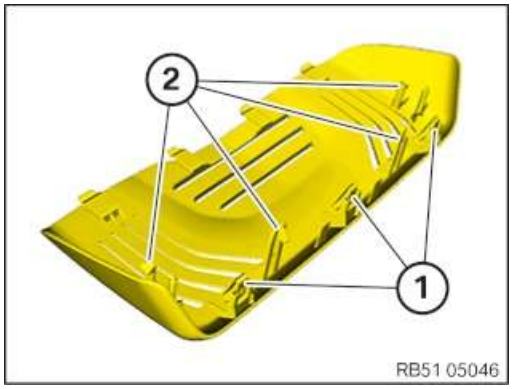
- Renew the cover.



- Guide in cover (1) on left and right and engage using latch mechanisms (2) and (3).

Check

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- Check clamps (1) for damage; renew if necessary.
- Check latch mechanisms (2) for damage.

Result

» The latch mechanism is damaged.

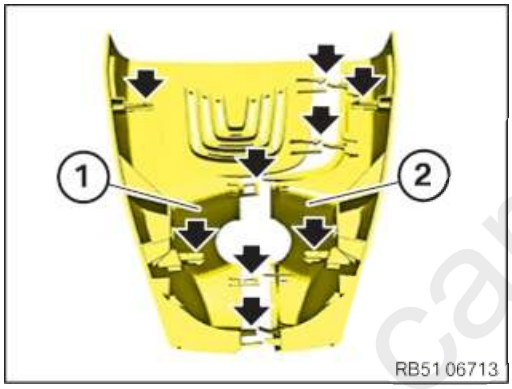
Measure

- Renew the cover.



- Guide cover (1) into front guides and engage using retaining lugs (3) and clamps (2).

- **Version D:**



- Check the latch mechanisms (arrows) on covers (1) and (2) for damage and, if necessary, renew covers (1) and (2).



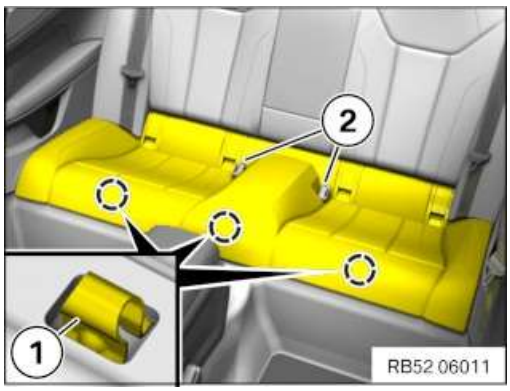
- Position covers (1) and (2) correctly on the mirror and engage at the separation point (3).

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61 35 201 Removing and installing the seat-belt extender controller (LCPA) (left or right)

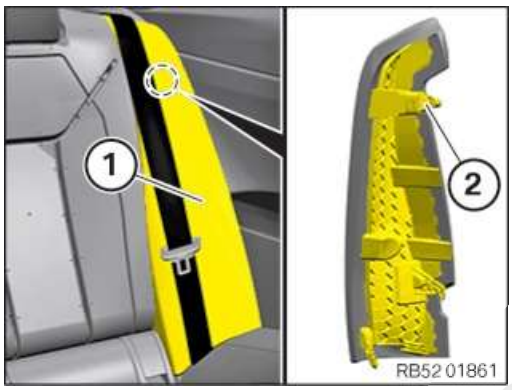
PRELIMINARY WORK

1 – Remove rear seat bench



- Unclip the rear seat bench upwards from clamps (1) and guide out seat belt buckles (2).
- Remove the rear seat bench.

2 – Remove armrest side section



▸ **Remove armrest side section**

- Reach behind the backrest side section (1) from the top and unclip the backrest side section (1) from the mounting element (2) to the front.
- Remove backrest side section (1) in the upward direction from the guide.

3 – Remove C-pillar trim panel

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

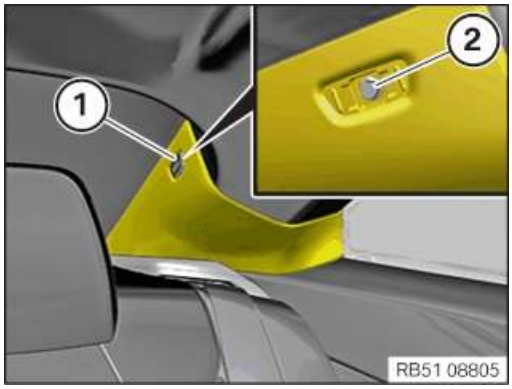
RISK OF DAMAGE

Damage to the head airbag.

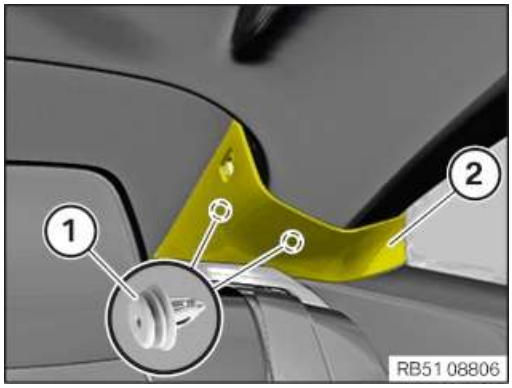
Improper use of a tool when removing the trim panel may damage the head airbag.

- Do not use sharp-edged tools when removing the trim panel.

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- Unclip cover (1) of the C-pillar trim panel.
- Release the screw (2).



- Unclip C-pillar trim panel (2) from clips (1) and guide it out.

4 – Removing the inner door sill cover strip

RISK OF DAMAGE

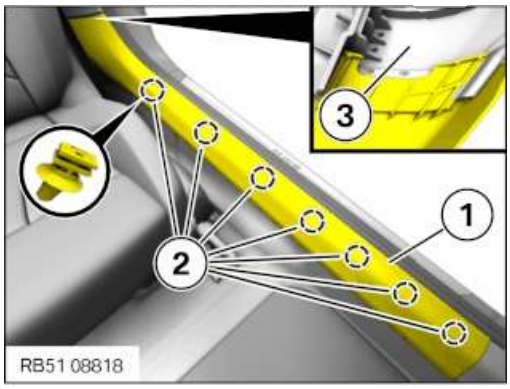
Bending of plastic parts.

Application of too much force can lead to bending of plastic parts.

- Place special tool directly beside the mounting clip.
- Continue unclipping the part without using the tool if possible.

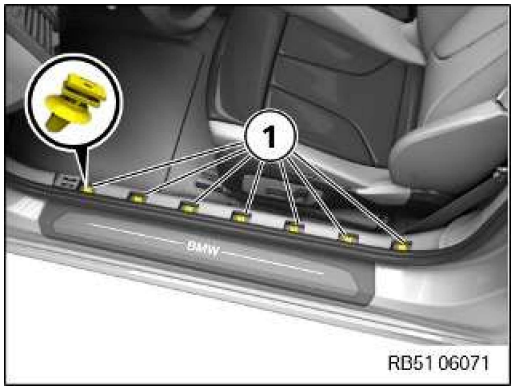
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



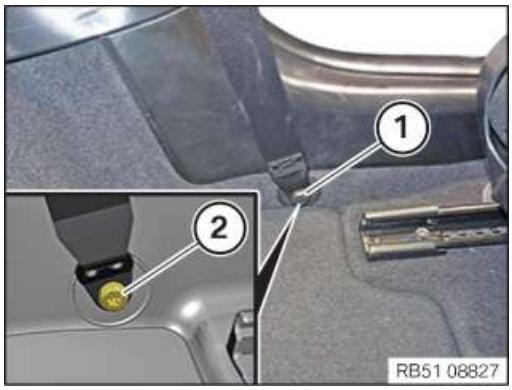
- Release door sill cover strip (1) with clips (2) starting from the front using a suitable special tool from the set of special tools 0 493 752 (00 9 329).
- Guide out and remove door sill cover strip (1) under the rear side trim panel (3) .

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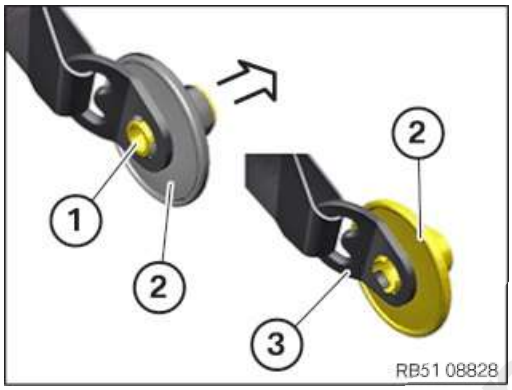


- If necessary, remove clips (1) and connect them to the door sill cover strip.

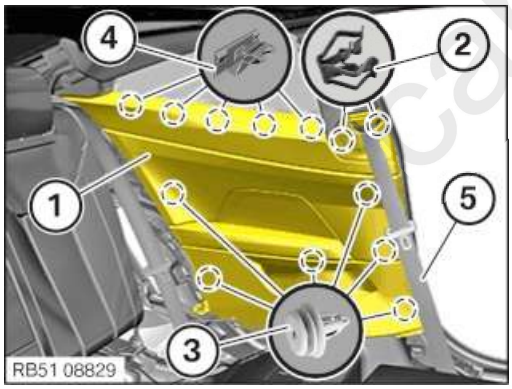
5 – Remove rear side trim panel



- Unclip the cover cap (1).
- Release the screw (2).



- Pull out the sleeve (1) from the cover (2) of the end fitting (3).
- Unclip the cover (2) of the end fitting (3) from the end fitting (3).

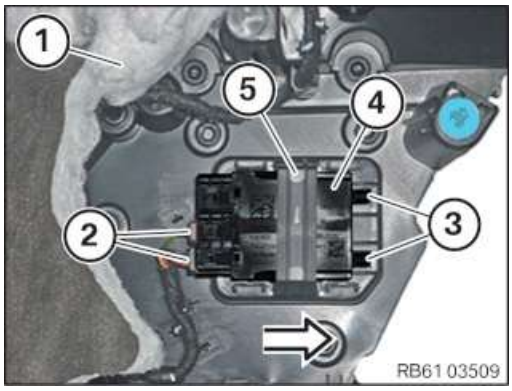


- Unclip the rear side trim panel (1) with a suitable tool at the clamps (2).
- Unclip the rear side trim panel (1) with a suitable tool at the clips (3).
- Release the rear side trim panel (1) at the clamps (4) and feed out at the edge protection.
- Unlock and disconnect all the plug connections at the rear side trim panel (1) of the wiring harness.
- Feed out the upper seat belt (5).

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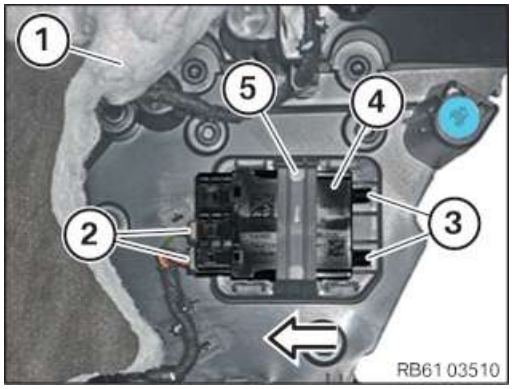
MAIN WORK

6 – Removing the seat-belt extender controller (LCPA)



- Slide the insulation (1) as shown to the side.
- Unlock plug connections (2) and disconnect.
- Unlock the latch mechanisms (3).
- Pull the seat-belt extender controller (LCPA) (4) in the direction of arrow from the holder (5).

7 – Installing the seat-belt extender controller (LCPA)

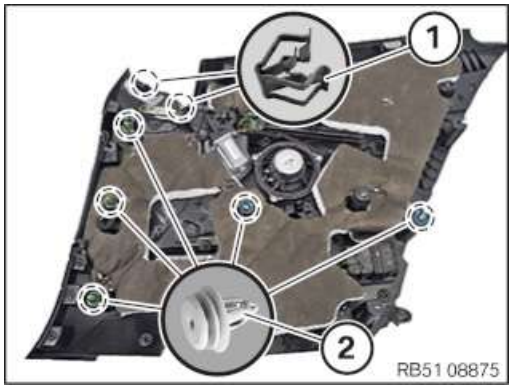


- Position the seat-belt extender controller (LCPA) (4) on the holder (5) and move in the direction of arrow, until the latch mechanisms (3) engage.
- Connect connector (2).
- Route the insulation (1) correctly.

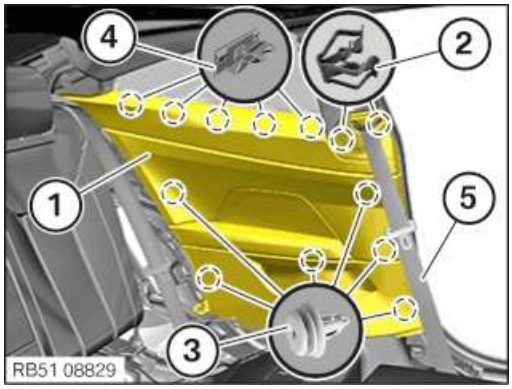
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POSTPROCESSES

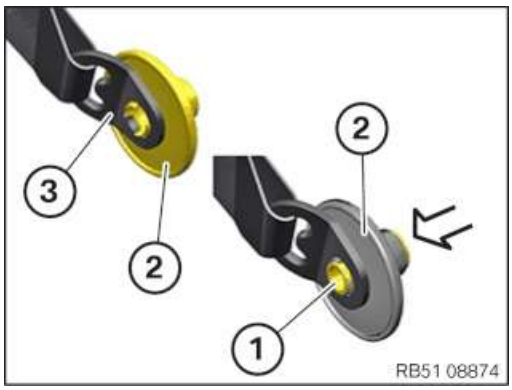
8 – Install rear side trim panel



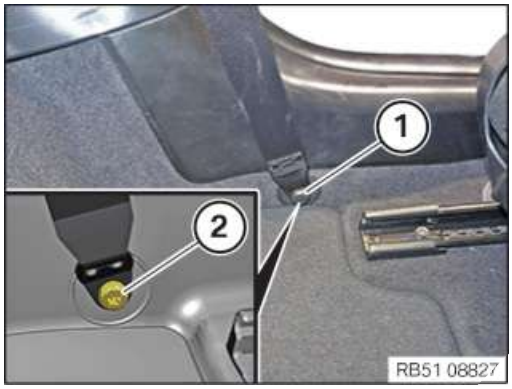
- Check clamps (1) for damage; renew them if necessary.
- Check clips (2) for damage, replace if necessary.



- Connect all the connectors to rear side trim panel (1) of the wiring harness and lock and disconnect them.
- Guide in upper seat belt (5).
- Position rear side trim panel (1) and clip it into clamps (4).
- Clip rear side trim panel (1) into clips (3).
- Clip rear side trim panel (1) into clamps (2).



- Clip cover (2) of end fitting (3) into end fitting (3).
- Slide sleeve (1) into cover (2) of end fitting (3).



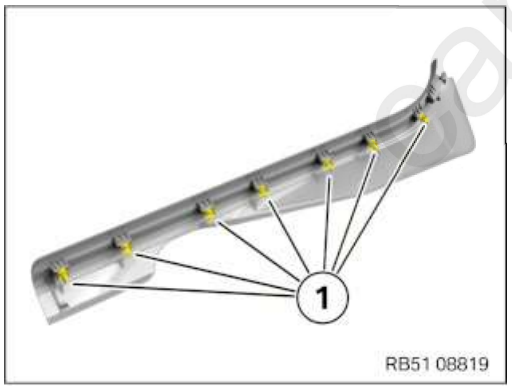
- Correctly position the seat belt end fitting.
- Tighten down screw (2).

End fitting to body

M10		Tightening torque	42 Nm

- Clip in cover cap (1).

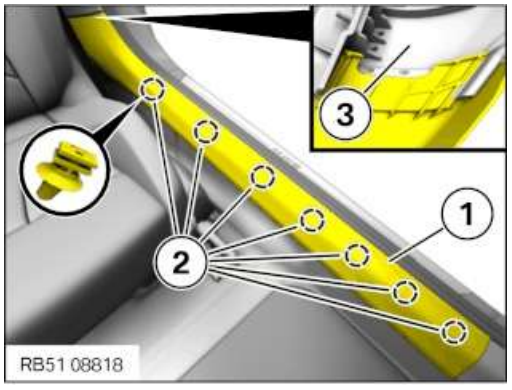
9 – Installing the inner door sill cover strip



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Check the clips (1) for damage and renew if necessary.



- Insert the door sill cover strip (1) below the rear side trim panel (3).
- Clip the door sill cover strip (1) in with the clips (2).

10 – Installing C-pillar trim panel

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WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

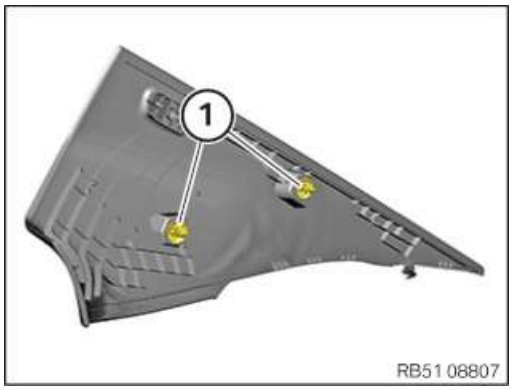
- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

RISK OF DAMAGE

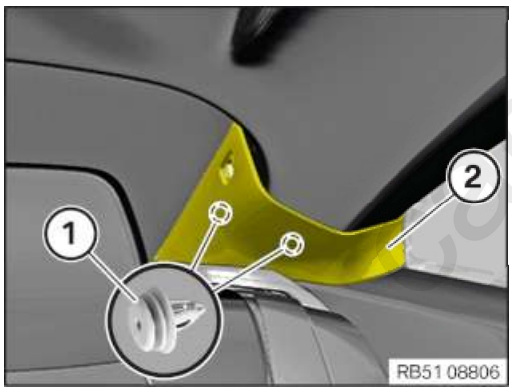
Damage to the head airbag.

Improper use of a tool when removing the trim panel may damage the head airbag.

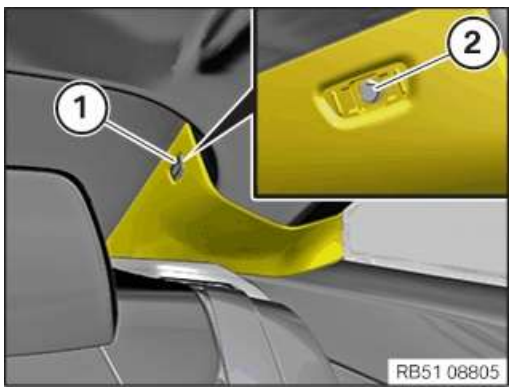
- Do not use sharp-edged tools when removing the trim panel.



- Check clips (1) for damage and, if necessary, renew them.



- Position C-pillar trim panel (2) and clip it onto clips (1).



- Tighten down screw (2).

C-pillar trim panel to body

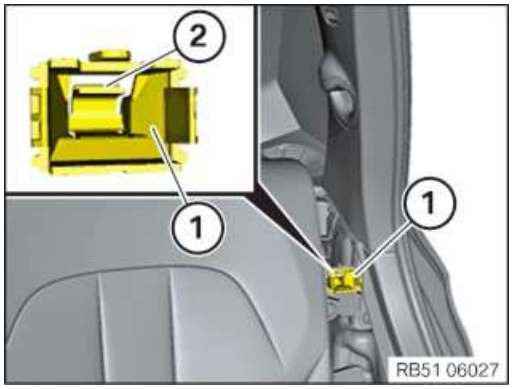
Screw		Tightening torque	2,6 Nm

- Clip in cover (1) of the C-pillar trim panel.

11 – Installing backrest side section

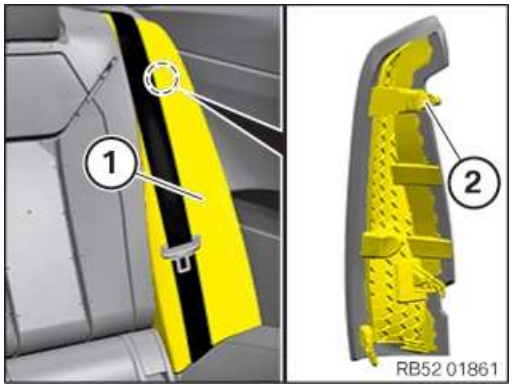
▸ **Installing backrest side section**

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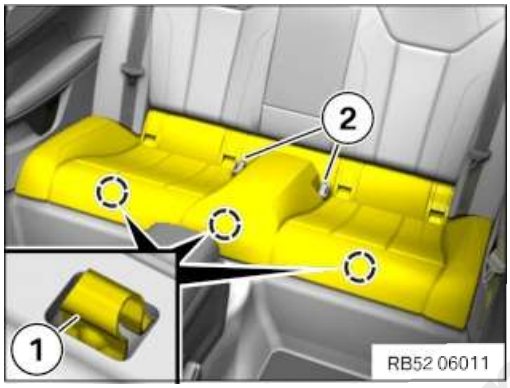
- Release mounting element (1) from latch mechanism (2) and remove it from the body.
- Check the mounting element (1) for damage, renew if necessary.

  The mounting element (1) must not be damaged or missing.
- Fit mounting element (1) on the backrest side section.



- Insert lower backrest side section (1) into the guide and position it correctly.
- Clip in backrest side section (1) to mounting element (2).

12 – Installing the rear seat bench



- Feed in the seat belt buckles (2).
- Position the rear seat bench and clip into the clamps (1).

Additional Information

Overview of Tightening Torques

End fitting to body — Used in step 8

M10		Tightening torque	42 Nm

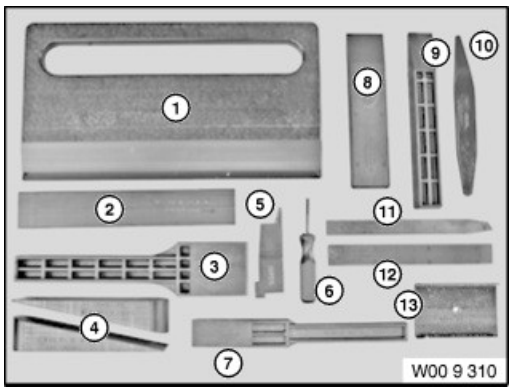
C-pillar trim panel to body — Used in step 10

Screw		Tightening torque	2,6 Nm

Overview of Special Tools

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0 493 752 (00 9 329) Case



Common	Used in step 4
Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

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Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	211

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	211

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle) 211
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61 20 900 Disconnecting and connecting battery earth lead 211

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61 35 243 Removing and installing top non-contact tailgate opening sensor line

RISK OF DAMAGE

Mechanical effects.

Paint damage.

- Mask those working areas at risk with yellow plastic adhesive tape.
- Remove and install heavy or bulky components with the aid of another person/other persons.

TECHNICAL INFORMATION

To guarantee the quality of the driver assistance functions in vehicles with concealed radar sensors installed, the component may only be repainted by observing the repair specifications described in the document "Standards for repair painting with sensor systems".

Sourcing reference:

https://colorsystem-paint.com/

Aftersales Information Research (AIR) - Repair and service messages - HG99 - ColorSystem

ISTA - HG99 - ColorSystem

No stickers or foils (transparent or coloured) may be attached in the radiation areas of the radar sensors.

The component may be painted if no radar sensors have been installed.

The following features can be used to identify whether radar sensors are installed on the vehicle:

Radar sensors are installed at the rear if the triangular warning light is located on the exterior mirror (in the mirror glass or on the mirror frame).

Radar sensors are installed at the front and rear if the triangular warning light is located on the exterior mirror (in the mirror glass or on the mirror frame) in conjunction with the optional equipment S5ATA or S5AUA.

PRELIMINARY WORK

1 – Removing the luggage compartment floor trim panel

▸ **Removing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



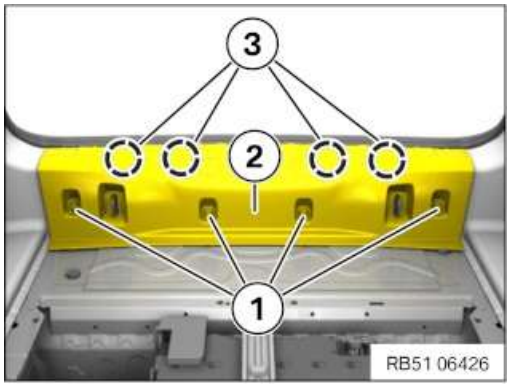
- Remove luggage compartment floor trim panel (1).

2 – Removing the loading edge trim

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NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



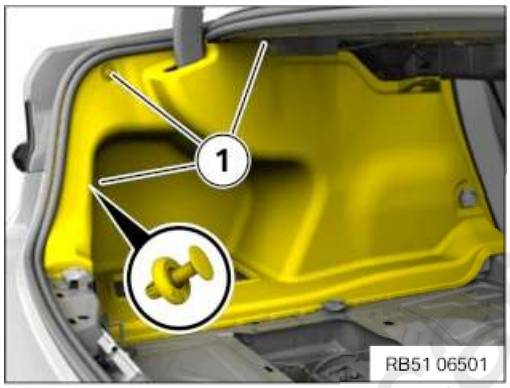
- Loosen the expanding rivet (1).
- Unclip loading edge trim(2) upwards from latch mechanisms (3).
- Guide out and remove loading edge trim (2) under the sealing lip of the tailgate seal.

3 – Removing part of the luggage compartment wheel arch trim panel on the left and right

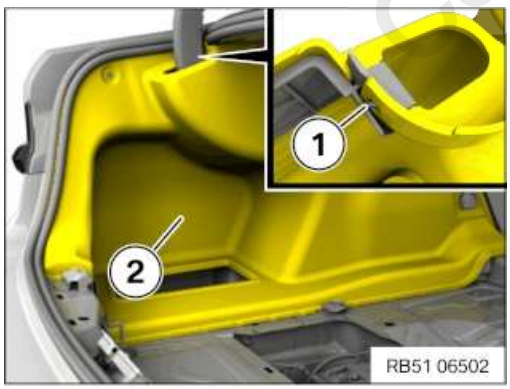
▸ **Partially remove luggage compartment wheel arch panel on left**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Loosen the expanding rivet (1).



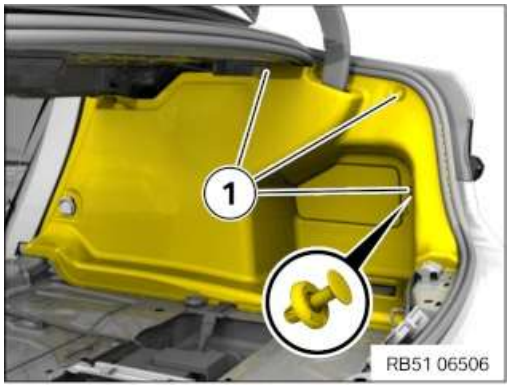
- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip of the tailgate seal and release it in the rear area.

▸ **Partially remove luggage compartment wheel arch panel on right**

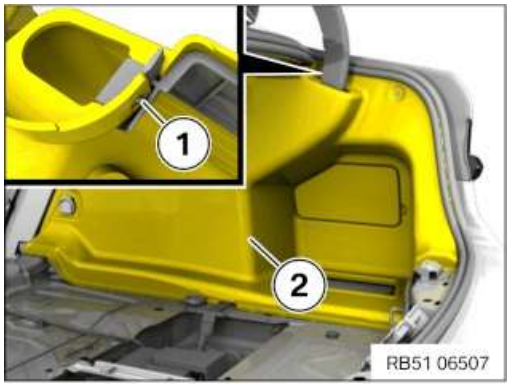
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

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- Loosen the expanding rivet (1).



- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip of the tailgate seal and release it in the rear area.

4 – Removing trim from water channel on left and right

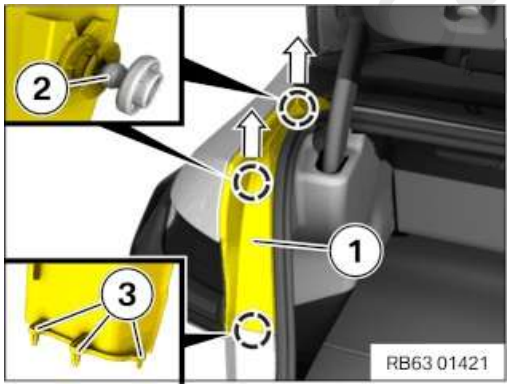
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing trim from water channel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Unclip trim (1) in upward direction from ball pins (2).
- Release trim (1) from guides (3) and remove.

5 – Removing the rear light on the left and right side panels

NOTICE

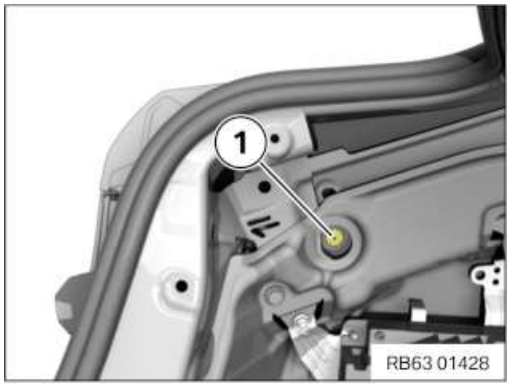
Description is for left component only. Procedure on the right side is identical.

▸ **Removing the rear light on the side panel**

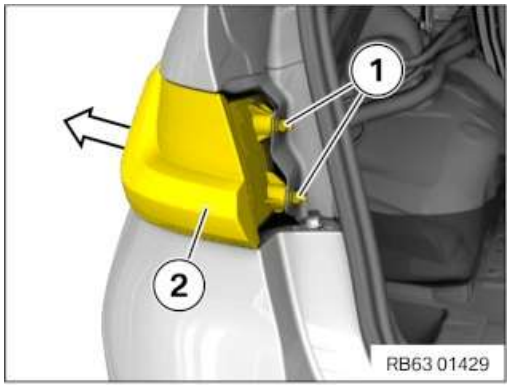
cardiagn.com

NOTICE

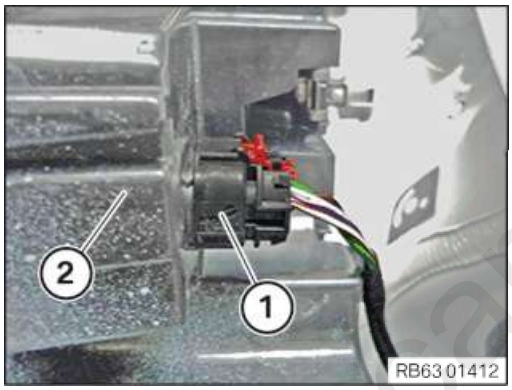
Schematic diagram is for example purposes. Some parts may differ in certain details.



- Loosen nut (1).



- Release the nuts (1) and feed out the rear light on the side panel (2) in the direction of arrow.



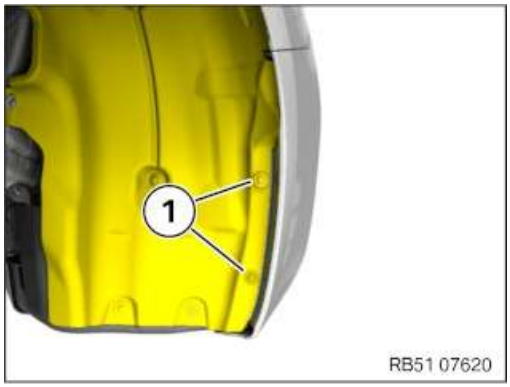
TECHNICAL INFORMATION

Observe note on unlocking and disconnecting plug connections.

For additional information see: 6113 ... Unlocking and disconnecting different plug connections

- Unlock plug connection (1) and disconnect.
- Remove the rear light on the side panel (2).

6 – Remove rear bumper panel



NOTICE

Perform the operations on the left and right side.

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

- Loosen screws (1).

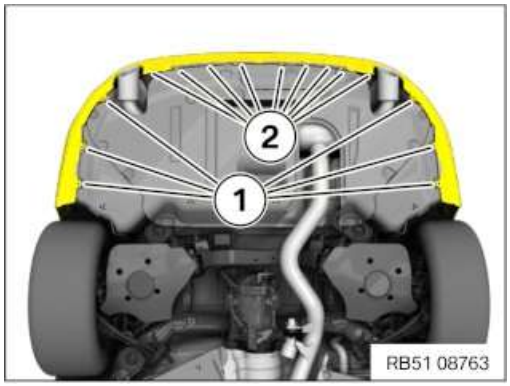
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NOTICE

Perform the operations on the left and right side.

- Release the screw (1).



- Loosen screws (1).
- Release the bumper panel at the latch mechanisms (2).



NOTICE

Perform the operations on the left and right side.

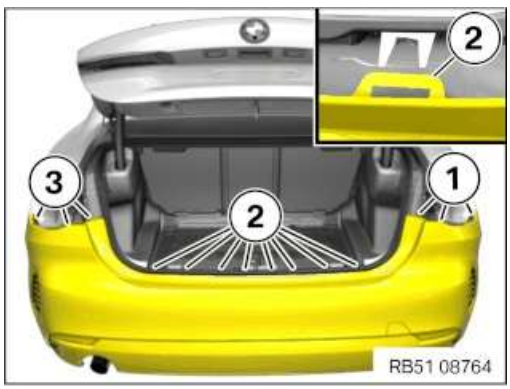
- Release the screw (1).



NOTICE

Perform the operations on the left and right side.

- Release the bumper panel with the latch mechanisms (1).



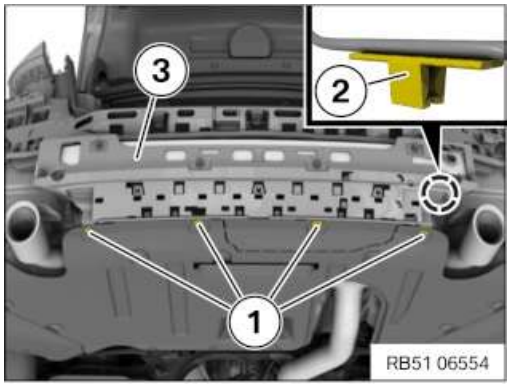
- Release the bumper panel with the latch mechanisms (1).
- Release the bumper panel from the latch mechanisms (2) starting from the right.
- Release the bumper panel from the latch mechanisms (3)



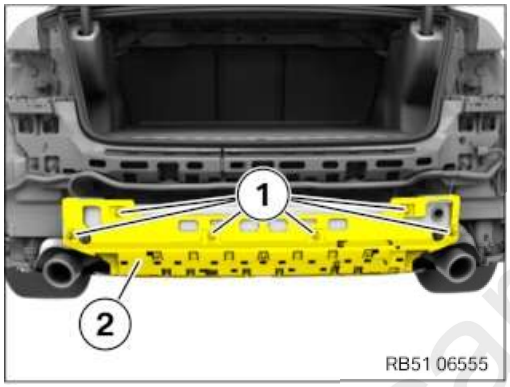
- Unlock plug connection and disconnect.
- Remove bumper panel.

MAIN WORK

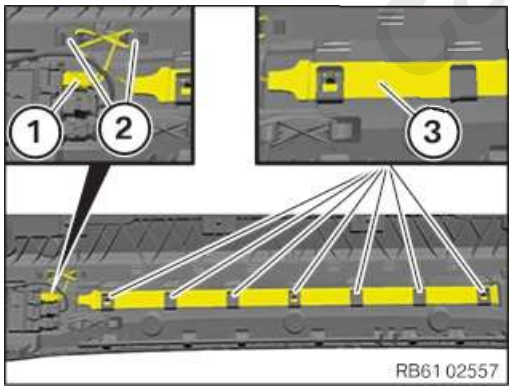
7 – Remove the sensor line for the contactless tailgate opening (top)



- Loosen screws (1).
- Unclip the cable clip (2) on the inside of the brace for the rear bumper (3).



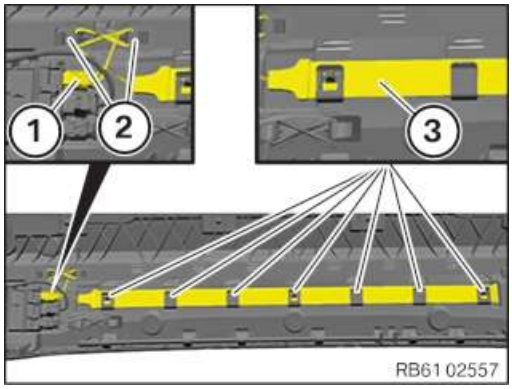
- Open expanding rivets (1) and remove the brace for the rear bumper (2).



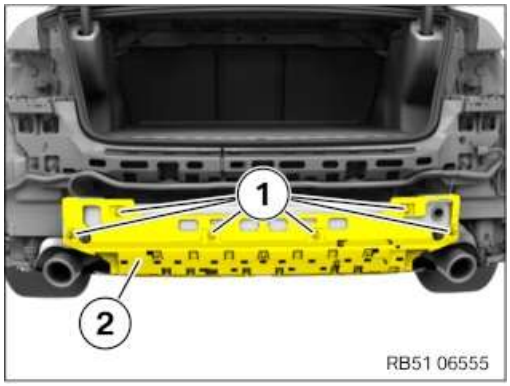
- Unlock and disconnect connector (1).
- Release cable from brackets (2).
- Unclip top sensor line (3) upwards.

8 – Install the sensor line for the contactless tailgate opening (top)

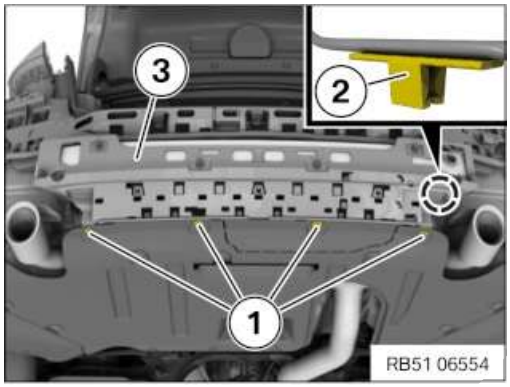
cardiagn.com



- Clip in top sensor line (3) from above.
- Fasten the cable at the clips (2).
- Connect connector (1).



- Position brace for the rear bumper (2) on the support.
- Install the expanding rivet (1).



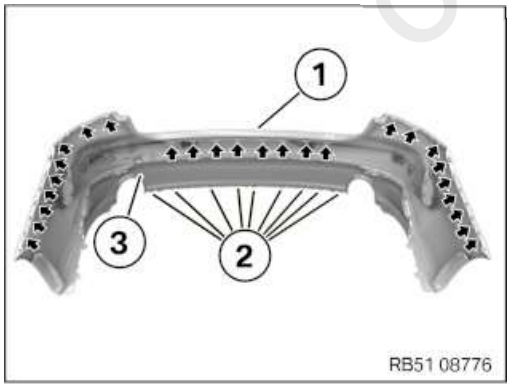
- Clip in the cable clip (2) on the inside of the brace for the rear bumper (3).
- Tighten the screws (1).

Mounting for rear bumper panel on support for rear bumper panel

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm

POSTPROCESSES

9 – Install rear bumper panel



Check

- Check the latch mechanisms (arrows) on the bumper panel (1) for damage.

  Check the latch mechanisms (2) on the bumper trim (3) for damage.

Result

» Latch mechanisms (arrows) are damaged.

Measure

- Renew the bumper panel (1).

Result

» Latch mechanisms (2) are damaged.

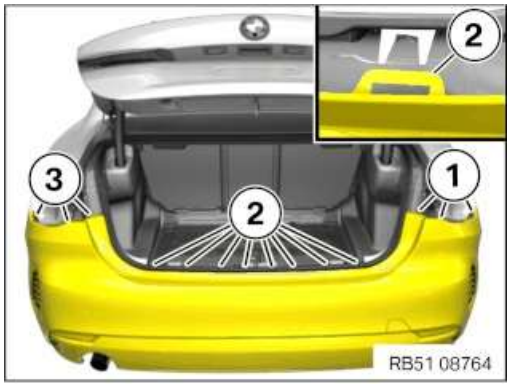
cardiagn.com

Measure

- Renew the bumper trim (3).



- Position the bumper panel.
- Connect connectors (1) and lock.



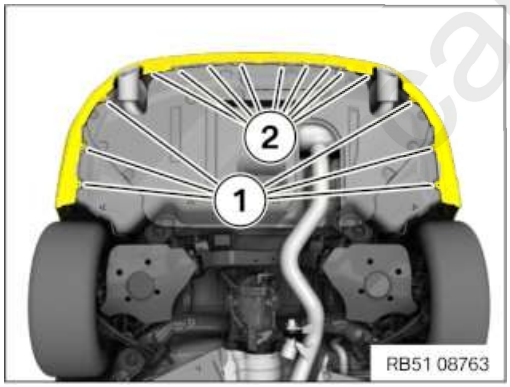
- Clip in the bumper panel with the latch mechanisms (1),(2) and (3).



NOTICE

Perform the operations on the left and right side.

- Clip in the bumper panel with latch mechanisms (1).



- Clip in the bumper panel with latch mechanisms (2).
- Tighten the screws (1).

Rear bumper trim panel to guide

Hexagon screw		Tightening torque	2.5 Nm



NOTICE

Perform the operations on the left and right side.

- Tighten down screw (1).

Rear bumper trim panel to guide

Hexagon screw		Tightening torque	2.5 Nm

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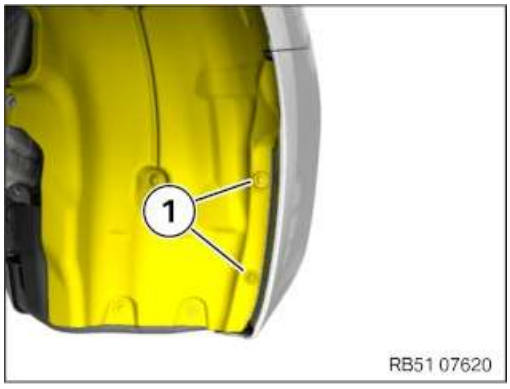
NOTICE

Perform the operations on the left and right side.

- Tighten down screw (1).

Lower bumper panel to body

Oval-head screw		Tightening torque	2.5 Nm



NOTICE

Perform the operations on the left and right side.

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

- Tighten the screws (1).

Rear wheel arch cover to bumper trim panel

Hexagon screw		Tightening torque	2,6 Nm

10 – Installing the rear light on the left and right side panels

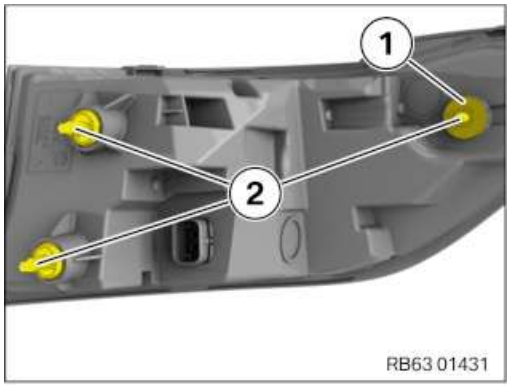
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Install the rear light on the side panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



Check

- Check the seal (1) for damage and renew if necessary.
- Check the threaded inserts (2) for damage.

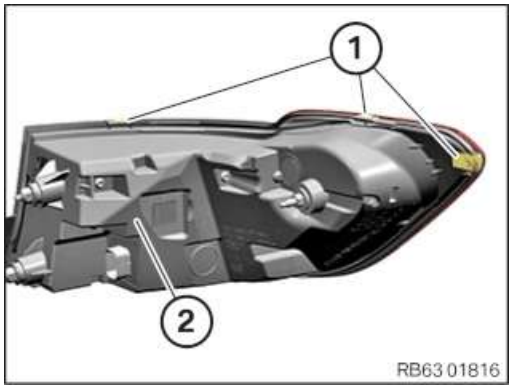
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Result

» The threaded inserts are damaged.

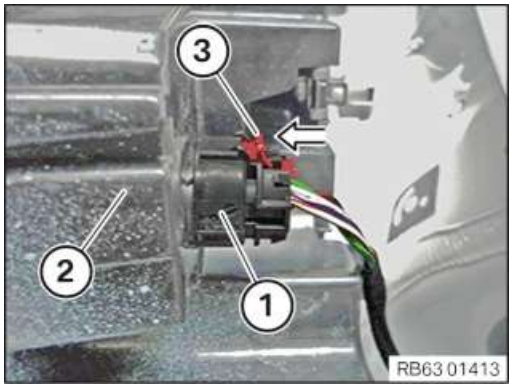
Measure

- Replace rear light.



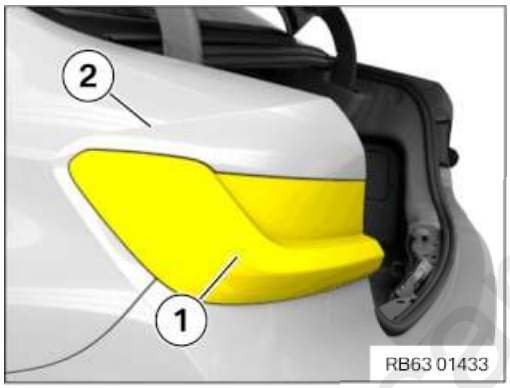
- Contact surfaces (1) on rear light (2) must not be damaged or missing.

  Missing contact surfaces (1) could cause paintwork damage.

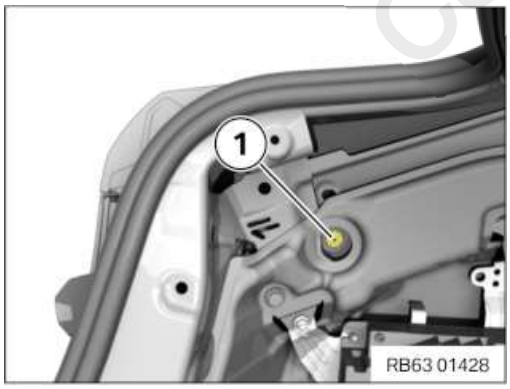


- Connect the connector (1) to the rear light on the side panel (2).

  The connector (1) must engage audibly.
- Lock the lock in direction of arrow (3).

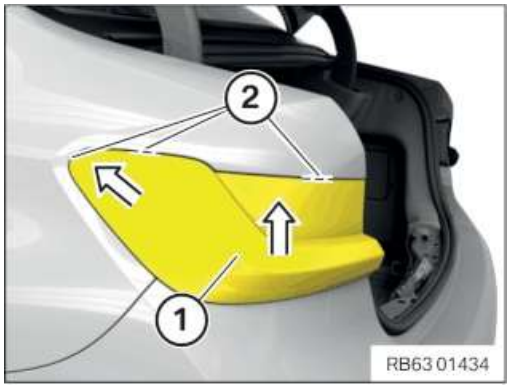


- Position the rear light on the side panel (1) on the side panel (2).

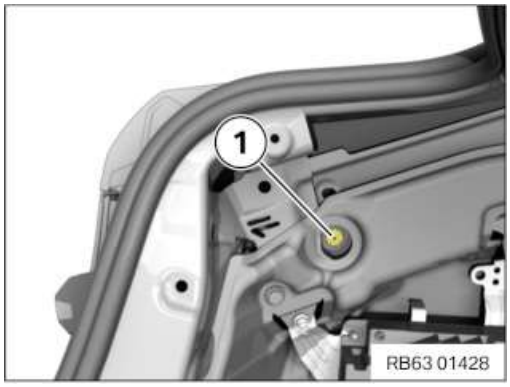


- Position the nut (1).

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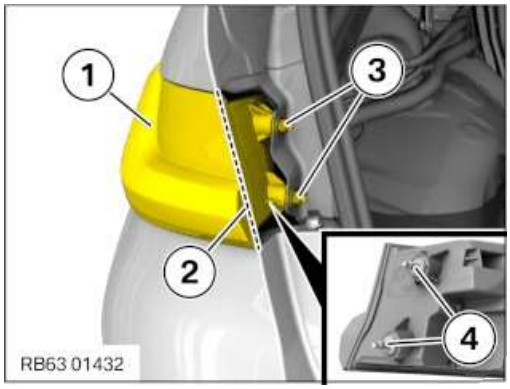
- Position the rear light on the side panel (1) to the front at the top.
- Move the contact surfaces (2) of the rear light on the side panel (1) upwards (arrow) so that they are in place.
- Hold the rear light on the side panel (1) in position.



- Tighten nut (1).

Rear light to side panel to body

Combination hexagon nut		Tightening torque	4 Nm



- Position nuts (3).
- Align rear light on the side panel (1) with the connecting line (2).

  The alignment is done through threaded inserts (4) on the rear light on the side panel (2).
- If necessary, correct the position of the rear light on the side panel (1) by twisting threaded inserts (4).
- Tighten nuts (3).

Rear light to side panel to body

Combination hexagon nut		Tightening torque	4 Nm

11 – Installing trim in water channel on left and right

NOTICE

Description is for left component only. Procedure on the right side is identical.

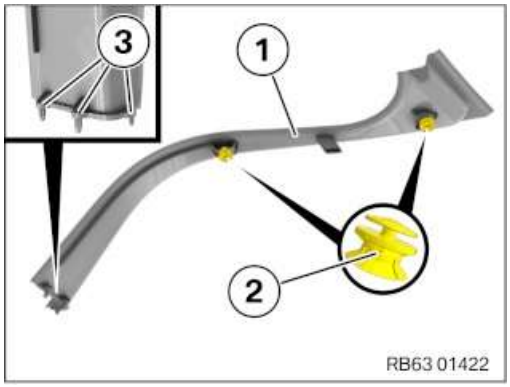
▸ Installing trim in water channel

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

Check

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- Check clips (2) for damage and renew if necessary.
- Check guides (3) for damage.

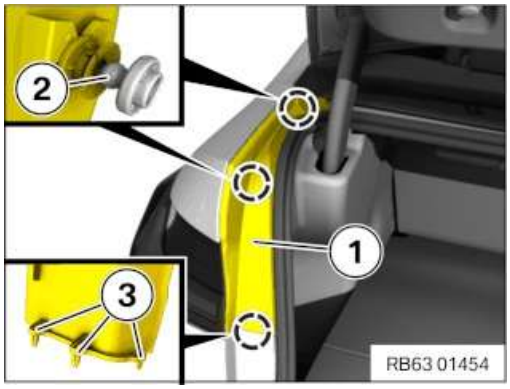
Result

» The guides are damaged.

Measure

- Renew the trim .

  Parts: trim



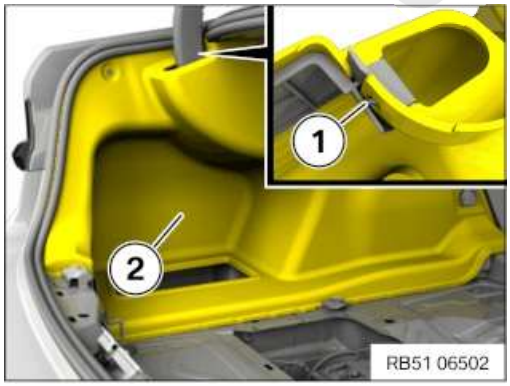
- Insert trim (1) in guides (3).
- Clip trim (1) from above into ball pins (2).

12 – Partially installing the luggage compartment wheel arch trim panel on the left and right

▸ Partially installing the left luggage compartment wheel arch trim panel

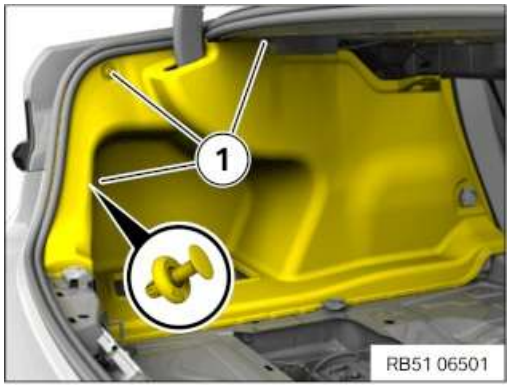
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Feed the luggage compartment wheel arch trim panel (2) into the rear area under the sealing lip of the tailgate seal.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).

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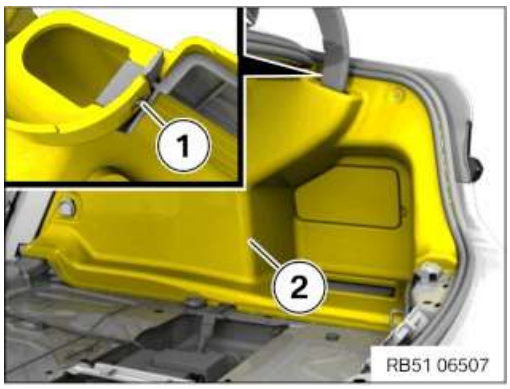


- Secure expanding rivet (1).

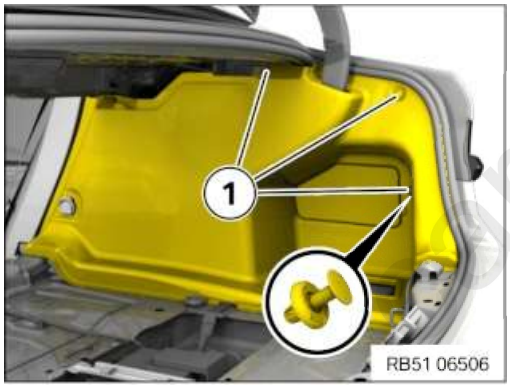
▸ **Partially installing right luggage compartment wheel arch trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Guide luggage compartment wheel arch trim panel (2) into the rear area under the sealing lip of the tailgate seal.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).

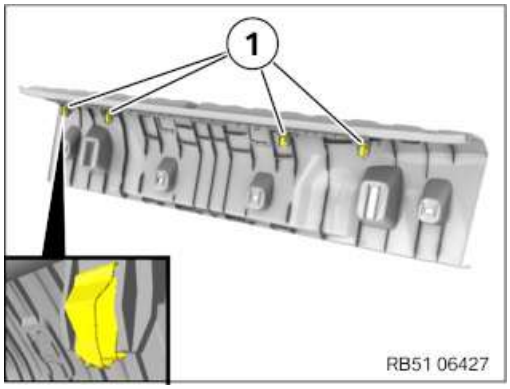


- Secure expanding rivet (1).

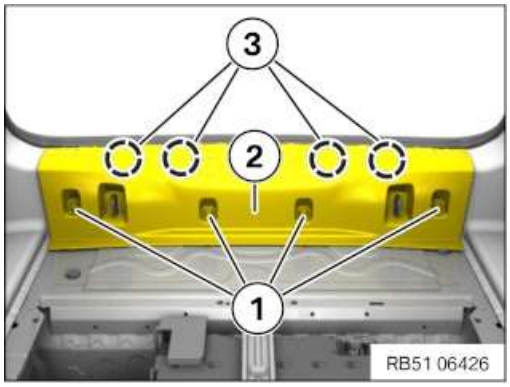
13 – Installing loading edge trim

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Check the clamps (1) for damage and renew if necessary.



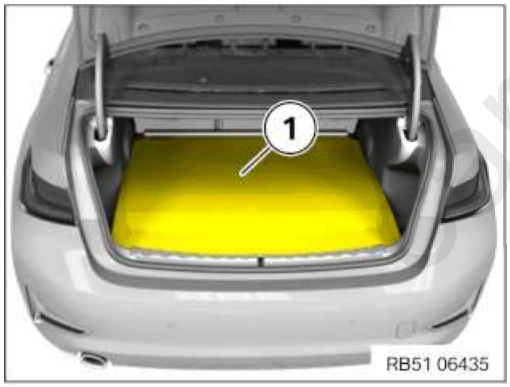
- Insert the loading edge trim (2) under the sealing lip of the tailgate seal.
- Fit the trim of the loading edge (2) at the latch mechanisms (3) and clip it in to the bottom.
- Secure expanding rivet (1).

14 – Installing the luggage compartment floor trim panel

▸ **Installing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Insert the luggage compartment floor trim panel (1).

Additional Information

Overview of Tightening Torques

Mounting for rear bumper panel on support for rear bumper panel — Used in step 8

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm

Rear bumper trim panel to guide — Used in step 9

Hexagon screw		Tightening torque	2.5 Nm

Lower bumper panel to body — Used in step 9

Oval-head screw		Tightening torque	2.5 Nm

Rear wheel arch cover to bumper trim panel			Used in step 9
Hexagon screw		Tightening torque	2,6 Nm

Rear light to side panel to body			Used in step 10
Combination hexagon nut		Tightening torque	4 Nm

Links

Repair instructions	Used in step
61 13 ... Unlocking and disconnecting different plug connections	5

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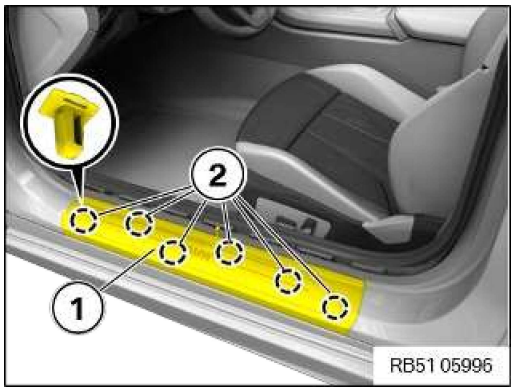
61 35 980 Removing and installing/replacing aerial for Comfort Access on left or right

PRELIMINARY WORK

1 – Remove the front sill trim

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



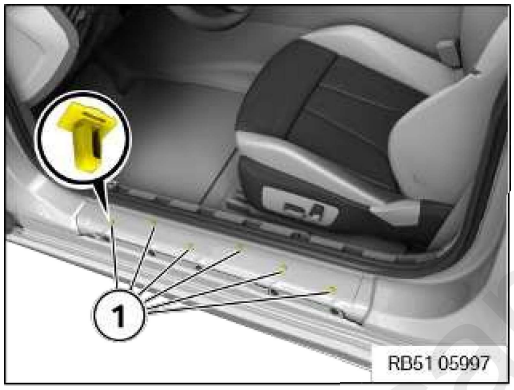
RISK OF DAMAGE

Bending of plastic parts.

Application of too much force can lead to bending of plastic parts.

- Place special tool directly beside the mounting clip.
- Continue unclipping the part without using the tool if possible.

- Release and remove the front sill trim (1) using special tool 0 496 569 (00 9 325) from clips (2).



- Remove clips (1) if necessary and connect them on the front sill trim.

2 – Removing the side sill trim panel

RISK OF DAMAGE

Mechanical effects.

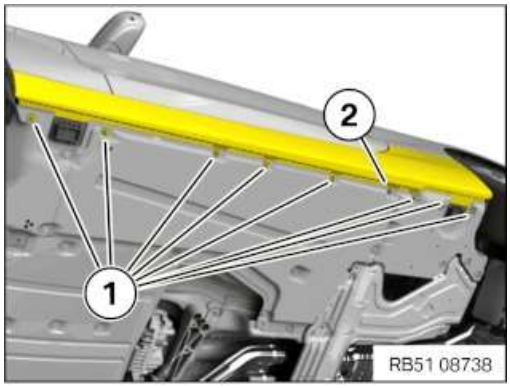
Paint damage.

- Mask those working areas at risk with yellow plastic adhesive tape.
- Remove and install heavy or bulky components with the aid of another person/other persons.

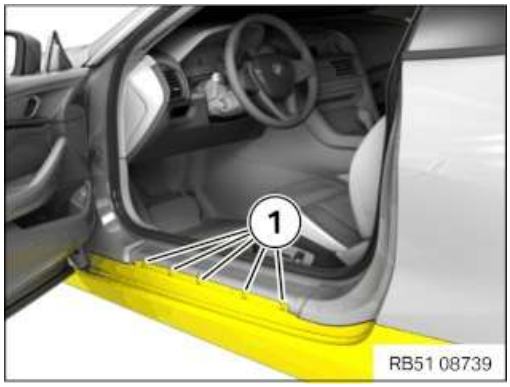
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

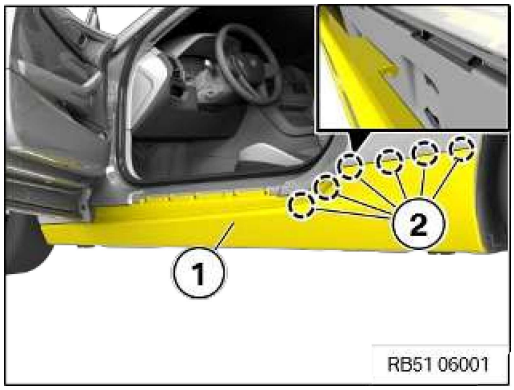
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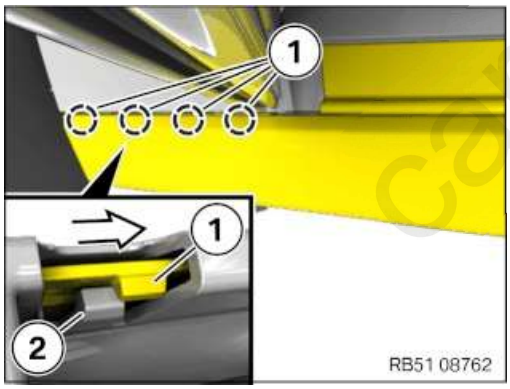
- Loosen screws (1).
- Release nut (2).



- Release the expanding rivet (1).



- Release side sill trim panel (1) from latch mechanisms (2) using a suitable tool, starting from the rear.

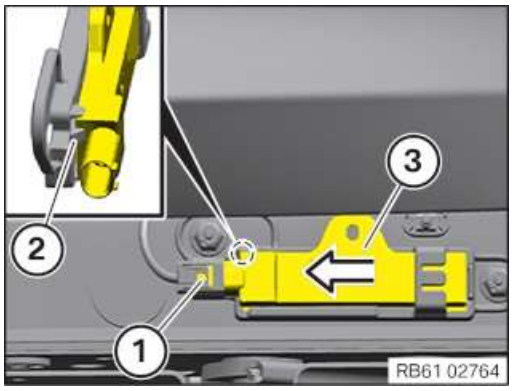


- Slide the side sill trim panel to the front in the direction of the arrow to release latch mechanisms (1) from supporting strip (2).
- Release the side sill trim panel with latch mechanisms (1) from supporting strip (2) and remove it with the help of another person.

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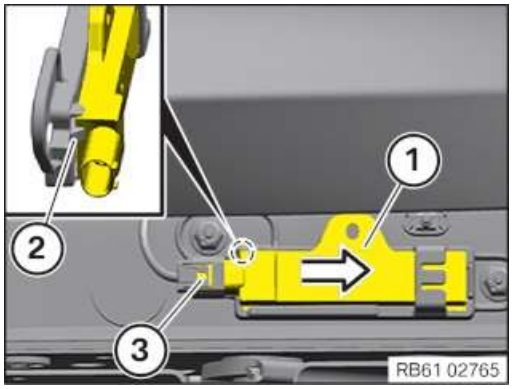
MAIN WORK

3 – Remove aerial for the Car Access System (CAS)



- Unlock plug connection (1) and disconnect.
- Release the latch mechanism (2) and remove the aerial (3) in direction of arrow.

4 – Install the aerial for the Car Access System (CAS)



- Install the aerial (1) in the direction of arrow.
- Check the latch mechanism (2) is fitted correctly.
- Connect connectors (3) and lock.

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POSTPROCESSES

5 – Installing the side sill trim panel

RISK OF DAMAGE

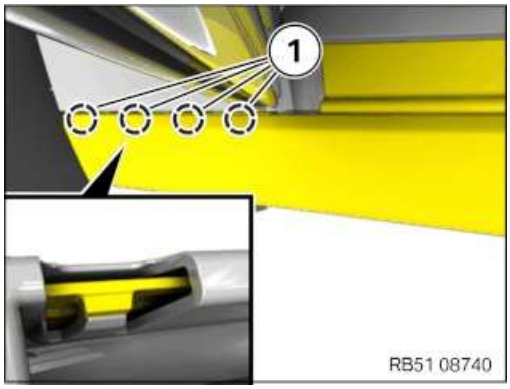
Mechanical effects.

Paint damage.

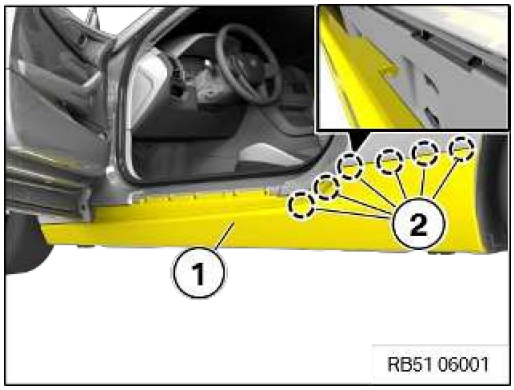
- Mask those working areas at risk with yellow plastic adhesive tape.
- Remove and install heavy or bulky components with the aid of another person/other persons.

NOTICE

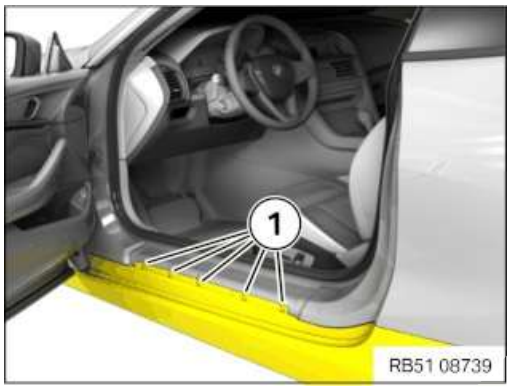
Schematic diagram is for example purposes. Some parts may differ in certain details.



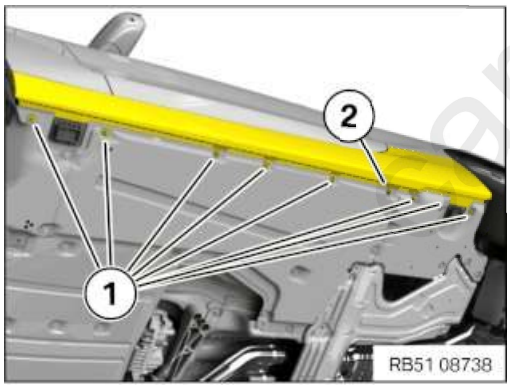
- Position the side sill trim panel.
- Clip in the front side sill trim panel at the latch mechanisms (1).



- Clip in the side sill trim panel (1) at the rear into the latch mechanisms (2).



- Secure expanding rivet (1).



- Tighten the screws (1) and nuts (2).

Underbody panelling, side

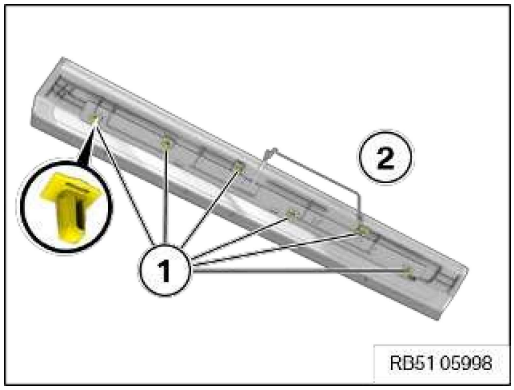
Hexagon screw		Tightening torque	2.6 Nm
Plastic nut		Tightening torque	2.6 Nm

6 – Installing the front sill trim

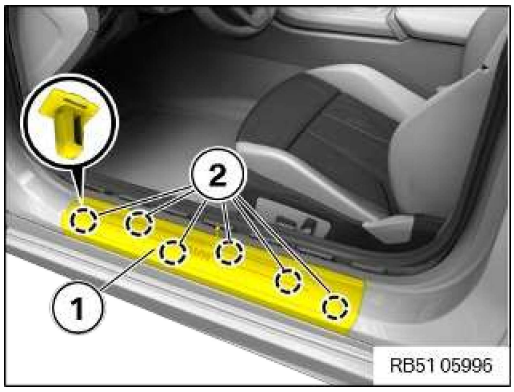
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

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- Check if clips (1) on the front sill trim (2) are missing or damaged and renew them if necessary.



- Position the front sill trim (1) correctly.
- Clip in the front sill trim (1) with the clips (2).

Additional Information

Overview of Tightening Torques

Underbody panelling, side — Used in step 5

Hexagon screw		Tightening torque	2.6 Nm
Plastic nut		Tightening torque	2.6 Nm

Overview of Special Tools

0 496 569 (00 9 325) Wedge



Common — Used in step 1

Usage	(Panel wedge) From 11/2008 this special tool replaces panel wedge 00 9 317 (different material)
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	41 01 09 (507)

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61 35 975 Removing and installing/replacing bumper aerial for Comfort Access

RISK OF DAMAGE

Mechanical effects.

Paint damage.

- Mask those working areas at risk with yellow plastic adhesive tape.
- Remove and install heavy or bulky components with the aid of another person/other persons.

TECHNICAL INFORMATION

To guarantee the quality of the driver assistance functions in vehicles with concealed radar sensors installed, the component may only be repainted by observing the repair specifications described in the document "Standards for repair painting with sensor systems".

Sourcing reference:

https://colorsystem-paint.com/

Aftersales Information Research (AIR) - Repair and service messages - HG99 - ColorSystem

ISTA - HG99 - ColorSystem

No stickers or foils (transparent or coloured) may be attached in the radiation areas of the radar sensors.

The component may be painted if no radar sensors have been installed.

The following features can be used to identify whether radar sensors are installed on the vehicle:

Radar sensors are installed at the rear if the triangular warning light is located on the exterior mirror (in the mirror glass or on the mirror frame).

Radar sensors are installed at the front and rear if the triangular warning light is located on the exterior mirror (in the mirror glass or on the mirror frame) in conjunction with the optional equipment S5ATA or S5AUA.

PRELIMINARY WORK

1 – Removing the luggage compartment floor trim panel

▸ **Removing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



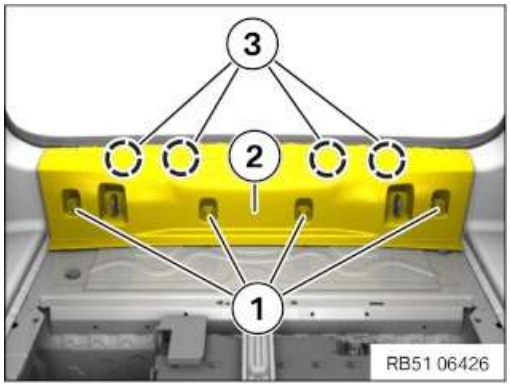
- Remove luggage compartment floor trim panel (1).

2 – Removing the loading edge trim

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NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



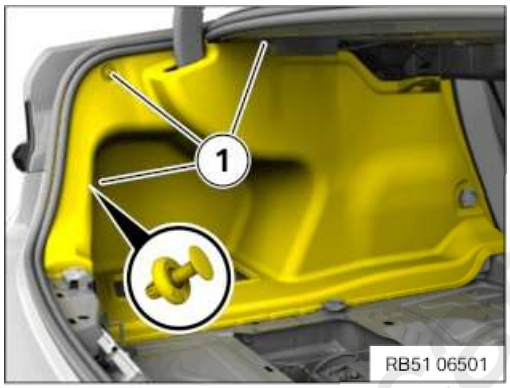
- Loosen the expanding rivet (1).
- Unclip loading edge trim(2) upwards from latch mechanisms (3).
- Guide out and remove loading edge trim (2) under the sealing lip of the tailgate seal.

3 – Removing part of the luggage compartment wheel arch trim panel on the left and right

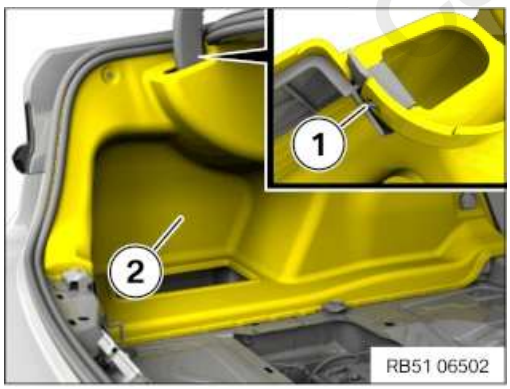
▸ **Partially remove luggage compartment wheel arch panel on left**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Loosen the expanding rivet (1).



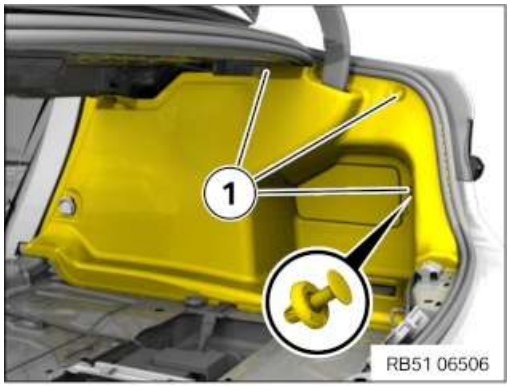
- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip of the tailgate seal and release it in the rear area.

▸ **Partially remove luggage compartment wheel arch panel on right**

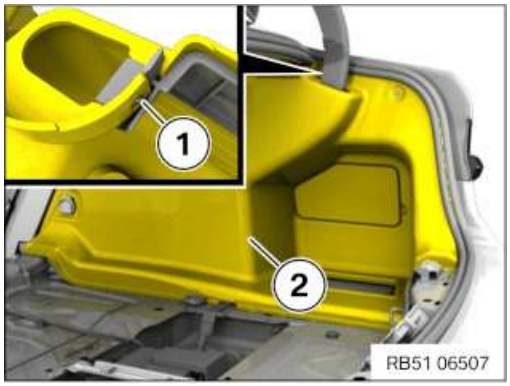
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

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- Loosen the expanding rivet (1).



- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip of the tailgate seal and release it in the rear area.

4 – Removing trim from water channel on left and right

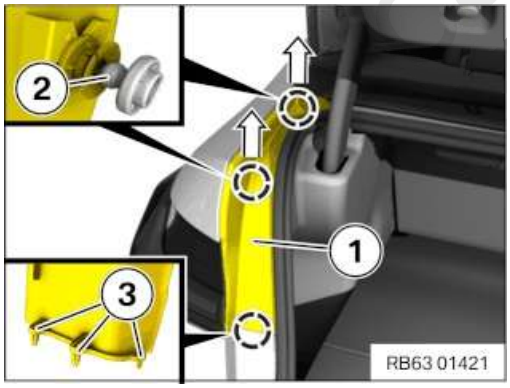
NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing trim from water channel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Unclip trim (1) in upward direction from ball pins (2).
- Release trim (1) from guides (3) and remove.

5 – Removing the rear light on the left and right side panels

NOTICE

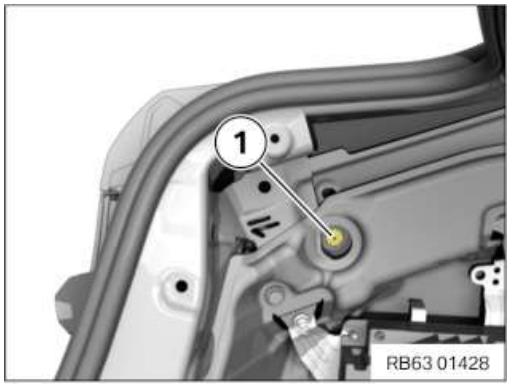
Description is for left component only. Procedure on the right side is identical.

▸ **Removing the rear light on the side panel**

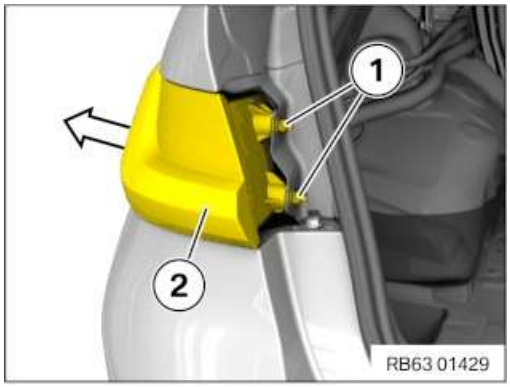
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NOTICE

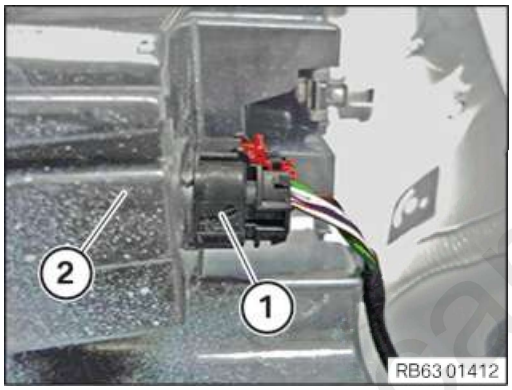
Schematic diagram is for example purposes. Some parts may differ in certain details.



- Loosen nut (1).



- Release the nuts (1) and feed out the rear light on the side panel (2) in the direction of arrow.



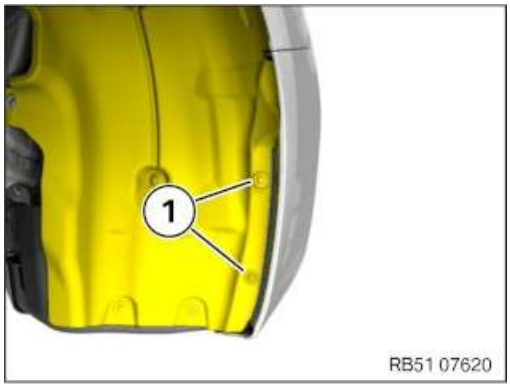
TECHNICAL INFORMATION

Observe note on unlocking and disconnecting plug connections.

For additional information see: 6113 ... Unlocking and disconnecting different plug connections

- Unlock plug connection (1) and disconnect.
- Remove the rear light on the side panel (2).

6 – Remove rear bumper panel



NOTICE

Perform the operations on the left and right side.

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

- Loosen screws (1).

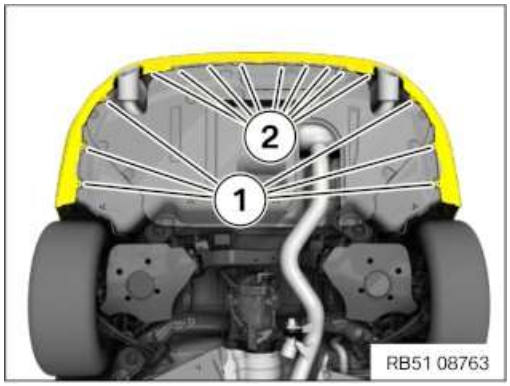
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NOTICE

Perform the operations on the left and right side.

- Release the screw (1).



- Loosen screws (1).
- Release the bumper panel at the latch mechanisms (2).



NOTICE

Perform the operations on the left and right side.

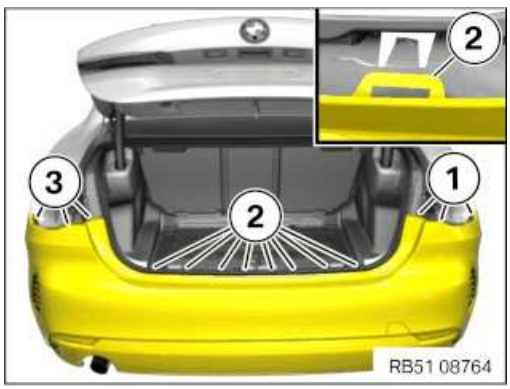
- Release the screw (1).



NOTICE

Perform the operations on the left and right side.

- Release the bumper panel with the latch mechanisms (1).



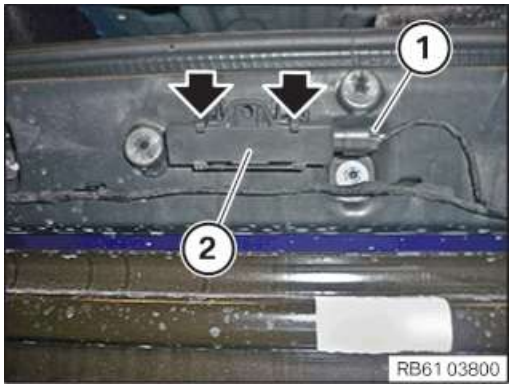
- Release the bumper panel with the latch mechanisms (1).
- Release the bumper panel from the latch mechanisms (2) starting from the right.
- Release the bumper panel from the latch mechanisms (3)



- Unlock plug connection and disconnect.
- Remove bumper panel.

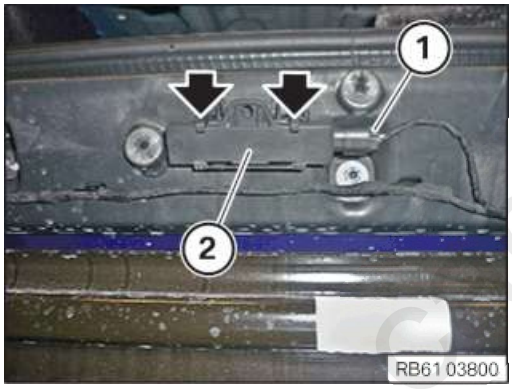
MAIN WORK

7 – Removing bumper aerial for the Comfort Access



- Disconnect plug connection (1).
- Release the latch mechanism (arrows).
- Remove the bumper aerial (2).

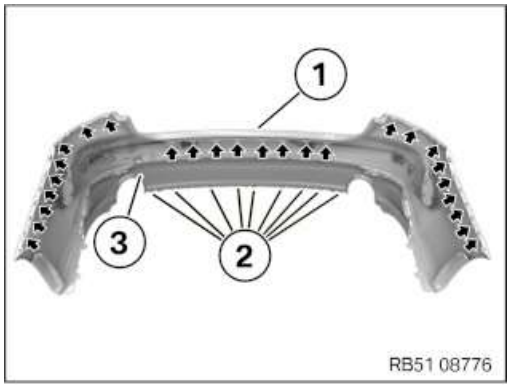
8 – Installing the bumper aerial for Comfort Access



- Position the bumper aerial (2) and engage it in the latch mechanisms (arrows).
- Connect connector (1).

POSTPROCESSES

9 – Install rear bumper panel



Check

- Check the latch mechanisms (arrows) on the bumper panel (1) for damage.

  Check the latch mechanisms (2) on the bumper trim (3) for damage.

Result

» Latch mechanisms (arrows) are damaged.

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Measure

- Renew the bumper panel (1).

Result

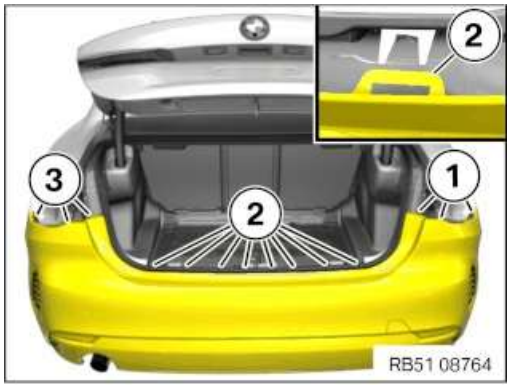
» Latch mechanisms (2) are damaged.

Measure

- Renew the bumper trim (3).



- Position the bumper panel.
- Connect connectors (1) and lock.



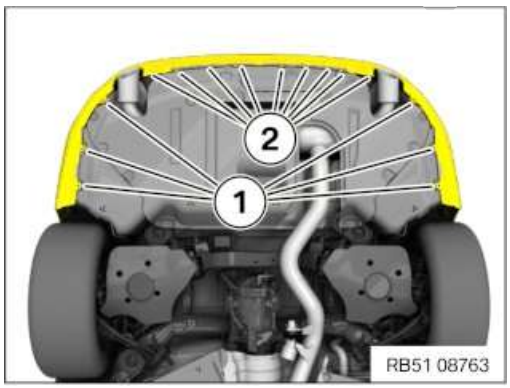
- Clip in the bumper panel with the latch mechanisms (1),(2) and (3).



NOTICE

Perform the operations on the left and right side.

- Clip in the bumper panel with latch mechanisms (1).



- Clip in the bumper panel with latch mechanisms (2).
- Tighten the screws (1).

Rear bumper trim panel to guide

Hexagon screw		Tightening torque	2.5 Nm

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NOTICE

Perform the operations on the left and right side.

- Tighten down screw (1).

Rear bumper trim panel to guide

Hexagon screw		Tightening torque	2.5 Nm



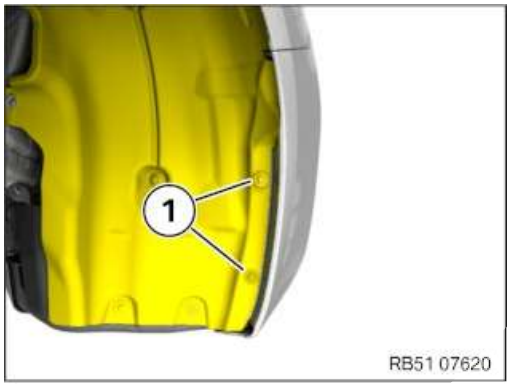
NOTICE

Perform the operations on the left and right side.

- Tighten down screw (1).

Lower bumper panel to body

Oval-head screw		Tightening torque	2.5 Nm



NOTICE

Perform the operations on the left and right side.

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

- Tighten the screws (1).

Rear wheel arch cover to bumper trim panel

Hexagon screw		Tightening torque	2,6 Nm

10 – Installing the rear light on the left and right side panels

NOTICE

Description is for left component only. Procedure on the right side is identical.

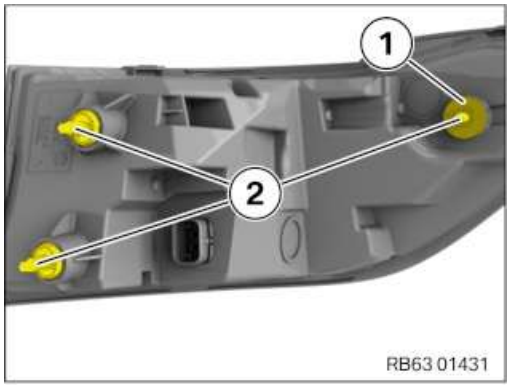
▸ **Install the rear light on the side panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

Check

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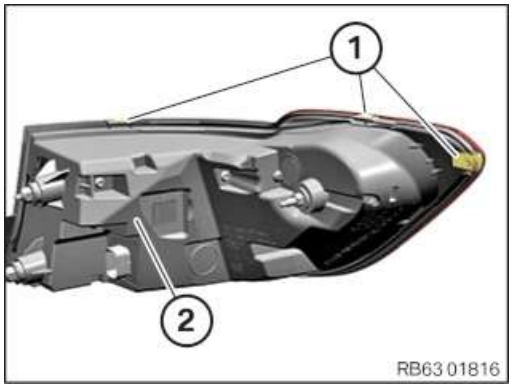
- Check the seal (1) for damage and renew if necessary.
- Check the threaded inserts (2) for damage.

Result

» The threaded inserts are damaged.

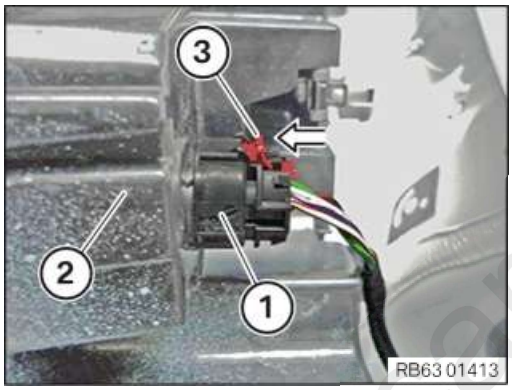
Measure

- Replace rear light.



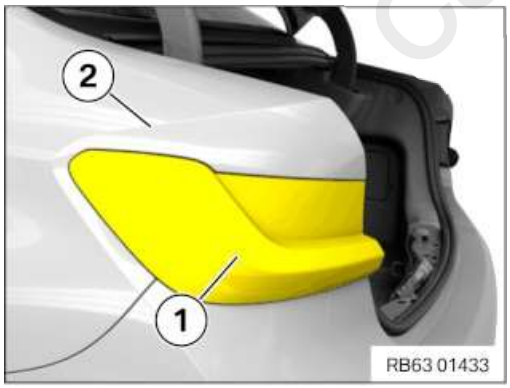
- Contact surfaces (1) on rear light (2) must not be damaged or missing.

  Missing contact surfaces (1) could cause paintwork damage.



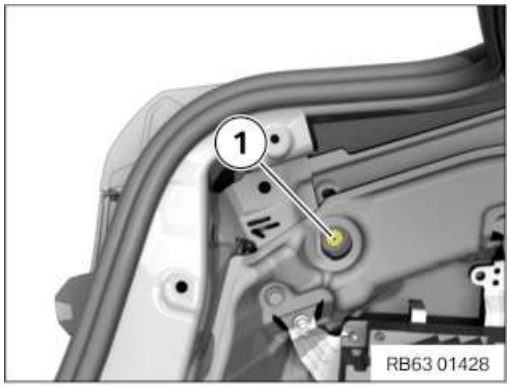
- Connect the connector (1) to the rear light on the side panel (2).

  The connector (1) must engage audibly.
- Lock the lock in direction of arrow (3).

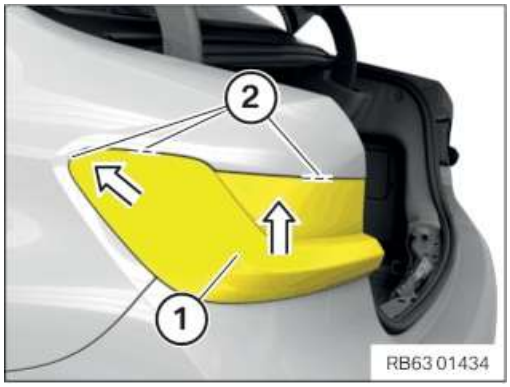


- Position the rear light on the side panel (1) on the side panel (2).

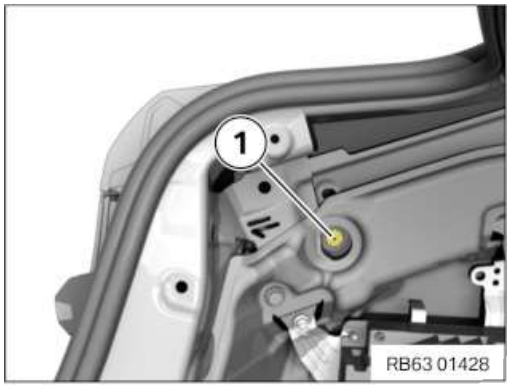
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- Position the nut (1).



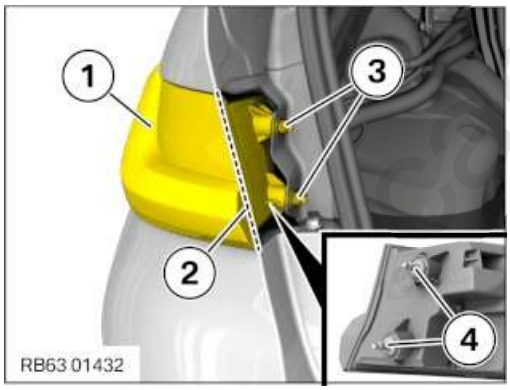
- Position the rear light on the side panel (1) to the front at the top.
- Move the contact surfaces (2) of the rear light on the side panel (1) upwards (arrow) so that they are in place.
- Hold the rear light on the side panel (1) in position.



- Tighten nut (1).

Rear light to side panel to body

Combination hexagon nut		Tightening torque	4 Nm



- Position nuts (3).
- Align rear light on the side panel (1) with the connecting line (2).

  The alignment is done through threaded inserts (4) on the rear light on the side panel (2).
- If necessary, correct the position of the rear light on the side panel (1) by twisting threaded inserts (4).
- Tighten nuts (3).

Rear light to side panel to body

Combination hexagon nut		Tightening torque	4 Nm

11 – Installing trim in water channel on left and right

NOTICE

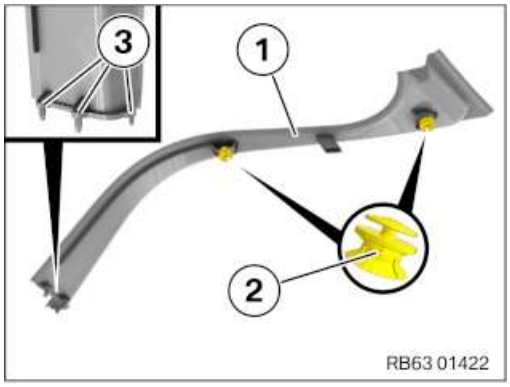
Description is for left component only. Procedure on the right side is identical.

▸ **Installing trim in water channel**

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NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



Check

- Check clips (2) for damage and renew if necessary.
- Check guides (3) for damage.

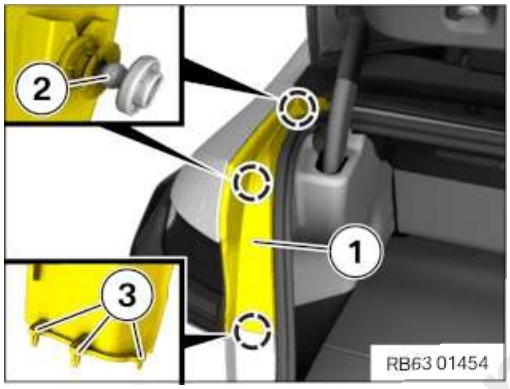
Result

» The guides are damaged.

Measure

- Renew the trim .

  Parts: trim



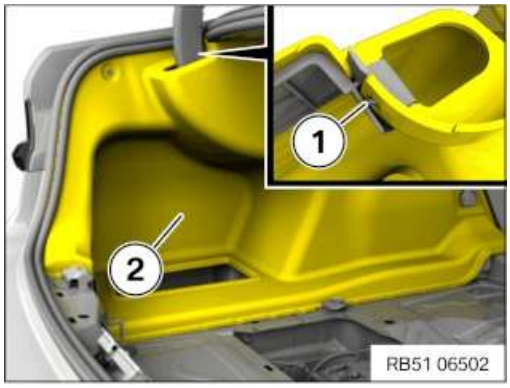
- Insert trim (1) in guides (3).
- Clip trim (1) from above into ball pins (2).

12 – Partially installing the luggage compartment wheel arch trim panel on the left and right

▸ Partially installing the left luggage compartment wheel arch trim panel

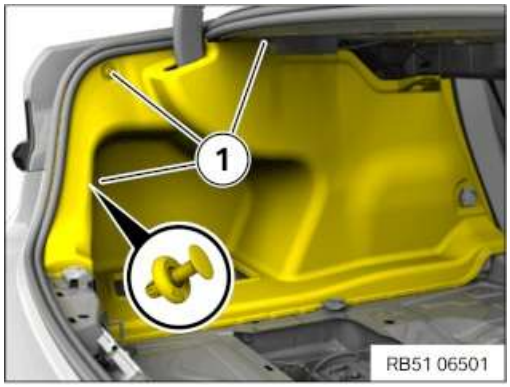
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Feed the luggage compartment wheel arch trim panel (2) into the rear area under the sealing lip of the tailgate seal.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).

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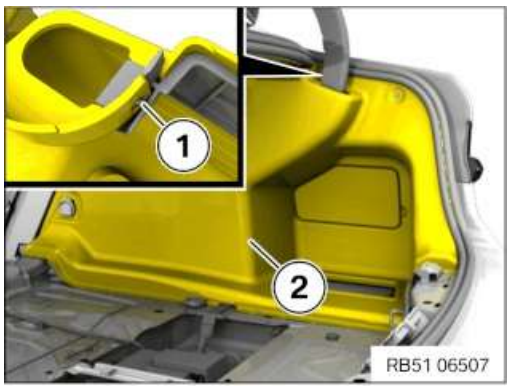


- Secure expanding rivet (1).

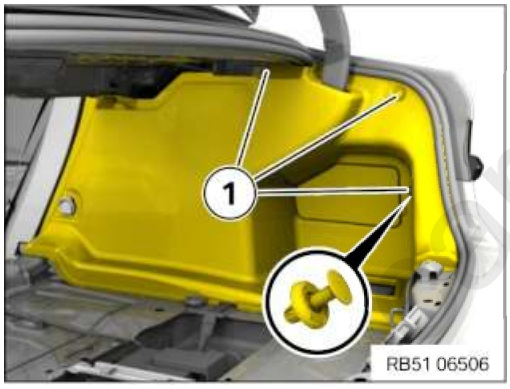
▸ **Partially installing right luggage compartment wheel arch trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Guide luggage compartment wheel arch trim panel (2) into the rear area under the sealing lip of the tailgate seal.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).

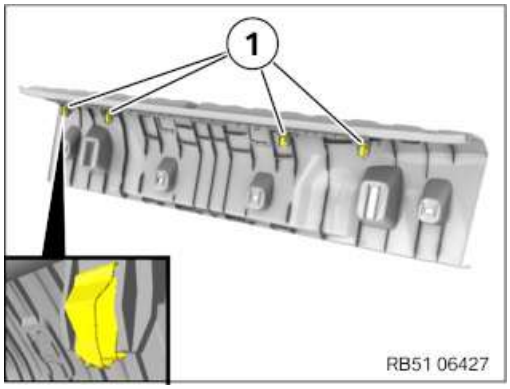


- Secure expanding rivet (1).

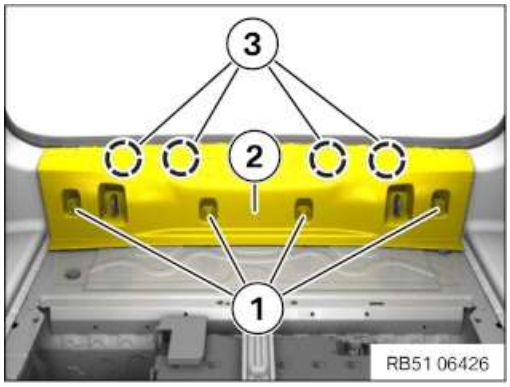
13 – Installing loading edge trim

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Check the clamps (1) for damage and renew if necessary.



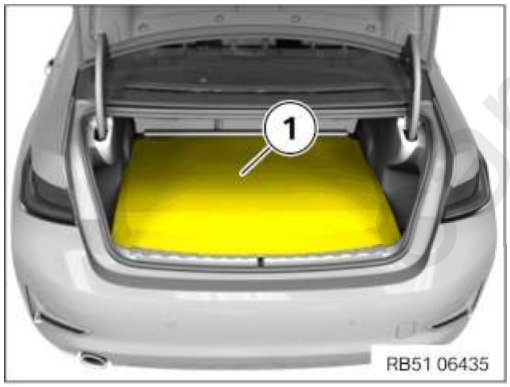
- Insert the loading edge trim (2) under the sealing lip of the tailgate seal.
- Fit the trim of the loading edge (2) at the latch mechanisms (3) and clip it in to the bottom.
- Secure expanding rivet (1).

14 – Installing the luggage compartment floor trim panel

▸ **Installing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Insert the luggage compartment floor trim panel (1).

Additional Information

Overview of Tightening Torques

Rear bumper trim panel to guide			Used in step 9
Hexagon screw		Tightening torque	2.5 Nm

Lower bumper panel to body			Used in step 9
Oval-head screw		Tightening torque	2.5 Nm

Rear wheel arch cover to bumper trim panel			Used in step 9
Hexagon screw		Tightening torque	2,6 Nm

Rear light to side panel to body			Used in step 10
Combination hexagon nut		Tightening torque	4 Nm

Links

Repair instructions	Used in step
61 13 ... Unlocking and disconnecting different plug connections	5

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61 35 970 Removing and installing/replacing luggage compartment aerial for Comfort Access

PRELIMINARY WORK

1 – Removing the luggage compartment floor trim panel

▸ **Removing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Remove luggage compartment floor trim panel (1).

2 – Removing the luggage compartment floor trim panel

NOTICE

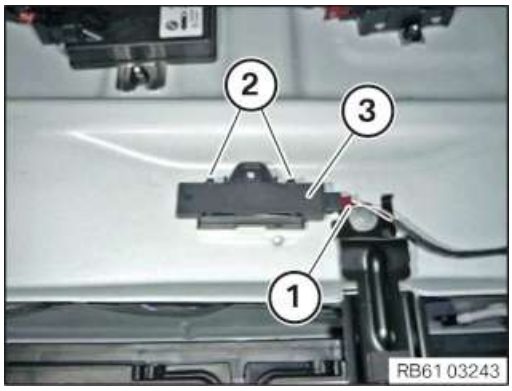
Schematic diagram is for example purposes. Some parts may differ in certain details.



- Remove luggage compartment floor trim panel (1).

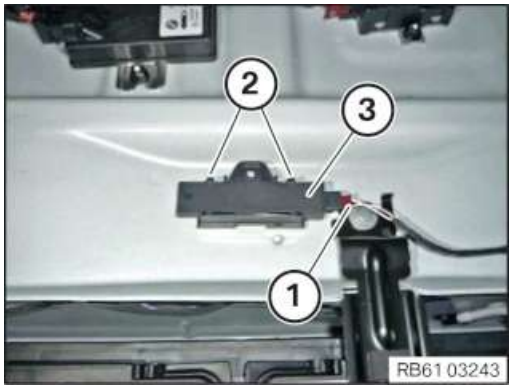
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3 – Removing the luggage compartment aerial



- Disconnect plug connection (1).
- Unlock the latch mechanisms (2).
- Remove the luggage compartment aerial (3).

4 – Installing the luggage compartment aerial



- Position the luggage compartment aerial (3) correctly.
  The latch mechanisms (2) must engage.
- Connect connector (1).

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5 – Installing the luggage compartment floor trim panel

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



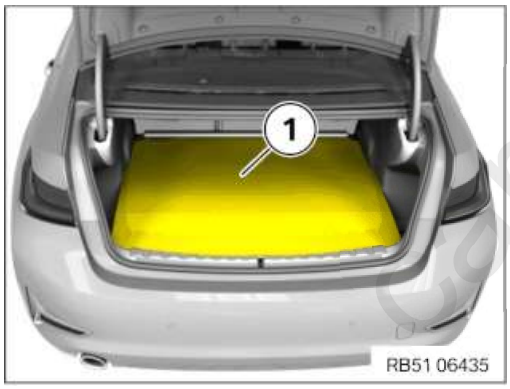
- Insert the luggage compartment floor trim panel (1).

6 – Installing the luggage compartment floor trim panel

▸ **Installing the luggage compartment floor trim panel**

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Insert the luggage compartment floor trim panel (1).

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61 35 779 Replace Body Domain Controller control unit (BDC) (after vehicle diagnosis) (flat rate specification without programming/encoding, see 61 00 ...)

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

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Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

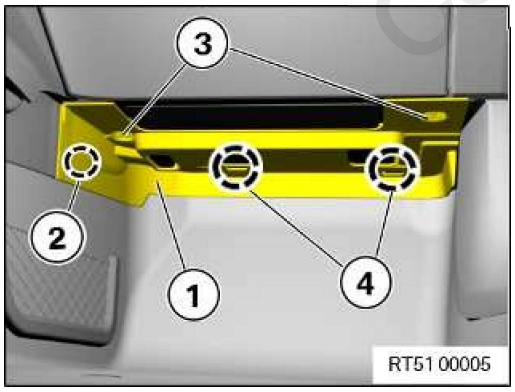
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Remove the right footwell trim



- Turn the locks (3) by 90°.
- Feed the footwell trim (1) out of the guide (2).
- Detach the footwell trim (1) inward out of the guides (4).
- Unlock associated plug connection and disconnect.

4 – Removing inner right door sill cover strip

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing the inner door sill cover strip**

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RISK OF DAMAGE

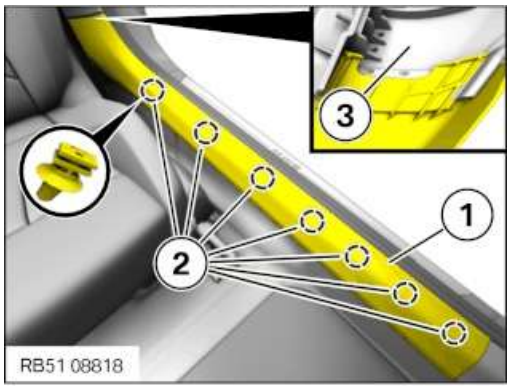
Bending of plastic parts.

Application of too much force can lead to bending of plastic parts.

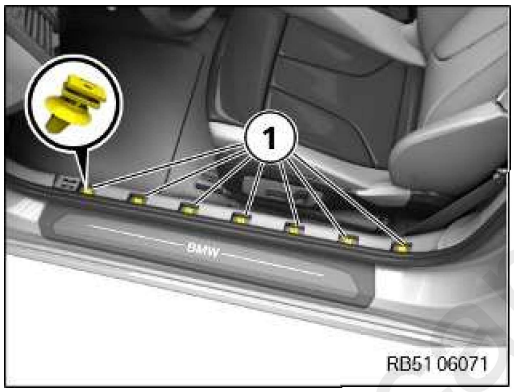
- Place special tool directly beside the mounting clip.
- Continue unclipping the part without using the tool if possible.

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

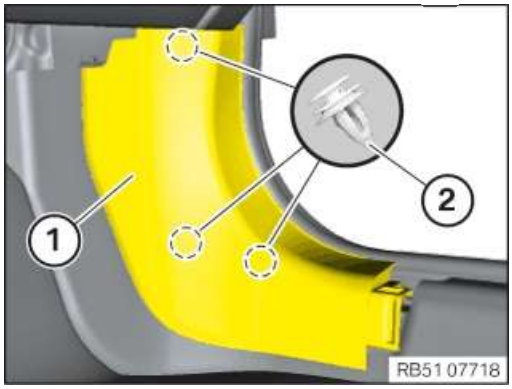


- Release door sill cover strip (1) with clips (2) starting from the front using a suitable special tool from the set of special tools 0 493 752 (00 9 329).
- Guide out and remove door sill cover strip (1) under the rear side trim panel (3) .



- If necessary, remove clips (1) and connect them to the door sill cover strip.

5 – Removing the side trim panel in the footwell at the right-hand A-pillar

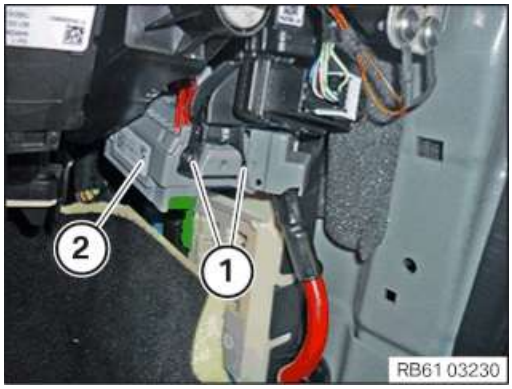


- Loosen the side trim panel (1) at the clips (2) and remove it toward the inside.

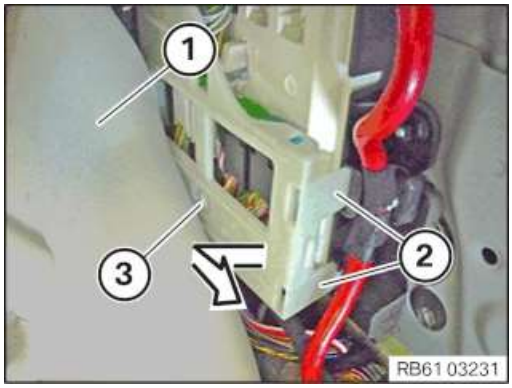
MAIN WORK

6 – Remove the BDC control unit

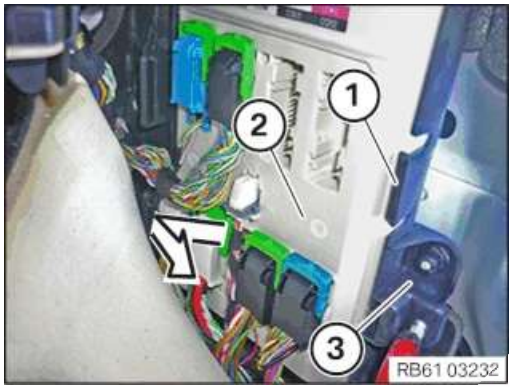
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- Unlock the latch mechanisms (1) and remove the power distribution box (2) downwards.

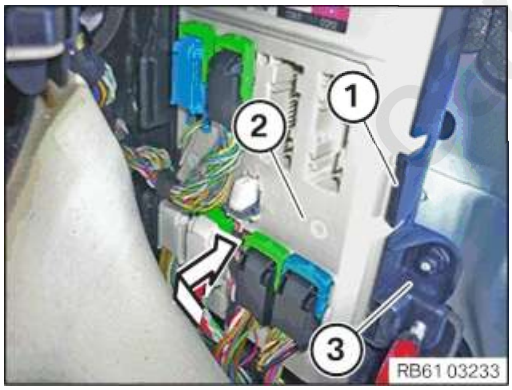


- Fold the carpet (1) to the side.
- Loosen the latch mechanisms (2).
- Guide cover (3) out in direction of arrow.

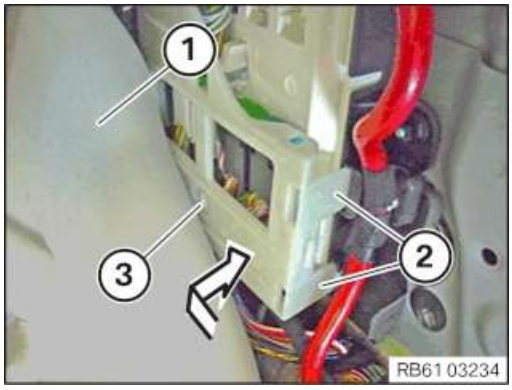


- Unlock all plug connections and disconnect.
- Loosen latch mechanism (1).
- Guide out the BDC control unit (2) from the bracket(3) in the direction of the arrow.

7 – Install the BDC control unit

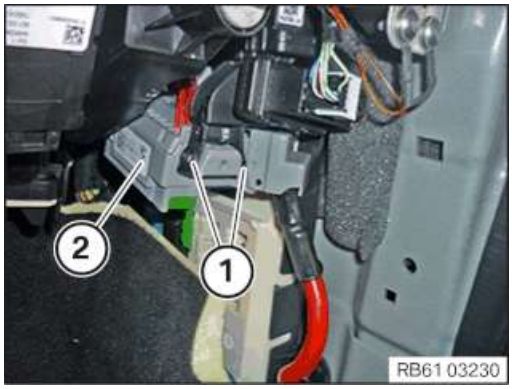


- Guide in the BDC control unit (2) in the holder (3) in the direction of the arrow.
- Engage the BDC control unit (2) in the latch mechanism (1).
- Connect all connectors and lock.



- Feed in the cover (3) in the direction of arrow and engage it in the latch mechanisms (2).
- Position the carpet (1).

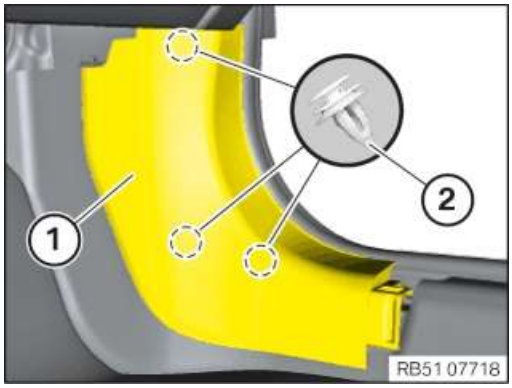
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- Guide in the power distribution box (2) upwards and engage it correctly in the latch mechanisms (1).

POSTPROCESSES

8 – Installing side trim panel in footwell on right A-pillar



- Check the clips (2) for damage.

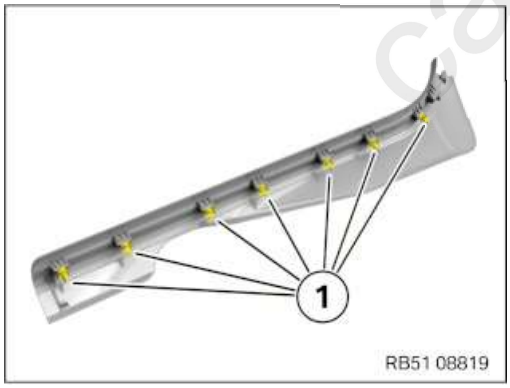
  Renew damaged or missing clips (2).
- Correctly position the side trim panel (1) and clip in to the clips (2).
- Make sure that the side trim panel (1) is correctly fitted against edge protection.

9 – Installing inner right door sill cover strip

NOTICE

Description is for left component only. Procedure on the right side is identical.

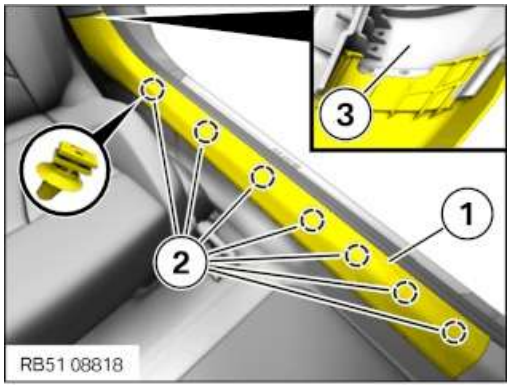
▸ **Installing the inner door sill cover strip**



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

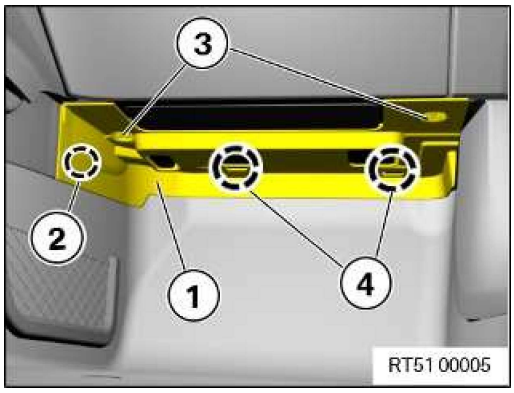
- Check the clips (1) for damage and renew if necessary.



- Insert the door sill cover strip (1) below the rear side trim panel (3).
- Clip the door sill cover strip (1) in with the clips (2).

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10 – Install the right footwell trim panel



- Connect associated connector.
- Attach the footwell trim (1) to the guides (4) and fold up.
- Guide the footwell trim (1) into the guide (2) of the centre console.
- Position the locks (3) correctly and turn by 90°.

11 – Connecting all battery earth leads



- See additional information.

12 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

13 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

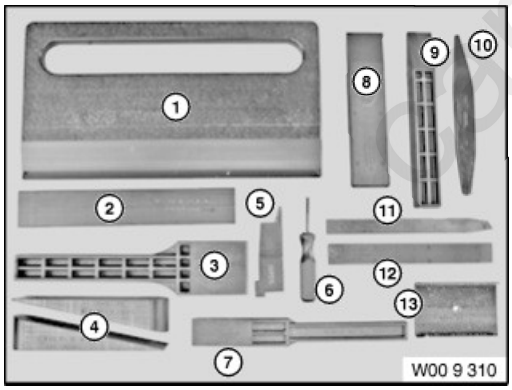
Additional Information

Overview of Tightening Torques

Negative battery cable to 48-V battery			Used in step 13
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common	Used in step 4
Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	113

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211

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61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211

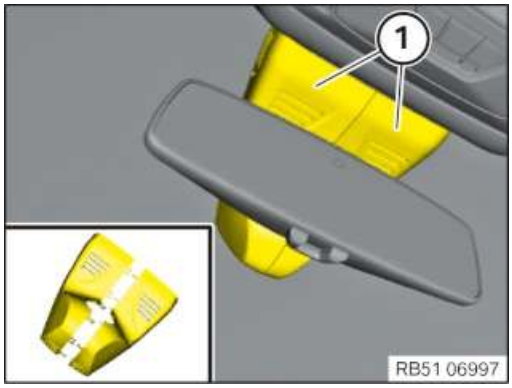
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61 35 678 Replace the rain/light sensor

PRELIMINARY WORK

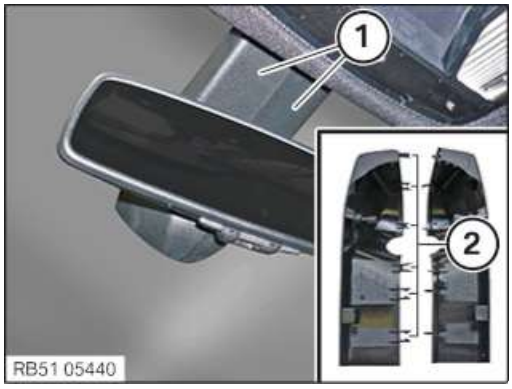
1 – Removing the covers for the interior mirror

- **Version A:**



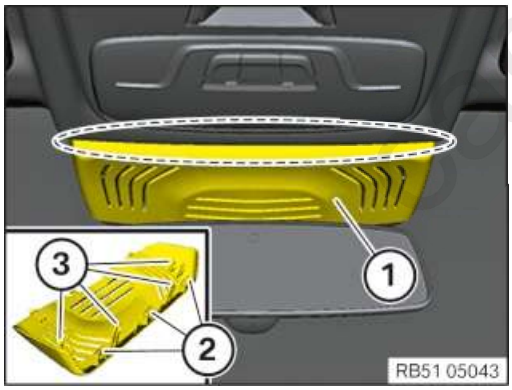
- Release cover (1) in the middle with a suitable plastic wedge from the latch mechanisms and remove.

- **Version B:**

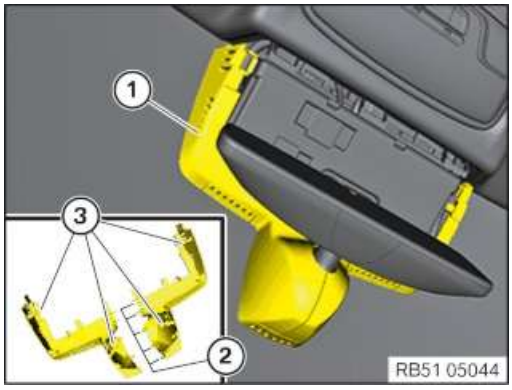


- Release the cover (1) from the latch mechanisms (2) with a suitable plastic wedge and remove sideways.

- **Version C:**



- Detach cover (1) from the clamps (2) in the marked area using a suitable plastic wedge and pull down a certain distance.
- Release cover (1) at the retaining lugs (3) and remove from the guides to the rear.



- Release cover (1) from the latch mechanisms (2) and (3) and remove sideways.
- Remove cover (1) from mirror base (2).

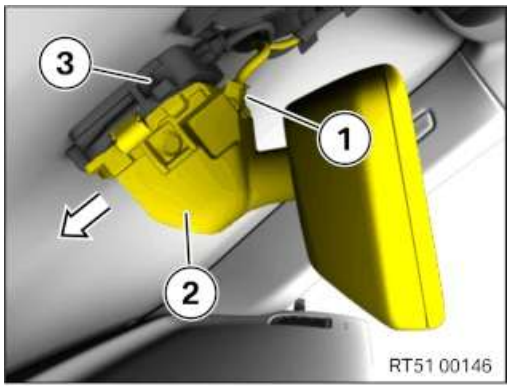
- **Version D:**

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- Release covers (1) and (2) using a suitable plastic wedge at the separation point (3) and remove from the side.

2 – Remove inside mirror



TECHNICAL INFORMATION

Carry out the work at temperatures between 18 °C and 23 °C only.

- Unlock plug connection (1) and disconnect.

RISK OF DAMAGE

Damage to the component.

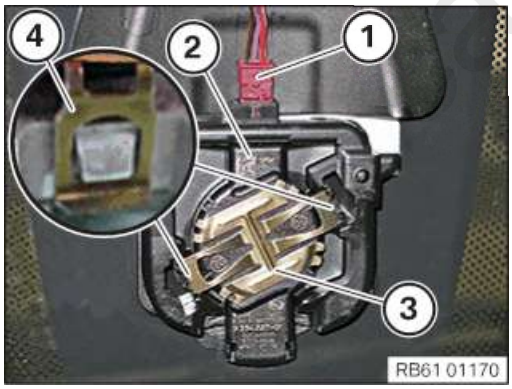
Excessive force may damage the component.

- Handle component carefully.

- Jerk and pull off the interior mirror (2) in the direction of the arrow from the mirror base (3).

MAIN WORK

3 – Remove driving light sensor



RISK OF DAMAGE

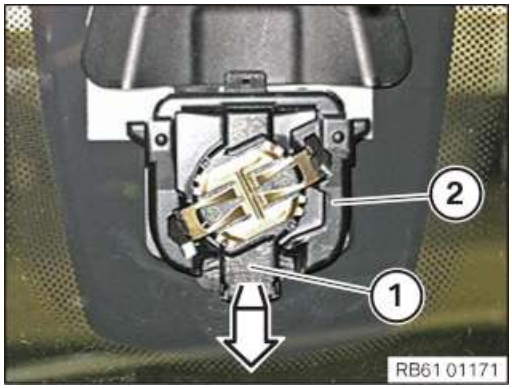
Damage to silicone surface.

A damaged silicone surface can lead to malfunctioning of the rain-light-solar-condensation sensor.

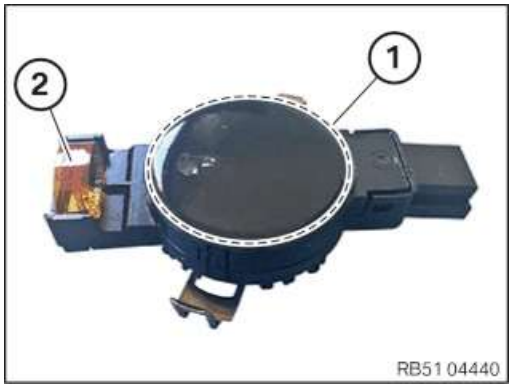
- Do not touch or damage the silicone-coated surface on the rain-light-solar-condensation sensor.
- After releasing lock, wait approx. 30 min. at 20°C for silicone surface to relax.

- Disconnect the connector (1) .
- Push in retaining spring (3) on both sides and unlock the lock (4) by means of a screwdriver.
- Release driving light sensor.

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- Slowly pull the driving light sensor (1) in direction of arrow from the holder (2).



RISK OF DAMAGE

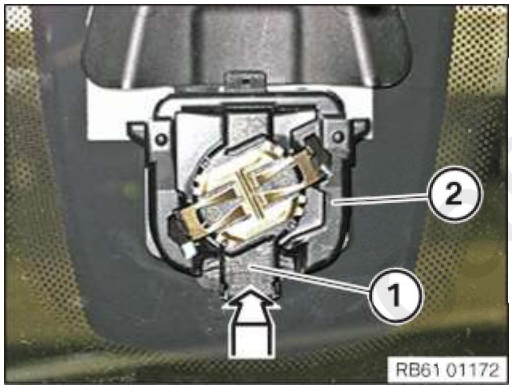
Damage to silicone surface.

A damaged silicone surface can lead to malfunctioning of the rain-light-solar-condensation sensor.

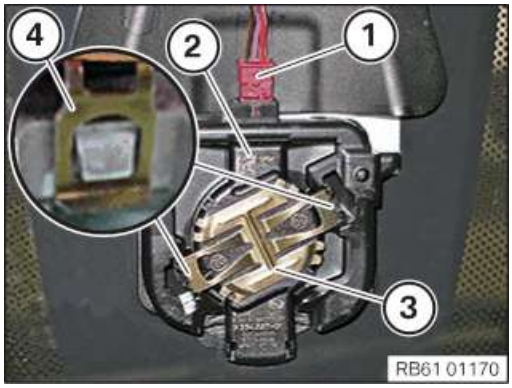
- Do not touch or damage the silicone-coated surface on the rain-light-solar-condensation sensor.
- After releasing lock, wait approx. 30 min. at 20°C for silicone surface to relax.

- Check the silicone-coated surface (1) and the printed circuit board (2) on the driving light sensor for damage.
- When replacing windscreen: Immediately install the driving light sensor on the new windscreen.

4 – Installing driving light sensor

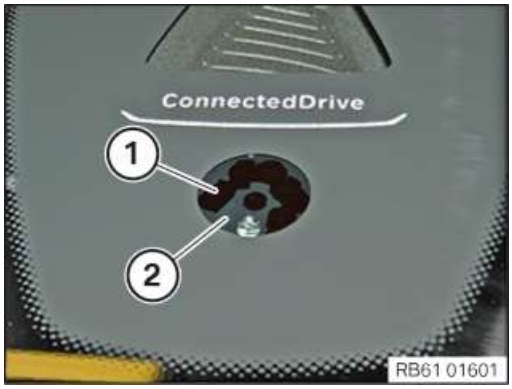


- Thread in the driving light sensor (1) in direction of arrow into the holder (2).



- Press on the driving light sensor (2) on the retaining spring (3) in the centre.
- Successively press down the retaining springs (4) on each side to lock it.
- Connect connector (1).

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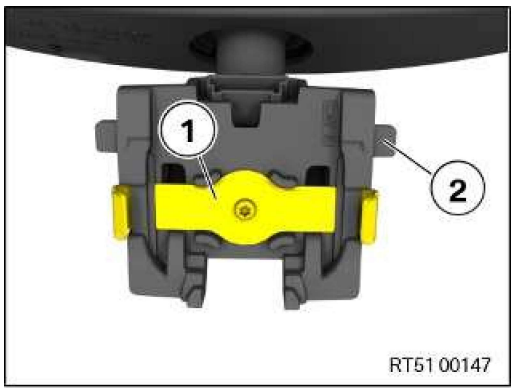


- Check if air pockets are visible.

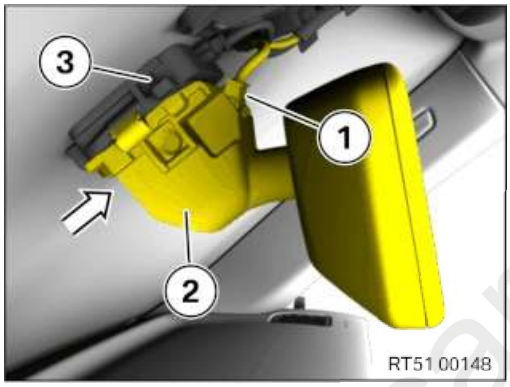
  Visible shades (1) and (2) are not air pockets but rather the optical element of the sensor. The shades do not represent any functional limitation.

POSTPROCESSES

5 – Install interior mirror



- Check the clamp (1) on both sides of the mirror base (2) for damage and renew as needed.



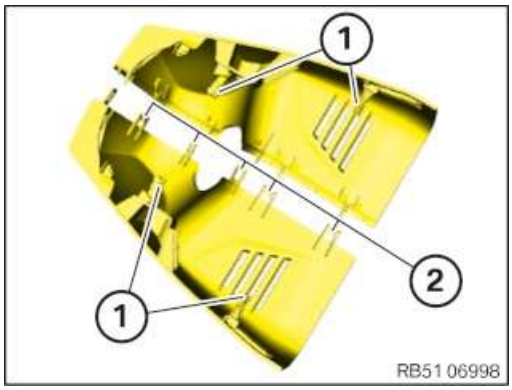
TECHNICAL INFORMATION

Carry out the work at temperatures between 18 °C and 23 °C only.

- Position the interior mirror (2) at the mirror base and slide it on in direction of the arrow.
- Check the correct installation position of the interior mirror (2) at the mirror base (3).
- Connect connectors (1) and lock.

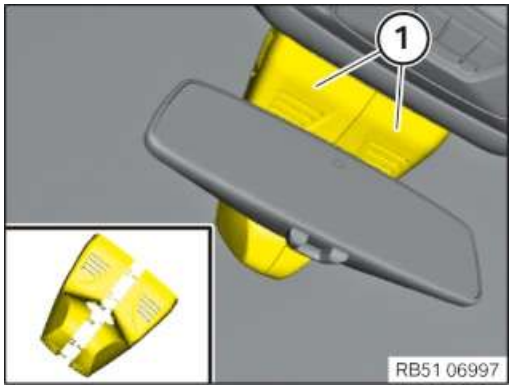
6 – Installing the covers for the interior mirror

- **Version A:**



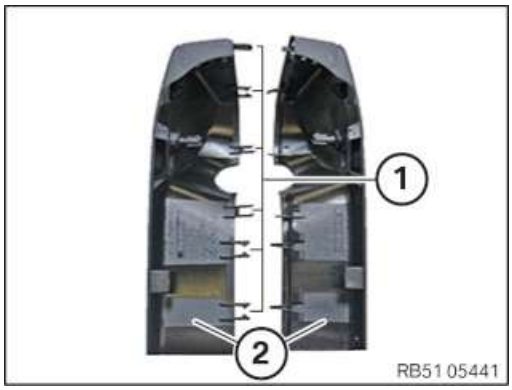
- Check latch mechanisms (1) and (2).
- If the latch mechanisms (1) or (2) are faulty, renew the covers.

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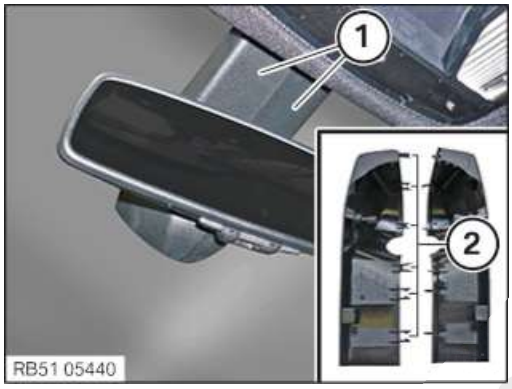
- Feed cover (1) in and lock.

- **Version B:**



- Check the latch mechanisms (1) on the two covers (2) for damage, renew the covers (2) if necessary.

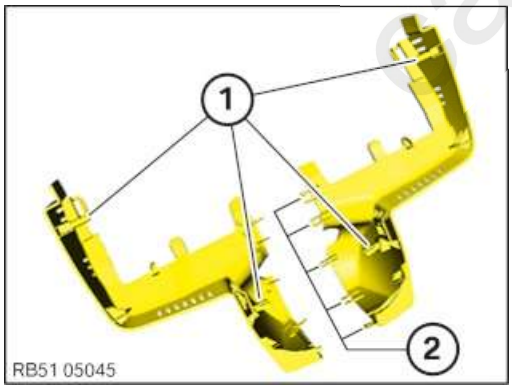
  The covers (2) must not be damaged or missing.



- Position the covers (1) correctly on the mirror and engage with the latch mechanisms (2).

- **Version C:**

Check



- Check the latch mechanisms (1) and (2) of the covers for damage.

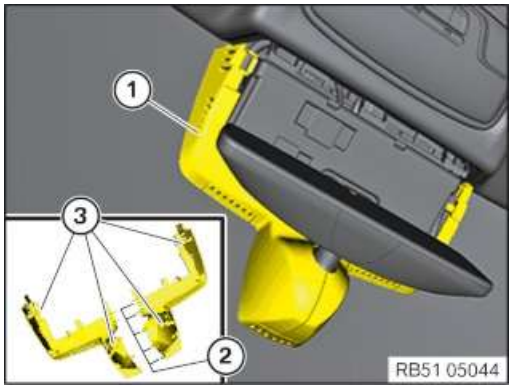
Result

» The latch mechanism is damaged.

Measure

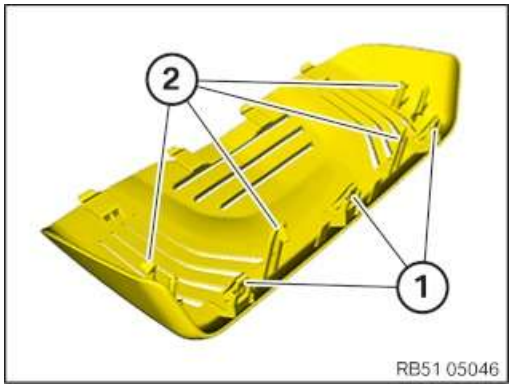
- Renew the cover.

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- Guide in cover (1) on left and right and engage using latch mechanisms (2) and (3).

Check



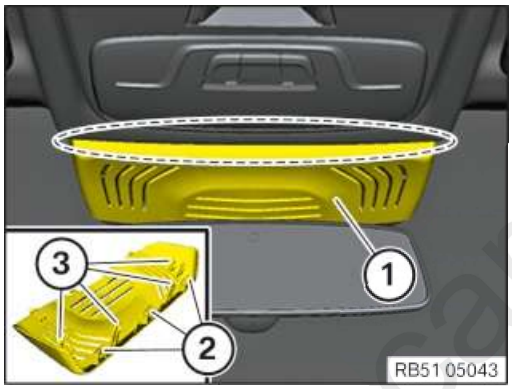
- Check clamps (1) for damage; renew if necessary.
- Check latch mechanisms (2) for damage.

Result

» The latch mechanism is damaged.

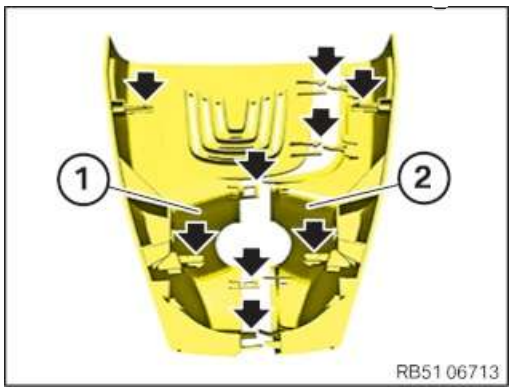
Measure

- Renew the cover.



- Guide cover (1) into front guides and engage using retaining lugs (3) and clamps (2).

- **Version D:**



- Check the latch mechanisms (arrows) on covers (1) and (2) for damage and, if necessary, renew covers (1) and (2).

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- Position covers (1) and (2) correctly on the mirror and engage at the separation point (3).

7 – Initialising rain/light solar sensor

TECHNICAL INFORMATION

Perform initialization when replacing the RLS.

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61 35 697 Replacing control unit for automatic tailgate operation

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads

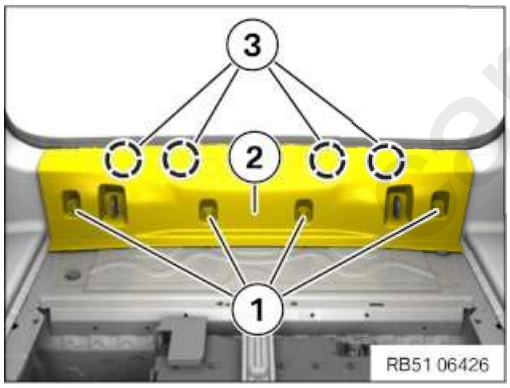


- See additional information.

3 – Removing the loading edge trim

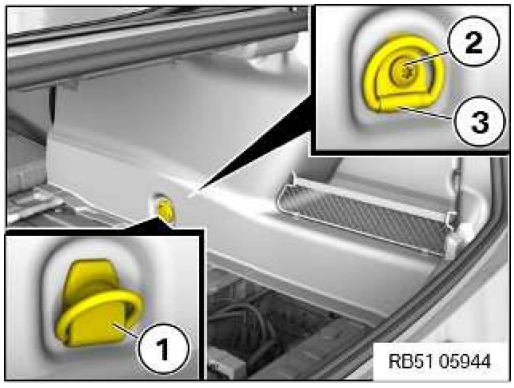
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

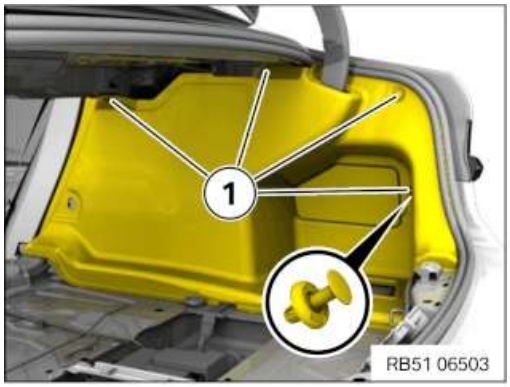


- Loosen the expanding rivet (1).
- Unclip loading edge trim(2) upwards from latch mechanisms (3).
- Guide out and remove loading edge trim (2) under the sealing lip of the tailgate seal.

4 – Removing right luggage compartment wheel arch trim panel

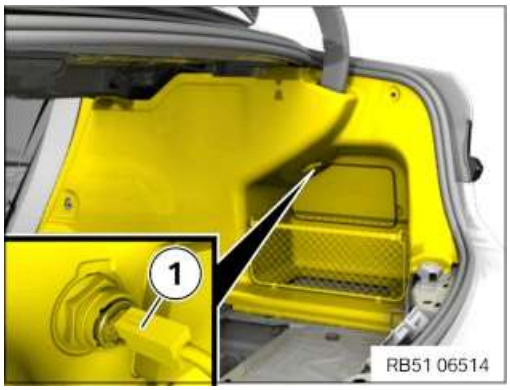


- Remove the cover (1).
- Loosen screw (2).
- Remove the lashing eye (3).

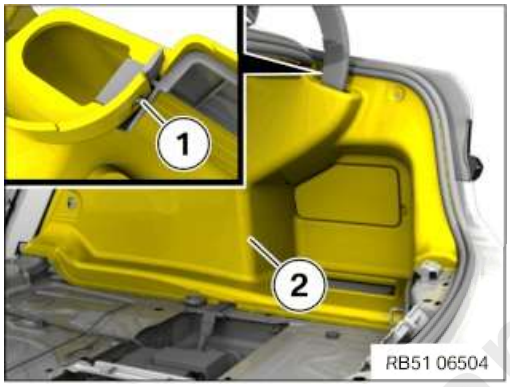


- Reposition the right rear seat backrest.
- Loosen the expanding rivet (1).

▸ If installed: Disconnect plug connection of the 12 V connection (additional work with storage package equipment specification)



- Unlock and disconnect the plug connection (1) of the 12 V power socket.

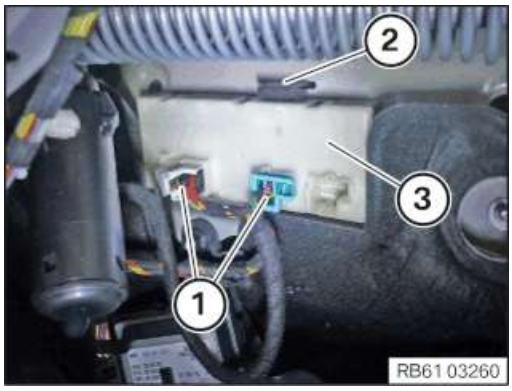


- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip for the tailgate and the side trim panel in the rear passenger compartment.
- Remove luggage compartment wheel arch trim panel (2).

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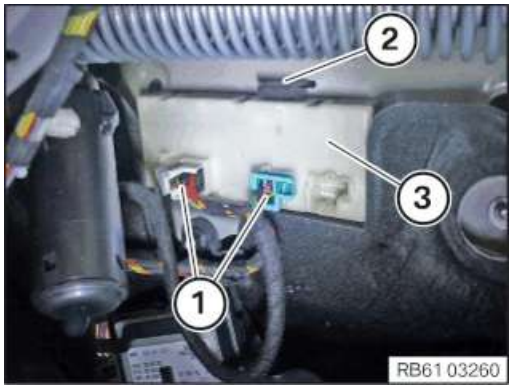
MAIN WORK

5 – Remove the control unit for the automatic tailgate operation



- Unlock and disconnect plug connections (1).
- Unlock the latch mechanism (2) and remove the control unit (3).

6 – Install the control unit for the automatic tailgate operation



- Position the control unit (3) correctly and engage it in the latch mechanism (2).
- Connect connectors (1) and lock.

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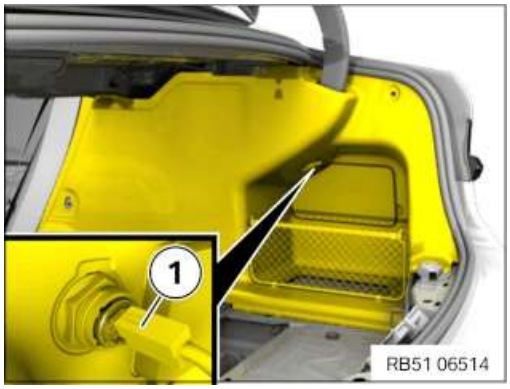
POSTPROCESSES

7 – Installing the luggage compartment wheel arch trim panel on the right

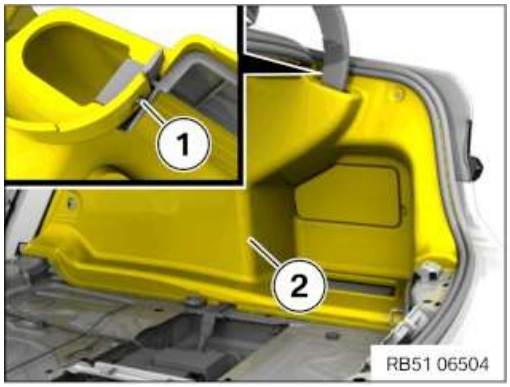
NOTICE

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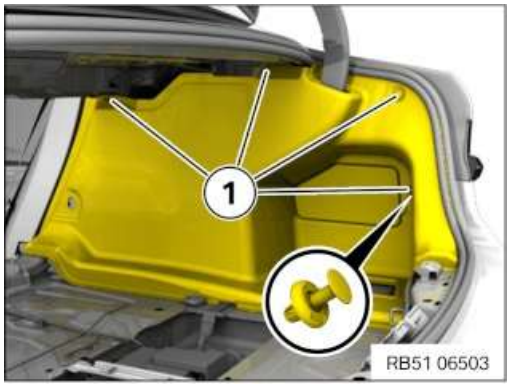
▸ If installed: Connecting plug of the 12 V power socket (additional work for equipment specification with storage package)



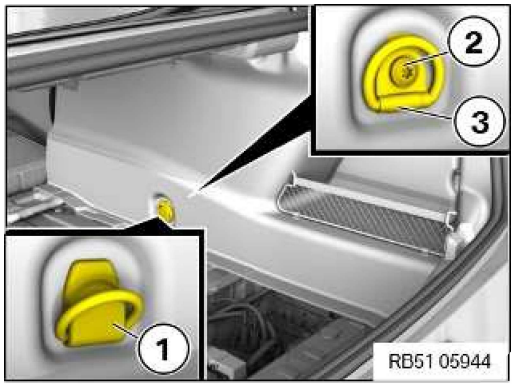
- Connect and lock connector (1) of the 12 V power socket.



- Feed luggage compartment wheel arch trim panel (2) under the side trim panel in the rear passenger compartment and the sealing lip for the tailgate.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).



- Secure expanding rivet (1).
- Raise the right rear seat backrest.



- Position the lashing eye (3).
- Tighten down screw (2).

Lashing eye to body

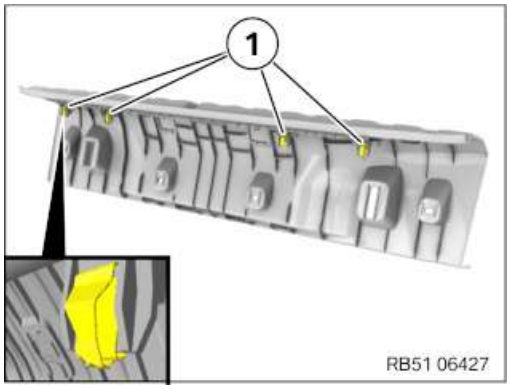
	Tightening torque	19 Nm

- Install the cover (1) .

8 – Installing loading edge trim

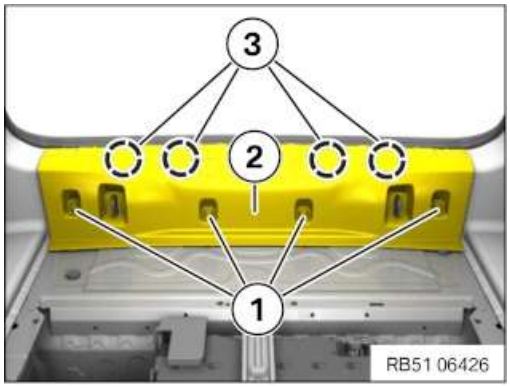
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Check the clamps (1) for damage and renew if necessary.

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- Insert the loading edge trim (2) under the sealing lip of the tailgate seal.
- Fit the trim of the loading edge (2) at the latch mechanisms (3) and clip it in to the bottom.
- Secure expanding rivet (1).

9 – Connecting all battery earth leads



- See additional information.

10 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

11 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Lashing eye to body			Used in step 7
		Tightening torque	19 Nm

Negative battery cable to 48-V battery			Used in step 11
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	111

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29

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61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
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61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
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61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29
61 20 900 Disconnecting and connecting battery earth lead	29

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61 35 582 Replacing control unit/module for left or right seat adjustment

NOTICE

Description is for left component only. Procedure on the right side is identical.

PRELIMINARY WORK

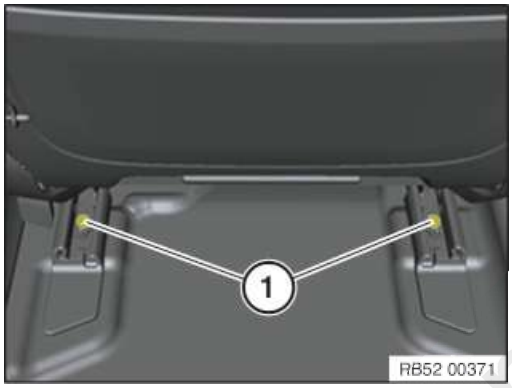
1 – Remove front seat

WARNING

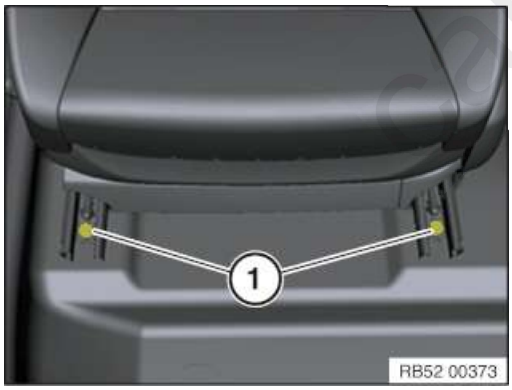
Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.



- Loosen screws (1).



- Loosen screws (1).
- Adjust the front seat to the centre position.
- **When removing the driver's seat:**

  Completely retract the steering column

  Adjust the steering column completely upwards.

▸ **Deactivating the 48 V electrical system**

Prerequisite

Ignition is switched off.

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WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

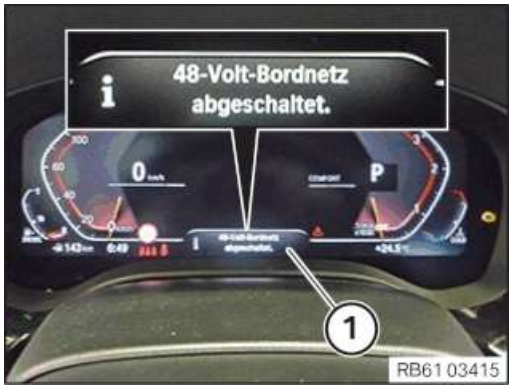
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.

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WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

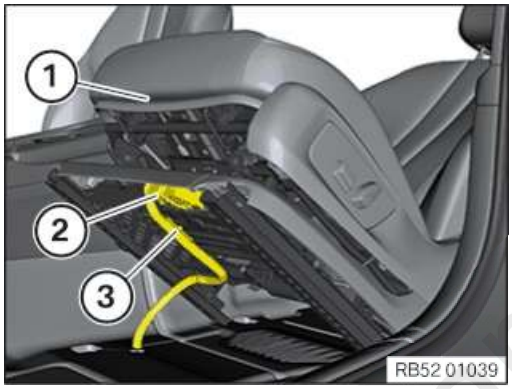
- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

▸ **Disconnecting all battery earth leads**



- See additional information.



RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

- Cover the door sill using protective covers.
- Place front seat (1) to the rear.
- Unlock plug connection (2) and disconnect.
- Loosen the cable clip (3).

RISK OF DAMAGE

Heavy component.

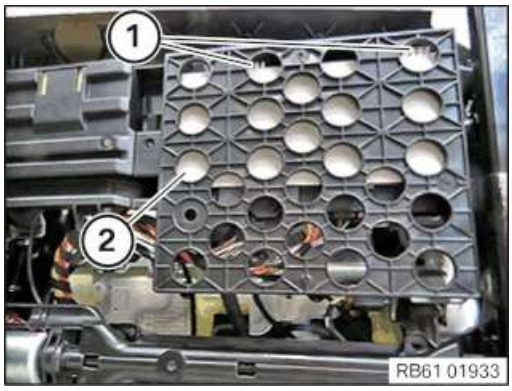
Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.

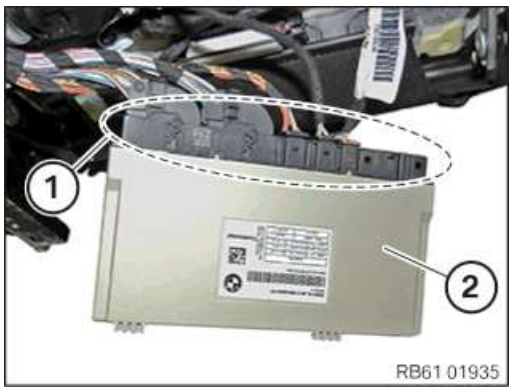
- Lift out front seat (1) with the assistance of a second person.

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2 – Removing the driver's seat module (SMFA)

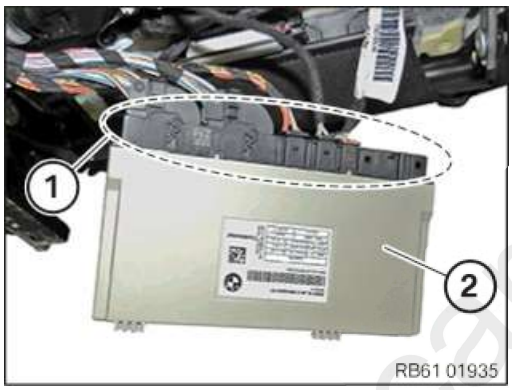


- Unlock the retaining lugs (1).
- Pull the driver's seat module (SMFA) (2) forwards.

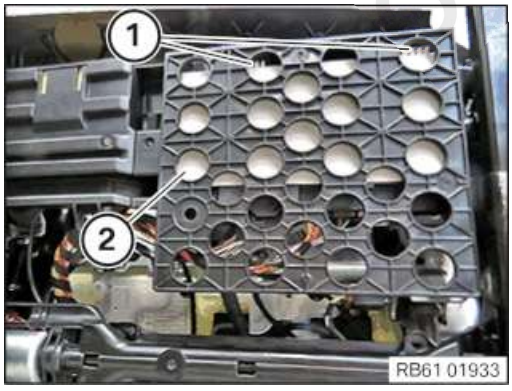


- Unlock plug connection (1) and disconnect.
- Remove the driver's seat module (SMFA) (2) from the holder.

3 – Installing the driver's seat module (SMFA)



- Connect connector (1).
- Position the driver's seat module (SMFA) (2) in the holder.



- Press the driver's seat module (SMFA) (2) in the holder until the retaining lugs (1) engage.

POSTPROCESSES

4 – Install front seat

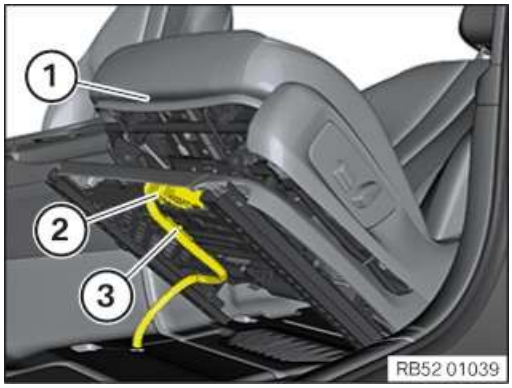
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WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.



RISK OF DAMAGE

Careless handling of tools and sharp-edged components.

Scratch, surface damage.

- Protect working area.
- Handle tools and components carefully.

- Cover the door sill using protective covers.

RISK OF DAMAGE

Heavy component.

Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.

- Lift front seat (1) into the vehicle with the assistance of a second person.
- Place front seat (1) to the rear.
- Connect connectors (2) and lock.
- Attach the cable clip (3).

▸ **Connecting all battery earth leads**

- See additional information.



▸ **Activating the 48 V electrical system**

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

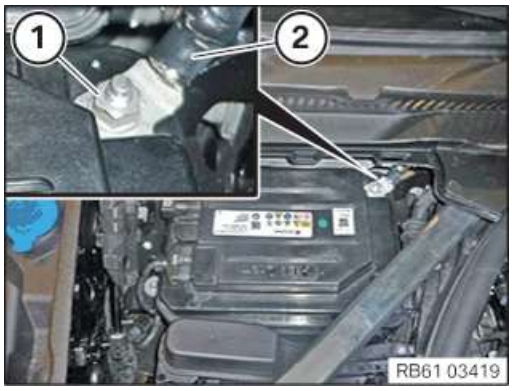
Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm

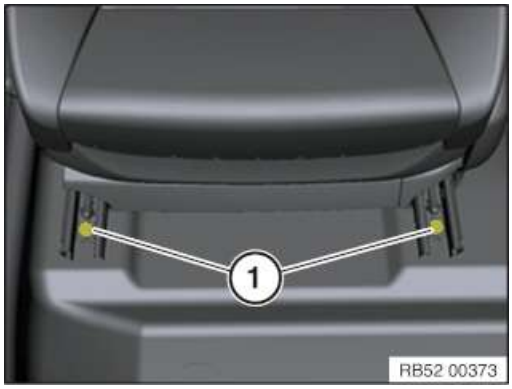


- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

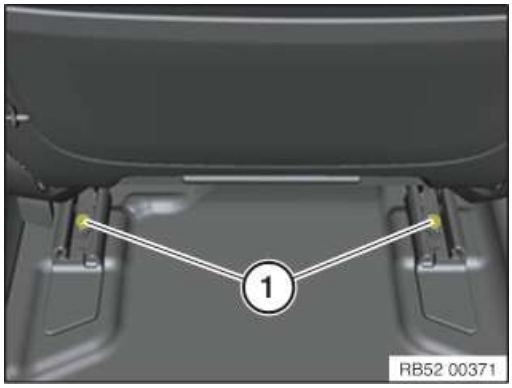


- Move front seat rearwards.
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Seat to body

Cheese head screw with collar	Renew screw.	Tightening torque	42 Nm



- Move front seat forwards.
- Renew screws (1).

  Parts: Screws
- Tighten the screws (1).

Seat to body

Cheese head screw with collar	Renew screw.	Tightening torque	42 Nm

5 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

- 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.

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Additional Information

Overview of Tightening Torques

Negative battery cable to 48-V battery — Used in step 4

Nut M8		Tightening torque	19 Nm

Seat to body — Used in step 4

Cheese head screw with collar	Renew screw.	Tightening torque	42 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	14

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	14

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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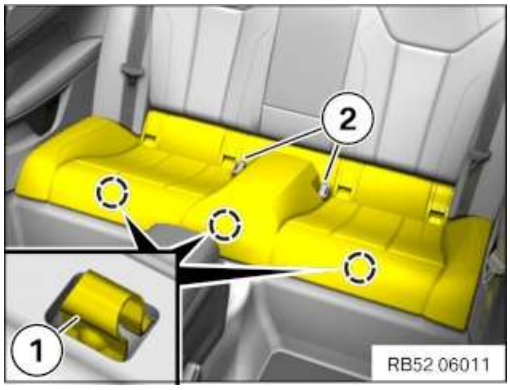
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 35 702 Replacing the seat-belt extender controller (LCPA) (left or right) (after vehicle diagnosis) (flat rate unit specification without programming/encoding, see 61 00 ...)

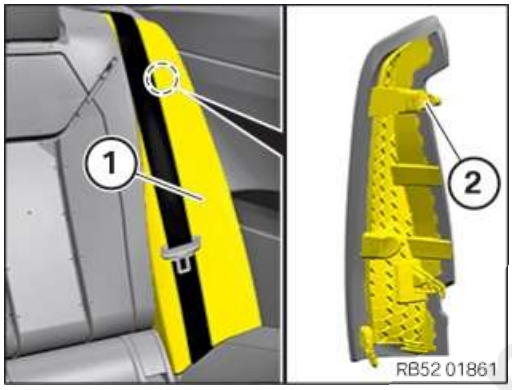
PRELIMINARY WORK

1 – Remove rear seat bench



- Unclip the rear seat bench upwards from clamps (1) and guide out seat belt buckles (2).
- Remove the rear seat bench.

2 – Remove armrest side section



▸ **Remove armrest side section**

- Reach behind the backrest side section (1) from the top and unclip the backrest side section (1) from the mounting element (2) to the front.
- Remove backrest side section (1) in the upward direction from the guide.

3 – Remove C-pillar trim panel

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

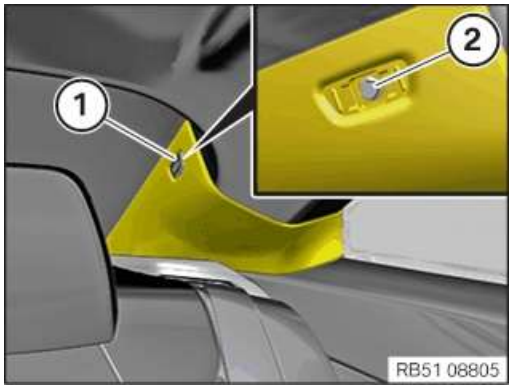
RISK OF DAMAGE

Damage to the head airbag.

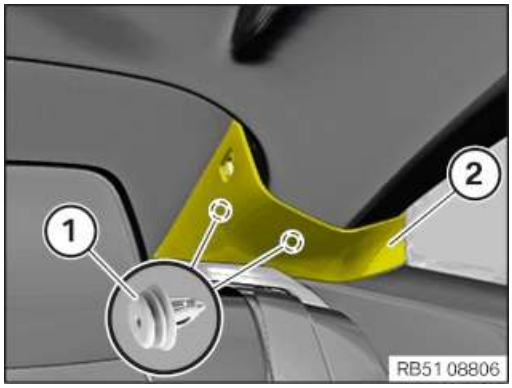
Improper use of a tool when removing the trim panel may damage the head airbag.

- Do not use sharp-edged tools when removing the trim panel.

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- Unclip cover (1) of the C-pillar trim panel.
- Release the screw (2).



- Unclip C-pillar trim panel (2) from clips (1) and guide it out.

4 – Removing the inner door sill cover strip

RISK OF DAMAGE

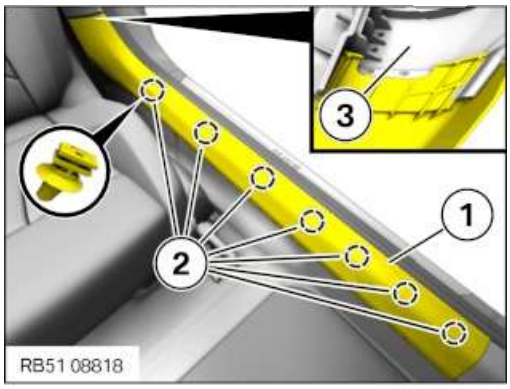
Bending of plastic parts.

Application of too much force can lead to bending of plastic parts.

- Place special tool directly beside the mounting clip.
- Continue unclipping the part without using the tool if possible.

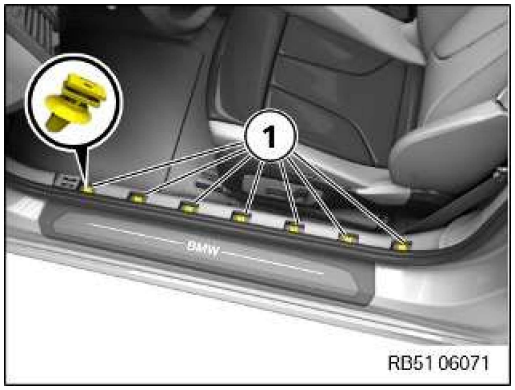
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



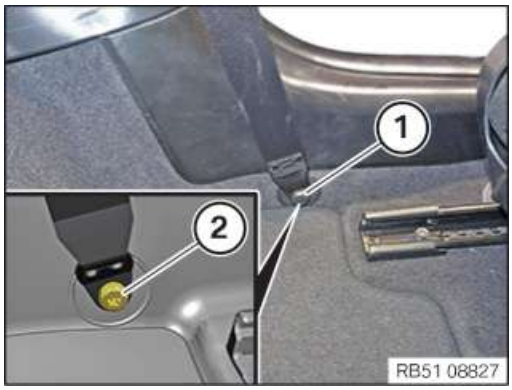
- Release door sill cover strip (1) with clips (2) starting from the front using a suitable special tool from the set of special tools 0 493 752 (00 9 329).
- Guide out and remove door sill cover strip (1) under the rear side trim panel (3) .

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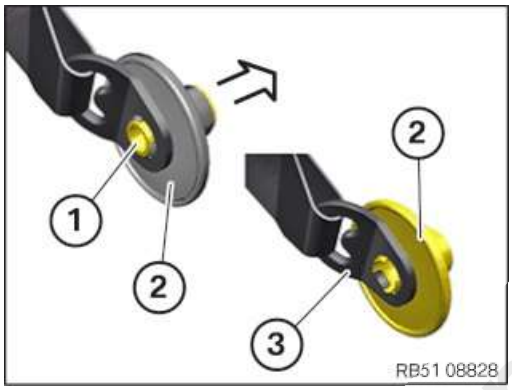


- If necessary, remove clips (1) and connect them to the door sill cover strip.

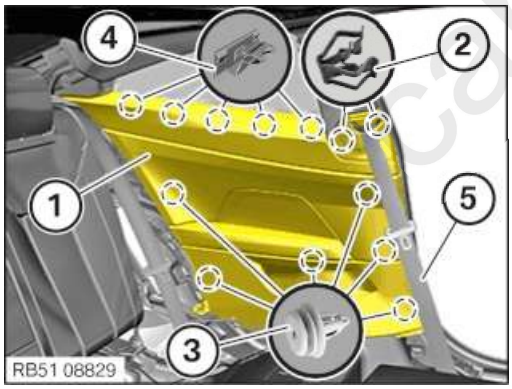
5 – Remove rear side trim panel



- Unclip the cover cap (1).
- Release the screw (2).



- Pull out the sleeve (1) from the cover (2) of the end fitting (3).
- Unclip the cover (2) of the end fitting (3) from the end fitting (3).

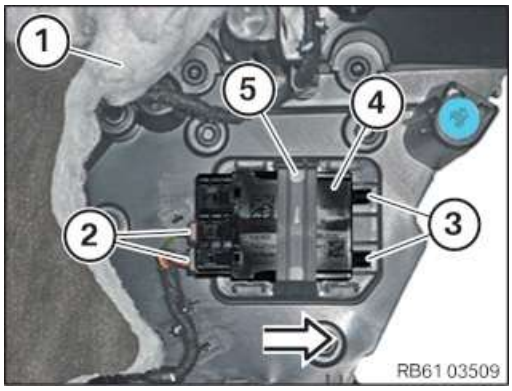


- Unclip the rear side trim panel (1) with a suitable tool at the clamps (2).
- Unclip the rear side trim panel (1) with a suitable tool at the clips (3).
- Release the rear side trim panel (1) at the clamps (4) and feed out at the edge protection.
- Unlock and disconnect all the plug connections at the rear side trim panel (1) of the wiring harness.
- Feed out the upper seat belt (5).

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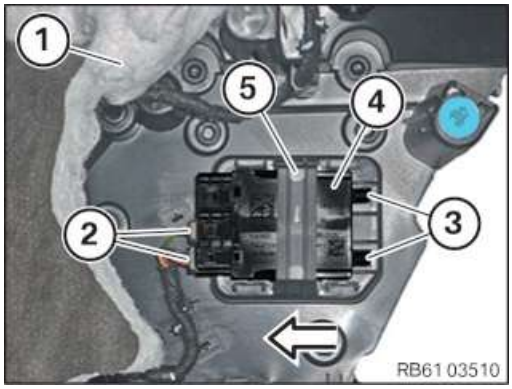
MAIN WORK

6 – Removing the seat-belt extender controller (LCPA)



- Slide the insulation (1) as shown to the side.
- Unlock plug connections (2) and disconnect.
- Unlock the latch mechanisms (3).
- Pull the seat-belt extender controller (LCPA) (4) in the direction of arrow from the holder (5).

7 – Installing the seat-belt extender controller (LCPA)

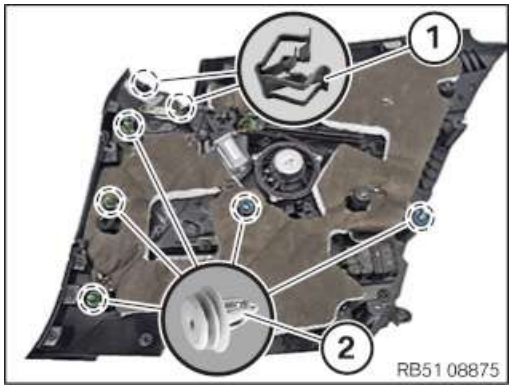


- Position the seat-belt extender controller (LCPA) (4) on the holder (5) and move in the direction of arrow, until the latch mechanisms (3) engage.
- Connect connector (2).
- Route the insulation (1) correctly.

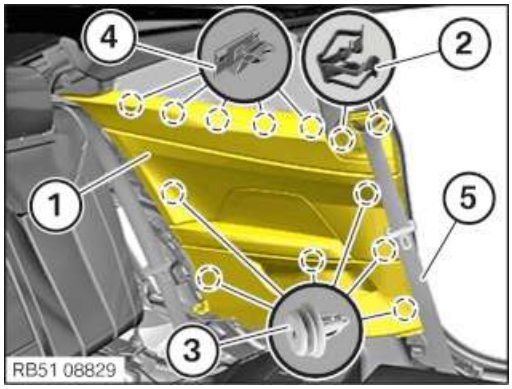
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POSTPROCESSES

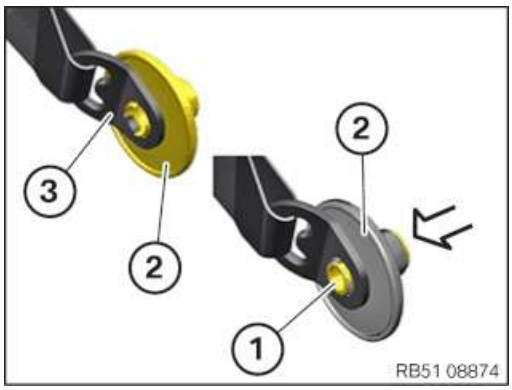
8 – Install rear side trim panel



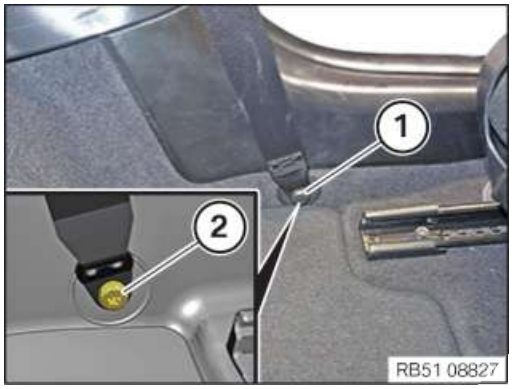
- Check clamps (1) for damage; renew them if necessary.
- Check clips (2) for damage, replace if necessary.



- Connect all the connectors to rear side trim panel (1) of the wiring harness and lock and disconnect them.
- Guide in upper seat belt (5).
- Position rear side trim panel (1) and clip it into clamps (4).
- Clip rear side trim panel (1) into clips (3).
- Clip rear side trim panel (1) into clamps (2).



- Clip cover (2) of end fitting (3) into end fitting (3).
- Slide sleeve (1) into cover (2) of end fitting (3).



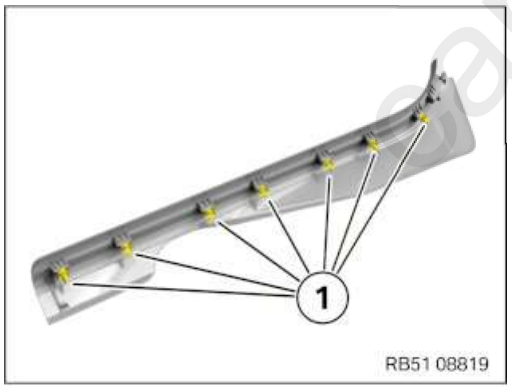
- Correctly position the seat belt end fitting.
- Tighten down screw (2).

End fitting to body

M10		Tightening torque	42 Nm

- Clip in cover cap (1).

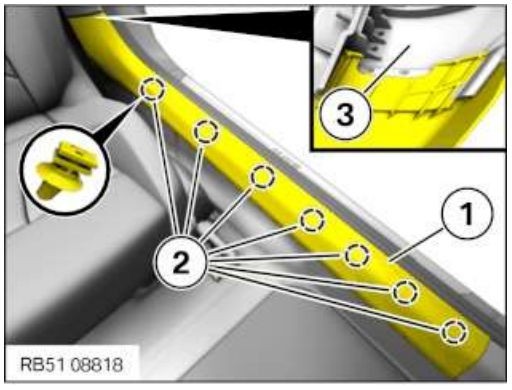
9 – Installing the inner door sill cover strip



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Check the clips (1) for damage and renew if necessary.



- Insert the door sill cover strip (1) below the rear side trim panel (3).
- Clip the door sill cover strip (1) in with the clips (2).

10 – Installing C-pillar trim panel

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WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

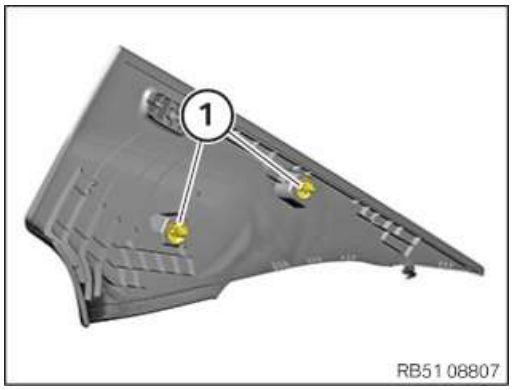
- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

RISK OF DAMAGE

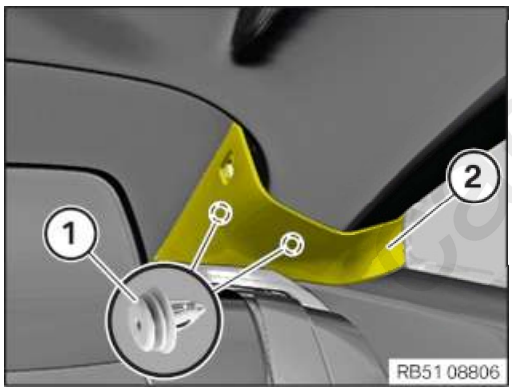
Damage to the head airbag.

Improper use of a tool when removing the trim panel may damage the head airbag.

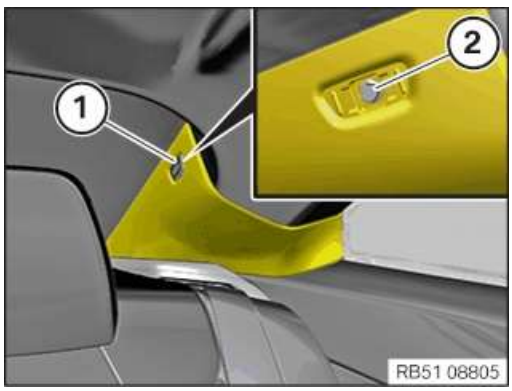
- Do not use sharp-edged tools when removing the trim panel.



- Check clips (1) for damage and, if necessary, renew them.



- Position C-pillar trim panel (2) and clip it onto clips (1).



- Tighten down screw (2).

C-pillar trim panel to body

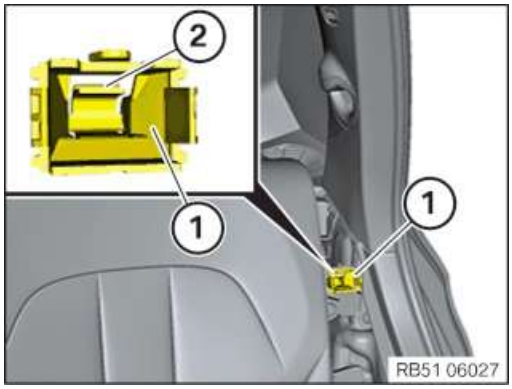
Screw		Tightening torque	2,6 Nm

- Clip in cover (1) of the C-pillar trim panel.

11 – Installing backrest side section

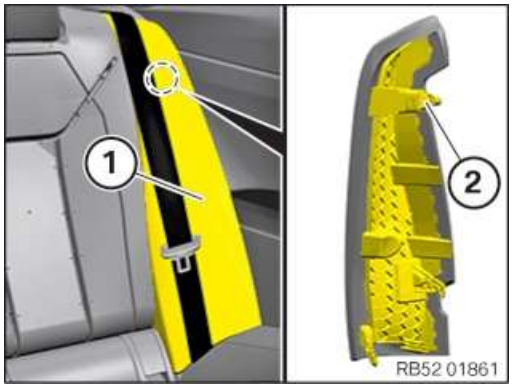
▸ **Installing backrest side section**

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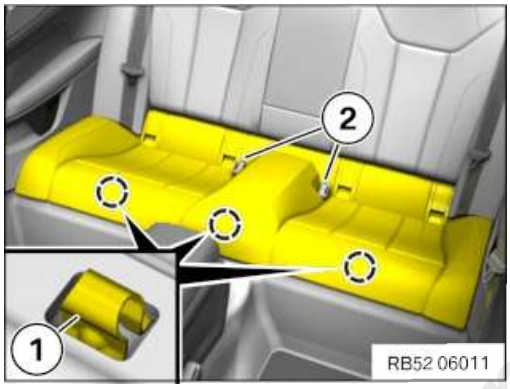
- Release mounting element (1) from latch mechanism (2) and remove it from the body.
- Check the mounting element (1) for damage, renew if necessary.

  The mounting element (1) must not be damaged or missing.
- Fit mounting element (1) on the backrest side section.



- Insert lower backrest side section (1) into the guide and position it correctly.
- Clip in backrest side section (1) to mounting element (2).

12 – Installing the rear seat bench



- Feed in the seat belt buckles (2).
- Position the rear seat bench and clip into the clamps (1).

13 – Encode/program control unit(s)

Prerequisite

Component has been replaced.

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.

Additional Information

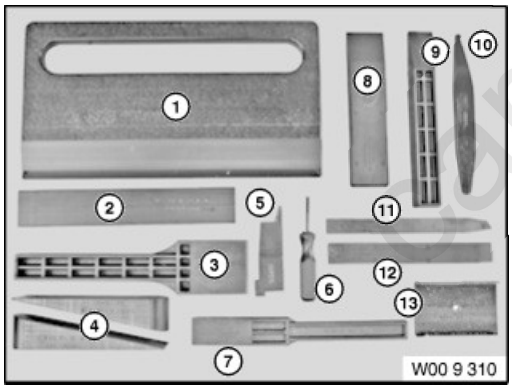
Overview of Tightening Torques

End fitting to body			Used in step 8
M10		Tightening torque	42 Nm

C-pillar trim panel to body			Used in step 10
Screw		Tightening torque	2,6 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common	Used in step 4
Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	211

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	211

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211

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61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211

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61 42 100 Removing and installing PCU48

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing inner right door sill cover strip

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing the inner door sill cover strip**

RISK OF DAMAGE

Bending of plastic parts.

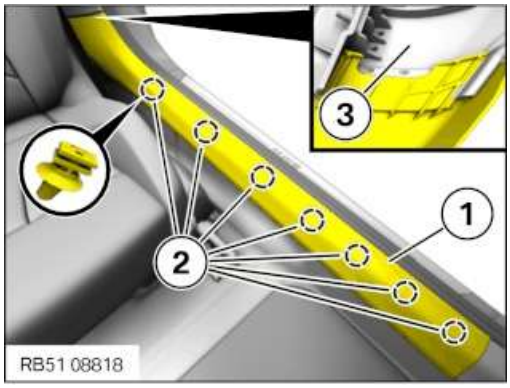
Application of too much force can lead to bending of plastic parts.

- Place special tool directly beside the mounting clip.
- Continue unclipping the part without using the tool if possible.

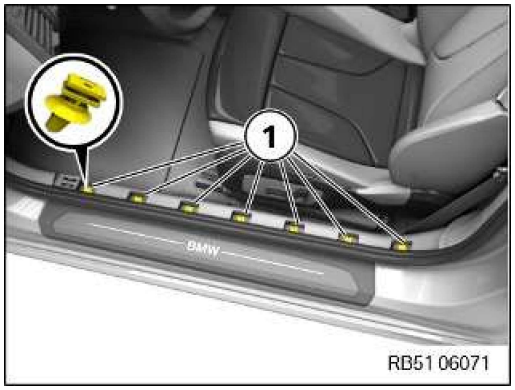
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

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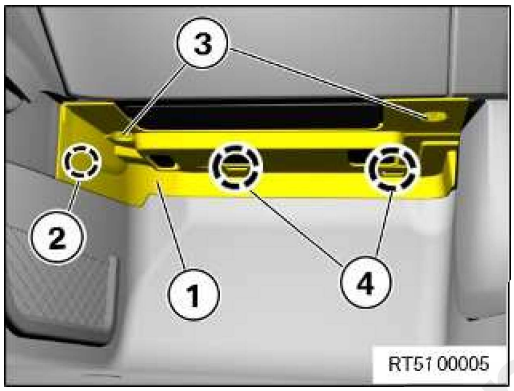


- Release door sill cover strip (1) with clips (2) starting from the front using a suitable special tool from the set of special tools 0 493 752 (00 9 329).
- Guide out and remove door sill cover strip (1) under the rear side trim panel (3) .



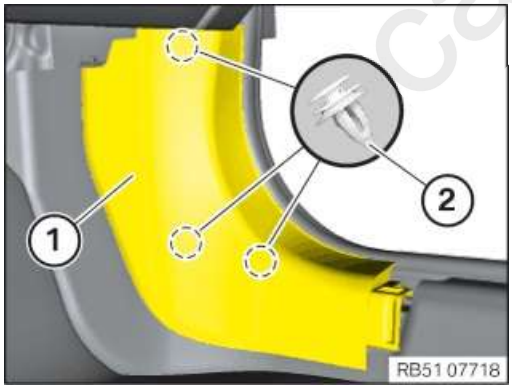
- If necessary, remove clips (1) and connect them to the door sill cover strip.

4 – Remove the right footwell trim



- Turn the locks (3) by 90°.
- Feed the footwell trim (1) out of the guide (2).
- Detach the footwell trim (1) inward out of the guides (4).
- Unlock associated plug connection and disconnect.

5 – Removing the side trim panel in the footwell at the right-hand A-pillar



- Loosen the side trim panel (1) at the clips (2) and remove it toward the inside.

MAIN WORK

6 – Removing PCU48

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WARNING

Hot surfaces.

Risk of burning!

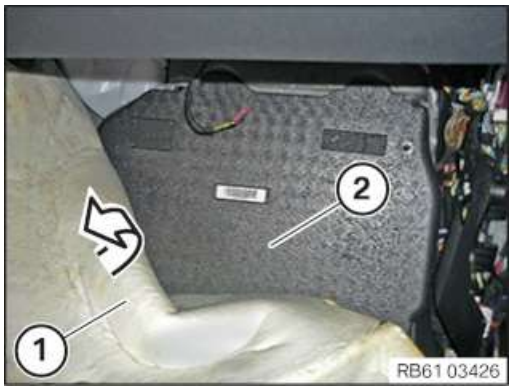
- Perform all work only on components that have cooled down.

TECHNICAL INFORMATION

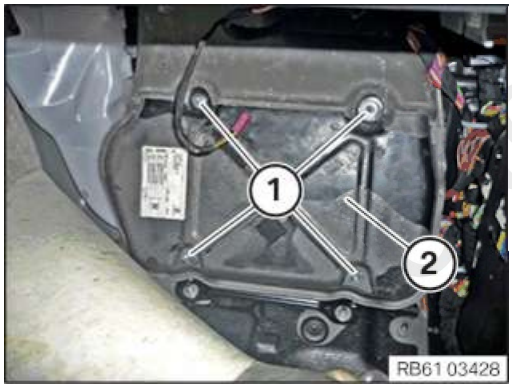
Use commercially available pinch-off tools to pinch off the coolant hoses.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



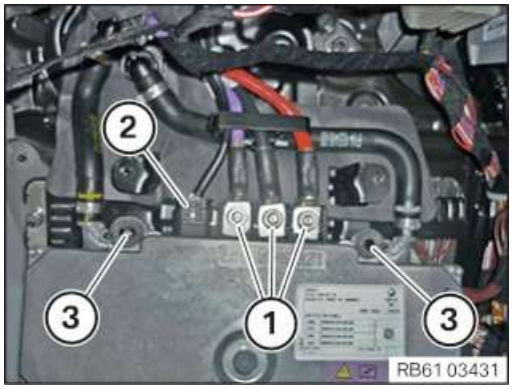
- Fold back carpet (1) in direction of arrow.
- Remove the shaped element (2).



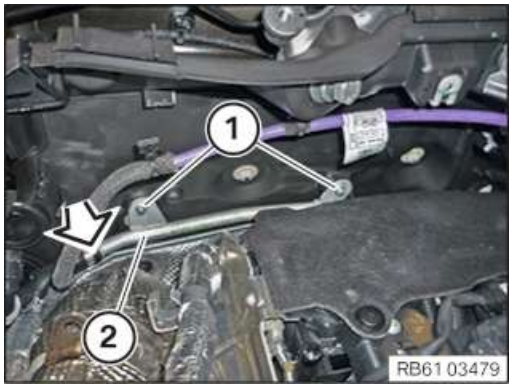
- Loosen screws (1).
- Remove the cover (2).



- Unclip the cover (1).



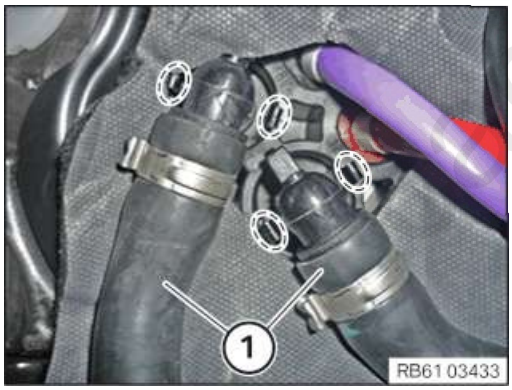
- Unlock plug connection (2) and disconnect.
- Release nuts (1) and feed out the corresponding lines.
- Loosen screws (3).



- Loosen screws (1).
- Press the coolant line (2) in the direction of arrow and fix it.

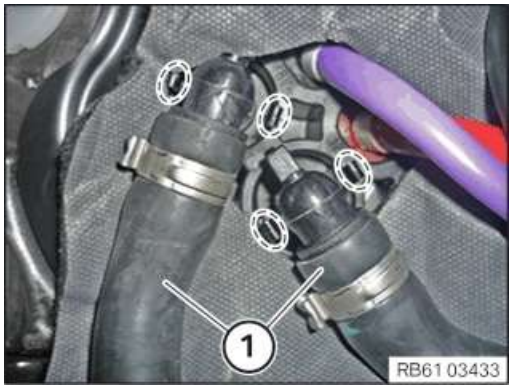


- Release the screw (1).
- Release the coolant flange (2).
- Unlock and release the coolant hose (3).
- Unlock and release the coolant hose (4).



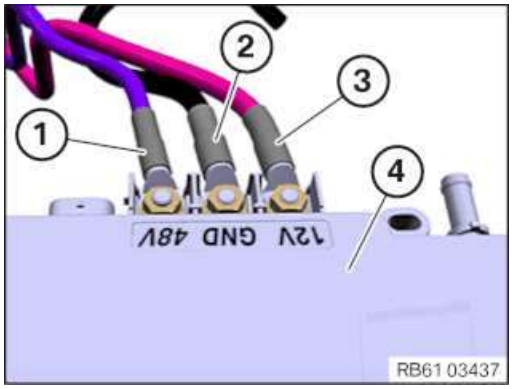
- Unlock the coolant line (1) on the vehicle interior and release.
- Remove PCU48.

7 – Installing PCU48

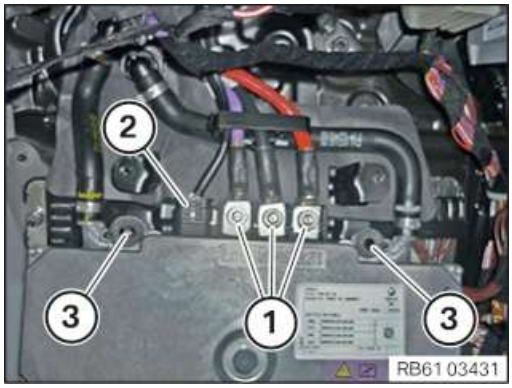


- Position the PCU48.
- Connect coolant line (1) in the vehicle interior and lock.
  Latch mechanisms must engage audibly.

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- Correctly position the lines (1), (2) and (3) on the PCU48 (4)based on colours and designations.



- Tighten the screws (3).

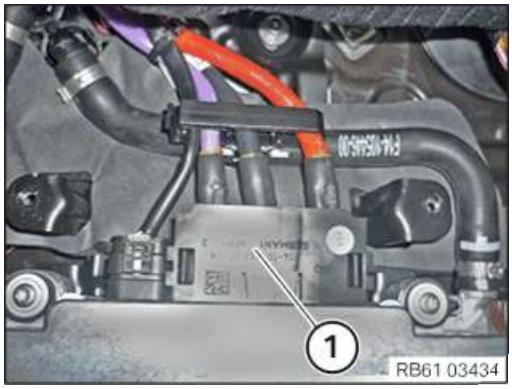
PCU48 screw

M6 screw		Tightening torque	8 Nm

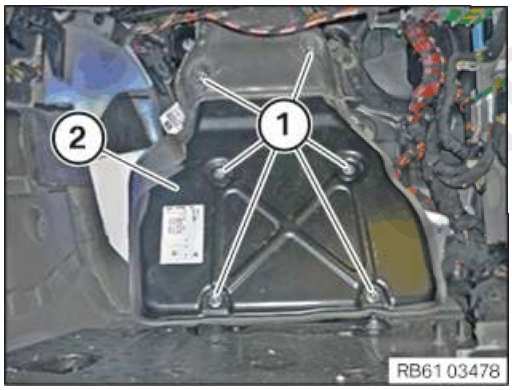
- Connect connectors (2) and lock.
- Tighten nuts (1).

Wire on PCU48

Nut M8		Tightening torque	15 Nm



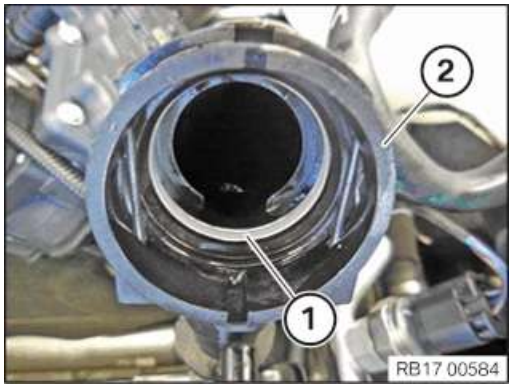
- Clip in the cover (1).



- Position the cover (2).
- Tighten the screws (1).

PCU48 screw

M6 screw		Tightening torque	8 Nm



- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

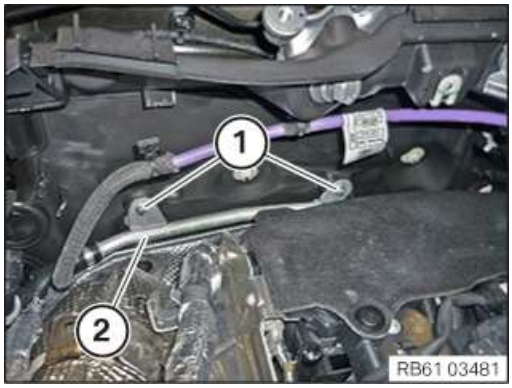
mdiagn.com



- Connect the coolant hose (4) and lock.
- Connect the coolant hose (3) and lock.
- Position the coolant connection (2).
- Tighten down screw (1).

Coolant flange screw

M6x20 screw		Tightening torque	8 Nm



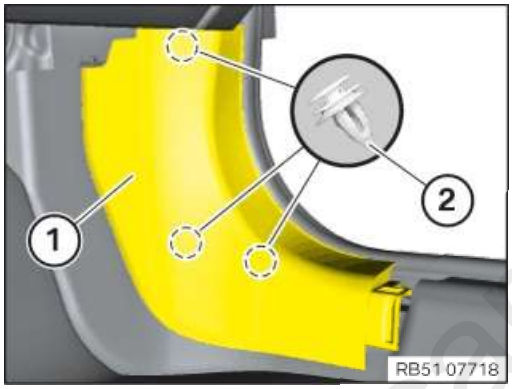
- Position coolant line (2).
- Tighten the screws (1).

Screw for coolant line

M6 screw		Tightening torque	8 Nm

POSTPROCESSES

8 – Installing side trim panel in footwell on right A-pillar



- Check the clips (2) for damage.

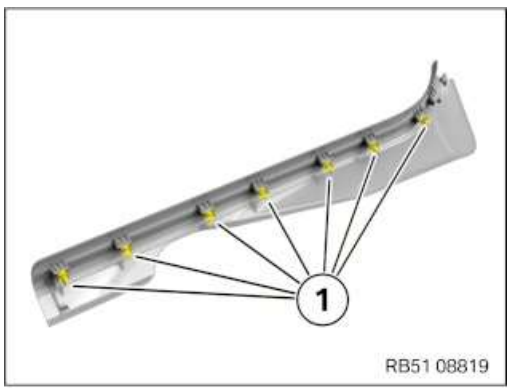
  Renew damaged or missing clips (2).
- Correctly position the side trim panel (1) and clip in to the clips (2).
- Make sure that the side trim panel (1) is correctly fitted against edge protection.

9 – Installing inner right door sill cover strip

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Installing the inner door sill cover strip**

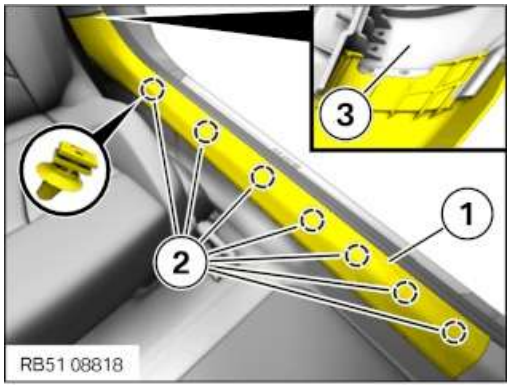


NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

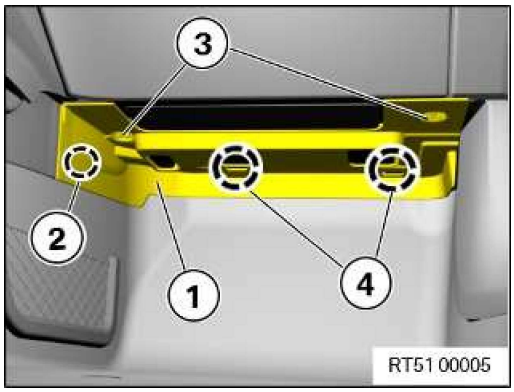
- Check the clips (1) for damage and renew if necessary.

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- Insert the door sill cover strip (1) below the rear side trim panel (3).
- Clip the door sill cover strip (1) in with the clips (2).

10 – Install the right footwell trim panel



- Connect associated connector.
- Attach the footwell trim (1) to the guides (4) and fold up.
- Guide the footwell trim (1) into the guide (2) of the centre console.
- Position the locks (3) correctly and turn by 90°.

11 – Connecting all battery earth leads



- See additional information.

12 – Filling and bleed the low-temperature coolant circuit



TECHNICAL INFORMATION

It is **mandatory** to fill the cooling system before bleeding.
Fill **both** the circuits for high and low-temperature coolant circuits.

- See additional information.

13 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

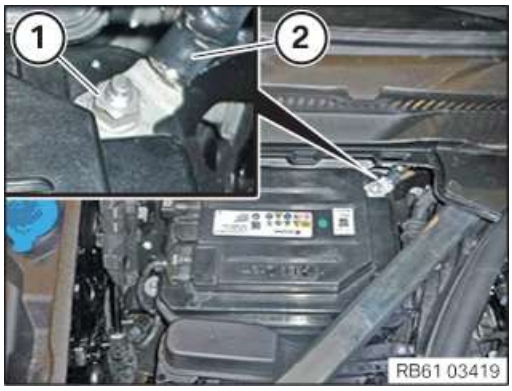
Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

PCU48 screw			Used in step 7
M6 screw		Tightening torque	8 Nm

Wire on PCU48			Used in step 7
Nut M8		Tightening torque	15 Nm

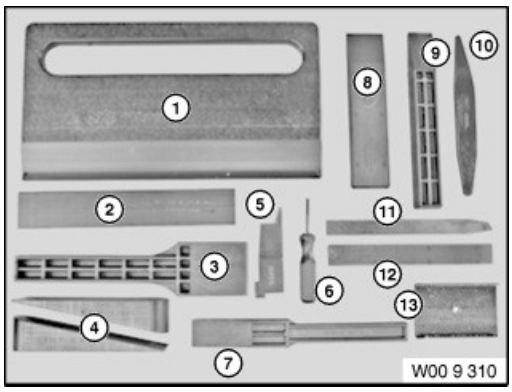
Coolant flange screw			Used in step 7
M6x20 screw		Tightening torque	8 Nm

Screw for coolant line			Used in step 7
M6 screw		Tightening torque	8 Nm

Negative battery cable to 48-V battery			Used in step 13
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

0 493 752 (00 9 329) Case



Common	Used in step 3
Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	113

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
17 00 011 Draining and topping up the coolant for the low-temperature circuit	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	12
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12

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17 00 040 Venting cooling system and checking on watertightness	12
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	12
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	12
17 00 040 Bleeding lower-temperature cooling system (B48)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 011 Draining and topping up coolant circuit for low temperature	12
17 00 040 Bleed the low-temperature cooling system and check for watertightness (coolant circuit for low temperature)	12
17 00 040 Bleeding and filling low temperature cooling system using vacuum filler device (B48)	12
17 00 011 Draining and topping up low-temperature coolant circuit	12
17 00 011 Draining and topping up low-temperature coolant circuit	12
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	12
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	12
17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	12
17 00 011 Draining and topping up low-temperature coolant circuit	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12

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61 42 601 Replacing PCU48

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check

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TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing inner right door sill cover strip

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing the inner door sill cover strip**

RISK OF DAMAGE

Bending of plastic parts.

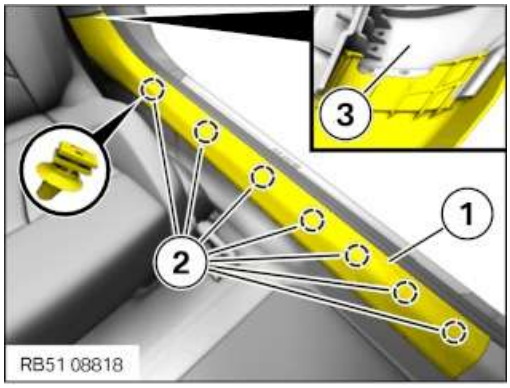
Application of too much force can lead to bending of plastic parts.

- Place special tool directly beside the mounting clip.
- Continue unclipping the part without using the tool if possible.

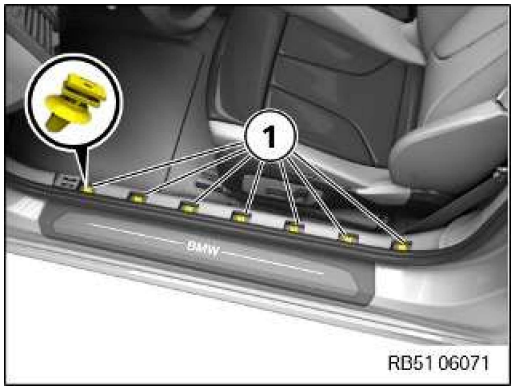
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

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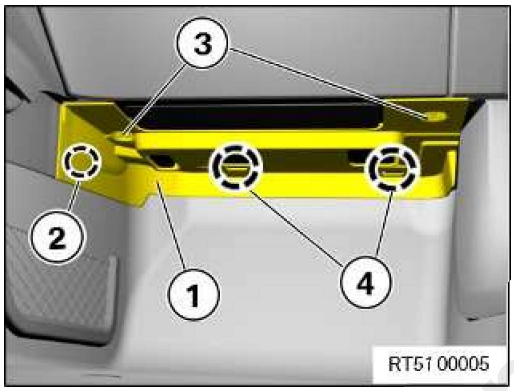


- Release door sill cover strip (1) with clips (2) starting from the front using a suitable special tool from the set of special tools 0 493 752 (00 9 329).
- Guide out and remove door sill cover strip (1) under the rear side trim panel (3) .



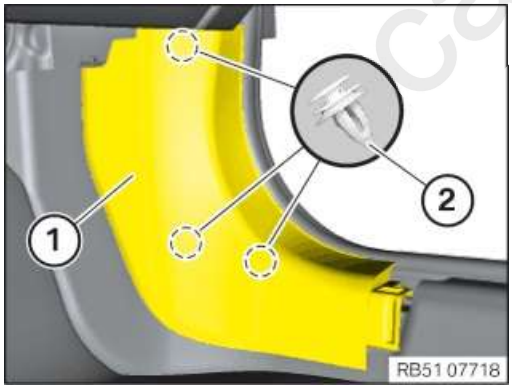
- If necessary, remove clips (1) and connect them to the door sill cover strip.

4 – Remove the right footwell trim



- Turn the locks (3) by 90°.
- Feed the footwell trim (1) out of the guide (2).
- Detach the footwell trim (1) inward out of the guides (4).
- Unlock associated plug connection and disconnect.

5 – Removing the side trim panel in the footwell at the right-hand A-pillar



- Loosen the side trim panel (1) at the clips (2) and remove it toward the inside.

MAIN WORK

6 – Removing PCU48

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WARNING

Hot surfaces.

Risk of burning!

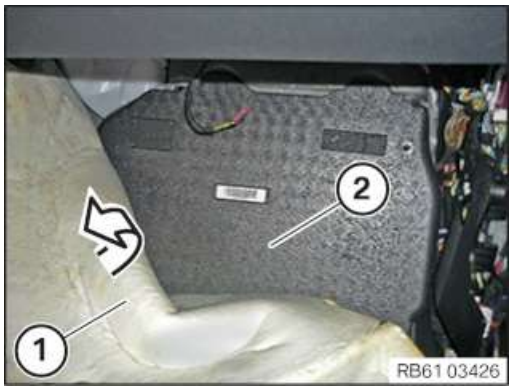
- Perform all work only on components that have cooled down.

TECHNICAL INFORMATION

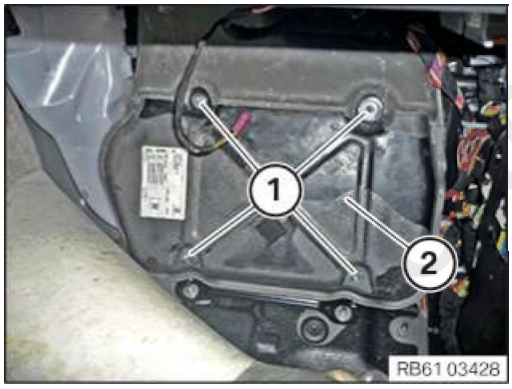
Use commercially available pinch-off tools to pinch off the coolant hoses.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



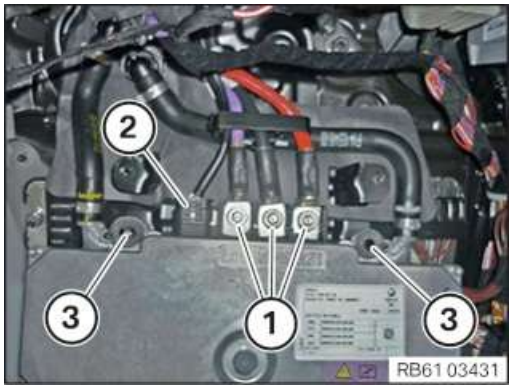
- Fold back carpet (1) in direction of arrow.
- Remove the shaped element (2).



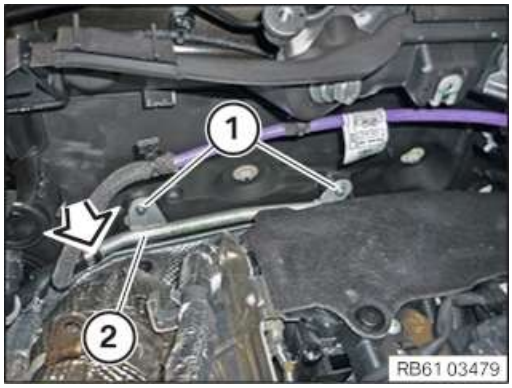
- Loosen screws (1).
- Remove the cover (2).



- Unclip the cover (1).



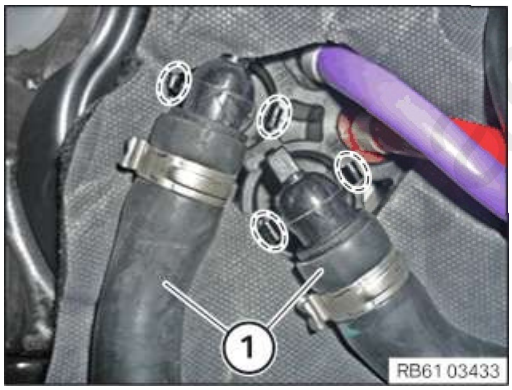
- Unlock plug connection (2) and disconnect.
- Release nuts (1) and feed out the corresponding lines.
- Loosen screws (3).



- Loosen screws (1).
- Press the coolant line (2) in the direction of arrow and fix it.

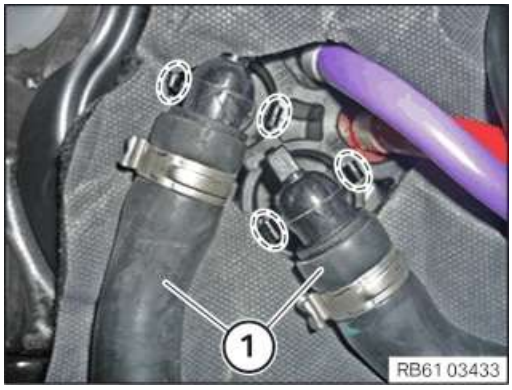


- Release the screw (1).
- Release the coolant flange (2).
- Unlock and release the coolant hose (3).
- Unlock and release the coolant hose (4).



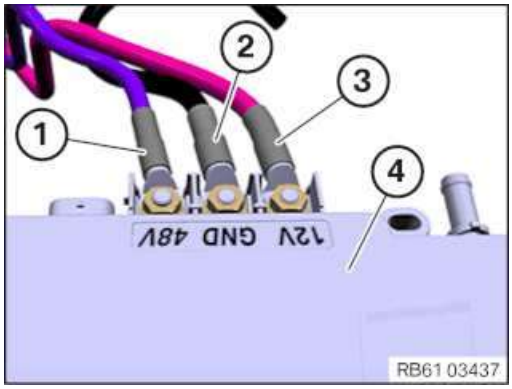
- Unlock the coolant line (1) on the vehicle interior and release.
- Remove PCU48.

7 – Installing PCU48

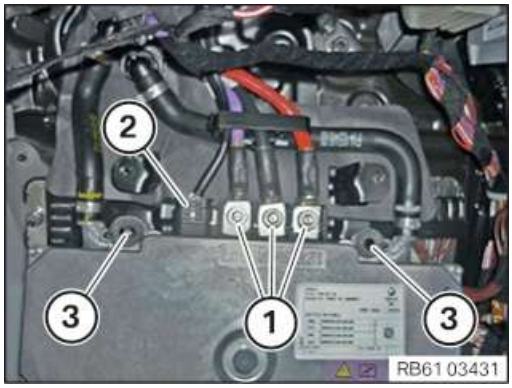


- Position the PCU48.
- Connect coolant line (1) in the vehicle interior and lock.
  Latch mechanisms must engage audibly.

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- Correctly position the lines (1), (2) and (3) on the PCU48 (4)based on colours and designations.



- Tighten the screws (3).

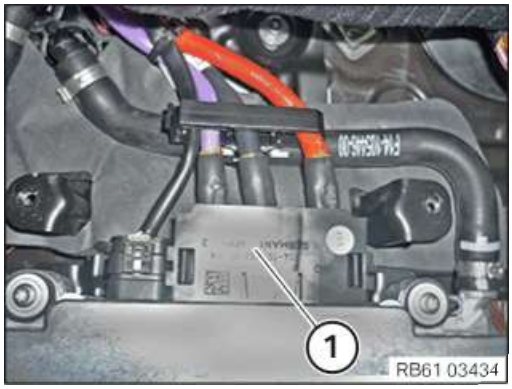
PCU48 screw

M6 screw		Tightening torque	8 Nm

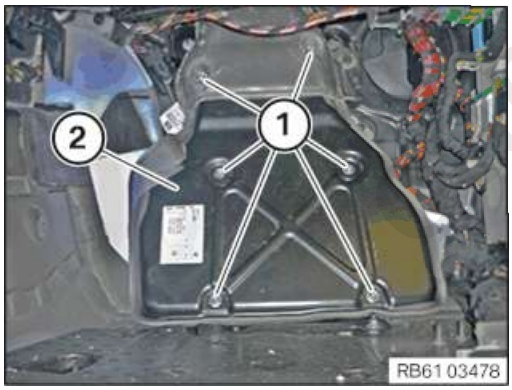
- Connect connectors (2) and lock.
- Tighten nuts (1).

Wire on PCU48

Nut M8		Tightening torque	15 Nm



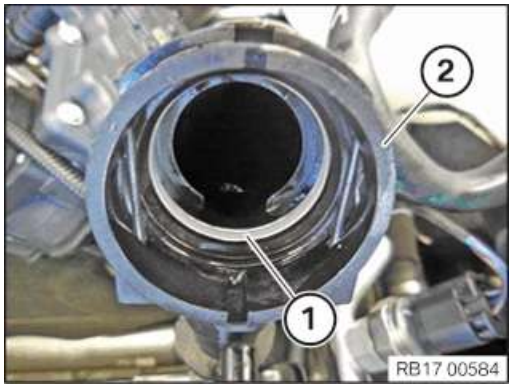
- Clip in the cover (1).



- Position the cover (2).
- Tighten the screws (1).

PCU48 screw

M6 screw		Tightening torque	8 Nm



- Check the sealing rings (1) of the coolant lines (2) for damage and renew if necessary.

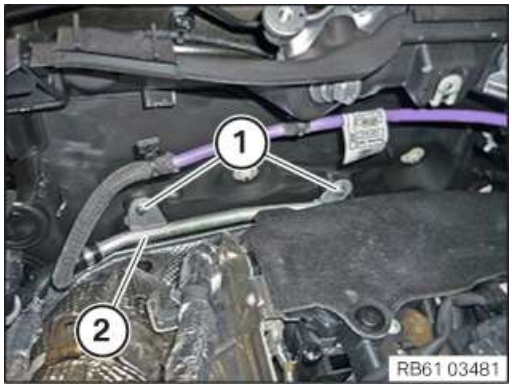
mdiagn.com



- Connect the coolant hose (4) and lock.
- Connect the coolant hose (3) and lock.
- Position the coolant connection (2).
- Tighten down screw (1).

Coolant flange screw

M6x20 screw		Tightening torque	8 Nm



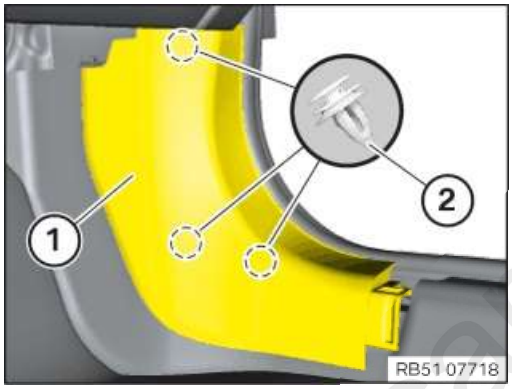
- Position coolant line (2).
- Tighten the screws (1).

Screw for coolant line

M6 screw		Tightening torque	8 Nm

POSTPROCESSES

8 – Installing side trim panel in footwell on right A-pillar



- Check the clips (2) for damage.

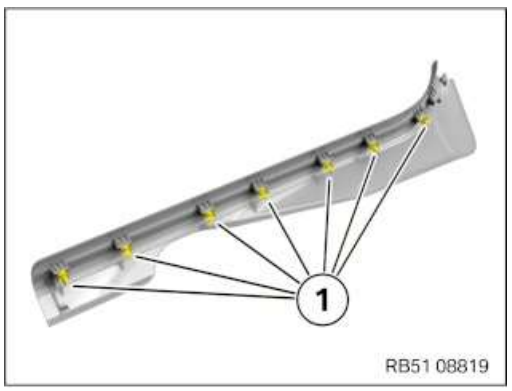
  Renew damaged or missing clips (2).
- Correctly position the side trim panel (1) and clip in to the clips (2).
- Make sure that the side trim panel (1) is correctly fitted against edge protection.

9 – Installing inner right door sill cover strip

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Installing the inner door sill cover strip**

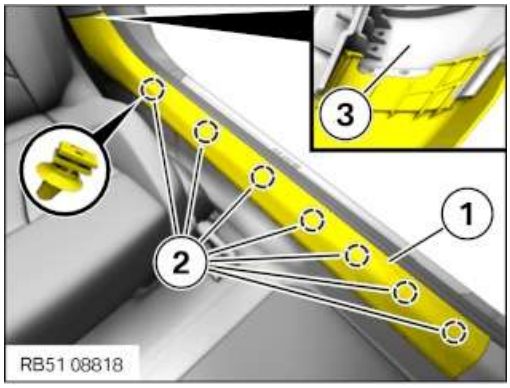


NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

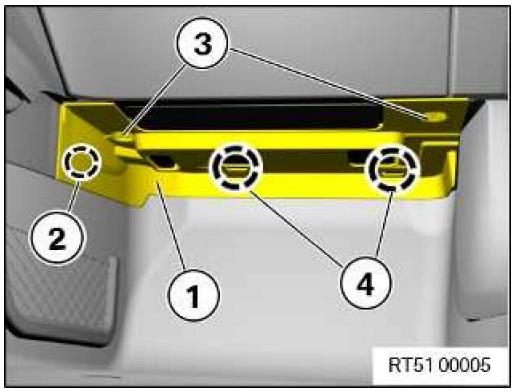
- Check the clips (1) for damage and renew if necessary.

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- Insert the door sill cover strip (1) below the rear side trim panel (3).
- Clip the door sill cover strip (1) in with the clips (2).

10 – Install the right footwell trim panel



- Connect associated connector.
- Attach the footwell trim (1) to the guides (4) and fold up.
- Guide the footwell trim (1) into the guide (2) of the centre console.
- Position the locks (3) correctly and turn by 90°.

11 – Connecting all battery earth leads



- See additional information.

12 – Filling and bleed the low-temperature coolant circuit



TECHNICAL INFORMATION

It is **mandatory** to fill the cooling system before bleeding.
Fill **both** the circuits for high and low-temperature coolant circuits.

- See additional information.

13 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

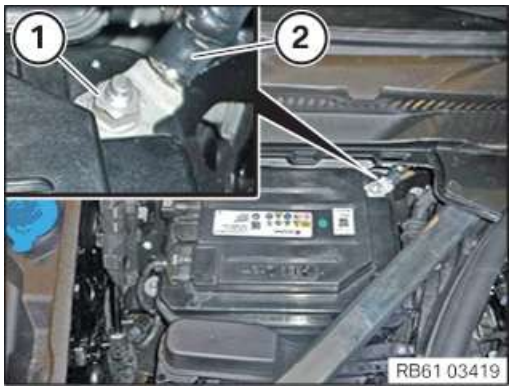
Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

14 – Encode/program control unit(s)

Prerequisite

The control unit was replaced.

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.
Exception:
BMW I01: Note Product and Measures Management Aftersales measure 55176388.

- Connect the battery charger to the vehicle (activity not included in the flat rate unit).
- 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.

Additional Information

Overview of Tightening Torques

PCU48 screw — Used in step 7

M6 screw		Tightening torque	8 Nm

Wire on PCU48 — Used in step 7

Nut M8		Tightening torque	15 Nm

Coolant flange screw — Used in step 7

M6x20 screw		Tightening torque	8 Nm

Screw for coolant line — Used in step 7

M6 screw		Tightening torque	8 Nm

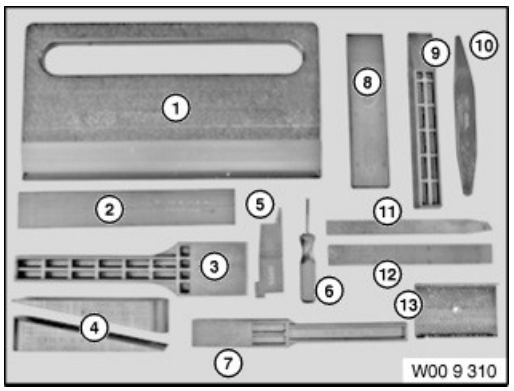
Negative battery cable to 48-V battery — Used in step 13

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

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0 493 752 (00 9 329) Case



Common	Used in step 3
Usage	(Case) with insert without mounting wedges, delivery while stocks last - as of 02/2019.
Included in the tool or work	0 490 527
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 09 (530)

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	113

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211

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61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
61 20 900 Disconnecting and connecting battery earth lead	211
17 00 011 Draining and topping up the coolant for the low-temperature circuit	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	12
17 11 103 Removing and installing/replacing coolant expansion tank for the low-temperature coolant circuit	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Venting cooling system and checking on watertightness	12
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	12
17 00 040 Venting high temperature - cooling system and checking for water leaks (N20 hybrid drive)	12
17 00 040 Bleeding lower-temperature cooling system (B48)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 011 Draining and topping up coolant circuit for low temperature	12

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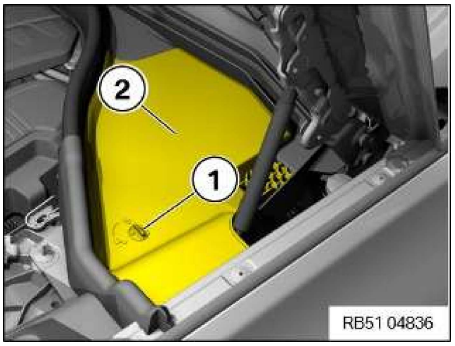
17 00 040 Bleed the low-temperature cooling system and check for watertightness (coolant circuit for low temperature)	12
17 00 040 Bleeding and filling low temperature cooling system using vacuum filler device (B48)	12
17 00 011 Draining and topping up low-temperature coolant circuit	12
17 00 011 Draining and topping up low-temperature coolant circuit	12
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	12
17 00 040 Bleeding the low-temperature coolant circuit and checking it for watertightness	12
17 00 015 Draining and topping up the coolant circuit for the drive \PREMIUM	12
17 00 011 Draining and topping up low-temperature coolant circuit	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (low-temperature coolant circuit)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12
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17 00 040 Bleed the cooling system and check for watertightness with the special tool (coolant circuit for low temperature)	12

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61 61 270 Completely removing and installing the console for the windscreen wiper system including engine

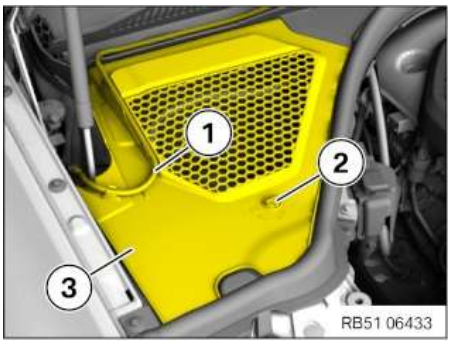
PRELIMINARY WORK

1 – Remove the cover of the engine compartment at the rear left



- Loosen the lock (1).
- Remove the cover (2) of the rear left engine compartment.

2 – Remove the cover of the rear right engine compartment



- Release washer fluid hose (1) from the guides.
- Loosen the lock (2).
- Remove the cover (3) of the rear right engine compartment.

3 – Removing the wiper arm on the left and right

NOTICE

Description is for left component only. Procedure on the right side is identical.

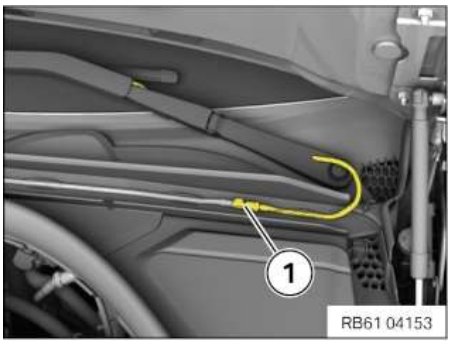
▸ **Remove the wiper arm**

RISK OF DAMAGE

Damage to wiper console.

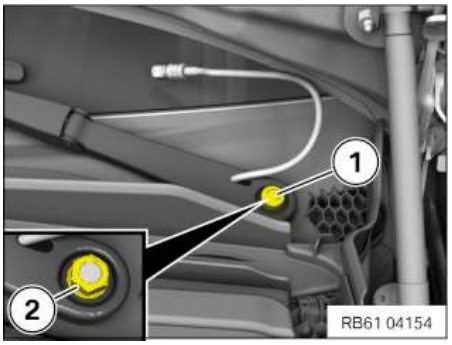
While removing the wiper arms without using special tool, the wiper console can break.

- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do **not** lever off the wiper arm because otherwise the wiper console may break at the predetermined breaking point for active pedestrian protection.

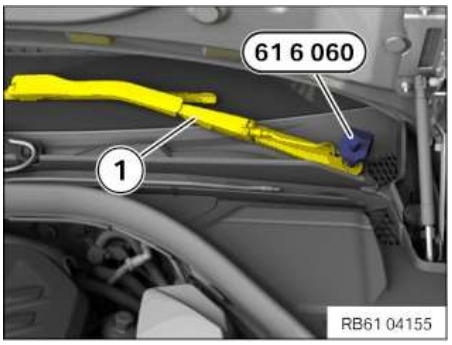


- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.

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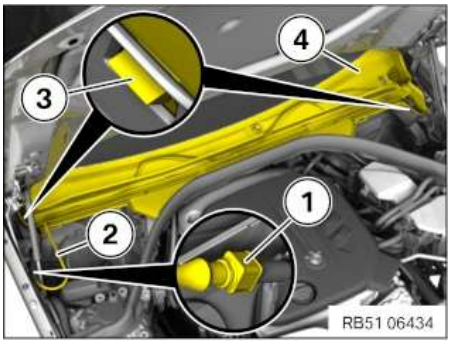


- Remove the protective cap (1).
- Loosen nut (2).

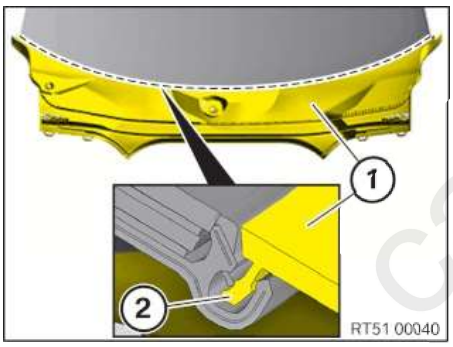


- Pull off the wiper arm (1) using special tool .

4 – Remove cowl panel cover



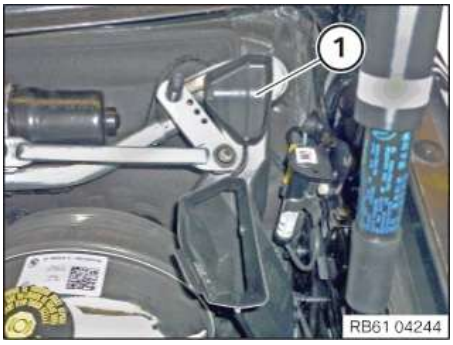
- Release snap fastener (1) of the washer fluid hose (2) and put the washer fluid hose (2) to one side.
- Unclip clips (3) on the cowl panel cover (4).



- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

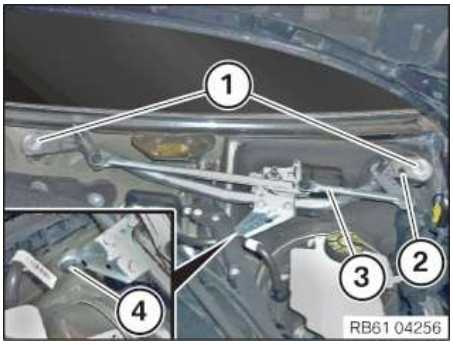
MAIN WORK

5 – Remove wiper console.

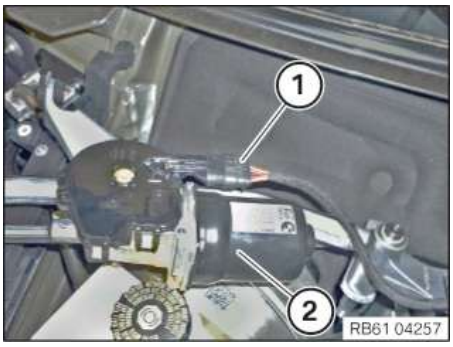


- Remove the water drain channel (1).

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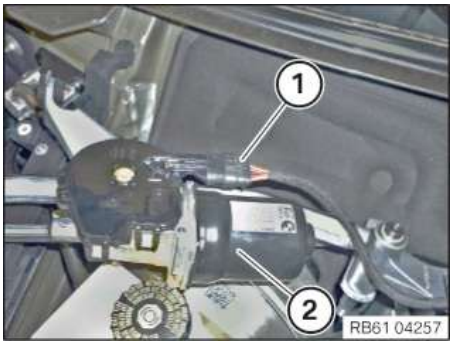


- Loosen nuts (1).
- Unclip the cable clip (2).
- Remove the wiper console (3) from the guide (4) and raise it.

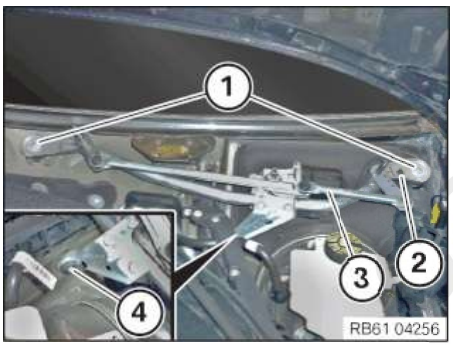


- Unlock plug connection (1) and disconnect.
- Remove the wiper console (2).

6 – Installing the wiper console



- Position the wiper console (2).
- Connect connectors (1) and lock.



- Insert the wiper console (3) into the guide (4) and position it correctly.
- Clip in the cable clip (2).
- Renew nuts (1) and tighten.

  Parts: Nuts

Wiper console to body

Nut M8	Renew nut.	Tightening torque	11,8 Nm



- Guide in the water drain channel (1) and clip into place.

POSTPROCESSES

7 – Installing cowl panel cover

RISK OF DAMAGE

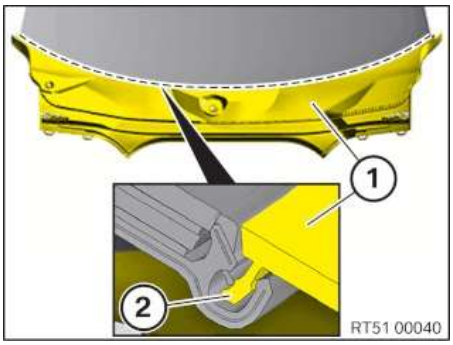
Damage caused by water ingress into the vehicle.

Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

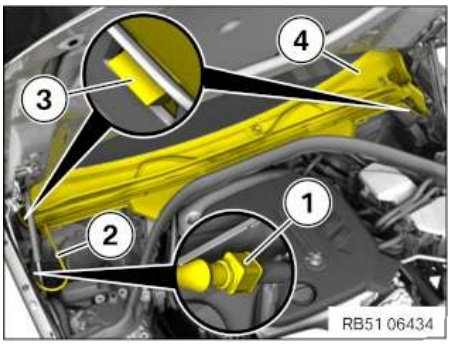
- Ensure correct installation of the components.
- Only use undamaged components.

TECHNICAL INFORMATION

Before installing the cowl panel cover it is **mandatory** to check that the 48 V line is routed correctly and fitted tightly.
An incorrectly laid or attached 48 V line can be damaged by the wiper kinematics.



- Push the cowl panel cover (1) into the latch mechanism (2) beginning on the side.



- Clip cowl panel cover (4)in by means of the latch mechanisms (3).
- Position windscreen wash hose (2) and connect windscreen wash hose (1)quick lock.

8 – Install left and right wiper arm

NOTICE

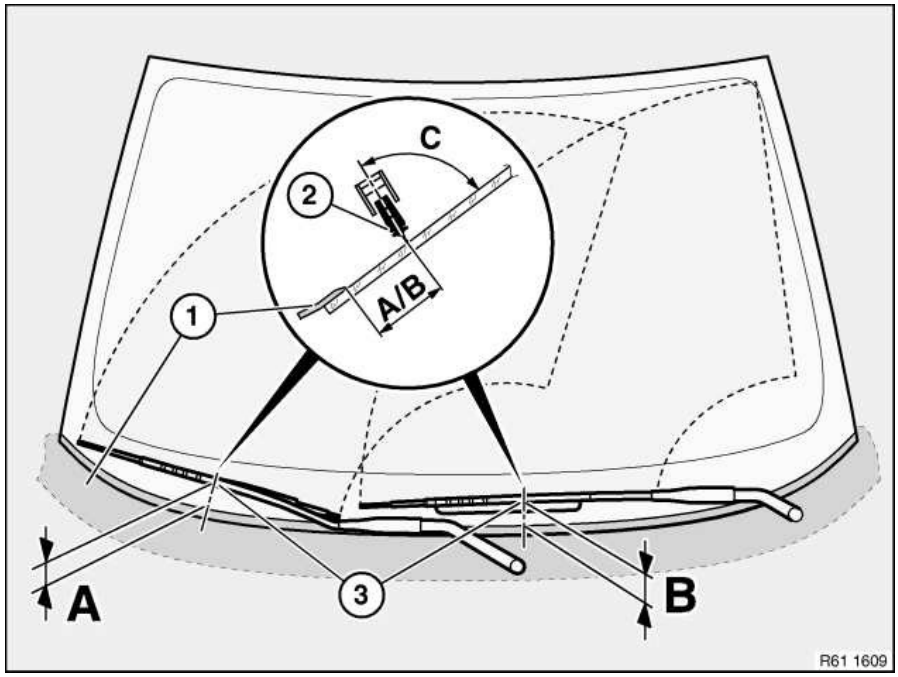
Description is for left component only. Procedure on the right side is identical.

▸ **Installing left and right wiper arm**

TECHNICAL INFORMATION

The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.

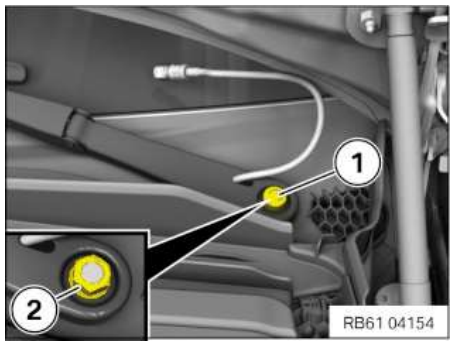
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- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

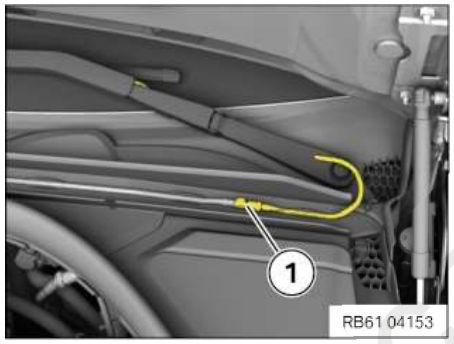


- Tighten nut (2).

Windscreen wiper arm

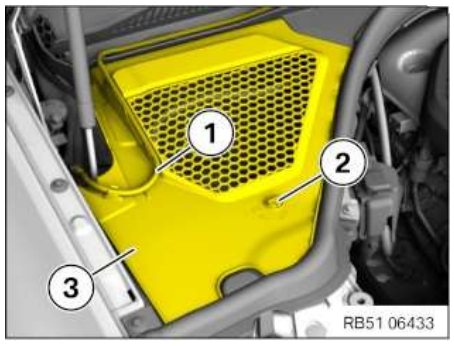
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Feed washer fluid hose (1) into the cowl panel guide and connect at the separation point.

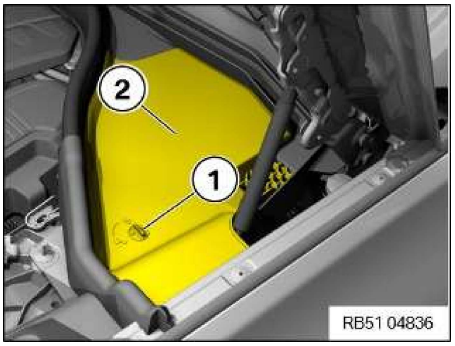
9 – Install the rear right engine compartment cover



- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

10 – 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).

Additional Information

Overview of Tightening Torques

Wiper console to body			Used in step 6
Nut M8	Renew nut.	Tightening torque	11,8 Nm

Windscreen wiper arm			Used in step 8
Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 8
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

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61 61 100 Removing and installing/replacing both windscreen wiper arms

TECHNICAL INFORMATION

The wiper arm must not touch the windscreen or the rear window without a wiper blade. Otherwise the windscreen or the rear window could be damaged.

NOTICE

Description is for left component only. Procedure on the right side is identical.

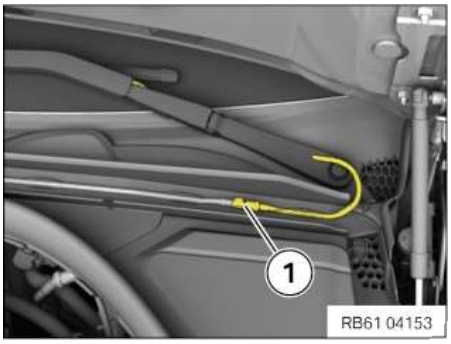
1 – Remove the wiper arm

RISK OF DAMAGE

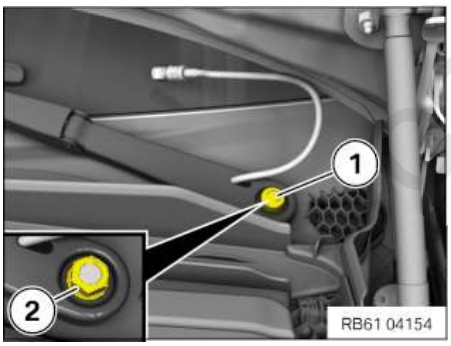
Damage to wiper console.

While removing the wiper arms without using special tool, the wiper console can break.

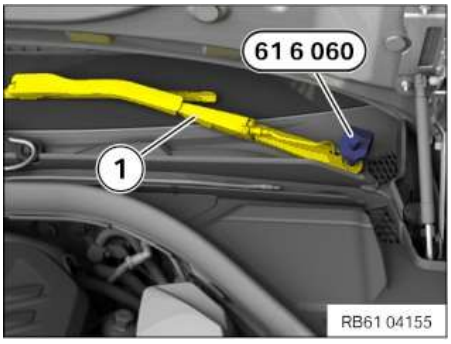
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do **not** lever off the wiper arm because otherwise the wiper console may break at the predetermined breaking point for active pedestrian protection.



- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.



- Remove the protective cap (1).
- Loosen nut (2).



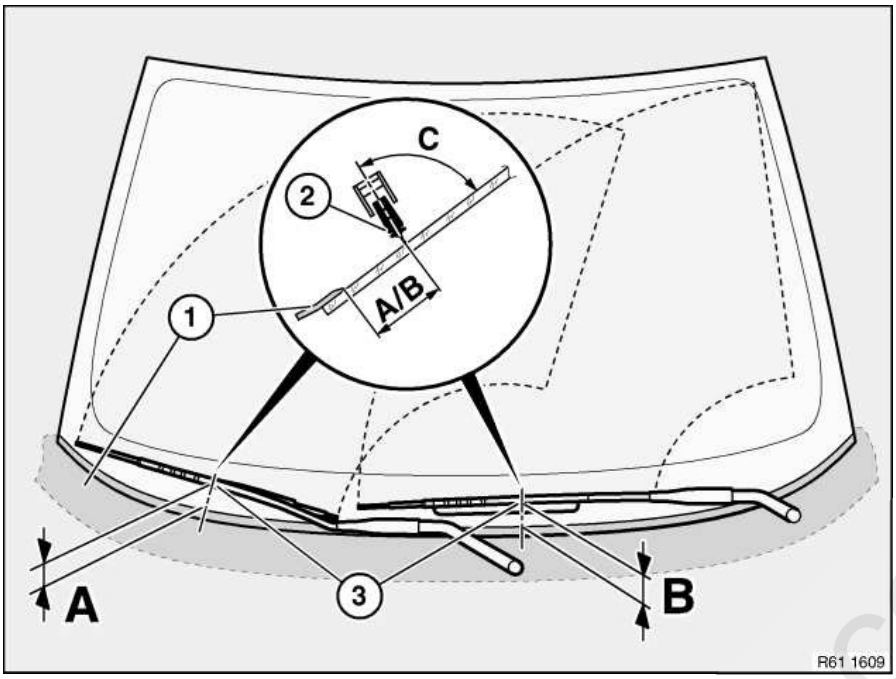
- Pull off the wiper arm (1) using special tool .

2 – Installing left and right wiper arm

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TECHNICAL INFORMATION

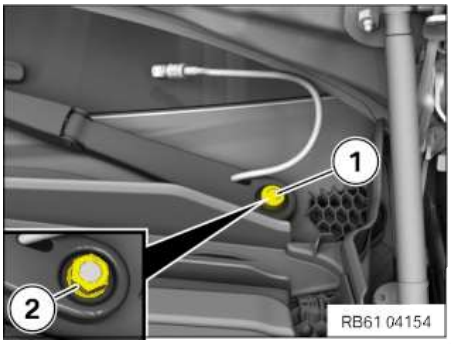
The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.



- 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

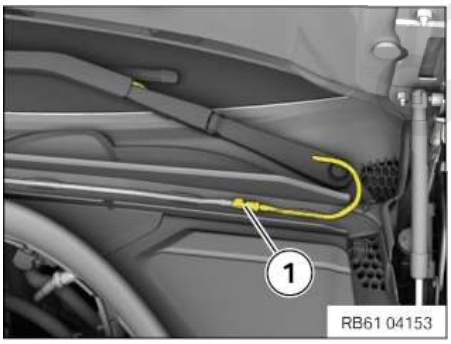


- Tighten nut (2).

Windscreen wiper arm

Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Feed washer fluid hose (1) into the cowl panel guide and connect at the separation point.

Additional Information

Overview of Tightening Torques

Windscreen wiper arm — Used in step 2

Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade — Used in step 2

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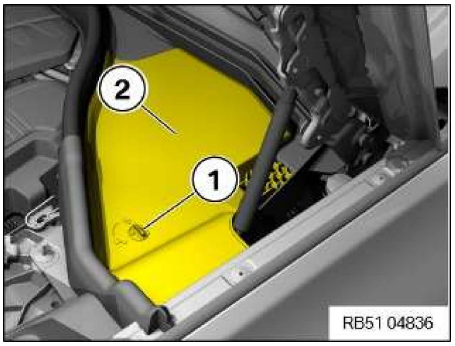
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

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61 61 271 Replace console for windscreen wiper system

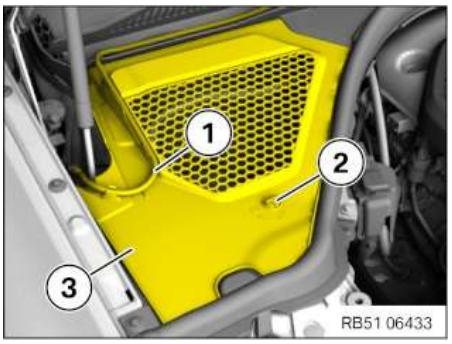
PRELIMINARY WORK

1 – Remove the cover of the engine compartment at the rear left



- Loosen the lock (1).
- Remove the cover (2) of the rear left engine compartment.

2 – Remove the cover of the rear right engine compartment



- Release washer fluid hose (1) from the guides.
- Loosen the lock (2).
- Remove the cover (3) of the rear right engine compartment.

3 – Removing the wiper arm on the left and right

NOTICE

Description is for left component only. Procedure on the right side is identical.

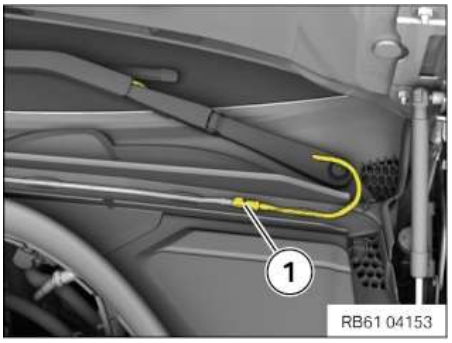
▸ **Remove the wiper arm**

RISK OF DAMAGE

Damage to wiper console.

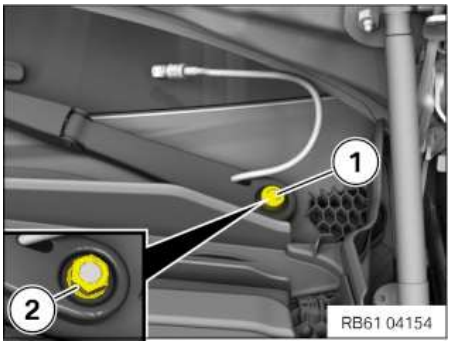
While removing the wiper arms without using special tool, the wiper console can break.

- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do **not** lever off the wiper arm because otherwise the wiper console may break at the predetermined breaking point for active pedestrian protection.

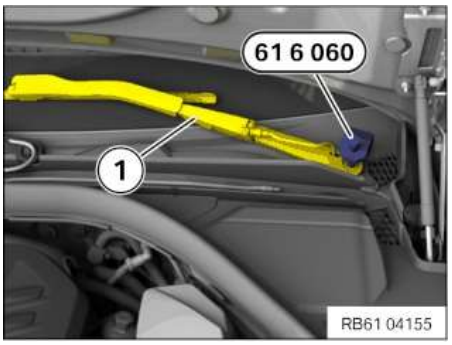


- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.

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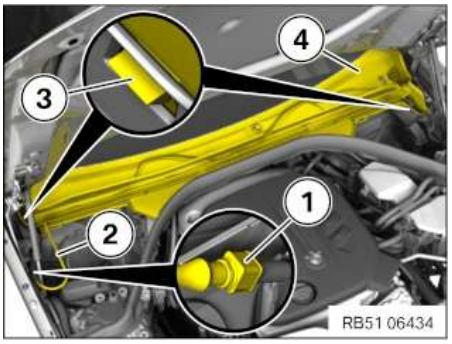


- Remove the protective cap (1).
- Loosen nut (2).

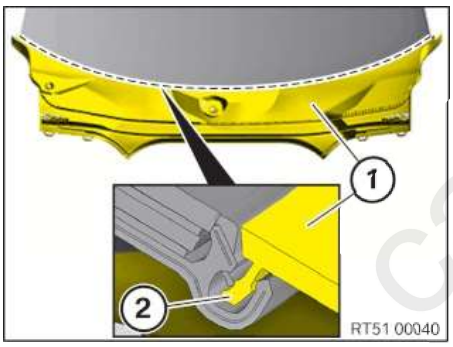


- Pull off the wiper arm (1) using special tool .

4 – Remove cowl panel cover



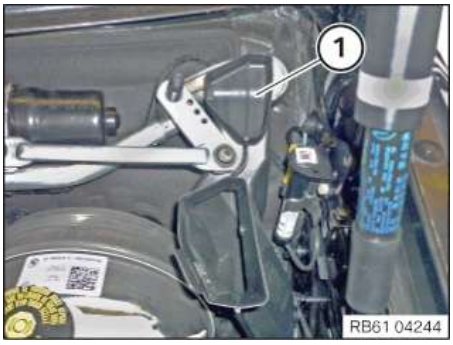
- Release snap fastener (1) of the washer fluid hose (2) and put the washer fluid hose (2) to one side.
- Unclip clips (3) on the cowl panel cover (4).



- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

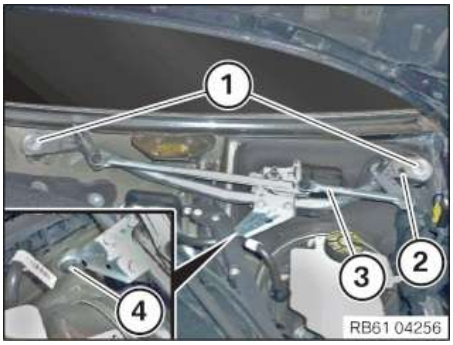
MAIN WORK

5 – Remove wiper console.

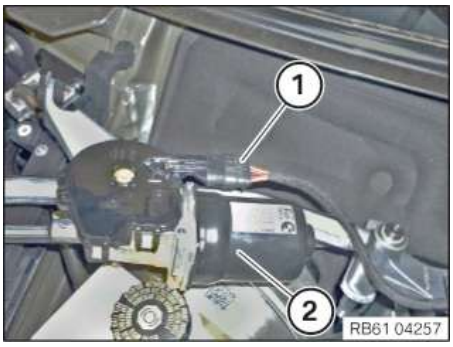


- Remove the water drain channel (1).

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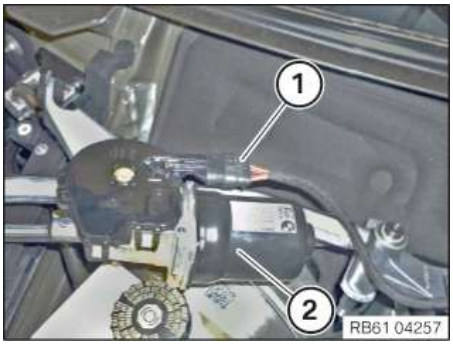


- Loosen nuts (1).
- Unclip the cable clip (2).
- Remove the wiper console (3) from the guide (4) and raise it.

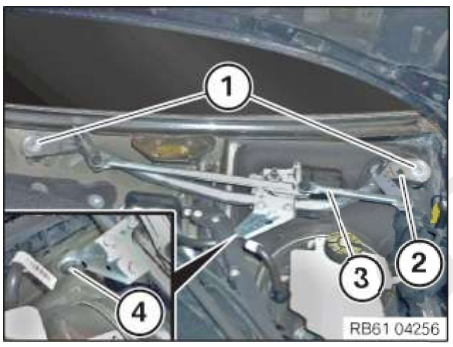


- Unlock plug connection (1) and disconnect.
- Remove the wiper console (2).

6 – Installing the wiper console



- Position the wiper console (2).
- Connect connectors (1) and lock.



- Insert the wiper console (3) into the guide (4) and position it correctly.
- Clip in the cable clip (2).
- Renew nuts (1) and tighten.

  Parts: Nuts

Wiper console to body

Nut M8	Renew nut.	Tightening torque	11,8 Nm



- Guide in the water drain channel (1) and clip into place.

POSTPROCESSES

7 – Installing cowl panel cover

RISK OF DAMAGE

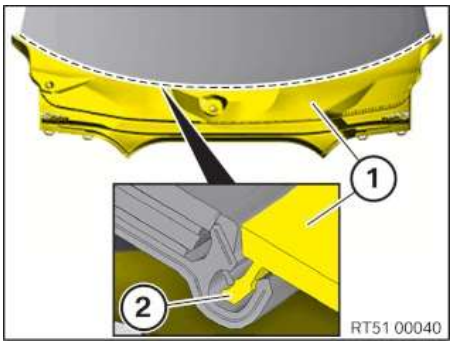
Damage caused by water ingress into the vehicle.

Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

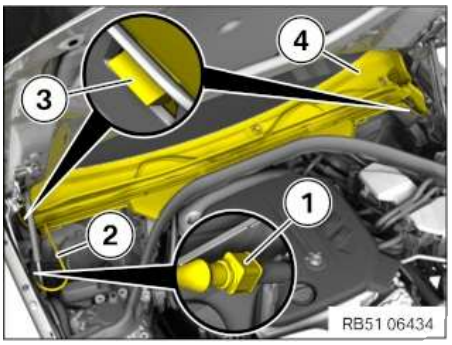
- Ensure correct installation of the components.
- Only use undamaged components.

TECHNICAL INFORMATION

Before installing the cowl panel cover it is **mandatory** to check that the 48 V line is routed correctly and fitted tightly.
An incorrectly laid or attached 48 V line can be damaged by the wiper kinematics.



- Push the cowl panel cover (1) into the latch mechanism (2) beginning on the side.



- Clip cowl panel cover (4)in by means of the latch mechanisms (3).
- Position windscreen wash hose (2) and connect windscreen wash hose (1)quick lock.

8 – Install left and right wiper arm

NOTICE

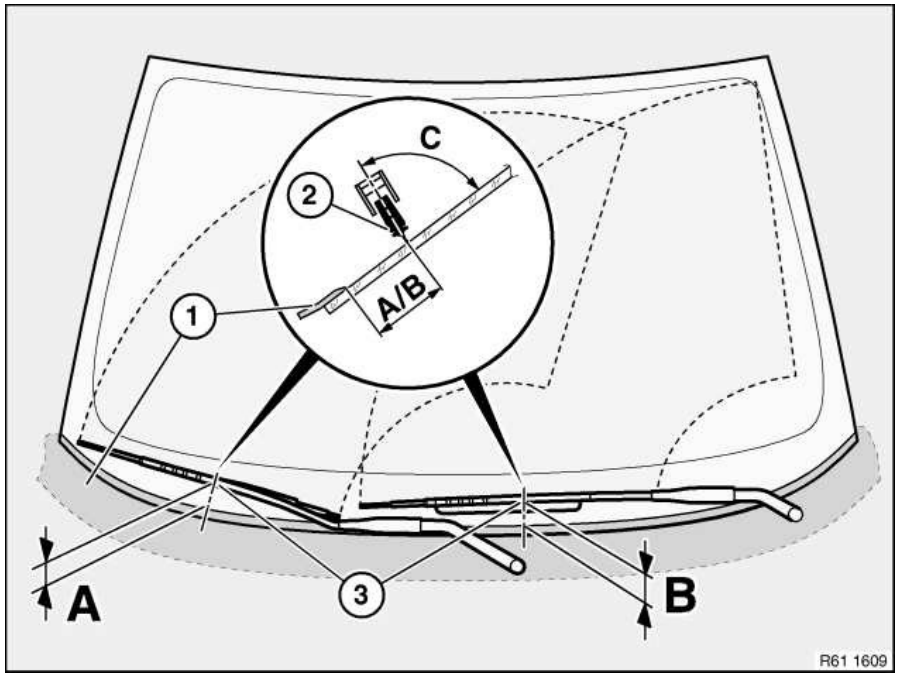
Description is for left component only. Procedure on the right side is identical.

▸ **Installing left and right wiper arm**

TECHNICAL INFORMATION

The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.

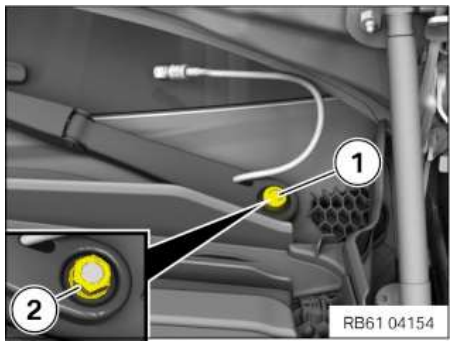
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- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

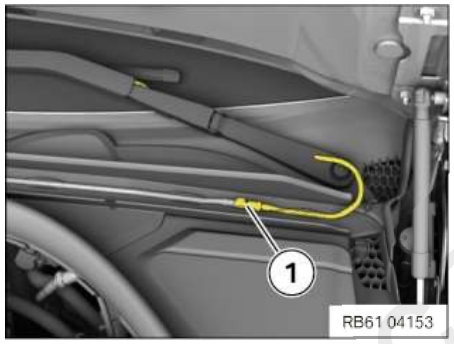


- Tighten nut (2).

Windscreen wiper arm

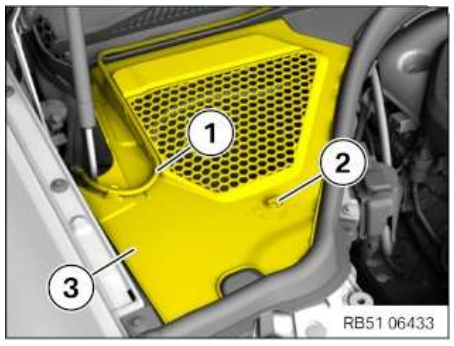
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Feed washer fluid hose (1) into the cowl panel guide and connect at the separation point.

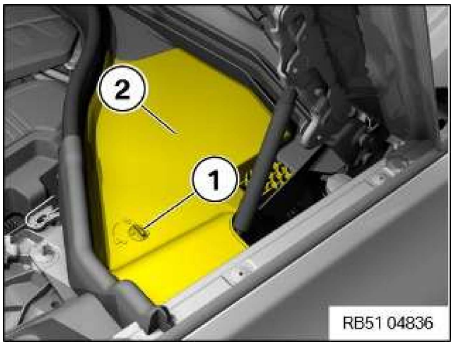
9 – Install the rear right engine compartment cover



- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

10 – 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).

Additional Information

Overview of Tightening Torques

Wiper console to body			Used in step 6
Nut M8	Renew nut.	Tightening torque	11,8 Nm

Windscreen wiper arm			Used in step 8
Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 8
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

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61 61 041 Replacing both wiper blades

TECHNICAL INFORMATION

The wiper arm must not touch the windscreen or the rear window without a wiper blade. Otherwise the windscreen or the rear window could be damaged.

TECHNICAL INFORMATION

In the event of a customer complaint about the cleaning or wiper performance and/or noise (windscreen wiper judder, squeaking noise) of the wiper blades, proceed as follows:

First, **check** if the customer complaint is caused by contamination (preservation wax with new vehicles, tree resins or other environmental influences) on the windscreen. If necessary, **clean the windscreen thoroughly.**

Replace the wiper blades only if cleaning the windscreen fails to remedy the situation.

NOTICE

Description is for left component only. Procedure on the right side is identical.

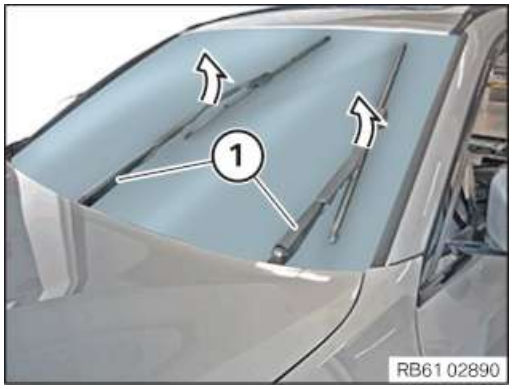
1 – Removing left and right wiper blade

NOTICE

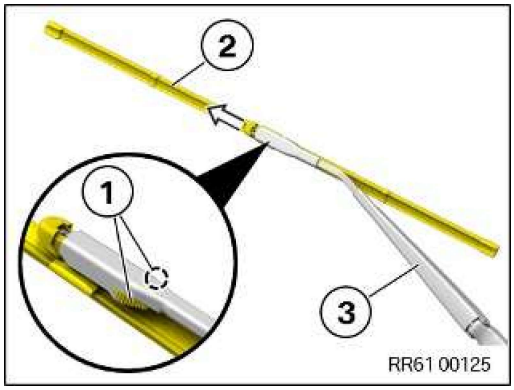
Description is for left component only. Procedure on the right side is identical.



- Prepare for operating readiness.
- Hold the wash/wipe switch (1) down until the windscreen wiper stands still in a vertical position.



- Fold the wiper arm (1) out.

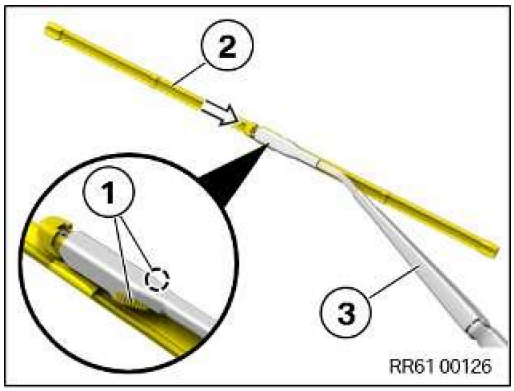


- Compress the lock (1).
- Remove the wiper blade (2) from the wiper arm (3) in the direction of the arrow.

2 – Installing left and right wiper blade

NOTICE

Description is for left component only. Procedure on the right side is identical.



- Clip in the wiper blade (2) in the direction of the arrow on the wiper arm (3).

  Lock (1) must engage audibly.



- Fold in the wiper arms (1).



- Switch on driving readiness or hold the wash/wipe switch (1) down again.

  Windscreen wipers move back to wiper park position and are operational once again.

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61 71 063 Removing and installing the washer fluid reservoir for the window washer system

WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raise the vehicle using a vehicle lift.

PRELIMINARY WORK

1 – Removing the wheel



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

  This process is intended to prevent damage to the brake disc.

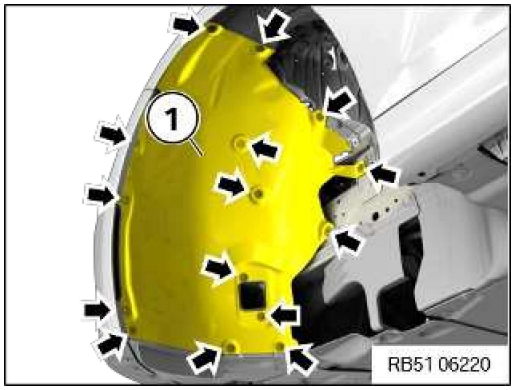


- If several wheels are removed at the same time: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use the correct adapter from the set of special tools .

2 – Removing the front section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

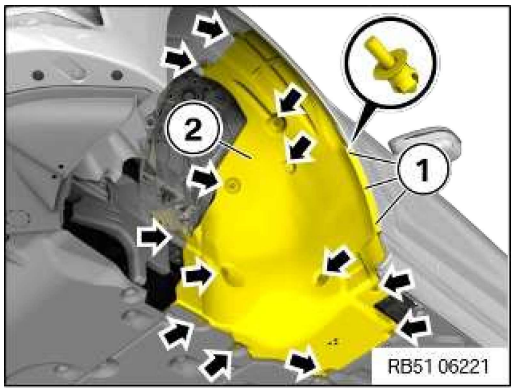


- Remove screws (arrows).
- Remove front section of the front wheel arch cover (1).

3 – Removing the rear section of the front wheel arch cover front

NOTICE

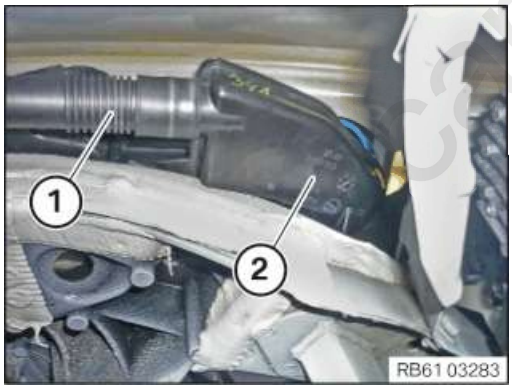
To provide a better overview: Schematic diagram with partially hidden components.



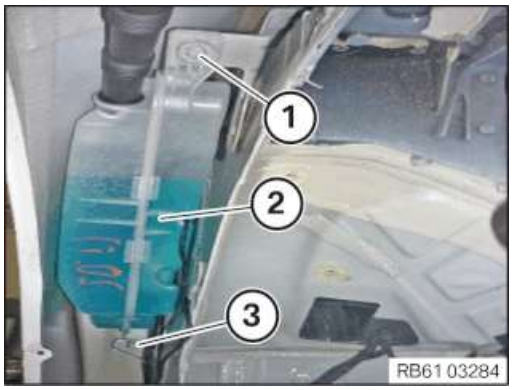
- Loosen the expanding rivet (1).
- Remove screws (arrows).
- Remove the rear section of the front wheel arch cover (2).

MAIN WORK

4 – Remove washer fluid reservoir

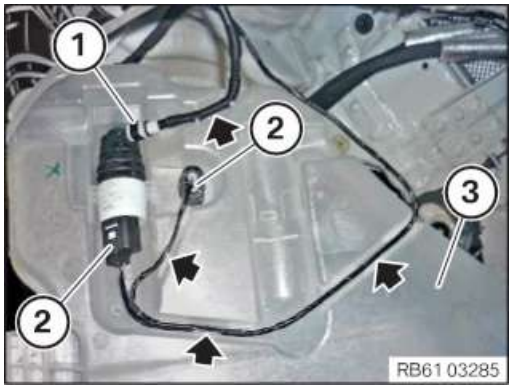


- Pull off filler channel (1) from fuel filler neck (2).



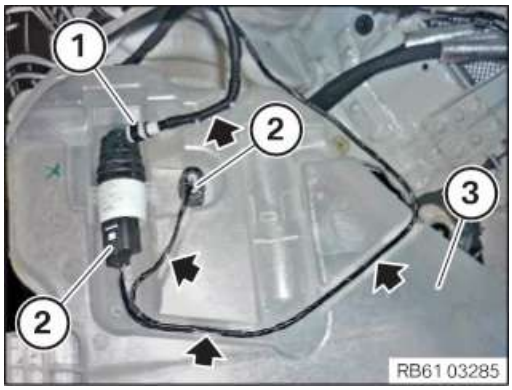
- Loosen screw (1).
- Guide out washer fluid reservoir (2) from holder (3).

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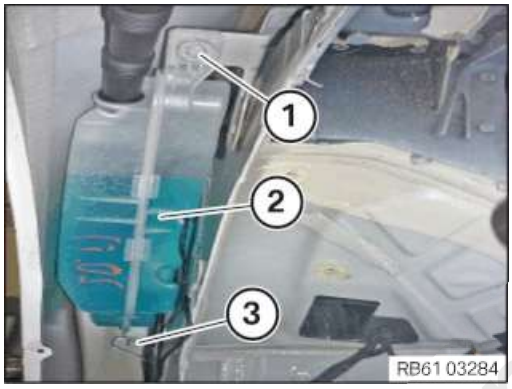


- Unlock hose pipe (1) and disconnect.
- Unclip the hose pipe (1) from the washer fluid hose (3) (arrow).
- Unlock and disconnect connector (2).
- Unclip the cable from the washer fluid reservoir (3) (arrows).

5 – Installing washer fluid reservoir



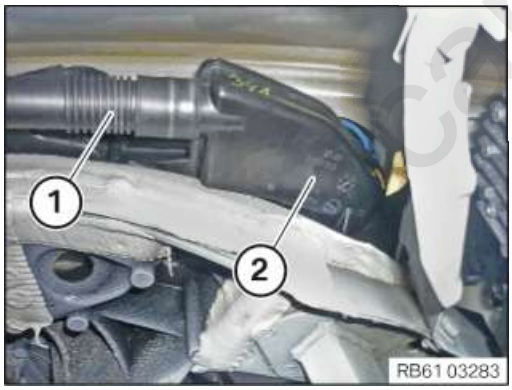
- Connect connector (2).
- Clip the cable into the washer fluid reservoir (3) (arrows).
- Connect and lock hose pipe (2).
- Clip the hose pipe (2) into the washer fluid reservoir (3) (arrow).



- Position the washer fluid reservoir (2) and feed towards the rear into the holder (3).
- Tighten down screw (1).

Washer fluid reservoir

	Tightening torque	8 Nm



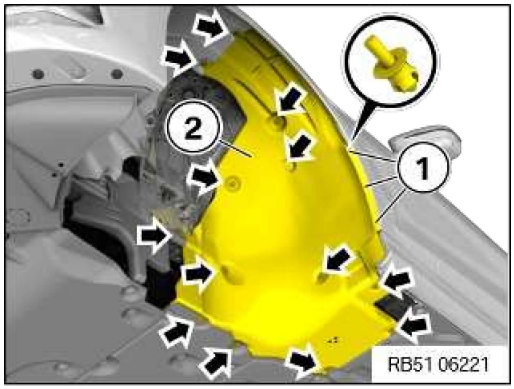
- Connect filler channel (1) with the fuel filler neck (2).

POSTPROCESSES

6 – Install the rear section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Install the rear section of the front wheel arch cover(2) .
- Tighten screws (arrows).

Wheel arch trim panel, front

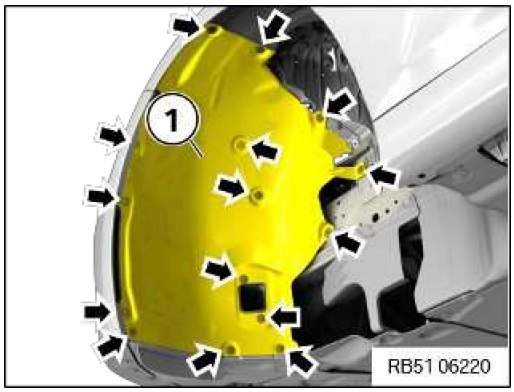
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

- Secure expanding rivet (1).

7 – Install the front section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Install the front section of the front wheel arch cover (1).
- Tighten screws (arrows).

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

8 – Mounting the wheel



TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

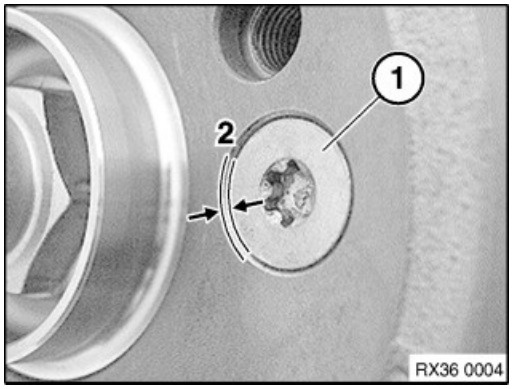
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.



- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).



- Check that the mounting bolt (1) for the brake disc is securely seated.

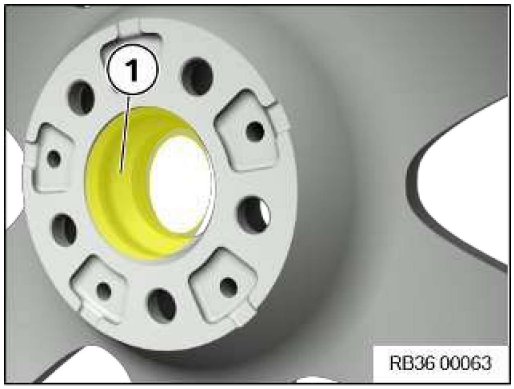
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

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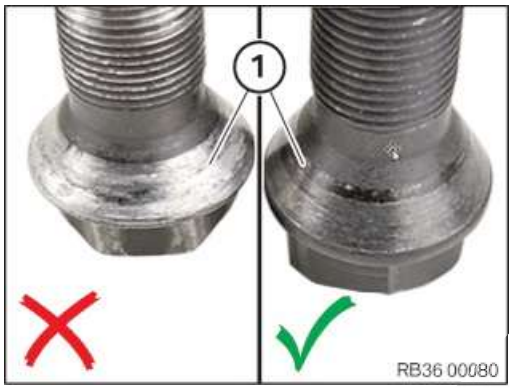


TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

  This process is intended to prevent damage to the brake disc.



Check

- **Check wheel bolts for wear.**

Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts

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TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew the corroded wheel bolts (arrows).

  Parts: Wheel bolts
- Clean the wheel bolts (arrows).
- Check the wheel bolts (arrows) and threads for damage, renew the wheel bolts (arrows) if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence.	Check	140 Nm
	Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.		

Additional Information

Overview of Tightening Torques

Washer fluid reservoir — Used in step 5

	Tightening torque	8 Nm

Wheel arch trim panel, front — Used in step 67

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Brake disc to front wheel hub — Used in step 8

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 8

M8	Renew screw.	Tightening torque	16 Nm

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Wheel bolts			Used in step 8
M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim. Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Tightening torque Check	140 Nm 140 Nm

Overview of Special Tools

2 344 011 Tool



Common	Used in step 8
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	08 08 12 (872)

Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common	Used in step 1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 224 (36 1 326) Wheel stud



Common	Used in step 1
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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0 495 225 (36 1 327) Wheel stud



Common	Used in step 1
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 226 (36 1 328) Wheel stud



Common	Used in step 1
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 227 (36 1 329) Wheel stud



Common	Used in step 1
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 228 (36 1 331) Wheel stud



Common	Used in step 1
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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0 495 229 (36 1 332) Wheel stud



Common	Used in step 1
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 230 (36 1 333) Wheel stud



Common	Used in step 1
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Links

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	18

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61 71 100 Removing and installing/replacing window washer pump

WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raise the vehicle using a vehicle lift.

PRELIMINARY WORK

1 – Removing the wheel



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

  This process is intended to prevent damage to the brake disc.



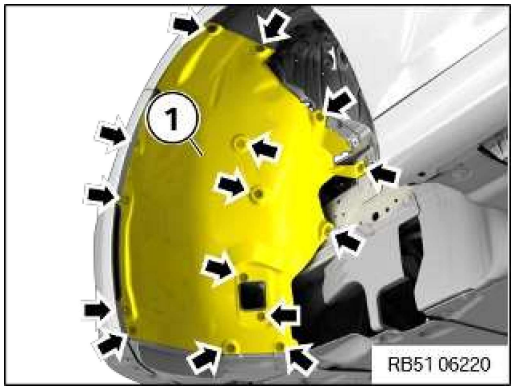
- If several wheels are removed at the same time: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use the correct adapter from the set of special tools .

2 – Removing the front section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

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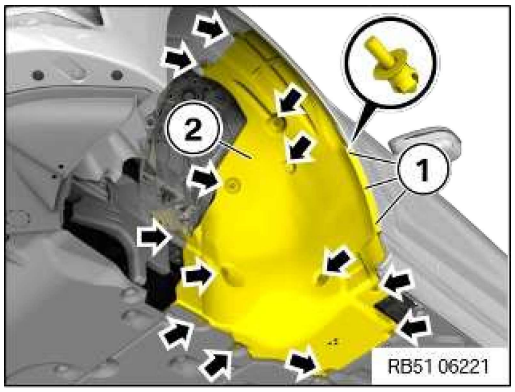


- Remove screws (arrows).
- Remove front section of the front wheel arch cover (1).

3 – Removing the rear section of the front wheel arch cover front

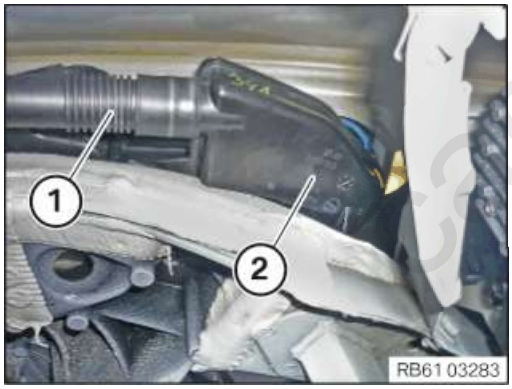
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

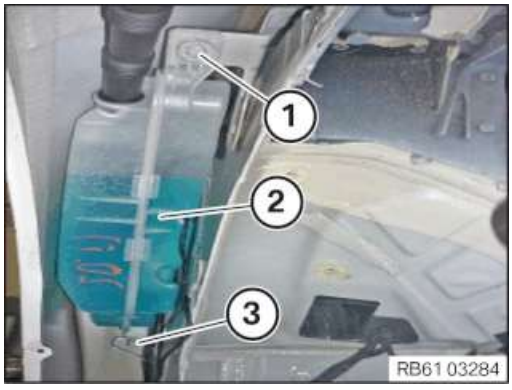


- Loosen the expanding rivet (1).
- Remove screws (arrows).
- Remove the rear section of the front wheel arch cover (2).

4 – Remove washer fluid reservoir

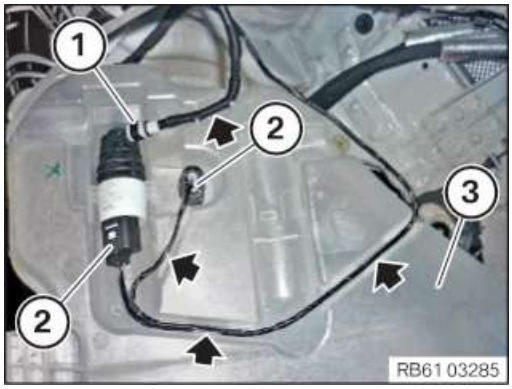


- Pull off filler channel (1) from fuel filler neck (2).



- Loosen screw (1).
- Guide out washer fluid reservoir (2) from holder (3).

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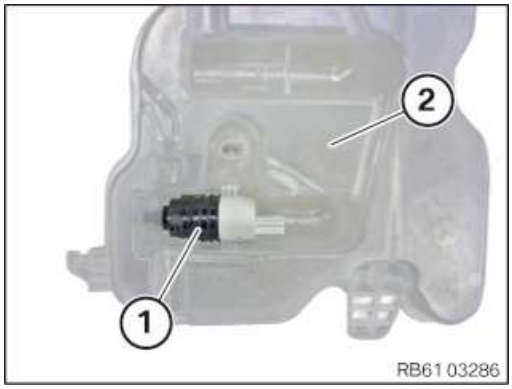


- Unlock hose pipe (1) and disconnect.
- Unclip the hose pipe (1) from the washer fluid hose (3) (arrow).
- Unlock and disconnect connector (2).
- Unclip the cable from the washer fluid reservoir (3) (arrows).

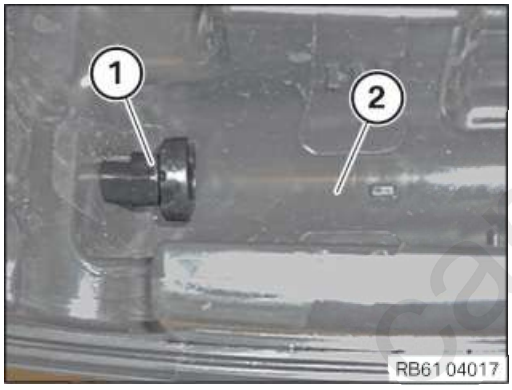
MAIN WORK

5 – Replace windscreen washer pump

▸ **Remove window washer pump**

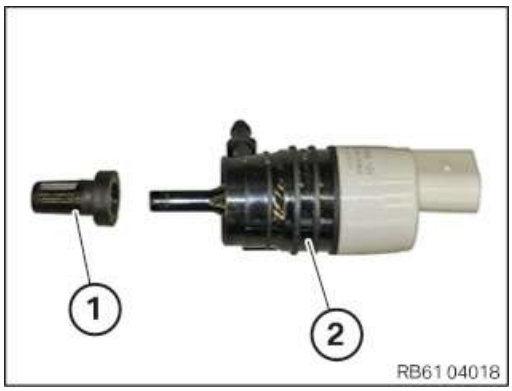


- Pull washer pump relay (1) out of washer fluid hose (2).



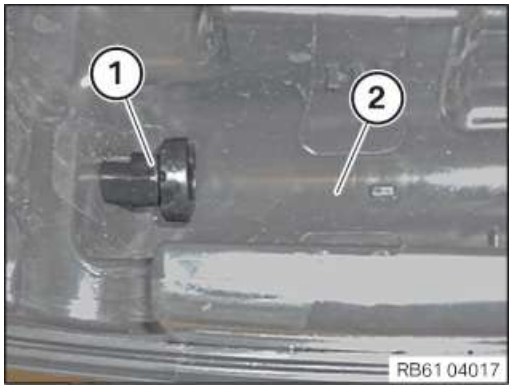
- Pull strainer with gasket (1) out of the washer fluid reservoir (2).

▸ **Installing the window washer pump**

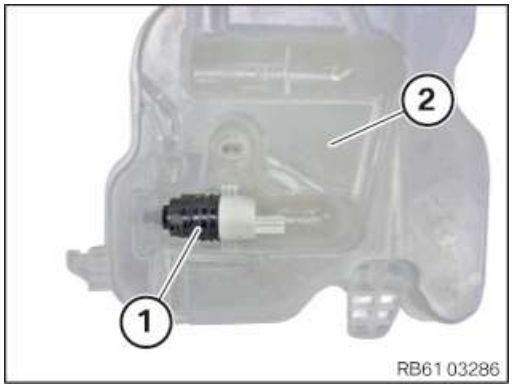


- Check the strainer with seal (1) and pump (2) for damage.

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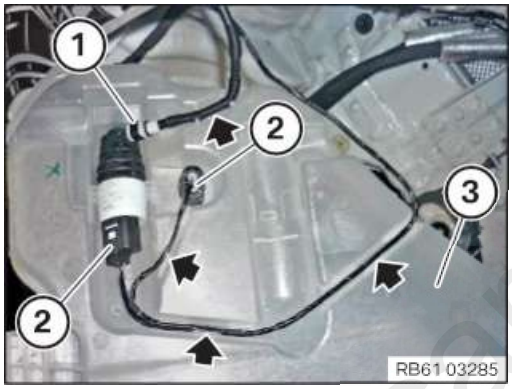
- Join strainer with gasket (1) into the washer fluid reservoir (2).



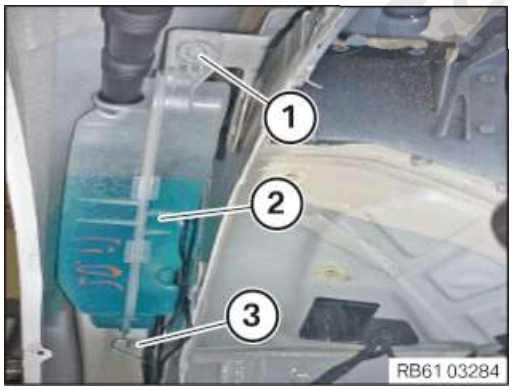
- Join windscreen washer pump (1) into washer fluid reservoir (2).

POSTPROCESSES

6 – Installing washer fluid reservoir



- Connect connector (2).
- Clip the cable into the washer fluid reservoir (3) (arrows).
- Connect and lock hose pipe (2).
- Clip the hose pipe (2) into the washer fluid reservoir (3) (arrow).

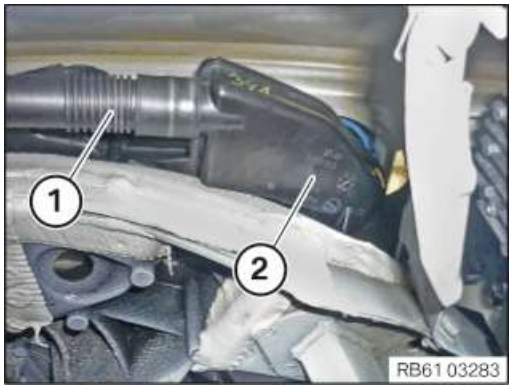


- Position the washer fluid reservoir (2) and feed towards the rear into the holder (3).
- Tighten down screw (1).

Washer fluid reservoir

	Tightening torque	8 Nm

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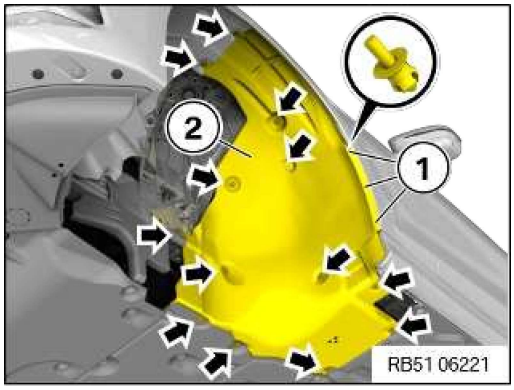


- Connect filler channel (1) with the fuel filler neck (2).

7 – Install the rear section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Install the rear section of the front wheel arch cover(2) .
- Tighten screws (arrows).

Wheel arch trim panel, front

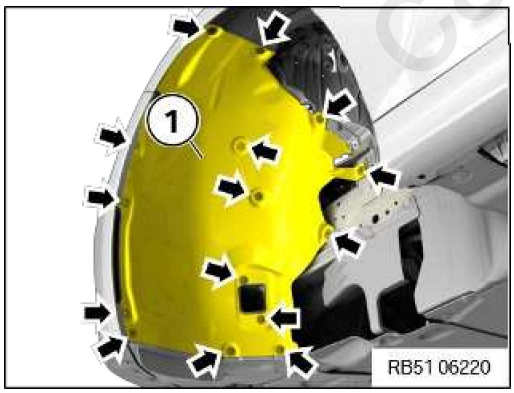
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

- Secure expanding rivet (1).

8 – Install the front section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Install the front section of the front wheel arch cover (1).
- Tighten screws (arrows).

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

9 – Mounting the wheel

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TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

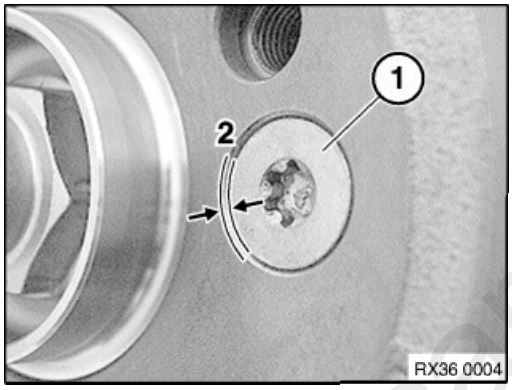
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.



- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).



- Check that the mounting bolt (1) for the brake disc is securely seated.

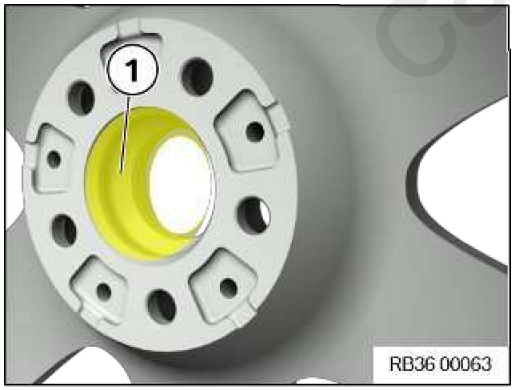
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

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TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



TECHNICAL INFORMATION

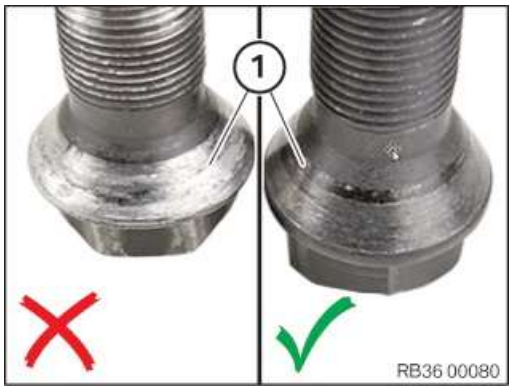
A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

  This process is intended to prevent damage to the brake disc.

Check

- **Check wheel bolts for wear.**



Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts



TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew the corroded wheel bolts (arrows).

  Parts: Wheel bolts
- Clean the wheel bolts (arrows).
- Check the wheel bolts (arrows) and threads for damage, renew the wheel bolts (arrows) if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence.		
	Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

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Additional Information

Overview of Tightening Torques

Washer fluid reservoir — Used in step 6

	Tightening torque	8 Nm

Wheel arch trim panel, front — Used in step 78

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Brake disc to front wheel hub — Used in step 9

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 9

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts			Used in step 9
M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim. Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Tightening torque Check	140 Nm 140 Nm

Overview of Special Tools

2 344 011 Tool



Common	Used in step 9
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	08 08 12 (872)

Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common	Used in step 1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 224 (36 1 326) Wheel stud



Common	Used in step 1
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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0 495 225 (36 1 327) Wheel stud



Common	Used in step 1
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 226 (36 1 328) Wheel stud



Common	Used in step 1
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 227 (36 1 329) Wheel stud



Common	Used in step 1
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 228 (36 1 331) Wheel stud



Common	Used in step 1
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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0 495 229 (36 1 332) Wheel stud



Common	Used in step 1
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 230 (36 1 333) Wheel stud



Common	Used in step 1
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Links

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	19

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61 71 065 Replace the washer fluid reservoir for the window washer system

WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raise the vehicle using a vehicle lift.

PRELIMINARY WORK

1 – Removing the wheel



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

  This process is intended to prevent damage to the brake disc.



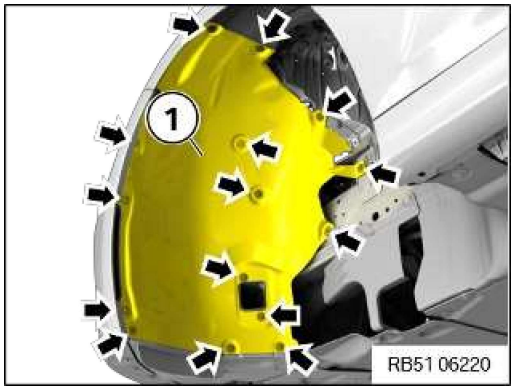
- If several wheels are removed at the same time: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use the correct adapter from the set of special tools .

2 – Removing the front section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

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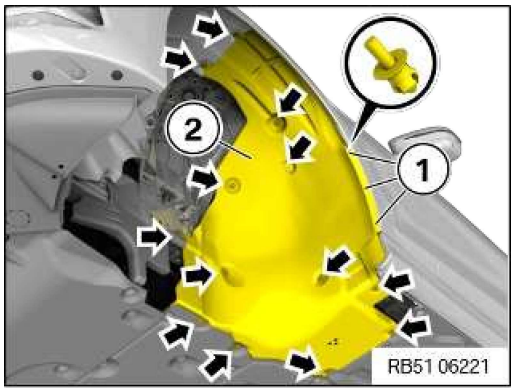


- Remove screws (arrows).
- Remove front section of the front wheel arch cover (1).

3 – Removing the rear section of the front wheel arch cover front

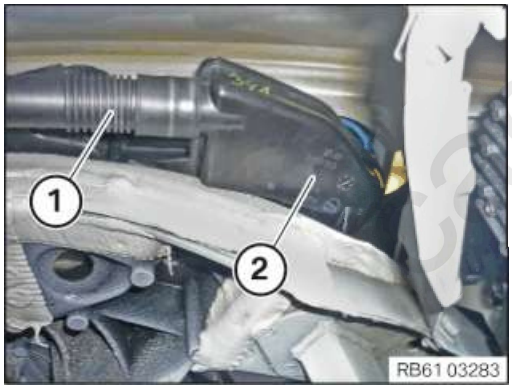
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

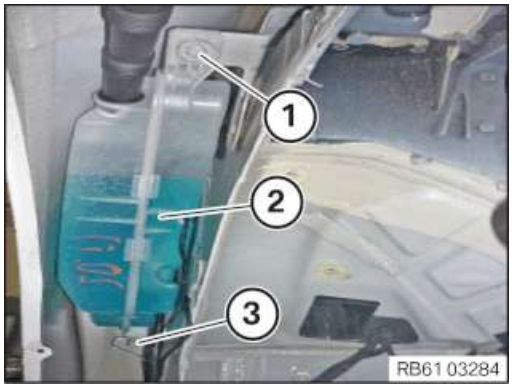


- Loosen the expanding rivet (1).
- Remove screws (arrows).
- Remove the rear section of the front wheel arch cover (2).

4 – Remove washer fluid reservoir

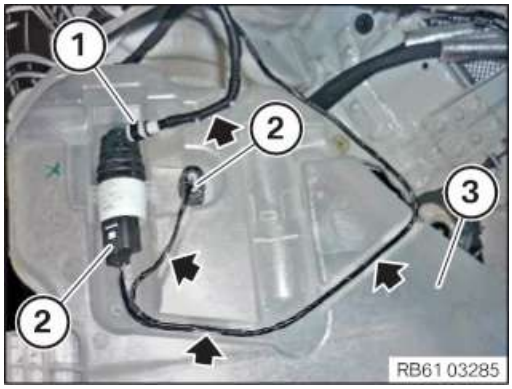


- Pull off filler channel (1) from fuel filler neck (2).



- Loosen screw (1).
- Guide out washer fluid reservoir (2) from holder (3).

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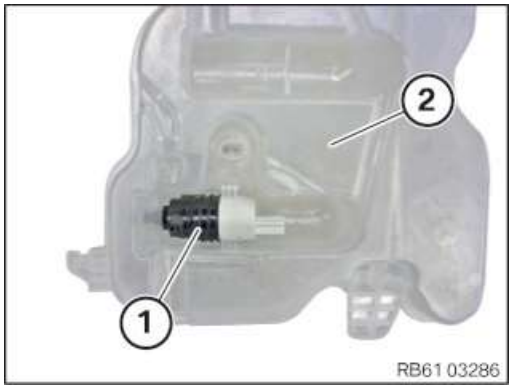


- Unlock hose pipe (1) and disconnect.
- Unclip the hose pipe (1) from the washer fluid hose (3) (arrow).
- Unlock and disconnect connector (2).
- Unclip the cable from the washer fluid reservoir (3) (arrows).

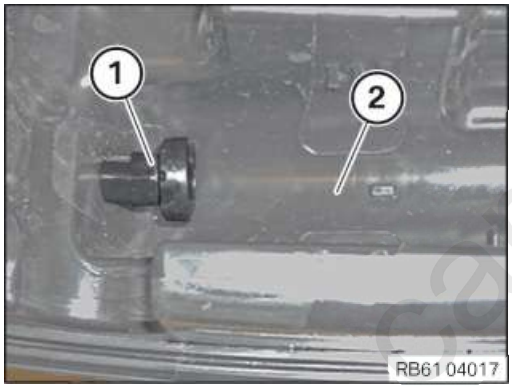
MAIN WORK

5 – Replace washer fluid reservoir

▸ **Remove window washer pump**

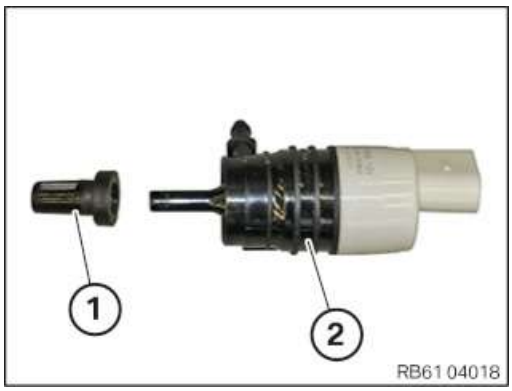


- Pull washer pump relay (1) out of washer fluid hose (2).



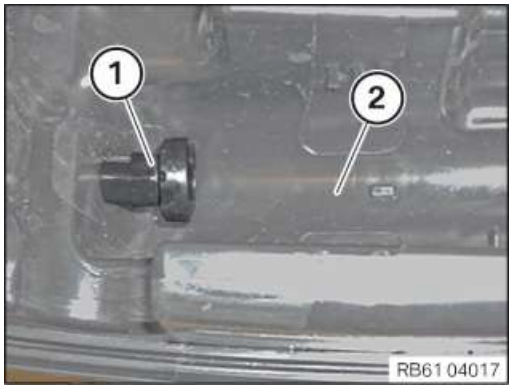
- Pull strainer with gasket (1) out of the washer fluid reservoir (2).

▸ **Installing the window washer pump**

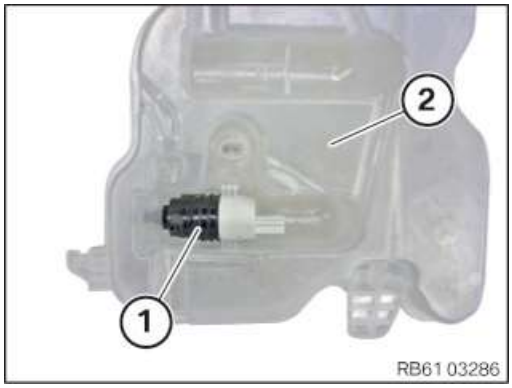


- Check the strainer with seal (1) and pump (2) for damage.

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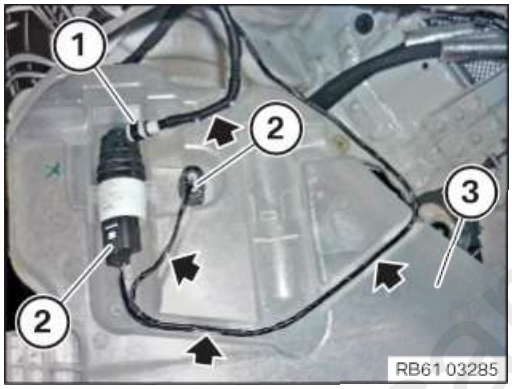
- Join strainer with gasket (1) into the washer fluid reservoir (2).



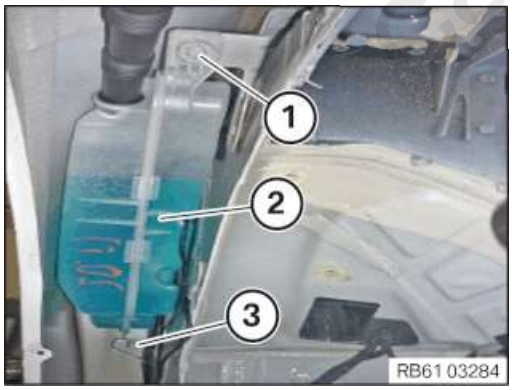
- Join windscreen washer pump (1) into washer fluid reservoir (2).

POSTPROCESSES

6 – Installing washer fluid reservoir



- Connect connector (2).
- Clip the cable into the washer fluid reservoir (3) (arrows).
- Connect and lock hose pipe (2).
- Clip the hose pipe (2) into the washer fluid reservoir (3) (arrow).

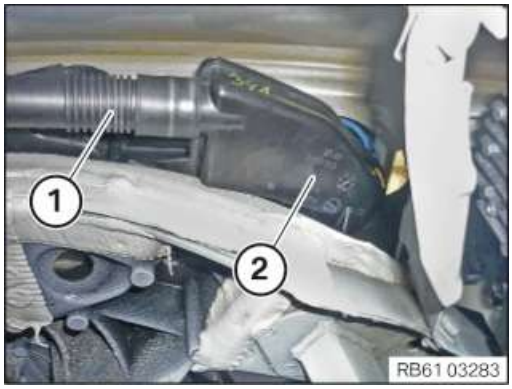


- Position the washer fluid reservoir (2) and feed towards the rear into the holder (3).
- Tighten down screw (1).

Washer fluid reservoir

	Tightening torque	8 Nm

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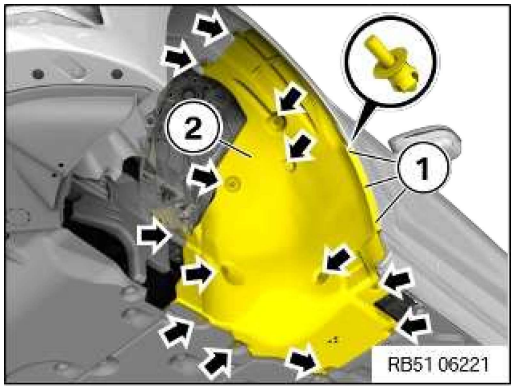


- Connect filler channel (1) with the fuel filler neck (2).

7 – Install the rear section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Install the rear section of the front wheel arch cover(2) .
- Tighten screws (arrows).

Wheel arch trim panel, front

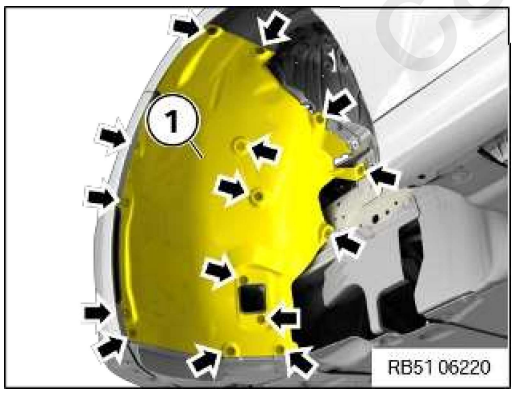
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

- Secure expanding rivet (1).

8 – Install the front section of the front wheel arch cover

NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



- Install the front section of the front wheel arch cover (1).
- Tighten screws (arrows).

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

9 – Mounting the wheel

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TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

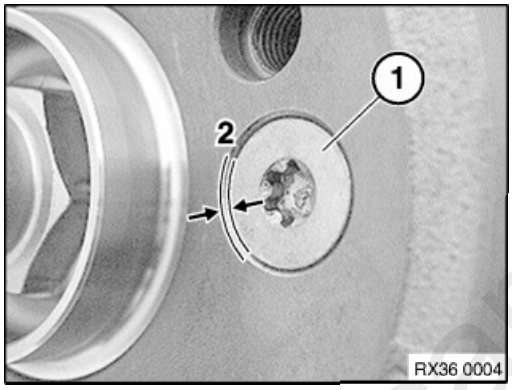
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.



- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).



- Check that the mounting bolt (1) for the brake disc is securely seated.

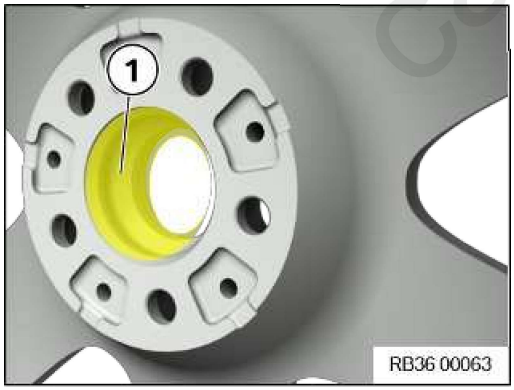
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

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TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



TECHNICAL INFORMATION

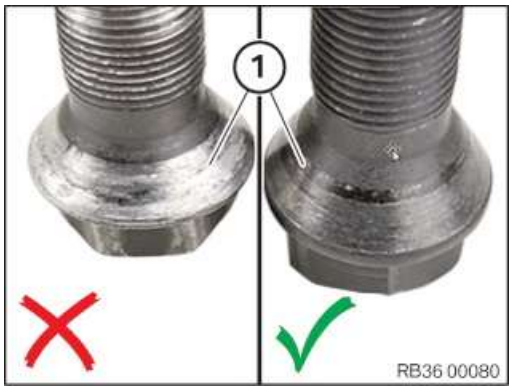
A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

  This process is intended to prevent damage to the brake disc.

Check

- **Check wheel bolts for wear.**



Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts



TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew the corroded wheel bolts (arrows).

  Parts: Wheel bolts
- Clean the wheel bolts (arrows).
- Check the wheel bolts (arrows) and threads for damage, renew the wheel bolts (arrows) if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence.		
	Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

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Additional Information

Overview of Tightening Torques

Washer fluid reservoir — Used in step 6

	Tightening torque	8 Nm

Wheel arch trim panel, front — Used in step 78

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Brake disc to front wheel hub — Used in step 9

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 9

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts			Used in step 9
M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim. Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Tightening torque Check	140 Nm 140 Nm

Overview of Special Tools

2 344 011 Tool



Common	Used in step 9
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	08 08 12 (872)

Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common	Used in step 1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 224 (36 1 326) Wheel stud



Common	Used in step 1
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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0 495 225 (36 1 327) Wheel stud



Common	Used in step 1
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 226 (36 1 328) Wheel stud



Common	Used in step 1
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 227 (36 1 329) Wheel stud



Common	Used in step 1
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 228 (36 1 331) Wheel stud



Common	Used in step 1
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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0 495 229 (36 1 332) Wheel stud



Common	Used in step 1
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 230 (36 1 333) Wheel stud



Common	Used in step 1
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Links

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	19

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61 71 002 Replacing spray nozzles on left and right wiper arm

PRELIMINARY WORK

1 – Removing the wiper arm on the left and right

NOTICE

Description is for left component only. Procedure on the right side is identical.

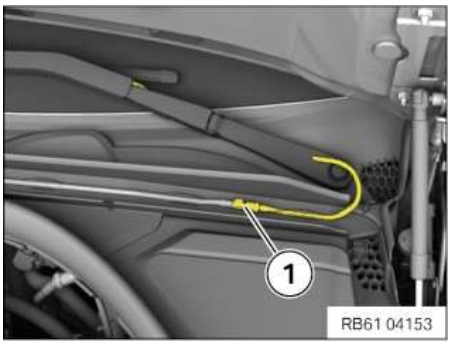
▸ **Remove the wiper arm**

RISK OF DAMAGE

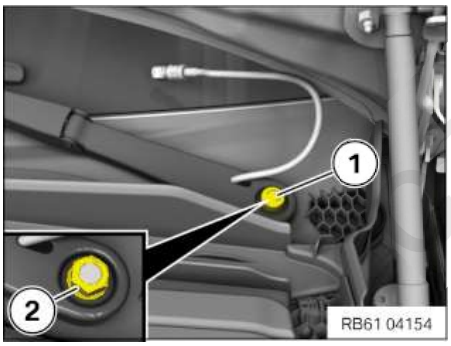
Damage to wiper console.

While removing the wiper arms without using special tool, the wiper console can break.

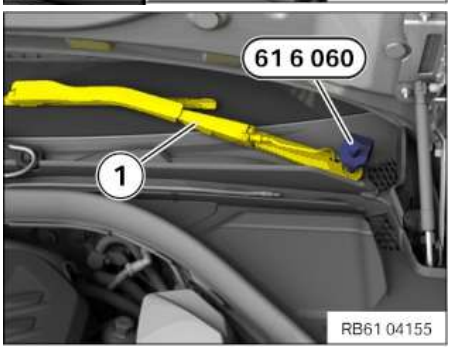
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do **not** lever off the wiper arm because otherwise the wiper console may break at the predetermined breaking point for active pedestrian protection.



- Disconnect the washer fluid hose (1) at the separation point and feed out from the cowl panel guide.



- Remove the protective cap (1).
- Loosen nut (2).



- Pull off the wiper arm (1) using special tool .

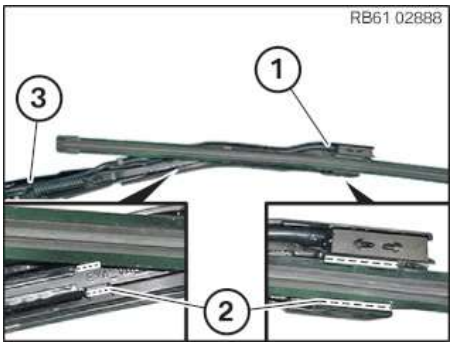
MAIN WORK

2 – Removing left window washer nozzles

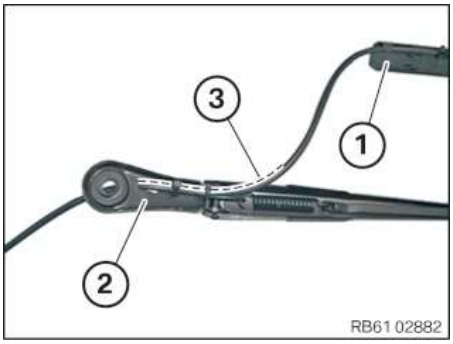
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- Disconnect quick-release coupling (1) from the washer fluid hose (2)by pulling off.

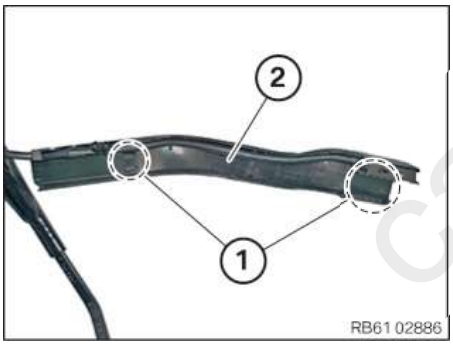


- Disengage window washer nozzles (1) in the marked areas (2) from the wiper arm (3).



- Feed out the window washer nozzles (1) with the washer fluid hose (3) from the wiper arm (2).

3 – Installing left window washer nozzles



Check

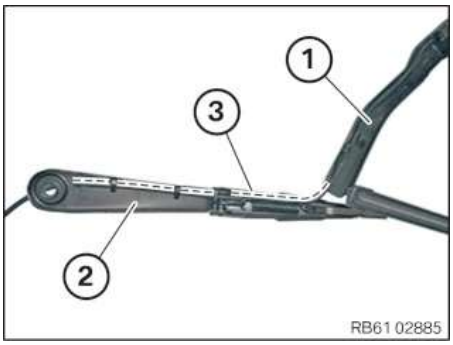
- Check latch mechanisms (2) on the window washer nozzles (1)f or damage.

Result

» Latch mechanisms (1) are damaged.

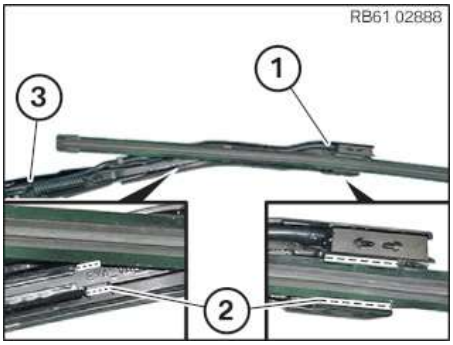
Measure

- Replace window washer nozzles (2).

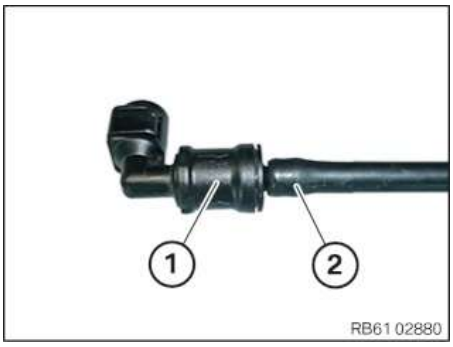


- Insert the window washer nozzles (1) with the washer fluid hose (3) into the wiper arm (2).

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- Position and lock window washer nozzles (1) at the wiper arm (3).
  Latch mechanism (2) must engage audibly.

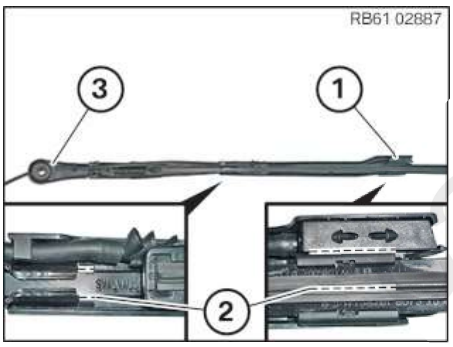


- Connect quick-release coupling (1) to the washer fluid hose (2).

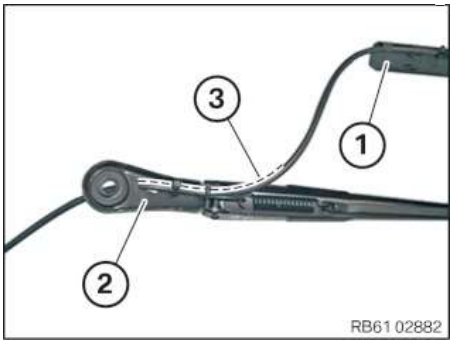
4 – Removing right windscreen washer jets



- Detach quick-release coupling (1) from washer fluid hose (2) by pulling off.



- Disengage windscreen washer jets (1) in marked areas (2) from wiper arm (3).

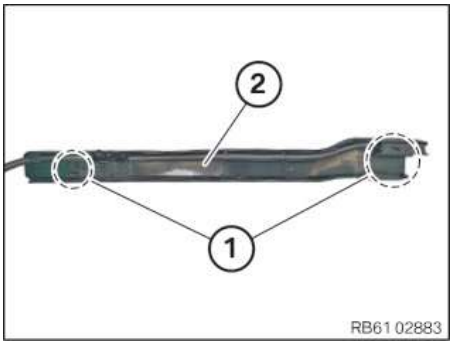


- Feed windscreen washer jets (1) with washer fluid hose (3) out of wiper arm (2).

5 – Installing right windscreen washer jets

Check

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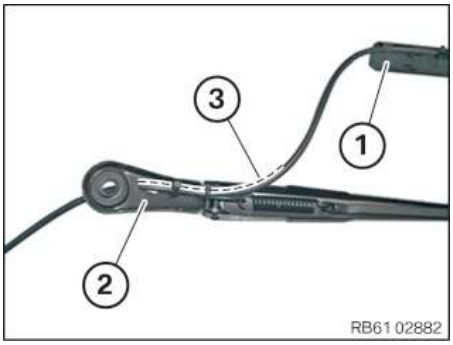
- Check latch mechanisms (1) on windscreen washer jets (2) for damage.

Result

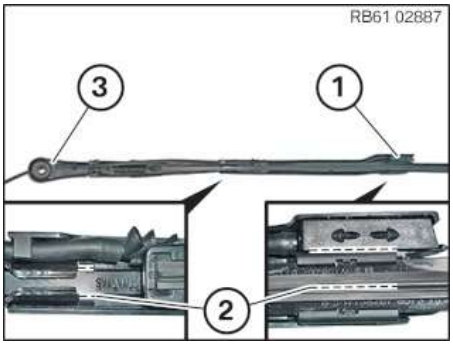
» Latch mechanisms (1) are damaged.

Measure

- Renew windscreen washer jets (2).

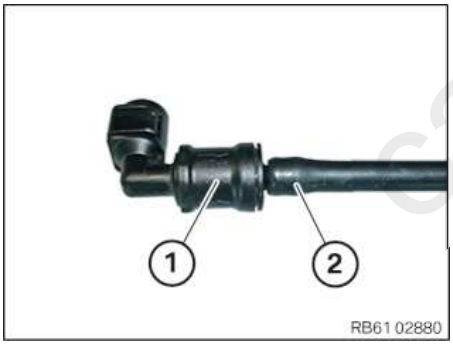


- Feed windscreen washer jets (1) with washer fluid hose (3) into wiper arm (2).



- Position windscreen washer jets (1) on wiper arm (3) and lock in place.

  Latch mechanisms (2) must engage audibly.



- Connect quick-release coupling (1) to washer fluid hose (2).

POSTPROCESSES

6 – Install left and right wiper arm

NOTICE

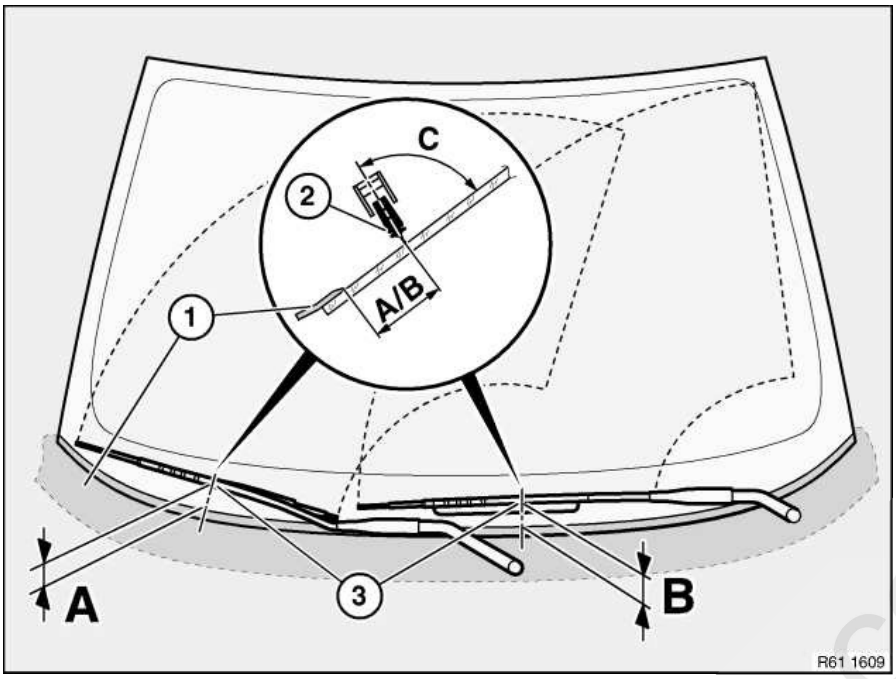
Description is for left component only. Procedure on the right side is identical.

▸ **Installing left and right wiper arm**

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TECHNICAL INFORMATION

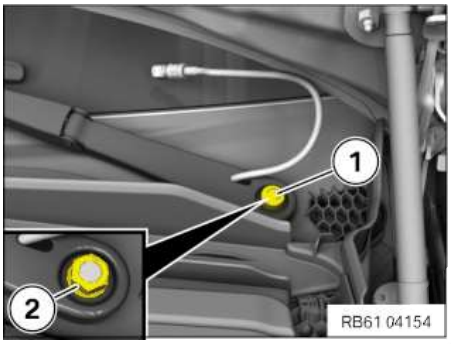
The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.



- 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

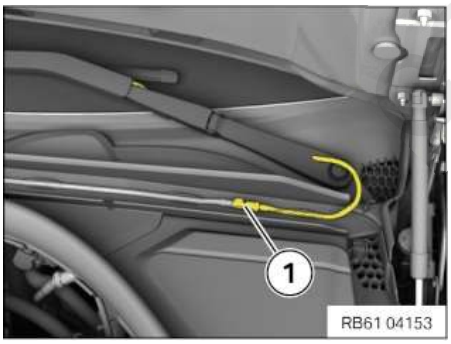


- Tighten nut (2).

Windscreen wiper arm

Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Feed washer fluid hose (1) into the cowl panel guide and connect at the separation point.

Additional Information

Overview of Tightening Torques

Windscreen wiper arm — Used in step 6

Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade — Used in step 6

Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

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