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)

Information for the battery charging calendar

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61 20 ... Battery replacement information

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

If the vehicle electrical system of electric vehicles is not accessible due to a faulty 12 V battery, proceed as follows:

Battery exchange in electrified vehicles

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 exchange.

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.

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

Diagnosis system:

Register battery exchange.

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

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 20 908 Carrying out a voltage interruption of the 12-V battery



Important!

Observe safety informations for handling vehicle battery.



There are two ways to carry out a voltage interruption of the 12-V battery:

1. Manually by disconnecting the battery earth lead
2. With the diagnosis system

1. Manually: Carry out the following steps:

- Switch off and disconnect battery charger
- Turn off ignition.

  For vehicles with ignition key: Ignition key in neutral position

  Vehicles with ID transmitter: Remove ID transmitter from slot

  For vehicles with Comfort Access: Secure terminal 30
- Disconnect negative battery lead
- Reconnect battery earth lead (to ensure bus activity)
- Observe a waiting period of 5–10 s
- Disconnect negative battery lead
- Observe a waiting period of approx. 1 minute
- Connect battery earth lead

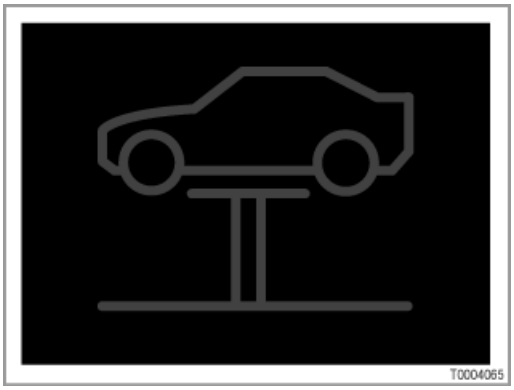
  Tightening torque: 61 21 1AZ
- Connect and switch on battery charger
- Switch on ignition.

2. With the diagnosis system:

- 03 Body
- Voltage supply
- Activate rest state
- Power-down command

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61 00 ... Diagnosis for Condition Based Service

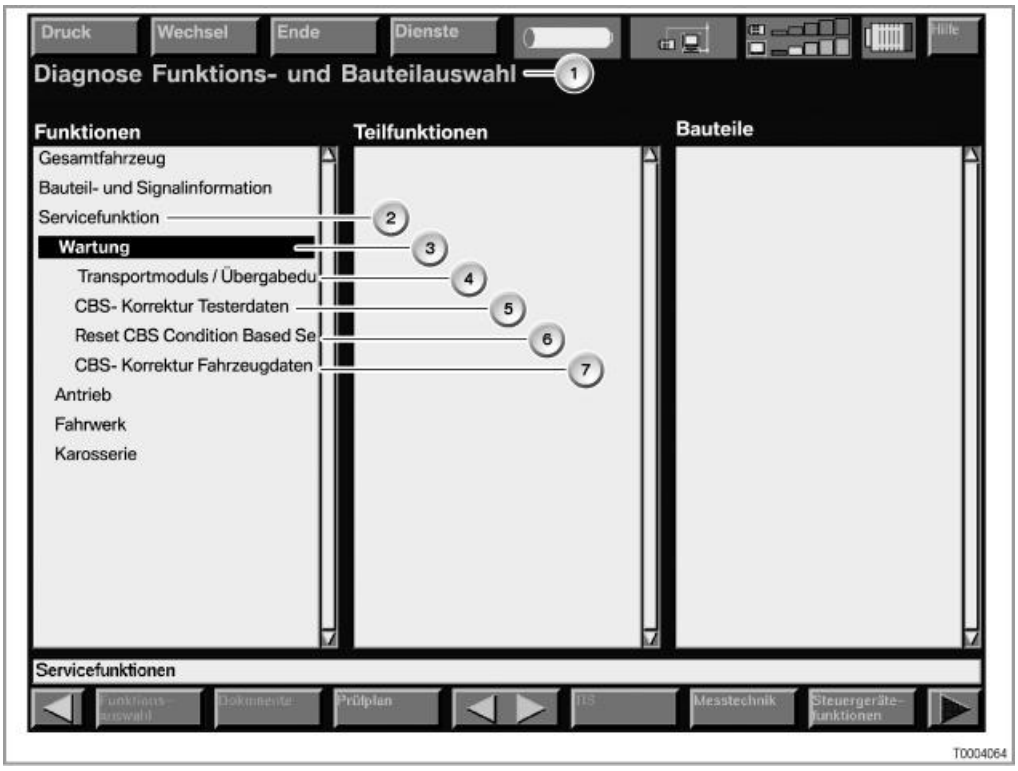


Note: Red symbol for pre-delivery check
The vehicle is coded at the end of line so that the red symbol for the pre-delivery check is shown in the Next Service indicator (same symbol as vehicle check).

The symbol is a reminder to the Service staff that the pre-delivery check has not yet been carried out on this vehicle.

Note: Do not carry out a reset.
Do **not** confuse this function with the "Vehicle check" scope of maintenance work. Do not run a reset with the KOMBI.

When executing the pre-delivery check with the "Transport mode / Pre-delivery check" service function: The symbol will be suppressed automatically after the service function has been executed.



Item	Explanation	Item	Explanation
1	Function and component selection	2	Service functions
3	Maintenance	4	Transport mode/pre-delivery check
5	CBS correction, tester data	6	Reset CBS Condition Based Service
7	CBS vehicle data correction		

4 service functions are available in the BMW diagnosis system for maintenance:

- Transport mode/pre-delivery check
- CBS correction, tester data
- Reset CBS
- CBS vehicle data correction

Service Function: Transport Mode/Pre-delivery check

In order to ensure that a vehicle can be handed over to the customer in proper condition, the "Transport mode/pre-delivery check" service function must be performed.

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The following positions are checked during the pre-delivery check:

- Deactivation of the transport mode.
- To determine the vehicle-specific vehicle performance per week an adaptation process is activated. Transport and immobilisation periods before vehicle delivery to the customer therefore do not have any effect on the customer-specific weekly distance travelled.

  The weekly mileage/kilometrage is used to control escalation from ”green” to ”yellow” (approx. 4 weeks before ”red”) for maintenance scopes with remaining distances. It is the vehicle performance determined over the last 6 weeks which is taken into account.
- Encoding or deletion of the legally-specified intervals for the legally stipulated vehicle inspection and exhaust-gas test.
- Inputting the target dates for the legally stipulated vehicle inspection and exhaust-gas test (automatically or manually).

  Automatically: by date entry of the first registration and the interval

  Manually: by directly entering the target date
- Entry of local, service-related phone numbers, depending on vehicle equipment specification (e.g. BMW Group Mobile Service, BMW Hotline, customer's local dealer).

  The country-specific phone numbers are displayed in the BMW diagnosis system as a note. When asked for input information the phone numbers can simply be read off.
- Information on initialising the TeleServices depending on the vehicle equipment.
- Checking and where necessary adjusting the on-board date for the vehicle.
- Entry of the date of the first registration of the vehicle.
- Clear diagnostic fault entries from fault memory.

Note: Reduction of input effort.
In order to minimise the input effort for the workshop, standardised data is saved on the BMW diagnosis system (for repeat use). The standardised data can be changed with the ”CBS correction, tester data” service function.

Service Function: CBS correction, tester data

With the "Pre-delivery check" service function, data will automatically be stored in the vehicle. The standardised data can be changed with the "CBS correction, tester data" service function.

The following standardised data can be modified:

- Phone numbers:
  - BMW Group Mobile Service
  - BMW Hotline
  - Local dealer

  The country-specific phone numbers are contained in the BMW diagnosis system as a note (to be read off when required for input). The phone numbers must be input with the international dialling code.
- Legally stipulated vehicle inspection (country-specific):
  - Encoding or deletion
  - Interval for calculating the target date

  The target date is calculated on the basis of the date of the first registration.
- Legally stipulated exhaust-gas test (country-specific):
  - Encoding or deletion
  - Interval for calculating the target date

  The target date is calculated on the basis of the date of the first registration.

Note: Automation after installation of the BMW diagnosis system.
If the pre-delivery check is being carried out for the first time, the standardised data will be defined automatically. It is therefore not necessary to enter the data separately.

Service Function: Reset CBS Condition Based Service

The scope of maintenance work can be reset with the ”Reset CBS Condition Based Service” service function. Even when the availability is above 80 %. The reset via the BMW diagnosis system has the advantage that the on-board date is corrected automatically.

The individual maintenance scopes are displayed in the BMW diagnosis system with service counter and availability.

- The service counter is increased by one count on resetting. In new vehicles all service counters are set to ”1”.

  The service counters are used in the Service Acceptance Module (SAM) to control the additional work for specific maintenance operations.
- On resetting the availability is set at 100%. The percentage availability is the wear value for the maintenance operation.

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The greater the availability, the further away the next service.

0% means that the maintenance measure must be carried out.

Service Function: CBS vehicle data correction

Important! The datas have been exceeded.
After carrying out this service function, it will no longer be possible to restore the previous status.

The service function "CBS vehicle data correction" is available if resetting has been carried out **unintentionally**. Thus the availability of a maintenance measure can be corrected to a value which corresponds more closely to the actual situation.

For this correction a date or kilometre reading is entered. This data is processed internally to give a percentage availability. Here, the BMW diagnosis system will only accept a value which is lower that the current status in the control unit. In addition, the service counter of the scope is automatically reduced by one counter during correction.

The entries in the service booklet are used to determine the actual availability. The most recent maintenance measure (kilometre reading and date) allows the reconstruction availability for the specific scope that corresponds more closely to the actual situation. This does not include the correction of the brake pad availability. The remaining brake pad thickness must be measured and entered (in millimetres).

Note: Reference for distance- and time-dependent maintenance scopes
On correction the availability depends on the distance-dependent and time-dependent calculation.

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61 00 ... Encode/program control unit(s)

Note:
Depending on the vehicle and the equipment, the following flat rate unit items are available for programming/encoding:

- 61 00 710
- 61 00 720
- 61 00 730

Note:

- In order to avoid incorrect programming procedures and fault messages, it is essential when working with the ISTA/P programming system always to use the version.
- Battery voltage must not drop below **13.0 V** during programming.

  Only use chargers* recommended by BMW for low voltage vehicle electrical system.

  *Sourcing reference Workshop Equipment Catalogue



programming routine via ISTA/P:

- Connect the battery charger to the vehicle.
- Connect the programming system with the vehicle.
- Determine the action plan.
- Accept action plan with the control units to be programmed/encoded and enabled, if necessary or work through.
- Observe the reworking list!
- If applicable, connect the workshop system to the vehicle depending on the rework list, run the brief test and delete the fault memory.

  Note:

  A switch to the workshop system may not necessarily be required with the integration of the service functions and the "Delete fault memory" function in ISTA/P. Check the rework list accordingly!
- The information about programming the workshop system and the corresponding notes in the user documentation must be observed.

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61 00 730 Encode/program control unit (s) (After vehicle test)

1 â€“ Encode/program control unit(s)

Prerequisite

Replacement of the control unit.

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.
- 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 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 ... 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 loads/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.

Attention!

- 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.
- When installing battery terminal: Tightening torque 61 21 1AZ.

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:

Attention!

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.

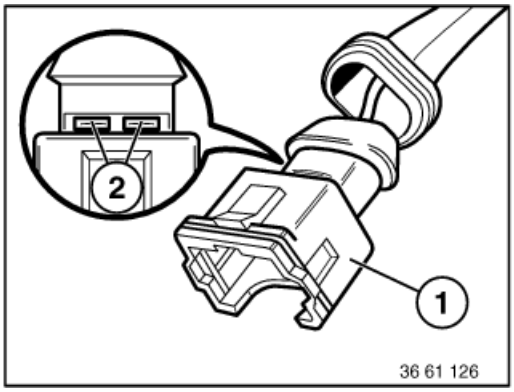
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61 13 ... Notes for opening contacts and locks of different plug contact systems

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100

Abbreviations of contacts and what they mean:	
ELA	**Strand seal**
D 1.5 / 2.5 / 3.5	**Round contacts with 1.5 mm, 2.5 mm or 3.5 mm diameter**
MDK	**Miniature double flat spring contact**
JPT	Junior Power timer
DFK	Double flat spring contacts
Elo	Electronic contacts
Elo Power	Electronic contacts for heavy load
MQS	Micro Quadlock system
MPQ	Micro Power Quadlock
MLK	Mini laminated contact
SLK	Sensor laminated contact
LSK	Load current contact
MLK	Mini laminated contact
Mcon	Multi contact



Important!

The contacts can be changed on ultrasonically welded connectors (1).

Ultrasonically welded connectors (1) must be replaced completely.

Ultrasonic-welded connectors (1) can be identified by the welds (2) on their longitudinal side.

Note:

Special tools referred to in the repair instructions below are contained in the following special tool sets:

- Unlocking and pressing-off tool 61 1 150

  is replaced as of 09/2005 by 61 0 300 (BMW) and 61 0 400 (MINI)
- Release and pressing-off tool 61 1 100 (engine)

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Repair instructions for opening connector housings and removing contacts of different connector systems:

Connector system D 1.5/D 2.5:

- Circular connectors, 7- or 8-pin, system D 2.5
- Circular connectors, 13-pin, system D 2.5
- Circular connectors, 20-pin, system D 2.5
- Circular connectors, 4-, 7-, 10-, 12- or 25-pin, system D 1.5/D 2.5
- In-line connectors, 15-pin, system D 2.5
- In-line connectors, 8-, 12-pin, system D 2.5
- In-line connectors, 30-pin, system D 2.5
- In-line connectors, 20-pin, system D 2.5

Connector system JPT/MDK/DFK:

- In-line connectors, 2-pin, System JPT ELA
- In-line plugs, 2-pin, System MDK 3 plus 2.8
- In-line plugs, 4-pin, System DFK ELA

Connector system Elo/Elo Power:

- Inline plugs, 4-, 10-pin, System Elo
- In-line connectors, 6- to 50-pin, System Elo
- Inline plugs, 3-, 6-pin, System Elo-Power 2.8

Connector system LSK:

- Connector housing LSK contact

Connector system MQS/MPQ:

- Inline connectors, 6-, 8-pin, System MQS
- Inline plugs, 2-pin, System MPQ 2.8
- Control unit connectors, 25-, 35-, 55-, 83-, 88-pin
- In-line plugs, 24-pin, Hybrid System MQS/MPQ
- Socket housing 42-, 43-pin, Hybrid System MQS / MPQ
- Socket housings 2x21-, 2x27-pin, Hybrid System MQS/MPQ, Elo/Elo Power
- In-line connectors, 30-pin, Hybrid System MQS/MPQ
- Socket housings, 5-, 8-pin, System MQS/MPQ
- Socket housing (radio connector), Hybrid System MQS/MPQ

For connector contact systems not listed, refer to Service Information:

SI 2 05 05 217
SI 2 05 06 294
SI 2 03 08 440
SI 2 08 06 312
SI 2 02 08 439
SI 2 01 08 438

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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 heater 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) fibre-optic cable
- Orange=repair fibre-optic cables

Follow instructions 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 60Â 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 instructions:

- Avoid compressive and tensile loads
- Make sure cables are laid without kinks or abrasions
- Ensure non-contacting routing at sharp-edged body parts; use edge protection if necessary
- Secure additionally laid cables/leads with cable ties

The following additionally applies:

Shielded lines

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

Coaxial lines

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

CVBS lines

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

HSD lines

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

Optical fibre cable:

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

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

Attention!

- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables 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.

Note:

- FlexRay lines may only reveal one separation point (bride); renew

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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.

Note:
Repair wiring harnesses can be equipped with an **additional socket housing** (e.g. 30-pin), **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):

- 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**

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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.

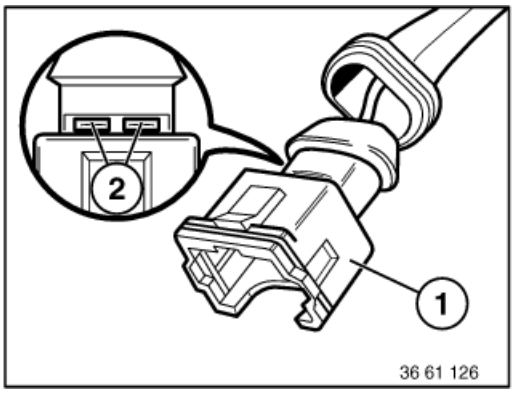
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61 13 ... Opening plug housings and removing contacts of different plug systems

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100
- 61 1 150

Abbreviations of contacts and what they mean:	
ELA	**Strand seal**
D 1.5 / 2.5 / 3.5	**Round contacts with 1.5 mm, 2.5 mm or 3.5 mm diameter**
MDK	**Miniature double flat spring contact**
JPT	Junior Power timer
DFK	Double flat spring contacts
Elo	Electronic contacts
Elo Power	Electronic contacts for heavy load
MQS	Micro Quadlock system
MPQ	Micro Power Quadlock
MLK	Mini laminated contact
SLK	Sensor laminated contact
MLK	Mini laminated contact
Mcon	Multi contact



Important!

The contacts can be changed on ultrasonically welded plugs (1).

Ultrasonically welded plugs (1) must be replaced completely.

Ultrasonic-welded connectors (1) can be identified by the welds (2) on their longitudinal side.

Note:

Special tools referred to in the repair instructions below are contained in the following special tool kits:

- Release and press-out tool 61 1 150

  is replaced from 09/2005 by 61 0 300 (BMW) and 61 0 400 (MINI)
- Release and press-out tool 61 1 100 (engine)

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Repair instructions for opening plug housings and removing contacts of different plug systems:

Plug system D 1.5/D 2.5:

- Circular plugs, 7-, 8-pin, System D 2.5
- Circular plugs, 13-pin, System D 2.5
- Circular plugs, 20-pin, System D 2.5
- Circular plugs, 4-, 7-, 10-, 12-, 25-pin, System D 1.5/D 2.5
- In-line plugs, 15-pin, System D 2.5
- In-line plugs, 8-, 12-pin, System D 2.5
- In-line plugs, 30-pin, System D 2.5
- In-line plugs, 20-pin, System D 2.5

Plug system JPT/MDK/DFK:

- In-line plugs, 2-pin, System JPT ELA
- In-line plugs, 2-pin, System MDK 3plus 2.8
- In-line plugs, 4-pin, System DFK ELA

Plug system Elo/Elo-Power:

- In-line plugs, 4-, 10-pin, System Elo
- In-line plugs, 6- to 50-pin, System Elo
- In-line plugs, 3-, 6-pin, System Elo-Power 2.8

Plug system MQS/MPQ:

- In-line plugs, 6-, 8-pin, System MQS
- In-line plugs, 2-pin, System MPQ 2.8
- Control unit plugs, 25-, 35-, 55-, 83-, 88-pin
- In-line plugs, 24-pin, Hybrid System MQS/MPQ
- Socket housing 42-, 43-pin, Hybrid System MQS / MPQ
- Socket housings 2x21-, 2x27-pin, Hybrid System MQS/MPQ, Elo/Elo-Power
- In-line plugs, 30-pin, Hybrid System MQS/MPQ
- Socket housings, 5-, 8-pin, System MQS/MPQ
- Socket housing (radio plug), Hybrid System MQS/MPQ

For plug contact systems not listed, refer to Service Information:

SI 2 05 05 217

SI 2 05 06 294

SI 2 03 08 440

SI 2 08 06 312

SI 2 02 08 439

SI 2 01 08 438

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61 00 ... Repairing airbag cables

Important!

> **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 adapter plug. 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 plug connection on 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 contacts of repair cable for airbag control unit in control unit plug, assignment of repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead. Now pin in contacts for airbag control unit or contacts of adapter plug, assignment of repair cables is relevant. Cut off excess length of repair cable in proximity (visible area) of airbag module or of adapter plug. 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.

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.

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 scope of work, unpin contacts either on airbag control unit/airbag module or on adapter plug. 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 connectors.

Installing and removing contacts.

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



Warning!

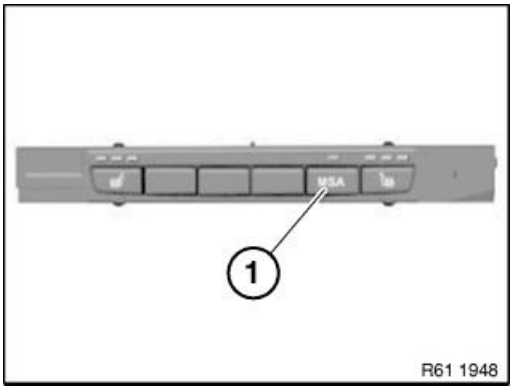
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

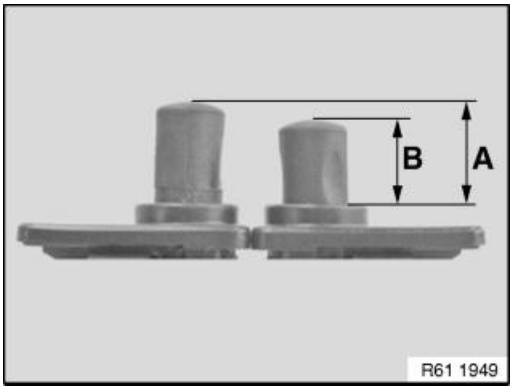
Observe safety precautions when working on MSA vehicles.

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

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

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

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

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

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

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

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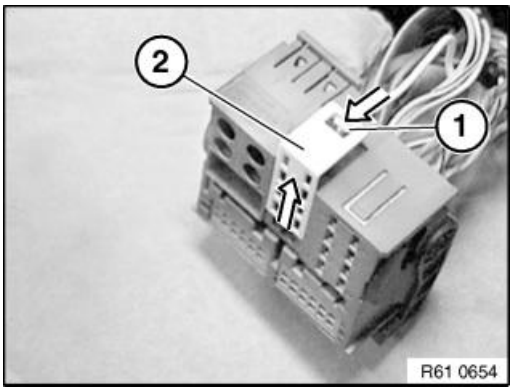
61 13 ... Socket housing (radio connector), Hybrid System MQS/MPQ

Special tools required:

- 61 0 314

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

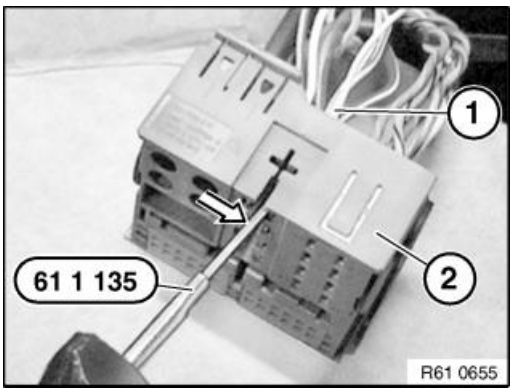
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



Removing MPQ contacts from radio connector:

Press lock (1) in direction of arrow.

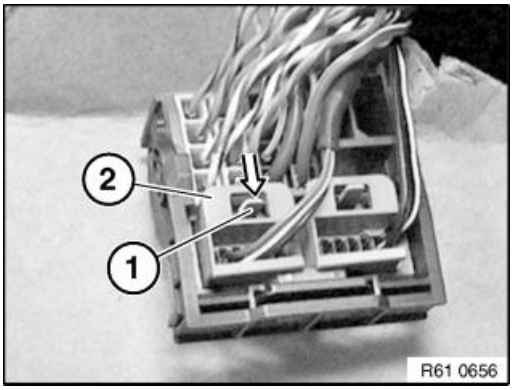
Detach secondary lock (2) from radio plug.



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.

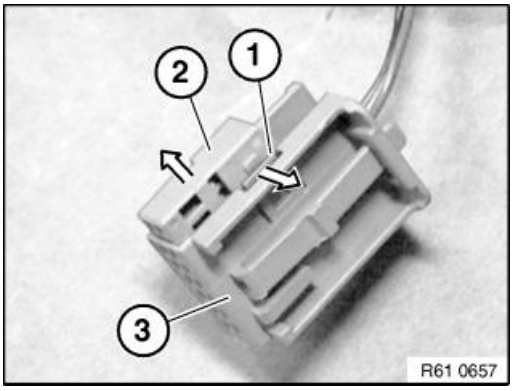
Pull wire (1) with socket contact out of radio connector (2).



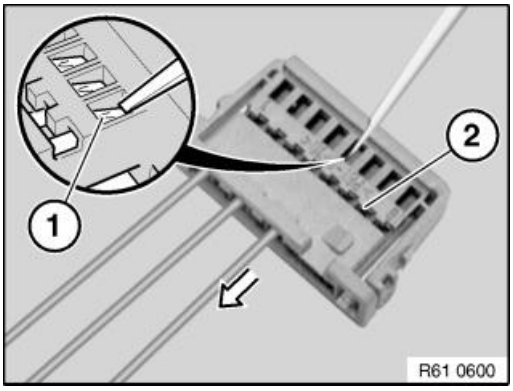
Removing MQS contacts from contact carrier:

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

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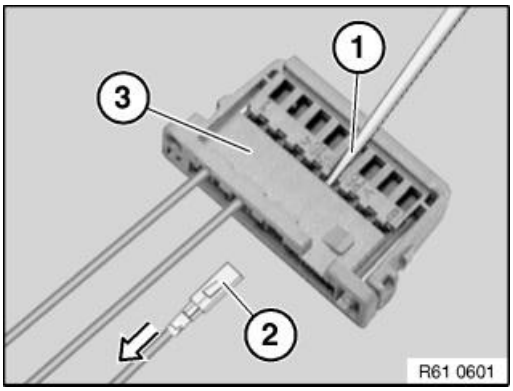
Press lock (1) in direction of arrow. Pull contact carrier (2) out of housing (3).*Note:*
When the contact carrier is pulled out, the secondary locks of the socket contacts are raised.



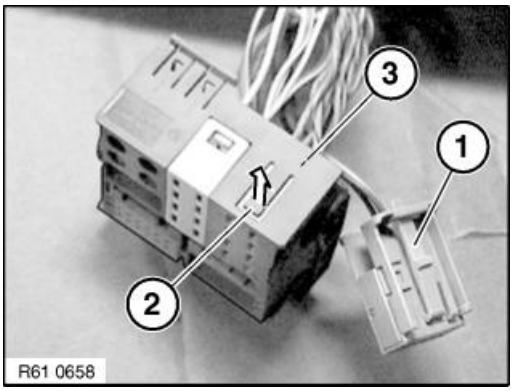
Note:
Schematic diagram shows the 8-pin socket housing by way of example.

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).



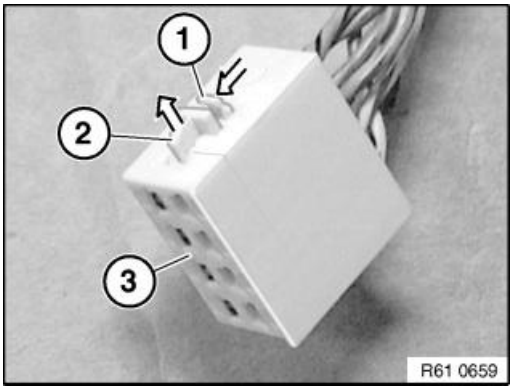
Removing MPQ contacts from contact carrier:

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

Raise lock (2) on radio connector.

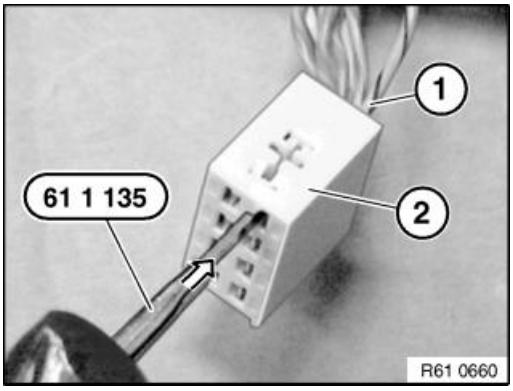
Pull contact carrier (3) out of radio connector.

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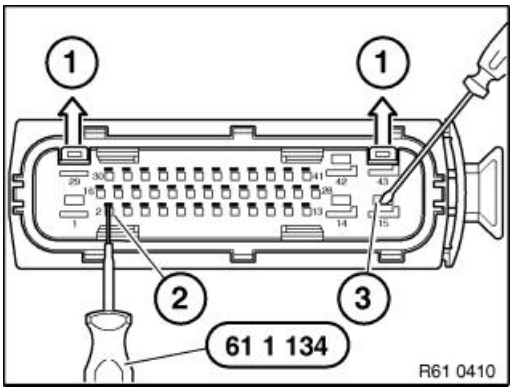
61 13 ... Socket housing 42-, 43-, 46-pin, Hybrid System MQS / MPQ

Special tools required:

- 61 0 312

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

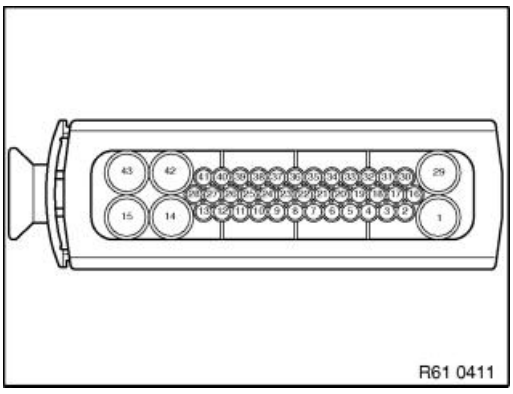
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



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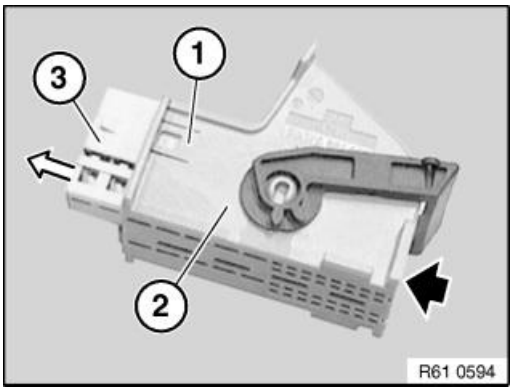
61 13 ... Socket housings, 2x21-, 2x27-pin, Hybrid Systems MQS/MPQ, Elo/Elo Power

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)

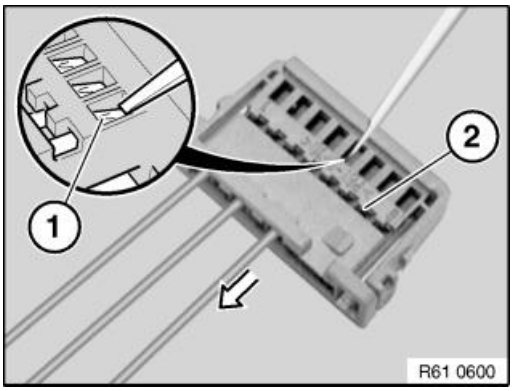


Raise lock (1) on housing (2).

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

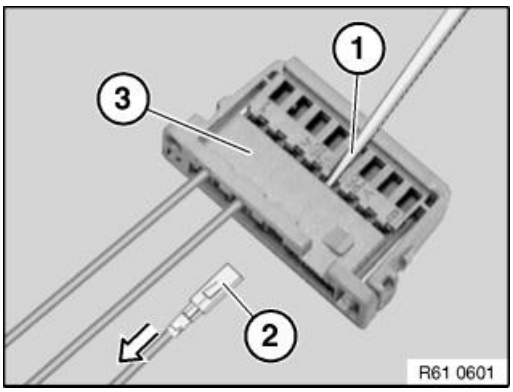
Note:
The second contact carrier is pushed out in the same way.

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).



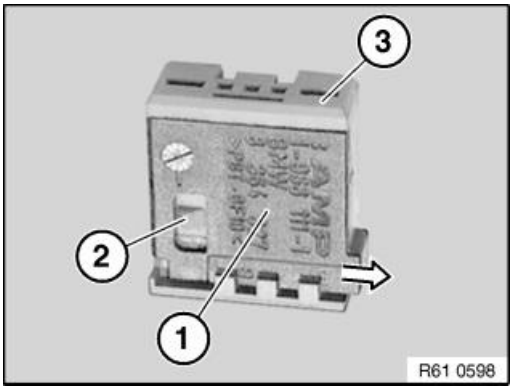
Hold down retaining hook in secondary lock (1) again and pull cable with socket contact (2) completely out of contact carrier (3).

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

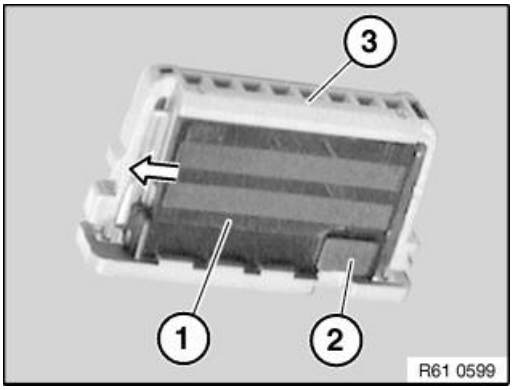
Manufactured by AMP: The following contact types without strand sealing can be fitted in the connector housings:

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



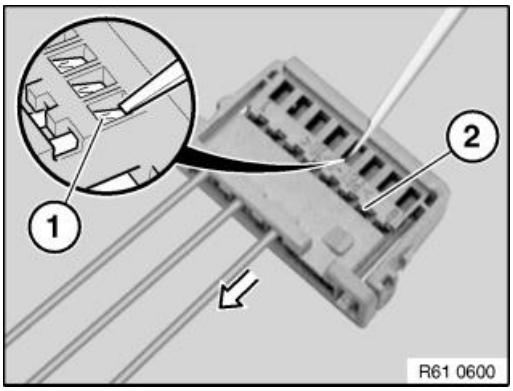
Socket housing, 5-pin (Hybrid System MQS/MPQ)

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



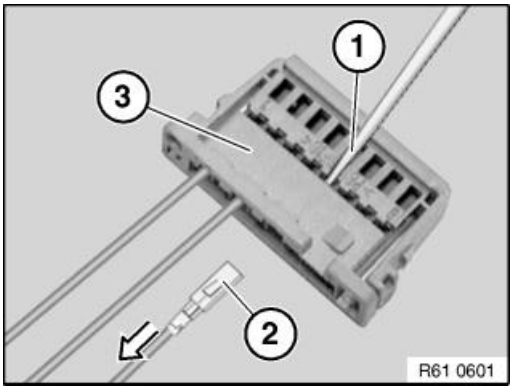
Socket housing, 8-pin (MQS):

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 ... Treating cables and optical fibres

Special tools required:

- 61 4 320
- 61 0 200

Note:
Special tools referred to in the repair instructions below are contained in the following special tool sets:

Repair range for vehicle electrical system	SI 2 04 07 341
Crimping set with pliers for optical fibres, Micro Power Quadlock (MPQ), Micro Quadlock System (MQS) contacts and universal crimping head	61 4 320 61 0 200

Subject of repair instructions

- Special tools for wiring harness repairs
- Cutting cables to length and strip insulation
- Crimping stop parts (contacts)
- Butt connector for repairing a plug connection
- Comb connector for retrofitting/repairs
- Cutting to length and stripping insulation from optical fibres

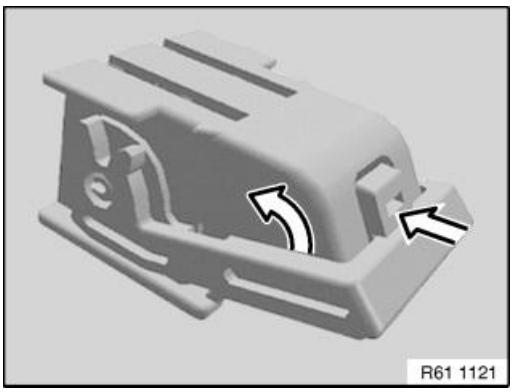
  Crimping optical fibres

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61 13 ... Unlocking and disconnecting different plug connections

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

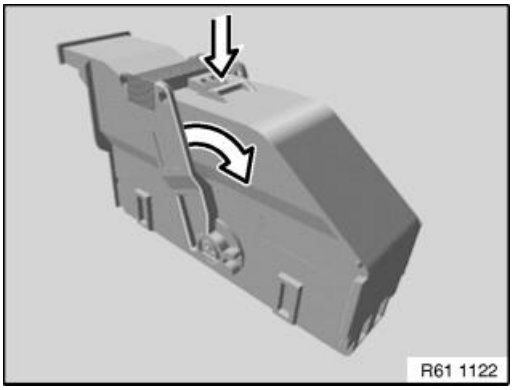
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

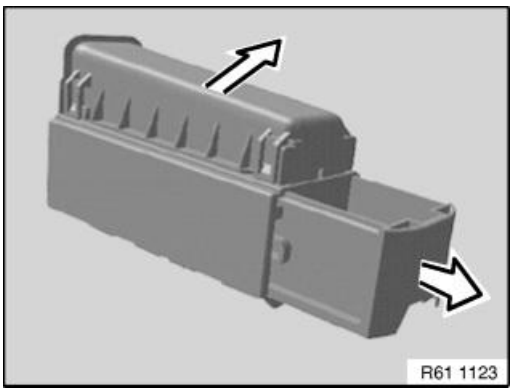
Disconnect plug connection.



2.

Press lock and open release clip in direction of arrow.

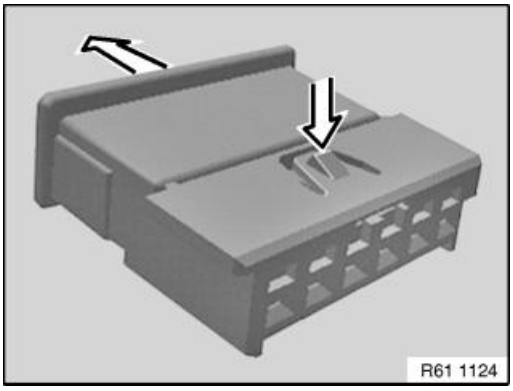
Disconnect plug connection.



3.

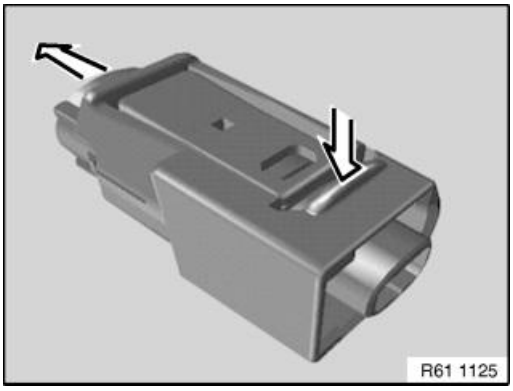
Open release clip in direction of arrow and disconnect plug connection in direction of arrow.

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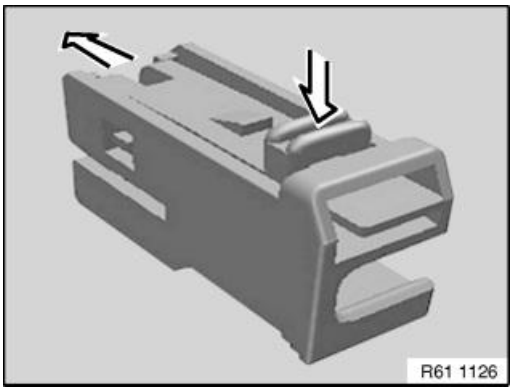
4.

Press lock and disconnect plug connection in direction of arrow.



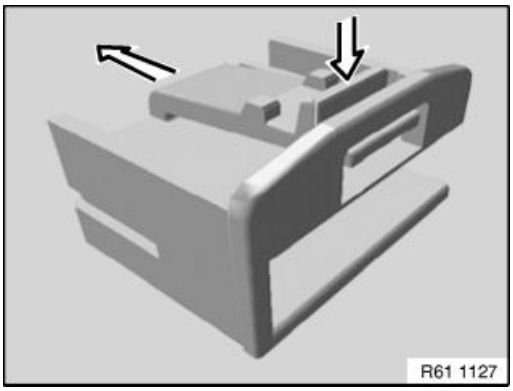
5.

Press lock and disconnect plug connection in direction of arrow.



6.

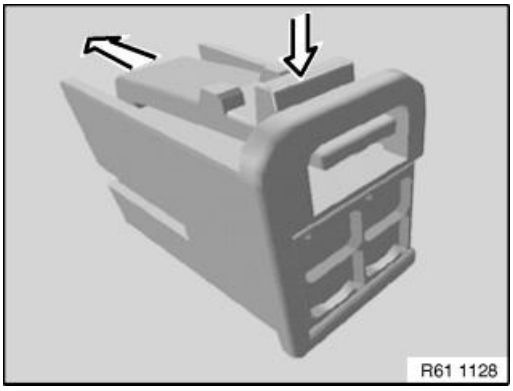
Press lock and disconnect plug connection in direction of arrow.



7.

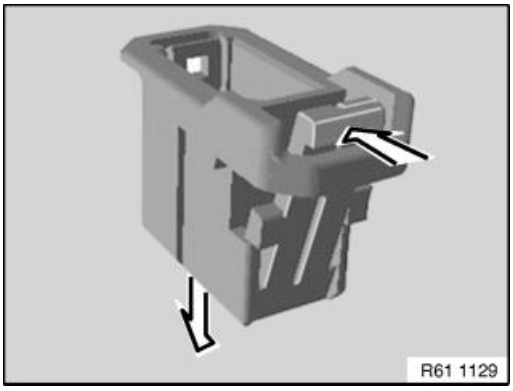
Press lock and disconnect plug connection in direction of arrow.

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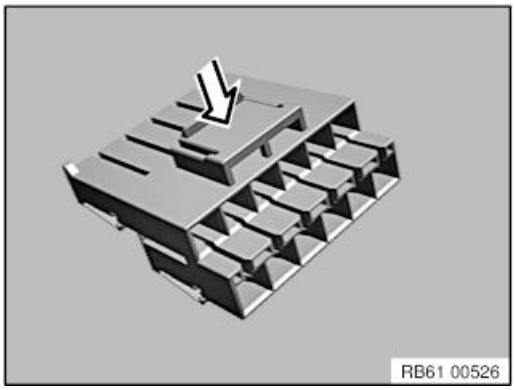
8.

Press lock and disconnect plug connection in direction of arrow.



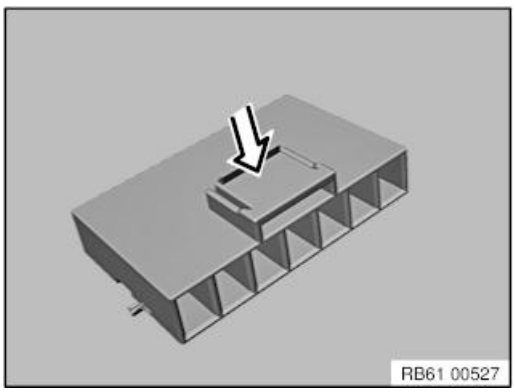
9.

Press lock and disconnect plug connection in direction of arrow.



10.

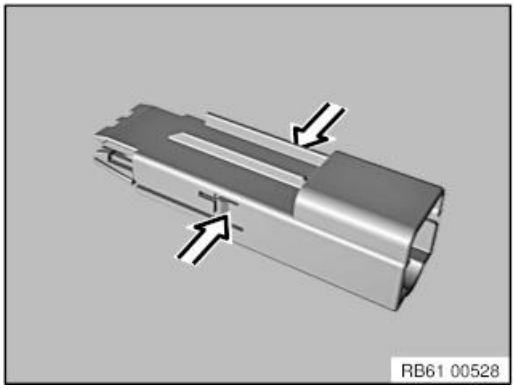
Press the lock and detach plug connection.



11.

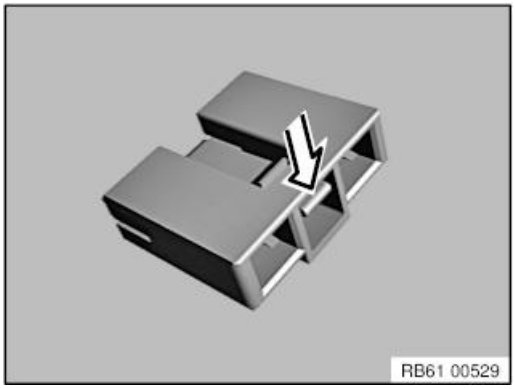
Press the lock and detach plug connection.

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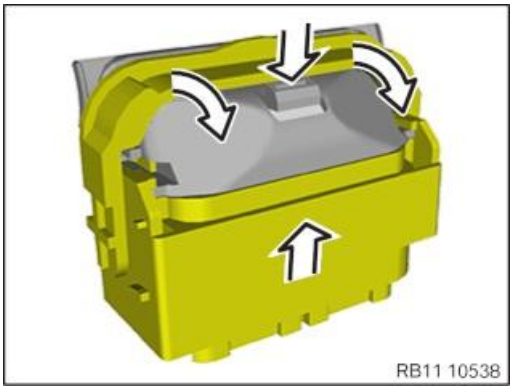
12.

Press the lock on both sides and detach plug connection.



13.

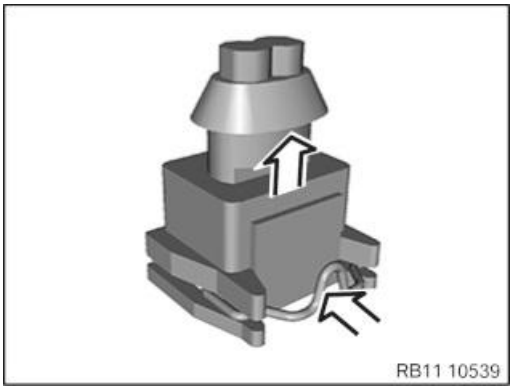
Press the lock and detach plug connection.



14.

Press lock and open release clip in direction of arrow.

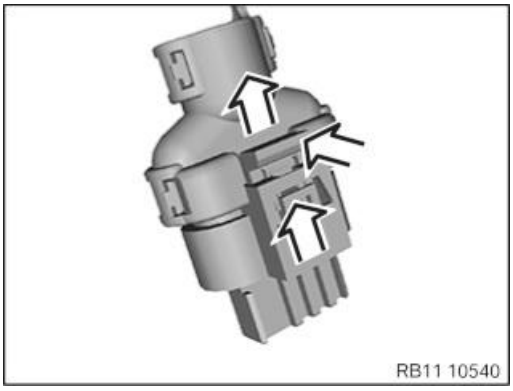
Disconnect plug connection.



15.

Press the lock and detach plug connection.

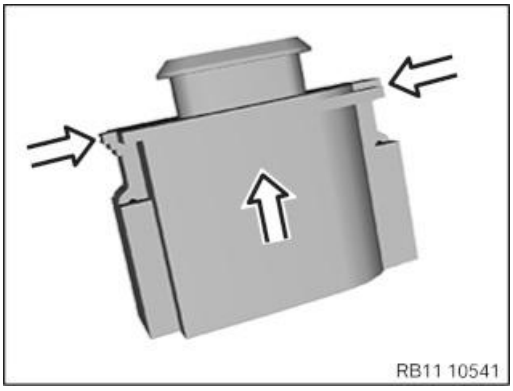
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16.

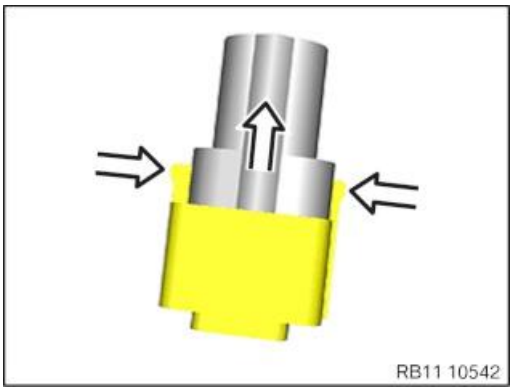
Pull out lock and press.

Disconnect plug connection.



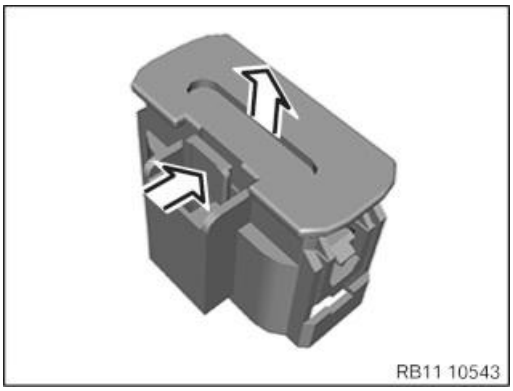
17.

Press the lock and detach plug connection.



18.

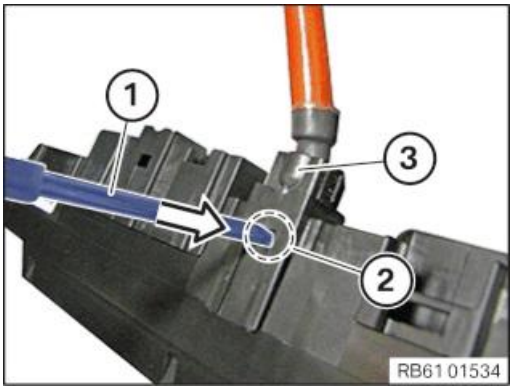
Press the lock and detach plug connection.



19.

Press the lock and detach plug connection.

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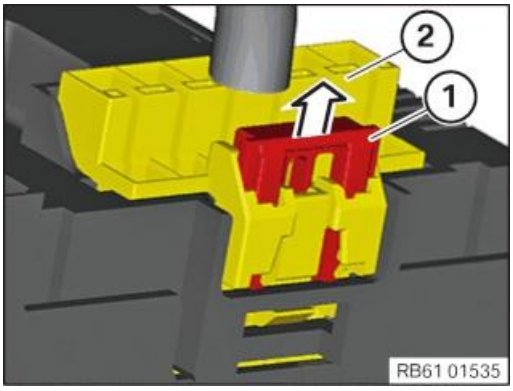


20.

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.

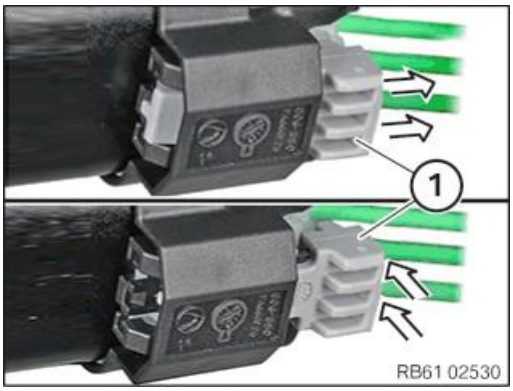


21.

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!

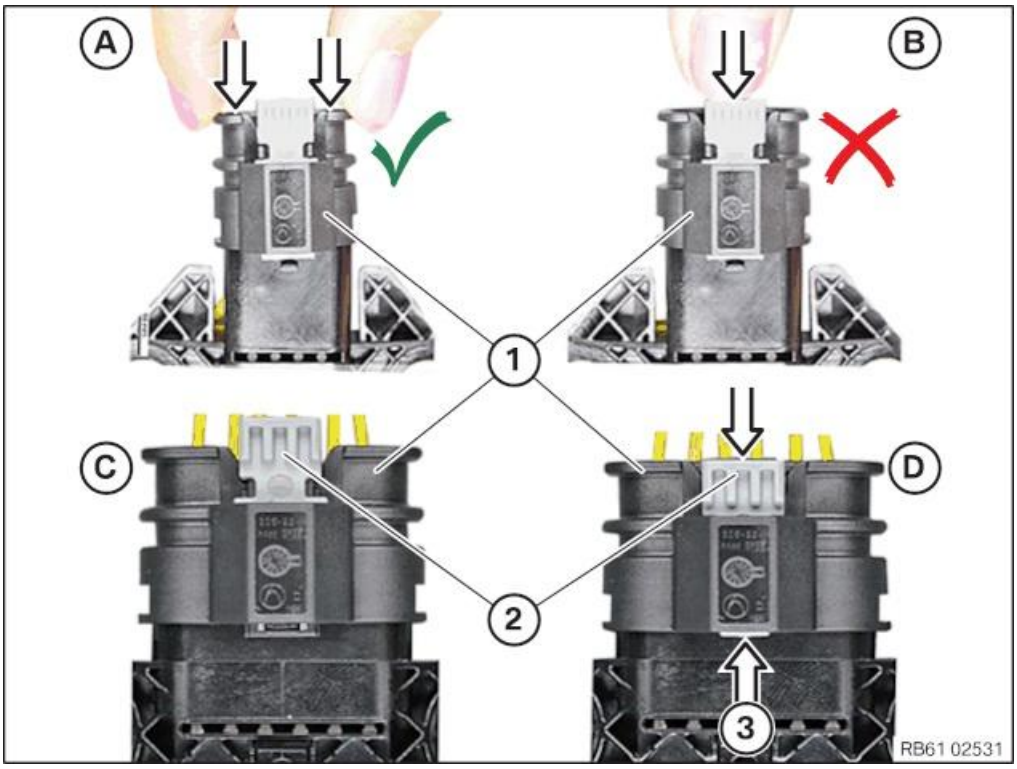
For this connector type, increased forces come into play when disconnecting and closing.

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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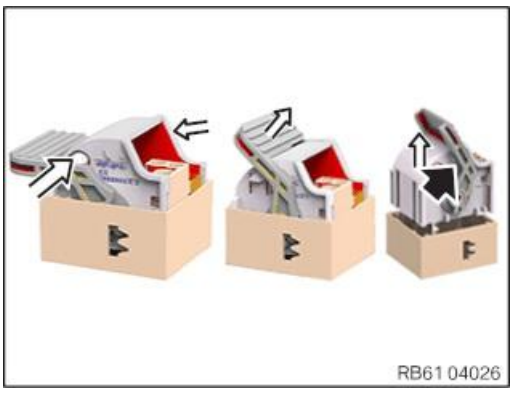


23.

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:

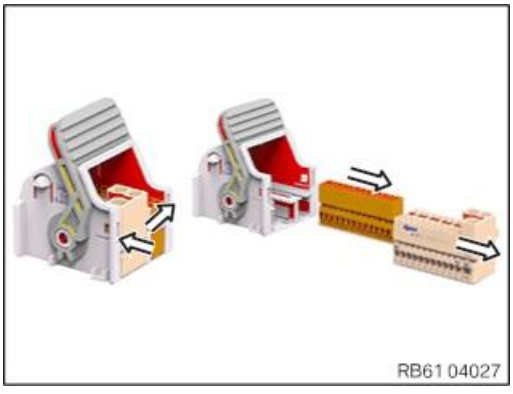


24.

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.

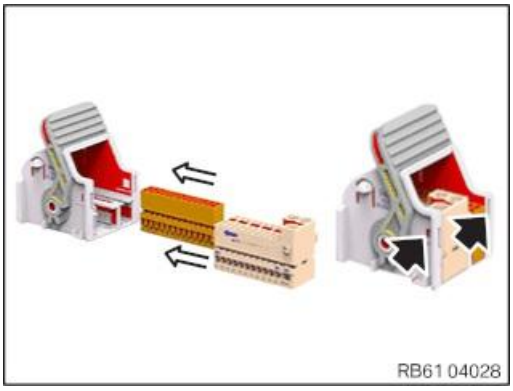
Once the lever is locked in the end position, remove plug connection upwards.



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

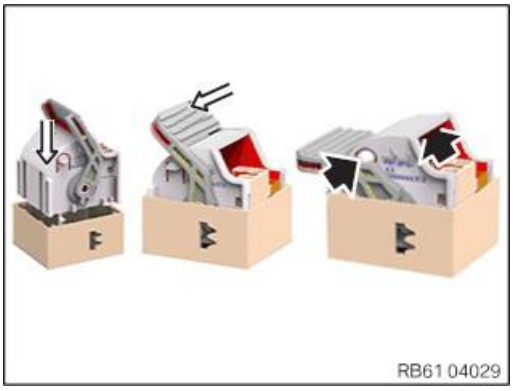
Slide out after unlocking the socket housing.

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Slide in socket housing up to limit position.

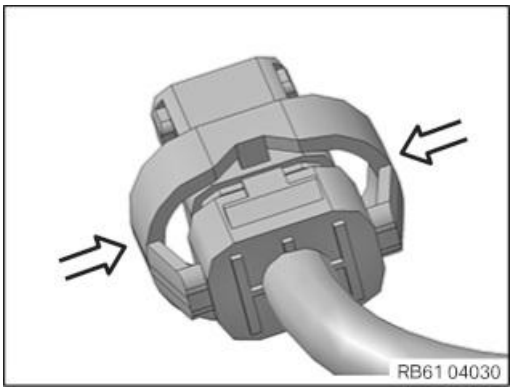
Lock socket housing into place in end position.



Sliding in up to limit position.

Activate plug-inn procedure by moving lever downwards.

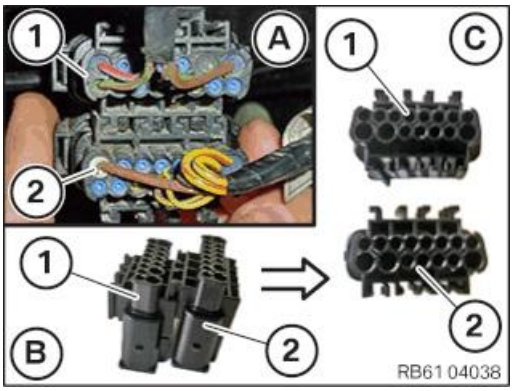
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.



25.

Rosenberger D4S20G-400A5-Y

Press to unlock on both sides.

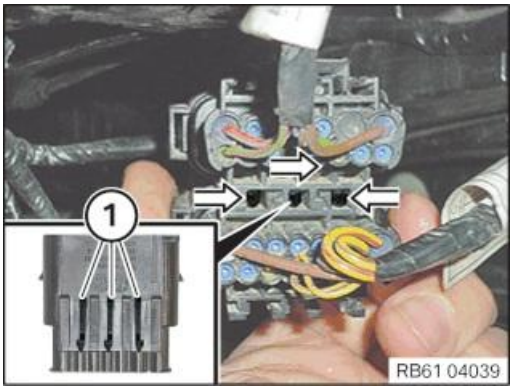


26.

Pin housing, 15-pinMLK1

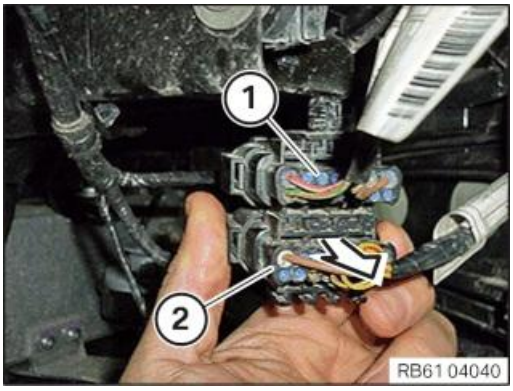
- A & B. To avoid any damage to individual connectors, the given connector assembly consisting of several individual connectors (1) & (2) must be released before disconnecting the plug connection.
- C: released connector assembly

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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).

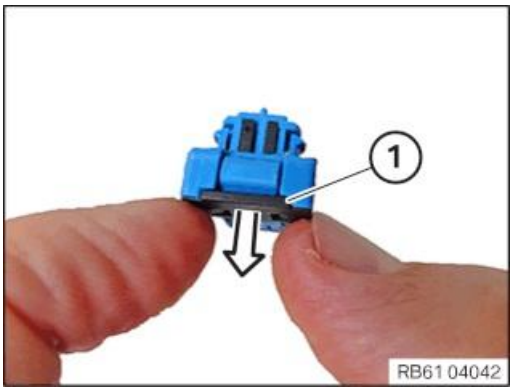


27.

Airbag ignition circuit connector

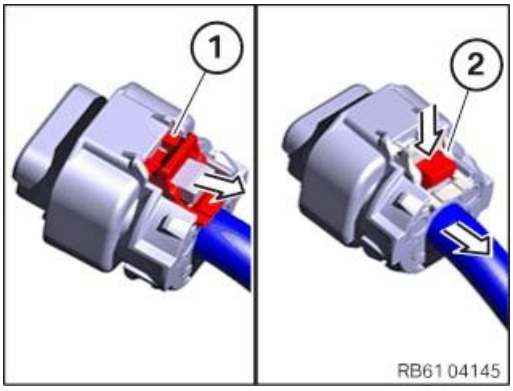
Warning!

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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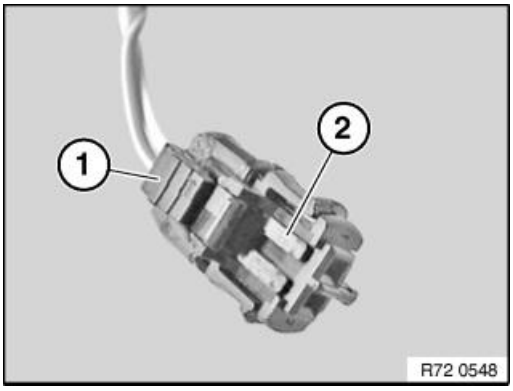


28.

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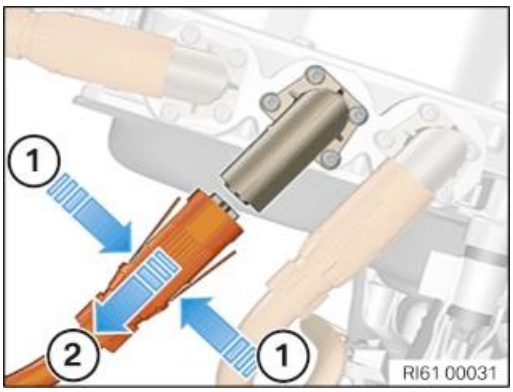
61 13 ... Unlocking and disconnecting various plug connections in electrical and hybrid vehicles



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:

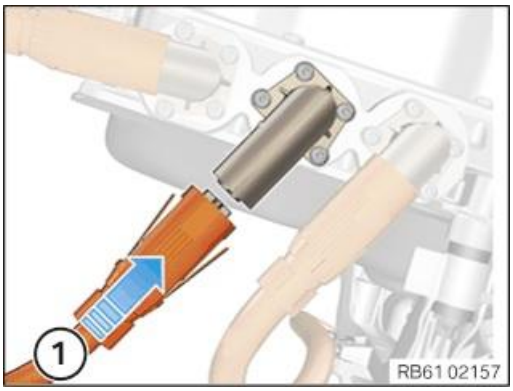
Press the lock (1) on the left and right on the connector in the direction of the arrow.

Pull off connector (2) in direction of arrow.

Attention!

Connector (2) is difficult to pull off.

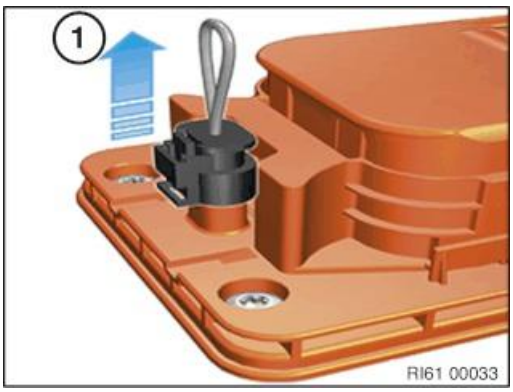
In the event of damage to high-voltage connector (2), the complete high-voltage cable must be replaced!



Connect the Hirschmann high-voltage connectors:

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

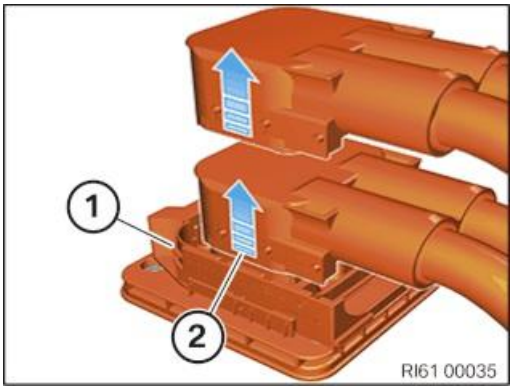
Note:
Connector (2) must lock audibly.



Disconnect the Kostal high-voltage connector:

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

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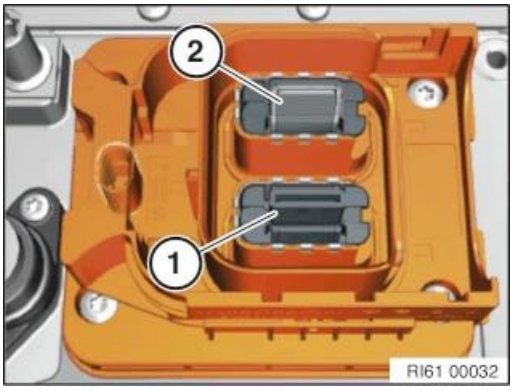
Push the lock (1) fully to the front.

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:

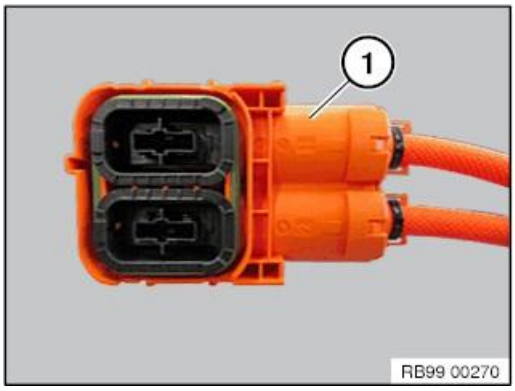
Check the touch protection for damage and correct positioning (1).

Warning!

Do not touch unprotected connector (2)!

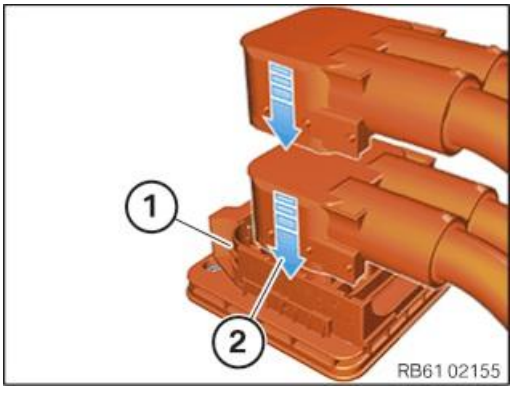
If the contact protection (1) has been pushed to the bottom (2), the high-voltage connector must be refitted.

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:

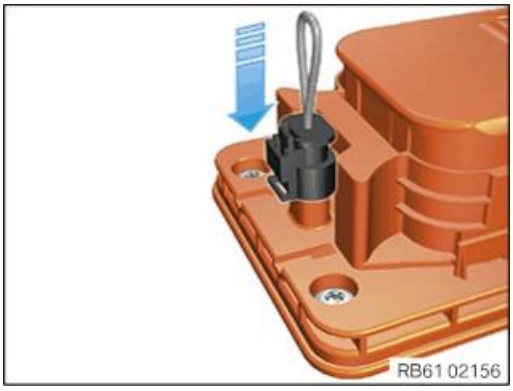
Connect the connector (2) in one single movement to the counter-housing.

Push the lock (1) fully to the rear.

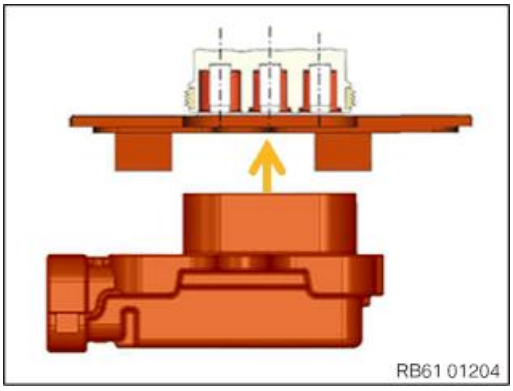
Attention!

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

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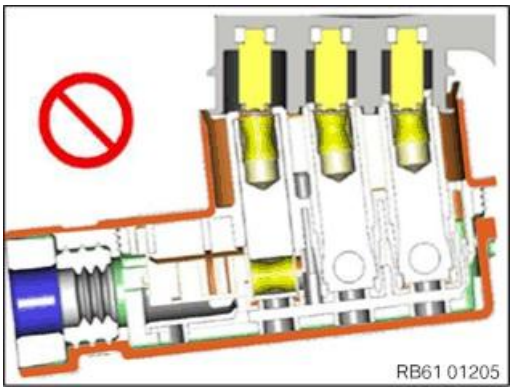


Connect the connector for the high-voltage interlock.



Three-phase high-voltage connector:

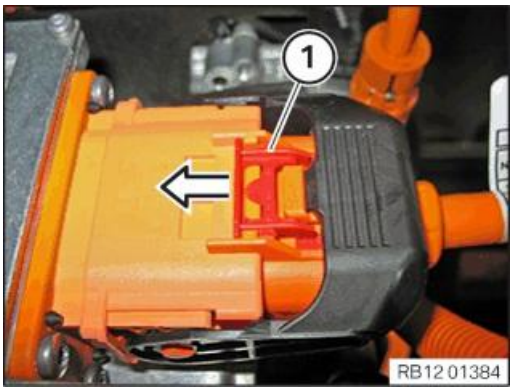
Connect and disconnect the connector straight.



Attention!

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

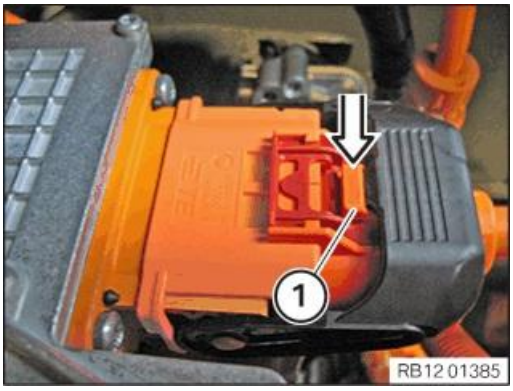
Increased tilted connections will increase the connecting force and the risk of danger.



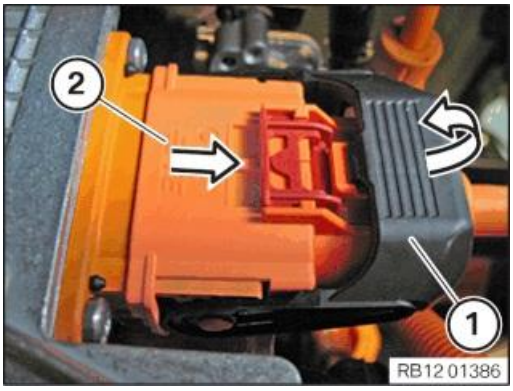
Disconnect the high-voltage connector from the high-voltage connection of the KLE:

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

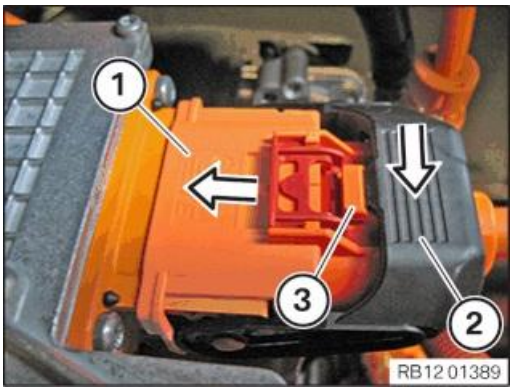
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Press lock (1).



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



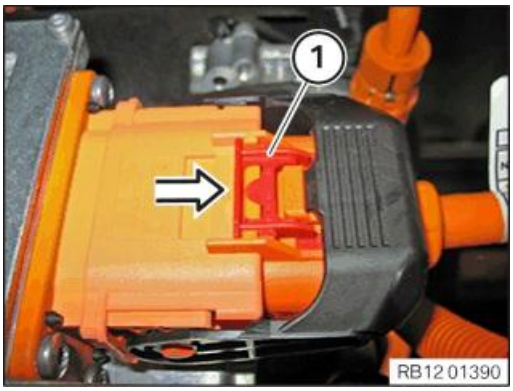
Connect the high-voltage connector to the high-voltage connection of the KLE:

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

Attention!

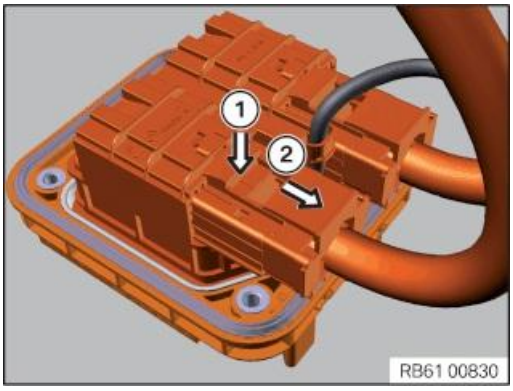
Lock (2) must snap audibly into place.

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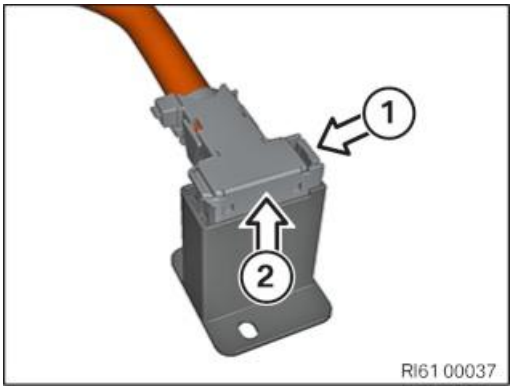
High-voltage connector on the high-voltage connection of the high-voltage battery unit:

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.



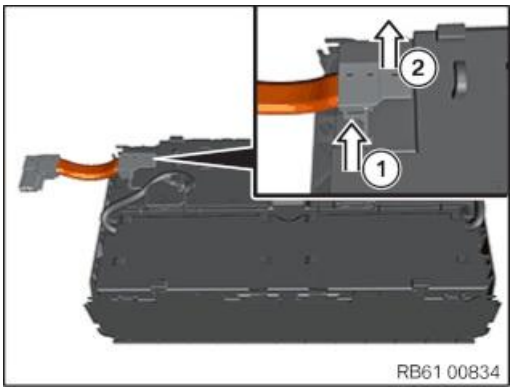
High-voltage connector on the cell module I01:

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.

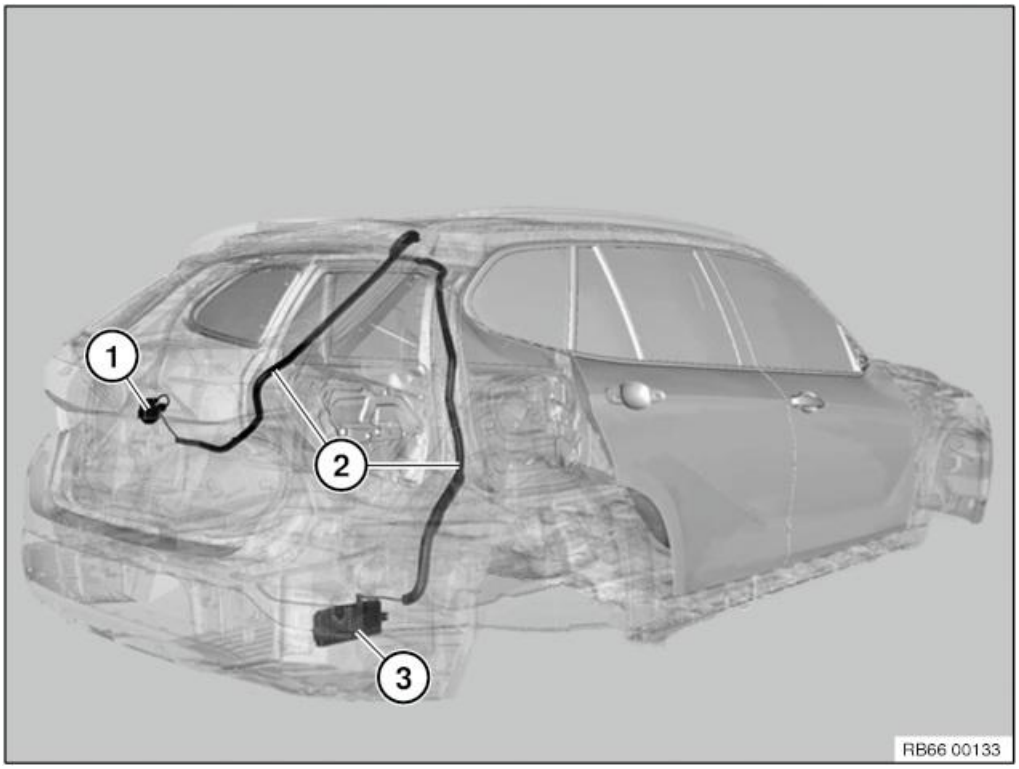
In this case, contact technical support.

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61 11 ... Installing repair cable for reversing camera

Read and comply with notes on handling wiring harnesses and cables.

Note:
Work is shown by way of example. There may be differences in detail in the case of other vehicle types and equipment specifications.



Remove trim panels.

Lay repair cable from reversing camera (1) along wiring harness (2) up to TRSVC control unit (3, middle slot) and secure sufficiently.

After successful completion of function check, detach start and end of faulty cable at first mounting point.

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61 11 ... Installing the positive battery terminal repair cable

Special tools required:

- 61 0 202
- 0 444 131

The repair instructions describe how to install the positive battery terminal repair cable (BMW Parts Department 9 283 498).

Read and comply with notes on handling wiring harnesses and wiring!

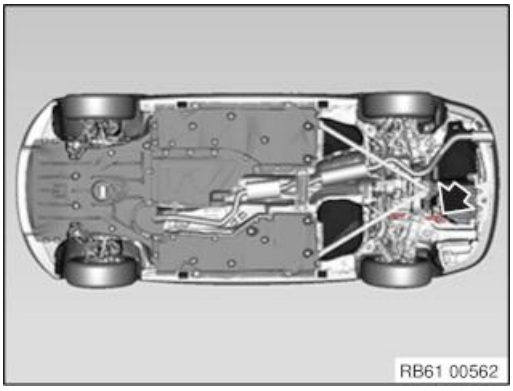
Read and comply with notes on crimping stops!

Necessary preliminary work:

- Disconnect the battery
- Remove the cover for the carbon canister if required

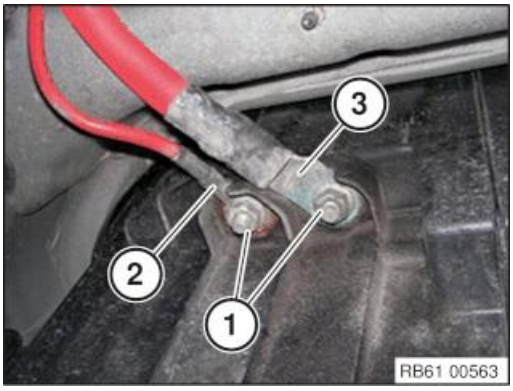
Work is shown on the E82 by way of example.

There may be differences in detail in the case of other vehicle types and equipment specifications.



The positive battery cable is fitted at the position marked with an arrow.

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Loosen both nuts (1) (tightening torque: 15 Nm).

Remove both positive battery cables (2, 3).

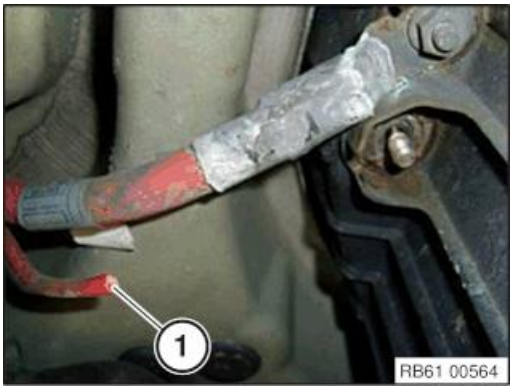
Installation note:
Before fastening the screw connection after successful repair work, clean both threaded bolts **and** the cable shoe of the thick positive battery cable (3), e.g. with brake cleaner.

Provide the cable shoe of the repaired positive battery cable (2) **and** the thick positive battery cable (3) **on both sides with ample grease**.

Only secure to the threaded bolt with nuts (1) **after greasing** both cable shoes (2, 3).

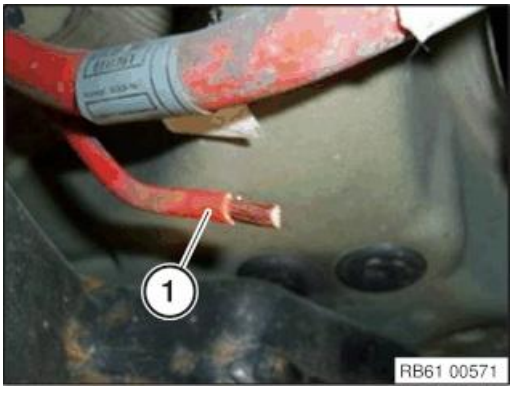
After installation, also **generously grease** the two nuts (1) and the threaded bolt.

(Grease part number: 2 295 229)



Measure out and mark a length of 100 mm on the positive battery cable (1).

Cut the positive battery cable (1) at the mark.

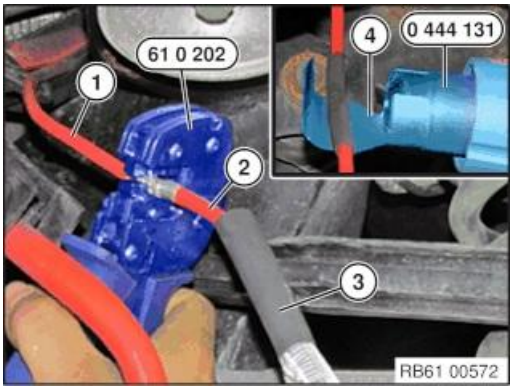


Measure out and mark a length of 12 mm on the positive battery cable (1).

Strip the insulation from the positive battery cable (1) at the mark.

Do not damage the strands during stripping!

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Attach the heat-shrink tubing (3) to the positive battery terminal repair cable (2).

Crimp the vehicle-side positive battery cable (1) and the positive battery terminal repair cable (2) using special tool 61 0 202 .

Position the heat-shrink tubing (3) centrally over the crimping point.

Shrink the heat-shrink tubing (3) with a hot air blower 0 444 131 at 400 °C. Use a heat-shrink tubing reflector (4)!

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61 11 ... Installing the repair cable for the positive battery cable of the power distribution box

Special tools required:

- 2 337 974
- 2 339 646
- 2 339 647
- 0 444 131

The repair instructions describe the installation of repair cables for positive battery terminal (BMW Group Parts Department 9 312 133).

Attention!
The repair instructions apply only to connected contacts!

Read and comply with notes on handling wiring harnesses and wiring!

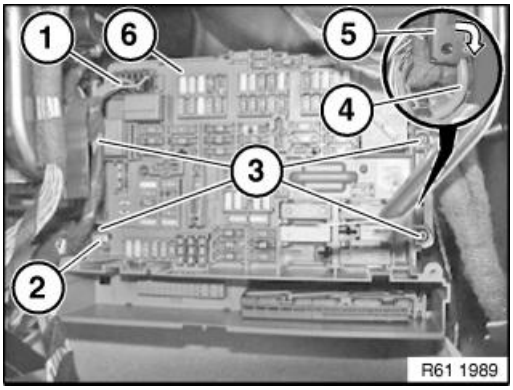
Read and comply with notes on crimping stops!

Necessary preliminary work:

Remove glove box.

Work is shown on the E90 by way of example.

There may be differences in detail in the case of other vehicle types and equipment specifications.



Disconnect plug connection (1).

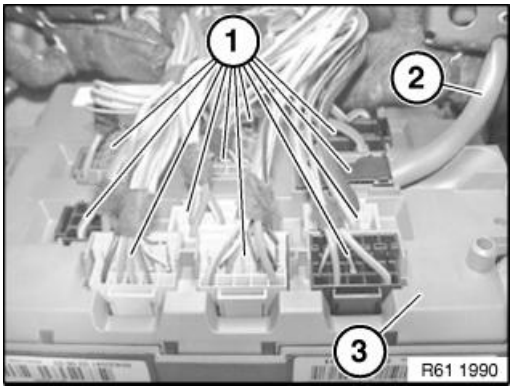
Release the wiring harness mounting (2) from the power distribution box (6).

Loosen screws (3).

Attention!
Risk of damage!

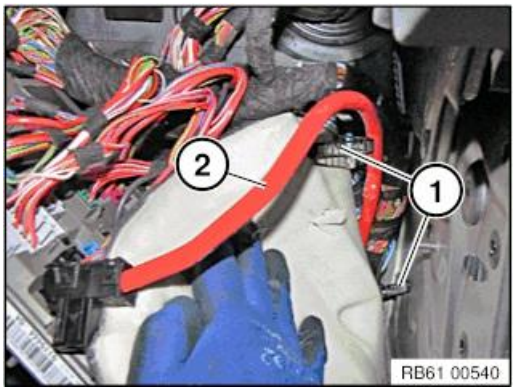
Fold the power distribution box (6) forward. Feed positive battery cable (4) out of holder (5) in the direction of the arrow.

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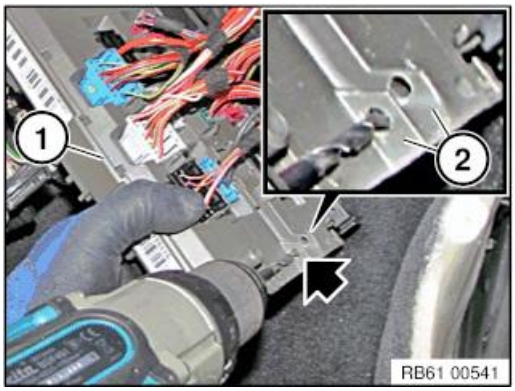


Disconnect the positive battery cable (2).

Extra plug connections (1) on the back of the power distribution box (3) must not be detached.

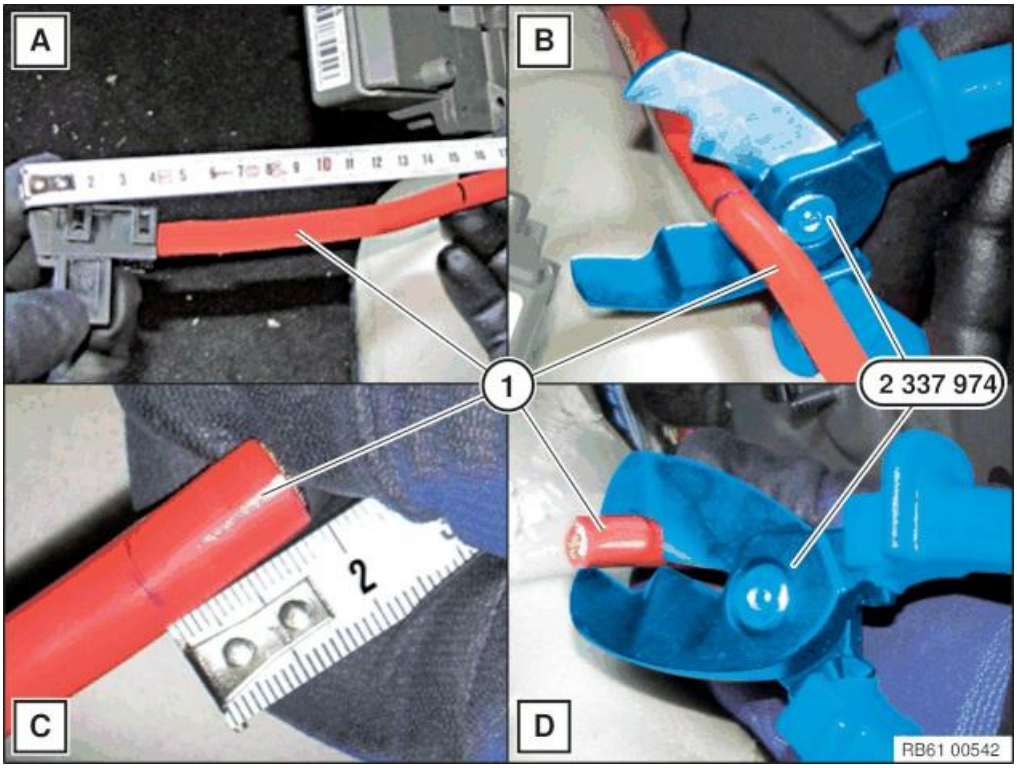


Open retaining straps (1). Pull out positive battery cable (2) as far as possible.



Predrill both bridges (2) of the power distribution box (1) at the area marked with an arrow with a 2 mm drill. Then drill through with a 5 mm drill.

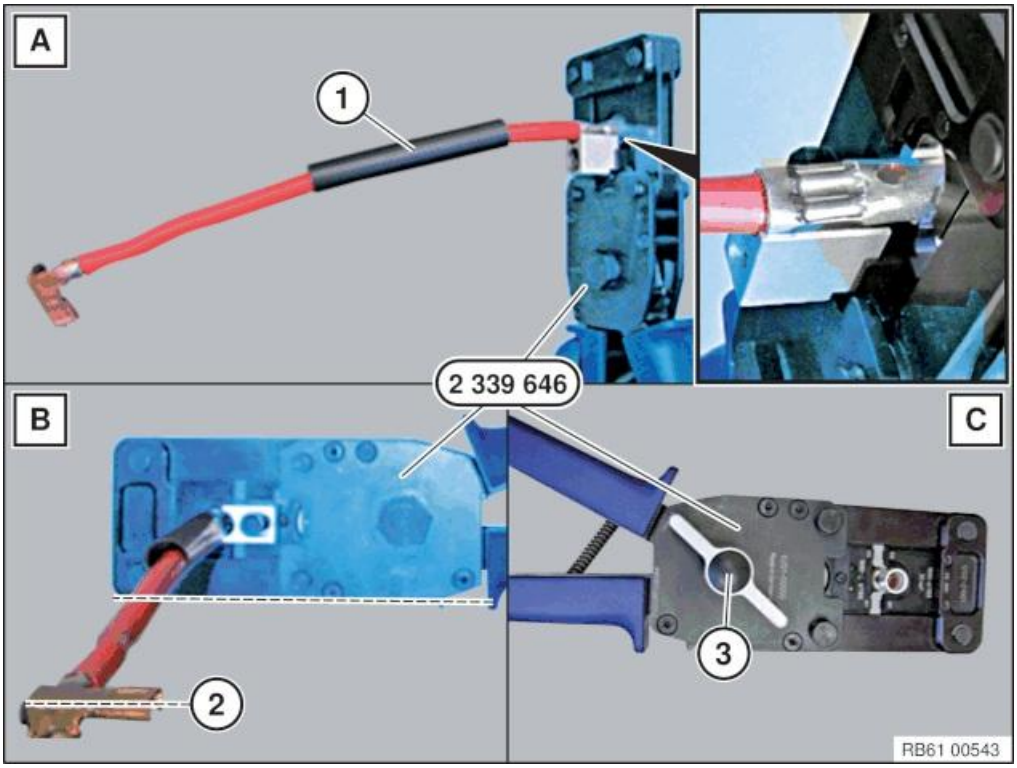
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A. Measure a 15 cm length as shown and mark on the positive battery cable (1).
B. Cut off the positive battery cable (1) at the marked location with special tool 2 337 974 .
C. At the cut-off end of the positive battery cable (1), measure and mark 2 cm.
D. Carefully strip insulation off of the positive battery cable (1) at the marked location with special tool 2 337 974 .

Do not damage the strands during stripping!

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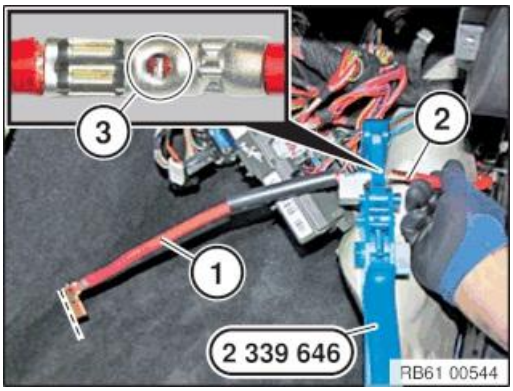


A. Attach heat-shrink tubing (1) to positive battery cable. Insert the positive battery cable in special tool 2 339 646 as shown.

(Pliers 2 339 646 , die plate 2 339 647)

B. Position the contact (2) as shown.

C. Close the special tool. Turn the screw plug (3) counter-clockwise and move it to the position shown.



Crimp the vehicle-side positive battery cable (2) and the repair positive battery cable (1) using the special tool 2 339 646 .

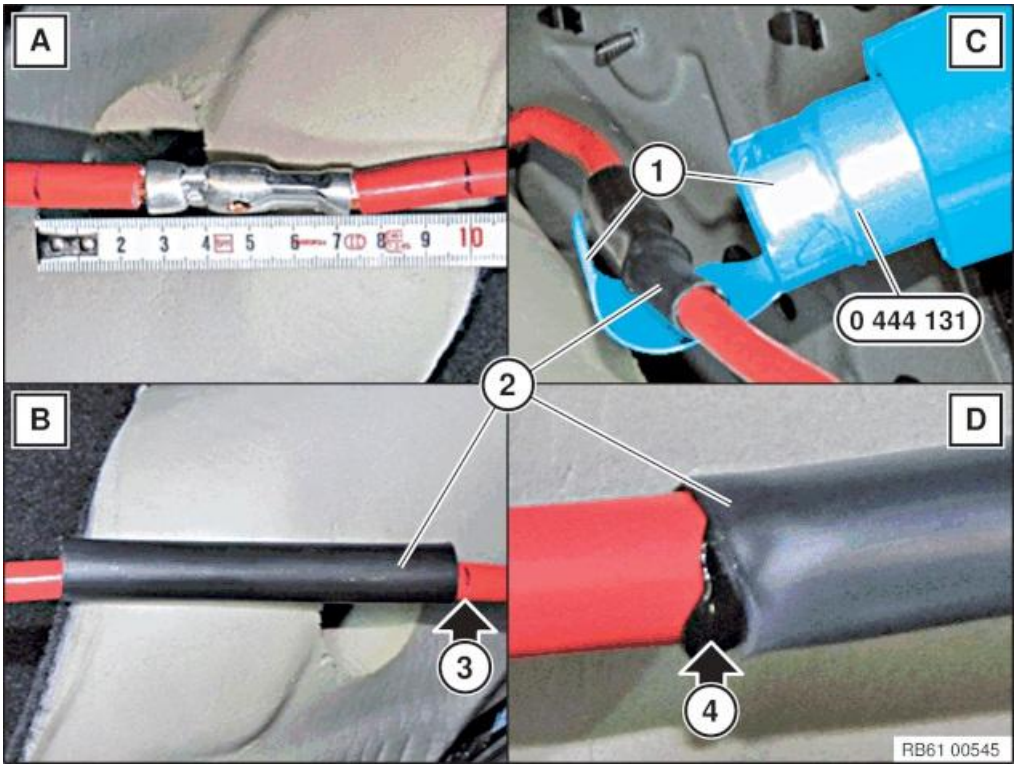
(Pliers 2 339 646 , die plate 2 339 647)

After crimping, copper wires of the vehicle-side positive battery cable (2) must be visible in the opening (3).

Pliers 2 339 646 must be operated approx. 20 times during the crimping process.

Crimping process is complete when pliers 2 339 646 automatically open.

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A. Centrally measure and mark distance = 10 cm as shown.

B. Position the heat-shrink tubing (2) over the crimping location so that mark (3) is must barely visible.

C. Shrink the heat-shrink tubing (2) with hot air blower 0 444 131 .

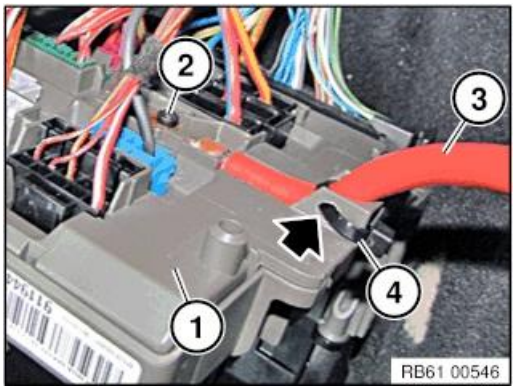
(Heat shrink temperature **400 °C**)

D. After shrinking, adhesive (4) must emerge from both sides of the heat-shrink tubing (2).

Attention!

Risk of damage!

It is imperative that you use a heat-shrink tubing reflector (1).



Connect the connector contact of repair positive battery cable (3) to power distribution box (1) by **pressing bolt (2)** all the way to the limit position.

Tighten screw (2). Tightening torque: 1,0 Nm

While tightening bolt (2), continue pushing down the connector contact.

After tightening, bolt (2) must be flush with the connector contact.

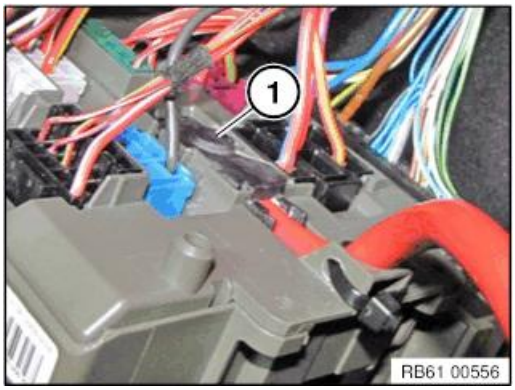
Separate the connector contact if bolt (2) has already been tightened:

Loosen bolt (2) by approx. 4 rotations. Using a suitable object, strike bolt (2) lightly to release the connector contact.

Remove the connector contact from power distribution box (1).

Fasten the repair positive battery cable (3) on the power distribution box (1) at the location indicated by the arrow using a cable strap (4).

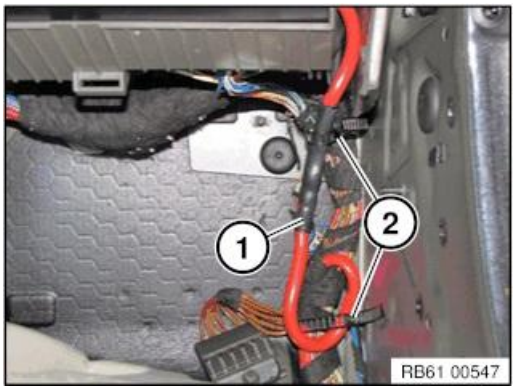
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Mount the cap (1) flush.

If cap (1) cannot be flush-mounted, the connector contact below it is not mounted correctly.

In this case, release the connector contact as described in the previous operation and connect it again.



Fasten the positive battery cable (1) at locations (2).

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



The following applies in general:

To avoid damage, observe the following instructions:

- Avoid compressive and tensile loads
- Make sure cables are laid without kinks or abrasions
- Ensure non-contacting routing at sharp-edged body parts; use edge protection if necessary
- Secure additionally laid cables/leads with cable ties

The following additionally applies:

Shielded lines

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

Coaxial lines

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

CVBS lines

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

HSD lines

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

Optical fibre cable:

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

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

Attention!

- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables 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.

Note:

- FlexRay lines may only reveal one separation point (bride); renew

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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.

Note:
Repair wiring harnesses can be equipped with an **additional socket housing** (e.g. 30-pin), **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):

- 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**

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separation point outside the vehicle interior.

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61 11 ... Repairing wiring harness for blower controller

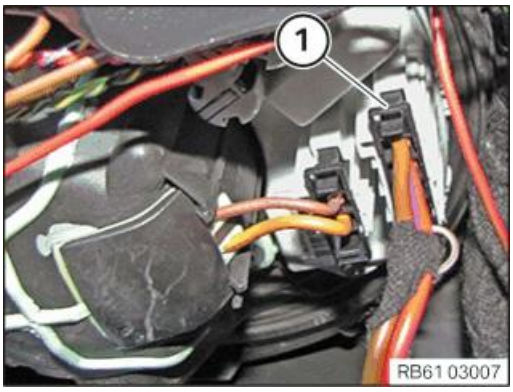
Special tools required:

- 2 221 122
- 0 495 324
- 0 496 464
- 0 494 159
- 0 495 555
- 0 496 833
- 0 444 131

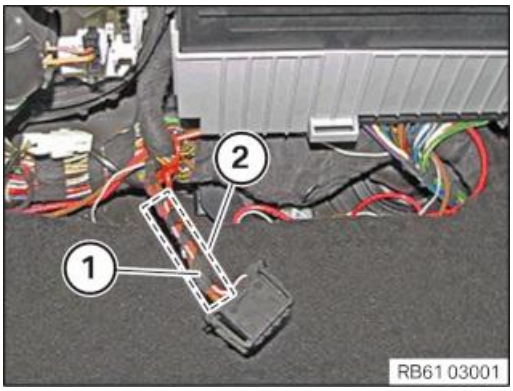
Read and comply with notes on handling wiring harnesses and wiring!

Necessary preliminary work:

- Disconnecting the battery earth lead
- Remove instrument panel trim, bottom right

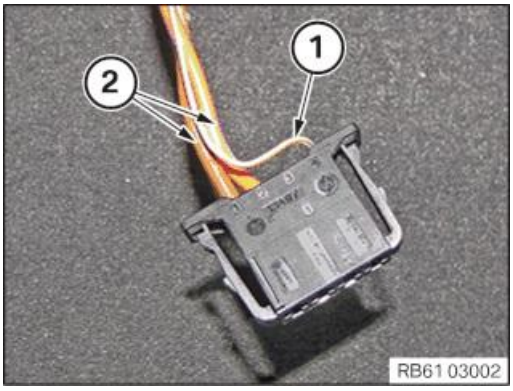


Disconnect plug connection (1).



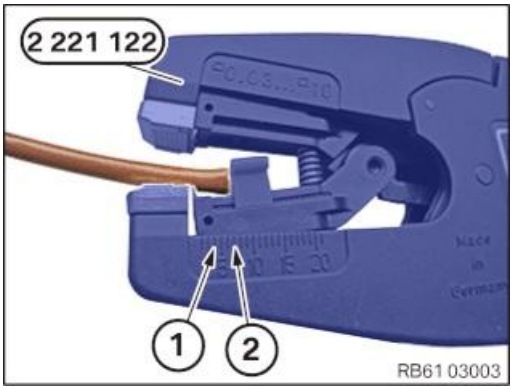
Remove insulating tape (1) in the area (2) carefully.

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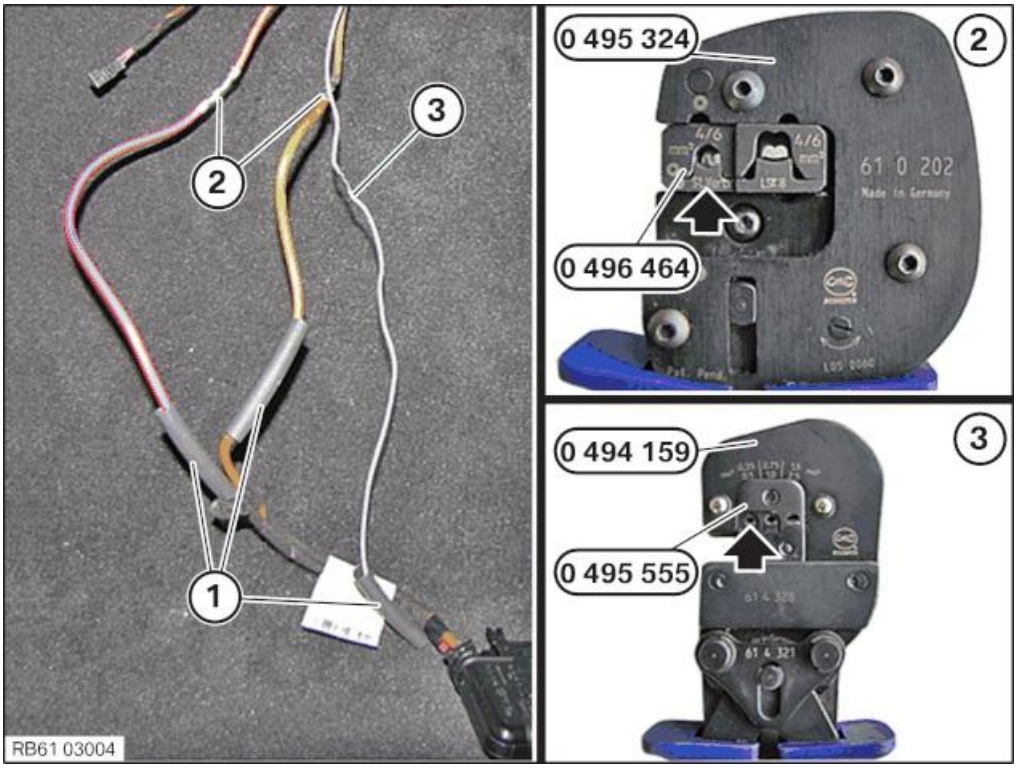
Disconnect thin line (1) at point indicated by arrow.

Disconnect thick lines (2) at point indicated by arrow.



Strip approx. 4 mm (1) insulation off thin line using insulation strippers 2 221 122 .

Strip approx. 7 mm (2) insulation off thick lines using insulation strippers 2 221 122 .



Caution!
Only the crimping pliers shown may be used for crimping!

Slide heat-shrink tubing (1) over it.

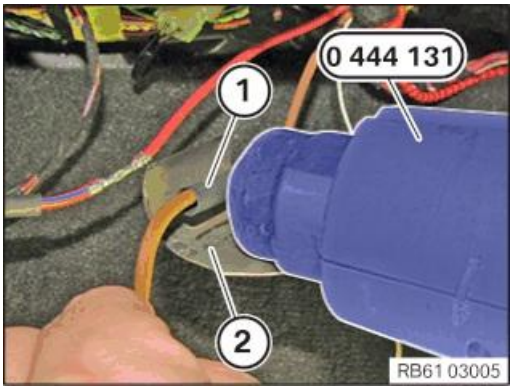
Crimp thick lines (2) using crimping pliers 0 495 324 (matrix 0 496 464).

Use opening marked by an arrow for crimping.

Crimp thin line (3) using crimping pliers 0 494 159 (die 0 495 555 earlier designation, 0 496 833 current designation).

Use opening marked by an arrow for crimping.

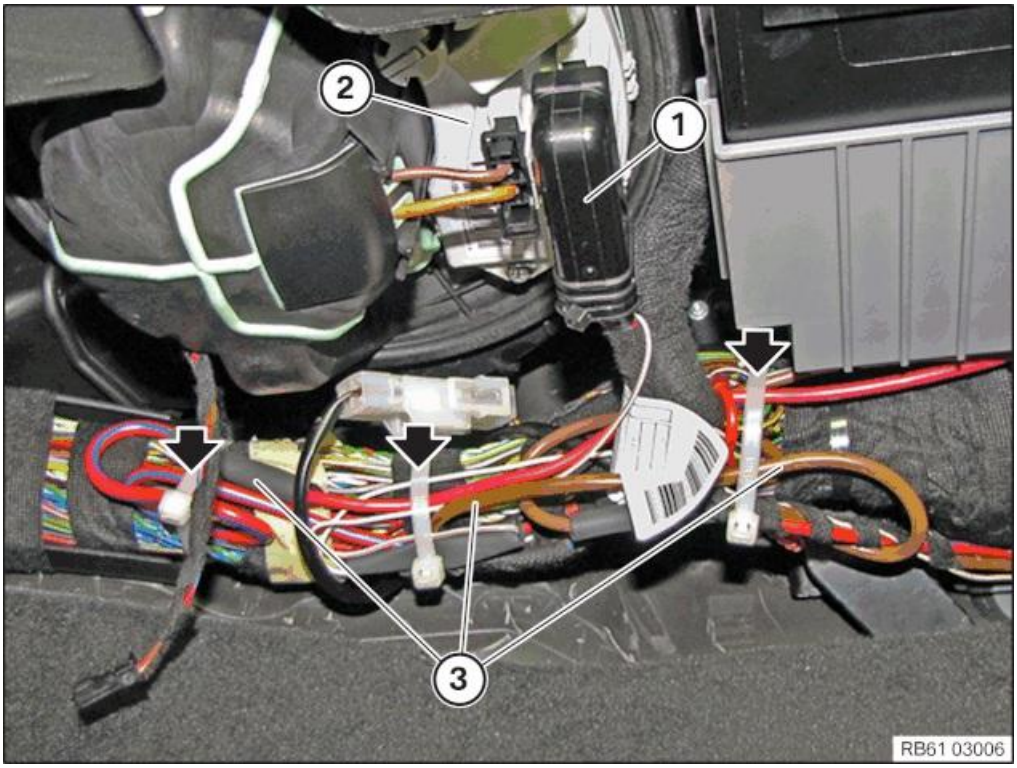
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Position heat-shrink tubing (1) centrally over the crimping point.

Shrink the heat-shrink tubing (1) with a hot air blower 0 444 131 at 400 °C. Use a heat-shrink tubing reflector (2)!

Repeat the procedure for all three lines.



Close plug connection (1) on the controller for blower (2).

Route possible excess length of the repair cable (3) as shown and secure it to positions marked with an arrow using cable straps.

Caution!
Risk of damage!

Route repair cable in such a way that the thin line is not under voltage.

Add final details to vehicle:

- Only right-hand drive vehicle with Bluetooth aerial: Remounting Bluetooth aerial
- Installing the bottom right instrument panel trim
- Connecting the battery earth lead

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61 11 ... Replacing wiring harness for blower controller

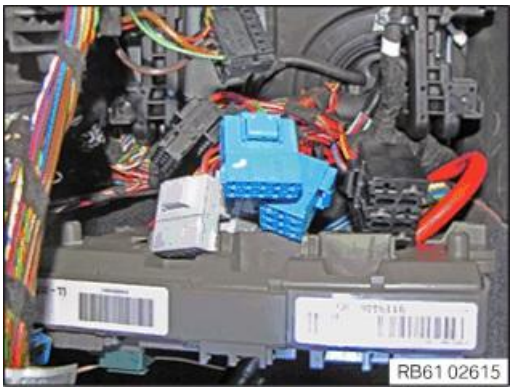
Special tools required:

- 0 495 399
- 0 495 324
- 0 496 833
- 0 444 131

Read and comply with notes on handling wiring harnesses and wiring!

Necessary preliminary work:

- Disconnecting the battery earth lead
- Remove instrument panel trim, bottom right
- Remove glove box
- Remove junction box



Remove fuse box as far as shown.

Vehicles with production date up to 03/2007:

Installation location of the connector X11007

Unpin the pin 6 from the connector X11017 using special tool 0 495 399 .

Disconnect the unpinned pin from vehicle side cable.

Secure remainder of vehicle cable.

Pin the pin from the repair cable at pin 6.

Vehicles with production date from 03/2007:

Installation location of the connector X11011

Unpin the pin 2 from the connector X11011 using special tool 0 495 399 .

Disconnect the unpinned pin from vehicle side cable.

Secure remainder of vehicle cable.

Pin the pin from the repair cable at pin 2.

Note:
Depending on the equipment specification, the repair cable can have the following colours:

- red
- red/blue

Connect all plug connections on the fuse box.

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Caution!

Caution! Risk of damage on sharp-edged clip (2)!

Route and secure red repair cable (1) as illustrated.

Install fuse box.



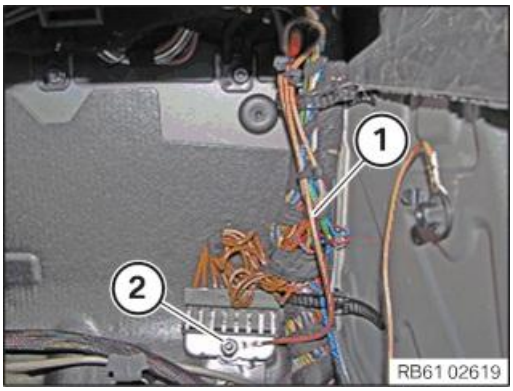
Cut the thin cable (1) through from the vehicle-side vehicle wiring harness at the place marked with the arrow and strip insulation.

Push the heat-shrink tubing over it prior to crimping.

Crimp the thin cable (1) to the same cable from the repair wiring harness using crimping pliers 0 495 324 (matrix 0 496 833).

Position the heat-shrink tubing at the centre of the crimping location.

Shrink heat-shrink tubing with hot air blower 0 444 131 set to 400°C. Use a heat-shrink tubing reflector.

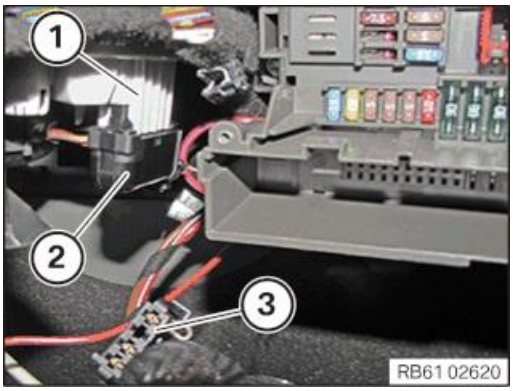


Carefully lift carpet in the passenger footwell.

Route and secure grounding cable (1) from repair cable as illustrated.

Secure grounding cable (1) at point (2) with nut (2).

Tightening torque: 8 Nm



Connect plug connection (2) from the repair wiring harness on the controller for the blower (1).

Disconnect plug connection (3) from vehicle wiring harness, secure cable.

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Add final details to vehicle:

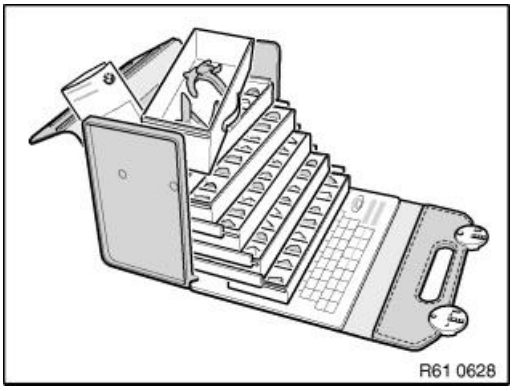
- Install junction box
- Install glove box
- Only right-hand drive vehicle with Bluetooth aerial: Remounting Bluetooth aerial
- Installing the bottom right instrument panel trim
- Connecting the battery earth lead

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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



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

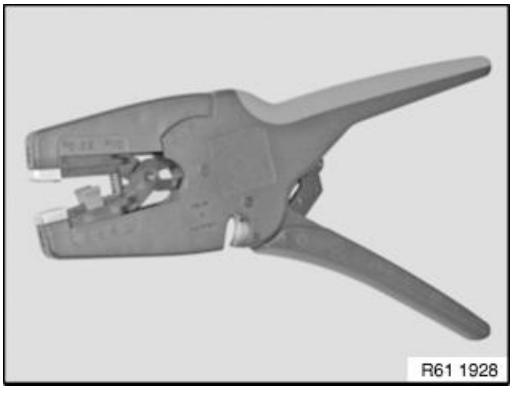


Release and press-out tool:

- Special tool61 0 300
- Special tool 61 0 400 (MINI N12/N14)
- Special tool 61 1 100 (engine)

Handling:

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



Cutting to length and stripping insulation from cables:

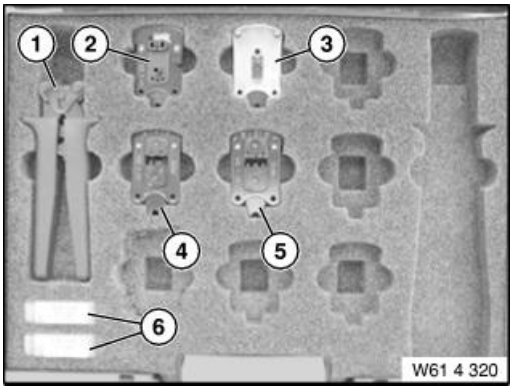
Wire stripper MultiStrip10*

*Sourcing reference BMW Workshop Equipment Catalogue

Handling:

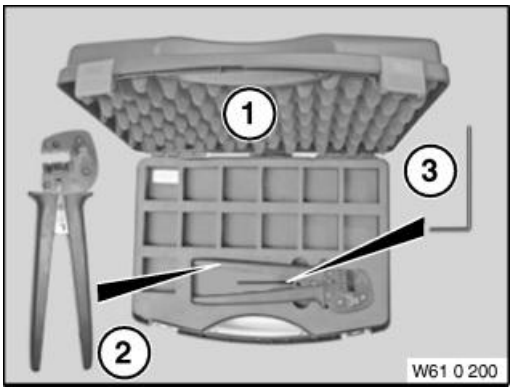
- Cutting cables to length and strip insulation

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Crimping stop parts (small contacts) and butt connectors:

- Special tool61 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 set)
- 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.

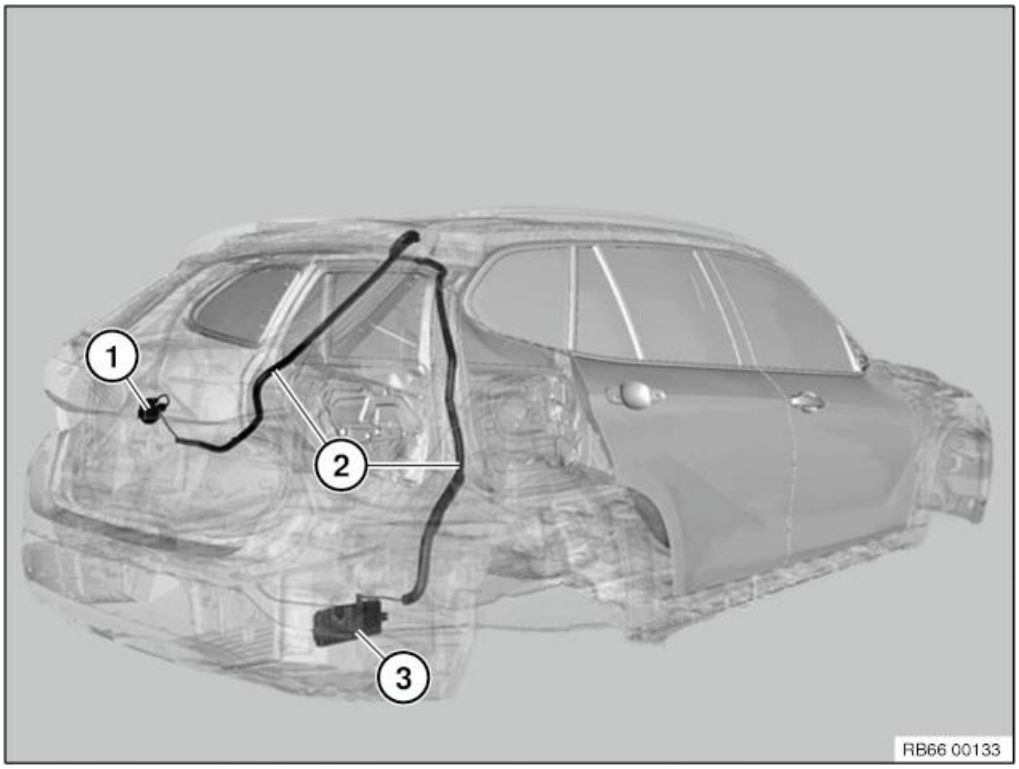
- A battery can be drained (e.g. with lights or radio switched on) even when the IBS functions perfectly in conjunction with power management.
- **For this reason, only exchange the IBS when there is a corresponding fault code entry!**

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61 11 ... Installing repair cable for reversing camera

Read and comply with notes on handling wiring harnesses and cables.

Note:
Work is shown by way of example. There may be differences in detail in the case of other vehicle types and equipment specifications.



Remove trim panels.

Lay repair cable from reversing camera (1) along wiring harness (2) up to TRSVC control unit (3, middle slot) and secure sufficiently.

After successful completion of function check, detach start and end of faulty cable at first mounting point.

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61 11 ... Installing the positive battery terminal repair cable

Special tools required:

- 61 0 202
- 0 444 131

The repair instructions describe how to install the positive battery terminal repair cable (BMW Parts Department 9 283 498).

Read and comply with notes on handling wiring harnesses and wiring!

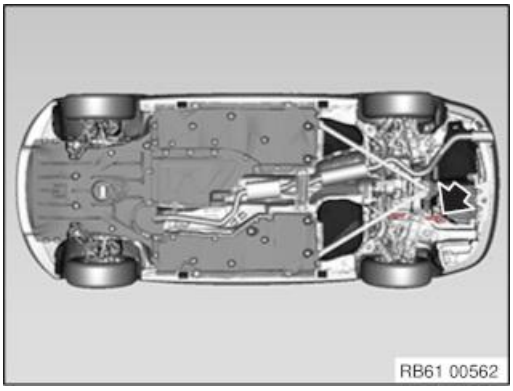
Read and comply with notes on crimping stops!

Necessary preliminary work:

- Disconnect the battery
- Remove the cover for the carbon canister if required

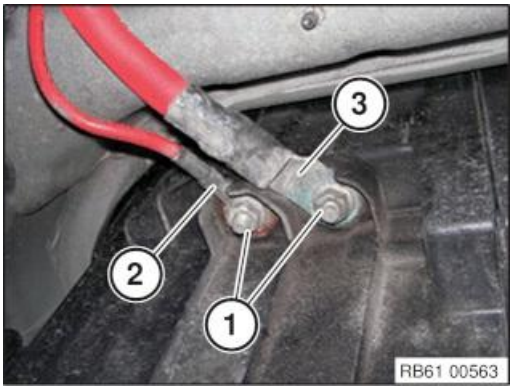
Work is shown on the E82 by way of example.

There may be differences in detail in the case of other vehicle types and equipment specifications.



The positive battery cable is fitted at the position marked with an arrow.

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Loosen both nuts (1) (tightening torque: 15 Nm).

Remove both positive battery cables (2, 3).

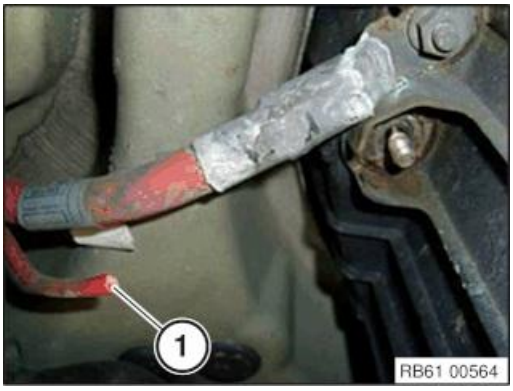
Installation note:
Before fastening the screw connection after successful repair work, clean both threaded bolts **and** the cable shoe of the thick positive battery cable (3), e.g. with brake cleaner.

Provide the cable shoe of the repaired positive battery cable (2) **and** the thick positive battery cable (3) **on both sides with ample grease**.

Only secure to the threaded bolt with nuts (1) **after greasing** both cable shoes (2, 3).

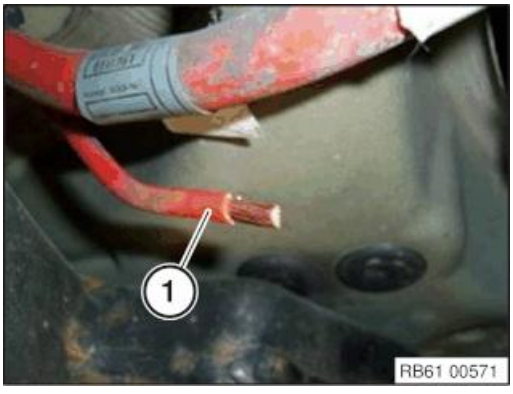
After installation, also **generously grease** the two nuts (1) and the threaded bolt.

(Grease part number: 2 295 229)



Measure out and mark a length of 100 mm on the positive battery cable (1).

Cut the positive battery cable (1) at the mark.

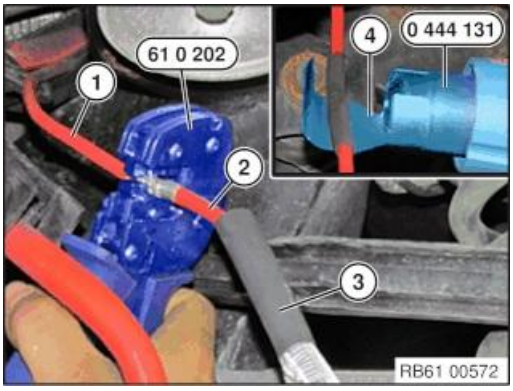


Measure out and mark a length of 12 mm on the positive battery cable (1).

Strip the insulation from the positive battery cable (1) at the mark.

Do not damage the strands during stripping!

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Attach the heat-shrink tubing (3) to the positive battery terminal repair cable (2).

Crimp the vehicle-side positive battery cable (1) and the positive battery terminal repair cable (2) using special tool 61 0 202 .

Position the heat-shrink tubing (3) centrally over the crimping point.

Shrink the heat-shrink tubing (3) with a hot air blower 0 444 131 at 400 °C. Use a heat-shrink tubing reflector (4)!

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61 11 ... Installing the repair cable for the positive battery cable of the power distribution box

Special tools required:

- 2 337 974
- 2 339 646
- 2 339 647
- 0 444 131

The repair instructions describe the installation of repair cables for positive battery terminal (BMW Group Parts Department 9 312 133).

Attention!
The repair instructions apply only to connected contacts!

Read and comply with notes on handling wiring harnesses and wiring!

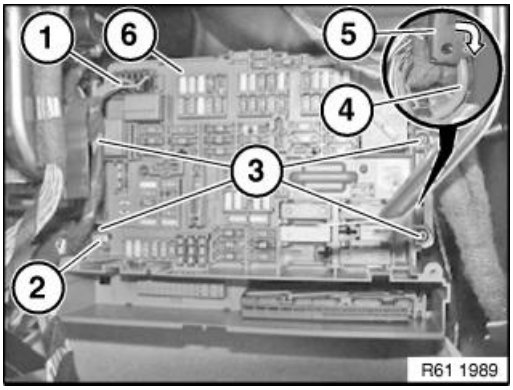
Read and comply with notes on crimping stops!

Necessary preliminary work:

Remove glove box.

Work is shown on the E90 by way of example.

There may be differences in detail in the case of other vehicle types and equipment specifications.



Disconnect plug connection (1).

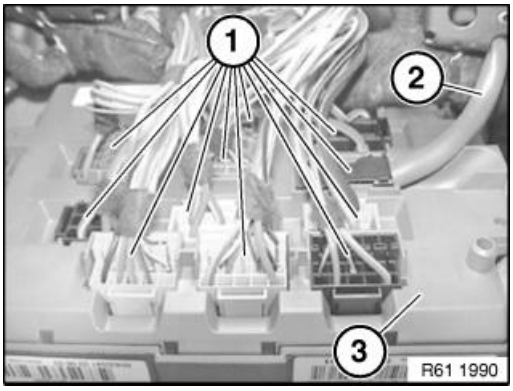
Release the wiring harness mounting (2) from the power distribution box (6).

Loosen screws (3).

Attention!
Risk of damage!

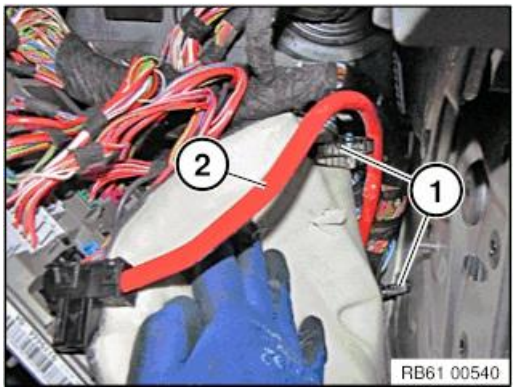
Fold the power distribution box (6) forward. Feed positive battery cable (4) out of holder (5) in the direction of the arrow.

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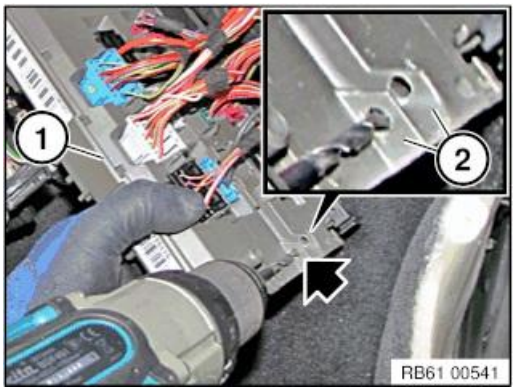


Disconnect the positive battery cable (2).

Extra plug connections (1) on the back of the power distribution box (3) must not be detached.

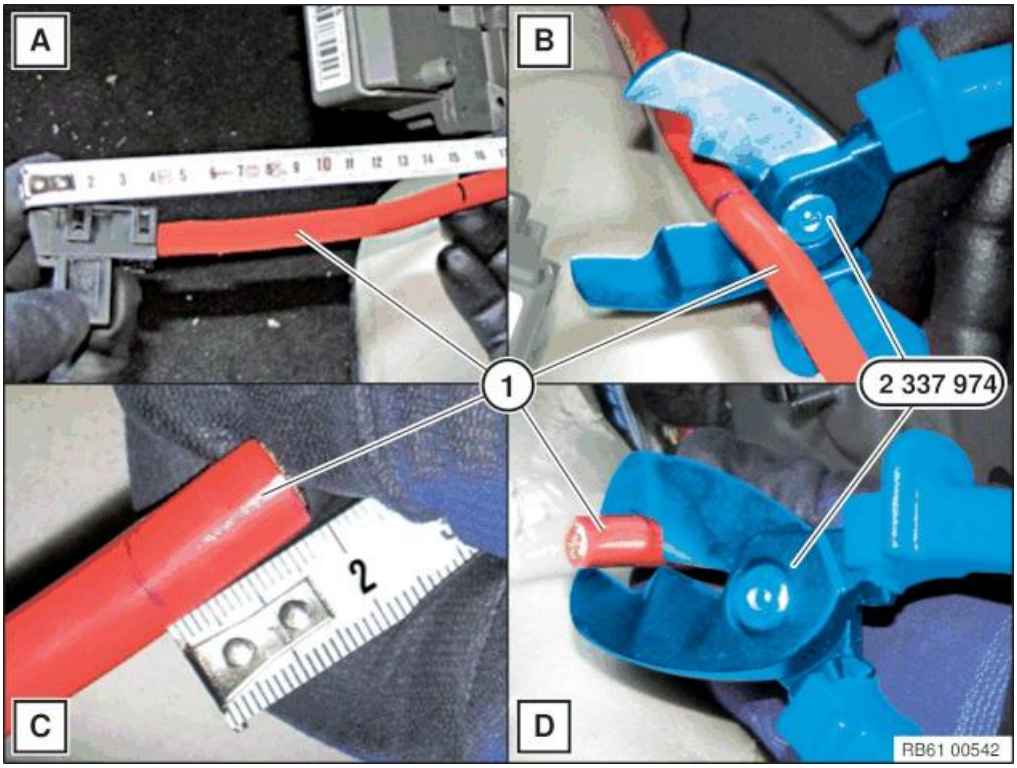


Open retaining straps (1). Pull out positive battery cable (2) as far as possible.



Predrill both bridges (2) of the power distribution box (1) at the area marked with an arrow with a 2 mm drill. Then drill through with a 5 mm drill.

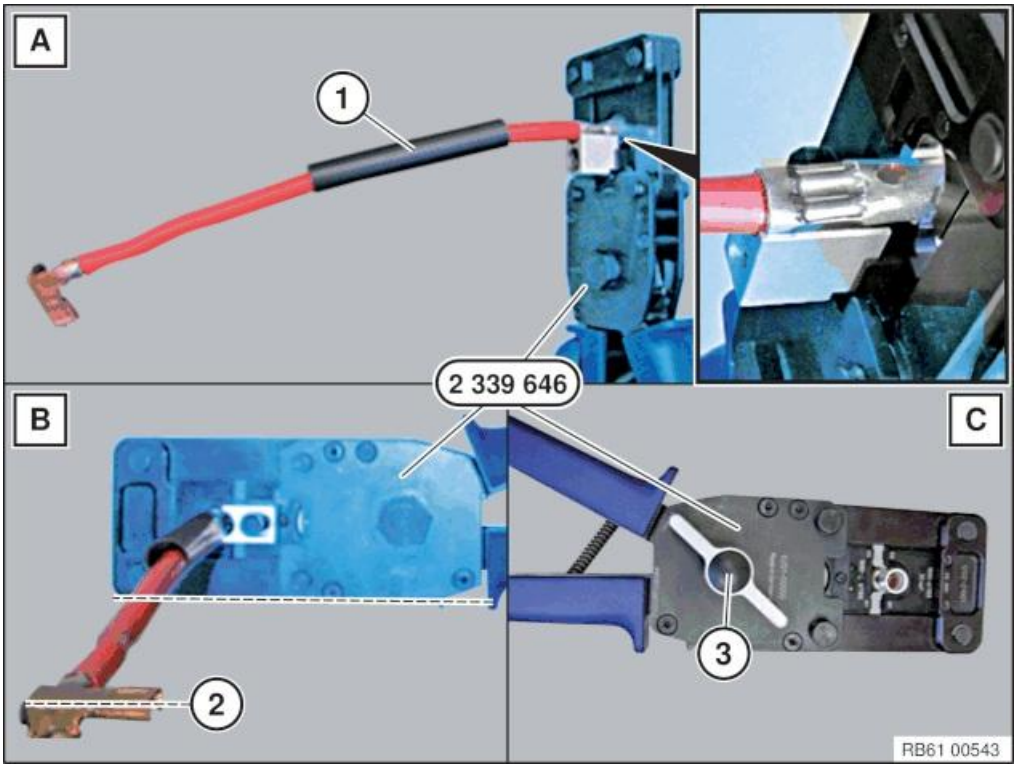
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A. Measure a 15 cm length as shown and mark on the positive battery cable (1).
B. Cut off the positive battery cable (1) at the marked location with special tool 2 337 974 .
C. At the cut-off end of the positive battery cable (1), measure and mark 2 cm.
D. Carefully strip insulation off of the positive battery cable (1) at the marked location with special tool 2 337 974 .

Do not damage the strands during stripping!

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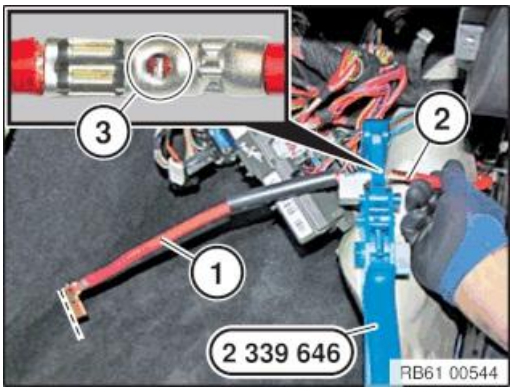


A. Attach heat-shrink tubing (1) to positive battery cable. Insert the positive battery cable in special tool 2 339 646 as shown.

(Pliers 2 339 646 , die plate 2 339 647)

B. Position the contact (2) as shown.

C. Close the special tool. Turn the screw plug (3) counter-clockwise and move it to the position shown.



Crimp the vehicle-side positive battery cable (2) and the repair positive battery cable (1) using the special tool 2 339 646 .

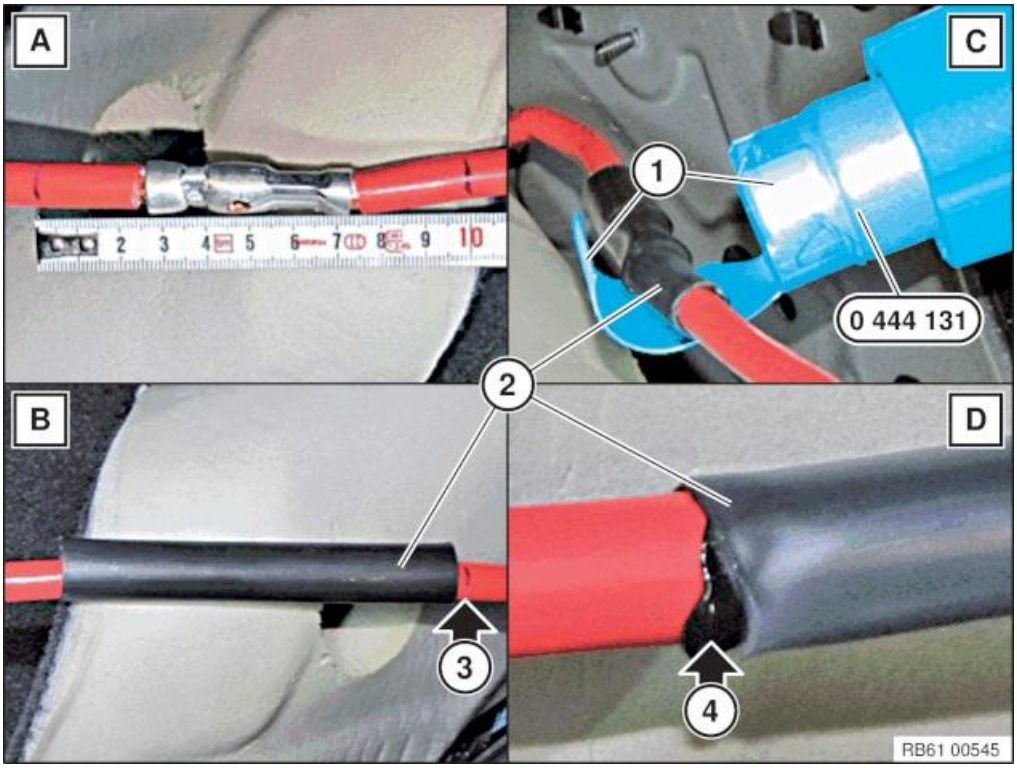
(Pliers 2 339 646 , die plate 2 339 647)

After crimping, copper wires of the vehicle-side positive battery cable (2) must be visible in the opening (3).

Pliers 2 339 646 must be operated approx. 20 times during the crimping process.

Crimping process is complete when pliers 2 339 646 automatically open.

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A. Centrally measure and mark distance = 10 cm as shown.

B. Position the heat-shrink tubing (2) over the crimping location so that mark (3) is must barely visible.

C. Shrink the heat-shrink tubing (2) with hot air blower 0 444 131 .

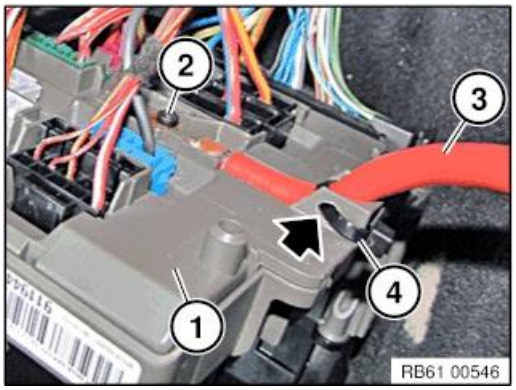
(Heat shrink temperature **400 °C**)

D. After shrinking, adhesive (4) must emerge from both sides of the heat-shrink tubing (2).

Attention!

Risk of damage!

It is imperative that you use a heat-shrink tubing reflector (1).



Connect the connector contact of repair positive battery cable (3) to power distribution box (1) by **pressing bolt (2)** all the way to the limit position.

Tighten screw (2). Tightening torque: 1,0 Nm

While tightening bolt (2), continue pushing down the connector contact.

After tightening, bolt (2) must be flush with the connector contact.

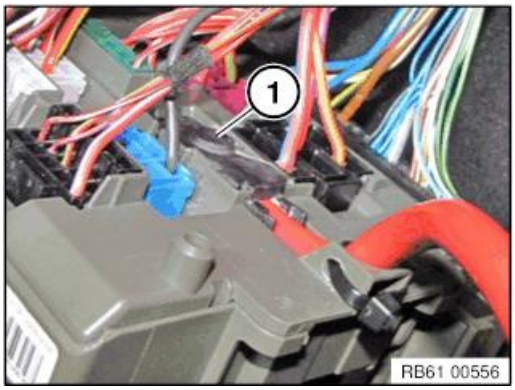
Separate the connector contact if bolt (2) has already been tightened:

Loosen bolt (2) by approx. 4 rotations. Using a suitable object, strike bolt (2) lightly to release the connector contact.

Remove the connector contact from power distribution box (1).

Fasten the repair positive battery cable (3) on the power distribution box (1) at the location indicated by the arrow using a cable strap (4).

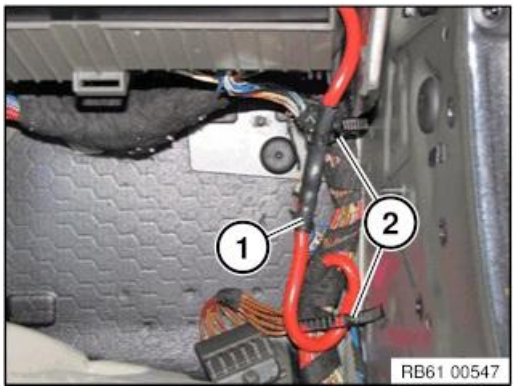
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Mount the cap (1) flush.

If cap (1) cannot be flush-mounted, the connector contact below it is not mounted correctly.

In this case, release the connector contact as described in the previous operation and connect it again.



Fasten the positive battery cable (1) at locations (2).

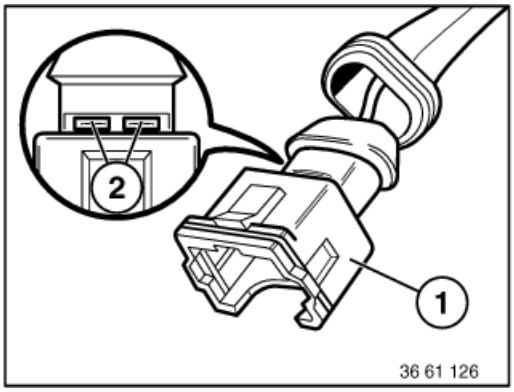
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61 13 ... Notes for opening contacts and locks of different plug contact systems

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100

Abbreviations of contacts and what they mean:	
ELA	**Strand seal**
D 1.5 / 2.5 / 3.5	**Round contacts with 1.5 mm, 2.5 mm or 3.5 mm diameter**
MDK	**Miniature double flat spring contact**
JPT	Junior Power timer
DFK	Double flat spring contacts
Elo	Electronic contacts
Elo Power	Electronic contacts for heavy load
MQS	Micro Quadlock system
MPQ	Micro Power Quadlock
MLK	Mini laminated contact
SLK	Sensor laminated contact
LSK	Load current contact
MLK	Mini laminated contact
Mcon	Multi contact



Important!

The contacts can be changed on ultrasonically welded connectors (1).

Ultrasonically welded connectors (1) must be replaced completely.

Ultrasonic-welded connectors (1) can be identified by the welds (2) on their longitudinal side.

Note:

Special tools referred to in the repair instructions below are contained in the following special tool sets:

- Unlocking and pressing-off tool 61 1 150

  is replaced as of 09/2005 by 61 0 300 (BMW) and 61 0 400 (MINI)
- Release and pressing-off tool 61 1 100 (engine)

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Repair instructions for opening connector housings and removing contacts of different connector systems:

Connector system D 1.5/D 2.5:

- Circular connectors, 7- or 8-pin, system D 2.5
- Circular connectors, 13-pin, system D 2.5
- Circular connectors, 20-pin, system D 2.5
- Circular connectors, 4-, 7-, 10-, 12- or 25-pin, system D 1.5/D 2.5
- In-line connectors, 15-pin, system D 2.5
- In-line connectors, 8-, 12-pin, system D 2.5
- In-line connectors, 30-pin, system D 2.5
- In-line connectors, 20-pin, system D 2.5

Connector system JPT/MDK/DFK:

- In-line connectors, 2-pin, System JPT ELA
- In-line plugs, 2-pin, System MDK 3 plus 2.8
- In-line plugs, 4-pin, System DFK ELA

Connector system Elo/Elo Power:

- Inline plugs, 4-, 10-pin, System Elo
- In-line connectors, 6- to 50-pin, System Elo
- Inline plugs, 3-, 6-pin, System Elo-Power 2.8

Connector system LSK:

- Connector housing LSK contact

Connector system MQS/MPQ:

- Inline connectors, 6-, 8-pin, System MQS
- Inline plugs, 2-pin, System MPQ 2.8
- Control unit connectors, 25-, 35-, 55-, 83-, 88-pin
- In-line plugs, 24-pin, Hybrid System MQS/MPQ
- Socket housing 42-, 43-pin, Hybrid System MQS / MPQ
- Socket housings 2x21-, 2x27-pin, Hybrid System MQS/MPQ, Elo/Elo Power
- In-line connectors, 30-pin, Hybrid System MQS/MPQ
- Socket housings, 5-, 8-pin, System MQS/MPQ
- Socket housing (radio connector), Hybrid System MQS/MPQ

For connector contact systems not listed, refer to Service Information:

SI 2 05 05 217
SI 2 05 06 294
SI 2 03 08 440
SI 2 08 06 312
SI 2 02 08 439
SI 2 01 08 438

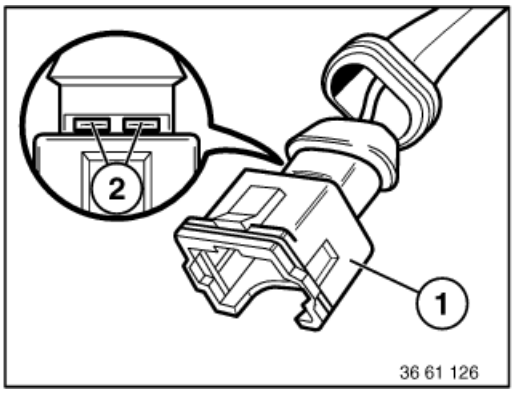
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61 13 ... Opening plug housings and removing contacts of different plug systems

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100
- 61 1 150

Abbreviations of contacts and what they mean:	
ELA	**Strand seal**
D 1.5 / 2.5 / 3.5	**Round contacts with 1.5 mm, 2.5 mm or 3.5 mm diameter**
MDK	**Miniature double flat spring contact**
JPT	Junior Power timer
DFK	Double flat spring contacts
Elo	Electronic contacts
Elo Power	Electronic contacts for heavy load
MQS	Micro Quadlock system
MPQ	Micro Power Quadlock
MLK	Mini laminated contact
SLK	Sensor laminated contact
MLK	Mini laminated contact
Mcon	Multi contact



Important!

The contacts can be changed on ultrasonically welded plugs (1).

Ultrasonically welded plugs (1) must be replaced completely.

Ultrasonic-welded connectors (1) can be identified by the welds (2) on their longitudinal side.

Note:

Special tools referred to in the repair instructions below are contained in the following special tool kits:

- Release and press-out tool 61 1 150

  is replaced from 09/2005 by 61 0 300 (BMW) and 61 0 400 (MINI)
- Release and press-out tool 61 1 100 (engine)

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Repair instructions for opening plug housings and removing contacts of different plug systems:

Plug system D 1.5/D 2.5:

- Circular plugs, 7-, 8-pin, System D 2.5
- Circular plugs, 13-pin, System D 2.5
- Circular plugs, 20-pin, System D 2.5
- Circular plugs, 4-, 7-, 10-, 12-, 25-pin, System D 1.5/D 2.5
- In-line plugs, 15-pin, System D 2.5
- In-line plugs, 8-, 12-pin, System D 2.5
- In-line plugs, 30-pin, System D 2.5
- In-line plugs, 20-pin, System D 2.5

Plug system JPT/MDK/DFK:

- In-line plugs, 2-pin, System JPT ELA
- In-line plugs, 2-pin, System MDK 3plus 2.8
- In-line plugs, 4-pin, System DFK ELA

Plug system Elo/Elo-Power:

- In-line plugs, 4-, 10-pin, System Elo
- In-line plugs, 6- to 50-pin, System Elo
- In-line plugs, 3-, 6-pin, System Elo-Power 2.8

Plug system MQS/MPQ:

- In-line plugs, 6-, 8-pin, System MQS
- In-line plugs, 2-pin, System MPQ 2.8
- Control unit plugs, 25-, 35-, 55-, 83-, 88-pin
- In-line plugs, 24-pin, Hybrid System MQS/MPQ
- Socket housing 42-, 43-pin, Hybrid System MQS / MPQ
- Socket housings 2x21-, 2x27-pin, Hybrid System MQS/MPQ, Elo/Elo-Power
- In-line plugs, 30-pin, Hybrid System MQS/MPQ
- Socket housings, 5-, 8-pin, System MQS/MPQ
- Socket housing (radio plug), Hybrid System MQS/MPQ

For plug contact systems not listed, refer to Service Information:

SI 2 05 05 217

SI 2 05 06 294

SI 2 03 08 440

SI 2 08 06 312

SI 2 02 08 439

SI 2 01 08 438

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61 11 ... Repairing wiring harness for blower controller

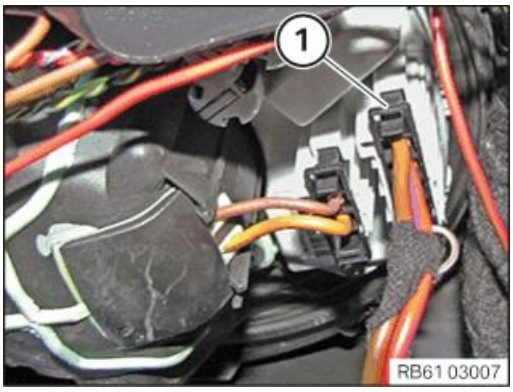
Special tools required:

- 2 221 122
- 0 495 324
- 0 496 464
- 0 494 159
- 0 495 555
- 0 496 833
- 0 444 131

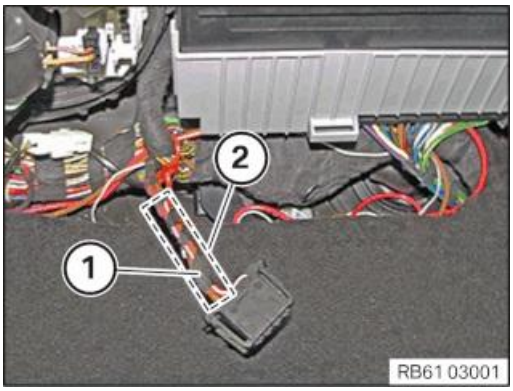
Read and comply with notes on handling wiring harnesses and wiring!

Necessary preliminary work:

- Disconnecting the battery earth lead
- Remove instrument panel trim, bottom right

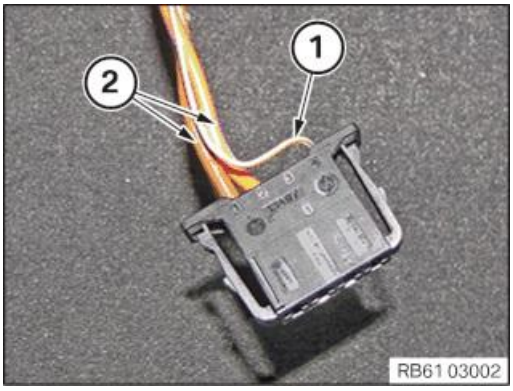


Disconnect plug connection (1).



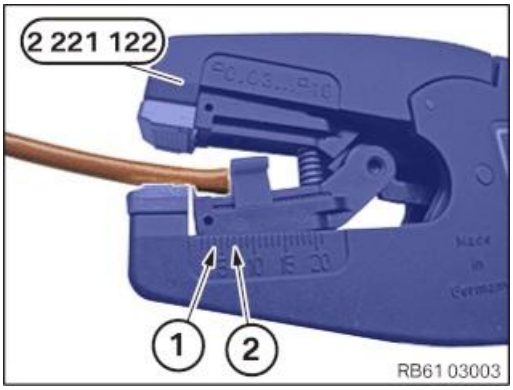
Remove insulating tape (1) in the area (2) carefully.

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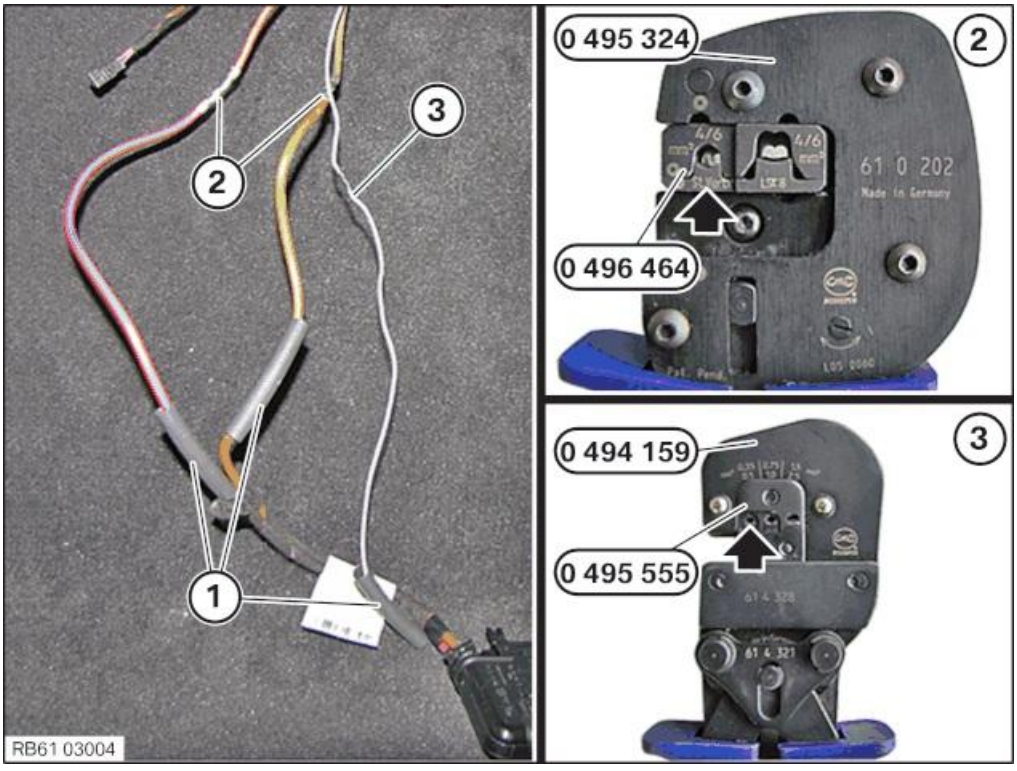
Disconnect thin line (1) at point indicated by arrow.

Disconnect thick lines (2) at point indicated by arrow.



Strip approx. 4 mm (1) insulation off thin line using insulation strippers 2 221 122 .

Strip approx. 7 mm (2) insulation off thick lines using insulation strippers 2 221 122 .



Caution!
Only the crimping pliers shown may be used for crimping!

Slide heat-shrink tubing (1) over it.

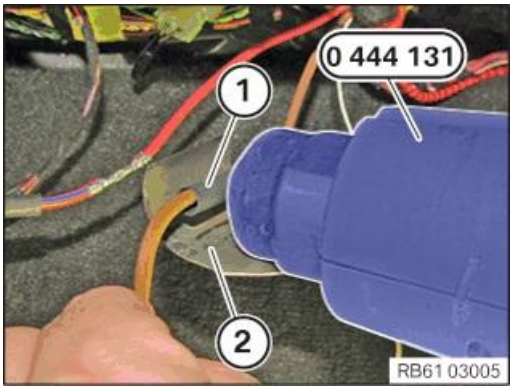
Crimp thick lines (2) using crimping pliers 0 495 324 (matrix 0 496 464).

Use opening marked by an arrow for crimping.

Crimp thin line (3) using crimping pliers 0 494 159 (die 0 495 555 earlier designation, 0 496 833 current designation).

Use opening marked by an arrow for crimping.

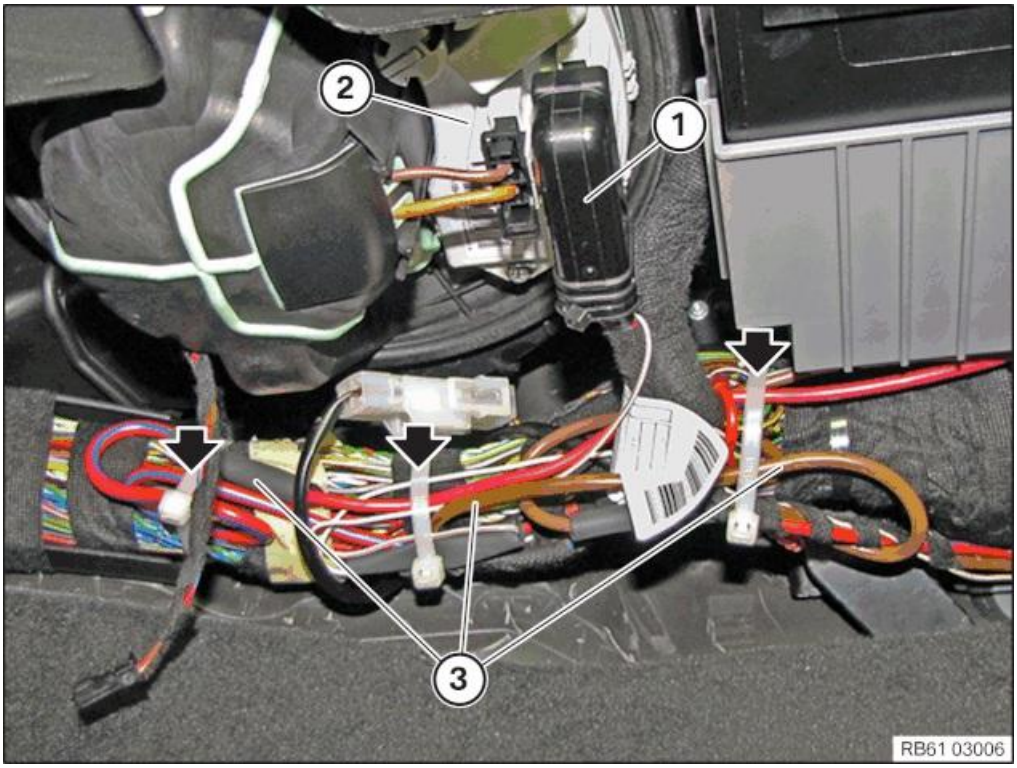
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Position heat-shrink tubing (1) centrally over the crimping point.

Shrink the heat-shrink tubing (1) with a hot air blower 0 444 131 at 400 °C. Use a heat-shrink tubing reflector (2)!

Repeat the procedure for all three lines.



Close plug connection (1) on the controller for blower (2).

Route possible excess length of the repair cable (3) as shown and secure it to positions marked with an arrow using cable straps.

Caution!
Risk of damage!

Route repair cable in such a way that the thin line is not under voltage.

Add final details to vehicle:

- Only right-hand drive vehicle with Bluetooth aerial: Remounting Bluetooth aerial
- Installing the bottom right instrument panel trim
- Connecting the battery earth lead

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61 11 ... Replacing wiring harness for blower controller

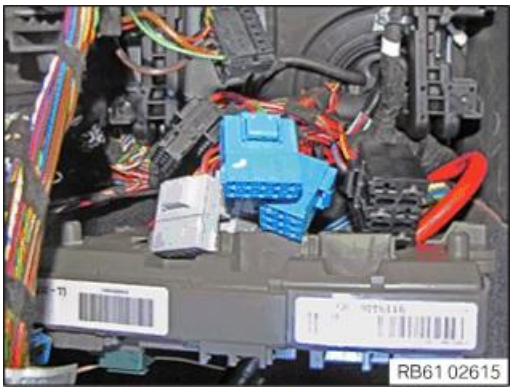
Special tools required:

- 0 495 399
- 0 495 324
- 0 496 833
- 0 444 131

Read and comply with notes on handling wiring harnesses and wiring!

Necessary preliminary work:

- Disconnecting the battery earth lead
- Remove instrument panel trim, bottom right
- Remove glove box
- Remove junction box



Remove fuse box as far as shown.

Vehicles with production date up to 03/2007:

Installation location of the connector X11007

Unpin the pin 6 from the connector X11017 using special tool 0 495 399 .

Disconnect the unpinned pin from vehicle side cable.

Secure remainder of vehicle cable.

Pin the pin from the repair cable at pin 6.

Vehicles with production date from 03/2007:

Installation location of the connector X11011

Unpin the pin 2 from the connector X11011 using special tool 0 495 399 .

Disconnect the unpinned pin from vehicle side cable.

Secure remainder of vehicle cable.

Pin the pin from the repair cable at pin 2.

Note:
Depending on the equipment specification, the repair cable can have the following colours:

- red
- red/blue

Connect all plug connections on the fuse box.

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Caution!

Caution! Risk of damage on sharp-edged clip (2)!

Route and secure red repair cable (1) as illustrated.

Install fuse box.



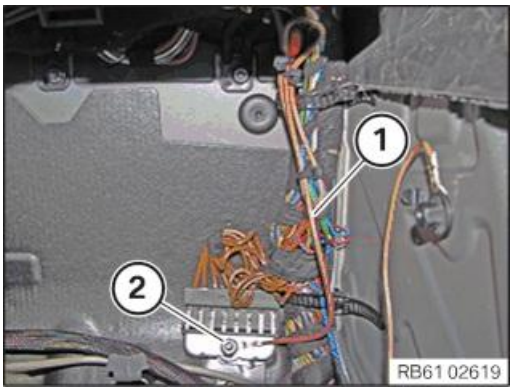
Cut the thin cable (1) through from the vehicle-side vehicle wiring harness at the place marked with the arrow and strip insulation.

Push the heat-shrink tubing over it prior to crimping.

Crimp the thin cable (1) to the same cable from the repair wiring harness using crimping pliers 0 495 324 (matrix 0 496 833).

Position the heat-shrink tubing at the centre of the crimping location.

Shrink heat-shrink tubing with hot air blower 0 444 131 set to 400°C. Use a heat-shrink tubing reflector.

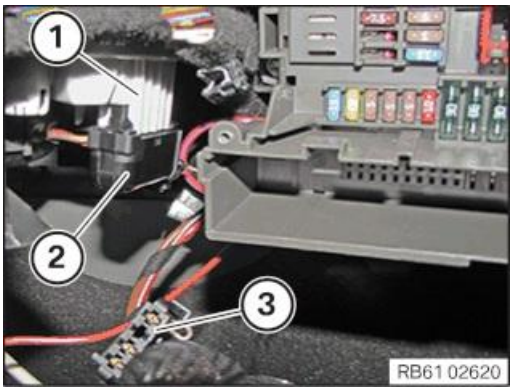


Carefully lift carpet in the passenger footwell.

Route and secure grounding cable (1) from repair cable as illustrated.

Secure grounding cable (1) at point (2) with nut (2).

Tightening torque: 8 Nm



Connect plug connection (2) from the repair wiring harness on the controller for the blower (1).

Disconnect plug connection (3) from vehicle wiring harness, secure cable.

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Add final details to vehicle:

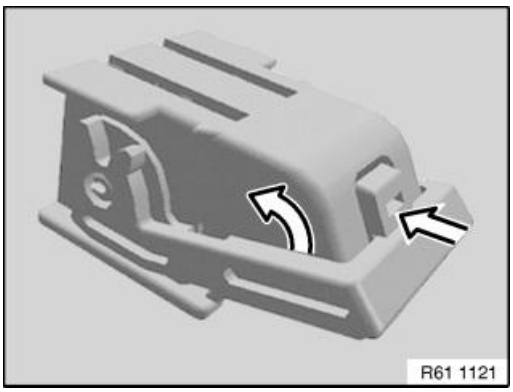
- Install junction box
- Install glove box
- Only right-hand drive vehicle with Bluetooth aerial: Remounting Bluetooth aerial
- Installing the bottom right instrument panel trim
- Connecting the battery earth lead

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61 13 ... Unlocking and disconnecting different plug connections

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

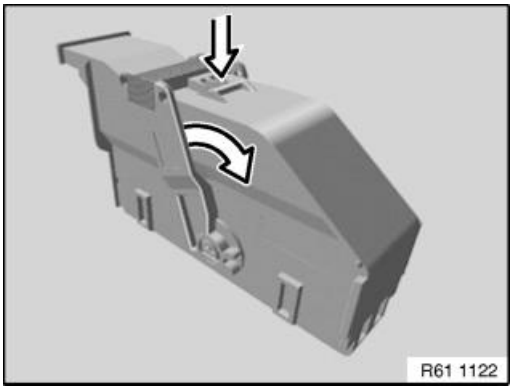
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

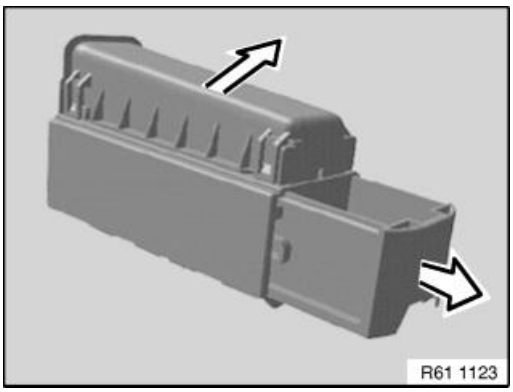
Disconnect plug connection.



2.

Press lock and open release clip in direction of arrow.

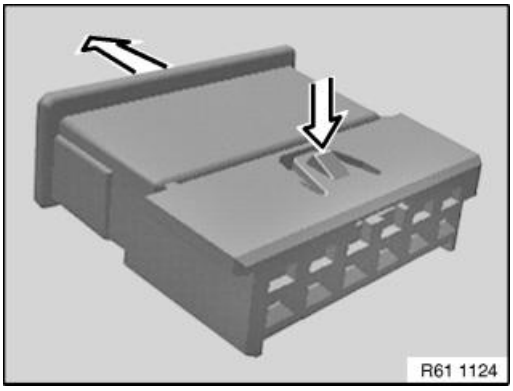
Disconnect plug connection.



3.

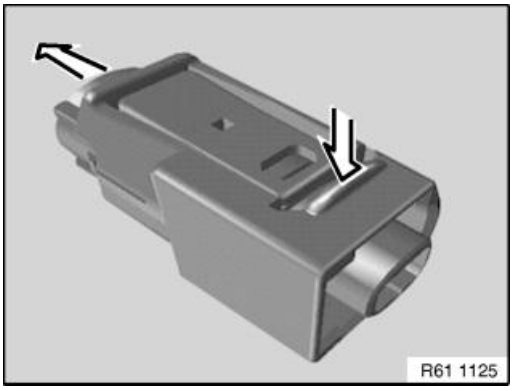
Open release clip in direction of arrow and disconnect plug connection in direction of arrow.

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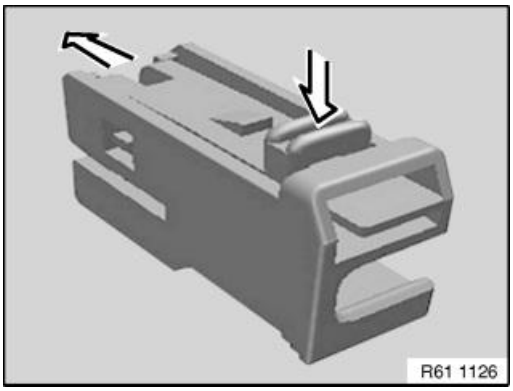
4.

Press lock and disconnect plug connection in direction of arrow.



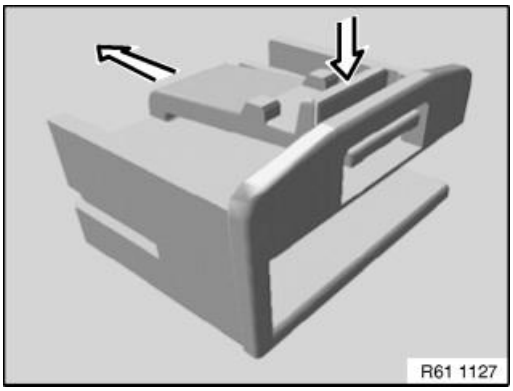
5.

Press lock and disconnect plug connection in direction of arrow.



6.

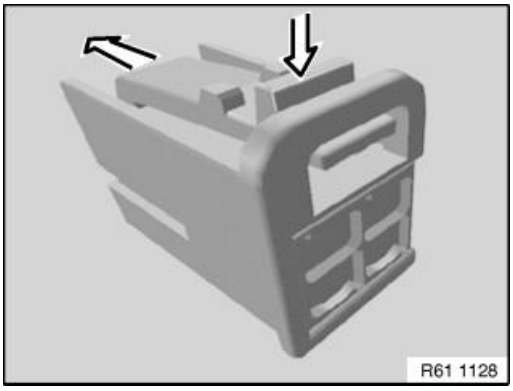
Press lock and disconnect plug connection in direction of arrow.



7.

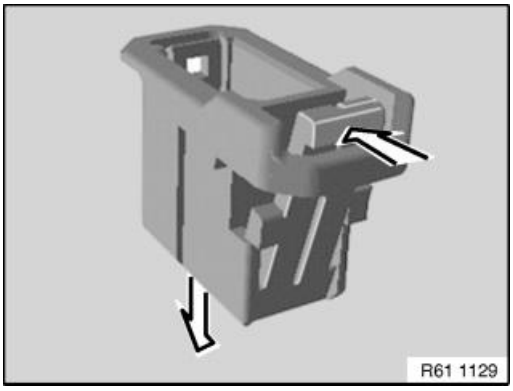
Press lock and disconnect plug connection in direction of arrow.

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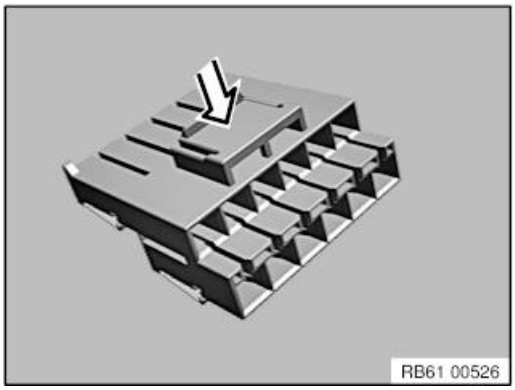
8.

Press lock and disconnect plug connection in direction of arrow.



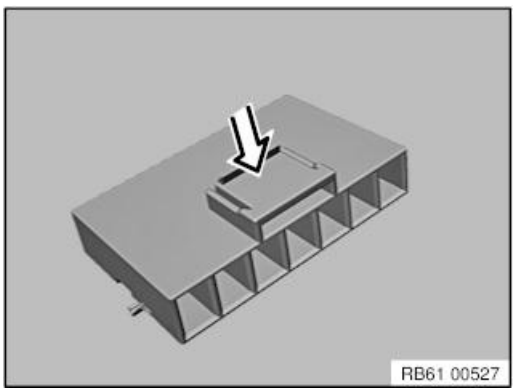
9.

Press lock and disconnect plug connection in direction of arrow.



10.

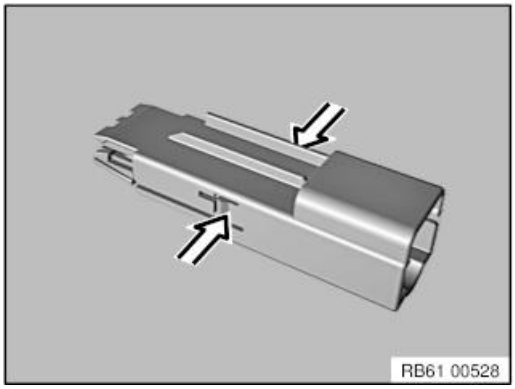
Press the lock and detach plug connection.



11.

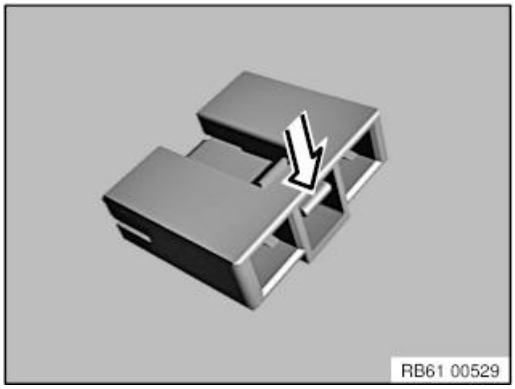
Press the lock and detach plug connection.

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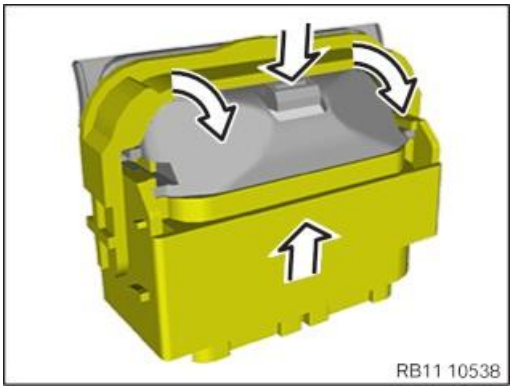
12.

Press the lock on both sides and detach plug connection.



13.

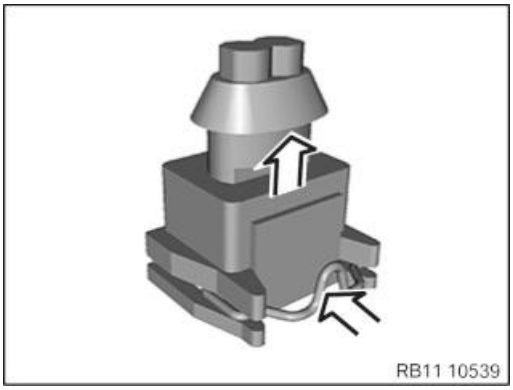
Press the lock and detach plug connection.



14.

Press lock and open release clip in direction of arrow.

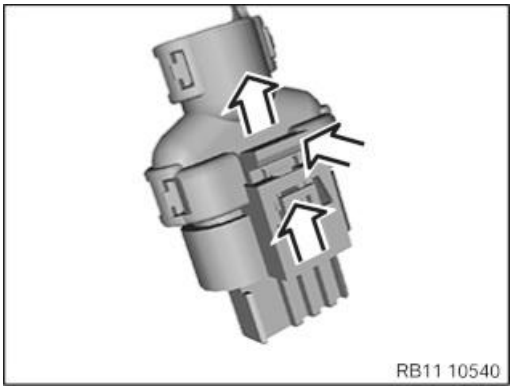
Disconnect plug connection.



15.

Press the lock and detach plug connection.

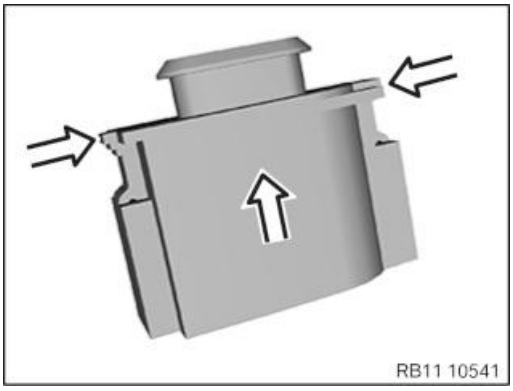
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16.

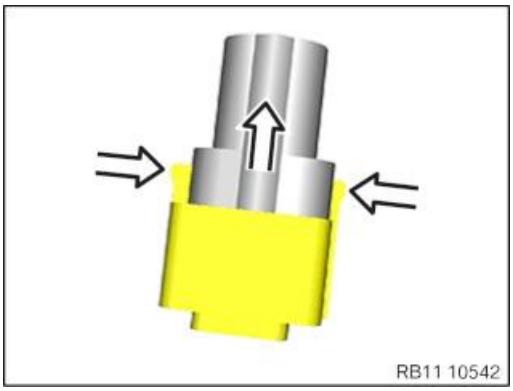
Pull out lock and press.

Disconnect plug connection.



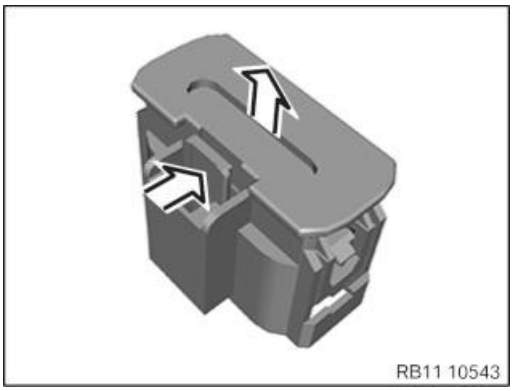
17.

Press the lock and detach plug connection.



18.

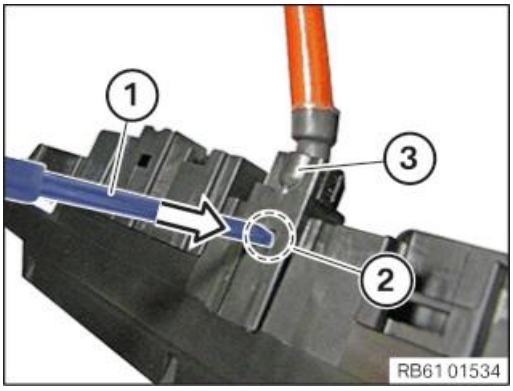
Press the lock and detach plug connection.



19.

Press the lock and detach plug connection.

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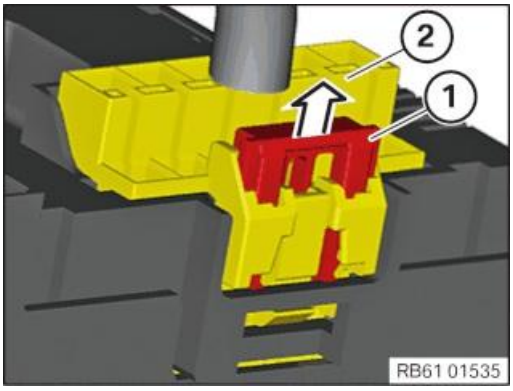


20.

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.

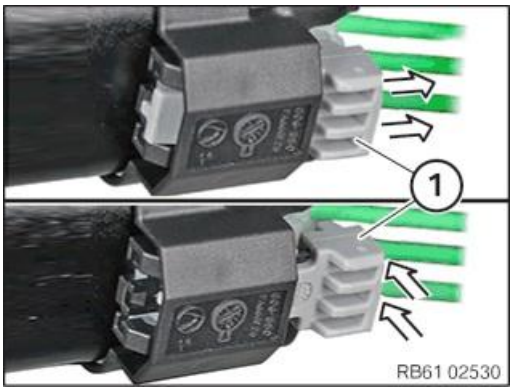


21.

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!

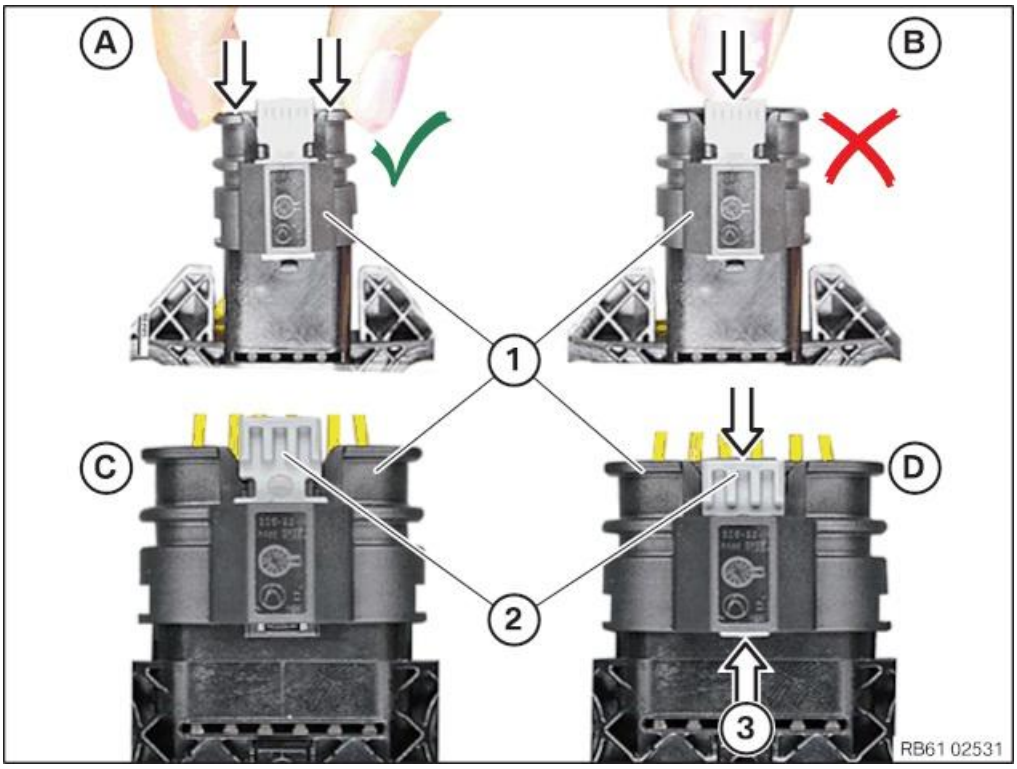
For this connector type, increased forces come into play when disconnecting and closing.

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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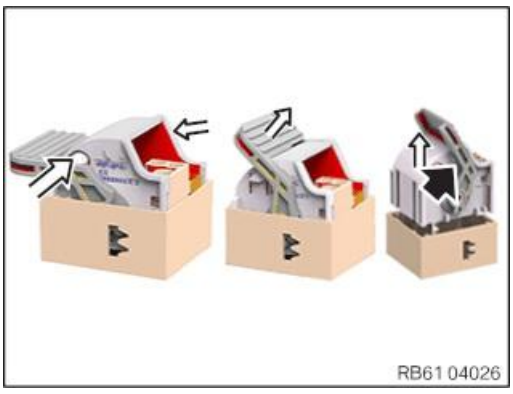


23.

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:

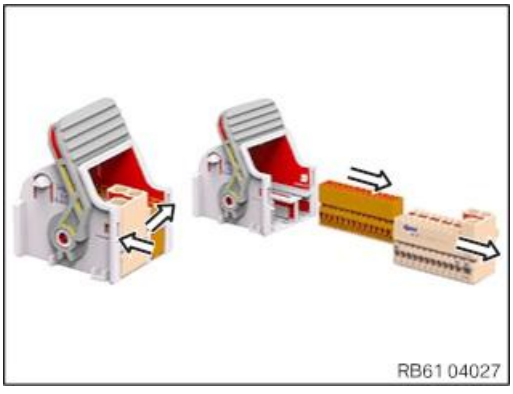


24.

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.

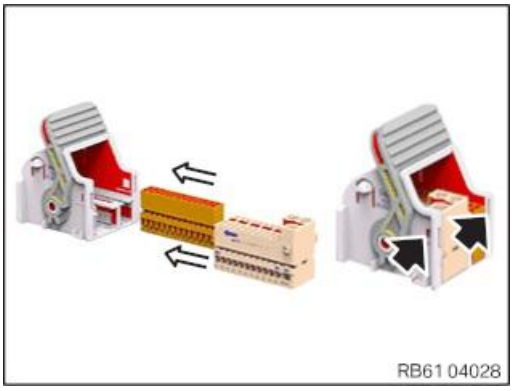
Once the lever is locked in the end position, remove plug connection upwards.



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

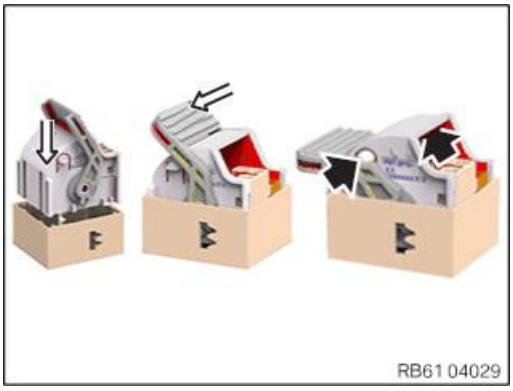
Slide out after unlocking the socket housing.

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Slide in socket housing up to limit position.

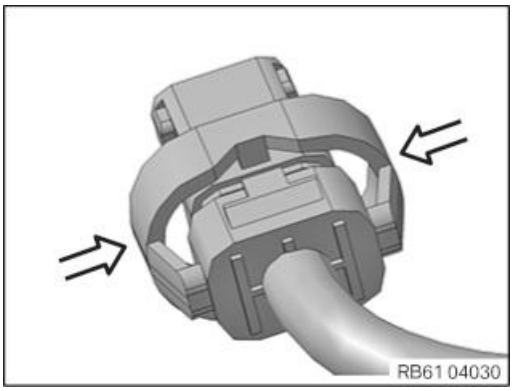
Lock socket housing into place in end position.



Sliding in up to limit position.

Activate plug-inn procedure by moving lever downwards.

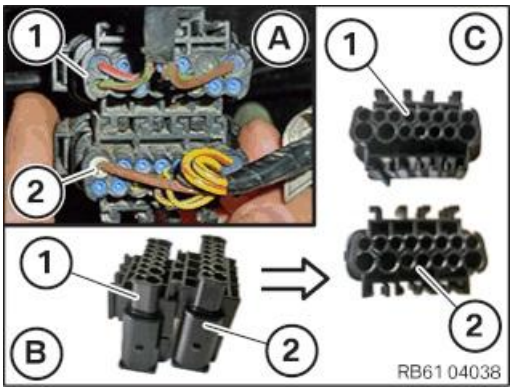
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.



25.

Rosenberger D4S20G-400A5-Y

Press to unlock on both sides.

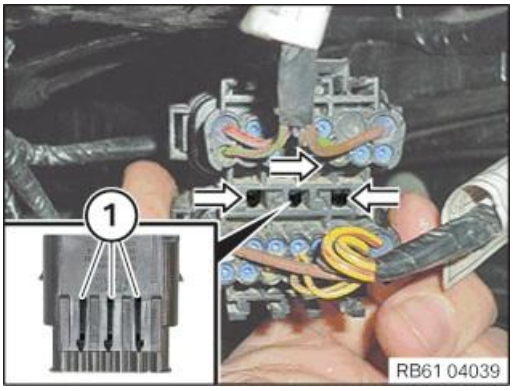


26.

Pin housing, 15-pinMLK1

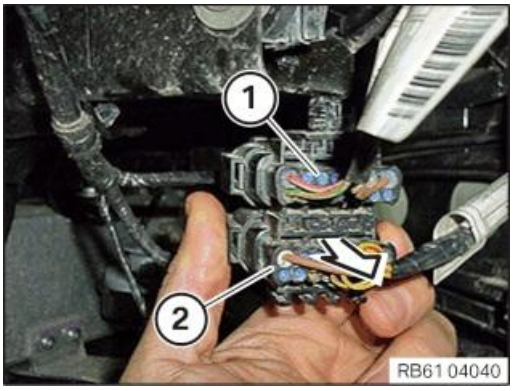
- A & B. To avoid any damage to individual connectors, the given connector assembly consisting of several individual connectors (1) & (2) must be released before disconnecting the plug connection.
- C: released connector assembly

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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).

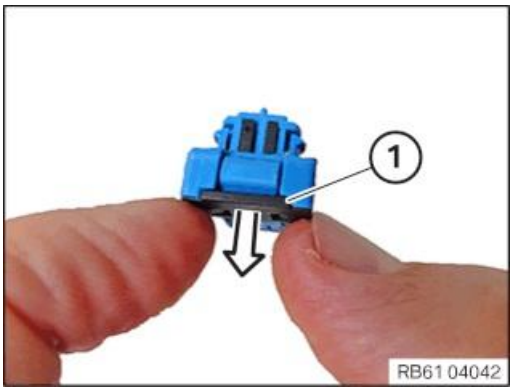


27.

Airbag ignition circuit connector

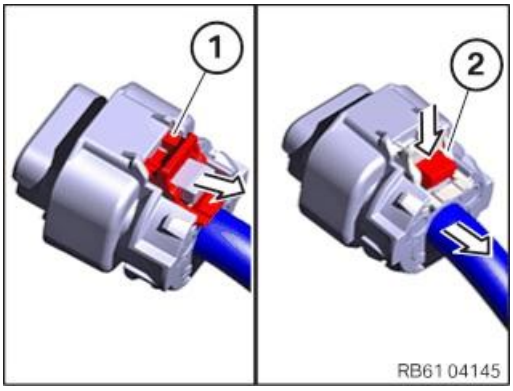
Warning!

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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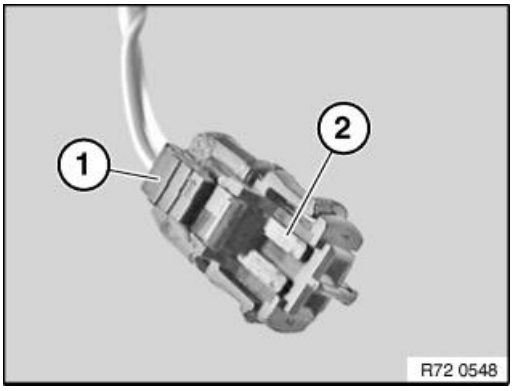


28.

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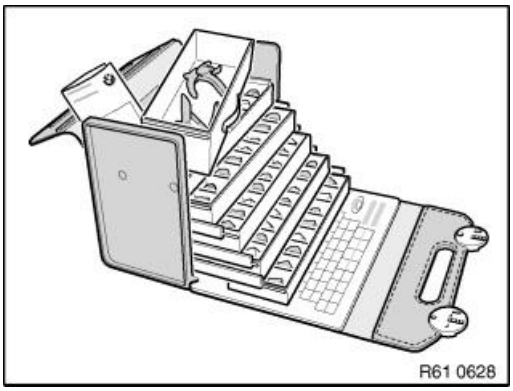
61 13 ... Butt connector for repairing a plug connection

Special tools required:

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

Important!

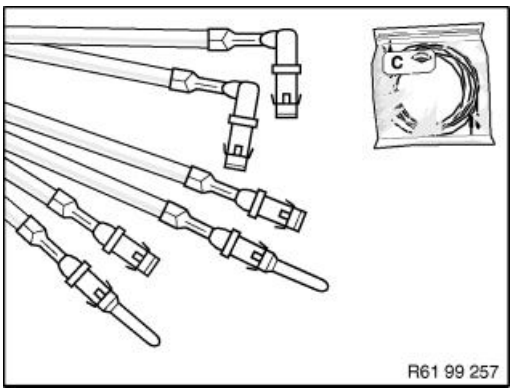
1. Identify cause of damage (e.g. sharp-edged body components, faulty electrical loads, jammed mechanisms, corrosion caused by ingress of water, etc.).
2. Read out fault memory
3. Eliminate cause of damage.
4. Disconnect battery negative terminal
5. Make sure that no safety-related system according to 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.

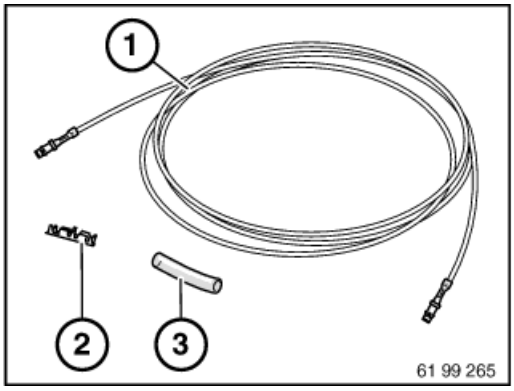
- Refer to Service Information:
  SI 02 04 07 341



Choose repair kit.

Example: Repair kit, circular connector system D 2.5.

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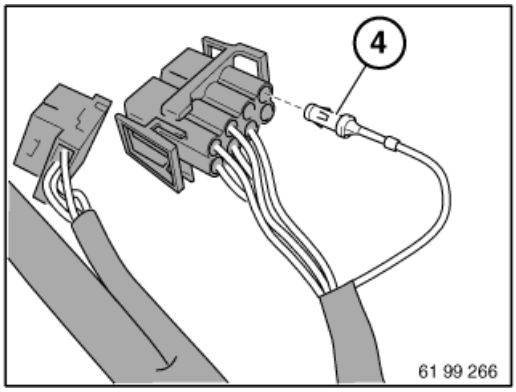


Remove following parts:

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

(2) Crimp connector for selected wire cross-section

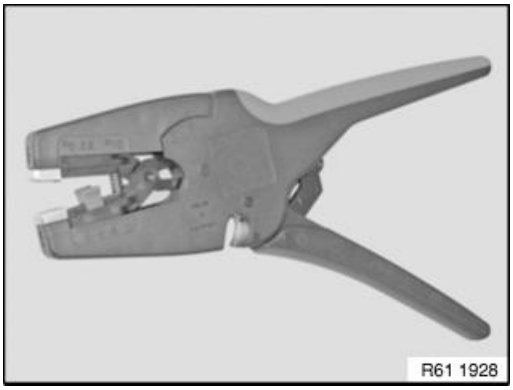
(3) Shrink-fit hose



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.



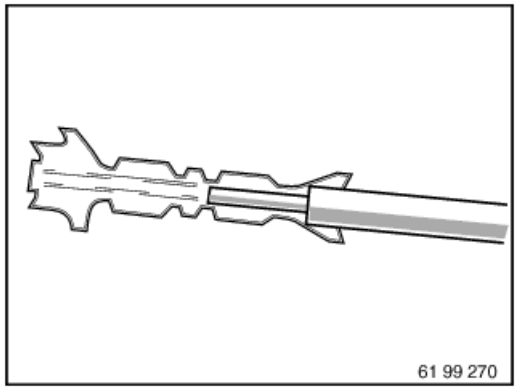
Important!

- 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



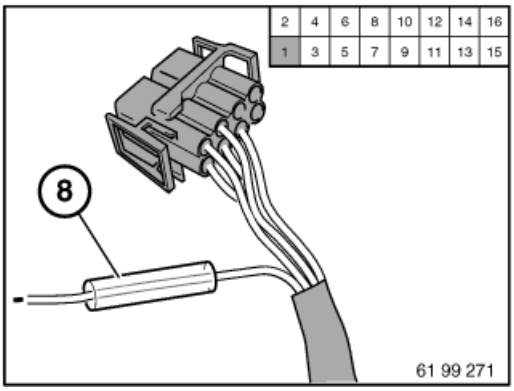
Crimp butt connector on preassembled wire end.

Special tools:

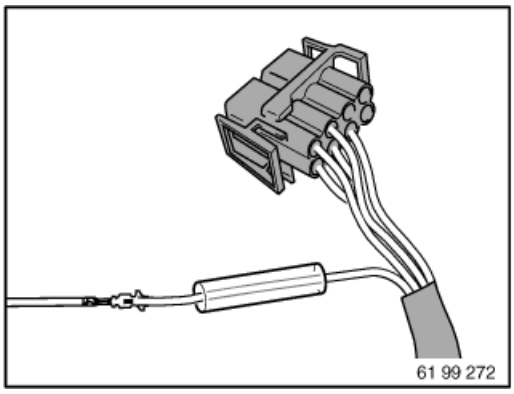
- 61 4 340 (0.35 - 2.5 sq mm)
- 61 0 240 (4.0 - 6.0 sq mm)

See repair instructions
Crimping on stop parts

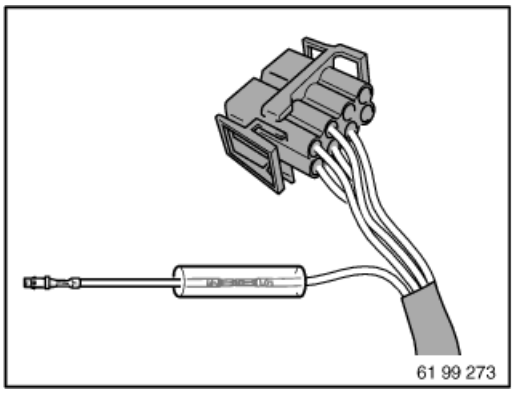
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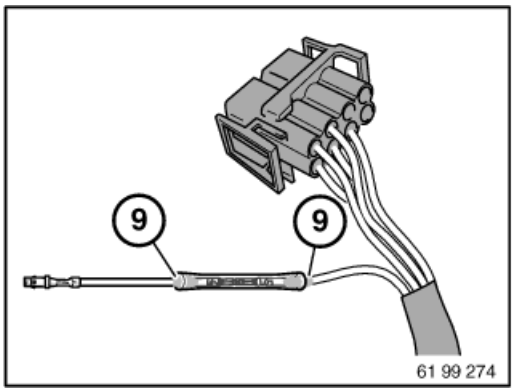
Push shrink-fit hose (8) onto free wire end.



Crimp unused wire end to butt connector.



Pull shrink-on sleeve over butt connector.



Important!

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.

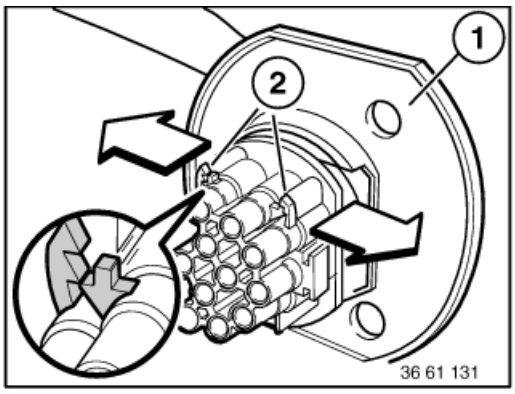
Close secondary lock on housing.

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

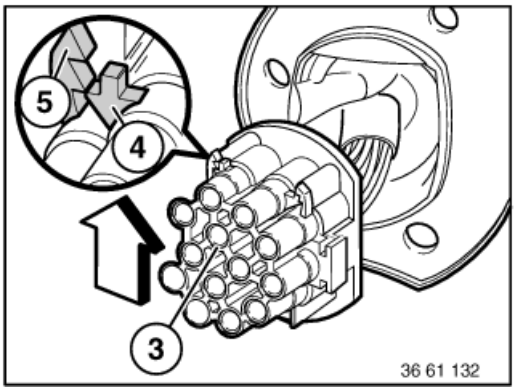
Special tools required:

- 61 0 303

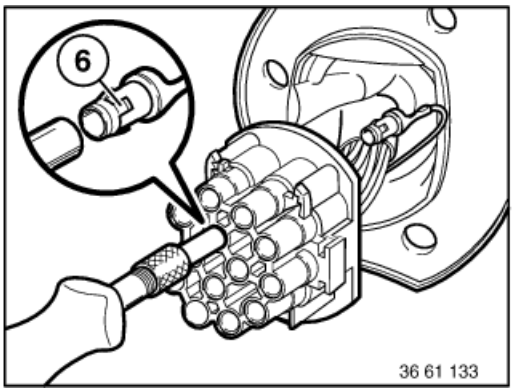


Pull off rubber grommet (1).

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).



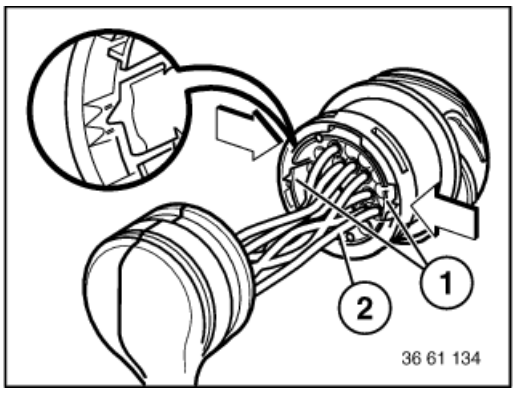
With special tool 61 0 303 , press down retaining lugs (6) of corresponding contact and pull out cable.

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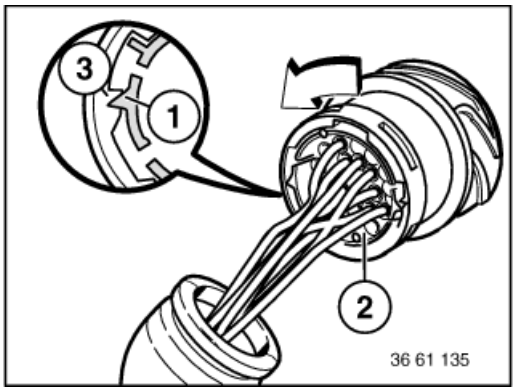
61 13 ... Circular connector, 20-pin, system D2.5

Special tools required:

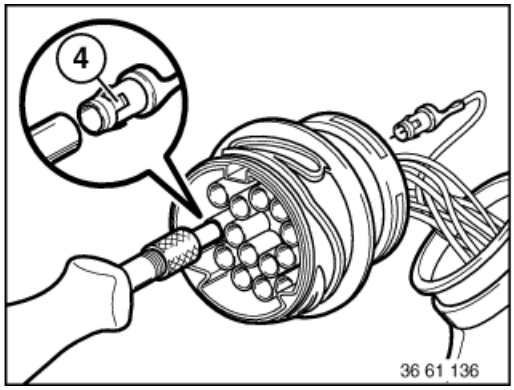
- 61 0 303



Carefully press back retaining tabs (1) of internal connector (2).



Turn internal connector (2) until retaining lugs (1) snap into release groove (3).



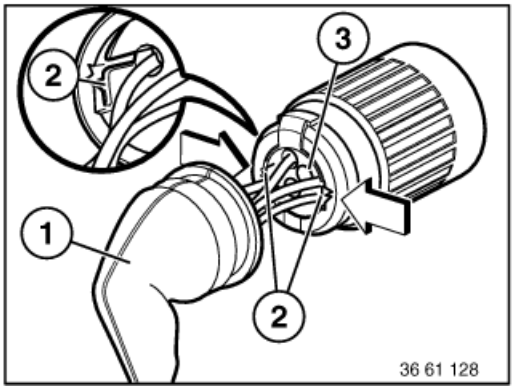
With special tool 61 0 303 press down retaining hook (4) of corresponding contact and pull out cable.

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61 13 ... Circular connector, 7-pin, 8-pin, system D2.5

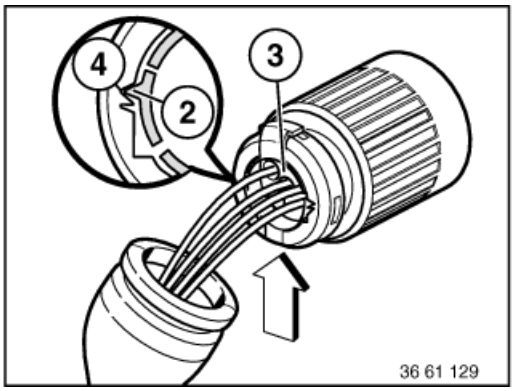
Special tools required:

- 61 0 303

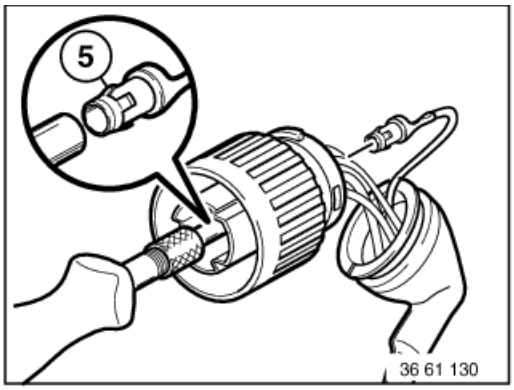


Carefully pull off rubber grommet (1).

Carefully press back retaining tabs (2) of internal connector (3).



Slide internal connector (3) in direction of arrow until retaining tabs (2) lock into locking groove (4).



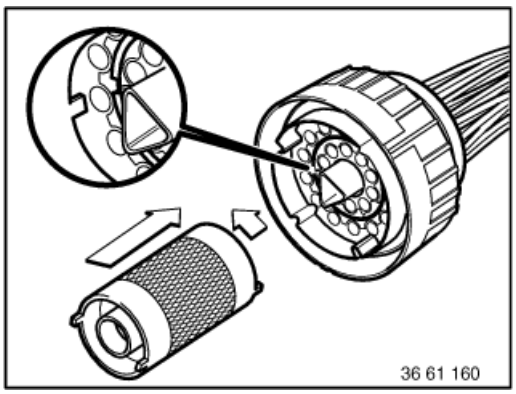
Use special tool 61 0 303 (61 1 132) to press back retaining hook (5) of corresponding contact and pull out cable with contact.

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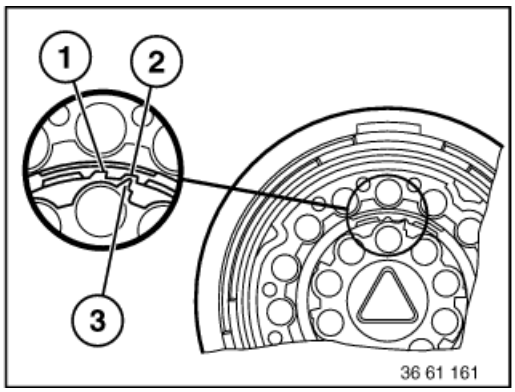
61 13 ... Circular plugs, 4-, 7-, 10- 12-, 25-pin, System D1.5/D2.5

Special tools required:

- 61 0 303

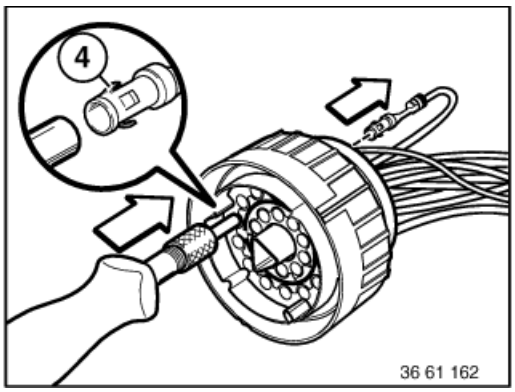


Insert special tool with suitable connection side in connector and twist approx. 3° anticlockwise.



The connector is locked down if retaining lug (3) is located in locking groove (2).

1. Unlocking groove
2. Locking groove
3. Retaining lug



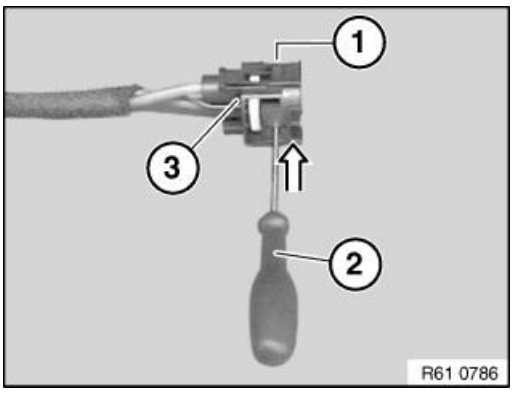
With special tool 61 0 303 press back retaining hook(4) of corresponding contact and pull out cable with contact.

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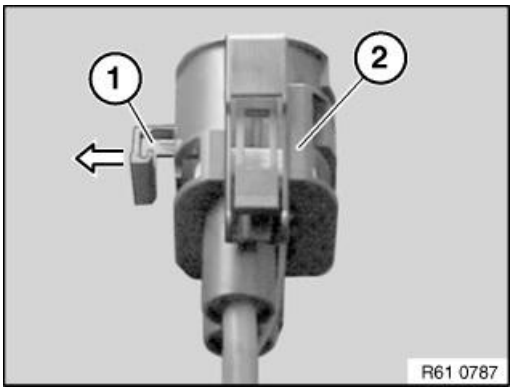
61 13 ... Connector housing, LCC contact (load current contact)

Special tools required:

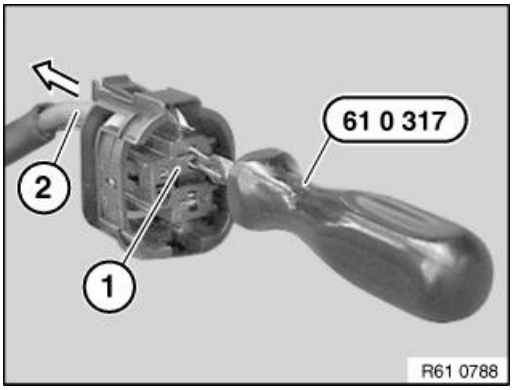
- 61 0 317



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

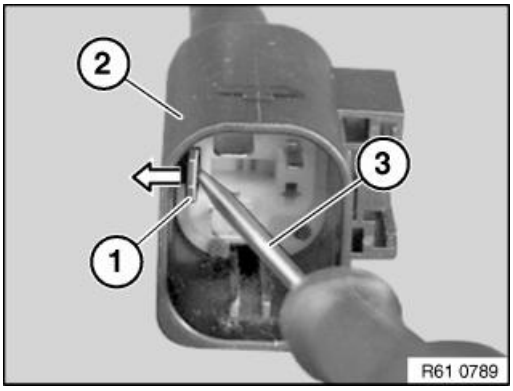


Pull lock (1) out of socket housing (2).

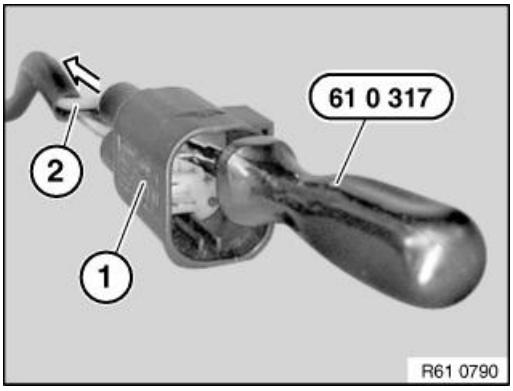


Insert special tool 61 0 317 into socket housing (1) and pull out wiring with LCC contact (2) in direction of arrow.

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



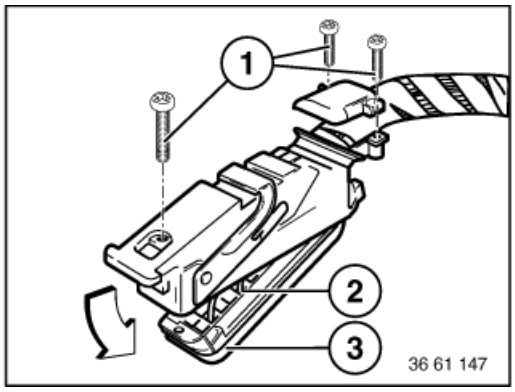
Insert special tool 61 0 317 into pin housing (1) and pull out wiring with LCC contact (2) in direction of arrow.

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61 13 ... Control unit plugs, 25-, 35-, 55-, 83-, 88-pin

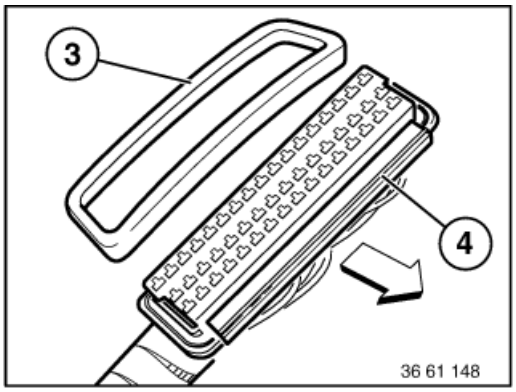
Special tools required:

- 61 0 312
- 61 0 314
- 61 0 315
- 61 0 323



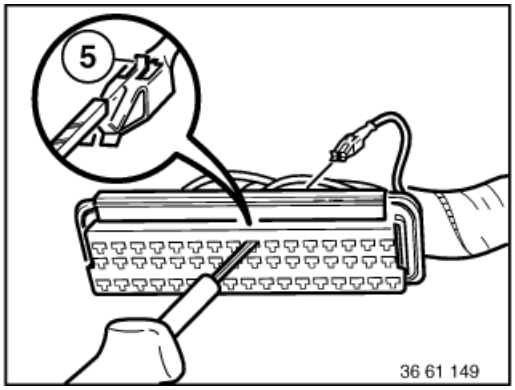
Release screws (1).

Lever out pin sensor (2) with gasket (3) in direction of arrow.



Remove gasket (3).

Pull out housing lock (4) in direction of arrow and unlock.

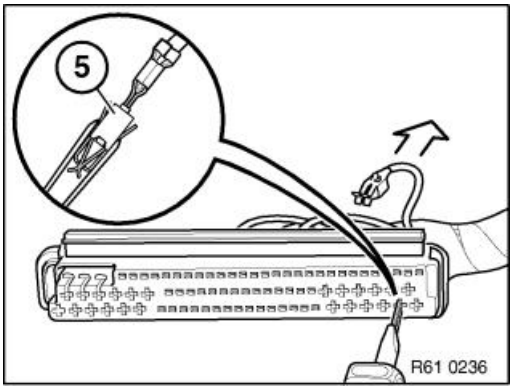


Press down retaining hook (5) of corresponding contact and pull out cable with contact.

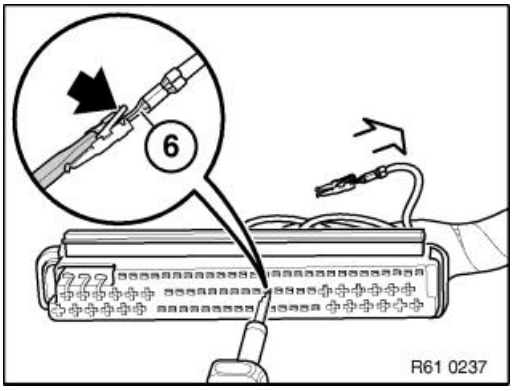
Special tool 61 0 312 (61 1 134) for mini flat spring contacts.

Special tool 61 0 314 (61 1 135) for mini flat spring contacts.

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Special tool 61 0 315 (61 1 151) for double flat spring contacts (dual retaining hooks).



Special tool 61 0 323 (61 1 152) for double flat spring contacts (special retaining hook).

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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:

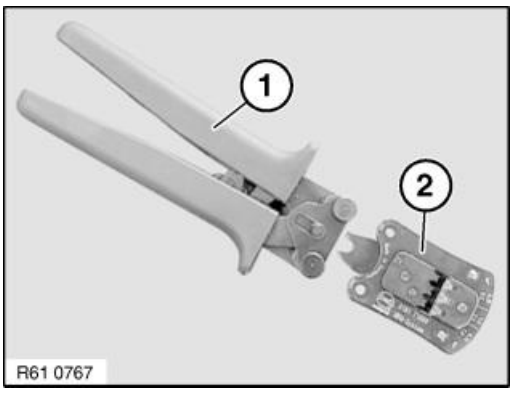
- SI 2 04 06 2939

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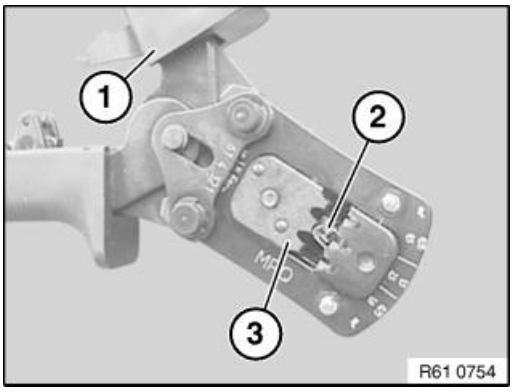
61 13 ... Crimping Micro Power Quadlock contacts (MPQ)

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.

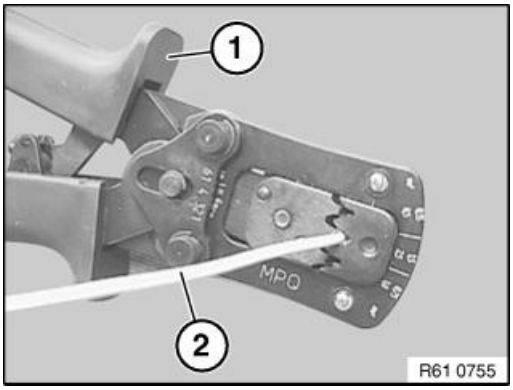


Open hand pliers (1).

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!

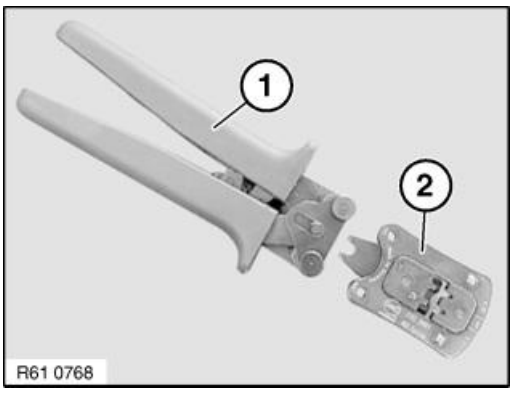
Check contact for correct crimping.

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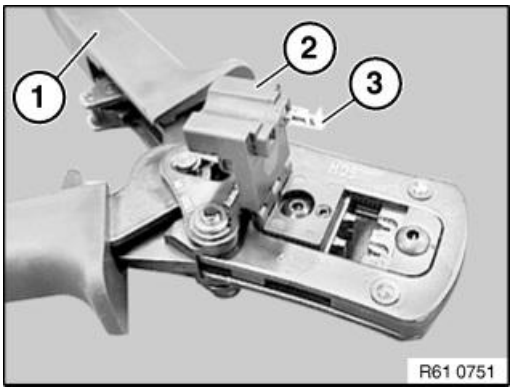
61 13 ... Crimping Micro Quadlock System contacts (MQS)

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.

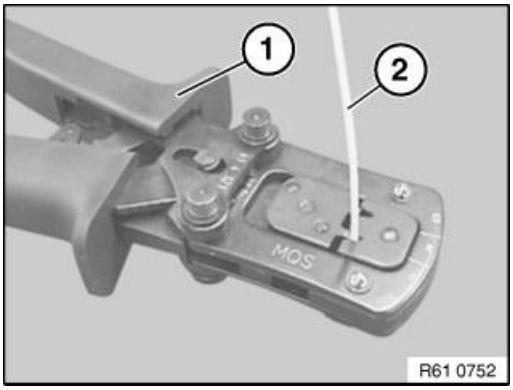


Open hand pliers (1).

Fold up contact carrier (2).

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

Fold back contact carrier (2).



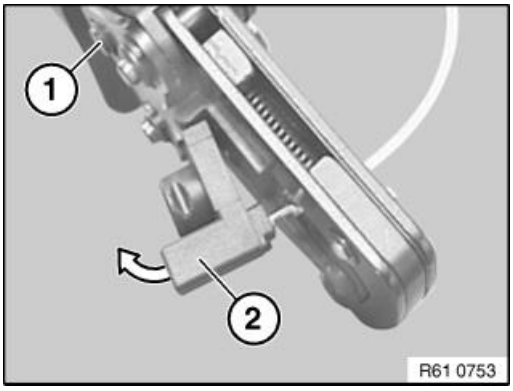
Note:
Follow procedure for cutting and stripping insulation from cables.

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!

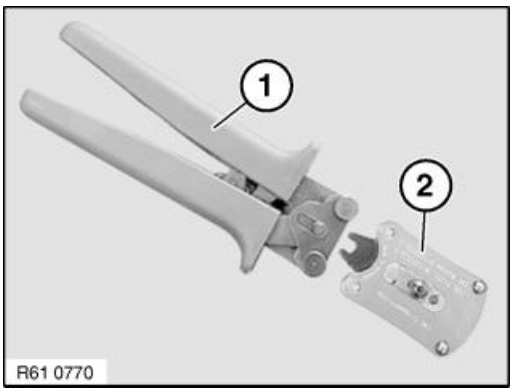
Check contact for correct crimping.

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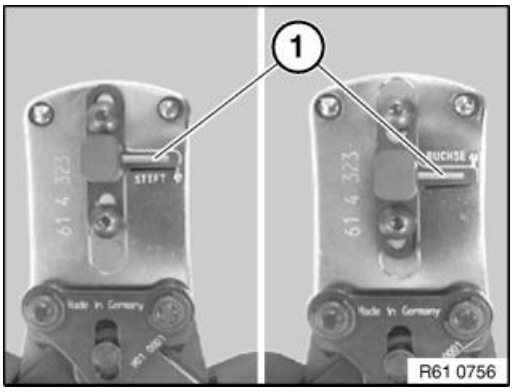
61 13 ... Crimping optical fibres

Special tools required:

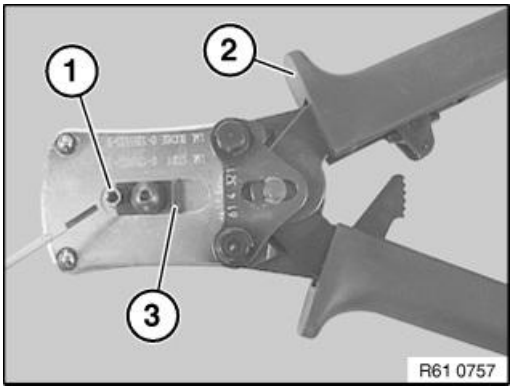
- 61 4 320



To crimp optical fibres, use hand pliers 61 4 321 (1) in conjunction with crimping head 61 4 323 (2) from crimping set 61 4 320 .*Note:*
Hand pliers (1) open automatically until limit position when handles are pressed together.



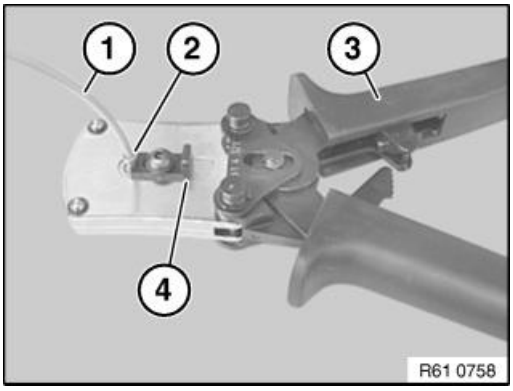
Move contact guide by means of stop lever (1) into corresponding position (pin contact or jack).



Open hand pliers (2).

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

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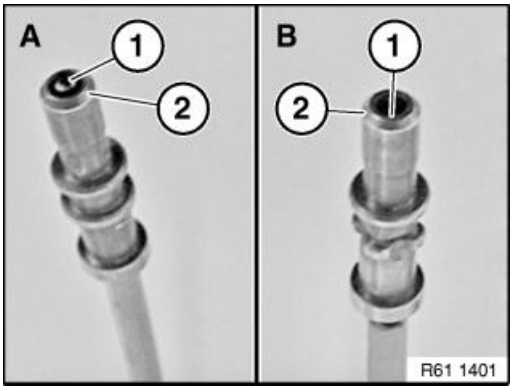
Note:
Follow procedure for cutting and stripping insulation from optical fibres.

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).



Attention!

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 ... Crimping stop parts

Special tools required:

- 12 1 080
- 12 1 081
- 12 1 083

Spare parts for in-car electronics (housing and contacts):

Refer to Service Information:

SI 2 04 07 341

1. Crimping butt connectors and contact sleeves for comb connectors up to 2.5 mm

Refer to Service Information:

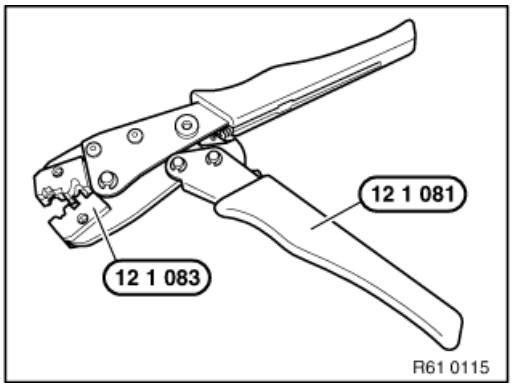
SI 2 04 06 293

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

Refer to Service Information:

SI 2 02 05 194

SI 2 07 05 233

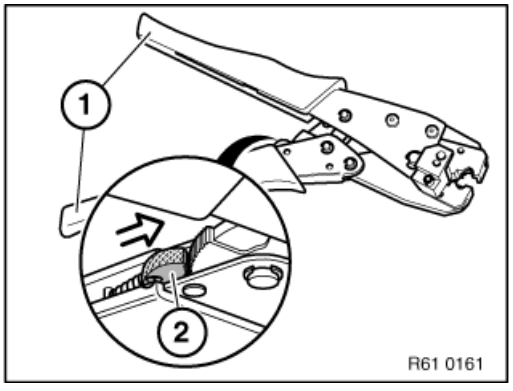


3. Crimping contact sleeves for 4 mm^2 comb connectors and ignition cable contacts

Use special tool kit 12 1 080 to attach ignition cable contacts and crimp 4 mm^2 contact sleeves for comb connectors.

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

See repair instructions
Special tools for wiring harness repairs.



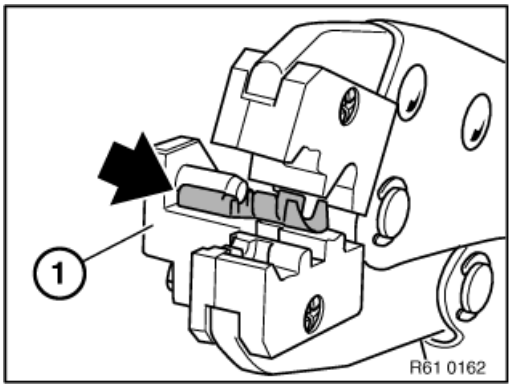
Release special tool 12 1 081 :

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

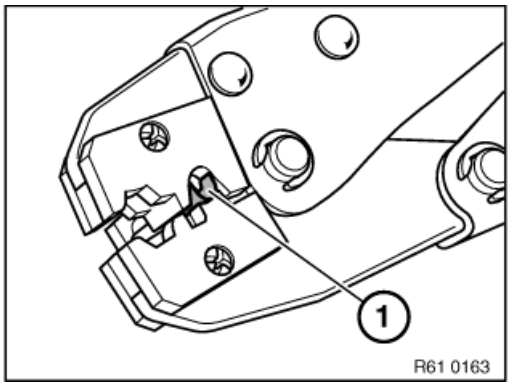
Or:

Compress handles until limit position, hand pliers unlock automatically.

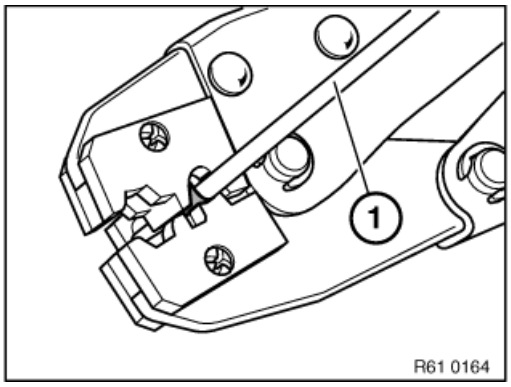
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Place 4 mm² contact sleeve in nest with anti-twist safeguard (1) as far as possible.



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



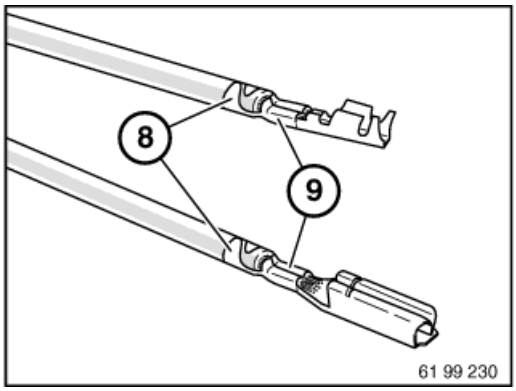
Note:
Follow procedure for cutting and stripping insulation from cables.

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

Compress crimping tool to limit position.

Crimping tool unlocks automatically.

Take contact out of crimping tool.

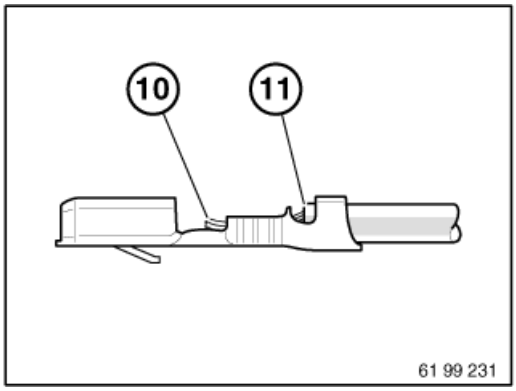


4. Checking crimping

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.

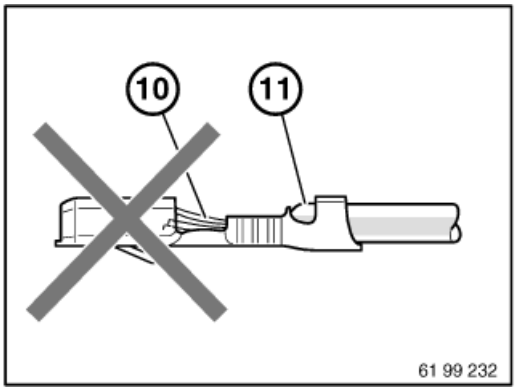
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Correct crimping:

Visible conductor end (10).

Visible insulation end (11).

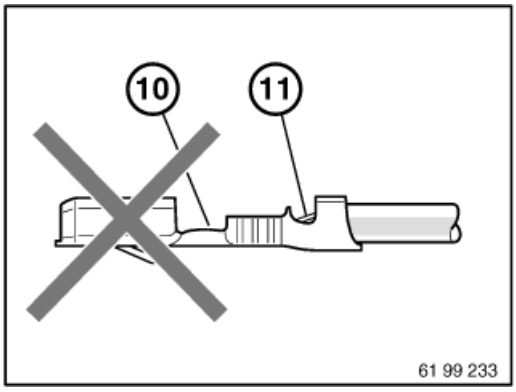


Incorrect crimping:

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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61 13 ... Crimping stop parts



Special tools required:

- 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



Necessary preliminary work:

- Notes for opening contacts and locks of different connector systems.
- Cutting cables to length and strip insulation

Special tools for wiring harness repair.

New part for vehicle electrical system (stops and housing):

- Sourcing reference: BMW Group Parts
- Refer to Service Information SI 2 04 07 341



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 (die-plate) 0 496 833
- Stripping tool2 407 379



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

Crimping Micro Quadlock System contacts (MQS).

- Special tool61 4 320

Crimping Micro Power Quadlock contacts (MPQ).

- Special tool61 4 320

Crimping miscellaneous stop parts up to 2.5 mm^2

- Special tool 61 4 340 (up to 03/2010 SWZ 61 4 328)

Refer to Service Information SI 2 04 06 293

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

Crimping load current contacts (LSK 8).

- Special tool61 0 210

Crimping SLK 2.8.

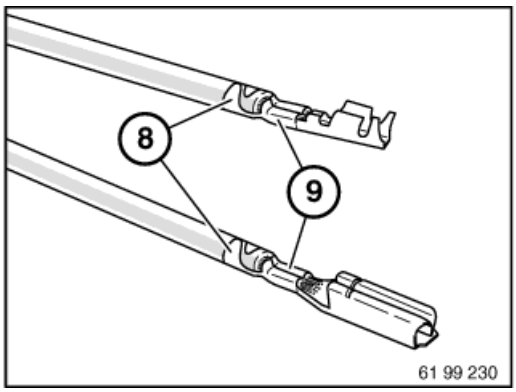
- Special tool61 0 220

Refer to Service Information SI 2 02 05 194

Crimping double spring contact (DFK 40)

Crimping MAK 8

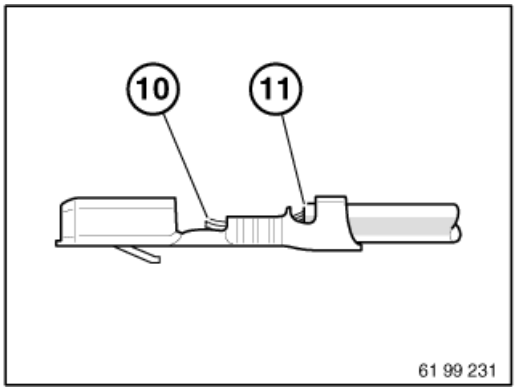
- Special tool61 0 230
- Refer to Service Information SI 2 07 05 233



Checking crimping

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

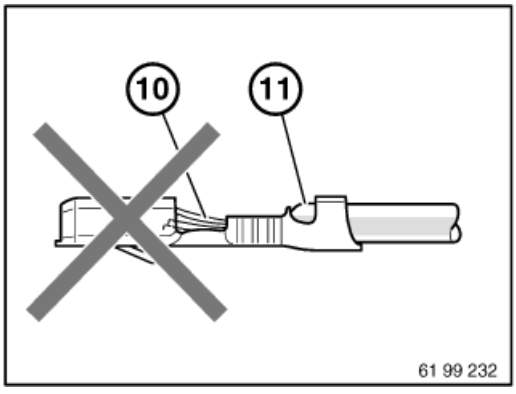
Note:
Illustration shows butt connectors and contact sleeves for comb connectors knocked on one side. The crimping procedure is identical here.



Correct crimping:

Visible conductor end (10).

Visible insulation end (11).



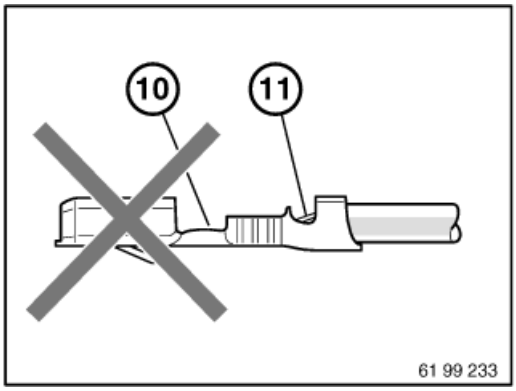
Incorrect crimping:

Conductor end (10) inserted too far.

Insulation end (11) in wire crimp.

If necessary, repeat crimping with a new contact.

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Incorrect crimping:

Conductor end (10) not visible.

Insulation end (11) not visible.

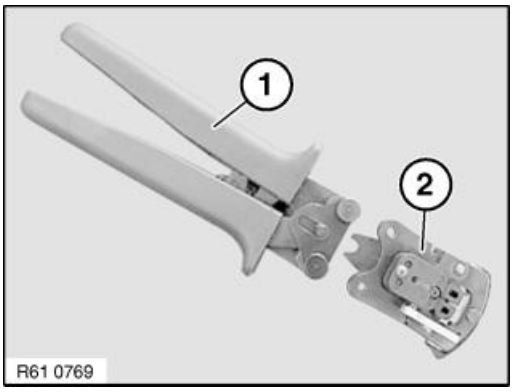
If necessary, repeat crimping with a new contact.

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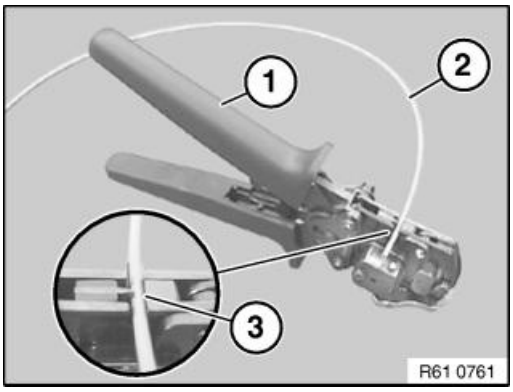
61 13 ... Cutting off, stripping insulation and cutting optical fibres to length

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.

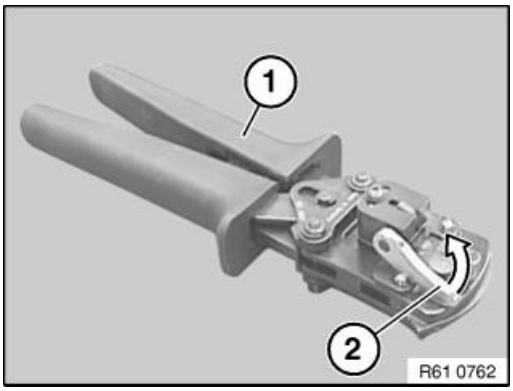


Cutting optical fibre

Open hand pliers (1).

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

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

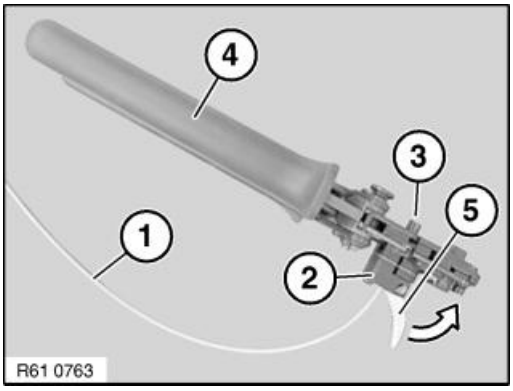


Stripping insulation from optical fibre

Open hand pliers (1).

Open lever (2) in direction of arrow.

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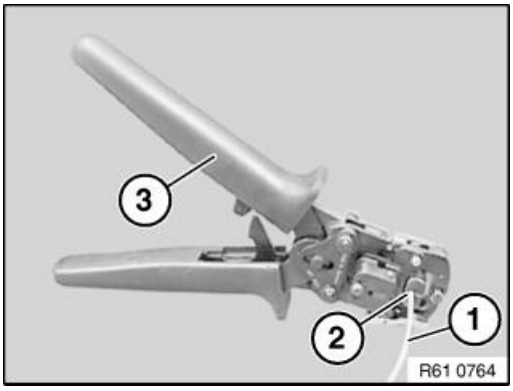
Push the optical fibre (1) into the strip insulation equipment (2) until it is flush in this area (3).

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).



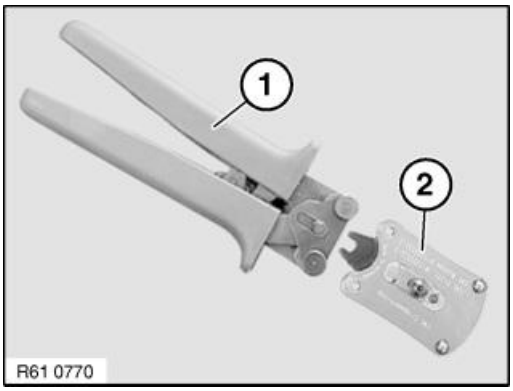
Cutting optical fibre to length

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.

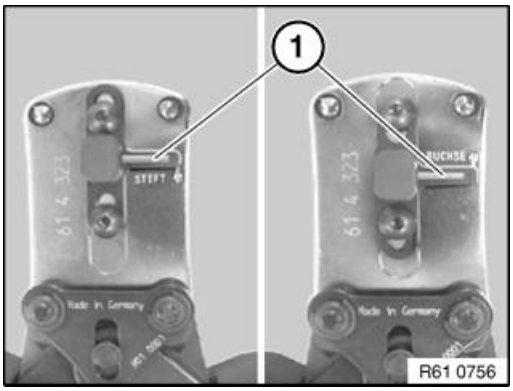
Remove optical fibre (1).



Crimp optical fibre

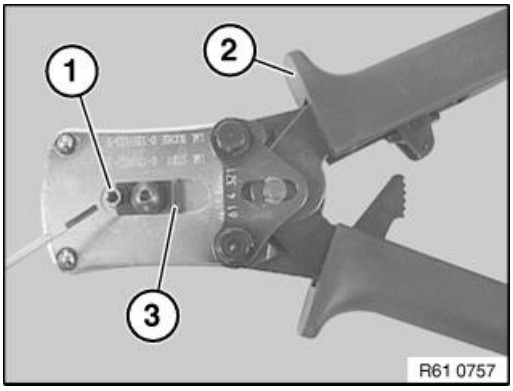
The hand pliers 61 4 321 (1) in connection with the crimping head 61 4 323 (2) from crimping kit 61 4 320 are used for crimping the optical fibres to size.

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



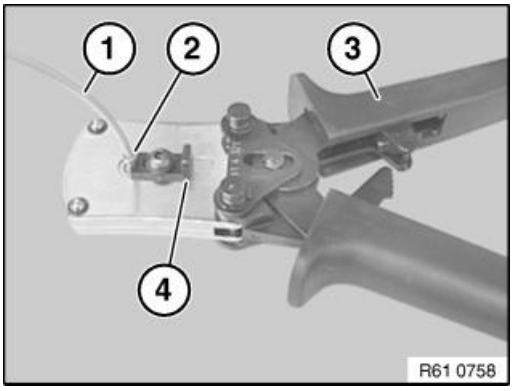
Move contact guide by means of stop lever (1) into corresponding position (pin contact or jack).

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Open hand pliers (2).

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

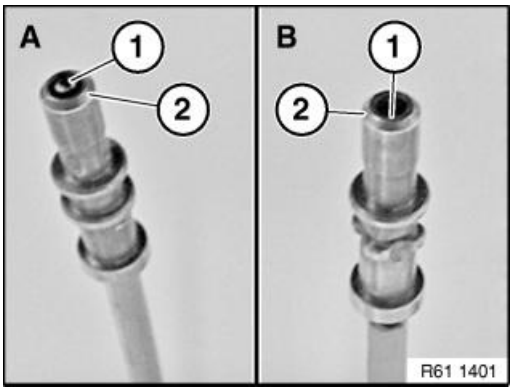


Insert stripped optical fibre(1) until limit position into pin contact or jack (2).

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 ... Cutting to length and stripping insulation from cables

For cutting cables to length and stripping insulation, refer to Service Information:

SI 2 07 11 721

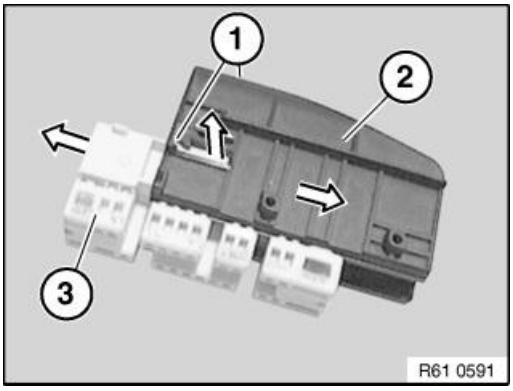
Stripped length:

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

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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)

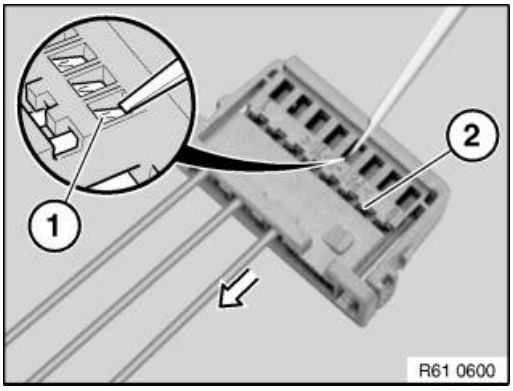


Socket housing:

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

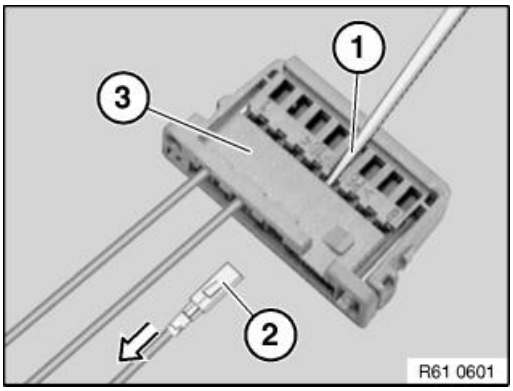
Detach protective cap from contact carrier (3).

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



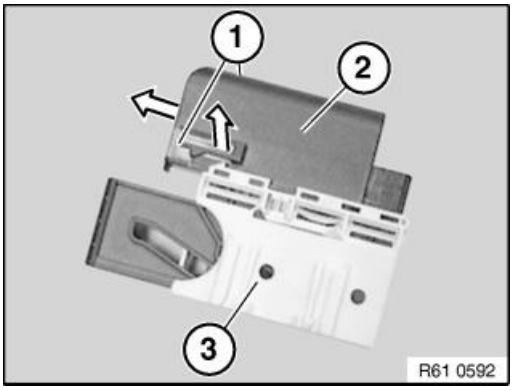
Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

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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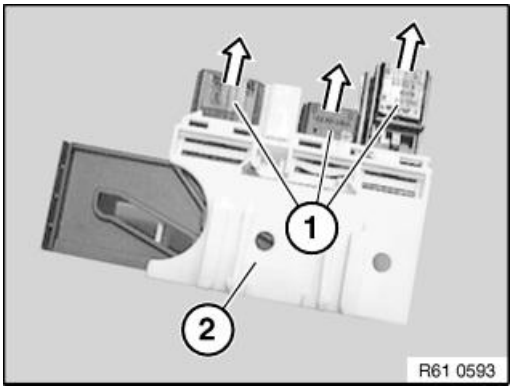


Pin housing:

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.



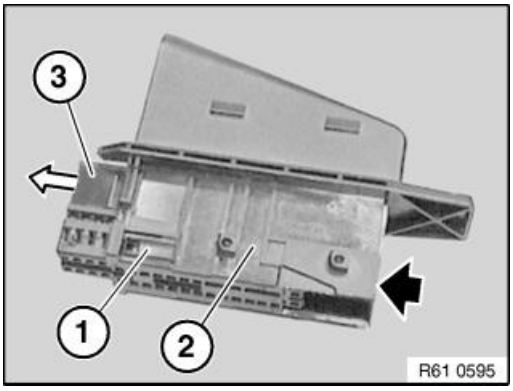
Pull contact carrier (1) out of housing carrier (2).

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

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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)

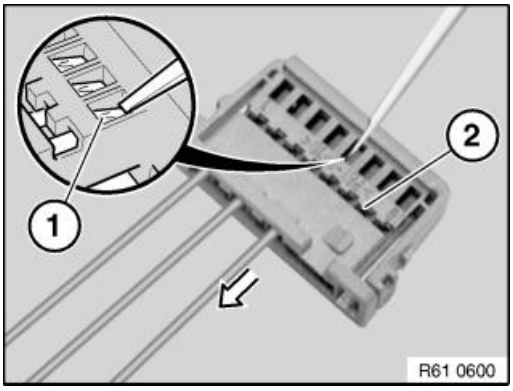


Socket housing:

Raise lock (1) on housing (2).

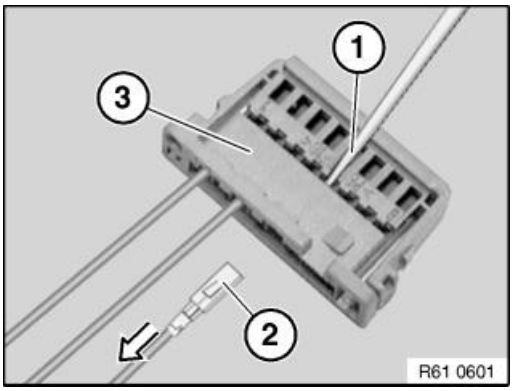
Push contact carrier (3) out of housing (2).

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



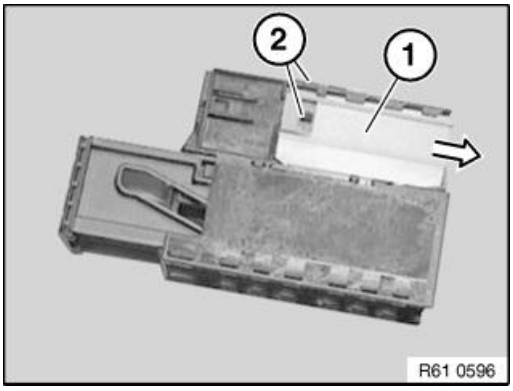
Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

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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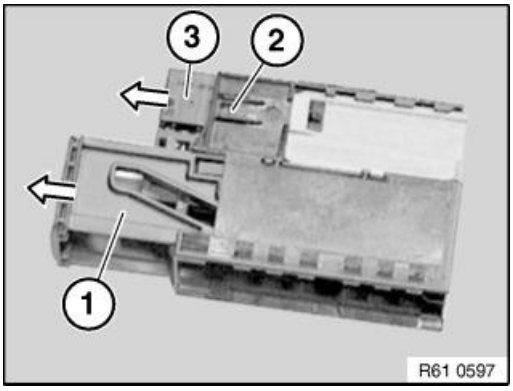


Pin housing:

Contacts 1 ... 13 and 19 ... 27:

Raise locking slide (1) on both sides (2) of housing and detach.

Note:
Detaching the locking slide releases the secondary locks of the pin contacts.



Contacts 14 ... 18 and 28 ... 30:

Pull slide (1) outwards completely.

Raise lock (2) on housing.

Pull contact carrier (3) out of housing.

Note:
Pulling out the contact carrier releases the secondary locks of the pin contacts.

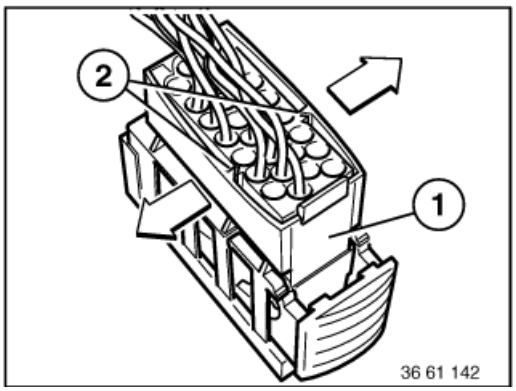
The pin contacts are pulled out of a contact carrier as described under ”Socket housing”.

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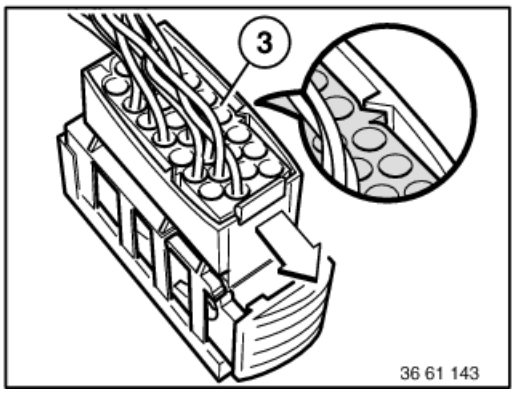
61 13 ... In-line connectors, 30-pin, System D2.5

Special tools required:

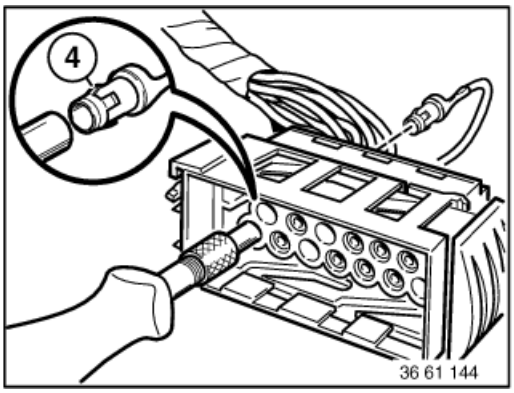
- 61 0 303



Carefully pull external connector (1) in area of retaining lugs (2) apart slightly.



Pull internal connector (3) until limit position in direction of arrow.



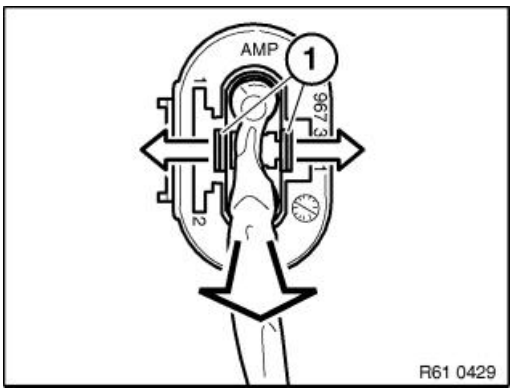
With special tool 61 0 303 press back retaining hook(4) of corresponding contact and pull out cable with contact.

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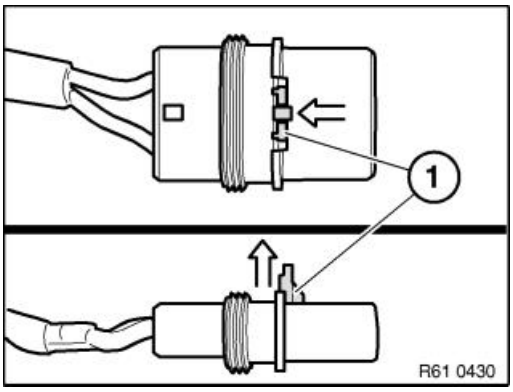
61 13 ... In-line plugs, 2-pin, System JPT ELA

Special tools required:

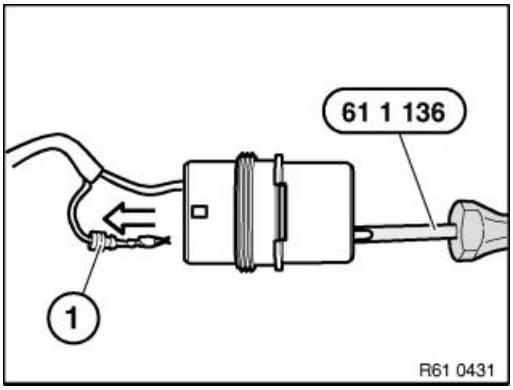
- 61 0 316



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



Press lock (1) downward and slide out to one side.



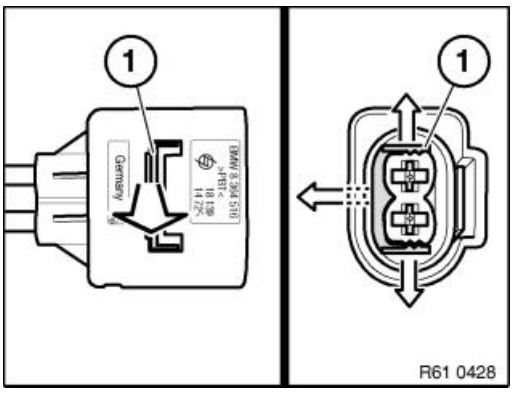
With special tool 61 0 316 (61 1 136), unlock contact and pull out cable with contact (1) towards rear.

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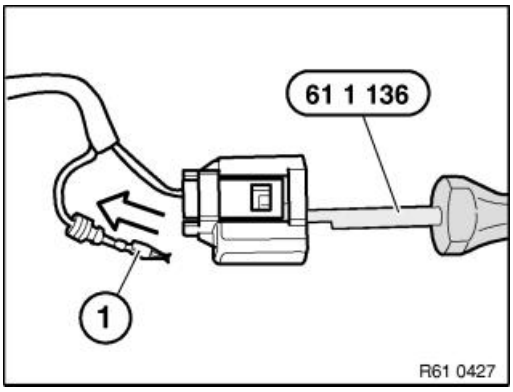
61 13 ... In-line plugs, 2-pin, System MDK 3 plus 2.8

Special tools required:

- 61 0 316



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



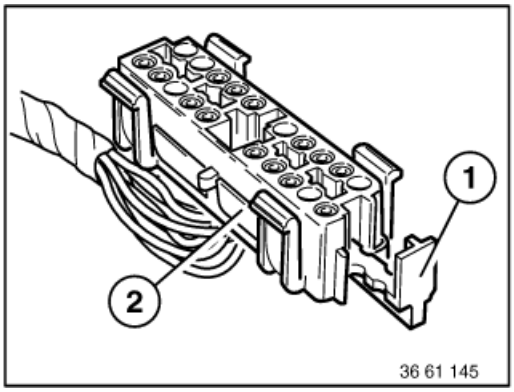
With special tool 61 0 316 (61 1 136), unlock contact and pull out cable with contact (1) towards rear.

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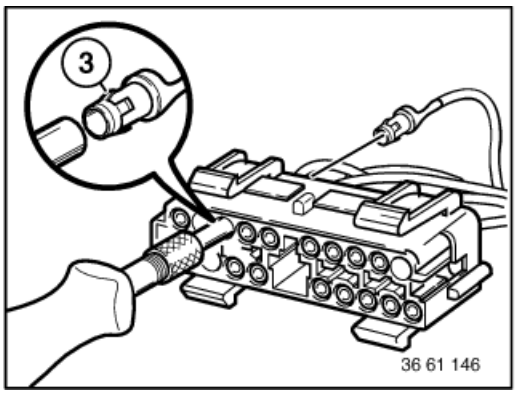
61 13 ... In-line plugs, 20-pin, System D2.5

Special tools required:

- 61 0 303



Pull locking slide (1) out of connector (2).



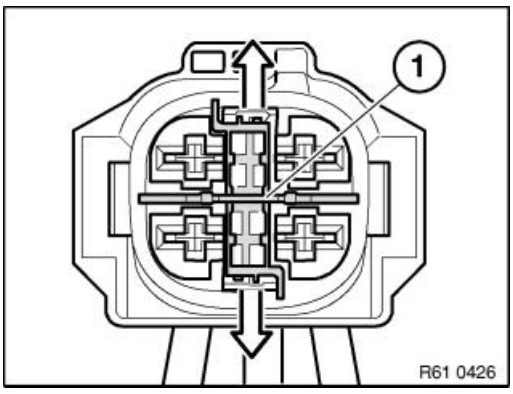
With special tool 61 0 303 , press down retaining hook (3) of corresponding contact and pull out cable with contact.

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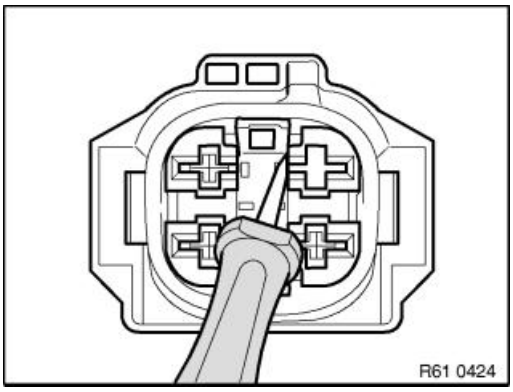
61 13 ... In-line plugs, 4-pin, System DFK ELA

Special tools required:

- 61 0 316

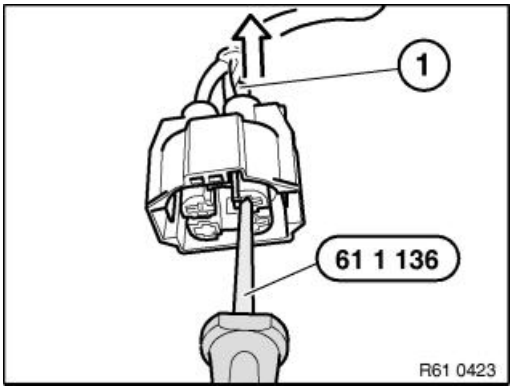


Press retaining hook in direction of arrow and remove lock (1).



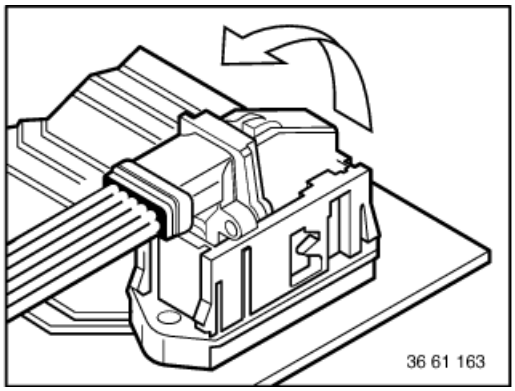
Installation notes:

If necessary, side lock must also be unlocked with screwdriver.

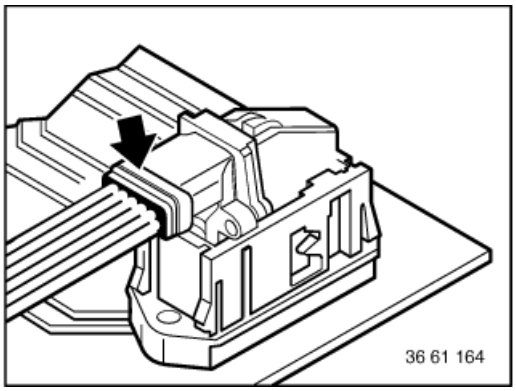


With special tool 61 0 316 (61 1 136), unlock contact and pull out cable with contact (1) towards rear.

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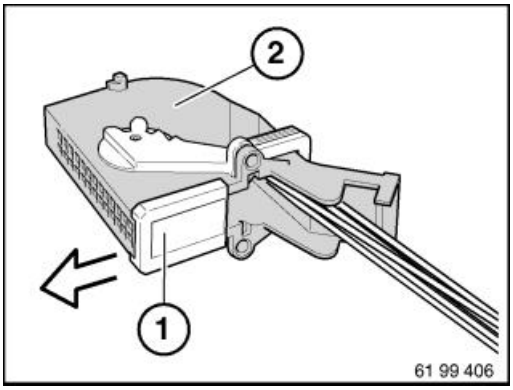


Open lock.

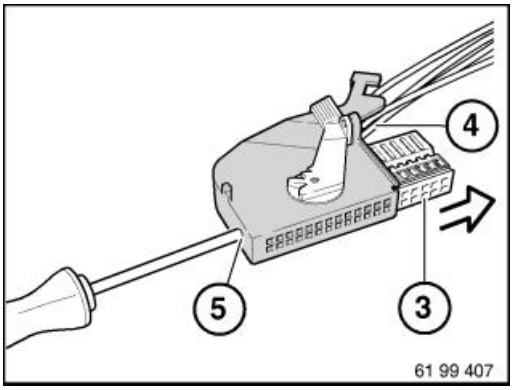


Detach cable strap.

Installation note:
Cable strap must be reinstalled.

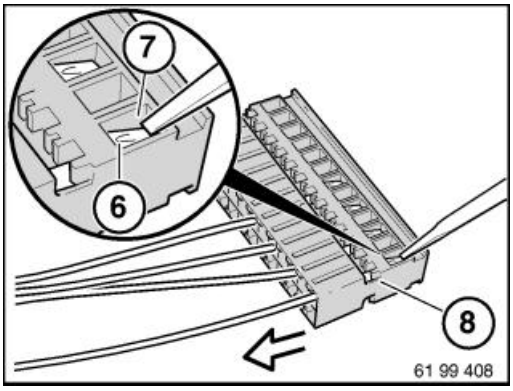


Detach catch (1) from connector housing (2).

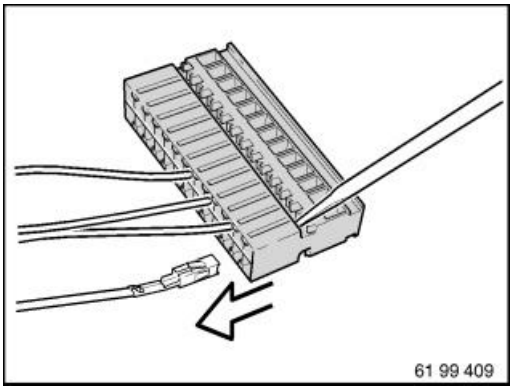


Press out contact carrier (3) with wiring harness (4) through opening (5).

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Hold down retaining hook (6) of defective contact and pull cable and contact up to secondary lock (8).



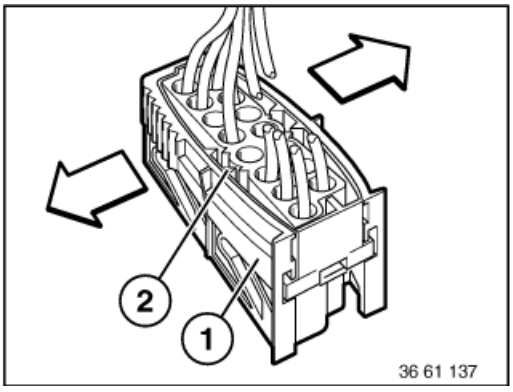
Hold down retaining hook once again in secondary lock (8) and pull cable and contact completely out of contact carrier.

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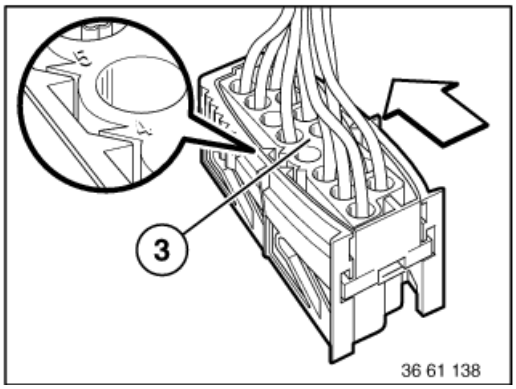
61 13 ... Inline connectors, 15-pin, System D2.5

Special tools required:

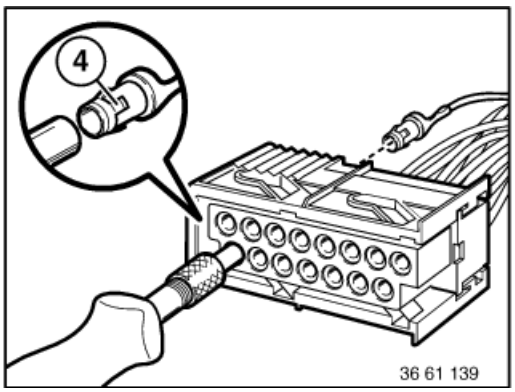
- 61 0 303



Carefully pull external connector (1) in area of retaining lugs (2) apart slightly.

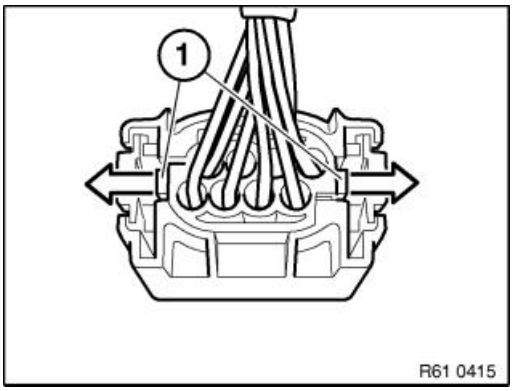


Pull internal connector (3) until limit position in direction of arrow.

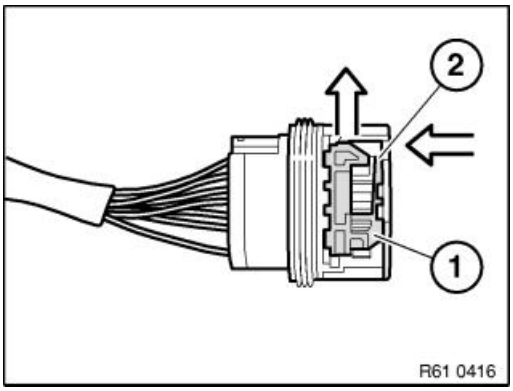


With special tool 61 0 303 press back retaining hook(4) of corresponding contact and pull out cable with contact.

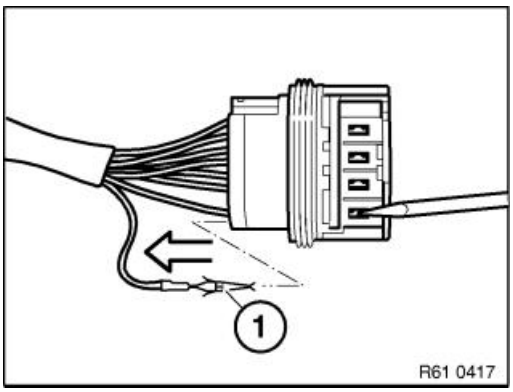
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Press lock (1) in direction of arrow and slide connector forward.



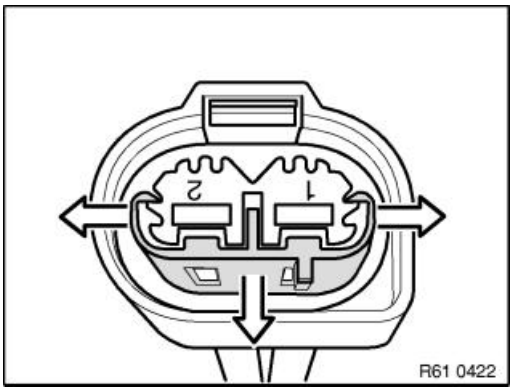
Press locking hook (2) downward and slide lock (1) out.



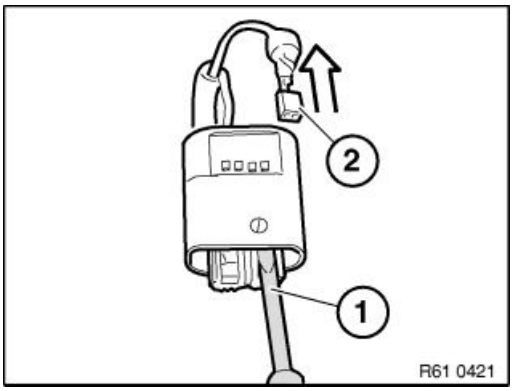
Press down retaining hook (1) with screwdriver and pull out cable with contact towards rear.

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



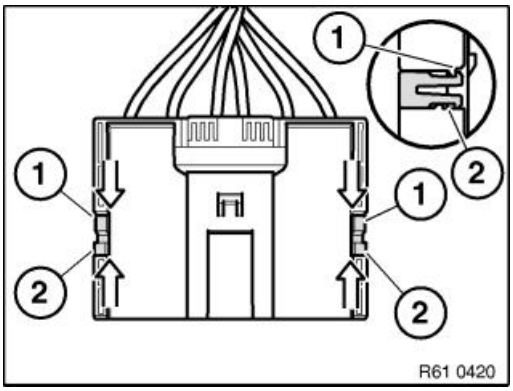
Press catch on outside in direction of arrow and remove towards top.



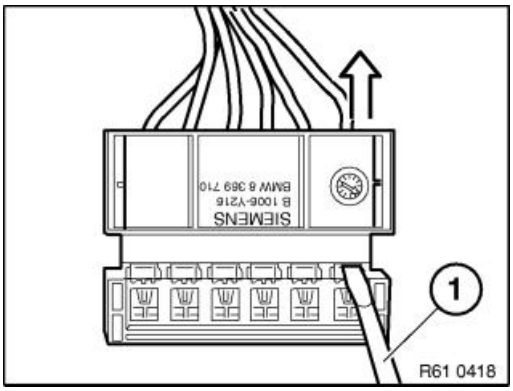
Press down retaining hook (1) with screwdriver and pull out cable and contact (2) towards rear.

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

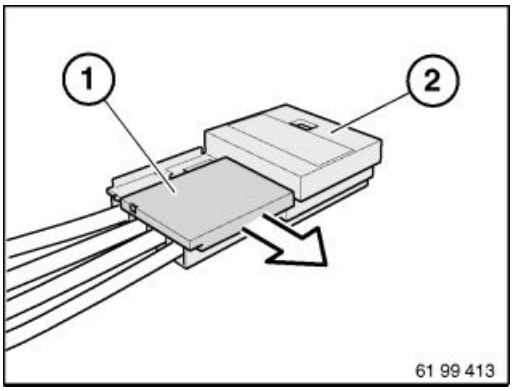


Press locking hook (1) in direction of arrow and disengage. Then unlock locking hook (2) and remove lock.

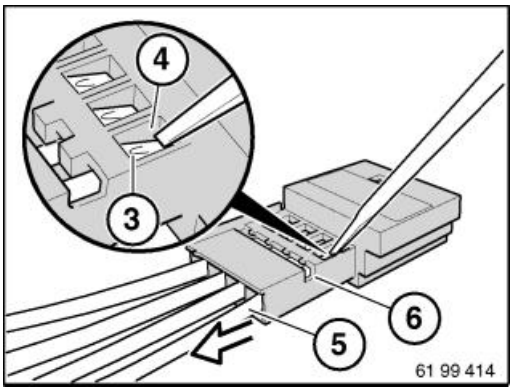


Press down retaining hook with screwdriver (1) and pull out cable with contact towards rear.

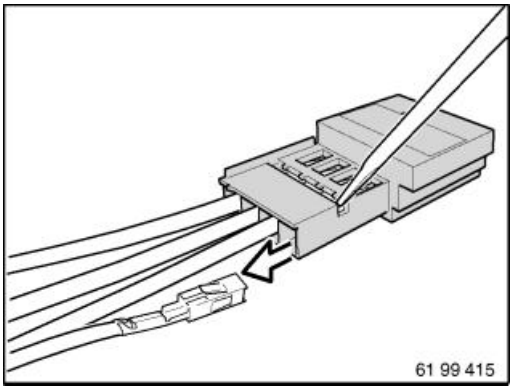
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Detach fastener (1) from contact carrier (2).



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



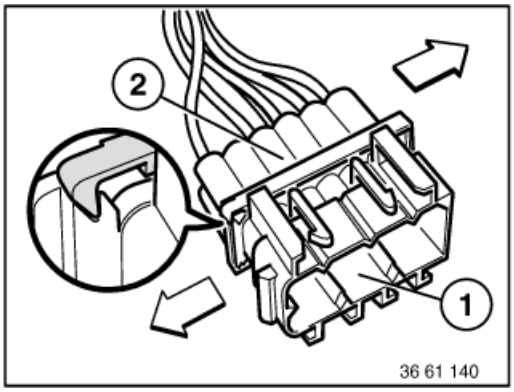
Hold down retaining hook once again in secondary lock and pull cable and contact completely out of contact carrier.

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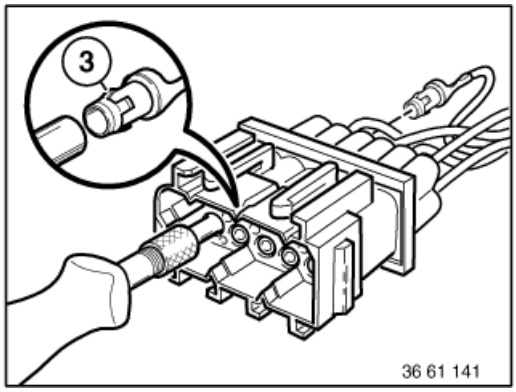
61 13 ... Inline plugs, 8-, 12-pin, System D2.5

Special tools required:

- 61 0 303



Move upper section of connector (1) and lower section of connector (2) against each other in direction of arrow.



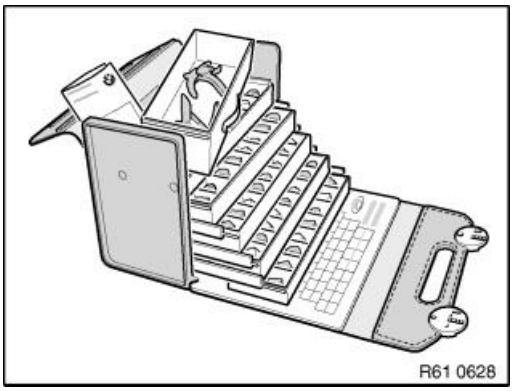
With special tool 61 0 303 , press down retaining hook (3) of corresponding contact and pull out cable with contact.

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61 13 ... Installing comb connector for retrofitting/repairs

Special tools required:

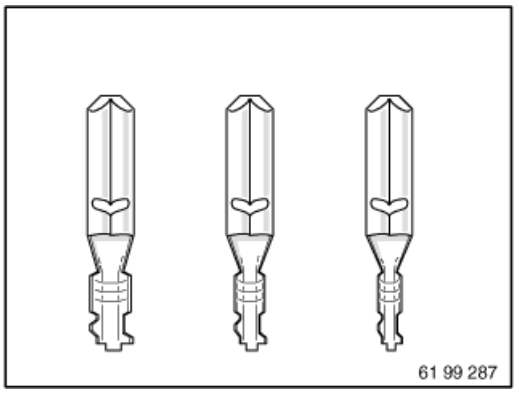
- 61 9 041
- 61 9 042



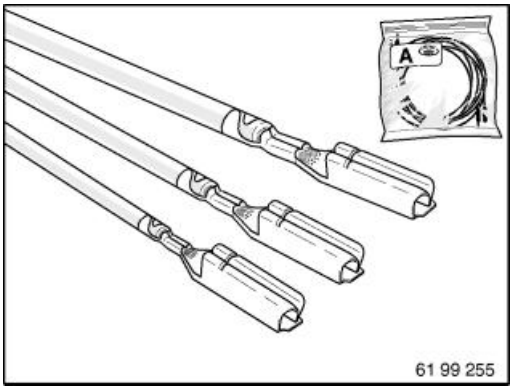
Note:
The repair range IV for vehicle electrical system contained the required special tools and individual parts for retrofitting and repair work with the aid of fan connectors.

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



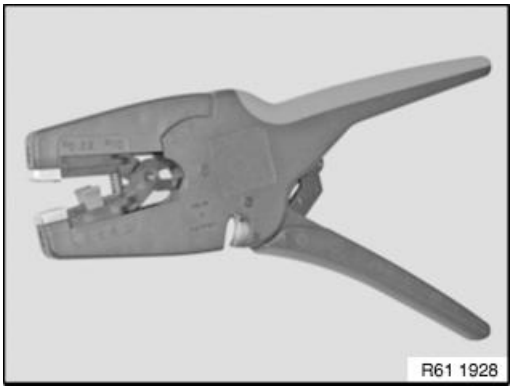
Choose contact sleeve (up to 4 mm^2) in accordance with wire cross-section.



Alternatively:

Choose contact sleeves (up to 2.5 mm^2) or comb connectors.

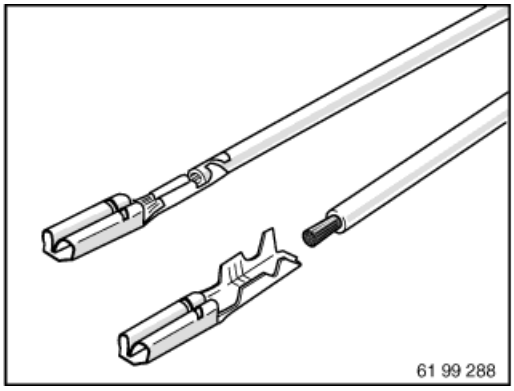
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Cut through wire loop in wiring harness at established point.

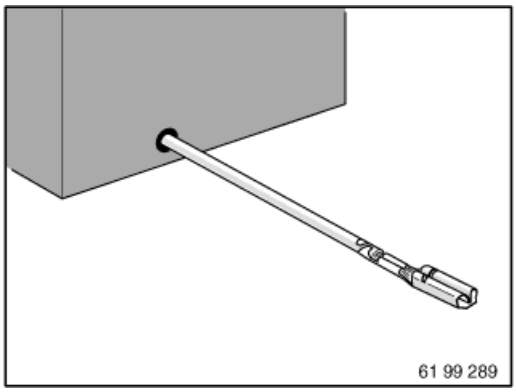
Strip insulation from both wire ends.

See repair instructions
Cutting to length and stripping insulation from cables

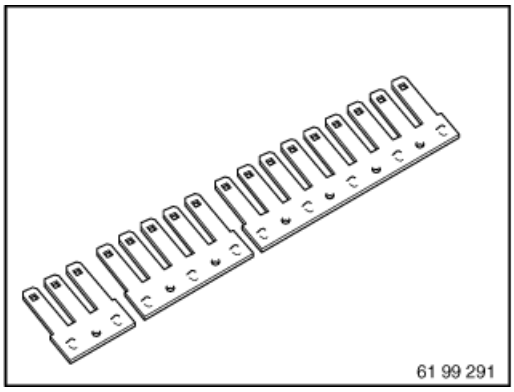


Crimp contact sleeves on both wire ends.*See repair instructions*
Crimping on stop parts

Note:
If using repair kit for contact sleeves, refer to repair instructions:
Butt connector for repairing a plug connection.

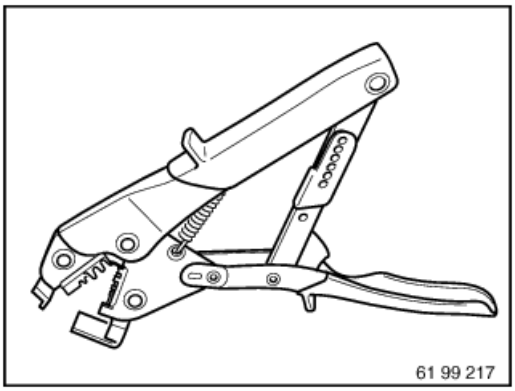


Crimp connecting cable for retrofitting likewise with contact sleeve.

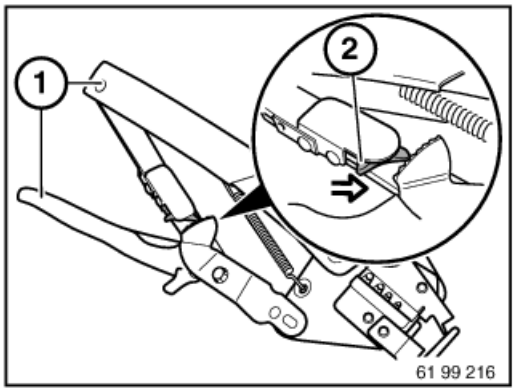


Cut required number of poles to length for comb connectors.

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Special tool 61 9 041 (hand pliers) in conjunction with 61 9 042 (matrix) are used for pushing contact sleeves onto comb connectors.*See repair instructions*
Special tools for wiring harness repairs.

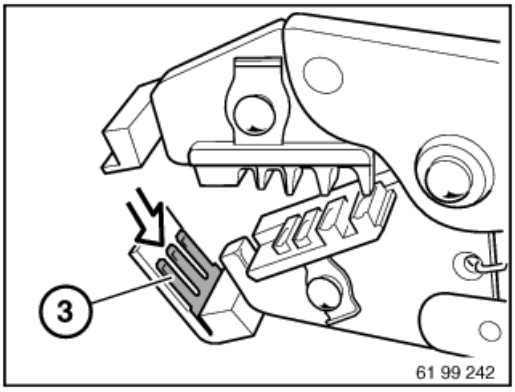


Unlock special tool 61 9 041 :

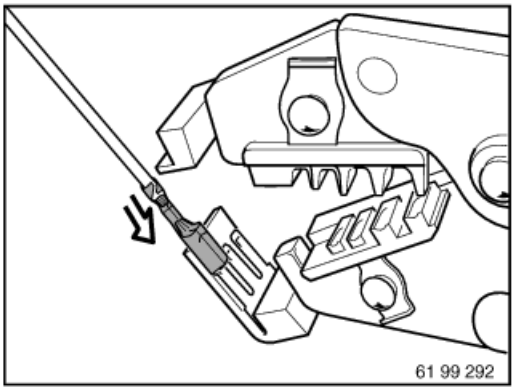
Squeeze grips (1) lightly and push release lever (2) in direction of arrow.

Or:

Compress handles until limit position, hand pliers unlock automatically.

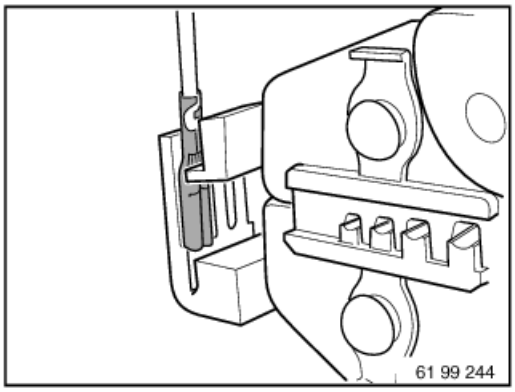


Insert prepared comb connectors (3) in special tool 61 9 041 / 61 9 042 .

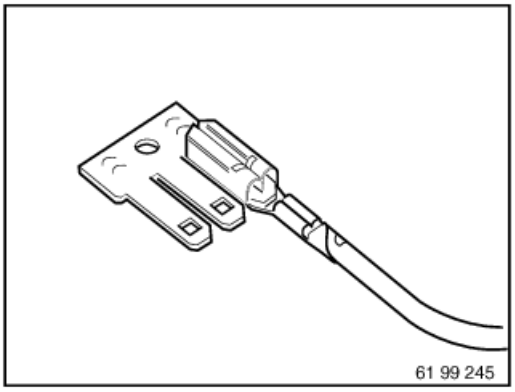


Attach wire with contact sleeve to comb connector.

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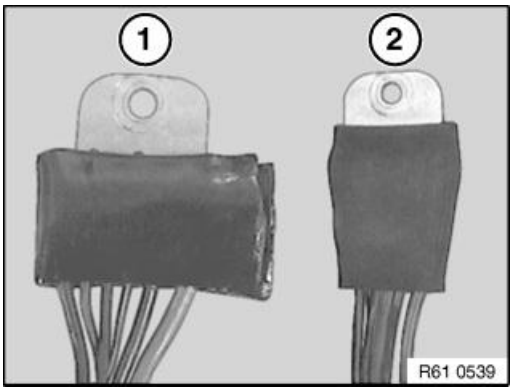
Press hand pliers together and slide on contact sleeve until limit position.



Attention!

Once contact sleeves have been pushed on, they should not be detached again from the comb connector or reused.

Push on further contact sleeves for potential branching.



Installation in wet area (engine compartment, wheel arch):

Apply sealing compound on both sides and press into contacts (1).

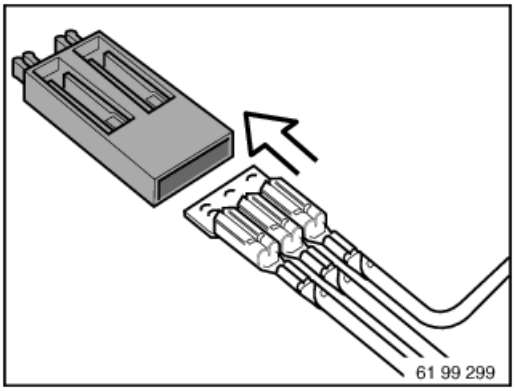
Fit heat-shrink tubing and heat up with hot air blower (2) (approx. 250 °C).

Note:
Ensure that comb connector has sufficient contact surface on attachment point.

Do not heat-shrink tubing on edges of comb connector too strongly, risk of cracking.

Allow heat-shrink tubing to cool down until hand-warm. Then press sealing material again into contacts and onto edges of comb connector.

If necessary, carefully heat-shrink tubing again.



Installation in dry area (interior, luggage compartment):

Slide assembled comb connector into insulation housing until it locks into place.

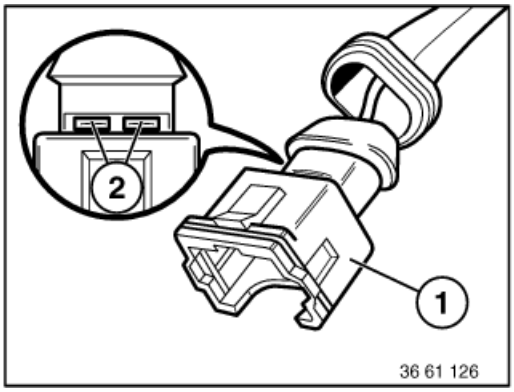
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61 13 ... Notes for opening contacts and locks of different plug contact systems

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100

Abbreviations of contacts and what they mean:	
ELA	**Strand seal**
D 1.5 / 2.5 / 3.5	**Round contacts with 1.5 mm, 2.5 mm or 3.5 mm diameter**
MDK	**Miniature double flat spring contact**
JPT	Junior Power timer
DFK	Double flat spring contacts
Elo	Electronic contacts
Elo Power	Electronic contacts for heavy load
MQS	Micro Quadlock system
MPQ	Micro Power Quadlock
MLK	Mini laminated contact
SLK	Sensor laminated contact
LSK	Load current contact
MLK	Mini laminated contact
Mcon	Multi contact



Important!

The contacts can be changed on ultrasonically welded connectors (1).

Ultrasonically welded connectors (1) must be replaced completely.

Ultrasonic-welded connectors (1) can be identified by the welds (2) on their longitudinal side.

Note:

Special tools referred to in the repair instructions below are contained in the following special tool sets:

- Unlocking and pressing-off tool 61 1 150

  is replaced as of 09/2005 by 61 0 300 (BMW) and 61 0 400 (MINI)
- Release and pressing-off tool 61 1 100 (engine)

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Repair instructions for opening connector housings and removing contacts of different connector systems:

Connector system D 1.5/D 2.5:

- Circular connectors, 7- or 8-pin, system D 2.5
- Circular connectors, 13-pin, system D 2.5
- Circular connectors, 20-pin, system D 2.5
- Circular connectors, 4-, 7-, 10-, 12- or 25-pin, system D 1.5/D 2.5
- In-line connectors, 15-pin, system D 2.5
- In-line connectors, 8-, 12-pin, system D 2.5
- In-line connectors, 30-pin, system D 2.5
- In-line connectors, 20-pin, system D 2.5

Connector system JPT/MDK/DFK:

- In-line connectors, 2-pin, System JPT ELA
- In-line plugs, 2-pin, System MDK 3 plus 2.8
- In-line plugs, 4-pin, System DFK ELA

Connector system Elo/Elo Power:

- Inline plugs, 4-, 10-pin, System Elo
- In-line connectors, 6- to 50-pin, System Elo
- Inline plugs, 3-, 6-pin, System Elo-Power 2.8

Connector system LSK:

- Connector housing LSK contact

Connector system MQS/MPQ:

- Inline connectors, 6-, 8-pin, System MQS
- Inline plugs, 2-pin, System MPQ 2.8
- Control unit connectors, 25-, 35-, 55-, 83-, 88-pin
- In-line plugs, 24-pin, Hybrid System MQS/MPQ
- Socket housing 42-, 43-pin, Hybrid System MQS / MPQ
- Socket housings 2x21-, 2x27-pin, Hybrid System MQS/MPQ, Elo/Elo Power
- In-line connectors, 30-pin, Hybrid System MQS/MPQ
- Socket housings, 5-, 8-pin, System MQS/MPQ
- Socket housing (radio connector), Hybrid System MQS/MPQ

For connector contact systems not listed, refer to Service Information:

SI 2 05 05 217
SI 2 05 06 294
SI 2 03 08 440
SI 2 08 06 312
SI 2 02 08 439
SI 2 01 08 438

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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 heater 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) fibre-optic cable
- Orange=repair fibre-optic cables

Follow instructions 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 instructions:

- Avoid compressive and tensile loads
- Make sure cables are laid without kinks or abrasions
- Ensure non-contacting routing at sharp-edged body parts; use edge protection if necessary
- Secure additionally laid cables/leads with cable ties

The following additionally applies:

Shielded lines

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

Coaxial lines

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

CVBS lines

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

HSD lines

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

Optical fibre cable:

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

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

Attention!

- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables 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.

Note:

- FlexRay lines may only reveal one separation point (bride); renew

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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.

Note:
Repair wiring harnesses can be equipped with an **additional socket housing** (e.g. 30-pin), **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):

- 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**

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separation point outside the vehicle interior.

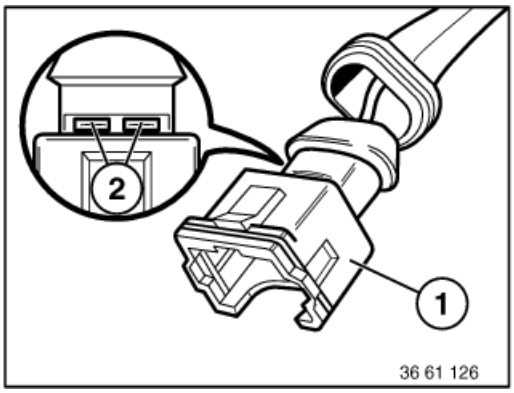
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61 13 ... Opening plug housings and removing contacts of different plug systems

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100
- 61 1 150

Abbreviations of contacts and what they mean:	
ELA	**Strand seal**
D 1.5 / 2.5 / 3.5	**Round contacts with 1.5 mm, 2.5 mm or 3.5 mm diameter**
MDK	**Miniature double flat spring contact**
JPT	Junior Power timer
DFK	Double flat spring contacts
Elo	Electronic contacts
Elo Power	Electronic contacts for heavy load
MQS	Micro Quadlock system
MPQ	Micro Power Quadlock
MLK	Mini laminated contact
SLK	Sensor laminated contact
MLK	Mini laminated contact
Mcon	Multi contact



Important!

The contacts can be changed on ultrasonically welded plugs (1).

Ultrasonically welded plugs (1) must be replaced completely.

Ultrasonic-welded connectors (1) can be identified by the welds (2) on their longitudinal side.

Note:

Special tools referred to in the repair instructions below are contained in the following special tool kits:

- Release and press-out tool 61 1 150

  is replaced from 09/2005 by 61 0 300 (BMW) and 61 0 400 (MINI)
- Release and press-out tool 61 1 100 (engine)

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Repair instructions for opening plug housings and removing contacts of different plug systems:

Plug system D 1.5/D 2.5:

- Circular plugs, 7-, 8-pin, System D 2.5
- Circular plugs, 13-pin, System D 2.5
- Circular plugs, 20-pin, System D 2.5
- Circular plugs, 4-, 7-, 10-, 12-, 25-pin, System D 1.5/D 2.5
- In-line plugs, 15-pin, System D 2.5
- In-line plugs, 8-, 12-pin, System D 2.5
- In-line plugs, 30-pin, System D 2.5
- In-line plugs, 20-pin, System D 2.5

Plug system JPT/MDK/DFK:

- In-line plugs, 2-pin, System JPT ELA
- In-line plugs, 2-pin, System MDK 3plus 2.8
- In-line plugs, 4-pin, System DFK ELA

Plug system Elo/Elo-Power:

- In-line plugs, 4-, 10-pin, System Elo
- In-line plugs, 6- to 50-pin, System Elo
- In-line plugs, 3-, 6-pin, System Elo-Power 2.8

Plug system MQS/MPQ:

- In-line plugs, 6-, 8-pin, System MQS
- In-line plugs, 2-pin, System MPQ 2.8
- Control unit plugs, 25-, 35-, 55-, 83-, 88-pin
- In-line plugs, 24-pin, Hybrid System MQS/MPQ
- Socket housing 42-, 43-pin, Hybrid System MQS / MPQ
- Socket housings 2x21-, 2x27-pin, Hybrid System MQS/MPQ, Elo/Elo-Power
- In-line plugs, 30-pin, Hybrid System MQS/MPQ
- Socket housings, 5-, 8-pin, System MQS/MPQ
- Socket housing (radio plug), Hybrid System MQS/MPQ

For plug contact systems not listed, refer to Service Information:

SI 2 05 05 217

SI 2 05 06 294

SI 2 03 08 440

SI 2 08 06 312

SI 2 02 08 439

SI 2 01 08 438

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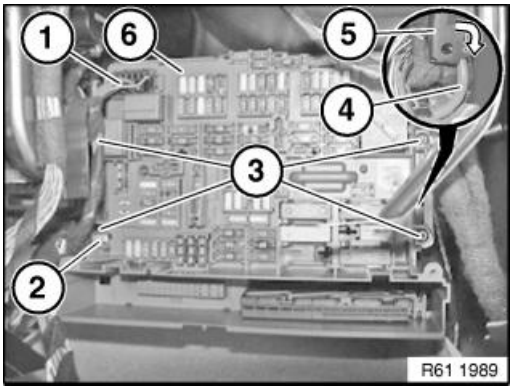
61 13 050 Removing and installing or replacing fuse box in passenger compartment (built after 03/2007)

Important!

Read and comply with notes on handling wiring harnesses and cables.

Necessary preliminary work:

- Remove right glove box with housing
- Remove Junction box



Disconnect plug connection (1).

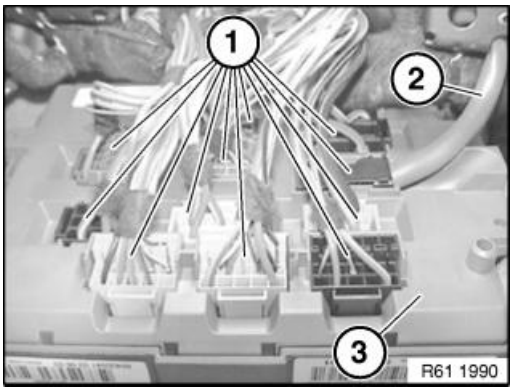
Release wiring harness mount (2) from fuse box interior (6).

Release screws (3).

Important!

Risk of damage!

Carefully fold passenger compartment fuse box (6) forwards, feeding positive battery cable (4) in direction of arrow out of passenger compartment fuse box bracket (5).



Disconnect all plug connections (1) on reverse side of fuse box interior (3).

Remove fuse box interior (3).

Installation note:
Battery positive lead (2) must not be damaged.

Make sure wiring harnesses are correctly laid and plug connections (1) are correctly latched.

Replacement:

If necessary, remove fuses and relays.

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61 14 ... Removing and installing/replacing power distribution box in passenger compartment



Operation is described in:

Removing and installing/replacing power distribution box in passenger compartment

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61 31 134 Removing and installing/replacing USB audio interface connection socket



Operation is described in:

Removing and installing/replacing AV connection socket

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61 00 ... Repairing airbag cables

Important!

> **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 adapter plug. 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 plug connection on 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 contacts of repair cable for airbag control unit in control unit plug, assignment of repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead. Now pin in contacts for airbag control unit or contacts of adapter plug, assignment of repair cables is relevant. Cut off excess length of repair cable in proximity (visible area) of airbag module or of adapter plug. 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.

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.

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 scope of work, unpin contacts either on airbag control unit/airbag module or on adapter plug. 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 connectors.

Installing and removing contacts.

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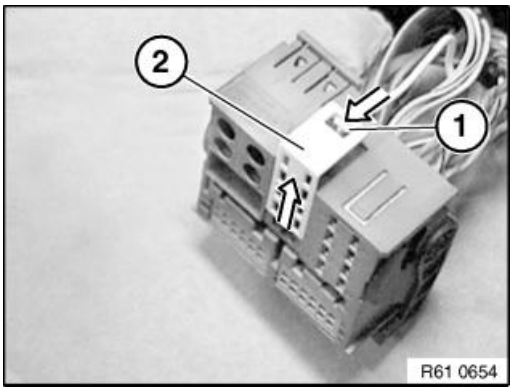
61 13 ... Socket housing (radio connector), Hybrid System MQS/MPQ

Special tools required:

- 61 0 314

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

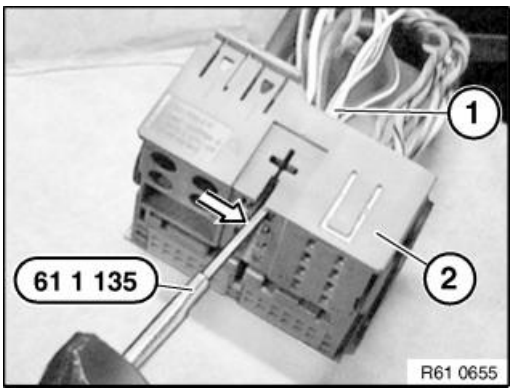
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



Removing MPQ contacts from radio connector:

Press lock (1) in direction of arrow.

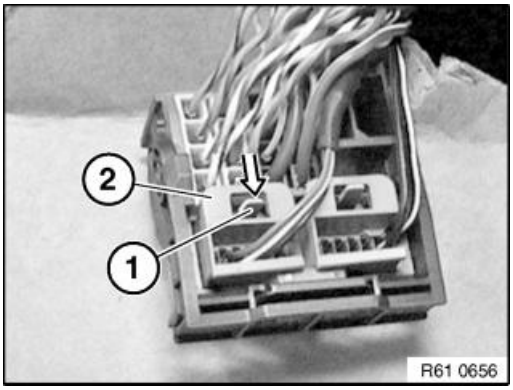
Detach secondary lock (2) from radio plug.



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.

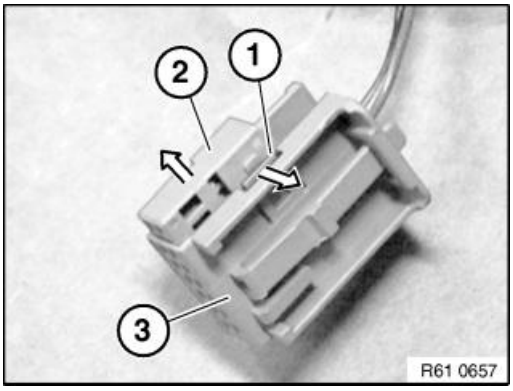
Pull wire (1) with socket contact out of radio connector (2).



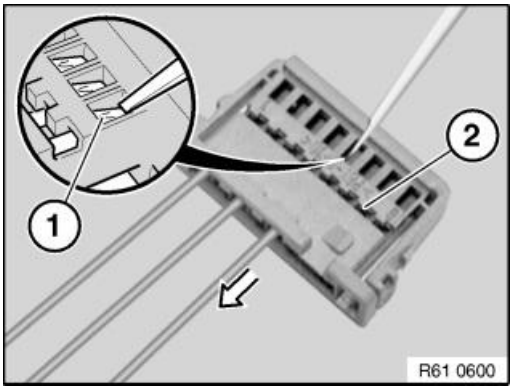
Removing MQS contacts from contact carrier:

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

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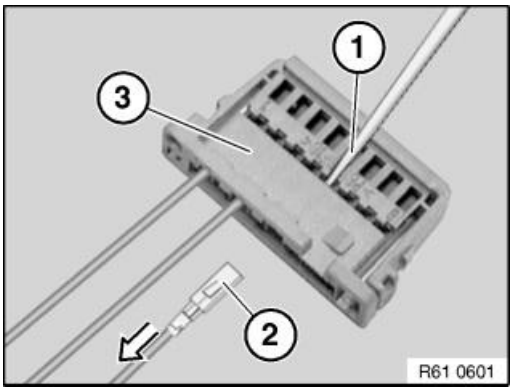
Press lock (1) in direction of arrow. Pull contact carrier (2) out of housing (3).*Note:*
When the contact carrier is pulled out, the secondary locks of the socket contacts are raised.



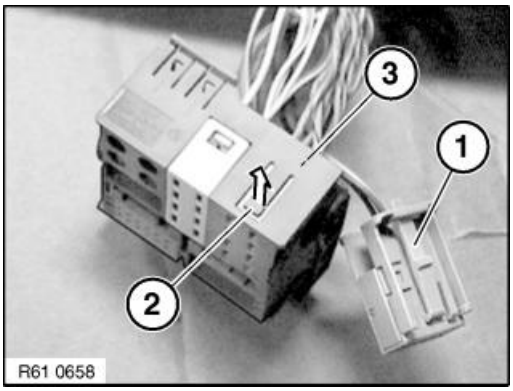
Note:
Schematic diagram shows the 8-pin socket housing by way of example.

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).



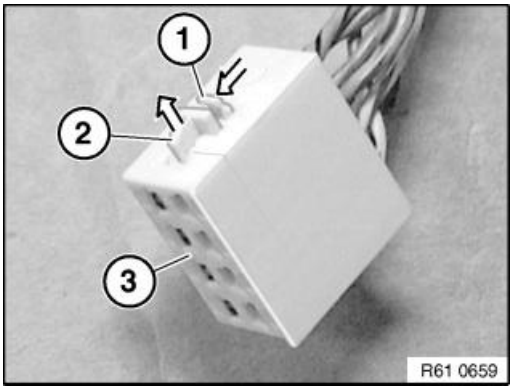
Removing MPQ contacts from contact carrier:

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

Raise lock (2) on radio connector.

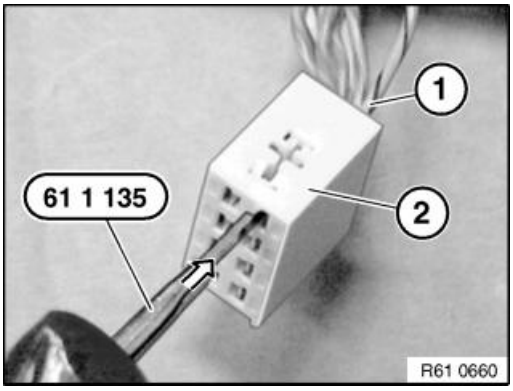
Pull contact carrier (3) out of radio connector.

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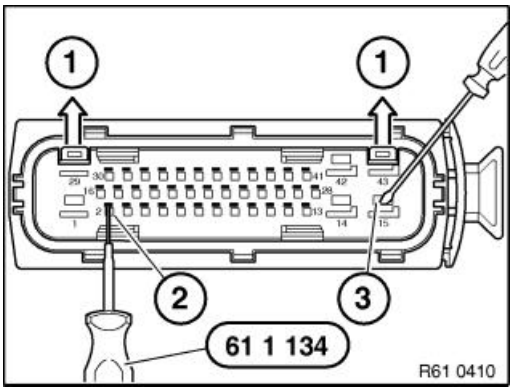
61 13 ... Socket housing 42-, 43-, 46-pin, Hybrid System MQS / MPQ

Special tools required:

- 61 0 312

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

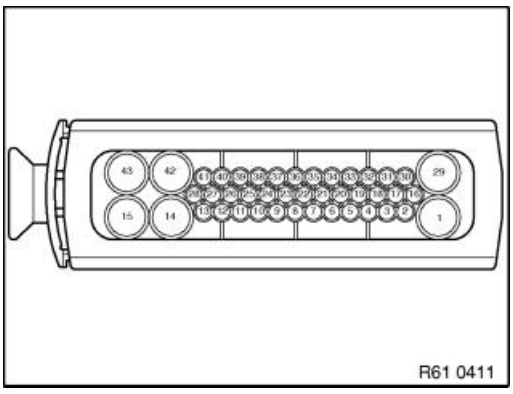
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



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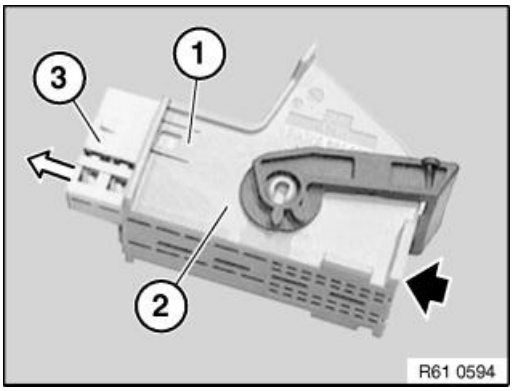
61 13 ... Socket housings, 2x21-, 2x27-pin, Hybrid Systems MQS/MPQ, Elo/Elo Power

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)

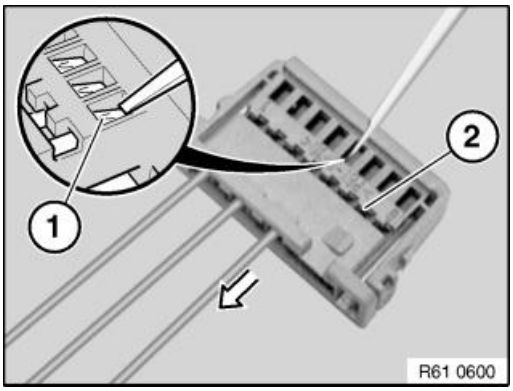


Raise lock (1) on housing (2).

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

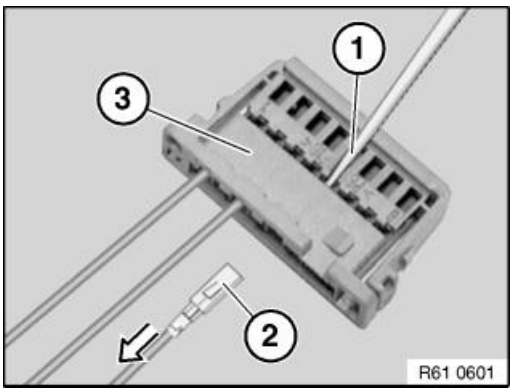
Note:
The second contact carrier is pushed out in the same way.

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).



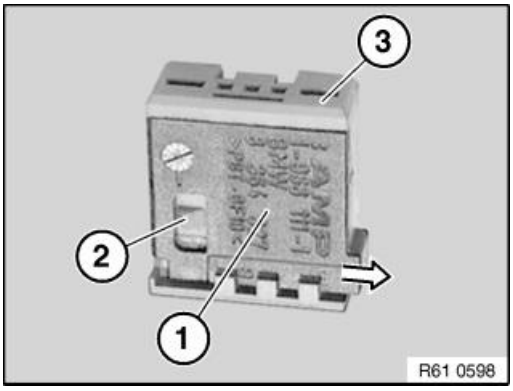
Hold down retaining hook in secondary lock (1) again and pull cable with socket contact (2) completely out of contact carrier (3).

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

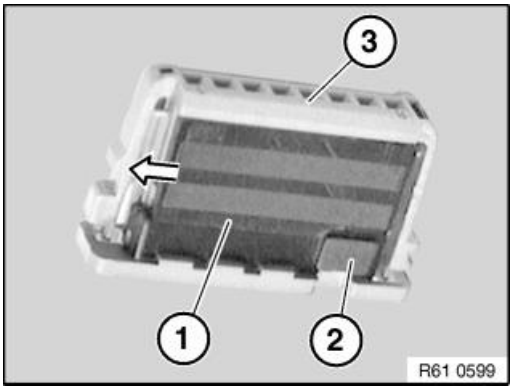
Manufactured by AMP: The following contact types without strand sealing can be fitted in the connector housings:

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



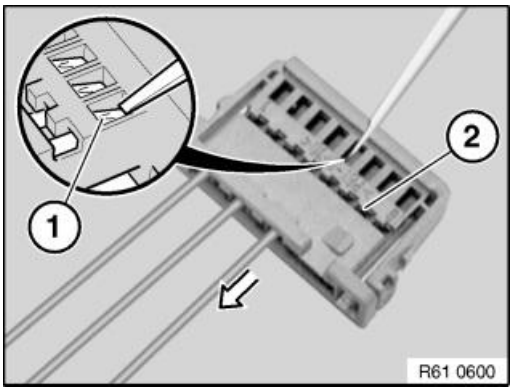
Socket housing, 5-pin (Hybrid System MQS/MPQ)

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



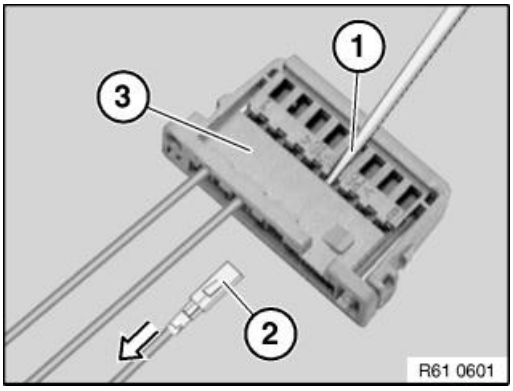
Socket housing, 8-pin (MQS):

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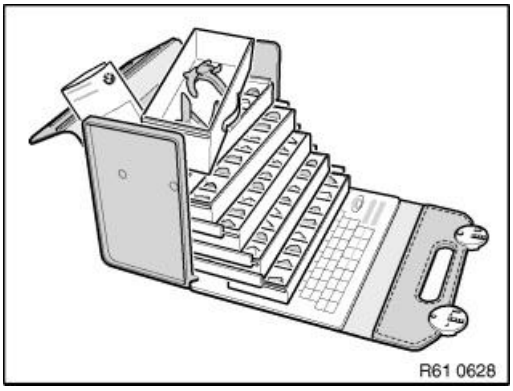
Hold down retaining hook in secondary lock (1) again and pull cable with contact (2) completely out of contact carrier (3).

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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



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

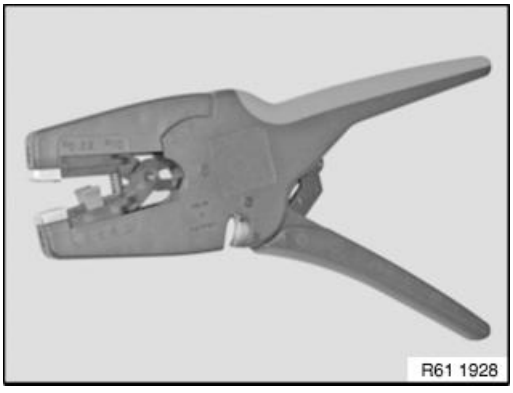


Release and press-out tool:

- Special tool61 0 300
- Special tool 61 0 400 (MINI N12/N14)
- Special tool 61 1 100 (engine)

Handling:

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



Cutting to length and stripping insulation from cables:

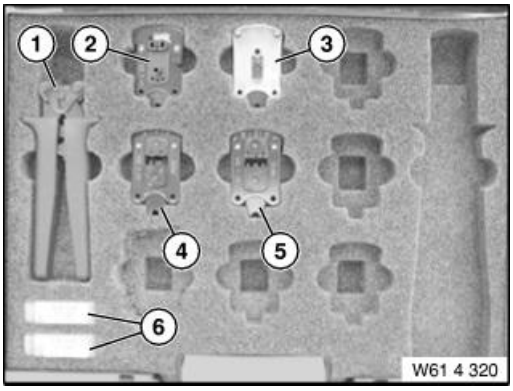
Wire stripper MultiStrip10*

*Sourcing reference BMW Workshop Equipment Catalogue

Handling:

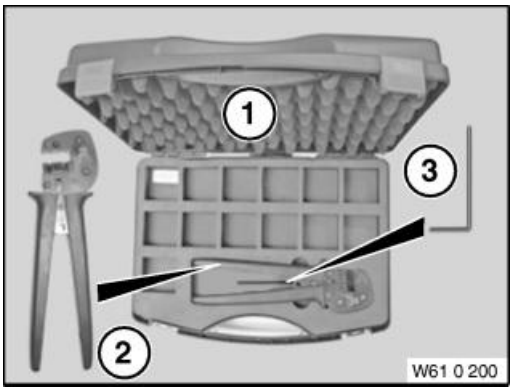
- Cutting cables to length and strip insulation

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Crimping stop parts (small contacts) and butt connectors:

- Special tool61 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 set)
- 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 ... Treating cables and optical fibres

Special tools required:

- 61 4 320
- 61 0 200

Note:
Special tools referred to in the repair instructions below are contained in the following special tool sets:

Repair range for vehicle electrical system	SI 2 04 07 341
Crimping set with pliers for optical fibres, Micro Power Quadlock (MPQ), Micro Quadlock System (MQS) contacts and universal crimping head	61 4 320 61 0 200

Subject of repair instructions

- Special tools for wiring harness repairs
- Cutting cables to length and strip insulation
- Crimping stop parts (contacts)
- Butt connector for repairing a plug connection
- Comb connector for retrofitting/repairs
- Cutting to length and stripping insulation from optical fibres

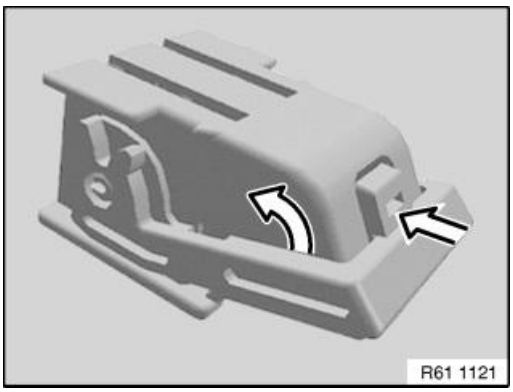
  Crimping optical fibres

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61 13 ... Unlocking and disconnecting different plug connections

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

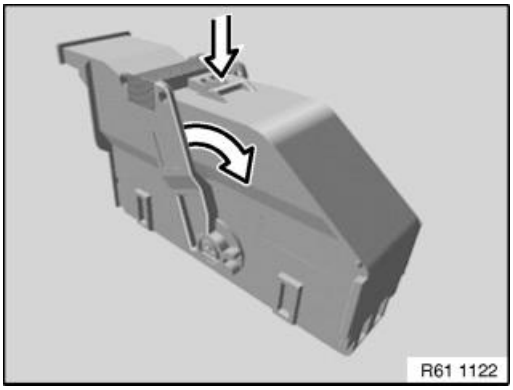
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

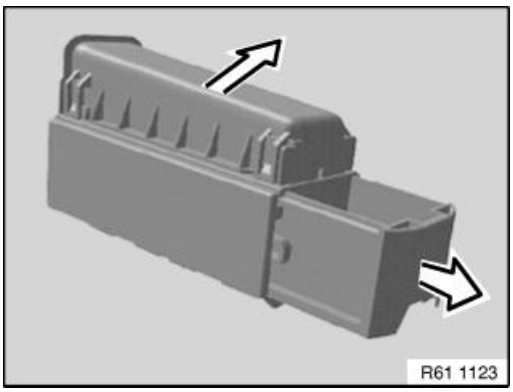
Disconnect plug connection.



2.

Press lock and open release clip in direction of arrow.

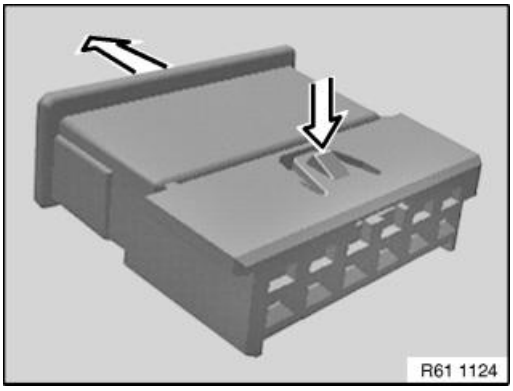
Disconnect plug connection.



3.

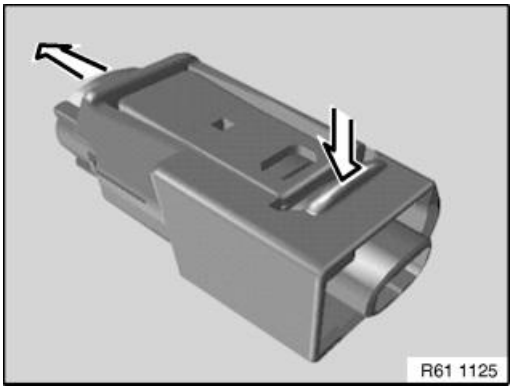
Open release clip in direction of arrow and disconnect plug connection in direction of arrow.

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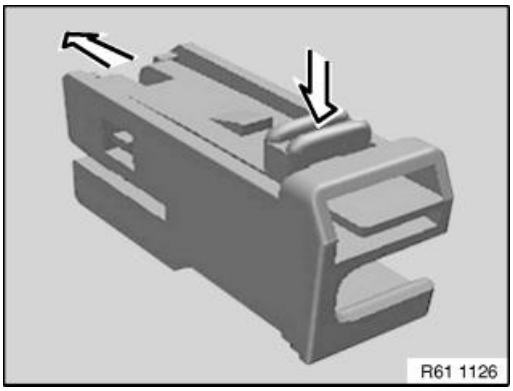
4.

Press lock and disconnect plug connection in direction of arrow.



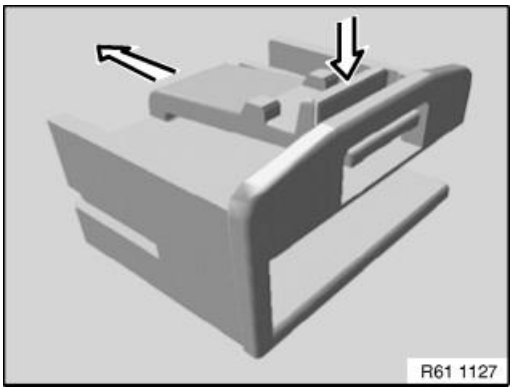
5.

Press lock and disconnect plug connection in direction of arrow.



6.

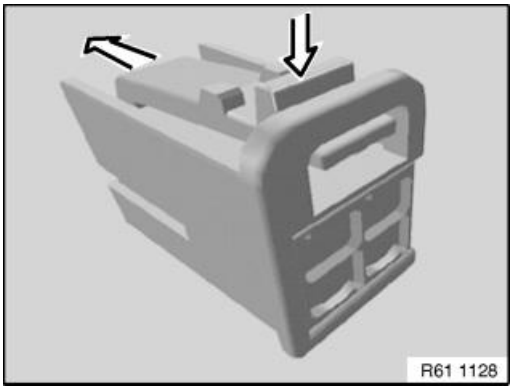
Press lock and disconnect plug connection in direction of arrow.



7.

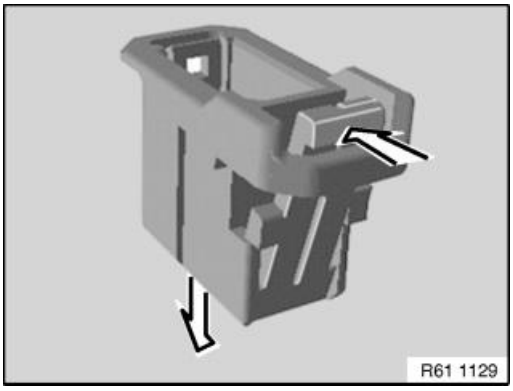
Press lock and disconnect plug connection in direction of arrow.

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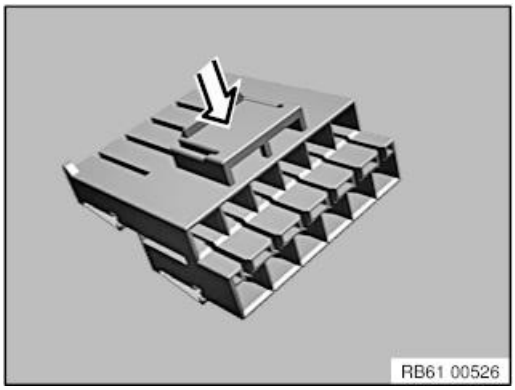
8.

Press lock and disconnect plug connection in direction of arrow.



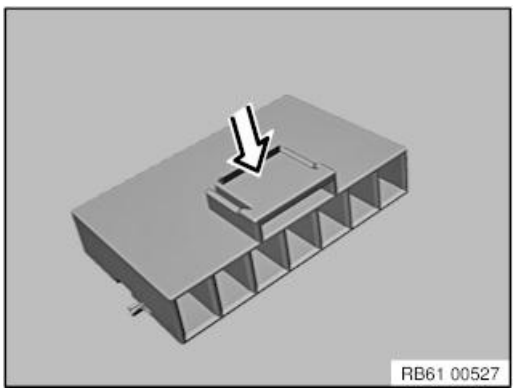
9.

Press lock and disconnect plug connection in direction of arrow.



10.

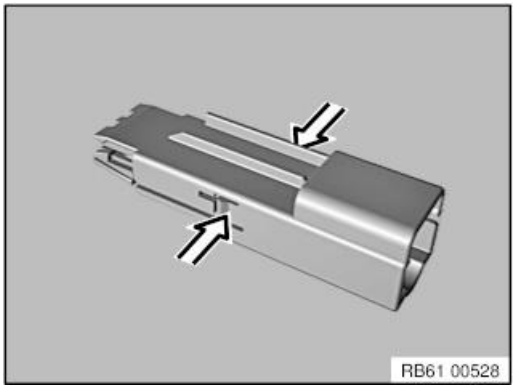
Press the lock and detach plug connection.



11.

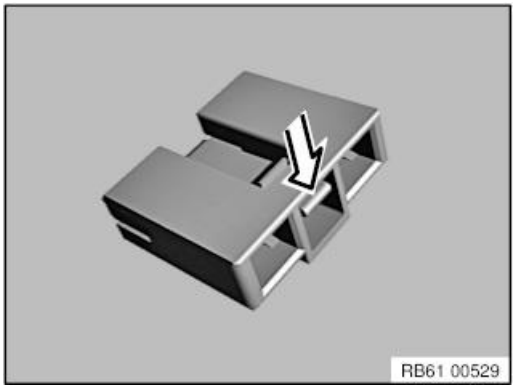
Press the lock and detach plug connection.

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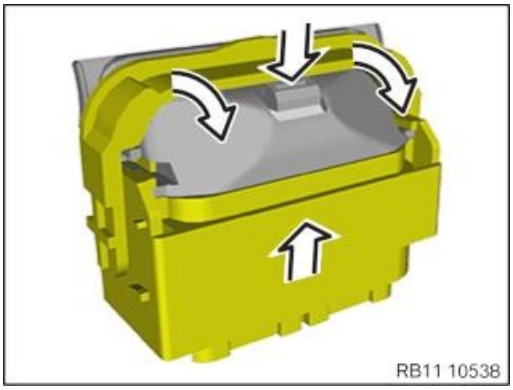
12.

Press the lock on both sides and detach plug connection.



13.

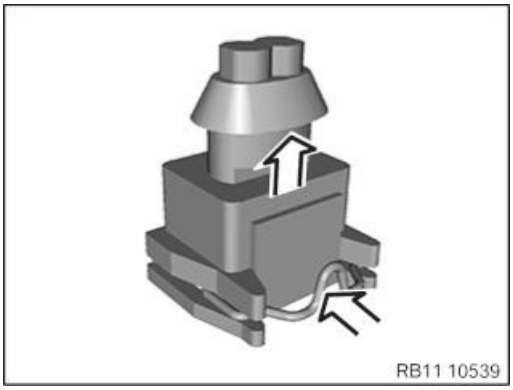
Press the lock and detach plug connection.



14.

Press lock and open release clip in direction of arrow.

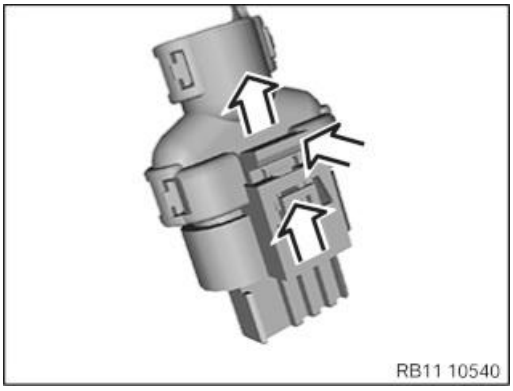
Disconnect plug connection.



15.

Press the lock and detach plug connection.

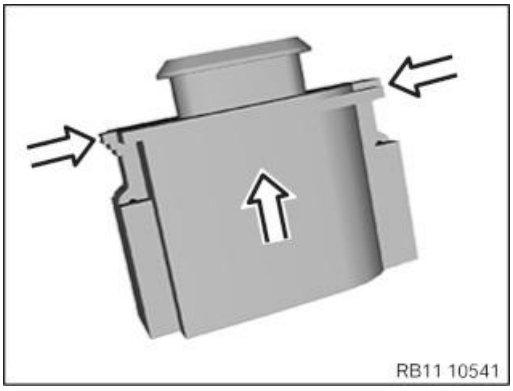
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16.

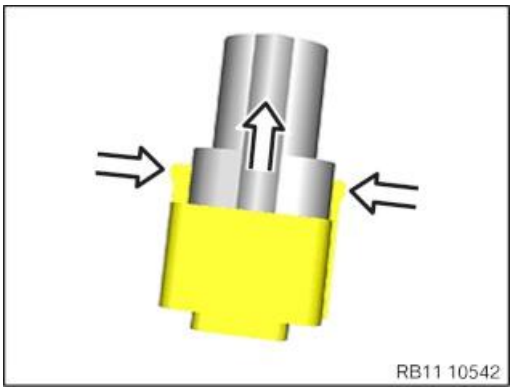
Pull out lock and press.

Disconnect plug connection.



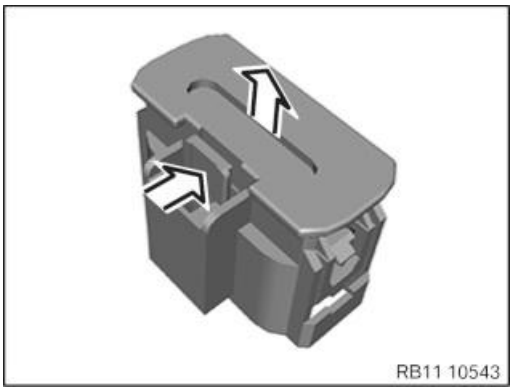
17.

Press the lock and detach plug connection.



18.

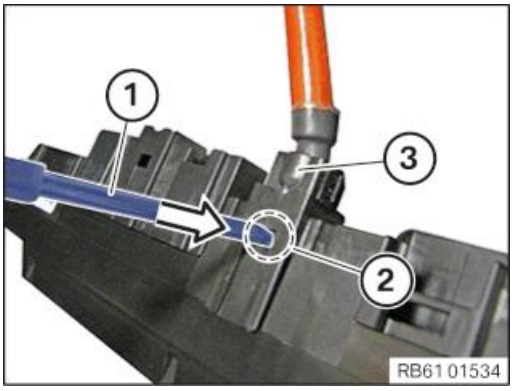
Press the lock and detach plug connection.



19.

Press the lock and detach plug connection.

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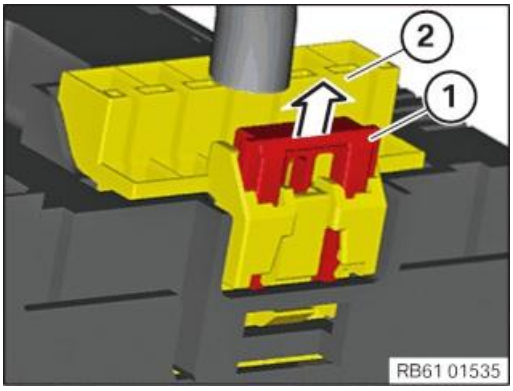


20.

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.

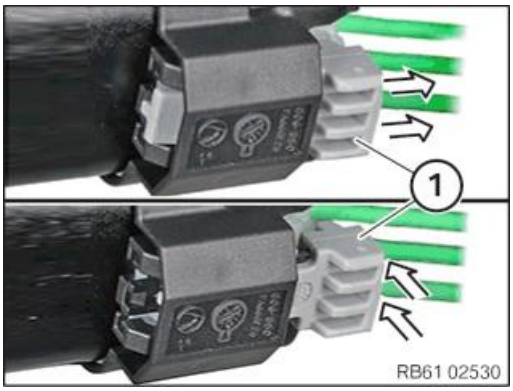


21.

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!

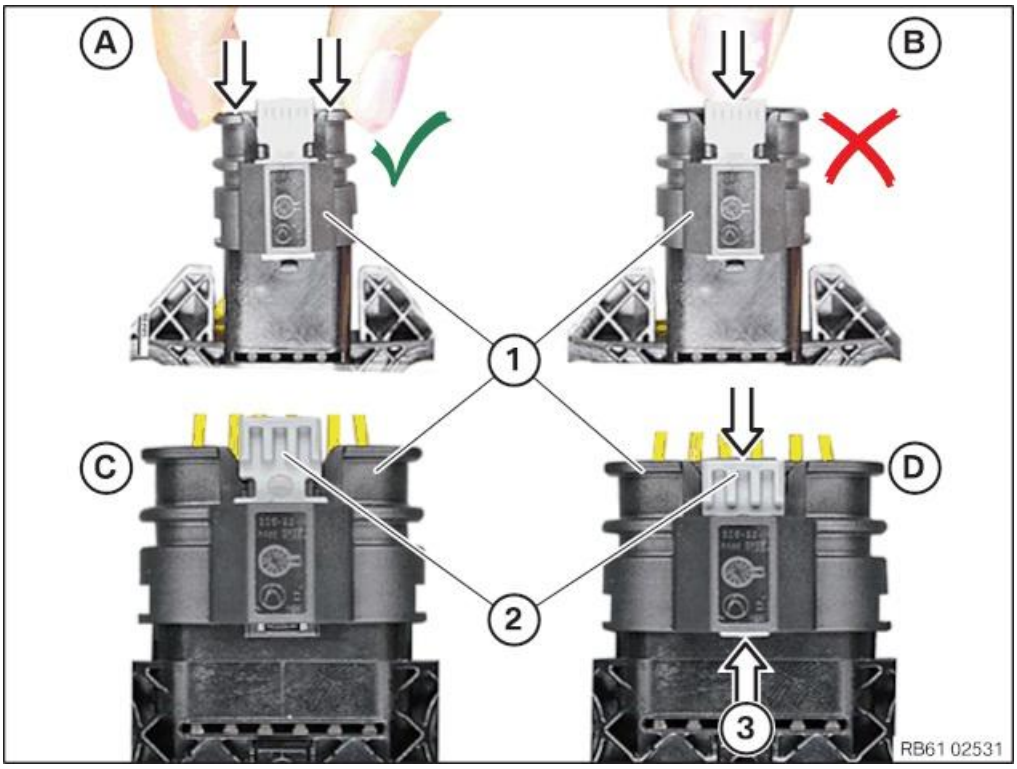
For this connector type, increased forces come into play when disconnecting and closing.

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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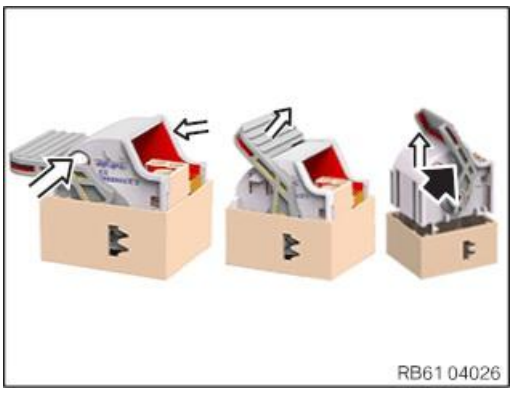


23.

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:

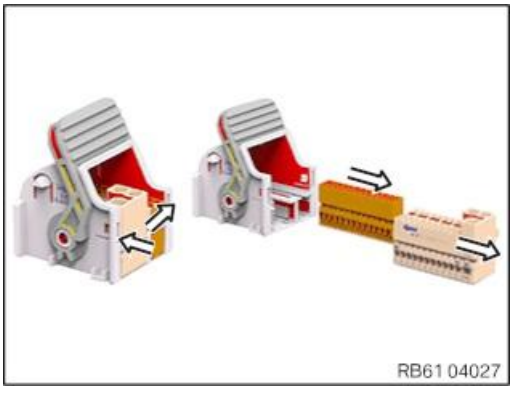


24.

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.

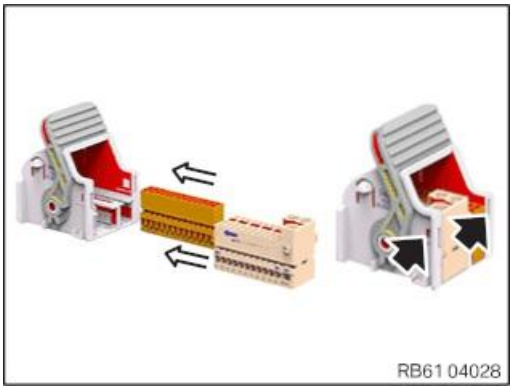
Once the lever is locked in the end position, remove plug connection upwards.



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

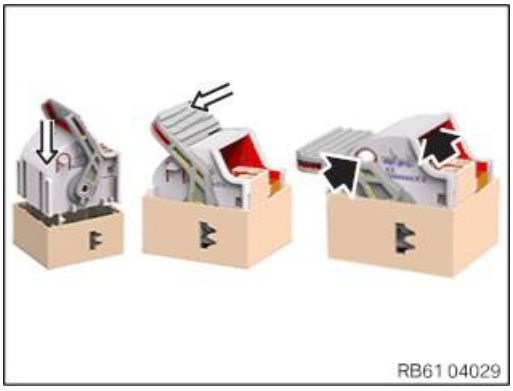
Slide out after unlocking the socket housing.

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Slide in socket housing up to limit position.

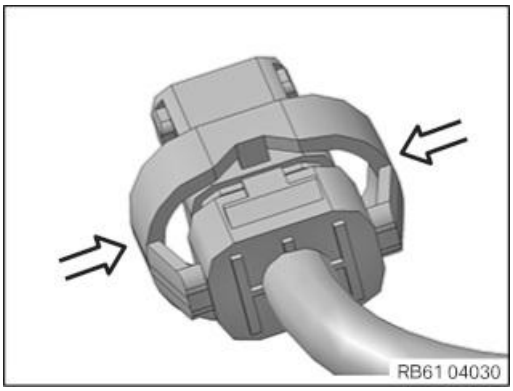
Lock socket housing into place in end position.



Sliding in up to limit position.

Activate plug-inn procedure by moving lever downwards.

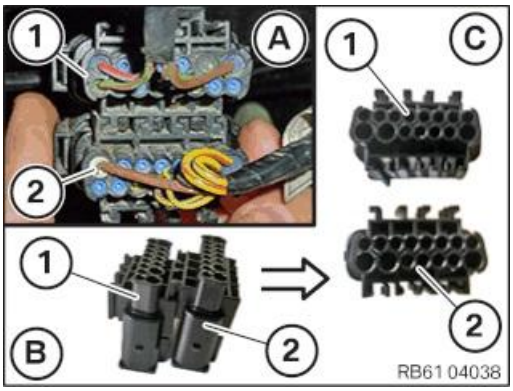
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.



25.

Rosenberger D4S20G-400A5-Y

Press to unlock on both sides.

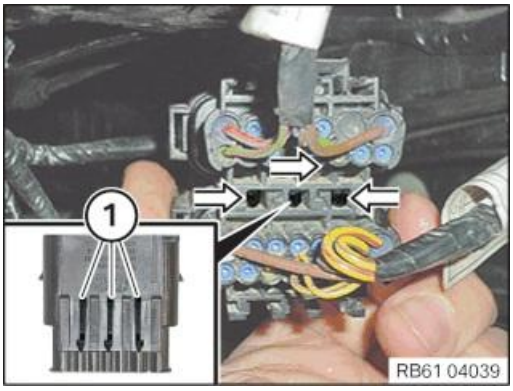


26.

Pin housing, 15-pinMLK1

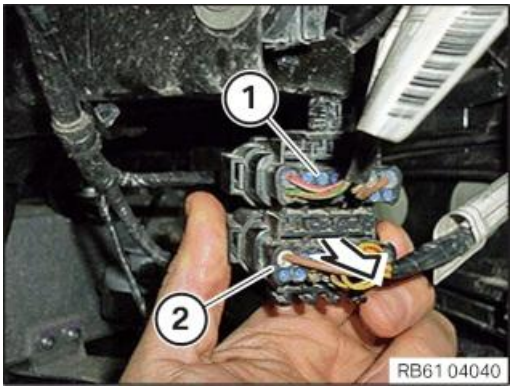
- A & B. To avoid any damage to individual connectors, the given connector assembly consisting of several individual connectors (1) & (2) must be released before disconnecting the plug connection.
- C: released connector assembly

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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).

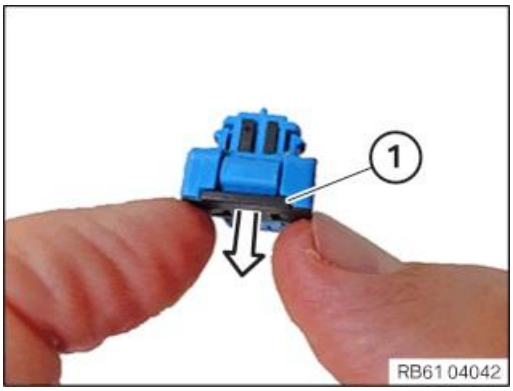


27.

Airbag ignition circuit connector

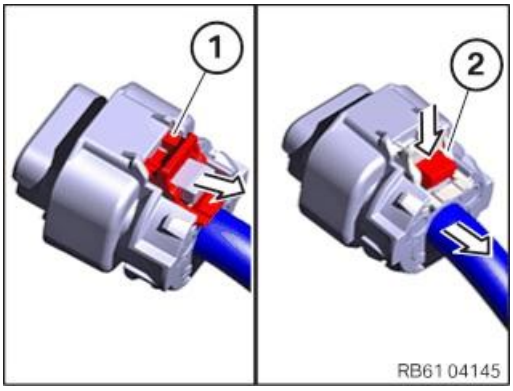
Warning!

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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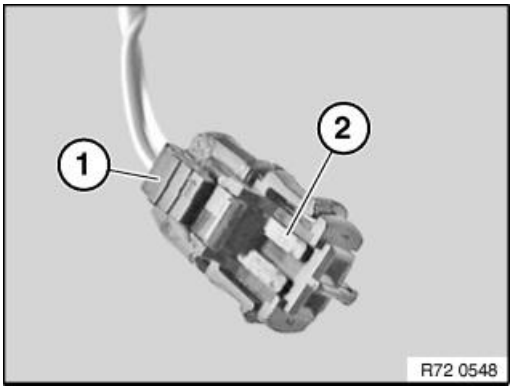


28.

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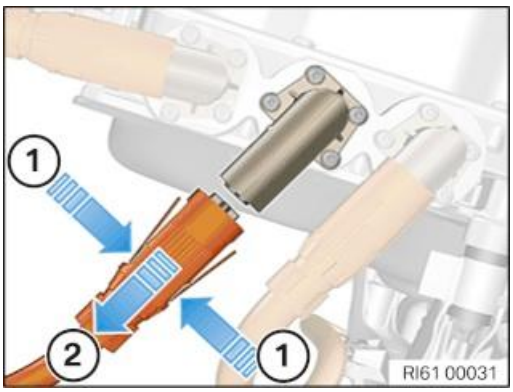
61 13 ... Unlocking and disconnecting various plug connections in electrical and hybrid vehicles



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:

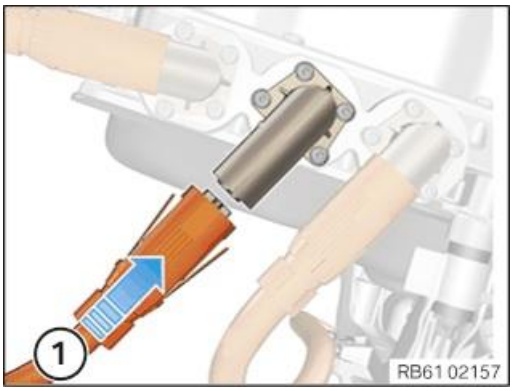
Press the lock (1) on the left and right on the connector in the direction of the arrow.

Pull off connector (2) in direction of arrow.

Attention!

Connector (2) is difficult to pull off.

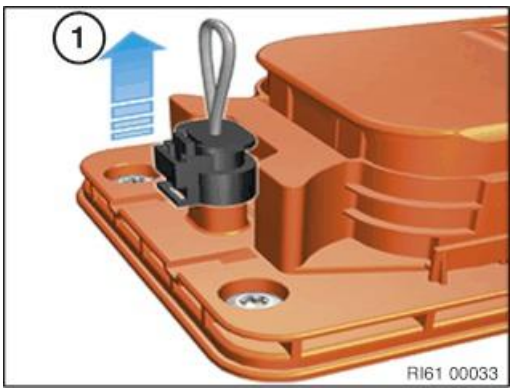
In the event of damage to high-voltage connector (2), the complete high-voltage cable must be replaced!



Connect the Hirschmann high-voltage connectors:

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

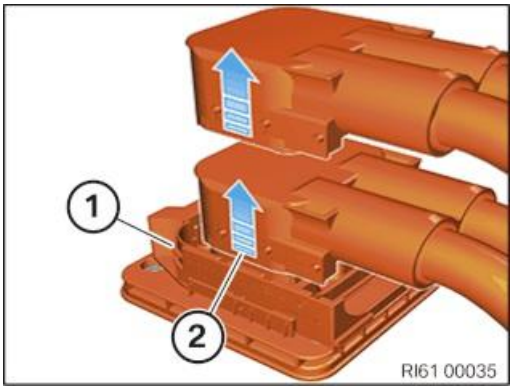
Note:
Connector (2) must lock audibly.



Disconnect the Kostal high-voltage connector:

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

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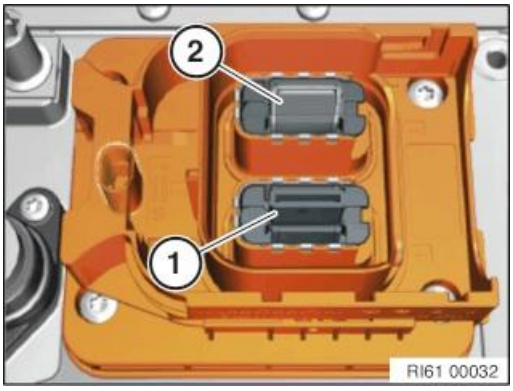
Push the lock (1) fully to the front.

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:

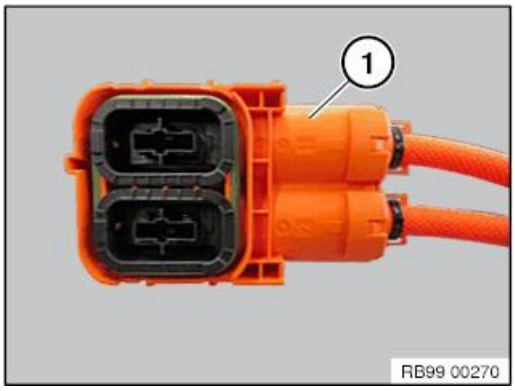
Check the touch protection for damage and correct positioning (1).

Warning!

Do not touch unprotected connector (2)!

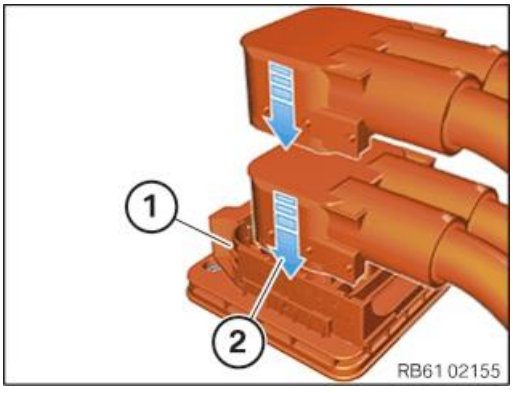
If the contact protection (1) has been pushed to the bottom (2), the high-voltage connector must be refitted.

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:

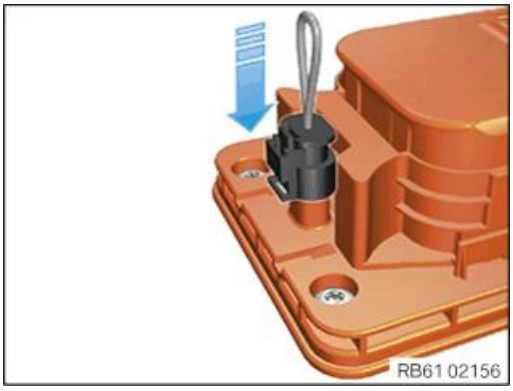
Connect the connector (2) in one single movement to the counter-housing.

Push the lock (1) fully to the rear.

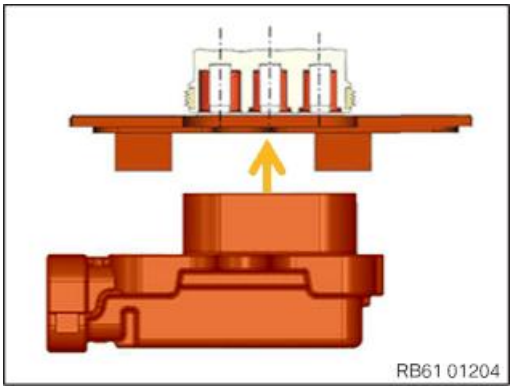
Attention!

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

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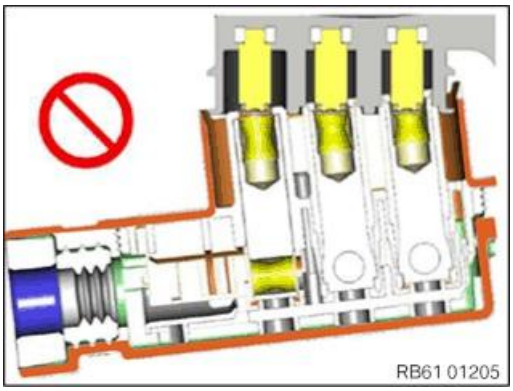


Connect the connector for the high-voltage interlock.



Three-phase high-voltage connector:

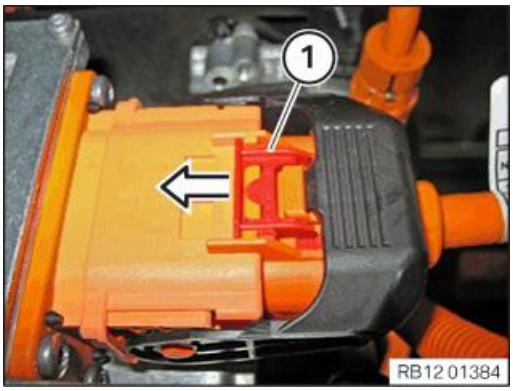
Connect and disconnect the connector straight.



Attention!

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

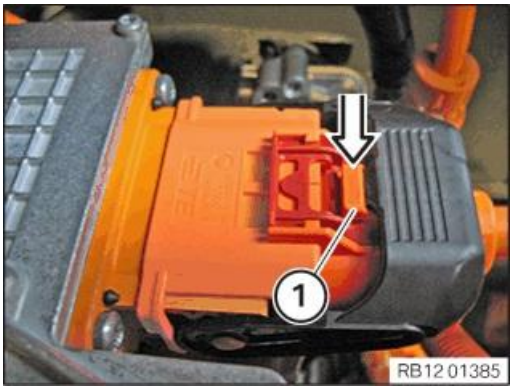
Increased tilted connections will increase the connecting force and the risk of danger.



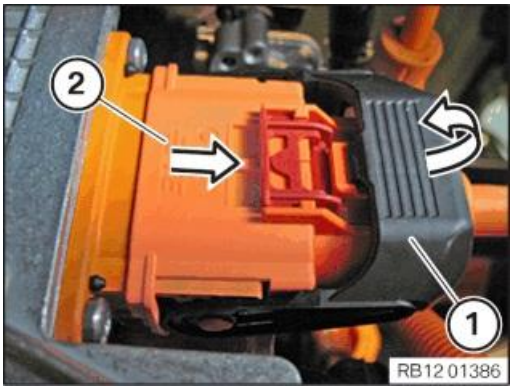
Disconnect the high-voltage connector from the high-voltage connection of the KLE:

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

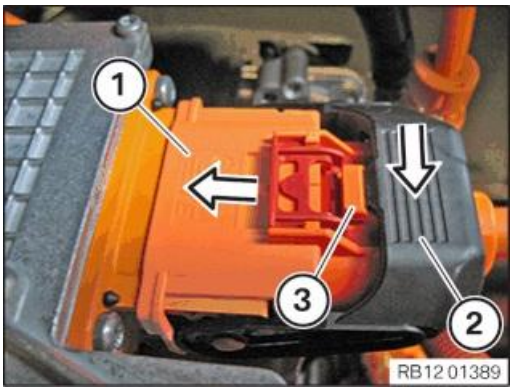
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Press lock (1).



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



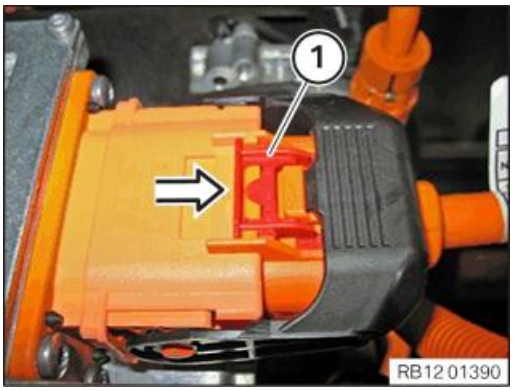
Connect the high-voltage connector to the high-voltage connection of the KLE:

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

Attention!

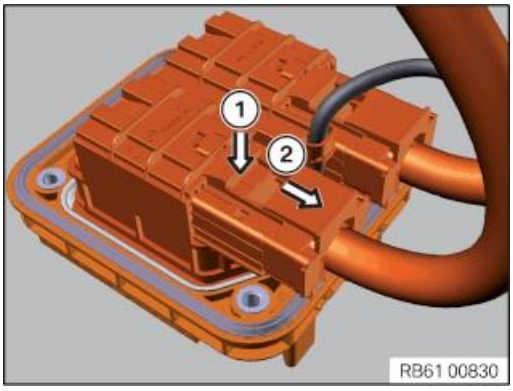
Lock (2) must snap audibly into place.

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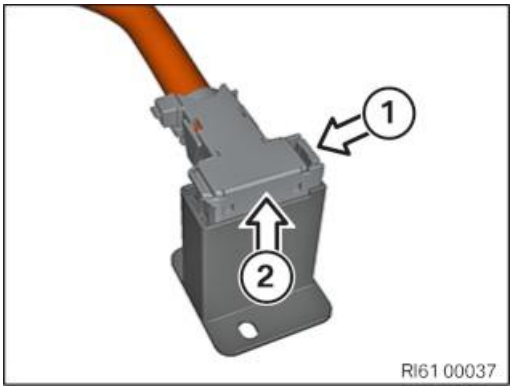
High-voltage connector on the high-voltage connection of the high-voltage battery unit:

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.



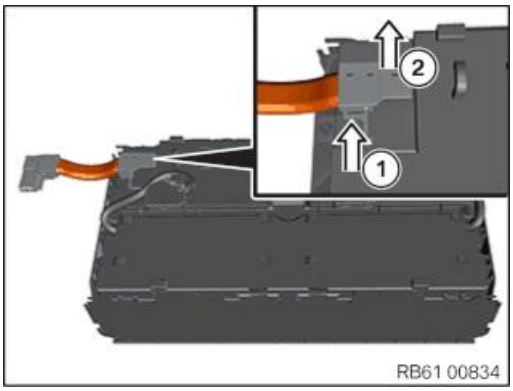
High-voltage connector on the cell module I01:

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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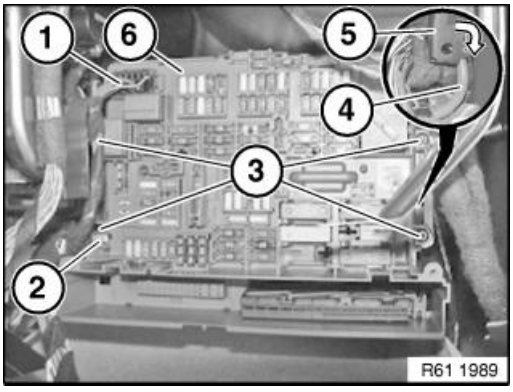
61 13 050 Removing and installing or replacing fuse box in passenger compartment (built after 03/2007)

Important!

Read and comply with notes on handling wiring harnesses and cables.

Necessary preliminary work:

- Remove right glove box with housing
- Remove Junction box



Disconnect plug connection (1).

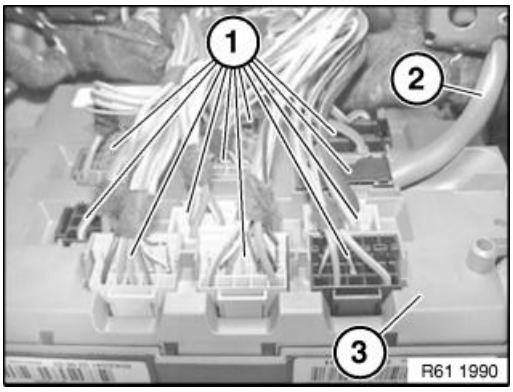
Release wiring harness mount (2) from fuse box interior (6).

Release screws (3).

Important!

Risk of damage!

Carefully fold passenger compartment fuse box (6) forwards, feeding positive battery cable (4) in direction of arrow out of passenger compartment fuse box bracket (5).



Disconnect all plug connections (1) on reverse side of fuse box interior (3).

Remove fuse box interior (3).

Installation note:
Battery positive lead (2) must not be damaged.

Make sure wiring harnesses are correctly laid and plug connections (1) are correctly latched.

Replacement:

If necessary, remove fuses and relays.

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61 42 ... Removing and installing/replacing DC/DC converter

Note:
DC/DC converter in vehicles with automatic start-stop function.

There are two versions:

- Without additional bracket for diesel engine vehicles
- With additional bracket for petrol engine vehicles

Depending on the equipment, one or both versions are installed in the M3

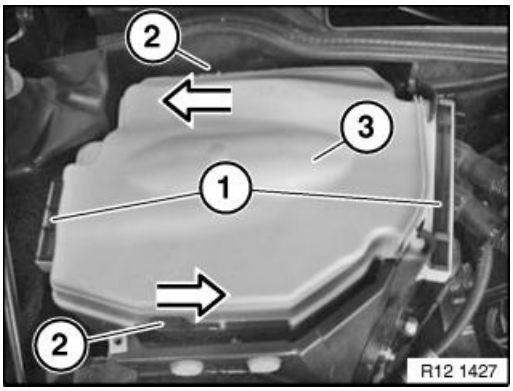
Important!

Read and comply with information on protection against damage from electrostatic discharge .

Necessary preliminary work:

Remove lower section of microfilter housing (all except M3)

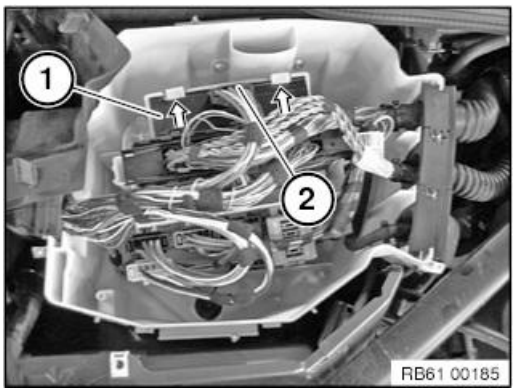
Remove right upper section of microfilter housing M3



Unlock fasteners (1) from below and slide upwards approx. 10 mm.

Unlock locks (2) in direction of arrow.

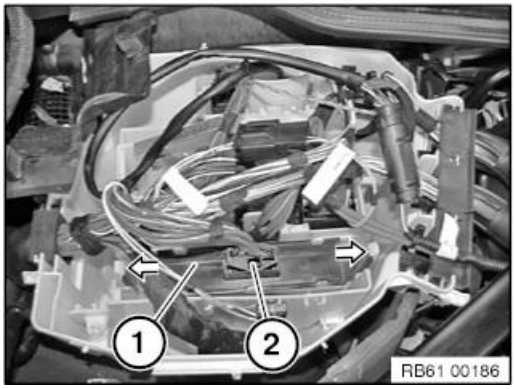
Remove cover (3).



Diesel engine vehicles (without additional bracket):

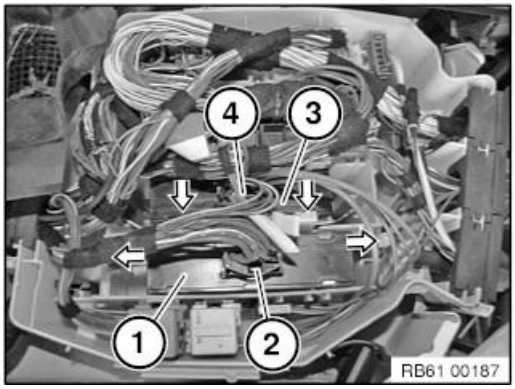
Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).

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Petrol engine vehicles (with additional bracket):

Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).



M3:

Release tabs in direction of arrow and remove DC/DC converter with additional bracket (1) upward. Disconnect plug connection (2).

Release tabs in direction of arrow and remove DC/DC converter without additional bracket (3) upward. Disconnect plug connection (4).

Important!

Do not mix up plug connections (2, 4)!

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61 14 ... Removing and installing/replacing power distribution box in passenger compartment



Operation is described in:

Removing and installing/replacing power distribution box in passenger compartment

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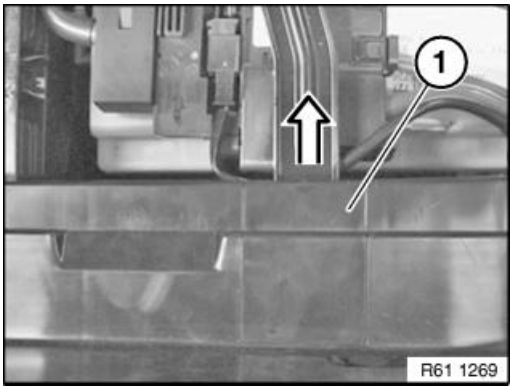
61 14 010 Removing and installing/replacing power distributor (on battery) (from 03/2007)

Warning!

Observe safety instructions for handling vehicle battery.

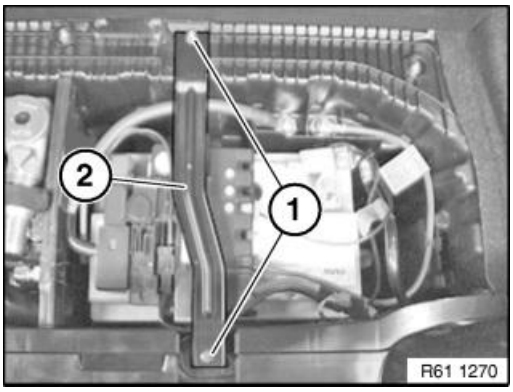
Necessary preliminary tasks:

- Remove luggage compartment floor trim
- Disconnect battery negative lead

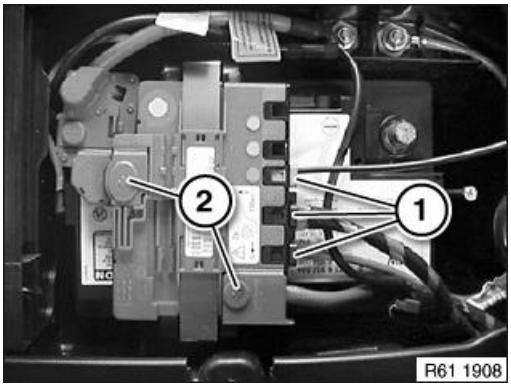


E81/E87:

Unclip trim (1) in direction of arrow and remove.



Release screws (1) and remove bracket (2). Tightening torque 61 14 1AZ.



Disconnect plug connection (1).

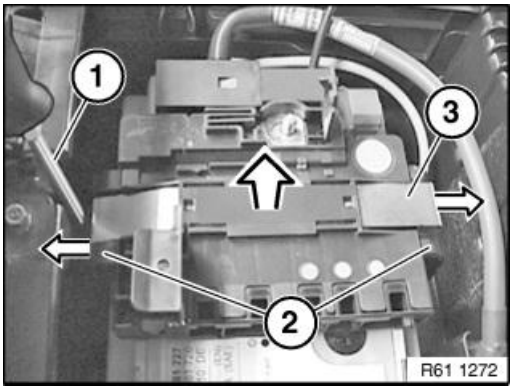
If necessary, release wiring harness fasteners from power distributor.

Open covers (2) and release nuts underneath.

Tightening torque

- 61 21 2AZ
- 61 21 4AZ

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Press locking brackets (2) downwards and unclip.

If necessary, using a screwdriver (1), expand locking bracket (2) at lower end and clip out.

Remove power distributor (3) towards top.

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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)

Information for the battery charging calendar

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61 20 ... Battery replacement information

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

If the vehicle electrical system of electric vehicles is not accessible due to a faulty 12 V battery, proceed as follows:

Battery exchange in electrified vehicles

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 exchange.

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.

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

Diagnosis system:

Register battery exchange.

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

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 20 908 Carrying out a voltage interruption of the 12-V battery



Important!

Observe safety informations for handling vehicle battery.



There are two ways to carry out a voltage interruption of the 12-V battery:

1. Manually by disconnecting the battery earth lead
2. With the diagnosis system

1. Manually: Carry out the following steps:

- Switch off and disconnect battery charger
- Turn off ignition.

  For vehicles with ignition key: Ignition key in neutral position

  Vehicles with ID transmitter: Remove ID transmitter from slot

  For vehicles with Comfort Access: Secure terminal 30
- Disconnect negative battery lead
- Reconnect battery earth lead (to ensure bus activity)
- Observe a waiting period of 5–10 s
- Disconnect negative battery lead
- Observe a waiting period of approx. 1 minute
- Connect battery earth lead

  Tightening torque: 61 21 1AZ
- Connect and switch on battery charger
- Switch on ignition.

2. With the diagnosis system:

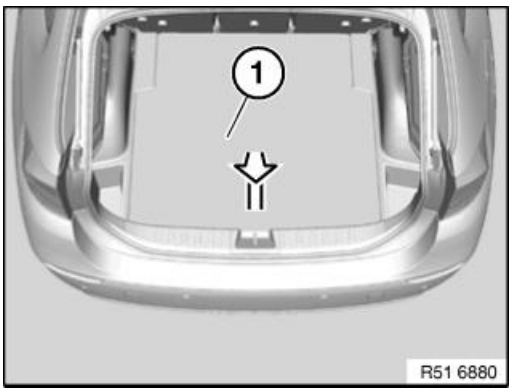
- 03 Body
- Voltage supply
- Activate rest state
- Power-down command

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61 20 900 Disconnecting and connecting battery earth lead

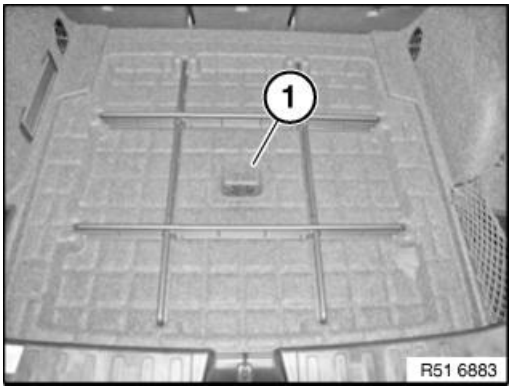
PRELIMINARY WORK

1 – Removing the luggage compartment floor trim panel



- Lift the luggage compartment floor trim panel (1) at the rear and remove it in the direction of the arrow.

2 – Removing the spare wheel well trim panel



- Remove the trim panel of the luggage compartment well (1) towards the top.

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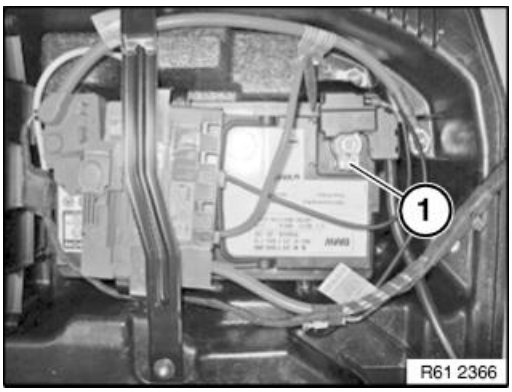
3 – Disconnecting the battery earth lead

Prerequisite

Ignition is switched off.

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)



RISK OF DAMAGE

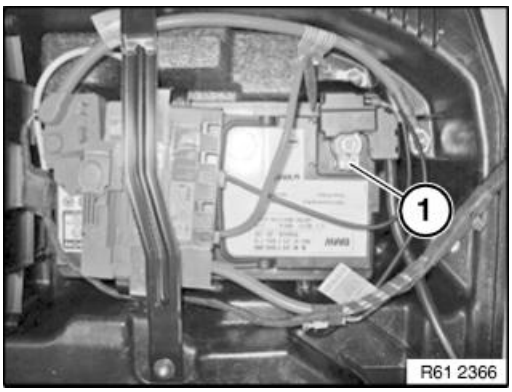
Damage to battery terminal, the safety battery terminal or the intelligent battery sensor (IBS).

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.

- Slacken nut (1).
- Pull off the intelligent battery sensor (IBS) towards the top and put to one side.

4 – Connecting the battery earth lead



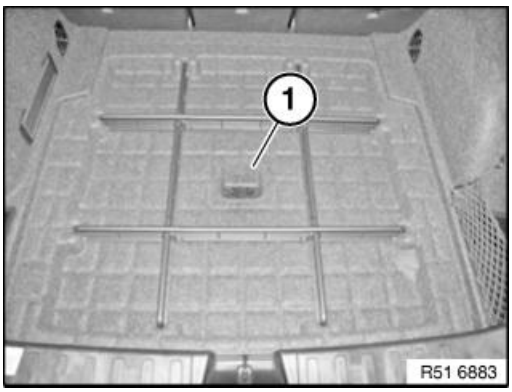
- Position the intelligent battery sensor (IBS) on the vehicle battery.
- Tighten nut (1).

Battery earth lead to battery

M6			5 Nm

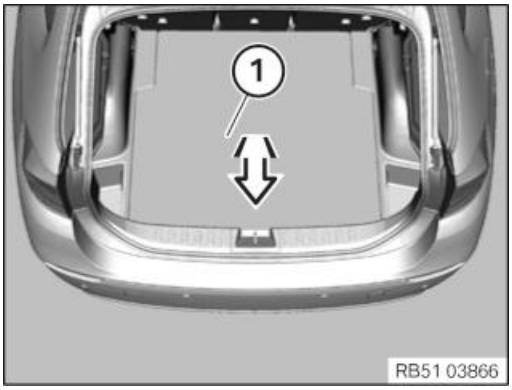
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5 – Installing the spare wheel well trim panel



- Install the trim panel of the luggage compartment well (1).

6 – Installing the luggage compartment floor trim panel



- Insert the luggage compartment floor trim panel (1) in the direction of the arrow.

Additional Information

Overview of Tightening Torques

Battery earth lead to battery			Used in step 4
M6			5 Nm

Links

General repair instructions	Used in step
12 00 ... Notes for disconnecting and connecting battery	3
61 00 ... Safety information for handling vehicle battery	3
61 12 ... Notes on intelligent battery sensor (IBS)	3

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61 20 900 Disconnecting and connecting battery negative lead

Warning!

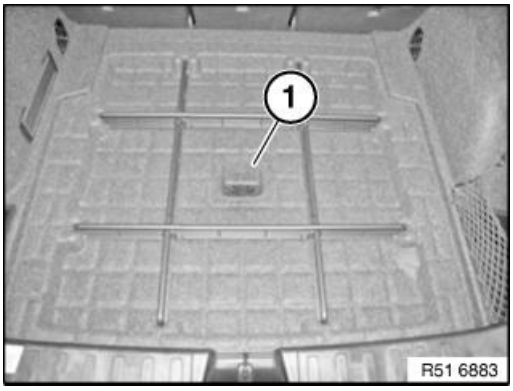
Observe safety instructions for handling vehicle battery.

Follow instructions for disconnecting and connecting battery !

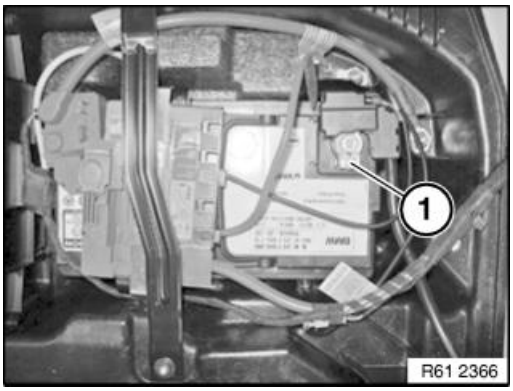
Observe notes on power supply / on intelligent battery sensor (IBS).

Necessary preliminary tasks:

- Remove luggage compartment floor trim



Completely remove luggage compartment well trim (1) upward at an angle.



Loosen nut (1).

Tightening torque 61 21 1AZ .

Important!

Do not under any circumstances use force to pull off negative terminal.

Detach battery negative lead with IBS towards top, lay to one side and secure.

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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 ... 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 loads/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.

Attention!

- 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.
- When installing battery terminal: Tightening torque 61 21 1AZ.

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:

Attention!

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.

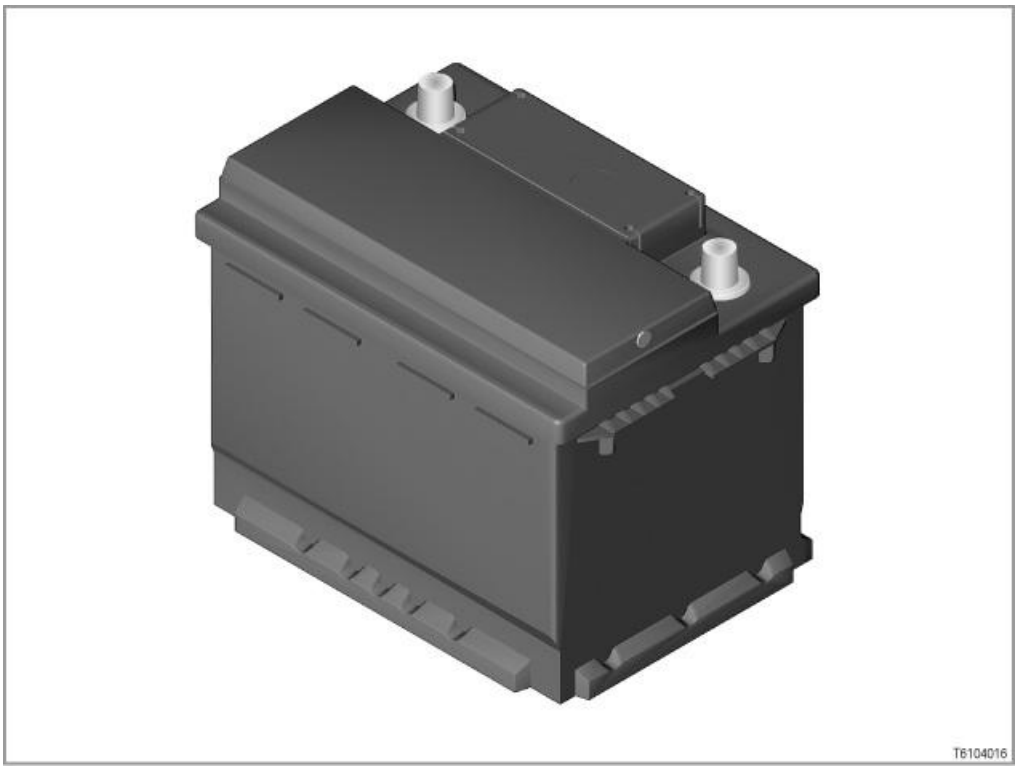
For example:

- 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).

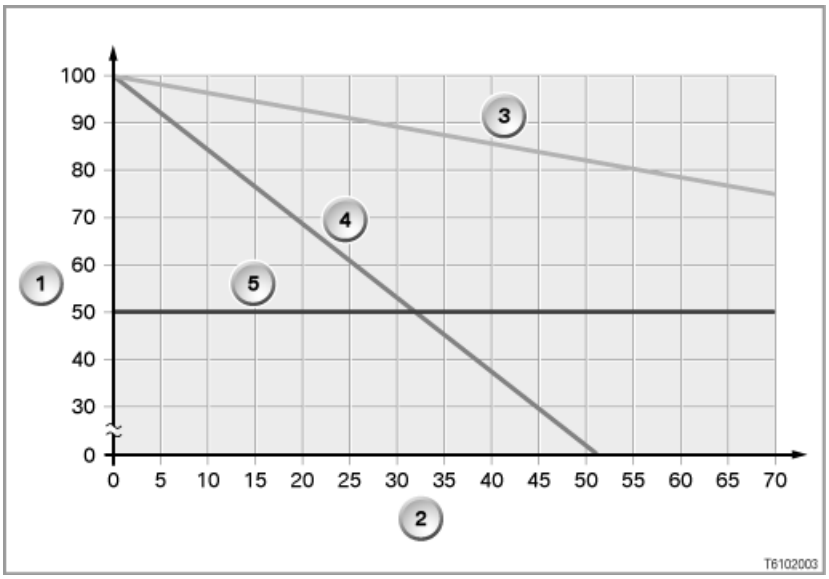
The constantly increasing energy demand of modern vehicle electrical systems calls for ever more powerful battery solutions. A modern luxury-class vehicle has some 100 actuator motors that have to be fed with electrical current. Added to these are safety, environmental and comfort elements which are 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
- reliable starting of engines with high starting current requirements, e.g. 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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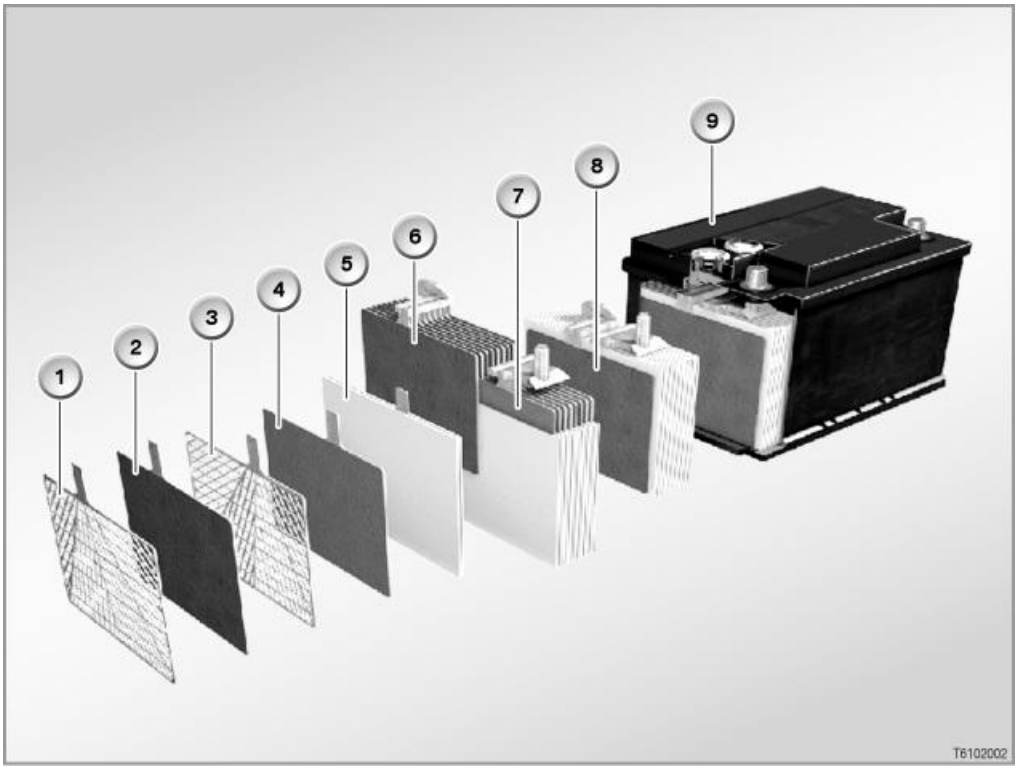


Item	Explanation	Item	Explanation
1	Available capacity [%]	2	Mileage [thousand km]
3	AGM battery	4	Lead-calcium battery
5	50 % capacity limit		

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 by the permeability of the separators.

Brief component description

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



Item	Explanation	Item	Explanation

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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.

Charging

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 ... Safety information on handling hybrid cars

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

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

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

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

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

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

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61 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 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)

Information for the battery charging calendar

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61 20 908 Carrying out a voltage interruption of the 12-V battery



Important!

Observe safety informations for handling vehicle battery.



There are two ways to carry out a voltage interruption of the 12-V battery:

1. Manually by disconnecting the battery earth lead
2. With the diagnosis system

1. Manually: Carry out the following steps:

- Switch off and disconnect battery charger
- Turn off ignition.

  For vehicles with ignition key: Ignition key in neutral position

  Vehicles with ID transmitter: Remove ID transmitter from slot

  For vehicles with Comfort Access: Secure terminal 30
- Disconnect negative battery lead
- Reconnect battery earth lead (to ensure bus activity)
- Observe a waiting period of 5–10 s
- Disconnect negative battery lead
- Observe a waiting period of approx. 1 minute
- Connect battery earth lead

  Tightening torque: 61 21 1AZ
- Connect and switch on battery charger
- Switch on ignition.

2. With the diagnosis system:

- 03 Body
- Voltage supply
- Activate rest state
- Power-down command

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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 BMWÂ 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 21 028 Recharge vehicle 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)

▸ **Charging lead-acid batteries and AGM batteries**

- 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)

- 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.

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

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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 21 010 Removing and installing (replacing) battery (from 03/2007)

Warning!

Observe safety instructions for handling vehicle battery.

Observe notes on power supply / on intelligent battery sensor (IBS).

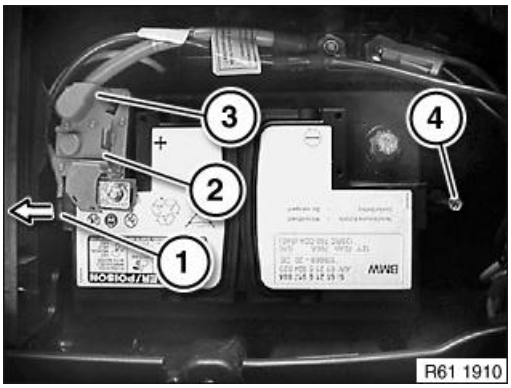
To ensure the correct safety and convenience functions, install only the original battery (battery size and type) stored in the vehicle order. Observe note on battery replacement .

Important!

Do not under any circumstances pull/lever safety battery terminal off by force.

Necessary preliminary tasks:

- Remove distribution box



Detach vent (1) in direction of arrow.

Open cover (2) and slacken nut underneath.

Tightening torque 61 21 1AZ .

Detach safety battery terminal (3) towards top, lay to one side and secure.

Release threaded pin (4) and remove with holder.

Remove battery towards right side.

Installation:
Make sure battery is correctly seated in associated fixture.

Replacement:

- Read out fault memory, clear if necessary
- On vehicles with IBS (intelligent battery sensor) register battery replacement

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61 00 ... Safety information on handling hybrid cars

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

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

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

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

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

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

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61 25 ... Assessing the transport capability of cell block in service workshops



Warning!

High-voltage system - danger to life!

The following points must be strictly observed **prior to starting work**:

- Safety information for handling electric / hybrid vehicles.
- Visual check of the high-voltage battery unit following an accident

Initiating:

For analysis and disposal purposes, it is necessary to transport an already used cell module. These lithium-ion based cell blocks 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 cell block 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.

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 in order to assess the transportability of a used cell block. The transport preparation and execution is **not** an element of this document.

Further information on this can be found in the information bulletin in the ASAP.

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:

The analysis and assessment of the cell block is to be performed by an "expert for working on HV intrinsically safe vehicles".

The certificate of the transportability is the responsibility of the qualified person.

The following specifications for work safety must also be observed:

Storage of cell blocks

For dual-cell modules, the module connector should be disconnected.

The information for this can be found in the information bulletin in the ASAP.

Note:	This document must be printed out and archived with the vehicle data.

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Assessment cell block

NAME	Date	Serial no.	VIN

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

The electrical assessment of the cell module takes place via the **diagnosis and test module**.

The de-energised state of the high-voltage battery unit is to be determined **before** it is removed from the vehicle.

De-energise the high-voltage system.

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

Visual assessment:

Smoke	Yes	No
Evidence of fire damage	Yes	No
Heat development	Yes	No
Crack or opening on the housing	Yes	No
Dents on the housing, deformation, damage	Yes	No
Loose connections, loose or damaged	Yes	No
Serial number not readable	Yes	No
Suspected water damage	Yes	No

Cell module, transport capable	**No**	**Yes**

The serial number must be clearly legible. If the serial number can no longer be read, the housing of the cell block must be clearly marked with the serial number.

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

If one or more points is/are answered with yes the following procedure must be clarified with technical support! Furthermore, the high-voltage battery unit that has been removed must be blocked off with high-voltage barrier tape. If the high-voltage battery unit is still in the vehicle, the vehicle must be made inaccessible and blocked off.

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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)

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

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cleaning of vehicles and to workbays intended for repair work relating to the body. Use movable walls for 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

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- 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 (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

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

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

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

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

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

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

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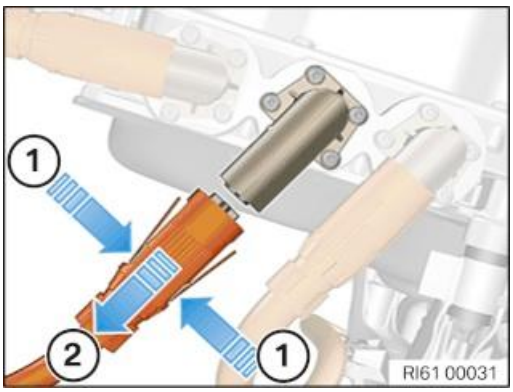
61 13 ... Unlocking and disconnecting various plug connections in electrical and hybrid vehicles



Attention!

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

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



Disconnect the Hirschmann high-voltage connector:

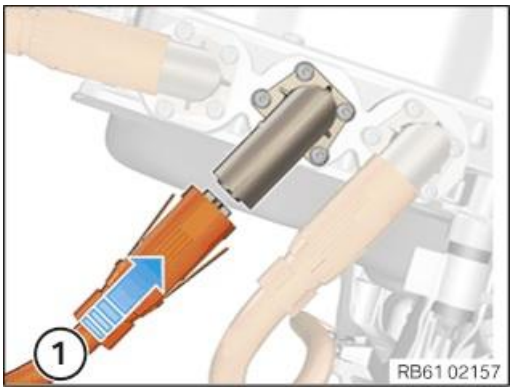
Press the lock (1) on the left and right on the connector in the direction of the arrow.

Pull off connector (2) in direction of arrow.

Attention!

Connector (2) is difficult to pull off.

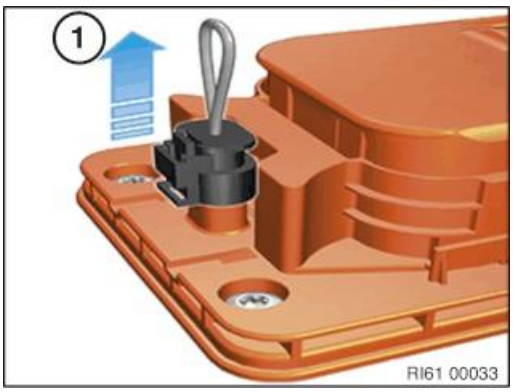
In the event of damage to high-voltage connector (2), the complete high-voltage cable must be replaced!



Connect the Hirschmann high-voltage connectors:

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

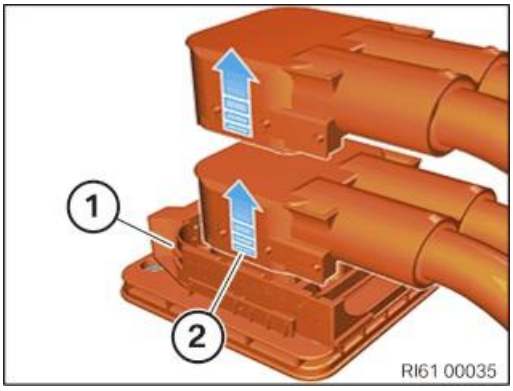
Note:
Connector (2) must lock audibly.



Disconnect the Kostal high-voltage connector:

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

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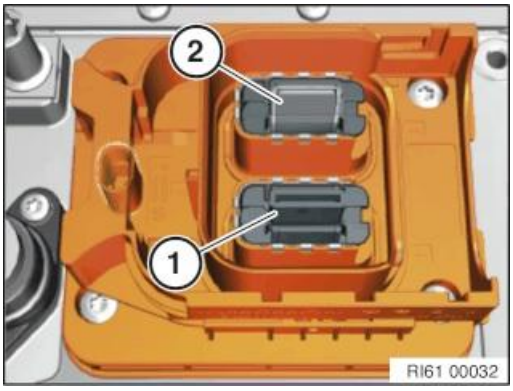
Push the lock (1) fully to the front.

Lift the connector (2) and remove it entirely.

Attention!

Plug connection (3) is difficult to pull off.

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



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

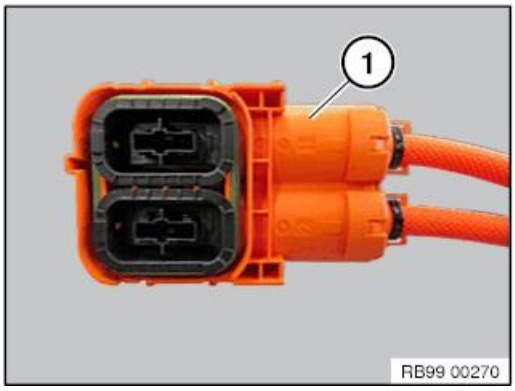
Check the touch protection for damage and correct positioning (1).

Warning!

Do not touch unprotected connector (2)!

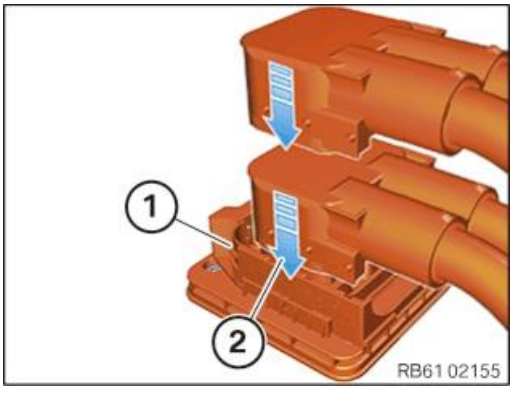
If the contact protection (1) has been pushed to the bottom (2), the high-voltage connector must be refitted.

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



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

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



Connect the Kostal high-voltage connector:

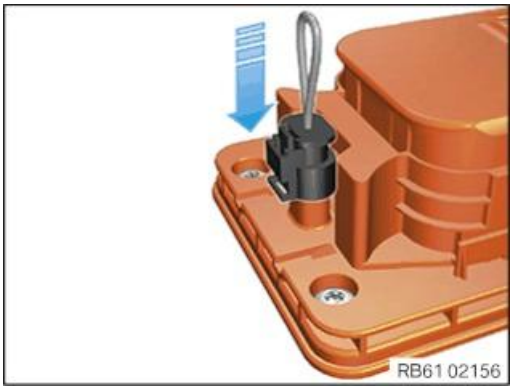
Connect the connector (2) in one single movement to the counter-housing.

Push the lock (1) fully to the rear.

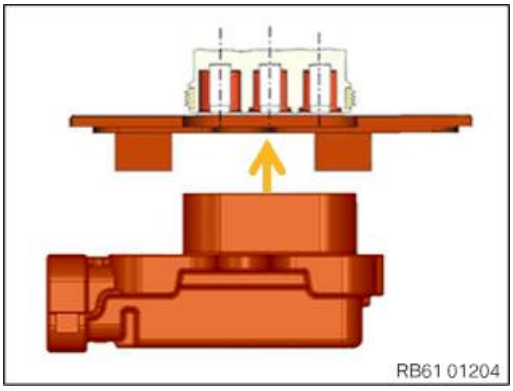
Attention!

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

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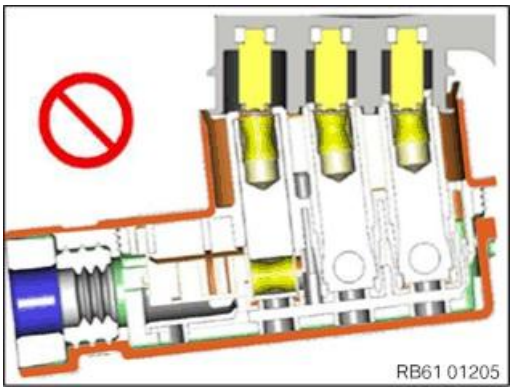


Connect the connector for the high-voltage interlock.



Three-phase high-voltage connector:

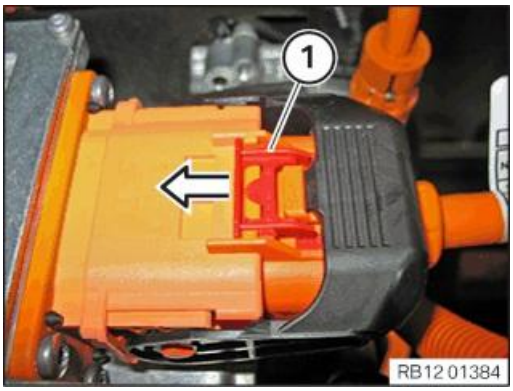
Connect and disconnect the connector straight.



Attention!

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

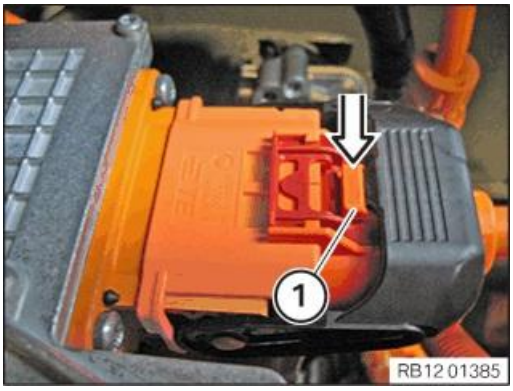
Increased tilted connections will increase the connecting force and the risk of danger.



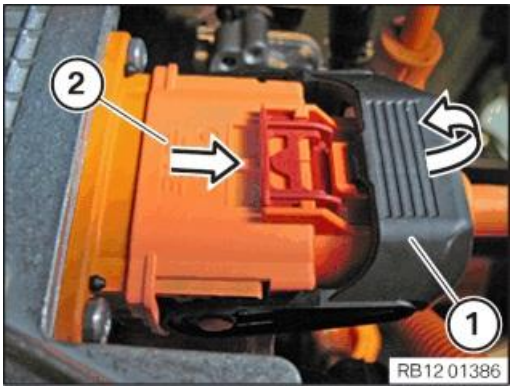
Disconnect the high-voltage connector from the high-voltage connection of the KLE:

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

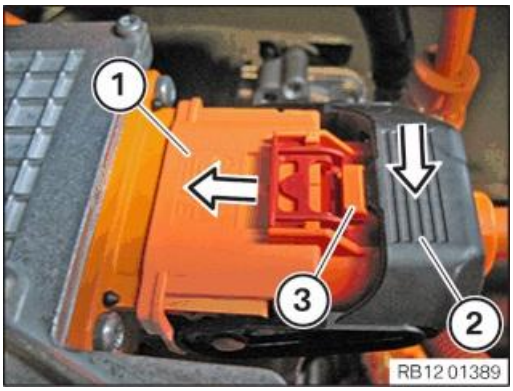
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Press lock (1).



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



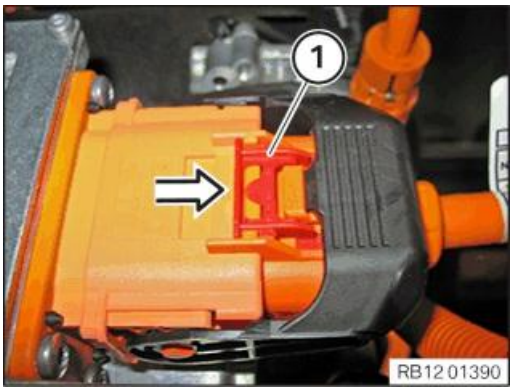
Connect the high-voltage connector to the high-voltage connection of the KLE:

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

Attention!

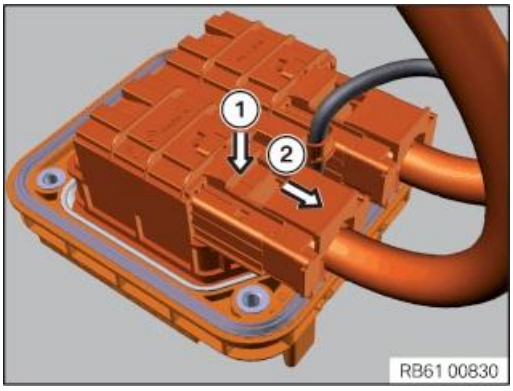
Lock (2) must snap audibly into place.

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



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

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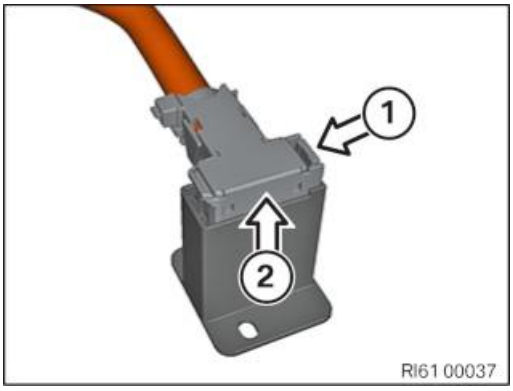
High-voltage connector on the high-voltage connection of the high-voltage battery unit:

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

Attention!

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

In this case, contact technical support.



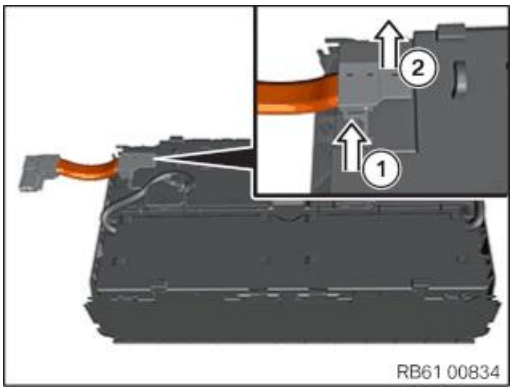
High-voltage connector on the cell module I01:

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

Attention!

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

In this case, contact technical support.



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

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

Attention!

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

In this case, contact technical support.

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61 42 ... Removing and installing/replacing DC/DC converter

Note:
DC/DC converter in vehicles with automatic start-stop function.

There are two versions:

- Without additional bracket for diesel engine vehicles
- With additional bracket for petrol engine vehicles

Depending on the equipment, one or both versions are installed in the M3

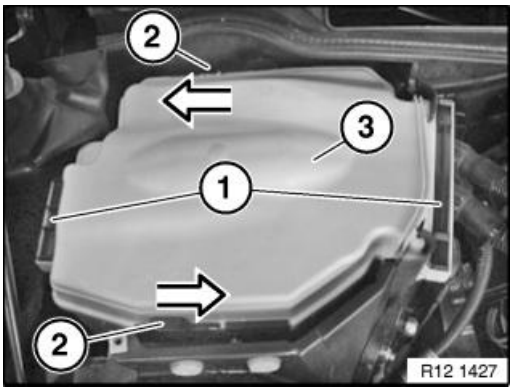
Important!

Read and comply with information on protection against damage from electrostatic discharge .

Necessary preliminary work:

Remove lower section of microfilter housing (all except M3)

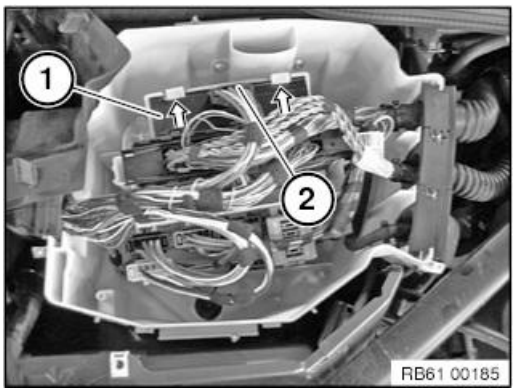
Remove right upper section of microfilter housing M3



Unlock fasteners (1) from below and slide upwards approx. 10 mm.

Unlock locks (2) in direction of arrow.

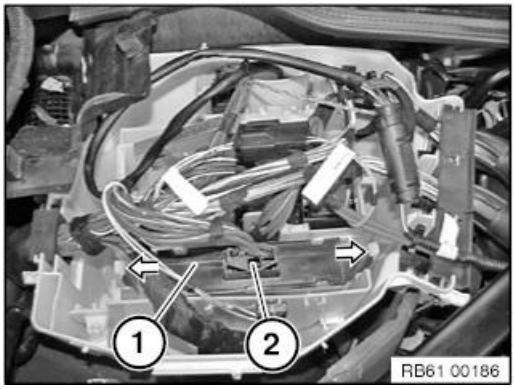
Remove cover (3).



Diesel engine vehicles (without additional bracket):

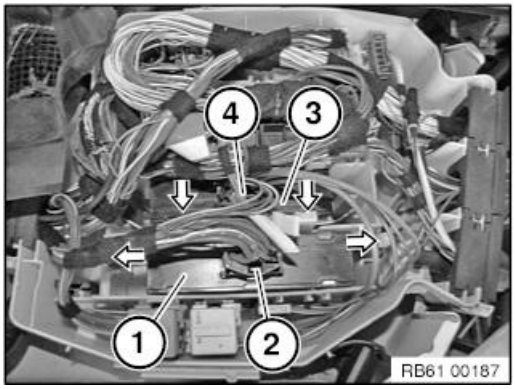
Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).

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Petrol engine vehicles (with additional bracket):

Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).



M3:

Release tabs in direction of arrow and remove DC/DC converter with additional bracket (1) upward. Disconnect plug connection (2).

Release tabs in direction of arrow and remove DC/DC converter without additional bracket (3) upward. Disconnect plug connection (4).

Important!

Do not mix up plug connections (2, 4)!

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61 31 996 Carrying out steering angle sensor adjustment



Important!

In vehicles with active steering, steering angle sensor adjustment is integrated in the service function "Initial operation/adjustment for active steering" and must not be carried out separately!



Note:
Steering angle sensor adjustment must be carried out:

- Before adjustment work on the front axle/steering
- after all mechanical work on the steering system
- E36 Z3, E38: If Dynamic Stability Control (DSC) is installed
- E46 (All-wheel drive vehicle), E53, E83: After the battery has been disconnected
- After the following components have been replaced/encoded/programmed:
  - Fixture for switches of steering column / switch cluster / steering angle sensor
  - Dynamic Stability Control (DSC) control unit
  - Control unit active anti-roll stabilization (ARS)



Connect the vehicle to the diagnosis system or Software Service Station.

Select and carry out steering angle sensor adjustment under Service functions.

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61 35 679 Initializing rain/light (solar) sensor



Note:
Initialization is necessary:

- after replacing windscreen
- after replacing rain/light (solar) sensor
- after replacing optical element on rain/light (solar) sensor
- after installing a used rain/light (solar) sensor



Note:

- Connect BMW diagnosis system
- Initializing rain/light (solar) sensor

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61 31 195 Removing and installing (replacing) front controller

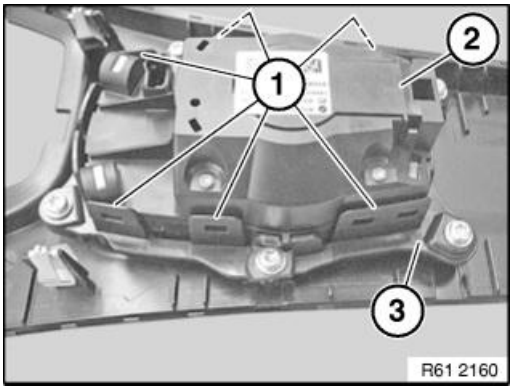
Important!

Risk of damage!

The button for the controller must not be removed!

Necessary preliminary tasks:

- Remove trim for storage tray



Important!

Risk of damage!

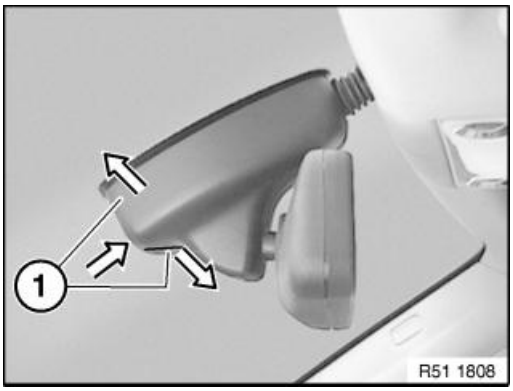
Carefully raise catches (1) on controller holder (3) and remove controller (2) towards top.*Installation:*
Make sure controller (2) is correctly engaged in controller holder (3).

Replacement:

Carry out vehicle programming/encoding.

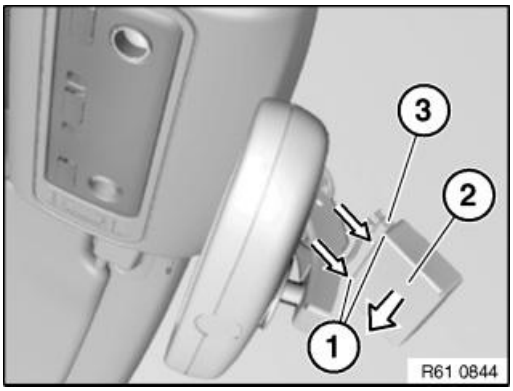
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61 35 177 Removing and installing (replacing) rain/light sensor



Expand two-part mirror base cover (1) by pressing from below and detach.

Feed out two-part mirror base cover (1) and remove.



Disconnect plug connection (3).

Press locks (1) in direction of arrow and remove rain/light sensor (2) towards bottom.

Installation note:
Do not damage optical element covered by rain/light sensor (2).

If necessary, initialise rain/light sensor.



Replacement:

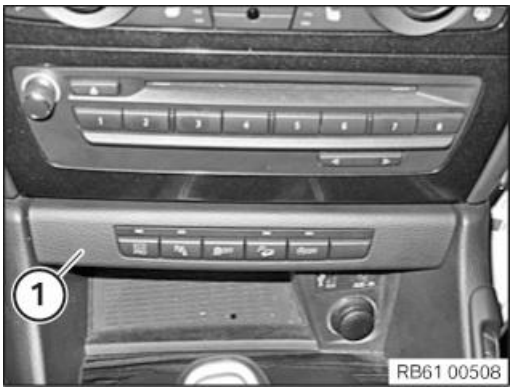
Carry out programming/encoding.

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61 31 054 Removing and installing centre console control panel (version with CIC, from 07/2012)

Necessary preliminary tasks:

- Partially remove control panel for heating and air conditioning system



Remove centre console control panel trim (1) from centre console to the rear.



Note:
Graphic similar.

Unlock and disconnect plug connection (1) on heating and air conditioning system control panel.



Release top radio cover (1).

Carefully thread out ribbon cable (2) under radio cover (1).

Remove centre console control panel (3).

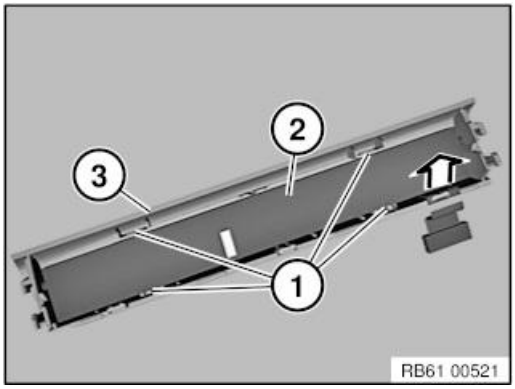
Attention!

Risk of damage!

Ensure that the ribbon cable (2) is not bent and is correctly routed.

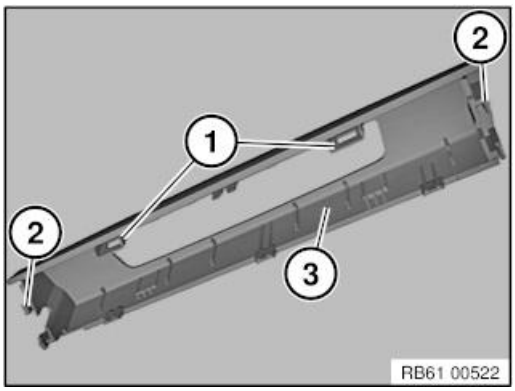
Ribbon cable (2)must not be trapped by latch mechanisms of radio cover (1).

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Unlock retaining lugs (1).

Remove centre console control panel (2) from centre console control panel cover (3).



Installation note:
Retaining lugs (1) and guides (2) on centre console control panel cover (3) must not be damaged or missing.

Replacement:

Assign buttons depending on equipment fitted, see Replace centre console control panel.

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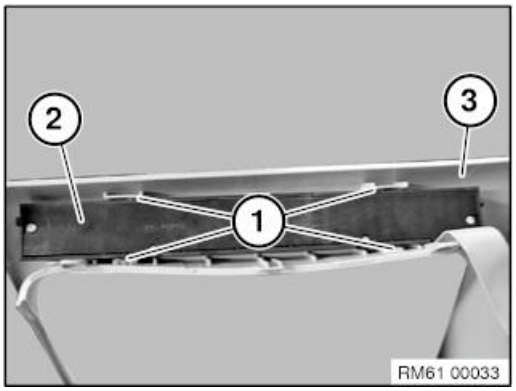
61 31 054 Removing and installing centre console control panel (version with CIC, up to 07/2012)

Necessary preliminary work:

- Remove control panel for heating and air conditioning system

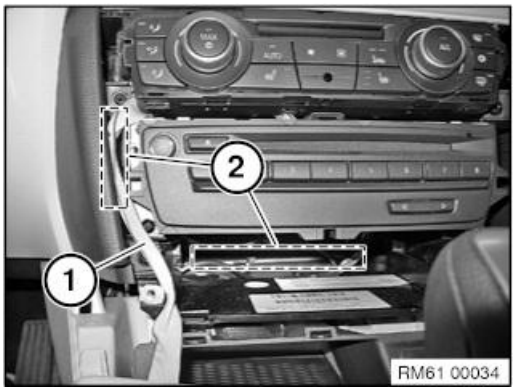


Unlock plug connection (1) and disconnect.



Unlock retaining lugs (1).

Remove centre console control panel (2) from centre console cover (3).



Important!

Risk of damage!

Route ribbon cable (1) in marked area (2).

Ensure that the ribbon cable (1) is not bent and is correctly routed.

Replacement:

Assign buttons according to vehicle equipment.

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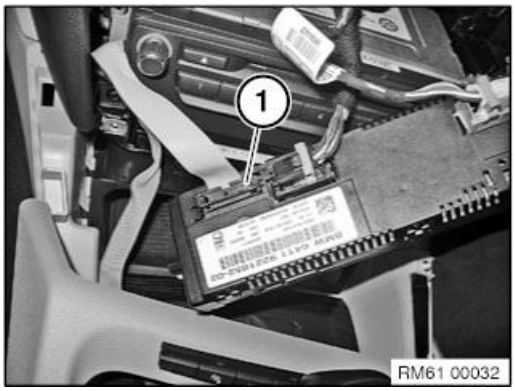
61 31 052 Removing and installing centre console control panel (version without CIC, from 07/2012)

Necessary preliminary tasks:

- Remove control panel for heating and air conditioning system



Remove centre console control panel cover (1) from centre console (2) in direction of arrow.



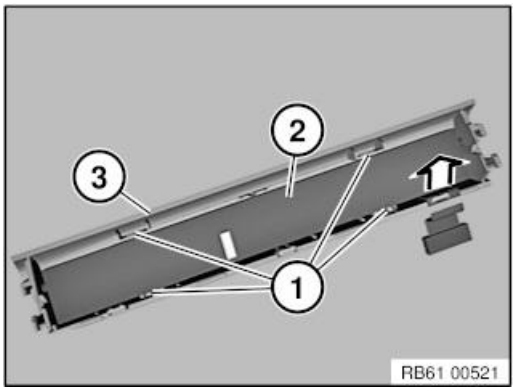
Note:
Graphic similar.

Unlock and disconnect ribbon cable plug connection (1) on heating and air conditioning system control panel.**Important!**

Risk of damage!

Ensure that the ribbon cable (1) is not bent and is correctly routed.

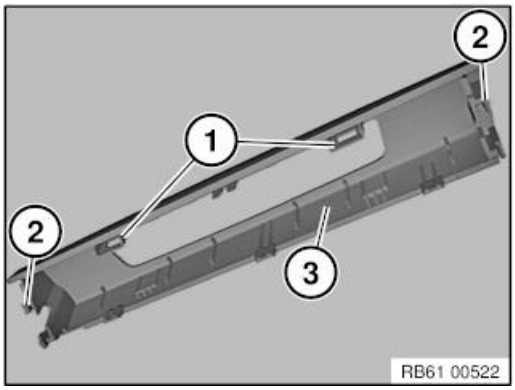
Ribbon cable (1) must not be trapped.



Unlock retaining lugs (1).

Remove centre console control panel (2) from centre console control panel cover (3).

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Installation note:
Retaining lugs (1) and guides (2) on centre console control panel cover (3) must not be damaged or missing.

Replacement:

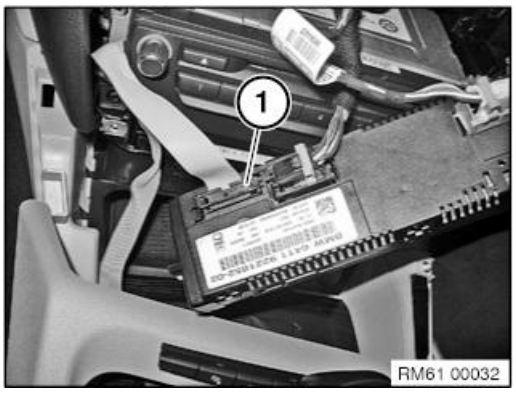
Assign buttons depending on equipment fitted, see Replace centre console control panel.

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61 31 052 Removing and installing centre console control panel (version without CIC, up to 07/2012)

Necessary preliminary work:

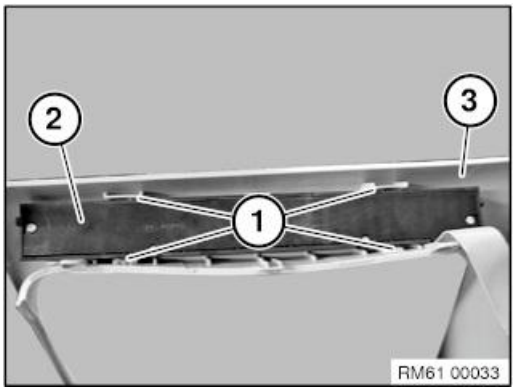
- Remove control panel for heating and air conditioning system



Unlock ribbon cable (1) and disconnect.**Important!**

Risk of damage!

Ensure that the ribbon cable (1) is not bent and is correctly routed.



Unlock retaining lugs (1).

Remove centre console control panel (2) from centre console cover (3).

Replacement:

Assign buttons according to vehicle equipment.

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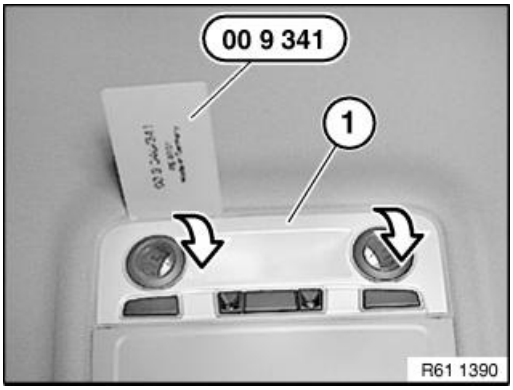
61 31 043 Removing and installing or replacing roof switch cluster

Special tools required:

- 00 9 340

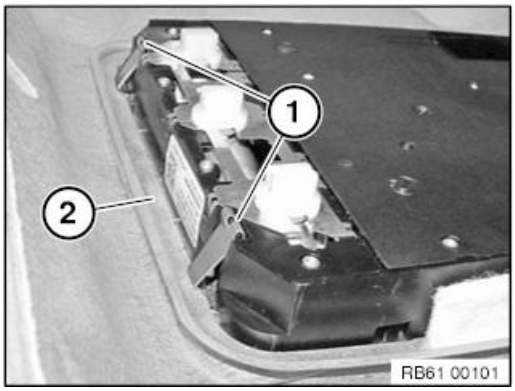
Important!
Follow instructions for handling light bulbs (interior lights).

Important!
Read and comply with notes on protection against electrostatic damage (ESD protection).

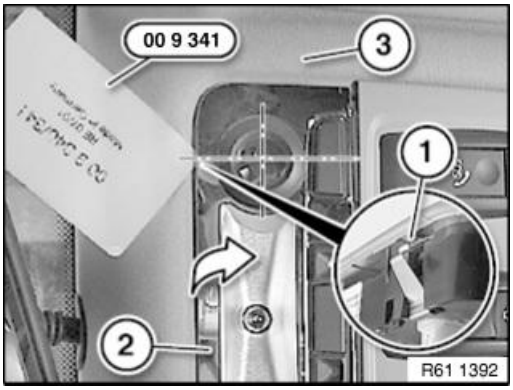


Important!
Reflector on interior roof light must not be damaged!

Carefully unclip cover of interior roof light (1) from interior roof light with special tool 00 9 340 (00 9 341) in direction of arrow and remove.



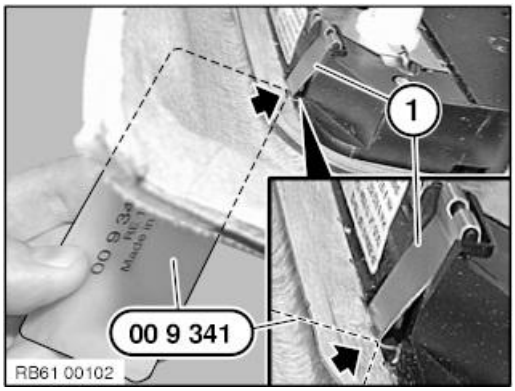
Note:
Roof switch cluster is secured to frame of roofliner (2) with two retaining clips (1).



Important!
Reflector (2) and roofliner (3) must not be damaged!

Retaining clips (1) are located on centreline of both reading lights.
Position special tool 00 9 340 (00 9 341) as illustrated.

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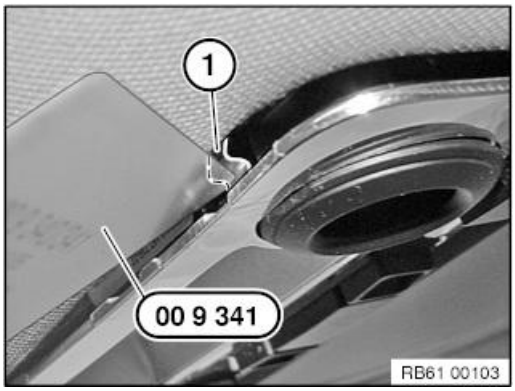
Note:
Shown from above on a model for clearer illustration.

Important!

Risk of damage!

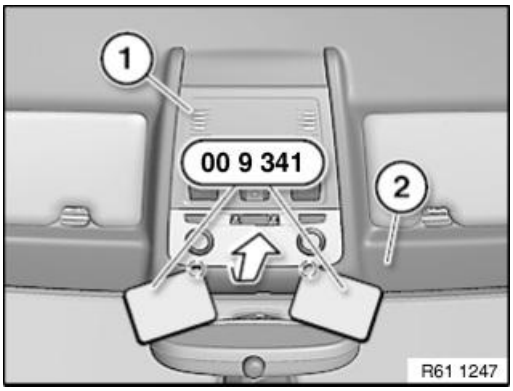
Retaining clips (1) must not be damaged!

Position special tool 00 9 340 (00 9 341) as illustrated.



Position special tool 00 9 340 (00 9 341) as illustrated and release retaining clips (1).

Note:
Only then can the roof switch cluster be removed without causing damage!



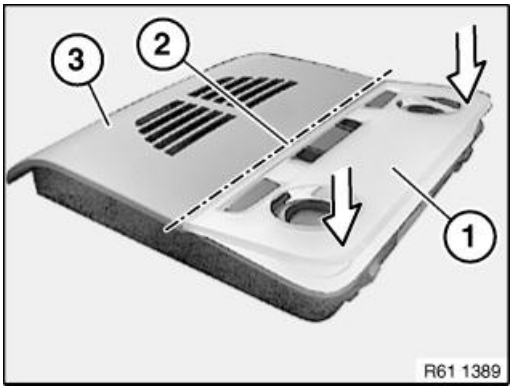
Lever roof switch cluster (1) out of roofliner (2) with special tool 00 9 340 (00 9 341) in direction of arrow.

Disconnect plug connections underneath and remove roof switch cluster (1).

Note:
Disconnecting the plug connection for the handsfree microphone or emergency call button results in fault memory entries in the telephone control unit (limitation in the emergency call system).

After fitting, read out fault memory and if necessary delete entries.

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Installation note:
Immediately after removal, fit interior roof light cover (1) to roof switch cluster (3):

1. Feed in interior roof light cover (1) at line (2)
2. Press interior roof light cover (1) onto interior roof light in direction of arrow

Make sure interior roof light cover (1) is correctly engaged on interior roof light.

Installation note:
If necessary, initialise slide/tilt sunroof



Replacement:

- Carry out vehicle programming/encoding
- Initialise slide/tilt sunroof.
- If necessary, remove bulbs.

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61 31 133 Removing and installing/replacing AV connection socket

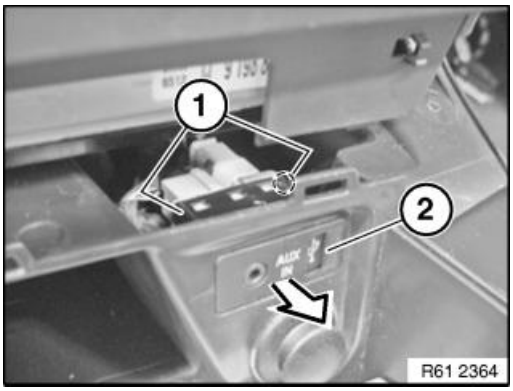
Necessary preliminary work:

Build date up to 07/2012:

- Remove centre console cover

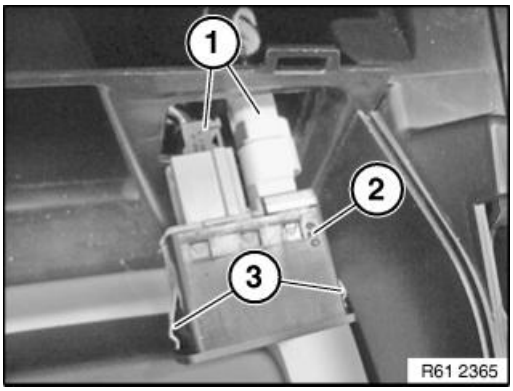
Version after 07/2012:

- Detach centre console and pull back



Unlock latch mechanisms (1).

Press connecting socket (2) in direction of arrow.



Unlock plug connections (1) and disconnect.

Remove connecting socket (2).

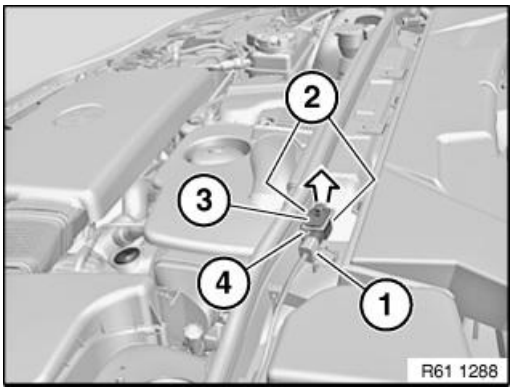
Installation note:

Make sure connecting socket (2) is correctly seated.

Retaining lugs (3) must not be damaged.

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61 31 241 Removing and installing/replacing bonnet/hood contact switch



Disconnect plug connection (1).

Release catches (2) and feed bonnet/hood contact switch (3) in direction of arrow out of fixture (4).

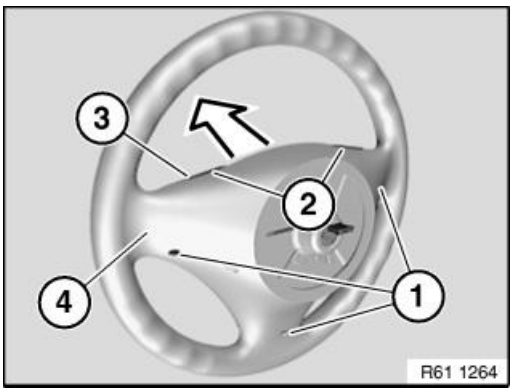
Installation:
Make sure bonnet/hood contact switch (3) is correctly seated in holder (4).

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61 31 229 Removing and installing/replacing both switches on sport steering wheel

Necessary preliminary tasks:

- Remove airbag unit



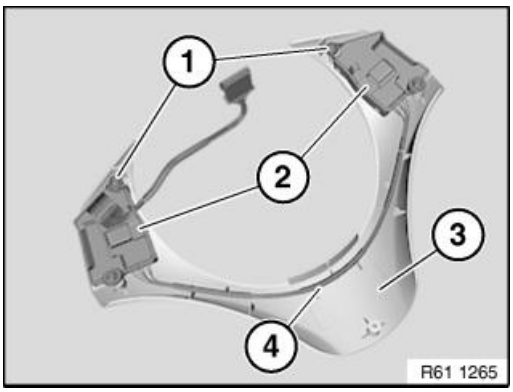
Note:
Illustrations show multifunction steering wheel (4) removed.

Release screws (1).

Detach decorative trim (3) in direction of arrow from holders (2).

Disconnect associated plug connection and remove complete decorative trim (3).

Installation:
Make sure electrical leads are correctly routed.



Feed wiring harness (4) out of associated holders.

Release screws (1) and remove both multifunction steering wheel switches (2) from decorative trim (3).

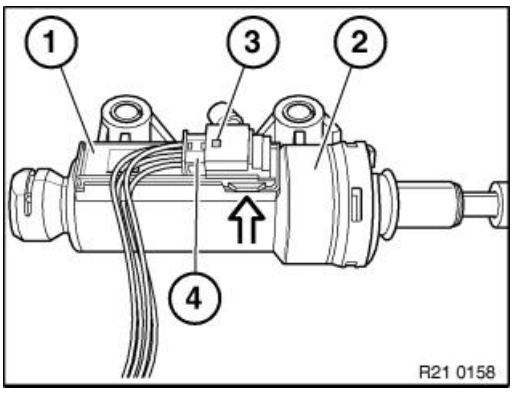
Installation:
Make sure there is a uniform gap between both multifunction steering wheel switches (2) and decorative trim (3).

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61 31 299 Removing and installing/replacing clutch switch module

Necessary preliminary tasks:

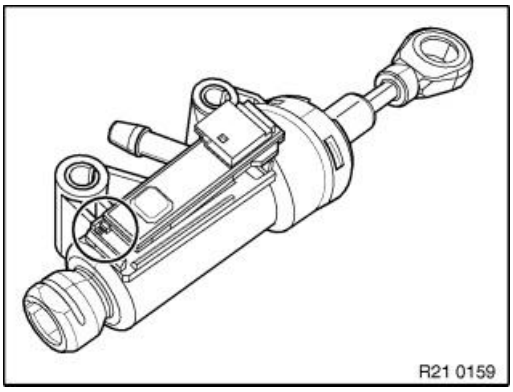
- Remove trim panel for pedal assembly.



Note:
Clutch master cylinder (2) is removed for purposes of clarity.

Lever out clutch switch module (1) from clutch master cylinder (2) with screwdriver.

Unlock plug (4) and disconnect from housing (3).



Installation:
Clutch switch module is secured against incorrect installation.

Clutch switch module must snap audibly into place.

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61 42 ... Removing and installing/replacing DC/DC converter

Note:
DC/DC converter in vehicles with automatic start-stop function.

There are two versions:

- Without additional bracket for diesel engine vehicles
- With additional bracket for petrol engine vehicles

Depending on the equipment, one or both versions are installed in the M3

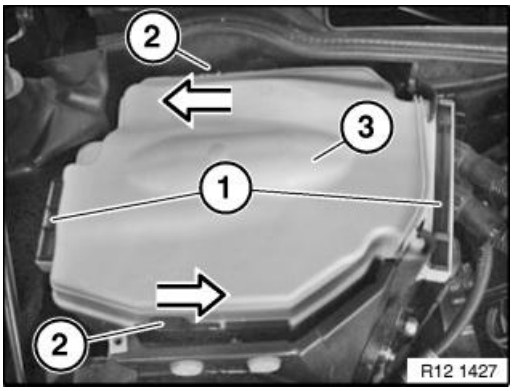
Important!

Read and comply with information on protection against damage from electrostatic discharge .

Necessary preliminary work:

Remove lower section of microfilter housing (all except M3)

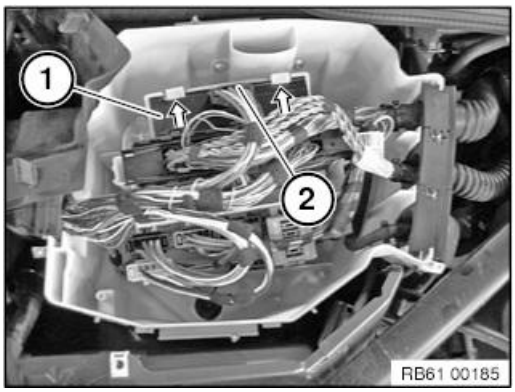
Remove right upper section of microfilter housing M3



Unlock fasteners (1) from below and slide upwards approx. 10 mm.

Unlock locks (2) in direction of arrow.

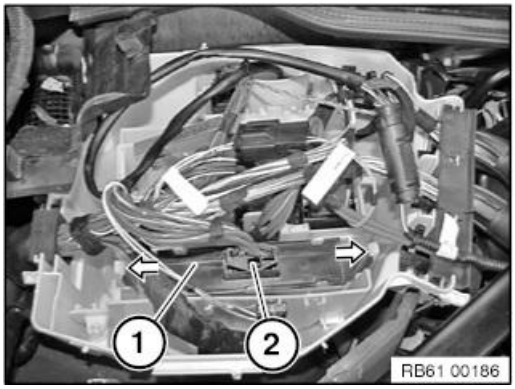
Remove cover (3).



Diesel engine vehicles (without additional bracket):

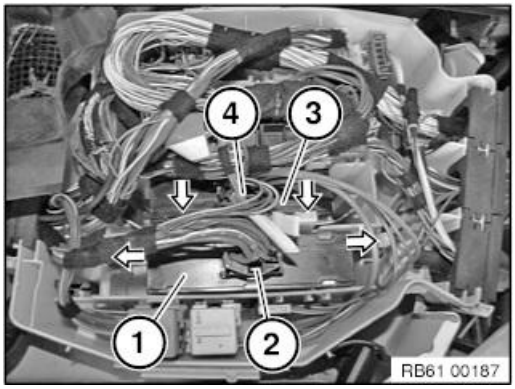
Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).

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Petrol engine vehicles (with additional bracket):

Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).



M3:

Release tabs in direction of arrow and remove DC/DC converter with additional bracket (1) upward. Disconnect plug connection (2).

Release tabs in direction of arrow and remove DC/DC converter without additional bracket (3) upward. Disconnect plug connection (4).

Important!

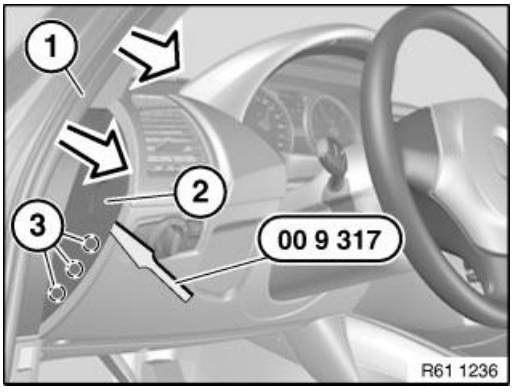
Do not mix up plug connections (2, 4)!

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61 31 037 Removing and installing/replacing light control unit

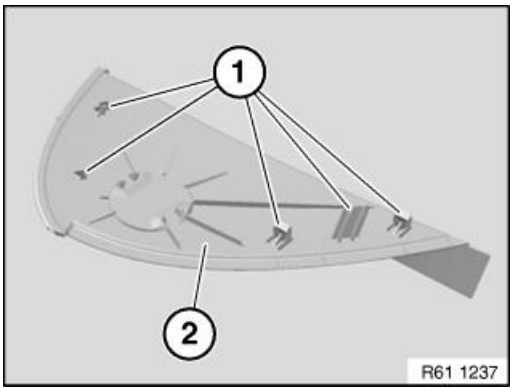
Special tools required:

- 00 9 317

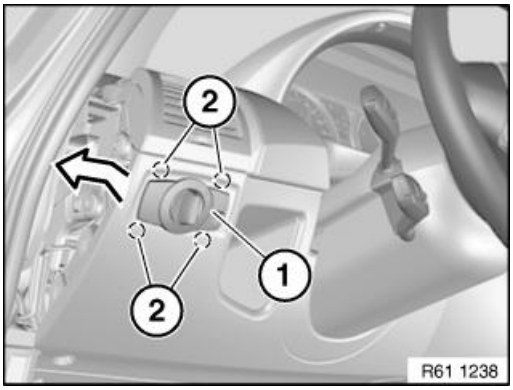


Detach mucket (1) in area of trim (2) in direction of arrow.

Lever out trim (2) with special tool 00 9 317 at mounting points (3) and remove.



Installation:
Retaining lugs (1) on trim (2) must not be damaged.



Note:
Unlock concealed catches (2) of light control unit (1) through opening created by removed trim.

Unlock concealed catches (2) of light control unit (1) and feed out light control unit (1) in direction of arrow.

Disconnect associated plug connection and remove light control unit (1).

Installation:

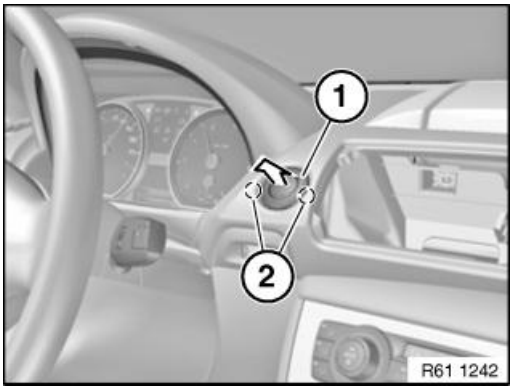
- Catches (2) of light control unit (1) must not be damaged.
- Make sure catches (2) are correctly seated.

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61 31 023 Removing and installing/replacing Start/Stop switch

Necessary preliminary tasks:

- Remove centre fresh-air grille



Press latch mechanisms (2) together and unclip Start/Stop switch (1) with corresponding ribbon cable in direction of arrow.

Important!

Carefully unlock and disconnect associated plug connection for ribbon cable.

Replace the ribbon cable if damaged.

The ribbon cable leads to:

- Control unit for Car Access System
- Insert for radio control key

Remove Start/Stop switch (1).

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61 31 008 Removing and installing/replacing steering-column switch cluster

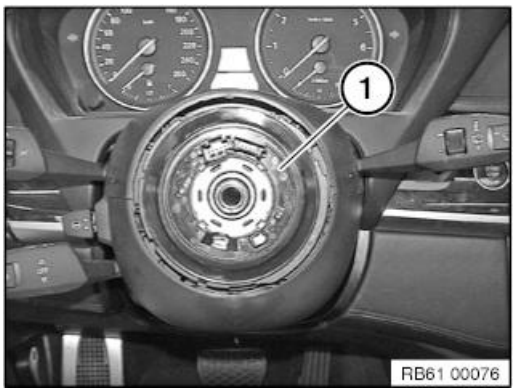
Warning!

Move wheels into straight-ahead position and do not alter this position during the repair work.

Do not under any circumstances turn the steering column switch cluster when the steering wheel is removed.

Necessary preliminary work:

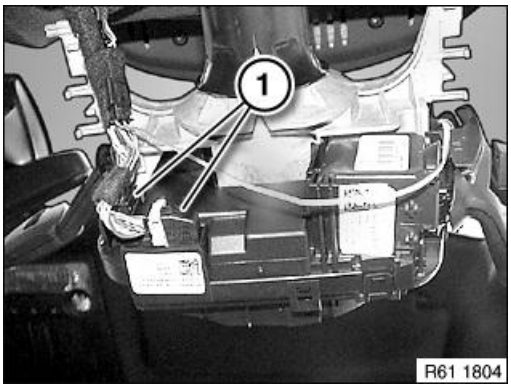
- Remove steering wheel
- Remove steering column shroud lower section



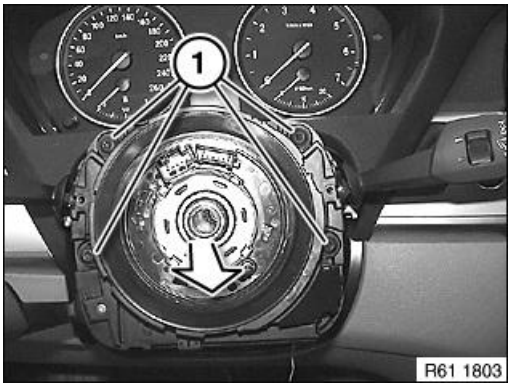
Warning!

Do not twist the coil spring cassette (1)!

Note:
The coil spring cassette (1) may be replaced separately, if necessary!



Disconnect plug connection (1).



Release screws (1).

Tightening torque 61 31 8AZ.

Remove steering-column switch cluster in direction of arrow.

Installation note:
The steering column switch cluster is installed in reverse sequence.

Carry out steering angle sensor adjustment.

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Replacement:

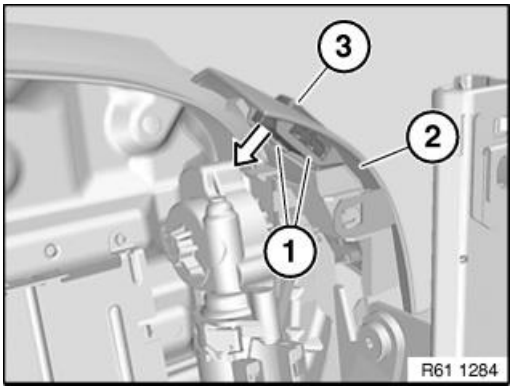
- Remove volute spring cassette
- Carry out steering angle sensor adjustment

  Note:

  - If steering angle sensor adjustment is cancelled, first code the DSC control unit
  - Then adjust the steering angle sensor again
- Vehicles with active steering:
  - Steering angle sensor is adjusted by means of initial operation / adjustment of active front steering
  - If necessary, proceed in accordance with instructions

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61 31 101 Removing and installing/replacing switch for backrest width adjustment



Expand catches (1) of outter cover (2) and unclip switch for backrest width adjustment (3) in the direction of the arrow.

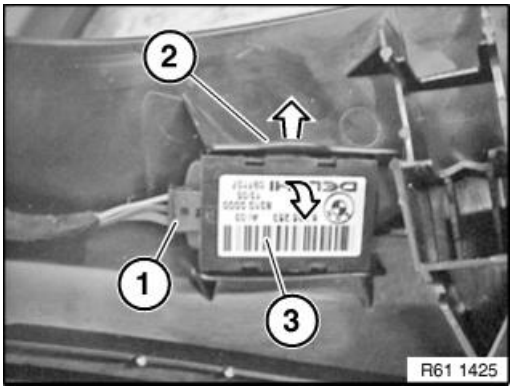
Disconnect associated plug connection and remove switch for backrest width adjustment (3).

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61 31 101 Removing and installing/replacing switch for backrest width adjustment

Necessary preliminary tasks:

- Remove outer cover on front seat



Disconnect plug connection (1).

Unlock retaining tab (2) in direction of arrow.

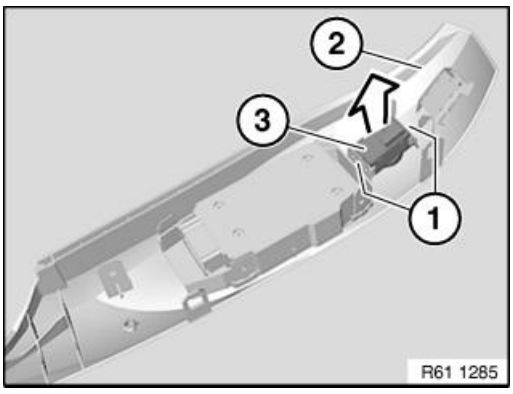
Remove switch for backrest width adjustment (3) in direction of arrow.

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61 31 208 Removing and installing/replacing switch for front lumbar support

Necessary preliminary tasks:

- Remove outer cover on front seat



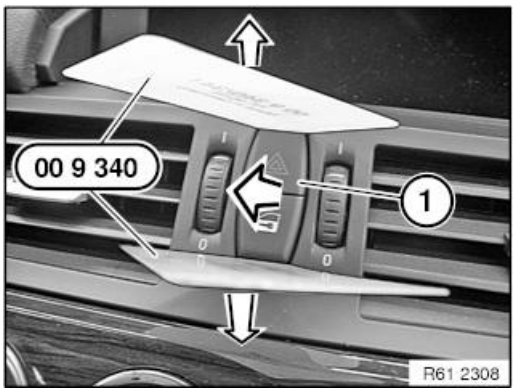
Expand catches (1) of cover (2), unclip switch for front lumbar support (3) in direction of arrow and remove.

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61 31 079 Removing and installing/replacing switch for hazard warning flashers/central locking

Special tools required:

- 00 9 341



Carefully lever out switch for hazard warning system/central locking (1) with special tool 00 9 341 in direction of arrow.

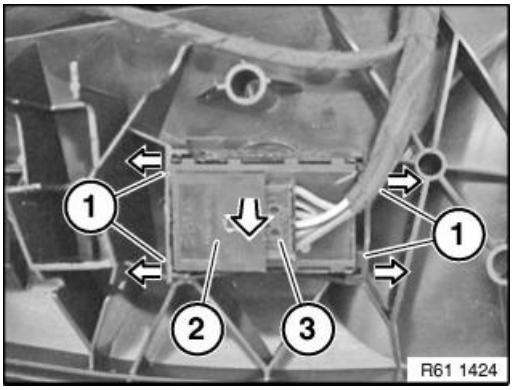
Remove switch for hazard warning system/central locking (1) in direction of arrow and disconnect plug connection behind.

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61 31 208 Removing and installing/replacing switch for lumbar support

Necessary preliminary tasks:

- Remove outer cover on front seat



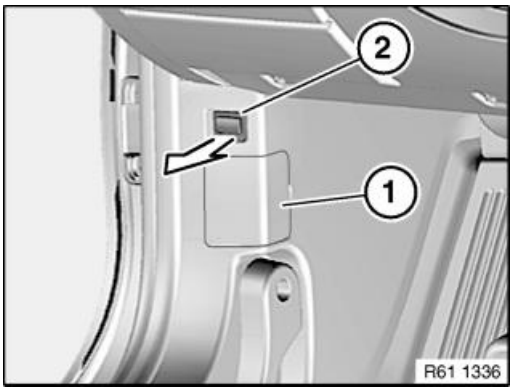
Disconnect plug connection (3).

Unlock catches (1).

Remove switch for lumbar support (2) in direction of arrow.

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61 31 083 Removing and installing/replacing switch for unlocking rear lid



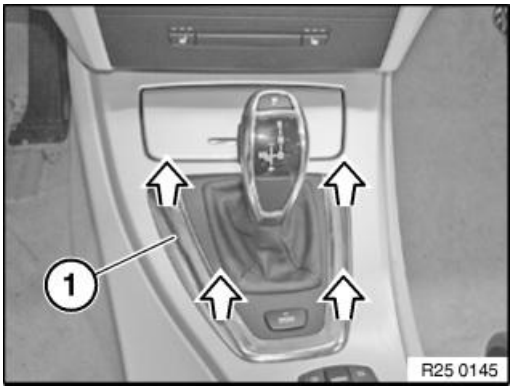
Note:
To facilitate handling, unclip OBD socket cover (1).

Unclip rear lid unlocking switch (2) in direction of arrow.

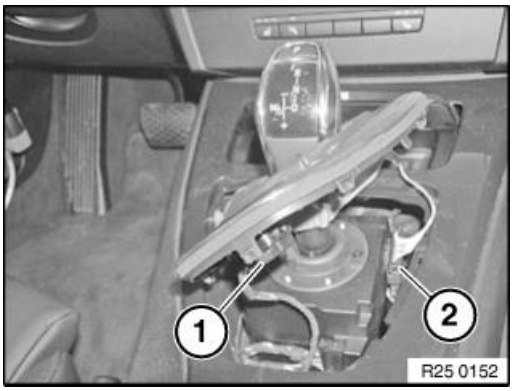
Disconnect associated plug connection and remove switch for unlocking rear lid (2).

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61 31 327 Removing and installing/replacing the shift knob of gear selector switch



Release installation frame (1) from centre console.



Disconnect plugs (1) and (2).



Note:

Do not twist gearshift lever knob during removal as this would cause the anti-twist lock in the knob to shear off.

Tug firmly to remove button.**Installation note:**

Fit gearshift lever knob on shift lever, align and press on until it snaps noticeably into place.

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61 31 134 Removing and installing/replacing USB audio interface connection socket



Operation is described in:

Removing and installing/replacing AV connection socket

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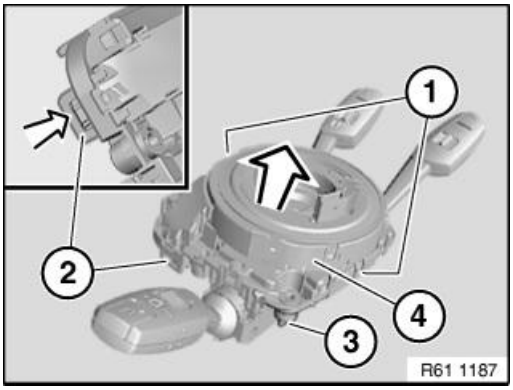
61 31 011 Removing and installing/replacing volute spring cassette

Warning!

Move wheels into straight-ahead position and do not alter this position during the repair work.

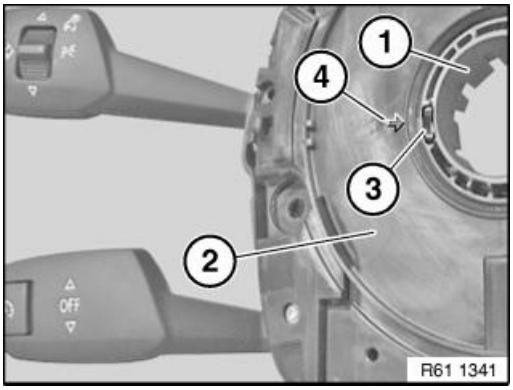
Necessary preliminary tasks:

- Remove steering-column switch cluster



Unlock catches (1).

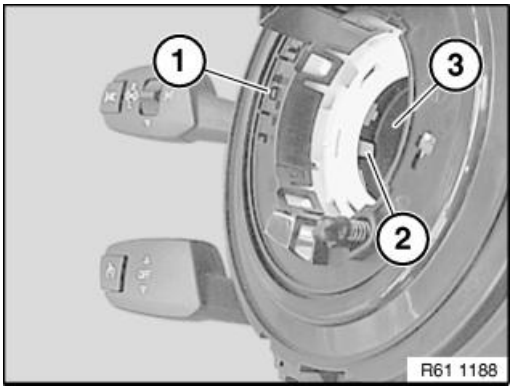
Press lock (2) and remove volute spring cassette (4) in direction of arrow from fixture for steering column stalk (3).



Important!

- Do not turn ring (1).
- Also turning ring (1) through 360° is not permitted!
- Secure ring (1) against unauthorized turning (e.g. with adhesive tape).

Installation:
Notch (3) on ring (1) must line up with arrow (4) on switch (2).



Important!

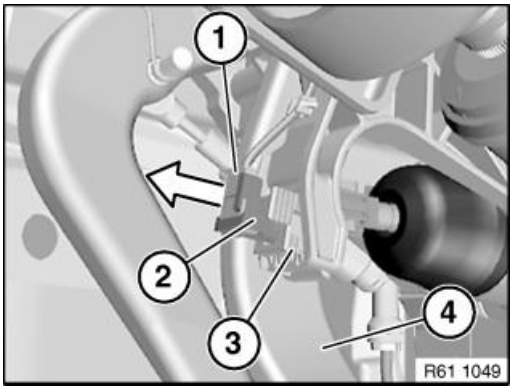
Fit volute spring cassette (1) so that guide (2) can slide exactly into associated notch on switch (3).

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61 31 310 Replacing brake light switch

Necessary preliminary tasks:

- Remove trim panel for pedal assembly.

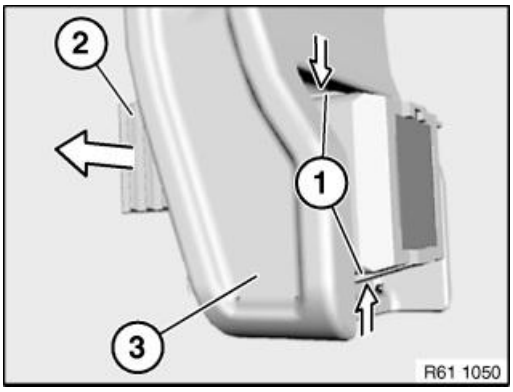


Unfasten plug connection (1) and disconnect.

Pull brake light switch (2) in direction of arrow out of brake light switch holder (3).

Installation:

- Press brake pedal (4) to floor.
- Slide brake light switch (2) as far as it will go into brake light switch holder (3).
- Grip brake light switch holder (3), slowly return brake pedal (4) to starting position and pull back to stop.



Note:
Removing brake light switch holder (2):

Press brake pedal.

Press catches (1) together and unclip brake light switch holder (2) from bearing block (3).

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61 31 382 Replacing coolant level switch

Warning!

Danger of scalding!

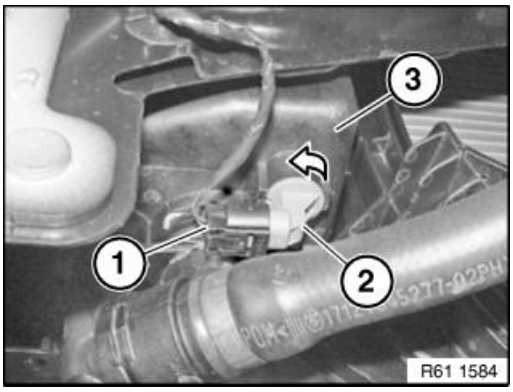
Carry out work only after engine has cooled down.

Important!

Do not damage connected water hoses.

Necessary preliminary tasks:

- If necessary, release screws for coolant expansion tank and raise coolant expansion tank slightly



Note:
Operation is shown by way of example on the E85. There may be differences in detail in the case of other vehicle models.

Disconnect plug connection (1).

Turn coolant level switch (2) in direction of arrow and feed downwards out of coolant expansion tank (3).

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64 11 970 Replacing fogging sensor

Special tools required:

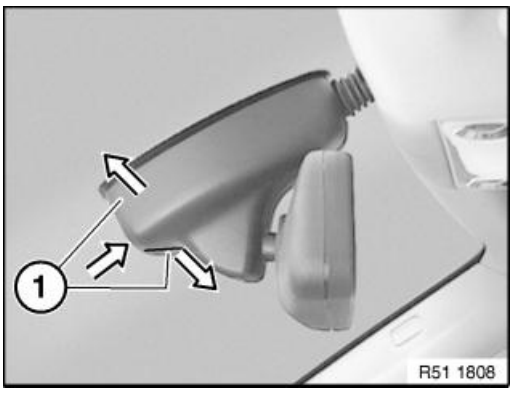
- 00 9 317

Warning!

Make sure rooms are well ventilated when working with adhesive remover indoors.

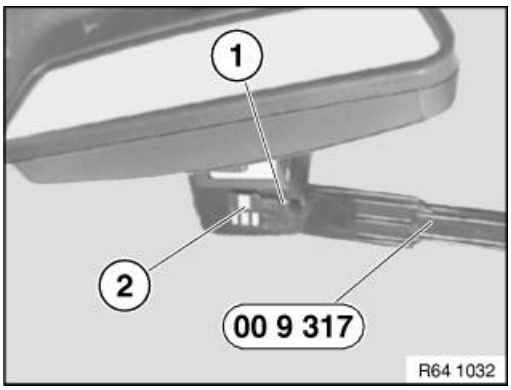
Important!

Do not under any circumstances use paint thinner to clean the bonding surface.



Expand two-part mirror base cover (1) by pressing from below and detach.

Feed out two-part mirror base cover (1) and remove.



Disconnect plug connection (1).

Note:
If necessary, carefully heat fogging sensor (2) with a hot air blower to approx. 40-60 °C.

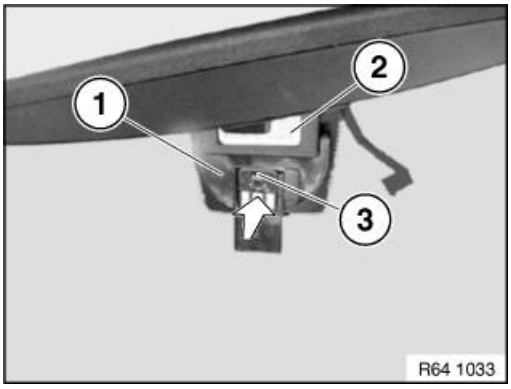
Lift off fogging sensor (2) with special tool 00 9 317 and slowly pull off from windshield.

Installation:
Bonding surface must be dry and free of dust and grease.

Clean bonding surface with adhesive remover (sourcing reference: BMW Parts Service).

After cleaning, do not touch bonding surface with bare hands.

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Pull off protective film completely from fogging sensor (3).

Place mounting template (1) as pictured on rain sensor (2).

Press fogging sensor (3) in direction of arrow with a contact pressure of ≥15 N/cm^2 onto inside of windshield.

Note:
Firm thumb pressure attains approx. 30 N/cm^2.

Remove mounting template (1) carefully from fogging sensor (3).

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61 31 118 Replacing front passenger power window switch



Operation is described in:

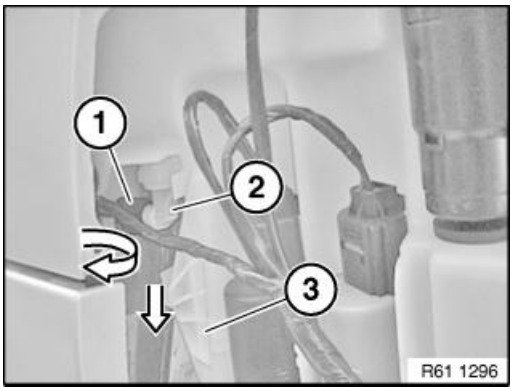
Replacing rocker switch for side window operation (front)

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61 31 492 Replacing level switch for windscreen washer system

Necessary preliminary tasks:

- Release fluid reservoir for windscreen washer system and pull out



Disconnect plug connection (1).

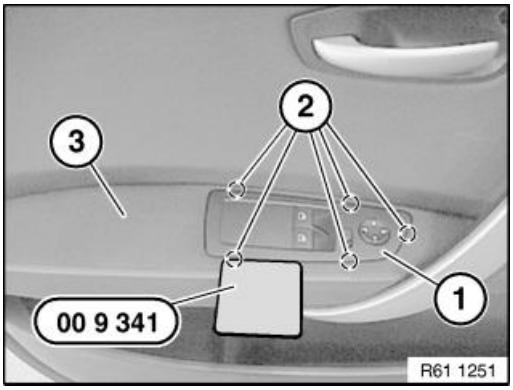
Turn level switch for windscreen washer system (2) in direction of arrow and remove towards bottom from fluid reservoir for windscreen washer system (3).

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61 31 115 Replacing rocker switch for side window operation (front)

Special tools required:

- 00 9 341



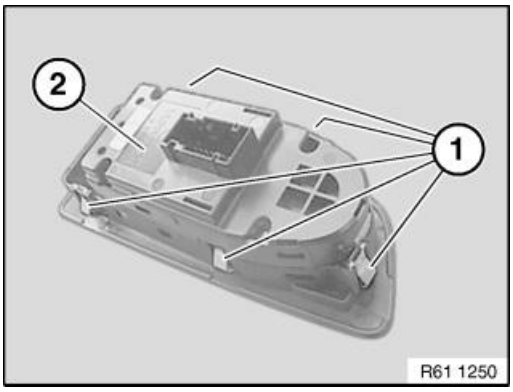
Important!

Carry out the following work step carefully in order to avoid damaging the armrest and rocker switch.

Carefully lever out rocker switch for side window operation (1) with special tool 00 9 341 at specified points (2).

Feed rocker switch for side window operation (1) out of armrest (3).

Disconnect associated plug connection and remove rocker switch for side window operation (1).



Installation:

Retaining clips (1) of rocker switch for side window operation (2) must not be damaged or missing.

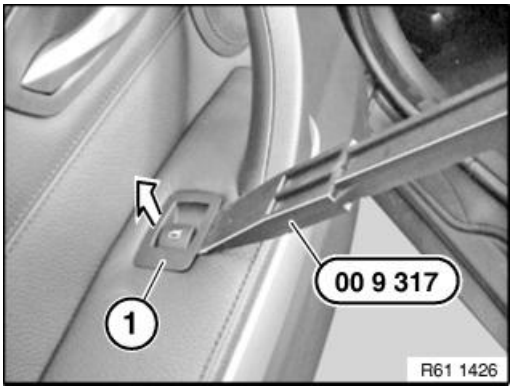
Make sure rocker switch for side window operation (2) is correctly seated in armrest.

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61 31 116 Replacing rocker switch for side window operation (rear)

Special tools required:

- 00 9 317



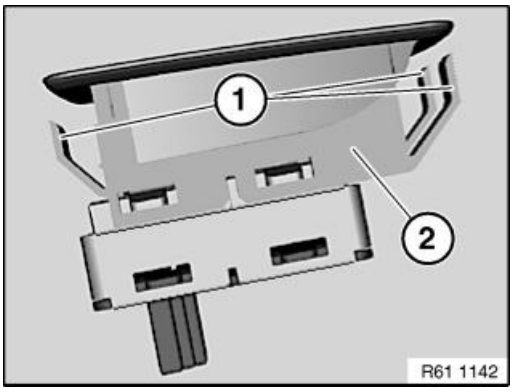
Important!

Carry out the following operation carefully so as to avoid damaging the door trim panel and switch.

If necessary, tape off working area.

Lever rocker switch for side window operation (1) with special tool 00 9 317 in direction of arrow out of armrest.

Disconnect associated plug connection and remove rocker switch for side window operation (1).



Installation note:
Retaining hooks (1) of rocker switch for side window operation (2) must not be damaged.

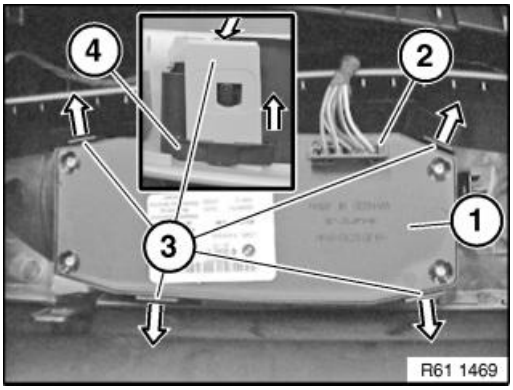
Make sure rocker switch for side window operation (2) is correctly seated in armrest.

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61 31 204 Replacing switch combination for seat adjustment

Necessary preliminary tasks:

- Remove outer cover on front seat



Disconnect plug connection (2).

Unlock retaining tabs (3) in direction of arrow and remove switch combination (1) from cover.

Installation:
Retaining tabs (3) of cover and guide (4) of switch combination (1) must not be damaged.

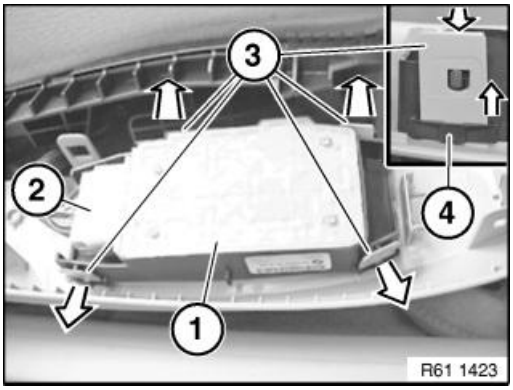
Make sure switch combination (1) is correctly seated in retaining tabs (3).

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61 31 204 Replacing switch combination for seat adjustment

Necessary preliminary tasks:

- Remove outer cover on front seat



Unlock retaining tabs (3) in direction of arrow and remove switch combination (1) from cover.

Disconnect plug connection (2).

Installation:
Retaining tabs (3) of cover and guide (4) of switch combination (1) must not be damaged.

Make sure switch combination (1) is correctly seated in retaining tabs (3).

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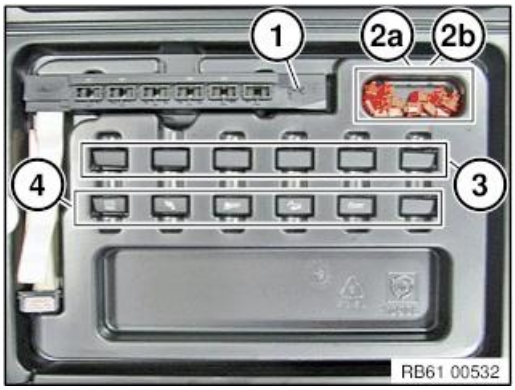
61 31 553 Replacing the centre console control panel (from 07/2012)

Special tools required:

- 64 1 020

Necessary preliminary tasks:

- Remove centre console control panel

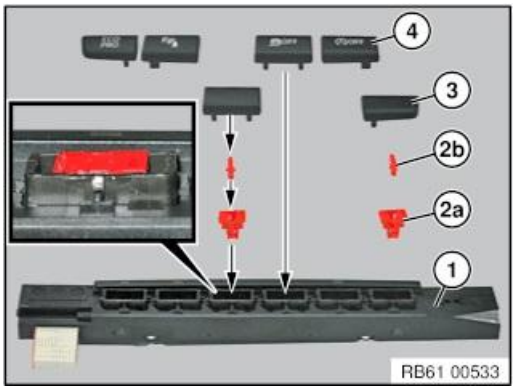


Graphic shows repair kit for centre console control panel.

Centre console control panel does not function (1) in accordance with the implementation of the used part with protective cap (3) and assigned symbol caps (4).

For protective caps without function (3) it is mandatory to use the red block clip (2a; 2b) in order to prevent the operation of the function key.

Incorrect assignment may result in damage to the centre console control panel (1) or functional impairment.



Note:
The assignment shown here is only an example!

Place the symbol cap (4) on the centre console control panel (1) and lock with firm pressure.

For protective caps without function (3) first set the red block clip (2a; 2b) in the corresponding function key on the centre console control panel (1).

The block clip (2a; 2b) must sit flush in the function key.

Place the protective cap without function (3) on the centre console control panel (1) and lock with firm pressure.

Note:
If necessary, carefully lift off the incorrectly set protective cap without function (3) or symbol cap (4) from the centre console control panel (1) using the SWZ 64 1 020 .

The locking tongues on the protective cap without function (3) or symbol cap (4) must not be damaged or missing.

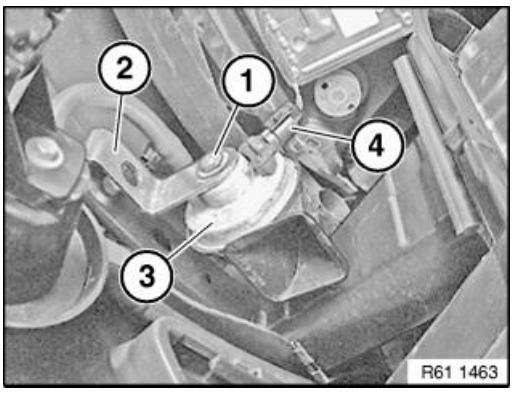
If necessary, carefully disengage the incorrectly set block clip (2a; 2b) using a suitable tool (e.g. screwdriver with 3mm blade) from the corresponding function key on the centre console control panel (1).

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61 33 040 Removing and installing/replacing a fanfare horn

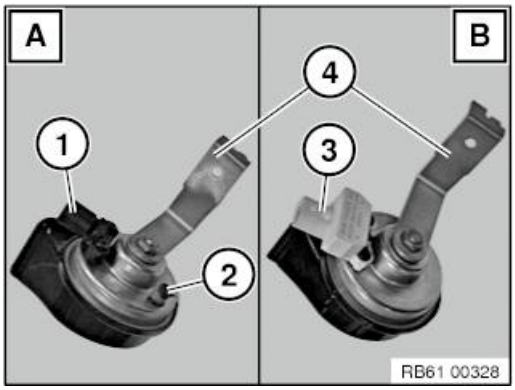
Necessary preliminary tasks:

- Remove front wheel arch cover



Disconnect plug connection (4).

Release nut (1) and remove fanfare (3) from holder (2).



Note:
The electromechanical fanfare is installed as standard equipment. Only in China, India, Russia,

South Africa and the Gulf States is the electronic fanfare installed as of 01/2011.

A: Electromechanical fanfare

B: Electronic fanfare

Distinguishing features:

- Electromechanical fanfare has a black connector (1)
- Electronic fanfare has a white connector (3)
- Only the electromechanical fanfare has a small adjusting screw (2)
- Holder (4) is vehicle-specific and may differ by vehicle from the graphic.

Important!

In vehicles with a production data before 01/2011, both fanfares must be replaced in the countries listed above.

The electronic fanfare has a different sound pattern.

Combining the mechanical and electronic fanfares is not permissible.

The connector position may vary slightly.

It is particularly important to ensure that the holder is firmly seated on the vehicle and the fanfare is firmly seated on the holder! The effect on sound is very high!

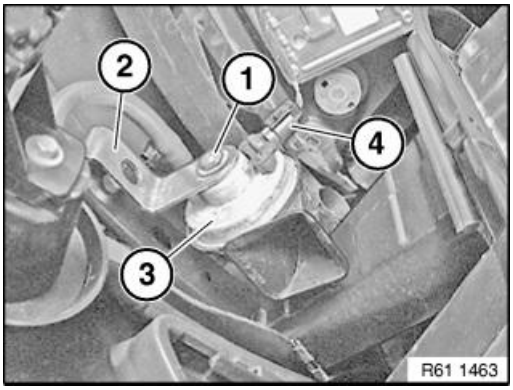
If the new part is supplied with the holder included, this must be replaced completely with the holder!

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61 33 060 Removing and installing/replacing both fanfare horns

Necessary preliminary tasks:

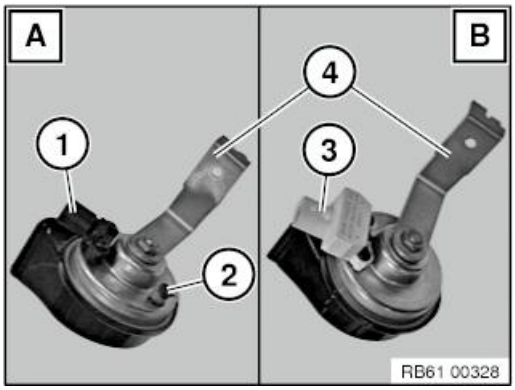
- Remove front bumper panel



Note:
Graphic shows the left side.

Disconnect plug connection (4).

Release nut (1) and remove fanfare (3) from holder (2).



Note:
The electromechanical fanfare is installed as standard equipment. Only in China, India, Russia,

South Africa and the Gulf States is the electronic fanfare installed as of 01/2011.

A: Electromechanical fanfare

B: Electronic fanfare

Distinguishing features:

- Electromechanical fanfare has a black connector (1)
- Electronic fanfare has a white connector (3)
- Only the electromechanical fanfare has a small adjusting screw (2)
- Holder (4) is vehicle-specific and may differ by vehicle from the graphic.

Important!

In vehicles with a production data before 01/2011, both fanfares must be replaced in the countries listed above.

The electronic fanfare has a different sound pattern.

Combining the mechanical and electronic fanfares is not permissible.

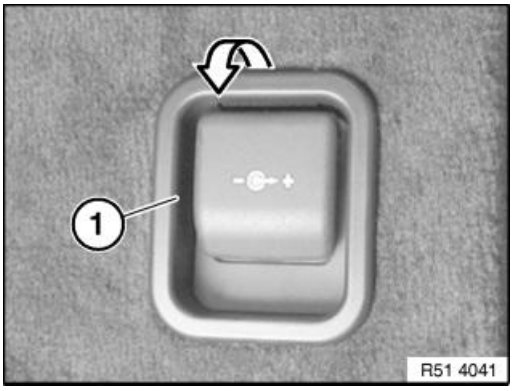
The connector position may vary slightly.

It is particularly important to ensure that the holder is firmly seated on the vehicle and the fanfare is firmly seated on the holder! The effect on sound is very high!

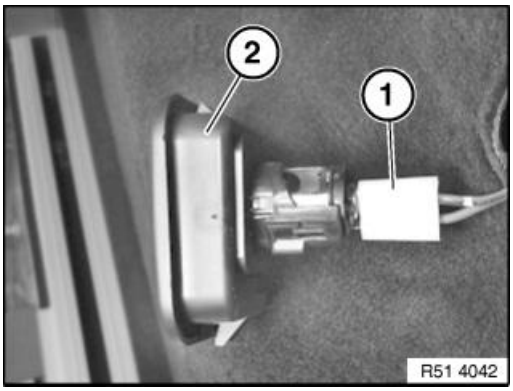
If the new part is supplied with the holder included, this must be replaced completely with the holder!

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61 34 ... Removing and installing or replacing socket outlet in luggage compartment

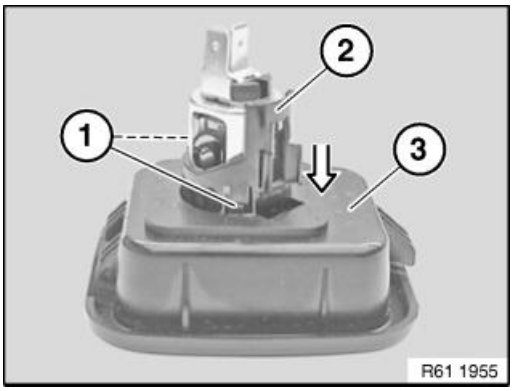


Carefully lift out 12-V-socket (1) in direction of arrow.



Disconnect plug connection (1).

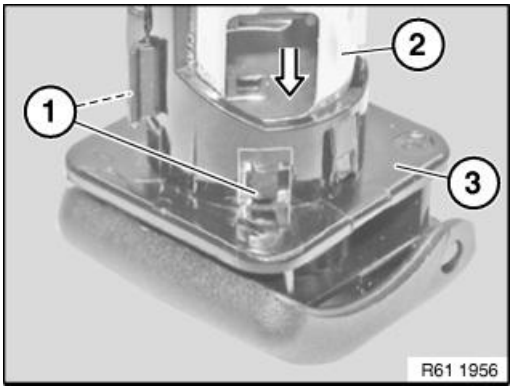
Remove 12-V-socket (2).



Unlock catches (1) with a suitable tool and press socket receptacle (2) in direction of arrow out of socket frame (3).

Installation:
Catches (1) on socket receptacle (2) must not be damaged.

Make sure socket receptacle (2) is correctly seated in socket frame (3).



Unlock catches (1) with a suitable tool and press socket (2) in direction of arrow out of socket receptacle (3).

Installation:
Catches (1) on socket receptacle (3) must not be damaged.

Make sure socket (2) is correctly seated in socket receptacle (3).

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61 00 ... Encode/program control unit(s)

Note:
Depending on the vehicle and the equipment, the following flat rate unit items are available for programming/encoding:

- 61 00 710
- 61 00 720
- 61 00 730

Note:

- In order to avoid incorrect programming procedures and fault messages, it is essential when working with the ISTA/P programming system always to use the version.
- Battery voltage must not drop below **13.0 V** during programming.

  Only use chargers* recommended by BMW for low voltage vehicle electrical system.

  *Sourcing reference Workshop Equipment Catalogue



programming routine via ISTA/P:

- Connect the battery charger to the vehicle.
- Connect the programming system with the vehicle.
- Determine the action plan.
- Accept action plan with the control units to be programmed/encoded and enabled, if necessary or work through.
- Observe the reworking list!
- If applicable, connect the workshop system to the vehicle depending on the rework list, run the brief test and delete the fault memory.

  Note:

  A switch to the workshop system may not necessarily be required with the integration of the service functions and the "Delete fault memory" function in ISTA/P. Check the rework list accordingly!
- The information about programming the workshop system and the corresponding notes in the user documentation must be observed.

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61 35 679 Initializing rain/light (solar) sensor



Note:
Initialization is necessary:

- after replacing windscreen
- after replacing rain/light (solar) sensor
- after replacing optical element on rain/light (solar) sensor
- after installing a used rain/light (solar) sensor



Note:

- Connect BMW diagnosis system
- Initializing rain/light (solar) sensor

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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.

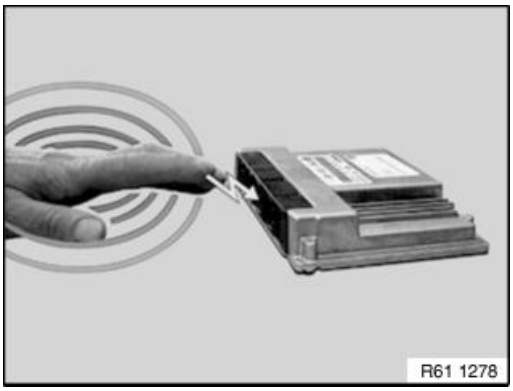
E-Electro

S-Static

D-Discharge

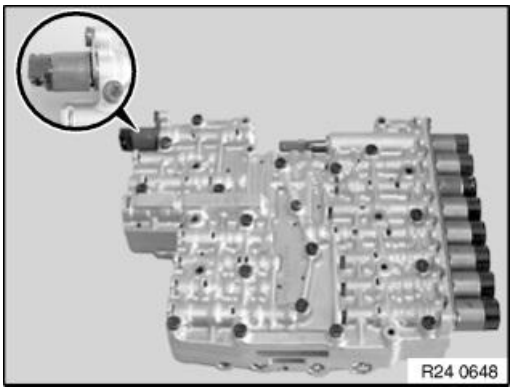
Important!

Read and comply without fail with the notes on this subject from Service Information **2 06 04 128**.



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:

Mechatronic control unit.

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Important!
Do not touch pins and multi-pin connectors directly!

Touch electrical components by their housings only.

Important!

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, rain sensor (additional work when replacing the windscreen / sensor replacement)

- **1-Series:** E8x
- **3-Series:** E9x
- **5-Series:** E6x
- **6-Series:** E6x
- **X1:** E84
- **Z4:** E89

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
Condensation sensor square 30 x 20 mm	Yes	No	No	No

- **5-Series:** E6x
- **6-Series:** E6x
- **7-Series:** E6x

Sensor type/ Sensor shape	With windscreen replacement replacement **sensor** required	When replacing **the sensor** Programming/encoding necessary	When replacing **substitute visuals** Programming/encoding necessary	When replacing **the sensor/ substitute visuals** Initialisation required	Connecting the diagnosis system required
all types square 60 x 40 mm	No	Yes	-	Yes	Yes
RLS approximately ø 50 mm	No (new **substitute visuals** required, refer to Electronic Parts Catalogue)	-	No	Yes	Yes

- **X5:** E70
- **X6**: E7x

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Sensor type/ Sensor shape	With windscreen replacement replacement **sensor** required	When replacing **the sensor** Programming/encoding necessary	When replacing **substitute visuals** Programming/encoding necessary	When replacing **the sensor/** **substitute visuals** Initialisation required	Connecting the diagnosis system required
RLPSS (Rain, light and precipitation solar sensor) (Designation is located on the back of the sensor) approximately ø 50 mm	Yes	Yes	-	Yes	Yes
RLS (vehicle **with no HUD**) (Designation is located on the back of the sensor) approximately ø 50 mm	No (new **substitute visuals** required, refer to Electronic Parts Catalogue)	-	No	Yes	Yes
RLSS (vehicle **with HUD**) (Designation is located on the back of the sensor) approximately ø 50 mm	Yes	Yes	-	Yes	Yes

- **1-Series:** E8x
- **3-Series:** E9x
- **X1:** E84
- **X3:** E83
- **Z4:** E89

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 square 60 x 40 mm	No	Yes	Yes	Yes

- **5-Series:** F1x
- **5 Series GT:** F07

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- **6-Series:** F06, F1x
- **7-Series:** F0x
- **X3:** F25
- **X4:** F26

Sensor type/ Sensor shape	With windscreen replacement replacement **sensor** required	When replacing **the sensor** Programming/encoding necessary	When replacing **substitute visuals** Programming/encoding necessary	When replacing **the sensor/ substitute visuals** Initialisation required	Connecting the diagnosis system required
all types approximately ø 35 mm	No	No	-	Yes	Yes
all types approximately ø 50 mm	Yes	Yes	-	Yes	Yes
Only for F25 : RLS approximately ø 50 mm	No (new **substitute visuals** required, refer to Electronic Parts Catalogue)	-	No	Yes	Yes

- **X5:** F15, F85
- **X6:** F16, F86

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

- **1-Series:** F2x
- **2-Series:** F2x
- **3-Series:** F3x, F8x
- **3 Series GT:** F34
- **4-Series:** F3x, F8x

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

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all **up to 03/2014** except SBS (01) (Designation is located on the back of the sensor) approximately ø 35 mm	No	No	Yes	Yes
SBS (01) (Designation is located on the back of the sensor) approximately ø 35 mm	No	No	No	No
All **as from 03/2014** approximately ø 35 mm	No	No	No	No

- **2-Series:** F4x

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	No	No	No	No

BMW i:

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

BMW from **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	No	No	No	No

MINI (all):

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 square 60 x 40 mm	No	Yes	Yes	Yes

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all types approximately ø 35 mm	No	No	No	No

Rolls-Royce:

- RR1
- RR2
- RR3
- RR4
- RR5
- RR6

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 square 60 x 40 mm	No	Yes	Yes	Yes
all types approximately ø 35 mm	No	No	Yes	Yes
all types approximately ø 50 mm	Yes	Yes	Yes	Yes

Rolls-Royce:

- RR11
- RR12

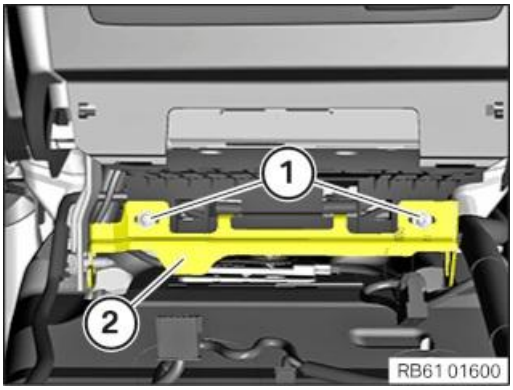
Sensor type/ Sensor shape	With windscreen replacement replacement sensor required	When replacing the sensor Programming/encoding necessary	When replacing the sensor Initialisation required	Connecting the diagnosis system required
all types approximately ø 35 mm	No	No	No	No

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61 35 953 Remove and install/replace interior aerial for Comfort Access

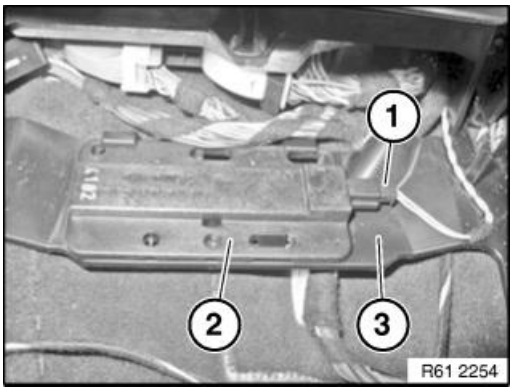
Necessary preliminary tasks:

- Remove centre console.



Release screws (1).

Feed out holder (2).



Disconnect plug connection (1).

Unlock and remove interior aerial for Comfort Access (2) from bracket (3).

Installation note:
Make sure interior aerial for Comfort Access (2) is correctly seated in designated holder (3).

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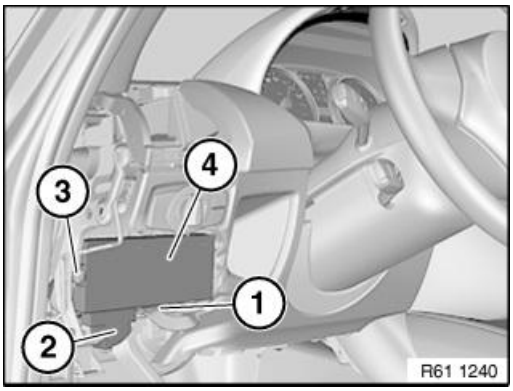
61 35 015 Removing and installing (replacing) control unit for Car Access System

Important!

Read and comply with notes on protection against electrostatic damage (ESD protection) .

Necessary preliminary tasks:

- Disconnect battery negative lead
- Remove trim panel for pedal assembly

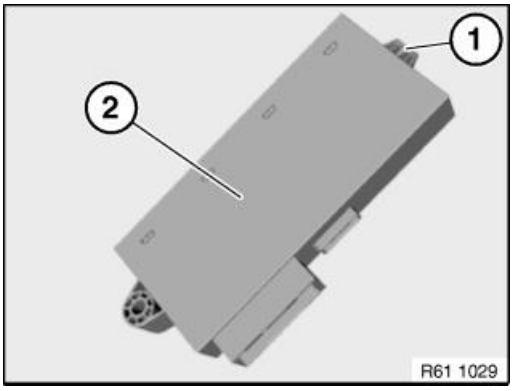


Note:
For purposes of clarity, the illustration shows the bottom left instrument panel trim removed.

Unlock plug connections (1/2) and disconnect.

Release bolt (3).

Feed control unit for Car Access System (4) from bracket and remove.



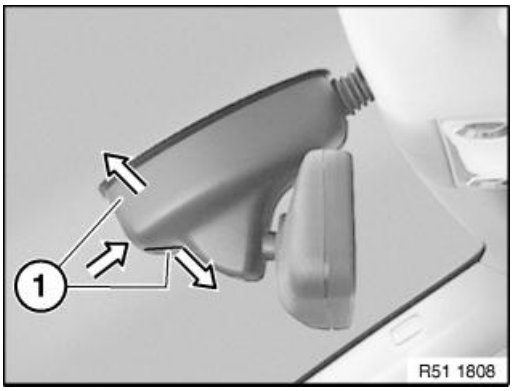
Installation:
Feed guide (1) of control unit for Car Access System (2) correctly into associated mounting.

Replacement:

Carry out vehicle programming/encoding .

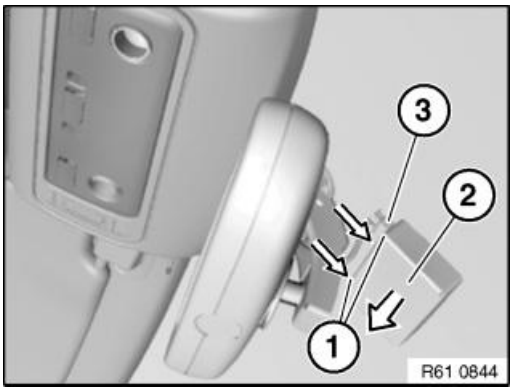
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61 35 177 Removing and installing (replacing) rain/light sensor



Expand two-part mirror base cover (1) by pressing from below and detach.

Feed out two-part mirror base cover (1) and remove.



Disconnect plug connection (3).

Press locks (1) in direction of arrow and remove rain/light sensor (2) towards bottom.

Installation note:
Do not damage optical element covered by rain/light sensor (2).

If necessary, initialise rain/light sensor.



Replacement:

Carry out programming/encoding.

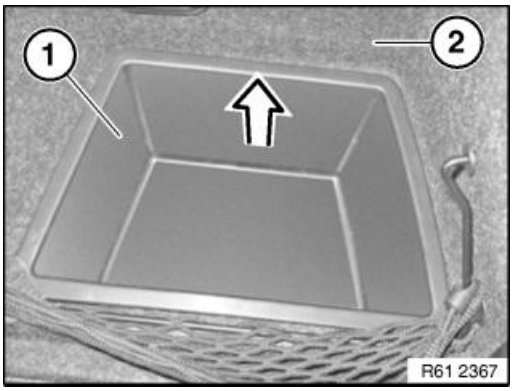
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66 53 170 Removing and installing (replacing) reversing camera control unit

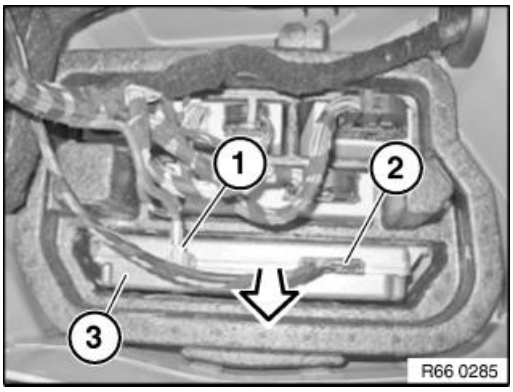


Important!

Read and comply with notes on protection against electrostatic damage (ESD protection).



Remove storage compartment (1) in direction of arrow from wheel arch panel (2) in luggage compartment.



Unlock and detach plug connections (1 and 2).

Remove control unit (3) in direction of arrow from equipment holder.



Replacement:

- Carry out programming/encoding.
- Calibrate reversing camera

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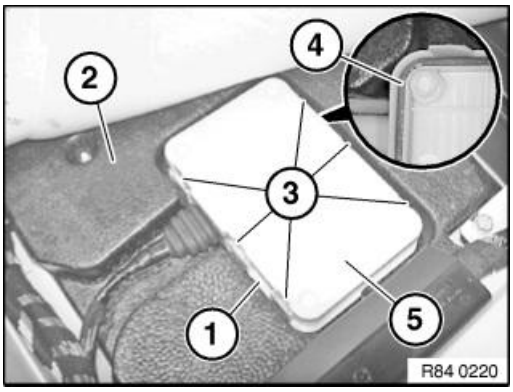
84 10 050 Removing and installing (replacing) USB hub

Important!

Read and comply with notes on protection against electrostatic damage (ESD protection).

Necessary preliminary tasks:

- Remove left front seat
- Remove front left entrance cover strip
- Fold back carpet for passenger compartment at front left in direction of travel

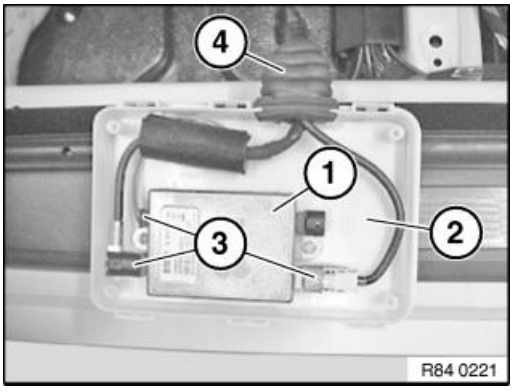


Remove USB hub protective socket (1) from footwell insert (2).

Unlock catches (3) with a suitable tool and remove USB hub protective socket cover (5).

Installation:
Make sure USB hub protective socket cover (5) engages correctly on USB hub protective socket lower section.

Seal (4) must not be damaged; if necessary, replace USB hub protective socket cover (5).



Remove USB hub (1) from USB hub protective socket lower section (2).

Installation:
Make sure rubber grommet (4) is correctly seated on USB hub protective socket lower section (2).

Disconnect plug connection (3).

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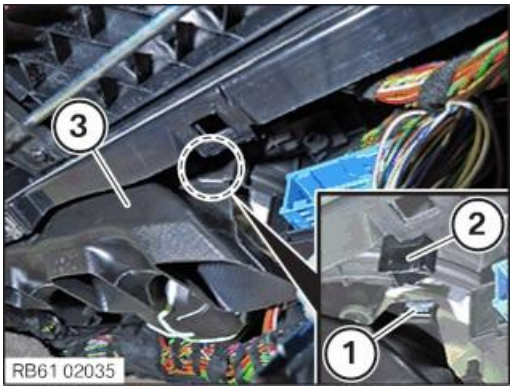
61 35 107 Removing and installing or replacing junction box electronics

Attention!

Read and comply with notes on protection against electrostatic damage (ESD protection).

Necessary preliminary tasks:

- Disconnect battery negative cable
- Remove instrument panel trim at bottom right
- Remove the footwell side trim panel at the A-pillar on the right

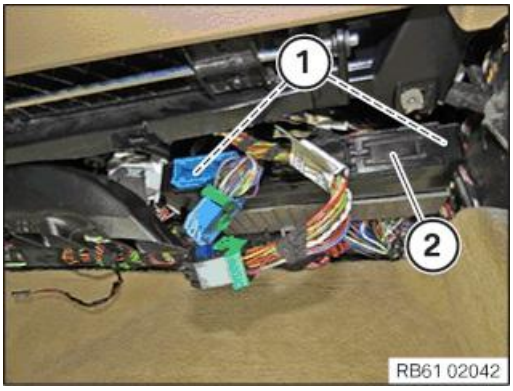


Loosen the clamp (1) from the bracket (2).

Slightly pull down the fresh-air duct (3).



Unlock plug connections (1) and disconnect.



Release screws (1).

Pull out the electronics junction box (2) towards the front.

Unlock plug connections behind and disconnect.

Remove the electronics junction box (2).

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Replacement:

- Carry out programming/encoding
- Delete transport mode

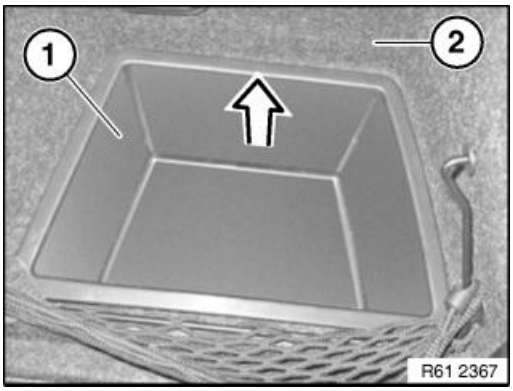
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61 35 001 Removing and installing trailer module

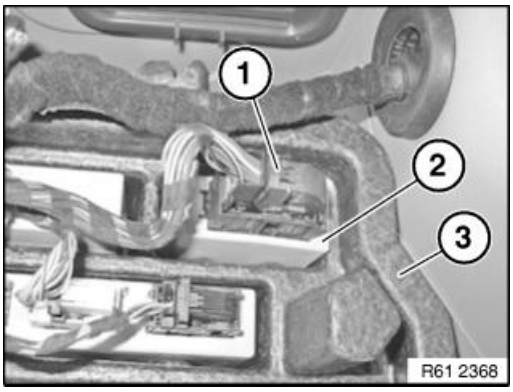


Important!

Read and comply with notes on protection against electrostatic discharge (ESD protection) .



Remove the storage compartment (1) in direction of arrow from wheel arch panel (2).



Unfasten plug connection (1) and disconnect.

Lift trailer module (2) out of equipment holder (3).

Installation:

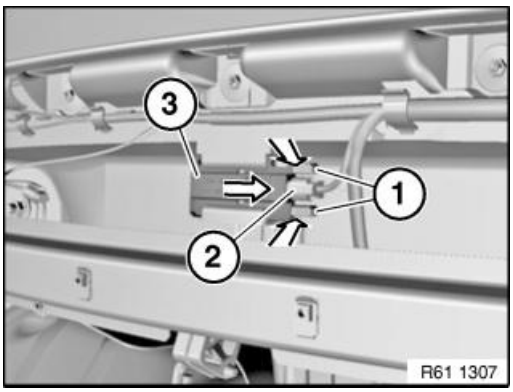
Make sure trailer module (2) is correctly seated.

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61 35 975 Removing and installing/replacing bumper antenna for Comfort Access System

Necessary preliminary tasks:

- Remove rear bumper trim



Disconnect plug connection (2).

Unlock catches (1) and remove bumper antenna for comfort access system (3) in direction of arrow from holder.

Installation:
Make sure bumper aerial/antenna for comfort access system (3) is correctly seated in holder.

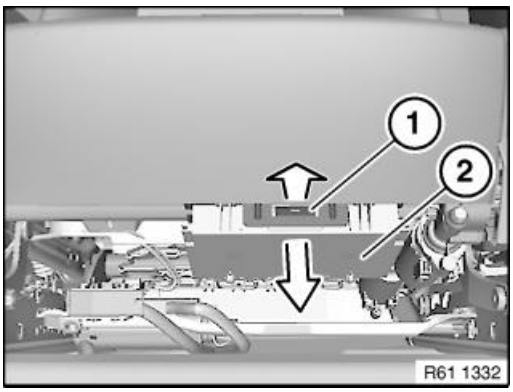
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61 35 080 Removing and installing/replacing control unit/module for left or right seat adjustment

Important!

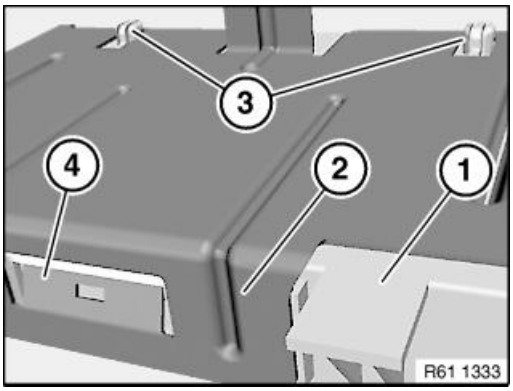
Read and comply with notes on protection against electrostatic damage (ESD protection) .

Note:
Move seat completely towards rear/top.



Unlock metal lug (1) towards front and remove control unit/module for seat adjustment (2) towards bottom.

Disconnect all associated plug connections.



Installation:
Make sure control unit/module for seat adjustment (1) is correctly seated in mounting (2).

Guides (3) and metal lug (4) must not be damaged.

Replacement:

Carry out vehicle programming/encoding .

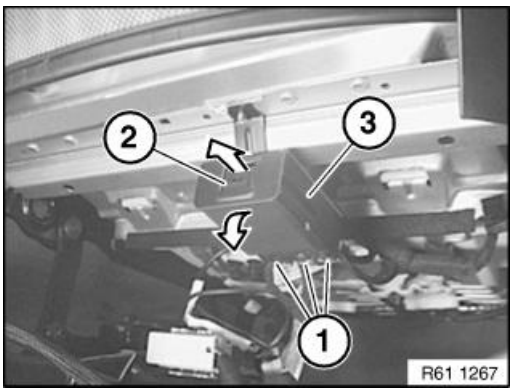
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61 35 095 Removing and installing/replacing control unit/module for seat heating

Important!

Read and comply with notes on protection against electrostatic damage (ESD protection) .

Note:
Move seat completely towards rear/top.



Disconnect plug connection (1).

Open lock (2) in direction of arrow and remove control unit/module for seat heating (3) towards bottom.

Installation:
Make sure control unit/module for seat heating (3) is correctly engaged.

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61 42 ... Removing and installing/replacing DC/DC converter

Note:
DC/DC converter in vehicles with automatic start-stop function.

There are two versions:

- Without additional bracket for diesel engine vehicles
- With additional bracket for petrol engine vehicles

Depending on the equipment, one or both versions are installed in the M3

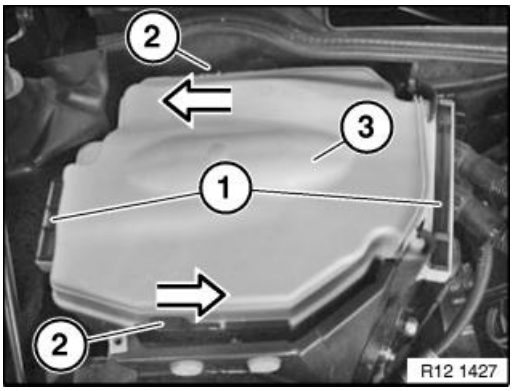
Important!

Read and comply with information on protection against damage from electrostatic discharge .

Necessary preliminary work:

Remove lower section of microfilter housing (all except M3)

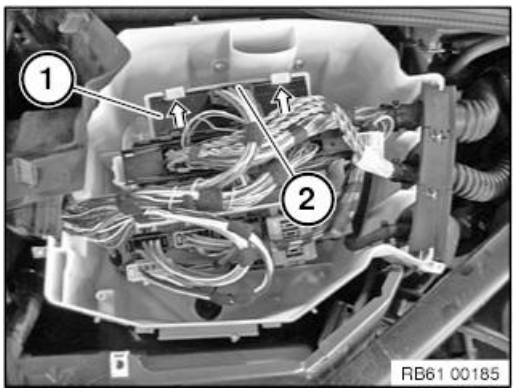
Remove right upper section of microfilter housing M3



Unlock fasteners (1) from below and slide upwards approx. 10 mm.

Unlock locks (2) in direction of arrow.

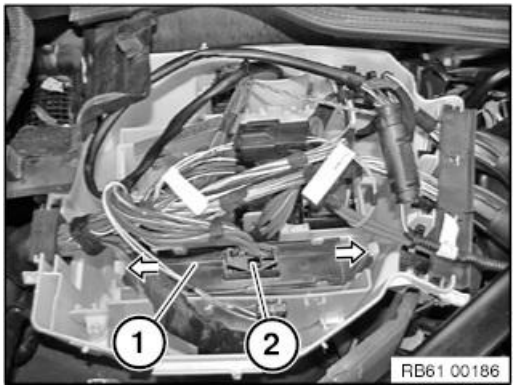
Remove cover (3).



Diesel engine vehicles (without additional bracket):

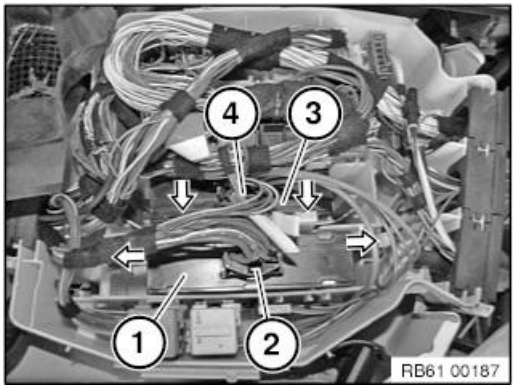
Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).

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Petrol engine vehicles (with additional bracket):

Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).



M3:

Release tabs in direction of arrow and remove DC/DC converter with additional bracket (1) upward. Disconnect plug connection (2).

Release tabs in direction of arrow and remove DC/DC converter without additional bracket (3) upward. Disconnect plug connection (4).

Important!

Do not mix up plug connections (2, 4)!

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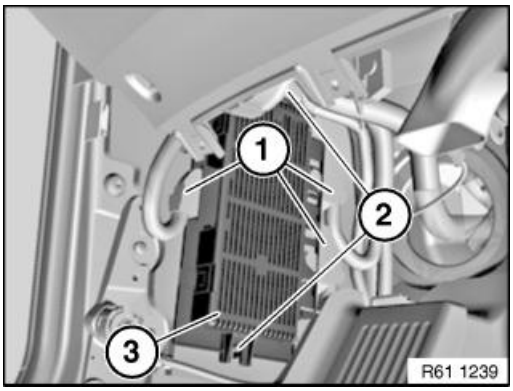
61 35 115 Removing and installing/replacing footwell module

Important!

Read and comply with notes on protection against electrostatic damage (ESD protection) .

Necessary preliminary tasks:

- Clamp off battery negative lead
- Remove footwell side trim panel on A-pillar, left



Disconnect plug connection (1).

Release nutsÂ (2) and remove footwell module (3).

Replacement:

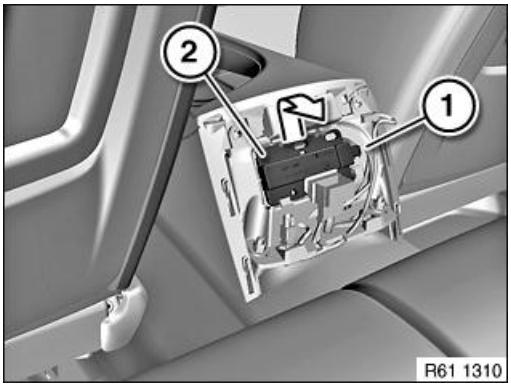
Carry out vehicle programming/encoding .

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61 35 954 Removing and installing/replacing interior aerial for comfort access system (rear)

Necessary preliminary tasks:

- Remove trim on rear storage compartment



Unclip interior aerial for comfort access system (2) in the direction of arrow and remove.

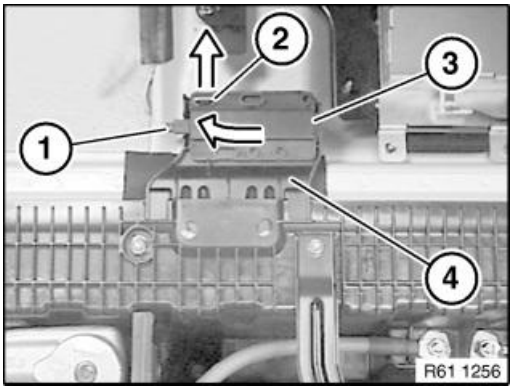
Disconnect plug connection (1).

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61 35 970 Removing and installing/replacing rear luggage compartment antenna for comfort access system

Necessary preliminary tasks:

- Remove luggage compartment floor trim panel.



Disconnect plug connection (1).

Unlock catches (2) and remove luggage compartment antenna for comfort access system (3) in direction of arrow from holder (4).

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64 11 970 Replacing fogging sensor

Special tools required:

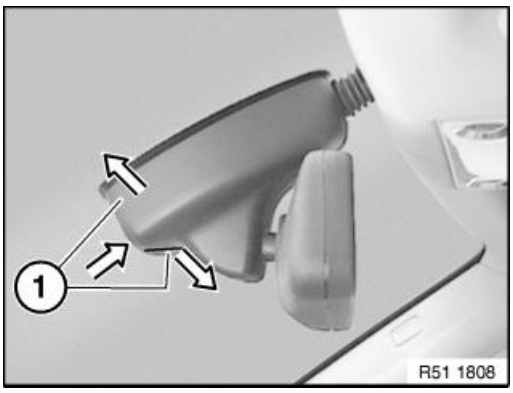
- 00 9 317

Warning!

Make sure rooms are well ventilated when working with adhesive remover indoors.

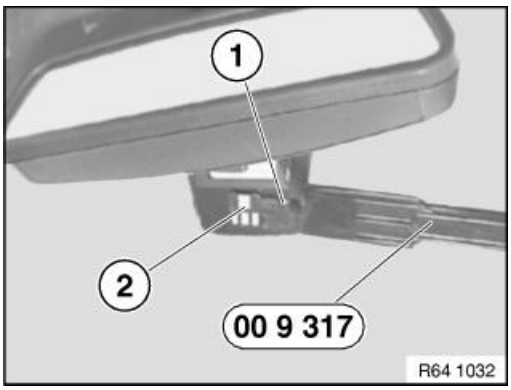
Important!

Do not under any circumstances use paint thinner to clean the bonding surface.



Expand two-part mirror base cover (1) by pressing from below and detach.

Feed out two-part mirror base cover (1) and remove.



Disconnect plug connection (1).

Note:
If necessary, carefully heat fogging sensor (2) with a hot air blower to approx. 40-60 °C.

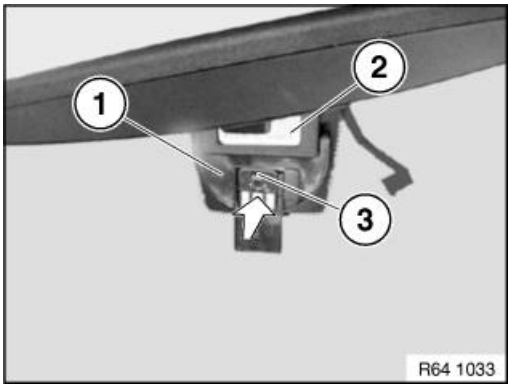
Lift off fogging sensor (2) with special tool 00 9 317 and slowly pull off from windshield.

Installation:
Bonding surface must be dry and free of dust and grease.

Clean bonding surface with adhesive remover (sourcing reference: BMW Parts Service).

After cleaning, do not touch bonding surface with bare hands.

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Pull off protective film completely from fogging sensor (3).

Place mounting template (1) as pictured on rain sensor (2).

Press fogging sensor (3) in direction of arrow with a contact pressure of ≥15 N/cm^2 onto inside of windshield.

Note:
Firm thumb pressure attains approx. 30 N/cm^2.

Remove mounting template (1) carefully from fogging sensor (3).

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61 42 ... Removing and installing/replacing DC/DC converter

Note:
DC/DC converter in vehicles with automatic start-stop function.

There are two versions:

- Without additional bracket for diesel engine vehicles
- With additional bracket for petrol engine vehicles

Depending on the equipment, one or both versions are installed in the M3

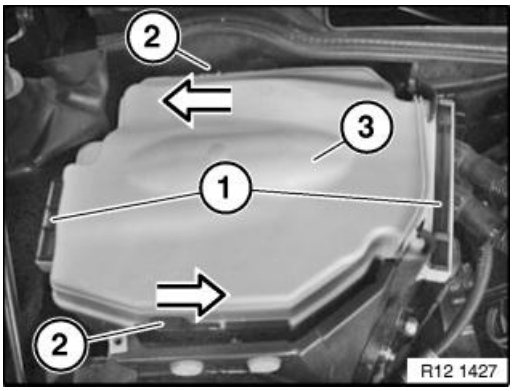
Important!

Read and comply with information on protection against damage from electrostatic discharge .

Necessary preliminary work:

Remove lower section of microfilter housing (all except M3)

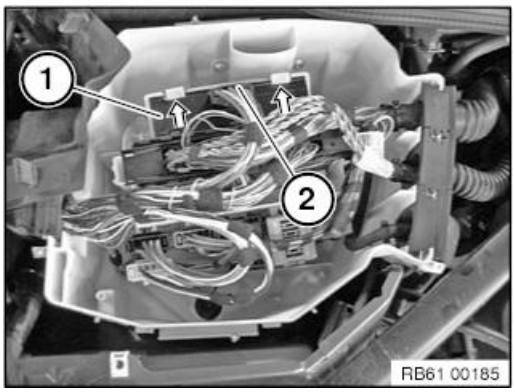
Remove right upper section of microfilter housing M3



Unlock fasteners (1) from below and slide upwards approx. 10 mm.

Unlock locks (2) in direction of arrow.

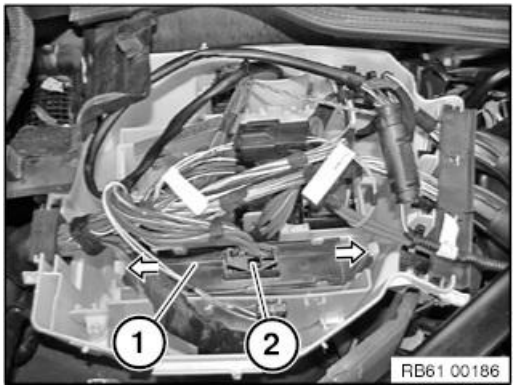
Remove cover (3).



Diesel engine vehicles (without additional bracket):

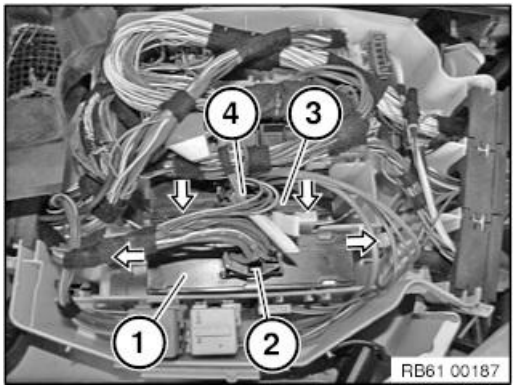
Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).

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Petrol engine vehicles (with additional bracket):

Release lugs in direction of arrow. Remove DC/DC converter (1) by pulling upward. Disconnect plug connection (2).



M3:

Release tabs in direction of arrow and remove DC/DC converter with additional bracket (1) upward. Disconnect plug connection (2).

Release tabs in direction of arrow and remove DC/DC converter without additional bracket (3) upward. Disconnect plug connection (4).

Important!

Do not mix up plug connections (2, 4)!

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61 61 010 Checking/adjusting contact angle of windscreen wiper arms on windscreen

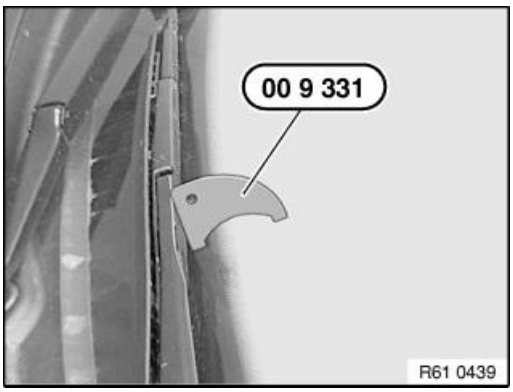
Special tools required:

- 00 9 220
- 00 9 331
- 61 6 100

Note:

Wipe quality is improved by precise adjustment of contact/approach angle of wiper arms.

Adjustment angle can be checked with special tool 00 9 331 or 61 6 100 .

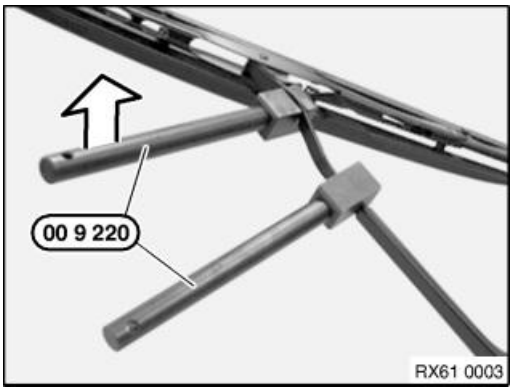


Checking with setting gauge:

Before checking approach angle, briefly lift windscreen wiper arms off windscreen.

Place special tool 00 9 331 next to pivot point of wiper blade on windscreen.

Check light gap, adjust wiper arm if necessary.

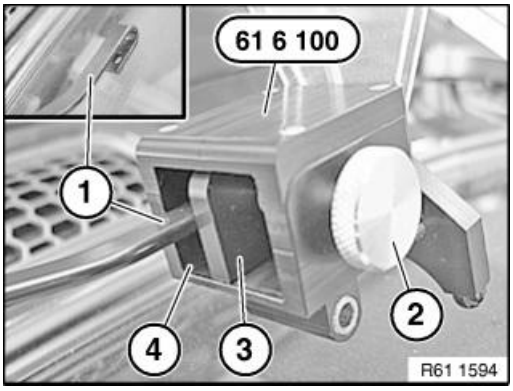


Note:

Tape off wiper arm with fabric adhesive tape to avoid damage.

Press special tools 00 9 220 in appropriate direction until correct contact/approach angle is obtained.

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Checking with angulometer:

Remove wiper blades.

Insert windscreen wiper arm (1) in angulometer 61 6 100 .

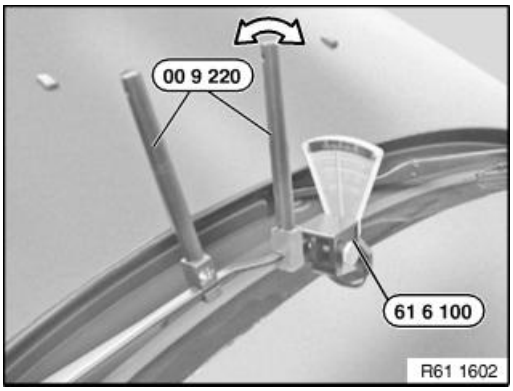
Using screw (2) and pressure plate (3), locate windscreen wiper arm (1) and position on windscreen.

Read off value in degrees, adjust wiper arm if necessary.

Note:

Windscreen wiper arm (1) must rest correctly on lower and side contact surfaces (4) of angulometer 61 6 100 .

On right-hand-drive cars, screw (2) must be located on left side of special tool 61 6 100.



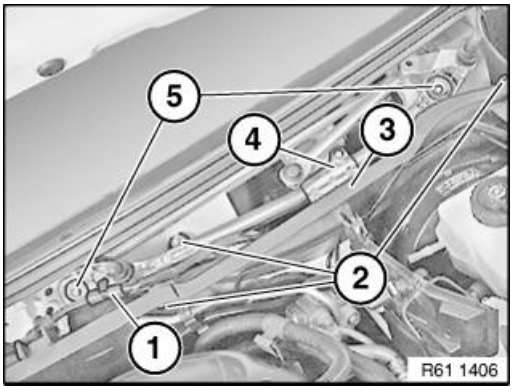
Press special tools 00 9 220 in appropriate direction until correct contact/approach angle is obtained.

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61 61 270 Removing and installing or replacing bracket for windscreen wiper system complete with motor

Necessary preliminary tasks:

- Remove cowl panel cover
- Remove both tension struts from spring strut dome



Release screws (2) from left heater bulkhead (3).

Remove left heater bulkhead (3) towards top.

Unclip cable (1) for wiper motor from holder.

Release screws (5) for wiper bracket (4).

Tightening torque 61 61 6AZ.

Remove wiper bracket (4) upwards.

Disconnect plug for wiper motor.

Installation:
Before fitting the wiper arms, allow the windscreen wiper motor to run into the rest position.

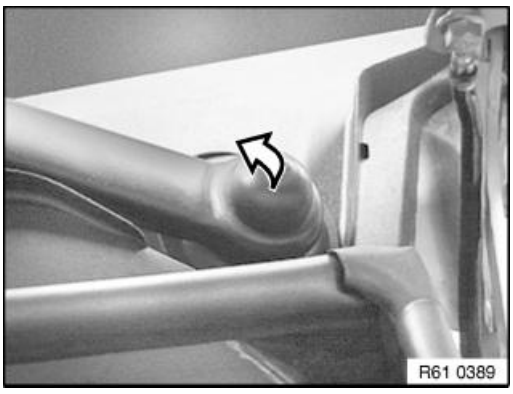
To ensure that the windscreen wiper system functions properly, check/adjust the contact angle of the wiper arms to the windscreen.

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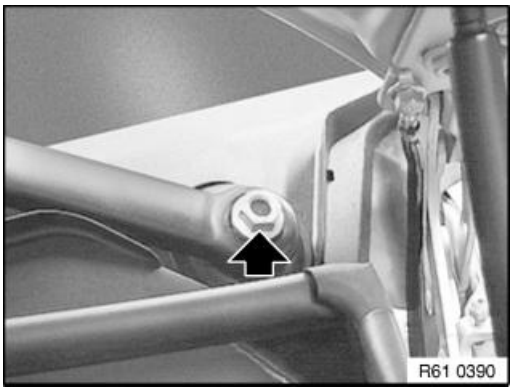
61 61 100 Removing and installing/replacing both windscreen wiper arms

Special tools required:

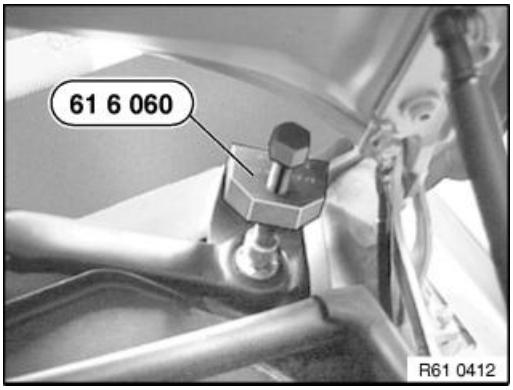
- 61 6 060



Take off cap.



Unfasten nut. Tightening torque 61 61 11AZ.

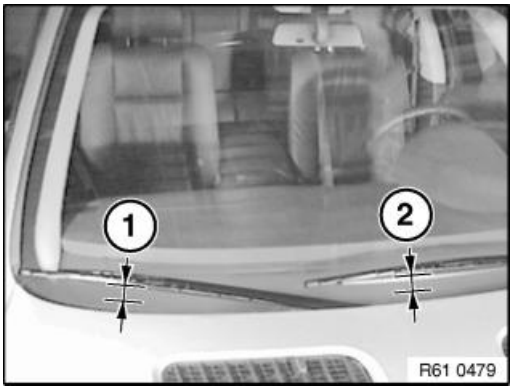


Important!

Do not bend windscreen wiper arm during removal (risk of breakage).

Detach windshield wiper arm with special tool 61 6 060 .

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Installation:
Adjust position of wiper arm in question in rest position (measured between wiper lip and top edge of cowl panel cover).

Then tighten down wiper arm and check position of relevant wiper arm again.

1. 47 ± 3 mm
2. 54 ± 3 mm

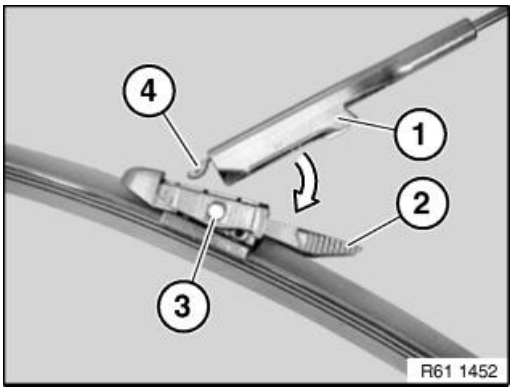
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61 61 041 Replacing both windscreen wiper blades

Important!

Make sure the wiper arm does not contact the windscreen without its wiper blade.

Note:
In the event of a **customer complaint** regarding the cleaning or wiping performance or noise build-up (scratching, squeaking) by the wiper blades, proceed as follows: **First check** whether the complaint is caused by dirt (preservation wax on new vehicles, 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.



Fold wiper arm (1) away from windscreen.

Press lock (2) and remove wiper blade (3) in direction of arrow.

Installation note:
Make sure guide (4) is correctly seated in wiper blade (3).

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61 61 081 Replacing the left or right wiper arm \PREMIUM

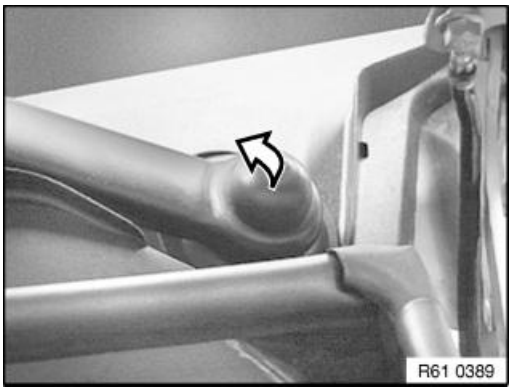
NOTICE

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

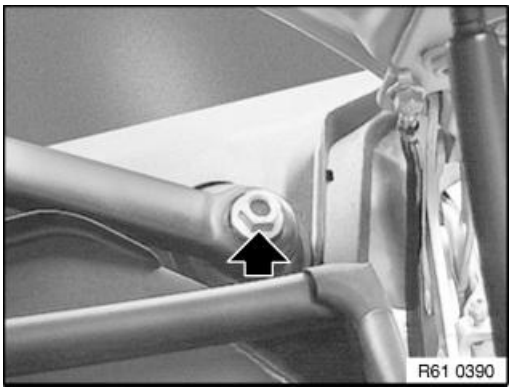
1 – Remove wiper arm

Prerequisite

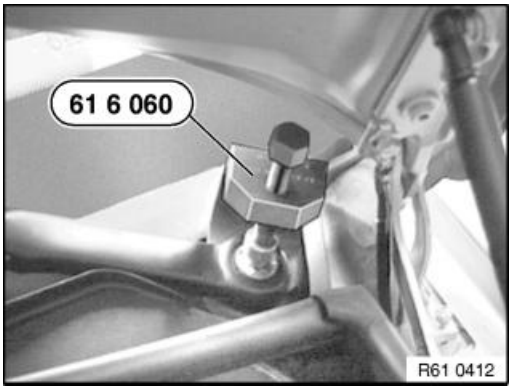
Engine compartment lid is open.



- Remove the protective cap in the direction of the arrow.



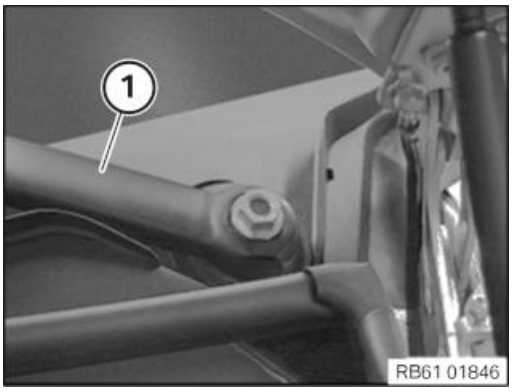
- Unscrew the nut (arrow).



- Pull off and remove the wiper arm with the help of the special tool **0 493 441 (61 6 060)**.

2 – Installing the wiper arm

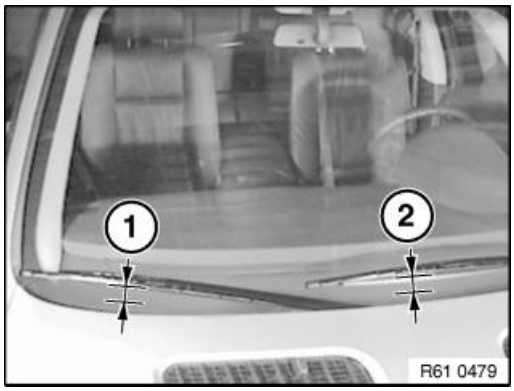
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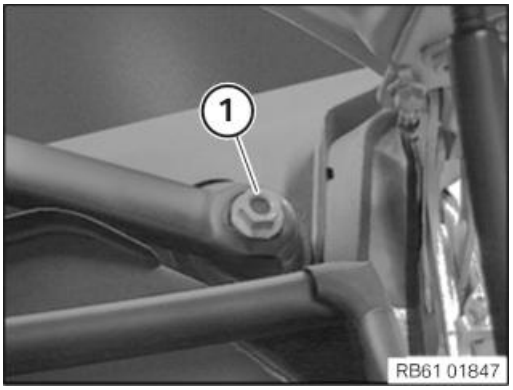


- Attach the wiper arm (1) and ensure that the wiper arm (1) is positioned correctly.

Windscreen wiper arm

Left wiper arm (2)	44 mm ... 50 mm
Right wiper arm (1)	51 mm ... 57 mm





- Tighten nut (1).

Windscreen wiper arm

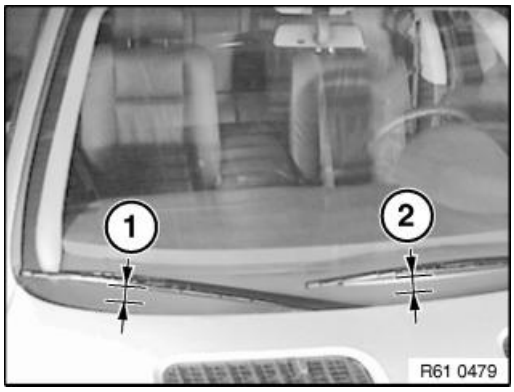
	35 Nm

Check

- Operate the wipers.
- Measure the distance between the wiper blade and cowl panel cover.

Windscreen wiper arm

Left wiper arm (2)	44 mm ... 50 mm
Right wiper arm (1)	51 mm ... 57 mm



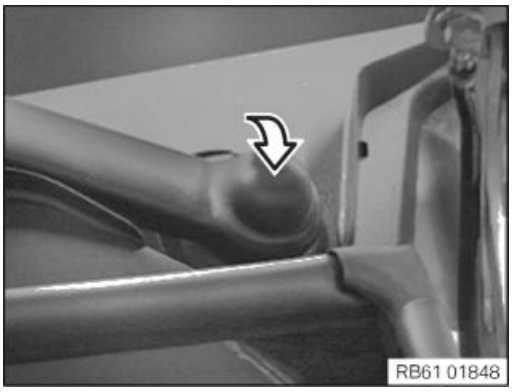
Result

» The distance between the wiper blade and cowl panel cover is incorrect: The wiper arm has not been positioned correctly.

Measure

- Remove the wiper arm and install it correctly.

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- Mount the protective cap (1).

Additional Information

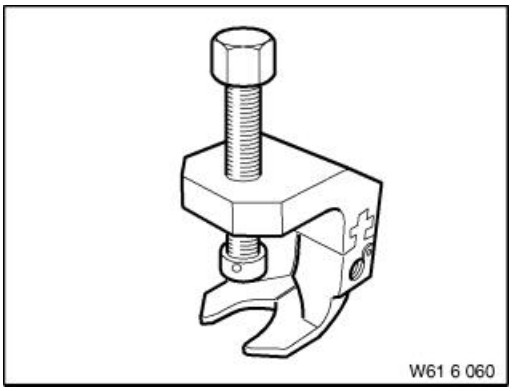
Overview of Tightening Torques

Windscreen wiper arm — Used in step 2

	35 Nm

Overview of Special Tools

0 493 441 (61 6 060) Extractor



Common — Used in step 1

Usage	(Wiper arm puller, universal) To pull off wiper arm from drive shaft
Included in the tool or work	
Storage location	C3
Replaced by	
In connection with	
SI-Number	01 10 99 (433)

Consisting of

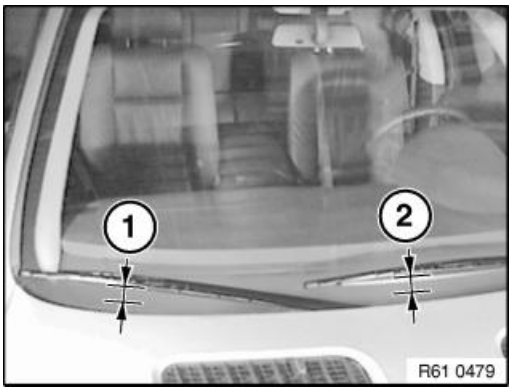
Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 494 704 (61 6 061)		**Basic body**	
2	0 494 705 (61 6 062)		**Claw** (Left / right claw)	
3	0 494 706 (61 6 063)		**Spindle**	
4	0 494 707 (61 6 064)		**Synchronising key**	

Overview Technical Data

Windscreen wiper arm — Used in step 2

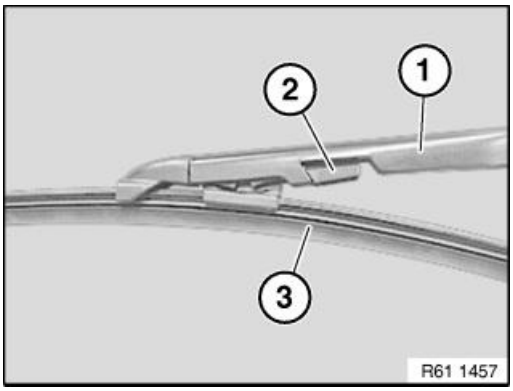
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Left wiper arm (2)	44 mm ... 50 mm
Right wiper arm (1)	51 mm ... 57 mm



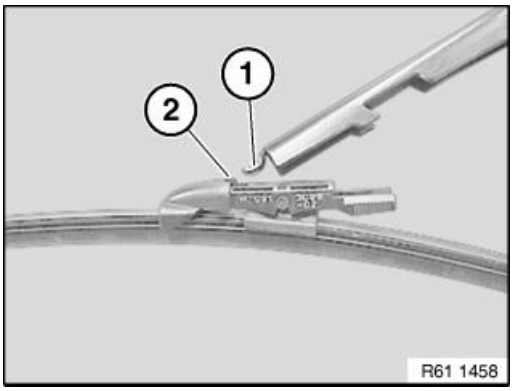
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61 62 020 Removing and installing/replacing rear window wiper blade



Fold wiper arm (1) away from rear window.

Press lock (2) and remove wiper blade (3) in direction of arrow.



Installation:

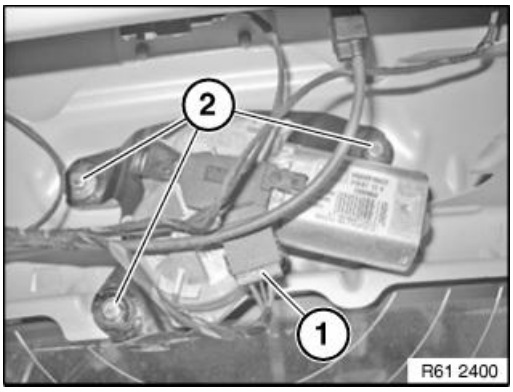
Make sure guide (1) is correctly seated in wiper blade (2).

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61 62 060 Removing and installing/replacing rear window wiper motor

Necessary preliminary tasks:

- Remove rear window wiper arm
- Remove panel for tailgate



Unfasten plug connection (1) and disconnect.

Release screws (2) and remove rear window wiper motor (3).

Tightening torque 61 62 2AZ .

Installation:

Check wiper shaft grommet for signs of damage.

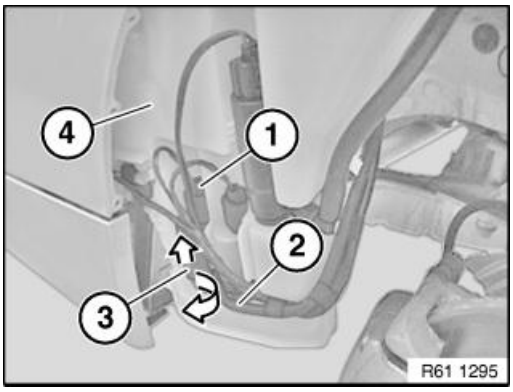
If necessary, replace grommet.

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61 62 150 Removing and installing/replacing window washer pump for rear window washer unit

Necessary preliminary tasks:

- Release fluid reservoir for windscreen washer system and pull out



Disconnect plug connection (1).

Detach hose (2) from washer pump for rear window washer unit (3).

Turn washer pump for rear window washer system (3) if necessary and pull in direction of arrow out of fluid reservoir for windscreen washer system (4).

Installation:

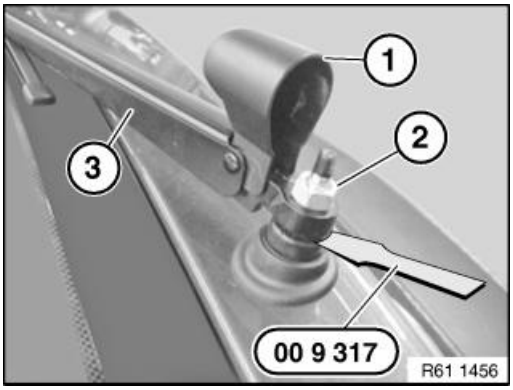
- Replace strainer of washer pump for rear window washer unit
- Coat sealing ring of washer pump for rear window washer unit with antiseize agent
- Lay hose of washer pump for rear window washer unit without kinks
- Fill fluid reservoir

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61 62 030 Removing and installing/replacing wiper arm on rear window

Special tools required:

- 00 9 317



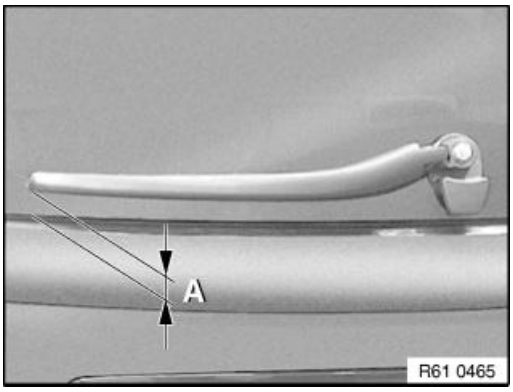
Open protective cap (1).

Slacken nut (2).

Tightening torque 61 62 5AZ .

With E84 tightening torque 61 62 1AZ .

Press off wiper arm (3) with special tool 00 9 317 and remove.



Installation:

Before fitting wiper arm, allow wiping system to run two wipe cycles into park position.

Adjust measurement (A) between wiper arm and rear window edge.

Measurement (A): 35 ±3 mm.

Replacement:

Remove wiper blade.

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61 62 115 Replacing washer jet for rear window washer system (from 08/2009)



Operation is identical to:

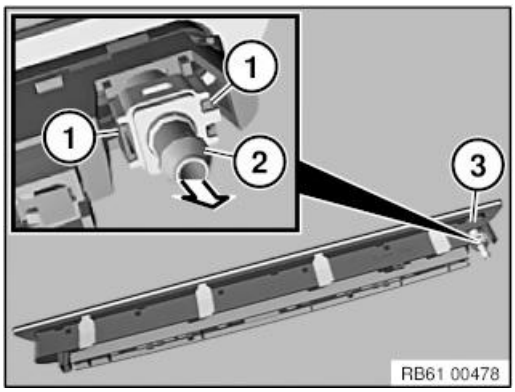
Completely replace additional brake light.

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61 62 115 Replacing washer jet for rear window washer system (up to 08/2009)

Necessary preliminary work:

- Remove additional brake light



If necessary, disconnect hose connection to the washer jet.

Push latch mechanisms (1) apart and pull washer jet (2) out of additional brake light (3).

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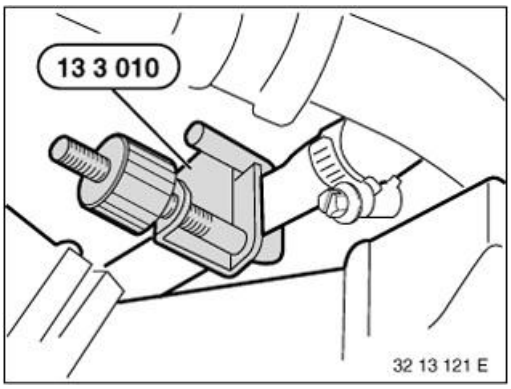
61 67 083 Removing and installing / replacing left or right high-pressure nozzle of headlight washer system

Special tools required:

- 13 3 010

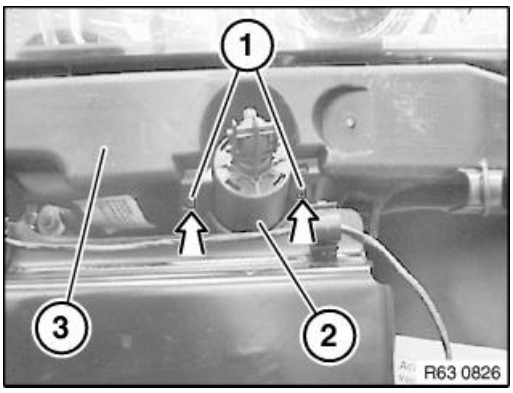
Necessary preliminary tasks:

- Remove cover from spray nozzle
- Remove front wheel arch cover



To prevent excessive escape of washer fluid, seal off end of high-pressure line with special tool 13 3 010 .

Catch any escaping washer fluid if necessary.

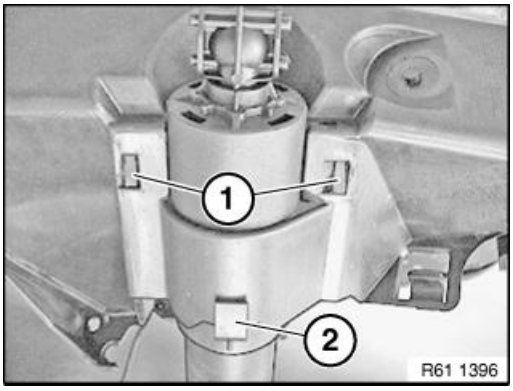


Note:
Bumper trim shown removed for purposes of clarity.

Unlock catch (1) in direction of arrow.

Feed high-pressure nozzle (2) towards rear out of headlight arm (3).

Unlock plug connection on high-pressure nozzle (2) and detach high-pressure line from high-pressure nozzle (2).



Installation:
Keep plug connection for high-pressure nozzle and high-pressure line clean and free from grease.

Ensure guide (2) is correctly seated.

Retaining lugs (1) must snap audibly into place.

Check function.

If necessary, adjustment can be carried out carefully using pointed pliers (tape of front area with adhesive tape where necessary).

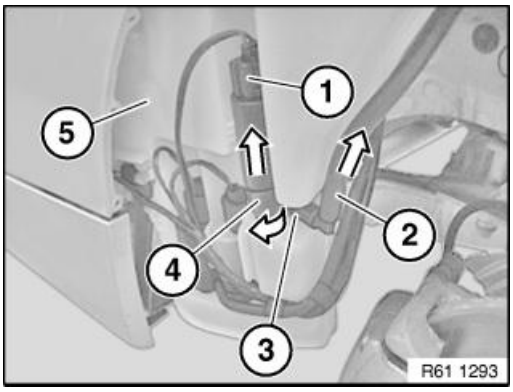
If necessary, top up washer fluid.

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61 67 010 Removing and installing/replacing washer pump of headlight washer system

Necessary preliminary tasks:

- Release fluid reservoir for windscreen washer system and pull out



Disconnect plug connection (1).

Note:
Catch any escaping washer fluid if necessary.

Open split pin (3) and detach hose (2) from washer pump of headlight cleaning system (4).

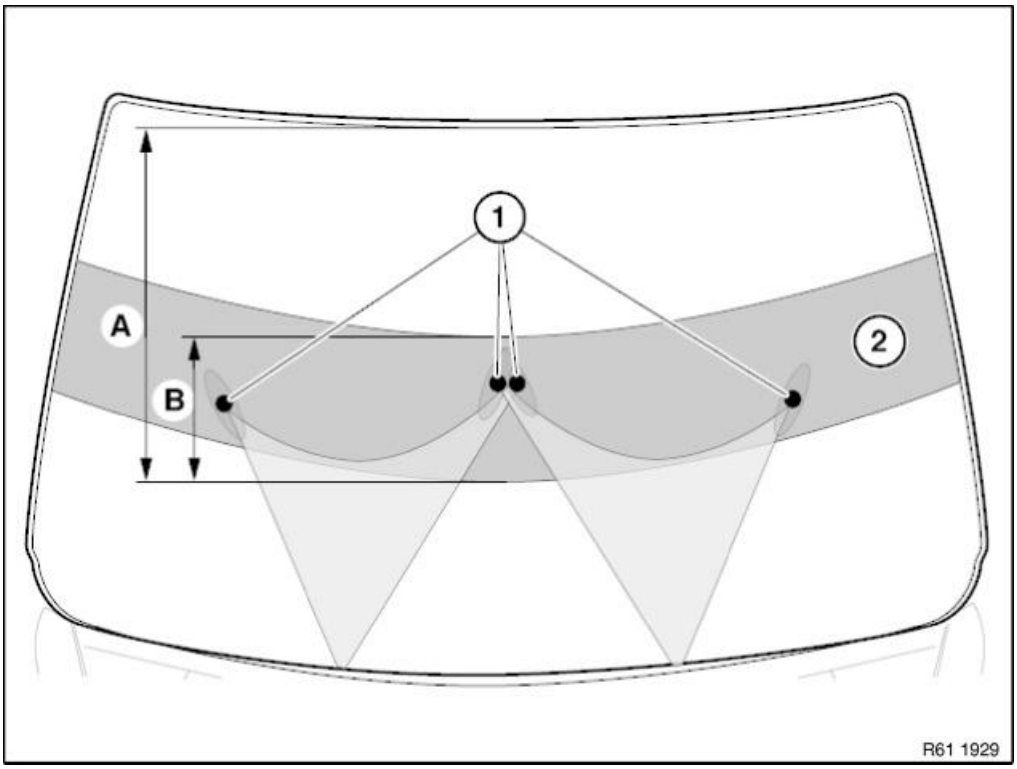
If necessary, turn washer pump of headlight cleaning system (4) and pull out of fluid reservoir for windscreen washer system (5).

Installation:

- Replace strainer for washer pump of headlight washer system.
- Coat sealing ring of washer pump for headlight cleaning system with antiseize agent.
- Lay hose of washer pump for headlight cleaning system without kinks
- Fill fluid reservoir

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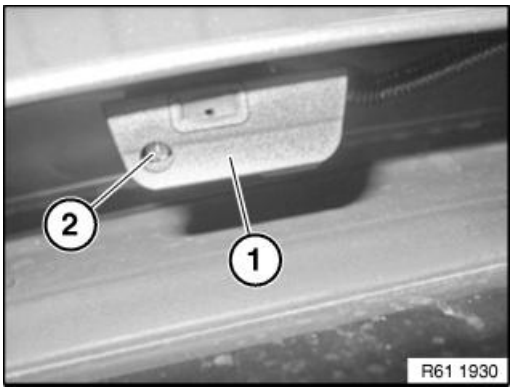
61 71 004 Adjusting windscreen washer jets



Mark tolerance range (2) with adhesive tape (A=500 mm / B=200 mm).

Actuate windscreen washer system.

Contact points (1) must be in tolerance range (2).



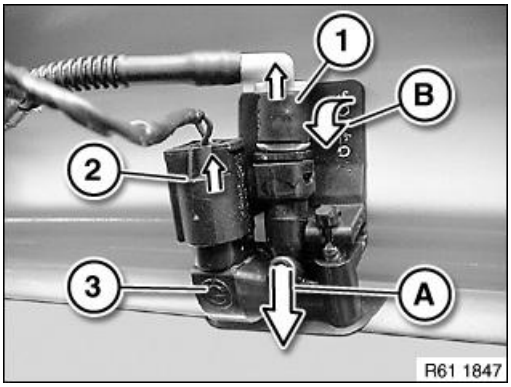
If necessary, adjust left or right washer jet (1) by way of screw (2).

Note:
If necessary, remove adhesive residue from windscreen.

Fill up with washer fluid.

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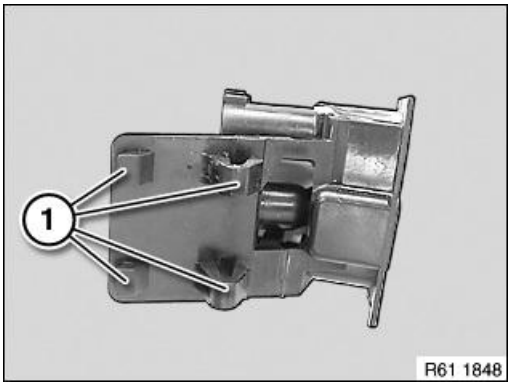
61 71 015 Removing and installing/replacing a jet nozzle in windscreen washer system



Unlock retaining clip for water hose (1) and detach water hose in direction of arrow.

Unlock plug connection (2) and disconnect in direction of arrow.

Press spray nozzle (3) in direction of arrow (A) and remove at top in direction of arrow (B).



Installation:

- Retaining lugs (1) must not be damaged.
- Check adjustment of spray nozzles and correct if necessary

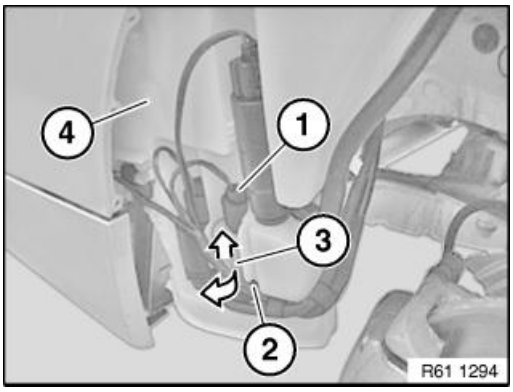
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61 71 100 Removing and installing/replacing windscreen washer pump

- Before replacing the windscreen washer pump, check the fluid reservoir for dirt contamination and clean if necessary!

Necessary preliminary tasks:

- Release fluid reservoir for windscreen washer system and pull out



Disconnect plug connection (1).

Note:
Catch any escaping washer fluid if necessary.

Detach hose (2) from windscreen washer pump (3).

Turn windscreen washer pump (3) if necessary and pull in direction of arrow out of fluid reservoir for windscreen washer system (4).

Installation note:

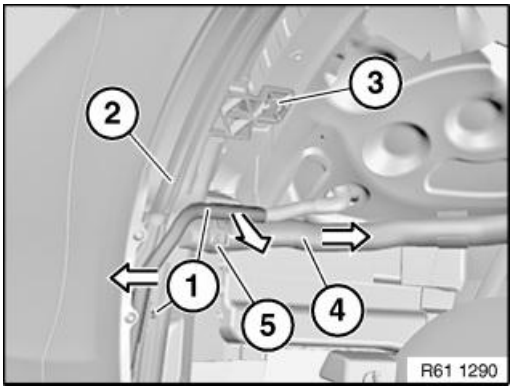
- Replace strainer for windscreen washer pump
- Coat sealing ring of windscreen washer pump with lubricant
- Lay hose pipe of windscreen washer pump without kinks
- Fill fluid reservoir

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61 71 061 Replacing fluid reservoir for windscreen washer system

Necessary preliminary tasks:

- Remove front right auxiliary turn indicator light
- Remove right wheel arch cover
- If necessary, remove right front wheel

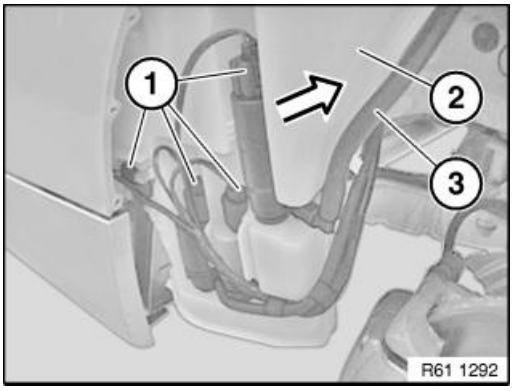


Unclip wiring harness fasteners (1) in direction of arrow out of fluid reservoir for windscreen washer unit (2).

Release screw (3).

Note:
Catch any escaping washer fluid if necessary.

Unlock filler hose (4) and detach from fitting on fluid reservoir (5).

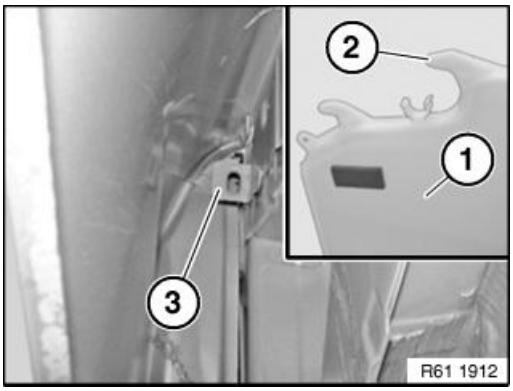


Pull fluid reservoir for windscreen washer system (2) in direction of arrow out of holder.

Disconnect all plug connections (1).

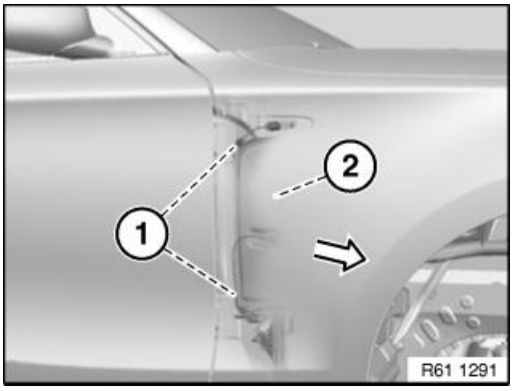
Disengage hose for washer pump (3) from fluid reservoir for windscreen washer system (2).

- Remove window washer pump
- Remove level switch
- If necessary, remove washer pump for headlight cleaning system
- If necessary, remove washer pump for rear window washer system



Installation:
Make sure lug (2) of water reservoir for windscreen washer unit (1) fits correctly in retaining fixture (3).

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Unclip auxiliary direction indicator wiring harness (1) in direction of arrow out of fluid reservoir for windscreen washer unit (2).

Installation:
Make sure auxiliary direction indicator wiring harness (1) is laid correctly.

Remove fluid reservoir for windscreen washer system (2) in direction of arrow.

Installation:

- Replace strainers on washer pumps
- Coat sealing rings of washer pumps with antiseize agent
- Lay hoses of washer pumps without kinks and clip into holders on fluid reservoir
- Fill fluid reservoir

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



The following applies in general:

To avoid damage, observe the following instructions:

- Avoid compressive and tensile loads
- Make sure cables are laid without kinks or abrasions
- Ensure non-contacting routing at sharp-edged body parts; use edge protection if necessary
- Secure additionally laid cables/leads with cable ties

The following additionally applies:

Shielded lines

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

Coaxial lines

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

CVBS lines

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

HSD lines

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

Optical fibre cable:

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

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

Attention!

- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables 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.

Note:

- FlexRay lines may only reveal one separation point (bride); renew

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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.

Note:
Repair wiring harnesses can be equipped with an **additional socket housing** (e.g. 30-pin), **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):

- 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**

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separation point outside the vehicle interior.

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