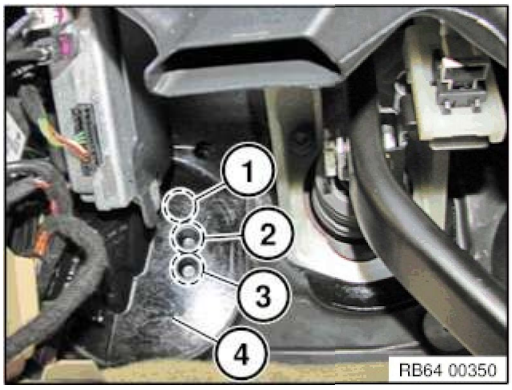
61 11 ... Installing repair cable for left Side View camera

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

Note:
Work is shown on the F30 by way of example. There may be differences in detail in the case of other vehicle types and equipment specifications.

Necessary preliminary work:

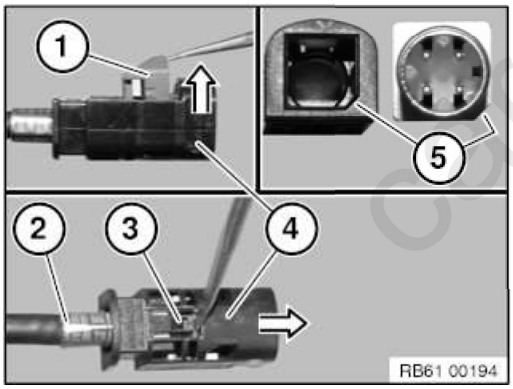
- Remove wheel arch cover front section, front left
- Remove the cover in the left engine compartment
- Remove trim panel for pedal mechanism



Break through the driver's footwell opening (2) in rubber grommet (4) using a suitable tool.

Note:
If the opening (2) is used, use opening (3).

If both openings (2, 3) are used, break through at position (1).



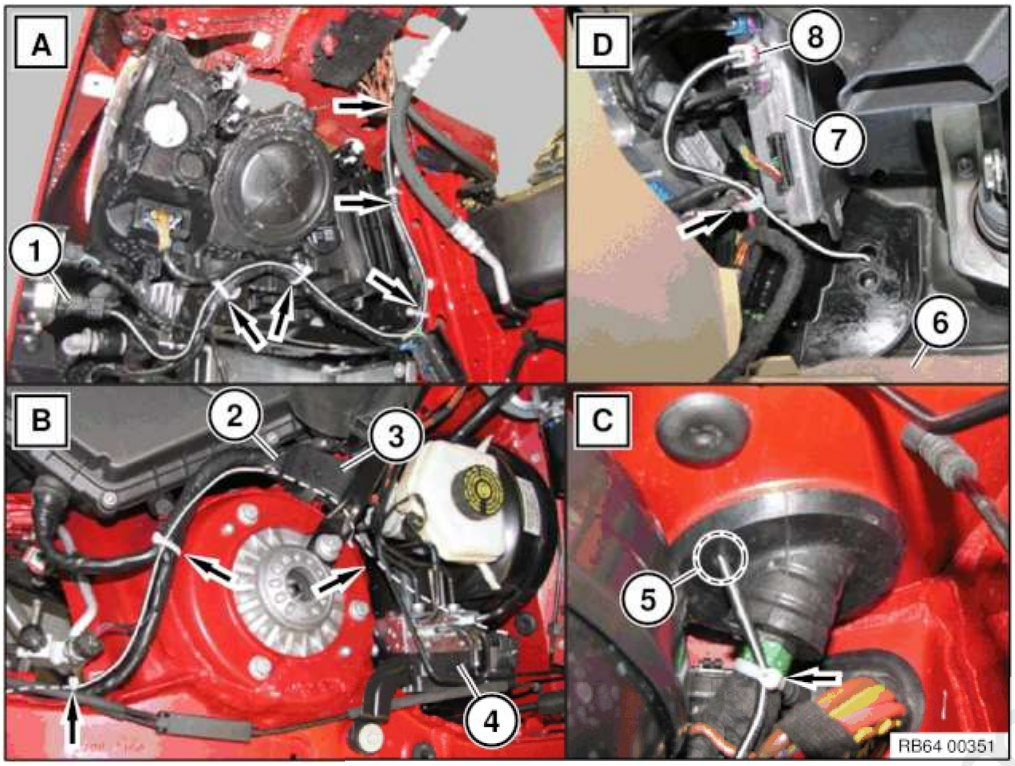
Unlock the lock (1) in direction of arrow with suitable tool.

Important!
Risk of damage!

Unlock the lock (3) carefully with a suitable tool. Pull connector housing (4) of line (2) in direction of arrow.

Installation note:
Pay attention to encoding (5)!

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Connect the repair cable (shown in white) to the Side View camera (1). Leave approx. 10 cm overlength in the area of Side View camera (1) (Figure A).

Route repair cable in direction of arrow along the vehicle wiring harness and attach at locations marked with arrow (Figure A, B, C, D).

Remove adhesive tape in position (2). Feed the repair cable through the cable channel (3) and underneath the DSC hydraulic unit (4) (Figure B).

Feed the repair cable through at point (5) in driver's footwell (Figure C).

Assemble repair cable. Connect repair cable to connector (8) of all-round vision camera control unit (7) (Figure D).

Installation note:
Tape off the point (2) with suitable adhesive tape.

Important!
To prevent moisture from entering the passenger compartment, seal opening (5) on the outside, using suitable means!

Note:
Route any repair cable overlength under the carpet (6).

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

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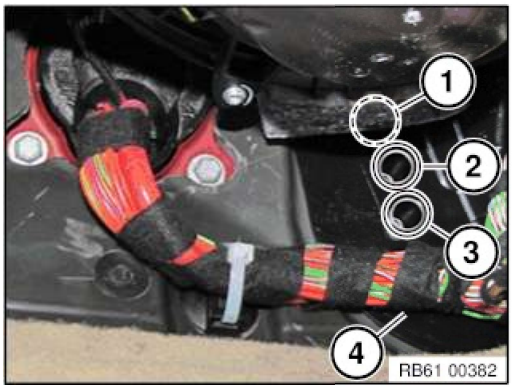
61 11 ... Installing repair cable for right Side View camera

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

Note:
Work is shown on the F30 by way of example. There may be differences in detail in the case of other vehicle types and equipment specifications.

Necessary preliminary work:

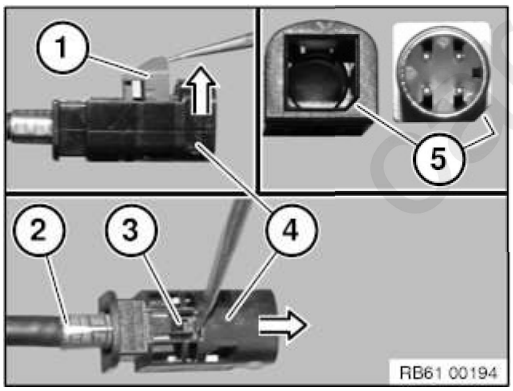
- Remove the front right wheel arch cover front section
- Remove the right cover in the engine compartment
- Remove instrument panel trim, bottom left
- Remove trim panel for pedal assembly



Break through the passenger footwell opening (2) in rubber grommet (4) using a suitable tool.

Note:
If the opening (2) is used, use opening (3).

If both openings (2, 3) are used, break through at position (1).



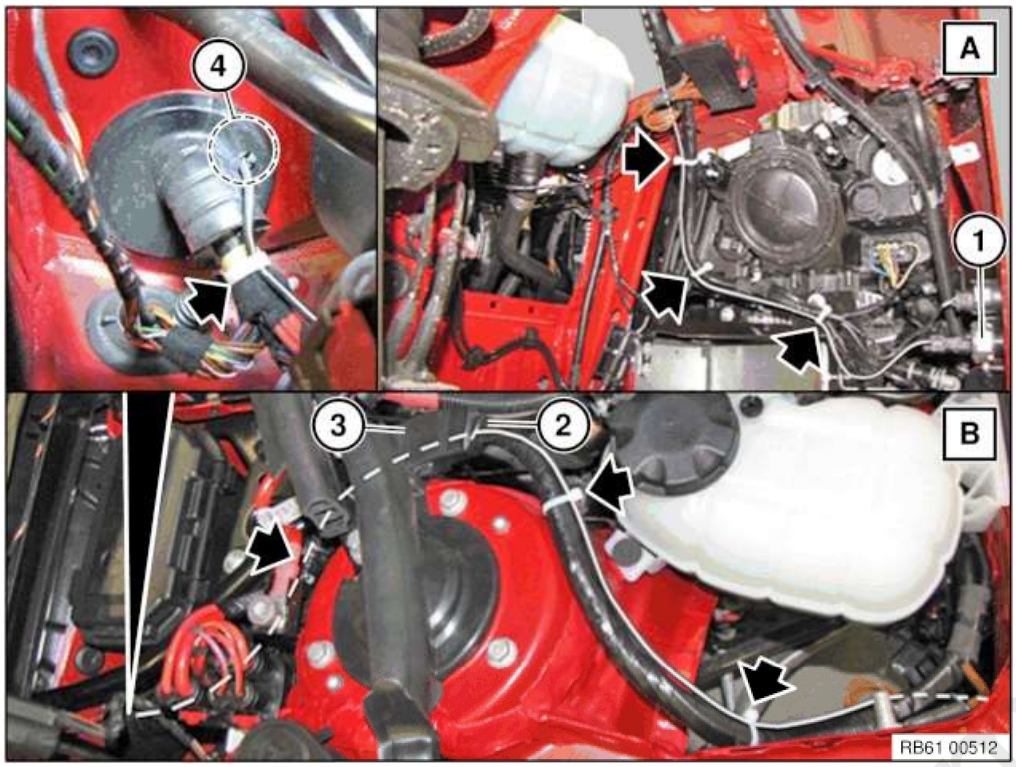
Unlock the lock (1) in direction of arrow with suitable tool.

Important!
Risk of damage!

Unlock the lock (3) carefully with a suitable tool. Pull connector housing (4) of line (2) in direction of arrow.

Installation note:
Pay attention to encoding (5)!

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Connect the repair cable (shown in white) to the Side View camera (1).

Leave approx. 10 cm overlength in the area of Side View camera (1) (Figure A).

Route repair cable in direction of arrow along the vehicle wiring harness and attach at locations marked with arrow (Figure A, B).

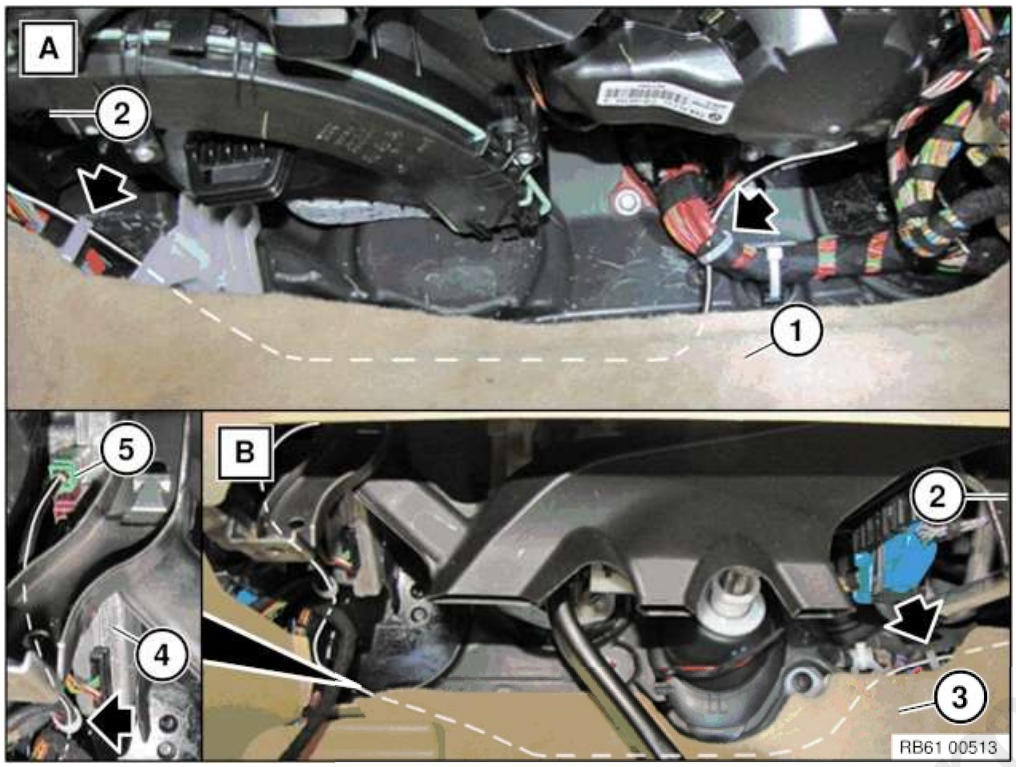
Remove adhesive tape at point (2). Feed through repair cable through cable channel (3) (graphic B).

Feed through repair cable at point (4) in passenger footwell (graphic B).

Installation note:
Tape off the point (2) with suitable adhesive tape.

Important!
To prevent moisture from entering the passenger compartment, seal opening (4) on the outside, using suitable means!

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Route repair cable in passenger footwell (graphic A)/driver's footwell (graphic B) under carpet (1, 3) as illustrated up to TRSCV control unit (4).

Secure repair cable at points marked with an arrow.

Route the repair cable from the passenger footwell under the heating and air-conditioning unit (2) in the driver's footwell (Figure A, B).

Complete the repair cable and connect at slot (5) of the TRSCV control unit (4) (Figure B).

Note:
Route any repair cable overlength under the carpet (3).

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

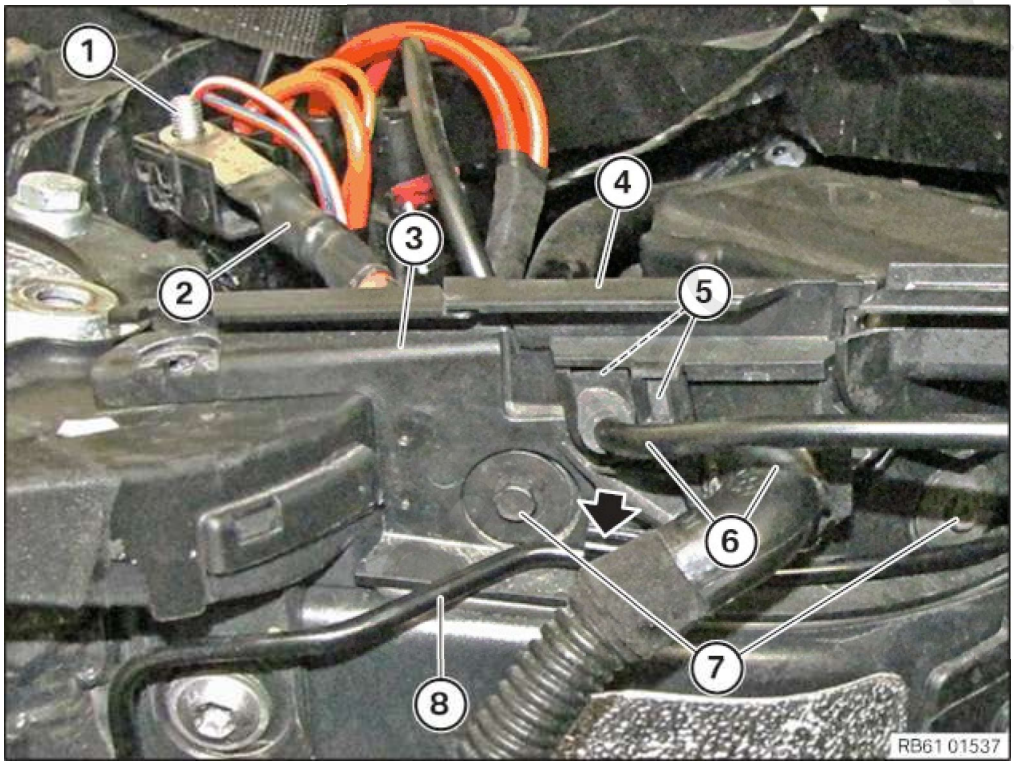
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61 11 ... Installing the EPS repair wiring harness

Note:
The EPS repair wiring harness fits the steering gear manufactured by the ZF and TKP company.

Necessary preliminary work:

- Disconnect negative battery lead
- Remove the sound insulation from the upper bulkhead section
- Remove front underbody protection
- Removing front wheel arch cover (front section), right
- Place the coolant expansion tank to one side:
  - Loosen screws.
  - If necessary unfasten plug connection.
  - Do **not** pull off the coolant connections.



Carefully lift the tabs (5).

Remove the sealing on the upper section of the partition wall (4).

Remove the cable (6) towards the top.

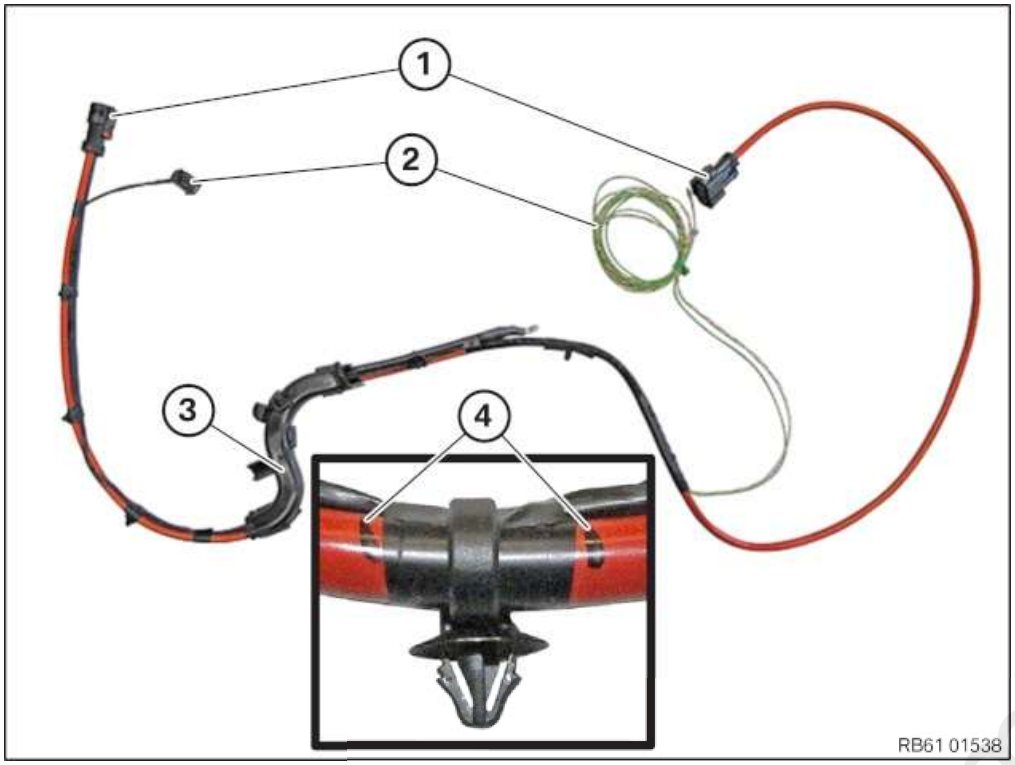
Detach the brake line (8) at the point marked by the arrow.

Release screws (7).

Remove the partition wall sealing (3).

Slacken nut (1).

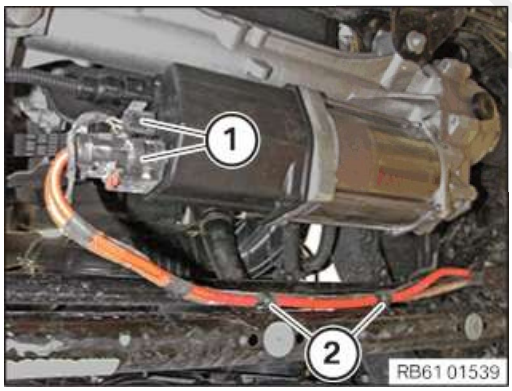
Disconnect positive line (2) and place to one side.



Note:
The line (2) from repair wiring harness (1) will not be required. A line installed in the vehicle will be used.

Removing line (2) from the repair wiring harness (1):

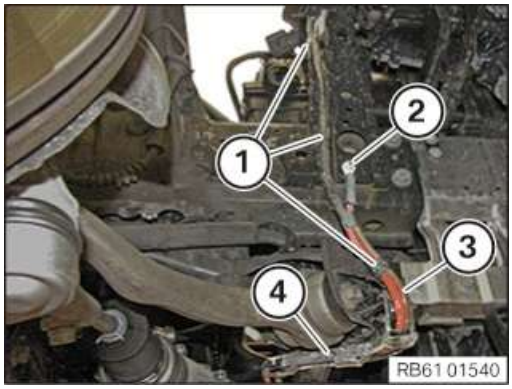
- Mark all the adhesive tape positions as shown (4).
- Remove all cable straps.
- Open cable channel (3).
- Remove all the adhesive tape.
- Remove line (2).



Disconnect plug connection (1).

Release wiring harness retainers (2).

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Release wiring harness retainers (1).

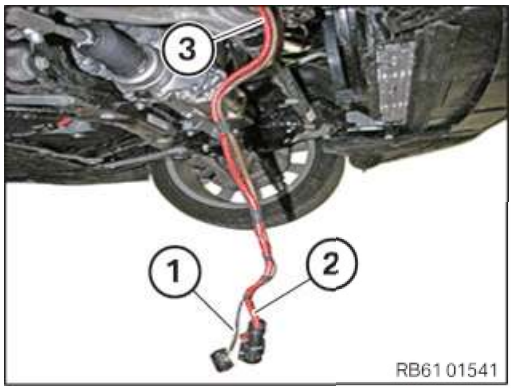
Slacken nut (2).

Remove grounding cable on wiring harness (3) from ground pin.

Release cable channel (4) from front axle support.

Remove cable strap from cable channel (4).

Open cable channel (4) and remove wiring harness (3).



Remove all cable straps in the area shown.

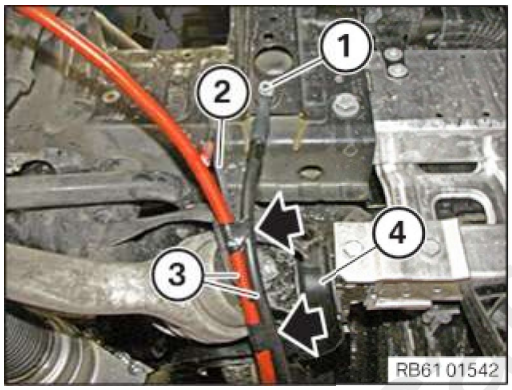
Remove all the adhesive tape in the area shown.

Remove line (1) from wiring harness (2).

Disconnect the positive line from wiring harness (2) at point (3). Do not damage line (1) while doing so.

Remove wiring harness (2) (both **thick** cables).

Wiring harness (2) is no longer needed.



Mount cable channel (4) on front axle support.

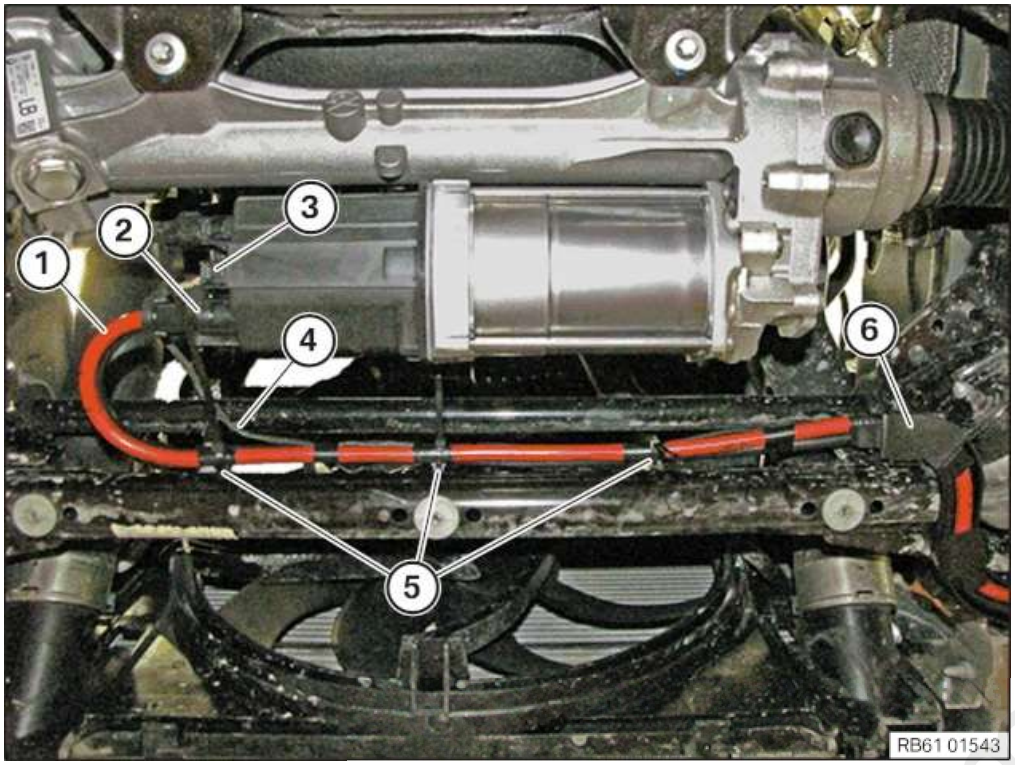
Mount grounding cable from repair wiring harness (3) on ground support point (1).

Tighten nut (1).

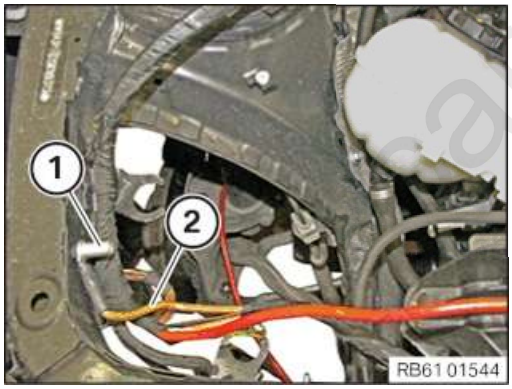
Tightening torque 61 11 1AZ.

Fasten line (2) and repair wiring harness (3) together at the places marked by the arrow using adhesive tape.

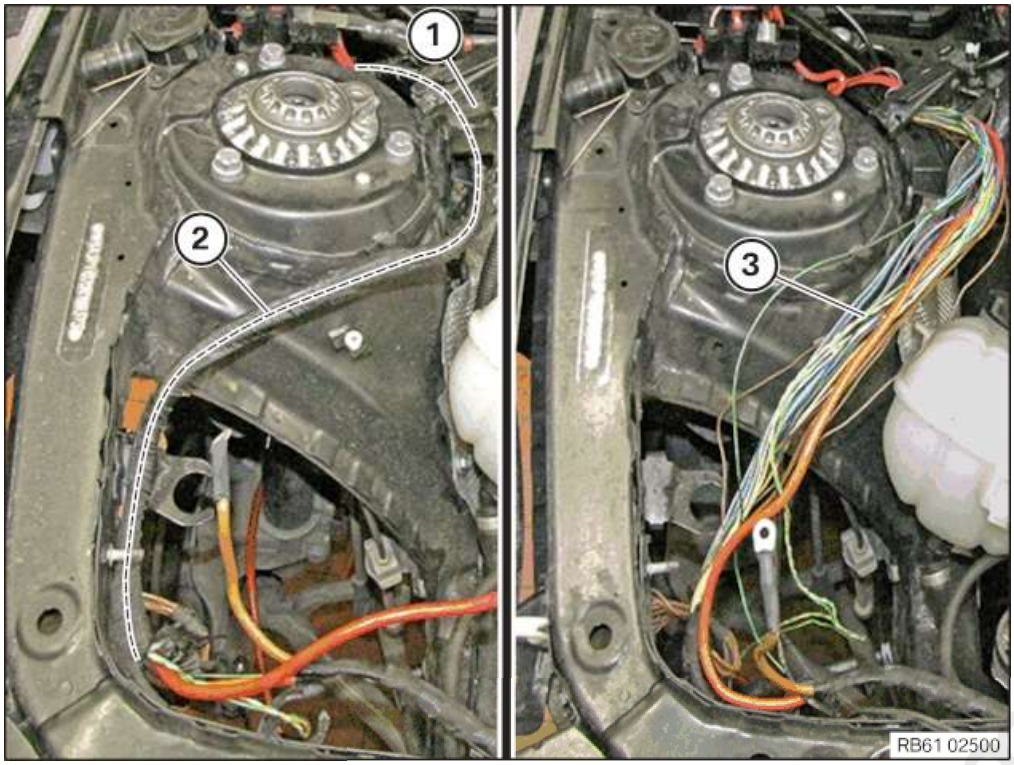
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Connect plug connection (2) of repair wiring harness (1).
Connect plug connection (3) of line (4).
Route repair wiring harness (1) and line (4) as shown.
Fasten line (4) and repair wiring harness (1) together at the places marked as shown, using adhesive tape.
Place repair wiring harness (1) and line (4) in cable channel (6).
Shut cable channel (6).
Position repair wiring harness (1) and line (4) such that the cable straps lie on the adhesive tape.
Fasten repair wiring harness (1) and line (4) at points (5) using cable straps on the front axle support.



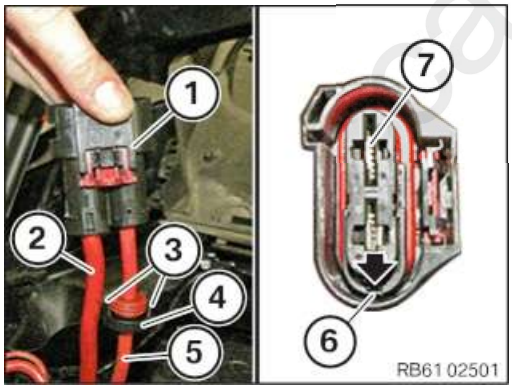
Slacken nut (1).
Remove ground cable (2) and place to one side.



Attention!
Risk of damage!
Do not damage the lines (3) when removing the adhesive tape.

Open cable channel (1).
Remove adhesive tape from wiring harness (2).

Note:
The bonding area is marked by the dotted line.



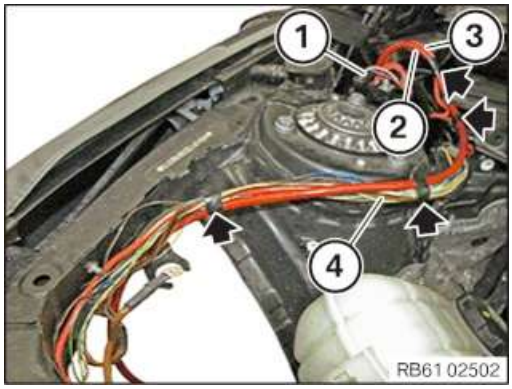
<u>Unpin pin 2 of the positive line (5) from connector (1) that is no longer required:</u>

Lift tabs (3) **carefully**.
Push bach sealing (4).
Open primary locking device (6) in the direction of the arrow.
Unpin pin 2 (7) of the positive line (5) using a suitable tool.
Connector (1) with positive line (2) is no longer required.

<u>Pin positive line (5) in the connector (1) of the repair wiring harness:</u>

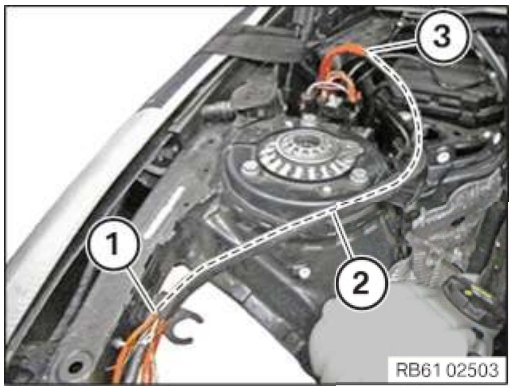
Pin pin 2 (7) of the positive line (5).
Close primary locking device (6) against direction of arrow.
Push sealing (4) upwards and engage correctly on the connector (1).

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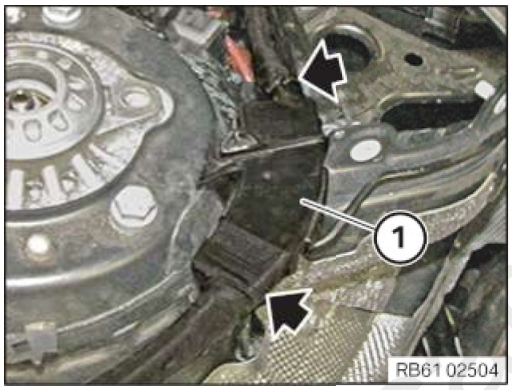
Close connector (1).

Secure repair wiring harness (2), positive line (3) and wiring harness (4) using adhesive tape at the points marked with an arrow as shown in the figure.



Wrap all the wiring harnesses (2) mentioned in the last operation **beginning with (1) and ending with (3)** with adhesive tape.

Note:
The bonding area is marked by the dotted line.

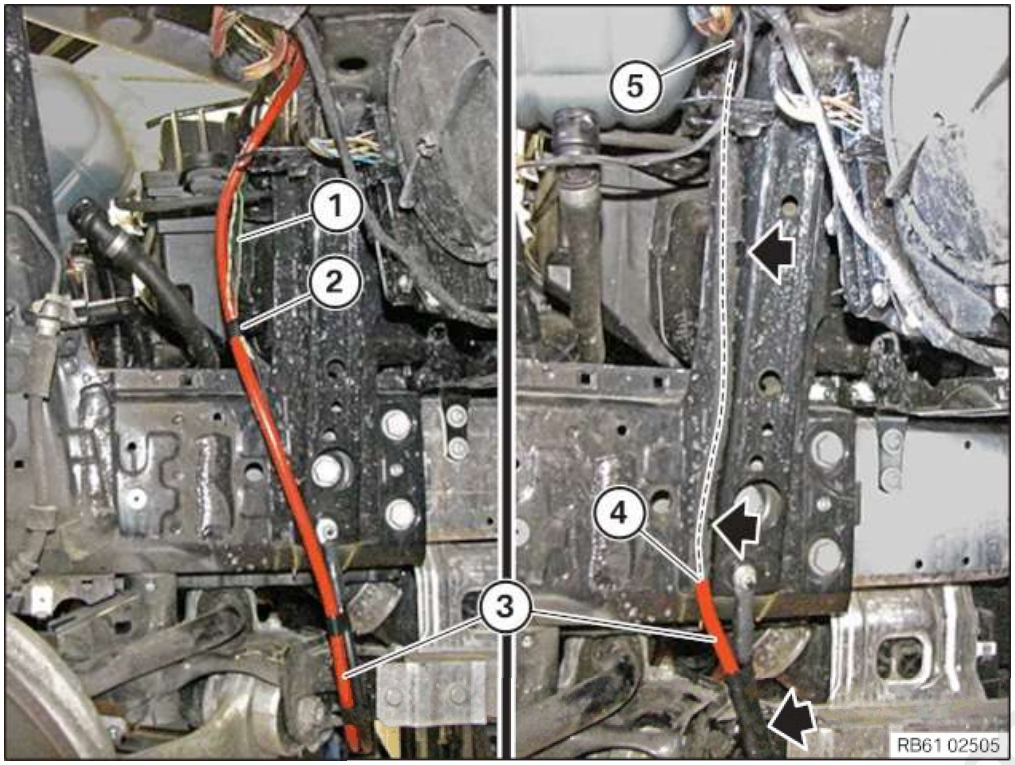


Close cable channel (1).

Secure cable channel (1) at the points marked with an arrow using cable straps.

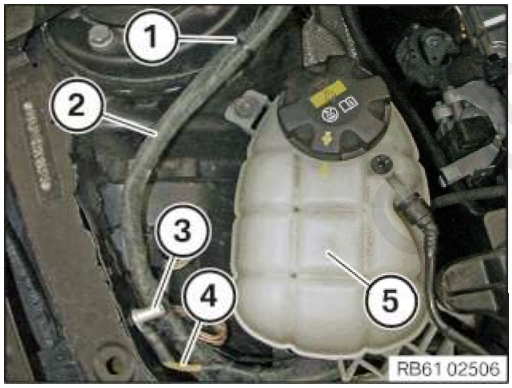
Wrap cable channel (1) with adhesive tape as shown.

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Secure repair wiring harness (3) and line (1) at point (2) with adhesive tape.
Wrap repair wiring harness (3) and line (1) **beginning with (4) and ending with (5)** with adhesive tape.
Wrap mounting elements for wiring harness (3) at the points marked with an arrow, as well.
Secure wiring harness (3) at the points marked with an arrow.

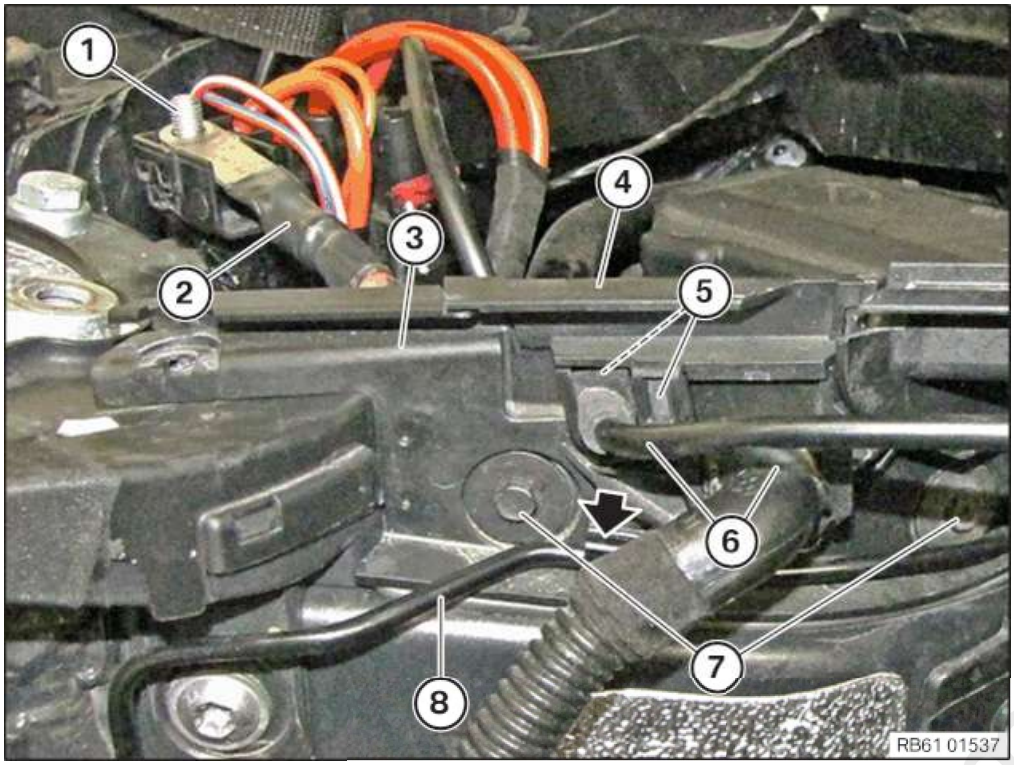
Note:
The bonding area is marked by the dotted line.



Secure wiring harness (2) with a cable strap at point (1).
Fasten grounding cable (4) using the nut (3).
Tightening torque 61 11 1AZ.

Note:
The figure of coolant expansion tank (5) can vary depending on the vehicle and the engine.

Fasten the coolant expansion tank (5).
Close plug connection, if necessary.



Position positive line (2) and fasten with nut (1).
Tightening torque 61 11 2AZ.
Install partition wall sealing (3) and fasten with screws (7).
Tightening torque 61 11 3AZ.
Attach the brake line (8) at the point marked by the arrow.
Install wiring harnesses (6).
Fit upper section of partition wall sealing (4) until tabs (5) engage correctly.

Add final details to vehicle:

- Install centre bulkhead upper part sound insulation
- Connect battery earth lead
- Install front underbody protection
- Installing front wheel arch cover (front section), right

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

The following applies in general:

To avoid damage, observe the following instructions:

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

The following additionally applies:

Shielded lines

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

Coaxial lines

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

CVBS lines

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

HSD lines

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

Optical fibre cable:

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

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

Attention!

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

Treating cables and fibre-optic cables

FlexRay (twisted cables):

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

Note:

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

Airbag lines:

Repairing airbag cables

Ribbon cables:

Repairing ribbon cables

Replacing wiring harnesses

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

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

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

Procedure

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

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

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

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

- Cut the additional socket housing and connect the lines to the vehicle-

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side wiring harness using a butt connector.

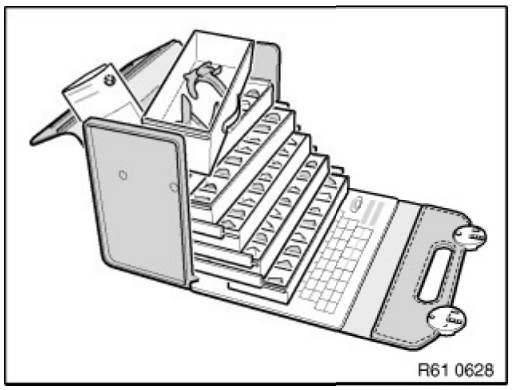
- **Using the additional socket housing is not permitted with a separation point outside the vehicle interior.**

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61 13 ... Special tools for wiring harness repairs

Special tools required:

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



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

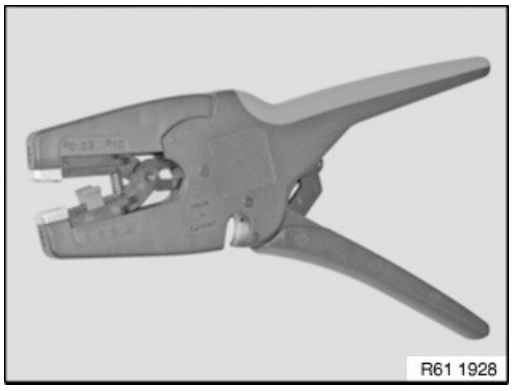


Release and press-out tool:

- 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:

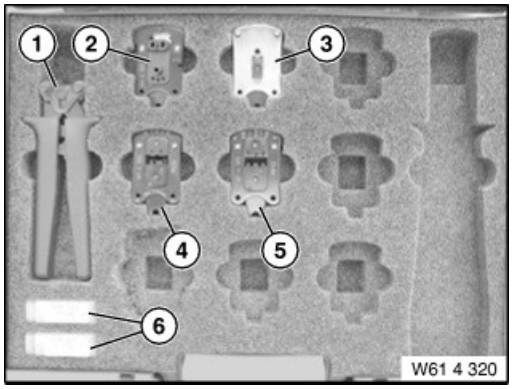
Wire stripper MultiStrip10*

*Sourcing reference BMW Workshop Equipment Catalogue

Handling:

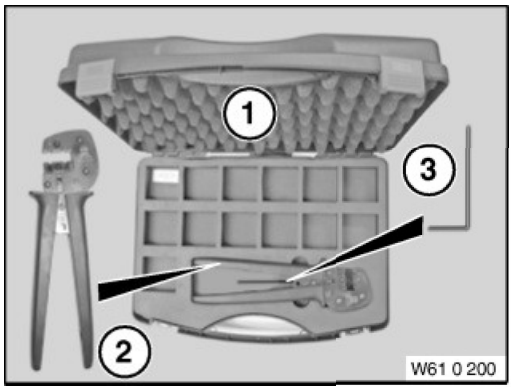
- Cutting cables to length and strip insulation

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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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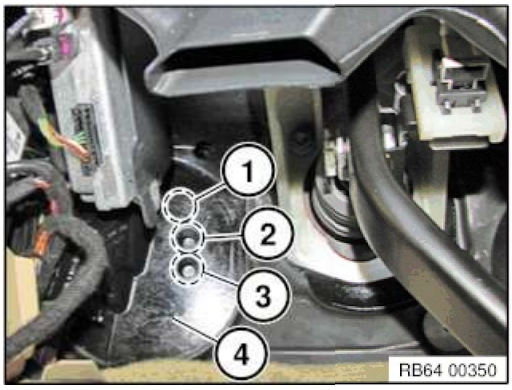
61 11 ... Installing repair cable for left Side View camera

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

Note:
Work is shown on the F30 by way of example. There may be differences in detail in the case of other vehicle types and equipment specifications.

Necessary preliminary work:

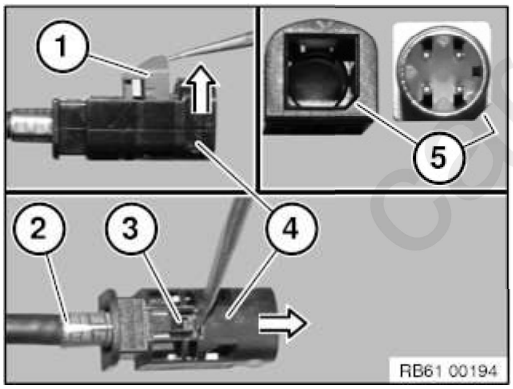
- Remove wheel arch cover front section, front left
- Remove the cover in the left engine compartment
- Remove trim panel for pedal mechanism



Break through the driver's footwell opening (2) in rubber grommet (4) using a suitable tool.

Note:
If the opening (2) is used, use opening (3).

If both openings (2, 3) are used, break through at position (1).



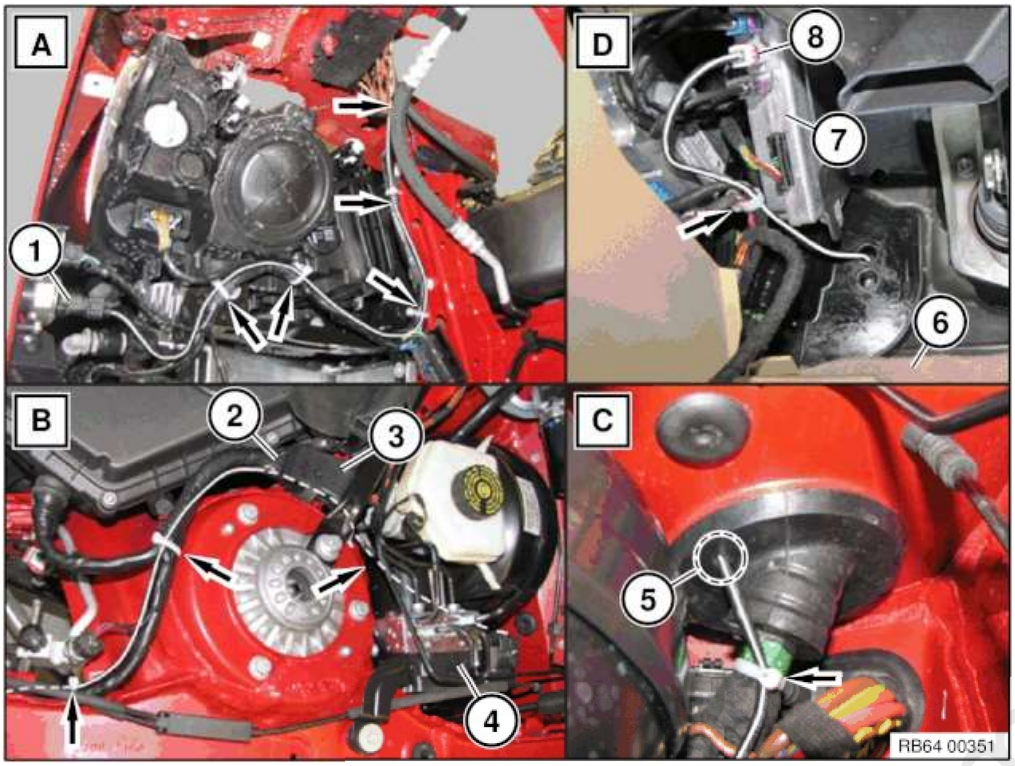
Unlock the lock (1) in direction of arrow with suitable tool.

Important!
Risk of damage!

Unlock the lock (3) carefully with a suitable tool. Pull connector housing (4) of line (2) in direction of arrow.

Installation note:
Pay attention to encoding (5)!

obdiagn.com



Connect the repair cable (shown in white) to the Side View camera (1). Leave approx. 10 cm overlength in the area of Side View camera (1) (Figure A).

Route repair cable in direction of arrow along the vehicle wiring harness and attach at locations marked with arrow (Figure A, B, C, D).

Remove adhesive tape in position (2). Feed the repair cable through the cable channel (3) and underneath the DSC hydraulic unit (4) (Figure B).

Feed the repair cable through at point (5) in driver's footwell (Figure C).

Assemble repair cable. Connect repair cable to connector (8) of all-round vision camera control unit (7) (Figure D).

Installation note:
Tape off the point (2) with suitable adhesive tape.

Important!
To prevent moisture from entering the passenger compartment, seal opening (5) on the outside, using suitable means!

Note:
Route any repair cable overlength under the carpet (6).

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

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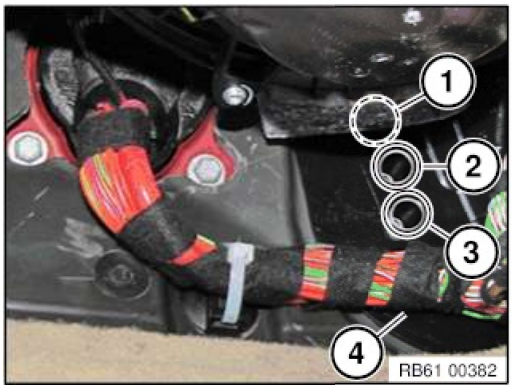
61 11 ... Installing repair cable for right Side View camera

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

Note:
Work is shown on the F30 by way of example. There may be differences in detail in the case of other vehicle types and equipment specifications.

Necessary preliminary work:

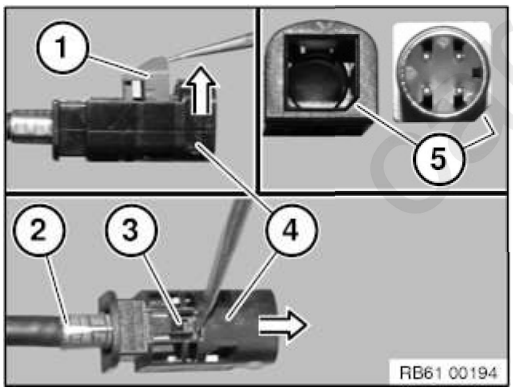
- Remove the front right wheel arch cover front section
- Remove the right cover in the engine compartment
- Remove instrument panel trim, bottom left
- Remove trim panel for pedal assembly



Break through the passenger footwell opening (2) in rubber grommet (4) using a suitable tool.

Note:
If the opening (2) is used, use opening (3).

If both openings (2, 3) are used, break through at position (1).



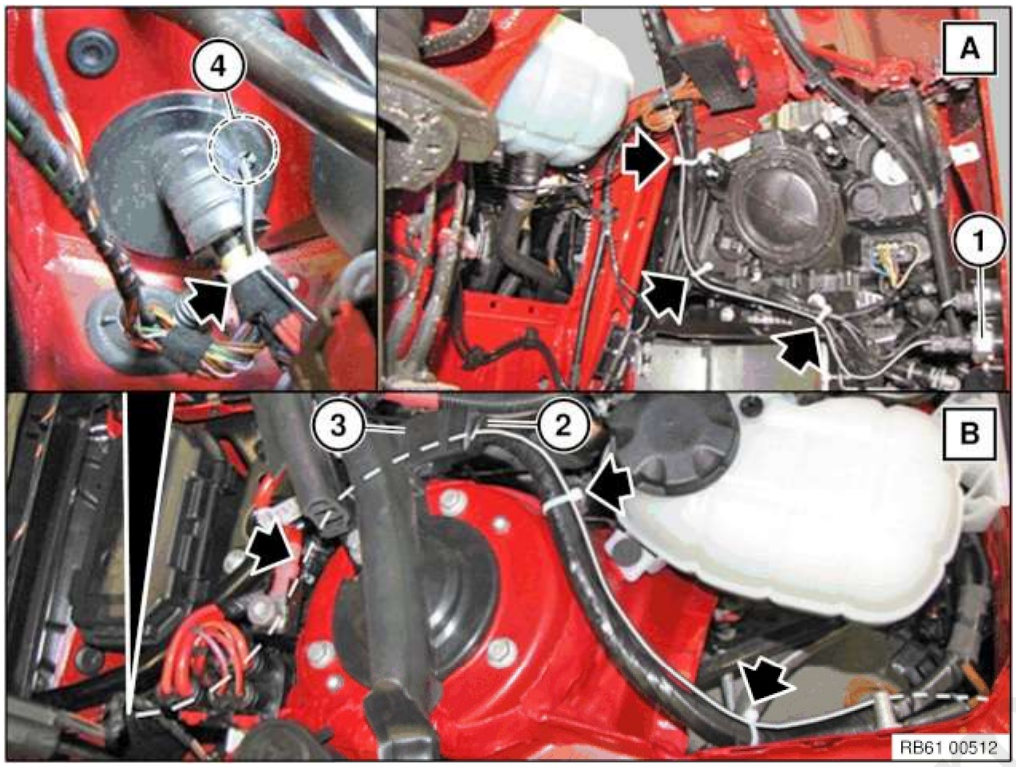
Unlock the lock (1) in direction of arrow with suitable tool.

Important!
Risk of damage!

Unlock the lock (3) carefully with a suitable tool. Pull connector housing (4) of line (2) in direction of arrow.

Installation note:
Pay attention to encoding (5)!

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Connect the repair cable (shown in white) to the Side View camera (1).

Leave approx. 10 cm overlength in the area of Side View camera (1) (Figure A).

Route repair cable in direction of arrow along the vehicle wiring harness and attach at locations marked with arrow (Figure A, B).

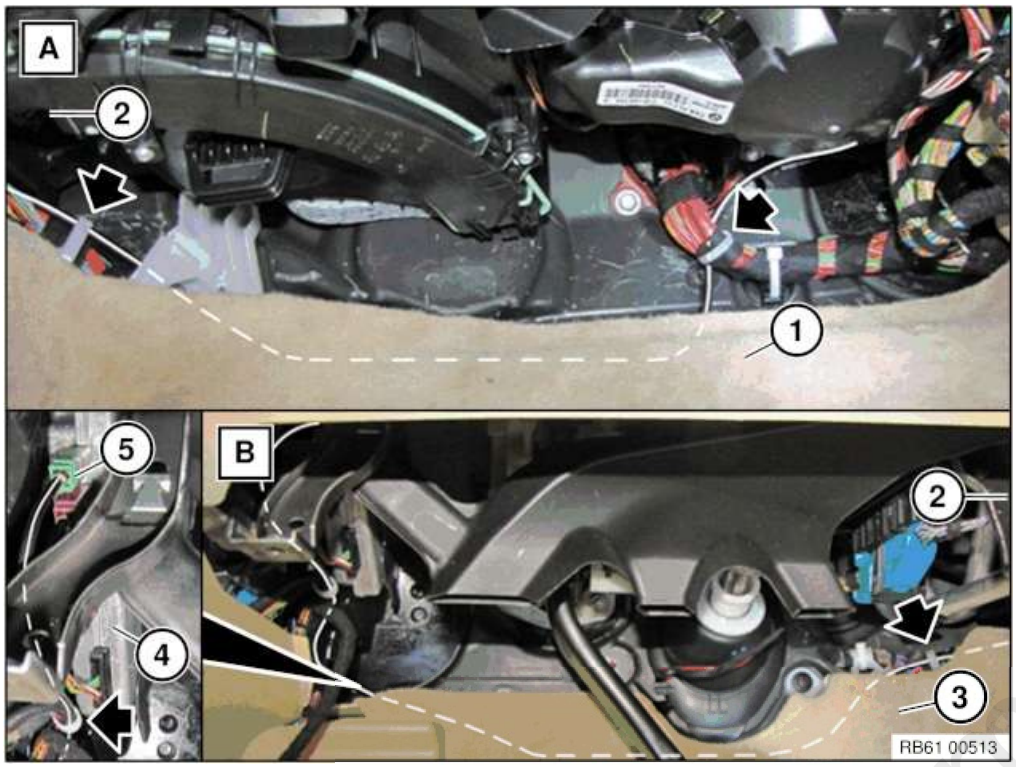
Remove adhesive tape at point (2). Feed through repair cable through cable channel (3) (graphic B).

Feed through repair cable at point (4) in passenger footwell (graphic B).

Installation note:
Tape off the point (2) with suitable adhesive tape.

Important!
To prevent moisture from entering the passenger compartment, seal opening (4) on the outside, using suitable means!

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Route repair cable in passenger footwell (graphic A)/driver's footwell (graphic B) under carpet (1, 3) as illustrated up to TRSCV control unit (4).

Secure repair cable at points marked with an arrow.

Route the repair cable from the passenger footwell under the heating and air-conditioning unit (2) in the driver's footwell (Figure A, B).

Complete the repair cable and connect at slot (5) of the TRSCV control unit (4) (Figure B).

Note:
Route any repair cable overlength under the carpet (3).

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

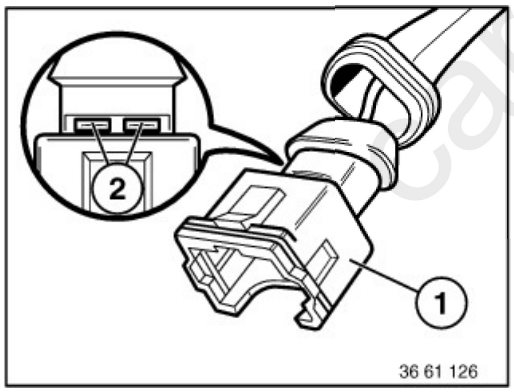
cardiagn.com

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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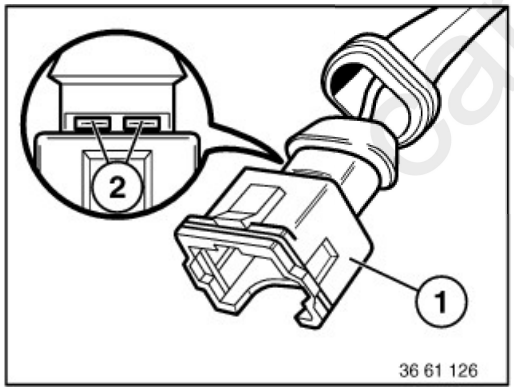
cardiagn.com

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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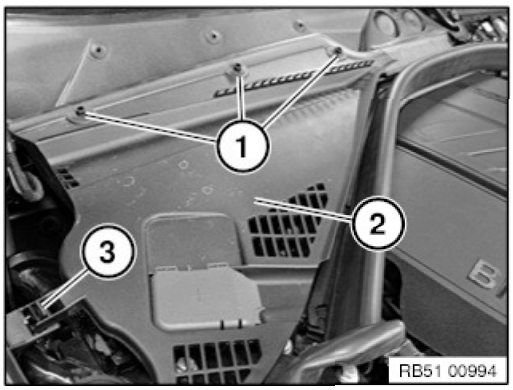
61 12 ... Removing and installing / replacing positive battery cable at partition seal (engine compartment)

Warning!

Observe safety informations for handling vehicle battery.

Necessary preliminary tasks:

- Clamp off battery lead from negative connection point

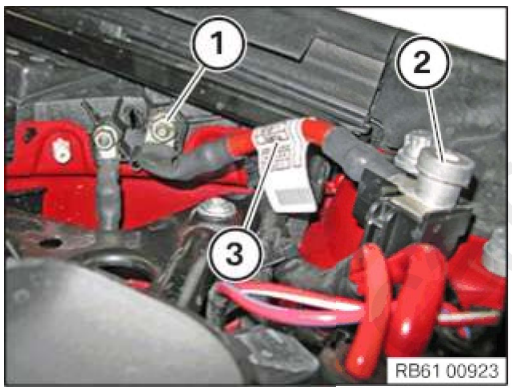


Note:
Graphics shown on the F20 by way of example, deviations in detail are possible in other models.

Turn locks (1) 90° counterclockwise.

Unlock catch (3).

Remove cover (2).



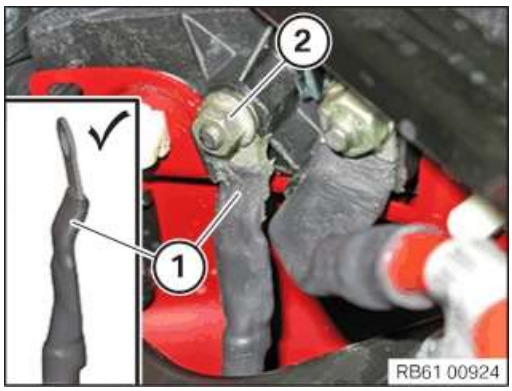
Slacken nut (1).

Tightening torque 61 21 4AZ.

Slacken nut (2).

Tightening torque 61 21 4AZ.

Remove positive battery cable (3).



Check that the positive battery cable subsurface (1) is correctly positioned.

Positive battery cable subsurface (1) must face away from partition seal as shown.

In case of incorrect installation position:

Release nut (2) and correct installation position of positive battery cable subsurface (1).

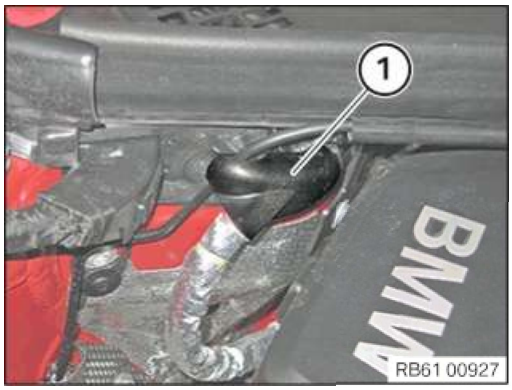
Tightening torque 61 21 7AZ.



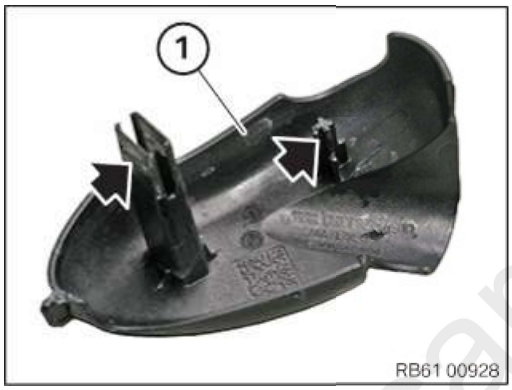
Installation note:
Coat positive battery cables (1) at partition seal with contact protection grease.

(Contact protection grease BMW part number 83 19 2 295 229.)

Use a standard flat brush with a width of approx. 2.5 cm to apply the grease.



Unclip cover (1).



Installation note:
Guide and retaining lugs on cover (1) must not be damaged or missing.



Installation note:
Coat positive battery cables (1) at partition seal with contact protection grease.

(Contact protection grease BMW part number 83 19 2 295 229.)

Use a standard flat brush with a width of approx. 2.5 cm to apply the grease.

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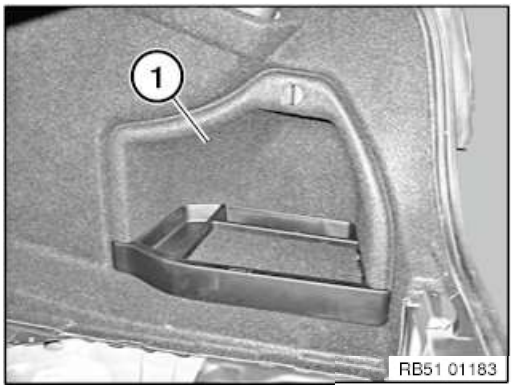
61 12 013 Replacing negative battery lead



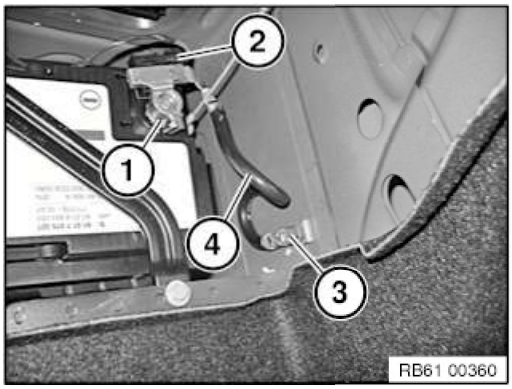
Warning!

Observe safety information for handling vehicle battery.

Read and comply with notes and notes on intelligent battery sensor.



Remove flap (1).



Slacken nut (1) on negative battery terminal.

Tightening torque 61 21 1AZ.

Important!

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

Detach battery earth lead with intelligent battery sensor (IBS) in upward direction, lay to one side and secure.

Disconnect plug connection (2).

Release nut (3) and battery earth lead (4).

Tightening torque 61 21 6AZ.

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61 12 002 Replacing positive battery cable (from battery to luggage compartment cable connector)

Warning!

Observe safety instructions for handling vehicle battery.

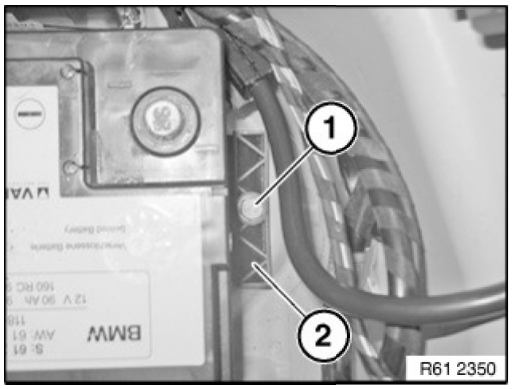
Follow instructions on intelligent battery sensor (IBS).

Important!

Do not under any circumstances use force to pull or lever off safety battery terminal.

Necessary preliminary tasks:

- Clamp off battery lead from negative connection point



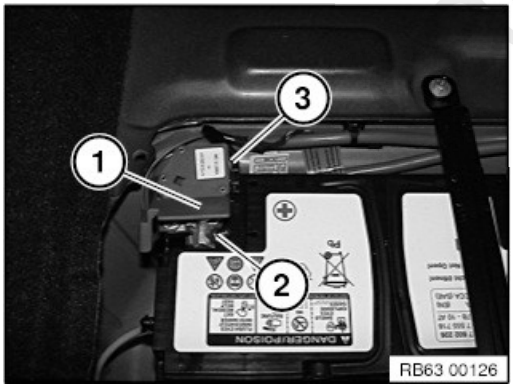
Note:
Work shown on the F30 by way of example, deviations in detail are possible in other models.

Release screw (1) and remove holder (2).

Tightening torque 61 21 5AZ.

Slide battery fully towards rear.

Installation note:
Make sure battery is correctly fitted.



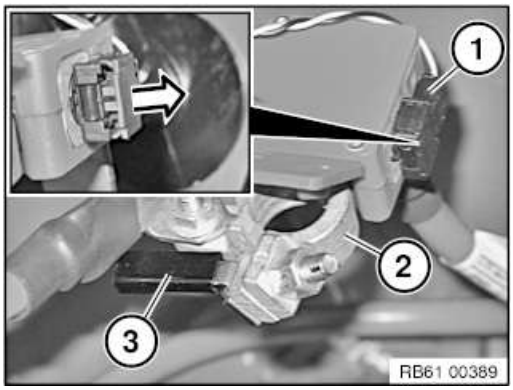
Open cover (1) and release nut (2) below it.

Tightening torque 61 21 1AZ.

Important!

Do not under any circumstances pull or lever off safety battery terminal (3) by force.

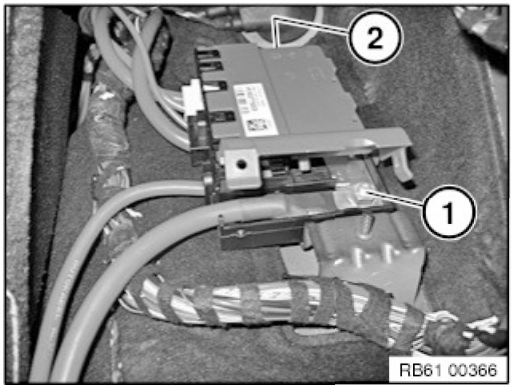
Remove safety battery terminal (3) towards top.



Release lock of plug connection (1) in direction of arrow with a suitable tool.

Remove plug connection (1) from safety battery terminal (2) in direction of arrow.

Pull off plug connection (3) from safety battery terminal (2).



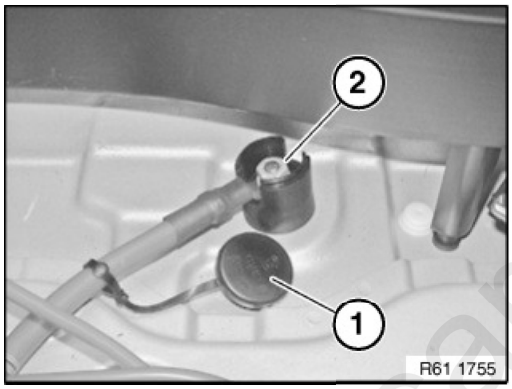
Open cover on power distribution box (2) and release nut (1) underneath.

Tightening torque 61 21 4AZ.

Remove positive battery cable from power distribution box (2).

Installation note:
Risk of short circuits!

Make sure positive battery cable is correctly fitted.



Remove cover (1) and release nut (2) below it.

Tightening torque 61 21 4AZ.

Remove complete positive battery cable from vehicle.

Installation note:
Risk of short circuits!

Make sure positive battery cable is correctly fitted.

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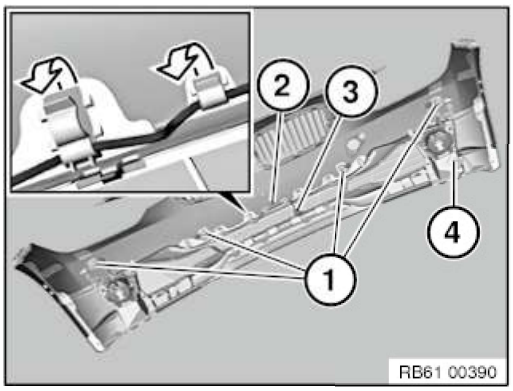
61 12 062 Replacing wiring harness on front bumper

Important!

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

Necessary preliminary tasks:

- Remove front bumper panel



Note:
Graphic shows the F30 by way of example, deviations in detail are possible in other models.

Depending on equipment specifications following sensors can be installed:

(1) Ultrasonic sensors.

(2) Pedestrian protection sensor.

(3) ACC sensor.

Unlock associated plug connections and disconnect.

Unclip wiring harness from bumper panel in direction of arrow.

Release central connector (4) from latch mechanism and remove wiring harness.

Installation note:
Make sure wiring harness is correctly laid.

Make sure central connector is fitted correctly (4) on bumper panel.

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61 12 265 Replacing wiring harness on left or right front seat

NOTICE

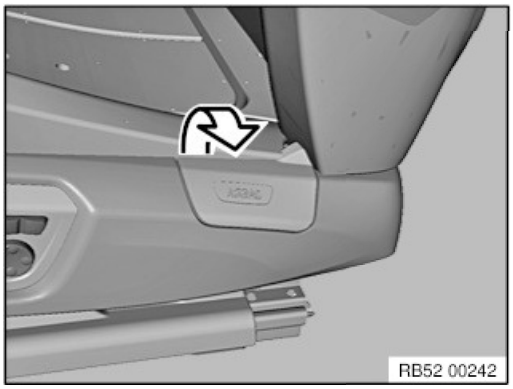
Schematic diagram is for example purposes. Some parts may differ in certain details.

NOTICE

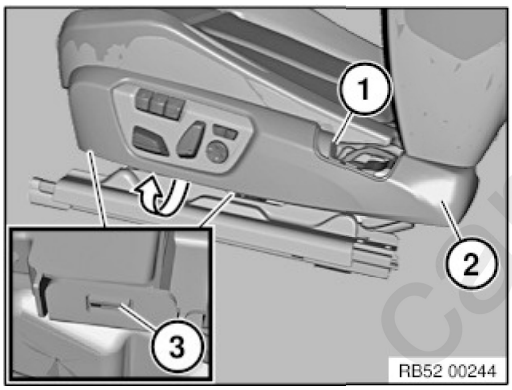
Description is for left component only. Procedure on the right side is identical.

PRELIMINARY WORK

1 – Remove outer cover on front seat



- Move backrest to full rearward position.
- Grip end fitting cover centrally between seat belt strap and cover and unclip in direction of arrow.



- Loosen screw (1).
- Lever latch mechanism (3) of the cover (2) out of seat mechanism.
- Remove cover (2) in direction of arrow from seat mechanism.
- Unlock associated plug connections of the operating unit and disconnect.

2 – Partially remove the front seat

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

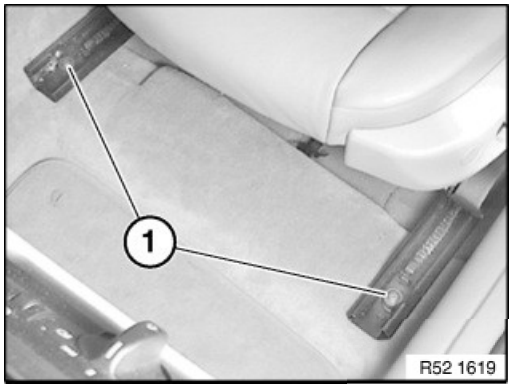
cardiagn.com

RISK OF DAMAGE

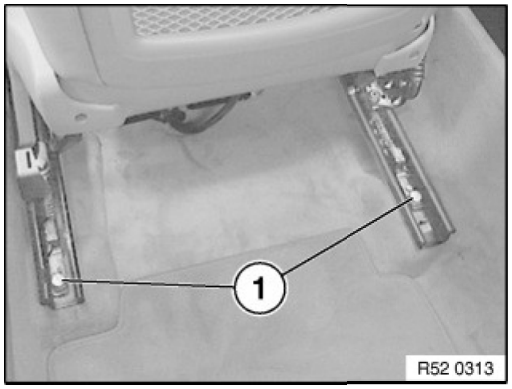
Scratches.

Tools and sharp-edged components can cause scratches.

- Protect working area.
- Handle tools and components carefully.



- Move seat to upper back position.
- Loosen screws (1).

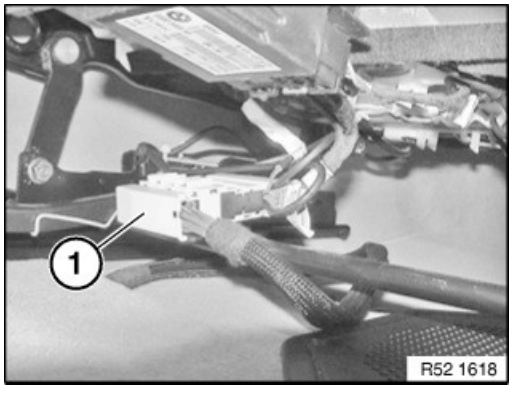


- Adjust the seat to the front top.
- Loosen screws (1).

► **Disconnecting all battery earth leads**



- See additional information.



- Place the front seat to the rear.
- Unlock plug connection (1) and disconnect.

MAIN WORK

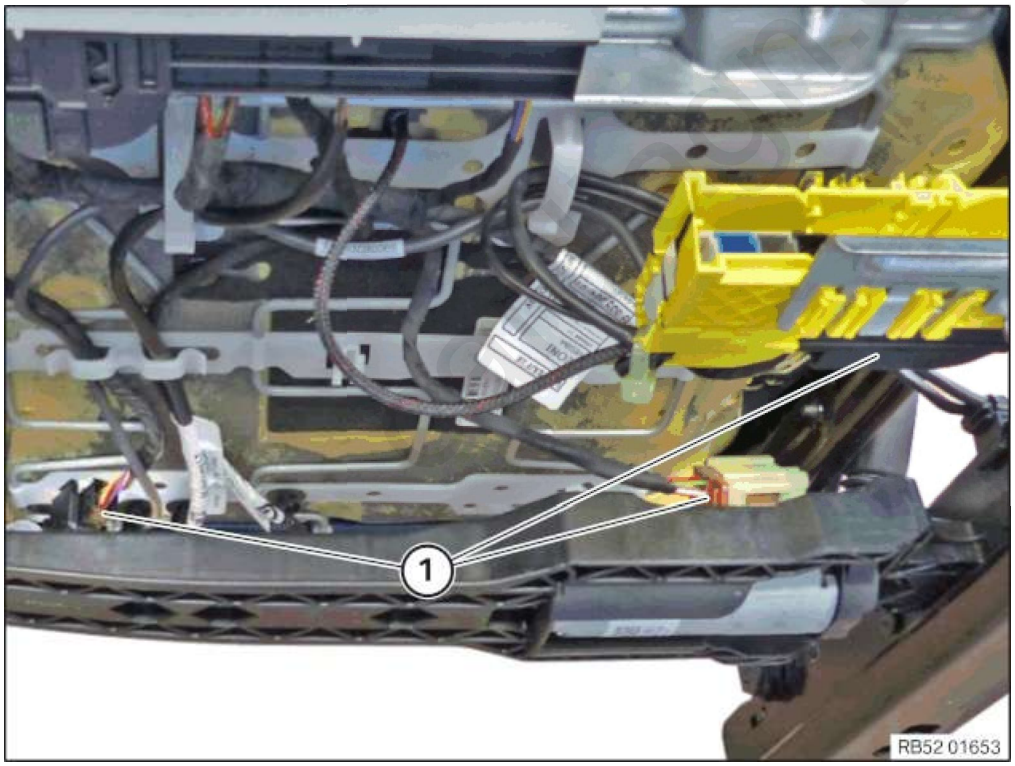
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3 – Replacing wiring harness for front seat

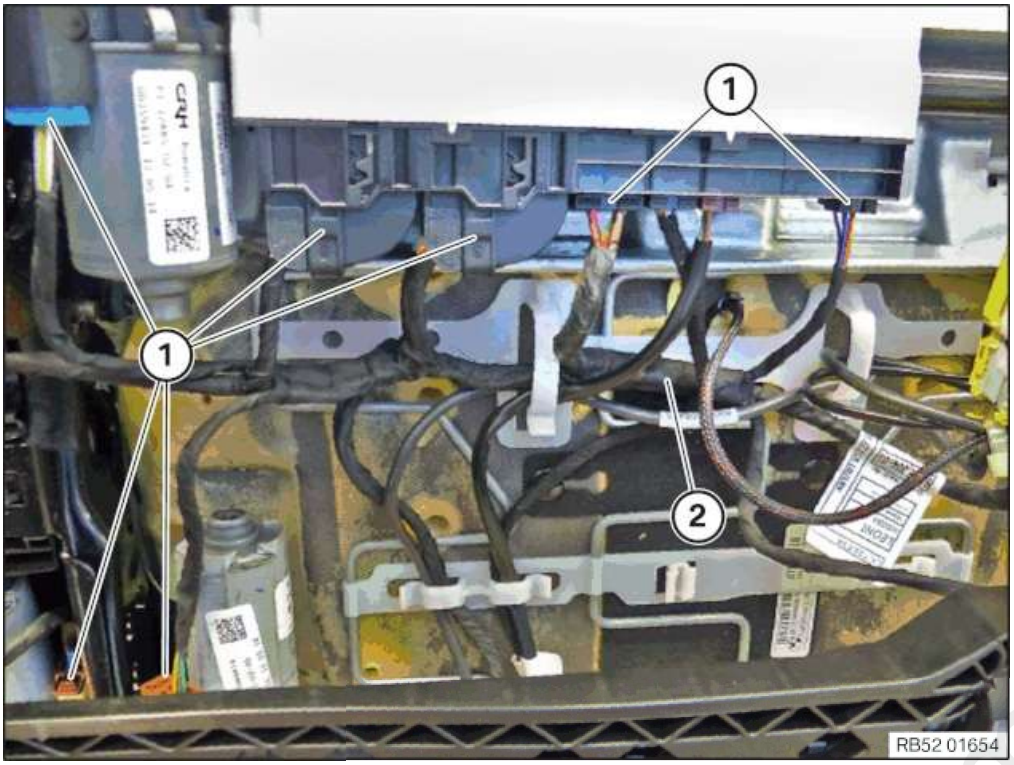
Overview of seat wiring harness



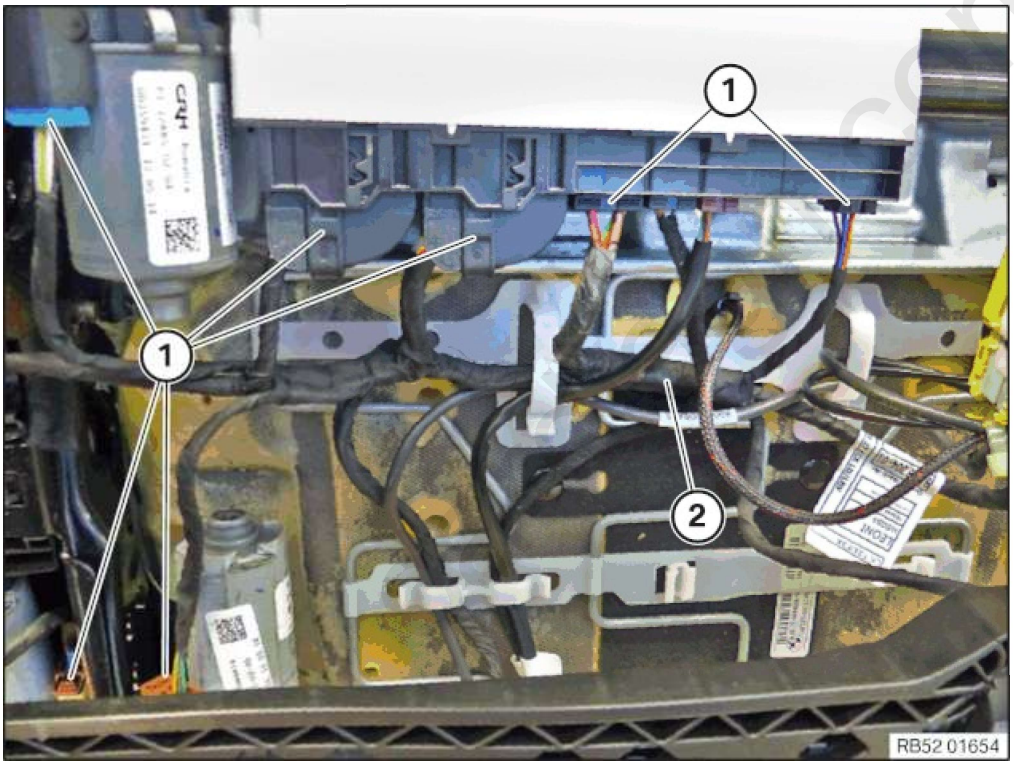
1 Seat wiring harness



- Unlock and disconnect connector (1).

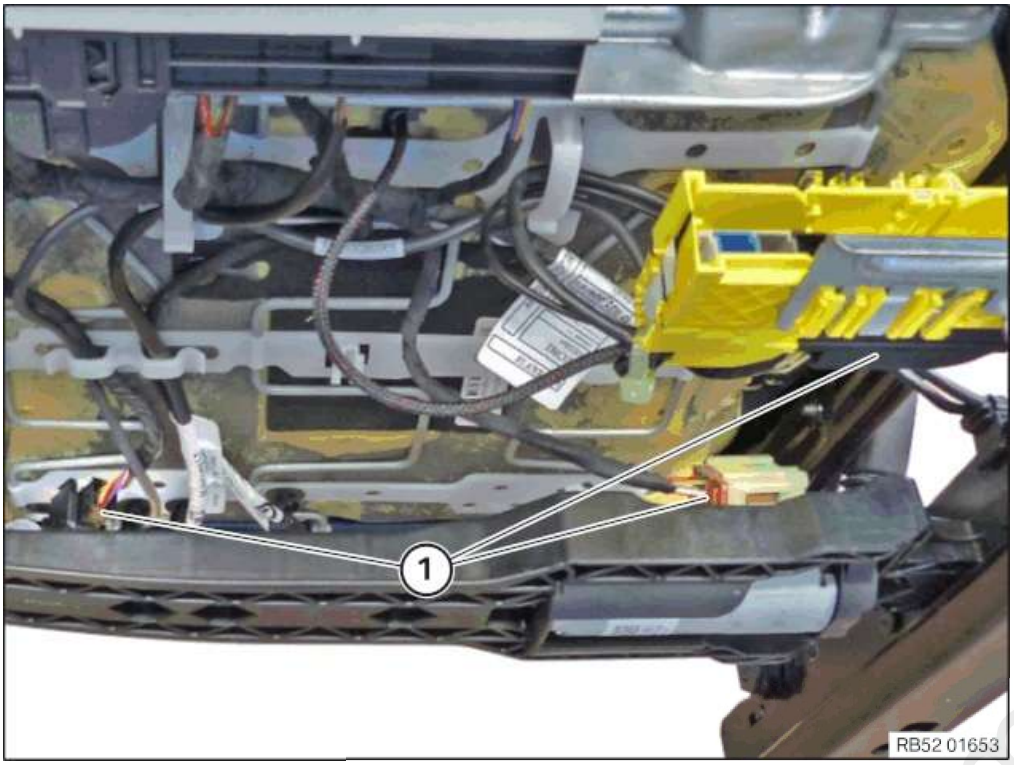


- Unlock and disconnect connector (1).
- Remove the wiring harness (2).



- Replace wiring harness (2).

  Parts: Wiring harness
- Insert the wiring harness (2).
- Connect connectors (1) and lock.



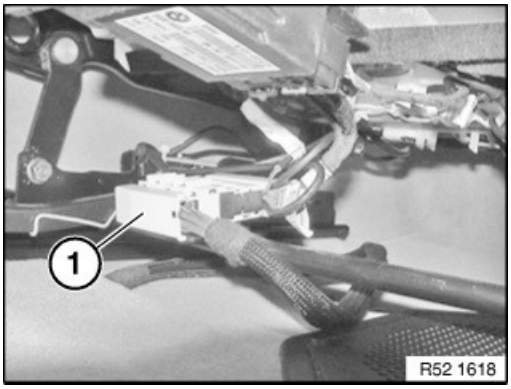
- Connect connectors (1) and lock.



- Check if the wiring harness (1) and the cable are correctly fed into the marked areas.

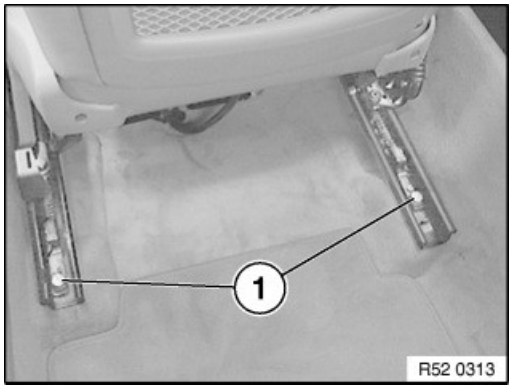
POSTPROCESSES

4 – Install front seat (partially removed)



- Connect connectors (1) and lock.
- Position front seat.

  The seat rails must be in direct contact with the floor panel.



- Renew screws (1).

  Parts: Bolts

- Tighten the screws (1).

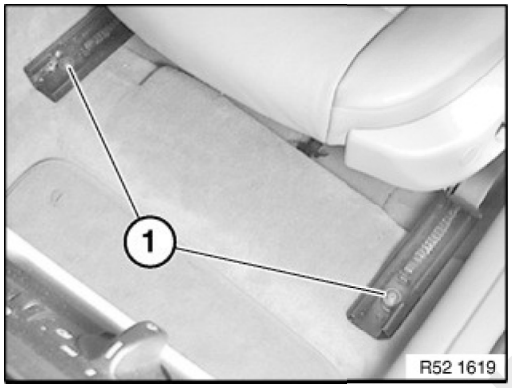
Front seat to body

Screw	Renew screw.	Tightening torque	42 Nm

▶ **Disconnecting all battery earth leads**



- See additional information.



- Move seat to upper back position.
- Renew screws (1).

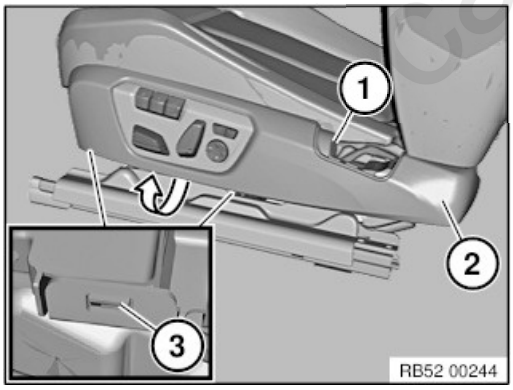
  Parts: Bolts

- Tighten the screws (1).

Front seat to body

Screw	Renew screw.	Tightening torque	42 Nm

5 – Installing the outer cover on the front seat

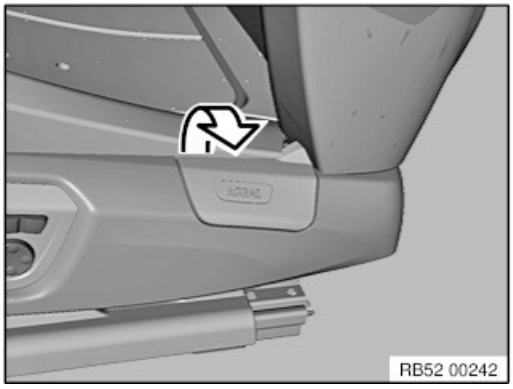


- Check cover (2) for damage and replace if required.
- Connect associated plug connections of the operating unit.
- Install the cover (2).
- Tighten down screw (1).

Outer cover to front seat

Screw		Tightening torque	1,5 Nm

- Check whether the latch mechanism (3) of the cover (2) is engaged correctly on the seat mechanism.



- Clip in the trim end fitting.

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6 – Delete fault memory



- Delete the fault memory.

Additional Information

Overview of Tightening Torques

Front seat to body			Used in step 4
Screw	Renew screw.	Tightening torque	42 Nm

Outer cover to front seat			Used in step 5
Screw		Tightening torque	1,5 Nm

Links

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	2

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2 4
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2 4
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
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61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4
61 20 900 Disconnecting and connecting battery earth lead	2 4

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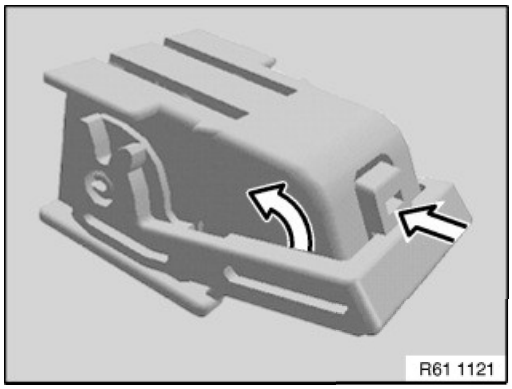
61 20 900 Disconnecting and connecting battery earth lead 2 4
61 20 900 Disconnecting and connecting battery earth lead 2 4
61 20 900 Disconnecting and connecting battery earth lead 2 4
61 20 900 Disconnecting and connecting battery earth lead 2 4

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61 13 ... Unlocking and disconnecting different plug connections

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

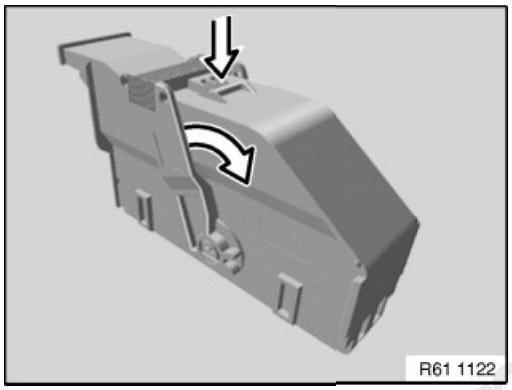
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

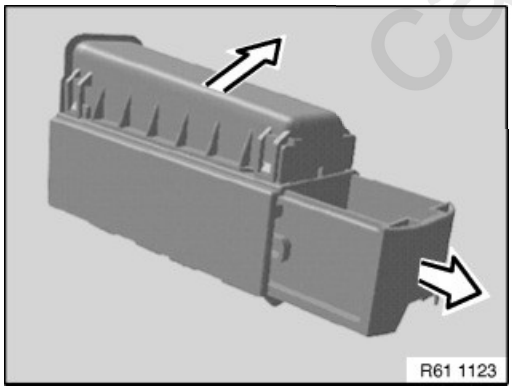
Disconnect plug connection.



2.

Press lock and open release clip in direction of arrow.

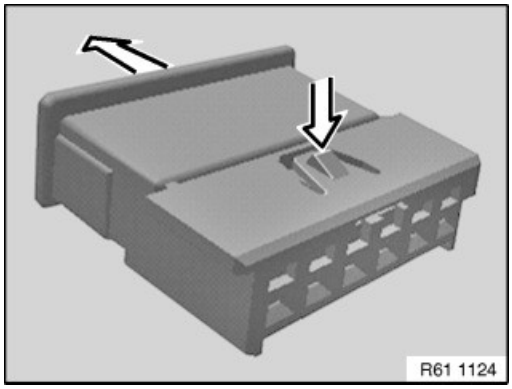
Disconnect plug connection.



3.

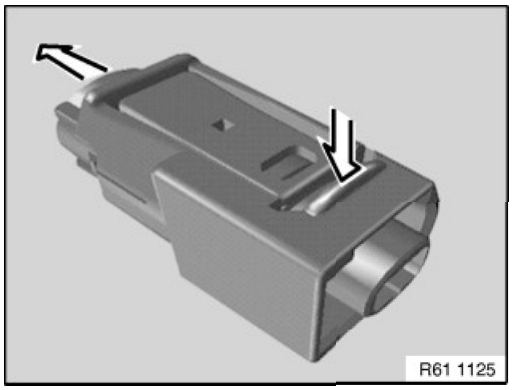
Open release clip in direction of arrow and disconnect plug connection in direction of arrow.

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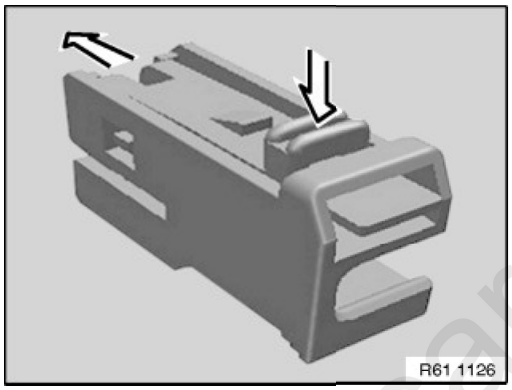
4.

Press lock and disconnect plug connection in direction of arrow.



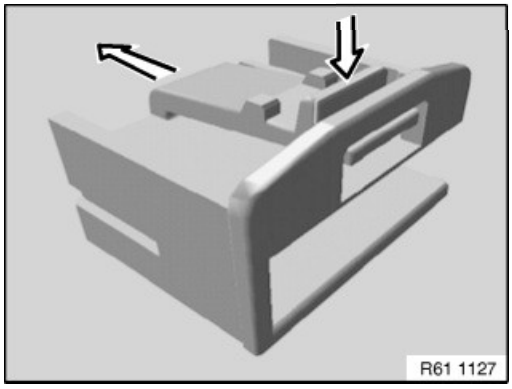
5.

Press lock and disconnect plug connection in direction of arrow.



6.

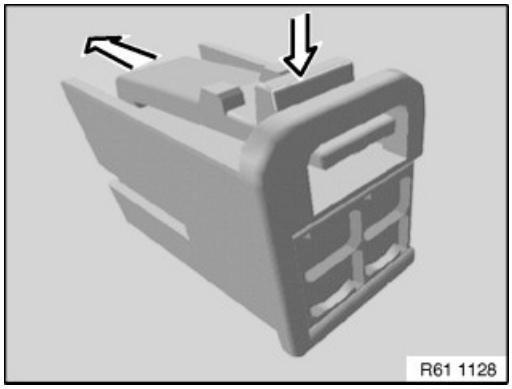
Press lock and disconnect plug connection in direction of arrow.



7.

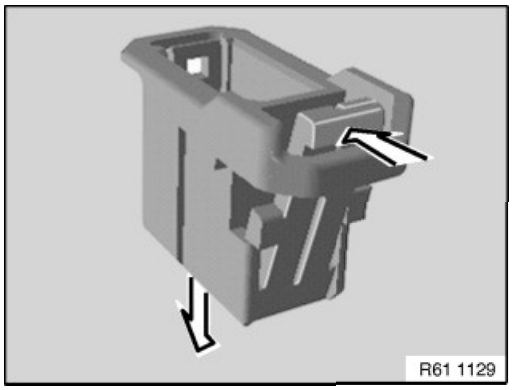
Press lock and disconnect plug connection in direction of arrow.

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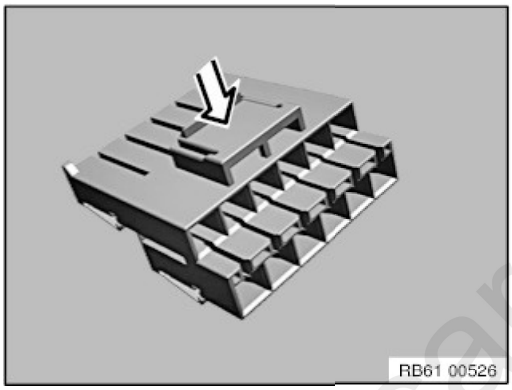
8.

Press lock and disconnect plug connection in direction of arrow.



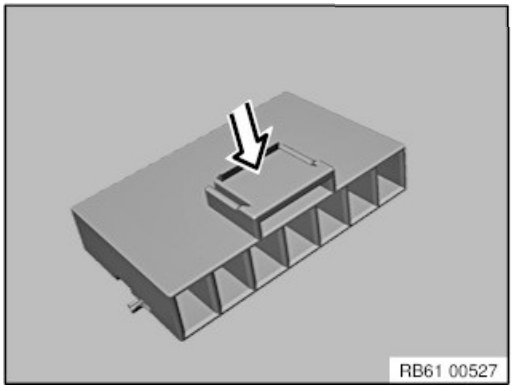
9.

Press lock and disconnect plug connection in direction of arrow.



10.

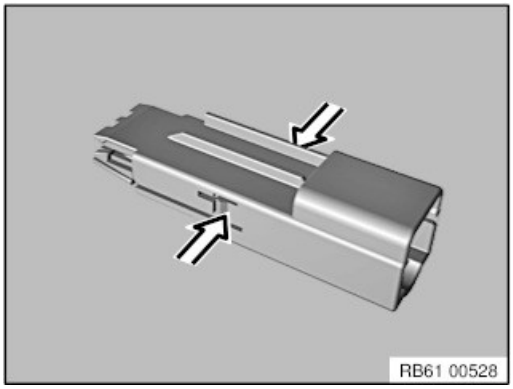
Press the lock and detach plug connection.



11.

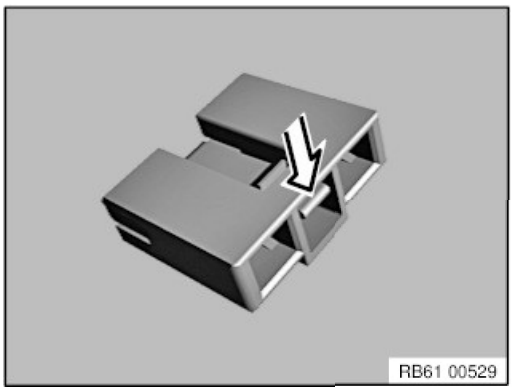
Press the lock and detach plug connection.

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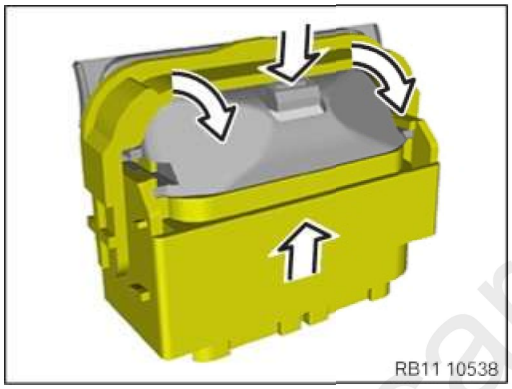
12.

Press the lock on both sides and detach plug connection.



13.

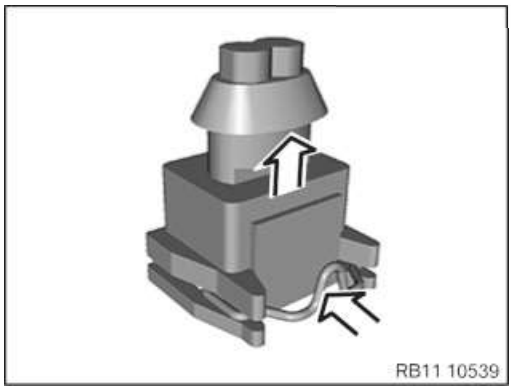
Press the lock and detach plug connection.



14.

Press lock and open release clip in direction of arrow.

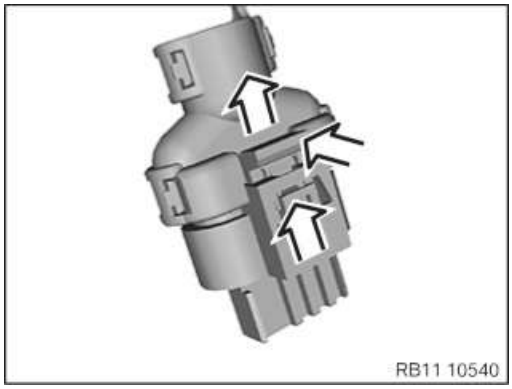
Disconnect plug connection.



15.

Press the lock and detach plug connection.

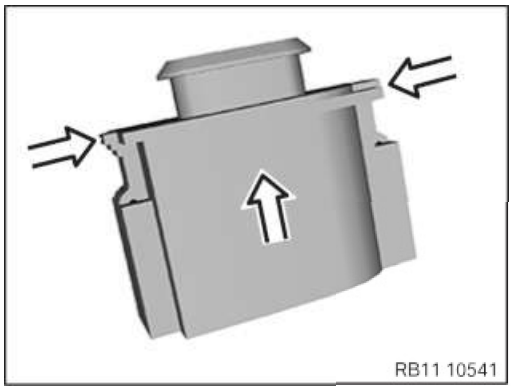
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16.

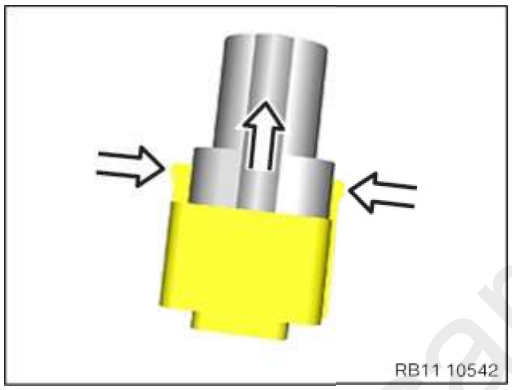
Pull out lock and press.

Disconnect plug connection.



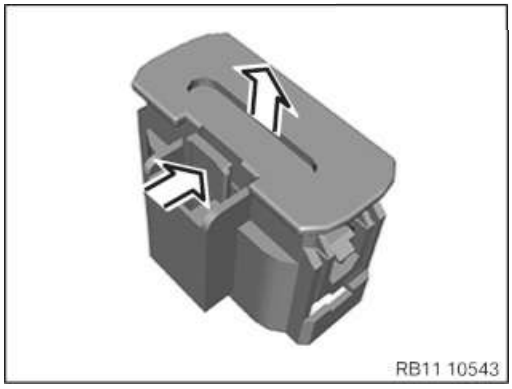
17.

Press the lock and detach plug connection.



18.

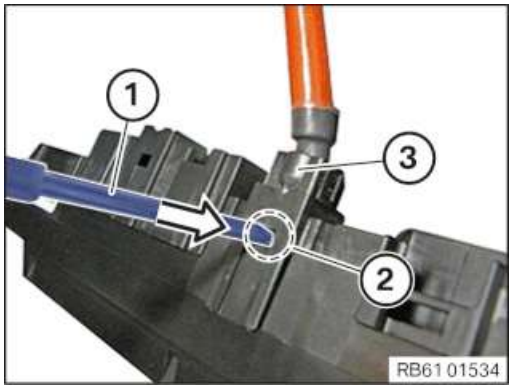
Press the lock and detach plug connection.



19.

Press the lock and detach plug connection.

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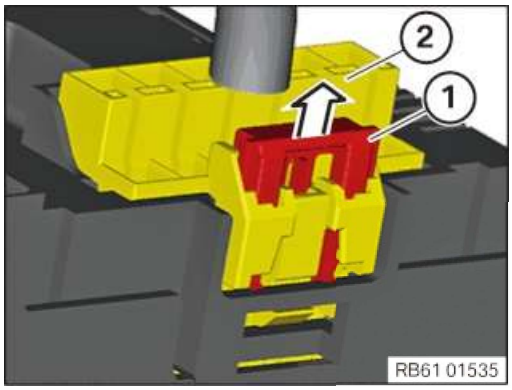


20.

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!

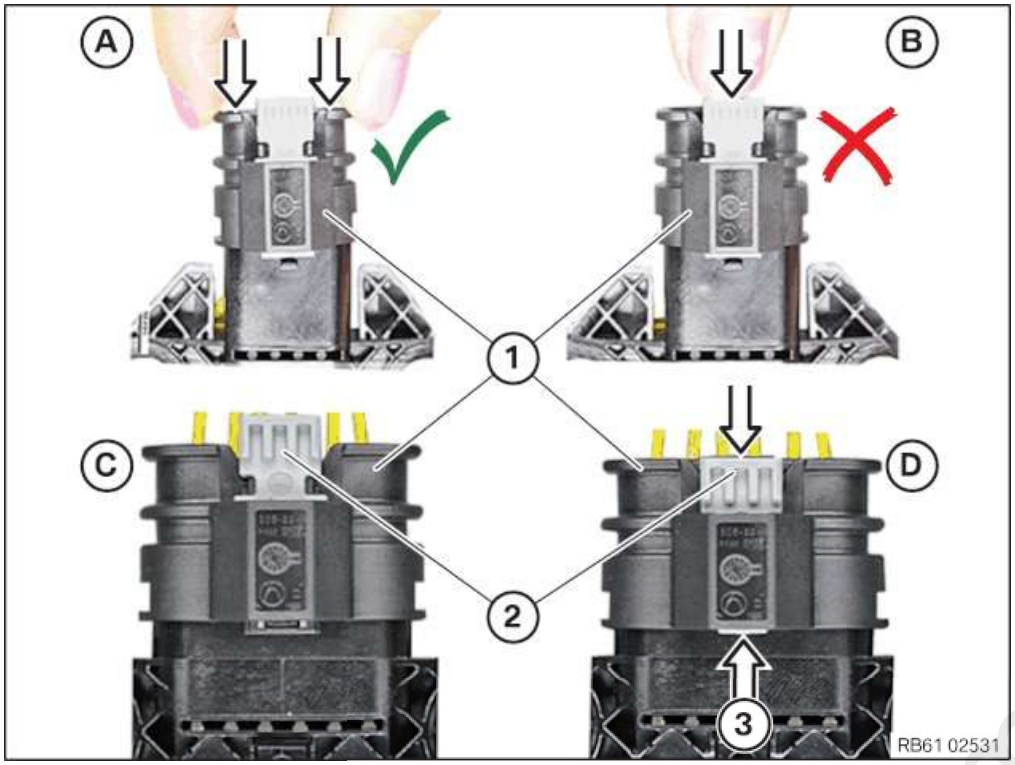
For this connector type, increased forces come into play when disconnecting and closing.

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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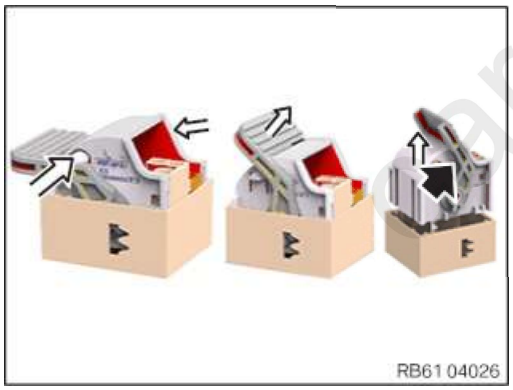


23.

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:

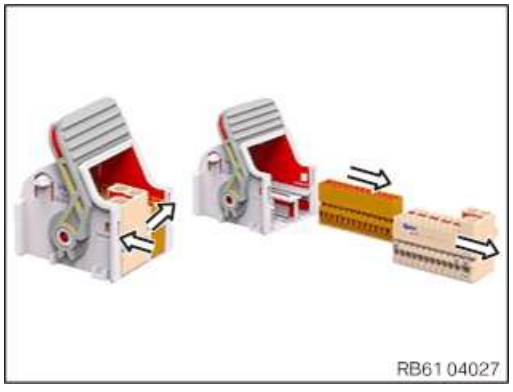


24.

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.

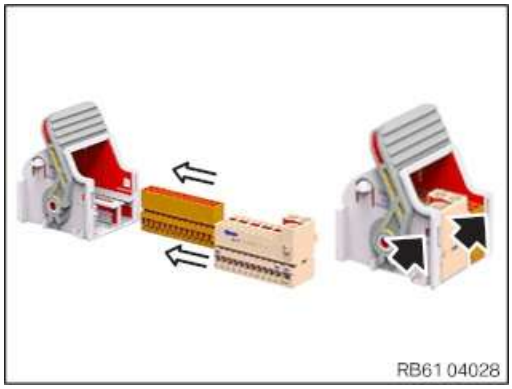
Once the lever is locked in the end position, remove plug connection upwards.



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

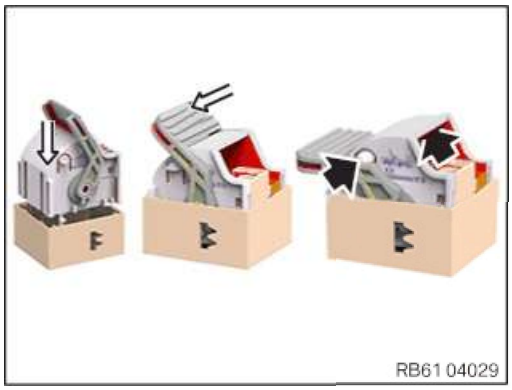
Slide out after unlocking the socket housing.

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Slide in socket housing up to limit position.

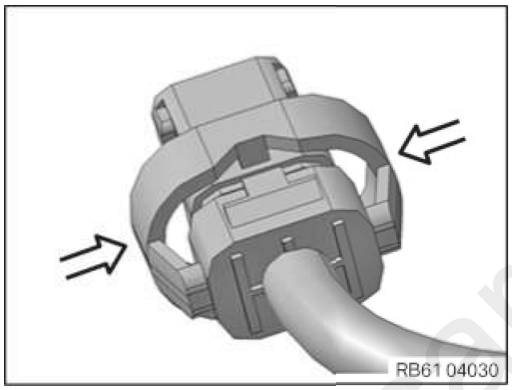
Lock socket housing into place in end position.



Sliding in up to limit position.

Activate plug-inn procedure by moving lever downwards.

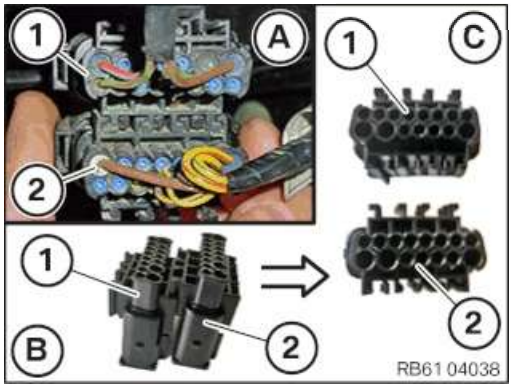
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.



25.

Rosenberger D4S20G-400A5-Y

Press to unlock on both sides.

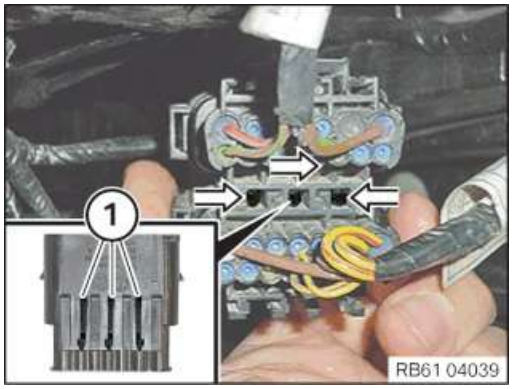


26.

Pin housing, 15-pinMLK1

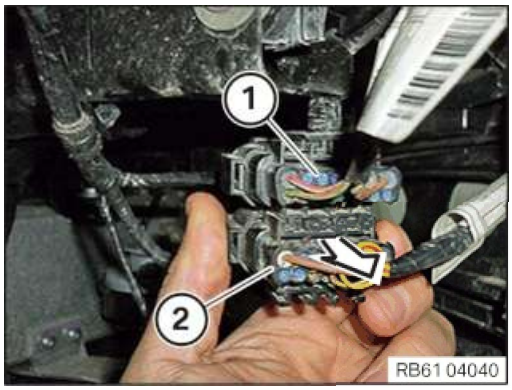
- A & B. To avoid any damage to individual connectors, the given connector assembly consisting of several individual connectors (1) & (2) must be released before disconnecting the plug connection.
- C: released connector assembly

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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).

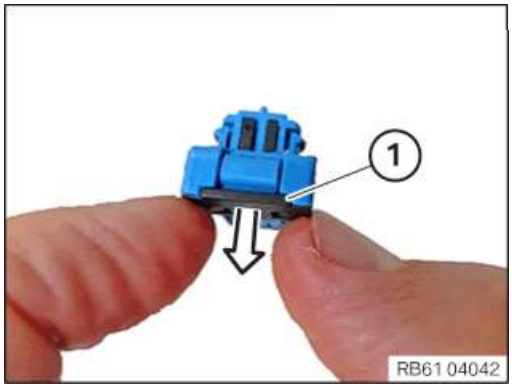


27.

Airbag ignition circuit connector

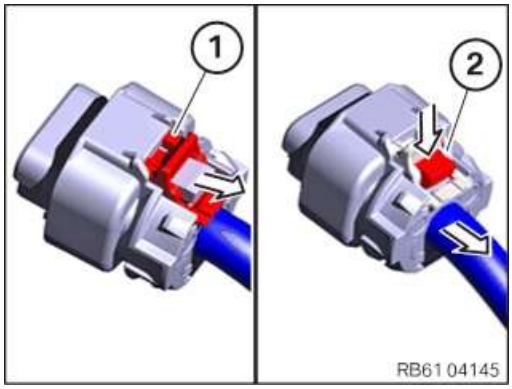
Warning!

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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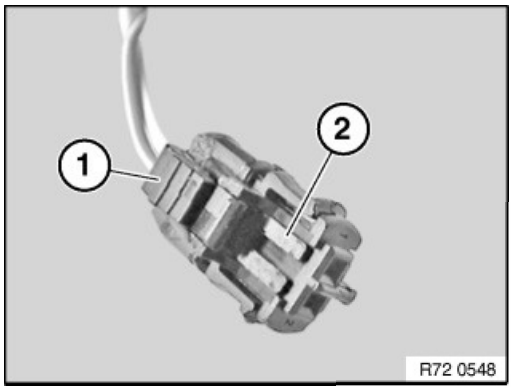


28.

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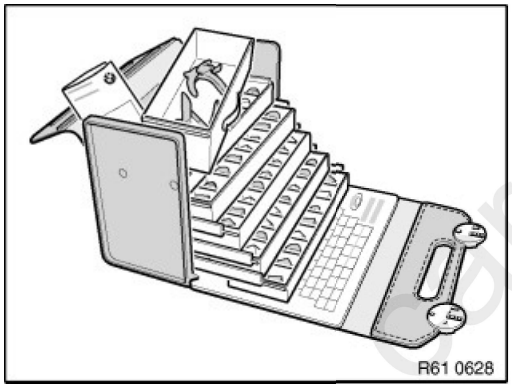
61 13 ... Butt connector for repairing a plug connection

Special tools required:

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

Important!

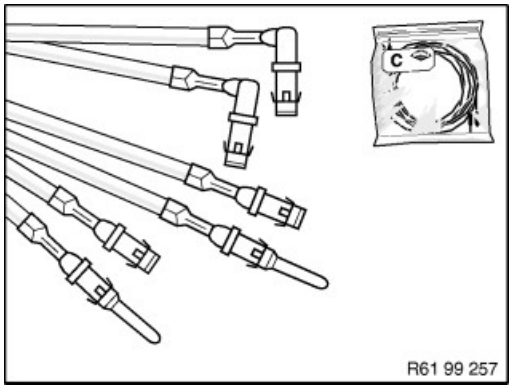
1. Identify cause of damage (e.g. sharp-edged body components, faulty electrical loads, jammed mechanisms, corrosion caused by ingress of water, etc.).
2. Read out fault memory
3. Eliminate cause of damage.
4. Disconnect battery negative terminal
5. Make sure that no safety-related system according to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

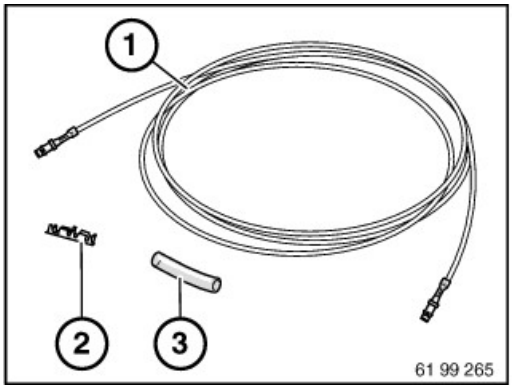
The case can no longer be ordered. Order individual parts for wiring harness repair through BMW Parts Department.

- Refer to Service Information:
  SI 02 04 07 341



Choose repair kit.

Example: Repair kit, circular connector system D 2.5.

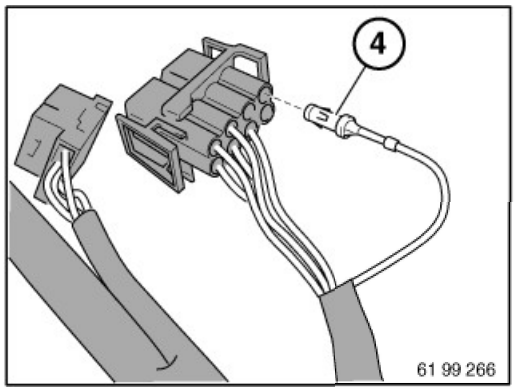


Remove following parts:

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

(2) Crimp connector for selected wire cross-section

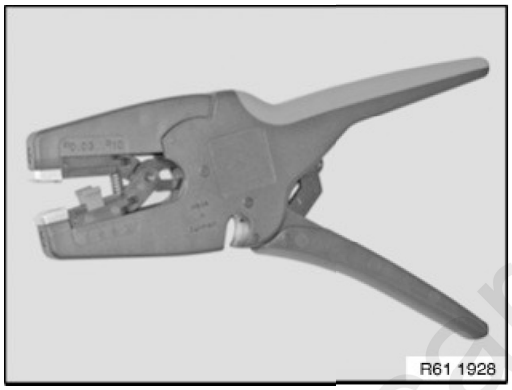
(3) Shrink-fit hose



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.



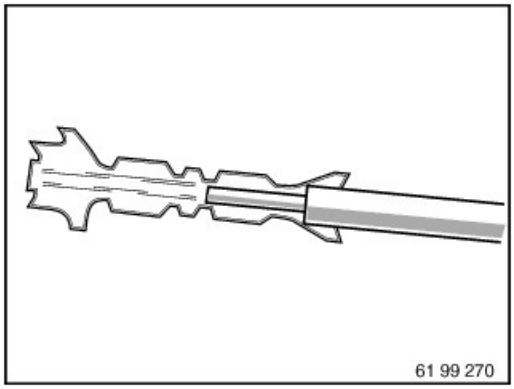
Important!

- 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



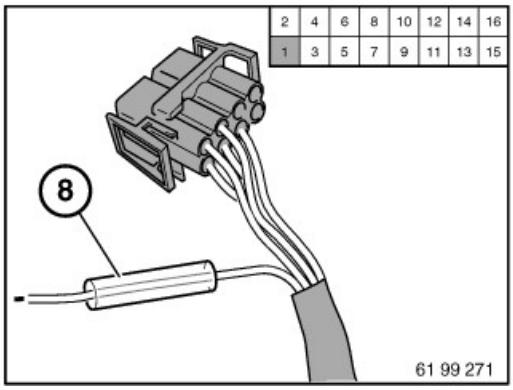
Crimp butt connector on preassembled wire end.

Special tools:

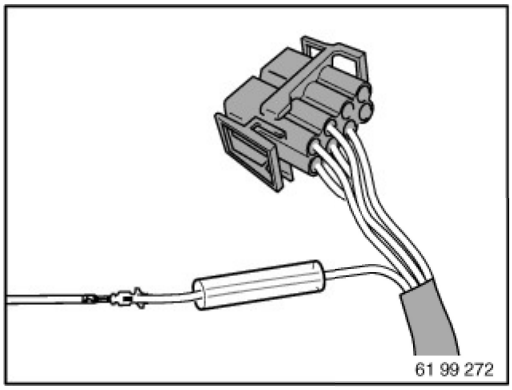
- 61 4 340 (0.35 - 2.5 sq mm)
- 61 0 240 (4.0 - 6.0 sq mm)

See repair instructions
Crimping on stop parts

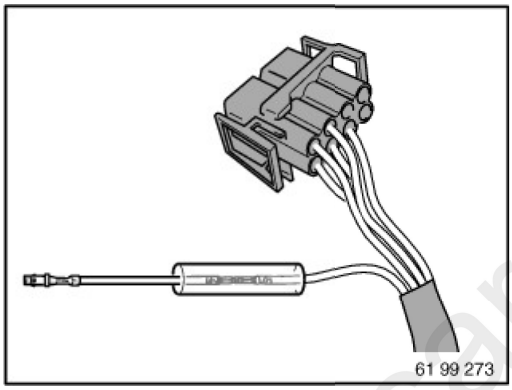
cardiagn.com



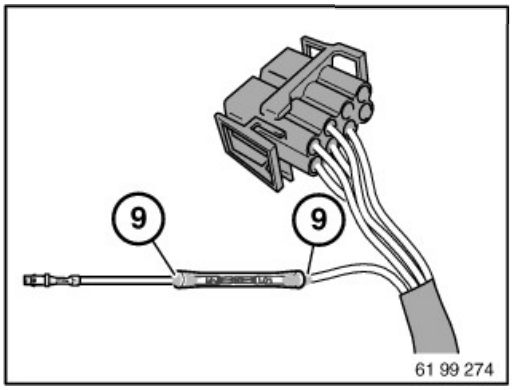
Push shrink-fit hose (8) onto free wire end.



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.

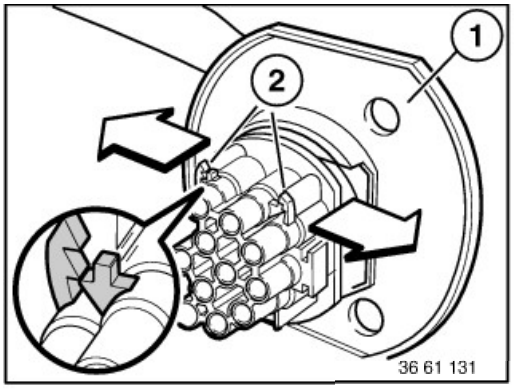
Close secondary lock on housing.

cardiagn.com

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

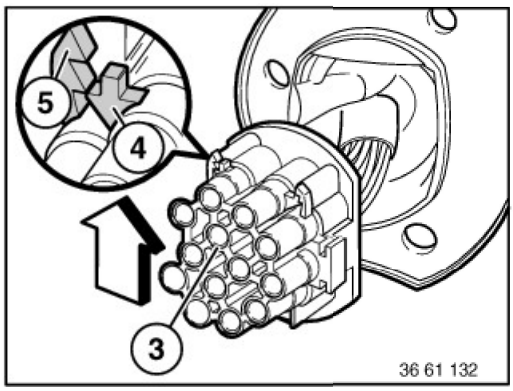
Special tools required:

- 61 0 303

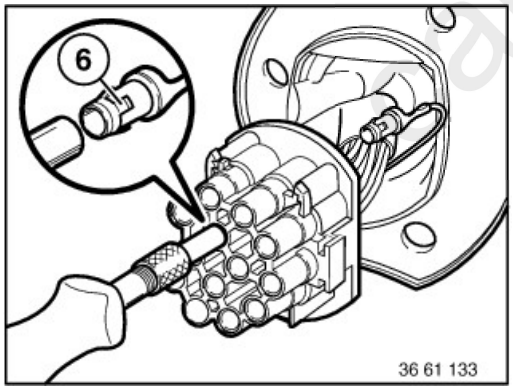


Pull off rubber grommet (1).

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).



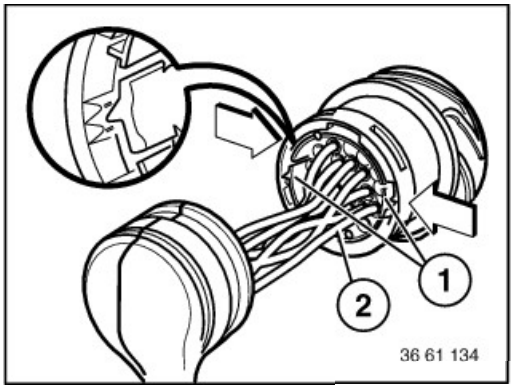
With special tool 61 0 303 , press down retaining lugs (6) of corresponding contact and pull out cable.

cardiagn.com

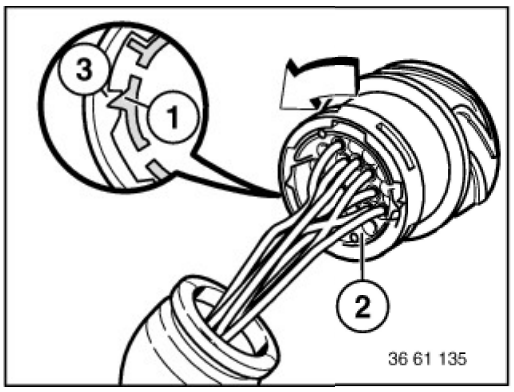
61 13 ... Circular connector, 20-pin, system D2.5

Special tools required:

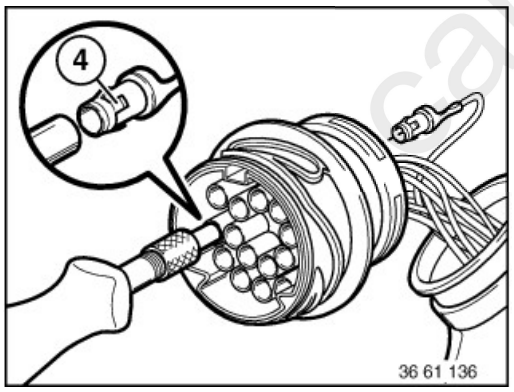
- 61 0 303



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



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



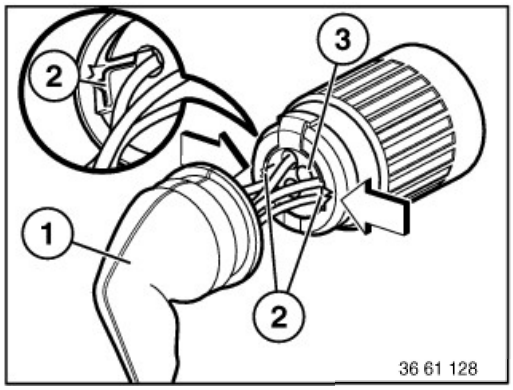
With special tool 61 0 303 press down retaining hook (4) of corresponding contact and pull out cable.

cardiagn.com

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

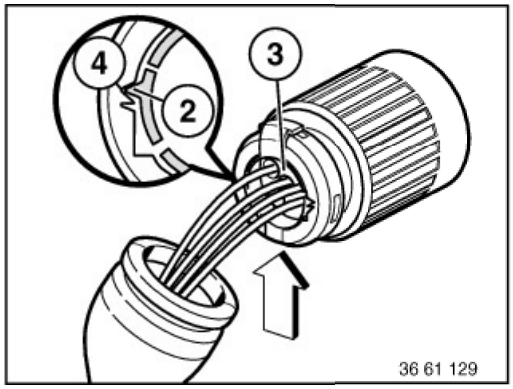
Special tools required:

- 61 0 303

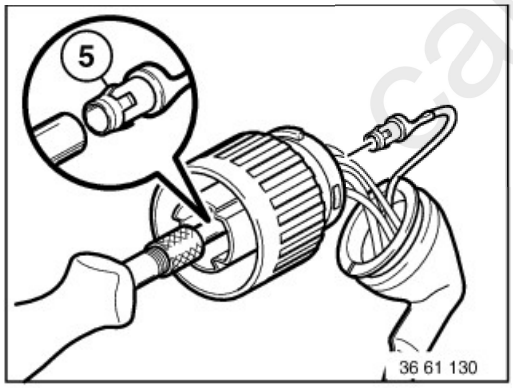


Carefully pull off rubber grommet (1).

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).



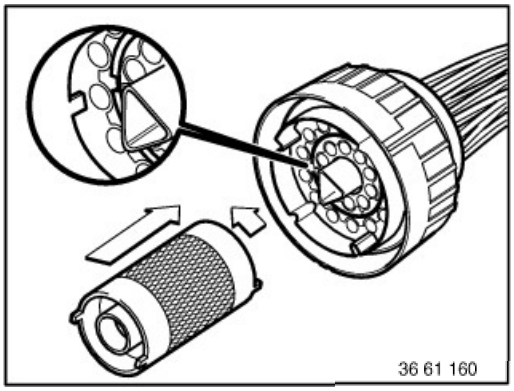
Use special tool 61 0 303 (61 1 132) to press back retaining hook (5) of corresponding contact and pull out cable with contact.

cardiagn.com

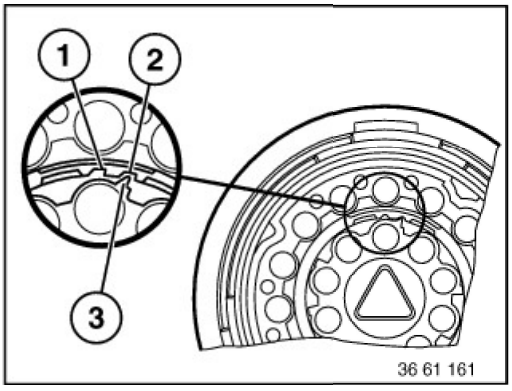
61 13 ... Circular plugs, 4-, 7-, 10- 12-, 25-pin, System D1.5/D2.5

Special tools required:

- 61 0 303

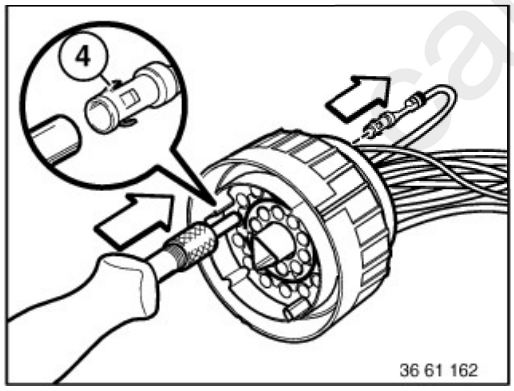


Insert special tool with suitable connection side in connector and twist approx. 3° anticlockwise.



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

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



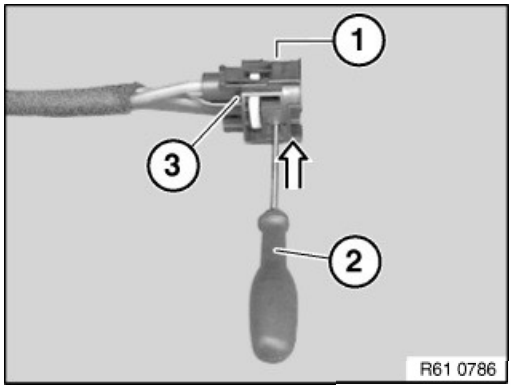
With special tool 61 0 303 press back retaining hook(4) of corresponding contact and pull out cable with contact.

cardiagn.com

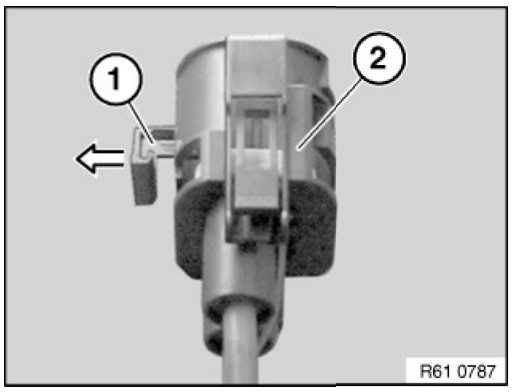
61 13 ... Connector housing, LCC contact (load current contact)

Special tools required:

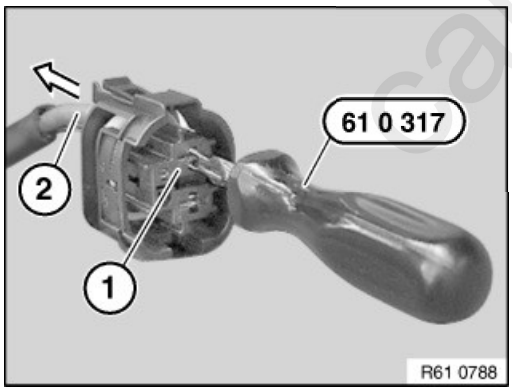
- 61 0 317



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

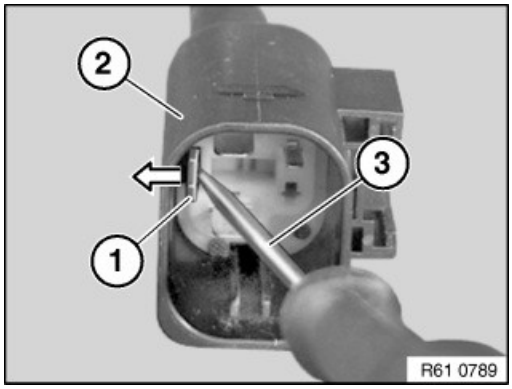


Pull lock (1) out of socket housing (2).

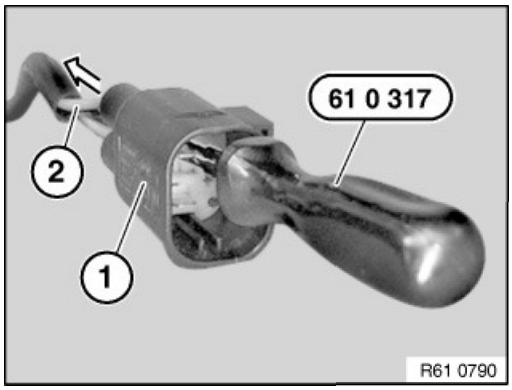


Insert special tool 61 0 317 into socket housing (1) and pull out wiring with LCC contact (2) in direction of arrow.

carDiagn.com



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



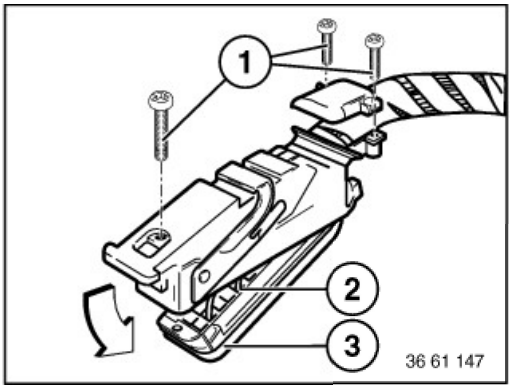
Insert special tool 61 0 317 into pin housing (1) and pull out wiring with LCC contact (2) in direction of arrow.

cardiagn.com

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

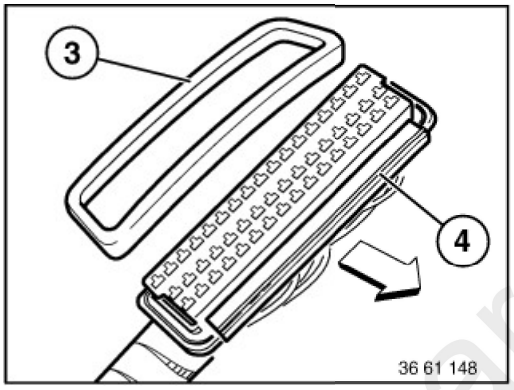
Special tools required:

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



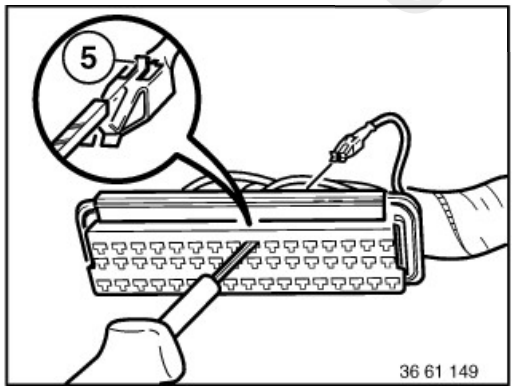
Release screws (1).

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.

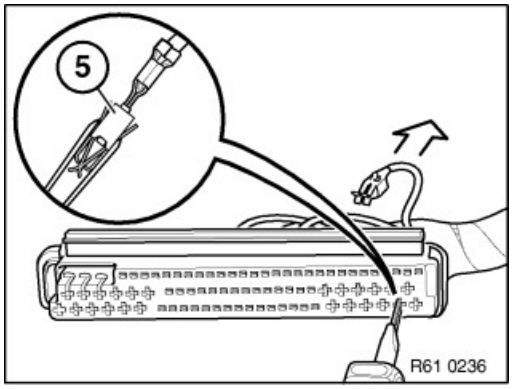


Press down retaining hook (5) of corresponding contact and pull out cable with contact.

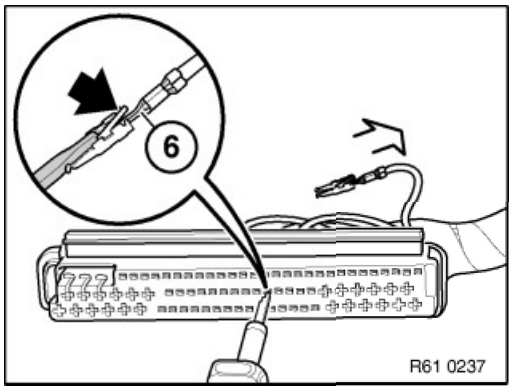
Special tool 61 0 312 (61 1 134) for mini flat spring contacts.

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).

cardiagn.com

61 13 ... Crimping annular contacts



Special tools required:

- 61 4 320



Crimping annular contacts:

Special tool61 4 320

Handling:

Refer to Service Information:

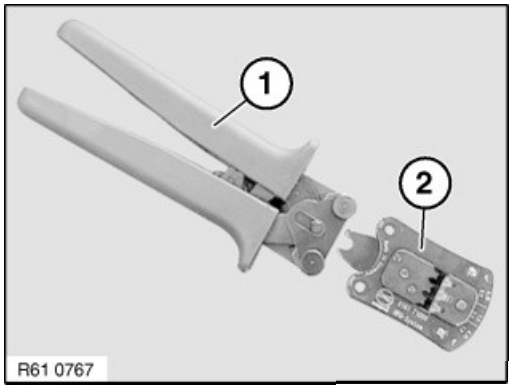
- SI 2 04 06 2939

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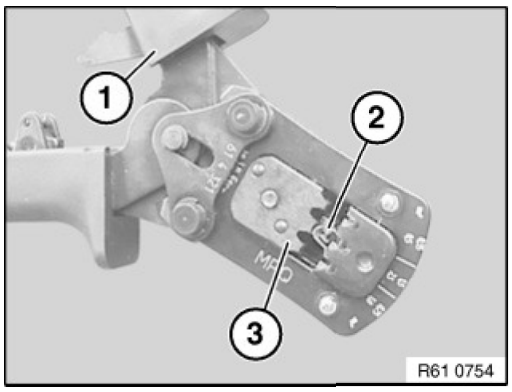
61 13 ... Crimping Micro Power Quadlock contacts (MPQ)

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.

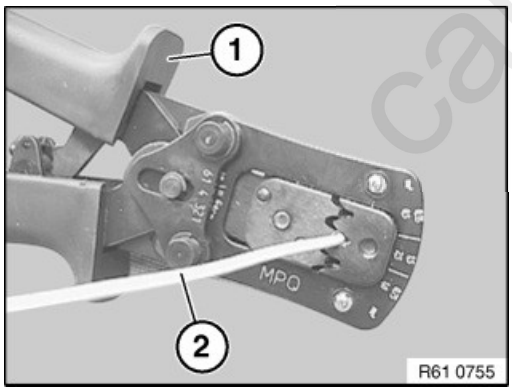


Open hand pliers (1).

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!

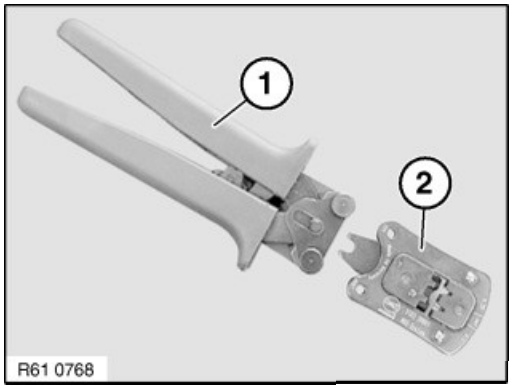
Check contact for correct crimping.

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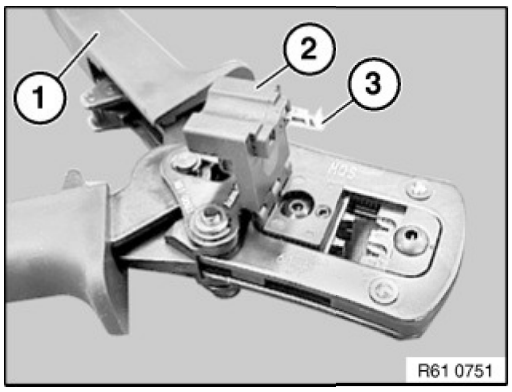
61 13 ... Crimping Micro Quadlock System contacts (MQS)

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.

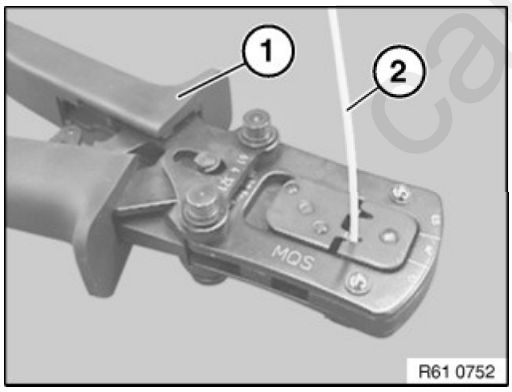


Open hand pliers (1).

Fold up contact carrier (2).

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

Fold back contact carrier (2).



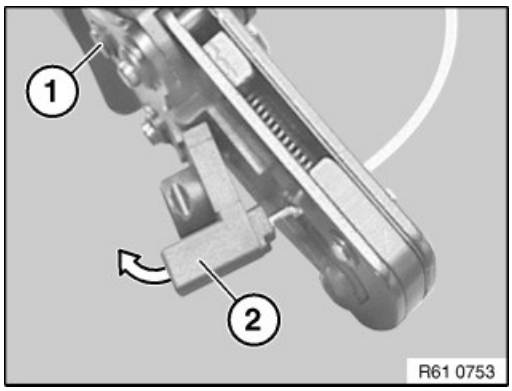
Note:
Follow procedure for cutting and stripping insulation from cables.

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!

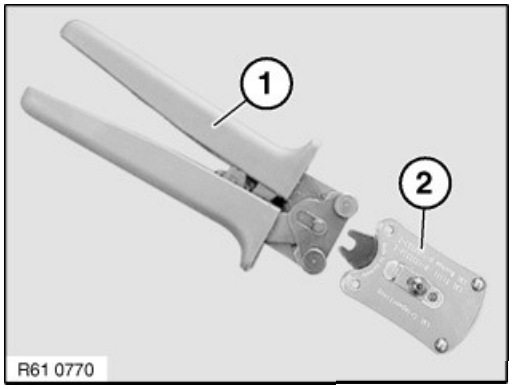
Check contact for correct crimping.

cardiagn.com

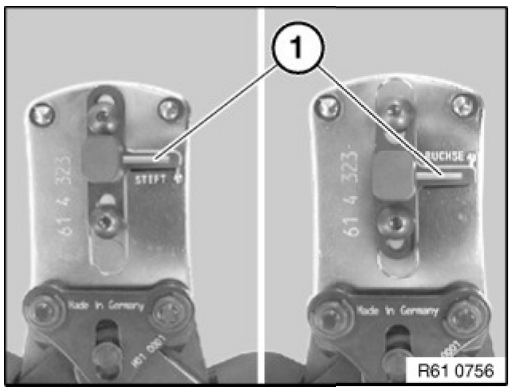
61 13 ... Crimping optical fibres

Special tools required:

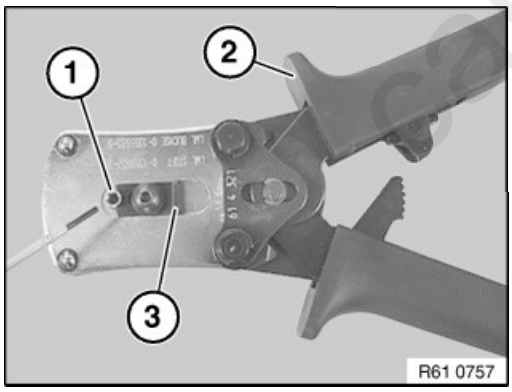
- 61 4 320



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.



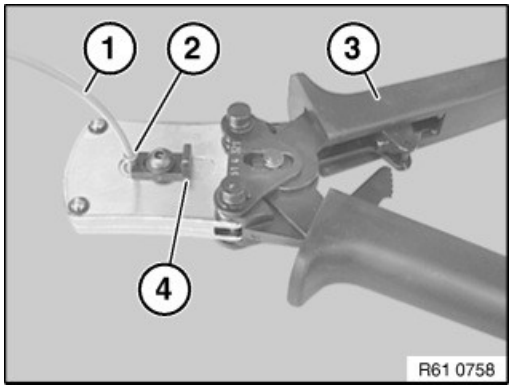
Move contact guide by means of stop lever (1) into corresponding position (pin contact or jack).



Open hand pliers (2).

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

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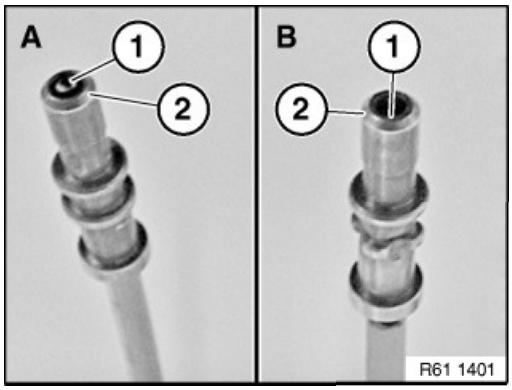
Note:
Follow procedure for cutting and stripping insulation from optical fibres.

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:

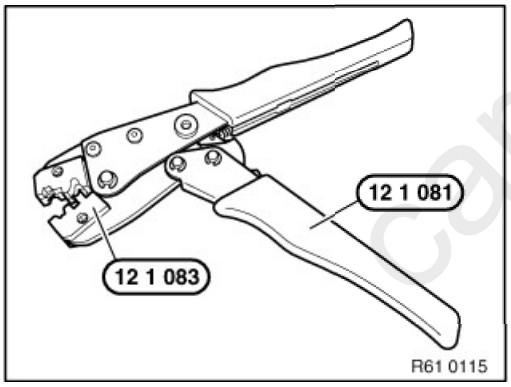
SI 2 04 06 293

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

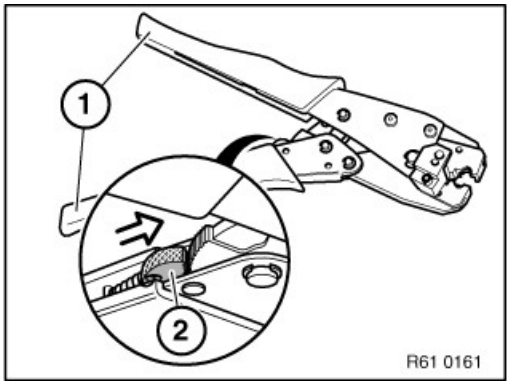


3. Crimping contact sleeves for 4 mm^2 comb connectors and ignition cable contacts

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.



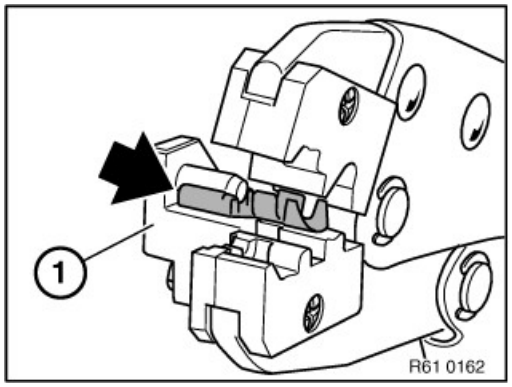
Release special tool 12 1 081 :

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

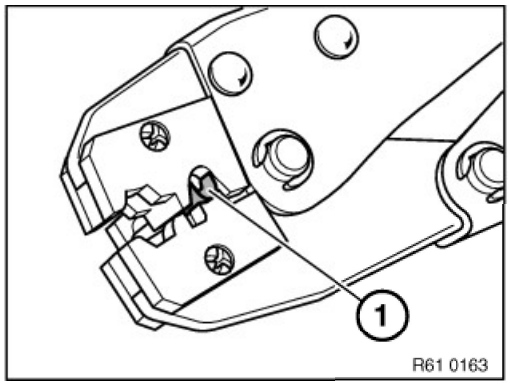
Or:

Compress handles until limit position, hand pliers unlock automatically.

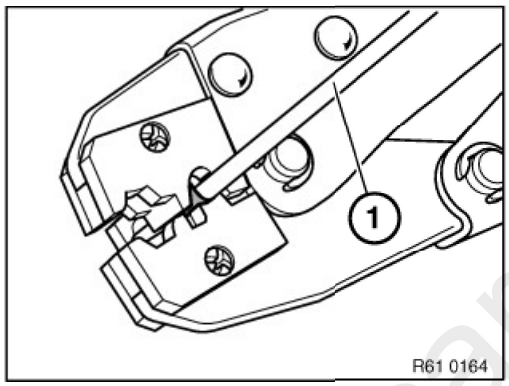
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Place 4 mm^2 contact sleeve in nest with anti-twist safeguard (1) as far as possible.



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



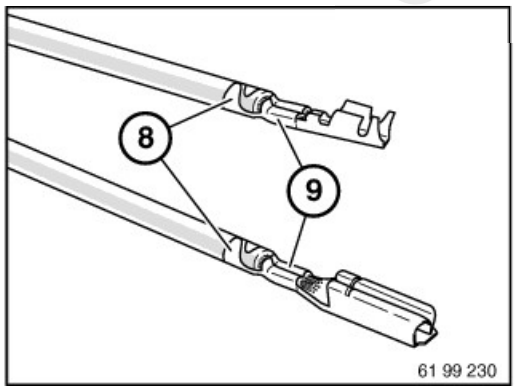
Note:
Follow procedure for cutting and stripping insulation from cables.

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.

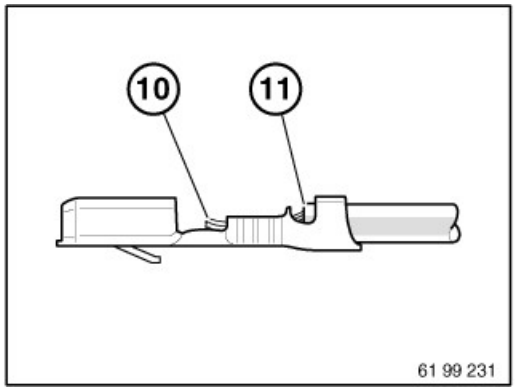


4. Checking crimping

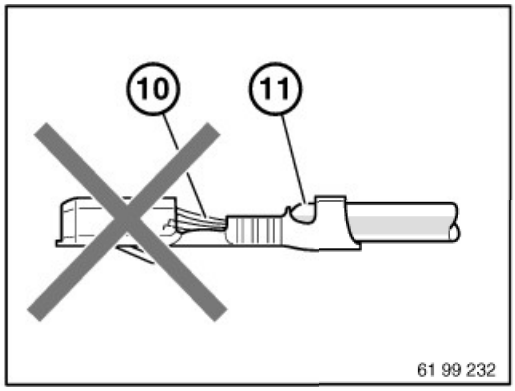
Check insulation crimping (8) and wire crimp (9) against following illustrations to ensure crimps are correctly located.

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

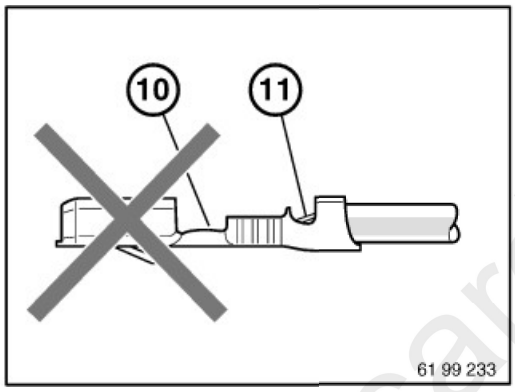
cardiagn.com



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.

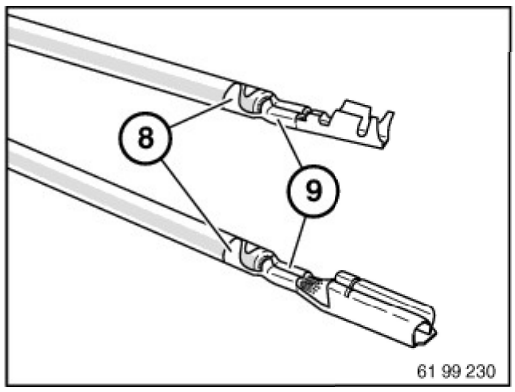
- Special tool61 0 220

Refer to Service Information SI 2 02 05 194

Crimping double spring contact (DFK 40)

Crimping MAK 8

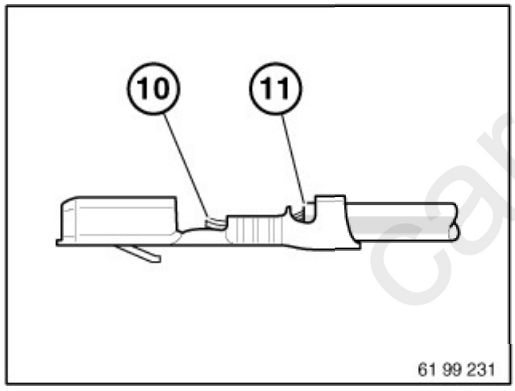
- Special tool61 0 230
- Refer to Service Information SI 2 07 05 233



Checking crimping

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

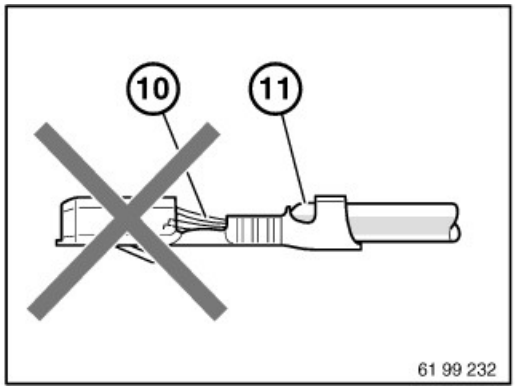
Note:
Illustration shows butt connectors and contact sleeves for comb connectors knocked on one side. The crimping procedure is identical here.



Correct crimping:

Visible conductor end (10).

Visible insulation end (11).



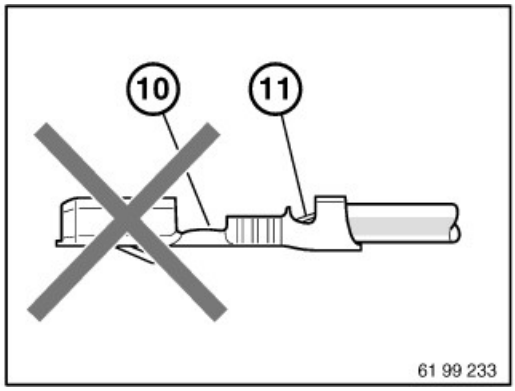
Incorrect crimping:

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.

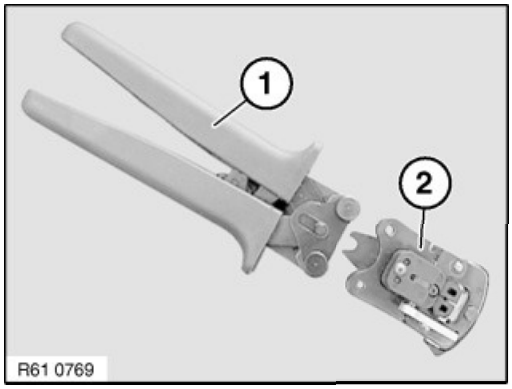
If necessary, repeat crimping with a new contact.

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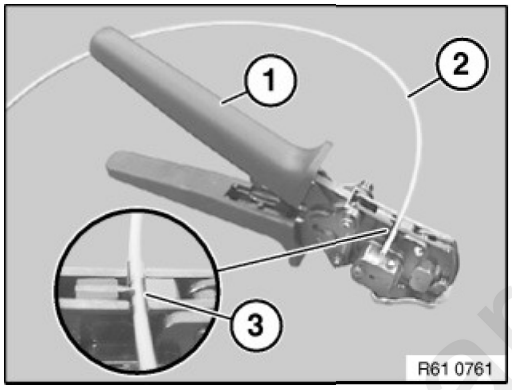
61 13 ... Cutting off, stripping insulation and cutting optical fibres to length

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.

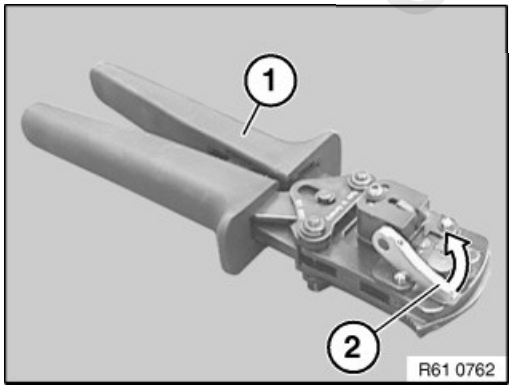


Cutting optical fibre

Open hand pliers (1).

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

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

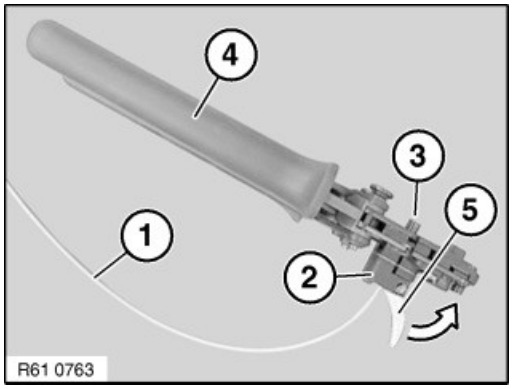


Stripping insulation from optical fibre

Open hand pliers (1).

Open lever (2) in direction of arrow.

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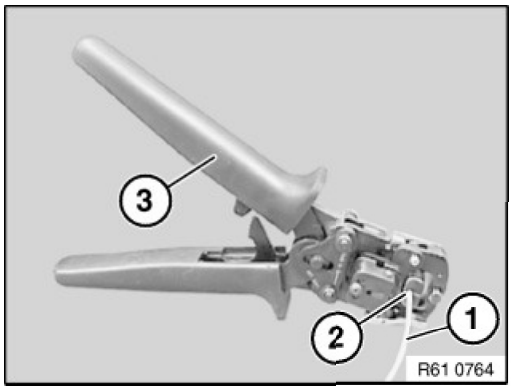
Push the optical fibre (1) into the strip insulation equipment (2) until it is flush in this area (3).

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).



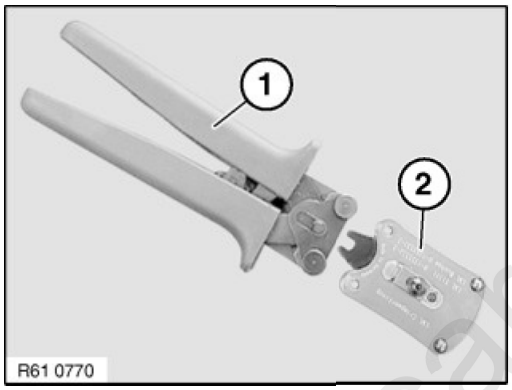
Cutting optical fibre to length

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.

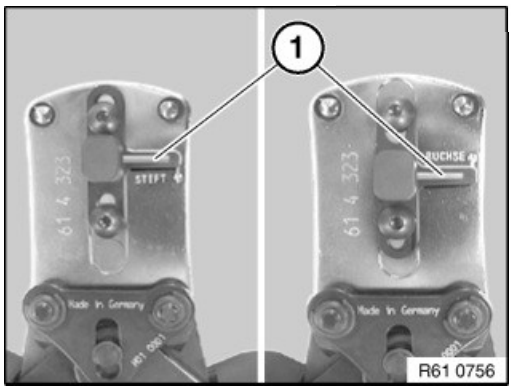
Remove optical fibre (1).



Crimp optical fibre

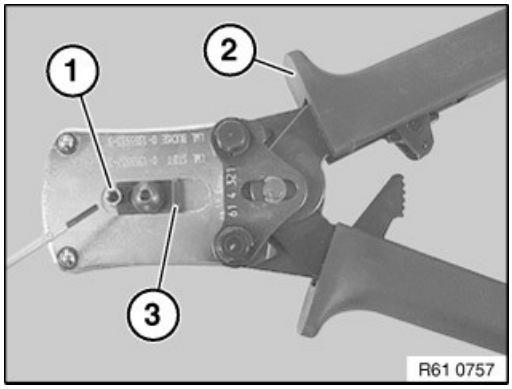
The hand pliers 61 4 321 (1) in connection with the crimping head 61 4 323 (2) from crimping kit 61 4 320 are used for crimping the optical fibres to size.

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



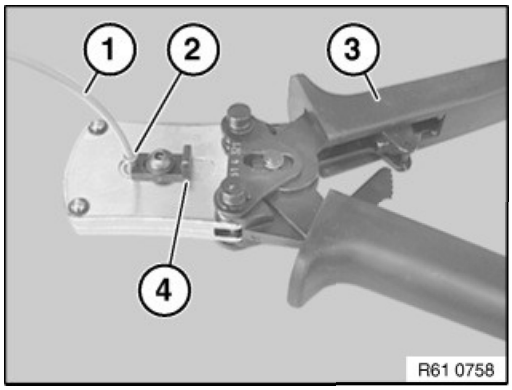
Move contact guide by means of stop lever (1) into corresponding position (pin contact or jack).

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Open hand pliers (2).

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

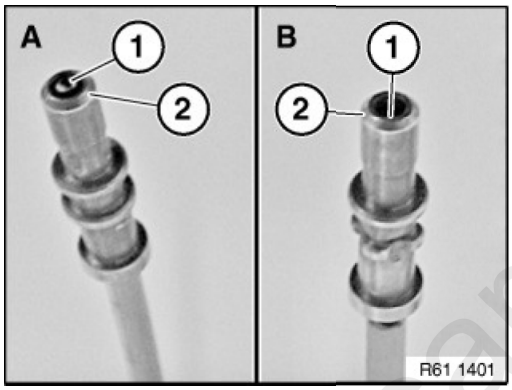


Insert stripped optical fibre(1) until limit position into pin contact or jack (2).

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

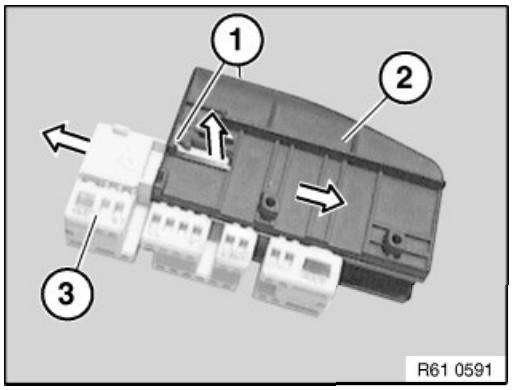
Stripped length:

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)

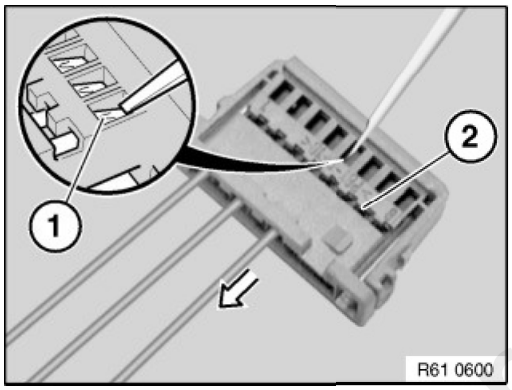


Socket housing:

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

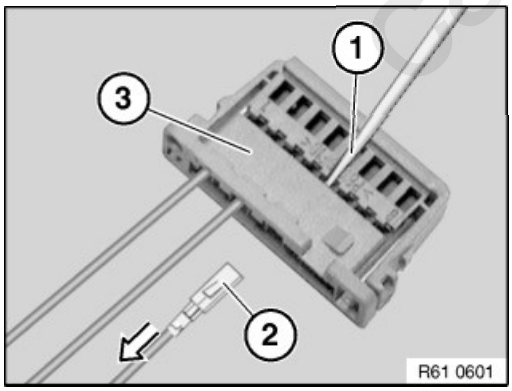
Detach protective cap from contact carrier (3).

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



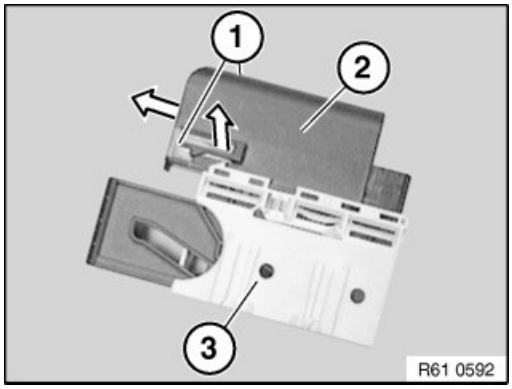
Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

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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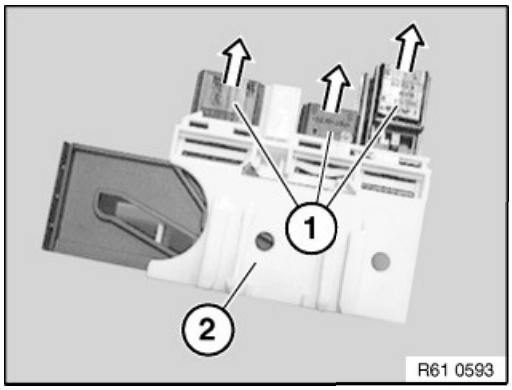


Pin housing:

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.



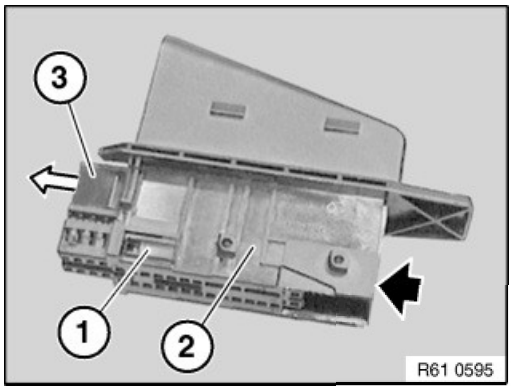
Pull contact carrier (1) out of housing carrier (2).

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)

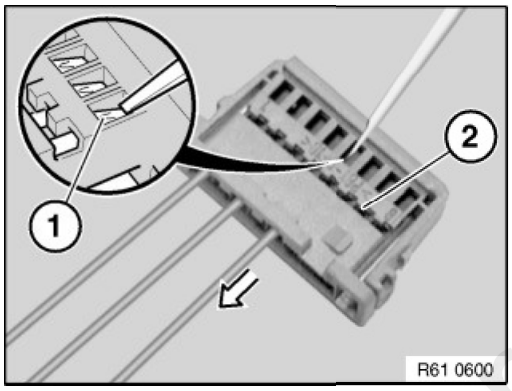


Socket housing:

Raise lock (1) on housing (2).

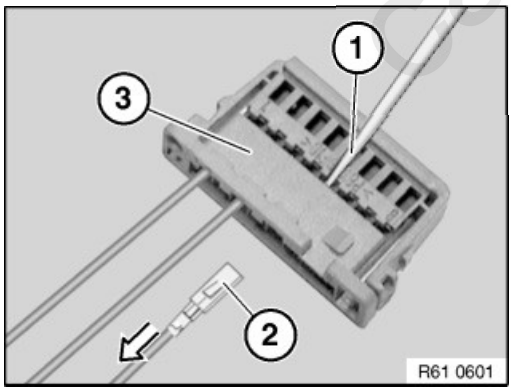
Push contact carrier (3) out of housing (2).

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



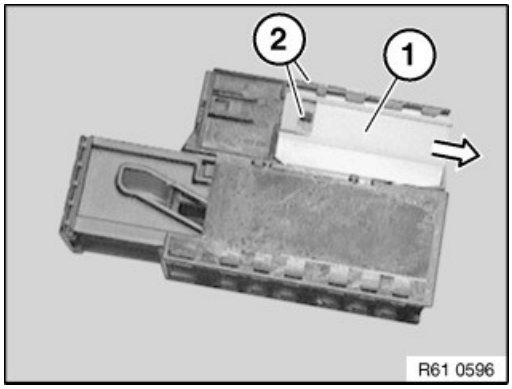
Hold down retaining hook (1) of socket contact in opening of contact carrier with a small screwdriver.

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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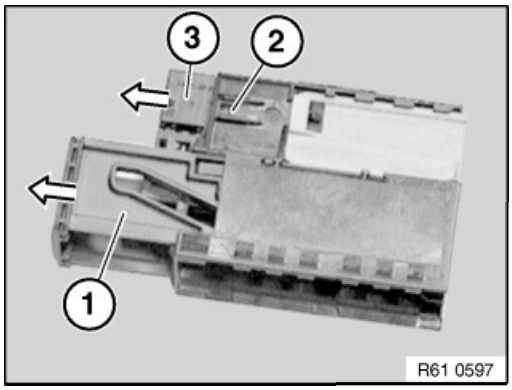


Pin housing:

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.

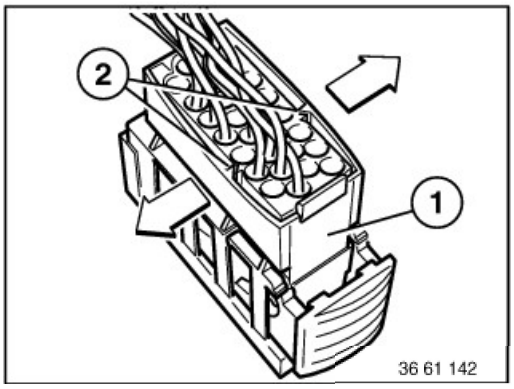
The pin contacts are pulled out of a contact carrier as described under ”Socket housing”.

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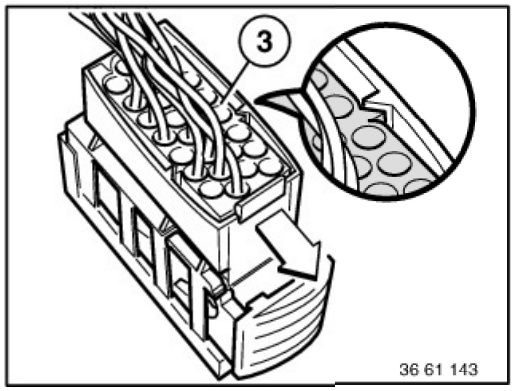
61 13 ... In-line connectors, 30-pin, System D2.5

Special tools required:

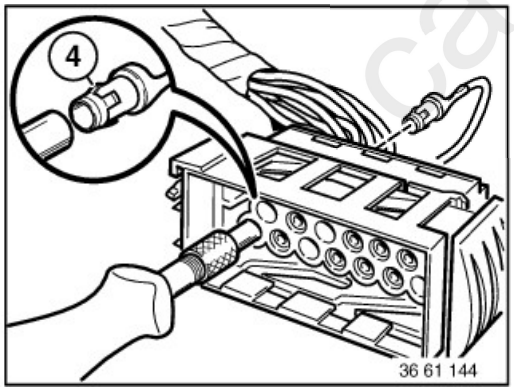
- 61 0 303



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



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



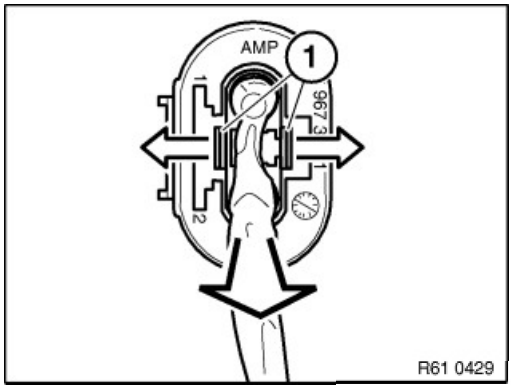
With special tool 61 0 303 press back retaining hook(4) of corresponding contact and pull out cable with contact.

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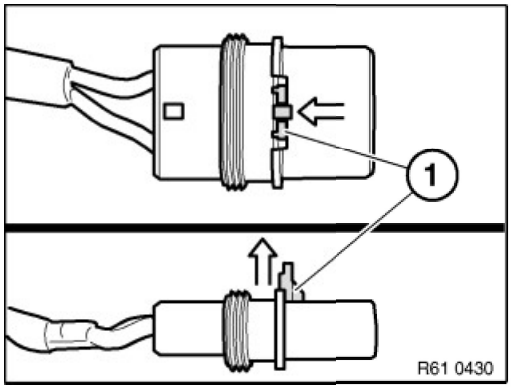
61 13 ... In-line plugs, 2-pin, System JPT ELA

Special tools required:

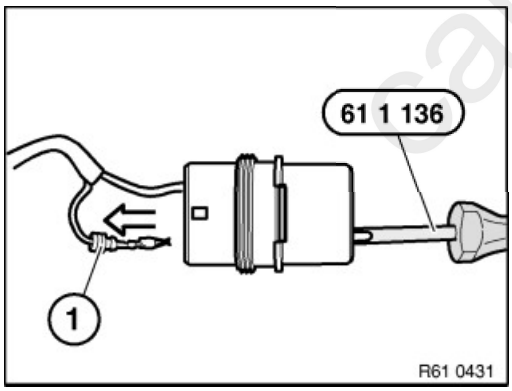
- 61 0 316



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



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



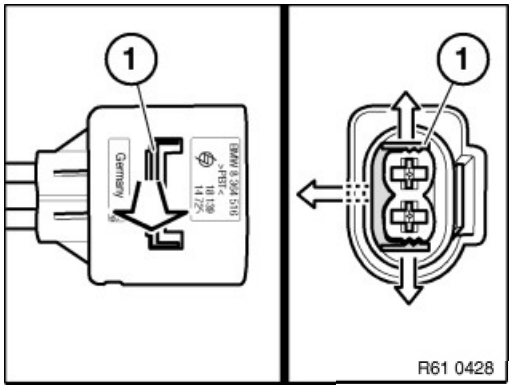
With special tool 61 0 316 (61 1 136), unlock contact and pull out cable with contact (1) towards rear.

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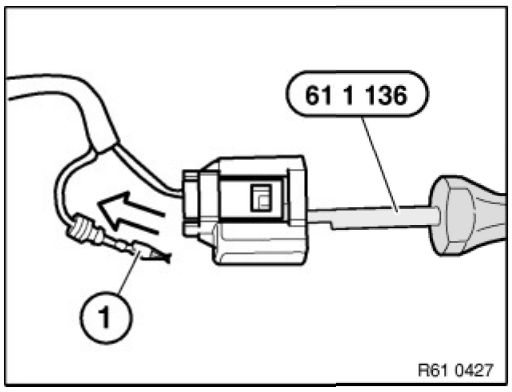
61 13 ... In-line plugs, 2-pin, System MDK 3 plus 2.8

Special tools required:

- 61 0 316



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



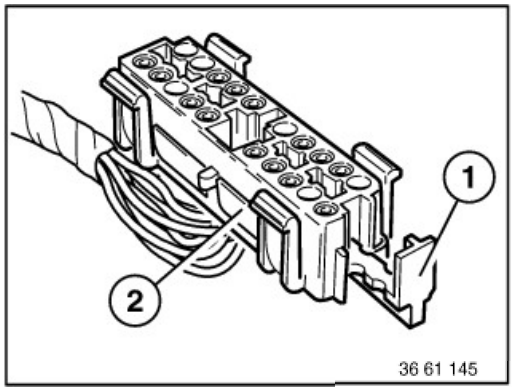
With special tool 61 0 316 (61 1 136), unlock contact and pull out cable with contact (1) towards rear.

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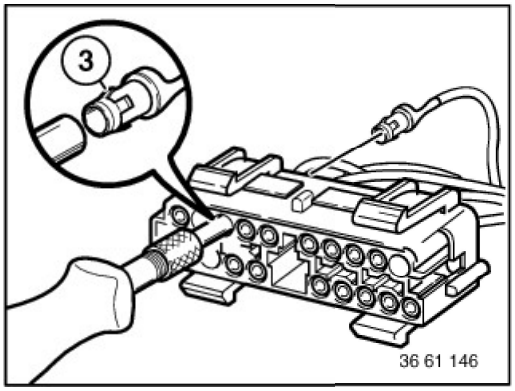
61 13 ... In-line plugs, 20-pin, System D2.5

Special tools required:

- 61 0 303



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



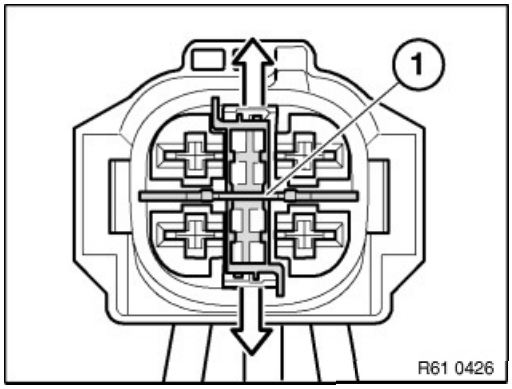
With special tool 61 0 303 , press down retaining hook (3) of corresponding contact and pull out cable with contact.

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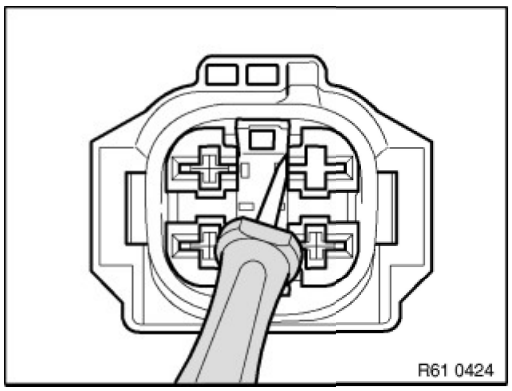
61 13 ... In-line plugs, 4-pin, System DFK ELA

Special tools required:

- 61 0 316

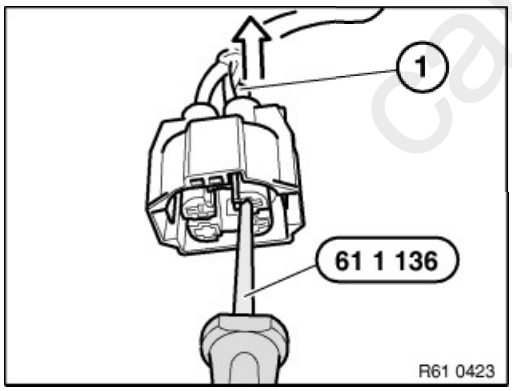


Press retaining hook in direction of arrow and remove lock (1).



Installation notes:

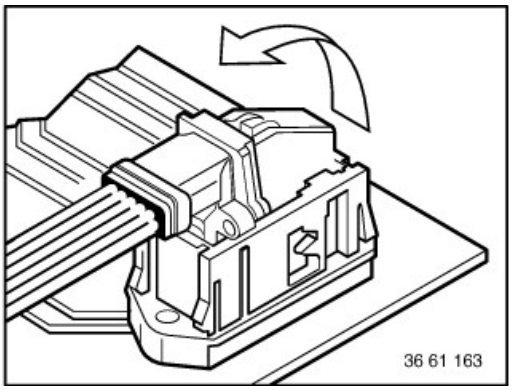
If necessary, side lock must also be unlocked with screwdriver.



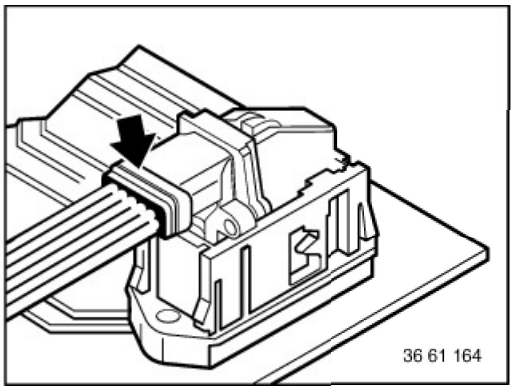
With special tool 61 0 316 (61 1 136), unlock contact and pull out cable with contact (1) towards rear.

cardiagn.com

61 13 ... In-line plugs, 6- to 50-pin, System Elo

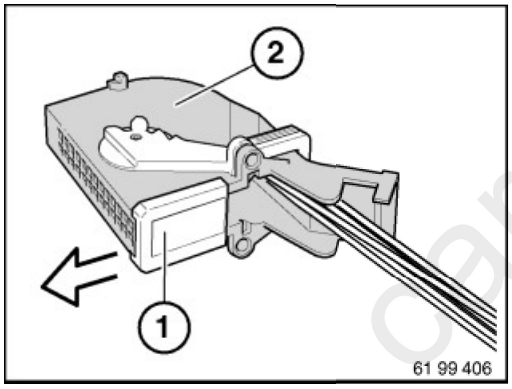


Open lock.

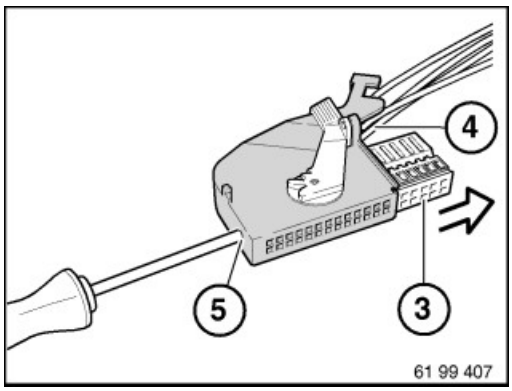


Detach cable strap.

Installation note:
Cable strap must be reinstalled.

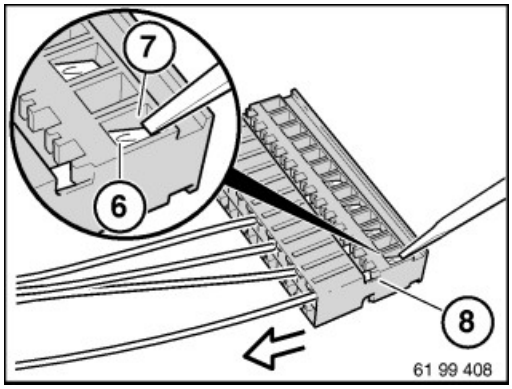


Detach catch (1) from connector housing (2).

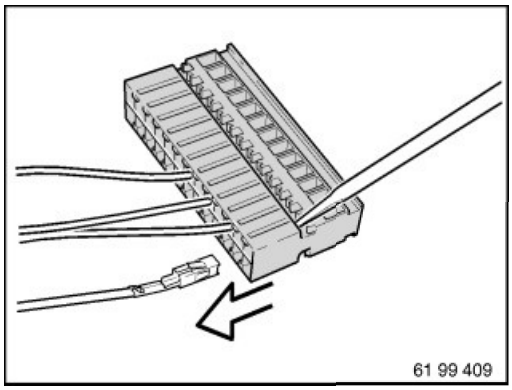


Press out contact carrier (3) with wiring harness (4) through opening (5).

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



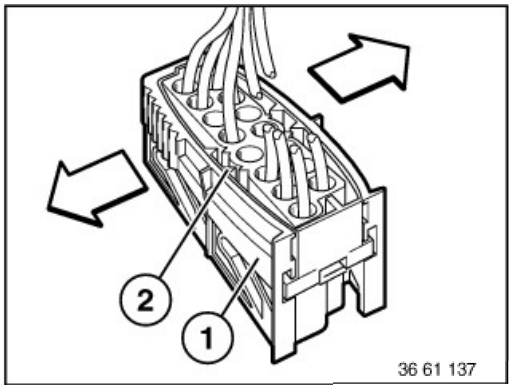
Hold down retaining hook once again in secondary lock (8) and pull cable and contact completely out of contact carrier.

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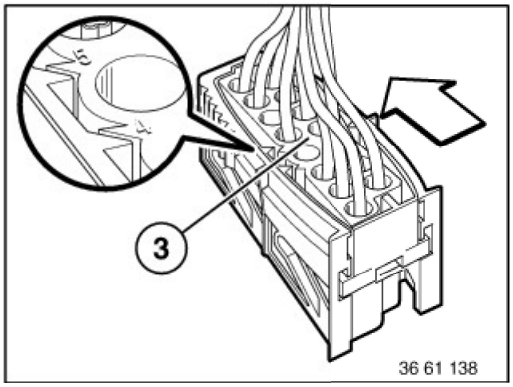
61 13 ... Inline connectors, 15-pin, System D2.5

Special tools required:

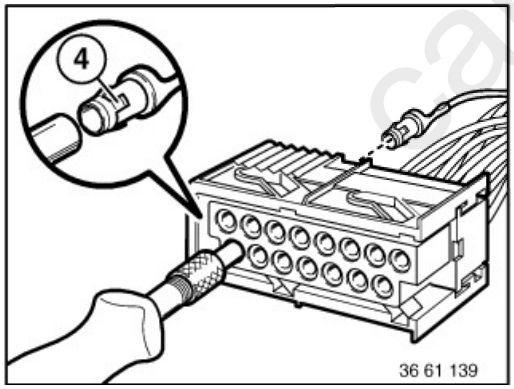
- 61 0 303



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



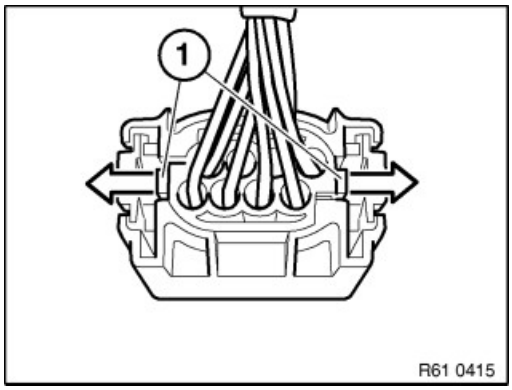
Pull internal connector (3) until limit position in direction of arrow.



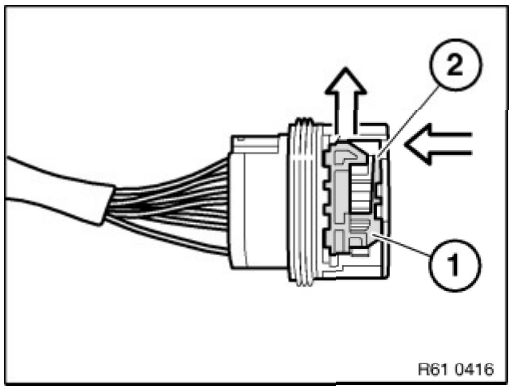
With special tool 61 0 303 press back retaining hook(4) of corresponding contact and pull out cable with contact.

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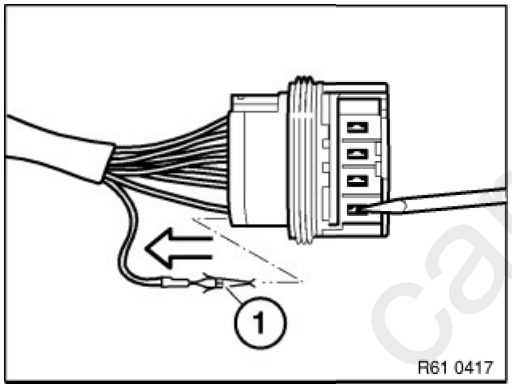
61 13 ... Inline connectors, 6-, 8-pin, System MQS



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



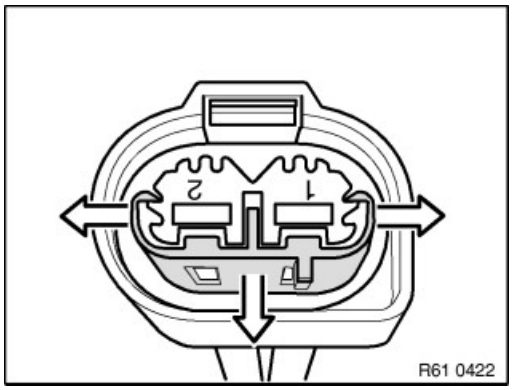
Press locking hook (2) downward and slide lock (1) out.



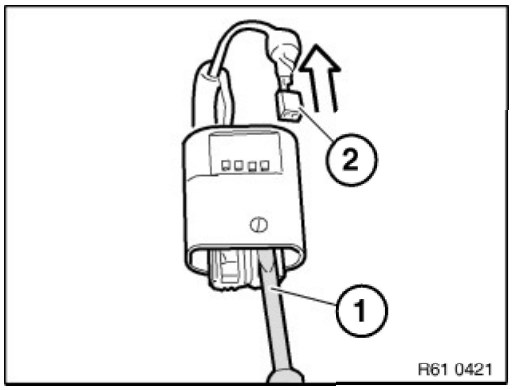
Press down retaining hook (1) with screwdriver and pull out cable with contact towards rear.

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



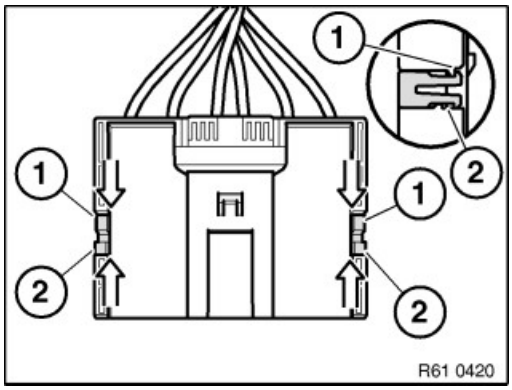
Press catch on outside in direction of arrow and remove towards top.



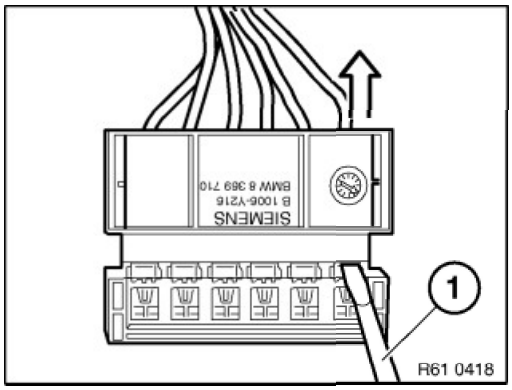
Press down retaining hook (1) with screwdriver and pull out cable and contact (2) towards rear.

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



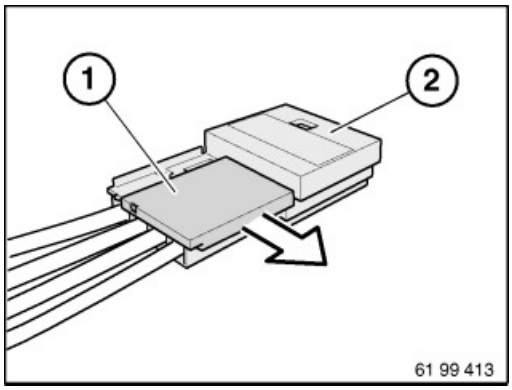
Press locking hook (1) in direction of arrow and disengage. Then unlock locking hook (2) and remove lock.



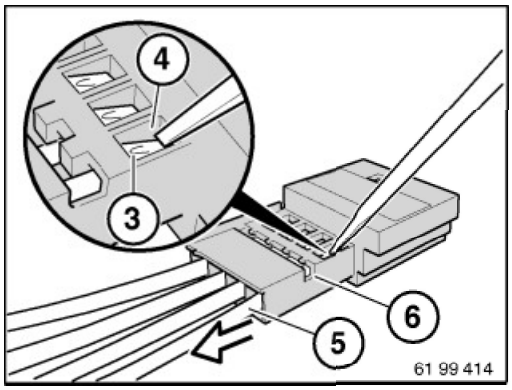
Press down retaining hook with screwdriver (1) and pull out cable with contact towards rear.

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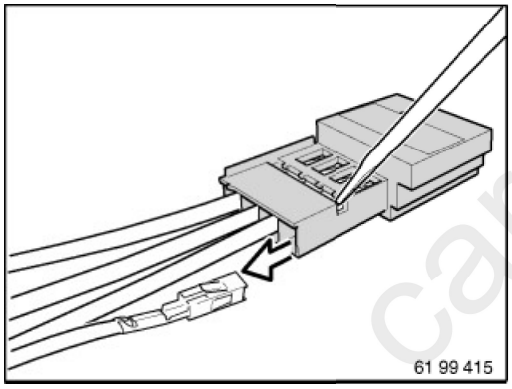
61 13 ... Inline plugs, 4-, 10-pin, System Elo



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



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



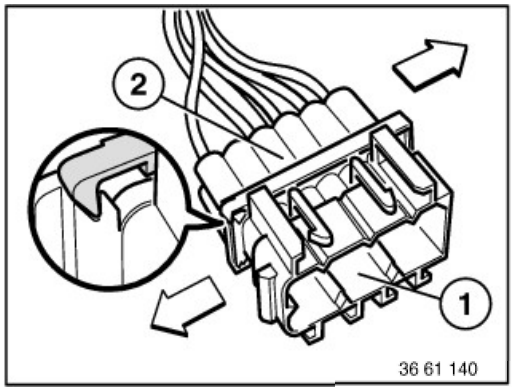
Hold down retaining hook once again in secondary lock and pull cable and contact completely out of contact carrier.

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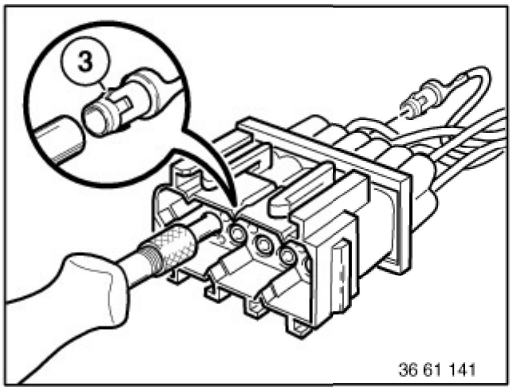
61 13 ... Inline plugs, 8-, 12-pin, System D2.5

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.



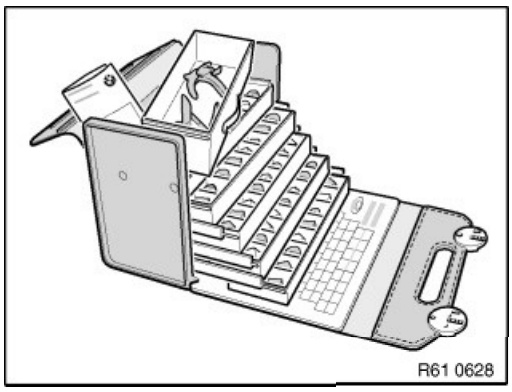
With special tool 61 0 303 , press down retaining hook (3) of corresponding contact and pull out cable with contact.

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

Special tools required:

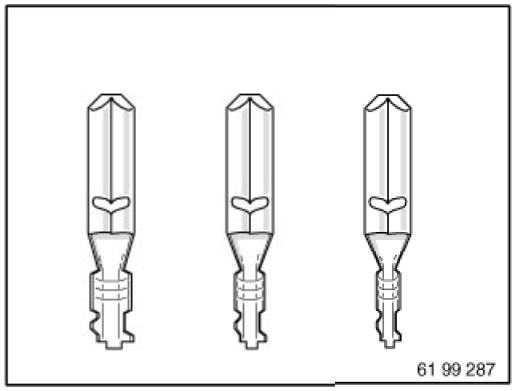
- 61 9 041
- 61 9 042



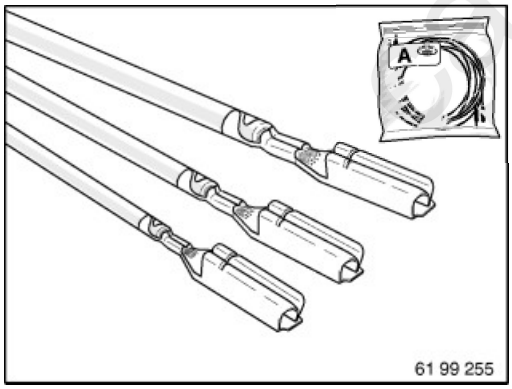
Note:
The repair range IV for vehicle electrical system contained the required special tools and individual parts for retrofitting and repair work with the aid of fan connectors.

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



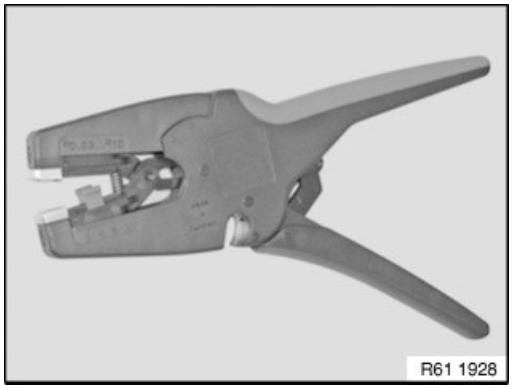
Choose contact sleeve (up to 4 mm^2) in accordance with wire cross-section.



Alternatively:

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

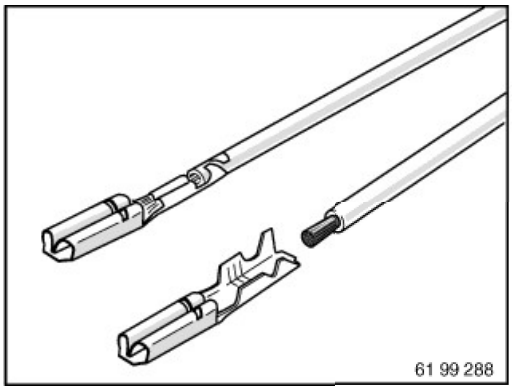
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Cut through wire loop in wiring harness at established point.

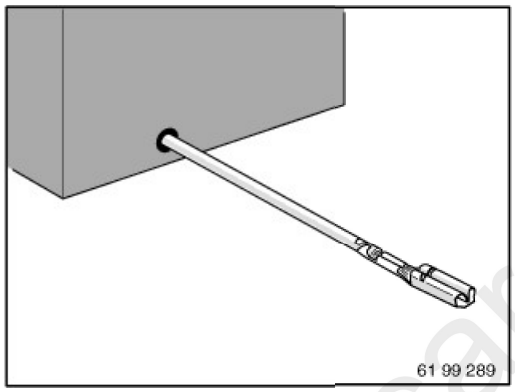
Strip insulation from both wire ends.

See repair instructions
Cutting to length and stripping insulation from cables

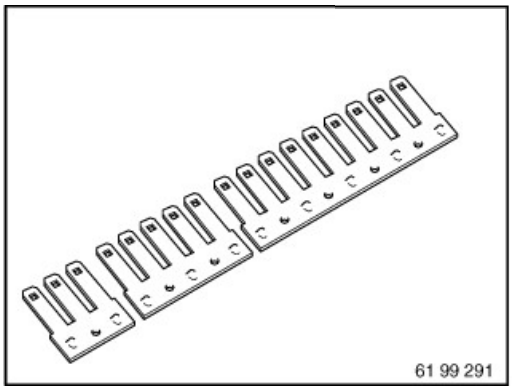


Crimp contact sleeves on both wire ends.*See repair instructions*
Crimping on stop parts

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

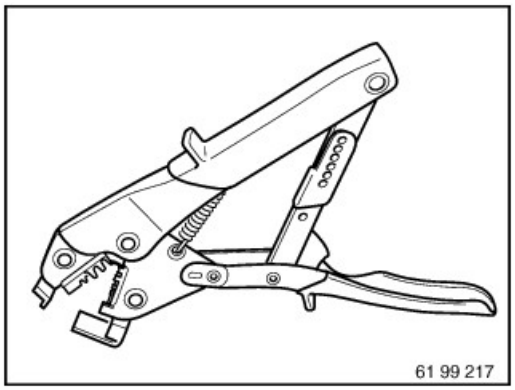


Crimp connecting cable for retrofitting likewise with contact sleeve.

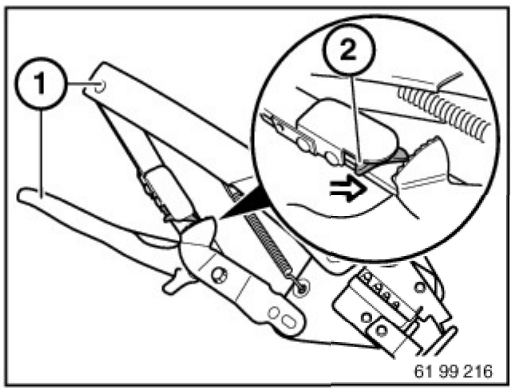


Cut required number of poles to length for comb connectors.

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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.

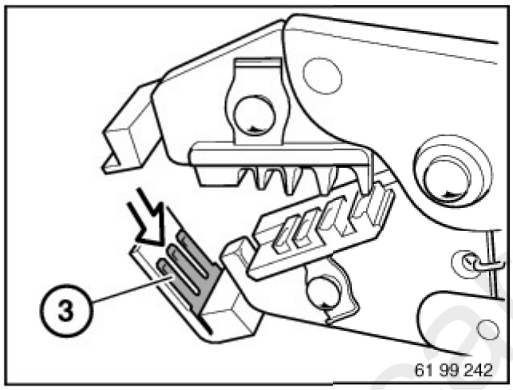


Unlock special tool 61 9 041 :

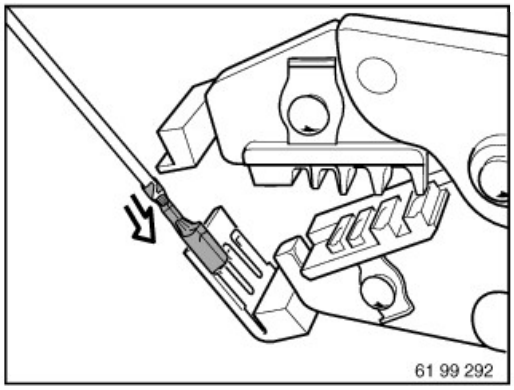
Squeeze grips (1) lightly and push release lever (2) in direction of arrow.

Or:

Compress handles until limit position, hand pliers unlock automatically.

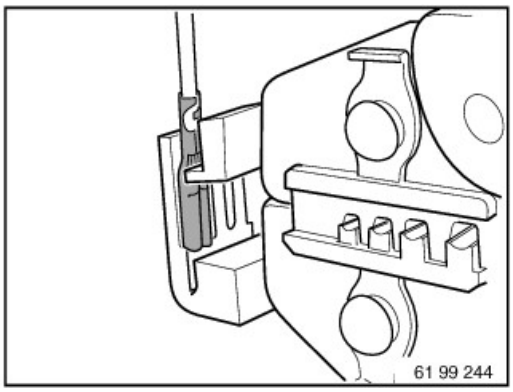


Insert prepared comb connectors (3) in special tool 61 9 041 / 61 9 042 .

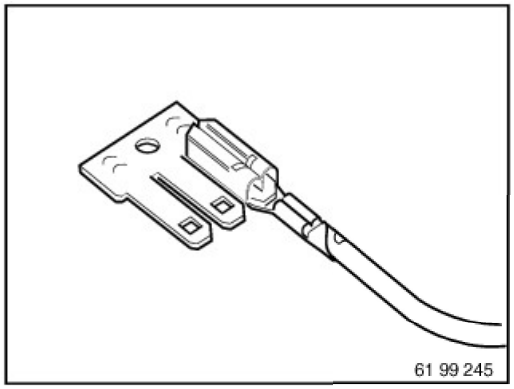


Attach wire with contact sleeve to comb connector.

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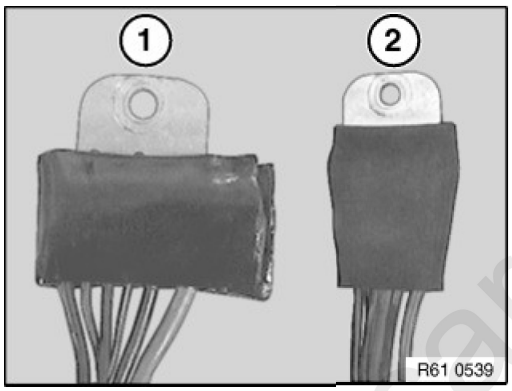
Press hand pliers together and slide on contact sleeve until limit position.



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).

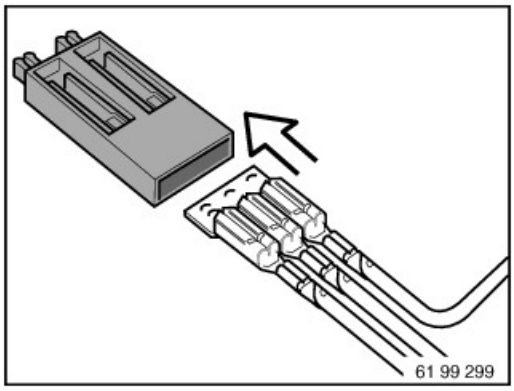
Fit heat-shrink tubing and heat up with hot air blower (2) (approx. 250 °C).

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.

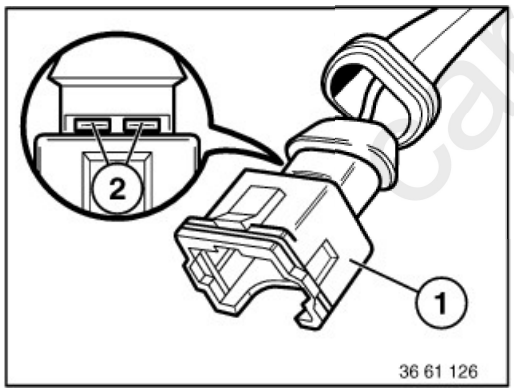
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61 13 ... Notes for opening contacts and locks of different plug contact systems

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)

car diagn.com

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 beams or hot air blower)
- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables if necessary



Note:
The optical fibres are coloured differently as follows:

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

Follow notes for processing cables and optical fibres.

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

The following applies in general:

To avoid damage, observe the following instructions:

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

The following additionally applies:

Shielded lines

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

Coaxial lines

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

CVBS lines

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

HSD lines

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

Optical fibre cable:

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

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

Attention!

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

Treating cables and fibre-optic cables

FlexRay (twisted cables):

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

Note:

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

Airbag lines:

Repairing airbag cables

Ribbon cables:

Repairing ribbon cables

Replacing wiring harnesses

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

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

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

Procedure

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

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

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

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

- Cut the additional socket housing and connect the lines to the vehicle-

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side wiring harness using a butt connector.

- **Using the additional socket housing is not permitted with a separation point outside the vehicle interior.**

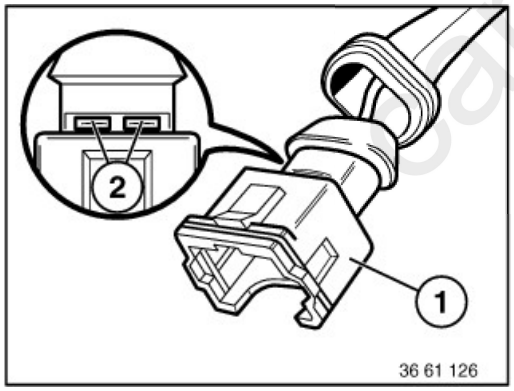
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61 13 ... Opening plug housings and removing contacts of different plug systems

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 42 ... Removing and installing control unit holder

Important!

Read and comply with notes on protection against electrostatic discharge (ESD protection).

Necessary preliminary tasks:

For F30; F32; F35; F80; F82:

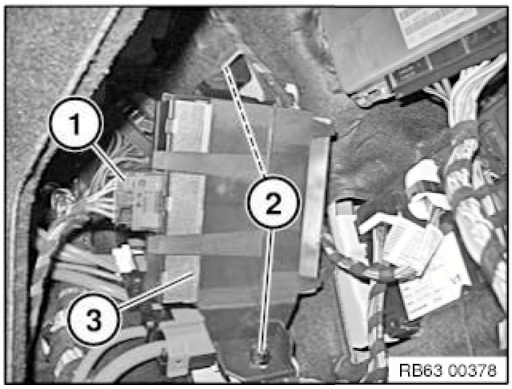
- Open flap in luggage compartment panel on right

F31For:

- Remove battery cover

For F34; F36:

- Remove luggage compartment trim on side panel on right



Release plug connections (1) on all control units.

Release nuts (2) and remove control unit holder (3).

Installation note:
Ensure that the plug connections (1) are correctly seated.

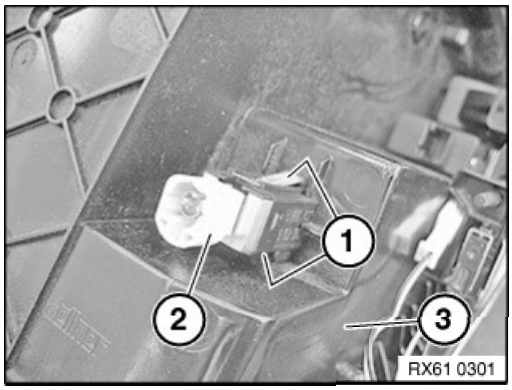
Ensure that the control unit holder (3) is correctly seated.

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61 31 137 Removing and installing/renewing USB interface connecting socket

Necessary preliminary tasks:

- Remove glove box with housing



Note:
Similar to graphic.

Release retaining clamps (1).

Push USB interface connecting socket (2) to the front from glove box (3).

Installation note:
Retaining clips (1) must not be damaged.

Make sure USB interface connecting socket (2) is correctly seated.

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61 14 005 Removing and installing/replacing distribution box (front)

Special tools required:

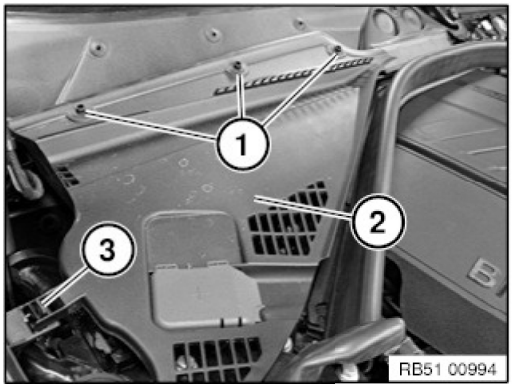
- 00 9 325

Warning!

Observe safety information for handling vehicle battery.

Necessary preliminary tasks:

- Clamp off battery lead from negative connection point

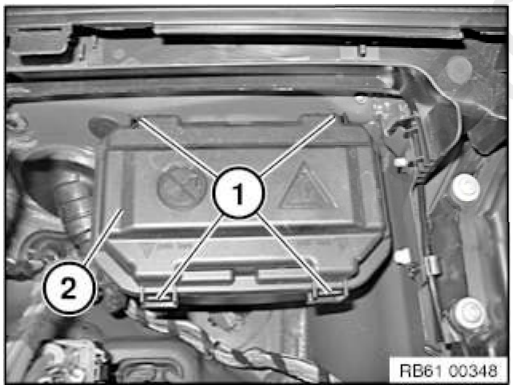


Note:
Work shown on the F20 by way of example, deviations in detail are possible in other models.

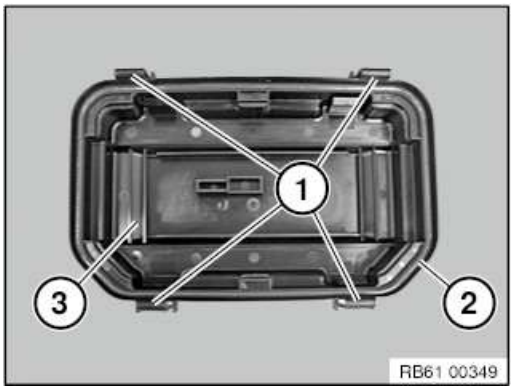
Turn locks (1) 90° counterclockwise.

Unlock catch (3).

Remove cover (2).

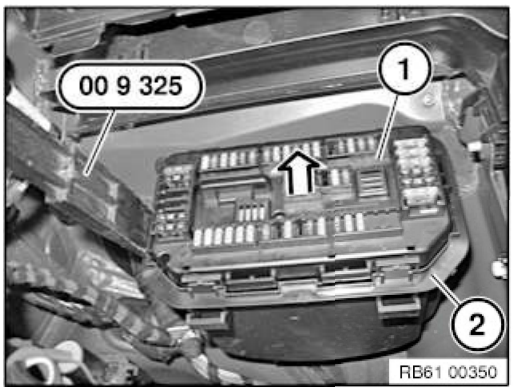


Release latch mechanisms (1) and remove lid (2).*Installation note:*
Make sure cover (2) is correctly locked.

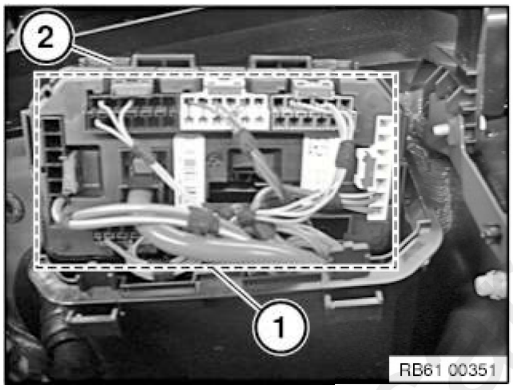


Installation note:
Latch mechanisms (1) and gasket (2) on lid (3) must not be damaged or missing.

Make sure gasket (2) is correctly seated in lid (3).



Release power distribution box (1) with special tool 00 9 325 from lower section (2) and pull power distribution box (1) upward.



Release and disconnect all plug connections in area (1).

Remove power distribution box (2).

Installation note:
Make sure all plug connections are correctly locked.

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61 13 ... Removing and installing/replacing fuse box (right engine compartment)



Operation is described in:

Removing and installing/replacing distribution box (front)

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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.

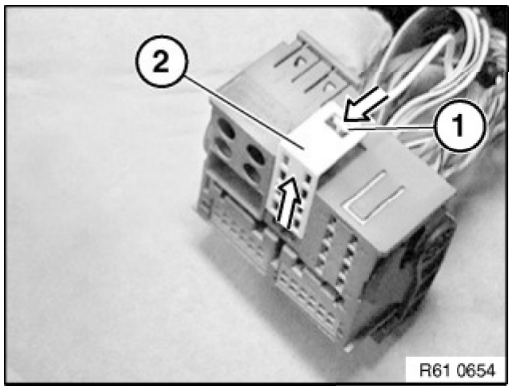
61 13 ... Socket housing (radio connector), Hybrid System MQS/MPQ

Special tools required:

- 61 0 314

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

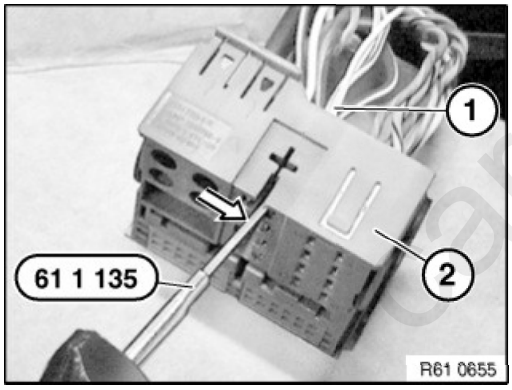
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



Removing MPQ contacts from radio connector:

Press lock (1) in direction of arrow.

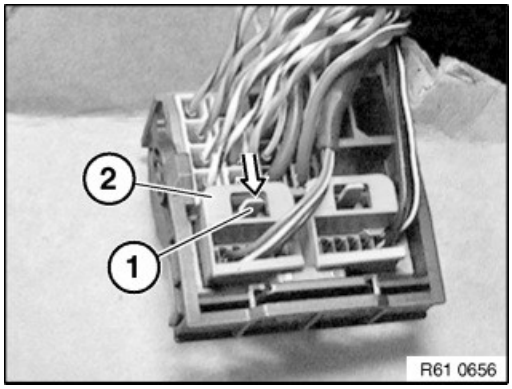
Detach secondary lock (2) from radio plug.



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.

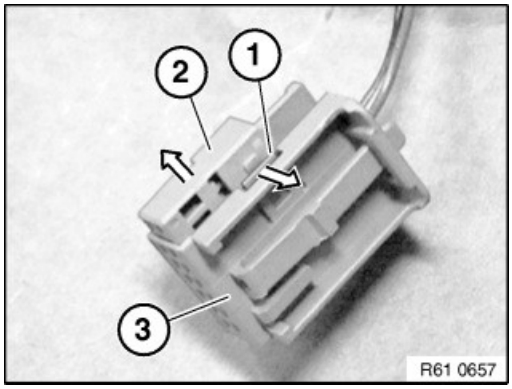
Pull wire (1) with socket contact out of radio connector (2).



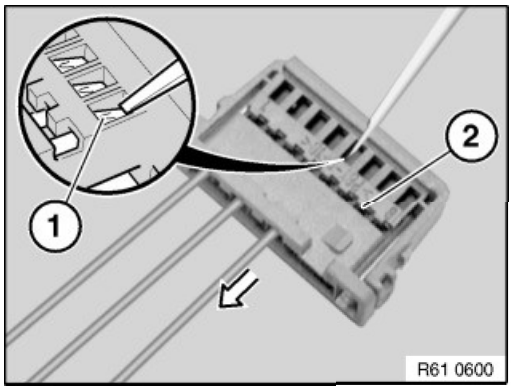
Removing MQS contacts from contact carrier:

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

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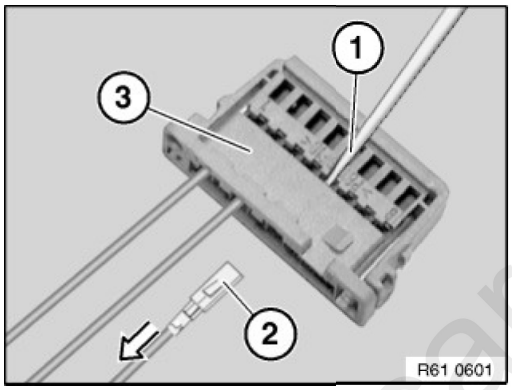
Press lock (1) in direction of arrow. Pull contact carrier (2) out of housing (3).*Note:*
When the contact carrier is pulled out, the secondary locks of the socket contacts are raised.



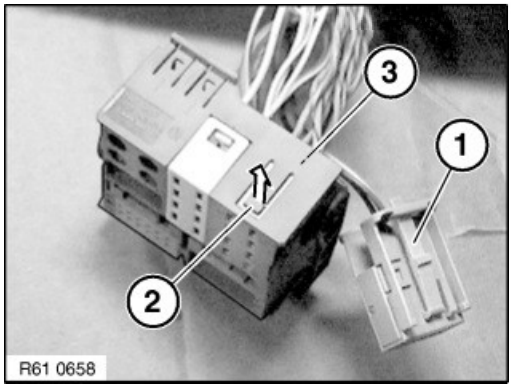
Note:
Schematic diagram shows the 8-pin socket housing by way of example.

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).



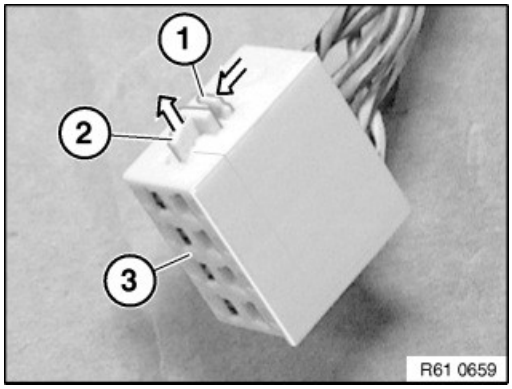
Removing MPQ contacts from contact carrier:

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

Raise lock (2) on radio connector.

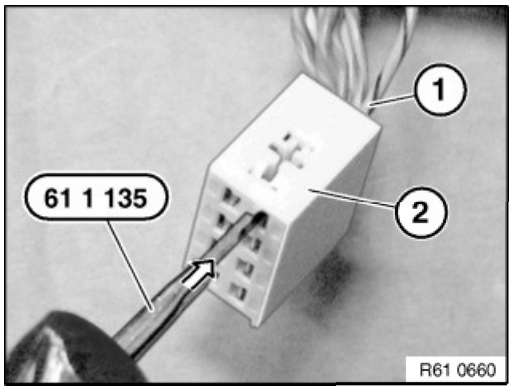
Pull contact carrier (3) out of radio connector.

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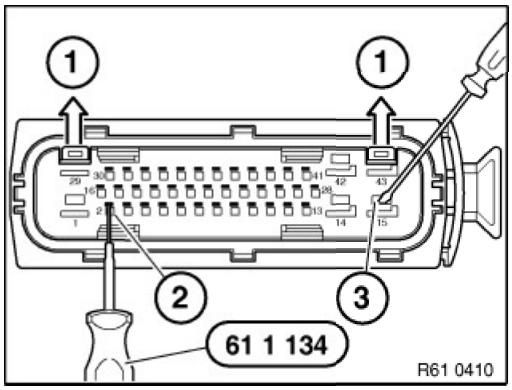
61 13 ... Socket housing 42-, 43-, 46-pin, Hybrid System MQS / MPQ

Special tools required:

- 61 0 312

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

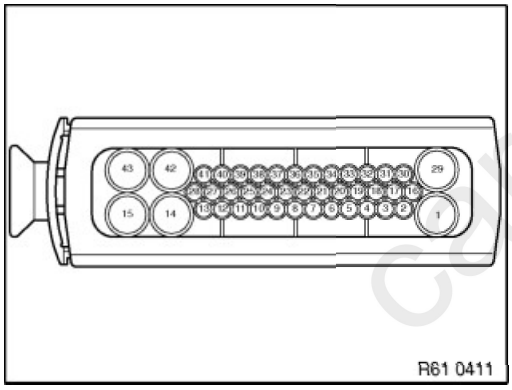
- MQS (Micro Quadlock System)
- MPQ, width 2.8 mm (Micro Power Quadlock)
- MPQ, width 5.2 mm (Micro Power Quadlock)



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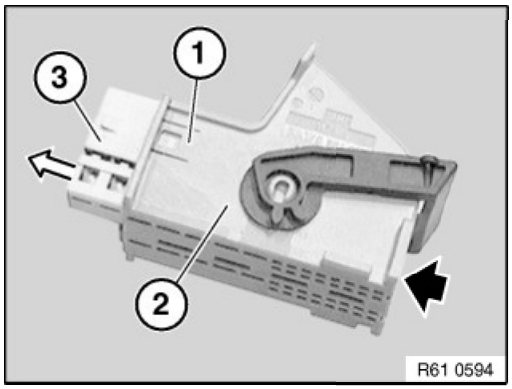
61 13 ... Socket housings, 2x21-, 2x27-pin, Hybrid Systems MQS/MPQ, Elo/Elo Power

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)

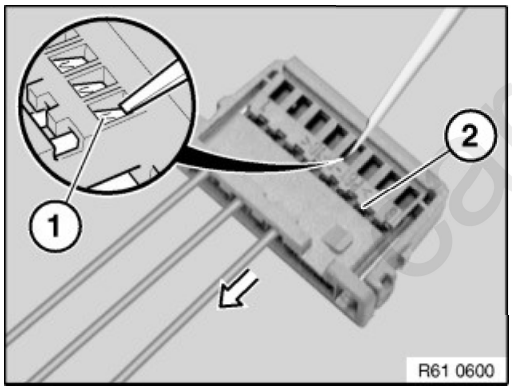


Raise lock (1) on housing (2).

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

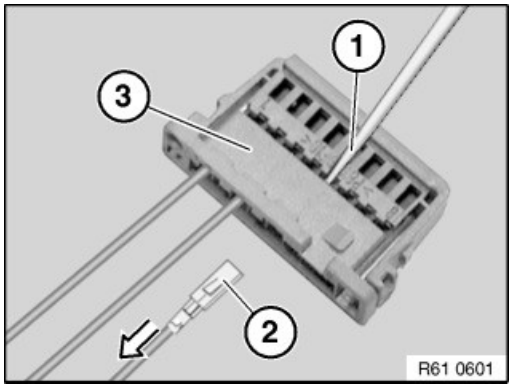
Note:
The second contact carrier is pushed out in the same way.

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).



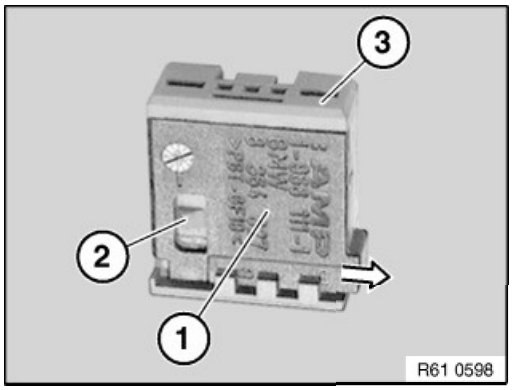
Hold down retaining hook in secondary lock (1) again and pull cable with socket contact (2) completely out of contact carrier (3).

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

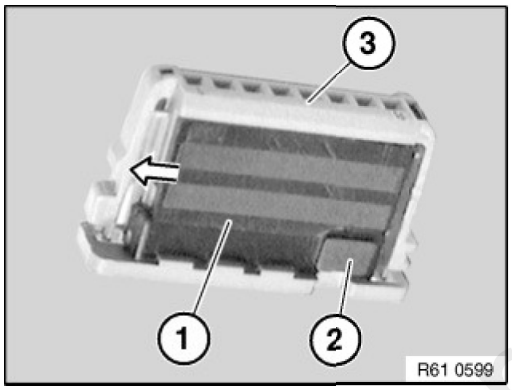
Manufactured by AMP: The following contact types without strand sealing can be fitted in the connector housings:

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



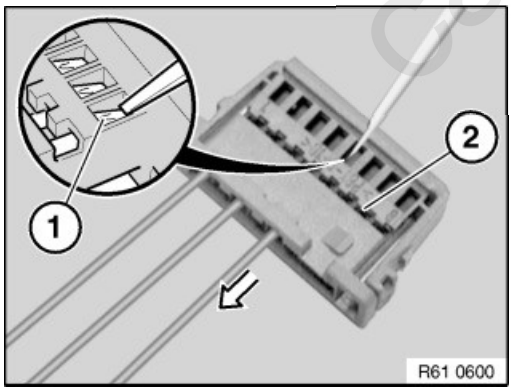
Socket housing, 5-pin (Hybrid System MQS/MPQ)

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



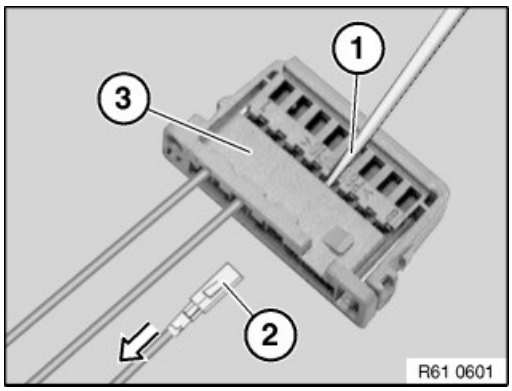
Socket housing, 8-pin (MQS):

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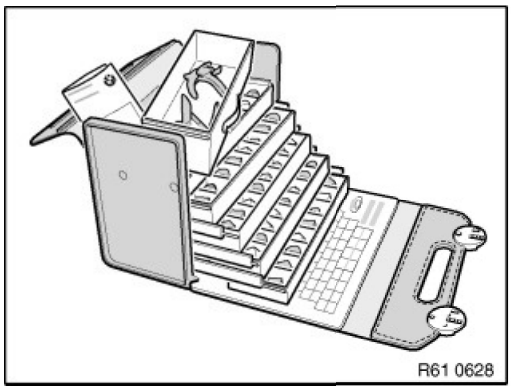
Hold down retaining hook in secondary lock (1) again and pull cable with contact (2) completely out of contact carrier (3).

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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

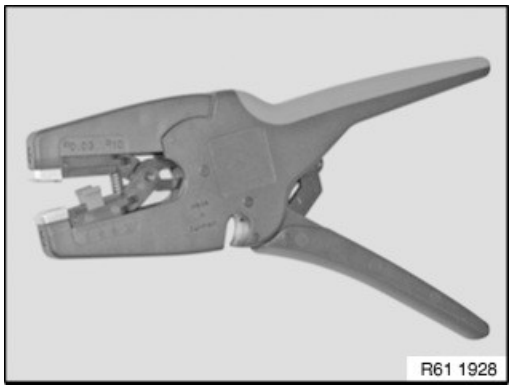


Release and press-out tool:

- 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:

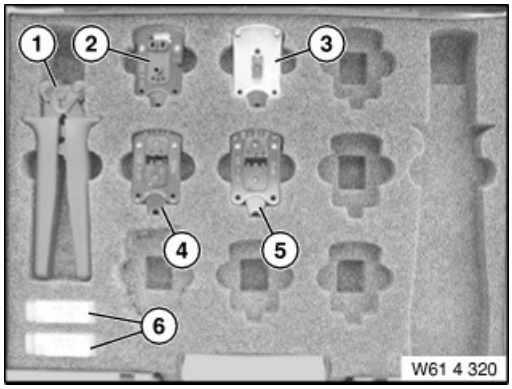
Wire stripper MultiStrip10*

*Sourcing reference BMW Workshop Equipment Catalogue

Handling:

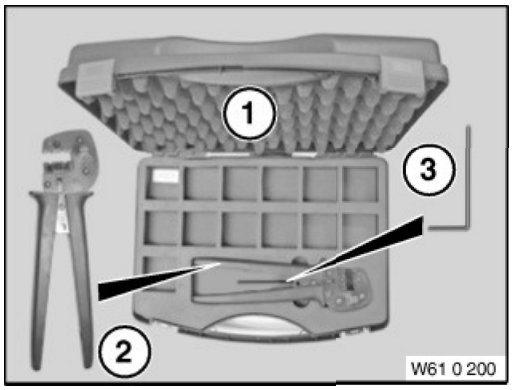
- Cutting cables to length and strip insulation

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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

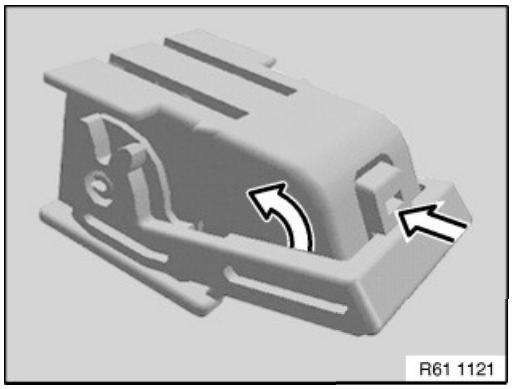
- Special tools for wiring harness repairs
- Cutting cables to length and strip insulation
- Crimping stop parts (contacts)
- Butt connector for repairing a plug connection
- Comb connector for retrofitting/repairs
- Cutting to length and stripping insulation from optical fibres
  Crimping optical fibres

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61 13 ... Unlocking and disconnecting different plug connections

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

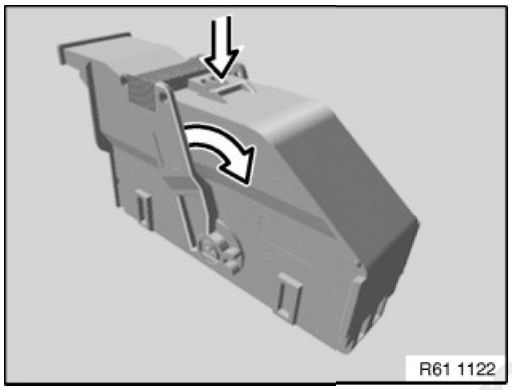
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

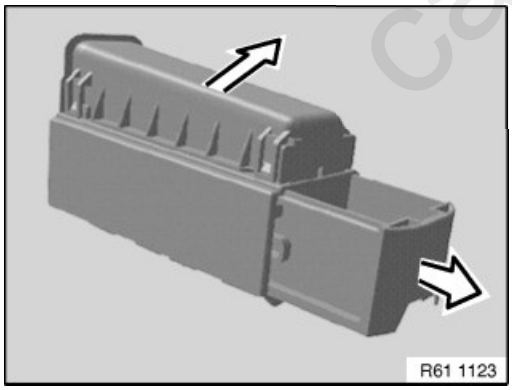
Disconnect plug connection.



2.

Press lock and open release clip in direction of arrow.

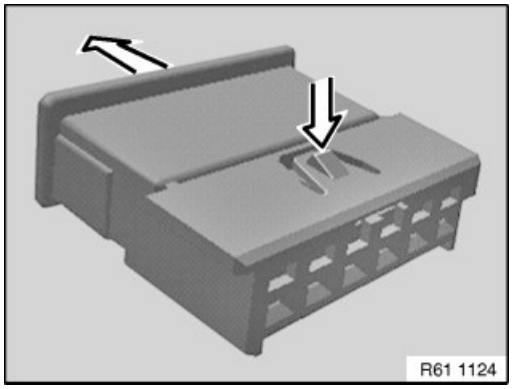
Disconnect plug connection.



3.

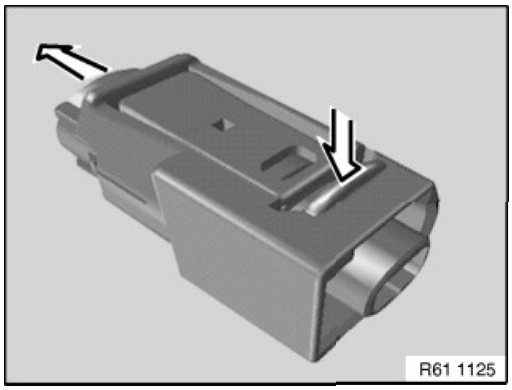
Open release clip in direction of arrow and disconnect plug connection in direction of arrow.

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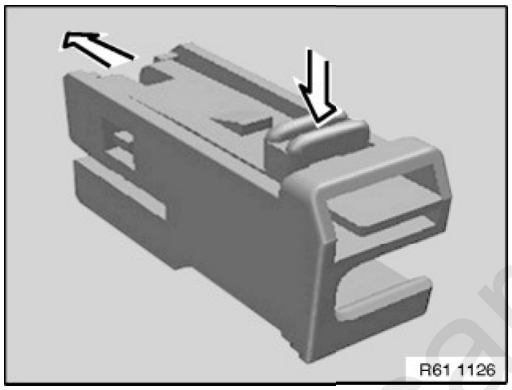
4.

Press lock and disconnect plug connection in direction of arrow.



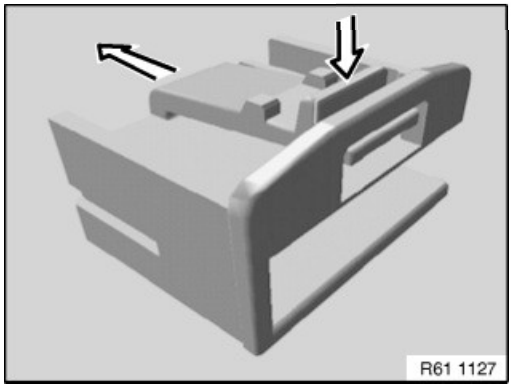
5.

Press lock and disconnect plug connection in direction of arrow.



6.

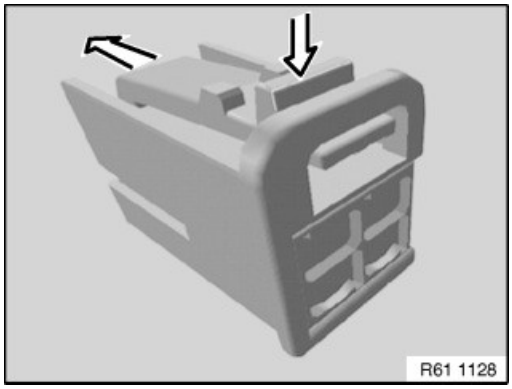
Press lock and disconnect plug connection in direction of arrow.



7.

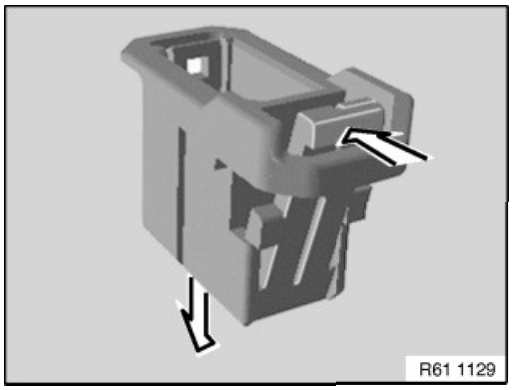
Press lock and disconnect plug connection in direction of arrow.

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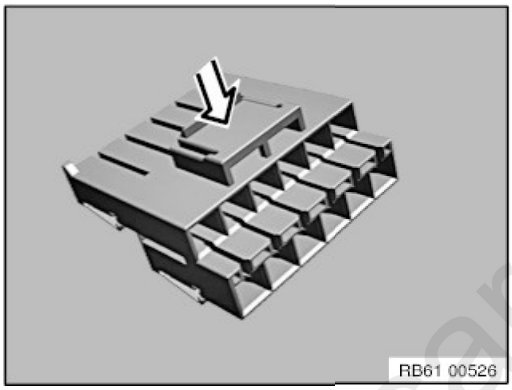
8.

Press lock and disconnect plug connection in direction of arrow.



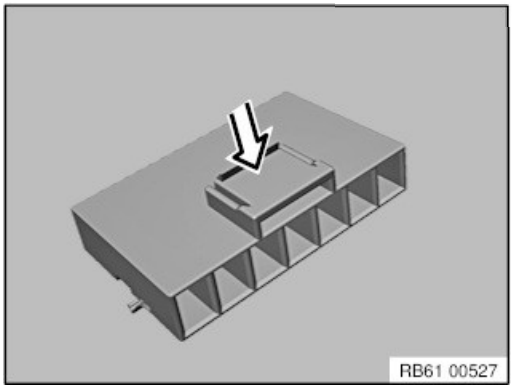
9.

Press lock and disconnect plug connection in direction of arrow.



10.

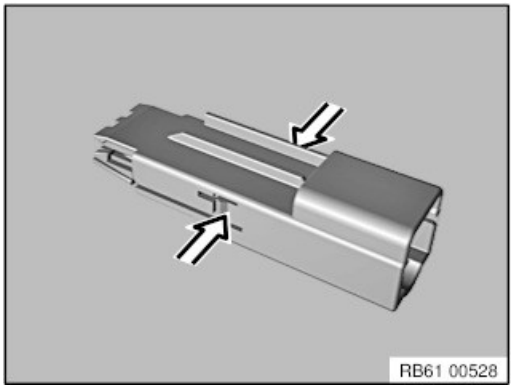
Press the lock and detach plug connection.



11.

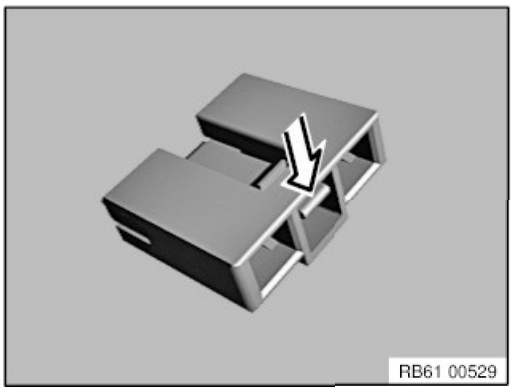
Press the lock and detach plug connection.

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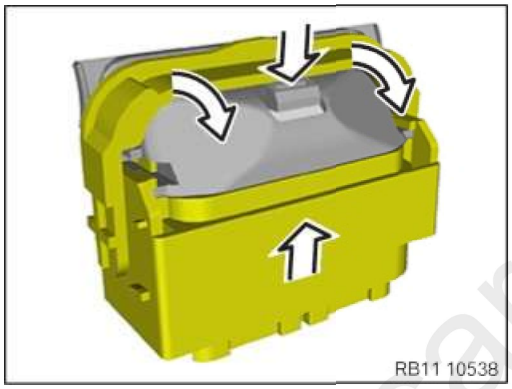
12.

Press the lock on both sides and detach plug connection.



13.

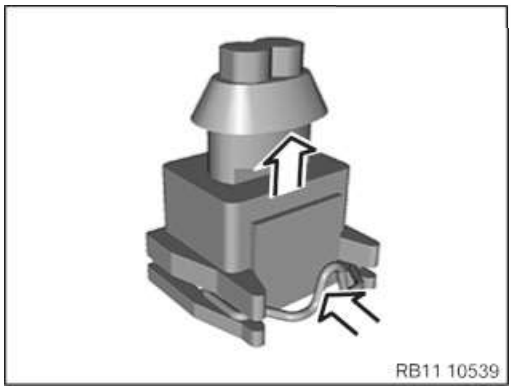
Press the lock and detach plug connection.



14.

Press lock and open release clip in direction of arrow.

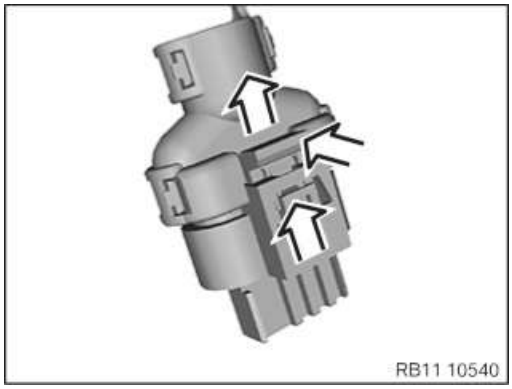
Disconnect plug connection.



15.

Press the lock and detach plug connection.

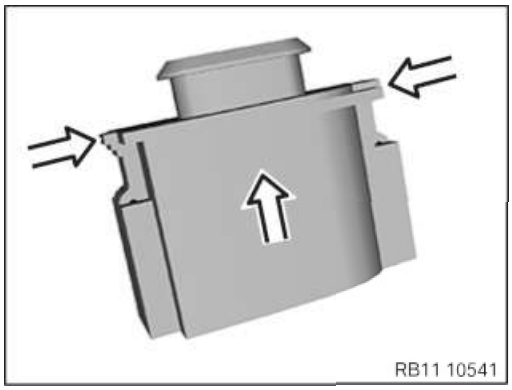
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16.

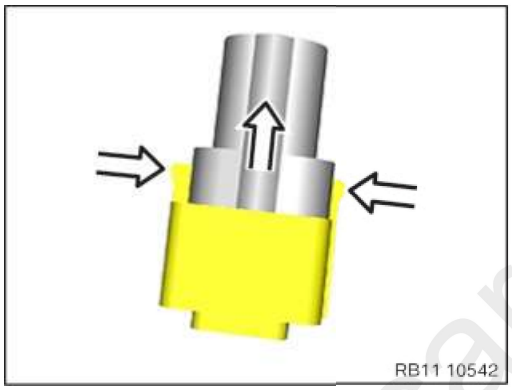
Pull out lock and press.

Disconnect plug connection.



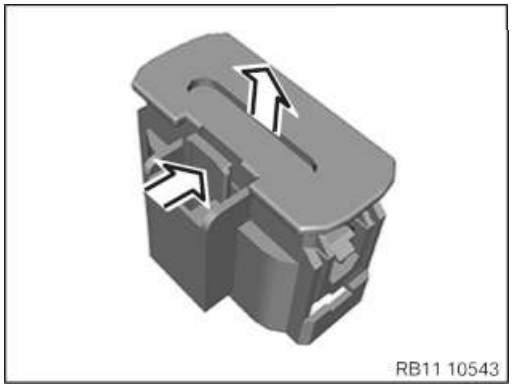
17.

Press the lock and detach plug connection.



18.

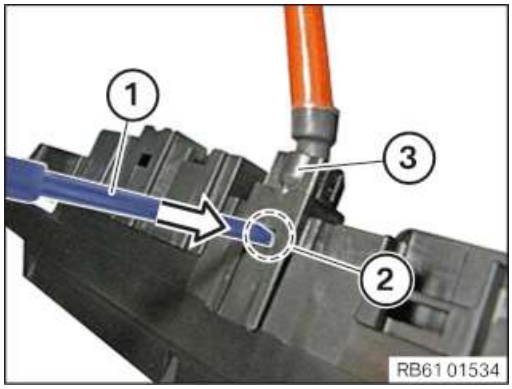
Press the lock and detach plug connection.



19.

Press the lock and detach plug connection.

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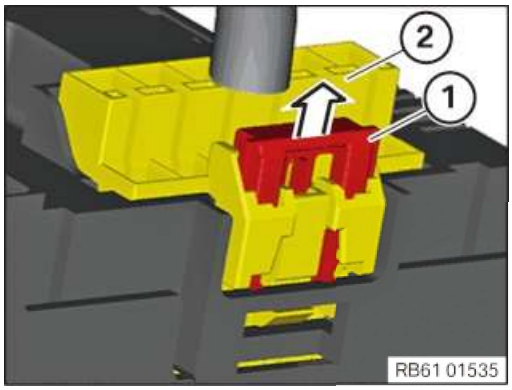


20.

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!

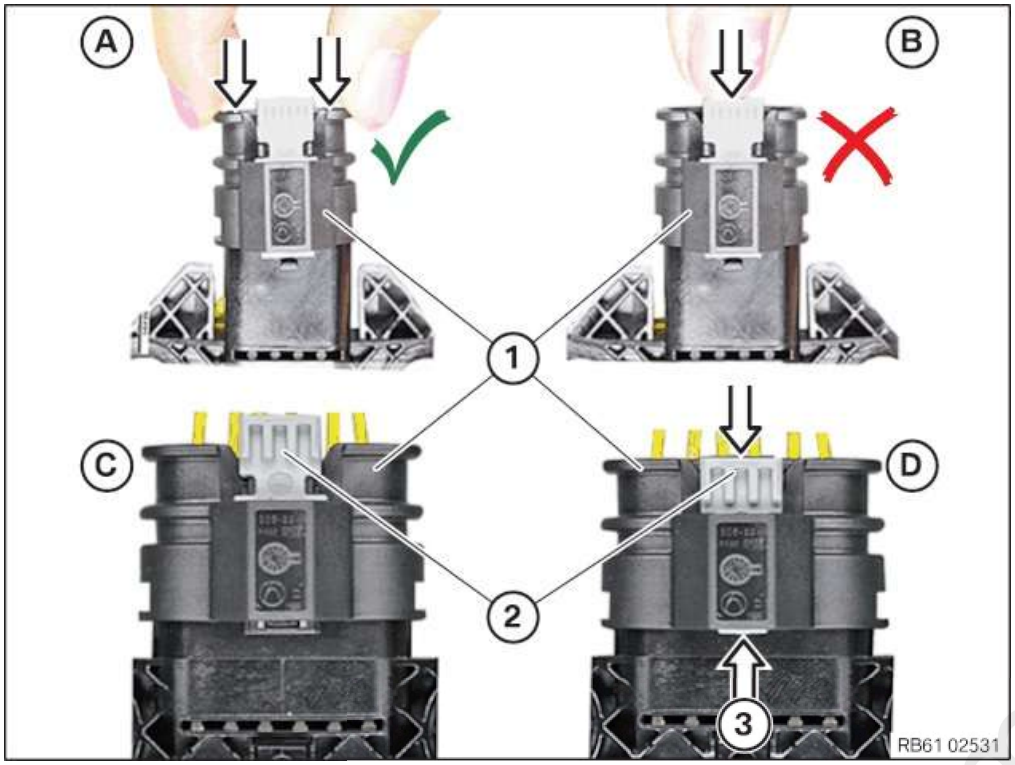
For this connector type, increased forces come into play when disconnecting and closing.

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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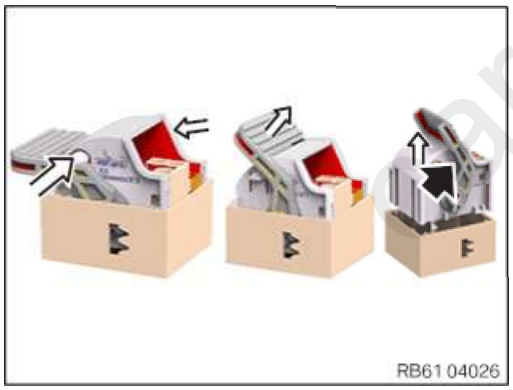


23.

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:

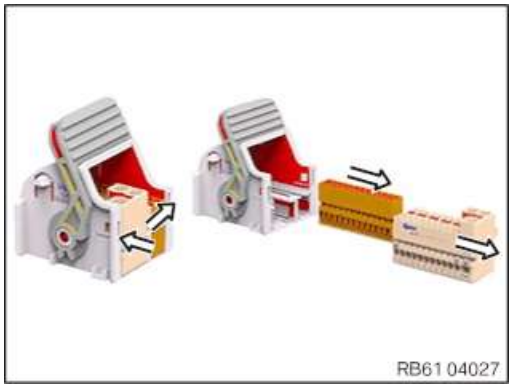


24.

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.

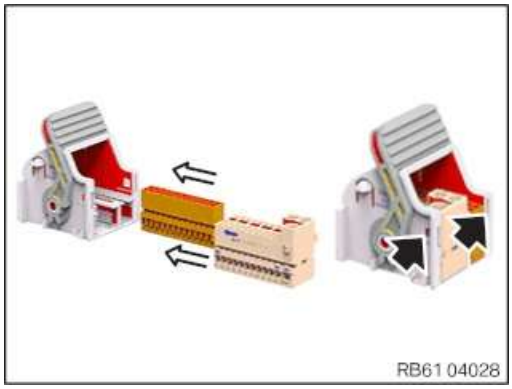
Once the lever is locked in the end position, remove plug connection upwards.



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

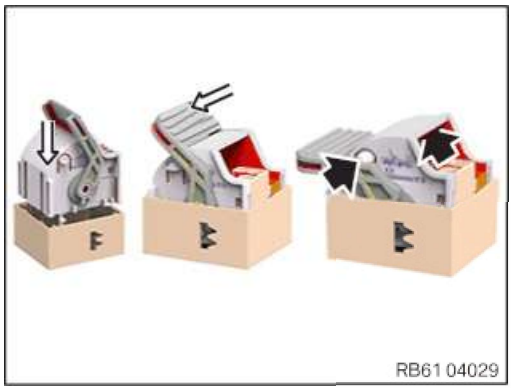
Slide out after unlocking the socket housing.

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Slide in socket housing up to limit position.

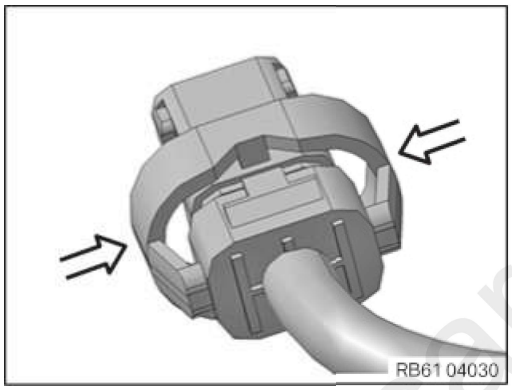
Lock socket housing into place in end position.



Sliding in up to limit position.

Activate plug-inn procedure by moving lever downwards.

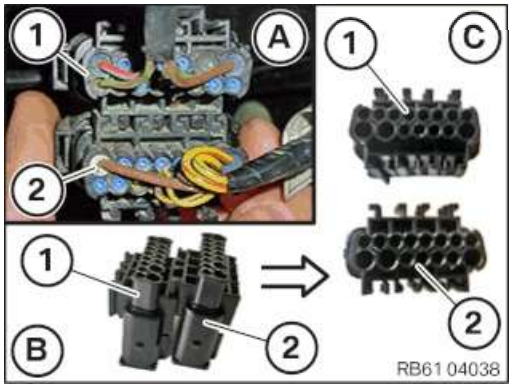
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.



25.

Rosenberger D4S20G-400A5-Y

Press to unlock on both sides.

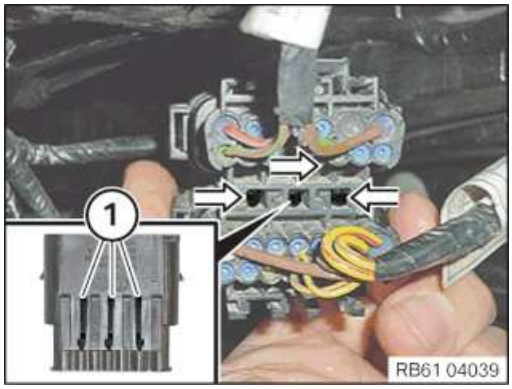


26.

Pin housing, 15-pinMLK1

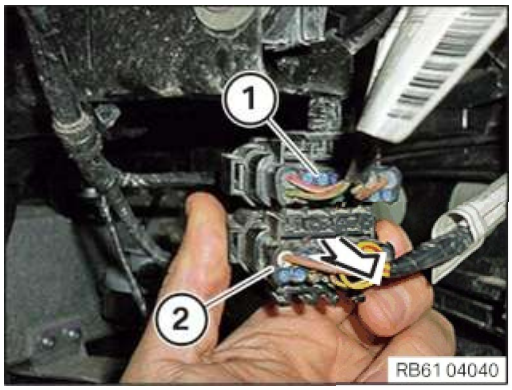
- A & B. To avoid any damage to individual connectors, the given connector assembly consisting of several individual connectors (1) & (2) must be released before disconnecting the plug connection.
- C: released connector assembly

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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).

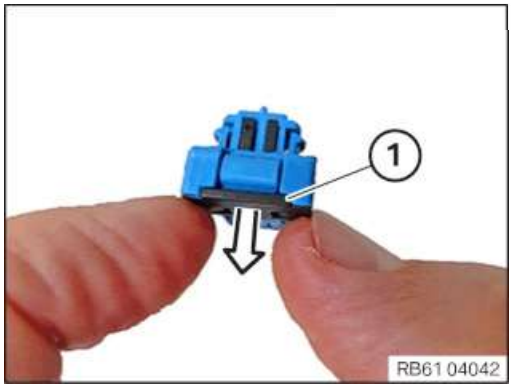


27.

Airbag ignition circuit connector

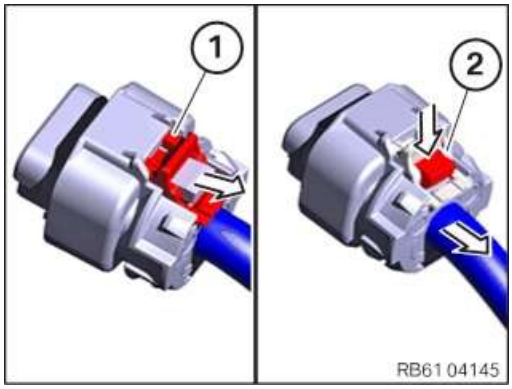
Warning!

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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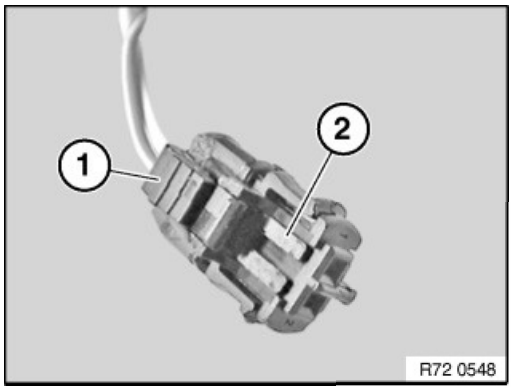


28.

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).

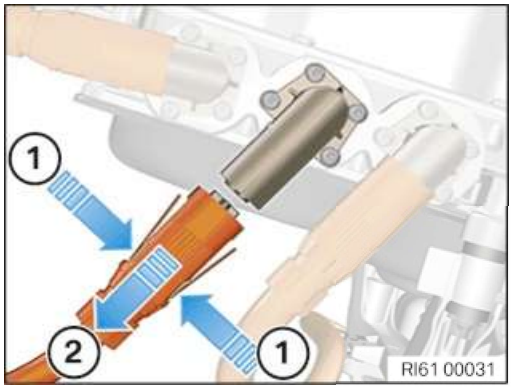
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61 13 ... Unlocking and disconnecting various plug connections in electrical and hybrid vehicles

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:

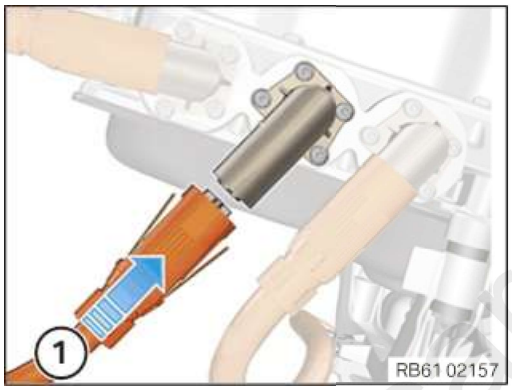
Press the lock (1) on the left and right on the connector in the direction of the arrow.

Pull off connector (2) in direction of arrow.

Attention!

Connector (2) is difficult to pull off.

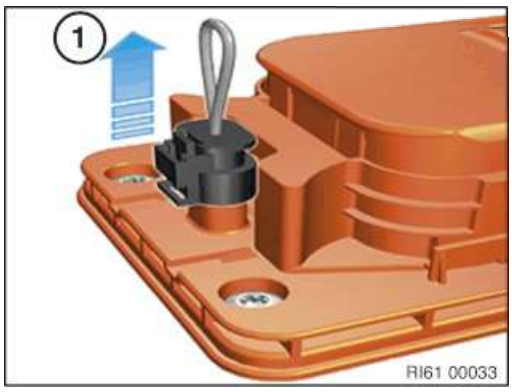
In the event of damage to high-voltage connector (2), the complete high-voltage cable must be replaced!



Connect the Hirschmann high-voltage connectors:

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

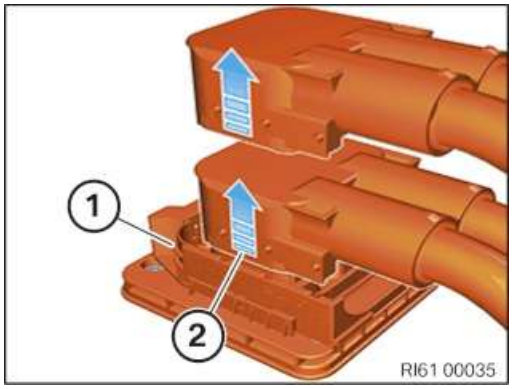
Note:
Connector (2) must lock audibly.



Disconnect the Kostal high-voltage connector:

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

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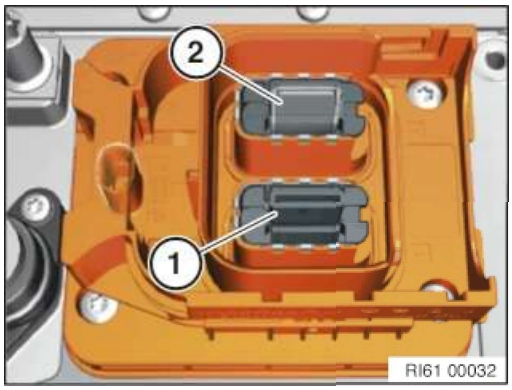
Push the lock (1) fully to the front.

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:

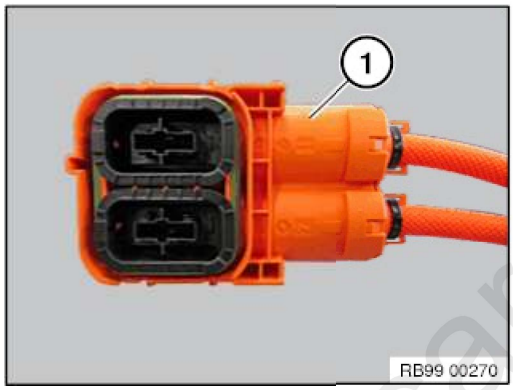
Check the touch protection for damage and correct positioning (1).

Warning!

Do not touch unprotected connector (2)!

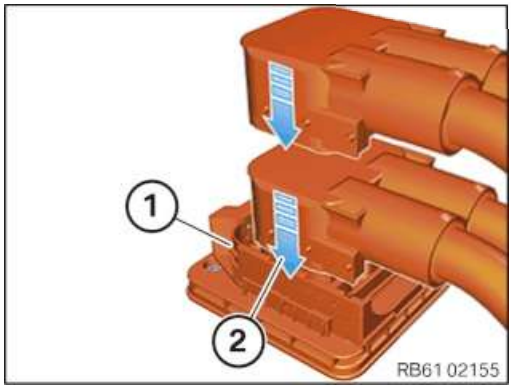
If the contact protection (1) has been pushed to the bottom (2), the high-voltage connector must be refitted.

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:

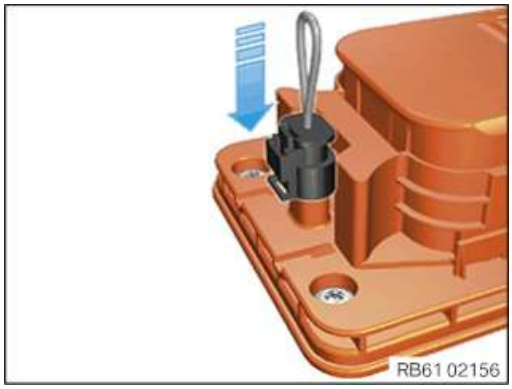
Connect the connector (2) in one single movement to the counter-housing.

Push the lock (1) fully to the rear.

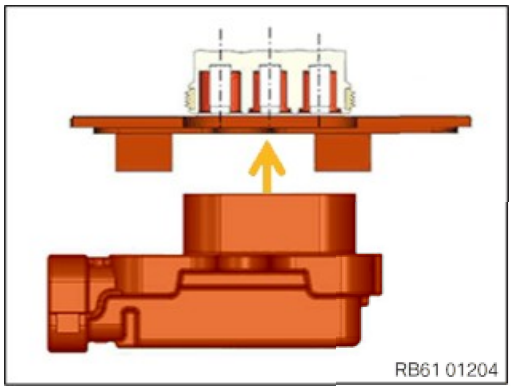
Attention!

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

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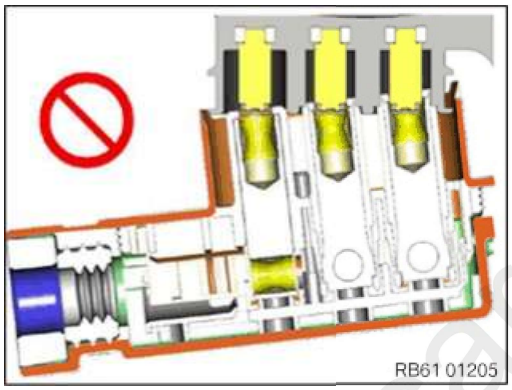


Connect the connector for the high-voltage interlock.



Three-phase high-voltage connector:

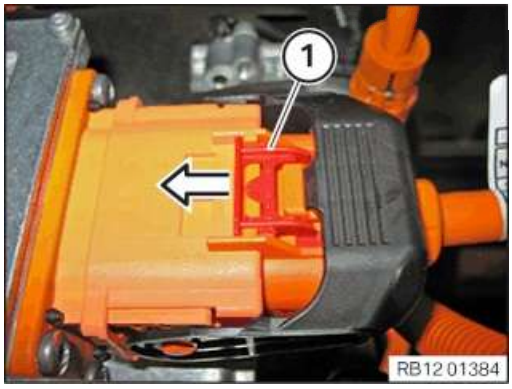
Connect and disconnect the connector straight.



Attention!

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

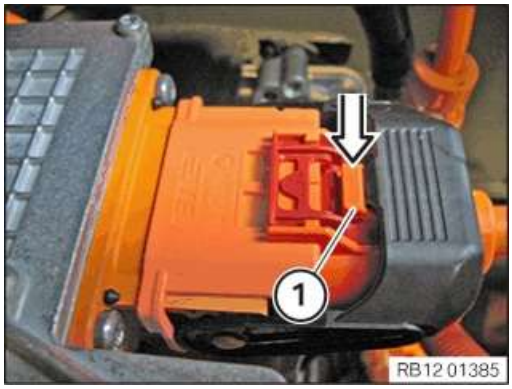
Increased tilted connections will increase the connecting force and the risk of danger.



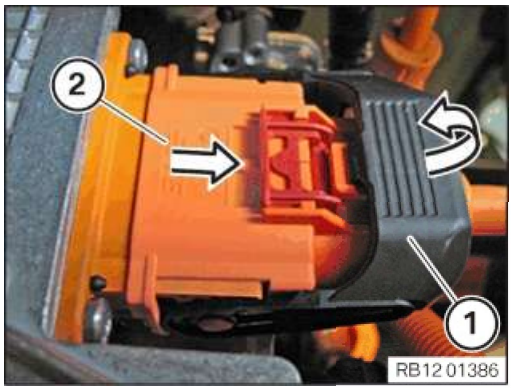
Disconnect the high-voltage connector from the high-voltage connection of the KLE:

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

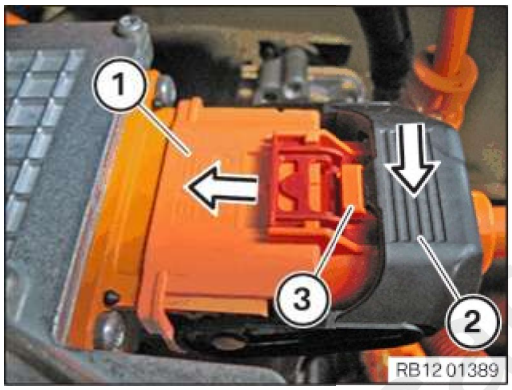
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Press lock (1).



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



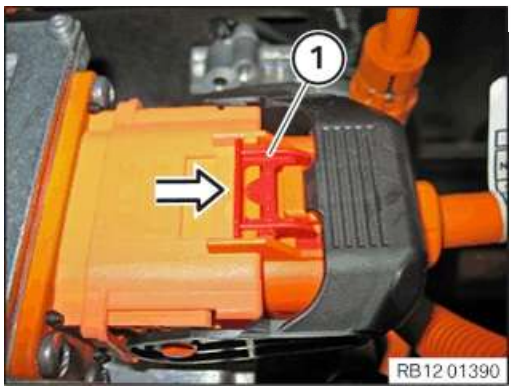
Connect the high-voltage connector to the high-voltage connection of the KLE:

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

Attention!

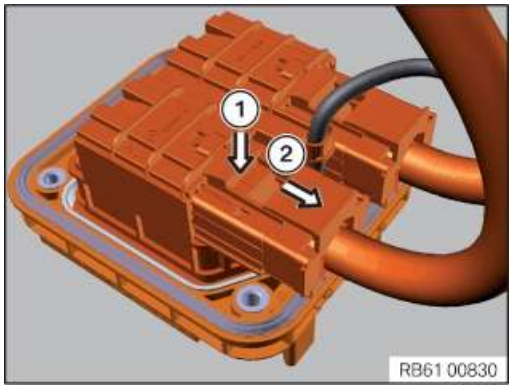
Lock (2) must snap audibly into place.

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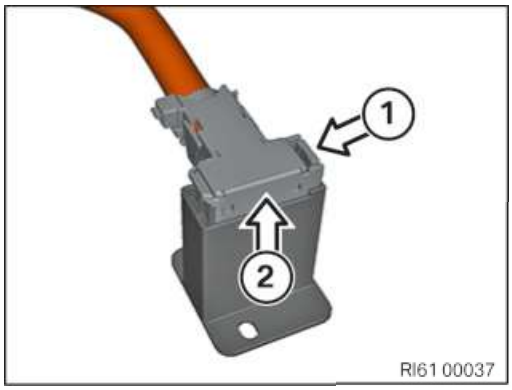
High-voltage connector on the high-voltage connection of the high-voltage battery unit:

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.



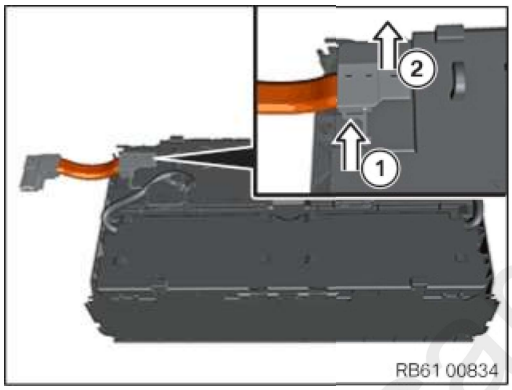
High-voltage connector on the cell module I01:

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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