

**Special tools required:**

- 0 494 159
- 0 496 849
- 0 496 833
- 2 407 379
- 61 4 320
- 61 4 340
- 61 4 328
- 61 0 210
- 61 0 220
- 61 0 230



New parts for vehicle electrical system (stops, housing):

- Sourcing reference: BMW Group Parts



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

Stripped length:

Wire cross-section (mm ²)	Stripped length (mm)
0,35 ... 0,50	4,0
0,75 ... 1,00	4,5
1,00 ... 2,50	5,0

**Crimping on NanoMQS stop parts**

Crimping of NanoMQS contacts (MQS).

- Special tool handle 0 494 159 or 0 496 849
- Special tool (die-plate) 0 496 833
- Stripping tool 2 407 379



2. Crimping of stops up to 2.5 mm

Crimping Micro Quadlock System contacts (MQS).

- Special tool 61 4 320

Crimping Micro Power Quadlock contacts (MPQ).

- Special tool 61 4 320

Crimping miscellaneous stop parts up to 2.5 mm²

- Special tool 61 4 340 (up to 03/2010 special tool 61 4 328)
- Refer to Service Information bulletin



Crimping of stops above 2.5 mm²

Crimping load current contacts (LSK 8).

- Special tool 61 0 210

Crimping load current contact 2.8.

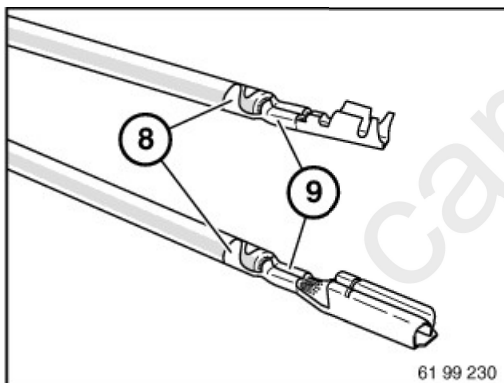
- Special tool 61 0 220

Refer to Service Information SI 2 02 05 194

Crimping double spring contact (DFK 40)

Crimping MAK 8

- Special tool 61 0 230
- Refer to Service Information bulletin

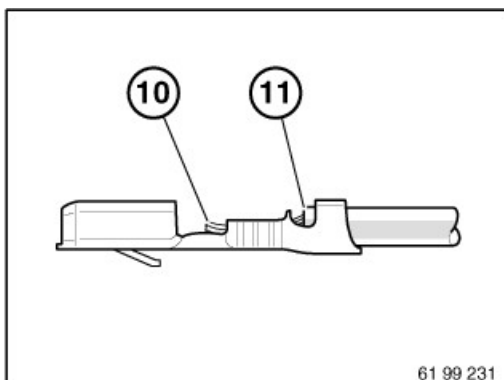


Checking crimping

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

Note:

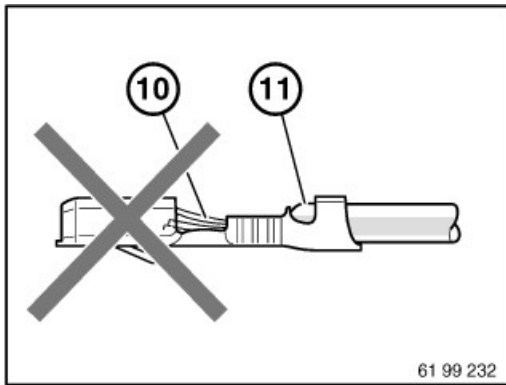
Illustration shows butt connectors and contact sleeves for comb connectors knocked on one side. The crimping procedure is identical here.



Correct crimping:

Visible conductor end (10).

Visible insulation end (11).

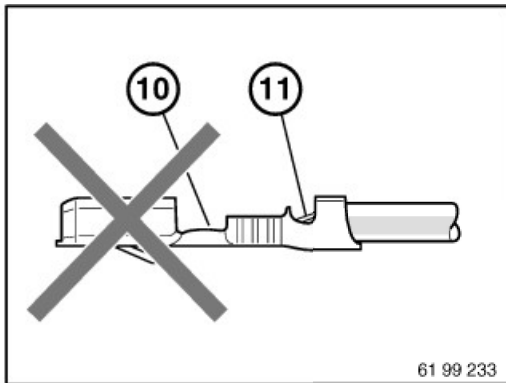


Incorrect crimping:

Conductor end (10) inserted too far.

Insulation end (11) in wire crimp.

If necessary, repeat crimping with a new contact.



Incorrect crimping:

Conductor end (10) not visible.

Insulation end (11) not visible.

If necessary, repeat crimping with a new contact.

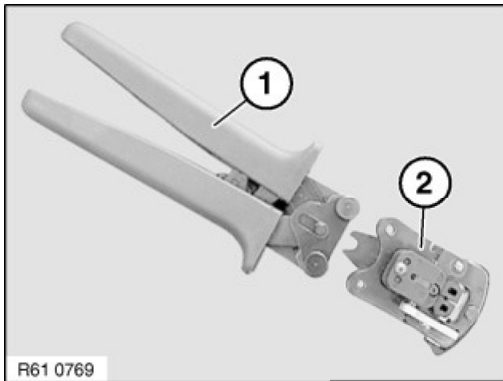
cardiagn.com

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

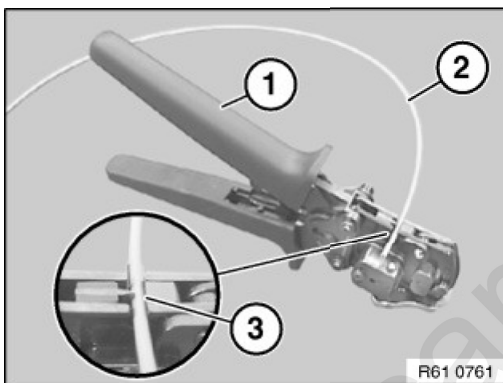


Special tools required:

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



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

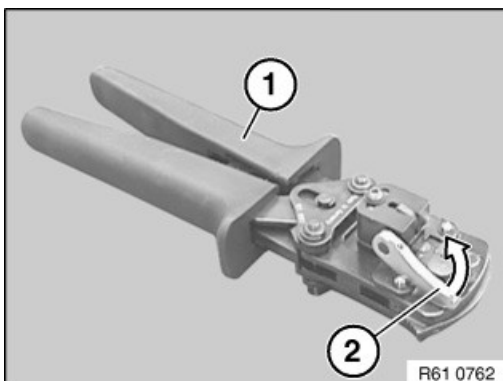


Cutting optical fibre

Open hand pliers (1).

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

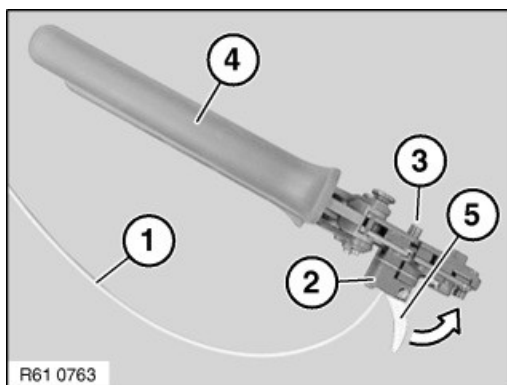
Close pliers (1) and remove optical fibre (2).



Stripping insulation from optical fibre

Open hand pliers (1).

Open lever (2) in direction of arrow.



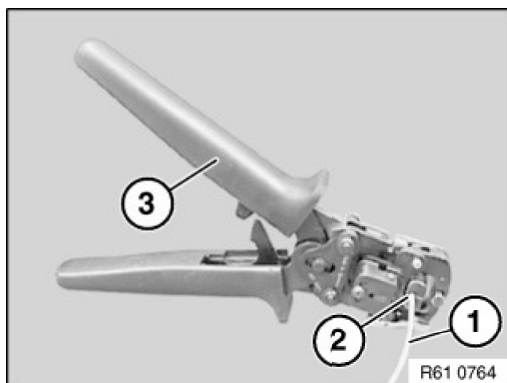
Push the optical fibre (1) into the strip insulation equipment (2) until it is flush in this area (3).

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).



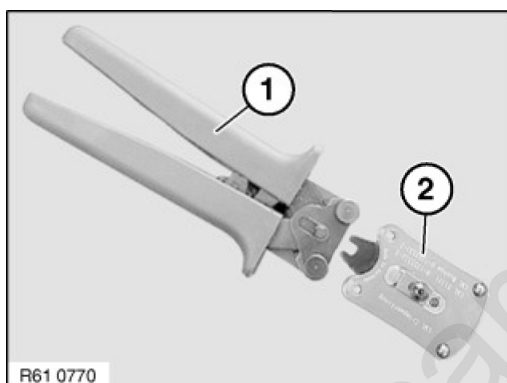
Cutting optical fibre to length

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).

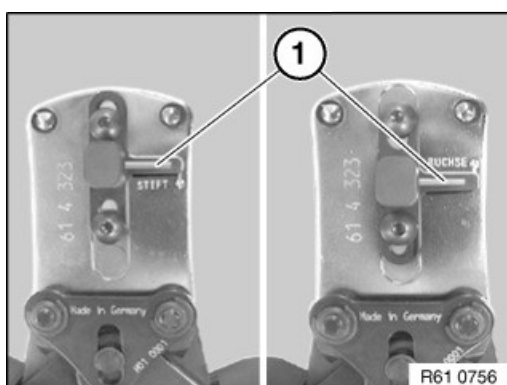


Crimp optical fibre

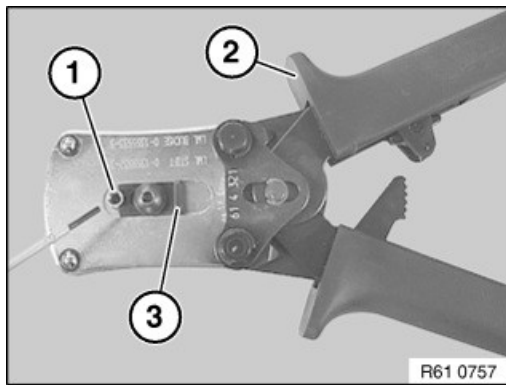
The hand pliers 61 4 321 (1) in connection with the crimping head 61 4 323 (2) from crimping kit 61 4 320 are used for crimping the optical fibres to size.

Note:

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

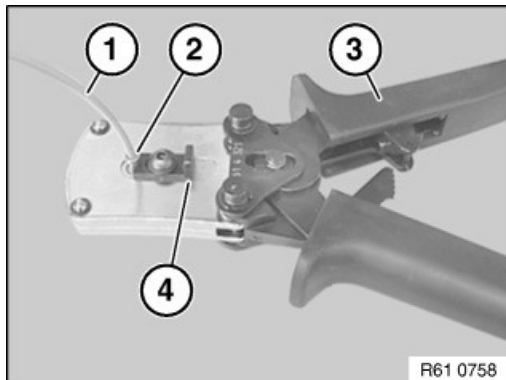


Move contact guide by means of stop lever (1) into corresponding position (pin contact or jack).



Open hand pliers (2).

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

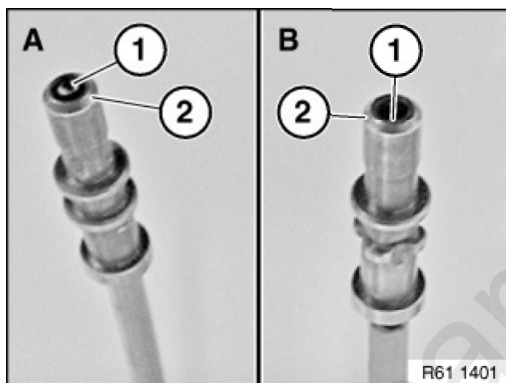


Insert stripped optical fibre (1) until limit position into pin contact or jack (2).

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).

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!**

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



WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

2 – Removing the safety battery terminal



WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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



RISK OF DAMAGE

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

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

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



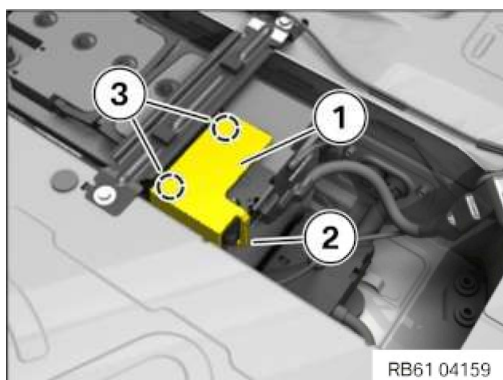
RISK OF DAMAGE



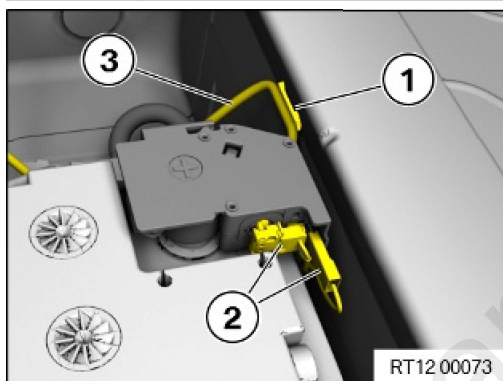
Electrostatic discharge.

Damage to or destruction of electrical components.

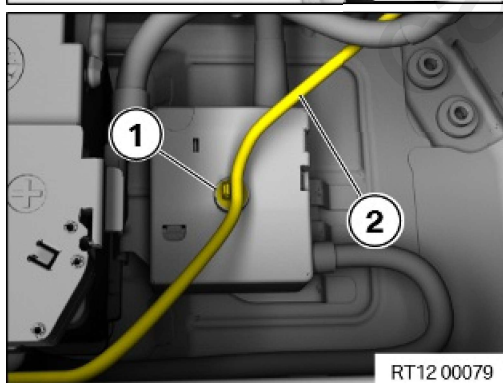
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the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



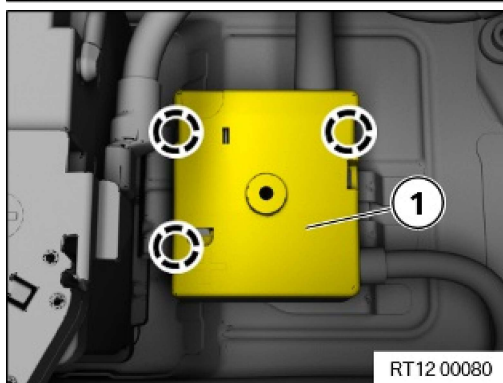
- Release latch mechanism (2) of the protective cap (1).
- Feed out protective cap (1) to the top and remove it from the guides (3).



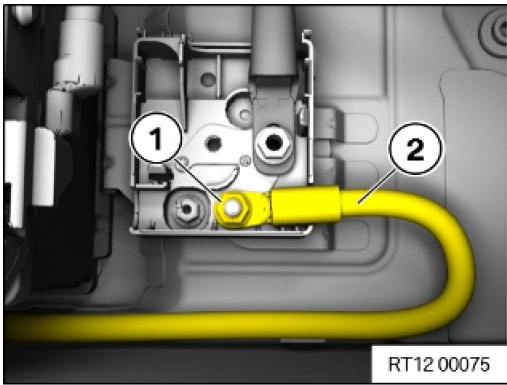
- Loosen the holder (1).
- Unlock and disconnect plug connections (2).
- Put the cable (3) to one side.



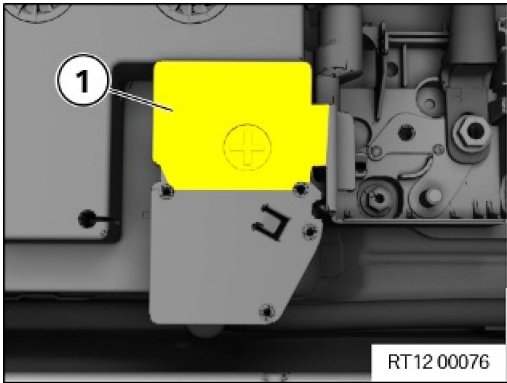
- Loosen the holder (1).
- Put the cable (2) to one side.



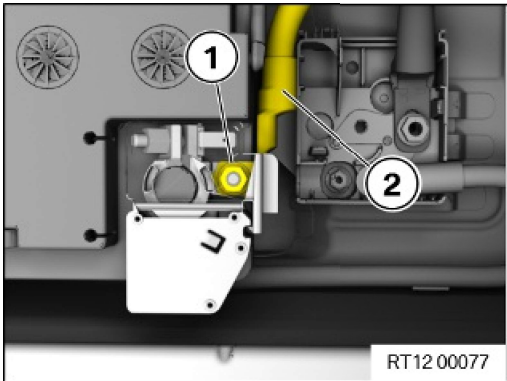
- Unclip the cover (1) in the marked areas.
- Release and remove the cover (1).



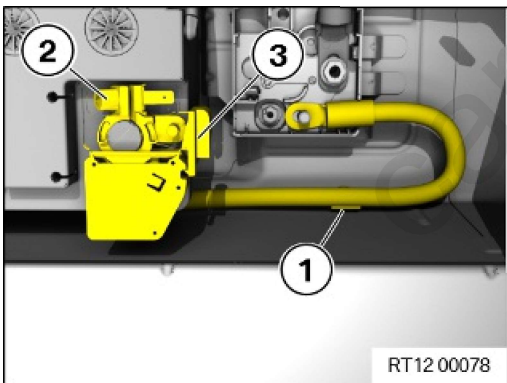
- Unfasten nut (1).
- Remove positive battery cable (2).



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

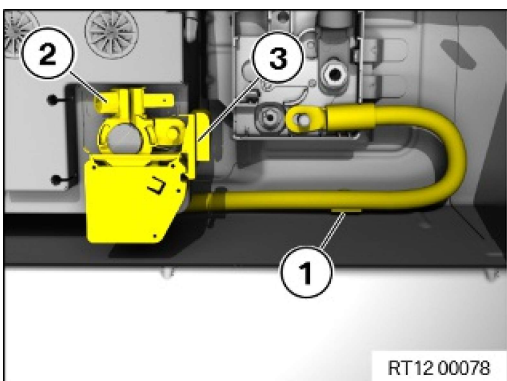


- Release the nut (1) and put the positive battery cable (2) aside.



- Open the holder (1).
- Release nut (2) and remove the safety battery terminal (3).

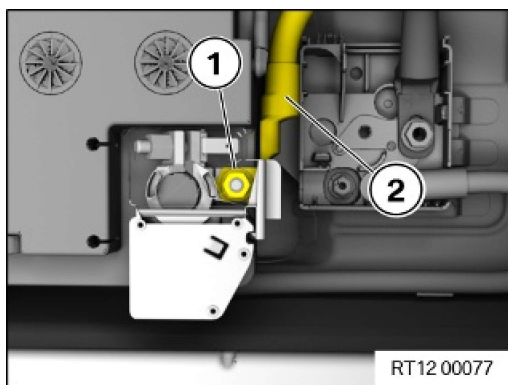
3 – Installing the safety battery terminal



- Position the safety battery terminal (3) on the positive battery terminal.
- Close the holder (1).
- Tighten nut (2).

Positive battery terminal

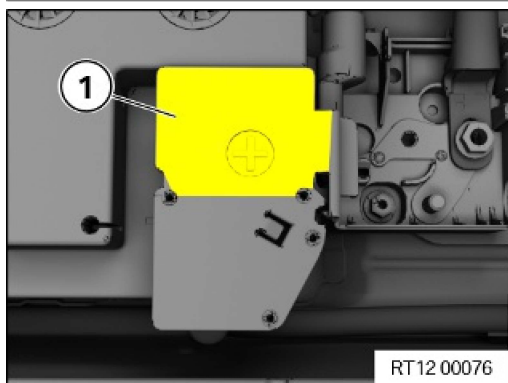
Nut		Tightening torque	5 Nm
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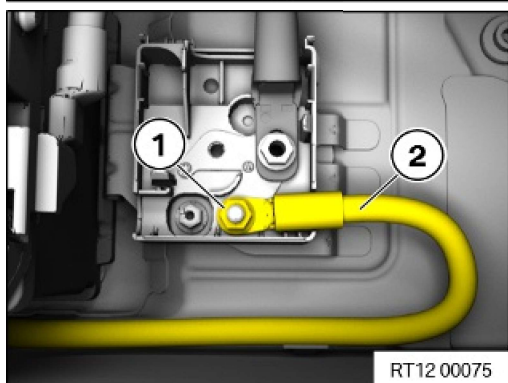
- Position the positive battery cable (2) on the safety battery terminal.
- Tighten nut (1).

Positive battery cable to safety battery terminal

Flange nutM8		Tightening torque	15 Nm
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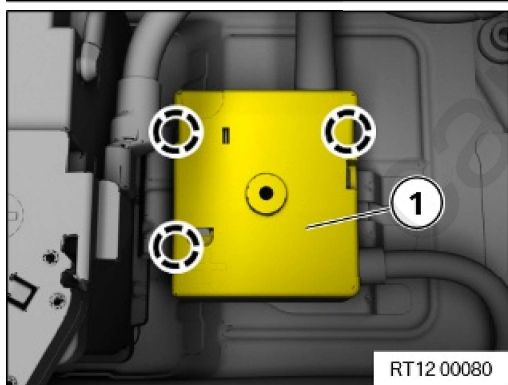
- Close the positive terminal cover (1).



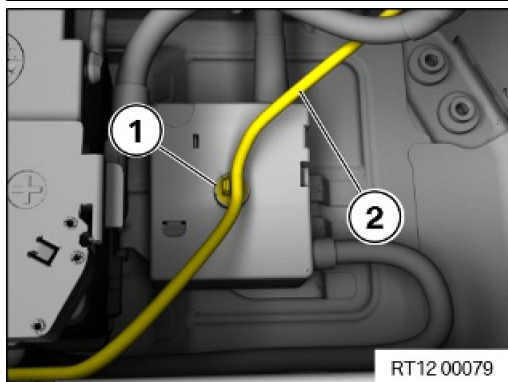
- Position the positive battery cable (2) on the power distribution box.
- Tighten nut (1).

Positive battery cable to power distribution box

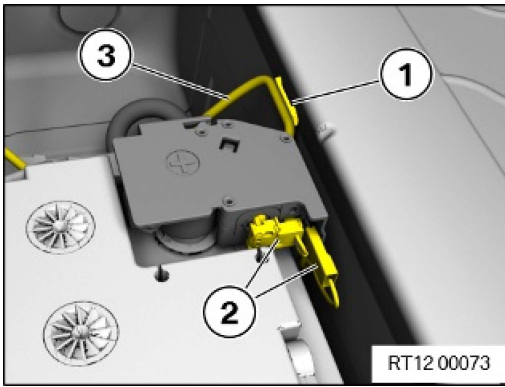
Flange nutM8		Tightening torque	15 Nm
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- Position the cover (1) and clip it in at the marked areas.



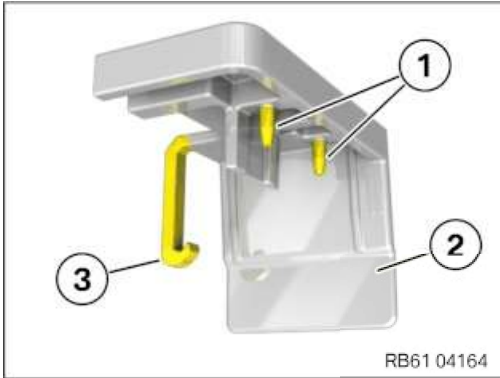
- Position cable (2).
- Clip in the holder (1).



- Position the cable (3) and clip in the holder (1).
- Connect connectors (2) and lock.

Check

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

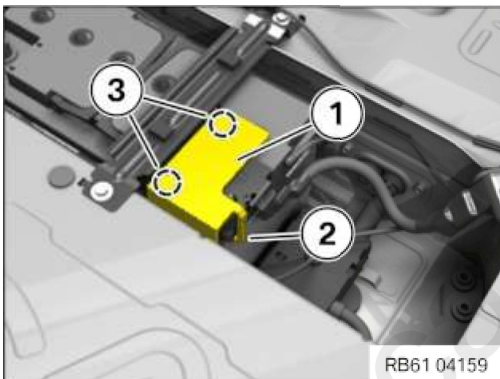


Result

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

Measure

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



POSTPROCESSES

4 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Overview of Tightening Torques

Positive battery terminal

Used in step 3

Nut		Tightening torque	5 Nm
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Positive battery cable to safety battery terminal

Used in step 3

Flange nutM8		Tightening torque	15 Nm
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Positive battery cable to power distribution box

Used in step 3

Flange nutM8		Tightening torque	15 Nm
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Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 35 ... Notes on ESD protection (Electro Static Discharge)	2

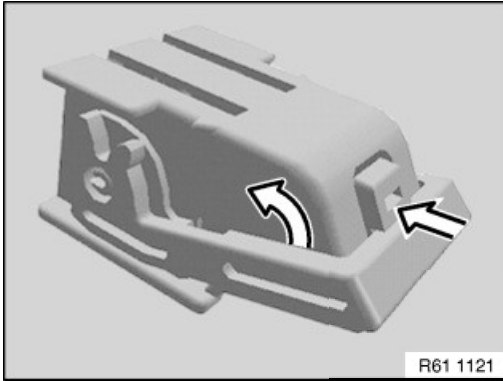
61 13 ... Unlocking and disconnecting different plug connections



Note:

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

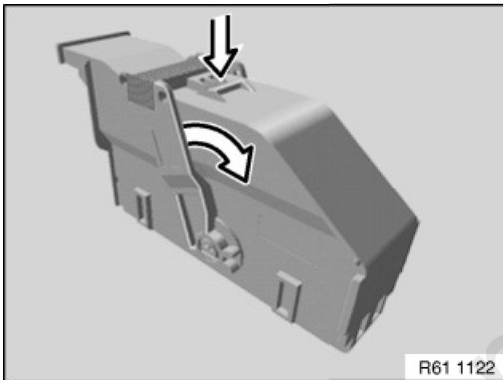
Differences in the details of the size and shape of the plug connections are possible.



1.

Press lock and open release clip in direction of arrow.

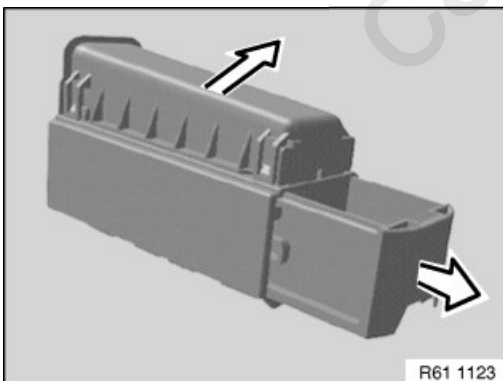
Disconnect plug connection.



2.

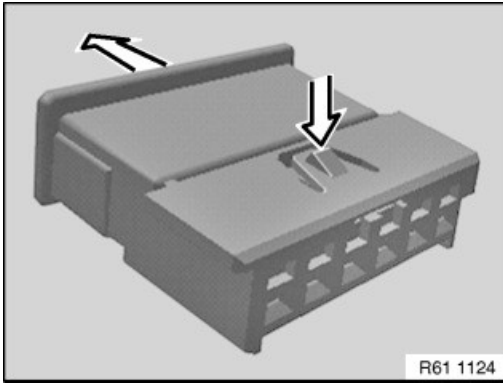
Press lock and open release clip in direction of arrow.

Disconnect plug connection.



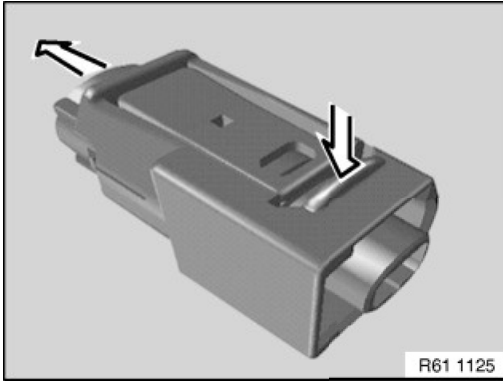
3.

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



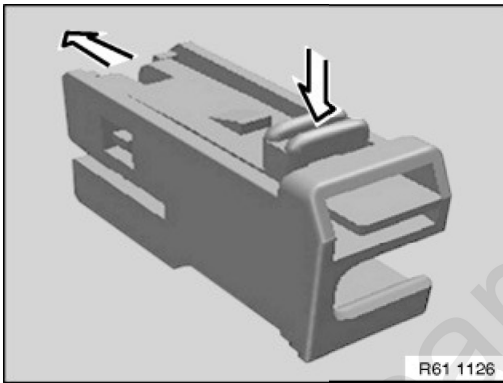
4.

Press lock and disconnect plug connection in direction of arrow.



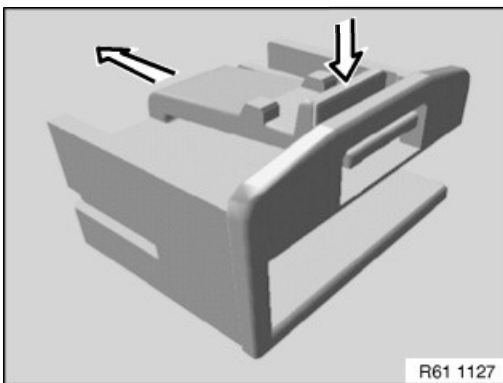
5.

Press lock and disconnect plug connection in direction of arrow.



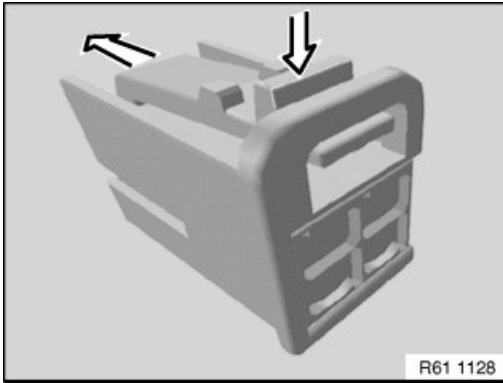
6.

Press lock and disconnect plug connection in direction of arrow.



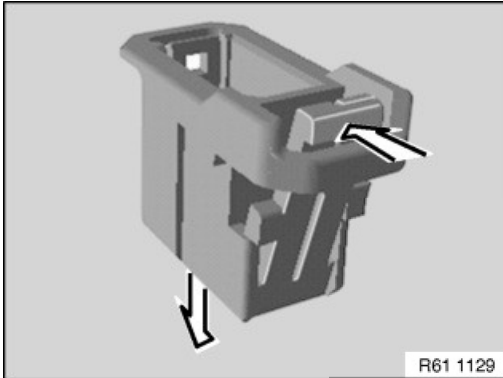
7.

Press lock and disconnect plug connection in direction of arrow.



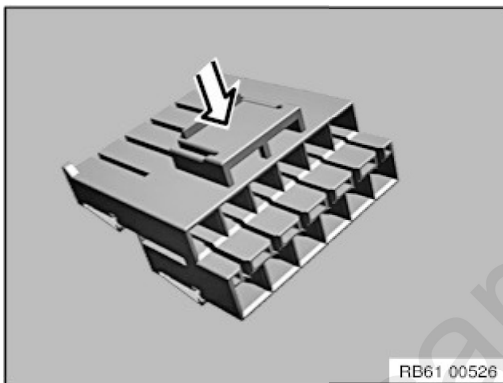
8.

Press lock and disconnect plug connection in direction of arrow.



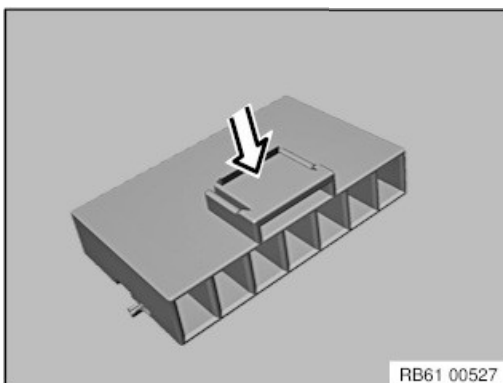
9.

Press lock and disconnect plug connection in direction of arrow.



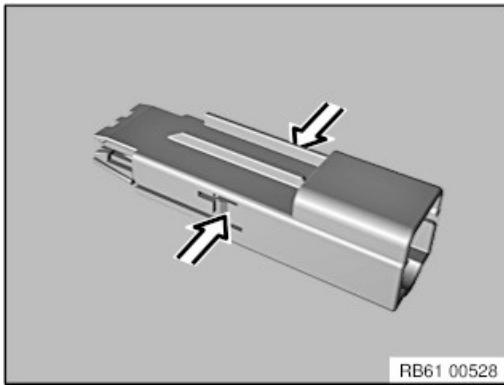
10.

Press the lock and detach plug connection.



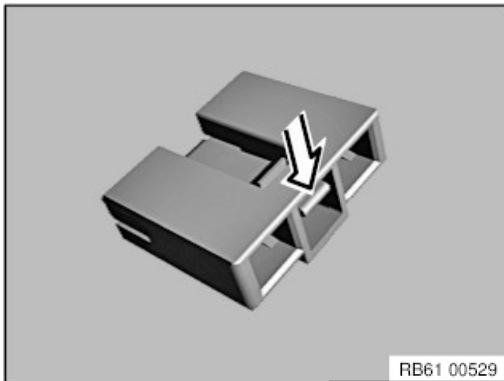
11.

Press the lock and detach plug connection.



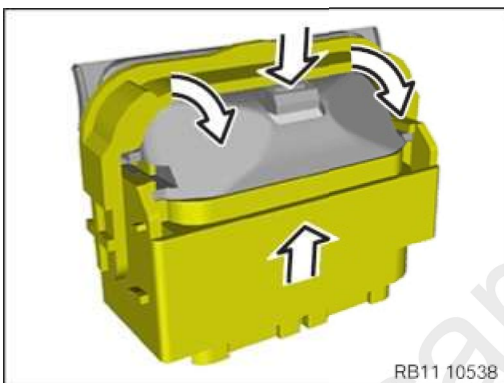
12.

Press the lock on both sides and detach plug connection.



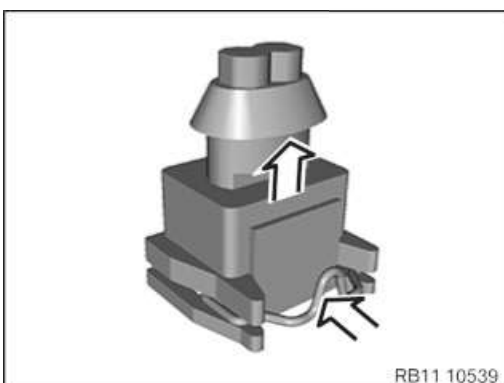
13.

Press the lock and detach plug connection.



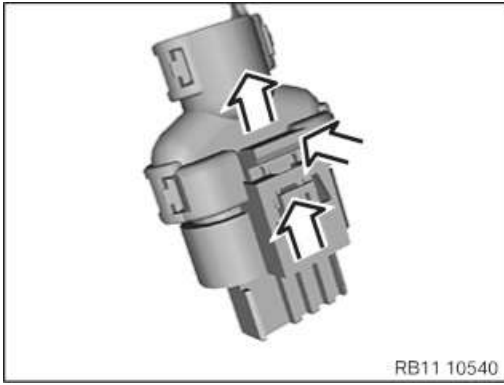
14.

Press lock and open release clip in direction of arrow.
Disconnect plug connection.

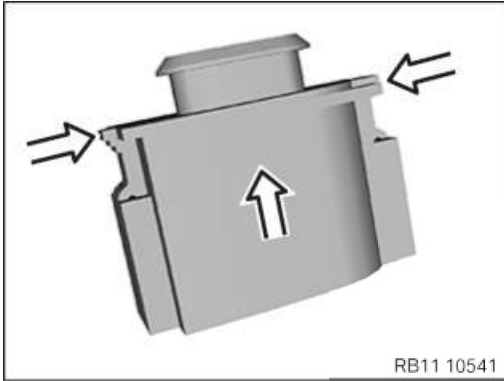


15.

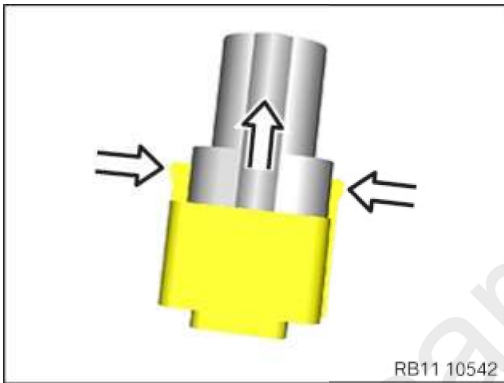
Press the lock and detach plug connection.



16.
Pull out lock and press.
Disconnect plug connection.



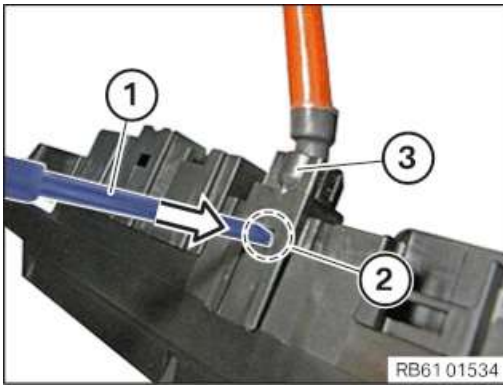
17.
Press the lock and detach plug connection.



18.
Press the lock and detach plug connection.

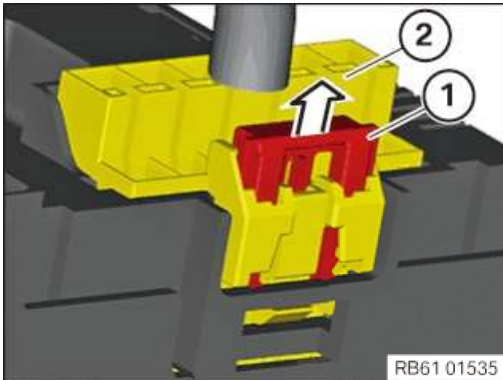


19.
Press the lock and detach plug connection.



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:

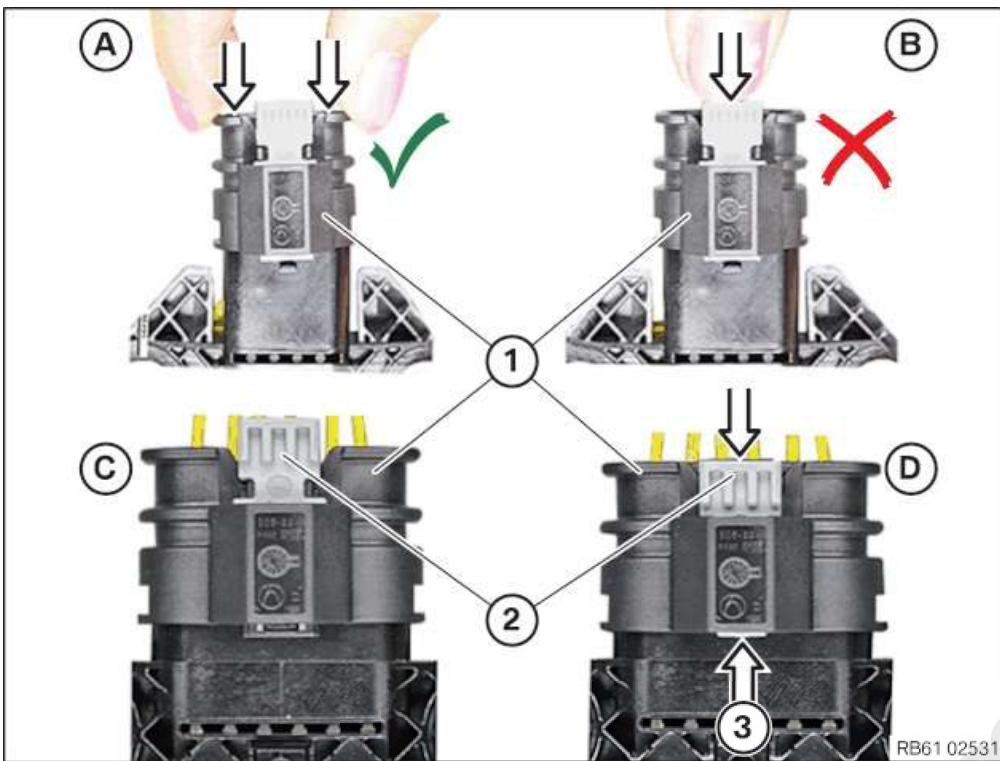
Caution!

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.

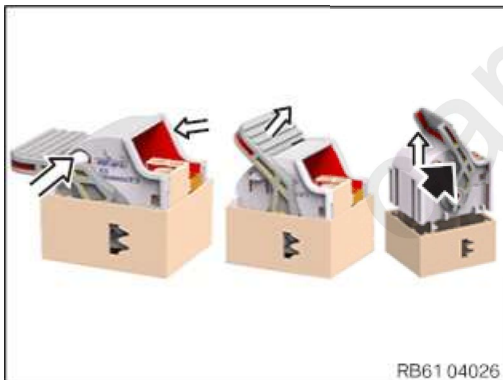


23.

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:

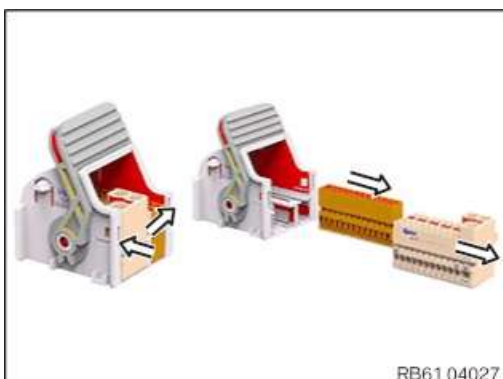


24.

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

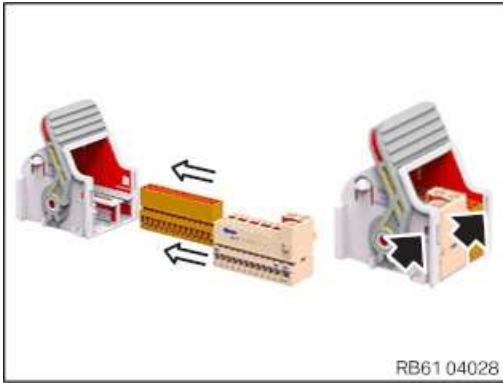
Move lever upwards until it latches into place in the end position.

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

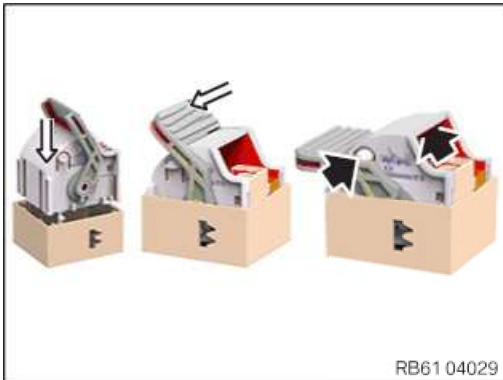


Unlock socket housing by lifting up each of the locking tabs.

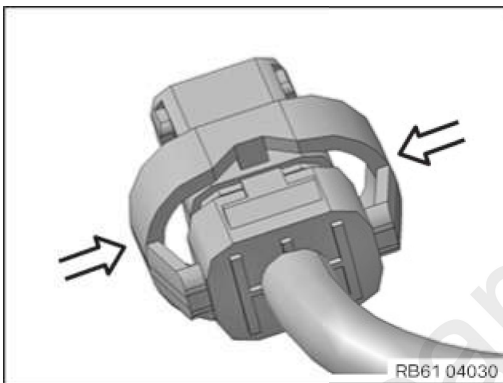
Slide out after unlocking the socket housing.



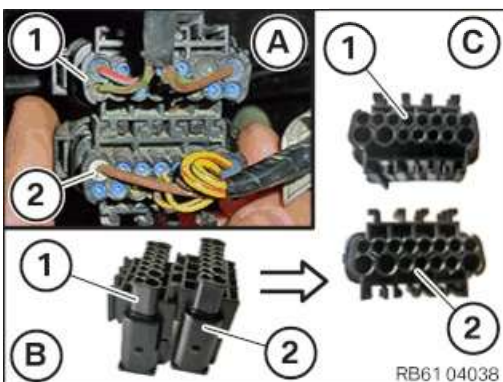
Slide in socket housing up to limit position.
Lock socket housing into place in end position.



Sliding in up to limit position.
Activate plug-in procedure by moving lever downwards.
IMPORTANT: the latch mechanism on both sides only works for a completed plug-in procedure.

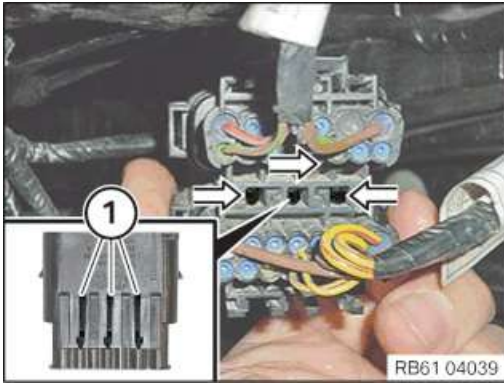


25.
Rosenberger D4S20G-400A5-Y
Press to unlock on both sides.



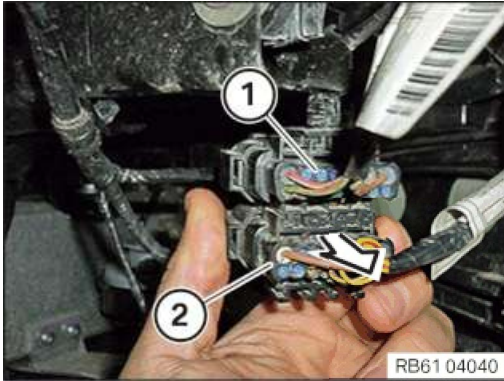
26.
Pin housing, 15-pinMLK1

- 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



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).

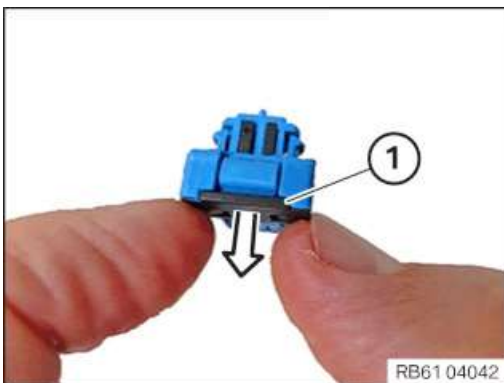


27.

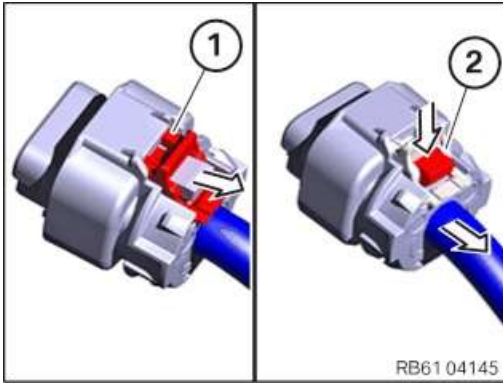
Airbag ignition circuit connector

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

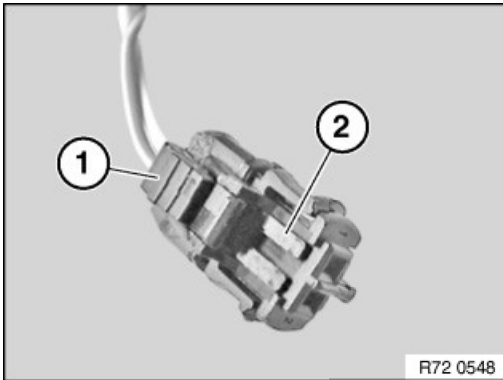


28.

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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