

**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.

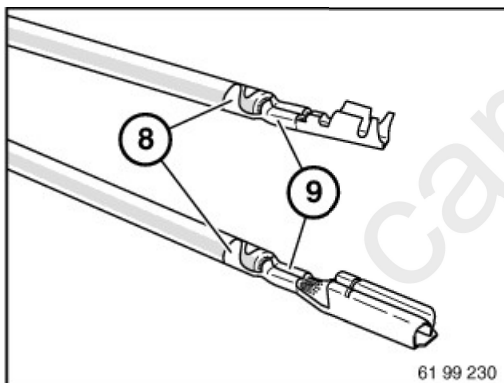
- Special tool 61 0 220

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

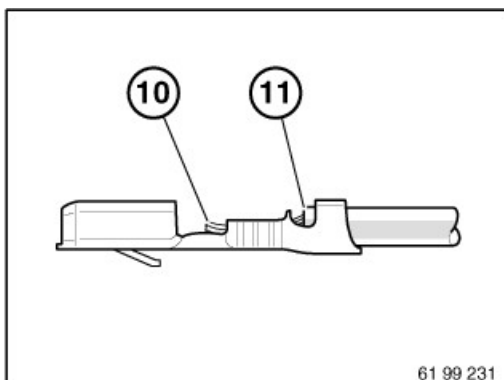


Checking crimping

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

Note:

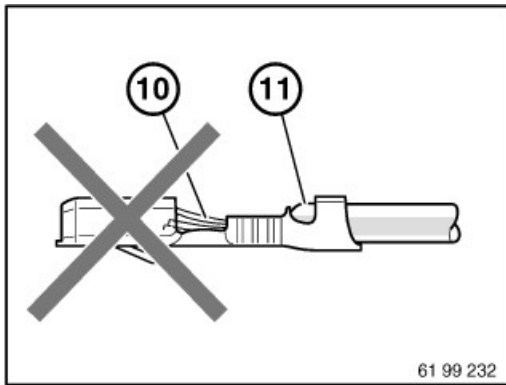
Illustration shows butt connectors and contact sleeves for comb connectors knocked on one side. The crimping procedure is identical here.



Correct crimping:

Visible conductor end (10).

Visible insulation end (11).

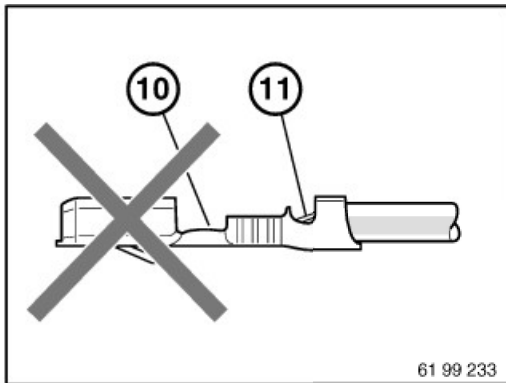


Incorrect crimping:

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.

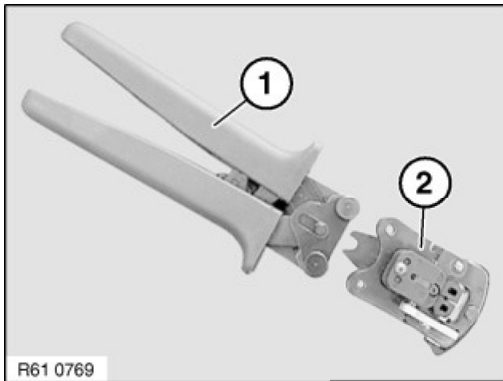
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61 13 ... Cutting, strip insulation and crimping optical fibres

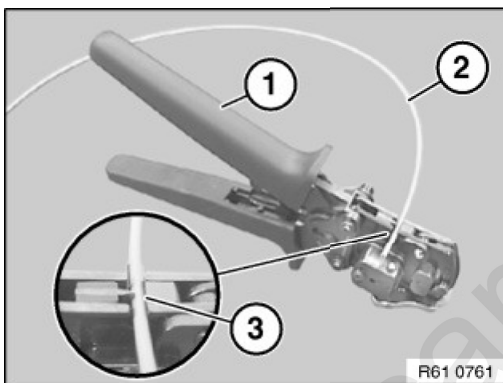


Special tools required:

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



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

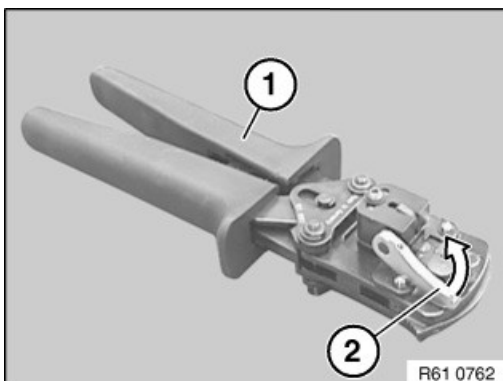


Cutting optical fibre

Open hand pliers (1).

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

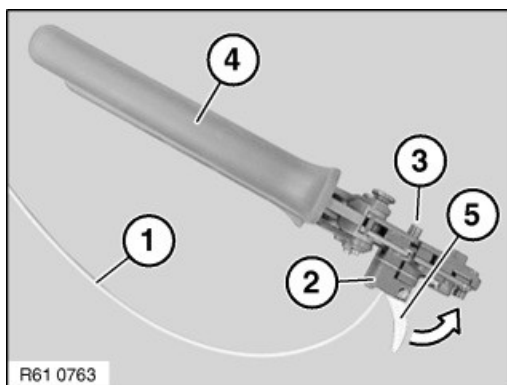
Close pliers (1) and remove optical fibre (2).



Stripping insulation from optical fibre

Open hand pliers (1).

Open lever (2) in direction of arrow.



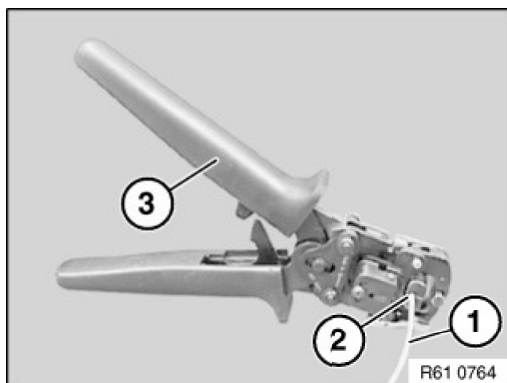
Push the optical fibre (1) into the strip insulation equipment (2) until it is flush in this area (3).

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).



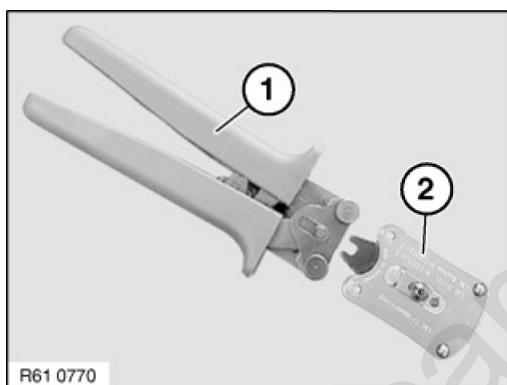
Cutting optical fibre to length

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).

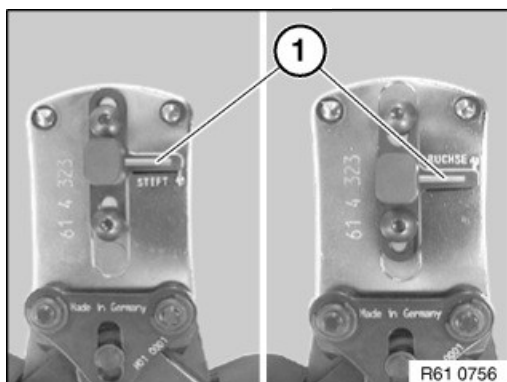


Crimp optical fibre

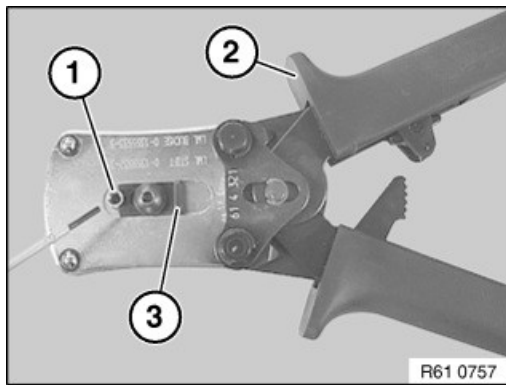
The hand pliers 61 4 321 (1) in connection with the crimping head 61 4 323 (2) from crimping kit 61 4 320 are used for crimping the optical fibres to size.

Note:

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

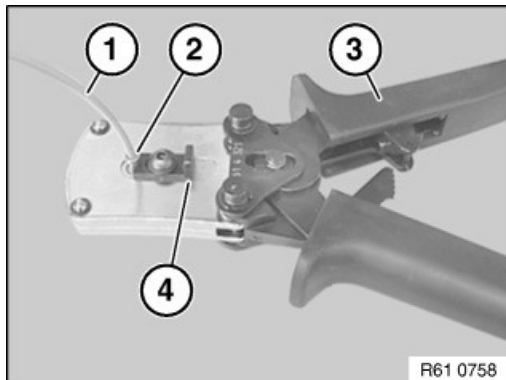


Move contact guide by means of stop lever (1) into corresponding position (pin contact or jack).



Open hand pliers (2).

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

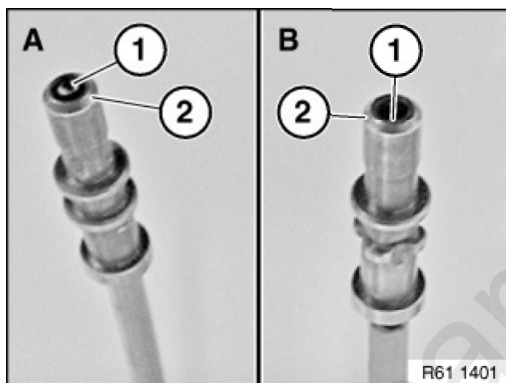


Insert stripped optical fibre (1) until limit position into pin contact or jack (2).

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).



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** (Media Oriented Systems Transport) optical fibres
- Yellow = **ISIS** (Intelligent Safety and Integration System) 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 $\geq 85^\circ$

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:

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

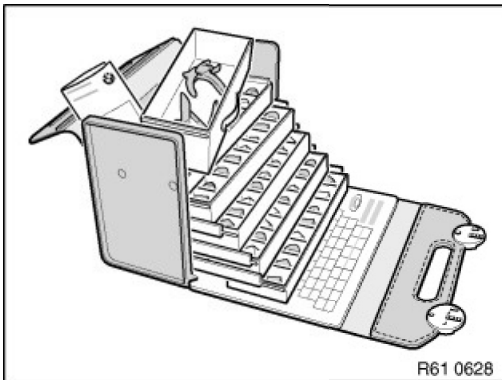
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61 13 ... Special tools for wiring harness repairs



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

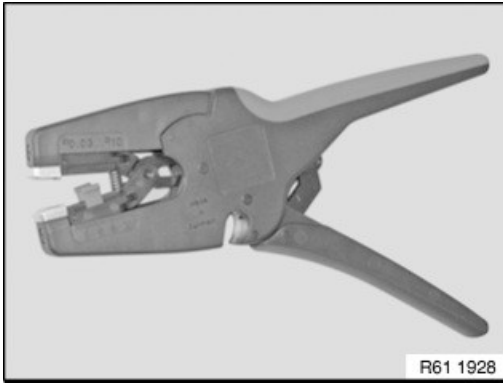


Release and press-out tool:

- Special tool 61 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



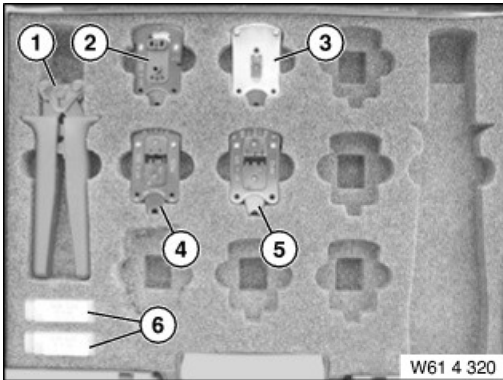
Cutting to length and stripping insulation from cables:

Wire stripper MultiStrip10*

*Sourcing reference BMW Workshop Equipment Catalogue

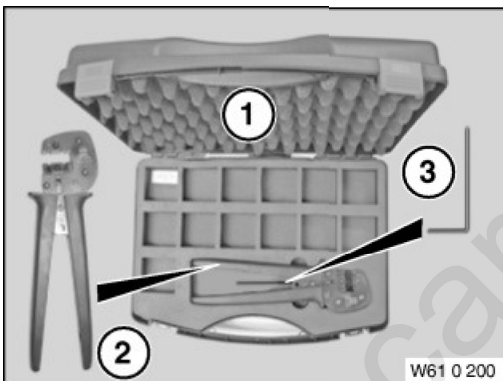
Handling:

- Cutting cables to length and strip insulation



Crimping stop parts (small contacts) and butt connectors:

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



Crimping stop parts (large contacts) and butt connectors:

- Special tool 61 0 200 (crimping 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:

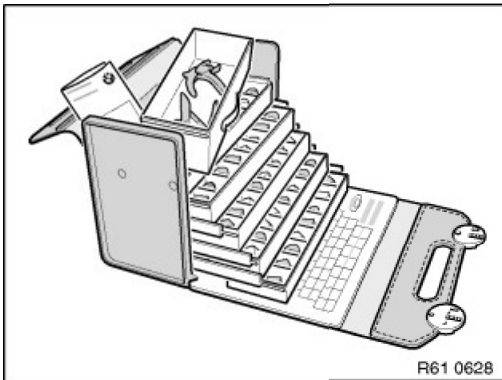
- Refer to Service Information:
SI 2 02 05 194
SI 2 07 05 233

61 13 ... Wiring harness repair (special tools, butt connectors)



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
- 61 4 340



Repair range for vehicle electrical system:

Single parts for wiring harness repairs*

* sourcing reference BMW Group Parts Department

Note:

- Refer to Service Information bulletin

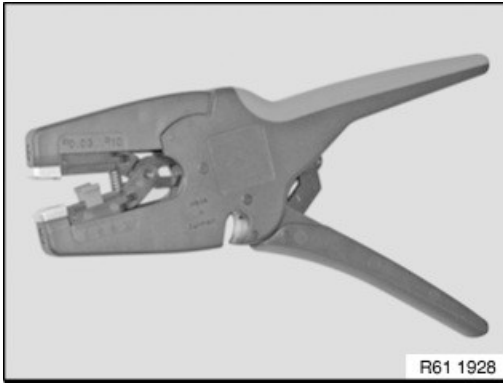


Release and press-out tool:

- Special tool 61 0 300
- Special tool 61 0 400
- Special tool 61 1 100 (engine)

Handling:

- Notes on opening contacts and locks of various connector systems



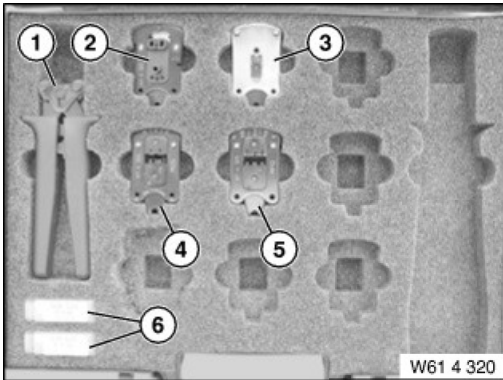
Cutting to length and stripping insulation from cables:

Wire stripper MultiStrip10*

*Sourcing reference BMW Workshop Equipment Catalogue

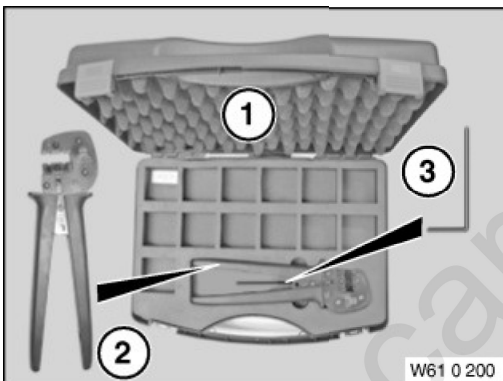
Handling:

- Cutting cables to length and strip insulation



Crimping stop parts (small contacts) and butt connectors:

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



Crimping stop parts (large contacts) and butt connectors:

- Special tool 61 0 200 (crimping 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)

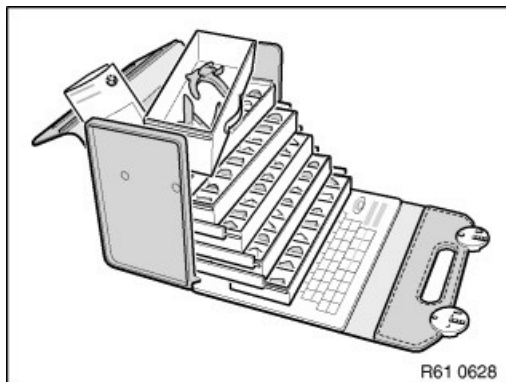
Handling:

- Service Information bulletins
- Service Information bulletins



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. Reading out the fault memory
3. Eliminate cause of damage.
4. Disconnect battery negative terminal
5. Check the wiring diagram to make sure that no safety systems (e.g. antilock braking system, active rear axle kinematics, airbag, etc.) are influenced. Otherwise replace faulty wiring harness or use repair cable (sourcing reference: BMW Group Parts)
6. Carry out function check and read out fault memories again
7. Eliminate new faults if applicable and clear fault memories

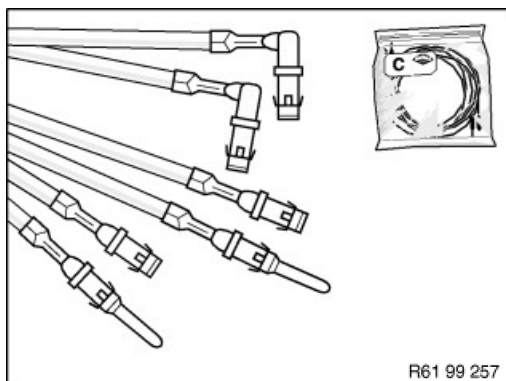


Note:

The repair range IV for the vehicle electrical system contained the required special tools and separate components for retrofitting and repair work with the aid of comb connectors.

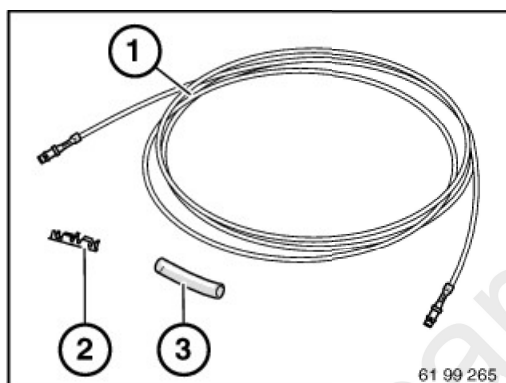
The case can no longer be ordered. Order separate components for wiring harness repair via BMW Group Parts.

- Refer to Service Information:



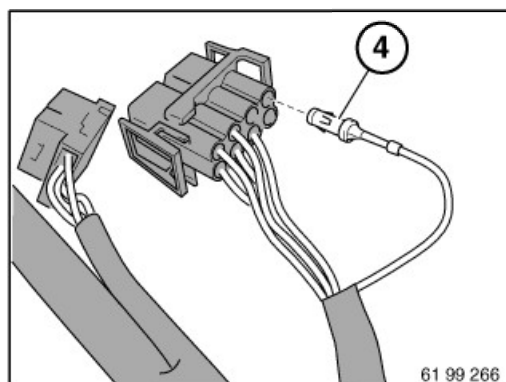
Choose repair kit.

Example: Repair kit, circular connector system D 2.5.



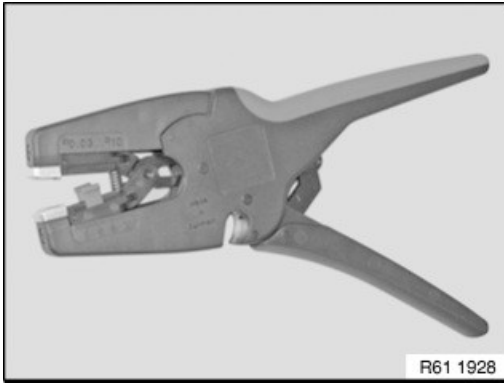
Remove following parts:

- (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).



Important!

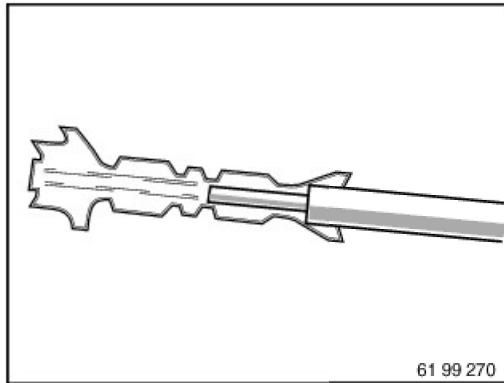
- Check maximum length of repair cable
- If more than one wire is to be repaired, the individual interfaces must be offset so that the wiring harness is not too thick at the repaired point.

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



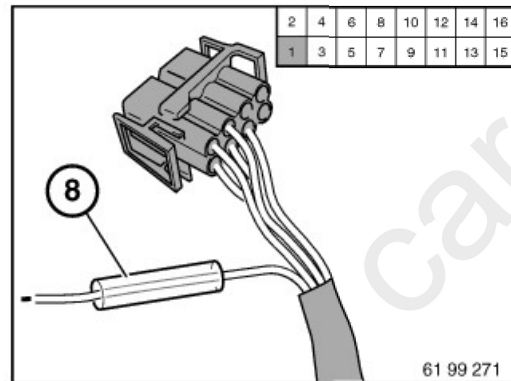
Crimp butt connector on preassembled wire end.

Special tools:

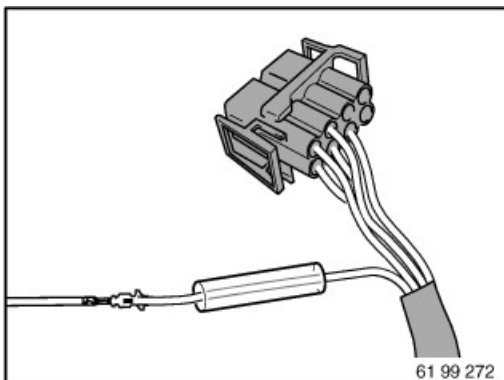
- 61 4 340 (0.35 - 2.5 sq mm)
- 61 0 240 (4.0 - 6.0 sq mm)

See repair instructions

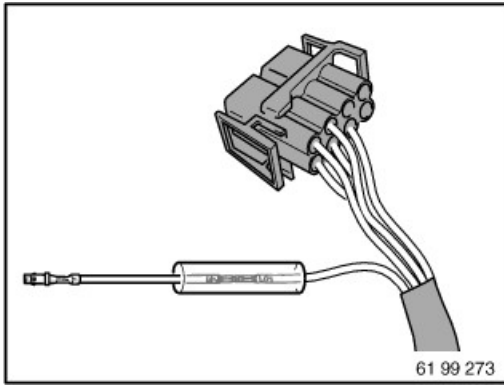
Crimping on stop parts



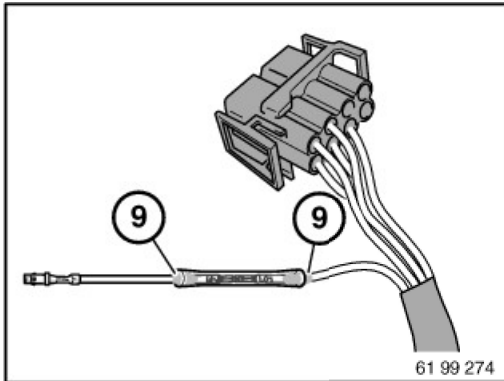
Push shrink-fit hose (8) onto free wire end.



Crimp unused wire end using butt connector.



Pull shrink-on sleeve over butt connector.



Important!

Do not burn shrink-on sleeve.

Using hot air blower, shrink heat-shrink tubing until adhesive is discharged uniformly at both ends (9) of heat-shrink tubing.

Insert contact in housing.

Close secondary lock on housing.

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