

ACCESSORIES AND BODY, CAB

General Electrical System - Repair Instructions - X6

TROUBLESHOOTING

12 00 ... NOTES/INFORMATION ON START ASSISTANCE (JUMP STARTING)

Do not start the engine with help of starting sprays.

Preparation:

Conform with the following when starting the engine with a jump starting cable.

- Ensure that the jump starting cable wires are of appropriate cross-section size.
- Only use fuse-protected jump starting cables.
- Check whether the current-supplying battery has 12 V voltage.
- If the engine is started from the battery of another vehicle, ensure that there is no contact between the bodies of both vehicles.

IMPORTANT: Never touch electrically live ignition system components: high voltage - danger of injury!

If the battery in the vehicle supplying power is weak, start the engine of this vehicle and let it run at idling speed.

Operation

It is essential to conform to the procedures so as to avoid injury to persons or damage to parts.

- Automatic transmission: select drive position "P", apply parking brake.
- Manual transmission: move gear lever to neutral position, apply parking brake.
- Ensure that the jump leads cannot get caught in rotating parts, e.g. fan.
- First connect both positive poles of the batteries with one jump starting cable (red).
- Use the battery positive terminal in the engine compartment for vehicles with the battery in the luggage compartment.
- Then use the second jump starting cable (black) to connect the negative post of the current-supplying battery with the earth/ground point (not the negative pole or the body) of the vehicle to be started.

IMPORTANT: Do not connect the second jump starting cable (black) with the negative pole of the battery in the vehicle to be started. Produced gas could be ignited by sparks.

Risk of explosion!

After the engine of the vehicle to be started has fired, first disconnect the jump starting cable between the negative pole and the earth/ground point. Then remove the starting cable from the positive poles.

61 00 ... BATTERY

Battery care and maintenance

In low-maintenance batteries, check the acid level at least once a year. If necessary, top up with distilled water up to the top marking.

The increasing number of electronic control units in the car reduces the self-discharging time of the battery (even in standby mode). To maintain the battery service life and to avoid exhaustive discharging, recharge laid-up vehicles every 6 weeks at the latest.

Battery test

The battery acid density can be used to measure the charge state. However this test produces uncertainty caused by a design-related range of variation. The acid density e.g. for a charged battery is 1.28 kg/l (in the tropical version the acid density is 1.23 kg/l).

Another interference factor is the acid lamination immediately after filling with distilled water.

Battery wear with partially sulfated and/or heavily contaminated plates will also lead to incorrect acid density test results.

61 00 ... DIAGNOSIS FOR CONDITION BASED SERVICE

NOTE: Red symbol for pre-delivery check

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

The symbol is a reminder to the Service staff that the predelivery check has not yet been carried out on this car.

NOTE: Do not carry out a reset.

Do **not** confuse this function with the "Vehicle check" maintenance scope.

Do not carry out a reset via the instrument cluster.

When carrying out the pre-delivery check with the "Transport Mode/Pre-delivery check" service function:

The symbol is automatically removed from the display after the service function has been executed.



Fig. 1: Service Display - Under Body Nut/Bolt Check
Courtesy of BMW OF NORTH AMERICA, INC.

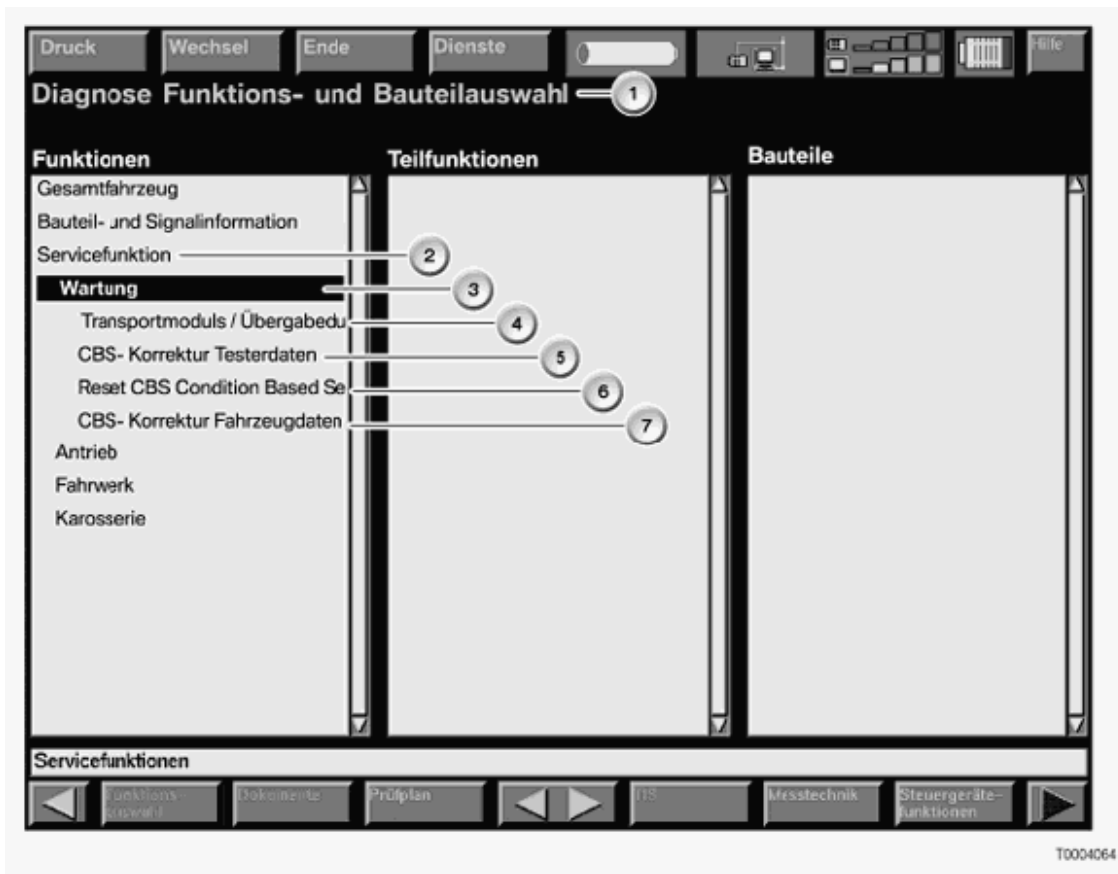


Fig. 2: Screen Display - Pre-Delivery Check Service Function
Courtesy of BMW OF NORTH AMERICA, INC.

KEY EXPLANATION CHART

Key	Explanation	Key	Explanation
1	Function and component selection	2	Service functions
3	Maintenance	4	Transport Mode/Pre-delivery check

5	CBS Correction Tester Data	6	Reset CBS Condition Based Service
7	CBS	Correction Vehicle Data	

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

- Transport Mode/Pre-delivery check
- CBS Correction Tester Data
- Reset CBS
- CBS Correction Vehicle Data

Service function: CBS Correction Tester Data

Data are automatically stored in the vehicle with the "Pre-delivery check" service function.

The standardized data can be changed with the "CBS Correction Tester Data" service function.

The following standardized data can be changed:

- Phone numbers:
 - BMW Group Mobile Service
 - BMW Hotline
 - Customer's home dealer

The country-specific phone numbers are contained as reference texts in the BMW diagnosis system (read off during the input prompt). The phone numbers must be input with the international dialling code.

- Legally prescribed vehicle inspection (country-specific):
 - Coding or blanking out
 - Interval for calculating the target date

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

- Legally prescribed exhaust emissions test (country-specific):
 - Coding or blanking out
 - Interval for calculating the target date

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

NOTE: Automatic function after installation of the BMW diagnosis system.

The standardized data are automatically established when the pre-delivery check is carried out for the first time. It is therefore not necessary to input the data separately.

Service function: Reset CBS Condition Based Service

A maintenance scope can be reset with the "Reset CBS Condition Based Service" service function. Even when availability is over 80 %.

The benefit of reset via the BMW diagnosis system is that the on-board date is corrected automatically.

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

- The service counter is reset by one counter on resetting. All service counters are set to "1" on new vehicles.

The service counters are used in the Service Acceptance/Reception Module (SAM) on a scope-specific basis for controlling additional work.

- Availability is set to 100 % on resetting. Availability in % is the wear value of the maintenance scope.

The greater the availability, the longer it is to the next maintenance scope.

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

Service function: CBS Correction Vehicle Data

IMPORTANT: The data are overwritten.

Once this service function has been executed, it is no longer possible to reconstruct the previous status.

The "CBS Correction Vehicle Data" service function is available if a reset has been carried out **erroneously**. In this way, the availability of a maintenance scope can be corrected to a realistic value.

A data or a mileage/kilometer reading is entered for correction. These data are converted internally into an availability in %. In so doing, the BMW diagnosis system only accepts a smaller value as the current reading in the control unit. In addition, the service counter of the scope is automatically reduced by one counter.

The inputs are used in the Service Booklet to determine the realistic availability. A realistic availability can be reconstructed on a scope-specific basis by means of the last maintenance measure (with mileage/km reading and date).

This does not include correcting the availability for brake pads. The brake pad residual thickness must be measured and input (in millimeters).

NOTE: Reference for distance- and time-dependent maintenance scopes

For a correction, the availability is referred to the distance- and time-dependent calculation.

61 00 ... NOTES ON HANDLING OPTICAL FIBERS

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

- The minimum permitted bending radius is 25 mm
- Do not subject optical fibers to compressive and tensile load
- Protect optical fibers against the effects of heat $> \text{ or } = 85^{\circ}\text{C}$ (e.g. during welding work, drying work with infrared heater or hot air blower)
- Optical fibers are permitted to show only one junction point (bridge), replace optical fibers if necessary

NOTE: The optical fibers are colored differently as follows:

- Green=MOST (Media Oriented Systems Transport) optical fibers
- Yellow=ISIS (Intelligent Safety and Integration System) optical fibers
- Orange=repair optical fibers

61 00 ... NOTES ON HANDLING WIRING HARNESSES AND CABLES

In general

To avoid damage, observe the following instructions:

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

In addition

Shielded cables (coaxial cables):

IMPORTANT: Shielded cables must not be repaired!

- This may lead to indifferences in noise radiation and interference immunity at contact points in the shield
- To satisfy the requirements of the type approval, it is essential to replace shielded cables completely

Fibre-optic cables:

NOTE: Fibre-optic cables are colored differently as follows:

- Green = MOST (Media Oriented Systems Transport) fibreoptic cables
- Yellow = ISIS (Integrated Service Information Server) fibreoptic cables

- Orange=repair fibre-optic cables

IMPORTANT:

- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables if necessary
- Smallest permissible bending radius is 25 mm
- Avoid effects of heat > or = 85°

Treating cables and fibre-optic cables

FlexRay:

It is possible to repair the FlexRay. In the event of damage, the cables can be joined with conventional **butt connectors** .

NOTE:

- The cable is a twisted cable. If possible, maintain twisted cable after repair.

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

Safety regulations for **handling components of airbag system** . See **72 00 .. SAFETY REGULATIONS FOR HANDLING COMPONENTS WITH GAS GENERATORS** .

Instructions for **disconnecting and connecting battery**.

Procedure for cable repair

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 them being mixed up! 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 car 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 connectors and shrink-fit hoses in the Electronic Parts Catalogue (EPC), reconnect the cables

with the same cable colors. Twist cables again, open length (twist) must not exceed 40 mm. Secure interface (shrink-fit hoses) with insulating tape to prevent cables from twisting open.

In event of visible damage

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

61 00 ... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY

Battery acid is highly corrosive

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

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

In event of contact with acid

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

If acid is splashed onto the skin or clothing, neutralize it immediately with a soapy solution and rinse with lots of water.

Seek medical attention immediately if battery acid is accidentally swallowed.

Explosion hazard

Strictly no flames, sparks, naked light or smoking!

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

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

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

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

61 13 ... TREATING CABLES AND FIBRE-OPTIC CABLES

Special tools required:

- 61 1 190
- 61 4 320

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

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

SPECIAL TOOL SPECIFICATION

Repair range for vehicle electrical system	SI 2 04 07 341
Crimping set with tool for fibre-optic cables, Micro Power Quadlock (MPQ), Micro Quadlock System (MQS) contacts and universal crimping head	61 4 320
Insulation displacement tool for ribbon cable	61 1 190

61 13 ... UNLOCKING AND DISCONNECTING DIFFERENT PLUG CONNECTIONS

NOTE: Examples of unlocking and disconnecting different plug connections.

Press lock and open clip in direction of arrow.

Disconnect plug connection.

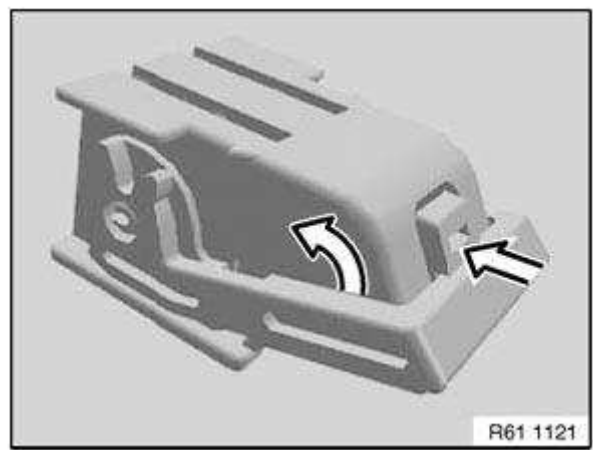


Fig. 3: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and open clip in direction of arrow.

Disconnect plug connection.

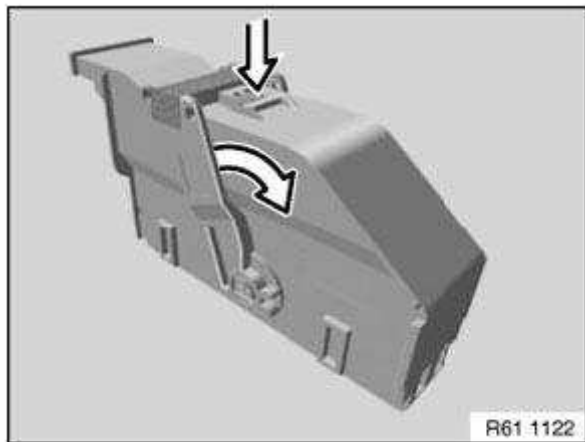


Fig. 4: Pressing Lock And Open Clip
Courtesy of BMW OF NORTH AMERICA, INC.

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

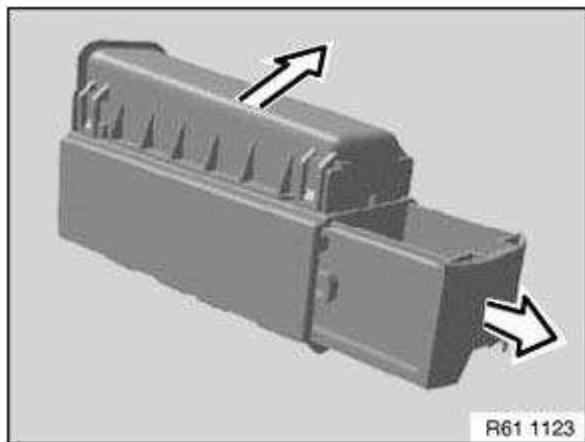


Fig. 5: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

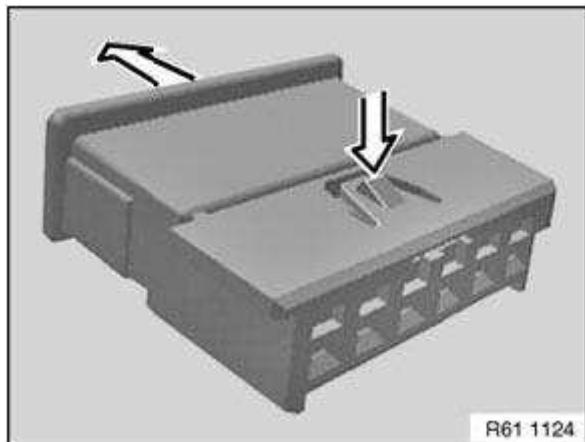


Fig. 6: Press Lock And Disconnect Plug Connection (1 of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

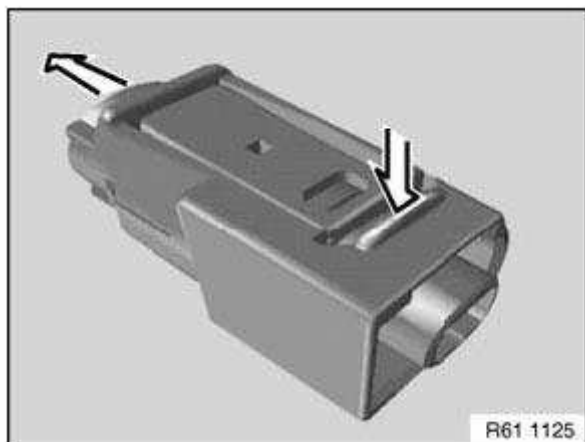


Fig. 7: Press Lock And Disconnect Plug Connection (2 of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

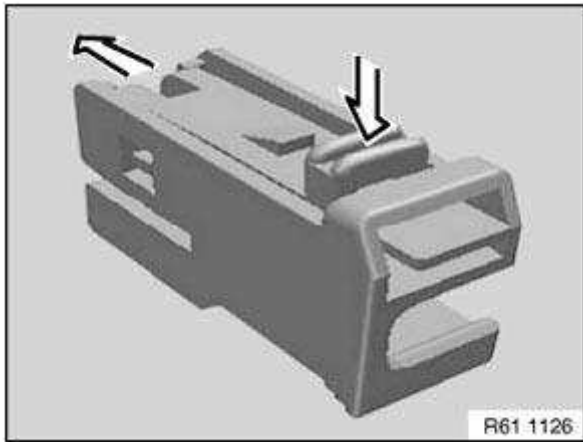


Fig. 8: Press Lock And Disconnect Plug Connection (3 of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

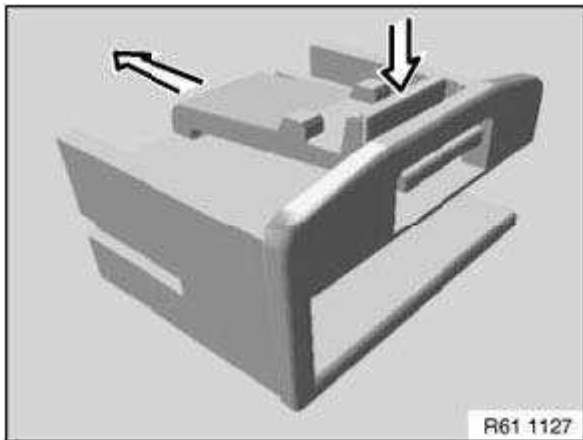


Fig. 9: Press Lock And Disconnect Plug Connection (4 of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

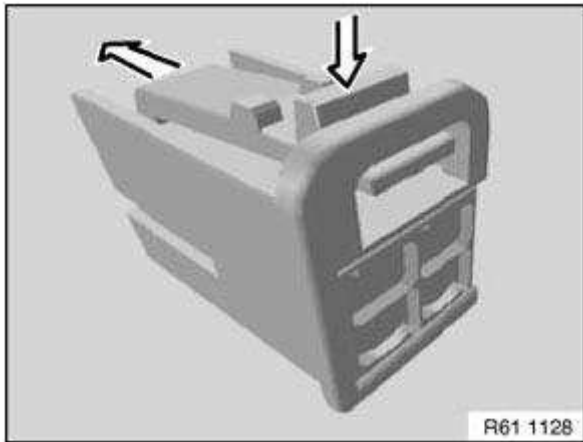


Fig. 10: Press Lock And Disconnect Plug Connection (5 of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

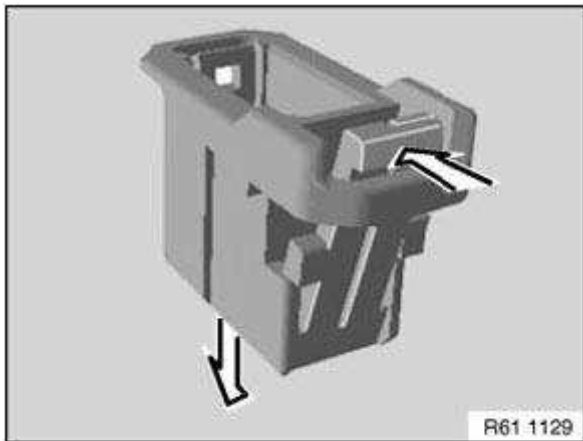


Fig. 11: Press Lock And Disconnect Plug Connection (6 of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

WIRING HARNESS

61 00 ... NOTES ON HANDLING WIRING HARNESSES AND CABLES

NOTE: See Notes on handling wiring harnesses and cables.

AUXILIARY CABLES

61 12 ... GENERAL INFORMATION ON INTELLIGENT BATTERY SENSOR (IBS)

NOTE: Do not connect continuous trickle charger to the cigarette lighter.

The cigarette lighter is powered by the rear distribution box via a relay. This relay drops out after terminal 15 OFF. This means that a continuous trickle charger connected to the cigarette lighter is disconnected from the battery.

Charge the battery via the jump-start connection points. Only then can the power 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 grounding cable also serves to dissipate heat.

- 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 grounding 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 (screw with Torx head).
- Avoid contact between IBS and ground.

WARNING: Danger of destruction to IBS and cables when battery is replaced

- The IBS and the cables can be destroyed by mechanical strain when the battery is replaced. 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 when replacing the battery.
- Register battery change via Service Function (Progman or DIS).
- Delete fault 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 replace the IBS when a corresponding fault is entered in the DME or DDE.**

61 12 002 REPLACING BATTERY POSITIVE LEAD (FROM BATTERY TO LUGGAGE COMPARTMENT CONNECTOR)

WARNING: Observe safety instructions for handling vehicle battery.
Follow instructions on intelligent battery sensor (IBS) .

IMPORTANT: Do not under any circumstances pull or lever safety battery terminal off by force.

Necessary preliminary tasks:

- Disconnect battery negative lead

Disconnect plug connection (1).

Open cover and release nut (2). Tightening torque, see **61 21 2AZ** in **61 21 BATTERY WITH TERMINAL** .

Open cover (3) and slacken nut underneath. Tightening torque, see **61 21 1AZ** in **61 21 BATTERY WITH TERMINAL** .

Using a suitable tool, expand locking bracket (4) at lower end and clip out.

Raise distribution box slightly and remove safety battery terminal.

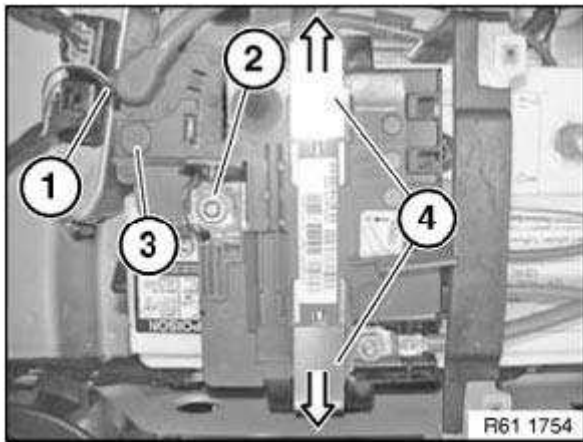


Fig. 12: Expanding Locking Bracket At Lower End
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip cover (1) from cable lug mounting.

Slacken nut (2). Tightening torque, see **61 12 3AZ** in **61 12 AUXILIARY CABLE** .

Disconnect battery positive lead.

Installation:

Risk of short circuits!

Make sure battery positive lead is correctly seated on cable lug mounting.

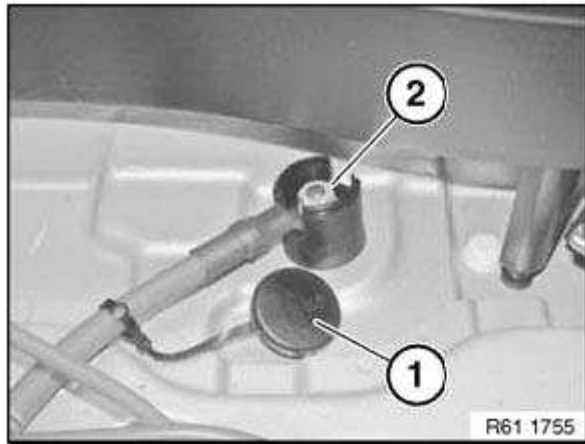


Fig. 13: Slacken Nut And Unclip Cover
Courtesy of BMW OF NORTH AMERICA, INC.

61 12 013 REPLACING BATTERY NEGATIVE LEAD

WARNING: Observe safety instructions for handling vehicle battery.

Follow instructions for disconnecting and connecting battery .

Follow instructions on intelligent battery sensor (IBS) .

IMPORTANT: Do not under any circumstances pull or lever off intelligent battery sensor (IBS) by force.

Necessary preliminary tasks:

- Remove **battery cover**

Slacken nut (1) and pull intelligent battery sensor (IBS) from battery. Tightening torque, see **61 21 1AZ** in **61 21 BATTERY WITH TERMINAL** .

Disconnect plug connection (2).

If necessary, detach cable tie for battery negative lead from battery positive lead.

Release nut (3) and disconnect battery negative lead. Tightening torque, see **61 12 5AZ** in **61 12 AUXILIARY CABLE** .

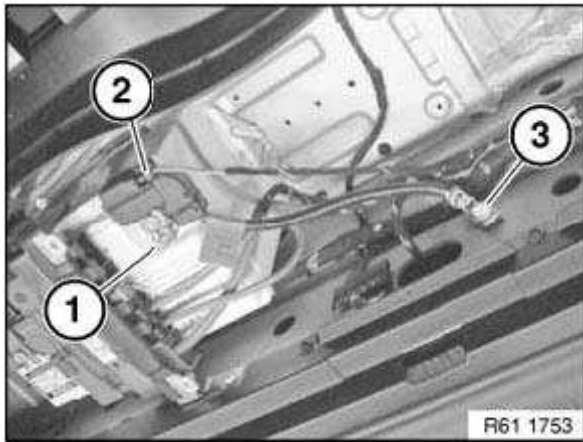


Fig. 14: Slacken Nut (1) And Pull Intelligent Battery Sensor (IBS) From Battery
 Courtesy of BMW OF NORTH AMERICA, INC.

61 12 062 REPLACING WIRING HARNESS FOR FRONT BUMPER

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

Necessary preliminary tasks:

- Remove **front bumper trim** . See **51 11 156 REMOVING AND INSTALLING FRONT BUMPER TRIM** .

NOTE: Work is shown on the E70 by way of example. There may be differences in detail in the case of other vehicle models.

Disconnect plug connections for ultrasonic transducer (1).

Unclip or feed out wiring harness for front bumper (2) from bumper trim and remove.

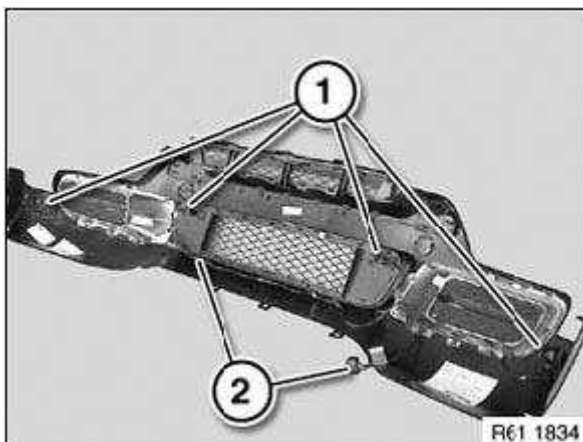


Fig. 15: Identifying Front Bumper And Ultrasonic Transducer

Courtesy of BMW OF NORTH AMERICA, INC.

61 12 067 REPLACING WIRING HARNESS FOR REAR BUMPER

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

Necessary preliminary tasks:

- Remove **rear bumper trim** . See 51 12 156 REMOVING AND INSTALLING REAR BUMPER TRIM .

Disconnect plug connection (1).

Release cable tie (2).

Feed wiring harness for rear bumper (3) out of bumper trim (4) and remove.

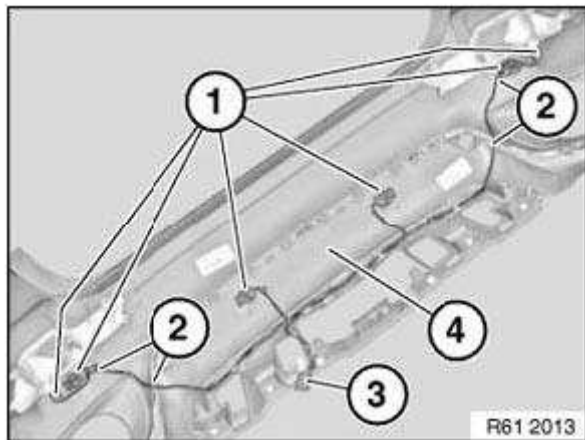


Fig. 16: Identifying Plug Connection, Cable Tie And Rear Bumper

Courtesy of BMW OF NORTH AMERICA, INC.

61 12 200 REPLACING WIRING HARNESS IN LEFT OR RIGHT FRONT DOOR

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

Necessary preliminary tasks:

- Close front side window completely
- Remove **front sound insulation** . See 51 48 060 REMOVING AND INSTALLING/REPLACING SOUND INSULATION IN LEFT OR RIGHT FRONT DOOR .

NOTE: Work is shown on the E70 by way of example. There may be differences in detail from other vehicle models and equipment specifications.

Disconnect plug connection (1).

If necessary, disconnect plug connection for **sensor on front door** .

Release all attachment points (2) of door wiring harness.

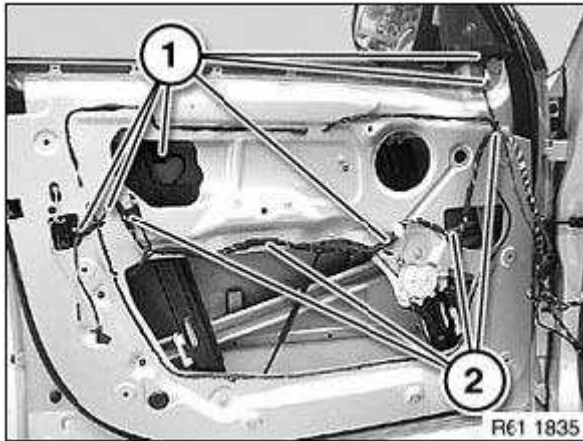


Fig. 17: Identifying Plug Connections And Attachment Points
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Front side panel shown removed for purposes of clarity.

Release screw (1), fold door wiring harness plug on A-pillar (2) downwards slightly and remove in direction of arrow.

Disconnect associated plug connection.

Pull rubber grommet (3) in direction of arrow out of front door (4).

Feed out door wiring harness towards front to A-pillar and remove.

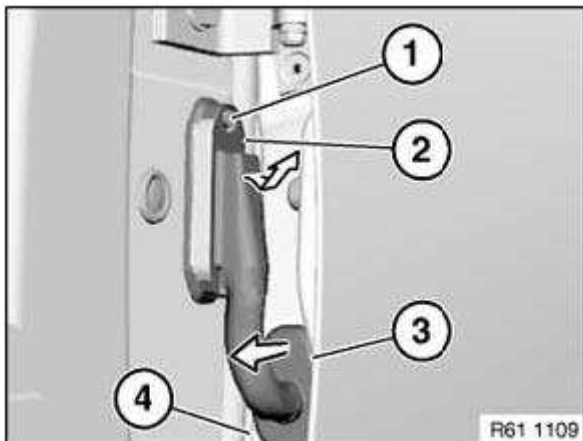


Fig. 18: Identifying Door Wiring Harness Plug On A-Pillar
Courtesy of BMW OF NORTH AMERICA, INC.

61 12 210 REPLACING WIRING HARNESS IN LEFT OR RIGHT REAR DOOR

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

Necessary preliminary tasks:

- Close rear side window completely
- Remove **rear sound insulation** . See **51 48 070 REMOVING AND INSTALLING/REPLACING SOUND INSULATION ON LEFT OR RIGHT REAR DOOR** .

NOTE: Work is shown on the E70 by way of example. There may be differences in detail from other vehicle models and equipment specifications.

Disconnect plug connection (1).

Disconnect door lock plug connection.

Release all attachment points (2) of door wiring harness.

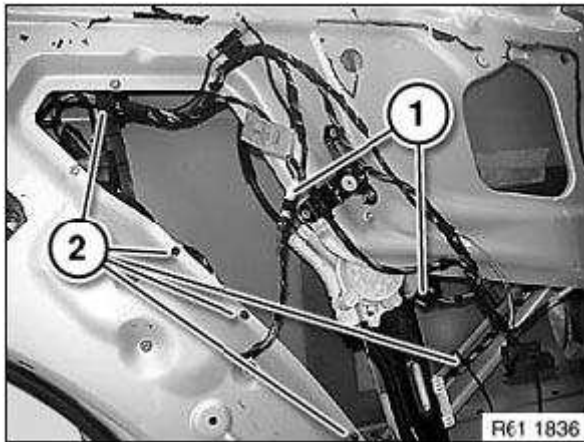


Fig. 19: Identifying Plug Connection And Door Lock Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1), fold door wiring harness plug on B-pillar (2) downwards slightly and remove in direction of arrow.

Disconnect associated plug connection.

Pull rubber grommet (3) out of rear door.

Feed out door wiring harness towards front to B-pillar and remove.

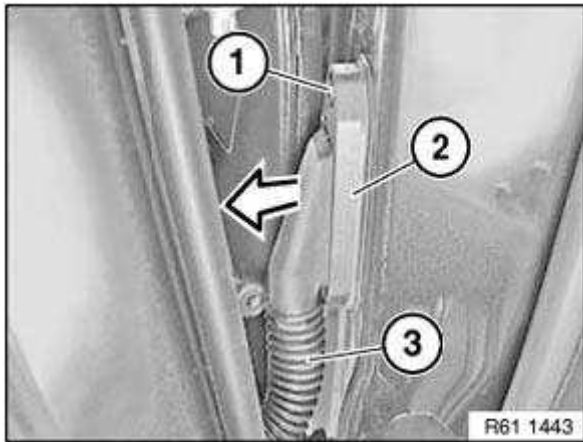


Fig. 20: Pulling Rubber Grommet Off Rear Door
Courtesy of BMW OF NORTH AMERICA, INC.

61 12 850 REPLACING RIBBON CABLE (CAS)

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

Necessary preliminary tasks:

- Remove Start/Stop switch
- Remove trim for pedal assembly . See 51 45 185 REMOVING AND INSTALLING/REPLACING PANEL FOR PEDALS .

Disconnect plug connection (1).

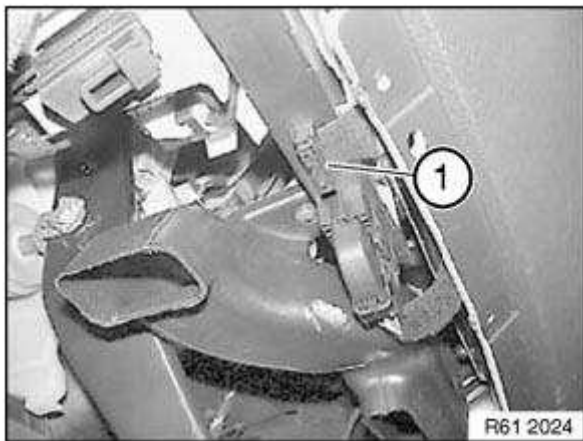


Fig. 21: Identifying Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Instrument panel (2) removed for purposes of clarity.

Pull off insulating tape (1) with ribbon cable (3) from instrument panel (2).

Installation:

Make sure ribbon cable is laid correctly.

Secure ribbon cable with new insulating tape to instrument panel (2).

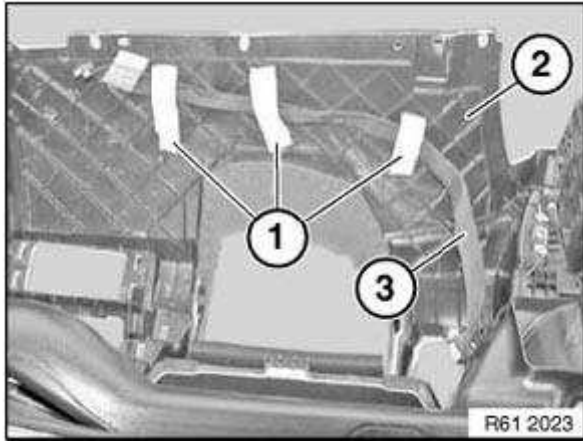


Fig. 22: Identifying Instrument Panel And Ribbon Cable
Courtesy of BMW OF NORTH AMERICA, INC.

PLUG CONNECTION, TERMINALS, FUSE BOX

61 00 ... NOTES ON HANDLING OPTICAL FIBERS

NOTE: See 61 00 ... Notes on handling optical fibers.

61 00 ... NOTES ON HANDLING WIRING HARNESSES AND CABLES

NOTE: See 61 00 ... Notes on handling wiring harnesses and cables.

61 00 ... REPAIRING AIRBAG CABLES

NOTE: See 61 00 ... Repairing airbag cables.

61 13 ... DME MASTER RELAY CONNECTOR

Unlock locking flap (1) of corresponding cable.

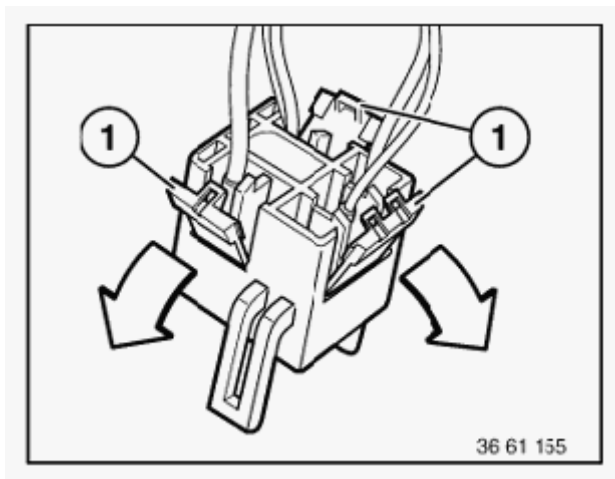


Fig. 23: Identifying Locking Flap Of Corresponding Cable
 Courtesy of BMW OF NORTH AMERICA, INC.

With special tool 61 1 136 or 61 1 137 (ejector), press back arrester hook (2) of appropriate contact and pull out cable.

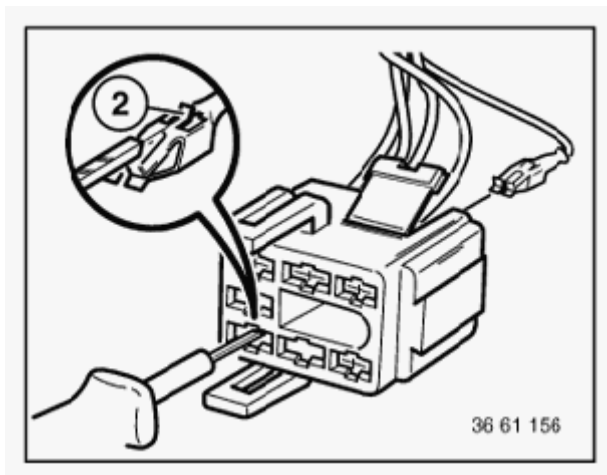


Fig. 24: Pressing Back Arrester Hook
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... BASE OF TAB CONNECTOR HOUSINGS

Unlock hook (1) with special tool 61 1 360 and slide plug housing downwards out of base.

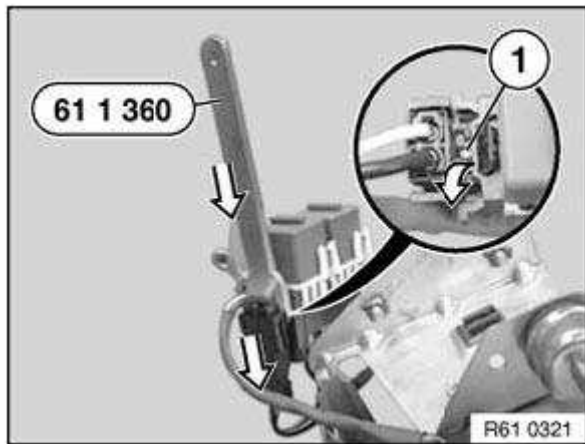


Fig. 25: Sliding Plug Housing

Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION

Special tools required:

- 61 0 300
- 61 9 040

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

- IMPORTANT:**
1. Identify cause of damage (e.g. sharp-edged body parts, 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 connection scheme (e.g. anti-lock braking system, active rear-axle kinematics, airbags, etc.) are influenced. Otherwise replace faulty wiring harness or use repair cable (sourcing reference: BMW Parts Service)
 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 Service.

Special tools:

- special tool 61 9 040

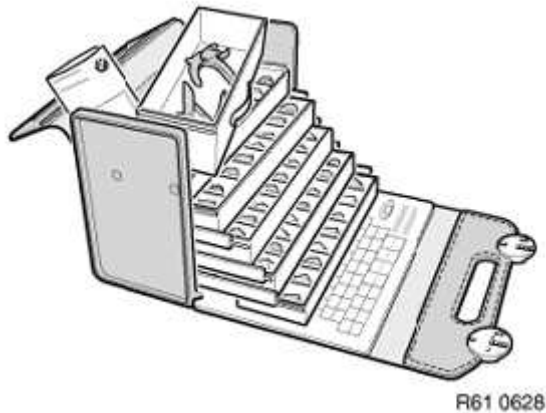


Fig. 26: Identifying Repair Kit
Courtesy of BMW OF NORTH AMERICA, INC.

Choose repair kit.

Example: Repair kit, circular plug system D 2.5.

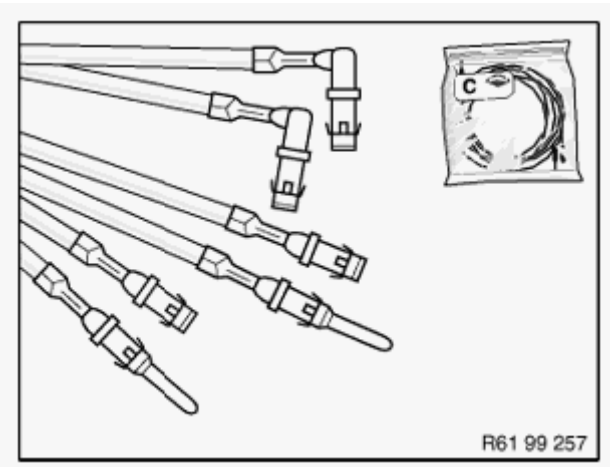


Fig. 27: Identifying Circular Plug System D 2.5
Courtesy of BMW OF NORTH AMERICA, INC.

Remove following parts:

1. Prepackaged end of cable with requisite wire cross-section
2. Crimp connector for selected wire cross-section
3. Shrink-fit hose

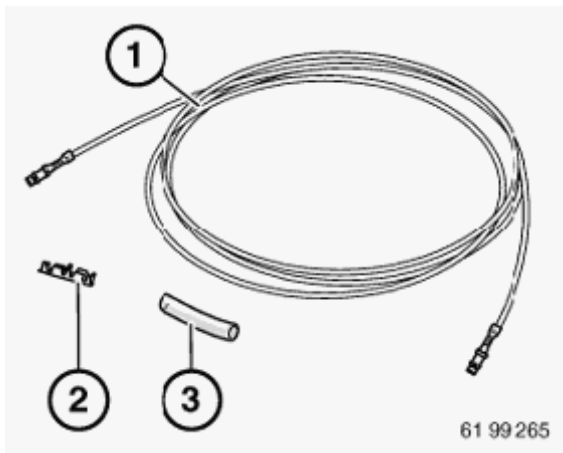


Fig. 28: Identifying Wire, Shrink-Fit Hose And Crimp Connector
 Courtesy of BMW OF NORTH AMERICA, INC.

Open secondary lock on housing.

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

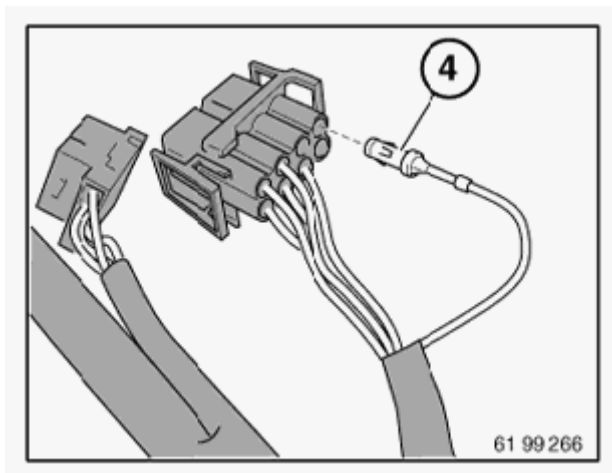


Fig. 29: Mark Damaged Contact With Socket Number
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

Observe 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

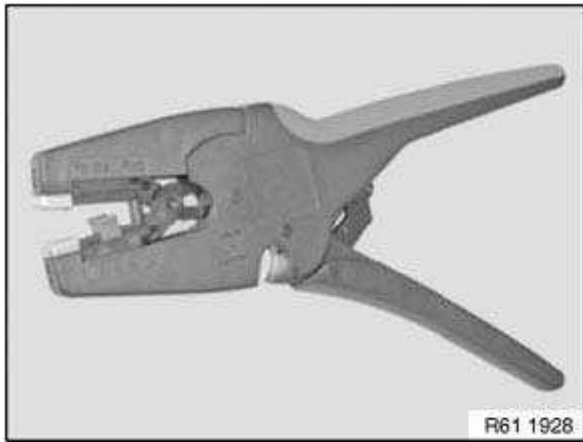


Fig. 30: Identifying Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Crimp butt connector on preassembled wire end.

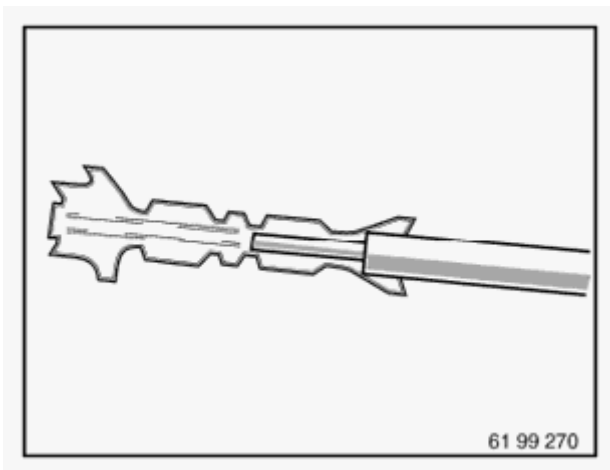


Fig. 31: Identifying Crimp Butt Connector On Preassembled Wire End
Courtesy of BMW OF NORTH AMERICA, INC.

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

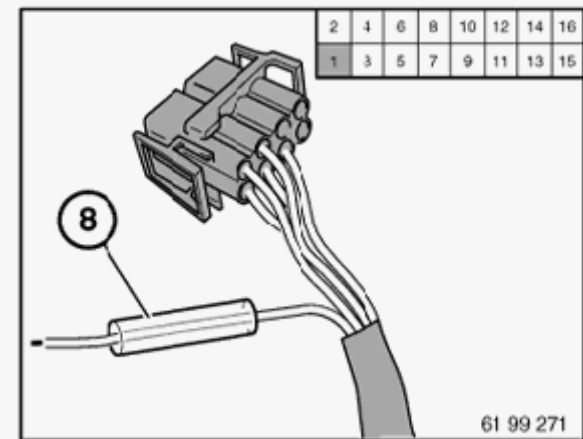


Fig. 32: Identifying Shrink-Fit Hose Onto Free Wire End
 Courtesy of BMW OF NORTH AMERICA, INC.

Crimp unused wire end to butt connector.

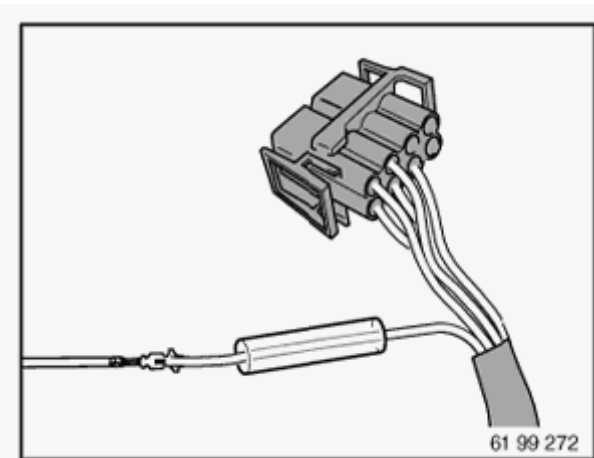


Fig. 33: Crimping Wire End To Butt Connector
 Courtesy of BMW OF NORTH AMERICA, INC.

Pull shrink-on sleeve over butt connector.

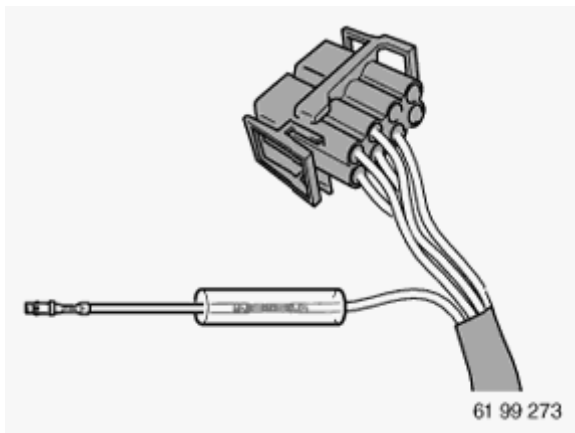


Fig. 34: Pulling Shrink-On Sleeve

Courtesy of BMW OF NORTH AMERICA, INC.

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.

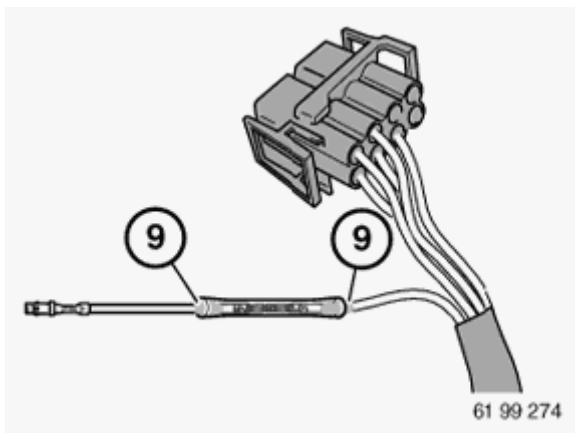


Fig. 35: Identifying Secondary Lock On Housing

Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... CRIMPING MICRO POWER QUADLOCK CONTACTS (MPQ)

Special tools required:

- 61 4 320

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

To crimp MPQ contacts, use pliers 61 4 321 (1) in conjunction with crimping head 61 4 325 (2) from crimping set 61 4 320 .

NOTE: Pliers (1) open automatically as far as they will go when handles are pressed together.

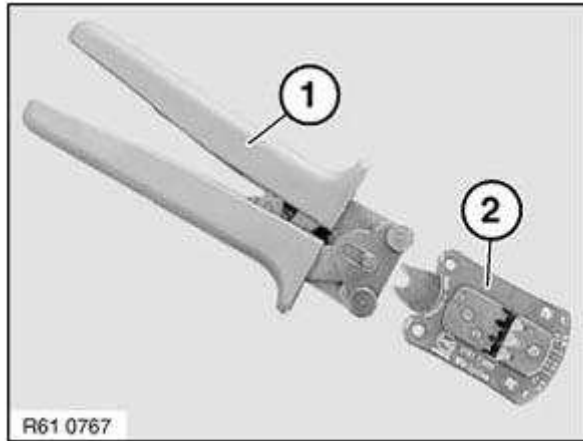


Fig. 36: Identifying Pliers And Crimping Head
Courtesy of BMW OF NORTH AMERICA, INC.

Open pliers (1).

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

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

Close pliers (1) one notch.

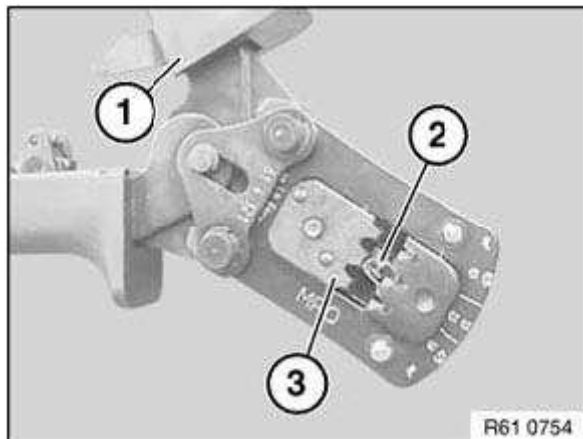


Fig. 37: Identifying MPQ Contact And Crimping Head
Courtesy of BMW OF NORTH AMERICA, INC.

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

Insert stripped cable (2).

Close pliers (1) fully.

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

NOTE: Check contact for correct crimping.

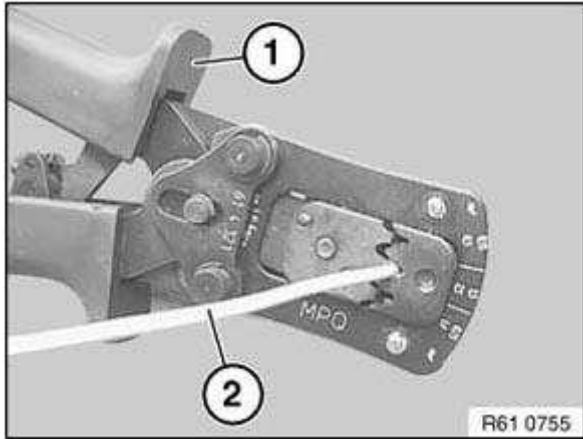


Fig. 38: Identifying Stripped Cable, Cable And Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... CRIMPING MICRO QUADLOCK SYSTEM CONTACTS (MQS)

Special tools required:

- 61 4 320

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

To crimp MQS contacts, use pliers 61 4 321 (1) in conjunction with crimping head 61 4 324 (2) from crimping set 61 4 320 .

NOTE: Pliers (1) open automatically as far as they will go when handles are pressed together.

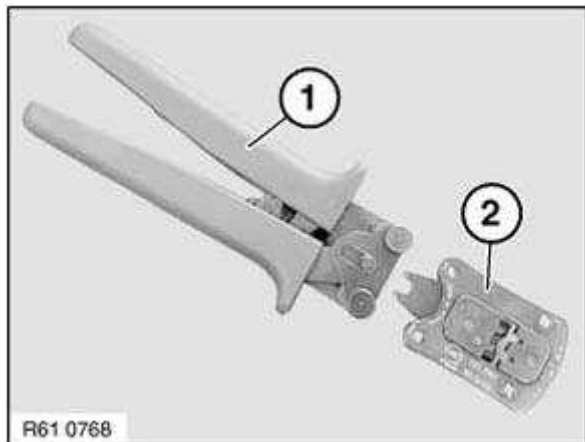


Fig. 39: Identifying Pliers And Crimping Head
 Courtesy of BMW OF NORTH AMERICA, INC.

Open pliers (1).

Fold up contact carrier (2).

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

Fold back contact carrier (2).

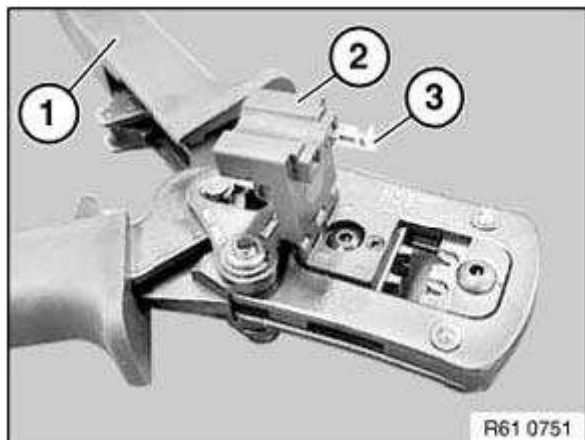


Fig. 40: Identifying MQS Contact, Contact Carrier And Pliers
 Courtesy of BMW OF NORTH AMERICA, INC.

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

Close pliers (1) one notch.

Insert stripped cable (2).

Close pliers (1) fully.

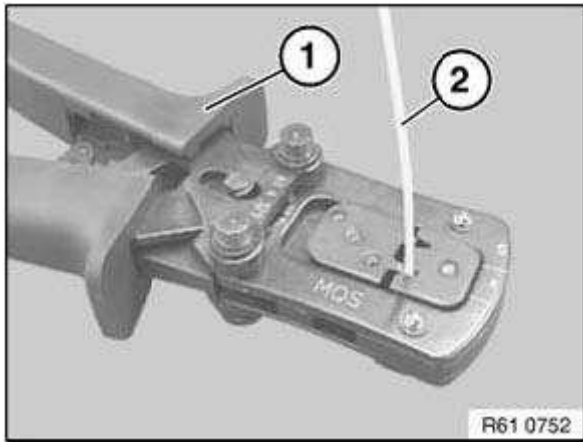


Fig. 41: Identifying Stripped Cable And Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

Open pliers (1).

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

NOTE: Check contact for correct crimping.

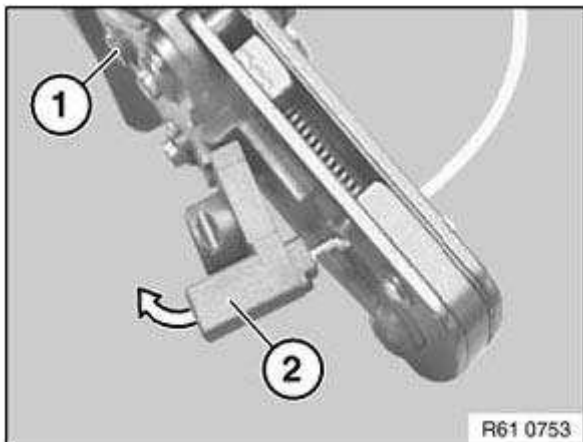


Fig. 42: Checking Contact For Correct Crimping
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... CRIMPING ANNULAR CONTACTS

Special tools required:

- 61 4 320

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

Crimping annular contacts:

Special tool 61 4 320

Handling:

61 13 ... CRIMPING OPTICAL FIBRES

Special tools required:

- 61 4 320

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

To crimp optical fibres, use pliers 61 4 321 (1) in conjunction with crimping head 61 4 323 (2) from crimping set 61 4 320 .

NOTE: Pliers (1) open automatically as far as they will go when handles are pressed together.

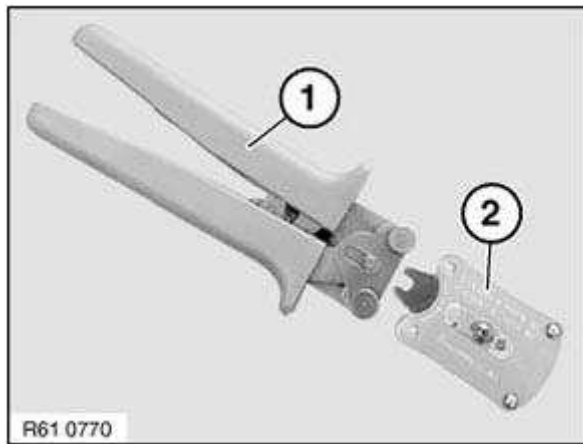


Fig. 43: Identifying Crimping Head And Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

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

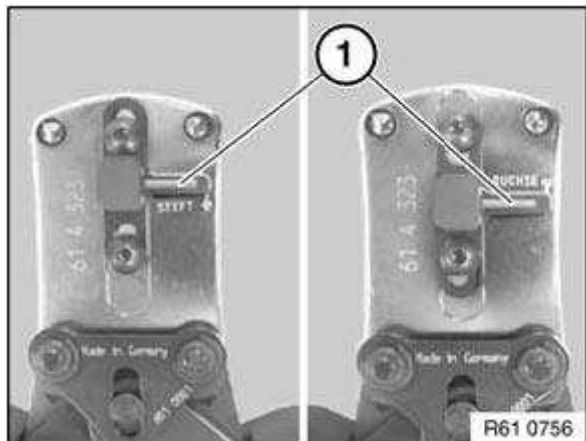


Fig. 44: Identifying Stop Lever

Courtesy of BMW OF NORTH AMERICA, INC.

Open pliers (2).

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

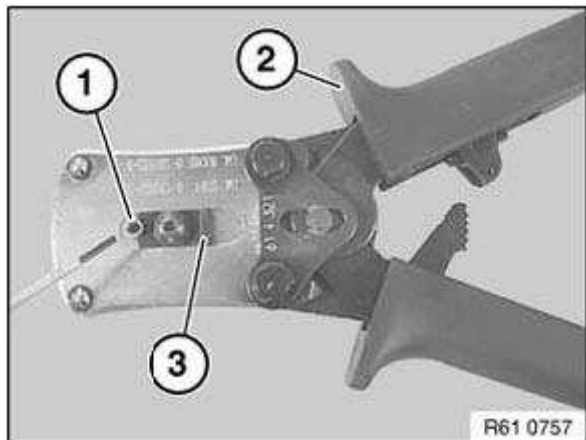


Fig. 45: Identifying Jack And Locking Lever

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Follow procedure for cutting and stripping insulation from optical fibres .
 Insert stripped optical fibre (1) as far as it will go into pin contact or jack (2).
 Close pliers (3) fully.
 Open pliers (3) and locking lever (4).
 Remove optical fibre (1).

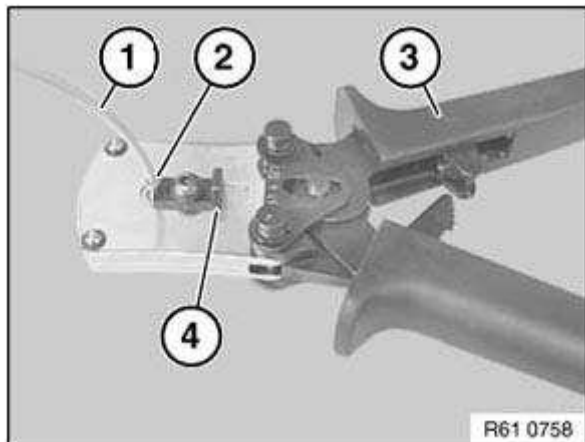


Fig. 46: Identifying Pliers, Locking Lever And Stripped Optical Fibre
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: 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).

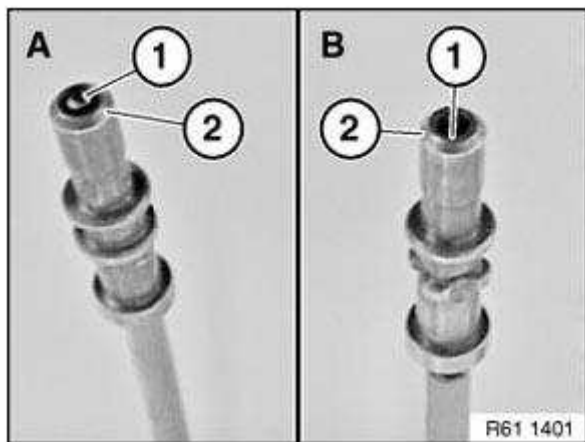


Fig. 47: Identifying Optical Fibre And Pin Contact
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... CRIMPING STOP PARTS

Special tools required:

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

NOTE: See ENGINE ELECTRICAL SYSTEM - SPECIAL TOOLS (N54, N63) .

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

3. Crimping contact sleeves for fan connectors 4 mm² and ignition cable contacts

Special tool kit **12 1 080** is used to fit ignition cable contacts and to crimp 4 mm² contact sleeves for fan connectors.

- **12 1 081** (hand crimping tool)
- **12 1 083** (matrix)

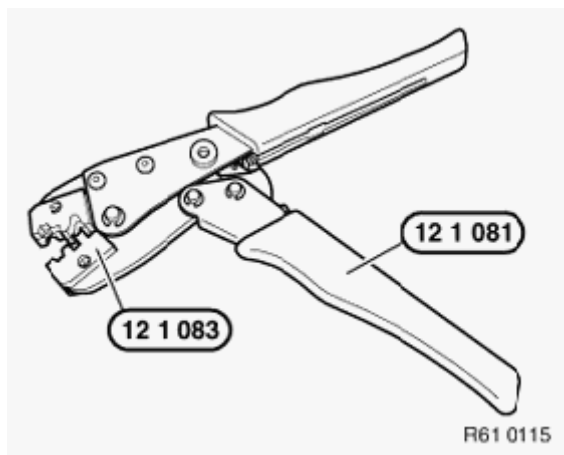


Fig. 48: Identifying Hand Crimping Tool And Matrix
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock special tool **12 1 081** :

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

Or:

Compress handles as far as they will go, tool unlocks automatically.

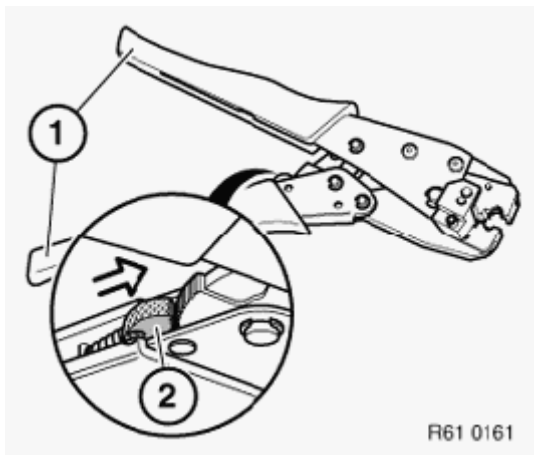


Fig. 49: Identifying Squeeze Grips And Unlocking Lever
 Courtesy of BMW OF NORTH AMERICA, INC.

Insert contact sleeve 4 mm² in nest with lock (1) as far as it will go.

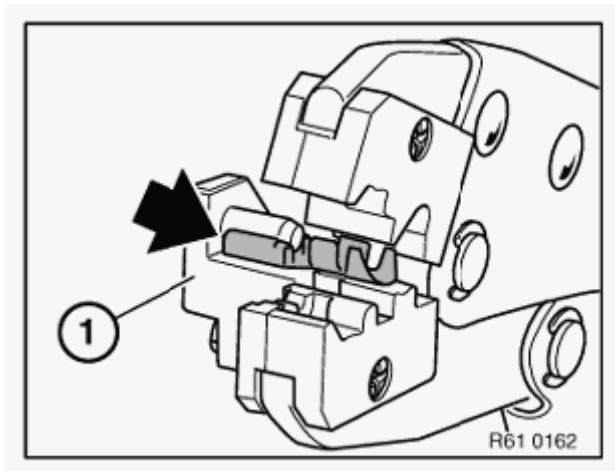


Fig. 50: Inserting Contact Sleeve With Lock
 Courtesy of BMW OF NORTH AMERICA, INC.

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

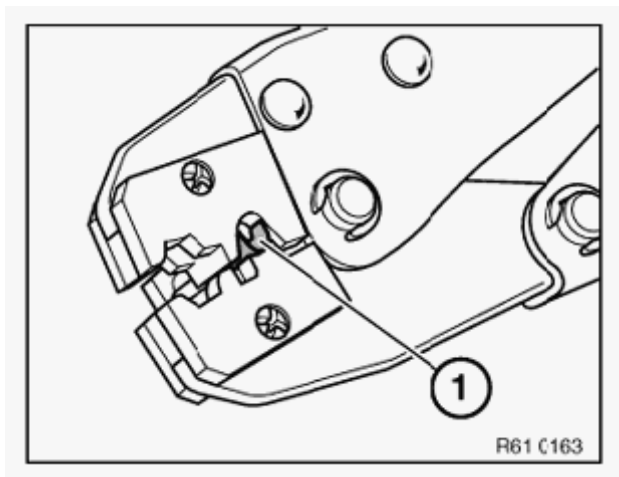


Fig. 51: Grip Contact Firmly
 Courtesy of BMW OF NORTH AMERICA, INC.

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 as far as it will go.

Crimping tool unlocks automatically.

Take contact out of crimping tool.

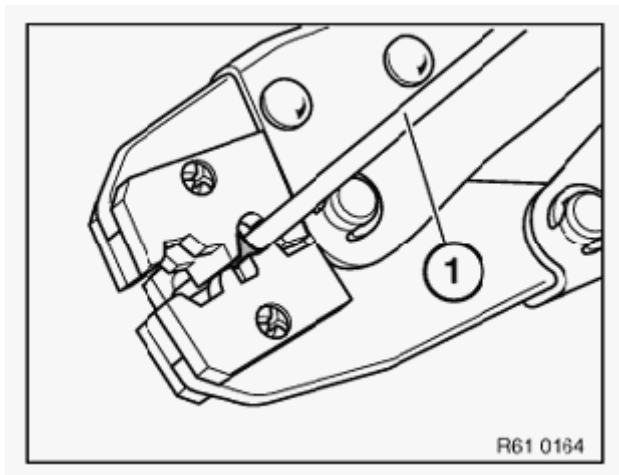


Fig. 52: Inserting Stripped End Of Wire
 Courtesy of BMW OF NORTH AMERICA, INC.

4. Checking crimping

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

located.

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

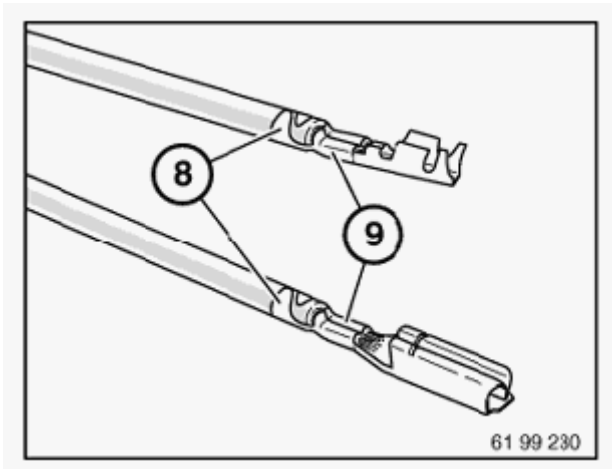


Fig. 53: Identifying Insulation Crimp And Wire Crimp
Courtesy of BMW OF NORTH AMERICA, INC.

Correct crimping:

Visible conductor end (10).

Visible insulation end (11).

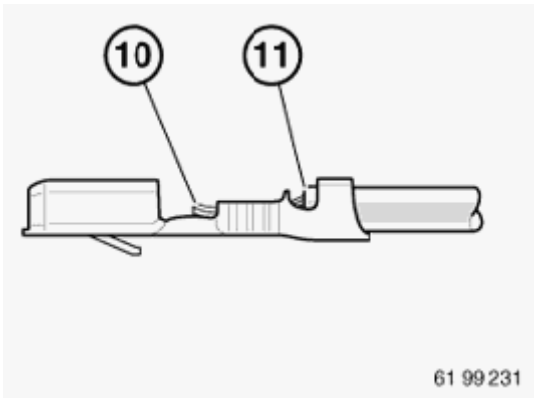


Fig. 54: Identifying Visible Insulation End And Visible Conductor End (Correct Crimping)
Courtesy of BMW OF NORTH AMERICA, INC.

Incorrect crimping:

Conductor end (10) inserted too far.

Insulation end (11) in wire crimp.

If necessary, repeat crimping with a new contact.

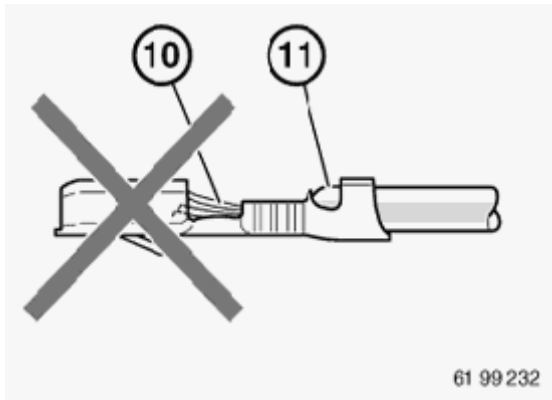


Fig. 55: Identifying Visible Insulation End And Visible Conductor End (Incorrect Crimping)
Courtesy of BMW OF NORTH AMERICA, INC.

Incorrect crimping:

Conductor end (10) not visible.

Insulation end (11) not visible.

If necessary, repeat crimping with a new contact.

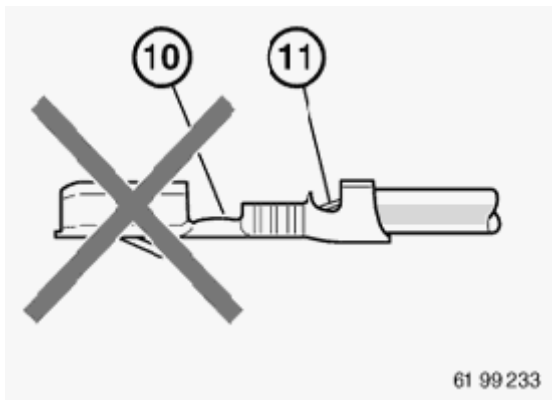


Fig. 56: Identifying Conductor End And Insulation End (Not Visible)
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... CUTTING OFF, STRIPPING INSULATION AND CUTTING OPTICAL FIBRES TO LENGTH

Special tools required:

- 61 4 320

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

To cut off, strip insulation and cut optical fibres to length, use pliers 61 4 321 (1) in conjunction with crimping head 61 4 322 (2) from crimping set **61 4 320** .

NOTE: **Pliers (1) open automatically as far as they will go when handles are pressed together.**

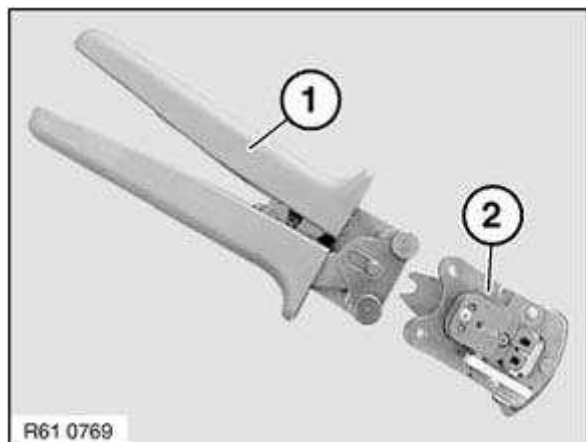


Fig. 57: Identifying Crimping Head And Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

Cutting optical fibre

Open pliers (1).

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

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

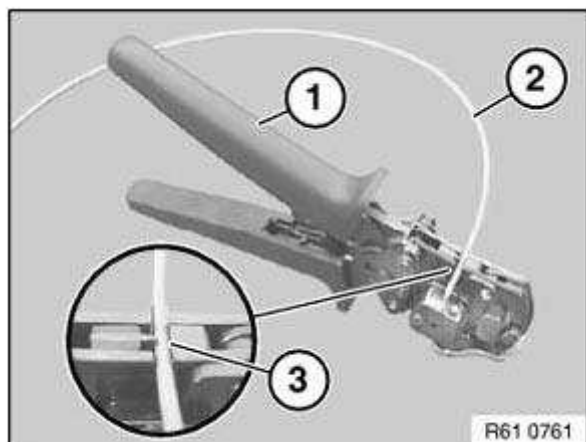


Fig. 58: Identifying Optical Fibre And Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

Stripping insulation from optical fibre

Open pliers (1).

Open lever (2) in direction of arrow.

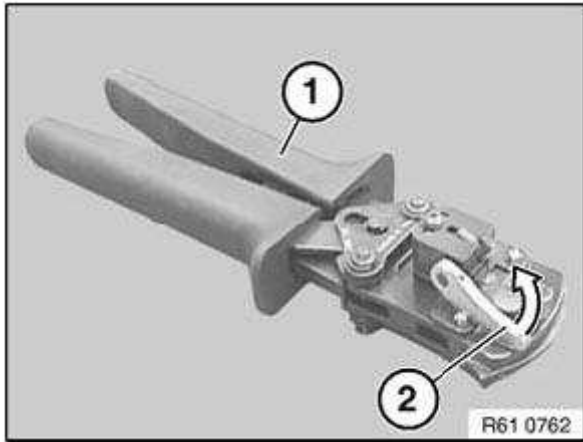


Fig. 59: Identifying Pliers And Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Slide optical fibre (1) into stripping device (2) until flush at point (3).

Close pliers (4) fully.

Close clamping lever (5) in direction of arrow.

Open pliers (4) by one tooth notch.

Open clamping lever (5) against direction of arrow again and remove optical fibre (1).

NOTE: A stripping replacement blade set is available under number 61 4 327.

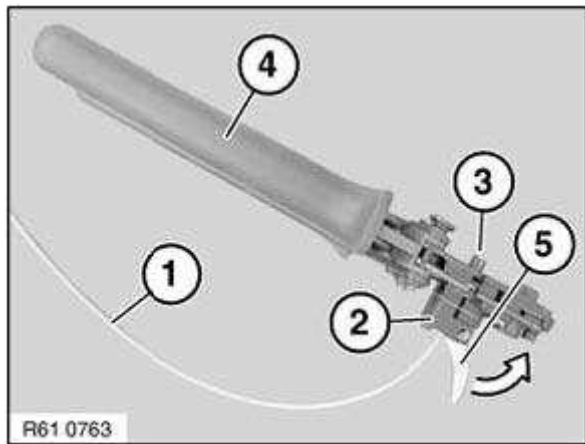


Fig. 60: Identifying Clamping Lever And Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

Cutting optical fibre to length

IMPORTANT: The cutting blade must be replaced prior to each cutting of the optical fibre.

Pull pin (1) in direction of arrow.

Fold up blade retaining link (2) in direction of arrow.

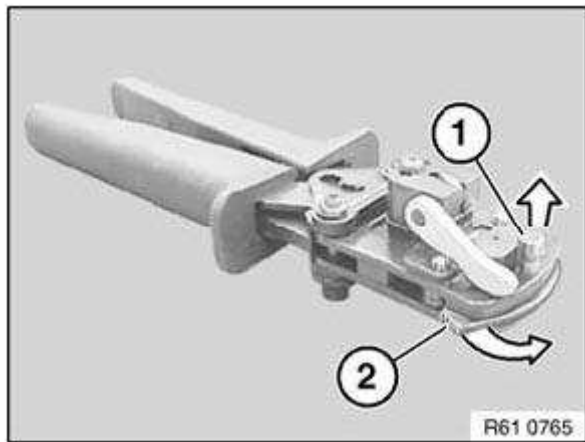


Fig. 61: Identifying Blade Retaining Link And Pin
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: Risk of injury when changing the blade.

Remove blade (1) and replace.

Installation:

Make sure blade (1) is correctly seated on locating points (2).

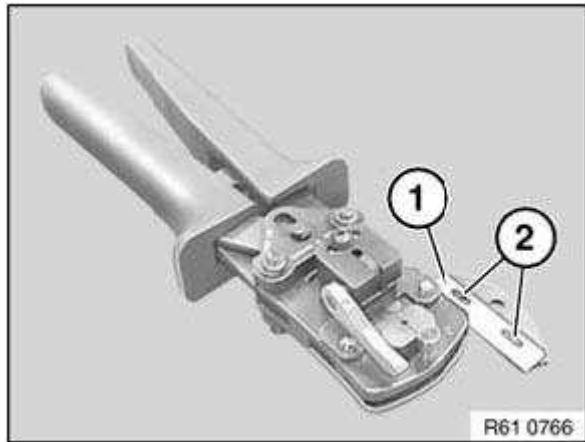


Fig. 62: Identifying Blade And Locating Points
Courtesy of BMW OF NORTH AMERICA, INC.

Open pliers (3).

Slide optical fibre (1) into cutting device (2) until insulation of optical fibre (1) butts against clamping device.

Close pliers (3) fully and keep closed.

Remove optical fibre (1).

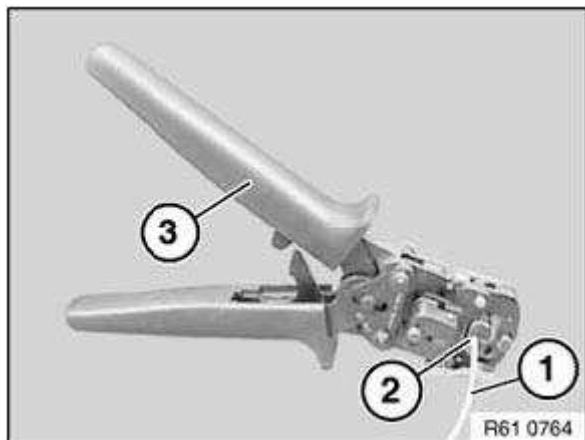


Fig. 63: Identifying Optical Fibre And Cutting Device
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES

Stripped length

STRIPPED LENGTH CHART

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

61 13 ... IN-LINE PLUGS, 30-PIN, HYBRID SYSTEM MQS/MPQ

Manufactured by AMP: The following contact types without strand sealing can be fitted in the plug 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) from rear out of housing (2).

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

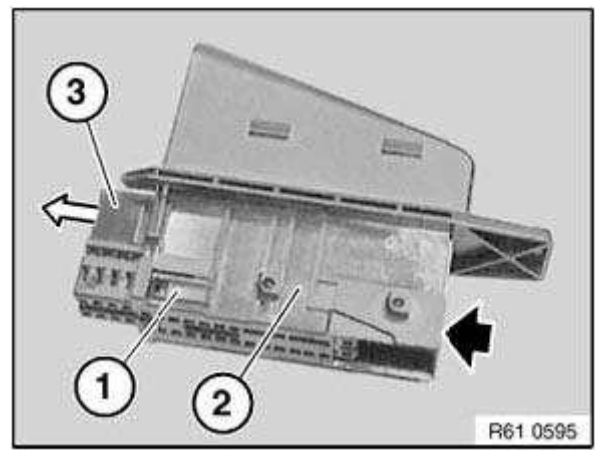


Fig. 64: Raising Lock On Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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).

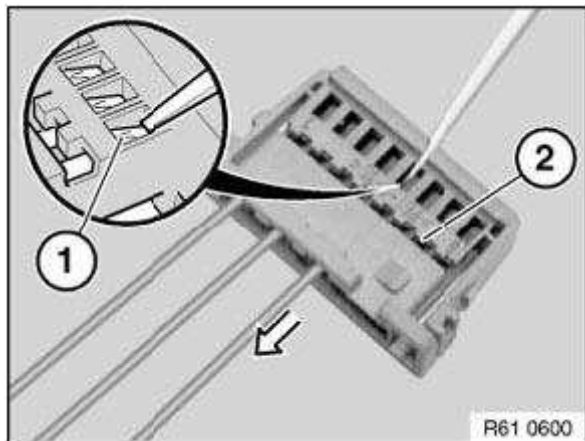


Fig. 65: Holding Retaining Hook Of Socket
Courtesy of BMW OF NORTH AMERICA, INC.

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

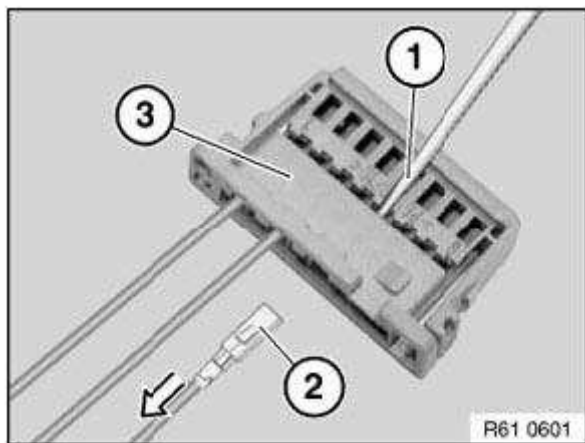


Fig. 66: Pulling Cable With Socket Contact
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... IN-LINE PLUGS, 6- TO 50-PIN, SYSTEM ELO

Unlock lock.

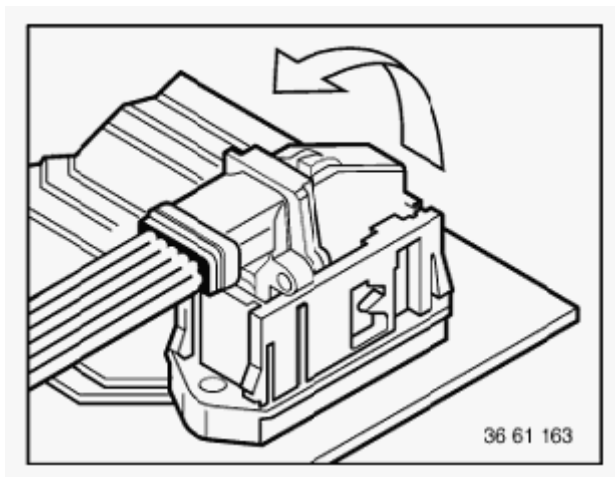


Fig. 67: Identifying Unlock Lock
 Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten cable clip.

Installation:

Cable clip must be reinstalled.

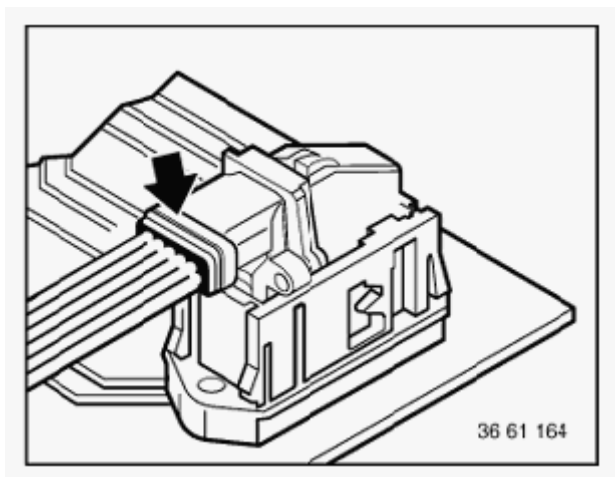


Fig. 68: Identifying Cable Clip
 Courtesy of BMW OF NORTH AMERICA, INC.

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

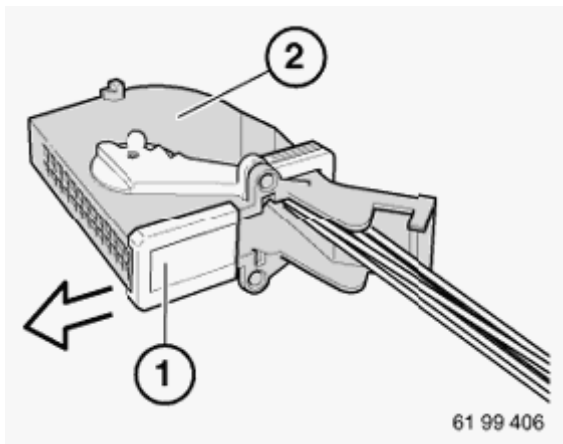


Fig. 69: Detaching Catch From Plug Housing
 Courtesy of BMW OF NORTH AMERICA, INC.

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

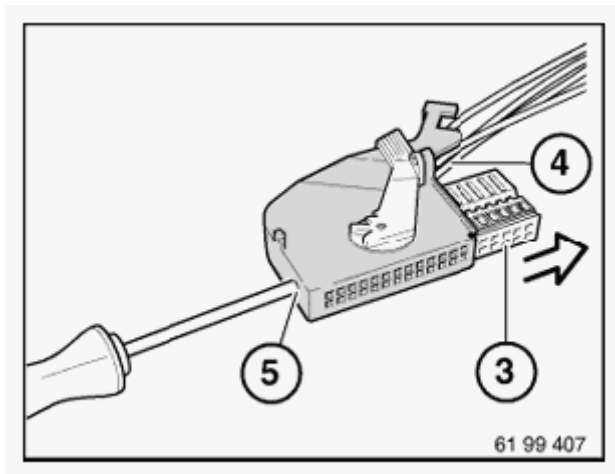


Fig. 70: Press Out Contact Carrier With Wiring Harness Through Opening
 Courtesy of BMW OF NORTH AMERICA, INC.

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

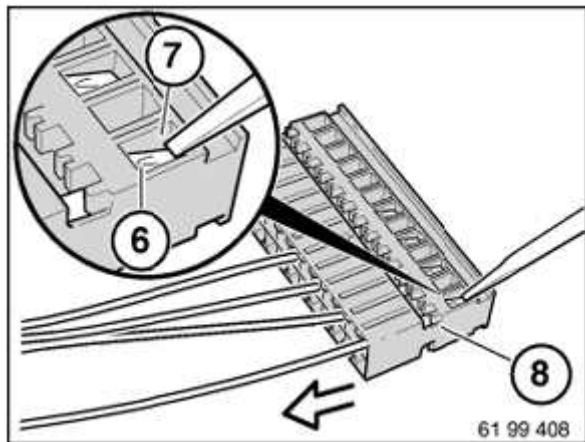


Fig. 71: Identifying Arrestor Hook And Secondary Lock
 Courtesy of BMW OF NORTH AMERICA, INC.

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

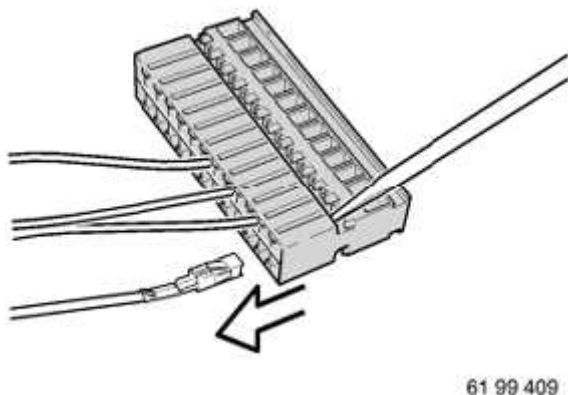


Fig. 72: Holding Arrestor Hook In Secondary Lock
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... IN-LINE PLUGS, 6-, 8-PIN, SYSTEM MQS

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

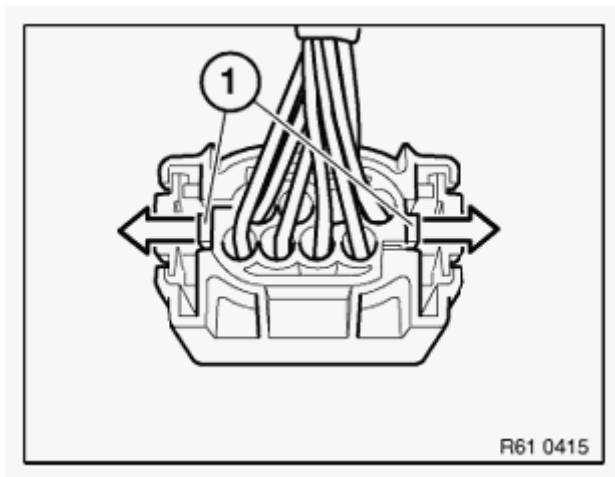


Fig. 73: Pressing Lock Of Slide Plug
 Courtesy of BMW OF NORTH AMERICA, INC.

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

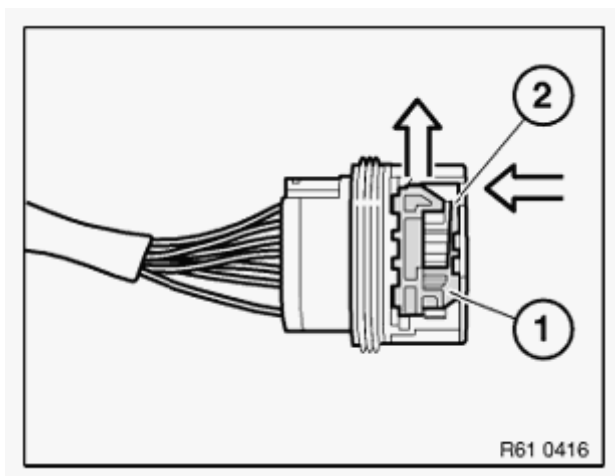


Fig. 74: Pressing Locking Hook And Slide Lock
 Courtesy of BMW OF NORTH AMERICA, INC.

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

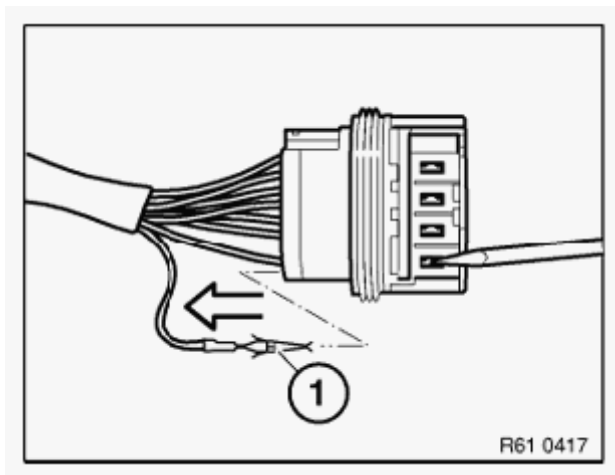


Fig. 75: Pressing Down Arrestor Hook
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... INSTALLING FAN CONNECTOR FOR RETROFITTING/REPAIRS

Special tools required:

- 61 9 040
- 61 9 041
- 61 9 042

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

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 Service.

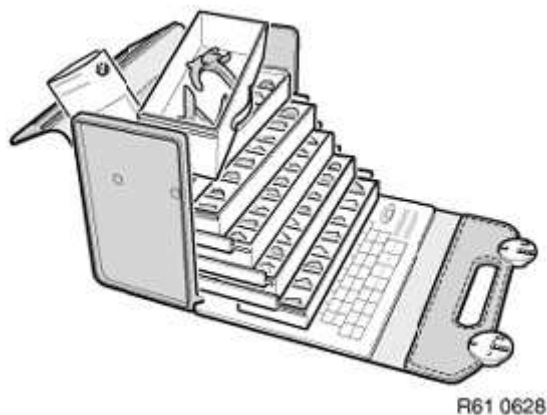


Fig. 76: Identifying Repair Kit
Courtesy of BMW OF NORTH AMERICA, INC.

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

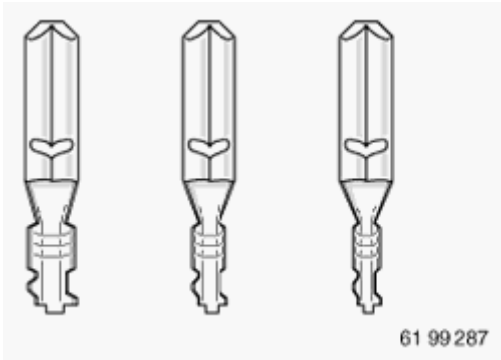


Fig. 77: Identifying Contact Sleeve In Wire Cross-Section
Courtesy of BMW OF NORTH AMERICA, INC.

Alternatively:

Choose contact sleeves (up to 2.5 mm^2) for fan connectors.

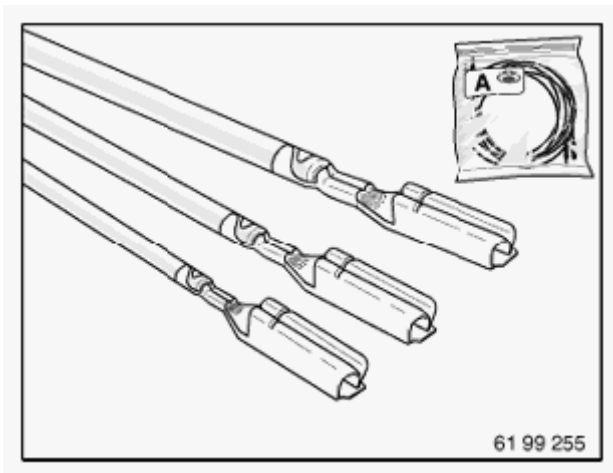


Fig. 78: Identifying Contact Sleeves For Fan Connectors
Courtesy of BMW OF NORTH AMERICA, INC.

Cut through wire loop in wiring harness at established point.

Strip insulation from both wire ends.

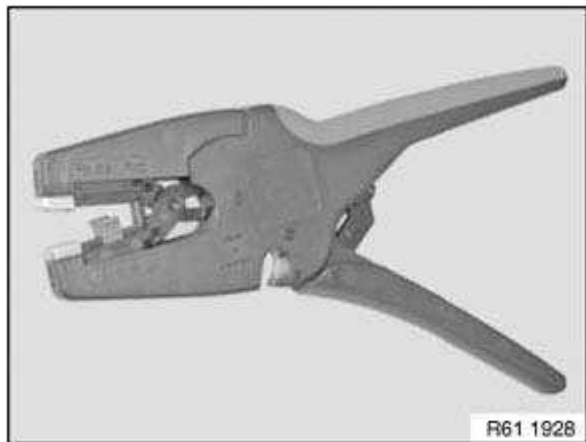


Fig. 79: Identifying Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Crimp contact sleeves on both wire ends.

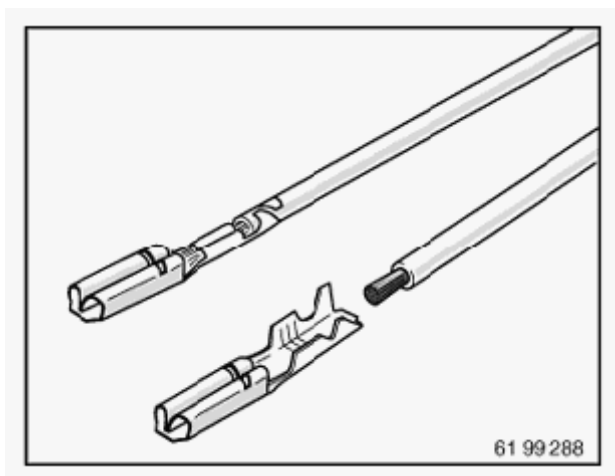


Fig. 80: Identifying Contact Sleeves On Both Wire Ends
Courtesy of BMW OF NORTH AMERICA, INC.

Crimp connecting cable for retrofitting likewise with contact sleeve.

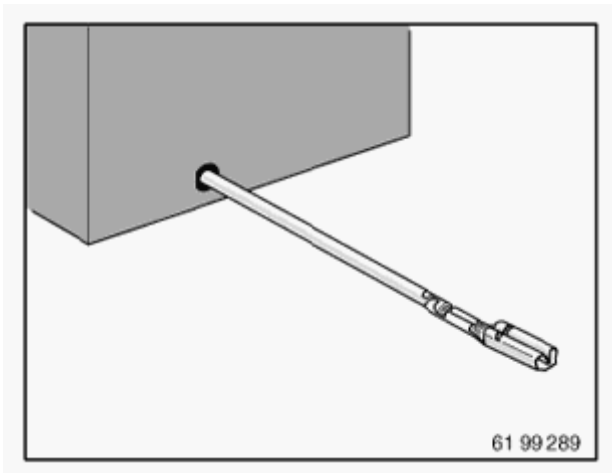


Fig. 81: Crimping Connecting Cable For Retrofitting
Courtesy of BMW OF NORTH AMERICA, INC.

Cut required number of poles to length for fan connectors.

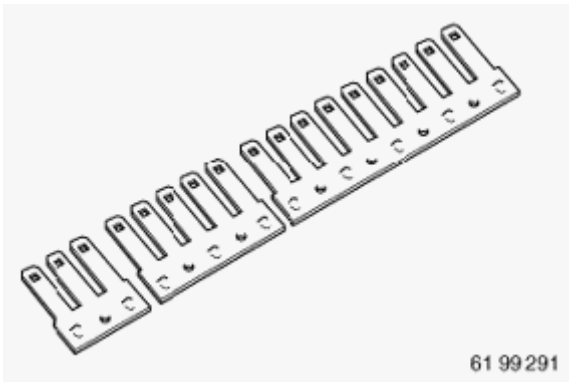


Fig. 82: Identifying Fan Connectors Poles
Courtesy of BMW OF NORTH AMERICA, INC.

Special tool **61 9 041** (hand crimping tool) in conjunction with **61 9 042** (matrix) are used for pushing contact sleeves onto fan connectors.

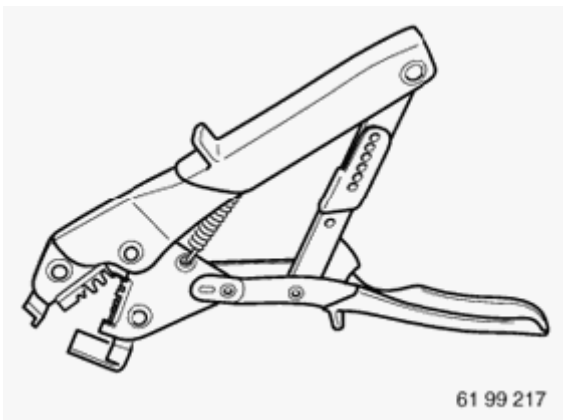


Fig. 83: Identifying Special Tools For Wiring Harness Repairs
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock special tool **61 9 041** :

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

Or:

Compress handles as far as they will go, tool unlocks automatically.

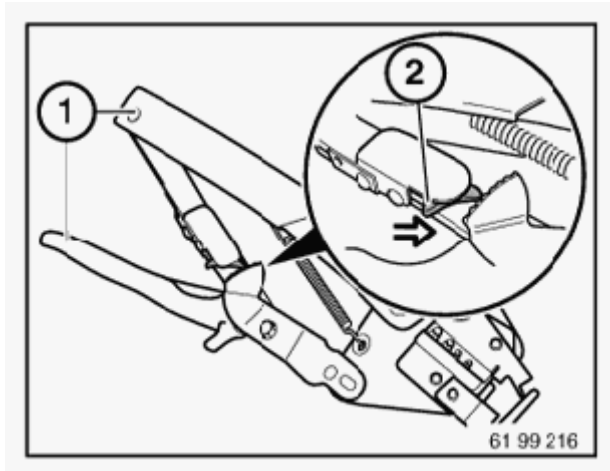


Fig. 84: Identifying Unlocking Lever And Squeeze Grips
Courtesy of BMW OF NORTH AMERICA, INC.

Insert prepared fan connector (3) in special tool **61 9 041 /61 9 042** .

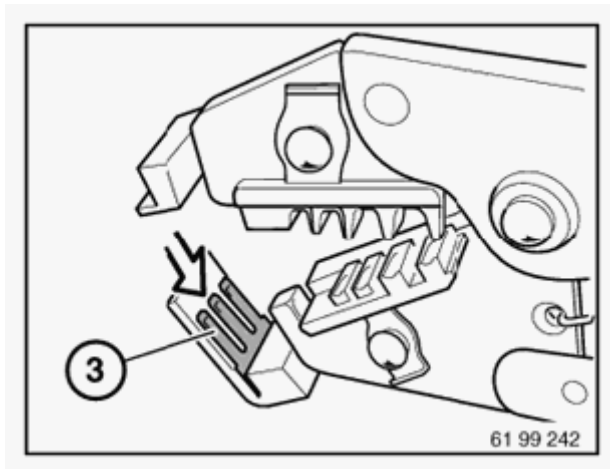


Fig. 85: Identifying Fan Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Attach wire with contact sleeve to fan connector.

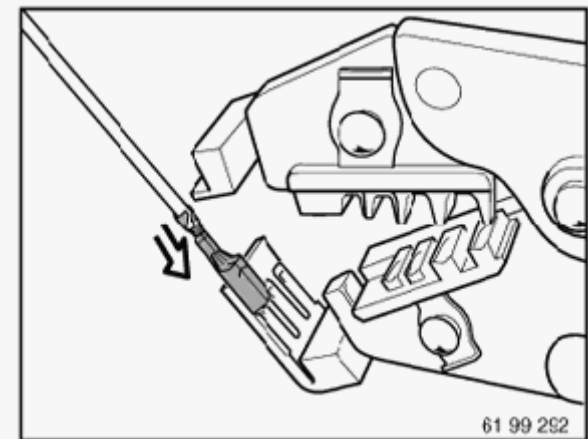


Fig. 86: Attaching Wire With Contact Sleeve To Fan Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Press crimping tool together and slide contact sleeve firmly home.

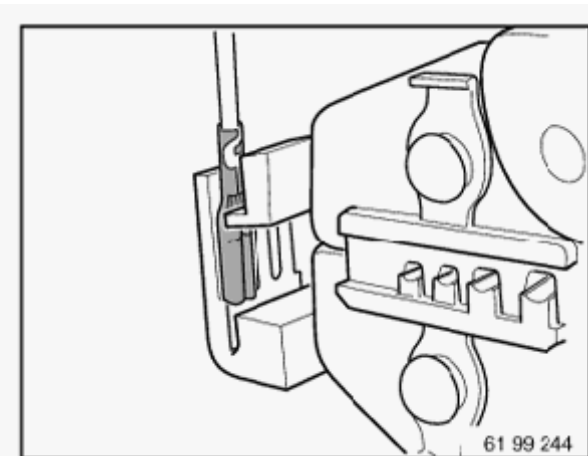


Fig. 87: Pressing Crimping Tool
Courtesy of BMW OF NORTH AMERICA, INC.

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

Push on further contact sleeves for potential branching.

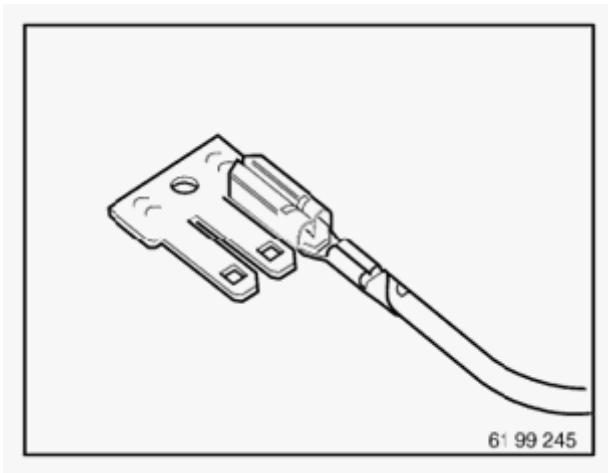


Fig. 88: Push On Further Contact Sleeves For Potential Branching
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation in wet area (engine compartment, wheel arch)

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

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

NOTE: Ensure that fan connector has sufficient contact surface on mounting point.

Do not heat shrink-fit hose on edges of fan connector too strongly, risk of cracking.

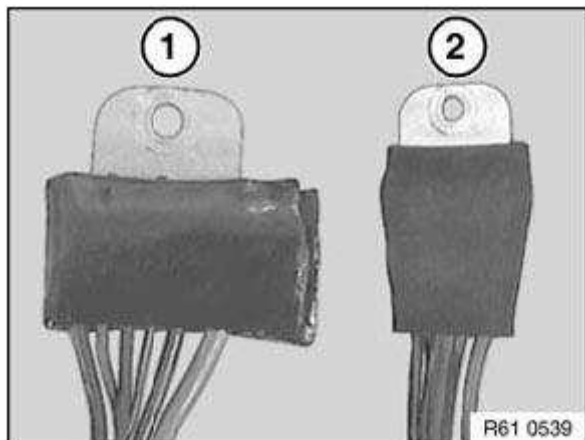


Fig. 89: Fitting Shrink-Fit Hose And Hot Air Blower
 Courtesy of BMW OF NORTH AMERICA, INC.

Allow shrink-fit hose to cool down until hand-warm. Then press sealing material again into contacts and onto edges of fan connector.

If necessary, carefully heat shrink-fit hose again.

Installation in dry area (interior, luggage compartment)

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

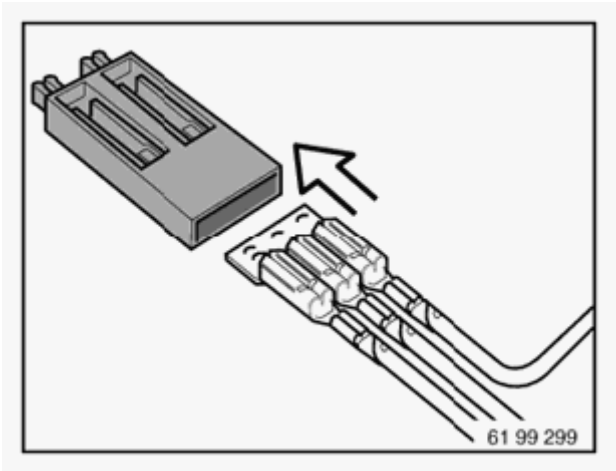


Fig. 90: Sliding Assembled Fan Connector Into Insulation Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

SPECIAL TOOL SPECIFICATION

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.

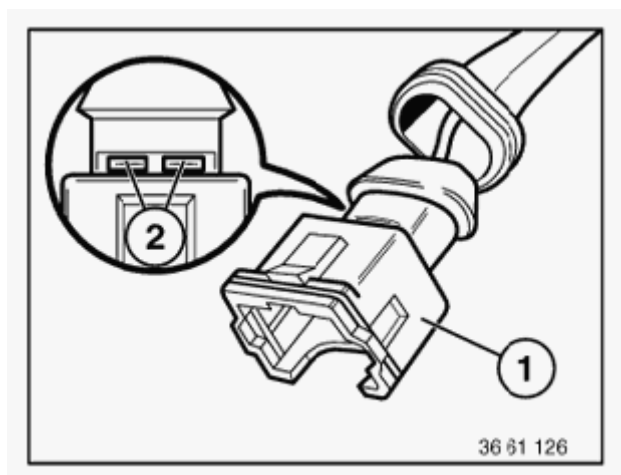


Fig. 91: Identifying Ultrasonically Welded Plugs And Ultrasonic-Welded Connectors

Courtesy of BMW OF NORTH AMERICA, INC.

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)

61 13 ... PLUG HOUSING, LCC CONTACT (LOAD CURRENT CONTACT)

Special tools required:

- 61 0 317

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

Socket housing:

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

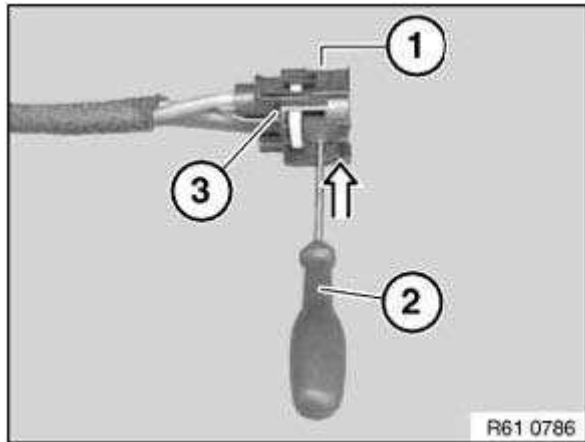


Fig. 92: Pressing Lock With Suitable Tool
Courtesy of BMW OF NORTH AMERICA, INC.

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

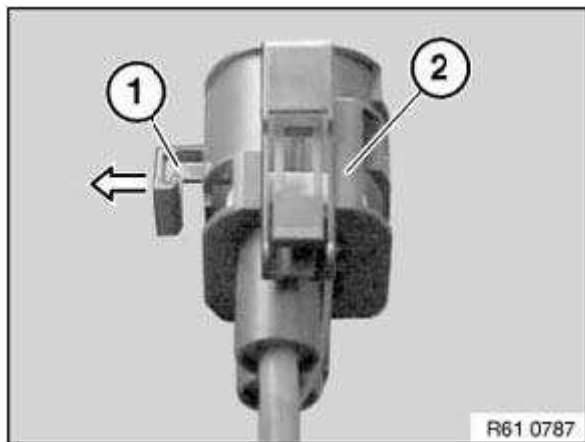


Fig. 93: Pulling Lock Out Of Socket Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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

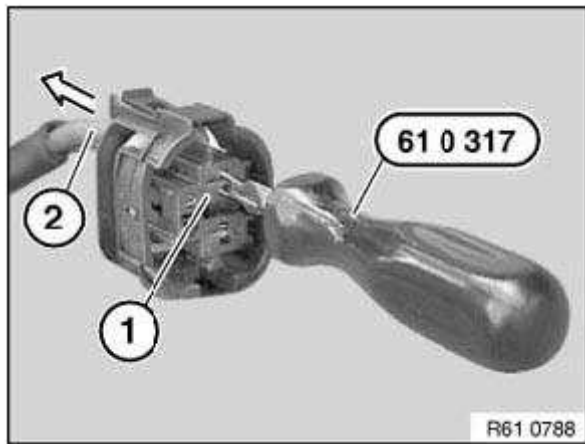


Fig. 94: Identifying Socket Housing And LCC Contact
 Courtesy of BMW OF NORTH AMERICA, INC.

Pin housing:

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

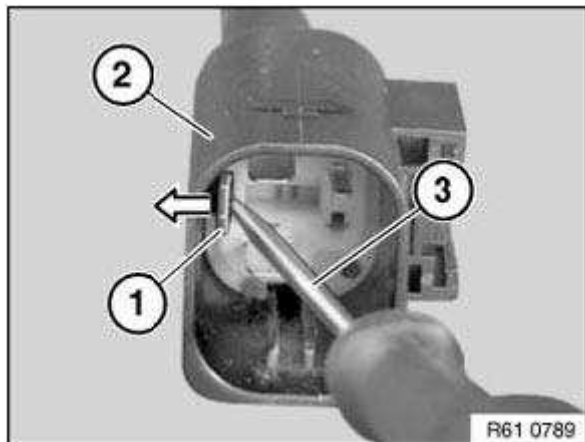


Fig. 95: Identifying Locking Slide Of Pin Housing
 Courtesy of BMW OF NORTH AMERICA, INC.

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

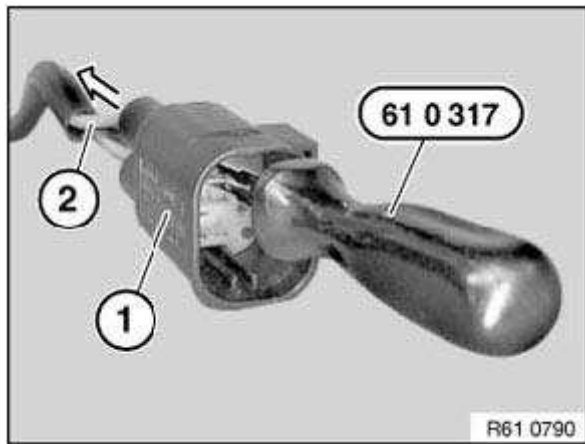


Fig. 96: Identifying Pin Housing And LCC Contact
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... RELAY CARRIER

Place special tool 61 1 153 on relay carrier (1) and carefully pull in direction of arrow until retaining lugs (2) on relay carrier are raised.

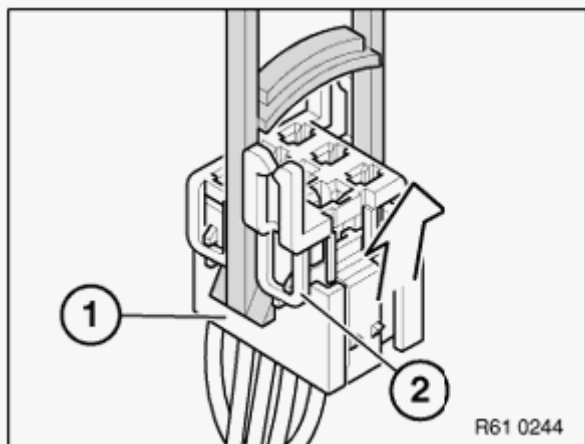


Fig. 97: Identifying Retaining Lugs
 Courtesy of BMW OF NORTH AMERICA, INC.

Pull relay carrier (2) in direction of arrow into first catch (3).

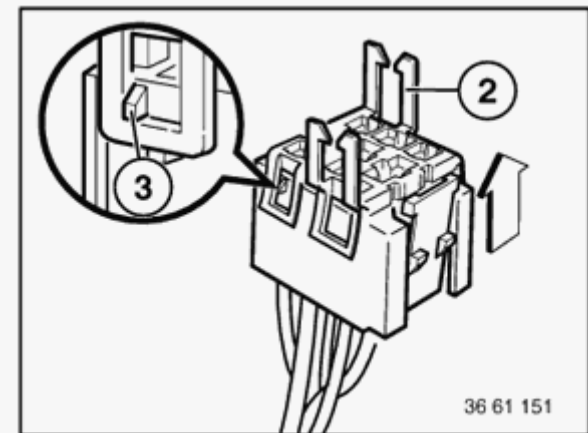


Fig. 98: Pulling Relay Carrier Into First Catch
 Courtesy of BMW OF NORTH AMERICA, INC.

Press down arrester hook (4) of appropriate contact and pull out cable with contact.

Press out double flat spring contact with special tool 61 1 136 or 61 1 137 (ejector).

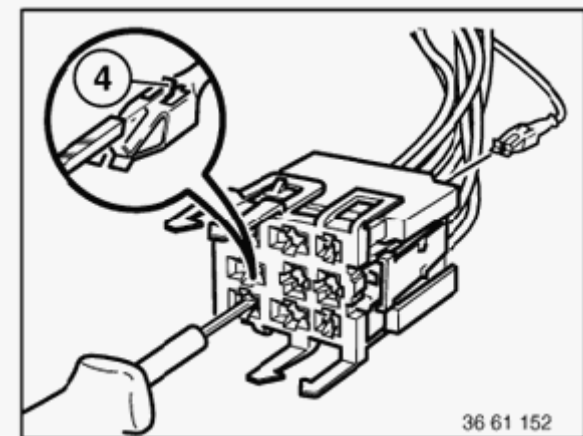


Fig. 99: Pressing Down Arrester Hook
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... REMOVING AND INSTALLING/REPLACING OBD-II SOCKET

Special tools required:

- 61 0 315

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

Necessary preliminary tasks:

- Remove pedal assembly trim . See 51 45 185 REMOVING AND INSTALLING/REPLACING

PANEL FOR PEDALS .

Release screws (1).

Remove OBD-II socket (2) from instrument panel carrier (3).

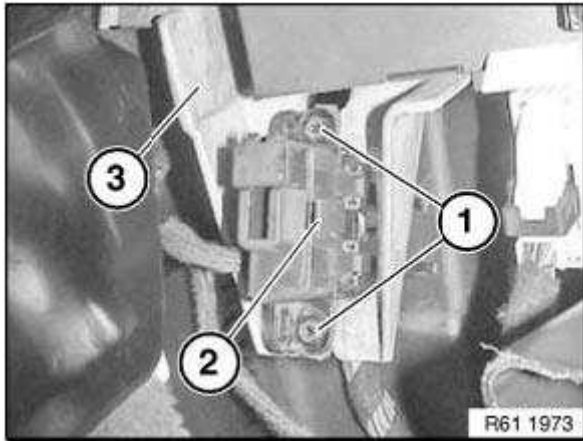


Fig. 100: Identifying OBD-II Socket And Instrument Panel Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

Remove OBD-II socket cover (2) from OBD-II socket (1).

Unlock slide plate (3) with a suitable tool in direction of arrow.

Insert special tool **61 0 315** in OBD-II socket (1) in direction of arrow and press out associated flat spring contact (4). Press remaining flat spring contacts with special tool **61 0 315** out of OBD-II socket (1).

Installation:

Pay attention to pin assignment of OBD-II socket (1).

Make sure flat spring contacts and slide plate (3) are correctly engaged and seated in OBD-II socket (1).

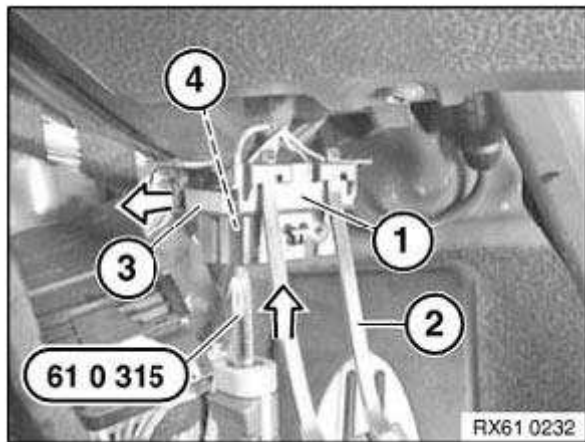


Fig. 101: Identifying Slide Plate And OBD-II Socket
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... REMOVING AND INSTALLING/REPLACING FIBREOPTIC CABLE CONNECTOR

IMPORTANT: Comply with notes and instructions on handling optical waveguides .

Necessary preliminary tasks:

Remove **trim on C-pillar at bottom left** .

Slacken nut (2).

Feed fibre optic cable (1) out of holder (3).

Unlock catch on fibre-optic cable connector (4) with a suitable tool (5).

Remove fibre-optic cable connector (4) in direction of arrow from bracket (3).

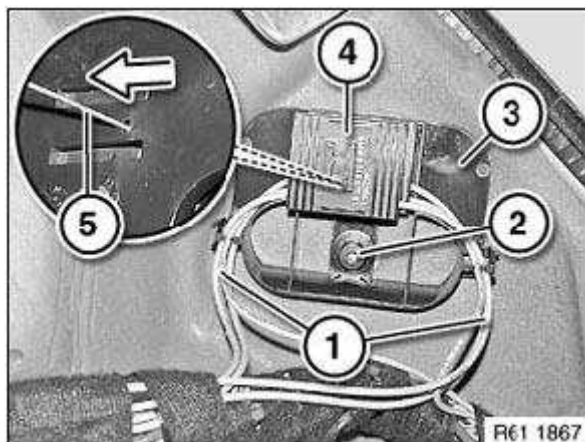


Fig. 102: Remove Fibre-Optic Cable Connector In Direction Of Arrow

Courtesy of BMW OF NORTH AMERICA, INC.

Carefully raise cover cap (1) with a suitable tool and remove from fibre-optic cable connector (2).

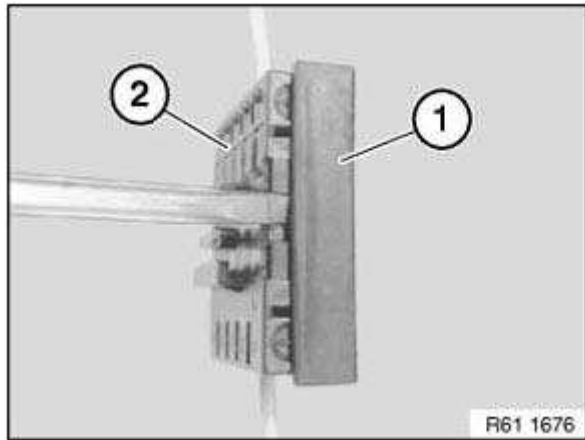


Fig. 103: Raise Cover Cap And Remove Fibre-Optic Cable Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully raise lock (1) and pull fibre-optic cable (2) out of fibreoptic cable connector (3).

Installation:

Make sure fibre-optic cable (2) is correctly seated and engaged in fibre-optic cable connector (3).

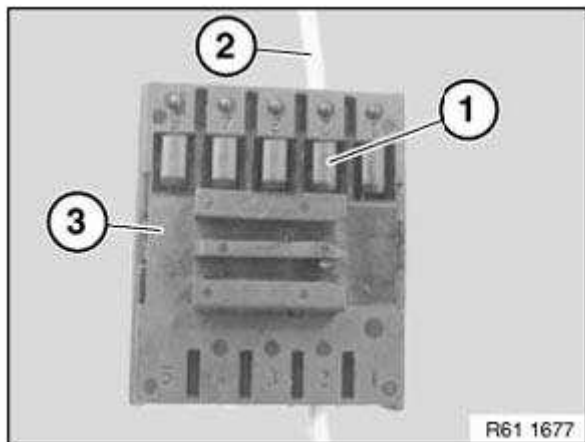


Fig. 104: Identifying Fibre-Optic Cable And Fibre-Optic Cable Connector
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... REPAIRING RIBBON CABLES

Special tools required:

- 61 1 190

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

Place ribbon cables (1) in connector housing (2) and close cover (3).

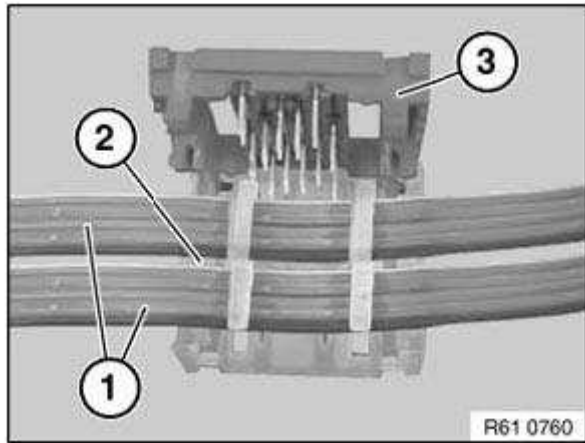


Fig. 105: Place Ribbon Cables In Connector Housing And Close Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Place connector housing (1) in tool (2) 61 1 190 .

Close tool (2).

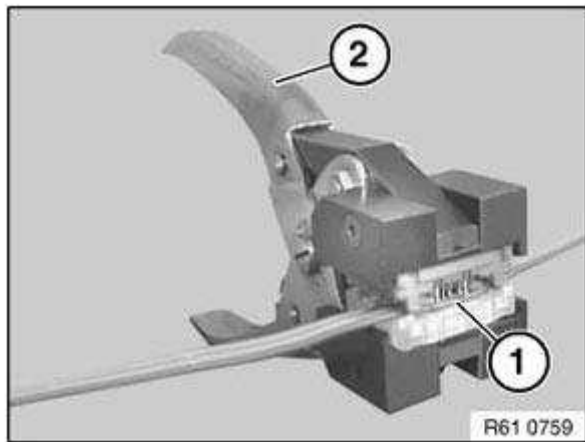


Fig. 106: Identifying Connector Housing
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... RETAINING BRACKET

Pull relevant fuse out of fuse block (1).

NOTE: Mark positions when removing fuses.

Pull locking slide (2) out of fuse block (1) as far as it will go.

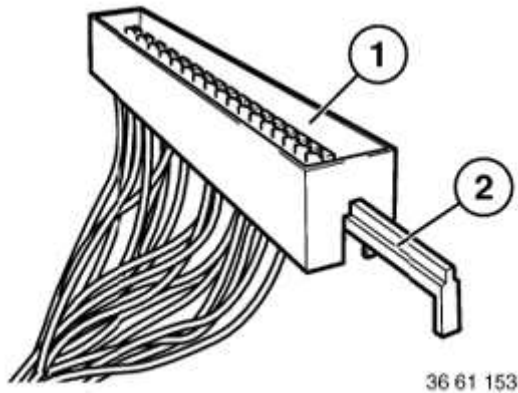


Fig. 107: Identifying Locking Slide And Fuse Block
Courtesy of BMW OF NORTH AMERICA, INC.

With special tool 61 1 136 or 61 1 137 (ejector), press back arrester hook (3) of appropriate contact and pull out cable.

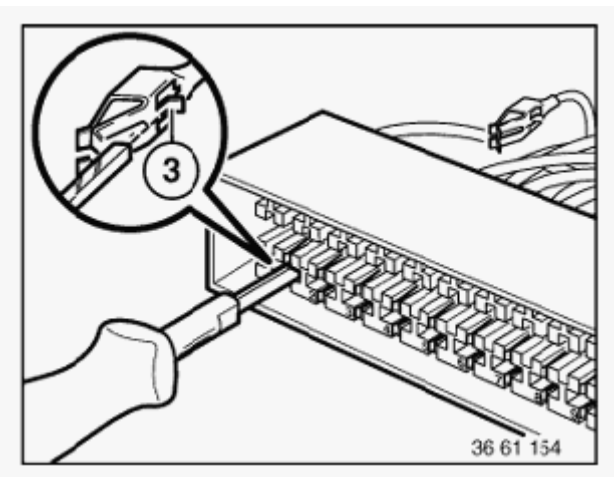


Fig. 108: Pressing Back Arrester Hook
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... SOCKET HOUSING (RADIO PLUG), HYBRID SYSTEM MQS/MPQ

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

Press lock (1) in direction of arrow.

Detach secondary lock (2) from radio plug.

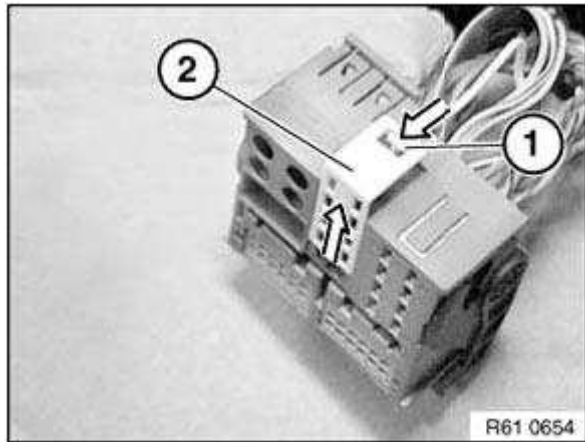


Fig. 109: Detaching Secondary Lock From Radio Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Feed special tool 61 1 135 past side of contact.

Press special tool 61 1 135 in direction of arrow.

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

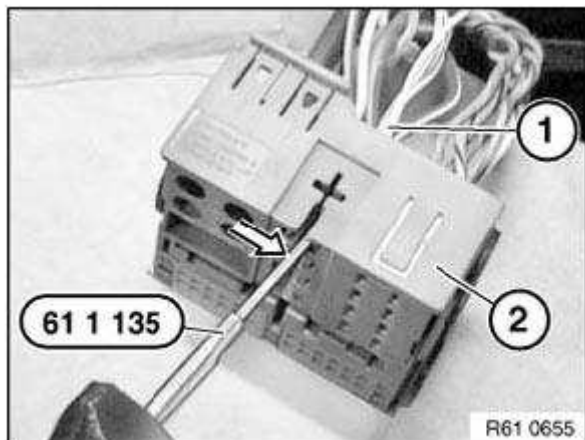


Fig. 110: Pulling Wire Out Of Radio Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Removing MQS contacts from contact carrier

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

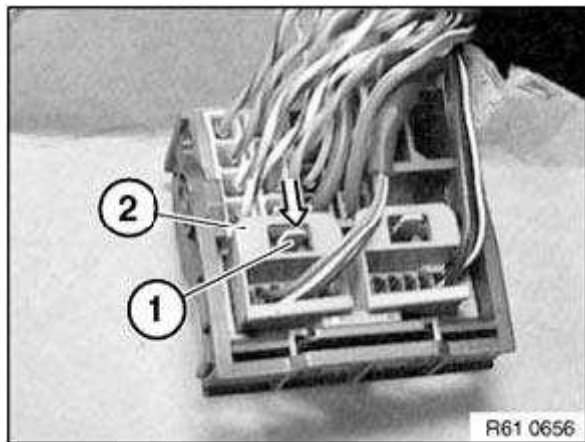


Fig. 111: Press Lock (1) In Direction Of Arrow And Pull Housing (2) Out Of Radio Plug
Courtesy of BMW OF NORTH AMERICA, INC.

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.

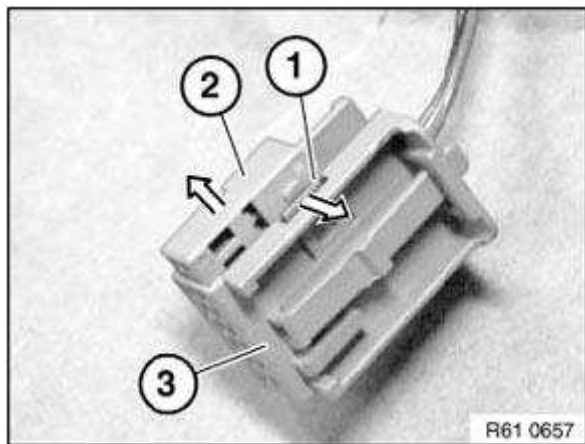


Fig. 112: Pulling Contact Carrier Out Of Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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).

NOTE: The illustration shows an 8-pin socket housing where removal of the contacts is identical.

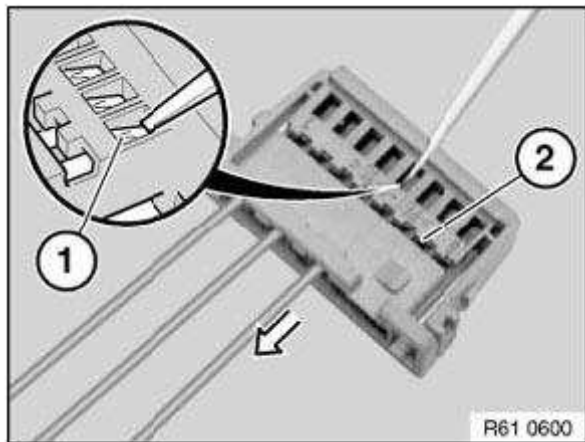


Fig. 113: Holding Retaining Hook Of Socket
Courtesy of BMW OF NORTH AMERICA, INC.

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

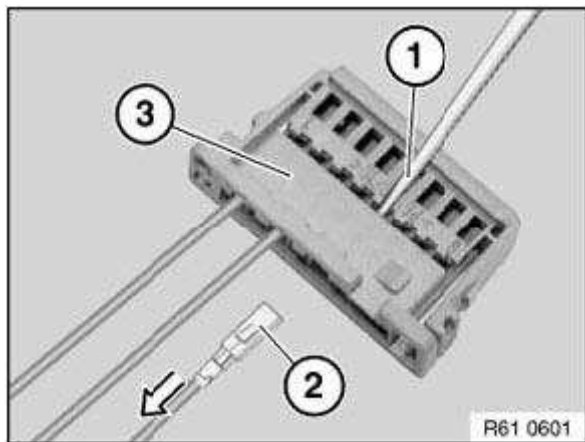


Fig. 114: Pulling Cable With Socket Contact Out Of Contact Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

Removing MPQ contacts from contact carrier

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

Raise lock (2) on radio plug.

Pull contact carrier (3) out of radio plug.

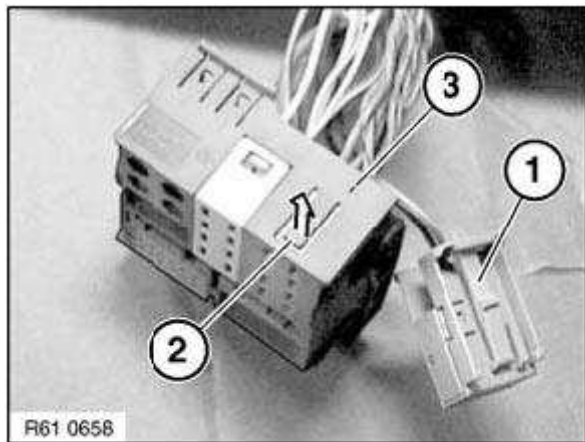


Fig. 115: Removing Contact Carrier With MQS Contacts From Radio Plug
 Courtesy of BMW OF NORTH AMERICA, INC.

Press lock (1) in direction of arrow.

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

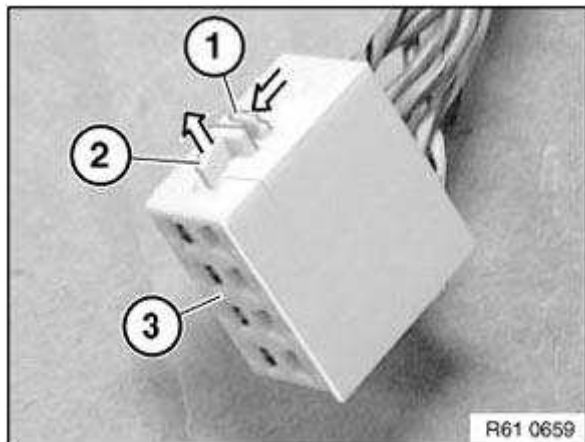


Fig. 116: Pulling Secondary Lock In Direction Of Arrow Completely Out Of Contact Carrier
 Courtesy of BMW OF NORTH AMERICA, INC.

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

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

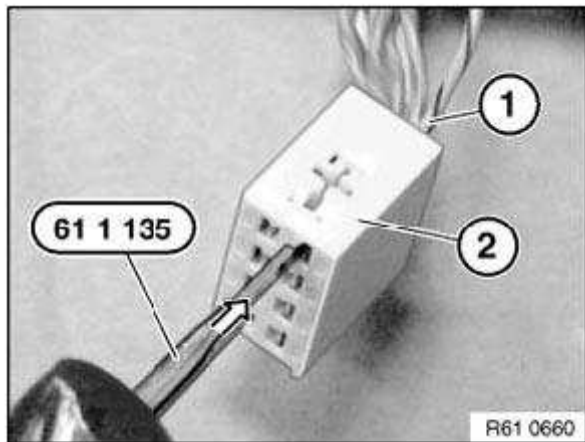


Fig. 117: Pulling Wire Out Of Contact Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... SOCKET HOUSING 42-, 43-PIN, HYBRID SYSTEM MQS/MPQ

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 1 134 and pull out cable with contact.

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

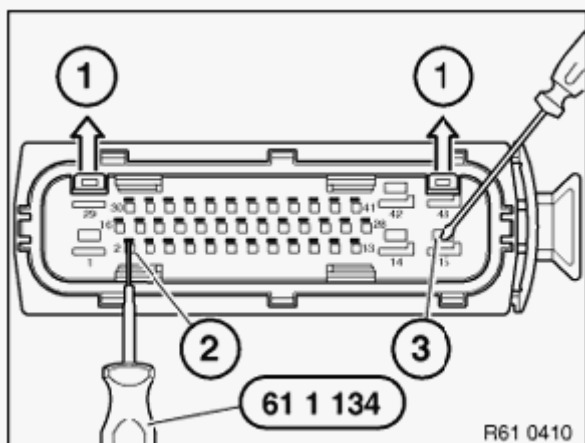


Fig. 118: Pressing Back Retaining Hook Of MPQ Contacts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Bend open retaining hook of contacts gently before inserting into plug housing.

To install contacts, observe cavity numbers on reverse side of socket housing.

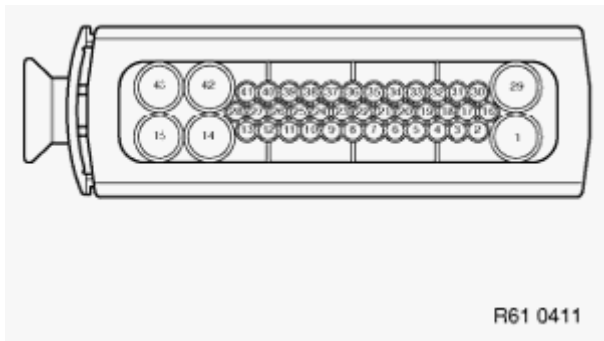


Fig. 119: Identifying Plug Housing

Courtesy of BMW OF NORTH AMERICA, INC.

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 (electronic contact)
- Elo-Power 2.8 mm wide (electronic contact for heavy loads)
- Elo-Power 5.2 mm wide (electronic 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.

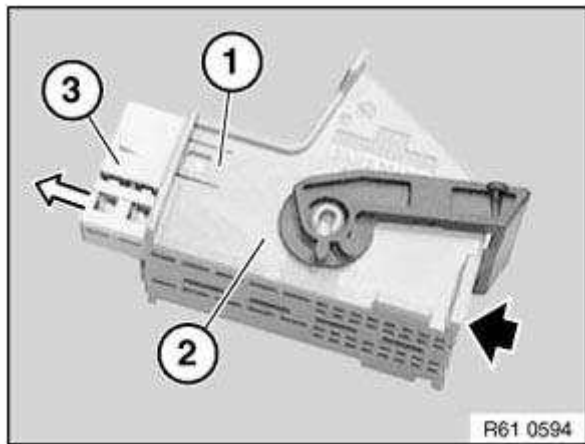


Fig. 120: Raising Lock On Housing

Courtesy of BMW OF NORTH AMERICA, INC.

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).

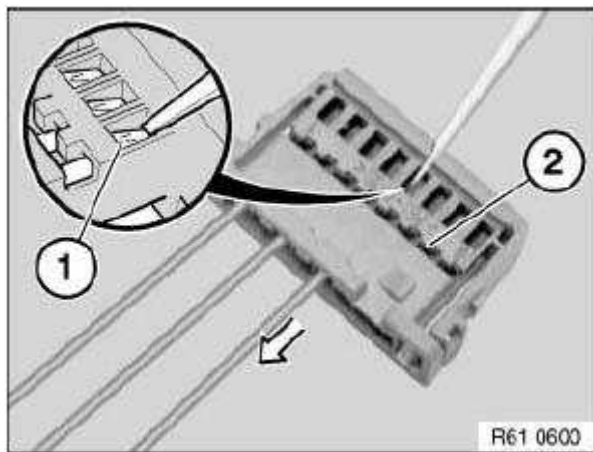


Fig. 121: Holding Down Retaining Hook Of Socket

Courtesy of BMW OF NORTH AMERICA, INC.

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

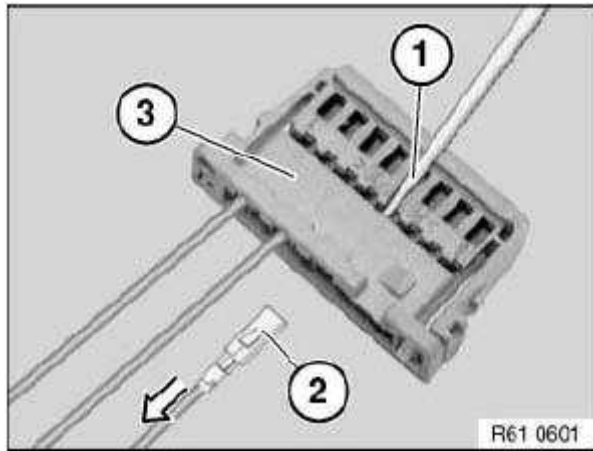


Fig. 122: Pulling Cable With Socket Contact Completely Out Of Contact Carrier
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... SPECIAL TOOLS FOR WIRING HARNESS REPAIRS

Special tools required:

- 12 1 080
- 61 0 200
- 61 0 210
- 61 0 220
- 61 0 230
- 61 0 300
- 61 0 400
- 61 1 190
- 61 4 320
- 61 9 041
- 61 9 044

NOTE: See ENGINE ELECTRICAL SYSTEM - SPECIAL TOOLS (N54, N63) .

See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

Release and press-out tool

- Special tool 61 0 300
- Special tool 61 0 400 (MINI N12/N14)



Fig. 123: Identifying Special Tool Kit
Courtesy of BMW OF NORTH AMERICA, INC.

Cutting to length and stripping insulation from cables

- Cutting to length and stripping insulation from cables

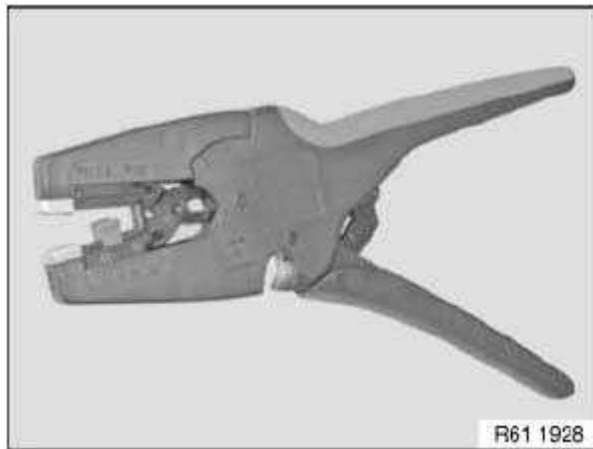


Fig. 124: Identifying Special Tool For Cutting Wire And Stripping Insulation
Courtesy of BMW OF NORTH AMERICA, INC.

Crimping stop parts (small contacts)

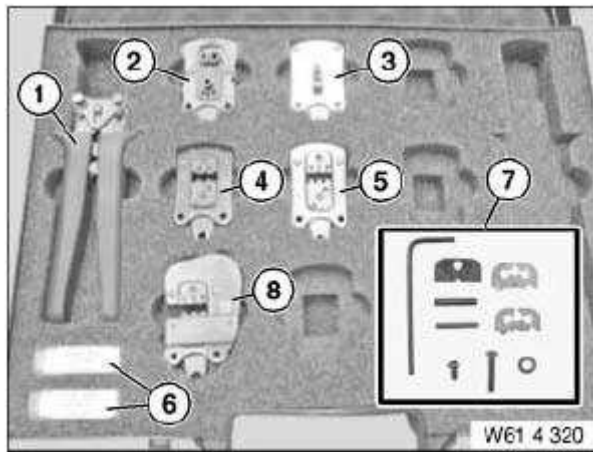


Fig. 125: Identifying Crimping Stop Parts (Small Contacts)
Courtesy of BMW OF NORTH AMERICA, INC.

Crimping stop parts (large contacts)

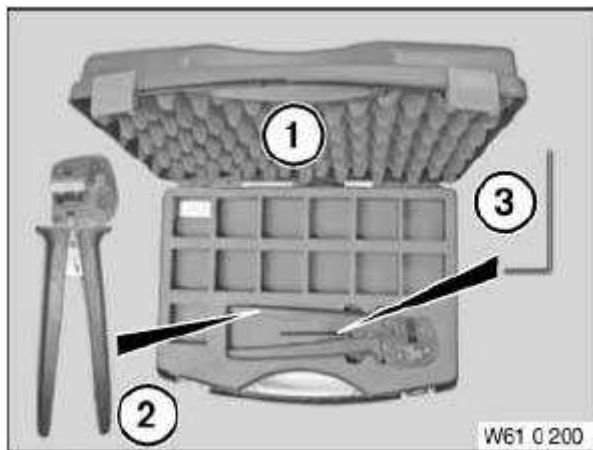


Fig. 126: Identifying Crimping Stop Parts (Large Contacts)
Courtesy of BMW OF NORTH AMERICA, INC.

Crimping antenna elbow plugs

- Special tool 61 9 041 (hand crimping tool)
- Special tool 61 9 044 (matrix)

Handling:

- Antenna elbow plug on radio receiver

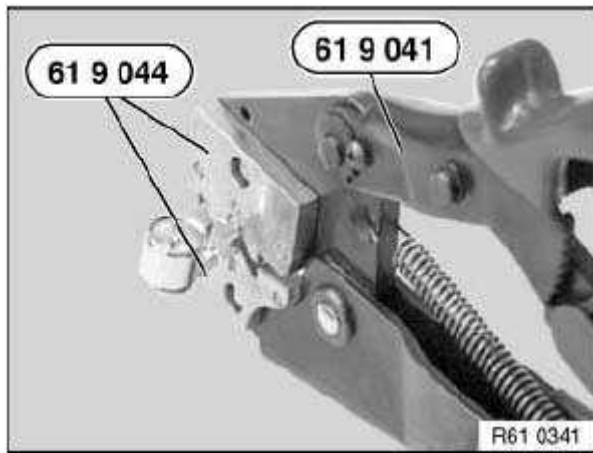


Fig. 127: Identifying Hand Crimping Tool And Matrix
 Courtesy of BMW OF NORTH AMERICA, INC.

Repair kit for ignition cables and for crimping fan connector receptacles 4 mm^2 :

- special tool **12 1 080**
- **Crimping stop parts (contacts)**



Fig. 128: Crimping Stop Parts (Contacts)
 Courtesy of BMW OF NORTH AMERICA, INC.

Repairing ribbon cables

- special tool **61 1 190**

Handling:

- **Repairing ribbon cables**



Fig. 129: Identifying Special Tool (61 1 190)
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... TREATING CABLES AND FIBRE-OPTIC CABLES

Special tools required:

- 61 1 190
- 61 4 320

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL

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

SPECIAL TOOL SPECIFICATION

Repair range for vehicle electrical system	SI 2 04 07 341
Crimping set with tool for fibre-optic cables, Micro Power Quadlock (MPQ), Micro Quadlock System (MQS) contacts and universal crimping head	61 4 320
Insulation displacement tool for ribbon cable	61 1 190

61 13 ... UNLOCKING AND DISCONNECTING DIFFERENT PLUG CONNECTIONS

NOTE: Examples of unlocking and disconnecting different plug connections.

Press lock and open clip in direction of arrow.

Disconnect plug connection.

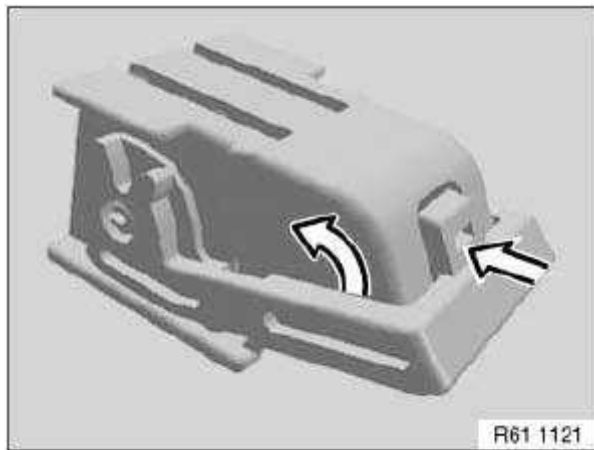


Fig. 130: Disconnecting Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and open clip in direction of arrow.

Disconnect plug connection.

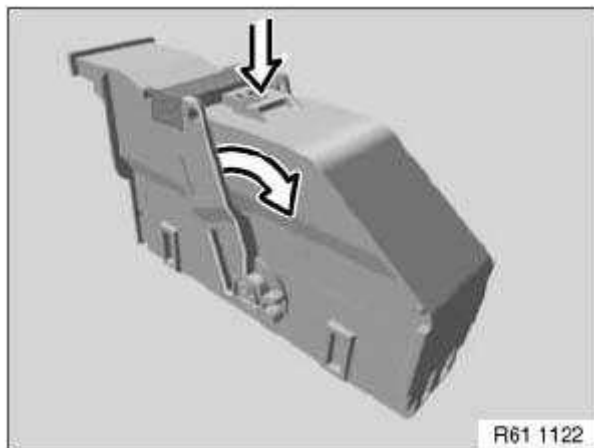


Fig. 131: Pressing Lock And Open Clip
 Courtesy of BMW OF NORTH AMERICA, INC.

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

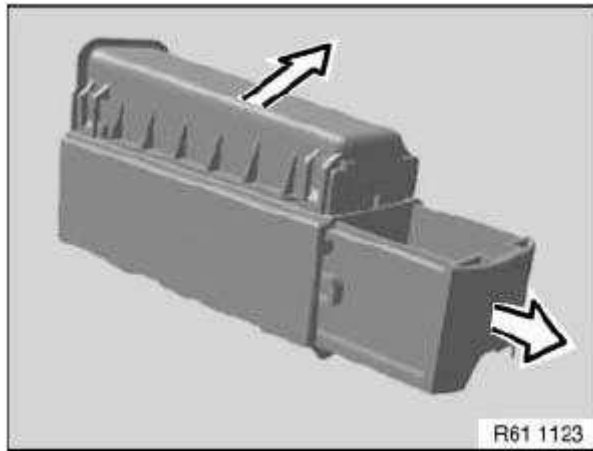


Fig. 132: Disconnecting Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

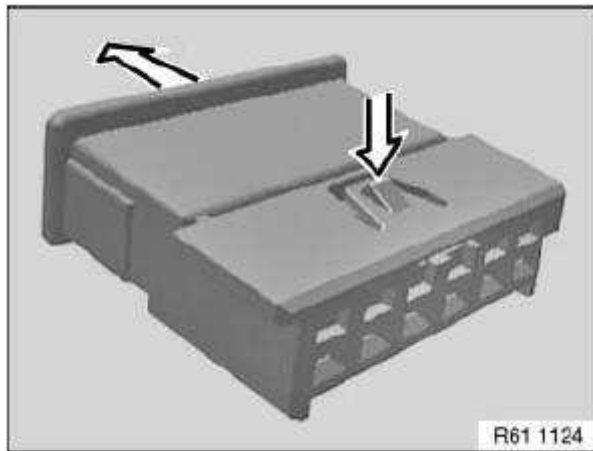


Fig. 133: Press Lock And Disconnect Plug Connection (1 Of 6)

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

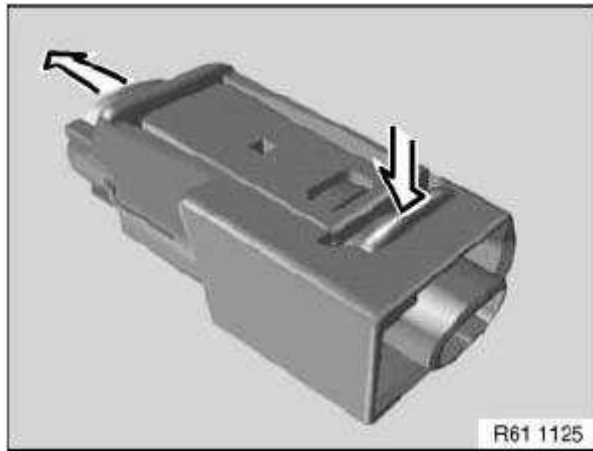


Fig. 134: Press Lock And Disconnect Plug Connection (2 Of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

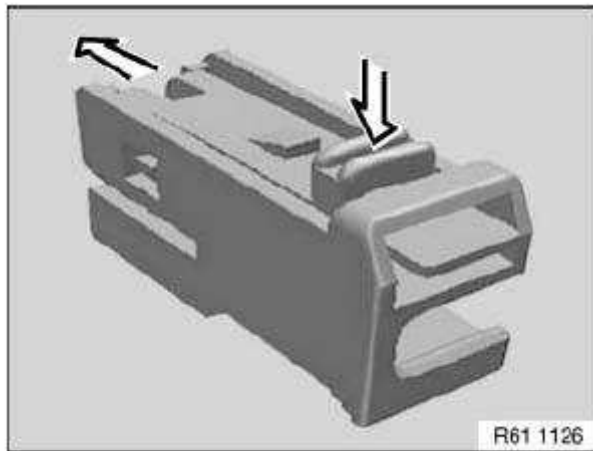


Fig. 135: Press Lock And Disconnect Plug Connection (3 Of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

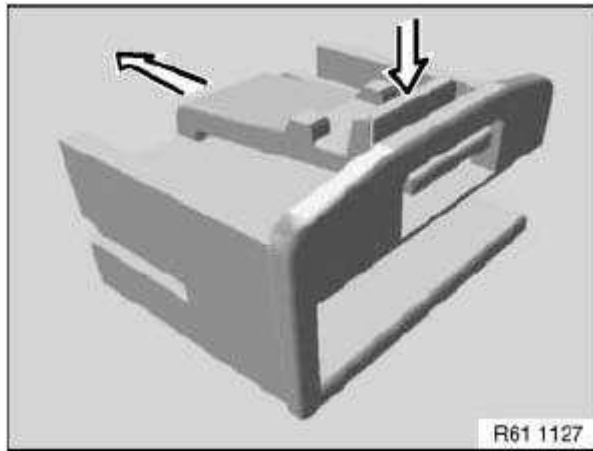


Fig. 136: Press Lock And Disconnect Plug Connection (4 Of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

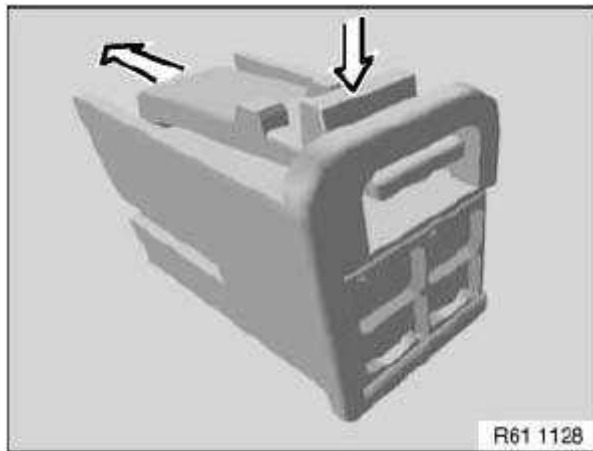


Fig. 137: Press Lock And Disconnect Plug Connection (5 Of 6)
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

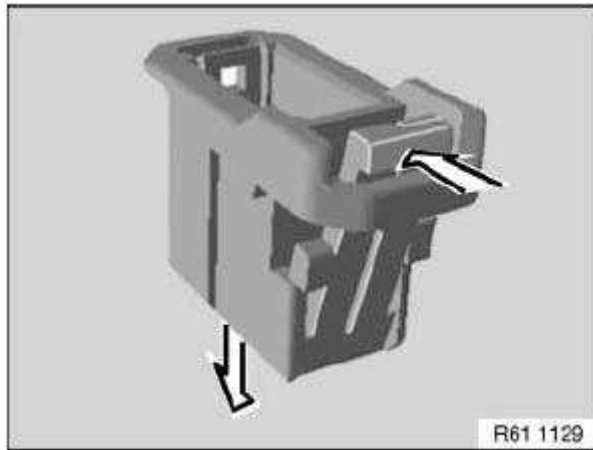


Fig. 138: Press Lock And Disconnect Plug Connection (6 Of 6)
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 042 REPLACING DISTRIBUTION BOX (LUGGAGE COMPARTMENT)

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

Necessary preliminary tasks:

- Disconnect **battery negative lead**
- Remove **flap in right luggage compartment wheel arch trim** . See **51 47 172 REMOVING AND INSTALLING/REPLACING FLAP IN LUGGAGE COMPARTMENT TRIM, LEFT OR RIGHT** .

E70:

Release expansion rivets (1).

Remove insulating mat (2).

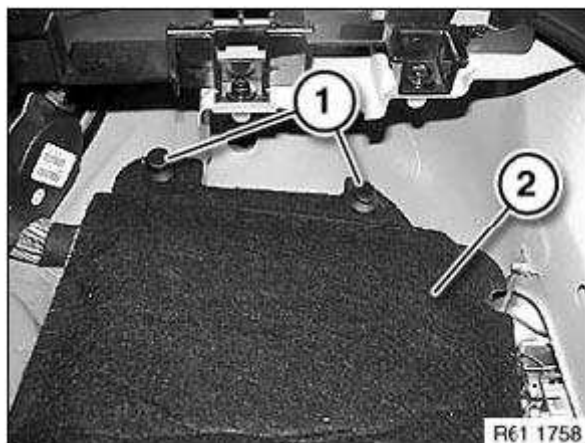


Fig. 139: Identifying Expansion Rivets And Insulating Mat

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release wiring harness fastener (2) on distribution box.

Release screws (3).

Pull distribution box forwards slightly in direction of arrow.

Feed emergency actuator (4) out of distribution box.

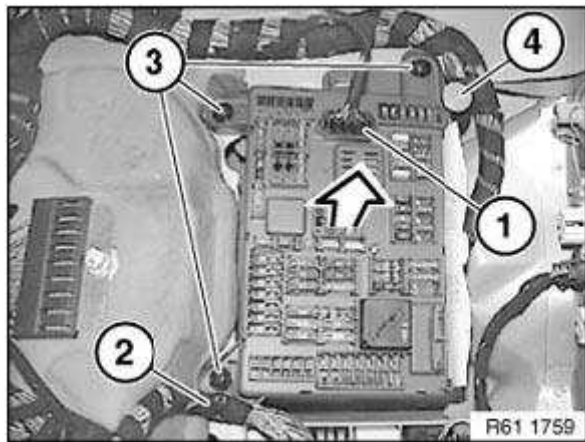


Fig. 140: Identifying Plug Connection And Wiring Harness Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

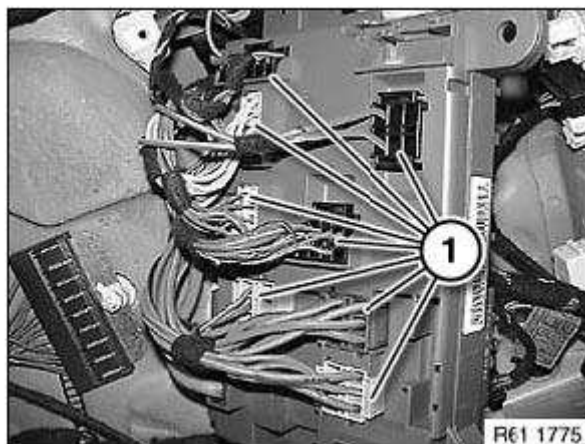


Fig. 141: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Remove distribution box.

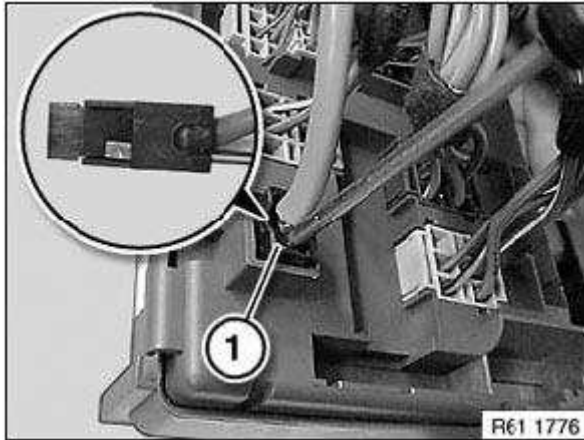


Fig. 142: Identifying Plug Connection And Distribution Box
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Remove fuses and relays.

61 13 050 REMOVING AND INSTALLING/REPLACING FUSE BOX IN PASSENGER COMPARTMENT

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

Necessary preliminary tasks:

- Disconnect **battery negative lead**
- Remove **trim for instrument panel at bottom right** . See **51 45 181 REMOVING AND INSTALLING/REPLACING TRIM FOR INSTRUMENT PANEL, BOTTOM RIGHT** .

Release screws (1).

Remove air duct (2).

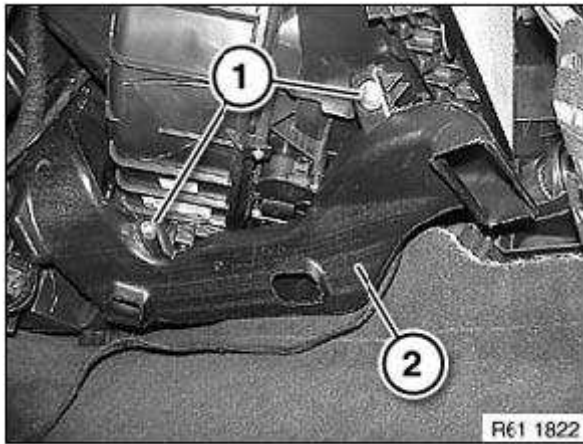


Fig. 143: Identifying Air Duct And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Slacken wiring harness in cable holder (2).

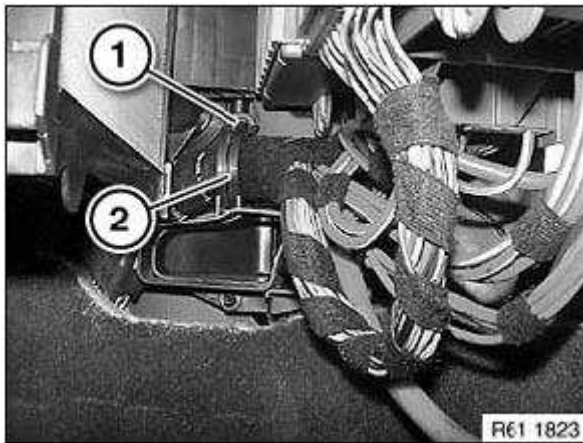


Fig. 144: Slacken Wiring Harness In Cable Holder
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screw (2).

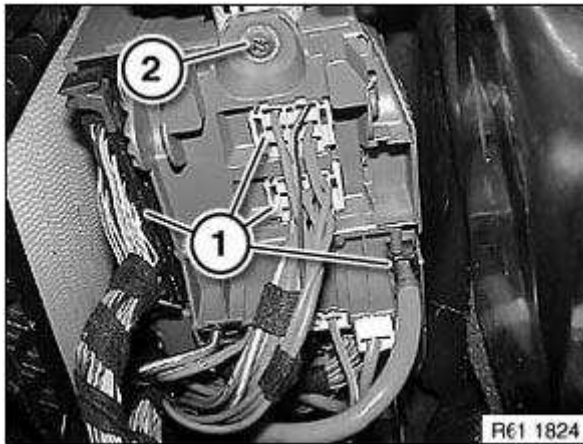


Fig. 145: Identifying Plug Connection And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Lever holders (1) at bulkhead out of fuse box (2) in direction of arrow.

Lower fuse box (2).

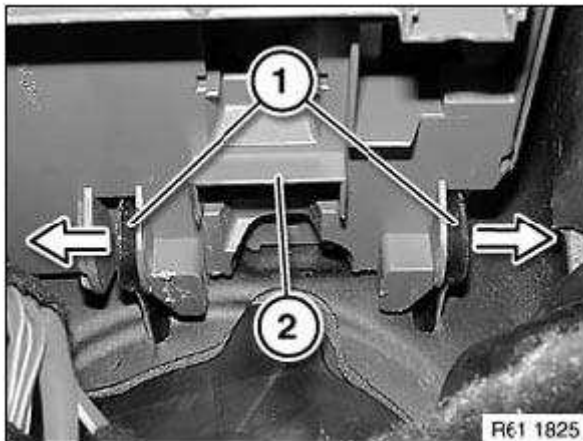


Fig. 146: Identifying Lever Holders And Lower Fuse Box
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

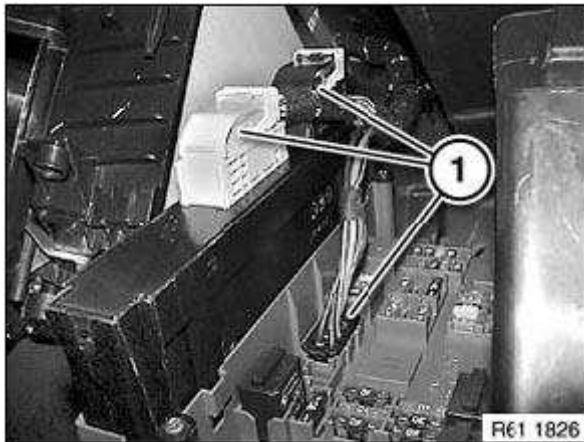


Fig. 147: Disconnecting Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

Turn fuse box (2) over and disconnect all plug connections (1).

Replacement:

Remove **junction box electronics** .

Remove fuses and relays.

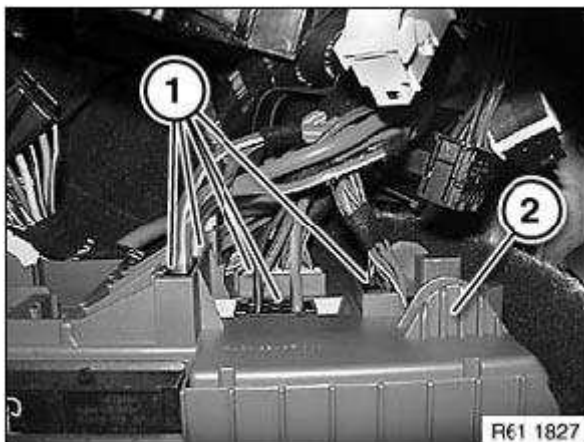


Fig. 148: Identifying Fuse Box And Plug Connections
 Courtesy of BMW OF NORTH AMERICA, INC.

DISTRIBUTION BOX POWER

61 14 ... REMOVING AND INSTALLING/REPLACING B+ TERMINAL (ENGINE COMPARTMENT)

Special tools required:

- 64 1 020

NOTE: **HEATING AND AIR CONDITIONING - SPECIAL TOOLS**

Necessary preliminary tasks:

- Disconnect **battery negative lead**

Open cover (1).

Release screw (2). Tightening torque, see 61 12 4AZ in **61 12 AUXILIARY CABLE** .

Feed battery positive lead (3) in direction of arrow out of B+ terminal (5).

Release catch (4) with special tool 64 1 020 .

Detach B+ terminal (5) in direction of arrow from holder (6).

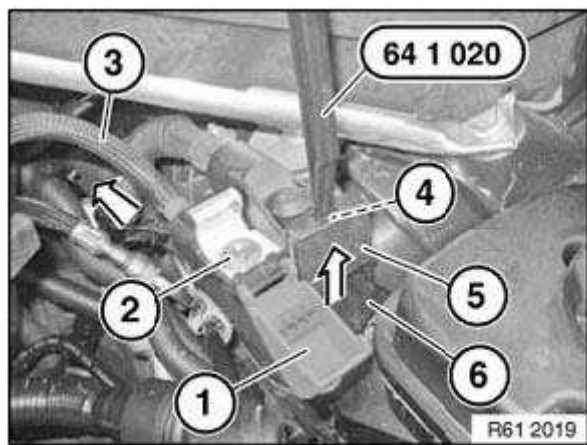


Fig. 149: Releasing Catch With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1). Tightening torque, see 61 12 4AZ in **61 12 AUXILIARY CABLE** .

Remove B+ terminal (2) in direction of arrow from battery positive lead (3).

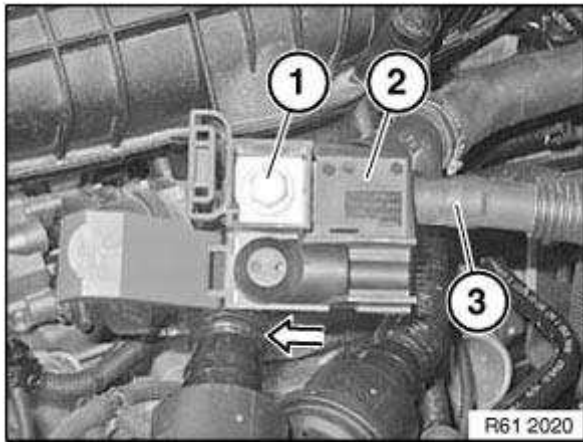


Fig. 150: Identifying Battery Positive Lead
 Courtesy of BMW OF NORTH AMERICA, INC.

61 14 010 REMOVING AND INSTALLING/REPLACING DISTRIBUTION BOX (ON BATTERY)

WARNING: Observe safety instructions for handling vehicle battery.
 Follow instructions on intelligent battery sensor (IBS) .

Necessary preliminary tasks:

- Disconnect battery negative lead

Additionally E70 Security (optional extra SA 106):

- Disconnect **Security** battery positive lead

Disconnect plug connection (1).

Open cover, release nut (3) underneath and disconnect battery positive lead. Tightening torque, see **61 21 4AZ** in **61 21 BATTERY WITH TERMINAL** .

Open cover (5) and release nut (4). Tightening torque, see **61 21 2AZ** in **61 21 BATTERY WITH TERMINAL** .

Using a suitable tool, expand locking bracket (6) at lower end and clip out.

Lift distribution box (2) out of battery.

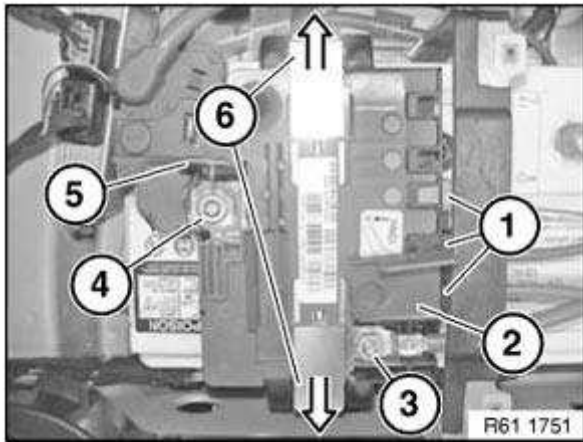


Fig. 151: Lifting Distribution Box Out Of Battery
 Courtesy of BMW OF NORTH AMERICA, INC.

BATTERY

12 00 ... INSTRUCTIONS FOR DISCONNECTING AND CONNECTING BATTERY

Observe safety instructions for handling vehicle battery .

Before disconnecting battery

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

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

IMPORTANT:

- There is a danger of mixing up battery leads: If the battery positive and negative leads are the same color and you are in doubt, follow the polarity to the battery, then mark and cover the leads.
- On vehicles with radio code: After disconnecting the battery, the radio code must be re-entered. Therefore obtain the radio code card from the customer beforehand. Note stored stations and restore them after connecting the battery.
- Stored settings of the on-board computer and clock will also be lost.
- All available central keys must be recoded for cars with first generation infrared transmitter locking systems.

General notes on disconnecting battery

- Do not disconnect battery leads and leads from alternator and starter motor while engine is running.
- Cars with IBS on battery negative terminal:

Do not under any circumstances pull/lever off pole shoes by force.

Do not under any circumstances release socket-head cap screw of IBS.

- Detach **terminal of battery negative** lead from car battery and second battery if fitted. Cover battery negative terminal(s) and secure.
- When work is carried out on the electrical system, faults may be caused in the fault memories of some control units when the battery is connected.
- When installing battery terminal: Tightening torque, see **61 21 1AZ** in **61 21 BATTERY WITH TERMINAL** .

After connecting battery

IMPORTANT: The scope of application of some systems may be restricted after a power supply interruption.

Likewise, individual settings may be lost.

Settings or activations must be carried out, depending on the equipment specification.

Example:

- Vehicles with automatic engine start-stop system (MSA) :

MSA function is active only after learning period (vehicle must not be woken for a period of approx. 6 hours) > if necessary, notify customer of the situation

- E46 (AWD)/ E53/ E83: Carry out **STEERING ANGLE SENSOR ADJUSTMENT**
- If necessary, carry out adjustment of active front steering . See **32 10 005 ADJUSTMENT FOR ACTIVE FRONT STEERING** .
- If necessary, activate sliding sunroof . See **54 0 ... NOTES ON STEEL AND GLASS SLIDE/TILT SUNROOFS (INITIALIZATION/NORMALIZATION/LEARNING OF CHARACTERISTIC CURVE)** .
- If necessary, activate power windows . See **51 33 000 REMOVING AND INSTALLING (REPLACING) POWER WINDOW UNIT IN LEFT OR RIGHT FRONT DOOR** .
- If necessary, activate mirror with compass . See **51 16 060 REMOVING AND INSTALLING/REPLACING INTERIOR REARVIEW MIRROR (WITH RAIN SENSOR)** .

Vehicles with a two-battery system

Starter and equipment batteries

A two-battery system has a starter battery circuit and an equipment battery circuit. A supplementary control unit

monitors both battery circuits. Depending on the situation, the battery circuits are connected to or isolated from the supplementary control unit via an isolating relay.

Two AGM batteries, whose design and properties are described in AGM batteries, are used as a storage battery.

IMPORTANT: These batteries must not under any circumstances be charged with a voltage in excess of 14.8 V. Rapid programs must not be used either.

Receiving/giving starting assistance via jump start terminal

The engine can be jump-started with an external voltage supply via the jump start terminal on the right side of the engine compartment.

NOTE: The starter battery is isolated from the alternators when the engine hood/bonnet is open.

Giving starting assistance via the jump start terminal is thus limited by the capacity of the starter battery when the engine hood/bonnet is open.

Charging starter and equipment batteries via jump start terminal

The starter battery is charged as a matter of priority with a charger connected to the jump start terminal. The voltage at the starter battery is the decisive factor in determining whether the equipment battery is also included in the charging operation. The supplementary control unit automatically detects a charging operation at a charging voltage at the starter battery of $> \text{ or } = 13.5 \text{ V}$. The isolating relay is closed and thus the equipment battery is connected in parallel. Both batteries are now charged.

Prerequisite:

- Terminal 61 inactive
- Terminal 15 inactive

If terminal 15 becomes "active" during the charging operation, the isolating relay is opened immediately and again only the starter battery is charged.

**NOTE: When the engine hood is open, the isolating relay is also opened in normal operation when the engine is running.
A special mode can be set by means of diagnosis for workshop/garage operation. The isolating relay is closed from terminal R in this operating mode. This mode is automatically reset once a distance of 5 km has been driven.**

Trickle charging

The increased closed-circuit current consumption can be compensated for via the jump-start connection point with the aid of the "Acctiva easy" battery trickle charger (Service Information 2 03 05 205).

IMPORTANT: The cigarette lighter is isolated from the electrical system after terminal R "OFF" on a timed basis (60 mins.), thereby interrupting charging of the equipment battery via the cigarette lighter. This is prevented if the battery master switch (on the right side of the luggage compartment behind the panel) is turned on and off again twice within 2 seconds. (Cigarette light battery charging function).

12 00 ... NOTES/INFORMATION ON START ASSISTANCE (JUMP STARTING)

Do not start the engine with help of starting sprays.

Preparation

Conform with the following when starting the engine with a jump starting cable.

- Ensure that the jump starting cable wires are of appropriate cross-section size.
- Only use fuse-protected jump starting cables.
- Check whether the current-supplying battery has 12 V voltage.
- If the engine is started from the battery of another vehicle, ensure that there is no contact between the bodies of both vehicles.

IMPORTANT: Never touch electrically live ignition system components: high voltage - danger of injury!

If the battery in the vehicle supplying power is weak, start the engine of this vehicle and let it run at idling speed.

Operation

It is essential to conform to the procedures so as to avoid injury to persons or damage to parts.

- Automatic transmission: select drive position "P", apply parking brake.
- Manual transmission: move gear lever to neutral position, apply parking brake.
- Ensure that the jump leads cannot get caught in rotating parts, e.g. fan.
- First connect both positive poles of the batteries with one jump starting cable (red).
- Use the battery positive terminal in the engine compartment for vehicles with the battery in the luggage compartment.
- Then use the second jump starting cable (black) to connect the negative post of the current-supplying battery with the earth/ground point (not the negative pole or the body) of the vehicle to be started.

IMPORTANT: Do not connect the second jump starting cable (black) with the negative pole of the battery in the vehicle to be started. Produced gas could be ignited by sparks.

Risk of explosion!

After the engine of the vehicle to be started has fired, first disconnect the jump starting cable between the negative pole and the earth/ground point. Then remove the starting cable from the positive poles.

61 00 ... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY

Battery acid is highly corrosive

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

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

In event of contact with acid

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

If acid is splashed onto the skin or clothing, neutralize it immediately with a soapy solution and rinse with lots of water.

Seek medical attention immediately if battery acid is accidentally swallowed.

Explosion hazard

Strictly no flames, sparks, naked light or smoking!

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

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

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

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

61 20 . . . THRESHOLD VALUES FOR BATTERY INSPECTION OF ALL BATTERY (TELEPHONE EXCEPT FOR TELEPHONE BATTERY)

safety instructions for handling vehicle battery.

Test step 1 - before charging the battery

STARTING CAPABILITY RESULT REFERENCE

Charge state ¹⁾	Starting capability ²⁾	Test result
Not testable		Charge
less than 50 % ²⁾		Charge
more than 50 %	less than 75 %	Charge

more than 50 %	more than 75 % ³⁾	Charge
more than 80 %	more than 75 %	O.K.

Test step 2 - after charging the battery

STARTING CAPABILITY RESULT REFERENCE

Charge condition ¹⁾	Starting capability ²⁾	Test result
Not testable		Defective
less than 50 %	less than 75 %	Charge
more than 50 %	more than 75 %	Charge

1. Charge condition and starting power must always be evaluated together
2. When test charging for more than 5 hours, use charger Gossen CG 32 or Siemens/Gossen VB 801
3. Fully charge until charge state is more than 80 %.

NOTE: If battery was checked on the positive terminal in the engine compartment, repeat check directly on battery for sake of safety.

61 20 ... AGM BATTERY



Fig. 152

Fig. 152: Identifying AGM Battery
 Courtesy of BMW OF NORTH AMERICA, INC.

In September 2002 so-called VRLA batteries, better known as **AGM batteries** , were introduced.

(VRLA stands for **V** alve **R** egulated **L** ead **A** cid, i.e. lead acid battery with pressure relief valve; **AGM** stands for **A** bsorbent **G** lass Mat, i.e. absorbent glass fibre fleece)

AGM batteries are fitted in models with electrical loads/consumers which have a high energy demand.

With the option SA 146 (2nd battery), the AGM battery (70 Ah) is fitted as the 2nd battery.

The constantly increasing energy demand of modern vehicle electrical systems calls for ever more powerful battery solutions. Today, up to 100 servomotors, which have to be electrically powered, operate in a modern luxury-class motor vehicle. Added to these are safety, environmental and comfort and convenience elements which are increasingly becoming standard features, such as e.g. Anti-lock Brake System (ABS), Dynamic Stability Control (DSC), electric steering effort assistance (EPS), heated catalytic converter, electronic chassis and suspension control, air conditioning and navigation system.

The power consumption is considerable even when the vehicle is parked.

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

- Significantly longer service life
- Increased starting reliability at low temperatures
- Safe starting of engines with high starting current demands, e.g. high-performance diesel engines
- 100 % freedom from maintenance
- Low risk in event of an accident (reduced risk to the environment)

Service life of AGM battery

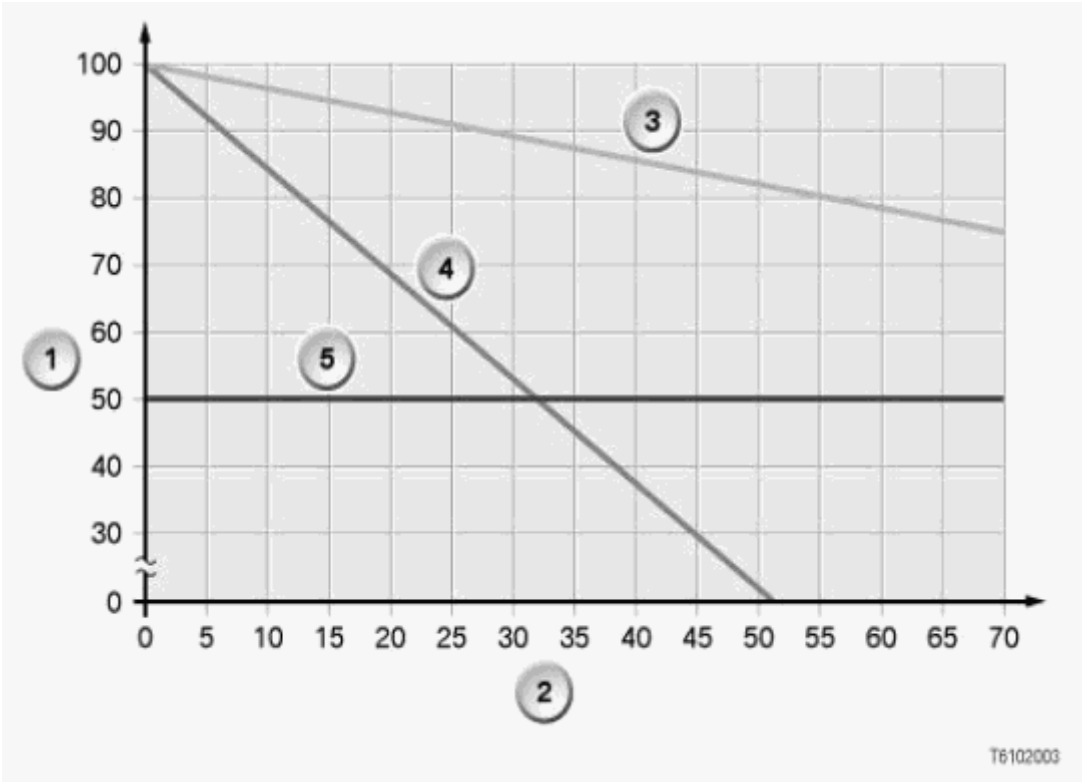


Fig. 153: AGM Battery Service Life Graph
Courtesy of BMW OF NORTH AMERICA, INC.

KEY EXPLANATION CHART

Key	Explanation	Key	Explanation
1	Available capacity [%]	2	Kilometres covered [1000 km]
3	AGM battery	4	Lead calcium battery
5	50 % capacity limit		

Unlike the previously used lead calcium batteries, the sulfuric acid contained in batteries with fleece technology is not self-contained in the battery housing.

Instead, the sulfuric acid is 100 % bound up in glass fibre fleece mats (separators). Thus, no acid can escape if the battery housing is damaged. In addition, the AGM battery is sealed gas-tight. This is possible because the gases are converted back into water as a result of the separator permeability.

Brief description of components

An AGM battery can be recognized by its black housing and the lack of a so-called "Magic Eye".

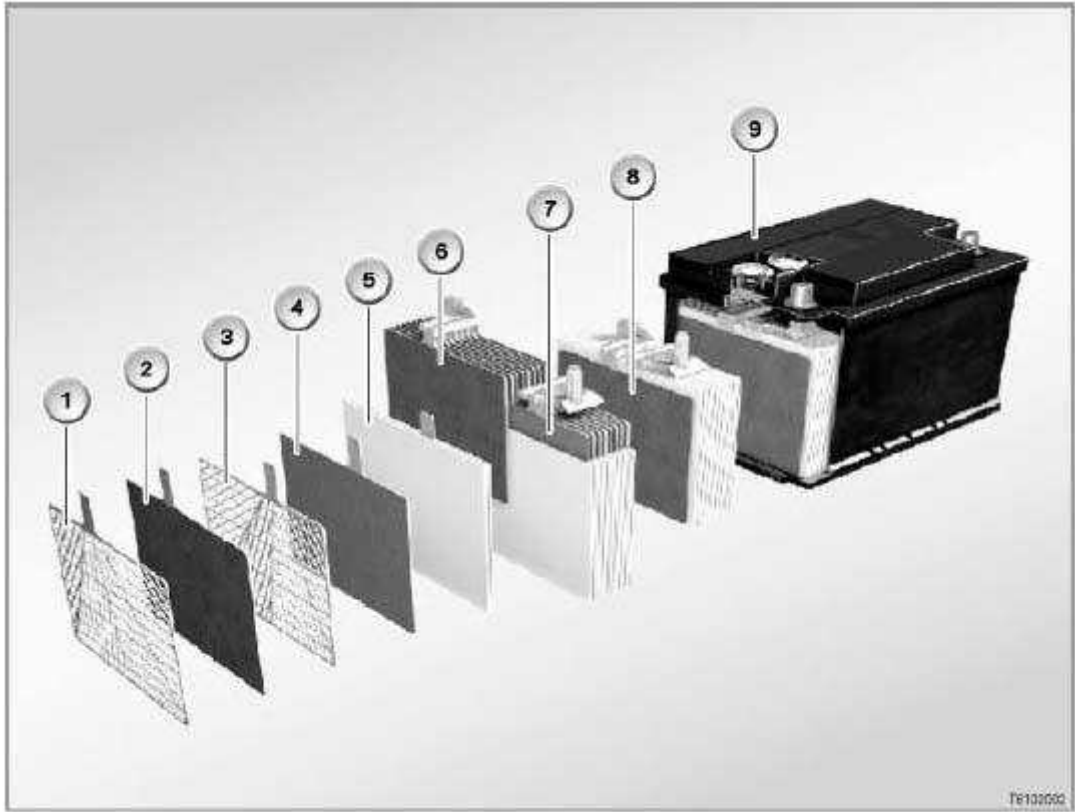


Fig. 154: Identifying AGM Battery Components
Courtesy of BMW OF NORTH AMERICA, INC.

KEY EXPLANATION CHART

Key	Explanation	Key	Explanation
1	Positive grid with silver alloy	2	Positive plate
3	Negative grid	4	Negative plate
5	Separator made of glass fibre fleece	6	Positive plate pack
7	Negative plate pack	8	Plate block
9	Block holder with bottom rails		

Design

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

- Larger plates:
Larger plates provide for a 25 % higher power density.
- Separators made of glass fibre fleece:
These provide for up to 3 times higher cycle reliability.

This in turn improves cold starting performance, current consumption and service life.

- Gas-tight housing with pressure relief valve:

The cell plugs are welded and cannot be opened.

- Acid bound up in the glass fibre fleece:

The acid is not as previously self-contained in the housing, but 100 % bound up in the glass fibre fleece. This provides increased protection against acid leakage and thus represents a reduced risk to the environment.

Mode of operation

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

When vehicle batteries are charged, the two gases oxygen and hydrogen are released by electrolysis.

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

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

Only in the event of an excessively heavy buildup of gas, i.e. excessively high pressure buildup (20 to 200 mbar), does the pressure relief valve discharge the gas. In this process, the pressure relief valve does not allow any oxygen in the air to enter. Because a valve regulates the pressure in the battery, the AGM battery is also known as a VRLA battery (Valve Regulated Lead Acid).

Notes and instructions for service personnel

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

Charging

WARNING: Do not charge the AGM battery with $>$ or $= 15.2$ V. No quick-charging routines!

When charging removed batteries (so-called stand-alone batteries), do not exceed the maximum charging voltage of 15.2 V at room temperature. Also when charging via the jump start terminal, do not exceed the maximum charging voltage of 15.2 V at room temperature.

The AGM battery will be damaged even when it is only briefly charged

with a charging voltage of more than 15.2 V. A charging voltage of more than 15.2 V is usually used in quick-charging routines.

Installation location

WARNING: Do not install the AGM battery in the engine compartment.

The AGM battery must not be installed in the engine compartment on account of the high spatial temperature differences, otherwise its service life will be significantly shortened.

Housing

WARNING: Do not open the AGM battery.

The AGM battery must not be opened under any circumstances as the introduction of oxygen from the air will cause the battery to lose its chemical equilibrium and be rendered non-operational.

Battery changing

Any conventional lead calcium battery can always be replaced by an AGM battery.

Using an AGM battery does not require any alterations to be made to the vehicle electrical system.

NOTE: The AGM battery is recommended for "problem customers". "Problem customers" encounter a high energy throughput through their batteries. This high energy throughput is caused by stationary loads/consumers (TV, independent heating, etc.) and a bad use profile for the battery ("chauffeur operation", short-distance driving, "stop-and-go"). The use of an AGM battery is recommended for these problem customers.

61 20 ... BATTERY CHARGING

If a normal or quick charger is used to charge the battery, the battery must be disconnected from the vehicle electrical system and removed. This prevents damage to paintwork and upholstery.

IMPORTANT: In order to prevent the intelligent battery sensor from malfunctioning, the charging terminals in the engine compartment must be used without fail in vehicles from E60 and should be used if possible in other vehicles.

IMPORTANT: Before charging the battery while it is installed, first carry out a closed-circuit current test. If here the voltage is 10 V or less, one or more of the cells may be faulty or the entire battery may already be damaged. In this case, always remove the battery as escaping gases during charging could damage the interior equipment and trim. Attempt to regenerate faulty cells with low

charging current.

If necessary, open existing plugs on the individual cells.

61 20 ... BATTERY OPEN-CIRCUIT CURRENT TEST

NOTE: Observe safety instructions for handling vehicle battery .



W05 95 001

Fig. 155: Identifying Battery Tester

Courtesy of BMW OF NORTH AMERICA, INC.

The open-circuit current test is performed using the Diagnosis and Information System (DIS).

61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD

WARNING: Observe safety instructions for handling vehicle battery.

Follow instructions for disconnecting and connecting battery .

Follow instructions on intelligent battery sensor (IBS) .

Necessary preliminary tasks:

- Remove **battery cover**

IMPORTANT: Do not under any circumstances detach or lever off intelligent battery sensor (2) from battery by force.

Loosen nut (1). Tightening torque, see 61 21 1AZ in 61 21 BATTERY WITH TERMINAL .

Remove intelligent battery sensor (2) from battery and secure to side.

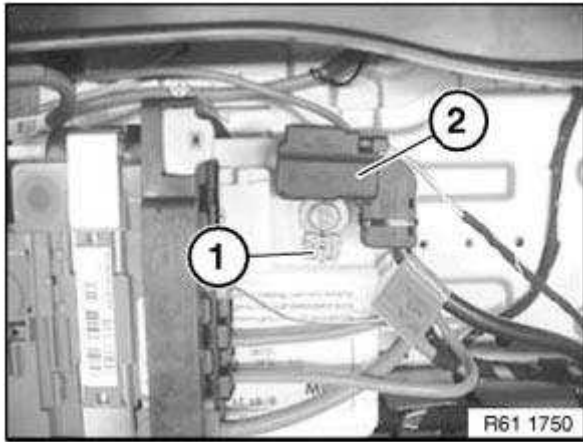


Fig. 156: Identifying Battery Sensor And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

61 20 908 PERFORMING BATTERY "POWER RESET" (FOR PROGRAMMING/CODING CONTROL UNIT(S))

IMPORTANT: Observe safety instructions for handling vehicle battery .

The following steps must be carried out for a "power reset":

- Switch off and disconnect battery charger
- Switch off ignition

Cars with ignition key: Turn ignition key to 0 position

Cars with identification sensor: Remove identification sensor from slot

Cars with comfort access system: Make sure terminal is in 0 position

- Disconnect **battery negative** terminal
- Reconnect battery negative terminal (to ensure bus activity)

- Waiting time (5-10 seconds)
- Disconnect **battery negative** terminal
- Waiting time (1 minute)
- Connect battery negative terminal and tighten, tightening torque, see **61 21 1AZ** in **61 21 BATTERY WITH TERMINAL** .
- Connect and switch on battery charger
- Switch ignition on

BATTERY/VAPOR SEPARATE

51 47 ... REMOVING AND INSTALLING/REPLACING BATTERY COVER

Release bolts (1).

Remove battery cover upwards.

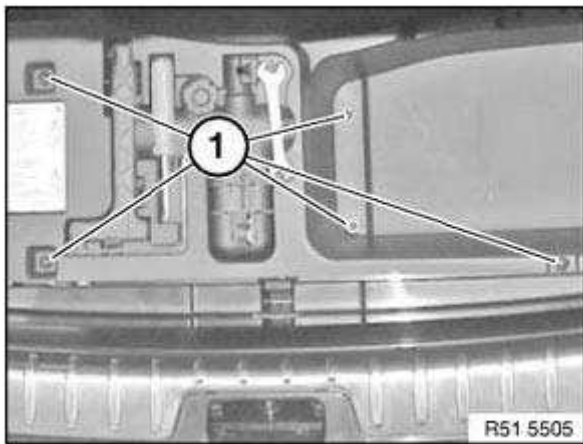


Fig. 157: Identifying Battery Cover Bolts
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Remove on-board tool kit from battery cover.

61 20 908 PERFORMING BATTERY "POWER RESET" (FOR PROGRAMMING/CODING CONTROL UNIT(S))

IMPORTANT: Observe **safety instructions** for handling vehicle battery .

The following steps must be carried out for a "power reset":

- Switch off and disconnect battery charger

- Switch off ignition

Cars with ignition key: Turn ignition key to 0 position

Cars with identification sensor: Remove identification sensor from slot

Cars with comfort access system: Make sure terminal is in 0 position

- Disconnect **battery negative** terminal
- Reconnect battery negative terminal (to ensure bus activity)
- Waiting time (5--10 seconds)
- Disconnect battery negative terminal
- Waiting time (1 minute)
- Connect battery negative terminal and tighten, tightening torque, see **61 21 1AZ** in **61 21 BATTERY WITH TERMINAL** .
- Connect and switch on battery charger
- Switch ignition on

61 21 010 REMOVING AND INSTALLING OR REPLACING BATTERY

WARNING: Observe safety instructions for handling vehicle battery.
Follow instructions on intelligent battery sensor (IBS) .

IMPORTANT: Do not under any circumstances pull or lever safety battery terminal off by force.

Necessary preliminary tasks:

- Remove **power distributor**

Detach vent (1) in direction of arrow.

Open cover (2) and release nut (3). Tightening torque, see **61 21 1AZ** in **61 21 BATTERY WITH TERMINAL** .

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

Release screws (4,6) and remove brackets.

Release screw (5) and remove holder.

Lift battery out of luggage compartment.

Installation:

Make sure battery is correctly seated in associated fixture.

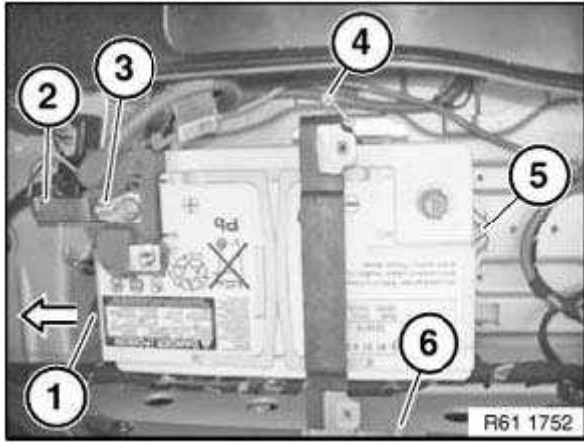


Fig. 158: Identifying Battery Bolt, Nut And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Replacing version with intelligent battery sensor (IBS):

- Register battery replacement
- Read out fault memory, clear fault memory entries if necessary

SWITCH

32 41 ... REPLACING LEVEL SWITCH FOR DYNAMIC DRIVE FLUID RESERVOIR

Unscrew nuts.

Remove shims.

Installation:

Replace self-locking nuts.

Tightening torque, see **32 41 1AZ** in **32 41 PUMP AND OIL SUPPLY** .

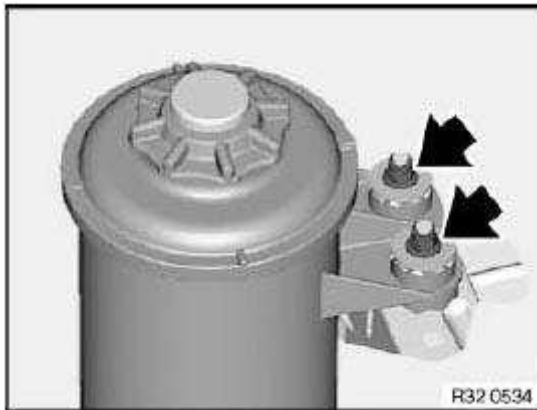


Fig. 159: Identifying Self-Locking Nuts
 Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Raise and/or turn fluid reservoir in order to gain better access to plug connection.**

Disconnect plug connection (1).

Turn level switch (2) through approx. 45° and remove towards bottom.

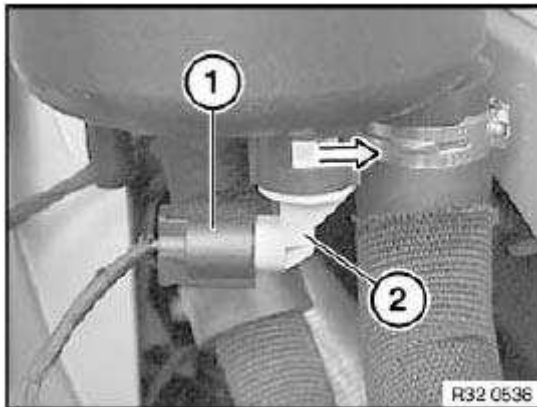
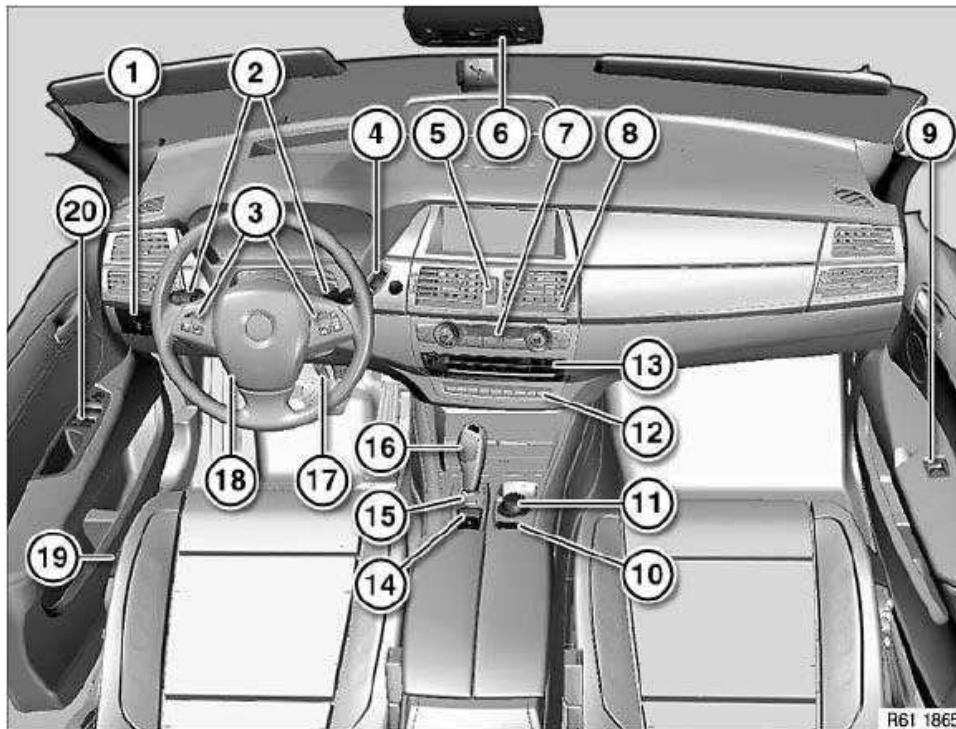


Fig. 160: Identifying Level Switch And Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

61 31 ... OVERVIEW OF SWITCHES



- | | | | |
|----|---|----|---|
| 1 | <u>Light operating unit</u> | 2 | <u>Steering column switch cluster (SZL)</u> |
| 3 | <u>Multifunction steering wheel switches / shift paddles for automatic transmission (E71)</u> | 4 | <u>Start/Stop switch</u> |
| 5 | <u>Switch for hazard warning system/central locking</u> | 6 | <u>Roof switch cluster</u> |
| 7 | <u>Control panel for heater/air conditioner</u> | 8 | <u>Switch for unlocking glovebox</u> |
| 9 | <u>Power window switch (passenger side)</u> | 10 | <u>Button unit</u> |
| 11 | <u>Controller</u> | 12 | <u>Centre console switch cluster</u> |
| 13 | <u>Car Communication Computer / audio system controller</u> | 14 | <u>Switch for electromechanical parking brake</u> |
| 15 | <u>Switch for Electronic Damper Control (Sports button)</u> | 16 | <u>Gear selector switch</u> |
| 17 | <u>Brake-light switch</u> | 18 | <u>Steering column adjustment switch</u> |
| 19 | <u>Switch combination for seat adjustment</u> | 20 | <u>Power window switch (driver's side)</u> |

Fig. 161: Identifying Switch Locations
 Courtesy of BMW OF NORTH AMERICA, INC.

61 31 008 REMOVING AND INSTALLING/REPLACING STEERING COLUMN SWITCH CLUSTER (SZL)

WARNING: Move wheels into straight-ahead position and do not alter this position during the repair work.
 Do not under any circumstances turn the steering column switch cluster when the steering wheel is removed.

Necessary preliminary tasks:

- Remove **steering wheel** . See 32 33 000 REMOVING AND INSTALLING/REPLACING SPORT STEERING WHEEL 32 33 010
- Remove **lower section of steering column trim** . See 32 31 020 REMOVING AND INSTALLING/REPLACING LOWER SECTION OF STEERING COLUMN TRIM .
- If necessary, remove **switch for steering column adjustment**.

WARNING: Secure volute spring cassette (1) against rotating with adhesive tape (2).

If unauthorized rotation of volute spring cassette (1) cannot be ruled out, it is essential to return volute spring cassette (1) to center position.

- Turn volute spring counterclockwise as far as it will go.
- Turn volute spring clockwise as far as it will go.
- Turn volute spring back to center position and secure so that centering pin (3) is at bottom position.

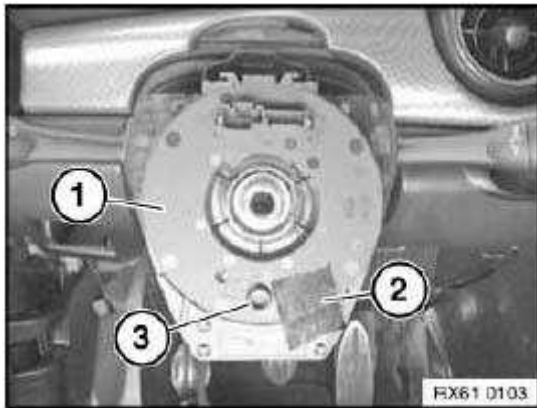


Fig. 162: Identifying Volute Spring Cassette And Centering Pin
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

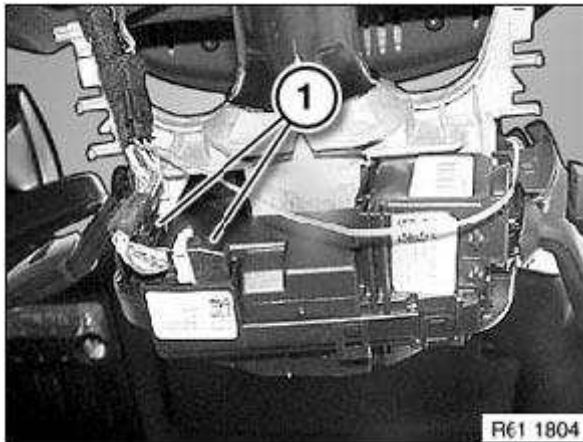


Fig. 163: Identifying Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove steering column switch cluster in direction of arrow.

Installation:

Carry out **STEERING ANGLE SENSOR ADJUSTMENT**.

On vehicles with active front steering, steering angle sensor adjustment is performed by means of **initial operation** /adjustment of active front steering.

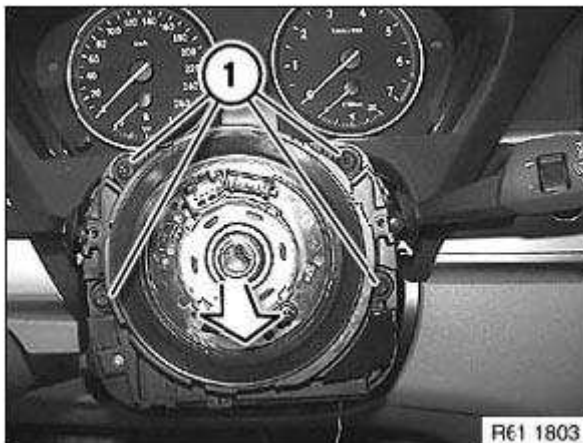


Fig. 164: Identifying Steering Angle Sensor Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Remove **volute spring cassette**

- Carry out VEHICLE PROGRAMMING/CODING

NOTE:

- If replacement of the steering column switch cluster is initiated via Progman, the steering column switch cluster is coded indirectly via the DSC control unit
- If coding is cancelled, first adjust the steering angle sensor; this makes a brand-new steering column switch cluster coding-compatible again if necessary
- Then code the DSC control unit again

- Carry out STEERING ANGLE SENSOR ADJUSTMENT

NOTE:

- If steering angle sensor adjustment is cancelled, first code the DSC control unit
- Then adjust the steering angle sensor again

- **Vehicles with active front steering:**

- Steering angle sensor adjustment is performed by means of **initial operation** /adjustment of active front steering. See 32 10 005 ADJUSTMENT FOR ACTIVE FRONT STEERING .
- If necessary, proceed in accordance with instructions

61 31 011 REMOVING AND INSTALLING/REPLACING VOLUTE SPRING CASSETTE

Necessary preliminary tasks:

- Remove steering column switch cluster

Unlock catch (1) and remove volute spring cassette (2) in direction of arrow from steering column switch cluster (3).

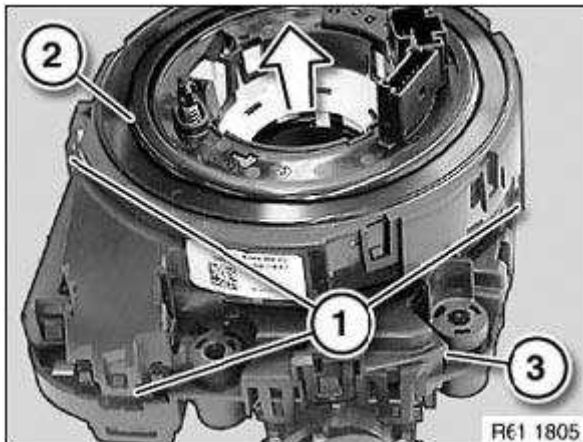


Fig. 165: Removing Volute Spring Cassette And Steering Column Switch Cluster

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:

- Do not turn ring (1).
- Also turning ring (1) through 360° is not permitted!
- Secure ring (1) against unauthorized turning.

Installation:

Marking (2) must line up with marking (3).

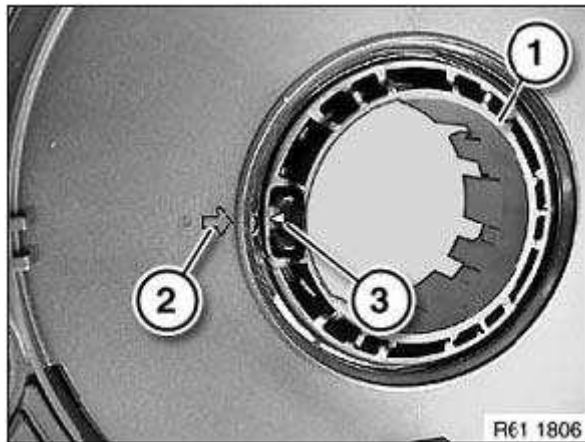


Fig. 166: Identifying Volute Spring Cassette Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Drive pin (1) of volute spring (2) must line up correctly with opening (3) in inner ring of steering column switch cluster.

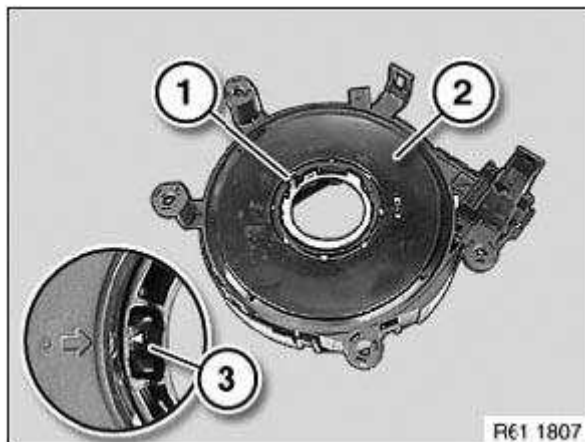


Fig. 167: Identifying Pin And Volute Spring

Courtesy of BMW OF NORTH AMERICA, INC.

61 31 014 REMOVING AND INSTALLING/REPLACING START/STOP SWITCH

Necessary preliminary tasks:

- Remove **decorative strip on instrument panel, driver's side, on right** . See **51 45 374 REMOVING AND INSTALLING/REPLACING DECORATIVE STRIP ON INSTRUMENT PANEL ON DRIVER'S SIDE ON RIGHT** .

Release screws (1).

Pull Start/Stop switch (2) forward a little.

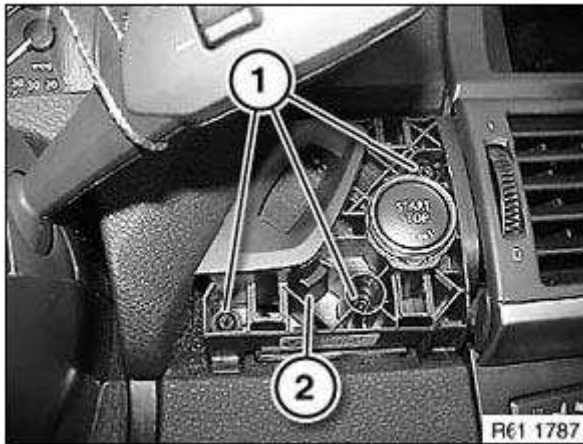


Fig. 168: Identifying Start/Stop Switch And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connections (1) and remove Start/Stop switch.

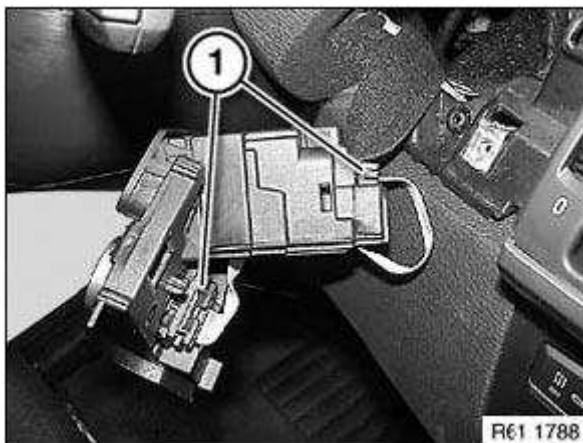


Fig. 169: Identifying Plug Connections
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 035 REMOVING AND INSTALLING/REPLACING SWITCH FOR STEERING COLUMN ADJUSTMENT

Necessary preliminary tasks:

- Remove **lower section of steering column trim** . See **32 31 020 REMOVING AND INSTALLING/REPLACING LOWER SECTION OF STEERING COLUMN TRIM** .

Unclip steering column adjustment switch (1) in direction of arrow.

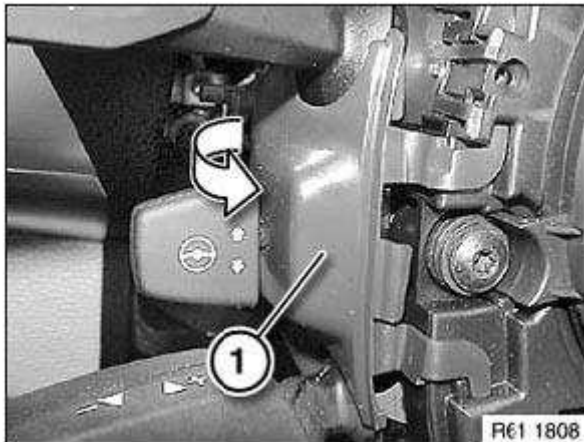


Fig. 170: Identifying Steering Column Adjustment Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

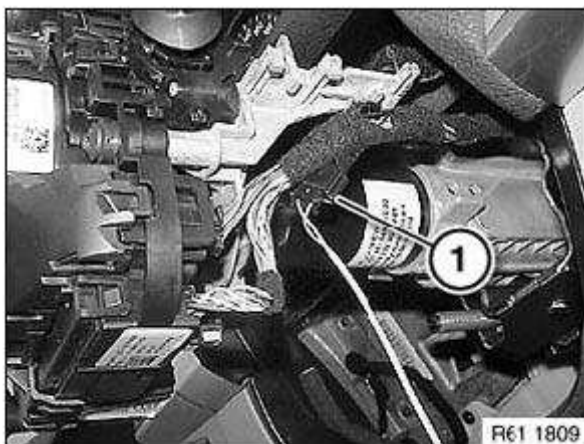


Fig. 171: Identifying Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 037 REMOVING AND INSTALLING/REPLACING LIGHT CONTROL UNIT

Necessary preliminary tasks:

- Remove **left fresh-air grille** . See **64 22 135 REMOVING AND INSTALLING OR REPLACING LEFT FRESH-AIR GRILLE** .

Press out light control unit (1) from inside.



Fig. 172: Identifying Light Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Remove light control unit.

Installation:

Make sure retainers (2) are correctly seated on trim of light control unit.

If necessary, replace faulty retainers.

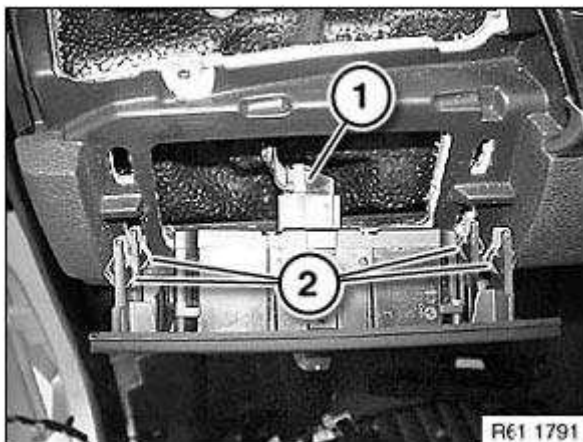


Fig. 173: Identifying Plug Connection And Retainers
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement

Release screws (1).

Remove light control unit (2) from trim (3).

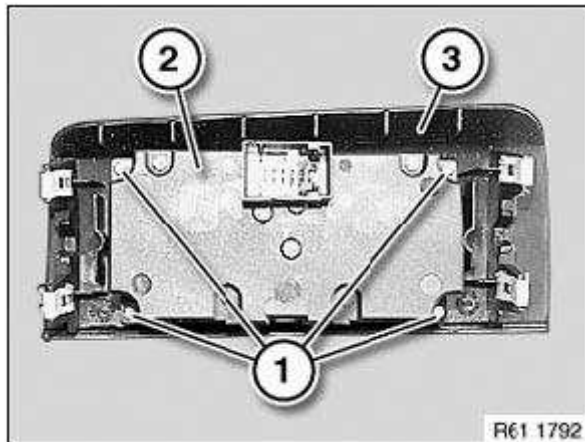


Fig. 174: Identifying Light Control Unit, Trim And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 038 REMOVING AND INSTALLING (REPLACING) SWITCH FOR PASSENGER AIRBAG DEACTIVATION

WARNING: Read and comply with safety regulations for handling airbag modules and pyrotechnical belt pretensioners.
See . See 72 00 .. SAFETY REGULATIONS FOR HANDLING COMPONENTS WITH GAS GENERATORS .
Incorrect handling can activate airbag and cause injury.

Necessary preliminary tasks:

- Disconnect **battery negative lead**
- Remove **side cover on instrument panel** . See 51 45 ... REPLACING SIDE COVER ON INSTRUMENT PANEL .

Unlock catches (1) and feed out switch for passenger airbag deactivation (2) to front of cover.

Installation:

Make sure switch for passenger airbag deactivation (2) is correctly seated in cover.

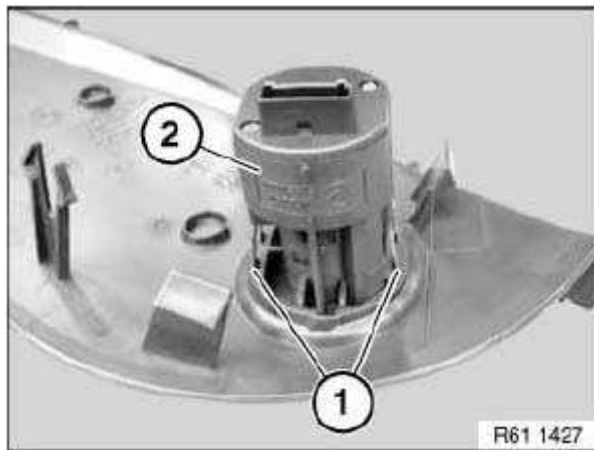


Fig. 175: Unlock Catches (1) And Feed Out Switch For Passenger Airbag Deactivation
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Remove lock cylinder for passenger airbag deactivation .

61 31 043 REMOVING AND INSTALLING OR REPLACING ROOF SWITCH CLUSTER

Special tools required:

- 00 9 317
- 00 9 340

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

IMPORTANT: Follow instructions for handling light bulbs (interior lights) . See 63 99 ... INSTRUCTIONS FOR REPLACING LIGHT BULBS (INTERIOR LIGHTS) .

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) .

Carefully unclip trim (1) with special tool **00 9 340** and remove.

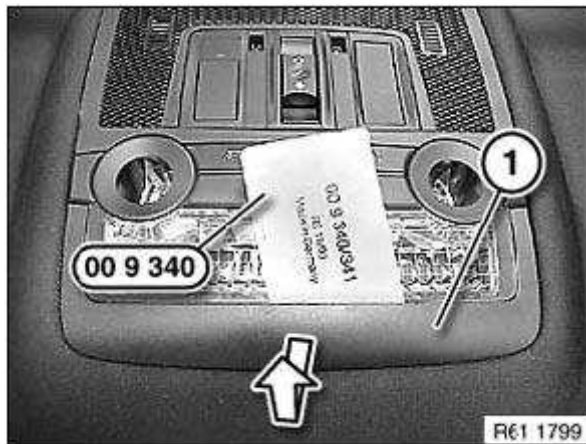


Fig. 176: Removing Clip Using Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

Release retaining clips (1).

Lever roof switch cluster with special tool **00 9 317** out of roofliner.

Disconnect plug connections underneath.

Installation:

Before installing, fit trim on roof switch cluster.

Make sure trim is correctly seated.

Feed in roof switch cluster at an angle of 90° with respect to the roofliner and attach.

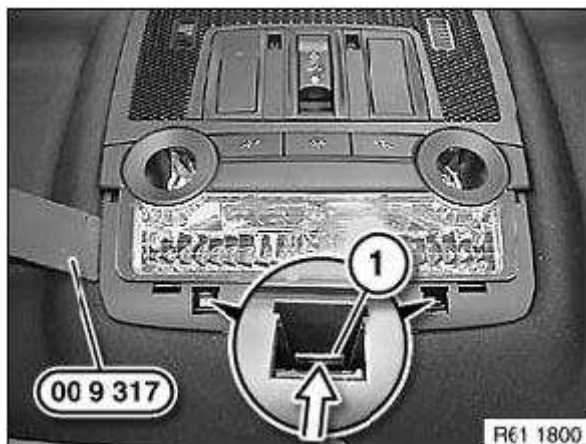


Fig. 177: Disconnecting Plug Connections Underneath
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Disconnecting the plug connection for the hands-free microphone or emergency SOS call button results in fault memory entries in the telephone control unit (limitation in the emergency SOS call system).
After fitting, read out fault memory and if necessary delete entries.

Replacement:

- Carry out **VEHICLE PROGRAMMING/CODING**
- If necessary, remove **bulbs** . See **63 99 ... INSTRUCTIONS FOR REPLACING LIGHT BULBS (INTERIOR LIGHTS)** .
- If necessary, remove **hands-free microphone** . See **84 31 020 REMOVING AND INSTALLING/REPLACING HANDSFREE SYSTEM SPEAKER** .
- If necessary, **initialize slide/tilt sunroof** . See **54 0 ... NOTES ON STEEL AND GLASS SLIDE/TILT SUNROOFS (INITIALIZATION/NORMALIZATION/LEARNING OF CHARACTERISTIC CURVE)** .

61 31 052 REMOVING AND INSTALLING/REPLACING CENTER CONSOLE SWITCH CLUSTER

Necessary preliminary tasks:

- Remove **middle trim for instrument panel** . See **51 45 310 REMOVING AND INSTALLING (REPLACING) CENTER TRIM FOR INSTRUMENT PANEL** .

Disconnect plug connection (1) and expose ribbon cable up to center console switch cluster (2).

Unclip center console switch cluster (2) at retaining points (3).

Remove center console switch cluster (2) in direction of arrow from instrument panel trim.

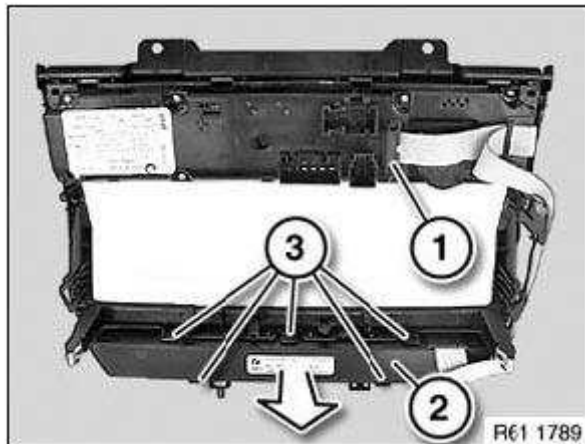


Fig. 178: Identifying Plug Connection And Centre Console Switch Cluster
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 079 REMOVING AND INSTALLING/REPLACING SWITCH FOR HAZARD WARNING

FLASHERS/CENTRAL LOCKING

Special tools required:

- 00 9 340

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

IMPORTANT: Risk of damage!

Protect middle fresh-air grille in working area against damage, tape off if necessary.

Lever switch for hazard warning flashers/central locking (1) with special tool **00 9 340** out of middle fresh-air grille and feed out.

Disconnect associated plug connection and remove switch for hazard warning flashers/central locking (1).

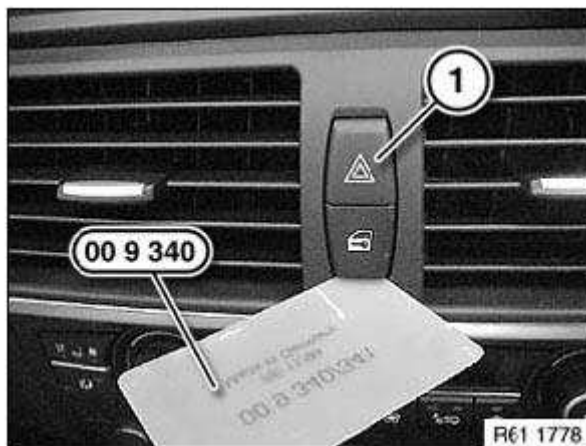


Fig. 179: Lever Hazard Warning Flashers And Central Locking With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 084 REMOVING AND INSTALLING/REPLACING SWITCH FOR AUTOMATIC REAR LID ACTUATION

Special tools required:

- 64 1 020

NOTE: See HEATING AND AIR CONDITIONING - SPECIAL TOOLS .

Lever switch for automatic rear lid actuation (1) with special tool **64 1 020** sideways out of frame (2).

Disconnect associated plug connection and remove switch for automatic rear lid actuation (1).

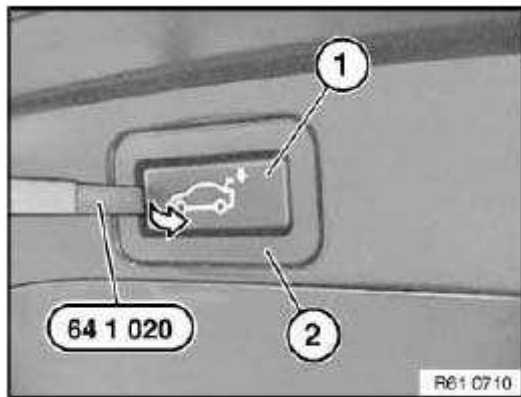


Fig. 180: Removing Switch For Automatic Rear Lid Actuation
 Courtesy of BMW OF NORTH AMERICA, INC.

61 31 091 REMOVING AND INSTALLING/REPLACING SWITCH FOR (REAR) LEFT OR RIGHT SEAT HEATING

Special tools required:

- 00 9 340

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

Unclip trim with special tool **00 9 340** from center console.

Installation:

Retaining lugs of trim must not be damaged or missing.

Make sure trim is correctly engaged on center console.



Fig. 181: Unclip Trim With Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect left or right plug connection (1).

Press together retaining lugs (2) of left or right switch for seat heating and feed switch for seat heating in direction of arrow out of trim (3).

Installation:

Make sure switch for seat heating is correctly seated in trim (3).

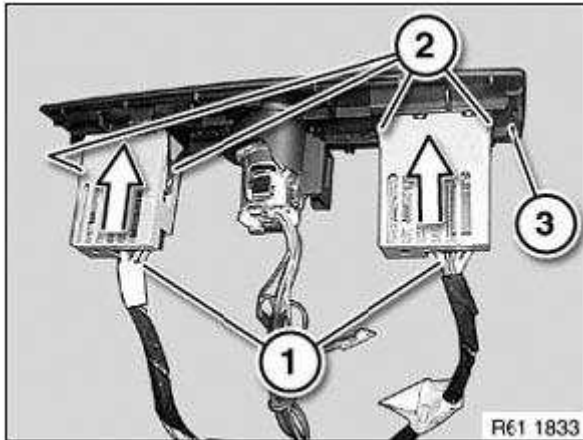


Fig. 182: Pressing Retaining Lugs

Courtesy of BMW OF NORTH AMERICA, INC.

61 31 112 REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT SHIFT PADDLE FOR AUTOMATIC TRANSMISSION

Necessary preliminary tasks:

- Remove **airbag unit** . See **32 34 030 REMOVING AND INSTALLING/REPLACING AIRBAG UNIT (SPORT STEERING WHEEL)** .

Disconnect plug connection (1).

Release screw (3).

Feed out wiring harness (2) and remove shift paddle for automatic transmission (4) in direction of arrow from steering wheel (5).

Installation:

Make sure shift paddle for automatic transmission (4) is correctly seated on steering wheel (5)

Make sure wiring harness (2) is laid exactly.

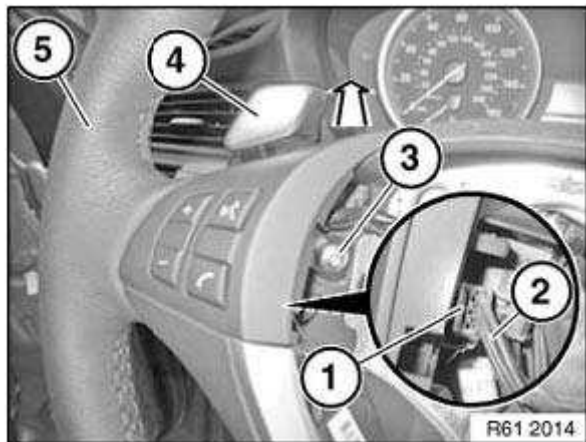


Fig. 183: Identifying Wiring Harness, Plug Connection And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

61 31 116 REPLACING ROCKER SWITCH FOR SIDE WINDOW OPERATION (REAR)

Special tools required:

- 00 9 317

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

IMPORTANT: Carry out the following operation carefully so as to avoid damaging the door trim panel and switch.
 If necessary, tape off working area.

Lever rocker switch for side window operation (1) with special tool **00 9 317** in direction of arrow out of armrest.

Disconnect associated plug connection and remove rocker switch for side window operation (1).

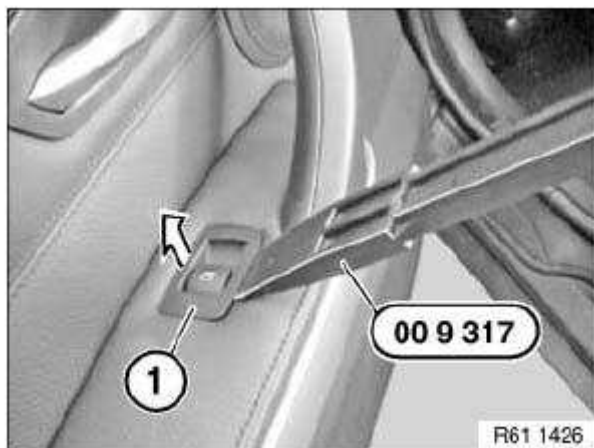


Fig. 184: Removing Rocker Switch For Side Window Operation
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Retaining hooks (1) of rocker switch for side window operation (2) must not be damaged.

Make sure rocker switch for side window operation (2) is correctly seated in armrest.

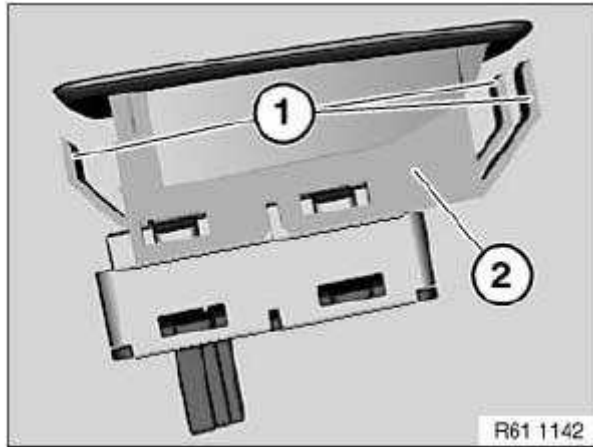


Fig. 185: Identifying Retaining Hooks
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 117 REMOVING AND INSTALLING/REPLACING POWER WINDOW SWITCH (DRIVER'S SIDE)

Special tools required:

- 00 9 317

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

IMPORTANT: Carry out the following operation carefully so as to avoid damaging the door trim panel and switch.
If necessary, tape off working area.

Lever power window switch (1) with special tool **00 9 317** in direction of arrow out of armrest.

Installation:

Make sure power window switch (1) is correctly engaged in armrest.

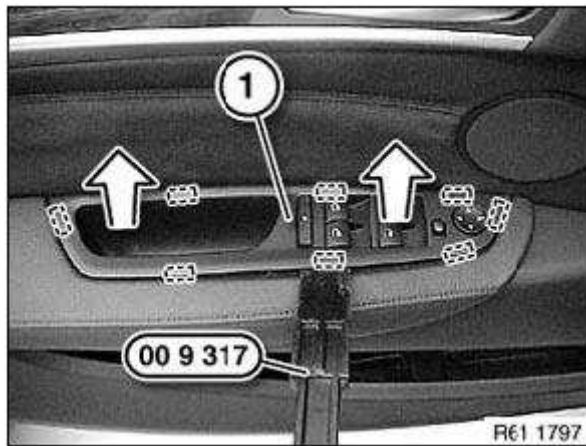


Fig. 186: Lever Power Window Switch (1) With Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) and remove power window switch.

Installation:

Make sure retainers (2) are correctly seated on power window switch.

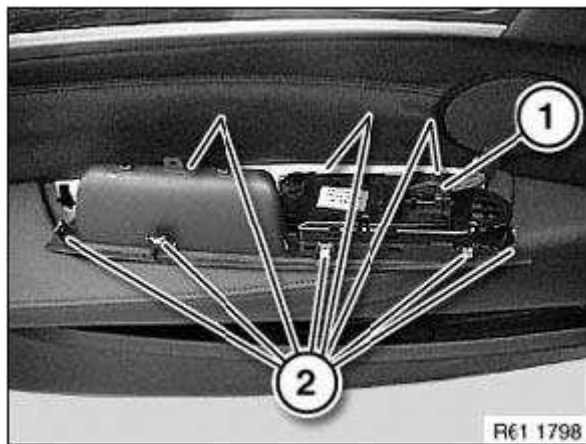


Fig. 187: Identifying Retainers And Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

61 31 118 REMOVING AND INSTALLING/REPLACING POWER WINDOW SWITCH (PASSENGER SIDE)

Special tools required:

- 00 9 317

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

IMPORTANT: Carry out the following operation carefully so as to avoid damaging the door trim panel and switch.
If necessary, tape off working area.

Lever power window switch (1) with special tool **00 9 317** in direction of arrow out of armrest.

Disconnect associated plug connection and remove power window switch (1).

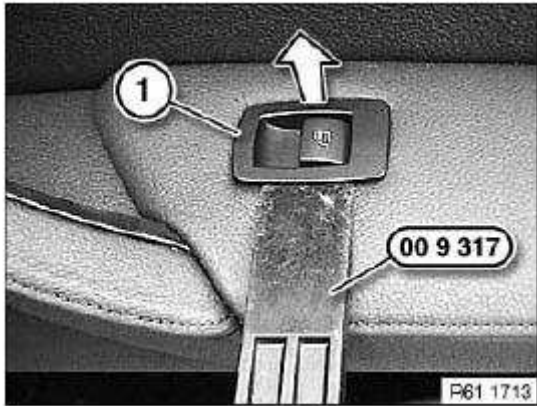


Fig. 188: Removing Power Window Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Retaining hooks (1) of power window switch (2) must not be damaged.

Make sure power window switch (2) is correctly seated in armrest.

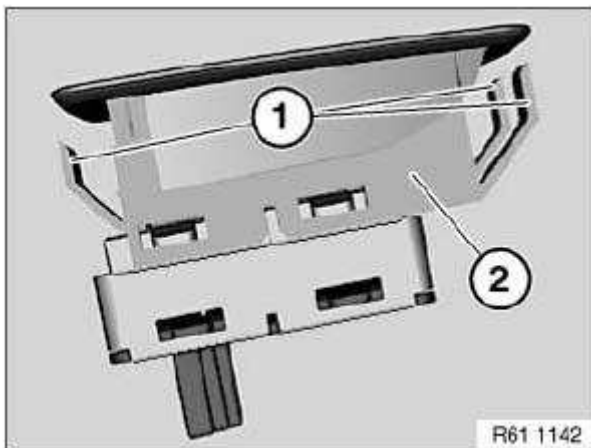


Fig. 189: Identifying Power Window Switch And Retaining Hooks
Courtesy of BMW OF NORTH AMERICA, INC.

Special tools required:

- 00 9 323

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

Necessary preliminary tasks:

- Open storage compartment

Unlock retaining lugs (2) with special tool **00 9 323** and feed trim (1) out of storage compartment.

Disconnect associated plug connections and remove trim (1).

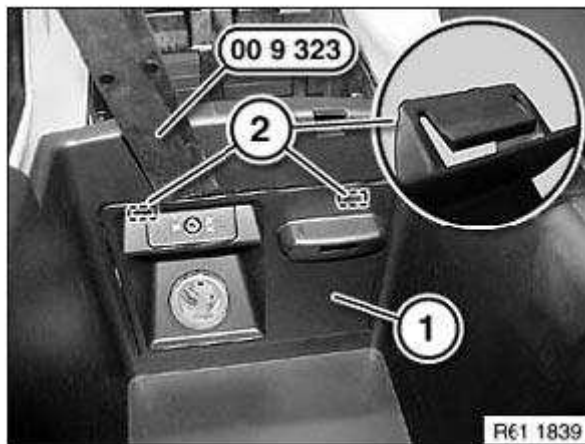


Fig. 190: Identifying Retaining Lugs
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock retaining lugs (1) and feed out AV connection socket (2) to front side of trim (3).

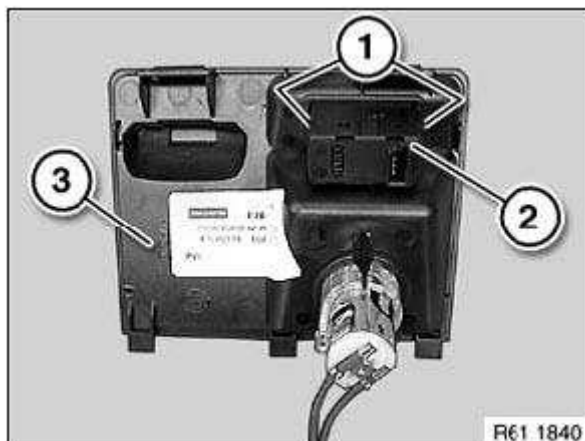


Fig. 191: Identifying Retaining Lugs And AV Connection Socket

Courtesy of BMW OF NORTH AMERICA, INC.

61 31 134 REMOVING AND INSTALLING/REPLACING USB/AUDIO INTERFACE CONNECTING SOCKET

Operation is described in:

Removing and installing/replacing AV connection socket

61 31 135 REMOVING AND INSTALLING/REPLACING HEADPHONES CONNECTION SOCKET

Special tools required:

- 00 9 340

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

Unclip trim (1) with special tool 00 9 340 from center console.

Installation:

Retaining lugs on trim (1) must not be damaged or missing.

Make sure trim (1) is correctly engaged on center console.

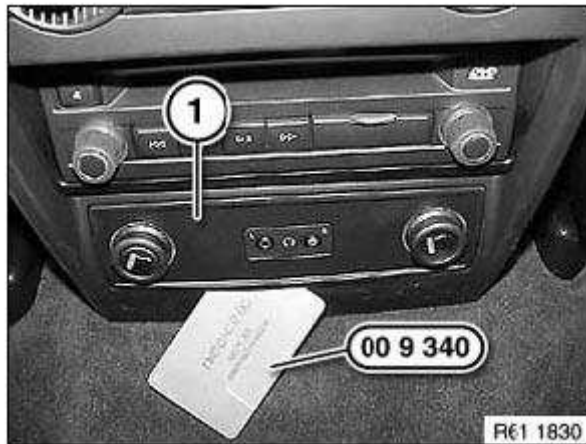


Fig. 192: Identifying Trim Location

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Press together retaining lugs (2) and feed headphones connection socket in direction of arrow out of trim (3).

Installation:

Make sure headphones connection socket is correctly seated in trim (3).

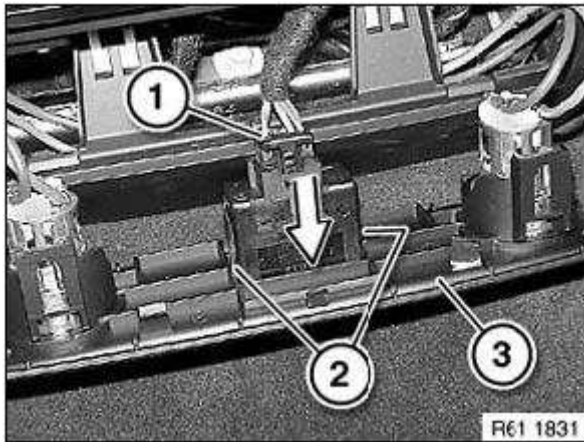


Fig. 193: Identifying Plug Connection And Retaining Lugs
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 172 REMOVING AND INSTALLING/REPLACING SWITCH FOR ELECTROMECHANICAL PARKING BRAKE

Necessary preliminary tasks:

- Remove **trim for gear selector switch**

Release screws (1) and remove switch for electromechanical parking brake (2) from trim for gear selector switch (3).

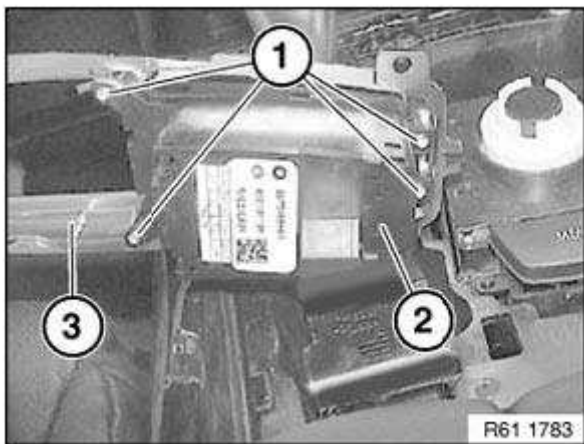


Fig. 194: Identifying Electromechanical Parking Brake And Gear Selector Switch
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 192 REPLACING KNOB FOR CONTROLLER

Special tools required:

- 00 9 317
- 00 9 323

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

Lever knob for controller (1) with special tools **00 9 323** and **00 9 317** in direction of arrow off controller and remove.

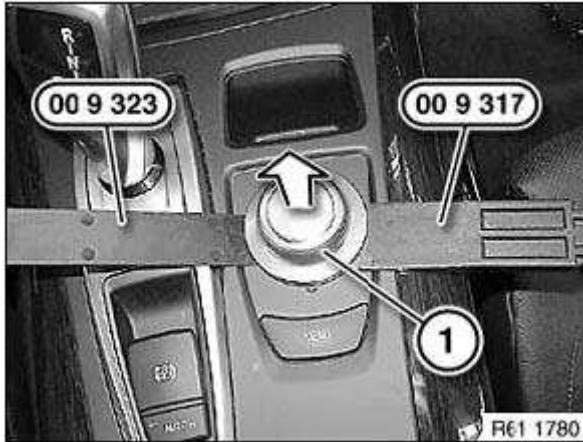


Fig. 195: Removing Controller

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!

Fit knob for controller only when controller is installed.

Installation:

Fit knob for controller (1) so that guides (2) are seated in recesses (3).

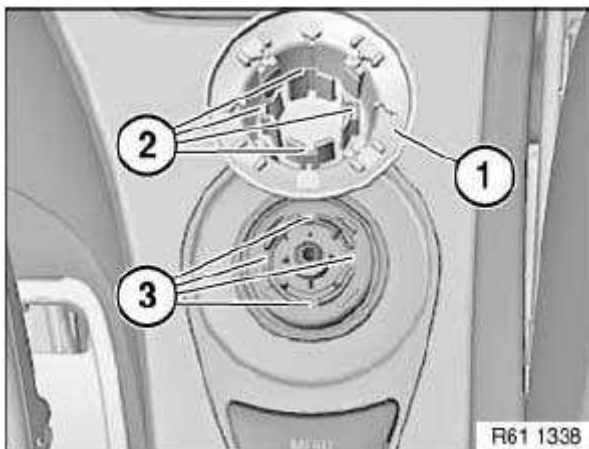


Fig. 196: Identifying Controller And Guides

Courtesy of BMW OF NORTH AMERICA, INC.

61 31 193 REMOVING AND INSTALLING/REPLACING BUTTON UNIT (MENU/VOICE INPUT)

Necessary preliminary tasks:

- Remove center console trim . See **51 16 160 REMOVING AND INSTALLING/REPLACING CENTER CONSOLE TRIM (GEAR SELECTOR SWITCH)** .

Unlock catches (2) and feed button unit (1) in direction of arrow out of controller.

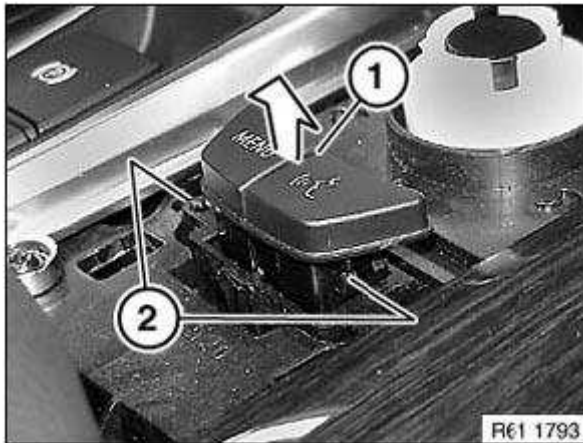


Fig. 197: Unlock Catches (2) And Feed Button Unit (1) In Direction Of Arrow
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) and remove button unit.

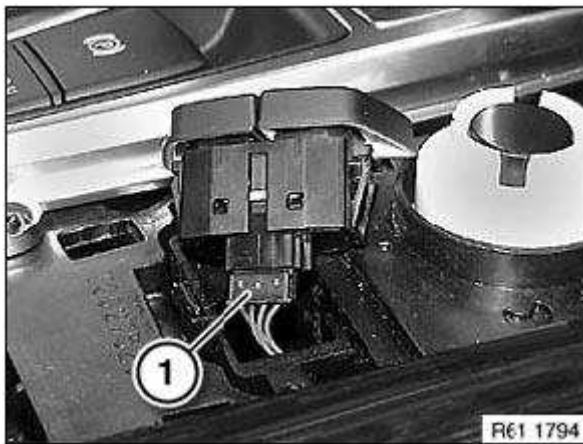


Fig. 198: Disconnect Plug Connection (1) And Remove Button Unit
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 195 REMOVING AND INSTALLING (REPLACING) FRONT CONTROLLER

Necessary preliminary tasks:

- Remove **center console trim** . See **51 16 160 REMOVING AND INSTALLING/REPLACING CENTER CONSOLE TRIM (GEAR SELECTOR SWITCH)** .

Release screws (1). Tightening torque, see **61 31 5AZ** in **61 31 SWITCH** .

Raise controller (2) and disconnect plug connection underneath.

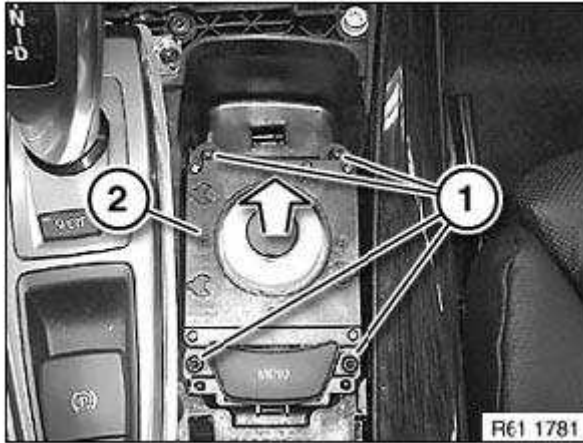


Fig. 199: Raise Controller (2) And Disconnect Plug Connection Underneath
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Remove **button unit** .

Carry out **VEHICLE PROGRAMMING/CODING**.

61 31 203 REPLACING SWITCH COMBINATION FOR SEAT ADJUSTMENT

Necessary preliminary tasks:

- Remove **cover from front seat** . See **FRONT SEATS** .

Release screws (1).

Raise switch combination for seat adjustment (2).

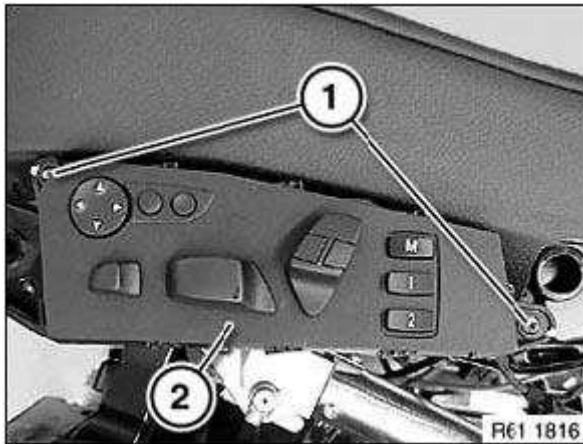


Fig. 200: Raising Switch Combination For Seat Adjustment
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

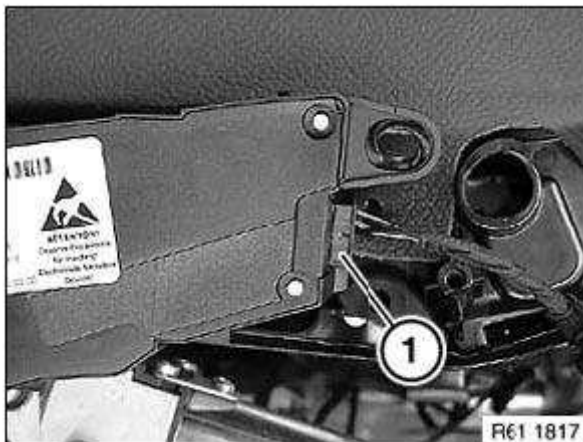


Fig. 201: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 214 REMOVING AND INSTALLING/REPLACING SWITCH FOR ELECTRONIC DAMPER CONTROL (SPORT SWITCH)

Necessary preliminary tasks:

- Remove **trim for gear selector switch**

Release screws (1).

Raise trim (2) slightly.

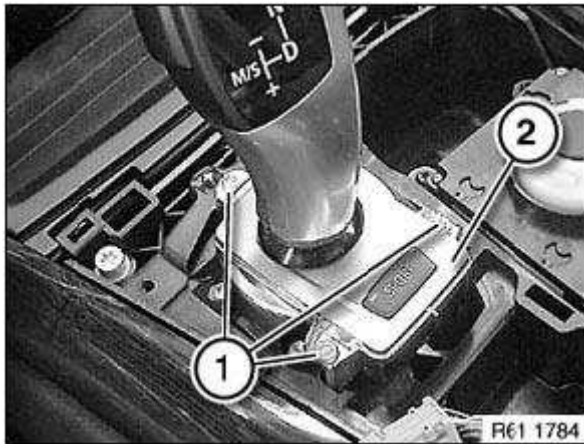


Fig. 202: Identifying Trim And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Plug connection (1) must not be disconnected.

Unlock switch for Electronic Damper Control (2) and remove downwards from trim.

Installation:

Make sure switch for Electronic Damper Control (2) engages correctly on trim.

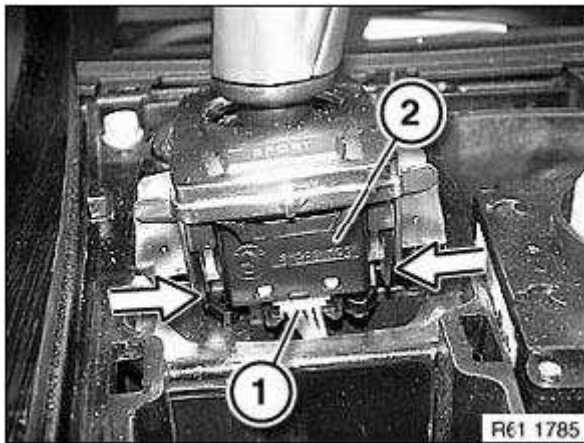


Fig. 203: Identifying Electronic Damper Control And Plug
 Courtesy of BMW OF NORTH AMERICA, INC.

Remove **gear selector switch carrier (3)** .

Disconnect plug connection (1).

Feed wiring harness (2) in direction of arrow out of gear selector switch carrier (3) and remove switch for Electronic Damper Control.

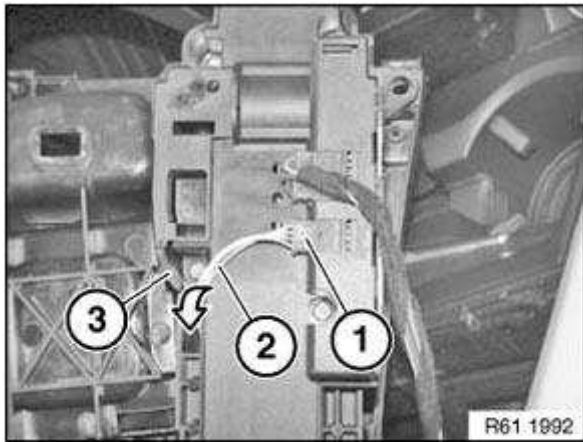


Fig. 204: Identifying Gear Selector Switch Carrier And Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

61 31 229 REMOVING AND INSTALLING/REPLACING BOTH SWITCHES ON SPORT STEERING WHEEL

Necessary preliminary tasks:

- Remove airbag unit . See **32 34 030 REMOVING AND INSTALLING/REPLACING AIRBAG UNIT (SPORT STEERING WHEEL)** .

NOTE: Steering wheel shown removed for purposes of clarity.

Release screws (1).

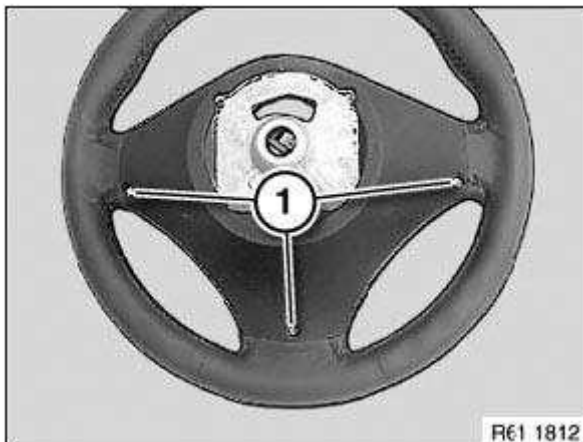


Fig. 205: Identifying Steering Wheel Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Version - shift paddles for automatic transmission:

Release screws (1).

Disconnect plug connections (2).

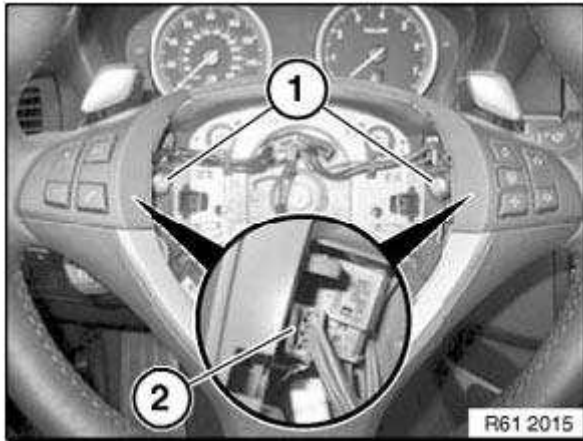


Fig. 206: Identifying Plug Connections And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Both sport steering wheel switches (1) are connected to each other by the wiring harness.

Disconnect plug connections (2).

Detach switches on sport steering wheel (1) with design cover (3) in direction of arrow from steering wheel.

Installation:

Make sure wiring harnesses are correctly routed.

Make sure switches on sport steering wheel (1) with design cover (3) are correctly seated on steering wheel.

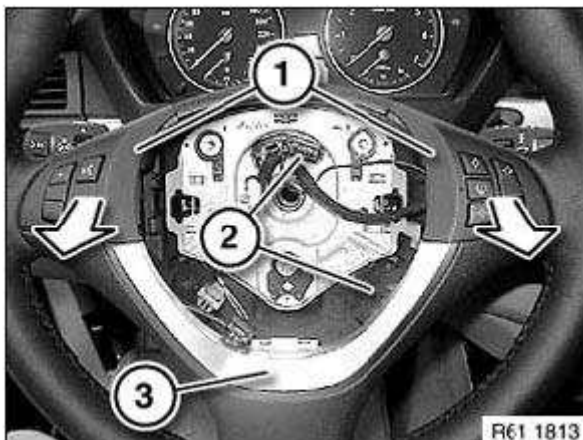


Fig. 207: Identifying Sport Steering Wheel Switches And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Feed wiring harness (3) out of design cover (4).

Remove switches on sport steering wheel (2) from design cover (4).

Installation:

Make sure wiring harness (3) is correctly laid on design cover (4).

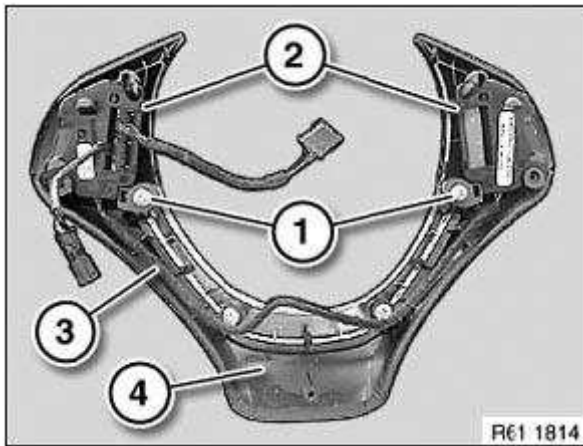


Fig. 208: Remove Switches On Sport Steering Wheel (2) From Design Cover (4)
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 241 REMOVING AND INSTALLING/REPLACING BONNET/HOOD CONTACT SWITCH

Necessary preliminary tasks:

- Remove **right bonnet/hood lock**

Release screw (1).

Remove bonnet/hood contact switch (2) from bonnet/hood lock (3).

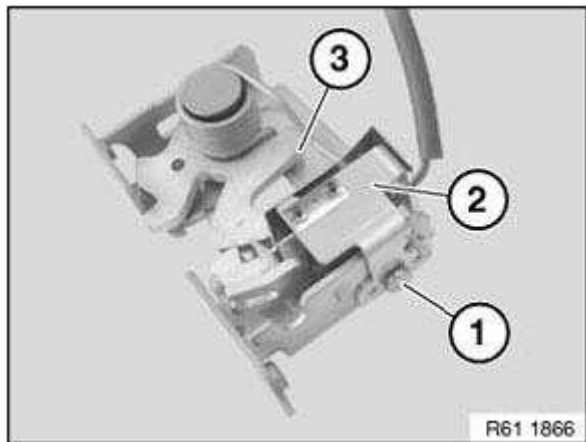


Fig. 209: Identifying Bonnet, Hood Contact Switch And Hood Lock
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 255 REPLACING SWITCH FOR OUTSIDE MIRROR

Operation is described in:

Removing and installing/replacing **power window switch** (driver's side).

61 31 310 REPLACING BRAKE-LIGHT SWITCH

Necessary preliminary tasks:

- Remove **trim panel for pedal assembly** . See **51 45 185 REMOVING AND INSTALLING/REPLACING PANEL FOR PEDALS** .

NOTE: **Brake light switch (2) is situated above the brake pedal.**

Disconnect plug connection (1).

Pull brake light switch (2) in direction of arrow out of brake light switch holder (3).

Press catches (4) together and unclip brake light switch holder (3) from brake pedal.

Installation:

Depress brake pedal.

Slide brake light switch (2) as far as it will go into brake light switch holder (3).

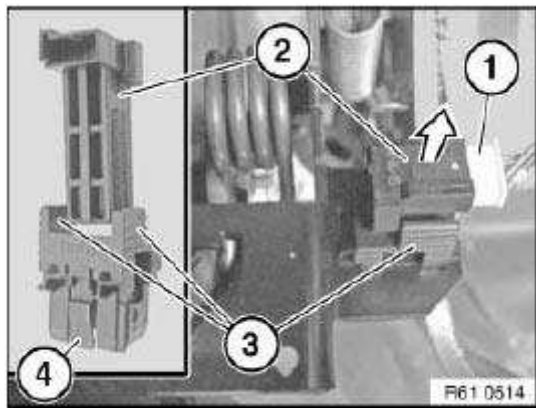


Fig. 210: Pulling Brake Light Switch Off Brake Light Switch Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Grip brake light switch holder (3), slowly return brake pedal to starting position and **pull back to stop** .

61 31 333 REMOVING AND INSTALLING/REPLACING SWITCH FOR UNLOCKING GLOVEBOX

Necessary preliminary tasks:

- Remove **decorative strip from middle fresh-air grille** . See **51 45 377 REMOVING AND INSTALLING/REPLACING DECORATIVE STRIP ON MIDDLE FRESH-AIR GRILLE** .

Unlock catches (1).

Press switch (2) out of decorative strip.

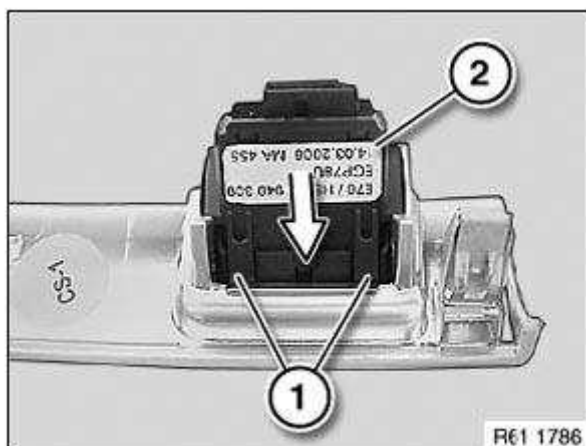


Fig. 211: Pressing Switch Out Of Decorative Strip
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 334 REMOVING AND INSTALLING OR REPLACING GRIP TRIM FOR GEAR SELECTOR SWITCH

Special tools required:

- 64 1 030

NOTE: See HEATING AND AIR CONDITIONING - SPECIAL TOOLS .

Turn circlip (1) in direction of arrow and remove.

Installation:

Make sure circlip (1) is correctly seated.

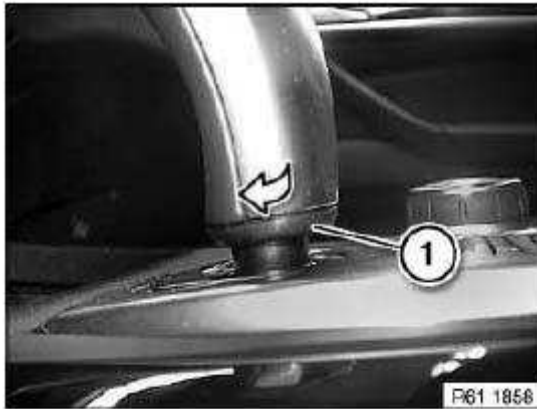


Fig. 212: Turning Circlip

Courtesy of BMW OF NORTH AMERICA, INC.

Feed special tool **64 1 030** from below into trim (1) and carefully pull off trim (1) in direction of arrow.

Remove symbol plate (2).

Installation:

To facilitate fitting, secure pushbutton (3) with adhesive tape on trim (1).

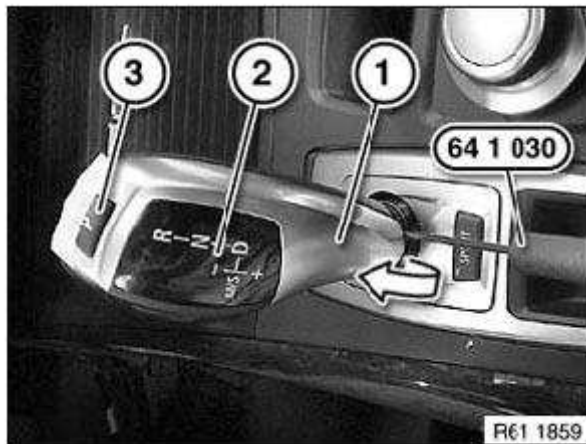


Fig. 213: Secure Pushbutton (3) With Adhesive Tape On Trim (1)
 Courtesy of BMW OF NORTH AMERICA, INC.

61 31 336 REMOVING AND INSTALLING/REPLACING TRIM FOR GEAR SELECTOR SWITCH

Necessary preliminary tasks:

- Remove **center console trim** . See **51 16 160 REMOVING AND INSTALLING/REPLACING CENTER CONSOLE TRIM (GEAR SELECTOR SWITCH)** .

Release screws (1) and raise trim for gear selector switch (2) slightly. Tightening torque, see **61 31 3AZ** in **61 31 SWITCH** .

Disconnect plug connection underneath and remove trim for gear selector switch (2).



Fig. 214: Identifying Gear Selector Switch And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Remove **switch for electromechanical parking brake** .

61 31 342 REMOVING AND INSTALLING/REPLACING GEAR SELECTOR SWITCH

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) .

Necessary preliminary tasks:

- Disconnect battery negative lead
- Remove **center console trim** . See **51 16 160 REMOVING AND INSTALLING/REPLACING CENTER CONSOLE TRIM (GEAR SELECTOR SWITCH)** .

Release screws (1). Tightening torque, see **51 16 2AZ** in **51 16 MIRRORS, FINISHERS, ASHTRAYS, CONSOLES** .

Raise gear selector switch carrier (2) and disconnect all plug connections.

Remove gear selector switch carrier (2).

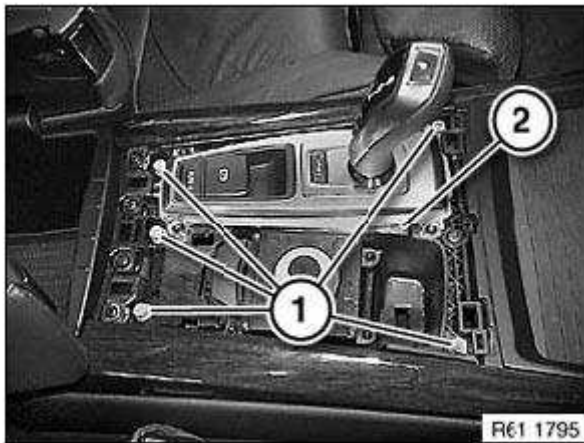


Fig. 215: Identifying Gear Selector Switch Carrier And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Remove trim for gear selector switch .

Release screws (1). Tightening torque, see **61 31 4AZ** in **61 31 SWITCH** .

Remove gear selector switch (2) from gear selector switch carrier (3).

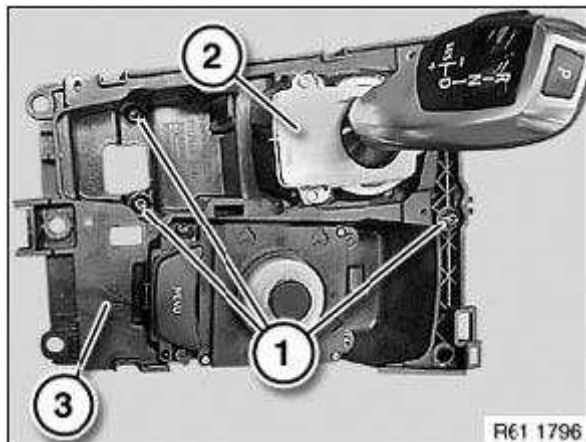


Fig. 216: Identifying Gear Selector Switch And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out **VEHICLE PROGRAMMING/CODING**.

61 31 382 REPLACING COOLANT LEVEL SWITCH

WARNING: Danger of scalding!
Carry out work only after engine has cooled down.

IMPORTANT: Do not damage connected water hoses.

Necessary preliminary tasks:

- If necessary, release screws for **coolant expansion tank** and raise coolant expansion tank slightly

NOTE: Operation is shown by way of example on the E85. There may be differences in detail in the case of other vehicle models.

Disconnect plug connection (1).

Turn coolant level switch (2) in direction of arrow and feed downwards out of coolant expansion tank (3).

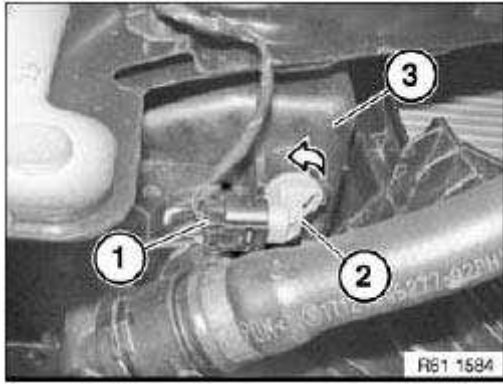


Fig. 217: Identifying Coolant Level Switch And Coolant Expansion Tank
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 492 REPLACING LEVEL SWITCH FOR WINDSCREEN WASHER SYSTEM

Necessary preliminary tasks:

- Release **wheel arch cover** at front (rear section) right in working area and pull forwards

Disconnect plug connection (1).

Turn level switch for windscreen washer system (2) in direction of arrow and remove towards bottom from fluid reservoir for windscreen washer system (3).

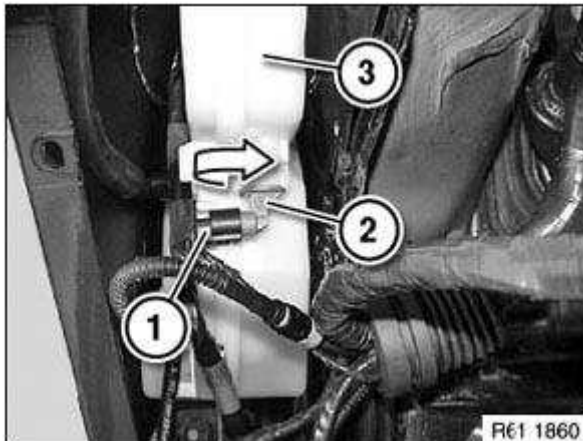


Fig. 218: Identifying Windscreen Washer System And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 996 CARRYING OUT STEERING ANGLE SENSOR ADJUSTMENT

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

See 32 10 005 ADJUSTMENT FOR ACTIVE FRONT STEERING .

NOTE: Steering angle sensor adjustment must be carried out:

- after adjustment work on the front axle/steering
- after all mechanical work on the steering system
- E46 (AWD), E53, E83: after disconnection of battery
- after replacement/coding/programming of the following components:
 - Fixture for switches of steering column/switch cluster/steering angle sensor
 - Dynamic Stability Control (DSC) control unit
 - Control unit active anti-roll stabilization (ARS)

Connect vehicle to BMW diagnosis system or Software Service Station.

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

HORN

61 33 050 REMOVING AND INSTALLING/REPLACING LEFT FANFARE HORN

Necessary preliminary tasks:

Remove **front bumper trim** . See 51 11 156 REMOVING AND INSTALLING FRONT BUMPER TRIM .

NOTE: Work is shown on the E70 (without engine oil cooler) by way of example. There may be differences in detail in the case of other vehicle models.

WARNING: Risk of injury!
Tape off edges (1) of bumper trim.



Fig. 219: Identifying Bumper Trim
 Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) and pull holder with fanfare horn (2) forwards slightly. Tightening torque, see **61 33 4AZ** in **61 33 HORN** .

Disconnect associated plug connection and remove holder with fanfare horn (2).

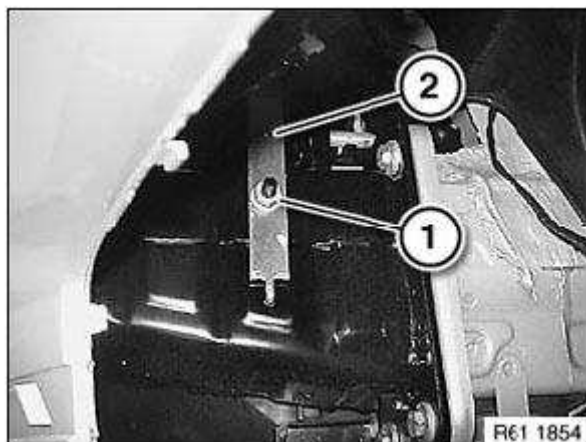


Fig. 220: Identifying Fanfare Horn And Nut
 Courtesy of BMW OF NORTH AMERICA, INC.

61 33 055 REMOVING AND INSTALLING/REPLACING RIGHT FANFARE HORN

Necessary preliminary tasks:

Remove **front bumper trim** . See **51 11 156 REMOVING AND INSTALLING FRONT BUMPER TRIM** .

NOTE: **Work is shown on the E70 (without supplementary radiator) by way of example. There may be differences in detail in the case of other vehicle models.**

WARNING: Risk of injury!
Tape off edges (1) of bumper trim.

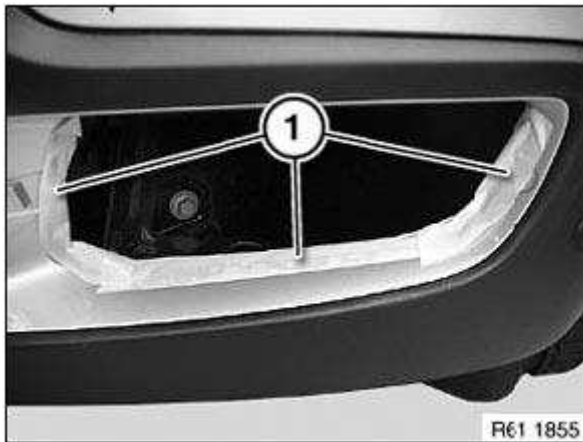


Fig. 221: Identifying Bumper Trim
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) and pull holder with fanfare horn (2) forwards slightly. Tightening torque, see **61 33 4AZ** in **61 33 HORN** .

Disconnect associated plug connection and remove holder with fanfare horn (2).

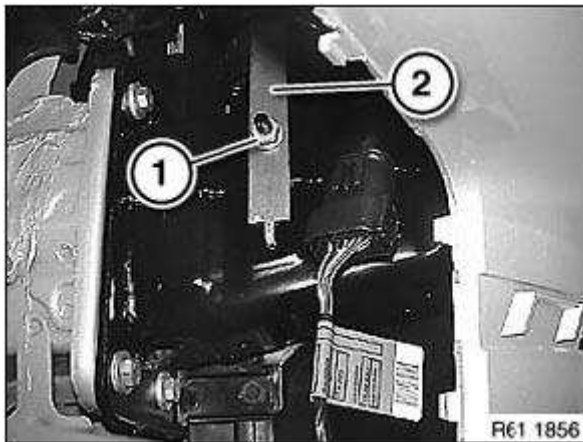


Fig. 222: Release Nut (1) And Pull Holder With Fanfare Horn (2) Forwards Slightly
Courtesy of BMW OF NORTH AMERICA, INC.

INSERT HOLDER FOR CIGARETTE LIGHTER

61 34 ... REMOVING AND INSTALLING OR REPLACING SOCKET OUTLET IN LUGGAGE COMPARTMENT

Special tools required:

- 64 1 020

NOTE: See HEATING AND AIR CONDITIONING - SPECIAL TOOLS .

Necessary preliminary tasks:

- Remove **flap in right luggage compartment wheel arch trim** . See 51 47 172 REMOVING AND INSTALLING/REPLACING FLAP IN LUGGAGE COMPARTMENT TRIM, LEFT OR RIGHT .

NOTE: Work is shown on the E71 by way of example. There may be differences in detail in the case of other vehicle models.

Disconnect plug connection (1).

Release retaining lugs (2) with special tool **64 1 020** and feed socket frame (3) in direction of arrow out of luggage compartment panel (4).

Installation:

Retaining lugs (2) must not be damaged or missing.

Feed in socket frame (3) first at bottom into luggage compartment panel (4) and then press down at top.

Make sure socket frame (3) is correctly seated on luggage compartment panel (4).

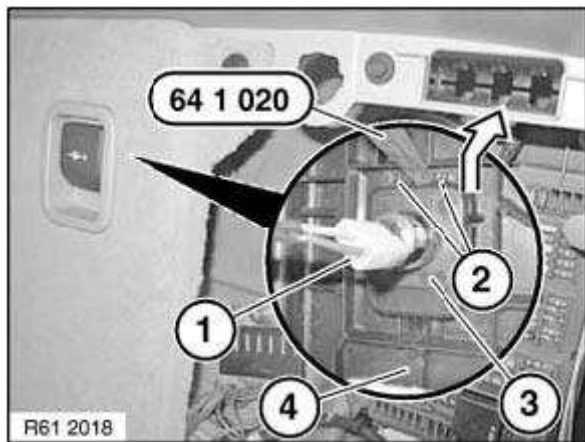


Fig. 223: Identifying Socket Frame And Luggage Compartment Panel
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock catches (1) with a suitable tool and press socket receptacle (2) in direction of arrow out of socket frame (3).

Installation:

Catches (1) on socket receptacle (2) must not be damaged.

Make sure socket receptacle (2) is correctly seated in socket frame (3).

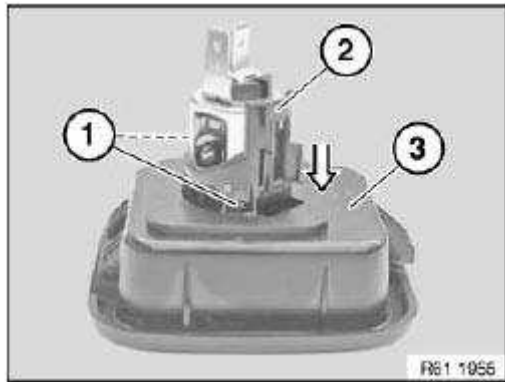


Fig. 224: Make Sure Socket Receptacle (2) Is Correctly Seated In Socket Frame (3)
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock catches (1) with a suitable tool and press socket (2) in direction of arrow out of socket receptacle (3).

Installation:

Catches (1) on socket receptacle (3) must not be damaged.

Make sure socket (2) is correctly seated in socket receptacle (3).

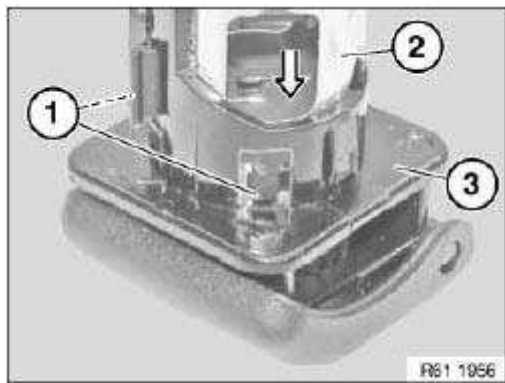


Fig. 225: Identifying Catches And Socket
Courtesy of BMW OF NORTH AMERICA, INC.

61 34 ... REMOVING AND INSTALLING/REPLACING SOCKET IN CENTER CONSOLE (FRONT)

Necessary preliminary tasks:

- Remove complete **center console** . See **51 16 165 REMOVING AND INSTALLING/REPLACING COMPLETE CENTER CONSOLE** .

Detach plug connection holder (1) from center console (2).

Carefully pull LED (3) in direction of arrow out of center console (2).

Unlock catches (4) with a suitable tool.

Press socket (5) in direction of arrow out of center console (2).

Feed wiring harness (6) out of center console (2) and remove socket (5).

Installation:

Make sure socket (5) and LED (3) are correctly seated in center console (2).

Make sure wiring harness (6) is laid correctly.

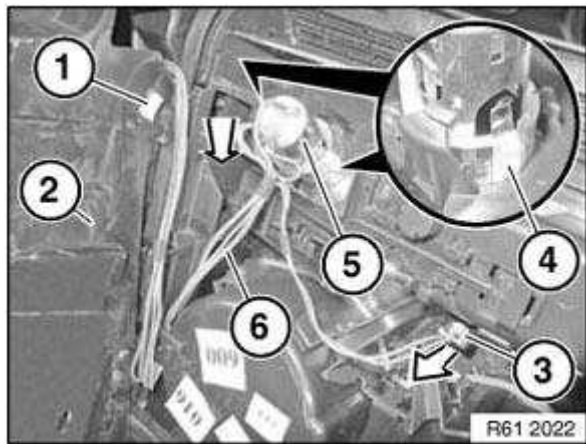


Fig. 226: Identifying Wiring Harness And Catches
Courtesy of BMW OF NORTH AMERICA, INC.

61 34 ... REMOVING AND INSTALLING/REPLACING SOCKET IN CENTER CONSOLE (REAR/LEFT OR RIGHT)

Necessary preliminary tasks:

- Remove **rear center console trim** . See **51 16 163 REMOVING AND INSTALLING/REPLACING REAR CENTER CONSOLE TRIM** .

Unlock retaining lugs for left or right plug housing (1).

Detach left or right plug housing from rear center console trim (3).

Unclip trim (2) in direction of arrow from rear center console trim (3).

Installation:

Retaining lugs on trim (2) must not be damaged or missing.

Make sure trim (2) is correctly engaged on rear center console trim (3).

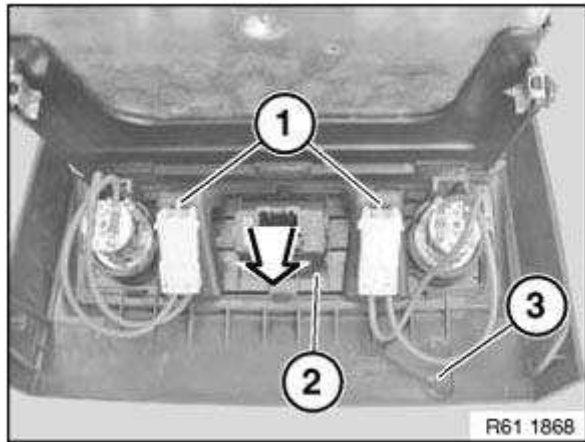


Fig. 227: Identifying Left/Right Plug Housing And Trim
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock retaining lugs on left or right socket (1) with a suitable tool.

Press left or right socket (1) in direction of arrow out of trim (2).

Installation:

Make sure left or right socket (1) is correctly seated in trim (2).

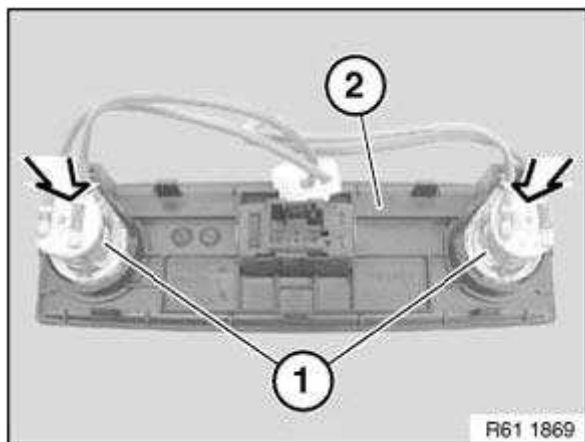


Fig. 228: Pressing Left Or Right Socket
Courtesy of BMW OF NORTH AMERICA, INC.

61 34 ... REMOVING AND INSTALLING/REPLACING SOCKET IN CENTER CONSOLE (REAR)

Special tools required:

- 00 9 317

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

Pull lighter insert (1) out of socket.

Release retaining lugs (2) with special tool 00 9 317 and feed trim (3) in direction of arrow out of center console (4).

Disconnect plug connection (5) and remove trim (3).

Installation:

Retaining lugs (2) must not be damaged or missing.

Feed in trim (3) first at bottom into center console (4) and then press down at top.

Make sure trim (3) is correctly engaged on center console (4).

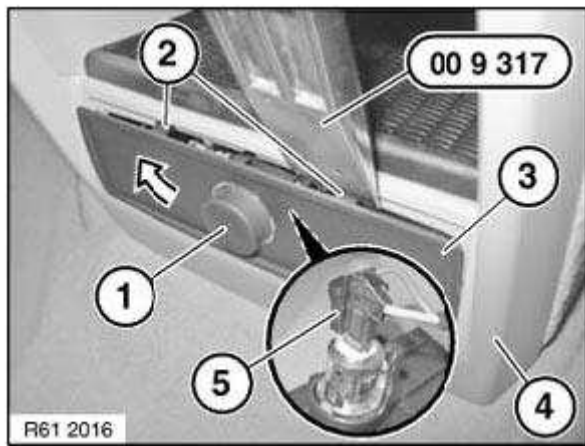


Fig. 229: Identifying Centre Console And Trim
Courtesy of BMW OF NORTH AMERICA, INC.

Release retaining lugs (1) with a suitable tool and press socket (2) in direction of arrow out of trim (3).

Installation:

Make sure socket (2) is correctly seated in trim (3).

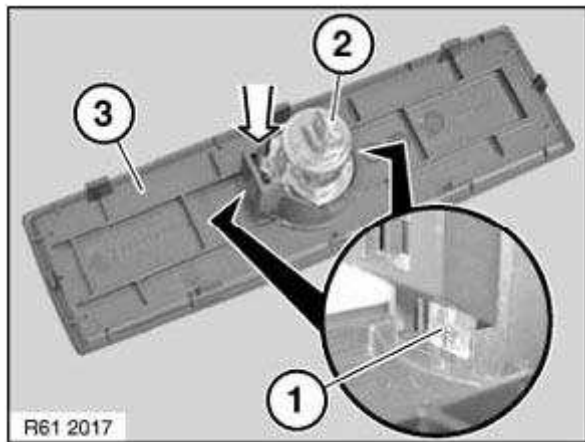


Fig. 230: Identifying Retaining Lugs And Trim
 Courtesy of BMW OF NORTH AMERICA, INC.

61 34 ... REMOVING AND INSTALLING/REPLACING SOCKET IN REAR CONSOLE

Necessary preliminary tasks:

- Remove **rear console**

Unlock catches (1) with a suitable tool.

Press socket (2) in direction of arrow out of rear console (3).

Feed wiring harness (4) out of rear console (3) and remove socket (2).

Installation:

Make sure socket (2) is correctly seated in rear console (3).

Make sure wiring harness (4) is laid correctly.

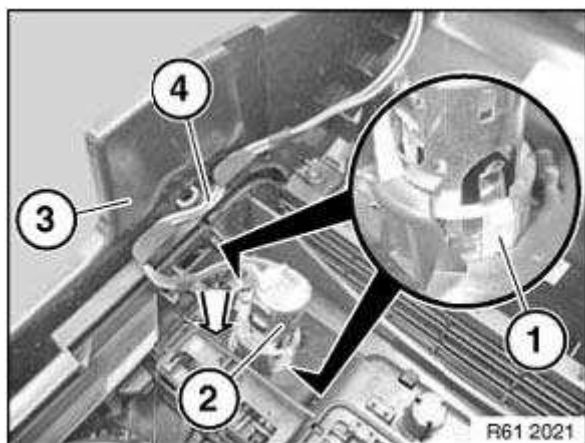


Fig. 231: Identifying Wiring Harness And Rear Console
Courtesy of BMW OF NORTH AMERICA, INC.

CONTROL UNITS, MODULES

32 43 010 REMOVING AND INSTALLING/REPLACING CONTROL UNIT FOR ACTIVE FRONT STEERING

IMPORTANT: Read and comply with notes on protection against electrostatic damage (**ESD protection**) .

Necessary preliminary tasks:

- Disconnect **battery negative lead**
- Partially remove **front left wheel arch cover (rear section)**

Release nuts (1) and if necessary remove grounding cable (2).

Unclip cable holder (3).

Remove control unit from guide (5) and disconnect plug connections (4).

Installation:

Replace damaged cable holder.

Tightening torque, see 32 43 1AZ in **32 43 ELECTRONIC POWER STEERING** .

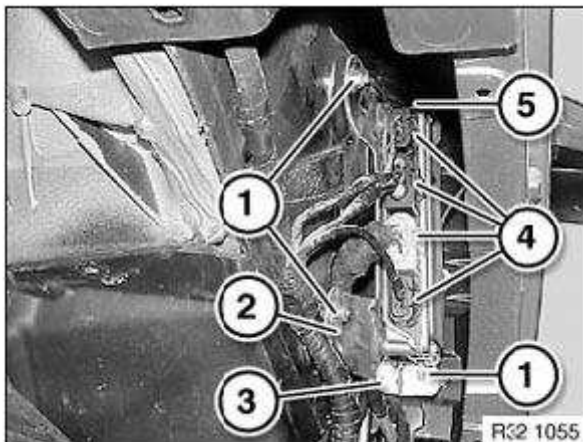


Fig. 232: Identifying Cable Holder, Guide And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- Replacement only: Carry out **programming/coding**
- Carry out **adjustment for active front steering** . See **32 10 005 ADJUSTMENT FOR ACTIVE FRONT STEERING** .

61 35 ... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE)

Special tools required:

- 12 7 060

NOTE: See **ENGINE ELECTRICAL SYSTEM - SPECIAL TOOLS (N54, N63)** .

NOTE: Electrical components which are particularly sensitive to electrostatic discharge (electronic control units, sensors, etc.) are marked with the ESD warning symbol.

E -Electro

S -Static

D -Discharge

IMPORTANT: Read and comply without fail with the notes on this subject from Service Information 2 06 04 128 .

Statically charged persons can discharge by touching electrical components.

NOTE: Humans can only detect a discharge starting from a level of approx. 3000 V. The danger threshold for electrical components already starts from a level of approx. 100 V.

Example:

Mechatronic control unit.

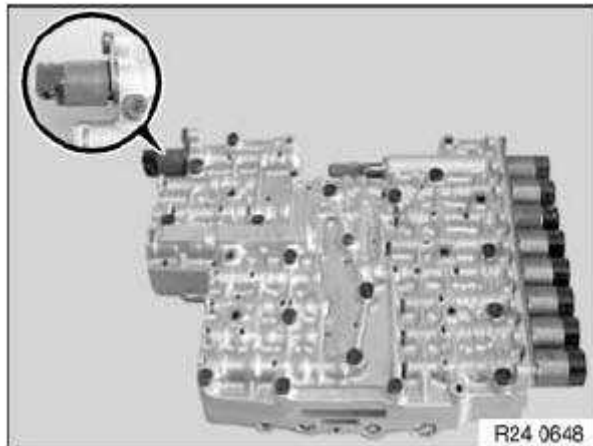


Fig. 233: Identifying Mechatronic Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.



Fig. 234: Precaution For Mechatronic Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not touch pins or multi-pin connectors directly!
Touch electrical components by their housings only.

IMPORTANT: To prevent electrical components from being damaged or destroyed by electrostatic discharge, it is absolutely essential to comply with the following instructions:

- When replacing electrical components, leave the replacement components in their original packaging until immediately before they are to be installed
- If necessary, always return a removed component in its original packaging (always pack the component away immediately)
- Read and comply with user information on using the associated special tool 12 7 060

Personal protective equipment:

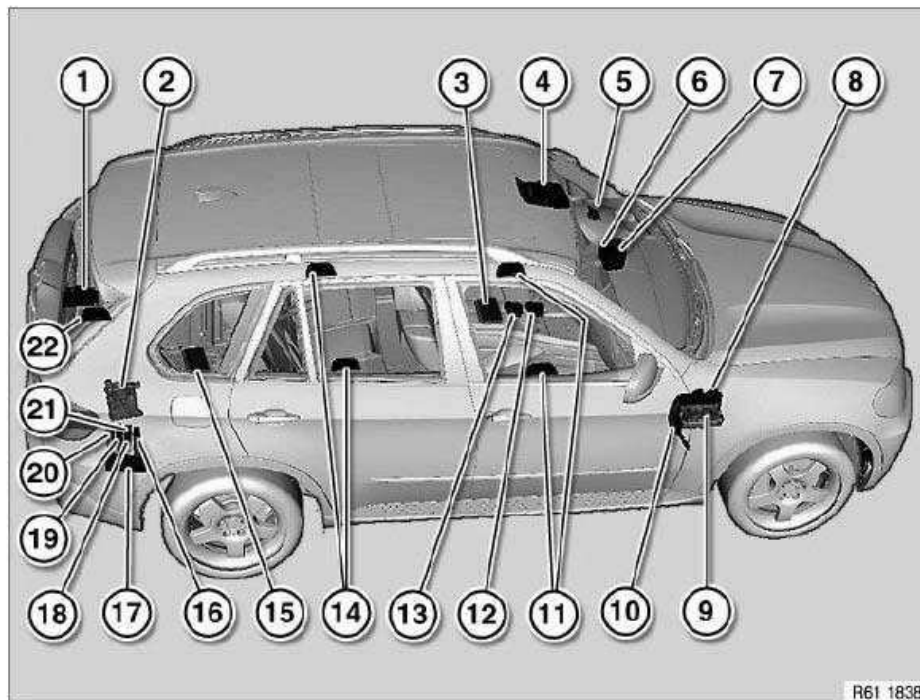
Electrically conducting clothing (high wool content, antistatic shoes required).

These can primarily be identified by the logo on the side.



Fig. 235: Identifying Antistatic Shoes For Safety Purpose
Courtesy of BMW OF NORTH AMERICA, INC.

61 35 ... OVERVIEW OF CONTROL UNITS



- | | |
|--|---|
| 1 Distribution box (on battery) | 2 Distribution box (luggage compartment) |
| 3 Airbag control unit | 4 Roof switch cluster |
| 5 Solar rain/light sensor | 6 Footwell module |
| 7 Control unit for Car Access System | 8 Junction box electronics |
| 9 Fuse box, vehicle interior | 10 Dynamic Drive control unit |
| 11 Control unit/module for seat adjustment/seat heating (front seat) | 12 Controller |
| 13 USB hub | 14 Control unit/module for seat heating (rear seat) |
| 15 A/C control unit -3rd seat row- (E70) | 16 Control unit for comfort access system |
| 17 Control unit for rear lid actuation | 18 Control unit for air supply unit |
| 19 Control unit, Vertical Dynamics Management | 20 Control unit, Park Distance Control |
| 21 Trailer module | 22 Control unit for transfer case |

Fig. 236: Identifying Control Unit Locations
 Courtesy of BMW OF NORTH AMERICA, INC.

61 35 001 REMOVING AND INSTALLING TRAILER MODULE

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) .

Necessary preliminary tasks:

- Remove **flap in right luggage compartment wheel arch trim** . See **51 47 172 REMOVING AND INSTALLING/REPLACING FLAP IN LUGGAGE COMPARTMENT TRIM, LEFT OR RIGHT** .

E70:

Lift back insulating mat.

Disconnect plug connection (1).

Unlock catch (2) and remove trailer module (3) from device carrier (4).

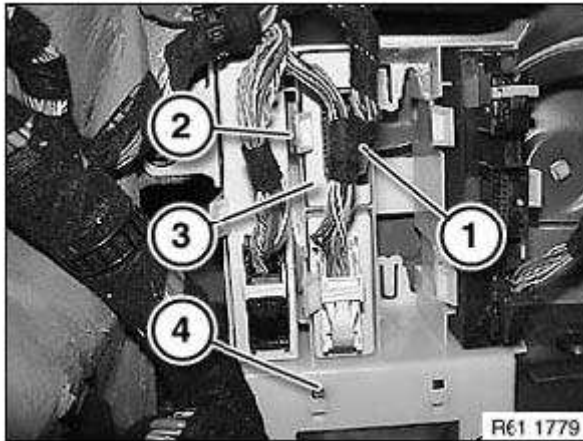


Fig. 237: Unlock Catch (2) And Remove Trailer Module (3) From Device Carrier (4)
Courtesy of BMW OF NORTH AMERICA, INC.

61 35 015 REMOVING AND INSTALLING (REPLACING) CONTROL UNIT FOR CAR ACCESS SYSTEM

IMPORTANT: Read and comply with notes on protection against electrostatic damage (**ESD protection**) .

NOTE: The comfort access system is a radio-based system and can be interfered with by radio waves from other systems (e.g. mobile phone).

Necessary preliminary tasks:

- Disconnect **battery negative lead**
- Remove **trim for pedal assembly** . See **51 45 185 REMOVING AND INSTALLING/REPLACING PANEL FOR PEDALS** .

Disconnect plug connection (1).

Unlock catches (2) and pull out control unit for Car Access System (3) in downward direction.

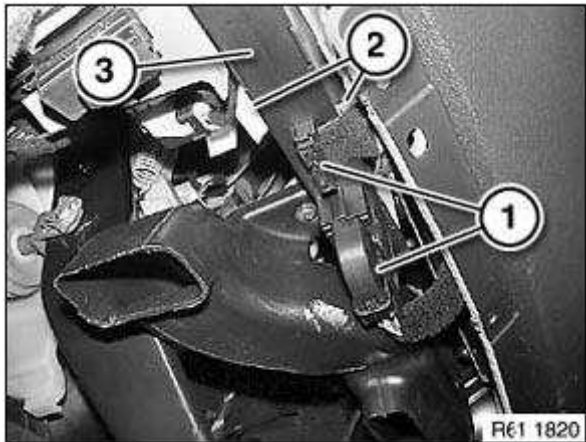


Fig. 238: Identifying Plug Connection And Catches
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Carry out **VEHICLE PROGRAMMING/CODING**
- If necessary, initialize **Telestart hand transmitter** (independent heating)

61 35 080 REMOVING AND INSTALLING/REPLACING CONTROL UNIT/MODULE FOR LEFT OR RIGHT SEAT ADJUSTMENT

IMPORTANT: Read and comply with notes on protection against electrostatic damage (**ESD protection**) .

Necessary preliminary tasks:

- Disconnect **battery negative lead**

NOTE: To facilitate installation/removal of control unit, move seat upwards fully.

Disconnect all plug connections on control unit for seat adjustment (1).

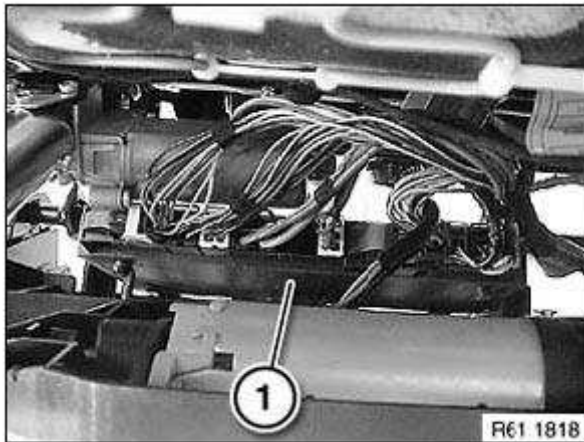


Fig. 239: Identifying Plug Connections On Control Unit For Seat Adjustment
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock retaining tabs (1) towards front and remove control unit for seat adjustment (2) in direction of arrow.

Installation:

Make sure control unit for seat adjustment (2) is correctly seated in mounting.

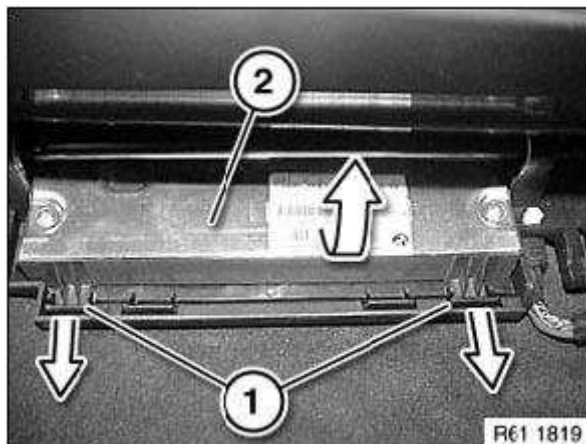


Fig. 240: Identifying Control Unit And Retaining Tabs
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out **programming/coding** .

61 35 095 REMOVING AND INSTALLING/REPLACING CONTROL UNIT/MODULE FOR SEAT HEATING (LEFT OR RIGHT REAR SEAT)

IMPORTANT: Read and comply with notes on protection against electrostatic damage (**ESD**)

protection) .

Necessary preliminary tasks:

- Disconnect **battery negative lead**
- Unclip and raise **rear seat** . See **REAR SEAT, THROUGH-LOAD** .

Feed control unit/module for seat heating (1) out of rear seat (2).

Disconnect plug connections (3) and remove control unit/module for seat heating (1).

Installation:

Lay wiring harness so that it cannot be damaged when rear seat (2) is installed.

Make sure control unit/module for seat heating (1) is correctly seated in rear seat (2).

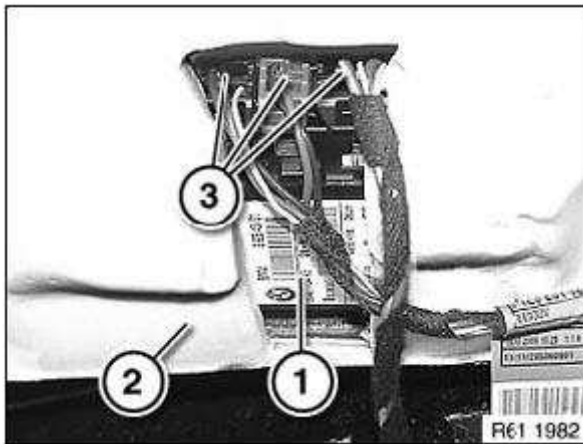


Fig. 241: Identifying Plug Connections And Control Unit/Module
Courtesy of BMW OF NORTH AMERICA, INC.

61 35 107 REMOVING AND INSTALLING OR REPLACING JUNCTION BOX ELECTRONICS

IMPORTANT: Read and comply with notes on protection against electrostatic damage (**ESD protection)** .

Necessary preliminary tasks:

- Disconnect **battery negative lead**
- Remove **trim for instrument panel at bottom right** . See **51 45 181 REMOVING AND INSTALLING/REPLACING TRIM FOR INSTRUMENT PANEL, BOTTOM RIGHT** .

Release screws (1).

Remove air duct (2).

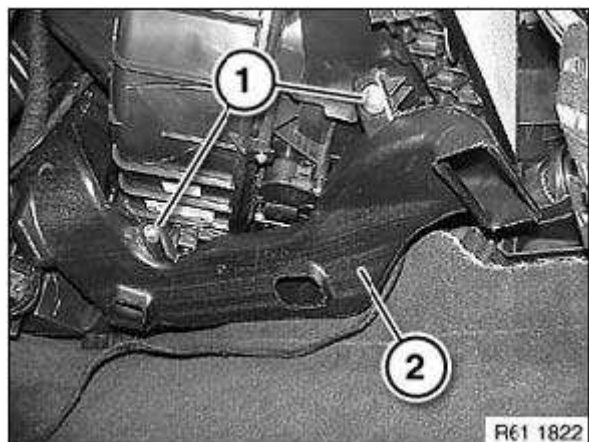


Fig. 242: Identifying Air Duct And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Slacken wiring harness in cable holder (2).

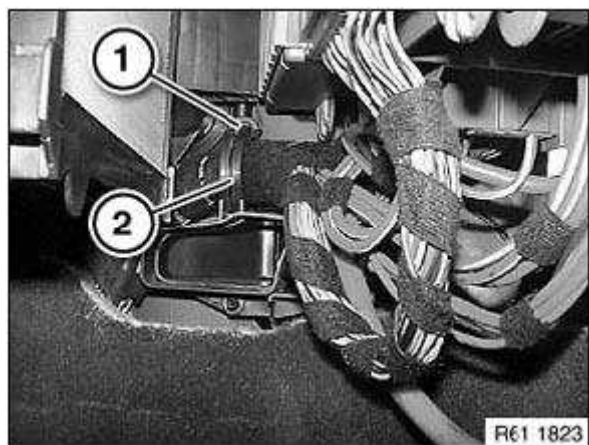


Fig. 243: Identifying Cable Holder And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

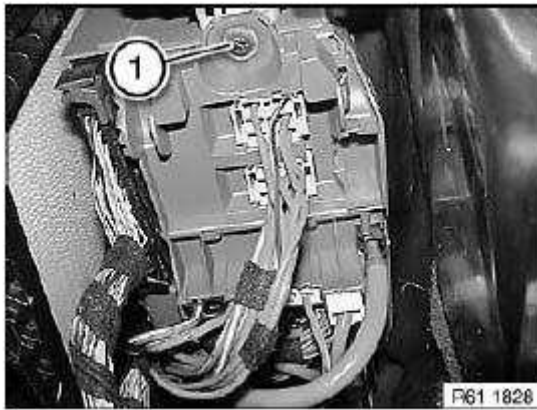


Fig. 244: Identifying Cable Holder Screw Location
 Courtesy of BMW OF NORTH AMERICA, INC.

Lever holders (1) at bulkhead out of passenger compartment fuse box (2) in direction of arrow.

Lower passenger compartment fuse box (2).

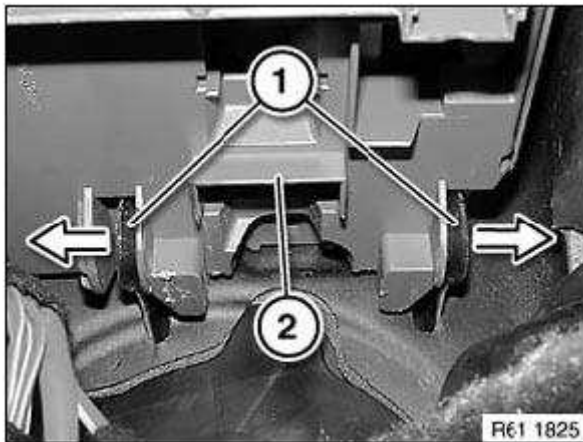


Fig. 245: Identifying Lower Passenger Compartment Fuse Box
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

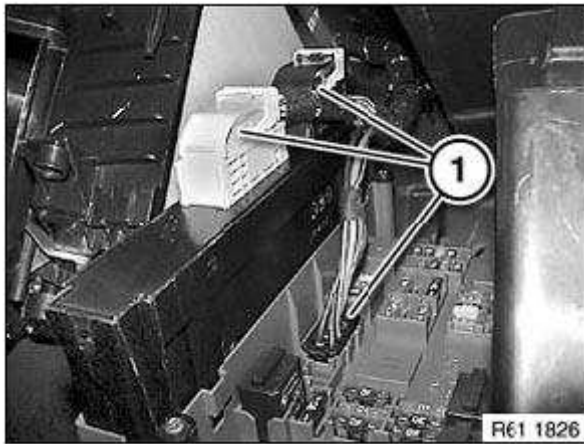


Fig. 246: Identifying Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Pull junction box electronics (2) in direction of arrow out of passenger compartment fuse box.

Disconnect associated plug connection and remove junction box electronics (2).

Installation:

Make sure junction box electronics (2) is correctly seated in passenger compartment fuse box.

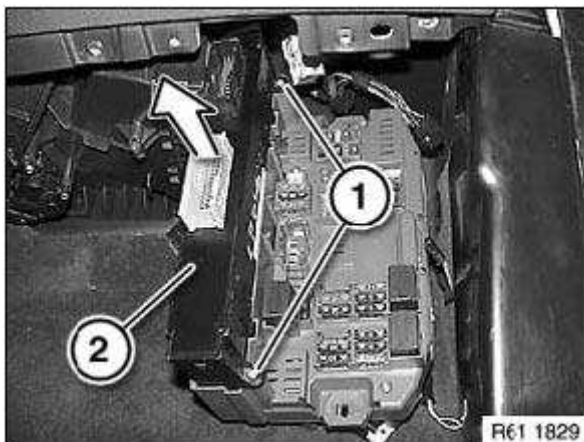


Fig. 247: Identifying Junction Box Electronics
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out **VEHICLE PROGRAMMING/CODING**.

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) .

Necessary preliminary tasks:

- Disconnect **battery negative lead**
- Remove **footwell side trim panel on A-pillar, left** . See **51 43 070 REMOVING AND INSTALLING/REPLACING SIDE TRIM PANEL, FOOTWELL, ON A-PILLAR, LEFT** .

Fold back carpet (1) in area of A-pillar a little.

Disconnect plug connection (2).

Release plastic nuts (3).

Pull footwell module (4) forwards a little.

Disconnect plug connection (5).

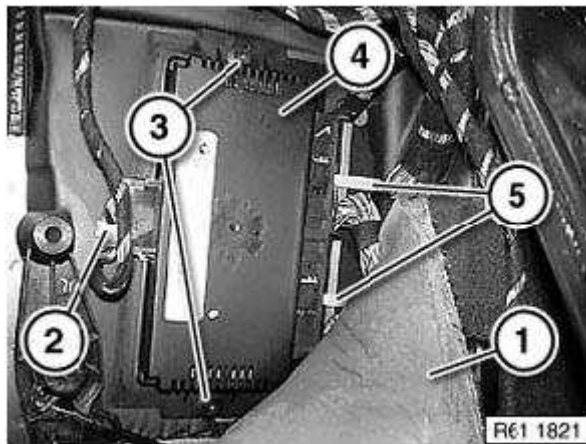


Fig. 248: Identifying Plug Connection, Footwell Module And Plastic Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement

Carry out **programming/coding** .

61 35 196 REMOVING AND INSTALLING (REPLACING) CONTROL UNIT FOR AUTOMATIC REAR LID ACTUATION

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) .

IMPORTANT: Risk of damage to rear lid!

The set value for the opening angle is stored in the control unit for automatic rear lid actuation. Therefore, when the control unit for automatic rear lid actuation is replaced, this value is lost and must be reset.

Before starting work, read out and make a note of the set value for the opening angle (refer to Owner's Handbook). If the set value cannot be read out (control unit for automatic rear lid actuation faulty), the customer must be informed of this situation.

Necessary preliminary tasks:

- Remove **storage compartment in luggage compartment on right** . See **51 47 ... REMOVING AND INSTALLING/REPLACING STORAGE COMPARTMENT IN LUGGAGE COMPARTMENT ON LEFT OR RIGHT** .

Disconnect plug connection (1).

Unlock catch (2) and remove control unit for automatic rear lid actuation (3) in direction of arrow from rear lid lift bracket (4).

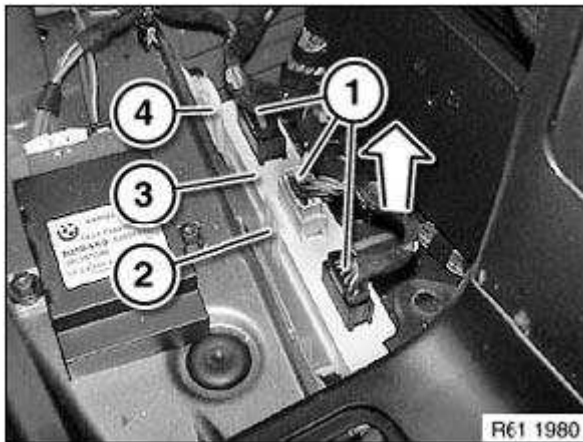


Fig. 249: Removing Control Unit For Automatic Rear Lid Actuation And Rear Lid Lift Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Carry out **VEHICLE PROGRAMMING/CODING**
- Learn end stops for rear lid:
 1. Lower end stop: Close rear lid (lower end stop is determined when the rear lid contact of the rear lock changes from open to closed)
 2. Upper end stop: Rear lid must be fully opened up to upper stop.

61 35 502 REPLACING TRAILER MODULE (09/2006-03/2009)

Special tools required:

- 61 0 202
- 61 0 230
- 61 0 316
- 61 0 324

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL .

NOTE: From 03/2009 trailer module AHM3+ will be replaced by trailer module AHM4R. Plug connectors and associated pin assignments must be adapted if the old plug connector AHM3(+) is fitted.

- A. Plug connector, new AHM4
- B. Plug connector, old AHM3(+)

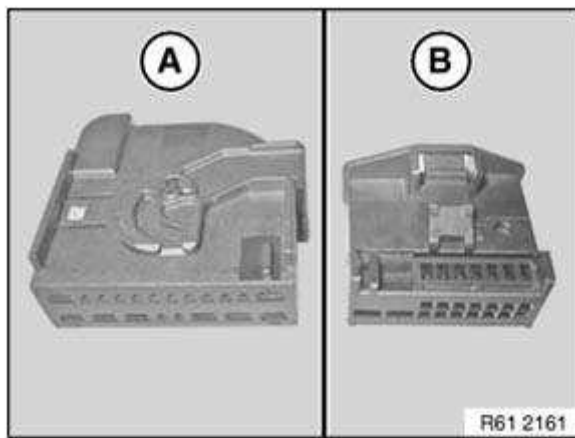


Fig. 250: Identifying Plug Connector Models
Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary tasks:

- Remove **trailer module**

From build date/version 03/2007 Series E60/61:

Installation:

Cut out device holder up to marking (1).

Cut out indentation in area (2).

Make sure AHM module is exactly seated and wiring harness is correctly routed.

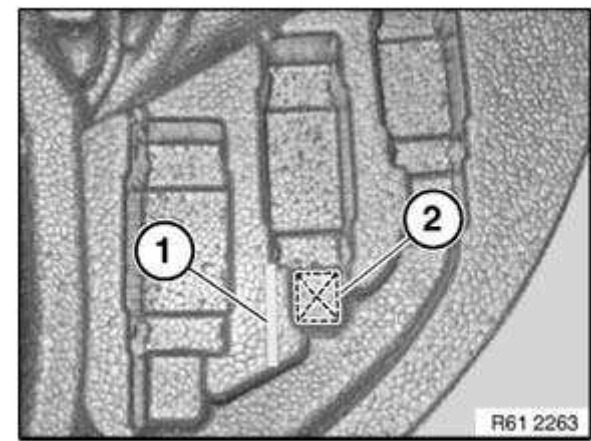


Fig. 251: Identifying Marking On Device Holder
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Positions of plugs and associated pin assignments are set out in the diagnosis system.
The repair instruction represents the highest vehicle configuration. Pin assignments of plug connections may be absent if optional equipments are not fitted.

Special tools for disconnecting

Secondary lock:

Special tool **61 0 324**

Primary lock:

Special tool **61 0 316**

Special tool for crimping

Double flat spring contact:

Crimping tool special tool **61 0 202** (crimping tool) with special tool **61 0 230** (matrix)

SPECIAL TOOL SPECIFICATION

(09/2006 - 03/2009)			
Previously AHM3(+)		New AHM4R	
Pin no.	Contact (mm ²)	Pin no.	Contact (mm ²)
1	2.8	13	2.8
2	2.8	20	2.8

3	0.63	-	-
4	0.63	17	0.63
5	0.63	2	0.63
6	0.63	3	0.63
7	0.63	11	0.63
8	0.63	9	0.63
9	0.63	10	0.63
10	0.63	18	2.8
Recrimp contact from 0.63 mm ² to 2.8 mm ²			
11	0.63	14	2.8
Recrimp contact from 0.63 mm ² to 2.8 mm ²			
12	0.63	15	2.8
Recrimp contact from 0.63 mm ² to 2.8 mm ²			
13	0.63	19	2.8
Recrimp contact from 0.63 mm ² to 2.8 mm ²			
14	0.63	12	2.8
Recrimp contact from 0.63 mm ² to 2.8 mm ²			
15	0.63	16	0.63
16	0.63	1	2.8
Recrimp contact from 0.63 mm ² to 2.8 mm ²			
-	-	4-8	0.63

Carry out **VEHICLE PROGRAMMING/CODING**.

61 35 679 INITIALIZING RAIN/LIGHT (SOLAR) SENSOR

NOTE: Initialization is necessary:

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

NOTE:

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

61 35 683 REPLACING OPTICAL ELEMENT FOR SOLAR RAIN/LIGHT SENSOR

IMPORTANT: Read and comply with notes on protection against electrostatic damage (**ESD protection**) .

Necessary preliminary tasks:

- Remove **solar rain/light sensor**

Optical element can only be replaced in the following equipment specifications:

- E70/E71 without Head-Up Display

Carefully unlock catches (1) of solar rain/light sensor (2).

Remove optical element for solar rain/light sensor (3).

Installation:

Detach protective cover from new optical element for solar rain/light sensor.

Catches (1) of solar rain/light sensor (2) must not be damaged or missing.

Observe laser marking (4) of fitting aid.

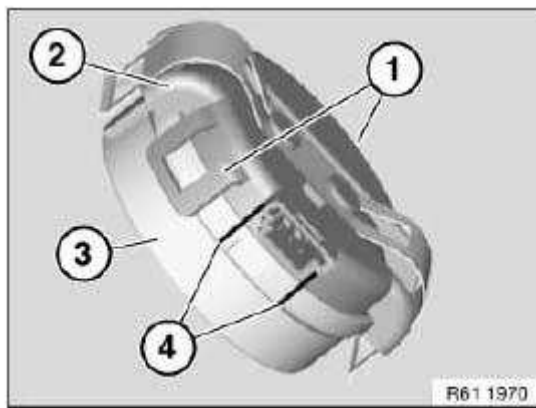


Fig. 252: Identifying Solar Rain And Light Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

When fitting a different type of windscreen, carry out **coding** to determine the windscreen type for the light sensor.

Carry out **initialization** to calibrate the rain sensor to the windscreen.

61 35 685 REPLACING RAIN/LIGHT SOLAR SENSOR

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) .

Necessary preliminary tasks:

- Remove **interior rearview mirror** . See **51 16 060 REMOVING AND INSTALLING/REPLACING INTERIOR REARVIEW MIRROR (OVERVIEW)** .

Disconnect plug connection (1).

Unlock metal spring (3) in direction of arrow.

Pull off solar rain/light sensor (2) from windscreen.

Installation:

Close plug connection (1) only after fitting solar rain/light sensor on windscreen.

Pull off protective cover from new solar rain/light sensor.

Align solar rain/light sensor (2) and press firmly on windscreen. Pay attention to mechanical coding (6).

Press metal spring (3) centrally to ensure that retaining element (5) engages correctly in both hooks (4).

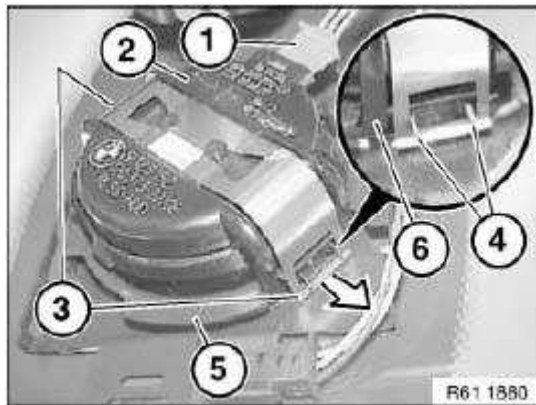


Fig. 253: Identifying Solar Rain And Light Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully clean windscreen in area (A) of retaining element. Remove all silicone residues.



Fig. 254: Identifying Retaining Element
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out **coding** to determine the windscreen type for the light sensor.

Carry out **initialization** to calibrate the rain sensor to the windscreen.

61 35 950 REMOVING AND INSTALLING/REPLACING CONTROL UNIT FOR COMFORT ACCESS SYSTEM (PASSIVE GO)

IMPORTANT: Read and comply with notes on protection against electrostatic damage (**ESD protection**) .

Necessary preliminary tasks:

- Remove **flap in right luggage compartment wheel arch trim** . See **51 47 172 REMOVING AND INSTALLING/REPLACING FLAP IN LUGGAGE COMPARTMENT TRIM, LEFT OR RIGHT** .

E70:

Lift back insulating mat (1).

Disconnect plug connection (3).

Unlock catch (2) and remove control unit for Comfort Access System (4) from device carrier (5).

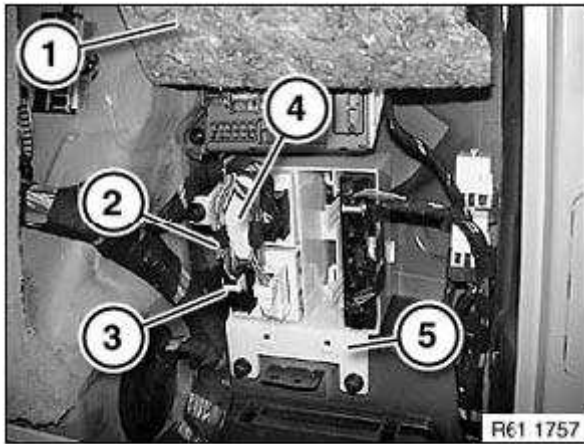


Fig. 255: Identifying Plug Connection And Device Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out **VEHICLE PROGRAMMING/CODING**.

61 35 953 REMOVING AND INSTALLING/REPLACING INTERIOR AERIAL/ANTENNA FOR COMFORT ACCESS SYSTEM (FRONT CENTER CONSOLE)

Necessary preliminary tasks:

- Remove **Car Communication Computer**

Release screw (1).

Release screw (2) through opening (3).

Feed interior aerial/antenna for comfort access system (4) out of holder.

Disconnect plug connection and remove interior aerial/antenna for comfort access system (4).

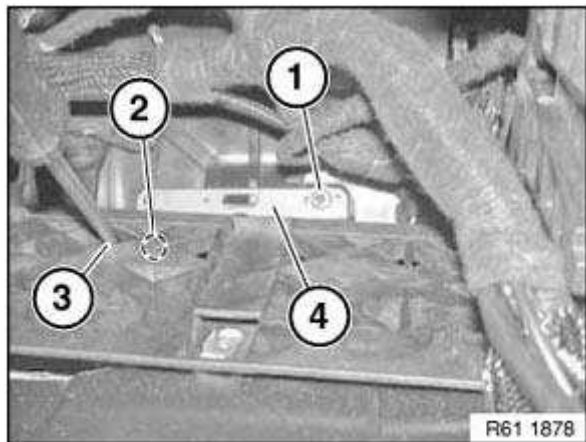


Fig. 256: Identifying Interior Aerial And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

61 35 954 REMOVING AND INSTALLING/REPLACING INTERIOR ANTENNA FOR COMFORT ACCESS SYSTEM (REAR CENTER CONSOLE)

Necessary preliminary tasks:

- Remove rear center console trim . See **51 16 163 REMOVING AND INSTALLING/REPLACING REAR CENTER CONSOLE TRIM** .

Unlock retaining hook (1) and remove interior antenna for comfort access system (2).

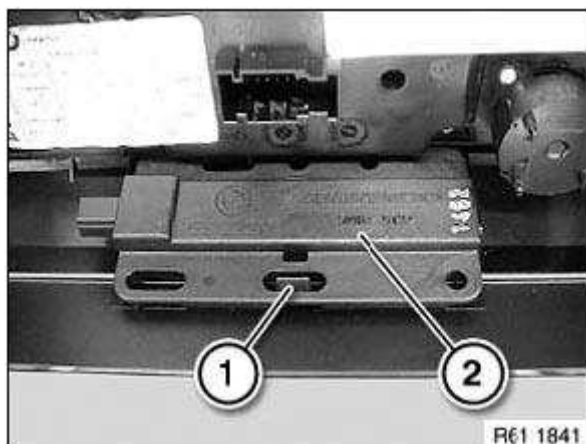


Fig. 257: Identifying Retaining Hook And Interior Antenna
Courtesy of BMW OF NORTH AMERICA, INC.

61 35 958 REMOVING AND INSTALLING/REPLACING INTERIOR AERIAL/ANTENNA FOR COMFORT ACCESS SYSTEM ON LEFT OR RIGHT (LUGGAGE COMPARTMENT, SIDE)

Necessary preliminary tasks:

- Remove panel for luggage compartment floor or fold upwards

Release expansion rivets (1).

Move panel (2) downwards.

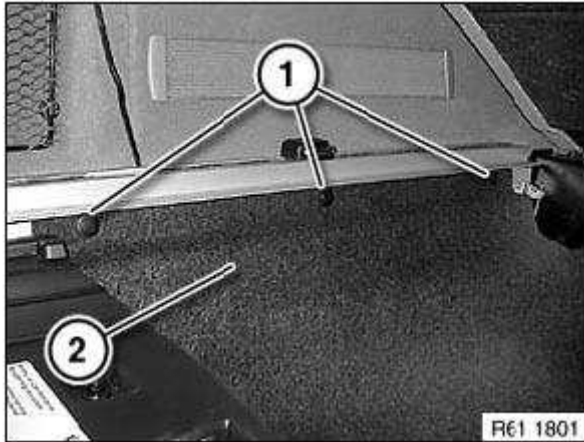


Fig. 258: Releasing Expansion Rivets
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screws (2) and remove interior aerial/antenna for comfort access system (3).

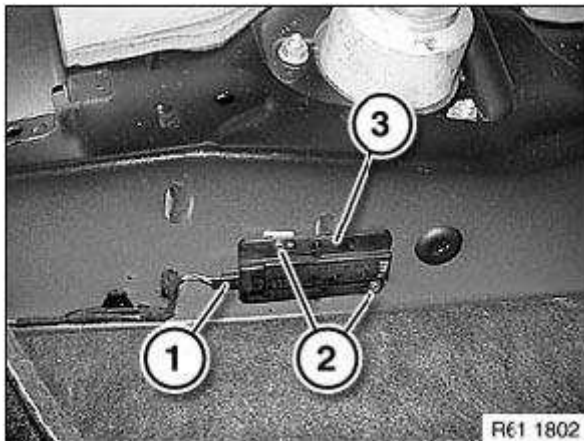


Fig. 259: Identifying Aerial, Antenna And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

61 35 975 REMOVING AND INSTALLING/REPLACING BUMPER AERIAL/ANTENNA FOR COMFORT ACCESS SYSTEM

Necessary preliminary tasks:

- **E71:** Remove **trim for bumper trim** at bottom middle rear. See **51 12 223 REMOVING AND INSTALLING/REPLACING TRIM FOR REAR BOTTOM MIDDLE BUMPER TRIM** .

Reach in middle behind bumper trim at rear and disconnect plug connection (1).

Unlock catches (2) and feed bumper aerial/antenna for comfort access system (3) in direction of arrow out of holder.

Installation:

Make sure bumper aerial/antenna for comfort access system (3) is correctly seated and engaged in holder.

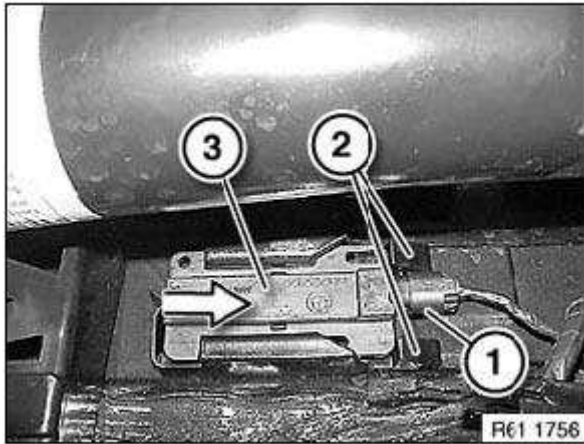


Fig. 260: Unlock Catches (2) And Feed Bumper Aerial/Antenna For Comfort Access System (3) In Direction Of Arrow

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 970 REPLACING FOGGING SENSOR (FROM 10/2008)

Special tools required:

- 00 9 317

NOTE: See **MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS** .

WARNING: Make sure rooms are well ventilated when working with adhesive remover indoors.

IMPORTANT: Do not under any circumstances use paint thinner to clean the bonding surface.

Press on end caps (1) and at same time press them apart; this releases clip connection of both caps (1).

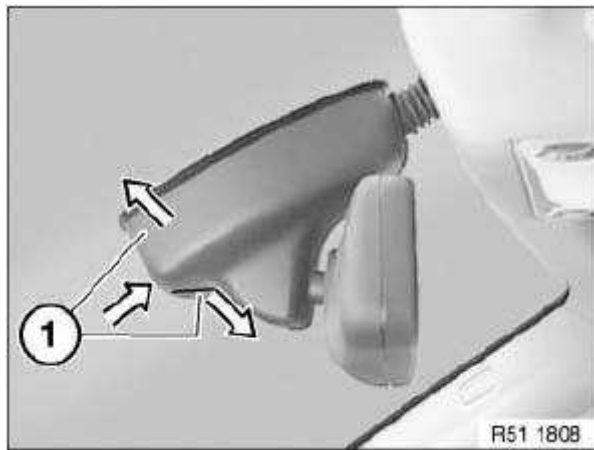


Fig. 261: Pressing On End Caps

Courtesy of BMW OF NORTH AMERICA, INC.

Twist mirror (1) at an angle towards front and right/top.

Swivel left end cap (2) off ball neck in direction of arrow; this detaches the engagement clip (3) from the metal foot.

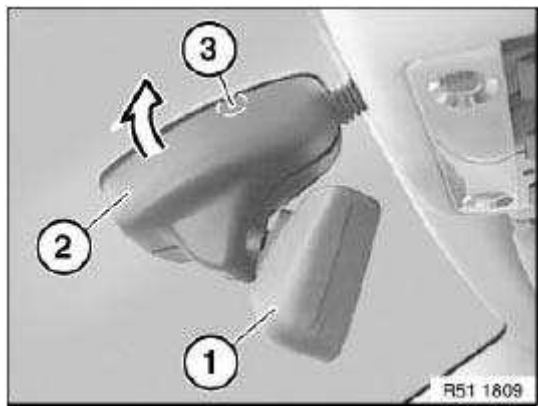


Fig. 262: Detaching Engagement Clip

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

NOTE: If necessary, carefully heat fogging sensor (2) with a hot air blower to approx. 40-60°C.

Lift off fogging sensor (2) with special tool **00 9 317** and slowly pull off from windshield.

Installation:

Bonding surface must be dry and free of dust and grease.

Clean bonding surface with adhesive remover (sourcing reference: BMW Parts Service).

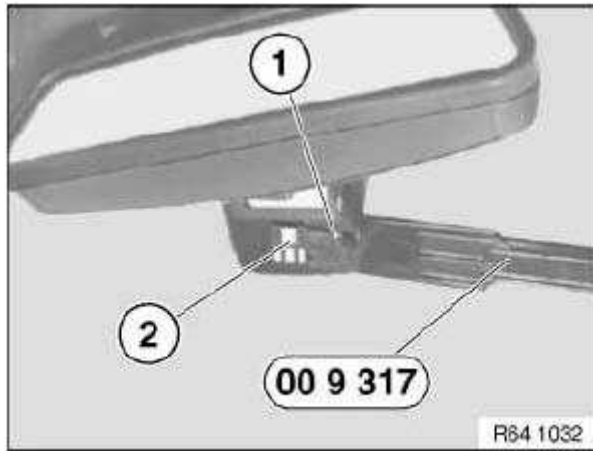


Fig. 263: Lift Off Fogging Sensor (2) With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

After cleaning, do not touch bonding surface with bare hands.

Pull off protective film completely from fogging sensor (3).

Place mounting template (1) as pictured on rain sensor (2).

Press fogging sensor (3) in direction of arrow with a contact pressure of $\geq 15 \text{ N/cm}^2$ onto inside of windshield.

NOTE: Firm thumb pressure attains approx. 30 N/cm^2 .

Remove mounting template (1) carefully from fogging sensor (3).

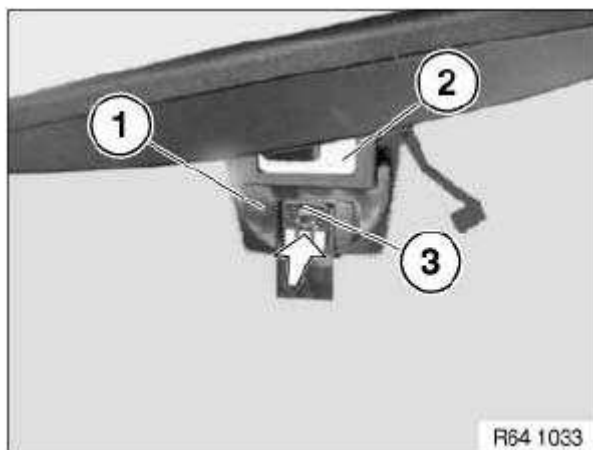


Fig. 264: Press Fogging Sensor (3) In Direction Of Arrow

Courtesy of BMW OF NORTH AMERICA, INC.

84 10 050 REMOVING AND INSTALLING (REPLACING) USB HUB

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) .

Necessary preliminary tasks:

- Remove gear selector switch carrier.

Unlock catch (1) and guide USB hub (2) in direction of arrow out of holder (3).

Disconnect plug connection (4).

Installation:

Make sure USB hub (2) is correctly seated in holder (3).

Make sure wiring harness is correctly laid.

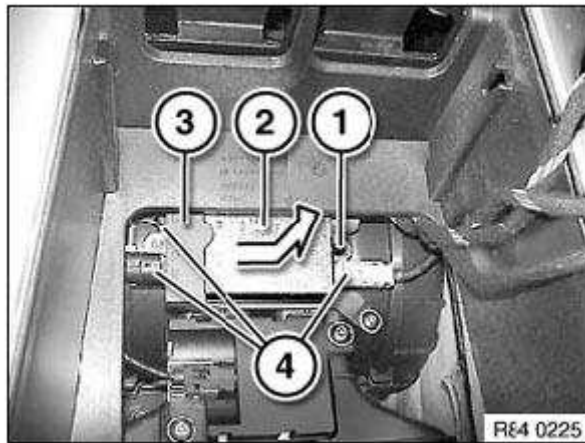


Fig. 265: Unlock Catch (1) And Guide USB Hub (2) In Direction Of Arrow Out Of Holder (3)
Courtesy of BMW OF NORTH AMERICA, INC.

84 21 541 REMOVING AND INSTALLING (REPLACING) HANDS-FREE CHARGING ELECTRONICS (HIGH)

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) .

NOTE: Comply with notes and instructions on handling optical waveguides .

Necessary preliminary tasks:

- Remove **complete rear console** . See **51 16 270 REMOVING AND INSTALLING COMPLETE REAR SECTION OF REAR CONSOLE** .

Release nuts (1) and remove rear console holder (2).

Release screw (3) and raise hands-free charging electronics holder (4) in direction of arrow.

Installation:

Make sure centering pin (5) is correctly seated in associated hold of hands-free charging electronics holder (4).

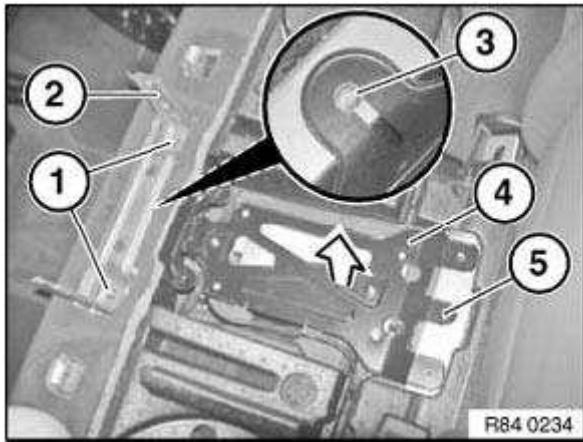


Fig. 266: Release Screw (3) And Raise Hands-Free Charging Electronics Holder (4) In Direction Of Arrow

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release all nuts.

Remove hands-free charging electronics (2) from hands-free charging electronics holder (3).

Installation:

Make sure wiring harness (4) is laid correctly.

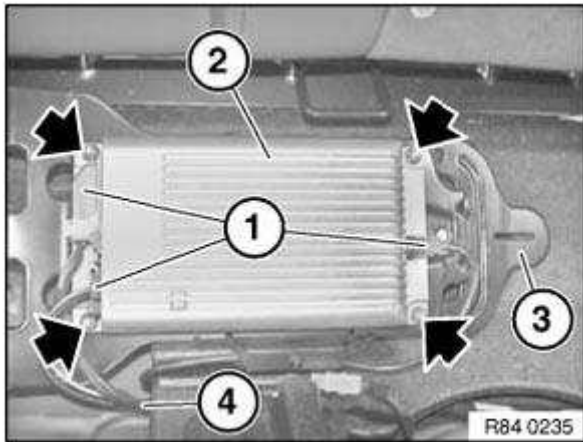


Fig. 267: Remove Hands-Free Charging Electronics (2) From Hands-Free Charging Electronics Holder (3)

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out **VEHICLE PROGRAMMING/CODING**.

If necessary, log mobile phone on to vehicle.

VEHICLE PROGRAMMING AND CODING

Select menu item (1).

Select corresponding procedure from selection list.

Example:

- Preparation and subsequent evaluation of vehicle programming
- Start a Progman session
- Sequence of BMW/MINI vehicle programming and coding
- BMW/MINI Car & Key Memory
- BMW/MINI initialization
- BMW/MINI service functions in Progman

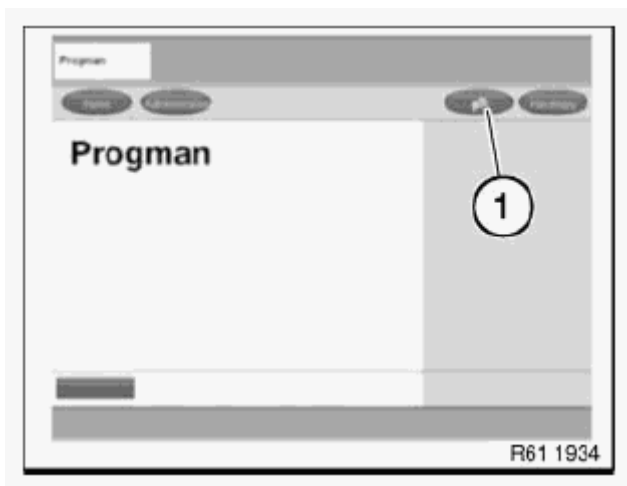


Fig. 268: Screen Display - Menu Item

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: In order to avoid incorrect programming procedures and error messages, it is essential when working with the Progman programming system always to use the latest Progman version.

RELAY

61 13 ... DME MASTER RELAY CONNECTOR

Unlock locking flap (1) of corresponding cable.

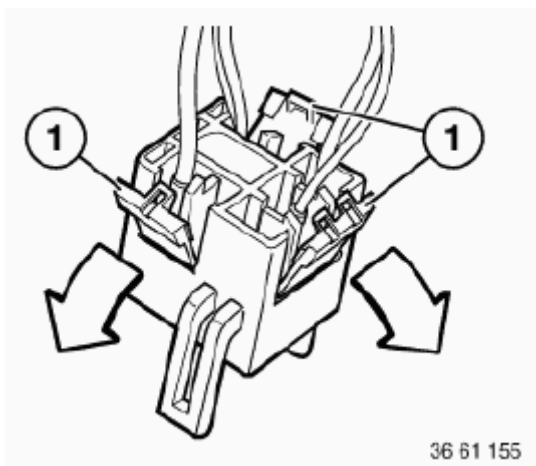


Fig. 269: Unlock Locking Flap (1) Of Corresponding Cable

Courtesy of BMW OF NORTH AMERICA, INC.

With special tool 61 1 136 or 61 1 137 (ejector), press back arrester hook (2) of appropriate contact and pull out cable.

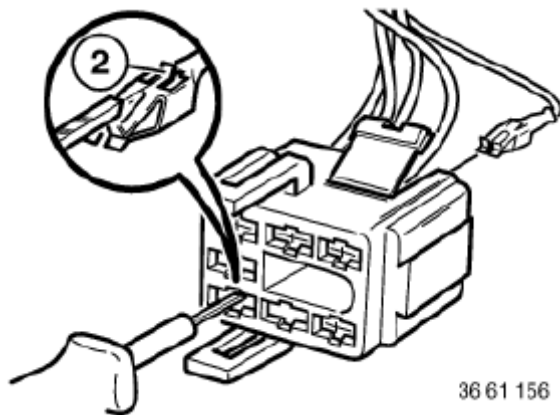


Fig. 270: Press Back Arrester Hook (2) Of Appropriate Contact And Pull Out Cable
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 ... RELAY CARRIER

Place special tool 61 1 153 on relay carrier (1) and carefully pull in direction of arrow until retaining lugs (2) on relay carrier are raised.

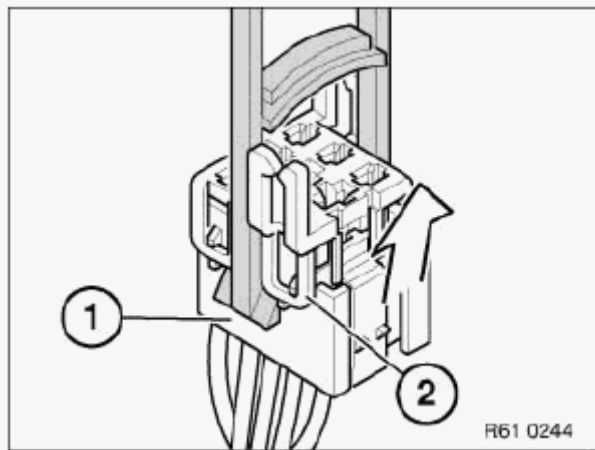


Fig. 271: Identifying Retaining Lugs
 Courtesy of BMW OF NORTH AMERICA, INC.

Pull relay carrier (2) in direction of arrow into first catch (3).

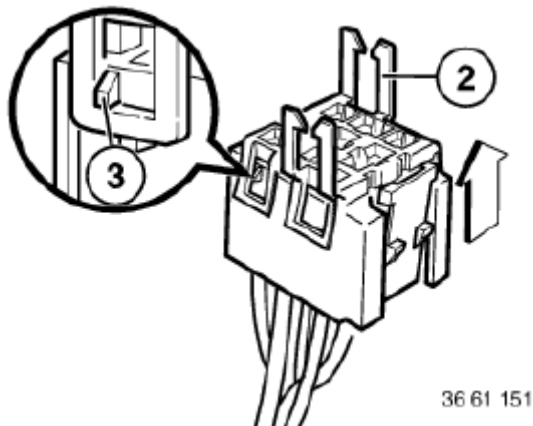


Fig. 272: Pulling Relay Carrier Into First Catch
 Courtesy of BMW OF NORTH AMERICA, INC.

Press down arrester hook (4) of appropriate contact and pull out cable with contact.

Press out double flat spring contact with special tool 61 1 136 or 61 1 137 (ejector).

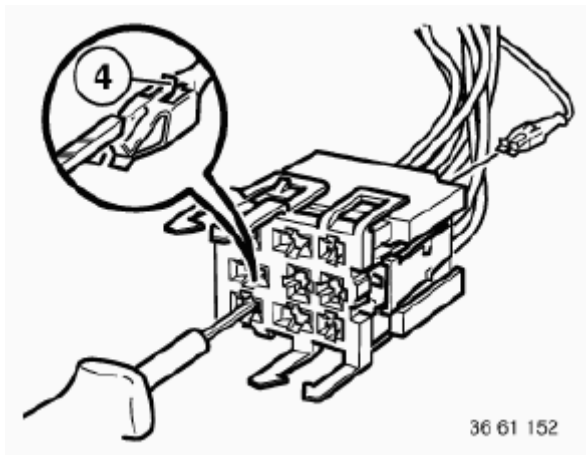


Fig. 273: Pressing Down Arrester Hook
 Courtesy of BMW OF NORTH AMERICA, INC.

61 36 540 REMOVING AND INSTALLING/REPLACING AIR SUPPLY UNIT RELAY

Necessary preliminary tasks:

- Remove ignition key
- Remove trim for instrument panel at bottom right . See **51 45 181 REMOVING AND INSTALLING/REPLACING TRIM FOR INSTRUMENT PANEL, BOTTOM RIGHT** .

Release screw (1) and fold down passenger compartment fuse box.

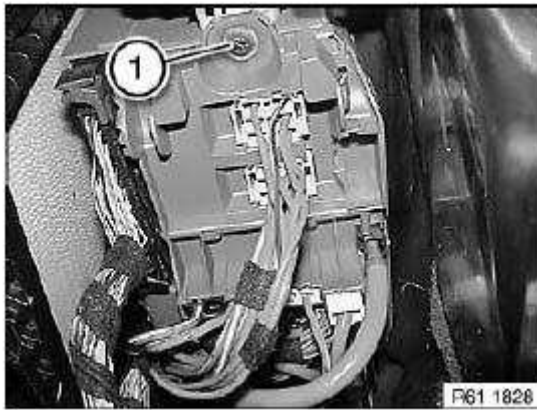


Fig. 274: Release Screw (1) And Fold Down Passenger Compartment Fuse Box
 Courtesy of BMW OF NORTH AMERICA, INC.

Pull air supply unit relay (1) from passenger compartment fuse box.

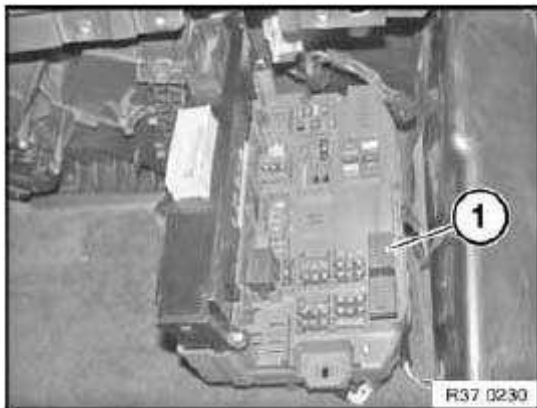


Fig. 275: Pull Air Supply Unit Relay (1) From Passenger Compartment Fuse Box
 Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- Clear fault memory entries

61 36 600 REMOVING AND INSTALLING/REPLACING RELAY FOR DEACTIVATING ELECTRIC FAN

Necessary preliminary tasks:

- Disconnect **battery negative lead**.
- Remove **wheel arch cover at front (front section)** right.

Release nuts (1) and disconnect battery positive leads (2) from relay for deactivating electric fan (5). Tightening torque, see **61 36 1AZ** in **61 36 RELAY** .

Disconnect plug connection (3).

Release nuts (4) and remove relay for deactivating electric fan (5) from holder.

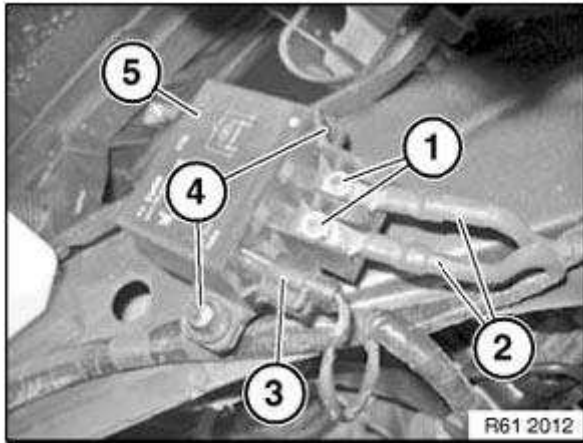


Fig. 276: Removing Relay For Deactivating Electric Fan (5) From Holder
Courtesy of BMW OF NORTH AMERICA, INC.

WINDSCREEN WIPERS

61 61 ... ADJUSTING LEFT OR RIGHT WINDSCREEN WIPER

Special tools required:

- 61 6 100

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL .

Correctly adjusting the contact angle of the wiper arms on the windscreen increases wiping quality. For adjustment, refer to WINDSCREEN WIPER ARM DIMENSION CHART.

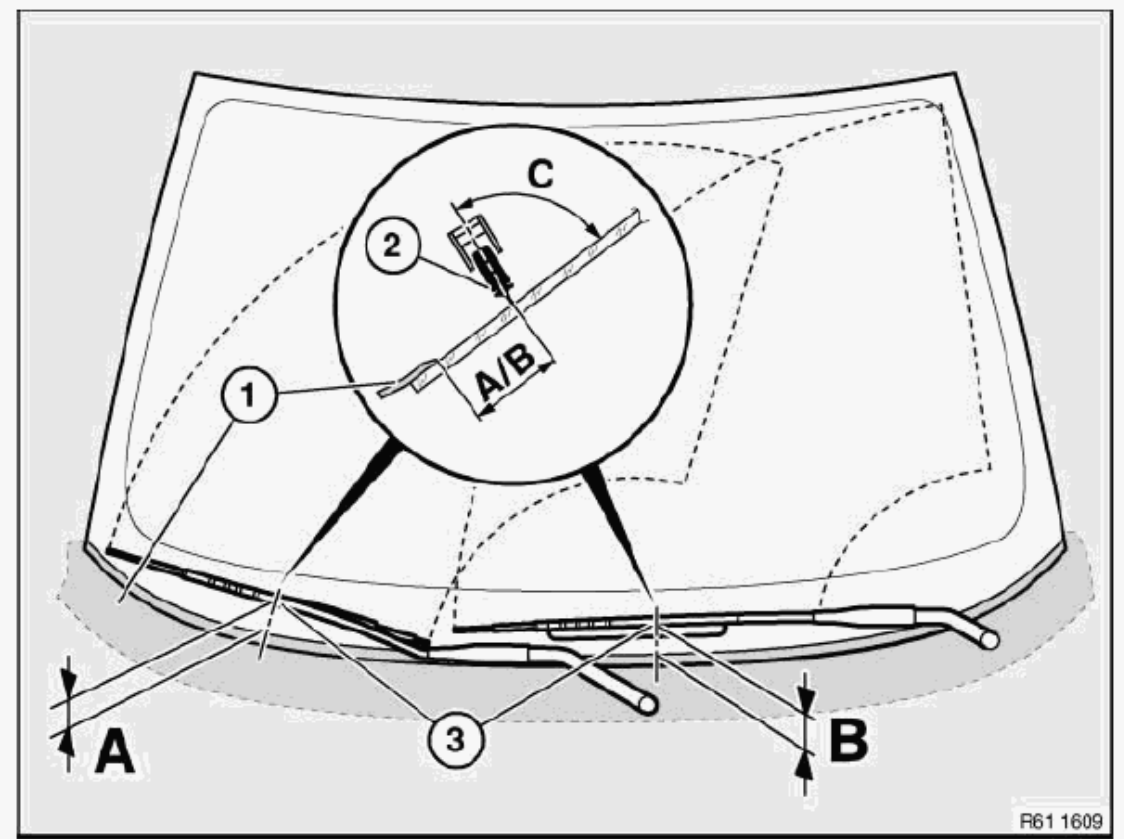


Fig. 277: Distance Between Windscreen Wiper Blade And Trim Panel
 Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Measurement is taken at the height of the locators (3) for the windscreen wiper arms

C= Contact angle between wiper blade center plane and windscreen

When adjusting with special tool 61 6 100, set the scale value in accordance with the following table.

For RHD cars, change the preceding sign of the scale values.

- LHD cars, scale range 0 to -10
- RHD cars, scale range 0 to +10

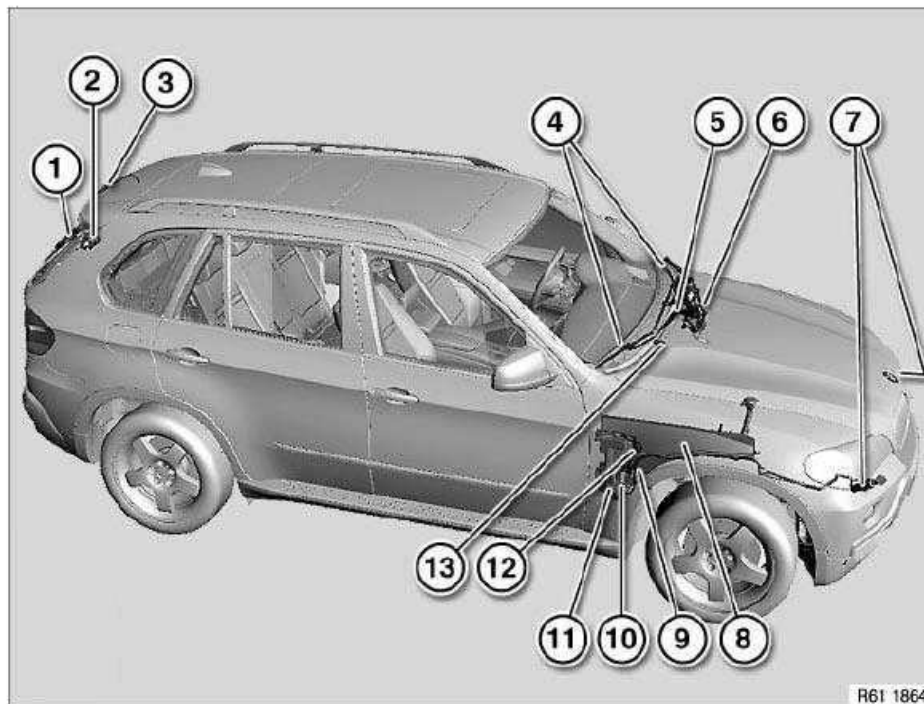
WINDSCREEN WIPER ARM DIMENSION CHART

Model	Contact angle (C) on windscreen wiper arm		Scale value (LHD) on special tool		Adjustment dimension (A, B) on windscreen wiper arm		
	Passenger side	Driver side	Passenger side	Driver side	Passenger side	Driver side	Rear end
	85.5°	85.5°					

1'	E81	+1.5° - 1.0°	+1.5° - 1.0°	-5	-5	47±3 mm	54±3 mm	
	E82	85.5° +1.5° - 1.0°	85.5° +1.5° - 1.0°	-5	-5	47±3 mm	54±3 mm	
	E87	85.5° +1.5° - 1.0°	85.5° +1.5° - 1.0°	-5	-5	47±3 mm	54±3 mm	
	E88	85.5° +1.5° - 1.0°	85.5° +1.5° - 1.0°	-5	-5	47±3 mm	54±3 mm	
	E46	85.7° ±1°	85.3° ±1°	-4	-5			
	E90	86.7° ±1°	86.0° ±1°	-3	-4	88±3 mm	95±3 mm	
	E91	86.7° ±1°	86.0° ±1°	-3	-4	88±3 mm	95±3 mm	35±3 mm
	E92	86.7° ±1°	86.0° ±1°	-3	-4	75±3 mm	84±3 mm	
5'	E93	86.7° ±1°	86.0° ±1°	-3	-4	75±3 mm	84±3 mm	
	E39	86.5° ±1°	86.5° ±1°	-4	-4			60.1±1 mm
	E60	86.0° ±1°	86.0° ±1°	-4	-4	69±3 mm	87±3 mm	
6'	E61	86.0° ±1°	86.0° ±1°	-4	-4	69±3 mm	87±3 mm	30±3 mm
	E63	86.0° ±1°	86.0° ±1°	-4	-4	69±3 mm	87±3 mm	
	E64	86.0°	86.0° ±1°	-4	-4	69±3 mm	87±3 mm	

		$\pm 1^\circ$						
	E38	$87.0^\circ \pm 1^\circ$	$87.0^\circ \pm 1^\circ$	-3	-3	65 ± 3 mm	58 ± 3 mm	
7'	E65	$85.5^\circ \pm 1^\circ$	$87.0^\circ \pm 1^\circ$	-	-	20 ± 3 mm	48 ± 3 mm	
	E66	$85.5^\circ \pm 1^\circ$	$87.0^\circ \pm 1^\circ$	-	-	20 ± 3 mm	48 ± 3 mm	
	E67	$85.5^\circ \pm 1^\circ$	$87.0^\circ \pm 1^\circ$	-	-	20 ± 3 mm	48 ± 3 mm	
8'	E52	$85.5^\circ \pm 1^\circ$	$85.5^\circ \pm 1^\circ$	-4	-4	38 ± 2 mm	104 ± 2 mm	
X	E53	$85.0^\circ \pm 1^\circ$	$85.0^\circ \pm 1^\circ$	-5	-5	54 ± 3 mm	55 ± 3 mm	32.5 ± 2 mm
	E70	$85.6^\circ \pm 1^\circ$	$85.0^\circ \pm 1^\circ$	-4	-5	103 ± 3 mm	90 ± 3 mm	39 ± 2 mm
	E71	$85.6^\circ \pm 1^\circ$	$85.0^\circ \pm 1^\circ$	-4	-5	103 ± 3 mm	90 ± 3 mm	
	E83	$85.2^\circ \pm 1^\circ$	$85.4^\circ \pm 1^\circ$	-5	-5	66 ± 3 mm	61 ± 3 mm	29 ± 1 mm
Z	E85/E89	$85.5^\circ \pm 1^\circ$	$85.5^\circ \pm 1^\circ$	-4	-4	57 ± 2 mm	52 ± 2 mm	
	E86	$85.5^\circ \pm 1^\circ$	$85.5^\circ \pm 1^\circ$	-4	-4	57 ± 2 mm	52 ± 2 mm	

61 61 ... OVERVIEW OF WINDSCREEN WIPER, WINDSCREEN WASHER AND HEADLIGHT WASHER SYSTEMS



R61 1864

- | | | | |
|----|---|----|--|
| 1 | Rear window wiper blade (E70) | 2 | Rear window wiper motor (E70) |
| | Window wiper arm for rear window wiper (E70) | | |
| 3 | Spray nozzle for rear window washer system (E70) | 4 | Wiper blades |
| 5 | Windscreen wiper arms | 6 | Mounting bracket for windscreen wiper system, complete |
| 7 | High-pressure nozzles for headlight washer system | 8 | Fluid reservoir for windscreen washer system |
| 9 | Level switch for windscreen washer system | 10 | Windscreen washer pump |
| 11 | Window washer pump for rear window wiper (E70) | 12 | Washer pump for headlight washer system |
| 13 | Spray nozzle for windscreen washer system | | |

Fig. 278: Identifying Windscreen Wiper, Windscreen Washer And Headlight Washer Systems Part Locations

Courtesy of BMW OF NORTH AMERICA, INC.

61 61 010 CHECKING/ADJUSTING CONTACT ANGLE OF WINDSCREEN WIPER ARMS ON WINDSCREEN

Special tools required:

- 00 9 220
- 61 6 100

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL .

NOTE: The wipe quality is improved by precise adjustment of the contact/approach angle of the wiper arms.

Necessary preliminary tasks:

- Remove wiper blade (1) from wiper arm (2)

NOTE: Pin (3) is locator for special tool 61 6 100 .

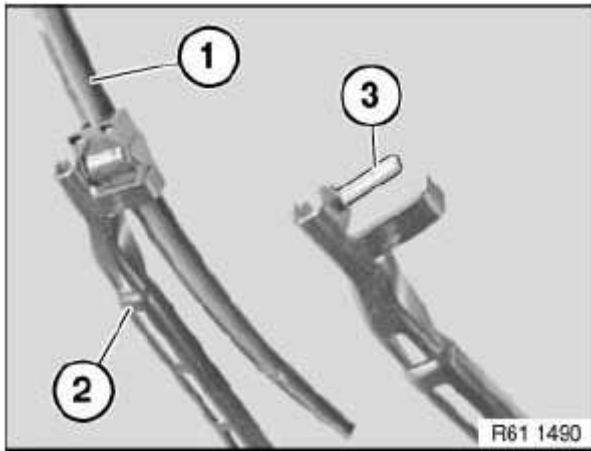


Fig. 279: Identifying Wiper Blade And Wiper Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Push special tool 61 6 100 onto pin (1).

Place special tool 61 6 100 on windscreen (2) and read off value in degrees on scale.

NOTE: LHD vehicles are covered by the scale range of 0 to -10 and RHD vehicles by the scale range of 0 to +10.

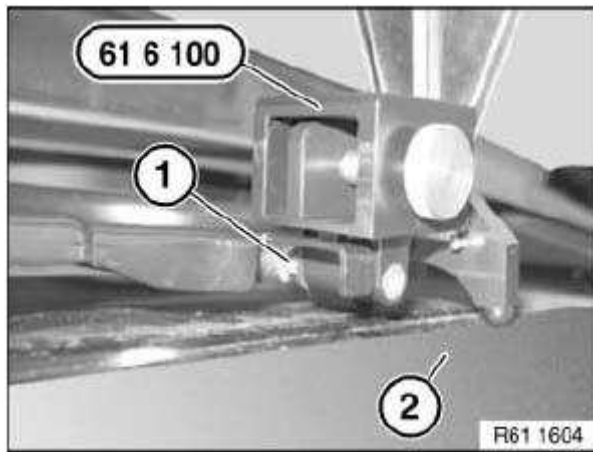


Fig. 280: Pushing Special Tool Onto Pin
 Courtesy of BMW OF NORTH AMERICA, INC.

If the specified number in degrees is not correct, the wiper arm must be bent with special tool **00 9 220** at the point shown.

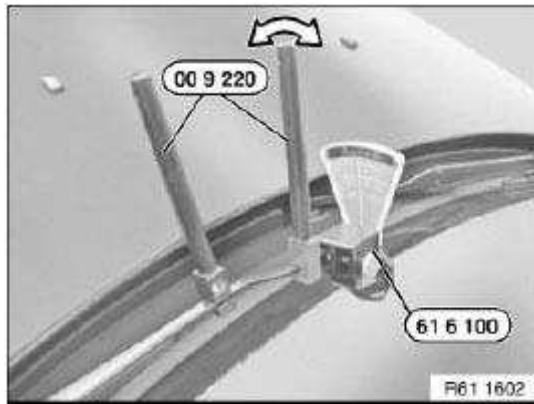


Fig. 281: Bending Wiper Arm With Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

61 61 041 REPLACING BOTH WINDSCREEN WIPER BLADES

IMPORTANT: Make sure the wiper arm does not contact the windscreen without its wiper blade.

Fold wiper arm (1) away from windscreen.

Turn windscreen wiper blade (2) at an angle of 90° and remove from windscreen wiper arm (1).

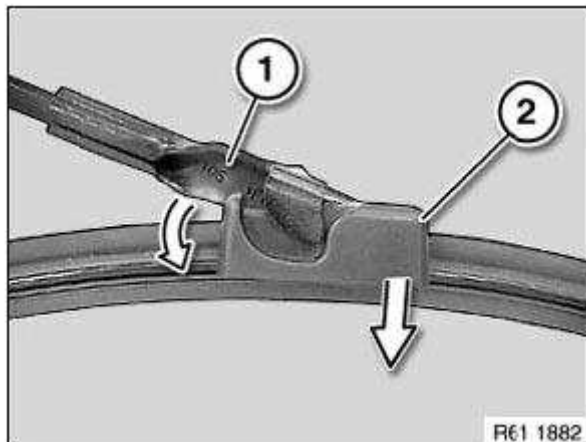


Fig. 282: Replacing Both Windscreen Wiper Blades
Courtesy of BMW OF NORTH AMERICA, INC.

61 61 081 REPLACING (REMOVING AND INSTALLING) LEFT OR RIGHT WINDSCREEN WIPER ARM

Special tools required:

- 61 6 060

NOTE: See GENERAL ELECTRICAL SYSTEM - SPECIAL TOOL .

IMPORTANT: Do not bend windscreen wiper arm during removal (risk of breakage).

Remove cover cap for wiper arm (1) on left or right.

Release nut underneath. Tightening torque, see 61 61 11AZ in 61 61 WINDSCREEN WIPERS .

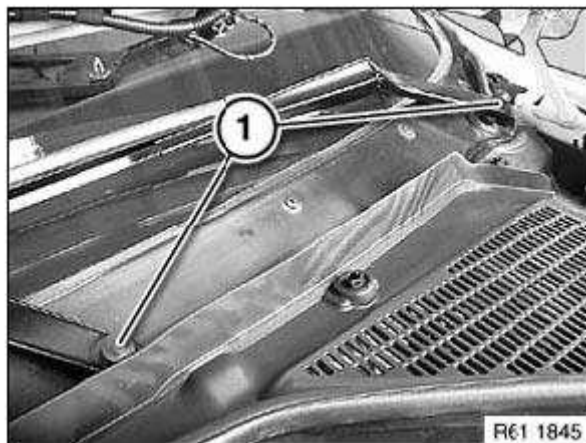


Fig. 283: Removing Cover Cap For Wiper Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Detach wiper arm (1) with special tool **61 6 060** .

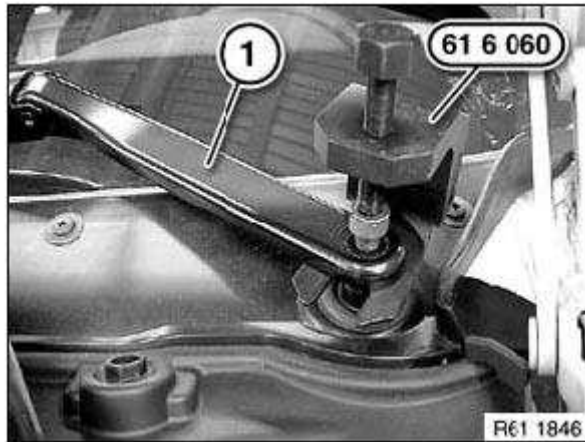


Fig. 284: Detaching Wiper Arm With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Adjust position of wiper arm in question in rest position (measured between wiper lip and top edge of cowl panel cover).

Then tighten down wiper arm and check adjustment dimensions of relevant wiper arm again.

Reference points (A, B) are the mountings of the wiper blades on the wiper arms to the sealing lip (1) of the cowl panel.

Contact angle (C) is the angle between wiper blade center plane (2) and windscreen.

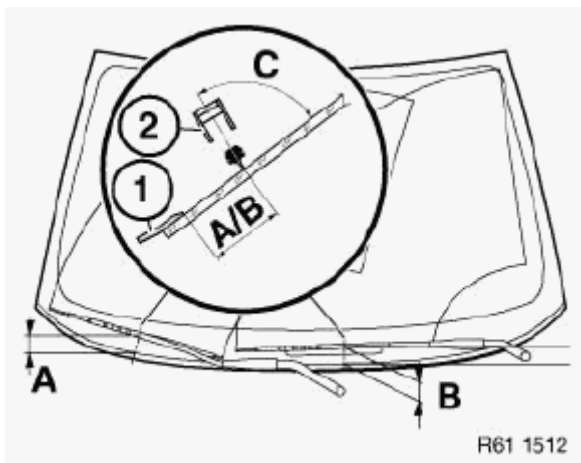


Fig. 285: Identifying Dimensions Of Relevant Wiper Arm
Courtesy of BMW OF NORTH AMERICA, INC.

WIPER SYSTEM COMPLETE WITH MOTOR

Necessary preliminary tasks:

- Remove **cowl panel cover** . See **51 13 116 REMOVING AND INSTALLING/REPLACING COWL PANEL COVER** .

Release screws (1). Tightening torque, see **61 61 6AZ** in **61 61 WINDSCREEN WIPERS** .

Disconnect plug connection (2).

Feed out bracket for windscreen wiper system (3) in upward direction.

Installation:

Rubber guide (4) must be correctly seated in guide (5).

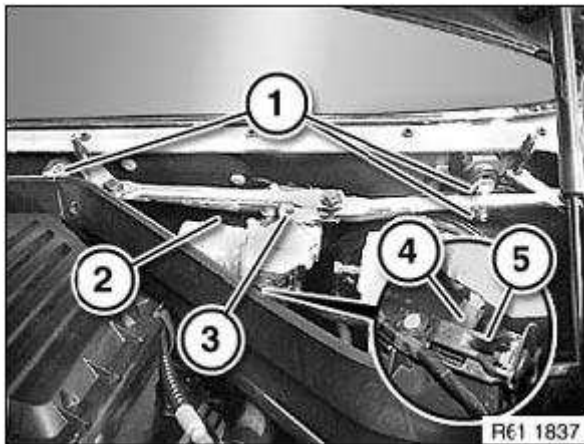


Fig. 286: Rubber Guide (4) Must Be Correctly Seated In Guide (5)
Courtesy of BMW OF NORTH AMERICA, INC.

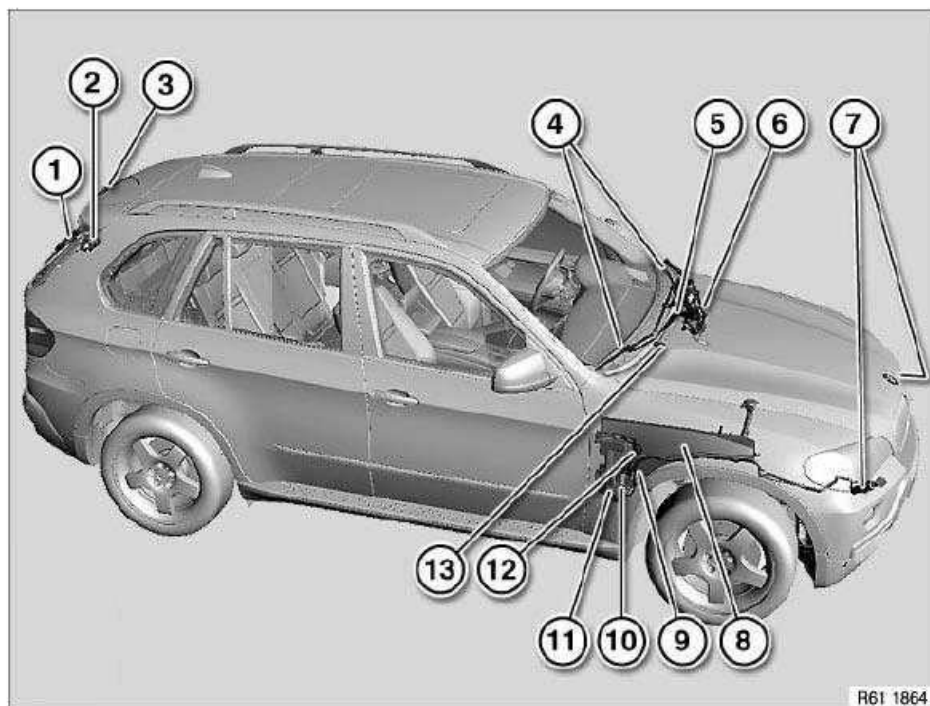
Installation:

Before installing wiper arms, allow wiper motor to return to its rest position.

To ensure the wiper system works properly, **check and correct** the contact angle of the wiper arms.

TAILGATE WINDOW WIPER

61 61 ... OVERVIEW OF WINDSCREEN WIPER, WINDSCREEN WASHER AND HEADLIGHT WASHER SYSTEMS



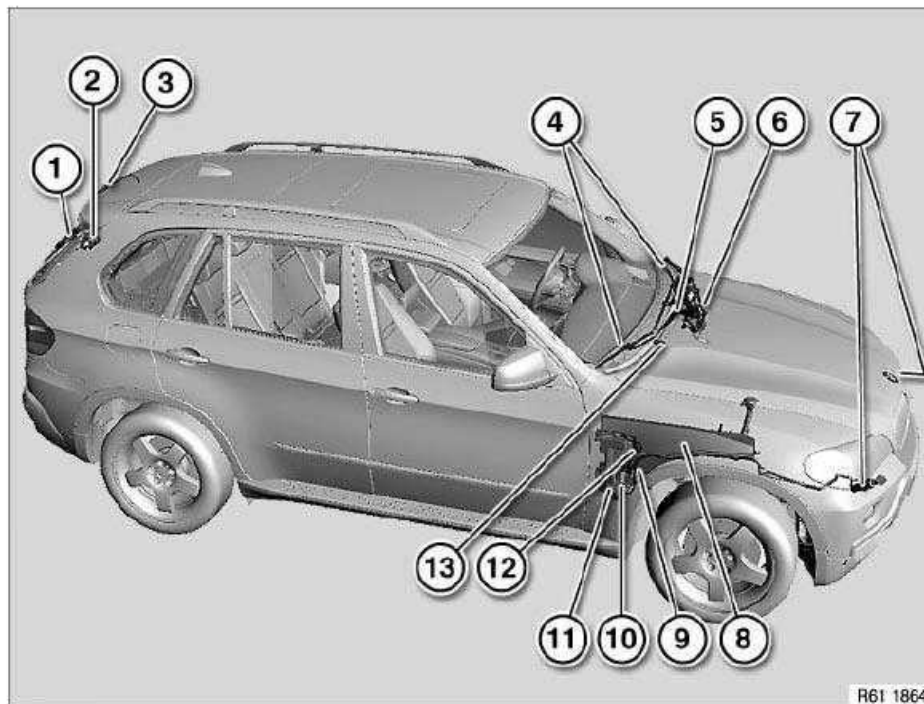
- | | | | |
|----|--|----|--|
| 1 | <u>Rear window wiper blade (E70)</u> | 2 | <u>Rear window wiper motor (E70)</u> |
| | <u>Window wiper arm for rear window wiper (E70)</u> | | |
| 3 | <u>Spray nozzle for rear window washer system (E70)</u> | 4 | <u>Wiper blades</u> |
| 5 | <u>Windscreen wiper arms</u> | 6 | <u>Mounting bracket for windscreen wiper system complete</u> |
| 7 | <u>High-pressure nozzles for headlight washer system</u> | 8 | <u>Fluid reservoir for windscreen washer system</u> |
| 9 | <u>Level switch for windscreen washer system</u> | 10 | <u>Windscreen washer pump</u> |
| 11 | <u>Window washer pump for rear window wiper (E70)</u> | 12 | <u>Washer pump for headlight washer system</u> |
| 13 | <u>Spray nozzle for windscreen washer system</u> | | |

Fig. 287: Identifying Windscreen Wiper, Windscreen Washer And Headlight Washer System Parts Location

Courtesy of BMW OF NORTH AMERICA, INC.

HEADLIGHT WASHER SYSTEM

61 61 ... OVERVIEW OF WINDSCREEN WIPER, WINDSCREEN WASHER AND HEADLIGHT WASHER SYSTEMS



R61 1864

- | | | | |
|----|---|----|---|
| 1 | Rear window wiper blade (E70) | 2 | Rear window wiper motor (E70) |
| | Window wiper arm for rear window wiper (E70) | | |
| 3 | Spray nozzle for rear window washer system (E70) | 4 | Wiper blades |
| 5 | Windscreen wiper arms | 6 | Mounting bracket for windscreen wiper system complete |
| 7 | High-pressure nozzles for headlight washer system | 8 | Fluid reservoir for windscreen washer system |
| 9 | Level switch for windscreen washer system | 10 | Windscreen washer pump |
| 11 | Window washer pump for rear window wiper (E70) | 12 | Washer pump for headlight washer system |
| 13 | Spray nozzle for windscreen washer system | | |

Fig. 288: Identifying Headlight Washer System Parts Location

Courtesy of BMW OF NORTH AMERICA, INC.

61 67 010 REMOVING AND INSTALLING/REPLACING WASHER PUMP OF HEADLIGHT WASHER SYSTEM

Necessary preliminary tasks:

- Remove **trim panel for cover on frame side member** on right
- Remove **wheel arch cover** at front (rear section) right

NOTE: Work is shown on the E70 by way of example. There may be differences in detail in the case of other vehicle models.

IMPORTANT: Risk of damage!

Carry out this operation carefully so as to avoid damaging the side panel.

Release screws.

Pull side panel forwards slightly.

Installation:

Tightening torque, see **41 35 7AZ** (A-pillar area) in **41 35 SIDE PANELS** .

Tightening torque, see **41 35 8AZ** (sill area) in **41 35 SIDE PANELS** .

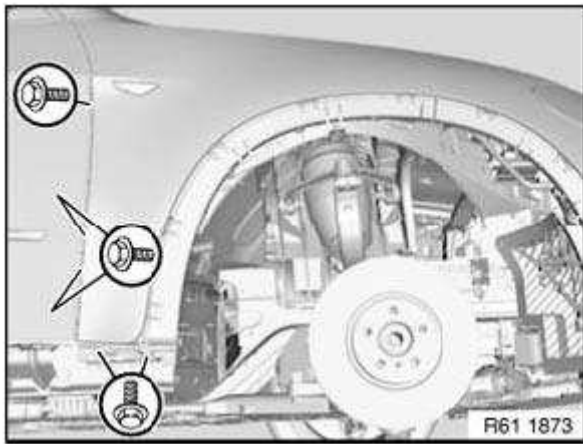


Fig. 289: Pulling Side Panel

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Side panel shown removed for purposes of clarity.**
 Catch any escaping washer fluid if necessary.

Disconnect plug connection (1).

Pull washer pump for headlight washer system (2) in direction of arrow out of fluid reservoir for windscreen washer system.

Disconnect plug connection for high-pressure line (3) from washer pump of headlight washer system (2).

Installation:

Replace strainer in washer pump.

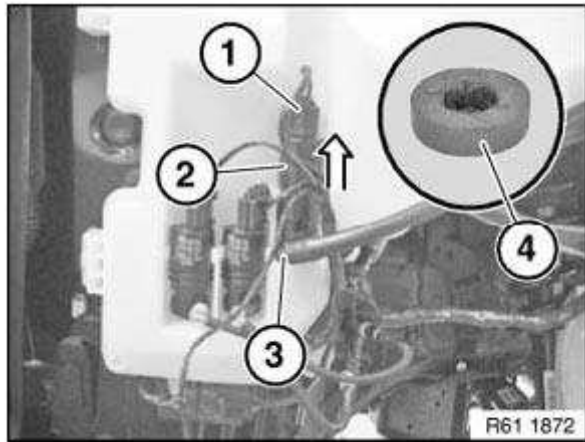


Fig. 290: Removing Washer Pump For Headlight Washer System
 Courtesy of BMW OF NORTH AMERICA, INC.

Coat sealing ring (4) of washer pump (2) with antiseize agent.

Make sure high-pressure line is correctly routed.

Fill fluid reservoir.

61 67 100 REMOVING AND INSTALLING/REPLACING HIGH-PRESSURE NOZZLE OF HEADLIGHT WASHER SYSTEM ON LEFT (OR RIGHT)

Special tools required:

- 00 9 340
- 13 3 010

NOTE: See MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS .

See FUEL SYSTEM - SPECIAL TOOLS .

Necessary preliminary tasks:

- Remove **front bumper trim** . See 51 11 156 REMOVING AND INSTALLING FRONT BUMPER TRIM .

Lever out cover (1) with special tool 00 9 340 .

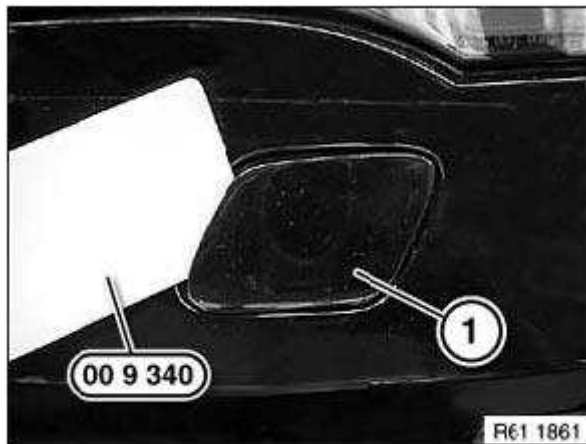


Fig. 291: Lever Out Cover With Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

Slowly pull out high-pressure nozzle of headlight washer system (1) at cover (2).

Unclip cover (2) in direction of arrow and remove.

Allow high-pressure nozzle of headlight washer system (1) to slide back slowly.

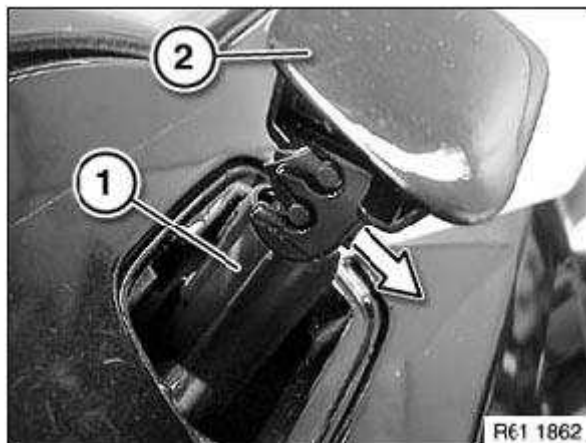


Fig. 292: Identifying Headlight Washer System
 Courtesy of BMW OF NORTH AMERICA, INC.

To prevent excessive escape of washer fluid, seal off end of high-pressure line with special tool **13 3 010** .

Catch any escaping washer fluid if necessary.

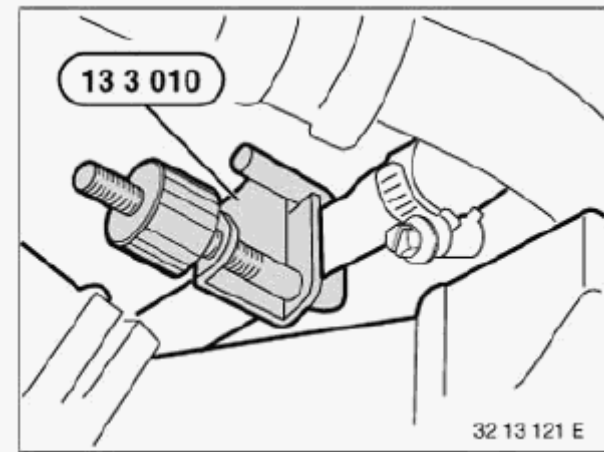


Fig. 293: Seal Off High-Pressure Line With Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

Raise retaining bracket (1) and detach high-pressure line (2) in direction of arrow from high-pressure nozzle of headlight washer system (4).

Raise retaining lugs (3) in direction of arrow and feed high-pressure nozzle of headlight washer system (4) towards rear out of front side panel.

Installation:

Keep plug connection for high-pressure nozzle (4) and high-pressure line (2) clean and free from grease.

Make sure high-pressure line (2) is correctly engaged on high-pressure nozzle (4) and high-pressure nozzle (4) correctly seated on front side panel respectively.

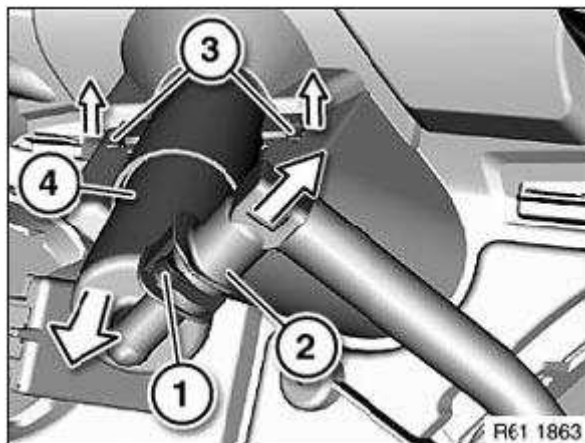


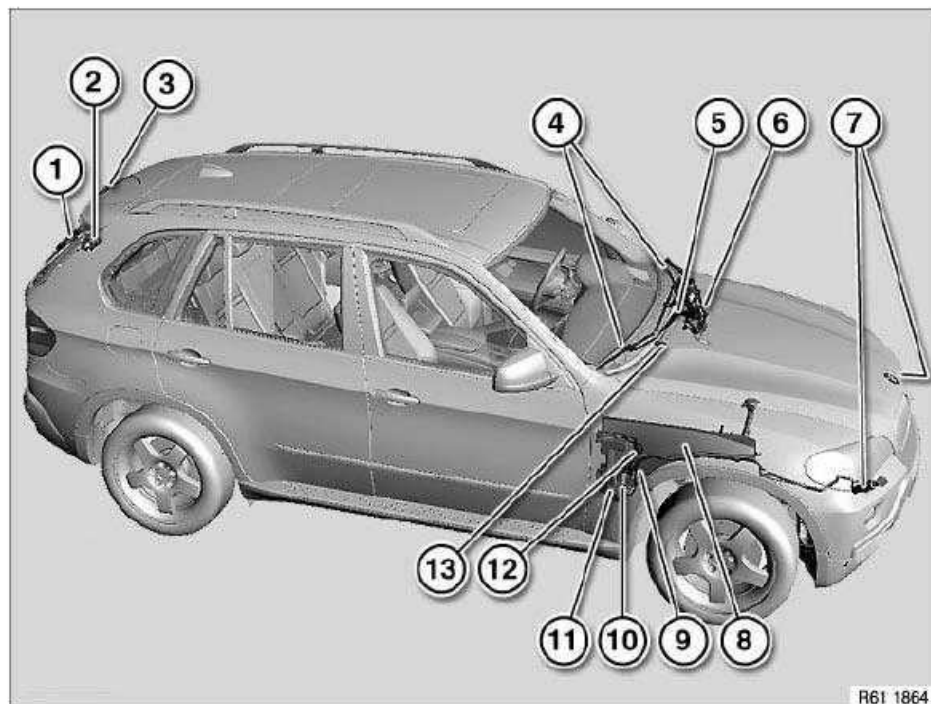
Fig. 294: Identifying Retaining Lugs And Headlight Washer System
 Courtesy of BMW OF NORTH AMERICA, INC.

Carry out a function test before fitting bumper trim.

If necessary, top up washer fluid.

SCREEN WASHER SYSTEM

61 61 ... OVERVIEW OF WINDSCREEN WIPER, WINDSCREEN WASHER AND HEADLIGHT WASHER SYSTEMS



- | | | | |
|----|--|----|---|
| 1 | <u>Rear window wiper blade (E70)</u> | 2 | <u>Rear window wiper motor (E70)</u> |
| 3 | <u>Spray nozzle for rear window washer system (E70)</u> | 4 | <u>Wiper blades</u> |
| 5 | <u>Windscreen wiper arms</u> | 6 | <u>Mounting bracket for windscreen wiper system, complete</u> |
| 7 | <u>High-pressure nozzles for headlight washer system</u> | 8 | <u>Fluid reservoir for windscreen washer system</u> |
| 9 | <u>Level switch for windscreen washer system</u> | 10 | <u>Windscreen washer pump</u> |
| 11 | <u>Window washer pump for rear window wiper (E70)</u> | 12 | <u>Washer pump for headlight washer system</u> |
| 13 | <u>Spray nozzle for windscreen washer system</u> | | |

Fig. 295: Identifying Window Washer System Component Locations
Courtesy of BMW OF NORTH AMERICA, INC.

61 71 004 ADJUSTING WINDSCREEN WASHER SPRAY NOZZLES

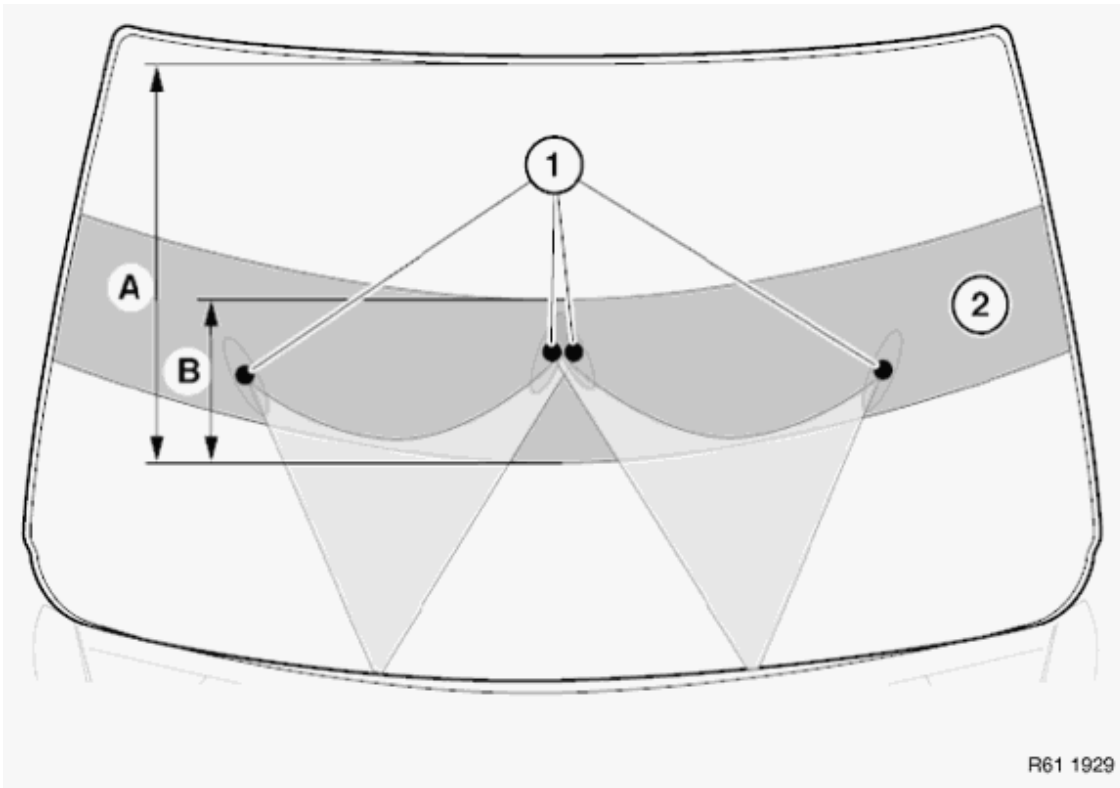


Fig. 296: Identifying Windscreen Washer Spray Nozzles Tolerance Range
Courtesy of BMW OF NORTH AMERICA, INC.

Mark tolerance range (2) with adhesive tape (A=500 mm/B=200 mm).

Actuate windscreen washer system.

Contact points (1) must be in tolerance range (2).

If necessary, adjust left or right spray nozzle (1) by way of screw (2).

NOTE: **If necessary, remove adhesive residue from windscreen.**
 Fill up with washer fluid.

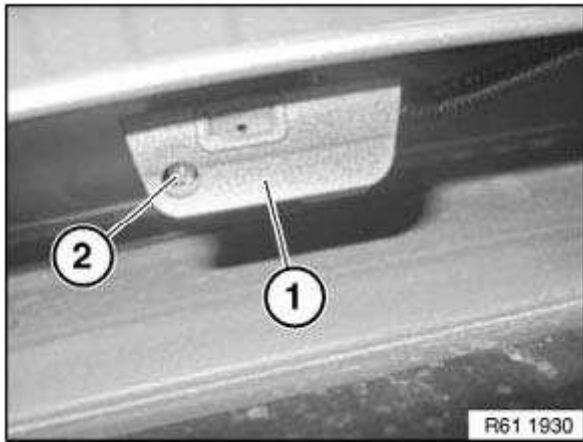


Fig. 297: Identifying Left/Right Spray Nozzle And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

61 71 015 REMOVING AND INSTALLING/REPLACING A SPRAY NOZZLE IN WINDSCREEN WASHER SYSTEM

Unlock retaining clip for water hose (1) and detach water hose in direction of arrow.

Disconnect plug connection (2) and detach in direction of arrow.

Press spray nozzle (3) in direction of arrow (A) and remove at top in direction of arrow (B).

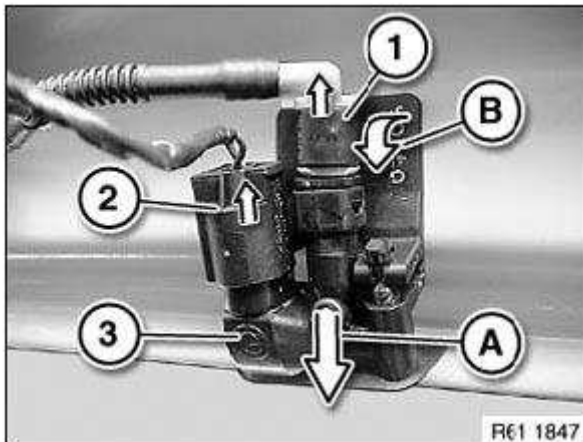


Fig. 298: Pressing Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

- Retaining lugs (1) must not be damaged.
- Check **adjustment of spray nozzles** and correct if necessary

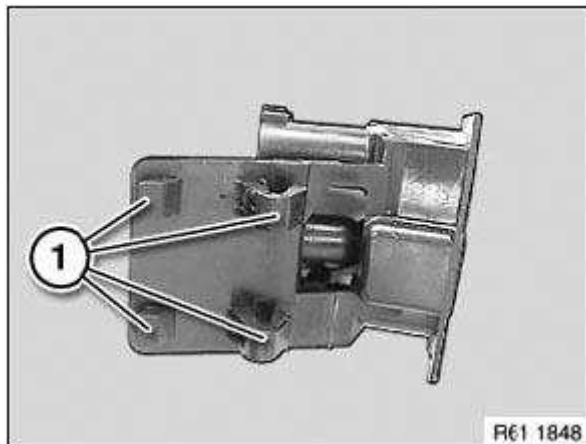


Fig. 299: Retaining Lugs (1) Must Not Be Damaged
Courtesy of BMW OF NORTH AMERICA, INC.

61 71 061 REPLACING (REMOVING AND INSTALLING) FLUID RESERVOIR FOR WINDSCREEN WASHER UNIT

Necessary preliminary tasks:

- Remove **trim panel for cover on frame side member** on right
- Remove **wheel arch cover** at front (rear section) right
- Remove front right **auxiliary turn indicator light**

NOTE: **Work is shown on the E70 by way of example. There may be differences in detail in the case of other vehicle models.**

Release screw (1).

Twist filler duct (2) in direction of arrow out of fluid reservoir for windscreen washer unit (3) and remove.

If necessary, release air supply unit vent line (4) at mounting points (5) from fluid reservoir for windscreen washer unit (3).

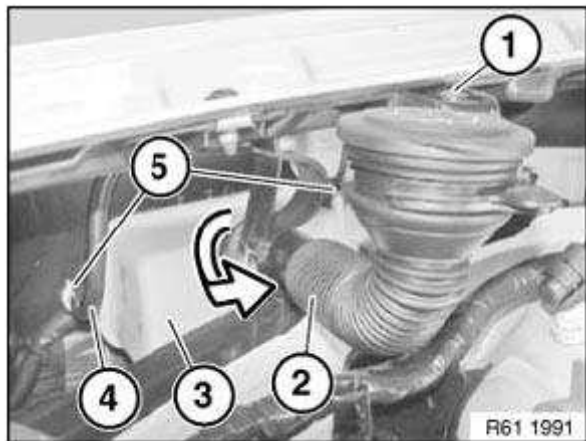


Fig. 300: Release Air Supply Unit Vent Line (4) At Mounting Points (5) From Fluid Reservoir For Windscreen Washer Unit (3)

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!

Carry out this operation carefully so as to avoid damaging the side panel.

Release screws.

Pull side panel forwards slightly.

Installation:

Tightening torque, see **41 35 7AZ** (A-pillar area) in **41 35 SIDE PANELS** .

Tightening torque, see **41 35 8AZ** (sill area) in **41 35 SIDE PANELS** .

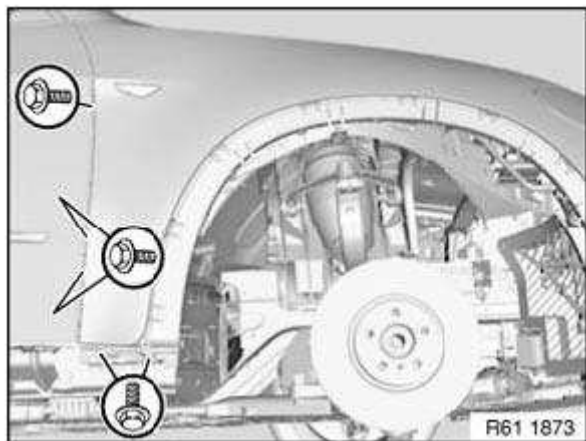


Fig. 301: Removing Side Panel

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Side panel shown removed for purposes of clarity.
Catch any escaping washer fluid if necessary.

Remove **level switch for windscreen washer unit (5)** .

Remove **washer pump of headlight washer system (1)** .

Remove **windscreen washer pump (4)** .

If necessary, remove **washer pump for rear window washer system (2)** .

Unlock plug connection (3) on fluid reservoir for windscreen washer system and disconnect.

Remove high-pressure line (6) and if necessary air supply unit vent line from fluid reservoir for windscreen washer unit.

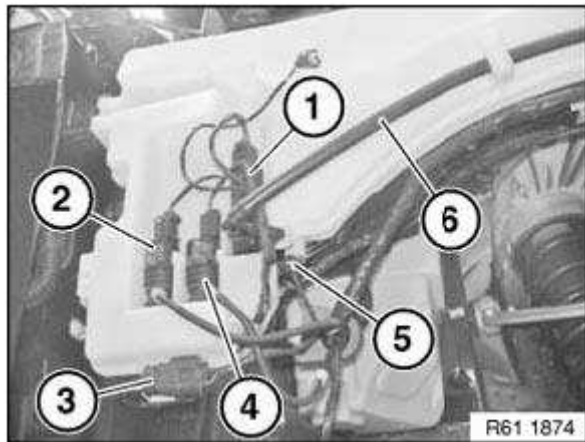


Fig. 302: Identifying Windscreen Washer Pump And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release wiring harness (1) from wheel arch (2) and lay to one side.

Release screw (4).

Feed out fluid reservoir for windscreen washer unit (3) towards front.

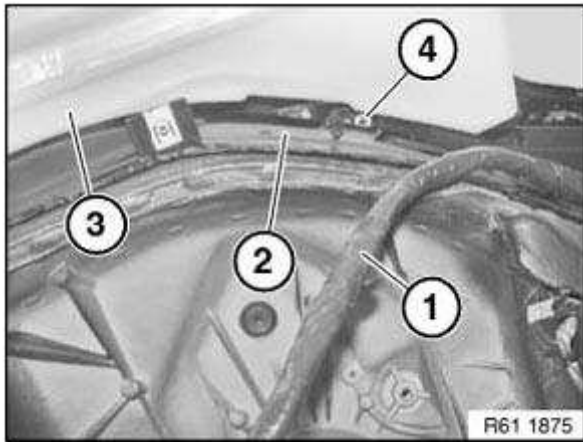


Fig. 303: Identifying Wiring Harness, Wheel Arch And Windscreen Washer Unit
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

- Make sure fluid reservoir for windscreen washer unit (1) is correctly seated in lug (2)
- Replace strainers on washer pumps
- Coat sealing rings of washer pumps with antiseize agent
- Make sure hoses and wiring harnesses are correctly routed
- Fill fluid reservoir

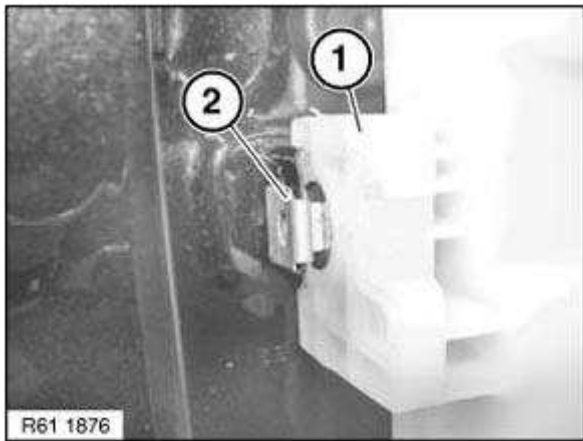


Fig. 304: Identifying Windscreen Washer Unit And Lug
 Courtesy of BMW OF NORTH AMERICA, INC.

61 71 100 REMOVING AND INSTALLING/REPLACING WINDSCREEN WASHER PUMP

Necessary preliminary tasks:

- Remove **trim panel for cover on frame side member** on right

- Remove **wheel arch cover** at front (rear section) right

NOTE: Work is shown on the E70 by way of example. There may be differences in detail in the case of other vehicle models.

IMPORTANT: Risk of damage!

Carry out this operation carefully so as to avoid damaging the side panel.

Release screws.

Pull side panel forwards slightly.

Installation:

Tightening torque, see **41 35 7AZ** (A-pillar area) in **41 35 SIDE PANELS** .

Tightening torque, see **41 35 8AZ** (sill area) in **41 35 SIDE PANELS** .

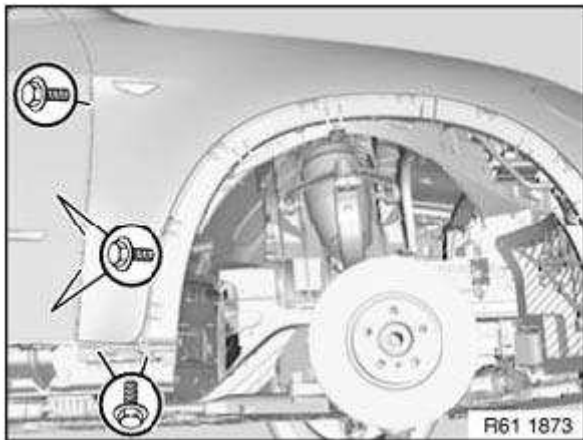


Fig. 305: Removing Side Panel

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Side panel shown removed for purposes of clarity.
Catch any escaping washer fluid if necessary.

Disconnect plug connection (1).

Pull windscreen washer pump (2) in direction of arrow out of fluid reservoir for windscreen washer system.

Disconnect hose plug connection (3) from windscreen washer pump (2).

Installation:

Replace strainer in windscreen washer pump.

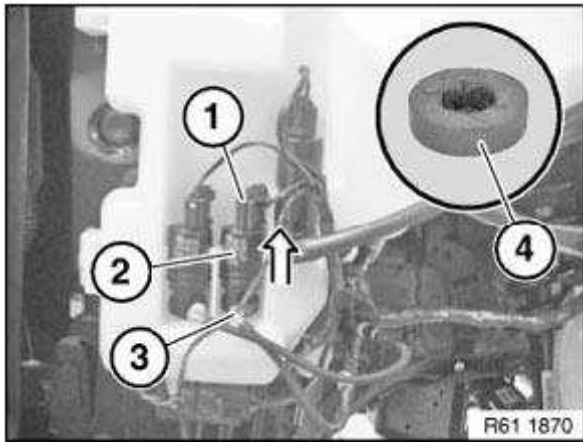


Fig. 306: Removing Windscreen Washer Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Coat sealing ring (4) of windscreen washer pump (2) with antiseize agent.

Make sure hose is correctly routed.

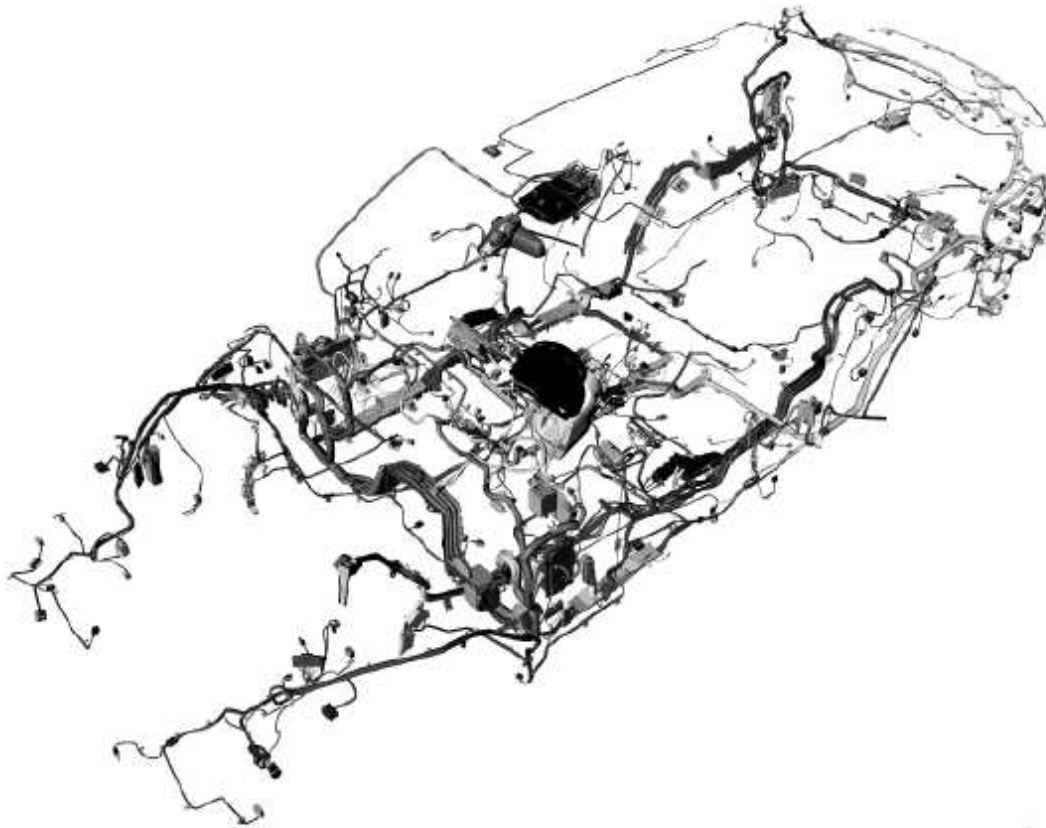
Fill fluid reservoir.

ACCESSORIES AND EQUIPMENT

General Electrical System - Service Techniques - X6

GENERAL ELECTRICAL SYSTEM

ELECTRICAL SYSTEMS : E70, E71



T6107107

Fig. 1: Identifying Electrical Systems
Courtesy of BMW OF NORTH AMERICA, INC.

Introduction

For the new BMW X5 (E70) the following objectives have been set by Marketing and Design:

- Clear positioning in the MCL+ vehicle class (size, price)
- Development of the BMW interpretation of a SAV, based on driving dynamics, handling, agility, design and passion
- Installation of additional 3rd seating row without compromising other vehicle characteristics (weight, exterior, proportion)
- Increase of the variability and practicality compared with E53 so that multiple uses can be supported
- Extension of the accessory equipment program to meet the increased customer expectations in the MCL+

(e.g. Active Steering, adaptive drive, tailgate lift, reversing camera)

The X6 (E71) besides being the sportiest BMW X model, also opens up a completely new vehicle segment: the Sport Activity Coupe segment.

The X6 features the following innovations:

- Conceptual innovation of the world's first Sports Activity Coupe
- Sportiest development of a BMW X model with special emphasis on the active driving potential
- Lavish body styling
- Worldwide first vehicle with Dynamic Performance Control (marketing designation) for unique forward driving stability
- Generous ground clearance and capacious wheel housings

This BMW Service Technical bulletin gives an overview of the electrical systems in the new BMW X5. The electrical systems are arranged as follows:

- Drive
- Chassis
- Body

The overviews of the electrical systems can be accessed from this main document by clicking the hotspots.

Electrical systems

The most important technical details are briefly described below.

- Electrical system
- Drive
- Chassis
- Body

Electrical system

The new X5 is equipped with the Electrical System 2000. For the first time ever the FlexRay databus will be introduced in a BMW vehicle. FlexRay is a new bus standard.

The Electrical System 2000 is made up of the following databuses:

- Body CAN K-CAN
- Media Oriented System Transport: MOST
- Powertrain CAN PT-CAN
- FlexRay: Databus with a data transmission rate of 10 Mbit/s
- Chassis CAN F-CAN

- Between the diagnosis socket and the Junction Box Electronics (JBE) there is now a CAN that acts as the diagnosis interface. The D-CAN interface has a higher data transfer rate (500 kbit/s). D-CAN is a twin-wire connection. D-CAN stands for: Diagnosis-on-CAN.

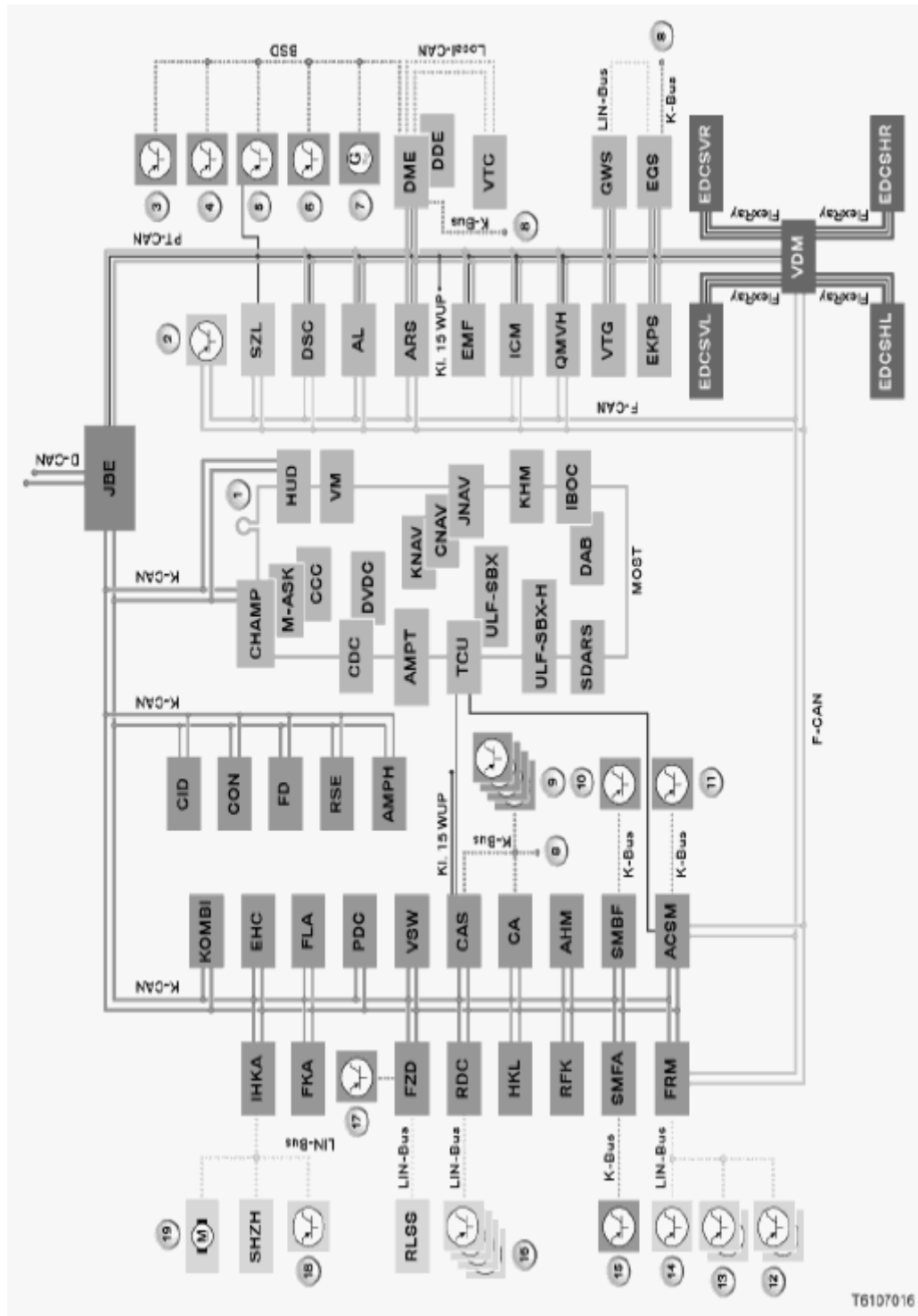


Fig. 2: Electrical Wiring Diagram
Courtesy of BMW OF NORTH AMERICA, INC.

ITEM DESCRIPTION CHART

Control units on K-CAN (body CAN) databus			
Item	Description	Item	Description
JBE	Junction Box Electronics	CHAMP	Central Head unit And Multimedia Platform
M-ASK	Multi-audio system controller	CCC	Car Communication Computer
HUD	Head-up display	CID	Central Information Display
CON	Controller	FD	Rear seat display
RSE	Rear Seat Entertainment	AMPH	HiFi amplifier
KOMBI	Instrument cluster	EHC	Electronic height control
FLA	Mainbeam assistant	PDC	Park Distance Control
VSW	Video switch	CAS	Car Access System
CA	Comfort Access	AHM	Trailer module
SMBF	Seat module, passenger	ACSM	Crash Safety Module
FRM	Footwell module	SMFA	Seat module, driver
RFK	Reversing camera	HKL	Tailgate lift
RDC	Tyre pressure control, US	RLSS	Rain-light solar sensor
FZD	Roof control panel	FKA	Automatic rear seat climate control
IHKA	Integrated automatic heating and climate control system	SHZH	Parking heater via LIN
8	Connection K-Bus with EWS 4th Generation	9	Exterior door handle electronics (4x)
10	Switch block, seat adjustment, front passenger	11	Seat occupancy mat, passenger side, US
12	Step motor controller (2 x)	13	Exterior mirror (2x)
14	Switch block, driver's door	15	Switch block, seat adjustment, driver's seat
16	RDC aerial, US (4 x)	17	Siren with integrated tilt alarm sensor
18	Auxiliary heater, 3rd seating row	19	Actuator motor (number is equipment-dependent)

ITEM DESCRIPTION CHART

Control units on MOST (Media Oriented System Transport) databus			
Item	Description	Item	Description
CHAMP	Central Headunit And Multimedia Platform	M-ASK	Multi-audio system controller
CCC	Car Communication Computer	CDC	CD changer
DVDC	DVD changer	AMPT	TOP-HiFi amplifier
TCU	Telematics control unit	ULF-SBX-H	Interface box (telephone) not simultaneously with ULF-SBX-H

ULF-SBX-H	Interface box High (USB audio interface) not simultaneously with ULF-SBX	SDARS	Satellite tuner, US
IBOC	Digital tuner, US	DAB	Digital tuner, EURO
KHM	Headset module (from 09/2007)	JNAV	Japan navigation system
KNAV	Korea navigation system	CNAV	China navigation system
VM	Video module	HUD	Head-up display
1	MOST port		

ITEM DESCRIPTION CHART

Control units on PT-CAN (powertrain CAN) databus			
Item	Description	Item	Description
JBE	Junction Box Electronics	SZL	Only activation wire to switch cluster in middle console
DSC	Dynamic Stability Control	AL	Active Steering
ARS	Active Roll Stabilization (Dynamic Drive)	EMF	Electromechanical parking brake (parking brake)
ICM	> only E71 Integrated Chassis Management	QMVH	> only E71 Transverse torque distribution, rear axle
VTG	Transfer case	EKPS	Fuel pump control (not on US version)
VDM	Vertical Dynamic Management	EGS	Electronic transmission control
GWS	Gear selector switch	DDE	Digital Diesel Electronics
DME	Digital engine electronics	VTC	Valvetronic via local CAN bus
3	Oil level sensor via bitserial data interface (BSD)	4	Electric coolant pump (BSD), spark-ignition engine
5	Intelligent Battery Sensor (IBS)	6	Preglow control device (BSD), diesel engine
7	Alternator via bitserial data interface (BSD)		

ITEM DESCRIPTION CHART

Control units on FlexRay databus			
Item	Description	Item	Description
VDM	Vertical Dynamic Management	EDCSVL	Shock absorber satellite, front left
EDCSVR	Shock absorber satellite, front right	EDCSHL	Shock absorber satellite, rear left
EDCSHR	Shock absorber satellite, rear right		

ITEM DESCRIPTION CHART

Control units on F-CAN (chassis CAN) databus			
Item	Description	Item	Description
SZL	Steering Column Switch with steering-angle sensor	DSC	Dynamic Stability Control
AL	Active Steering	ARS	Active Roll Stabilization (Dynamic Drive)

VDM	Vertical Dynamic Management	ACSM	Crash Safety Module
FRM	Footwell module		
2	DSC sensor		

IMPORTANT: Automatic terminal cutoff of Terminal 15 from 03/2007.

Terminal 15 is automatically switched off by the signal from the door contact when the driver's door is opened or closed. Terminal 15 is permanently reactivated if the START/STOP button is then pressed. Perform this operation before programming or diagnosing a vehicle.

Drive

With **BMW Efficient Dynamics**, the Sports Activity Vehicle in the model year 2008 sets new standards in drive dynamics and wear reduction.

The comprehensive program for the optimization of wear and emission performance includes intelligent alternator control as well as requirement-based control of auxiliary units (e.g. coolant pump).

In addition the belt drive for the A/C compressor is equipped with a clutch. If the climate control system is switched off, the A/C compressor is automatically disconnected. In this way the drag torque of the A/C compressor is reduced to a minimum.

The scope of equipment includes roll-resistance reduced tires, a friction-minimised rear axle transmission and a modified drive assistance pump. The pressure- and volume-dependent adjustment of the cam ring prevents transmission losses increasing in proportion to engine speed.

The vehicle is also equipped with active aerodynamic features. The vent flaps open and close depending on the driving situation. In this way as soon as the cooling requirement of the engine falls, the air resistance of the vehicle can be reduced.

The X5 contains the following advanced engineering features in the powertrain area:

○ **Spark-ignition engines**

For the market launch the familiar N52B30O1 and N62B48O1 spark-ignition engines will be used. However the engines shall be adapted in certain respects.

The exhaust system, the cooling system and the fuel supply system are specific to the vehicle.

The belt drive has been adapted to the increase in the number of optional extras. On the power takeoff side, the transfer case has been redesigned.

In addition, a modified rear axle transmission is used in the X5 4.8i and 3.0d. The way in which the drive shaft and power takeoff shafts are coupled with the rear axle is new.

The N52B30O1 will be equipped from 10/2007 with a map-controlled oil pressure regulator. The coolant temperature sensor at the cooler outlet has been omitted.

With the E71, the new N63B44O0 8-cylinder spark-ignition engine will be introduced to the market. In addition, the N54B30O0 6-cylinder spark-ignition engine with 2 turbo chargers will also be used in the E71.

○ **Diesel engines**

The vehicle contains the 2 familiar diesel engines:

- M57D30O2 (turbo charged)
- M57D30T2 (2-level turbo charging)

A new exhaust system has been developed for these diesel engines that satisfies the high expectations on this vehicle (e.g. with respect to exhaust emissions, noise). These diesel engines comply as standard with the exhaust norm EURO 4. The oxidation catalysator is installed close to the engine. The diesel particle filter is accommodated in the same housing.

The M57D30T2 is equipped with a pressure-controlled fuel low pressure system.

A fuel-pressure-temperature sensor measures the pressure and the temperature in the fuel low-pressure system. The signals are received by the Digital Diesel Electronics (DDE).

The DDE actuates the fuel pump controller (EKPS control unit).

The EKPS control unit in turn actuates the fuel pump.

This enables very precise and responsive fuel delivery.

○ **Intelligent alternator regulation**

The intelligent alternator regulation is a function of the engine controller.

The intelligent alternator regulation represents a refinement of the recharging strategy for the vehicle battery.

The vehicle battery is no longer completely recharged but charged to a certain degree depending on various external conditions (ambient temperature, battery age etc.).

In contrast to conventional recharging strategies, the battery is only recharged when the vehicle is coasting. In the process the alternator receives maximum stimulus, electrical energy is produced and fed into the vehicle battery.

No fuel is consumed in the process. The kinetic energy from the coasting vehicle drives the alternator via the wheels and engine. Electrical energy is generated.

The alternator is not actuated during acceleration phases of the vehicle. This means no energy and more specifically no fuel is used to generate electrical energy.

○ **Automatic transmission**

The GA6HPTU automatic transmission has been revised in the following respects:

- Torque moment converter with torsion damper
- Adjusted electronic transmission control (EGS)
- More responsive hydraulics thanks to new pressure regulator
- Electric switching via gear selector switch (GMWS)

The EGS control unit is located in the automatic transmission. The electronic immobilizer (EWS) is integrated in the EGS control unit. This increases the degree of theft protection.

The gear selector switch (GWS) is a separate control unit.

The gear selector switch (GWS) acts to select a drive level of the automatic transmission with Steptronic mode and sport program. The transmission selector switch is located at the front of the center console of the vehicle and is a separate control unit. With the gear selector switch, instead of being actuated mechanically, the transmission is now actuated electronically.

The gear selector switch (GWS) consists of the control electronics and the selector lever.

The sensors for recording the selector lever position and for inhibiting inadvertent gearshifts are integrated in the control electronics.

The E71 is available with rocker switches.

○ **xDrive**

xDrive is an all-wheel drive system that links Dynamic Stability Control (DSC) system to an electronically controlled multi-plate clutch in the transfer case.

The electronically controlled multi-plate clutch smoothly distributes the drive torque as required to the front axle. The rear axle is always powered.

All of the input torque is applied to the rear axle when the multi-plate clutch is separated.

xDrive constantly communicates with the DSC. The drive-dynamic input information is computed in the DSC control unit.

Important items of information are:

- Gas pedal position
- Engine torque
- Drive-dynamic state

The DSC calculates the necessary locking torque. The locking torque is communicated to xDrive. This

allows xDrive to determine whether the vehicle is able to follow the driver's commands.

If the wheels exhibit a tendency to spin or there is a risk of over- or under steering, xDrive cuts in with a corrective effect.

xDrive adjusts the drive torque between the two axles in response to requirements.

Only if xDrive cannot maintain the vehicle's course on its own will DSC also intervene. Engine output is reduced and individual wheels are specifically braked.

The drive torque is delivered to the axle that has better traction when road conditions change, due for example to snow, ice or a loose road surface.

○ **Transverse torque distribution (only E71)**

The rear axle transverse torque distribution is fitted as standard and is offered by Marketing under the name "Dynamic Performance Control".

The rear axle transverse torque distribution specifically distributes the drive torque between both wheels on the rear axle.

With the new development, the rear axle transmission of the conventional design is supplemented by 2 planetary gearboxes with override function. These planetary gearboxes can if required be integrated in the powertrain via a disc set. Independently of the required drive torque of the engine, a differential moment of up to 1800 Nm can be actively set between the left and right rear wheel.

Benefits:

- Optimum directional stability as well as reduced steering effort
- Improved traction
- Increased driving safety

The chassis control systems are still interconnected, even if they function largely independent of each other.

The innovative architecture of the Integrated Chassis Management (ICM) takes over the role of a superordinate control unit, opening up new potentials in driving dynamics. The ICM as the central controller in the vehicle compiles all the available individual items of information and distributes these in a coordinated and concerted manner to the chassis control systems.

On the basis of a comprehensive analysis of the driving status derived from a wide variety of information, the ICM can decide: Which servo interventions in the respective driving context are most likely to harmonize driver wishes and vehicle reaction. By means of networking via ICM, new functions are also created that are only made possible by the interaction of several control systems.

Thus the Dynamic Performance Control (rear axle transverse torque distribution) interacts dynamically with Dynamic Stability Control, Active Steering and dynamic drive.

Chassis

From an electrical point of view, the chassis has been modified with respect to the following systems:

○ **Dynamic Stability Control**

The vehicle is equipped as standard with Dynamic Stability Control (DSC).

DSC is a development of the DSC 8Plus.

For ease of identification this chassis control system is known as "Premium".

The control functions of DSC have been further optimized. The improvements have been achieved through the use of a return pump with 6 pistons as well as more efficient electronics. The extended functions of the DSC are:

- Brake standby by preemptive application of brake shoes in case of need (creation of low anticipatory brake pressure)
- "Dry braking" of the brake discs on wet roads when wiper switched on
- Detection of fading and increase in brake pressure during fading
- Start-off assistant
- Cruise control with brake function (option 544)
- Parking brake (electromechanical and hydraulic parking brake)
 - from 09/2007: additionally with automatic-hold function

New from 10/2007:

The DSC is equipped with the function "Drive dynamic brake intervention". To this end, the software in the DSC has been changed. No additional hardware is required.

Drive dynamic brake intervention increases agility and reduces understeering. This improves the handling characteristics of the vehicle.

As soon as the front wheels push unduly outward, the rear wheel on the inside of the curve will be specifically braked by the DSC.

The resulting loss in forward drive is compensated for by an increase in engine power. Thus even on slippery roads, curves can be taken more precisely.

Whether and to what extent intervention of this kind is required, is determined with the data on yaw rate, steering angle and engine power.

○ **Active front steering**

For the 3rd generation of Active Steering the following features are new:

- Yawing moment compensation has been fully integrated as a function in the Active Steering control unit
- Cumulative steering angle sensor withdrawn
- Digital motor position sensor
- Commissioning exclusively via service function in BMW diagnosis system

On the X5, Active Steering is available for the first time on an all-wheel drive vehicle.

The variable steering transmission ratio offer the optimum gear ratio for every speed. With speeds of up to approx. 100 km/h, a very direct and agile vehicle performance is realized in conjunction with a small steering angle.

It is hardly necessary for the driver to span the steering wheel with his hands. This means that the controls on the steering wheel are easier and safer to control. Thus for parking you can steer from the left stop to the right stop with only two turns of the steering wheel.

At high speeds, steering becomes increasingly indirect, thus improving the straight-running stability and the general driving comfort.

The road speed dependent Servotronic adjusts the force required to turn the steering wheel to a reasonable degree, while the Active Steering influences the steering angle requirement. Thus Active Steering and Servotronic have different effects and perfectly complement each other. For this reason Active Steering is only offered in combination with the Servotronic.

Drive stability functions:

The possibilities of Active Steering are also exploited to stabilize the vehicle in oversteering situations.

The Active Steering can countersteer more rapidly and precisely than the average driver and stabilizes the car largely automatically. Another function increases vehicle stability during braking maneuvers on non-uniform road surfaces (μsplit braking). The differences in frictional coefficients result in vehicle reactions and the driver has to compensate for these with conventional systems by counter steering.

Active Steering takes over this function and stabilizes the vehicle automatically. On one hand, it is easier to stay in control in this kind of situation and, on the other, the braking distance is reduced. This produces a tangible increase in safety compared with an identical vehicle without Active Steering.

○ Adaptive Drive

With the optional extra Adaptive Drive the following are functionally combined:

Active Roll Stabilization Dynamic Drive (ARS = Dynamic Drive) and variable Impact Damping Adjustment (VDM = Vertical Dynamic Management).

The integration of both systems maximizes safety, comfort and responsiveness and is not available with any other SAV.

- **Vertical Dynamic Management**

The Vertical Dynamic Management offers the following advantages:

- Increased driving comfort
- Increased vehicle agility
- Improved independent steering performance and response to changing loads

The VDM increases driving comfort. Increased driving comfort is attained when the vertical movement of the vehicle body is reduced to the minimum: whether this is due to agitation of the vehicle by the road surface (unevenness, joints) or on curves.

The VDM controls the damper satellites in the actuation of the shock absorbers (impact force for individual wheel). To this end, the VDM control unit is connected with the damper satellites via the very high speed FlexRay databus. With a data transfer rate of 10 Mbit/s, FlexRay is significantly faster than the databuses employed on comparable vehicles (in the areas of body and powertrain/suspension).

In addition to the higher bandwidth, FlexRay supports a realtime datatime transmission. FlexRay can be configured to be error-tolerant.

The damper satellites (= control units) electronically regulate the impact forces.

The damper satellites and the EDC valves are directly connected to the shock absorbers. Each damper satellite contains its own vertical acceleration sensor.

- **Active Roll Stabilization** (Marketing designation Dynamic Drive)

Dynamic Drive provides active stabilizers on the front and rear axles. These active stabilizers support continuous adaptation to the current driving situation.

There is thus no necessity to make compromises between the basic attunement of the chassis to sporty or comfortable driving. When you are driving straight ahead Dynamic Drive is "sensitively" activated, thus offering the greatest possible degree of suspension comfort. Depending on the lateral acceleration, the lateral inclination when taking curves or avoiding obstacles will be minimized by a "sporty" setting of the stabilizers. The active stabilizers are vertically distributed in the center. The active stabilizer consists of the oscillating motor and the stabilizer halves mounted on the oscillating motor.

As one stabilizer half is connected with the shaft and the other with the housing, the stabilizer halves counter-rotate. The torque thus produced exerts a stabilizing effect on the rolling motion. The maximum system pressure is 180 bar.

The most important control variable is the lateral acceleration. In addition the following signals are evaluated on the PT-CAN:

- Lateral acceleration
- Yaw rate

- Vehicle road speed
- Steering wheel angle

○ **Electronic height control (simple level control)**

Ride height is controlled by air being fed into or withdrawn from the air springs. The EHC control unit receives information about the ride height on the left and right-hand sides of the vehicle from the level sensors.

If the ride height is outside defined tolerances, the system will automatically activate the air supply unit to regulate to the specified level.

The system is activated and starts to regulate whenever a door or the tailgate is opened. The system is deactivated after a certain time (approx. 20 minutes).

The signals from the level sensors are filtered to distinguish between changes in load and other disturbances such as an uneven road surface. For correct use, two signals filtered at different frequencies are computed for each signal (low-pass filter with fast and slow filtering).

Fast filtering is always employed when regulation is in progress. This prevents the regulated height from exceeding the specified level. Slow filtering is employed when the vehicle is in motion. This mode of filtering eliminates oscillations induced by the road surface.

Both sides of the vehicle are regulated independently.

In other words, the comparison of specification to actual value is performed separately for each side (Exception: testing the minimum height and the control function "Intermeshing".)

With these control functions, the mean values of the left and right-hand sides of the vehicle are taken into account. The EHC control unit recognizes the different operating conditions from the incoming signals and messages. Depending on operating conditions, appropriately adapted control functions are activated.

○ **Parking brake (electromechanical parking brake = EMF)**

The vehicle is equipped as standard with an electromechanical parking brake (EMF). The parking brake acts as a hand brake. The parking brake is actuated via the parking brake button in the central console.

- Exclusion of all safety-critical conditions
- Optimum functionality
- Highest availability
- Highest degree of comfort

The parking brake is designed to secure the parked vehicle against rolling away. When the engine is turned off, the EMF takes over braking: electromechanically via the servo unit.

When the engine is running, braking is control by the Dynamic Stability Control (DSC): hydraulically via the 4 disc brakes.

New from 10/2007:

The vehicle has an automatic-hold function. The automatic-hold function is activated by a button behind the parking brake switch. The switch is linked to the EMF.

When the function is selected, the vehicle is hydraulically braked from the first application of the brake by the DSC until it comes to a complete halt. Stepping on the gas pedal releases the disc brakes and the vehicle continues in motion. The automated braking and release process supports driving in city traffic or in jams, for example.

The start assistant for starting on uphill slopes is integrated in the DSC (via signal longitudinal acceleration sensor).

○ **Tyre pressure control (US version only)**

The tire pressure control (RDC) is a system for monitoring the tire pressure when driving.

To this end, the tire pressure and the tire air temperature are measured at certain intervals on request by the RDC control device and telemetrically transmitted to the RDC aerial via a high-frequency transmission path.

The RDC aerial relays the signal back to the RDC control device via a sub-bus. The control device evaluates the received data.

Then the RDC control device forwards the data if necessary to the instrument cluster (KOMBI).

The driver can thus be informed about any correction required to the tire pressure or about a flat tire (check-control message).

The RDC monitors the tire pressure throughout the journey.

The driver sets the tire pressure to be monitored. He instructs the system via the control function in iDrive or via the RDC button to save the current tire pressure as the target pressure value (Reset).

The RDC control unit tests the target value for plausibility before saving it (axle by axle comparison of target pressures, minimum pressures).

A reset is only possible when the air pressure in all wheels is at least 1.6 bar. If the tire pressure of a wheel is under this limit, a check-control message will be issued immediately.

If the pressure difference between the wheels on an axle is > 0.4 bar, the reset will be rejected after the plausibility test. A check-control message will be issued. Remedy: Set the tire pressures to the correct values and repeat the reset.

Body

The following systems are described under "Body electrics/electronics":

○ **Power supply**

Two software functions are of fundamental importance for the power supply:

- **Energy management**

The energy management system ensures that sufficient starting power is always available. Energy management monitors the vehicle even when the engine is not running.

The energy management system monitors all components in the vehicle which generate, store and consume energy.

- **Power management**

The power management system is a subsystem of the energy management system. Power management is controlled by the engine control unit (DME or DDE: digital engine electronics or digital diesel electronics).

While the vehicle is in motion, power management regulates the output of the alternator and the battery charge.

- **Intelligent alternator regulation see Chapter Drive**

The central element of the power supply is the junction box. The junction box consists of a power distributor and a control unit, the Junction Box Electronics (JBE).

There is a power distributor in the luggage compartment: the rear fuse block. The fuse block is attached to the vehicle battery by a retaining clip.

○ **Car Access System**

In addition to the CAS control unit, the following components are also installed.

- **START-STOP unit**, comprising the START-STOP button and the remote control holder
- **Electric steering lock (ELV, not on US version)**

A new generation of electronic immobilizer is being introduced on vehicles with spark-ignition engine (4th generation EWS)

The 4th generation EWS is an advanced development of the previous electronic immobilizer. This advanced development uses an innovative, state-of-the-art encoding method.

Each vehicle is assigned a 128 bit secret code. This secret code is stored in a BMW database. The secret code is thus known only to BMW.

The secret code is programmed and locked in the following control units:

- CAS control unit
- DME/DDE control unit

When the secret code is locked in the control units, it cannot be cleared or changed. This means that each control unit is assigned to a specific vehicle. The control units identify themselves with the secret code and with the same algorithm.

The CAS is also responsible for terminal management and the comfort start. Moreover, the CAS is the master control unit for various system functions such as central locking and power windows.

○ **Central locking system**

The central locking system is the central vehicle access system. The central locking system enables the opening or closing of the vehicle.

The central locking system manages:

- all vehicle doors
- the upper section of the two part back hatch
- the tank flap
- the electrically lockable glove compartment

The central locking system can be actuated via the following components:

- Remote control
- Locking cylinder, driver's door (door lock)
- Central locking button
- Tailgate, external button
- Identification transponder and outside door handle electronics with comfort access

As soon as the upper tailgate is open, the lower tailgate can also be opened. The lower tailgate must be unlocked and opened/closed and locked manually (mechanically).

The Car Access System (CAS) is the master control unit for the central locking system.

The Junction Box Electronics (JBE) actuates the central locking system drives (including unlocking of the glove compartment).

The Automatic Soft Closer is available as an optional extra for all doors from 10/2007.

○ **Automatic Soft Closer**

The Automatic Soft Closer is available as an optional extra for all doors from 10/2007.

The Automatic Soft Closer in the tailgate comes as standard.

The special feature of the Automatic Soft Closer is that the lock is linked to the Automatic Soft Closer by a Bowden cable.

The Automatic Soft Closer can be activated from terminal 30g ON. The vehicle door only has to be gently drawn into the locked. The Automatic Soft Closer then starts and finishes closes the vehicle door.

The drives for the Automatic Soft Closer are only connected to Terminal 30g and the Ground. These means that the drives are not diagnosable.

As the Automatic Soft Closer is not active until the door gap is 6 mm (in the prelocking position), no anti-trap protection is required.

Even if the door has been completely closed during the closing procedure, the drive turns over one more time to exclude the risk of false closing.

○ **Comfort Access**

Like the various BMW model series, the vehicle now has a Comfort Access system.

Comfort Access can be used to carry out the following functions:

- **Passive Entry**

Opening the vehicle or upper tailgate without actively using the ID transmitter

- **Passive Go**

Engine start without actively using the ID transmitter

- **Passive Exit**

Closing the vehicle without actively using the ID transmitter

Comfort Access is based on the comfort access system from the BMW 3 Series. By placing the hand in the recess behind the door handle, the vehicle can be unlocked and then opened.

By touching the sensitive surfaces of the door handle, the vehicle can be locked. With vehicles with Automatic Soft Closer, the drive for Automatic Soft Closer completely closes the vehicle door. The vehicle can then be locked by touching the sensitive surfaces of the vehicle.

New from 10/2007:

The optional extra "Comfort Access" can also be ordered for the Japanese market version. The remote control is enabled with a frequency of 315 MHz.

○ **Tailgate lift**

The electric tailgate lift is offered in the E70 from 10/07. For the first time, a system with spindle drive is being used.

The upper tailgate can be automatically opened or closed by pressing a button. The lower tailgate is opened as previously manually.

The opening angle of the tailgate can be predefined in 5 steps via a menu in the Central Information Display with the Controller. The tailgate is thereby raised only to the predefined angle.

The tailgate lift control unit (HKL) is installed in the luggage area on the right on the device carrier. The tailgate lift controls and monitors the action of the tailgate lift.

By pressing one of the tailgate buttons the tailgate is automatically opened or closed.

The tailgate button in the switch cluster of the center console is excepted from this. This switch can only be used for automatic opening.

○ **Power windows**

The power windows use the familiar technology.

The Car Access System (CAS) is the master control unit for the power window.

The functions of the power windows are:

- Opening and closing
- Opening and closing with one-touch control function.
- Auto-remote opening and convenience closing
- Indirect anti-trap function
- Panic mode
- Load deactivation at Terminal 50
- Overheating protection for power-window motors

The FRM (footwell module) actuates the power window

○ **Anti-theft alarm system**

The anti-theft alarm system warns of unauthorized access to the vehicle by an alarm.

The alarm can be acoustically and optically triggered.

In an activated condition, the anti-theft alarm system monitors the passenger compartment of the vehicle. In addition the engine compartment, the luggage compartment as well as the vehicle inclination are monitored.

The ultrasonic interior movement detector of the anti-theft alarm system is integrated in the Roof Control

Centre (FZD).

The emergency power siren with tilt alarm sensor is located in the front wheel housing. The Roof Control Centre (FZD) activates the emergency power siren via the K-Bus.

New from 10/2007:

Also in the European version in compliance with legal requirements a repeat alarm is being introduced.

○ **Door mirrors**

The door mirrors are offered in 2 versions.

As standard the door mirrors can be electrically adjusted. The door mirrors have a mirror heater.

Additional functions are available as optional extras:

- Folding in of door mirrors
- Electrochrome door mirrors
- Memory function, door mirrors
- Automatic parking function, door mirror, front-passenger side

The door mirrors are directly connected via the LIN bus to the footwell module (FRM).

○ **Door mirror camera**

- **Japan version only**

From the driver side a certain area of the front-passenger side cannot be viewed.

The view is obscured by the door mirror and the A-pillar. So that this area can still be viewed, the front-passenger door mirror is equipped with the door mirror camera.

The door mirror camera can be switched on or off by pressing the button in the center console switch cluster.

The picture from the door mirror camera is relayed via the video switch (VSW) to the Central Information Display (CID). The video switch is necessary as the Car Communication Computer (CCC) may require up to 20 seconds to boot up.

The opening angle of the door mirror camera along the vehicle transverse axis is about 130°. The opening angle of the door mirror camera along the vehicle longitudinal axis is about 90°.

○ **Reversing camera**

The reversing camera is designed to support the driver in driving into and out of parking spots as well as in maneuvering. A high resolution, wide angle image of the area behind the vehicle is taken (approx.

120°).

The reversing camera comes with a series of additional customer functions. These include: Lane guidelines, turning circle lines, obstacle markings, zoom for trailer hitch.

The reversing camera is accommodated in the handle strip in the tailgate offset to the right.

Depending on the travel speed (5 km/h) various picture sections are displayed in the vertical direction. This software function is described as virtual camera panning.

New from 10/2007:

An automatic video switch is being introduced.

The videomultiplexer is a hardware solution to switching between two video sources in the vehicle. The reversing camera is the master control device.

The slave is the DVD changer.

The signal changeover is controlled by the video signal arriving at the automatic videomultiplexer.

This means that the reversing camera can be offered in conjunction with the DVD changer even without the "TV function" optional extra.

o Park Distance Control

Park Distance Control (PDC) is a familiar technology.

The distance to obstacles is measured by 4 ultrasonic sensors in the rear as well as 4 in the front bumper. The acoustic distance signal is provided by loudspeaker in the tail and front of the vehicle. The closer the vehicle gets to the obstacle the greater the signal frequency.

With very close obstacles (approx. 30 cm) a constant tone is produced. The graphic distance signalling is produced by the Central Information Display CID.

The Park Distance Control can be switched on and off via a switch in the center console switch cluster.

In comparison with predecessor models, the following changes should be noted: new ultrasonic sensors and a new control device.

The reversing camera can be combined with the data that is available to the Park Distance Control. Thus obstacles that are identified by the Park Distance Control can be displayed in the realtime display of the reversing camera.

o Trailer module

The maximum load for the trailer hitch is 3.5 t (only ECE, not N52B30O1). The ball coupling can be

removed.

The trailer module (AHM) is connected to the body CAN (K-CAN).

In the U.S. version, the trailer hitch is offered as a retrofit.

The trailer stabilization control is activated in conjunction with the trailer hitch. This function is integrated in the chassis control system and recognizes the presence of a trailer when a plug is inserted in the trailer socket.

If the trailer begins to snake, all four wheels are automatically braked and the engine output is reduced.

This stabilizes the car-trailer unit in the shortest possible time.

○ **Panorama glass sunroof**

The Roof Control Centre (FZD) receives signals from other control units for the functions of the panorama glass roof.

The executive control unit is the Roof Control Centre. The FZD actuates the drives of the panorama glass roof. At the same time, the speeds of the drives is monitored. The following functions of the panorama glass roof are integrated in the Roof Control Centre:

- Reading in control requests
- Opening and closing the panorama glass roof and the sliding panel
- Anti-trap circuit
- Blocking protection
- Panic mode
- Load deactivation during the start-up procedure
- Locating lamp, terminal 58g
- Initialization

○ **Exterior lighting**

The exterior lighting comprises the familiar standard equipment as well as optional extras such as automatic headlight control, adaptive headlight or highbeam assistant.

New functions of the exterior lighting are:

- Turning light in the foglight, additional scope of the SA 524 "adaptive headlight"

During turning, an inside foglight is automatically activated that shines in the direction of turning via an additional reflector. The turning light is activated according to the parameters steering angle, driving speed and flashing. In the process, a segment of up to 90° is illuminated.

- Daylight driving lights via optoconductive rings

The daylight driving light is country-specific and is activated from Terminal 15 ON. The daylight driving light can be activated/deactivated via personal profile (not in U.S. version).

In the case of bi-xenon headlights, both the daylight driving light and the parking light are generated by an optoconductive ring illuminated from behind. A part of the lighting current is diverted via light conductors into the light conducting ring for the dipped beam headlight.

- Welcome light

Here, the side lights are switched on for a maximum of 20 seconds when the vehicle is unlocked. The switching time can be increased to up to 60 seconds via the personal profiles. The following light sources are actuated: Tail light, light conducting rings in the headlight, side markers, inside lighting, headlight coverage.

The FRM (footwell module) actuates the exterior lighting.

With the optional extras "Adaptive Headlight" or "Vertical Dynamic Management" the footwell module is also connected to the chassis CAN (F-CAN). This supports optimum adjustment of the adaptive headlight.

- **Mainbeam assistant**

The mainbeam assistant assists the driver to operate the mainbeam headlights.

With the aid of the mainbeam assistant, the headlight is automatically switched on and off in response to the traffic situation.

The mainbeam assistant recognizes approaching and preceding vehicles as well as built-up areas with continuous street lighting. By automatically switching off the mainbeam headlights in good time, the mainbeam assistant ensures that the occupants of oncoming vehicles, for example, are not dazzled by the headlights.

Benefits

- The mainbeam assistant assists the driver in operating the mainbeam headlights. This enhances the level of convenience for the driver.
- The mainbeam headlights are switched on more frequently by the mainbeam assistant than is the case with manually operated mainbeam headlights.
- The driver's field of vision is optimally illuminated. Driving in the dark, therefore, is rendered safer.

IMPORTANT: The driver retains full responsibility for all his/her actions, despite the assistance of the mainbeam assistant.

The mainbeam assistant merely assists the driver in the task of operating the mainbeam headlights. The responsibility for switching the headlight on and off in accordance with the traffic situation remains with the driver. The mainbeam assistant can be deactivated at any stage with the driving direction - mainbeam switch.

○ Adaptive headlights

The adaptive headlights turn the bi-xenon headlights towards the inside of a bend when cornering. This improves illumination of the curve of the road. Visibility is therefore improved. When cornering, the driver is not looking into a "black hole" - instead, the adaptive headlights allow the driver to see the curve of the road.

The AHL control unit actuates the adaptive headlights. For safety reasons, the AHL control unit is also responsible for the automatic headlight-range adjustment. This is because: Oncoming traffic may not be dazzled by the adaptive headlights.

If a headlight sticks in an unfavorable position, the AHL control unit will attempt to move this headlight down (using the stepper motors in the automatic headlight-range adjustment). The AHL control unit is connected to the PT-CAN.

The turning light is new.

The turning lights give the area next to the carriageway additional illumination when you are turning or cornering (driving in tight bends). The function is also active when you are parking. Depending on the country concerned, the turning lights are switched on when cornering.

The turning lights are implemented with the front foglights. (Reason: The installation location of the headlights is too high for the turning lights. This prevents the legal requirements from being observed.

Depending on actuation, the right-hand and/or left-hand front foglight is switched on. The turning lights are actuated by the light module (LM).

The front foglights have an additional reflector to improve illumination of the areas to the sides.

When turning, the front foglight on the inside of the turn is automatically activated. The additional reflector for the turning light reflects the light beam towards the turning area.

The turning light is not switched on suddenly but rather faded in according to special time parameters. Depending on the country concerned, the turning lights is switched on when cornering.

○ Interior lighting

The FRM (footwell module) actuates the interior lighting.

The internal lighting comprises the roof area, the luggage compartment, the footwell and the inside door lighting.

The area outside the doors is lighted by the exterior lighting (outside door handles) and the access lights.

The roof area is actuated by the footwell module via the Roof Control Centre (FZD) by bodywork CAN.

In the roof area on the passenger side as well as at the rear of driver side the internal lighting is equipped

with 2 separate lamps.

The two-section electrically lockable glove compartment is new. The glove compartment lighting is controlled and supplied via electronics in the locking drive.

○ **Roof control panel**

Prior to the introduction of the roof control panel, the wiring in the roof was extremely complex. Individual lines were required for the following functions:

- Interior lighting (front and rear)
- Sliding/tilting sunroof
- Anti-theft alarm system
- Lighting for vanity mirrors
- Electrochrome interior mirror with connection for electrochrome exterior mirrors
- Rain-light sensor or rain-light solar sensor
- Condensation sensor

The roof control panel is available in the Basic variant and the High variant. The roof control panel in the High variant is installed in conjunction with associated optional extras: e.g. sliding/tilting sunroof or with option 563 "Lighting kit".

The internal lighting comprises the roof area, the luggage compartment, the footwell and the inside door lighting.

The area outside the doors is lighted by the exterior lighting (outside door handles) and the access lights. The roof area is actuated by the footwell module via the Roof Control Centre (FZD) by bodywork CAN.

In the roof area on the passenger side as well as at the rear of driver side the internal lighting is equipped with 2 separate lamps.

The two-section electrically lockable glove compartment is new. The glove compartment lighting is controlled and supplied via electronics in the locking drive.

○ **Electrically lockable glove compartment**

The glove compartment with a two-section lid is new. The two-section lid can be electrically unlocked by pressing a button.

After unlocking, the lids are automatically opened by springs. This action is activated via a switch. The switch is installed below the central nozzle in the instrument panel.

Locking and unlocking can also be effected via the center-lock button.

All that is required to close the compartment is to push only one lid in the CLOSED direction. The other lid will then be automatically closed.

The lids snap in place in the final CLOSED position in the lock. A CD or DVD changer can be installed in the glove compartment according to the customer order.

So that the glove compartment can be opened when no power is available or if there is a fault, a manual unlocking option is available.

- **Head-up display**

The head-up display is a familiar technology.

The head-up display is used to display information relevant to driving the vehicle (e.g. navigation instructions, driving speed) in an ergonomically favorable position on the windscreen. Information appears as a virtual image apparently at the front end of the bonnet.

The following is new:

The driver can adjust the position of the image via the iDrive to his own requirements. The image position can be displaced by up to 30 mm upwards or downwards. A service function is now available in the BMW diagnostic system for adjustment of the head-up display (special tool no longer required).

The geometric representation of the head-up display can be adjusted with the service function.

- **Instrument cluster**

The instrument cluster features a typical BMW Design.

The permanent indicator and warning lights are centrally located between the two pointer instruments. There is no indicator lamp for spare fuel.

A check-control message indicates that the fuel reserve has been reached. There is an LC display between the two indicator instruments.

The following is new:

The test functions are no longer started at Terminal 15.

Test functions must be called up with terminal R, coming from terminal 30: Terminal 15 > Terminal R > Terminal 30 > Terminal R.

- **Steering Column Switch**

The SZL (steering column switch) recognizes the steering angle. In addition, the SZL recognizes the position of the steering column switches via optical sensors.

Switch pads are provided for the switches on the multifunction steering wheel and the various switches on the steering column.

The signals are read by the steering column switch.

The information from the switches and the steering angle sensor are in some cases processed by the steering column switch and relayed to other systems via the F-CAN.

In some cases, information is directly forwarded to other control units.

The following is new:

The steering wheel electronics are responsible for controlling steering wheel heating.

○ **Crash Safety Module**

Passive safety is ensured by a development of the Advanced Crash Safety Module (ACSM).

The Advanced Crash Safety Module is responsible for constantly monitoring all sensor signals so that it can recognize a crash situation.

On the basis of the sensor signals and their evaluation, the CSM recognizes the crash direction and the force of the collision.

Furthermore, it receives information about the occupants, e.g. whether these wearing belts or not. From this information, the system initiates appropriate measures for selective activation of the required restraint systems.

The following is new:

Under the provisions of the FMVSS (Federal Motor Vehicle Safety Standard, US version), the system must be able to distinguish between a relatively small person (5% woman) and a normal sized person (50% man) in the driver's seat.

The seat position detector indicates the longitudinal position of the driver's seat. This allows the system to recognize the distance between the person sitting on the driver's seat and the steering wheel.

The seat position signal influences the response of the adaptive belt force limiter and the delayed triggering of the 2nd stage of the gas generator (driver's airbag). The adjustment distance of the driver's seat is registered by Hall sensors in the drive and processed in the seat module.

The seat module emits a message on the K-CAN. The Crash Safety Module is joined to the K-CAN and the F-CAN buses.

Special sensors for recognizing rollovers are integrated in the crash safety module: Yaw rate sensor, longitudinal acceleration sensor, lateral acceleration sensor. Occupant safety is yet further increased by the rollover protection system.

The belt tighteners and head airbags are triggered by a certain severity of impact.

The direct networking with the Dynamic Stability Control (DSC) via the F-CAN means that any rollover can be predicted more precisely and rapidly.

From **10/2007** the E70 will be equipped with a crash-active head restraint (E71 from market launch).

The crash-active head restraint reduces loading of the cervical spine in a rear collision.

Depending on the seat position and the seat design, the distance between the head and the head restraint may be more than 100 mm.

In a rear collision the front part of the head restraint is moved almost instantaneously forwards by up to 60 mm by a spring drive.

Even before the head is thrown back by the rear impact, the crash active head restraint has already reduced the distance between it and the passenger's head.

The crash-active head restraint is pyrotechnically triggered by the Crash Safety Module (ACSM).

- **Wiper/washer system**

The vehicle is equipped with 2 front windscreen wipers and one rear window wiper. The headlight cleaning system is an optional extra. The wiper switch forms part of the steering column switch cluster (SZL).

The signals from the wiper switch are relayed by the steering column switch cluster via the F-CAN to the Dynamic Stability Control.

From the Dynamic Stability Control, the sign is transmitted via the PT-CAN to the junction box electronics (JBE). The JBE evaluates the signals and actuates the wiper motors.

The JBE recognizes the resting position of the wiper via the reset contact in the wiper motor.

- **Seats**

An extensive range of seat fittings is available for the vehicle. Basically, 3 different seat models are offered: Basic seat, sport seat, multifunction seat (comfort seat).

The front side airbag is integrated in the backrest of the driver and front passenger seats.

In the active seat, the seating cushion is electropneumatically activated instead of electrohydraulically as previously. The electropneumatic control means that the total weight of the seat can be reduced.

The backrests in the 2nd row are divided in two (60/40).

The locking of the 2nd seat row is monitored by several microswitches. These microswitches ensure that the seat once locked is not inadvertently or unexpectedly released.

This increases the protection of occupants against injuries.

For the first time, the E70 has a third seat row (7 seater, SA 4UB). These seats are not heated. However, a separate heating system is available for the third row.

○ **Climate control**

The heating/climate control system is a water regulated heating/climate control system. The performance of the system has been improved compared with that of the E53 with respect to cold output, heat output and comfort (air distribution and acoustics).

In principle, 3 versions of the heating/climate control system are available:

- IHKA Basic, integrated automated heat/climate control system (1-zone)
- IHKA High, integrated automated heat/climate control system (2-zone)
- IHKA High with automatic climate control system for rear seat FKA (4-zone)

FKA is the automatic rear seat climate control system and is a separate control device for the rear seat. This control unit supports individual heating/air-conditioning options for the passengers in the rear seats.

IHKA Basic supports uniform temperature setting, blower control and air vent control on the driver and front passenger sides. The entire passenger compartment is regulated according to these settings as a single zone (1-zone).

IHKA High supports separate settings on the left and right for temperature and vent control or control for driver and front passenger.

The passenger compartment is correspondingly regulated in 2 zones (2-zone).

The rear passengers also have the option of setting different temperatures on the right and left and can control the blowers in the back of the car separately by means of the optionally available automatic rear seat climate control system.

The passenger compartment is correspondingly regulated in 4 separate zones (4-zone).

A separate heating and ventilation system is also available for the optional 3rd row (E70 only).

Heating is provided in versions with diesel engines with a separate electrical heater based on the PTC principle.

If a parking heater system is installed, the electrical PTC heater is omitted in diesel versions.

Due to measures to reduce CO₂ emissions, the A/C compressors are installed with a magnetic coupling (not for N62B48O1).

○ **Parking heater**

The parking heater comprises the independent auxiliary heater and the associated components and power supply.

The parking heater is incorporated in the integrated automatic heating/climate control system (IHKA).

The main element of the new independent auxiliary heater is a Venturi burner. This optimizes the entire combustion process to make it considerably more efficient than compared to previous burner technology.

The Junction Box Electronics (JBE) controls the water valve to meter the coolant throughflow for the heat exchanger

The water valve operates electromagnetically and meters the coolant flow rate to the heating system heat exchanger as it is needed. This determines the air temperature used for heating the vehicle interior.

In the case of automatic air conditioning with separate adjustment for the driver and passenger sides, a duo water valve is installed on account of the left/right separation of the heat exchanger.

After starting, the parking heater runs in full-load operation. If the temperature in the heating circuit of the parking heater reaches approx. 80 °C it switches over to part-load operation.

New from 04/2007:

A new Telestart transmitter is being used.

The procedure for initializing this telestart transmitter has changed .

○ **Audio systems**

The following equipment is available for audio reception:

- Professional radio
- "Professional" navigation system

The Professional radio is fitted as standard. The standard equipment includes the iDrive with controller and Central Information Display (CID). The Professional Radio is available in 2 hardware versions with the same range of functions.

In the European version, a development of the familiar M-ASK is used. In the U.S. version, with CHAMP (Central Headunit and Multimedia Platform), the new platform for the central radio segment is used for the first time in BMW vehicles.

As the Professional Navigation System, a development of the Car Communication Computer (CCC) is available.

CCC, M-ASK and CHAMP are designated as headunits, as they act as masters in the MOST ring that synchronizes data transmission. In addition the head unit acts as an interface between K-CAN and MOST.

Radio Professional and Navigation System Professional provides 8 favorite buttons. In the U.S. version, 6 favorite buttons can be assigned with certain functions, two buttons are assigned fixed functions. In the European version, all 8 favorite buttons are assignable.

In addition to the reception of AM and FM stations, digital radio is also available. In the U.S. version, the satellite tuner (SDARS) and the digital tuner (IBOC) are offered.

In the European version Digital Audio Broadcasting (DAB) is available.

For the first time ever, a CD changer with a shaft is being offered in a BMW. This changer can accept 6 CDs that can be inserted in the device without the necessity of a magazine.

A DVD changer is offer for playing DVSDs. The combination of Top-HiFi amplifier and DVD changer supports multichannel audioformats such as "Dolby Digital" or "dts".

CHAMP, M-ASK, CCC, CD and DVD changers support the replay of compressed audio files.

A USB interface is offered in the vehicle in certain markets by means of the SA 6FL "USB Audio Interface". This supports the connection of a USB mass memory.

The mass memories can be operated via the iDrive and the audio data can be relayed via the vehicle loudspeakers.

○ **Navigation systems**

The navigation systems for the European and U.S. versions are integrated in the Car Communication Computer (CCC).

In Japan an independent MOST control unit is used for navigation. An independent MOST control unit is also installed for navigation in China or Korea.

The separate control units require the CCC as head unit. For the market launch in the USA and Canada, the Real Time Traffic Information (RTTI) warning service is being offered.

The RTTI signals are transmitted via FM. The service is controlled via the SA 6UH "Traffic Info for Navigation" and at present is include in the scope of functions of the SA 609 "Navigation System Professional".

In the European versions, the TMC (Traffic Message Channel) is used for traffic radio messages.

If SA 612 "BMW Assist" is installed and activated in the vehicle, VInfoPlus (VI+) can also be selected as the traffic information channel.

Compared with TMC, VI+ provides more accurate traffic information because of its higher update rate and the use of other traffic sensors.

In the Japanese version, an independent traffic information in the form of VICS (Vehicle Information and

Communication System) is used.

CHAMP, M-ASK, CCC, CD and DVD changers support the replay of compressed audio files.

A USB interface is offered in the vehicle in certain markets by means of the SA 6FL "USB Audio Interface". This supports the connection of a USB mass memory.

The mass memories can be operated via the iDrive and the audio data can be relayed via the vehicle loudspeakers.

The interface box High (ULF-SBX-H) is installed with the 6FL "USB audio interface".

○ **Television**

The television allows motion pictures to be displayed on the screen and the reproduction of the associated sound information via the audio system.

In the Central Information Display (CID) television or videos from DVD (Digital Versatile Disc) can be viewed.

For safety reason, the TV picture is replaced during journeys with a notice.

The following optional extras are available ex-works:

- SA 601 "TV Function" in conjunction with SA 609 "Navigation System Professional"
- SA 602 "On-board monitor with TV" without SA 609 "Navigation System Professional"
- SA 696 "DVD changer 6-fold"

Depending on the country-specific version, the Hybrid video module (VM-Hybrid) or the 5 (VM5) video module are used.

The VM-Hybrid is designed to receive digital and analogue TV signals, the VM5 to receive analogue TV signals.

For color TV systems, there are basically three different standards in use worldwide:

- PAL
- NTSC
- SECAM

The above color TV systems are supported by the video modules. The appropriate television system is selected via the country-specific settings.

These settings can be changed by the customer.

With the aid of the DVD changer and a suitable DVD it is possible, besides showing films, to display and

operate interactive media such as travel guides, reference works, catalogues etc.

Multichannel audioformats are supported in conjunction with the Top-HiFi amplifier.

○ Rear Seat Entertainment

With the SA 6FF "DVD system in the rear seat" an entertainment system for the back seats is offered as an optional extra ex-works. The (Rear Seat Entertainment = RSE control unit) offers the following functions:

- Remote control
- Playing of CDs or DVDs via the DVD drive
- Confirmation of settings made to the Rear Seat Entertainment as well as display (CDs, DVDs, photos) via an 8 inch TFT color monitor (rear seat display)
- Audio relay via the vehicle loudspeakers or cable-connected headsets
- Audio replay via headsets with infrared transmission

The infrared transmitter is integrated in the rear seat display.

- Connection for external devices (e.g. video camera, games console)
- TV in rear seat

TV reception in the rear seat is also possible through the use of the headset module from 09/2007 and in conjunction with the SA 601 "TV Function" or SA 602 "On-board monitor with TV".

The headset module (KHM) performs the following function:

To convert the TV sound for the Rear Seat Entertainment (RSE), that is sent as an optical signal to the MOST bus into an analogue signal

TV reception in the rear seat is only possible with the headset module (KHM).

The Rear Seat Entertainment is functionally independent of other entertainment sources available in the vehicle.

Via iDrive, the Rear Seat Entertainment can be enabled or locked in the menu "Settings". The RSE control unit can be activated via the K-CAN.

The pictures shown in the rear seat display are all generated in the RSE control unit.

All picture information is transmitted from the RSE control unit via the LVDS datalink to the rear seat display.

The RSE control unit can be switched on from Terminal 30g ON.

After Terminal R OFF, the RSE control unit can be switched on within the follow-up time (approx. 30

minutes).

○ **Telephone systems**

With the SA 644, the new telephone control unit interface box (ULF-SBX) is being introduced.

The ULF-SBX is a functional development of the universal and freespeaking device (ULF) familiar from other BMW models.

The interface box High (ULF-SBX-H) operates in the U.S. version solely the SA 6FL "USB audio interface".

In all other markets the telephone function is also available via the ULF-SBX-H.

For the U.S. version from 04/2007 a development of the Telematic Control Unit (TCU) for the SA 639 "Complete Preparation Cellphone USA/CDN including telematics" is installed.

New telematic functions in the U.S. version include:

- Remote door unlock: remote control unlocking of doors

The vehicle unlocking feature is activated by the service provider ATX on behalf of the customer.

- Stolen vehicle recovery: locates stolen vehicles

The service provider ATX can be given the job of locating the vehicle's position.

In the European version the familiar TCU is installed as the SA 633 "Mobile Preparation Business with Bluetooth Interface".

The use of a development of the TCU for the SA 633 is planned for 04/2007.

In order to support customers in connecting their own mobile phones, a connecting assistant has been introduced. The connecting assistant accompanies the connecting procedure with extended menus in the Central Information Display (CID).

The specified scope of functions is only achieved with Bluetooth-compatible mobile phones recommended by BMW. A list of the currently recommended Bluetooth-compatible mobile phones can be obtained via various applications (e.g. PuMA or ASAP).

○ **Voice input**

Voice input is available in the Basic and High versions.

The basic voice input is used to operate the telephone and the talking directory. Basic voice processing is available when no SA 620 "voice input system" is installed but one of the following optional extras:

- SA 633 "Mobile Preparation Business with Bluetooth Interface"
- SA 639 "Complete Preparation Cellphone USA/CDN inclusive Telematics"
- SA 644 "Mobile Preparation Business with Bluetooth Interface"

The Basic voice input is implemented in the telephone control unit.

The High voice input is offered as the optional extra 620 "Voice input system". If a vehicle is equipped with the SA 609 "Navigation System Professional" the SA 620 is implemented in the Car Communication Computer (CCC).

If the vehicle is not equipped with CCC, the SA 620 can still be ordered from 09/2007. In that case the High voice processing is integrated in the High interface box (ULF-SBX-H). There is no automatic connection to the telephone function.

If the TCU (Telephone function) and ULF-SBX-H (voice input) are both installed in the vehicle then the microphone is connected to the TCU.

○ **iDrive**

The head unit can be the following control unit.

- Car Communication Computer (CCC)
- Multi-audio system controller (M-ASK)
- Central Headunit and Multimedia Platform (CHAMP), U.S. version only

The new color display is integrated in the instrument panel without double binnacles. In comparison with the predecessor, the Central Information Display is however placed in a more ergonomically favorable position in the primary viewing range of the driver.

Thus even while the driver looks at the display he can also take in the ongoing traffic situation. The display has been designed to be clear, simple and user-friendly.

Colors and typography have been adjusted to optimize their readability and contrast in all environmental conditions (e.g. brightness).

8 favorite buttons facilitate rapid and safe operation. Frequently used functions can be saved on these and accessed at any time.

For example, telephone numbers or navigation goals can be stored as functions.

Also entertainment sources such as radio stations or CDs can be directly selected. In the U.S. version 2 buttons are permanently assigned for switching between AM/FM and the individual audio sources.

Functions are saved by keeping the buttons pressed down, functions are called up by pressing the button. The buttons are touch sensitive to enable a preview of the function assignment before the function is actually activated.

- **BMW TeleServices**

The intelligent networking between the vehicle and BMW Service has now been extending, thus offering even greater convenience:

The BMW Group is the only car maker that offers the automatic BMW TeleService Call, by which the vehicle automatically reports a service requirement to the BMW Service Partner. The option of manually activating the BMW TeleService Call is still available.

This is useful, when for example a driver would like to arrange a special service date for a tire change.

The following is new:

The driver can now get into direct contact with the BMW Breakdown Service and initiate a BMW TeleService Diagnosis.

In the process in addition to the Based Service data (CBS), any existing fault messages in the vehicle are transmitted.

The specialist from the BMW Breakdown Service thus has more possibility to determine the cause of a fault and to initiate appropriate measures to rectify it.

The specialist can then decide whether the operability of the vehicle can be restored by BMW TeleService remotely or other measures are required.

Subject to change.

INTERIOR MIRROR WITH DIGITAL COMPASS : E70, E71, E82, E83, E88, E90, E91, E92, E93



Fig. 3: Identifying Interior Mirror With Digital Compass
Courtesy of BMW OF NORTH AMERICA, INC.

Introduction

A digital compass in the interior mirror is offered as an optional extra (option 4NA) for the following BMW vehicles: 1 Series (only E82, E88), 3 Series, X3 and X5.

- **Up to 09/2006**

A small LC display at top right in the interior mirror indicates the point of the compass in which the direction of travel is pointing: e.g. **SW** for South West.

- **from 09/2006**

The display is effected with transmitted light technology. An LC display (window) is no longer needed. The display can be deactivated.

The compass offers an additional benefit especially in the USA. In large cities the streets are frequently arranged according to the points of the compass. The points of the compass are also marked on signposts.

The compass also makes orientation in European cities easier.

- **E88, E93 from 09/2008**

The digital compass must be calibrated once with the soft top or retractable hardtop closed, and once with the soft top or retractable hardtop open.

The position of the soft top or retractable hardtop has an effect on the magnetic field in the vehicle. A deflected magnetic field will lead to calibration errors.

Brief description of components

The following components deliver signals for the digital compass:

- **Magnetic field sensor**
 - **up to 09/2006**

The magnetic field sensor is installed in the mirror base. The magnetic field sensor measures the current alignment of the magnetic field. The signal is sent to the control electronics for the compass in the interior mirror.

- **from 09/2006**

The magnetic field sensor is on the PCB in the interior mirror.

- **Control electronics for the compass**

The interior mirror is electrically connected to the roof control panel (FZD).

The control electronics for the compass are integrated into the board for the interior mirror. The signals from the magnetic field sensor are received by the control electronics. The LCD display is activated directly by the control electronics.

The following components are controlled:

- **Display in interior mirror**
 - **up to 09/2006**

The LC display (window) is situated at top right in the interior mirror.

The points of the compass are presented digitally on the LCD display (LCD: Liquid Crystal Display). The display is divided into eight compass points.

- **from 09/2006**

The point of the compass is displayed in transparent light technology in the interior mirror as well. The display is also at the top right in the interior mirror. The display is divided into eight compass points.

System functions

The following system functions for the digital compass are described:

- Display
- Brightness control of display
- Adjustment of magnetic field zones and calibration
- from 09/2006: Further adjustments
- up to 09/2006: Fault display

Display

The 8 points of the compass are digitally displayed by abbreviations.

- **from 09/2006**

The display is available in English and German (delivery status: English LHD)

N: North

NE: North East Nordosten)

E: East Osten)

SE: South East Sudosten)

S: South

SW: South West

W: West

NW: North West

The changeover between displays is carried out as follows:

- The current vehicle position is the center of a 360° circle.
- The eight points of the compass divide these 360° into sixteen 22.5° segments.
- The display changes over if the direction of travel changes by more than 22.5°.

Brightness control of display

2 photodiodes in the electrochromic interior mirror record the surrounding brightness (1 photodiode for the surrounding brightness coming from the front, 1 photodiode for the surrounding brightness coming from the rear).

The photodiodes deliver the signals for the display brightness control.

The brightness of the display is adjusted by the interior mirror control electronics to suit the surrounding brightness.

- E88, E93

A darkened interior mirror will become lighter while the soft top or the retractable hardtop is opening and closing.

The overhead control panel (FZD) transmits the signal (roof open or closed) to the control electronics for the interior mirror. The signal is transmitted on the wire that is also used for transmitting the signal for driving in reverse.

Adjustment of magnetic field zones and calibration

The worldwide magnetic field zones are permanently stored in the interior mirror. The magnetic field zones represent the deviations in relation to an ideal magnetic field for earth. The orientation "North" is precisely determined by the magnetic field zones.

The current magnetic field zone may be adjusted according to the geographic location. For example, Germany is located in magnetic field zone "8".

A vehicle has its own magnetic field. This makes it possible for the magnetic field sensor to measure an overlapping of the magnetic field with the earth's magnetic field. This overlapping is "worked out" by calibrating the compass.

A changed magnetic field is normally calibrated "automatically".

The vehicle's magnetic field may change under the following special circumstances:

- Powerful vibration during an accident
- Very large external magnetic field - e.g. if a vehicle passes under a train when travelling through an underpass

However, a manual calibration may speed up the automatic calibration.

from 09/2006: Further adjustments

Different time-based adjustment menus can be obtained by means of the adjustment button:

- 0 to 3 seconds: Display ON/OFF
- 3 to 6 seconds: Adjustment of magnetic field zones (0 - 15)
- 6 to 9 seconds: Calibration (C)
- 9 to 12 seconds: Left-hand drive or right-hand drive (L or R)
- 12 to 15 seconds: English or German (E or O)

Release the adjustment button when the correct menu is obtained. Select values in the menu by pressing briefly.

After approx. 5 seconds the value is stored and the menu is automatically exited.

up to 09/2006: Fault display

The LC matrix for the LCD display lights up completely if a system fault develops. A fault is displayed under the following conditions:

- If the vehicle is highly magnetized (2,200-2,500 milligauss), the measuring range of the magnetic field sensor will be exceeded.
- If a fault develops in the circuitry of the magnetic field sensor.

NOTE: regarding the physical unit "gauss".

Gauss is the unit of measurement for magnetic flux density.

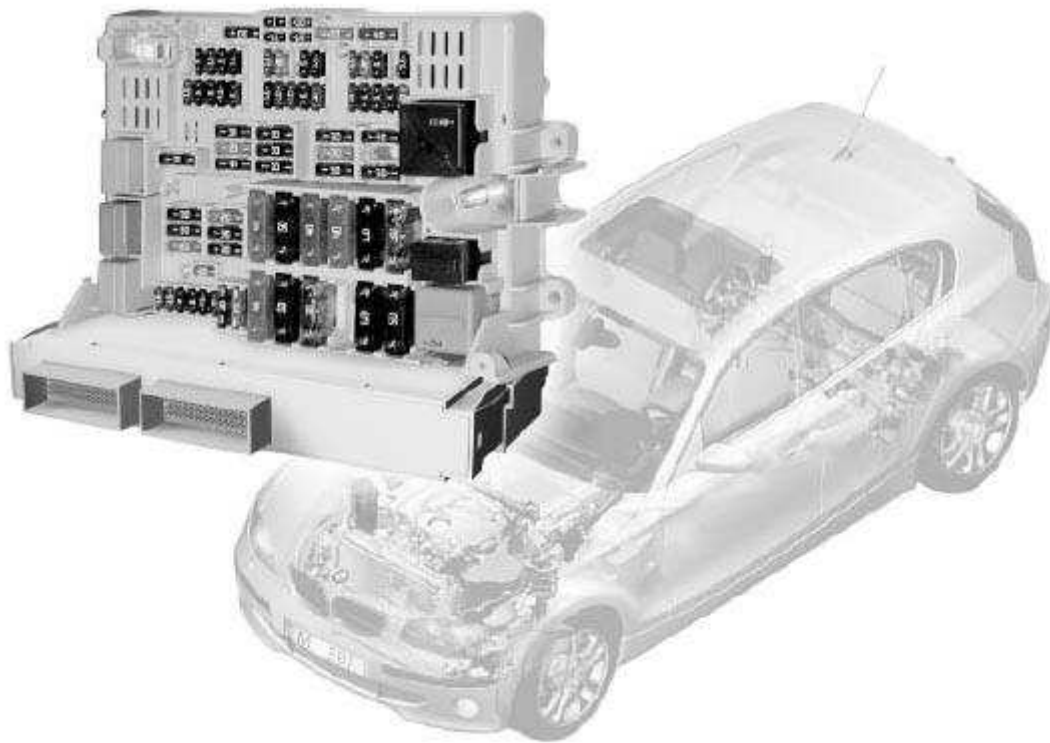
Preconditions for activation

At terminal 15 ON, the display is activated with a test run.

- **up to 09/2006**

During this process, the LC matrix lights up completely (approx. 3 seconds). The digital compass is then switched on. There is no switch for turning off the LCD display at terminal 15 ON.

JUNCTION BOX : E70, E71, E81, E82, E87, E88, E90, E91, E92, E93



TE104055

Fig. 4: Identifying Junction Box

Courtesy of BMW OF NORTH AMERICA, INC.

Introduction

On the BMW 1-Series, 3-Series and on the BMW X5, the junction box assumes a central role in the vehicle. In the junction box, the distribution box and the junction box electronics form a single unit.

The junction box electronics is the central gateway in the vehicle.

- E70, E71:
- E81, E82, E87, E88:
- E90, E91, E92, E93:

Brief description of components

The junction box consists of the distribution box and the junction box electronics.

○ JBE: Junction box electronics

The junction box electronics unit combines numerous functions in a single control unit. The junction box electronics unit is connected via 4 plug connections.

A 54-pin connector connects the instrument panel. Two further connectors are for the connection on the main wiring harness. These connectors are 54-pin and 47-pin. A 23-pin internal connection directly

connects the junction box electronics to the power distributor.

○ **Electrical distributors**

The fuses and various plug-in relays are located in the junction box distribution box. The boards in the distribution box are connected to various relays, depending on the equipment specification. There is an opening in the lower section of the junction box. The junction box electronics unit is connected with the distribution box through this opening.

NOTE: **For current details about the pin assignment and fuse assignment of the junction box electronics and the power distributor, please refer to the BMW diagnosis system**

Different versions of the power distributor are fitted, depending on the model series and Model Year measures. For example, the complete fuse assignment may change as part of Model Year measures.

- 03/2007 Model Year measure (not E70, E71):

primarily changes to pin assignment

- 09/2007 Model Year measure (not E70, E71):

primarily changes to fuse assignment

Depending on the vehicle equipment, various relays are mounted on the boards in the power distributor.

System functions

Numerous functions are provided in the junction box electronics (JBE). For example, the junction box electronics unit processes multiple signals, which it makes available to other bus subscribers on the electrical system. It also performs control tasks.

Depending on the model series and equipment, the following functions can be controlled or signals detected by the junction box electronics:

○ **Gateway**

The junction box electronics unit enables a number of bus systems to communicate with one another. The junction box electronics unit provides the gateway function for the following bus systems:

- Body CAN
- Powertrain CAN
- Diagnosis wire or D-CAN (diagnosis-on CAN)

The chassis CAN (F-CAN) is connected to the junction box, but is merely looped through.

After waking, the gateway is ready to send messages to the corresponding bus systems within 20 ms.

○ **Power windows**

The footwell module (FRM) and the junction box electronics (JBE) control and monitor the power windows.

The junction box electronics detects the following signals and makes them available to other bus subscribers:

- Power window switch, front passenger door
- Power window switch, rear door on the front-passenger side
- Power window switch, rear door on the driver's side
- Hall sensor, rear door on the driver's side
- Hall sensor, rear door on the front-passenger side

The junction box electronics unit controls the following actuators:

- Power window drive, rear door on the front-passenger side
- Power window drive, rear door on the driver's side

○ **Wiper/washer system**

The junction box electronics unit detects the following signals and makes them available to other bus subscribers:

- Reset contact, front
- Reset contact, rear

The junction box electronics unit controls the following actuators:

- Wiper relay for wiper stage 1 and 2
- Wiper relay for rear window
- Windscreen washer pump relay for headlamp wipe/wash unit

○ **Central locking system**

The junction box electronics (JBE) is the executing control unit for the central locking system. The junction box electronics assume the task of actuating all central-locking system drives. The following control combinations are possible:

- Selective unlocking
- Deadlock release
- Locking
- Unlocking and deadlock release
- Deadlocking

The boot lid lock is activated via its own output stage.

○ **Climate control**

The junction box electronics (JBE) detect the following signals and makes them available to other bus subscribers:

- Sensor for automatic air recirculation mode
- Refrigerant pressure sensor
- Rear stratification control

The junction box electronics unit controls the following actuators:

- Additional coolant pump
- Control valve for air-conditioning system or magnetic coupling
- Water valve (depends on engine equipment)

○ **Seat heating**

A seat heating module or the more advanced driver's seat module can be fitted for the seat heating. A seat module is always fitted with seat memory.

The junction box electronics unit (JBE) sends a request to check whether a seat module has been fitted. If the junction box electronics unit does not receive a confirmation, the JBE will take over control of the seat heating. The junction box electronics generate a pulse-width-modulated signal. This signal is used to control the seat heating module.

If a seat module has been fitted, the seat heating is controlled directly by it.

○ **Mirror heating and heated washer jets**

The junction box electronics (JBE) control the following actuators:

- Basic variant of mirror heating
- Heated washer jets

If a mirror memory has been fitted, the LIN bus takes over control of the footwell module (FRM).

○ **Bistable relay**

The bistable relay is used to shut down terminal 30g-f if there is a closed-circuit current fault. Similar to the micro power module (MPM), e.g. for E60 before 09/2005.

The relay is built in for certain options only (e.g. CCC, M-ASK, TCU, ULF). If a bistable relay is fitted, an intelligent battery sensor will also be fitted.

○ **Functions for instrument cluster**

The junction box electronics unit detects the following signals for the instrument cluster:

- Fuel level sensor 1
- Fuel level sensor 2
- Coolant level
- Parking brake warning switch
- Washer fluid level
- **Lock for second row of seats**
 - E70

The junction box electronics (JBE) monitor the locking of the second row of seats.

A total of 5 microswitches are fitted in the second row of seats. The microswitches are used to verify that the second row of seats is correctly locked. The microswitches are wired in parallel directly with the junction box electronics.

When the second row of seats is correctly locked, a signal is sent to the junction box electronics. If the signal is not received, the second row of seats is not correctly locked. The junction box electronics sends a message on the body CAN. The instrument cluster emits a Check-Control message.

- **DTC button**

The junction box electronics unit detects signals from the DTC button.

- **Parking brake warning switch**

The junction box electronics unit detects signals from the parking brake warning switch.

- **Roller sunblind for rear window**

The junction box electronics actuates the drive for the roller sunblind.

- **Servotronic valve**

On vehicles with Servotronic, the junction box electronics actuates the Servotronic valve (only on vehicles without option 217 "Active Steering").

Cable connector

As well as its electronic function, the junction box electronics unit (JBE) also has a connector function. Many of the wires from the 4 connectors that are connected to the junction box electronics are linked via the junction box electronics. The connections optimize the wiring harness. Here, the junction box electronics work as a node.

Junction box electronics relays

The junction box electronics unit (JBE) has internal and external relays. The excitation coils on all relays are

permanently supplied with a positive cable. The positive power supply for the external relays is provided via the load circuit which is to be switched through. The positive power supply for the internal relay is provided via the fused junction box electronics supply wire. All relays are controlled via the negative lead. All internal relays and the relay for wiper stage 1 and wiper stage 2 are located downstream of the fuse on the current circuit. All other external relays on the junction box electronics are located upstream of the fuse on the current circuit.

The internal relays are:

- Relay for power window drive, rear
- Relay for central-locking drive (except tailgate)

The external relays are:

- Relay for drive, rear window wiper
- Relay for drives, wiper stage 1 and wiper stage 2
- Relay for headlight washer system
- Relay for heated rear window
- Bistable relay (deactivation of closed-circuit current fault)

STEERING COLUMN SWITCH : E70, E71, E81, E82, E87, E90, E91, E92, E93



Fig. 5: Identifying Steering Column Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Introduction

For the first time on a BMW, the E87 steering column switch cluster (SZL) will optically record the steering angle and the positions of the steering column stalks.

With a conventional steering column stalk the electrical contacts are mechanically switched and thus influence the pressure points felt by the driver.

The benefit of optical monitoring is that it allows these pressure points to be more precisely defined. In other words, optical monitoring greatly reduces the level of mechanical influence.

- E70, E71:
- E81, E82, E87, E90, E91, E92, E93:

The steering column switch cluster (SZL) has the following tasks:

- Measuring the steering angle and steering-angle speed
- Picking up signals from controls in the multi-function steering wheel via coil springs
- Picking up signals from the steering column stalks
- Sending data as CAN messages on the BUS or via direct wires
- Looping signals through (e.g. driver's airbag and horn)

Brief description of components

The steering column switch cluster (SZL) is connected to the vehicle wiring harness via 2 plug connectors.

The steering column switch cluster consists of the following components:

- **Evaluation electronics**

The evaluation electronics analyze the signals from the components and send them as CAN messages on the F-CAN.

The evaluation electronics include the following components:

- Microprocessor
- Power supply
- F-CAN connection
- Interfaces for optical and electrical input signals

- **Steering-angle sensor**

The steering-angle sensor optically detects the steering angle turned at the steering wheel by means of an encoded disc.

The data is read and analyzed by the evaluation electronics. The data is transmitted directly to the DSC via the F-CAN. (F-CAN = Chassis CAN; DSC = Dynamic Stability Control.)

Signal path:

SZL -> F-CAN -> DSC

○ **Steering column stalk**

The lever positions of all steering column stalks are optically monitored.

The actions of pressing the buttons, turning the thumbwheels and pressing the rocker switches are detected by switching mats. The switching mats forward the position of the buttons and thumbwheels as voltage signals.

Depending on the vehicle's equipment, the steering column switch cluster (SZL) could have the following steering column stalks:

- Wiper/washer switch

The switch signals are read into the steering column switch cluster where they are evaluated. The evaluated switch signals are emitted onto the F-CAN as a CAN message (It is only possible to check the switch positions with the BMW diagnosis system via DSC as the steering column switch cluster is not directly connected to the diagnosis system).

- Cruise-control system steering column stalk

The switch signals are read into the steering column switch cluster where they are evaluated. The evaluated switch signals are emitted onto the F-CAN as a CAN message (It is only possible to check the switch positions with the BMW diagnosis system via DSC as the steering column switch cluster is not directly connected to the diagnosis system).

- Turn-signal/main-beam switch

The switch signals are read into the steering column switch cluster where they are evaluated. The evaluated switch signals are resistance-encoded and transmitted from the steering column switch cluster by direct wires to the FRM (footwell module).

The signals for the on-board computer functions are transmitted by a direct wire to the instrument cluster (KOMBI).

○ **Coil spring cassette**

The coil spring cassette has the task of transferring electrical signals to or from the steering wheel.

The signals are transferred as follows:

- Airbag unit (signals to steering wheel)

Signal path:

MRS control unit -> SZL (signal simply looped through) -> Coil spring -> Airbag unit

- Horn (signal from steering wheel)

Signal path:

Horn switch -> SZL (signal simply looped through) -> Junction box

- Multifunction buttons (signal from steering wheel)

Signal path:

Multifunction buttons -> SZL -> F-CAN -> Junction box electronics (signal simply looped through) -> F-CAN -> DSC control unit (serves as gateway) ->

PT-CAN -> Junction box electronics (serves as gateway) -> K-CAN -> Audio system

(check switch positions with BMW diagnostic system using DSC)

The control units involved in the functions of the steering column switch cluster are as follows:

- **DSC: Dynamic Stability Control**

The steering column switch cluster (SZL) does not have its own fault memory. All fault data for the steering column switch cluster are stored in the DSC control unit.

The DSC is connected to the steering column switch cluster via the F-CAN (chassis CAN).

- **JBE: Junction box electronics**

The junction box electronics unit is the data interface (= gateway) between the K-CAN and the PT-CAN. (K-CAN = Body CAN; PT-CAN = Powertrain CAN).

Signals from the F-CAN (Chassis CAN) are simply looped through. This means: Signals from the F-CAN are not received or evaluated by the junction box electronics. The F-CAN cables are simply routed through the junction box housing.

The junction box consists of the junction box electronics and the electrical distribution center.

- **FRM: Footwell module**

The footwell module controls the vehicle lighting. The footwell module is connected to the steering column switch cluster (SZL) by direct wires.

- **CAS: Car Access System**

The Car Access System reactivates the control units on the PT-CAN via the wake-up wire (terminal 15 wake-up).

- **KOMBI: Instrument cluster**

Information on the on-board computer functions can be called up via the on-board computer button (BC button) and the rocker switch. (The BC button and the rocker switch are integrated into the turn-signal/main-beam switch).

The contents are displayed in the LCD display in the instrument cluster.

The signals for the on-board computer functions are transmitted by a direct wire from the SZL to the instrument cluster.

System functions

The steering column switch cluster (SZL) comprises the following functions:

- Monitoring of steering angle and steering-wheel turns
- Monitoring of signals from coil spring cassette
- Reading of signals from wiper/washer switch and cruise-control system steering column stalk and output of signals on the F-CAN
- Reading of signals from turn-signal/main-beam switch and resistance-encoded output of signals to the FRM
- Reading of signals from the BC switch for on-board computer function and from the rocker switch (on turn signal/main-beam switch) and resistance-encoded output of signals to the instrument cluster
- Self-diagnosis (fault memory in DSC)

Monitoring of steering angle and steering-wheel turns

The steering column switch cluster (SZL) records the following information for the DSC functions:

- Steering angle
- Steering-angle rate
- Steering-wheel turn

The relative steering angle gives the angular position of the steering wheel. A steering angle of $\pm 180^\circ$ can be measured. The information always remains stored, even when there is no current applied to the steering column switch cluster.

Zero calibration must be performed with the BMW diagnosis system in the following cases:

- Replacement of SZL (steering column switch cluster)
- Coil spring cassette replacement
- Replacement of DSC control unit
- Working on the steering

Information about steering-wheel rotations

The signal from the steering-angle sensor is repeated every 360° . These signal repetitions are used to count the

number of turns of the steering wheel.

The steering column switch cluster has a permanent power source via terminal 30. This allows steering wheel movements to be detected even when the ignition is OFF.

Following a power interruption, the information about the number of turns of the steering wheel is lost.

When a journey is started, the steering column switch cluster will again measure the number of turns of the steering wheel.

If this process has not been completed when a speed of approximately 25 km/h has been reached, the DSC indicator and warning light will light up (repeat the process by restarting).

During measurement, the steering column switch cluster uses various pieces of information, including data from the wheel-speed sensors on the front wheels.

Not all signals are processed in the steering column switch cluster. Some signals are simply looped through the steering column switch cluster (e.g.: driver's airbag, on-board computer function, horn).

Information is transmitted via the F-CAN (Chassis CAN) or via direct wires to the systems or affected control units.

The steering column switch cluster (SZL) is activated:

- From the outside via the wake-up wire (terminal 15 wake-up) with bus activation (e.g. when the driver's door is opened)
- From the inside by steering wheel movements

(without bus activation, only for internal evaluation of the steering angle)

- From the inside by movement of the turn-signal/main-beam switch

(without bus activation, SZL is only active as interface to FRM, e.g. when park lights are switched on)

FOOTWELL MODULE : E70, E71, E81, E82, E87, E90, E91, E92, E93



76104056

Fig. 6: Identifying Footwell Module

Courtesy of BMW OF NORTH AMERICA, INC.

Introduction

The footwell module (FRM) is an electrical node point in the footwell on the driver's side. The footwell module picks up the signals from the doors and controls the lighting. The footwell module also controls the adaptive headlights. The footwell module is also the interface to the dashboard.

NOTE: System description of adaptive headlights.

There is a separate system description for the adaptive headlights.

Brief description of components

The following components supply signals for the footwell module:

- Ride-height sensors
- Reversing light switch
- Brake light switch
- Hazard warning lights switch
- Light switch

- Driver's door switch block
- Door contacts in rear doors
- Door contacts in front doors
- Driver's door lock

Several control units are involved in the lighting: In a stricter sense, the following control unit are involved in the lighting system (in alphabetical order):

- **ACSM/MRS: Crash safety module/multiple-restraint system**
 - E81, E82, E87, E90, E91, E92: Multiple restraint system
 - E70, E71, E93: (ACSM stands for "Advanced Crash Safety Module", also known as the crash safety module)

The footwell module is connected to the crash safety module/MRS control unit via the K-CAN.

In the event of an accident with corresponding severity, the footwell module automatically switches on the interior light hazard warning lights.

- E92

The crash safety module transmits a message about the status of the front-passenger seat-occupancy detector on the K-CAN.

The belt feeder on the front-passenger side is only actuated if the front-passenger seat is occupied.

- **AHM: Trailer module**

The trailer module sends a signal indicating whether or not the vehicle is towing a trailer. The trailer module controls the trailer lighting.

When a trailer is being towed, the trailer module automatically deactivates, for example the rear Park Distance Control (PDC) and the rear foglight on the vehicle.

The automatic parking function is deactivated whenever a trailer is detected. (Automatic parking function: To improve the view of the curb, the mirror glass is folded downwards when reverse gear is engaged. This brings the area close to the bottom of the vehicle, i.e. the curbside, into view when parking.)

The trailer module (AHM) is connected to the footwell module via the K-CAN.

- **DSC: Dynamic Stability Control**

When cruise control is in operation, the brake lights are actuated during automatic braking (legal requirement). To this end, a signal must be sent from the DSC to the accelerator pedal module via the PT-CAN.

○ **FLA: Main-beam assistant**

In accordance with the traffic situation, the main-beam assistant sends a switch-on recommendation or a switch-off recommendation for the main-beam headlights to the light module or footwell module (FRM). On the basis of this recommendation and various other the input variables, the footwell module decides whether the main-beam headlights should be switched on or off.

○ **FRM: Footwell module**

The footwell module is connected to the vehicle with three connectors.

Two 51-pin connectors connect the main wiring harness. A further 26-pin connector is provided for the connection to the dashboard.

○ **FZD: Roof control panel**

The roof control panel is responsible for the interior lighting components in the roof area.

The basic variant of the roof control panel does not have its own control unit. The front interior lights and the rear interior lights are actuated by the footwell module (FRM).

The High variant of the roof control panel has its own control unit: the FZD control unit.

The footwell module is connected to the FZD control unit via the K-CAN.

○ **JBE: Junction box electronics**

The luggage compartment lights and the glove compartment lighting are connected to the junction box electronics.

○ **LDM: Longitudinal dynamics management**

In conjunction with the LDM, the option "Active Cruise Control" uses the "turn signal" signal from the footwell module to help when changing lanes. In other words, if a left turn signal is given before overtaking, the distance to the vehicle in front is reduced. The vehicle to be overtaken is "ignored" more easily. Conversely, when you move back into the right lane, vehicles being driven there will be monitored more quickly.

○ **RLS/RLSS: Rain-light sensor/rain-light solar sensor**

- E81, E82, E87, E90, E91, E92, E93: Rain-light sensor
- E70, E71: Rain-light solar sensor

The rain-light sensor measures the ambient brightness outside the vehicle.

Depending on the ambient lighting conditions, the footwell module will switch the driving lights on or off. To do this, the automatic driving lights control must be activated (light switch in switch position "A").

- In twilight conditions, the rain-light sensor sends the message "Twilight". The footwell module switches the driving lights on. The automatic headlight-range adjustment for the dipped-beam headlights is actuated.
- In darkness, the rain-light sensor sends the message "Darkness". The adaptive headlights are then activated when the vehicle is cornering.

○ **SZL: Steering Column Switch**

The switch signals from the turn-signal/main-beam switch are picked up and evaluated by the SZL. The evaluated switch signals are resistance-encoded and transmitted from the SZL by direct wires to the footwell module.

The following components are controlled:

- Exterior mirrors
- Power window drive
- Headlights
- Rear lights
- Front foglights
- Additional brake light
- Auxiliary turn signal light
- Courtesy lighting, front
- Courtesy lighting, rear
- Licence-plate light
- 2 stepper motor controllers for the adaptive headlight stepper motors
- 2 belt feeder controllers (E92 only)

Belt feeder controllers (E92 only)

The footwell module (FRM) actuates the two belt feeder controllers for the driver's side and front-passenger side. The belt feeder controllers are connected to the footwell module via a LIN bus.

The belt feeder controllers actuate the drive of the belt feeder.

The position of the drive is reported back to the belt feeder controller by a Hall sensor in the drive.

The end position of the extended belt feeder is recorded by another Hall sensor. The end position is indicated to the belt feeder controller.

The belt feeder controller transmits both signals to the footwell module (FRM) via the LIN bus. The actuation circuit is located in the footwell module.

The belt feeder on the front-passenger side is only actuated if the front-passenger seat is occupied.

System functions

The following functions are executed by the footwell module:

- Gateway between LIN bus and K-CAN
- Activation via various signals
- Storing vehicle order
- Other functions

Gateway between LIN bus and K-CAN

The footwell module (FRM) enables communication to take place between the LIN bus and the K-CAN.

The footwell module transfers the messages to the relevant recipient bus.

Components on the LIN bus:

- Special equipment exterior mirrors
- Switch block in driver's door, High variant
- 2 stepper motor controllers for the adaptive headlight stepper motors
- 2 belt feeder controllers (E92 only)

Activation via various signals

The footwell module (FRM) can be woken up via the following signals:

- K-CAN active
- Terminal 15 ON
- Hazard warning switch ON
- Change in state of door contacts
- Anti-theft alarm system alarm

Storing vehicle order

The vehicle order is stored in the footwell module (FRM). For the order to be stored, terminal 15 must be ON and the vehicle must be travelling at a road speed of less than 5 km/h.

The vehicle order enables the vehicle to be identified. Besides the type code number, the vehicle order contains all important equipment features on the vehicle.

Other functions

The footwell module (FRM) influences various functions on the vehicle. The following components are controlled by the footwell module:

- Exterior mirrors
- Exterior lighting

- Interior lighting
- Central locking system
- Power windows

Door mirrors

There are 2 versions of the switch block in the driver's door:

- Switch block in the driver's door, basic variant

The switch block sends its signals directly to the footwell module (FRM).

- Switch block in driver's door, High variant

The switch block is connected to the LIN bus. The requests to adjust the mirror are sent via the LIN bus. The footwell module (FRM) receives and processes the signals via the LIN bus.

The footwell module scans for requests from the driver's door High switch block every 20 milliseconds. In sleep mode, the power supply is disconnected. The exterior mirrors cannot be actuated.

The mirror heating is controlled by the footwell module. The corresponding signal is fed via the LIN bus to the electronic evaluation unit in the mirror.

If a mirror memory is fitted, the footwell module will store the memory position of the mirrors.

Exterior lighting

The lighting functions are integrated into the footwell module (FRM).

These lighting functions are:

- Parking lights
- Main-beam headlights
- Headlight flasher
- Turn signals
- Hazard warning lights
- Brake lights
- Dipped-beam headlights
- Reversing light
- Front foglights
- Rear foglight
- Parking lights

Besides the lighting functions, other exterior lighting functions are also integrated in the footwell module:

- Light monitoring
- Headlight beam throw adjustment
- Emergency operating mode if the footwell module should fail
- Lamp replacement

(important lighting functions are substituted by other lights being actuated in the event of individual lights failing.)

- Follow-me-home lights
- Visual alarm after anti-theft alarm has been triggered

(the visual alarm is given as per encoding with hazard warning lights, turn signals with dipped headlights or turn signals with main-beam headlights.)

- Actuation of bi-xenon headlamps
- Control of the stepper motor controller for the adaptive headlights
- Turning light

The turning lights are coupled to the adaptive headlights.

All lighting functions except the additional brake light are supplied with a pulse-modulated signal by the footwell module (FRM). This PWM signal allows constant brightness of exterior lighting.

Interior lighting

On vehicles without roof control panel (FZD), the footwell module actuates the interior lighting in the roof area directly.

All footwell module outputs for interior lighting are pulse-width modulated. This ensures that the brightness of the interior lighting always remains constant in spite of voltage fluctuations.

With standard equipment, the interior lighting comprises the following components:

- Front interior light
- Luggage compartment lighting
- Glove compartment lighting
- Footwell lighting

The following components can also be installed as special equipment for the interior lights:

- Rear interior light
- Courtesy lighting

Central locking system

The footwell module evaluates the status of the Hall sensors in the door contacts.

When the vehicle is locked or unlocked with the mechanical key element, the footwell module will recognize this request. The footwell module will send a message through the K-CAN to the CAS (Comfort Access System).

Power windows

The footwell module (FRM) and the junction box electronics (JBE) actuate the power window drives.

The relays for the front power window motors are located in the footwell module. The relays for the rear power window drives are located in the junction box electronics.

Preconditions for activation

The footwell module (FRM) receives a large number of input signals that switch on the interior lighting. The input signals are directly read into the footwell module or are received via the K-CAN.

The following signals switch the interior lighting ON:

- Interior lighting button pressed
- Door opened
- Vehicle unlocked at driver's door lock cylinder
- Vehicle unlocked with remote control
- Terminal R OFF, if terminal 58g was ON no more than 2 minutes earlier
- Crash signal
- Lock button on remote control pressed when central locking system has been in central double-locking for at least 10 seconds

The interior lighting is switched off under the following conditions:

- Central locking system set to thiefproof mode, all doors and the tailgate closed
- Interior lighting button pressed for longer than 3 seconds
- Terminal 58 ON and terminal R OFF
- Terminal R ON with doors closed
- The vehicle is unlocked with the remote control and no door is opened with the space of 20 seconds
- Terminal R OFF and a car door left open for longer than 1 minute
- "Power Down" via diagnosis
- 8 minutes after terminal R OFF

When terminal R is switched OFF, the footwell module (FRM) will switch the interior lighting off after 8 minutes. To do this, the footwell module sends the message for consumer shutdown via the K-CAN. The roof control panel (FZD) receives this message and switches off the interior lighting in the roof area. Interior lights that are switched on directly by the footwell module are also switched off.

The footwell module makes terminal 58 g available via K-CAN or via conventional wiring. Terminal 58 g is pulse-width modulated and has two brightness levels.

- Brightness level for locating lights

The brightness for the locating lights can be set individually with the rocker switch on the steering-column stalk.

- Brightness level for function lighting

The brightness level for function lighting is not dimmed and is switched on at full intensity.

As soon as the hazard-warning lights switch is pressed, the lighting in the hazard-warning lights switch is switched on at full intensity by the footwell module. If terminal 58 g is activated, the hazard-warning lights switch will no longer be illuminated with full intensity. Brightness depends on the setting for the locating lights.

ELECTRICAL

General Electrical System - Special Tools - X6

61 0 021 FUSE LINK FF 3.15 A / 500 V

NOTE: For analog/digital multimeter M 2005, M 2007, M2008

Storage location: H 107

Order number: 61 0 021

Fuse link FF 3.15 A / 500 V

61 0 200 CRIMPING SET (BASIC TOOL)

Minimum set: Measuring and testing equipment

NOTE: Consisting of case + basic crimping tool

Series: E30, E30/C, E30tou, E31, E32, E32/3, E34, E34tou, E36, E36/2, E36/3, E36/5, E36/7, E36/C, E36tou, E38, E38/3, E39, E39PL, E39tou, E46, E46/16, E46/2, E46/3, E46/5, E46/C, E52, E53, E60, E61, E63, E64, E65, E66, E67, E68, E70, E71, E81, E82, E83, E85, E86, E87, E88, E90, E91, E92, E93, F01, R50, R52, R53, R55, R56, RR1, RR2

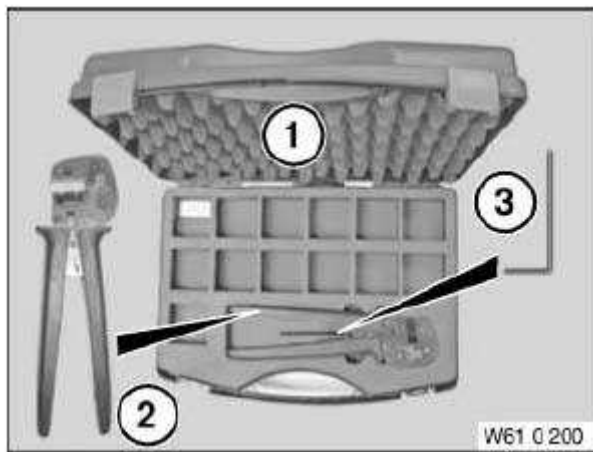


Fig. 1: Identify Special Tool (61 0 200)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number: 02 02 05 (194)

Order number: 61 0 200

Crimping set (basic tool)

Consisting of:

1 = 61 0 201 Plastic case

NOTE: As storage system for complete set.

2 = 61 0 202 Crimping tool

NOTE: Basic tool for assorted matrices (crimping insert set)

3 = 61 0 203 Allen key

NOTE: For securing individual matrices in crimping tool

61 0 210 MATRIX LSK 8

In conjunction with: 61 0 202 (crimping tool)

NOTE: (crimping insert set for load current contact 8)

SI number: 02 02 05 (194)

Order number: 61 0 210

Matrix LSK 8

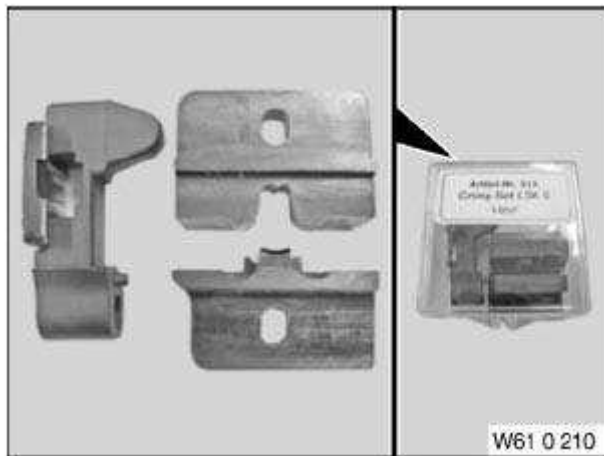


Fig. 2: Identify Special Tool (61 0 210)

Courtesy of BMW OF NORTH AMERICA, INC.

61 0 220 MATRIX FOR SLK 2.8

In conjunction with: 61 0 202 (crimping tool)

NOTE: (crimping insert set for load contact tube 2.8)

SI number: 02 02 05 (194)

Order number: 61 0 220

Matrix for SLK 2.8



Fig. 3: Identify Special Tool (61 0 220)

Courtesy of BMW OF NORTH AMERICA, INC.

61 0 230 STENCIL FOR CONTACTS "DFK 40" AND "MAK 8"

In conjunction with: 61 0 202 (crimping tool)

NOTE: For crimping contacts when replacing interior fuse box (up to model year 09/2005) and for further applications.

SI number: 02 07 05 233

Order number: 61 0 230

Stencil for contacts "DFK 40" and "MAK 8"

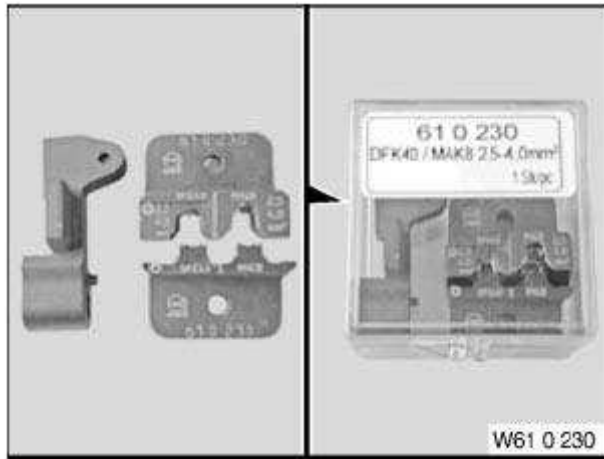


Fig. 4: Identify Special Tool (61 0 230)
 Courtesy of BMW OF NORTH AMERICA, INC.

61 0 300 RELEASING TOOL (COMPLETE KIT)

Minimum set: Measuring and testing equipment

NOTE: Replaces from 09/2005 special tool 61 1 150. From 06/2006 extended by tools 61 0 325 - 61 0 331. From 02/2008 extended by 61 0 332 and 61 0 333.

Series: E30, E30/C, E30tou, E31, E32, E32/3, E34, E34tou, E36, E36/2, E36/3, E36/5, E36/7, E36/C, E36tou, E38, E38/3, E39, E39PL, E39tou, E46, E46/16, E46/2, E46/3, E46/5, E46/C, E52, E53, E60, E61, E63, E64, E65, E66, E67, E68, E70, E71, E81, E82, E83, E85, E86, E87, E88, E90, E91, E92, E93, F01, F02, R50, R52, R53, R55, R56, RR1, RR2, RR3



Fig. 5: Identify Special Tool (61 0 300)
 Courtesy of BMW OF NORTH AMERICA, INC.

Order number: 61 0 300

Releasing tool (complete kit)

Consisting of:

1 = 61 0 301 Release tool for round contacts (diameter 1.5)

NOTE: Replaces from 09/2005 special tool 61 1 131

2 = 61 0 302 Replacement sleeve D=1.5

NOTE: Replaces from 09/2005 special tool 61 1 157

In conjunction with: 61 3 301

3 = 61 0 303 Release tool for round systems with D=2.5

NOTE: Replaces from 09/2005 special tool 61 1 132

4 = 61 0 304 Replacement sleeve (D=2.5)

NOTE: Replaces from 09/2005 special tool 61 1 156

5 = 61 0 305 Release tool for round contacts (D=3.5)

NOTE: Replaces from 09/2005 special tool 61 1 133

6 = 61 0 306 Replacement sleeve (D=3.5) for 61 0 305

NOTE: Replaces from 09/2005 special tool 61 1 155

7 = 61 0 307 Release tool for socket-side round contacts (D=1.5)

8 = 61 0 308 Replacement sleeve for special tool 61 0 307 (D=1.5)

9 = 61 0 309 Release tool for pin-side round contact (D=1.5) manufacturer: Kostal

NOTE: Replaces from 09/2005 special tool 61 1 139

10 = 61 0 311 Replacement sleeve for special tool 61 0 309

NOTE: Replaces from 09/2005 special tool 61 1 154

11 = 61 0 312 Release tool for flat spring contact with a retaining lug (1.6 mm)

NOTE: Replaces from 09/2005 special tool 61 1 134

12 = 61 0 313 Release tool for flat spring contacts with a snap-in pin (1.9 mm)

NOTE: Replaces from 09/2005 special tool 61 1 137

13 = 61 0 314 Release tool for flat spring contact with a snap-in pin (2.7 mm)

NOTE: Replaces from 09/2005 special tool 61 1 135

14 = 61 0 315 Release tool for flat spring contacts with double snap-in pin "Micro-Timer 2"

NOTE: Replaces from 09/2005 special tool 61 1 151

15 = 61 0 316 Release tool for flat spring contacts with double snap-in pin "SPT 4.8" "JPT 2.8"

NOTE: Replaces from 09/2005 special tool 61 1 136

16 = 61 0 317 Release tool for LSK 8

NOTE: Replaces from 09/2005 special tool 61 1 200

17 = 61 0 318 Release tool for "Maxi Power Timer 9.5"

NOTE: Replaces from 09/2005 special tool 61 1 180

19 = 61 0 321 Release tool for sensor laminated contacts with unlocking element ("SLK 2.8")

20 = 61 0 322 Release tool for mini laminated contact ("MLK 1.2 mm")

21 = 61 0 323 Release tool for flat spring contacts with a snap-in pin (MQS)

NOTE: Replaces from 09/2005 special tool 61 1 152

22 = 61 0 324 Release tool for secondary locking

NOTE: Universal tool for damage-free opening/removal of secondary locks

23 = 61 0 329 Case with foam inlay without tools

NOTE: Storage system for release tools from set 61 0 300

24 = 61 0 325 Release tool "JPT"

25 = 61 0 326 Release tool "MQS"

NOTE: For releasing all micro contacts

26 = 61 0 327 Plug-in aid

NOTE: For inserting contacts (0.64 - 1.2 mm) in housing

27 = 61 0 328 Plug-in aid

NOTE: For inserting contacts (2.8 - 4.8 mm) in housing

28 = 61 0 331 Release tool "SLK 5.8"

NOTE: For release "SLK 5.8 mm" contacts

29 = 61 0 332 Release tool

NOTE: For releasing "MQS 0.64 mm" contacts

30 = 61 0 333 Release tool

NOTE: For releasing "Mcon 2.8" contacts. Replaces special tool 61 0 319 from 2008.

61 1 180 REMOVAL TOOL

Minimum set: Mechanical tools

NOTE: For load current contacts

Series: All models

SI number: 20600(636)

Order number: 61 1 180

Removal tool

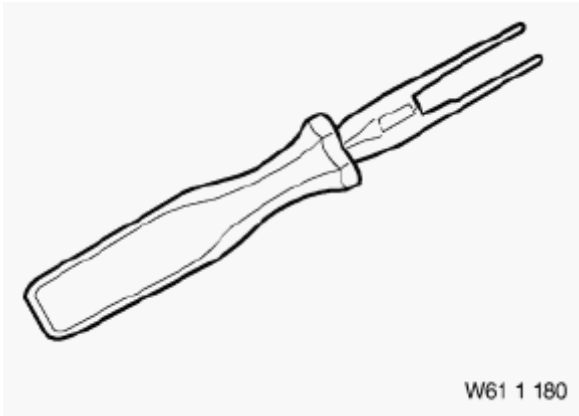


Fig. 6: Identify Special Tool (61 1 180)
Courtesy of BMW OF NORTH AMERICA, INC.

61 1 190 PLIERS

NOTE: For insulation displacement connectors for repairing ribbon cables

Series: E60, E61, E63, E64, E65, E66, E67, E71, E81, E82, E83, E86, E87, E88, E90, E91, E92, F01, R50, R52, R55, R56, RR1, RR2

SI number: 1 14 01(766)

Order number: 61 1 190

Pliers

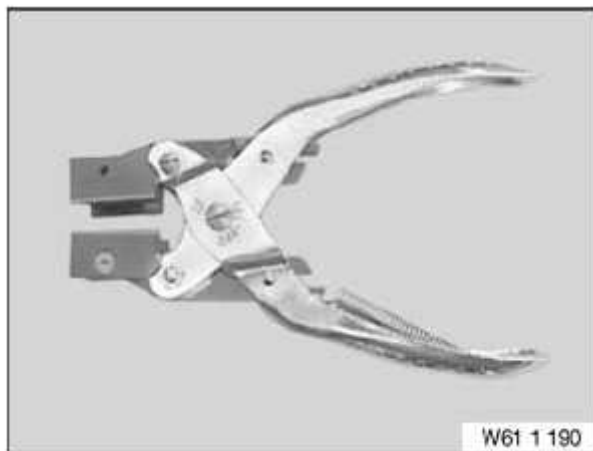


Fig. 7: Identify Special Tool (61 1 190)
Courtesy of BMW OF NORTH AMERICA, INC.

61 1 350 SET OF ASSEMBLY TOOLS

NOTE: For removing and installing socket in transmission connector on automatic transmission

Transmission: 4 HP 22, 4 HP 24

Storage location: I 103

Order number: 61 1 350

Set of assembly tools

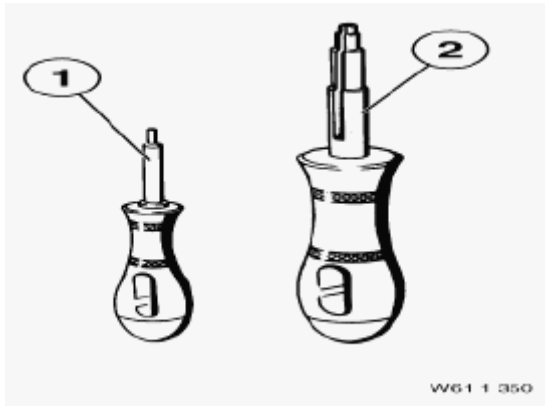


Fig. 8: Identify Special Tool (61 1 350)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1 = 61 1 351 Removal tool

2 = 61 1 352 Fitting drift

61 2 440 SYSTEM CONNECTING CABLE (COUNTRY-SPECIFIC)

NOTE: System connecting cable for battery trickle charger 61 2 410

Order number: 61 2 440

System connecting cable (country-specific)

Consisting of:

1 = 61 2 441 System connecting cable (country-specific)

NOTE: Algeria / Armenia / Belarus / Belgium / Brazil / Denmark / Dubai / Egypt / Finland / France / Germany / Greece / Korea / Luxembourg / Martinique /

Morocco / Norway / Saudi Arabia / Sweden / Spain and others

2 = 61 2 442 System connecting cable (country-specific)

NOTE: Australia / New Zealand

3 = 61 2 443 System connecting cable (country-specific)

NOTE: Italy

4 = 61 2 444 System connecting cable (country-specific)

NOTE: Bahrain / Brunei Dar es Salaam / England / Hong Kong / India / Kuwait / Nigeria / Northern Ireland / Oman / Qatar / Singapore / Sri Lanka (Ceylon)

5 = 61 2 445 System connecting cable (country-specific)

NOTE: Switzerland

6 = 61 2 446 System connecting cable (country-specific)

NOTE: Argentina / Barbados / Canada / China / Guam / Honduras / Jamaica / Mexico / Panama / Philippines / Tahiti / Taiwan / USA

7 = 61 2 447 System connecting cable (country-specific)

NOTE: Japan

61 3 140 ADAPTER LEAD, 38-PIN

Minimum set: Measuring and testing equipment

NOTE: For diagnosis work on DSC

SI number: 02 06 08 475

Order number: 61 3 140

Adapter lead, 38-pin

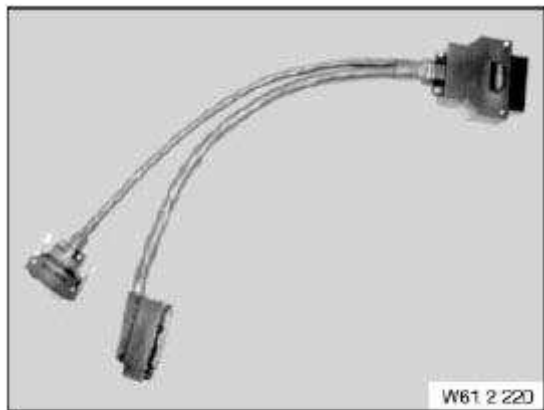


Fig. 9: Identify Special Tool (61 3 140)
Courtesy of BMW OF NORTH AMERICA, INC.

61 4 300 ADAPTER LEAD FOR OBD SOCKET

NOTE: For connecting diagnosis system to OBD socket from 06/2000.

Storage location: Single

SI number: 2 04 00 (561)

Order number: 61 4 300

Adapter lead for OBD socket



Fig. 10: Identify Special Tool (61 4 300)
Courtesy of BMW OF NORTH AMERICA, INC.

61 4 320 CRIMPING SET WITH PLIERS

Minimum set: Measuring and testing equipment

NOTE: For repairing fibre optics conductors and cables. Universal crimp head 61 4 328 added as from 06/2006.

Series: E12, E21, E23, E24, E28, E30, E30/C, E30tou, E31, E32, E32/3, E34, E34tou, E36, E36/2, E36/3, E36/5, E36/7, E36/C, E36tou, E38, E38/3, E39, E39PL, E39tou, E46, E46/16, E46/2, E46/3, E46/5, E46/C, E52, E53, E60, E61, E63, E64, E65, E66, E67, E68, E70, E71, E81, E82, E83, E85, E86, E87, E88, E90, E91, E92, E93, F01, R50, R52, R53, R55, R56, RR1, RR2, RR3

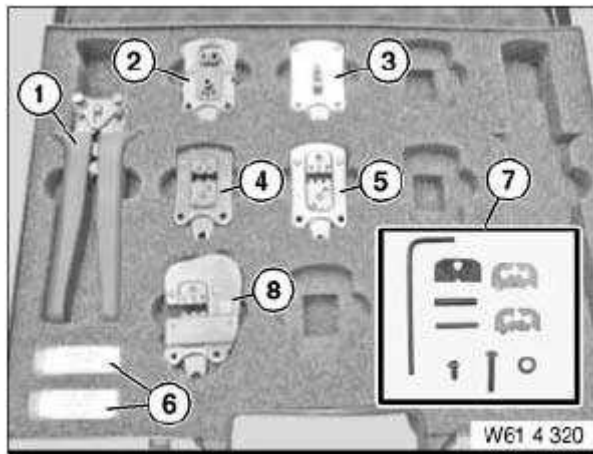


Fig. 11: Identify Special Tool (61 4 320)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number: 1 14 01(766)

Order number: 61 4 320

Crimping set with pliers

Consisting of:

1 = 61 4 321 Pliers without crimping head

2 = 61 4 322 Crimping head

NOTE: For stripping insulation and cutting fibre optic cable to length

3 = 61 4 323 Crimping head

NOTE: For crimping fibre optic cable contacts

4 = 61 4 324 Crimping head

NOTE: For crimping MQS contacts

5 = 61 4 325 Crimping head

NOTE: For crimping MPQ contacts

6 = 61 4 326 Substitute blade

NOTE: For face-cutting fibre optic cables

7 = 61 4 327 Substitute blade

NOTE: With tool for replacing blade in cable stripping unit. Must be ordered separately, not included in 61 4 320 delivery specification!

8 = 61 4 328 Universal crimping head

NOTE: For crimping contacts (without seal) and cable cross-sections of 0.35 - 2.5 mm.

In conjunction with: in conjunction with 61 4 321

61 6 060 UNIVERSAL WIPER ARM PULLER

Minimum set: Mechanical tools

NOTE: For removing windscreen wiper arm from drive shaft

Series: E12, E21, E23, E24, E28, E30, E30/C, E30tou, E31, E32, E32/3, E34, E34tou, E36, E36/2, E36/3, E36/5, E36/7, E36/C, E36tou, E38, E38/3, E39, E39PL, E39tou, E46, E46/16, E46/2, E46/3, E46/5, E46/C, E52, E53, E60, E61, E63, E64, E65, E66, E67, E71, E81, E82, E83, E85, E86, E87, E88, E90, E91, RR1, RR2

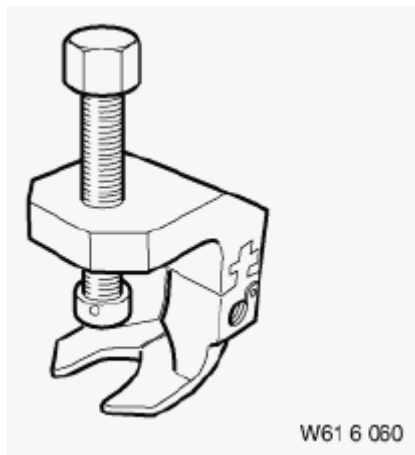


Fig. 12: Identify Special Tool (61 6 060)

Courtesy of BMW OF NORTH AMERICA, INC.

Storage location: B7

SI number: 1 10 99 (433)

Order number: 61 6 060

Universal wiper arm puller

Consisting of:

1 = 61 6 061 Basic body

2 = 61 6 062 Claw, left/right

3 = 61 6 063 Spindle

4 = 61 6 064 Thrust piece

61 6 100 ANGLE MEASURING INSTRUMENT

Minimum set: Mechanical tools

NOTE: For measuring contact/approach angle of wiper blades to window (angle when setting wiper arms)

Series: E36, E39, E46, E52, E53, E60, E61, E63, E64, E65, E66, E67, E68, E70, E71, E81, E82, E83, E85, E86, E87, E88, E90, E91, E92, E93, F01, F02, R50, R52, R53, R55, R56, RR1, RR2, RR3

Storage location: A54

SI number: 1 21 05 220

Order number: 61 6 100

Angle measuring instrument



Fig. 13: Identify Special Tool (61 6 100)
Courtesy of BMW OF NORTH AMERICA, INC.

61 8 081 ADDITIONS TO REPAIR KIT I

NOTE: Order through BMW EPC (Electronic Parts Catalogue)

Storage location: K 108

Order number: 61 8 081

Additions to repair kit I

61 8 082 ADDITIONS TO REPAIR KIT II

NOTE: Order through BMW EPC (Electronic Parts Catalogue)

Storage location: K 108

Order number: 61 8 082

Additions to repair kit II

61 8 083 ADDITIONS TO REPAIR KIT III

NOTE: Order through BMW EPC (Electronic Parts Catalogue)

Storage location: K 108

Order number: 61 8 083

Additions to repair kit III

61 9 045 FEMALE DIE

In conjunction with: 61 9 041 Crimping tool

NOTE: For crimping 2.5 mm (dia.) sleeves

Order number: 61 9 045

Female die

ACCESSORIES AND BODY, CAB

General Electrical System - Tightening Torques - X6

AUXILIARY CABLE

61 12 AUXILIARY CABLE

AUXILIARY CABLE-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening Spec
1AZ Battery positive lead to distributor, luggage compartment	E60/E61/E63/E64/E65/E66/E70/E71/E81/E82/E83/E87/E88/E90/E91/E92/E93	M8	15 Nm
2AZ Battery positive lead to connector, engine compartment partition wall	E83	M8	19 Nm
3AZ Battery positive lead to connection support point, luggage compartment floor	E60/E61/E63/E64/E65/E66/E70/E71/E81/E82/E85/E86/E87/E88/E90/E91/E92/E93	M8	15 Nm
4AZ Battery positive lead to engine compartment B+ terminal	E70/E71/E81/E82/E85/E86/E87/E88/E90/E91/E92/E93	M8	15 Nm
	E70/E71/E81/E82/E85/E86/E87/E88/E90/E91/E92/E93	M6	8 Nm
5AZ Battery negative lead to body	E70/E71/E81/E82/E85/E86/E87/E88/E93	M8	15 Nm

BATTERY-VAPOUR SEPARATOR

61 21 BATTERY WITH TERMINAL

BATTERY WITH TERMINAL-TIGHTENING TORQUE SPECIFICATIONS

	Type
1AZ Battery positive lead, battery negative lead, safety battery terminal, IBS (screw connection from above)	E38/E39/E46/E53/E60/E61/E63/E64/E65/E66/E67/E70/E71/E81/E82/E83/E85/E86/E87/E88/E90/I
	E38/E39
2AZ Distribution box	E60/E61/E63/E64/E70/E71/E81/E82/E87/E88/E90/E91/E92/E93
	E60/E61/E63/E64
3AZ Fuse box	E85/E86
	E85/E86
	E85/E86
4AZ Battery positive lid to distributor, safety battery terminal	E46/E53/E60/E61/E63/E64/E65/E66/E67/E70/E71/E81/E82/E83/E85/E86/E87/E88/E90/E91/E92/I

SWITCH

61 31 SWITCH

SWITCH-TIGHTENING TORQUE SPECIFICATIONS

	Type	T
1AZ Ignition starter switch	E60/E61/E63/E64	

2AZ Reversing light switch	E36/E38/E39/E46/E53/E60/E61/E63/E64/E81/E82/E83/E85/E86/E87/E88/E89/E90/E91/E92/E93	M
3AZ Trim, gear selector switch	E70/E71	M
4AZ Gear selector switch	E70/E71	M
5AZ Controller	E70/E71	M
6AZ Gear selector switch	E60/E61/E63/E64/E90 M3/E92 M3/E93 M3	M
7AZ Emergency release to gear selector switch	E60/E61/E63/E64	M

HORN

61 33 HORN

HORN-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening Specification
1AZ Fanfare horn to holder	E90/E91/E92/E93	M6	8 Nm + 3 Nm
	E81/E82/E87/E88	M6	10 Nm
2AZ Fanfare horn to retaining plate	E63/E64	M8	8 Nm
3AZ Retaining plate, fanfare horn to holder	E63/E64	M6	8 Nm
4AZ Bracket, fanfare horn, to body	E70/E71	M8	10 Nm ± 2 Nm

RELAY

61 36 RELAY

RELAY-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening Specification
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1AZ Battery positive lead to relay for deactivating electric fan	E71	M6	5.0 Nm
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WINDSCREEN WIPERS

61 61 WINDSCREEN WIPERS

WINDSCREEN WIPERS-TIGHTENING TORQUE SPECIFICATIONS

	Type	Th
1AZ Wiper motor secured to wiper bracket	E52	M6
2AZ Parked position stop to wiper console		
3AZ Wiper contact pressure motor to wiper console		
4AZ Motor crank to wiper motor	E52	M8
5AZ Wiper shaft nut to body		
6AZ Wiper bracket to firewall	E52/E53/E60/E61/E63/E64/E65/E66/E67/E70/E71/E81/E82/E85/E86/E87/E88/E90/E91/E92/E93	M6
7AZ Wiper	E53	M6

bracket to rubber buffer		
8AZ Wiper arms	E53	
9AZ Wiper arms	E52	
10AZ Adjusting screw, wiper arm, right side	E65/E66/E67	
11AZ Wiper arms	E85/E86	
	E90/E91/E92/E93	M:
	E70/E71/E81/E82/E87/E88	M:
12AZ Wiper arm, left side	E60/E61/E63/E64	M:
	E65/E66/E67	M:

13AZ Wiper arm, right side	E60/E61/E63/E64	2x
	E60/E61/E63/E64	1x 1x
	E65/E66/E67	M:
14AZ Adjusting screw, wiper arm, right side	E60/E61/E63/E64	
15AZ Bearing block tension strut/cowl	E60/E61/E63/E64	

panel		
16AZ Nut to deflection lever	E65/E66/E67	M.