

2007-08 ACCESSORIES AND BODY, CAB**General Electrical System - Repair Instructions - X5****00 TROUBLESHOOTING****12 00 ... INSTRUCTIONS ON STARTING AID**

Do not start the engine with help of starting sprays.

Preparation:

Conform with the following when starting engine with starting cable.

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

CAUTION: Never touch ignition system components and current - dangerous high tension!

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

Carrying out:

Always conform with the procedures to avoid injury to persons or damage to parts.

- On automatic transmission, select "P" setting, apply handbrake.
- Move the shift lever of vehicles with manual transmission into neutral and apply the parking brake.
- Ensure that the jump leads cannot get caught in rotating parts, e.g. fan.
- First connect positive terminals of both batteries with one jump lead (red).
- Use positive connection point in engine compartment for vehicles with one battery in trunk.
- Then attach second jump lead (black) to negative terminal of donor battery and to engine ground or body ground on vehicle to be started.

CAUTION: Never connect second jump lead (black) to negative terminal of battery in vehicle to be started. This would produce explosive gas which could be ignited by sparks.

After engine of vehicle to be started has started up, first disconnect the jump lead on the negative terminal/ground connection. Then remove jump lead from positive terminals.

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. The time for self-discharging depends on vehicle type and equipment specification.

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 sulphated 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 pre - delivery 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.

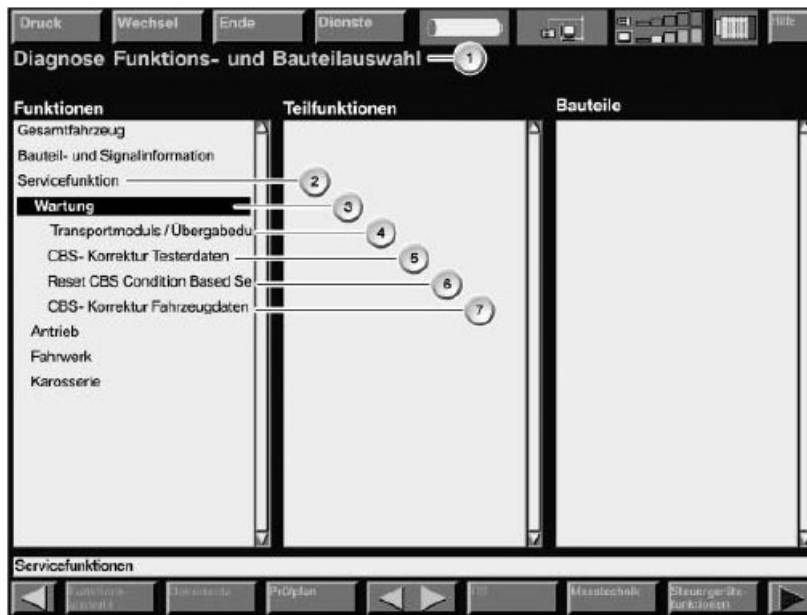
When carrying out the pre-delivery check with the "Transport Mode/Pre-delivery check" service function:

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



T0004055

Fig. 1: Display Vehicle Service Symbol
 Courtesy of BMW OF NORTH AMERICA, INC.



T0004054

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		

Fig. 2: Display BMW Diagnosis Function Screen
 Courtesy of BMW OF NORTH AMERICA, INC.

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: Transport Mode/Pre-delivery check

To be able to hand over a vehicle to the customer in proper working order, it is essential to execute the "Transport Mode/Pre-delivery check" service function.

The following items are worked through during the pre-delivery check:

- Deactivation of transport mode.
- An adaptation process must be activated in order to determine the vehicle-specific mileage/kilometrage per week. Transport and immobilization periods before the vehicle is delivered to the customer therefore have no effect on the customer-specific weekly mileage/kilometrage.

The weekly mileage/kilometrage is used to control escalation from "green" to "yellow" (approx. 4 weeks before "red") for maintenance scopes with remaining distances. The averaged mileage/kilometrage of the last 6 weeks is taken into account here.

- Coding or blanking out of the legally prescribed intervals for the statutory vehicle inspection and statutory exhaust emissions test.
- Input of the target dates for the statutory vehicle inspection and the statutory exhaust emissions test (automatic or manual).

Automatic: By input of the date of first registration and of the time interval

Manual: By direct input of the target date

- Entry of local, service-related phone numbers, depending on vehicle equipment specification (e.g. BMW Group Mobile Service, BMW Hotline, customer's home dealer).

The country-specific phone numbers are displayed in the BMW diagnosis system as a reference text. The phone numbers can simply be read off during the input prompt.

- Reference to initialization of TeleService, depending on vehicle equipment specification.
- Checking and if necessary setting of the on-board date for the vehicle.
- Entry of the date for first registration of the vehicle.
- Now clear the fault memory.

NOTE: *Reducing input expenditure.*
Standardized data are stored in the BMW diagnosis system (for repeated use) in the interests of minimizing the time spent on making inputs in the garage/workshop. The standardized data can be changed with the "CBS Correction Tester Data" service function.

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 > or =85°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* (*M*edia *O*riented *S*ystems *T*ransport) optical fibers
- Yellow=*ISIS* (*I*ntelligent *S*afety and *I*ntegration *S*ystem) optical fibers
- Orange=repair optical fibers

Follow instructions for processing cables and optical fibers. See 61 13...
TREATING CABLES AND FIBER-OPTIC CABLES.

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. See 12 00... 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.

Instructions for cutting off, insulating, crimping cables, installing and removing contacts:
 1952 of 3160

Cutting off and insulating cables. See 61 13 CUTTING TO LENGTH AND STRIPPING INSULATION

FROM CABLES.

Repairing a plug connection using connectors. See **61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION.**

Installing and removing contacts. See **61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS.**

In event of visible damage:

Expose cable at damaged areas. Cut through one cable after the other at an appropriate position and insulate cables no longer required in wiring harness with insulating tape, do not under any circumstances cut through both cables at the same time. Now, depending on the scope of work, unpin contacts either on airbag control unit/airbag module or on adapter plug. Cut off unpinned cables. Insulate cables remaining in wiring harness with insulating tape. Now pin in contacts of repair cable, assignment of repair cables is relevant. Lay repair 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.

Instructions for cutting off, insulating, crimping cables, installing and removing contacts:

Cutting off and insulating cables. See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES.**

Repairing a plug connection using connectors. See **61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION.**

Installing and removing contacts. See **61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS.**

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 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 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS**Special tools required:**

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

Abbreviations and what they mean:**ABBREVIATIONS MEANINGS**

D 1.5 / 2.5	Round contacts of 1.5 mm or 2.5 mm diameter
MDK 3plus	Miniature double flat spring contact
JPT ELA	Junior Power Timer flat spring contacts with strand sealing
DFK ELA	Double flat spring contacts with strand sealing
Elo	Electronic contacts with and without strand sealing Manufacturer: Siemens
Elo Power	Electronic contacts for heavy loads with and without strand sealing Manufacturer: Siemens
MQS	Micro Quadlock System electronic contacts with and without strand sealing Manufacturer: AMP

MPQ

Micro Power Quadlock electronic contacts for heavy loads with and without strand sealing
 Manufacturer: AMP

Ultrasonic-welded connectors:

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

The contacts of these connectors cannot be replaced. Replace plug completely.

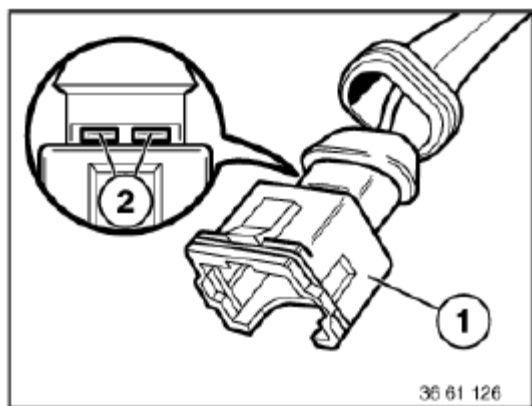


Fig. 3: Identifying Ultrasonic-Welded Connectors

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

Replaced as from 09/2005 by: 61 0 300

61 0 400

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

For plug contact systems not listed, refer to appropriate Service Information.

Plug system D 1.5/D 2.5:

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

- In-line plugs, 8-, 12-pin, System D 2.5
- In-line plugs, 30-pin, System D 2.5
- In-line plugs, 20-pin, System D 2.5

Plug system JPT/MDK/DFK:

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

Plug system Elo/Elo-Power:

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

Plug system MQS/MPQ:

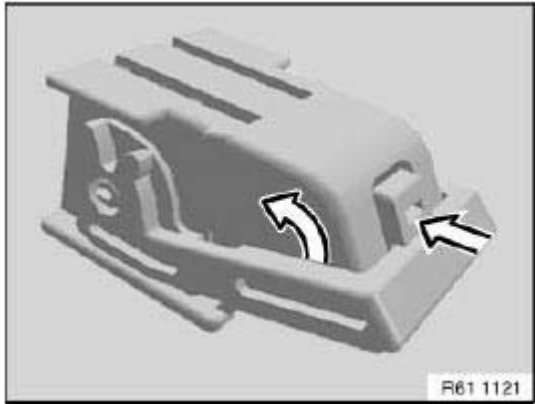
- In-line plugs, 6-, 8-pin, System MQS
- In-line plugs, 2-pin, System MPQ 2.8
- Control unit plugs, 25-, 35-, 55-, 83-, 88-pin
- In-line plugs, 24-pin, Hybrid System MQS/MPQ
- Socket housing 42-, 43-pin, Hybrid System MQS / MPQ
- Socket housings 2x21-, 2x27-pin, Hybrid System MQS/MPQ, Elo/Elo-Power
-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

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.

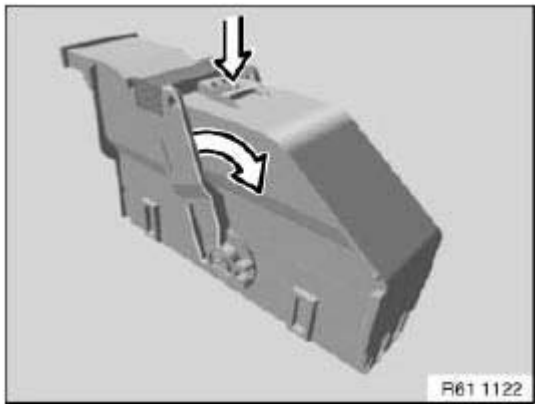
Disconnect plug connection.

**Fig. 4: Pressing Lock**

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and open clip in direction of arrow.

Disconnect plug connection.

**Fig. 5: Opening Clip**

Courtesy of BMW OF NORTH AMERICA, INC.

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

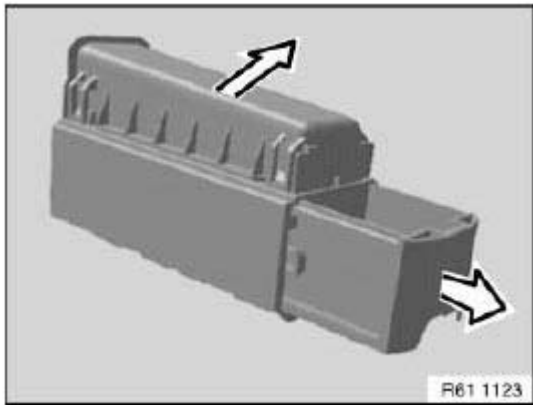


Fig. 6: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

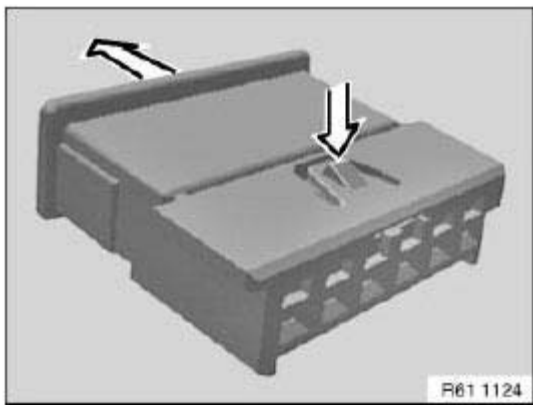


Fig. 7: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

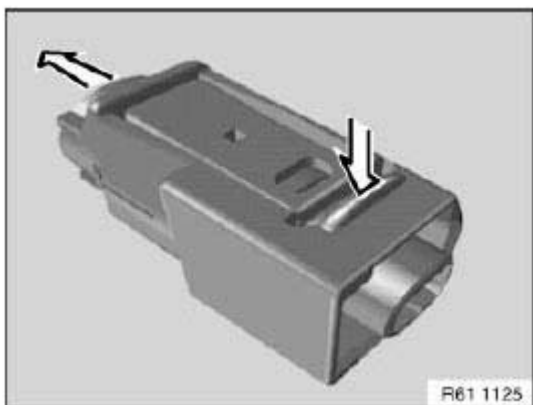
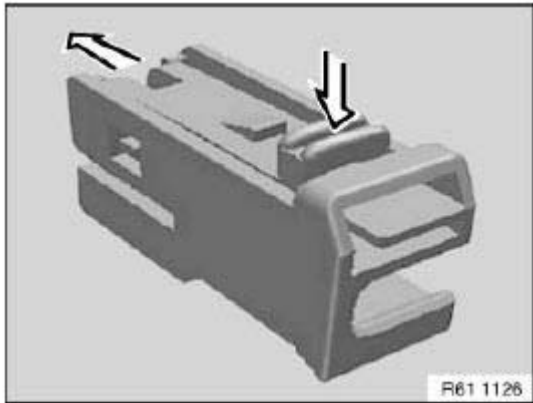


Fig. 8: Pressing Lock

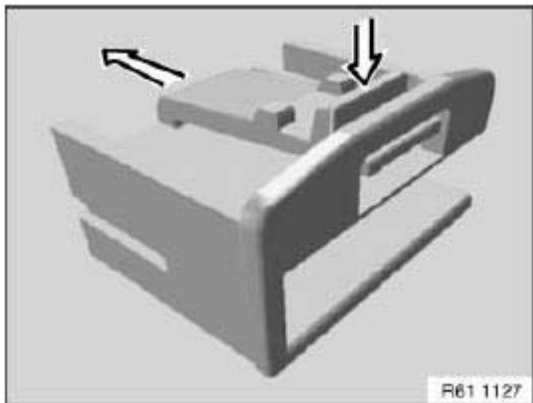
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

**Fig. 9: Disconnecting Plug Connection**

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

**Fig. 10: Pressing Lock**

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

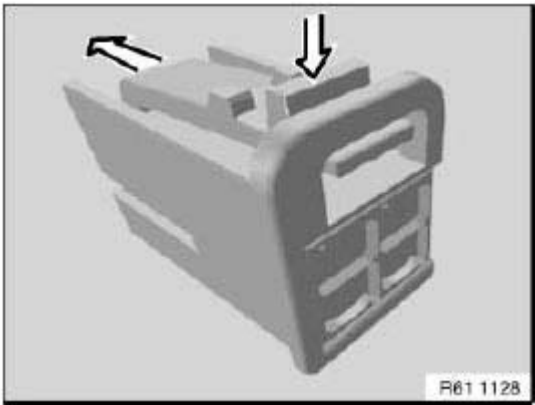


Fig. 11: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

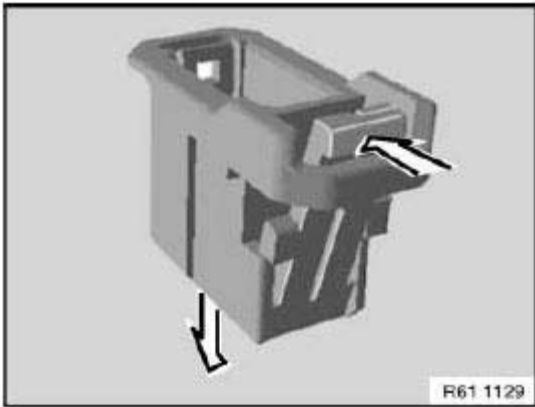


Fig. 12: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 61 1 190
- 61 4 320

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

SPECIAL TOOL KITS REFERENCE

Repair range for vehicle electrical system	1961 of 3160	SI 2 04 07 341
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Crimping set with tool for fiber-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

Subject of repair instructions

- Special tools for wiring harness repairs . See **61 13 SPECIAL TOOLS FOR WIRING HARNESS REPAIRS**
- Cutting to length and stripping insulation from cables . See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES**.
- Crimping stop parts (contacts) . See **61 13 CRIMPING STOP PARTS**.
- Butt connector for repairing a plug connection . See **61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION**.
- Fan connector for retrofitting/repairs . See **61 13 INSTALLING FAN CONNECTOR FOR RETROFITTING/REPAIRS**.
- Cutting to length and stripping insulation from optical fibers . See **61 13... CUTTING OFF, STRIPPING INSULATION AND CUTTING OPTICAL FIBERS TO LENGTH**.
- Crimping optical fibers . See **61 13... CRIMPING OPTICAL FIBERS**.
- Insulation displacement connector for repairing ribbon cables . See **61 13... REPAIRING RIBBON CABLES**.

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

IMPORTANT: Observe safety instructions for handling vehicle battery . See 61 00... 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. See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD**.
- 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 **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

- Connect and switch on battery charger
- Switch ignition on

12 AUXILIARY CABLE

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. See 61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.
Notes and instructions on Intelligent Battery Sensor IBS . See 61 12... GENERAL INFORMATION ON INTELLIGENT BATTERY SENSOR (IBS).

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

Necessary preliminary tasks:

- Remove flap in luggage compartment panel on right. See 51 47 172 REMOVING AND INSTALLING/REPLACING FLAP IN LUGGAGE COMPARTMENT TRIM, LEFT OR RIGHT .
- Disconnect negative battery cable . See 61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.

Disconnect plug connection (1) on safety battery terminal (2).

Open cover and release nut (3).

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

Open cover (2) and slacken nut underneath.

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES**.

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

Raise distribution box slightly and remove safety battery terminal.

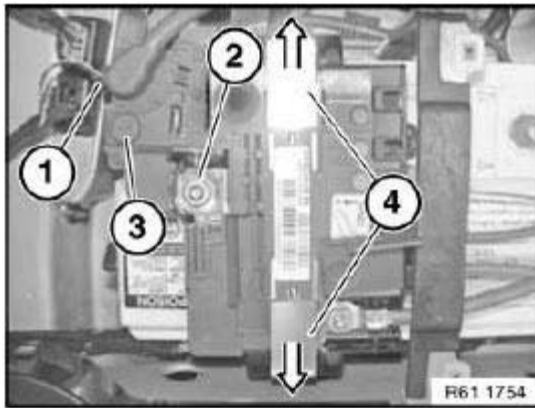


Fig. 13: Identifying Plug Connection, Battery Terminal And Locking Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

Open cover (1).

Slacken nut (2).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES**.

Disconnect battery positive lead.

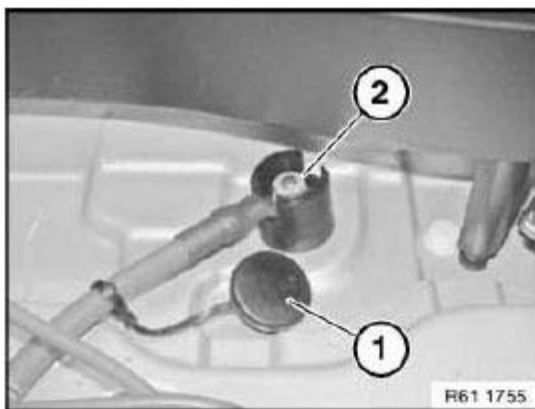


Fig. 14: Identifying Cover
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: Observe safety instructions for handling vehicle battery. See 61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.
Follow instructions for disconnecting and connecting battery. See 12 00... INSTRUCTIONS FOR DISCONNECTING AND CONNECTING BATTERY.

IMPORTANT: Do not under any circumstances use force to pull/lever off Intelligent Battery Sensor (IBS).

Necessary preliminary tasks:

- Raise luggage compartment floor trim

Release screws (1).

Remove battery cover (2) upwards.

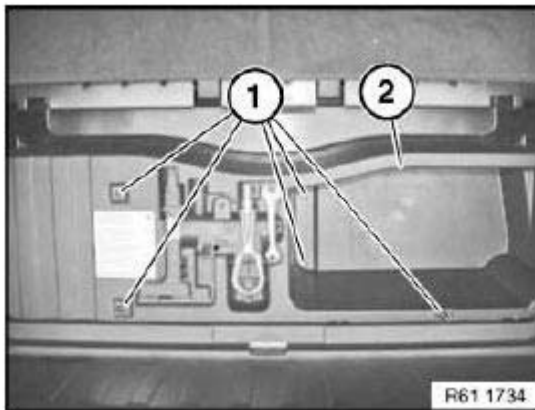


Fig. 15: Identifying Battery Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Loosen nut (1).

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES.

Remove battery negative lead with IBS.

Disconnect plug connection (2).

Unscrew nut (3).

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES.

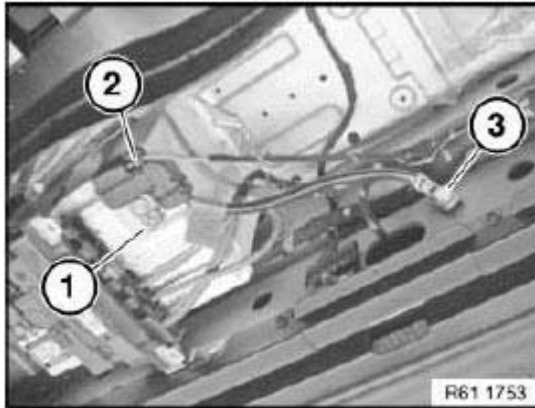


Fig. 16: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

61 12 062 REPLACING WIRING HARNESS FOR FRONT BUMPER

Necessary preliminary tasks:

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

Disconnect plug connections (1) on ultrasonic transducer.

Unclip wiring harness (2) from bumper trim.

Installation:

Make sure wiring harness (2) is laid correctly.

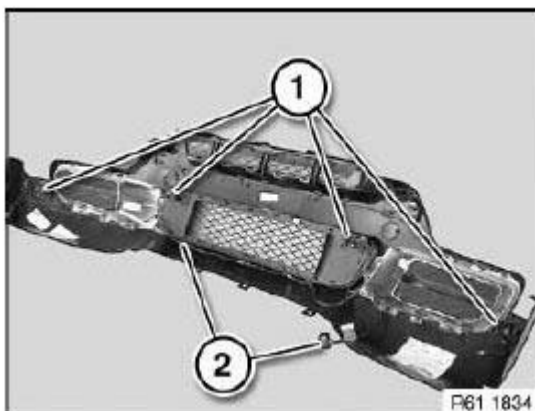


Fig. 17: Identifying Plug Connections And Wiring Harness

Courtesy of BMW OF NORTH AMERICA, INC.

61 12 067 REPLACING WIRING HARNESS FOR REAR BUMPER

Necessary preliminary tasks:

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

Disconnect plug connections (1) on ultrasonic transducer.

Unclip wiring harness from bumper trim and remove.

Installation:

Make sure wiring harness is correctly laid.

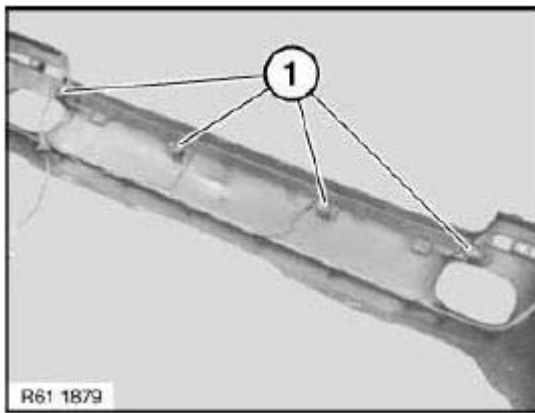


Fig. 18: Identifying Plug Connections On Ultrasonic Transducer
Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary tasks:

- Close front side window completely
- Remove front door trim . See **51 41 000 REMOVING AND INSTALLING LEFT OR RIGHT FRONT DOOR TRIM PANEL** .
- Remove front acoustic insulation . See **51 48 060 REMOVING AND INSTALLING/REPLACING SOUND INSULATION IN LEFT OR RIGHT FRONT DOOR** .

Unlock plug connections (1) and disconnect.

Unclip door wiring harness at points (2).

Installation:

Make sure door wiring harness is correctly laid. 1968 of 3160

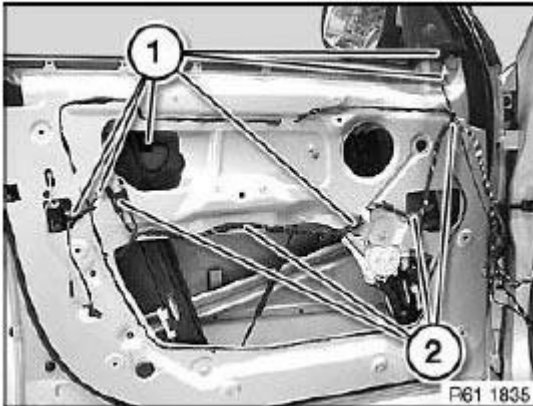


Fig. 19: Identifying Plug Connections

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.
 Unlock plug connection behind and disconnect.
 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.

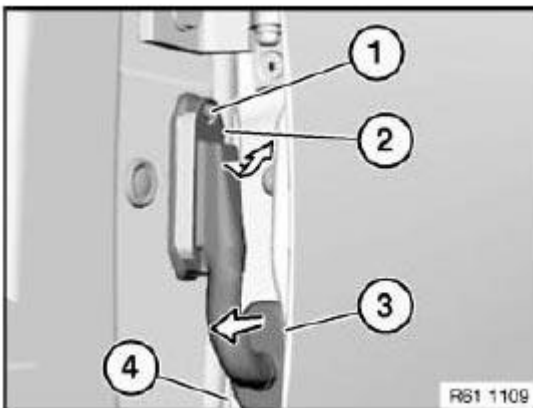


Fig. 20: Pulling Rubber Grommet Out Of Front Door

Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary tasks:

- Close rear side window completely
- Remove rear door trim panel . See **51 42 000 REMOVING AND INSTALLING LEFT OR RIGHT REAR DOOR TRIM PANEL** .
- Remove rear acoustic insulation . See **51 48 070 REMOVING AND INSTALLING/REPLACING**

SOUND INSULATION ON LEFT OR RIGHT REAR DOOR .

Unfasten plug connection (1) and disconnect.

Unclip door wiring harness at points (2).

Installation:

Make sure door wiring harness is correctly laid.

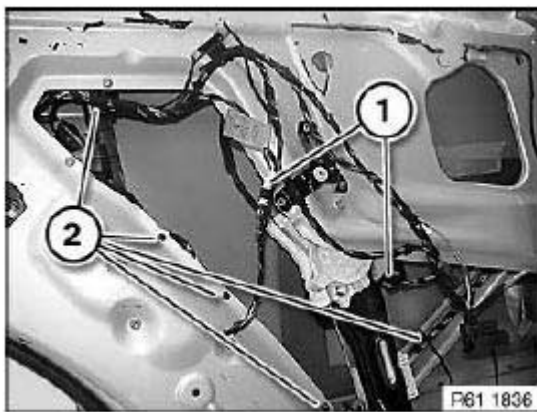


Fig. 21: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

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

Unlock plug connection behind and disconnect.

Pull rubber grommet (3) out of rear door.

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

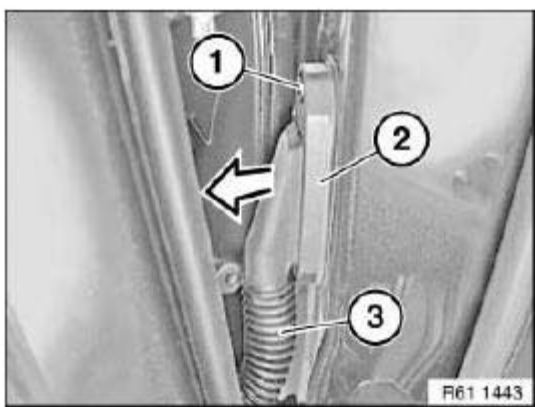


Fig. 22: Pulling Rubber Grommet Out Of Rear Door

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 1 150

Abbreviations and what they mean:

ABBREVIATIONS MEANINGS

D 1.5 / 2.5	Round contacts of 1.5 mm or 2.5 mm diameter
MDK 3plus	Miniature double flat spring contact
JPT ELA	Junior Power Timer flat spring contacts with strand sealing
DFK ELA	Double flat spring contacts with strand sealing
Elo	Electronic contacts with and without strand sealing Manufacturer: Siemens
Elo Power	Electronic contacts for heavy loads with and without strand sealing Manufacturer: Siemens
MQS	Micro Quadlock System electronic contacts with and without strand sealing Manufacturer: AMP
MPQ	Micro Power Quadlock electronic contacts for heavy loads with and without strand sealing Manufacturer: AMP

Ultrasonic-welded connectors:

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

The contacts of these connectors cannot be replaced. Replace plug completely.

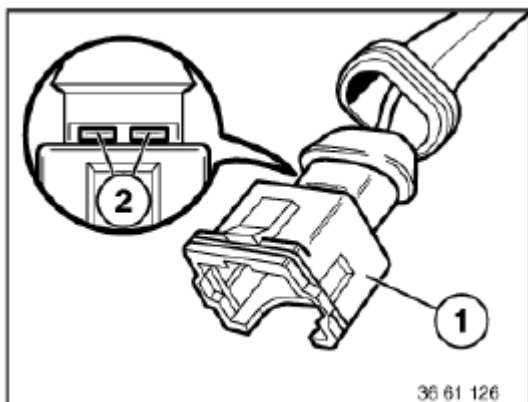


Fig. 23: Identifying Ultrasonic-Welded Connectors

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

Replaced as from 09/2005 by: 61 0 300

61 0 400

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

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

Plug system D 1.5/D 2.5:

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

Plug system JPT/MDK/DFK:

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

Plug system Elo/Elo-Power:

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

Plug system MQS/MPQ:

- In-line plugs, 6-, 8-pin, System MQS
- In-line plugs, 2-pin, System MPQ 2.8

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

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.

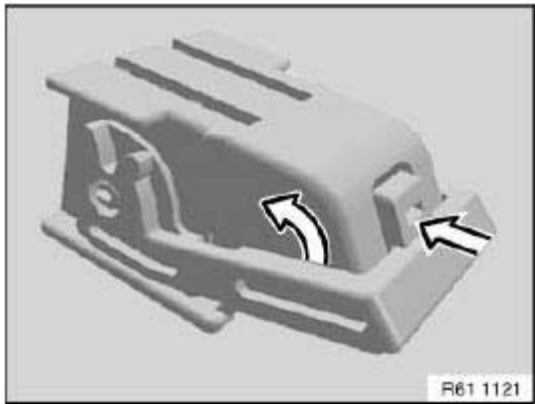


Fig. 24: Pressing Lock

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and open clip in direction of arrow.

Disconnect plug connection.

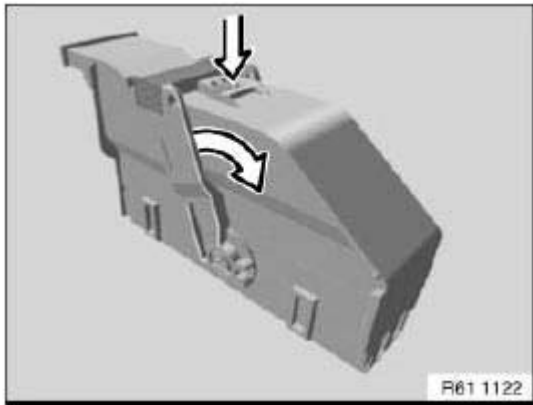


Fig. 25: Opening Clip

Courtesy of BMW OF NORTH AMERICA, INC.

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

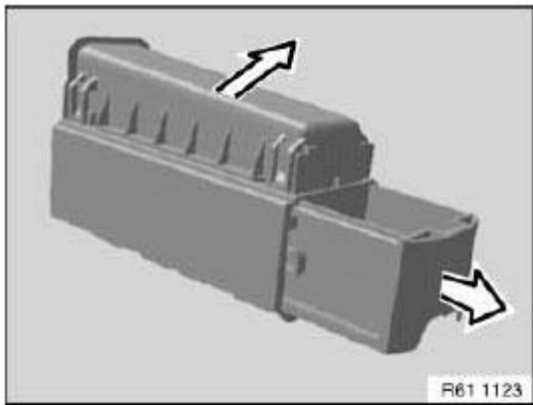


Fig. 26: Disconnecting Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

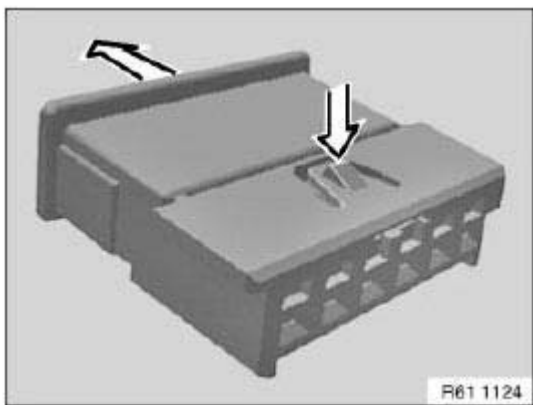
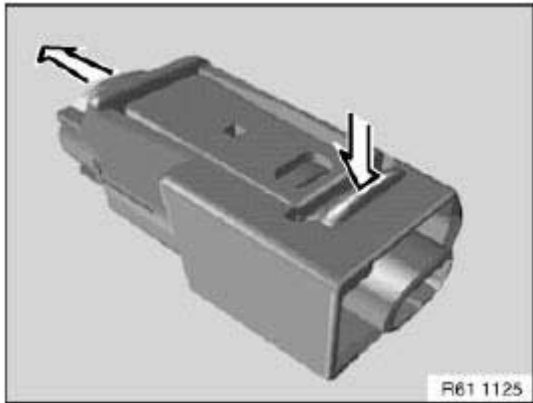


Fig. 27: Disconnecting Plug Connection

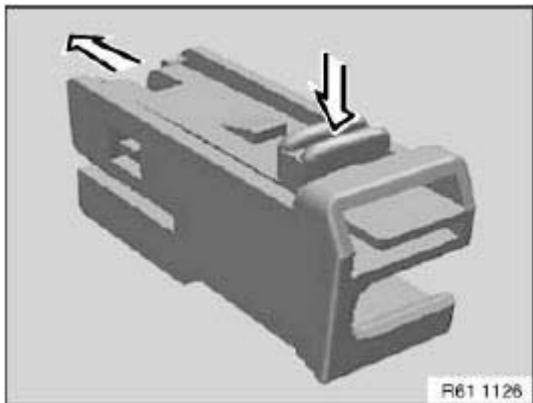
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

**Fig. 28: Pressing Lock**

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

**Fig. 29: Disconnecting Plug Connection**

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

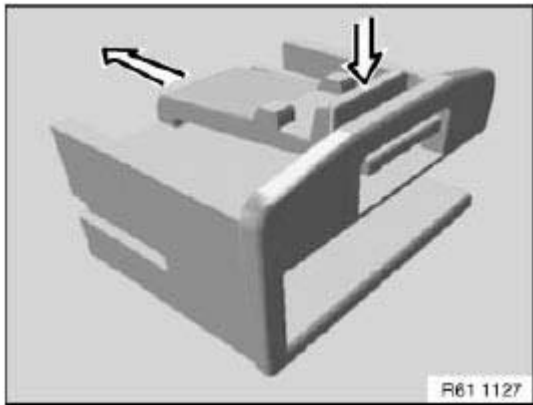


Fig. 30: Pressing Lock

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

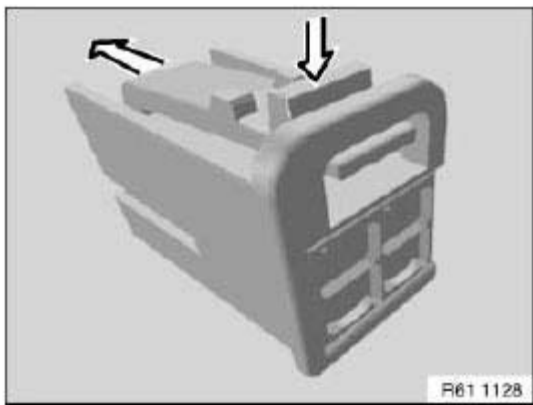


Fig. 31: Disconnecting Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

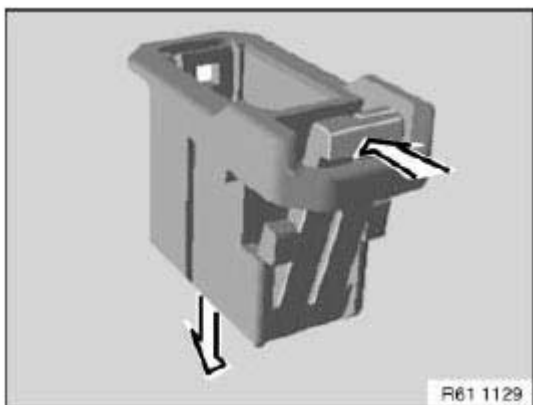


Fig. 32: Disconnecting Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

13 PLUG CONNECTION, TERMINALS**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* (*M*edia *O*riented *S*ystems *T*ransport) optical fibers
- Yellow=*ISIS* (*I*ntelligent *S*afety and *I*ntegration *S*ystem) optical fibers
- Orange=repair optical fibers

Follow instructions for processing cables and optical fibers. . See 61 13... TREATING CABLES AND FIBER-OPTIC CABLES.

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. See 12 00... 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.

Instructions for cutting off, insulating, crimping cables, installing and removing contacts:

Cutting off and insulating cables. See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES**.

Repairing a plug connection using connectors. See **61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION**.

Installing and removing contacts. See **61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS**.

In event of visible damage:

Expose cable at damaged areas. Cut through one cable after the other at an appropriate position and insulate cables no longer required in wiring harness with insulating tape, do not under any circumstances cut through both cables at the same time. Now, depending on the scope of work, unpin contacts either on airbag control unit/airbag module or on adapter plug. Cut off unpinned cables. Insulate cables remaining in wiring harness with insulating tape. Now pin in contacts of repair cable, assignment of repair cables is relevant. Lay repair 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.

Instructions for cutting off, insulating, crimping cables, installing and removing contacts:

Cutting off and insulating cables. See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES**.

Repairing a plug connection using connectors. See **61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION**.

Installing and removing contacts. See **61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS.**

61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION

Special tools required:

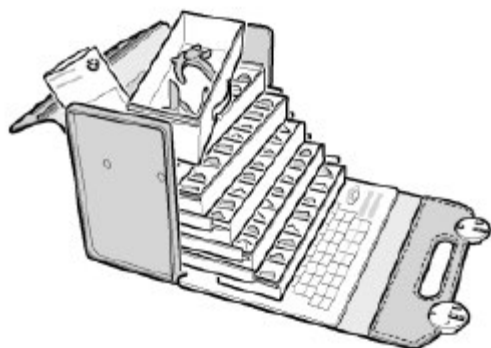
- 61 0 300
- 61 9 040

- 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



R61 0628

1979 of 3160

Fig. 33: Identifying BMW Special Tool Kit

Courtesy of BMW OF NORTH AMERICA, INC.

Choose repair kit.

Example: Repair kit, circular plug system D 2.5.

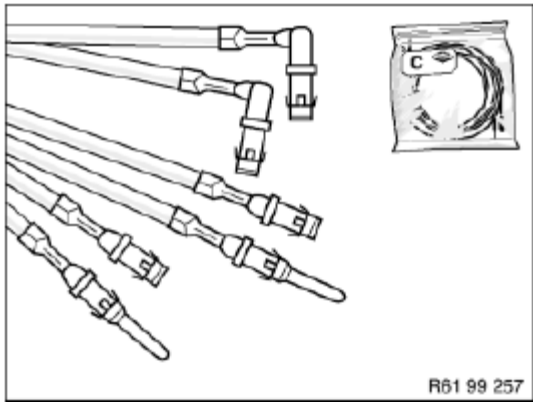


Fig. 34: Identifying Repair Kit

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

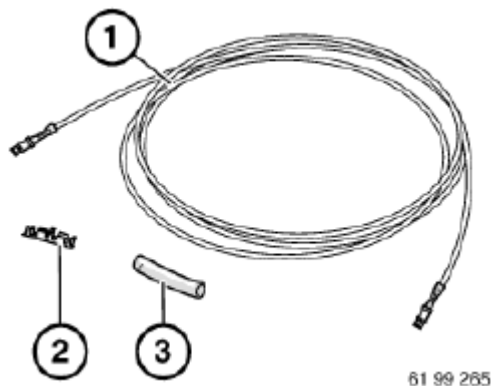


Fig. 35: Identifying Cable, Connector And Shrink-Fit Hose

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.

Refer to repair instructions:

See **61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS.**

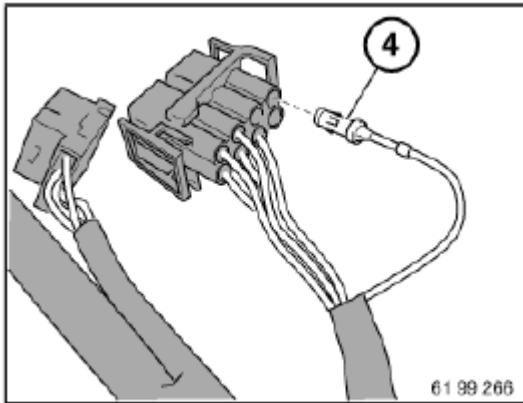


Fig. 36: Removing Damaged Contact
Courtesy of BMW OF NORTH AMERICA, INC.

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.

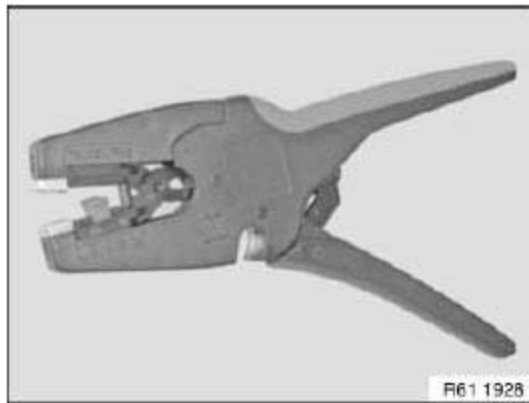


Fig. 37: Identifying Cutting Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Observe following procedure:

- Cut off wire with faulty contact at point which is easily accessible.
- Strip wiring-harness wire end (6).
- Cut preassembled wire end (7) to length and strip insulation.

Refer also to repair instruction:

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

Crimp butt connector on preassembled wire end.

Refer to repair instructions:

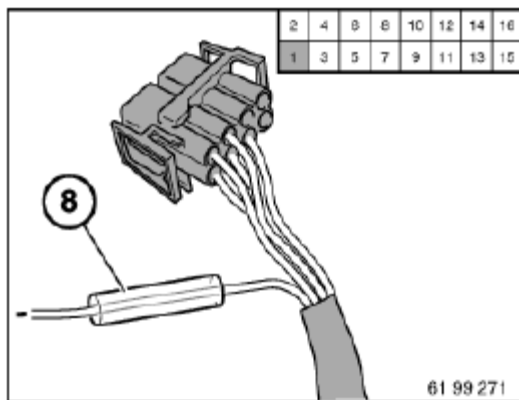
See **61 13 CRIMPING STOP PARTS**.



61 99 270

Fig. 38: Crimping Butt Connector On Preassembled Wire End
 Courtesy of BMW OF NORTH AMERICA, INC.

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



61 99 271

Fig. 39: Identifying Shrink-Fit Hose
 Courtesy of BMW OF NORTH AMERICA, INC.

Crimp unused wire end to butt connector.

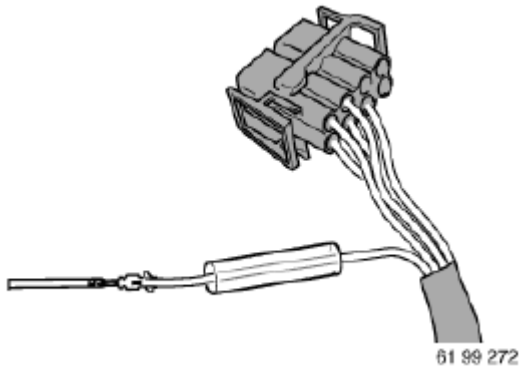


Fig. 40: Crimping Unused Wire End To Butt Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Pull shrink-on sleeve over butt connector.

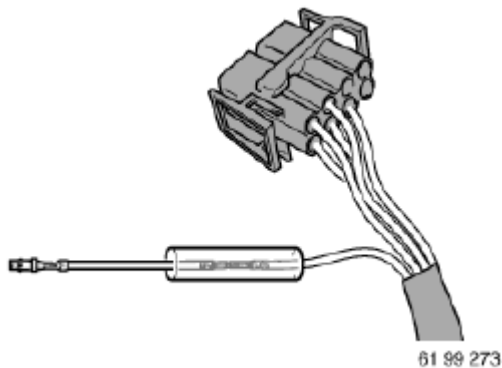


Fig. 41: Pulling Shrink-On Sleeve Over Butt Connector
Courtesy of BMW OF NORTH AMERICA, INC.

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.

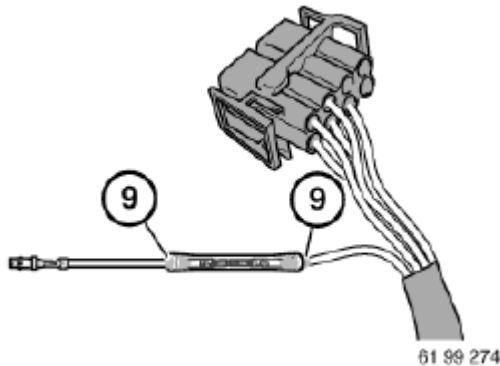


Fig. 42: Identifying Shrink-On Sleeve On Both Sides Of Shrink-Fit Hose
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 CRIMPING STOP PARTS

Special tools required:

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

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

1. Crimping butt connectors and contact sleeves for fan connectors up to 2.5 mm²
2. Crimping butt connectors and contact sleeves for fan connectors from 2.5 mm²
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)

Refer to repair instructions:

See **SPECIAL TOOLS FOR WIRING HARNESS REPAIRS**

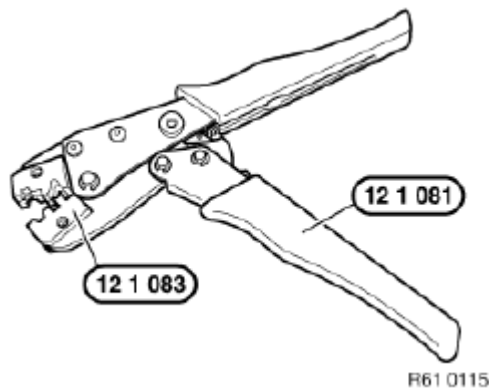


Fig. 43: Identifying Special Tool 12 1 081 And 12 1 083
Courtesy of BMW OF NORTH AMERICA, INC.

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.

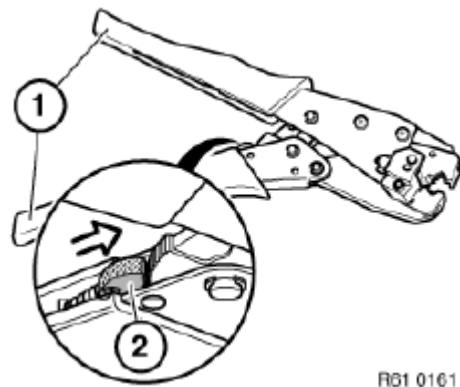


Fig. 44: Pushing Unlocking Lever
Courtesy of BMW OF NORTH AMERICA, INC.

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

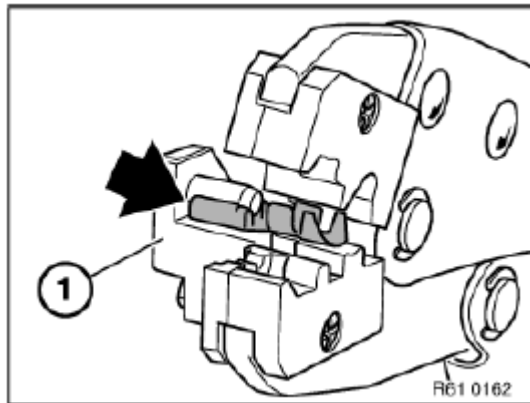


Fig. 45: Identifying Lock

Courtesy of BMW OF NORTH AMERICA, INC.

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

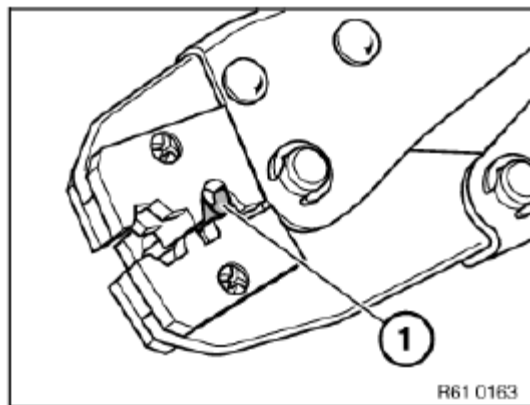


Fig. 46: [Identifying Grip Contact]

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Follow procedure for cutting and stripping insulation from cables. See 61 13 CUTTING TO LENGTH 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.

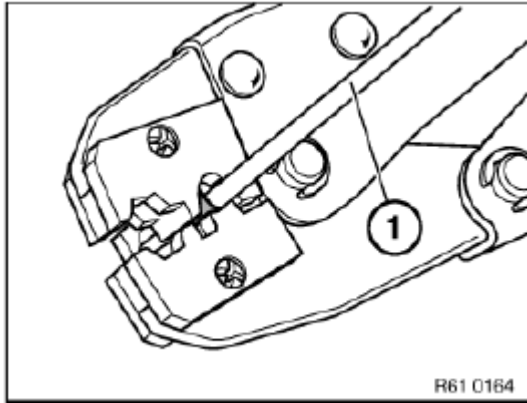


Fig. 47: Identifying Crimping Tool

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.

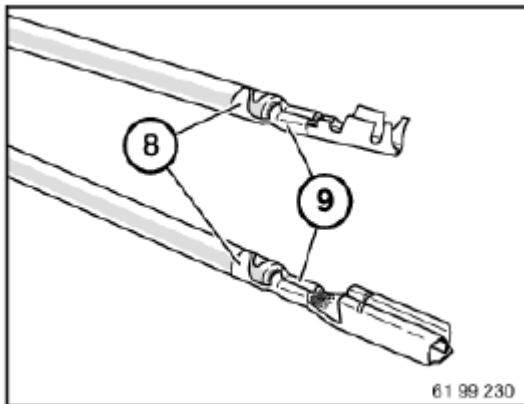


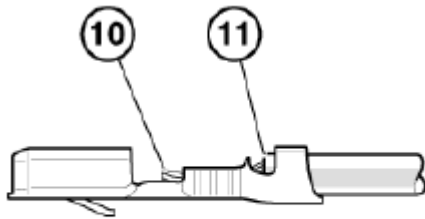
Fig. 48: Identifying Insulation Crimp And Wire Crimp

Courtesy of BMW OF NORTH AMERICA, INC.

Correct crimping:

Visible conductor end (10).

Visible insulation end (11).



61 99 231

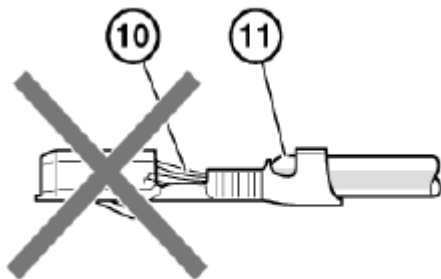
Fig. 49: Identifying Conductor End And Insulation End
Courtesy of BMW OF NORTH AMERICA, INC.

Incorrect crimping:

Conductor end (10) inserted too far.

Insulation end (11) in wire crimp.

If necessary, repeat crimping with a new contact.



61 99 232

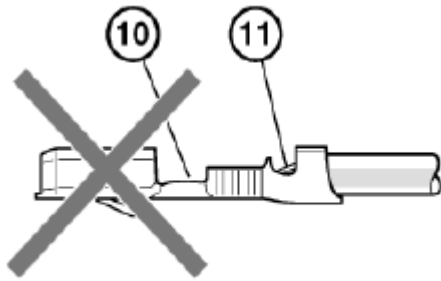
Fig. 50: Identifying Incorrect Crimping
Courtesy of BMW OF NORTH AMERICA, INC.

Incorrect crimping:

Conductor end (10) not visible.

Insulation end (11) not visible.

If necessary, repeat crimping with a new contact.



61 99 233

Fig. 51: Identifying Incorrect Crimping
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES

Stripped length:

STRIPPED LENGTH SPECIFICATION

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 INSTALLING FAN CONNECTOR FOR RETROFITTING/REPAIRS

Special tools required:

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

NOTE: The repair range IV for vehicle electrical system contained the required special tools and individual parts for retrofitting and repair work with the aid of fan connectors.
 The case can no longer be ordered. Order individual parts for wiring harness repair through BMW Parts Service.

Special tools:

- special tool 61 9 040

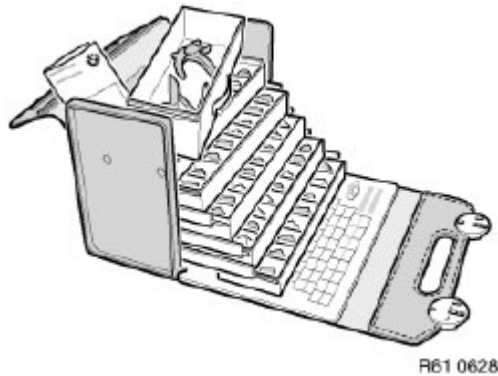


Fig. 52: Identifying BMW Special Tool Kit
Courtesy of BMW OF NORTH AMERICA, INC.

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

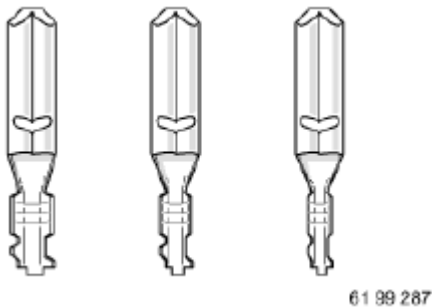


Fig. 53: Identifying Contact Sleeve
Courtesy of BMW OF NORTH AMERICA, INC.

Alternatively:

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

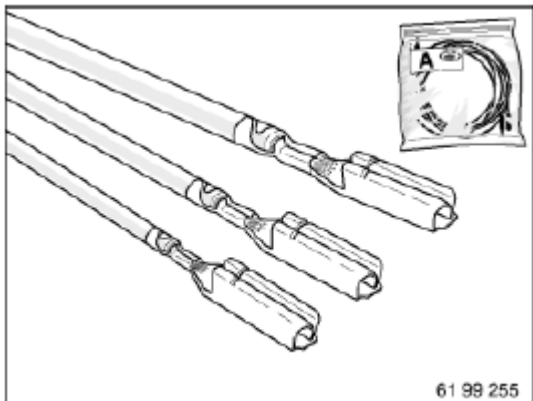


Fig. 54: Identifying Contact Sleeves For Fan Connectors

Courtesy of BMW OF NORTH AMERICA, INC.

Cut through wire loop in wiring harness at established point.

Strip insulation from both wire ends.

Refer to repair instructions:

CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES

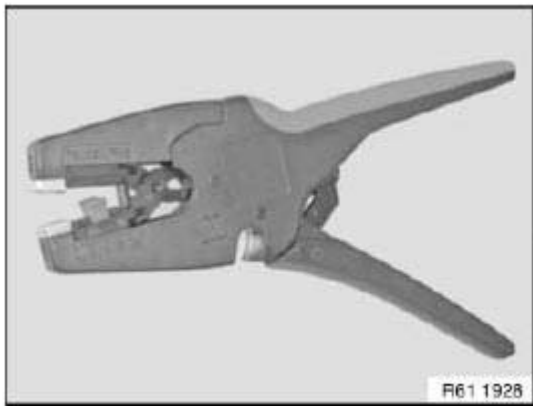


Fig. 55: Identifying Cutting Tool

Courtesy of BMW OF NORTH AMERICA, INC.

Crimp contact sleeves on both wire ends. See **61 13 CRIMPING STOP PARTS**.

NOTE: If using repair kit for contact sleeves, refer to repair instruction **BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION**.

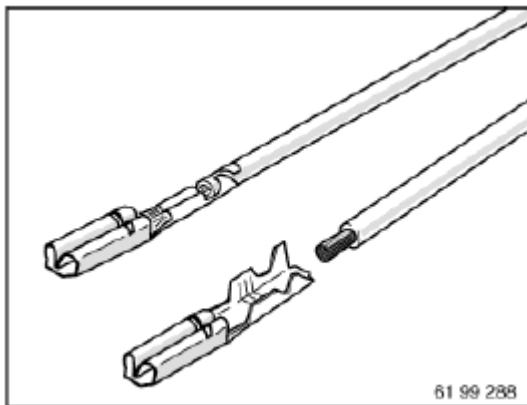


Fig. 56: Crimping Contact Sleeves On Both Wire Ends

Courtesy of BMW OF NORTH AMERICA, INC.

Crimp connecting cable for retrofitting likewise with contact sleeve.

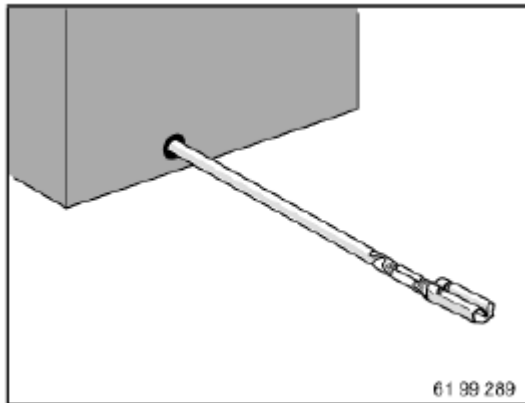


Fig. 57: Crimping Connecting Cable For Retrofitting Likewise With Contact Sleeve
Courtesy of BMW OF NORTH AMERICA, INC.

Cut required number of poles to length for fan connectors.

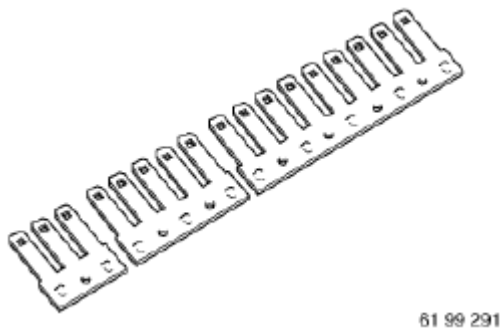
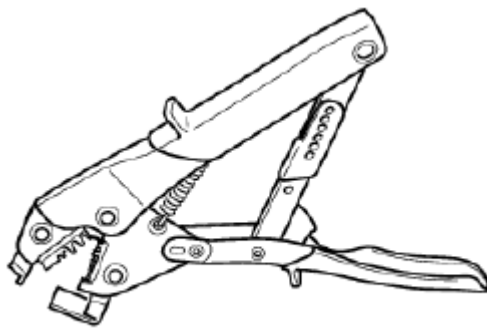


Fig. 58: Identifying Poles
Courtesy of BMW OF NORTH AMERICA, INC.

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

Refer to repair instructions:

SPECIAL TOOLS FOR WIRING HARNESS REPAIRS



61 99 217

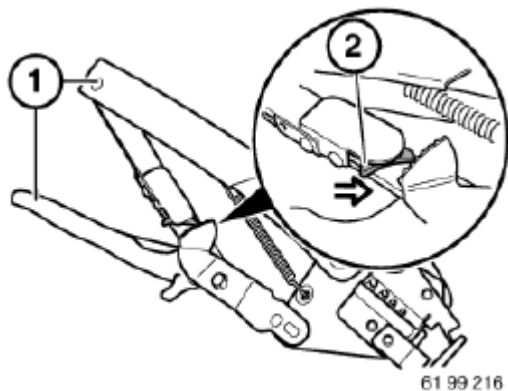
Fig. 59: Identifying Special Tool 61 9 041 (Hand Crimping Tool)
Courtesy of BMW OF NORTH AMERICA, INC.

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.



61 99 216

Fig. 60: Pushing Unlocking Lever
Courtesy of BMW OF NORTH AMERICA, INC.

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

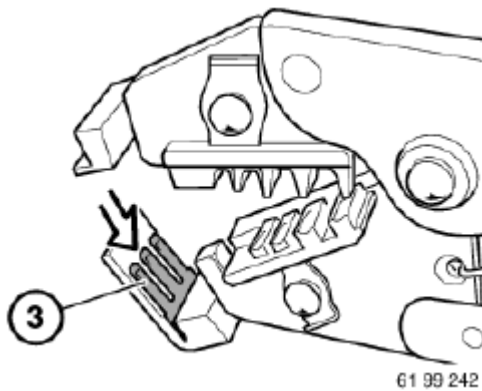


Fig. 61: Inserting Prepared Fan Connector In Special Tool 61 9 041/61 9 042
 Courtesy of BMW OF NORTH AMERICA, INC.

Attach wire with contact sleeve to fan connector.

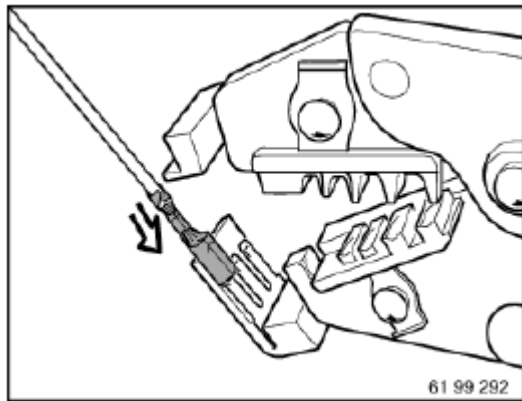


Fig. 62: Attaching Wire With Contact Sleeve To Fan Connector
 Courtesy of BMW OF NORTH AMERICA, INC.

Press crimping tool together and slide contact sleeve firmly home.

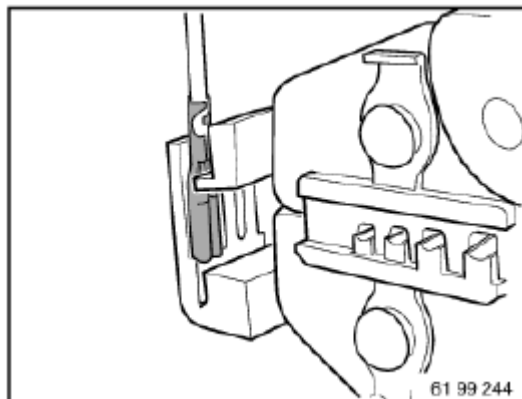
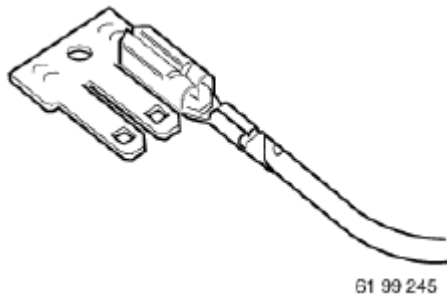


Fig. 63: Pressing Crimping Tool

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.

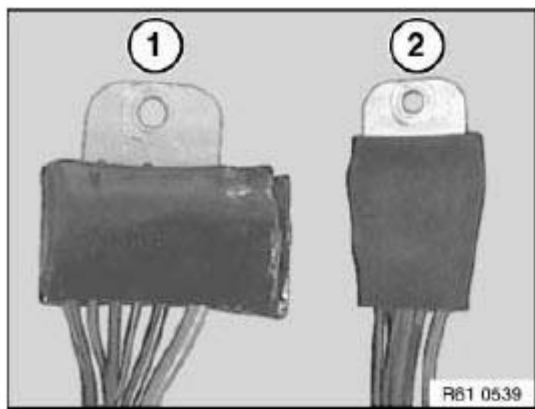
**Fig. 64: Identifying Contact Sleeves**

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).

**Fig. 65: Identifying Terminal Contacts**

Courtesy of BMW OF NORTH AMERICA, INC.

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.

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.

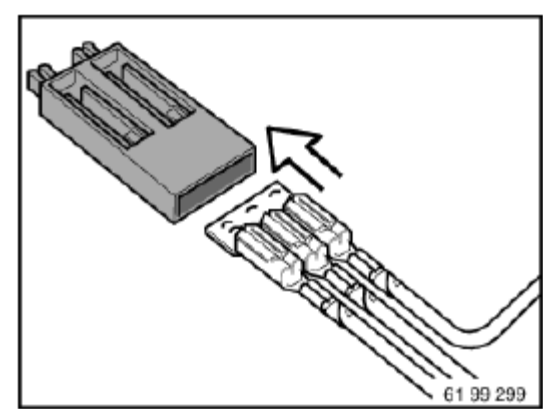


Fig. 66: Sliding Assembled Fan Connector Into Insulation Housing
Courtesy of BMW OF NORTH AMERICA, INC.

61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS

Special tools required:

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

Abbreviations and what they mean:

ABBREVIATIONS MEANINGS

D 1.5 / 2.5	Round contacts of 1.5 mm or 2.5 mm diameter
MDK 3plus	Miniature double flat spring contact
JPT ELA	Junior Power Timer flat spring contacts with strand sealing
DFK ELA	Double flat spring contacts with strand sealing
Elo	Electronic contacts with and without strand sealing Manufacturer: Siemens
Elo Power	Electronic contacts for heavy loads with and without strand sealing Manufacturer: Siemens
MQS	Micro Quadlock System electronic contacts with and without strand sealing Manufacturer: AMP

MPQ

Micro Power Quadlock electronic contacts for heavy loads with and without strand sealing
 Manufacturer: AMP

Ultrasonic-welded connectors:

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

The contacts of these connectors cannot be replaced. Replace plug completely.

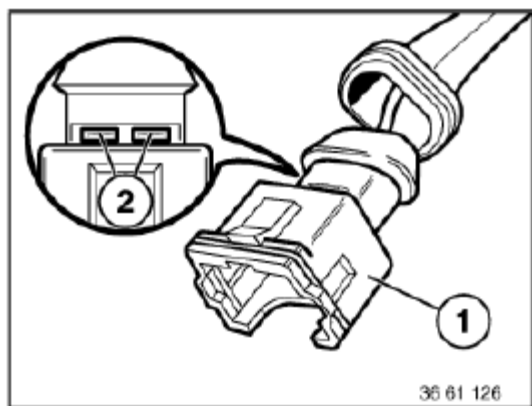


Fig. 67: Identifying Ultrasonic-Welded Connectors

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

Replaced as from 09/2005 by: 61 0 300

61 0 400

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

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

Plug system D 1.5/D 2.5:

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

- In-line plugs, 8-, 12-pin, System D 2.5
- In-line plugs, 30-pin, System D 2.5
- In-line plugs, 20-pin, System D 2.5

Plug system JPT/MDK/DFK:

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

Plug system Elo/Elo-Power:

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

Plug system MQS/MPQ:

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

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

Repair range, vehicle electrical system:

Release and press-out tool:

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

Handling:

- Opening plug housings and removing contacts of different plug systems. See **61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS.**



Fig. 68: Identifying Special Tool Kit

Courtesy of BMW OF NORTH AMERICA, INC.

Cutting to length and stripping insulation from cables:

Handling:

- Cutting to length and stripping insulation from cables . See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES.**

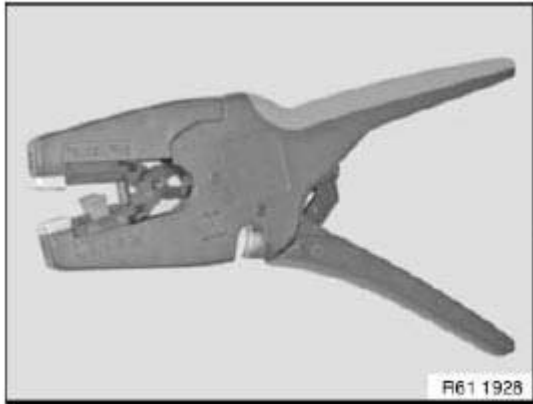


Fig. 69: Identifying Cutting Tool

Courtesy of BMW OF NORTH AMERICA, INC.

Crimping stop parts (small contacts):

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

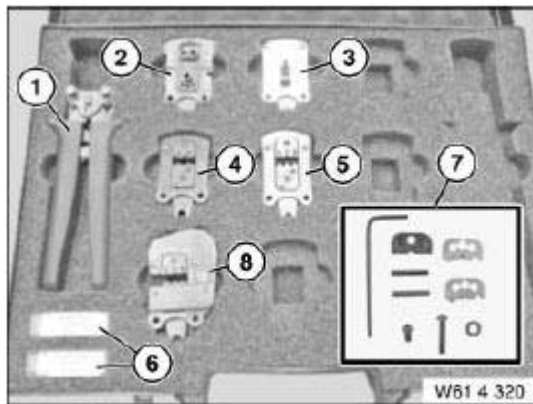


Fig. 70: Identifying Crimping Stop Parts (Small Contacts)

Courtesy of BMW OF NORTH AMERICA, INC.

Crimping stop parts (large contacts):

- Special tool 61 0 200 (crimping set)
- Special tool 61 0 210 (matrix set LSK 8)
- Special tool 61 0 220 (matrix set SLK 2.8)
- Special tool 61 0 230 (matrix set MAK 8 / DFK4)

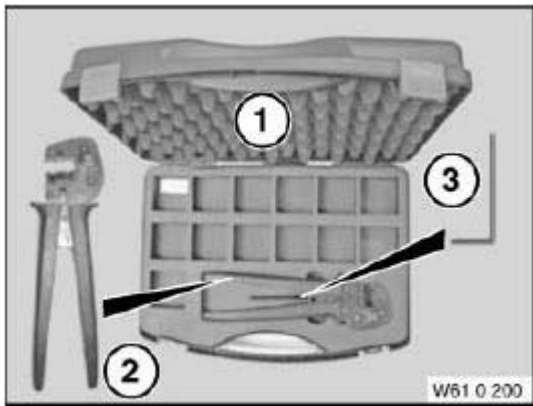


Fig. 71: Identifying Crimping Stop Parts (Large Contacts)
Courtesy of BMW OF NORTH AMERICA, INC.

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

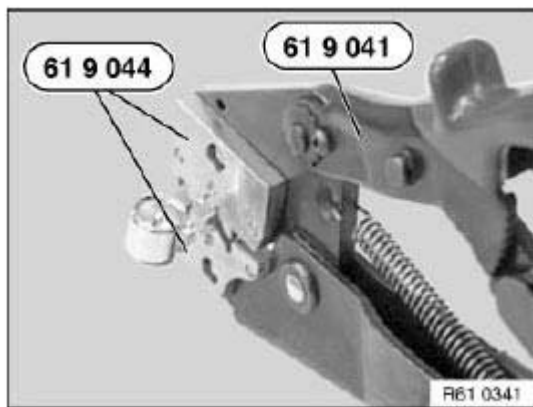


Fig. 72: Identifying Special Tool 61 9 041 And 61 9 044
Courtesy of BMW OF NORTH AMERICA, INC.

- Special tool 12 1 080

Handling:

- Crimping stop parts (contacts) . See **61 13 CRIMPING STOP PARTS.**



W12 1 080

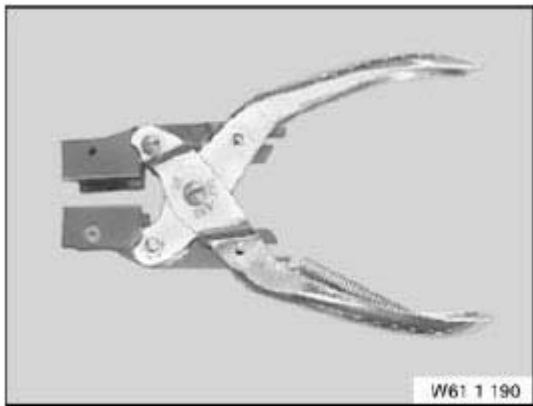
Fig. 73: Identifying Repair Kit For Ignition Cables
Courtesy of BMW OF NORTH AMERICA, INC.

Repairing ribbon cables:

- Special tool 61 1 190

Handling:

- Repairing ribbon cables



W61 1 190

Fig. 74: Identifying Special Tool 61 1 190
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Comply with notes and instructions on handling fiber-optic cables . See 61 00... NOTES ON HANDLING OPTICAL FIBERS.

Necessary preliminary tasks:

- Remove side section on rear seat backrest on left. See **52 26 008 REMOVING AND INSTALLING/REPLACING LEFT/RIGHT SIDES OF BACKREST ON REAR SEAT BACKREST (THROUGH-LOADING)** .

Remove fiber optic cable (1) from holder (2).

Unlock fiber optic cable plug (3) and remove.

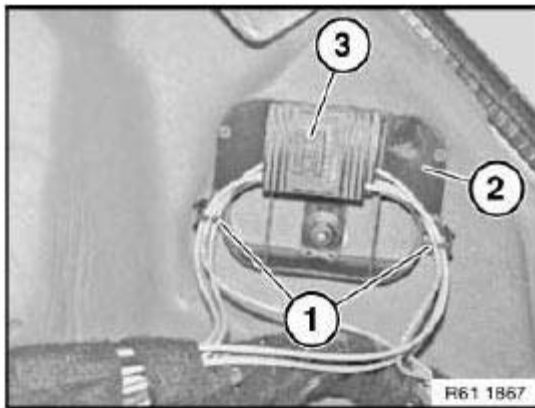


Fig. 75: Identifying Fiber Optic Cable, Fiber Optic Cable Plug And Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully raise cover cap (1) and remove from fiber optic cable plug (2).

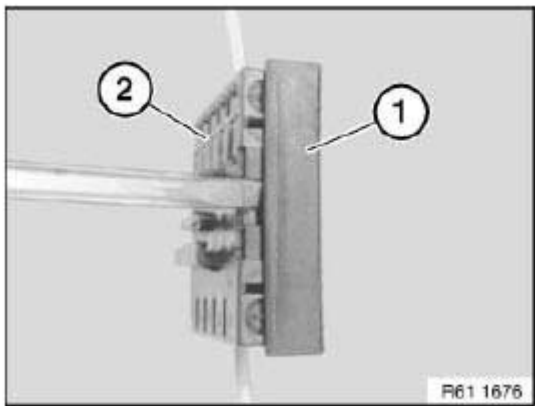


Fig. 76: Identifying Cover Cap And Fiber Optic Cable Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully raise lock (1) and pull fiber optic cable (2) out of fiber optic cable plug (3).

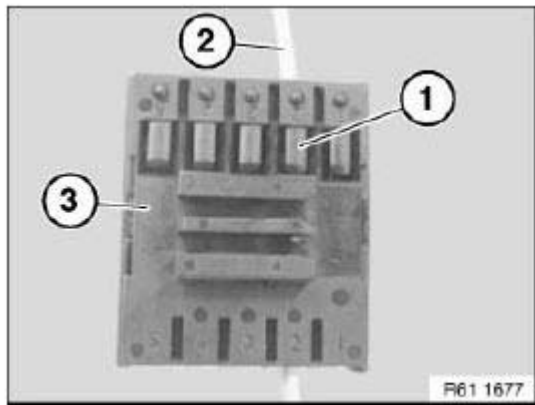


Fig. 77: Identifying Lock, Fiber Optic Cable And Fiber Optic Cable Plug
Courtesy of BMW OF NORTH AMERICA, INC.

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.

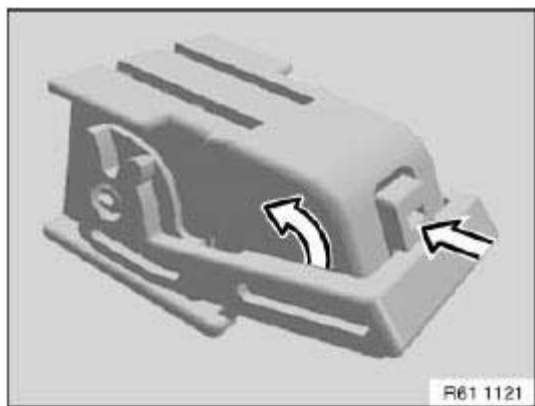
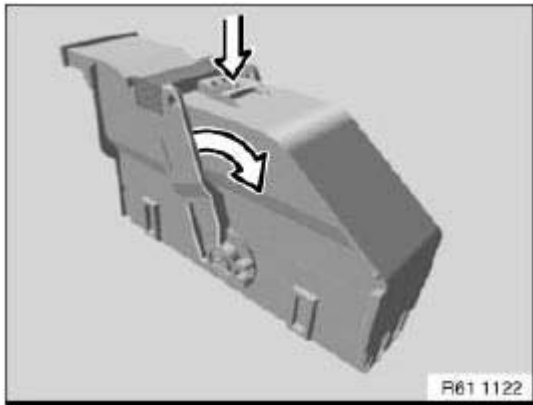


Fig. 78: Pressing Lock
Courtesy of BMW OF NORTH AMERICA, INC.

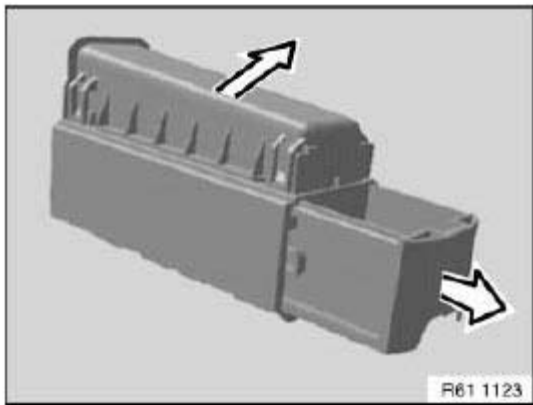
Press lock and open clip in direction of arrow.

Disconnect plug connection.

**Fig. 79: Opening Clip**

Courtesy of BMW OF NORTH AMERICA, INC.

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

**Fig. 80: Disconnecting Plug Connection**

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

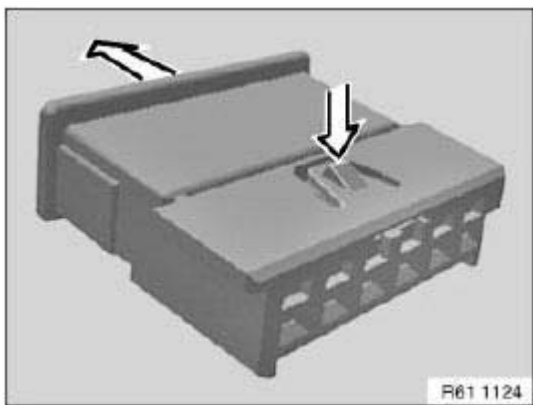
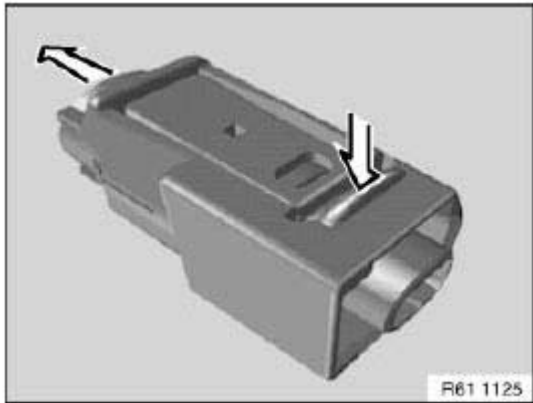
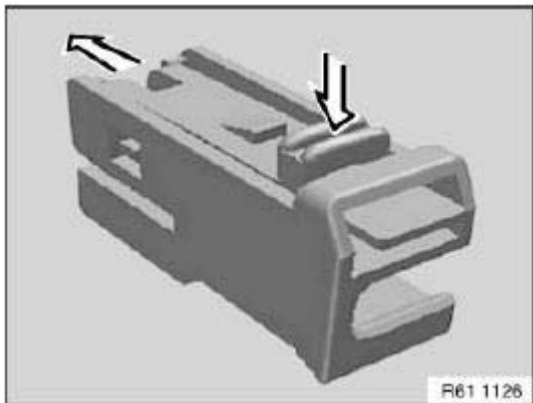


Fig. 81: Disconnecting Plug Connection**Courtesy of BMW OF NORTH AMERICA, INC.**

Press lock and disconnect plug connection in direction of arrow.

**Fig. 82: Pressing Lock****Courtesy of BMW OF NORTH AMERICA, INC.**

Press lock and disconnect plug connection in direction of arrow.

**Fig. 83: Disconnecting Plug Connection****Courtesy of BMW OF NORTH AMERICA, INC.**

Press lock and disconnect plug connection in direction of arrow.

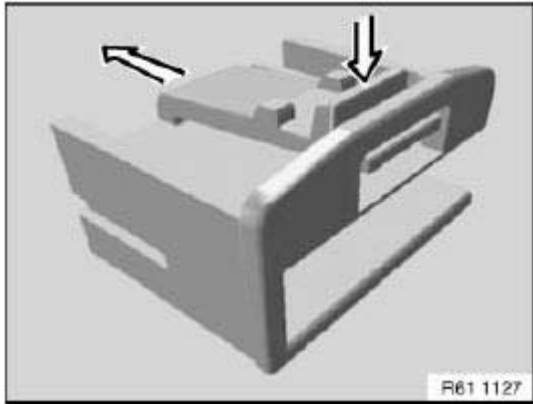


Fig. 84: Pressing Lock

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

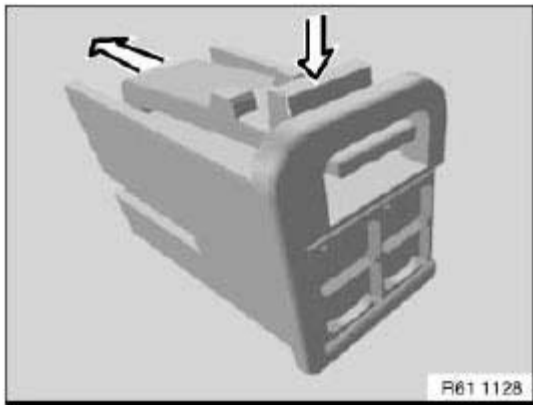


Fig. 85: Disconnecting Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Press lock and disconnect plug connection in direction of arrow.

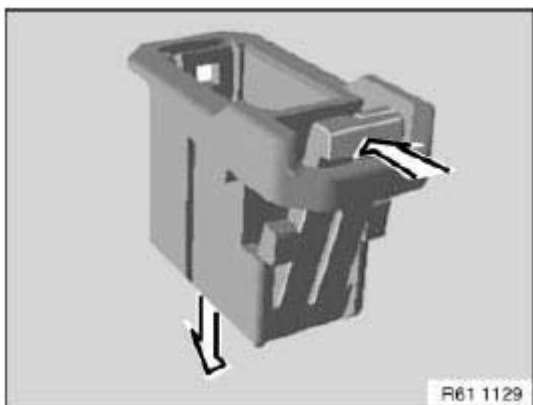
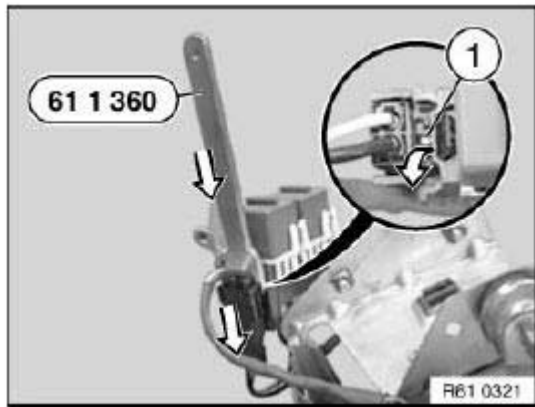


Fig. 86: Disconnecting Plug Connection

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. 87: Sliding Plug Housing Downwards Out Of Base**

Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 61 4 320

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.

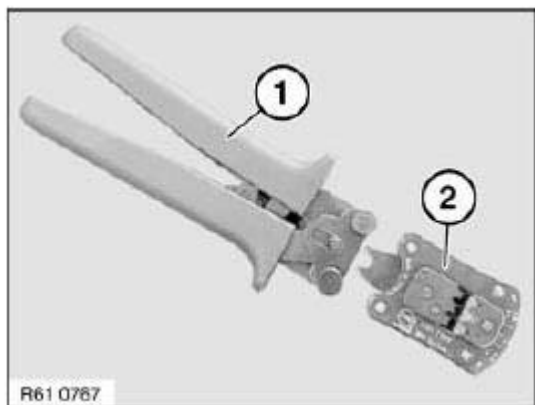


Fig. 88: Identifying Pliers 61 4 321

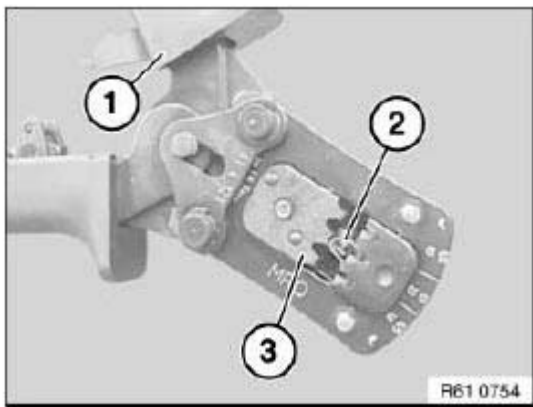
Courtesy of BMW OF NORTH AMERICA, INC.

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. 89: Identifying Pliers And Crimping Head**

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Follow procedure for cutting and stripping insulation from cables. See 61 13 CUTTING TO LENGTH 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.

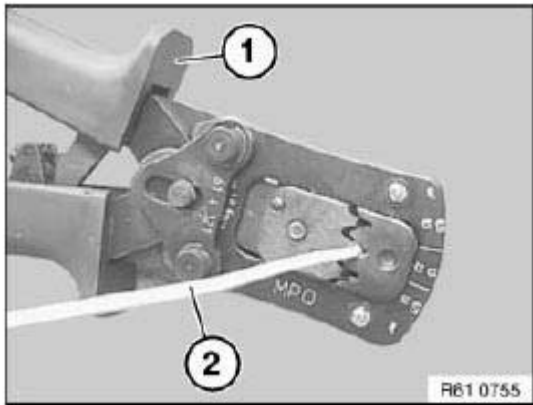


Fig. 90: Identifying Stripped Cable And Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 61 4 320

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.

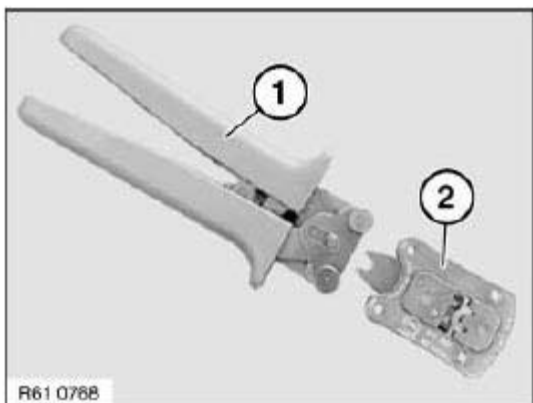


Fig. 91: Identifying Pliers 61 4 321
Courtesy of BMW OF NORTH AMERICA, INC.

Open pliers (1).

Fold up contact carrier (2).

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

Fold back contact carrier (2).

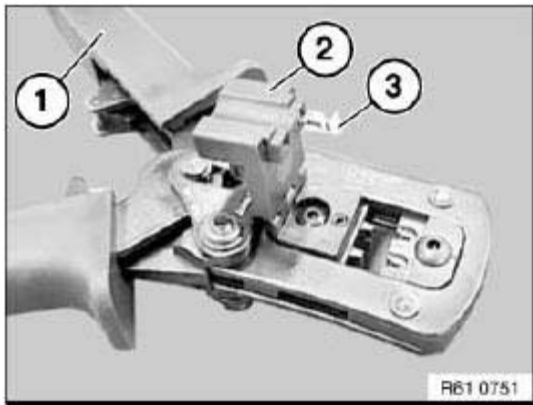


Fig. 92: Identifying Pliers And Contact Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Follow procedure for cutting and stripping insulation from cables. See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES.**

Close pliers (1) one notch.

Insert stripped cable (2).

Close pliers (1) fully.

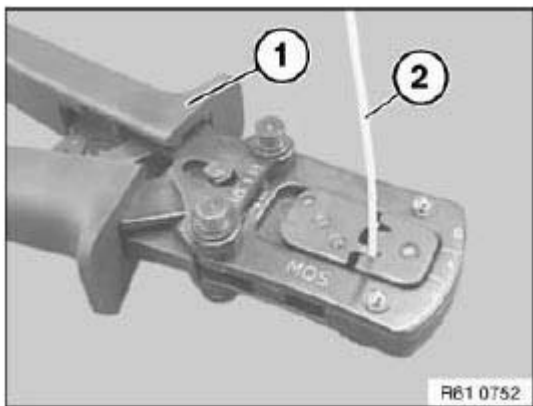


Fig. 93: Identifying Pliers And Stripped Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Open pliers (1).

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

NOTE: Check contact for correct crimping.

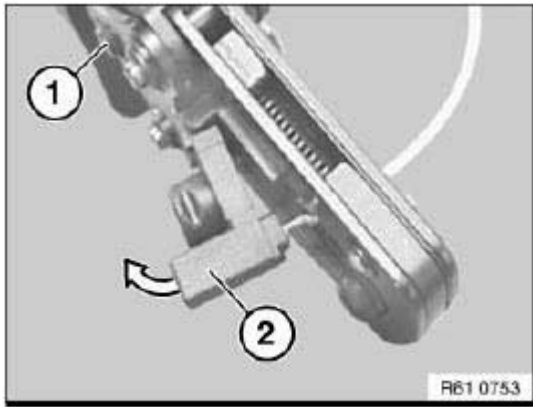


Fig. 94: Opening Contact Carrier

Courtesy of BMW OF NORTH AMERICA, INC.

61 13... CRIMPING ANNULAR CONTACTS

Special tools required:

- 61 4 320

Crimping annular contacts:

Special tool 61 4 320

61 13... CRIMPING OPTICAL FIBERS

Special tools required:

- 61 4 320

To crimp optical fibers, 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.

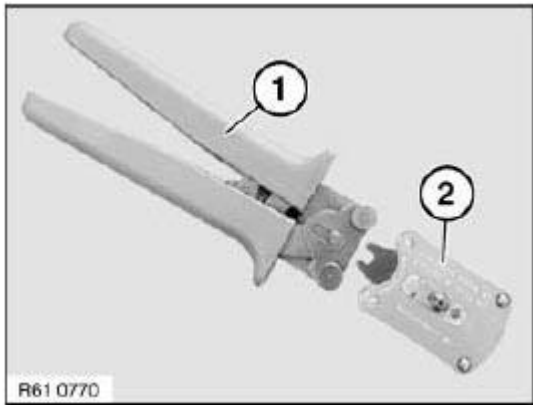


Fig. 95: Identifying Pliers 61 4 321

Courtesy of BMW OF NORTH AMERICA, INC.

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

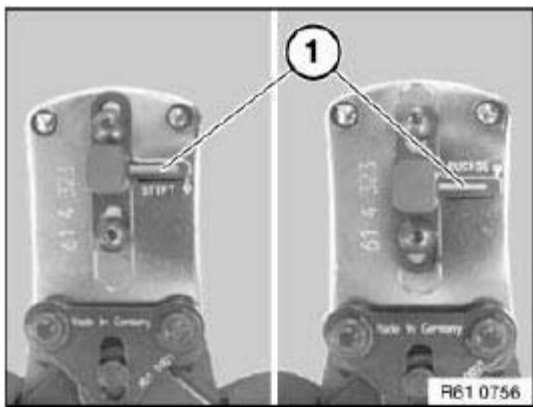


Fig. 96: Identifying Stop Lever

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).

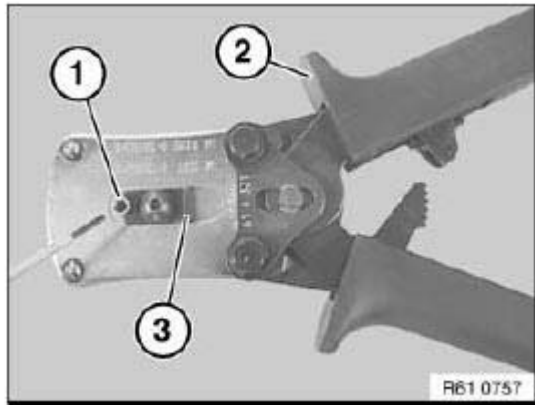


Fig. 97: Identifying Pliers, Jack And Locking Lever
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Follow procedure for cutting and stripping insulation from optical fibers. See **61 13... CUTTING OFF, STRIPPING INSULATION AND CUTTING OPTICAL FIBERS TO LENGTH.**

Insert stripped optical fiber (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 fiber (1).

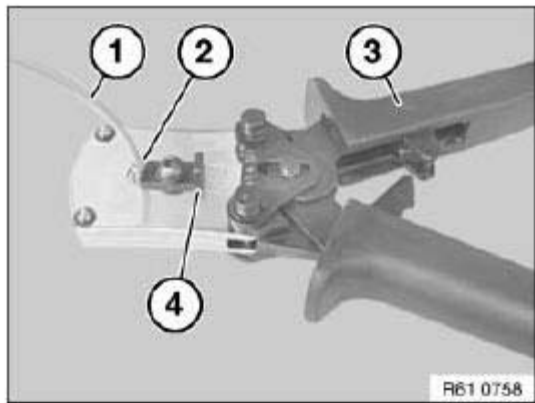


Fig. 98: Identifying Stripped Optical Fiber, Pliers And Optical Fiber
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Make sure optical fiber is correctly seated in jack.

End of optical fiber (1) must be flush with tip of pin contact (2).

Wrong (B)

End of optical fiber (1) is not flush with tip of pin contact (2).

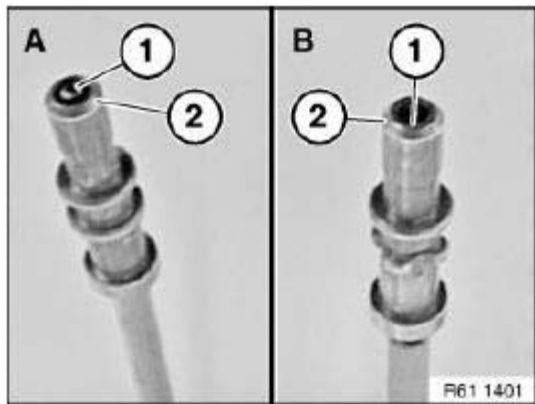


Fig. 99: Identifying End Of Optical Fiber

Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 61 4 320

To cut off, strip insulation and cut optical fibers 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.

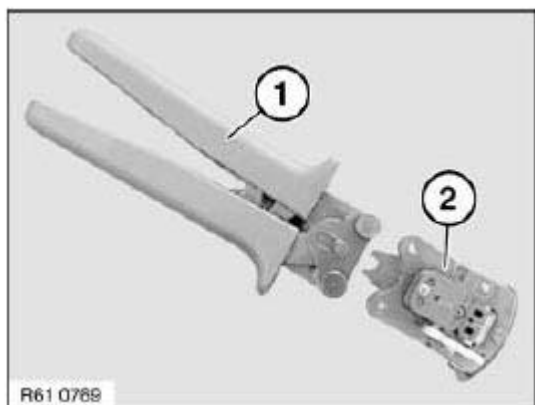


Fig. 100: Identifying Pliers 61 4 321

Courtesy of BMW OF NORTH AMERICA, INC.

Cutting optical fiber

Open pliers (1).

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

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

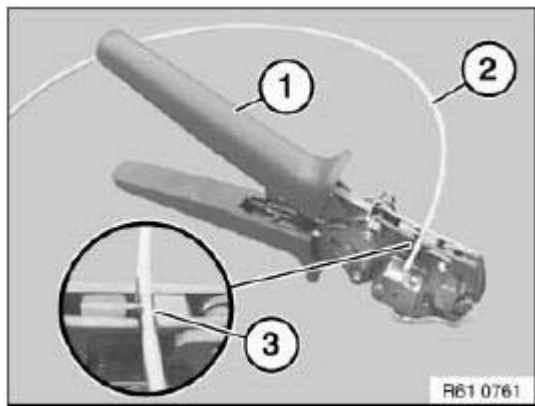


Fig. 101: Identifying Optical Fiber In Cutting Device
Courtesy of BMW OF NORTH AMERICA, INC.

Stripping insulation from optical fiber

Open pliers (1).

Open lever (2) in direction of arrow.

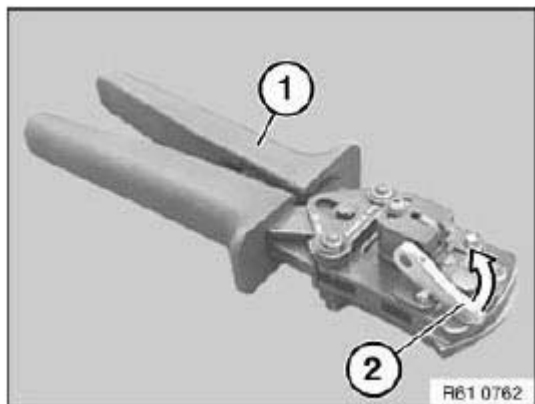


Fig. 102: Opening Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Slide optical fiber (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 fiber (1).

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

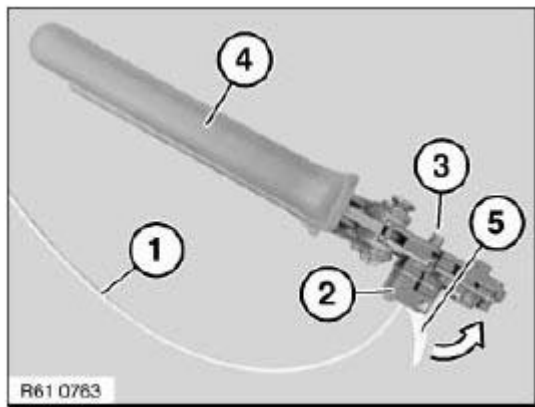


Fig. 103: Closing Clamping Lever

Courtesy of BMW OF NORTH AMERICA, INC.

Cutting optical fiber to length

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

Pull pin (1) in direction of arrow.

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

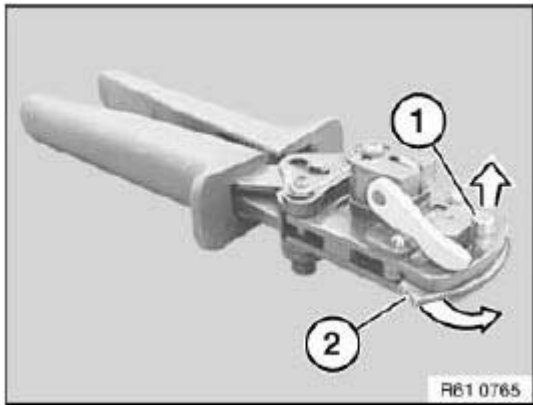


Fig. 104: Pulling Pin

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).

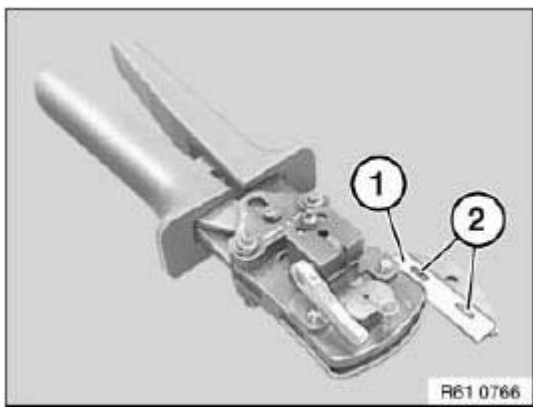


Fig. 105: Identifying Blade

Courtesy of BMW OF NORTH AMERICA, INC.

Open pliers (3).

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

Close pliers (3) fully and keep closed.

Remove optical fiber (1).

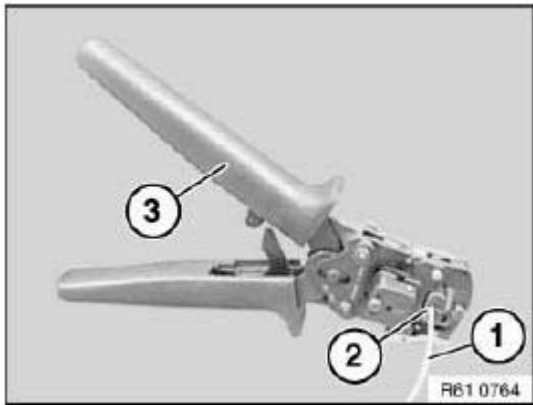


Fig. 106: Identifying Pliers, Optical Fiber And Cutting Device
Courtesy of BMW OF NORTH AMERICA, INC.

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.

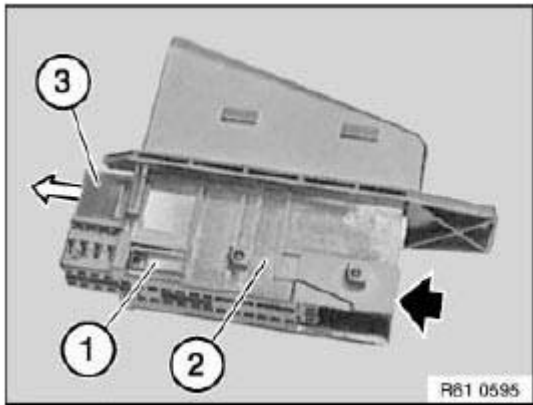


Fig. 107: Pushing Contact Carrier From Rear Out Of Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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).

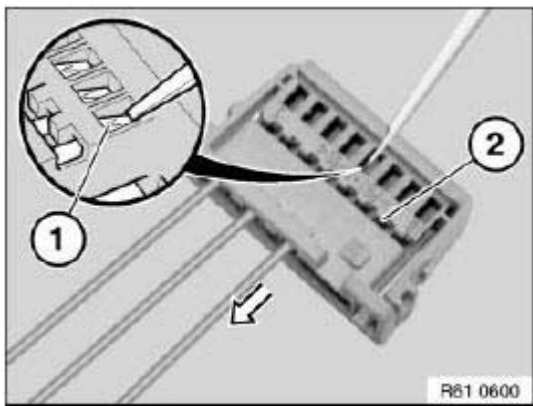


Fig. 108: Pulling Wire With Socket Contact
Courtesy of BMW OF NORTH AMERICA, INC.

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

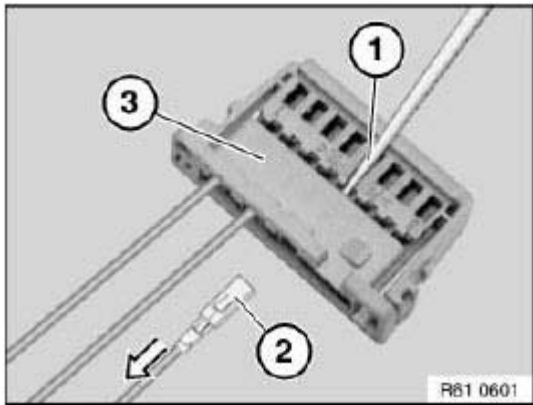


Fig. 109: Pulling Cable With Socket Contact Out Of Contact Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

Pin housing:

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

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

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

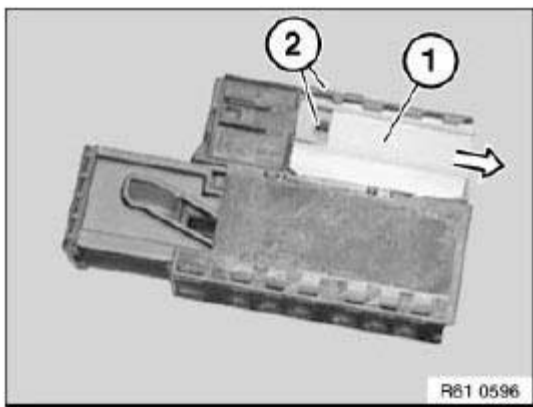


Fig. 110: Detaching Locking Slide
Courtesy of BMW OF NORTH AMERICA, INC.

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

Pull slide (1) outwards completely.

Raise lock (2) on housing.

Pull contact carrier (3) out of housing.

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

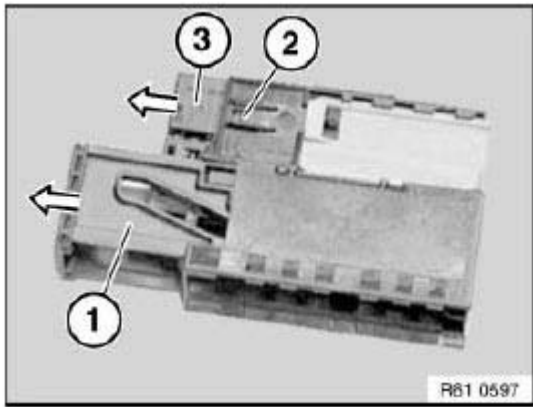


Fig. 111: Pulling Contact Carrier Out Of Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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

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

Special tools required:

- 61 0 317

Socket housing:

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

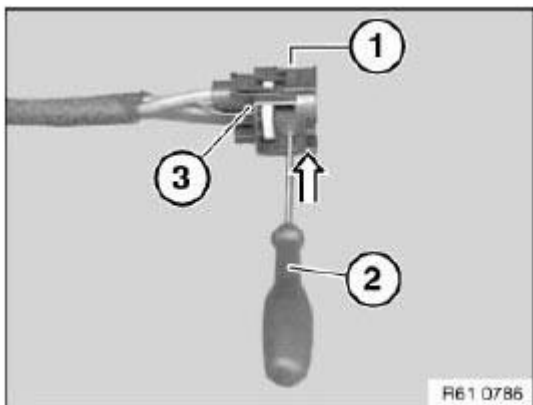


Fig. 112: Pressing Lock Out Of Socket Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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

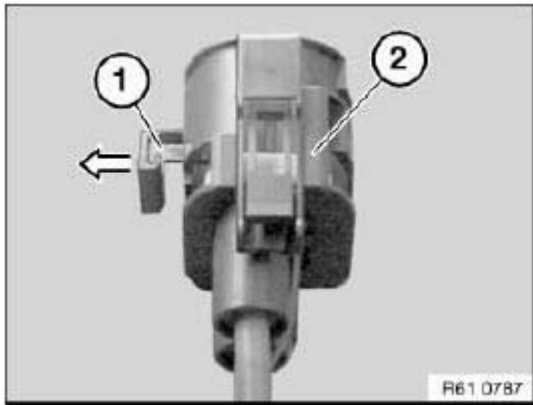


Fig. 113: Pulling Lock Out Of Socket Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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

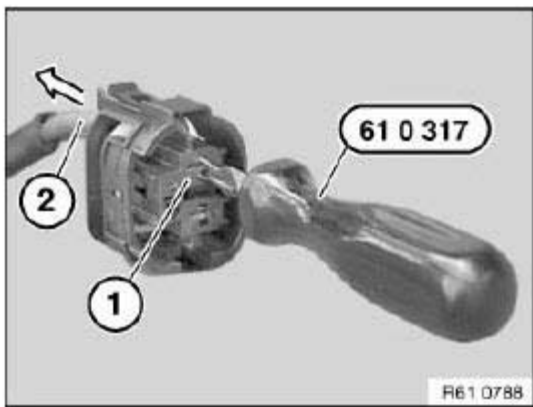


Fig. 114: Pulling Out Lead With LCC Contact
Courtesy of BMW OF NORTH AMERICA, INC.

Pin housing:

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

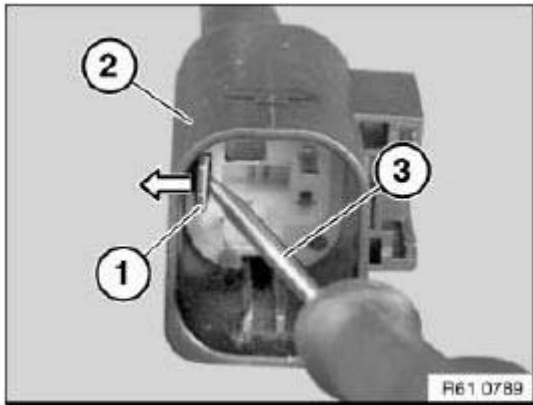


Fig. 115: Unlocking Locking Slide Of Pin Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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

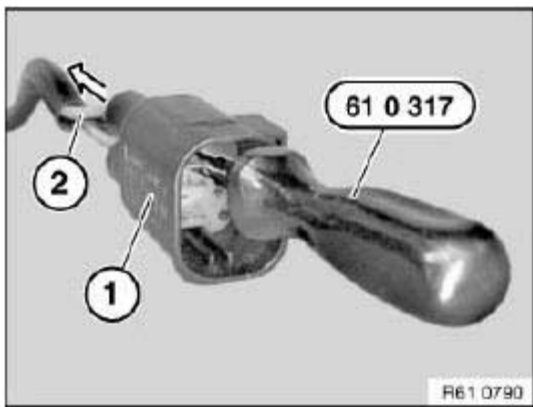


Fig. 116: Pulling Out Lead With LCC Contact
Courtesy of BMW OF NORTH AMERICA, INC.

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.

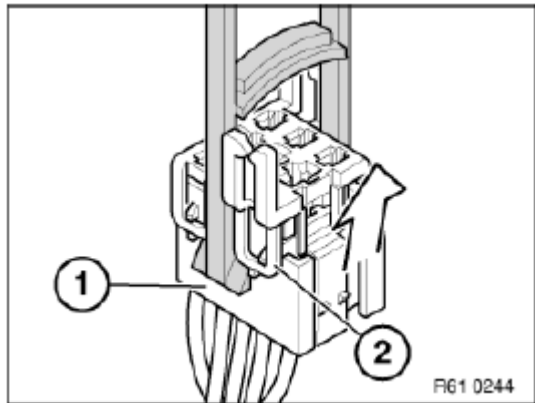


Fig. 117: Pulling Relay Carrier

Courtesy of BMW OF NORTH AMERICA, INC.

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

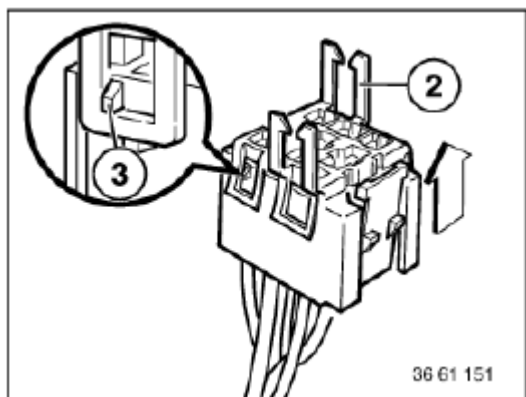


Fig. 118: Pulling Relay Carrier Into First Catch

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).

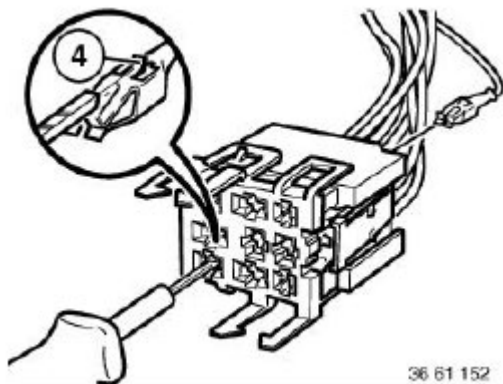


Fig. 119: Pressing Down Arrester Hook
 Courtesy of BMW OF NORTH AMERICA, INC.

61 13... REPAIRING RIBBON CABLES

Special tools required:

- 61 1 190

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

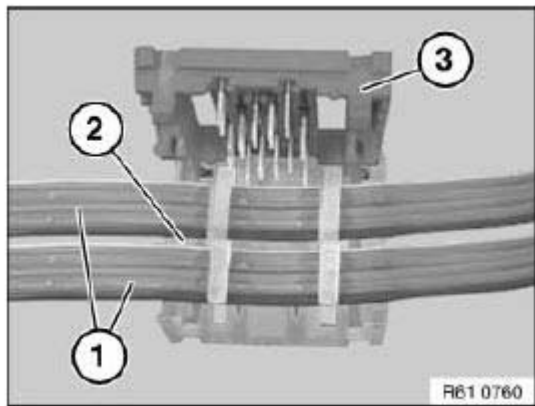


Fig. 120: Identifying Ribbon Cables, Connector Housing And Cover
 Courtesy of BMW OF NORTH AMERICA, INC.

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

Close tool (2).

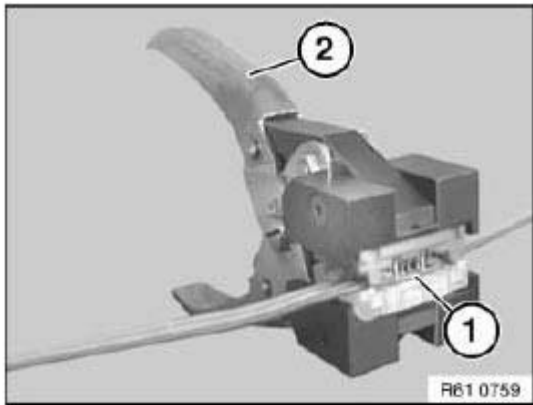


Fig. 121: Identifying Connector Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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.

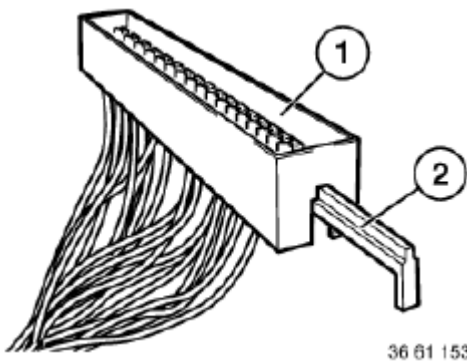


Fig. 122: Identifying Fuse Block And Locking Slide
Courtesy of BMW OF NORTH AMERICA, INC.

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

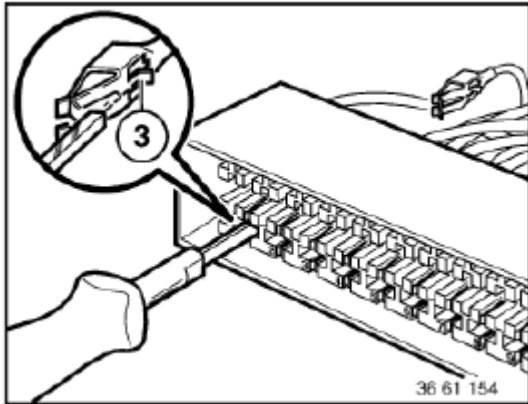


Fig. 123: Pressing Back Arrester Hook Of Appropriate Contact
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

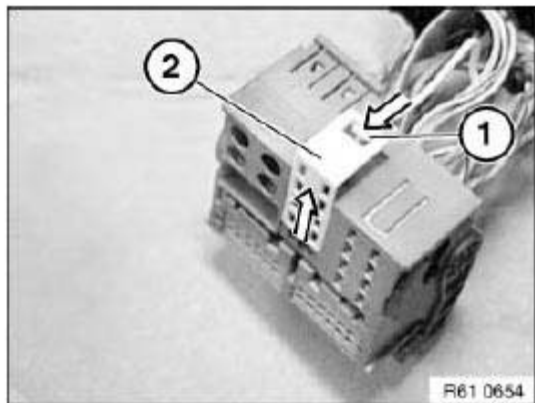


Fig. 124: Pressing Lock
 Courtesy of BMW OF NORTH AMERICA, INC.

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).

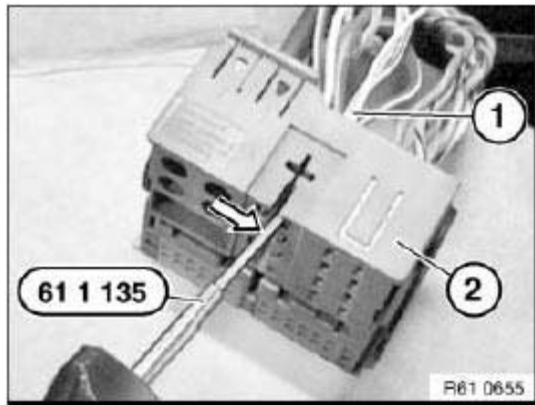


Fig. 125: Pressing Special Tool 61 1 135
Courtesy of BMW OF NORTH AMERICA, INC.

Removing MQS contacts from contact carrier:

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

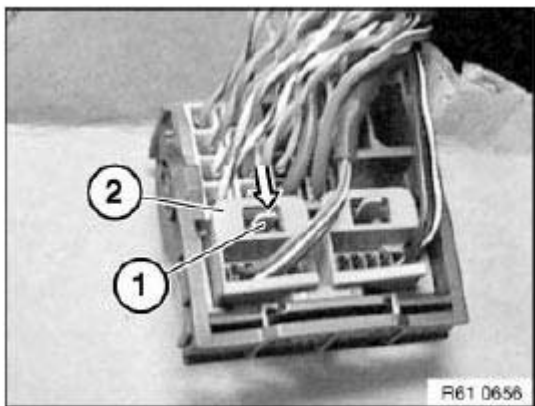


Fig. 126: Pressing Lock
Courtesy of BMW OF NORTH AMERICA, INC.

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.

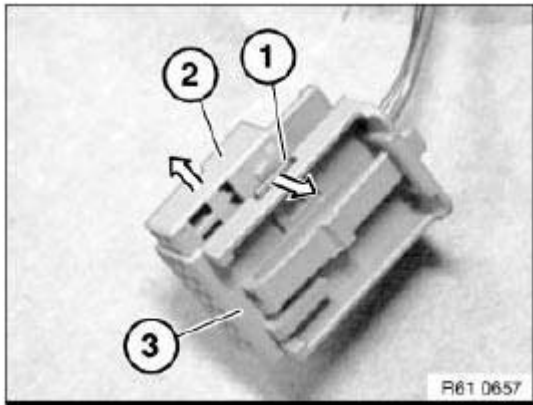


Fig. 127: Pressing Lock

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.

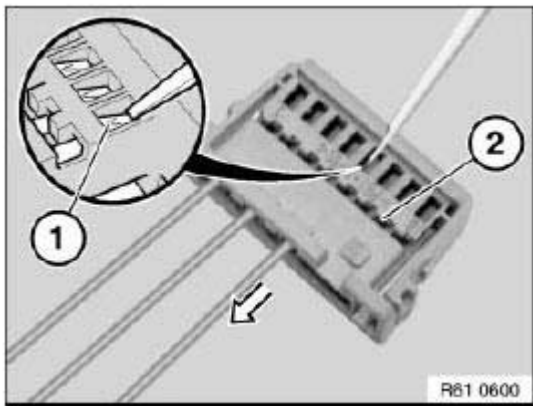


Fig. 128: Pulling Wire With Socket Contact

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).

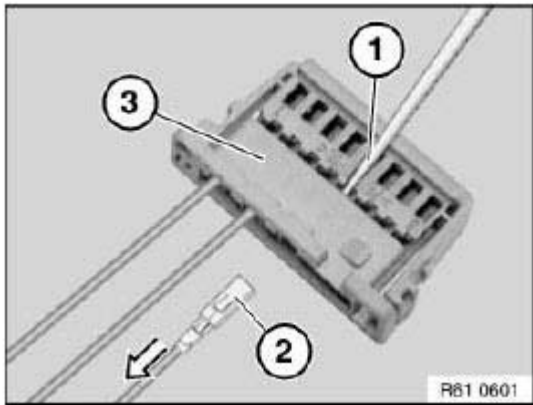


Fig. 129: Pulling Cable With Socket Contact Out Of Contact Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

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.

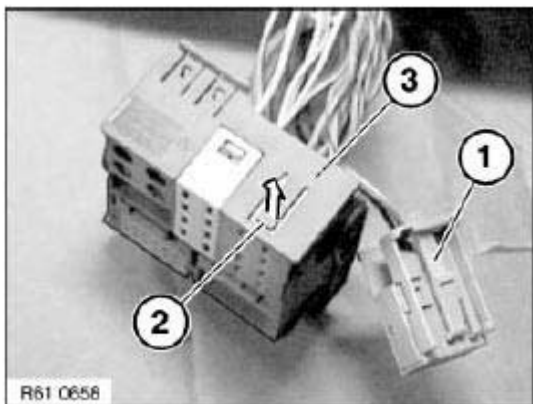


Fig. 130: Pulling Contact Carrier Out Of Radio Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Press lock (1) in direction of arrow.

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

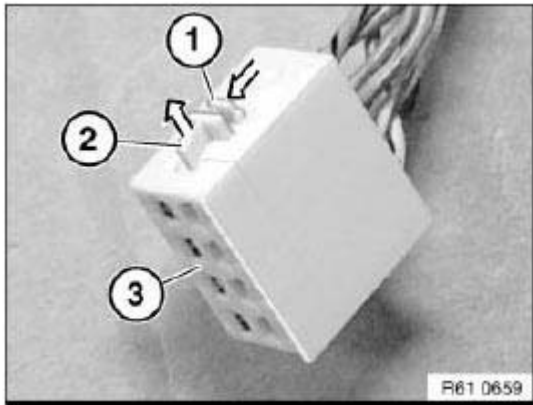


Fig. 131: Pulling Secondary Lock Out Of Contact Carrier
 Courtesy of BMW OF NORTH AMERICA, INC.

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).

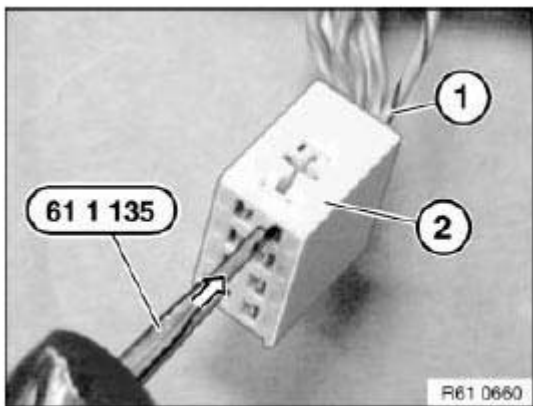


Fig. 132: Pressing Special Tool 61 1 135 On Inside Of Contact Into Contact Carrier
 Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 61 1 190
- 61 4 320

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

Repair range for vehicle electrical system	SI 2 04 07 341
Crimping set with tool for fiber-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

Subject of repair instructions

- Special tools for wiring harness repairs . See **61 13 SPECIAL TOOLS FOR WIRING HARNESS REPAIRS**
- Cutting to length and stripping insulation from cables . See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES**.
- Crimping stop parts (contacts) . See **61 13 CRIMPING STOP PARTS**.
- Butt connector for repairing a plug connection . See **61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION**.
- Fan connector for retrofitting/repairs . See **61 13 INSTALLING FAN CONNECTOR FOR RETROFITTING/REPAIRS**.
- Cutting to length and stripping insulation from optical fibers . See **61 13... CUTTING OFF, STRIPPING INSULATION AND CUTTING OPTICAL FIBERS TO LENGTH**.
- Crimping optical fibers . See **61 13... CRIMPING OPTICAL FIBERS**.
- Insulation displacement connector for repairing ribbon cables . See **61 13... REPAIRING RIBBON CABLES**.

61 13 042 REPLACING DISTRIBUTION BOX (LUGGAGE COMPARTMENT)

WARNING: Observe safety instructions for handling vehicle battery. See **61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY**.

Necessary preliminary tasks:

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD**.
- Remove flap in luggage compartment panel on right . See **51 47 172 REMOVING AND INSTALLING/REPLACING FLAP IN LUGGAGE COMPARTMENT TRIM, LEFT OR RIGHT**.

Release expansion rivet (1).

Remove insulating mat (2).

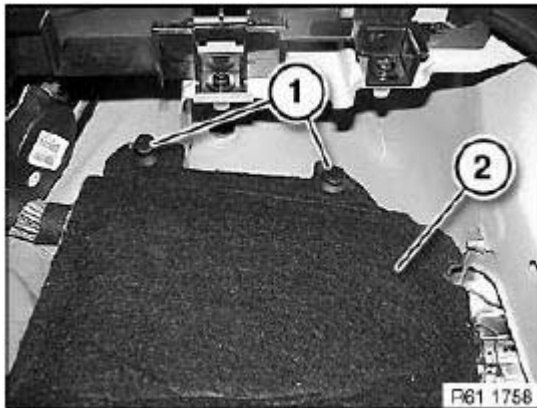


Fig. 133: Identifying Expansion Rivet And Insulating Mat
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release bolts (2).

Disengage distribution box in direction of arrow.

Disengage emergency actuator (3).

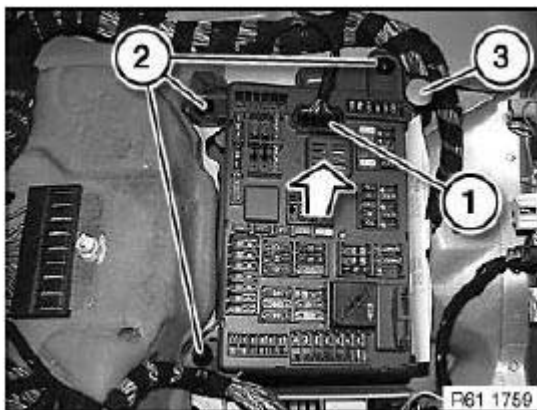


Fig. 134: Disengaging Distribution Box
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

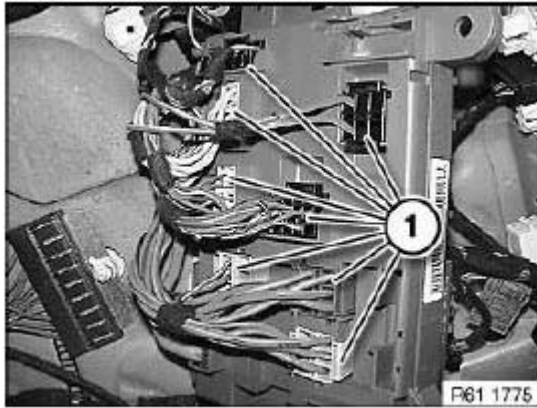


Fig. 135: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Remove distribution box.

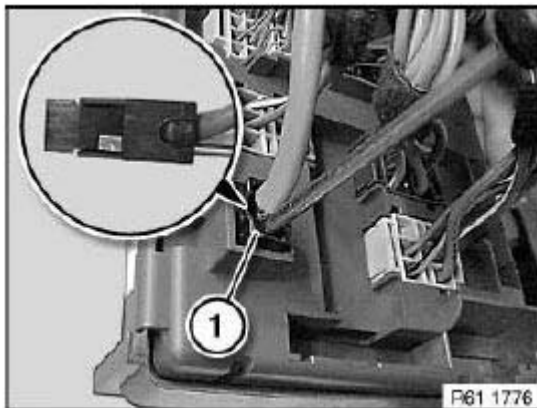


Fig. 136: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Remove fuses and relays.

61 13 050 REMOVING AND INSTALLING/REPLACING INTERIOR FUSE BOX

Necessary preliminary tasks:

- Remove trim for instrument panel, bottom left . See **51 45 181 REMOVING AND INSTALLING/REPLACING BOTTOM RIGHT TRIM FOR INSTRUMENT PANEL** .
- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD** .

Release screws (1).

Remove air duct (2).

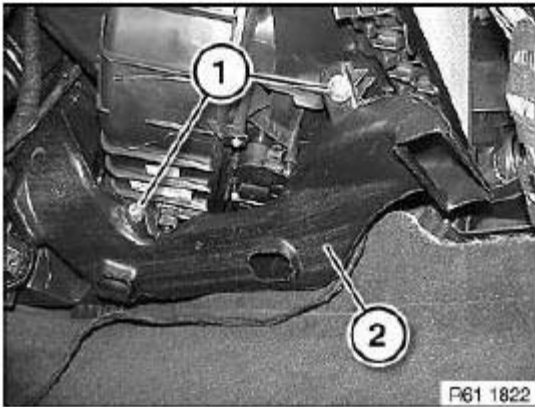


Fig. 137: Identifying Air Duct

Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Slacken wiring harness in cable holder (2).

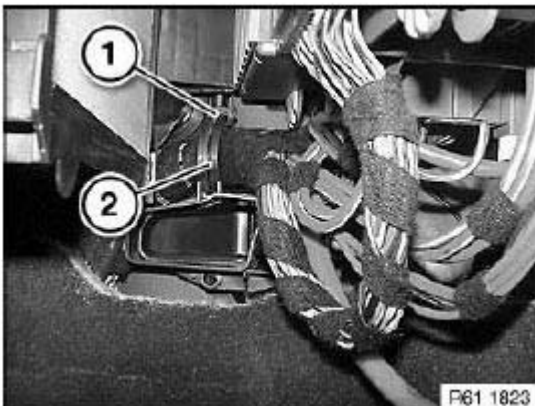


Fig. 138: Identifying Cable Holder

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screw (2).

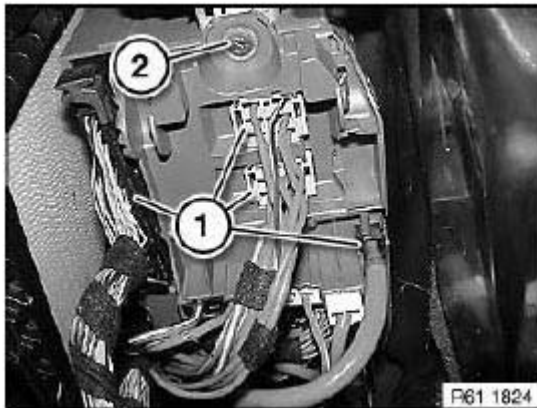


Fig. 139: Identifying Plug Connection

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).

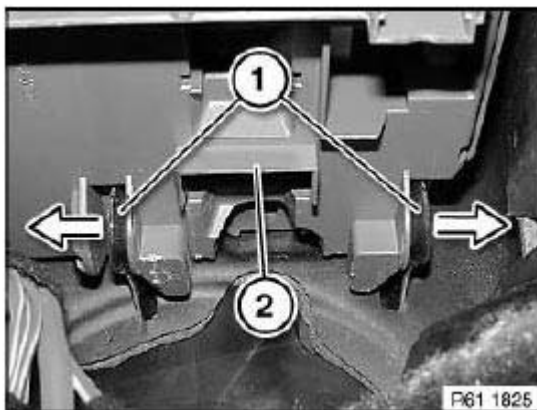


Fig. 140: Removing Holders

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

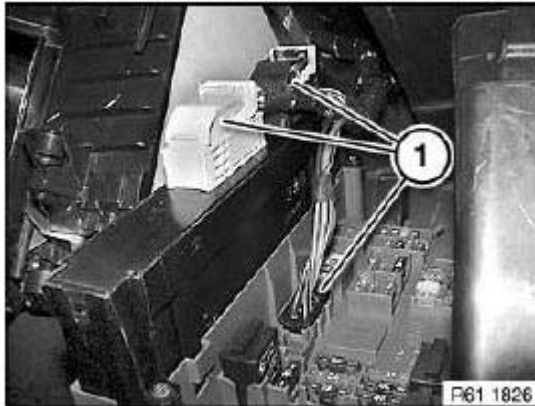


Fig. 141: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

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

Detach plug connections (1) on back of fuse box (2).

Replacement:

Remove fuses and relays.

Remove junction box electronics . See **61 35 107 REMOVING AND INSTALLING/REPLACING JUNCTION BOX ELECTRONICS.**

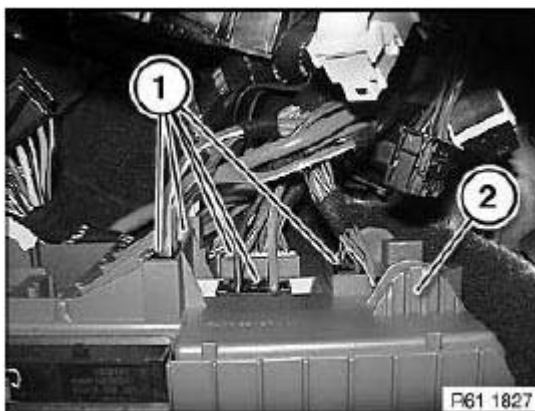


Fig. 142: Identifying Plug Connections And Fuse Box

Courtesy of BMW OF NORTH AMERICA, INC.

14 DISTRIBUTION BOX, POWER

61 13 042 REPLACING DISTRIBUTION BOX (LUGGAGE COMPARTMENT)

**WARNING: Observe safety instructions for handling vehicle battery. See 61 00...
SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.**

Necessary preliminary tasks:

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.**
- Remove flap in luggage compartment panel on right . See **51 47 172 REMOVING AND INSTALLING/REPLACING FLAP IN LUGGAGE COMPARTMENT TRIM, LEFT OR RIGHT .**

Release expansion rivet (1).

Remove insulating mat (2).

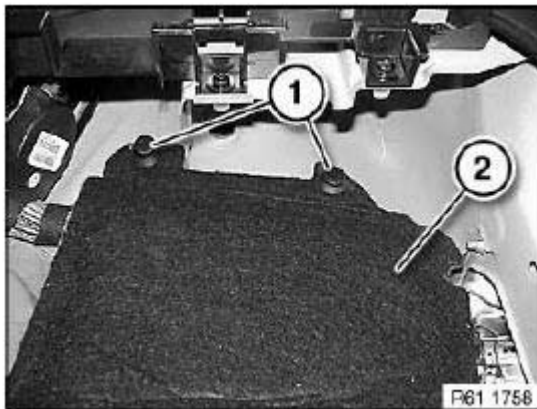


Fig. 143: Identifying Expansion Rivet And Insulating Mat
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release bolts (2).

Disengage distribution box in direction of arrow.

Disengage emergency actuator (3).

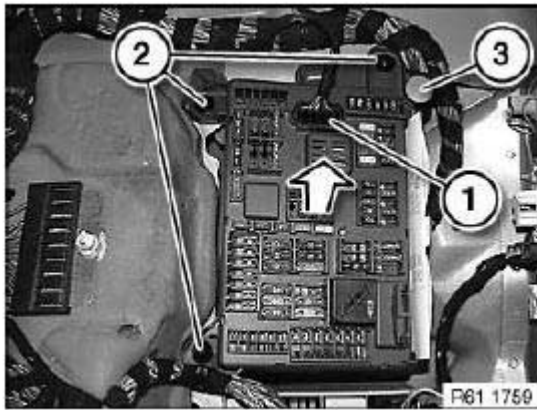


Fig. 144: Disengaging Distribution Box
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

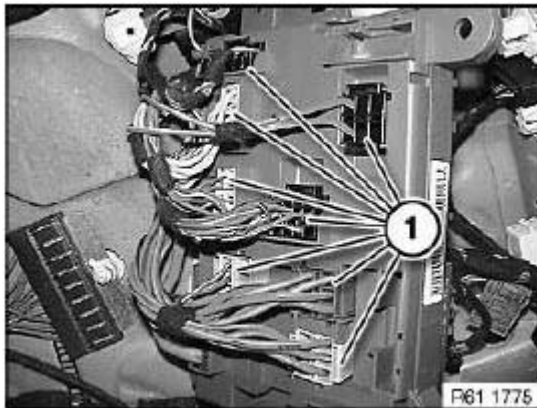


Fig. 145: Identifying Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Remove distribution box.

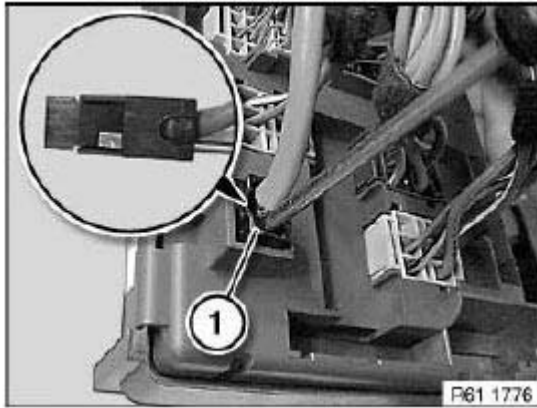


Fig. 146: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Remove fuses and relays.

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

WARNING: Observe safety instructions for handling vehicle battery. See 61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.
Notes and instructions on Intelligent Battery Sensor IBS . See 61 12... GENERAL INFORMATION ON INTELLIGENT BATTERY SENSOR (IBS).

Necessary preliminary tasks:

- Disconnect negative battery cable . See 61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.

Disconnect plug connection (1).

Fold up covers (2).

Release nut (3) and remove cable shoe.

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

Fold up covers (5).

Unscrew nuts (4).

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

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

Remove distribution box (2) towards top.

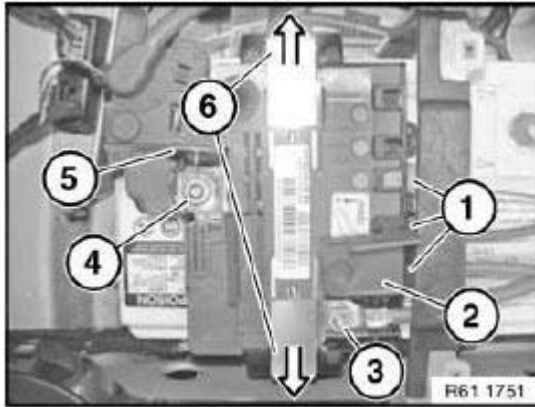


Fig. 147: Expanding Locking Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

20 BATTERY

12 00... INSTRUCTIONS FOR DISCONNECTING AND CONNECTING BATTERY

Observe safety instructions for handling vehicle battery . See **61 00... 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.

- 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. See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD**.
- 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 **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

After connecting battery:

IMPORTANT: After a power supply interruption some equipment is disabled and must be reactivated.

Likewise, individual settings are lost and must be activated.

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 6 hours) > if necessary, notify customer of the situation
- **E46 (AWD)/ E53/ E83:** Carry out steering angle sensor adjustment . See **61 31 996 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 PANORAMA GLASS ROOF (INITIALIZATION/NORMALIZATION/LEARNING OF CHARACTERISTIC CURVE)** .
- If necessary, activate power windows . See **67 62 ... NOTES ON INITIALIZING POWER WINDOW UNIT IN FRONT DOOR** .
- If necessary, activate mirror with compass . See **51 16 ... CALIBRATING COMPASS IN INTERIOR REARVIEW MIRROR** .

Please refer to the Progan user documentation for further information on vehicle-specific activation.

Starter and equipment batteries

A two-battery system has a starter battery circuit and an equipment battery circuit. A secondary control unit monitors both battery circuits. Depending on the situation, the battery circuits are connected to or isolated from the secondary 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 secondary control unit automatically detects a charging operation at a charging voltage at the starter battery of $>$ or $= 13.5$ 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.**

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... INSTRUCTIONS ON STARTING AID

Do not start the engine with help of starting sprays.

Preparation:

Conform with the following when starting engine with starting cable.

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

CAUTION: Never touch ignition system components and current - dangerous high tension!

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

Carrying out:

Always conform with the procedures to avoid injury to persons or damage to parts.

- On automatic transmission, select "P" setting, apply handbrake.
- Move the shift lever of vehicles with manual transmission into neutral and apply the parking brake.
- Ensure that the jump leads cannot get caught in rotating parts, e.g. fan.
- First connect positive terminals of both batteries with one jump lead (red).
- Use positive connection point in engine compartment for vehicles with one battery in trunk.
- Then attach second jump lead (black) to negative terminal of donor battery and to engine ground or body ground on vehicle to be started.

CAUTION: Never connect second jump lead (black) to negative terminal of battery in

vehicle to be started. This would produce explosive gas which could be ignited by sparks.

Danger of explosion!

After engine of vehicle to be started has started up, first disconnect the jump lead on the negative terminal/ground connection. Then remove jump lead from positive terminals.

32 00... TEACHING IN CENTRE POSITION FOR POWER STEERING (ACTIVE FRONT STEERING) (FROM 03/2007)

NOTE: Carry out the following procedure after disconnecting the battery or disconnecting electrical plug connections on the steering column switch cluster.

Turn on ignition, start engine if necessary.

Turn steering wheel twice in both directions to full lock.

IMPORTANT: If the indicator lamp does not go out after the ignition is turned on again, an adjustment of the active front steering must be carried out. See 32 10 005 ADJUSTMENT FOR ACTIVE FRONT STEERING .



R32 0849

Fig. 148: Identifying Ignition Lamp Indicator
Courtesy of BMW OF NORTH AMERICA, INC.

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. The time for self-discharging depends on vehicle type and equipment

specification.

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 sulphated and/or heavily contaminated plates will also lead to incorrect acid density test results.

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. See 12 00... 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.

Cutting off and insulating cables. See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES**.

Repairing a plug connection using connectors. See **61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION**.

Installing and removing contacts. See **61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS**.

In event of visible damage:

Expose cable at damaged areas. Cut through one cable after the other at an appropriate position and insulate cables no longer required in wiring harness with insulating tape, do not under any circumstances cut through both cables at the same time. Now, depending on the scope of work, unpin contacts either on airbag control unit/airbag module or on adapter plug. Cut off unpinned cables. Insulate cables remaining in wiring harness with insulating tape. Now pin in contacts of repair cable, assignment of repair cables is relevant. Lay repair 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.

Instructions for cutting off, insulating, crimping cables, installing and removing contacts:

Cutting off and insulating cables. See **61 13 CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES**.

Repairing a plug connection using connectors. See **61 13 BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION**.

Installing and removing contacts. See **61 13 OPENING PLUG HOUSINGS AND REMOVING CONTACTS OF DIFFERENT PLUG SYSTEMS**.

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 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 12 013 REPLACING BATTERY NEGATIVE LEAD

WARNING: Observe safety instructions for handling vehicle battery. See 61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.
Follow instructions for disconnecting and connecting battery. See 12 00... INSTRUCTIONS FOR DISCONNECTING AND CONNECTING BATTERY.

IMPORTANT: Do not under any circumstances use force to pull/lever off Intelligent Battery Sensor (IBS).

Necessary preliminary tasks:

- Raise luggage compartment floor trim

Release screws (1).

Remove battery cover (2) upwards.

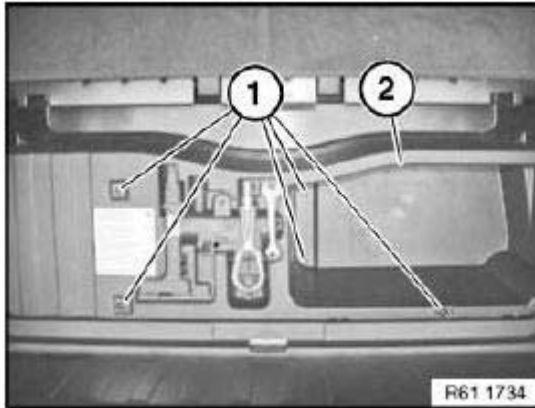


Fig. 149: Identifying Battery Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Loosen nut (1).

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

Remove battery negative lead with IBS.

Disconnect plug connection (2).

Unscrew nut (3).

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

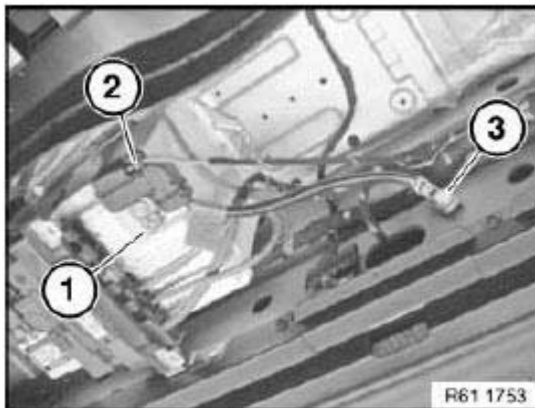


Fig. 150: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

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

VEHICLE BATTERY.**Test step 1 - before charging the battery****THRESHOLD VALUES FOR BATTERY INSPECTION - BEFORE CHARGING BATTERY**

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.
(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 %.		

Test step 2 - after charging the battery**THRESHOLD VALUES FOR BATTERY INSPECTION - AFTER CHARGING BATTERY**

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		

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



T6104016

Fig. 151: Identifying AGM Battery
Courtesy of BMW OF NORTH AMERICA, INC.

Introduction

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

(VRLA stands for Valve Regulated Lead Acid, i.e. lead acid battery with pressure relief valve; **AGM** stands for **A**bsorbent **G**lass **M**at, i.e. absorbent glass fiber 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.

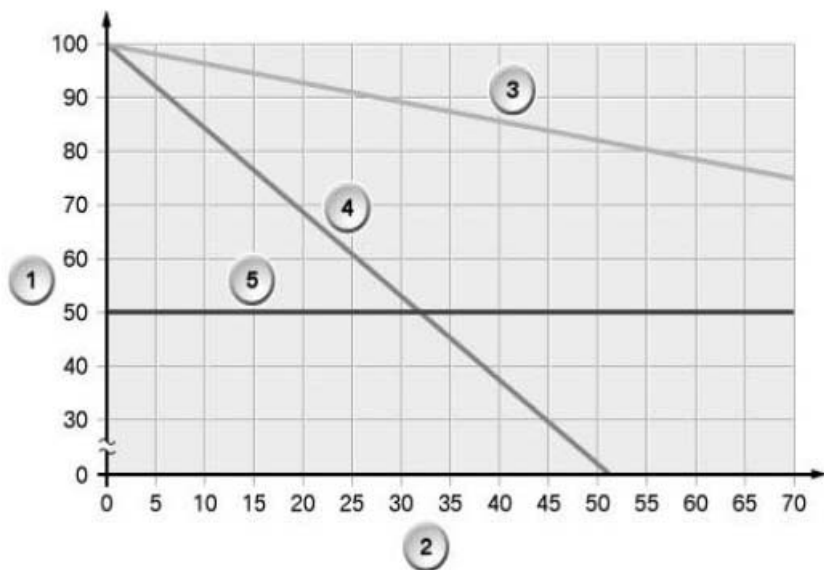
The somewhat higher price compared with a battery of similar size is fully balanced by the following benefits:

2053 of 3160

- 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



T6102903

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

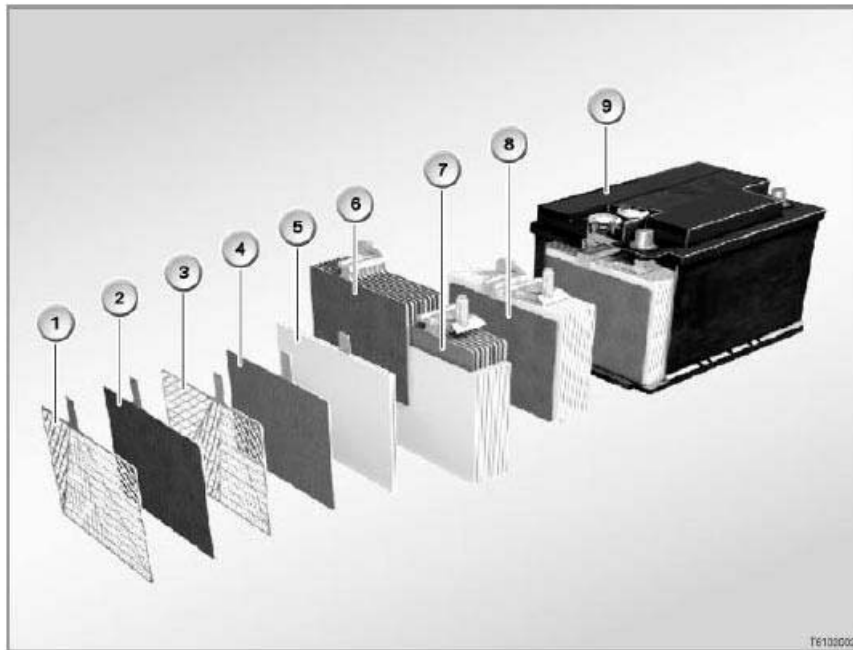
Fig. 152: Identifying AGM Battery Service Life Graph
Courtesy of BMW OF NORTH AMERICA, INC.

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

Instead, the sulphuric acid is 100 % bound up in glass fiber 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".



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		

Fig. 153: Identifying AGM Battery Components
 Courtesy of BMW OF NORTH AMERICA, INC.

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 fiber 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 (see also mode of operation):

The cell plugs are welded and cannot be opened.

- Acid bound up in the glass fiber fleece:

The acid is not as previously self-contained in the housing, but 100 % bound up in the glass fiber 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 fiber 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.

Ideally, battery charging is performed with BMW-approved charging computers.

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 TESTS

NOTE: Observe safety instructions for handling vehicle battery . See 61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.



W05 95 001

Fig. 154: Identifying Diagnosis And Information System
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. See 61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.
Follow instructions for disconnecting and connecting battery

IMPORTANT: Do not under any circumstances use force to pull/lever off Intelligent Battery Sensor (IBS).

Necessary preliminary tasks:

- Raise luggage compartment floor trim

Release screws (1).

Remove battery cover (2) upwards.

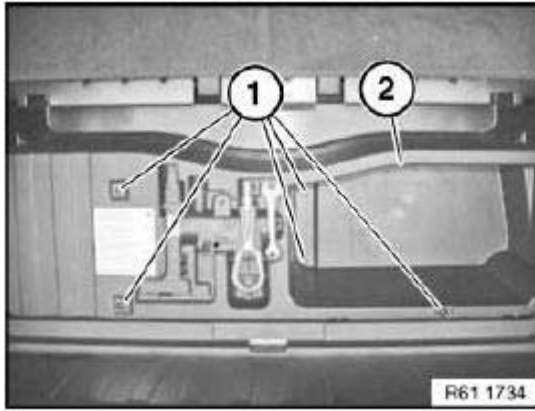


Fig. 155: Identifying Battery Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen nut (1).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES**.

Disconnect battery negative lead (2) with IBS and secure at side.

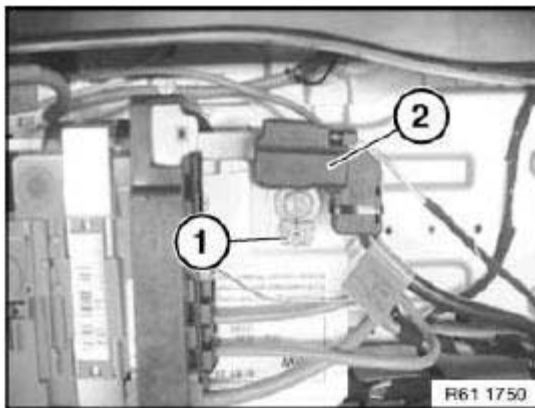


Fig. 156: Identifying Battery Negative Lead
Courtesy of BMW OF NORTH AMERICA, INC.

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

IMPORTANT: Observe safety instructions for handling vehicle battery . See 61 00... 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 GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

- Connect and switch on battery charger
- Switch ignition on

21 BATTERY VAPOR SEPARATOR

61 12 013 REPLACING BATTERY NEGATIVE LEAD

WARNING: Observe safety instructions for handling vehicle battery. See 61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.
Follow instructions for disconnecting and connecting battery. See 12 00... INSTRUCTIONS FOR DISCONNECTING AND CONNECTING BATTERY.

IMPORTANT: Do not under any circumstances use force to pull/lever off Intelligent Battery Sensor (IBS).

Necessary preliminary tasks:

- Raise luggage compartment floor trim

Release screws (1).

Remove battery cover (2) upwards.

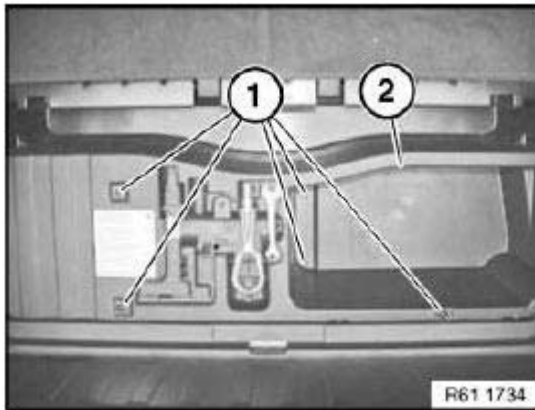


Fig. 157: Identifying Battery Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Loosen nut (1).

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

Remove battery negative lead with IBS.

Disconnect plug connection (2).

Unscrew nut (3).

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

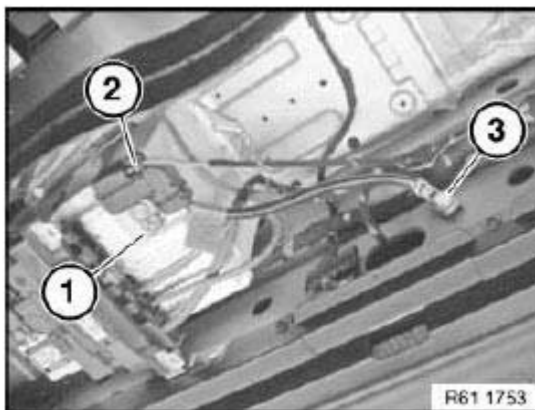


Fig. 158: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD

WARNING: Observe safety instructions for handling vehicle battery. See 61 00...

SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.
Follow instructions for disconnecting and connecting battery

IMPORTANT: Do not under any circumstances use force to pull/lever off Intelligent Battery Sensor (IBS).

Necessary preliminary tasks:

- Raise luggage compartment floor trim

Release screws (1).

Remove battery cover (2) upwards.

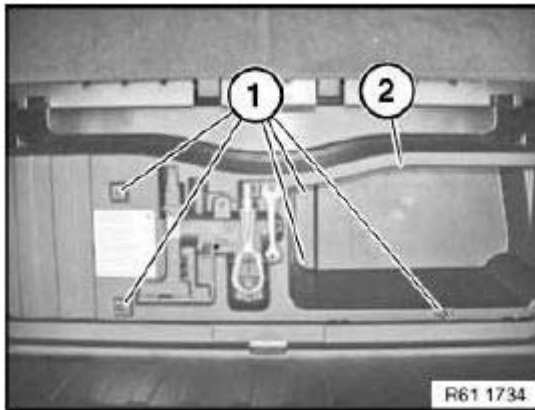


Fig. 159: Identifying Battery Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen nut (1).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

Disconnect battery negative lead (2) with IBS and secure at side.

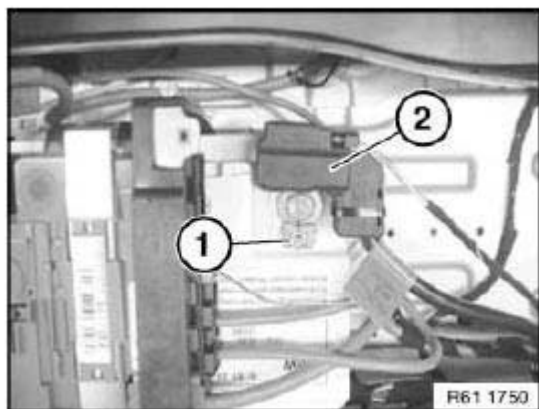


Fig. 160: Identifying Battery Negative Lead

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 . See 61 00... 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.

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

- Connect and switch on battery charger
- Switch ignition on

61 21 010 REMOVING AND INSTALLING/REPLACING BATTERY

WARNING: Observe safety instructions for handling vehicle battery. See 61 00... SAFETY INSTRUCTIONS FOR HANDLING VEHICLE BATTERY.
Notes and instructions on Intelligent Battery Sensor IBS . See 61 12... GENERAL INFORMATION ON INTELLIGENT BATTERY SENSOR (IBS).

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

Necessary preliminary tasks:

- Disconnect negative battery cable . See 61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.
- Remove distribution box . See 61 13 042 REPLACING DISTRIBUTION BOX (LUGGAGE COMPARTMENT).

Detach vent (1) in direction of arrow.

Unlock positive terminal cover (2).

Slacken nut (3) of safety battery terminal.

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

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

Release threaded pin (4).

Release screw (6) and remove holder.

Release screw (5) and remove holder.

Lift out battery.

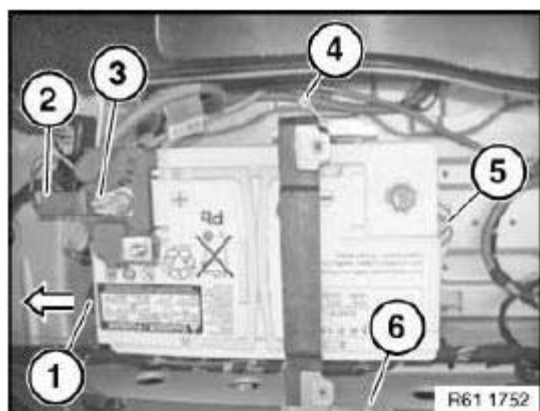


Fig. 161: Detaching Vent

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure battery is correctly seated in associated fixture.

Replacement:

Version with Intelligent Battery Sensor:

- Carry out programming/coding . See **VEHICLE PROGRAMMING AND CODING**.

Code Car Access System (CAS) and delete fault memory entries relating to battery replacement in engine control unit.

31 SWITCH

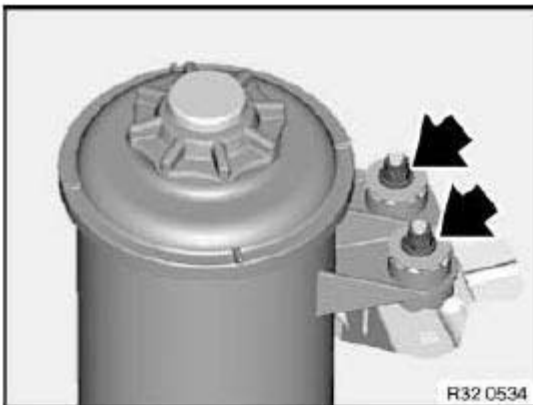
32 41... REPLACING LEVEL SWITCH FOR DYNAMIC DRIVE FLUID RESERVOIR

Unscrew nuts.

Remove shims.

Installation:

Replace self-locking nuts.

**Fig. 162: Locating 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.

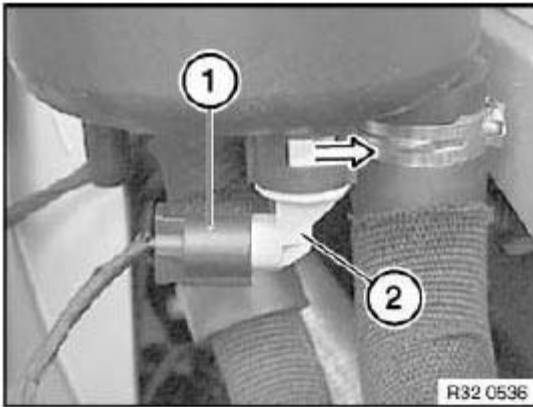
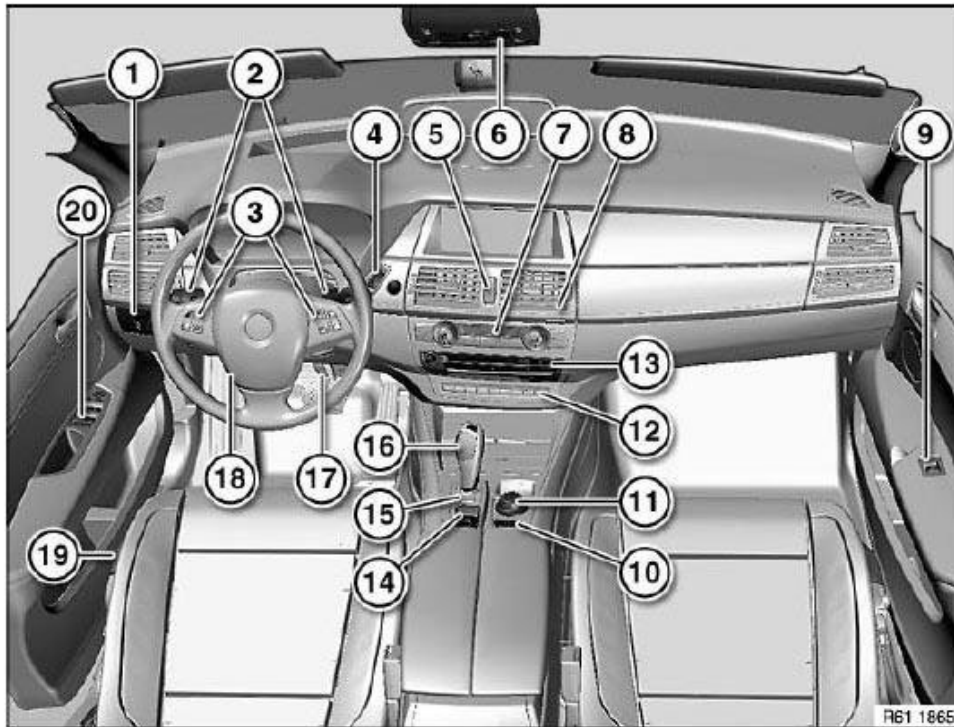


Fig. 163: Turning Level Switch

Courtesy of BMW OF NORTH AMERICA, INC.

61 31.. OVERVIEW OF SWITCHES



- | | | | |
|----|---|----|---|
| 1 | <u>Light operating unit</u> | 2 | <u>Steering column switch cluster</u> |
| 3 | <u>Multifunction steering wheel switch</u> | 4 | <u>Start/Stop switch</u> |
| 5 | <u>Switch for hazard warning system/central locking</u> | 6 | <u>Roof switch centre</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</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. 164: Overview Of Switches

Courtesy of BMW OF NORTH AMERICA, INC.

61 31 008 REMOVING AND INSTALLING OR REPLACING STEERING COLUMN SWITCH CLUSTER

WARNING: Move wheels into straight-ahead position and do not alter this position during the repair work.

With steering wheel removed, do not under any circumstances turn/twist fixture for steering column stalk!

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.**
- Remove steering wheel . See **32 33 000 REMOVING AND INSTALLING/REPLACING STEERING WHEEL** or **32 33 010 REMOVING AND INSTALLING/REPLACING SPORT STEERING WHEEL** .
- 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 . See **61 31 035 REMOVING AND INSTALLING/REPLACING 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.

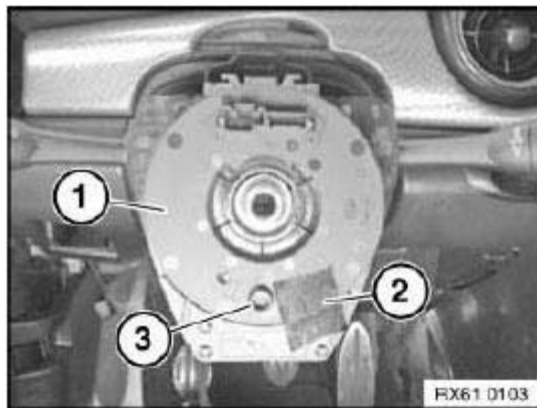


Fig. 165: Identifying Volute Spring Cassette And Centering Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connections (1) from rear on steering column switch cluster.

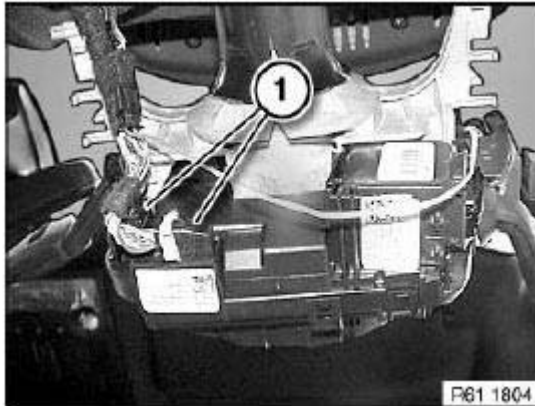


Fig. 166: Identifying Plug Connections

Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove steering column switch cluster in direction of arrow.

Installation:

NOTE: Carry out steering angle sensor adjustment. See **61 31 996 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. See **32 10 005 ADJUSTMENT FOR ACTIVE FRONT STEERING** .

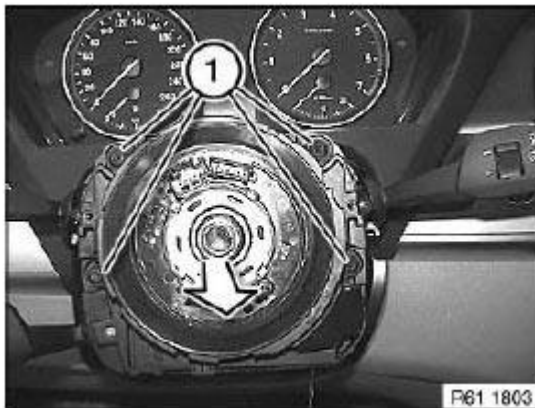


Fig. 167: Removing Steering Column Switch Cluster

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

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- Remove volute spring cassette . See **61 31 011 REMOVING AND INSTALLING/REPLACING**

VOLUTE SPRING CASSETTE.

- Carry out programming/coding . See **VEHICLE PROGRAMMING AND CODING.**
- Carry out steering angle sensor adjustment . See **61 31 996 CARRY OUT STEERING ANGLE SENSOR ADJUSTMENT** or adjustment for active steering . See **32 10 005 ADJUSTMENT FOR ACTIVE FRONT STEERING** .

61 31 011 REMOVING AND INSTALLING/REPLACING VOLUTE SPRING CASSETTE

Necessary preliminary tasks:

- Remove steering column switch cluster . See **61 31 008 REMOVING AND INSTALLING OR REPLACING STEERING COLUMN SWITCH CLUSTER.**

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

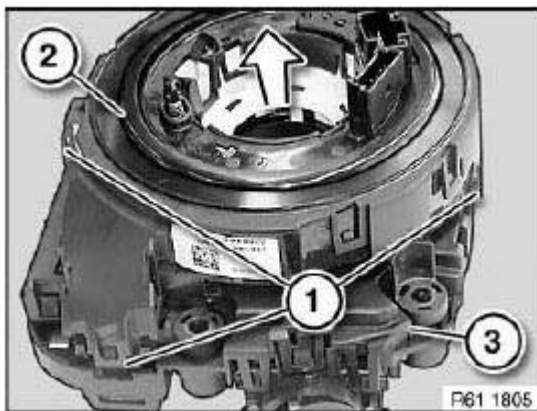


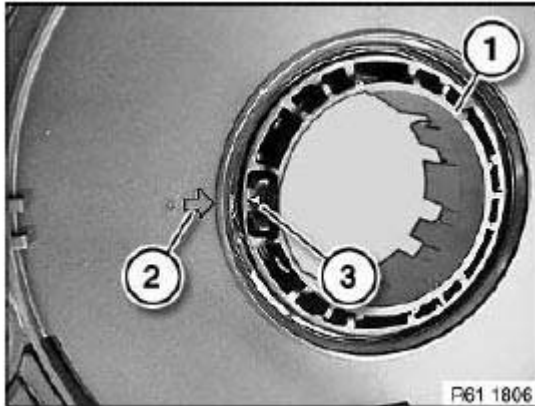
Fig. 168: Removing Volute Spring Cassette From Steering Column Switch Cluster
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:

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

Installation:

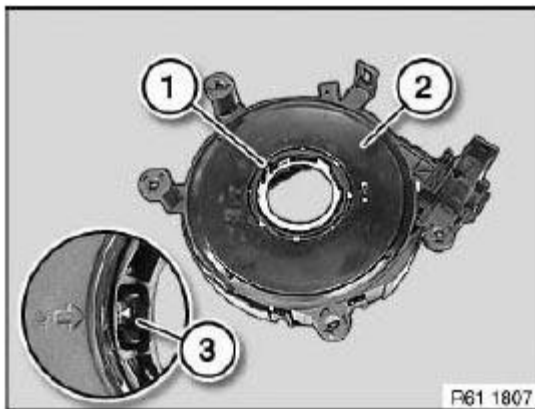
Marking (2) must line up with marking (3).

**Fig. 169: Identifying 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. 170: Identifying Pin Of 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 out Start/Stop switch (2) a little.

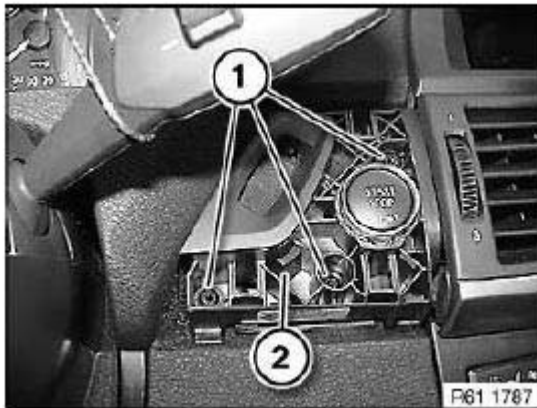


Fig. 171: Identifying Start/Stop Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

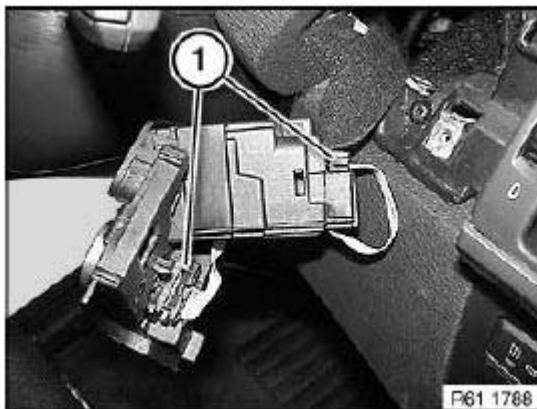


Fig. 172: Identifying Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

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.

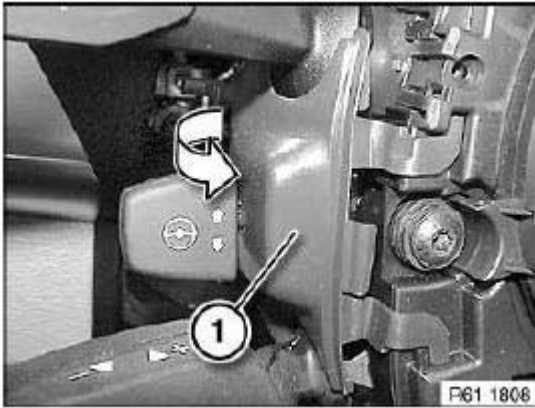


Fig. 173: Unclipping Steering Column Adjustment Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

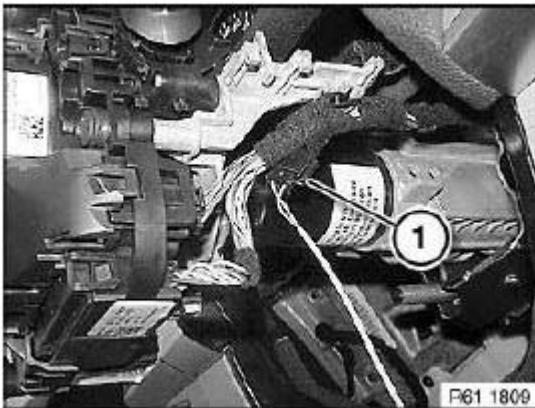


Fig. 174: Identifying Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

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/REPLACING LEFT/RIGHT FRESH-AIR GRILLE** .

Press out light control unit (1) from inside.

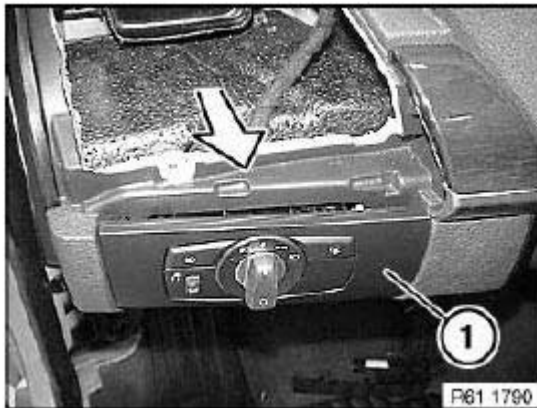


Fig. 175: Pressing Out Light Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

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.

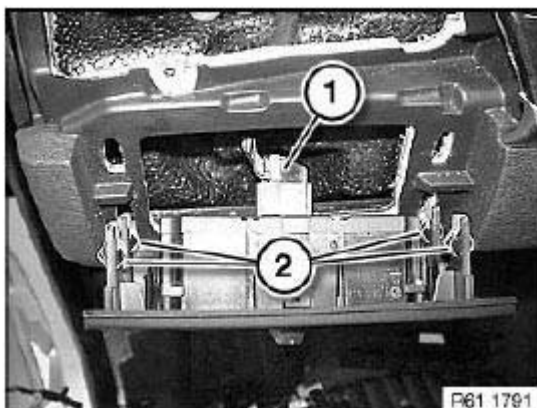


Fig. 176: Identifying Plug Connection And Retainers
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Release screws (1).

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

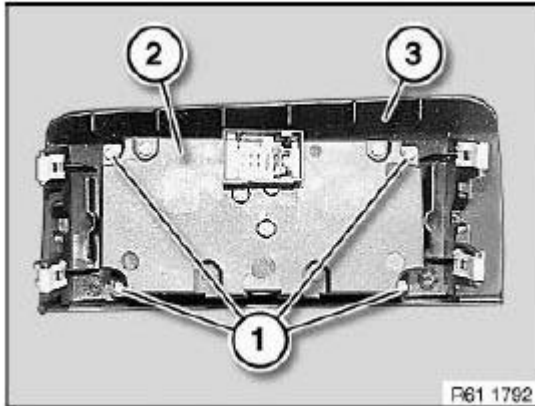


Fig. 177: Identifying Light Control Unit And Trim
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 043 REMOVING AND INSTALLING OR REPLACING ROOF SWITCH CENTRE

Special tools required:

- 00 9 317
- 00 9 340

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) . See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE).

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

Carefully lever out trim (1) with special tool 00 9 340.



Fig. 178: Levering Out Trim With Special Tool 00 9 340
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock retaining clip (1).

Lever out roof switch center with special tool 00 9 317.

Disconnect plug connections underneath.

Installation:

Before installing, fit trim on roof switch center.

Make sure trim is correctly seated.

Position roof switch cluster at an angle of 90° with respect to the headliner and attach.

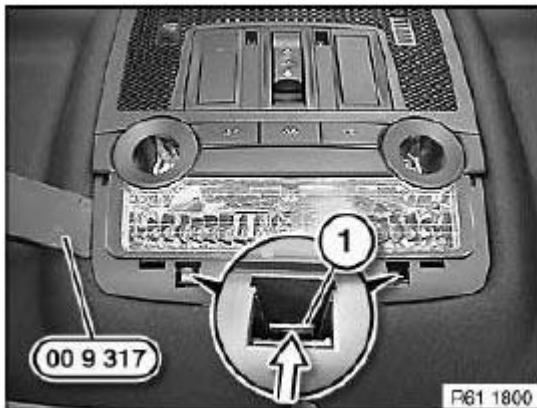


Fig. 179: Unlocking Retaining Clip

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:

- If necessary, modify bulbs . See 63 99 431 REPLACING BULB FOR FRONT CEILING LIGHT .
- If necessary, remove hands-free microphone.
- Carry out programming/coding . See **VEHICLE PROGRAMMING AND CODING**.
- If necessary, initialize slide/tilt sunroof . See 54 0 ... NOTES ON PANORAMA GLASS ROOF (INITIALIZATION/NORMALIZATION/LEARNING OF CHARACTERISTIC CURVE) .

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

- 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.

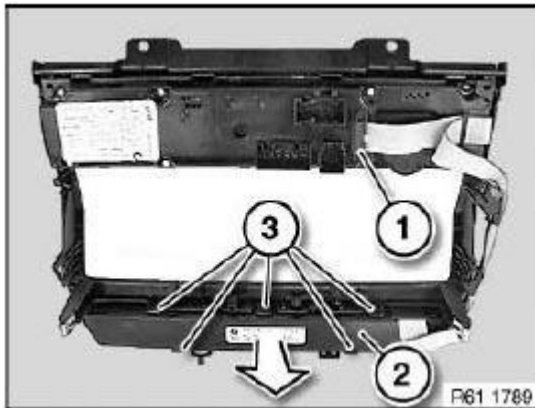


Fig. 180: Removing Centre Console Switch Cluster From Instrument Panel Trim

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

Lever out switch for hazard warning system/central locking (1) with special tool 00 9 340 and pull back.

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



Fig. 181: Identifying Switch For Hazard Warning System/Central Locking
Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 00 9 340

Unclip trim with special tool 00 9 340.



Fig. 182: Unclipping Trim With Special Tool 00 9 340
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Press locks (2) together and press switches for seat heating out of trim (3).

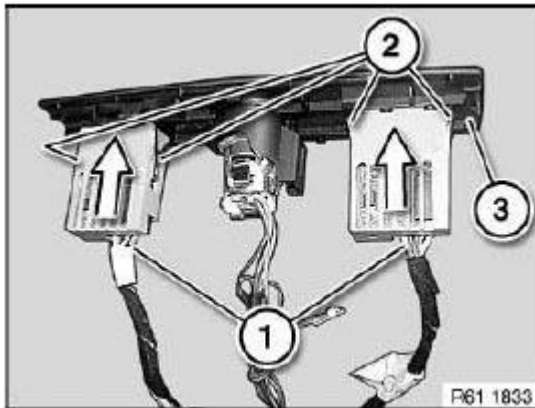


Fig. 183: Pressing Seat Heating Switches Out Of Trim

Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 00 9 317

Lever rocker switch (1) with special tool 00 9 317 upwards out of armrest.

Disconnect plug connection.

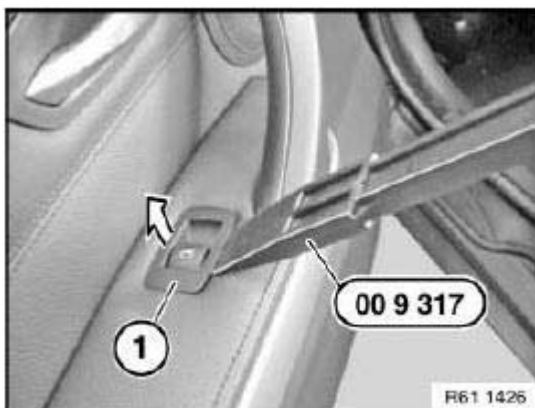


Fig. 184: Removing Rocker Switch

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

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

Make sure rocker switch (2) is correctly seated. 2079 of 3160

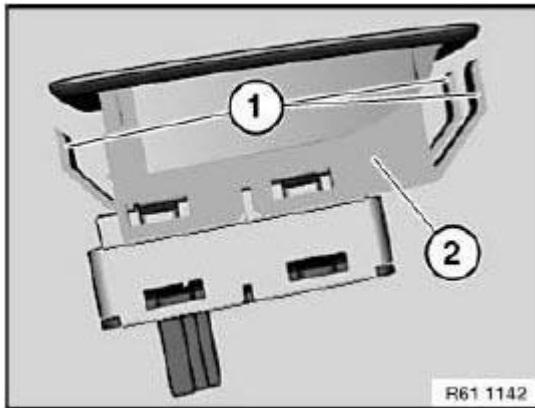


Fig. 185: Identifying Hooks Of Rocker Switch

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

Lever rocker switch (1) with special tool 00 9 317 upwards out of armrest.

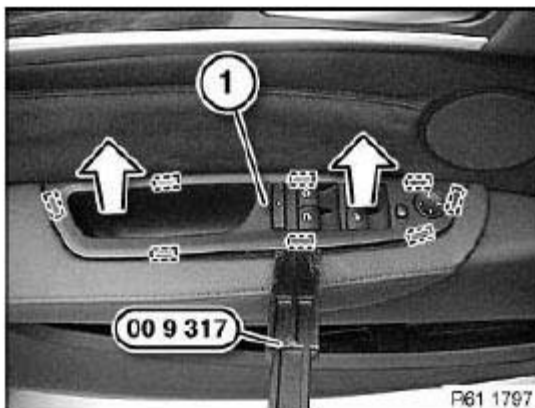


Fig. 186: Removing Rocker Switch

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Installation:

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

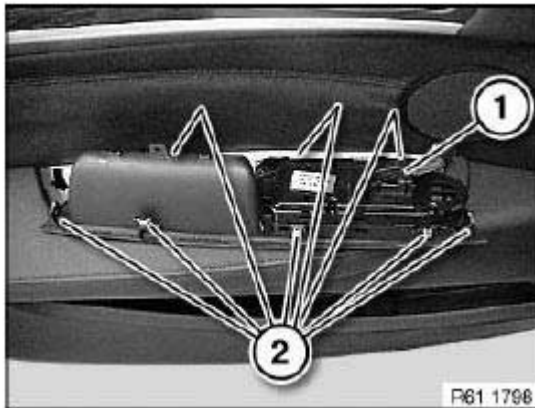


Fig. 187: Identifying Plug Connection And Retainers
Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 00 9 317

Lever rocker switch (1) with special tool 00 9 317 upwards out of armrest.

Disconnect plug connection.

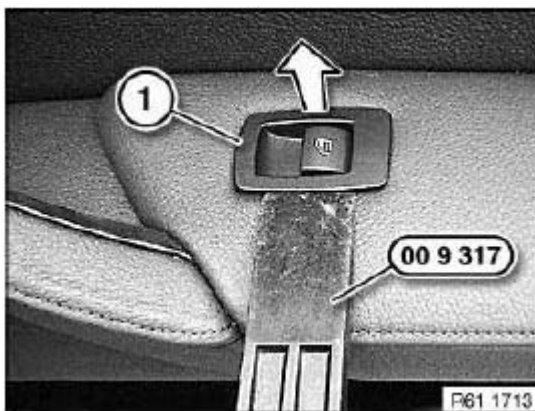


Fig. 188: Removing Rocker Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

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

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Make sure rocker switch (2) is correctly seated.

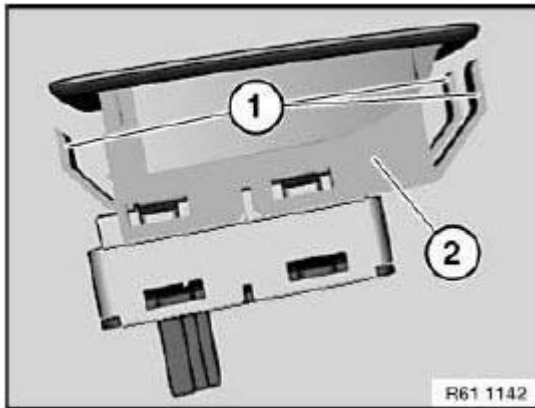


Fig. 189: Identifying Hooks Of Rocker Switch
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 133 REMOVING AND INSTALLING/REPLACING AUX CONNECTION SOCKET

Special tools required:

- 00 9 323

Necessary preliminary tasks:

- Open storage box

Unclip trim (1) with special tool 00 9 323 at retaining points (2).

Disconnect associated plug connections.

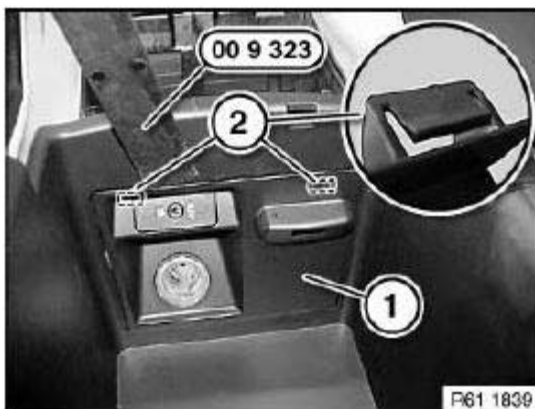


Fig. 190: Identifying Trim And Special Tool 00 9 323
Courtesy of BMW OF NORTH AMERICA, INC.

Press locks (1) together and press AUX connection socket (2) out of trim (3).

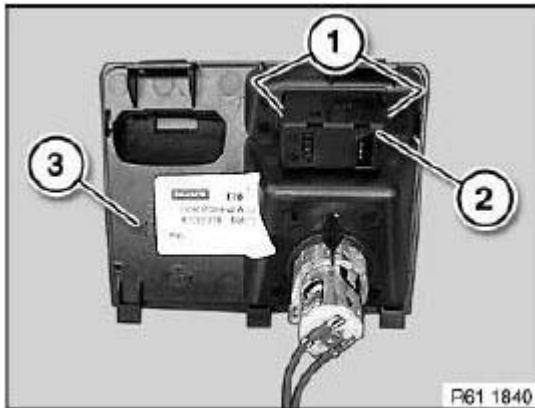


Fig. 191: Identifying Locks, AUX Connection Socket And Trim
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 135 REMOVING AND INSTALLING/REPLACING HEADPHONES CONNECTION SOCKET

Special tools required:

- 00 9 340

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



Fig. 192: Unclipping Trim With Special Tool 00 9 340
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Press locks (2) together and press switches for seat heating out of trim (3).

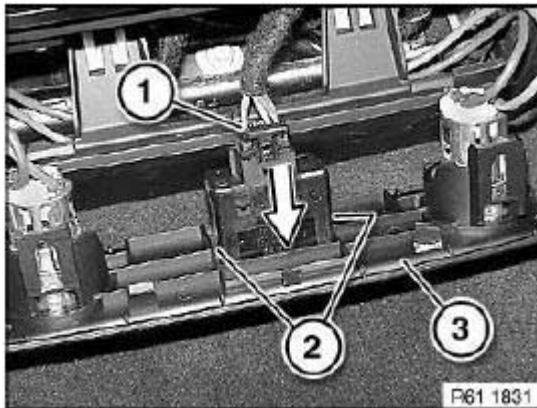


Fig. 193: Pressing Seat Heating Switches Out Of Trim

Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary tasks:

- Remove knob for controller . See **61 31 192 REPLACING KNOB FOR CONTROLLER**.
- Remove center console trim . See **51 16 160 REMOVING AND INSTALLING/REPLACING CENTRE CONSOLE TRIM** .

IMPORTANT: Risk of damage!

Install knob for controller only when controller is installed.

Release screws (1).

Unclip parking brake with trim (2) towards top.

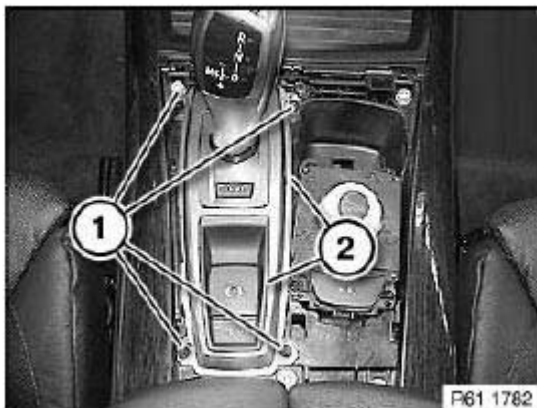


Fig. 194: Identifying Trim

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screws (2).

Remove parking brake button (3) from trim.

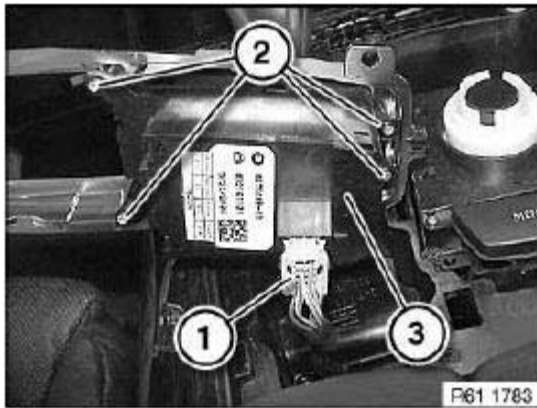


Fig. 195: Identifying Plug Connection And Parking Brake Button

Courtesy of BMW OF NORTH AMERICA, INC.

61 31 192 REPLACING KNOB FOR CONTROLLER

Special tools required:

- 00 9 317
- 00 9 323

Engage special tools 00 9 323 and 00 9 317 as pictured.

Lever out knob for controller (1) and remove towards top.



Fig. 196: Removing Knob For Controller

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!
Install knob for controller only when controller is installed.

Installation:

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

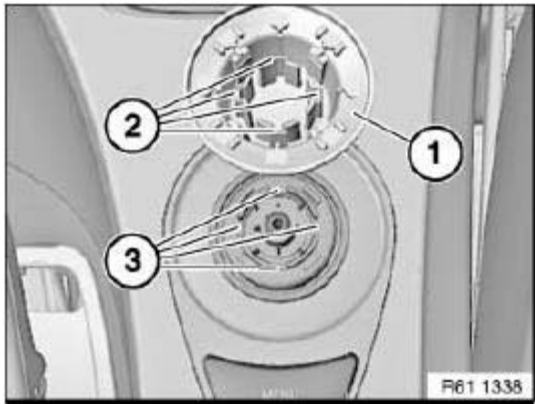


Fig. 197: Identifying Controller And Guides
 Courtesy of BMW OF NORTH AMERICA, INC.

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 CENTRE CONSOLE TRIM** .

Unclip button unit (1) at retaining points (2) and pull out.

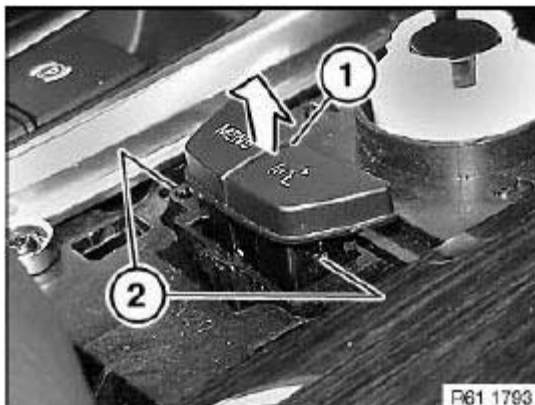


Fig. 198: Pulling Out Button Unit
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

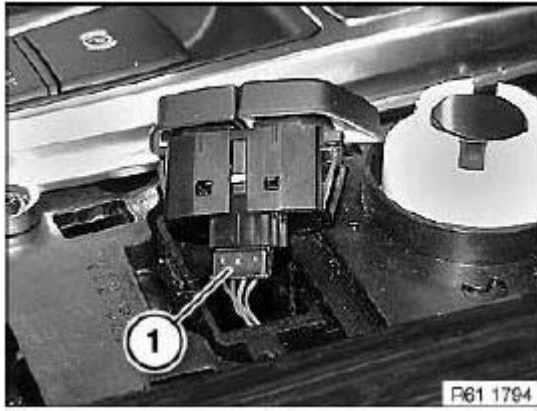


Fig. 199: Identifying Plug Connection

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 CENTRE CONSOLE TRIM** .

Release screws (1).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

Raise controller (2) and disconnect plug connection underneath.

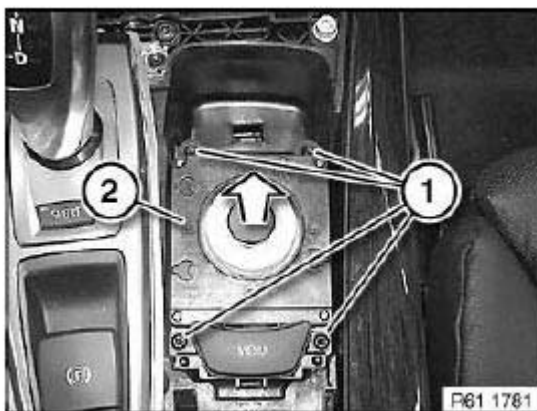


Fig. 200: Disconnecting Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Remove button unit . See **61 31 193 REMOVING AND INSTALLING/REPLACING BUTTON UNIT (MENU/VOICE INPUT)**.
- Carry out programming/coding . See **VEHICLE PROGRAMMING AND CODING**.

61 31 203 REPLACING SWITCH COMBINATION FOR SEAT ADJUSTMENT

Necessary preliminary tasks:

- Remove cover from front seat . See **52 17 040 REMOVING AND INSTALLING/REPLACING OUTER COVER ON LEFT OR RIGHT FRONT SEAT** .

Release screws (1).

Raise switch combination for seat adjustment (2).

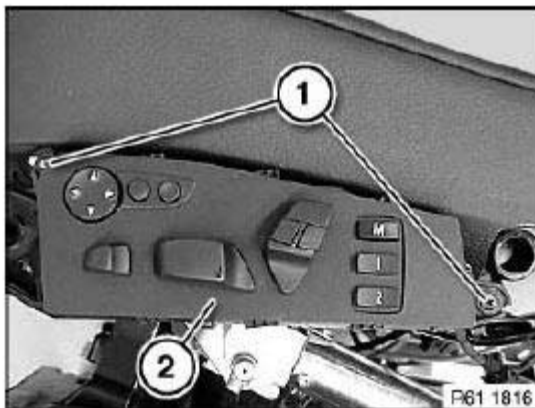


Fig. 201: Identifying Switch Combination For Seat Adjustment
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).



Fig. 202: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary tasks:

- Remove gear selector switch trim . See **61 31 336 REMOVING AND INSTALLING/REPLACING TRIM FOR GEAR SELECTOR SWITCH.**

Release screws (1).

Raise trim (2) slightly.

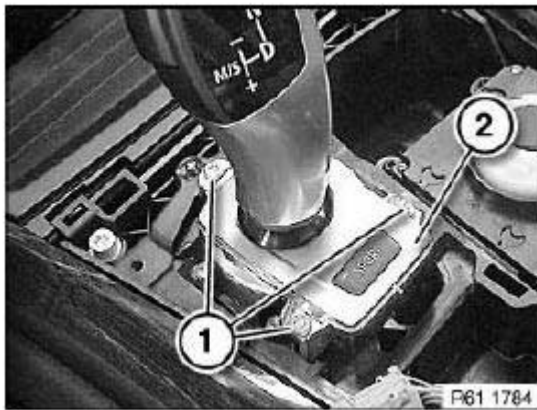


Fig. 203: Identifying Trim

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock switch (2) and remove towards bottom.

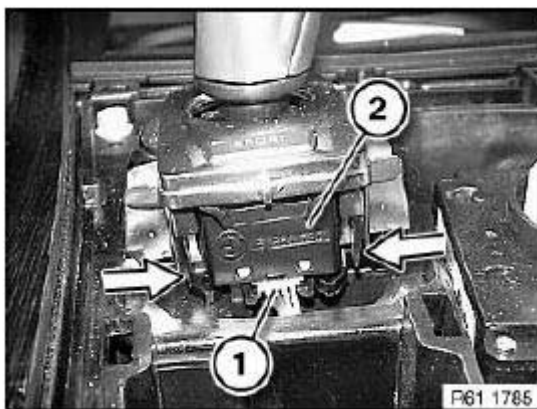


Fig. 204: Removing Switch

Courtesy of BMW OF NORTH AMERICA, INC.

61 31 221 REMOVING AND INSTALLING/REPLACING BOTH MULTIFUNCTION STEERING WHEEL SWITCHES

Necessary preliminary tasks:

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.**
- Remove airbag unit . See **32 34 020 REMOVING AND INSTALLING/REPLACING AIRBAG UNIT .**

NOTE: Illustration shows steering wheel removed.

Release screws (1).

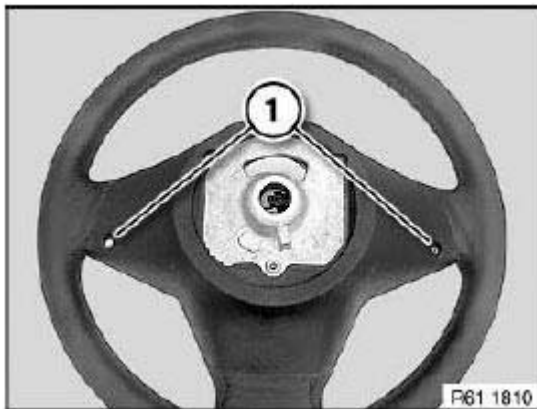


Fig. 205: Identifying Steering Wheel Screws

Courtesy of BMW OF NORTH AMERICA, INC.

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

Disconnect plug connections (2).

Feed wiring harness (3) out of steering wheel.

Pull multifunction steering wheel switches (1) in direction of arrow out of steering wheel.

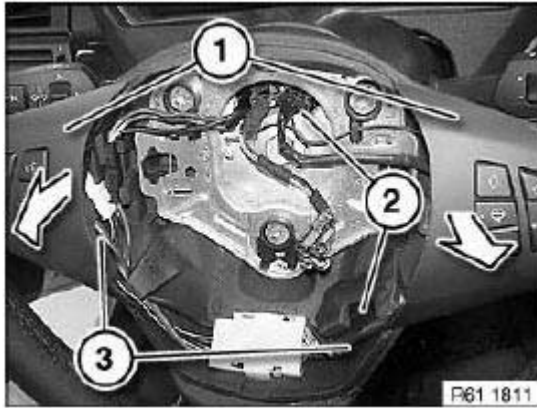


Fig. 206: Pulling Multifunction Steering Wheel Switches Out Of Steering Wheel
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure electrical leads are correctly routed.

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

Necessary preliminary tasks:

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.**
- Remove airbag unit . See **32 34 020 REMOVING AND INSTALLING/REPLACING AIRBAG UNIT .**

NOTE: Illustration shows steering wheel removed.

Release screws (1).

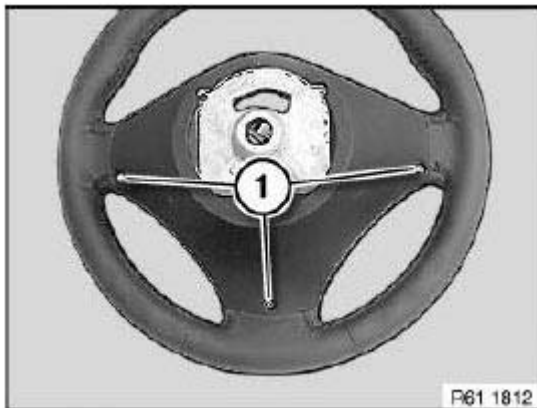


Fig. 207: Identifying Steering Wheel Screws

Courtesy of BMW OF NORTH AMERICA, INC.

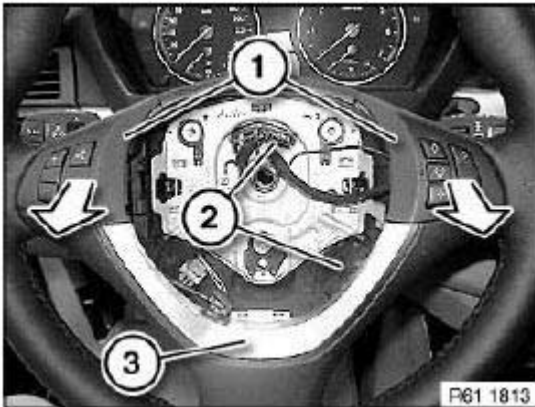
NOTE: Both sport steering wheel switches (1) are connected to each other by the wiring harness.

Disconnect plug connections (2).

Pull switches (1) with design cover (3) in direction of arrow out of steering wheel.

Installation:

Make sure electrical leads are correctly routed.

**Fig. 208: Pulling Switches With Design Cover Out Of Steering Wheel**

Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

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

Remove switches (2) from design cover (4).

Installation:

Make sure electrical leads are correctly routed.

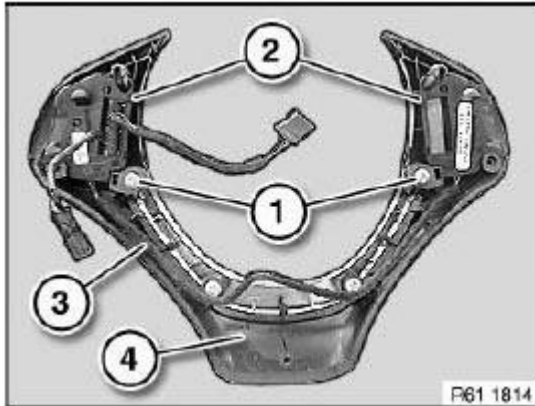


Fig. 209: Identifying Wiring Harness, Design Cover And Switches
 Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary tasks:

- Remove right bonnet/hood lock . See **51 23 100 REMOVING AND INSTALLING/REPLACING RIGHT ENGINE HOOD/BONNET LOCK** .

Release screw (1).

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

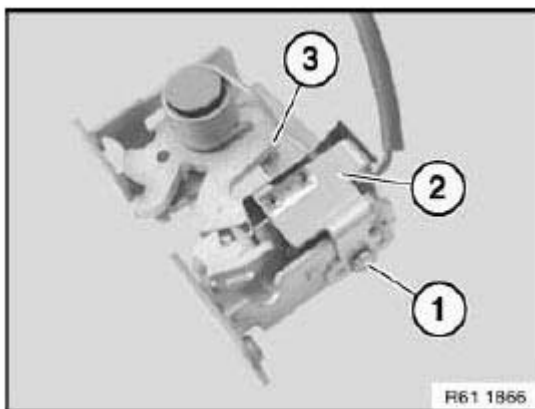


Fig. 210: Identifying Bonnet/Hood Contact Switch And Bonnet/Hood Lock
 Courtesy of BMW OF NORTH AMERICA, INC.

61 31 255 REPLACING SWITCH FOR DOOR MIRROR

Operation is described in:

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Replacing power window switch. See **61 31 117 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.

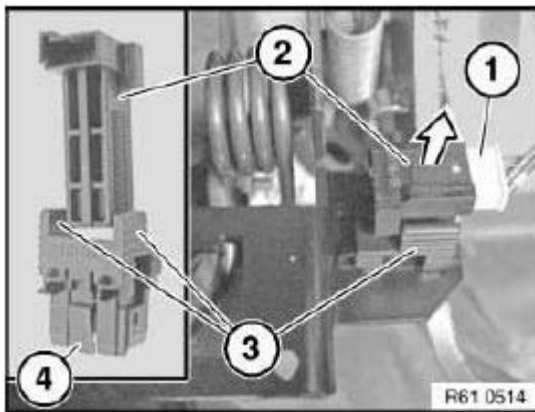


Fig. 211: Pulling Brake Light Switch Out Of Brake Light Switch Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Depress brake pedal.

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

Grip brake light switch holder (3), slowly return brake pedal 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.

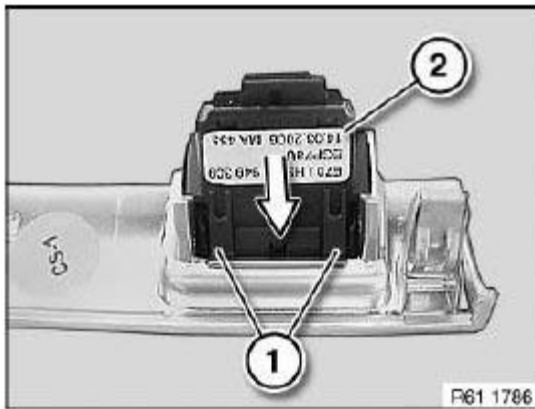


Fig. 212: Pressing Switch Out Of Decorative Strip
 Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 64 1 030

Turn end ring (1) in direction of ring and lower.

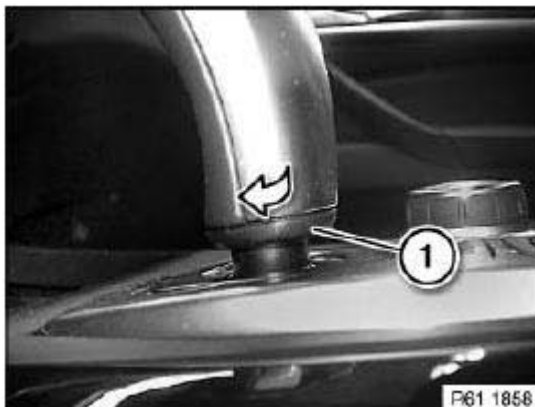


Fig. 213: Turning End Ring In Direction Of Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

Insert special tool 64 1 030 from below into trim (1) and carefully pull off trim (1).

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Remove symbol plate (2).

Installation:

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

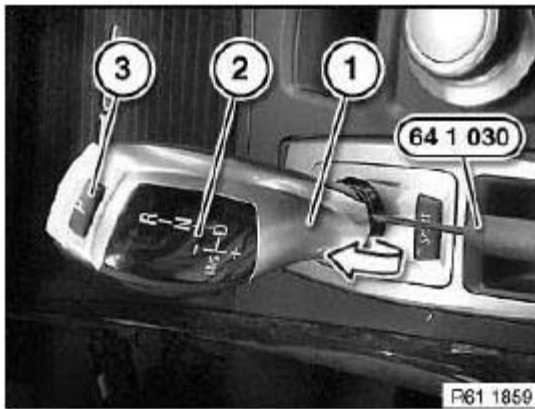


Fig. 214: Removing Trim

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 CENTRE CONSOLE TRIM** .

Release screws (1).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

Unclip parking brake with trim (2) towards top.

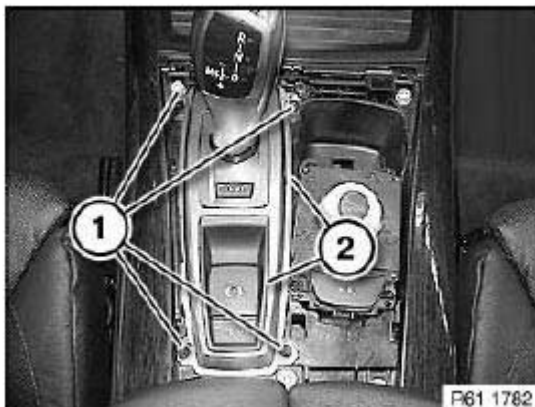


Fig. 215: Identifying Trim

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Replacement:

Release screws (2).

Remove parking brake button (3) from trim.

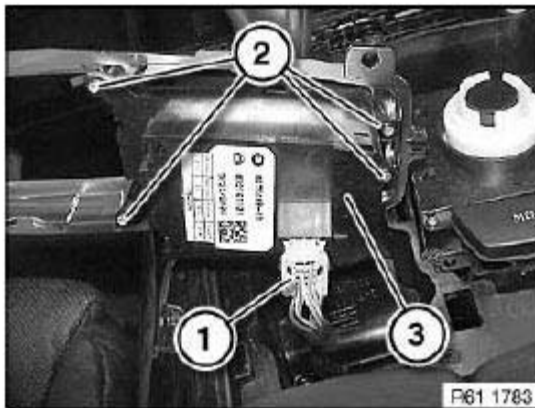


Fig. 216: Identifying Plug Connection And Parking Brake Button
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 342 REMOVING AND INSTALLING/REPLACING GEAR SELECTOR SWITCH

Necessary preliminary tasks:

- Remove center console trim . See **51 16 160 REMOVING AND INSTALLING/REPLACING CENTRE CONSOLE TRIM** .

Release screws (1).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

Raise gear selector switch carrier (2) a little.

Disconnect associated plug connections.

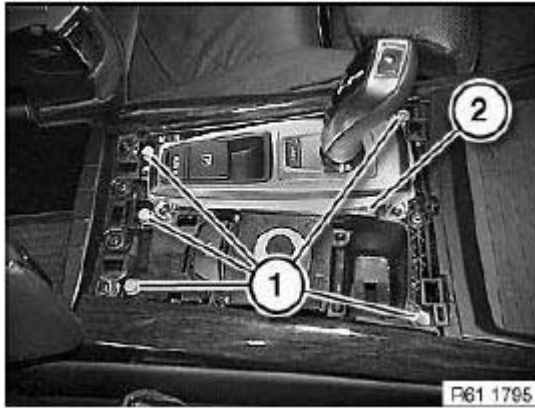


Fig. 217: Identifying Gear Selector Switch Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

Remove gear selector switch trim. . See **61 31 336 REMOVING AND INSTALLING/REPLACING TRIM FOR GEAR SELECTOR SWITCH**.

Release screws (1).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

Feed gear selector switch (2) out of carrier.

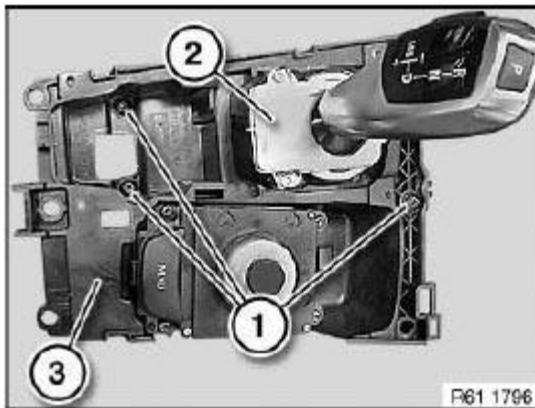


Fig. 218: Identifying Gear Selector Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out programming/coding. . See **VEHICLE PROGRAMMING AND CODING**.

61 31 382 REPLACING COOLANT LEVEL SWITCH

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Turn coolant level switch (1) and pull downwards out of coolant expansion tank (2).

Disconnect plug connection from coolant level switch.

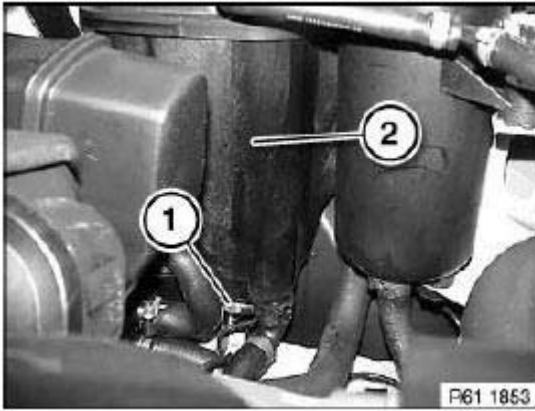


Fig. 219: Identifying Coolant Level Switch And Coolant Expansion Tank
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: For purposes of clarity, illustration shows coolant expansion tank (2) removed.

Turn coolant level switch (1) in direction of arrow, pull out of expansion tank (2) and remove.

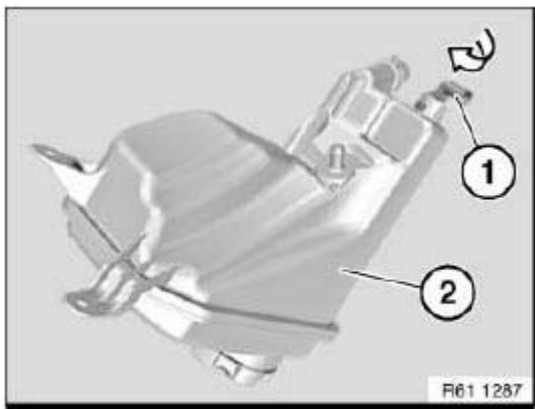


Fig. 220: Turning Coolant Level Switch
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 492 REPLACING LEVEL SWITCH FOR WINDSCREEN WASHER SYSTEM

Necessary preliminary tasks:

- Remove trim from wheel arch at front right . See **51 71 470 REMOVING AND INSTALLING/REPLACING TRIM ON FRONT LEFT OR RIGHT WHEEL ARCH** .
- Partially detach rear section of wheel arch cover at front and pull forwards. See **51 71 039 REMOVING AND INSTALLING/REPLACING FRONT LEFT OR RIGHT WHEEL ARCH COVER (REAR SECTION)** .

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).

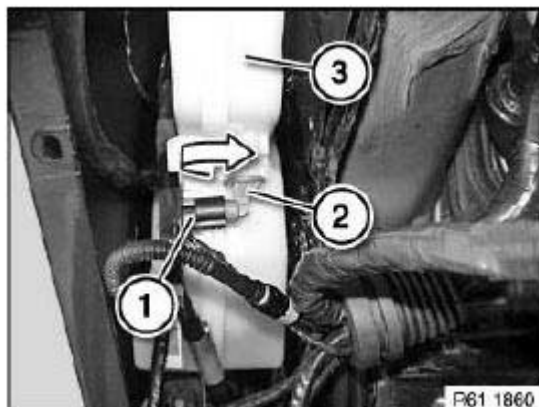


Fig. 221: Turning Level Switch For Windscreen Washer System
Courtesy of BMW OF NORTH AMERICA, INC.

61 31 996 CARRY 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!

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
- 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.

61 34... REMOVING AND INSTALLING/REPLACING POWER SOCKET IN STORAGE COMPARTMENT

Necessary preliminary tasks:

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

Unlock plug connection (1) and remove.

Press switch trim (2) out of rear center console trim (3).

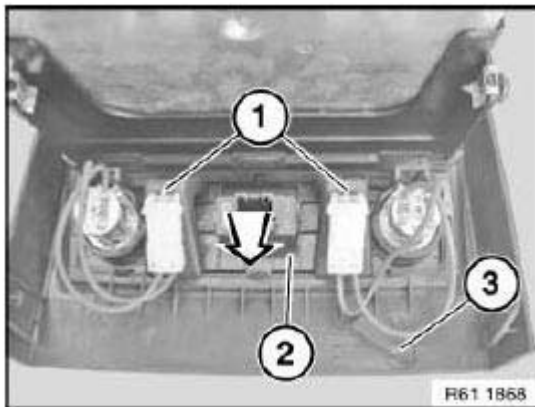


Fig. 222: Pressing Switch Trim Out Of Rear Centre Console Trim
Courtesy of BMW OF NORTH AMERICA, INC.

Press power sockets (1) out of switch trim (2).

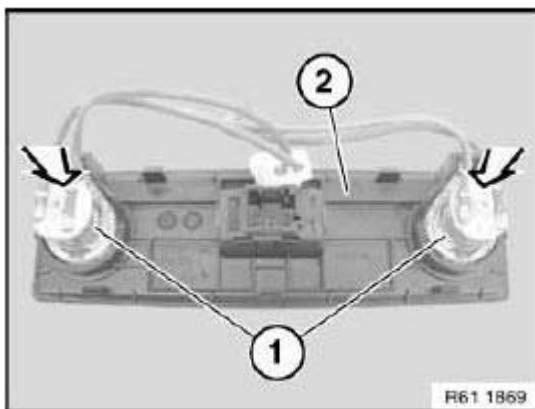


Fig. 223: Pressing Power Sockets Out Of Switch Trim
Courtesy of BMW OF NORTH AMERICA, INC.

33 HORN

61 33 050 REMOVING AND INSTALLING/REPLACING LEFT FANFARE HORN

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Necessary preliminary tasks:

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

Release nut (1) and feed out holder (2) with fanfare horn.

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

Disconnect associated plug connection.

Remove fanfare horn (2).

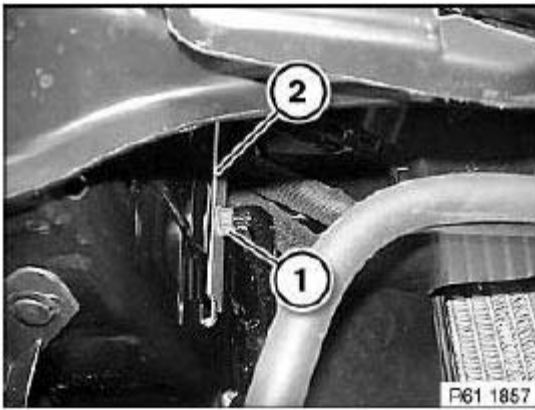


Fig. 224: Identifying Fanfare Horn And Holder
Courtesy of BMW OF NORTH AMERICA, INC.

61 33 050 REMOVING AND INSTALLING/REPLACING RIGHT FANFARE HORN

Necessary preliminary tasks:

- Remove grille in bumper trim on right . See **51 11 156 REMOVING AND INSTALLING FRONT BUMPER TRIM** .

WARNING: Risk of injury

Tape off edges (1) of bumper trim.



Fig. 225: Identifying Edges Of Bumper Trim
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) and feed out holder (2) with fanfare horn.

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

Disconnect associated plug connection.

Remove fanfare horn (2).

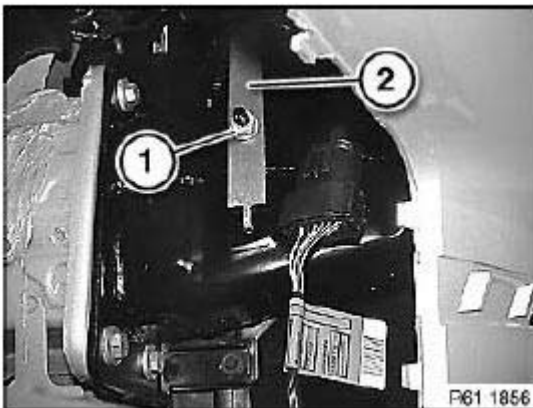


Fig. 226: Identifying Fanfare Horn And Holder
Courtesy of BMW OF NORTH AMERICA, INC.

34 INSERT HOLDER FOR CIGA

61 34... REMOVING AND INSTALLING/REPLACING POWER SOCKET IN STORAGE COMPARTMENT

Necessary preliminary tasks:

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

REAR CENTRE CONSOLE TRIM .

Unlock plug connection (1) and remove.

Press switch trim (2) out of rear center console trim (3).

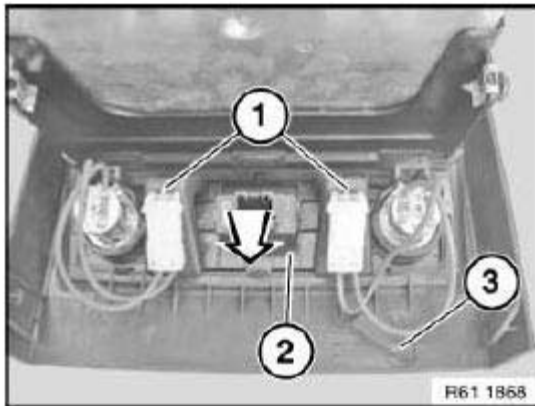


Fig. 227: Pressing Switch Trim Out Of Rear Center Console Trim
Courtesy of BMW OF NORTH AMERICA, INC.

Press power sockets (1) out of switch trim (2).

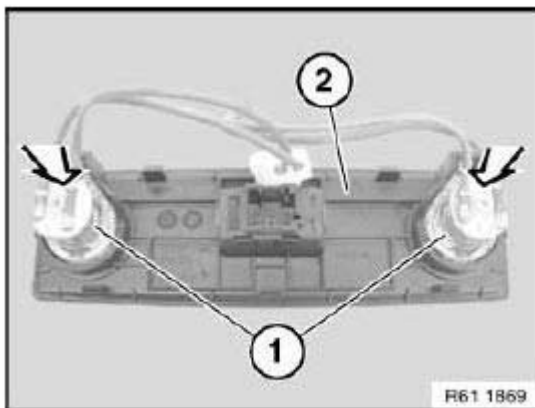


Fig. 228: Pressing Power Sockets Out Of Switch Trim
Courtesy of BMW OF NORTH AMERICA, INC.

35 ECUS 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) . See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC

DISCHARGE).

Necessary preliminary tasks:

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.**
- Remove front left wheel arch cover (rear section) . See **51 71 039 REMOVING AND INSTALLING/REPLACING FRONT LEFT OR RIGHT WHEEL ARCH COVER (REAR SECTION) .**

Release nut (1) and disconnect ground cable.

Disconnect plug connections (2).

Unclip cable holder (3).

Installation:

Replace damaged cable holder.

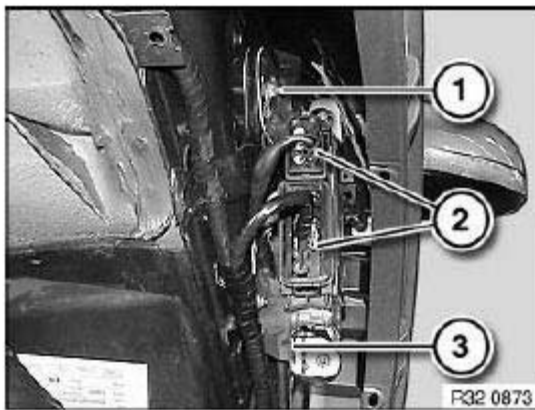


Fig. 229: Identifying Plug Connections And Cable Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1, 2).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .**

Remove active front steering control unit (3).

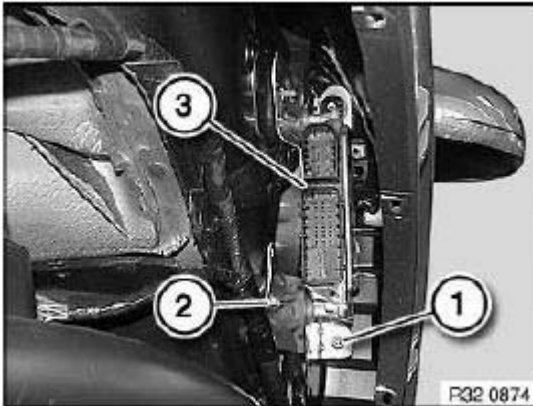
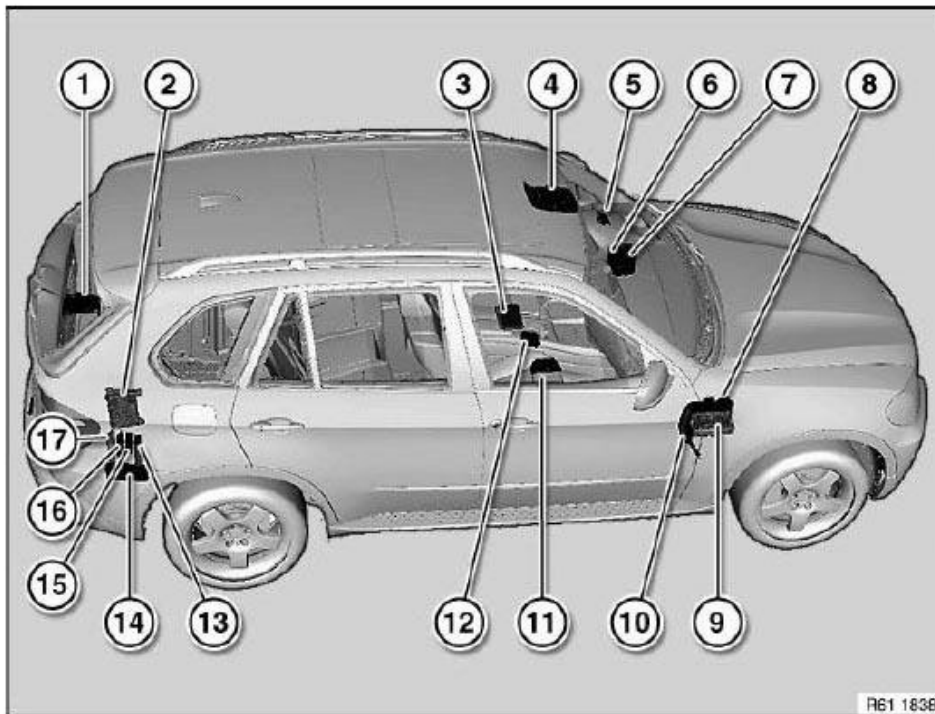


Fig. 230: Identifying Active Front Steering Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- Replacement only: Carry out coding . See **VEHICLE PROGRAMMING AND CODING**.
- Only when replacing / programming / coding: Carry out adjustment for active front steering . See **32 10 005 ADJUSTMENT FOR ACTIVE FRONT STEERING** .

61 35.. OVERVIEW OF CONTROL UNITS



- | | |
|---|--|
| 1 <u>Distribution box (on battery)</u> | 2 <u>Distribution box (luggage compartment)</u> |
| 3 <u>Airbag control unit</u> | 4 <u>Roof switch centre</u> |
| 5 <u>Rain/light sensor</u> | 6 <u>Footwell module</u> |
| 7 <u>Car Access System control unit</u> | 8 <u>Junction box electronics</u> |
| 9 <u>Fuse box, vehicle interior</u> | 10 <u>Dynamic Drive control unit</u> |
| 11 <u>Control unit/module for seat adjustment</u> | 12 <u>Controller</u> |
| 13 <u>Control unit for comfort access system</u> | 14 <u>Rear lid module</u> |
| 15 <u>Trailer module</u> | 16 <u>Control unit, Vertical Dynamics Management</u> |
| 17 <u>Control unit, Park Distance Control</u> | |

Fig. 231: Overview Of Control Units

Courtesy of BMW OF NORTH AMERICA, INC.

61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE)

Special tools required:

- 12 7 060

NOTE: Electrical components which are particularly sensitive to electrostatic discharge (electronic control units, sensors, etc.) are marked with the ESD warning symbol.

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.

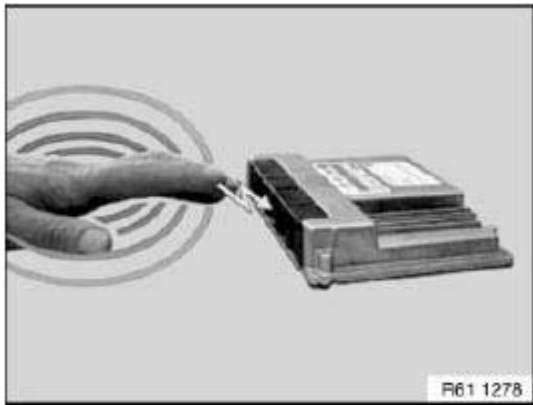


Fig. 232: Touching Electrical Components For Discharge
Courtesy of BMW OF NORTH AMERICA, INC.

Example:

Mechatronic control unit.

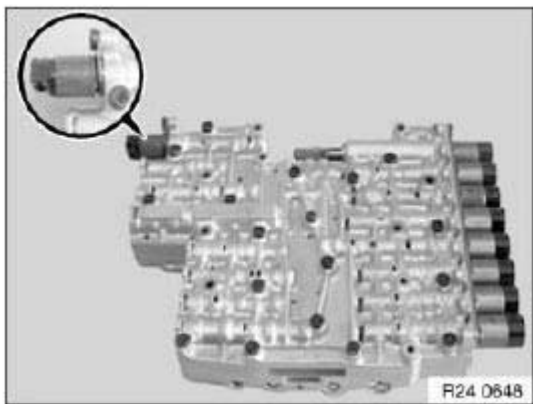


Fig. 233: Identifying Mechatronic Control Unit

Courtesy of BMW OF NORTH AMERICA, INC.



Fig. 234: Precaution For Touching Pins Or Multi-Pin Connectors Directly
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

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) . See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE).

Necessary preliminary tasks:

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

Lift back insulating mat.

Disconnect plug connection (1).

Unlock catch (2) and remove trailer module (3) from device carrier (4).

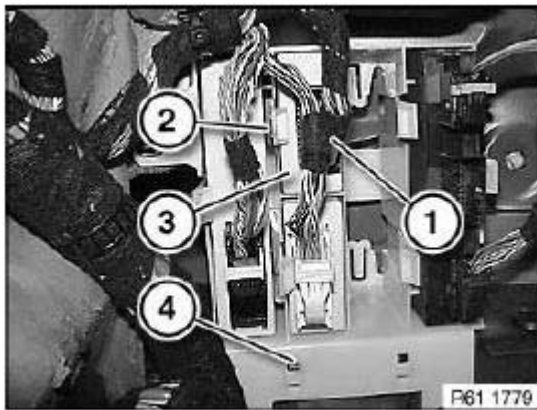


Fig. 235: Identifying Plug Connection, Catch, Trailer Module And Device Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out programming/coding . See VEHICLE PROGRAMMING AND CODING.

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) . See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE).

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 . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.**
- Remove trim panel for pedal assembly

Disconnect plug connection (1).

Release catches (2) and pull out control unit for Car Access System (3) in downward direction.

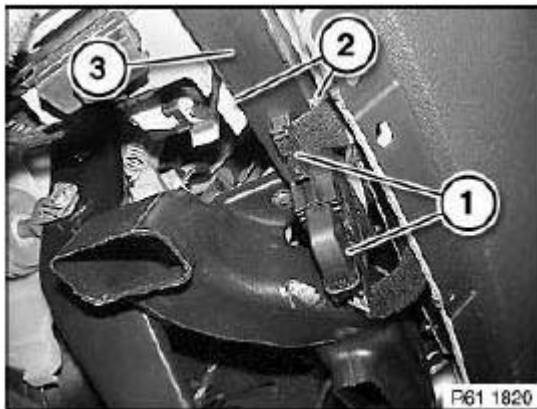


Fig. 236: Identifying Plug Connection, Catches And Car Access System
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out programming/coding . See **VEHICLE PROGRAMMING AND CODING.**

Version with independent heating:

Initialize Telestart hand transmitter . See **64 12 ... INITIALIZING TELESTART HAND TRANSMITTER .**

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) . See **61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE).**

Necessary preliminary tasks:

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING 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).

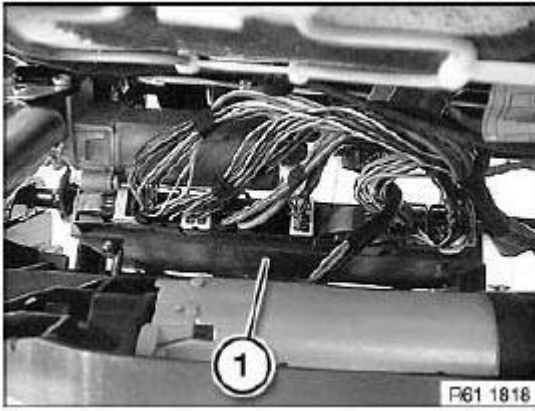


Fig. 237: Identifying Plug Connections On Control Unit For Seat Adjustment
Courtesy of BMW OF NORTH AMERICA, INC.

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.

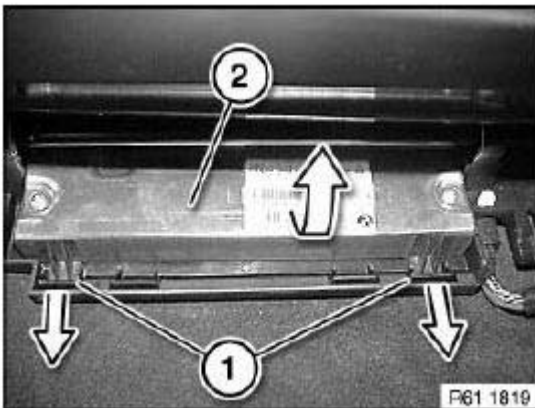


Fig. 238: Removing Control Unit For Seat Adjustment
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out programming/coding . See VEHICLE PROGRAMMING AND CODING.

61 35 107 REMOVING AND INSTALLING/REPLACING JUNCTION BOX ELECTRONICS

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) . See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC

DISCHARGE).

Necessary preliminary tasks:

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD.**
- Remove trim for instrument panel, bottom left . See **51 45 181 REMOVING AND INSTALLING/REPLACING BOTTOM RIGHT TRIM FOR INSTRUMENT PANEL .**

Release screws (1).

Remove air duct (2).

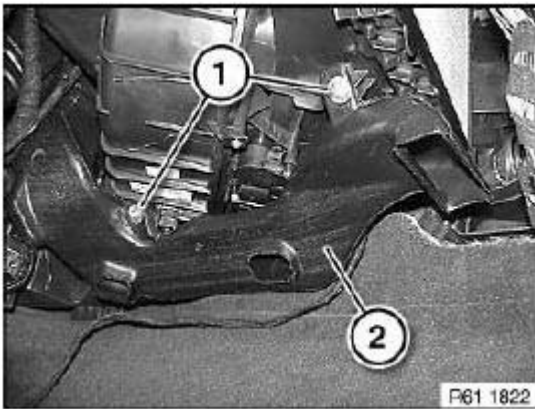


Fig. 239: Identifying Air Duct
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Slacken wiring harness in cable holder (2).

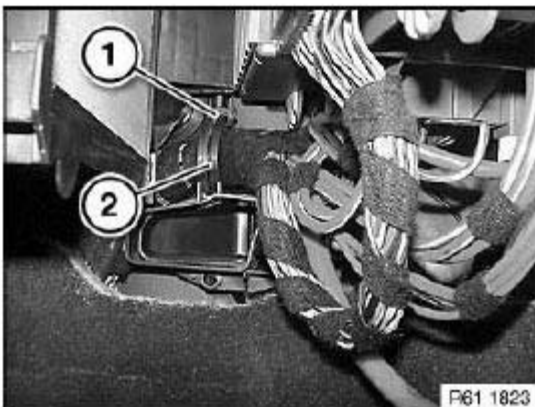


Fig. 240: Identifying Cable Holder

Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

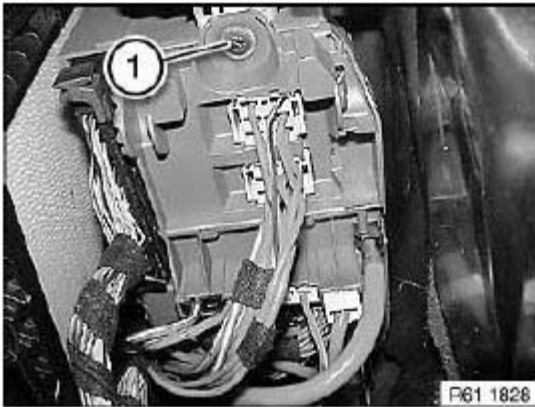


Fig. 241: Identifying Screw

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).

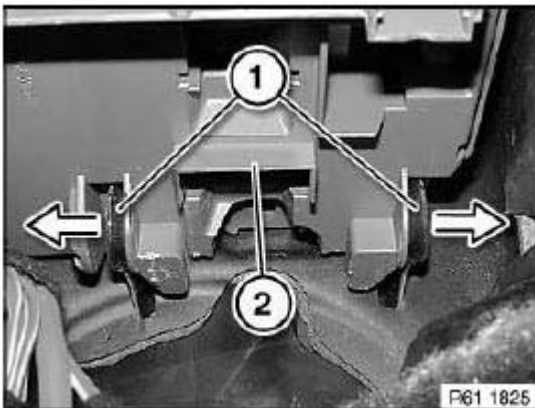


Fig. 242: Removing Holders

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

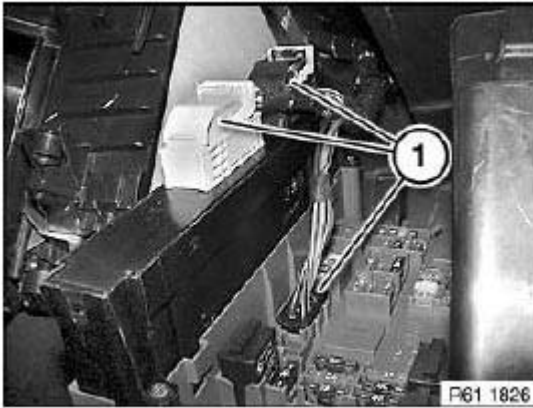


Fig. 243: Identifying Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Pull junction box electronics (2) out of fuse box.

Installation:

Make sure junction box electronics (2) is correctly seated in fuse box plug connection.

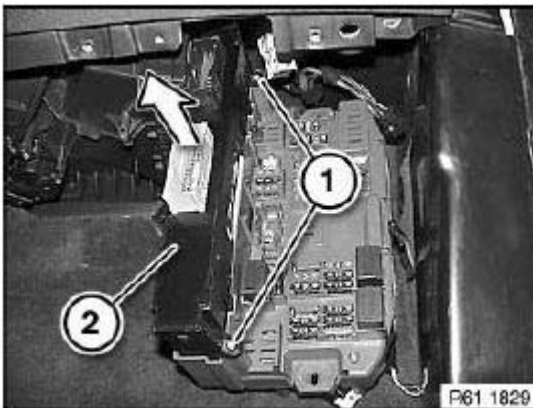


Fig. 244: Pulling Junction Box Electronics Out Of Fuse Box

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Carry out programming/coding . See VEHICLE PROGRAMMING AND CODING.

61 35 115 REMOVING AND INSTALLING/REPLACING FOOTWELL MODULE

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) . See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC

DISCHARGE).

Necessary preliminary tasks:

- Disconnect battery negative lead . See **61 20 900 DISCONNECTING AND CONNECTING 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).

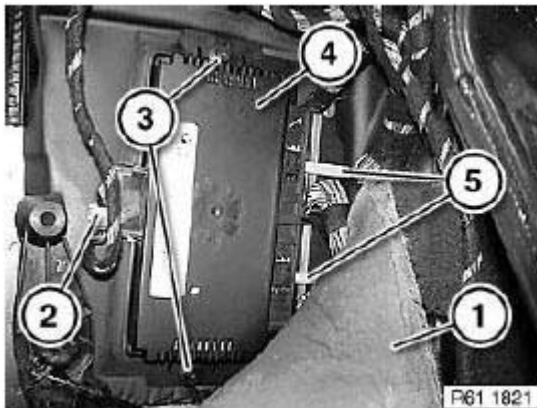


Fig. 245: Identifying Plug Connection And Footwell Module
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out programming/coding . See **VEHICLE PROGRAMMING AND CODING.**

61 35 679 INITIALIZING RAIN/LIGHT SENSOR

NOTE: Initialization is necessary:

- After replacing windshield
- When installing a used rain/light sensor

- NOTE:**
- Connect BMW diagnosis system
 - Initialize rain/light 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) . See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE).

Necessary preliminary tasks:

Remove solar rain/light sensor . See 61 35 685 REPLACING RAIN/LIGHT SOLAR SENSOR.

Optical element can only be replaced in the following equipment specifications:

- E70 without head-up display

Carefully expand catches (1) of solar rain/light sensor (2).

Remove optical element (3).

Installation:

Remove protective cover from replacement optical element.

Catches (1) of solar sensor (2) must not be damaged.

Observe laser marking (4) of fitting aid.

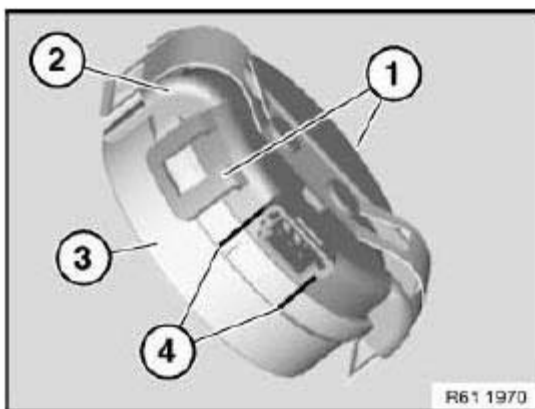


Fig. 246: Identifying Catches, Solar Rain/Light Sensor And Optical Element
Courtesy of BMW OF NORTH AMERICA, INC.

Carry out programming/coding if installing a different windscreen type. See **VEHICLE PROGRAMMING AND CODING**.

61 35 685 REPLACING RAIN/LIGHT SOLAR SENSOR

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) . See **61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE)**.

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

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

If necessary, remove interior rearview mirror . See **51 16 060 REMOVING AND INSTALLING/REPLACING INTERIOR REARVIEW MIRROR (WITH RAIN SENSOR)** .

NOTE: Catches of two-part mirror base cover (1) must not be damaged.

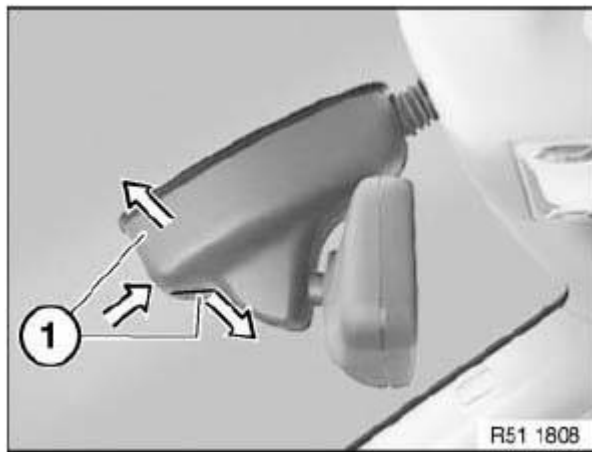


Fig. 247: Expanding Two-Part Mirror Base Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock metal spring (3) in direction of arrow.

Pull off solar rain/light sensor (2) from windscreen.

Installation:

Connect plug (1) only after fitting sensor.

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).

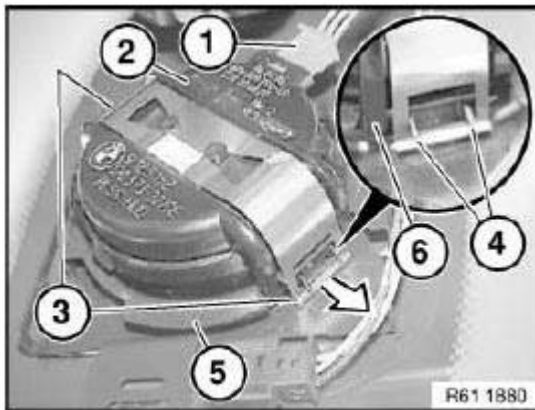


Fig. 248: Unlocking Metal Spring

Courtesy of BMW OF NORTH AMERICA, INC.

Clean windscreen in area (A) of fastening element and remove residues of silicone.



Fig. 249: Identifying Windscreen Cleaning Area

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Carry out programming/coding . See **VEHICLE PROGRAMMING AND CODING**.
- Carry out initialization. . See **61 35 679 INITIALIZING RAIN/LIGHT SENSOR**.

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) . See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE).

Necessary preliminary tasks:

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

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).

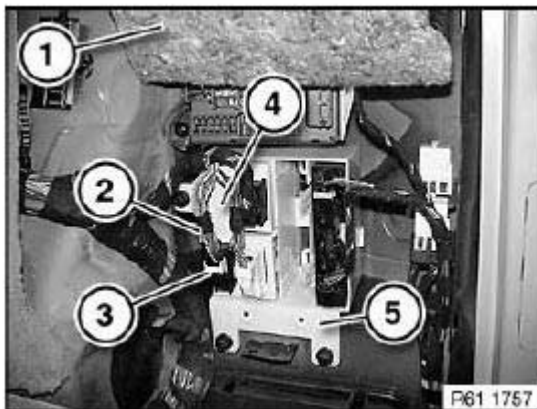


Fig. 250: Identifying Insulating Mat, Plug Connection And Device Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Carry out programming/coding . See VEHICLE PROGRAMMING AND CODING.

61 35 953 REMOVING AND INSTALLING/REPLACING INTERIOR ANTENNA FOR COMFORT ACCESS SYSTEM

Necessary preliminary tasks:

- Remove Car Communication Computer . See 65 83 010 REMOVING AND INSTALLING/REPLACING CAR COMMUNICATION COMPUTER .

Release screw (1).

Release screw (2) through opening (3).

Pull out interior antenna for comfort access system (4).

Disconnect plug connection.

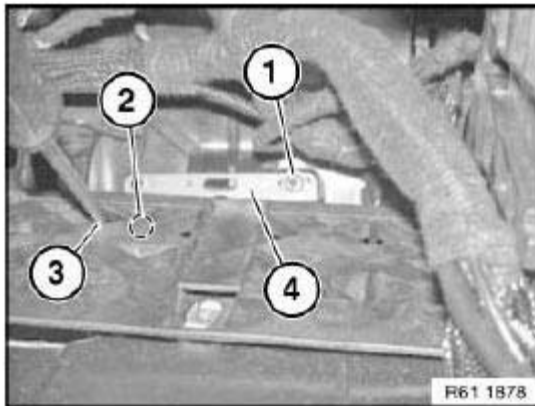


Fig. 251: Identifying Interior Antenna For Comfort Access System (4)

Courtesy of BMW OF NORTH AMERICA, INC.

61 35 954 REMOVING AND INSTALLING/REPLACING INTERIOR ANTENNA FOR COMFORT ACCESS SYSTEM (REAR CENTRE CONSOLE)

Necessary preliminary tasks:

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

Unlock retaining hook (1) and remove interior antenna for comfort access system (2).

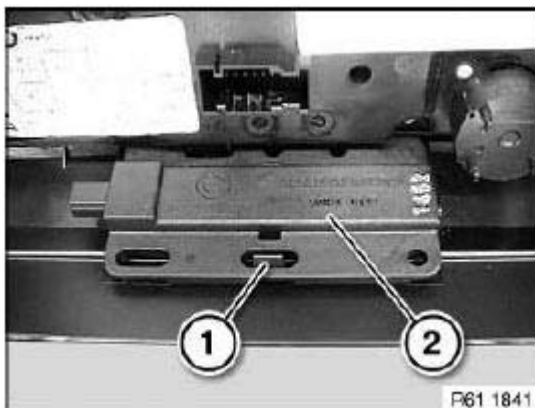


Fig. 252: Identifying Retaining Hook And Interior Antenna For Comfort Access System

Courtesy of BMW OF NORTH AMERICA, INC. 121 of 3160

61 35 958 REMOVING AND INSTALLING/REPLACING INTERIOR ANTENNA FOR COMFORT ACCESS SYSTEM ON LEFT OR RIGHT

Necessary preliminary tasks:

- Fold back luggage compartment floor trim panel

Release expansion rivet (1).

Fold back luggage compartment tray (2) slightly.

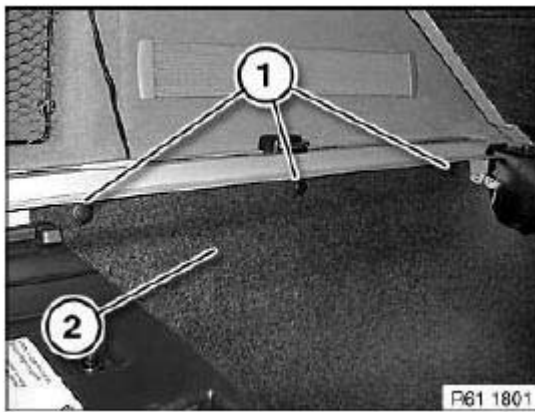


Fig. 253: Identifying Expansion Rivet And Luggage Compartment Tray
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screws (2).

Remove interior antenna (3).

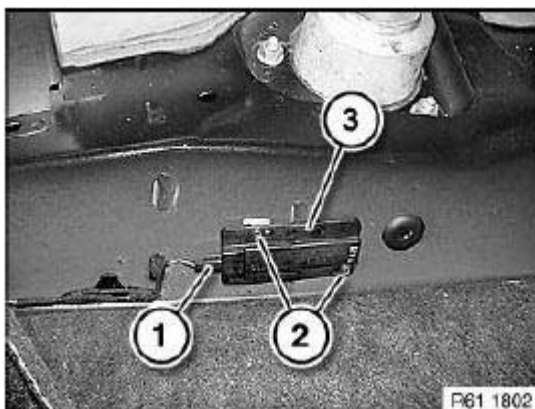


Fig. 254: Identifying Plug Connection And Interior Antenna
Courtesy of BMW OF NORTH AMERICA, INC.

61 35 975 REMOVING AND INSTALLING/REPLACING BUMPER ANTENNA FOR COMFORT ACCESS SYSTEM

Reach behind bumper trim and disconnect plug connection (2).

Press catches (1) and pull out bumper antenna for Comfort Access System (3) in direction of arrow.

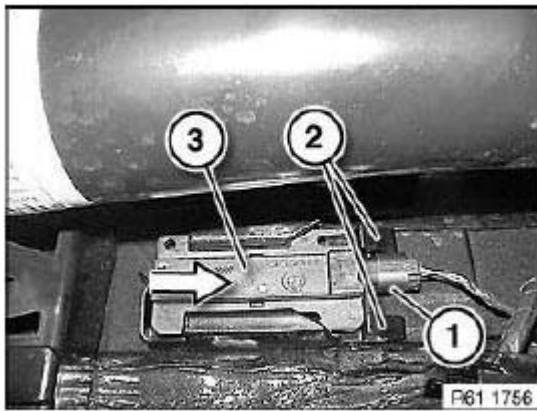


Fig. 255: Pulling Out Bumper Antenna For Comfort Access System
Courtesy of BMW OF NORTH AMERICA, INC.

VEHICLE PROGRAMMING AND CODING

Select menu item (1).

Select corresponding procedure from selection list.

Example:

- Preparation and subsequent evaluation of vehicle programming
- Start a Program session
- Sequence of BMW/MINI vehicle programming and coding
- BMW/MINI Car & Key Memory
- BMW/MINI initialization
- BMW/MINI service functions in Progman
- ...

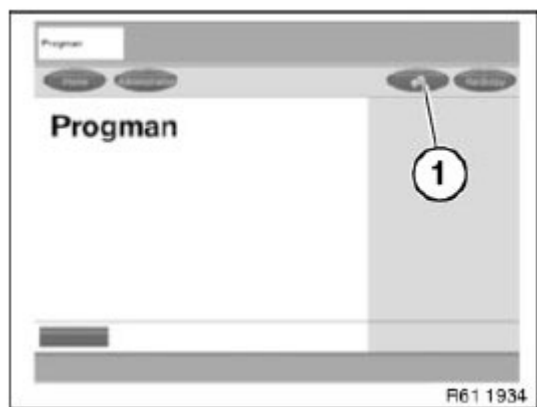


Fig. 256: Display BMW Vehicle Programming And Coding
Courtesy of BMW OF NORTH AMERICA, INC.

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.

36 RELAYS

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.

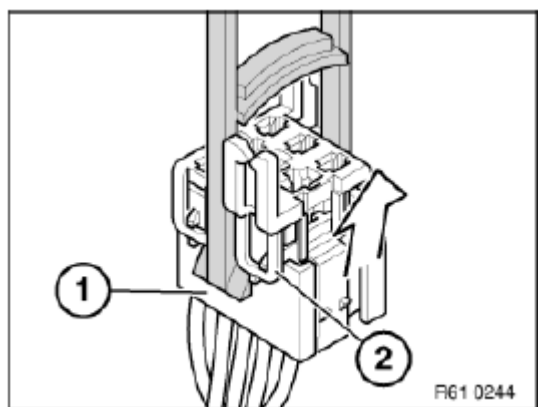


Fig. 257: Pulling Relay Carrier
Courtesy of BMW OF NORTH AMERICA, INC.

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

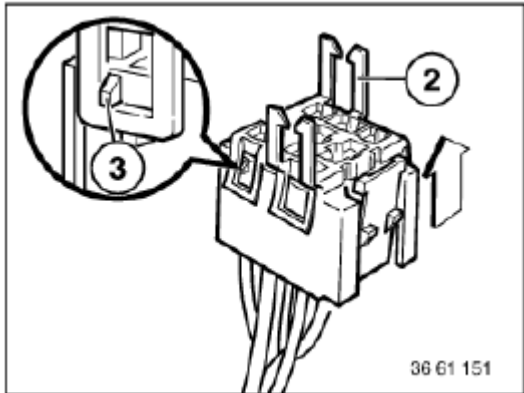


Fig. 258: Pulling Relay Carrier Into First Catch
Courtesy of BMW OF NORTH AMERICA, INC.

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).

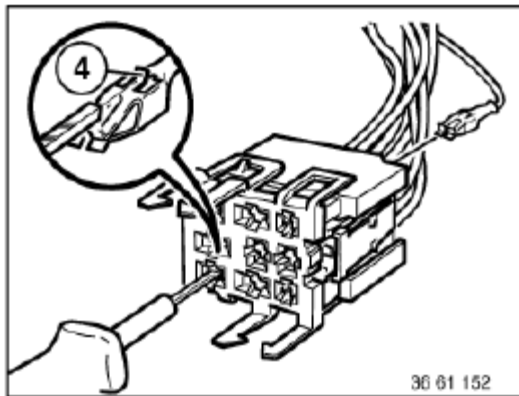


Fig. 259: Pressing Down Arrester Hook Of Appropriate Contact
Courtesy of BMW OF NORTH AMERICA, INC.

61 36 540 REMOVING AND INSTALLING/REPLACING AIR SUPPLY UNIT RELAY

After completing work:

- Clear fault memory

Necessary preliminary tasks:

- Remove ignition key.
- Remove trim panel for instrument panel at bottom right. See **51 45 181 REMOVING AND INSTALLING/REPLACING BOTTOM RIGHT TRIM FOR INSTRUMENT PANEL**.

Release screw (1) and fold down fuse box.

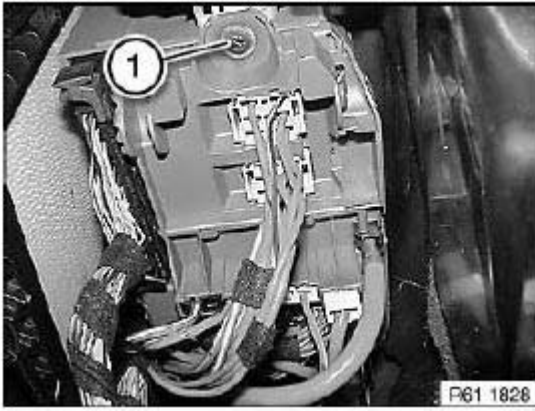


Fig. 260: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Pull relay (1) from fuse box.

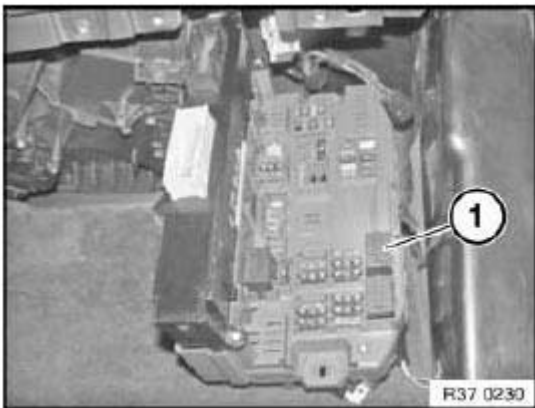
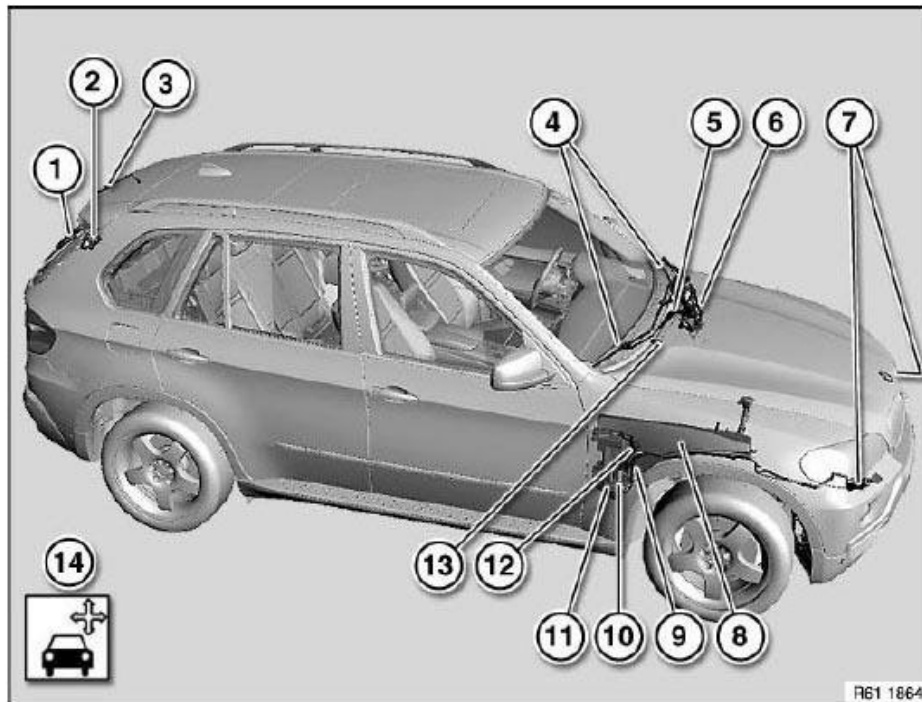


Fig. 261: Identifying Relay
Courtesy of BMW OF NORTH AMERICA, INC.

61 WINDSCREEN WIPERS

61 61.. OVERVIEW OF WINDSCREEN WIPER, WINDSCREEN WASHER AND HEADLIGHT WASHER SYSTEMS



- | | | | |
|----|--|----|--|
| 1 | <u>Rear window wiper blade</u> | 2 | <u>Rear window wiper motor</u> |
| 3 | <u>Spray nozzle for rear window washer system</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>Windscreen washer pump for rear window wiper</u> | 12 | <u>Washer pump for headlight washer system</u> |
| 13 | <u>Spray nozzle for windscreen washer system</u> | 14 | <u>Checking and adjustment work</u> |

Fig. 262: Overview Of Windscreen Wiper, Windscreen Washer And Headlight Washer Systems
 Courtesy of BMW OF NORTH AMERICA, INC.

61 61 01. ADJUSTING LEFT OR RIGHT WINDSCREEN WIPER

Special tools required:

- 61 6 100

Correctly adjusting the contact angle of the wiper arms on the windscreen increases wiping quality. For adjustment, refer to the vehicle-specific repair instruction.

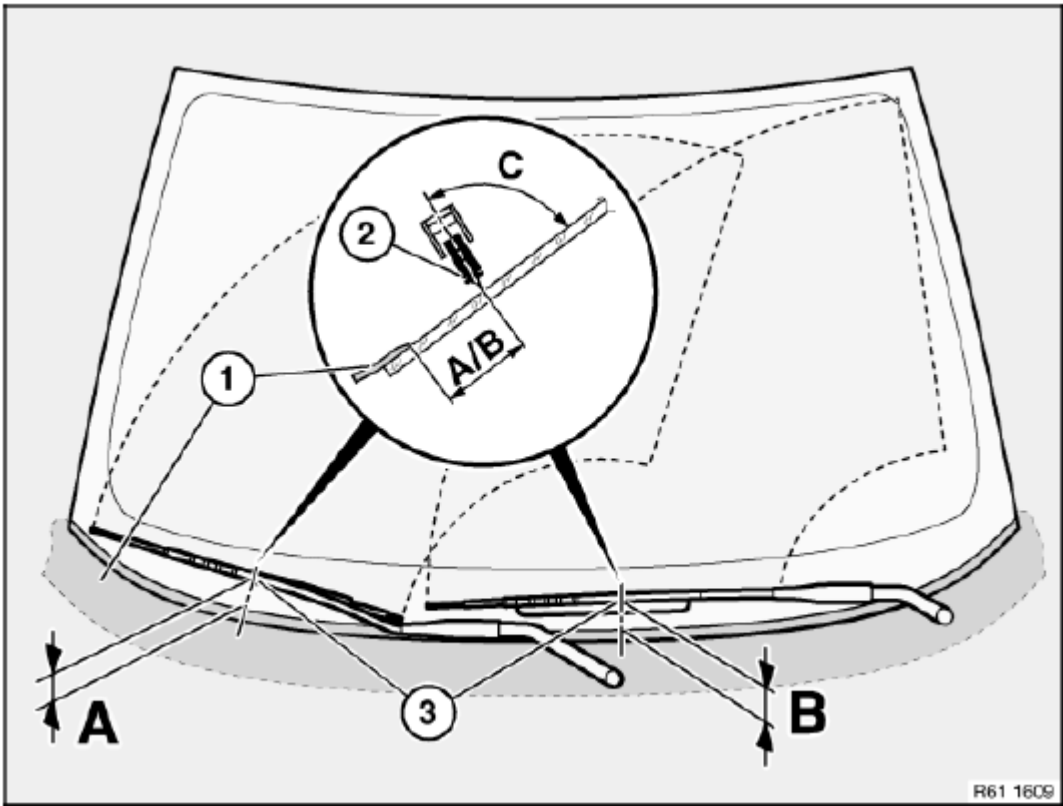


Fig. 263: Identifying Distance Between Windscreen Wiper Blade And Trim Panel On Cowl Panel
Courtesy of BMW OF NORTH AMERICA, INC.

A/B = Distance between windscreen wiper blade (2) and trim panel on cowl panel (1)

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 ADJUSTING VALUE

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
			2128	3160			

2008 BMW X5 48i

2007-08 ACCESSORIES AND BODY, CAB General Electrical System - Repair Instructions - X5

1'	E81	85.5° +1.5 to 1.0°	85.5° +1.5 to 1.0°	-5	-5	47 ± 3 mm	54 ± 3 mm	
	E82	85.5° +1.5 to 1.0°	85.5° +1.5 to 1.0°	-5	-5	47 ± 3 mm	54 ± 3 mm	
	E87	85.5° +1.5 to 1.0°	85.5° +1.5 to 1.0°	-5	-5	47 ± 3 mm	54 ± 3 mm	
3'	E46	85.7° ± 1°	85.3° ± 1°	-4	-5			
	E83	85.2° ± 1°	85.4° ± 1°	-5	-5	66 ± 3 mm	61 ± 3 mm	29 ± 1 mm
	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	
	E93	86.7° ± 1°	86.0° ± 1°	-3	-4	75 ± 3 mm	84 ± 3 mm	
5'	E39	86.5° ± 1°	86.5° ± 1°	-4	-4			60.1 ± 1 mm
	E53	85.0° ± 1°	85.0° ± 1°	-5	-5	5 ± 3 mm	55 ± 3 mm	32.5 ± 2 mm
	E60	86.0° ± 1°	86.0° ± 1°	-4	-4	69 ± 3 mm	87 ± 3 mm	
	E61	86.0° ± 1°	86.0° ± 1°	-4	-4	69 ± 3 mm	87 ± 3 mm	30 ± 3 mm
	E70	85.6° ± 1°	85.0° ± 1°	-4	-5	103 ± 3 mm	90 ± 3 mm	39 ± 2 mm
6'	E63	86.0° ± 1°	86.0° ± 1°	-4	-4	69 ± 3 mm	87 ± 3 mm	
	E64	86.0° ± 1°	86.0° ± 1°	-4	-4	69 ± 3 mm	87 ± 3 mm	
7'	E38	87.0° ± 1°	87.0° ± 1°	-3	-3	65 ± 3 mm	58 ± 3 mm	
	E65	85.5° ± 1°	87.0° ± 1°	-	-	20 ± 3 mm	48 ± 3 mm	
	E66	85.5° ± 1°	87.0° ± 1°	-	-	20 ± 3 mm	48 ± 3 mm	
8'	E52	85.5° ± 1°	85.5° ± 1°	-4	-4	38 ± 2 mm	104 ± 2 mm	
Z	E85	85.5° ± 1°	85.5° ± 1°	-4	-4	57 ± 2 mm	52 ± 2 mm	
	E86	85.5° ± 1°	85.5° ± 1°	-4	-4	57 ± 2 mm	52 ± 2 mm	

61 61 010 CHECKING/ADJUSTING CONTACT ANGLE OF WINDSCREEN WIPER ARMS ON WINDSCREEN

Special tools required:

- 00 9 220
- 61 6 100

NOTE: Wiping quality is increased if the approach angle of the windscreen wiper arms is precisely adjusted.

Adjusting dimensions of wiper arms. See **WINDSCREEN WIPER ADJUSTING VALUE:**

2129 of 3160

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.

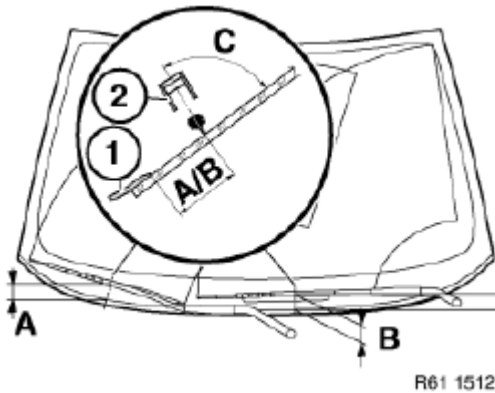


Fig. 264: Identifying Angle Between Wiper Blade Centre Plane And Windscreen
Courtesy of BMW OF NORTH AMERICA, INC.

Remove wiper blade (1) from wiper arm (2).

Pin (3) is locator for special tool 61 6 100.

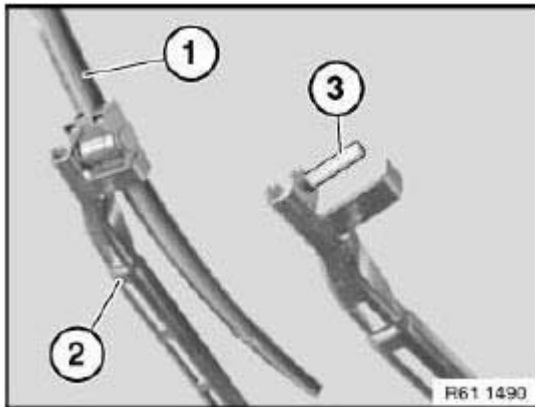


Fig. 265: Identifying Wiper Blade, Wiper Arm And Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Slide 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.

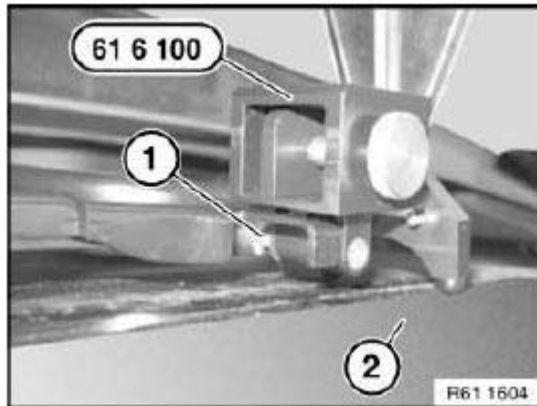


Fig. 266: Identifying Special Tool 61 6 100 On Windscreen
Courtesy of BMW OF NORTH AMERICA, INC.

If the specified number in degrees is not correct, the wiper arm (1) must be bent with special tool 00 9 220 at the point shown.

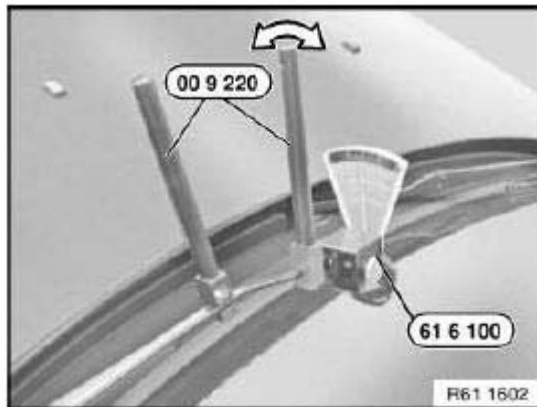


Fig. 267: Identifying Special Tool 00 9 220
Courtesy of BMW OF NORTH AMERICA, INC.

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).

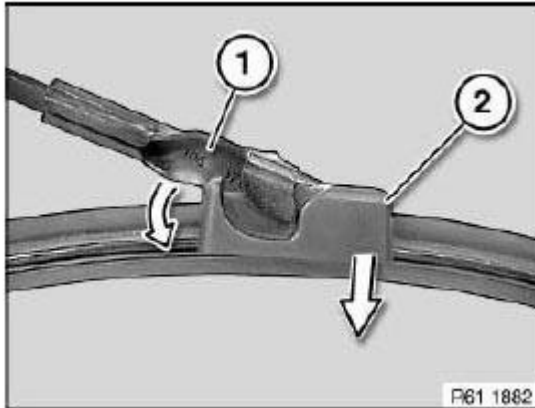


Fig. 268: Removing Windscreen Wiper Blade From Windscreen Wiper Arm
Courtesy of BMW OF NORTH AMERICA, INC.

61 61 081 REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT WINDSCREEN WIPER ARM

Special tools required:

- 61 6 060

IMPORTANT: Do not damage wiper arms when removing (risk of breakage).

Remove wiper arm cover caps (1) towards top.

Release nut underneath.

Tightening torque. See GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .

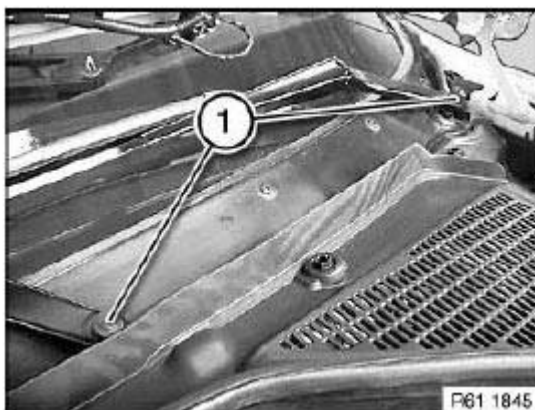


Fig. 269: Identifying Wiper Arm Cover Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Detach wiper arm (1) with special tool 61 6 060

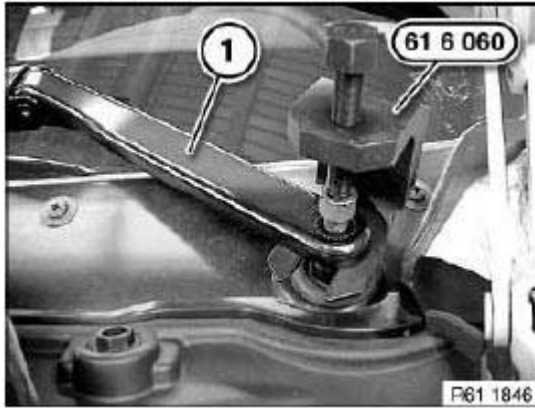


Fig. 270: Identifying Wiper Arm And Special Tool 61 6 060
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

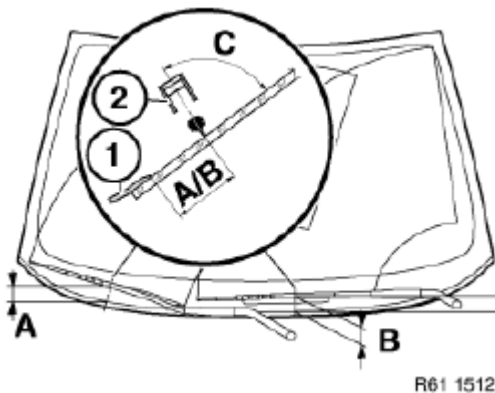


Fig. 271: Identifying Angle Between Wiper Blade Centre Plane And Windscreen
 Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary tasks:

- Remove cover for cowl panel . See **51 13 116 REMOVING AND INSTALLING/REPLACING COWL PANEL COVER** .

Release screws (1).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES** .

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).

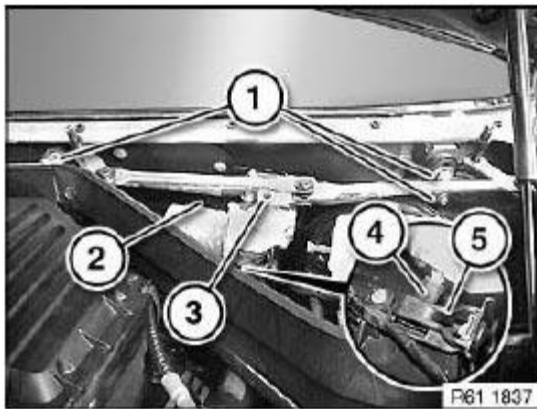


Fig. 272: Identifying Plug Connection, Windscreen Wiper System And Guides
Courtesy of BMW OF NORTH AMERICA, INC.

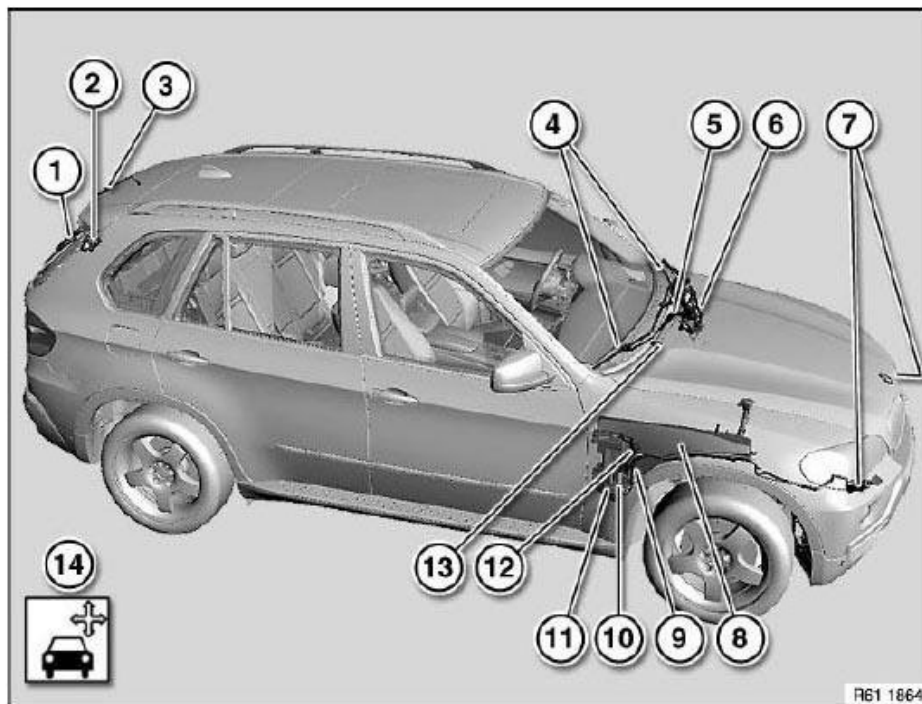
Installation:

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. See **61 61 010 CHECKING/ADJUSTING CONTACT ANGLE OF WINDSCREEN WIPER ARMS ON WINDSCREEN**.

62 REAR WINDOW WIPER

61 61.. OVERVIEW OF WINDSCREEN WIPER, WINDSCREEN WASHER AND HEADLIGHT WASHER SYSTEMS



- | | |
|--|---|
| 1 <u>Rear window wiper blade</u> | 2 <u>Rear window wiper motor</u> |
| 3 <u>Spray nozzle for rear window washer system</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>Windscreen washer pump for rear window wiper</u> | 12 <u>Washer pump for headlight washer system</u> |
| 13 <u>Spray nozzle for windscreen washer system</u> | 14 <u>Checking and adjustment work</u> |

Fig. 273: Overview Of Windscreen Wiper, Windscreen Washer And Headlight Washer Systems
 Courtesy of BMW OF NORTH AMERICA, INC.

61 62 020 REMOVING AND INSTALLING/REPLACING REAR WINDOW WIPER BLADE

Fold wiper arm (1) away from rear window.

Pull off window wiper blade (2) in direction of arrow.

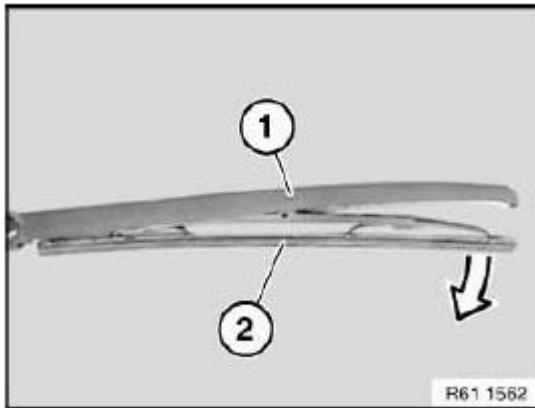


Fig. 274: Pulling Off Window Wiper Blade
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure guide (1) is correctly seated in wiper blade (2).

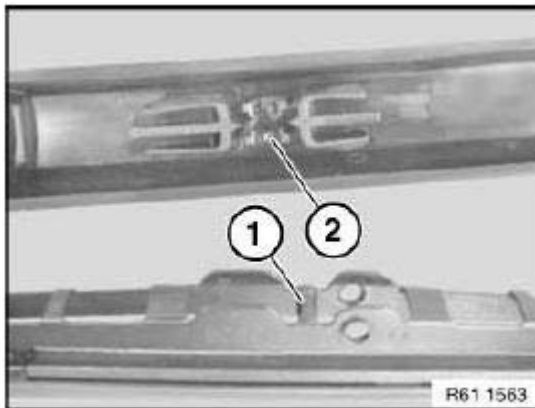


Fig. 275: Identifying Guide And Wiper Blade
 Courtesy of BMW OF NORTH AMERICA, INC.

61 62 030 REMOVING AND INSTALLING/REPLACING WIPER ARM ON REAR WINDOW

Special tools required:

- 61 6 060

Fold up cover cap (1) in direction of arrow.

Release nut underneath.

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES**.

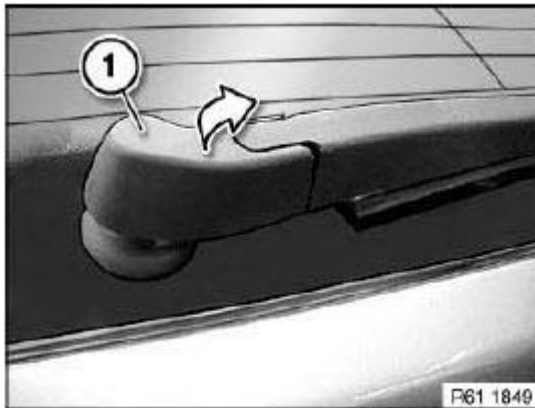


Fig. 276: Folding Up Cover Cap

Courtesy of BMW OF NORTH AMERICA, INC.

Press off wiper arm (1) with special tool 61 6 060 and remove.

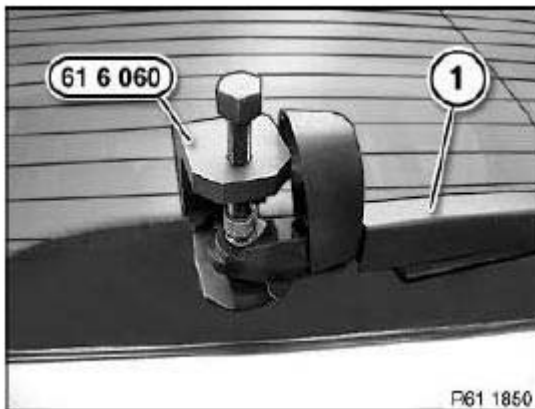


Fig. 277: Identifying Wiper Arm And Special Tool 61 6 060

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Before fitting wiper arm, allow wiping system to run two wipe cycles into park position.

Adjust measurement (A) between wiper arm and rear window edge.

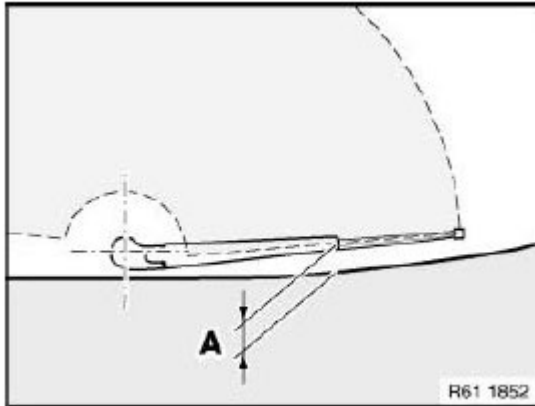


Fig. 278: Identifying Measurement Between Wiper Arm And Rear Window Edge
Courtesy of BMW OF NORTH AMERICA, INC.

61 62 060 REMOVING AND INSTALLING/REPLACING REAR WINDOW WIPER MOTOR

Necessary preliminary tasks:

- Remove wiper arm for rear window wiper . See **61 62 030 REMOVING AND INSTALLING/REPLACING WIPER ARM ON REAR WINDOW.**
- Remove trim for rear lid at bottom . See **51 49 000 REMOVING AND INSTALLING/REPLACING PANEL FOR REAR LID .**

Disconnect plug connector (1).

Release bolts (2).

Tightening torque. See **GENERAL ELECTRICAL SYSTEM - TIGHTENING TORQUES .**

Pull rear window wiper motor out of rear window grommet.

Installation:

Check wiper shaft grommet for signs of damage.

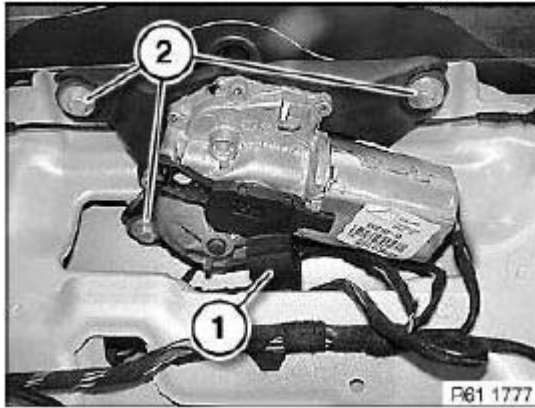


Fig. 279: Identifying Plug Connector

Courtesy of BMW OF NORTH AMERICA, INC.

61 62 115 REPLACING SPRAY NOZZLE FOR REAR WINDOW WASHER UNIT

Necessary preliminary tasks:

- Remove auxiliary brake light . See **63 25 000 REMOVING AND INSTALLING/REPLACING AUXILIARY BRAKE LIGHT** .

Disconnect hose connection (1).

Expand catch (2) and pull spray nozzle (3) out of auxiliary brake light.

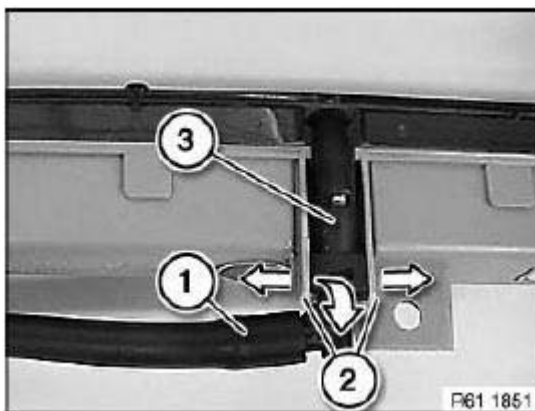


Fig. 280: Pulling Spray Nozzle Out Of Auxiliary Brake Light

Courtesy of BMW OF NORTH AMERICA, INC.

61 62 150 REMOVING AND INSTALLING/REPLACING WINDOW WASHER PUMP FOR REAR WINDOW WASHER SYSTEM

Necessary preliminary tasks:

- Remove trim panel for cover on frame side member on right. See **51 71 447 REMOVING AND INSTALLING OR REPLACING PANEL FOR COVER ON LEFT OR RIGHT SIDE MEMBER** .
- Remove wheel arch trim at front right. See **51 71 039 REMOVING AND INSTALLING/REPLACING FRONT LEFT OR RIGHT WHEEL ARCH COVER (REAR SECTION)** .
- Drain fluid reservoir for windscreen washer system

Release screws

Press off side panel slightly.

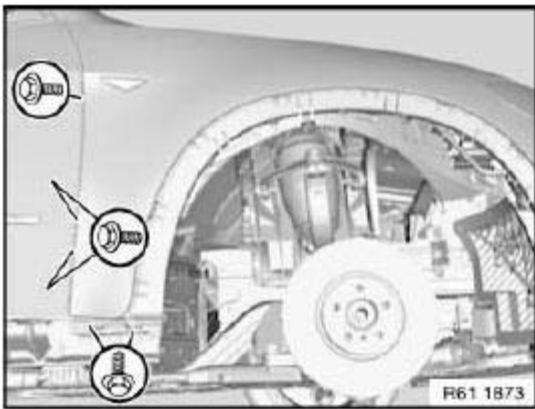


Fig. 281: Identifying Screws

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Side panel shown removed for purposes of clarity.

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:

Coat sealing ring (4) of windscreen washer pump (2) with antiseize agent.

Ensure hose is laid without kinks.

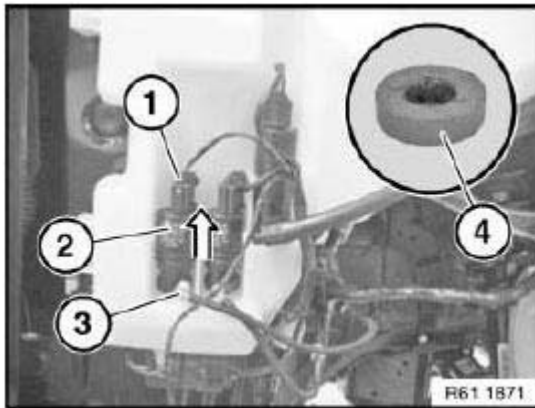
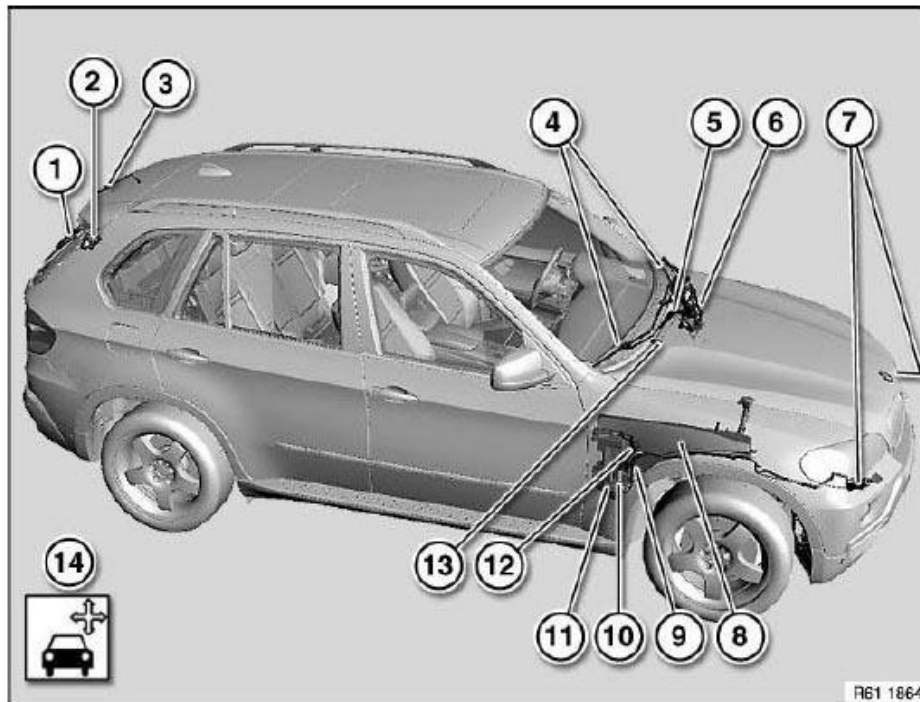


Fig. 282: Pulling Windscreen Washer Pump Out Of Windscreen Washer System Fluid Reservoir
Courtesy of BMW OF NORTH AMERICA, INC.

67 HEADLIGHT WASHER SYSTEM

61 61.. OVERVIEW OF WINDSCREEN WIPER, WINDSCREEN WASHER AND HEADLIGHT WASHER SYSTEMS



- | | | | |
|----|--|----|---|
| 1 | <u>Rear window wiper blade</u> | 2 | <u>Rear window wiper motor</u> |
| | <u>Wiper arm for rear window wiper</u> | | |
| 3 | <u>Spray nozzle for rear window washer system</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>Windscreen washer pump for rear window wiper</u> | 12 | <u>Washer pump for headlight washer system</u> |
| 13 | <u>Spray nozzle for windscreen washer system</u> | 14 | <u>Checking and adjustment work</u> |

Fig. 283: Overview Of Windscreen Wiper, Windscreen Washer And Headlight Washer Systems
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. See **51 71 447 REMOVING AND INSTALLING OR REPLACING PANEL FOR COVER ON LEFT OR RIGHT SIDE MEMBER**.
- Remove wheel arch trim at front right. See **51 71 039 REMOVING AND INSTALLING/REPLACING FRONT LEFT OR RIGHT WHEEL ARCH COVER (REAR SECTION)**.
- Drain fluid reservoir for windscreen washer. See **51 67 3160**.

Release bolts.

Press off side panel slightly.

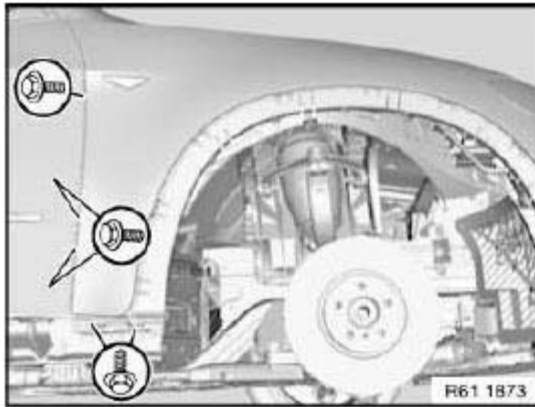


Fig. 284: Identifying Screws

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Side panel shown removed for purposes of clarity.

Disconnect plug connection (1).

Pull washer pump (2) in direction of arrow out of fluid reservoir for windscreen washer system.

Disconnect hose plug connection (3) from washer pump (2).

Installation:

Coat sealing ring (4) of washer pump (2) with antiseize agent.

Ensure hose is laid without kinks.

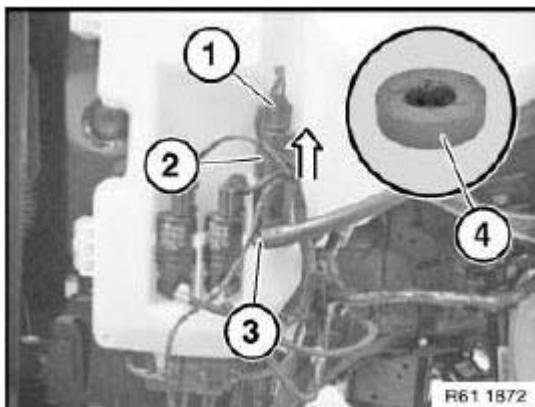


Fig. 285: Pulling Washer Pump Out Of Windscreen Washer System Fluid Reservoir

Courtesy of BMW OF NORTH AMERICA, INC.

61 67 100 REMOVING AND INSTALLING/REPLACING HIGH - PRESSURE NOZZLE OF HEADLIGHT WASHER SYSTEM ON LEFT (OR RIGHT)

Special tools required:

- 00 9 340

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.

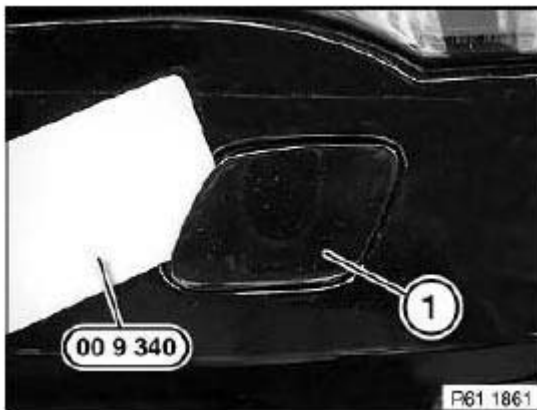


Fig. 286: Identifying Cover And Special Tool 00 9 340

Courtesy of BMW OF NORTH AMERICA, INC.

Slowly pull out spray nozzle (1) by cover (2).

Unclip cover (2) and remove.

Allow nozzle (1) to slide back slowly.

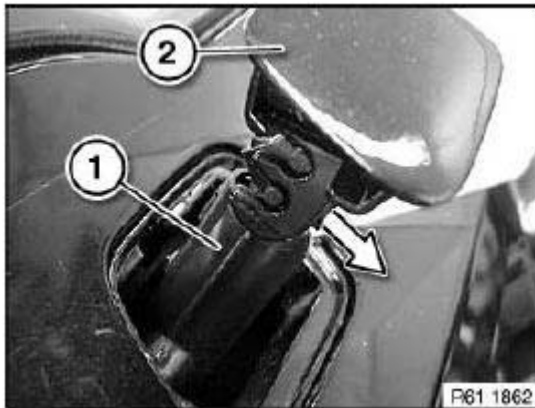


Fig. 287: Pulling Out Spray Nozzle

Courtesy of BMW OF NORTH AMERICA, INC.

Pull back clasp (1) and disconnect plug connection (2).

Unlock catch (3) in direction of arrow.

Pull out high-pressure nozzle (4) towards rear.

Installation:

Make sure retaining lugs (3) engage correctly.

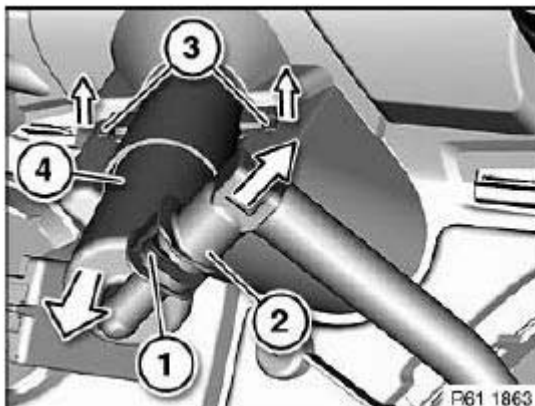
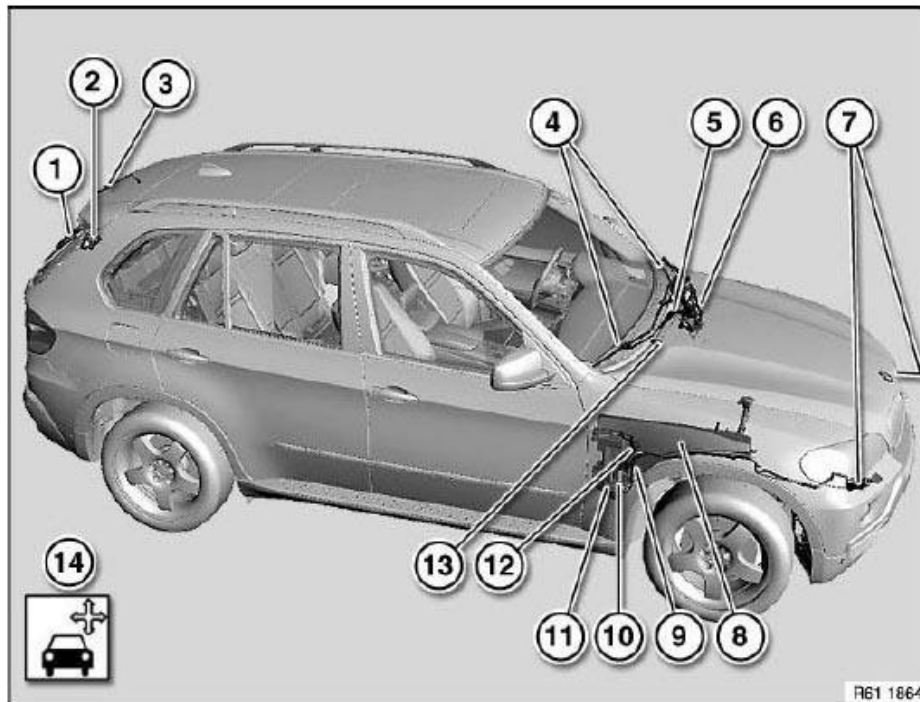


Fig. 288: Unlocking Catch

Courtesy of BMW OF NORTH AMERICA, INC.

71 WINDOW WASHER SYSTEM

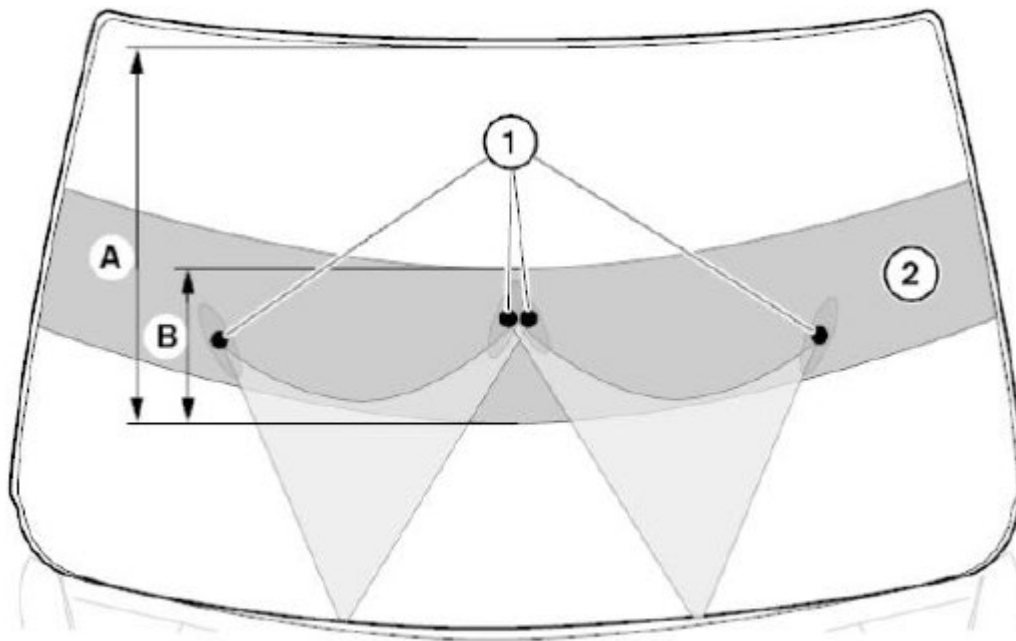
61 61.. OVERVIEW OF WINDSCREEN WIPER, WINDSCREEN WASHER AND HEADLIGHT WASHER SYSTEMS



- | | | | |
|----|--|----|---|
| 1 | <u>Rear window wiper blade</u> | 2 | <u>Rear window wiper motor</u> |
| | <u>Wiper arm for rear window wiper</u> | | |
| 3 | <u>Spray nozzle for rear window washer system</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>Windscreen washer pump for rear window wiper</u> | 12 | <u>Washer pump for headlight washer system</u> |
| 13 | <u>Spray nozzle for windscreen washer system</u> | 14 | <u>Checking and adjustment work</u> |

Fig. 289: Overview Of Windscreen Wiper, Windscreen Washer And Headlight Washer Systems
 Courtesy of BMW OF NORTH AMERICA, INC.

61 71 004 ADJUSTING WINDSCREEN WASHER SPRAY NOZZLES



R61 1929

Fig. 290: Identifying Windscreen Washer Spray Nozzles Adjusting Dimension
Courtesy of BMW OF NORTH AMERICA, INC.

Mark tolerance range (2) with crepe tape (A=500 mm / B=200 mm).

Actuate 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).

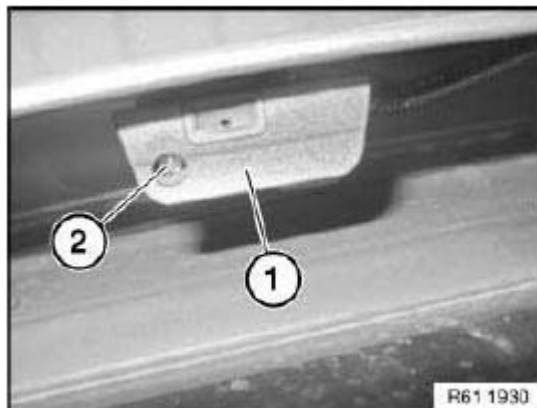


Fig. 291: Identifying Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

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).

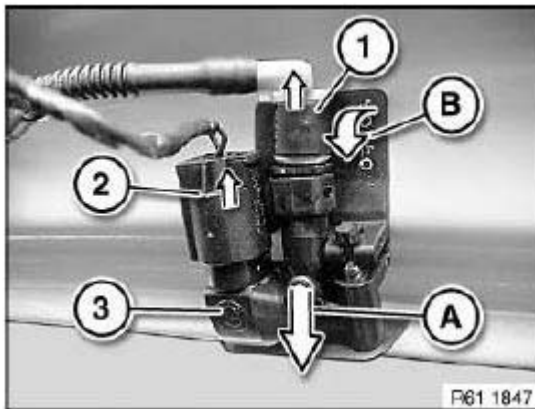


Fig. 292: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

- Retaining lugs (1) must not be damaged.
- Check adjustment of spray nozzles and correct if necessary. See **61 71 004 ADJUSTING WINDSCREEN WASHER SPRAY NOZZLES**.

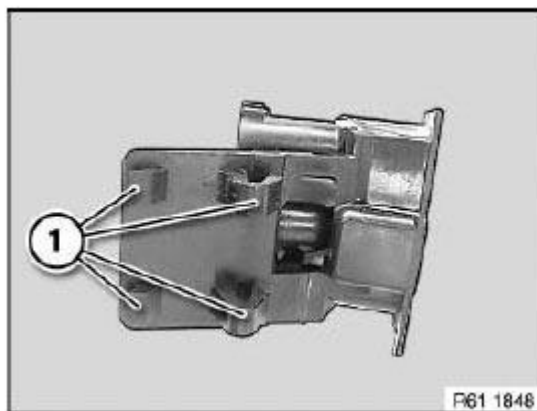


Fig. 293: Identifying Retaining Lugs
Courtesy of BMW OF NORTH AMERICA, INC.

WASHER UNIT

Necessary preliminary tasks:

- Remove trim panel for cover on frame side member on right. See **51 71 447 REMOVING AND INSTALLING OR REPLACING PANEL FOR COVER ON LEFT OR RIGHT SIDE MEMBER** .
- Remove wheel arch trim at front right. See **51 71 039 REMOVING AND INSTALLING/REPLACING FRONT LEFT OR RIGHT WHEEL ARCH COVER (REAR SECTION)** .
- Remove auxiliary direction indicator light at front right. See **63 13 200 REMOVING AND INSTALLING/REPLACING FRONT LEFT OR RIGHT AUXILIARY DIRECTION INDICATOR** .
- Drain fluid reservoir for windscreen washer system

Release screw (1).

Twist filler duct (2) in direction of arrow out of fluid reservoir (3).

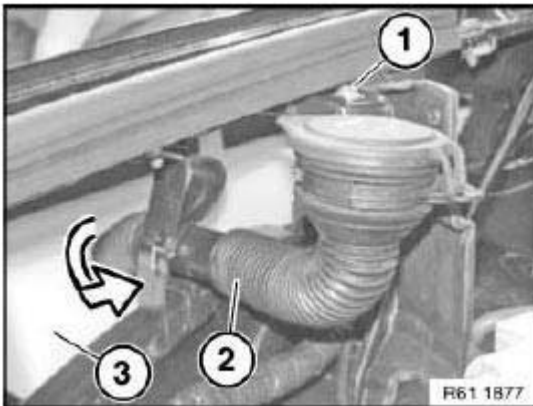


Fig. 294: Twisting Filler Duct Out Of Fluid Reservoir
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws.

Press off side panel slightly.

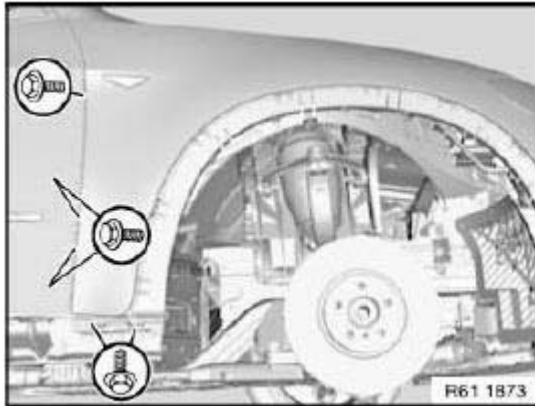


Fig. 295: Identifying Screws

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Side panel shown removed for purposes of clarity.

Remove washer pump of headlight washer system (1) . See **61 67 100 REMOVING AND INSTALLING/REPLACING HIGH - PRESSURE NOZZLE OF HEADLIGHT WASHER SYSTEM ON LEFT (OR RIGHT).**

Remove washer pump for rear window washer system (2)). See **61 62 150 REMOVING AND INSTALLING/REPLACING WINDOW WASHER PUMP FOR REAR WINDOW WASHER SYSTEM.**

Disconnect plug connection (3) and unclip wiring harness.

Remove windscreen washer pump (4) . See **61 71 100 REMOVING AND INSTALLING/REPLACING WINDSCREEN WASHER PUMP.**

Remove level switch (5) for windscreen washer system . See **61 31 492 REPLACING LEVEL SWITCH FOR WINDSCREEN WASHER SYSTEM.**

Unclip high-pressure line (6) from fluid reservoir.

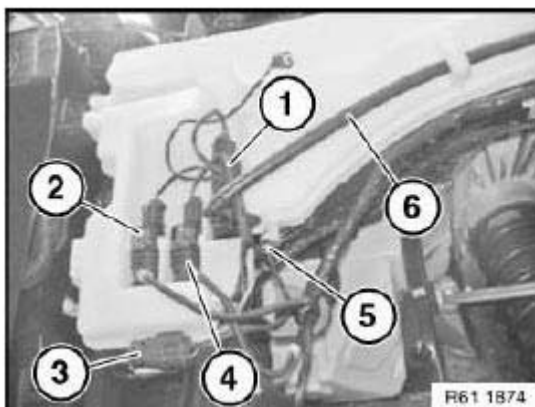


Fig. 296: Identifying Plug Connection, Level Switch, Windscreen Washer Pump And High-Pressure Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Feed out fluid reservoir (2) towards front.

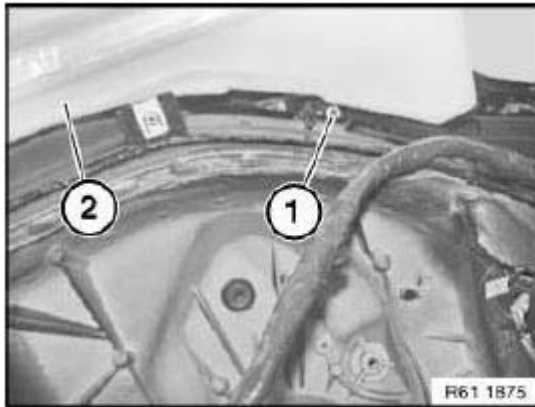


Fig. 297: Identifying Fluid Reservoir
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Fluid reservoir (1) must be correctly seated in lug (2).

Coat sealing rings of washer pump with anti-friction agent.

Ensure hose is laid without kinks.

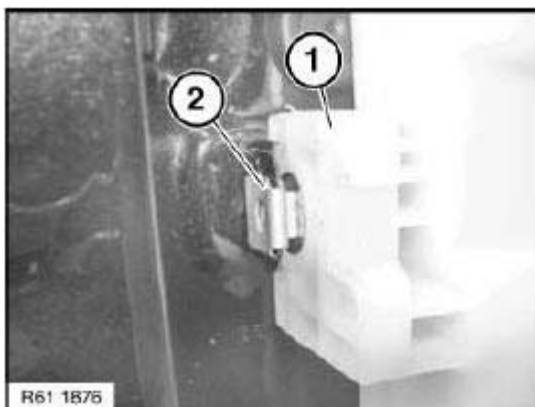


Fig. 298: Identifying Fluid Reservoir And Lug
Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary tasks:

- Remove trim panel for cover on frame side member on right. See **51 71 447 REMOVING AND INSTALLING OR REPLACING PANEL FOR COVER ON LEFT OR RIGHT SIDE MEMBER** .
- Remove wheel arch trim at front right. See **51 71 039 REMOVING AND INSTALLING/REPLACING FRONT LEFT OR RIGHT WHEEL ARCH COVER (REAR SECTION)** .
- Drain fluid reservoir for windscreen washer system

Release bolts.

Press off side panel slightly.

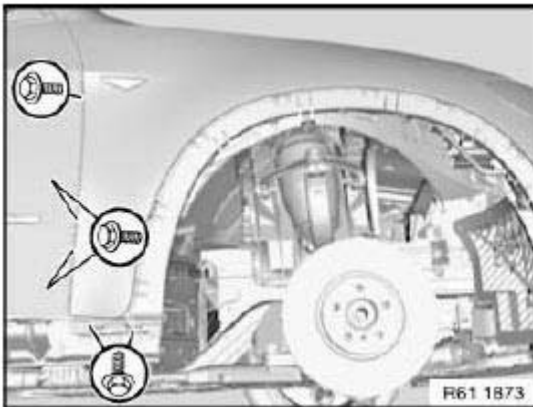


Fig. 299: Identifying Screws

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Side panel shown removed for purposes of clarity.

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).

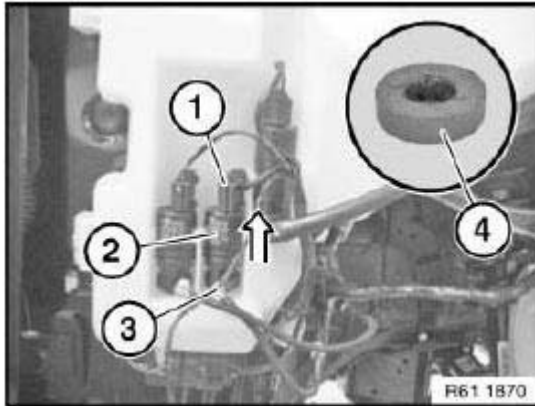


Fig. 300: Pulling Windscreen Washer Pump Out Of Windscreen Washer System Fluid Reservoir
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Coat sealing ring (4) of windscreen washer pump (2) with antiseize agent.

Ensure hose is laid without kinks.