



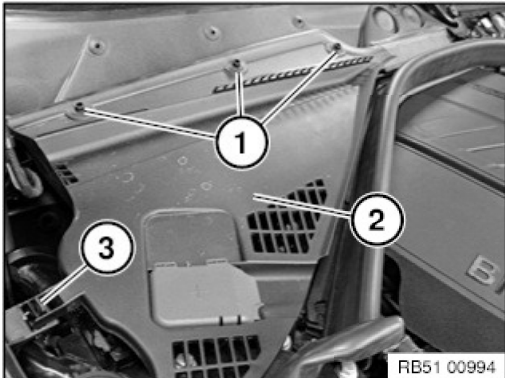
Warning!

Observe [safety information](#) for handling vehicle battery.



Necessary preliminary tasks:

- Clamp off [battery lead from negative connection point](#)



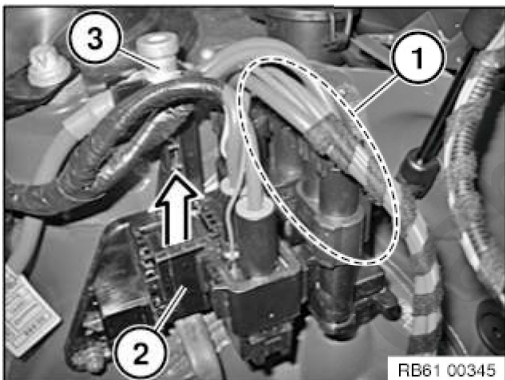
Note:

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

Turn locks (1) 90° counterclockwise.

Unlock catch (3).

Remove cover (2).



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

Disengage cover (2) in direction of arrow and take off.

Release nut from positive wire (3) and remove retaining bracket (3).

Tightening torque [61 21 4AZ](#)

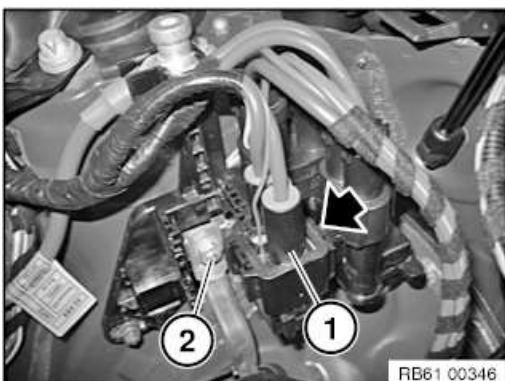
Installation note:

Make sure all plug connections are correctly latched.

Make sure cover (2) is correctly locked.

Risk of short circuits!

Ensure positive wire (3) is correctly seated.



Release latch mechanism (arrow) and pull relay carrier (1) up and out of power distribution box.

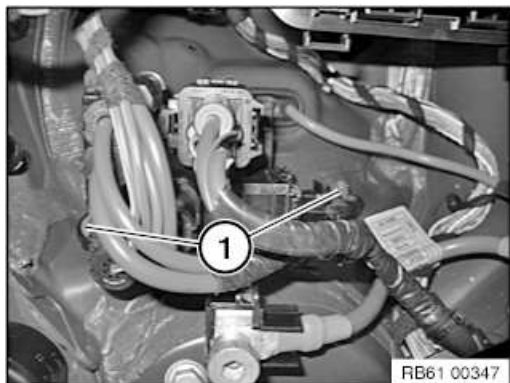
Release nut from flat positive terminal wire (2) and remove flat positive terminal wire (2).

Tightening torque [61 21 4AZ](#).

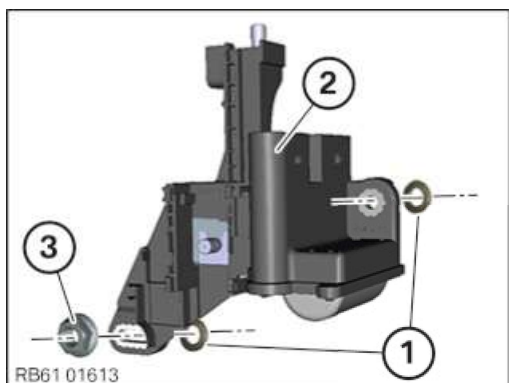
Installation note:

Risk of short circuits!

Make sure flat positive terminal wire (2) is correctly seated.



Release nuts (1) and remove power distribution box.
Tightening torque [61 21 2AZ](#).



Installation note:
Install power distribution box (2) as displayed in diagram with washers (1) and new nut (3).

cardiagn.com

61 14 035 Remove and install/replace power distribution box of positive battery cable (from 02/13)



Warning!

Observe [safety information](#) for handling vehicle battery.



Necessary preliminary tasks:

- Clamp off [battery lead from negative connection point](#)
- Remove [cowl panel cover](#)

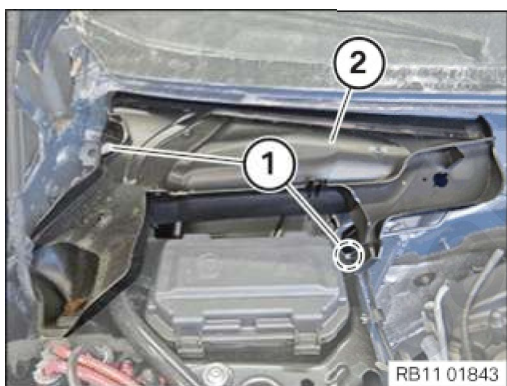


Note:

Removal and installation are described separately.

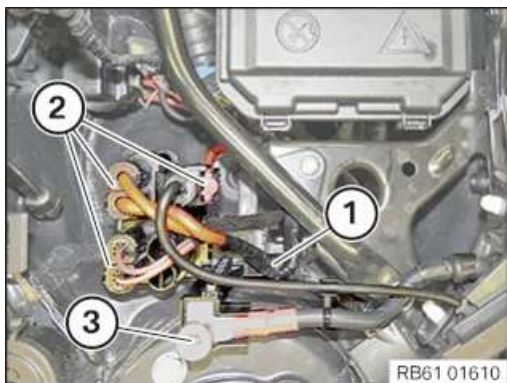


Removal:



Release screws (1).

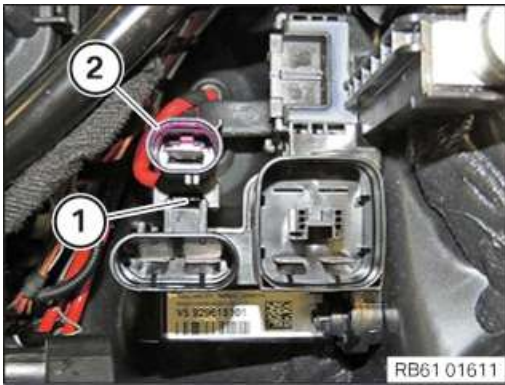
Remove attachment part of partition wall (2).



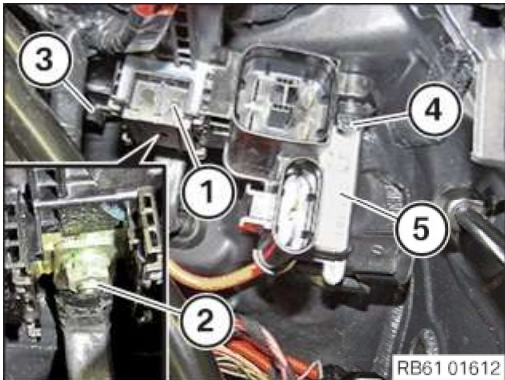
Release cable strap (1).

Unlock and disconnect connector (2).

Loosen the nut from positive wire (3) and remove positive wire (3).



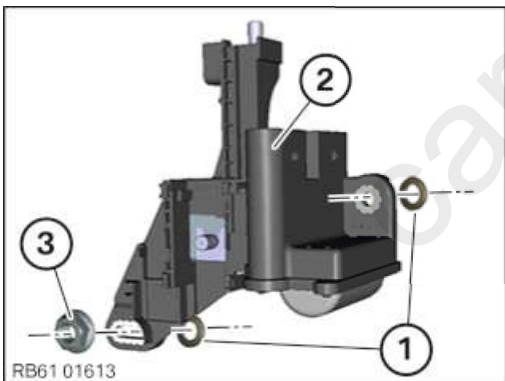
Loosen latch mechanism (1) and pull off socket (2) upwards.



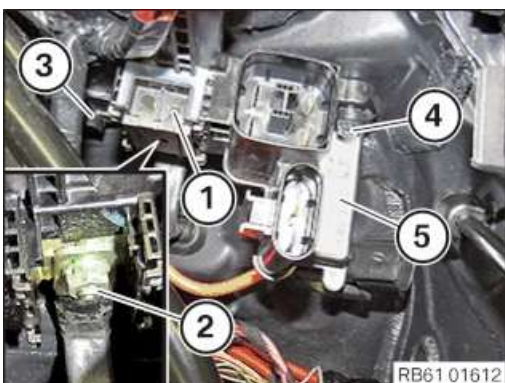
Loosen and remove cover (1) upwards.
Loosen the nut (2) and unthread positive wire.
Release nuts (3 and 4).
Pull out the power distribution box (5).



Installation:

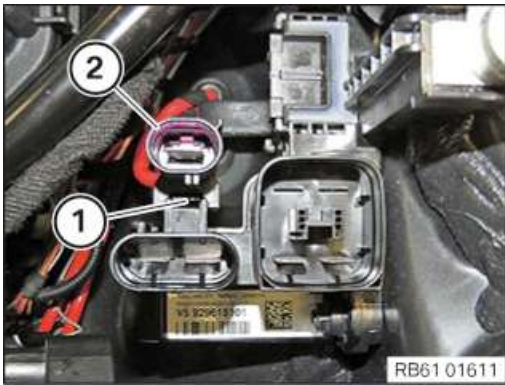


Installation note:
Install power distribution box (2) as displayed in diagram with washers (1) and new nut (3).

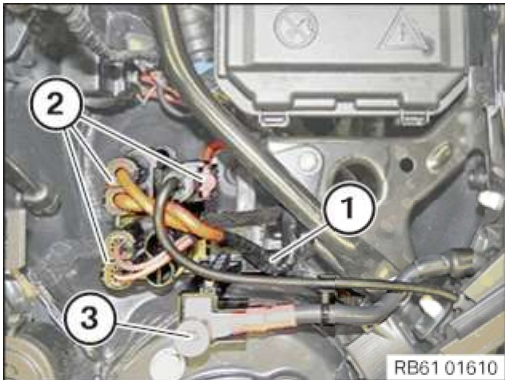


Installation note:
Ensure that the washers are on threaded bolt.

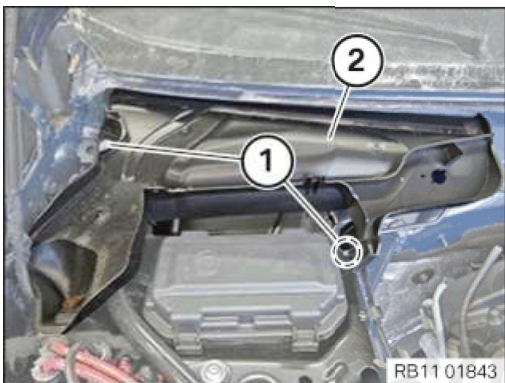
Insert power distribution box (5).
Tighten nut (4).
Tightening torque [61 21 2AZ](#).
Tighten new nut (3).
Tightening torque [61 21 2AZ](#).
Thread positive wire and tighten with nut (2).
Tightening torque [61 21 4AZ](#).
Insert and close cover.



Connect socket (2) from top to power distribution box. *Installation note:*
Ensure correct latch mechanism (1).



Connect all connectors (2).
Tighten positive wire (3) using nut.
Tightening torque [61 21 4AZ](#)
Replace cable tie (1).
Installation note:
Pay attention to correct latch mechanism of all connectors.
Risk of short circuits!
Ensure positive wire (3) is correctly seated.



Remove attachment part of partition wall (2).
Tighten down screws (1).

**Special tools required:**

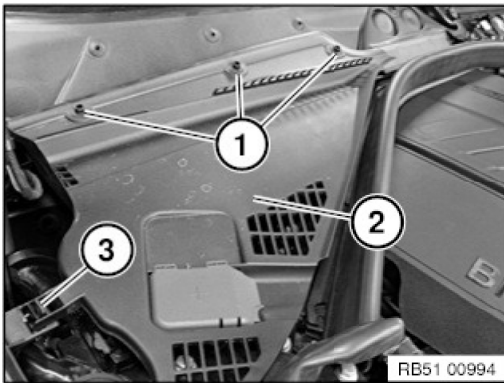
- [00 9 325](#)

**Warning!**

Observe [safety information](#) for handling vehicle battery.

**Necessary preliminary tasks:**

- Clamp off [battery lead from negative connection point](#)

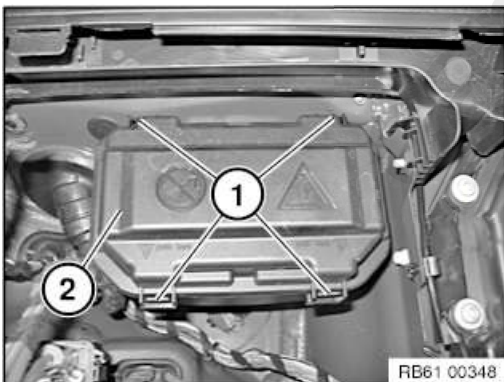
**Note:**

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

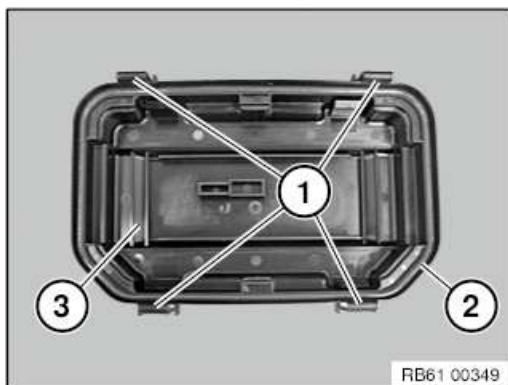
Turn locks (1) 90° counterclockwise.

Unlock catch (3).

Remove cover (2).



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



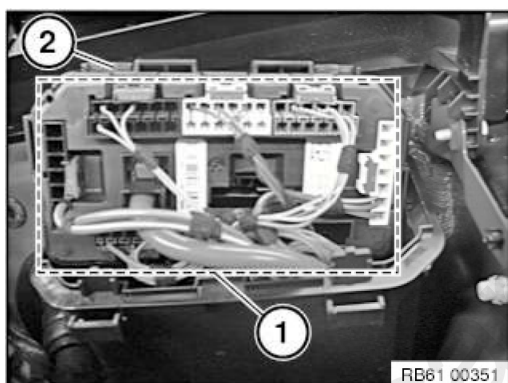
Installation note:

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

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



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



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

Remove power distribution box (2).

Installation note:

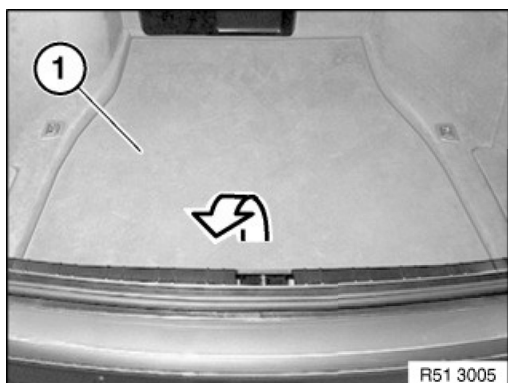
Make sure all plug connections are correctly locked.

**Warning!**

Observe [safety information](#) for handling vehicle battery.

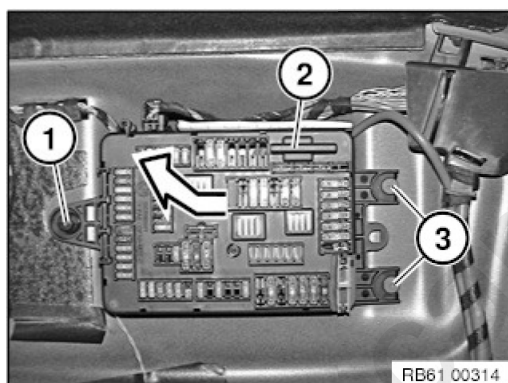
**Necessary preliminary tasks:**

- Clamp off [battery lead from negative connection point](#)

**Note:**

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

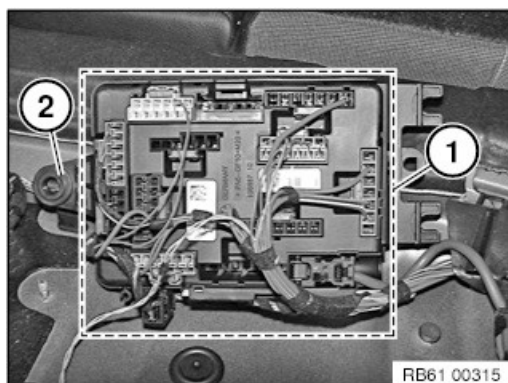
Remove luggage compartment floor trim panel (1) in direction of arrow.



Slacken nut (1).

Tightening torque [61 35 8AZ](#).

Remove power distribution box (2) from guide (3) in direction of arrow.



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

Remove power distribution box (2)

Installation note:

Make sure all plug connections are correctly locked.

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



Operation is described in:

[Removing and installing/replacing distribution box \(front\)](#)

cardiagn.com



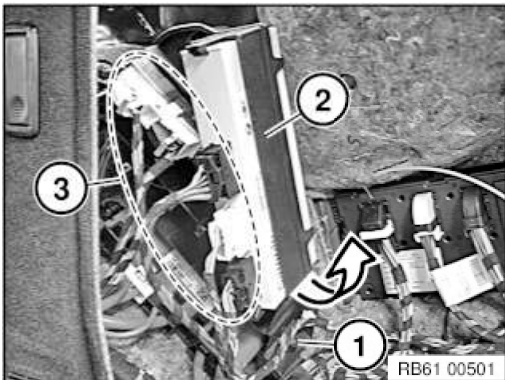
Warning!

Observe [safety information](#) for handling vehicle battery.



Necessary preliminary tasks:

- Clamp off [battery lead from negative connection point](#)



If the control unit holder (2) is not installed, continue with the next operation.

Release the nut (1) and swivel the control unit holder (2) in the direction of arrow.

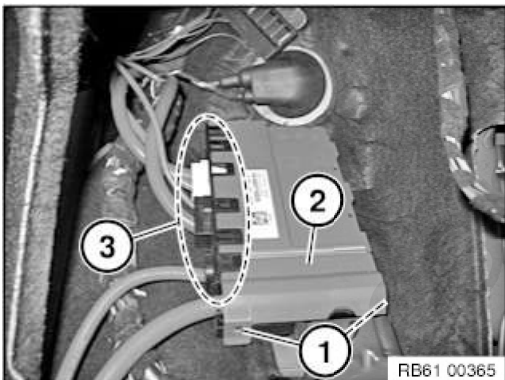
Tightening torque [61 35 8AZ](#).

If necessary, unlock associated plug connections (3) and disconnect.

Installation note:

Ensure that the control unit holder (2) is correctly seated.

Ensure the correct locking of the plug connections (3).



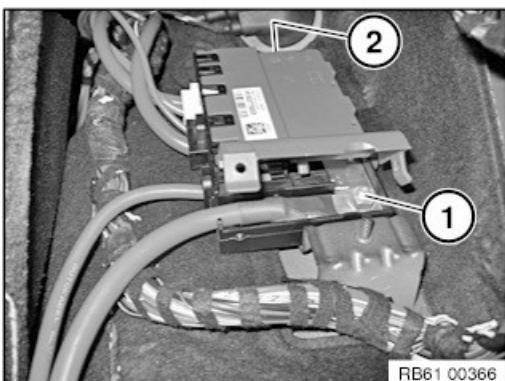
Release latches (1) and open cover (2).

Release and disconnect all plug connections in area (3).

Installation note:

Latches (1) on cover (2) must not be missing or damaged.

Make sure plug connections are correctly locked.



Release nut (1) and disconnect positive wire.

Tightening torque [61 21 4AZ](#).

Release nut (2) and remove power distribution box (3).

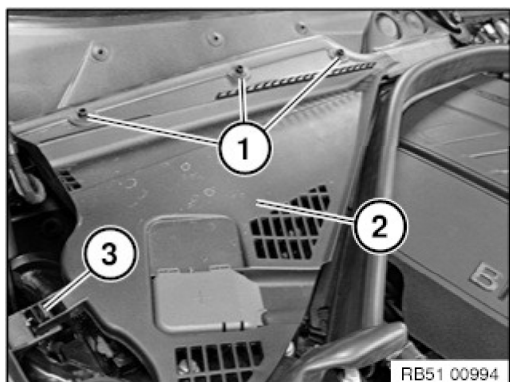
Tightening torque [61 21 2AZ](#).

**Warning!**

Observe [safety information](#) for handling vehicle battery.

**Necessary preliminary tasks:**

- Clamp off [battery lead from negative connection point](#)

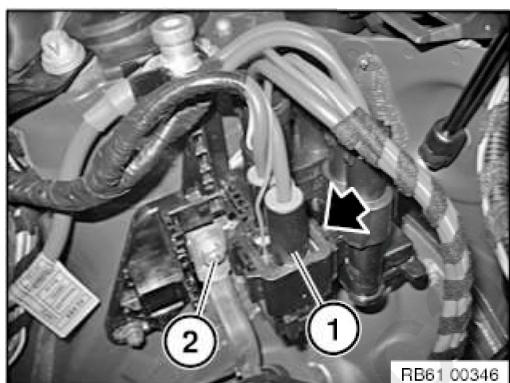
**Note:**

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

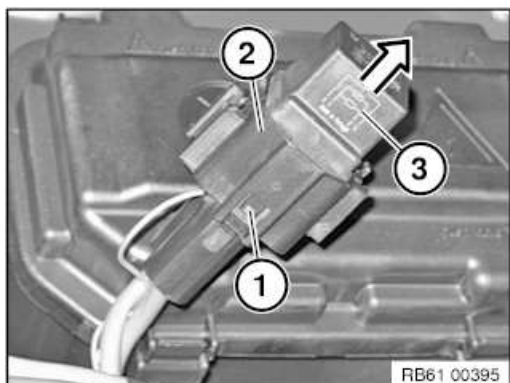
Turn locks (1) 90° counterclockwise.

Unlock catch (3).

Remove cover (2).

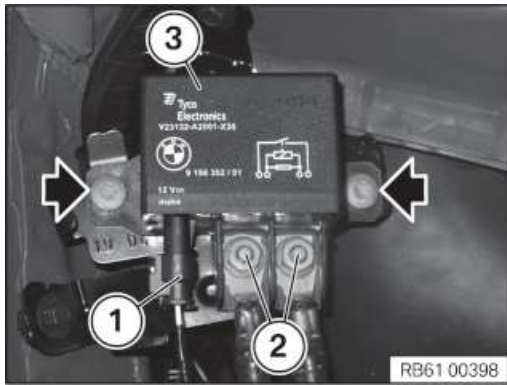


Release latch mechanism (arrow) and pull relay carrier (1) up and out of power distribution box (2).



Release latch mechanism (1) from relay carrier (2) and pull relay (3) off of relay carrier (2). *Installation note:*

Ensure that relay carrier (2) and relay (3) are properly engaged.



For hot-climate version:

Unfasten plug connection (1) and disconnect.

Release nuts (2) and attach cable to the side.

Tightening torque [61 21 1AZ](#).

Loosen screws on relay (3) and remove relay.

Tightening torque [61 36 1AZ](#).

Installation note:

Ensure that cable (2) and relay (3) are screwed on properly.

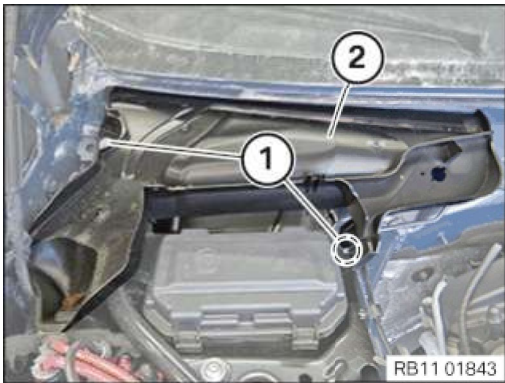
cardiagn.com

**Warning!**

Observe [safety information](#) for handling vehicle battery.

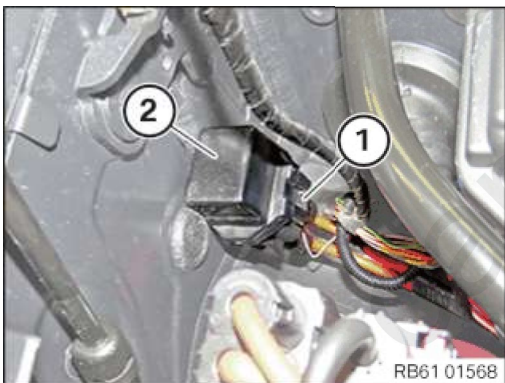
**Necessary preliminary tasks:**

- Remove [cowl panel cover](#)
- Clamp off [battery lead from negative connection point](#)

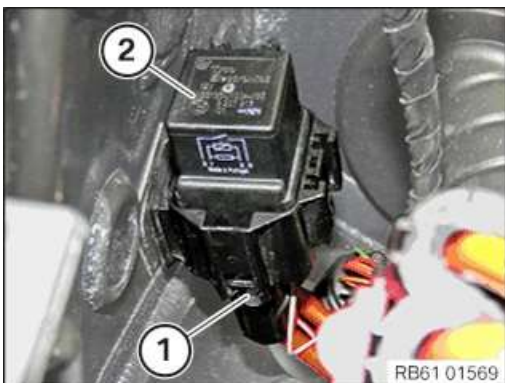


Release screws (1).

Remove attachment part of partition wall (2).



Release latch mechanism (1) and pull off intake port (2) towards top.



Remove latch mechanism (1) from the relay carrier.

Pull off the relay (2) upwards from the relay carrier.

61 00 ... **Battery charging calendar**

[Battery charging calendar 2016 \(PDF file\)](#)

[Battery charging calendar 2017 \(PDF file\)](#)

[Battery charging calendar 2018 \(PDF file\)](#)

[Battery charging calendar 2019 \(PDF file\)](#)

[Information for the battery charging calendar](#)

cardiagn.com

61 20 ... Battery replacement information

A vehicle battery is constructed for the installation location and the individual power requirements of the particular vehicle. These individual power requirements depend on the motorisation and different types of equipment. The individually assigned vehicle battery is the ideal compromise between the power requirements of the vehicle electrical system and the weight and service life of the vehicle battery.

If the vehicle electrical system of electric vehicles is not accessible due to a faulty 12 V battery, proceed as follows:

Battery exchange in electrified vehicles

Vehicles with the automatic engine start-stop function or particular engine types and optional equipment are equipped with a special vehicle battery (AGM battery), since only this battery type can provide elevated power requirements over the extended service life. Installing a different vehicle battery can cause problems with vehicle electronics, can reduce functions or can cause leakage of battery acid.

In the event of an accident where the airbags are deployed in vehicles with a vehicle battery in the luggage compartment, the electrical connection between the vehicle battery and the trigger is automatically disconnected through pyrotechnics. This prevents possible short-circuiting.

Proper operation of all of these safety and convenience functions requires a battery that conforms with specifications and that is properly registered in vehicles with energy management systems (IBS, power module).

Vehicles with energy management systems (IBS, power module): Register battery exchange

The vehicle electrical system is informed about the vehicle battery characteristic data, such as type, size, age and current power capacity. Therefore, there will always be only one work scope provided that is permitted by the current status of information.

If the performance readiness drops below a defined minimum, a Check Control message will be generated to advise the driver that the battery must be replaced.

When installing a new vehicle battery, the battery must be registered and thus must also be registered with the vehicle electrical system.

Note:

Only this registration/logon will ensure that the corresponding Check Control message will go out again.

Diagnosis system:

Register battery exchange

- Service functions
- Body
- Voltage supply
- Register battery exchange

When retrofitting, a more powerful battery may be used. Standard batteries may always be replaced by AGM batteries with the same specifications.

When installing a battery of a different size or a different battery type, this change in vehicle data must be programmed into the vehicle data in accordance with specifications.

Programming system:

- Battery retrofitting

**Important!**

Observe [safety informations for handling vehicle battery](#).

**There are two ways to carry out a voltage interruption of the 12-V battery:**

1. Manually by disconnecting the battery earth lead
2. With the diagnosis system

1. Manually: Carry out the following steps:

- Switch off and disconnect battery charger
- Turn off ignition.
For vehicles with ignition key: Ignition key in neutral position
Vehicles with ID transmitter: Remove ID transmitter from slot
For vehicles with Comfort Access: Secure terminal 30
- [Disconnect negative battery lead](#)
- [Reconnect battery earth lead](#) (to ensure bus activity)
- Observe a waiting period of 5–10 s
- [Disconnect negative battery lead](#)
- Observe a waiting period of approx. 1 minute
- [Connect battery earth lead](#)
Tightening torque: [61 21 1AZ](#)
- Connect and switch on battery charger
- Switch on ignition.

2. With the diagnosis system:

- 03 Body
- Voltage supply
- Activate rest state
- Power-down command

**Warning!**

Observe the [safety informations](#) for handling the battery!

Follow instructions [for disconnecting and connecting battery](#)!

Observe notes on [power supply](#) / on intelligent battery sensor (IBS).

**Necessary preliminary tasks:**

For F20; F21; F22; F23; F87:

- Lift luggage compartment floor

For F30; F32; F35; F80; F82:

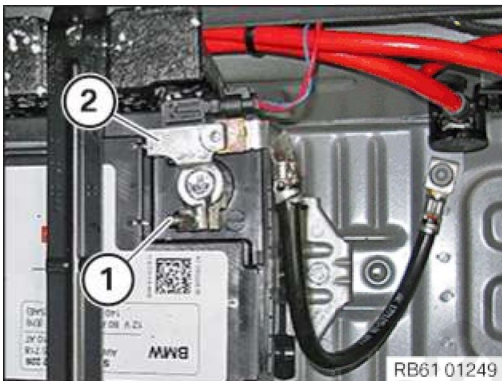
- Open flap in luggage compartment panel on right

For F31:

- [Remove battery cover](#)

For F33; F34; F36; F83:

- [Remove luggage compartment trim on side panel on right](#)

**Note:**

With lead-acid battery (F2x; F87 only).

Loosen nut (1).

Tightening torque [61 21 1AZ](#).

Important!

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

Pull off battery earth lead (2) and IBS in an upward direction, place to one side and secure.

**Note:**

With lead-acid battery (F3x only).

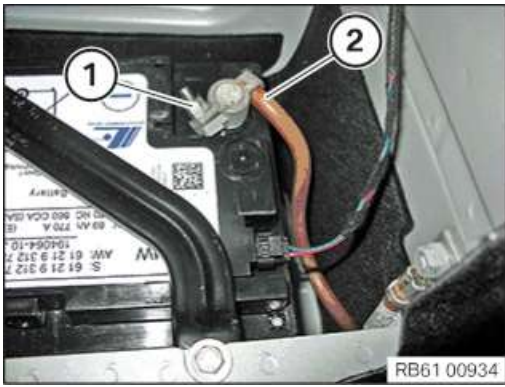
Loosen nut (1).

Tightening torque [61 21 1AZ](#).

Important!

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

Pull off battery negative lead and IBS (2) in an upward direction, place to one side and secure.



Note:

For lithium ion battery (only F8x).

Loosen nut (1).

Tightening torque [61 21 1AZ](#).

Important!

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

Pull negative battery cable (2) up and off, place to one side and secure.

cardiagn.com

61 12 ... Information on intelligent battery sensor (IBS)

Notice! Do not connect the charger to the 12 V charging socket

The 12 V charging socket is supplied with voltage by the rear power distribution box via relay. This relay drops out after terminal 15 OFF. This means that a trickle charger connected at the 12 V charging socket will be disconnected from the battery. Only charge the battery via the jump start terminal point. Only then can the voltage supply be registered by the vehicle.

Warning! Danger of destruction in event of mechanical strain

- Do not introduce any additional connections at the battery negative terminal.
- Do not modify the grounding cable. The ground cable also serves heat dissipation.
- Do not establish any connection between the IBS and the sensor screw.
- Do not use force when disconnecting the pole shoe from the battery terminal:
 - Do not pull on the ground cable.
 - Do not place any tools under the IBS to lever off the pole shoe.
- Do not use IBS connections as levers.
- Use a torque wrench and set tightening torque in accordance with repair instructions.
- Do not release or tighten down sensor screw (Torx screw).
- Avoid contact between IBS and ground.

Warning! Danger of destruction to IBS and wiring upon battery replacement

- The IBS and wiring can be destroyed by mechanical strain upon battery replacement. Therefore avoid mechanical strain.
- The size (capacity) of the battery required for the car is coded in the Car Access System (CAS).
- Use the battery size (capacity) installed as standard upon battery replacement.
- Recode the Car Access System (CAS) when installing a battery with a different capacity.
- Register battery replacement via Service functions in diagnosis system.
- Delete fault code entries in the Digital Engine Electronics (DME) associated with battery replacement.
- Always proceed in accordance with the repair instructions.

Note: Battery draining possible in spite of the intelligent battery sensor IBS being fault-free.

- A battery can be drained (e.g. with lights or radio switched on) even when the IBS functions perfectly in conjunction with power management.
- **For this reason, only exchange the IBS when there is a corresponding fault code entry!**

61 00 ... Notes for disconnecting and connecting the vehicle battery

Observe [safety informations for handling vehicle battery](#).

Before disconnecting vehicle battery:

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

Note:

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

Attention!

- There is a danger of mixing up battery cables: if the positive battery cable and battery earth lead are the same colour and you are in doubt, follow the polarity to the vehicle battery, then mark and cover the leads
- The on-board computer and clock may lose your data.

General notes on disconnecting the vehicle battery:

- Do not disconnect battery leads and leads from alternator and starter motor while engine is running.
- Disconnect terminal of [battery earth lead](#) from the battery. Cover battery negative terminal(s) and secure.
- Disconnect [both battery earth leads](#) in version with auxiliary battery. Cover battery negative terminal(s) and secure.
- When work is carried out on the electrical system, faults may be caused in the fault memories of some control units when the vehicle battery is connected.
- When installing battery terminal: Tightening torque [61 21 1AZ](#).

Only lead AGM battery:

- On vehicles with IBS at negative battery terminal:
Do not under any circumstances pull/lever off pole shoes by force.
Do not under any circumstances release the hexagon socket screw of the IBS.

Note the following after having connected the vehicle battery:

Attention!

The scope of application of some systems may be restricted after an open circuit.

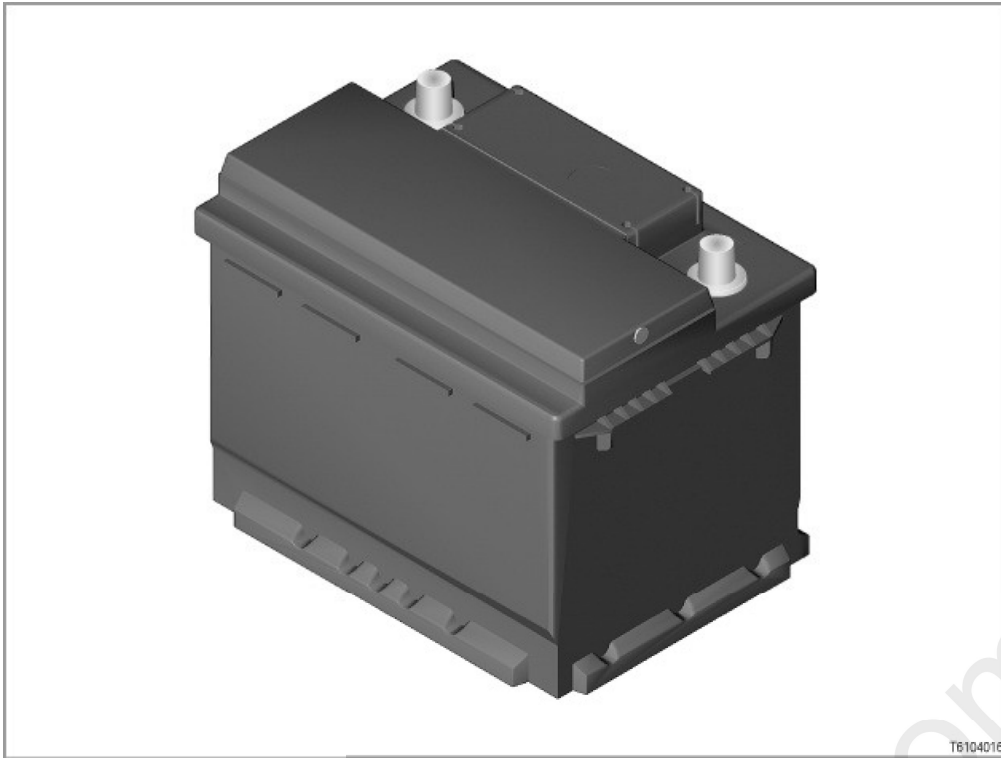
Personal Profiles may also be lost.

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

For example:

- Activate [slide/tilt sunroof](#), if necessary
- Activate [power window](#), if necessary

Refer to the diagnosis system for further vehicle-specific information.



Introduction

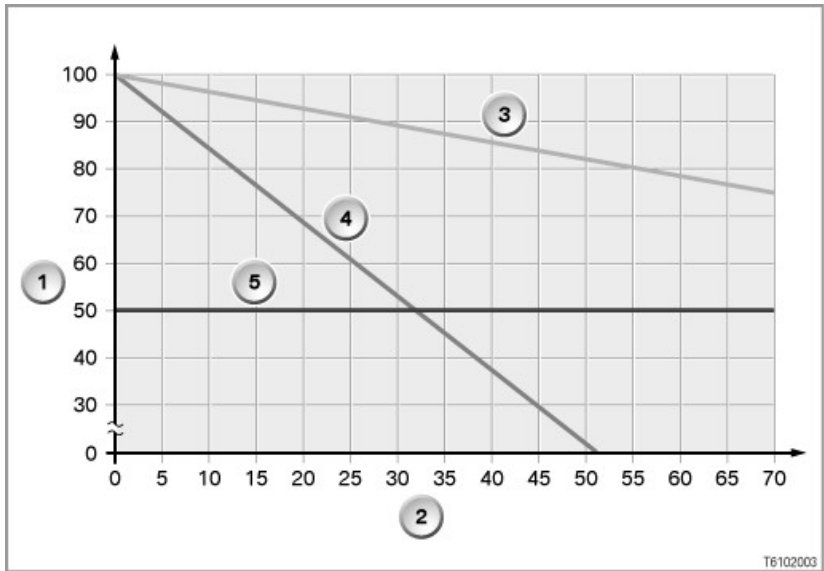
In September 2002, the first so-called VRLA batteries, better known as **AGM batteries** came into use. (VRLA stands for **V**alve **R**egulated **L**ead **A**cid, i.e. lead-acid battery with pressure relief valve; **AGM stands for A**bsorbent **G**lass **M**at, i.e. absorbent glass-fibre fleece).

The constantly increasing energy demand of modern vehicle electrical systems calls for ever more powerful battery solutions. A modern luxury-class vehicle has some 100 actuator motors that have to be fed with electrical current. Added to these are safety, environmental and comfort elements which are increasingly becoming standard features, such as e.g. Antilock Brake System (ABS), Dynamic Stability Control (DSC), steering assistance (EPS), electronic chassis and suspension control, air conditioning and navigation system. Current consumption is considerable even when the vehicle is not in use.

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

- greatly longer service life
- improved starting reliability at low temperatures
- reliable starting of engines with high starting current requirements, e.g. high-performance diesel engines
- 100 % freedom from maintenance
- low risk in the event of an accident (reduced environmental risk)

Service life of AGM batteries

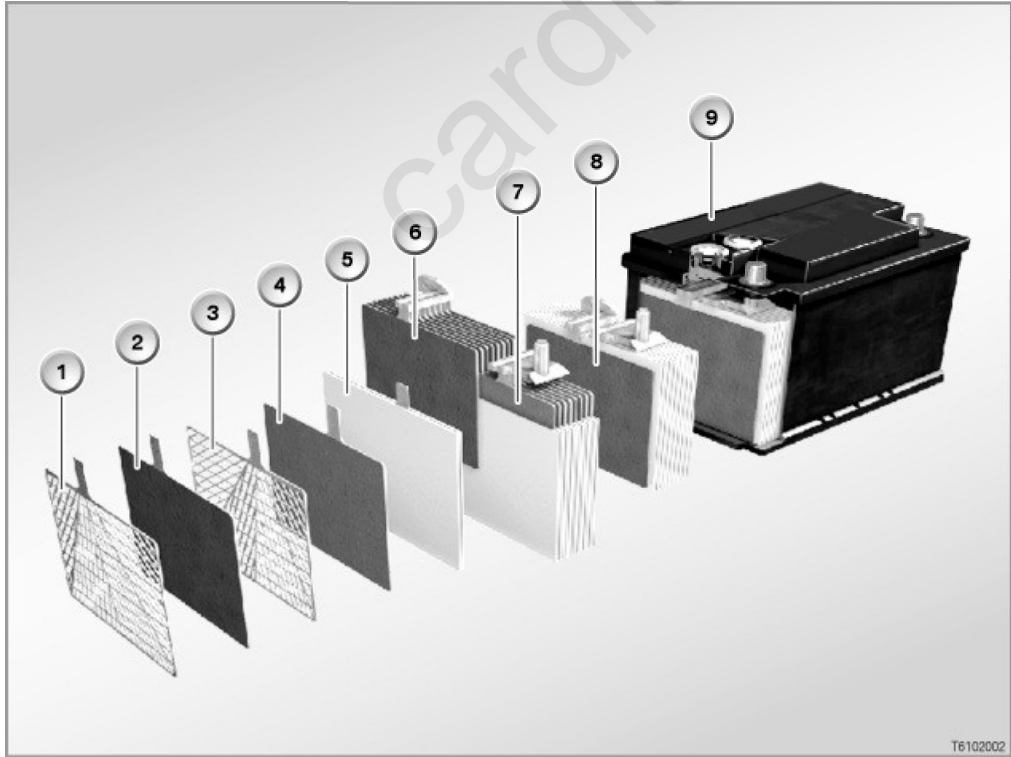


Item	Explanation	Item	Explanation
1	Available capacity [%]	2	Mileage [thousand km]
3	AGM battery	4	Lead-calcium battery
5	50 % capacity limit		

In contrast to conventional lead-calcium batteries, the sulphuric acid in a battery with fleece technology is not held freely in the battery housing. Rather, 100% of the sulphuric acid is bound into the mats of the glass-fibre fleece (separators). For this reason, no battery acid can escape if the battery housing is damaged. In addition, the AGM battery is sealed to be airtight. This is possible because the gases are converted back into water by the permeability of the separators.

Brief component description

The AGM battery has a black housing and the so-called "Magic Eye" is missing.



Item	Explanation	Item	Explanation
------	-------------	------	-------------

1	Positive grille with silver alloy	2	Positive plate
3	Negative grille	4	Negative plate
5	Separator made of glass-fibre fleece	6	Set of positive plates
7	Set of negative plates	8	Block of plates
9	Block box with base strips		

Construction

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

- larger plates: Larger plates allow a 25% larger power density.
- Separators made of glass-fibre fleece: These can cause an up to 3-times higher cycle stability to be reached. This improves the cold starting capability, the power consumption and service life.
- Airtight housing with pressure relief valve (please refer to "How it works"): The inspection plugs are sealed and can not be opened.
- Battery acid bound in glass-fibre fleece: Battery acid is not found free in the housing as before, but is rather bound 100% in the glass-fibre fleece. This gives increased security against the acid escaping and thus reduces the environmental risk.

How it works

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

When a battery is charged, the electrolysis process emits the gases oxygen and hydrogen.

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

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

Only in the event of an excessively heavy build-up of gas, i.e. excessively high pressure build-up (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 the pressure in the battery is regulated by a valve, the AGM battery is also known as the VRLA battery (valve-regulated lead acid).

Notes for Service department

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 > 14.8 V. Do not use rapid-charging programs!

When charging removed batteries (so-called stand-alone batteries), do not exceed the maximum charging voltage of 14.8 V at room temperature. Also, for charging via the external start connection point, the maximum charging voltage of 14.8 V at room temperature must not be exceeded. The battery can be damaged even if the AGM battery is only briefly charged with a charging voltage higher than 14.8 V. A charging voltage of more than 14.8 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 AGM batteries.

On no account may AGM batteries be opened, as the ingress of oxygen from the atmosphere would cause the battery to lose its chemical balance, rendering it unserviceable.

cardiagn.com

12 00 ... Notes/information on start assistance (jump starting)

Do not start the engine with help of starting sprays.

Preparation:

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

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

Important!

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

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

Operation:

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

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

Important!

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

Risk of explosion!

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

61 00 ... Repairing airbag cables

Important!

Only repair those cables which show visible signs of damage. In the event of visible damage, make sure there is only one cable repair in effect after the repair work. If no visible damage can be identified, the entire cable must be replaced. When carrying out repairs to the airbag wiring harness, you must use the spare parts offered in the Electronic Parts Catalogue (EPC).

Safety regulations for [handling components of airbag system](#).

[Instructions for disconnecting and connecting battery](#).

In event of non-visible damage to wiring harness:

Disconnect plug connection on airbag module or on adapter plug. It is absolutely vital to disconnect the contacts in succession as there is a risk of mixing up (similar parts)! Cut through one cable after the other at an appropriate position, do not under any circumstances cut through both cables at the same time. Insulate cables remaining in wiring harness with insulating tape. Now disconnect plug connection on airbag control unit. Unpin contacts. Cut through one cable after the other at an appropriate position and insulate with insulating tape, do not under any circumstances cut through both cables at the same time. Pin contacts of repair cable for airbag control unit in control unit plug, assignment of repair cables is relevant. Lay repair cable in vehicle parallel to existing airbag lead. Now pin in contacts for airbag control unit or contacts of adapter plug, assignment of repair cables is relevant. Cut off excess length of repair cable in proximity (visible area) of airbag module or of adapter plug. Twist open cables. With the butt connectors and heat-shrink tubings in the Electronic Parts Catalogue (EPC), reconnect the cables with the same cable colours. Twist cables again, open length (twist) must not exceed 40 mm. Secure interface (heat-shrink tubing) with insulating tape to prevent cables from twisting open.

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

[Cutting off and insulating cables](#).

[Repairing a plug connection using butt connectors](#).

[Installing and removing contacts](#).

In event of visible damage:

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

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

[Cutting off and insulating cables](#).

[Repairing a plug connection using connectors](#).

[Installing and removing contacts](#).

61 00 ... Safety information on handling hybrid cars

1. Qualification:

All repair work on high-voltage components may **only be performed by specially trained personnel** (qualification: Work on high-voltage inherently safe vehicles) must be performed by qualified technicians. Each hybrid car requires additional vehicle specific training with training achievement controls. Required training is offered by the BMW Training Academy.

2. Identification:

Observe **warning notices** on high-voltage components. When replacing individual high-voltage components, check if warning stickers are present. Independently attaching warnings is only allowed on the locations provided for them. Use only approved and appropriately identified original new parts.

3. Rules of conduct/protective measures:

- Note operating instructions for handling high-voltage battery units.
- Do not under any circumstances touch open high-voltage cables and high-voltage components on damaged vehicle before shutting down the high-voltage electrical system.
- In the event of damage (mechanical, thermal) transition metal oxides, carbon, electrolyte solvents and their products of decomposition may be released.
Suitable acid-resistant protective clothing/equipment must therefore be used when handling the vehicle!

- Hand protection: Gloves
- Eye protection: Safety goggles

Damaged high-voltage battery units must be stored in an acid-resistant pan in a location in the open that is protected against the weather (sun, rain) and secured against unauthorised access. Do not inhale escaping gasses.

- Prevent escaping substances from entering drains, pits and the sewer system.
- Collect any material that is discharged and have it disposed of according to the work instruction, wear acid-resistant protective clothing when doing so.
- Notify the fire brigade if fire breaks out, clear the area immediately and make accident scene safe. Attempt to extinguish the fire without putting persons in danger (suitable extinguishant: water and water foam).
- A cut 2nd emergency separation point must be repaired with a butt connector.

4. Measures before starting work:

- Each job on the vehicle must be assigned by appropriately trained personnel. Before work is started, this electrician must place the vehicle in the operating condition required to perform the relevant activity. The qualified personnel's instructions and directions absolutely must be followed. **No work may be carried out without this qualified personnel being consulted first.**
- It is **not** permitted to work on the high voltage system or on high voltage components while the engine is running.
- The readiness to drive must be ended before shutting off the voltage of the high-voltage system. The readiness to drive is ended when the driver is absent only under the following conditions:
 1. seat belt buckle unlocked **and**
 2. the driver's door is open **and**
 3. no brake activated **and**
 4. the accelerator pedal is not activated **and**
 5. speed < 3 km/h (2 mph)
- Work on live high-voltage components is expressly prohibited. Before each operation on the high-voltage system, the system must be isolated from the power supply by qualified personnel (high-voltage safety connector Off) and secured against unauthorised recommissioning (padlock).
- After each deactivation of the high-voltage system, it is essential to observe a **waiting period** of at least **10 seconds** prior to further work.
- Before beginning work, it is mandatory to check that the equipment is de-energised and is protected against being energised again.
Work is only permitted to begin if:
 1. Corresponding display in the KOMBI **High-voltage system deactivated** or
When a high-voltage warning is active (indicator light, Check Control, etc.), it is essential to determine and eliminate the cause of this warning via the diagnosis system before continuing with any other work. **If it cannot be definitively established that the equipment is de-energised**, work is not permitted to begin. **Danger to life!** Before work begins, a qualified electrician (1000 V AC) must verify that the system is de-energised using appropriate measuring devices and procedures.
=> In this case, Technical Support must be contacted!
- Do not perform any work on the vehicle while it is charging. Before starting work, disconnect the charging

cable from the vehicle.

Battery charging may result in heating of the high-voltage battery unit. This heating may lead to sporadic launches of the electric fan (switch-on request from the electric fan). Therefore, work in the vicinity of the electric fan during the charging procedure is prohibited. Ensure freedom of movement of the battery charge lines in the vicinity of the electric fan.

5. *Measures during/after activities:*

- Identifiable mechanical damage to or tampering with high-voltage components must be reported immediately to the qualified personnel in charge.
- When carrying out any work on the high-voltage system, it is prohibited to drive externally all the drivetrain components (wheels, gearbox, drive shafts, etc.).
- *E72 only:* When the "Power Electronic Box Cover" is removed, the high-voltage system is not permitted to be activated. The high-voltage service disconnect must only be used when the "Power Electronics Box Cover" is completely installed.
- High-voltage cables (orange coating) and their connectors and stop parts **may not** be repaired. If damaged, a cable must always be replaced completely.
- When working in the vicinity of high-voltage components (identified accordingly with warning stickers and orange-coloured coating), protect these components against damage.
- The specified work steps in the repair instructions must be adhered to exactly.
- High-voltage components and their holders must be screwed/bolted to the defined tightening torque. Tightening torques and tightening specifications must be observed.
- Connecting high-voltage components to body ground is crucial to safety for reasons of equipotential bonding. For this reason, it is prohibited to operate any high-voltage components without them being correctly connected to body ground. The measurements (insulation/potential equalisation measurement) are performed automatically by the vehicle. Manual measurement is not therefore necessary. For a correct earthing connection, the retaining elements of high-voltage components must not be painted. Follow further [painting notes](#).
- Removed high-voltage battery units must be stored in a manner that protects them from misuse and damage.
- Damaged or warning stickers that are no longer legible on high-voltage components must always be replaced.

6. *Potential compensation:*

Equipotential bonding lines, high-voltage cables and the battery negative lead to the EME are fitted with safety screws.

- Clean contact faces and have then checked by a second person.
- Tighten down screws/bolts to specified torque.
- Have tightening torque checked by a second person.
- Both persons must document that the work has been carried out correctly in the vehicle records.

61 00 ... **Safety instructions for handling vehicle battery**

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

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

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, neutralise it immediately with a soap solution and rinse with lots of water.

Seek medical attention immediately if battery acid is accidentally swallowed.

Strictly no flames, sparks, naked light or smoking!

A highly explosive detonating 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 circuit and explosion hazard!).

cardiagn.com



Necessary preliminary tasks:

To access the battery earth lead, perform the necessary preliminary work described in the document [Disconnecting battery earth lead](#).

Do not disconnect the battery earth lead!



Note:

If several 12 V batteries are installed in the vehicle:

Closed-circuit current check is possible **on the vehicle battery only**.



Connect diagnosis system.

Connect the clip-on probe to the battery earth lead of the vehicle battery. The arrow on the clip-on probe must point towards the vehicle battery.

[Measure closed-circuit current](#).

cardiagn.com

61 00 ... **Battery charging calendar**

[Battery charging calendar 2016 \(PDF file\)](#)

[Battery charging calendar 2017 \(PDF file\)](#)

[Battery charging calendar 2018 \(PDF file\)](#)

[Battery charging calendar 2019 \(PDF file\)](#)

[Information for the battery charging calendar](#)

cardiagn.com

**Important!**

Observe [safety informations for handling vehicle battery](#).

**There are two ways to carry out a voltage interruption of the 12-V battery:**

1. Manually by disconnecting the battery earth lead
2. With the diagnosis system

1. Manually: Carry out the following steps:

- Switch off and disconnect battery charger
- Turn off ignition.
For vehicles with ignition key: Ignition key in neutral position
Vehicles with ID transmitter: Remove ID transmitter from slot
For vehicles with Comfort Access: Secure terminal 30
- [Disconnect negative battery lead](#)
- [Reconnect battery earth lead](#) (to ensure bus activity)
- Observe a waiting period of 5–10 s
- [Disconnect negative battery lead](#)
- Observe a waiting period of approx. 1 minute
- [Connect battery earth lead](#)
Tightening torque: [61 21 1AZ](#)
- Connect and switch on battery charger
- Switch on ignition.

2. With the diagnosis system:

- 03 Body
- Voltage supply
- Activate rest state
- Power-down command

**Warning!**

[Read and comply with safety informations pertaining to vehicle battery.](#)

**Attention!**

Lead-acid battery, AGM battery:

To prevent the intelligent battery sensor from malfunctioning, use the charging points in the engine compartment.

[Observe instructions on intelligent battery sensor/battery electronics.](#)

**Note:**

Use BMW-recommended charging computers* to charge the battery.

*Sourcing reference [BMWÂ Workshop Equipment Catalogue](#)

**Pay attention when charging the lithium ion battery!**

The charging voltage generated by existing chargers designed for the lead-acid or AGM batteries is **too high** for the lithium-ion battery.

In the event of excessive charging voltage, the Li-ion battery isolating switch can open, generating among things a ccm message in the cluster.

[Before charging a lithium ion battery, adjust the charging voltage of existing charger adapters once.](#)

[Follow notes on lithium ion battery.](#)

61 21 028 Recharge vehicle battery

1 – Charging battery



TECHNICAL INFORMATION

Observe the notes on handling the vehicle battery.

For additional information see:

61 00 ... Safety information on handling the vehicle battery

61 00 / 12 00 ... Notes on disconnecting and connecting the vehicle battery

61 12 ... Notes on the intelligent battery sensor (IBS)

► Charging lead-acid batteries and AGM batteries

- Connect to a charger approved by BMW.
- If the battery is charged while it is still installed: always connect the charger to the jump start terminal point in the engine compartment.
- Fully charge the battery.

The battery is fully loaded once the charge current drops below a certain value:

Battery temperature	Charge current
15° C - 25° C	<2.5 A
< 15°C	<1.5 A

- Disconnect the charger after having completed charging.

► Charging the lithium ion battery



TECHNICAL INFORMATION

Comply with notes on handling lithium ion batteries.

For more information see:

08 08 14 (094) Charging parameters for lithium ion batteries

61 12 ... Notes regarding intelligent battery electronics (lithium ion battery)

- Adapt the charging voltage on the charger to the lithium ion batteries.
Too high charging voltage can lead to opening of the electronic disconnect switch.
- Connect to a charger approved by BMW.
- Fully charge the battery.
- Disconnect the charger after having completed charging.

Additional Information

Links

General repair instructions

Used in step

[61 20 ... Notes on AGM battery](#)

1

[61 20 ... Notes regarding the lithium ion battery](#)

1

[61 12 ... Notes on intelligent battery sensor \(IBS\)](#)

1

Special tool service information**Used in step**[Description of the manual Li parameter setting for DEUTRONIC DBL800/1200/1600](#)

1

[Description of the manual Li parameter setting for ELEKTRON HS-1000](#)

1

[Description of the manual Li parameter setting for ELTEK MultiCharger 750/900/1500](#)

1

Special tool service information**Used in step**[Charging parameters for lithium ion batteries](#)

1

[Note for the workshop equipment catalogue BMW, MINI](#)

1

cardiagn.com

**Warning!**

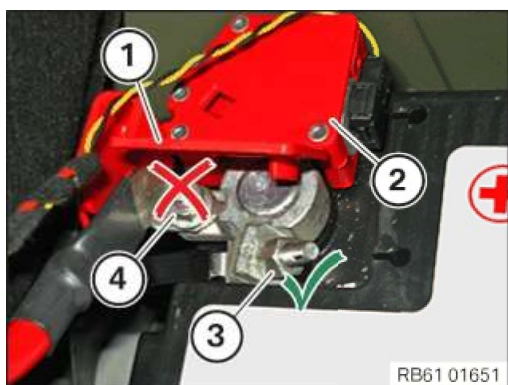
Observe [safety informations](#) for handling vehicle battery.



To ensure the correct safety and convenience functions, install only the original battery (battery size and type) stored in the vehicle order. [Observe note on battery replacement.](#)

**Necessary preliminary work:**

- [Clamp off battery cable from negative terminal](#)

*Note:*

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

Fold up cover (1) on safety battery terminal (2).

Loosen nut (3).

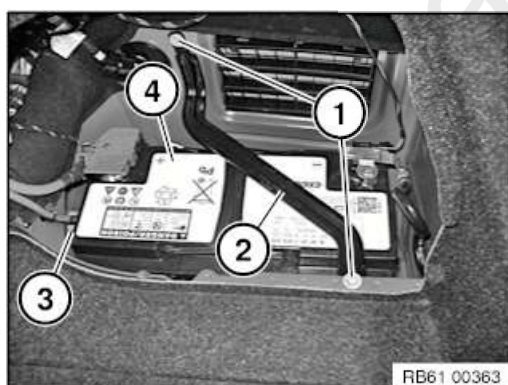
Tightening torque [61 21 1AZ](#).

Caution!

Nut (4) must not be loosened or released.

Do not under any circumstances pull/lever off safety battery terminal (2) by force.

Pull off safety battery terminal (2) towards top, lay to one side and secure.

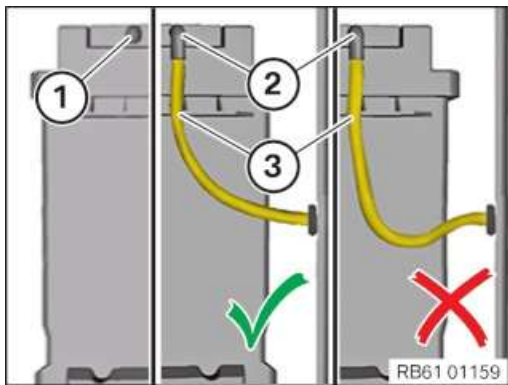


Release screws (1).

Tightening torque [61 21 5AZ](#).

Remove retaining brackets (2).

Detach vent hose (3) from vehicle battery (4).



Caution!

Danger due to released gases!

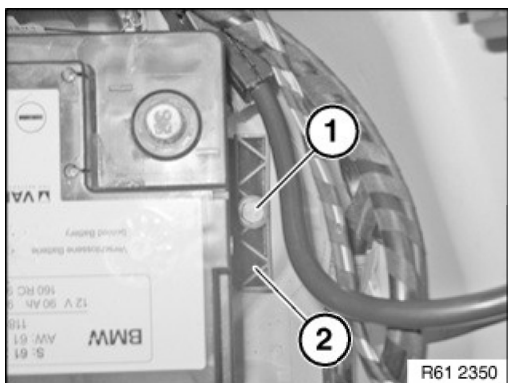
Installation note:

The battery has two vent holes:

- One vent hole (1) must be closed correctly with a dummy plug.
- The vent hose (3) must be connected correctly at the other vent hole (2) .

Always install the vent hose (3) with a downhill gradient to the outside!

No siphon formation!



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

Tightening torque [61 21 5AZ](#)

Remove battery.

Installation note:

Make sure battery is correctly seated in mounting.



Replacement

- [Register battery exchange](#)

**Important!**

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

**Necessary preliminary tasks:**

For F30; F32; F35; F80; F82:

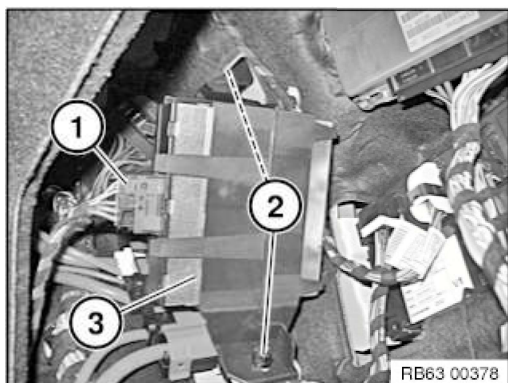
- Open flap in luggage compartment panel on right

F31For:

- [Remove battery cover](#)

For F34; F36:

- [Remove luggage compartment trim on side panel on right](#)



Release plug connections (1) on all control units.

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

Installation note:

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

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

61 00 ... Safety information on handling hybrid cars

1. Qualification:

All repair work on high-voltage components may **only be performed by specially trained personnel** (qualification: Work on high-voltage inherently safe vehicles) must be performed by qualified technicians. Each hybrid car requires additional vehicle specific training with training achievement controls. Required training is offered by the BMW Training Academy.

2. Identification:

Observe **warning notices** on high-voltage components. When replacing individual high-voltage components, check if warning stickers are present. Independently attaching warnings is only allowed on the locations provided for them. Use only approved and appropriately identified original new parts.

3. Rules of conduct/protective measures:

- Note operating instructions for handling high-voltage battery units.
- Do not under any circumstances touch open high-voltage cables and high-voltage components on damaged vehicle before shutting down the high-voltage electrical system.
- In the event of damage (mechanical, thermal) transition metal oxides, carbon, electrolyte solvents and their products of decomposition may be released.
Suitable acid-resistant protective clothing/equipment must therefore be used when handling the vehicle!
 - Hand protection: Gloves
 - Eye protection: Safety goggles

Damaged high-voltage battery units must be stored in an acid-resistant pan in a location in the open that is protected against the weather (sun, rain) and secured against unauthorised access. Do not inhale escaping gasses.

- Prevent escaping substances from entering drains, pits and the sewer system.
- Collect any material that is discharged and have it disposed of according to the work instruction, wear acid-resistant protective clothing when doing so.
- Notify the fire brigade if fire breaks out, clear the area immediately and make accident scene safe. Attempt to extinguish the fire without putting persons in danger (suitable extinguishant: water and water foam).
- A cut 2nd emergency separation point must be repaired with a butt connector.

4. Measures before starting work:

- Each job on the vehicle must be assigned by appropriately trained personnel. Before work is started, this electrician must place the vehicle in the operating condition required to perform the relevant activity. The qualified personnel's instructions and directions absolutely must be followed. **No work may be carried out without this qualified personnel being consulted first.**
- It is **not** permitted to work on the high voltage system or on high voltage components while the engine is running.
- The readiness to drive must be ended before shutting off the voltage of the high-voltage system. The readiness to drive is ended when the driver is absent only under the following conditions:
 1. seat belt buckle unlocked **and**
 2. the driver's door is open **and**
 3. no brake activated **and**
 4. the accelerator pedal is not activated **and**
 5. speed < 3 km/h (2 mph)
- Work on live high-voltage components is expressly prohibited. Before each operation on the high-voltage system, the system must be isolated from the power supply by qualified personnel (high-voltage safety connector Off) and secured against unauthorised recommissioning (padlock).
- After each deactivation of the high-voltage system, it is essential to observe a **waiting period** of at least **10 seconds** prior to further work.
- Before beginning work, it is mandatory to check that the equipment is de-energised and is protected against being energised again.
Work is only permitted to begin if:
 1. Corresponding display in the KOMBI **High-voltage system deactivated** or
When a high-voltage warning is active (indicator light, Check Control, etc.), it is essential to determine and eliminate the cause of this warning via the diagnosis system before continuing with any other work. **If it cannot be definitively established that the equipment is de-energised**, work is not permitted to begin. **Danger to life!** Before work begins, a qualified electrician (1000 V AC) must verify that the system is de-energised using appropriate measuring devices and procedures.
=> In this case, Technical Support must be contacted!
- Do not perform any work on the vehicle while it is charging. Before starting work, disconnect the charging

cable from the vehicle.

Battery charging may result in heating of the high-voltage battery unit. This heating may lead to sporadic launches of the electric fan (switch-on request from the electric fan). Therefore, work in the vicinity of the electric fan during the charging procedure is prohibited. Ensure freedom of movement of the battery charge lines in the vicinity of the electric fan.

5. *Measures during/after activities:*

- Identifiable mechanical damage to or tampering with high-voltage components must be reported immediately to the qualified personnel in charge.
- When carrying out any work on the high-voltage system, it is prohibited to drive externally all the drivetrain components (wheels, gearbox, drive shafts, etc.).
- *E72 only:* When the "Power Electronic Box Cover" is removed, the high-voltage system is not permitted to be activated. The high-voltage service disconnect must only be used when the "Power Electronics Box Cover" is completely installed.
- High-voltage cables (orange coating) and their connectors and stop parts **may not** be repaired. If damaged, a cable must always be replaced completely.
- When working in the vicinity of high-voltage components (identified accordingly with warning stickers and orange-coloured coating), protect these components against damage.
- The specified work steps in the repair instructions must be adhered to exactly.
- High-voltage components and their holders must be screwed/bolted to the defined tightening torque. Tightening torques and tightening specifications must be observed.
- Connecting high-voltage components to body ground is crucial to safety for reasons of equipotential bonding. For this reason, it is prohibited to operate any high-voltage components without them being correctly connected to body ground. The measurements (insulation/potential equalisation measurement) are performed automatically by the vehicle. Manual measurement is not therefore necessary. For a correct earthing connection, the retaining elements of high-voltage components must not be painted. Follow further [painting notes](#).
- Removed high-voltage battery units must be stored in a manner that protects them from misuse and damage.
- Damaged or warning stickers that are no longer legible on high-voltage components must always be replaced.

6. *Potential compensation:*

Equipotential bonding lines, high-voltage cables and the battery negative lead to the EME are fitted with safety screws.

- Clean contact faces and have then checked by a second person.
- Tighten down screws/bolts to specified torque.
- Have tightening torque checked by a second person.
- Both persons must document that the work has been carried out correctly in the vehicle records.