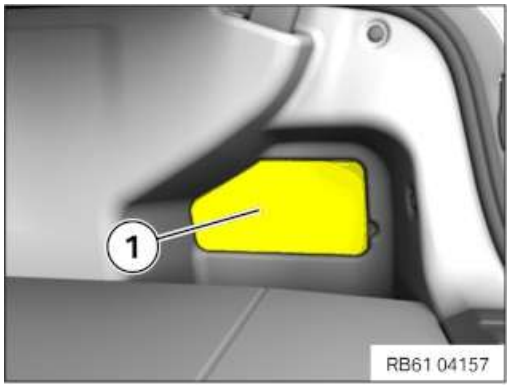
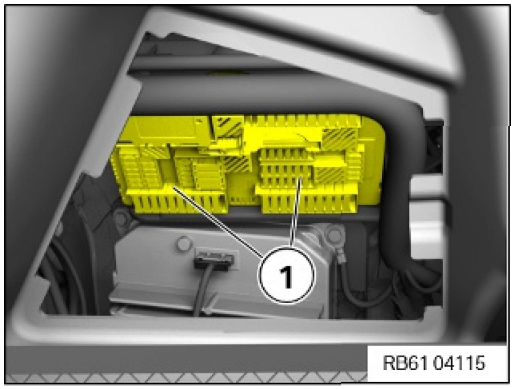
61 14 002 Check/replace fuse

1 Checking the rear fuse on the power distribution box



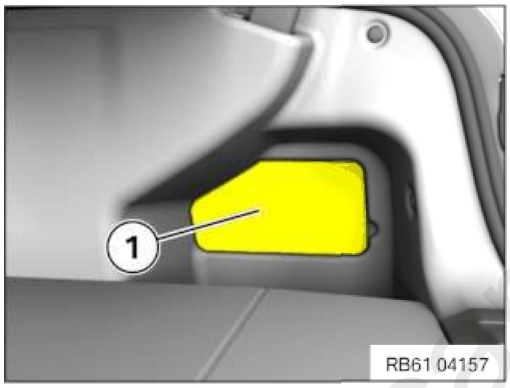
- Remove service flap (1) on the right side in the luggage compartment.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Check and, if necessary, renew the rear fuse on power distribution box (1).



- Install the service flap (1).

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61 14 035 Rem.& install/replace power distribution box front positive battery cable

NOTICE

Description is for left component only. Procedure on the right side is identical.

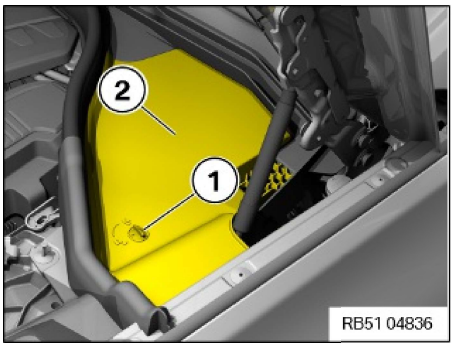
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Remove the cover of the engine compartment at the rear left



- Loosen the lock (1).
- Remove rear left cover of engine compartment (2).

3 – Removing both wiper arms

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Remove the wiper arm**

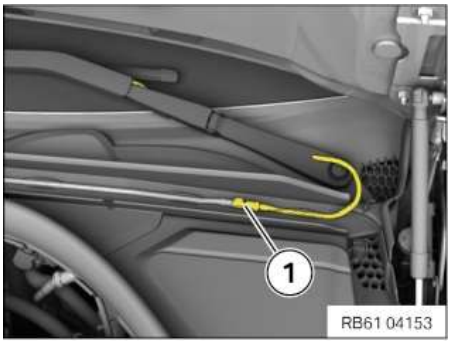
RISK OF DAMAGE

Damage to wiper console

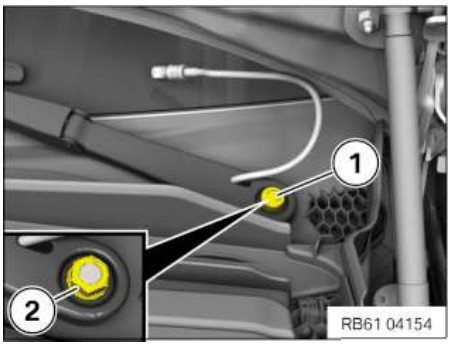
While removing the wiper arms without using special tool, the wiper console can break.

- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.

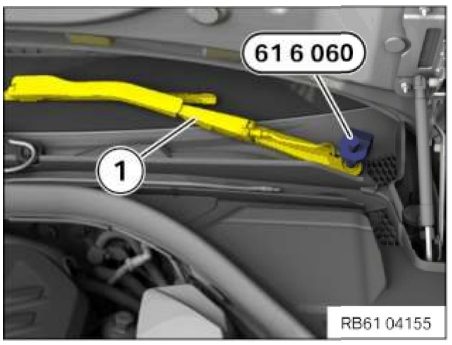
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- Disconnect the windscreen wash hose(1) at the separation point and remove from the cowl guide.

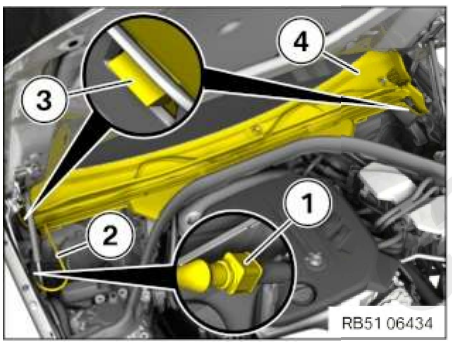


- Remove the protective cap (1).
- Loosen nut (2).

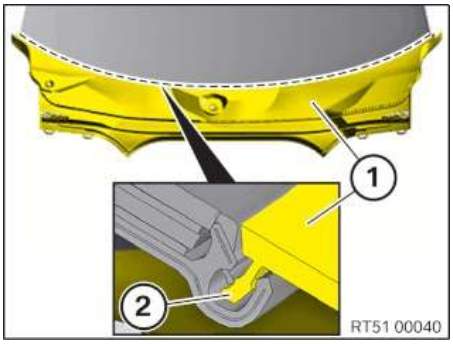


- Pull off the wiper arm (1) using special tool .

4 – Remove cowl panel cover



- Release snap fastener of the washer fluid hose (1) and put the washer fluid hose(2) to one side.
- Unclip clips (3) on the cowl panel cover (4).



- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

5 – Remove the seal for the rear bonnet

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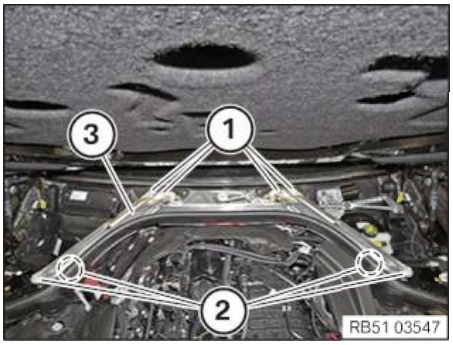


- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

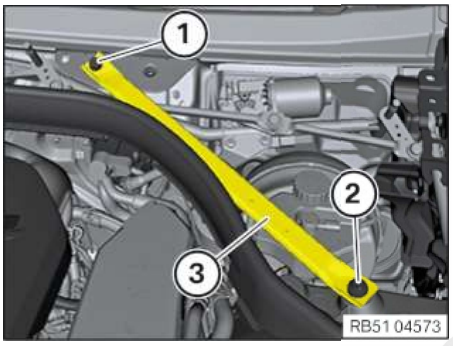
6 – Removing the centre bulkhead upper part

TECHNICAL INFORMATION

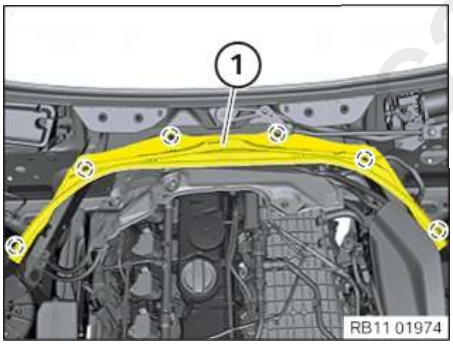
Driving without the strut brace/front end or tension strut is not permitted.



- **If installed:** Remove tension strut on spring strut dome.
- **Version 1:**
- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.



- **If installed:** Remove tension strut on spring strut dome.
- **Version 2:**
- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.

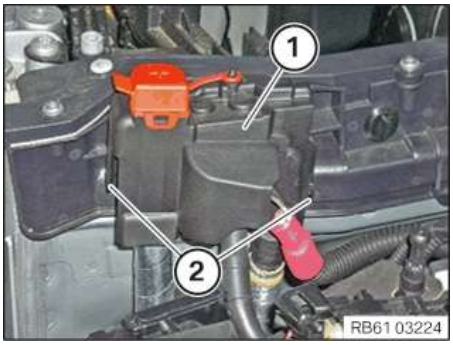


- Release the screws at the marked points.
- Remove the centre bulkhead upper part (1).

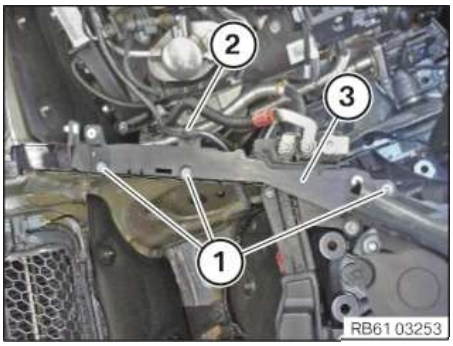
MAIN WORK

7 – Removing the power distribution box of the positive battery cable at the front

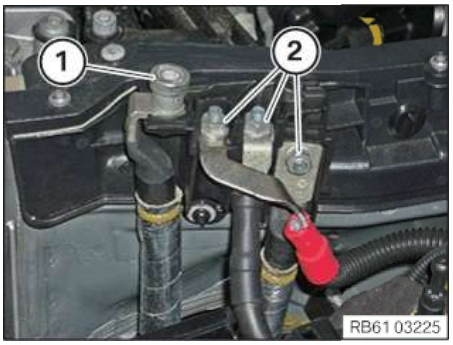
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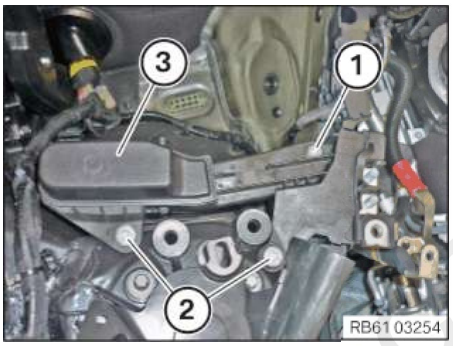
- Release cover (1) at the latch mechanisms (2).
- Remove the cover (1) in an upwards direction.



- Loosen screws (1).
- Loosen the cable clip (2).
- Remove the cover (3).



- Release the screw (1) and feed out the corresponding cable.
- Release nuts (2) and feed out the corresponding cable.



- Loosen screw (1).
- Loosen screws (2).
- Feed out the power distribution box (3) in an upwards direction.



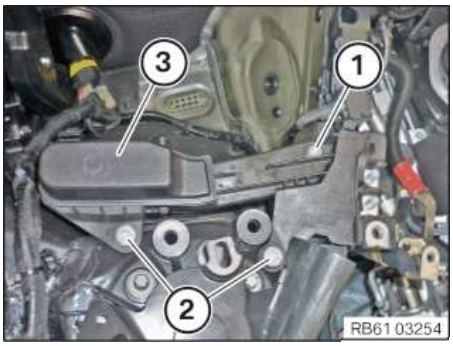
- Unlock and disconnect connector (1).
- Remove power distribution box (2).

8 – Installing the front power distribution box

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- Connect connector (1) to power distribution box (2) and lock.



- Position power distribution box (3) and thread in toward the bottom.
- Tighten the screws (2).

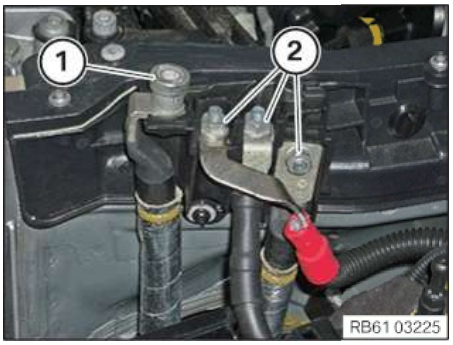
Power distribution box, front

M8x35 screw		Tightening torque	13 Nm

- Tighten down screw (1).

Power distribution box, front

Screw TS5x16			2.5 Nm



- Insert the corresponding cable and tighten the nuts (2).

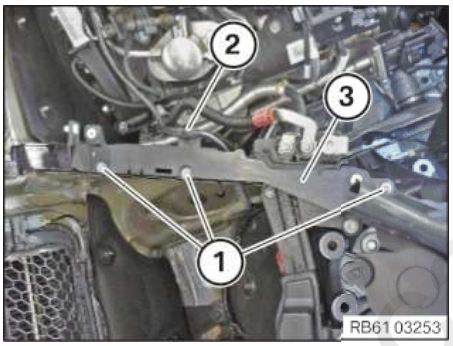
Positive battery cable

Flange nutM8		Tightening torque	15 Nm

- Insert the corresponding cable and tighten the bolt (1).
-

Positive battery connection point

Positive pole screw		Tightening torque	15 Nm

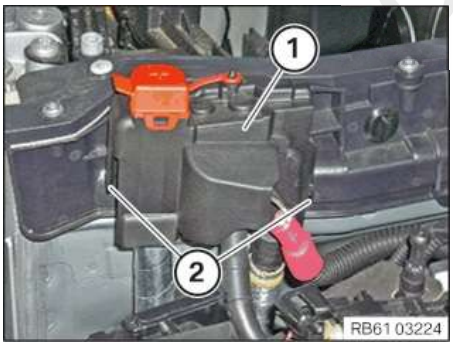


- Correctly position the cover (3) and tighten the screws (1).

Front power distribution box sealing frame

Bolt RF5x25		Tightening torque	2.5 Nm

- Secure the cable clips (2).



- Feed in the cover (2) in a downwards direction.
- The latch mechanisms (1) must be correctly locked.

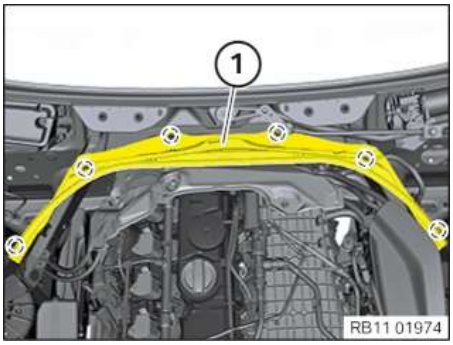
POSTPROCESSES

9 – Installing the centre bulkhead upper part

TECHNICAL INFORMATION

Driving without the strut brace/front end or tension strut is not permitted.

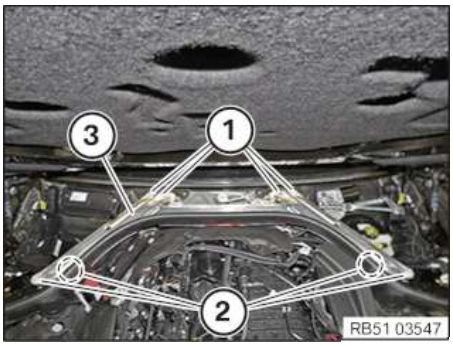
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- Position the centre bulkhead upper part (1).
- Tighten the screws in the marked area.

Bulkhead upper part to bottom bulkhead

		Tightening torque	3 Nm



- **If installed:** Install tension strut on spring strut dome.
- **Version 1:**
- Install the tension strut (3) on the spring strut dome.
- Tighten the screws (1).

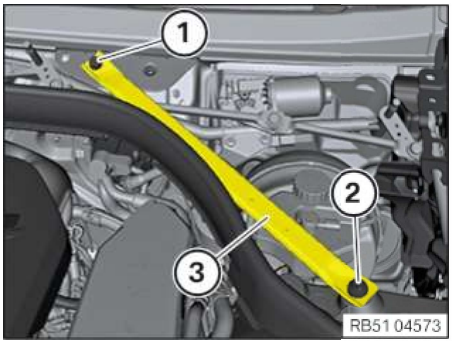
Tension strut on bulkhead

M10x25 screw		Tightening torque	56 Nm

- Renew screws (2).
  Parts: Bolts
- Tighten the screws (2).

Tension strut to spring strut dome

Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °



- **If installed:** Install tension strut on spring strut dome.
- **Version 2:**
- Install tension strut on spring strut dome (3).
- Tighten down screw (1).

Tension strut on bulkhead

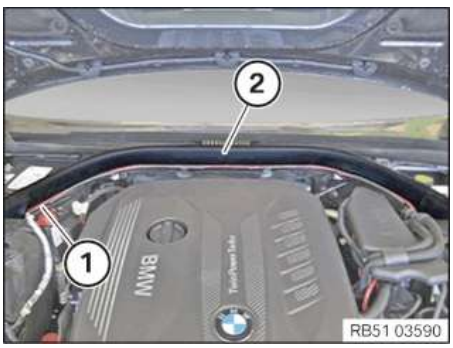
M10x25 screw		Tightening torque	56 Nm

- Renew the screw (2).
  Parts: Screw
- Tighten down screw (2).

Tension strut to spring strut dome

Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

10 – Install the seal for the bonnet



- Press the rear bonnet seal (2) into the guide.
- Feed in cable (1) into the brackets.
- Check that the rear bonnet seal (2) and the cable (1) are seated correctly.

11 – Installing cowl panel cover

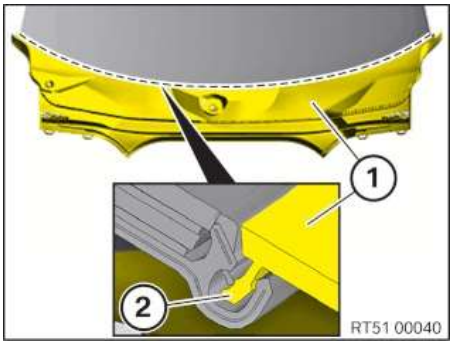
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RISK OF DAMAGE

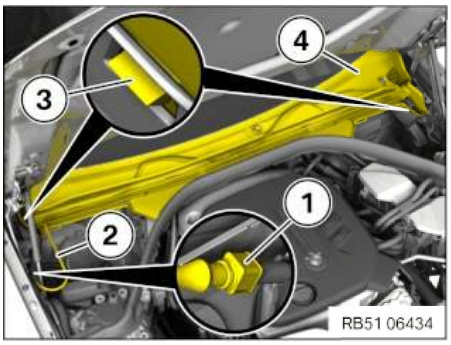
Damage caused by water ingress into the vehicle.

Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

- Ensure correct installation of the components.
- Only use undamaged components.



- Push the cowl panel cover (1) into the latch mechanism (2) beginning on the side.



- Clip cowl panel cover (4)in by means of the latch mechanisms (3).
- Position windscreen wash hose (2) and connect windscreen wash hose (1)quick lock.

12 – Installing both wiper arms

NOTICE

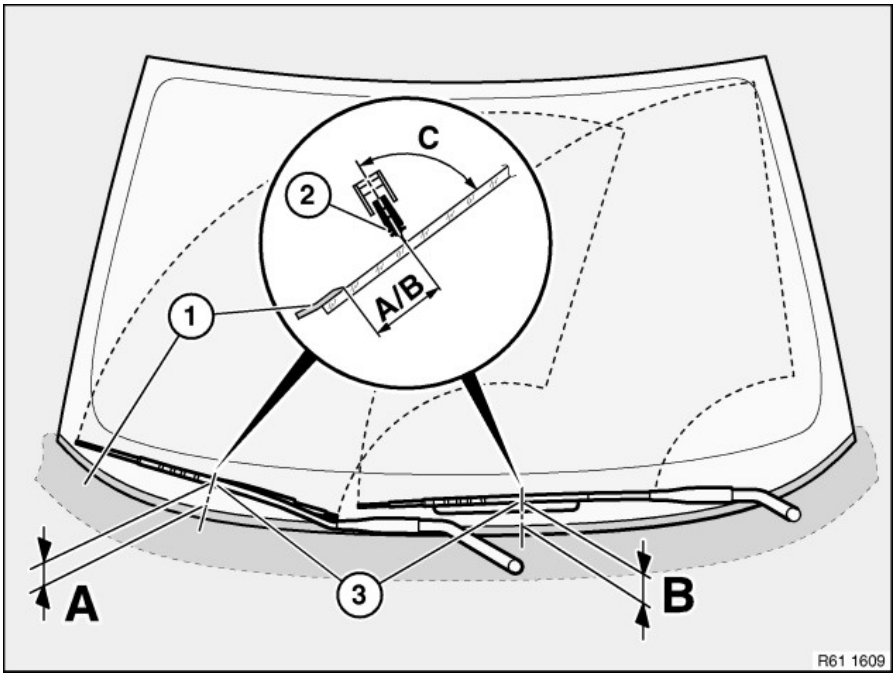
Description is for left component only. Procedure on the right side is identical.

▸ Install the wiper arm

TECHNICAL INFORMATION

The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.

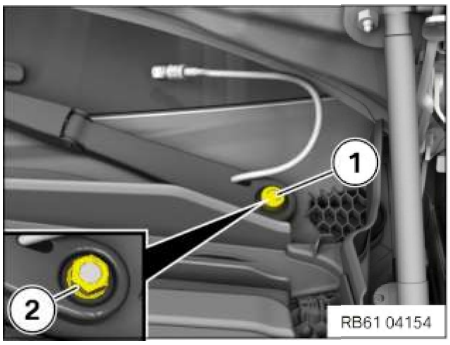
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- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

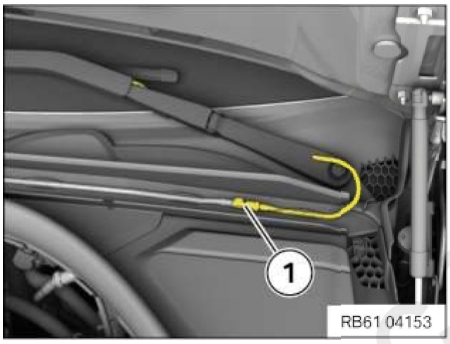


- Tighten nut (2).

Windscreen wiper arm

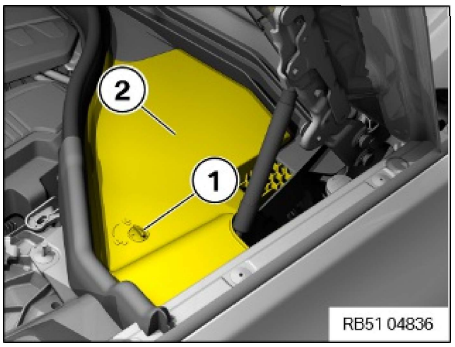
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Insert windscreen wash hose (1) into the cowl and connect at the separating point.

13 – Install the cover of the engine compartment on the rear left



- Position the engine compartment cover at the rear left (2) .
- Close lock (1).

14 – Disconnecting all battery earth leads

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- See additional information.

Additional Information

Overview of Tightening Torques

Power distribution box, front			Used in step 8
M8x35 screw		Tightening torque	13 Nm

Power distribution box, front			Used in step 8
Screw TS5x16			2.5 Nm

Positive battery cable			Used in step 8
Flange nutM8		Tightening torque	15 Nm

Positive battery connection point			Used in step 8
Positive pole screw		Tightening torque	15 Nm

Front power distribution box sealing frame			Used in step 8
Bolt RF5x25		Tightening torque	2.5 Nm

Bulkhead upper part to bottom bulkhead			Used in step 9
		Tightening torque	3 Nm

Tension strut on bulkhead			Used in step 9
M10x25 screw		Tightening torque	56 Nm

Tension strut to spring strut dome			Used in step 9
Screw	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 12
Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 12
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	114
61 20 900 Disconnecting and connecting battery earth lead	114
61 20 900 Disconnecting and connecting battery earth lead	114

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61 20 900 Disconnecting and connecting battery earth lead 114

61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 114
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 114
61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 114
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle) 114
61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting battery earth lead 114
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61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 114
61 20 900 Disconnecting and connecting battery earth lead 114
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61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting battery earth lead 114
61 20 900 Disconnecting and connecting battery earth lead 114

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61 14 010 Remove and install/replace power distribution box

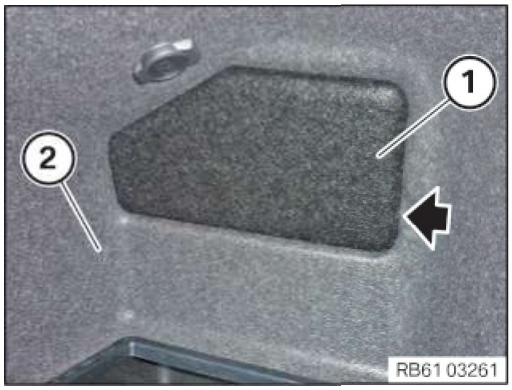
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

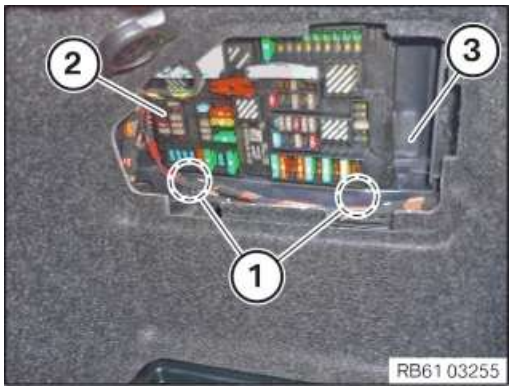
2 – Removing the flap in the luggage compartment wheel arch trim panel on the right



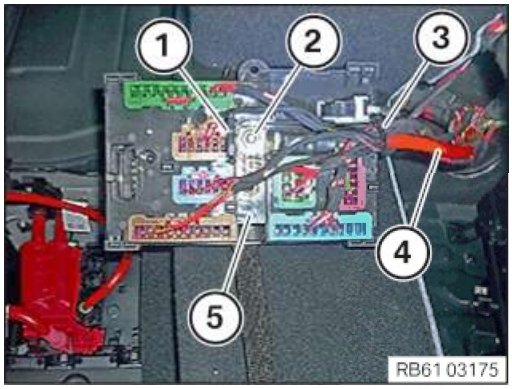
- Remove the flap (1) from the luggage compartment wheel arch trim panel on the right (2)

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3 – Removing the rear power distribution box

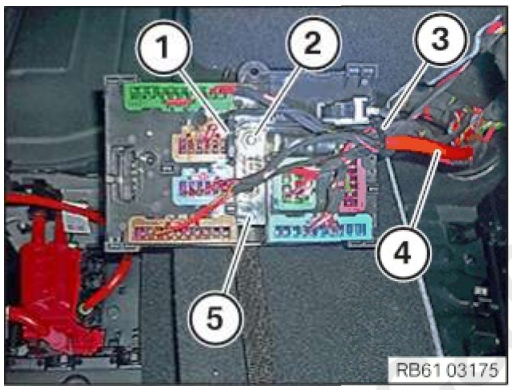


- Unlock latch mechanisms (1) and remove power distribution box (2) from holder (3).



- Open lid (1).
- Loosen nut (2).
- Release cable strap (3) on positive battery cable (4).
- Remove positive battery cable (4).
- Unlock and disconnect all connectors.
- Remove power distribution box (5).

4 – Installing the rear power distribution box

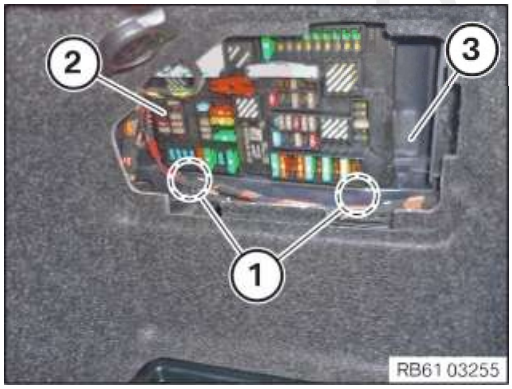


- Position the positive battery cable (4) on the power distribution box (5).
- Tighten nut (2).

Positive battery cable

Flange nutM8		Tightening torque	15 Nm

- Close lid (1).
- Renew the cable strap (3) on the positive battery cable (4).
- Connect all connectors and lock.

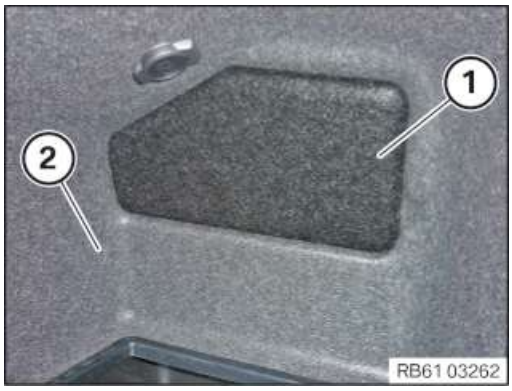


- Position power distribution box (2) correctly and engage it in bracket (3).

  The latch mechanisms (1) must engage correctly.

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5 – Installing the flap in the luggage compartment wheel arch trim panel on the right



- Position the flap (1) correctly in the right luggage compartment wheel arch trim panel (2) and install.

6 – Disconnecting all battery earth leads



- See additional information.

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Additional Information

Overview of Tightening Torques

Positive battery cable			Used in step 4
Flange nutM8		Tightening torque	15 Nm

Links

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	16
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	16

61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16
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61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	16
61 20 900 Disconnecting and connecting battery earth lead	16
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61 20 900 Disconnecting and connecting battery earth lead	16
61 20 900 Disconnecting and connecting battery earth lead	16

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61 14 040 Removing and installing/replacing rear power distribution box positive battery cable

PRELIMINARY WORK

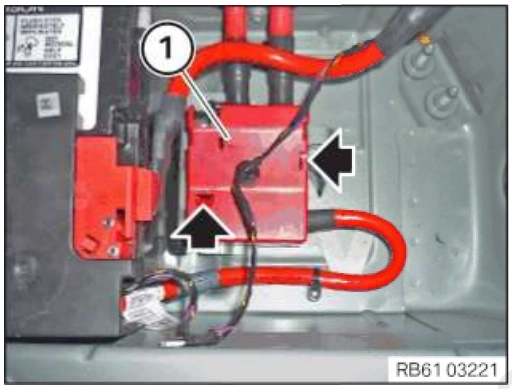
1 – Disconnecting all battery earth leads



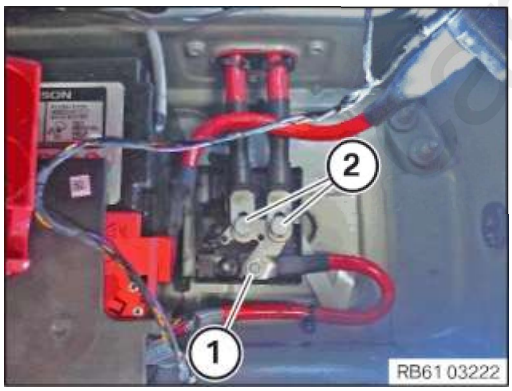
- See additional information.

MAIN WORK

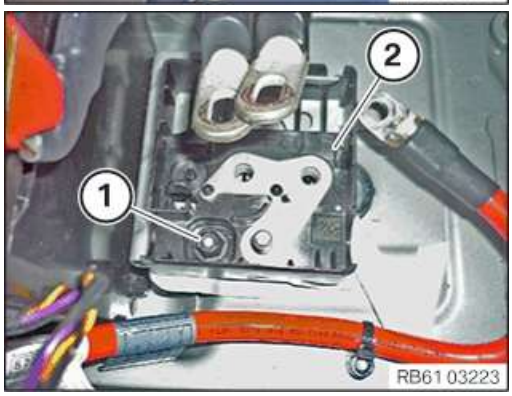
2 – Removing the low power distribution box



- Unclip the cover (1) from the latch mechanisms and put it aside.



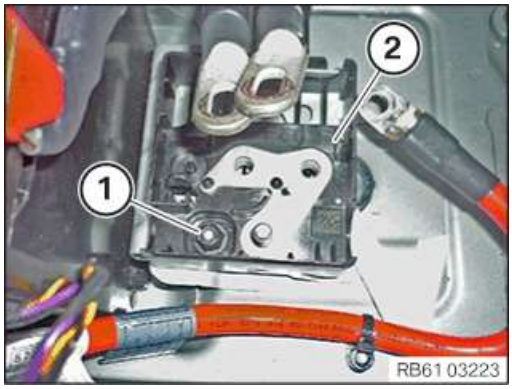
- Loosen nut (1).
- Remove positive battery cable and secure at side.
- Loosen screws (2).
- Remove positive battery cables and secure at side.



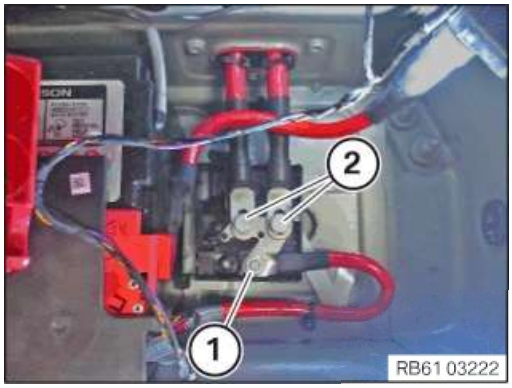
- Release the plastic nut (1).
- Remove the power distribution box (2).

3 – Installing the low power distribution box

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- Insert the power distribution box (2).
- Tighten plastic nut (1).

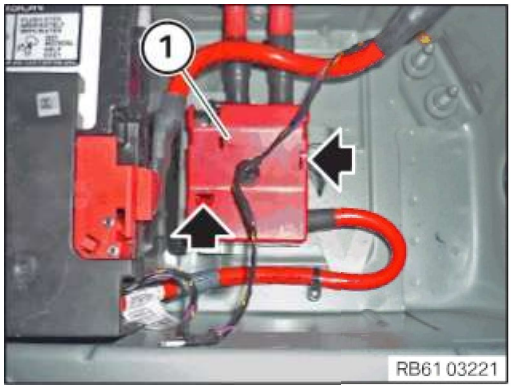


- Tighten the positive battery cable using the nut (1).

Positive battery cable

Flange nutM8		Tightening torque	15 Nm

- Tighten the positive battery cables using the screws (2).



- Clip in the cover (1).

POSTPROCESSES

4 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Positive battery cable Used in step 3

Flange nutM8		Tightening torque	15 Nm

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Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14

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61 14 041 Removing and installing/replacing rear power distribution box positive battery cable

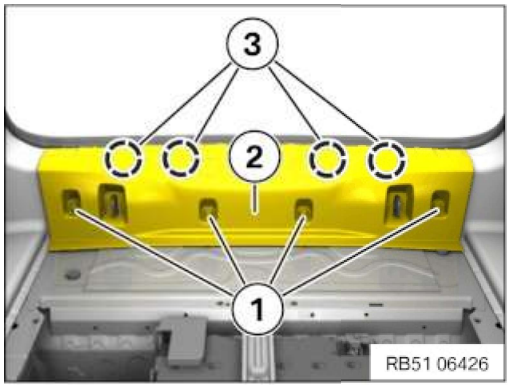
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



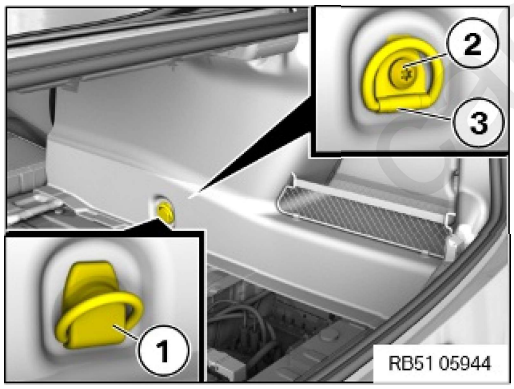
- See additional information.

2 – Removing the loading edge trim



- Loosen the expanding rivet (1).
- Unclip loading edge trim(2) upwards from latch mechanisms (3).
- Guide out and remove loading edge trim (2) under the sealing lip of the tailgate seal.

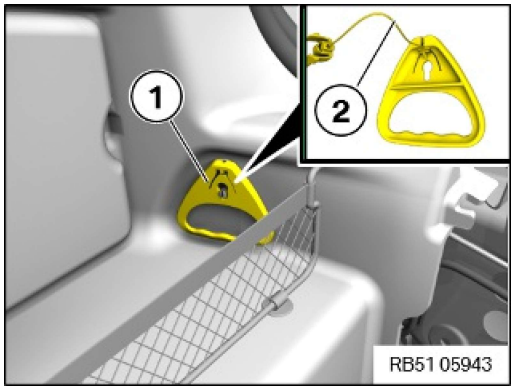
3 – Removing right luggage compartment wheel arch trim panel



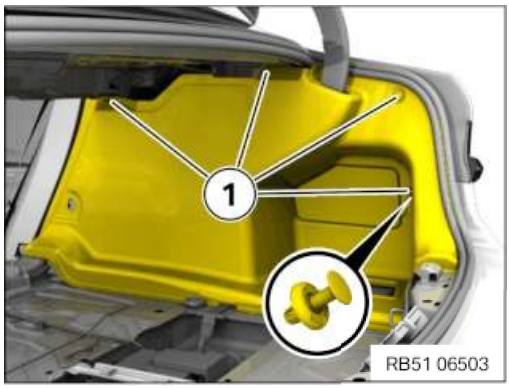
- Remove the cover (1).
- Loosen screw (2).
- Remove the lashing eye (3).

▸ If installed: Remove the emergency release handle for the tailgate (additional work in the US version)

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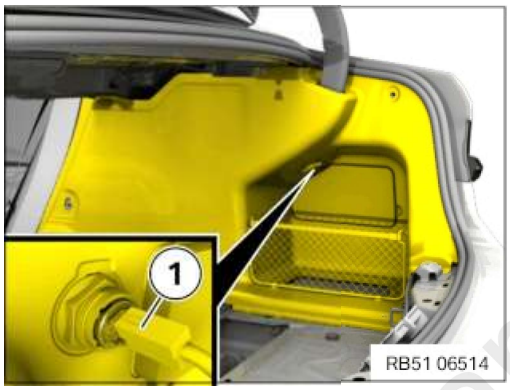


- Release the emergency release handle for tailgate (1) from the holder.
- Detach Bowden cable (2) and remove the emergency release handle for tailgate (1).

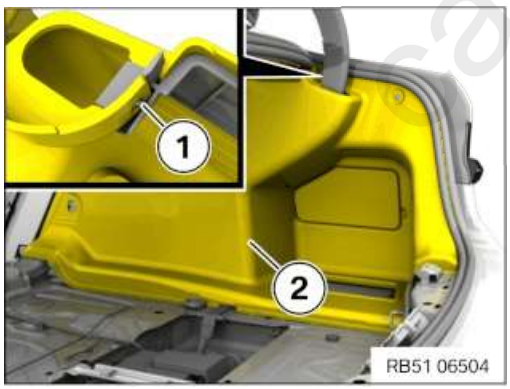


- Reposition the right rear seat backrest.
- Loosen the expanding rivet (1).

▸ If installed: Disconnect plug connection of the 12 V connection (additional work with storage package equipment specification)



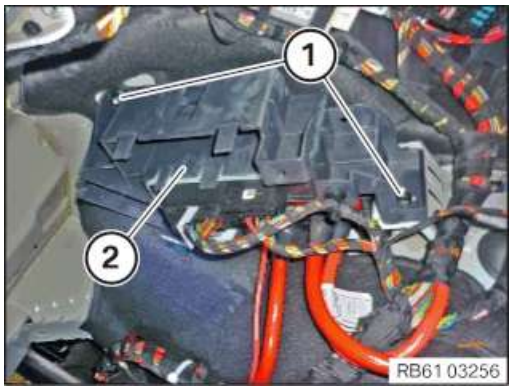
- Unlock and disconnect the plug connection (1) of the 12 V power socket.



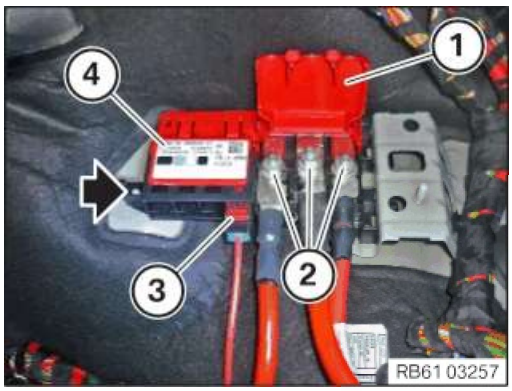
- Press the tab for luggage compartment wheel arch trim panel (2) on the outer side of the hinge to the front using the stop on trim (1).
- Guide out luggage compartment wheel arch trim panel (2) under the sealing lip for the tailgate and the side trim panel in the rear passenger compartment.
- Remove luggage compartment wheel arch trim panel (2).

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4 – Removing the rear power distribution box for the rear positive battery cable

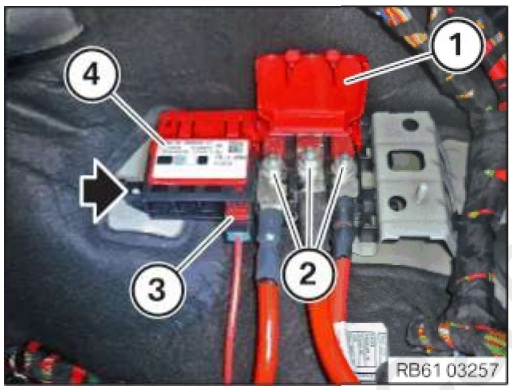


- Loosen nuts (1).
- Remove control unit holder (2).



- Unfold the cover (1).
- Release nut (2) and remove the associated positive battery cables.
- Unlock and disconnect connector (3).
- Release latch mechanism on marked point and remove the power distribution box (4).

5 – Installing the power distribution box for the positive battery cable at the rear

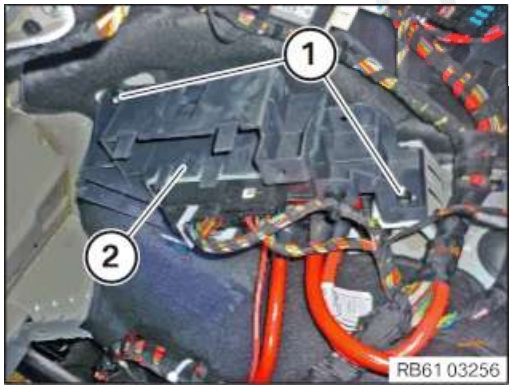


- Correctly position the power distribution box (4) and clip it in with the latch mechanism where marked.
- Connect connectors (3) and lock.
- Position the power distributor and tighten the nuts (2).

Positive battery cable

Flange nutM8		Tightening torque	15 Nm

- Close the cover (1).



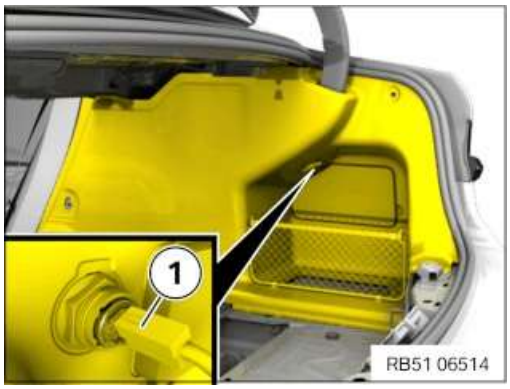
- Position the control unit holder (2).
- Tighten nuts (1).

Control unit holder

Plastic nut with flange		2,6 Nm

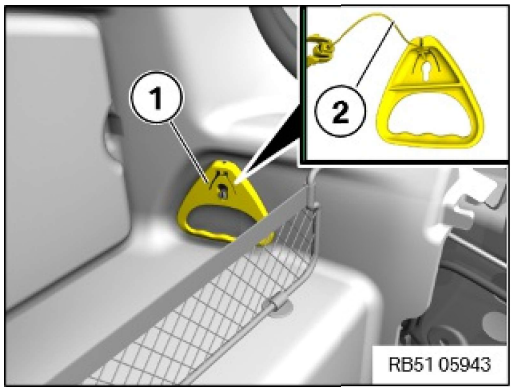
6 – Installing the luggage compartment wheel arch trim panel on the right

▸ If installed: Connecting plug of the 12 V power socket (additional work for equipment specification with storage package)

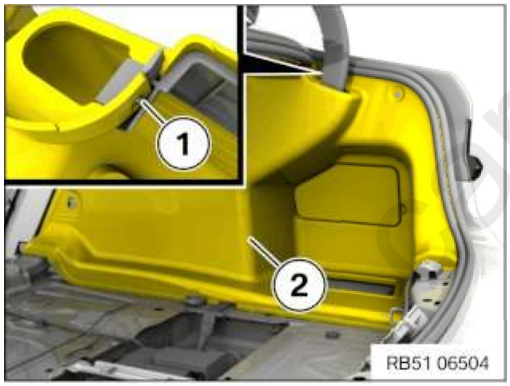


- Connect and lock connector (1) of the 12 V power socket.

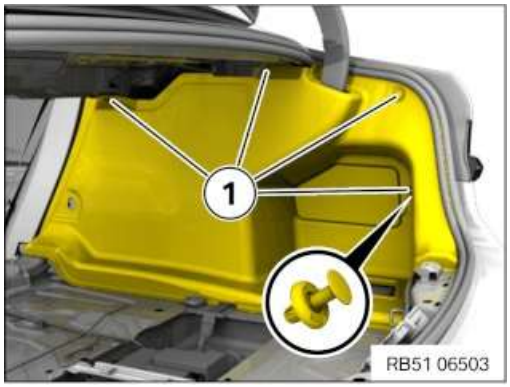
▸ If installed: Installing the emergency tailgate release handle (additional work for US version)



- Attach the Bowden cable (2).
- Fasten emergency tailgate release handle (1) to the bracket.

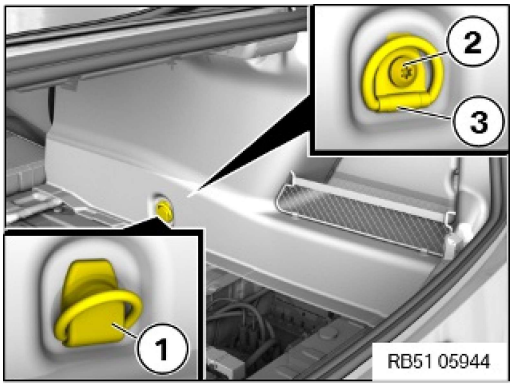


- Feed luggage compartment wheel arch trim panel (2) under the side trim panel in the rear passenger compartment and the sealing lip for the tailgate.
- Feed the tab of the luggage compartment wheel arch trim panel (2) on the outer side of the hinge into the stop on the trim (1).



- Secure expanding rivet (1).
- Raise the right rear seat backrest.

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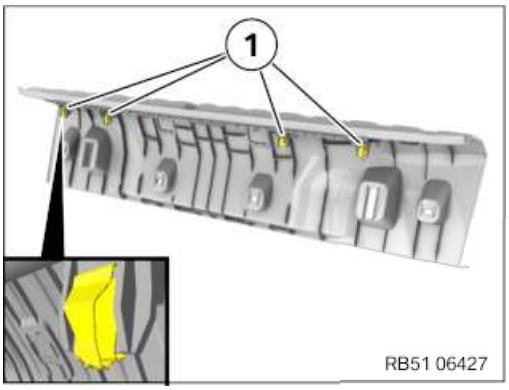
- Position the lashing eye (3).
- Tighten down screw (2).

Lashing eye to body

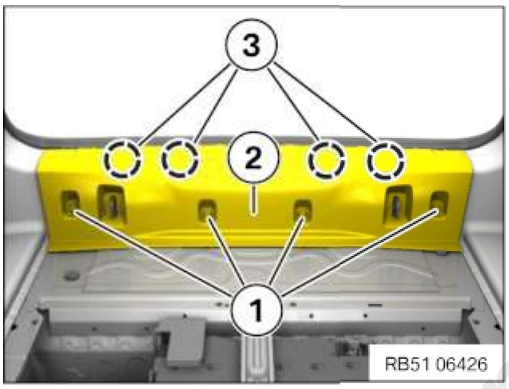
	Tightening torque	19 Nm

- Install the cover (1).

7 – Installing loading edge trim



- Check the clamps (1) for damage and renew if necessary.



- Insert the loading edge trim (2) under the sealing lip of the tailgate seal.
- Fit the trim of the loading edge (2) at the latch mechanisms (3) and clip it in to the bottom.
- Secure expanding rivet (1).

8 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Positive battery cable Used in step 5

Flange nutM8		Tightening torque	15 Nm

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Control unit holder		Used in step 5
Plastic nut with flange		2,6 Nm

Lashing eye to body		Used in step 6
	Tightening torque	19 Nm

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting the battery earth lead (*all* battery earth leads)	18
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	18
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
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61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	18
61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
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61 20 900 Disconnecting and connecting battery earth lead	18
61 20 900 Disconnecting and connecting battery earth lead	18
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61 20 900 Disconnecting and connecting battery earth lead	18

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61 25 ... Assessment of the transportability of the 12 V lithium ion starter / auxiliary battery in service workshops

Initiating:

For analysis and disposal purposes, it is necessary to transport the already used starter batteries. These lithium ion based starter batteries are to be classified as hazardous material according to UN 38.3, and may only be transported under particular prerequisites.

Obtaining the certified transportability between the assessment and delivery of the starter / auxiliary battery to the disposal/transportation company is the responsibility of a qualified person. For shipping one also needs to take into account the influence of the storage requirements and other possible occurring events for the determined transportability. If there is a possibility that previously certified transportability is no longer valid, it must be reassessed using the guideline.

The transport in the sense of the hazardous goods legislation is organised in three areas:

1. Assessment of the transportability
2. Transport preparation
3. Performing the transport

This document contains all the necessary information in order to assess the transportability of a used 12 V lithium ion starter / auxiliary battery. The transport preparation and execution is **not** an element of this document.

Further information on this can be found in the information bulletin in the ASAP.

It will be explained which measures are necessary in order to assess the transportability. How these measures are to be performed individually depends on the particular situation at the location and is not an element of this document. These procedures are to be defined according to the local regulations / laws and recorded as valid local work instructions.

Prerequisites from a security perspective:

It should be noted that working on the open battery is prohibited.

The analysis , assessment and certification of the transportability of the 12 V lithium ion starter / auxiliary battery is the responsibility of a qualified person.

The following specifications for work safety must also be observed:

Storage of the lithium ion starter / auxiliary battery

The following points should be noted for reasons work safety point:

The battery must always protected against short circuit (cover the terminals).

The information for this can be found in the information bulletin in the ASAP.

Note: For better traceability, this document must be printed out and archived with the vehicle data.

Assessment of the 12 V lithium ion starter / auxiliary battery

NAME	Date	Serial no.	VIN

Signature: ----------

The electrical assessment of the 12 V lithium ion starter / auxiliary battery takes place via the diagnosis and test module.

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Transport preventing faults according to the diagnosis or the test module	Yes	No

Visual assessment:

Smoke	Yes	No
Evidence of fire damage	Yes	No
Heat development	Yes	No
Deformations, changes (scratches up to 0.5 mm deep or 5 cm long are permitted)	Yes	No
Cracked or broken housing	Yes	No
Electrolyte odour	Yes	No
Noise generation	Yes	No
Loose connections, loose or damaged	Yes	No
Serial number/label safety information cannot be read	Yes	No
DMC code is not readable or no functional LIN communication can be established	Yes	No
Suspected water damage	Yes	No

The serial number must be clearly legible. If the type plate can no longer be read, the housing of the 12 V lithium ion starter / auxiliary battery must be clearly marked with the serial number.

The label of the safety information must be replaced if it is illegible.

The electrical and visual assessment must be set down in writing!

If one or more points is/are answered with yes the following procedure must be clarified by technical support! Furthermore, the removed 12 V lithium ion starter / auxiliary battery must be blocked off with high-voltage barrier tapes. If a 12 V lithium ion starter / auxiliary battery is still located in the vehicle, the vehicle must be parked in the open.

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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

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61 20 908 Carrying out vehicle battery "power reset"

1 Carrying out a voltage interruption of the 12-V battery

TECHNICAL INFORMATION

The voltage interruption is carried out with the diagnosis system via the specified path.

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

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61 20 900 Disconnecting and connecting battery earth lead

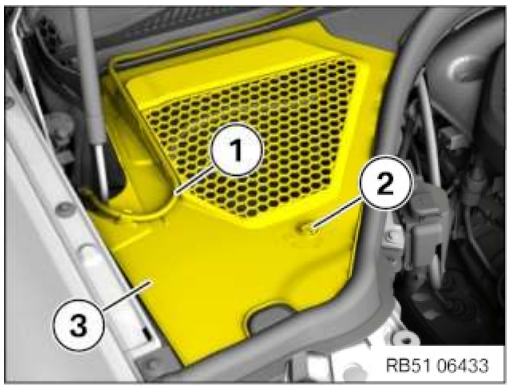
WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

1 – Remove the cover of the rear right engine compartment



- Release washer fluid hose (1) from the guides.
- Loosen the lock (2).
- Remove the cover of rear right engine compartment (3).

2 – Disconnecting the negative auxiliary battery lead in the engine compartment

Check

- Check, whether an auxiliary battery is installed in the engine compartment.

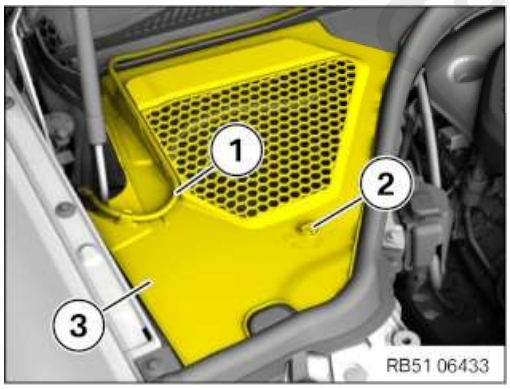
Result

» Auxiliary battery is not installed in the engine compartment

Measure

- Install the rear right engine compartment cover

▸ Install the rear right engine compartment cover



- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

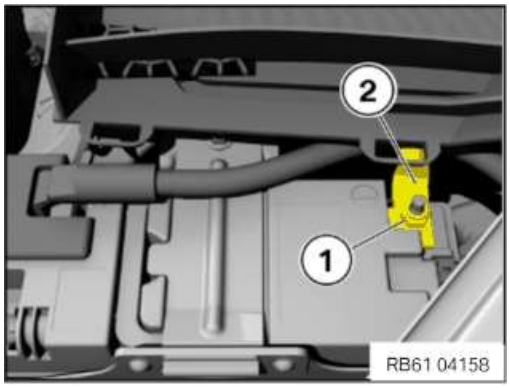
Result

» 12-V dual storage system is installed.

Measure

- Disconnect the negative battery cable of the 12 V dual storage system

▸ Disconnect the negative battery cable of the 12V dual storage system



TECHNICAL INFORMATION

Follow notes for 12 V dual storage system.

See additional information 6120 ... Notes on the 12 V dual storage system.

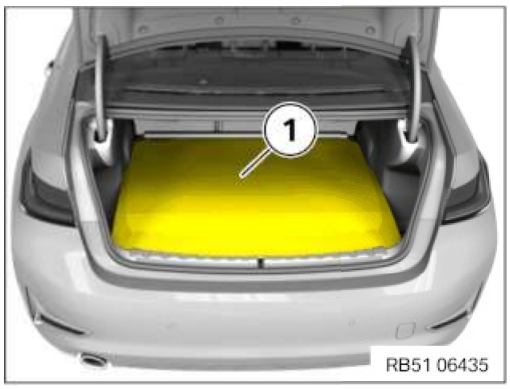
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Unfasten nut (1).

  The nut (1) is non-detachable and connected with the negative battery cable of the 12-V dual storage battery (2).
- Disconnect negative battery lead of the 12-V dual storage battery (2) from the negative battery terminal, set to one side and secure.

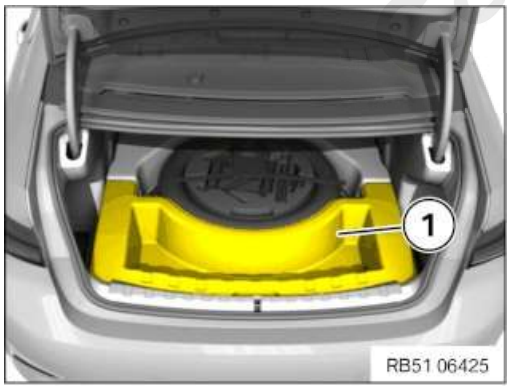
3 – Removing the luggage compartment floor trim panel



- Remove luggage compartment floor trim panel (1).

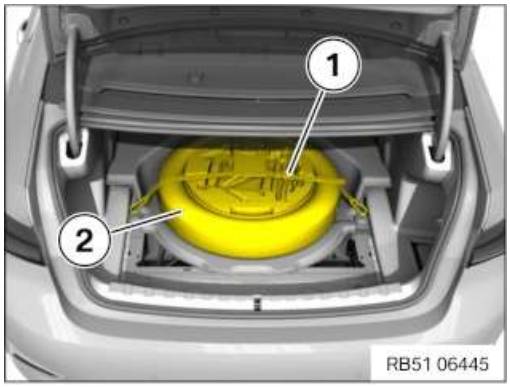
4 – If installed: Removing the compact spare wheel

▶ **Removing rear luggage compartment well**



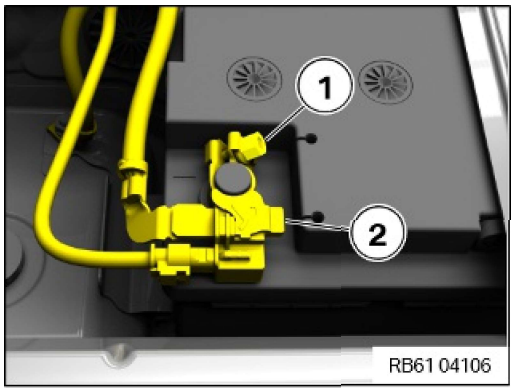
- Remove rear luggage compartment well (1).

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- Open buckle on seat belt strap (1) and set it aside.
- Remove emergency wheel (2) with the insert.

5 – Disconnecting the negative battery cable of the system battery



RISK OF DAMAGE

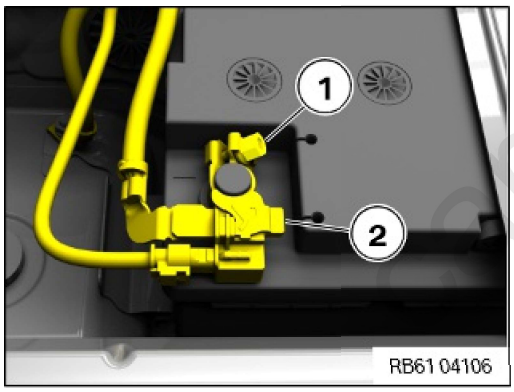
Damage to battery terminal, the safety battery terminal or the intelligent battery sensor (IBS).

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

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

- Loosen nut (1).
- Remove negative on-board electrical system battery lead (2) from the negative battery terminal, place to one side and secure.

6 – Connecting the negative battery cable of the system battery

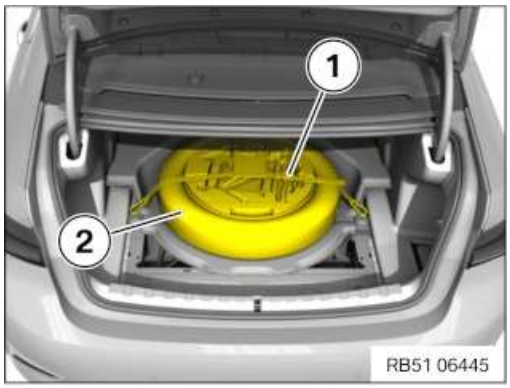


- Position negative battery cable of the system battery (2) on the negative battery terminal as shown.
- Tighten nut (1).

Negative battery terminal

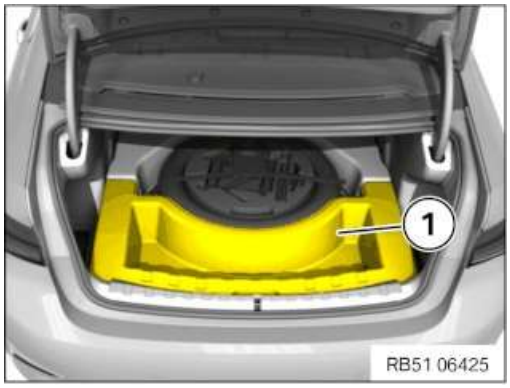
Nut		Tightening torque	5 Nm

7 – If installed: Install the emergency wheel



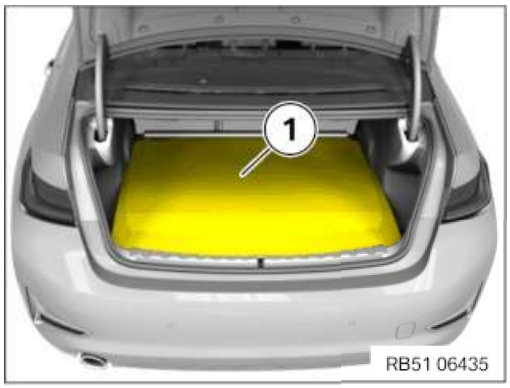
- Install the emergency wheel (2) with the insert.
- Position the seat belt strap above the emergency wheel and close the buckle on the seat belt strap (1).

▸ **Installing rear luggage compartment well**



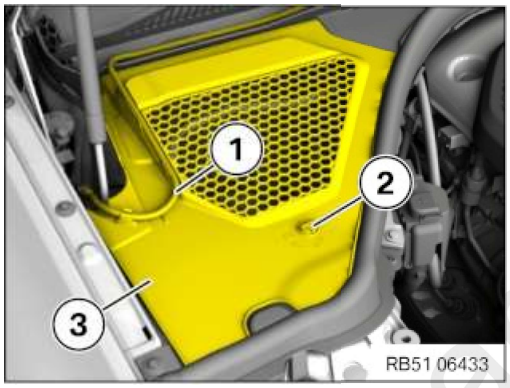
- Install rear luggage compartment well (1).

8 – Installing the luggage compartment floor trim panel



- Insert the luggage compartment floor trim panel (1).

9 – Remove the cover of the rear right engine compartment



- Release washer fluid hose (1) from the guides.
- Loosen the lock (2).
- Remove the cover of rear right engine compartment (3).

10 – Connect the negative battery lead of the auxiliary battery in the engine compartment

Check

- Check whether an auxiliary battery is installed in the engine compartment.

Result

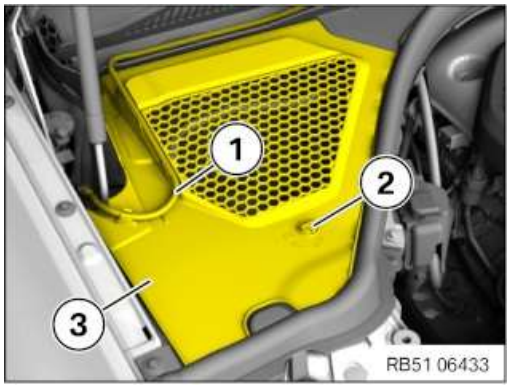
» Auxiliary battery is not installed in the engine compartment.

Measure

- Install the rear right engine compartment cover.

▸ Install the rear right engine compartment cover

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- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

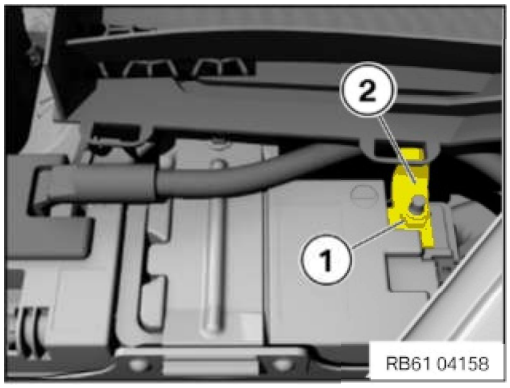
Result

» 12 V dual storage system is installed.

Measure

- Connecting negative battery cable of 12-V dual storage system

▸ **Connecting negative battery cable of 12-V dual storage system**



TECHNICAL INFORMATION

Follow notes for 12 V dual storage system.

See additional information 6120 ... Notes on the 12 V dual storage system.

NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

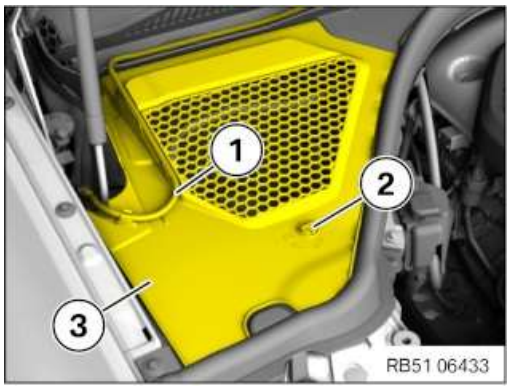
- Release negative battery cable of the 12- V - dual storage system (2) release from the fixture.
- Position the negative battery cable of 12-V dual storage system (2) as shown on the negative battery terminal.

  The nut (1) is connected to the negative battery cable of the dual storage battery (2) in a way that it cannot be lost.
- Tighten nut (1).

Negative battery terminal 12V dual storage system

Nut		Tightening torque	19 Nm

11 – Install the rear right engine compartment cover



- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

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Additional Information

Overview of Tightening Torques

Negative battery terminal			Used in step 6
Nut		Tightening torque	5 Nm

Negative battery terminal 12V dual storage system			Used in step 10
Nut		Tightening torque	19 Nm

Links

Repair instructions (PRE)	Used in step
Instructions for 12 V dual storage system	210

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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!**

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61 00 ... Information on removing, connecting and changing the battery

Observe safety informations for handling vehicle battery.

Disconnecting the 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 cables: If the battery positive and negative leads are the same colour and you are in doubt, follow the polarity to the battery, then mark and cover the leads.
- The on-board computer and clock may lose your data.

General notes on disconnecting 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 versions with an 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 battery is connected.
- When installing battery terminal: Tightening torque 61 21 1AZ.

AGM battery only:

- 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.

Connected battery

After connecting battery:

Important!

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.

Battery replacement

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

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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.

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 replacement.

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 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:

Registering the battery replacement:

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

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

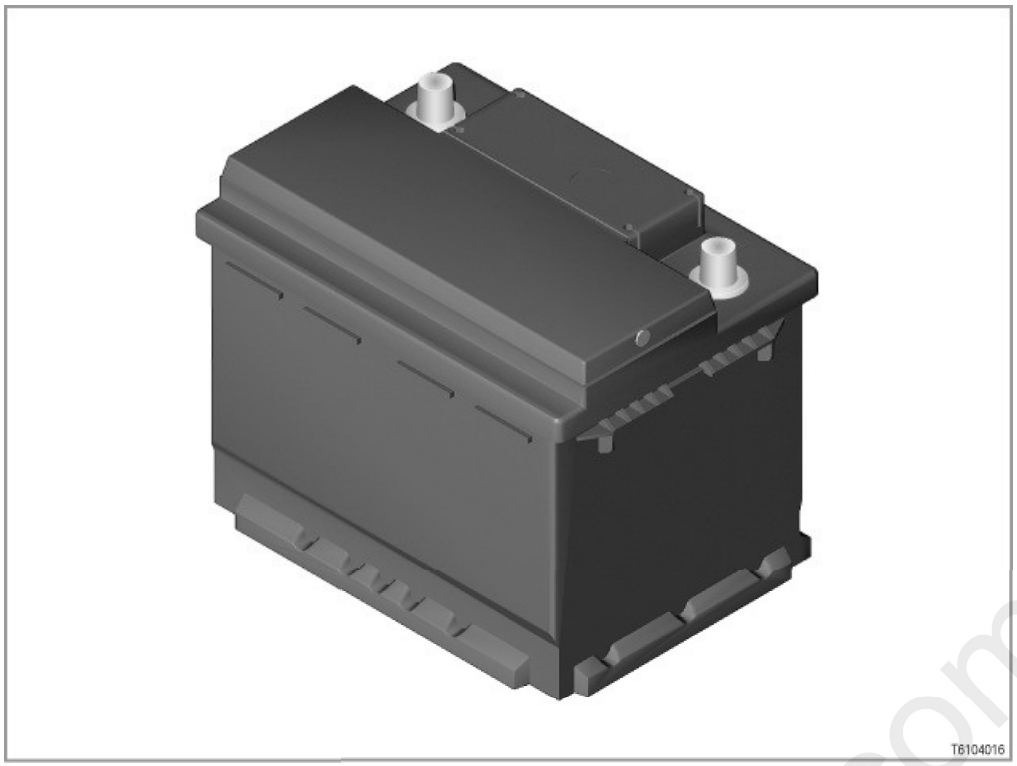
When installing a battery of a different size or a different battery type, this change in vehicle data must be programmed into the vehicle data in accordance with specifications.

Programming system:

- Battery retrofitting

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61 20 ... Notes on AGM battery



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).

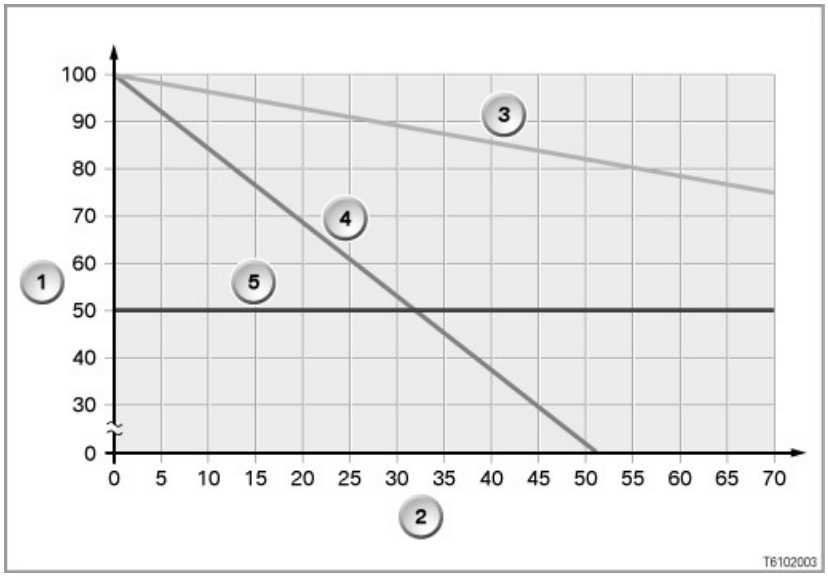
The constantly increasing energy demand of modern vehicle electrical systems calls for ever more powerful battery solutions. A modern luxury-class vehicle has some 100 actuator motors that have to be fed with electrical current. Added to these are safety, environmental and comfort elements which are 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

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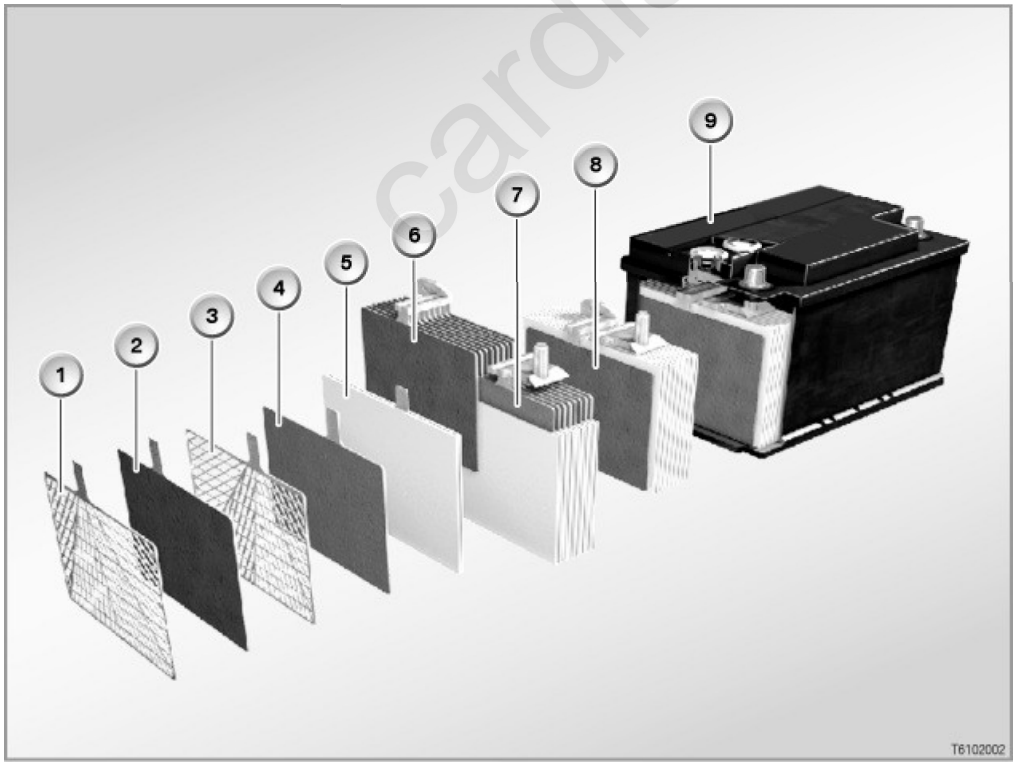


Item	Explanation	Item	Explanation
1	Available capacity [%]	2	Mileage [thousand km]
3	AGM battery	4	Lead-calcium battery
5	50 % capacity limit		

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.

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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.

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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 save 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-boltage 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.

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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 solutionand 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!).

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61 20 503 Vehicle battery - closed-circuit current monitoring

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.

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61 25 ... Assessment of the transportability of the 12 V lithium ion starter / auxiliary battery in service workshops

Initiating:

For analysis and disposal purposes, it is necessary to transport the already used starter batteries. These lithium ion based starter batteries are to be classified as hazardous material according to UN 38.3, and may only be transported under particular prerequisites.

Obtaining the certified transportability between the assessment and delivery of the starter / auxiliary battery to the disposal/transportation company is the responsibility of a qualified person. For shipping one also needs to take into account the influence of the storage requirements and other possible occurring events for the determined transportability. If there is a possibility that previously certified transportability is no longer valid, it must be reassessed using the guideline.

The transport in the sense of the hazardous goods legislation is organised in three areas:

1. Assessment of the transportability
2. Transport preparation
3. Performing the transport

This document contains all the necessary information in order to assess the transportability of a used 12 V lithium ion starter / auxiliary battery. The transport preparation and execution is **not** an element of this document.

Further information on this can be found in the information bulletin in the ASAP.

It will be explained which measures are necessary in order to assess the transportability. How these measures are to be performed individually depends on the particular situation at the location and is not an element of this document. These procedures are to be defined according to the local regulations / laws and recorded as valid local work instructions.

Prerequisites from a security perspective:

It should be noted that working on the open battery is prohibited.

The analysis , assessment and certification of the transportability of the 12 V lithium ion starter / auxiliary battery is the responsibility of a qualified person.

The following specifications for work safety must also be observed:

Storage of the lithium ion starter / auxiliary battery

The following points should be noted for reasons work safety point:

The battery must always protected against short circuit (cover the terminals).

The information for this can be found in the information bulletin in the ASAP.

Note: For better traceability, this document must be printed out and archived with the vehicle data.

Assessment of the 12 V lithium ion starter / auxiliary battery

NAME	Date	Serial no.	VIN

Signature: ----------

The electrical assessment of the 12 V lithium ion starter / auxiliary battery takes place via the diagnosis and test module.

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Transport preventing faults according to the diagnosis or the test module	Yes	No

Visual assessment:

Smoke	Yes	No
Evidence of fire damage	Yes	No
Heat development	Yes	No
Deformations, changes (scratches up to 0.5 mm deep or 5 cm long are permitted)	Yes	No
Cracked or broken housing	Yes	No
Electrolyte odour	Yes	No
Noise generation	Yes	No
Loose connections, loose or damaged	Yes	No
Serial number/label safety information cannot be read	Yes	No
DMC code is not readable or no functional LIN communication can be established	Yes	No
Suspected water damage	Yes	No

The serial number must be clearly legible. If the type plate can no longer be read, the housing of the 12 V lithium ion starter / auxiliary battery must be clearly marked with the serial number.

The label of the safety information must be replaced if it is illegible.

The electrical and visual assessment must be set down in writing!

If one or more points is/are answered with yes the following procedure must be clarified by technical support! Furthermore, the removed 12 V lithium ion starter / auxiliary battery must be blocked off with high-voltage barrier tapes. If a 12 V lithium ion starter / auxiliary battery is still located in the vehicle, the vehicle must be parked in the open.

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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

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61 21 028 Charging battery



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 BMW 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.

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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

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61 12 ... Notes on intelligent battery sensor (IBS)	1
61 12 ... Notes regarding the battery electronics (lithium ion battery)	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

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61 21 010 Remove and install the vehicle battery

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

2 – Removing system battery

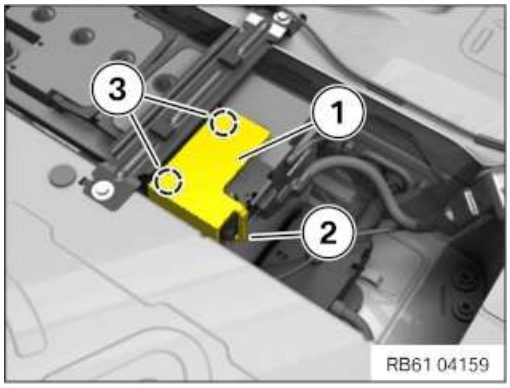
WARNING

Working on 12 V vehicle electrical system.

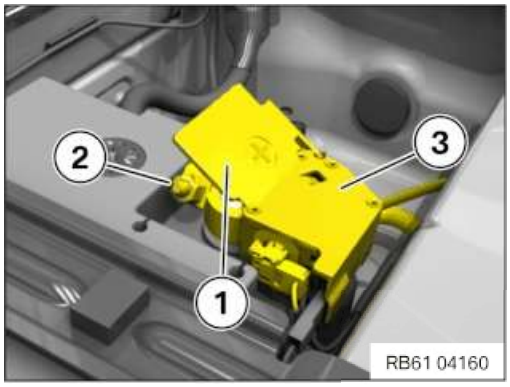
Risk of short circuits! Risk of fire!

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

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



- Remove the cover for the positive battery terminal (1).
- Loosen nut (2).

RISK OF DAMAGE

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

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

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

- Pull off the positive battery terminal (3) from the positive battery terminal.

WARNING

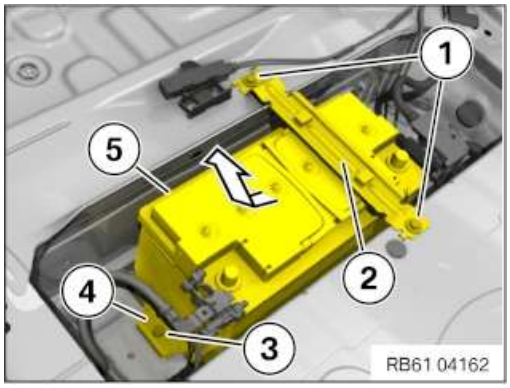
Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

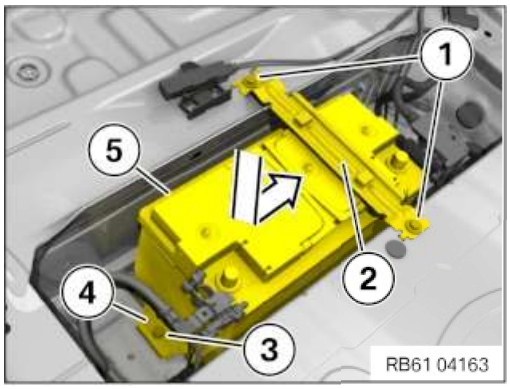
- Locate positive battery terminal (3) laterally.
- Pull off vent hose (1) on the system battery.





- Loosen screws (1).
- Remove battery rollover protection bracket (2).
- Loosen screw (3).
- Remove the battery holder (4).
- Release vehicle battery (5) in direction of arrow and remove by the grab handles.

3 – Installing system battery



- Insert system battery (5) in the direction of the arrow.
- Install the battery holder (4).
- Tighten down screw (3).

Battery holder to body

M8 screw		Tightening torque	15 Nm

- Position battery rollover protection bracket (2).
- Tighten the screws (1).

Battery rollover protection bracket to luggage compartment floor

Screw		Tightening torque	8 Nm



- Insert vent hose (1) in the opening on the system battery.

▸ **Check the vent holes of the battery**

WARNING

Gas emission.

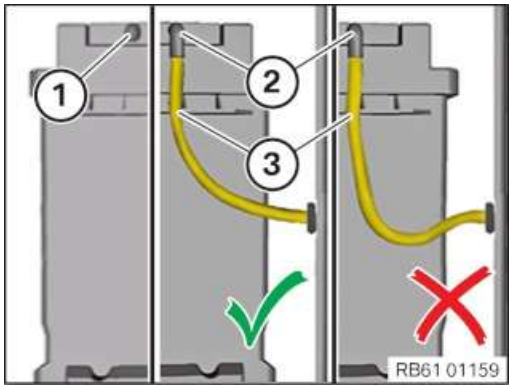
Danger of injury! Danger of explosion!

- Assign the vent holes correctly.
- Route the vent hose correctly.

TECHNICAL INFORMATION

The battery has two vent holes, opposite:
One vent hole (1) must be closed correctly with a dummy plug.
The vent hose (3) must be correctly connected and routed at the other vent hole (2).

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Check
- Check if the vent hole (1) is correctly closed with a dummy plug.

Result

» No dummy plug.

Measure
- Close the vent hole (1) correctly with a dummy plug.

Check
- Check if the vent hole (2) has a correctly connected vent hose (3).

Result

» The vent hose (3) is not correctly connected.

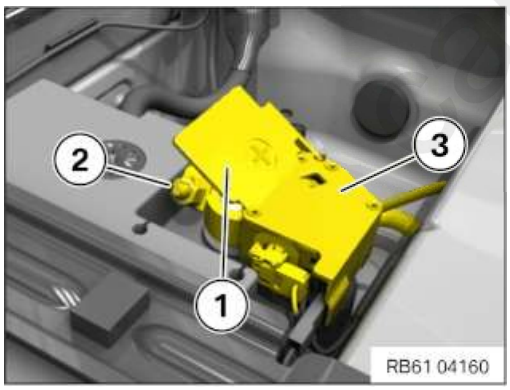
Measure
- At the vent hole (2), connect the vent hose (3) correctly.

Check
- Check if the vent hose (3) is routed to the outside with a downhill gradient (**no siphon formation!**).

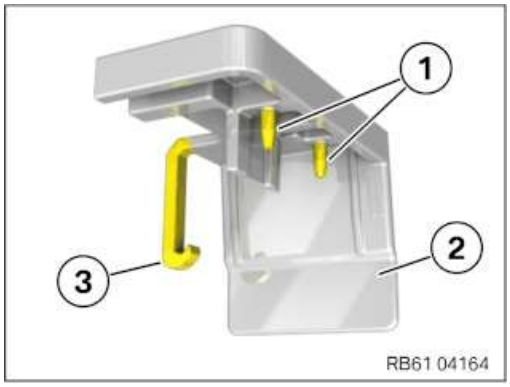
Result

» The vent hose (3) is not correctly routed as shown in the image on the right.

Measure
- Route the vent hose (3) correctly as shown in the centre image.



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



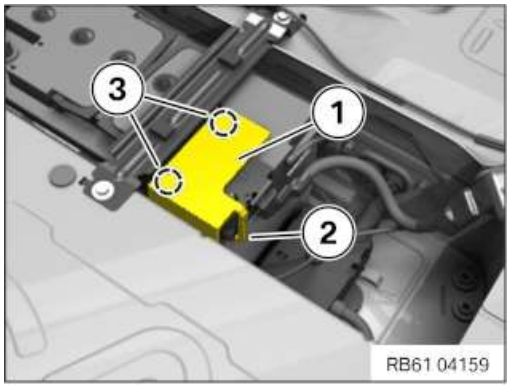
Check
- Check guides (1) and latch mechanism (3) on protective cap (2) for damage.

Result

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

Measure

- Renew protective cap (2).



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

POSTPROCESSES

4 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Battery holder to body — Used in step 3

M8 screw		Tightening torque	15 Nm

Battery rollover protection bracket to luggage compartment floor — Used in step 3

Screw		Tightening torque	8 Nm

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14

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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
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61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14
61 20 900 Disconnecting and connecting battery earth lead	14

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61 21 003 Removing and installing the 12-V dual storage battery

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

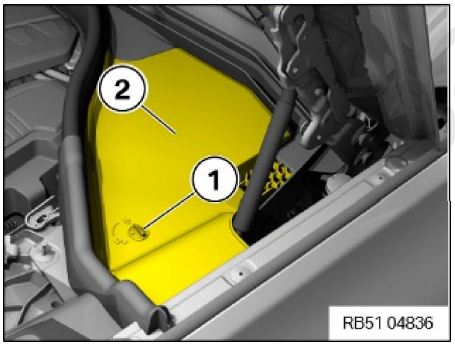
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Remove the cover of the engine compartment at the rear left



- Loosen the lock (1).
- Remove rear left cover of engine compartment (2).

3 – Removing both wiper arms

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Remove the wiper arm**

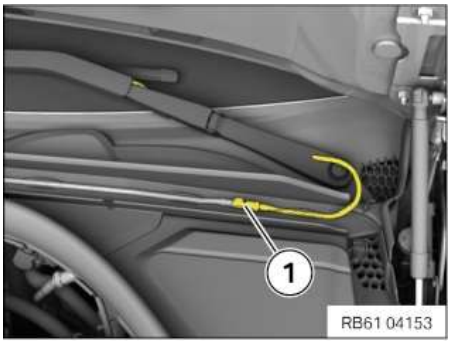
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RISK OF DAMAGE

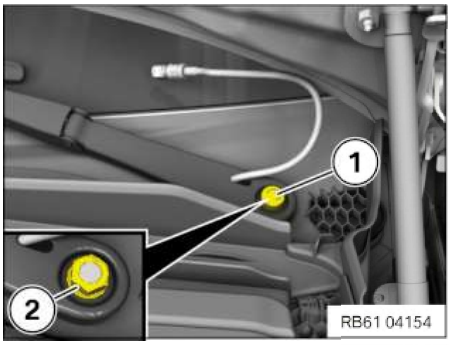
Damage to wiper console

While removing the wiper arms without using special tool, the wiper console can break.

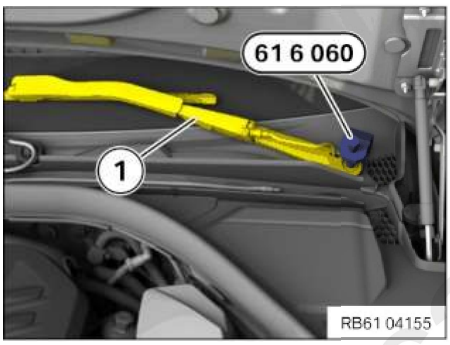
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.



- Disconnect the windscreen wash hose(1) at the separation point and remove from the cowl guide.

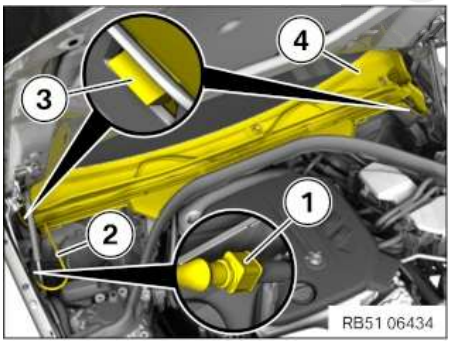


- Remove the protective cap (1).
- Loosen nut (2).

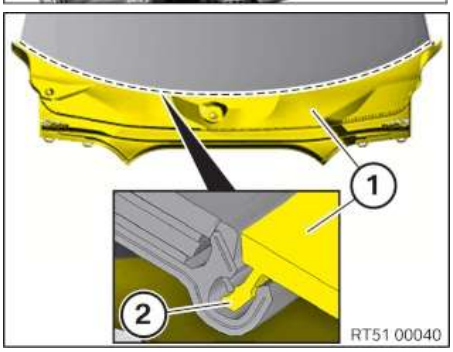


- Pull off the wiper arm (1) using special tool .

4 – Remove cowl panel cover



- Release snap fastener of the washer fluid hose (1) and put the washer fluid hose(2) to one side.
- Unclip clips (3) on the cowl panel cover (4).



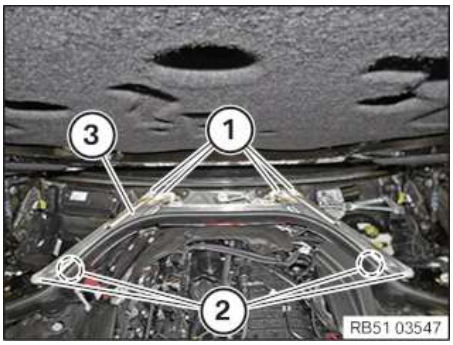
- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

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5 – If installed: Removing the strut brace from the back of the engine compartment

TECHNICAL INFORMATION

Driving without the strut brace/front end or tension strut is not permitted.



- Loosen screws (1) and (2).
- Remove the strut brace (3).

MAIN WORK

6 – Removing 12 V dual storage system

WARNING

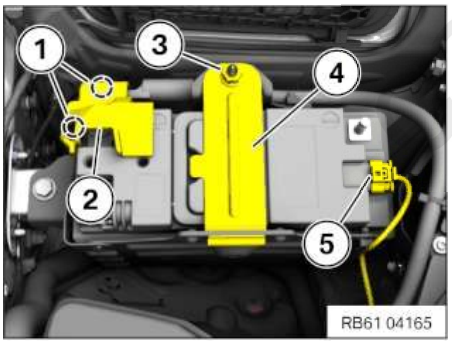
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

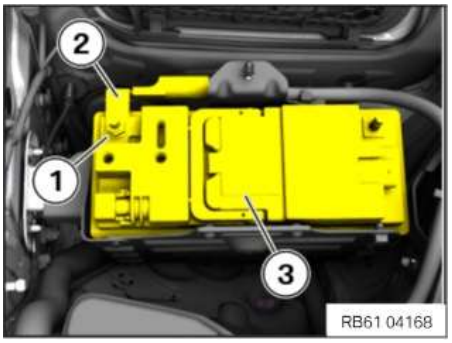
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

TECHNICAL INFORMATION

Follow notes for 12 V dual storage system.
See additional information 6120 ... Notes on the 12 V dual storage system.



- Loosen the latch mechanisms (1).
- Remove positive terminal cover (2).
- Loosen nut (3).
- Remove battery rollover protection bracket (4).
- Unlock plug connection (5) and disconnect.



- Loosen nut (1).
- Pull off positive battery cable (2) from the positive terminal and secure at side.

WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

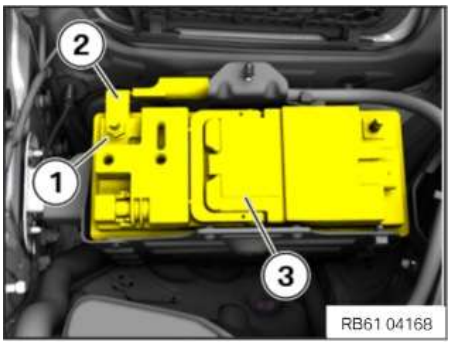
- Fold back grab handle and remove the 12-V dual storage battery (3).

7 – Install 12-V dual storage battery

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TECHNICAL INFORMATION

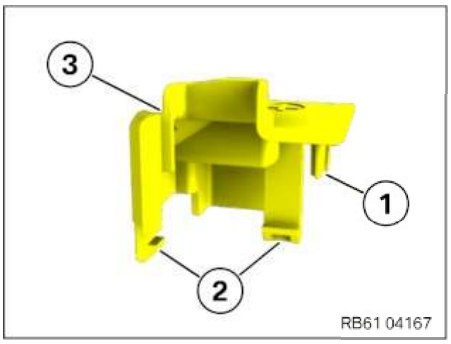
Follow notes for 12 V dual storage system.
See additional information 6120 ... Notes on the 12 V dual storage system.



- Install the 12 V dual storage system (3).
- Release the fixing element on the positive battery cable (2).
- Position the positive battery cable (2) on the positive terminal.
- Tighten nut (1).

Positive battery terminal

Nut		Tightening torque	5 Nm



Check

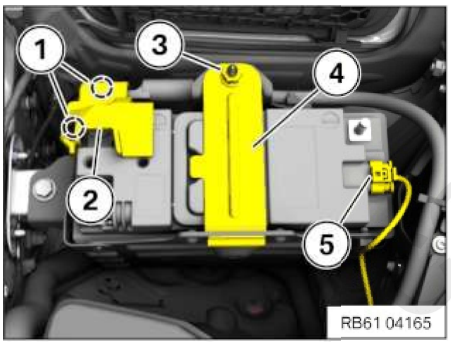
- Check guide (1) and retaining lugs (2) on the positive terminal cover (3) for damage.

Result

» Guides (1) or retaining lugs (2) are damaged.

Measure

- Renew positive terminal cover (3).



- Connect connectors (5) and lock.
- Install battery rollover protection bracket (4).
- Tighten nut (3).

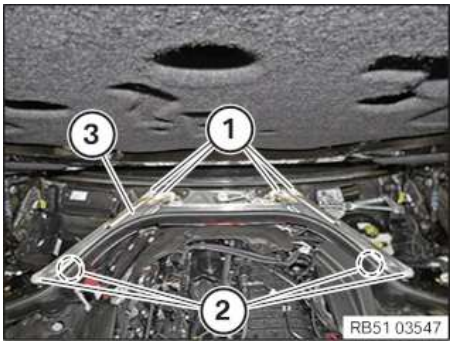
Rollover protection bar auxiliary battery on holder

Nut M8		Tightening torque	15 Nm

- Insert positive terminal cover (2).
- Clip in latch mechanisms (1) on the positive terminal cover (2).

POSTPROCESSES

8 – If installed: Install strut brace in rear of engine compartment



- Install the strut brace (3).
- Renew screws (1).

  Parts: Bolts
- Tighten the screws (1).

Cross-brace to bulkhead

Hexagon screw M10x25	Renew screws.	Tightening torque Angle of rotation	56 Nm 90 °

- Renew screws (2).

  Parts: Bolts
- Tighten down screws (2).

Cross-brace to spring strut dome

Hexagon screw M10x55	Renew screws.	Tightening torque Angle of rotation	56 Nm 90 °

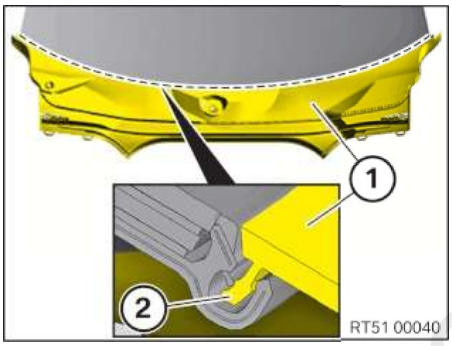
9 – Installing cowl panel cover

RISK OF DAMAGE

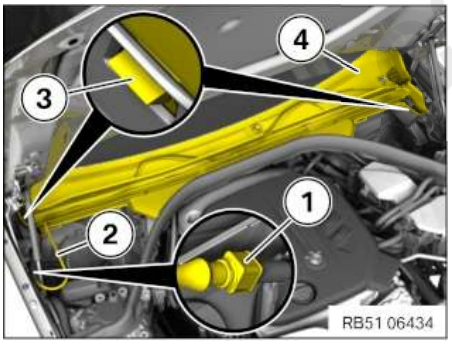
Damage caused by water ingress into the vehicle.

Water ingress into the vehicle may result in damage to components, malfunctions and corrosion.

- Ensure correct installation of the components.
- Only use undamaged components.



- Push the cowl panel cover (1) into the latch mechanism (2) beginning on the side.



- Clip cowl panel cover (4)in by means of the latch mechanisms (3).
- Position windscreen wash hose (2) and connect windscreen wash hose (1)quick lock.

10 – Installing both wiper arms

NOTICE

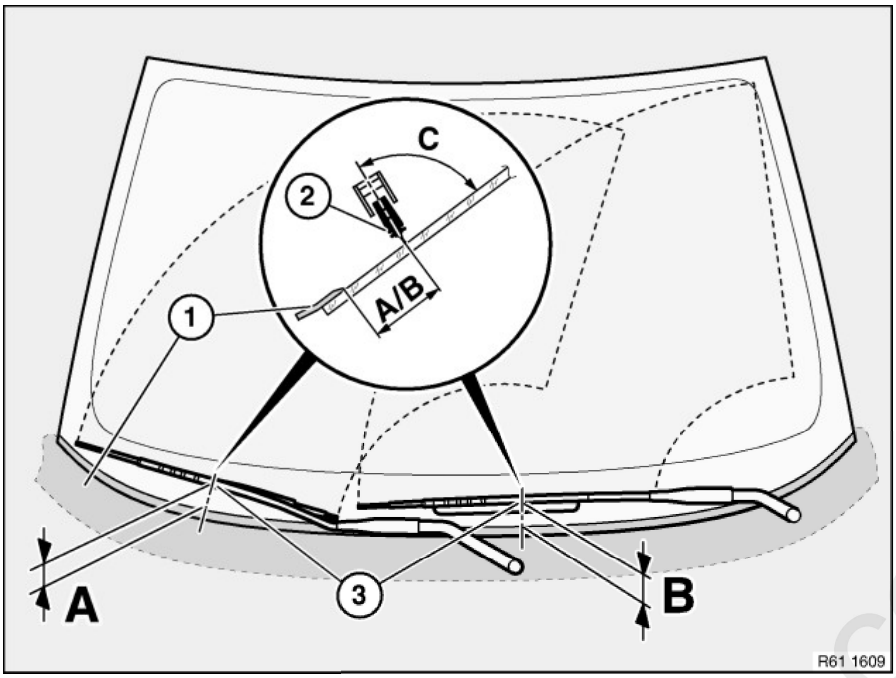
Description is for left component only. Procedure on the right side is identical.

▸ **Install the wiper arm**

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TECHNICAL INFORMATION

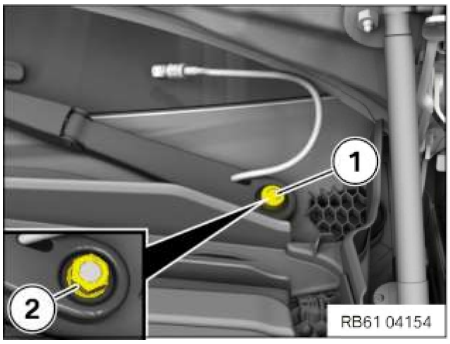
The wiper system must be in zero position.
After installing the cowl panel cover and before fitting the wiper arm:
Activate the wiper system once to ensure that it has the correct installation position.



- Connect the wiper arm (3).
- Correctly position the wiper arm (2) in relation to the window edge (1).

Distance from window pane edge to wiper blade

Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

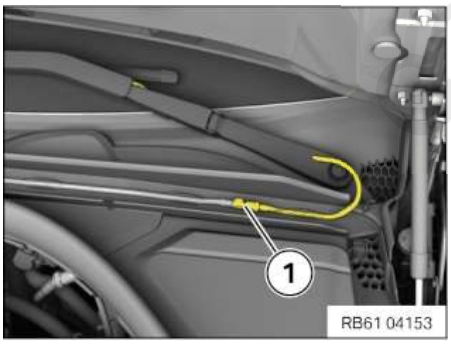


- Tighten nut (2).

Windscreen wiper arm

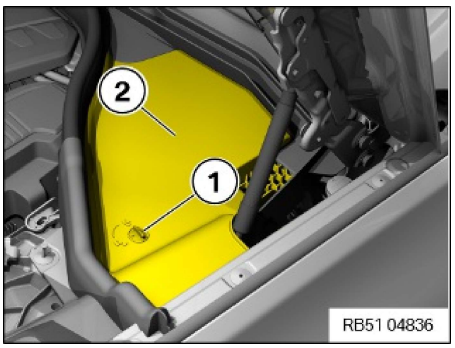
Combination hexagon nut		Tightening torque	35 Nm

- Connect the protective cap (1).



- Insert windscreen wash hose (1) into the cowl and connect at the separating point.

11 – Install the cover of the engine compartment on the rear left



- Position the engine compartment cover at the rear left (2) .
- Close lock (1).

12 – Disconnecting all battery earth leads

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- See additional information.

Additional Information

Overview of Tightening Torques

Positive battery terminal			Used in step 7
Nut		Tightening torque	5 Nm

Rollover protection bar auxiliary battery on holder			Used in step 7
Nut M8		Tightening torque	15 Nm

Cross-brace to bulkhead			Used in step 8
Hexagon screw M10x25	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Cross-brace to spring strut dome			Used in step 8
Hexagon screw M10x55	Renew screws.	Tightening torque	56 Nm
		Angle of rotation	90 °

Windscreen wiper arm			Used in step 10
Combination hexagon nut		Tightening torque	35 Nm

Overview of Special Tools

Overview Technical Data

Distance from window pane edge to wiper blade	Used in step 10
Wiper arm right (A)	57,5 ± 5 mm
Wiper arm left (B)	63,3 ± 4 mm

Links

Repair instructions (PRE)	Used in step
Instructions for 12 V dual storage system	67

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
61 20 900 Disconnecting and connecting battery earth lead	112
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61 21 017 Replacing vehicle battery - including registering battery exchange-

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

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

WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

2 – Removing system battery

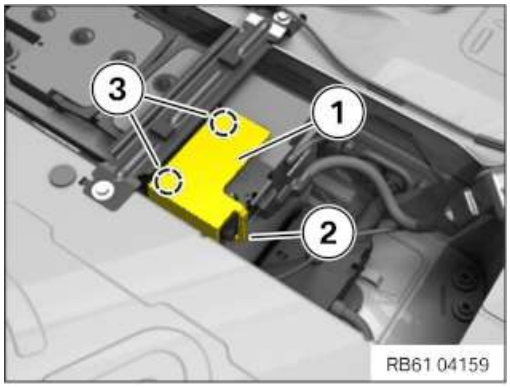
WARNING

Working on 12 V vehicle electrical system.

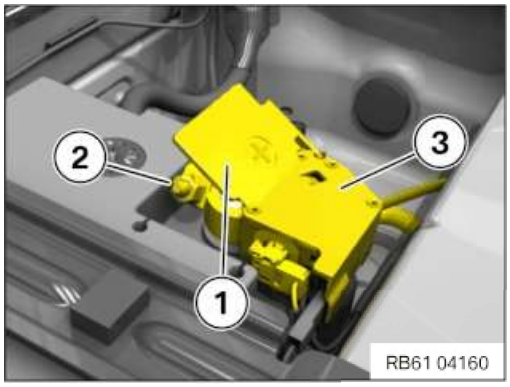
Risk of short circuits! Risk of fire!

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

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



- Remove the cover for the positive battery terminal (1).
- Loosen nut (2).

RISK OF DAMAGE

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

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

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

- Pull off the positive battery terminal (3) from the positive battery terminal.

WARNING

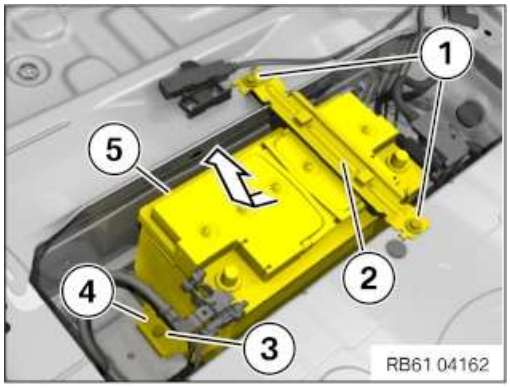
Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

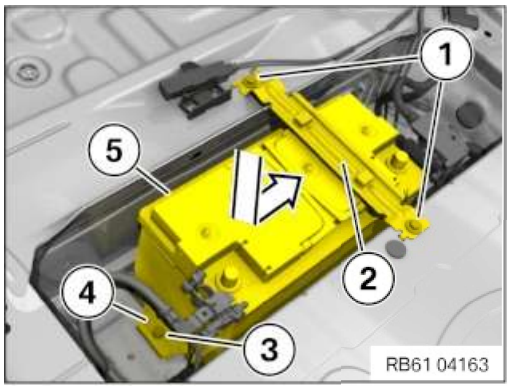
- Locate positive battery terminal (3) laterally.
- Pull off vent hose (1) on the system battery.





- Loosen screws (1).
- Remove battery rollover protection bracket (2).
- Loosen screw (3).
- Remove the battery holder (4).
- Release vehicle battery (5) in direction of arrow and remove by the grab handles.

3 – Installing system battery



- Insert system battery (5) in the direction of the arrow.
- Install the battery holder (4).
- Tighten down screw (3).

Battery holder to body

M8 screw		Tightening torque	15 Nm

- Position battery rollover protection bracket (2).
- Tighten the screws (1).

Battery rollover protection bracket to luggage compartment floor

Screw		Tightening torque	8 Nm



- Insert vent hose (1) in the opening on the system battery.

▸ **Check the vent holes of the battery**

WARNING

Gas emission.

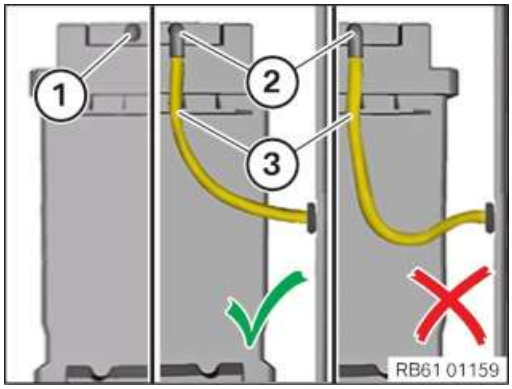
Danger of injury! Danger of explosion!

- Assign the vent holes correctly.
- Route the vent hose correctly.

TECHNICAL INFORMATION

The battery has two vent holes, opposite:
One vent hole (1) must be closed correctly with a dummy plug.
The vent hose (3) must be correctly connected and routed at the other vent hole (2).

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Check
- Check if the vent hole (1) is correctly closed with a dummy plug.

Result

» No dummy plug.

Measure
- Close the vent hole (1) correctly with a dummy plug.

Check
- Check if the vent hole (2) has a correctly connected vent hose (3).

Result

» The vent hose (3) is not correctly connected.

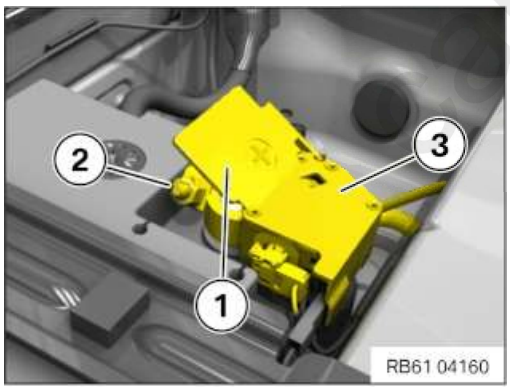
Measure
- At the vent hole (2), connect the vent hose (3) correctly.

Check
- Check if the vent hose (3) is routed to the outside with a downhill gradient (**no siphon formation!**).

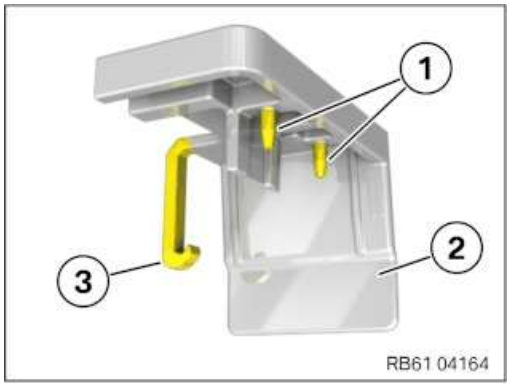
Result

» The vent hose (3) is not correctly routed as shown in the image on the right.

Measure
- Route the vent hose (3) correctly as shown in the centre image.



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



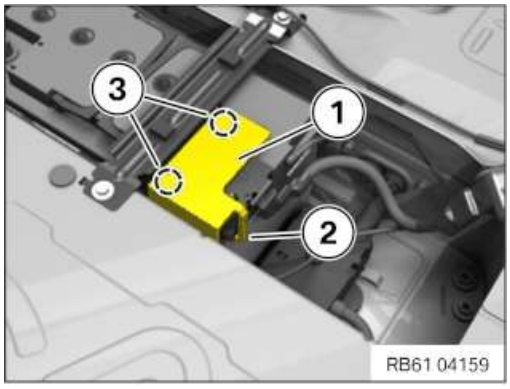
Check
- Check guides (1) and latch mechanism (3) on protective cap (2) for damage.

Result

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

Measure

- Renew protective cap (2).



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

POSTPROCESSES

4 – Disconnecting all battery earth leads



- See additional information.

5 – Register battery exchange



- After replacing the battery, register the battery exchange (see further information).

Additional Information

Overview of Tightening Torques

Battery holder to body			Used in step 3
M8 screw		Tightening torque	15 Nm

Battery rollover protection bracket to luggage compartment floor			Used in step 3
Screw		Tightening torque	8 Nm

Links

Repair instructions (PRE)	**Used in step**
Battery replacement information	5

Repair instructions	**Used in step**
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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 save 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-boltage 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.

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