

11 00 ... **Handling components after flood damage**

Flood damage can occur if the permissible fording depth of a vehicle is exceeded. Ingress of water can cause damage to the engine (water shock) or components.

Because dirt particles generally enter into the component with the water (e.g. starter motor, wiring harness), the components need to be thoroughly inspected.

Residual moisture in the components leads to corrosion (increased contact resistance in the component), which can lead to a component failure at a later time.

If water ingress into the electrical components cannot be ruled out, it is recommended to replace the component to ensure correct functioning through the vehicle lifetime.

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12 41 020 Removing and installing/replacing starter motor



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.



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.

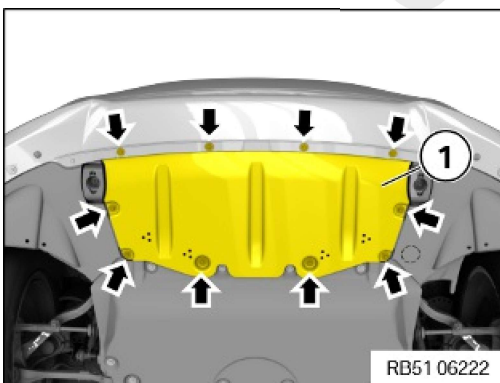
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

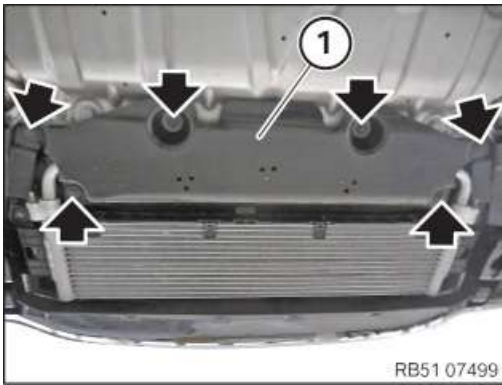
2 – Removing the front underbody protection



- **Version 1:**

Remove screws (arrows).

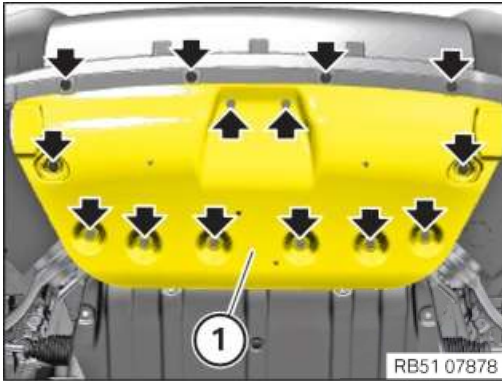
Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

Remove screws (arrows).

Guide out front underbody protection (1) and remove it.



- **Version 3:**

Remove screws (arrows).

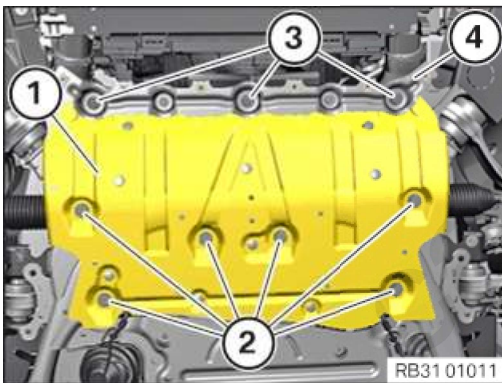
Guide out front underbody protection (1) and remove it.

3 – Removing the stiffening plate



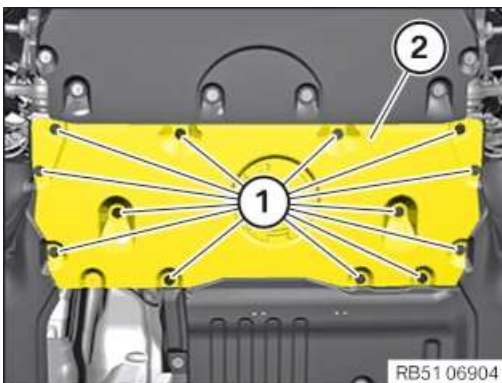
TECHNICAL INFORMATION

Driving without stiffening plate is not permissible.



- Loosen screws (3).
- Remove the holder of the underride protection (4).
- Loosen screws (2).
- Remove stiffening plate (1).

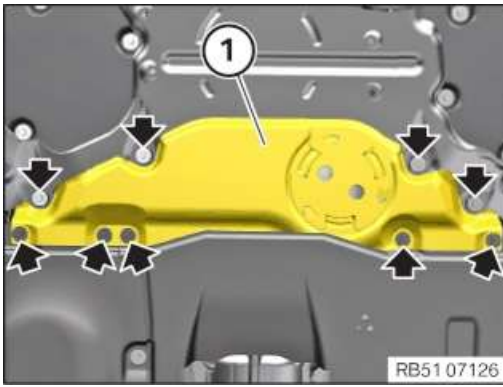
4 – Removing the centre underbody protection



- **Version with rear-wheel drive:**

Loosen screws (1).

Remove centre underbody protection (2) .

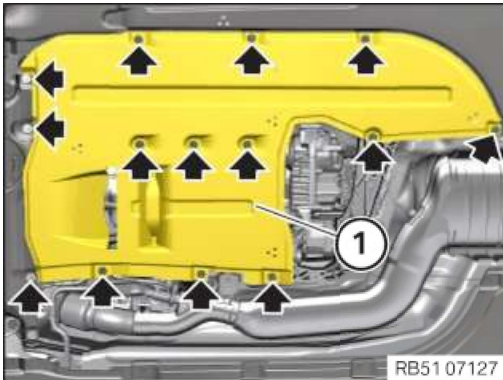


- **Version with all-wheel drive:**

Remove screws (arrows).

Feed out and remove the centre underbody protection (1).

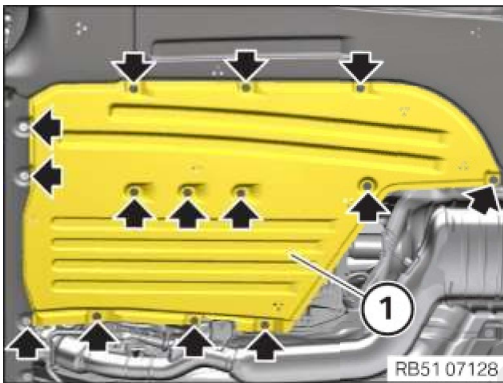
5 – Remove rear underbody protection



- **Version 1:**

Remove screws (arrows).

Feed out the rear underbody protection (1).



- **Version 2:**

Remove screws (arrows).

Guide out rear underbody protection (1) and remove it.

MAIN WORK

6 – Removing starter motor



WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



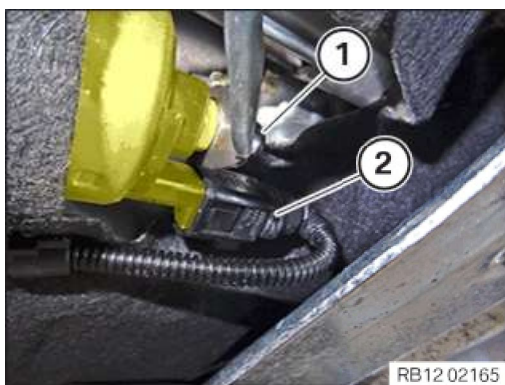
RISK OF DAMAGE



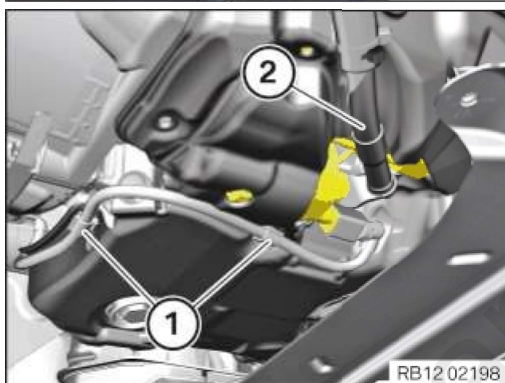
Electrostatic discharge.

Damage to or destruction of electrical components.

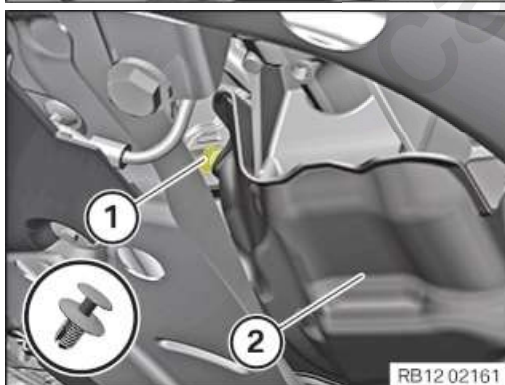
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



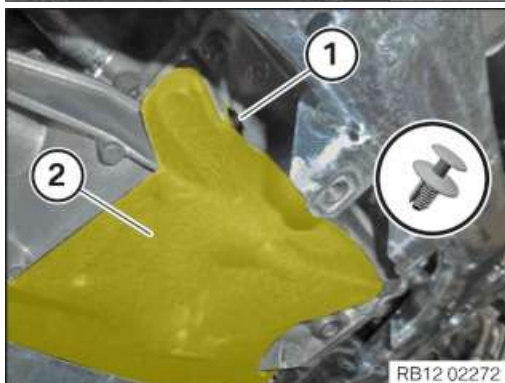
- Loosen nut (1).
- Unlock plug connection (2) and disconnect.



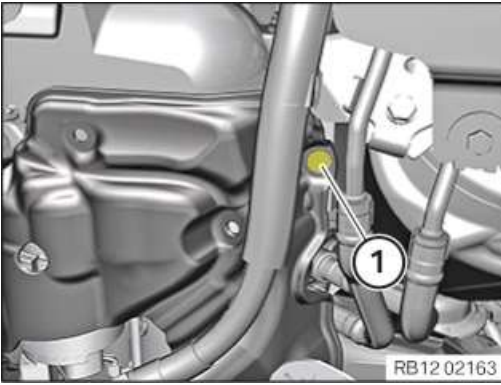
- Loosen clamps (1).
- Feed out positive battery cable (2) and put to one side.



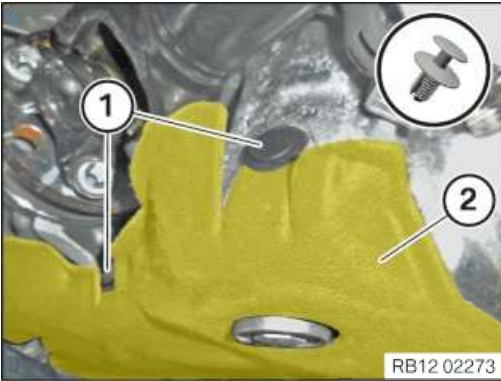
- Release the expanding rivet (1) for the acoustic cover (2) for oil sump.



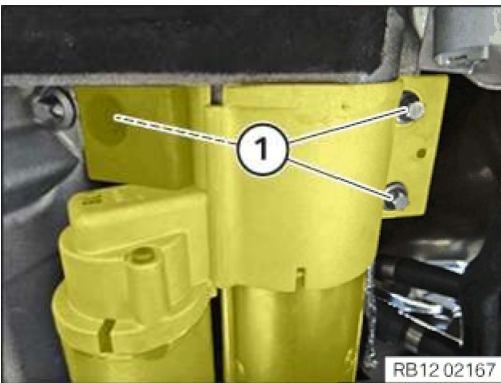
- Loosen expanding rivet (1).



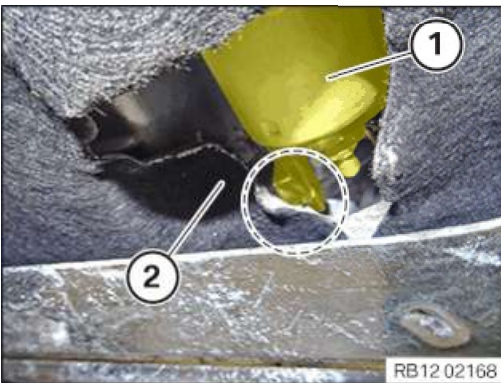
- Undo fir tree clip (1).



- Loosen the expanding rivet (1).
- Release acoustic cover (2) for the oil sump and store it below.

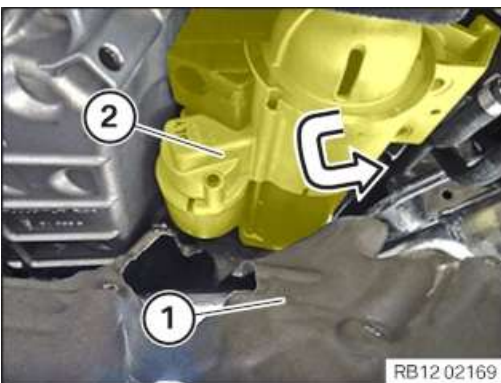


- Loosen screws (1).

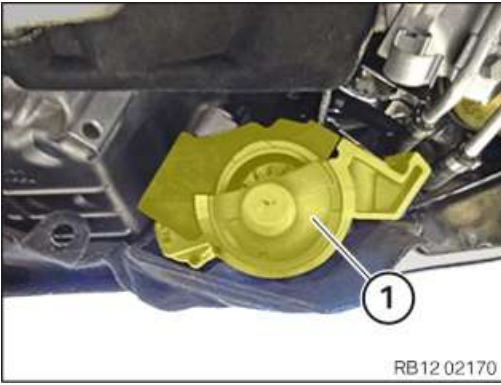


- Position the starter (1) **carefully** in the marked area above the acoustic cover (2) as shown.

An evaluation cannot be performed without positioning the starter.



- Make sure that the acoustic cover (1) **is not damaged**.
- Carefully fold the acoustic cover (1) down.
- Feed out the starter (2) **carefully** in the direction of arrow to the rear and below.



- Remove starter motor (1).

7 – Replace starter motor



- Remove noise damping plug (1) in the direction of the arrow.

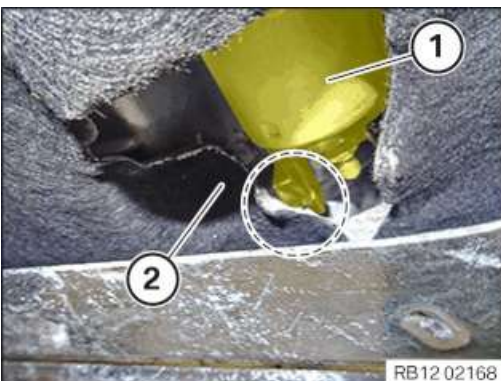


- Replace the starter motor.
- Parts:** Starter motor
- Fit noise damping plug (1) in the direction of the arrow.

8 – Installing starter motor

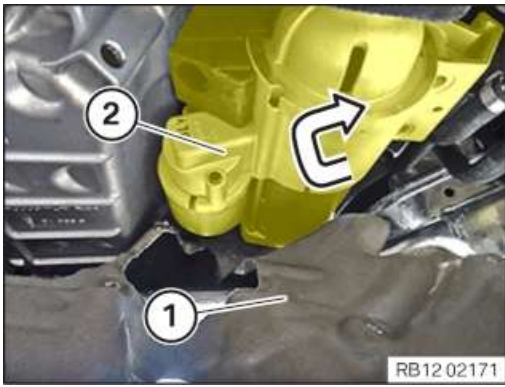


- Guide in the starter motor (1).

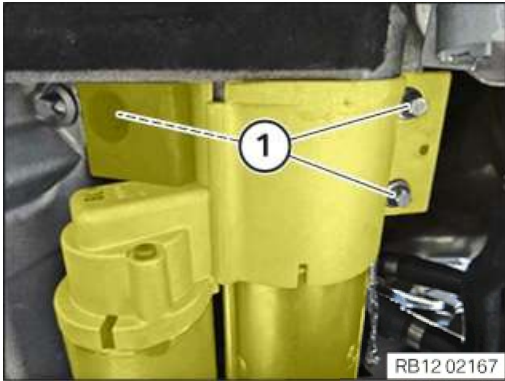


- Position the starter motor (1) carefully in the marked area over the acoustic cover (2) as shown.

An installation cannot be performed without positioning the starter motor.



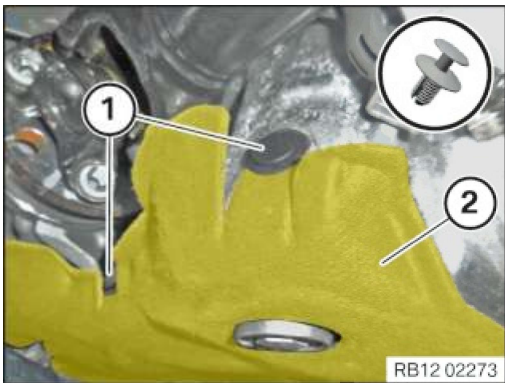
- Make sure that the acoustic cover (1) **is not damaged**.
- Fold the acoustic cover (1) **carefully** downwards.
- Install and position the starter motor (2) in direction of arrow.



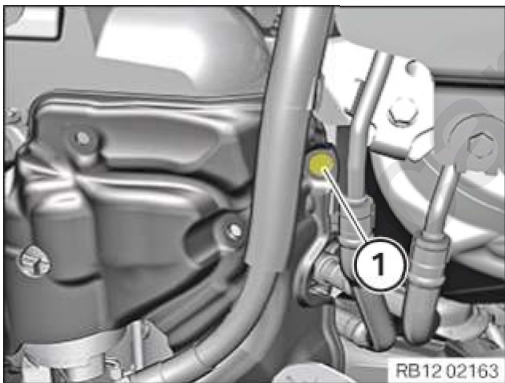
- Tighten the screws (1).

Starter motor to engine

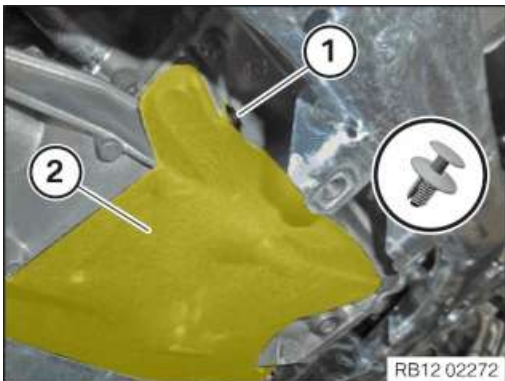
M8X60		Tightening torque	19 Nm
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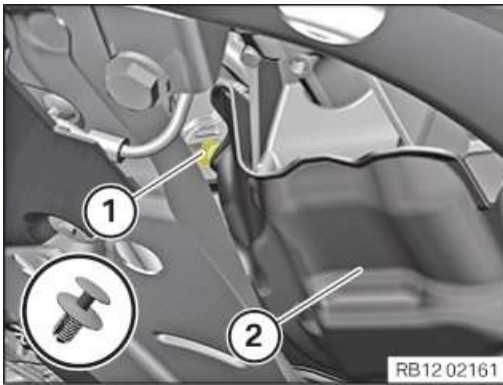
- Position the acoustic cover (2).
- Secure expanding rivet (1).



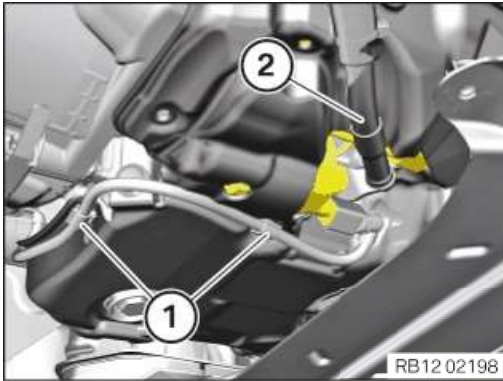
- Secure fir tree clip (1).



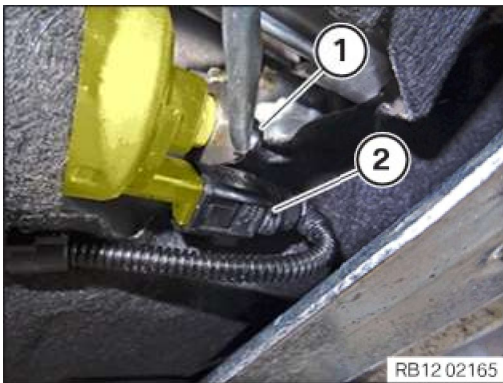
- Fasten expanding rivet (1).



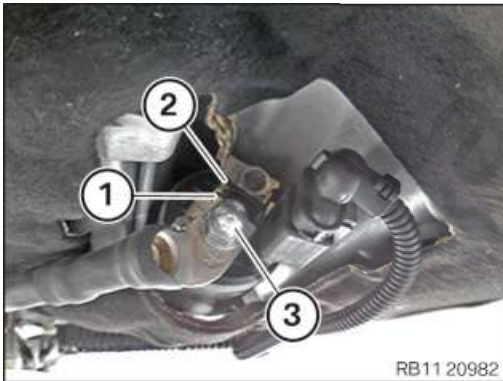
- Fasten expanding rivet (1).



- Insert and position the positive battery cable (2).
- Secure clamps (1).



- Connect connectors (2) and lock.
The connector (2) must engage audibly.
- Tighten the nut (1) hand-tight.



CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

- Route the positive battery cable without abrasions and do not trap.

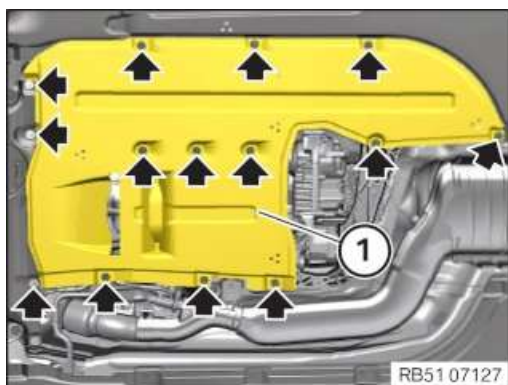
- Attach positive battery cable (1) **correctly** to anti-twist lock (2).
- Tighten nut (3).

Battery positive lead to starter

M8		Tightening torque	13,5 Nm
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POSTPROCESSES

9 – Installing underbody protection at rear



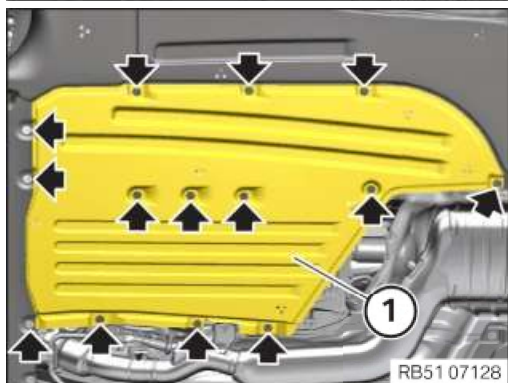
• **Version 1:**

Insert and install the rear underbody protection (1).

Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm
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• **Version 2:**

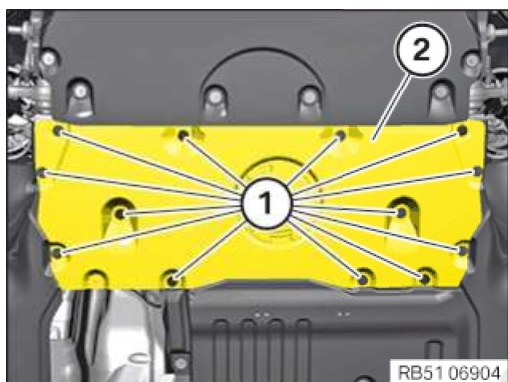
Insert and install the rear underbody protection (1).

Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm
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10 – Installing the centre underbody protection



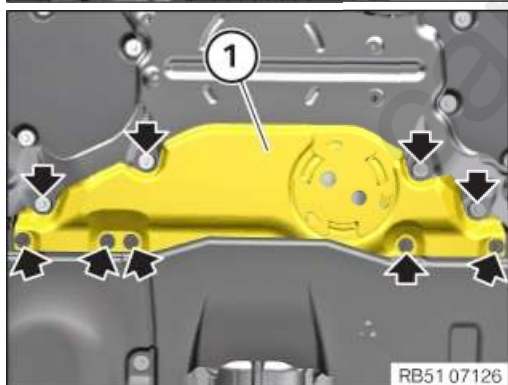
• **Version with rear-wheel drive:**

Position central underbody protection (2).

Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm
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• **Version with all-wheel drive:**

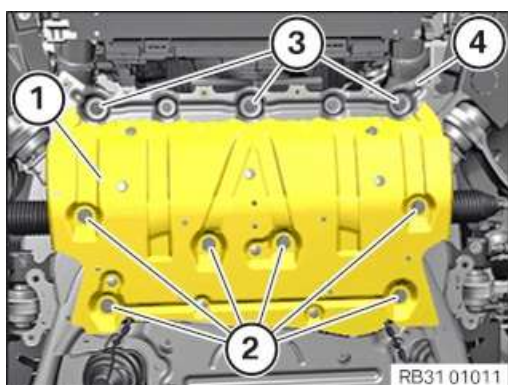
Guide in and install the centre of underbody protection (1).

Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm
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11 – Installing the stiffening plate

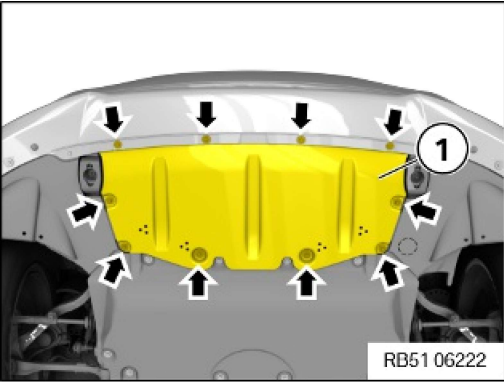


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm
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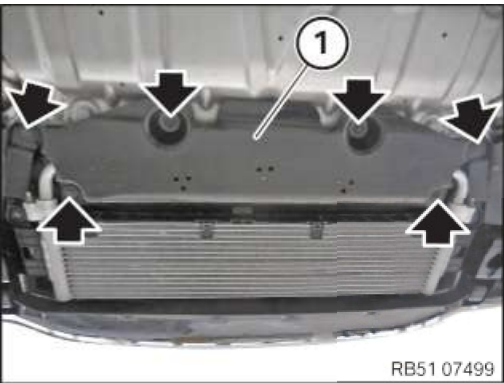
12 – Installing the front underbody protection



- **Version 1:**
Feed in the front underbody protection (1) towards the front under the bumper panel and position.
Tighten screws (arrows).

Underbody protection front

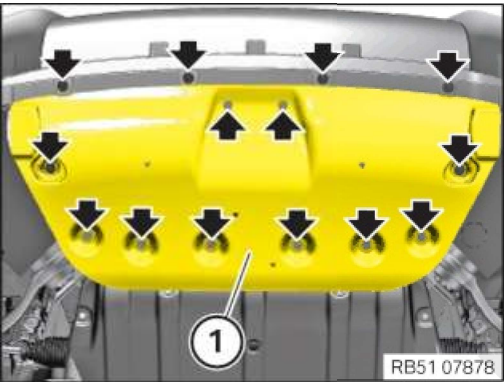
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



- **Version 2:**
Feed in and position the front underbody protection (1).
Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



- **Version 3:**
Feed in and install front underbody protection (1).
Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

13 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Starter motor to engine

Used in step 8

M8X60		Tightening torque	19 Nm
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Used in step 8

Underbody protection Used in step 910

Stiffening plate to front axle support Used in step 11

Underbody protection front Used in step 12

Hexagon screw M6x20	Tightening torque	8 Nm
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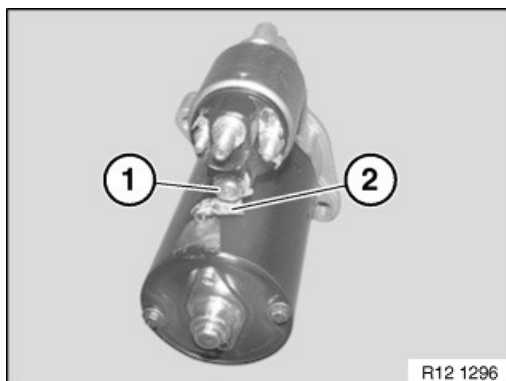
Repair instructions	Used in step
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[illegible]

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**Necessary preliminary work:**

- Switch off ignition.
- Remove starter motor.



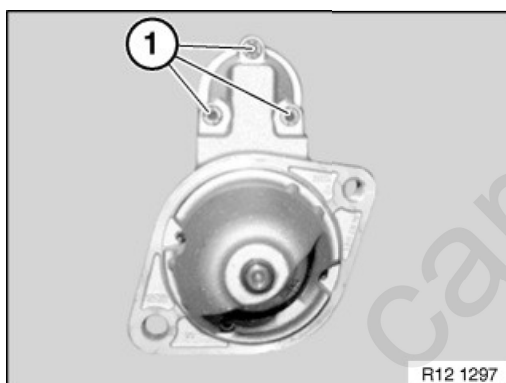
Slacken nut (1).

Remove the cable shoe (2).

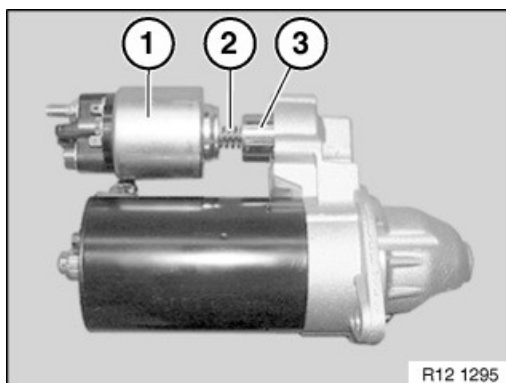
Attention!

Do not twist the cable shoe (2) when tightening, risk of shorting to starter motor housing.

Tightening torque 12 41 1AZ.



Release screws (1).



Remove the solenoid switch (1) and the spring (2).

Detach the bolt (3).

Installation note:

Check the bolt (3) for wear and grease the bolt.

12 42 651 Removing and installing/replacing the positive battery cable, remote positive terminal to alternator



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.



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.

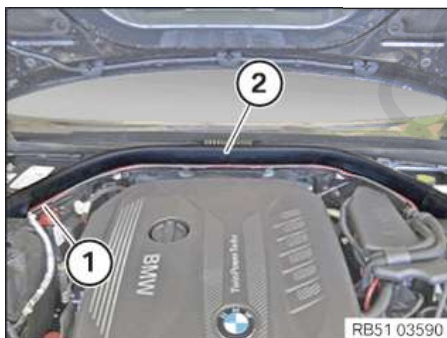
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



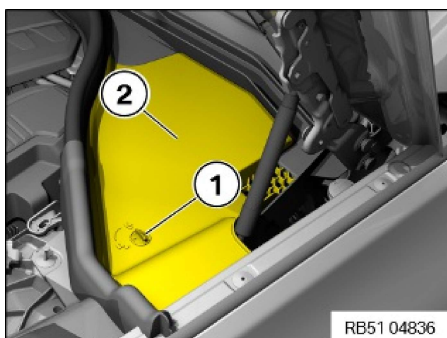
- See additional information.

2 – Remove the seal for the rear bonnet



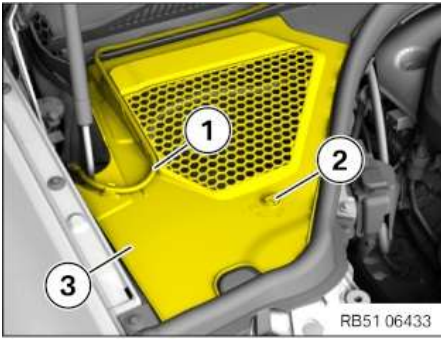
- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

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



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

4 – 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).

5 – Removing both wiper arms



NOTICE

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

► Remove the wiper arm

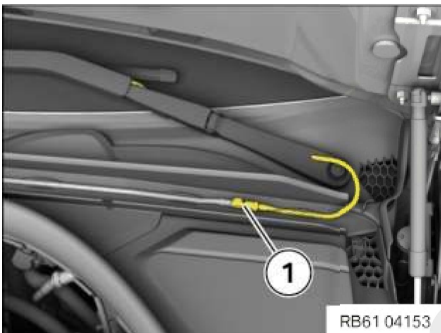


RISK OF DAMAGE

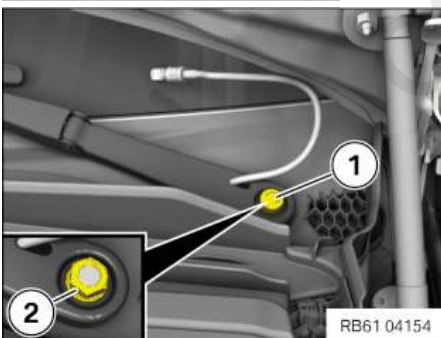
Damage to wiper console

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

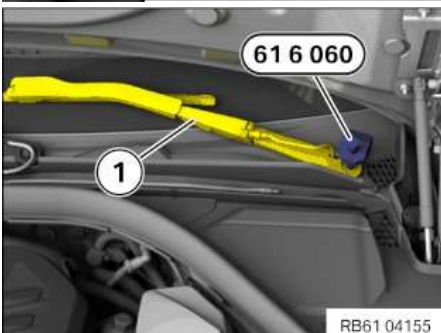
- Removing the wiper arms must be carried out only using the prescribed special tool.
- Do not lift off wiper arm, else the wiper console may break on the predetermined breaking point for the pedestrian protection.



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

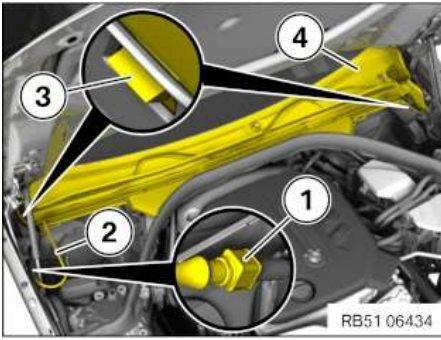


- Remove the protective cap (1).
- Loosen nut (2).

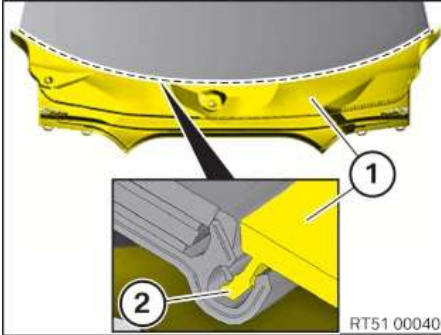


- Pull off the wiper arm (1) using special tool .

6 – 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).



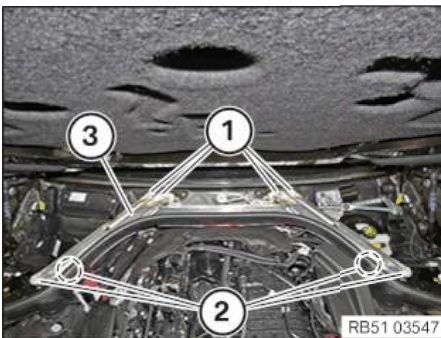
- Pull the cowl panel cover (1) upward out of the latch mechanism (2) beginning on the side.

7 – Removing the centre bulkhead upper part

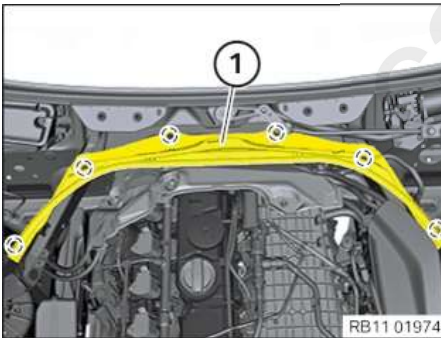


TECHNICAL INFORMATION

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

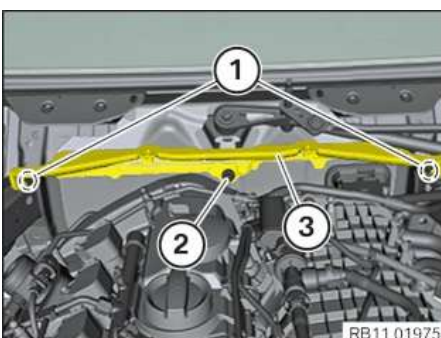


- **If installed:** Remove tension strut on spring strut dome.
- Loosen screws (1) and (2).
- Remove tension strut (3) in the spring strut dome upwards.



- Unscrew the bolts in the marked areas.
- Remove the centre bulkhead upper part (1).

8 – Removing the centre bulkhead lower section



- Loosen screws (1).
- Loosen nut (2).
- Remove the centre bulkhead lower part (3).

9 – Removing the acoustic cover



WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures $>20^{\circ}\text{C}$.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Release the acoustic cover (1) towards the top from the rubber mounts (marks).

10 – Removing acoustic cover at rear



- Unclip the acoustic cover (1) in the marked areas and remove it to the top.

11 – Removing the DME control unit



RISK OF DAMAGE



Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units



TECHNICAL INFORMATION

In a warranty case, you must always provide a fault memory printout with the defective part, even if the fault memory does not contain an entry.



TECHNICAL INFORMATION

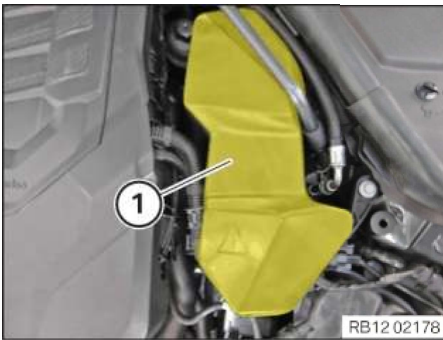
Control unit must be programmed after it is replaced.

For additional information see: 61 00 ... Programming/encoding control unit(s)

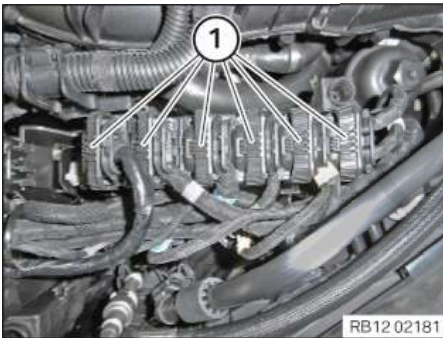


TECHNICAL INFORMATION

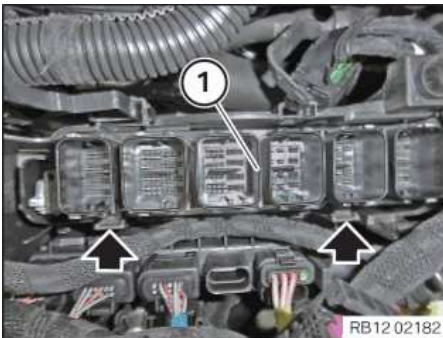
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



- Pull the cover (1) towards the top and feed out.



- Unlock and disconnect the plug connection (1).



- Unlock the locks (arrows).
- Guide out and remove DME control unit (1).

12 – Removing integrated supply module (PDM)



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.



RISK OF DAMAGE



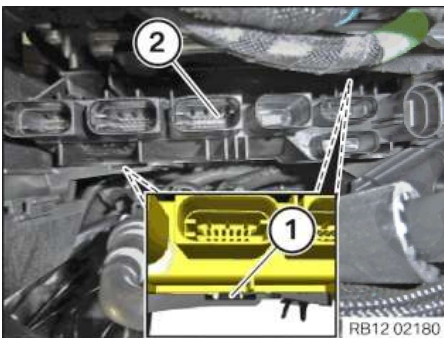
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

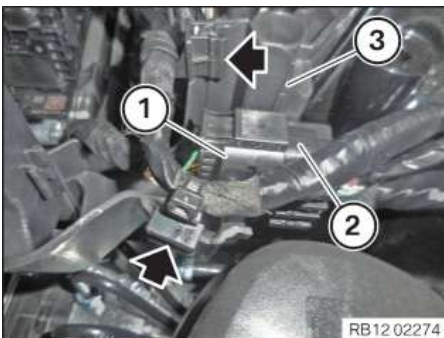


- Unlock and disconnect plug connections (1).

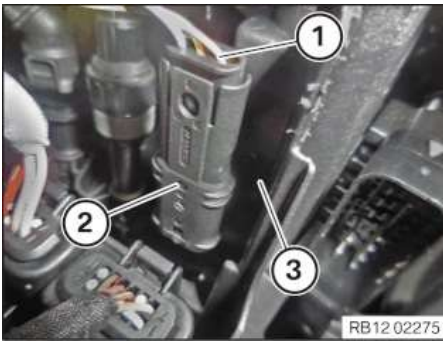


- Unlock the latch mechanisms (1).
- Guide out and remove integrated supply module (PDM) (2) upwards.

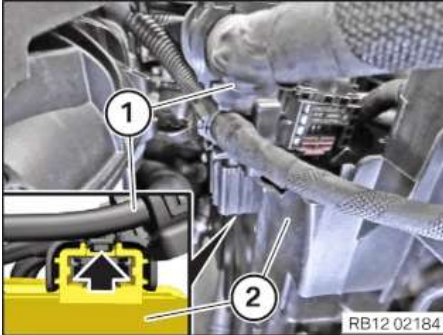
13 – Removing the control unit holder



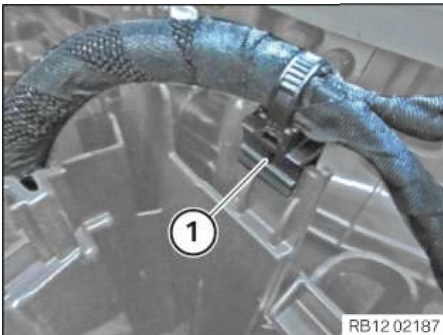
- Unlock plug connection (1) and disconnect.
- Unlock the connector (2) and disconnect from the control unit holder (3).
- Release the clamps (arrows).



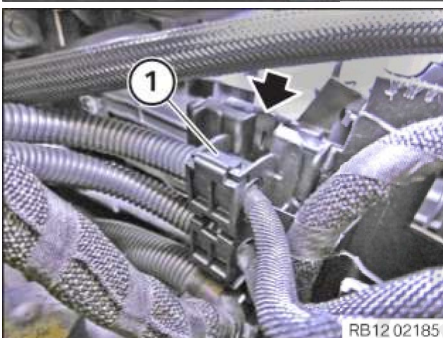
- Unlock plug connection (1) and disconnect.
- Unlock the connector and disconnect from the control unit holder (3).



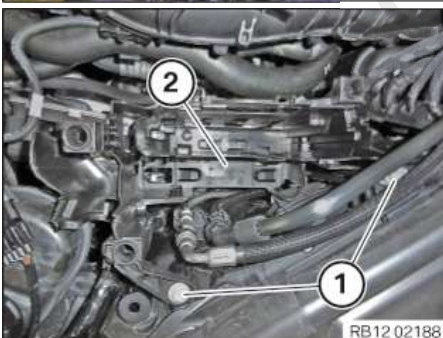
- Unlock the lock (arrow).
- Disconnect the cable holder (1) upwards from the control unit holder (2).



- Loosen clamp (1).



- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



- Loosen screws (1).
- Guide out and remove the control unit holder (2).

14 – Partially removing charge air line

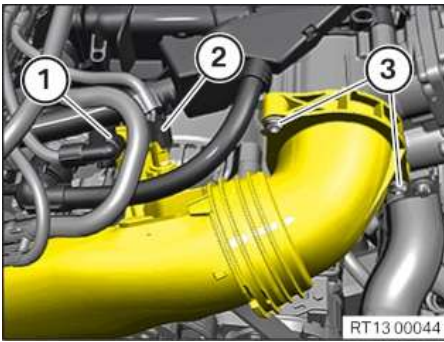


WARNING

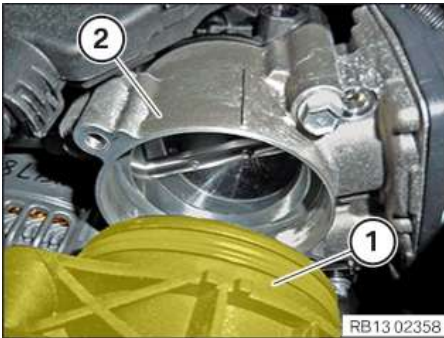
Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Unlock plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.
- Loosen screws (3).



- Disconnect charge air line (1) from throttle valve (2) and set it aside.

15 – Removing the throttle body



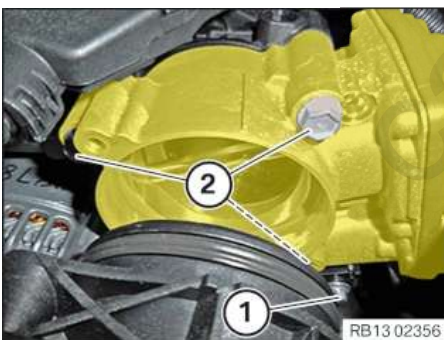
RISK OF DAMAGE



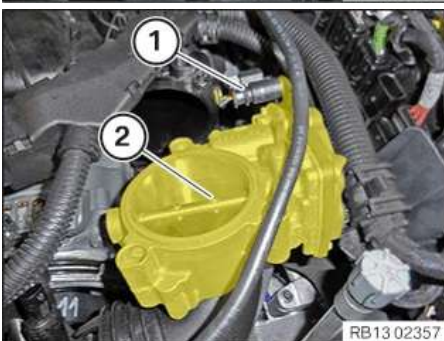
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.



- Loosen screw (1).
- Loosen screws (2).

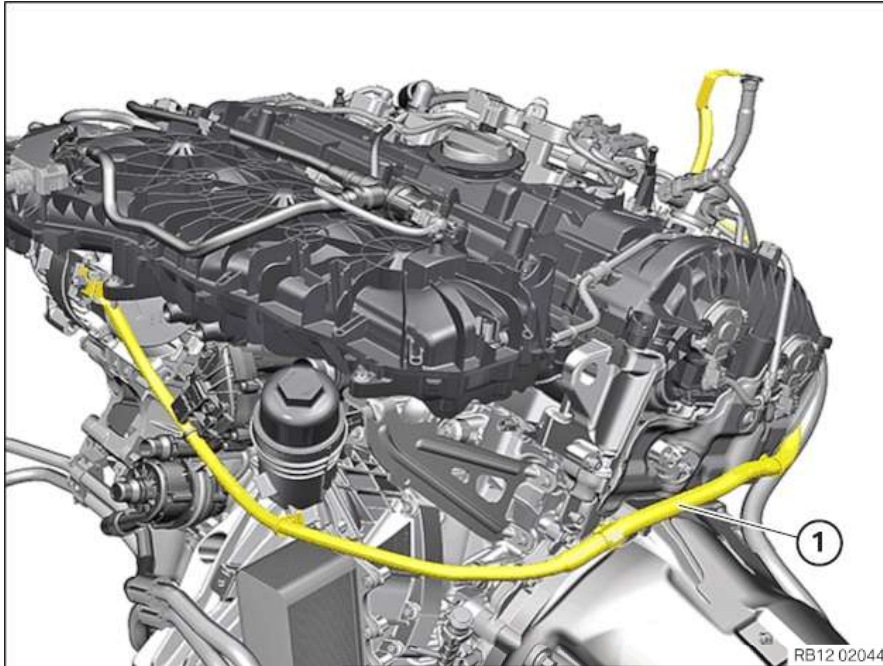


- Thread the throttle body (2) a little bit out to the front.
- Unlock plug connection (1) and disconnect.
- Remove throttle body (2).

MAIN WORK

16 – Removing the positive battery cable from the alternator to the positive battery connection point

Positive battery cable from alternator



1 Positive battery cable from alternator



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

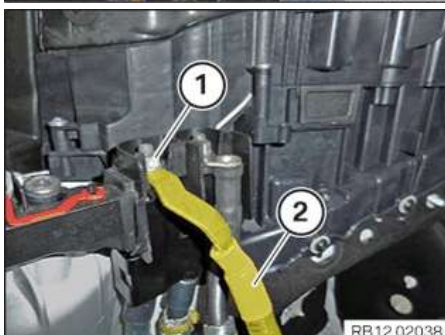
Hot surfaces.

Risk of burning!

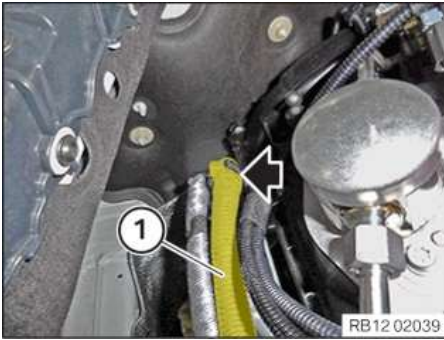
- Perform all work only on components that have cooled down.



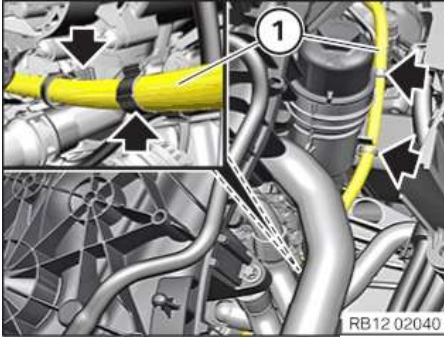
- Unlock lock (1).
- Guide and remove cover (2) in direction of arrow.



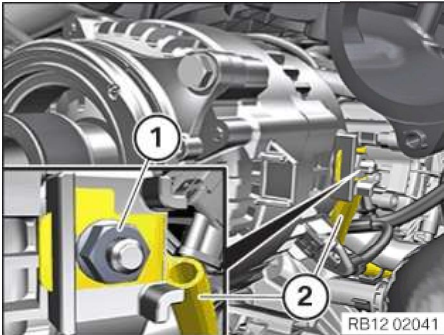
- Loosen nut (1).
- Feed out positive battery cable (2) and put to one side.



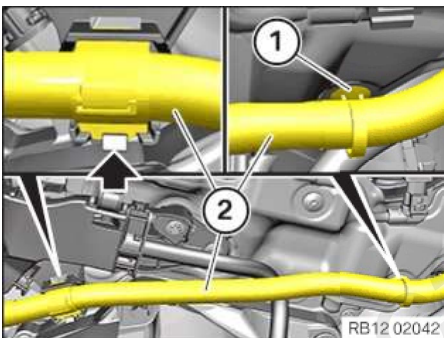
- Detach positive battery lead (1) from the clamp (arrow) and put to one side.



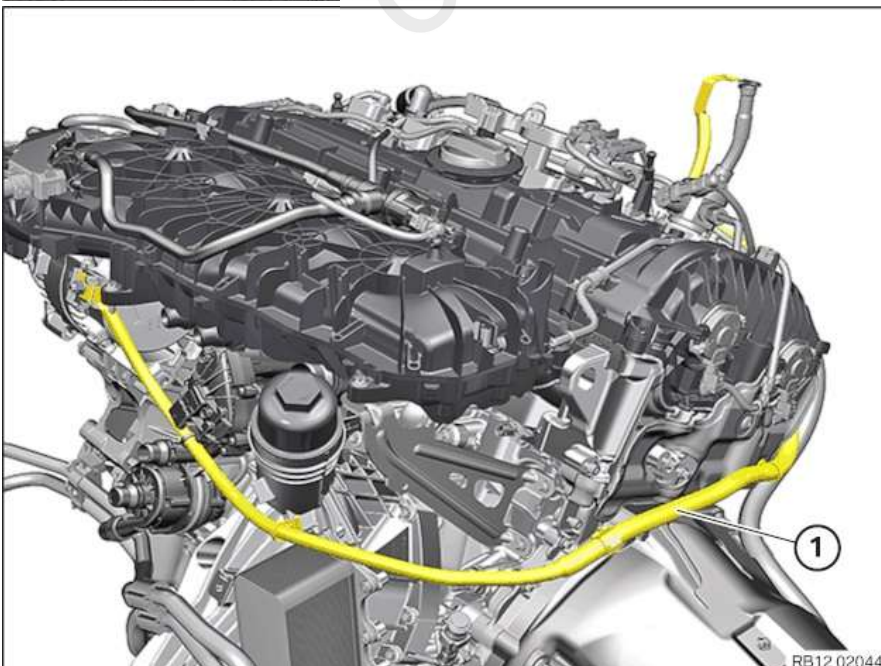
- Loosen holder (arrows).
- Feed out positive battery cable (1) and put to one side.



- Loosen nut (1).
- Feed out positive battery cable (2) and put to one side.



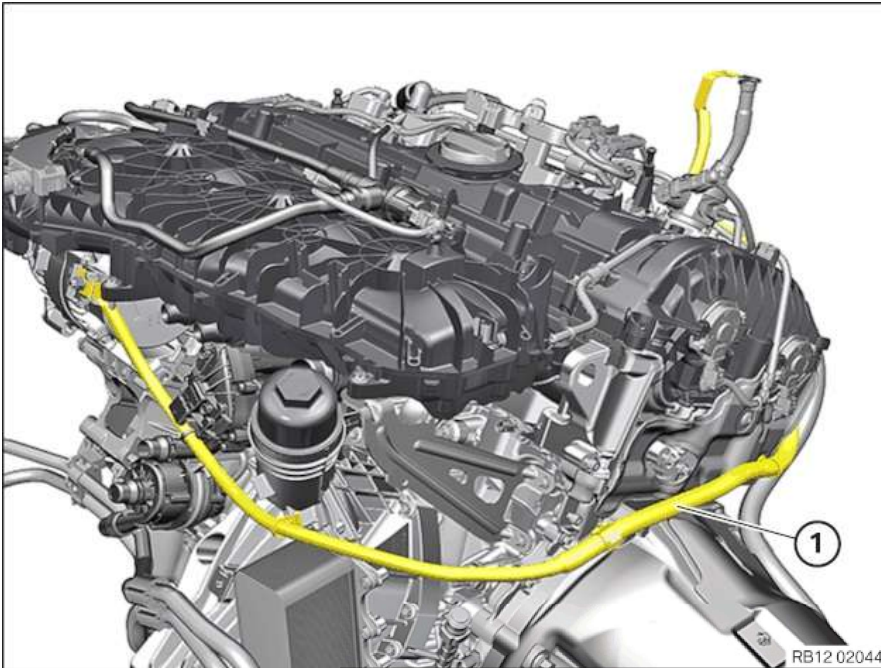
- Loosen clamp (1).
- Unlock lock (arrow), slide positive battery lead (2) out and put to one side.



- Remove positive battery cable (1) and remove.

17 – Installing the positive battery cable from the alternator to the positive battery connection point

Positive battery cable from alternator



1 Positive battery cable from alternator

Prerequisite

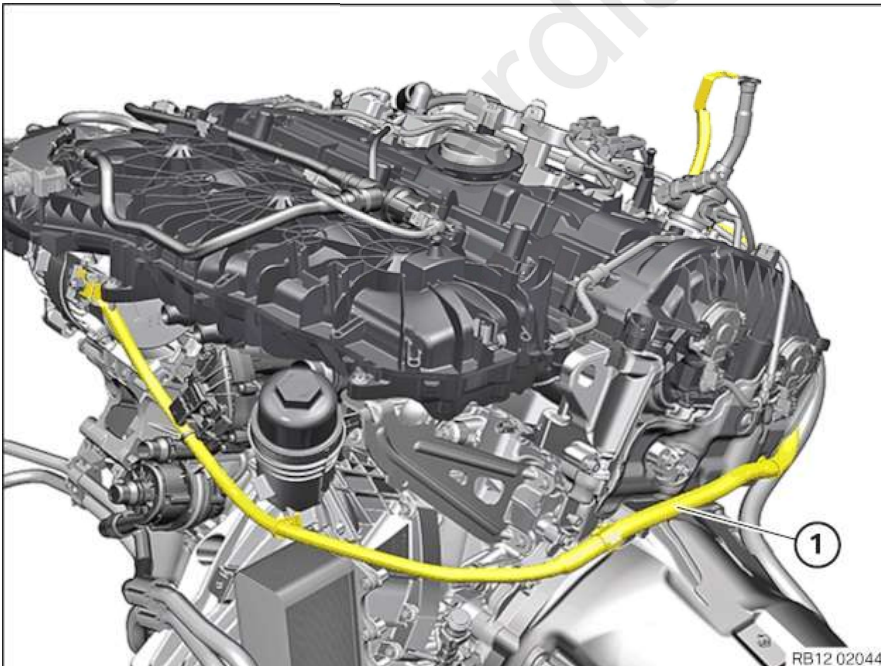


CAUTION

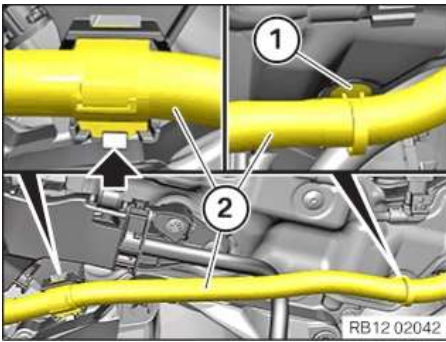
Improper routing of the positive battery cable.

Risk of short circuits!

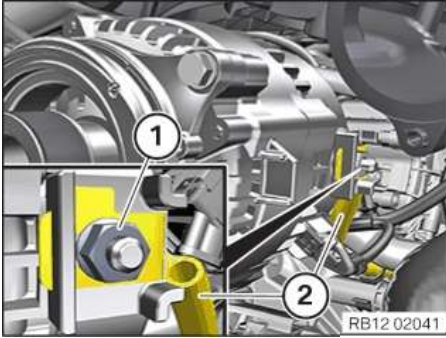
- Route the positive battery cable without abrasions and do not trap.



- Insert and install the positive battery cable (1).



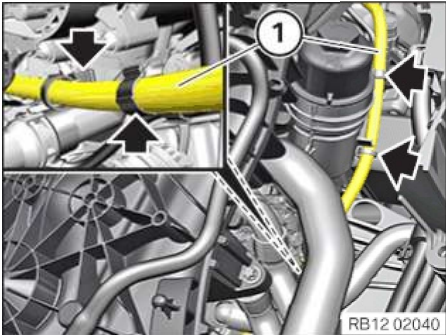
- Insert and install the positive battery cable (2).
- Secure clamps (1).
- Ensure that the lock (arrow) engages correctly.



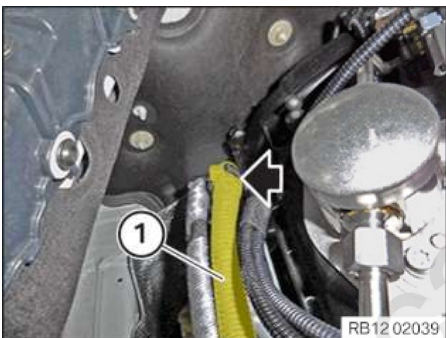
- Insert and install the positive battery cable (2).
- Tighten nut (1).

Positive battery cable to the alternator

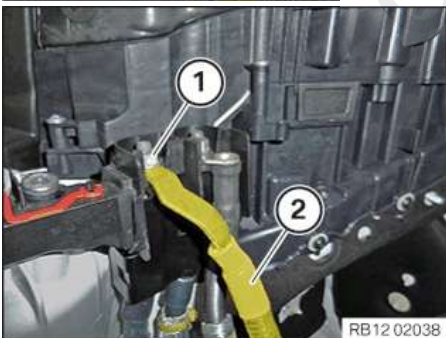
M8		Tightening torque	19 Nm
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- Fasten the positive battery cable (1) with the holders (arrows).



- Secure positive battery lead (1) with the clamp (arrow).



- Insert and install the positive battery cable (2).
- Tighten nut (1).

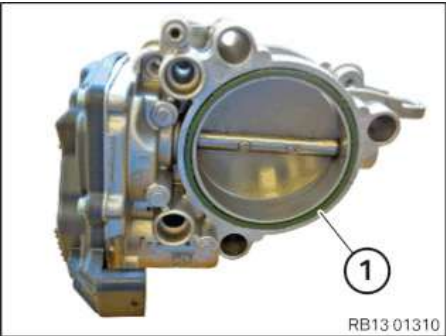
Battery positive lead to battery positive terminal

M8		Tightening torque	19 Nm
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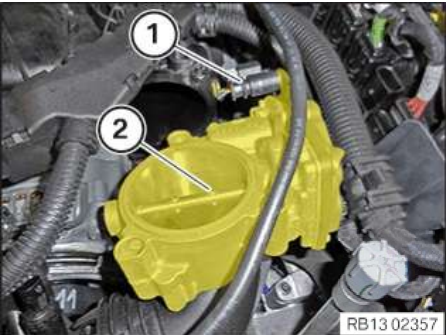


- Insert and install the cover (2) in the direction of the arrow.
The locks (1) must engage audibly.

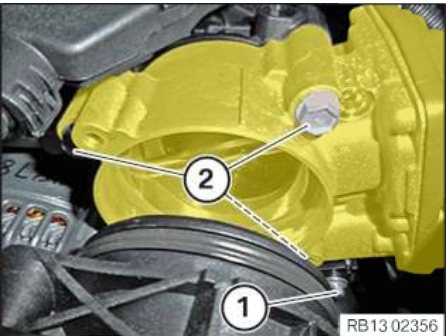
18 – Installing the throttle body



- Renew the sealing ring (1) with the special tool [0 496 714 \(00 9 030\)](#).
- Parts:** Sealing ring



- Position throttle body (2).
- Connect connectors (1) and lock.
The connector (1) must engage audibly.
- Install throttle body (2).



- Tighten down screws (2).
- Throttle body to intake plenum**

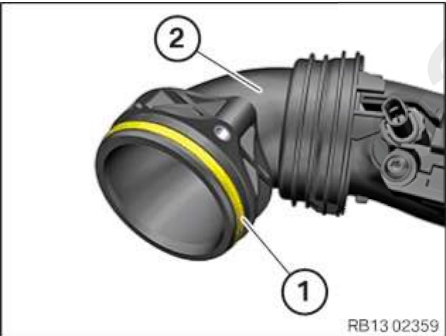
6X50		Tightening torque	7 Nm
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- Renew the screw (1).
- Parts:** Screw
- Tighten down screw (1).

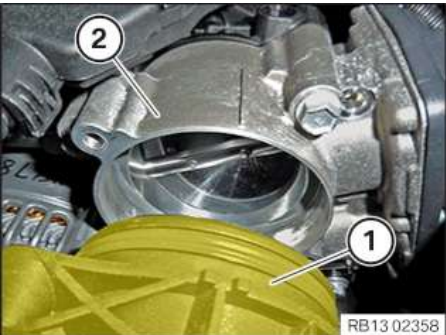
Bracket for coolant hose to throttle body

M6x16 screw	Renew screw.	Tightening torque	11,8 Nm
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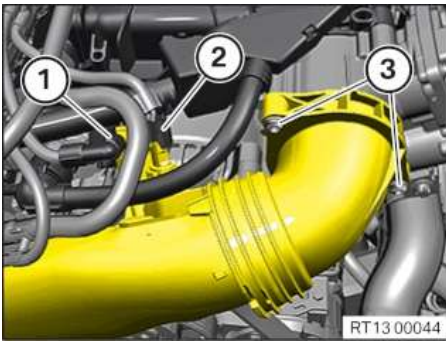
19 – Installing charge air line partially



- Check the sealing ring (1) on the charge air line (3) for damage and renew if required.



- Connect charge air line (1) with the throttle valve (2).



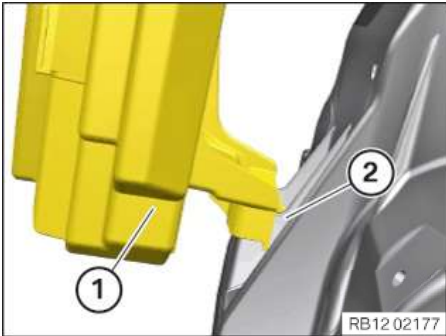
- Tighten down screws (3).

Charge air line to throttle valve

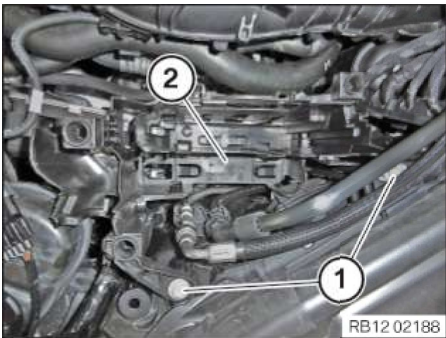
M6x30		Tightening torque	8 Nm
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- Connect connectors (2) and lock.
The connector (2) must engage audibly.
- Connect connectors (1) and lock.
The connector (1) must engage audibly.

20 – Installing the control unit holder



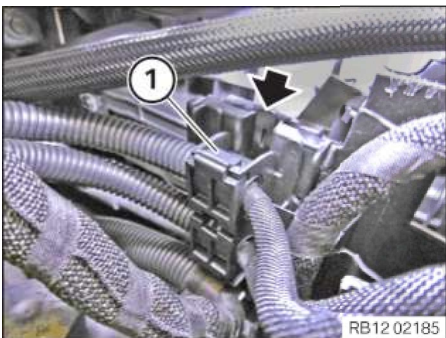
- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).



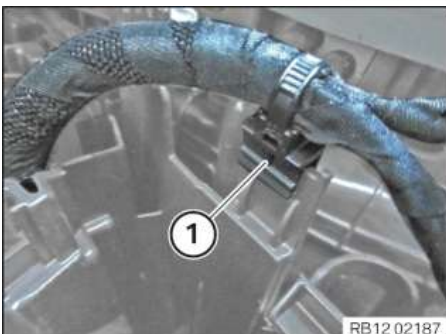
- Guide in and install control unit holder (2).
- Tighten the screws (1).

Control unit holder on spring strut dome

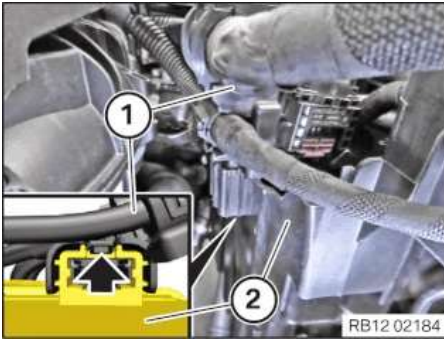
Hexagon screw		Tightening torque	8 Nm
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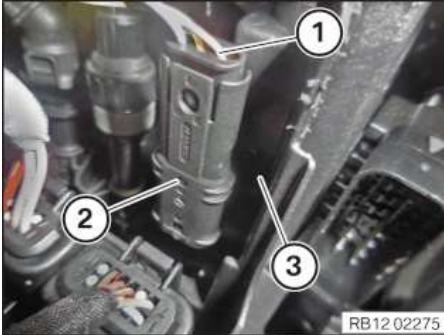
- Feed in and install the cable clip (1).
Lock (arrow) must audibly engage.



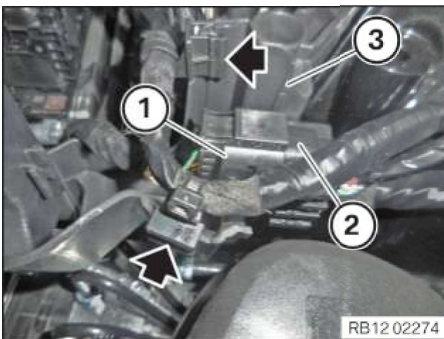
- Secure clamps (1).



- Connect the cable clip (1) with the control unit holder (2) and lock it.
Lock (arrow) must audibly engage.



- Connect connector (2) to the control unit holder (3) and lock it.
The connector (2) must engage audibly.
- Connect connectors (1) and lock.
The connector (1) must engage audibly.



- Connect and lock the connector (2) with the control unit holder (3).
The connector (2) must engage audibly.
- Connect connectors (1) and lock.
The connector (1) must engage audibly.
- Secure the clamps (arrows).

21 – Installing the integrated supply module (PDM)



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.



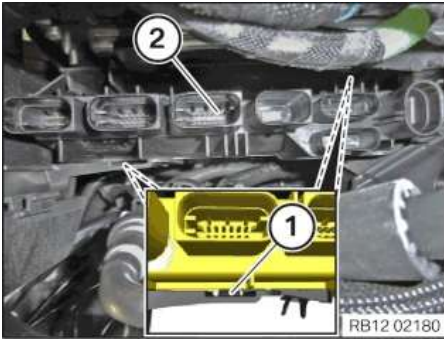
RISK OF DAMAGE



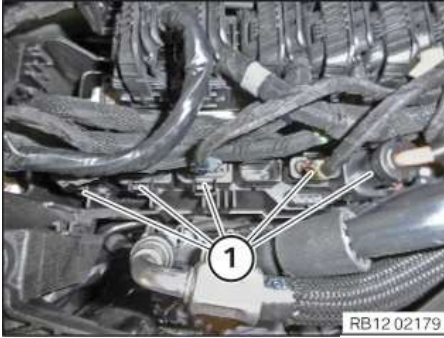
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

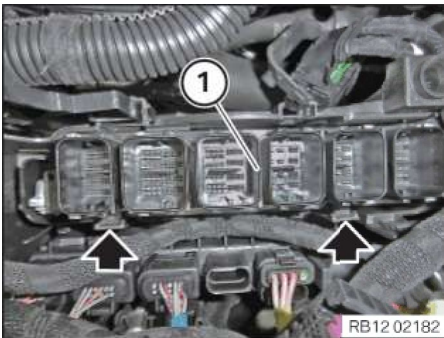


- Insert and install the integrated supply module (PDM) (2).
The latch mechanisms (1) must engage audibly.
- Unlock the latch mechanisms (1).

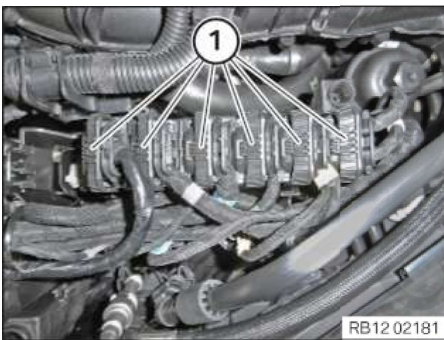


- Connect connectors (1) and lock.
The connectors (1) must engage audibly.

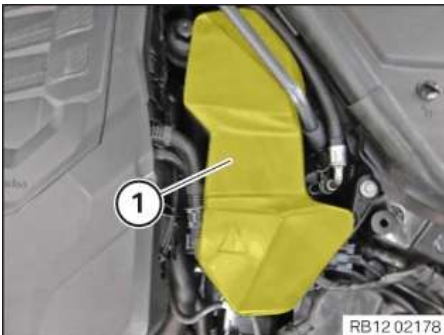
22 – Installing the DME control unit



- Feed in and install DME control unit (1).
The locks (arrows) must engage audibly.

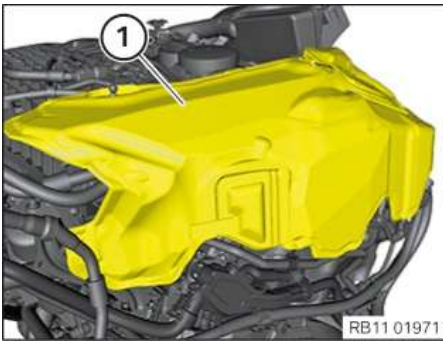


- Connect connectors (1) and lock.
All connectors (1) must engage audibly.



- Insert and install cover (1) into guides.

23 – Installing acoustic cover at rear



- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



- Install the acoustic cover (1) from the top and clip it in into the marked areas.

24 – Install acoustic cover

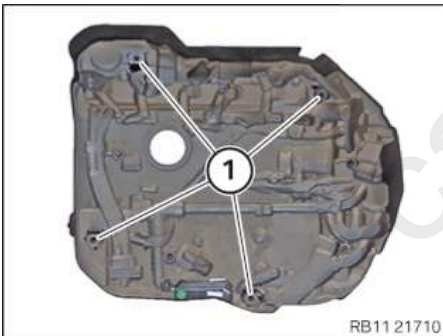


RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures $>20^{\circ}\text{C}$.
- Use only distilled water as an auxiliary material during installation, no lubricants.

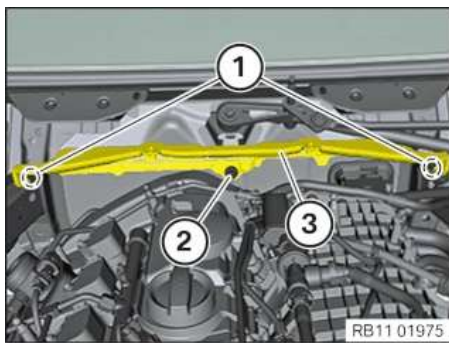


- Check the rubber mount (1) for correct fit in the acoustic cover.



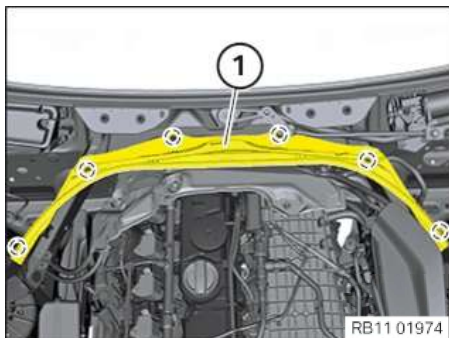
- Install acoustic cover (1) and fix in the rubber mounts (marks).

25 – Installing centre bulkhead lower section



- Position the centre bulkhead lower part (3).
- Tighten nut (2) and screws (1).

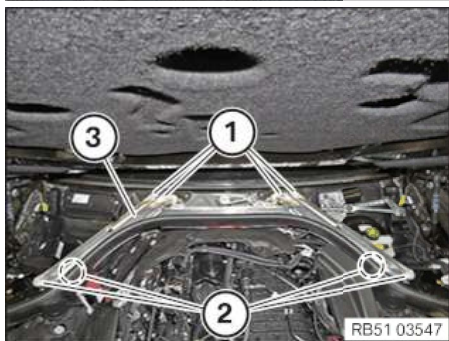
26 – Installing the centre bulkhead upper part



- Position the centre bulkhead upper part (1).
- Tighten the bolts in the marked areas.

Bulkhead upper part to bottom bulkhead

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

Tension strut on bulkhead

M10x25 screw	Tightening torque	56 Nm
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- 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 °

27 – Installing cowl panel cover

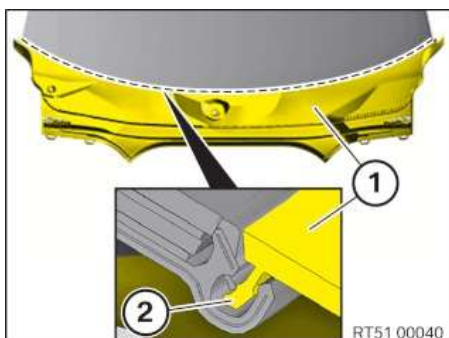


RISK OF DAMAGE

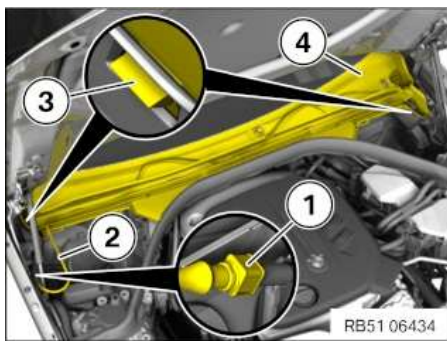
Damage caused by water ingress into the vehicle.

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.

28 – Installing both wiper arms



NOTICE

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

► Install the wiper arm

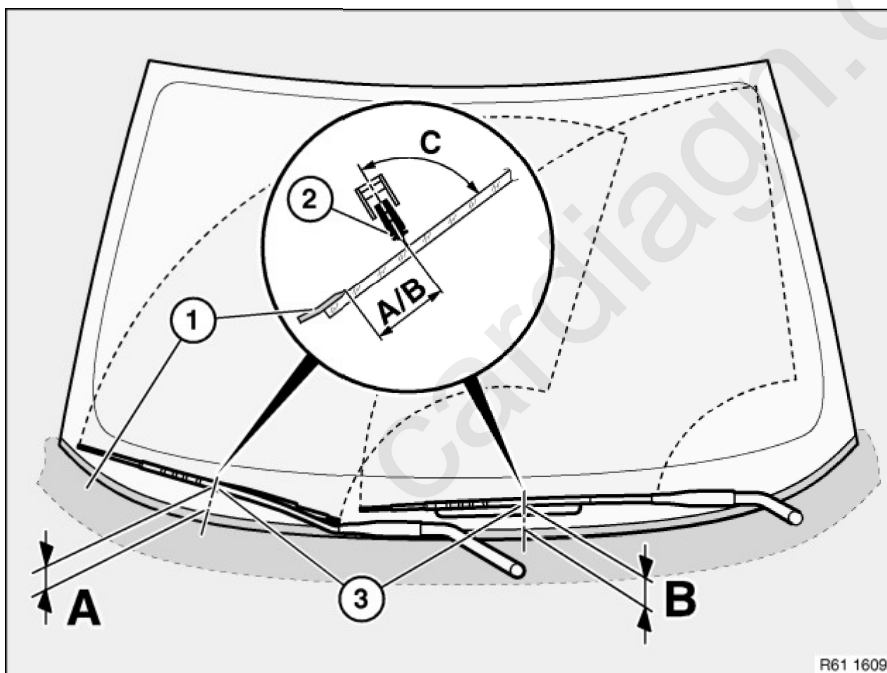


TECHNICAL INFORMATION

The wiper system must be in zero position.

After installing the cowl panel cover and before fitting the wiper arm:

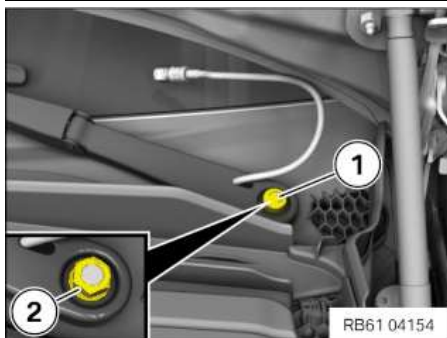
Activate the wiper system once to ensure that it has the correct installation position.



- 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

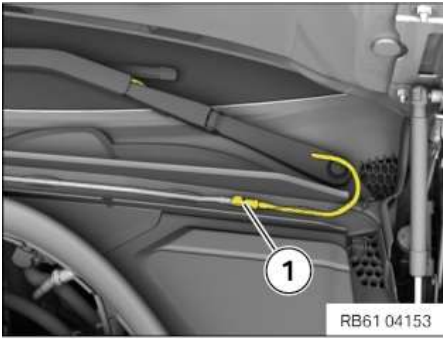


- Tighten nut (2).

Windscreen wiper arm

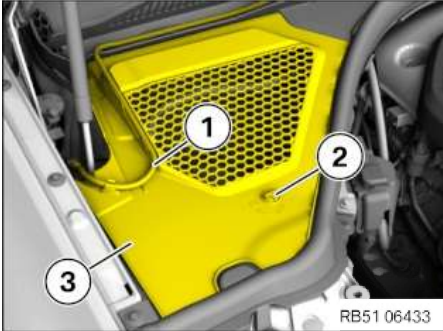
Combination hexagon nut		Tightening torque	35 Nm
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- Connect the protective cap (1).



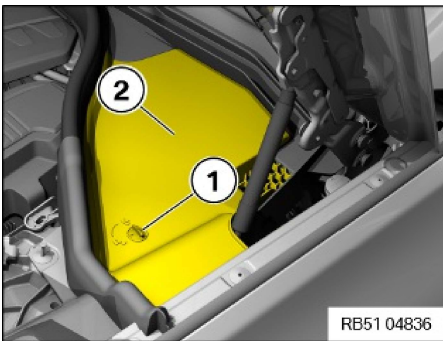
- Insert windscreen wash hose (1) into the cowl and connect at the separating point.

29 – Install the rear right engine compartment cover



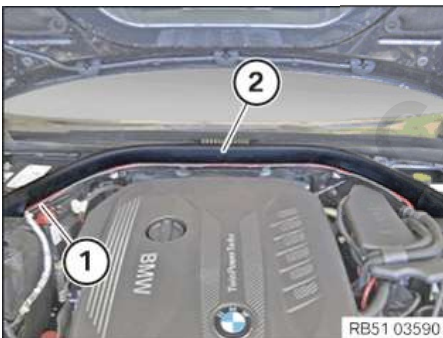
- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

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



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

31 – 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.

32 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Positive battery cable to the alternator

Used in step 17

M8		Tightening torque	19 Nm
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Battery positive lead to battery positive terminal

Used in step 17

M8		Tightening torque	19 Nm
----	--	-------------------	-------

Throttle body to intake plenum

Used in step 18

6X50		Tightening torque	7 Nm
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Bracket for coolant hose to throttle body

Used in step 18

M6x16 screw	Renew screw.	Tightening torque	11,8 Nm
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Charge air line to throttle valve

Used in step 19

M6x30		Tightening torque	8 Nm
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Control unit holder on spring strut dome

Used in step 20

Hexagon screw		Tightening torque	8 Nm
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Bulkhead upper part to bottom bulkhead

Used in step 26

		Tightening torque	3 Nm
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Tension strut on bulkhead

Used in step 26

M10x25 screw		Tightening torque	56 Nm
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Tension strut to spring strut dome

Used in step 26

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

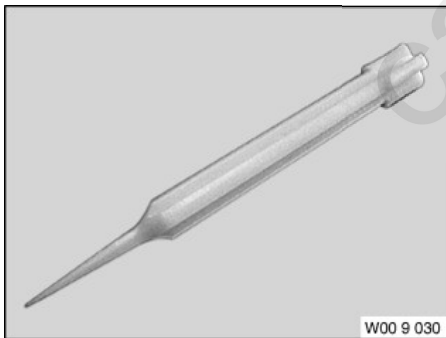
Windscreen wiper arm

Used in step 28

Combination hexagon nut		Tightening torque	35 Nm
-------------------------	--	-------------------	-------

Overview of Special Tools

0 496 714 (00 9 030) Wedge



Common

Used in step 18

Usage	For dismantling O-rings, gaskets and trim panels. This special tool replaces special tool 00 9 316.
Included in the tool or work	
Storage location	A50
Replaced by	
In connection with	
SI-Number	01 20 09 (581)

Overview Technical Data

Distance from window pane edge to wiper blade

Used in step 28

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

Links

General repair instructions

Used in step

12 00 ... Instructions for removal and replacement of control units	1122
---	------

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	132
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	132
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 20 900 Disconnecting and connecting battery earth lead	132
61 35 ... Notes on ESD protection (Electro Static Discharge)	11121521
61 00 730 Encode/program control unit(s) (after vehicle test)	22

12 42 652 Removing and installing/replacing the positive battery cable, remote positive terminal to starter motor



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.

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover



WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



RISK OF DAMAGE

Damage to the acoustic cover.

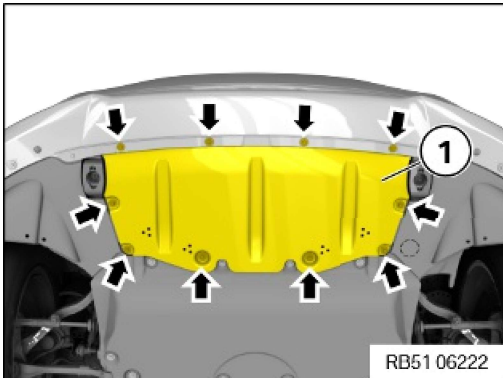
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures $>20^{\circ}\text{C}$.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Release the acoustic cover (1) towards the top from the rubber mounts (marks).

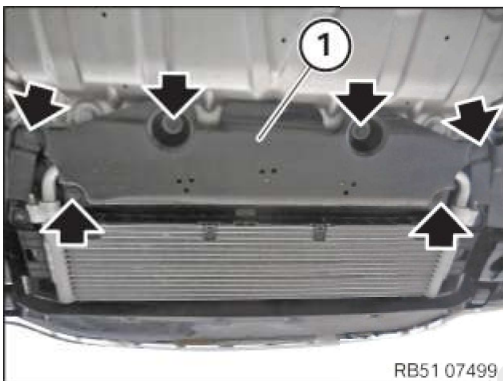
3 – Removing the front underbody protection



- **Version 1:**

Remove screws (arrows).

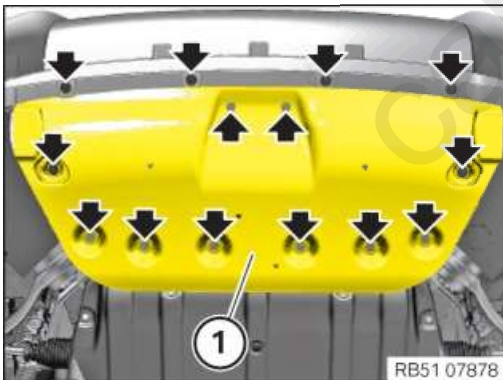
Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

Remove screws (arrows).

Guide out front underbody protection (1) and remove it.



- **Version 3:**

Remove screws (arrows).

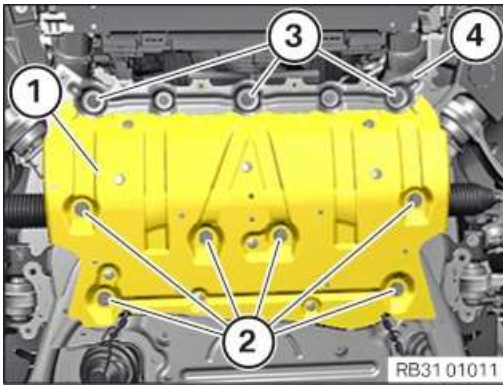
Guide out front underbody protection (1) and remove it.

4 – Removing the stiffening plate



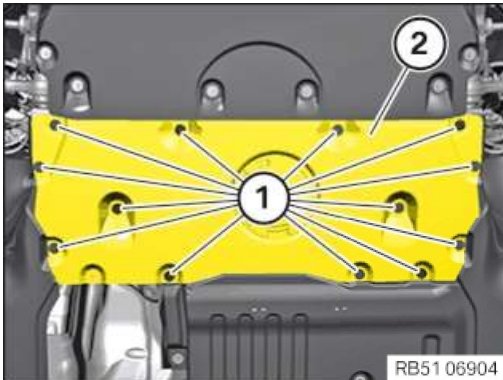
TECHNICAL INFORMATION

Driving without stiffening plate is not permissible.



- Loosen screws (3).
- Remove the holder of the underride protection (4).
- Loosen screws (2).
- Remove stiffening plate (1).

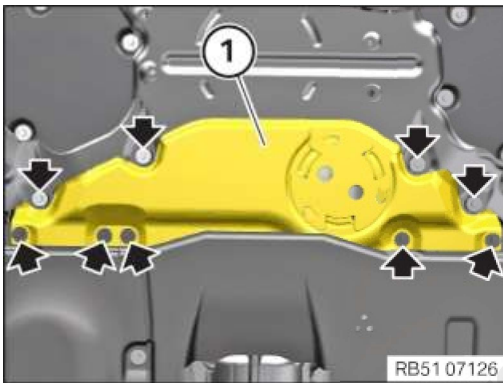
5 – Removing the centre underbody protection



• Version with rear-wheel drive:

Loosen screws (1).

Remove centre underbody protection (2) .

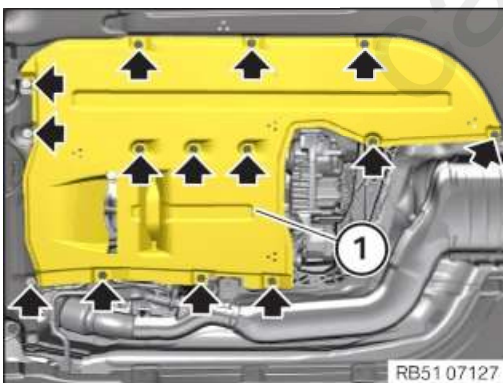


• Version with all-wheel drive:

Remove screws (arrows).

Feed out and remove the centre underbody protection (1).

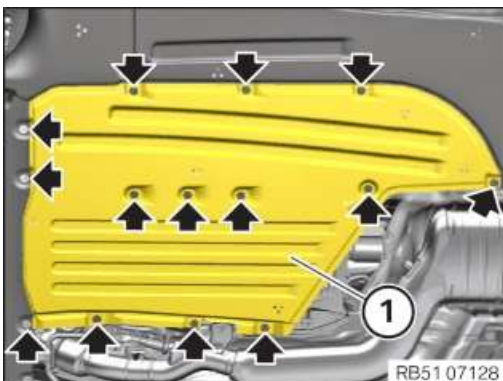
6 – Remove rear underbody protection



• Version 1:

Remove screws (arrows).

Feed out the rear underbody protection (1).



• Version 2:

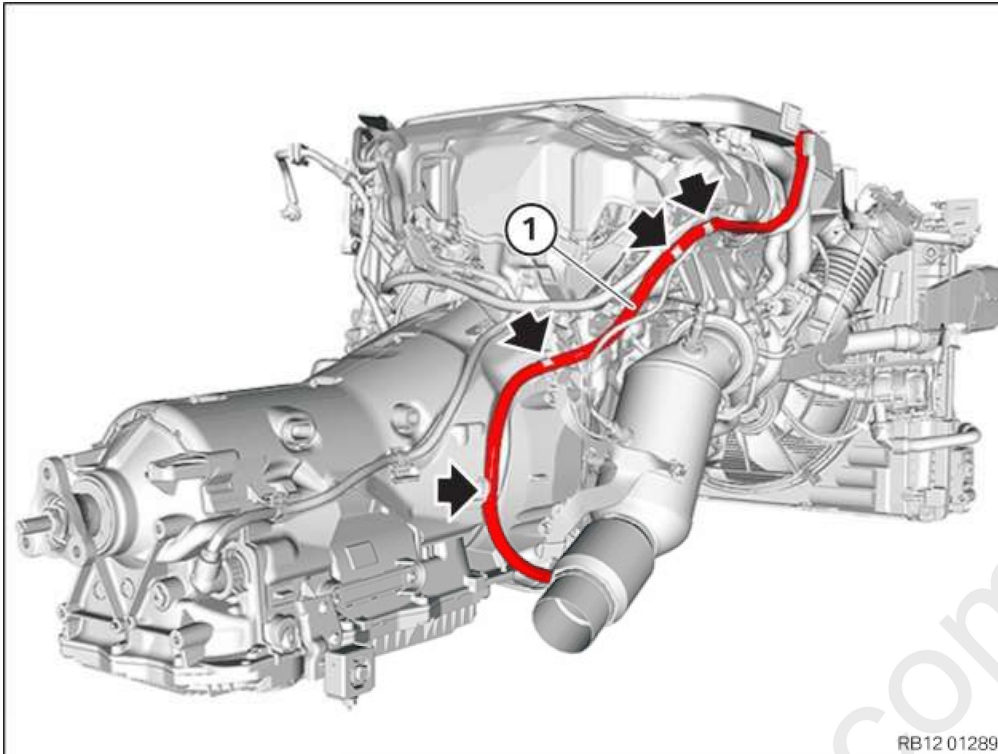
Remove screws (arrows).

Guide out rear underbody protection (1) and remove it.

MAIN WORK

7 – Removing the positive battery cable from the starter motor to the positive battery connection point

Positive battery cable from the starter motor to the battery connection point



Overview of the positive battery cable from the starter motor to the positive battery connection point



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

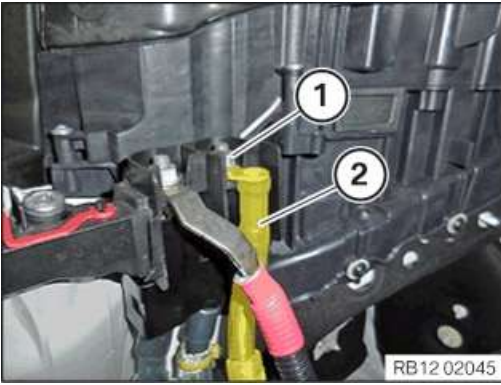
Hot surfaces.

Risk of burning!

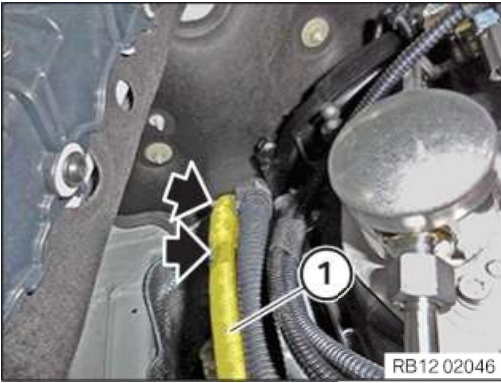
- Perform all work only on components that have cooled down.



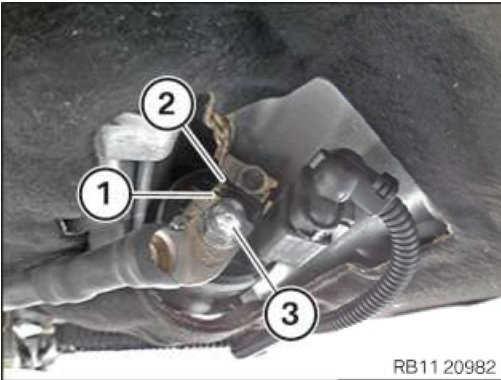
- Unlock the locks (1).
- Guide and remove cover (2) in direction of arrow.



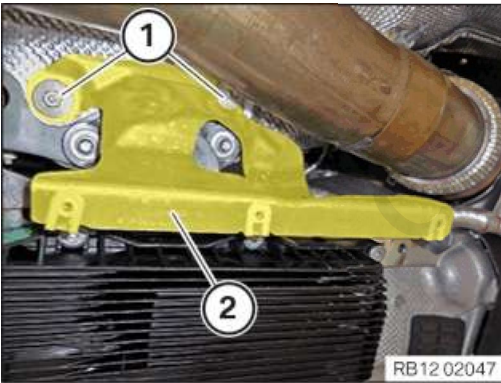
- Loosen nut (1).
- Feed out positive battery cable (3) and put to one side.



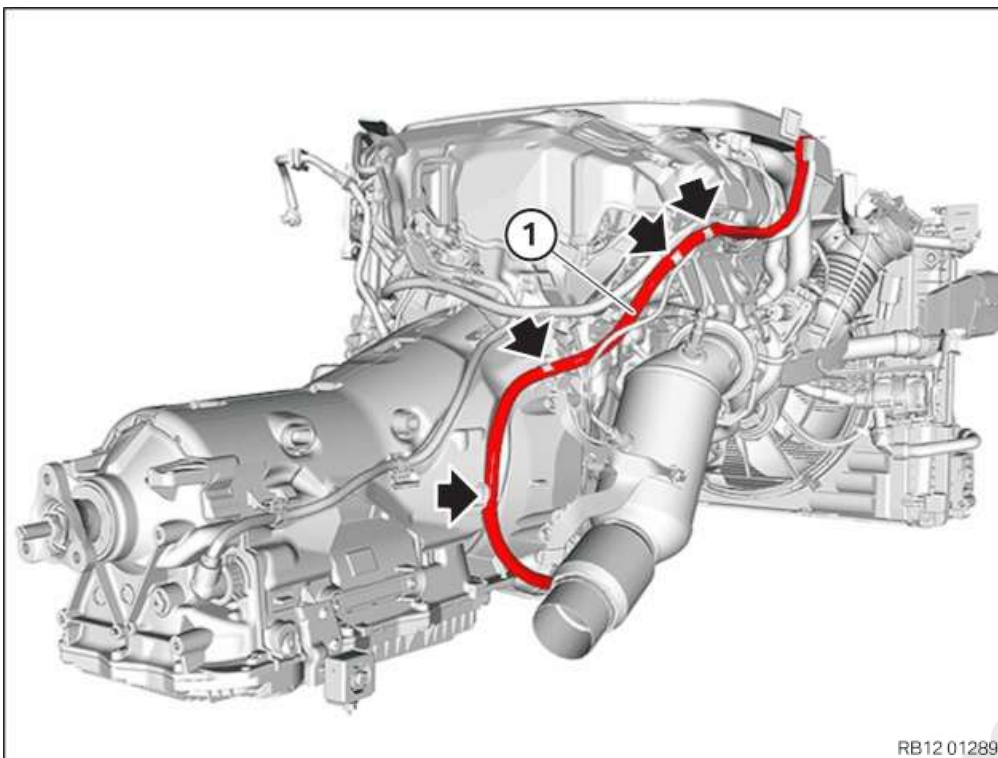
- Release the positive battery cable (1) from the clamps (arrows) and set it aside.



- Loosen nut (3).
- Feed out positive battery cable (1) and put to one side.



- Loosen nuts (1).
- Guide the heat shield (2) out and remove it.

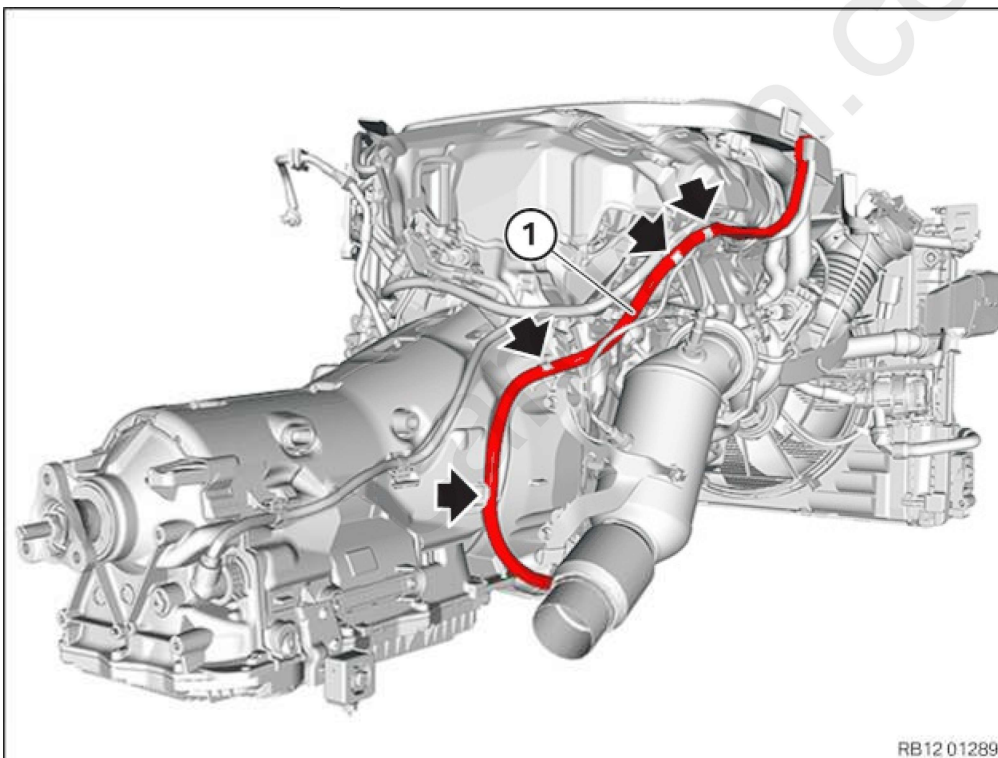


- Release the clamps (arrows).
- Remove positive battery cable (1) and remove.

RB12 01289

8 – Installing the positive battery cable from the starter motor to the positive battery connection point

Positive battery cable from the starter motor to the battery connection point



RB12 01289

Overview of the positive battery cable from the starter motor to the positive battery connection point

Prerequisite

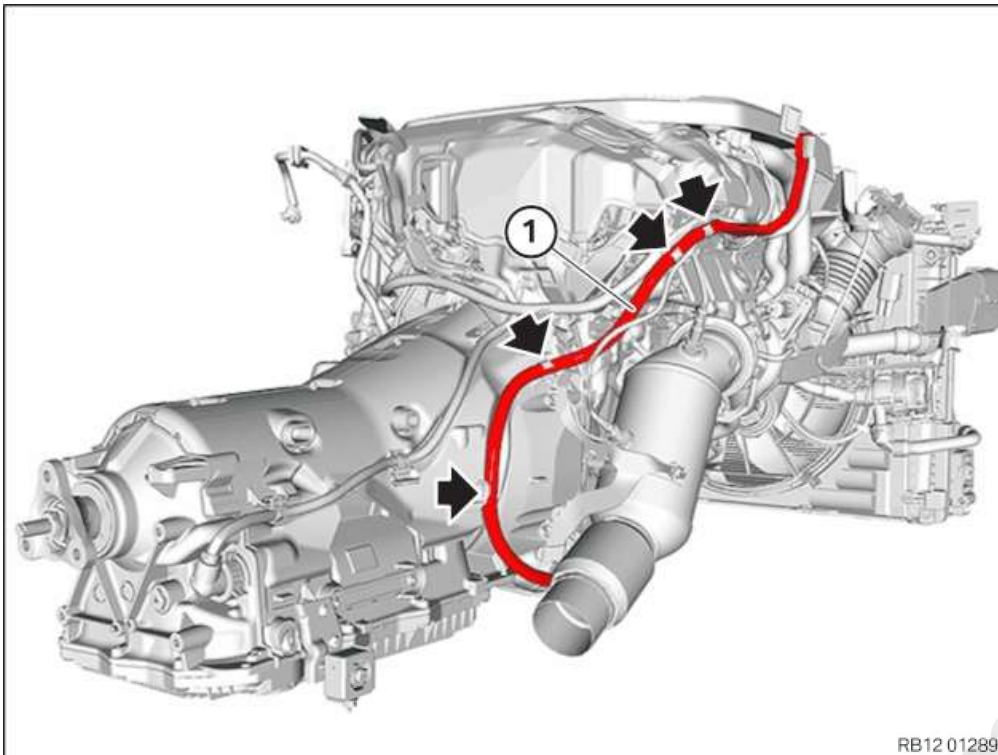


CAUTION

Improper routing of the positive battery cable.

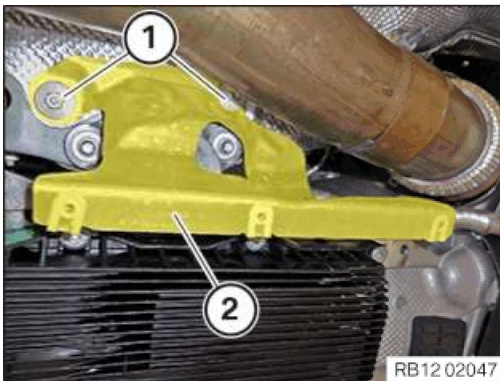
Risk of short circuits!

- Route the positive battery cable without abrasions and do not trap.



- Insert and install the positive battery cable (1).
- Secure the clamps (arrows).

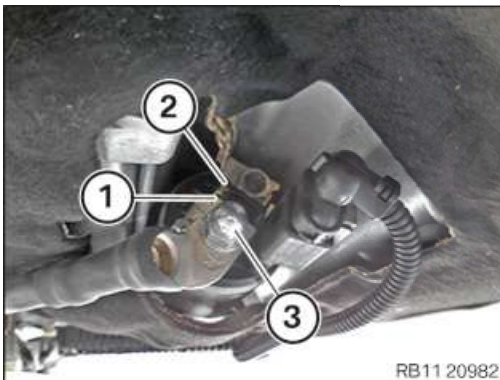
RB12 01289



- Insert and install the heat shield (2).
- Tighten nuts (1).

Heat shield to body

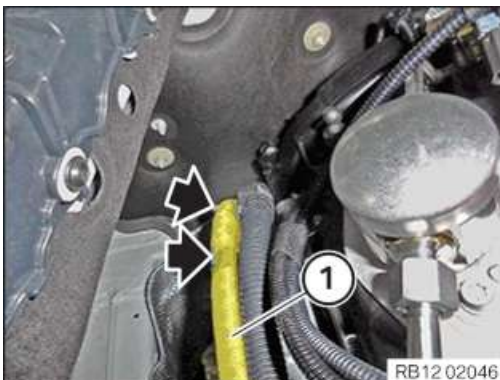
Nut		Tightening torque	3 Nm
-----	--	-------------------	------



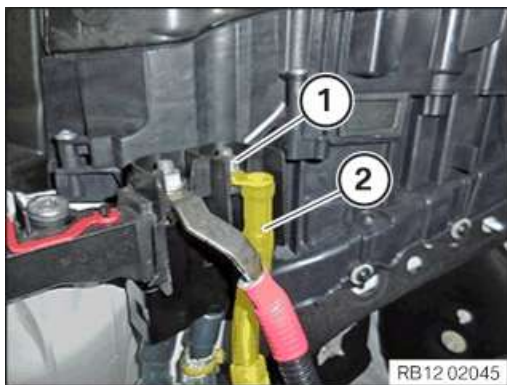
- Connect the positive battery cable (1) to the starter motor.
- Bring positive battery cable (1) on anti-twist lock (2) to the limit position.
- Tighten nut (3).

Battery positive lead to starter

M8		Tightening torque	13,5 Nm
----	--	-------------------	---------



- Secure the positive battery lead (1) to the clamps (arrows).



- Insert and install the positive battery cable (2).
- Tighten nut (1).

Battery positive lead to battery positive terminal

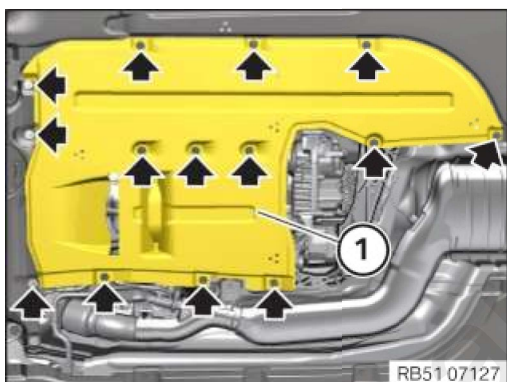
M8		Tightening torque	19 Nm
----	--	-------------------	-------



- Insert and install the cover (2) in the direction of the arrow. The locks (1) must engage audibly.

POSTPROCESSES

9 – Installing underbody protection at rear

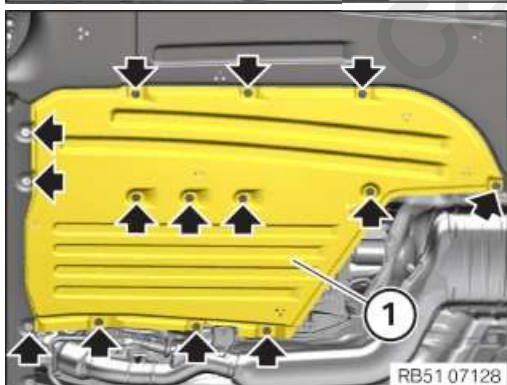


• Version 1:

- Insert and install the rear underbody protection (1).
- Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm
---------------	--	-------------------	------



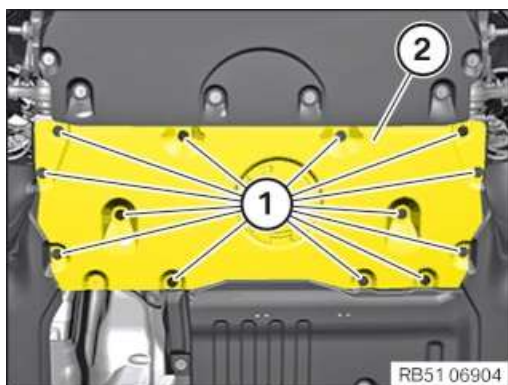
• Version 2:

- Insert and install the rear underbody protection (1).
- Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm
---------------	--	-------------------	------

10 – Installing the centre underbody protection



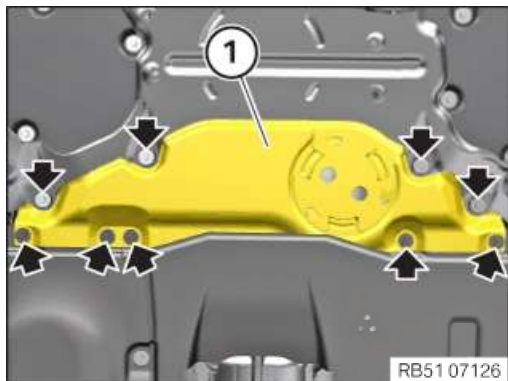
• **Version with rear-wheel drive:**

Position central underbody protection (2).

Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm
---------------	--	-------------------	------



• **Version with all-wheel drive:**

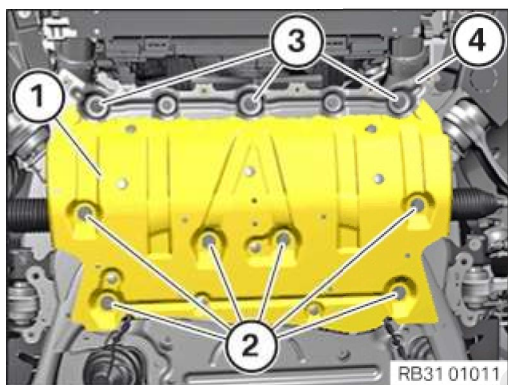
Guide in and install the centre of underbody protection (1).

Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm
---------------	--	-------------------	------

11 – Installing the stiffening plate

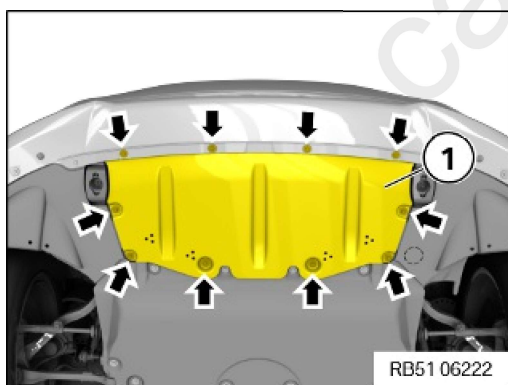


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm
-----	--	-------------------	-------

12 – Installing the front underbody protection



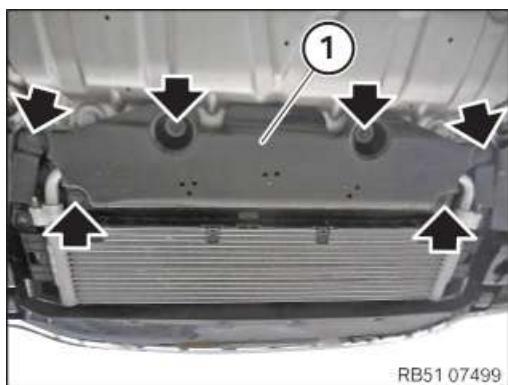
• **Version 1:**

Feed in the front underbody protection (1) towards the front under the bumper panel and position.

Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



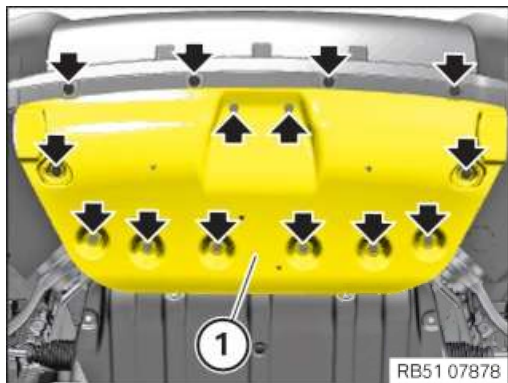
• **Version 2:**

Feed in and position the front underbody protection (1).

Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



• **Version 3:**

Feed in and install front underbody protection (1).

Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

13 – Install acoustic cover

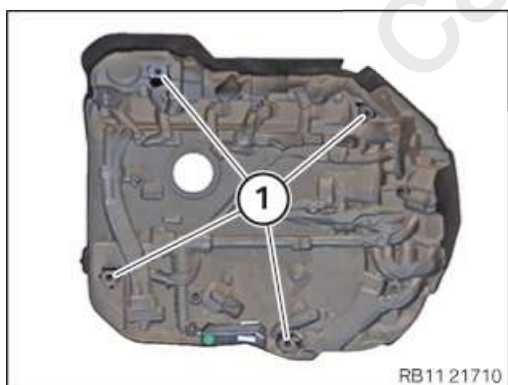


RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the rubber mount (1) for correct fit in the acoustic cover.



- Install acoustic cover (1) and fix in the rubber mounts (marks).

14 – Disconnecting all battery earth leads



- See additional information.

Additional Information

Overview of Tightening Torques

Heat shield to body

Used in step 8

Nut		Tightening torque	3 Nm
-----	--	-------------------	------

Battery positive lead to starter

Used in step 8

M8		Tightening torque	13,5 Nm
----	--	-------------------	---------

Battery positive lead to battery positive terminal

Used in step 8

M8		Tightening torque	19 Nm
----	--	-------------------	-------

Underbody protection

Used in step 910

Hexagon screw		Tightening torque	3 Nm
---------------	--	-------------------	------

Stiffening plate to front axle support

Used in step 11

M10		Tightening torque	56 Nm
-----	--	-------------------	-------

Underbody protection front

Used in step 12

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

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

[illegible]

Caution!

Observe safety regulations.

Investigate cause of triggering of safety battery terminal.

To do so, read out fault memory of airbag control unit. Note fault messages stored in memory. Rectify faults. Then clear fault memory.



Use of safety battery terminal:

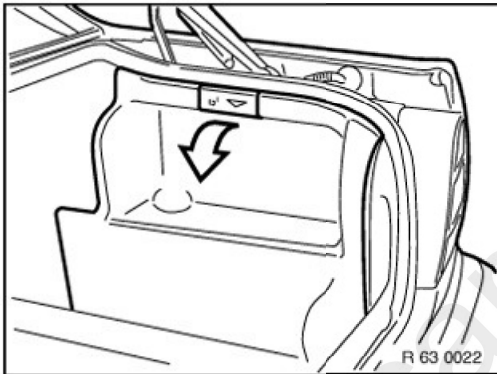
- From model year 1998 in Series E38, E39, E46
- From 4/99 in E36/Z3
- in each of following new Series

The different models have different installation locations:

**Battery in engine compartment**

Safety battery terminal is replaced with cable up to battery positive support point.

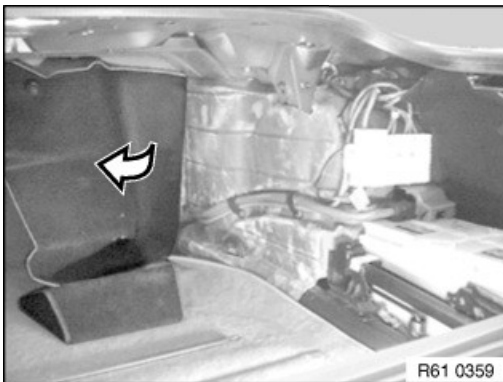
Safety battery terminal is omitted as from 03/2002 from all E46 LHD models with 4-cylinder engines.

**Battery in luggage compartment behind side trim panel**

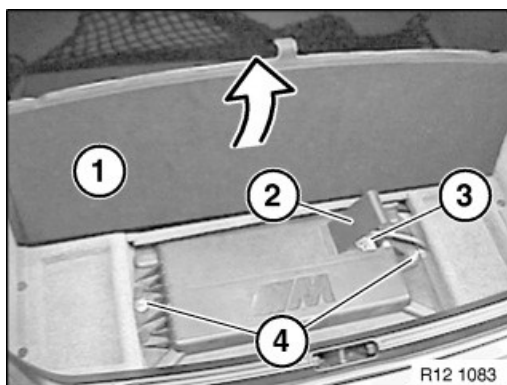
Remove side trim panel.

Follow instructions for disconnecting and connecting battery.

Disconnect and cover battery negative lead.



Release front side trim panel partly and fold forward.



Battery in luggage compartment under floor trim panel

Follow instructions for disconnecting and connecting battery.

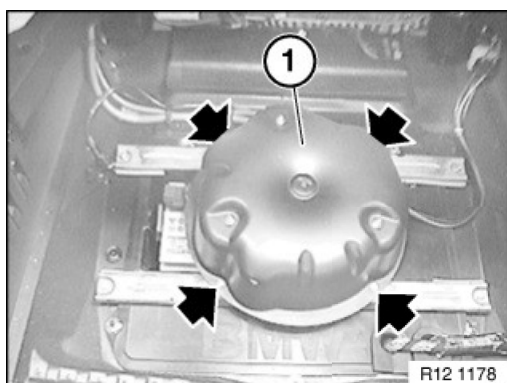
Fold back floor trim panel (1).

Lift cover (2) on battery negative lead.

Disconnect and cover battery negative lead (3).

Release nuts (4).

Remove battery cover.



Battery in luggage compartment under spare wheel

Remove spare wheel.

Release screws.

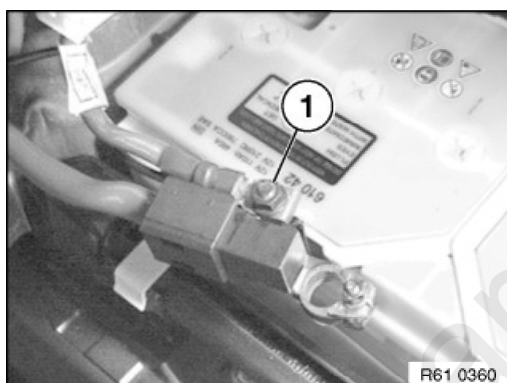
Caution!

Do not kink air pipes.

Set air supply system (1) to one side.

Follow instructions for disconnecting and connecting battery.

Disconnect battery negative lead.



Disconnect supply cable (1) for vehicle electrical system.

Installation:
Remove faulty fuses and carry out troubleshooting.



Caution!

Pay attention to interface.

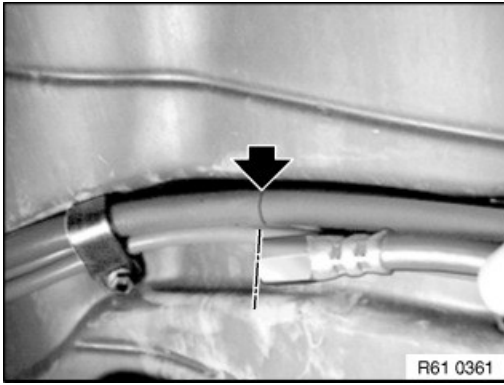
The repair cable is always a standard length.

The heavy-current connector of the repair cable has a larger diameter than the battery positive lead.

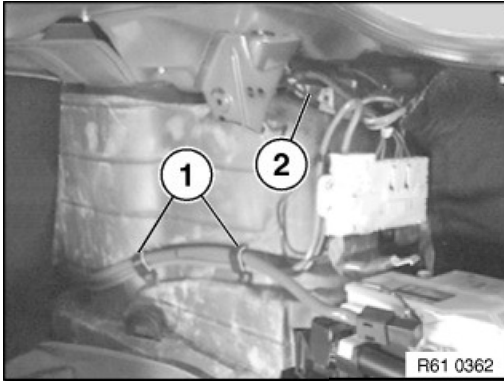
In some Series (e.g. E46 touring), the heavy-current connector of the repair cable can lead to installation problems.

This is the case when the interface is in the area of the close-fitting trim panels.

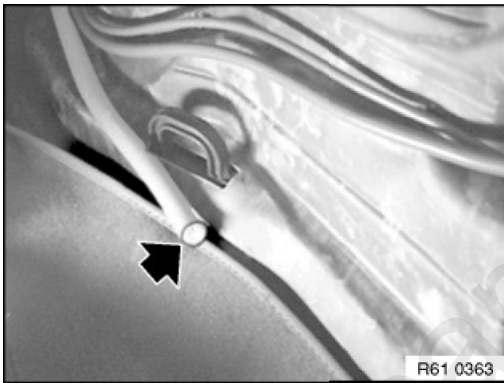
Find matching interface (e.g. approx. 10 cm behind rear seat backrest in E46 touring).



Lay repair cable parallel to battery positive lead.
Mark interface of battery positive lead at end of repair cable.



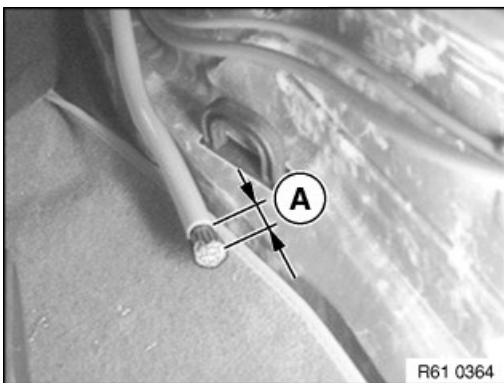
Release cable ties (1).
Disconnect plug connection (2).



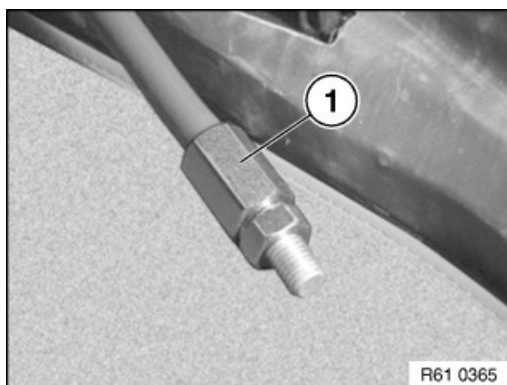
Caution!

Do not use bolt cutters or similar tools to cut through the cable.
A cable end that has been squashed flat will no longer fit into the clamping sleeve.

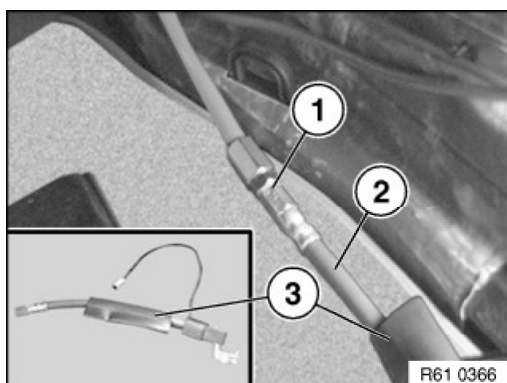
Saw through battery positive cable at marked point with an iron saw.



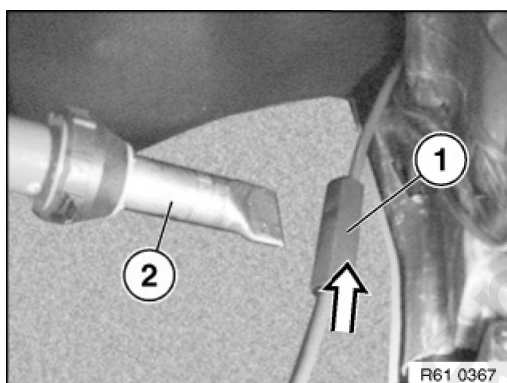
Strip insulation - length (A) - from cable end.
Distance (A) = 15 mm.



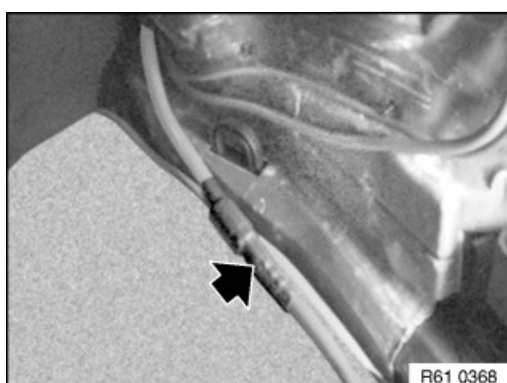
Push heavy-current connector (1) over stripped cable end and screw into position.



Push shrink-fit hose (3) over repair cable.
Screw threaded sleeve (1) of repair cable (2) to heavy-current connector.



Push shrink-fit hose (1) over connecting point and shrink on with a hot-air blower (2).

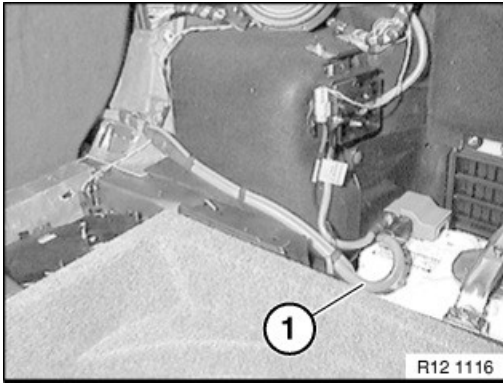


Note:
Heat up shrink-fit hose until it has settled completely around the connection point.



When laying the repaired battery positive cable, observe the following:

- The shrink-fit hose must not be scuffed during any movement.
- The repair cable must not cause any disturbing noises during driving operation.



Note:

Offsetting cutting line by approx. 10 cm produces excess length of battery positive lead (1).

Lay battery positive lead (1) without kinks or abrasions.

(Shown on E46 touring.)

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