

00 Danger of injury if oil comes into contact with eyes and skin



Danger of injury!

Contact with eyes or skin may result in injury!

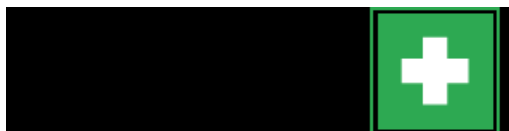
Possible symptoms are:

- Impaired sight
- Irritation of the eyes
- Reddening of the skin
- Rough and cracked skin



Protective measures/rules of conduct:

- Wear safety goggles.
- Wear oil-resistant protective gloves.
- Observe country-specific safety regulations.



First aid measures:

- Eye contact: Immediately flush eyes with lots of water for at least 15 minutes. In the case that it is available, use an eye wash bottle. If eye irritation persists, consult a doctor.
- Skin contact: Wash off with soap and water immediately. If irritation persists, consult a doctor.

Note: Do not use solvents/thinners.

00 Danger of poisoning if oil is ingested/absorbed through the skin



Danger of poisoning!

Ingesting oil or absorbing through the skin may cause poisoning!

Possible symptoms are:

- Headaches
- Dizziness
- Stomach aches
- Vomiting
- Diarrhoea
- Cramps/fits
- Unconsciousness



Protective measures/rules of conduct:

- Fill oil in appropriately marked containers only.
- Do not fill oil in containers meant for drinking out of. (bottles for beverages, glasses or cups)
- Observe country-specific safety regulations.



First aid measures:

- Do not induce vomiting.

If the person affected is still conscious, he/she must rinse out their mouth with water, drink plenty of water and consult a doctor immediately.

Do not administer anything to an unconscious person via their mouth; place them in a stable position on their side. Call the emergency doctor immediately.

23 00 012 Remove and install transmission



WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.



WARNING

Motor vehicle may slip off the vehicle hoist if the weight is distributed unevenly.

Danger! Life-threatening injuries!

- Ensure there is a specific weight compensation on the motor vehicle.



WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

Engine compartment lid is open.

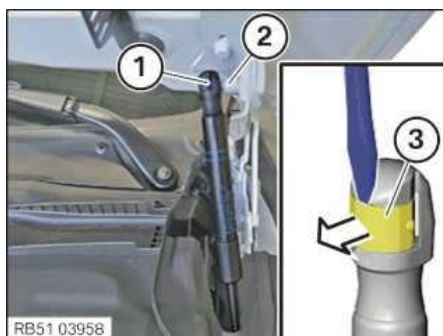


CAUTION

Shutting bonnet or tailgate.

Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.



- Lift clamp (3) slightly using a screwdriver, in the direction of the arrow.
- Lift off ball socket (1) from ball pin (2).
- Repeat the operation on the other side of vehicle.



TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

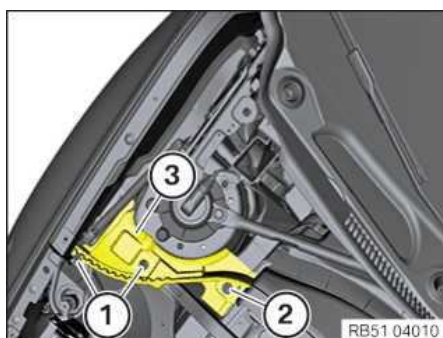
- Remove the bonnet support and open the bonnet further.
- Push special tool (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

2 – Remove suspension cross-brace



TECHNICAL INFORMATION

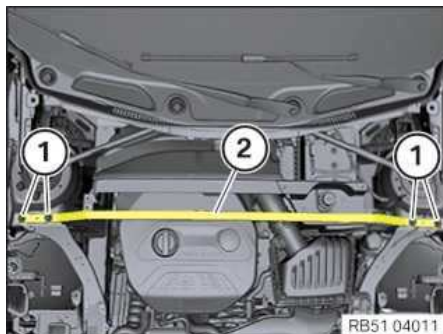
Driving without the strut brace/front end or tension strut is not permitted.



NOTICE

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

- Loosen expanding rivet (1).
- Loosen screw (2).
- Remove the cover (3).



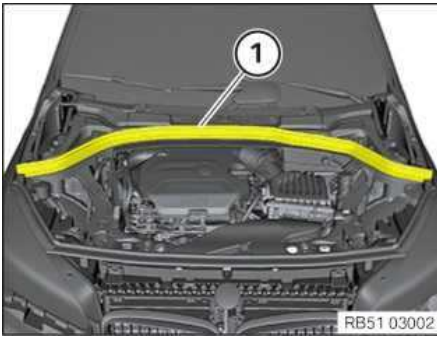
- Loosen screws (1).
- Remove strut brace (2).

3 – Remove the seal for the rear bonnet



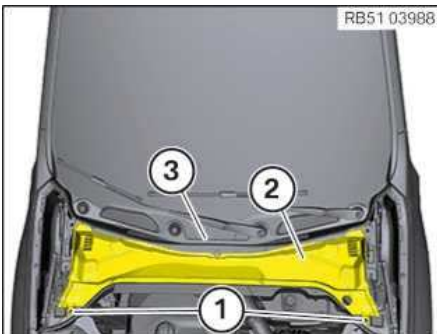
NOTICE

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



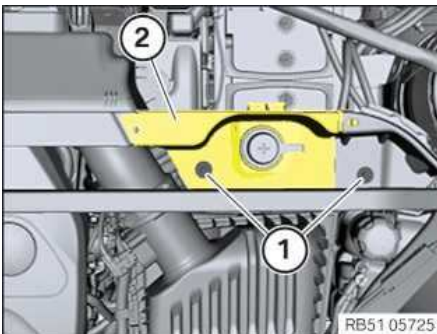
- Pull off rear bonnet seal (1) towards the top and remove.

4 – Removing front cowl panel cover

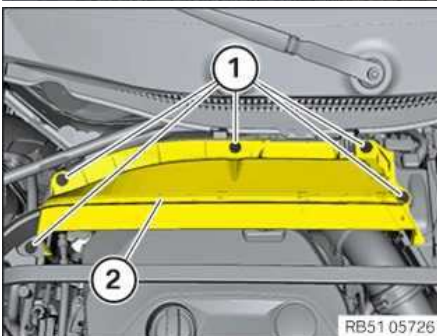


- Loosen the expanding rivet (1).
- Feed out and remove front cowl panel cover (2) from the rear cowl panel cover (3).

5 – Removing the upper bulkhead cover



- Loosen screws (1).
- Guide out and remove the cover (2).



- Loosen screws (1).
- Feed out and remove the upper bulkhead cover (2).

6 – Removing the acoustic cover



WARNING

Hot surfaces.

Risk of burning!

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



RISK OF DAMAGE

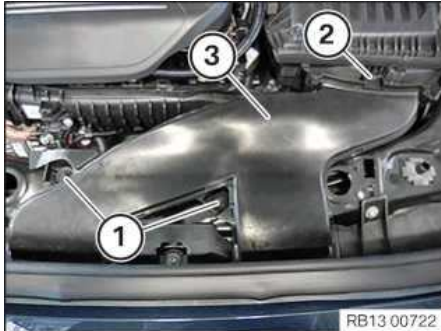
Damage to the acoustic cover.

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.

- Unclip the acoustic cover from the marked areas towards the top.

7 – Remove the intake neck for intake silencer housing



- Loosen nuts (1).
- Loosen the lock (2).
- Guide the intake neck (3) out and remove it.

8 – Removing intake silencer housing



- Loosen the holder (1).
- Loosen screw (2).
- Unlock and loosen connector (3).
- Unfasten clamp (4).
- Pull out and remove the intake silencer housing (5) from the rubber mounts towards the top.

9 – Disconnecting all battery earth leads



- See additional information.

10 – Remove vehicle battery

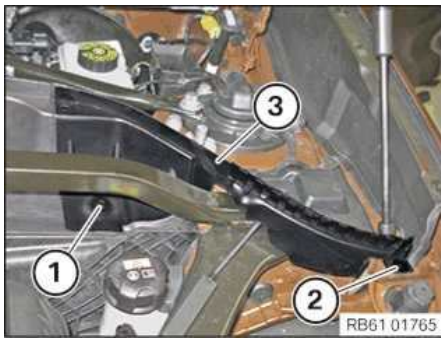


WARNING

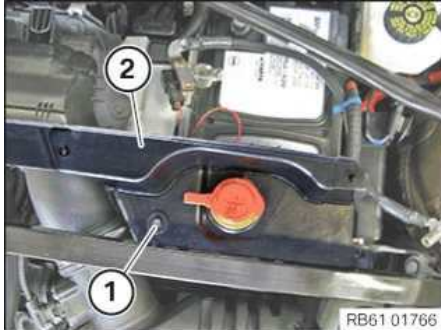
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

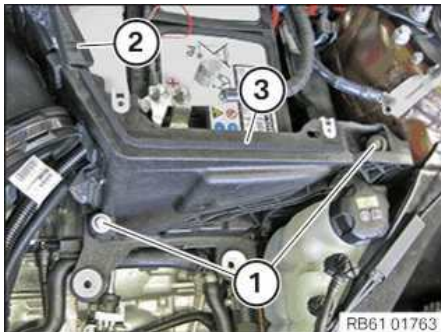
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.



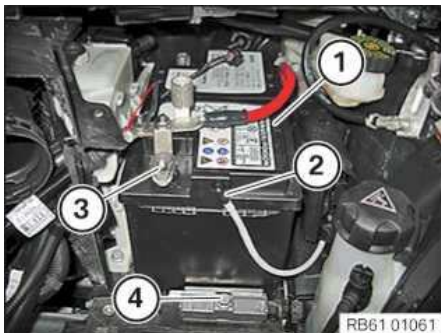
- Release the screw (1) and the expanding rivet (2).
- Remove the fixture for the gasket (3).



- Loosen screw (1).
- Remove the cover (2).



- Loosen screws (1).
- Unscrew the bolt (2) and guide the tension strut (3) out.



- Pull off the vent hose (2).
- Slacken the nut (3) on the positive battery terminal and remove the positive battery terminal.



WARNING

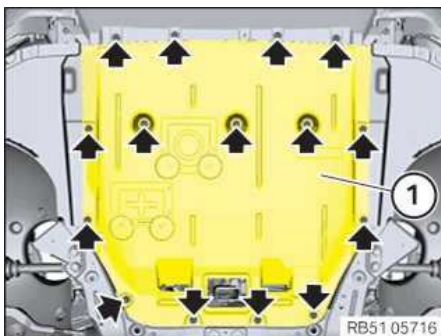
Unprotected battery terminals.

Risk of short circuits! Risk of fire!

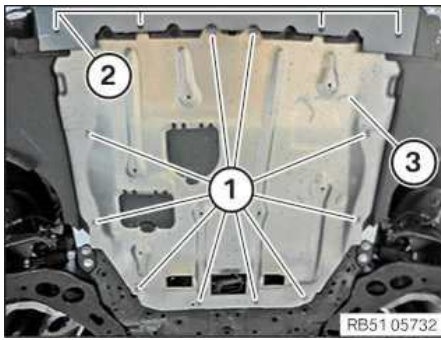
- Cover the vehicle battery.

- Loosen the screw (4) and remove the holder.
- Remove vehicle battery (1).

11 – Removing the front underbody protection



- Remove screws (arrows).
- Thread out and remove the front underbody protection (1) from the bumper panel.



- **Equipment specification with metal underride protection:**
- Loosen screws (1) and (2).
- Thread out and remove the underride protection (3).

12 – Drain oil level in the manual gearbox (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



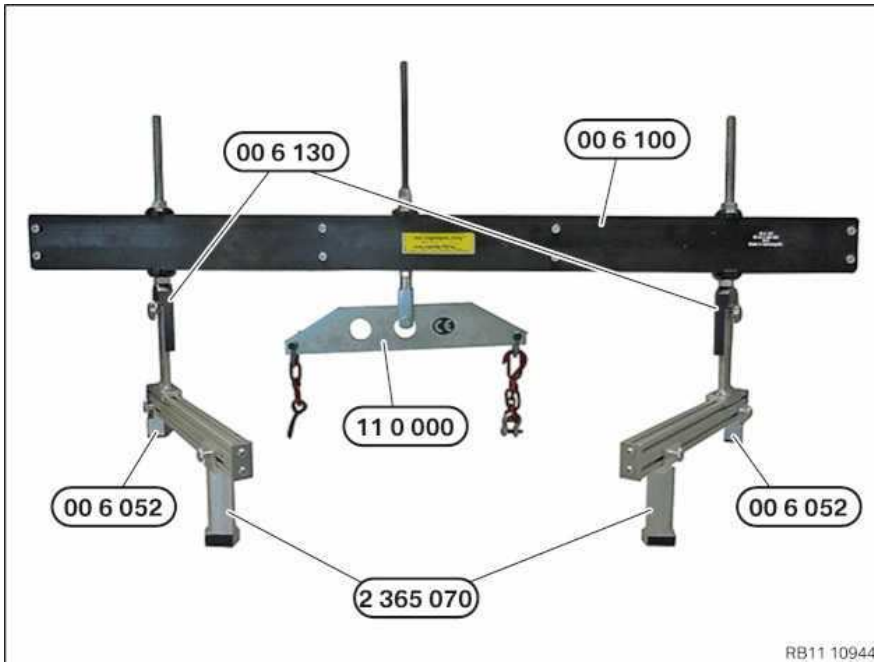
- Draining transmission oil:
 - Unscrew oil drain plug (1) and allow oil to flow out completely.
 - Clean oil drain plug (1) and screw in.

Oil drain plug / oil filler plug

Hexagon socket		Tightening torque	43 Nm
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13 – Installing the engine bridge

Overview: Prepared engine bridge



Prerequisite

Front compartment lid is in service position.



CAUTION

Components connected to the engine joint or cross member.

Danger of injury!

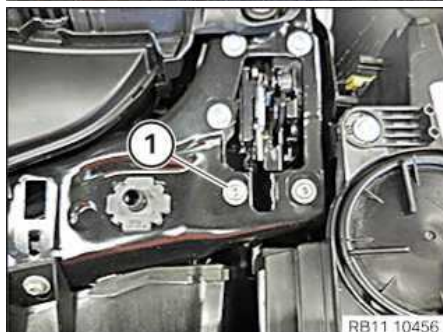
- Check lifting eyes and engine mounting brackets for damage, e.g. cracks.
- Attach the component to correctly mounted engine joints or cross members only.
- Exclusively lift the component, do not move it forwards, backwards or in transverse direction.



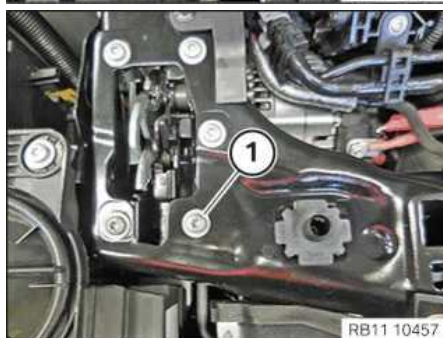
- Guide in and position special tool **2 459 012** on cylinder head.
- Tighten the screws (1) of special tool **2 459 012**.

Special tool to cylinder head

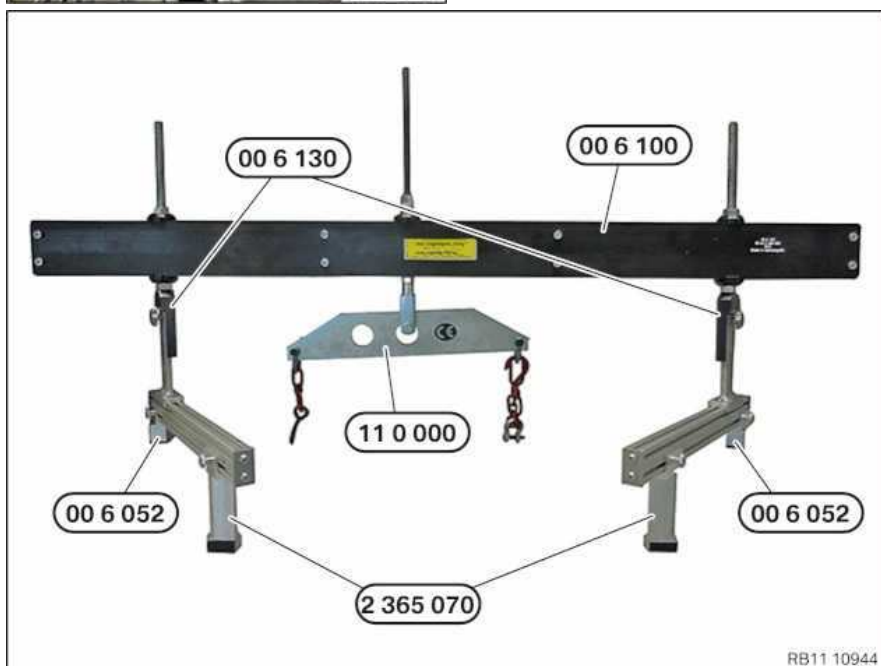
M8		Tightening torque	21,5 Nm
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- Loosen screw (1) of the left bonnet catch.



- Loosen screw (1) of the right bonnet catch.

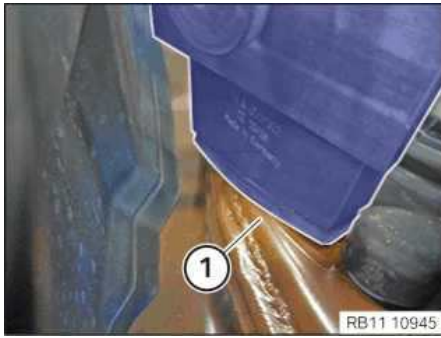


CAUTION

Heavy component.

Heavy components can lead to injury or damage.

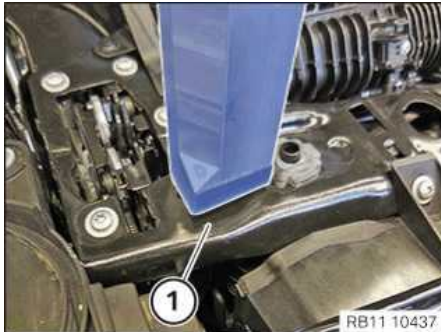
- Remove and install heavy components with the aid of another person/other persons.
- Set entire cross member **0 496 852 (00 6 100)** on the vehicle and position with the help of an auxiliary person.



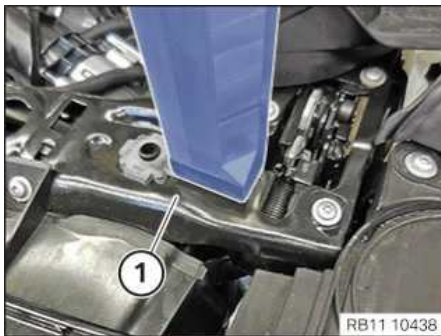
- Position the special tool at the rear mounting point (1) on the **right**.



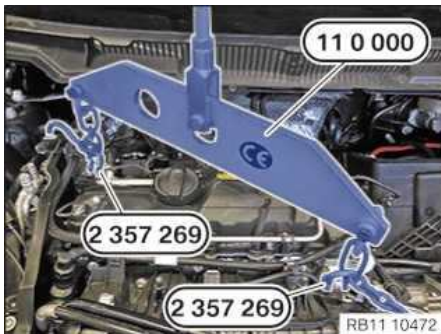
- Position the special tool at the rear mounting point (1) on the **left**.



- Position the special tool at the front mounting point (1) on the **right**.



- Position the special tool at the front mounting point (1) on the **left**.



- Position special tool **0 490 561 (11 0 000)** above the engine.
- Attach special tools to the mounting lugs of the engine.



- Tighten side screws (2) and (3).
- Slightly pretension the spindle screw (1) of the engine support beams.
- Tighten down all adjusting screws, knurled screws and nuts on cross member **0 496 852 (00 6 100)** and on special tool .

14 – Removing starter motor



WARNING

Hot surfaces.

Risk of burning!

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



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



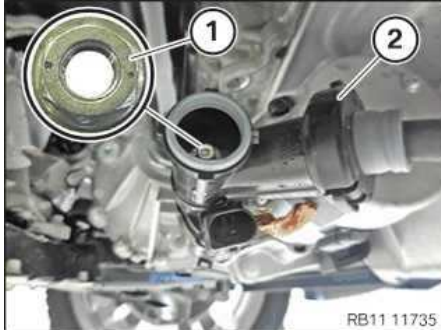
Electrostatic discharge.

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 loosen connector (1).
- Detach the sealing cap (2) in the direction of the arrow.
- Feed out and remove the sealing cap (2).

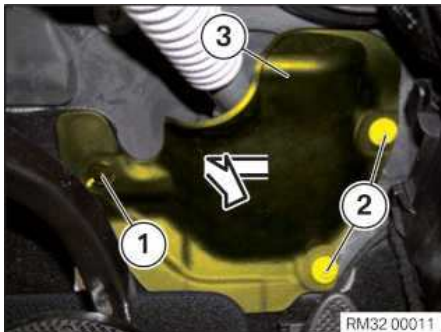


- Unfasten nut (1).
- Feed out the positive battery cable (2) of the starter motor and set it aside.

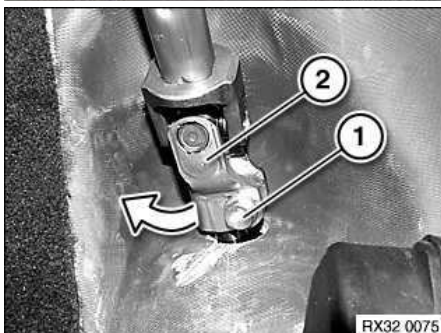


- Loosen screws (1).
- Feed out starter motor and remove.

15 – Releasing lower steering shaft from steering gear

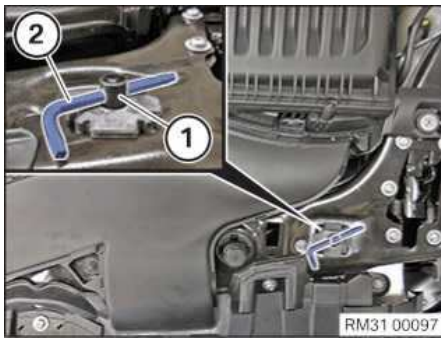


- **If installed:**
- Unfasten nut (1).
- Unscrew the nuts (2) by 1 rotation.
Do not remove the nuts (2) !
- Remove the cover (3) on the steering column in the direction of the arrow.
The side footwell trim must not be disassembled!



- Loosen screw (1).
- Swivel out the universal joint (2) of the bottom steering shaft from the steering gear in the direction of the arrow.

16 – Securing radiator on left and right



NOTICE

Perform the operations on the left and right side.

- Fasten radiator at centring pin (1) with suitable tool (2).

17 – Remove front left or right wheel

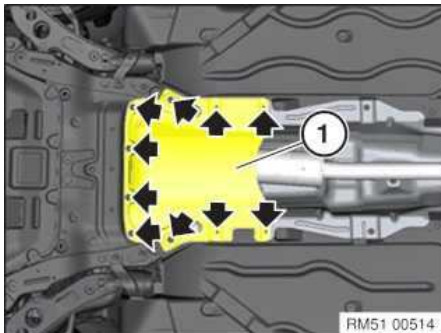


► Removing the wheel

- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Unscrew the wheel bolts (arrows) and remove the wheel.

Use the matching adapter from tool set (wheel bolt adapter set) to loosen and tighten down the wheel bolt with security code.

18 – If installed: Removing rear underbody protection



- Remove screws (arrows).
- Remove the rear underbody protection (1).

19 – Removing front left and right wheel arch cover



NOTICE

Perform the operations on the left and right side.

► Remove the front wheel arch trim



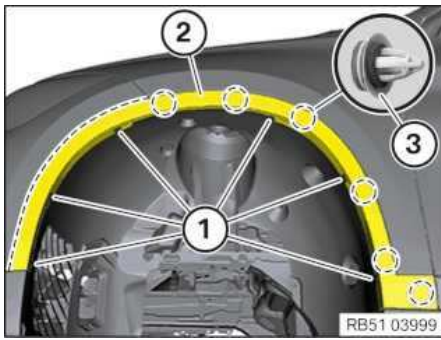
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



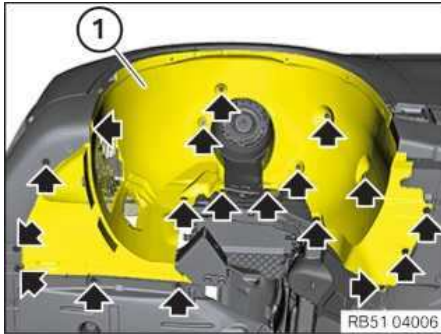
NOTICE

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



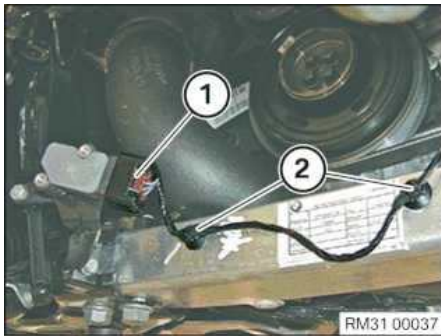
- Remove the blind rivets (1).
- Release the wheel arch trim (2) in the area of the side panel from the clips (3).
- Release the wheel arch trim (2) from the latch mechanisms on the bumper and remove.

► Remove front wheel arch cover



- Unscrew all bolts and nuts (arrows).
- Guide the wheel arch cover (1) out.

20 – With right installation: Detaching ride height sensor cable



- Unlock plug connection (1) and disconnect.
- Release cable clip (2) from deformation element adapter.

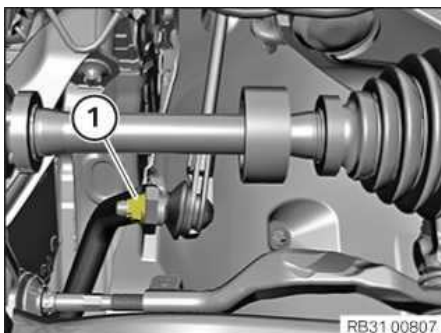
21 – Releasing anti-roll bar on left and right from anti-roll bar link



NOTICE

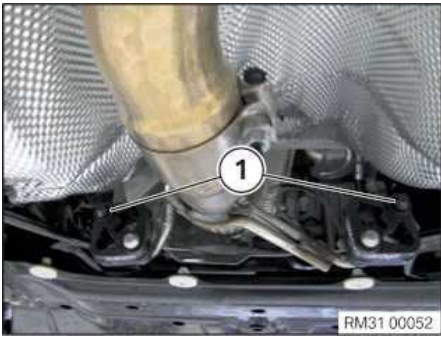
Perform the operations on the left and right side.

► Detach the anti-roll bar from the anti-roll bar link



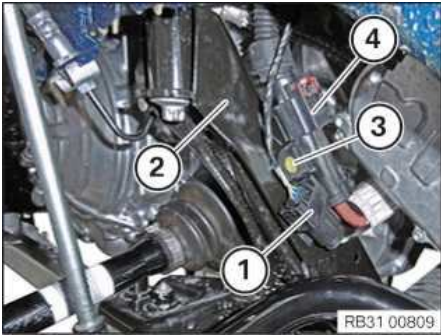
- Unfasten nut (1).
- Note:** Use the Torx socket for counter support.
- Loosen the anti-roll bar link from the anti-roll bar .

22 – Detaching rubber mount from front axle support



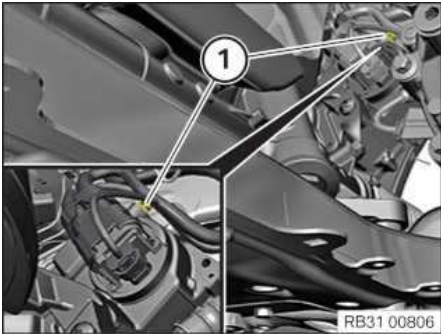
- Spray rubber mount (1) with lubricant and release from holder on front axle support.

23 – Disconnecting plug connections from steering gear

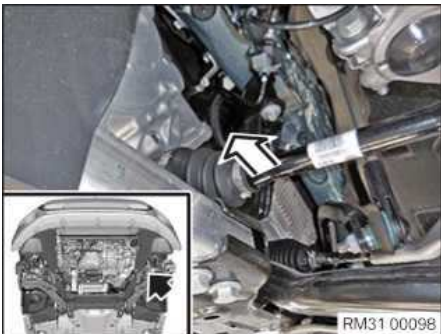


► If installed: Detach connectors from the front axle carrier

- Release the plug connection (1) from the front axle support (2).
- Loosen screw (3).
- Release the plug connection (4) from the front axle support (2).

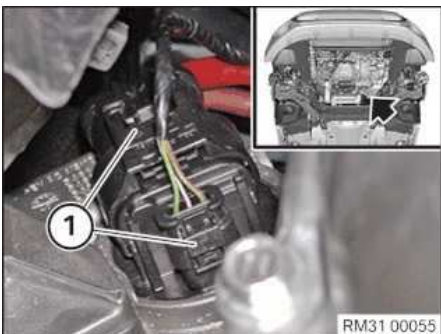


- Disconnect wiring harness (1) from steering gear.



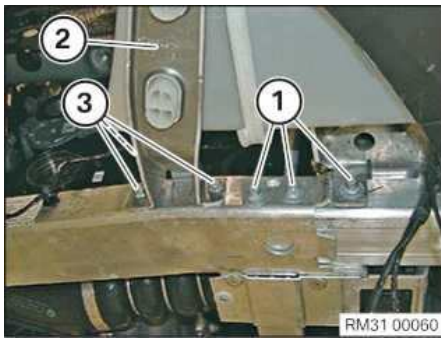
- To unlock the plug connections (see the following work step): unlock plug connections (arrow) with the right hand.

The plug connections can be reached via the left-hand output shaft.



- Unlock plug connections (arrow) (1) and disconnect from the steering gear.
- Make sure when lowering the front axle that the cables are not damaged!

24 – Releasing the mounted part from the front axle support



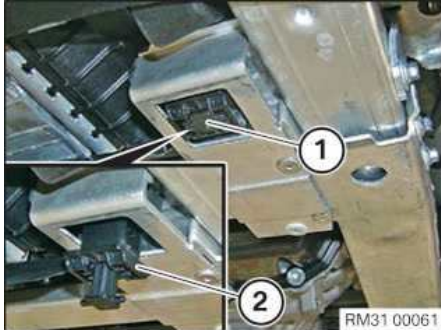
- **Only on right side:** Loosen screws (3) and remove holder for washer fluid reservoir (2).



NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).



NOTICE

Perform the operations on the left and right side.

- Unlock safety catch (1) of the lock (2) from the holder for the charge air cooler.
- Completely remove locks (2).



- Loosen screw (2) of the engine support (3) on the front axle (1).



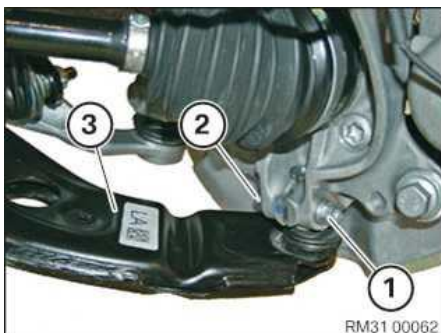
NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).



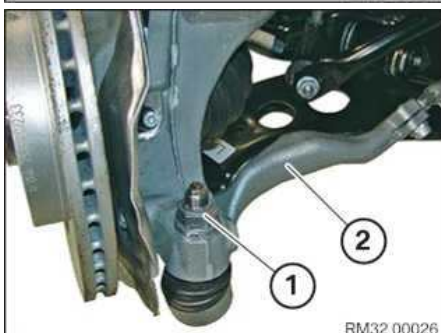
25 – Detaching and removing front axle completely



NOTICE

Perform the operations on the left and right side.

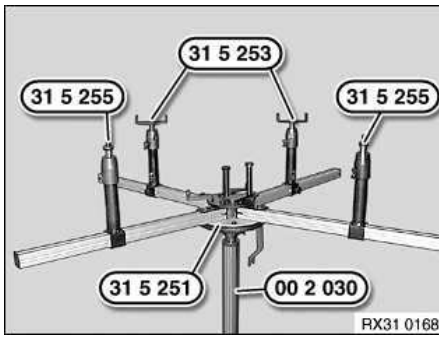
- Unfasten nut (1).
- (2) Pull out screw.
- Detach the wishbone (3) from the swivel bearing .



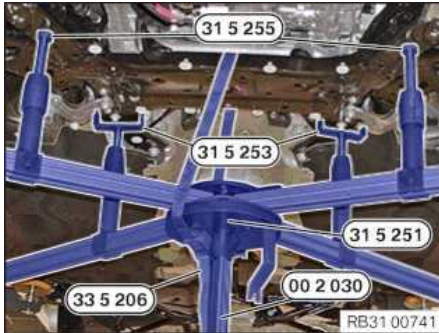
NOTICE

Perform the operations on the left and right side.

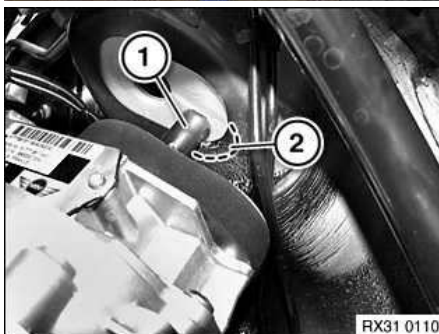
- Unfasten nut (1).
- Detach the track rod (2) from the swivel bearing.



- Fit the special tool completely onto the workshop jack **0 490 133 (00 2 030)** with an auxiliary person.
 - Insert special tools in telescopic supports of a profile rail pair.
 - Insert special tools in telescopic supports of other profile rail pair.
- Note:** In a profile rail pair, two profile rails are connected to one another by gearing.



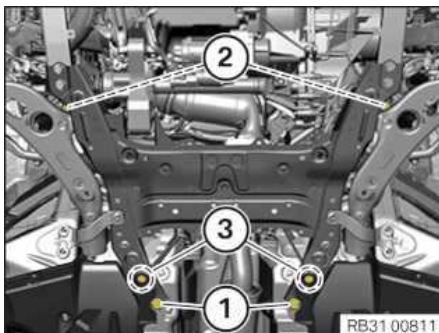
- Align special tools and to front axle support.
 - Support front axle support by operating workshop jack **0 490 133 (00 2 030)**.
- Note:** The centre of gravity of the front axle support must be positioned centrally over the workshop jack!
- Secure front axle support with special tool to special tool.



TECHNICAL INFORMATION

Non-compliance with the regulations for installation and disassembly may result in component damage. All work must be performed with care and in compliance with the regulations.

- When raising and lowering the front axle support, make sure that the torsion bar (1) of the electromechanical steering gear (EPS) in area (2) does not collide with the bulkhead!
- Note:** Collision with the bulkhead may result in damage to the electromechanical steering gear (EPS)!



- If applicable, release the screws in area (3).
- Release screws (1) (front axle support, rear).
- Release screws (2) (front axle support, front).
- Bend the underbody panelling to the side in area (3).
- When lowering, release charge air cooler from its rubber mounts.
- Completely lower and remove the front axle.

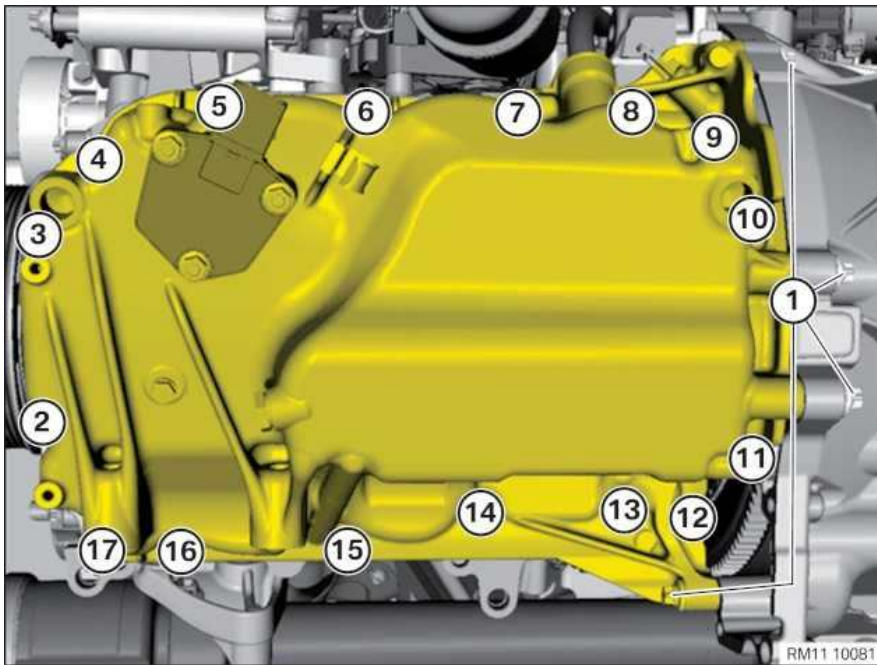


TECHNICAL INFORMATION

Note the information on thread repairs using Helicoil thread inserts.
For more information see: 41 00 ... Notes on repairing threads

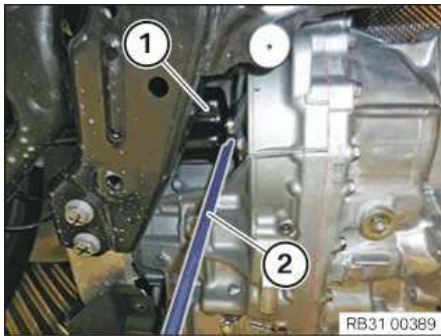
- Check threads for damage; if necessary, repair with Helicoil thread inserts.

26 – Release transmission-side bolting connection oil sump



- Unscrew the bolts (1) from the transmission.

27 – Partially removing the left output shaft



- Protect the output shaft (1) from falling.
- Lever out the output shaft (1) with a mounting lever (2) from the transmission.
- Tie up the output shaft (1).

► Removing the left radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

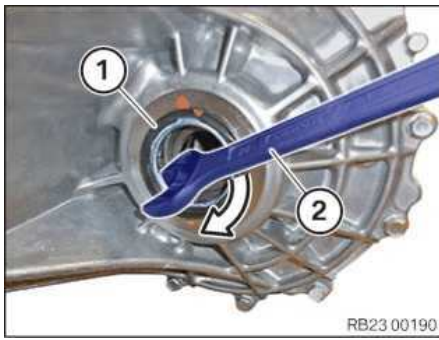


RISK OF DAMAGE

Damage to the transmission.

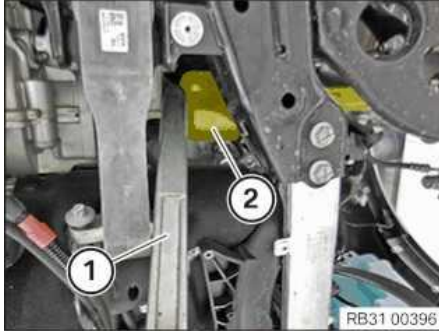
Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



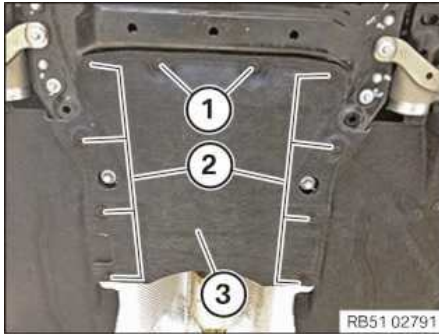
- Carefully remove the radial shaft seal (1) from the transmission using a suitable tool (2).

28 – Partially removing right output shaft



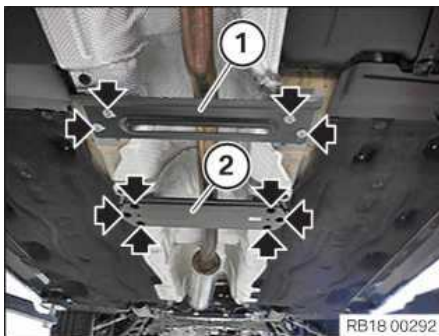
- Lever out the output shaft (2) with a mounting lever (1).
- Tie up output shaft (1).

29 – If installed: Removing rear underbody protection



- Loosen screws (1) and (2).
- Remove underbody protection (3).

30 – Removing the connecting support from the tunnel in front and back



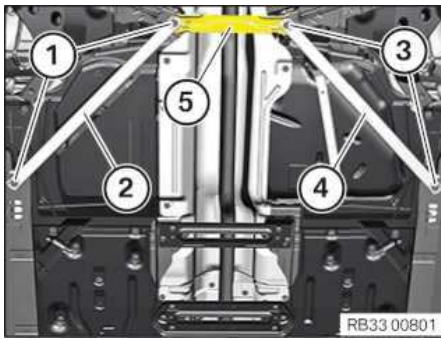
- Unscrew the bolts (arrows) from the connecting support (1).
- Feed out and remove the crossbeam (1).
- Unscrew the bolts (arrows) from the connecting support (2).
- Feed out and remove the crossbeam (2).

31 – Remove the cross strut with the torsion strut



TECHNICAL INFORMATION

Driving without a torsion strut is not permitted.



- Loosen screws (1).
- Thread out torsion strut (2) at left and remove.
- Loosen screws (3).
- Thread out torsion strut (4) at right and remove.
- Feed out and remove the cross-member (5).

32 – Remove exhaust system



WARNING

Hot surfaces.

Risk of burning!

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

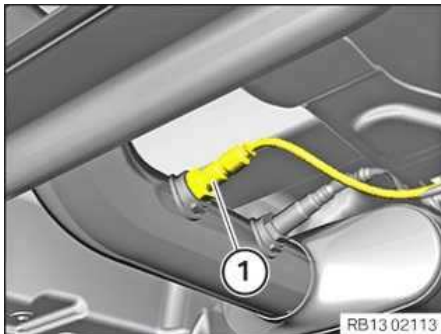


CAUTION

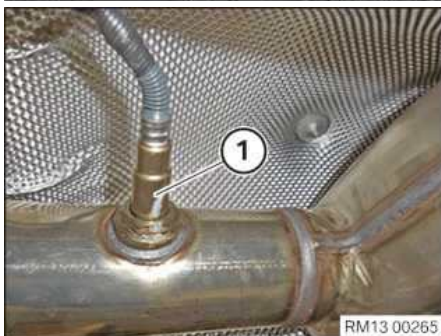
Heavy component.

Heavy components can lead to injury or damage.

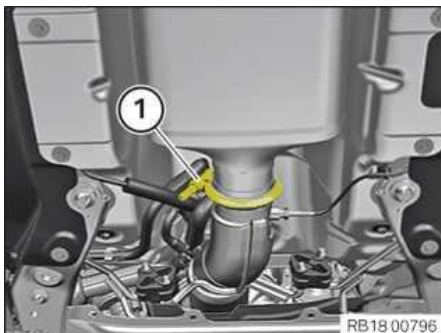
- Remove and install heavy components with the aid of another person/other persons.



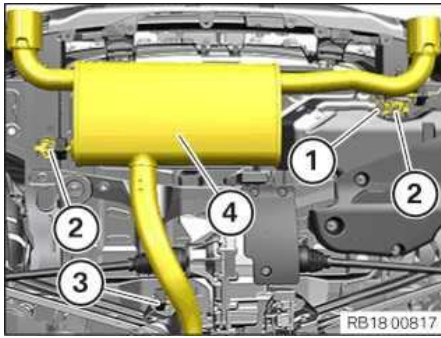
- Release the nitrogen oxide sensor (1) downstream of the SCR catalytic converter, guide it out and set it aside.



- Release the diesel particulate sensor (1), guide it out and set it aside.

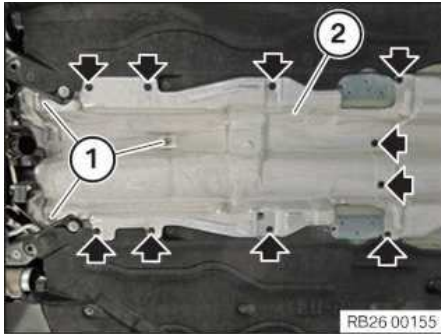


- Loosen V-band clamp (1).



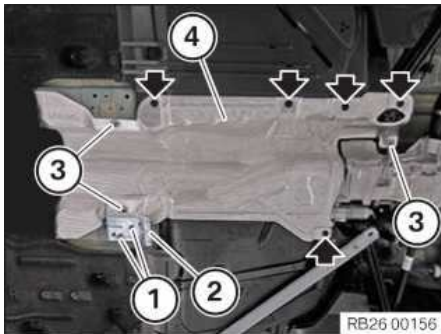
- Loosen screw (1).
- Loosen nuts (2).
- Release the rubber mount (3) of the exhaust system (4).
- Lower and guide out the exhaust system (4) with assistance of a second person and remove it.

33 – Remove front heat shield



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

34 – Remove heat shield at rear.



- Loosen screws (1).
- Guide out and remove holder (2).
- Remove screws (arrows).
- Loosen nuts (3).
- Guide the heat shield (4) out and remove it.

35 – Remove propeller shaft



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



RISK OF DAMAGE

Damage to propeller shaft during removal.

Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

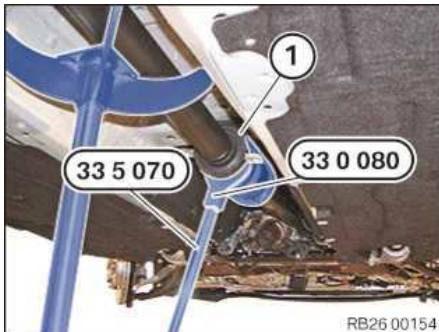
- Do not disassemble the three-hole flange, flexible disc and propeller shaft. The three-hole flange to the rear axle differential is balanced with the flexible disc and propeller shaft.
- Loosen the recessed nut against the direction of travel in clockwise direction. The propeller shaft must be loosened on the recessed nut only and exclusively in the direction of rotation otherwise the anti-twist lock of the bi-hexagonal flange nut is damaged.
- In the event of a damaged anti-twist lock on the bi-hexagonal flange nut: Replace the rear axle differential.



- Install the special tool between the front and rear propeller shaft.
- Make sure that the arrows on the special tool point forward in the direction of travel.



- Always support the propeller shaft (1) with a conventional jack.



- Protect the propeller shaft (1) with the special tools **0 495 554 (33 5 070)** and from twisting.



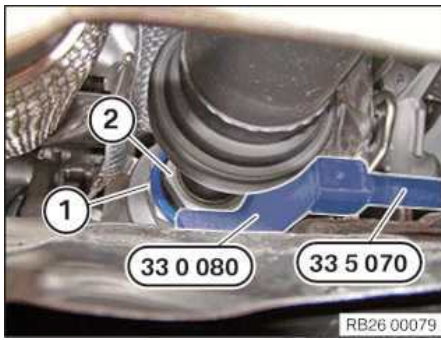
TECHNICAL INFORMATION

Compliance with the following instructions is required to avoid a humming noise from the propeller shaft after refitting the propeller shaft.

- Mark the installation position of the screw connection (1), the flexible disc (2) and the three-hole flange (3) on the same level.
- Loosen the screw connection (1).
- Loosen screws (1).



- Remove screws (arrows).
- Guide the propeller shaft out in the direction of the arrow and set it aside.

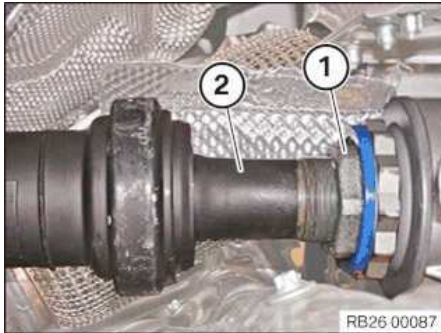


RISK OF DAMAGE

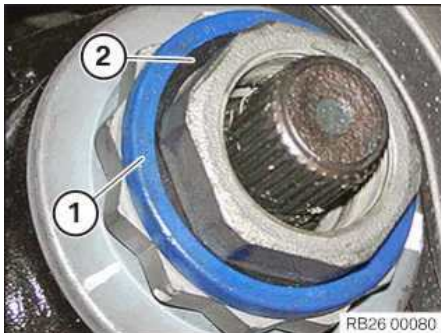
Damage to the transfer box.

Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

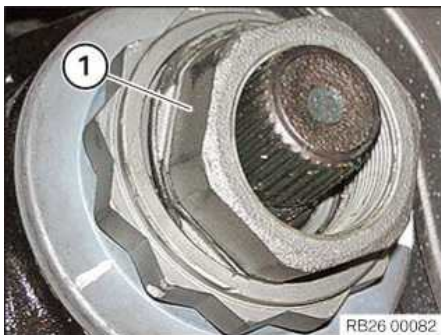
- Do not use the double hexagon head flange nut as counter support.
- Protect the recessed nut (2) on the transfer box from twisting with the special tools **0 495 554 (33 5 070)** and .
The recessed nut (2) on the transfer box must **not** be used to detach the propeller shaft.
The double hexagon flange nut (1) must **not** be used for counter support.
- Release the front propeller shaft with the special tools **0 495 554 (33 5 070)** and in the direction of the arrow.



- Thread the propeller shaft (2) out of the recessed nut (1) and remove.

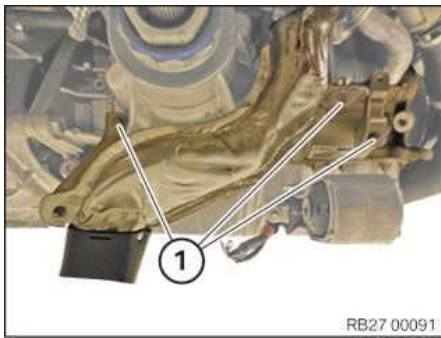


- Thread the retaining clip (1) and the seal (2) out and remove.

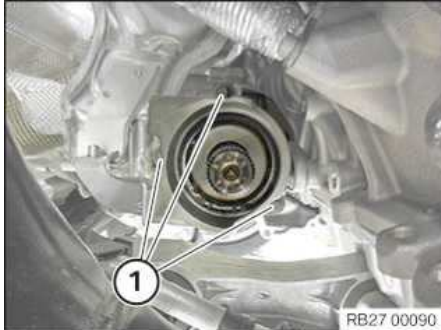


- Thread out and remove the recessed nut (1).

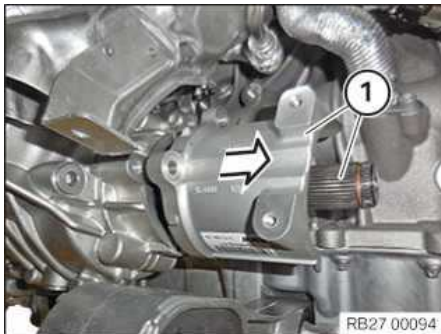
36 – Remove the intermediate shaft with the support tube



- With air duct installation: Loosen screws (1).
- Remove air duct



- Loosen screws (1).



- Pull the intermediate shaft with the support tube (1) out of the transfer box.

37 – Remove bracket with rubber mount

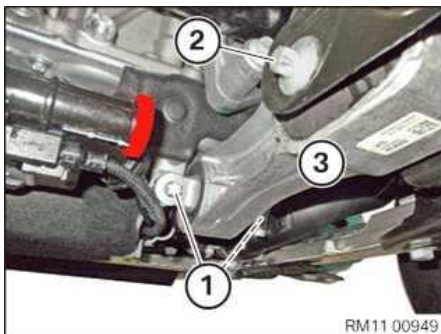


WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

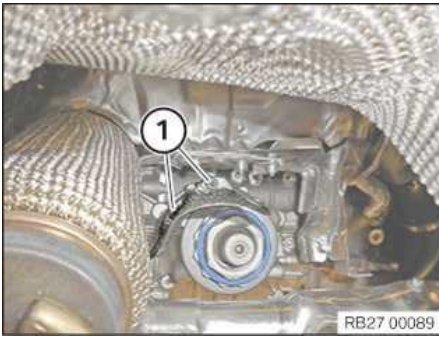
Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.



- Support the engine with the jack at a suitable point.
- Loosen screws (1) and (2).
- Guide out and remove holder (3).

38 – Remove transfer box (VTG)



- Loosen screws (1).
- Remove heat shield.



- Loosen screws (1).
- Remove the transfer box (VTG).

MAIN WORK

39 – Removing the manual gearbox (GS6-59DG, GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the engine block.

Damaged and corroded bolts will lead to major damage in the engine block and the transmission.

- It is imperative that protruding threads of the transmission bolts are checked for corrosion and damage prior to removal.
- It is imperative that all rust is removed from corroded threads and that they are cleaned prior to removal.
- Renew rusted and damaged bolts.

► Remove electronics box

Prerequisite

Battery earth lead is disconnected.



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.



RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.



TECHNICAL INFORMATION

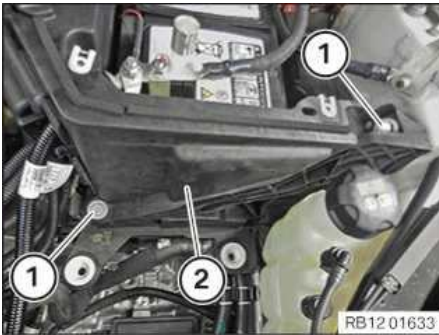
Follow instructions for removing and installing control units.

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

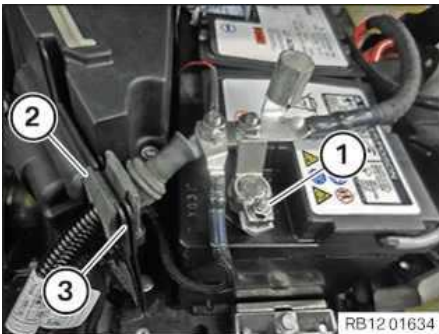


TECHNICAL INFORMATION

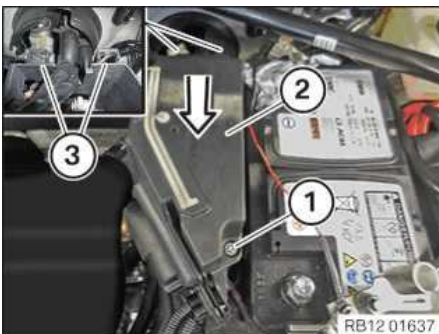
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



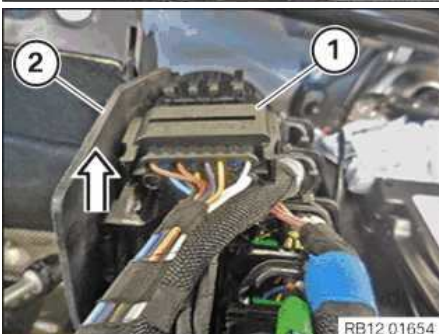
- Loosen screws (1).
- Guide out the tension strut (2) toward the top and remove it.



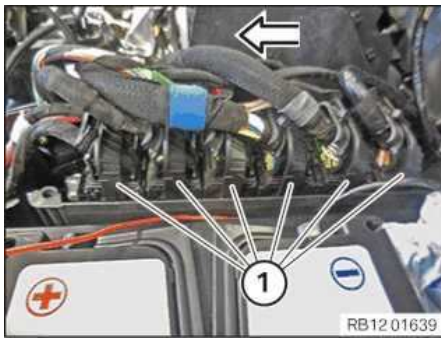
- Undo positive battery terminal (1).
- Feed out positive battery terminal (1) and set aside.
- Guide the positive battery cable (2) out of the holder (3) and lay to one side.



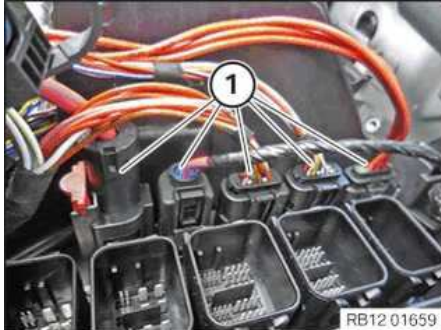
- Loosen screw (1).
- Unlock cover (2) and feed out and remove from the guides (3) in the direction of arrow.



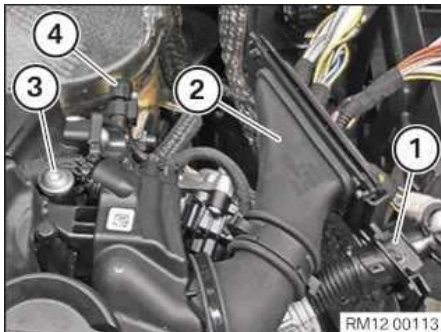
- Feed out connector (1) from the electronics box (2) and remove in the direction of arrow.
- Unlock and loosen connector (1).



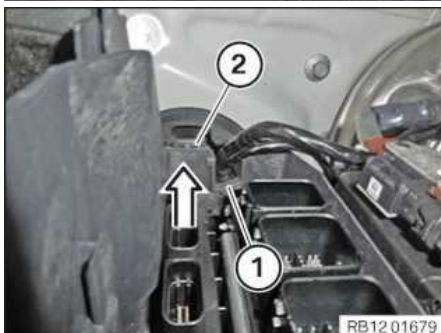
- Unlock and remove the connector (1) in the direction of the arrow.
- Feed out connector (1) and place to one side.



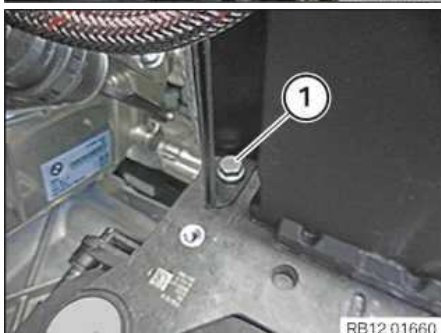
- Unlock and loosen connector (1).



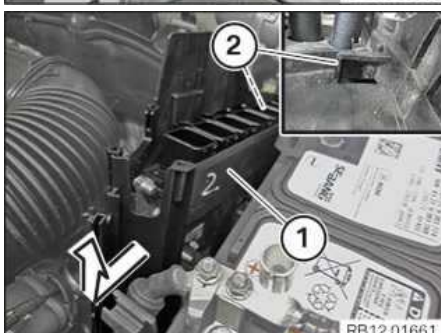
- Detach the wiring harness (1) from the electronics box.
- Detach the wiring harnesses (2) from electronics box.
- Loosen screw (3).
- Set wiring harnesses (1) and (2) aside.
- Unlock the connector (4) and disconnect it from the differential pressure sensor.



- Unlock and loosen holder (1).
- Guide the holder (1) out of the electronics box (2) in direction of arrow and set it aside.

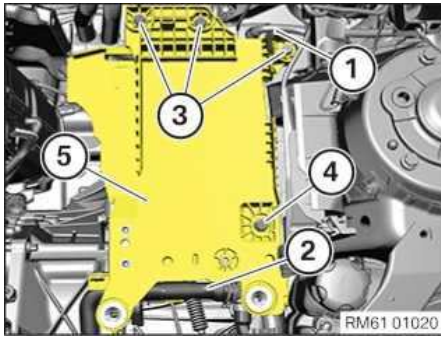


- Loosen screw (1).

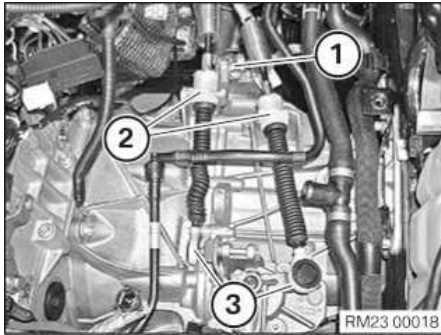


- Guide the electronics box (1) out of the guide (2) in direction of arrow and remove.

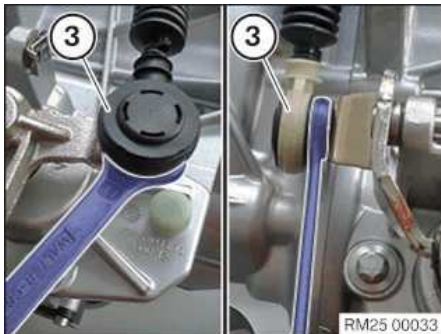
► Remove battery holder



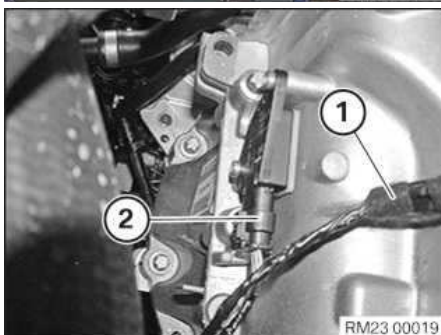
- Detach the cable clip (1) from the battery holder (5).
- Detach the coolant line (2) from the battery holder (5).
- Loosen screws (3).
- Loosen screw (4).
- Thread out and remove the battery holder (5).



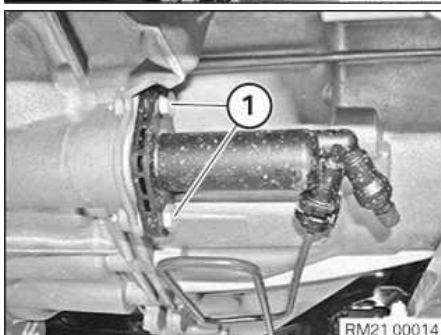
- Release the clip on the limit position/bracket (2) and bend the tabs slightly away from the limit position/bracket (2).
- Unscrew the bolt (1) and detach the ground strap from the transmission.



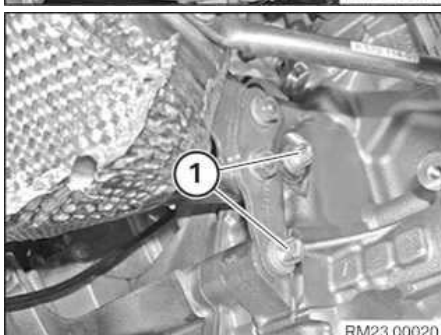
- Lever the fixtures (3) of the selector lever cables away from the ball joints with an open-end spanner SW13.



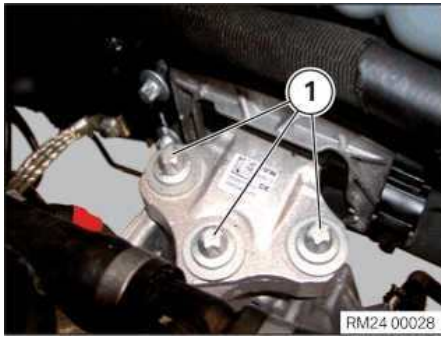
- Disconnect the plug connection (2) of the gear sensor.
- Detach the cable (1) with the holder from the transmission.



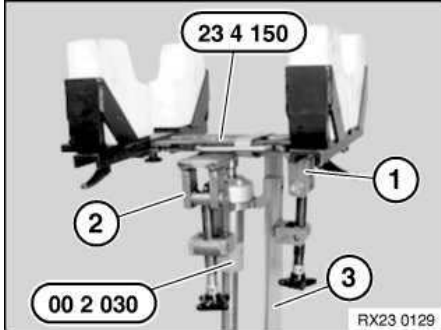
- Relieve tension on clutch slave cylinder slowly; otherwise air will be drawn in through sealing cup.
Pressure line of clutch slave cylinder remains connected.
- Unscrew the bolts (1) and remove the clutch slave cylinder.



- Loosen screws (1).



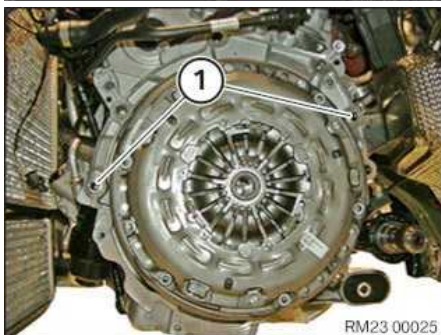
- Loosen screws (1).



- Support the transmission with special tool **0 490 133 (00 2 030)** and .
- Secure the transmission with the tensioning strap (3).



- Remove screws (arrows).
- Pull transmission downwards and remove.



- Check for correct fit of fitting sleeves(1).
- Replace damaged fitting sleeves.



- Remove any grease from the transmission input shaft (arrow) and clean the shaft.
- Do not grease transmission input shaft.
- Check clutch disc for frictional corrosion in gearing and replace if necessary.

40 – Installing the manual gearbox (GS6-59DG, GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

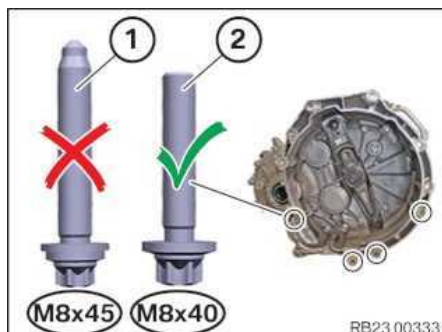


RISK OF DAMAGE

Damage to the engine block.

Damaged and corroded bolts will lead to major damage in the engine block and the transmission.

- It is imperative that protruding threads of the transmission bolts are checked for corrosion and damage prior to removal.
- It is imperative that all rust is removed from corroded threads and that they are cleaned prior to removal.
- Renew rusted and damaged bolts.



RISK OF DAMAGE

Component damage caused by incorrect screw length.

The use of screws with the incorrect screw length can damage the component.

- Check for correct screw length.
 - Re-install screws that correspond to the original screw length.
- **Wrong:** The screw (1) (starter motor screw connection) must **not** be used for the bottom screw connection of the transmission.
 - **Correct:** It is imperative to use the bolt (2) (M8x40) for the lower screw connection of the transmission and flange-mount the transmission.
 - Tighten screws (arrows).



Transmission to engine

M8x40		Tightening torque	19 Nm
M12x75		Tightening torque	66 Nm



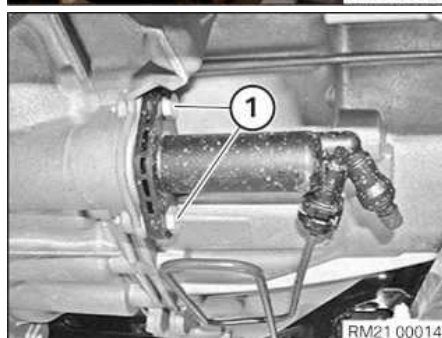
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Transmission mounting

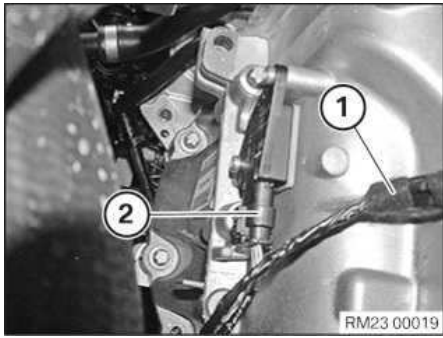
M10	Renew screws.	Jointing torque	40 Nm
		Angle of rotation	90 °



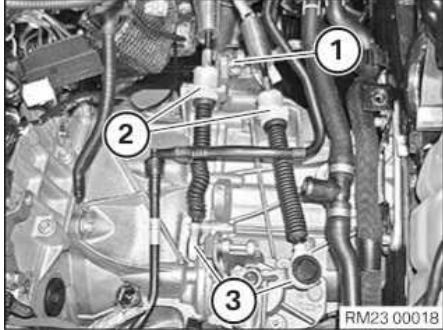
- Install clutch slave cylinder.
- Tighten the screws (1).

Clutch slave cylinder to transmission housing

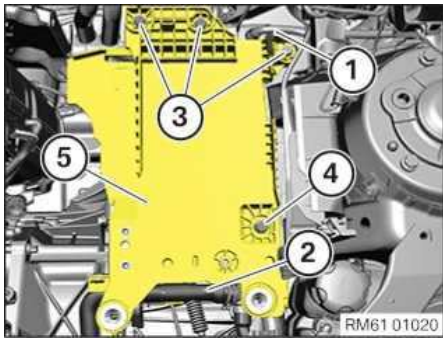
M8		Tightening torque	19 Nm
----	--	-------------------	-------



- Connect the plug connection (2) of the gear sensor.
- Clamp the cable (1) with the holder to the transmission.



- Tighten the ground strap on the transmission with the screw (1).
- Clip in the clip on the stop/holder (2).
- Attach the selector lever cables (3) on the ball joints.



► Install the battery holder

- Feed in and install the battery holder (5).
- Hand-tighten the bolt (4).
- Hand-tighten the bolts (3).
- Tighten down screw (2).

Battery holder to engine support

Hexagon screw M8x30		Tightening torque	19 Nm
------------------------	--	-------------------	-------

- Tighten down screws (3).

Battery holder to engine support

Hexagon screw M8x30		Tightening torque	19 Nm
------------------------	--	-------------------	-------

- Fasten the coolant line (2) on the battery holder (5).
- Fasten the cable clip (1) on the battery holder (5).

► Partially install vehicle battery

- Install vehicle battery (4).
- Correctly position the holder (3).
- Tighten down screw (2).

Battery terminal rail to battery tray

M8			19 Nm
----	--	--	-------

- Fit and clip the vent hose (1) in.



► Check the vent holes of the battery



WARNING

Gas emission.

Danger of injury! Danger of explosion!

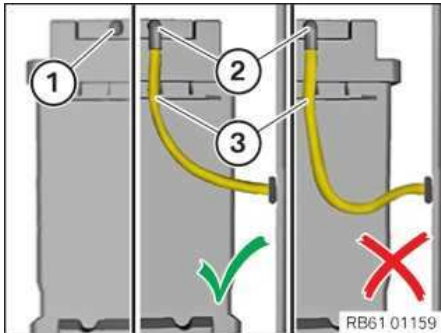
- Assign the vent holes correctly.
- Route the vent hose correctly.

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).

**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.

◀

► **Install electronics box**

Prerequisite

Battery earth lead is disconnected.

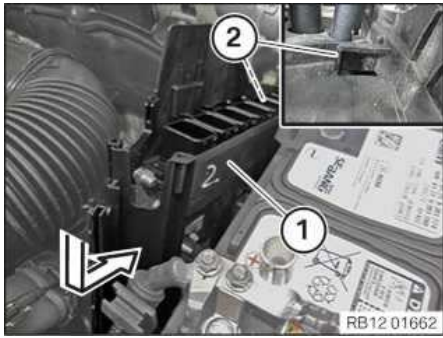


RISK OF DAMAGE

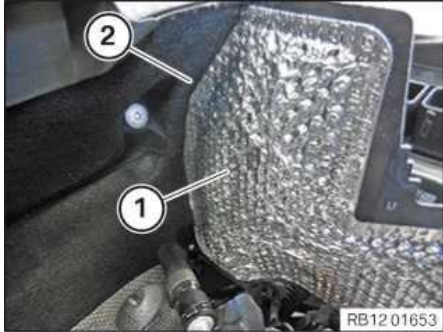
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

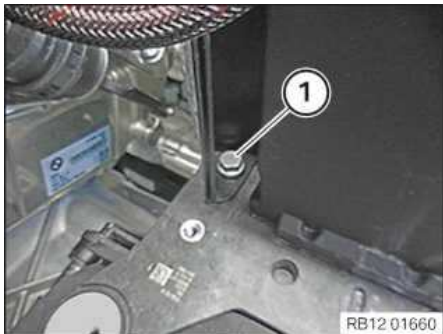
- Route all cables without abrasions, do not trap and crush.



- Guide in and install the electronics box (1) into the guide (2) in direction of arrow.



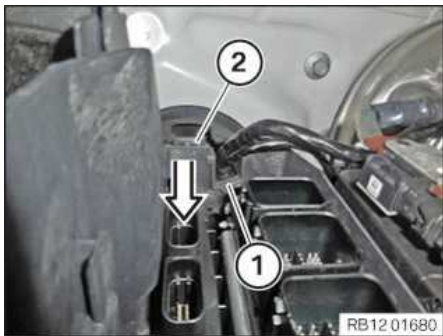
- Make sure that the electronics box (1) is positioned correctly on the bulkhead (2).



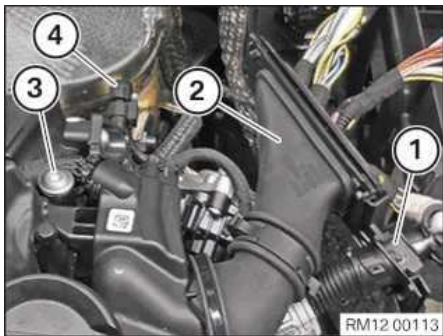
- Tighten down screw (1).

Electronics box to battery tray

M8X16		Tightening torque	15 Nm
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- Guide in and install the holder (1) in the electronics box (2) in direction of arrow.
- Make sure the bracket (1) engages audibly.

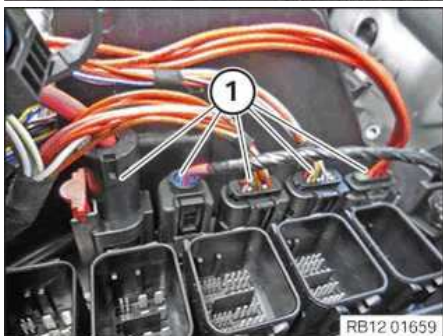


- Lay vehicle wiring harnesses (1) and (2) and mount on electronics box.
- Tighten down screw (3).

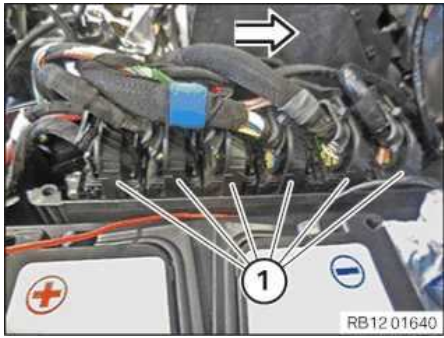
Wiring harness to cylinder head cover

TS5x20		Tightening torque	3,5 Nm
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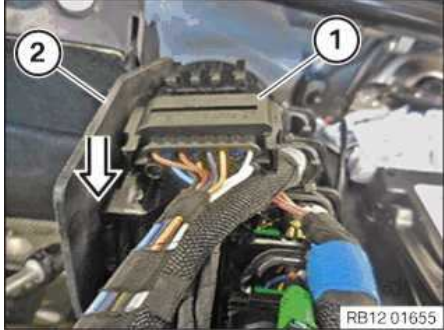
- Attach connector (4) to the differential pressure sensor and lock it audibly.



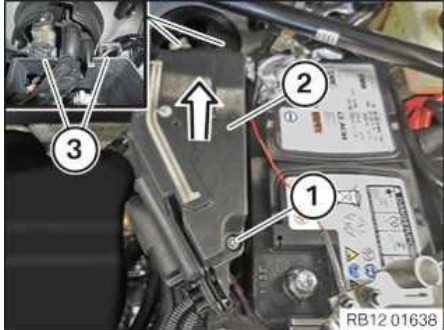
- Connect and lock the connector (1).
- Make sure the connectors (1) engage audibly.



- Connect connector (1) in direction of arrow and lock.
- Make sure the connectors (1) engage audibly.



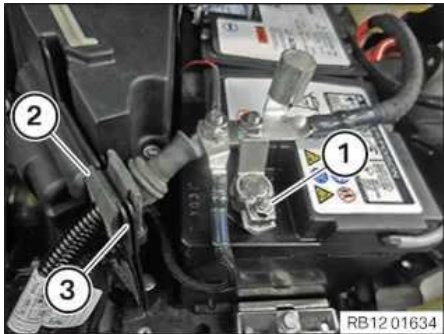
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.
- Insert the connector (1) in the direction of arrow at the electronics box (2) and install.



- Insert the cover (2) into the guides (3) in the direction of arrow and install.
- Make sure the cover audibly engages (2) in the guides (3).
- Tighten down screw (1).

Cover to electronics box

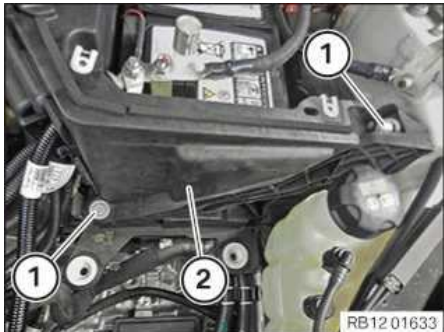
RF5x26.5		Tightening torque	2,5 Nm
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- Thread in positive battery cable (2) on holder (3) and install.
- Feed in and install positive battery terminal (1).
- Tighten positive battery terminal (1).

Positive battery terminal to battery

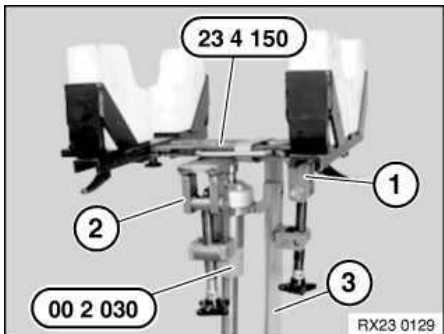
NutM6		Tightening torque	5 Nm
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- Feed in and install tension strut (2).
- Tighten the screws (1).

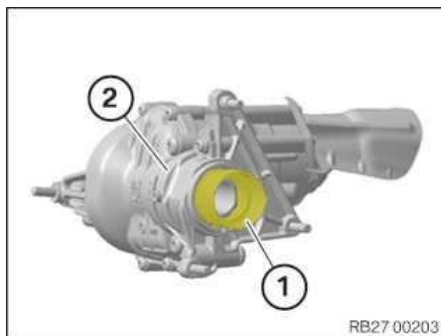
Tension strut to spring strut dome/battery tray

M8		Tightening torque	19 Nm
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- Loosening the tensioning strap (3).
- Remove special tools **0 490 133 (00 2 030)** and **23 4 150**.

41 – Install the transfer box (VTG)



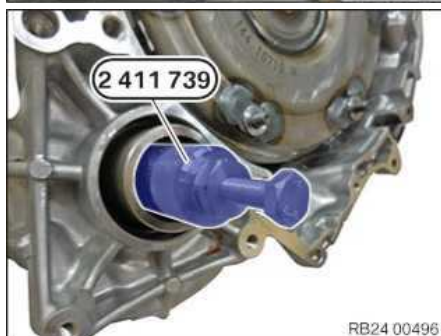
- If intermediate shaft (1) gets caught on transfer box (VTG) (2), renew intermediate shaft (1) and the radial shaft seals in the automatic or manual transmission.



- Screw special tool **2 409 025** into the outer radial shaft seal.
- Turn the screw on the special tool **2 409 025** until the outer radial shaft seal has been pulled out.



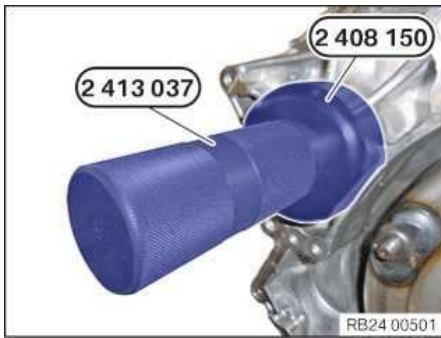
- Insert special tool **2 411 739** into the inner radial shaft seal.



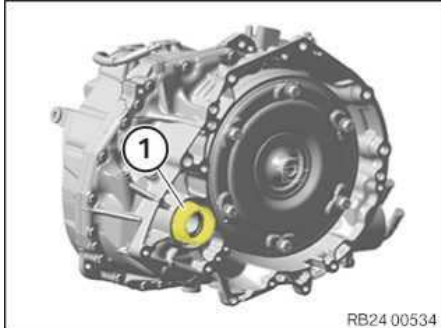
- Screw special tool **2 411 739** into the inner radial shaft seal.
- Turn the screw on the special tool **2 411 739** until the inner radial shaft seal has been pulled out.



- Drive in the inner radial shaft seal using special tools **2 408 152** and **2 413 037** up to the limit position.



- Drive in the outer radial shaft seal using special tools **2 413 037** and **2 408 150** up to the limit position.



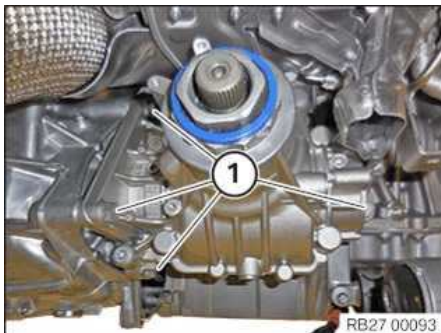
- If necessary, connect the new intermediate shaft (1) to the output flange of the automatic transmission or manual transmission.



- Coat the inside of the output flange (arrows) evenly with approx. 5 g of grease.

Expendable materials

Lubricating grease Optitemp HT 1 LF	50 g, Tube	83230417754
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- Install the transfer box (VTG).
- Tighten the screws (1).

Transfer box to transmission

M10		Tightening torque	56 Nm
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- Install heat shield.
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Heat shield to transfer box

M6	Renew screws.	Tightening torque	6 Nm
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- Check the transfer box oil level



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Check transfer case oil level, correct:
- Open the oil filler plug (1).
- Check transfer box oil level.
- If necessary, top up transmission oil up to the lower edge of the oil filler plug opening (1).

Transmission oil

Technically suitable transfer box and electrical transmission oils

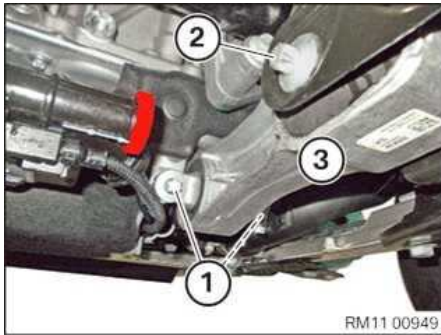
[Main group 27](#)

- Tighten the oil filler plug (1).

Oil filler plug on transfer box (VTG)

M18x1.5		Tightening torque	35 Nm
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42 – Install the holder with the rubber mount



- Insert and install the holder (3).
- Tighten the screws (1) and (2) hand-tight.
- Release jack.
- Tighten down screw (2).

Holder to front axle support

M12		Tightening torque	100 Nm
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- Tighten the screws (1).

Bracket to oil sump

M12		Tightening torque	100 Nm
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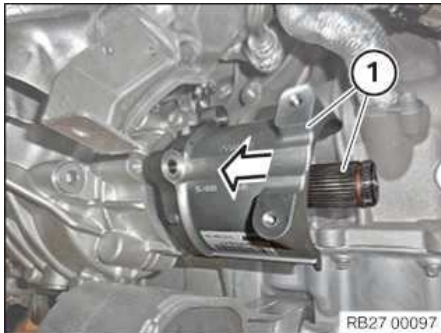
43 – Install the intermediate shaft with the support tube



- Coat gearing of the intermediate shaft uniformly with 5 g of grease.

Expendable materials

Lubricating grease Optitemp HT 1 LF	50 g, Tube	83230417754
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- Install the intermediate shaft with support tube (1) in the transfer box.



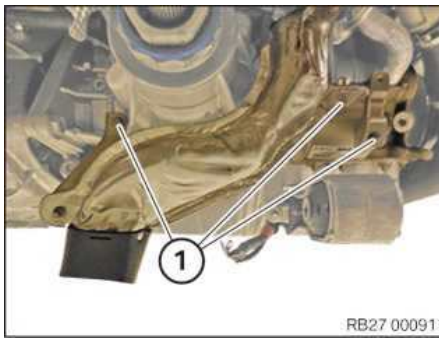
- Position screws (1).

Note: Check for correct screw length! Bolt M8x35 8.8

- Tighten the screws (1).

Intermediate shaft to transfer box

M8x35		Tightening torque	19 Nm
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- If installed: Install air duct.
- Tighten the screws (1).

44 – Install propeller shaft.



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



RISK OF DAMAGE

Damage to the propeller shaft during installation.

Non-observance of the installation guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- Always renew the recessed nut on the rear axle differential. Screw locking must be available.
- Strictly observe a minimum hardening time of two hours after having screwed in the recessed nut. The hardening time may be longer at lower temperatures.

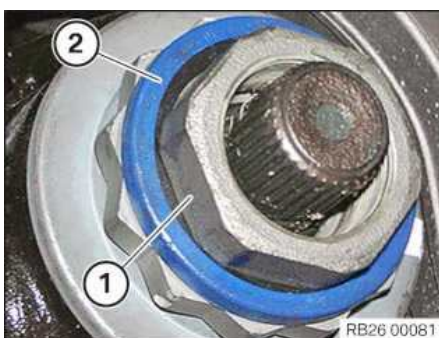


RISK OF DAMAGE

Damage to the transfer box.

Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

- Do not use the double hexagon head flange nut as counter support.



- Renew recessed nut (1).
- Parts:** Insert nut
- Renew the retaining clip (2) and the seal.
- Parts:** Retaining clip, seal
- Insert the seal with the recessed nut (1) and install.
 - Insert the retaining clip (2) and install.
 - Make sure that recessed nut (1) is screwed in within 5 min.
 - Make sure that the hardening time of **minimum 2 h** for the recessed nut is observed.
- The hardening time must be extended at lower temperatures.



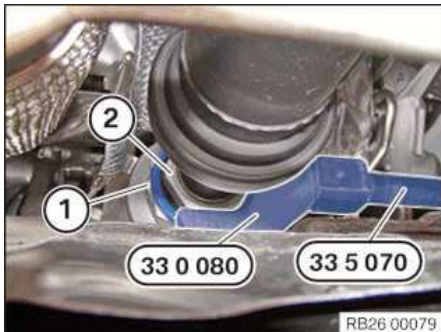
- Insert the propeller shaft (1) and install.
- Always support the propeller shaft (1) with a conventional jack.



- Hand-tighten the bolts (1).



- Push the propeller shaft (2) against the recessed nut (1) up to the limit position.
- Screw the propeller shaft (2) at least 2 thread starts onto the recessed nut (1) by hand.



RISK OF DAMAGE

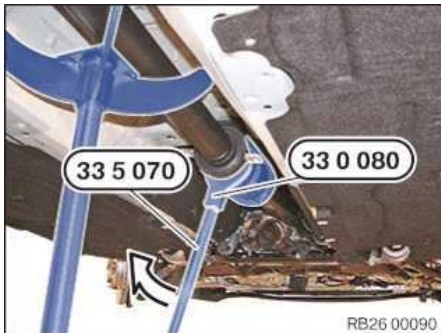
Damage to the transfer box.

Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

- Do not use the double hexagon head flange nut as counter support.
- Protect the recessed nut (2) on the transfer box from twisting with the special tools **0 495 554 (33 5 070)** and .
The recessed nut (2) on the transfer box must **not** be used to tighten the propeller shaft.
The double hexagon flange nut (1) must **not** be used for counter support.
- Tighten the front propeller shaft with the special tools **0 495 554 (33 5 070)** and in the direction of the arrow.

Propeller shaft to transfer box

		Tightening torque	80 Nm
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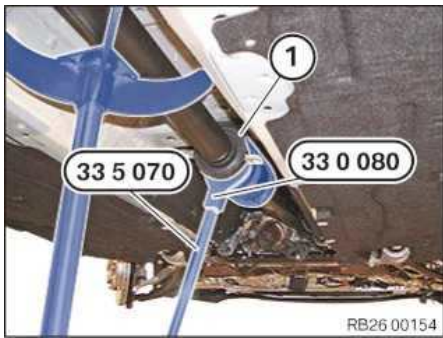
TECHNICAL INFORMATION

Compliance with the following instructions is required to avoid a humming noise from the propeller shaft after refitting the propeller shaft.

- Assemble the screw connection (1) of the flexible disc (2) and the three-hole flange (3) according to the mark.
- Renew screws (1).

Parts: Bolts

- Hand-tighten the bolts (1).



- Protect the propeller shaft (1) with the special tools **0 495 554 (33 5 070)** and from twisting.



- Tighten the bolts with the special tools **0 490 504 (00 9 120)** and .

Flexible disc to rear axle final drive

M12x1.5	Renew screws.	Tightening torque	55 Nm 90 °
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- Tighten the screws (1).

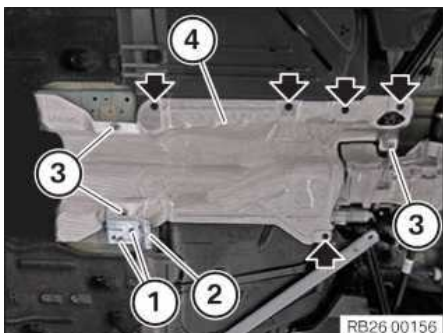
Centre mount to body

M8		Tightening torque	19 Nm
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- Guide the special tool out between the front and rear propeller shaft and remove.

45 – Installing the rear heat shield



- Insert and install the heat shield (4).
- Tighten screws (arrows).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
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- Tighten nuts (3).

Heat shield to body

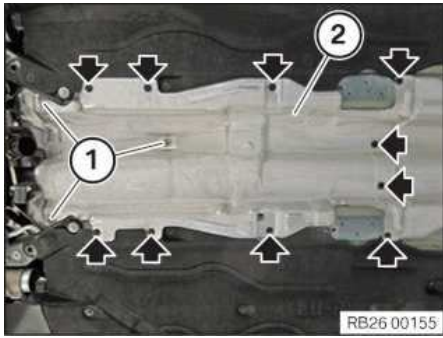
Bolts/nut		Tightening torque	3 Nm
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- Insert and install the holder (2).
- Tighten the screws (1).

Bracket to body

M8		Tightening torque	21 Nm
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46 – Install the front heat shield



- Insert and install the heat shield (2).
- Tighten screws (arrows).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
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- Tighten nuts (1).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
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47 – Install exhaust system



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

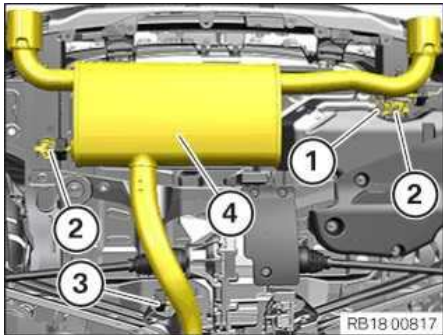


CAUTION

Heavy component.

Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.



- Feed in and install the exhaust system (4) with a second person.
- Renew nuts (2).

Parts: Nuts

- Tighten nuts (2).

Exhaust system to body

M8	Replace nuts.	Tightening torque	19 Nm
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- Tighten down screw (1).

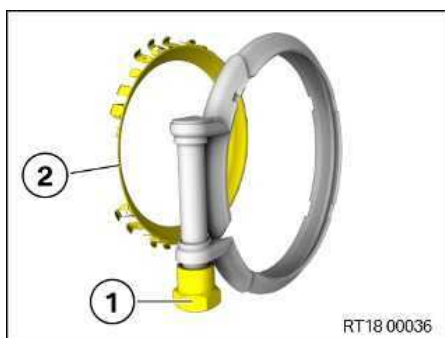
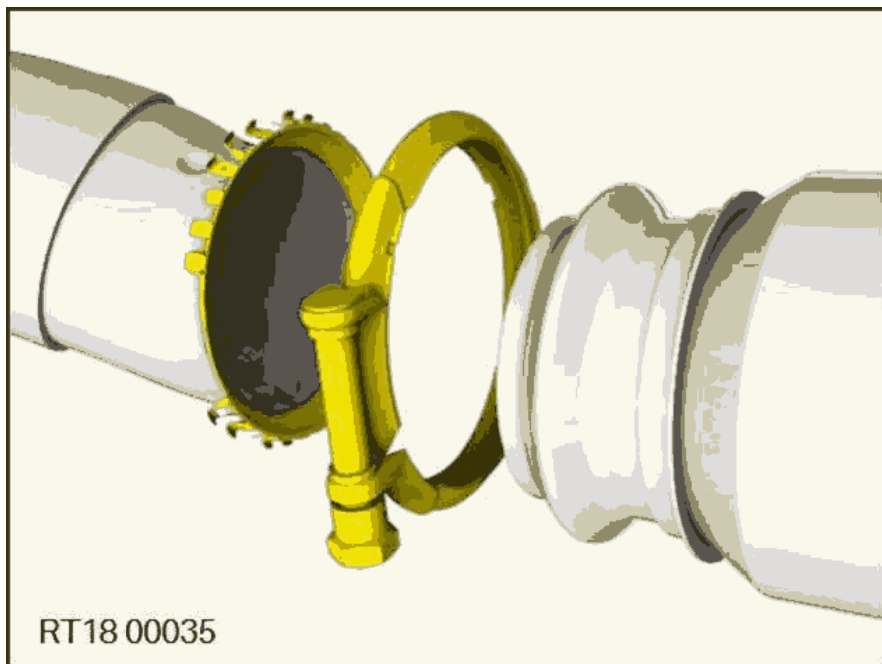
Exhaust bracket on body

Hexagon screw M8x30		Tightening torque	19 Nm
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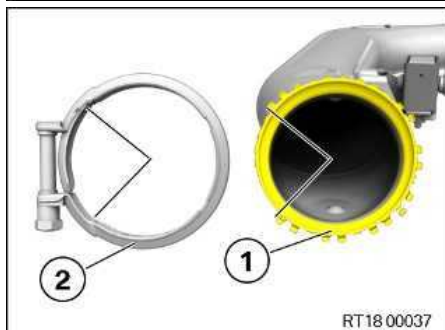
- Check the rubber mount (3) for damage and renew as needed.
- Mount rubber mount (3) on the exhaust system (4).

► Install the V-clip

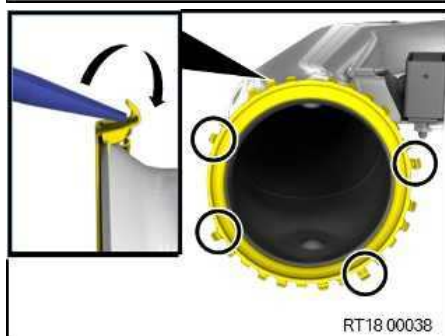
V-band clamp



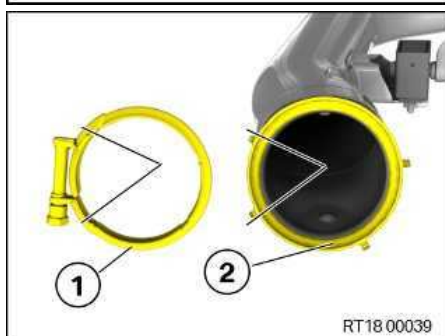
- Unscrew the nut (1) and remove the sealing ring (2).



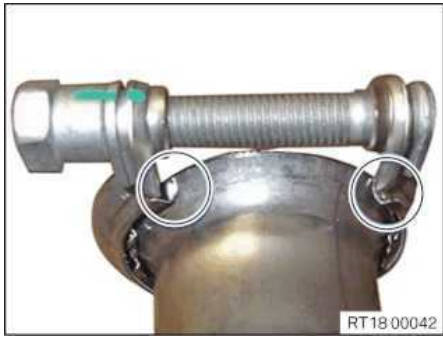
- Renew the V-clip (2).
- Parts:** V-band clamp
- Mount the sealing ring (1) on the exhaust system.
 - Ensure that the sealing ring (1) for the V-clip (2) is positioned correctly.



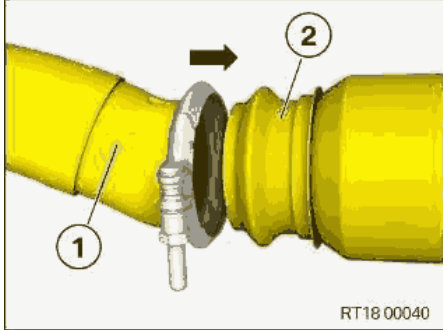
- Bend all sheet metal tabs over with a suitable tool, except those in the marked areas.



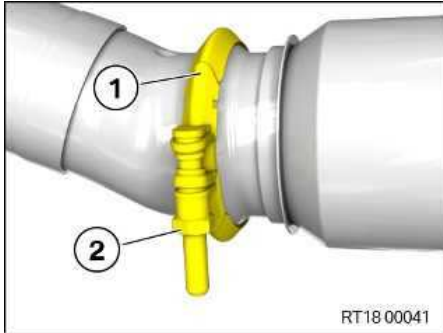
- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).



- Make sure that the V-clip rests against the sheet metal tabs after mounting (marks).



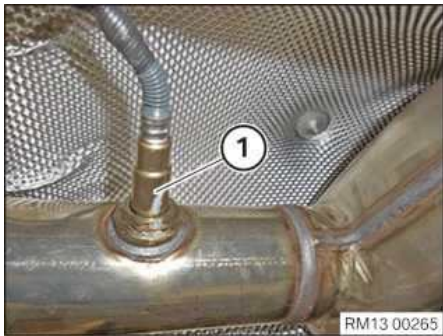
- Connect the exhaust system (1) with the catalytic converter (2) and position correctly.



- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

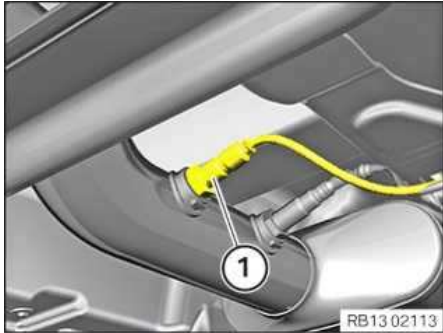
V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm
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- Feed in, install and tighten diesel particulate sensor (1).

Diesel particulate sensor to exhaust system

Sensor		Tightening torque	50 Nm
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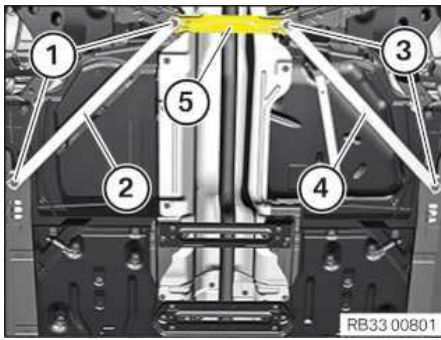


- Feed in, install and tighten nitrogen oxide sensor (1).

Nitrogen oxide sensor downstream of SCR catalytic converter

Sensor		Tightening torque	50 Nm
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48 – Install the cross-member with torsion struts



- Insert and install the cross-member (5).
 - Thread in torsion strut (4) at right and install.
 - Renew screws (3).
- Parts:** Bolts
- Tighten down screws (3).

Cross-member/torsion strut to axle support and mounting

M12x48	Renew screws.	Jointing torque	100 Nm
		Angle of rotation	90 °

- Guide in and install the left torsion strut (2).
- Renew screws (1).

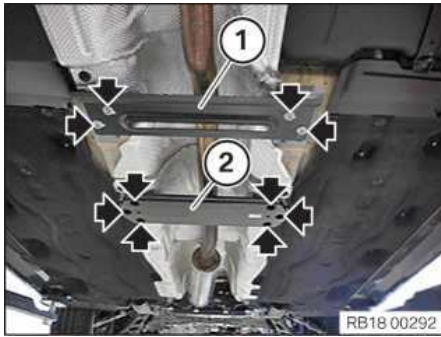
Parts: Bolts

- Tighten the screws (1).

Cross-member/torsion strut to axle support and mounting

M12x48	Renew screws.	Jointing torque	100 Nm
		Angle of rotation	90 °

49 – Install the connecting support on the tunnel in front and back



- Insert and install connecting supports (2).
- Tighten the screws (arrows) from the connecting support (2).

Front connection carrier to body

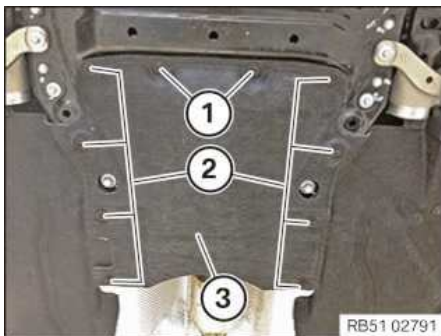
M10x18		Tightening torque	56 Nm
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- Insert and install connecting supports (1).
- Tighten the screws (arrows) from the connecting support (1).

Rear connection carrier to body

M8x18		Tightening torque	28 Nm
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50 – If installed: Installing underbody protection at rear



- Install the underbody protection (3).
- Tighten down screws (1) and (2).

Underbody protection to body

Screw		Tightening torque	3 Nm
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51 – Installing right output shaft partially



- Renew the circlip (1).
- Parts:** Circlip
- Slide output shaft into the transmission as far as the limit position.
 - Check for secure seat by levering.

52 – Partially installing the left output shaft

- Installing the left radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

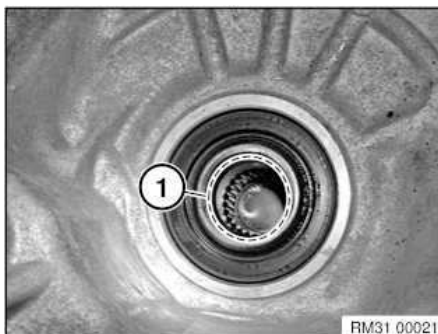
Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

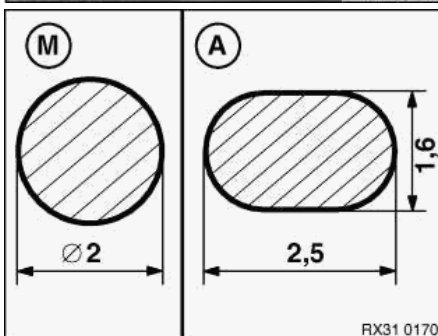
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



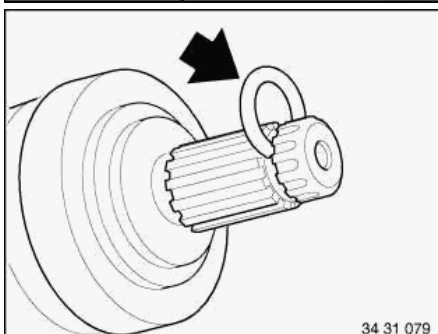
- Coat sealing lips of radial shaft seal with transmission oil.
- Drive the radial shaft seal into the housing with the special tool **2 407 668** until the sealing ring finishes flush with the transmission housing.



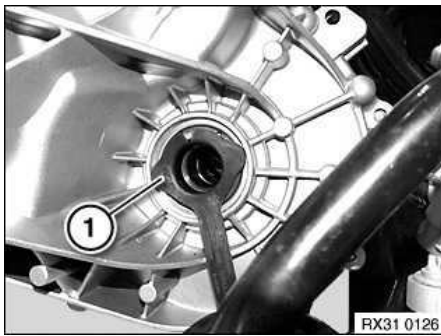
- **With automatic transmission only:**
 - Lever out O-ring (1).
 - Renew O-ring (1).
- Parts:** O-ring
- Insert new O-ring (1).



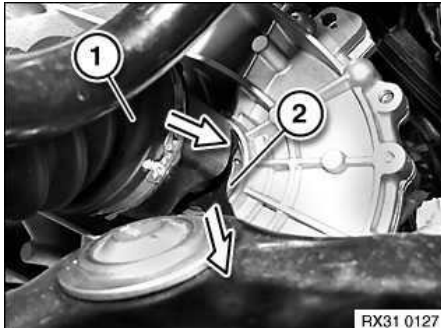
- Do not mix up circlips.
- Different types of output shafts fitted:
- **M:** Manual transmission
 - **A:** Automatic transmission



- Renew circlip (arrow).

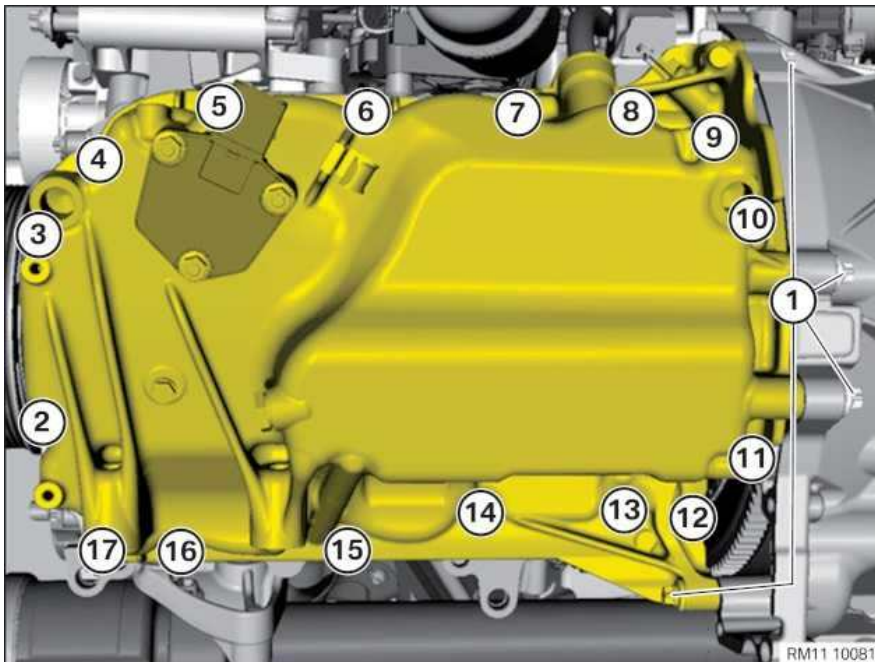


- Insert installation protection ring (1) into the radial shaft seal.
- Make sure the tool fits over the lip of the radial shaft seal so there is no damage to sealing ring when the output shaft is inserted.



- Insert output shaft (1) into transmission.
- **Manual gearbox only:** Pull on the handle to remove the installation protection ring (2) and dispose of it.
- Slide output shaft (1) into the transmission as far as the limit position.
The output shaft (1) must engage audibly.
- Check for secure seat by levering.

53 – Tighten down transmission-side bolting connection oil sump

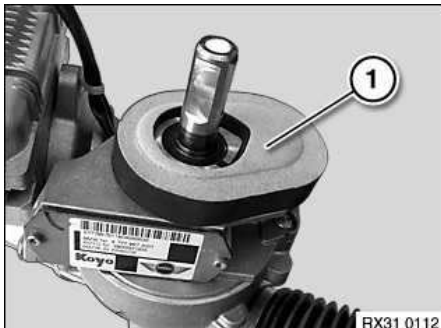


- Join transmission bolts (1) with 5 Nm.
- Tighten the transmission bolts (1) on the transmission.

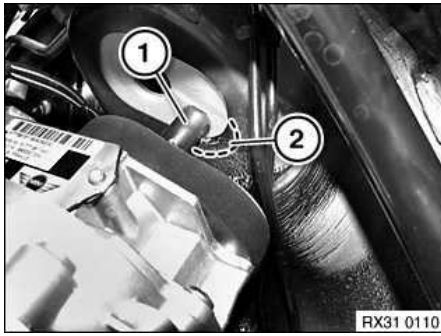
Transmission to oil sump

M8			19 Nm
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54 – Mount and secure the complete front axle



- Remove the seal (1).
- Clean surface on steering gear.
- Renew gasket (1).
Parts: Gasket
- Position the seal (1) and glue it on.

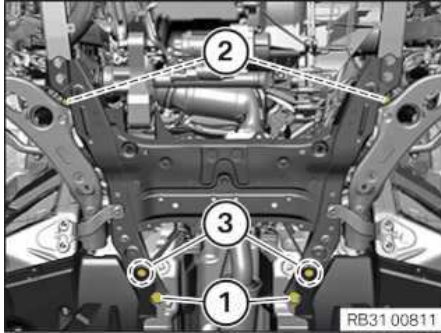


TECHNICAL INFORMATION

Non-compliance with the regulations for installation and disassembly may result in component damage. All work must be performed with care and in compliance with the regulations.

- When raising and lowering the front axle support, make sure that the torsion bar (1) of the electromechanical steering gear (EPS) in area (2) does not collide with the bulkhead!

Note: Collision with the bulkhead may result in damage to the electromechanical steering gear (EPS)!



- Position front axle support.
- Bend underbody panellings in the areas (3) to one side.
- Raise front axle support.
- When raising, insert charge air cooler into the rubber mount of the charge air cooler on cross member.
- Renew screws (1) and (2).

Parts: Bolts

- Tighten the screws (1).

Rear end of front axle support to body

M14 screw	Renew screw.	Tightening torque	175 Nm
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- Tighten down screws (2).

Front axle support, front to body

M12 screw	Renew screw.	Tightening torque	108 Nm
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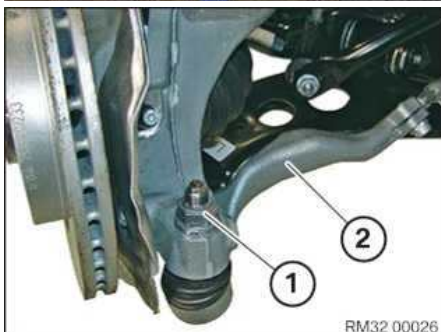
- If necessary, tighten the screws in the areas (3).

Underbody protection to body

Screw		Tightening torque	3 Nm
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- Remove special tool from special tool .
- Lower universal jack **0 490 133 (00 2 030)** with the special tool and place it to the side.



NOTICE

Perform the operations on the left and right side.

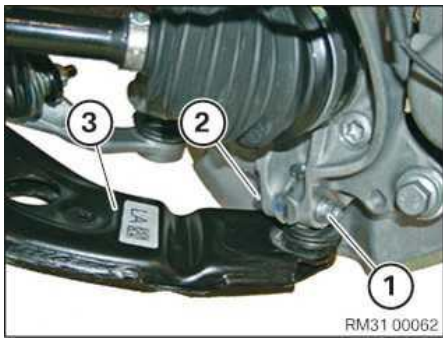
- Position the track rod (2) on the swivel bearing .
- Renew nut (1).

Parts: Nut

- Tighten nut (1).

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm
-----	------------	-------------------	--------



NOTICE

Perform the operations on the left and right side.

- Position the wishbone (3) on the swivel bearing .
- Renew the bolt (2) and the nut (1).

Parts: Bolt, nut

- Insert screw (2).
- Tighten nut (1).

Wishbone to swivel bearing

M10	Exclusively use the screw to tighten! Renew screw and nut.	Tightening torque	60 Nm
-----	---	-------------------	-------

55 – Install the mounted parts on the front axle support



NOTICE

Perform the operations on the left and right side.

- Renew screws (1).
- Parts:** Bolts
- Tighten the screws (1).

Holder, wishbone rubber mount, to body

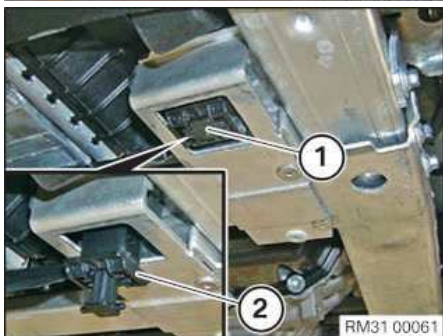
M10 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °



- Position the engine support (3) on the front axle support (1).
- Tighten down screw (2).

Holder with rubber mount to front axle support

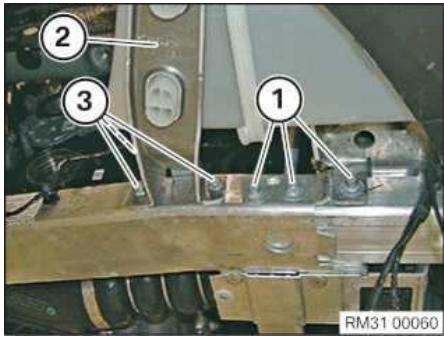
M12 screw			100 Nm
-----------	--	--	--------



NOTICE

Perform the operations on the left and right side.

- Position the lock (2).
- Lock the bracket (1) of the lock (2) of the holder for the charge air cooler.



- **Only on right side:** Position the holder for the washer fluid reservoir (2).
- Tighten down screws (3).

Washer fluid reservoir holder to front axle support adapter plate

		Tightening torque	10 Nm
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NOTICE

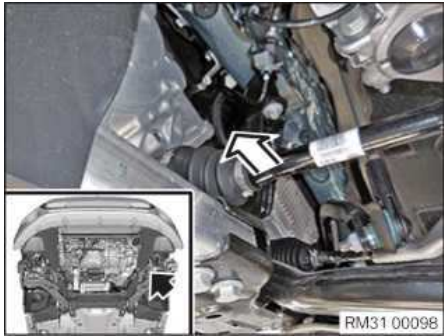
Perform the operations on the left and right side.

- Tighten the screws (1).

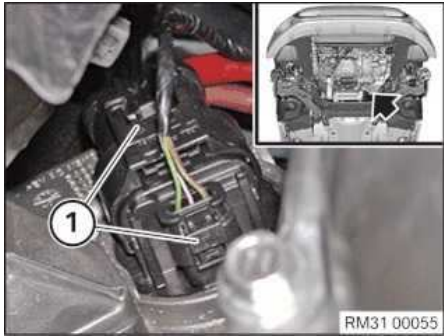
Deformation element, bottom, to adapter plate, front axle carrier

		Tightening torque	11,8 Nm
--	--	-------------------	---------

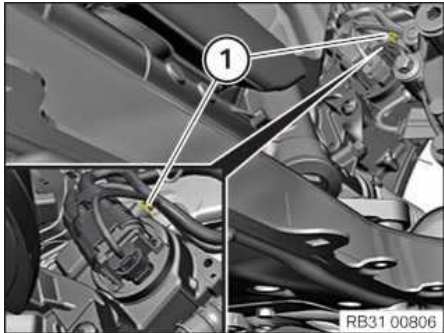
56 – Attaching connector at steering gear



- To connect the connector (see the following step): Connect the connector with the right hand. The connectors can be accessed via the left output shaft.



- Connect and lock connector (arrow) (1) with the steering gear.



- Fasten the wiring harness (1) on the steering gear.

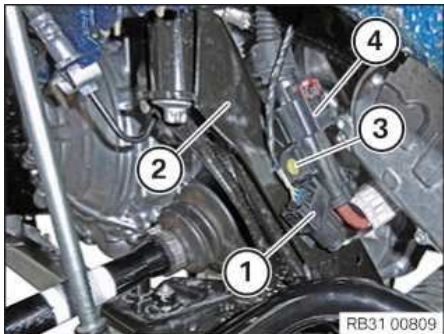
► If installed: Fasten the plug connections at the front axle support

- Position the plug connection (4) at the front axle support (2).
- Tighten down screw (3).

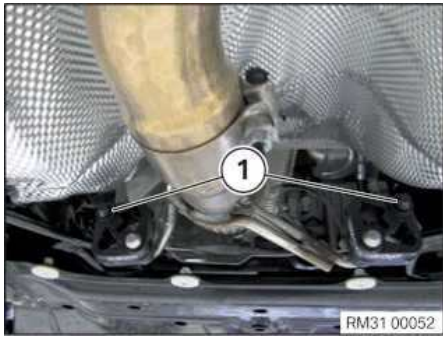
Holder to front axle support

Oval-head screw TS5 x 16		Tightening torque	2,6 Nm
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- Fasten the plug connection (1) at the front axle support (2).



57 – Securing rubber mount on front axle support



- Check rubber mount (1), replace if necessary.

Parts: Rubber mount

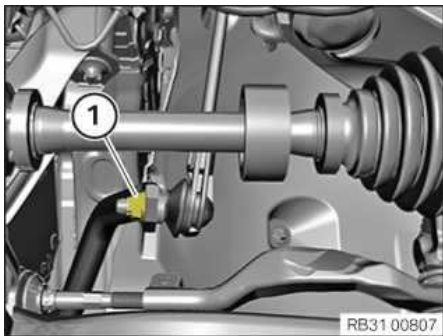
- Spray rubber mount (1) with lubricant and slide onto holder on front axle support.

58 – Securing anti-roll bar on left and right on the anti-roll bar link



NOTICE

Perform the operations on the left and right side.



► Fastening anti-roll bar on the anti-roll bar link

- Position the anti-roll bar link on the anti-roll bar .
- Renew nut (1).

Parts: Nut

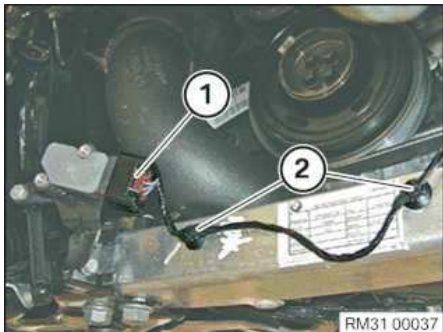
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Anti-roll bar link to anti-roll bar

M10	Renew nut.	Tightening torque	56 Nm
-----	------------	-------------------	-------

59 – With right installation: Securing the cable for the ride height sensor



- Secure the cable clip (2) on the adapter of the deformation element.
- Connect connectors (1) and lock.

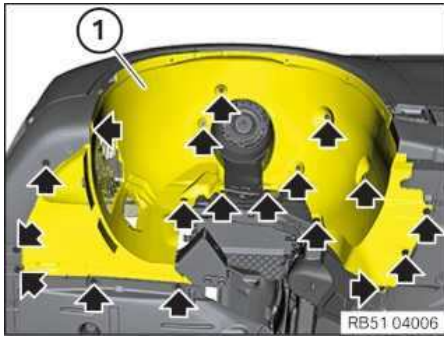
60 – Installing front left and right wheel arch cover



NOTICE

Perform the operations on the left and right side.

► Installing the front wheel arch cover



- Guide the wheel arch cover (1) in.
- Tighten all bolts and nuts (arrows).

Wheel arch cover to body

Plastic nut		Tightening torque	2,6 Nm
Screw		Tightening torque	2,6 Nm

Wheel arch cover to body

Screw		Tightening torque	2,5 Nm
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Wheel arch cover to body

Plastic nut		Tightening torque	3 Nm
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► Installing front wheel arch trim



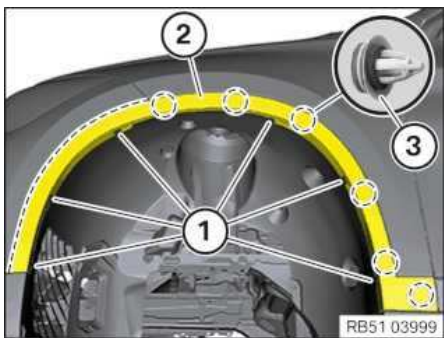
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



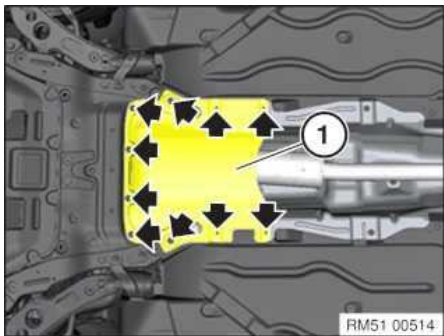
NOTICE

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



- Check the clips (3) for damage and renew where required.
The clips (3) must not be damaged or missing.
- Feed in wheel arch trim (2) and engage on the clips (3).
- Engage wheel arch trim (2) into the latch mechanisms on the bumper panel.
- Mount blind rivet (1) using the special tool **0 496 521 (00 2 230)**.

61 – If installed: Installing underbody protection at rear



- Position rear underbody protection (1).
- Tighten screws (arrows).

Underbody protection to body

Screw		Tightening torque	3 Nm
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62 – Installing front left or right wheel

► Mounting the wheel

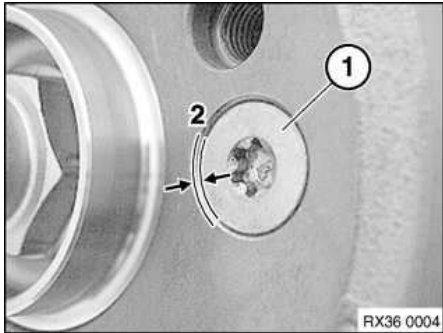
- Clean the contact surfaces between the brake disc and the wheel rim



TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool **2 344 011**.
Do not operate special tool **2 344 011** with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool **2 344 011**.
Do not operate special tool **2 344 011** with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).



- Renew mounting bolt (1).

Parts: Mounting bolt

- Check that the mounting bolt (1) for the brake disc is securely seated.

The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

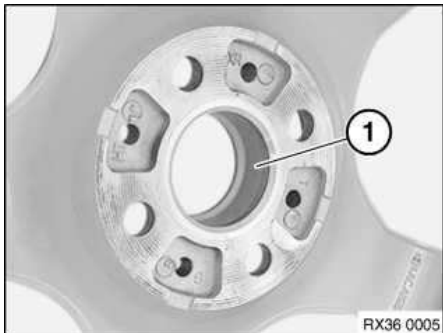
Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm
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Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

- Lightly grease the wheel centring (1) in the wheel rim; refer to additional information for grease for the wheel centring (1).





TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew corroded wheel bolts.

Parts: Wheel bolts

- Clean the wheel bolts.
- Check the wheel bolts and threads for damage, renew the wheel bolts if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M 14/AF 17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

63 – Installing starter motor



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 starter motor .
- Tighten the screws (1).

Starter motor to transmission

M8x45		Tightening torque	19 Nm
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- Feed the positive battery cable (2) in on the starter and install.
- Tighten nut (1).

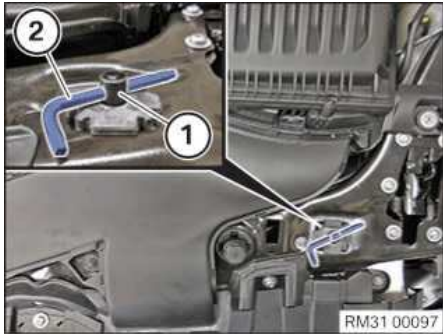
Battery positive lead to starter

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



- Insert and install the new sealing cap (2).
- Secure the sealing cap (2) in the direction of the arrow.
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

64 – Removing fastener for left and right radiator

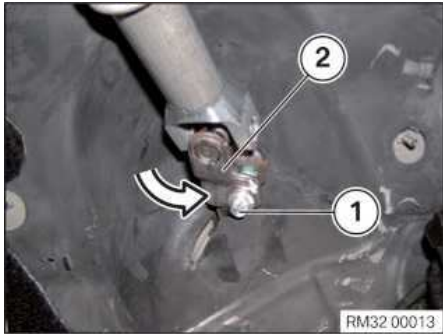


NOTICE

Perform the operations on the left and right side.

- Remove suitable tool (2) from the centering pin (1).

65 – Secure the steering shaft at the bottom on the steering gear



- Clean the screw lock residue from the screw thread in the universal joint (2).
 - Pivot the universal joint (2) in the direction of the arrow to the steering gear.
 - Renew the screw (1).
- Parts:** Screw
- Tighten down screw (1).

Lower steering shaft to steering gear

M10	Clean screw thread and remove remains of screw locking agent. Renew screw.	Tightening torque	28 Nm
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- **If installed:**
- Position the cover on the steering column (2).
- Tighten nuts (1).

Steering column cover to bulkhead

Plastic nut		Tightening torque	3 Nm
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66 – Remove the engine bridge



CAUTION

Heavy component.

Heavy components can lead to injury or damage.

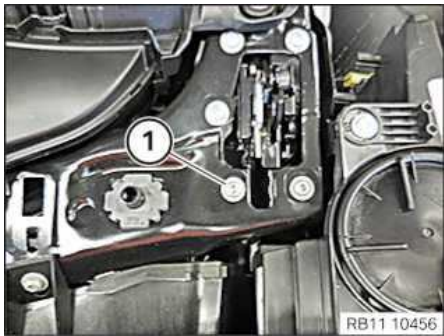
- Remove and install heavy components with the aid of another person/other persons.



- Detach the spindle screw (1) from the engine bridge.
- Unscrew the leg screws (2) and (3).
- Guide the engine bridge out of the vehicle with the help of another person and remove.



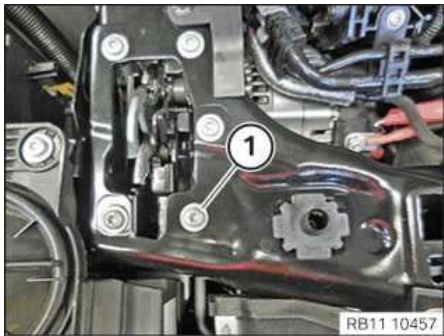
- Unscrew the bolts (1) of the special tool **2 459 012**.
- Feed out the special tool **2 459 012** at the cylinder head and remove.



- Tighten the screw (1) of the bonnet catch.

Cross connection on support for cross connection

M6x20		Tightening torque	12 Nm
-------	--	-------------------	-------

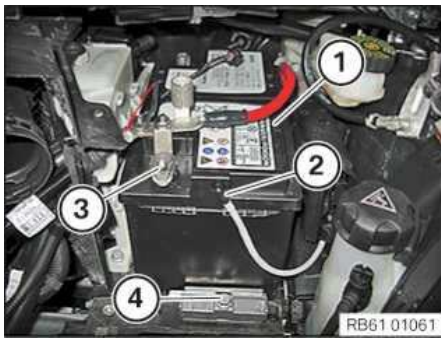


- Tighten the screw (1) of the bonnet catch.

Cross connection on support for cross connection

M6x20		Tightening torque	12 Nm
-------	--	-------------------	-------

67 – Install vehicle battery



- Install vehicle battery (1).
- Position the bracket and tighten with the screw (4) .

Battery terminal rail to battery tray

M8		19 Nm
----	--	-------

- Position the vent hose (2) and clip it in.
- Position the positive battery terminal and tighten with the nut (3) .

Battery terminal with IBS positive battery terminal / negative battery terminal

NutM6		5 Nm
-------	--	------

► 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.

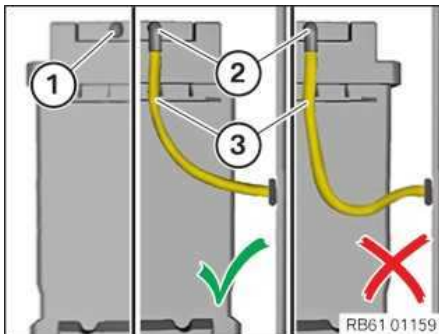


TECHNICAL INFORMATION

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).



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

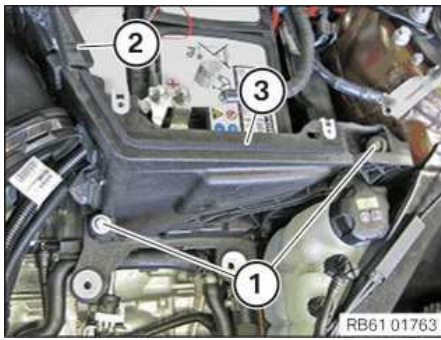
- Check if the vent hose (3) is routed to the outside with a downhill gradient (**no siphon formation!**).

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.



- Insert tension strut (3) and tighten with screws (1).

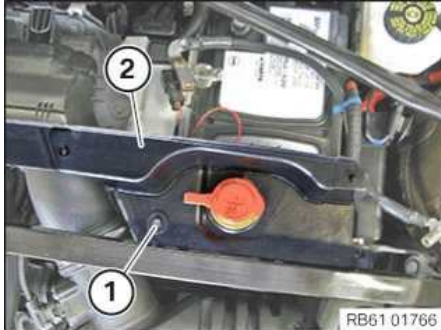
Trailing link

M8		Tightening torque	19 Nm
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- Tighten down screw (2).

Battery cover

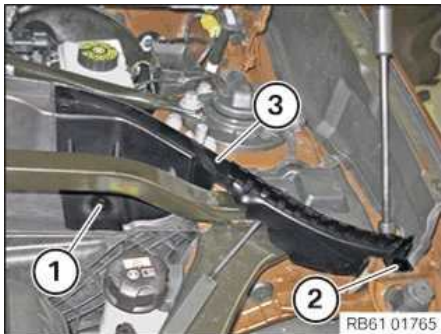
M8			2,8 Nm
----	--	--	--------



- Position the cover (2).
- Tighten down screw (1).

Battery cover

M8			2,8 Nm
----	--	--	--------



- Position the fixture for the gasket (3) and secure with the expanding rivet (2).
- Tighten down screw (1).

Battery cover

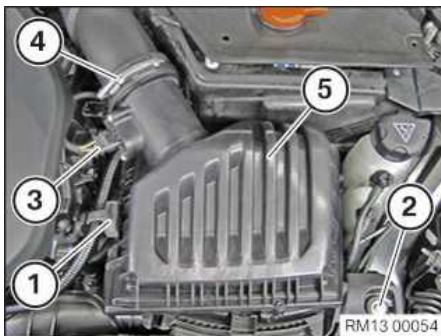
M8			2,8 Nm
----	--	--	--------

68 – Disconnecting all battery earth leads



- See additional information.

69 – Installing intake silencer housing



- Insert the intake silencer housing (5) into the rubber mounts and install it.
Intake filter housing (5) must engage audibly.
- Tighten down screw (2).

Intake silencer housing to lock bridge

M6X30		Tightening torque	8 Nm
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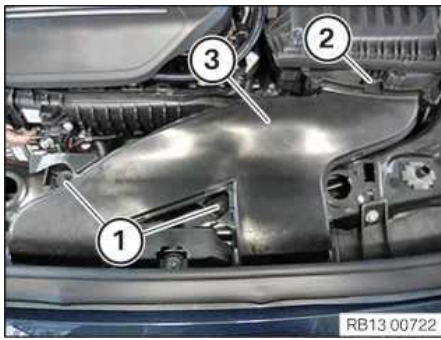
- Tighten clamp (4).

Clean air pipe to intake silencer housing

Clamp		Tightening torque	3 Nm
-------	--	-------------------	------

- Connect and lock the connector (3).
The connector (3) must engage audibly.
- Insert and install the holder (1).

70 – Install the intake neck for the intake filter housing



- Insert and install the intake neck (3).
The lock (2) must audibly engage.
- Tighten nuts (1).

Intake neck to cross connection

M6		Tightening torque	8 Nm
----	--	-------------------	------

71 – Topping up oil level in the manual gearbox (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



TECHNICAL INFORMATION

Make sure during removal of the filling/level control screw to note the installed filling/level control screw variant.

It is **mandatory** to use variant 1 in transmissions up to production date 08/2015.

It is **mandatory** to use variant 2 in transmissions from production date 08/2015.

Failure to observe will result in a leak on the transmission.

- Variant 1 **until** production date 08/2015.
- Variant 2 **from** production date 08/2015.
- Unscrew filling/level control screw (1) and fill the transmission until the oil overflows.

Transmission oil capacity

Transmission oil GS6-60DA, GS6X60DA/Owner's Handbook	2,2 l
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Transmission oil: Technically suitable manual gearbox oil

- Allow surplus oil to drain off.
- Renew the filling/level control screw (1).

Parts: Filling/level control screw

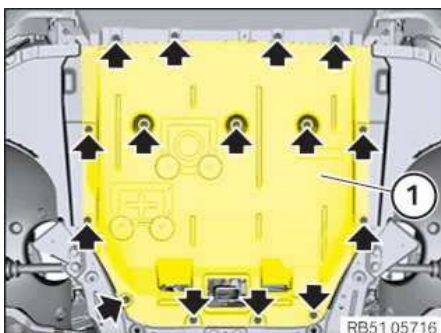
- Tighten filling/level control screw (1).

Oil drain plug / oil filler plug

Hexagon socket		Tightening torque	43 Nm
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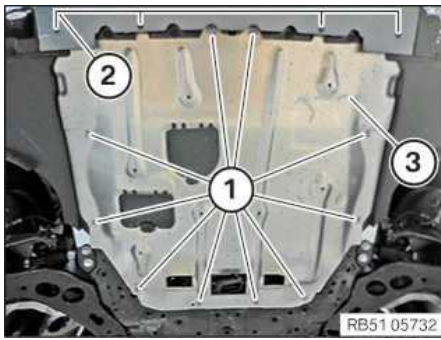
72 – Installing the front underbody protection



- Guide the front underbody protection (1) in under the bumper panel and position it at the screw points.
- Tighten screws (arrows).

Underbody protection front

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



• Equipment specification with metal underride guard:

- Guide in and attach the underride guard (3).
- Tighten down screws (1) and (2).

Underbody protection front

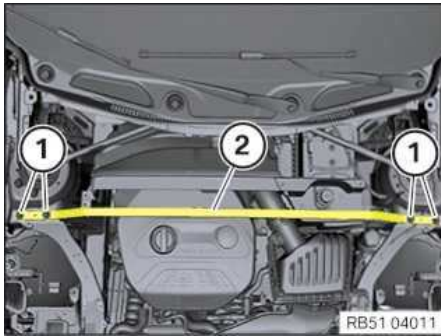
Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

73 – Install strut brace



TECHNICAL INFORMATION

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



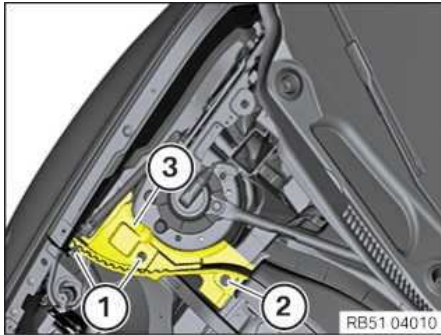
- Install the strut brace (2).
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Cross-brace to spring strut dome

Renew screw.	Jointing torque	28 Nm
	Angle of rotation	180 °



- Install the cover (3).
- Tighten down screw (2).

Cover on body

Hexagon screw	Tightening torque	3 Nm
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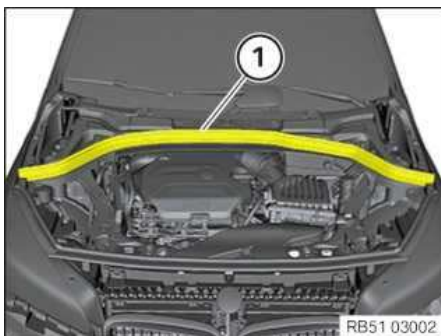
- Install the expanding rivet (1).

74 – Install the seal for the bonnet



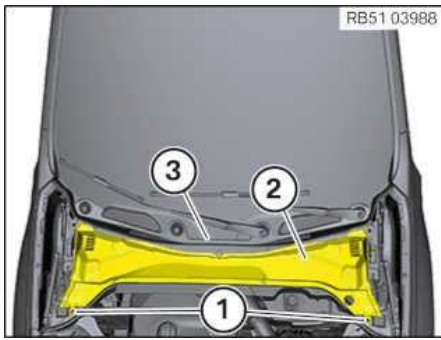
NOTICE

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



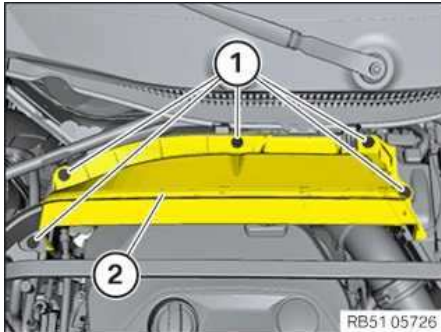
- Install bonnet seal at rear (1).
- Ensure that the rear bonnet seal (1) is fitted correctly.

75 – Installing front cowl panel cover



- Insert and install cowl panel cover at front (2) into cowl panel cover at rear (3).
- Check cowl panel cover at front is correctly seated (2).
- Secure expanding rivet (1).

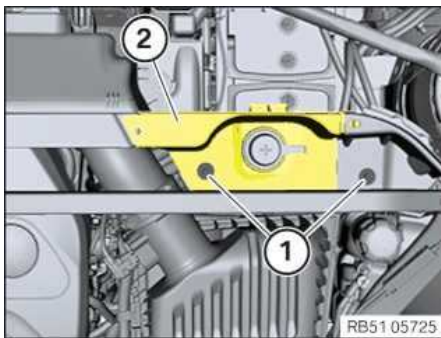
76 – Installing the upper bulkhead cover



- Feed in and install cover (2) of the bulkhead at the top.
- Tighten the screws (1).

Cover of top bulkhead

Screw		Tightening torque	2,6 Nm
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- Guide in and install cover (2).
- Tighten down screw (1).

Cover of remote positive terminal

Screw		Tightening torque	2,6 Nm
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77 – 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 for correct installation of all rubber mounts in the acoustic cover (1).

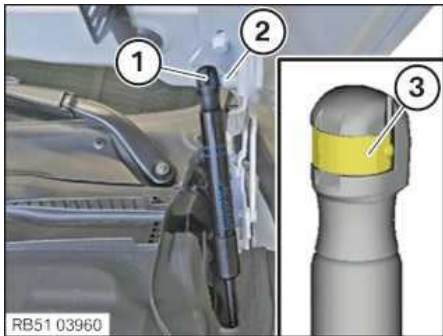


- Clip in the acoustic cover into the holders in the indicated areas.
- Make sure that the acoustic cover engages audibly.

78 – Take bonnet out of the service position



- Support the bonnet by hand.
- Remove the special tool (3) from the ball pin (2).
- Pull off the special tool (3) from the gas pressure spring (1).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.



CAUTION

Shutting bonnet or tailgate.

Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.
- Check the clamp (3) is fitted correctly.
- Connect ball socket (1) to ball pin (2).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.

Additional Information

Overview of Tightening Torques

Oil drain plug / oil filler plug

Used in step [12](#) [71](#)

Hexagon socket		Tightening torque	43 Nm
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Special tool to cylinder head

Used in step [13](#)

M8		Tightening torque	21,5 Nm
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Transmission to engine

Used in step [40](#)

M8x40		Tightening torque	19 Nm
M12x75		Tightening torque	66 Nm

Transmission mounting

Used in step [40](#)

M10	Renew screws.	Jointing torque	40 Nm
		Angle of rotation	90 °

Clutch slave cylinder to transmission housing

Used in step [40](#)

M8		Tightening torque	19 Nm
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Battery holder to engine support

Used in step [40](#)

Hexagon screw M8x30		Tightening torque	19 Nm
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Battery terminal rail to battery trayUsed in step [40](#) [67](#)

M8			19 Nm
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Electronics box to battery trayUsed in step [40](#)

M8X16		Tightening torque	15 Nm
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Wiring harness to cylinder head coverUsed in step [40](#)

TS5x20		Tightening torque	3,5 Nm
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Cover to electronics boxUsed in step [40](#)

RF5x26.5		Tightening torque	2,5 Nm
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Positive battery terminal to batteryUsed in step [40](#)

NutM6		Tightening torque	5 Nm
-------	--	-------------------	------

Tension strut to spring strut dome/battery trayUsed in step [40](#)

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

Transfer box to transmissionUsed in step [41](#)

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

Heat shield to transfer boxUsed in step [41](#)

M6	Renew screws.	Tightening torque	6 Nm
----	---------------	-------------------	------

Oil filler plug on transfer box (VTG)Used in step [41](#)

M18x1.5		Tightening torque	35 Nm
---------	--	-------------------	-------

Holder to front axle supportUsed in step [42](#)

M12		Tightening torque	100 Nm
-----	--	-------------------	--------

Bracket to oil sumpUsed in step [42](#)

M12		Tightening torque	100 Nm
-----	--	-------------------	--------

Intermediate shaft to transfer boxUsed in step [43](#)

M8x35		Tightening torque	19 Nm
-------	--	-------------------	-------

Propeller shaft to transfer boxUsed in step [44](#)

		Tightening torque	80 Nm
--	--	-------------------	-------

Flexible disc to rear axle final driveUsed in step [44](#)

M12x1.5	Renew screws.	Tightening torque	55 Nm
			90 °

Centre mount to bodyUsed in step [44](#)

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

Heat shield to bodyUsed in step [45](#) [46](#)

Bolts/nut		Tightening torque	3 Nm
-----------	--	-------------------	------

Bracket to bodyUsed in step [45](#)

M8		Tightening torque	21 Nm
----	--	-------------------	-------

Exhaust system to bodyUsed in step [47](#)

M8	Replace nuts.	Tightening torque	19 Nm
----	---------------	-------------------	-------

Exhaust bracket on bodyUsed in step [47](#)

Hexagon screw M8x30		Tightening torque	19 Nm
---------------------	--	-------------------	-------

V-clip to catalytic converterUsed in step [47](#)

V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm
--------------	---------------------	-------------------	-------

Diesel particulate sensor to exhaust systemUsed in step [47](#)

Sensor		Tightening torque	50 Nm
--------	--	-------------------	-------

Nitrogen oxide sensor downstream of SCR catalytic converterUsed in step [47](#)

Sensor		Tightening torque	50 Nm
--------	--	-------------------	-------

Cross-member/torsion strut to axle support and mountingUsed in step [48](#)

M12x48	Renew screws.	Jointing torque	100 Nm
		Angle of rotation	90 °

Front connection carrier to bodyUsed in step [49](#)

M10x18		Tightening torque	56 Nm
--------	--	-------------------	-------

Rear connection carrier to bodyUsed in step [49](#)

M8x18		Tightening torque	28 Nm
-------	--	-------------------	-------

Underbody protection to bodyUsed in step [50](#) [54](#) [61](#)

Screw		Tightening torque	3 Nm
-------	--	-------------------	------

Transmission to oil sumpUsed in step [53](#)

M8			19 Nm
----	--	--	-------

Rear end of front axle support to bodyUsed in step [54](#)

M14 screw	Renew screw.	Tightening torque	175 Nm
-----------	--------------	-------------------	--------

Front axle support, front to bodyUsed in step [54](#)

M12 screw	Renew screw.	Tightening torque	108 Nm
-----------	--------------	-------------------	--------

Track rod end to swivel bearingUsed in step [54](#)

M14	Renew nut.	Tightening torque	175 Nm
-----	------------	-------------------	--------

Wishbone to swivel bearingUsed in step [54](#)

M10	Exclusively use the screw to tighten! Renew screw and nut.	Tightening torque	60 Nm
-----	---	-------------------	-------

Holder, wishbone rubber mount, to bodyUsed in step [55](#)

M10 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °

Holder with rubber mount to front axle supportUsed in step [55](#)

M12 screw			100 Nm
-----------	--	--	--------

Washer fluid reservoir holder to front axle support adapter plateUsed in step [55](#)

		Tightening torque	10 Nm
--	--	-------------------	-------

Deformation element, bottom, to adapter plate, front axle carrierUsed in step [55](#)

		Tightening torque	11,8 Nm
--	--	-------------------	---------

Holder to front axle supportUsed in step [56](#)

Oval-head screw TS5 x 16		Tightening torque	2,6 Nm
--------------------------	--	-------------------	--------

Anti-roll bar link to anti-roll barUsed in step [58](#)

M10	Renew nut.	Tightening torque	56 Nm
-----	------------	-------------------	-------

Wheel arch cover to body Used in step [60](#)

Plastic nut		Tightening torque	2,6 Nm
Screw		Tightening torque	2,6 Nm

Wheel arch cover to body Used in step [60](#)

Screw		Tightening torque	2,5 Nm
-------	--	-------------------	--------

Wheel arch cover to body Used in step [60](#)

Plastic nut		Tightening torque	3 Nm
-------------	--	-------------------	------

Brake disc to rear wheel hub Used in step [62](#)

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Brake disc to front wheel hub Used in step [62](#)

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Wheel bolts Used in step [62](#)

M 14/AF 17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim. Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Tightening torque	140 Nm
		Check	140 Nm

Starter motor to transmission Used in step [63](#)

M8x45		Tightening torque	19 Nm
-------	--	-------------------	-------

Battery positive lead to starter Used in step [63](#)

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

Lower steering shaft to steering gear Used in step [65](#)

M10	Clean screw thread and remove remains of screw locking agent. Renew screw.	Tightening torque	28 Nm
-----	---	-------------------	-------

Steering column cover to bulkhead Used in step [65](#)

Plastic nut		Tightening torque	3 Nm
-------------	--	-------------------	------

Cross connection on support for cross connection Used in step [66](#)

M6x20		Tightening torque	12 Nm
-------	--	-------------------	-------

Battery terminal with IBS positive battery terminal / negative battery terminal Used in step [67](#)

NutM6			5 Nm
-------	--	--	------

Trailing link Used in step [67](#)

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

Battery cover Used in step [67](#)

M8			2,8 Nm
----	--	--	--------

Intake silencer housing to lock bridge Used in step [69](#)

M6X30		Tightening torque	8 Nm
-------	--	-------------------	------

Clean air pipe to intake silencer housing Used in step [69](#)

Clamp		Tightening torque	3 Nm
-------	--	-------------------	------

Intake neck to cross connection Used in step [70](#)

M6		Tightening torque	8 Nm
----	--	-------------------	------

Underbody protection front

Used in step 72

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

Cross-brace to spring strut dome

Used in step 73

	Renew screw.	Jointing torque	28 Nm
		Angle of rotation	180 °

Cover on body

Used in step 73

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

Cover of top bulkhead

Used in step 76

Screw		Tightening torque	2,6 Nm
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Cover of remote positive terminal

Used in step 76

Screw		Tightening torque	2,6 Nm
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Overview of Special Tools

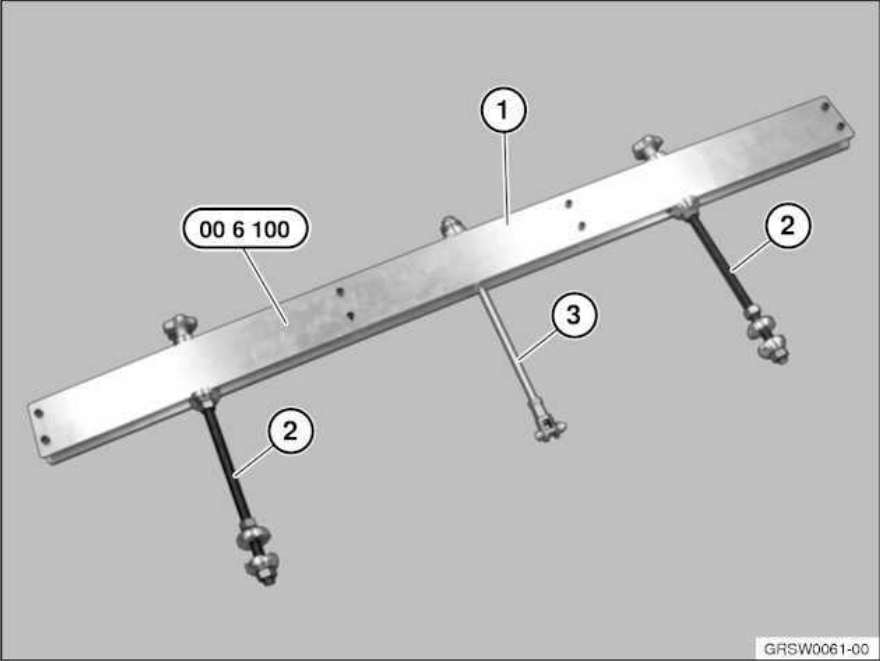
2 459 012 Holder



Common

Used in step 13 66

Usage	For removing and installing the cylinder head. Contour-graphic silhouette foil is included in the delivery specification.
Included in the tool or work	
Storage location	A58
Replaced by	
In connection with	
SI-Number	01 07 17 (487)



Common Used in step 13

Usage Engine bridge (device) 006000

Included in the tool or work

Storage location Individual

Replaced by

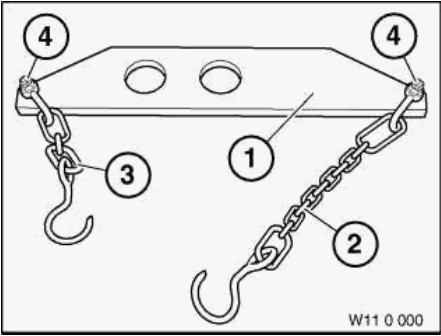
In connection with

SI-Number 01 17 10 (659)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
2	2 361 507 (00 6 102)		Spindle Set (2 pieces) in connection with 00 6 100.	
3	2 361 506 (00 6 103)		Spindle Spindle (central spindle) for Traverse 00 6 100.	

0 490 561 (11 0 000) Lifting gear

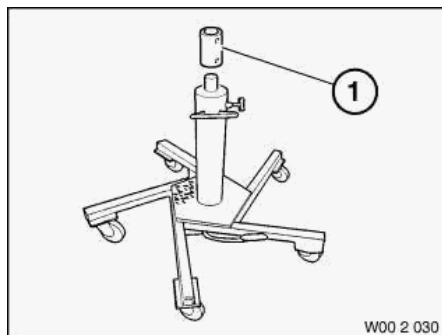


Common	
Usage	(Hoisting gear) For removing and installing engines. As of 08/2011 only available as a complete set. Delivered with TÜV inspection certificate and operating instructions. No delivery of separate parts.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 13 94 (888)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
4	0 490 565 (11 0 009)		Shackle (Shackle) 2 pieces. As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
1	0 490 562 (11 0 001)		Lifting gear (Cross member) As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
2	0 490 563 (11 0 002)		Chain (Chain) Version: long As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
3	0 490 564 (11 0 003)		Chain (Chain) Version: short As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	

0 490 133 (00 2 030) Device



Common

Used in step 25 39 40 54

Usage (universal hydraulic lifter base unit) Chassis and hydraulic lifter - For removing and installing rear axle supports and gearboxes. Also for soft top mounts. Is replaced by 81 22 2 219 012

Included in the tool or work

Storage location

Replaced by

In connection with

SI-Number 01 05 90 (207)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 490 134 (00 2 031)		Adapter (adapter for gearbox holder) Model series: E30, E31, E32, E34, E36	

0 495 554 (33 5 070) Extension



Common

Used in step 35 44

Usage Pull-out extension for 33 5 040, 33 5 050, 33 5 060.

Included in the tool or work

Storage location A18

Replaced by

In connection with

SI-Number 01 21 06 (300)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 592 (33 5 071)		Extension (Extension (1 item)) discontinued, can only be ordered using complete tool	

2 409 025 Puller



Common

Used in step 41

Usage For disassembly of the outer radial shaft seal of the transmission output shaft, right. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).

Included in the tool or work

Storage location A76

Replaced by

In connection with

SI-Number 01 53 14 (211)

2 411 739 Puller



Common

Used in step [41](#)

Usage	For disassembly of the inner radial shaft seal of the output, right. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C78
Replaced by	
In connection with	
SI-Number	01 53 14 (211)

2 408 152 Striking element



Common

Used in step [41](#)

Usage	For installation of the right radial shaft seal transmission output shaft (inner). Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B78
Replaced by	
In connection with	2413037
SI-Number	01 53 14 (211)

2 413 037 Handle

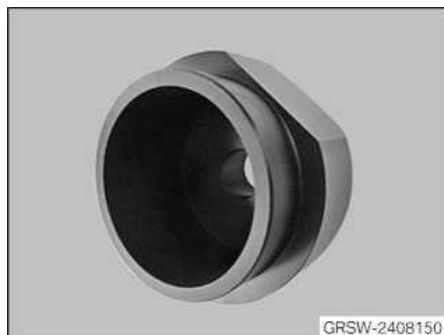


Common

Used in step [41](#)

Usage	Universal drift handle. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C77
Replaced by	
In connection with	
SI-Number	01 53 14 (211)

2 408 150 Striking element

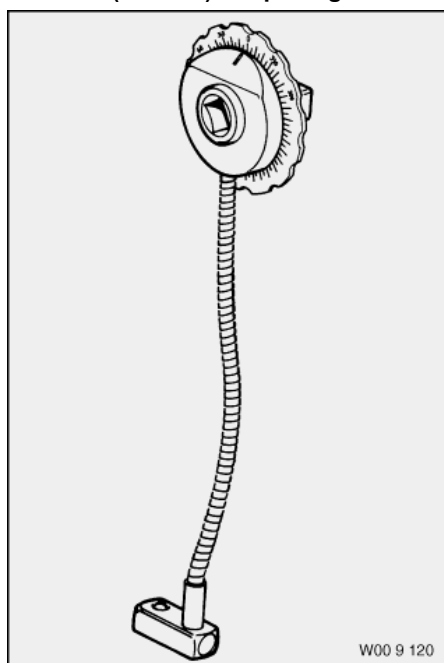


Common

Used in step 41

Usage	For installing the right radial shaft seal transmission output shaft (outer). Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B78
Replaced by	
In connection with	2413037
SI-Number	01 53 14 (211)

0 490 504 (00 9 120) Torque angle measuring dial



Common

Used in step 44

Usage	For torsion angle adjustment of cylinder head bolts (all engines) And reinforcement plate front axle support E46
Included in the tool or work	
Storage location	A4
Replaced by	
In connection with	
SI-Number	

2 407 668 Mandrel

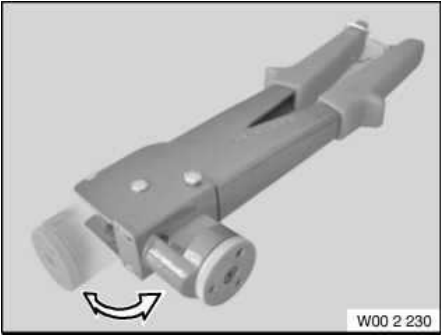


Common

Used in step 52

Usage	For installing the left radial shaft seal output shaft. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B75
Replaced by	
In connection with	
SI-Number	01 57 14 (215)

0 496 521 (00 2 230) Pliers



Common		Used in step	60
Usage	(Blind rivet pliers for plastic rivets) For shaft diameters of 3.5 mm, 3.9 mm and 4.5 mm		
Included in the tool or work			
Storage location	C25		
Replaced by			
In connection with			
SI-Number	01 17 08 (478)		

2 344 011 Tool



Common		Used in step	62
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.		
Included in the tool or work			
Storage location			
Replaced by			
In connection with			
SI-Number	08 08 12 (872)		

Replacement tools:
0 495 221 (36 1 323) Wheel stud



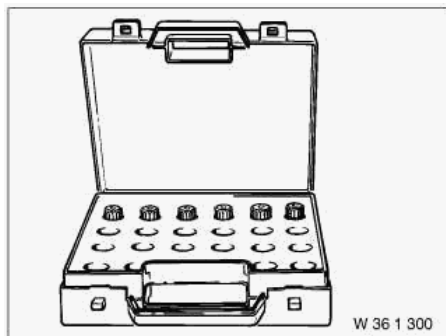
Common		Used in step	17
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 224 (36 1 326) Wheel stud



Common		Used in step	17
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 225 (36 1 327) Wheel stud

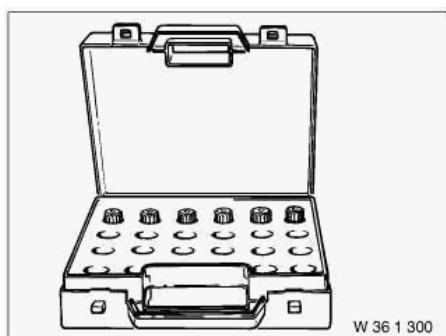


Common

Used in step 17

Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 226 (36 1 328) Wheel stud



Common

Used in step 17

Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 227 (36 1 329) Wheel stud

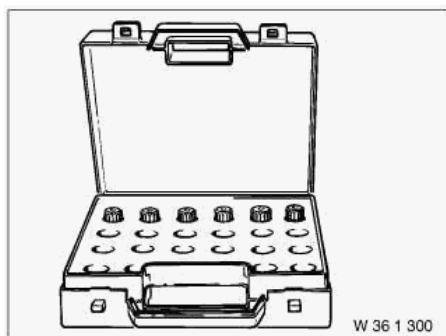


Common

Used in step 17

Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 228 (36 1 331) Wheel stud



Common

Used in step 17

Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Common		Used in step	17
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

Common		Used in step	17
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

Transmission oil capacity	Used in step 7
Transmission oil GS6-60DA, GS6X60DA/Owner's Handbook	2,2
Transmission oil: Technically suitable manual gearbox oil	

[illegible]

61 20 900 Disconnecting and connecting battery earth lead	9 68
61 20 900 Disconnecting and connecting battery earth lead	9 68
61 20 900 Disconnecting and connecting battery earth lead	9 68
61 20 900 Disconnecting and connecting battery earth lead	9 68
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	9 68
61 20 900 Disconnecting and connecting battery earth lead	9 68
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61 20 900 Disconnecting and connecting battery earth lead	9 68
61 20 900 Disconnecting and connecting battery earth lead	9 68
61 35 Notes on ESD protection (Electro Static Discharge)	39

Operating materials	Used in step
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	12
2.0 Grease for wheel centring	62

Operating materials	Used in step
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00 Safety instructions for handling oil



Warning!

[Danger of poisoning](#) if oil is ingested/absorbed through the skin!

[Risk of injury](#) if oil comes into contact with eyes and skin!



Recycling:

Observe country-specific waste disposal regulations.



Measures if oil is unintentionally released:

- Personal precautionary measures: Danger of slipping! Keep non-involved persons away from the work area. Wear personal protective clothing/equipment.
- Environmental protection measures: Prevent oil from draining into drain channels, sewerage systems, pits, cellars, water and the ground.
- Limiting spread: Use oil blocks to prevent the surface spread of oil.
- Cleaning procedure: Bind and dispose of escaped oil with nonflammable absorbents.

Note: Do not flush oil away with water or aqueous cleaning agents.

23 Transmission designations

Breakdown of BMW designation:

A5S 300J (former designation)		
A	Transmission type	- S = Manual gearbox - A = Automatic transmission
5	Number of forward gears	
S	Type of top gear	- D = Direct gear - S = Overdrive gear
300	Max. input torque (Nm)	
J	Code letter of transmission manufacturer	- G = Getrag - J = Jatco - R = GMPT (General Motors Powertrain) - Z = ZF (Zahnradfabrik Friedrichshafen)
SMG	Notes	SMG = Sequential M gearbox/transmission

GS6-37BZ (new designation according to BMW Group Standard GS 90007)		
G	Transmission	
S	Transmission type	- S = Manual gearbox - A = Automatic transmission
6	Number of forward gears	
-		- = Standard with manual gearshift - HP = Hydraulic planetary gear - DKG= twin-clutch gearbox
37	Transmission type	26 = D-transmission 31 = C-transmission 39 = F-transmission 37 = H-transmission 53 = G-transmission 17 = I-transmission 47= J transmission SMG -7-speed 45 = K transmission 36= Transmission DKG
B	Gear set	- B = Petrol gear ratio - D = Diesel gear ratio - S= Sport gear ratio

Z	Code letter of transmission manufacturer	- G = Getrag - Z = ZF (Zahnradfabrik Friedrichshafen) - A = AISIN
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Manual gearbox:

BMW designation	Manufacturer	Manufacturer designation	Remarks
S5D 200G	Getrag	B transmission (220/5)	
S5D 200G	Getrag	B transmission (221/5)	for M41 engine only
S5D 250G	Getrag	B transmission (220/5)	Reinforced version
S5D 260Z	ZF	C-transmission (S5-31 D)	for M51 engine only
S5D 280Z	ZF	C-transmission (S5-31)	
S5D 310Z	ZF	C-transmission (S5-31)	up to 9.95
S5D 320Z	ZF	C-transmission (S5-31)	from 9.95 (reinforced version)
GS5S31BZ (SMG)	ZF	C transmission	SMG
GS5-39DZ	ZF	F transmission	
S6S 420G	Getrag	D-transmission (226/6)	
S6S 420G (SMG)	Getrag	D transmission	SMG
S6S 560G	Getrag	E-transmission (286/6)	
GS6-37BZ	ZF	H-transmission	
GS6S37BZ (SMG)	ZF	H-transmission	
GS6-37DZ	ZF	H-transmission	
GS6-37BG	Getrag	H-transmission	
GS6-53BZ	ZF	G-transmission	
GS6-53DZ	ZF	G-transmission	
GS6-17BG	Getrag	I-transmission	
GS6-17DG	Getrag	I-transmission	
GS7S47BG (SMG)	Getrag	J-transmission (247)	SMG -7-gear
GS7D36SG	Getrag	DKG (436)	DKG -7-gear
GS6- 45BZ	ZF	K transmission	
GS6- 45DZ	ZF	K transmission	
GS6-60DA/BA	AISIN	BG6	

7DCT300	Getrag	7DCT	DKG -7-gear
GS6-58DG/BG	Getrag		
GS6-59DG/BG	Getrag		

Automatic transmission:

BMW designation	Manufacturer	Manufacturer designation	Remarks
A4S 200R	General Motors Powertrain	GM4	
A4S 270R	General Motors Powertrain	THM-R1w	Transmission wide-stepped
A4S 310R	General Motors Powertrain	THM-R1	
A5S 300J	Jatco	Jatco	
A5S 310Z	ZF	5HP-18	
A5S 325Z	ZF	5HP-19	
A5S 440Z	ZF	5HP-24	
A5S 560Z	ZF	5HP-30	
A5S 360R / 390R	GM	GM5	
GA6F21AW	AISIN	GA6F21AW	
GA6HP19Z	ZF	6HP19	
GA6HP26Z	ZF	6HP26	
GA6HP32Z	ZF	6HP32	
GA6L45R	GM	GM6	
GA6F21AW	AISIN	GA6F21AW	
GA8F22AW	AISIN	GA8F22AW	
GA8G45	AISIN	8G45	
GA8HP45Z	ZF	8HP45	
GA8HP50Z	ZF	8HP50	
GA8HP51Z	ZF	8HP51	
GA8HP70Z	ZF	8HP70	
GA8HP75Z	ZF	8HP75	
GA8HP76Z	ZF	8HP76	
GA8P70H	ZF	8P70	Hybrid
GA8P75H	ZF	8P75	Hybrid
GA8HP90Z	ZF	8HP90	
GA8HP95Z	ZF	8HP95	

GA7AHSCD	Daimler	AHS-C	Hybrid
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23 ... Universal BMW transmission take-up



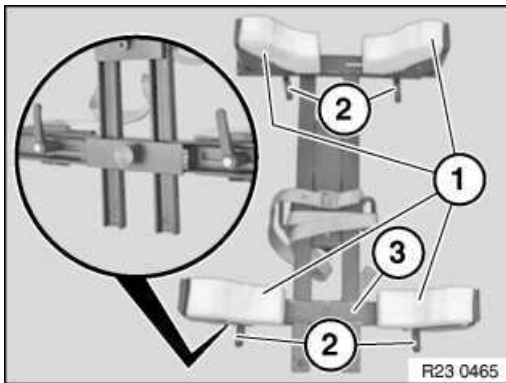
Special tools required:

- [00 2 030](#)
- [23 4 050](#)



Note:

- The universal transmission bracket is introduced for the E60 AWD
- Suitable for manual and automatic transmissions

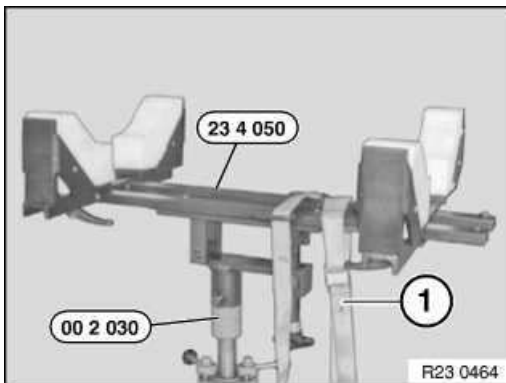


Important!

Front and rear supports (1) can be laterally adjusted by means of screws (2).

Carrier (3) of rear supports (1) can be longitudinally adjusted by means of screw.

Supports must be adapted in length and width to the transmission.



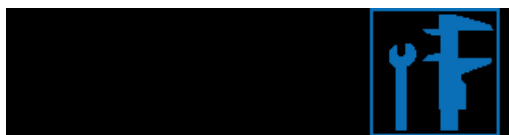
Supporting transmission:

Support transmission with special tools [23 4 050](#) , [00 2 030](#) .

Important!

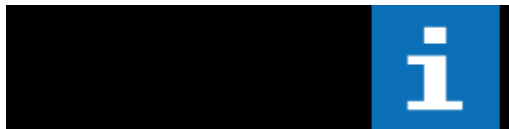
Transmission must be secured with tensioning strap (1).

23 Universal transmission retaining bridge



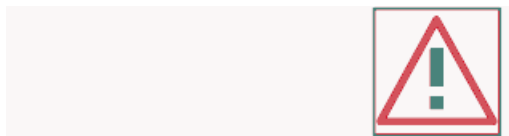
Special tools required:

- 0 495 187
- [24 0 200](#)



Note:

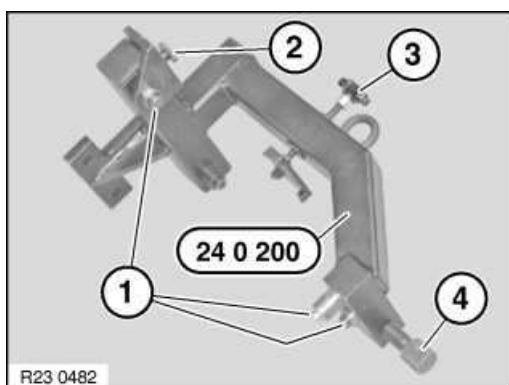
- Transmission retaining bridge [24 0 200](#) is suitable for manual and automatic transmissions



Attention!

The adapter and shaft must be adapted to positively lock with the transmission.

(Danger of injury)



Adapt the adapter (1) and spindle with the thrust piece (3) on the transmission.

Adjust the length using the sliding piece (2).

Screw in spindle (4).

Attention!

Before mounting on assembly stand 0 495 187 check retraining bridge for tight fit.

23 11 620 Replacing the guide sleeve for the clutch releaser (transmission removed)



WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.



WARNING

Motor vehicle may slip off the vehicle hoist if the weight is distributed unevenly.

Danger! Life-threatening injuries!

- Ensure there is a specific weight compensation on the motor vehicle.



WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

Engine compartment lid is open.

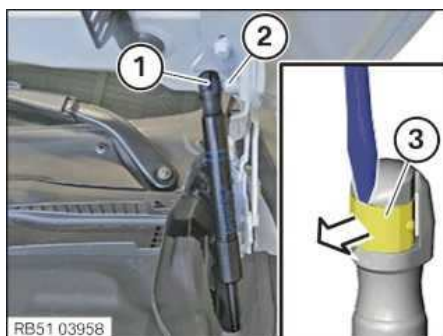


CAUTION

Shutting bonnet or tailgate.

Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.



- Lift clamp (3) slightly using a screwdriver, in the direction of the arrow.
- Lift off ball socket (1) from ball pin (2).
- Repeat the operation on the other side of vehicle.



TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

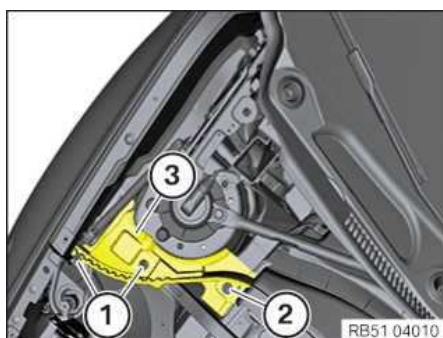
- Remove the bonnet support and open the bonnet further.
- Push special tool (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

2 – Remove suspension cross-brace



TECHNICAL INFORMATION

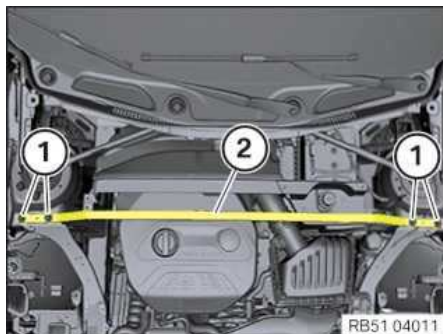
Driving without the strut brace/front end or tension strut is not permitted.



NOTICE

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

- Loosen expanding rivet (1).
- Loosen screw (2).
- Remove the cover (3).



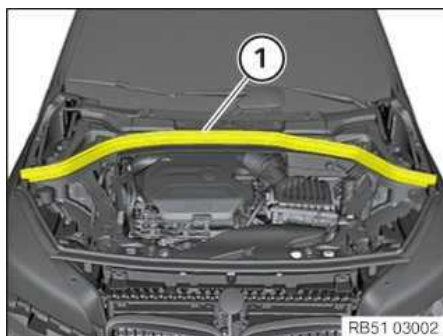
- Loosen screws (1).
- Remove strut brace (2).

3 – Remove the seal for the rear bonnet



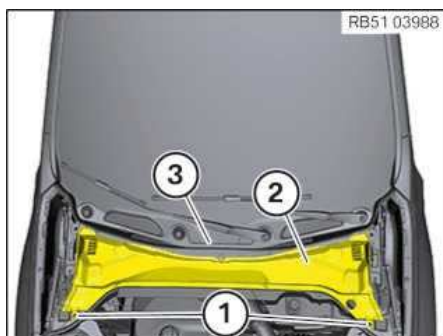
NOTICE

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



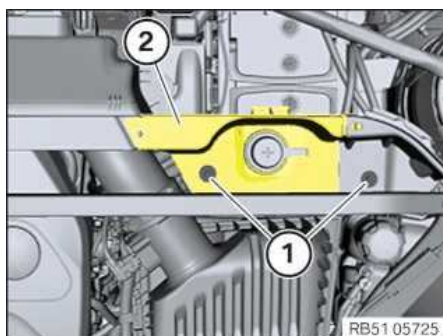
- Pull off rear bonnet seal (1) towards the top and remove.

4 – Removing front cowl panel cover

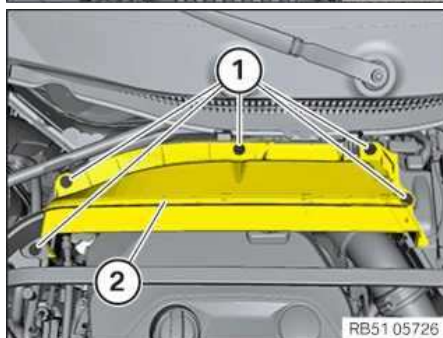


- Loosen the expanding rivet (1).
- Feed out and remove front cowl panel cover (2) from the rear cowl panel cover (3).

5 – Removing the upper bulkhead cover

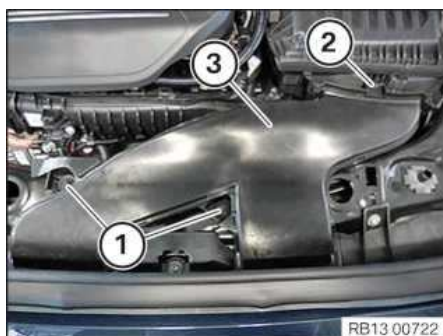


- Loosen screws (1).
- Guide out and remove the cover (2).



- Loosen screws (1).
- Feed out and remove the upper bulkhead cover (2).

6 – Remove the intake neck for intake silencer housing



- Loosen nuts (1).
- Loosen the lock (2).
- Guide the intake neck (3) out and remove it.

7 – Removing intake silencer housing



- Loosen the holder (1).
- Loosen screw (2).
- Unlock and loosen connector (3).
- Unfasten clamp (4).
- Pull out and remove the intake silencer housing (5) from the rubber mounts towards the top.

8 – Disconnecting all battery earth leads



- See additional information.

9 – Remove vehicle battery

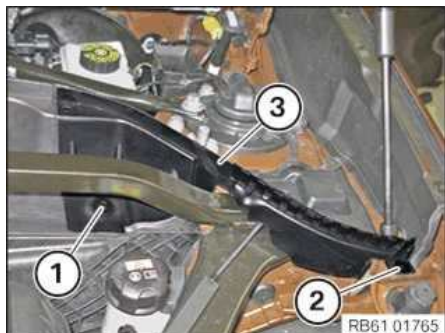


WARNING

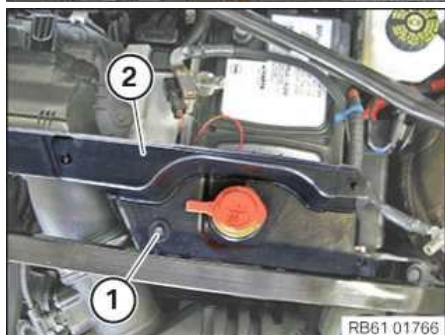
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

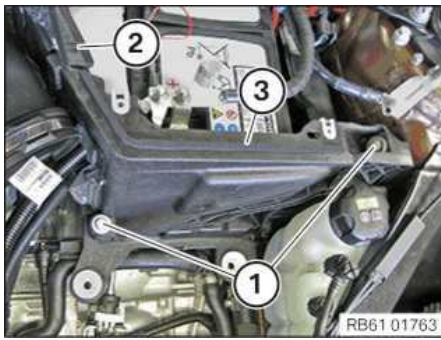
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.



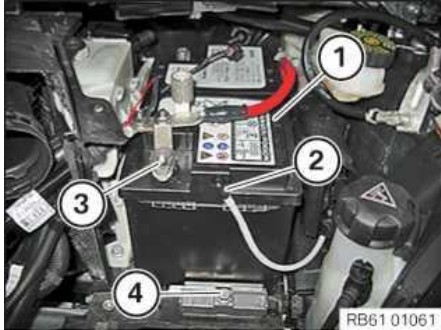
- Release the screw (1) and the expanding rivet (2).
- Remove the fixture for the gasket (3).



- Loosen screw (1).
- Remove the cover (2).



- Loosen screws (1).
- Unscrew the bolt (2) and guide the tension strut (3) out.



- Pull off the vent hose (2).
- Slacken the nut (3) on the positive battery terminal and remove the positive battery terminal.



WARNING

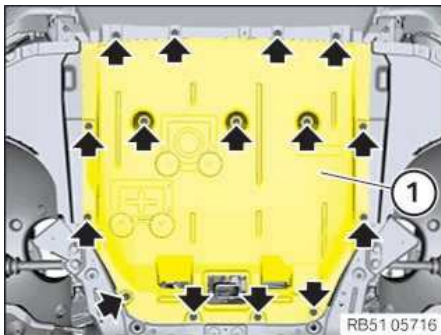
Unprotected battery terminals.

Risk of short circuits! Risk of fire!

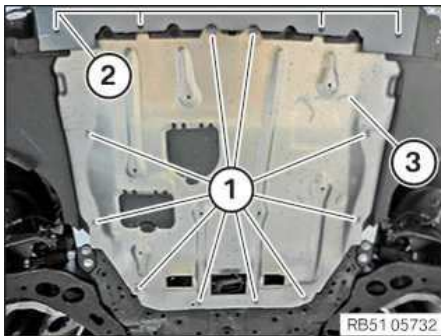
- Cover the vehicle battery.

- Loosen the screw (4) and remove the holder.
- Remove vehicle battery (1).

10 – Removing the front underbody protection



- Remove screws (arrows).
- Thread out and remove the front underbody protection (1) from the bumper panel.



- **Equipment specification with metal underride protection:**
- Loosen screws (1) and (2).
- Thread out and remove the underride protection (3).

11 – Draining the oil level in the manual gearbox (GS6-58BG, GS6-59DG)

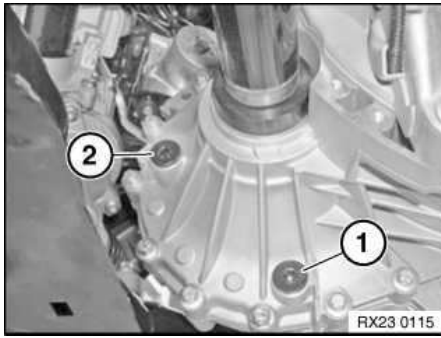


CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



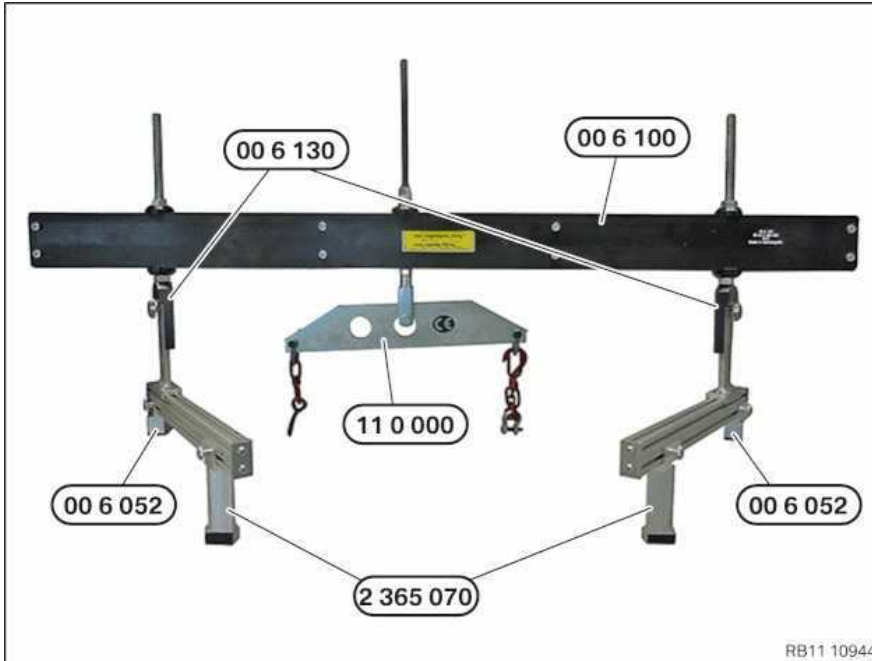
- Draining transmission oil:
 - Release oil drain plug (1) and oil filler plug (2).
 - Clean oil drain plug (1) and screw in.

Oil drain plug / oil filler plug

Hexagon socket		Tightening torque	43 Nm
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12 – Installing the engine bridge

Overview: Prepared engine bridge



Prerequisite

Front compartment lid is in service position.



CAUTION

Components connected to the engine joint or cross member.

Danger of injury!

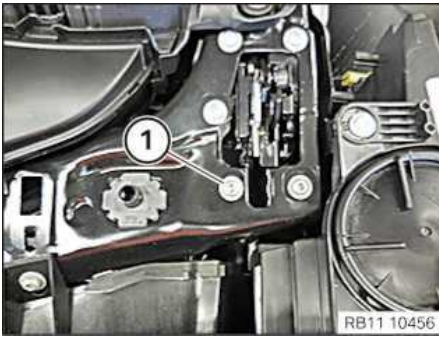
- Check lifting eyes and engine mounting brackets for damage, e.g. cracks.
- Attach the component to correctly mounted engine joints or cross members only.
- Exclusively lift the component, do not move it forwards, backwards or in transverse direction.



- Guide in and position special tool **2 459 012** on cylinder head.
- Tighten the screws (1) of special tool **2 459 012**.

Special tool to cylinder head

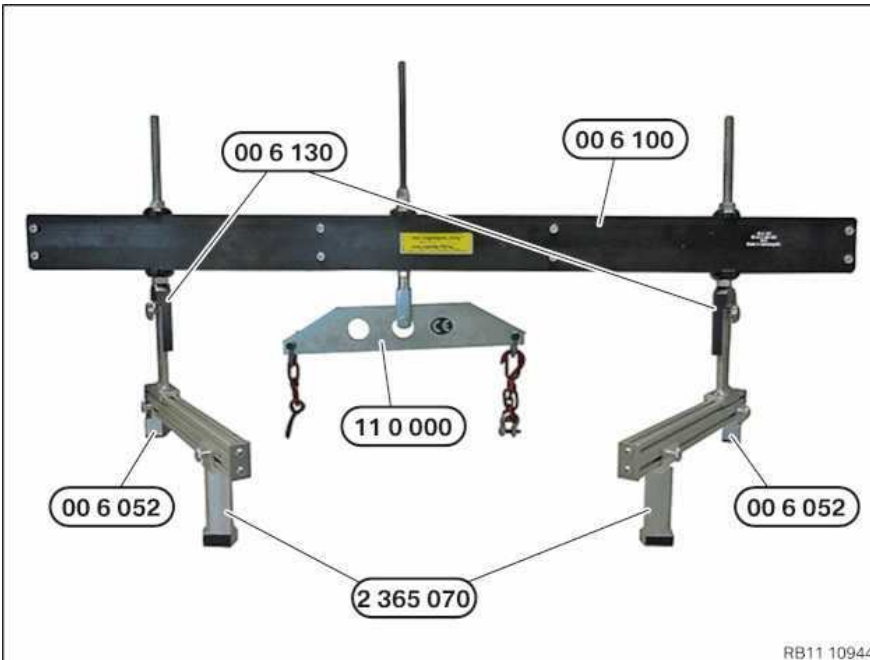
M8		Tightening torque	21,5 Nm
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- Loosen screw (1) of the left bonnet catch.



- Loosen screw (1) of the right bonnet catch.

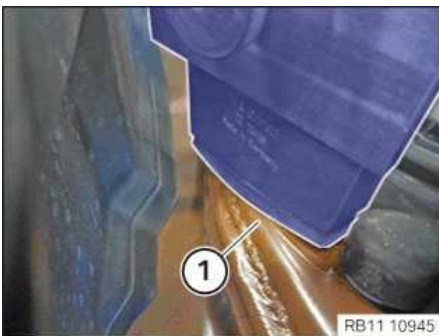


CAUTION

Heavy component.

Heavy components can lead to injury or damage.

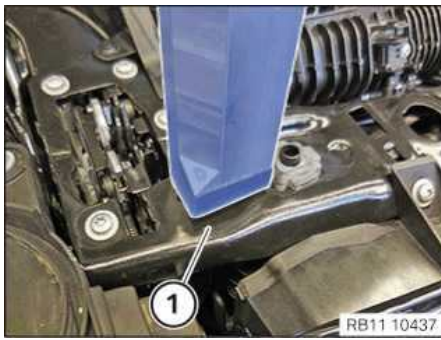
- Remove and install heavy components with the aid of another person/other persons.
- Set entire cross member **0 496 852 (00 6 100)** on the vehicle and position with the help of an auxiliary person.



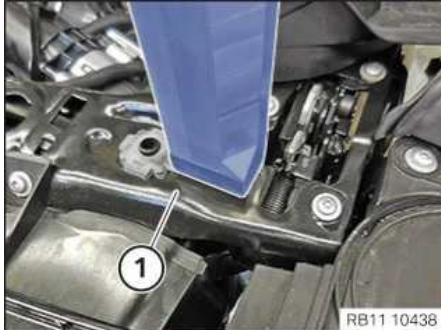
- Position the special tool at the rear mounting point (1) on the **right**.



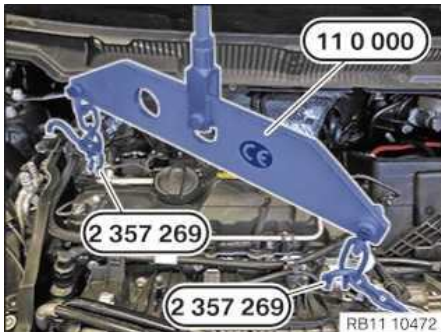
- Position the special tool at the rear mounting point (1) on the **left**.



- Position the special tool at the front mounting point (1) on the **right**.



- Position the special tool at the front mounting point (1) on the **left**.



- Position special tool **0 490 561 (11 0 000)** above the engine.
- Attach special tools to the mounting lugs of the engine.



- Tighten side screws (2) and (3).
- Slightly pretension the spindle screw (1) of the engine support beams.
- Tighten down all adjusting screws, knurled screws and nuts on cross member **0 496 852 (00 6 100)** and on special tool.

13 – Removing starter motor



WARNING

Hot surfaces.

Risk of burning!

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



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



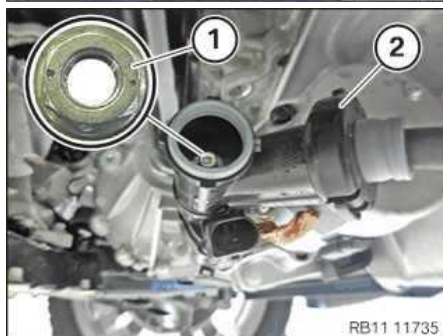
Electrostatic discharge.

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.



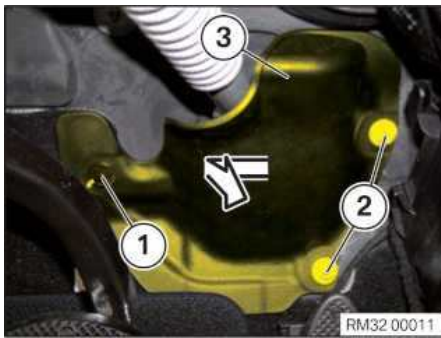
- Unlock and loosen connector (1).
- Detach the sealing cap (2) in the direction of the arrow.
- Feed out and remove the sealing cap (2).



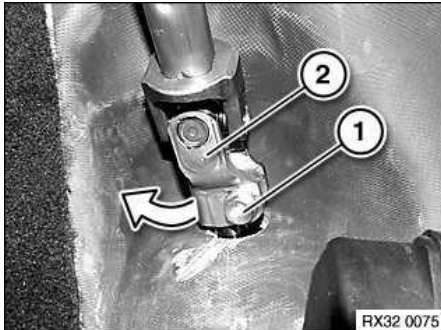
- Unfasten nut (1).
- Feed out the positive battery cable (2) of the starter motor and set it aside.



- Loosen screws (1).
- Feed out starter motor and remove.

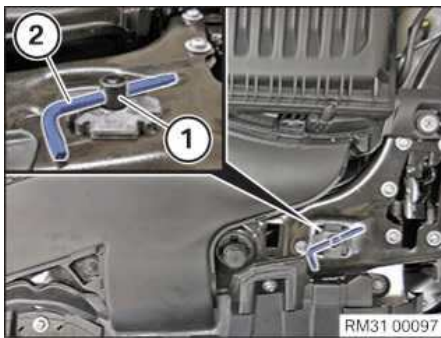


- **If installed:**
- Unfasten nut (1).
- Unscrew the nuts (2) by 1 rotation.
Do not remove the nuts (2) !
- Remove the cover (3) on the steering column in the direction of the arrow.
The side footwell trim must not be disassembled!



- Loosen screw (1).
- Swivel out the universal joint (2) of the bottom steering shaft from the steering gear in the direction of the arrow.

15 – Securing radiator on left and right

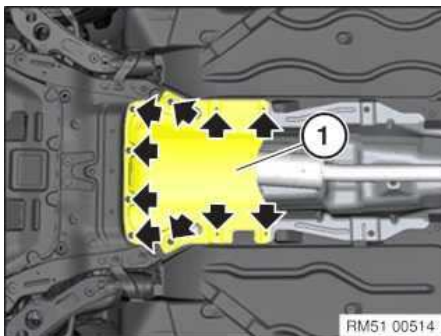


NOTICE

Perform the operations on the left and right side.

- Fasten radiator at centring pin (1) with suitable tool (2).

16 – If installed: Removing rear underbody protection



- Remove screws (arrows).
- Remove the rear underbody protection (1).

17 – Removing front left and right wheel arch cover



NOTICE

Perform the operations on the left and right side.

► Remove the front wheel arch trim



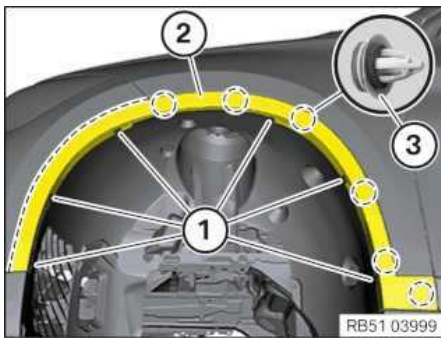
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.

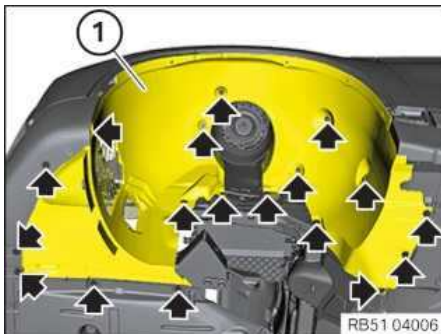


NOTICE

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



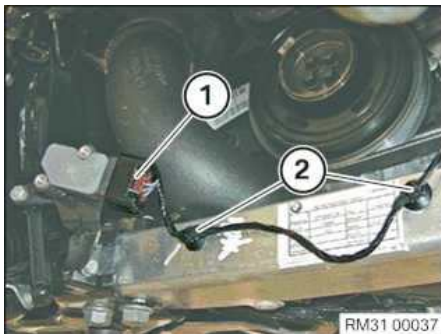
- Remove the blind rivets (1).
- Release the wheel arch trim (2) in the area of the side panel from the clips (3).
- Release the wheel arch trim (2) from the latch mechanisms on the bumper and remove.



► Remove front wheel arch cover

- Unscrew all bolts and nuts (arrows).
- Guide the wheel arch cover (1) out.

18 – With right installation: Detaching ride height sensor cable



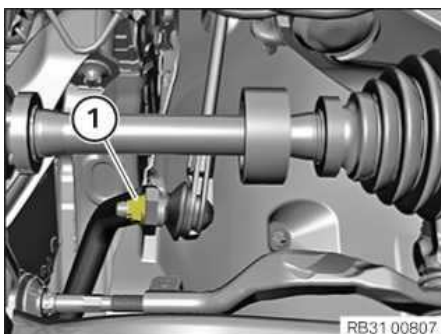
- Unlock plug connection (1) and disconnect.
- Release cable clip (2) from deformation element adapter.

19 – Releasing anti-roll bar on left and right from anti-roll bar link



NOTICE

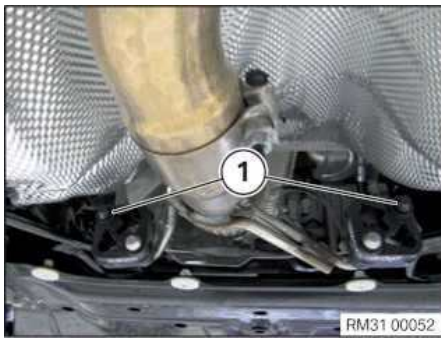
Perform the operations on the left and right side.



► Detach the anti-roll bar from the anti-roll bar link

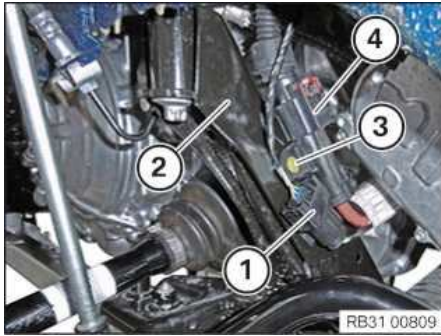
- Unfasten nut (1).
- Note:** Use the Torx socket for counter support.
- Loosen the anti-roll bar link from the anti-roll bar .

20 – Detaching rubber mount from front axle support



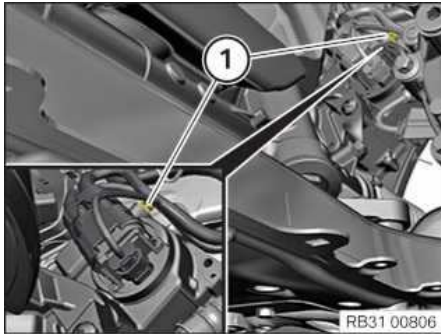
- Spray rubber mount (1) with lubricant and release from holder on front axle support.

21 – Disconnecting plug connections from steering gear



► If installed: Detach connectors from the front axle carrier

- Release the plug connection (1) from the front axle support (2).
- Loosen screw (3).
- Release the plug connection (4) from the front axle support (2).

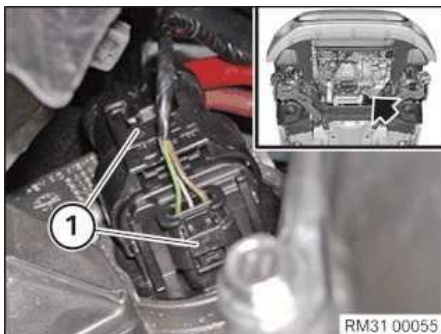


- Disconnect wiring harness (1) from steering gear.



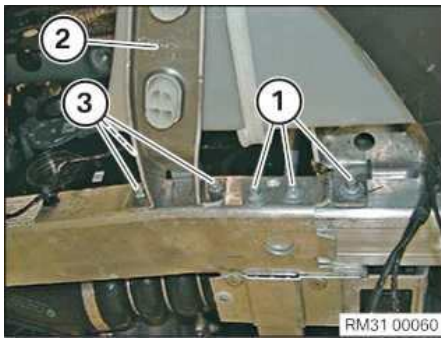
- To unlock the plug connections (see the following work step): unlock plug connections (arrow) with the right hand.

The plug connections can be reached via the left-hand output shaft.



- Unlock plug connections (arrow) (1) and disconnect from the steering gear.
- Make sure when lowering the front axle that the cables are not damaged!

22 – Releasing the mounted part from the front axle support



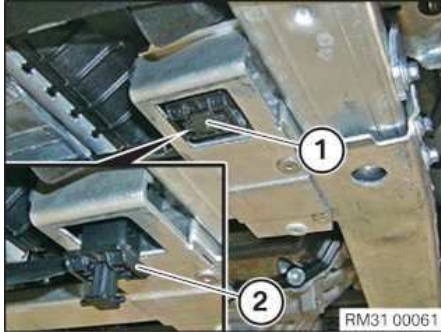
- **Only on right side:** Loosen screws (3) and remove holder for washer fluid reservoir (2).



NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).

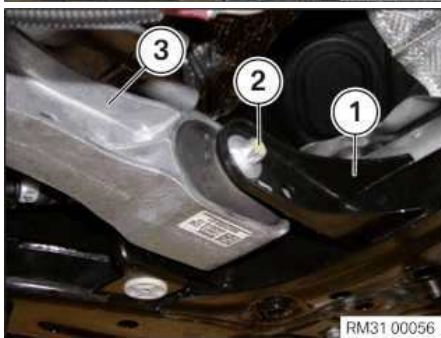


NOTICE

Perform the operations on the left and right side.

- Unlock safety catch (1) of the lock (2) from the holder for the charge air cooler.
- Completely remove locks (2).

- Loosen screw (2) of the engine support (3) on the front axle (1).

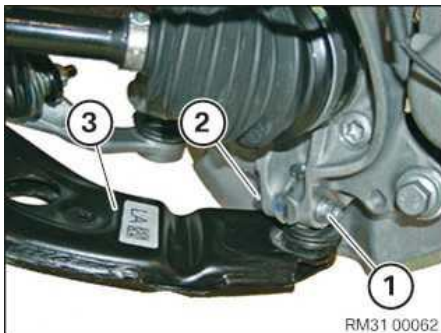


NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).

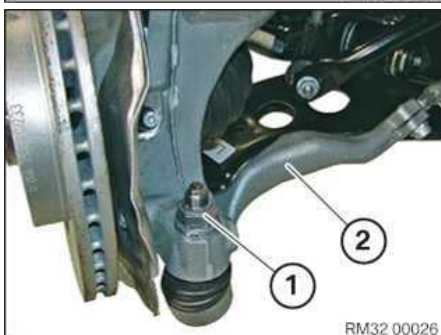
23 – Detaching and removing front axle completely



NOTICE

Perform the operations on the left and right side.

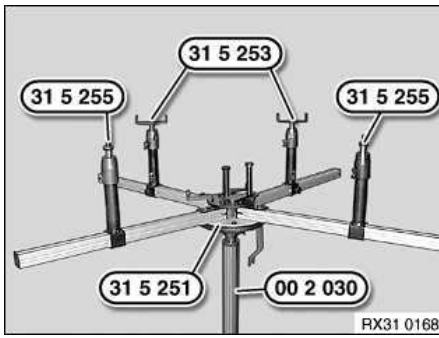
- Unfasten nut (1).
- (2) Pull out screw.
- Detach the wishbone (3) from the swivel bearing .



NOTICE

Perform the operations on the left and right side.

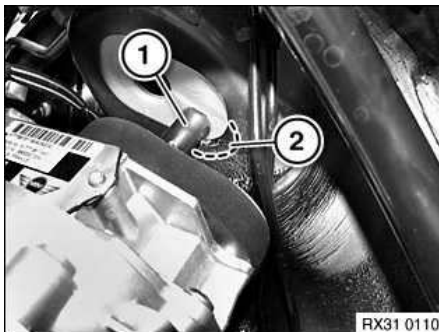
- Unfasten nut (1).
- Detach the track rod (2) from the swivel bearing.



- Fit the special tool completely onto the workshop jack **0 490 133 (00 2 030)** with an auxiliary person.
 - Insert special tools in telescopic supports of a profile rail pair.
 - Insert special tools in telescopic supports of other profile rail pair.
- Note:** In a profile rail pair, two profile rails are connected to one another by gearing.



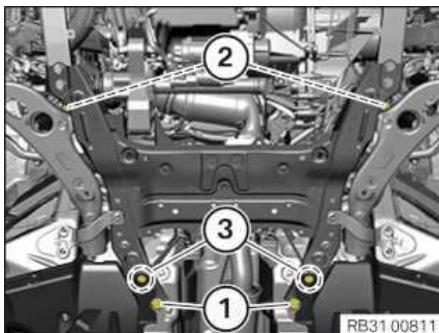
- Align special tools and to front axle support.
 - Support front axle support by operating workshop jack **0 490 133 (00 2 030)**.
- Note:** The centre of gravity of the front axle support must be positioned centrally over the workshop jack!
- Secure front axle support with special tool to special tool.



TECHNICAL INFORMATION

Non-compliance with the regulations for installation and disassembly may result in component damage. All work must be performed with care and in compliance with the regulations.

- When raising and lowering the front axle support, make sure that the torsion bar (1) of the electromechanical steering gear (EPS) in area (2) does not collide with the bulkhead!
- Note:** Collision with the bulkhead may result in damage to the electromechanical steering gear (EPS)!



- If applicable, release the screws in area (3).
- Release screws (1) (front axle support, rear).
- Release screws (2) (front axle support, front).
- Bend the underbody panelling to the side in area (3).
- When lowering, release charge air cooler from its rubber mounts.
- Completely lower and remove the front axle.

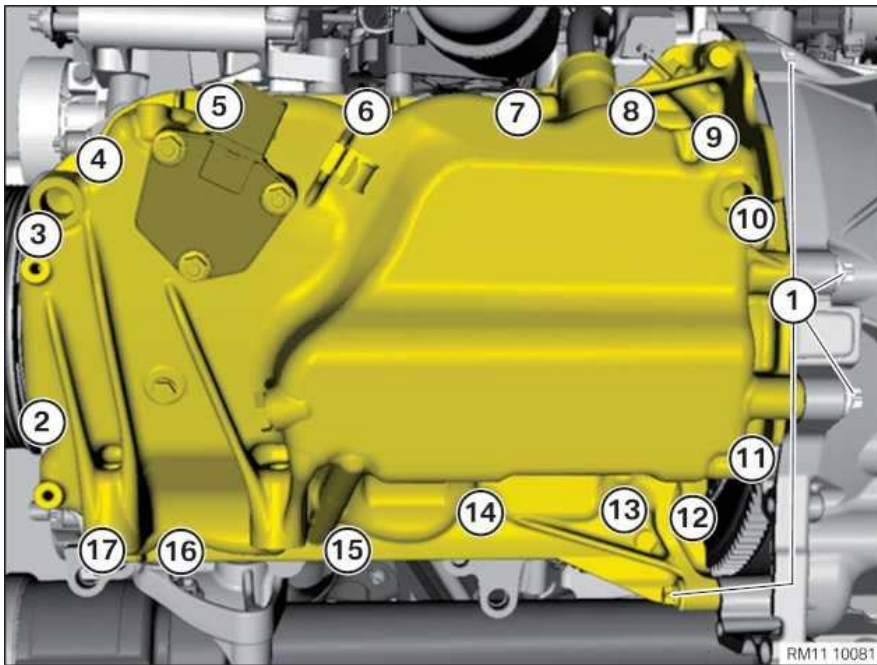


TECHNICAL INFORMATION

Note the information on thread repairs using Helicoil thread inserts.
For more information see: 41 00 ... Notes on repairing threads

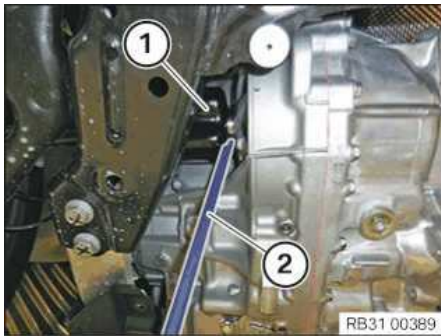
- Check threads for damage; if necessary, repair with Helicoil thread inserts.

24 – Release transmission-side bolting connection oil sump



- Unscrew the bolts (1) from the transmission.

25 – Partially removing the left output shaft



- Protect the output shaft (1) from falling.
- Lever out the output shaft (1) with a mounting lever (2) from the transmission.
- Tie up output shaft (1).

26 – Removing the right radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Screw special tool **2 358 468** into the radial shaft seal until the radial shaft seal is pulled out.



- Screw special tool **2 358 469** into the radial shaft seal until the radial shaft seal is pulled out.

27 – Removing the left radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

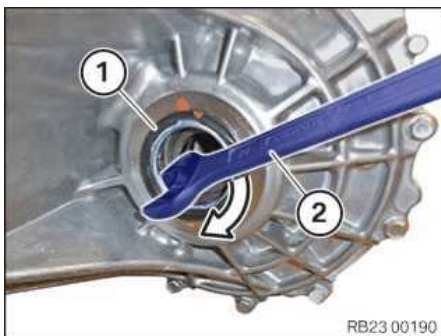


RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Carefully remove the radial shaft seal (1) from the transmission using a suitable tool (2).

28 – Removing the manual gearbox (GS6-59DG, GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the engine block.

Damaged and corroded bolts will lead to major damage in the engine block and the transmission.

- It is imperative that protruding threads of the transmission bolts are checked for corrosion and damage prior to removal.
- It is imperative that all rust is removed from corroded threads and that they are cleaned prior to removal.
- Renew rusted and damaged bolts.

► Remove electronics box

Prerequisite

Battery earth lead is disconnected.



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.



RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.



TECHNICAL INFORMATION

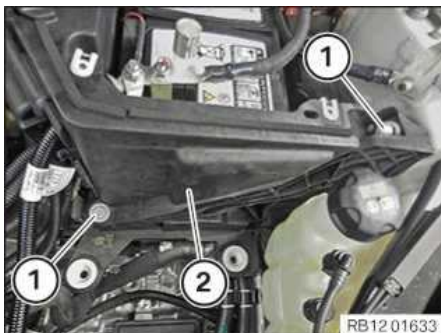
Follow instructions for removing and installing control units.

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

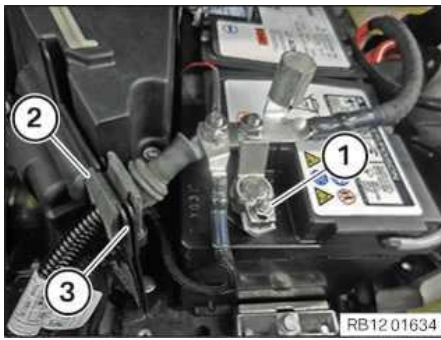


TECHNICAL INFORMATION

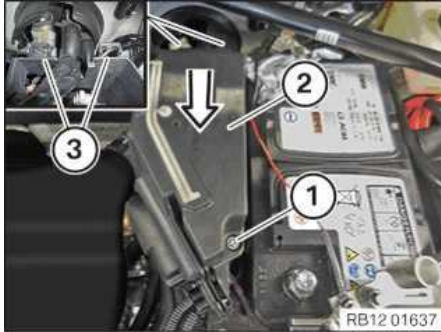
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



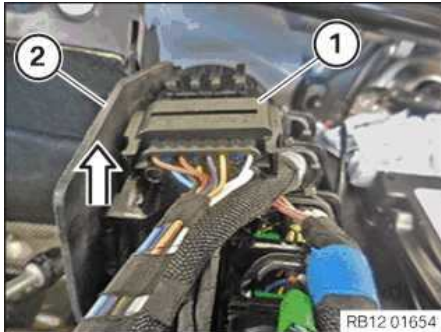
- Loosen screws (1).
- Guide out the tension strut (2) toward the top and remove it.



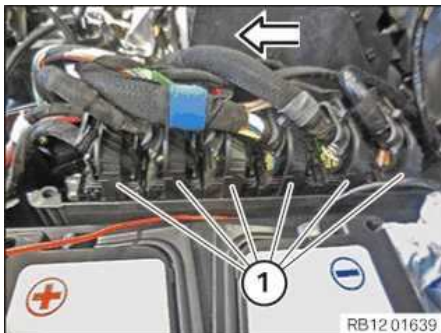
- Undo positive battery terminal (1).
- Feed out positive battery terminal (1) and set aside.
- Guide the positive battery cable (2) out of the holder (3) and lay to one side.



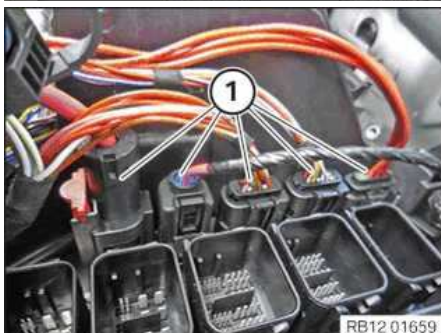
- Loosen screw (1).
- Unlock cover (2) and feed out and remove from the guides (3) in the direction of arrow.



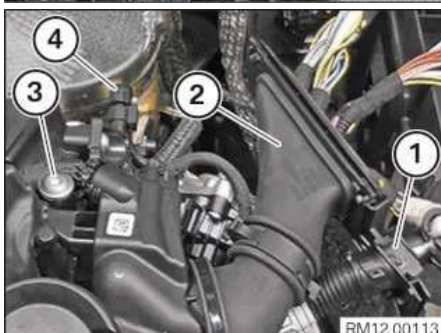
- Feed out connector (1) from the electronics box (2) and remove in the direction of arrow.
- Unlock and loosen connector (1).



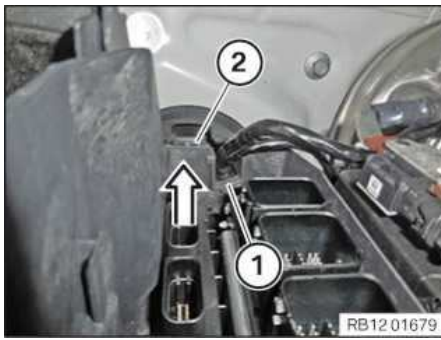
- Unlock and remove the connector (1) in the direction of the arrow.
- Feed out connector (1) and place to one side.



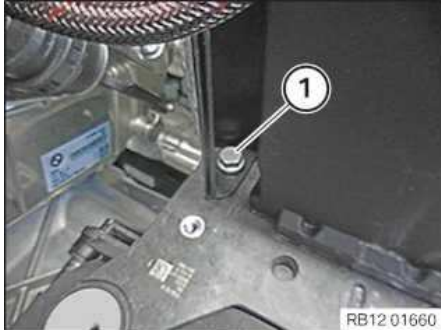
- Unlock and loosen connector (1).



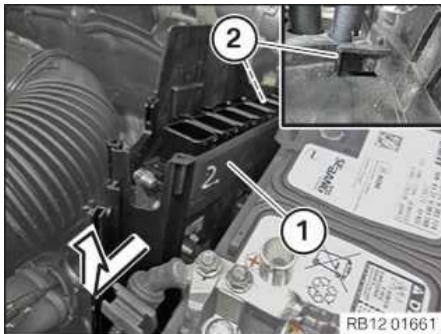
- Detach the wiring harness (1) from the electronics box.
- Detach the wiring harnesses (2) from electronics box.
- Loosen screw (3).
- Set wiring harnesses (1) and (2) aside.
- Unlock the connector (4) and disconnect it from the differential pressure sensor.



- Unlock and loosen holder (1).
- Guide the holder (1) out of the electronics box (2) in direction of arrow and set it aside.

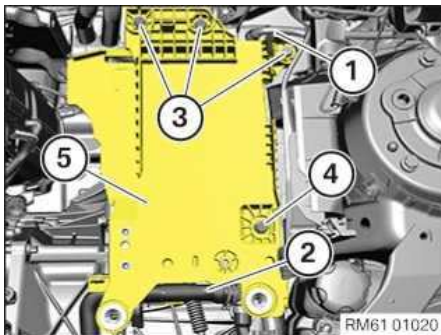


- Loosen screw (1).

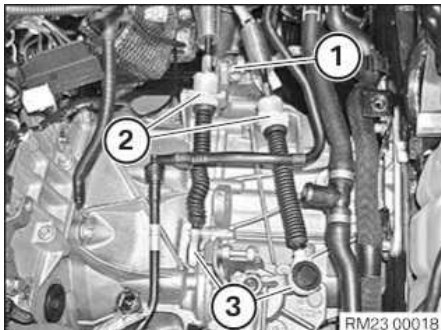


- Guide the electronics box (1) out of the guide (2) in direction of arrow and remove.

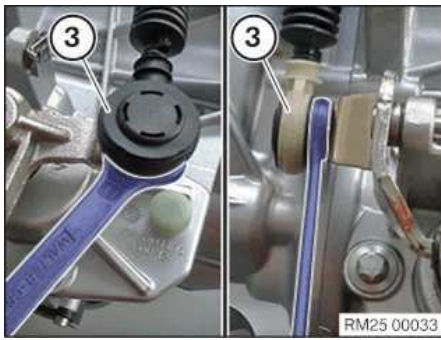
► Remove battery holder



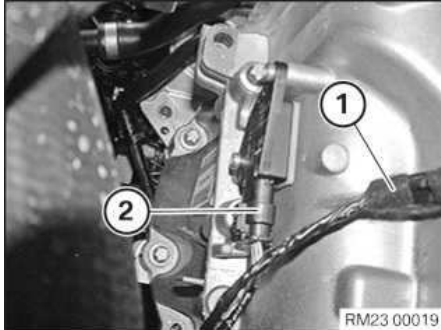
- Detach the cable clip (1) from the battery holder (5).
- Detach the coolant line (2) from the battery holder (5).
- Loosen screws (3).
- Loosen screw (4).
- Thread out and remove the battery holder (5).



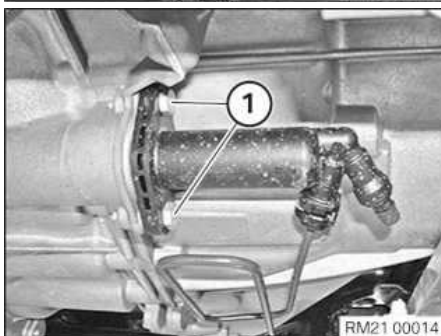
- Release the clip on the limit position/bracket (2) and bend the tabs slightly away from the limit position/bracket (2).
- Unscrew the bolt (1) and detach the ground strap from the transmission.



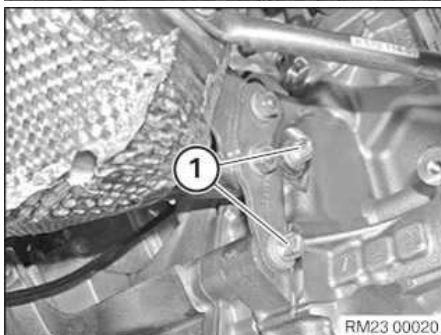
- Lever the fixtures (3) of the selector lever cables away from the ball joints with an open-end spanner SW13.



- Disconnect the plug connection (2) of the gear sensor.
- Detach the cable (1) with the holder from the transmission.



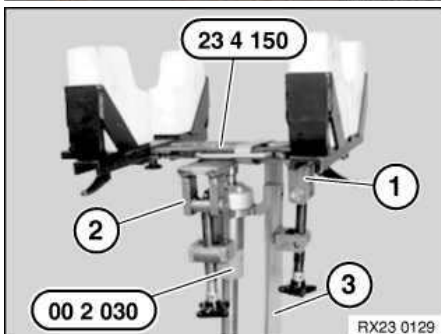
- Relieve tension on clutch slave cylinder slowly; otherwise air will be drawn in through sealing cup.
Pressure line of clutch slave cylinder remains connected.
- Unscrew the bolts (1) and remove the clutch slave cylinder.



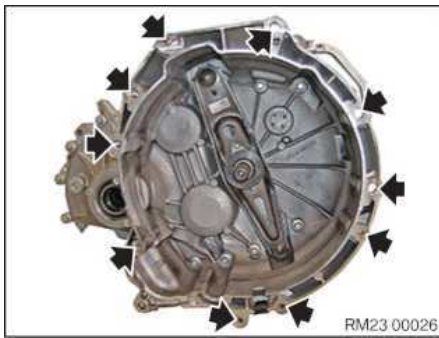
- Loosen screws (1).



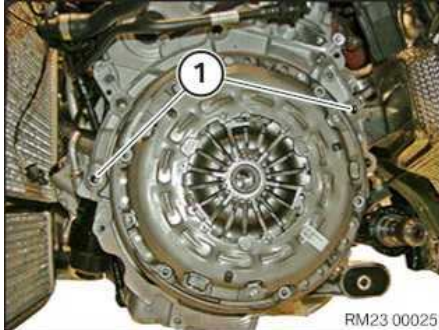
- Loosen screws (1).



- Support the transmission with special tool **0 490 133 (00 2 030)** and .
- Secure the transmission with the tensioning strap (3).



- Remove screws (arrows).
- Pull transmission downwards and remove.



- Check for correct fit of fitting sleeves(1).
- Replace damaged fitting sleeves.



- Remove any grease from the transmission input shaft (arrow) and clean the shaft.
- Do not grease transmission input shaft.
- Check clutch disc for frictional corrosion in gearing and replace if necessary.

29 – Removing the clutch operator (GS6-60DA, GS6XDA)

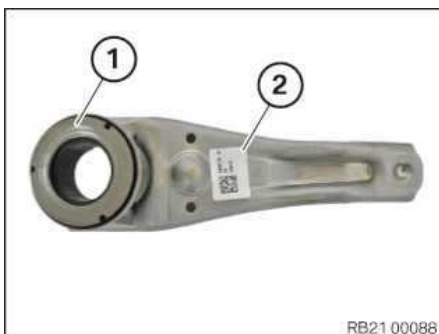


CAUTION

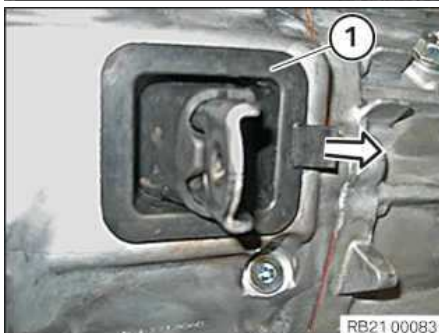
Materials harmful to health.

Contact with fluids harmful to health!

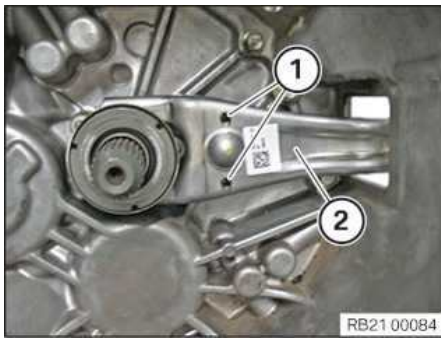
- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



- The release bearing (1) and release lever (2) have been combined to form a single clutch operator.
- Do **not** grease sliding surfaces.



- Remove / pull off the gaiter (1).



- Push together the retaining lugs (1) from the plastic cage and remove the clutch operator (2).



- Pull the plastic cage (1) off of the ball pin.

MAIN WORK

30 – Removing the guide sleeve for the clutch operator (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Loosen screws (1).
- Remove the guide sleeve.

31 – Install the guide sleeve for the clutch operator GS6X60DA



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Clean new guide tube.
Guide surface must be clean (no labels/stickers or adhesive residue).
- Tighten the screws (1).

Guide bush/clutch release bearing

M6		Tightening torque	8 Nm
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POSTPROCESSES

32 – Installing the clutch operator (GS6-60DA, GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



- Lightly grease the ball pin (1).

Expendable materials

Lubricating grease MI-Setral-43 N	50 g, Tube	83232152082
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- Only during replacement of clutch operator:
- Detach the ball pin (1).
- Renew the ball pin (1).

Parts: Ball pin

- Tighten the ball pin (1).

Ball pin on transmission

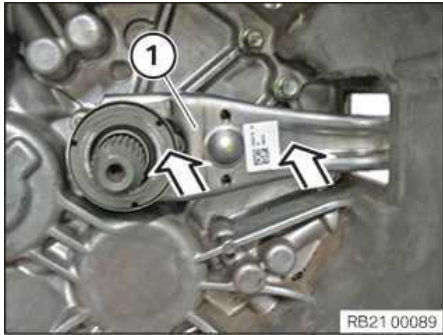
		Tightening torque	39 Nm
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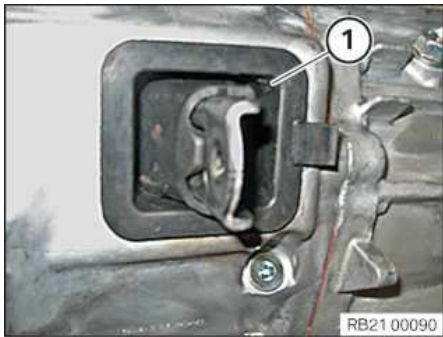
- Only during replacement of clutch operator:
 - Loosen screws (1).
 - Replace guide sleeve.
- Parts:** Guide sleeve
- Install the guide sleeve .
 - Tighten the screws (1).

Guide sleeve to transmission

M6		Tightening torque	8 Nm
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- Install the clutch operator (1).
- Plastic cage must noticeably and audibly engage on the ball pin.



- Install gaiter (1).
- To simplify installation, use water with low surface tension (washing-up liquid).

Note: Ensure that the sealing lip is positioned correctly!

33 – Installing the manual gearbox (GS6-59DG, GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

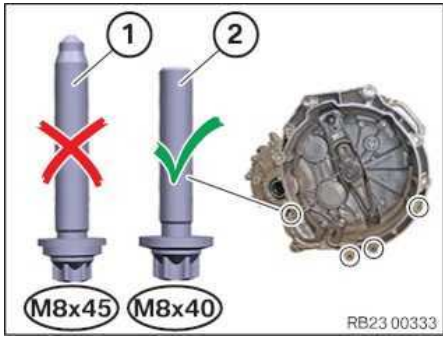


RISK OF DAMAGE

Damage to the engine block.

Damaged and corroded bolts will lead to major damage in the engine block and the transmission.

- It is imperative that protruding threads of the transmission bolts are checked for corrosion and damage prior to removal.
- It is imperative that all rust is removed from corroded threads and that they are cleaned prior to removal.
- Renew rusted and damaged bolts.



RISK OF DAMAGE

Component damage caused by incorrect screw length.

The use of screws with the incorrect screw length can damage the component.

- Check for correct screw length.
- Re-install screws that correspond to the original screw length.
- **Wrong:** The screw (1) (starter motor screw connection) must **not** be used for the bottom screw connection of the transmission.
- **Correct:** It is imperative to use the bolt (2) (M8x40) for the lower screw connection of the transmission and flange-mount the transmission.
- Tighten screws (arrows).

Transmission to engine

M8x40		Tightening torque	19 Nm
M12x75		Tightening torque	66 Nm



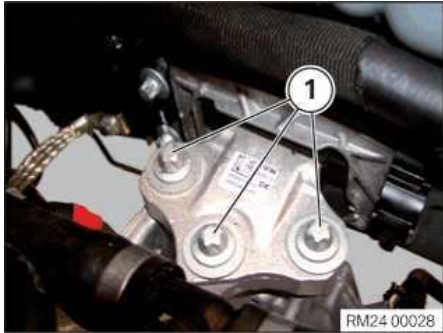
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Transmission mounting

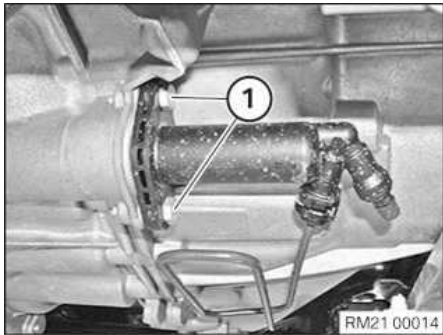
M10	Renew screws.	Jointing torque	40 Nm
		Angle of rotation	90 °



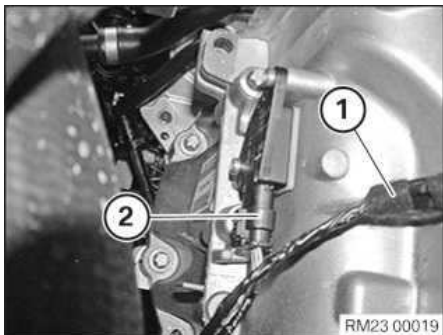
- Install clutch slave cylinder.
- Tighten the screws (1).

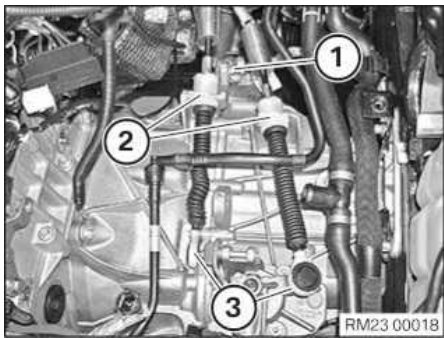
Clutch slave cylinder to transmission housing

M8		Tightening torque	19 Nm
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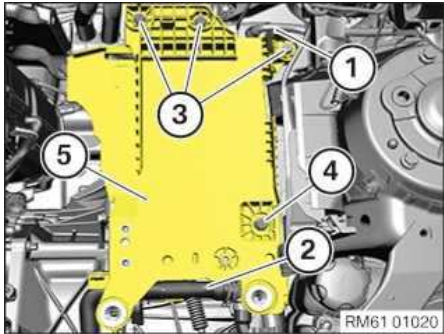


- Connect the plug connection (2) of the gear sensor.
- Clamp the cable (1) with the holder to the transmission.





- Tighten the ground strap on the transmission with the screw (1).
- Clip in the clip on the stop/holder (2).
- Attach the selector lever cables (3) on the ball joints.



► Install the battery holder

- Feed in and install the battery holder (5).
- Hand-tighten the bolt (4).
- Hand-tighten the bolts (3).
- Tighten down screw (2).

Battery holder to engine support

Hexagon screw M8x30		Tightening torque	19 Nm
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- Tighten down screws (3).

Battery holder to engine support

Hexagon screw M8x30		Tightening torque	19 Nm
------------------------	--	-------------------	-------

- Fasten the coolant line (2) on the battery holder (5).
- Fasten the cable clip (1) on the battery holder (5).



► Partially install vehicle battery

- Install vehicle battery (4).
- Correctly position the holder (3).
- Tighten down screw (2).

Battery terminal rail to battery tray

M8			19 Nm
----	--	--	-------

- Fit and clip the vent hose (1) in.

► 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.

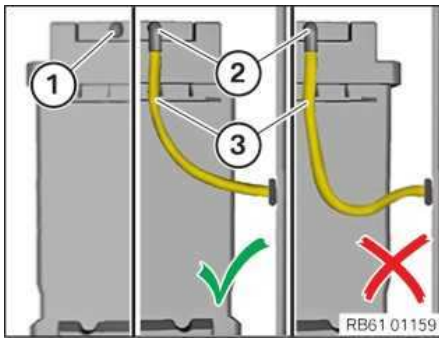


TECHNICAL INFORMATION

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).



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.

◀

► Install electronics box

Prerequisite

Battery earth lead is disconnected.

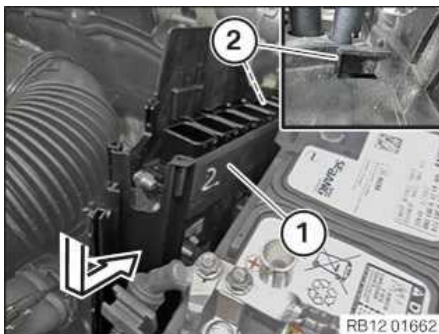


RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

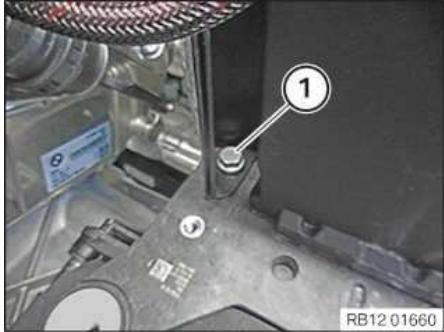
- Route all cables without abrasions, do not trap and crush.



- Guide in and install the electronics box (1) into the guide (2) in direction of arrow.



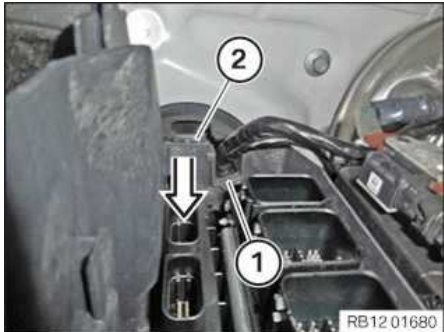
- Make sure that the electronics box (1) is positioned correctly on the bulkhead (2).



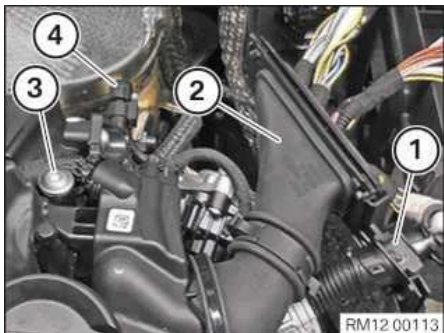
- Tighten down screw (1).

Electronics box to battery tray

M8X16		Tightening torque	15 Nm
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- Guide in and install the holder (1) in the electronics box (2) in direction of arrow.
- Make sure the bracket (1) engages audibly.

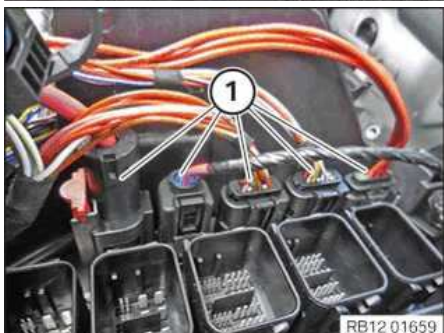


- Lay vehicle wiring harnesses (1) and (2) and mount on electronics box.
- Tighten down screw (3).

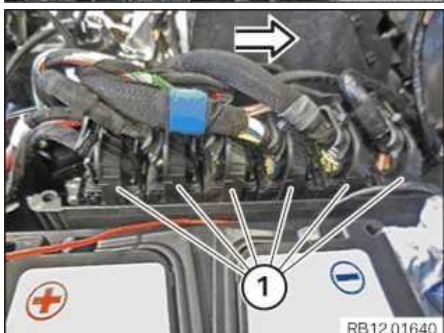
Wiring harness to cylinder head cover

TS5x20		Tightening torque	3,5 Nm
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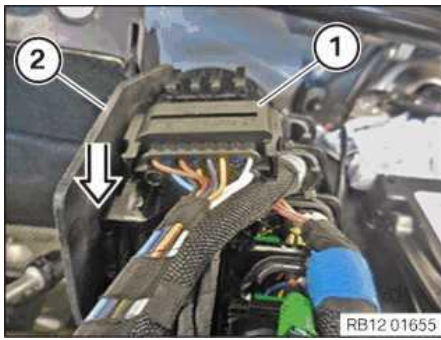
- Attach connector (4) to the differential pressure sensor and lock it audibly.



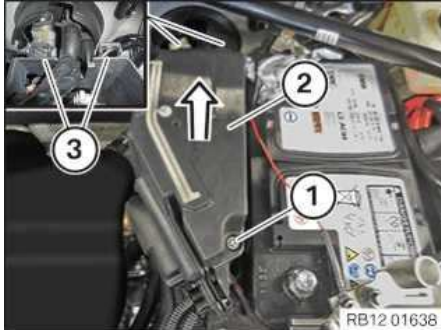
- Connect and lock the connector (1).
- Make sure the connectors (1) engage audibly.



- Connect connector (1) in direction of arrow and lock.
- Make sure the connectors (1) engage audibly.



- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.
- Insert the connector (1) in the direction of arrow at the electronics box (2) and install.



- Insert the cover (2) into the guides (3) in the direction of arrow and install.
- Make sure the cover audibly engages (2) in the guides (3).
- Tighten down screw (1).

Cover to electronics box

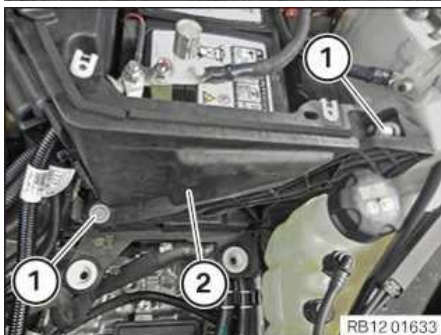
RF5x26.5		Tightening torque	2,5 Nm
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- Thread in positive battery cable (2) on holder (3) and install.
- Feed in and install positive battery terminal (1).
- Tighten positive battery terminal (1).

Positive battery terminal to battery

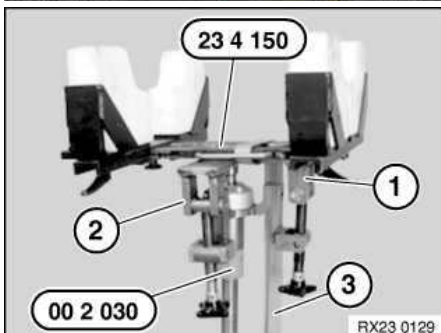
NutM6		Tightening torque	5 Nm
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- Feed in and install tension strut (2).
- Tighten the screws (1).

Tension strut to spring strut dome/battery tray

M8		Tightening torque	19 Nm
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- Loosening the tensioning strap (3).
- Remove special tools 0 490 133 (00 2 030) and .

34 – Installing the left radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Coat sealing lips of radial shaft seal with transmission oil.
- Drive the radial shaft seal into the housing with the special tool **2 407 668** until the sealing ring finishes flush with the transmission housing.

35 – Installing the right radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Coat the sealing lips of the radial shaft seal with transmission oil.
- Drive the outer radial shaft seal into the housing with the special tool **2 358 467** until the sealing ring finishes flush with the transmission housing.



- Coat the sealing lips of the inner radial shaft seal with transmission oil.
- Drive the inner radial shaft seal into the housing with the special tool **2 358 467** until the sealing ring finishes flush with the transmission housing.

36 – Partially installing the left output shaft

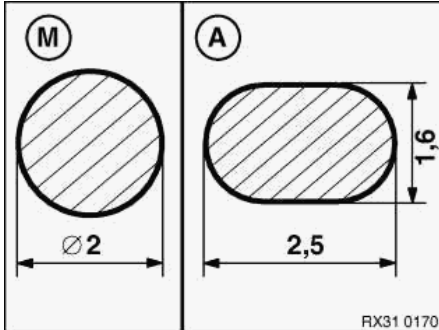


- **With automatic transmission only:**

- Lever out O-ring (1).
- Renew O-ring (1).

Parts: O-ring

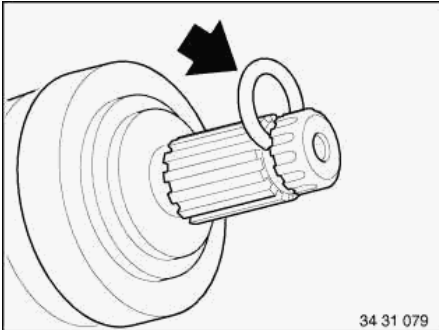
- Insert new O-ring (1).



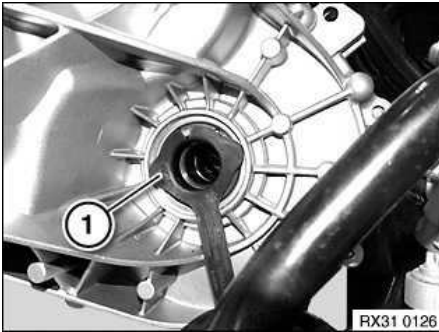
- Do not mix up circlips.

Different types of output shafts fitted:

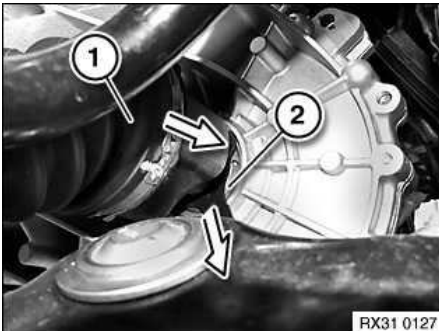
- **M:** Manual transmission
- **A:** Automatic transmission



- Renew circlip (arrow).

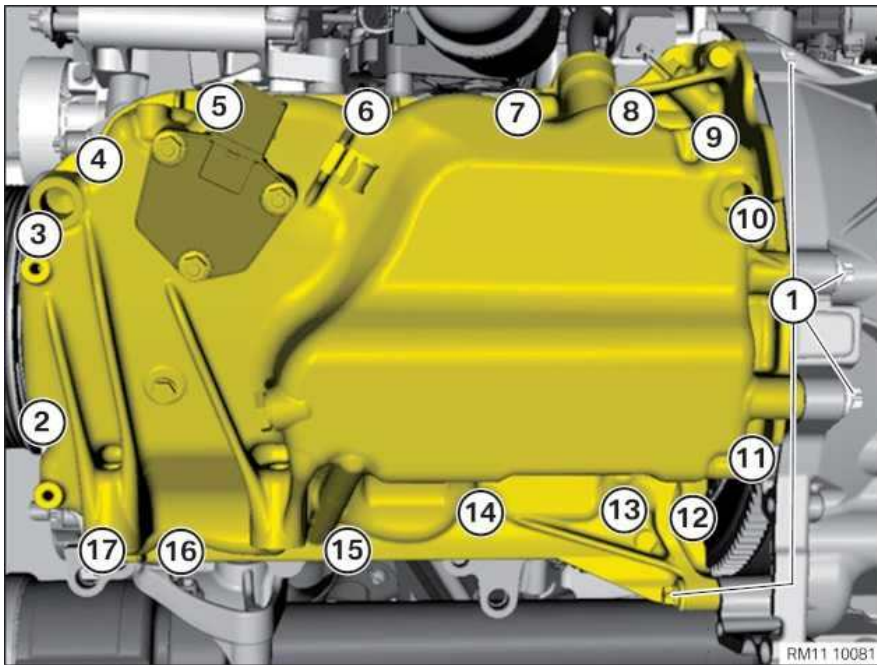


- Insert installation protection ring (1) into the radial shaft seal.
- Make sure the tool fits over the lip of the radial shaft seal so there is no damage to sealing ring when the output shaft is inserted.



- Insert output shaft (1) into transmission.
- **Manual gearbox only:** Pull on the handle to remove the installation protection ring (2) and dispose of it.
- Slide output shaft (1) into the transmission as far as the limit position.
The output shaft (1) must engage audibly.
- Check for secure seat by levering.

37 – Tighten down transmission-side bolting connection oil sump

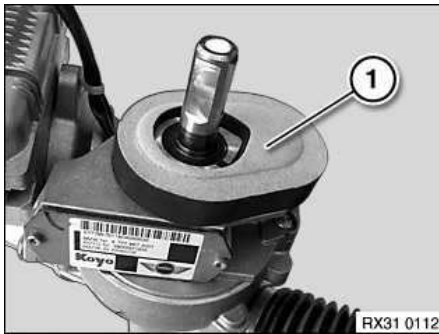


- Join transmission bolts (1) with 5 Nm.
- Tighten the transmission bolts (1) on the transmission.

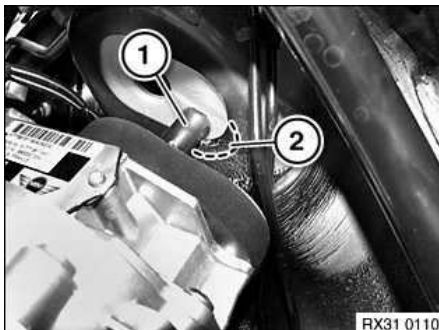
Transmission to oil sump

M8			19 Nm
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38 – Mount and secure the complete front axle



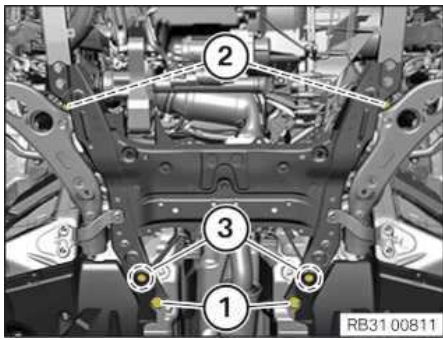
- Remove the seal (1).
 - Clean surface on steering gear.
 - Renew gasket (1).
- Parts:** Gasket
- Position the seal (1) and glue it on.



TECHNICAL INFORMATION

Non-compliance with the regulations for installation and disassembly may result in component damage. All work must be performed with care and in compliance with the regulations.

- When raising and lowering the front axle support, make sure that the torsion bar (1) of the electromechanical steering gear (EPS) in area (2) does not collide with the bulkhead!
- Note:** Collision with the bulkhead may result in damage to the electromechanical steering gear (EPS)!



- Position front axle support.
 - Bend underbody panellings in the areas (3) to one side.
 - Raise front axle support.
 - When raising, insert charge air cooler into the rubber mount of the charge air cooler on cross member.
 - Renew screws (1) and (2).
- Parts:** Bolts
- Tighten the screws (1).

Rear end of front axle support to body

M14 screw	Renew screw.	Tightening torque	175 Nm
-----------	--------------	-------------------	--------

- Tighten down screws (2).

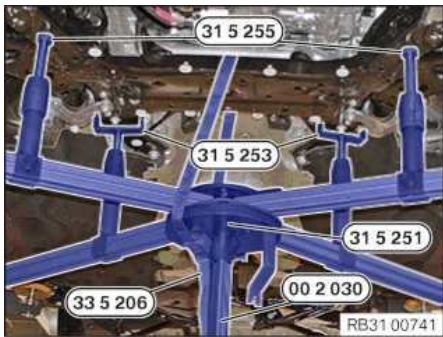
Front axle support, front to body

M12 screw	Renew screw.	Tightening torque	108 Nm
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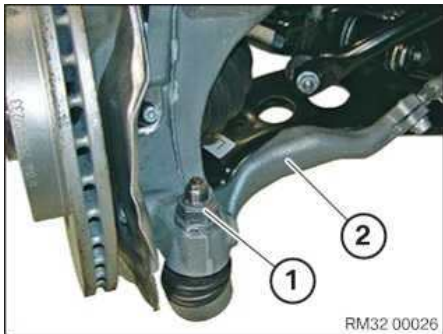
- If necessary, tighten the screws in the areas (3).

Underbody protection to body

Screw		Tightening torque	3 Nm
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- Remove special tool from special tool .
- Lower universal jack **0 490 133 (00 2 030)** with the special tool and place it to the side.



NOTICE

Perform the operations on the left and right side.

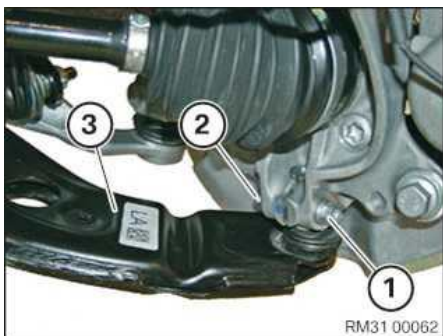
- Position the track rod (2) on the swivel bearing .
- Renew nut (1).

Parts: Nut

- Tighten nut (1).

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm
-----	------------	-------------------	--------



NOTICE

Perform the operations on the left and right side.

- Position the wishbone (3) on the swivel bearing .
- Renew the bolt (2) and the nut (1).

Parts: Bolt, nut

- Insert screw (2).
- Tighten nut (1).

Wishbone to swivel bearing

M10	Exclusively use the screw to tighten! Renew screw and nut.	Tightening torque	60 Nm
-----	---	-------------------	-------

39 – Install the mounted parts on the front axle support



NOTICE

Perform the operations on the left and right side.

- Renew screws (1).
- Parts:** Bolts
- Tighten the screws (1).

Holder, wishbone rubber mount, to body

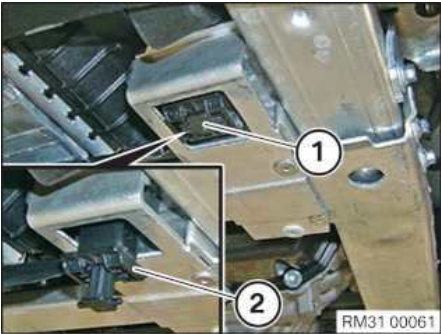
M10 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °



- Position the engine support (3) on the front axle support (1).
- Tighten down screw (2).

Holder with rubber mount to front axle support

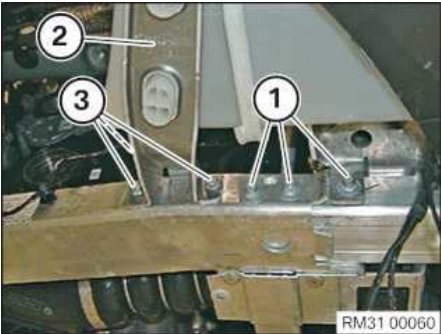
M12 screw			100 Nm
-----------	--	--	--------



NOTICE

Perform the operations on the left and right side.

- Position the lock (2).
- Lock the bracket (1) of the lock (2) of the holder for the charge air cooler.



- **Only on right side:** Position the holder for the washer fluid reservoir (2).
- Tighten down screws (3).

Washer fluid reservoir holder to front axle support adapter plate

		Tightening torque	10 Nm
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NOTICE

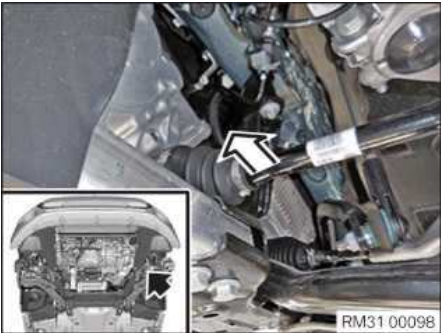
Perform the operations on the left and right side.

- Tighten the screws (1).

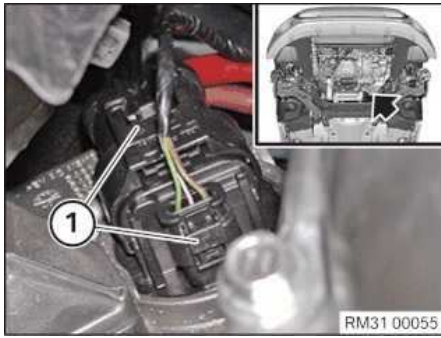
Deformation element, bottom, to adapter plate, front axle carrier

		Tightening torque	11,8 Nm
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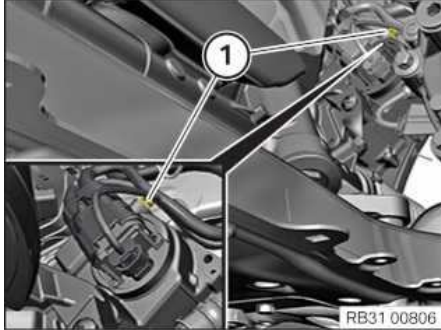
40 – Attaching connector at steering gear



- To connect the connector (see the following step): Connect the connector with the right hand. The connectors can be accessed via the left output shaft.



- Connect and lock connector (arrow) (1) with the steering gear.



- Fasten the wiring harness (1) on the steering gear.

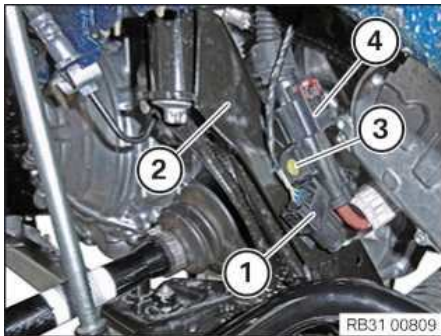
► **If installed: Fasten the plug connections at the front axle support**

- Position the plug connection (4) at the front axle support (2).
- Tighten down screw (3).

Holder to front axle support

Oval-head screw TS5 x 16	Tightening torque	2,6 Nm
-----------------------------	-------------------	--------

- Fasten the plug connection (1) at the front axle support (2).



41 – Securing rubber mount on front axle support



- Check rubber mount (1), replace if necessary.

Parts: Rubber mount

- Spray rubber mount (1) with lubricant and slide onto holder on front axle support.

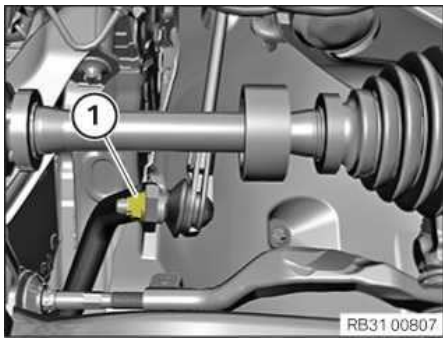
42 – Securing anti-roll bar on left and right on the anti-roll bar link



NOTICE

Perform the operations on the left and right side.

► **Fastening anti-roll bar on the anti-roll bar link**



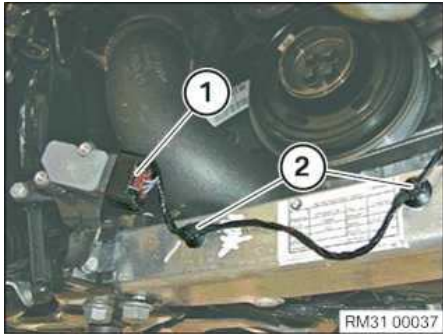
- Position the anti-roll bar link on the anti-roll bar .
 - Renew nut (1).
- Parts:** Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Anti-roll bar link to anti-roll bar

M10	Renew nut.	Tightening torque	56 Nm
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43 – With right installation: Securing the cable for the ride height sensor



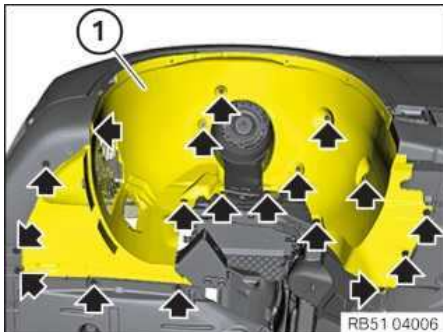
- Secure the cable clip (2) on the adapter of the deformation element.
- Connect connectors (1) and lock.

44 – Installing front left and right wheel arch cover



NOTICE

Perform the operations on the left and right side.



► Installing the front wheel arch cover

- Guide the wheel arch cover (1) in.
- Tighten all bolts and nuts (arrows).

Wheel arch cover to body

Plastic nut		Tightening torque	2,6 Nm
Screw		Tightening torque	2,6 Nm

Wheel arch cover to body

Screw		Tightening torque	2,5 Nm
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Wheel arch cover to body

Plastic nut		Tightening torque	3 Nm
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► Installing front wheel arch trim



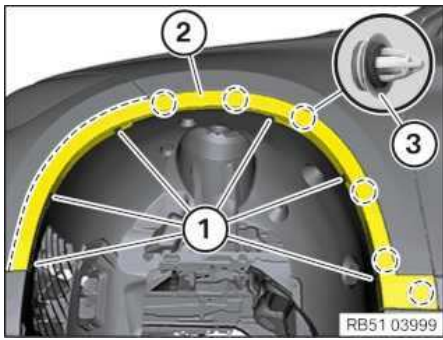
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



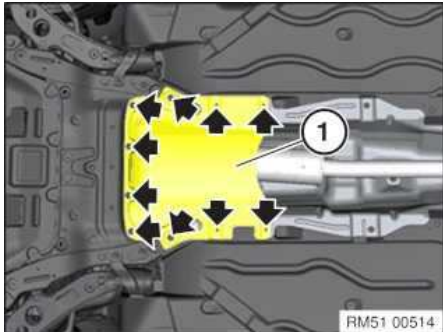
NOTICE

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



- Check the clips (3) for damage and renew where required.
The clips (3) must not be damaged or missing.
- Feed in wheel arch trim (2) and engage on the clips (3).
- Engage wheel arch trim (2) into the latch mechanisms on the bumper panel.
- Mount blind rivet (1) using the special tool **0 496 521 (00 2 230)**.

45 – If installed: Installing underbody protection at rear



- Position rear underbody protection (1).
- Tighten screws (arrows).

Underbody protection to body

Screw		Tightening torque	3 Nm
-------	--	-------------------	------

46 – Installing starter motor



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 starter motor .
- Tighten the screws (1).

Starter motor to transmission

M8x45		Tightening torque	19 Nm
-------	--	-------------------	-------



- Feed the positive battery cable (2) in on the starter and install.
- Tighten nut (1).

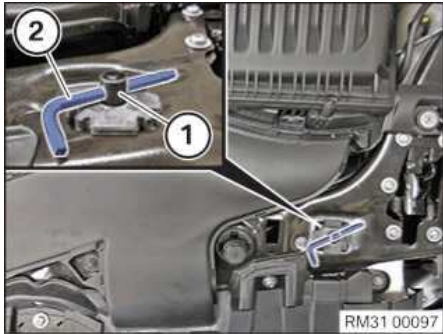
Battery positive lead to starter

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



- Insert and install the new sealing cap (2).
- Secure the sealing cap (2) in the direction of the arrow.
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

47 – Removing fastener for left and right radiator

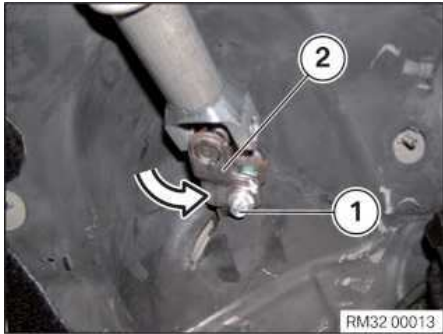


NOTICE

Perform the operations on the left and right side.

- Remove suitable tool (2) from the centering pin (1).

48 – Secure the steering shaft at the bottom on the steering gear



- Clean the screw lock residue from the screw thread in the universal joint (2).
- Pivot the universal joint (2) in the direction of the arrow to the steering gear.
- Renew the screw (1).

Parts: Screw

- Tighten down screw (1).

Lower steering shaft to steering gear

M10	Clean screw thread and remove remains of screw locking agent. Renew screw.	Tightening torque	28 Nm
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- **If installed:**
- Position the cover on the steering column (2).
- Tighten nuts (1).

Steering column cover to bulkhead

Plastic nut		Tightening torque	3 Nm
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49 – Remove the engine bridge



CAUTION

Heavy component.

Heavy components can lead to injury or damage.

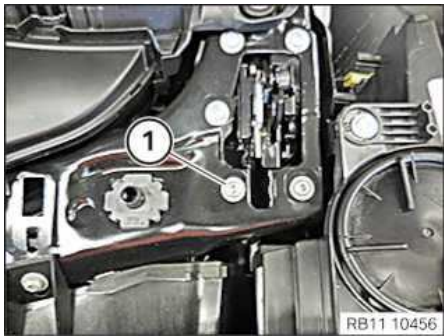
- Remove and install heavy components with the aid of another person/other persons.



- Detach the spindle screw (1) from the engine bridge.
- Unscrew the leg screws (2) and (3).
- Guide the engine bridge out of the vehicle with the help of another person and remove.



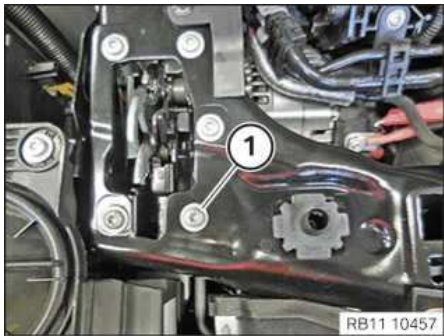
- Unscrew the bolts (1) of the special tool **2 459 012**.
- Feed out the special tool **2 459 012** at the cylinder head and remove.



- Tighten the screw (1) of the bonnet catch.

Cross connection on support for cross connection

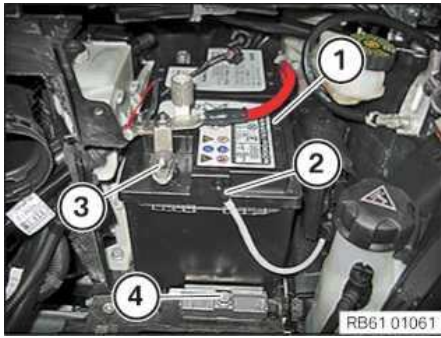
M6x20		Tightening torque	12 Nm
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- Tighten the screw (1) of the bonnet catch.

Cross connection on support for cross connection

M6x20		Tightening torque	12 Nm
-------	--	-------------------	-------



- Install vehicle battery (1).
- Position the bracket and tighten with the screw (4) .

Battery terminal rail to battery tray

M8		19 Nm
----	--	-------

- Position the vent hose (2) and clip it in.
- Position the positive battery terminal and tighten with the nut (3) .

Battery terminal with IBS positive battery terminal / negative battery terminal

NutM6		5 Nm
-------	--	------

► 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.

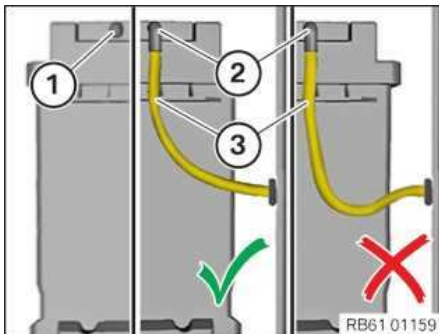


TECHNICAL INFORMATION

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).



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

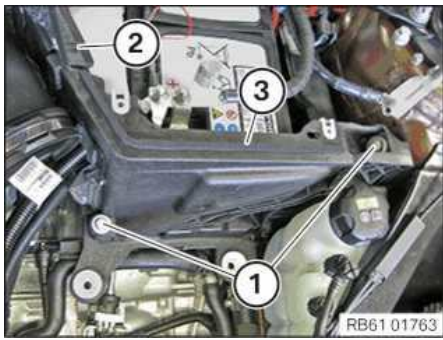
- Check if the vent hose (3) is routed to the outside with a downhill gradient (**no siphon formation!**).

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.



- Insert tension strut (3) and tighten with screws (1).

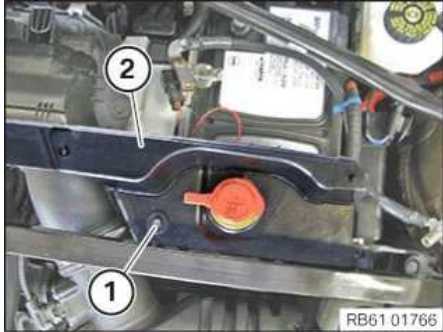
Trailing link

M8		Tightening torque	19 Nm
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- Tighten down screw (2).

Battery cover

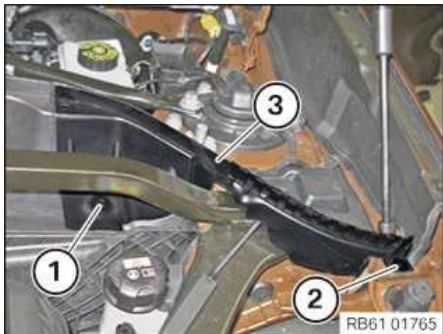
M8			2,8 Nm
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- Position the cover (2).
- Tighten down screw (1).

Battery cover

M8			2,8 Nm
----	--	--	--------



- Position the fixture for the gasket (3) and secure with the expanding rivet (2).
- Tighten down screw (1).

Battery cover

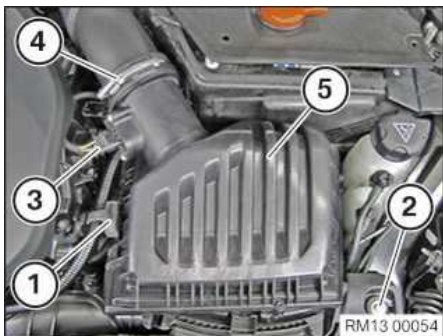
M8			2,8 Nm
----	--	--	--------

51 – Disconnecting all battery earth leads



- See additional information.

52 – Installing intake silencer housing



- Insert the intake silencer housing (5) into the rubber mounts and install it.
Intake filter housing (5) must engage audibly.
- Tighten down screw (2).

Intake silencer housing to lock bridge

M6X30		Tightening torque	8 Nm
-------	--	-------------------	------

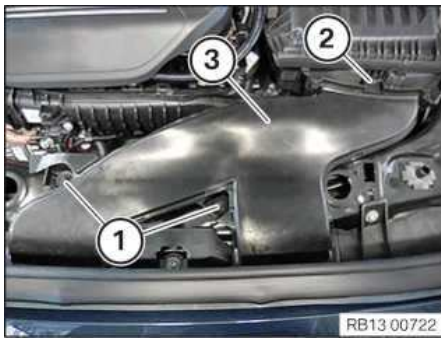
- Tighten clamp (4).

Clean air pipe to intake silencer housing

Clamp		Tightening torque	3 Nm
-------	--	-------------------	------

- Connect and lock the connector (3).
The connector (3) must engage audibly.
- Insert and install the holder (1).

53 – Install the intake neck for the intake filter housing

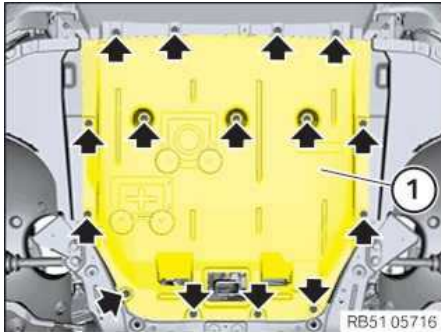


- Insert and install the intake neck (3).
The lock (2) must audibly engage.
- Tighten nuts (1).

Intake neck to cross connection

M6		Tightening torque	8 Nm
----	--	-------------------	------

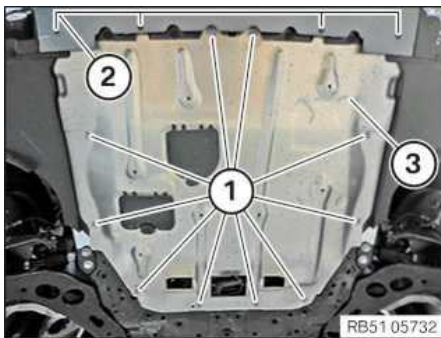
54 – Installing the front underbody protection



- Guide the front underbody protection (1) in under the bumper panel and position it at the screw points.
- Tighten screws (arrows).

Underbody protection front

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



Equipment specification with metal underride guard:

- Guide in and attach the underride guard (3).
- Tighten down screws (1) and (2).

Underbody protection front

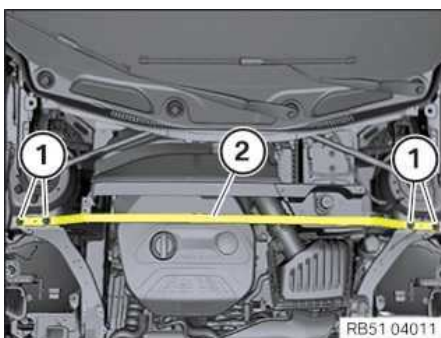
Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

55 – Install strut brace



TECHNICAL INFORMATION

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



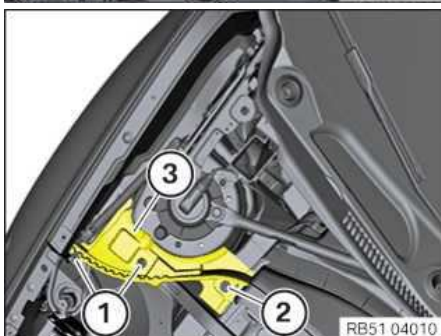
- Install the strut brace (2).
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Cross-brace to spring strut dome

Renew screw.		Jointing torque	28 Nm
		Angle of rotation	180 °



- Install the cover (3).
- Tighten down screw (2).

Cover on body

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

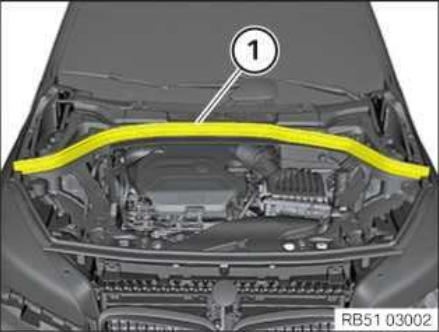
- Install the expanding rivet (1).

56 – Install the seal for the bonnet



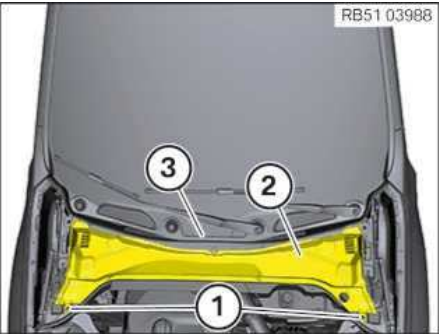
NOTICE

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



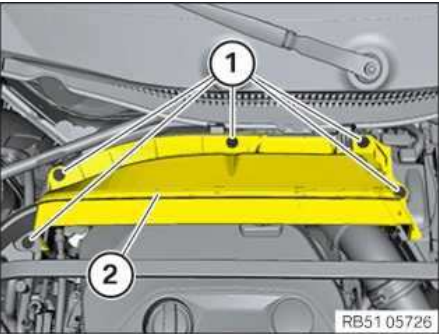
- Install bonnet seal at rear (1).
- Ensure that the rear bonnet seal (1) is fitted correctly.

57 – Installing front cowl panel cover



- Insert and install cowl panel cover at front (2) into cowl panel cover at rear (3).
- Check cowl panel cover at front is correctly seated (2).
- Secure expanding rivet (1).

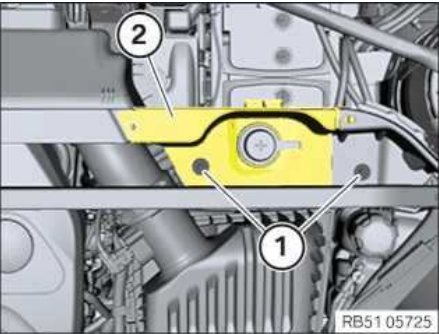
58 – Installing the upper bulkhead cover



- Feed in and install cover (2) of the bulkhead at the top.
- Tighten the screws (1).

Cover of top bulkhead

Screw		Tightening torque	2,6 Nm
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- Guide in and install cover (2).
- Tighten down screw (1).

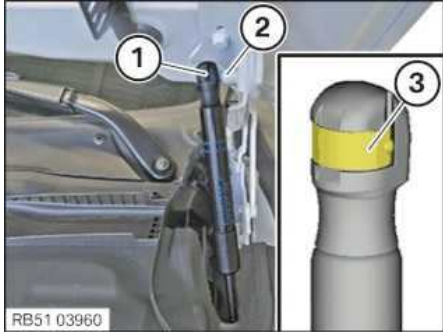
Cover of remote positive terminal

Screw		Tightening torque	2,6 Nm
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59 – Take bonnet out of the service position



- Support the bonnet by hand.
- Remove the special tool (3) from the ball pin (2).
- Pull off the special tool (3) from the gas pressure spring (1).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.



CAUTION
Shutting bonnet or tailgate.
Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.

- Check the clamp (3) is fitted correctly.
- Connect ball socket (1) to ball pin (2).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.

Additional Information

Overview of Tightening Torques

Oil drain plug / oil filler plug				Used in step	11
Hexagon socket		Tightening torque			43 Nm
Special tool to cylinder head				Used in step	12
M8		Tightening torque			21,5 Nm
Guide bush/clutch release bearing				Used in step	31
M6		Tightening torque			8 Nm
Ball pin on transmission				Used in step	32
		Tightening torque			39 Nm
Guide sleeve to transmission				Used in step	32
M6		Tightening torque			8 Nm
Transmission to engine				Used in step	33
M8x40		Tightening torque			19 Nm
M12x75		Tightening torque			66 Nm
Transmission mounting				Used in step	33
M10	Renew screws.	Jointing torque			40 Nm
		Angle of rotation			90 °
Clutch slave cylinder to transmission housing				Used in step	33
M8		Tightening torque			19 Nm
Battery holder to engine support				Used in step	33
Hexagon screw M8x30		Tightening torque			19 Nm
Battery terminal rail to battery tray				Used in step	33 50
M8					19 Nm

Electronics box to battery tray Used in step [33](#)

M8X16		Tightening torque	15 Nm
-------	--	-------------------	-------

Wiring harness to cylinder head cover Used in step [33](#)

TS5x20		Tightening torque	3,5 Nm
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Cover to electronics box Used in step [33](#)

RF5x26.5		Tightening torque	2,5 Nm
----------	--	-------------------	--------

Positive battery terminal to battery Used in step [33](#)

NutM6		Tightening torque	5 Nm
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Tension strut to spring strut dome/battery tray Used in step [33](#)

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

Transmission to oil sump Used in step [37](#)

M8			19 Nm
----	--	--	-------

Rear end of front axle support to body Used in step [38](#)

M14 screw	Renew screw.	Tightening torque	175 Nm
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Front axle support, front to body Used in step [38](#)

M12 screw	Renew screw.	Tightening torque	108 Nm
-----------	--------------	-------------------	--------

Underbody protection to body Used in step [38](#) [45](#)

Screw		Tightening torque	3 Nm
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Track rod end to swivel bearing Used in step [38](#)

M14	Renew nut.	Tightening torque	175 Nm
-----	------------	-------------------	--------

Wishbone to swivel bearing Used in step [38](#)

M10	Exclusively use the screw to tighten! Renew screw and nut.	Tightening torque	60 Nm
-----	---	-------------------	-------

Holder, wishbone rubber mount, to body Used in step [39](#)

M10 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °

Holder with rubber mount to front axle support Used in step [39](#)

M12 screw			100 Nm
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Washer fluid reservoir holder to front axle support adapter plate Used in step [39](#)

		Tightening torque	10 Nm
--	--	-------------------	-------

Deformation element, bottom, to adapter plate, front axle carrier Used in step [39](#)

		Tightening torque	11,8 Nm
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Holder to front axle support Used in step [40](#)

Oval-head screw TS5 x 16		Tightening torque	2,6 Nm
--------------------------	--	-------------------	--------

Anti-roll bar link to anti-roll bar Used in step [42](#)

M10	Renew nut.	Tightening torque	56 Nm
-----	------------	-------------------	-------

Wheel arch cover to body Used in step [44](#)

Plastic nut		Tightening torque	2,6 Nm
Screw		Tightening torque	2,6 Nm

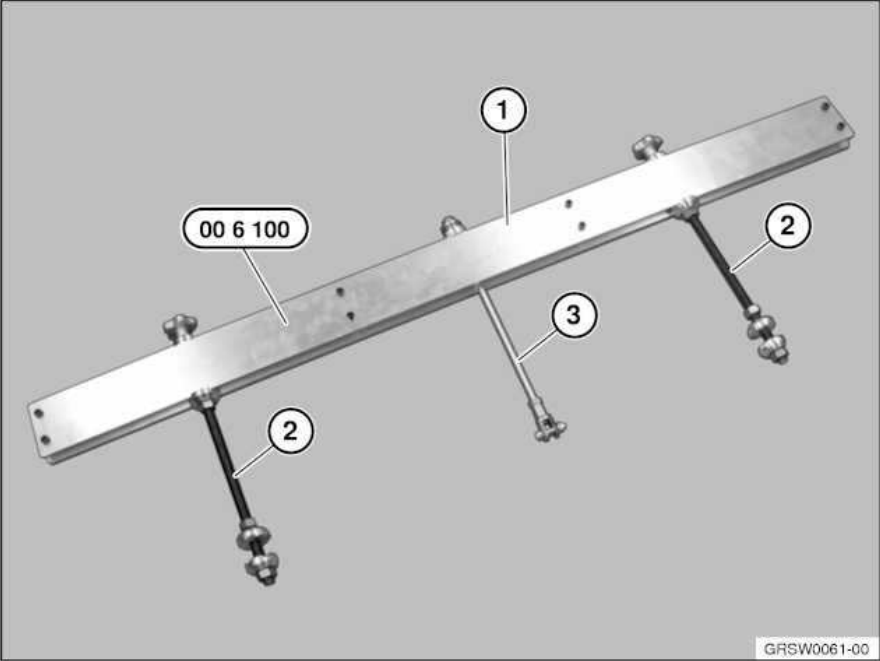
Wheel arch cover to body			Used in step 44
Screw		Tightening torque	2,5 Nm
Wheel arch cover to body			Used in step 44
Plastic nut		Tightening torque	3 Nm
Starter motor to transmission			Used in step 46
M8x45		Tightening torque	19 Nm
Battery positive lead to starter			Used in step 46
M8		Tightening torque	13,5 Nm
Lower steering shaft to steering gear			Used in step 48
M10	Clean screw thread and remove remains of screw locking agent. Renew screw.	Tightening torque	28 Nm
Steering column cover to bulkhead			Used in step 48
Plastic nut		Tightening torque	3 Nm
Cross connection on support for cross connection			Used in step 49
M6x20		Tightening torque	12 Nm
Battery terminal with IBS positive battery terminal / negative battery terminal			Used in step 50
NutM6			5 Nm
Trailing link			Used in step 50
M8		Tightening torque	19 Nm
Battery cover			Used in step 50
M8			2,8 Nm
Intake silencer housing to lock bridge			Used in step 52
M6X30		Tightening torque	8 Nm
Clean air pipe to intake silencer housing			Used in step 52
Clamp		Tightening torque	3 Nm
Intake neck to cross connection			Used in step 53
M6		Tightening torque	8 Nm
Underbody protection front			Used in step 54
Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm
Cross-brace to spring strut dome			Used in step 55
	Renew screw.	Jointing torque	28 Nm
		Angle of rotation	180 °
Cover on body			Used in step 55
Hexagon screw		Tightening torque	3 Nm
Cover of top bulkhead			Used in step 58
Screw		Tightening torque	2,6 Nm
Cover of remote positive terminal			Used in step 58
Screw		Tightening torque	2,6 Nm

Overview of Special Tools

2 459 012 Holder



Common		Used in step	12	49
Usage	For removing and installing the cylinder head. Contour-graphic silhouette foil is included in the delivery specification.			
Included in the tool or work				
Storage location	A58			
Replaced by				
In connection with				
SI-Number	01 07 17 (487)			



Usage Engine bridge (device) 006000

Included in the tool or work

Storage location Individual

Replaced by

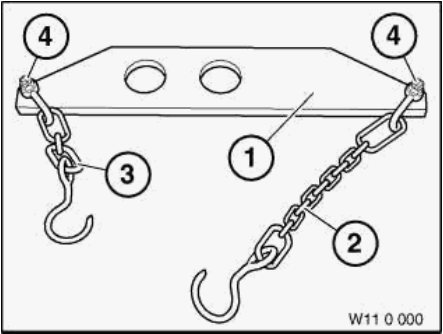
In connection with

SI-Number 01 17 10 (659)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
2	2 361 507 (00 6 102)		Spindle Set (2 pieces) in connection with 00 6 100.	
3	2 361 506 (00 6 103)		Spindle Spindle (central spindle) for Traverse 00 6 100.	

0 490 561 (11 0 000) Lifting gear

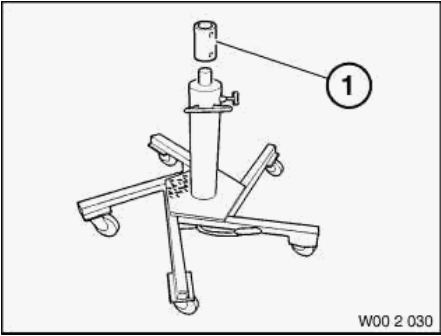


Common	
Usage	(Hoisting gear) For removing and installing engines. As of 08/2011 only available as a complete set. Delivered with TÜV inspection certificate and operating instructions. No delivery of separate parts.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 13 94 (888)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
4	0 490 565 (11 0 009)		Shackle (Shackle) 2 pieces. As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
1	0 490 562 (11 0 001)		Lifting gear (Cross member) As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
2	0 490 563 (11 0 002)		Chain (Chain) Version: long As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
3	0 490 564 (11 0 003)		Chain (Chain) Version: short As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	

0 490 133 (00 2 030) Device



Common		Used in step	23	28	33	38
Usage	(universal hydraulic lifter base unit) Chassis and hydraulic lifter - For removing and installing rear axle supports and gearboxes. Also for soft top mounts. Is replaced by 81 22 2 219 012					
Included in the tool or work						
Storage location						
Replaced by						
In connection with						
SI-Number	01 05 90 (207)					

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 490 134 (00 2 031)		Adapter (adapter for gearbox holder) Model series: E30, E31, E32, E34, E36	

2 358 468 Puller



Common		Used in step	26
Usage	For disassembly of the rear-wheel drive of output shaft. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).		
Included in the tool or work			
Storage location	C76		
Replaced by			
In connection with			
SI-Number	01 55 14 (213)		

2 358 469 Puller



Common

Used in step [26](#)

Usage	For dismantling the rear wheel drive of the transmission input shaft. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C76
Replaced by	
In connection with	
SI-Number	01 55 14 (213)

2 407 668 Mandrel



Common

Used in step [34](#)

Usage	For installing the left radial shaft seal output shaft. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B75
Replaced by	
In connection with	
SI-Number	01 57 14 (215)

2 358 467 Mandrel



Common

Used in step [35](#)

Usage	For installing the rear-wheel drive on the right-hand gear output. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C76
Replaced by	
In connection with	
SI-Number	01 55 14 (213)

0 496 521 (00 2 230) Pliers



Common

Used in step [44](#)

Usage	(Blind rivet pliers for plastic rivets) For shaft diameters of 3.5 mm, 3.9 mm and 4.5 mm
Included in the tool or work	
Storage location	C25
Replaced by	
In connection with	
SI-Number	01 17 08 (478)

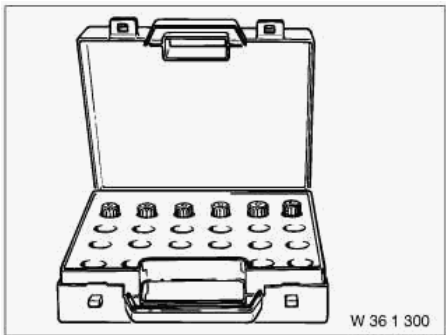
Replacement tools:

0 495 221 (36 1 323) Wheel stud



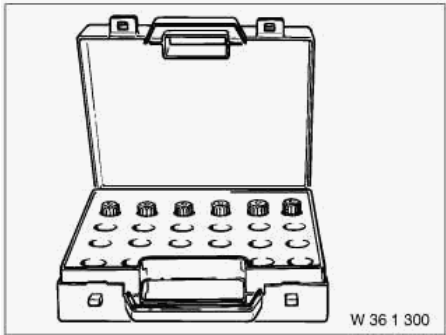
Common		Used in step
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 224 (36 1 326) Wheel stud



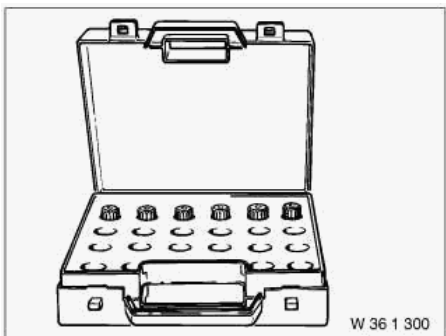
Common		Used in step
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 225 (36 1 327) Wheel stud



Common		Used in step
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 226 (36 1 328) Wheel stud



Common		Used in step
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 227 (36 1 329) Wheel stud



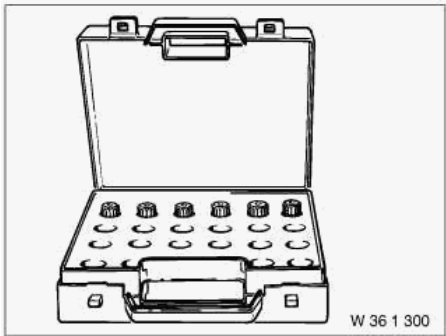
Common		Used in step
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 228 (36 1 331) Wheel stud



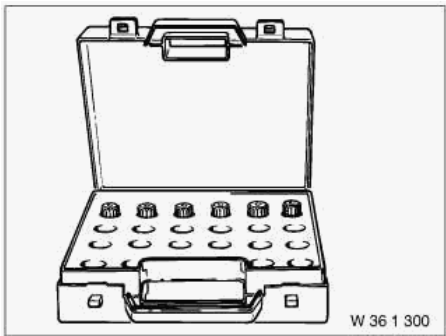
Common		Used in step
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 229 (36 1 332) Wheel stud



Common		Used in step
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 230 (36 1 333) Wheel stud



Common		Used in step
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

Overview Technical Data

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51

61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	8 51
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	8 51
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
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61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 20 900 Disconnecting and connecting battery earth lead	8 51
61 35 ... Notes on ESD protection (Electro Static Discharge)	28

Operating materials

Used in step

14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	11
2.0 Grease for wheel centring	

Operating materials

Used in step

23 11 204 Replacing the radial shaft seal, left on the differential



WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.



WARNING

Motor vehicle may slip off the vehicle hoist if the weight is distributed unevenly.

Danger! Life-threatening injuries!

- Ensure there is a specific weight compensation on the motor vehicle.



WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

PRELIMINARY WORK

1 – Removing the front left wheel

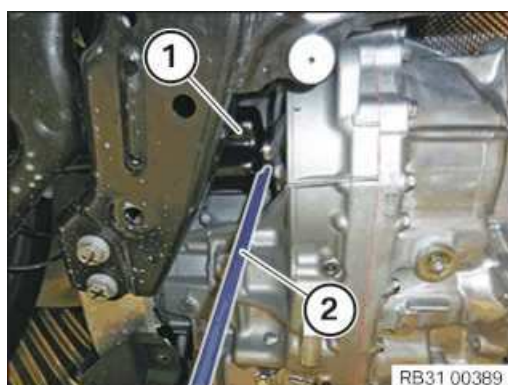


► Removing the wheel

- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Unscrew the wheel bolts (arrows) and remove the wheel.

Use the matching adapter from tool set (wheel bolt adapter set) to loosen and tighten down the wheel bolt with security code.

2 – Partially removing the left output shaft



- Protect the output shaft (1) from falling.
- Lever out the output shaft (1) with a mounting lever (2) from the transmission.
- Tie up output shaft (1).

MAIN WORK

3 – Removing the left radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

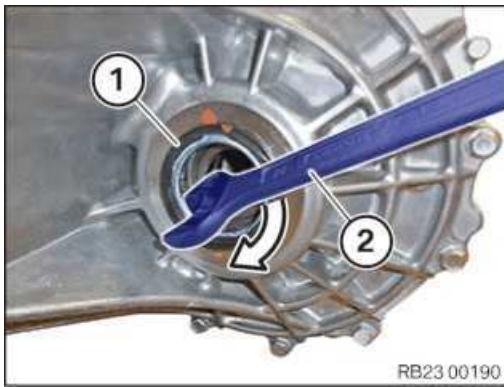


RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Carefully remove the radial shaft seal (1) from the transmission using a suitable tool (2).

4 – Installing the left radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

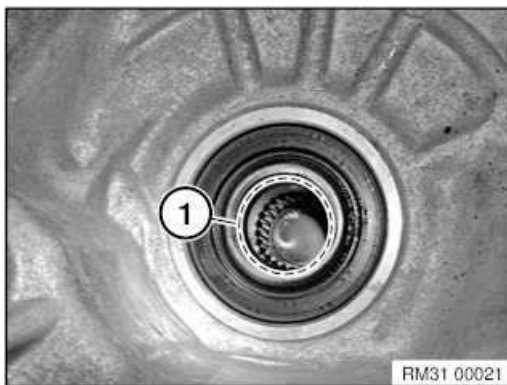
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Coat sealing lips of radial shaft seal with transmission oil.
- Drive the radial shaft seal into the housing with the special tool **2 407 668** until the sealing ring finishes flush with the transmission housing.

POSTPROCESSES

5 – Partially installing the left output shaft

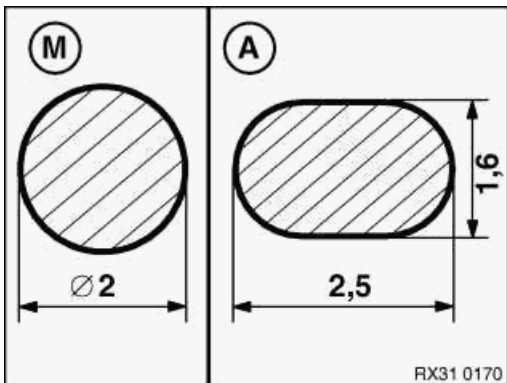


- **With automatic transmission only:**

- Lever out O-ring (1).
- Renew O-ring (1).

Parts: O-ring

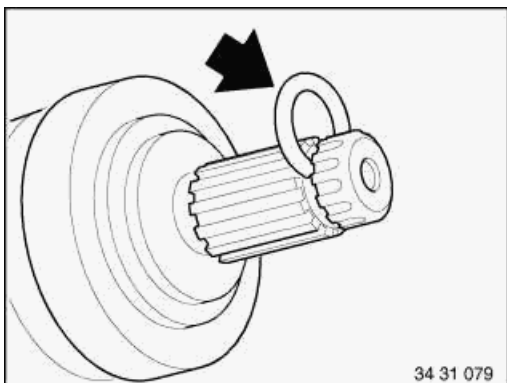
- Insert new O-ring (1).



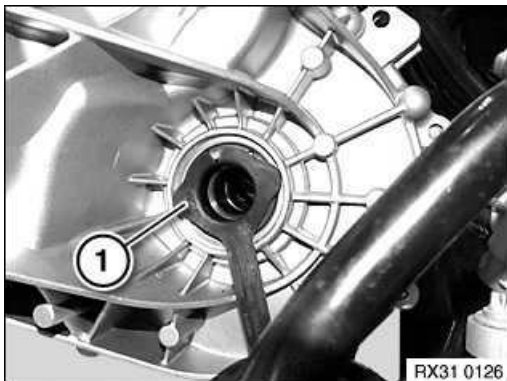
- Do not mix up circlips.

Different types of output shafts fitted:

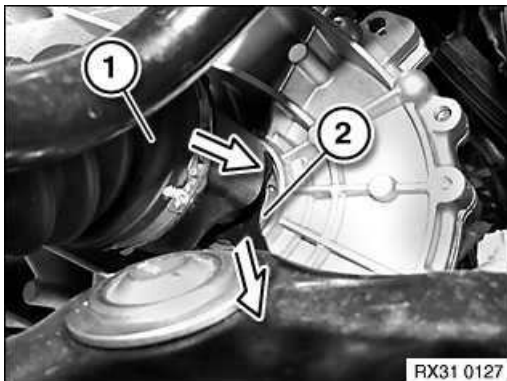
- **M:** Manual transmission
- **A:** Automatic transmission



- Renew circlip (arrow).



- Insert installation protection ring (1) into the radial shaft seal.
- Make sure the tool fits over the lip of the radial shaft seal so there is no damage to sealing ring when the output shaft is inserted.



- Insert output shaft (1) into transmission.
- **Manual gearbox only:** Pull on the handle to remove the installation protection ring (2) and dispose of it.
- Slide output shaft (1) into the transmission as far as the limit position. The output shaft (1) must engage audibly.
- Check for secure seat by levering.

6 – Attaching the front left wheel

► Mounting the wheel

▷ Clean the contact surfaces between the brake disc and the wheel rim



TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool **2 344 011**.

Do not operate special tool **2 344 011** with an impact screwdriver.

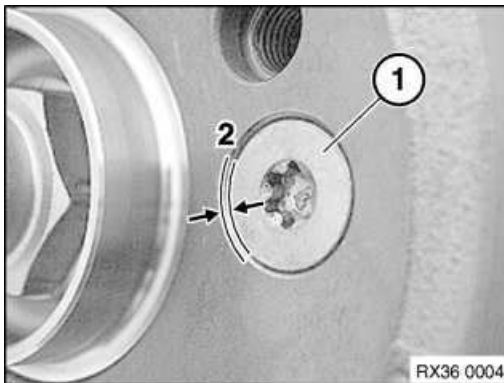
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.



- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool **2 344 011**.

Do not operate special tool **2 344 011** with an impact screwdriver.

- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).



- Renew mounting bolt (1).

Parts: Mounting bolt

- Check that the mounting bolt (1) for the brake disc is securely seated.

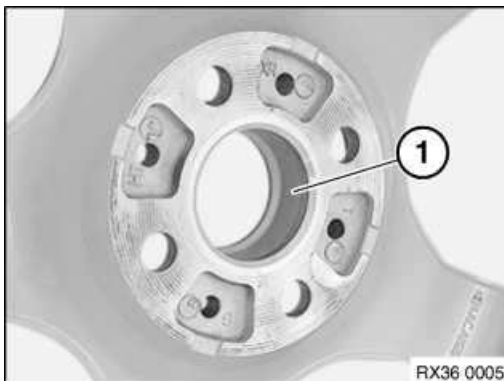
The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------



- Lightly grease the wheel centring (1) in the wheel rim; refer to additional information for grease for the wheel centring (1).



TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew corroded wheel bolts.

Parts: Wheel bolts

- Clean the wheel bolts.
- Check the wheel bolts and threads for damage, renew the wheel bolts if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M 14/AF 17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

Additional Information

Overview of Tightening Torques

Brake disc to rear wheel hub

Used in step 6

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Brake disc to front wheel hub

Used in step 6

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Wheel bolts

Used in step 6

M 14/AF 17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

Overview of Special Tools

2 407 668 Mandrel



Common		Used in step	4
Usage	For installing the left radial shaft seal output shaft. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).		
Included in the tool or work			
Storage location	B75		
Replaced by			
In connection with			
SI-Number	01 57 14 (215)		

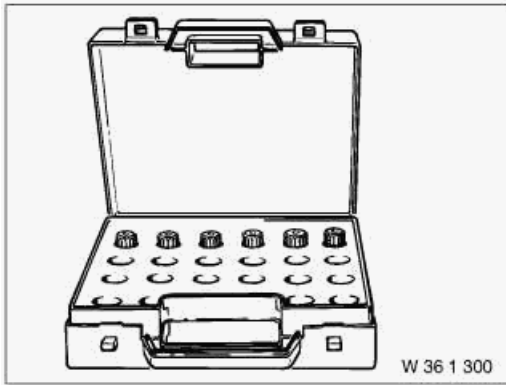
2 344 011 Tool



Common		Used in step	6
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.		
Included in the tool or work			
Storage location			
Replaced by			
In connection with			
SI-Number	08 08 12 (872)		

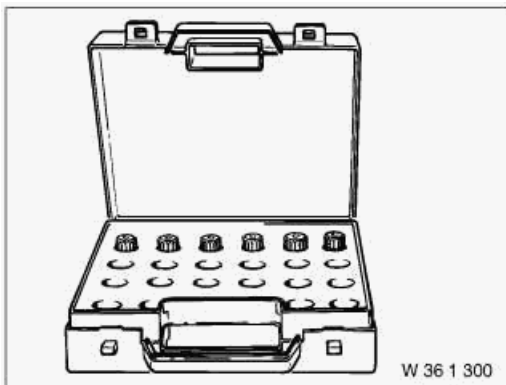
Replacement tools:

0 495 221 (36 1 323) Wheel stud



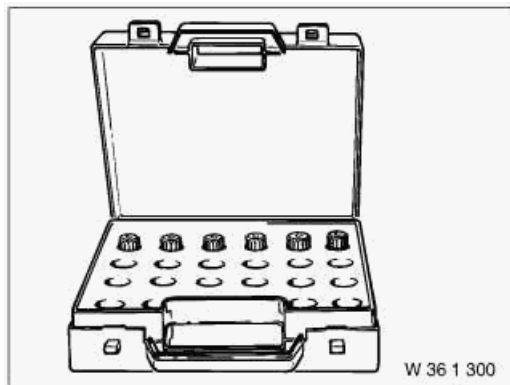
Common		Used in step	1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 224 (36 1 326) Wheel stud



Common		Used in step	1
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 225 (36 1 327) Wheel stud



Common

Used in step 1

Usage (Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547

Included in the tool or work 0 492 518

Storage location

Replaced by

In connection with

SI-Number

0 495 226 (36 1 328) Wheel stud



Common

Used in step 1

Usage (Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340

Included in the tool or work 0 492 518

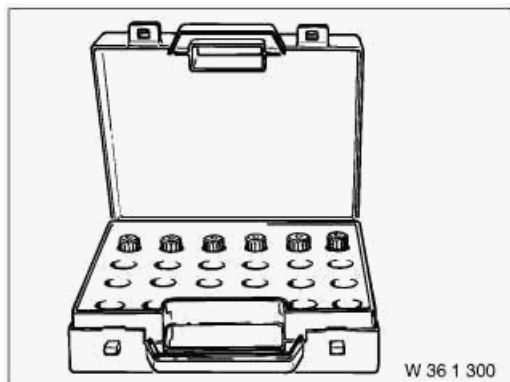
Storage location

Replaced by

In connection with

SI-Number

0 495 227 (36 1 329) Wheel stud



Common

Used in step 1

Usage (Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341

Included in the tool or work 0 492 518

Storage location

Replaced by

In connection with

SI-Number

0 495 228 (36 1 331) Wheel stud



Common

Used in step 1

Usage (Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342

Included in the tool or work 0 492 518

Storage location

Replaced by

In connection with

SI-Number

0 495 229 (36 1 332) Wheel stud



Common		Used in step	1
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 230 (36 1 333) Wheel stud



Common		Used in step	1
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

Links

Operating materials	Used in step
2.0 Grease for wheel centring	6

23 11 214 Replacing the radial shaft seal, right on the differential



WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.



WARNING

Motor vehicle may slip off the vehicle hoist if the weight is distributed unevenly.

Danger! Life-threatening injuries!

- Ensure there is a specific weight compensation on the motor vehicle.



WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

PRELIMINARY WORK

1 – Remove front right wheel

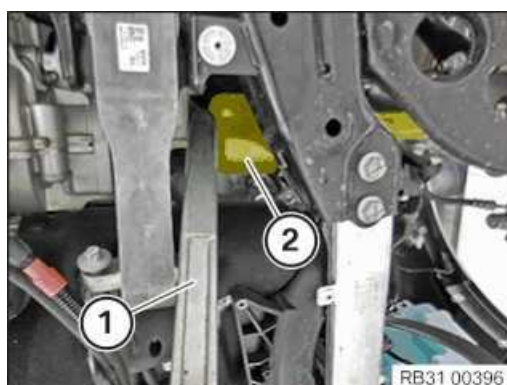


► Removing the wheel

- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Unscrew the wheel bolts (arrows) and remove the wheel.

Use the matching adapter from tool set (wheel bolt adapter set) to loosen and tighten down the wheel bolt with security code.

2 – Partially removing right output shaft



- Lever out the output shaft (2) with a mounting lever (1).
- Tie up output shaft (1).

MAIN WORK

3 – Removing the right radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Screw special tool **2 358 468** into the radial shaft seal until the radial shaft seal is pulled out.



- Screw special tool **2 358 469** into the radial shaft seal until the radial shaft seal is pulled out.

4 – Installing the right radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Coat the sealing lips of the radial shaft seal with transmission oil.
- Drive the outer radial shaft seal into the housing with the special tool **2 358 467** until the sealing ring finishes flush with the transmission housing.



- Coat the sealing lips of the inner radial shaft seal with transmission oil.
- Drive the inner radial shaft seal into the housing with the special tool **2 358 467** until the sealing ring finishes flush with the transmission housing.

POSTPROCESSES

5 – Installing right output shaft partially



- Renew the circlip (1).
- Parts:** Circlip
- Slide output shaft into the transmission as far as the limit position.
 - Check for secure seat by levering.

6 – Installing the front right wheel

► Mounting the wheel

► Clean the contact surfaces between the brake disc and the wheel rim



TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

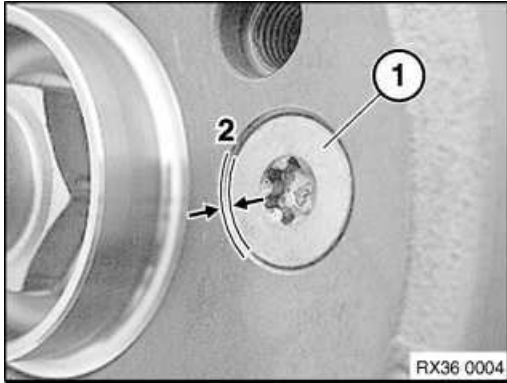
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool **2 344 011**.
- Do not operate special tool **2 344 011** with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
 - In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.



- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool **2 344 011**.

Do not operate special tool **2 344 011** with an impact screwdriver.

- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).



- Renew mounting bolt (1).
- Check that the mounting bolt (1) for the brake disc is securely seated.

Parts: Mounting bolt

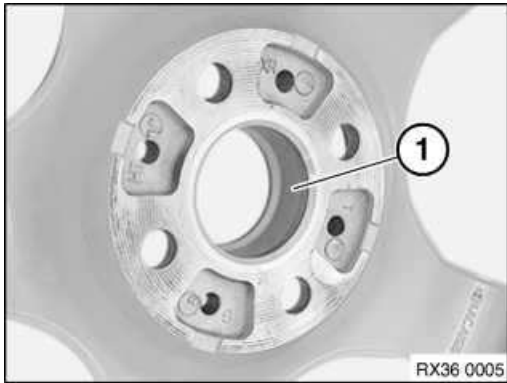
The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------



- Lightly grease the wheel centring (1) in the wheel rim; refer to additional information for grease for the wheel centring (1).



TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew corroded wheel bolts.

Parts: Wheel bolts

- Clean the wheel bolts.
- Check the wheel bolts and threads for damage, renew the wheel bolts if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M 14/AF 17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

Additional Information

Overview of Tightening Torques

Brake disc to rear wheel hub

Used in step 6

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Brake disc to front wheel hub

Used in step 6

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

M 14/AF 17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

Overview of Special Tools

2 358 468 Puller



Common		Used in step 3
Usage	For disassembly of the rear-wheel drive of output shaft. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).	
Included in the tool or work		
Storage location	C76	
Replaced by		
In connection with		
SI-Number	01 55 14 (213)	

2 358 469 Puller



Common		Used in step 3
Usage	For dismantling the rear wheel drive of the transmission input shaft. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).	
Included in the tool or work		
Storage location	C76	
Replaced by		
In connection with		
SI-Number	01 55 14 (213)	

2 358 467 Mandrel



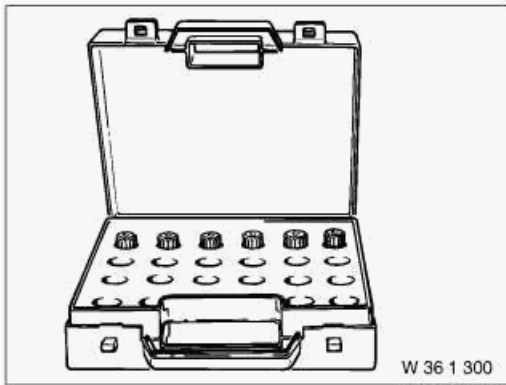
Common		Used in step 4
Usage	For installing the rear-wheel drive on the right-hand gear output. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).	
Included in the tool or work		
Storage location	C76	
Replaced by		
In connection with		
SI-Number	01 55 14 (213)	

2 344 011 Tool



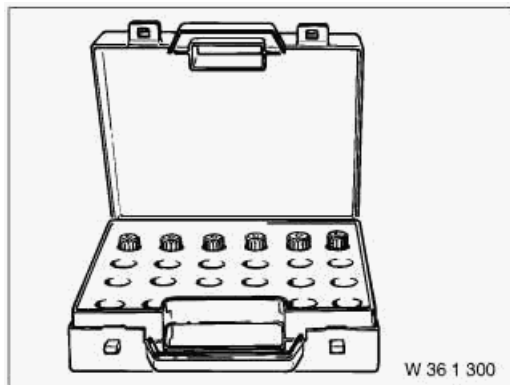
Common		Used in step	6
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.		
Included in the tool or work			
Storage location			
Replaced by			
In connection with			
SI-Number	08 08 12 (872)		

Replacement tools:
0 495 221 (36 1 323) Wheel stud



Common		Used in step	1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 224 (36 1 326) Wheel stud



Common

Used in step 1

Usage (Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546

Included in the tool or work 0 492 518

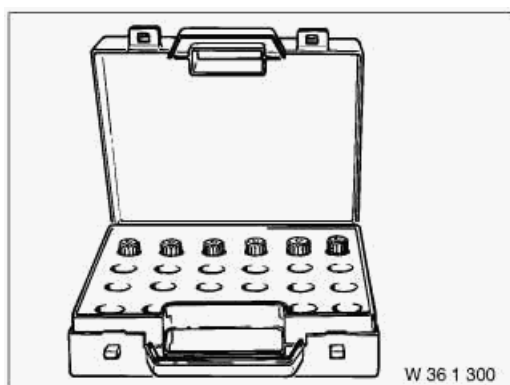
Storage location

Replaced by

In connection with

SI-Number

0 495 225 (36 1 327) Wheel stud



Common

Used in step 1

Usage (Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547

Included in the tool or work 0 492 518

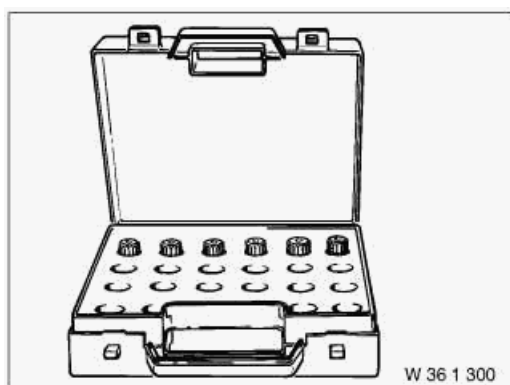
Storage location

Replaced by

In connection with

SI-Number

0 495 226 (36 1 328) Wheel stud



Common

Used in step 1

Usage (Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340

Included in the tool or work 0 492 518

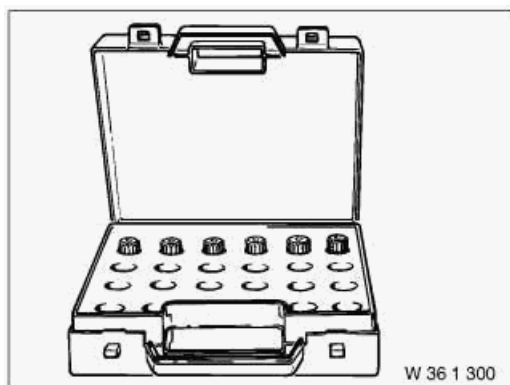
Storage location

Replaced by

In connection with

SI-Number

0 495 227 (36 1 329) Wheel stud



Common

Used in step 1

Usage (Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341

Included in the tool or work 0 492 518

Storage location

Replaced by

In connection with

SI-Number

0 495 228 (36 1 331) Wheel stud



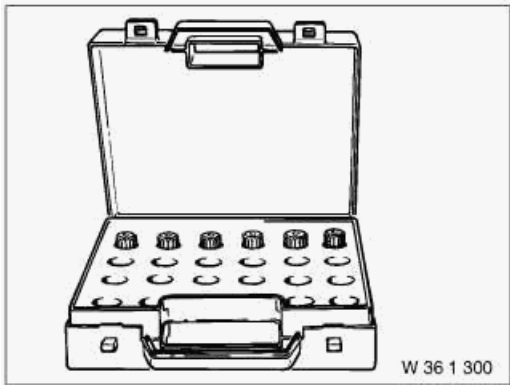
Common		Used in step	1
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 229 (36 1 332) Wheel stud



Common		Used in step	1
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 230 (36 1 333) Wheel stud



Common		Used in step	1
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

Links

Operating materials	Used in step
2.0 Grease for wheel centring	6

23 12 526 Replacing the radial shaft seal for the drive shaft



WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.



WARNING

Motor vehicle may slip off the vehicle hoist if the weight is distributed unevenly.

Danger! Life-threatening injuries!

- Ensure there is a specific weight compensation on the motor vehicle.



WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

Engine compartment lid is open.

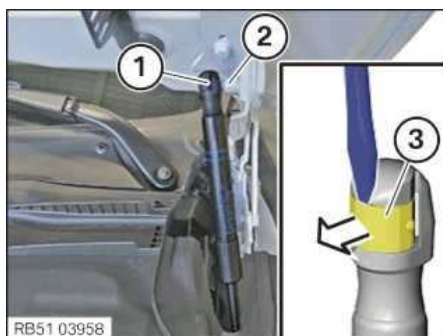


CAUTION

Shutting bonnet or tailgate.

Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.



- Lift clamp (3) slightly using a screwdriver, in the direction of the arrow.
- Lift off ball socket (1) from ball pin (2).
- Repeat the operation on the other side of vehicle.



TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

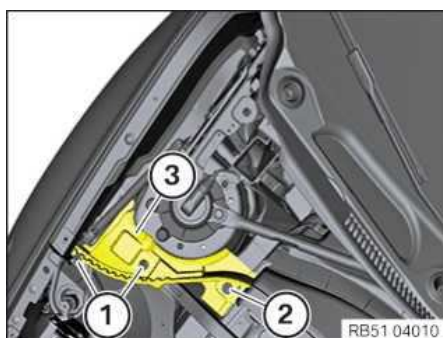
- Remove the bonnet support and open the bonnet further.
- Push special tool (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

2 – Remove suspension cross-brace



TECHNICAL INFORMATION

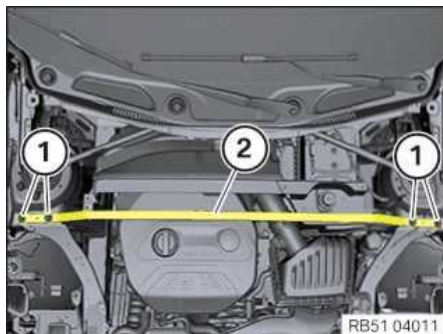
Driving without the strut brace/front end or tension strut is not permitted.



NOTICE

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

- Loosen expanding rivet (1).
- Loosen screw (2).
- Remove the cover (3).



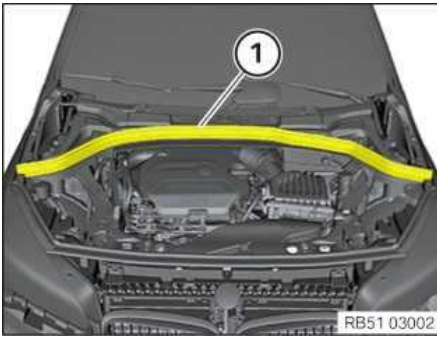
- Loosen screws (1).
- Remove strut brace (2).

3 – Remove the seal for the rear bonnet



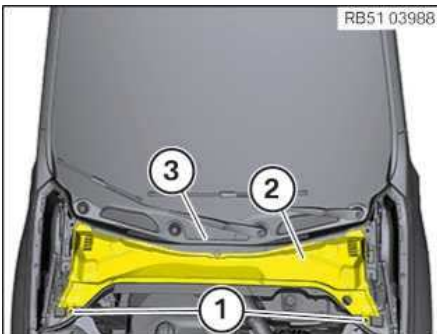
NOTICE

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



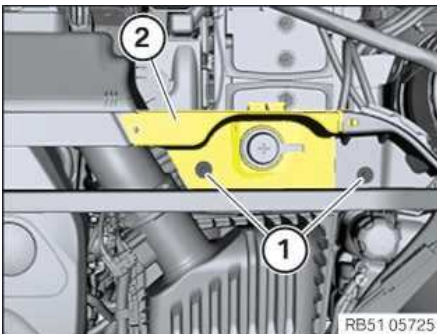
- Pull off rear bonnet seal (1) towards the top and remove.

4 – Removing front cowl panel cover

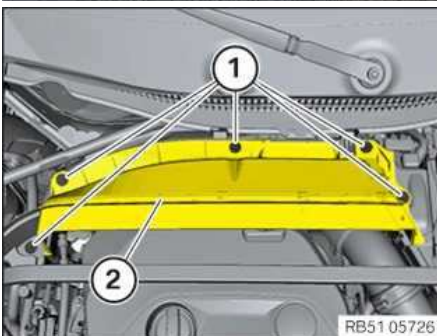


- Loosen the expanding rivet (1).
- Feed out and remove front cowl panel cover (2) from the rear cowl panel cover (3).

5 – Removing the upper bulkhead cover



- Loosen screws (1).
- Guide out and remove the cover (2).



- Loosen screws (1).
- Feed out and remove the upper bulkhead cover (2).

6 – Removing the acoustic cover



WARNING

Hot surfaces.

Risk of burning!

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



RISK OF DAMAGE

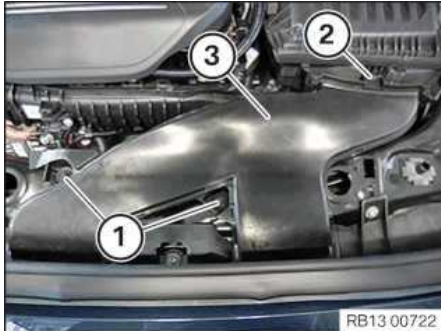
Damage to the acoustic cover.

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.

- Unclip the acoustic cover from the marked areas towards the top.

7 – Remove the intake neck for intake silencer housing



- Loosen nuts (1).
- Loosen the lock (2).
- Guide the intake neck (3) out and remove it.

8 – Removing intake silencer housing



- Loosen the holder (1).
- Loosen screw (2).
- Unlock and loosen connector (3).
- Unfasten clamp (4).
- Pull out and remove the intake silencer housing (5) from the rubber mounts towards the top.

9 – Disconnecting all battery earth leads



- See additional information.

10 – Remove vehicle battery

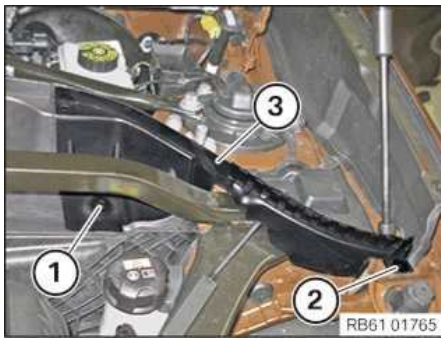


WARNING

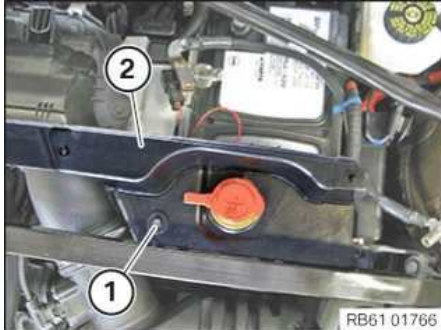
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

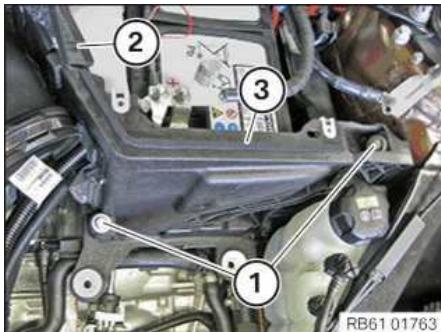
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.



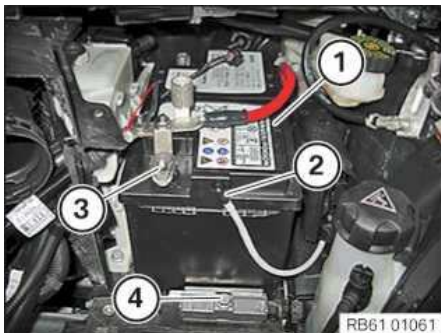
- Release the screw (1) and the expanding rivet (2).
- Remove the fixture for the gasket (3).



- Loosen screw (1).
- Remove the cover (2).



- Loosen screws (1).
- Unscrew the bolt (2) and guide the tension strut (3) out.



- Pull off the vent hose (2).
- Slacken the nut (3) on the positive battery terminal and remove the positive battery terminal.



WARNING

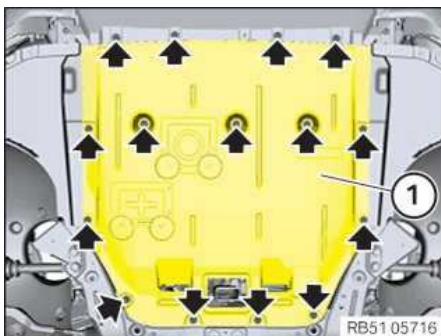
Unprotected battery terminals.

Risk of short circuits! Risk of fire!

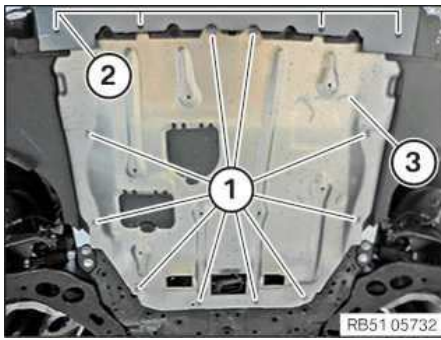
- Cover the vehicle battery.

- Loosen the screw (4) and remove the holder.
- Remove vehicle battery (1).

11 – Removing the front underbody protection



- Remove screws (arrows).
- Thread out and remove the front underbody protection (1) from the bumper panel.



- **Equipment specification with metal underride protection:**
- Loosen screws (1) and (2).
- Thread out and remove the underride protection (3).

12 – Drain oil level in the manual gearbox (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



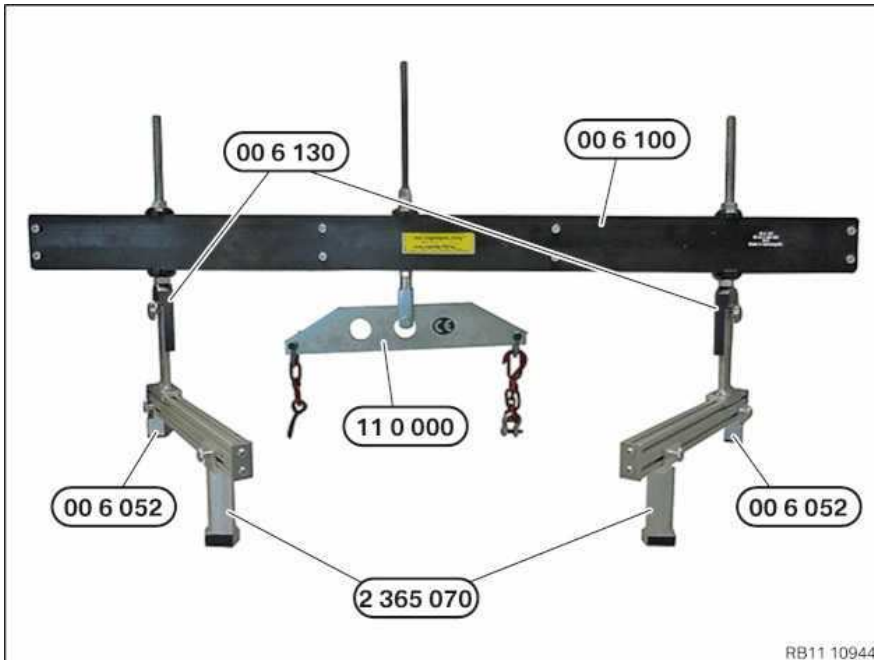
- **Draining transmission oil:**
 - Unscrew oil drain plug (1) and allow oil to flow out completely.
 - Clean oil drain plug (1) and screw in.

Oil drain plug / oil filler plug

Hexagon socket	Tightening torque	43 Nm
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13 – Installing the engine bridge

Overview: Prepared engine bridge



Prerequisite

Front compartment lid is in service position.



CAUTION

Components connected to the engine joint or cross member.

Danger of injury!

- Check lifting eyes and engine mounting brackets for damage, e.g. cracks.
- Attach the component to correctly mounted engine joints or cross members only.
- Exclusively lift the component, do not move it forwards, backwards or in transverse direction.



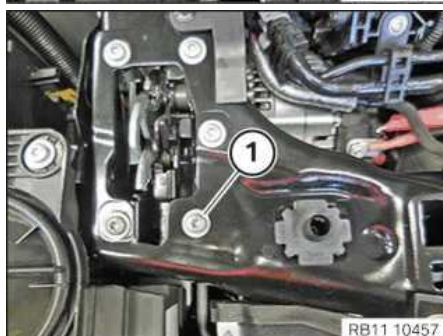
- Guide in and position special tool **2 459 012** on cylinder head.
- Tighten the screws (1) of special tool **2 459 012**.

Special tool to cylinder head

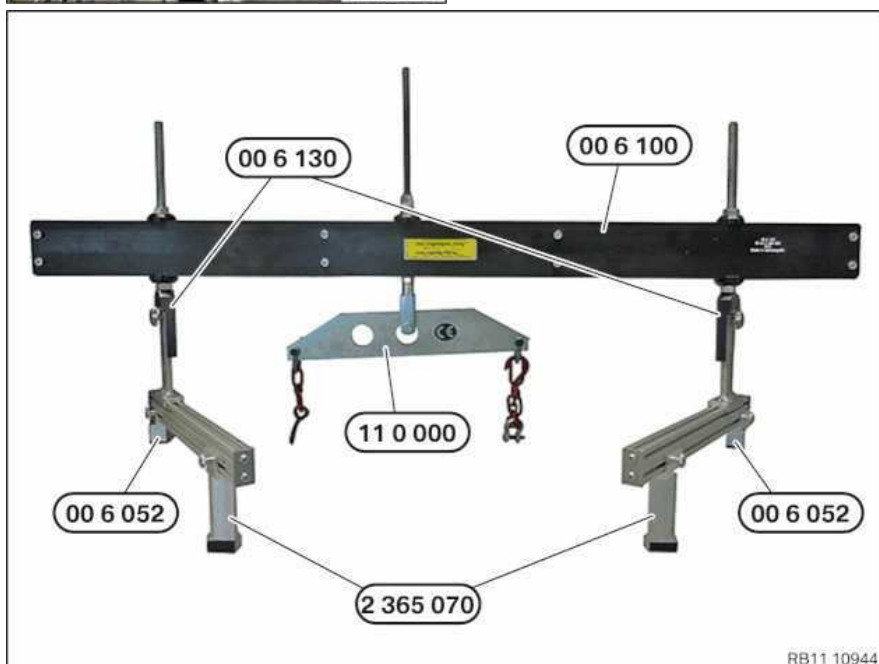
M8		Tightening torque	21,5 Nm
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- Loosen screw (1) of the left bonnet catch.



- Loosen screw (1) of the right bonnet catch.

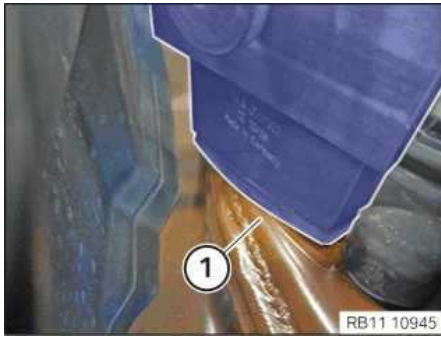


CAUTION

Heavy component.

Heavy components can lead to injury or damage.

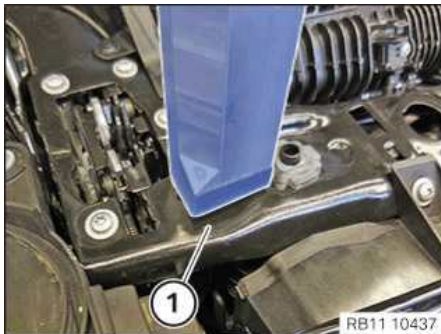
- Remove and install heavy components with the aid of another person/other persons.
- Set entire cross member **0 496 852 (00 6 100)** on the vehicle and position with the help of an auxiliary person.



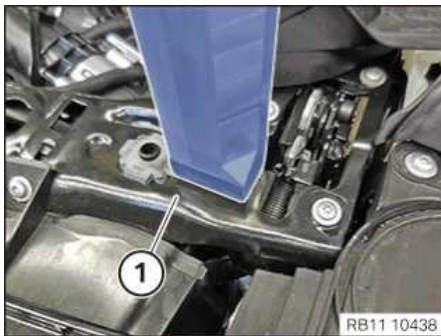
- Position the special tool at the rear mounting point (1) on the **right**.



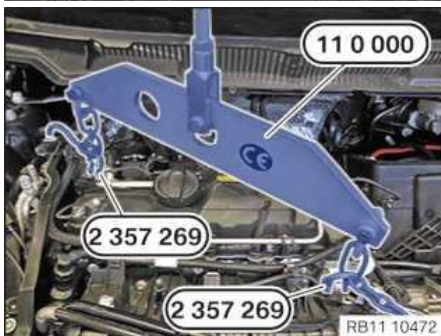
- Position the special tool at the rear mounting point (1) on the **left**.



- Position the special tool at the front mounting point (1) on the **right**.



- Position the special tool at the front mounting point (1) on the **left**.



- Position special tool **0 490 561 (11 0 000)** above the engine.
- Attach special tools to the mounting lugs of the engine.



- Tighten side screws (2) and (3).
- Slightly pretension the spindle screw (1) of the engine support beams.
- Tighten down all adjusting screws, knurled screws and nuts on cross member **0 496 852 (00 6 100)** and on special tool.

14 – Removing starter motor



WARNING

Hot surfaces.

Risk of burning!

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



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



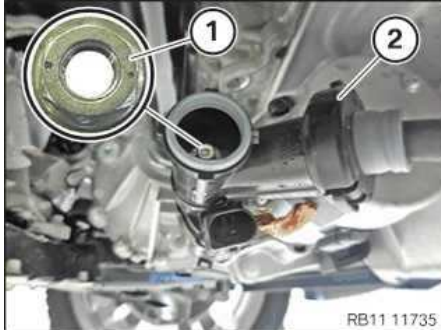
Electrostatic discharge.

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 loosen connector (1).
- Detach the sealing cap (2) in the direction of the arrow.
- Feed out and remove the sealing cap (2).

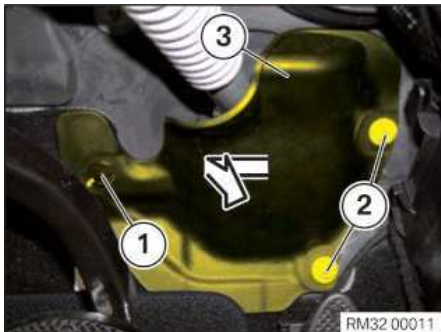


- Unfasten nut (1).
- Feed out the positive battery cable (2) of the starter motor and set it aside.

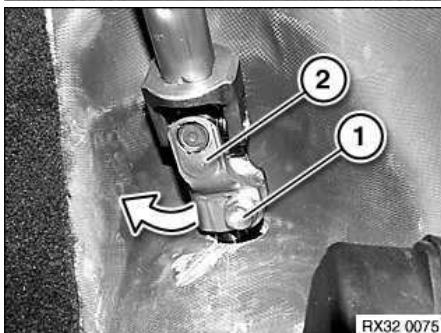


- Loosen screws (1).
- Feed out starter motor and remove.

15 – Releasing lower steering shaft from steering gear

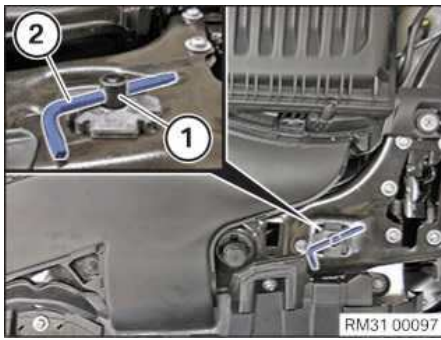


- **If installed:**
- Unfasten nut (1).
- Unscrew the nuts (2) by 1 rotation.
Do not remove the nuts (2) !
- Remove the cover (3) on the steering column in the direction of the arrow.
The side footwell trim must not be disassembled!



- Loosen screw (1).
- Swivel out the universal joint (2) of the bottom steering shaft from the steering gear in the direction of the arrow.

16 – Securing radiator on left and right



NOTICE

Perform the operations on the left and right side.

- Fasten radiator at centring pin (1) with suitable tool (2).

17 – Remove front left or right wheel

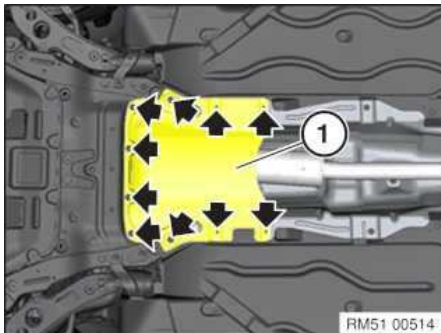


► Removing the wheel

- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Unscrew the wheel bolts (arrows) and remove the wheel.

Use the matching adapter from tool set (wheel bolt adapter set) to loosen and tighten down the wheel bolt with security code.

18 – If installed: Removing rear underbody protection



- Remove screws (arrows).
- Remove the rear underbody protection (1).

19 – Removing front left and right wheel arch cover



NOTICE

Perform the operations on the left and right side.

► Remove the front wheel arch trim



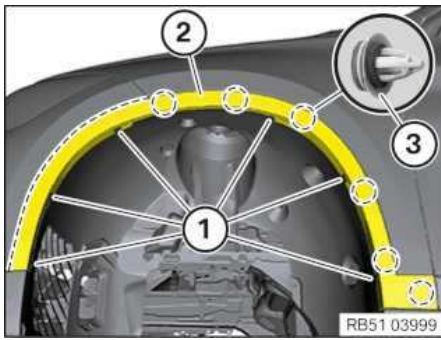
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



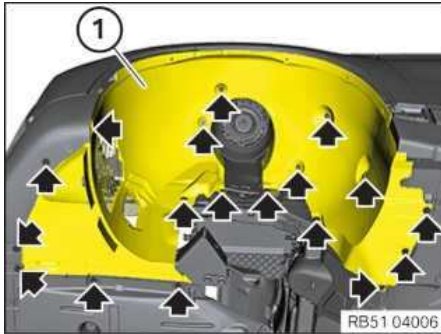
NOTICE

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



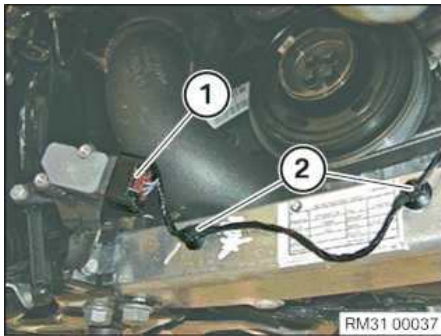
- Remove the blind rivets (1).
- Release the wheel arch trim (2) in the area of the side panel from the clips (3).
- Release the wheel arch trim (2) from the latch mechanisms on the bumper and remove.

► Remove front wheel arch cover



- Unscrew all bolts and nuts (arrows).
- Guide the wheel arch cover (1) out.

20 – With right installation: Detaching ride height sensor cable



- Unlock plug connection (1) and disconnect.
- Release cable clip (2) from deformation element adapter.

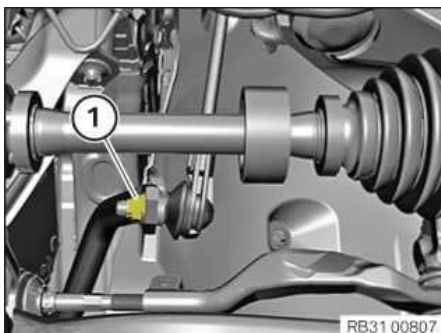
21 – Releasing anti-roll bar on left and right from anti-roll bar link



NOTICE

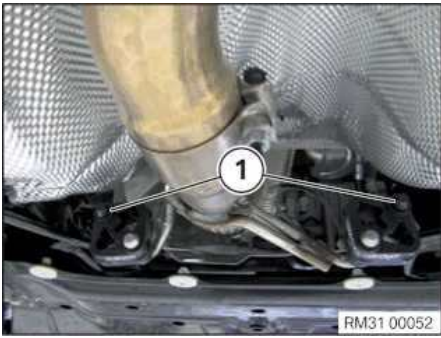
Perform the operations on the left and right side.

► Detach the anti-roll bar from the anti-roll bar link



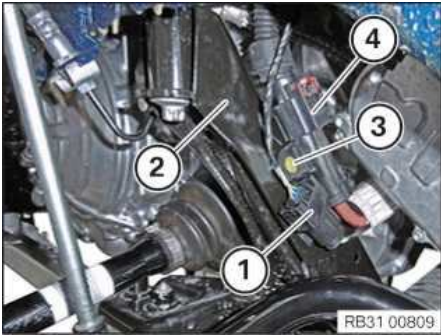
- Unfasten nut (1).
- Note:** Use the Torx socket for counter support.
- Loosen the anti-roll bar link from the anti-roll bar .

22 – Detaching rubber mount from front axle support



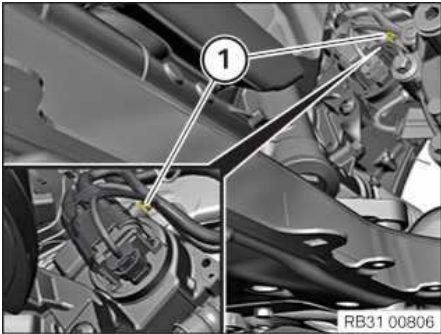
- Spray rubber mount (1) with lubricant and release from holder on front axle support.

23 – Disconnecting plug connections from steering gear

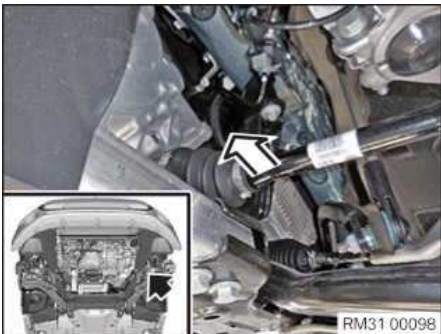


► If installed: Detach connectors from the front axle carrier

- Release the plug connection (1) from the front axle support (2).
- Loosen screw (3).
- Release the plug connection (4) from the front axle support (2).

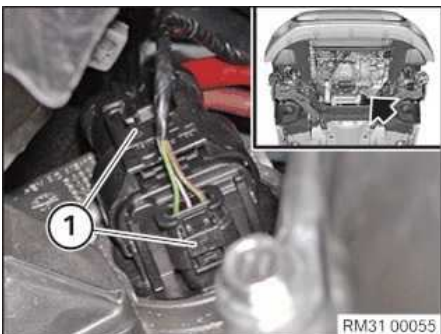


- Disconnect wiring harness (1) from steering gear.



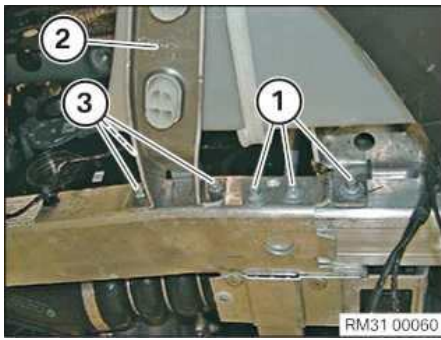
- To unlock the plug connections (see the following work step): unlock plug connections (arrow) with the right hand.

The plug connections can be reached via the left-hand output shaft.



- Unlock plug connections (arrow) (1) and disconnect from the steering gear.
- Make sure when lowering the front axle that the cables are not damaged!

24 – Releasing the mounted part from the front axle support



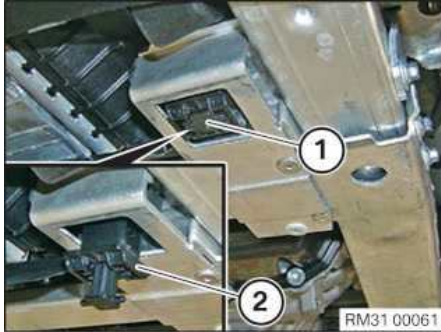
- **Only on right side:** Loosen screws (3) and remove holder for washer fluid reservoir (2).



NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).



NOTICE

Perform the operations on the left and right side.

- Unlock safety catch (1) of the lock (2) from the holder for the charge air cooler.
- Completely remove locks (2).



- Loosen screw (2) of the engine support (3) on the front axle (1).

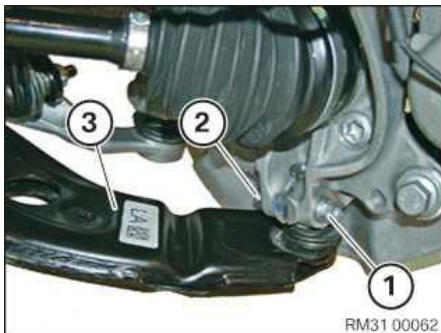


NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).

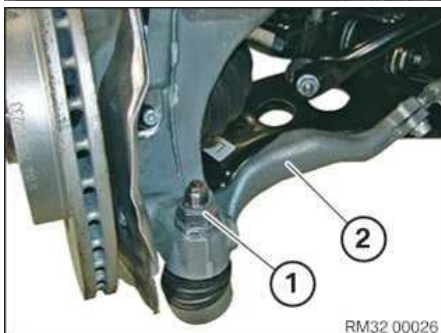
25 – Detaching and removing front axle completely



NOTICE

Perform the operations on the left and right side.

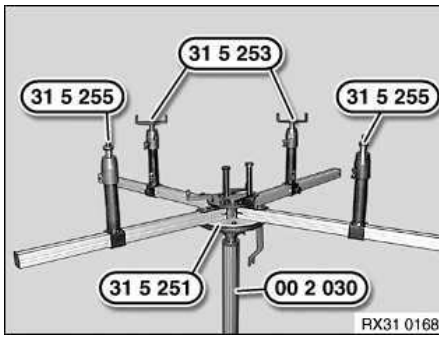
- Unfasten nut (1).
- (2) Pull out screw.
- Detach the wishbone (3) from the swivel bearing .



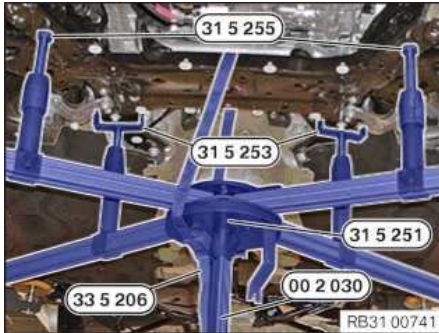
NOTICE

Perform the operations on the left and right side.

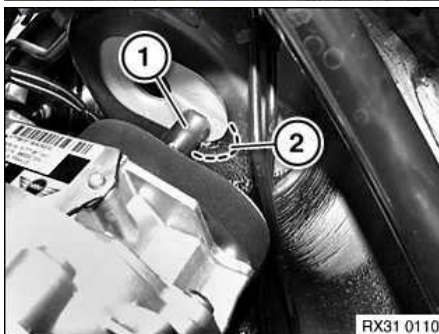
- Unfasten nut (1).
- Detach the track rod (2) from the swivel bearing.



- Fit the special tool completely onto the workshop jack **0 490 133 (00 2 030)** with an auxiliary person.
 - Insert special tools in telescopic supports of a profile rail pair.
 - Insert special tools in telescopic supports of other profile rail pair.
- Note:** In a profile rail pair, two profile rails are connected to one another by gearing.



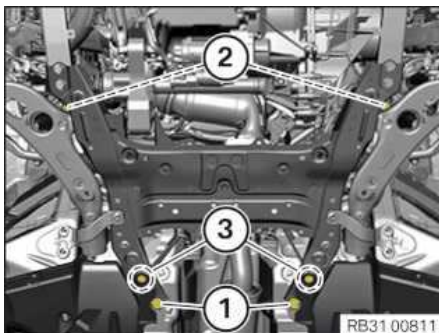
- Align special tools and to front axle support.
 - Support front axle support by operating workshop jack **0 490 133 (00 2 030)**.
- Note:** The centre of gravity of the front axle support must be positioned centrally over the workshop jack!
- Secure front axle support with special tool to special tool.



TECHNICAL INFORMATION

Non-compliance with the regulations for installation and disassembly may result in component damage. All work must be performed with care and in compliance with the regulations.

- When raising and lowering the front axle support, make sure that the torsion bar (1) of the electromechanical steering gear (EPS) in area (2) does not collide with the bulkhead!
- Note:** Collision with the bulkhead may result in damage to the electromechanical steering gear (EPS)!



- If applicable, release the screws in area (3).
- Release screws (1) (front axle support, rear).
- Release screws (2) (front axle support, front).
- Bend the underbody panelling to the side in area (3).
- When lowering, release charge air cooler from its rubber mounts.
- Completely lower and remove the front axle.

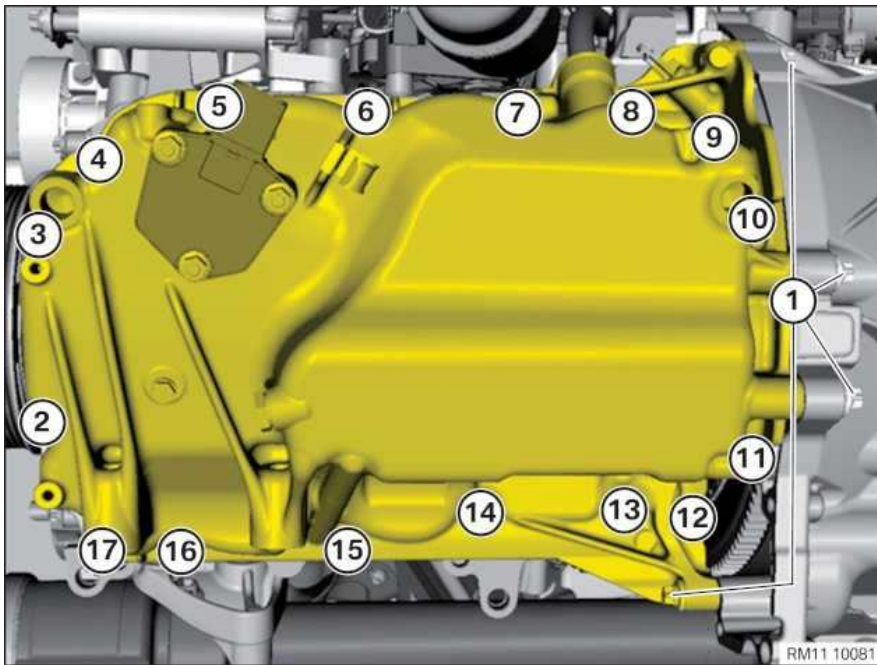


TECHNICAL INFORMATION

Note the information on thread repairs using Helicoil thread inserts.
For more information see: 41 00 ... Notes on repairing threads

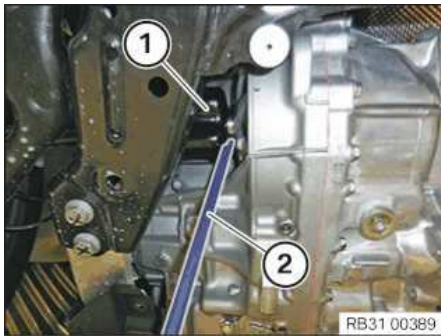
- Check threads for damage; if necessary, repair with Helicoil thread inserts.

26 – Release transmission-side bolting connection oil sump



- Unscrew the bolts (1) from the transmission.

27 – Partially removing the left output shaft



- Protect the output shaft (1) from falling.
- Lever out the output shaft (1) with a mounting lever (2) from the transmission.
- Tie up the output shaft (1).

► Removing the left radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

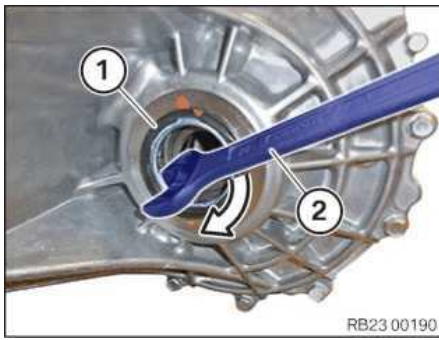


RISK OF DAMAGE

Damage to the transmission.

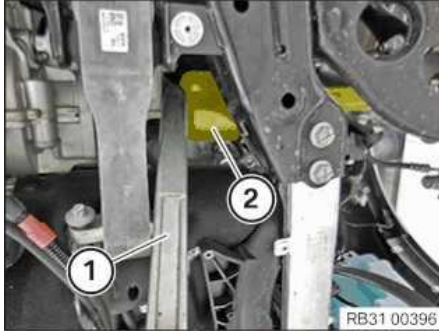
Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



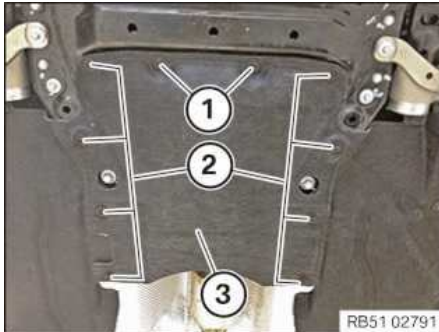
- Carefully remove the radial shaft seal (1) from the transmission using a suitable tool (2).

28 – Partially removing right output shaft



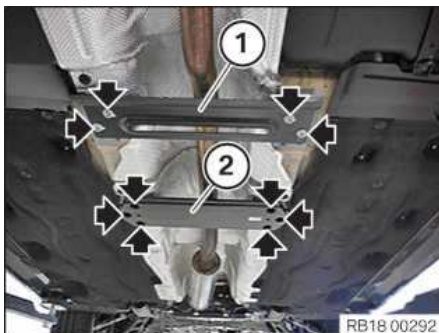
- Lever out the output shaft (2) with a mounting lever (1).
- Tie up output shaft (1).

29 – If installed: Removing rear underbody protection



- Loosen screws (1) and (2).
- Remove underbody protection (3).

30 – Removing the connecting support from the tunnel in front and back



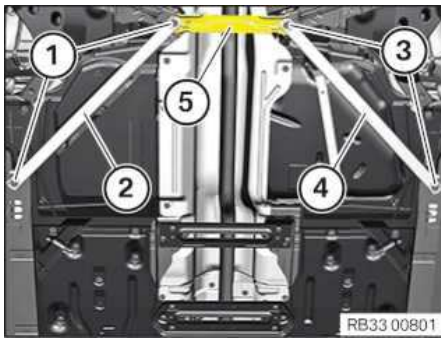
- Unscrew the bolts (arrows) from the connecting support (1).
- Feed out and remove the crossbeam (1).
- Unscrew the bolts (arrows) from the connecting support (2).
- Feed out and remove the crossbeam (2).

31 – Remove the cross strut with the torsion strut



TECHNICAL INFORMATION

Driving without a torsion strut is not permitted.



- Loosen screws (1).
- Thread out torsion strut (2) at left and remove.
- Loosen screws (3).
- Thread out torsion strut (4) at right and remove.
- Feed out and remove the cross-member (5).

32 – Remove exhaust system



WARNING

Hot surfaces.

Risk of burning!

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

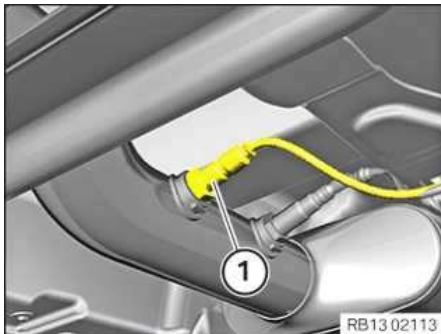


CAUTION

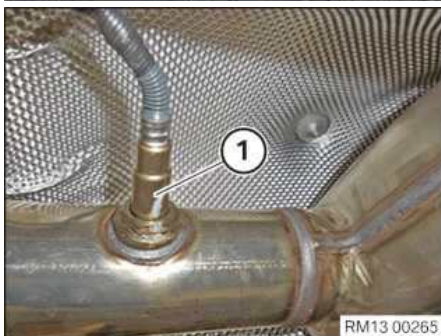
Heavy component.

Heavy components can lead to injury or damage.

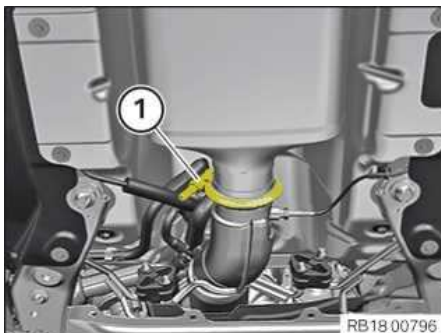
- Remove and install heavy components with the aid of another person/other persons.



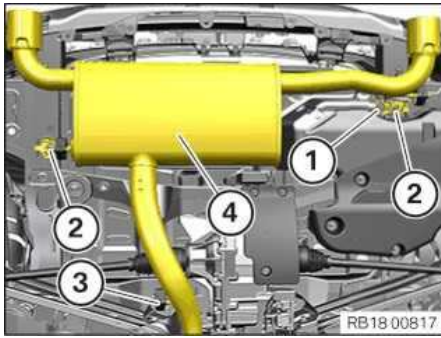
- Release the nitrogen oxide sensor (1) downstream of the SCR catalytic converter, guide it out and set it aside.



- Release the diesel particulate sensor (1), guide it out and set it aside.

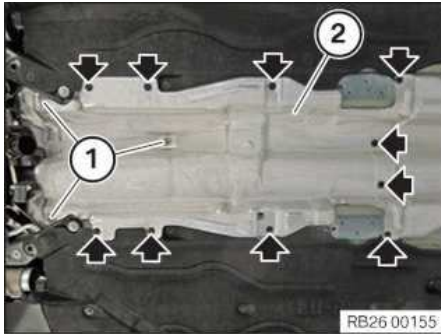


- Loosen V-band clamp (1).



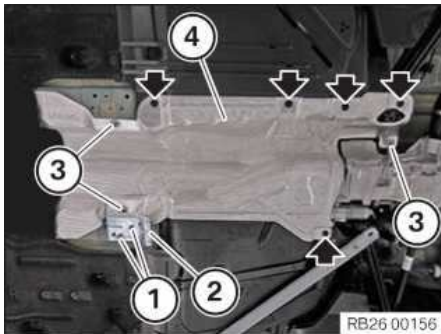
- Loosen screw (1).
- Loosen nuts (2).
- Release the rubber mount (3) of the exhaust system (4).
- Lower and guide out the exhaust system (4) with assistance of a second person and remove it.

33 – Remove front heat shield



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

34 – Remove heat shield at rear.



- Loosen screws (1).
- Guide out and remove holder (2).
- Remove screws (arrows).
- Loosen nuts (3).
- Guide the heat shield (4) out and remove it.

35 – Remove propeller shaft



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



RISK OF DAMAGE

Damage to propeller shaft during removal.

Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

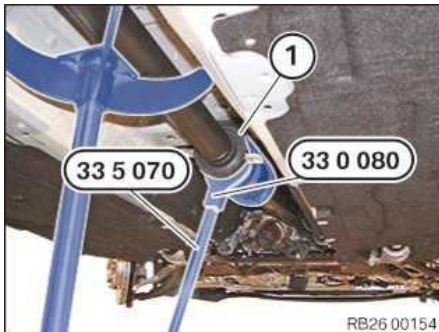
- Do not disassemble the three-hole flange, flexible disc and propeller shaft. The three-hole flange to the rear axle differential is balanced with the flexible disc and propeller shaft.
- Loosen the recessed nut against the direction of travel in clockwise direction. The propeller shaft must be loosened on the recessed nut only and exclusively in the direction of rotation otherwise the anti-twist lock of the bi-hexagonal flange nut is damaged.
- In the event of a damaged anti-twist lock on the bi-hexagonal flange nut: Replace the rear axle differential.



- Install the special tool between the front and rear propeller shaft.
- Make sure that the arrows on the special tool point forward in the direction of travel.



- Always support the propeller shaft (1) with a conventional jack.



- Protect the propeller shaft (1) with the special tools **0 495 554 (33 5 070)** and from twisting.



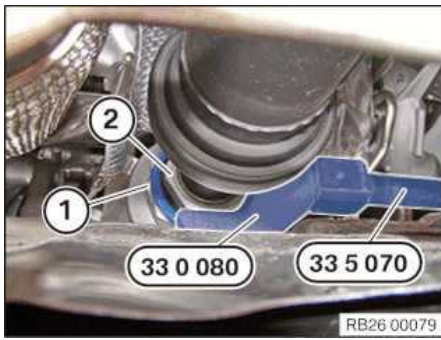
TECHNICAL INFORMATION

Compliance with the following instructions is required to avoid a humming noise from the propeller shaft after refitting the propeller shaft.

- Mark the installation position of the screw connection (1), the flexible disc (2) and the three-hole flange (3) on the same level.
- Loosen the screw connection (1).
- Loosen screws (1).



- Remove screws (arrows).
- Guide the propeller shaft out in the direction of the arrow and set it aside.

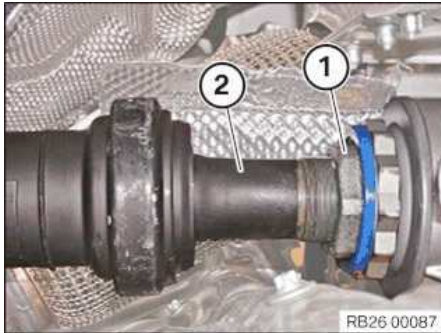


RISK OF DAMAGE

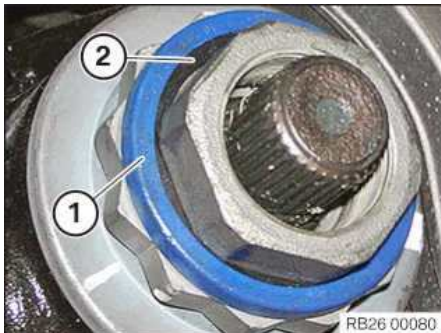
Damage to the transfer box.

Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

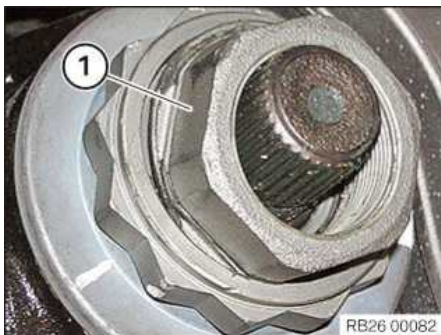
- Do not use the double hexagon head flange nut as counter support.
- Protect the recessed nut (2) on the transfer box from twisting with the special tools **0 495 554 (33 5 070)** and .
The recessed nut (2) on the transfer box must **not** be used to detach the propeller shaft.
The double hexagon flange nut (1) must **not** be used for counter support.
- Release the front propeller shaft with the special tools **0 495 554 (33 5 070)** and in the direction of the arrow.



- Thread the propeller shaft (2) out of the recessed nut (1) and remove.

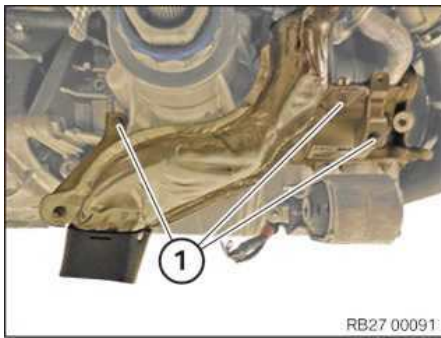


- Thread the retaining clip (1) and the seal (2) out and remove.

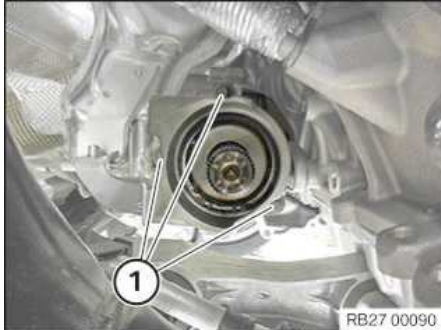


- Thread out and remove the recessed nut (1).

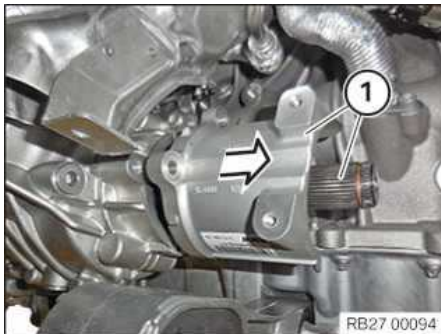
36 – Remove the intermediate shaft with the support tube



- With air duct installation: Loosen screws (1).
- Remove air duct



- Loosen screws (1).



- Pull the intermediate shaft with the support tube (1) out of the transfer box.

37 – Remove bracket with rubber mount

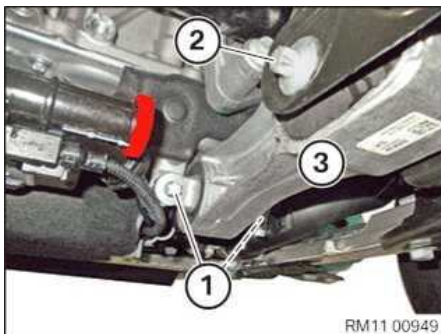


WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

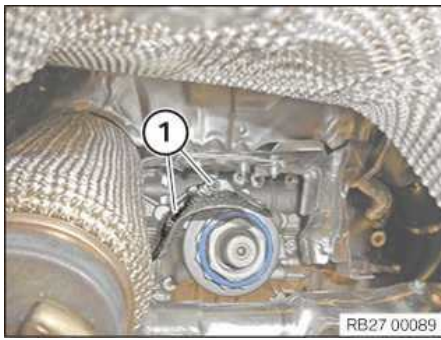
Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.



- Support the engine with the jack at a suitable point.
- Loosen screws (1) and (2).
- Guide out and remove holder (3).

38 – Remove transfer box (VTG)



- Loosen screws (1).
- Remove heat shield.



- Loosen screws (1).
- Remove the transfer box (VTG).

39 – Removing the manual gearbox (GS6-59DG, GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the engine block.

Damaged and corroded bolts will lead to major damage in the engine block and the transmission.

- It is imperative that protruding threads of the transmission bolts are checked for corrosion and damage prior to removal.
- It is imperative that all rust is removed from corroded threads and that they are cleaned prior to removal.
- Renew rusted and damaged bolts.

► Remove electronics box

Prerequisite

Battery earth lead is disconnected.



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.



RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.



TECHNICAL INFORMATION

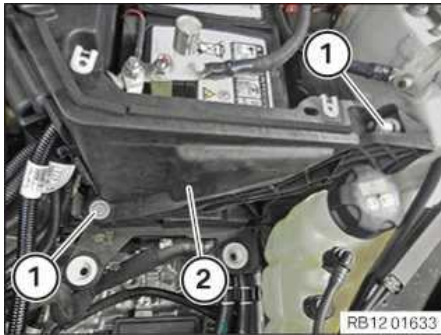
Follow instructions for removing and installing control units.

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

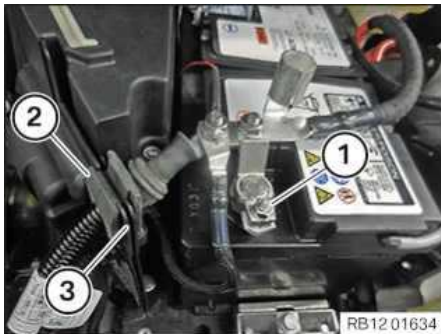


TECHNICAL INFORMATION

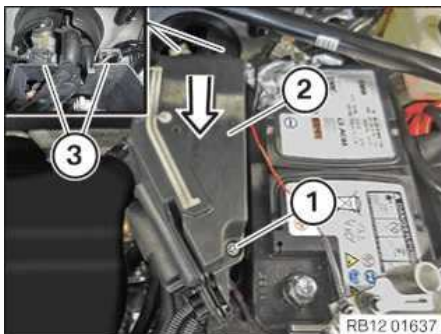
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



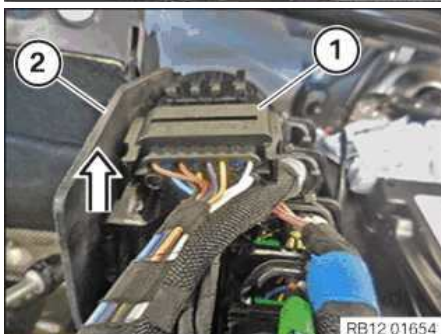
- Loosen screws (1).
- Guide out the tension strut (2) toward the top and remove it.



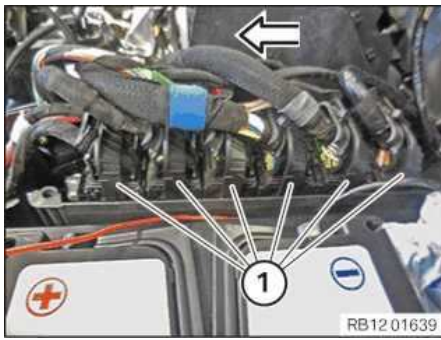
- Undo positive battery terminal (1).
- Feed out positive battery terminal (1) and set aside.
- Guide the positive battery cable (2) out of the holder (3) and lay to one side.



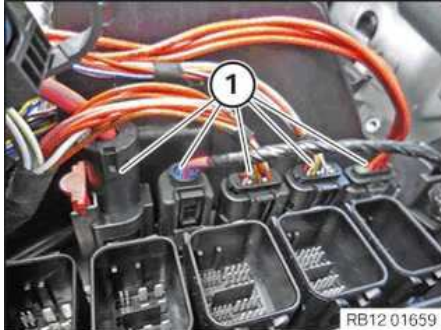
- Loosen screw (1).
- Unlock cover (2) and feed out and remove from the guides (3) in the direction of arrow.



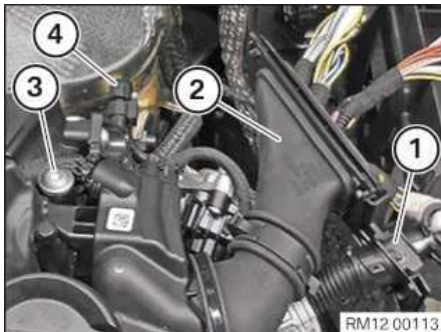
- Feed out connector (1) from the electronics box (2) and remove in the direction of arrow.
- Unlock and loosen connector (1).



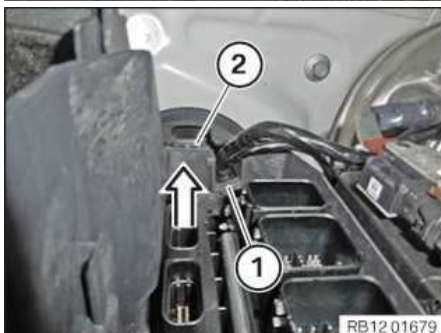
- Unlock and remove the connector (1) in the direction of the arrow.
- Feed out connector (1) and place to one side.



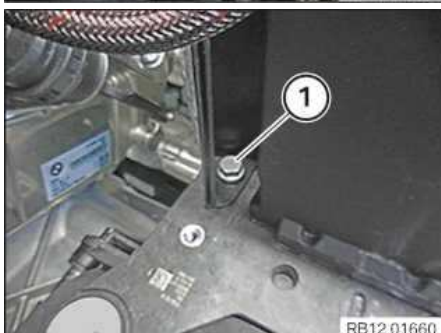
- Unlock and loosen connector (1).



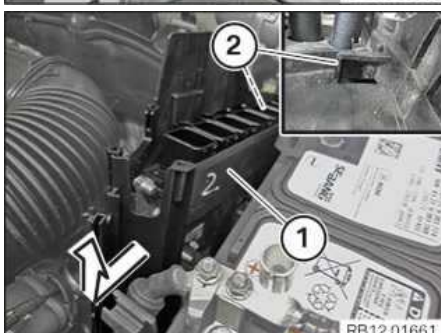
- Detach the wiring harness (1) from the electronics box.
- Detach the wiring harnesses (2) from electronics box.
- Loosen screw (3).
- Set wiring harnesses (1) and (2) aside.
- Unlock the connector (4) and disconnect it from the differential pressure sensor.



- Unlock and loosen holder (1).
- Guide the holder (1) out of the electronics box (2) in direction of arrow and set it aside.

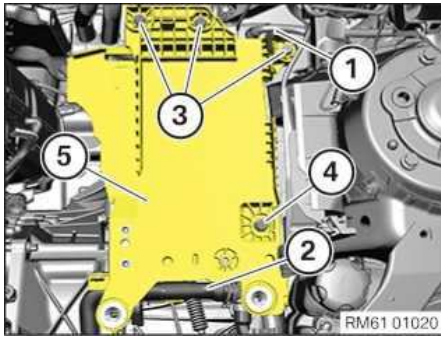


- Loosen screw (1).

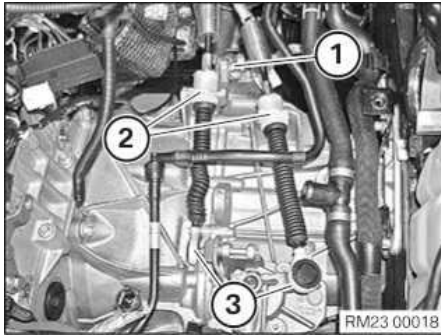


- Guide the electronics box (1) out of the guide (2) in direction of arrow and remove.

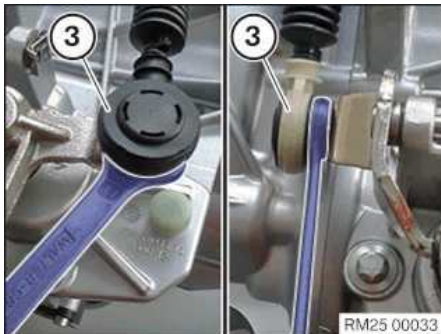
► Remove battery holder



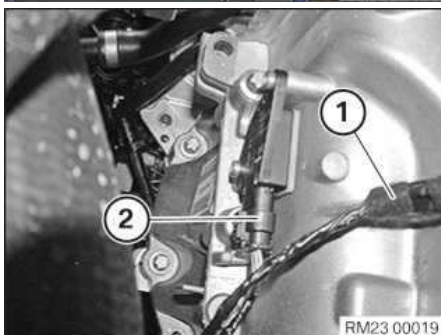
- Detach the cable clip (1) from the battery holder (5).
- Detach the coolant line (2) from the battery holder (5).
- Loosen screws (3).
- Loosen screw (4).
- Thread out and remove the battery holder (5).



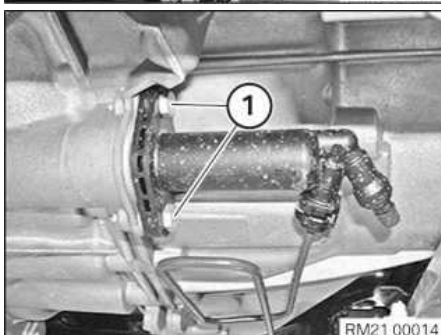
- Release the clip on the limit position/bracket (2) and bend the tabs slightly away from the limit position/bracket (2).
- Unscrew the bolt (1) and detach the ground strap from the transmission.



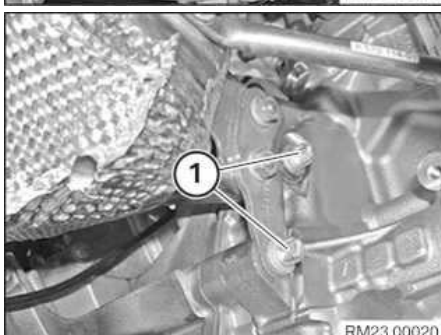
- Lever the fixtures (3) of the selector lever cables away from the ball joints with an open-end spanner SW13.



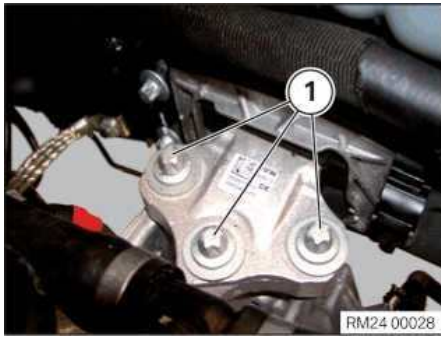
- Disconnect the plug connection (2) of the gear sensor.
- Detach the cable (1) with the holder from the transmission.



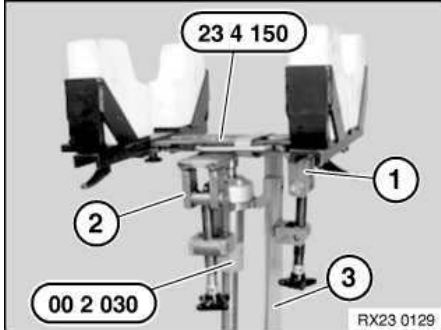
- Relieve tension on clutch slave cylinder slowly; otherwise air will be drawn in through sealing cup.
Pressure line of clutch slave cylinder remains connected.
- Unscrew the bolts (1) and remove the clutch slave cylinder.



- Loosen screws (1).



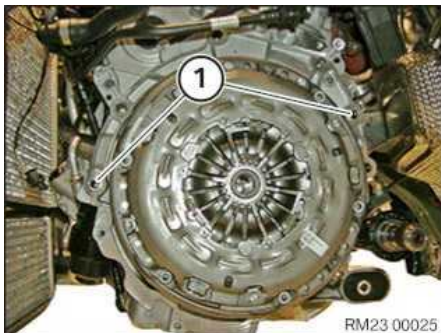
- Loosen screws (1).



- Support the transmission with special tool **0 490 133 (00 2 030)** and .
- Secure the transmission with the tensioning strap (3).



- Remove screws (arrows).
- Pull transmission downwards and remove.



- Check for correct fit of fitting sleeves(1).
- Replace damaged fitting sleeves.



- Remove any grease from the transmission input shaft (arrow) and clean the shaft.
- Do not grease transmission input shaft.
- Check clutch disc for frictional corrosion in gearing and replace if necessary.

40 – Removing the clutch operator (GS6-60DA, GS6XDA)

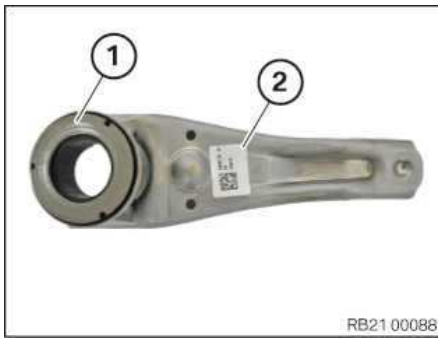


CAUTION

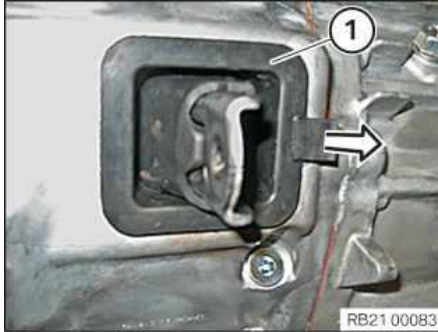
Materials harmful to health.

Contact with fluids harmful to health!

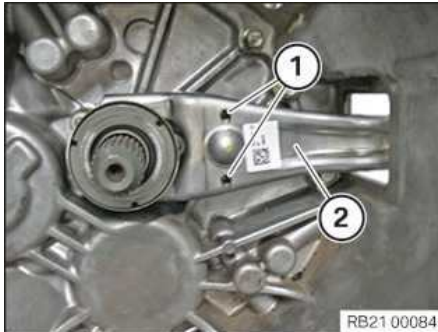
- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



- The release bearing (1) and release lever (2) have been combined to form a single clutch operator.
- Do **not** grease sliding surfaces.



- Remove / pull off the gaiter (1).



- Push together the retaining lugs (1) from the plastic cage and remove the clutch operator (2).



- Pull the plastic cage (1) off of the ball pin.

MAIN WORK

41 – Remove the radial shaft seal of the drive shaft (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Release screws (1) and remove the guide tube.



- Screw special tool **2 358 469** into the radial shaft seal until the radial shaft seal is pulled out.

42 – Installing the radial shaft seal, drive shaft (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Coat sealing lips of radial shaft seal with transmission oil.
- Push the radial shaft seal onto corresponding special tool **2 358 466** and drive it until the limit position.



- Install guide tube and tighten the screws (1).

Guide bush/clutch release bearing

M6		Tightening torque	8 Nm
----	--	-------------------	------

POSTPROCESSES

43 – Installing the clutch operator (GS6-60DA, GS6X60DA)

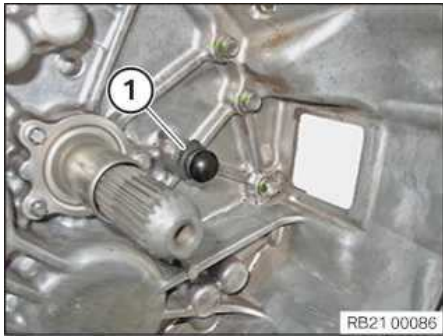


CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



- Lightly grease the ball pin (1).

Expendable materials

Lubricating grease MI-Setral-43 N	50 g, Tube	83232152082
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- Only during replacement of clutch operator:
- Detach the ball pin (1).
- Renew the ball pin (1).

Parts: Ball pin

- Tighten the ball pin (1).

Ball pin on transmission

		Tightening torque	39 Nm
--	--	-------------------	-------



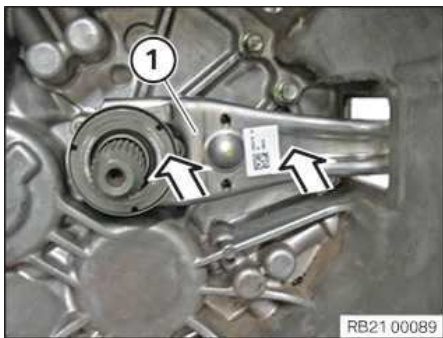
- Only during replacement of clutch operator:
- Loosen screws (1).
- Replace guide sleeve.

Parts: Guide sleeve

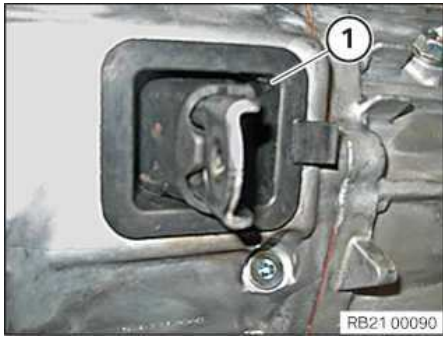
- Install the guide sleeve .
- Tighten the screws (1).

Guide sleeve to transmission

M6		Tightening torque	8 Nm
----	--	-------------------	------



- Install the clutch operator (1).
- Plastic cage must noticeably and audibly engage on the ball pin.



- Install gaiter (1).
- To simplify installation, use water with low surface tension (washing-up liquid).

Note: Ensure that the sealing lip is positioned correctly!

44 – Installing the manual gearbox (GS6-59DG, GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

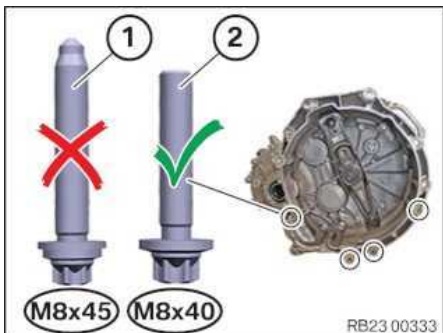


RISK OF DAMAGE

Damage to the engine block.

Damaged and corroded bolts will lead to major damage in the engine block and the transmission.

- It is imperative that protruding threads of the transmission bolts are checked for corrosion and damage prior to removal.
- It is imperative that all rust is removed from corroded threads and that they are cleaned prior to removal.
- Renew rusted and damaged bolts.



RISK OF DAMAGE

Component damage caused by incorrect screw length.

The use of screws with the incorrect screw length can damage the component.

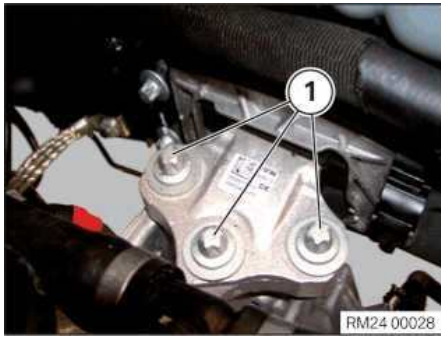
- Check for correct screw length.
 - Re-install screws that correspond to the original screw length.
- **Wrong:** The screw (1) (starter motor screw connection) must **not** be used for the bottom screw connection of the transmission.
 - **Correct:** It is imperative to use the bolt (2) (M8x40) for the lower screw connection of the transmission and flange-mount the transmission.

- Tighten screws (arrows).

Transmission to engine

M8x40	Tightening torque	19 Nm
M12x75	Tightening torque	66 Nm





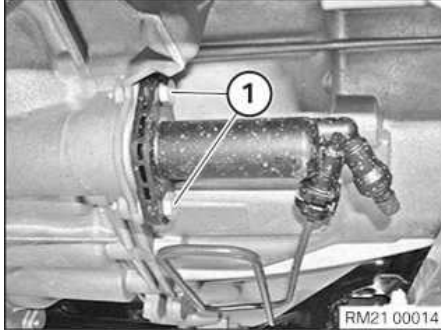
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Transmission mounting

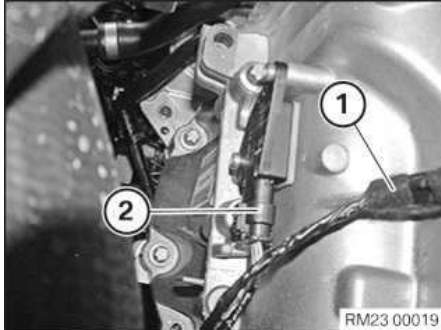
M10	Renew screws.	Jointing torque	40 Nm
		Angle of rotation	90 °



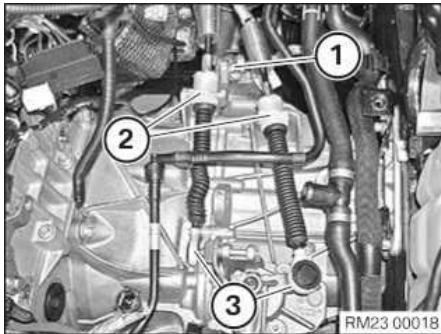
- Install clutch slave cylinder.
- Tighten the screws (1).

Clutch slave cylinder to transmission housing

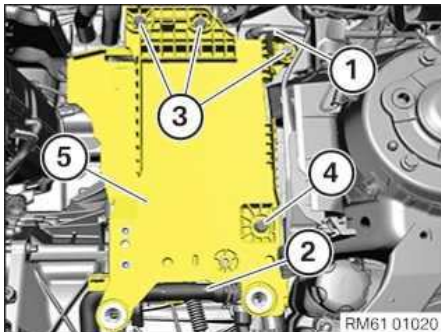
M8		Tightening torque	19 Nm
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- Connect the plug connection (2) of the gear sensor.
- Clamp the cable (1) with the holder to the transmission.



- Tighten the ground strap on the transmission with the screw (1).
- Clip in the clip on the stop/holder (2).
- Attach the selector lever cables (3) on the ball joints.



► **Install the battery holder**

- Feed in and install the battery holder (5).
- Hand-tighten the bolt (4).
- Hand-tighten the bolts (3).
- Tighten down screw (4).

Battery holder to engine support

Hexagon screw M8x30		Tightening torque	19 Nm
------------------------	--	-------------------	-------

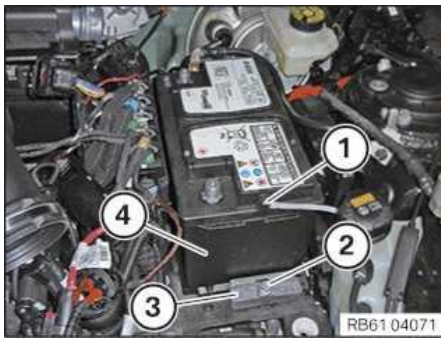
- Tighten down screws (3).

Battery holder to engine support

Hexagon screw M8x30		Tightening torque	19 Nm
------------------------	--	-------------------	-------

- Fasten the coolant line (2) on the battery holder (5).
- Fasten the cable clip (1) on the battery holder (5).

► **Partially install vehicle battery**



- Install vehicle battery (4).
- Correctly position the holder (3).
- Tighten down screw (2).

Battery terminal rail to battery tray

M8

19 Nm

- Fit and clip the vent hose (1) in.

▷ 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.

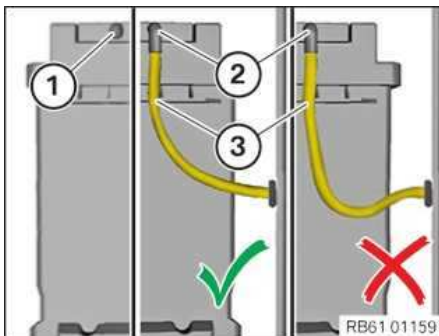


TECHNICAL INFORMATION

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).



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.

► Install electronics box

Prerequisite

Battery earth lead is disconnected.

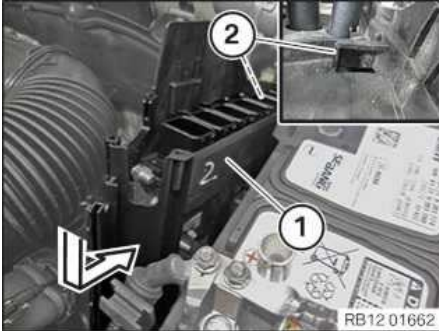


RISK OF DAMAGE

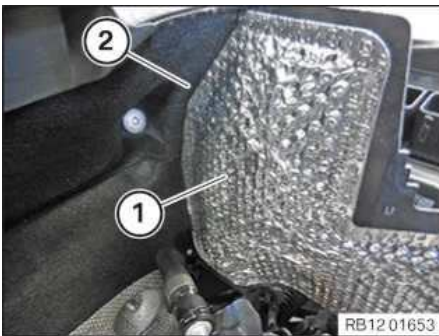
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

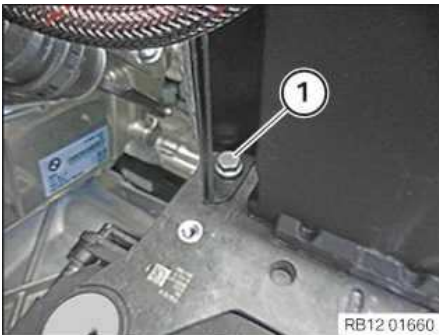
- Route all cables without abrasions, do not trap and crush.



- Guide in and install the electronics box (1) into the guide (2) in direction of arrow.



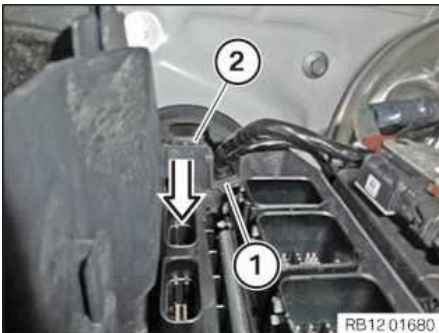
- Make sure that the electronics box (1) is positioned correctly on the bulkhead (2).



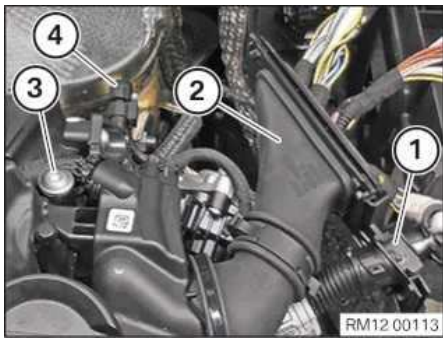
- Tighten down screw (1).

Electronics box to battery tray

M8X16		Tightening torque	15 Nm
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- Guide in and install the holder (1) in the electronics box (2) in direction of arrow.
- Make sure the bracket (1) engages audibly.



- Lay vehicle wiring harnesses (1) and (2) and mount on electronics box.
- Tighten down screw (3).

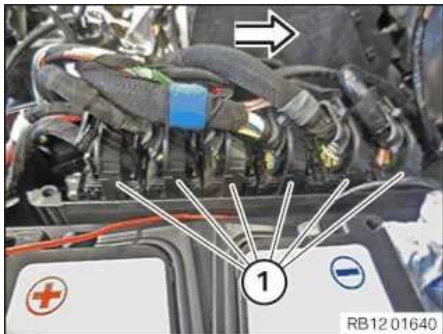
Wiring harness to cylinder head cover

TS5x20		Tightening torque	3,5 Nm
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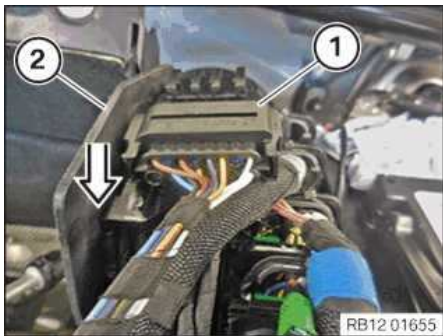
- Attach connector (4) to the differential pressure sensor and lock it audibly.



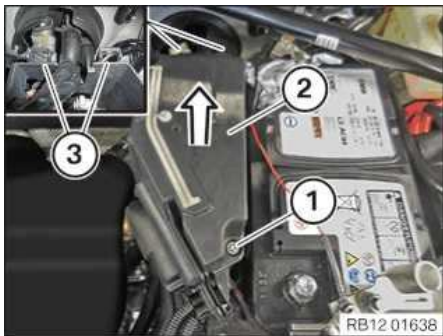
- Connect and lock the connector (1).
- Make sure the connectors (1) engage audibly.



- Connect connector (1) in direction of arrow and lock.
- Make sure the connectors (1) engage audibly.



- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.
- Insert the connector (1) in the direction of arrow at the electronics box (2) and install.



- Insert the cover (2) into the guides (3) in the direction of arrow and install.
- Make sure the cover audibly engages (2) in the guides (3).
- Tighten down screw (1).

Cover to electronics box

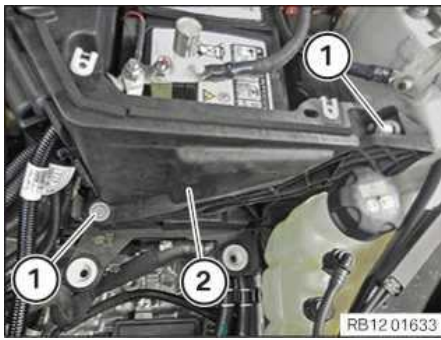
RF5x26.5		Tightening torque	2,5 Nm
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- Thread in positive battery cable (2) on holder (3) and install.
- Feed in and install positive battery terminal (1).
- Tighten positive battery terminal (1).

Positive battery terminal to battery

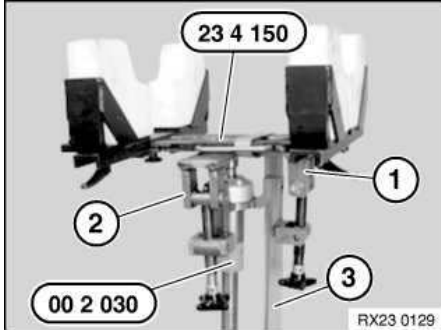
NutM6		Tightening torque	5 Nm
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- Feed in and install tension strut (2).
- Tighten the screws (1).

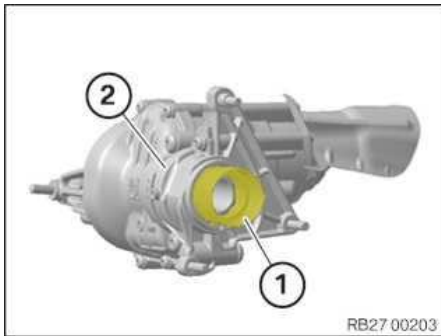
Tension strut to spring strut dome/battery tray

M8		Tightening torque	19 Nm
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- Loosening the tensioning strap (3).
- Remove special tools **0 490 133 (00 2 030)** and .

45 – Install the transfer box (VTG)



- If intermediate shaft (1) gets caught on transfer box (VTG) (2), renew intermediate shaft (1) and the radial shaft seals in the automatic or manual transmission.



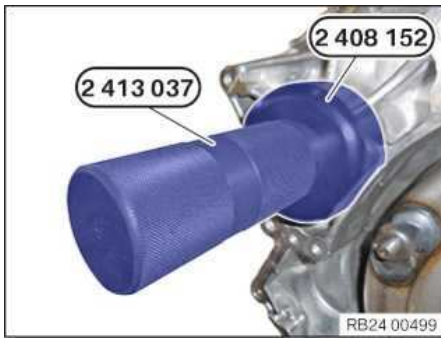
- Screw special tool **2 409 025** into the outer radial shaft seal.
- Turn the screw on the special tool **2 409 025** until the outer radial shaft seal has been pulled out.



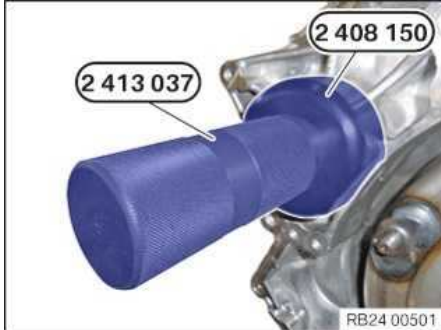
- Insert special tool **2 411 739** into the inner radial shaft seal.



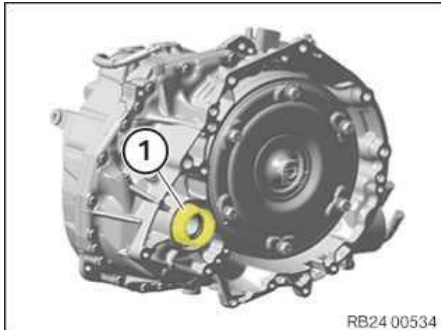
- Screw special tool **2 411 739** into the inner radial shaft seal.
- Turn the screw on the special tool **2 411 739** until the inner radial shaft seal has been pulled out.



- Drive in the inner radial shaft seal using special tools **2 408 152** and **2 413 037** up to the limit position.



- Drive in the outer radial shaft seal using special tools **2 413 037** and **2 408 150** up to the limit position.



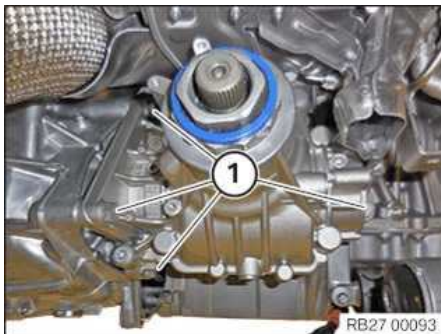
- If necessary, connect the new intermediate shaft (1) to the output flange of the automatic transmission or manual transmission.



- Coat the inside of the output flange (arrows) evenly with approx. 5 g of grease.

Expendable materials

Lubricating grease Optitemp HT 1 LF	50 g, Tube	83230417754
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- Install the transfer box (VTG).
- Tighten the screws (1).

Transfer box to transmission

M10	Tightening torque	56 Nm
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- Install heat shield.
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Heat shield to transfer box

M6	Renew screws.	Tightening torque	6 Nm
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- Check the transfer box oil level



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Check transfer case oil level, correct:
- Open the oil filler plug (1).
- Check transfer box oil level.
- If necessary, top up transmission oil up to the lower edge of the oil filler plug opening (1).

Transmission oil

Technically suitable transfer box and electrical transmission oils

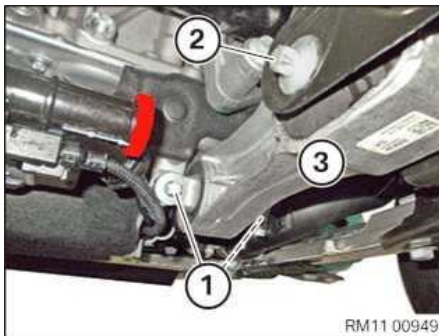
[Main group 27](#)

- Tighten the oil filler plug (1).

Oil filler plug on transfer box (VTG)

M18x1.5		Tightening torque	35 Nm
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46 – Install the holder with the rubber mount



- Insert and install the holder (3).
- Tighten the screws (1) and (2) hand-tight.
- Release jack.
- Tighten down screw (2).

Holder to front axle support

M12		Tightening torque	100 Nm
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- Tighten the screws (1).

Bracket to oil sump

M12		Tightening torque	100 Nm
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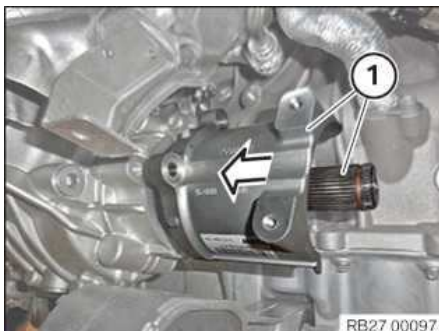
47 – Install the intermediate shaft with the support tube



- Coat gearing of the intermediate shaft uniformly with 5 g of grease.

Expendable materials

Lubricating grease Optitemp HT 1 LF	50 g, Tube	83230417754
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- Install the intermediate shaft with support tube (1) in the transfer box.



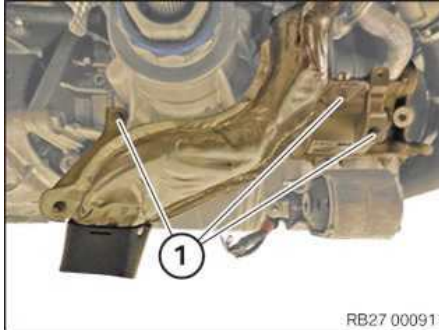
- Position screws (1).

Note: Check for correct screw length! Bolt M8x35 8.8

- Tighten the screws (1).

Intermediate shaft to transfer box

M8x35		Tightening torque	19 Nm
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- If installed: Install air duct.
- Tighten the screws (1).

48 – Install propeller shaft.



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



RISK OF DAMAGE

Damage to the propeller shaft during installation.

Non-observance of the installation guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- Always renew the recessed nut on the rear axle differential. Screw locking must be available.
- Strictly observe a minimum hardening time of two hours after having screwed in the recessed nut. The hardening time may be longer at lower temperatures.

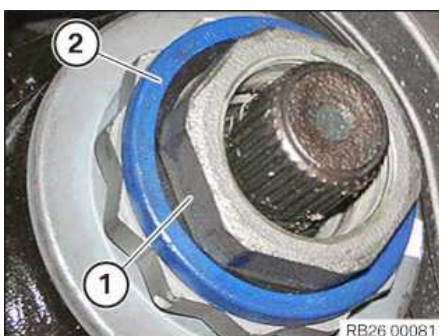


RISK OF DAMAGE

Damage to the transfer box.

Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

- Do not use the double hexagon head flange nut as counter support.



- Renew recessed nut (1).

Parts: Insert nut

- Renew the retaining clip (2) and the seal.

Parts: Retaining clip, seal

- Insert the seal with the recessed nut (1) and install.
- Insert the retaining clip (2) and install.
- Make sure that recessed nut (1) is screwed in within 5 min.
- Make sure that the hardening time of **minimum 2 h** for the recessed nut is observed.

The hardening time must be extended at lower temperatures.



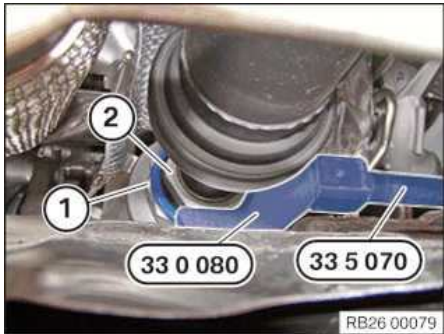
- Insert the propeller shaft (1) and install.
- Always support the propeller shaft (1) with a conventional jack.



- Hand-tighten the bolts (1).



- Push the propeller shaft (2) against the recessed nut (1) up to the limit position.
- Screw the propeller shaft (2) at least 2 thread starts onto the recessed nut (1) by hand.



RISK OF DAMAGE

Damage to the transfer box.

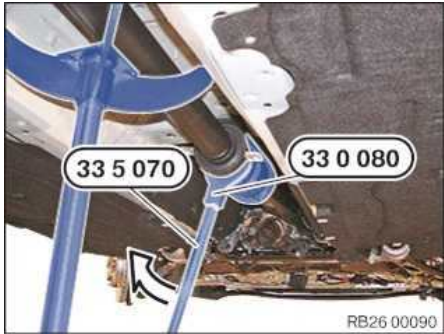
Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

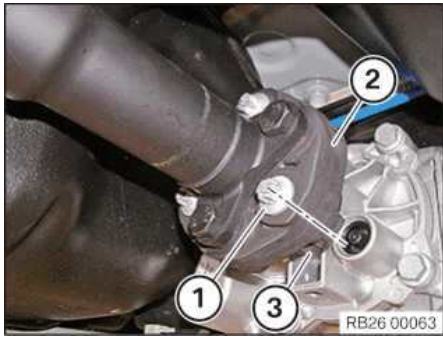
- Do not use the double hexagon head flange nut as counter support.

- Protect the recessed nut (2) on the transfer box from twisting with the special tools **0 495 554 (33 5 070)** and .
- The recessed nut (2) on the transfer box must **not** be used to tighten the propeller shaft.
- The double hexagon flange nut (1) must **not** be used for counter support.
- Tighten the front propeller shaft with the special tools **0 495 554 (33 5 070)** and in the direction of the arrow.

Propeller shaft to transfer box

		Tightening torque	80 Nm
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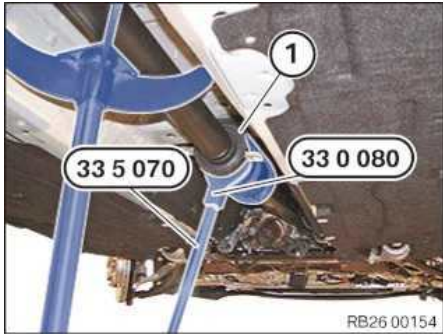




TECHNICAL INFORMATION

Compliance with the following instructions is required to avoid a humming noise from the propeller shaft after refitting the propeller shaft.

- Assemble the screw connection (1) of the flexible disc (2) and the three-hole flange (3) according to the mark.
- Renew screws (1).
- **Parts:** Bolts
- Hand-tighten the bolts (1).
- Protect the propeller shaft (1) with the special tools **0 495 554 (33 5 070)** and from twisting.



- Tighten the bolts with the special tools **0 490 504 (00 9 120)** and .

Flexible disc to rear axle final drive

M12x1.5	Renew screws.	Tightening torque	55 Nm 90 °
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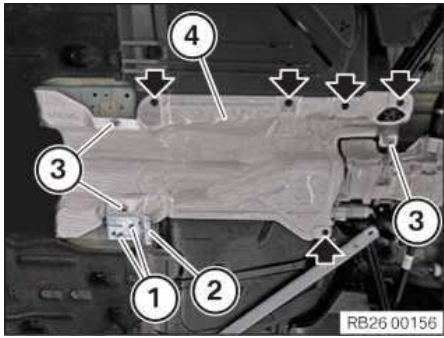
- Tighten the screws (1).

Centre mount to body

M8	Tightening torque	19 Nm
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49 – Installing the rear heat shield



- Insert and install the heat shield (4).
- Tighten screws (arrows).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
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- Tighten nuts (3).

Heat shield to body

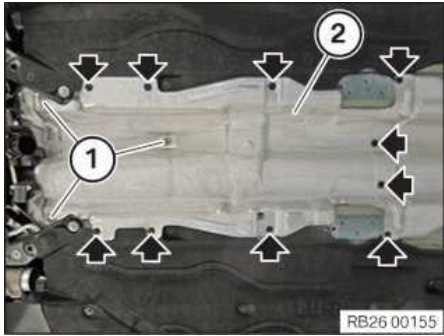
Bolts/nut		Tightening torque	3 Nm
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- Insert and install the holder (2).
- Tighten the screws (1).

Bracket to body

M8		Tightening torque	21 Nm
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50 – Install the front heat shield



- Insert and install the heat shield (2).
- Tighten screws (arrows).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
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- Tighten nuts (1).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
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51 – Install exhaust system



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

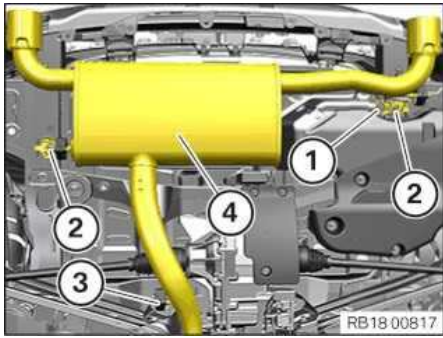


CAUTION

Heavy component.

Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.



- Feed in and install the exhaust system (4) with a second person.

- Renew nuts (2).

Parts: Nuts

- Tighten nuts (2).

Exhaust system to body

M8	Replace nuts.	Tightening torque	19 Nm
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- Tighten down screw (1).

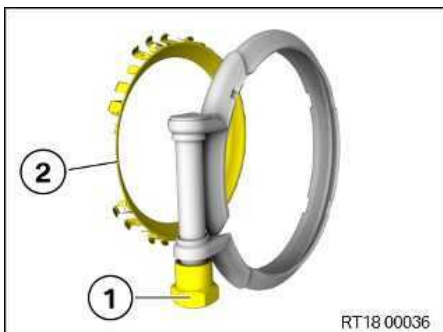
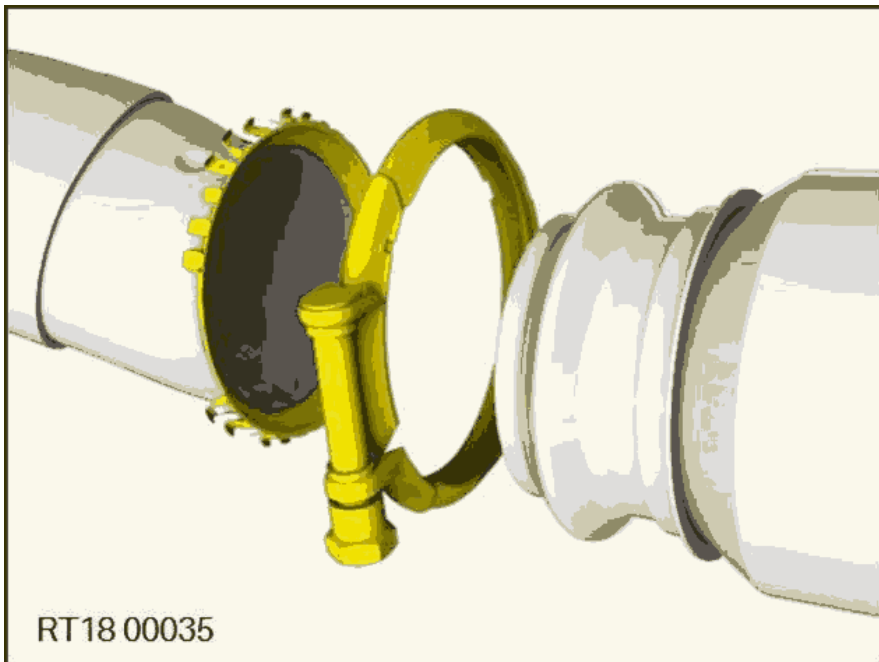
Exhaust bracket on body

Hexagon screw M8x30		Tightening torque	19 Nm
------------------------	--	-------------------	-------

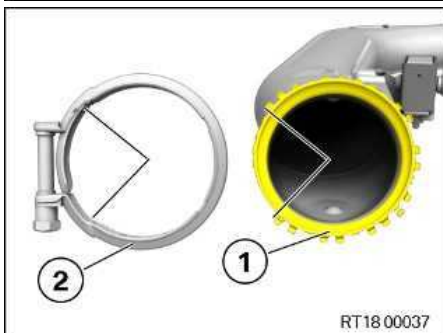
- Check the rubber mount (3) for damage and renew as needed.
- Mount rubber mount (3) on the exhaust system (4).

► Install the V-clip

V-band clamp



- Unscrew the nut (1) and remove the sealing ring (2).

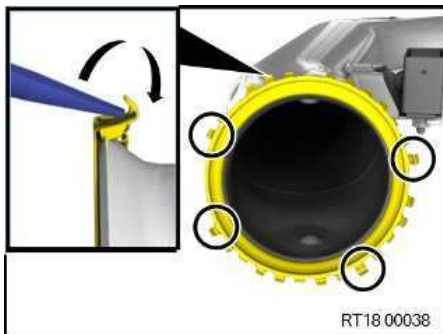


- Renew the V-clip (2).

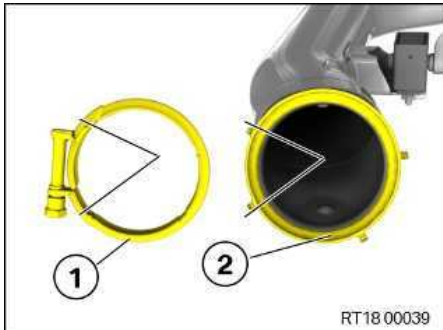
Parts: V-band clamp

- Mount the sealing ring (1) on the exhaust system.

- Ensure that the sealing ring (1) for the V-clip (2) is positioned correctly.



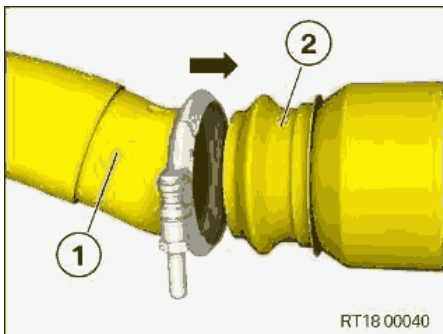
- Bend all sheet metal tabs over with a suitable tool, except those in the marked areas.



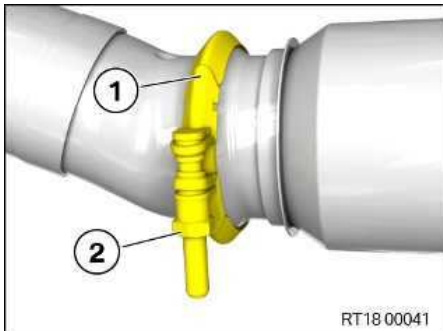
- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).



- Make sure that the V-clip rests against the sheet metal tabs after mounting (marks).



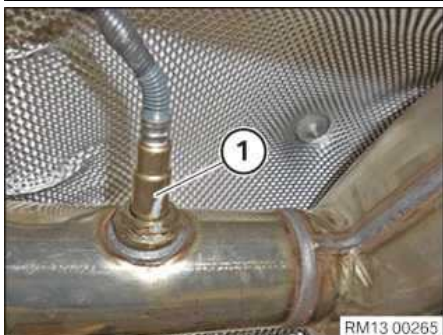
- Connect the exhaust system (1) with the catalytic converter (2) and position correctly.



- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

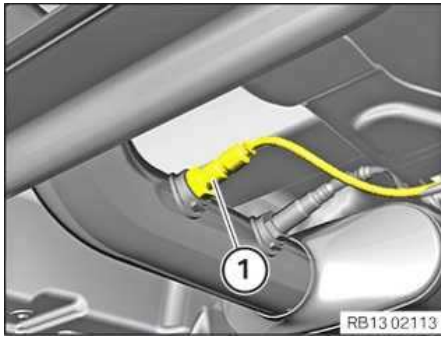
V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm
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- Feed in, install and tighten diesel particulate sensor (1).

Diesel particulate sensor to exhaust system

Sensor	Tightening torque	50 Nm
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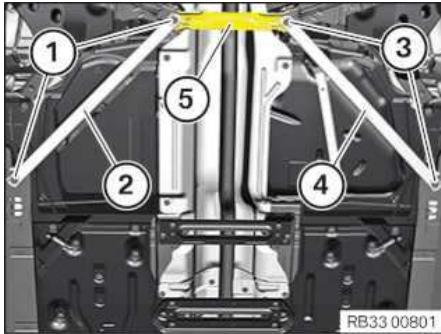


- Feed in, install and tighten nitrogen oxide sensor (1).

Nitrogen oxide sensor downstream of SCR catalytic converter

Sensor		Tightening torque	50 Nm
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52 – Install the cross-member with torsion struts



- Insert and install the cross-member (5).
- Thread in torsion strut (4) at right and install.
- Renew screws (3).

Parts: Bolts

- Tighten down screws (3).

Cross-member/torsion strut to axle support and mounting

M12x48	Renew screws.	Jointing torque	100 Nm
		Angle of rotation	90 °

- Guide in and install the left torsion strut (2).
- Renew screws (1).

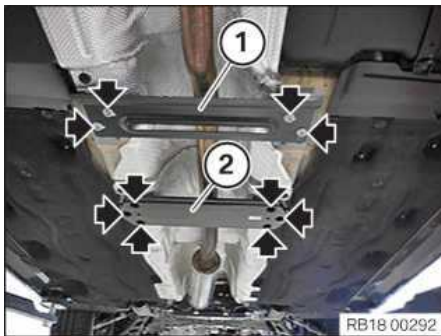
Parts: Bolts

- Tighten the screws (1).

Cross-member/torsion strut to axle support and mounting

M12x48	Renew screws.	Jointing torque	100 Nm
		Angle of rotation	90 °

53 – Install the connecting support on the tunnel in front and back



- Insert and install connecting supports (2).
- Tighten the screws (arrows) from the connecting support (2).

Front connection carrier to body

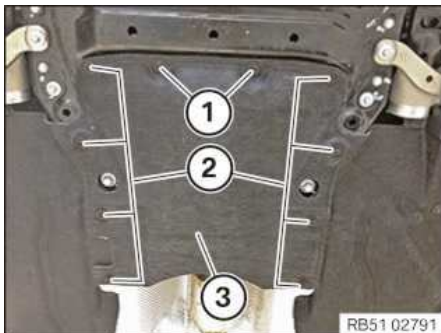
M10x18		Tightening torque	56 Nm
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- Insert and install connecting supports (1).
- Tighten the screws (arrows) from the connecting support (1).

Rear connection carrier to body

M8x18		Tightening torque	28 Nm
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54 – If installed: Installing underbody protection at rear



- Install the underbody protection (3).
- Tighten down screws (1) and (2).

Underbody protection to body

Screw		Tightening torque	3 Nm
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55 – Partially installing the left output shaft

- Installing the left radial shaft seal on the differential (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



RISK OF DAMAGE

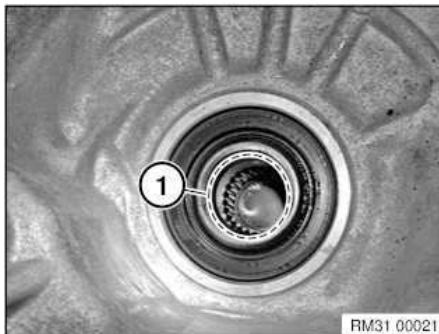
Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

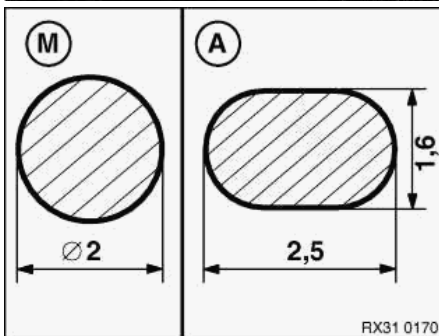
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



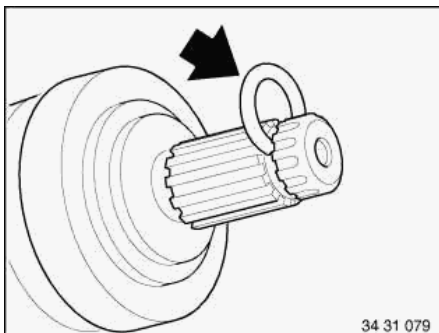
- Coat sealing lips of radial shaft seal with transmission oil.
- Drive the radial shaft seal into the housing with the special tool **2 407 668** until the sealing ring finishes flush with the transmission housing.



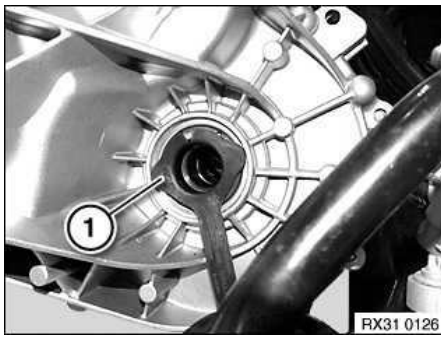
- **With automatic transmission only:**
 - Lever out O-ring (1).
 - Renew O-ring (1).
- Parts:** O-ring
- Insert new O-ring (1).



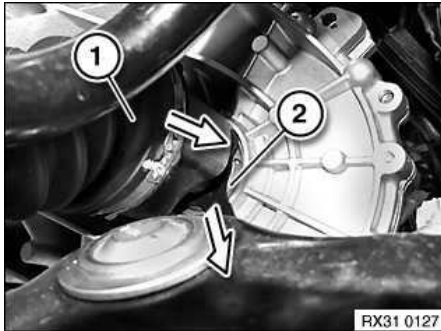
- Do not mix up circlips.
- Different types of output shafts fitted:
- **M:** Manual transmission
 - **A:** Automatic transmission



- Renew circlip (arrow).



- Insert installation protection ring (1) into the radial shaft seal.
- Make sure the tool fits over the lip of the radial shaft seal so there is no damage to sealing ring when the output shaft is inserted.



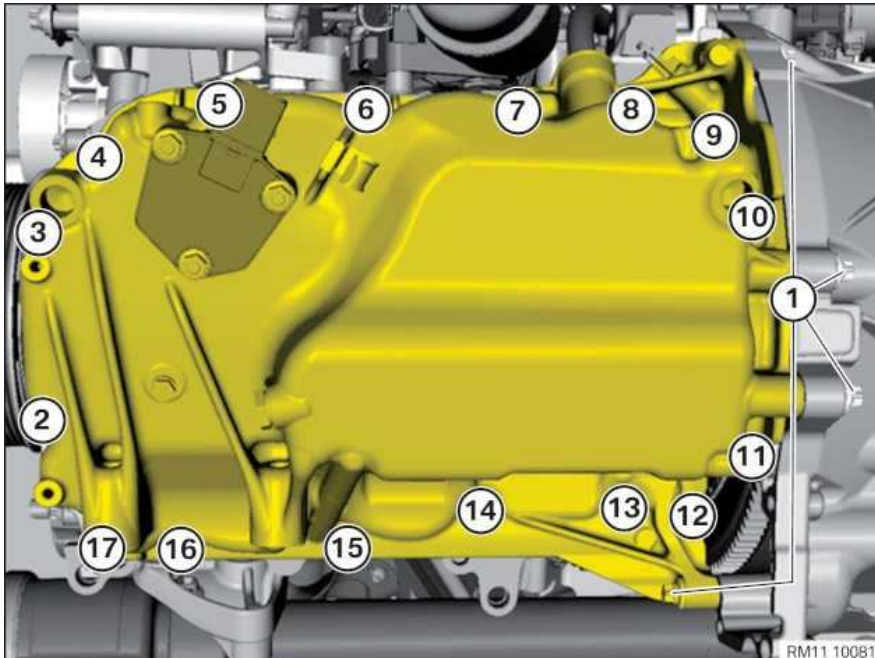
- Insert output shaft (1) into transmission.
- **Manual gearbox only:** Pull on the handle to remove the installation protection ring (2) and dispose of it.
- Slide output shaft (1) into the transmission as far as the limit position.
The output shaft (1) must engage audibly.
- Check for secure seat by levering.

56 – Installing right output shaft partially



- Renew the circlip (1).
- Parts:** Circlip
- Slide output shaft into the transmission as far as the limit position.
 - Check for secure seat by levering.

57 – Tighten down transmission-side bolting connection oil sump

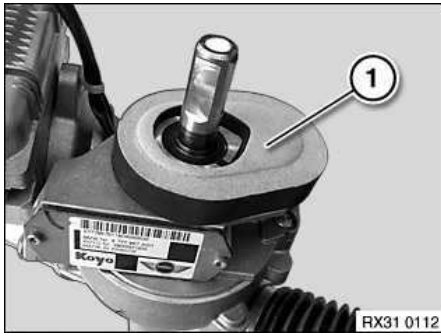


- Join transmission bolts (1) with 5 Nm.
- Tighten the transmission bolts (1) on the transmission.

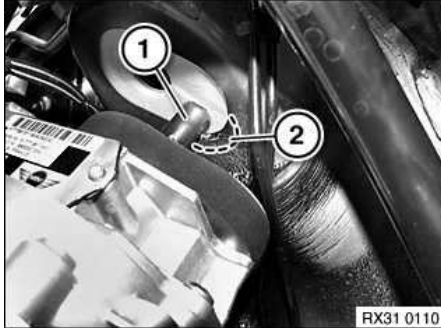
Transmission to oil sump

M8			19 Nm
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58 – Mount and secure the complete front axle



- Remove the seal (1).
 - Clean surface on steering gear.
 - Renew gasket (1).
- Parts:** Gasket
- Position the seal (1) and glue it on.

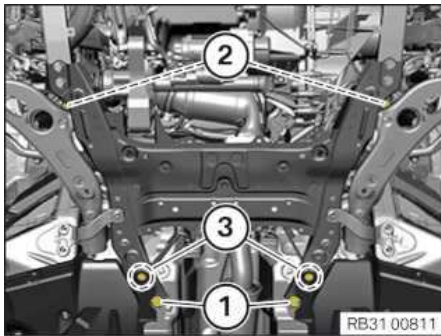


i

TECHNICAL INFORMATION

Non-compliance with the regulations for installation and disassembly may result in component damage. All work must be performed with care and in compliance with the regulations.

- When raising and lowering the front axle support, make sure that the torsion bar (1) of the electromechanical steering gear (EPS) in area (2) does not collide with the bulkhead!
- Note:** Collision with the bulkhead may result in damage to the electromechanical steering gear (EPS)!



- Position front axle support.
 - Bend underbody panellings in the areas (3) to one side.
 - Raise front axle support.
 - When raising, insert charge air cooler into the rubber mount of the charge air cooler on cross member.
 - Renew screws (1) and (2).
- Parts:** Bolts
- Tighten the screws (1).

Rear end of front axle support to body

M14 screw	Renew screw.	Tightening torque	175 Nm
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- Tighten down screws (2).

Front axle support, front to body

M12 screw	Renew screw.	Tightening torque	108 Nm
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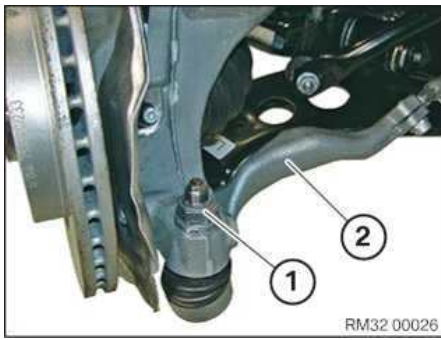
- If necessary, tighten the screws in the areas (3).

Underbody protection to body

Screw		Tightening torque	3 Nm
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- Remove special tool from special tool .
- Lower universal jack **0 490 133 (00 2 030)** with the special tool and place it to the side.



NOTICE

Perform the operations on the left and right side.

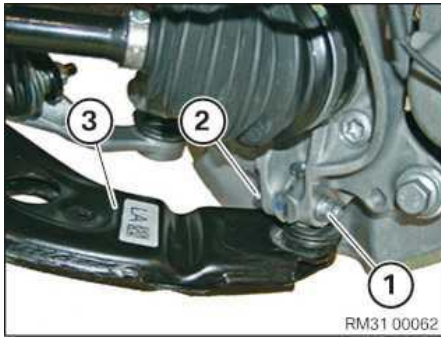
- Position the track rod (2) on the swivel bearing .
- Renew nut (1).

Parts: Nut

- Tighten nut (1).

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm
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NOTICE

Perform the operations on the left and right side.

- Position the wishbone (3) on the swivel bearing .
- Renew the bolt (2) and the nut (1).

Parts: Bolt, nut

- Insert screw (2).
- Tighten nut (1).

Wishbone to swivel bearing

M10	Exclusively use the screw to tighten! Renew screw and nut.	Tightening torque	60 Nm
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59 – Install the mounted parts on the front axle support



NOTICE

Perform the operations on the left and right side.

- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Holder, wishbone rubber mount, to body

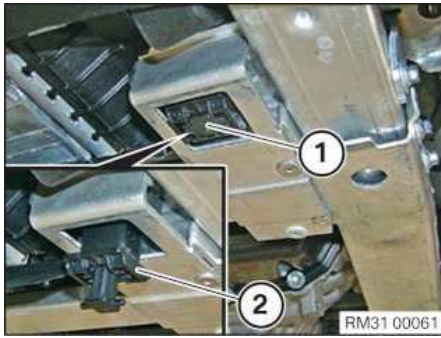
M10 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °



- Position the engine support (3) on the front axle support (1).
- Tighten down screw (2).

Holder with rubber mount to front axle support

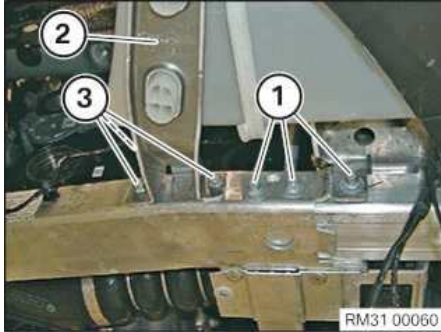
M12 screw			100 Nm
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NOTICE

Perform the operations on the left and right side.

- Position the lock (2).
- Lock the bracket (1) of the lock (2) of the holder for the charge air cooler.



- **Only on right side:** Position the holder for the washer fluid reservoir (2).
- Tighten down screws (3).

Washer fluid reservoir holder to front axle support adapter plate

		Tightening torque	10 Nm
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NOTICE

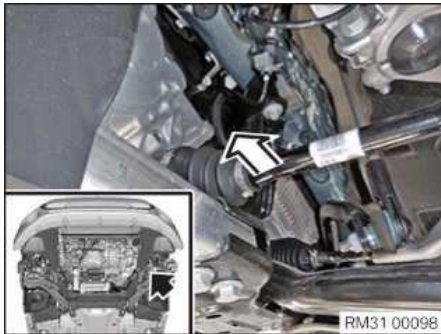
Perform the operations on the left and right side.

- Tighten the screws (1).

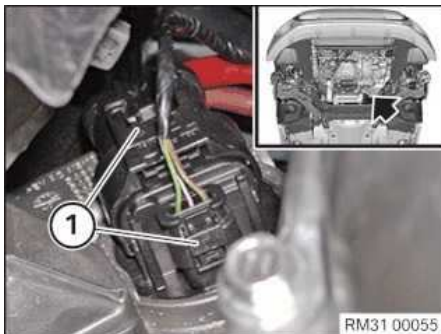
Deformation element, bottom, to adapter plate, front axle carrier

		Tightening torque	11,8 Nm
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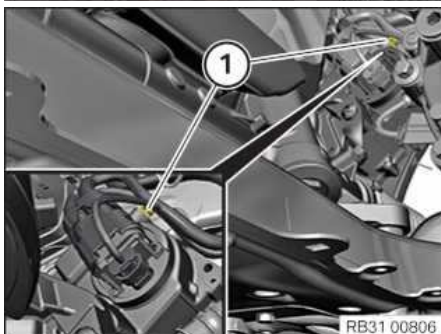
60 – Attaching connector at steering gear



- To connect the connector (see the following step): Connect the connector with the right hand. The connectors can be accessed via the left output shaft.

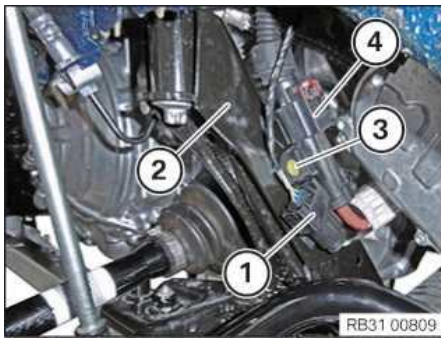


- Connect and lock connector (arrow) (1) with the steering gear.



- Fasten the wiring harness (1) on the steering gear.

► If installed: Fasten the plug connections at the front axle support



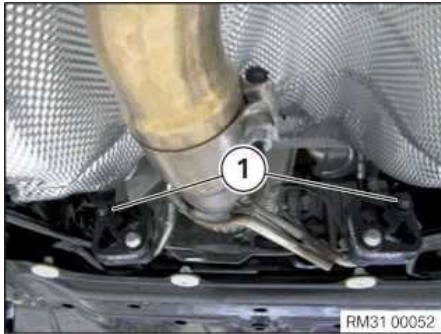
- Position the plug connection (4) at the front axle support (2).
- Tighten down screw (3).

Holder to front axle support

Oval-head screw TS5 x 16		Tightening torque	2,6 Nm
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- Fasten the plug connection (1) at the front axle support (2).

61 – Securing rubber mount on front axle support



- Check rubber mount (1), replace if necessary.

Parts: Rubber mount

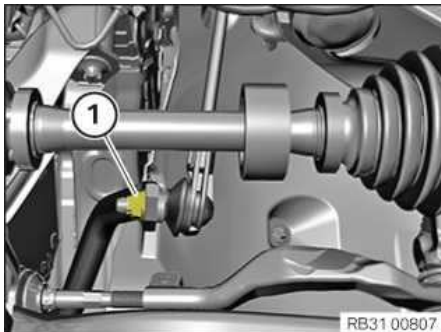
- Spray rubber mount (1) with lubricant and slide onto holder on front axle support.

62 – Securing anti-roll bar on left and right on the anti-roll bar link



NOTICE

Perform the operations on the left and right side.



► Fastening anti-roll bar on the anti-roll bar link

- Position the anti-roll bar link on the anti-roll bar .
- Renew nut (1).

Parts: Nut

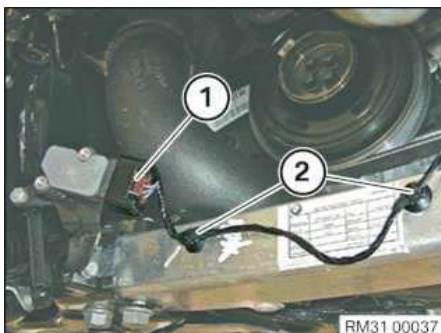
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Anti-roll bar link to anti-roll bar

M10	Renew nut.	Tightening torque	56 Nm
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63 – With right installation: Securing the cable for the ride height sensor



- Secure the cable clip (2) on the adapter of the deformation element.
- Connect connectors (1) and lock.

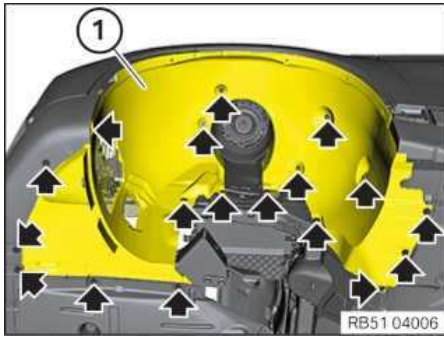
64 – Installing front left and right wheel arch cover



NOTICE

Perform the operations on the left and right side.

► Installing the front wheel arch cover



- Guide the wheel arch cover (1) in.
- Tighten all bolts and nuts (arrows).

Wheel arch cover to body

Plastic nut		Tightening torque	2,6 Nm
Screw		Tightening torque	2,6 Nm

Wheel arch cover to body

Screw		Tightening torque	2,5 Nm
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Wheel arch cover to body

Plastic nut		Tightening torque	3 Nm
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► Installing front wheel arch trim



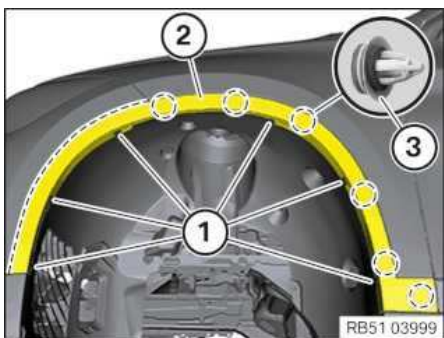
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



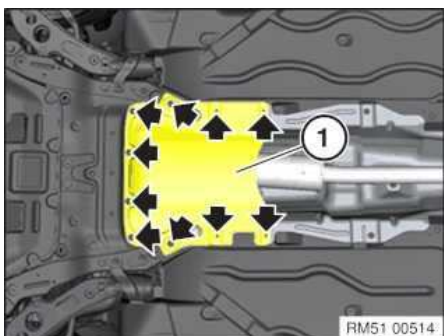
NOTICE

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



- Check the clips (3) for damage and renew where required.
The clips (3) must not be damaged or missing.
- Feed in wheel arch trim (2) and engage on the clips (3).
- Engage wheel arch trim (2) into the latch mechanisms on the bumper panel.
- Mount blind rivet (1) using the special tool **0 496 521 (00 2 230)**.

65 – If installed: Installing underbody protection at rear



- Position rear underbody protection (1).
- Tighten screws (arrows).

Underbody protection to body

Screw		Tightening torque	3 Nm
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66 – Installing front left or right wheel

► Mounting the wheel

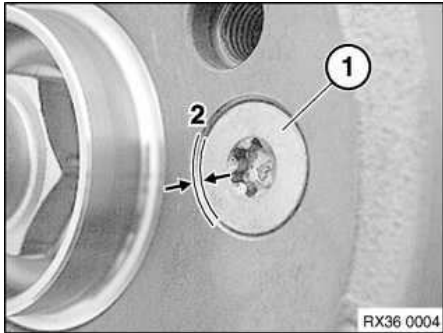
- Clean the contact surfaces between the brake disc and the wheel rim



TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool **2 344 011**.
Do not operate special tool **2 344 011** with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool **2 344 011**.
Do not operate special tool **2 344 011** with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).



- Renew mounting bolt (1).

Parts: Mounting bolt

- Check that the mounting bolt (1) for the brake disc is securely seated.

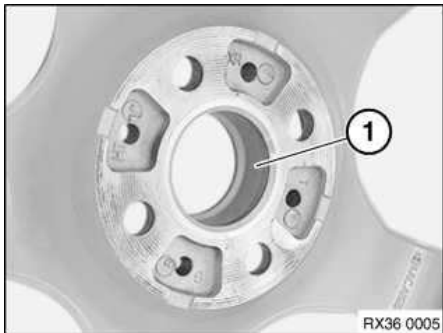
The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm
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Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm
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- Lightly grease the wheel centring (1) in the wheel rim; refer to additional information for grease for the wheel centring (1).



TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew corroded wheel bolts.

Parts: Wheel bolts

- Clean the wheel bolts.
- Check the wheel bolts and threads for damage, renew the wheel bolts if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M 14/AF 17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

67 – Installing starter motor



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 starter motor .
- Tighten the screws (1).

Starter motor to transmission

M8x45		Tightening torque	19 Nm
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- Feed the positive battery cable (2) in on the starter and install.
- Tighten nut (1).

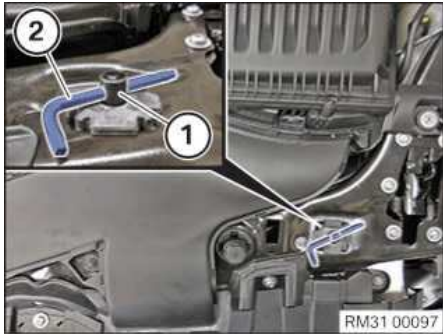
Battery positive lead to starter

M8		Tightening torque	13,5 Nm
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- Insert and install the new sealing cap (2).
- Secure the sealing cap (2) in the direction of the arrow.
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

68 – Removing fastener for left and right radiator



NOTICE

Perform the operations on the left and right side.

- Remove suitable tool (2) from the centering pin (1).

69 – Secure the steering shaft at the bottom on the steering gear



- Clean the screw lock residue from the screw thread in the universal joint (2).
 - Pivot the universal joint (2) in the direction of the arrow to the steering gear.
 - Renew the screw (1).
- Parts:** Screw
- Tighten down screw (1).

Lower steering shaft to steering gear

M10	Clean screw thread and remove remains of screw locking agent. Renew screw.	Tightening torque	28 Nm
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- **If installed:**
- Position the cover on the steering column (2).
- Tighten nuts (1).

Steering column cover to bulkhead

Plastic nut		Tightening torque	3 Nm
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70 – Remove the engine bridge



CAUTION

Heavy component.

Heavy components can lead to injury or damage.

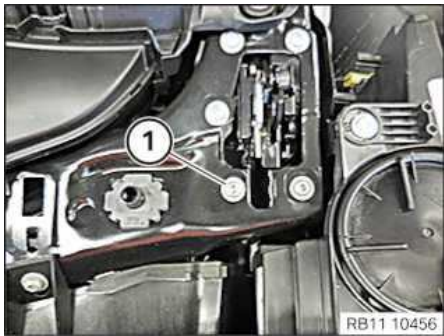
- Remove and install heavy components with the aid of another person/other persons.



- Detach the spindle screw (1) from the engine bridge.
- Unscrew the leg screws (2) and (3).
- Guide the engine bridge out of the vehicle with the help of another person and remove.



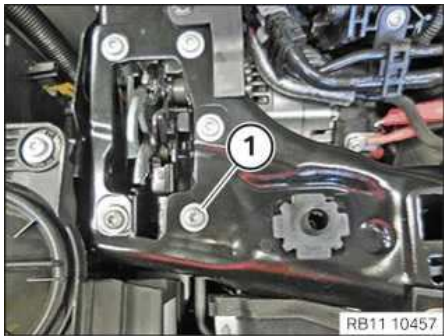
- Unscrew the bolts (1) of the special tool **2 459 012**.
- Feed out the special tool **2 459 012** at the cylinder head and remove.



- Tighten the screw (1) of the bonnet catch.

Cross connection on support for cross connection

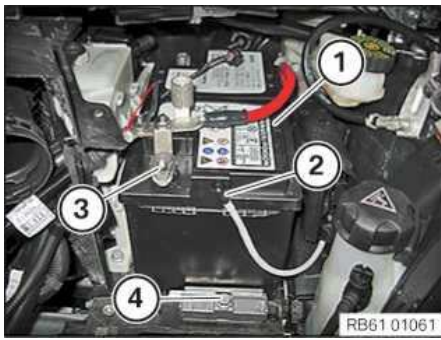
M6x20		Tightening torque	12 Nm
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- Tighten the screw (1) of the bonnet catch.

Cross connection on support for cross connection

M6x20		Tightening torque	12 Nm
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- Install vehicle battery (1).
- Position the bracket and tighten with the screw (4) .

Battery terminal rail to battery tray

M8		19 Nm
----	--	-------

- Position the vent hose (2) and clip it in.
- Position the positive battery terminal and tighten with the nut (3) .

Battery terminal with IBS positive battery terminal / negative battery terminal

NutM6		5 Nm
-------	--	------

► 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.

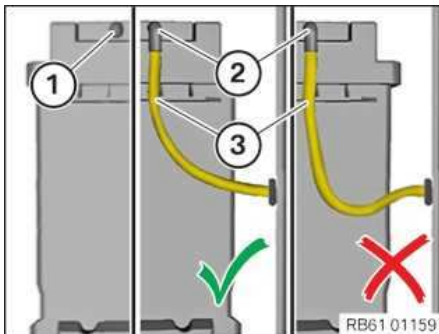


TECHNICAL INFORMATION

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).



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

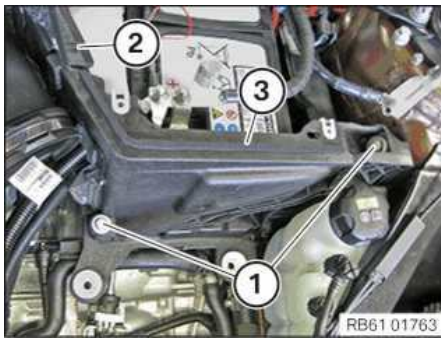
- Check if the vent hose (3) is routed to the outside with a downhill gradient (**no siphon formation!**).

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.



- Insert tension strut (3) and tighten with screws (1).

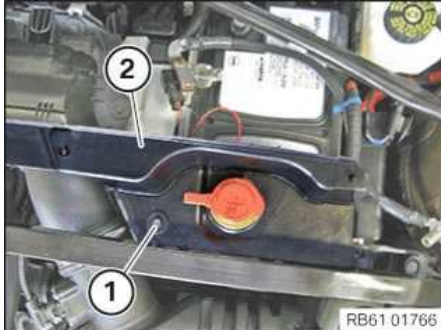
Trailing link

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

- Tighten down screw (2).

Battery cover

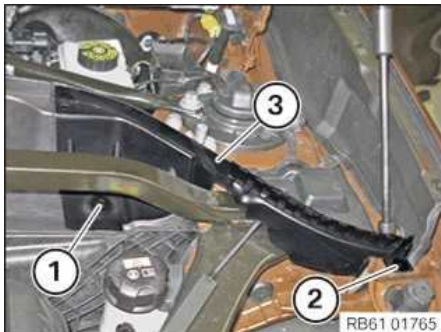
M8			2,8 Nm
----	--	--	--------



- Position the cover (2).
- Tighten down screw (1).

Battery cover

M8			2,8 Nm
----	--	--	--------



- Position the fixture for the gasket (3) and secure with the expanding rivet (2).
- Tighten down screw (1).

Battery cover

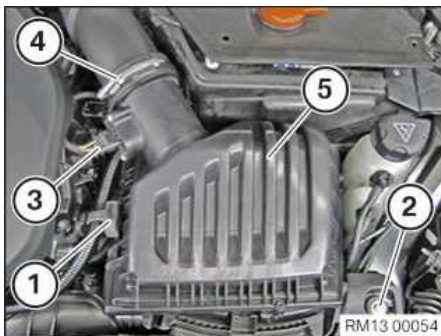
M8			2,8 Nm
----	--	--	--------

72 – Disconnecting all battery earth leads



- See additional information.

73 – Installing intake silencer housing



- Insert the intake silencer housing (5) into the rubber mounts and install it.
Intake filter housing (5) must engage audibly.
- Tighten down screw (2).

Intake silencer housing to lock bridge

M6X30		Tightening torque	8 Nm
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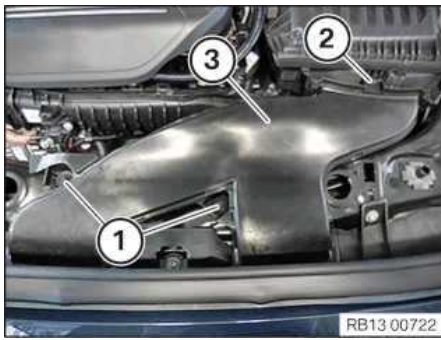
- Tighten clamp (4).

Clean air pipe to intake silencer housing

Clamp		Tightening torque	3 Nm
-------	--	-------------------	------

- Connect and lock the connector (3).
The connector (3) must engage audibly.
- Insert and install the holder (1).

74 – Install the intake neck for the intake filter housing



- Insert and install the intake neck (3).
The lock (2) must audibly engage.
- Tighten nuts (1).

Intake neck to cross connection

M6		Tightening torque	8 Nm
----	--	-------------------	------

75 – Topping up oil level in the manual gearbox (GS6X60DA)



CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



TECHNICAL INFORMATION

Make sure during removal of the filling/level control screw to note the installed filling/level control screw variant.

It is **mandatory** to use variant 1 in transmissions up to production date 08/2015.

It is **mandatory** to use variant 2 in transmissions from production date 08/2015.

Failure to observe will result in a leak on the transmission.

- Variant 1 **until** production date 08/2015.
- Variant 2 **from** production date 08/2015.
- Unscrew filling/level control screw (1) and fill the transmission until the oil overflows.

Transmission oil capacity

Transmission oil GS6-60DA, GS6X60DA/Owner's Handbook	2,2 l
---	-------

Transmission oil: Technically suitable manual gearbox oil

- Allow surplus oil to drain off.
- Renew the filling/level control screw (1).

Parts: Filling/level control screw

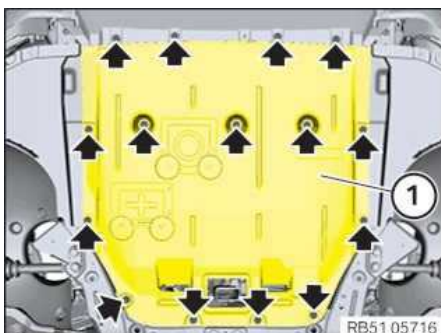
- Tighten filling/level control screw (1).

Oil drain plug / oil filler plug

Hexagon socket		Tightening torque	43 Nm
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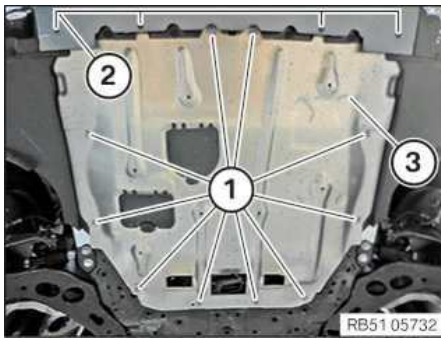
76 – Installing the front underbody protection



- Guide the front underbody protection (1) in under the bumper panel and position it at the screw points.
- Tighten screws (arrows).

Underbody protection front

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



Equipment specification with metal underride guard:

- Guide in and attach the underride guard (3).
- Tighten down screws (1) and (2).

Underbody protection front

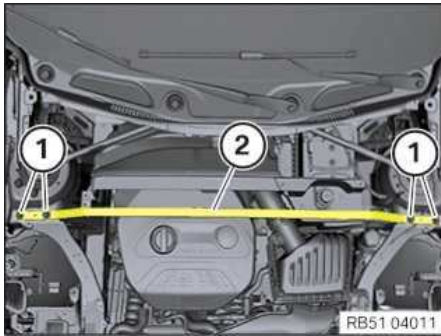
Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

77 – Install strut brace



TECHNICAL INFORMATION

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



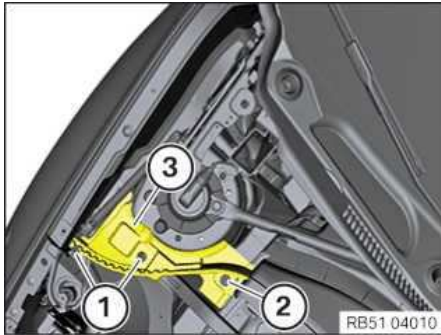
- Install the strut brace (2).
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Cross-brace to spring strut dome

	Renew screw.	Jointing torque	28 Nm
		Angle of rotation	180 °



NOTICE

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

- Install the cover (3).
- Tighten down screw (2).

Cover on body

Hexagon screw		Tightening torque	3 Nm
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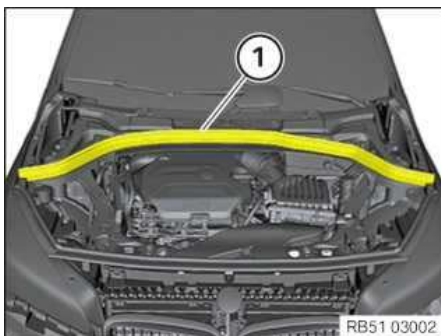
- Install the expanding rivet (1).

78 – Install the seal for the bonnet



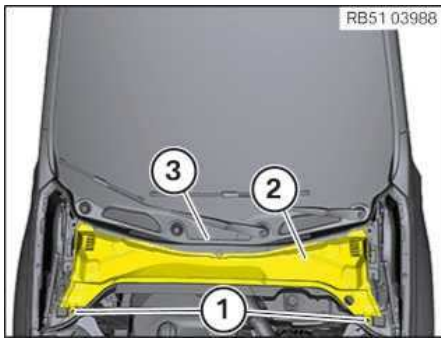
NOTICE

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



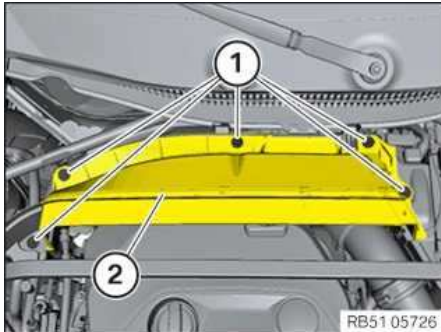
- Install bonnet seal at rear (1).
- Ensure that the rear bonnet seal (1) is fitted correctly.

79 – Installing front cowl panel cover



- Insert and install cowl panel cover at front (2) into cowl panel cover at rear (3).
- Check cowl panel cover at front is correctly seated (2).
- Secure expanding rivet (1).

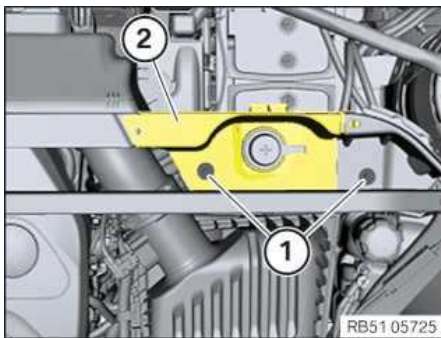
80 – Installing the upper bulkhead cover



- Feed in and install cover (2) of the bulkhead at the top.
- Tighten the screws (1).

Cover of top bulkhead

Screw		Tightening torque	2,6 Nm
-------	--	-------------------	--------



- Guide in and install cover (2).
- Tighten down screw (1).

Cover of remote positive terminal

Screw		Tightening torque	2,6 Nm
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81 – 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 for correct installation of all rubber mounts in the acoustic cover (1).

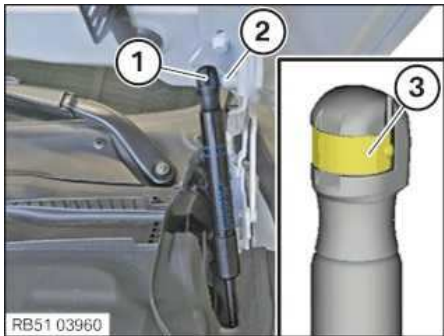


- Clip in the acoustic cover into the holders in the indicated areas.
- Make sure that the acoustic cover engages audibly.

82 – Take bonnet out of the service position



- Support the bonnet by hand.
- Remove the special tool (3) from the ball pin (2).
- Pull off the special tool (3) from the gas pressure spring (1).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.



CAUTION

Shutting bonnet or tailgate.

Danger of injury!

- Support bonnet/tailgate in fully open position with the aid of a suitable device.

- Check the clamp (3) is fitted correctly.
- Connect ball socket (1) to ball pin (2).
- Continue to support the bonnet and repeat the operation on the other side of vehicle.

Additional Information

Overview of Tightening Torques

Oil drain plug / oil filler plug

Used in step [12](#) [75](#)

Hexagon socket		Tightening torque	43 Nm
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Special tool to cylinder head

Used in step [13](#)

M8		Tightening torque	21,5 Nm
----	--	-------------------	---------

Guide bush/clutch release bearing

Used in step [42](#)

M6		Tightening torque	8 Nm
----	--	-------------------	------

Ball pin on transmission

Used in step [43](#)

		Tightening torque	39 Nm
--	--	-------------------	-------

Guide sleeve to transmission

Used in step [43](#)

M6		Tightening torque	8 Nm
----	--	-------------------	------

Transmission to engine

Used in step [44](#)

M8x40		Tightening torque	19 Nm
M12x75		Tightening torque	66 Nm

Transmission mounting Used in step [44](#)

M10	Renew screws.	Jointing torque	40 Nm
		Angle of rotation	90 °

Clutch slave cylinder to transmission housing Used in step [44](#)

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

Battery holder to engine support Used in step [44](#)

Hexagon screw M8x30		Tightening torque	19 Nm
---------------------	--	-------------------	-------

Battery terminal rail to battery tray Used in step [44](#) [71](#)

M8			19 Nm
----	--	--	-------

Electronics box to battery tray Used in step [44](#)

M8X16		Tightening torque	15 Nm
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Wiring harness to cylinder head cover Used in step [44](#)

TS5x20		Tightening torque	3,5 Nm
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Cover to electronics box Used in step [44](#)

RF5x26.5		Tightening torque	2,5 Nm
----------	--	-------------------	--------

Positive battery terminal to battery Used in step [44](#)

NutM6		Tightening torque	5 Nm
-------	--	-------------------	------

Tension strut to spring strut dome/battery tray Used in step [44](#)

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

Transfer box to transmission Used in step [45](#)

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

Heat shield to transfer box Used in step [45](#)

M6	Renew screws.	Tightening torque	6 Nm
----	---------------	-------------------	------

Oil filler plug on transfer box (VTG) Used in step [45](#)

M18x1.5		Tightening torque	35 Nm
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Holder to front axle support Used in step [46](#)

M12		Tightening torque	100 Nm
-----	--	-------------------	--------

Bracket to oil sump Used in step [46](#)

M12		Tightening torque	100 Nm
-----	--	-------------------	--------

Intermediate shaft to transfer box Used in step [47](#)

M8x35		Tightening torque	19 Nm
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Propeller shaft to transfer box Used in step [48](#)

		Tightening torque	80 Nm
--	--	-------------------	-------

Flexible disc to rear axle final drive Used in step [48](#)

M12x1.5	Renew screws.	Tightening torque	55 Nm
			90 °

Centre mount to body Used in step [48](#)

M8		Tightening torque	19 Nm
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Heat shield to body Used in step [49](#) [50](#)

Bolts/nut		Tightening torque	3 Nm
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Bracket to body			Used in step	49
M8		Tightening torque		21 Nm
Exhaust system to body			Used in step	51
M8	Replace nuts.	Tightening torque		19 Nm
Exhaust bracket on body			Used in step	51
Hexagon screw M8x30		Tightening torque		19 Nm
V-clip to catalytic converter			Used in step	51
V-band clamp	Renew V-band clamp.	Tightening torque		22 Nm
Diesel particulate sensor to exhaust system			Used in step	51
Sensor		Tightening torque		50 Nm
Nitrogen oxide sensor downstream of SCR catalytic converter			Used in step	51
Sensor		Tightening torque		50 Nm
Cross-member/torsion strut to axle support and mounting			Used in step	52
M12x48	Renew screws.	Jointing torque		100 Nm
		Angle of rotation		90 °
Front connection carrier to body			Used in step	53
M10x18		Tightening torque		56 Nm
Rear connection carrier to body			Used in step	53
M8x18		Tightening torque		28 Nm
Underbody protection to body			Used in step	54 58 65
Screw		Tightening torque		3 Nm
Transmission to oil sump			Used in step	57
M8				19 Nm
Rear end of front axle support to body			Used in step	58
M14 screw	Renew screw.	Tightening torque		175 Nm
Front axle support, front to body			Used in step	58
M12 screw	Renew screw.	Tightening torque		108 Nm
Track rod end to swivel bearing			Used in step	58
M14	Renew nut.	Tightening torque		175 Nm
Wishbone to swivel bearing			Used in step	58
M10	Exclusively use the screw to tighten! Renew screw and nut.	Tightening torque		60 Nm
Holder, wishbone rubber mount, to body			Used in step	59
M10 screw	Renew screw.	Jointing torque		56 Nm
		Angle of rotation		90 °
Holder with rubber mount to front axle support			Used in step	59
M12 screw				100 Nm
Washer fluid reservoir holder to front axle support adapter plate			Used in step	59
		Tightening torque		10 Nm

Deformation element, bottom, to adapter plate, front axle carrierUsed in step [59](#)

		Tightening torque	11,8 Nm
--	--	-------------------	---------

Holder to front axle supportUsed in step [60](#)

Oval-head screw TS5 x 16		Tightening torque	2,6 Nm
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Anti-roll bar link to anti-roll barUsed in step [62](#)

M10	Renew nut.	Tightening torque	56 Nm
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Wheel arch cover to bodyUsed in step [64](#)

Plastic nut		Tightening torque	2,6 Nm
Screw		Tightening torque	2,6 Nm

Wheel arch cover to bodyUsed in step [64](#)

Screw		Tightening torque	2,5 Nm
-------	--	-------------------	--------

Wheel arch cover to bodyUsed in step [64](#)

Plastic nut		Tightening torque	3 Nm
-------------	--	-------------------	------

Brake disc to rear wheel hubUsed in step [66](#)

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Brake disc to front wheel hubUsed in step [66](#)

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Wheel boltsUsed in step [66](#)

M 14/AF 17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence.	Check	140 Nm
	Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.		

Starter motor to transmissionUsed in step [67](#)

M8x45		Tightening torque	19 Nm
-------	--	-------------------	-------

Battery positive lead to starterUsed in step [67](#)

M8		Tightening torque	13,5 Nm
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Lower steering shaft to steering gearUsed in step [69](#)

M10	Clean screw thread and remove remains of screw locking agent. Renew screw.	Tightening torque	28 Nm
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Steering column cover to bulkheadUsed in step [69](#)

Plastic nut		Tightening torque	3 Nm
-------------	--	-------------------	------

Cross connection on support for cross connectionUsed in step [70](#)

M6x20		Tightening torque	12 Nm
-------	--	-------------------	-------

Battery terminal with IBS positive battery terminal / negative battery terminalUsed in step [71](#)

NutM6			5 Nm
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Trailing linkUsed in step [71](#)

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

Battery coverUsed in step [71](#)

M8			2,8 Nm
----	--	--	--------

Intake silencer housing to lock bridge			Used in step 73
M6X30		Tightening torque	8 Nm
Clean air pipe to intake silencer housing			Used in step 73
Clamp		Tightening torque	3 Nm
Intake neck to cross connection			Used in step 74
M6		Tightening torque	8 Nm
Underbody protection front			Used in step 76
Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm
Cross-brace to spring strut dome			Used in step 77
	Renew screw.	Jointing torque	28 Nm
		Angle of rotation	180 °
Cover on body			Used in step 77
Hexagon screw		Tightening torque	3 Nm
Cover of top bulkhead			Used in step 80
Screw		Tightening torque	2,6 Nm
Cover of remote positive terminal			Used in step 80
Screw		Tightening torque	2,6 Nm

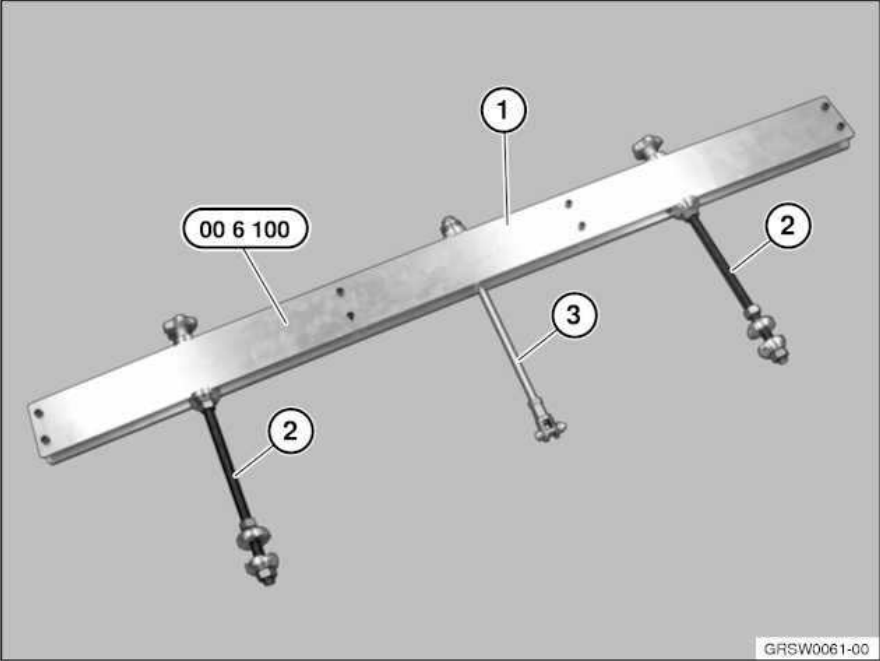
Overview of Special Tools

2 459 012 Holder



Common		Used in step 13 70
Usage	For removing and installing the cylinder head. Contour-graphic silhouette foil is included in the delivery specification.	
Included in the tool or work		
Storage location	A58	
Replaced by		
In connection with		
SI-Number	01 07 17 (487)	

0 496 852 (00 6 100) Device



Common Used in step 13

Usage Engine bridge (device) 006000

Included in the tool or work

Storage location Individual

Replaced by

In connection with

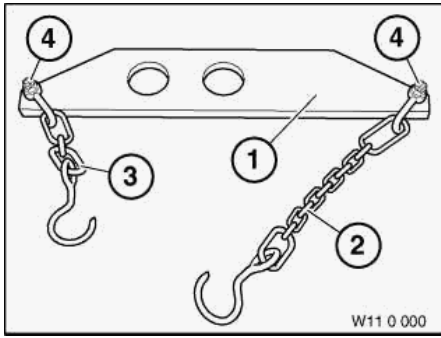
SI-Number 01 17 10 (659)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
2	2 361 507 (00 6 102)		Spindle Set (2 pieces) in connection with 00 6 100.	
3	2 361 506 (00 6 103)		Spindle Spindle (central spindle) for Traverse 00 6 100.	

0 490 561 (11 0 000) Lifting gear

Used in step 13



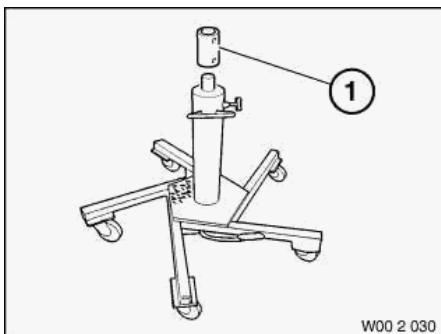
Common

Usage	(Hoisting gear) For removing and installing engines. As of 08/2011 only available as a complete set. Delivered with TÜV inspection certificate and operating instructions. No delivery of separate parts.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 13 94 (888)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
4	0 490 565 (11 0 009)		Shackle (Shackle) 2 pieces. As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
1	0 490 562 (11 0 001)		Lifting gear (Cross member) As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
2	0 490 563 (11 0 002)		Chain (Chain) Version: long As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	
3	0 490 564 (11 0 003)		Chain (Chain) Version: short As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TÜV inspection certificate and operating instructions.	

0 490 133 (00 2 030) Device



Common

Used in step [25](#) [39](#) [44](#) [58](#)

Usage	(universal hydraulic lifter base unit) Chassis and hydraulic lifter - For removing and installing rear axle supports and gearboxes. Also for soft top mounts. Is replaced by 81 22 2 219 012
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 90 (207)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 490 134 (00 2 031)		Adapter (adapter for gearbox holder) Model series: E30, E31, E32, E34, E36	

0 495 554 (33 5 070) Extension



Common

Used in step [35](#) [48](#)

Usage	Pull-out extension for 33 5 040, 33 5 050, 33 5 060.
Included in the tool or work	
Storage location	A18
Replaced by	
In connection with	
SI-Number	01 21 06 (300)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 592 (33 5 071)		Extension (Extension (1 item)) discontinued, can only be ordered using complete tool	

2 358 469 Puller



Common

Used in step [41](#)

Usage	For dismantling the rear wheel drive of the transmission input shaft. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C76
Replaced by	
In connection with	
SI-Number	01 55 14 (213)

2 358 466 Mandrel



Common

Used in step [42](#)

Usage	For installing rear-wheel drive on the transmission input shaft. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C76
Replaced by	
In connection with	
SI-Number	01 55 14 (213)

2 409 025 Puller



Common

Used in step [45](#)

Usage	For disassembly of the outer radial shaft seal of the transmission output shaft, right. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	A76
Replaced by	
In connection with	
SI-Number	01 53 14 (211)

2 411 739 Puller



Common

Used in step 45

Usage	For disassembly of the inner radial shaft seal of the output, right. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C78
Replaced by	
In connection with	
SI-Number	01 53 14 (211)

2 408 152 Striking element



Common

Used in step 45

Usage	For installation of the right radial shaft seal transmission output shaft (inner). Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B78
Replaced by	
In connection with	2413037
SI-Number	01 53 14 (211)

2 413 037 Handle



Common

Used in step 45

Usage	Universal drift handle. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C77
Replaced by	
In connection with	
SI-Number	01 53 14 (211)

2 408 150 Striking element

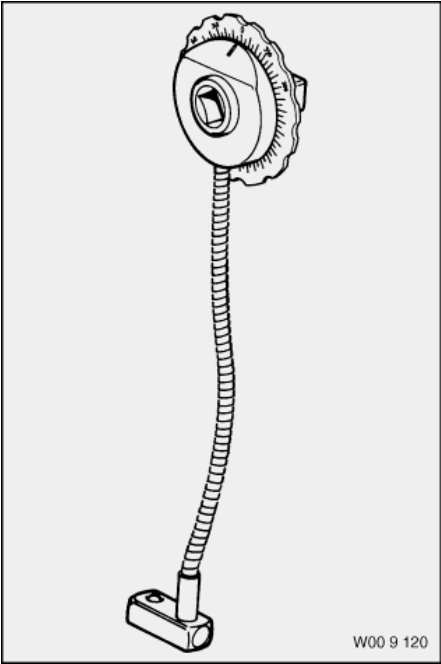


Common

Used in step 45

Usage	For installing the right radial shaft seal transmission output shaft (outer). Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B78
Replaced by	
In connection with	2413037
SI-Number	01 53 14 (211)

0 490 504 (00 9 120) Torque angle measuring dial



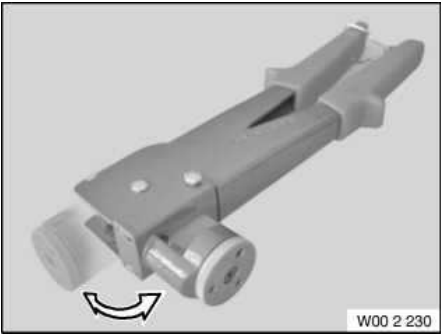
Common		Used in step	48
Usage	For torsion angle adjustment of cylinder head bolts (all engines) And reinforcement plate front axle support E46		
Included in the tool or work			
Storage location	A4		
Replaced by			
In connection with			
SI-Number			

2 407 668 Mandrel



Common		Used in step	55
Usage	For installing the left radial shaft seal output shaft. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).		
Included in the tool or work			
Storage location	B75		
Replaced by			
In connection with			
SI-Number	01 57 14 (215)		

0 496 521 (00 2 230) Pliers



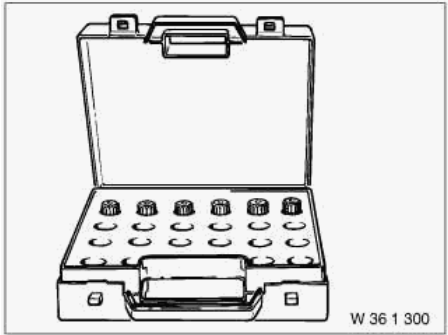
Common		Used in step	64
Usage	(Blind rivet pliers for plastic rivets) For shaft diameters of 3.5 mm, 3.9 mm and 4.5 mm		
Included in the tool or work			
Storage location	C25		
Replaced by			
In connection with			
SI-Number	01 17 08 (478)		

2 344 011 Tool



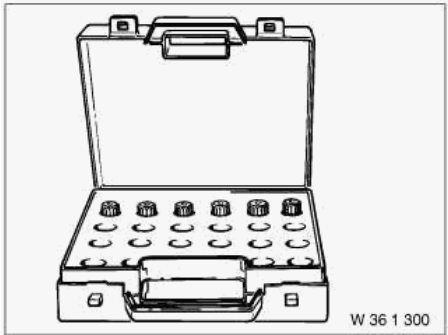
Common		Used in step 66
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.	
Included in the tool or work		
Storage location		
Replaced by		
In connection with		
SI-Number	08 08 12 (872)	

Replacement tools:
0 495 221 (36 1 323) Wheel stud



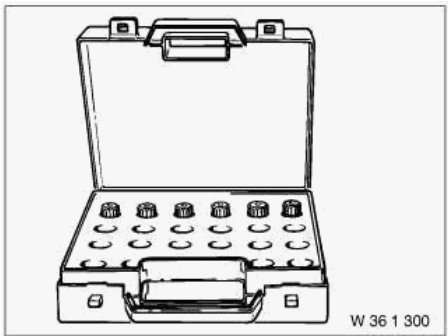
Common		Used in step 17
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 224 (36 1 326) Wheel stud



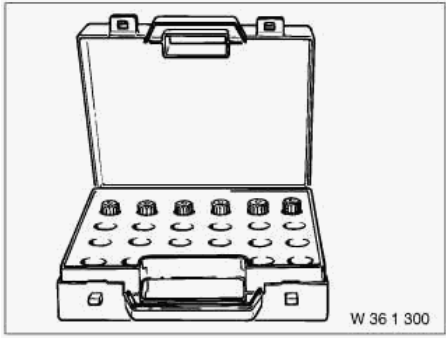
Common		Used in step 17
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 225 (36 1 327) Wheel stud



Common		Used in step 17
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547	
Included in the tool or work	0 492 518	
Storage location		
Replaced by		
In connection with		
SI-Number		

0 495 226 (36 1 328) Wheel stud



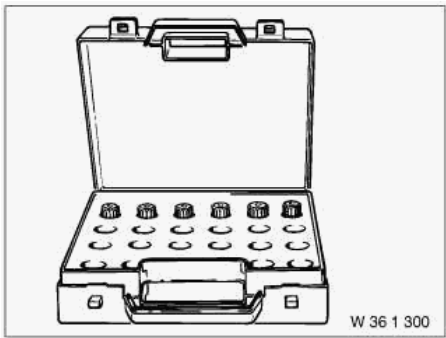
Common		Used in step	17
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 227 (36 1 329) Wheel stud



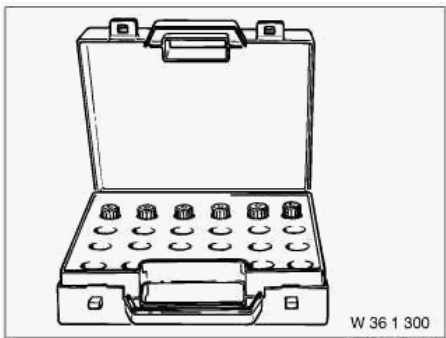
Common		Used in step	17
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 228 (36 1 331) Wheel stud



Common		Used in step	17
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 229 (36 1 332) Wheel stud



Common		Used in step	17
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

Common		Used in step	17
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

Transmission oil capacity	Used in step 75
Transmission oil GS6-60DA, GS6X60DA/Owner's Handbook	2,2 l
Transmission oil: Technically suitable manual gearbox oil	

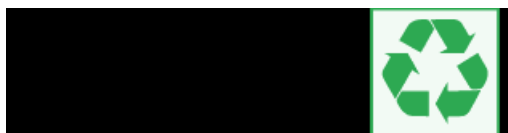
[illegible]

61 20 900 Disconnecting and connecting battery earth lead	9 72
61 20 900 Disconnecting and connecting battery earth lead	9 72
61 20 900 Disconnecting and connecting battery earth lead	9 72
61 20 900 Disconnecting and connecting battery earth lead	9 72
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	9 72
61 20 900 Disconnecting and connecting battery earth lead	9 72
61 20 900 Disconnecting and connecting battery earth lead	9 72
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61 20 900 Disconnecting and connecting battery earth lead	9 72
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61 20 900 Disconnecting and connecting battery earth lead	9 72
61 20 900 Disconnecting and connecting battery earth lead	9 72
61 35 ... Notes on ESD protection (Electro Static Discharge)	39

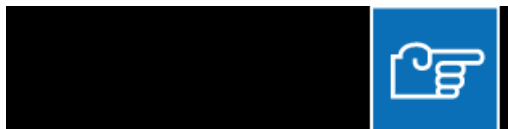
Operating materials	Used in step
----------------------------	---------------------

14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	12
2.0 Grease for wheel centring	66

Operating materials	Used in step
----------------------------	---------------------

**Recycling:**

Catch and dispose of escaping transmission oil.
Observe country-specific waste disposal regulations

**Note:**

Gearbox is at normal operation temperature.

Attention!

Use only the [approved transmission oil](#).

Failure to comply with this instruction will result in serious damage to the transmission.

Capacity, see BMW [operating fluid](#).

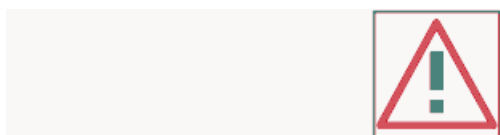
The vehicle must be parked on a level surface in the workshop during transmission oil filling.



Unscrew oil drain plug (1) and allow oil to flow out completely.

Clean oil drain plug and reinstall.

Tightening torque [23 00 2AZ](#).

**Attention!**

Make sure during removal of the filling/level control screw to note the installed filling/level control screw variant.

It is **mandatory** to use variant 1 in transmissions up to production date 08/2015.

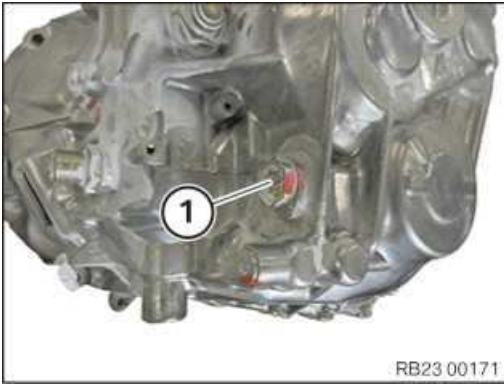
It is **mandatory** to use variant 2 in transmissions from production date 08/2015.

Failure to comply with this instruction will result in leaks on the transmission.



Variant 1 **until** production date 08/2015.

Variant 2 **from** production date 08/2015.



Unscrew filler/fluid level monitoring connector (1) and fill the transmission until the oil overflows.

Allow surplus oil to drain off.

Screw in the filling/level control screw (1).

Parts: Renew the filling/level control screw (1).

Tightening torque [23 00 2AZ](#).

23 Transmission designations

Breakdown of BMW designation:

A5S 300J (former designation)		
A	Transmission type	- S = Manual gearbox - A = Automatic transmission
5	Number of forward gears	
S	Type of top gear	- D = Direct gear - S = Overdrive gear
300	Max. input torque (Nm)	
J	Code letter of transmission manufacturer	- G = Getrag - J = Jatco - R = GMPT (General Motors Powertrain) - Z = ZF (Zahnradfabrik Friedrichshafen)
SMG	Notes	SMG = Sequential M gearbox/transmission

GS6-37BZ (new designation according to BMW Group Standard GS 90007)		
G	Transmission	
S	Transmission type	- S = Manual gearbox - A = Automatic transmission
6	Number of forward gears	
-		- = Standard with manual gearshift - HP = Hydraulic planetary gear - DKG= twin-clutch gearbox
37	Transmission type	26 = D-transmission 31 = C-transmission 39 = F-transmission 37 = H-transmission 53 = G-transmission 17 = I-transmission 47= J transmission SMG -7-speed 45 = K transmission 36= Transmission DKG
B	Gear set	- B = Petrol gear ratio - D = Diesel gear ratio - S= Sport gear ratio

Z	Code letter of transmission manufacturer	- G = Getrag - Z = ZF (Zahnradfabrik Friedrichshafen) - A = AISIN
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Manual gearbox:

BMW designation	Manufacturer	Manufacturer designation	Remarks
S5D 200G	Getrag	B transmission (220/5)	
S5D 200G	Getrag	B transmission (221/5)	for M41 engine only
S5D 250G	Getrag	B transmission (220/5)	Reinforced version
S5D 260Z	ZF	C-transmission (S5-31 D)	for M51 engine only
S5D 280Z	ZF	C-transmission (S5-31)	
S5D 310Z	ZF	C-transmission (S5-31)	up to 9.95
S5D 320Z	ZF	C-transmission (S5-31)	from 9.95 (reinforced version)
GS5S31BZ (SMG)	ZF	C transmission	SMG
GS5-39DZ	ZF	F transmission	
S6S 420G	Getrag	D-transmission (226/6)	
S6S 420G (SMG)	Getrag	D transmission	SMG
S6S 560G	Getrag	E-transmission (286/6)	
GS6-37BZ	ZF	H-transmission	
GS6S37BZ (SMG)	ZF	H-transmission	
GS6-37DZ	ZF	H-transmission	
GS6-37BG	Getrag	H-transmission	
GS6-53BZ	ZF	G-transmission	
GS6-53DZ	ZF	G-transmission	
GS6-17BG	Getrag	I-transmission	
GS6-17DG	Getrag	I-transmission	
GS7S47BG (SMG)	Getrag	J-transmission (247)	SMG -7-gear
GS7D36SG	Getrag	DKG (436)	DKG -7-gear
GS6- 45BZ	ZF	K transmission	
GS6- 45DZ	ZF	K transmission	
GS6-60DA/BA	AISIN	BG6	

7DCT300	Getrag	7DCT	DKG -7-gear
GS6-58DG/BG	Getrag		
GS6-59DG/BG	Getrag		

Automatic transmission:

BMW designation	Manufacturer	Manufacturer designation	Remarks
A4S 200R	General Motors Powertrain	GM4	
A4S 270R	General Motors Powertrain	THM-R1w	Transmission wide-stepped
A4S 310R	General Motors Powertrain	THM-R1	
A5S 300J	Jatco	Jatco	
A5S 310Z	ZF	5HP-18	
A5S 325Z	ZF	5HP-19	
A5S 440Z	ZF	5HP-24	
A5S 560Z	ZF	5HP-30	
A5S 360R / 390R	GM	GM5	
GA6F21AW	AISIN	GA6F21AW	
GA6HP19Z	ZF	6HP19	
GA6HP26Z	ZF	6HP26	
GA6HP32Z	ZF	6HP32	
GA6L45R	GM	GM6	
GA6F21AW	AISIN	GA6F21AW	
GA8F22AW	AISIN	GA8F22AW	
GA8G45	AISIN	8G45	
GA8HP45Z	ZF	8HP45	
GA8HP50Z	ZF	8HP50	
GA8HP51Z	ZF	8HP51	
GA8HP70Z	ZF	8HP70	
GA8HP75Z	ZF	8HP75	
GA8HP76Z	ZF	8HP76	
GA8P70H	ZF	8P70	Hybrid
GA8P75H	ZF	8P75	Hybrid
GA8HP90Z	ZF	8HP90	
GA8HP95Z	ZF	8HP95	

GA7AHSCD	Daimler	AHS-C	Hybrid
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23 ... Universal BMW transmission take-up



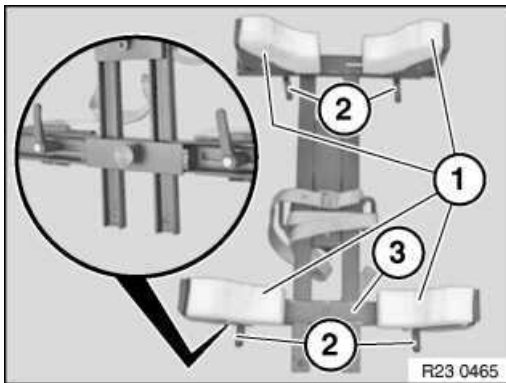
Special tools required:

- [00 2 030](#)
- [23 4 050](#)



Note:

- The universal transmission bracket is introduced for the E60 AWD
- Suitable for manual and automatic transmissions

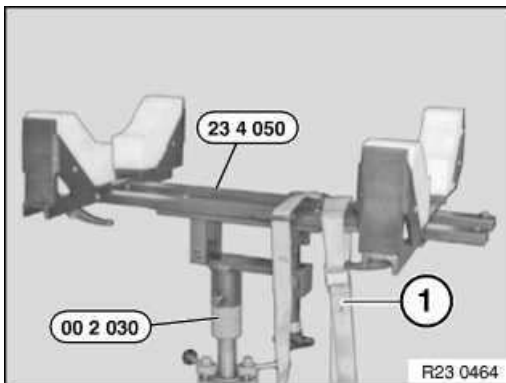


Important!

Front and rear supports (1) can be laterally adjusted by means of screws (2).

Carrier (3) of rear supports (1) can be longitudinally adjusted by means of screw.

Supports must be adapted in length and width to the transmission.



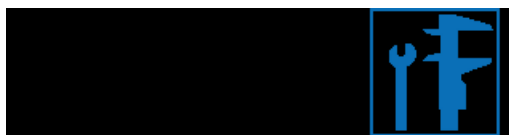
Supporting transmission:

Support transmission with special tools [23 4 050](#) , [00 2 030](#) .

Important!

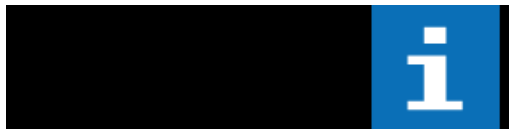
Transmission must be secured with tensioning strap (1).

23 Universal transmission retaining bridge



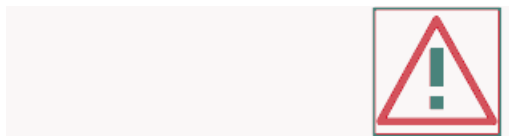
Special tools required:

- 0 495 187
- [24 0 200](#)



Note:

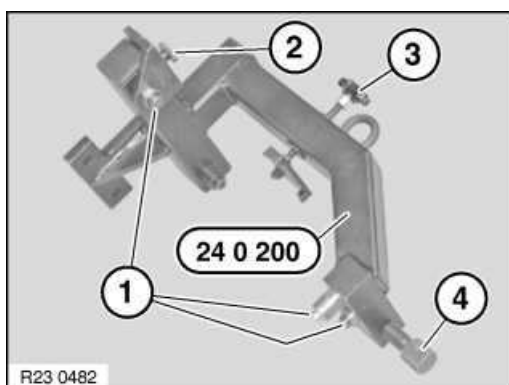
- Transmission retaining bridge [24 0 200](#) is suitable for manual and automatic transmissions



Attention!

The adapter and shaft must be adapted to positively lock with the transmission.

(Danger of injury)



Adapt the adapter (1) and spindle with the thrust piece (3) on the transmission.

Adjust the length using the sliding piece (2).

Screw in spindle (4).

Attention!

Before mounting on assembly stand 0 495 187 check retraining bridge for tight fit.