31 00 ... Information on replacing shock absorbers

Situation:

When a shock absorber is faulty on one side (leaking, noises, etc.), often both shock absorbers on the axle in question are replaced.

Effect:

This is not necessary for technical reasons and causes the manufacturer not to recognize the unnecessarily removed shock absorbers as defective parts. Unnecessarily high costs for the customer can be avoided by replacing the shock absorber on one side only.

Procedure:

If one shock absorber is damaged, it is only necessary to replace both shock absorbers when the car has driven in excess of 80 000 km.

Exception: On all M-GmbH models, when a limit value is exceeded on one side, it is still necessary always to replace both shock absorbers on the relevant axle.

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31 00 Mobile table lift

Warning!

Danger of injury!

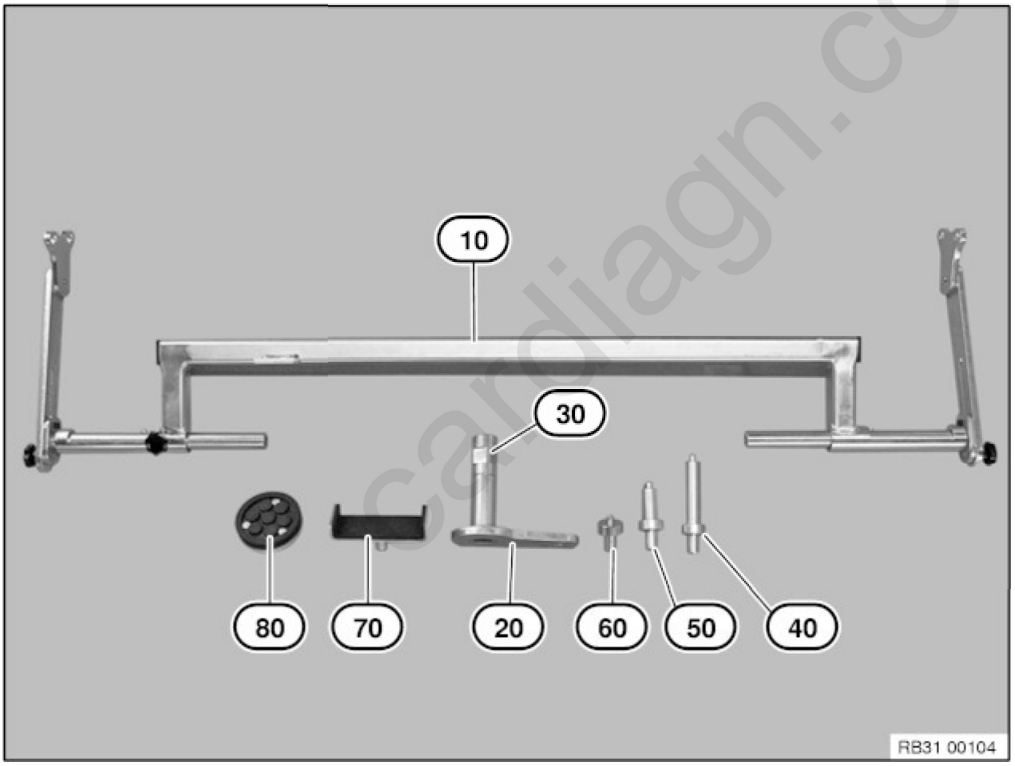
Before beginning work, position table lift with the lower frame securely on the floor.

Danger area around mechanism below platform.

- Do not reach into or step into the danger area.
- Note permissible bearing capacity of table lift.
- Mount load centrally (danger of tipping) and secure against shifting.

Follow the operating instructions from the equipment manufacturer.

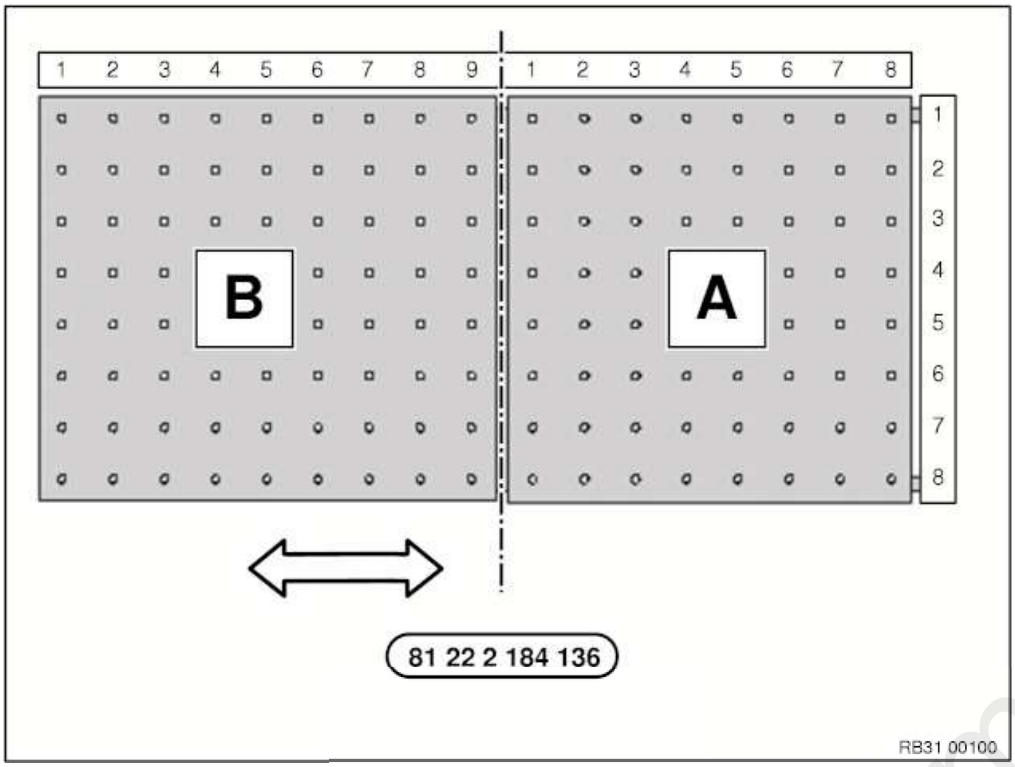
The mobile table lift is used for collision repairs and when removing large engines.



Adaptations for mounting front axle with engine and transmission.

No. 10	For mounting swivel bearing with brake disc
No. 20	Retaining element for adjustable fixture
No. 30	Adjustable fixture
No. 40	Distance pin 40 x 160 mm
No. 50	Distance pin 40 x 110 mm
No. 60	Distance pin 40 x 60 mm
No. 70	Fixture with U-profile
No. 80	Plate fixture Ø=100 mm

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Release star knob screw on working plate (B) of table lift; the working surface (B) can be extended by approx. 310 mm.

Release all push-pull clamps and the working plates can be shifted by approx. 20 mm.

Working plate (A and B) can be raised and lowered by 3° on the long side and by 5° on the transverse side.

Working plate (A and B) is subdivided by a coordinate system and a possible installation position is recommended in the respective repair manual.

Important!

Follow the operating instructions from the equipment manufacturer.

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31 00 ... Notes on wheel bearing replacement following accident damage

Wheel bearing facts:

In the event of accidents or driving conditions similar to accidents, shock-like loads to the wheel bearing units can cause slight damage to the bearing track. Despite initial running without noise, with continued use, this results in later noise generation at the wheel bearing.

Procedure:

The wheel bearing must be replaced on the damaged side of the axle if one or several of the following points apply:

- Visible or noticeable damage to the wheel bearing
- Rolling noises, radial/lateral runout on the wheel bearing
- Permissible tolerance for the wheel alignment is exceeded and no longer adjustable without the exchange of additional components
- Damage, permanent deformation or fractures to:
  - Wheel rims (major damage) and simultaneous negative result for wheel alignment
  - Spring struts, swivel bearings, wheel carriers
  - Wishbones
  - Struts or trailing links or anti-roll bar with this function
  - Body-side screwing/attachment points for wheel guide/control components
  - Track rods
  - Steering box fixtures

This guideline is binding for all accident repairs to BMW, MINI and Rolls-Royce vehicles!

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00 02 001 Raising the vehicle using a vehicle lift



Warning!

Danger to life!

Read and follow operating instructions for vehicle hoist.

Do not exceed approved load-carrying capacity and load distribution of vehicle hoist.

Weight compensation may be necessary due to the loading situation of the vehicle.

This also applies in the event of considerable removal of parts or conversions on the vehicle.

Note:

The vehicle hoist must comply with the relevant statutory/country-specific accident prevention regulations and be serviced according to the regulations.



Caution!

Risk of damage!

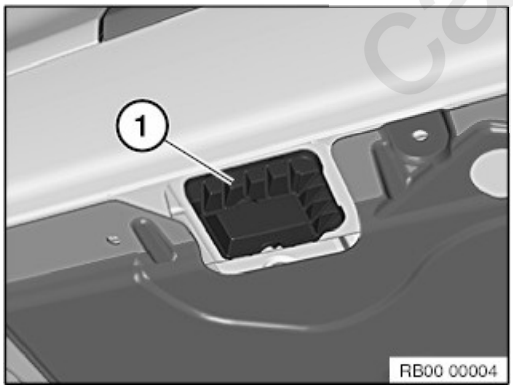
Before driving onto a vehicle hoist, make sure there is sufficient ground clearance between the vehicle hoist and the vehicle.

The vehicle may only be raised with the vehicle hoist at the four jacking points.



Necessary preliminary work:

- For new vehicles: If necessary, remove jacking points from equipment pack and insert from below into openings in front and rear sill areas

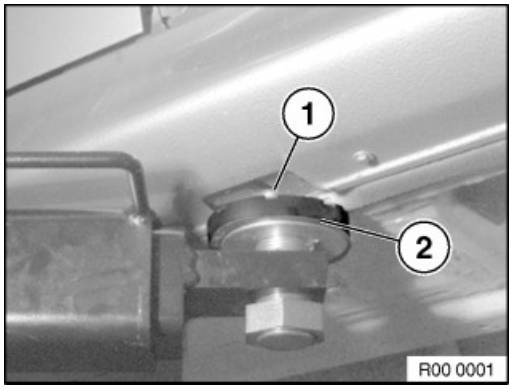


Caution!

All four jacking points (1) must be available!

Never raise the vehicle without the jacking points (1)!

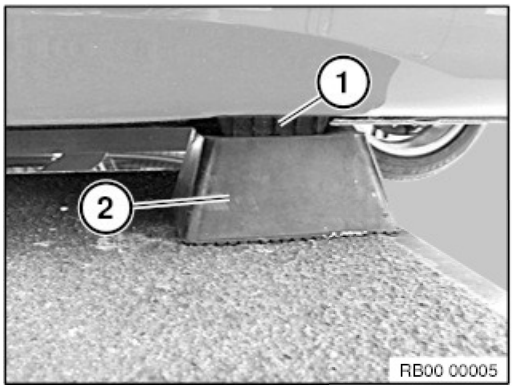
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Caution!

Risk of damage!

Align support plates (2) of lifting platform arms to jacking points (1) in such a way that no adjoining components are touched and thereby damaged.



Caution!

Risk of damage!

Align the rubber block (2) with the jacking points (1) in such a way that no adjoining components are touched and thereby damaged.

Never raise the vehicle without rubber blocks (or rigid foam blocks)!

There is a major risk of damage to the vehicle underbody!

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00 Safety information for working on vehicles with automatic engine start-stop function (MSA)



Warning!

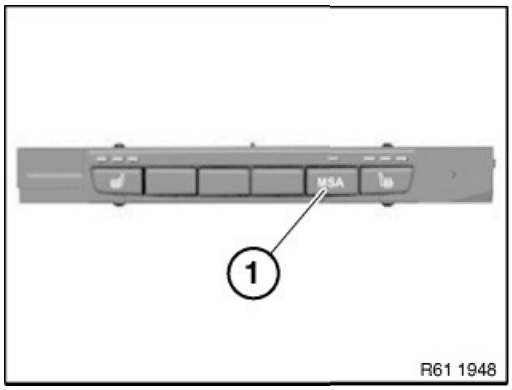
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

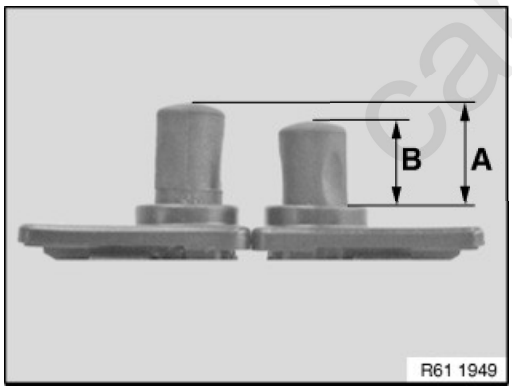
Observe safety precautions when working on MSA vehicles.

Before carrying out practical work on the engine, always ensure that the MSA functionality is deactivated so as to prevent automatic engine starting while work is being carried out in the engine compartment.

MSA function is deactivated by:



- Deactivate MSA by means of button (1) in passenger compartment
- Open seat belt buckle and driver's door



- Open engine bonnet/hood and ensure that engine hood/bonnet contact is not in workshop mode
  - Workshop mode

    A = 10 mm
  - Basic setting (engine hood/bonnet open)

    B = 7 mm

  To make sure that the engine hood/bonnet contact is at the basic setting, if necessary press the hood/bonnet contact up to the limit position before starting work and slowly release.



When working with diagnosis tools:

- Observe instructions in diagnosis tool

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Note:
For further information on automatic engine start-stop function (MSA):

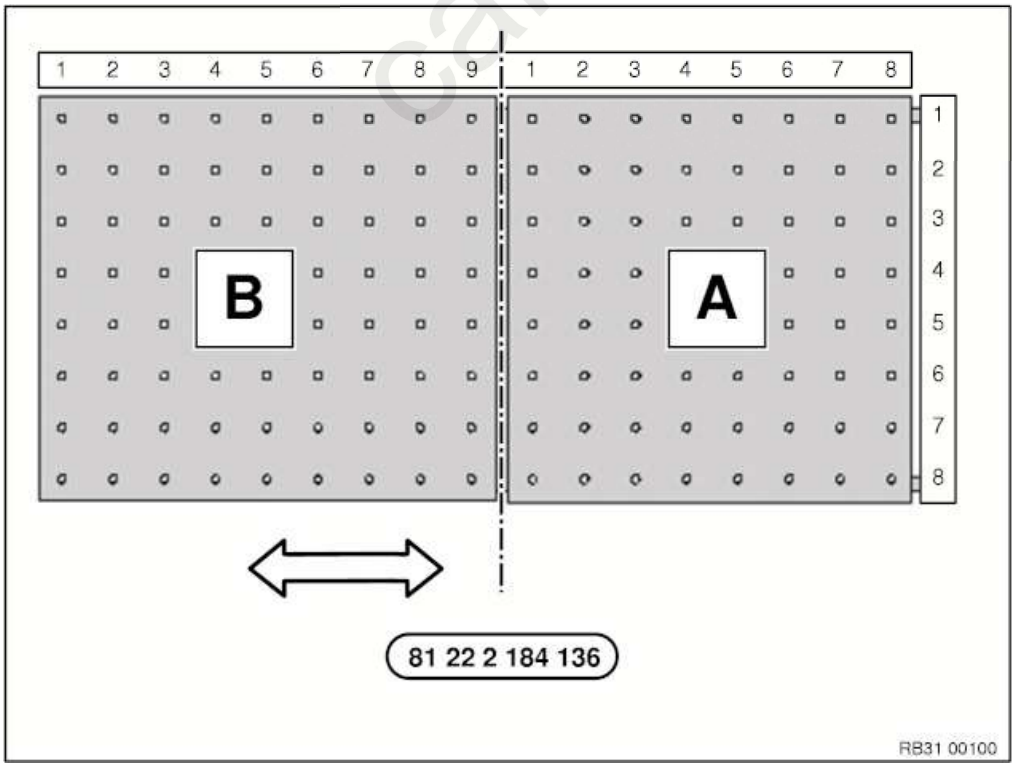
- Refer to the Service Information (bulletin) (for manual transmissions) Service Information (bulletin) 61 01 07 335
- Refer to the Service Information (bulletin) (for automatic transmissions or twin-clutch gearboxes) Service Information (bulletin) 61 01 10 629

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31 10 001 Completely removing and installing front axle with engine and transmission

Necessary preliminary work:

- Disconnecting the battery earth lead
- Move engine compartment lid into working position
- Load and unload vehicle
- Drawing off the air conditioning
- Remove electronics box
- Remove the underbody protection at the front, centre and rear
- Removing steering gear underbody protection
- Remove propeller shaft
- Remove both wheel arch covers
- Removing clean air pipe
- Release the vacuum hose on the brake servo
- Draining coolant
- Detach coolant hose from coolant radiator
- Release the coolant hoses on the expansion tank
- Detach lower steering shaft from steering gear
- Detach EPS cable from front axle support
- Release the fuel feed line
- Disconnect the fuel return line
- Remove pressure pipe
- Release the refrigerant line at the capacitor and compressor
- Disconnect positive battery cable in engine compartment
- Detach grounding cable from transmission
- Release left and right brake caliper and tie away
- Detach wheel speed sensor, left and right
- Remove front ram air lip on left and right



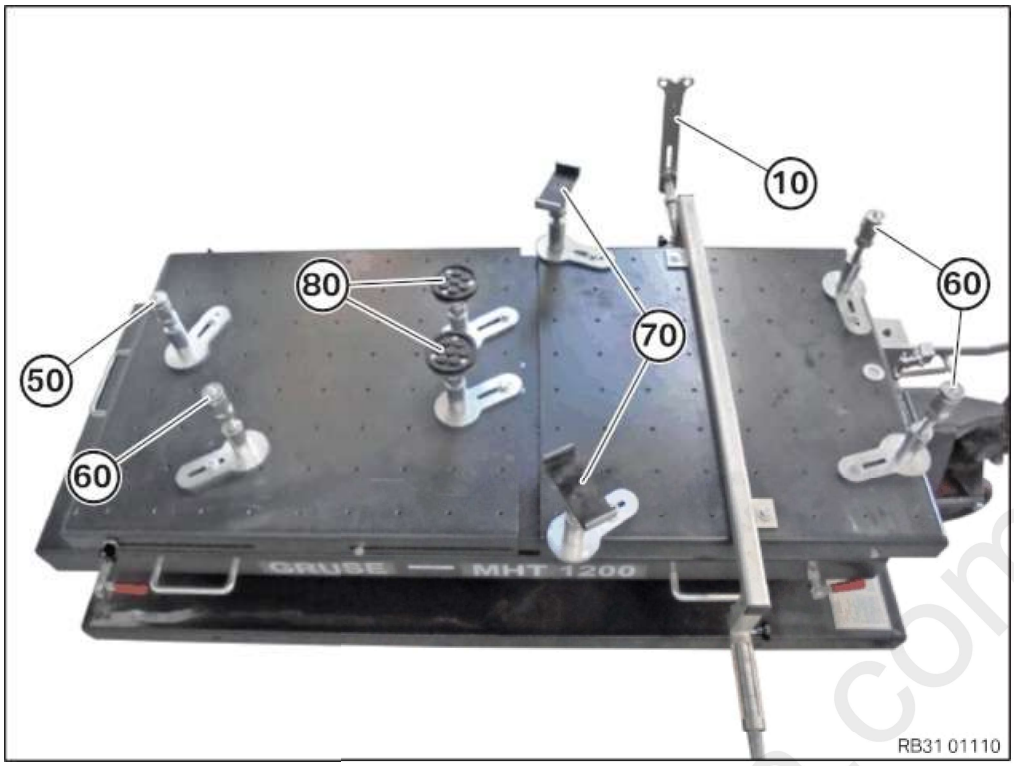
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Caution!
Coordinate determination always begins at the top.

Position engine assembly on table top **A**.

Position transmission on table top **B** .

Table top is adjustable in the longitudinal direction (see arrow).



Structure of table lift.

Position the mounting elements with the fixtures (60) on the work surface **A** at coordinates **8/3** and **7/7**.

Position the fixture (10) on work surface **A** for the swivel bearings at coordinates **4/1** and **5/8**.

Position the mounting elements with the fixtures (70) on the work surface **A** at coordinates **2/1** and **2/8**.

Position the mounting elements with the fixtures (80) on the work surface **B** at coordinates **9/3** and **9/5**.

Position the mounting element with the fixture (50) on the work surface **B** at coordinates **2/3**.

Position the mounting element with the fixture (60) on the work surface **B** at coordinates **3/7**.



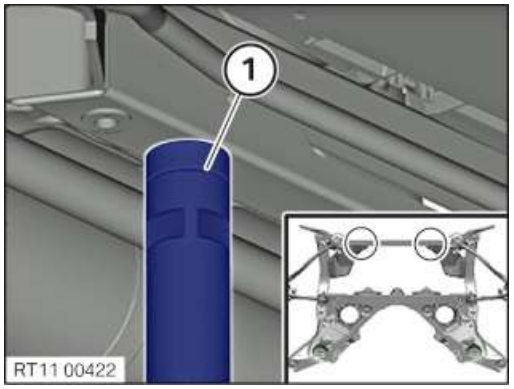
Caution!

Removal weight approx. 150 kg to 300 kg.

Check the payload of the vehicle and unload as needed.

Load front footwell with sandbags if necessary, approx. 100 kg.

Note safety instructions of table lift.



Position the mounting elements (1) with the fixtures (60) on the front left and right at the front axle support.

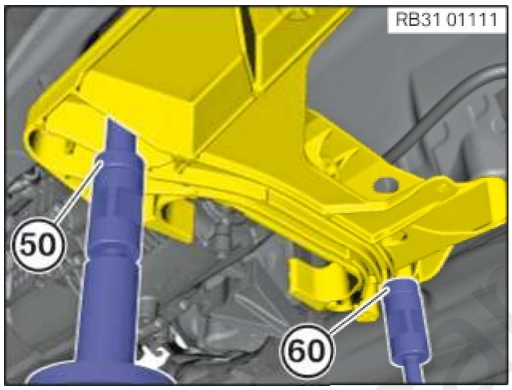
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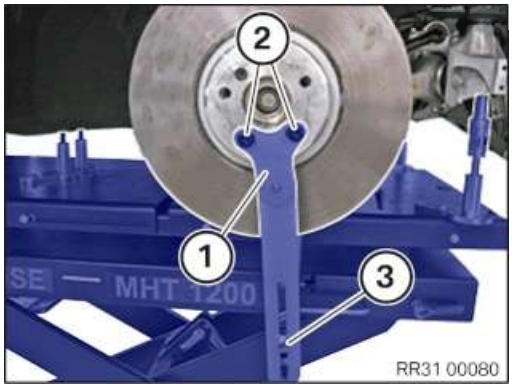
Position the mounting elements with the fixtures (70) on the rear left and right at the front axle support.



Position the mounting elements with the fixture (80) at the transmission.



Position the mounting elements with the fixtures (50) and (60) at the transmission cross member.



Secure the fixture for the swivel bearing (1) at the brake disc with the wheel bolts (2).

Secure adjusting screw (3).

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- Detach suspension struts
- Disassemble the front axle support
- Detach transmission cross member
- Slowly lower the lifting table and see that all components have freedom of movement

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31 10 000 Removing and installing complete front axle

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

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.

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.

PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

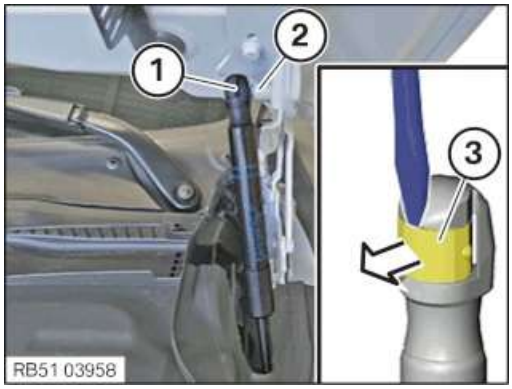
Engine compartment lid is open.

CAUTION

Shutting bonnet or tailgate.

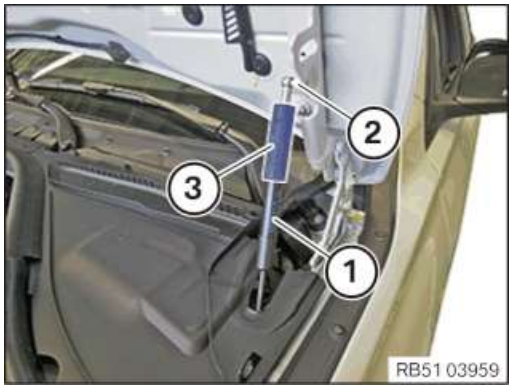
Danger of injury!

- 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.

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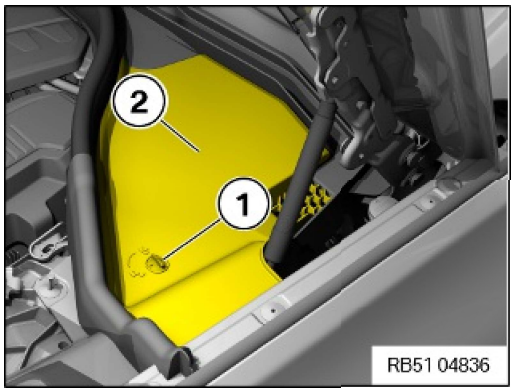


TECHNICAL INFORMATION

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

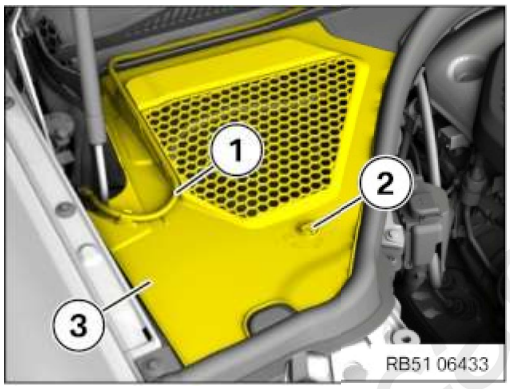
- Remove the bonnet support and open the bonnet further.
- Push special tool or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

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



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

3 – Remove the cover of the rear right engine compartment



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

4 – Disconnecting all battery earth leads



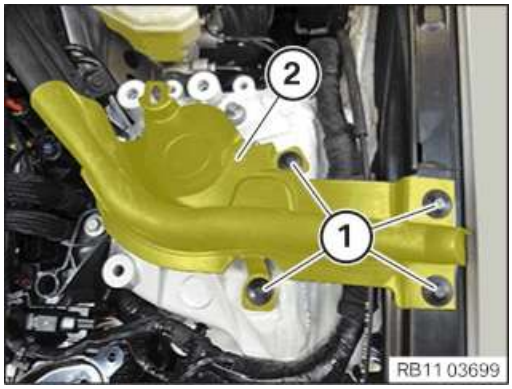
- See additional information.

5 – Removing side bonnet gaskets

NOTICE

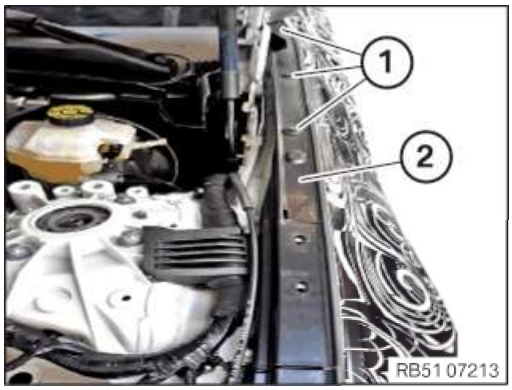
Perform the operations on the left and right side.

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- Loosen the rivet (1).
- Remove side bonnet seal (2) from spring strut dome.

6 – Remove sealing of the side panel

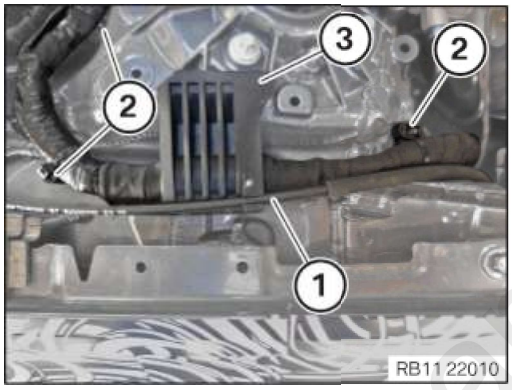


NOTICE

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

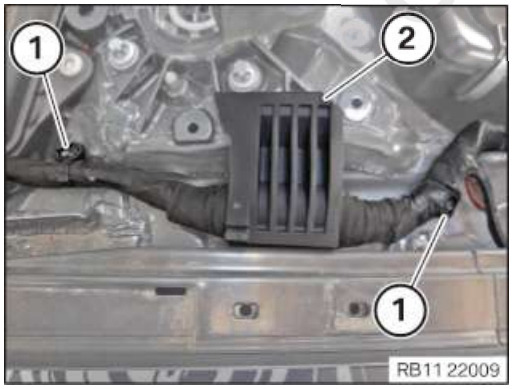
- Loosen the expanding rivet (1).
- Guide out seal (2) and remove.

7 – Partially loosen the wiring harness section on the spring strut dome



- Feed out the cable (1) of the front flap and set it aside.
- Loosen clamps (2).
- Feed out wiring harness section (3) on the spring strut dome on left and set it aside.

8 – Releasing the wiring harness section on the right spring strut dome



- Loosen clamps (1).
- Guide out wiring harness section (2) on the right spring strut dome and set it aside.

9 – Removing the acoustic cover

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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 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

10 – Removing the clean air pipe with the resonator

WARNING

Hot surfaces.

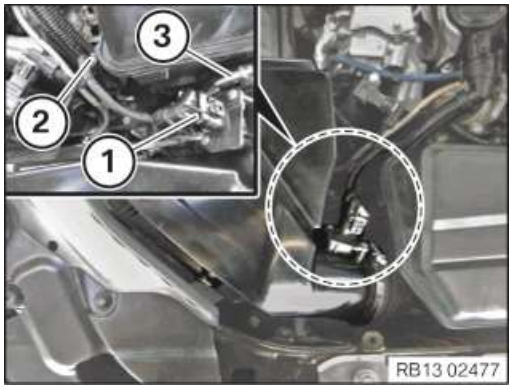
Risk of burning!

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

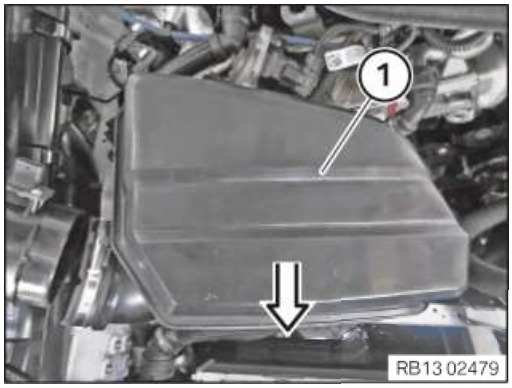


- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.

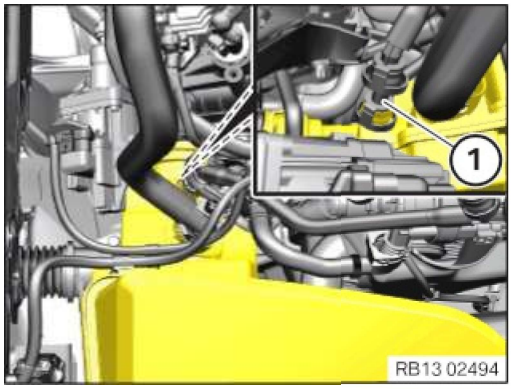
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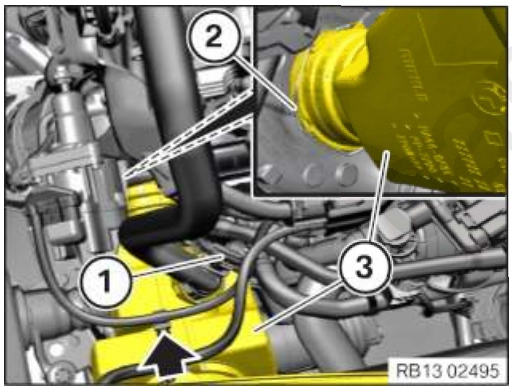
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and disconnect the tank ventilation line (1).



- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

11 – Removing both front wheels

▸ **Removing the wheel**

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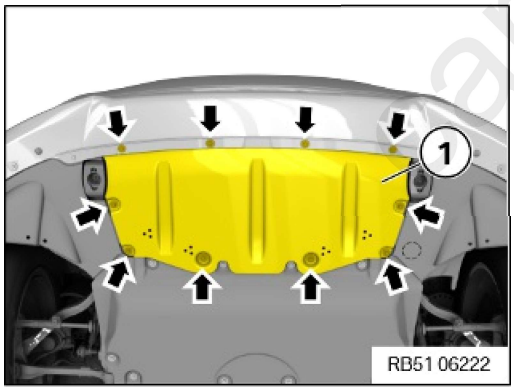
- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.



- 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.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

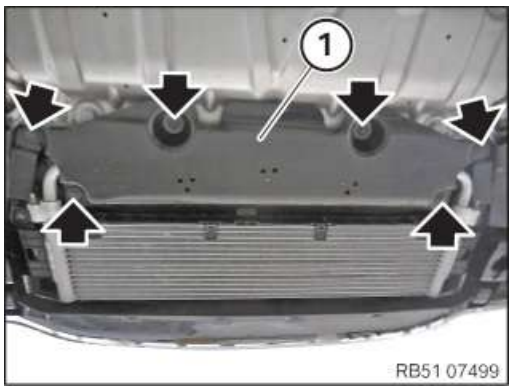
12 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

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

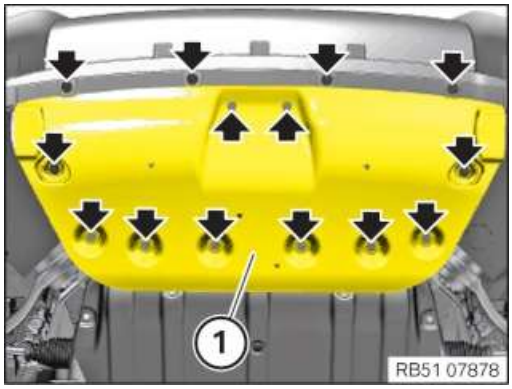


- **Version 2:**

  Remove screws (arrows).

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

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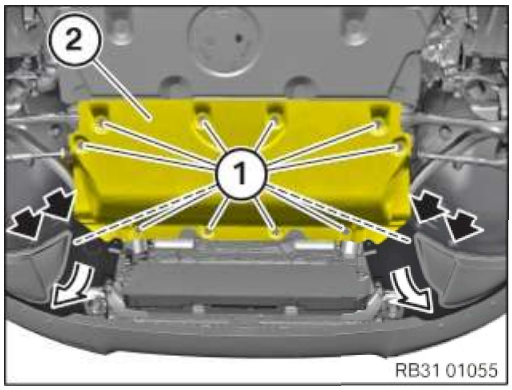


- **Version 3:**

  Remove screws (arrows).

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

13 – Remove the underbody protection of the steering gear



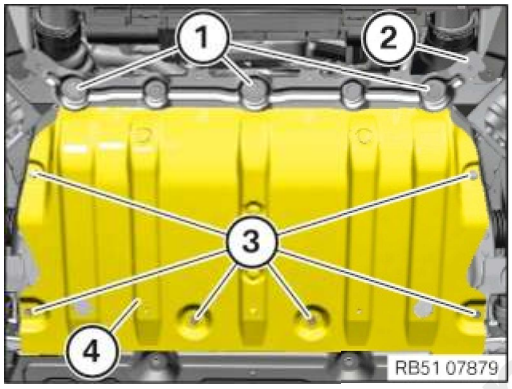
- **Version 1:**

  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).



- **Version 2:**

  Loosen screws (1).

  Remove the holder of the underride protection (2).

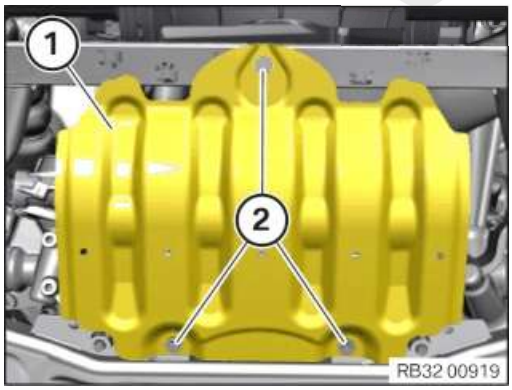
  Loosen screws (3).

  Slide the steering gear underbody protection (4) out and remove.

14 – If installed: Removing the steering start protection

Prerequisite

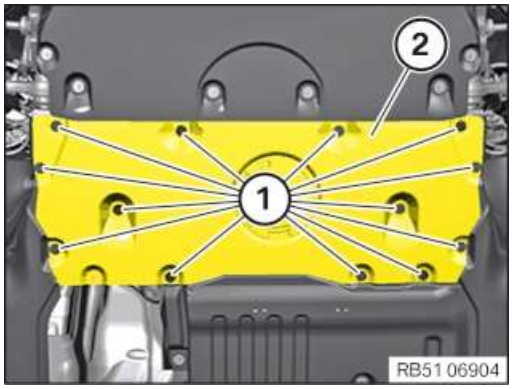
The front underbody protection is removed.



- Loosen screws (2).
- Remove guard (1).

15 – Removing the centre underbody protection

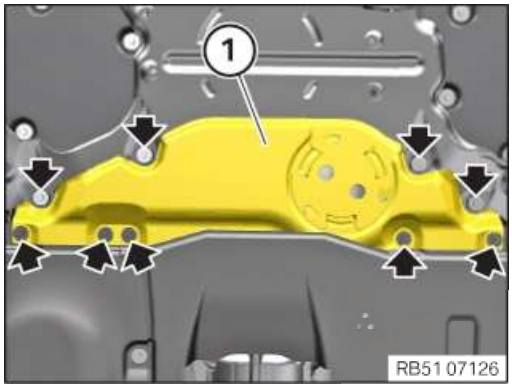
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- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

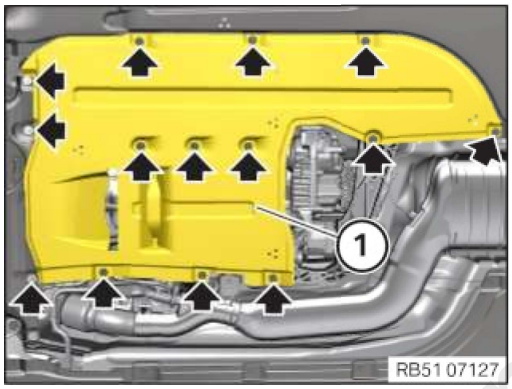


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

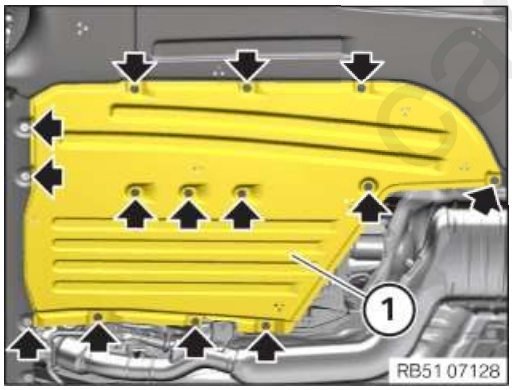
16 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



- **Version 2:**

  Remove screws (arrows).

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

17 – Remove the cover of the steering assembly on the left and right

NOTICE

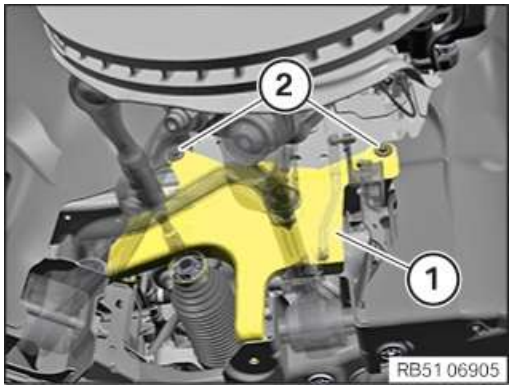
Description is for left component only. Procedure on the right side is identical.

▸ **Remove the cover of the steering assembly**

Prerequisite

Underbody protection of the steering gear is removed.

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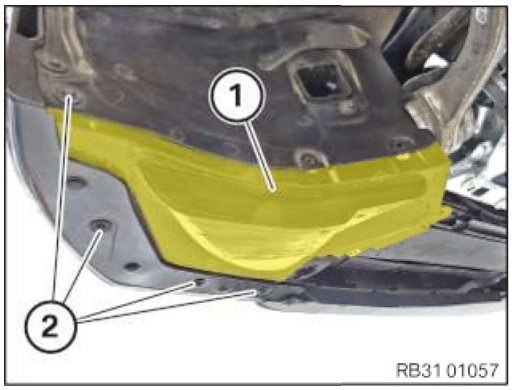
- Loosen screws (2).
- Remove the cover (1).

18 – Removing the bottom left and right wheel arch cover

NOTICE

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

▸ **Remove bottom wheel arch cover**

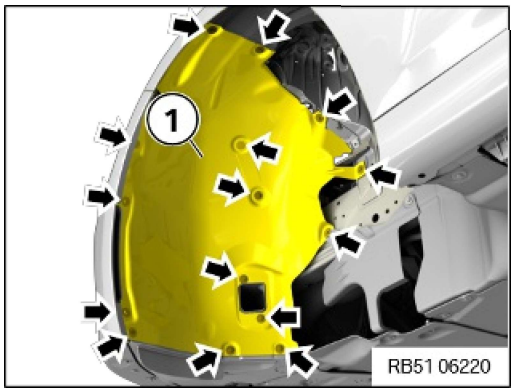


- Loosen screws (2).
- Remove bottom wheel arch cover (1)

19 – Removing the front section of the front wheel arch cover

NOTICE

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



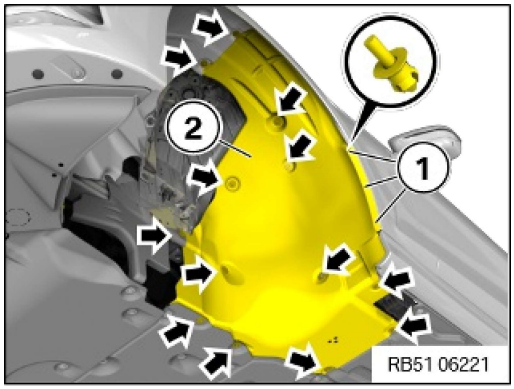
- Remove screws (arrows).
- Remove front section of the front wheel arch cover (1).

20 – Removing the rear section of the front wheel arch cover front

NOTICE

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

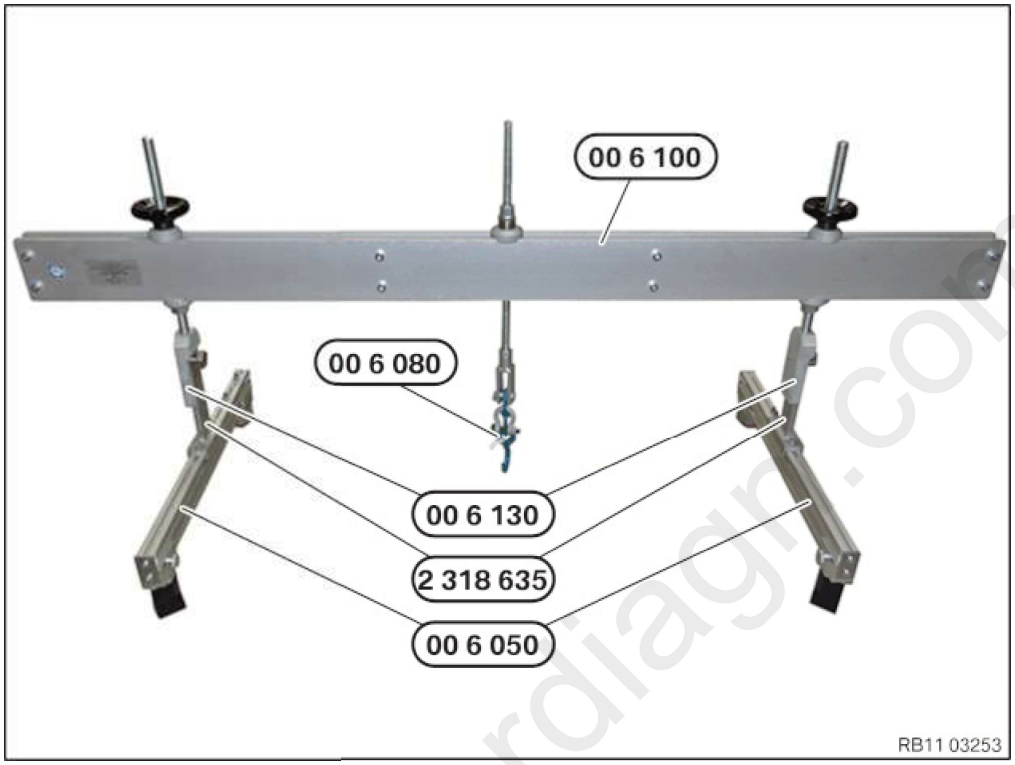
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- Loosen the expanding rivet (1).
- Remove screws (arrows).
- Remove the rear section of the front wheel arch cover (2).

21 – Securing engine in installation position

Overview: Prepared engine bridge



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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- **Carefully** position engine bridge (1) with help from an auxiliary person.



- Make sure that special tool on the left is correctly positioned on the lock support.
- Make sure that special tool from the set of special tools , left, rests correctly on the spring strut dome.



- Make sure that special tool on the right is correctly positioned on the lock support.
- Make sure that special tool from the set of special tools , right, rests correctly on the spring strut dome.



- Align the engine bridge by moving it on the profile strips of the special tool above the engine mounting bracket (1) and screw it down.
- Align the hook above the engine mounting bracket (1).
- Connect the hook to the engine mounting bracket (1).



- Check whether the special tool on the right is correctly positioned on the lock support.

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- Check whether the special tool from the special tool kit , right, rests correctly on the spring strut dome.



- Check whether the special tool on the left is correctly positioned on the lock support.



- Check whether the special tool from the special tool kit , left, rests correctly on the spring strut dome.



- Release screw (1) on the left engine mount from the top with a commercially available tool.



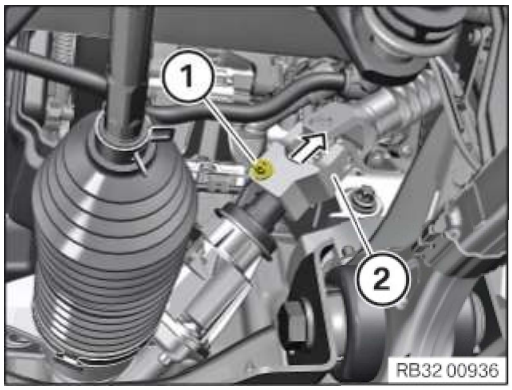
- Release screw (1) on the right engine mount from the top with a commercially available tool.

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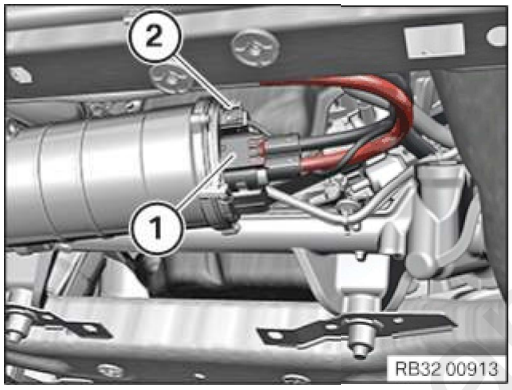
- Raise the engine by turning the special tool 2 361 506 (00 6 103) (spindle) by 10 mm.

22 – Releasing lower steering shaft from steering gear

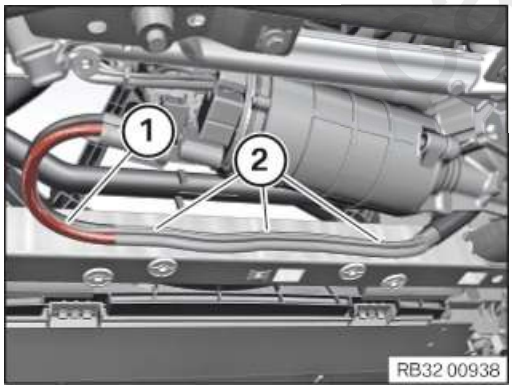


- Loosen screw (1).
- Pull off lower steering shaft (2) from steering gear in direction of arrow.

23 – Detach the wiring harness of the EPS from the front axle support

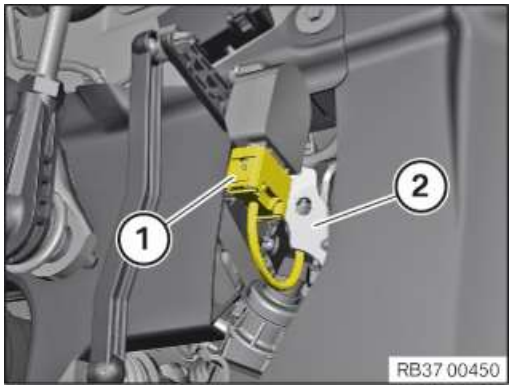


- Unlock and disconnect the plug connections (1) and (2).



- Loosen the holder (2).
- Place wiring harness (1) to one side.

24 – Detach the line connection of the ride height sensor

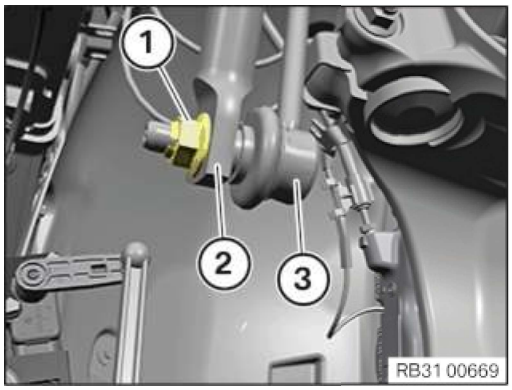


- Unlock plug connection (1) and disconnect.
- Unclip the line from holder (2).

25 – Release the left and right anti-roll bar link from the anti-roll bar

NOTICE

Perform the operations on the left and right side.



▸ **Loosening the anti-roll bar link from the anti-roll bar**

- Loosen nut (1).

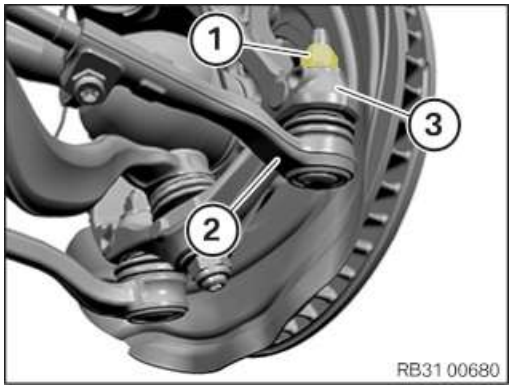
Note: Use the Torx socket for counter support.

- Loosen the anti-roll bar link (3) from the anti-roll bar (2).

26 – Loosening the track rod on the left and right from the swivel bearing

NOTICE

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



▸ **Loosening the track rod from the swivel bearing**

- Loosen nut (1).

Note: If necessary, counter-hold at the Torx socket.

- Detach the track rod (2) from the swivel bearing (3).

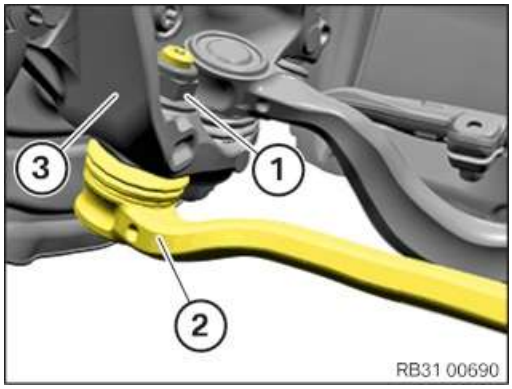
27 – Release the left and right wishbone from the swivel bearing

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NOTICE

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

▸ **Release the wishbone from the swivel bearing**



- Loosen nut (1).

Note: Use the Torx socket for counter support.

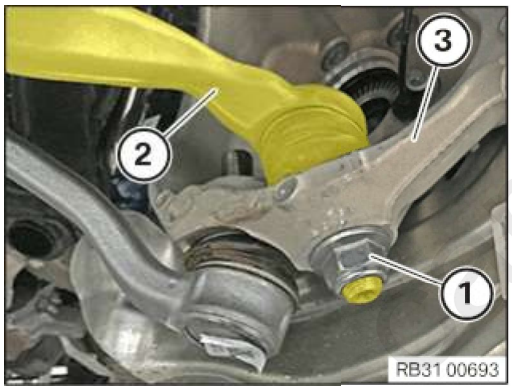
- Release wishbone (2) from swivel bearing (3).

28 – Releasing the left and right tension strut from the swivel bearing

NOTICE

Perform the operations on the left and right side.

▸ **Releasing the tension strut from the swivel bearing**



- Unfasten nut (1).

Note: Use the Torx socket for counter support.

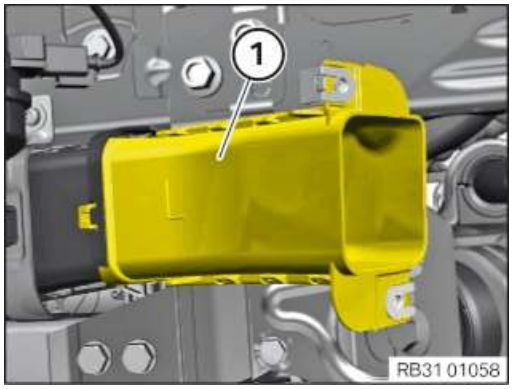
- Release the tension strut (2) from the swivel bearing (3).

29 – Removing the left and right brake air duct partially

NOTICE

Perform the operations on the left and right side.

▸ **Removing brake air duct partially**



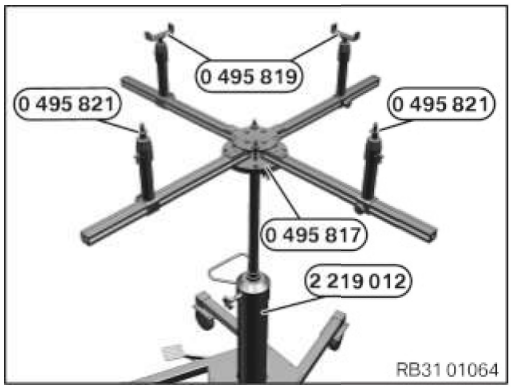
- Unclip and remove air duct (1).

MAIN WORK

30 – Preparing the special tool

TECHNICAL INFORMATION

In a profile rail pair, two profile rails are connected to one another by gearing.



- Fit the special tool completely on the universal jack 2 219 012 with the help of 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.

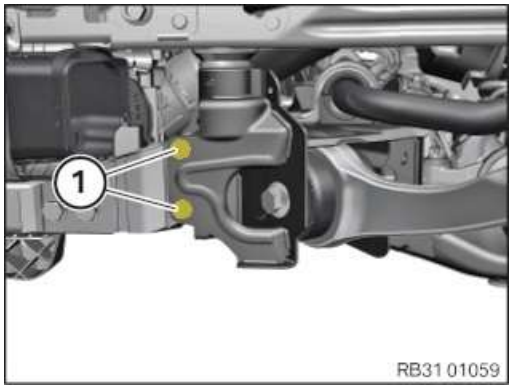
31 – Remove front axle carrier

WARNING

Falling or tipping of a heavy component.

Danger! Life-threatening injuries!

- Before lowering or removing the front axle: Secure the engine in mounting orientation.
- For additional information see: 11 00 670 Securing engine in installation position.

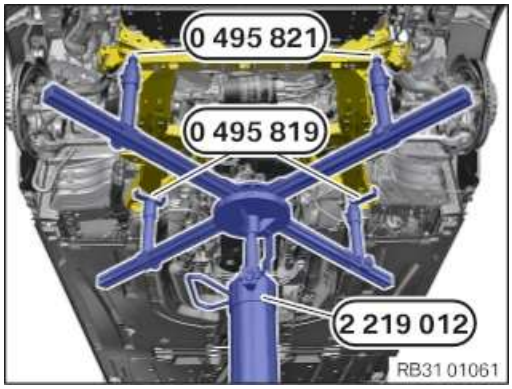


NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).

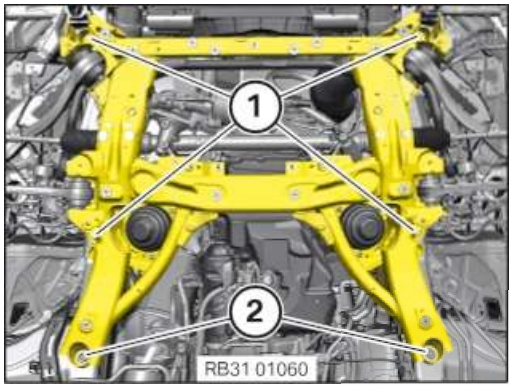
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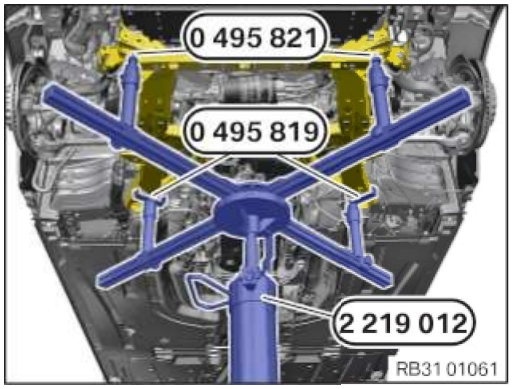
- Position the universal jack 2 219 012 with the special tools and on the front axle support.

  The centre of gravity of the front axle must be centred over the universal jack 2 219 012 !

- Support the front axle support with the universal jack 2 219 012.

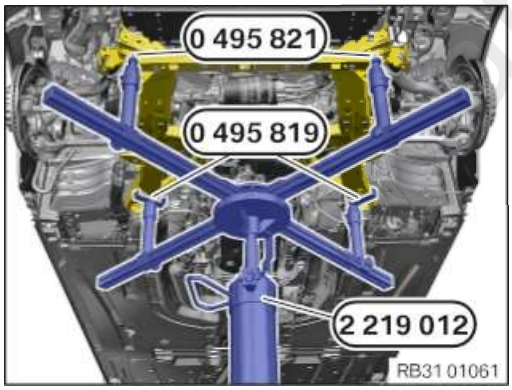


- Loosen screws (1) and (2).



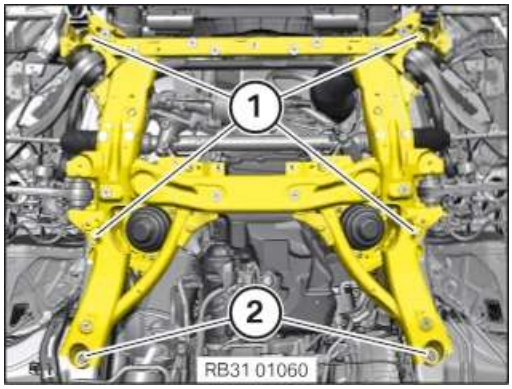
- Lower and remove the front axle support using the universal jack 2 219 012.

32 – Install front axle support



- Carefully lift the front axle support with the universal jack 2 219 012 and position on the body.

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- Replace the screws (1).

  Parts: Bolts
- Tighten the screws (1).

Front axle support to front/centre of body

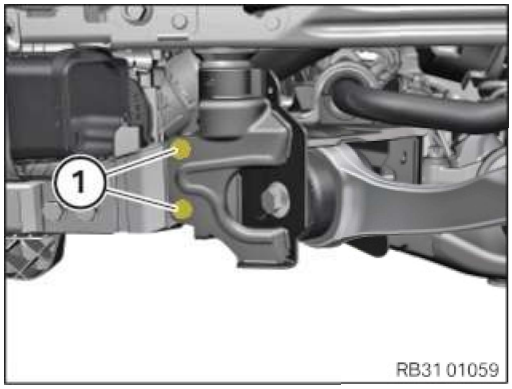
M12	Renew screws.	Jointing torque	108 Nm

- Replace the screws (2).

  Parts: Bolts
- Tighten the screws (2).

Front axle carrier to body, rear

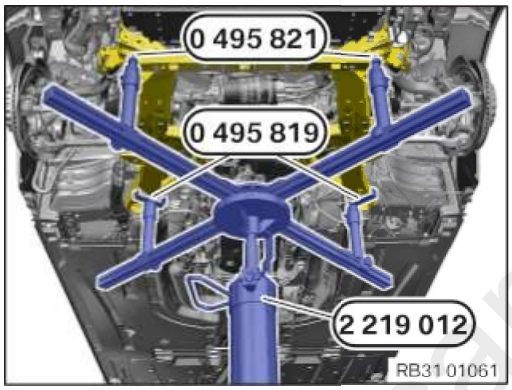
M14	Renew screws.	Tightening torque	175 Nm



- Position the adapter for the front axle support on the front axle support .
- Tighten the screws (1).

Adapter, front axle support to front axle support

M8x70		Tightening torque	19 Nm



- Lower the universal jack 2 219 012 and place to one side.

POSTPROCESSES

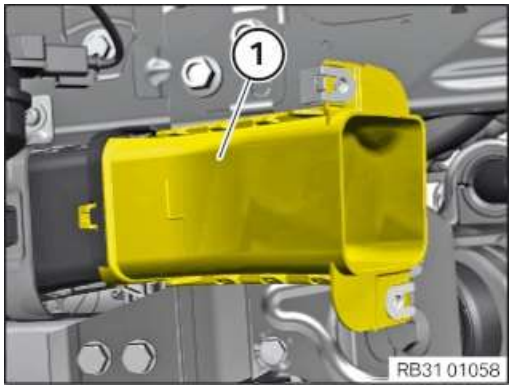
33 – Partially installing the left and right brake air duct

NOTICE

Perform the operations on the left and right side.

▸ **Installing the brake air duct partially**

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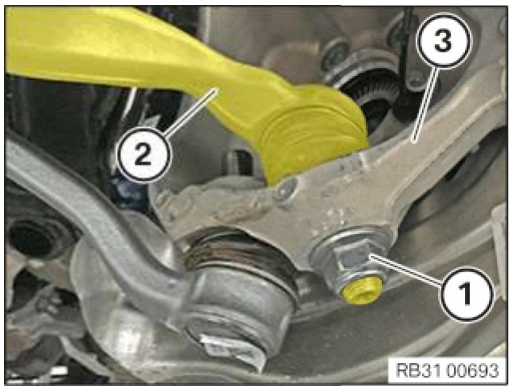


- Position and clip in air duct (1).

34 – Securing the left and right tension strut to the swivel bearing

NOTICE

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



▸ **Securing tension strut on swivel bearing**

- Position tension strut (2) on swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

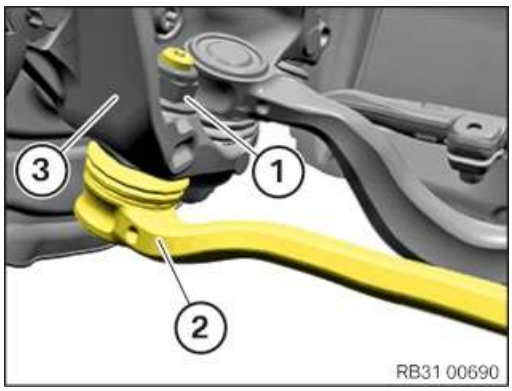
Tension strut to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

35 – Secure left and right wishbone onto swivel bearing

NOTICE

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



▸ **Mounting the wishbone on the swivel bearing**

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

  Parts: Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Wishbone to swivel bearing

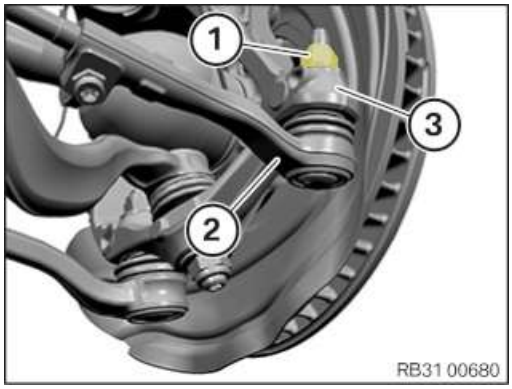
M14	Renew nut.	Tightening torque	175 Nm

36 – Securing the track rod on the left and right to the swivel bearing

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NOTICE

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



▸ **Securing the track rod on the swivel bearing**

- Position the track rod (2) on the swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1).

Note: If necessary, counter-hold at the Torx socket.

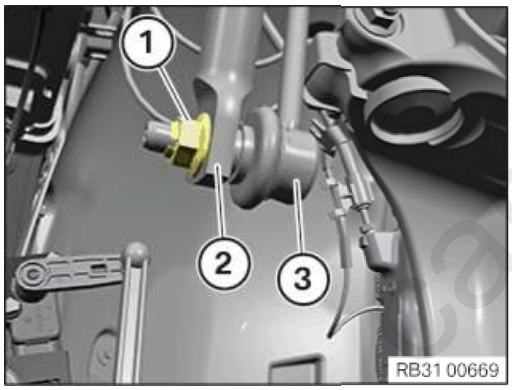
Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

37 – Securing the anti-roll bar link to the left and right anti-roll bar

NOTICE

Perform the operations on the left and right side.



▸ **Securing the anti-roll bar link to the anti-roll bar**

- Position the anti-roll bar link (3) on the anti-roll bar (2).
- Renew nut (1).

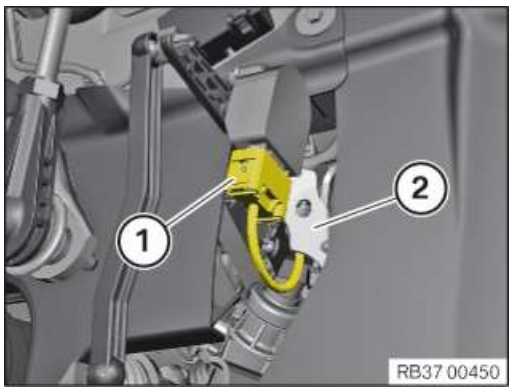
  Parts: Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Front anti-roll bar link to anti-roll bar/spring strut

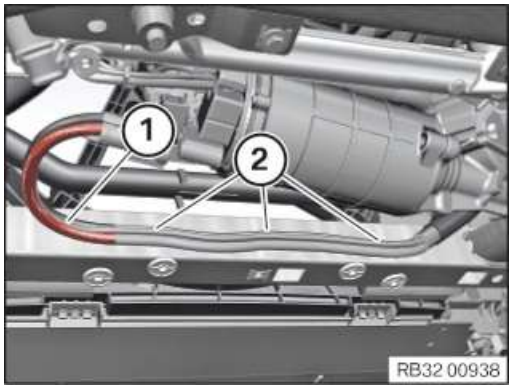
M10	Renew nut.	Tightening torque	56 Nm

38 – Attach the line connection of the ride height sensor

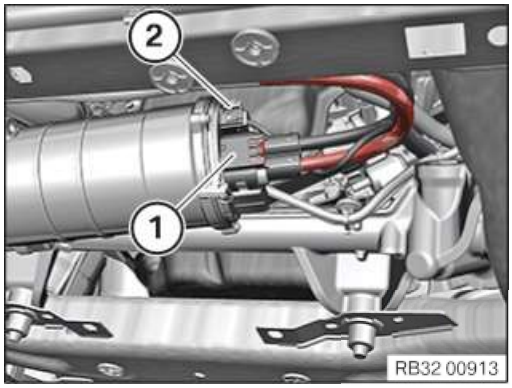


- Position the line .
- Clip in line on holder (2) .
- Connect connectors (1) and lock.

39 – Secure the wiring harness for the EPS on the front axle support



- Position the EPS wiring harness (1) from the front axle support.
- Secure the holder (2).

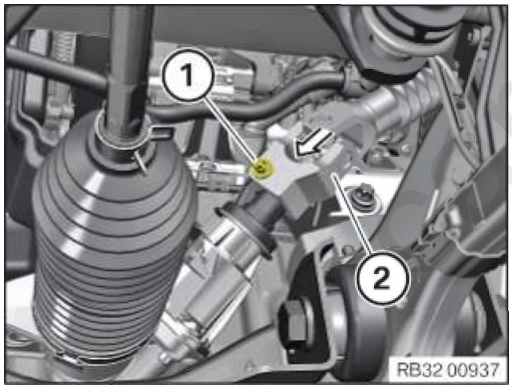


- Connect connectors (1) and (2) lock.

40 – Securing the steering shaft at the bottom on the steering gear

TECHNICAL INFORMATION

The universal joint can only be installed in one position.
The universal joint and the bottom steering gear and/or steering shaft are encoded with each other.
The clamping bolt must e positioned in the groove of the steering gear groove or the steering shaft.



- Clean the screw threads to remove all remnants of screw locking adhesive.
- Slide the lower steering shaft (2) onto the steering gear in the direction of the arrow.
- Renew the clamping bolt (1).

  Parts: Clamping bolt
- Tighten the clamping bolt (1).

Universal joint to steering box

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

41 – Loosen the attachment of the engine in installation position



- Lower engine by turning the spindle 2 361 506 (00 6 103) until the engine lies completely on the engine supports.



TECHNICAL INFORMATION

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

- Remove the engine bridge (1) with an auxiliary person.



- Tighten bolt (1) of the left engine mount from the bottom using a standard tool.

Engine mount to engine mounting bracket

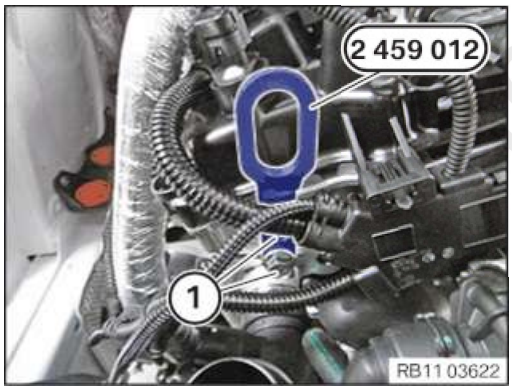
M12		Tightening torque	100 Nm



- Tighten bolt (1) of the right engine mount from the top using a standard tool.

Engine mount to engine mounting bracket

M12		Tightening torque	100 Nm



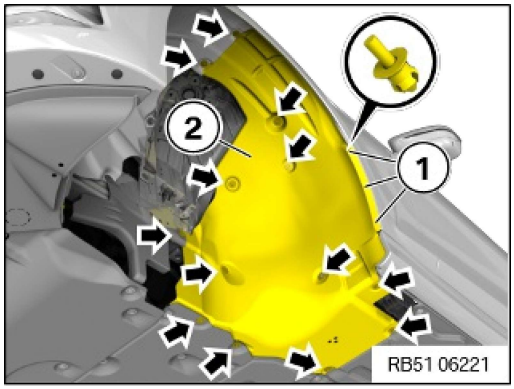
- Unscrew the bolts (1) of the special tool 2 459 012.
- Feed out the special tool 2 459 012 at the cylinder head and remove.

42 – Install the rear section of the front wheel arch cover

NOTICE

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

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- Install the rear section of the front wheel arch cover(2) .
- Tighten screws (arrows).

Wheel arch trim panel, front

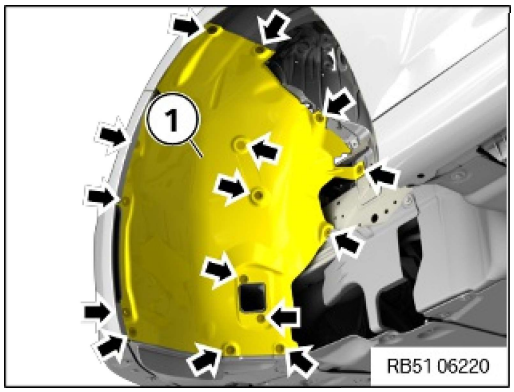
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

- Secure expanding rivet (1).

43 – Install the front section of the front wheel arch cover

NOTICE

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



- Install the front section of the front wheel arch cover (1).
- Tighten screws (arrows).

Wheel arch trim panel, front

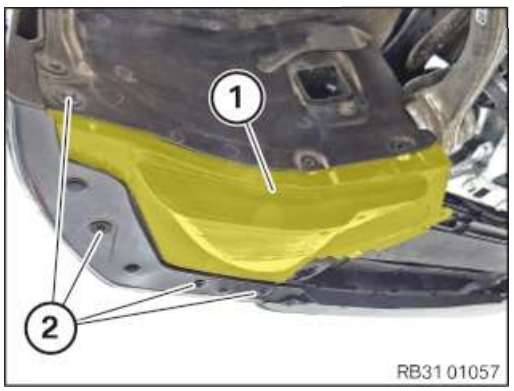
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

44 – Installing the bottom left and right wheel arch cover

NOTICE

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

▸ **Installing the bottom wheel arch cover**



- Position the bottom wheel arch cover (1).
- Tighten the screws (2).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

45 – Install the cover of the steering assembly on the left and right

NOTICE

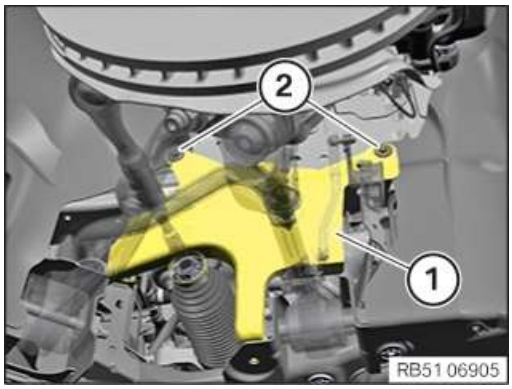
Description is for left component only. Procedure on the right side is identical.

cardiagn.com

▶ **Install the cover of the steering assembly**

Prerequisite

The underbody protection of the steering gear is removed.

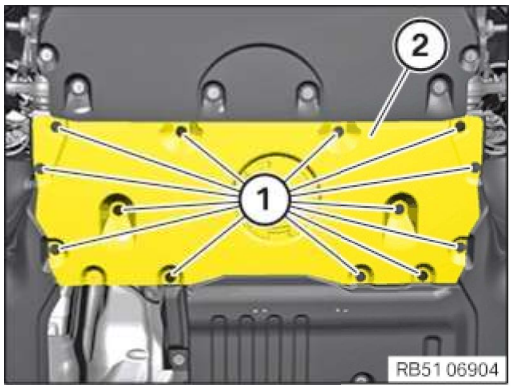


- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

46 – Installing the centre underbody protection



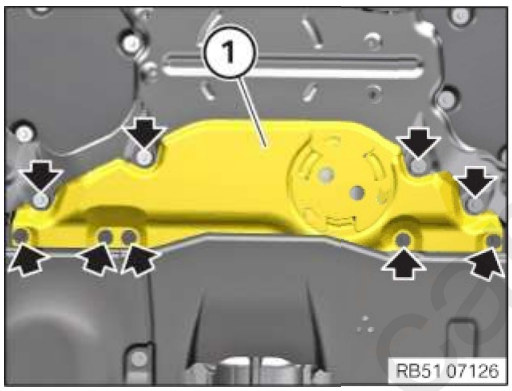
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

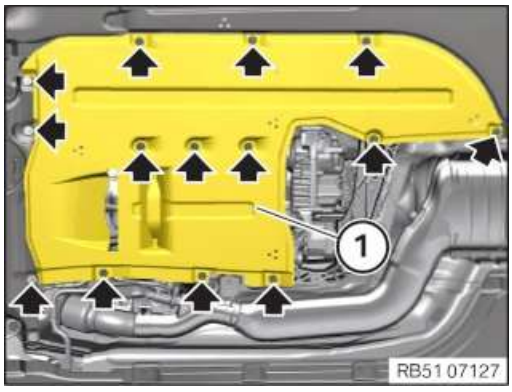
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

47 – Installing underbody protection at rear



- **Version 1:**

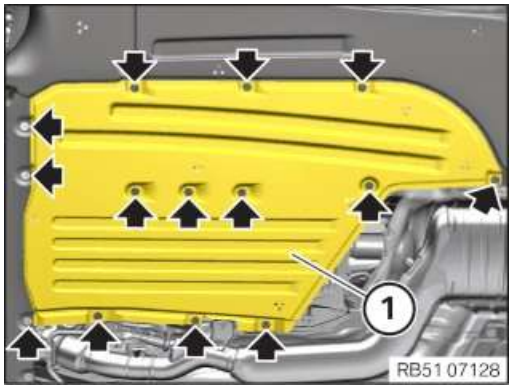
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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- **Version 2:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

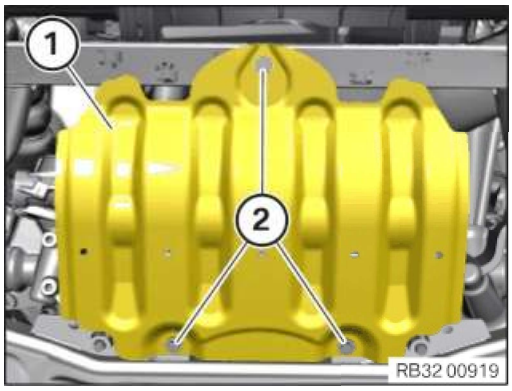
Underbody protection

Hexagon screw		Tightening torque	3 Nm

48 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

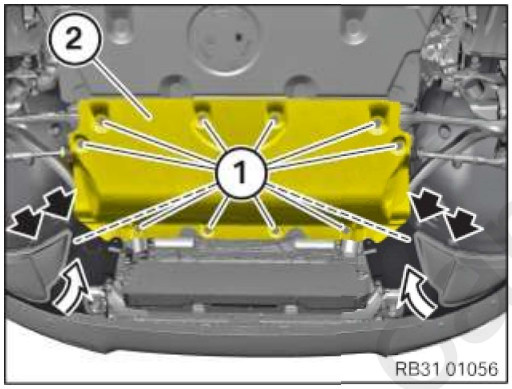


- Remove guard (1).
- Tighten the screws (2).

Bumper buffer device steering on front axle support

M10		Tightening torque	56 Nm

49 – Install the underbody protection of the steering gear



- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

Underbody protection of the steering gear

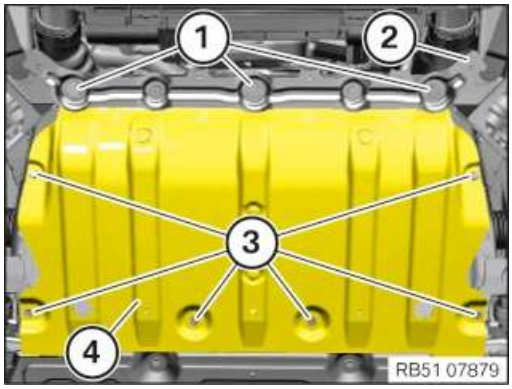
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm

ertlagn.com



- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

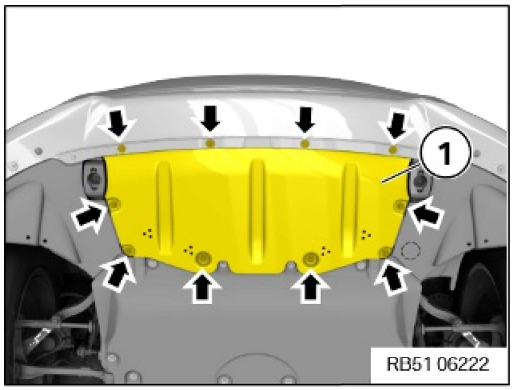
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

50 – Installing the front underbody protection



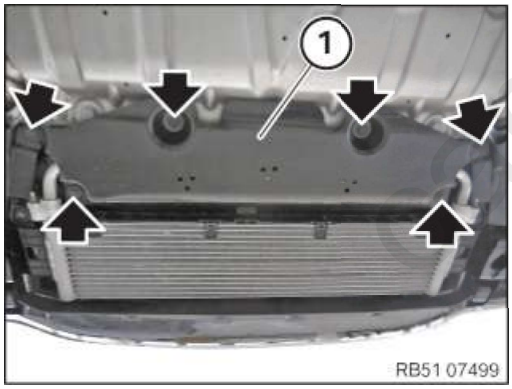
- **Version 1:**

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

Tighten screws (arrows).

Underbody protection front

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



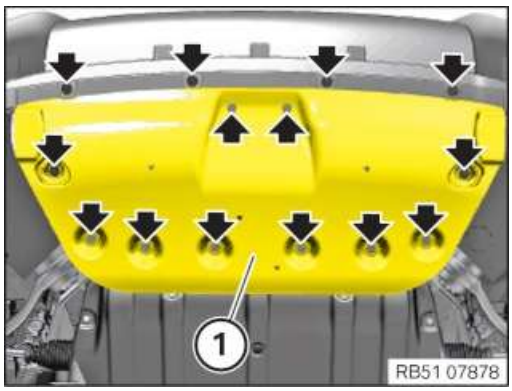
- **Version 2:**

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

Tighten screws (arrows).

Underbody protection front

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



- **Version 3:**

Feed in and install front underbody protection (1).

Tighten screws (arrows).

Underbody protection front

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

51 – Installing both front wheels

▸ **Mounting the wheel**

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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.

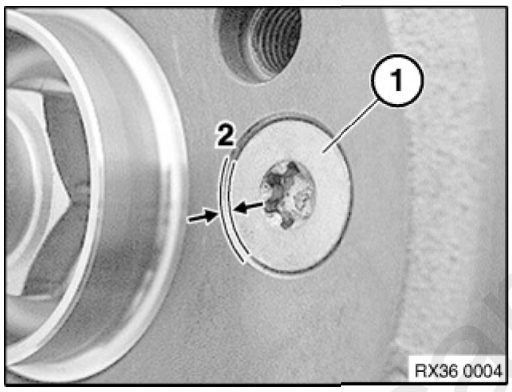
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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).



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

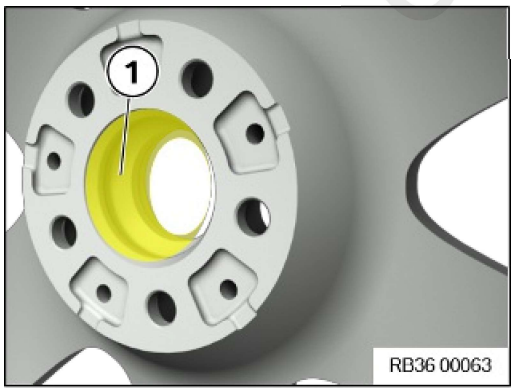
  The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

catalagn.com



- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

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

Wheel bolts

M14 / SW17	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 Check	140 Nm 140 Nm

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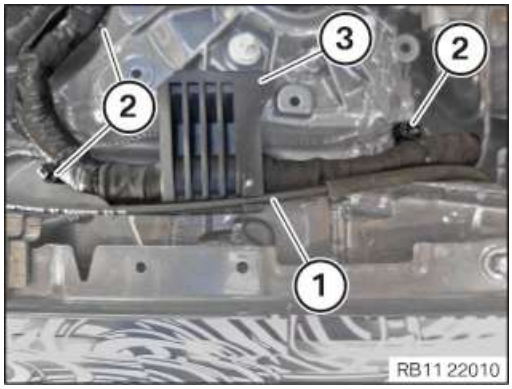
52 – Securing the wiring harness section to the left spring strut dome

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 position wiring harness section (3) on the left spring strut dome.
- Secure clamps (2).
- Guide in and install cable (1) of the front flap.

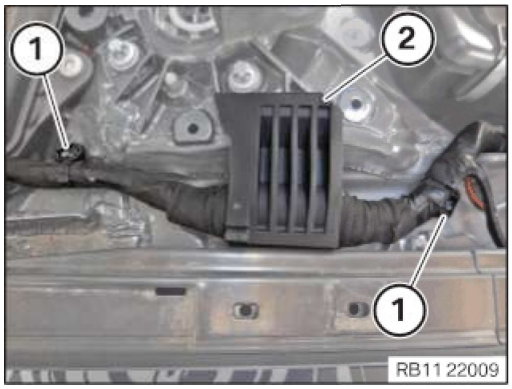
53 – Secure wiring harness section on right spring strut dome

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

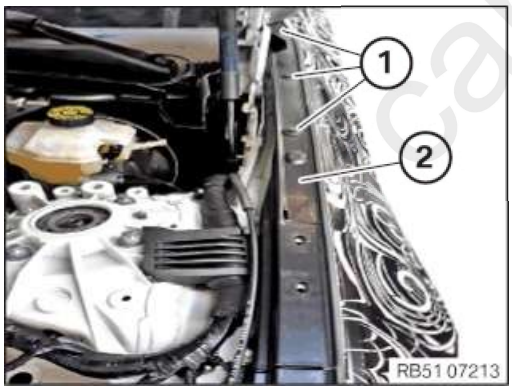
Trapped, crushed or damaged cables may cause short circuits and malfunctions.

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



- Guide in and position the wiring harness section (2) of right spring strut dome.
- Secure clamps (1).

54 – Installation of side panel sealing.



NOTICE

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

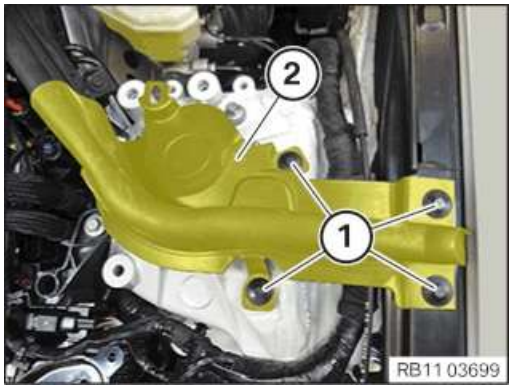
- Guide the sealing (2) in and install it.
- Mount the expanding rivets (1).

55 – Install side bonnet seals

NOTICE

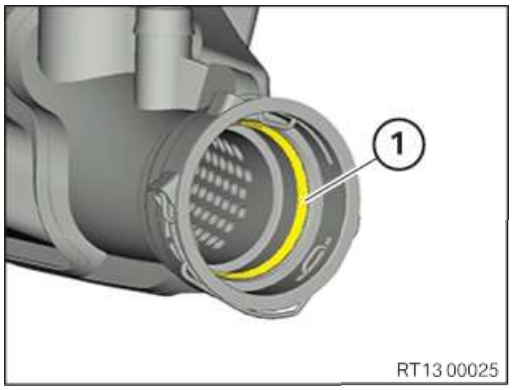
Perform the operations on the left and right side.

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- Position the side bonnet seal (2) on the spring strut dome.
- Secure the rivet (1).

56 – Installing the clean air pipe with resonator

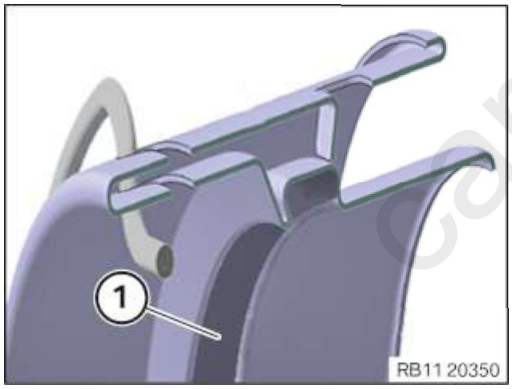


- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

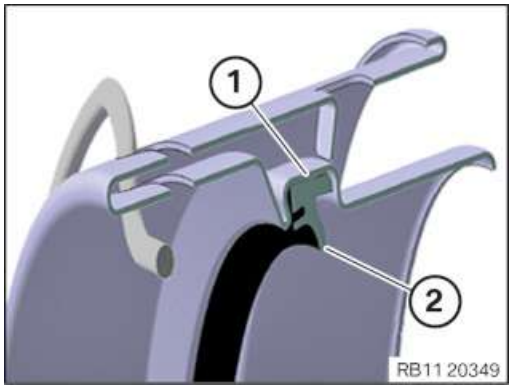
TECHNICAL INFORMATION

Do not use pointed or sharp-edged tools for the installation and/or removal.



- Remove damaged seal.
- Clean gasket groove (1) with a dry towel.

  The gasket groove (1) must be clean.



- Renew gasket.

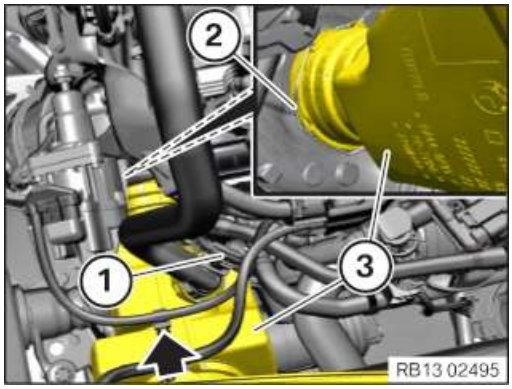
  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).

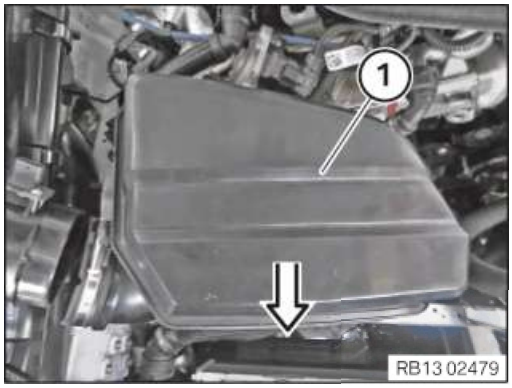
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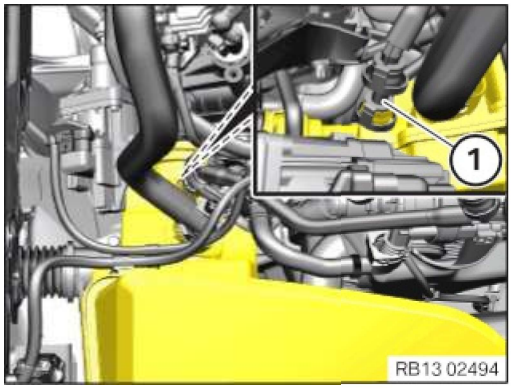
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

  The clamp (2) must engage audibly.
- Connect connectors (1) and lock.

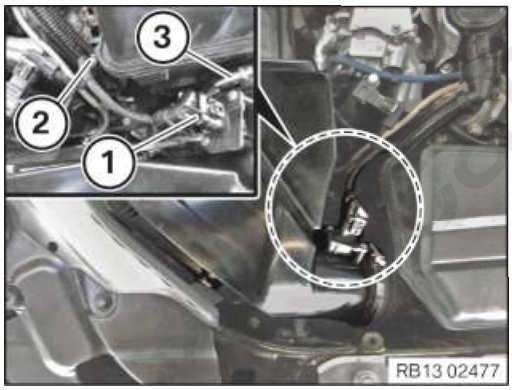
  The connector (1) must engage audibly.
- Secure clamp (arrow).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Connect and lock the tank ventilation line (1).



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure the clamp (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Insert and install the engine ventilation line (2).
- Ensure that the locks (1) engage audibly.

57 – Install acoustic cover

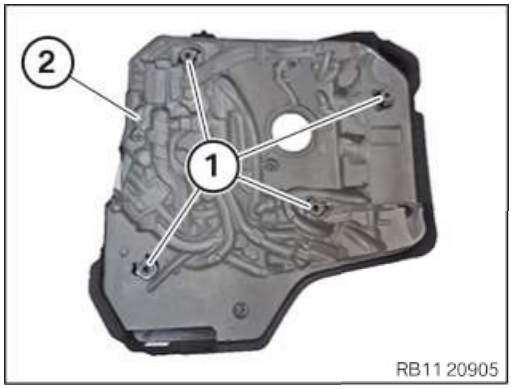
cardiagn.com

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 all rubber mounts (1) of acoustic cover (2) for correct seating.



- Clip in the acoustic cover (1) into the holders in the **marked** areas.

  The acoustic cover (1) must audibly engage into place.

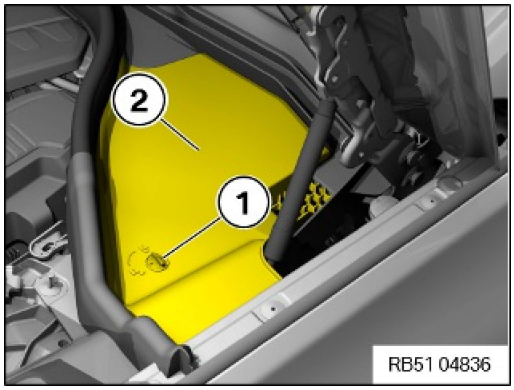
58 – Disconnecting all battery earth leads



- See additional information.

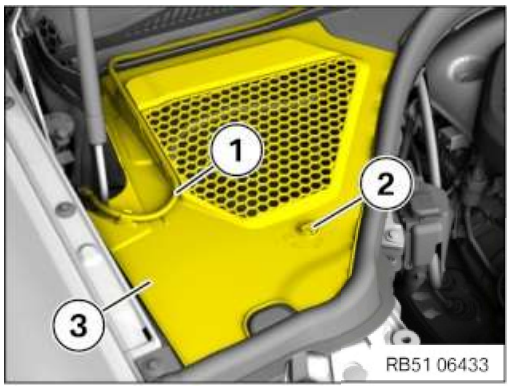
59 – Install the cover of the engine compartment on the rear left

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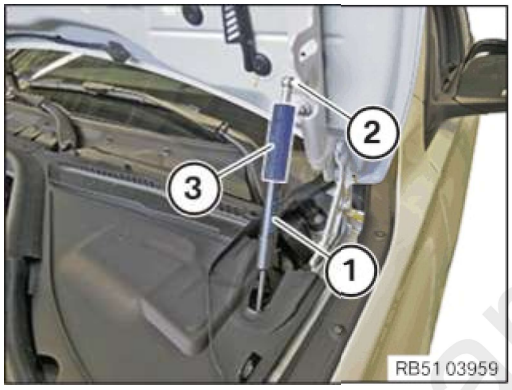
- Position the engine compartment cover at the rear left (2) .
- Close lock (1).

60 – Install the rear right engine compartment cover

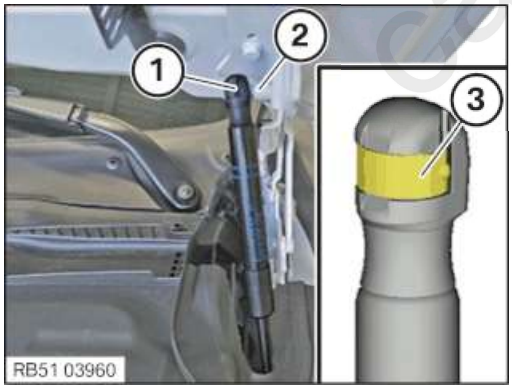


- Position the cover of the engine compartment on the rear right (3).
- Close lock (2).
- Insert washer fluid hose (1) into the guides.

61 – 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

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Special tool to cylinder head — Used in step 21

M8		Tightening torque	21,5 Nm

Front axle support to front/centre of body — Used in step 32

M12	Renew screws.	Jointing torque	108 Nm

Front axle carrier to body, rear — Used in step 32

M14	Renew screws.	Tightening torque	175 Nm

Adapter, front axle support to front axle support — Used in step 32

M8x70		Tightening torque	19 Nm

Tension strut to swivel bearing — Used in step 34

M14	Renew nut.	Tightening torque	175 Nm

Wishbone to swivel bearing — Used in step 35

M14	Renew nut.	Tightening torque	175 Nm

Track rod end to swivel bearing — Used in step 36

M14	Renew nut.	Tightening torque	175 Nm

Front anti-roll bar link to anti-roll bar/spring strut — Used in step 37

M10	Renew nut.	Tightening torque	56 Nm

Universal joint to steering box — Used in step 40

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

Engine mount to engine mounting bracket — Used in step 41

M12		Tightening torque	100 Nm

Wheel arch trim panel, front — Used in step 4243

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Cover, front bottom on side — Used in step 44

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Cover, steering unit — Used in step 45

Screw		Tightening torque	3 Nm

Underbody protection — Used in step 4647

Hexagon screw		Tightening torque	3 Nm

Bumper buffer device steering on front axle support — Used in step 48

M10		Tightening torque	56 Nm

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Underbody protection of the steering gear — Used in step 49

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws) — Used in step 49

Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support — Used in step 49

M10		Tightening torque	56 Nm

Underbody protection front — Used in step 50

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

Brake disc to front wheel hub — Used in step 51

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 51

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 51

M14 / SW17	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 Check	140 Nm 140 Nm

Clean air pipe to upper section of intake filter housing — Used in step 56

Clamp		Tightening torque	3 Nm

Overview of Special Tools

2 459 012 Holder



Common — Used in step 2141

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)

carlogn.com

2 361 506 (00 6 103) Spindle



Common	Used in step 2141
Usage	Spindle (central spindle) for Traverse 00 6 100.
Included in the tool or work	0 496 852
Storage location	
Replaced by	
In connection with	
SI-Number	01 17 10 (659)

2 219 012 Hydraulic lifter



Common	Used in step 303132
Usage	For raising and lowering various vehicle components.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 90 (207)

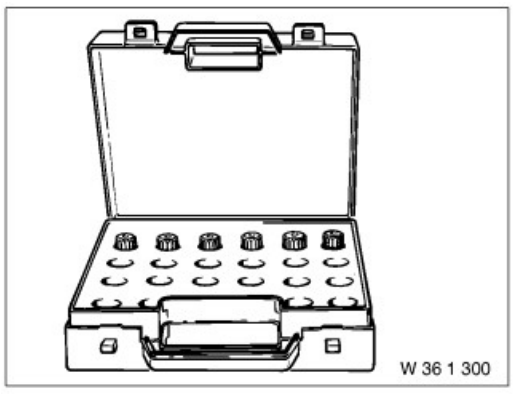
2 344 011 Tool



Common	Used in step 51
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 11
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	

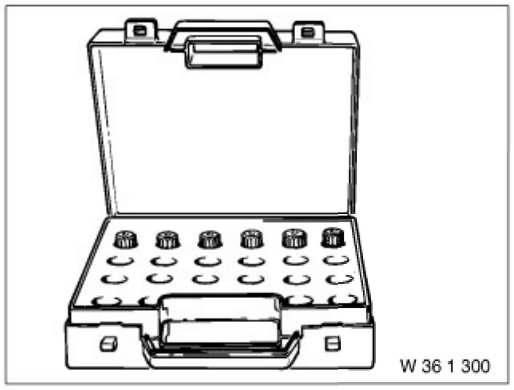
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0 495 224 (36 1 326) Wheel stud



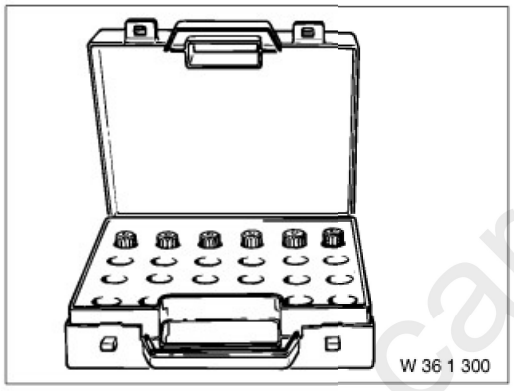
Common	Used in step 11
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 225 (36 1 327) Wheel stud



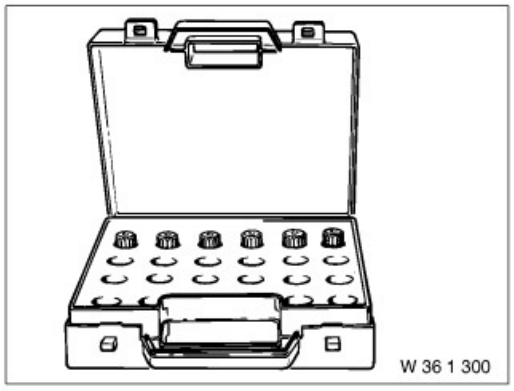
Common	Used in step 11
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 226 (36 1 328) Wheel stud



Common	Used in step 11
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 11
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	

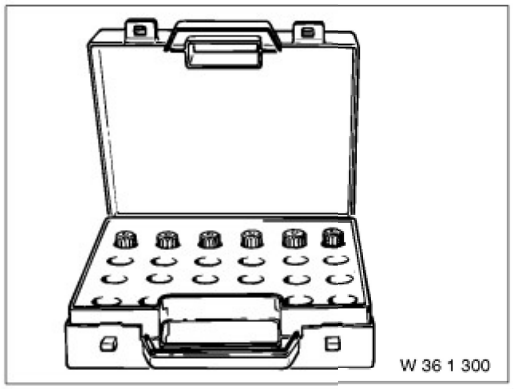
cardiagn.com

0 495 228 (36 1 331) Wheel stud



Common	Used in step 11
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 11
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 11
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

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	458
61 20 900 Disconnecting and connecting battery earth lead	458
61 20 900 Disconnecting and connecting battery earth lead	458
61 20 900 Disconnecting and connecting battery earth lead	458
61 20 900 Disconnecting and connecting battery earth lead	458

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61 20 900 Disconnecting and connecting battery earth lead 458
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 458
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 458
61 20 900 Disconnecting and connecting battery earth lead 458
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 458
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle) 458
61 20 900 Disconnecting and connecting battery earth lead 458
61 20 900 Disconnecting and connecting battery earth lead 458
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 458
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61 20 900 Disconnecting and connecting battery earth lead 458
61 20 900 Disconnecting and connecting battery earth lead 458
61 20 900 Disconnecting and connecting battery earth lead 458
00 .. ... Raising the vehicle using a vehicle hoist

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31 11 506 Lowering/raising front axle support

WARNING

Falling or tipping of a heavy component.

Danger! Life-threatening injuries!

- Before lowering or removing the front axle: Secure the engine in mounting orientation.
- For additional information see: 11 00 670 Securing engine in installation position.

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

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.

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.

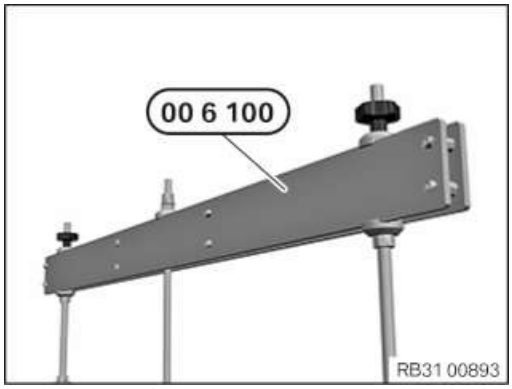
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PRELIMINARY WORK

1 – Securing engine in installation position

TECHNICAL INFORMATION

The additional information must be observed without fail!
Proceeding further without working through the additional information is not allowed!



- See additional information in “11 00 670 - Securing engine in mounting orientation”.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing both front wheels

▸ **Removing the wheel**



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

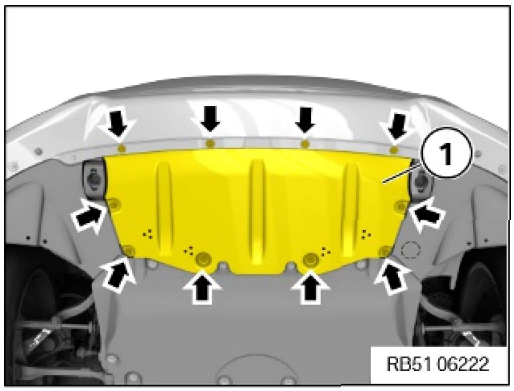
  This process is intended to prevent damage to the brake disc.

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- 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.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

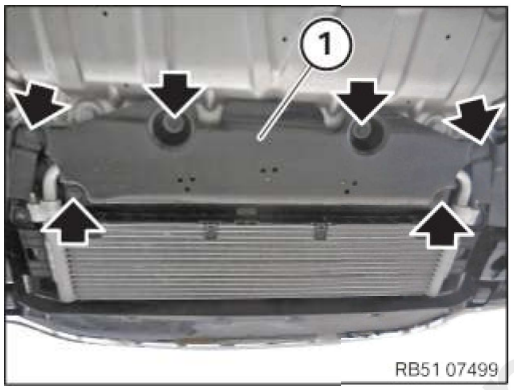
4 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

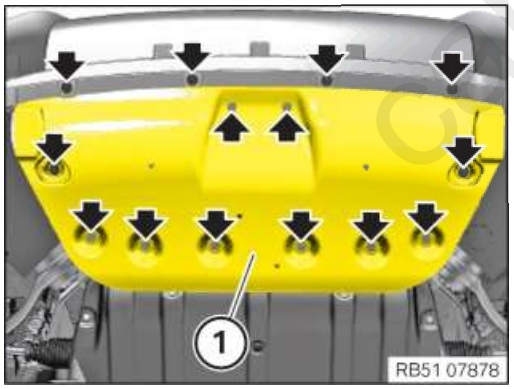
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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

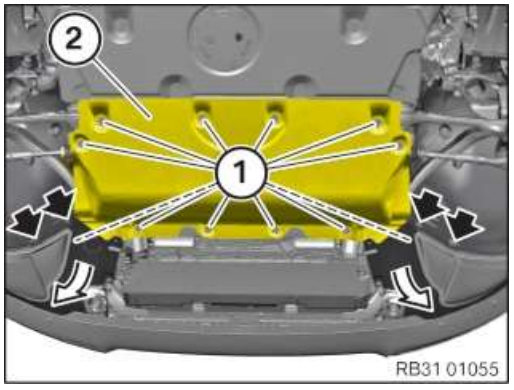


- **Version 3:**

  Remove screws (arrows).

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

5 – Remove the underbody protection of the steering gear



- **Version 1:**

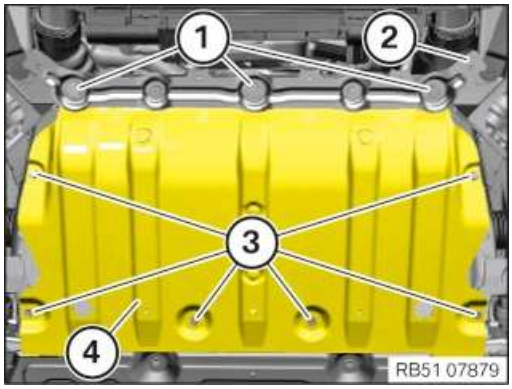
  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).

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- **Version 2:**

  Loosen screws (1).

  Remove the holder of the underride protection (2).

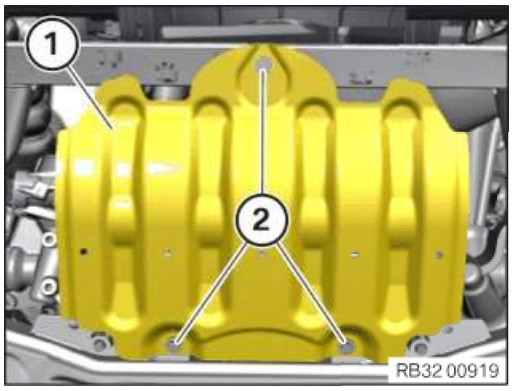
  Loosen screws (3).

  Slide the steering gear underbody protection (4) out and remove.

6 – If installed: Removing the steering start protection

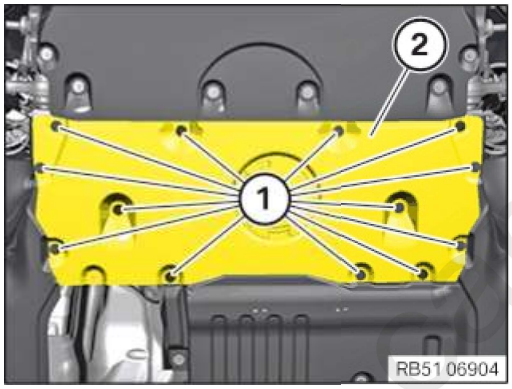
Prerequisite

The front underbody protection is removed.



- Loosen screws (2).
- Remove guard (1).

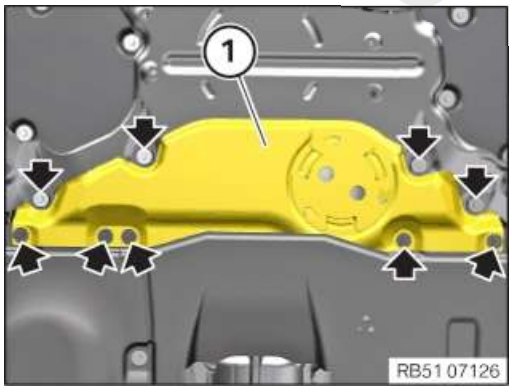
7 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .



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

  Remove screws (arrows).

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

8 – Remove the cover of the steering assembly on the left and right

NOTICE

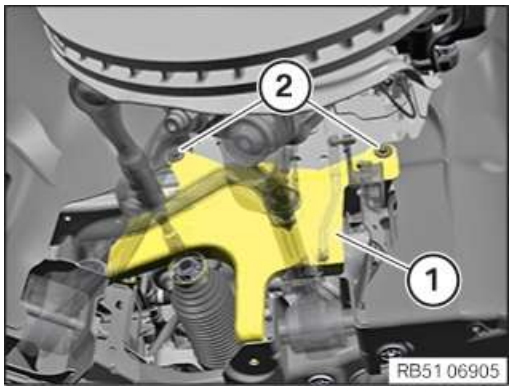
Description is for left component only. Procedure on the right side is identical.

autodiag.com

▸ **Remove the cover of the steering assembly**

Prerequisite

Underbody protection of the steering gear is removed.



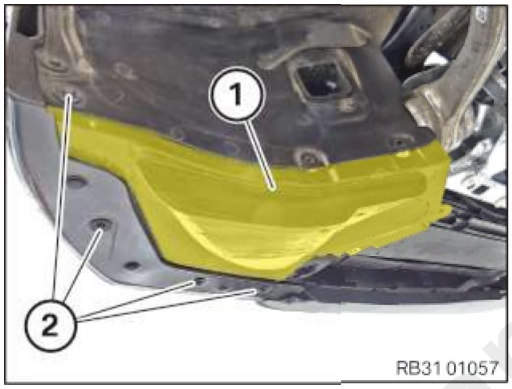
- Loosen screws (2).
- Remove the cover (1).

9 – Removing the bottom left and right wheel arch cover

NOTICE

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

▸ **Remove bottom wheel arch cover**

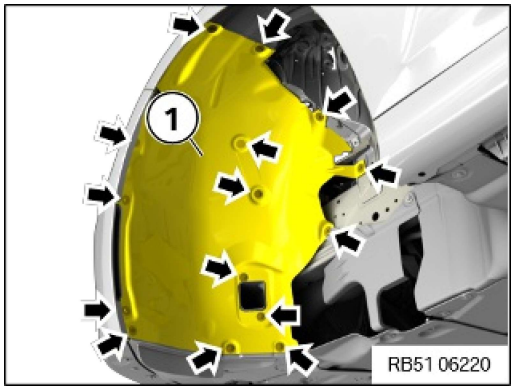


- Loosen screws (2).
- Remove bottom wheel arch cover (1)

10 – Removing the front section of the front wheel arch cover

NOTICE

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



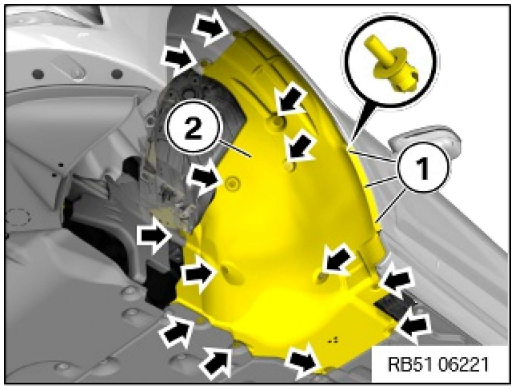
- Remove screws (arrows).
- Remove front section of the front wheel arch cover (1).

11 – Removing the rear section of the front wheel arch cover front

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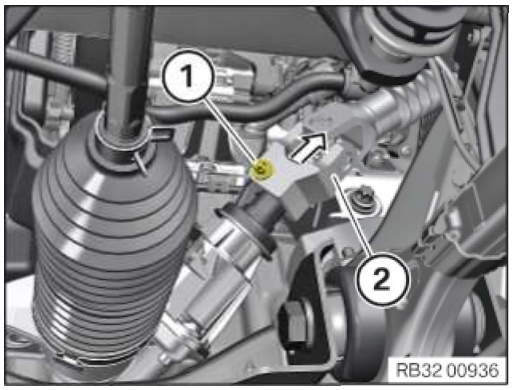
NOTICE

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



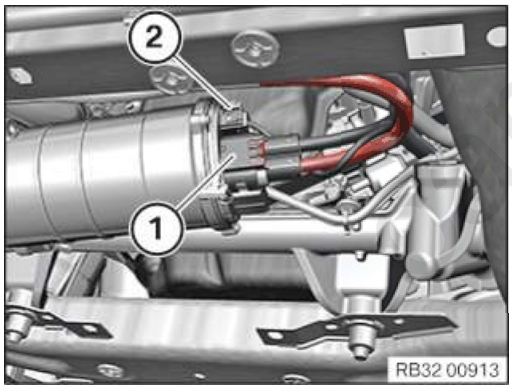
- Loosen the expanding rivet (1).
- Remove screws (arrows).
- Remove the rear section of the front wheel arch cover (2).

12 – Releasing lower steering shaft from steering gear

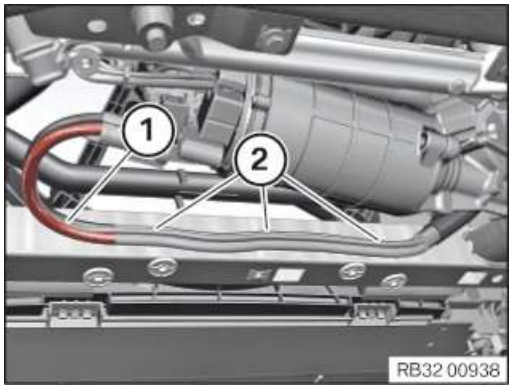


- Loosen screw (1).
- Pull off lower steering shaft (2) from steering gear in direction of arrow.

13 – Detach the wiring harness of the EPS from the front axle support

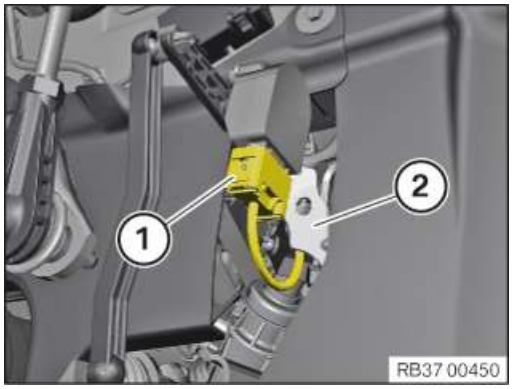


- Unlock and disconnect the plug connections (1) and (2).



- Loosen the holder (2).
- Place wiring harness (1) to one side.

14 – Detach the line connection of the ride height sensor



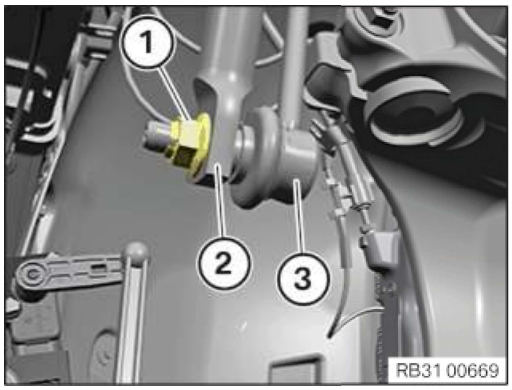
- Unlock plug connection (1) and disconnect.
- Unclip the line from holder (2).

15 – Release the left and right anti-roll bar link from the anti-roll bar

NOTICE

Perform the operations on the left and right side.

▸ **Loosening the anti-roll bar link from the anti-roll bar**



- Loosen nut (1).

Note: Use the Torx socket for counter support.

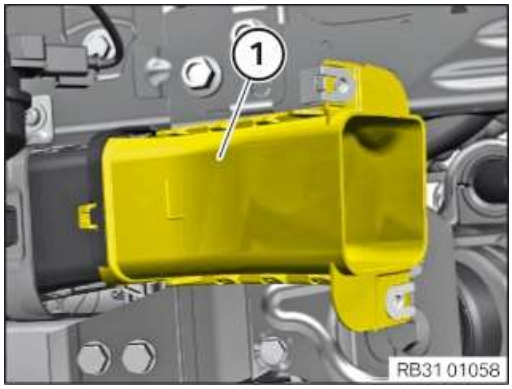
- Loosen the anti-roll bar link (3) from the anti-roll bar (2).

16 – Removing the left and right brake air duct partially

NOTICE

Perform the operations on the left and right side.

▸ **Removing brake air duct partially**



- Unclip and remove air duct (1).

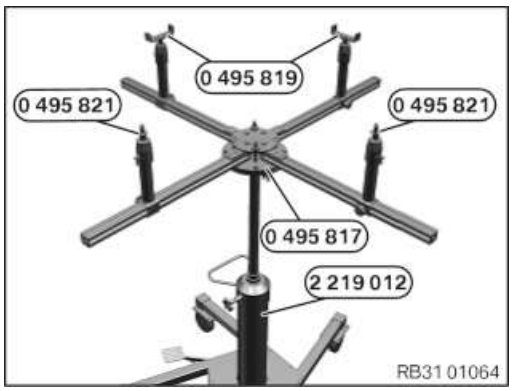
MAIN WORK

17 – Preparing the special tool

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TECHNICAL INFORMATION

In a profile rail pair, two profile rails are connected to one another by gearing.



- Fit the special tool completely on the universal jack 2 219 012 with the help of 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.

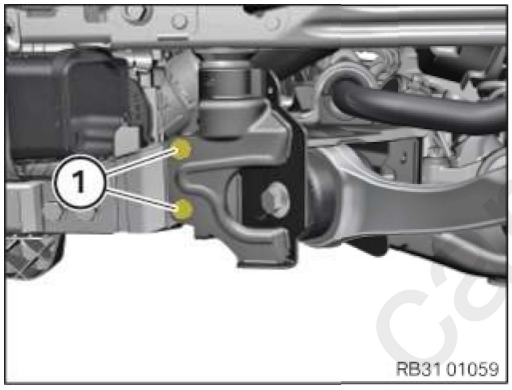
18 – Lower front axle support

WARNING

Falling or tipping of a heavy component.

Danger! Life-threatening injuries!

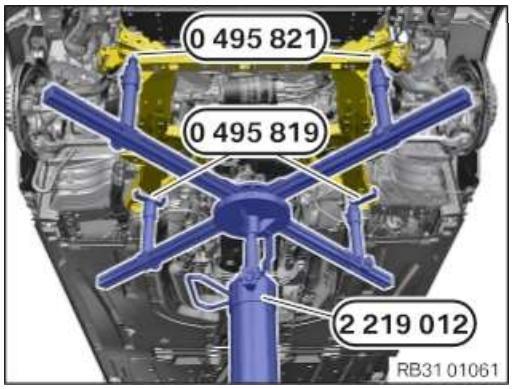
- Before lowering or removing the front axle: Secure the engine in mounting orientation.
- For additional information see: 11 00 670 Securing engine in installation position.



NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).

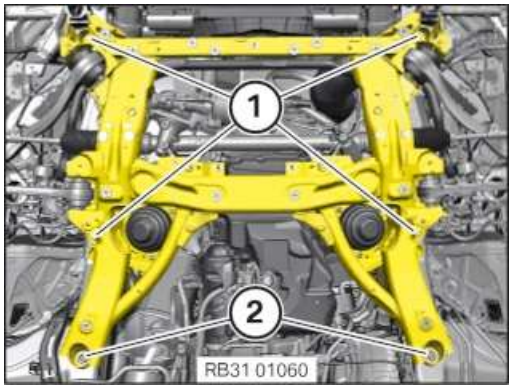


- Position the universal jack 2 219 012 with the special tools and on the front axle support.

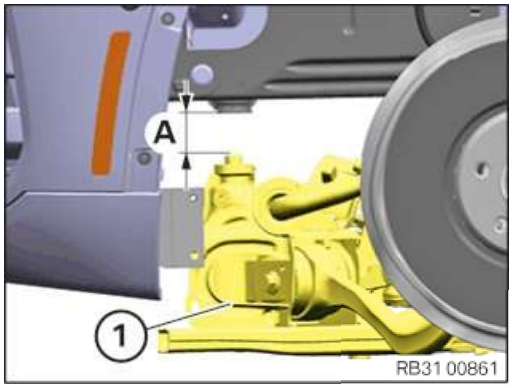
  The centre of gravity of the front axle must be centred over the universal jack 2 219 012 !

- Support the front axle support with the universal jack 2 219 012.

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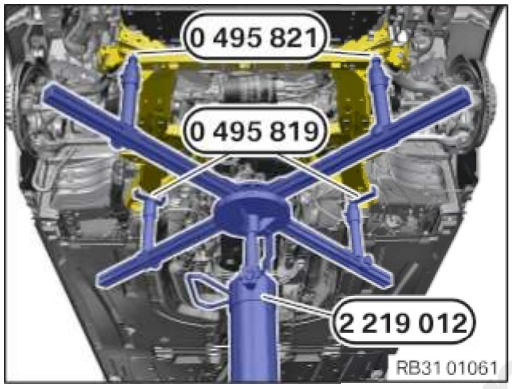
- Loosen screws (1) and (2).



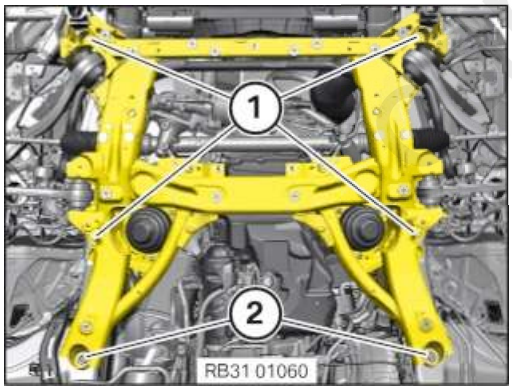
- Lower the front axle support (1) with the universal jack by dimension (A).

  Dimensions (A) = maximum 15 cm

19 – Lift front axle support and fasten.



- Carefully lift the front axle support with the universal jack 2 219 012 and position on the body.



- Replace the screws (1).

  Parts: Bolts

- Tighten the screws (1).

Front axle support to front/centre of body

M12	Renew screws.	Jointing torque	108 Nm

- Replace the screws (2).

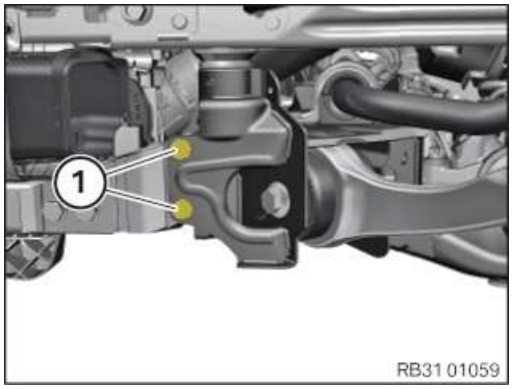
  Parts: Bolts

- Tighten the screws (2).

Front axle carrier to body, rear

M14	Renew screws.	Tightening torque	175 Nm

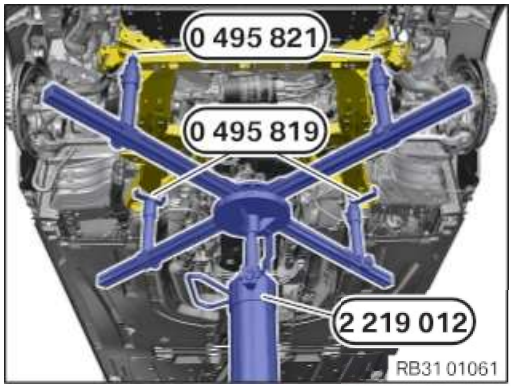
.diagn.com



- Position the adapter for the front axle support on the front axle support .
- Tighten the screws (1).

Adapter, front axle support to front axle support

M8x70		Tightening torque	19 Nm



- Lower the universal jack 2 219 012 and place to one side.

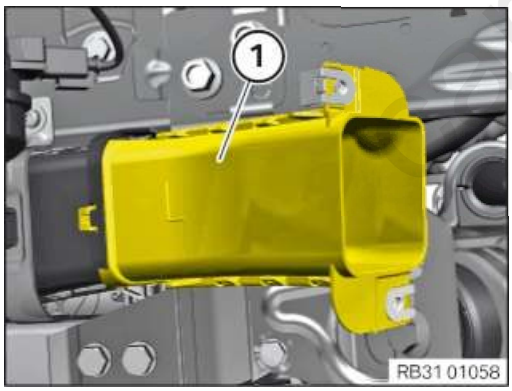
POSTPROCESSES

20 – Partially installing the left and right brake air duct

NOTICE

Perform the operations on the left and right side.

▸ **Installing the brake air duct partially**



- Position and clip in air duct (1).

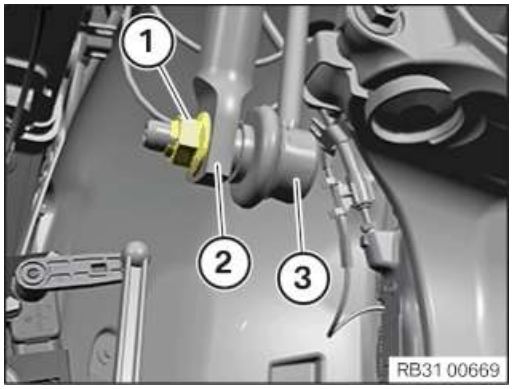
21 – Securing the anti-roll bar link to the left and right anti-roll bar

NOTICE

Perform the operations on the left and right side.

▸ **Securing the anti-roll bar link to the anti-roll bar**

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- Position the anti-roll bar link (3) on the anti-roll bar (2).
- Renew nut (1).

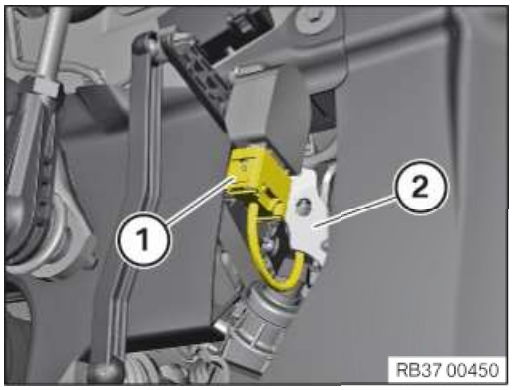
  Parts: Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Front anti-roll bar link to anti-roll bar/spring strut

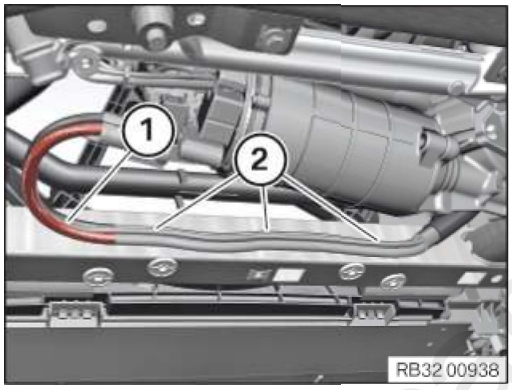
M10	Renew nut.	Tightening torque	56 Nm

22 – Attach the line connection of the ride height sensor

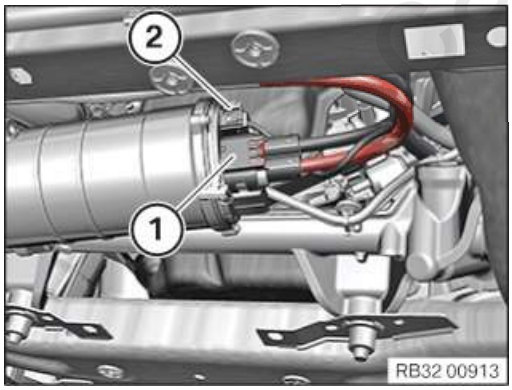


- Position the line .
- Clip in line on holder (2) .
- Connect connectors (1) and lock.

23 – Secure the wiring harness for the EPS on the front axle support



- Position the EPS wiring harness (1) from the front axle support.
- Secure the holder (2).



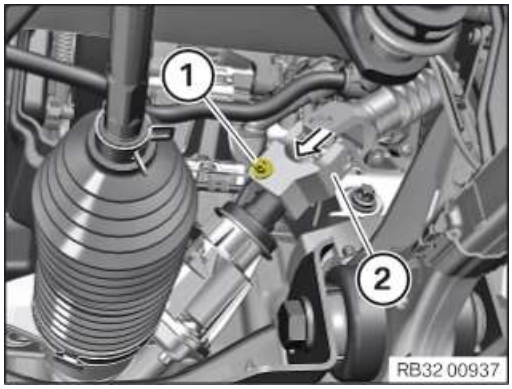
- Connect connectors (1) and (2) lock.

24 – Securing the steering shaft at the bottom on the steering gear

TECHNICAL INFORMATION

The universal joint can only be installed in one position.
The universal joint and the bottom steering gear and/or steering shaft are encoded with each other.
The clamping bolt must e positioned in the groove of the steering gear groove or the steering shaft.

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- Clean the screw threads to remove all remnants of screw locking adhesive.
- Slide the lower steering shaft (2) onto the steering gear in the direction of the arrow.
- Renew the clamping bolt (1).

  Parts: Clamping bolt
- Tighten the clamping bolt (1).

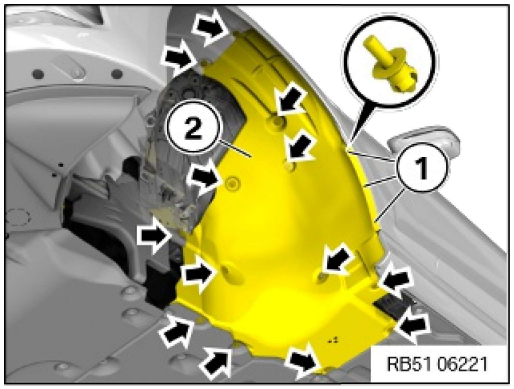
Universal joint to steering box

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

25 – Install the rear section of the front wheel arch cover

NOTICE

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



- Install the rear section of the front wheel arch cover(2) .
- Tighten screws (arrows).

Wheel arch trim panel, front

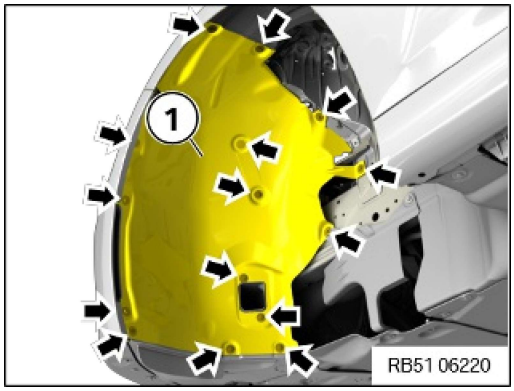
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

- Secure expanding rivet (1).

26 – Install the front section of the front wheel arch cover

NOTICE

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



- Install the front section of the front wheel arch cover (1).
- Tighten screws (arrows).

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

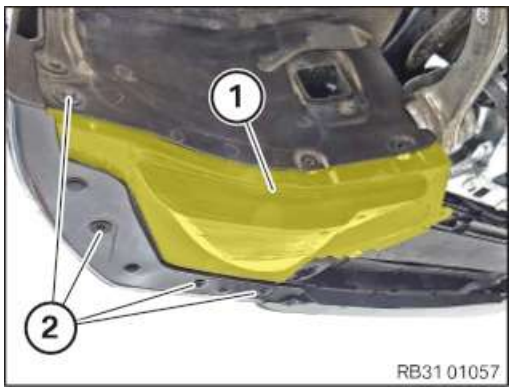
27 – Installing the bottom left and right wheel arch cover

NOTICE

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

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▸ **Installing the bottom wheel arch cover**



- Position the bottom wheel arch cover (1).
- Tighten the screws (2).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

28 – Install the cover of the steering assembly on the left and right

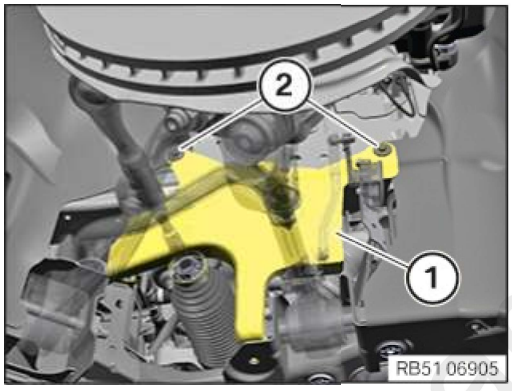
NOTICE

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

▸ **Install the cover of the steering assembly**

Prerequisite

The underbody protection of the steering gear is removed.

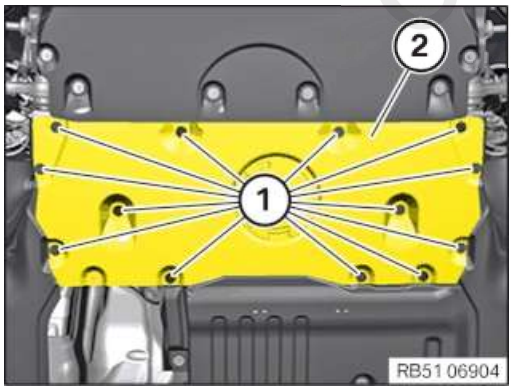


- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

29 – Installing the centre underbody protection



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

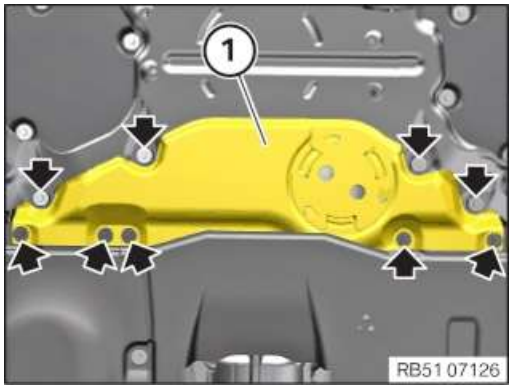
  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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

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

  Tighten screws (arrows).

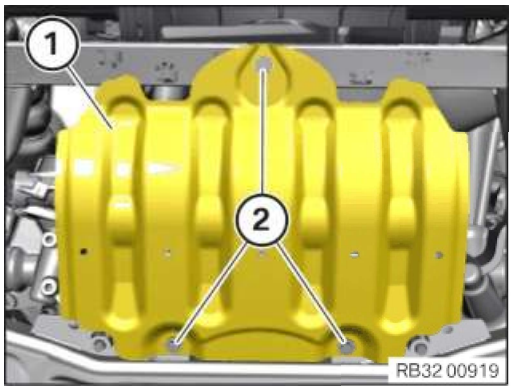
Underbody protection

Hexagon screw		Tightening torque	3 Nm

30 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

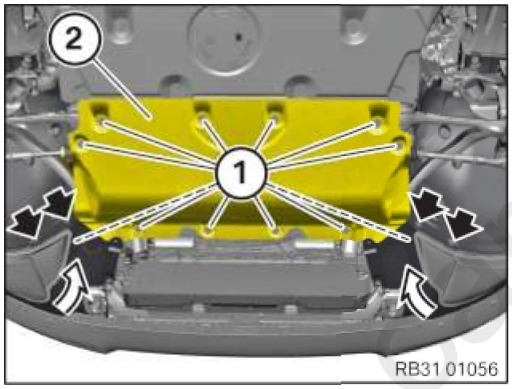


- Remove guard (1).
- Tighten the screws (2).

Bumper buffer device steering on front axle support

M10		Tightening torque	56 Nm

31 – Install the underbody protection of the steering gear



- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

Underbody protection of the steering gear

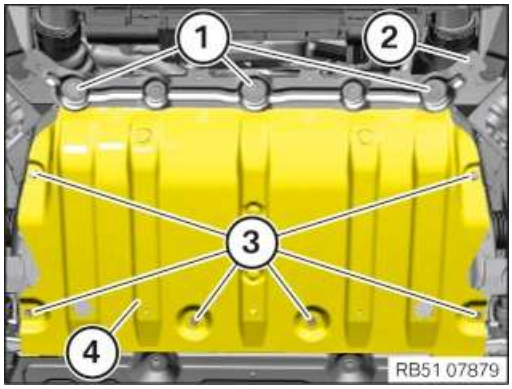
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm

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- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

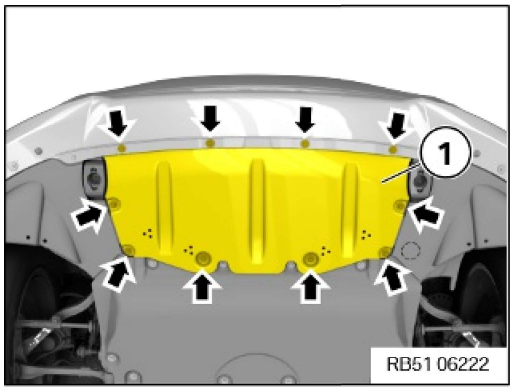
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

32 – Installing the front underbody protection



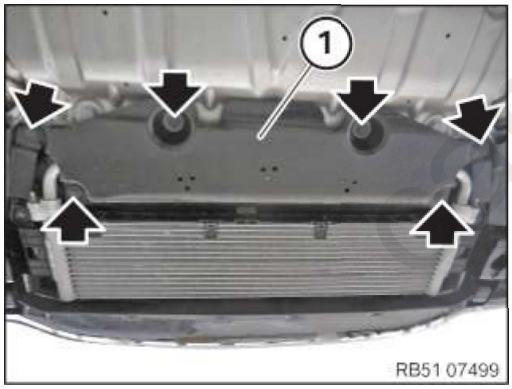
- **Version 1:**

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

Tighten screws (arrows).

Underbody protection front

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



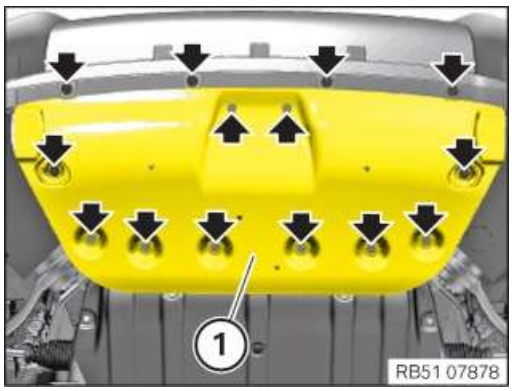
- **Version 2:**

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

Tighten screws (arrows).

Underbody protection front

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



- **Version 3:**

Feed in and install front underbody protection (1).

Tighten screws (arrows).

Underbody protection front

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

33 – Installing both front wheels

▸ **Mounting the wheel**

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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.

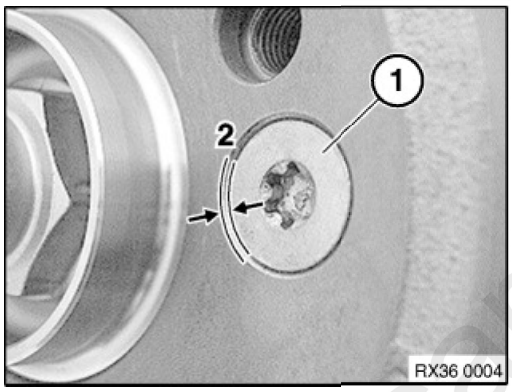
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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).



- 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 front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

catalagn.com



- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

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

Wheel bolts

M14 / SW17	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 Check	140 Nm 140 Nm

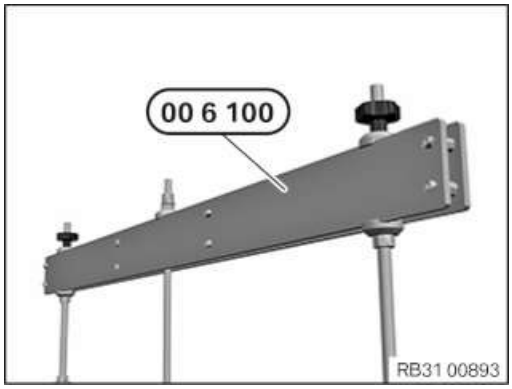
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34 – Disconnecting all battery earth leads



- See additional information.

35 – Releasing the engine from the attachment in mounting orientation



- See additional information in “11 00 670 - Securing engine in mounting orientation”.

Additional Information

Overview of Tightening Torques

Front axle support to front/centre of body — Used in step 19

M12	Renew screws.	Jointing torque	108 Nm

Front axle carrier to body, rear — Used in step 19

M14	Renew screws.	Tightening torque	175 Nm

Adapter, front axle support to front axle support — Used in step 19

M8x70		Tightening torque	19 Nm

Front anti-roll bar link to anti-roll bar/spring strut — Used in step 21

M10	Renew nut.	Tightening torque	56 Nm

Universal joint to steering box — Used in step 24

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

Wheel arch trim panel, front — Used in step 2526

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Cover, front bottom on side — Used in step 27

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Cover, steering unit — Used in step 28

Screw		Tightening torque	3 Nm

Underbody protection — Used in step 29

Hexagon screw		Tightening torque	3 Nm

Bumper buffer device steering on front axle support — Used in step 30

M10		Tightening torque	56 Nm

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Underbody protection of the steering gear — Used in step 31

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws) — Used in step 31

Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support — Used in step 31

M10		Tightening torque	56 Nm

Underbody protection front — Used in step 32

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

Brake disc to front wheel hub — Used in step 33

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 33

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 33

M14 / SW17	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 Check	140 Nm 140 Nm

Overview of Special Tools

2 219 012 Hydraulic lifter



Common — Used in step 171819

Usage	For raising and lowering various vehicle components.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 90 (207)

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2 344 011 Tool



Common	Used in step 33
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)

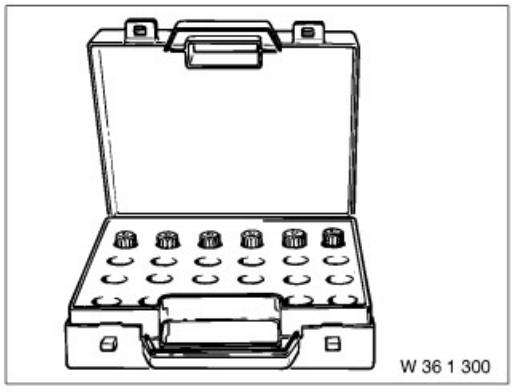
Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common	Used in step 3
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 3
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	

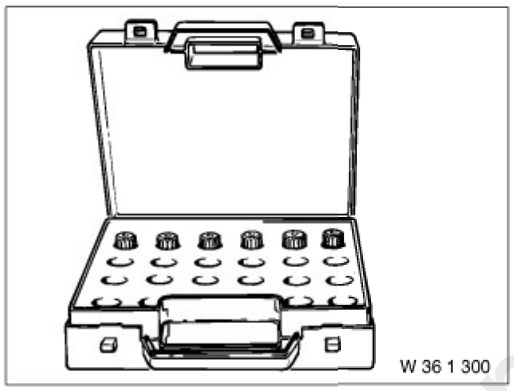
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0 495 225 (36 1 327) Wheel stud



Common	Used in step 3
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 3
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 3
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	

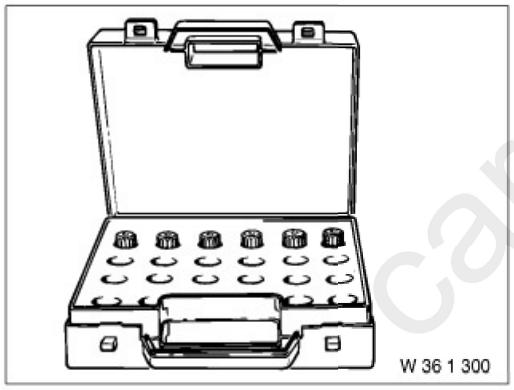
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0 495 228 (36 1 331) Wheel stud



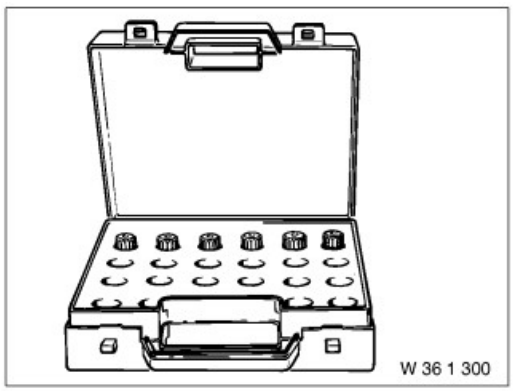
Common	Used in step 3
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 229 (36 1 332) Wheel stud



Common	Used in step 3
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 3
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

Repair instructions **Used in step**

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61 20 900 Disconnecting and connecting battery earth lead 234
61 20 900 Disconnecting and connecting battery earth lead 234
61 20 900 Disconnecting and connecting battery earth lead 234
61 20 900 Disconnecting and connecting battery earth lead 234
61 20 900 Disconnecting and connecting battery earth lead 234
61 20 900 Disconnecting and connecting battery earth lead 234
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 234
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61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle) 234
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61 20 900 Disconnecting and connecting battery earth lead 234
61 20 900 Disconnecting and connecting battery earth lead 234
00 .. ... Raising the vehicle using a vehicle hoist
11 00 670 Securing engine in installation position
11 00 670 Securing engine in installation position

31 12 050 Removing and installing/replacing left or right tension strut

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.

PRELIMINARY WORK

1 – Remove front left or right wheel

▸ **Removing the wheel**



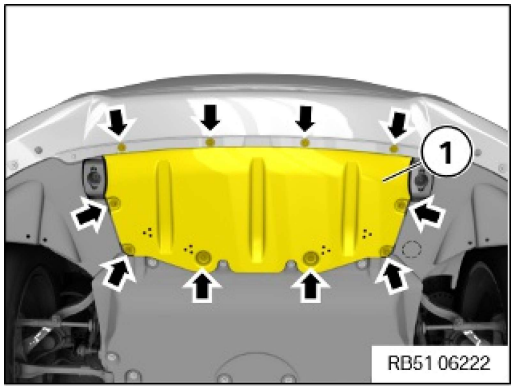
- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.



- 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.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

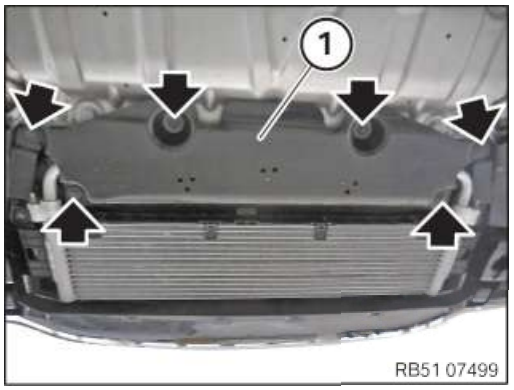
2 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

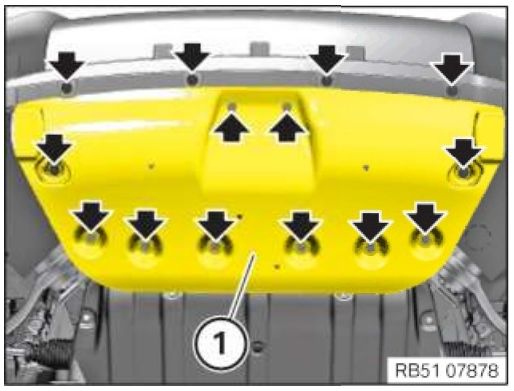
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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

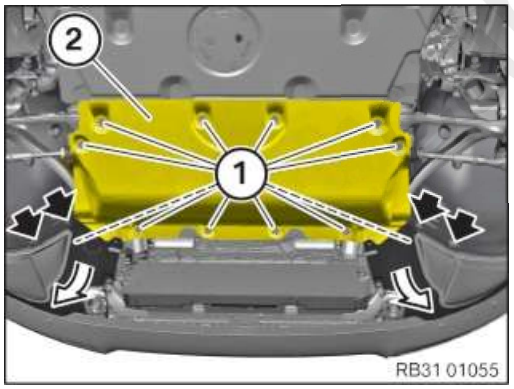


- **Version 3:**

  Remove screws (arrows).

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

3 – Remove the underbody protection of the steering gear



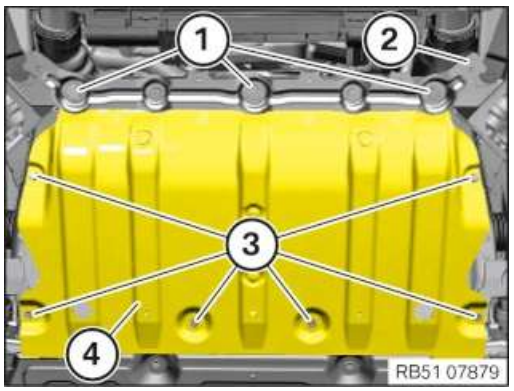
- **Version 1:**

  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).



- **Version 2:**

  Loosen screws (1).

  Remove the holder of the underride protection (2).

  Loosen screws (3).

  Slide the steering gear underbody protection (4) out and remove.

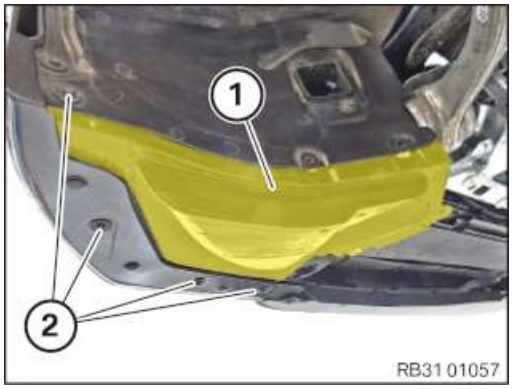
4 – Removing the bottom left and right wheel arch cover

rdiagn.com

NOTICE

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

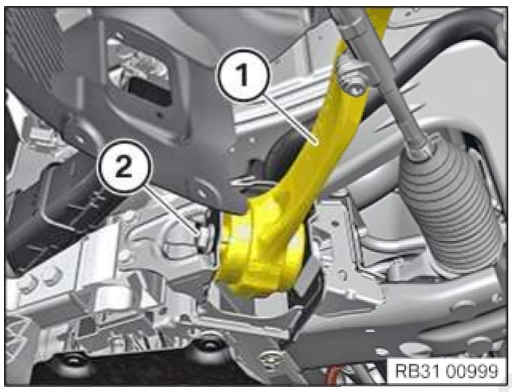
▶ **Remove bottom wheel arch cover**



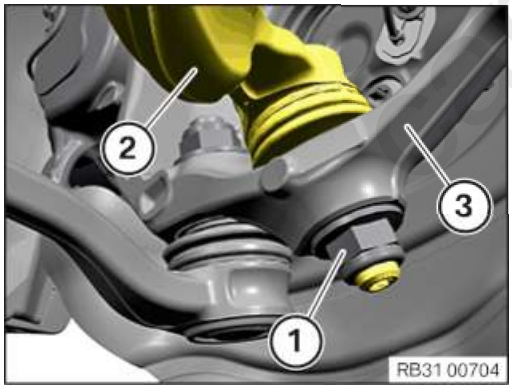
- Loosen screws (2).
- Remove bottom wheel arch cover (1)

MAIN WORK

5 – Remove trailing link



- Release bolt (2) and pull out.
- The tension strut (1) is released from the front axle support.

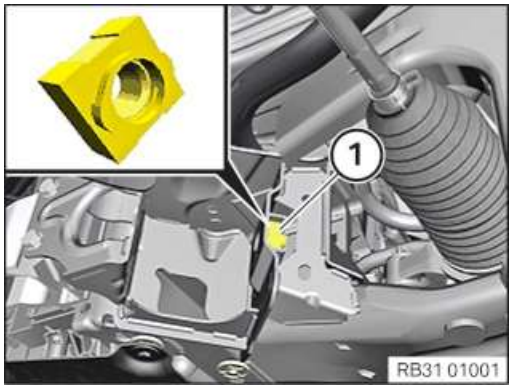


- Loosen nut (1).

Note: If necessary, counter-hold at the Torx socket.

- Remove tension strut (2) from swivel bearing (3).

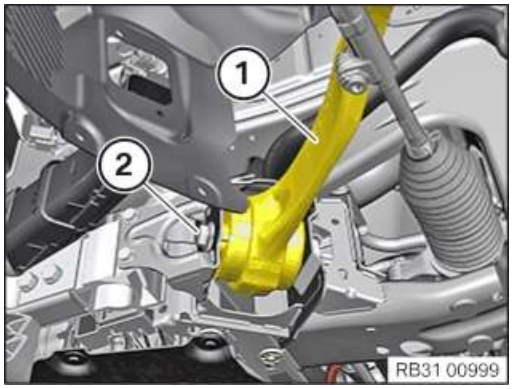
6 – Install the tension strut



- Replace the cage nut (1).

Parts: Cage nut

mdiagn.com



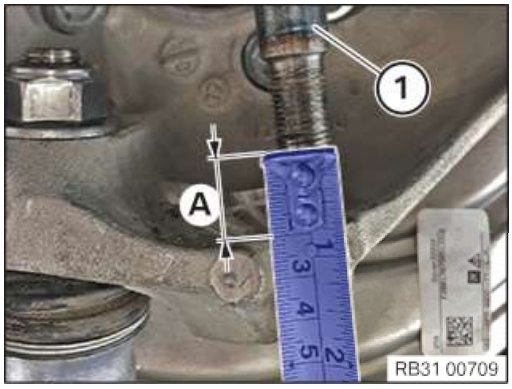
TECHNICAL INFORMATION

Tighten the screw connection in the normal position.

- Position the tension strut (1) on the front axle support.
- Renew the screw (2).

  Parts: Screw
- Insert the screw (2) and screw it in with a few turns.

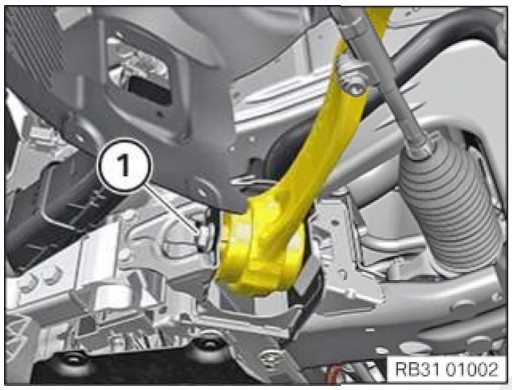
  Do not tighten the screw (2) yet.



- Adjust the tension strut (1) on the swivel bearing to the dimension (A) (vehicle lifted, spring strut decompressed).

  Dimension (A) = 5 mm

  Note: The installation of the tension strut on the front axle support to the dimension (A) corresponds to the normal position in compressed state!



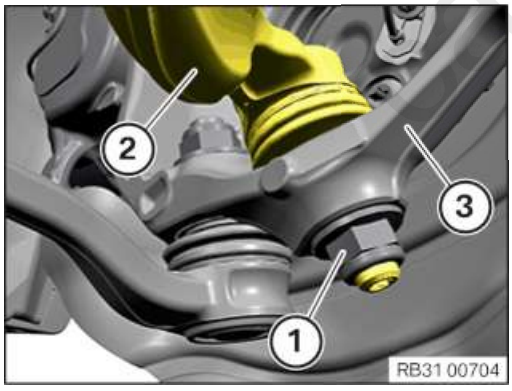
TECHNICAL INFORMATION

Tighten the screw connection in the normal position.

- Tighten down screw (1).

Tension strut to front axle support

M12	Renew bolt and cage nut. Tighten screw connection in normal position.	Jointing torque Angle of rotation	100 Nm 90 °



- Position tension strut (2) on swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1).

Note: If necessary, counter-hold at the Torx socket.

Tension strut to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

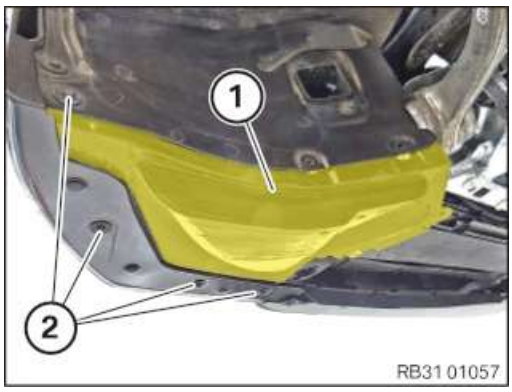
POSTPROCESSES

7 – Installing the bottom left and right wheel arch cover

NOTICE

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

▶ **Installing the bottom wheel arch cover**

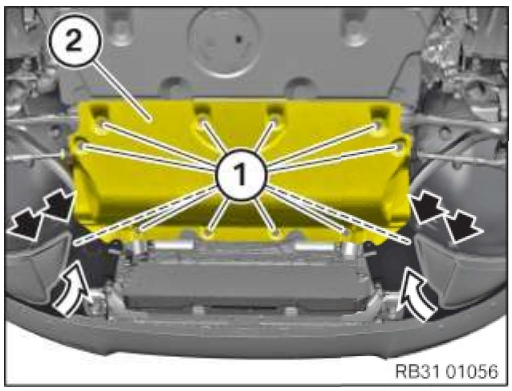


- Position the bottom wheel arch cover (1).
- Tighten the screws (2).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

8 – Install the underbody protection of the steering gear



- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

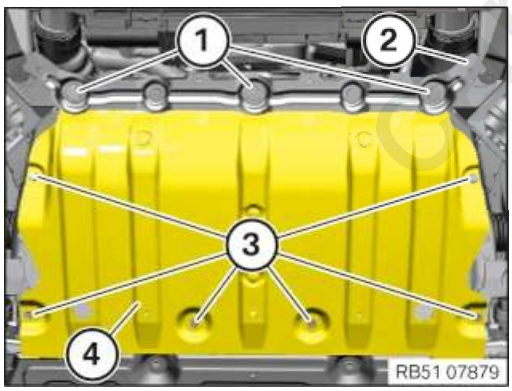
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm



- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

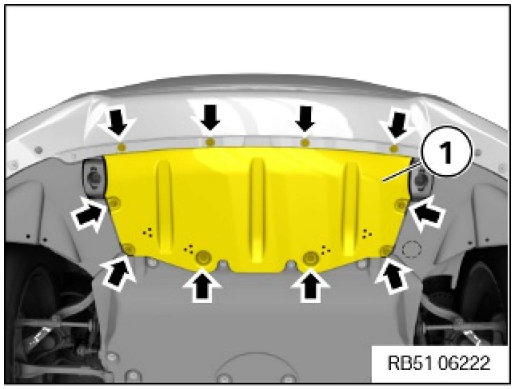
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

9 – Installing the front underbody protection



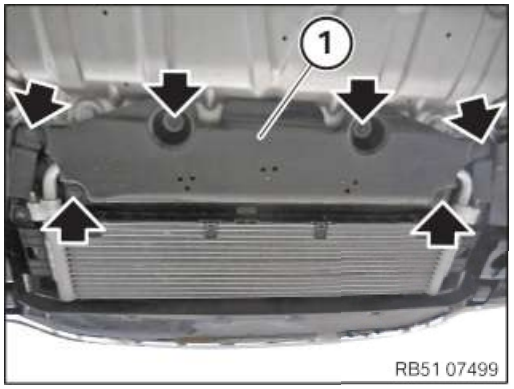
- **Version 1:**

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

  Tighten screws (arrows).

Underbody protection front

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



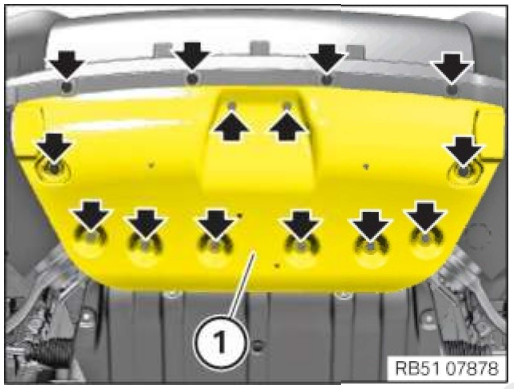
- **Version 2:**

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

  Tighten screws (arrows).

Underbody protection front

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



- **Version 3:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

10 – Install front left or right wheel



▸ **Mounting the wheel**

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.

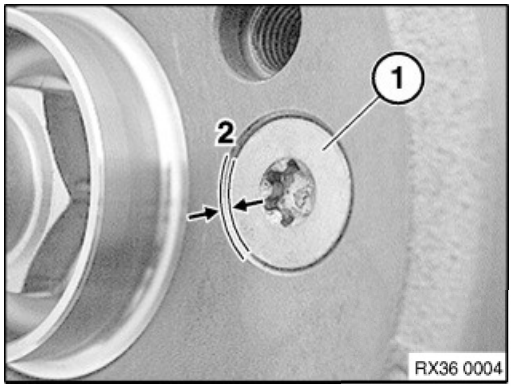
  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.

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- 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).



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

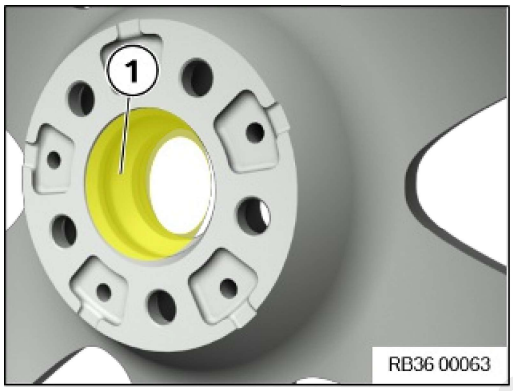
  The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

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- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.



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

Wheel bolts

M14 / SW17	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 Check	140 Nm 140 Nm

Additional Information

Overview of Tightening Torques

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Overview of Tightening Torques

Tension strut to front axle support — Used in step 6

M12	Renew bolt and cage nut. Tighten screw connection in normal position.	Jointing torque Angle of rotation	100 Nm 90 °

Tension strut to swivel bearing — Used in step 6

M14	Renew nut.	Tightening torque	175 Nm

Cover, front bottom on side — Used in step 7

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Underbody protection of the steering gear — Used in step 8

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws) — Used in step 8

Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support — Used in step 8

M10		Tightening torque	56 Nm

Underbody protection front — Used in step 9

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

Brake disc to front wheel hub — Used in step 10

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 10

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 10

M14 / SW17	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 Check	140 Nm 140 Nm

Overview of Special Tools

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2 344 011 Tool



Common	Used in step 10
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)

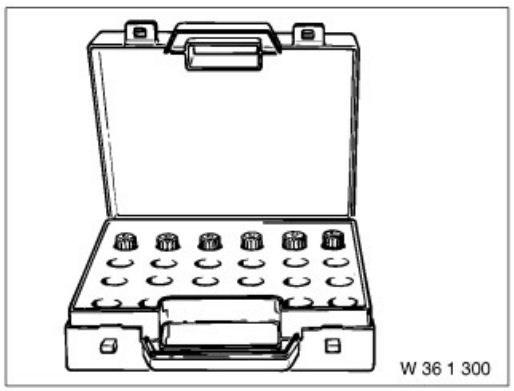
Replacement tools:

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	

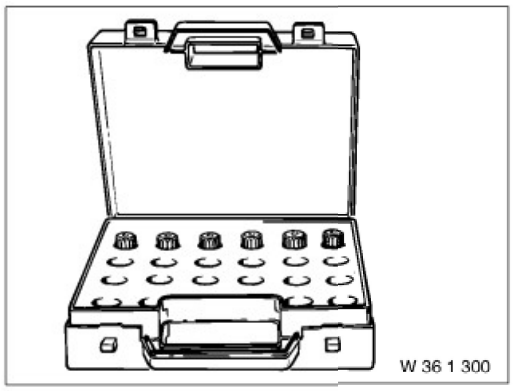
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0 495 225 (36 1 327) Wheel stud



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	

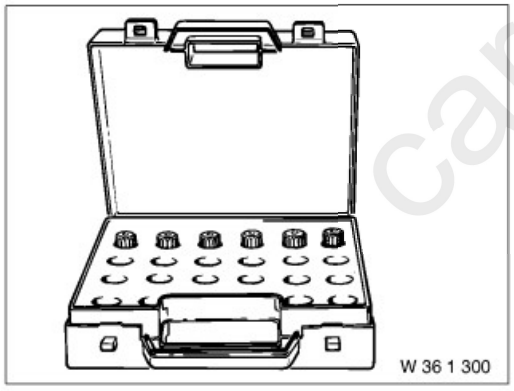
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0 495 228 (36 1 331) Wheel stud



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	

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Links

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	

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31 12 001 Replacing left or right wishbone

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.

TECHNICAL INFORMATION

Perform wheel alignment after installation.

PRELIMINARY WORK

1 – Remove front left or right wheel

▸ **Removing the wheel**



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

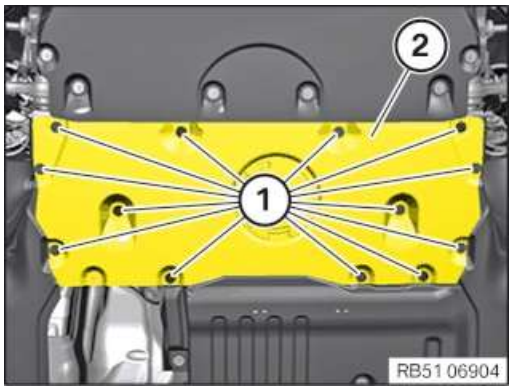


- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

? – Removing the centre underbody protection

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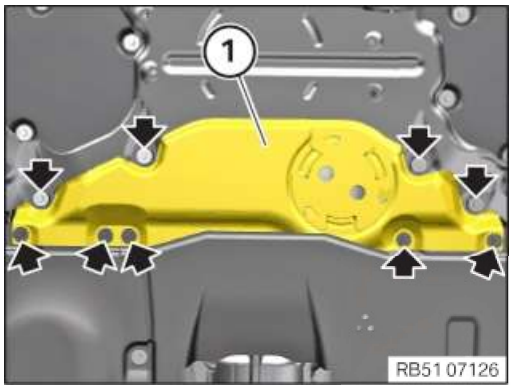
2 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .

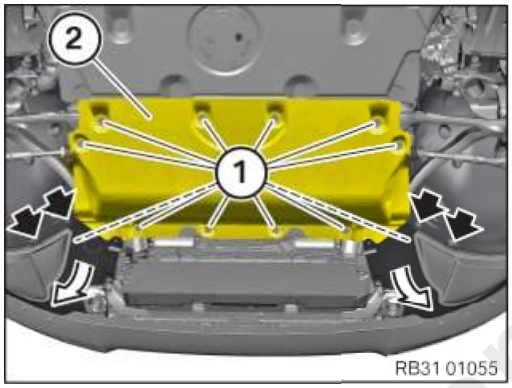


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

3 – Remove the underbody protection of the steering gear



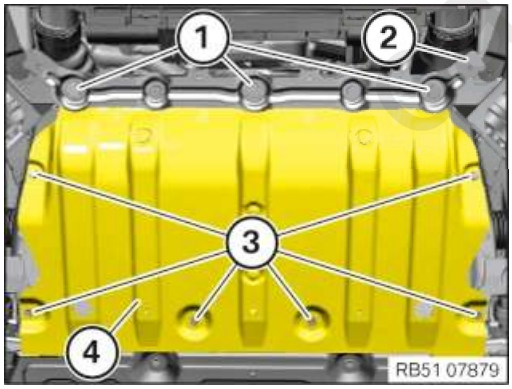
- **Version 1:**

  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).



- **Version 2:**

  Loosen screws (1).

  Remove the holder of the underride protection (2).

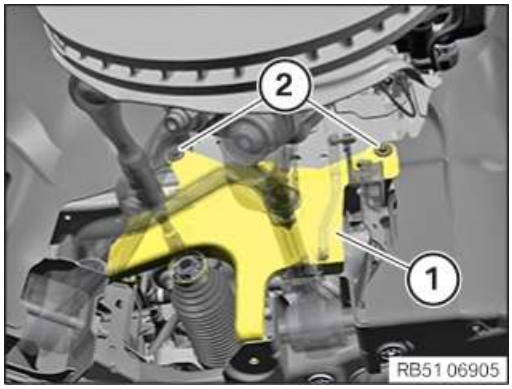
  Loosen screws (3).

  Slide the steering gear underbody protection (4) out and remove.

4 – Remove the cover of the steering assembly

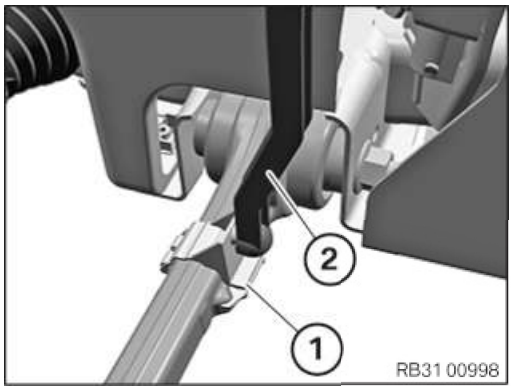
Prerequisite

Underbody protection of the steering gear is removed.



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

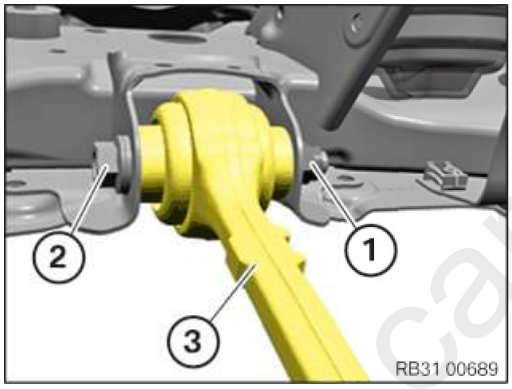
5 – Only on the left: Release the ride height sensor from the lower control arm



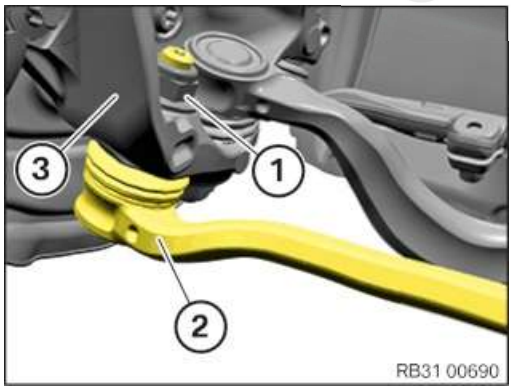
- Release the holder (1) of the attachment rod of the height-level sensor (2) and from the lower control arm.

MAIN WORK

6 – Remove control arm



- Unfasten nut (1).
- (2)Pull out screw.
- Loosen the wishbone (3) from the front axle support.



- Unfasten nut (1).

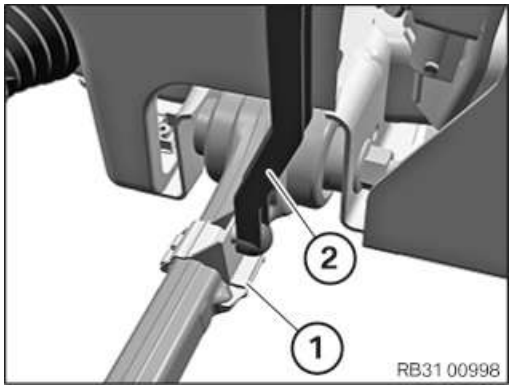
Note: Use the Torx socket for counter support.

- Detach the wishbone (2) from the swivel bearing (3) and remove.

POSTPROCESSES

7 – Left only: Attach the ride height sensor on the bottom wishbone

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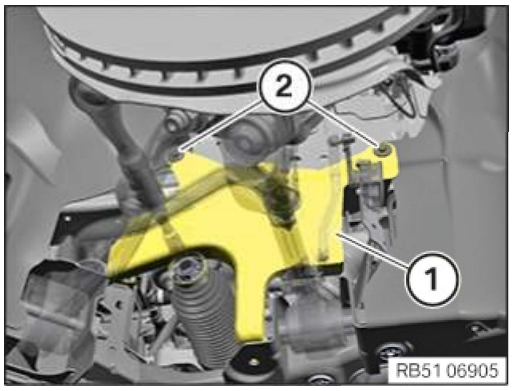


- Position and lock the holder (1) of the attachment rod of the ride height sensor (2) on the bottom wishbone.

8 – Install the cover of the steering assembly

Prerequisite

The underbody protection of the steering gear is removed.

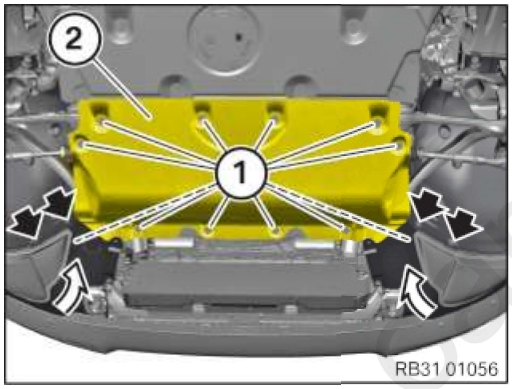


- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

9 – Install the underbody protection of the steering gear



- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

Underbody protection of the steering gear

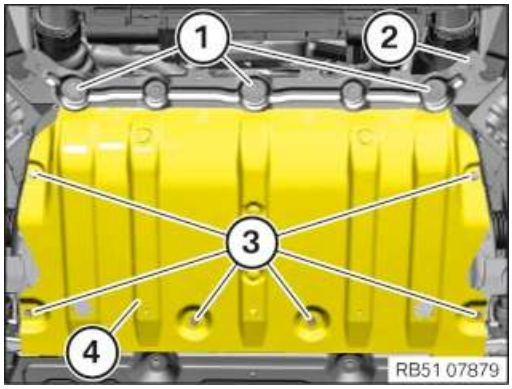
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm

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- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

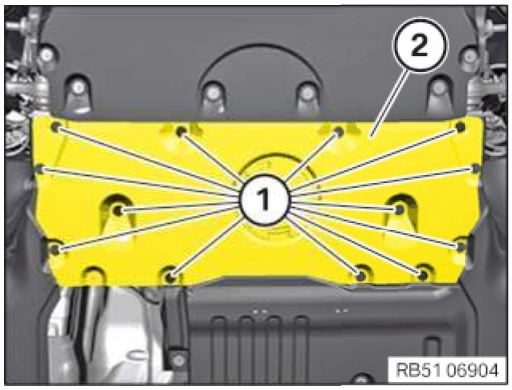
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

10 – Installing the centre underbody protection



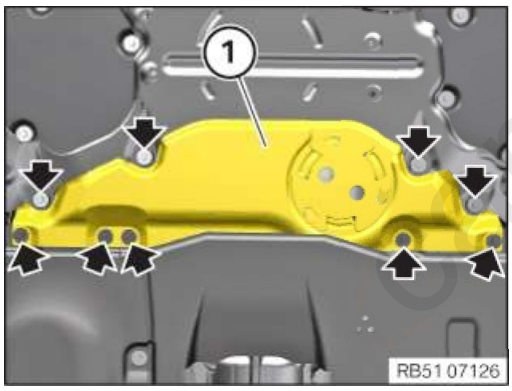
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

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

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

11 – Install front left or right wheel

▸ **Mounting the wheel**

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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.

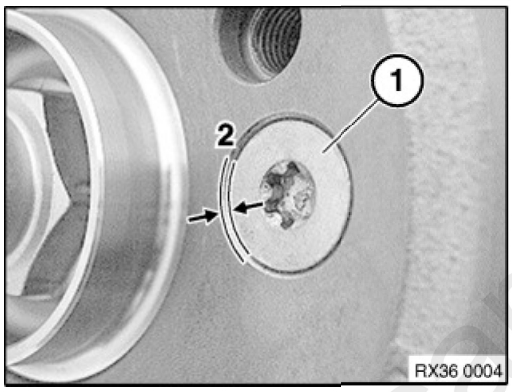
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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).



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

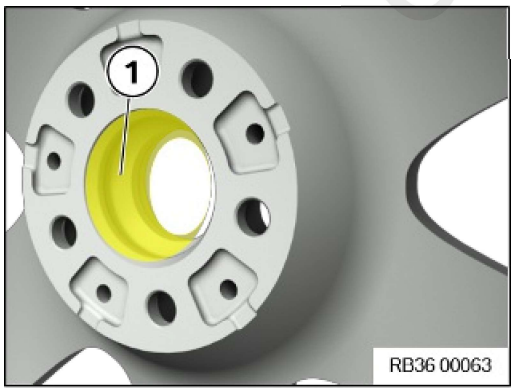
  The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

catalagn.com



- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

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

Wheel bolts

M14 / SW17	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 Check	140 Nm 140 Nm

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12 – Perform chassis alignment check

- Perform the introductory wheel alignment in accordance with equipment manufacturer's instructions.
- If necessary, adjust the front axle and the rear axle.
- Perform the final wheel alignment in accordance with equipment manufacturer's instructions.
- Save and print out test record.

Additional Information

Overview of Tightening Torques

Cover, steering unit Used in step 8

Screw		Tightening torque	3 Nm

Underbody protection of the steering gear			Used in step 9
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws)			Used in step 9
Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support			Used in step 9
M10		Tightening torque	56 Nm

Underbody protection			Used in step 10
Hexagon screw		Tightening torque	3 Nm

Brake disc to front wheel hub			Used in step 11
M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub			Used in step 11
M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts			Used in step 11
M14 / SW17	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 Check	140 Nm 140 Nm

Overview of Special Tools

2 344 011 Tool



Common		Used in step 11
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:

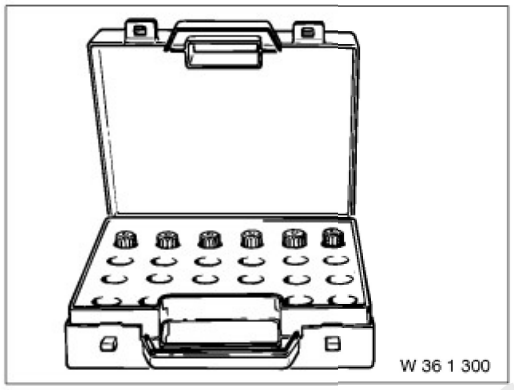
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0 495 221 (36 1 323) Wheel stud



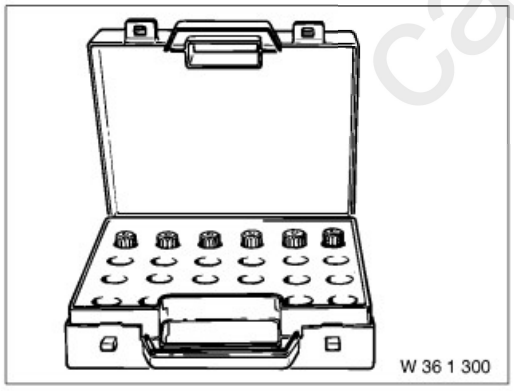
Common	Used in step 1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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	

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0 495 226 (36 1 328) Wheel stud



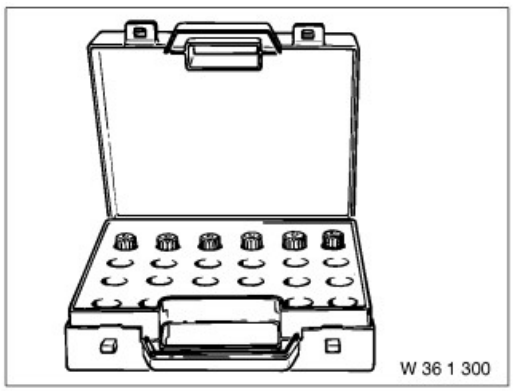
Common	Used in step 1
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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	

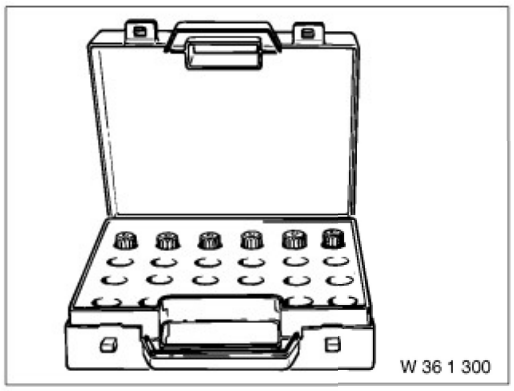
cardiagn.com

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

Overview: Technical data	Used in step
3100 Overview of Technical Data	

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	

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31 00 ... Information on replacing shock absorbers

Situation:

When a shock absorber is faulty on one side (leaking, noises, etc.), often both shock absorbers on the axle in question are replaced.

Effect:

This is not necessary for technical reasons and causes the manufacturer not to recognize the unnecessarily removed shock absorbers as defective parts. Unnecessarily high costs for the customer can be avoided by replacing the shock absorber on one side only.

Procedure:

If one shock absorber is damaged, it is only necessary to replace both shock absorbers when the car has driven in excess of 80 000 km.

Exception: On all M-GmbH models, when a limit value is exceeded on one side, it is still necessary always to replace both shock absorbers on the relevant axle.

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31 31 000 Removing and installing complete front left or right spring strut shock absorber

PRELIMINARY WORK

1 – Remove front left or right wheel

▸ **Removing the wheel**



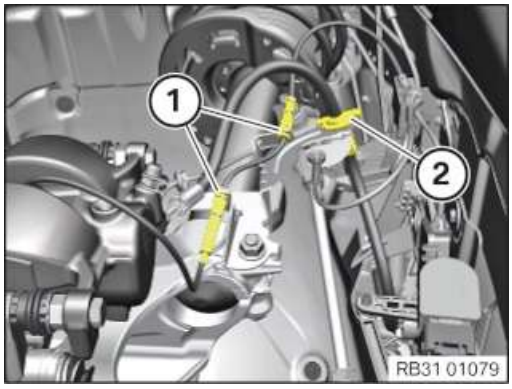
- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.



- 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.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

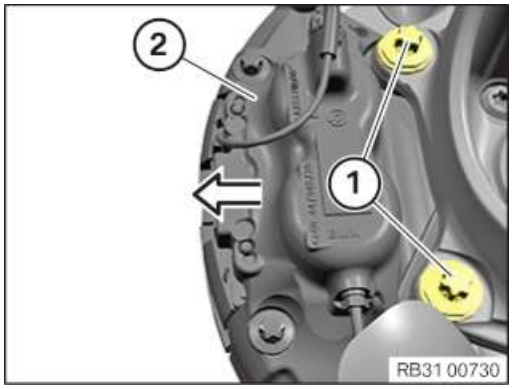
2 – Detach the cable of the brake pad sensor and front brake hose



- Detach the brake pad sensor cable from the holders (1).
- Detach brake hose from holder (2).

3 – Detach the front brake caliper

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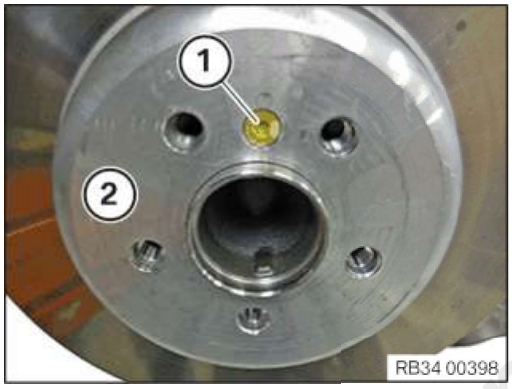
- Loosen screws (1).
- Detach the brake caliper (2) in the direction of the arrow.



- Tie the brake caliper (1) up with the special tool 2 413 317.

  Do not let the brake caliper (1) down on the brake hose.

4 – Remove front brake disc



- Loosen screw (1).

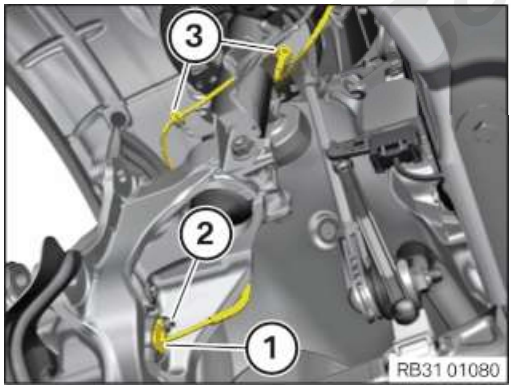
TECHNICAL INFORMATION

Note the following for the removal of the brake disc:

Do not under any circumstances strike the friction ring with a hammer or similar tool. If necessary, carefully tap with a rubber mallet against the brake disc chamber.

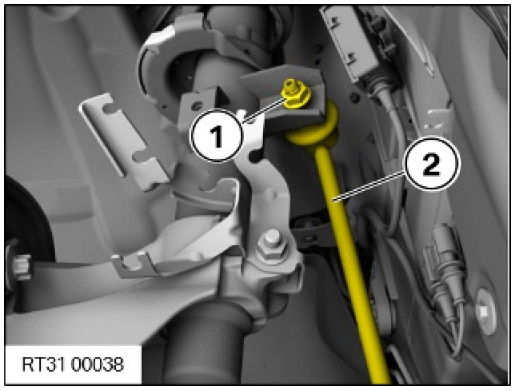
- Remove brake disc (2).

5 – Partially removing the front wheel speed sensor



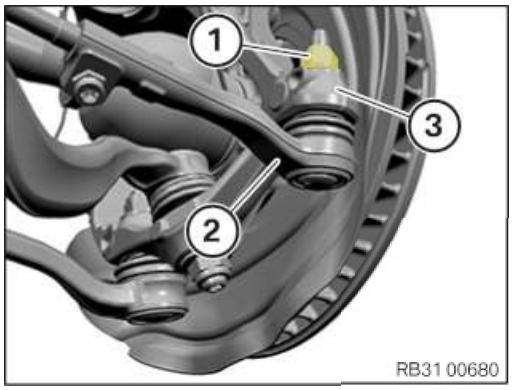
- Loosen screw (2).
- Release the wheel speed sensor (1) from the swivel bearing.
- Detach the wheel speed sensor cable from the brackets (3).
- Remove wheel speed sensor from spring strut.

6 – Releasing the anti-roll bar link from the spring strut



- Loosen the nut (1), if necessary, counter-hold the Torx socket.
- Release the anti-roll bar link (2) from the spring strut.

7 – Loosening the track rod from the swivel bearing

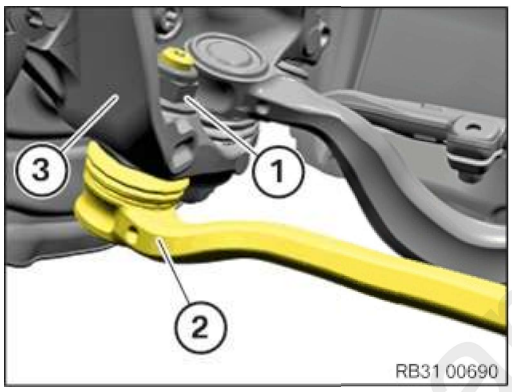


- Loosen nut (1).

Note: If necessary, counter-hold at the Torx socket.

- Detach the track rod (2) from the swivel bearing (3).

8 – Release the wishbone from the swivel bearing

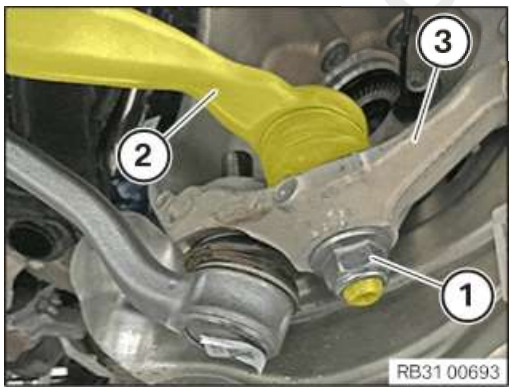


- Loosen nut (1).

Note: Use the Torx socket for counter support.

- Release wishbone (2) from swivel bearing (3).

9 – Releasing the tension strut from the swivel bearing



- Unfasten nut (1).

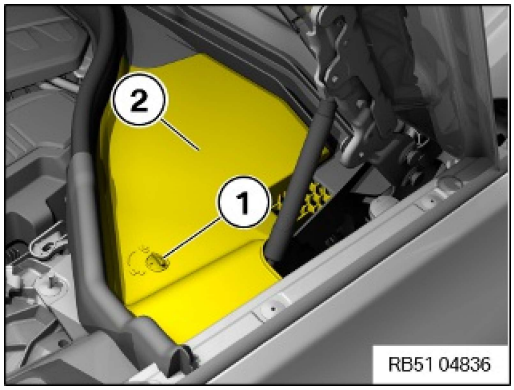
Note: Use the Torx socket for counter support.

- Release the tension strut (2) from the swivel bearing (3).

10 – Remove the cover of the engine compartment on the rear left or right

▸ **Remove the cover of the engine compartment at the rear left**

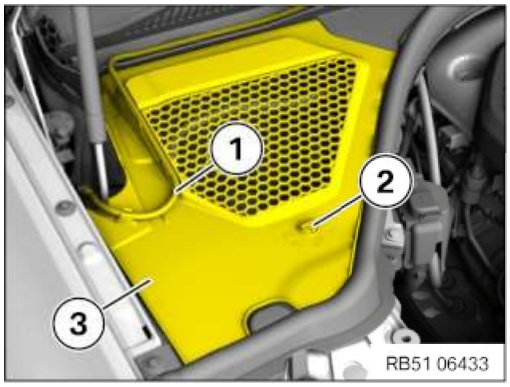
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- Loosen the lock (1).
- Remove rear left cover of engine compartment (2).

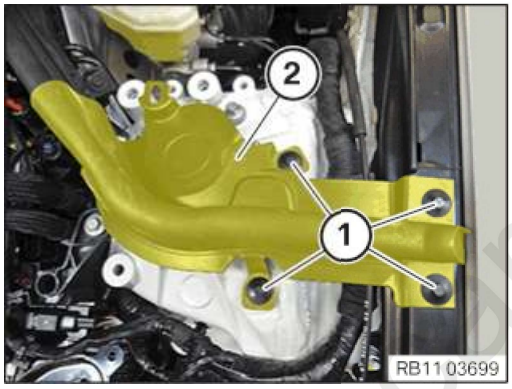
- **or**

▸ **Remove the cover of the rear right engine compartment**



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

11 – Removing side bonnet seal



- Loosen the rivet (1).
- Release and remove side bonnet seal (2) from spring strut dome.

MAIN WORK

12 – Remove front spring strut

TECHNICAL INFORMATION

Secure component against falling.

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- Loosen screws (1).



- Remove the front spring strut (1) complete with swivel bearing.

13 – Installing the front spring strut



- Position front spring strut (1) complete with swivel bearing in the wheel arch.



- Ensure correct positioning of journal (1) of support bearing on the spring strut dome.



- Renew screws (1).

  Parts: Bolts

- Tighten the screws (1).

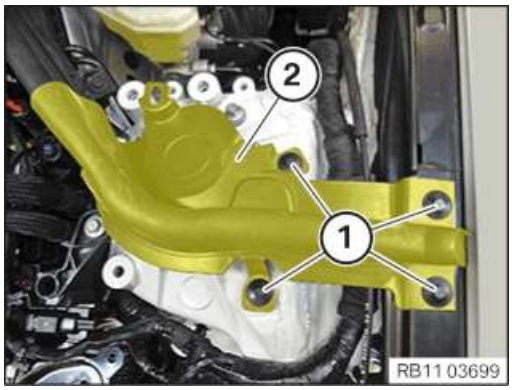
Nut and locknut/self-locking nut

M8	Renew screws.	Tightening torque	28 Nm
		Angle of rotation	90 °

POSTPROCESSES

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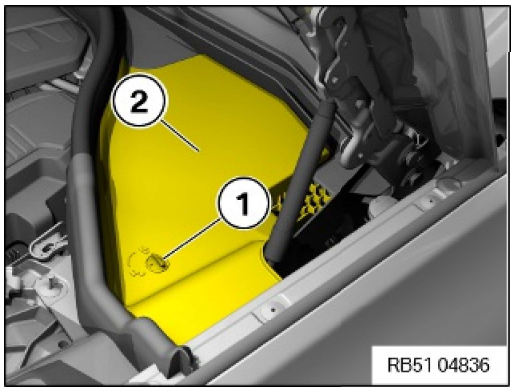
14 – Install the side bonnet seal



- Position the side bonnet seal (2) on the spring strut dome.
- Secure the rivet (1).

15 – Install the cover of the engine compartment on the rear left or right

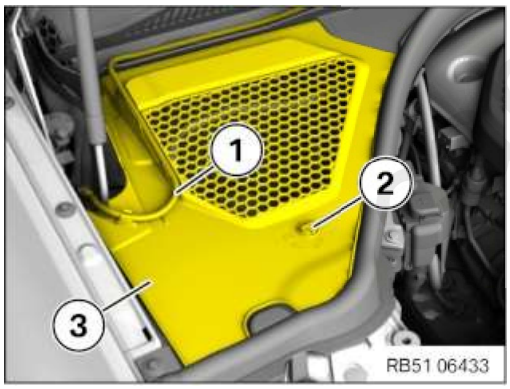
▶ **Install the cover of the engine compartment on the rear left**



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

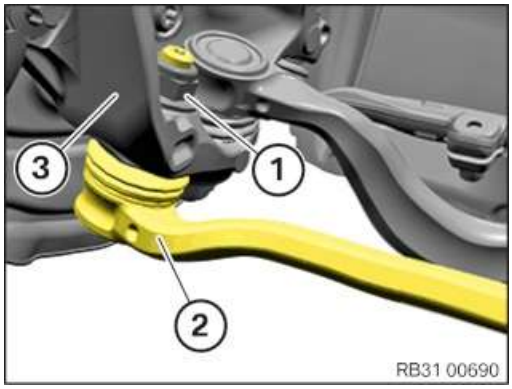
- **or**

▶ **Install the rear right engine compartment cover**



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

16 – Mounting the wishbone on the swivel bearing



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

  Parts: Nut
- Tighten nut (1).

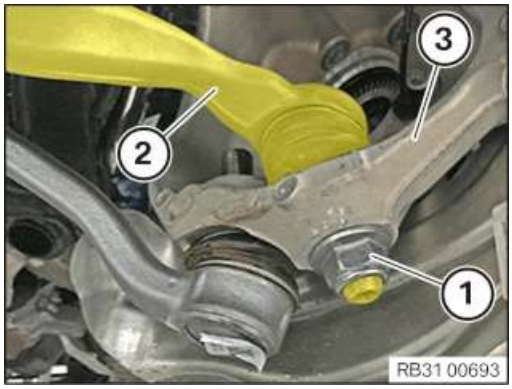
Note: Use the Torx socket for counter support.

Wishbone to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

17 – Securing tension strut on swivel bearing

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- Position tension strut (2) on swivel bearing (3).
- Renew nut (1).

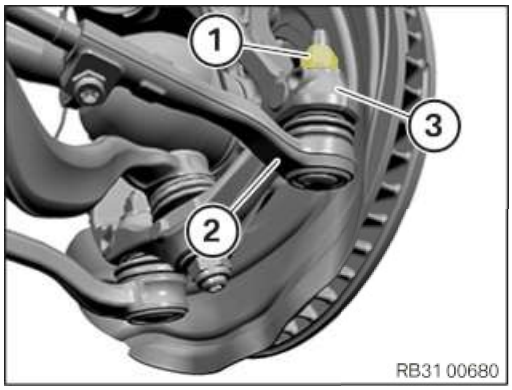
  Parts: Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Tension strut to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

18 – Securing the track rod on the swivel bearing



- Position the track rod (2) on the swivel bearing (3).
- Renew nut (1).

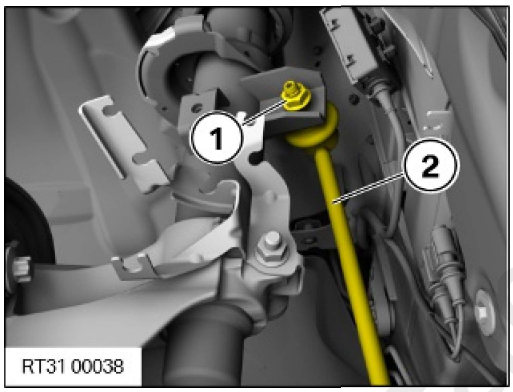
  Parts: Nut
- Tighten nut (1).

Note: If necessary, counter-hold at the Torx socket.

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm

19 – Securing the anti-roll bar link on the spring strut



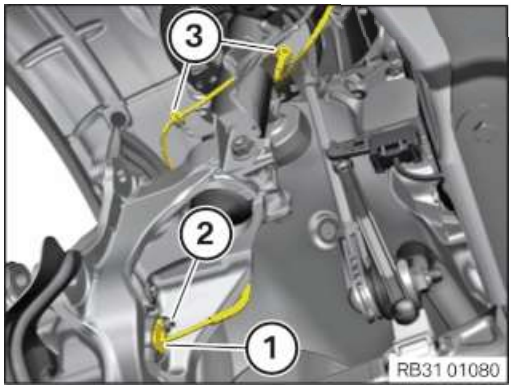
- Position the anti-roll bar link (2) at the spring strut.
- Renew nut (1).

  Parts: Nut
- Tighten the nut (1), if necessary, counter support the Torx socket.

Front anti-roll bar link to anti-roll bar/spring strut

M10	Renew nut.	Tightening torque	56 Nm

20 – Installing the front wheel speed sensor partially



- Position the wheel speed sensor on the spring strut.
- Mount the cable of wheel speed sensor on the holders(3).
- Position the wheel speed sensor (1) on the swivel bearing.
- Renew the screw (2).

  Parts: Screw
- Tighten down screw (2).

Wheel speed sensor to swivel bearing

M6	Renew screw.	Tightening torque	8 Nm

21 – Install front brake disc

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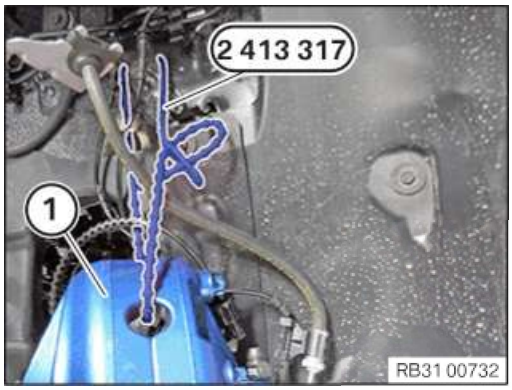
- Position brake disc (2) on wheel hub.
- Renew the screw (1).

  Parts: Screw
- Position and tighten the screw (1).

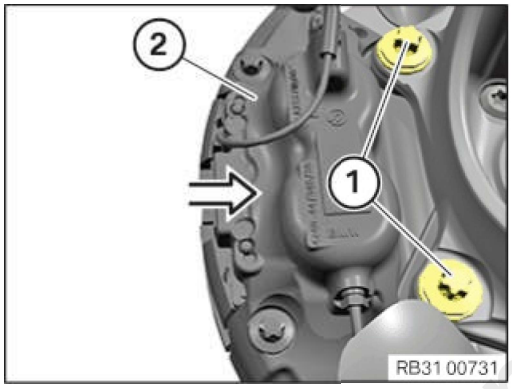
Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

22 – Fasten the front brake caliper



- Loosen brake caliper (1) from special tool 2 413 317.
- Remove special tool 2 413 317.



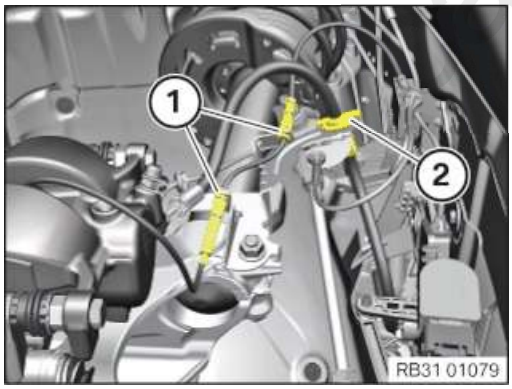
- Position the brake caliper (2) in direction of arrow on the swivel bearing.
- Renew screws (1).

  Parts: Bolts
- Tighten the screws (1).

Brake caliper / caliper carrier at front swivel bearing

M12	Renew screw.	Tightening torque	110 Nm

23 – Attach the cable of the brake pad sensor and front brake hose



- Attach cable of brake pad sensor in brackets (1).
- Attach the brake hose in the holder (2).

24 – Install front left or right wheel

▸ **Mounting the wheel**

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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.

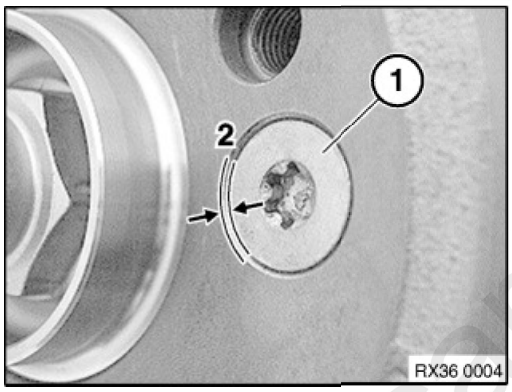
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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).



- 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 front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

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- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

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

Wheel bolts

M14 / SW17	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

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Additional Information

Overview of Tightening Torques

Nut and locknut/self-locking nut — Used in step 13

M8	Renew screws.	Tightening torque	28 Nm
		Angle of rotation	90 °

Wishbone to swivel bearing — Used in step 16

M14	Renew nut.	Tightening torque	175 Nm

Tension strut to swivel bearing — Used in step 17

M14	Renew nut.	Tightening torque	175 Nm

Track rod end to swivel bearing Used in step 18

M14	Renew nut.	Tightening torque	175 Nm

Front anti-roll bar link to anti-roll bar/spring strut Used in step 19

M10	Renew nut.	Tightening torque	56 Nm

Wheel speed sensor to swivel bearing Used in step 20

M6	Renew screw.	Tightening torque	8 Nm

Brake disc to front wheel hub Used in step 2124

M8	Renew screw.	Tightening torque	16 Nm

Brake caliper / caliper carrier at front swivel bearing Used in step 22

M12	Renew screw.	Tightening torque	110 Nm

Brake disc to rear wheel hub Used in step 24

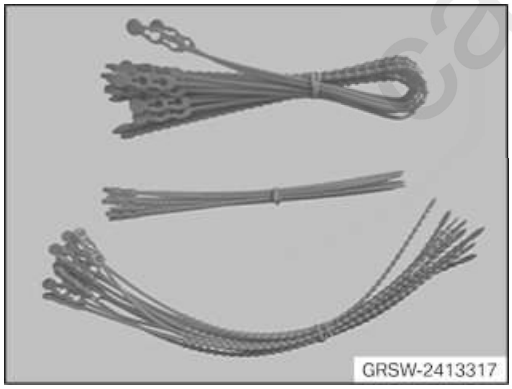
M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts Used in step 24

M14 / SW17	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 Check	140 Nm 140 Nm

Overview of Special Tools

2 413 317 Cable strap



Common Used in step 322

Usage	The "Cable ties" parts set consists of 3 items as follows: ABV232 Length: 320 mm colour: RedABV250 Length: 500 mm colour: RedABVS270 Length: 665 mm colour: Red
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 47 15 (332)

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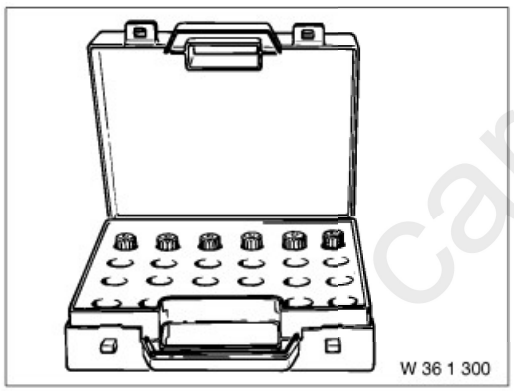
2 344 011 Tool



Common	Used in step 24
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)

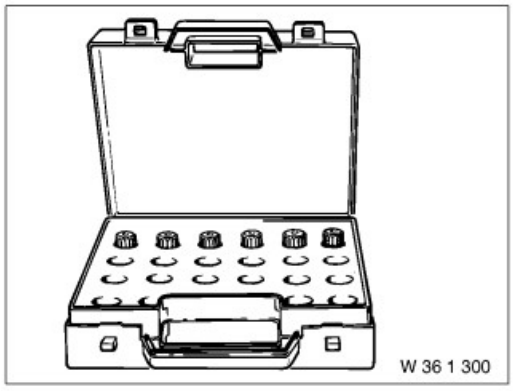
Replacement tools:

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	

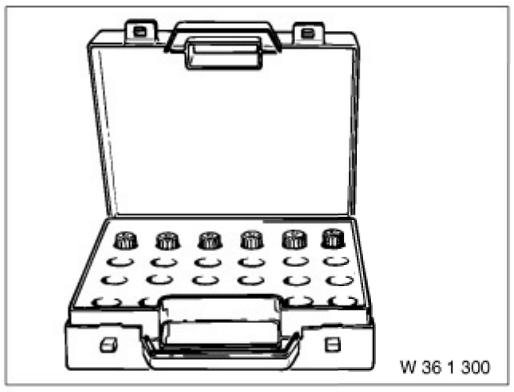
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0 495 225 (36 1 327) Wheel stud



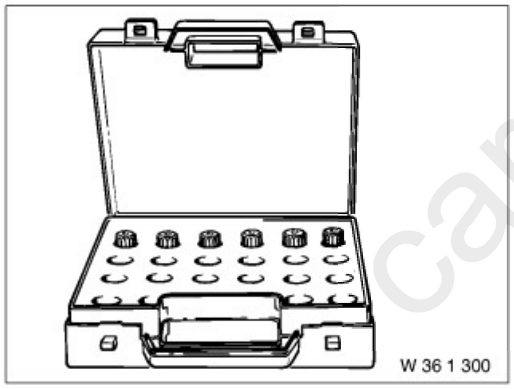
Common	Used in step 1
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 226 (36 1 328) Wheel stud



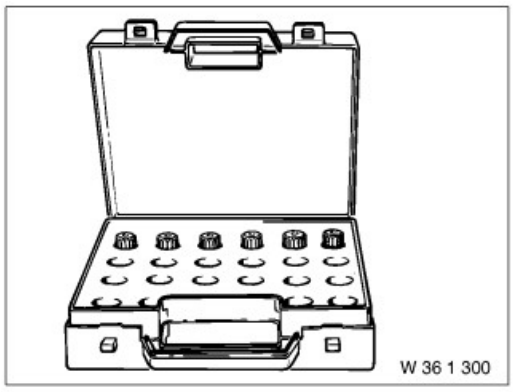
Common	Used in step 1
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

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	

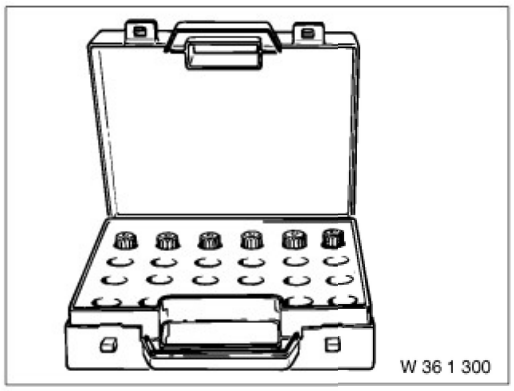
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0 495 229 (36 1 332) Wheel stud



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	

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31 35 014 Removing and installing / replacing anti-roll bar link, left

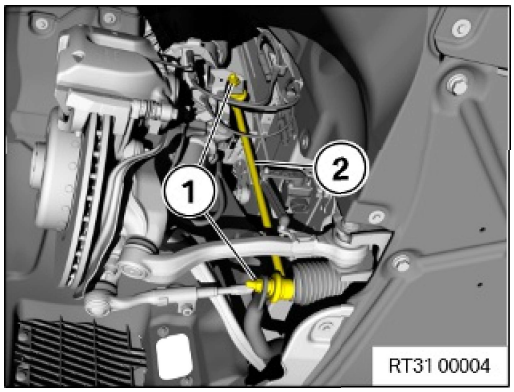
WARNING

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

Danger! Life-threatening injuries!

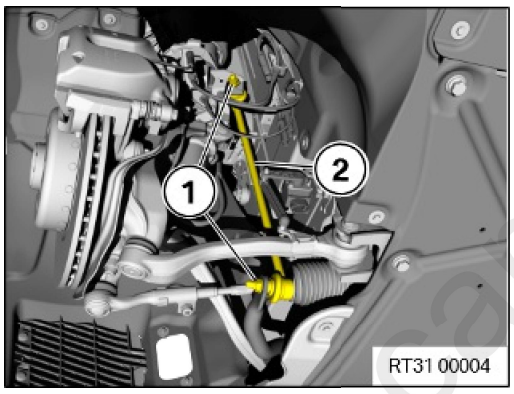
- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.

1 – Remove the anti-roll bar link



- Unscrew the nuts (1) and use the Torx socket for counter support as needed.
- Remove the anti-roll bar link (2).

2 – Install the anti-roll bar link



- Position the anti-roll bar link (2) on the anti-roll bar and the spring strut.
- Renew nuts (1).

  Parts: Nuts
- Tighten the nuts (1) and use the Torx socket for counter support as needed.

Front anti-roll bar link to anti-roll bar/spring strut

M10	Renew nut.	Tightening torque	56 Nm

Additional Information

Overview of Tightening Torques

Front anti-roll bar link to anti-roll bar/spring strut Used in step 2

M10	Renew nut.	Tightening torque	56 Nm

Links

Repair instructions	Used in step
00 .. ... Raising the vehicle using a vehicle hoist	

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31 35 015 Removing and installing / replacing anti-roll bar link, right

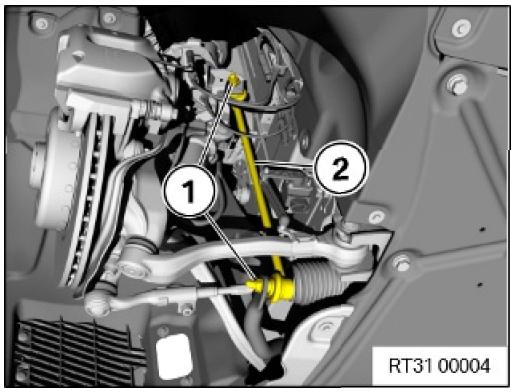
WARNING

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

Danger! Life-threatening injuries!

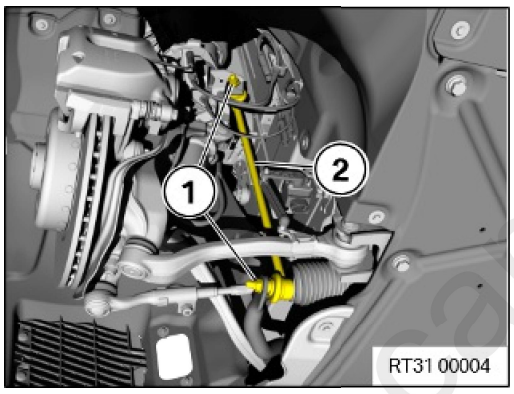
- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.

1 – Remove the anti-roll bar link



- Unscrew the nuts (1) and use the Torx socket for counter support as needed.
- Remove the anti-roll bar link (2).

2 – Install the anti-roll bar link



- Position the anti-roll bar link (2) on the anti-roll bar and the spring strut.
- Renew nuts (1).

  Parts: Nuts
- Tighten the nuts (1) and use the Torx socket for counter support as needed.

Front anti-roll bar link to anti-roll bar/spring strut

M10	Renew nut.	Tightening torque	56 Nm

Additional Information

Overview of Tightening Torques

Front anti-roll bar link to anti-roll bar/spring strut Used in step 2

M10	Renew nut.	Tightening torque	56 Nm

Links

Repair instructions	Used in step
00 .. ... Raising the vehicle using a vehicle hoist	

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31 35 000 Removing and installing/replacing front anti-roll bar

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

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.

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.

PRELIMINARY WORK

1 – Bring front compartment lid in the service position

Prerequisite

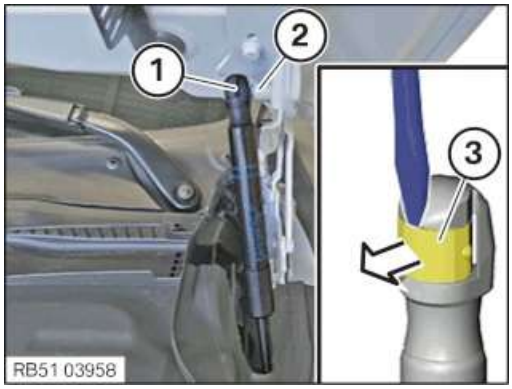
Engine compartment lid is open.

CAUTION

Shutting bonnet or tailgate.

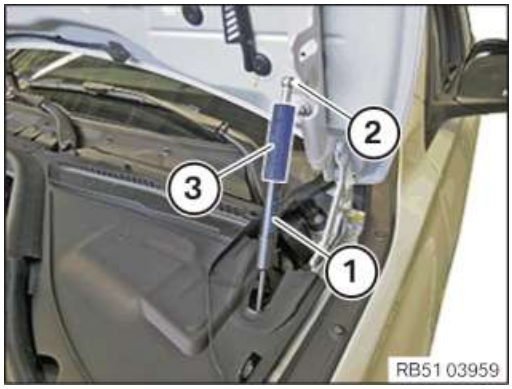
Danger of injury!

- 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.

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TECHNICAL INFORMATION

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

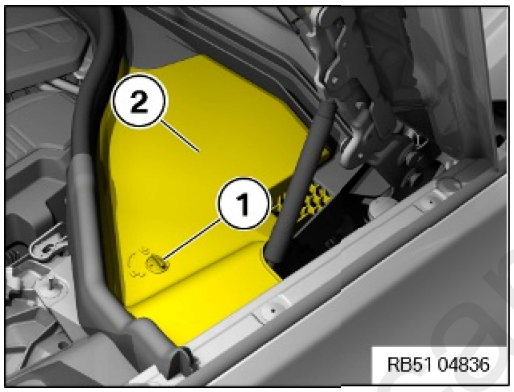
- Remove the bonnet support and open the bonnet further.
- Push special tool or (3) over gas pressure spring (1).
- Place special tool on the ball pin (2) and engage using force.
- Repeat the operation on the other side of vehicle.

2 – Disconnecting all battery earth leads



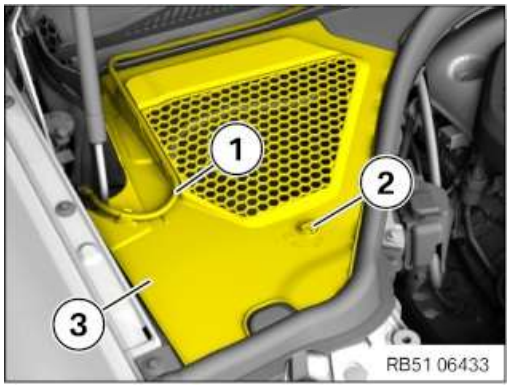
- See additional information.

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



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

4 – Remove the cover of the rear right engine compartment



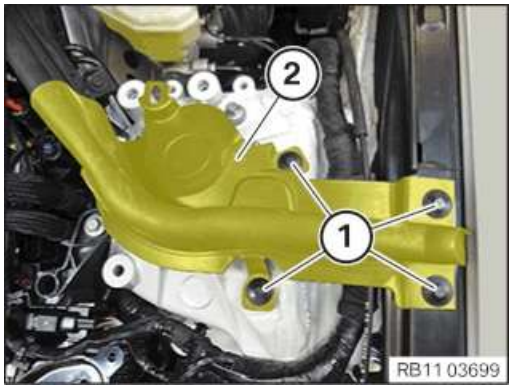
- Release washer fluid hose (1) from the guides.
- Loosen the lock (2).
- Remove the cover of rear right engine compartment (3).

5 – Removing side bonnet gaskets

NOTICE

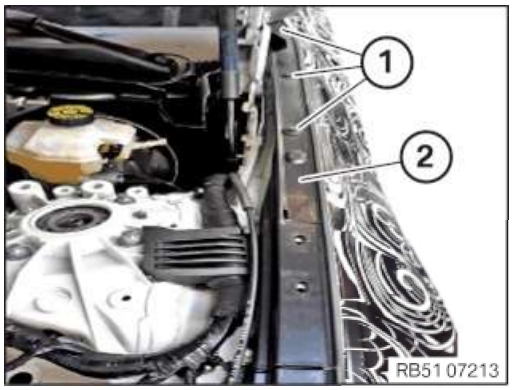
Perform the operations on the left and right side.

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- Loosen the rivet (1).
- Remove side bonnet seal (2) from spring strut dome.

6 – Remove sealing of the side panel

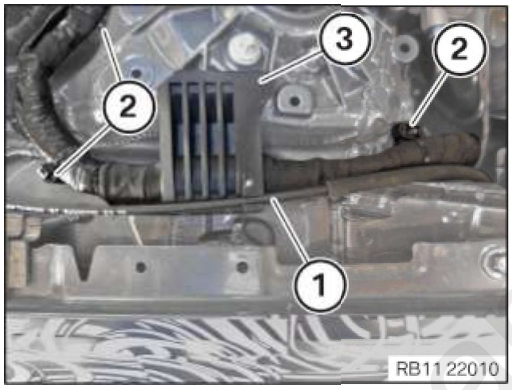


NOTICE

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

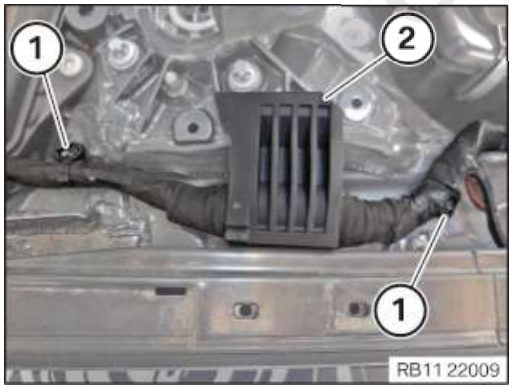
- Loosen the expanding rivet (1).
- Guide out seal (2) and remove.

7 – Partially loosen the wiring harness section on the spring strut dome



- Feed out the cable (1) of the front flap and set it aside.
- Loosen clamps (2).
- Feed out wiring harness section (3) on the spring strut dome on left and set it aside.

8 – Releasing the wiring harness section on the right spring strut dome



- Loosen clamps (1).
- Guide out wiring harness section (2) on the right spring strut dome and set it aside.

9 – Removing the acoustic cover

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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 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

10 – Removing the clean air pipe with the resonator

WARNING

Hot surfaces.

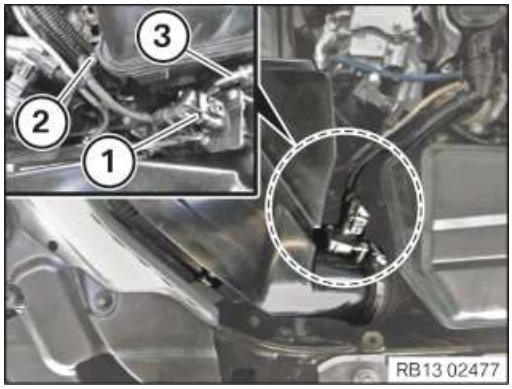
Risk of burning!

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

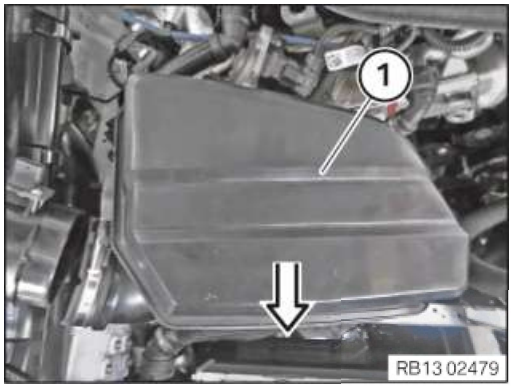


- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.

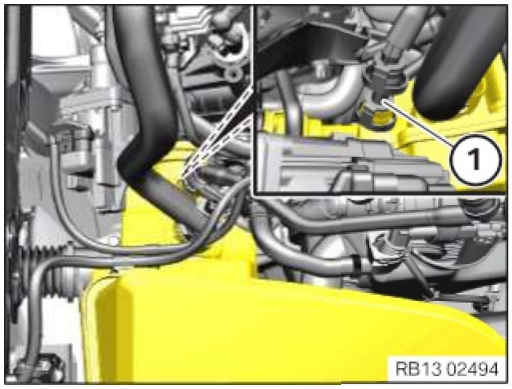
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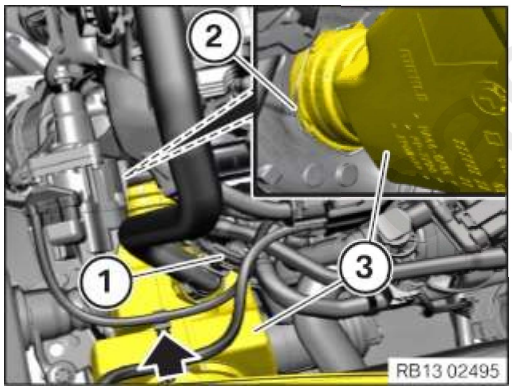
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and disconnect the tank ventilation line (1).



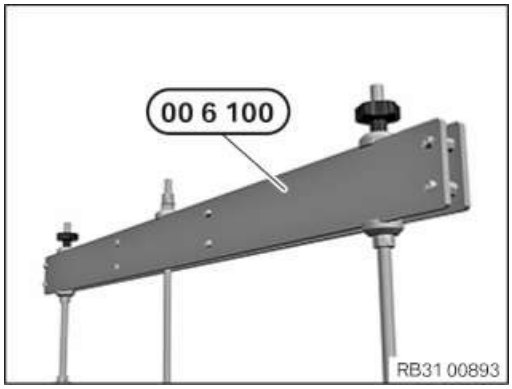
- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

11 – Securing engine in installation position

TECHNICAL INFORMATION

The additional information must be observed without fail!
Proceeding further without working through the additional information is not allowed!

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- See additional information in “11 00 670 - Securing engine in mounting orientation”.

12 – Removing both front wheels

▸ **Removing the wheel**



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

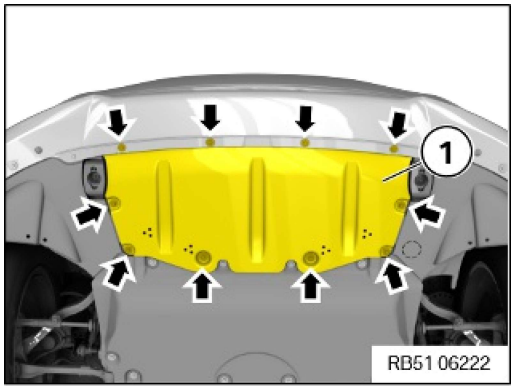
  This process is intended to prevent damage to the brake disc.



- 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.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

13 – Removing the front underbody protection

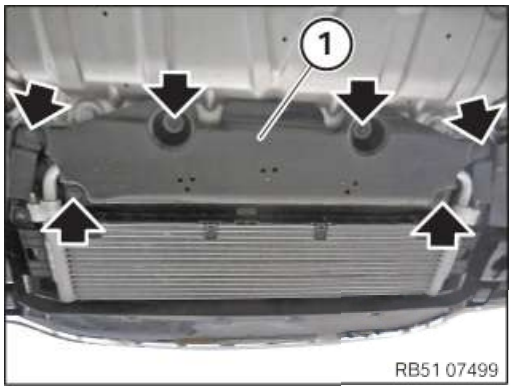
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- **Version 1:**

  Remove screws (arrows).

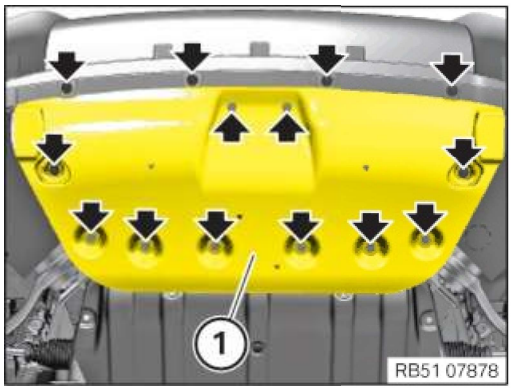
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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

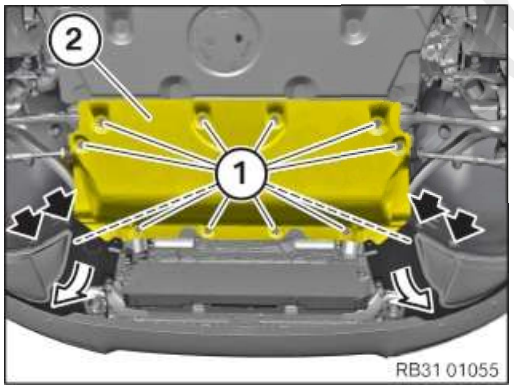


- **Version 3:**

  Remove screws (arrows).

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

14 – Remove the underbody protection of the steering gear



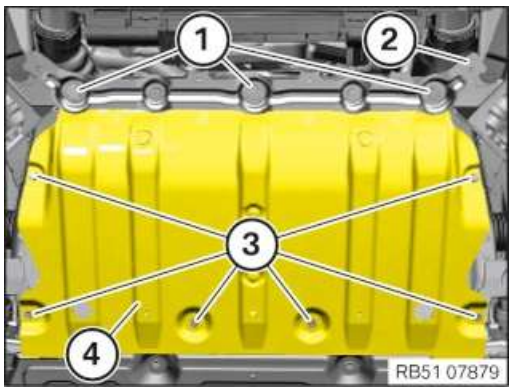
- **Version 1:**

  Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).



- **Version 2:**

  Loosen screws (1).

  Remove the holder of the underride protection (2).

  Loosen screws (3).

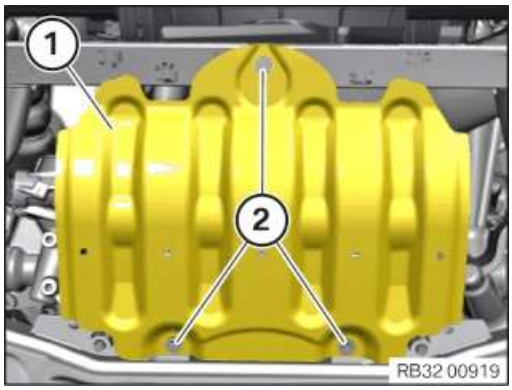
  Slide the steering gear underbody protection (4) out and remove.

15 – If installed: Removing the steering start protection

rdiagn.com

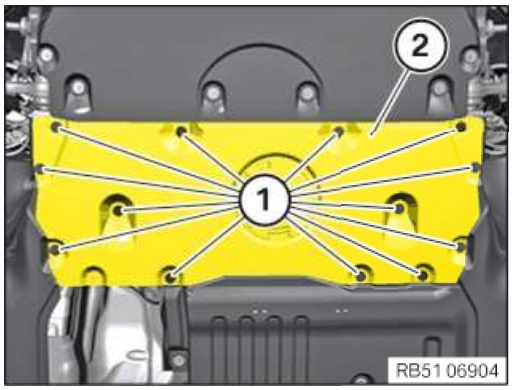
Prerequisite

The front underbody protection is removed.



- Loosen screws (2).
- Remove guard (1).

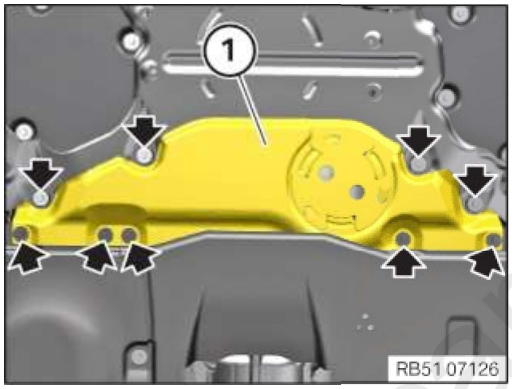
16 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .

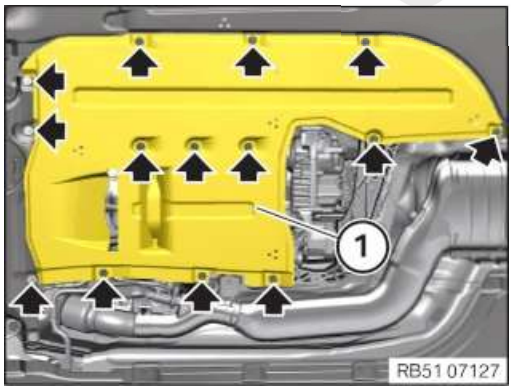


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

17 – Remove rear underbody protection

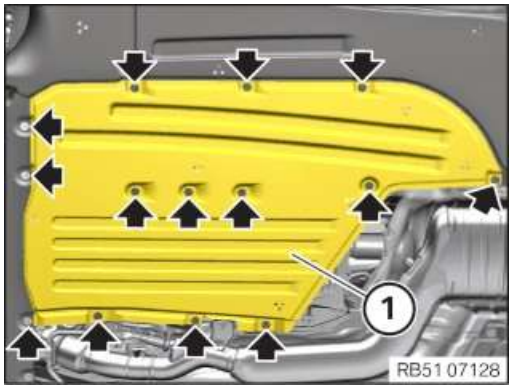


- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

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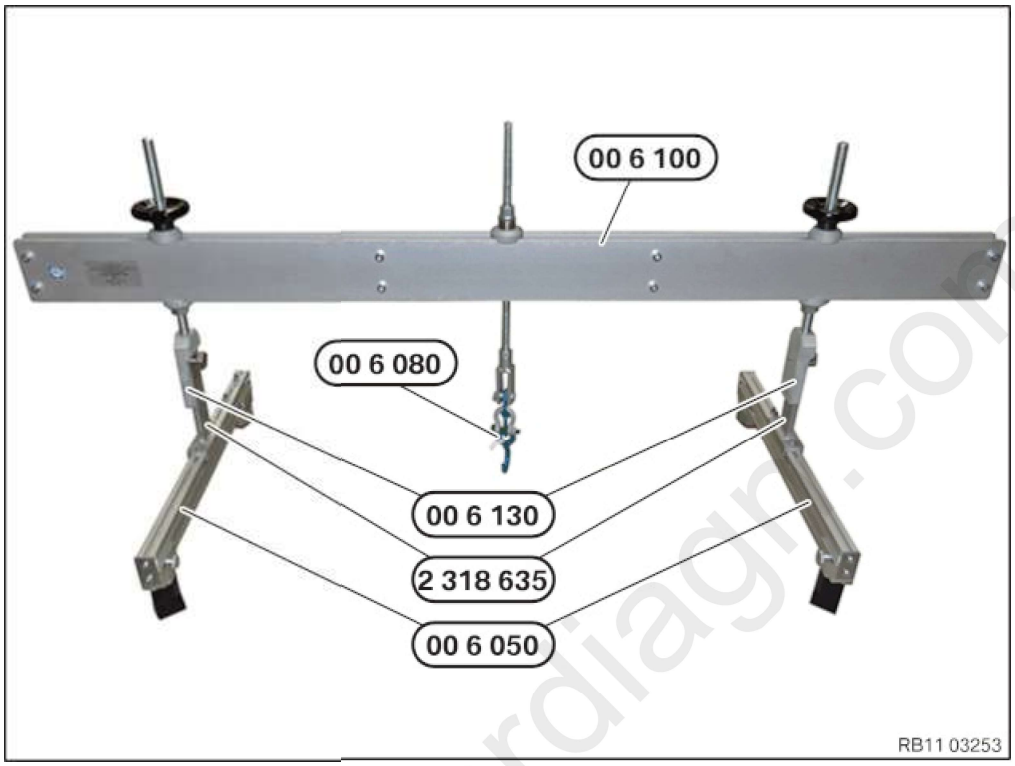
- **Version 2:**

  Remove screws (arrows).

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

18 – Securing engine in installation position

Overview: Prepared engine bridge



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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- **Carefully** position engine bridge (1) with help from an auxiliary person.



- Make sure that special tool on the left is correctly positioned on the lock support.
- Make sure that special tool from the set of special tools , left, rests correctly on the spring strut dome.



- Make sure that special tool on the right is correctly positioned on the lock support.
- Make sure that special tool from the set of special tools , right, rests correctly on the spring strut dome.



- Align the engine bridge by moving it on the profile strips of the special tool above the engine mounting bracket (1) and screw it down.
- Align the hook above the engine mounting bracket (1).
- Connect the hook to the engine mounting bracket (1).



- Check whether the special tool on the right is correctly positioned on the lock support.

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- Check whether the special tool from the special tool kit , right, rests correctly on the spring strut dome.



- Check whether the special tool on the left is correctly positioned on the lock support.



- Check whether the special tool from the special tool kit , left, rests correctly on the spring strut dome.



- Release screw (1) on the left engine mount from the top with a commercially available tool.



- Release screw (1) on the right engine mount from the top with a commercially available tool.

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- Raise the engine by turning the special tool 2 361 506 (00 6 103) (spindle) by 10 mm.

19 – Remove the cover of the steering assembly on the left and right

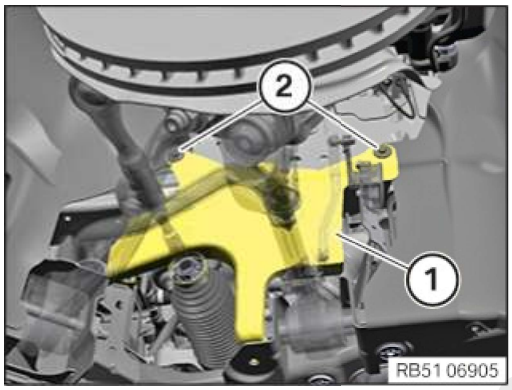
NOTICE

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

▸ **Remove the cover of the steering assembly**

Prerequisite

Underbody protection of the steering gear is removed.



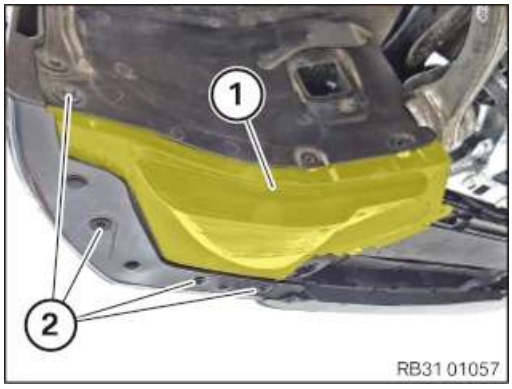
- Loosen screws (2).
- Remove the cover (1).

20 – Removing the bottom left and right wheel arch cover

NOTICE

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

▸ **Remove bottom wheel arch cover**



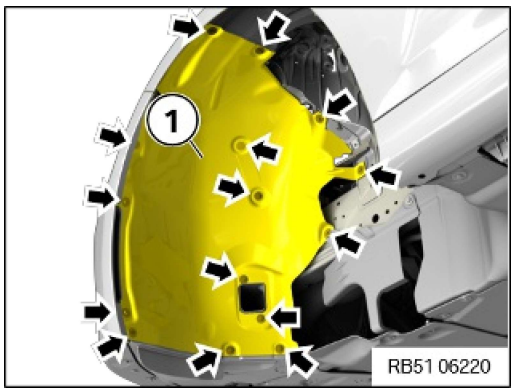
- Loosen screws (2).
- Remove bottom wheel arch cover (1)

21 – Removing the front section of the front wheel arch cover

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NOTICE

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

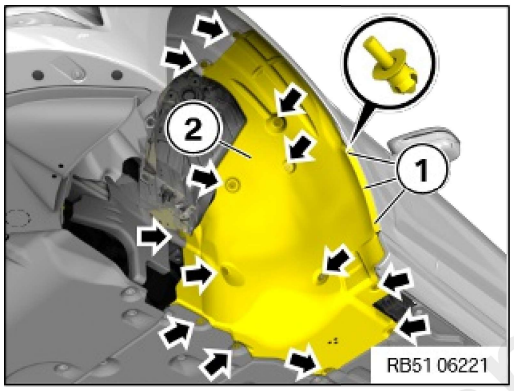


- Remove screws (arrows).
- Remove front section of the front wheel arch cover (1).

22 – Removing the rear section of the front wheel arch cover front

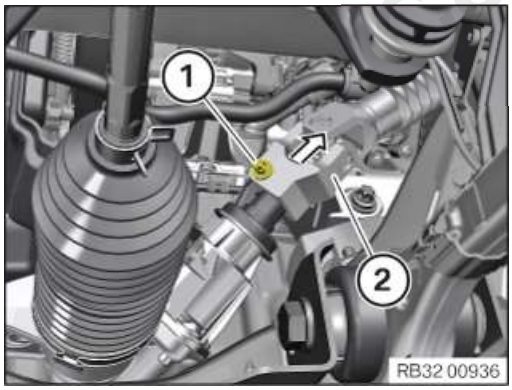
NOTICE

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



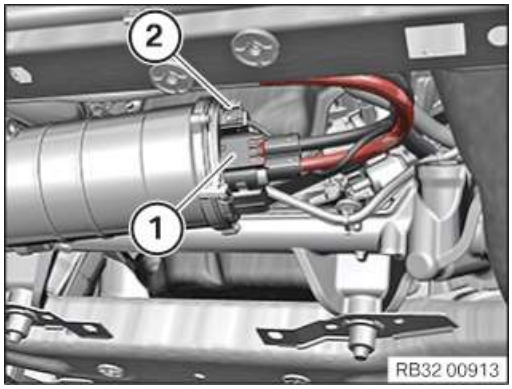
- Loosen the expanding rivet (1).
- Remove screws (arrows).
- Remove the rear section of the front wheel arch cover (2).

23 – Releasing lower steering shaft from steering gear

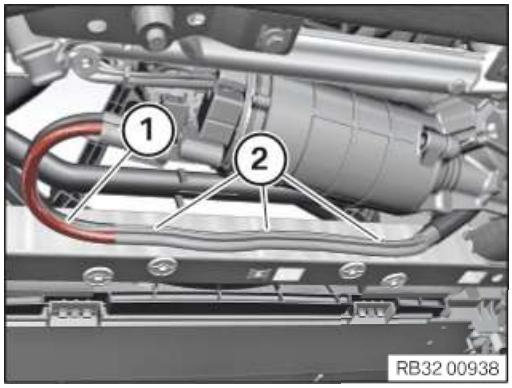


- Loosen screw (1).
- Pull off lower steering shaft (2) from steering gear in direction of arrow.

24 – Detach the wiring harness of the EPS from the front axle support

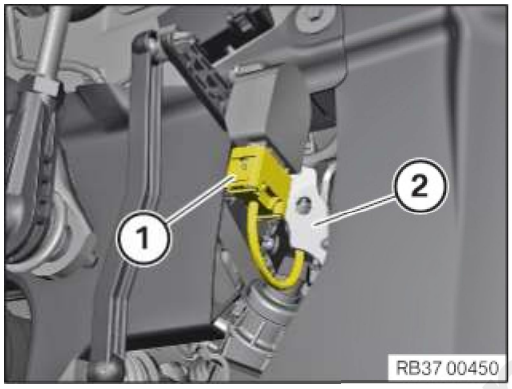


- Unlock and disconnect the plug connections (1) and (2).



- Loosen the holder (2).
- Place wiring harness (1) to one side.

25 – Detach the line connection of the ride height sensor



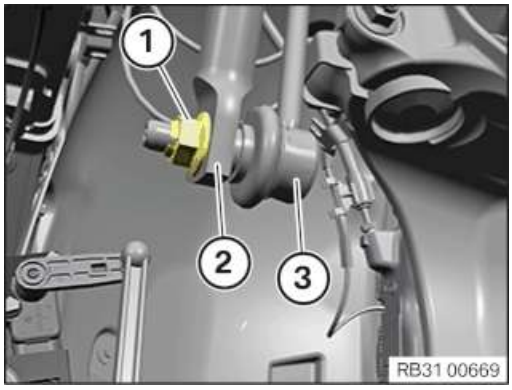
- Unlock plug connection (1) and disconnect.
- Unclip the line from holder (2).

26 – Release the left and right anti-roll bar link from the anti-roll bar

NOTICE

Perform the operations on the left and right side.

▸ **Loosening the anti-roll bar link from the anti-roll bar**



- Loosen nut (1).

Note: Use the Torx socket for counter support.

- Loosen the anti-roll bar link (3) from the anti-roll bar (2).

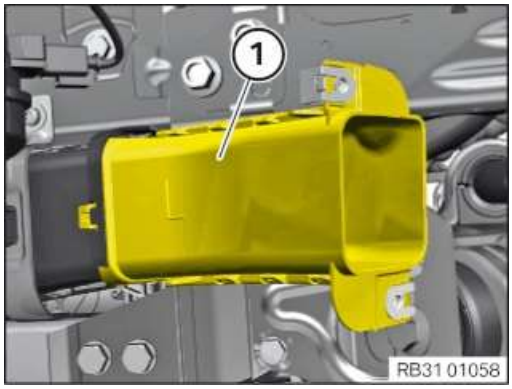
27 – Removing the left and right brake air duct partially

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NOTICE

Perform the operations on the left and right side.

▸ **Removing brake air duct partially**

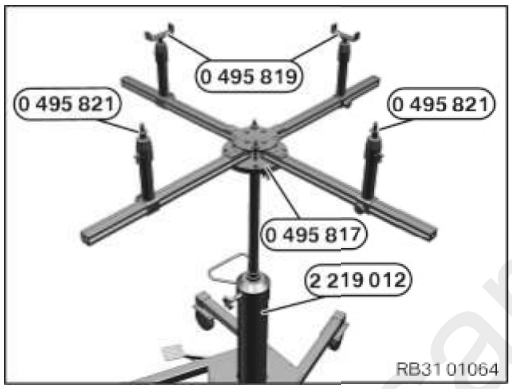


- Unclip and remove air duct (1).

28 – Preparing the special tool

TECHNICAL INFORMATION

In a profile rail pair, two profile rails are connected to one another by gearing.



- Fit the special tool completely on the universal jack 2 219 012 with the help of 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.

29 – Lower front axle support

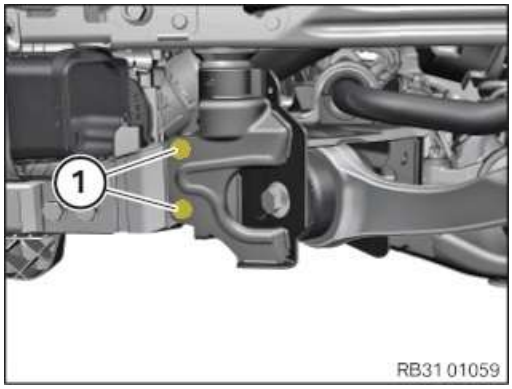
WARNING

Falling or tipping of a heavy component.

Danger! Life-threatening injuries!

- Before lowering or removing the front axle: Secure the engine in mounting orientation.
- For additional information see: 11 00 670 Securing engine in installation position.

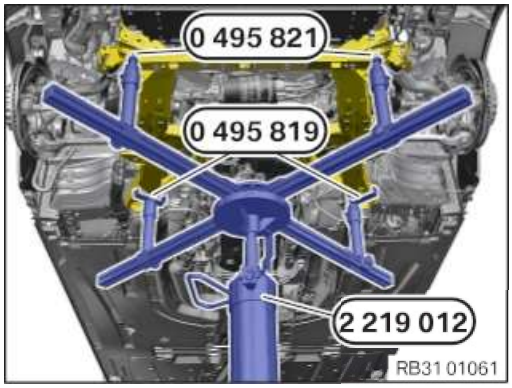
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NOTICE

Perform the operations on the left and right side.

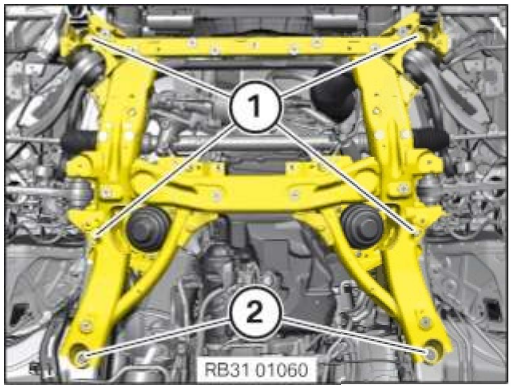
- Loosen screws (1).



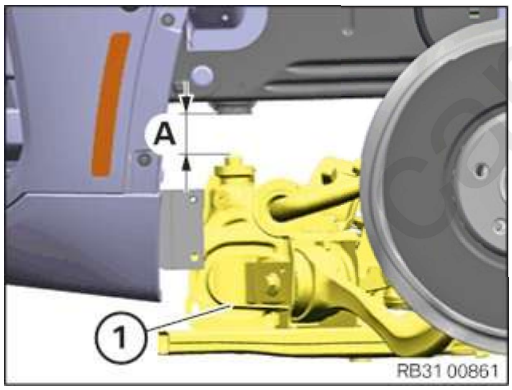
- Position the universal jack 2 219 012 with the special tools and on the front axle support.

  The centre of gravity of the front axle must be centred over the universal jack 2 219 012 !

- Support the front axle support with the universal jack 2 219 012.



- Loosen screws (1) and (2).



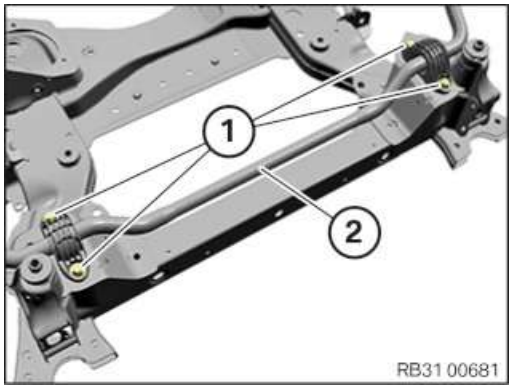
- Lower the front axle support (1) with the universal jack by dimension (A).

  Dimensions (A) = maximum 15 cm

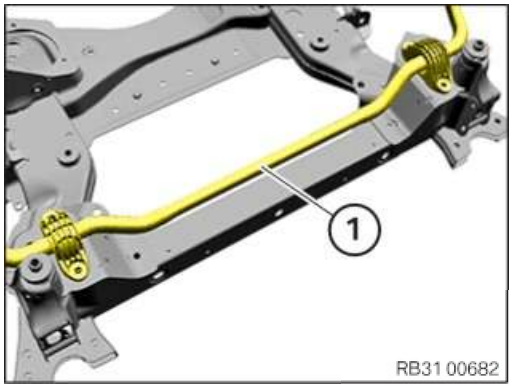
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MAIN WORK

30 – Removing the anti-roll bar

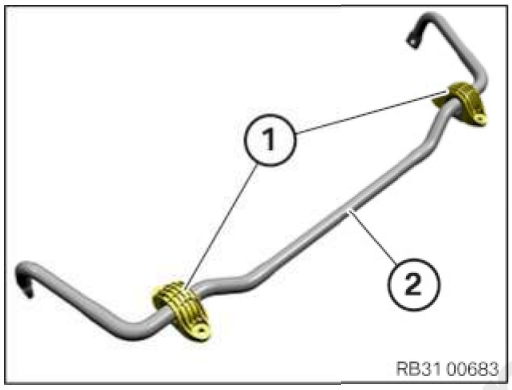


- Unscrew the bolts (1) from the anti-roll bar (2).



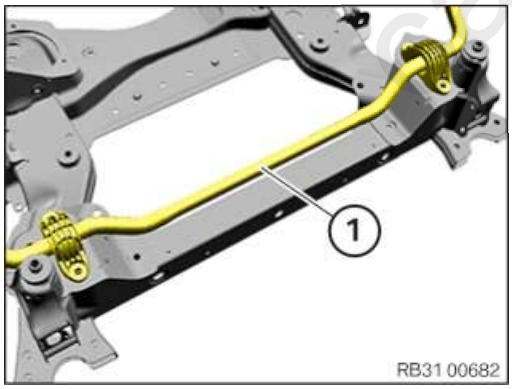
- Remove the anti-roll bar (1).

31 – Replacement: Remount the retaining bracket for the anti-roll bar

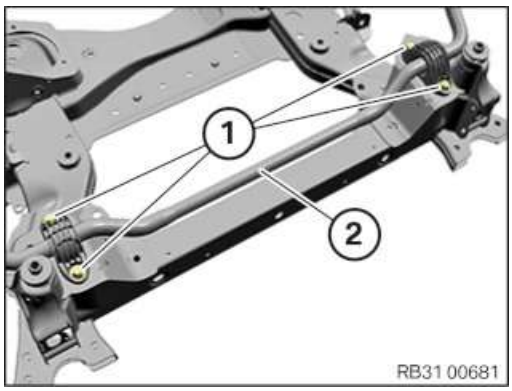


- Remove retaining bracket (1) from anti-roll bar (2) and mount on new anti-roll bar.

32 – Installing the anti-roll bar



- Guide the anti-roll bar (1) in at the side and position it on the front axle support.



- Renew screws (1).

  Parts: Bolts

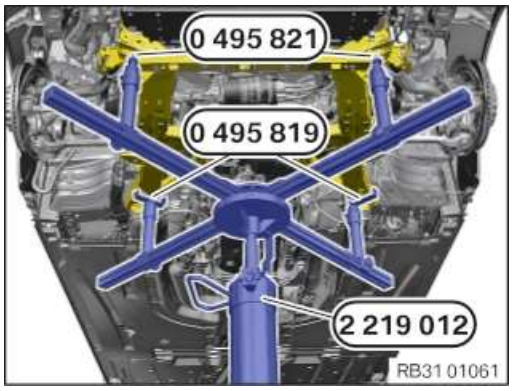
- Tighten the screws (1).

Retaining bar, stabiliser, to front axle carrier

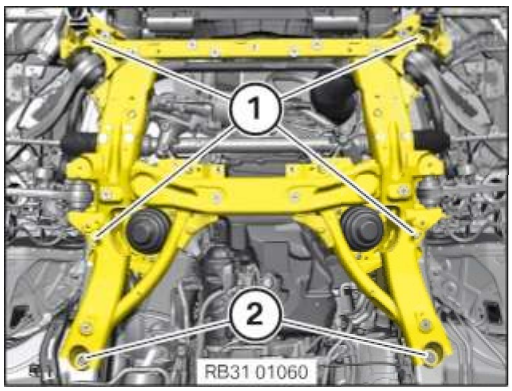
M8	Renew screws.	Tightening torque	19 Nm

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33 – Lift front axle support and fasten.



- Carefully lift the front axle support with the universal jack 2 219 012 and position on the body.



- Replace the screws (1).

  Parts: Bolts

- Tighten the screws (1).

Front axle support to front/centre of body

M12	Renew screws.	Jointing torque	108 Nm

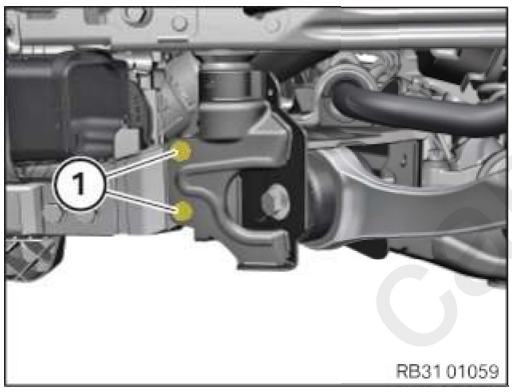
- Replace the screws (2).

  Parts: Bolts

- Tighten the screws (2).

Front axle carrier to body, rear

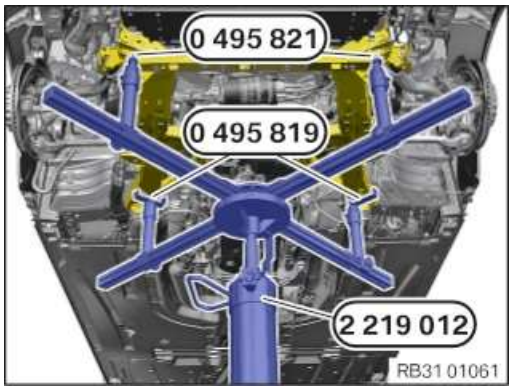
M14	Renew screws.	Tightening torque	175 Nm



- Position the adapter for the front axle support on the front axle support .
- Tighten the screws (1).

Adapter, front axle support to front axle support

M8x70		Tightening torque	19 Nm



- Lower the universal jack 2 219 012 and place to one side.

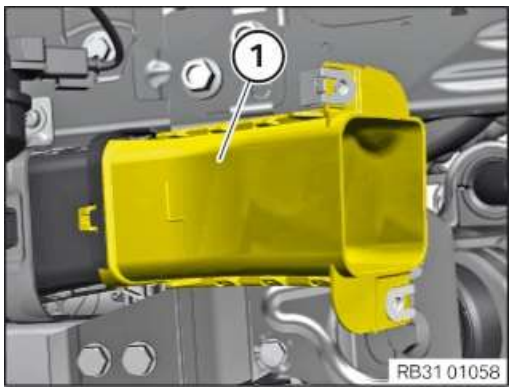
34 – Partially installing the left and right brake air duct

NOTICE

Perform the operations on the left and right side.

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▶ **Installing the brake air duct partially**



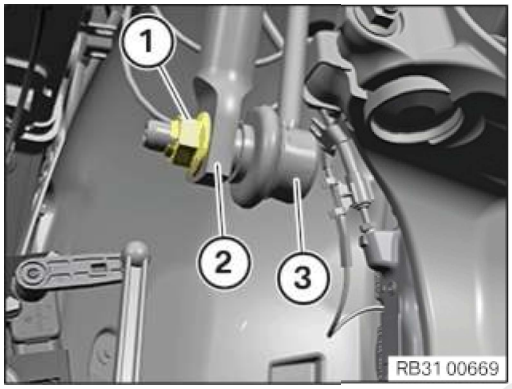
- Position and clip in air duct (1).

35 – Securing the anti-roll bar link to the left and right anti-roll bar

NOTICE

Perform the operations on the left and right side.

▶ **Securing the anti-roll bar link to the anti-roll bar**



- Position the anti-roll bar link (3) on the anti-roll bar (2).
- Renew nut (1).

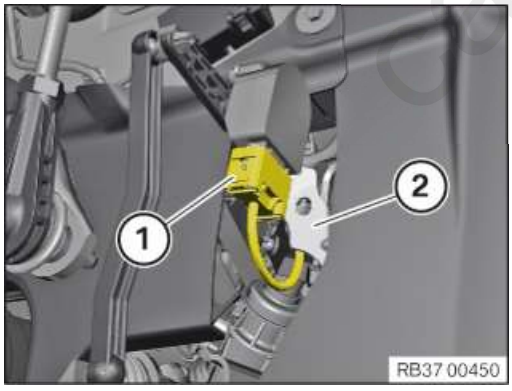
  Parts: Nut
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Front anti-roll bar link to anti-roll bar/spring strut

M10	Renew nut.	Tightening torque	56 Nm

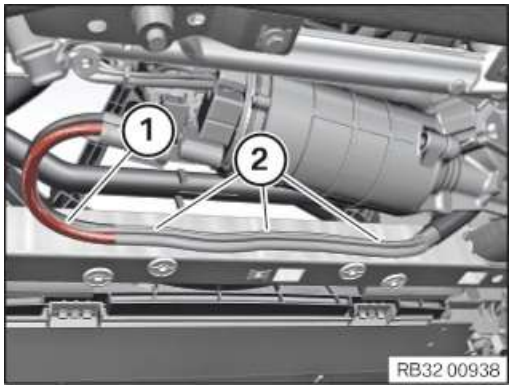
36 – Attach the line connection of the ride height sensor



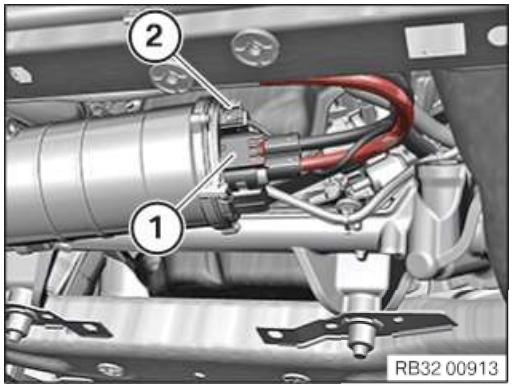
- Position the line .
- Clip in line on holder (2) .
- Connect connectors (1) and lock.

37 – Secure the wiring harness for the EPS on the front axle support

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- Position the EPS wiring harness (1) from the front axle support.
- Secure the holder (2).

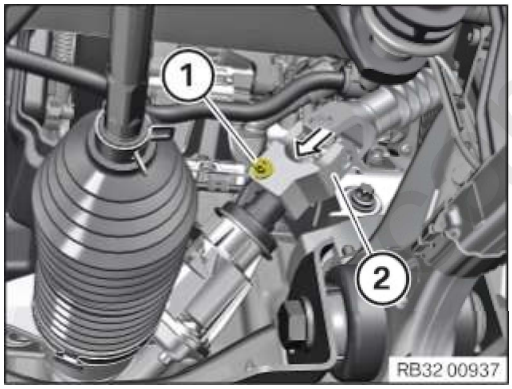


- Connect connectors (1) and (2) lock.

38 – Securing the steering shaft at the bottom on the steering gear

TECHNICAL INFORMATION

The universal joint can only be installed in one position.
The universal joint and the bottom steering gear and/or steering shaft are encoded with each other.
The clamping bolt must e positioned in the groove of the steering gear groove or the steering shaft.



- Clean the screw threads to remove all remnants of screw locking adhesive.
- Slide the lower steering shaft (2) onto the steering gear in the direction of the arrow.
- Renew the clamping bolt (1).

  Parts: Clamping bolt
- Tighten the clamping bolt (1).

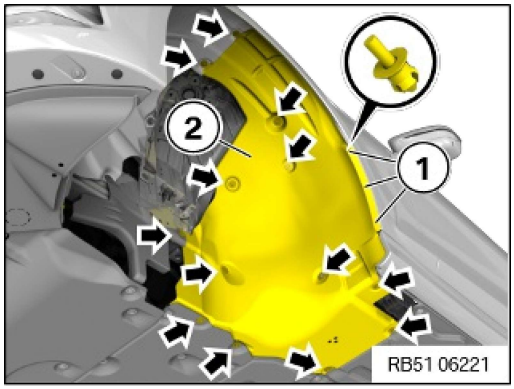
Universal joint to steering box

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

39 – Install the rear section of the front wheel arch cover

NOTICE

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



- Install the rear section of the front wheel arch cover(2) .
- Tighten screws (arrows).

Wheel arch trim panel, front

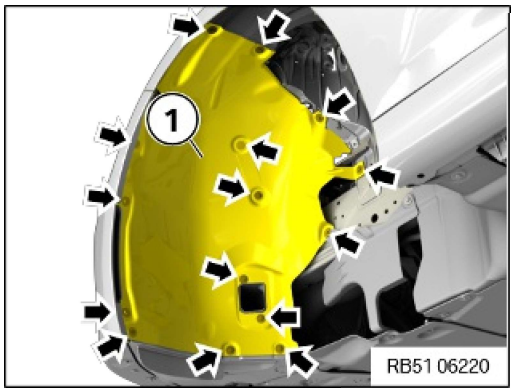
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

- Secure expanding rivet (1).

40 – Install the front section of the front wheel arch cover

NOTICE

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



- Install the front section of the front wheel arch cover (1).
- Tighten screws (arrows).

Wheel arch trim panel, front

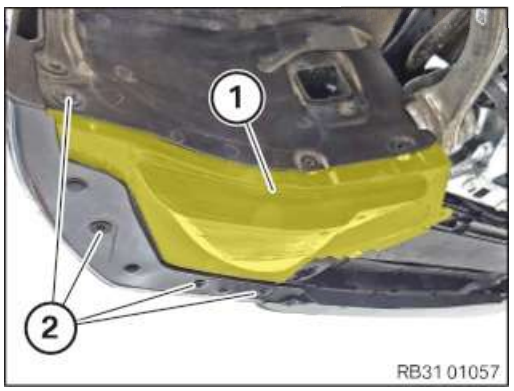
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

41 – Installing the bottom left and right wheel arch cover

NOTICE

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

▸ **Installing the bottom wheel arch cover**



- Position the bottom wheel arch cover (1).
- Tighten the screws (2).

Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

42 – Install the cover of the steering assembly on the left and right

NOTICE

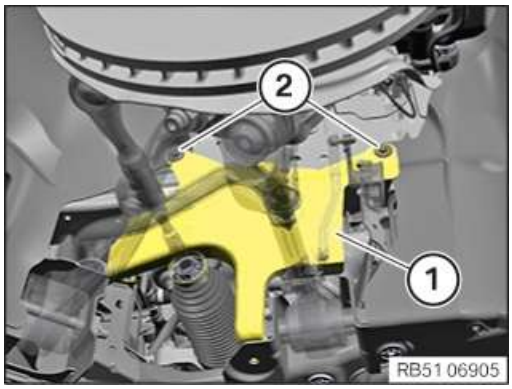
Description is for left component only. Procedure on the right side is identical.

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▸ **Install the cover of the steering assembly**

Prerequisite

The underbody protection of the steering gear is removed.



- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

43 – Loosen the attachment of the engine in installation position



- Lower engine by turning the spindle 2 361 506 (00 6 103) until the engine lies completely on the engine supports.



TECHNICAL INFORMATION

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

- Remove the engine bridge (1) with an auxiliary person.



- Tighten bolt (1) of the left engine mount from the bottom using a standard tool.

Engine mount to engine mounting bracket

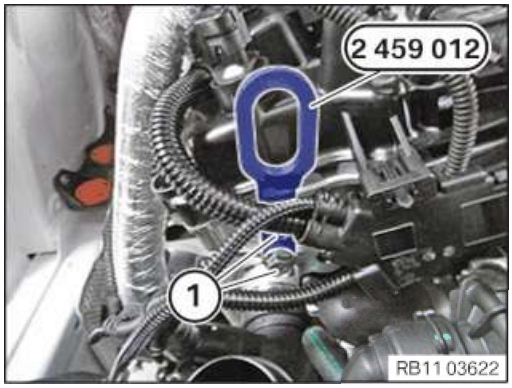
M12		Tightening torque	100 Nm



- Tighten bolt (1) of the right engine mount from the top using a standard tool.

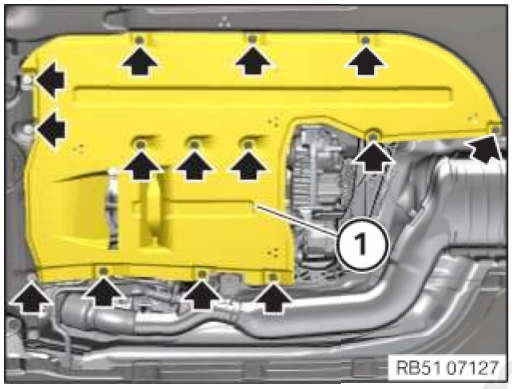
Engine mount to engine mounting bracket

M12		Tightening torque	100 Nm



- 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.

44 – Installing underbody protection at rear



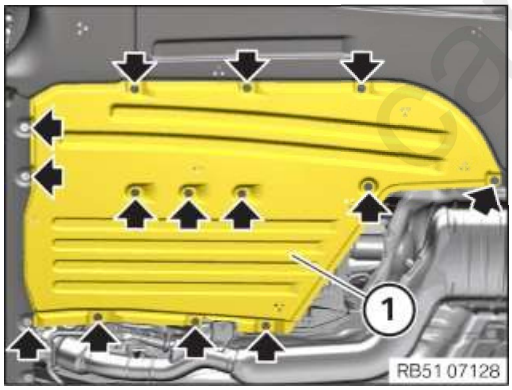
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

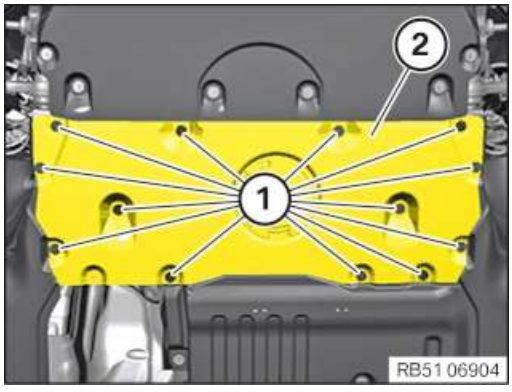
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

45 – Installing the centre underbody protection



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

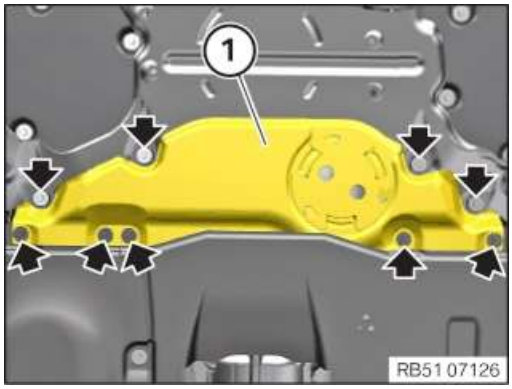
  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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

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

  Tighten screws (arrows).

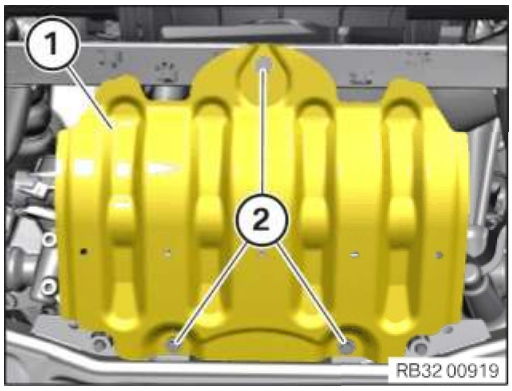
Underbody protection

Hexagon screw		Tightening torque	3 Nm

46 – If installed: Installing the steering guard

Prerequisite

The front underbody protection is removed.

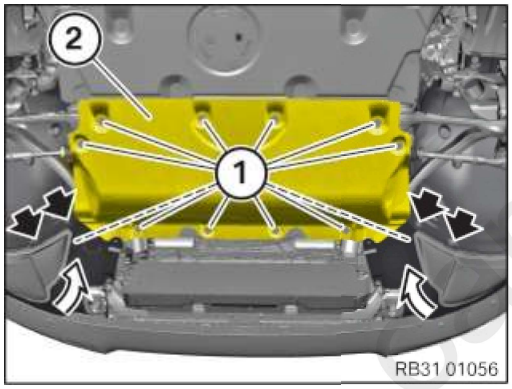


- Remove guard (1).
- Tighten the screws (2).

Bumper buffer device steering on front axle support

M10		Tightening torque	56 Nm

47 – Install the underbody protection of the steering gear



- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

Underbody protection of the steering gear

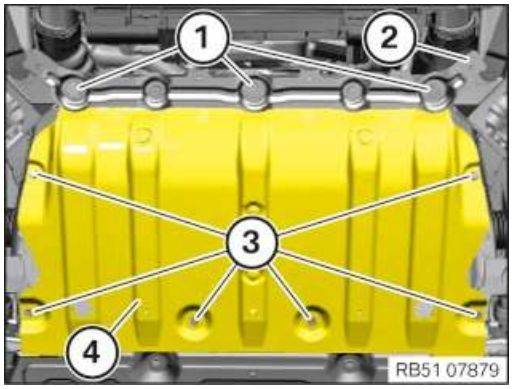
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm

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- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

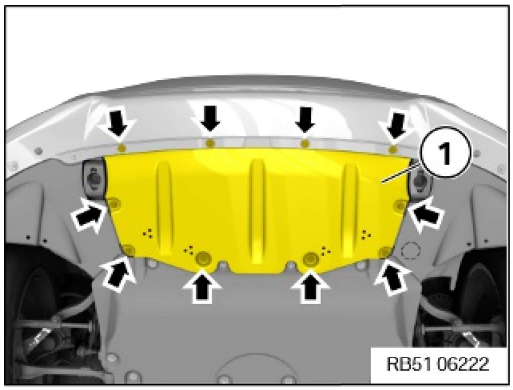
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

48 – Installing the front underbody protection



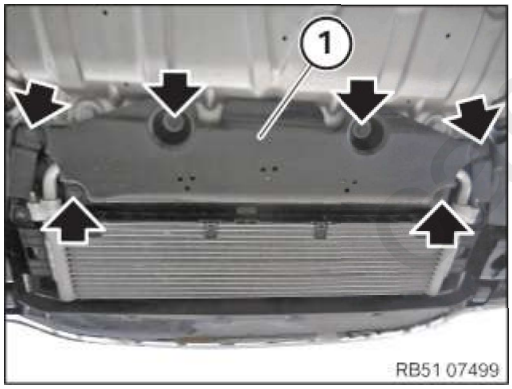
- **Version 1:**

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

Tighten screws (arrows).

Underbody protection front

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



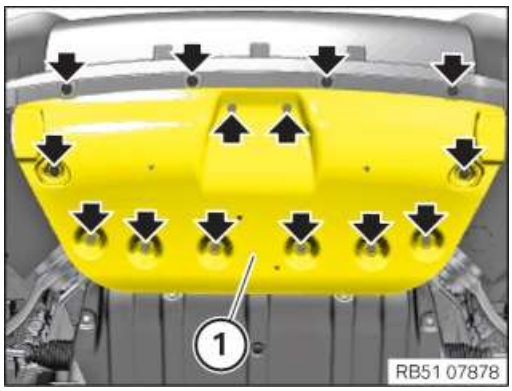
- **Version 2:**

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

Tighten screws (arrows).

Underbody protection front

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



- **Version 3:**

Feed in and install front underbody protection (1).

Tighten screws (arrows).

Underbody protection front

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

49 – Installing both front wheels

▸ **Mounting the wheel**

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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.

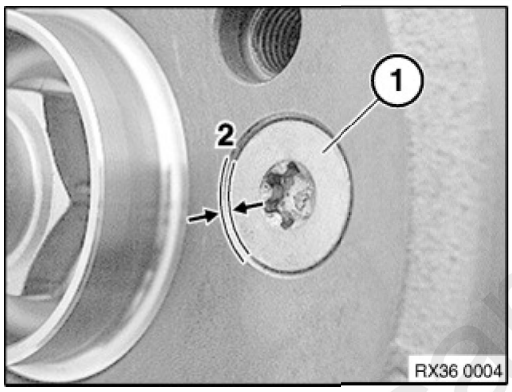
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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).



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

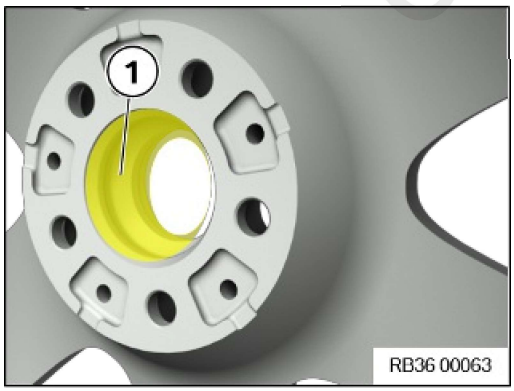
  The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

catalagn.com



- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

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

Wheel bolts

M14 / SW17	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 Check	140 Nm 140 Nm

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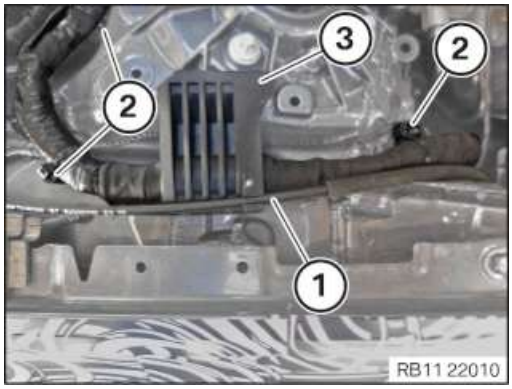
50 – Securing the wiring harness section to the left spring strut dome

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 position wiring harness section (3) on the left spring strut dome.
- Secure clamps (2).
- Guide in and install cable (1) of the front flap.

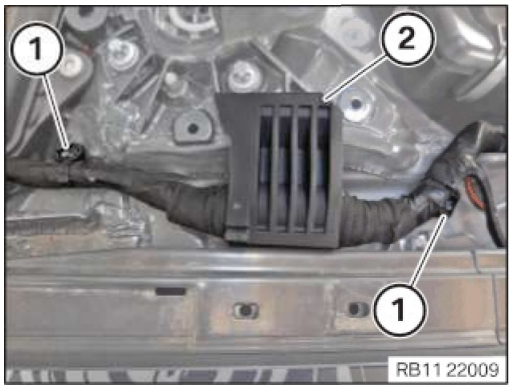
51 – Secure wiring harness section on right spring strut dome

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

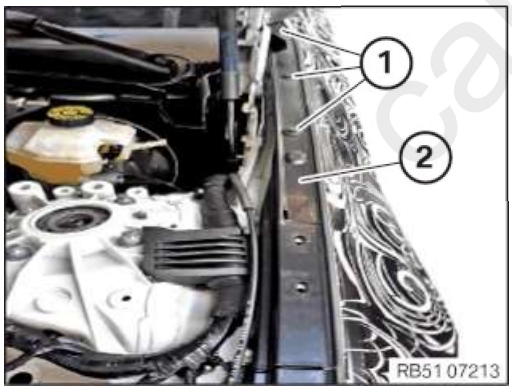
Trapped, crushed or damaged cables may cause short circuits and malfunctions.

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



- Guide in and position the wiring harness section (2) of right spring strut dome.
- Secure clamps (1).

52 – Installation of side panel sealing.



NOTICE

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

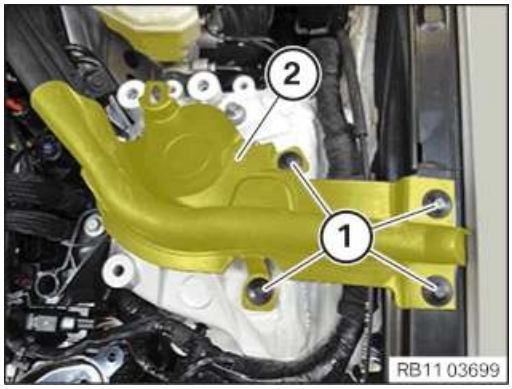
- Guide the sealing (2) in and install it.
- Mount the expanding rivets (1).

53 – Install side bonnet seals

NOTICE

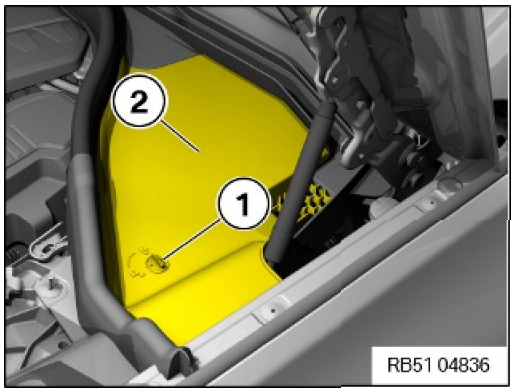
Perform the operations on the left and right side.

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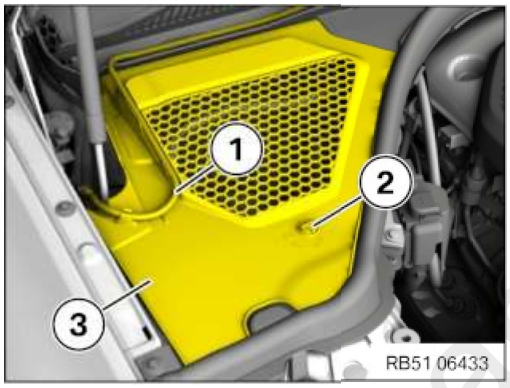
- Position the side bonnet seal (2) on the spring strut dome.
- Secure the rivet (1).

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



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

55 – Install the rear right engine compartment cover



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

56 – Installing the clean air pipe with resonator



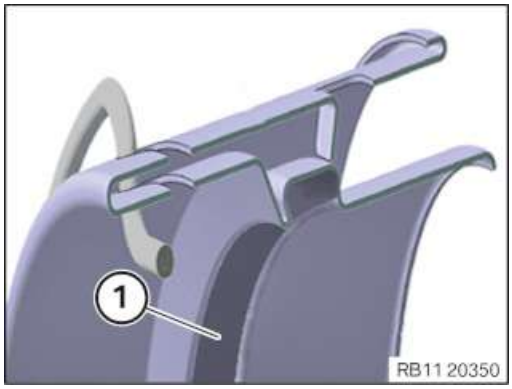
- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

TECHNICAL INFORMATION

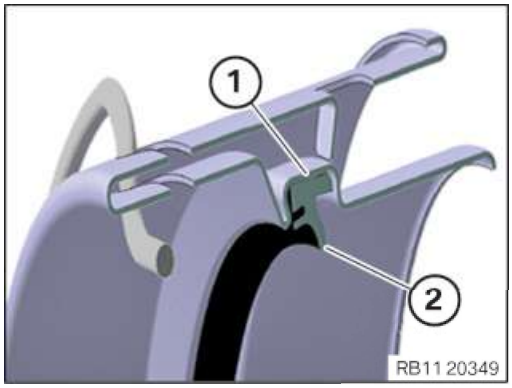
Do not use pointed or sharp-edged tools for the installation and/or removal.

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- Remove damaged seal.
- Clean gasket groove (1) with a dry towel.

  The gasket groove (1) must be clean.



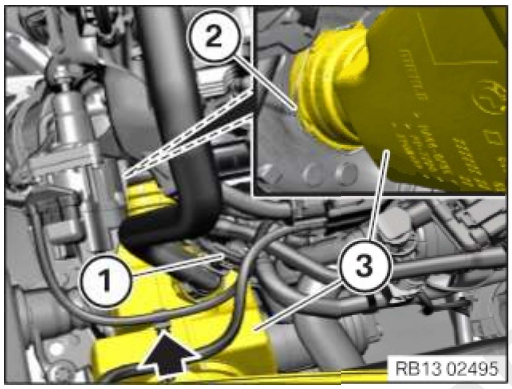
- Renew gasket.

  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

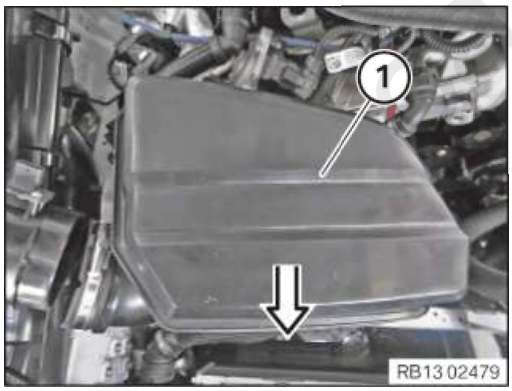
- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).



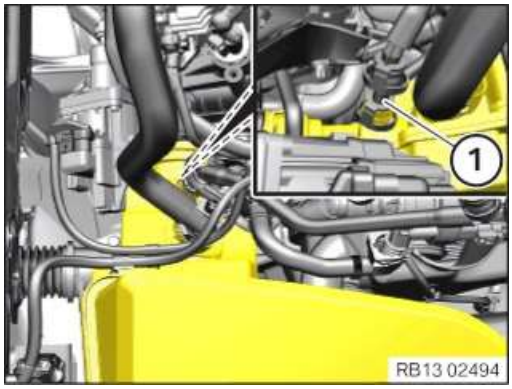
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

  The clamp (2) must engage audibly.
- Connect connectors (1) and lock.

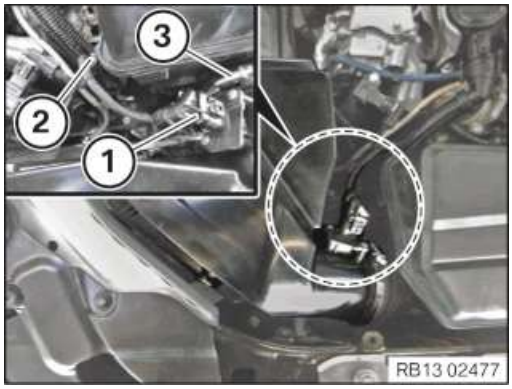
  The connector (1) must engage audibly.
- Secure clamp (arrow).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Connect and lock the tank ventilation line (1).



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure the clamp (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Insert and install the engine ventilation line (2).
- Ensure that the locks (1) engage audibly.

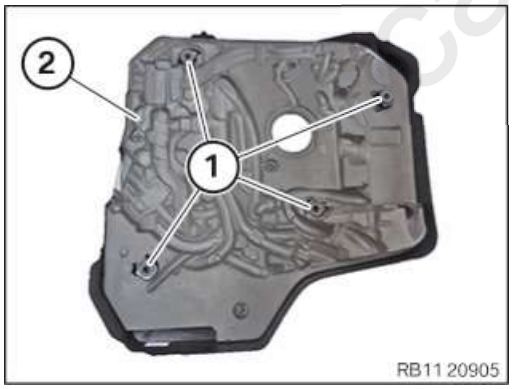
57 – Install acoustic cover

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 all rubber mounts (1) of acoustic cover (2) for correct seating.



- Clip in the acoustic cover (1) into the holders in the **marked** areas.

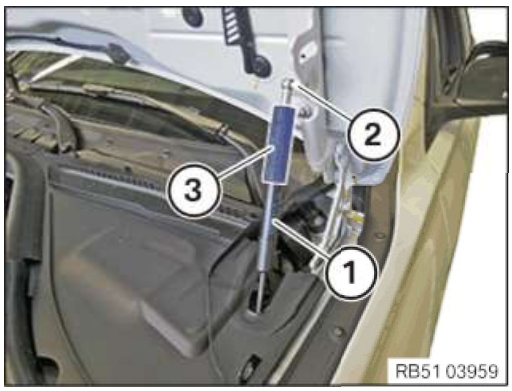
  The acoustic cover (1) must audibly engage into place.

58 – Disconnecting all battery earth leads

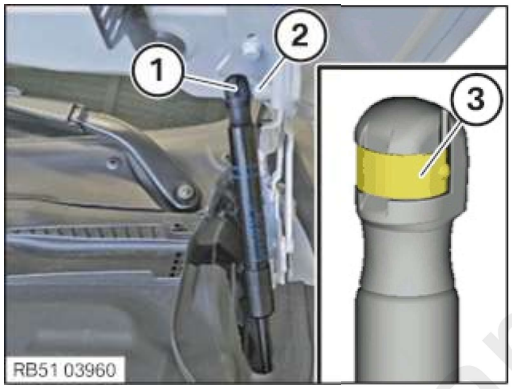


- See additional information.

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

Special tool to cylinder head — Used in step 18

M8		Tightening torque	21,5 Nm

Retaining bar, stabiliser, to front axle carrier — Used in step 32

M8	Renew screws.	Tightening torque	19 Nm

Front axle support to front/centre of body — Used in step 33

M12	Renew screws.	Jointing torque	108 Nm

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Front axle carrier to body, rear — Used in step 33

M14	Renew screws.	Tightening torque	175 Nm

Adapter, front axle support to front axle support — Used in step 33

M8x70		Tightening torque	19 Nm

Front anti-roll bar link to anti-roll bar/spring strut — Used in step 35

M10	Renew nut.	Tightening torque	56 Nm

Universal joint to steering box — Used in step 38

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

Wheel arch trim panel, front — Used in step 3940

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Cover, front bottom on side — Used in step 41

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Cover, steering unit — Used in step 42

Screw		Tightening torque	3 Nm

Engine mount to engine mounting bracket — Used in step 43

M12		Tightening torque	100 Nm

Underbody protection — Used in step 4445

Hexagon screw		Tightening torque	3 Nm

Bumper buffer device steering on front axle support — Used in step 46

M10		Tightening torque	56 Nm

Underbody protection of the steering gear — Used in step 47

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws) — Used in step 47

Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support — Used in step 47

M10		Tightening torque	56 Nm

Underbody protection front — Used in step 48

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

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Brake disc to front wheel hub Used in step 49

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub Used in step 49

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts Used in step 49

M14 / SW17	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 Check	140 Nm 140 Nm

Clean air pipe to upper section of intake filter housing Used in step 56

Clamp		Tightening torque	3 Nm

Overview of Special Tools

2 459 012 Holder



Common Used in step 1843

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)

2 361 506 (00 6 103) Spindle



Common Used in step 1843

Usage	Spindle (central spindle) for Traverse 00 6 100.
Included in the tool or work	0 496 852
Storage location	
Replaced by	
In connection with	
SI-Number	01 17 10 (659)

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2 219 012 Hydraulic lifter



Common	Used in step 282933
Usage	For raising and lowering various vehicle components.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 90 (207)

2 344 011 Tool



Common	Used in step 49
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:

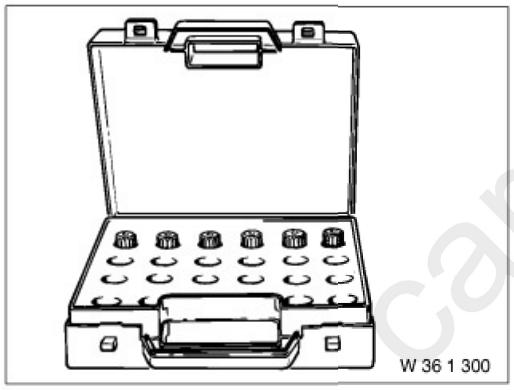
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0 495 221 (36 1 323) Wheel stud



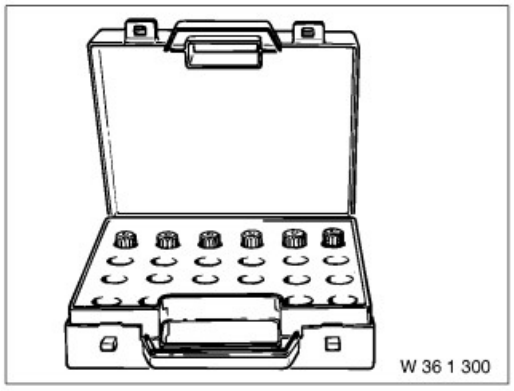
Common	Used in step 12
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 224 (36 1 326) Wheel stud



Common	Used in step 12
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 12
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	

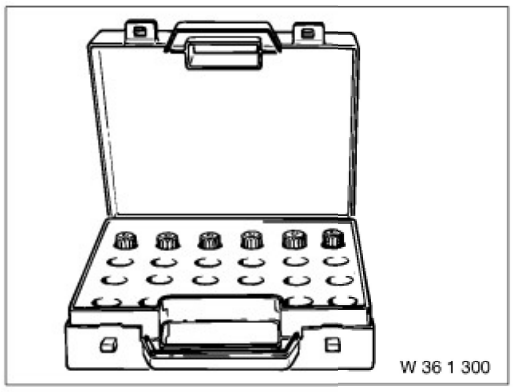
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0 495 226 (36 1 328) Wheel stud



Common	Used in step 12
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 12
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 12
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 12
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	

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0 495 230 (36 1 333) Wheel stud



Common	Used in step 12
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

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	258
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	258
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258
61 20 900 Disconnecting and connecting battery earth lead	258

00 .. ... Raising the vehicle using a vehicle hoist

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31 60 ... Notes on removing and installing Low Profile band clamps

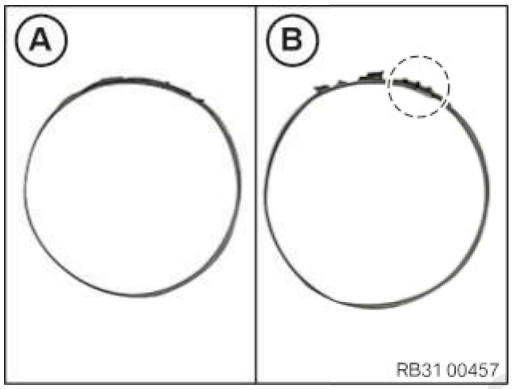
Special tools required:

- 31 5 200
- 2 413 949



Important!

During removal Low Profile band clamp (dotted line) is overstretched and must not be reused!

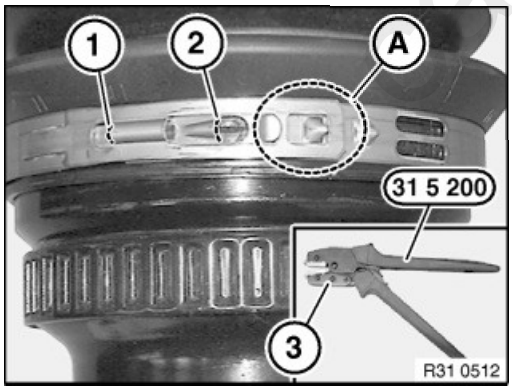


Depending on the design of the Low Profile band clamps, a different special tool (pliers) is needed for installation.

Identify band clamp and find required special tool.

Band clamp type A = pliers 31 5 200

Band clamp type B = pliers 2 413 949

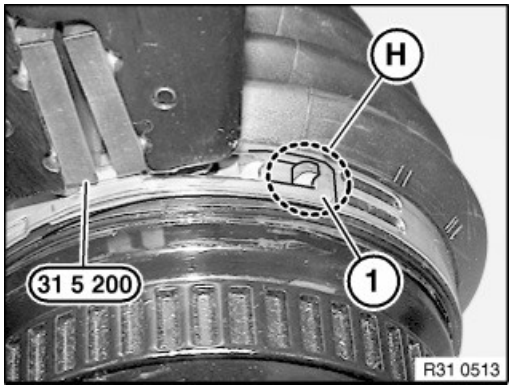


Installation (type A):

Position Low Profile band clamp in installation position (A) on gaiter.

Place special tool 31 5 200 on tabs (1, 2).

Note:
Make sure that the movable leg (3) of the special tool is placed on tab (1).



Check and if necessary correct positions of gaiter and Low Profile band clamp.

Compress Low Profile band clamp with special tool 31 5 200 and press on end of band clamp (1).

Relieve tension on special tool and remove.

Check hook fastener (H); if necessary, repeat operation with new Low Profile band clamp.



Installation (type B):

Position Low Profile band clamp in installation position on gaiter.

Place special tool 2 413 949 on tabs (1).



Check and if necessary correct positions of gaiter and Low Profile band clamp.

Press Low Profile band clamp together with the special tool 2 413 949 until the hook fastener engages.

Relieve tension on special tool and remove.

Check hook fastener; if necessary, repeat operation with new Low Profile band clamp.

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00 00 ... Microencapsulated screws



Screw securing adhesive is a means of preventing a screwed connection from being loosened by external influences.

Once the screw has been coated with adhesive, the adhesive remains inactive until such time that it is activated by the encapsulation breaking when the screw is inserted and then cures (hardens) at room temperature.



Installation note:

- Screw connection must be completed within 20 mins. (start of curing)
- Microencapsulated screws must not be retightened
- Thread of nut must be cleaned beforehand in event of repeated use

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