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



Danger of injury!

Contact with eyes or skin may result in injury!

Possible symptoms are:

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



Protective measures/rules of conduct:

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



First aid measures:

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

  Note: Do not use solvents/thinners.

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



Danger of poisoning!

Ingesting oil or absorbing through the skin may cause poisoning!

Possible symptoms are:

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



Protective measures/rules of conduct:

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



First aid measures:

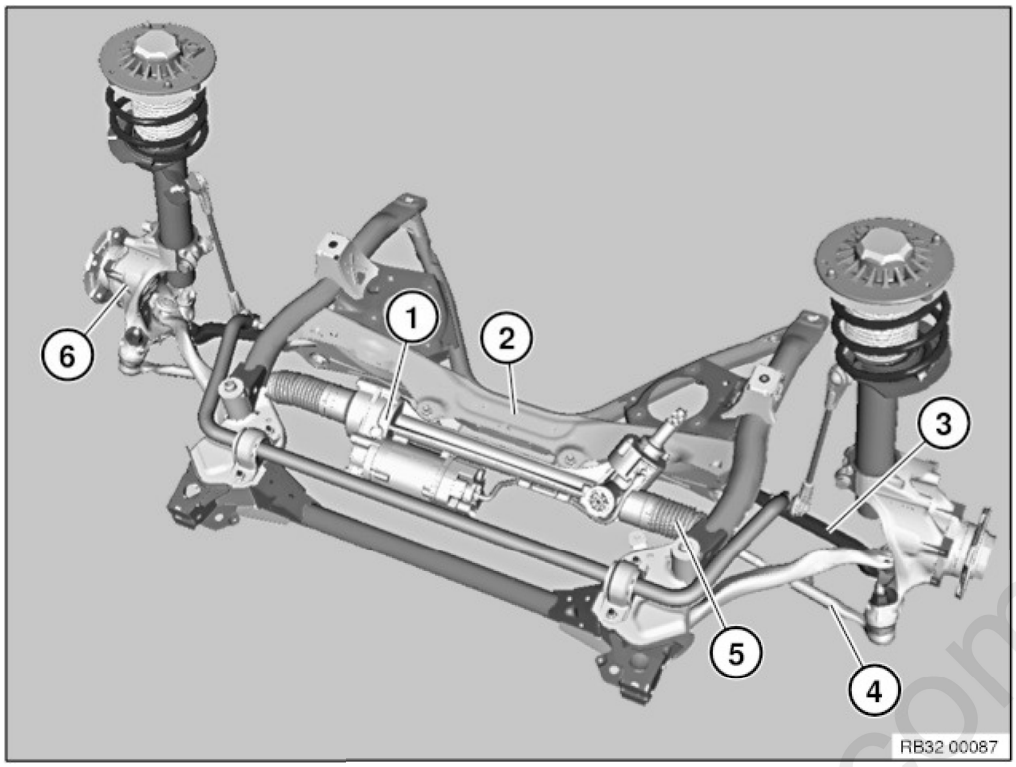
- Do not induce vomiting.

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

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

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31 00 ... Front axle + steering: wheel/chassis alignment check must be carried out after the following work



A wheel alignment check must be carried out after the following work:

Release the following screw connections:

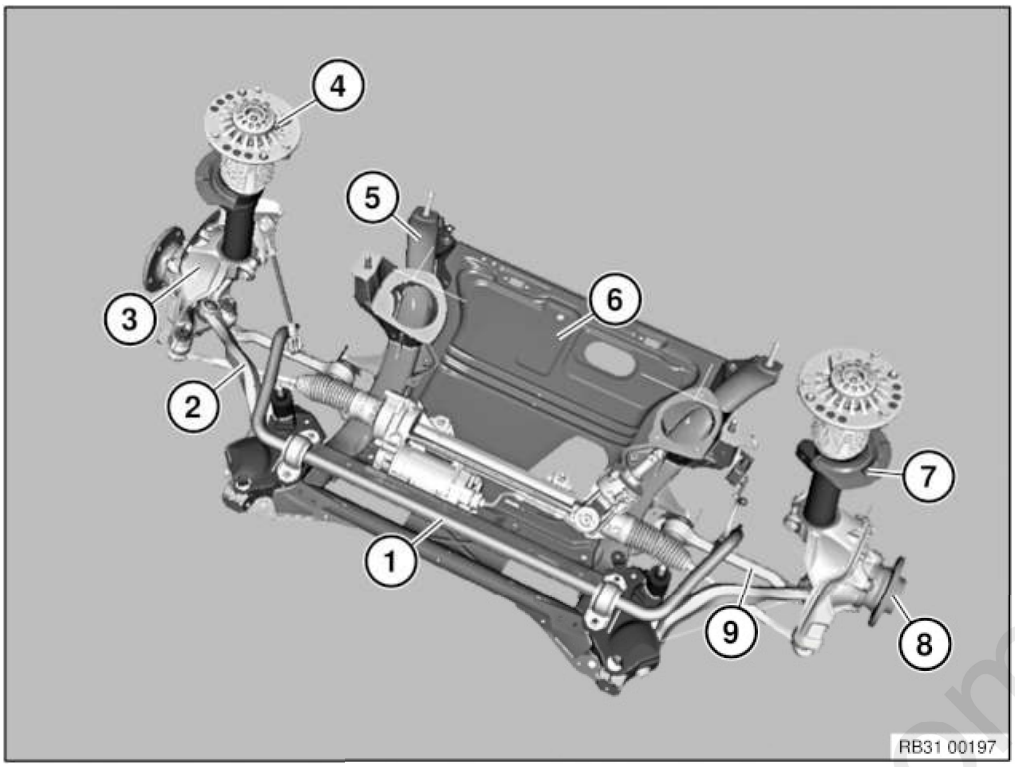
- Steering box to front axle support
- Lower wishbone to front axle support
- Track rod end to track rod

Replace the following components:

- Steering box (1)
- Front axle support (2)
- Wishbone, bottom (3)
- Track rod end (4)
- Track rod (5)
- Swivel bearing (6)

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31 .. ... Front axle overview



Safety instructions and general information

Testing/adjustment work

1 Anti-roll bar / anti-roll bar link
2 Trailing link/rubber mount
3 Swivel bearing
4 Support bearing
5 Front axle support
6 Reinforcement plate
7 Spring strut shock absorber
8 Wheel bearing
9 Wishbone, ride height sensor

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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 00 ... Instructions (chassis components made of aluminium)

Due to the chemical and corrosion characteristics of aluminium, always comply with the following points when handling aluminium components:

- Do not bring into contact with battery acid!

- Do not clean with wire brushes made of brass or iron! Always use wire brushes with stainless steel bristles!

- Do not expose to flying sparks when grinding/separating! Cover components!

- Do not strike with steel welding chips! Cover components!

- Do not expose to temperatures > 80 Â°C, even for brief periods! Temperatures in paint facilities do not have the same impact

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31 00 Mobile table lift

Warning!

Danger of injury!

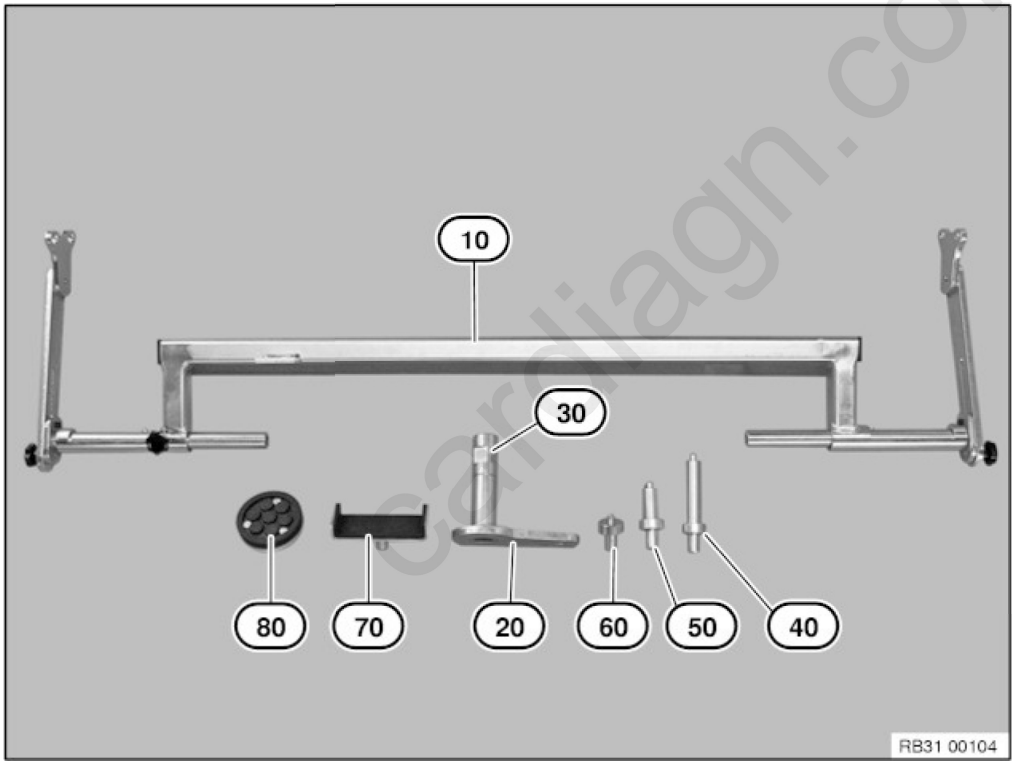
Before beginning work, position table lift with the lower frame securely on the floor.

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.

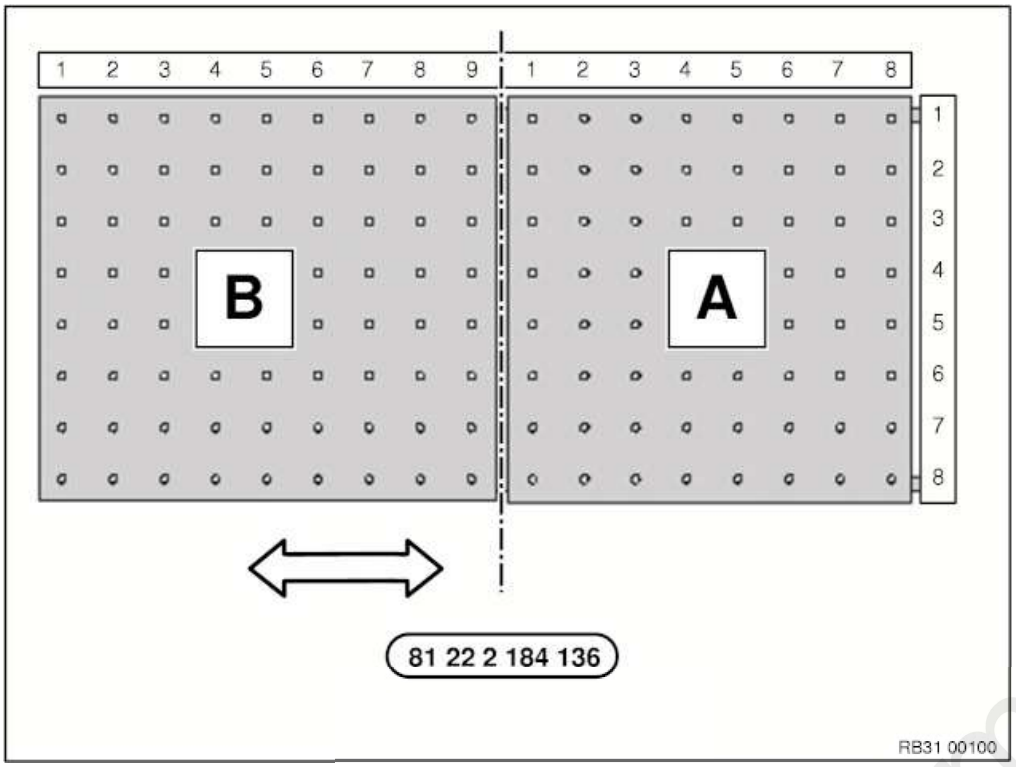
The mobile table lift is used for collision repairs and when removing large engines.



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

- Accident-related repairs:
  Read and comply with Notes on replacing steering box after accident damage.
  If the wishbone or track rod is bent, it is essential for safety reasons to check the spring strut piston rod for straightness.

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41 00 ... Notes on repairing threads

Important!

Install Helicoil thread inserts so that they are flush with the original thread!

Note:

Damaged threads may be repaired with Helicoil thread inserts. Observe the procedure described in the example.

Screw connection	Vehicle	Bolting point	Helicoil thread insert
Front axle support to engine support	F20, F21, F22, F30, F31, F32, F33, F34, F35, F36	Front	M12x1.5x24
	F20, F21, F22, F30, F31, F32, F33, F34, F35, F36	Centre	M12x1.5x24
	F20, F21, F22, F30, F31, F32, F33, F34, F35, F36	Rear	M14x1.5x28
Rear axle support to side member	F20, F21, F22, F30, F31, F32, F33, F34, F35, F36	All	M12x1.5x24

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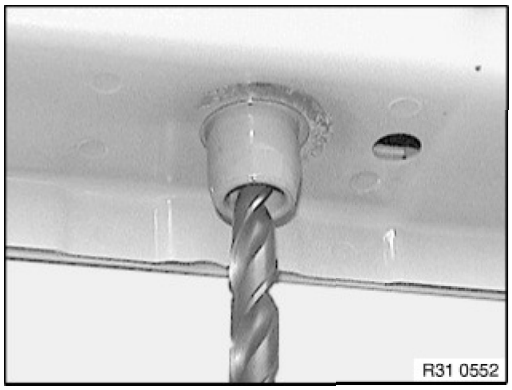
31 00 ... Notes on repairing threads



Important!

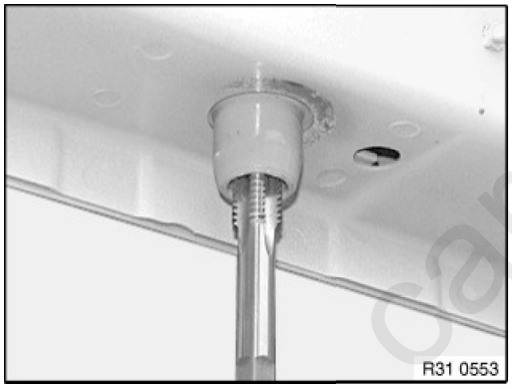
Install Helicoil thread inserts so that they are flush with the original thread.

Note:
Damaged threads on the engine support may be repaired with Helicoil thread inserts. Follow the procedure described in the example.

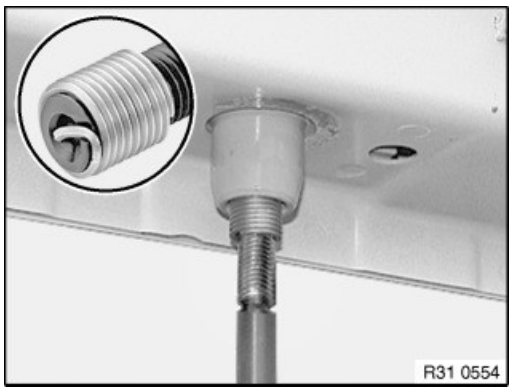


Procedure:

1. Create a clean core hole; if necessary, drill out screw remnants

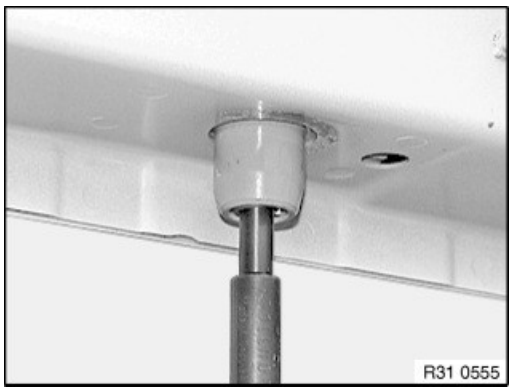


2. Create locating thread for Helicoil thread insert



3. Pick out Helicoil thread insert in accordance with the table and screw into the locating thread until flush with the original thread

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4. Break drive pin and remove

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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:

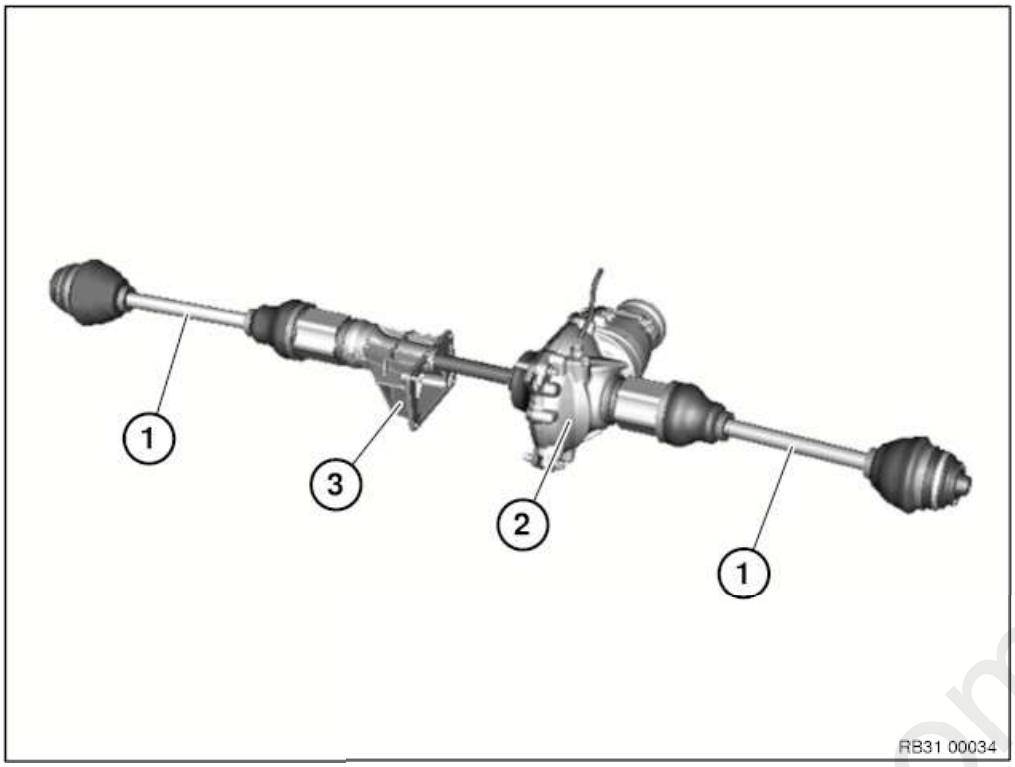
The wheel bearing must be replaced on the damaged side of the axle if one or several of the following points apply:

- 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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31 .. ... Overview of front axle differential/output shafts



Safety instructions & general information

1 Output shaft / gaiters

2 Front differential (incl. O-ring, shaft seals)

3 Bearing block (incl. O-ring, shaft seal)

Check/change front axle differential oil

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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!

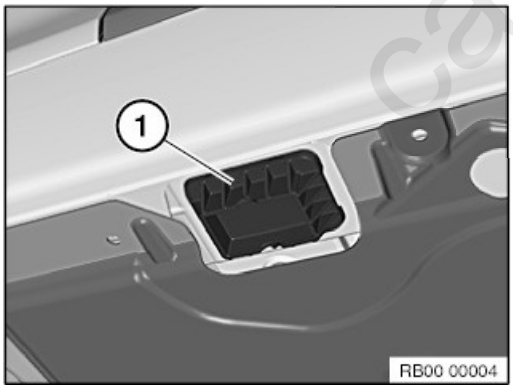
Before driving onto a vehicle hoist, make sure there is sufficient ground clearance between the vehicle hoist and the vehicle.

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



Necessary preliminary work:

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

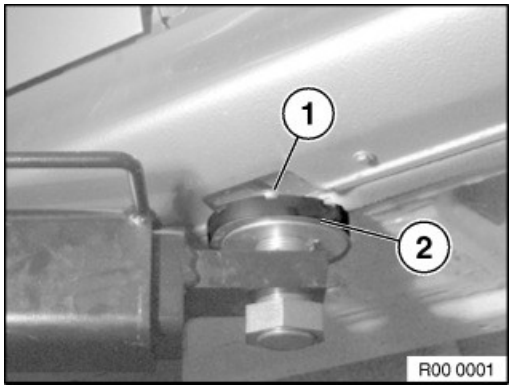


Caution!

All four jacking points (1) must be available!

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

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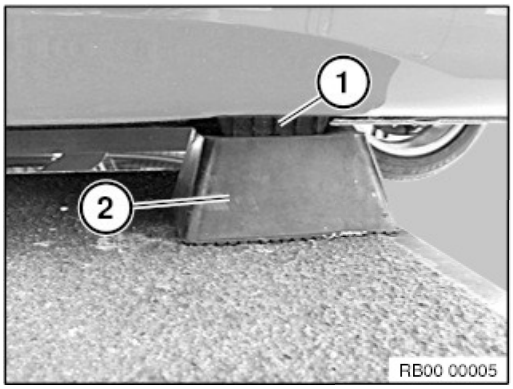


Caution!

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.

In hybrid cars there is a risk of damage to the high-voltage component behind the underbody panelling!



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.

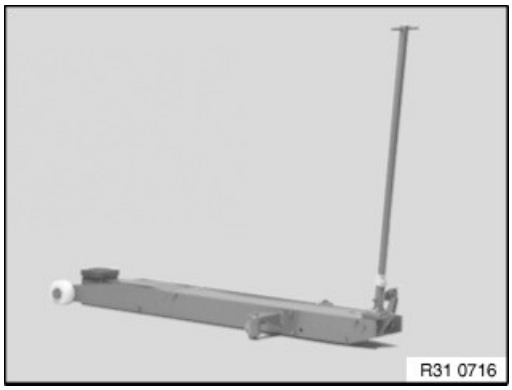
Never raise the vehicle without rubber blocks (or rigid foam blocks)!

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

In hybrid cars there is a risk of damage to the high-voltage component behind the underbody panelling!

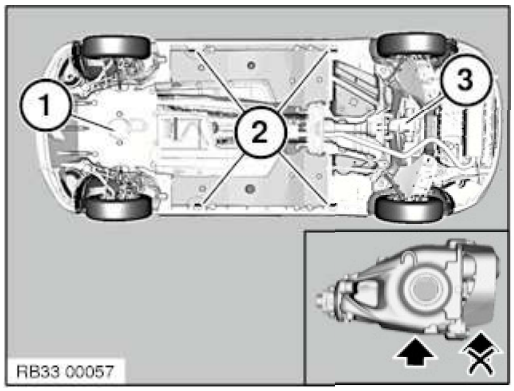
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00 02 000 Raising vehicle with trolley jack



Observe the following trolley-jack-related notes:

1. Only trolley jacks sold or approved by BMW, with a rubber plate on their mounting, may be used!
2. Trolley jacks must be regularly serviced and always checked for functional reliability before they are used!
3. Check the rubber plate on the trolley jack prior to each use, replacing if necessary.



Warning!

The vehicle may be raised with a trolley jack only at the following mounting point!

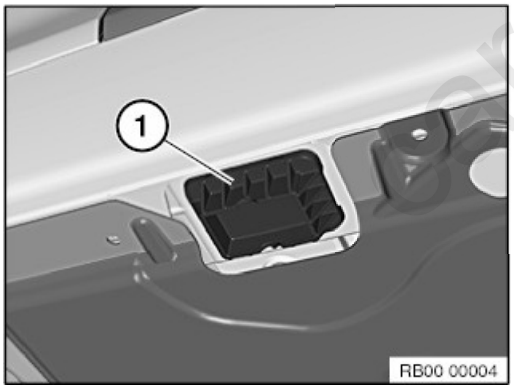
1 Car jacking point

Note: When raising, the underbody panelling is pressed against the front axle support.

2 Side car jacking points

3 Rear axle final drive

Note: It is not permitted to raise the vehicle at the rear differential cover!



Risk of damage!

Jacking point (1) must be present!

Align the rubber plate on the trolley jack to the jacking pointÂ (1) in such a way that there is no contact to adjacent components and that they are therefore not damaged.

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



Warning!

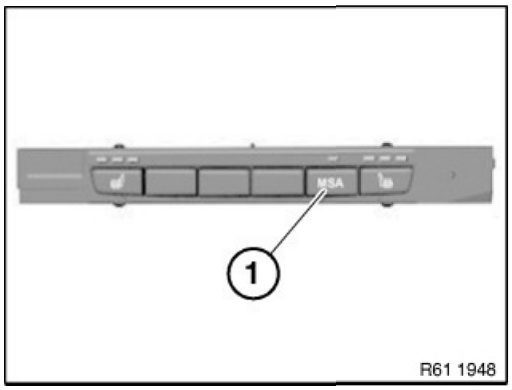
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

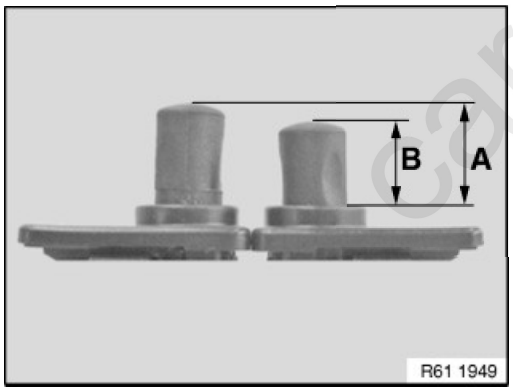
Observe safety precautions when working on MSA vehicles.

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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00 Safety instructions for handling oil



Warning!

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

Risk of injury if oil comes into contact with eyes and skin!



Recycling:

Observe country-specific waste disposal regulations.



Measures if oil is unintentionally released:

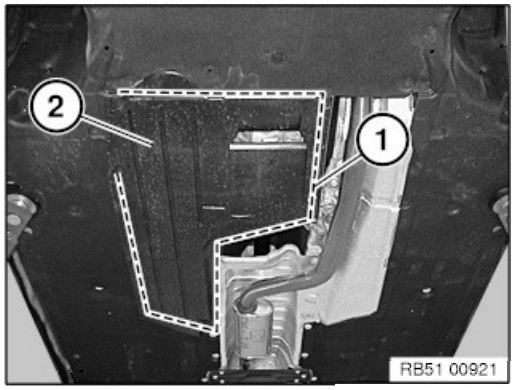
- Personal precautionary measures: Danger of slipping! Keep non-involved persons away from the work area. Wear personal protective clothing/equipment.
- Environmental protection measures: Prevent oil from draining into drain channels, sewerage systems, pits, cellars, water and the ground.
- Limiting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

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

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51 47 491 Removing and installing/replacing rear underbody protection

Note:
Illustration only an example. There may be differences in detail in the case of other models.



Release screws along line (1) and remove underbody protection (2).

Tightening torque 51 75 1AZ

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31 10 010 Removing and installing/replacing reinforcement plate

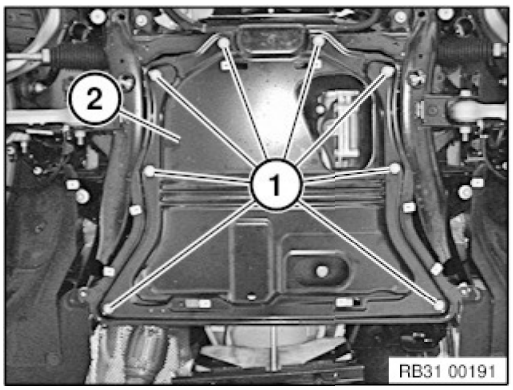
Important!

Observe safety instructions for raising the vehicle

Driving without reinforcement plate is not permitted!

Note:
Two variants of the reinforcement plate are installed.
Necessary preliminary tasks:

- Remove underbody protection.
- F23, F33: Remove both bottom reinforcement struts.



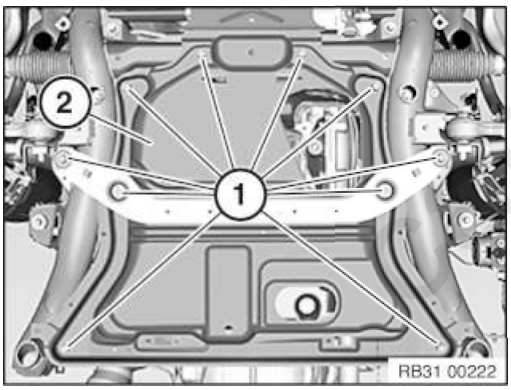
Version 1 :

Release screws (1).

Remove reinforcement plate (2).

Installation note:
Replace screws (1).

Tightening torque 31 10 4AZ.



Version 2 :

Release screws (1).

Remove reinforcement plate (2).

Installation note:
Replace screws (1).

Tightening torque 31 10 4AZ.

31 10 010 Removing and installing/replacing the reinforcement plate \PREMIUM

WARNING

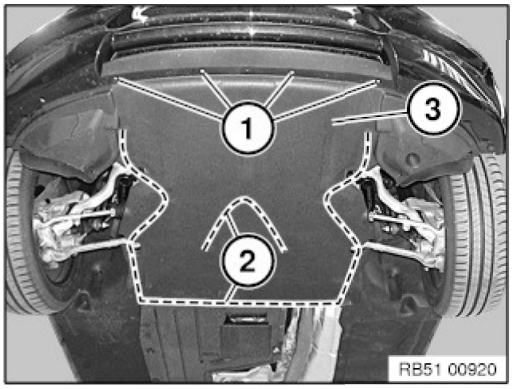
Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

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 – Removing the front underbody protection



NOTICE

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

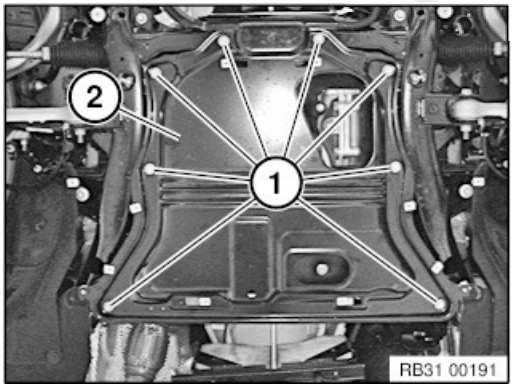
- Loosen screws (1).
- Release screws along line (2).
- Remove the front underbody protection (3).

MAIN WORK

2 – Remove reinforcement plate

TECHNICAL INFORMATION

Driving without a bracing plate is not permitted.

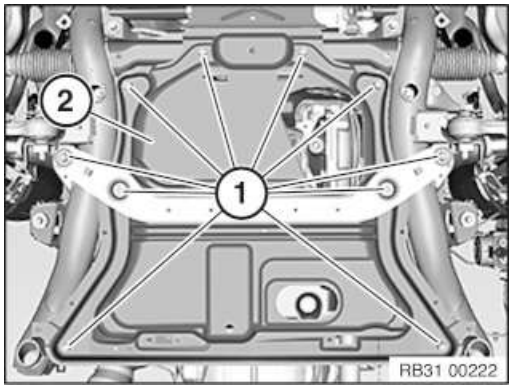


- **Version 1:**

  Loosen screws (1).

  Remove the bracing plate (2).

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- **Version 2:**

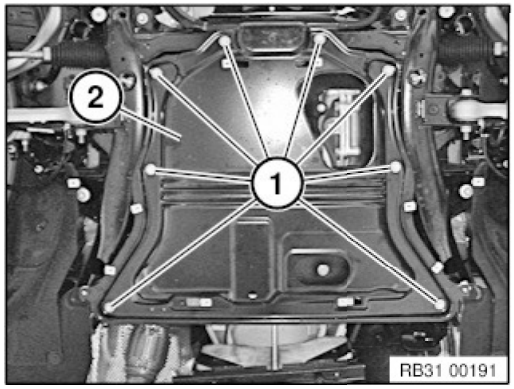
  Loosen screws (1).

  Remove the bracing plate (2).

3 – Install reinforcement plate

TECHNICAL INFORMATION

Driving without a bracing plate is not permitted.



- **Version 1:**

  Install the bracing plate (2).

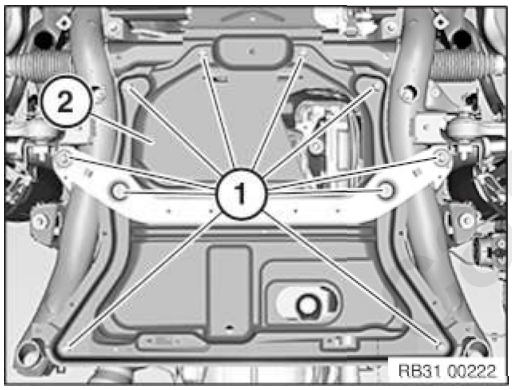
  Renew screws.

  Parts: Bolts

  Tighten the screws (1).

Reinforcement plate to front axle carrier

M10	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	60 °



- **Version 2:**

  Install the bracing plate (2).

  Renew screws.

  Parts: Bolts

  Tighten the screws (1).

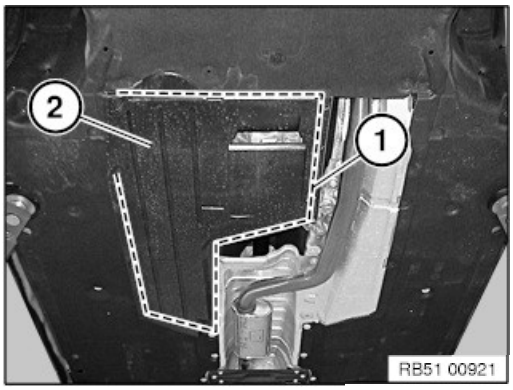
Reinforcement plate to front axle carrier

M10	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	60 °

4 – Installing underbody protection at rear

NOTICE

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

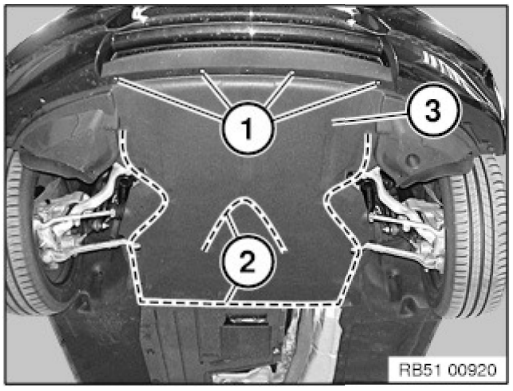


- Position the rear underbody protection (2).
- Tighten the bolts along the line (1).

Underbody panelling on body

Screw not metric thread			3 Nm
Screw M6			8,8 Nm
Nut			2,5 Nm

5 – Installing the front underbody protection



NOTICE

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

- Position the front underbody protection (3).
- Tighten the bolts along the line (2).
- Tighten the screws (1).

Underbody protection front

Screw not metric thread			3 Nm
Screw M6			8,8 Nm
Nut			2,5 Nm

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Additional Information

Overview of Tightening Torques

Reinforcement plate to front axle carrier — Used in step 3

M10	Renew screws.	Jointing torque	56 Nm
		Angle of rotation	60 °

Underbody panelling on body			Used in step 4
Screw not metric thread			3 Nm
Screw M6			8,8 Nm
Nut			2,5 Nm

Underbody protection front			Used in step 5
Screw not metric thread			3 Nm
Screw M6			8,8 Nm
Nut			2,5 Nm

Links

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

Parts

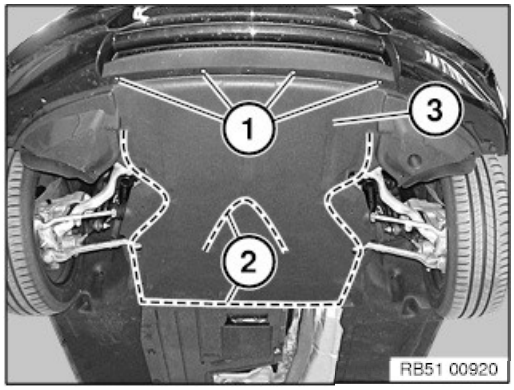
Parts required

Designation	Used in step
screws.	3

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51 47 490 Removing and installing/replacing underbody protection (front)

Note:
Illustration only an example. Detail deviations (depending on engine version) are possible.



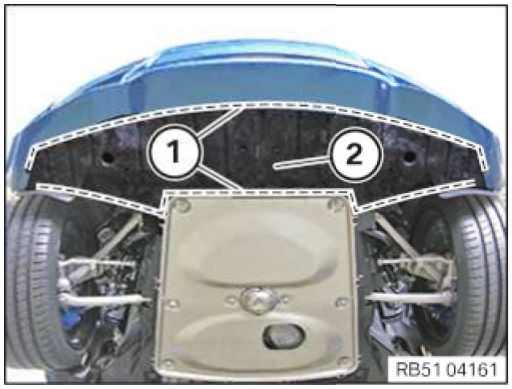
Release screws (1).

Tightening torque 51 75 1AZ.

Release all screws along line (2).

Tightening torque 51 75 1AZ.

Remove underbody protection (3).



Only F87:

Release screws (1).

Tightening torque 51 75 1AZ.

Remove underbody protection (2).

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31 11 506 Lowering/raising front axle support (universal lifter)



Special tools required:

- 31 5 251
- 00 2 030
- 31 5 255
- 31 5 253



Warning!

Danger of injury!

Failure to comply with the following instructions may result in the vehicle slipping off the lifting platform and critically injuring other persons.

When supporting components, make sure that:

- the vehicle can no longer be raised or lowered
- the vehicle does not lift off the locating plates on the vehicle hoist.



Important!

Before lowering/removing front axle support:

Observe safety information for raising the vehicle

In order to avoid damage to vehicle hoist, perform weight compensation on vehicle.

Load spring strut domes with sand bags.



Warning!

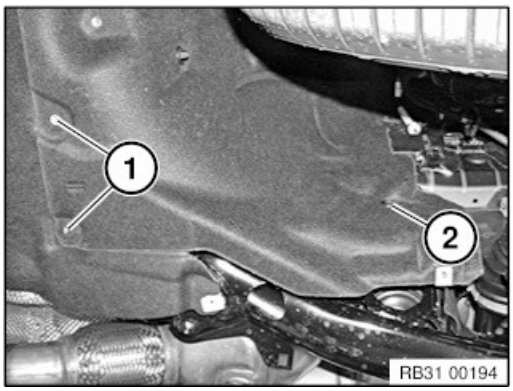
Secure engine in installation position with special tool to prevent it from falling down.



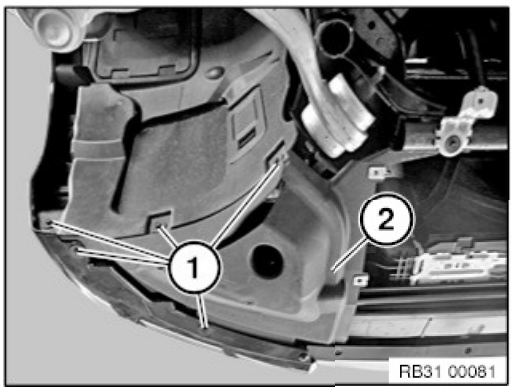
Necessary preliminary tasks:

- Secure engine in installation position.
- Disconnect battery.
- Remove reinforcement plate.
- Remove steering shaft from steering gear.
- Remove steering assembly cover. (N47)

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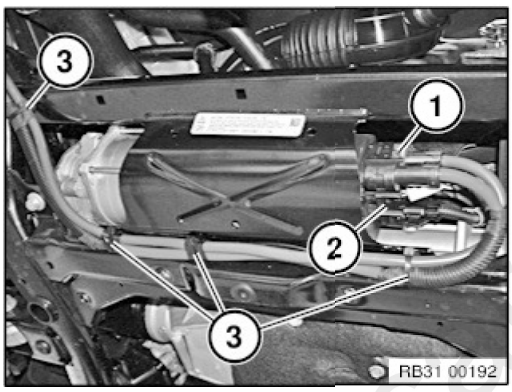


Release screws (1) and (2) on the wheel arch panel on the rear left and right.



Release screws (1) and remove cover (2) left and right.

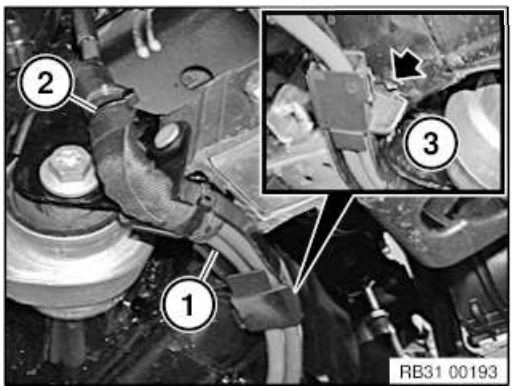
(Left side: Release connector from outside temperature sensor.)



Unlock and disconnect plug connection (1) and (2) on the steering gear.

Unclip cable routing on the front axle support (3) and fold the cable back towards the engine support.

Installation note:
Replace faulty cable clips.

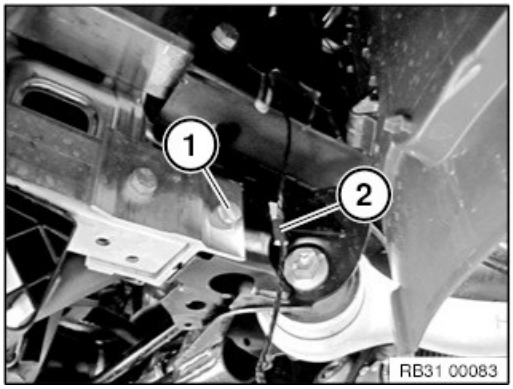


Unlock (3) holder (1).

Unfasten cable strap (2).

Installation note:
Replace faulty holders.

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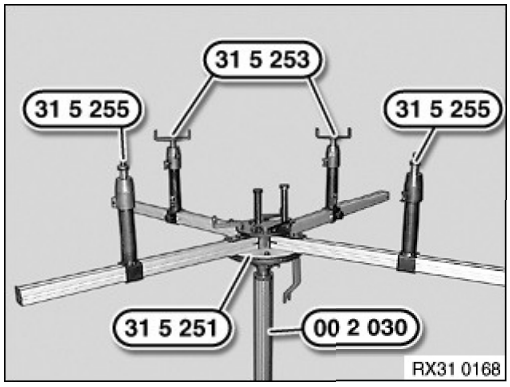


Release screws (1) on left and right.

Tightening torque 51 11 6AZ.

Unclip cable tie (2).

Installation note:
Replace faulty cable clips.

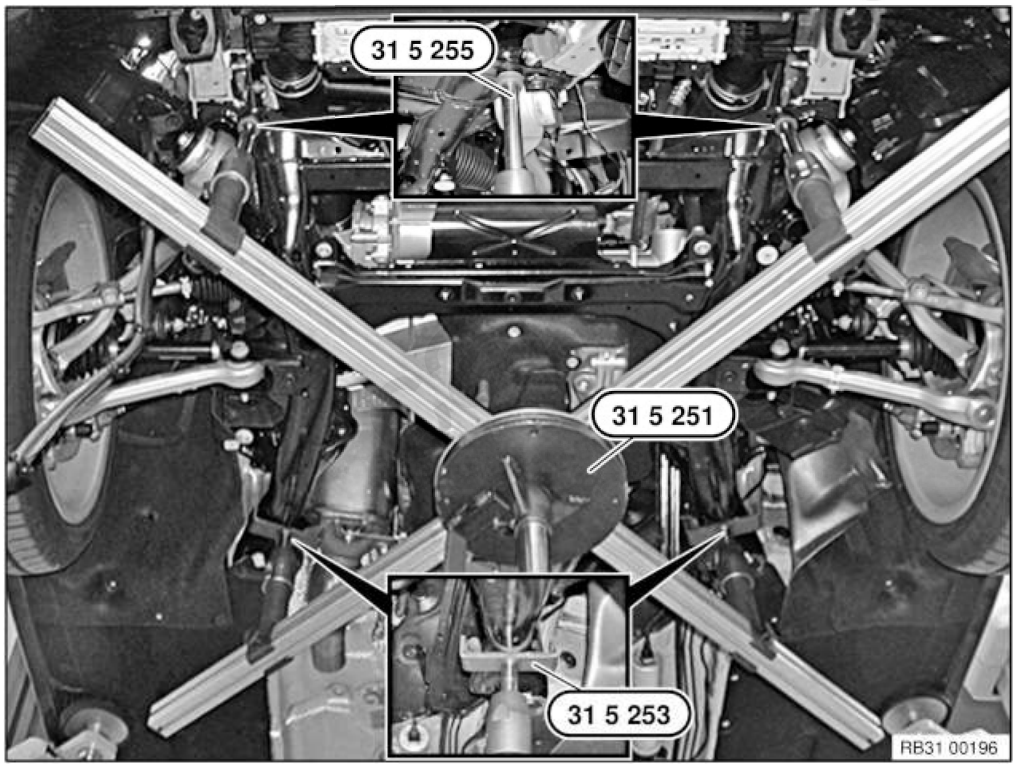


Engage special tool 31 5 251 with a 2nd person helping completely on workshop jack 00 2 030 .

Insert special tools 31 5 255 in telescopic supports of a profile rail pair.

Insert special tools 31 5 253 in telescopic supports of other profile rail pair.

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

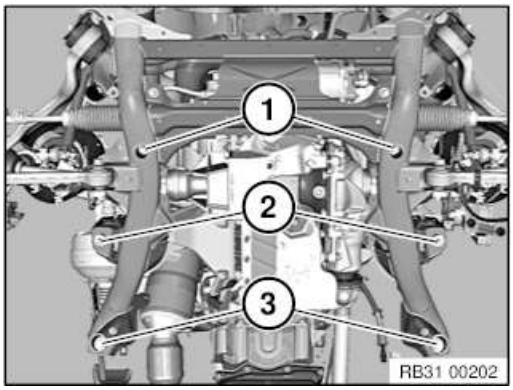


Align special tools 31 5 251 , 31 5 253 and 31 5 255 to front axle support.

Support front axle support by operating workshop jack 00 2 030 .

Important!

The centre of gravity of the front axle support must be positioned centrally over the workshop jack.



Release bolts (1-3).

Tightening torque 31 10 1AZ.

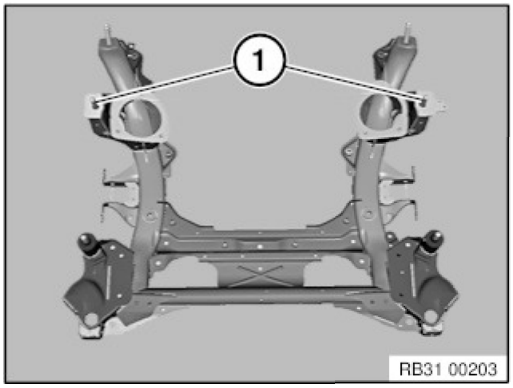
Lower front axle support by no more than 10 cm.

Installation note:
Check threads for damage; if necessary, repair with Helicoil thread inserts.

Note installation locations of screws.

- Bolt (1) M12x45
- Screw (2) M12x165 (foam seal between front axle support and body!)
- Screw (3) M14x60

Tighten down first screws (1) and then screws (2,3).



Installation note:
Renew foam seal (1).

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31 11 001 Replacing front axle support



Warning!

Danger of injury!

Failure to comply with the following instructions may result in the vehicle slipping off the lifting platform and critically injuring other persons.

When supporting components, make sure that:

- the vehicle can no longer be raised or lowered
- the vehicle does not lift off the locating plates on the vehicle hoist.



Important!

Before lowering/removing front axle support:

Observe safety information on raising the vehicle.

In order to avoid damage to vehicle hoist, perform weight compensation on vehicle.

Load spring strut domes with sand bags.



Warning!

Secure engine in installation position with special tool to prevent it from falling down.



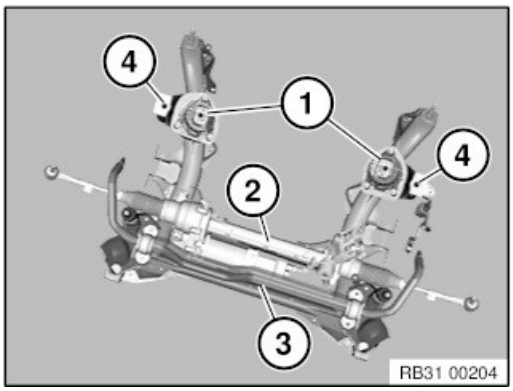
Necessary preliminary tasks:

- Secure engine in installation position.
- Disconnect battery earth lead.
- Remove front wheels.
- Remove steering shaft from steering gear.
- Remove anti-roll bar links from anti-roll bar.
- Remove both track rods from swivel bearing.
- Remove wishbone from front axle support.
- Remove trailing links from front axle support.



The subsequent procedure is described under "Lowering/raising front axle support".

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Remove heat shield(s) from front axle support.

Modify engine mount (1).

Modify steering gear (2).

Modify anti-roll bar (3).

Replace foam seal (4).

Installation note:
Use previous front axle support as a template for modifying or replacing small parts.

After installation:

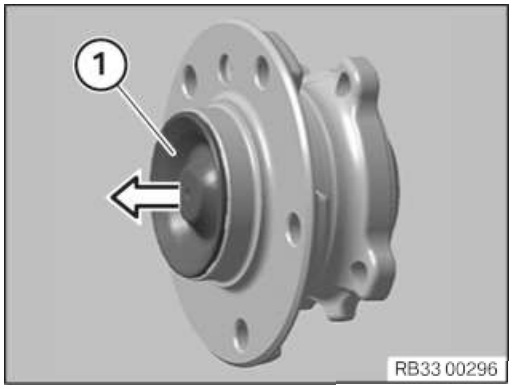
- Carry out wheel alignment procedure.

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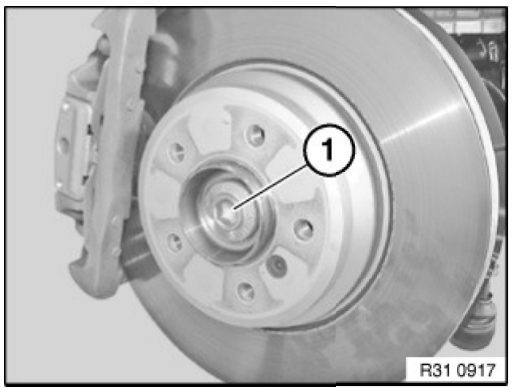
31 12 050 Removing and installing/replacing left or right tension strut

Necessary preliminary tasks:

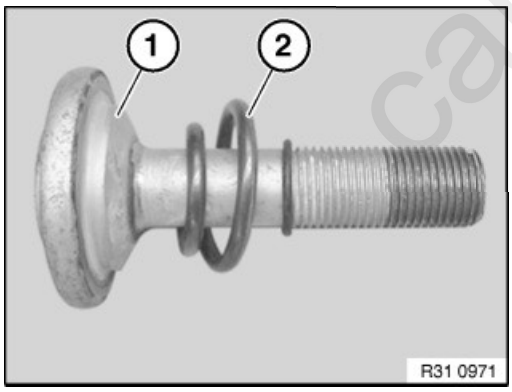
- Remove front wheel.



If necessary, remove visual protection cap (1).



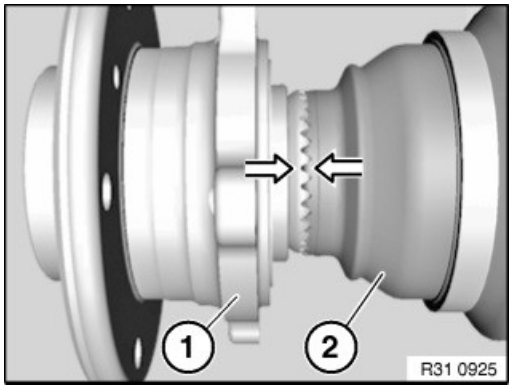
Release collar bolt (1), press brake pedal to floor for this purpose.



Installation note:

- Renew collar bolt (1) and compression spring (2).
- Pay attention to installation position of compression spring (2).
- Keep collar bolt and spur toothing of bearing/propeller shaft clean and free of grease
- **Follow installation note of the spur gearing.**

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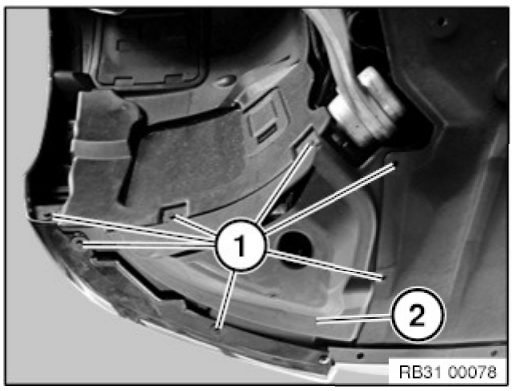
Important!

Note on installation must be observed without fail!

Installation note:

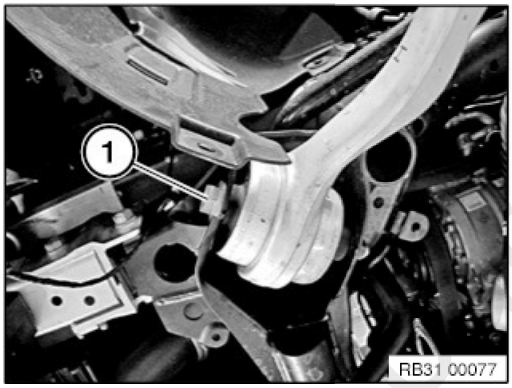
- Spur gearing of bearing (1) and output shaft (2) must be installed form-fit (tooth in tooth)!
- Tighten collar bolt and compression spring by hand.
- Check whether spur gearing is locked tooth in tooth by reciprocally rotating wheel hub/output shaft.
- Once a form-fit has been ensured, tighten to final torque.

  Tightening torque 31 60 2AZ.



Release screws (1) and remove cover (2).

(Left side: Release connector from outside temperature sensor.)

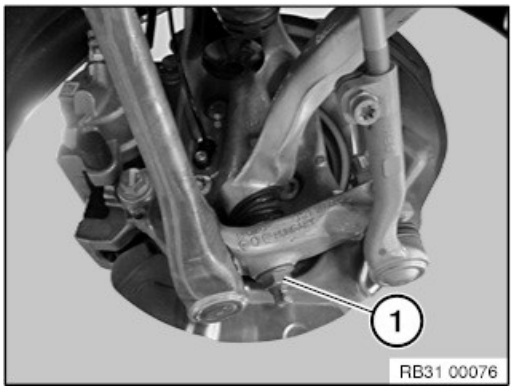


Release screw (1).

Tightening torque 31 12 1AZ.

Installation note:
Replace screw.

Tighten down screw connection in normal position.



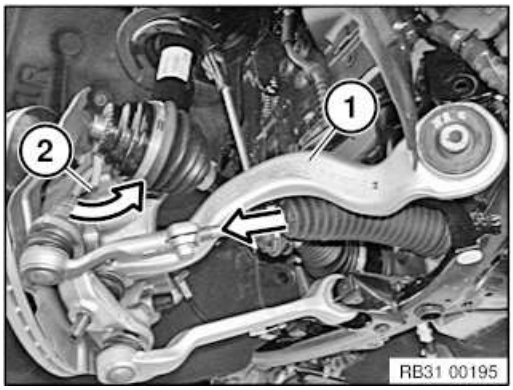
Slacken nut (1).

- If necessary, hold up at the Torx socket.

Tightening torque 31 12 2AZ.

Installation note:
Replace self-locking nut.

Keep tension strut to swivel bearing connection clean and free from oil and grease.



Turn the steering to the respective side (right side to the right, left side to the left).

Pivot output shaft upwards.

Important!

Risk of damage to the pulse sensor line (2).

Remove trailing link (1).

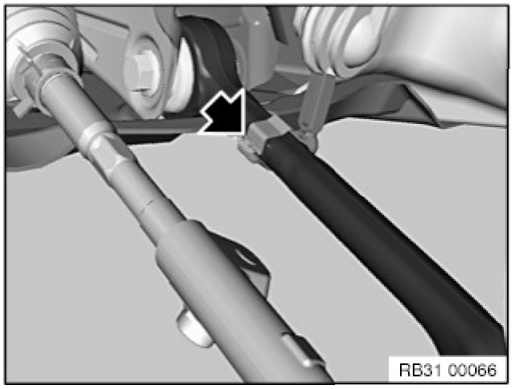
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31 12 000 Removing and installing/replacing left or right wishbone

Note:
If the wishbone is detached from the front axle support, it will be necessary to carry out the wheel alignment procedure.

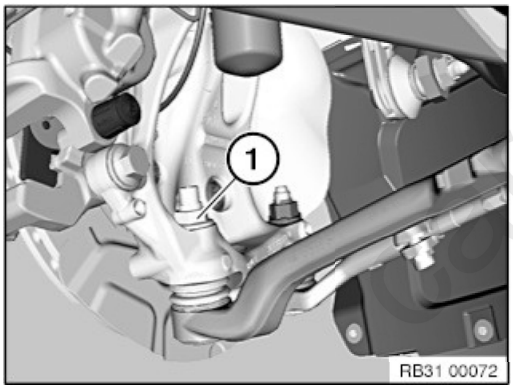
Necessary preliminary tasks:

- Remove front wheel.
- Remove front assembly underside protection.
- Remove steering assembly cover. (N47 with rear-wheel drive only)



Only on ride-height sensor at left:

Release link at wishbone.

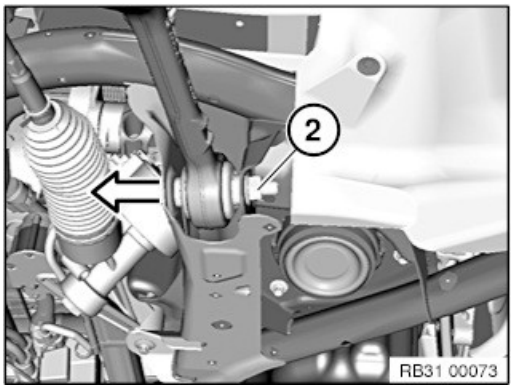


Release nut (1), if necessary, grip at inner Torx socket.

Tightening torque 31 12 4AZ.

Installation note:
Keep wishbone to swivel bearing connection clean and free from oil and grease.

Replace self-locking nut.



Slacken nut (2).

Tightening torque 31 12 3AZ.

Remove screw towards front.

Take off wishbone.

Installation note:
Renew screw and nut.

Bolt head points in direction of travel.

Tighten down screw connection in normal position.

After installation:

- Carry out wheel alignment procedure.

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31 12 134 Replacing rubber mount in left or right tension strut

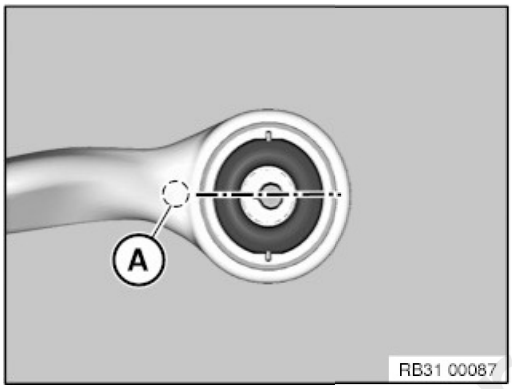
Special tools required:

- 31 3 031
- 31 3 032

Attention!
Rubber mounts may only be changed once.

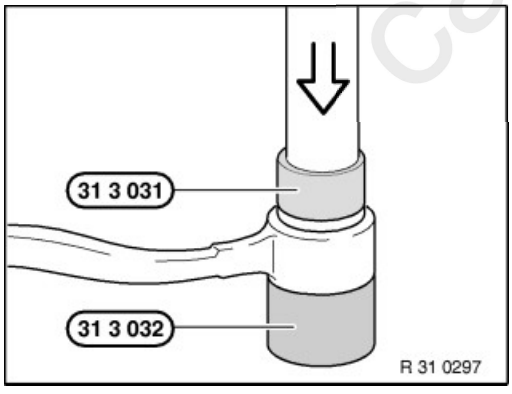
Necessary preliminary work:

- Check ball joint of the trailing link in the installed state.
  - If necessary renew trailing link.
- Remove tension strut.



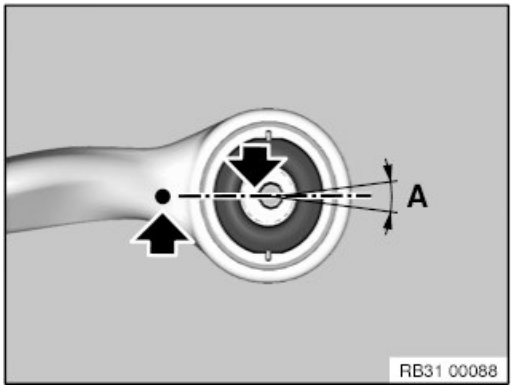
Attention!
Mark trailing link with a punch mark in area (A).

If the tension strut already features an identification mark with a centre punch, it is necessary to replace the tension strut.



Using a press and special tools 31 3 031 and 31 3 032 , press rubber mount out of tension strut.*Note:*
Special tool 31 3 031 must be exactly flush with rubber mount bush.

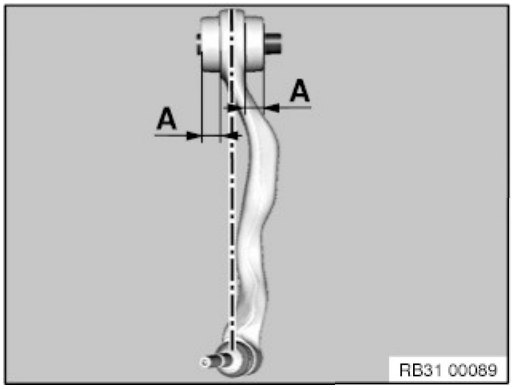
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Installation note:
Keep rubber mount and bushing in tension strut clean and free from grease.

Note:
The eye of the tension strut features a chamfer on one side. Press the rubber mount in from this side.

Align the rubber mount with the notch on the punch mark (arrow) at the tension strut and press it in. The deviation (A) must not exceed ±5°.



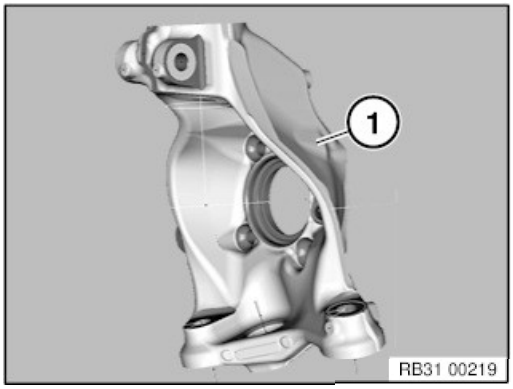
Protrusion (A) must be equal.*Note:*
The graphic shows the right trailing link. The installation position is reversed on the left side.

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31 21 090 Removing and installing/replacing left or right swivel bearing

Special tools required:

- 31 2 230



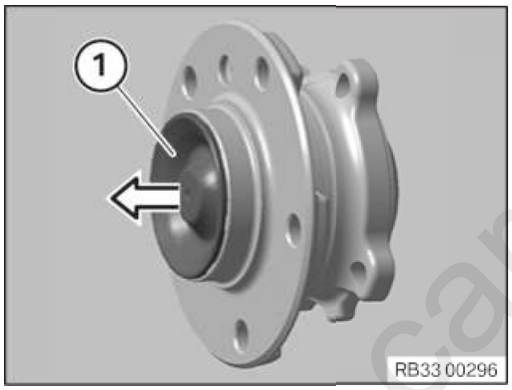
Note:
When replacing swivel bearing pay attention to camber correction swivel bearings.

Camber correction swivel bearing are used to correct the camber values by ±30 minutes. To be used only if the camber tolerance values are exceeded and undershot.

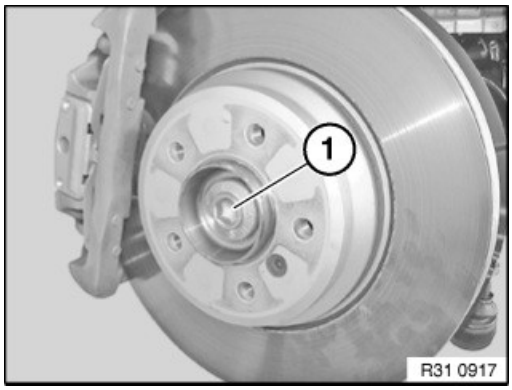
The unit is identified by means of the part number on the swivel bearing.

Necessary preliminary tasks:

- Remove front wheel.



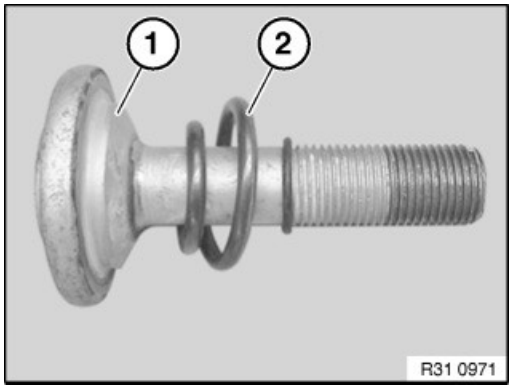
Remove protective cap (1), if required.



Release collar bolt (1), press brake pedal to floor for this purpose.

Tightening torque 31 60 2AZ.

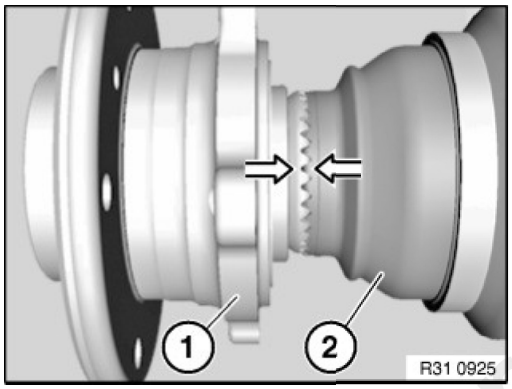
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Installation note:

- Renew collar bolt (1) and compression spring (2).
- Pay attention to installation position of compression spring (2).
- Keep collar bolt and spur gearing of wheel bearing/output shaft clean and free from grease.
- **Follow installation note of the spur gearing.**

- Remove brake disc.
- Detach anti-roll bar link at spring strut.
- Detach pulse sensor on swivel bearing set down with the engine support.
- Detach track rod end from swivel bearing.
- Detach wishbone.
- Detach tension strut from swivel bearing.



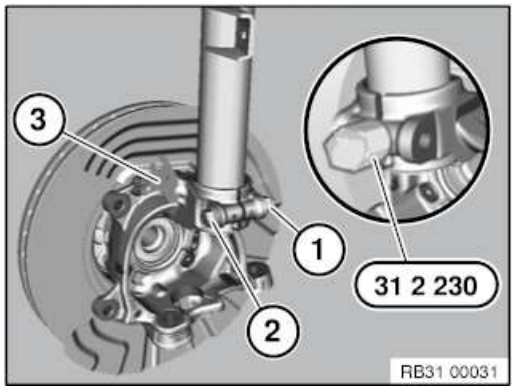
Attention!

Note on installation for spur gearing must be observed without fail!

Installation note:

- Spur gearing of wheel bearing (1) and output shaft (2) must be installed form-fit (tooth in tooth position)!
- Tighten collar bolt and compression spring by hand.
- Check whether spur gearing is locked tooth in tooth by reciprocally rotating wheel hub/output shaft.
- Once positive locking has been ensured, tighten screw connection to the specified torque.

  Tightening torque 31 60 2AZ.



Attention!

Secure swivel bearing against falling out.

Slacken nut (1).

Tightening torque 31 31 3AZ.

Pull out screw (2) with cable clip (3) toward the rear.

Expand swivel bearing with special tool 31 2 230 .

Remove swivel bearing from spring strut.

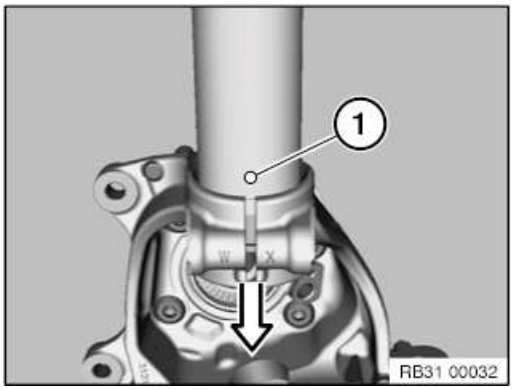
Installation note:

Keep press fit of swivel gearing and spring strut in lower area clean and free from oil and grease.

Screw head must face opposite to the direction of travel.

Renew screw and nut.

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Installation note:
Align positioning pin (1) on spring strut to swivel bearing. Slide spring strut into swivel bearing to the limit position.

Replacement:

- Remount wheel bearing or replace if necessary.
- Remount or if necessary replace caliper carrier/protective plate.

After installation:

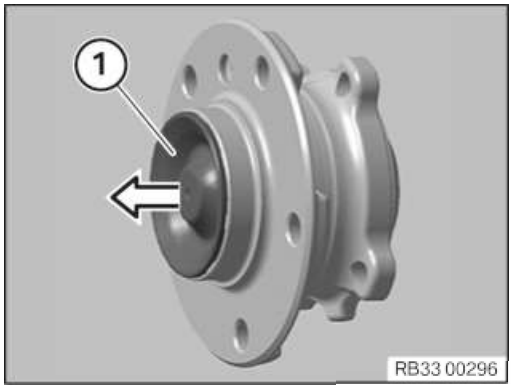
- Carry out wheel alignment procedure.

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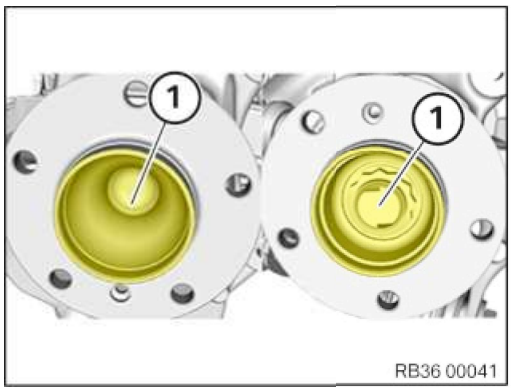
31 21 180 Replace the front wheel bearing

Necessary preliminary tasks:

- Remove front wheel.

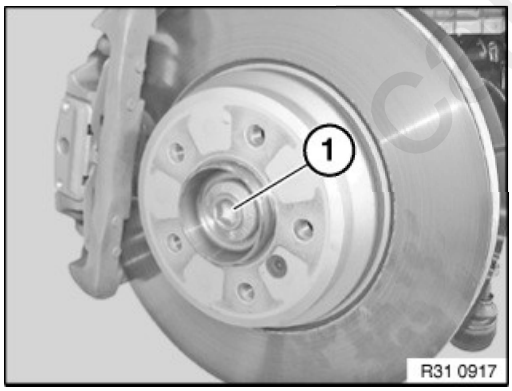


If necessary, remove visual protection cap (1).



Installation note:
Due to corrosion problems, do not install the visual protection cap (1) again!

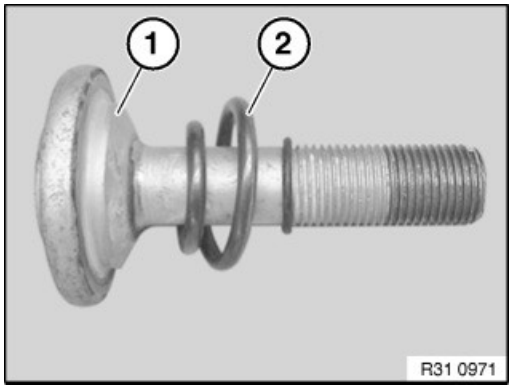
Instead, lightly grease the wheel hubs in area (1)!



Release collar bolt (1), press brake pedal to floor for this purpose.

Tightening torque 31 60 2AZ.

carsdiagn.com

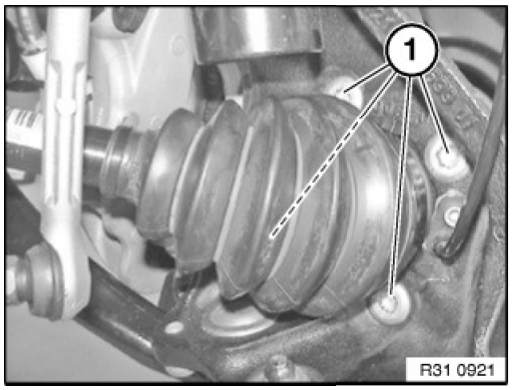


Installation note:

- Renew collar bolt (1) and compression spring (2).
- Pay attention to installation position of compression spring (2).
- Keep collar bolt and spur toothing of bearing/propeller shaft clean and free of grease
- **Follow installation note of the spur gearing.**

Remove brake disc.*Note:*

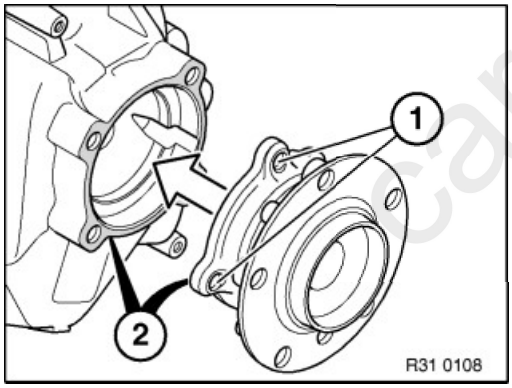
- Check brake pad and replace if necessary!



Press output shaft on swivel bearing to one side slightly and release screws (1).

Tightening torque 31 21 1AZ.

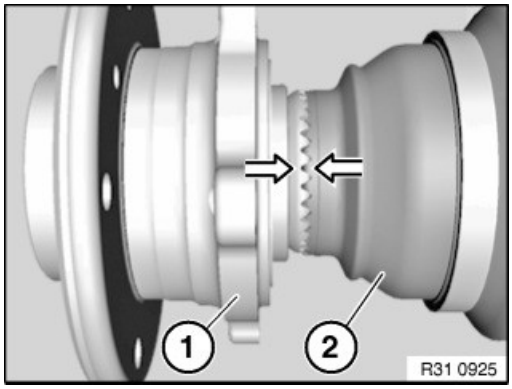
Remove bearing.



Installation note:

- Renew screws.
- Keep contact surface (2) of wheel bearing and swivel bearing clean and free from grease.

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Attention!

Note on installation for spur gearing must be observed without fail!

Installation note:

- Spur gearing of bearing (1) and output shaft (2) must be installed form-fit (tooth in tooth)!
- Tighten collar bolt and compression spring by hand.
- Check whether spur gearing is locked tooth in tooth by reciprocally rotating wheel hub/output shaft.
- Once a form-fit has been ensured, tighten to final torque.

  Tightening torque 31 60 2AZ.

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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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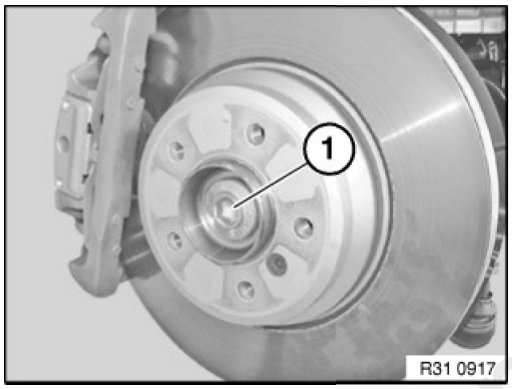
37 11 030 Removing and installing complete front left or right spring strut (adaptive M chassis and suspension)

Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Retaining elements on chassis and suspension and steering parts must be replaced.

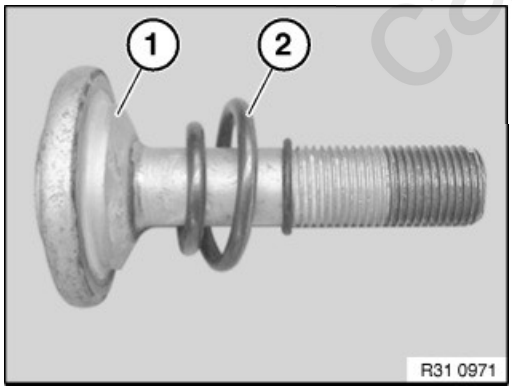
Necessary preliminary tasks:

- Remove front wheel.
- Remove anti-roll bar link from spring strut.
- Disconnect plug connection for pulse sensor and expose cable up to holder on spring strut.
- Disconnect plug connection for brake pad wear sensor and expose cable up to brake caliper.



Release collar bolt (1), press brake pedal to floor for this purpose.

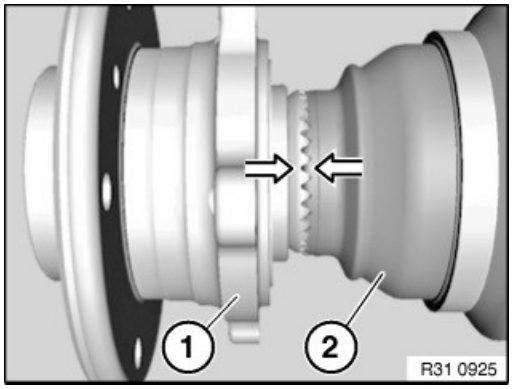
Tightening torque 31 60 2AZ.



Installation note:

- Renew collar bolt (1) and compression spring (2).
- Pay attention to installation position of compression spring (2).
- Keep collar bolt and spur toothing of bearing/propeller shaft clean and free of grease
- **Follow installation note of the spur gearing.**

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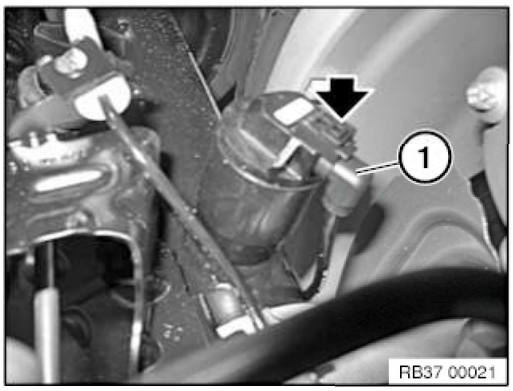
Attention!

Note on installation must be observed without fail!

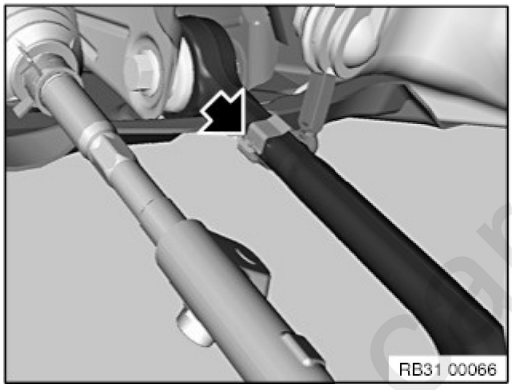
Installation note:

- Spur gearing of bearing (1) and output shaft (2) must be installed form-fit (tooth in tooth)!
- Tighten collar bolt and compression spring by hand.
- Check whether spur gearing is locked tooth in tooth by reciprocally rotating wheel hub/output shaft.
- Once a form-fit has been ensured, tighten to final torque.

  Tightening torque 31 60 2AZ.

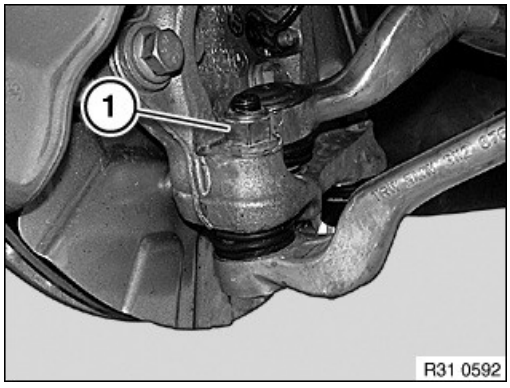


Unlock connector (1) in direction of arrow and pull off towards bottom!



Only on ride-height sensor at left:

Release link at wishbone.

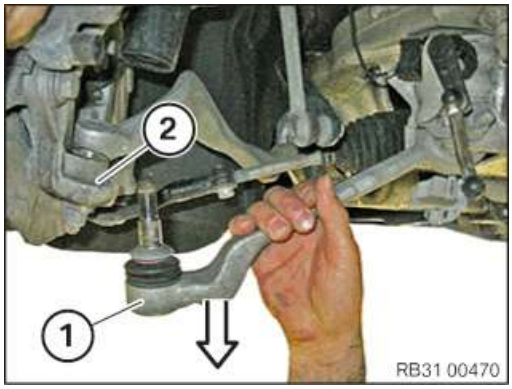


Release nut (1), if necessary, counter-hold at inner Torx (T40).*Installation note:*
Keep wishbone to swivel bearing connection clean and free from oil and grease.

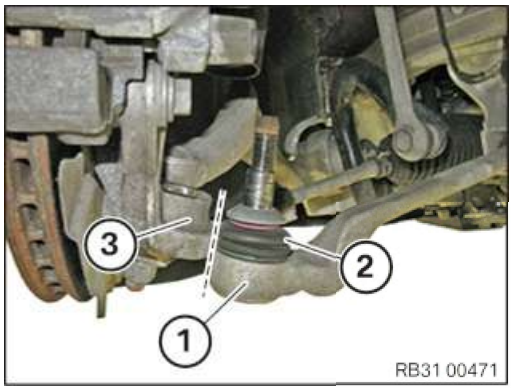
Replace self-locking nut.

Tightening torque 31 12 4AZ.

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Pull wishbone (1) in direction of arrow and feed out of swivel bearing (2).

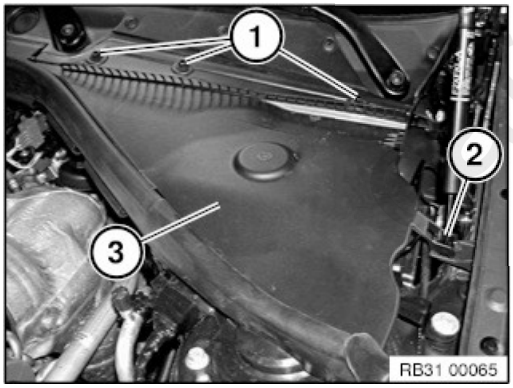


Attention!

Wishbone (1) can lie on swivel bearing (3).

Risk of damage to the rubber grommet (2) by the swivel bearing (3).

- Remove front brake disc.
- Remove track rod end from swivel bearing.
- Remove tension strut from swivel bearing



Unlock closures (1). Press clamps (2) together and lift.

Remove cover (3).

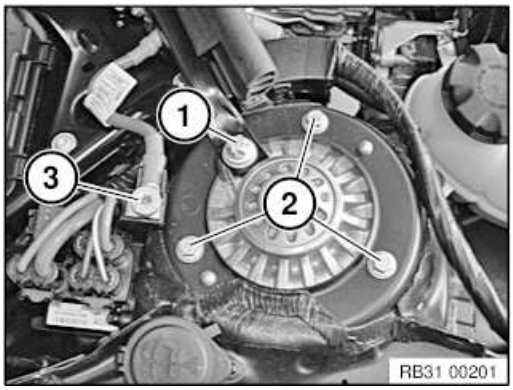
Installation note:

Make sure closures are correctly locked.

Warning!

Danger of injury!

Secure spring strut against falling out.



Attention! (Right side):

Risk of short circuits! Cover positive terminal (3) with suitable material.

Release screw (1) on suspension cross-brace.

Tightening torque 51 61 1AZ.

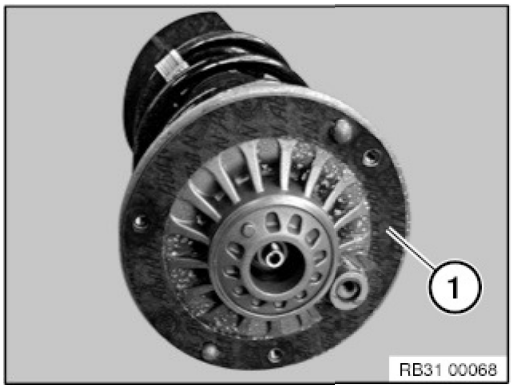
Installation note:
Renew screw.

Release screws (2) and remove spring strut with swivel bearing towards bottom.

Tightening torque 31 31 1AZ.

Installation note:
Clean inside contact surface at spring strut dome.

Align spring strut with boreholes on spring strut dome using centring pins and push up.



Installation note:
Check sealing washer (1) for damage, renew if necessary.

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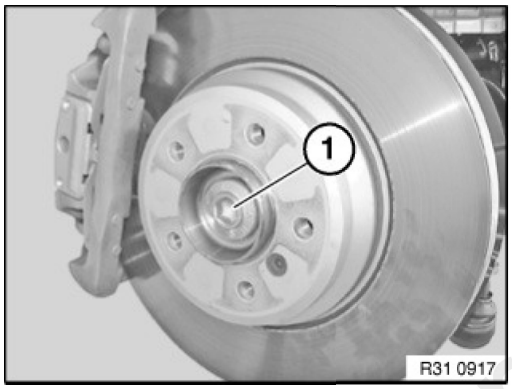
31 31 000 Removing and installing complete left or right spring strut shock absorber

Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Retaining elements on parts of the chassis and suspension and steering must be replaced.

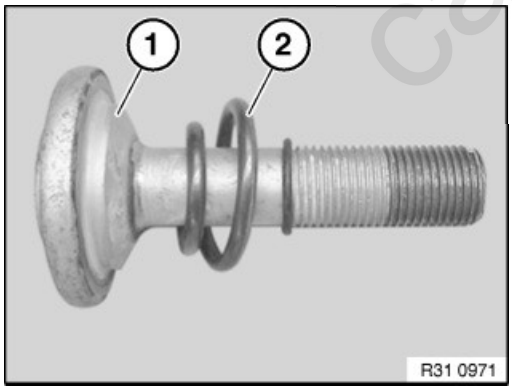
Necessary preliminary tasks:

- Remove front wheel.
- Remove anti-roll bar link from spring strut.
- Disconnect plug connection for pulse sensor and expose cable up to holder on spring strut.
- Disconnect plug connection for brake pad wear sensor and expose cable up to brake caliper.



Release collar bolt (1), press brake pedal to floor for this purpose.

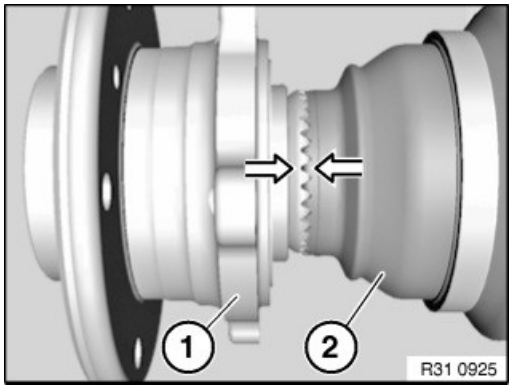
Tightening torque 31 60 2AZ.



Installation note:

- Renew collar bolt (1) and compression spring (2).
- Pay attention to installation position of compression spring (2).
- Keep collar bolt and spur gearing of wheel bearing/output shaft clean and free from grease.
- **Follow installation note of the spur gearing.**

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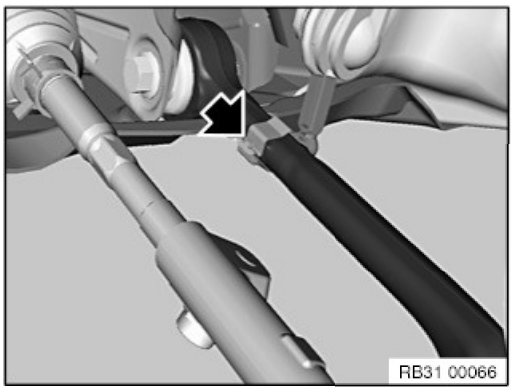
Attention!

Note on installation must be observed without fail!

Installation note:

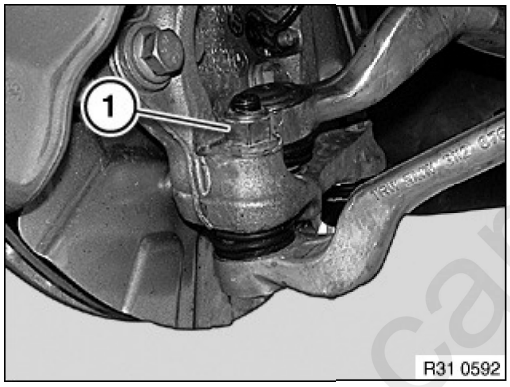
- Spur gearing of wheel bearing (1) and output shaft (2) must be installed form-fit (tooth in tooth position)!
- Tighten collar bolt and compression spring by hand.
- Check whether the front gearing is locked tooth in tooth by reciprocally rotating the wheel bearing / output shaft.
- Once a form-fit has been ensured, tighten to final torque.

  Tightening torque 31 60 2AZ.



Only on ride-height sensor at left:

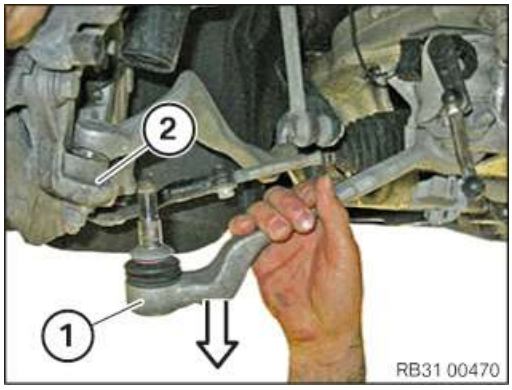
Release link at wishbone.



Release nut (1), if necessary, counter-hold at inner Torx (T40).*Installation note:*
Keep wishbone to swivel bearing connection clean and free from oil and grease.

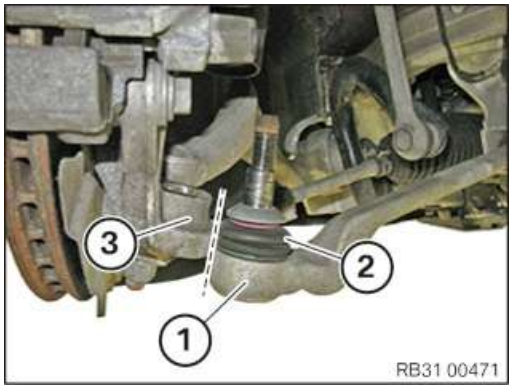
Replace self-locking nut.

Tightening torque 31 12 4AZ.



Pull wishbone (1) in direction of arrow and feed out of swivel bearing (2).

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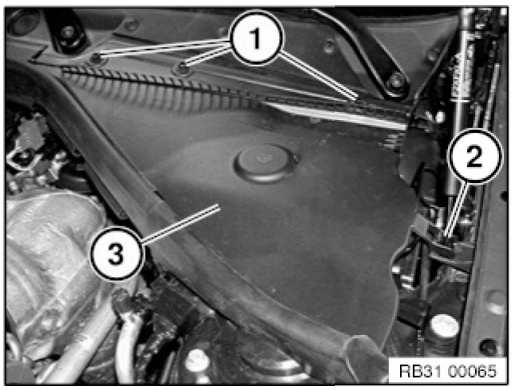


Attention!

Wishbone (1) can lie on swivel bearing (3).

Risk of damage to the rubber grommet (2) by the swivel bearing (3).

- Remove front brake disc.
- Remove track rod end from swivel bearing.
- Remove tension strut from swivel bearing



Unlock closures (1). Press clamps (2) together and lift.

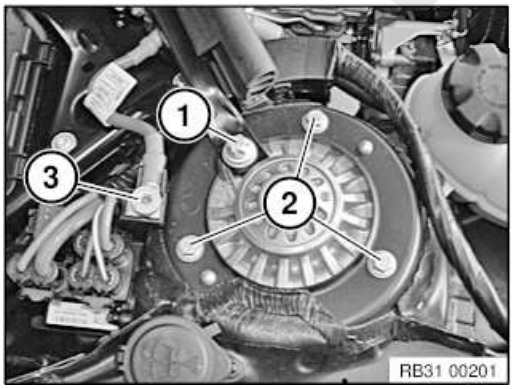
Remove cover (3).

Installation note:
Make sure closures are correctly locked.

Warning!

Danger of injury!

Secure spring strut against falling out.



Attention! (Right side):

Risk of short circuits! Cover positive terminal (3) with suitable material.

Release screw (1) on suspension cross-brace.

Tightening torque 51 61 1AZ.

Installation note:
Renew screw.

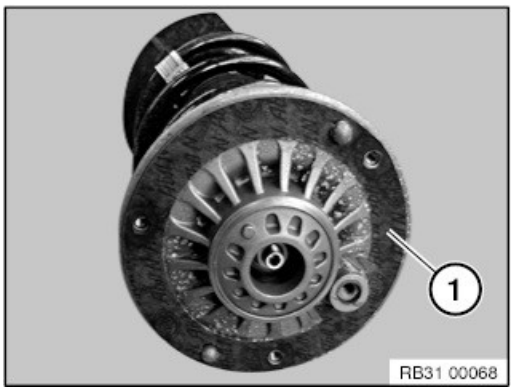
Release screws (2) and remove spring strut with swivel bearing towards bottom.

Tightening torque 31 31 1AZ.

Installation note:
Clean inside contact surface at spring strut dome.

Align spring strut with boreholes on spring strut dome using centring pins and push up.

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Installation note:
Check sealing washer (1) for damage, renew if necessary.

Required reworking:

- Install front wheel.
- Install anti-roll bar link on spring strut
- Connect plug connection for pulse sensor.
- Connect plug connection for brake pad wear sensor.

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51 71 373 Removing and installing/replacing trailing link on spring strut dome

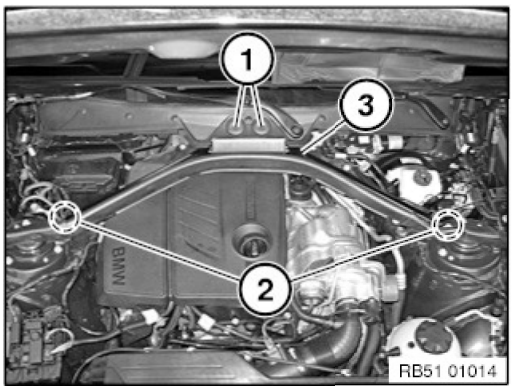
Important!

Driving without the trailing link is not permitted.

(risk of damage to the body).

Necessary preliminary tasks:

- Remove cover in engine compartment on the left and right



Lever out covers (1) and release screws underneath.

Release screws (2) and remove trailing link (3).

Tightening torque 51 61 1AZ

Installation note:
Replace screws and tighten to specified torque and then to angle of rotation.

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31 33 100 Replacing front left or right coil spring



Special tools required:

- 31 3 340
- 2 240 487
- 2 412 607
- 2 240 490



Attention!

Both coil springs on the relevant axle must be replaced only in the event of a breakage due to corrosion!

The coil spring is allocated in the Electronic Parts Catalogue (EPC) under the menu item "Spring table" after the vehicle identification number has been entered and the optional equipment of the respective car has been selected!



Warning!

Before using the special tool 31 3 340 take care to read through the Owner's Handbook!

All the safety precautions and instructions contained in the Owner's Handbook must be strictly observed!

Failure to observe these safety precautions and instructions increases the risk of serious physical injury, damage to your health and damage to property and equipment!



Attention!

1. Use only the BMW approved special tool!
2. Prior to each use, check the special tools for defects, modifications and operational reliability.
3. Damaged/modified special tools must not be used!
4. No changes or modifications may be made to the special tools!
5. These special tools are intended solely for the purpose of tightening and relieving cylindrical and tapered suspension springs.
6. Keep special tools dry, clean and (down to the spindle) free from grease.
7. Impact screwdrivers are prohibited!
8. Do not compress coil spring to full extent.



Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Mounting elements on parts of the chassis and suspension and steering must be replaced.

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Necessary preliminary work:

- Remove front spring strut.

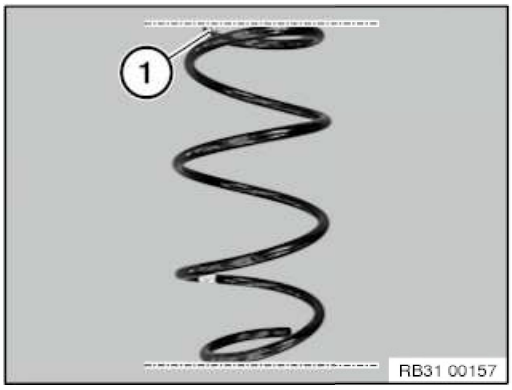


Relieve tension on coil spring.

Release special tool 2 240 487 .

Take out the coil spring with protective tube and support bearing.

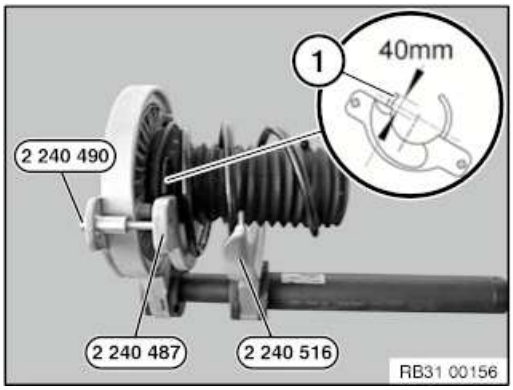
Installation note:
Check support bearing and protective tube for damage, replace if necessary.



Installation note:
The flattened end (1) of the spring is placed onto the support bearing.



Always use the pressure plate 2 240 487 with the protective insert 2 412 607 .



Attention!

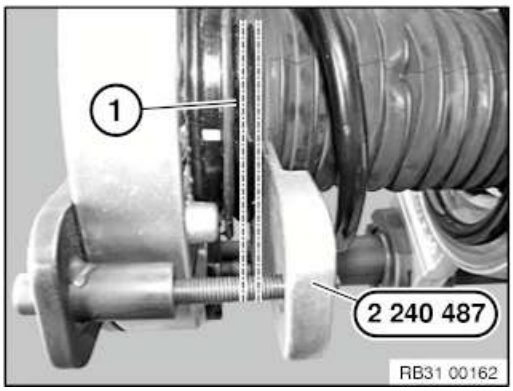
Do not compress coil spring to full extent.

The gummed side of the pressure plate 2 240 487 is fitted against the top spring coil!

Position the coil spring:

1. Insert the coil spring with protective tube and support bearing.
2. Assemble the pressure plate 2 240 487 with screws 2 240 490 .
3. Position the spring so that the end of the spring (1) protrudes by 40 mm beyond the pressure plate 2 240 487 .
4. Tighten the screws 2 240 490 evenly at 8 Nm.

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Attention!

The pressure plate 2 240 487 must be aligned parallel with the top spring coil (1)!

Tension coil spring.

Further assembly:

See Replacing the front left or right spring strut

After installation:

- Check headlight adjustment, correct if necessary.

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31 31 031 Replacing front left or right spring strut shock absorber



Special tools required:

- 31 3 340
- 31 2 230
- 2 240 516
- 2 364 829
- 31 3 341
- 2 240 482
- 2 240 523
- 2 364 828
- 2 240 486
- 2 240 487
- 2 412 607
- 2 240 490
- 33 0 040



Attention!

- When replacing the spring strut, replace the auxiliary damper as well!



Warning!

Before using the special tool 31 3 340 take care to read through the Owner's Handbook!

All the safety precautions and instructions contained in the Owner's Handbook must be strictly observed!

Failure to observe these safety precautions and instructions increases the risk of serious physical injury, damage to your health and damage to property and equipment!

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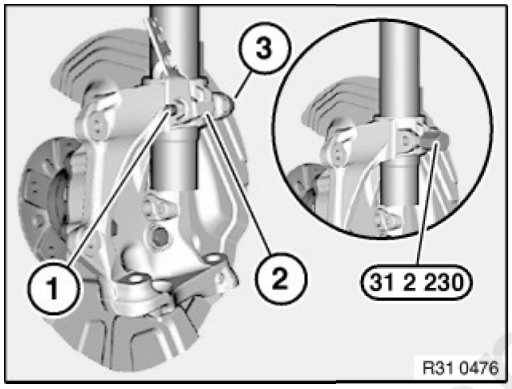
Attention!

1. Use only the BMW approved special tool!
2. Prior to each use, check the special tools for defects, modifications and operational reliability.
3. Damaged/modified special tools must not be used!
4. No changes or modifications may be made to the special tools!
5. These special tools are intended solely for the purpose of tightening and relieving cylindrical and tapered suspension springs.
6. Keep special tools dry, clean and (down to the spindle) free from grease.
7. Impact screwdrivers are prohibited!

   Risk of damage inside the shock absorber!
8. Do not compress coil spring to full extent.

Necessary preliminary work:

- Remove front spring strut.



Slacken nut (1).

Tightening torque 31 31 3AZ.

Take off holder (2).

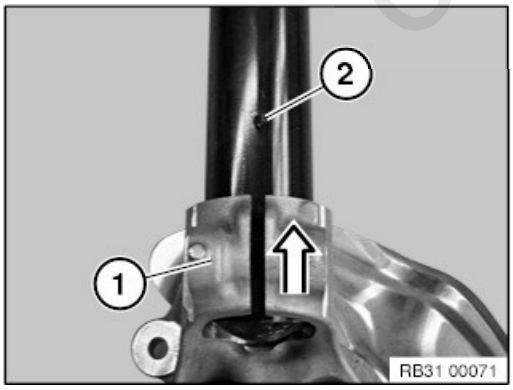
Pull out screw (3).

Expand swivel bearing with special tool 31 2 230 and pull off spring strut.

Installation note:
Keep swivel bearing and spring strut in lower area clean and free from oil and grease.

Screw head must point in direction of travel.

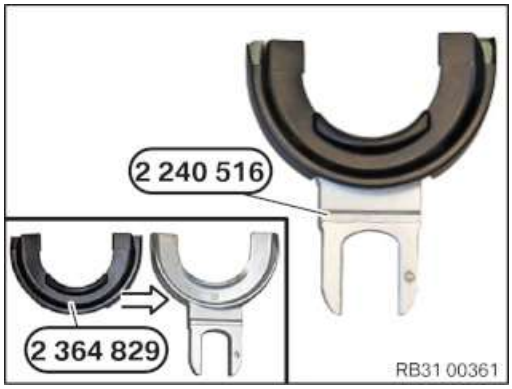
Replace screw (3) and self-locking nut (1).



Installation note:
Expand swivel bearing (1) with special tool 31 2 230 .

Align swivel bearing (1) to positioning pin (2) on the rear side of the spring strut along the gap and slide all the way in.

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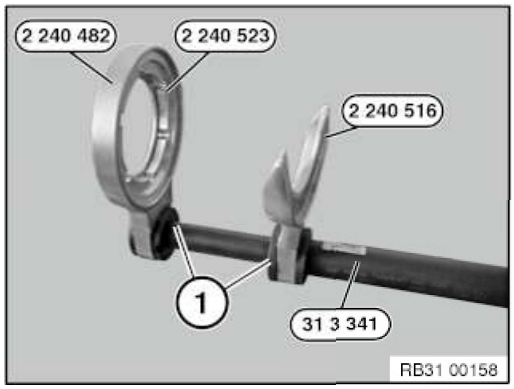
Attention!

Risk of damage to the coil spring!

Check protective inserts for wear before application, replace if necessary.

Use of faulty protective inserts leads to coil spring damage. This can lead to coil spring breakage (corrosion).

Always use the pressure plate 2 240 516 with protective insert 2 364 829 .



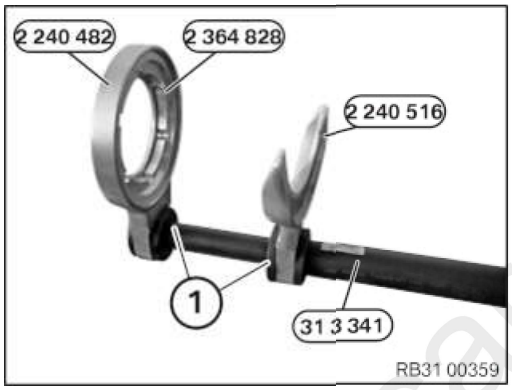
With support bearings with 3 screws (support bearing on body)**:**

Clamp special tool 31 3 341 in vice.

Fit special tool 2 240 516 and 2 240 482 onto special tool 31 3 341 until retaining bolt (1) can be felt and heard to snap into place.

Insert centering ring 2 240 523 into mounting plate 2 240 482 .

Check seating of special tools 2 240 516 and 2 240 482 with centring ring2 240 523 , correct if necessary.



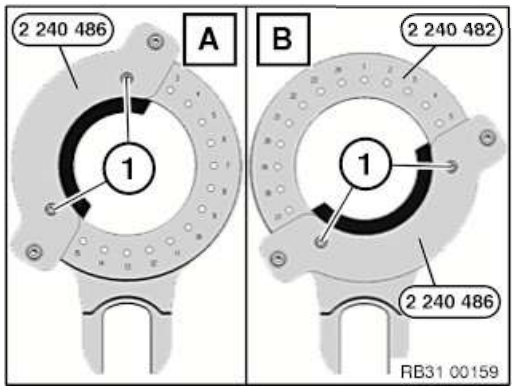
With support bearings with 5 screws (support bearing on body)**:**

Clamp special tool 31 3 341 in vice.

Fit special tool 2 240 516 and 2 240 482 onto special tool 31 3 341 until retaining bolt (1) can be felt and heard to snap into place.

Insert centering ring 2 364 828 into mounting plate 2 240 482 .

Check seating of special tools 2 240 516 and 2 240 482 with centring ring2 364 828 , correct if necessary.



Installation of brake onto mounting plate:

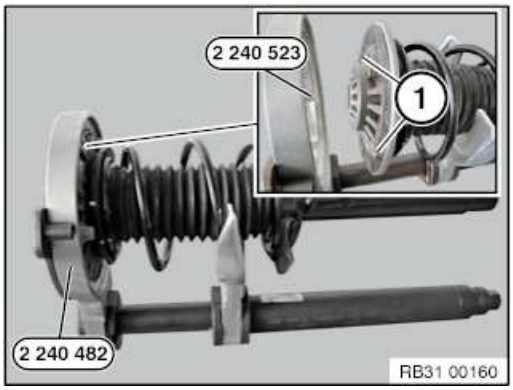
Move counter support 2 240 486 into the correct position/bore hole (see Figure A or B)

- **Standard suspension: Screw connection using bore holes 1 and 17**
- **Sports suspension settings: Screw connection using bore holes 7 and 15**

Turn centering ring 2 240 523 until counter support 2 240 486 can be screwed into place at the specified position.

Screw together counter support with mounting plate and the centering ring with screws (1) so they are hand-tight.

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With support bearings with 3 screws (support bearing on body)**:**

Clean coil spring to remove contamination.

Spring must be free of grease, clean and dry.

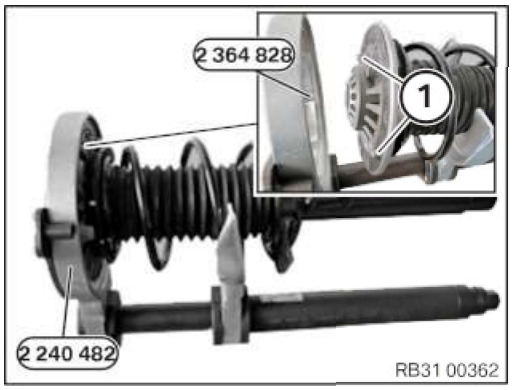
Insert spring strut into the spring tensioner.

Warning!

The guide pins (1) of the support bearing must fit into the recesses on the centering ring 2 240 523 .

The support bearing must be completely fitted against the centring ring 2 240 523 .

The lower spring coil must be placed completely into the recess of special tool 2 240 516 !



With support bearings with 5 screws (support bearing on body)**:**

Clean coil spring to remove contamination.

Spring must be free of grease, clean and dry.

Insert spring strut into spring tensioner.

Warning!

The guide pins (1) of the support bearing must fit into the recesses on the centering ring 2 364 828 .

The support bearing must be completely fitted against the centring ring 2 364 828 .

The lower spring coil must be placed completely into the recess of special tool 2 240 516 !



Attention!

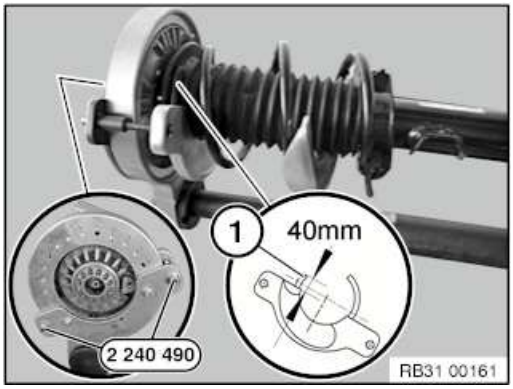
Risk of damage to the coil spring!

Before application: Check protective insert for wear, replace if necessary.

Use of faulty protective inserts leads to coil spring damage. This can lead to coil spring breakage (corrosion).

Always use the pressure plate 2 240 487 with protective insert 2 412 607 .

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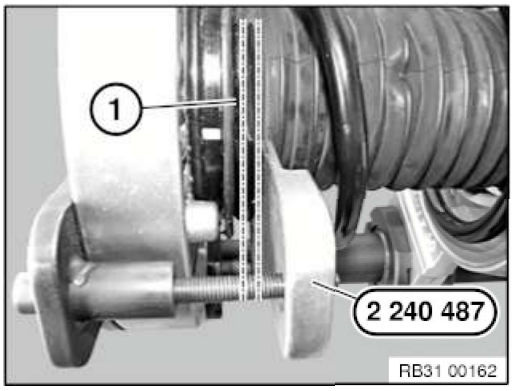


Attach pressure plate 2 240 487 with the screws2 240 490 !

The gummed side of the pressure plate 2 240 487 must be fitted against the top spring coil.

Position the spring strut so that the end of the spring (1) protrudes by 40 mm beyond the pressure plate 2 240 487 .

Tighten the screws 2 240 490 evenly at 8 Nm.



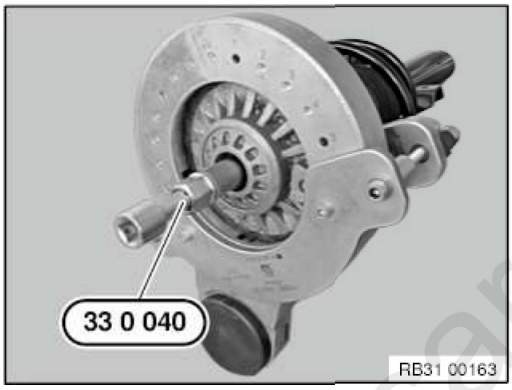
Attention!

The pressure plate 2 240 487 must be aligned parallel with the top spring coil (1)!

When the end of the spring begins to twist relative to the pressure plate, tensioning must be stopped immediately.

Correct seating of the pressure plate must be checked, and the rubberised mount and pressure plate must be checked for wear!

Tension coil spring with spring tensioner 31 3 341 until stress on piston rod is relieved.



Release nut with special tool 33 0 040 .

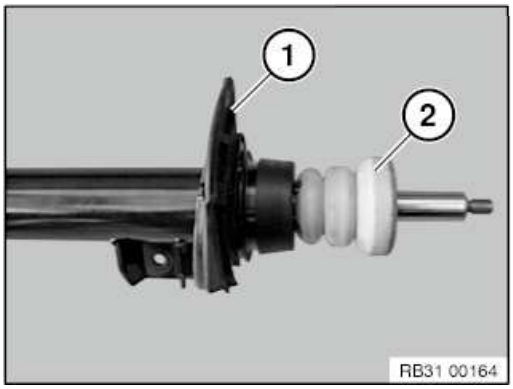
Remove the spring strut with auxiliary damper.

Installation note:
Renew nut.



Impact screwdrivers are prohibited!

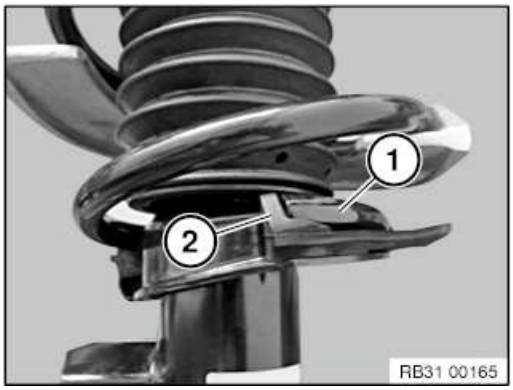
Risk of damage inside the shock absorber!



Installation note:
Remove the spring pad (1) and mount onto the new spring strut, replace if necessary.

Replace the auxiliary damper (2).

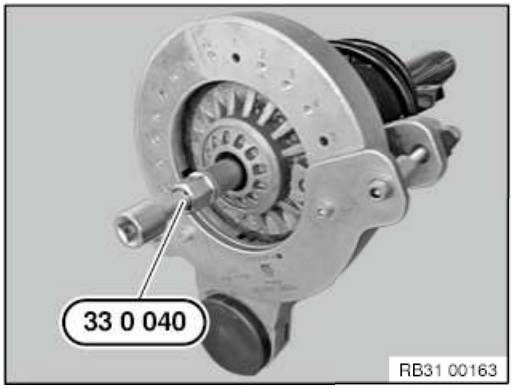
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Insert spring strut into tensioned coil spring.**Attention!**

Align the lower end of the spring (1) flush with the spring pad (2).

Check the installation position of the protective tube, correct the fold if necessary.



Parts: Nut

Tighten new nut with the special tool 33 0 040 .

Tightening torque 31 31 2AZ.

Align all components correctly to each other and relive tension on coil spring.

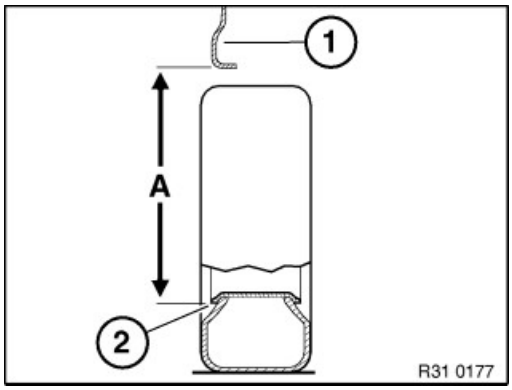


Impact screwdrivers are prohibited!

Risk of damage inside the shock absorber!

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31 33 ... Measuring vehicle ride height



Determine actual ride height (A) - to do so, attach tape measure to rim flange (2) at bottom middle and measure to wheel arch lower edge (1).

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31 33 100 Replacing front left or right coil spring



Special tools required:

- 31 3 340
- 2 240 487
- 2 412 607
- 2 240 490



Attention!

Both coil springs on the relevant axle must be replaced only in the event of a breakage due to corrosion!

The coil spring is allocated in the Electronic Parts Catalogue (EPC) under the menu item "Spring table" after the vehicle identification number has been entered and the optional equipment of the respective car has been selected!



Warning!

Before using the special tool 31 3 340 take care to read through the Owner's Handbook!

All the safety precautions and instructions contained in the Owner's Handbook must be strictly observed!

Failure to observe these safety precautions and instructions increases the risk of serious physical injury, damage to your health and damage to property and equipment!



Attention!

1. Use only the BMW approved special tool!
2. Prior to each use, check the special tools for defects, modifications and operational reliability.
3. Damaged/modified special tools must not be used!
4. No changes or modifications may be made to the special tools!
5. These special tools are intended solely for the purpose of tightening and relieving cylindrical and tapered suspension springs.
6. Keep special tools dry, clean and (down to the spindle) free from grease.
7. Impact screwdrivers are prohibited!
8. Do not compress coil spring to full extent.



Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Mounting elements on parts of the chassis and suspension and steering must be replaced.

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Necessary preliminary work:

- Remove front spring strut.

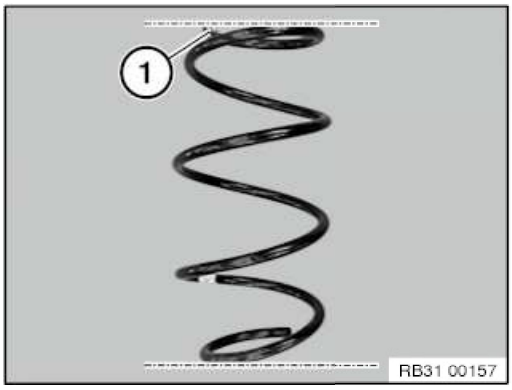


Relieve tension on coil spring.

Release special tool 2 240 487 .

Take out the coil spring with protective tube and support bearing.

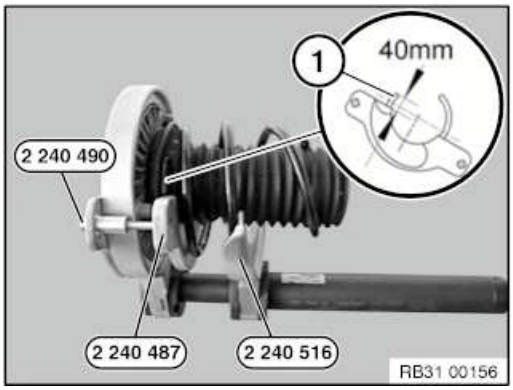
Installation note:
Check support bearing and protective tube for damage, replace if necessary.



Installation note:
The flattened end (1) of the spring is placed onto the support bearing.



Always use the pressure plate 2 240 487 with the protective insert 2 412 607 .



Attention!

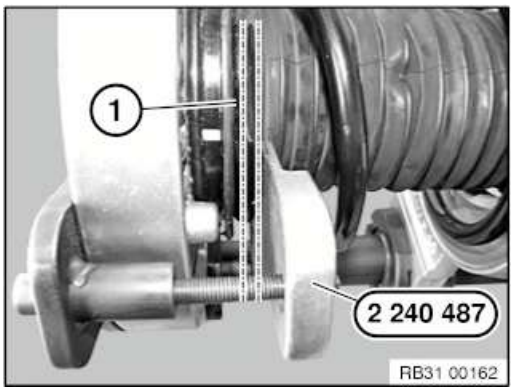
Do not compress coil spring to full extent.

The gummed side of the pressure plate 2 240 487 is fitted against the top spring coil!

Position the coil spring:

1. Insert the coil spring with protective tube and support bearing.
2. Assemble the pressure plate 2 240 487 with screws 2 240 490 .
3. Position the spring so that the end of the spring (1) protrudes by 40 mm beyond the pressure plate 2 240 487 .
4. Tighten the screws 2 240 490 evenly at 8 Nm.

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Attention!

The pressure plate 2 240 487 must be aligned parallel with the top spring coil (1)!

Tension coil spring.

Further assembly:

See Replacing the front left or right spring strut

After installation:

- Check headlight adjustment, correct if necessary.

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31 33 001 Replacing front left or right spring strut support bearing

Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Retaining elements on chassis and suspension and steering parts must be replaced.

Important!

Only F2x, F3x up to model year 05/2013:

Before fitting a new support bearing, the current version of the support bearing must be checked.

In the case of a support bearing with M8 screw connection (support beating on body), the support bearings must be replaced in pairs by support bearings with M10 screw connection.

The changeover of the screw connection from M8 to M10 results in a different level of stiffness. Therefore, **mixed installation (M8/M10) is not permitted**!

If the support bearings have already been replaced once by support bearings with M10 screw connection, the installation of an individual support bearing is permissible once more.

Note:
Procedure is described in the document ”Replacing front left or right coil spring”.

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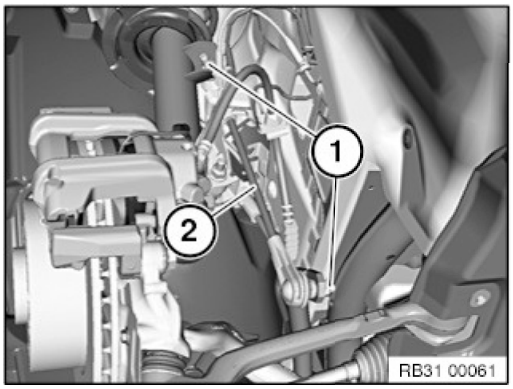
31 35 005 Removing and installing anti-roll bar link for left or right anti-roll bar

Risk of damage!

- Avoid bending the head of the anti-roll bar during assembly!
- An impact screwdriver must not be used!

Necessary preliminary tasks:

- Remove front wheel.



Important!

It is important to counterhold Torx socket when loosening push rod screw connection (1).

Unscrew nuts (1).

Tightening torque 31 35 2AZ.

Remove anti-roll bar link (2).

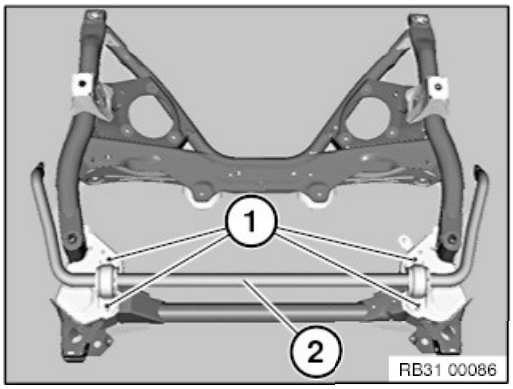
Installation note:
Replace self-locking nuts.

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

Necessary preliminary tasks:

- Remove anti-roll bar links from anti-roll bar.
- Lower front axle support.



Unscrew nuts (1).

Tightening torque 31 35 1AZ.

Remove retaining brackets.

Remove anti-roll bar (2) forward.

Installation note:
Replace nuts (1).

Check both rubber mounts for damage.

- In the event of rubber mount damage, the anti-roll bar must be renewed.

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31 50 ... Check/change front axle differential oil

Attention!

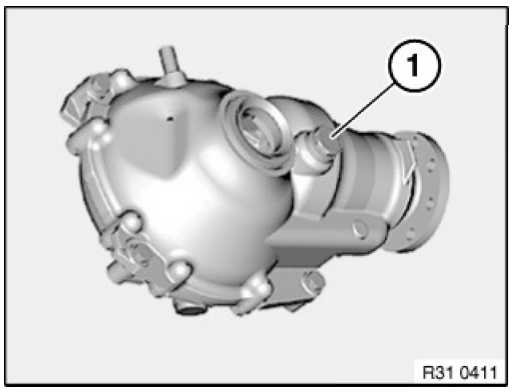
Use only the approved front axle oil in the front axle differential.

Failure to comply with this requirement will result in serious damage to the front axle differential!

Note:
Only change oil when front axle differential is at normal operating temperature.

Necessary preliminary tasks:

- Remove reinforcement plate.



Checking, correcting front axle differential oil level:

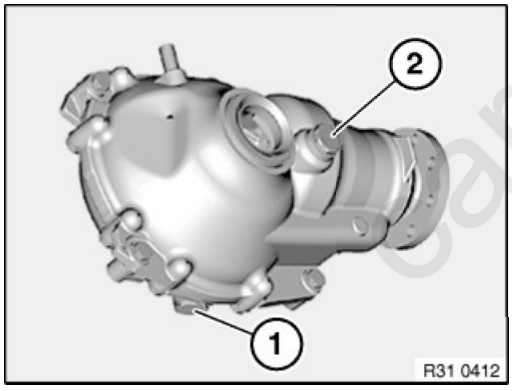
Undo oil filler plug (1).

Tightening torque 31 50 2AZ.

Check front axle differential oil level.

If necessary, top up the front axle differential oil to the lower edge of the opening for oil filler plug (1).

Installation note:
Replace oil filler plug (1).



Changing front axle differential oil:

Place oil collecting apparatus underneath.

Remove oil drain plug (1).

Tightening torque 31 50 2AZ.

Drain front axle differential oil.

Screw in oil drain plug (1) and tighten.

Undo oil filler plug (2).

Tightening torque 31 50 2AZ.

Pour in front axle differential oil up to lower edge of opening for oil filler plug (2).

Installation note:
Renew oil drain plug (1) and oil filler plug (2).

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31 50 001 Removing and installing/replacing front axle differential

Warning!

Danger to life!

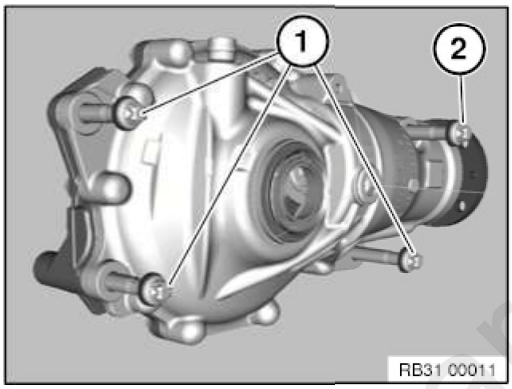
Secure engine in installation position to prevent it from falling down.

Necessary preliminary tasks:

- Secure engine in installation position.
- Drain and dispose of front differential oil
- Remove output shaft on left and right.
- Remove front propeller shaft.
- Lower front axle support.

Attention!

Grip front axle differential firmly while releasing last bolt in order to avoid damage caused by the differential falling.



Release screws (1,2).

Remove front axle differential downwards.

Installation note:
During removal and installation: Replace O-ring.

Coat O-ring with front axle differential oil.

Make sure screws are installed in correct positions.

- Screws (1) M12x55
- Screw (2) M12x105

Tightening torque 31 50 1AZ.

After installation:

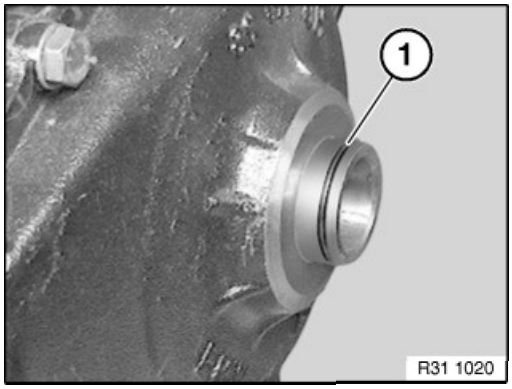
- Fill front axle differential with oil.
- Check oil level in transfer box, correct if necessary.

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31 51 060 Replacing O-ring for front axle differential on right

Necessary preliminary work:

- Remove front axle differential.



Remove O-ring (1) with a suitable tool from front axle differential.*Installation note:*
Insert O-ring (1) in groove and coat with front axle differential oil.

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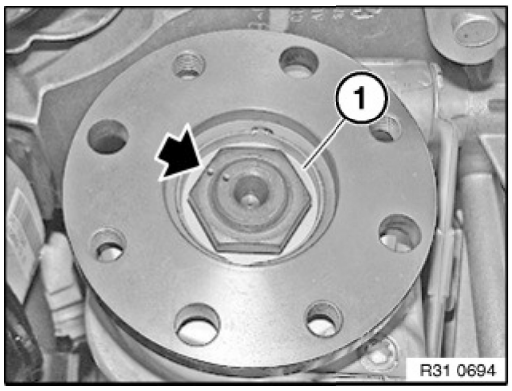
31 51 010 Replacing radial seal for drive flange of front axle differential

Special tools required:

- 23 0 020
- 31 5 130
- 33 1 150

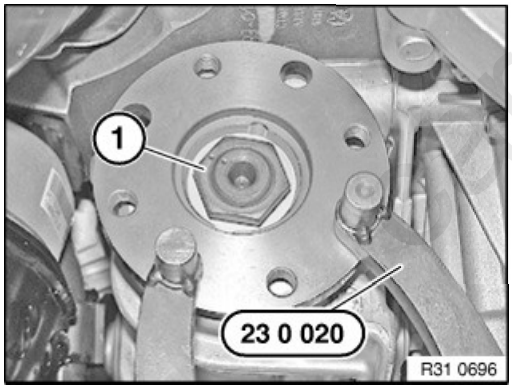
Necessary preliminary tasks:

- Disconnect battery earth lead.
- Remove reinforcement plate.
- Remove front propeller shaft.



Mark position of nut with respect to shaft with punch marks (arrow).

Lever out lockplate (1) with a suitable tool.

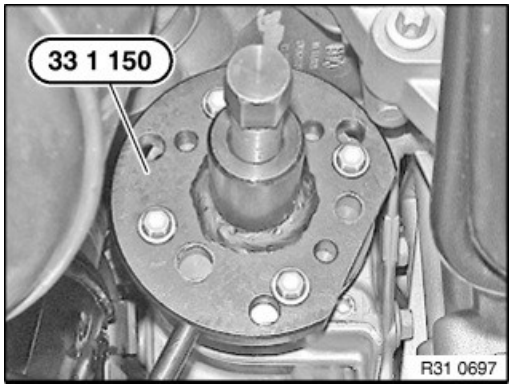


Important!

Risk of damage!

Do not place special tool on threaded holes of drive flange.

Secure drive flange with special tool 23 0 020 against turning and release nut (1).



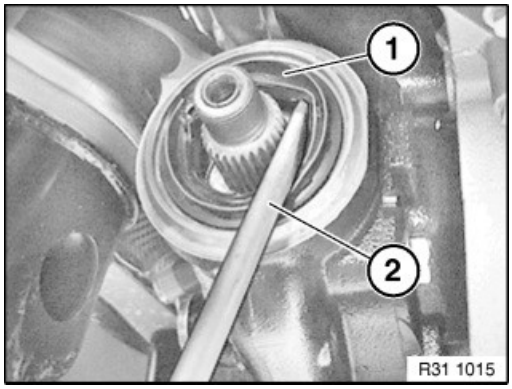
Important!

Risk of damage!

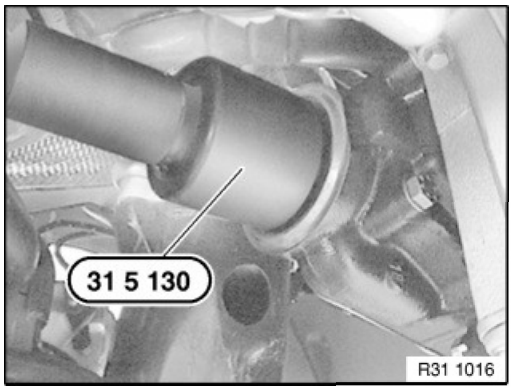
Mount special tool only with longer screws (M10x30) on drive flange.

Pull drive flange off drive shaft with special tool 33 1 150 .

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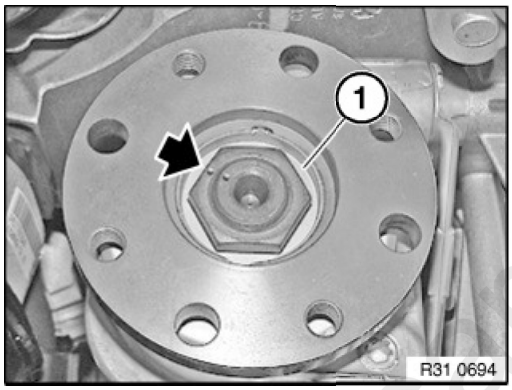


Lever radial shaft seal (1) out of front differential with a suitable screwdriver (2).



Installation note:
Drive in radial shaft seal with special tool 31 5 130 as far as it will go.

Coat sealing lips of new shaft seal (1) with front differential oil.



Important!

Risk of damage!

Do not tighten nut beyond punch marks. Otherwise the clamping sleeve will be damaged.

Clean drive flange and attach.

Tighten down nut until punch marks on nut and shaft are aligned.

Install new lockplate (1).

After installation:

- Check oil level in front axle differential, correct if necessary.

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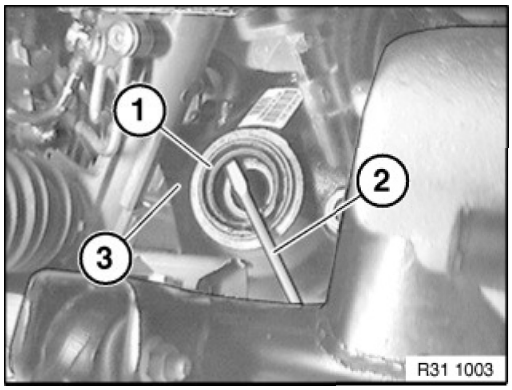
31 51 015 Replacing radial shaft seal for output shaft, left

Special tools required:

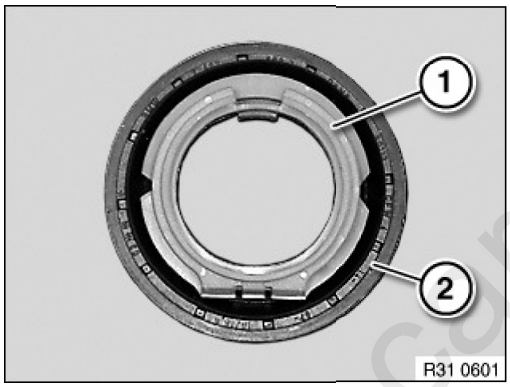
- 31 5 130

Necessary preliminary work:

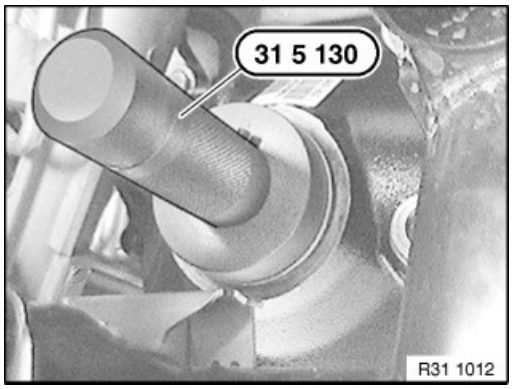
- Remove left output shaft.



Lever radial shaft seal (1) with a screwdriver (2) out of front axle differential (3).



Note:
Protective grommet (1) serves to protect the sealing lips of radial shaft seal (2) from being damaged when the output shaft is inserted into the front axle differential.



Installation note:
Drive in radial shaft seal with special tool 31 5 130 as far as it will go.

After installation:

- Check front axle gearbox oil level, correct if necessary.

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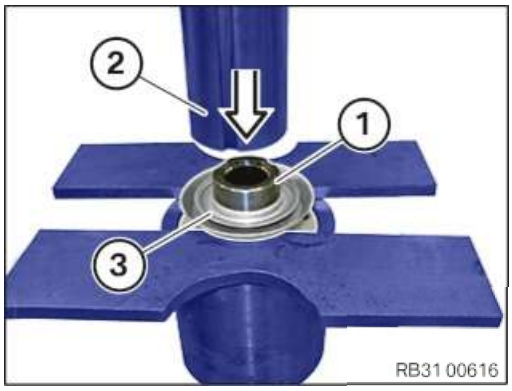
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31 51 600 Replacing both dust plates (input flange removed)

TECHNICAL INFORMATION

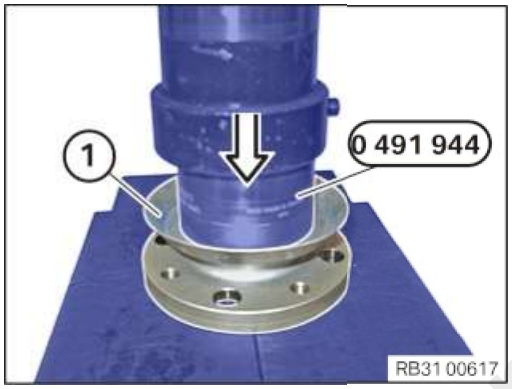
The work must be performed with care to prevent component damage.

1 – Releasing both dust plates

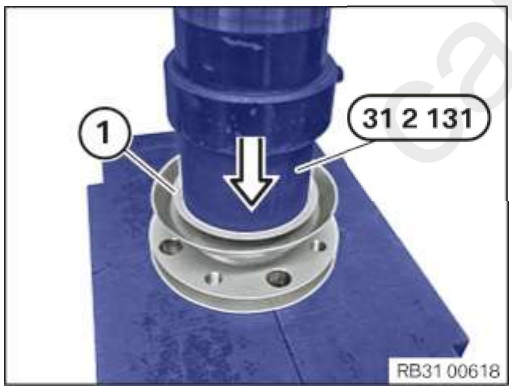


- Releasing both dust plates (3) using a hydraulic press (2) from the input flange (1).

2 – Press both dust plates on



- Press the large dust plate (1) onto the input flange with a hydraulic press and the special tool .



- Press the small dust plate (1) onto the input flange with a hydraulic press and the special tool .

Additional Information

Overview of Special Tools

Replacement tools:

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0 491 916 (31 2 133) Holding sleeve

Common	Used in step 2
Usage	(Pressure sleeve) For pulling out and in / model series: E30 All-wheel drive vehicle, E34, E36, E46 Can no longer be ordered separately. Only available as part of set 31 2 130 = 83 30 0 491 913.
Included in the tool or work	0 491 913
Storage location	Individual
Replaced by	
In connection with	
SI-Number	

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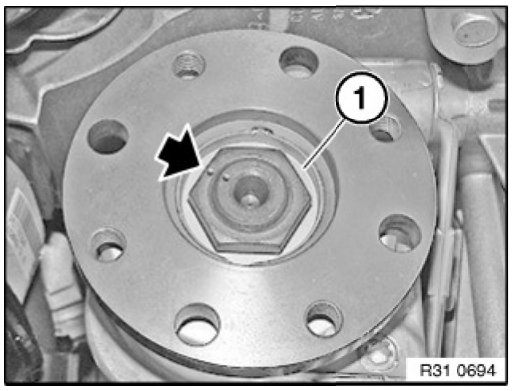
31 51 010 Replacing radial seal for drive flange of front axle differential

Special tools required:

- 23 0 020
- 31 5 130
- 33 1 150

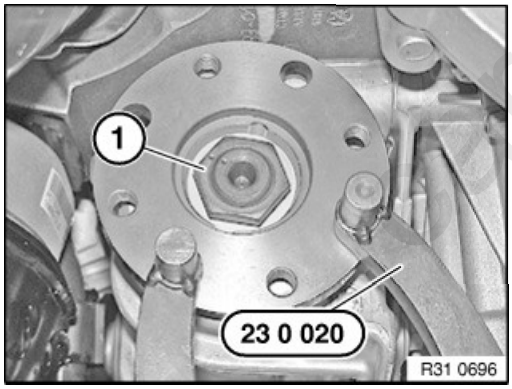
Necessary preliminary tasks:

- Disconnect battery earth lead.
- Remove reinforcement plate.
- Remove front propeller shaft.



Mark position of nut with respect to shaft with punch marks (arrow).

Lever out lockplate (1) with a suitable tool.

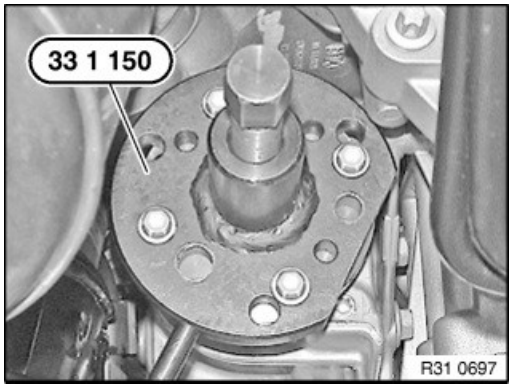


Important!

Risk of damage!

Do not place special tool on threaded holes of drive flange.

Secure drive flange with special tool 23 0 020 against turning and release nut (1).



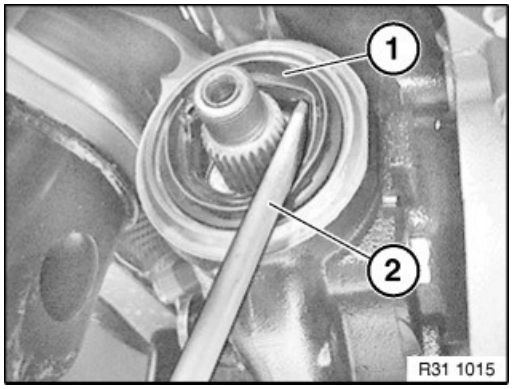
Important!

Risk of damage!

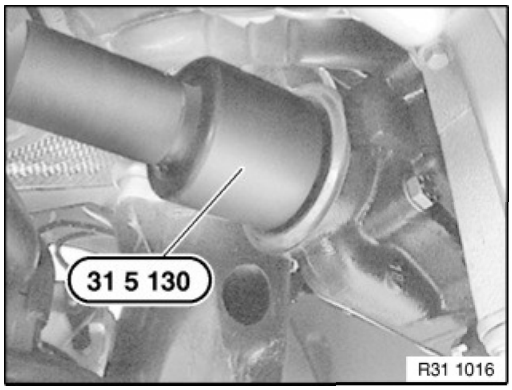
Mount special tool only with longer screws (M10x30) on drive flange.

Pull drive flange off drive shaft with special tool 33 1 150 .

diagn.com

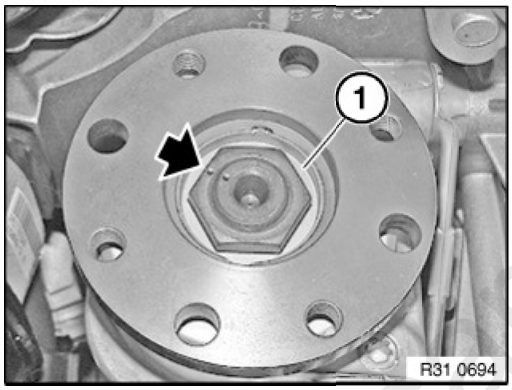


Lever radial shaft seal (1) out of front differential with a suitable screwdriver (2).



Installation note:
Drive in radial shaft seal with special tool 31 5 130 as far as it will go.

Coat sealing lips of new shaft seal (1) with front differential oil.



Important!

Risk of damage!

Do not tighten nut beyond punch marks. Otherwise the clamping sleeve will be damaged.

Clean drive flange and attach.

Tighten down nut until punch marks on nut and shaft are aligned.

Install new lockplate (1).

After installation:

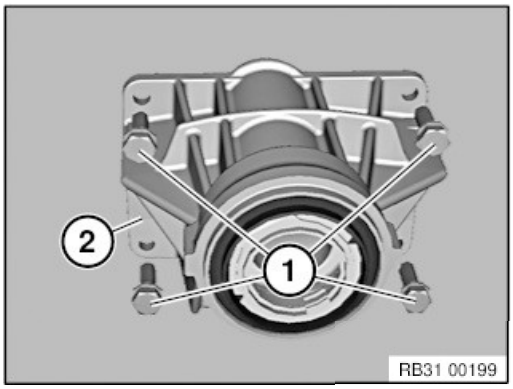
- Check oil level in front axle differential, correct if necessary.

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31 53 040 Removing and installing/replacing right output shaft bearing block

Necessary preliminary tasks:

- Remove right output shaft.
- Release sound insulation of oil sump if necessary.



Release screws (1).

Tightening torque 31 60 1AZ.

Remove bearing support from oil sump.

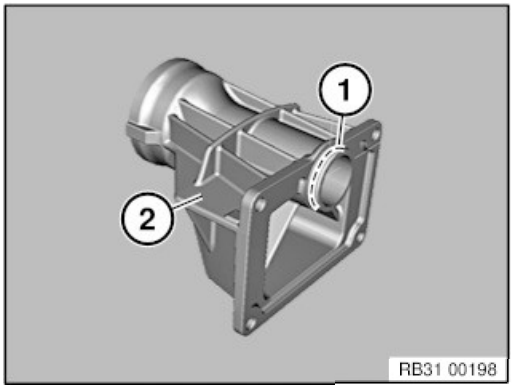
Installation note:
Replace O-ring.

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31 51 065 Replacing O-ring for bearing block

Necessary preliminary work:

- Remove bearing support.



Remove O-ring (1) with a suitable tool from bearing support (2).*Installation note:*
Insert O-ringÂ (1) in groove and coat with front axle differential oil.

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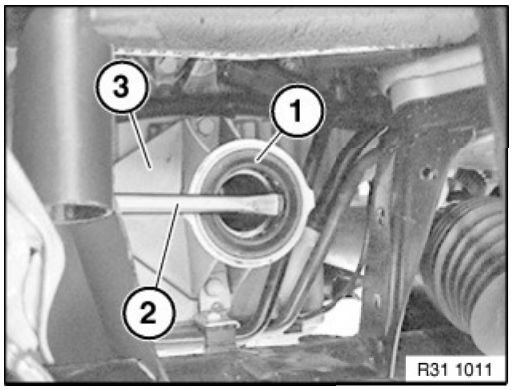
31 51 020 Replacing radial shaft seal for output shaft, right

Special tools required:

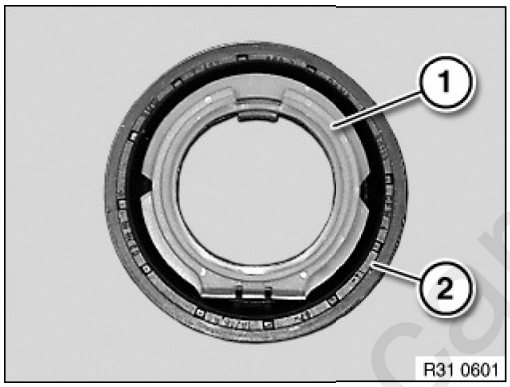
- 31 5 130

Necessary preliminary work:

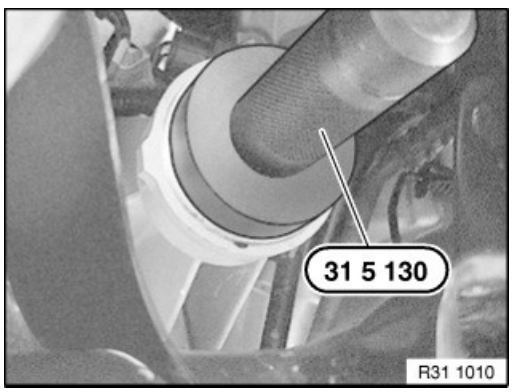
- Remove right output shaft.



Lift out radial shaft seal (1) from the bearing support (3) with a screwdriver (2).



Note:
Protective sleeve (1) serves to protect the sealing lip of radial shaft seal (2) from being damaged when the output shaft is inserted into the bearing support.



Installation note:
Drive in radial shaft seal with special tool 31 5 130 as far as it will go.

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

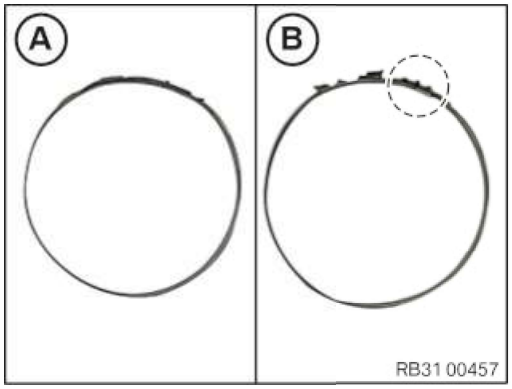
Special tools required:

- 31 5 200
- 2 413 949



Important!

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

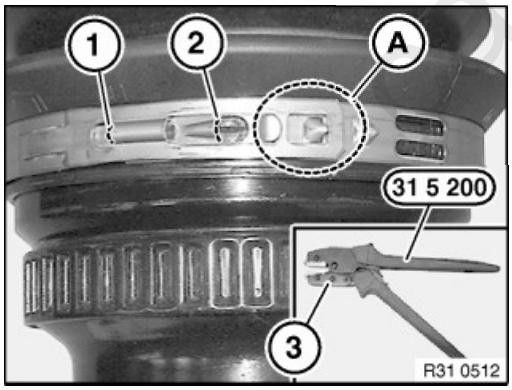


Depending on the design of the Low Profile band clamps, a different special tool (pliers) is needed for installation.

Identify band clamp and find required special tool.

Band clamp type A = pliers 31 5 200

Band clamp type B = pliers 2 413 949

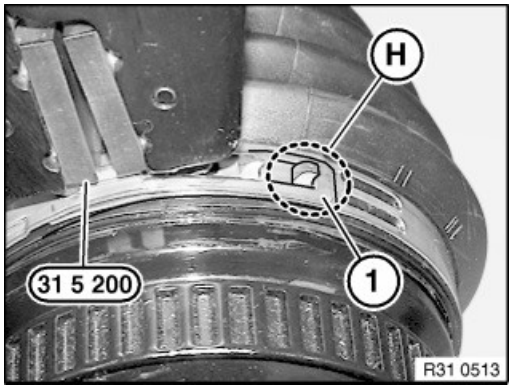


Installation (type A):

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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31 60 000 Removing and installing/replacing left or right output shaft

Special tools required:

- 31 5 110

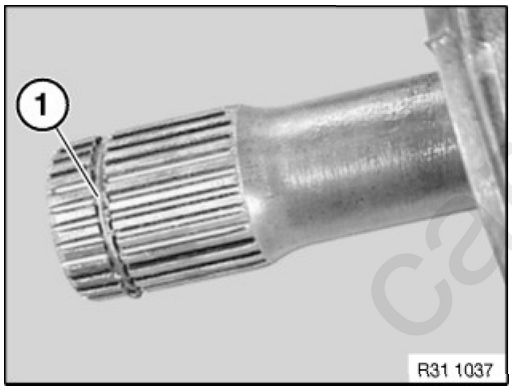
Note:
If the wishbone is detached from the front axle support, it will be necessary to carry out the wheel alignment procedure.

Necessary preliminary tasks:

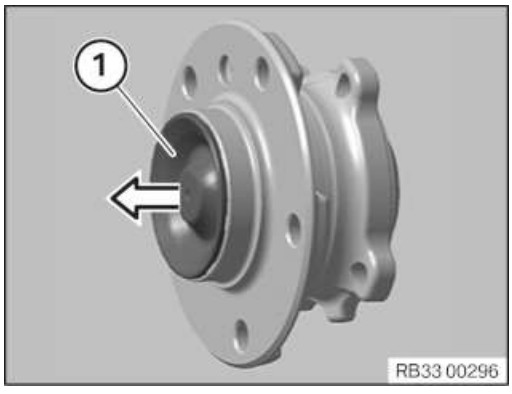
- Remove front wheel.
- Remove reinforcement plate.
- Remove anti-roll bar link from anti-roll bar.

Important!

- The radial shaft seal for the output shaft should be replaced every time the output shaft is removed and installed.

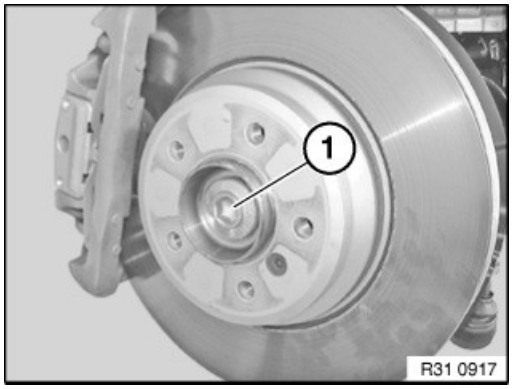


Important!
Circlip (1) in the bearing support/front differential must be replaced when fitting the output shaft!



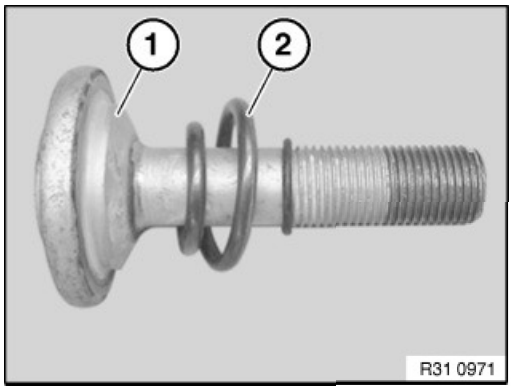
If necessary, remove visual protection cap (1).

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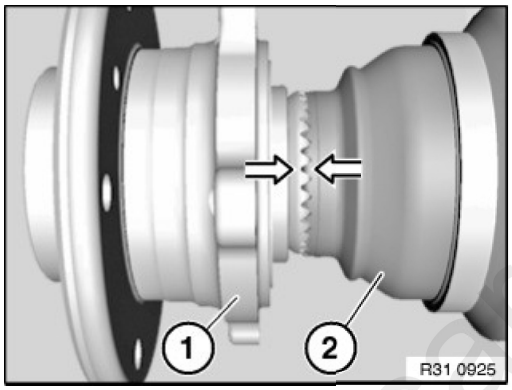
Release collar bolt (1), press brake pedal to floor for this purpose.

Tightening torque 31 60 2AZ.



Installation note:

- Renew collar bolt (1) and compression spring (2).
- Pay attention to installation position of compression spring (2).
- Keep collar bolt and spur toothing of bearing/propeller shaft clean and free of grease
- **Follow installation note of the spur gearing.**



Important!

Note on installation must be observed without fail!

Installation note:

- Spur gearing of bearing (1) and output shaft (2) must be installed form-fit (tooth in tooth)!
- Tighten collar bolt and compression spring by hand.
- Check whether spur gearing is locked tooth in tooth by reciprocally rotating wheel hub/output shaft.
- Once a form-fit has been ensured, tighten to final torque.

  Tightening torque 31 60 2AZ.

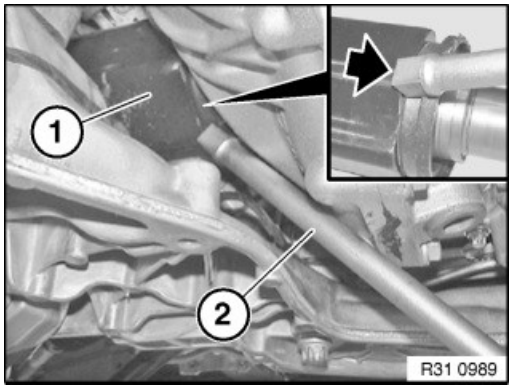
Detach tie rod end from swivel bearing.

Release wishbone on front axle carrier

Turn swivel bearing to one side.

Remove output shaft from swivel bearing/wheel bearing.

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Important!

Risk of damage!

Secure output shaft against falling out.

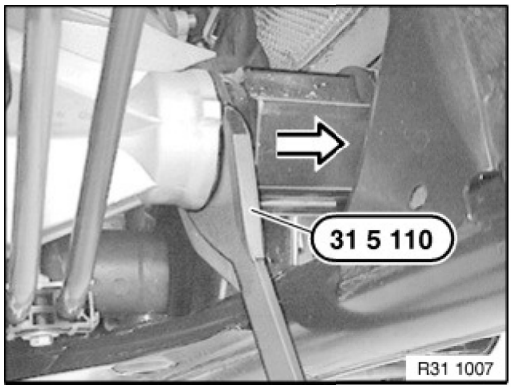
Knock out output shaft (1) on the left from the front axle differential with an aluminium drift (2).*Installation note:*
Renew radial shaft seal in front axle differential, coat sealing lips with front differential oil.

Replace circlip and slide in output shaft, overcoming resistance of circlip. Output shaft must snap audibly into place.

Important!

High installation forces indicate that the gearing on the output shaft/rear axle final drive side gear are damaged/deformed!

Check gearing and replace components if damaged.



bearing support:

Press output shaft with special tool 31 5 110 out of bearing support and remove.

Installation note:
Renew radial shaft seal in bearing support and coat sealing lips with front differential oil.

Replace circlip and slide in output shaft, overcoming resistance of circlip. Output shaft must snap audibly into place.

Important!

High installation forces indicate that the gearing on the output shaft/rear axle final drive side gear are damaged/deformed!

Check gearing and replace components if damaged.

After installation:

- Check oil level in front axle differential, correct if necessary.
- Carry out wheel alignment procedure.

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31 60 530 Replacing an output shaft gaiter (on transmission side) (output shaft removed)



Note:
Procedure is described in the document "both output shaft gaiters...".

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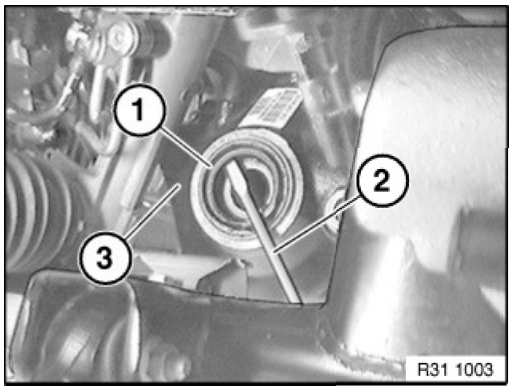
31 51 015 Replacing radial shaft seal for output shaft, left

Special tools required:

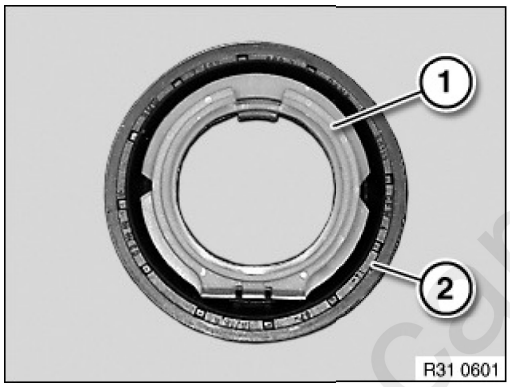
- 31 5 130

Necessary preliminary work:

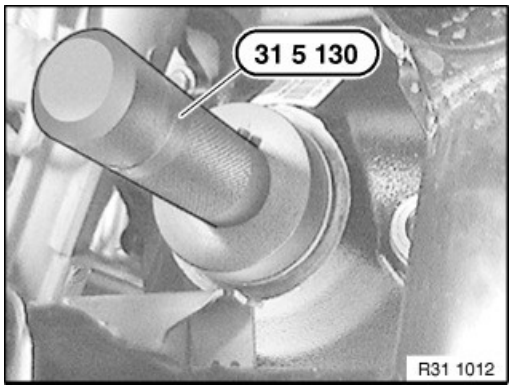
- Remove left output shaft.



Lever radial shaft seal (1) with a screwdriver (2) out of front axle differential (3).



Note:
Protective grommet (1) serves to protect the sealing lips of radial shaft seal (2) from being damaged when the output shaft is inserted into the front axle differential.



Installation note:
Drive in radial shaft seal with special tool 31 5 130 as far as it will go.

After installation:

- Check front axle gearbox oil level, correct if necessary.

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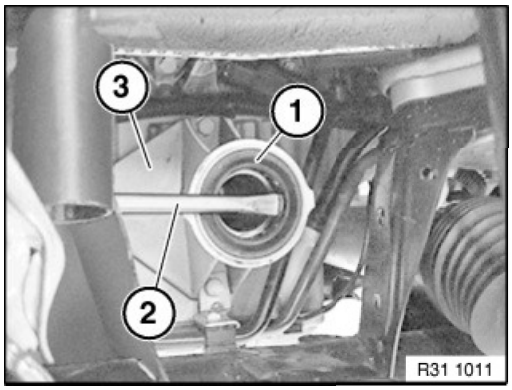
31 51 020 Replacing radial shaft seal for output shaft, right

Special tools required:

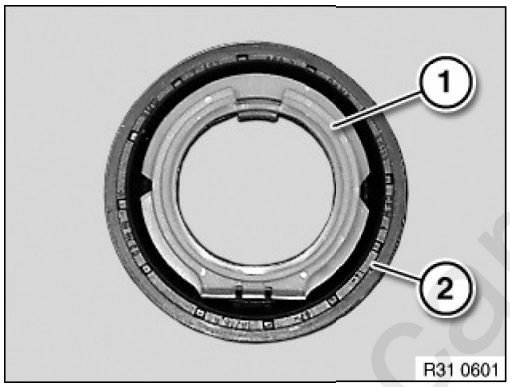
- 31 5 130

Necessary preliminary work:

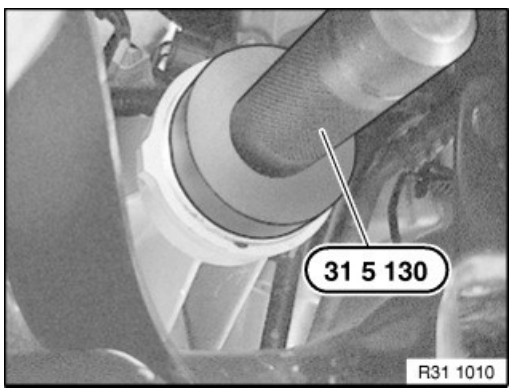
- Remove right output shaft.



Lift out radial shaft seal (1) from the bearing support (3) with a screwdriver (2).



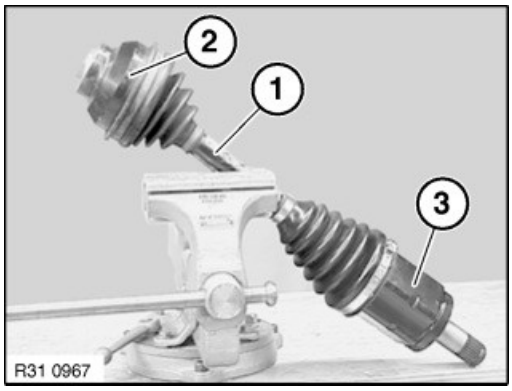
Note:
Protective sleeve (1) serves to protect the sealing lip of radial shaft seal (2) from being damaged when the output shaft is inserted into the bearing support.



Installation note:
Drive in radial shaft seal with special tool 31 5 130 as far as it will go.

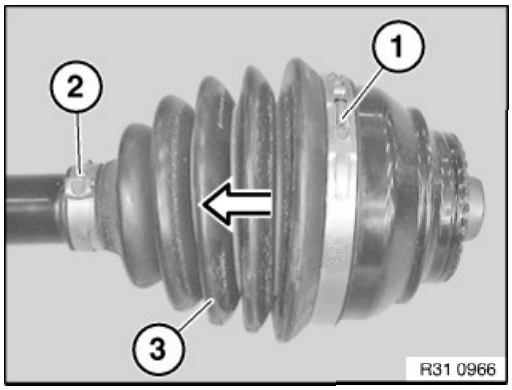
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31 60 535 Replacing two gaiters on output shaft(s) (output shaft(s) removed)



Grip output shaft (1) in vice with aluminium clamping jaws.*Note:*
2 = Joint, wheel side

3 = Joint, transmission side

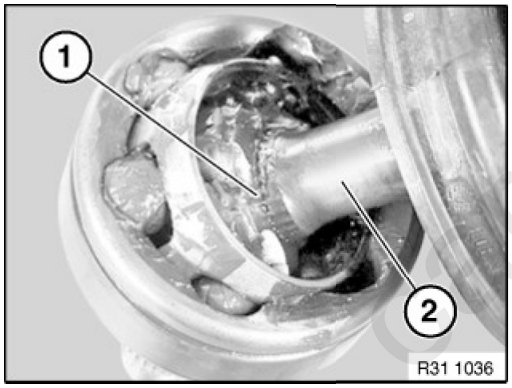


Replacing gaiter of joint on wheel side:

Release Low Profile clip (1) and clip (2).

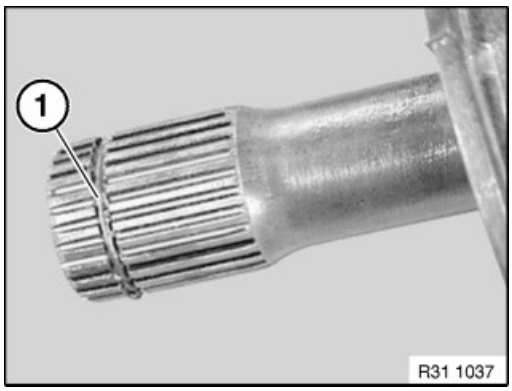
Pull back rubber gaiter (3).

Installation note:
Feed gaiter (3) into groove of joint.



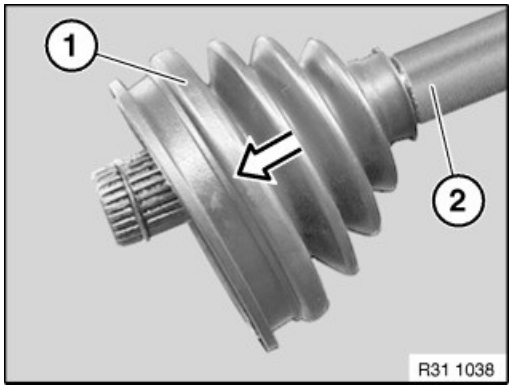
Press off joint (1) via contact pressure of circlip on shaft (2).*Installation note:*
Replace circlip.

Push on joint until circlip can be heard to snap into place.



Lift out circlip (1).*Installation note:*
Install retaining ring (1).

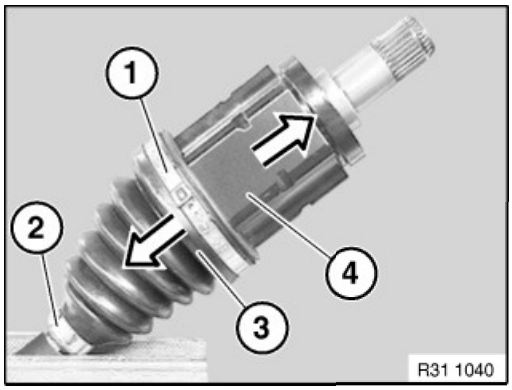
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Pull off gaiter (1) over shaft (2).

Carefully clean all components with a cloth.

Note:
Re-grease constant velocity joint with the grease from the repair kit.



Replacing gaiter of joint on gearbox side:

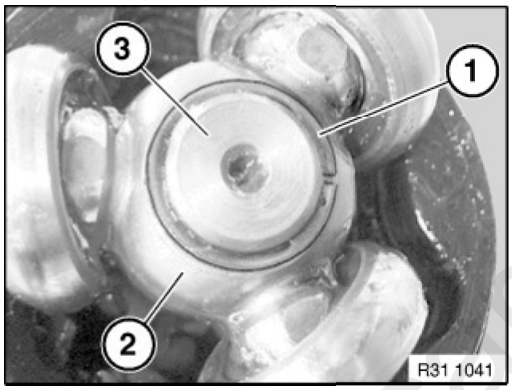
Release band clamps (1, 2).

Pull back rubber gaiter (3).

Detach joint housing (4).

Installation note:
Feed gaiter (3) into groove of joint housing (4).

Align band clamp (1) so that hook fastener is as at flat end of joint housing (4).



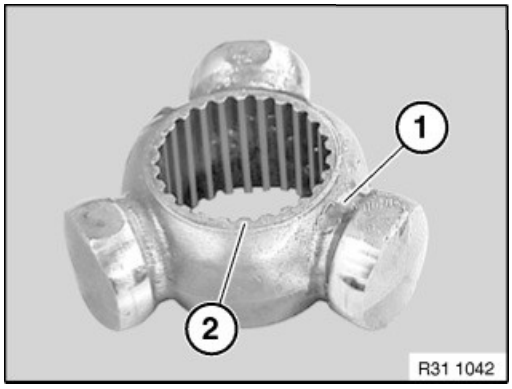
Remove circlip (1).

Installation note:
Install retaining ring (1).

Detach tripod element (2) from shaft (3).

Pull off gaiter over shaft (3).

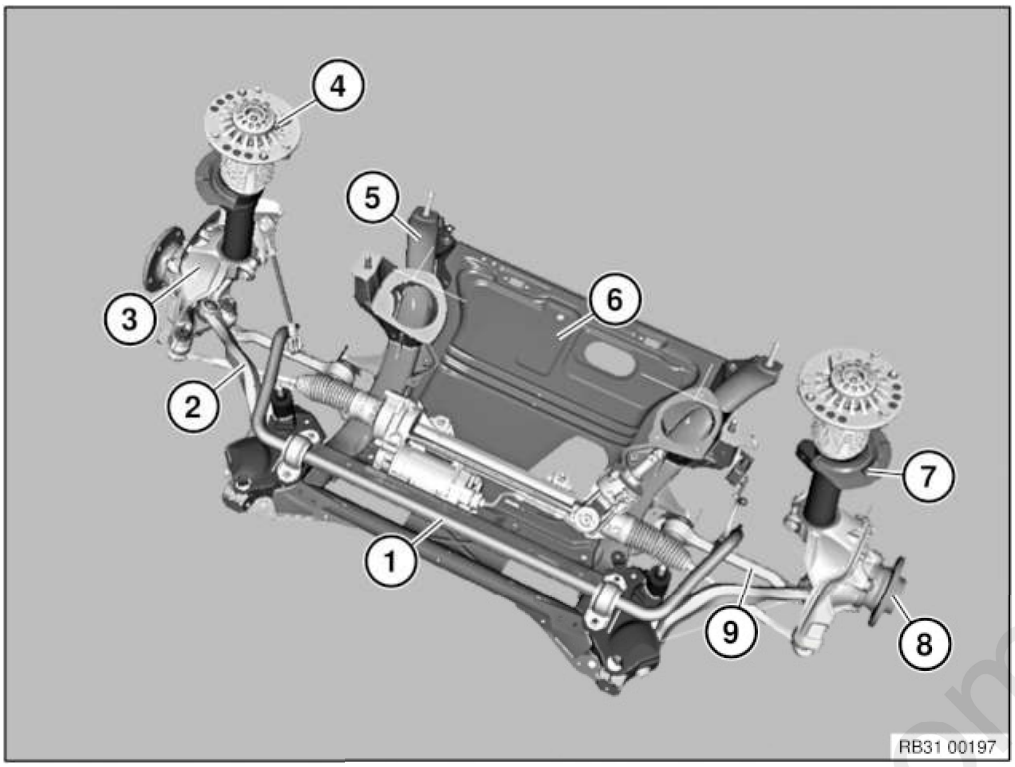
Carefully clean all components with a cloth.



Installation note:
Flat side (2) of tripod element (1) must point to circlip.
Note:
Re-grease constant velocity joint (tripod element) with the grease from the repair kit.

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31 .. ... Front axle overview



Safety instructions and general information

Testing/adjustment work

1 Anti-roll bar / anti-roll bar link
2 Trailing link/rubber mount
3 Swivel bearing
4 Support bearing
5 Front axle support
6 Reinforcement plate
7 Spring strut shock absorber
8 Wheel bearing
9 Wishbone, ride height sensor

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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.

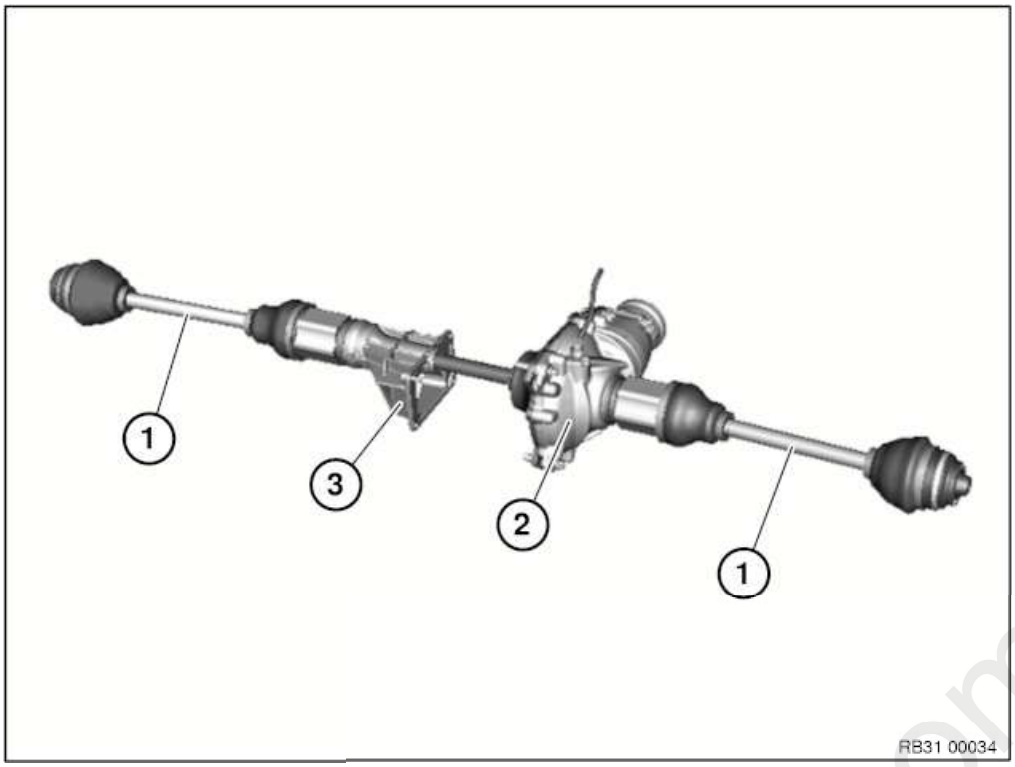


Installation note:

- 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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31 .. ... Overview of front axle differential/output shafts



Safety instructions & general information

1 Output shaft / gaiters

2 Front differential (incl. O-ring, shaft seals)

3 Bearing block (incl. O-ring, shaft seal)

Check/change front axle differential oil

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