

**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:**

- Pour oil only into appropriately marked containers
- Do not pour oil into drinking vessels (drinks bottles, glasses, cups or mugs)
- Observe country-specific safety regulations

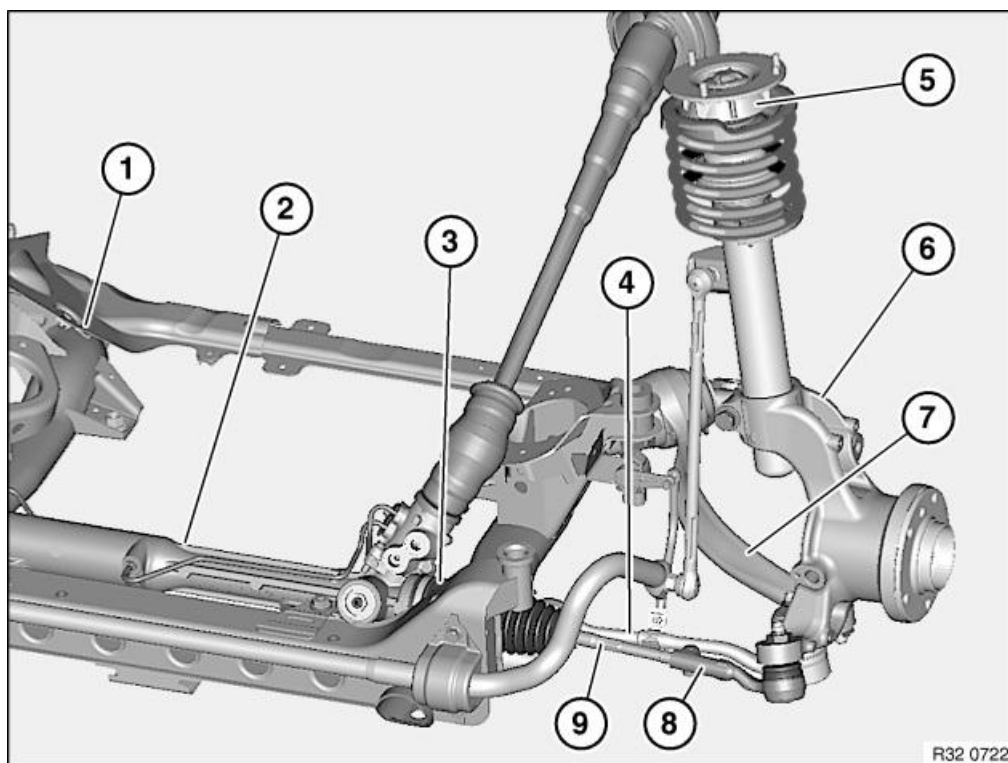
**First aid measures:**

- 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.

If the person affected is unconscious, do not administer anything by mouth, place the person in the recovery position and seek immediate medical attention.

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

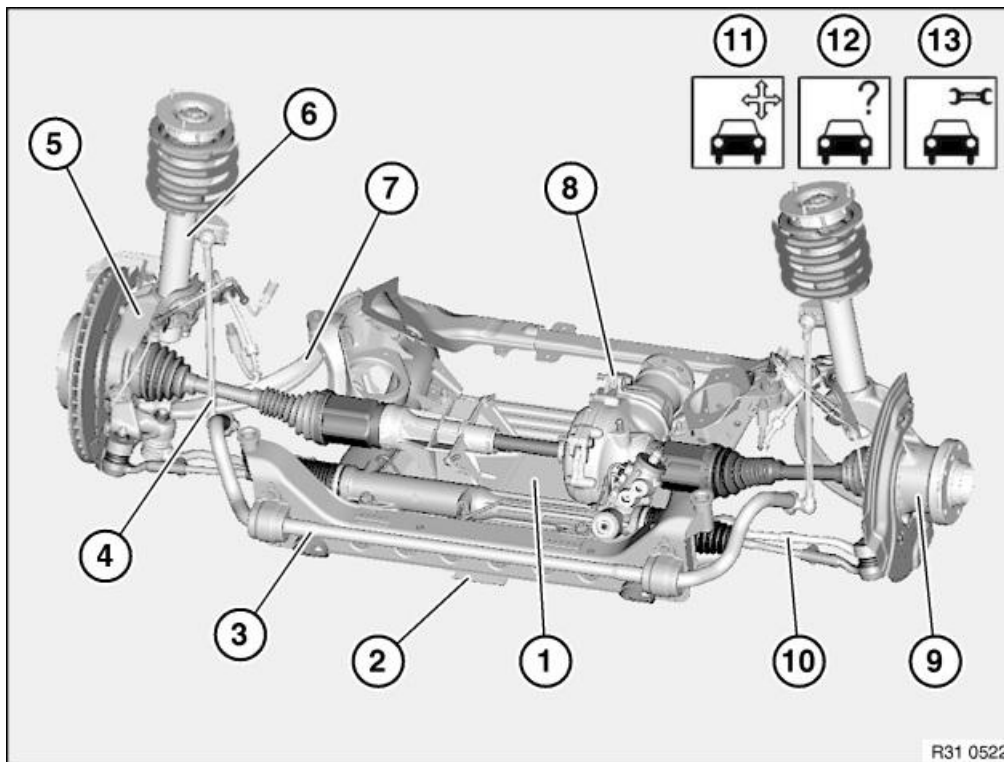


A [wheel/chassis alignment check](#) must be carried out after the following work:

- Release of following screw/bolt connections:
 - Steering gear to front axle carrier
 - Control arm to front axle carrier
 - Compression strut to front axle carrier
 - Support bearing to body (if centering pin is missing)
 - Tie rod end to tie rod

- Replacement of following parts:
 1. Front axle carrier
 2. Steering gear
 3. Gaiter (if the tie rod end has to be screwed off)
 4. Control arm
 5. Support bearing (if centering pin is missing)
 6. Swivel bearing
 7. Compression strut or compression strut rubber mount
 8. Tie rod end
 9. Tie rod

31 Front axle overview (all-wheel drive vehicle)



[Safety information and general information](#)

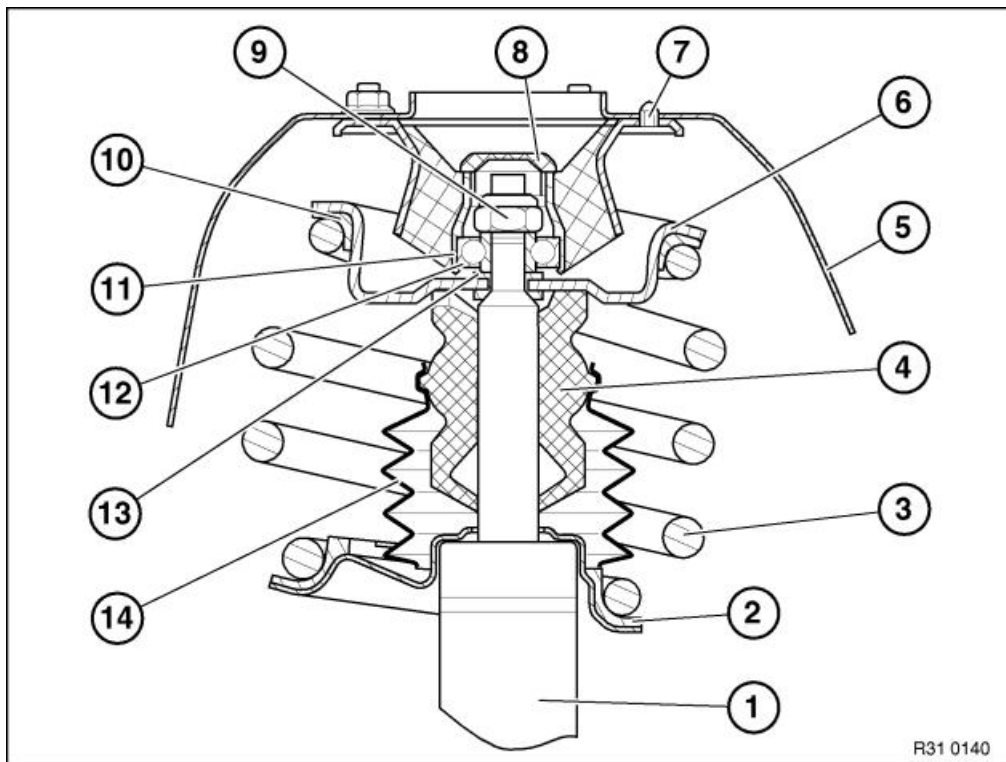
1	Reinforcement plate	8	Front axle differential/output shafts
2	Front axle support	9	Wheel bearing
3	Stabiliser	10	Wishbone
4	Anti-roll bar link	11	Adjustment work
5	Swivel bearing	12	Troubleshooting
6	Spring strut shock absorber	13	Testing
7	Leading link		

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 splashes! Cover components!
- Do not expose to temperatures $> 80\text{ }^{\circ}\text{C}$, even for brief periods! Temperatures in paint facilities do not have the same impact

31 Layout of spring strut shock absorber



- | | |
|---|-------------------------------------|
| 1 Spring strut shock absorber | 9 Nut |
| 2 Lower spring pad | 10 Upper spring pad |
| 3 Coil spring | 11 Support bearing |
| 4 Auxiliary damper | 12 Dust sleeve |
| 5 Wheel arch | 13 Thrust washer/shim |
| 6 Upper spring plate | 14 Gaiter |
| 7 Centring pin | |
| 8 Protective cap | |



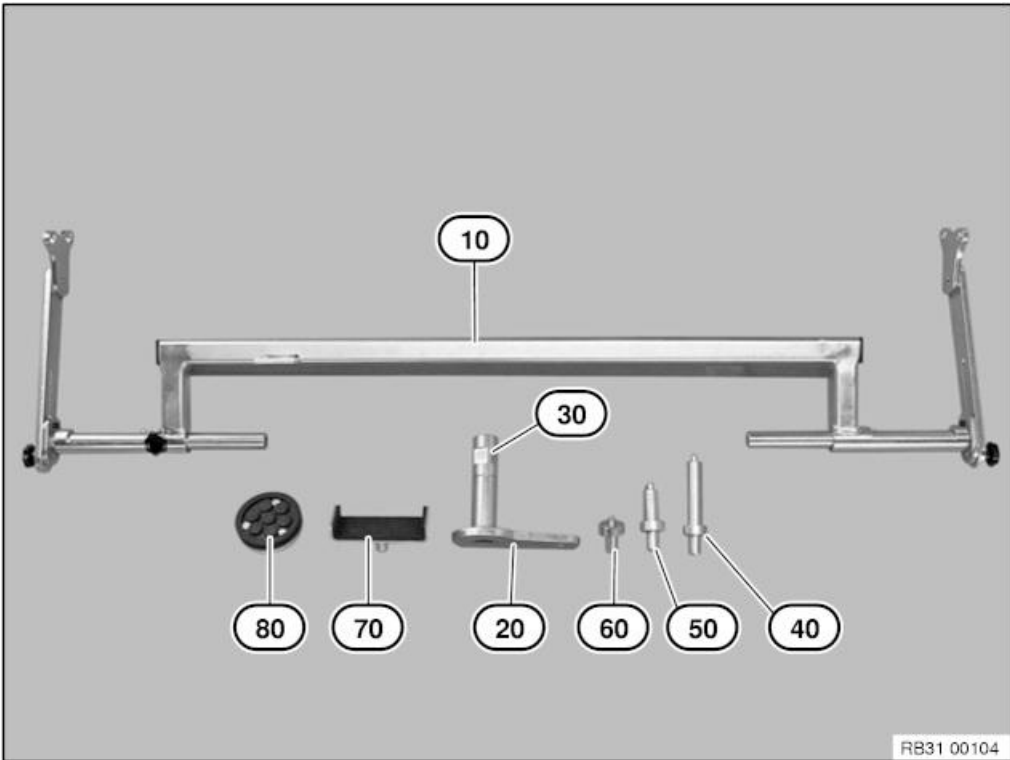
Warning!
Danger of injury!
Before beginning work, position table lift with the lower frame securely on the floor.
Danger area around mechanism below platform.

- 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.

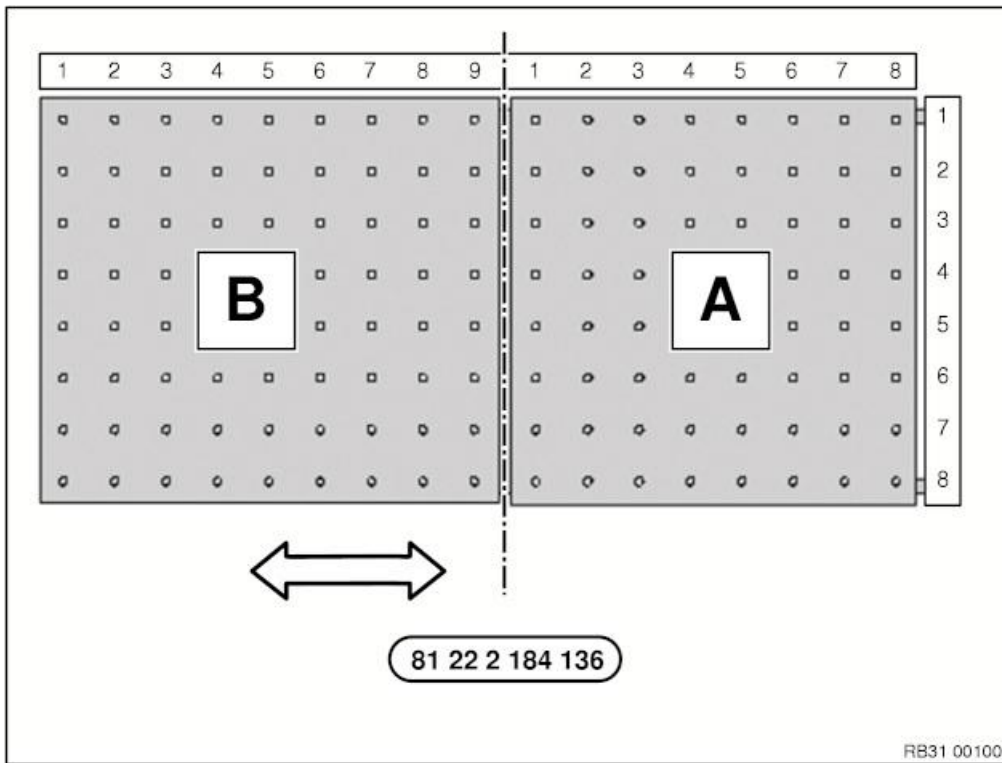


The mobile table lift is used for collision repairs and when removing large engines.



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



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.

31 00 ... Notes on repairing threads

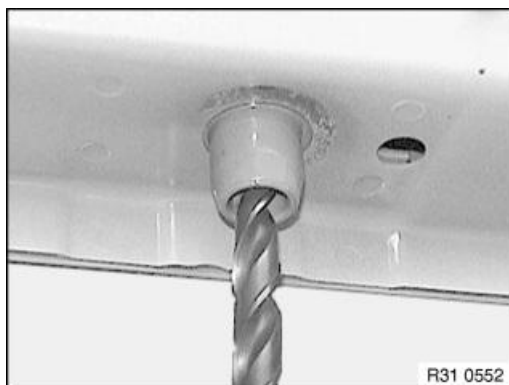


Important!

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

Note:

Damaged threads in engine support may be repaired with Helicoil thread inserts. Comply with the procedure described in the example.



Procedure:

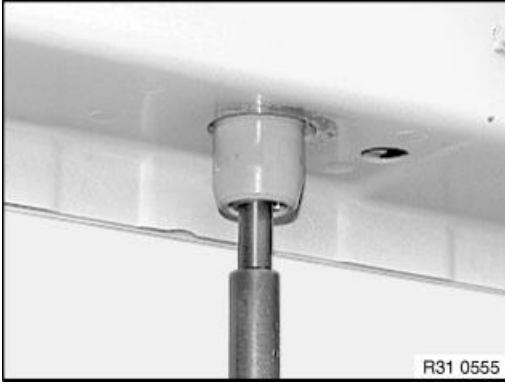
1. Create a clean core hole; if necessary, drill out screw remnants



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



4. Break drive pin and remove

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.

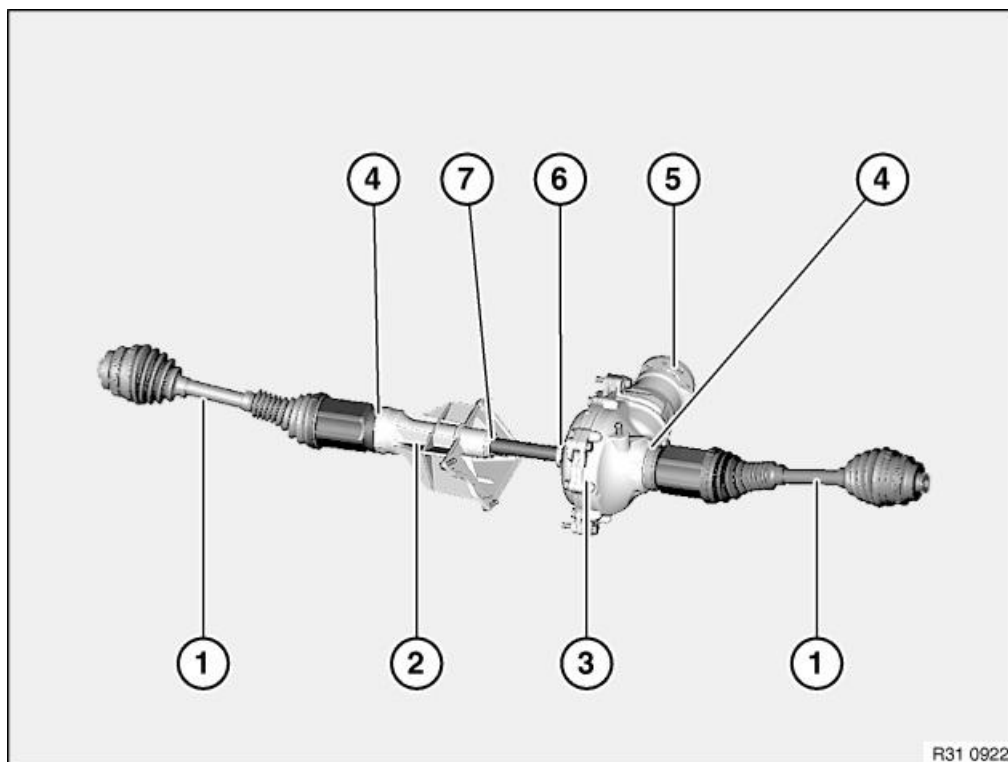
Procedure:

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

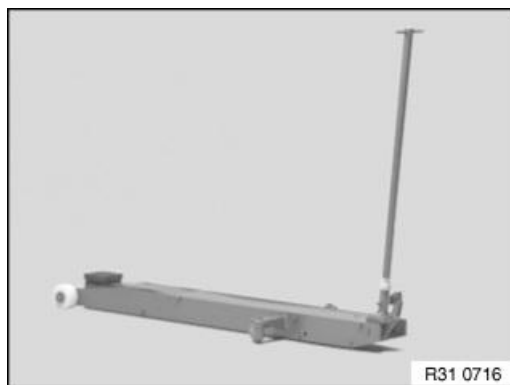
This guideline is binding for all accident repairs to BMW, MINI and Rolls-Royce vehicles!

31 Overview of front axle differential/output shafts



[Safety instructions & general information](#)

- | | |
|--|--|
| 1 Output shaft / gaiters | 5 Radial shaft seal (drive flange) |
| 2 Bearing support | 6 O-ring (front axle differential) |
| 3 Front axle differential | 7 O-ring (bearing support) |
| 4 Radial shaft seal (output shaft) | |



Observe the following trolley-jack-related notes:

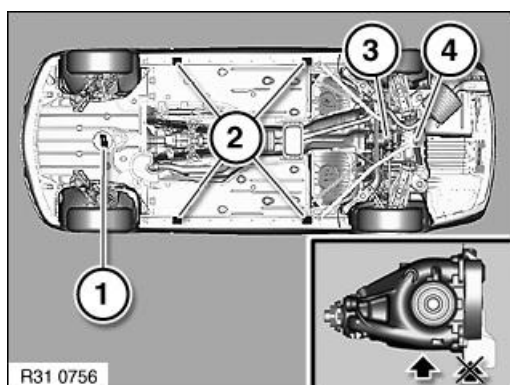
1. Only trolley jacks sold or approved by BMW, with a rubber plate on their mounting, may be used!
2. Trolley jacks must be regularly serviced and always checked for functional reliability before they are used!
3. Check the rubber plate on the trolley jack prior to each use, replacing if necessary.



Caution!

All-wheel drive vehicles may only be raised with the reinforcement plate fitted on the front axle!

Raising directly on the front axle support without reinforcement plate is not permissible!



Warning!

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

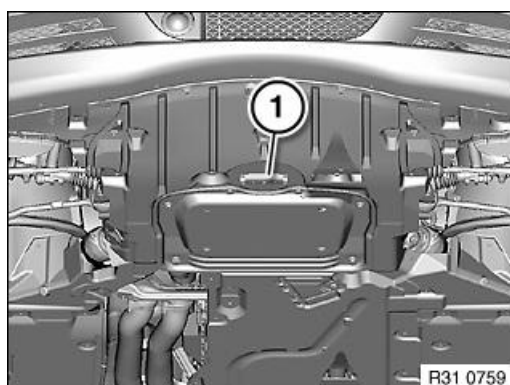
- 1 Jacking point on reinforcement strut (rear-wheel drive)

- 2 Side car jacking points

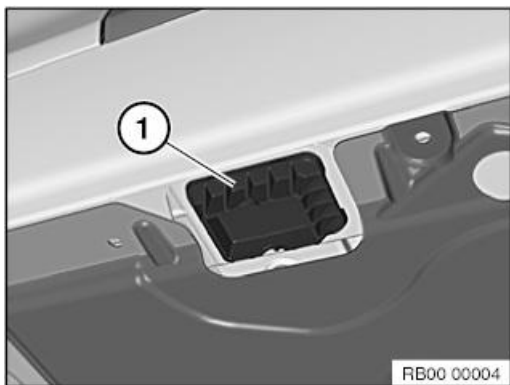
- 3 Rear axle final drive

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

- 4 Bolting point for rear axle trailing links



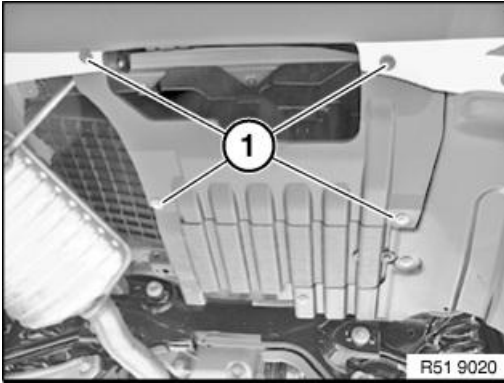
- 1 Jacking point on front axle support (four-wheel drive)

**Risk of damage!**

Jacking point (1) must be present!

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

51 12 ... Removing and installing/replacing lower cover (middle)



Release screws (1).

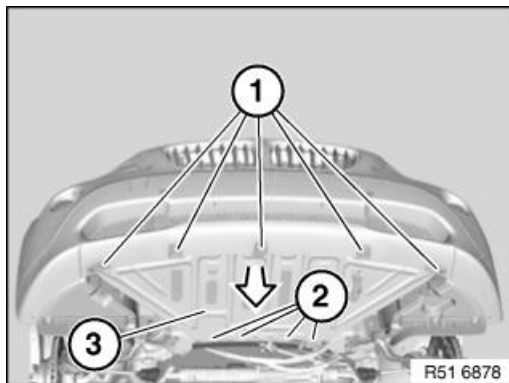
Remove lower cover.

Replacement

Modify sheet nuts

**Necessary preliminary tasks:**

- Remove [front underbody protection](#)



Release screws (1).

Unfasten screws (2).

Tightening torque [31 10 7AZ](#) .

Remove pedestrian protection (3) by pulling diagonally downward and rearward (in direction of arrow).

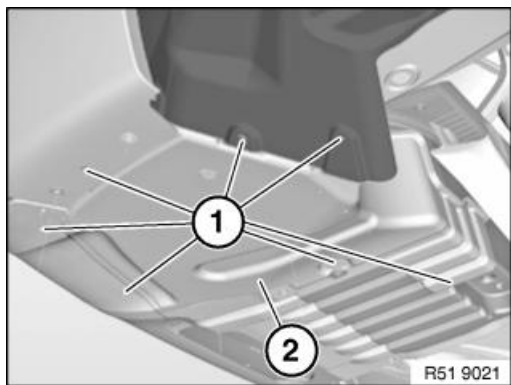
Installation:

Correctly align pedestrian protection and then tighten screw (1) and (2).

Replacement

Modify sheet nuts

51 75 ... Removing and installing/replacing underbody panelling (carbon canister)



Release screws (1).

Remove underbody panelling (2).

Replacement

Modify sheet nuts

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



First aid measures:

- Eye contact: Rinse eyes immediately with plenty of water for at least 15 minutes; if available, use an eye-rinsing bottle. If irritation of the eyes persists, consult a doctor.
- Skin contact: Wash off with soap and water immediately. If irritation persists, consult a doctor.

Note: Do not use solvents/thinners.

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



Warning!

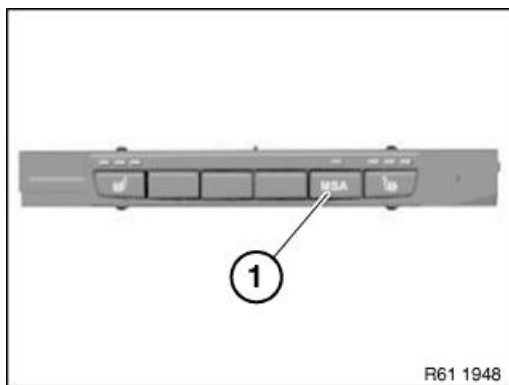
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

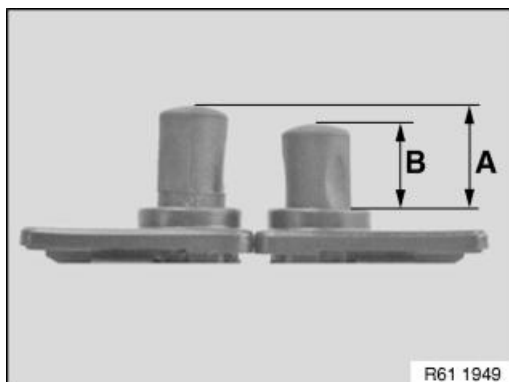
Observe safety precautions when working on MSA vehicles.

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
 $A = 10 \text{ mm}$
 - Basic setting (engine hood/bonnet open)
 $B = 7 \text{ mm}$

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



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](#)

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:

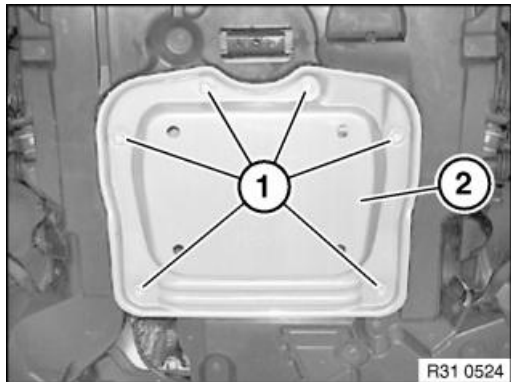
- Personal precautionary measures: Danger of slipping! Keep non-involved persons away from the work area. Wear personal protective clothing/equipment.
- Environmental protection measures: Prevent oil from draining into drain channels, sewerage systems, pits, cellars, water and the ground.
- Limiting 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.

**Important!**

Observe [safety instructions](#) for raising the vehicle

Driving without reinforcement plate is not permitted!



Release screws (1).

Remove reinforcement plate (2).

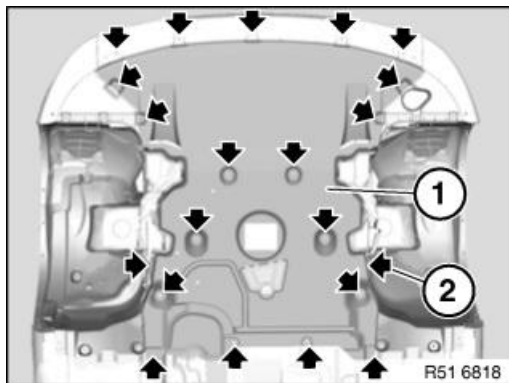
Installation:

Replace screws.

Tightening torque [31 10 3AZ](#) .

*Note:*

Illustration only an example. Detail deviations, depending on engine version, are possible.

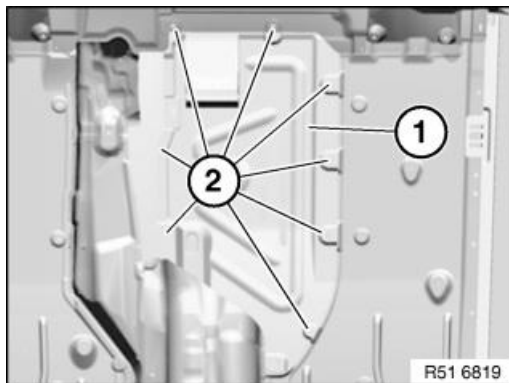


Unfasten screws (2).

Remove front underbody protection (1).

*Note:*

Illustration only an example. Detail deviations, depending on engine version, are possible.



Unfasten screws (2).

Unthread and remove the rear underbody protection (1) to the bottom.

Installation note:

Ensure correct fit.

**Special tools required:**

- [00 2 030](#)
- [31 5 251](#)
- [31 5 253](#)
- [31 5 255](#)

**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.

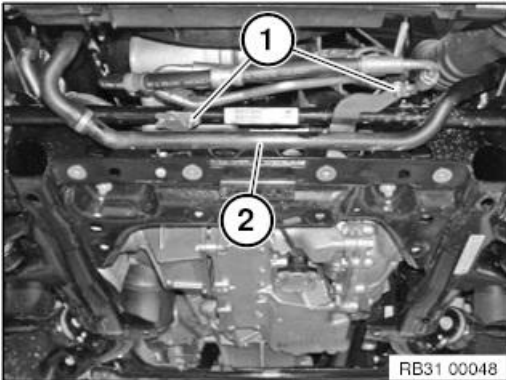
**Important!**

N47: Risk of shorting at starter motor!



Necessary preliminary tasks:

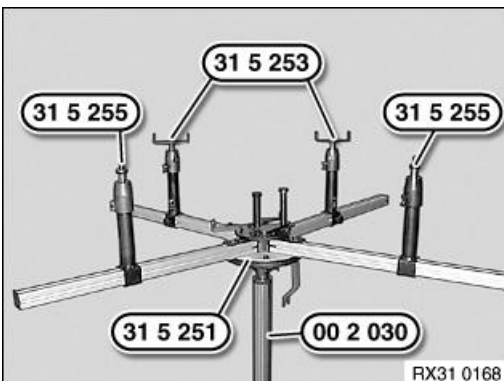
- Secure [engine in installation position](#).
- [Remove underbody protection](#).
- If necessary, remove [pedestrian protection](#).
- Remove [reinforcement plate](#).
- Remove [steering shaft from hydraulic steering gear](#).
- N20: Loosen [coolant pump on front axle support](#).
- N52K: Remove coolant pipe to front axle support.
- Disconnect [plug connection to ride height sensor](#) and expose cable up to engine support.



N20, N55:

Loosen nuts (1) on pressure line.

Remove coolant pipe (2) from front axle support.



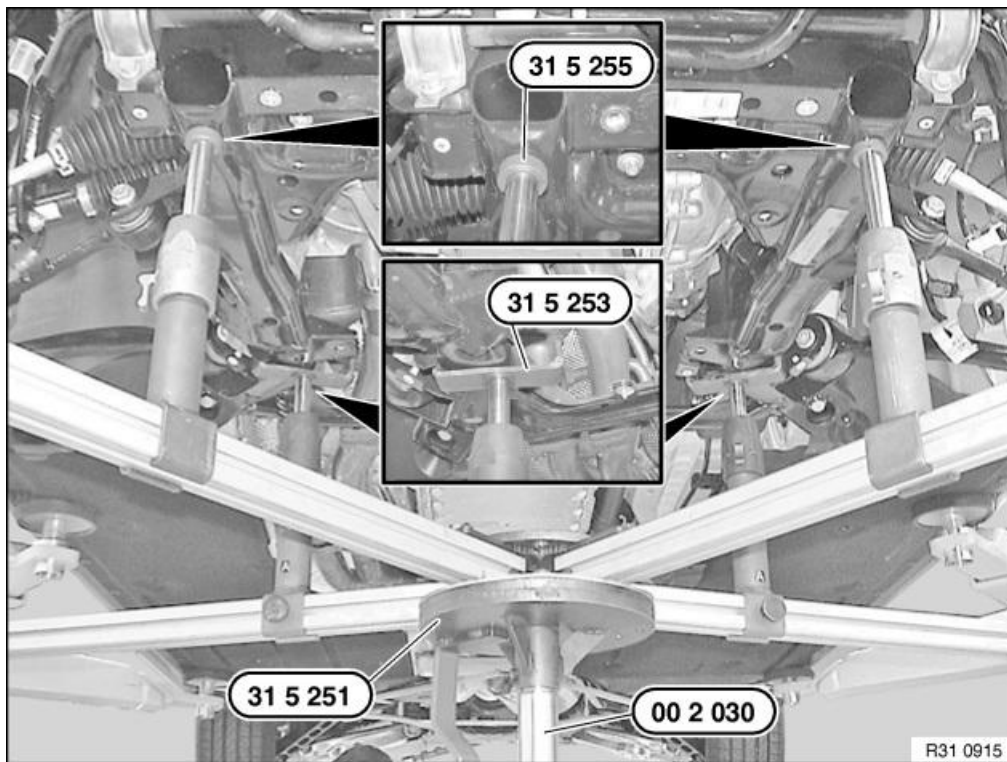
Engage special tool [31 5 251](#) with a 2nd person helping completely on workshop jack [00 2 030](#).

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 5 253](#) and [31 5 255](#) to front axle support.

Support front axle support by operating workshop jack [00 2 030](#).

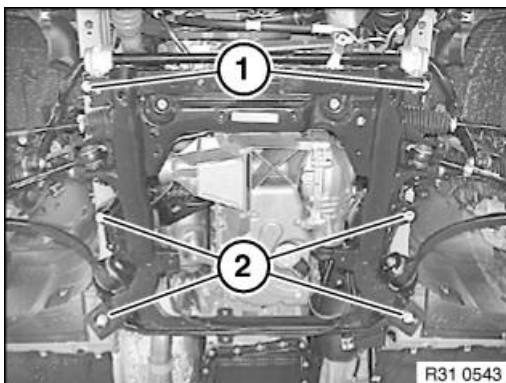
Important!

The centre of gravity of the front axle must lie in the middle above the workshop jack.



Important!

Pay attention to hydraulic steering hoses and lines when lowering and raising. Hoses/lines must not be kinked/tensioned/bent!



Release screws (1 and 2).

Tightening torque [31 10 1AZ](#).

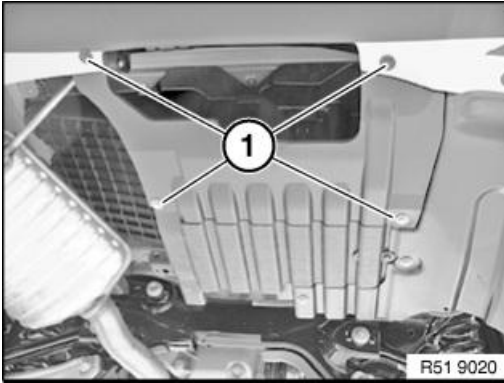
Lower front axle support.

Installation note:

Check threads for damage; if necessary, repair with [Helicoil thread inserts](#).

Make sure screws are installed in correct positions.

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



Release screws (1).

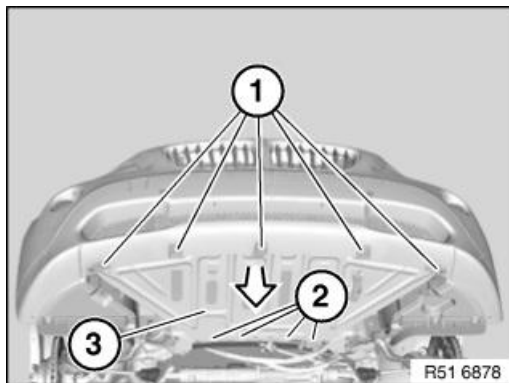
Remove lower cover.

Replacement

Modify sheet nuts

**Necessary preliminary tasks:**

- Remove [front underbody protection](#)



Release screws (1).

Unfasten screws (2).

Tightening torque [31 10 7AZ](#) .

Remove pedestrian protection (3) by pulling diagonally downward and rearward (in direction of arrow).

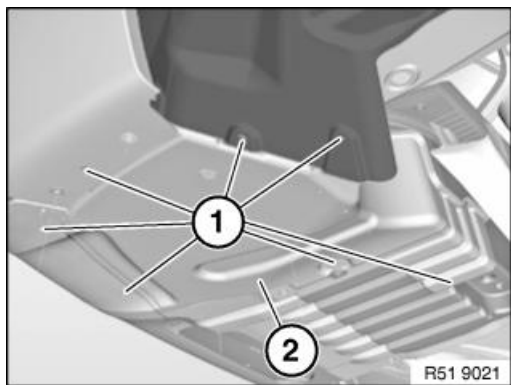
Installation:

Correctly align pedestrian protection and then tighten screw (1) and (2).

Replacement

Modify sheet nuts

51 75 ... Removing and installing/replacing underbody panelling (carbon canister)



Release screws (1).

Remove underbody panelling (2).

Replacement

Modify sheet nuts

**Warning!**

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.

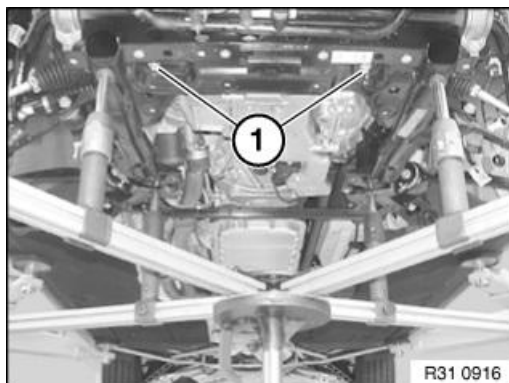
Load spring strut domes with sand bags.

**Warning!**

[Secure engine in installation position with special tool](#) to prevent it from falling down.

**Necessary preliminary tasks:**

- [Secure](#) engine in installation position.
- Remove [front wheels](#).
- Remove [anti-roll bar](#)
- If necessary, remove front [ride height sensor](#) with holder from front axle support.
- Remove [both track rods at the swivel bearing](#).
- Remove [both leading links from front axle support](#).
- Remove [both wishbones from front axle support](#).



Unscrew screws (1) on hydraulic steering gear and remove downward.

Tightening torque, [32 00 1AZ](#).

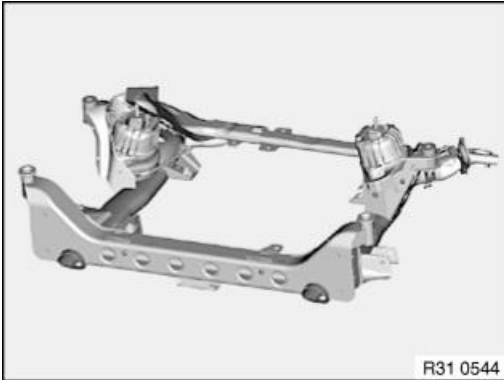
Tie up hydraulic steering gear

Installation note:

Replace screws and nuts.



The subsequent procedure is described under "[Lowering/raising front axle support](#)".



Lower front axle support and take down from special tool.

Remove heat shield(s).

Remove both [engine mounts](#) and if necessary remove with vacuum lines from front axle support.

Take front axle support down and set down on a suitable surface.

Installation note:

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



After installation:

- Perform [wheel alignment check](#)



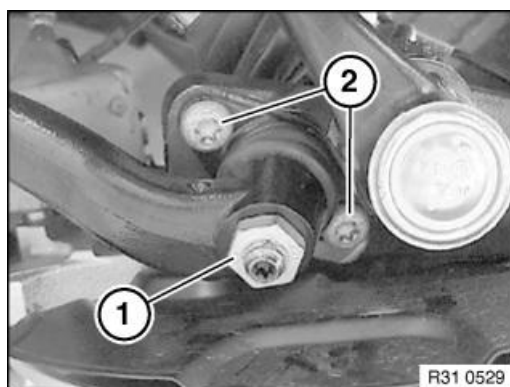
Special tools required:

- [31 2 240](#)
- [31 2 242](#)
- [31 2 246](#)
- [33 4 200](#)
- [33 4 205](#)



Necessary preliminary tasks:

- Remove [front wheel](#)



Slacken nut (1), grip with Allen key if necessary.

Tightening torque [31 12 6AZ](#).

Installation:

Replace self-locking nut.

Unfasten screws (2).

Remove guide joint with compression strut from opening in swivel bearing.

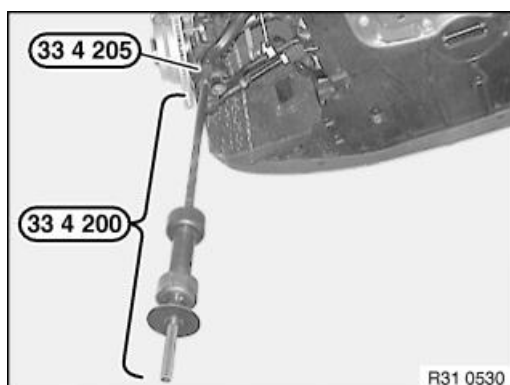
Tightening torque [31 12 7AZ](#).

Installation:

Recondition thread in swivel bearing.

Keep guide joint and opening in swivel bearing clean and free from oil and grease.

Replace microencapsulated screws.



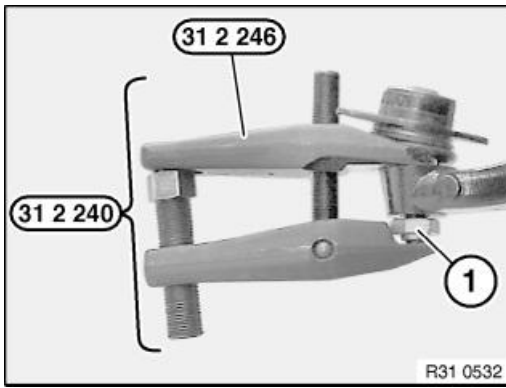
Guide joint tightly seated in swivel bearing:

Important!

The guide joint must be replaced once it has been driven out with the special tool.

[33 4 205](#) Unscrew nut and screw special tool onto guide joint.

[33 4 200](#) Drive guide joint out of swivel bearing with special tool.



If necessary, screw nut (1) onto guide joint by a few turns.

If necessary, replace lower section [31 2 242](#) with lower section [31 2 246](#)

[31 2 240](#) Press guide joint with special tool out of compression strut.

Unscrew nut (1) and remove guide joint.

Installation:

Keep journal on guide joint and bushing in compression strut clean and free from oil and grease.

**Special tools required:**

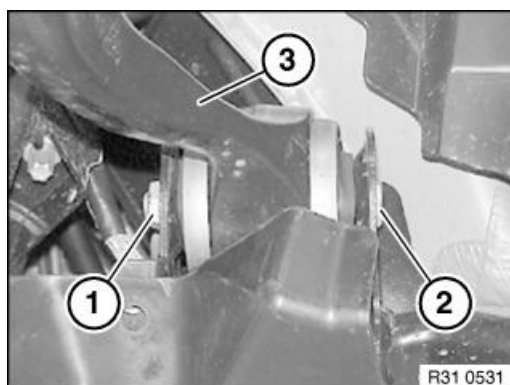
- [31 2 240](#)
- [31 2 242](#)
- [31 2 246](#)

**Note:**

If the leading link is detached from the front axle support, it is necessary after installation to carry out a wheel alignment.

**Necessary preliminary tasks:**

- Remove [guide joint from swivel bearing](#)
- If necessary, [remove reinforcement cover](#)



Slacken nut (1).

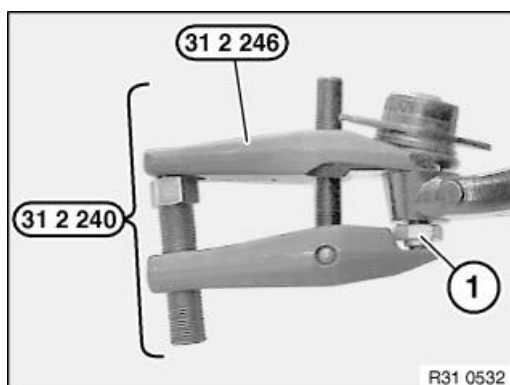
Tightening torque [31 12 5AZ](#).

Remove screw (2) to one side and remove leading link (3) with guide joint.

Installation note:

Replace self-locking nut.

Tighten bolt connection in [normal position](#).



If necessary, screw nut (1) onto guide joint by a few turns.

If necessary, replace lower section [31 2 242](#) with lower section [31 2 246](#) [31 2 240](#) Press guide joint with special tool out of leading link.

Unscrew nut (1) and remove guide joint.

Installation note:

Keep journal on guide joint and bushing in leading link clean and free from oil and grease.

**After installation:**

- Perform [chassis / wheel alignment check](#)

**Special tools required:**

- [31 2 240](#)
- [31 2 241](#)
- [31 2 242](#)
- [31 2 243](#)
- [31 2 244](#)
- [31 2 245](#)
- [31 2 246](#)

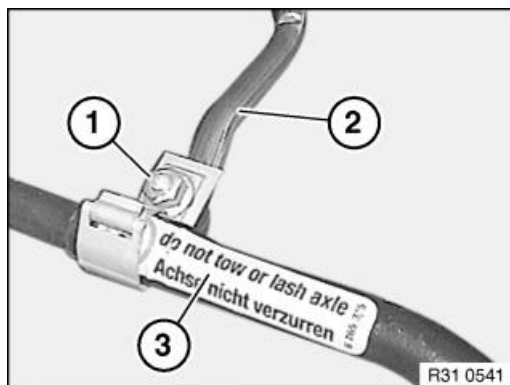
**Note:**

If the wishbone is detached from the front axle support, it is necessary after reinstallation to carry out a wheel/chassis alignment check.

If the wishbone is loosened at the swivel bearing only, no wheel alignment will be necessary.

**Necessary preliminary tasks:**

- Remove [front wheel](#)

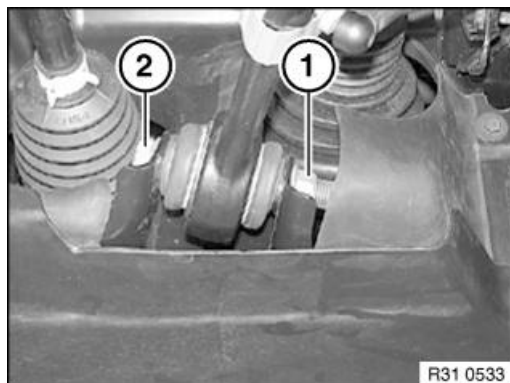
**Version with xenon lights:**

Release nut (1) and remove jointed rod (2) from wishbone (3).

Installation note:

Replace self-locking nut.

Tightening torque [37 14 3AZ](#).



Release nut (1) and remove bolt (2) towards front.

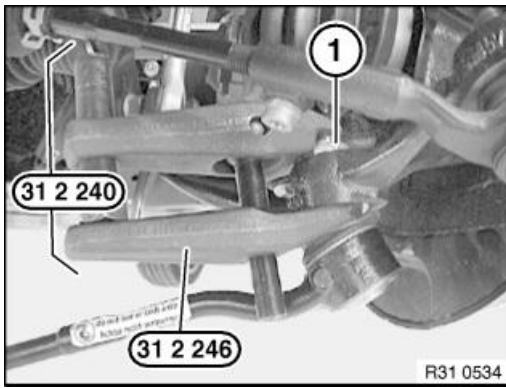
Press swivel bearing in area of leading link outwards and remove wishbone from front axle support.

Installation note:

Make sure that diesel enclosure is correctly positioned to side of wishbone.

Replace self-locking nut.

Tightening torque [31 12 3AZ](#).



Release nut (1) approx. 3--4 thread turns; if necessary, grip at hexagon.
If necessary, replace lower section [31 2 242](#) with lower section [31 2 246](#)
Press off wishbone from swivel bearing using special tool [31 2 240](#)
(consisting of [31 2 241](#) , [31 2 243](#) , [31 2 244](#) , [31 2 245](#) and [31 2 246](#)).
Unscrew nut (1) and remove wishbone.

Installation note:

Keep journal on ball head and bushing in swivel bearing clean and free from oil and grease.

Replace self-locking nut.

Tightening torque [31 12 4AZ](#).



After installation:

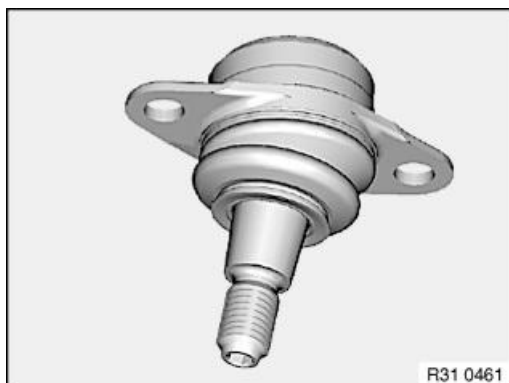
- Perform [wheel alignment](#)
- Carry out [steering angle sensor adjustment](#)

31 12 146 Replacing rubber mount in leading link on left or right (all-wheel drive vehicle)



Special tools required:

- [31 3 031](#)
- [31 3 032](#)



Carry out check:

There must always be a minimum amount of play in the guide joint.

1. Check guide joint play

Note: For this purpose, apply light pressure to the leading link (in the area of the guide joint) in the horizontal and vertical directions.

- Play is OK: Check screw connection (see Point 2)
- Play is not OK: Replace [rubber mount and guide joint](#)

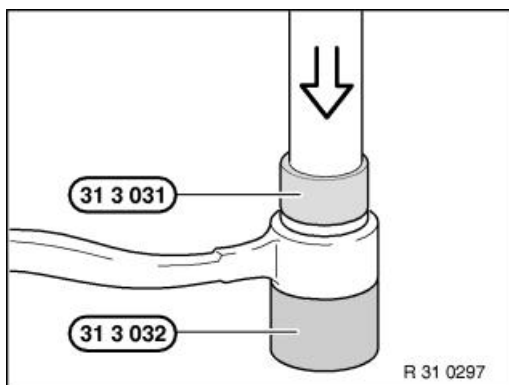
2. Check screw connection (leading link to guide joint) by tightening to 60 % of tightening torque [31 12 6AZ](#) and listening for cracking sound

- Torque wrench cracking sound: Replace rubber mount
- Screw connection turns: Replace [leading link and guide joint](#)



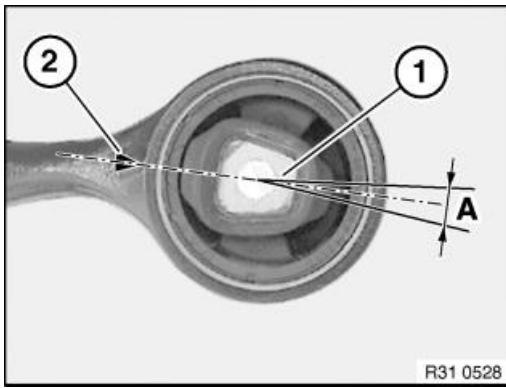
Replacing rubber mount:

Remove [leading link](#).



Using a press and special tools [31 3 031](#) and [31 3 032](#), press rubber mount out of leading link. *Note:*

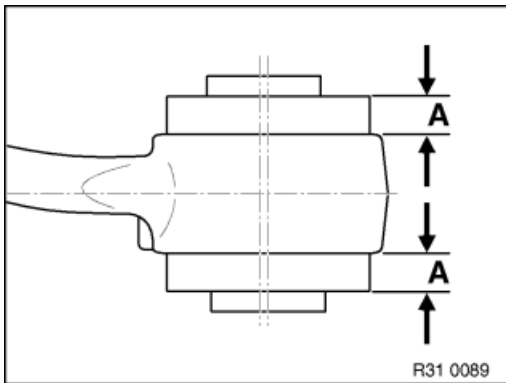
Special tool [31 3 031](#) must be exactly flush with rubber mount bush.



Installation note:

Keep rubber mount and bushing in leading link clean and free from grease.

Align rubber mount by way of recess (1) in bushing to marking (2) on leading link and press in. The deviation (A) must not exceed $\pm 5^\circ$.



Installation note:

Protrusion (A) equally large.



After installation:

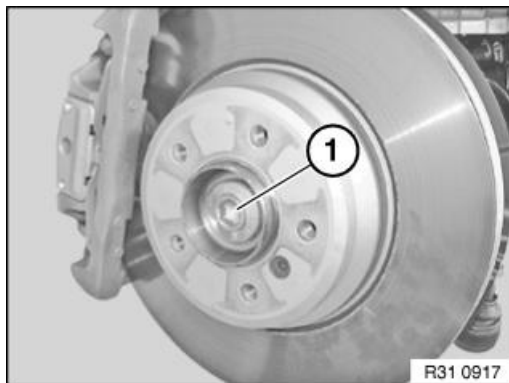
- Perform [wheel alignment check](#)
- Carry out [steering angle sensor adjustment](#)

*Note:*

Procedure is described in the document "[Replacing rubber mounts in leading link left or right](#)".

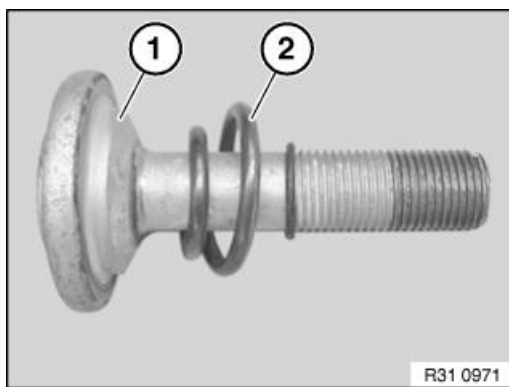
**Necessary preliminary tasks:**

- Remove [front wheel](#).



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

Tightening torque [31 60 3AZ](#).

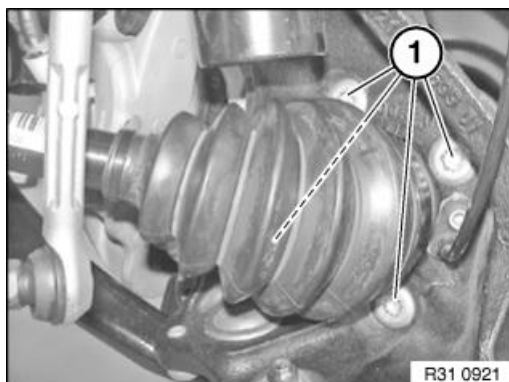
**Installation note:**

- Renew collar bolt (1) and compression spring (2).
- Pay attention to direction of installation 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.**



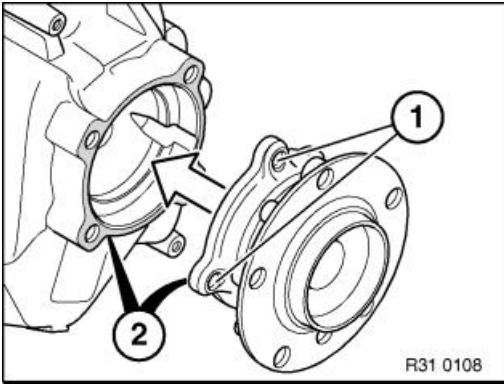
Remove [brake disc](#). *Note:*

- Check brake pad and replace if necessary!



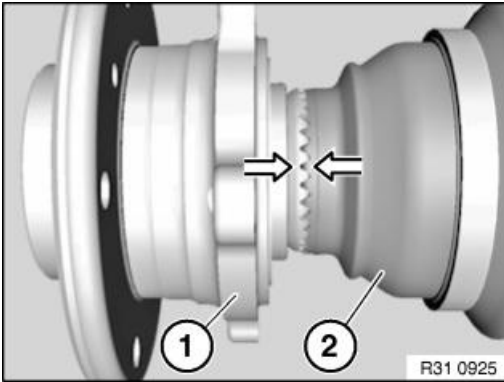
Press output shaft on swivel bearing to one side slightly and release screws (1).

Remove bearing.



Installation note:

- Replace screws (1).
- Pay attention to thread pitch of wheel bearing screw connection!!
Tightening torque [31 21 1AZ](#).
- Keep contact surface (2) of wheel bearing and swivel bearing clean and free from grease.



Important!

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

Installation note:

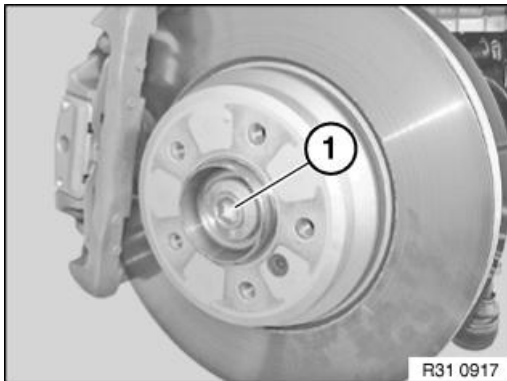
- Spur gearing of bearing (1) and output shaft (2) must be installed form-fit (tooth in tooth)!
- Tighten collar bolt and compression spring by hand.
- Check whether spur gearing is locked tooth in tooth by reciprocally rotating wheel hub/output shaft.
- Once a form-fit has been ensured, tighten to final torque.
Tightening torque [31 60 3AZ](#).

**Special tools required:**

- [31 2 230](#)

**Necessary preliminary tasks:**

- Remove [front wheel](#).



Release collar bolt; to do so, press brake pedal to floor.

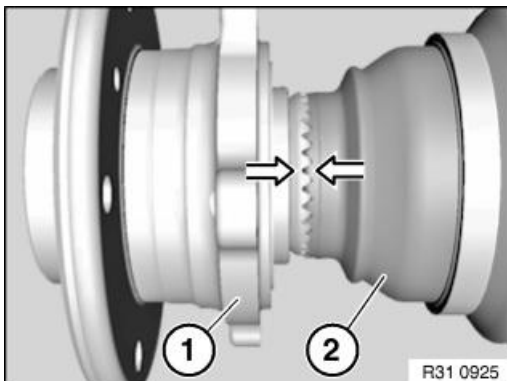
Tightening torque [31 60 3AZ](#).

Turn swivel bearing to one side.

Tie up output shaft.

Installation note:

- Replace collar bolt and compression spring.
- Keep collar bolt and spur toothing of bearing/propeller shaft clean and free of grease

*Installation note:*

- Spur gearing of bearing (1) and output shaft (2) must be installed tooth in tooth!
- Tighten collar bolt with compression spring by hand.
- Check whether spur gearing is locked tooth in tooth by reciprocally rotating wheel hub/output shaft.
- Tighten collar bolt.

Tightening torque, [31 60 3AZ](#).



Remove [anti-roll bar link from spring strut](#).

Remove [pulse sensor from swivel bearing](#).

Remove [brake disc](#).

Support swivel bearing with workshop jack and a suitable mounting.

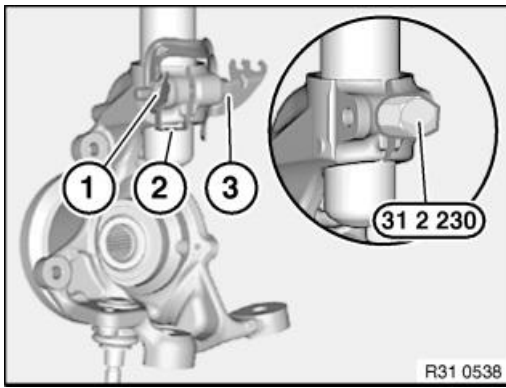
Remove [track rod end from swivel bearing](#).

Remove [guide joint from swivel bearing](#).

Remove [wishbone from swivel bearing](#).

**Important!**

- Check sensor head and line from pulse sensor prior to installation for external damage, replacing if necessary.



Release nut (1), remove holder (2) and remove screw (3).

Tightening torque [31 31 3AZ](#).

Expand swivel bearing with special tool [31 2 230](#).

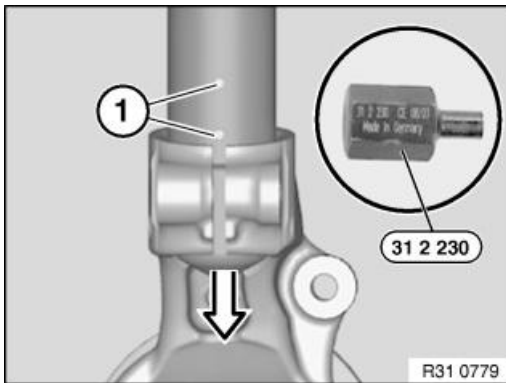
Lower workshop jack and remove swivel bearing.

Installation note:

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

Screw head must point in direction of travel.

Replace self-locking nut.



Installation note:

Expand swivel bearing with special tool [31 2 230](#) align by way of gap to positioning pins (1) on back of spring strut and raise up to stop.



Replacement:

- Modify [brake anchor plate/brake guard plate](#)
- Install new [wheel bearing](#).



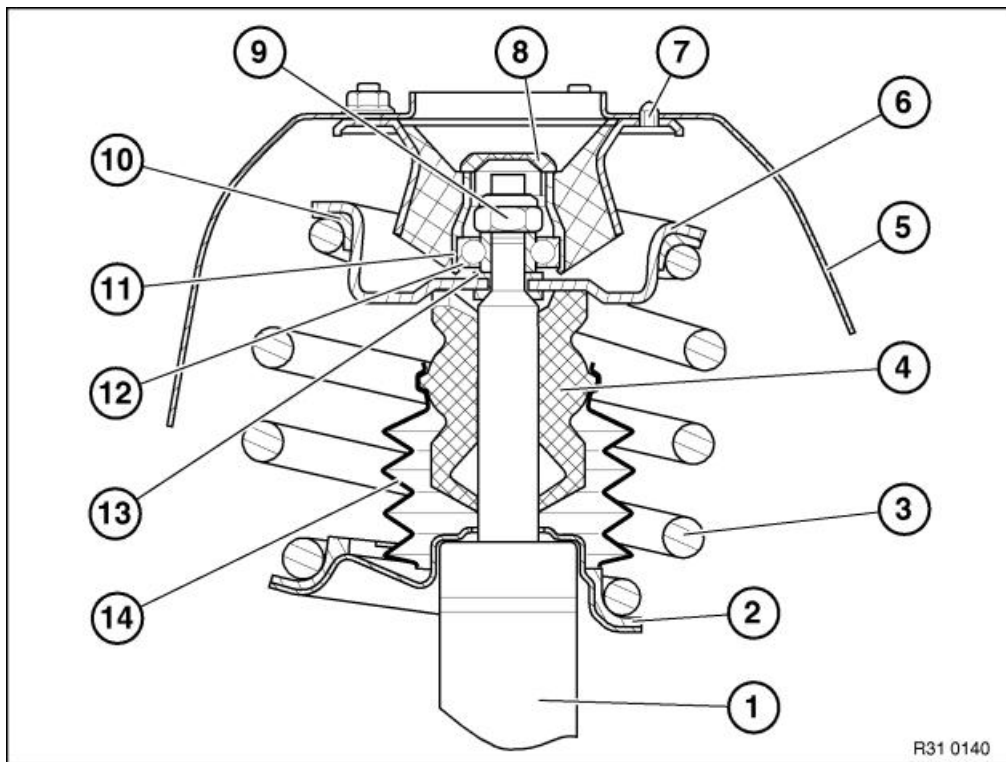
After installation:

- Replacement only: Perform [chassis alignment check](#)

*Note:*

Procedure is described in the document ” [Replacing front wheel bearing](#) ”.

31 Layout of spring strut shock absorber



- | | |
|---|-------------------------------------|
| 1 Spring strut shock absorber | 9 Nut |
| 2 Lower spring pad | 10 Upper spring pad |
| 3 Coil spring | 11 Support bearing |
| 4 Auxiliary damper | 12 Dust sleeve |
| 5 Wheel arch | 13 Thrust washer/shim |
| 6 Upper spring plate | 14 Gaiter |
| 7 Centring pin | |
| 8 Protective cap | |



Special tools required:

- [31 2 230](#)
- [31 5 220](#)



Important!

If the centring pin is missing from the support bearing, the position of the threaded bolts to the wheel arch must be marked so that the original camber is approximately maintained.

Only one nut may ever be released for marking.



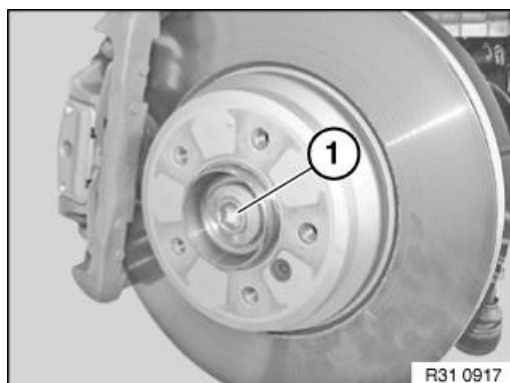
Installation note:

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](#)



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

Tightening torque, [31 60 3AZ](#).

Installation note:

- Replace collar bolt and compression spring.
- Keep collar bolt and spur toothing of bearing/propeller shaft clean and free of grease



- Remove [brake disc](#)
- Remove [anti-roll bar link from spring strut](#)
- Remove [track rod end from swivel bearing](#)
- Remove [guide joint from swivel bearing](#)
- Remove [wishbone from swivel bearing](#)



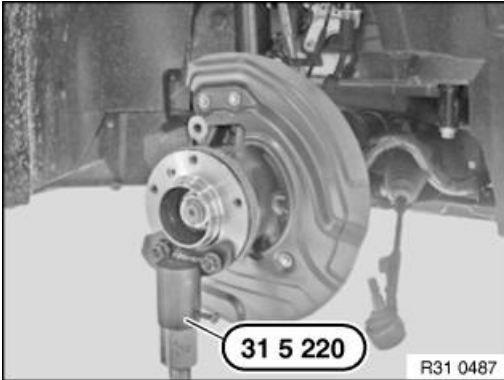
Warning!

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.

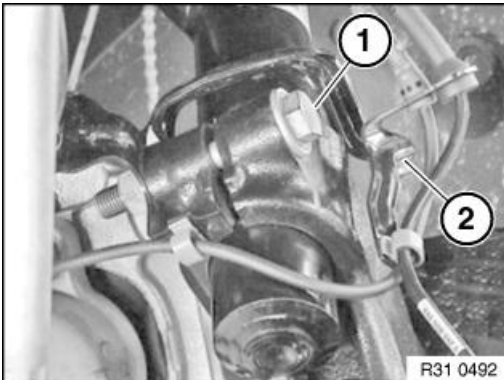
When supporting components, make sure that

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



Picture shows E90.

Secure special tool [31 5 220](#) with wheel studs to drive flange and support swivel bearing with workshop jack.



Unclip line for brake pad sensor on swivel bearing.

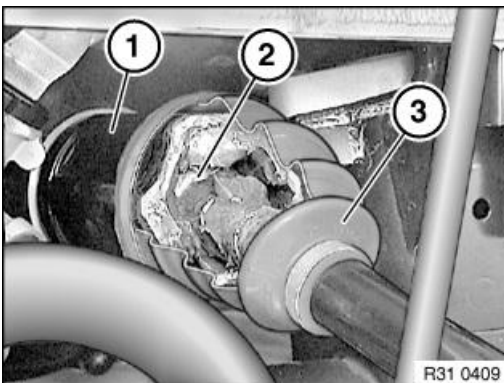
Release nut, remove holder (2) and remove screw (1).

Installation note:

Screw head must point in direction of travel.

Replace self-locking nut.

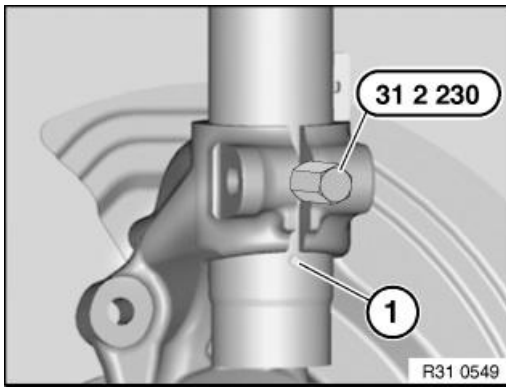
Tightening torque [31 31 3AZ](#).



Important!

Risk of damage!

When the swivel bearing is lowered, the tripod (2) can be pulled out of the joint housing (1) and fall into the gaiter (3). In this event, it will be necessary to install a new output shaft because the tripod (2) can jam or a roller of the tripod (2) can slip off the moulding. The roller would then be located in the gaiter (3) or bellows and result in rapid failure.

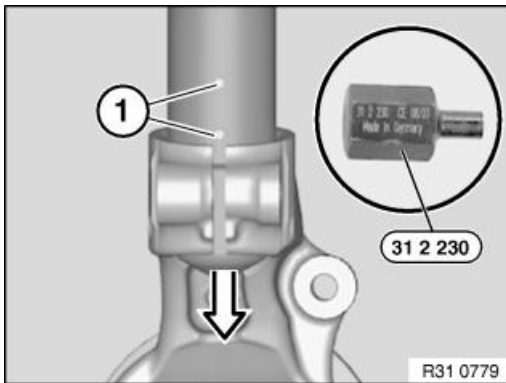


Expand swivel bearing with special tool [31 2 230](#).

Carefully lower swivel bearing.

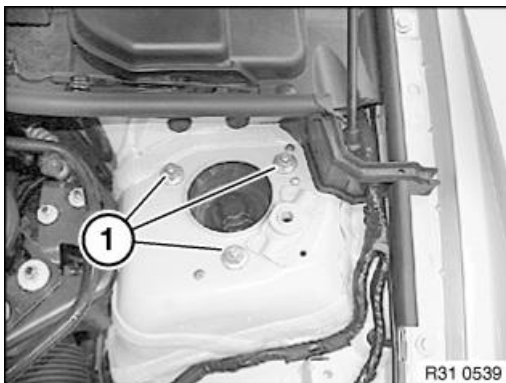
Installation note:

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



Installation note:

Expand swivel bearing with special tool [31 2 230](#) align by way of gap to positioning pins (1) on back of spring strut and raise up to stop.



Centring pin missing: Make position of threaded bolt in relation to wheel arch.

Secure spring strut against falling out.

Unscrew nuts (1).

Remove spring strut downwards out of wheel arch.

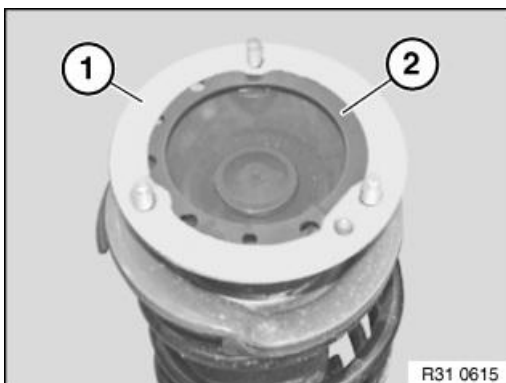
Installation note:

Clean contact surface in spring strut dome.

Align spring strut using centring pin to bore in wheel arch or stud bolts to the marks in wheel arch and push upwards.

Replace self-locking nuts.

Tightening torque [31 31 1AZ](#).



Important!

Replace faulty sealing washer (1).

Reinstall sealing washer (1) and plate insert (2).



After installation:

- Carry out [chassis/wheel alignment check](#) if a spring strut with support bearing was or has been installed without centring pin.

51 71 371 Removing and installing/replacing trailing link on left or right spring strut dome



Special tools required:

- [00 9 120](#)

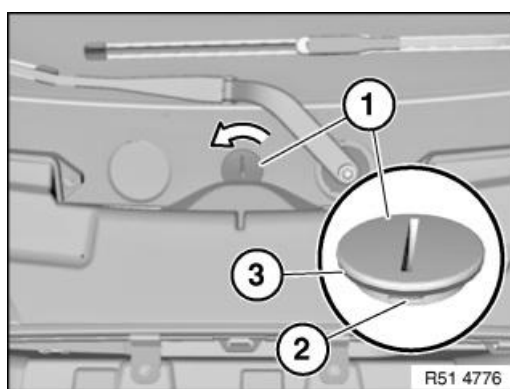


Important!

Risk of damage!

Driving without the tension strut is not permissible, as the body can be damaged.

Tension strut bolts must be tightened to torque and then tightened down with special tool [00 9 120](#).



Important!

Risk of damage!

Latch mechanism (2) and gasket (3) of the cover (1) must not be damaged.

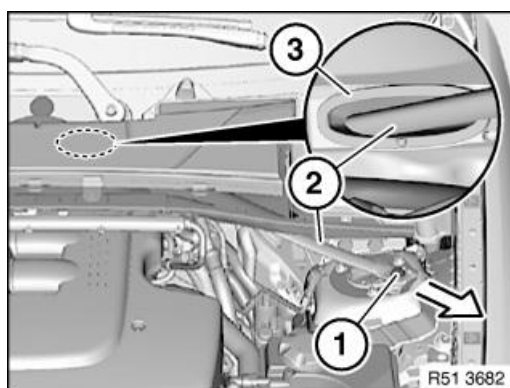
Even minor damage to the cover (1) can lead to water ingress; replace cover (1) if necessary.

Note:

Cover (1) available in two versions:

- Turn cover (with notch) about 45° to the left
- Disengage cover (without notch) in upward direction

Remove cover (1) and release screw underneath.



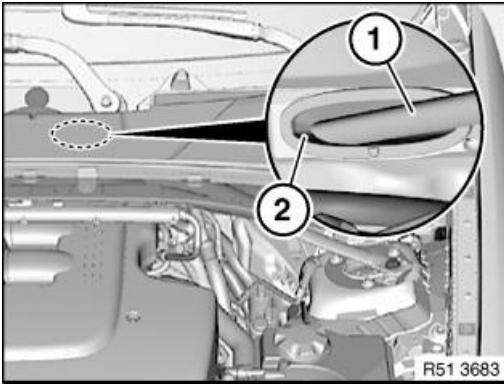
Version A:

Note:

Grommet (3) must not be pulled out of the bulkhead, as correct feeding in is not possible in installed state.

Release screw (1).

Hold down grommet (3) and pull out tension strut (2) in direction of arrow.



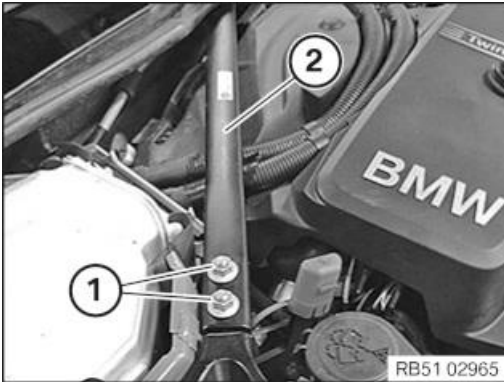
Installation note:

Replace screws.

Feed tension strut (1) carefully into the grommet (2).

Tighten screws to torque and then tighten to angle of rotation using special tool [00 9 120](#).

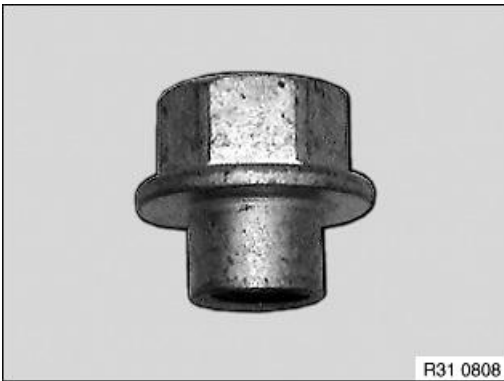
Tightening torque [51 71 2AZ](#).



Version B:

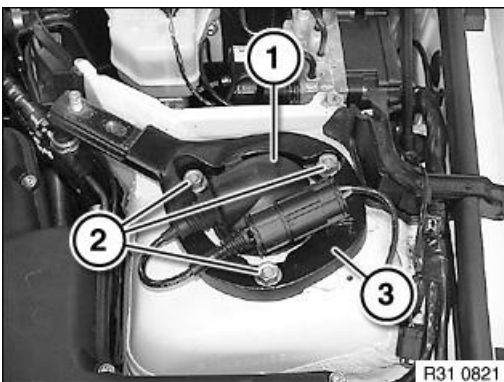
Loosen the nuts (1) and remove the strut brace (2).

Tightening torque [51 71 19AZ](#).



Important!

The nuts shown must be used to ensure the screw connection of the strut brace ring is correct.



Unclip protective cap (1) and disconnect plug connection underneath.

Slacken nuts (2) and remove the strut brace ring (3).

Tightening torque [31 31 1AZ](#).

Installation note:

Make sure the protective cap (1) is correctly seated.

Replace nuts (2).

**Special tools required:**

- [31 2 210](#)
- [31 3 340](#)
- [31 3 341](#)
- [31 3 354](#)
- [31 3 355](#)
- [31 3 358](#)
- [33 0 040](#)

**Attention!**

- When replacing shock absorber/spring strut, renew auxiliary damper!

**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!

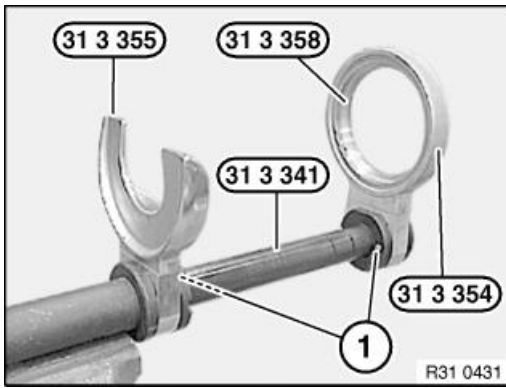
Failure to observe these safety precautions and instructions increases the risk of serious physical injury, damage to your health and damage to property and equipment!

**Attention!**

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

**Necessary preliminary tasks:**

- Remove [front spring strut](#).



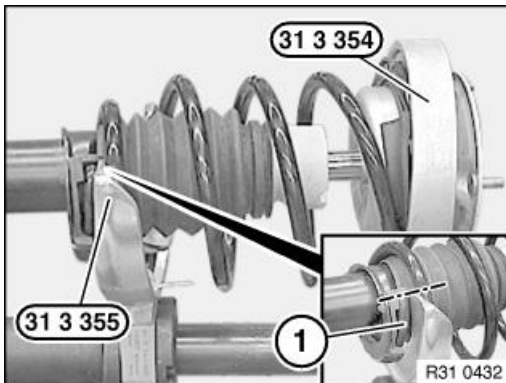
Removing:

Clamp special tool [31 3 341](#) in vice.

Install insert [31 3 358](#) in special tool [31 3 354](#).

Position special tools [31 3 355](#) and [31 3 354](#) with insert [31 3 358](#) from above on special tool [31 3 341](#) until retaining bolts (1) can be felt and heard snapping into place.

Check seating of special tools [31 3 355](#) and [31 3 354](#) with insert [31 3 358](#), correct if necessary.



Clean coil spring to remove coarse contamination and take up with special tools [31 3 355](#) and [31 3 354](#) with insert [31 3 358](#).

Twist spring strut until end of coil spring (1) is flush with end of special tool [31 3 355](#).

Warning!

Special tool [31 3 354](#) and centring ring [31 3 358](#) must rest correctly on the upper spring cup!

Bottom coil of coil spring must rest completely in recess of special tool [31 3 355](#)!

Compress coil spring until stress on piston rod is relieved.

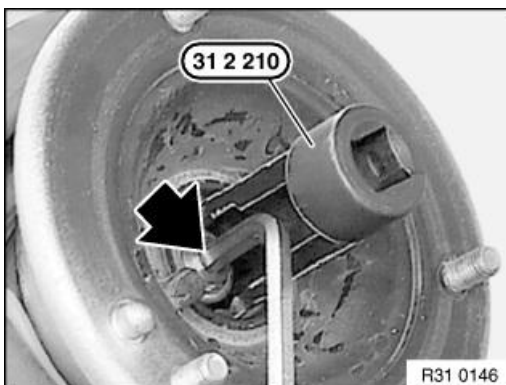


Note:

Different nuts - depending on the version - can be used to screw down the support bearing!

Check which nut is installed and use the corresponding tool.

See following illustrations.



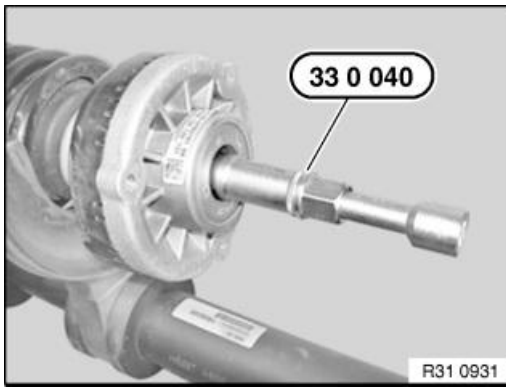
Take off protective cap.

Release nut with special tool [31 2 210](#) (grip piston rod in the process).



Impact screwdrivers are prohibited!

Risk of damage inside the shock absorber!



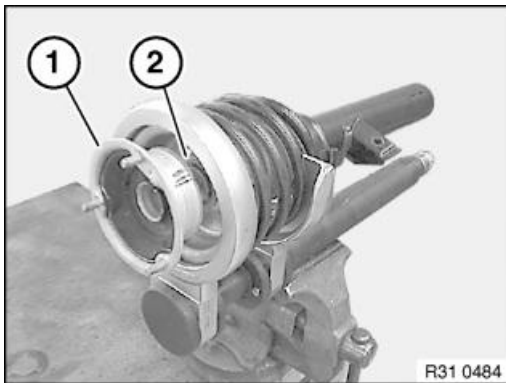
Note: Graphic F20!

Release nut with special tool [33 0 040](#) (grip piston rod in the process).



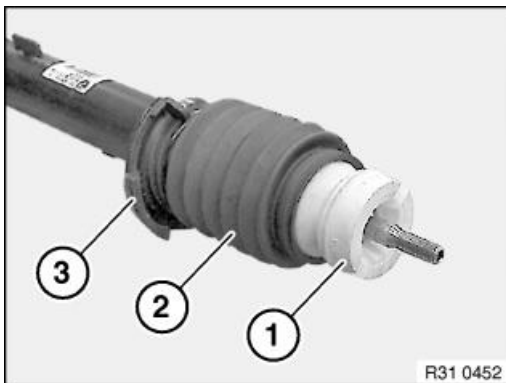
Impact screwdrivers are prohibited!

Risk of damage inside the shock absorber!

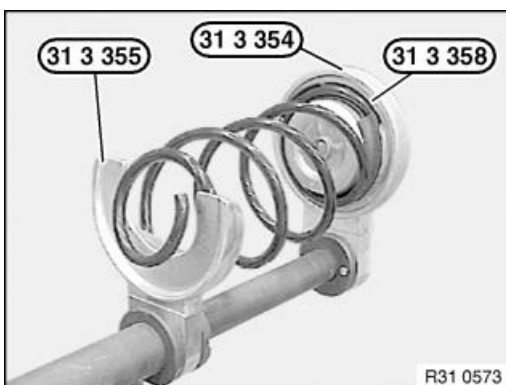


Remove support bearing (1), dust boot and supporting ring (2).

Remove shock absorber with auxiliary damper, gaiter and lower spring pad sideways from tensioned coil spring.

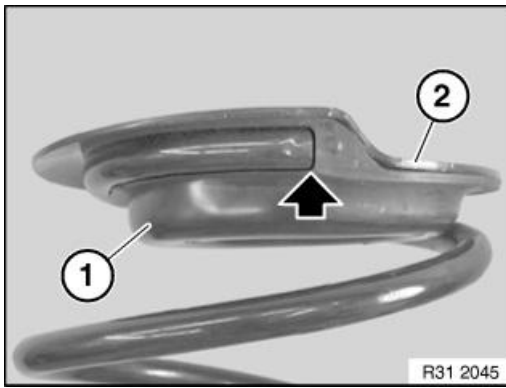


If necessary, remove auxiliary damper (1), gaiter (2) and spring pad (3) from shock absorber.



Relieve tension on coil spring.

Remove coil spring with spring cup from special tools [31 3 355](#) , [31 3 358](#) and [31 3 354](#) .



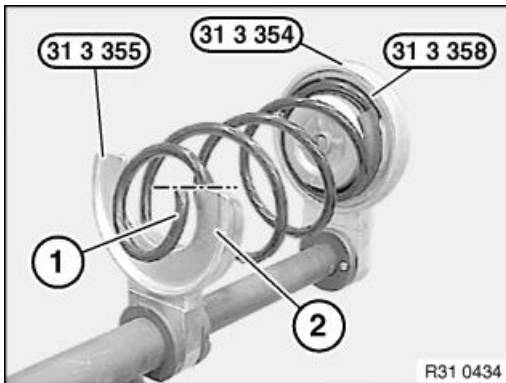
Assembly:

Check spring pad (1) for damage, replace if necessary.

Attach spring cup (2) with spring pad (1) to coil spring.

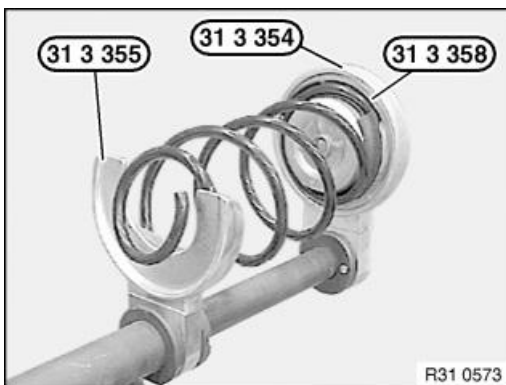
Note:

End of coil spring must be positively aligned to spring pad (1).



Hold coil spring and spring cup with special tools [31 3 355](#) , [31 3 358](#) and [31 3 354](#) .

Twist coil spring until lower end of coil spring (1) is flush with end (2) of special tool [31 3 355](#) .



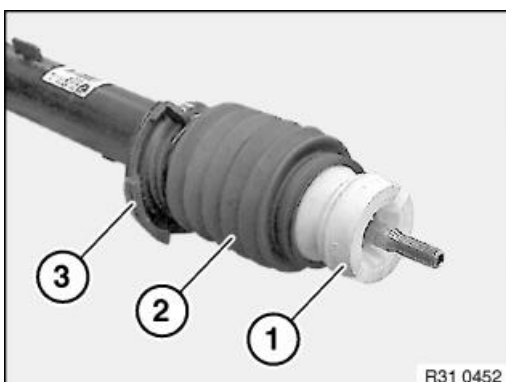
Warning!

Do not compress coil spring to full extent.

Special tool [31 3 354](#) and centring ring [31 3 358](#) must rest correctly on the upper spring cup!

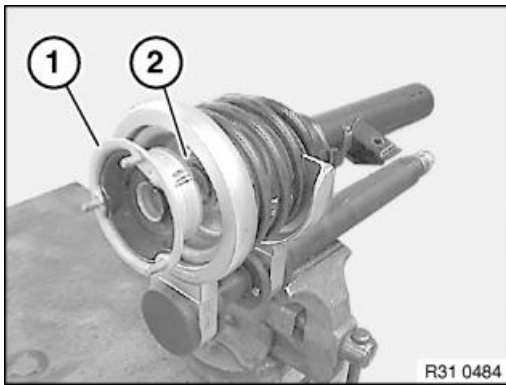
Bottom coil of coil spring must rest completely in recess of special tool [31 3 355](#) !

Tension coil spring.

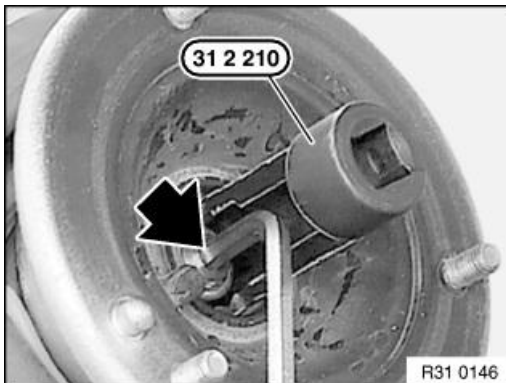


Check auxiliary damper (1), gaiter (2) and spring pad (3) for damage, replace if necessary. *Note:*

Make sure spring pad (3) is correctly seated on shock absorber.



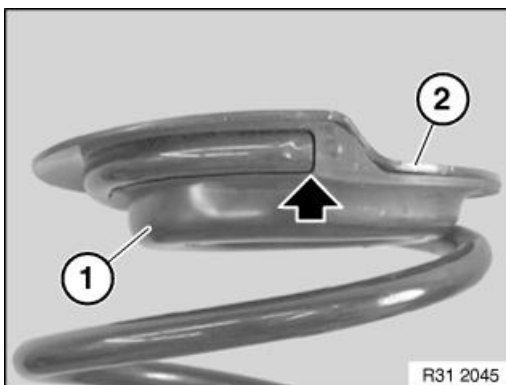
Insert shock absorber in tensioned coil spring.
 Attach support disc (2) to piston rod.
 Check support bearing (1) for damage, replace if necessary.
 Attach dust boot and support bearing to piston rod.



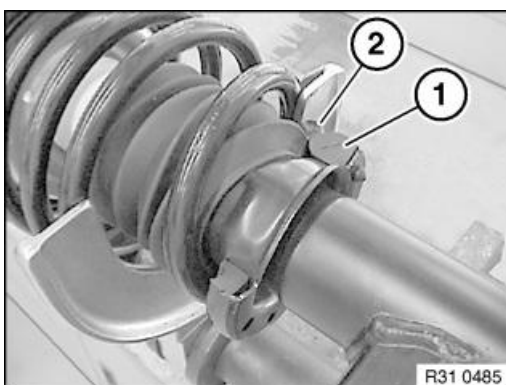
Replace nut and tighten down with special tool [31 2 210](#) / [33 0 040](#) (grip piston rod in the process).
 Tightening torque [31 31 2AZ](#).
 Fit protective cap.



Impact screwdrivers are prohibited!
Risk of damage inside the shock absorber!



Attention!
 Spring pad (1) must rest positively on spring cup (2)!
 Upper end of coil spring must rest on stop of spring pad (1)!



Attention!
 Lower end of coil spring (2) must rest on stop of spring pad (1)!

Relieve tension on coil spring.
 Check installation position of gaiter, correct fold if necessary.

31 33 001 (Removing and installing) replacing front left or right spring strut support bearing



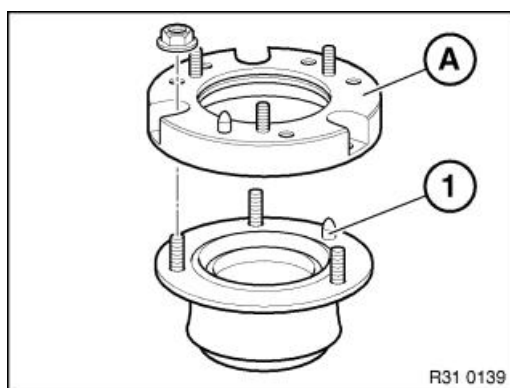
Installation note:

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.



Note:

Procedure is described in the document "[Replacing front left or right spring strut](#)".



Replacement:

Vehicle with spacer ring:

Note:

Spacer ring (A) is fitted in vehicles with "rough road package" version.

Unscrew nuts.

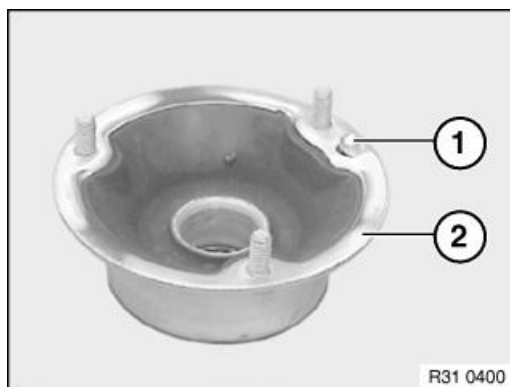
Tightening torque [31 31 1AZ](#).

Remove spacer ring (A) from support bearing.

Installation note:

Align spacer ring (A) using centering pin (1) to support bearing and place in position.

Replace self-locking nuts.



If necessary, twist/drive out centring pin (1). *Note:*

If a support bearing (2) was fitted without centring pin (1), the centring pin (1) of the new support bearing (2) must be driven or twisted out.



After installation:

- If a support bearing is installed without a centring pin, perform a [wheel alignment](#).

31 33 001 (Removing and installing) replacing front left or right spring strut support bearing



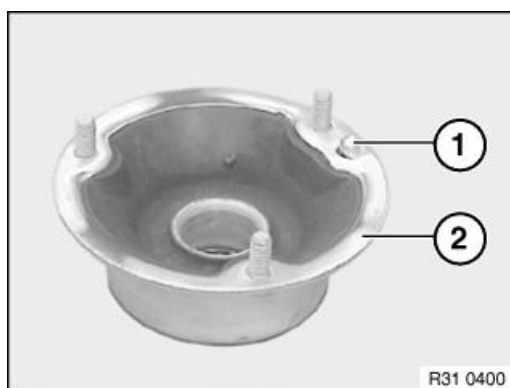
Installation note:

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.



Note:

Procedure is described in the document "[Replacing front left or right spring strut](#)".



If necessary, twist/drive out centring pin (1). *Note:*

If a support bearing (2) was fitted without centring pin (1), the centring pin (1) of the new support bearing (2) must be driven or twisted out.

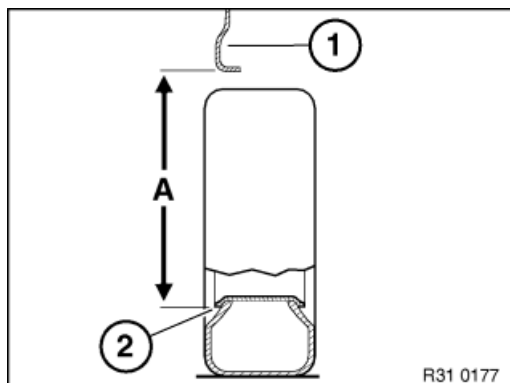


After installation:

- If a support bearing is installed without centring pin, a [wheel alignment](#) is required.

**Necessary preliminary tasks:**

- Move vehicle into [normal position](#)



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

31 33 100 Removing and installing/replacing coil spring for front left or front right spring strut



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!

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

For all E70/E71/E72 vehicles: When replacing coil spring, always renew spring pad at bottom

Note:

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



Note:

Procedure is described in the document "[Replacing front left or right spring strut](#)".



After installation:

- Check [headlight adjustment](#), correct if necessary.

31 35 000 Removing and installing/replacing front anti-roll bar (all-wheel drive vehicle)



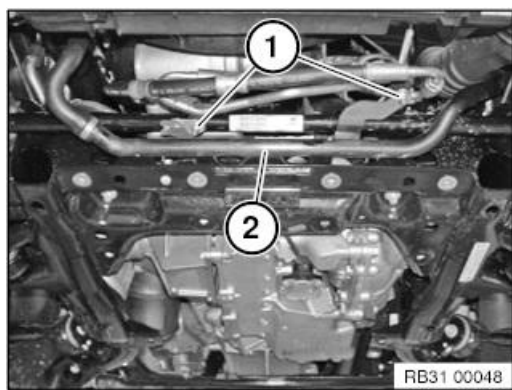
Important!

To avoid complaints being made by the customer about noise, set the vehicle on its wheels and tighten down the stabilizer mounting to specified torque.



Necessary preliminary tasks:

- Remove [front assembly underside protection](#).
- Remove lower [pedestrian protection](#).
- Remove [anti-roll bar link on both sides from anti-roll bar](#).



N20, N55:

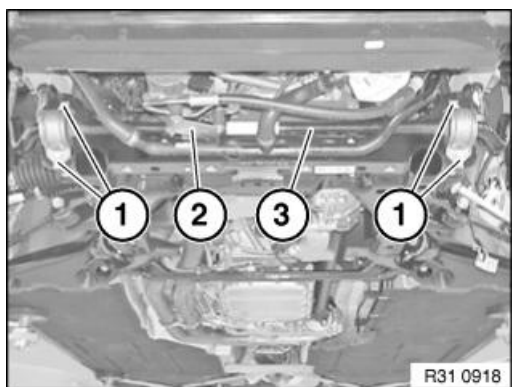
Loosen nuts (1) on pressure line.

Remove coolant pipe (2) from front axle support.



Note:

The following illustrations was created using the E84 with N52K as an example. Other vehicles and engines may show differences in detail.



N52K:

- Remove coolant pipe from front axle support.

Remove holder (2) with pressure line for hydraulic steering from front axle support.

Release screws (1).

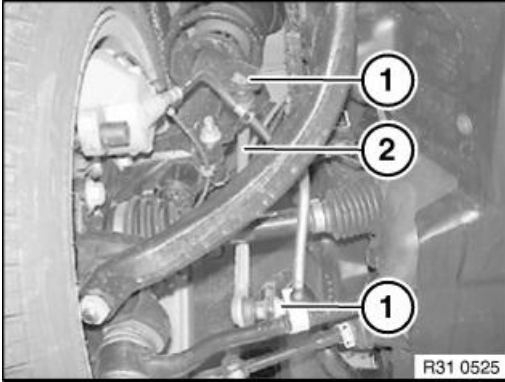
Tightening torque [31 35 1AZ](#).

Remove anti-roll bar (3) towards front.

Installation note:

Check rubber mount on both sides, replace anti-roll bar if necessary.

31 35 005 Removing and installing/replacing push rod (stabiliser link) for left or right stabiliser (AWD)



Release nuts (1); if necessary, grip with open-end wrench.

Remove stabiliser link (2).

Installation:

Replace self-locking nuts.

Tightening torque [31 35 2AZ](#).

31 50 ... Changing front 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!

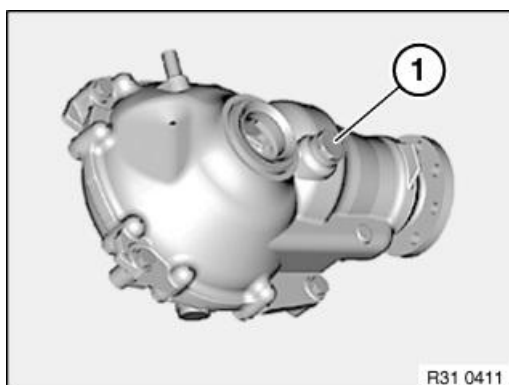
Note:

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



Necessary preliminary tasks:

- Remove [reinforcement plate](#).



Checking and correcting the front axle differential oil level:

Undo oil filler plug (1).

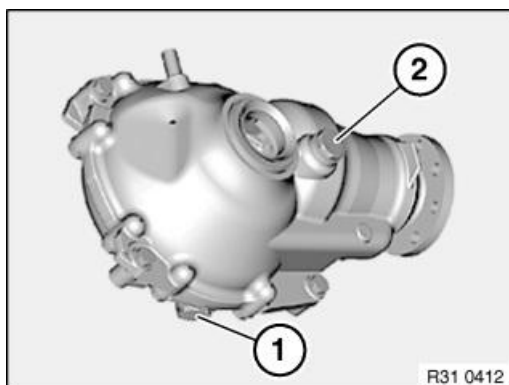
Check front axle differential oil level.

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

Installation note:

Renew the sealing ring.

Tightening torque [31 50 2AZ](#).



Changing front axle differential oil:

Place oil collecting apparatus underneath.

Remove oil drain plug (1).

Drain front axle differential oil.

Replace sealing ring, screw in oil drain plug (1) and tighten down.

Tightening torque [31 50 2AZ](#).

Undo oil filler plug (2).

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

Installation note:

Renew the sealing ring.

Tightening torque [31 50 2AZ](#).

**Warning!**

Danger to life!

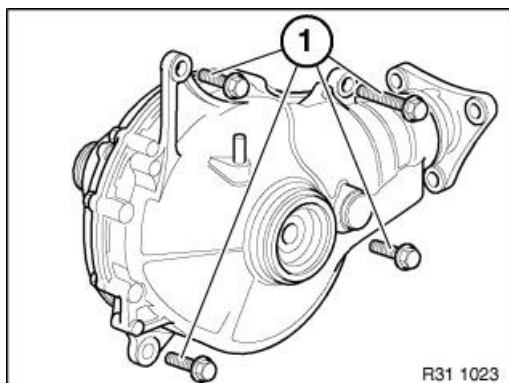
[Secure engine in installation position](#) to prevent it from falling down.

**Necessary preliminary tasks:**

- Secure [engine in installation position](#).
- Drain and dispose of [front differential oil](#)
- [Remove](#) left output shaft.
- [Remove](#) right output shaft.
- [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.



Equipment specification with automatic transmission: If necessary, disconnect hydraulic lines from oil sump.

Release screws (1).

Tightening torque [31 50 1AZ](#).

Detach front axle differential from oil sump and remove towards rear.

Installation note:

Replace [O-ring](#) if necessary.

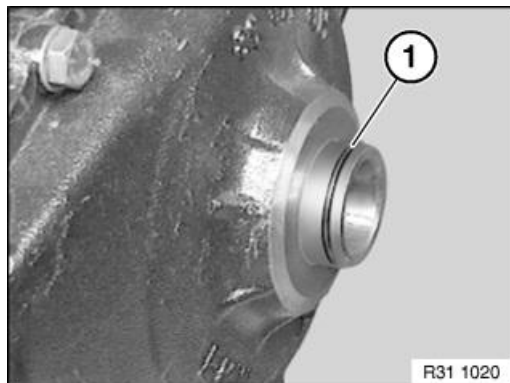
Coat O-ring with front axle differential oil.

**After installation:**

- Fill [front axle differential with oil](#).

**Necessary preliminary tasks:**

- Remove [front differential](#)



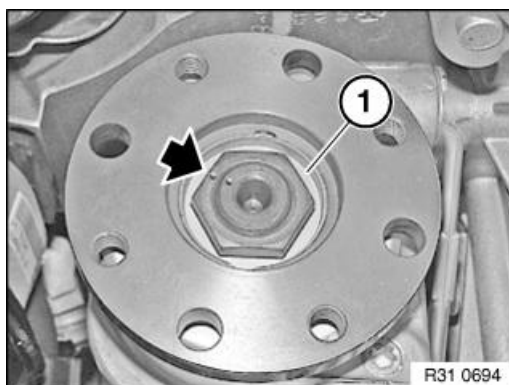
Remove O-ring (1) with a suitable tool from front differential. *Installation:* Insert O-ring (1) in groove and coat with front differential oil.

**Special tools required:**

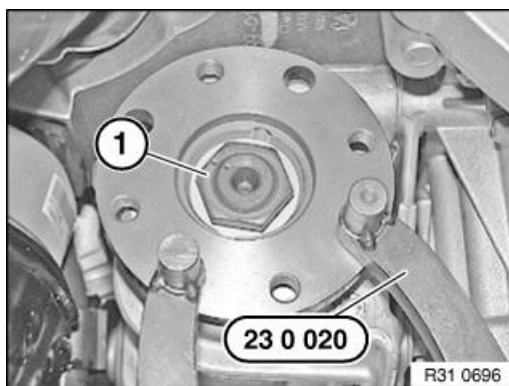
- [23 0 020](#)
- [31 5 130](#)
- [33 1 150](#)

**Necessary preliminary work:**

- Remove [reinforcement plate](#).
- Remove [front propeller shaft](#).



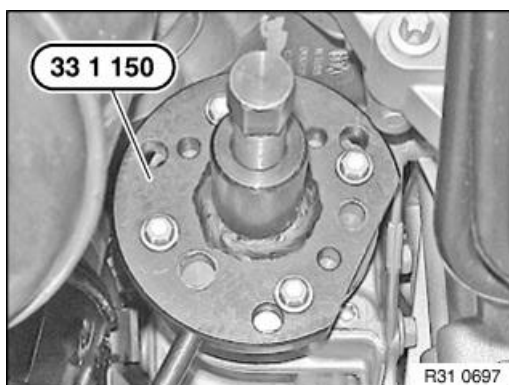
Mark position of nut with respect to shaft with punch marks (arrow).
Lever out lockplate (1) with a suitable tool.

**Important!**

Risk of damage!

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

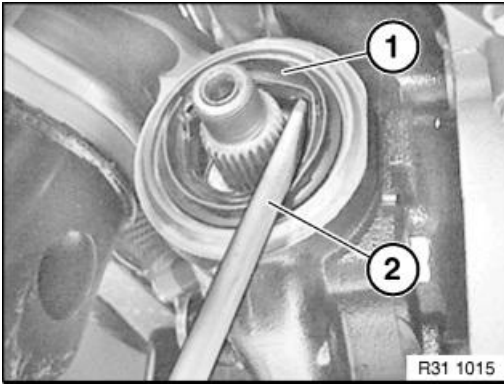
Secure drive flange with special tool [23 0 020](#) against turning and release nut (1).

**Important!**

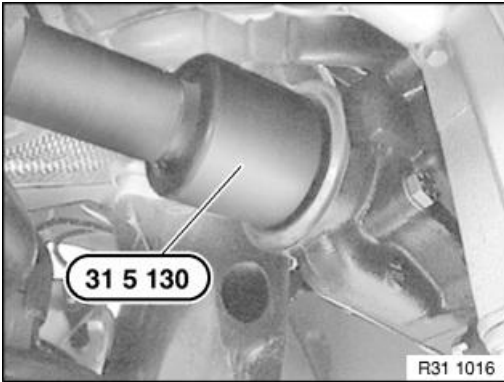
Risk of damage!

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

Pull drive flange off drive shaft with special tool [33 1 150](#).



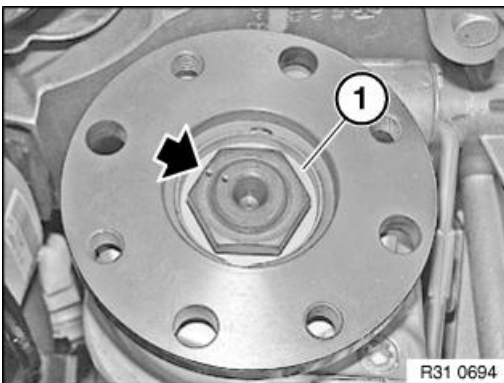
Lever shaft seal (1) out of front axle differential with a suitable screwdriver (2).



Installation note:

Drive in shaft seal with special tool [31 5 130](#) up to limit position.

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



Important!

Risk of damage!

Do not tighten nut beyond the punch marks or else 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:

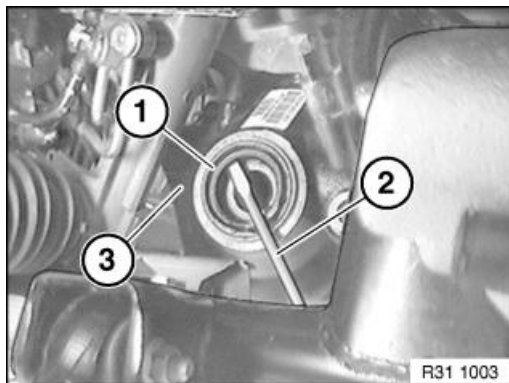
- Check [front axle gearbox oil level](#), correct if necessary.

**Special tools required:**

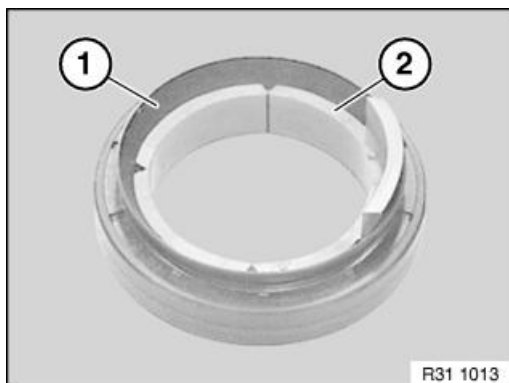
- [31 5 130](#)

**Necessary preliminary tasks:**

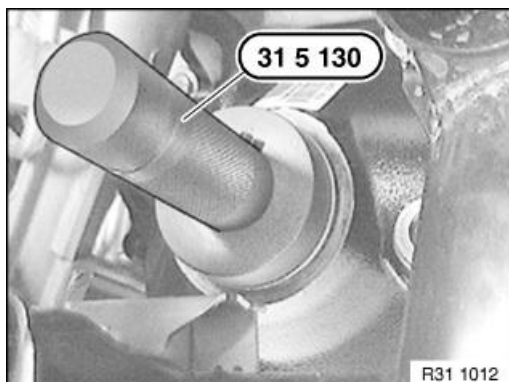
- Remove [left output shaft](#)



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

**Note:**

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

**Installation:**

Drive in shaft seal with special tool [31 5 130](#) as far as it will go.

**After installation:**

- Check [front differential oil level](#) , correct if necessary

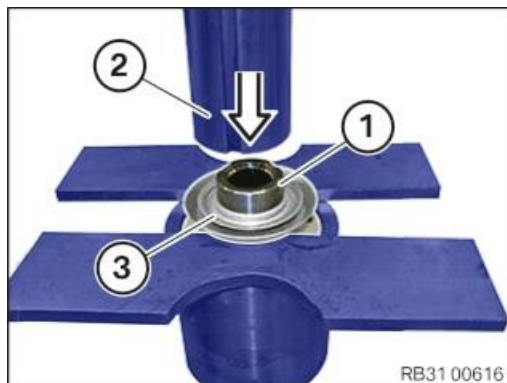
31 51 600 Replacing both dust plates (input flange removed)



TECHNICAL INFORMATION

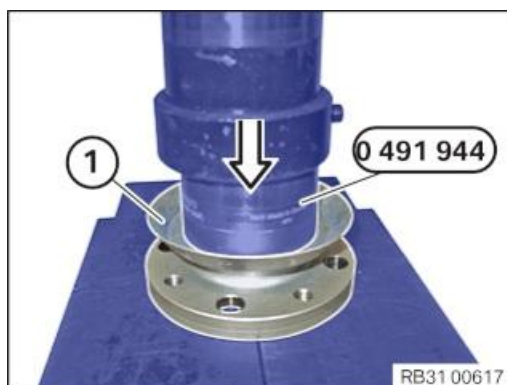
The work must be performed with care to prevent component damage.

1 – Releasing both dust plates

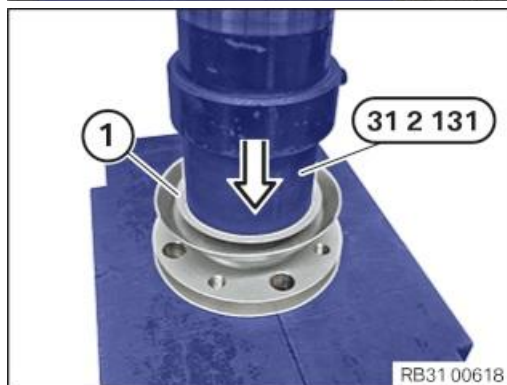


- Releasing both dust plates (3) using a hydraulic press (2) from the input flange (1).

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:

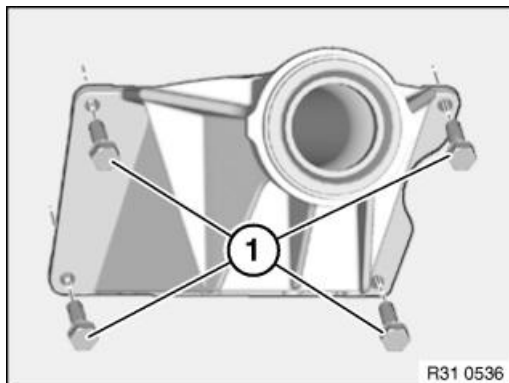
Common

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	

**Necessary preliminary tasks:**

- Remove [right output shaft](#)



Release screws (1).

Remove bearing block from oil sump.

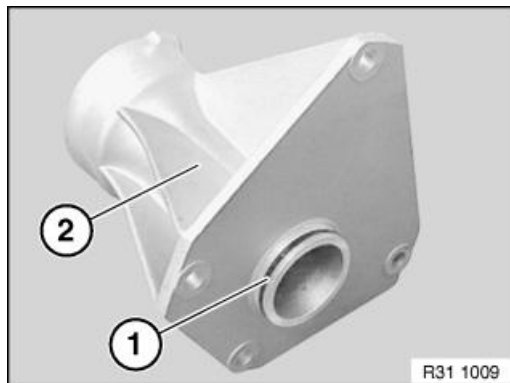
Installation:

Replace [O-ring](#) .

Tightening torque [31 60 1AZ](#) .

**Necessary preliminary tasks:**

- Remove [bearing support](#)



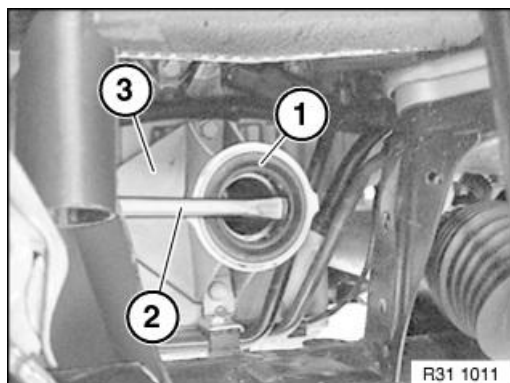
Remove O-ring (1) with a suitable tool from bearing block (2). *Installation:* Insert O-ring (1) in groove and coat with front differential oil.

**Special tools required:**

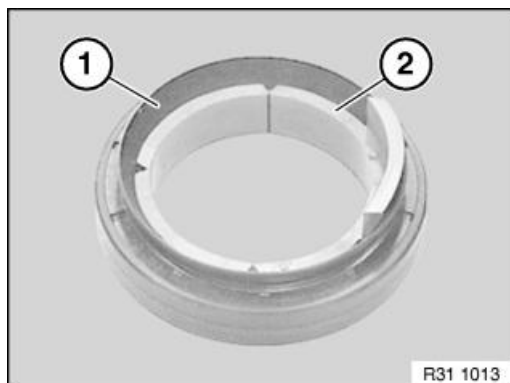
- [31 5 130](#)

**Necessary preliminary tasks:**

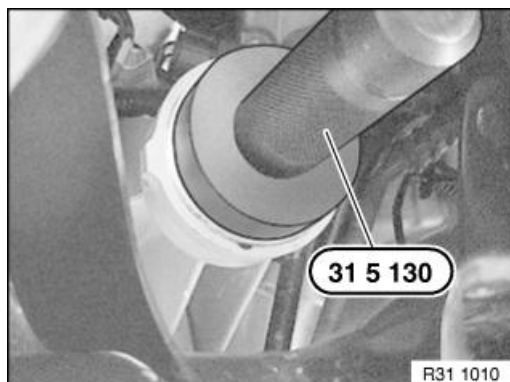
- [Remove](#) right output shaft.



Lever shaft seal (1) with a screwdriver (2) out of bearing support (3).

**Note:**

Protective grommet (2) serves to protect the sealing lips of shaft seal (1) from being damaged when the output shaft is inserted into the bearing support.

**Installation note:**

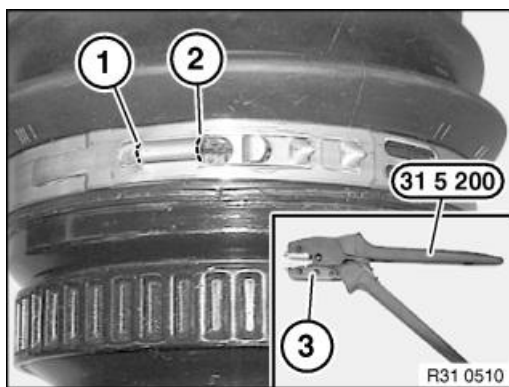
Drive in shaft seal with special tool [31 5 130](#) up to limit position.

**Special tools required:**

- [31 5 200](#)

**Important!**

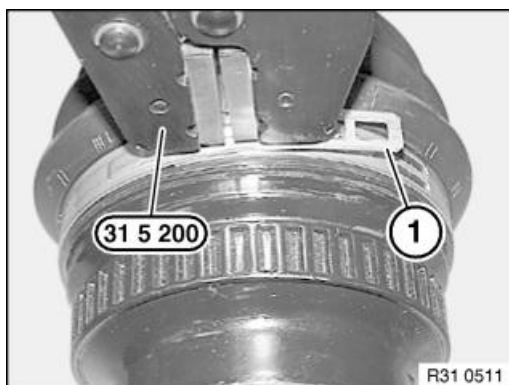
During removal Low Profile band clamp (dotted line) is overstretched and must not be reused!

**Removing:**

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

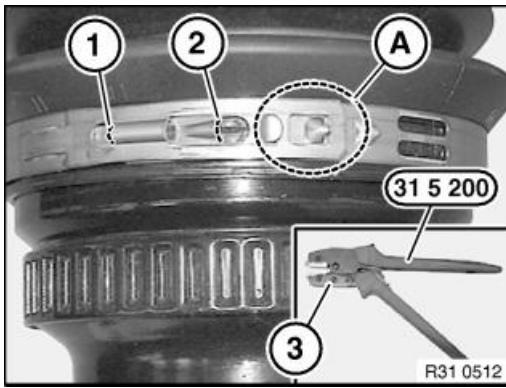
Note:

Make sure that the movable piece (3) of the special tool is placed on lug (1).



Compress Low Profile band clamp with special tool [31 5 200](#) until end of band clamp (1) lifts up.

Relieve tension on special tool and remove Low Profile band clamp.



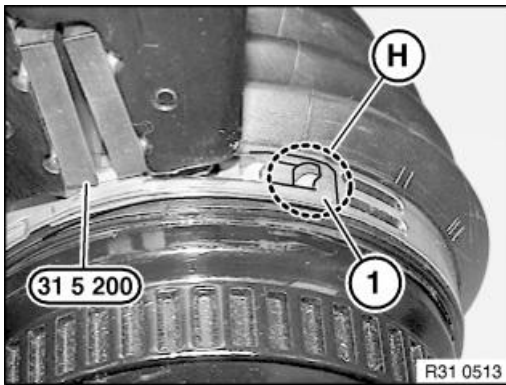
Assembly:

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 piece (3) of the special tool is placed on lug (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.

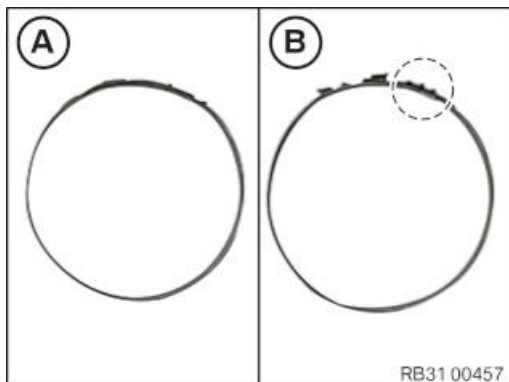
Check hook fastener (H); if necessary, repeat operation with new Low Profile band clamp.

**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!

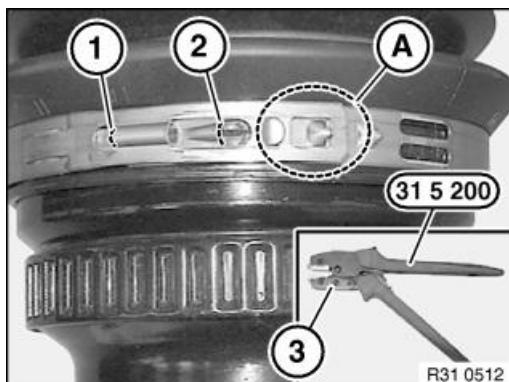


Depending on the design of the Low Profile band clamps, a different special tool (pliers) is needed for installation.

Identify band clamp and find required special tool.

Band clamp type A = pliers [31 5 200](#)

Band clamp type B = pliers [2 413 949](#)

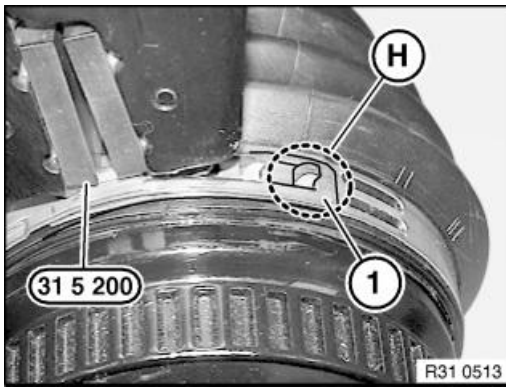
**Installation (type A):**

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.

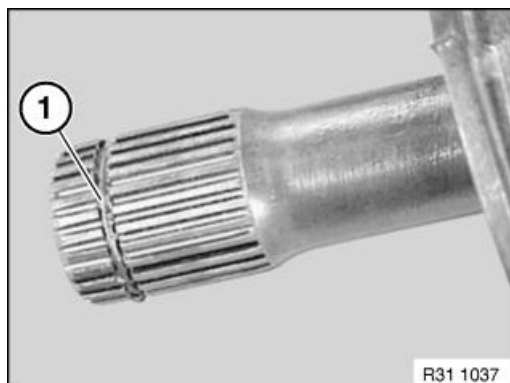
Check hook fastener; if necessary, repeat operation with new Low Profile band clamp.

**Special tools required:**

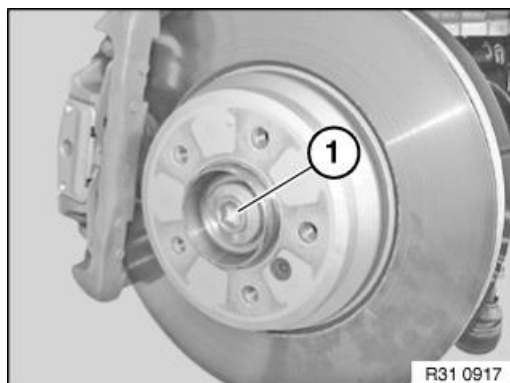
- [31 5 110](#)

**Necessary preliminary tasks:**

- Remove [front wheel](#).

**Important!**

When fitting the output shaft, the circlip (1) and shaft seal at the bearing support/front differential must be replaced!

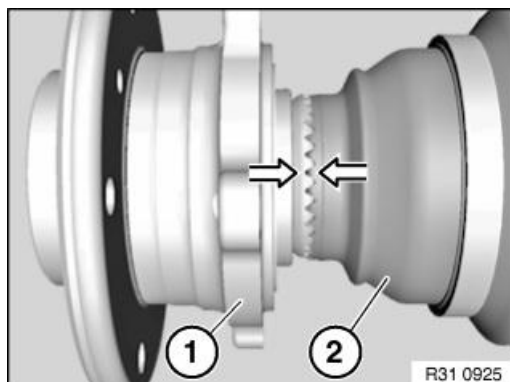


Release collar bolt (1), press brake pedal to floor for this purpose.

Tightening torque [31 60 3AZ](#).

Installation note:

- Replace collar bolt and compression spring.
- Keep collar bolt and spur toothing of bearing/propeller shaft clean and free of grease

**Important!**

Note on installation must be observed without fail!

Installation note:

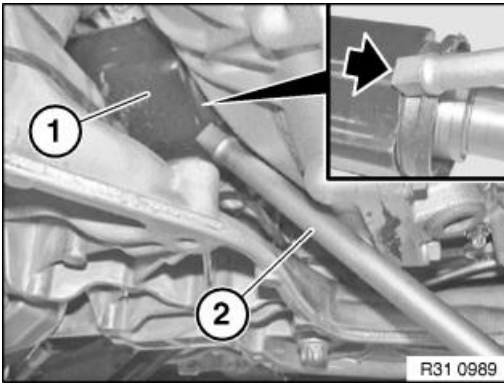
- Spur gearing of bearing (1) and output shaft (2) must be installed form-fit (tooth in tooth)!
 - Tighten collar bolt and compression spring by hand.
 - Check whether spur gearing is locked tooth in tooth by reciprocally rotating wheel hub/output shaft.
 - Once a form-fit has been ensured, tighten to final torque.
- Tightening torque [31 60 3AZ](#).



- Remove [reinforcement plate](#).
- Undo [track rod end at the swivel bearing](#).
- Loosen the [wishbone on the wheel carrier only](#) (no wheel alignment required)
- Undo [guide joint with trailing link on the wheel carrier](#).
- Undo [anti-roll bar link at the anti-roll bar](#).

Turn swivel bearing to one side.

Remove output shaft from swivel bearing/wheel bearing.



Important!

Risk of damage!

Secure output shaft against falling out.

Knock out left or right output shaft with an aluminium spike (2) at the front axle differential/bearing support. *Installation note:*

Replace the [radial shaft seal at the front axle differential/bearing support](#), coat sealing lips using front axle 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 damage and/or deformation of the gearing at the output shaft/axle shaft gear!

Check splines and replaced parts if damaged.



After installation:

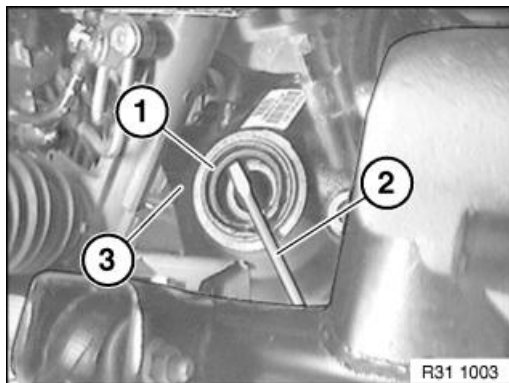
- Check [oil level in front axle differential](#), correct if necessary.

**Special tools required:**

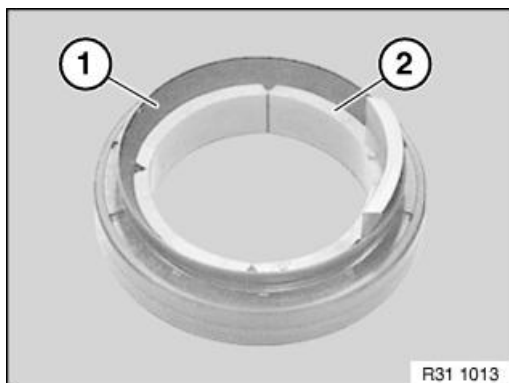
- [31 5 130](#)

**Necessary preliminary tasks:**

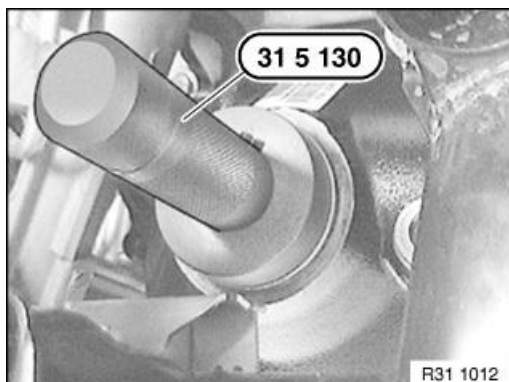
- Remove [left output shaft](#)



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

**Note:**

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

**Installation:**

Drive in shaft seal with special tool [31 5 130](#) as far as it will go.

**After installation:**

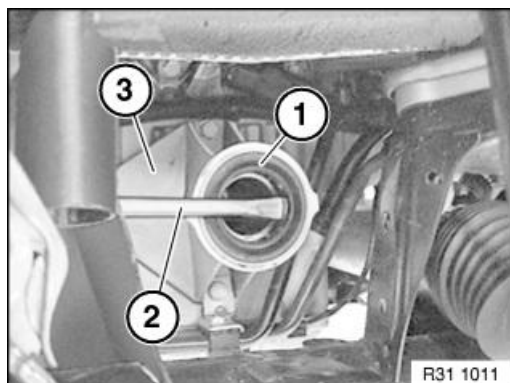
- Check [front differential oil level](#) , correct if necessary

**Special tools required:**

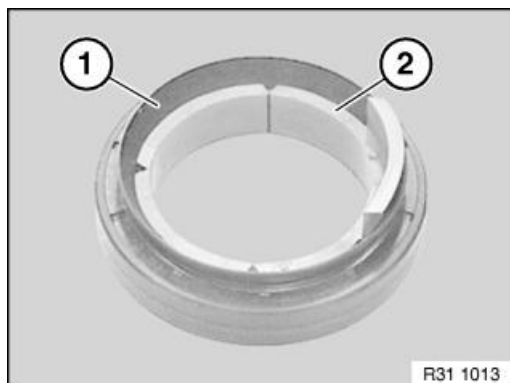
- [31 5 130](#)

**Necessary preliminary tasks:**

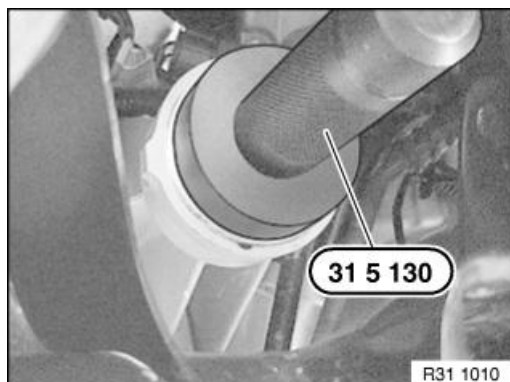
- [Remove](#) right output shaft.



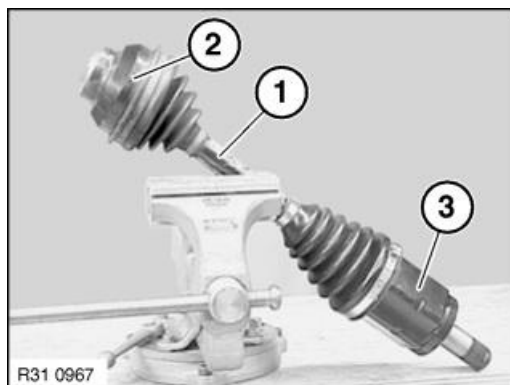
Lever shaft seal (1) with a screwdriver (2) out of bearing support (3).

**Note:**

Protective grommet (2) serves to protect the sealing lips of shaft seal (1) from being damaged when the output shaft is inserted into the bearing support.

**Installation note:**

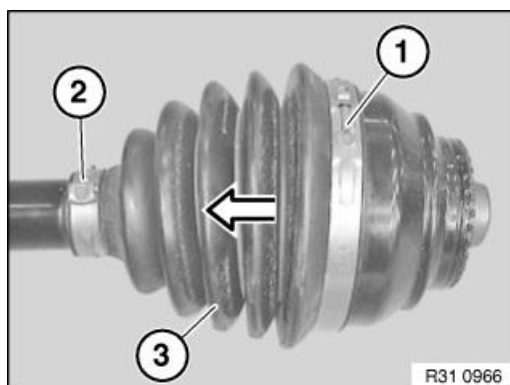
Drive in shaft seal with special tool [31 5 130](#) up to limit position.



Grip output shaft (1) in vice with aluminium clamping jaws. *Note:*

2 = Joint, wheel side

3 = Joint, transmission side



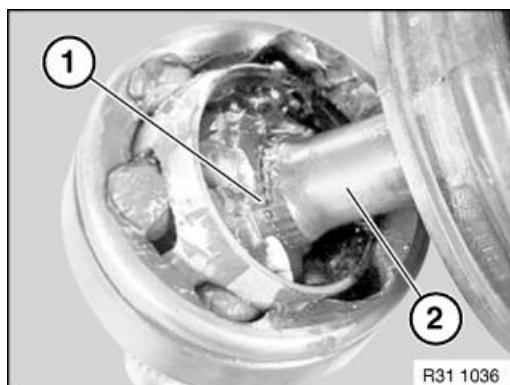
Replacing gaiter of joint on wheel side:

Release [Low Profile clip](#) (1) and clip (2).

Pull back rubber gaiter (3).

Installation note:

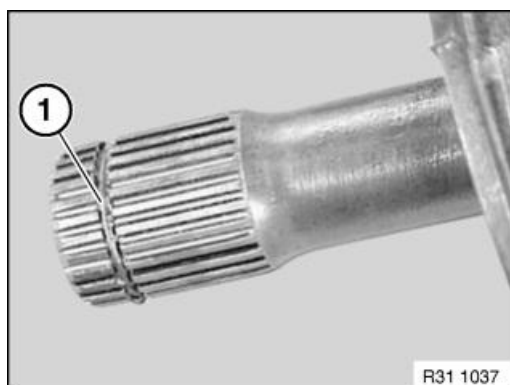
Feed gaiter (3) into groove of joint.



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

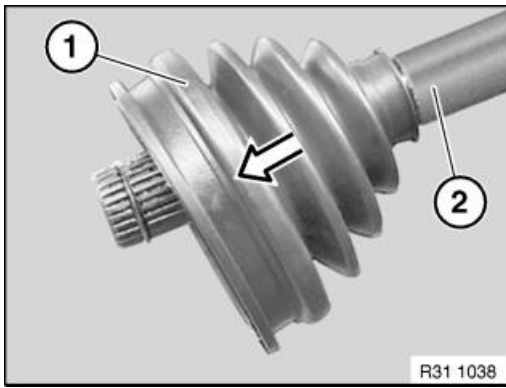
Replace circlip.

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



Lift out circlip (1). *Installation note:*

Install retaining ring (1).

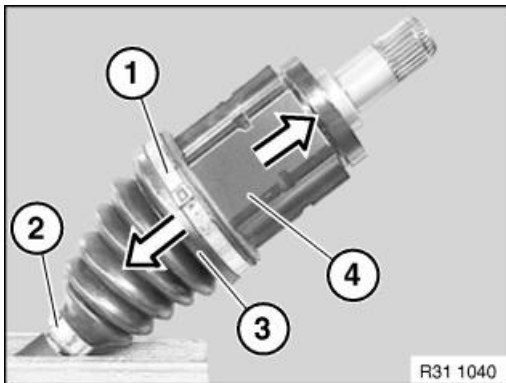


Pull off gaiter (1) over shaft (2).

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).

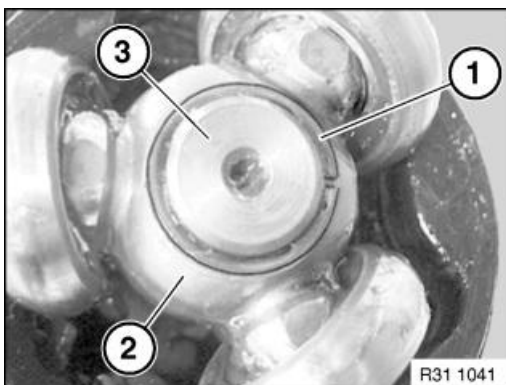
Pull back rubber gaiter (3).

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).

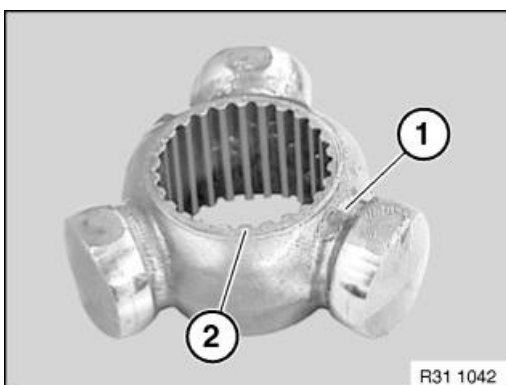
Installation note:

Install retaining ring (1).

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

Pull off gaiter over shaft (3).

Carefully clean all components with a cloth.



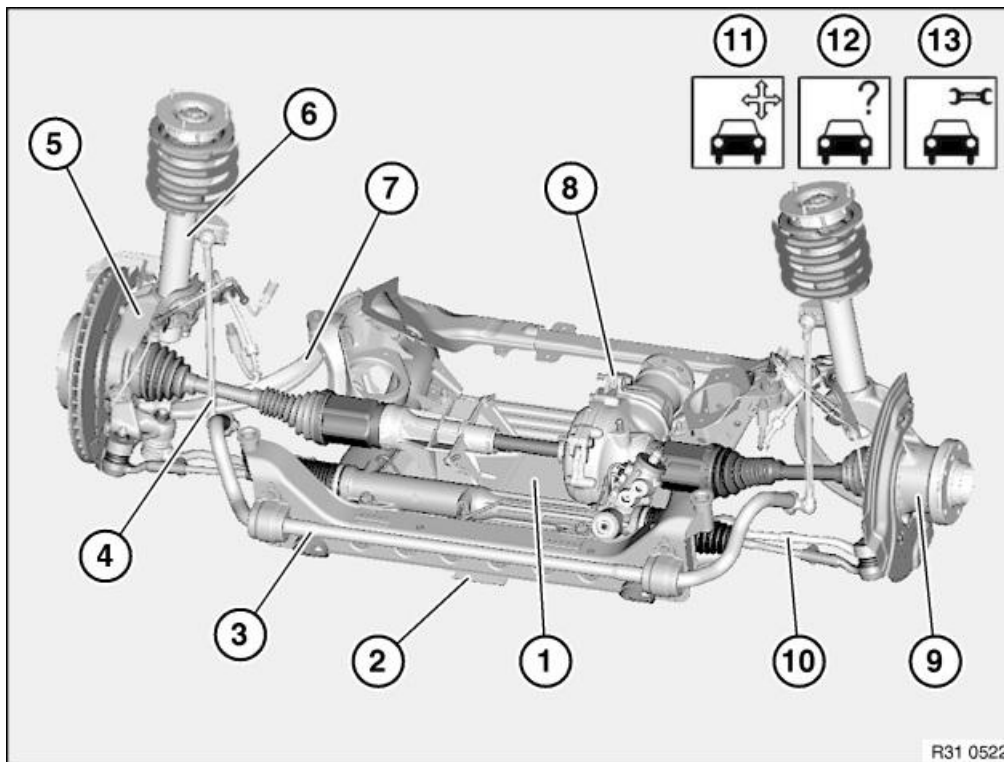
Installation note:

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.

31 Front axle overview (all-wheel drive vehicle)



[Safety information and general information](#)

1	Reinforcement plate	8	Front axle differential/output shafts
2	Front axle support	9	Wheel bearing
3	Stabiliser	10	Wishbone
4	Anti-roll bar link	11	Adjustment work
5	Swivel bearing	12	Troubleshooting
6	Spring strut shock absorber	13	Testing
7	Leading link		



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

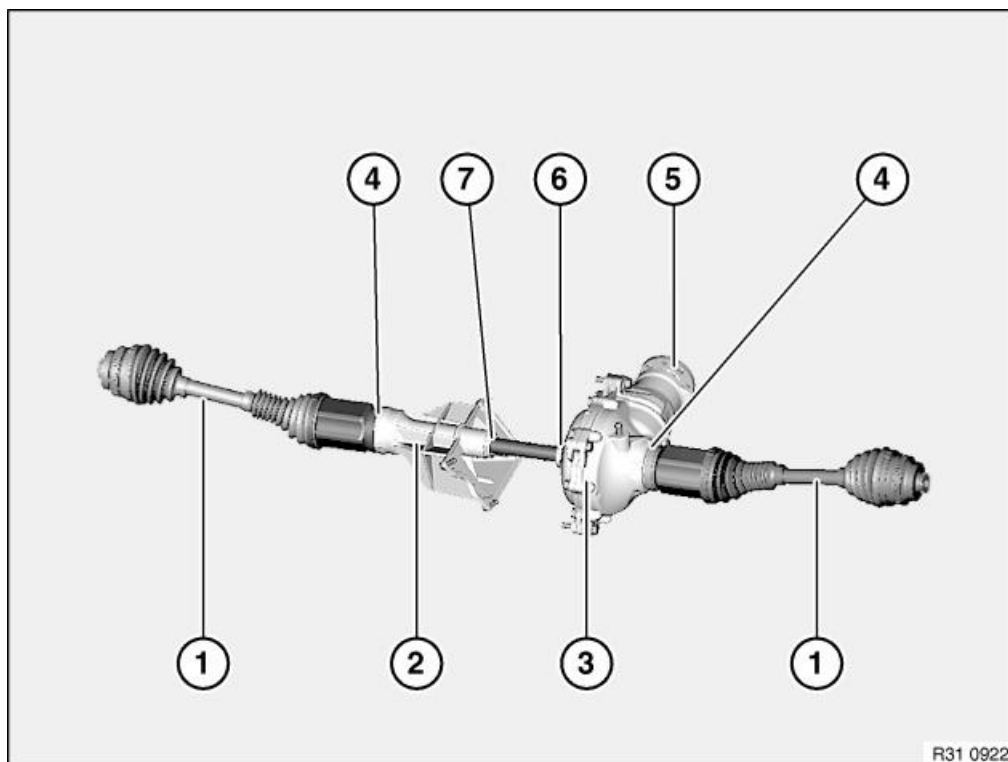
Once the screw has been coated with adhesive, the adhesive remains inactive until such time that it is activated by the encapsulation breaking when the screw is inserted and then cures (hardens) at room temperature.



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

31 Overview of front axle differential/output shafts



[Safety instructions & general information](#)

- | | |
|--|--|
| 1 Output shaft / gaiters | 5 Radial shaft seal (drive flange) |
| 2 Bearing support | 6 O-ring (front axle differential) |
| 3 Front axle differential | 7 O-ring (bearing support) |
| 4 Radial shaft seal (output shaft) | |