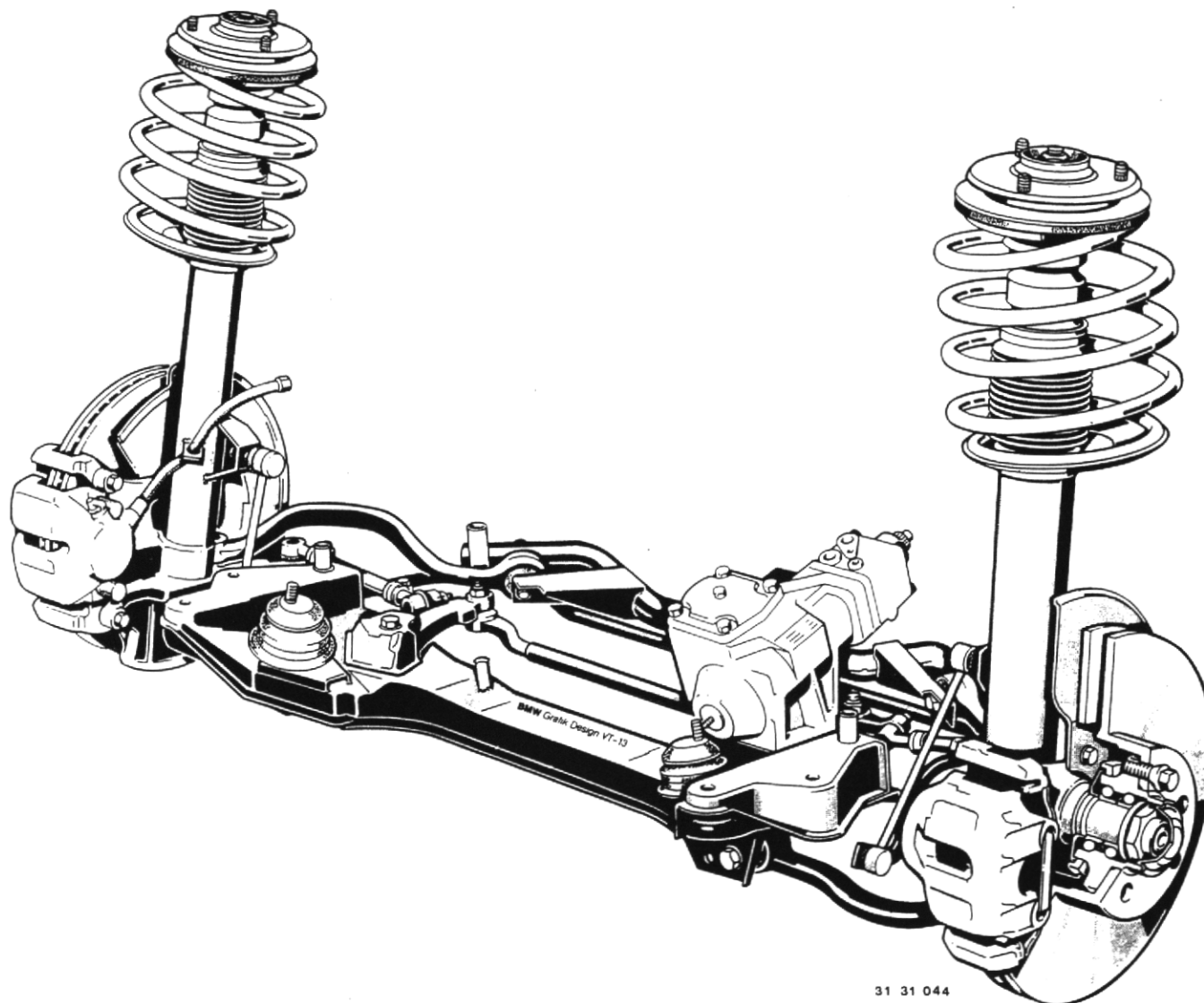


31 Front Axle

	Front wheel suspension layout	31-00/1
	Strut and steering arm layout	31-00/2
31 10 000	Front axle assembly – remove and install	31-10/1
31 11 001	Front axle carrier – replace	31-11/1
31 12 001	Control arm, left or right – replace	31-12/1
090	Thrust strut, left or right – remove and install or replace	31-12/2
147	Rubber mount for thrust stru – replace	31-12/3
31 21 180	Bearings (wheel hub) for front wheel – replace	31-21/1
	Spring strut assembly layout	31-31/1
31 31 000	Spring strut assembly, left or right – remove and install	31-31/2
031	Spring strut shock absorber, left or right – replace	31-31/3
31 33 001	Spring strut mount, left or right – replace	31-33/1
100	Spring strut coil spring, left or right – remove and install or replace	31-33/1
095	Car ride level height – measure and correct	31-33/2
31 35 000	Stabilizer – remove and install or replace	31-35/1
	Front axle – troubleshoot	31-90/1
	Shock absorbers – troubleshoot	31-90/3

31-00/1

FRONT AXLE LAYOUT DRAWING

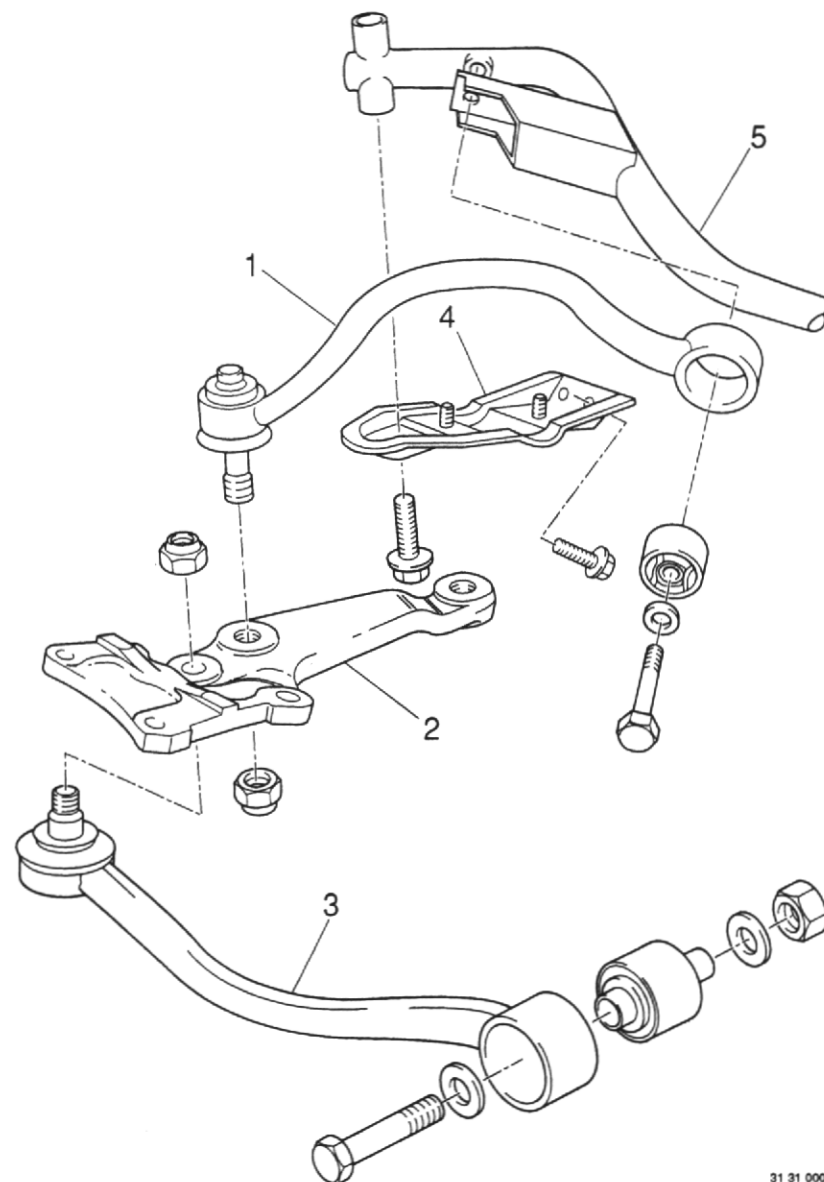


31 31 044

31-00/2

LAYOUT DRAWING OF STRUTS AND ARMS

- 1 Thrust strut
- 2 Tie rod arm
- 3 Control arm
- 4 Support
- 5 Connecting pipe

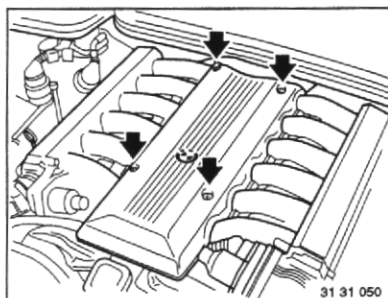


**31 10 000 REMOVING AND INSTALLING
FRONT AXLE ASSEMBLY**

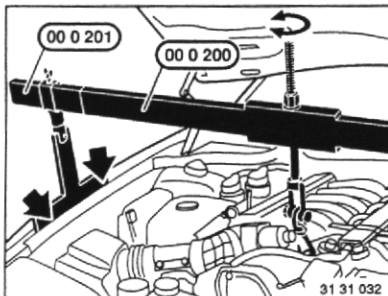
Unscrew brake calipers (lines remain connected) – see Group 34.
Unscrew ABS pulse senders – see Group 34.
Disconnect EDC wire – see Group 37.

Note:
Check and adjust wheel alignment after installation of the front axle – see Group 32.

Unscrew cover.

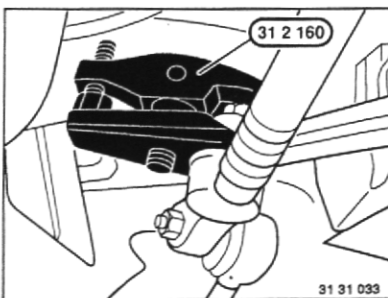


Suspend engine from Special Tools 00 0 200 / 201.
Supports must bear on the bolts of both side panels.

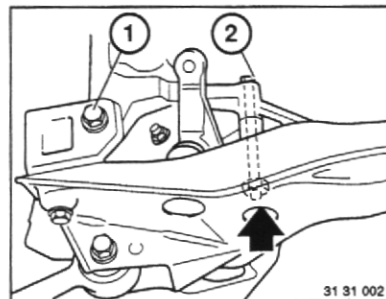


Unscrew nut.
Press tie rod off of the steering drop arm with Special Tool 31 2 160.

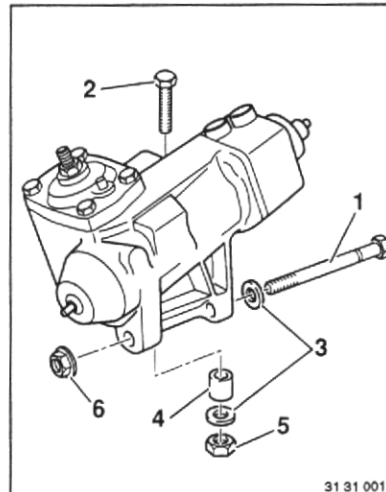
Installation:
Replace self-locking nut.
Tightening torque*.



* See Specifications



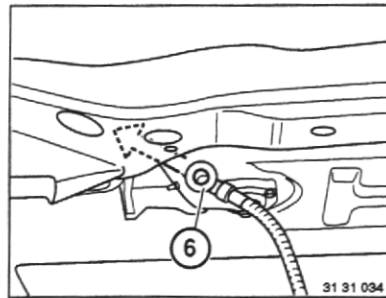
Unscrew bolts (1 and 2).
Suspend steering gear from car – lines remain connected.



Installation:

- 1 Bolt
- 2 Bolt
- 3 Washer
- 4 Sleeve
- 5 Nut
- 6 Nut with washer

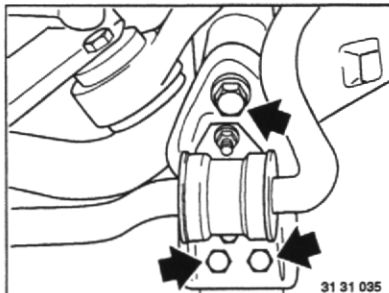
Tightening torque*.



Installation:
Install nut (6) with a flexible magnetic holder.

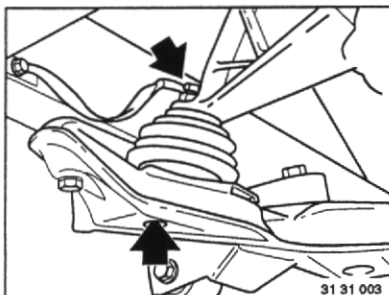
* See Specifications

31-10/2



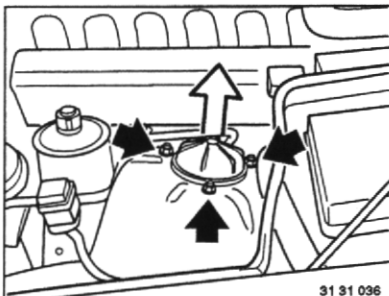
Unscrew left and right bolts.

Installation:
Tightening torque*.



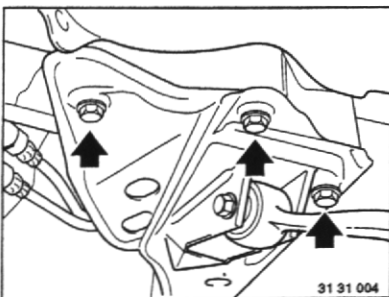
Unscrew left and right engine mounts on front axle.
Also unscrew right engine mount at top.

Installation:
Tightening torque*.



Take off cap.
Unscrew left and right nuts.

Installation:
Replace self-locking nuts.
Tightening torque*.



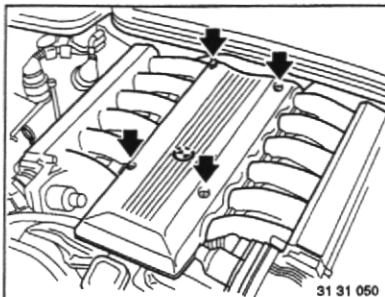
Place garage jack underneath front axle carrier.
Unscrew left and right bolts and lower the front axle slowly.

Important!
Spring struts must not fall out or down – this would damage the ball joints.

Installation:
Tightening torque*.

* See Specifications

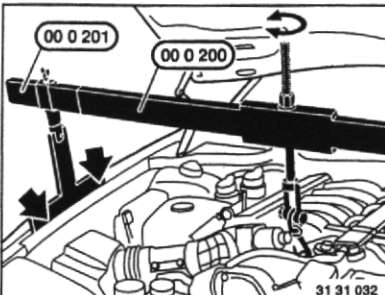
31-11/1



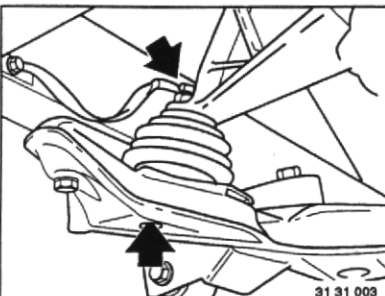
31 11 001 REPLACING FRONT AXLE CARRIER

Note:
The steering drop arm must be adjusted (see Group 32) after installation of a new front axle carrier.
Check and adjust wheel alignment after installation of front axle – see Group 32.

Unscrew cover.

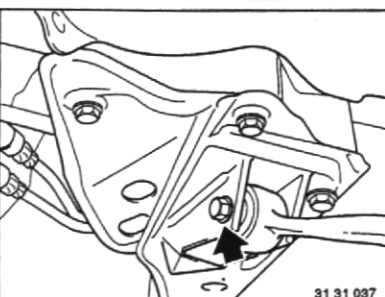


Suspend engine on Special Tools 00 0 200 / 201.
Supports must bear on the bolts of both side panels.



Unscrew left and right engine mounts on the front axle carrier.
Also unscrew right engine mount at top.

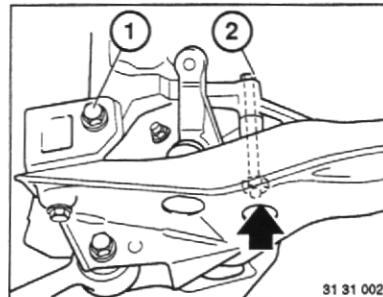
Installation:
Tightening torque*.



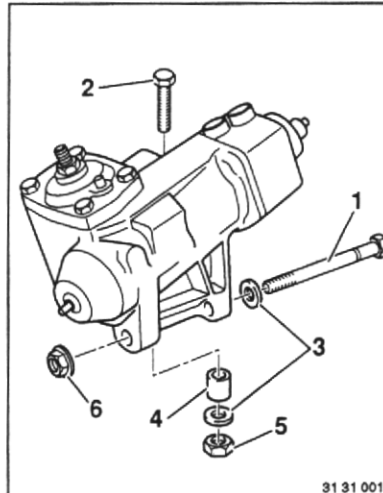
Unscrew left and right control arms.

Installation:
Replace self-locking nuts.
Use washers on both sides.
Tightening torque*.

* See Specifications

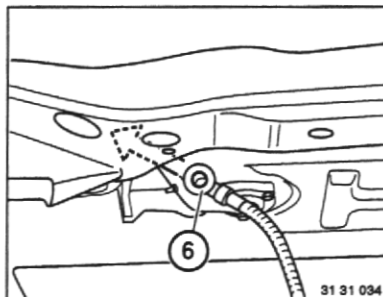


Unscrew bolts (1 and 2).
Suspend steering gear from car – lines remain connected.



Installation:
1 Bolt
2 Bolt
3 Washer
4 Sleeve
5 Nut
6 Nut with washer

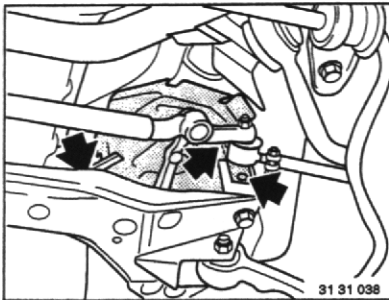
Tightening torque*.



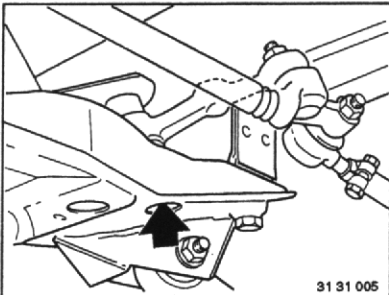
Installation:
Install nut (6) with a flexible magnetic holder.

* See Specifications

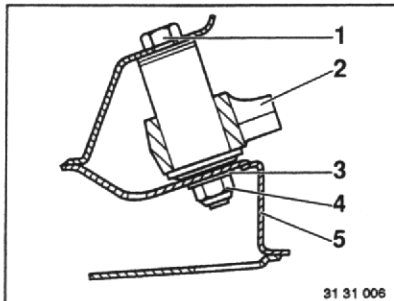
31-11/2



Unscrew heat shield.



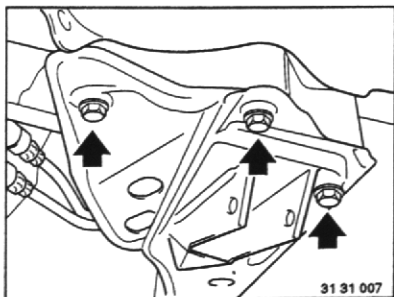
Unscrew steering guide arm.



Installation:

- 1 Bolt
- 2 Steering guide arm
- 3 Washer
- 4 Self-locking nut
- 5 Front axle carrier

Replace self-locking nut.
Tightening torque*.



Unscrew left and right bolts and take
off front axle carrier.

Installation:

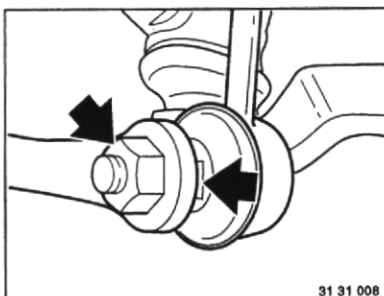
Tightening torque*.

* See Specifications

31-12/1

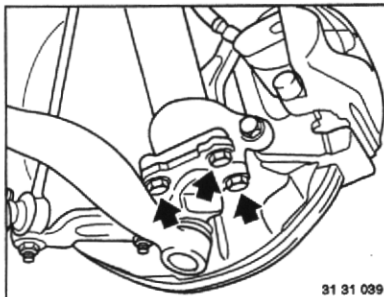
31 12 001 REPLACING LEFT OR RIGHT CONTROL ARM

Remove front wheel – see Group 36.



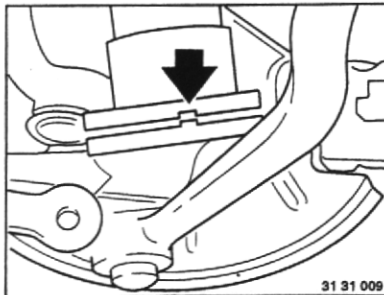
Unscrew thrust rod on stabilizer — counterhold with fork wrench.

Installation:
Wrench surface on ball head must be parallel to the absorber axis.
Tightening torque*.



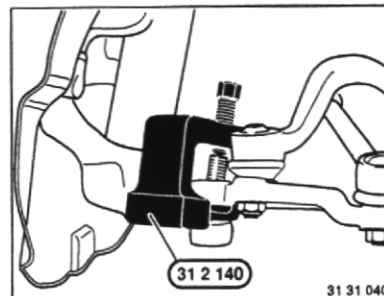
Unscrew bolts.

Installation:
Clean threads of bores and bolts.
Install bolts with a bolt cement**.
Tightening torque*.



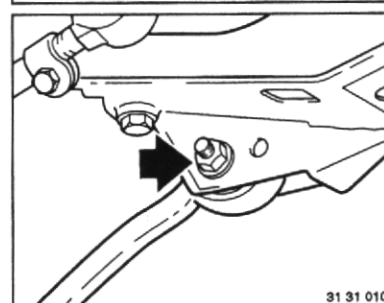
Check for correct installed position.

* See Specifications
** Source of Supply: HWB



Unscrew nut.
Pry off ball joint with Special Tool 31 2 140.

Installation:
Remove grease from ball pin and bore.
Replace self-locking nut.
Tightening torque*.



Unscrew bolt.

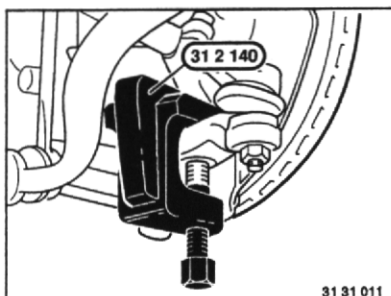
Installation:
Use washers on both sides.
Replace self-locking nut.
Tightening torque*.

* See Specifications

31-12/2

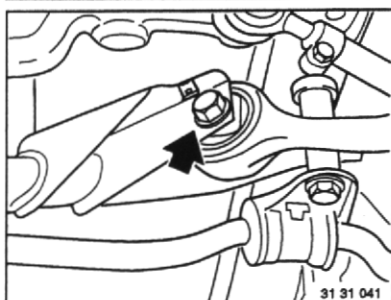
31 12 090 REMOVING AND INSTALLING OR REPLACING LEFT OR RIGHT THRUST STRUT

Remove front wheel – see Group 36.



Unscrew nut.
Pry off ball joint with Special Tool
31 2 140.

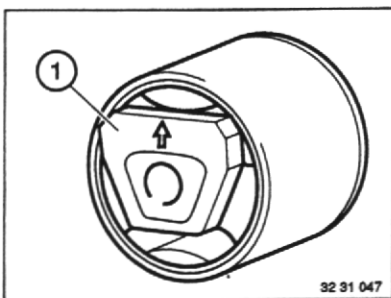
Installation:
Remove grease from ball pin and bore.
Replace self-locking nut.
Tightening torque*.



Unscrew heat shield if necessary.
Unscrew thrust strut.

Installation:
Use washer.
Replace self-locking nut.
Tightening torque* for car in normal
position*.

Important!
Thrust strut mounts must always be in-
stalled or replaced in pairs.



Note:
Hydraulic thrust strut mounts – recog-
nized on plastic clip (1) – cannot be
checked.
Both mounts must be replaced if fluid
is running out of a hydraulic mount.

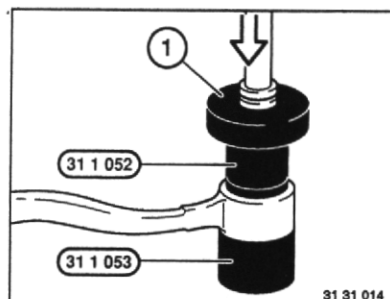
* See Specifications

31-12/3

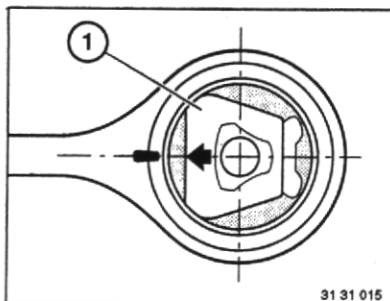
31 12 147 REPLACING THRUST STRUT RUBBER MOUNTS

Always replace both mounts!

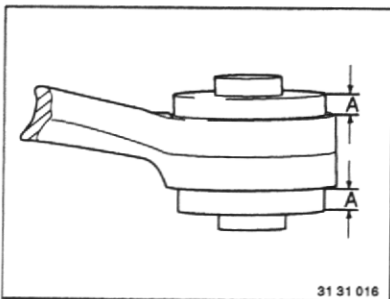
Remove thrust strut – see 31 12 090.



Press rubber mounts out (and in) on a press with Special Tools 31 1 052 / 053 and thrust pad (1).



Installation:
Remove grease from rubber mounts and thrust strut bore.
Arrow on plastic clip (1) faces mark on thrust strut.
Special tool must bear on the mount outer sleeve while pressing in.



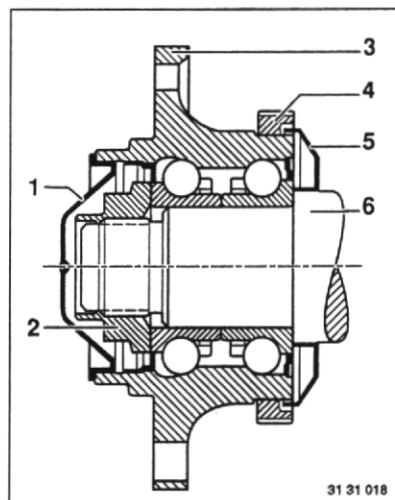
Installation:
Protrusion (A) equal on both sides.

31-21/1

31 21 180 REPLACING BEARINGS (WHEEL HUB) FOR FRONT WHEEL

Important!
Never reuse bearing unit after removal.

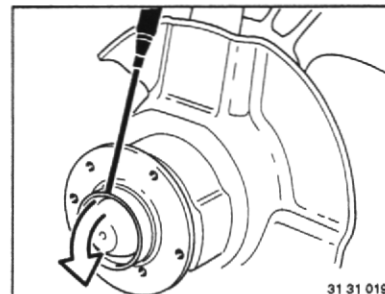
Unscrew brake disc (line remains connected) – see Group 34.



31 31 018

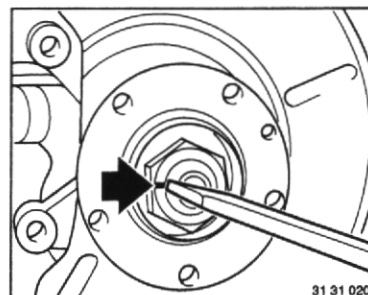
Wheel Bearings:

- 1 Grease cap
- 2 Collar nut
- 3 Bearing unit
- 4 Pulse gear
- 5 Dust cover
- 6 Stub axle



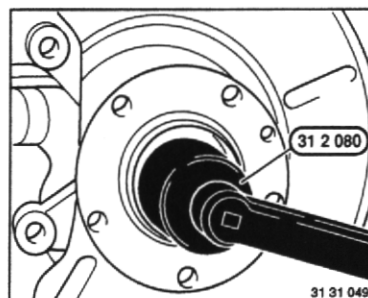
31 31 019

Pry off grease cap with a screwdriver.
Never reuse cap!



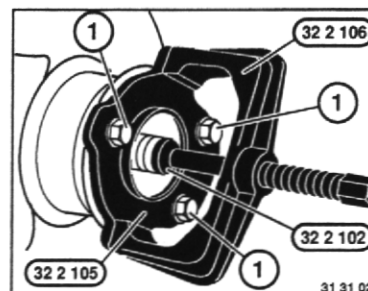
31 31 020

Chisel off lock of collar nut.



31 31 049

Unscrew nut with Special Tool
31 2 080.
Never reuse nut!

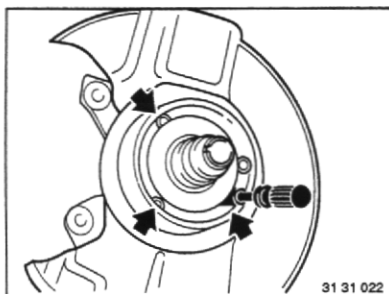


31 31 021

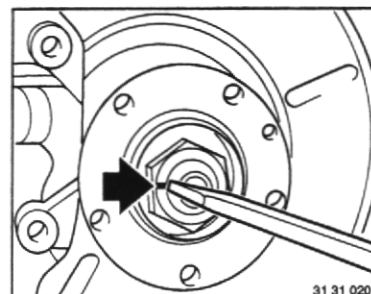
Pull off bearing unit with Special Tools
31 2 102 / 105 / 106 and wheel bolts (1).

Never reuse bearing unit!

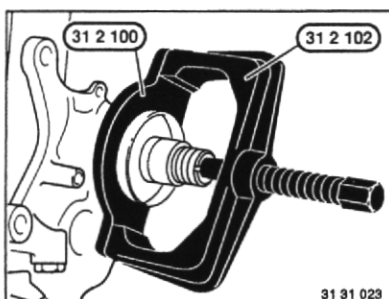
31-21/2



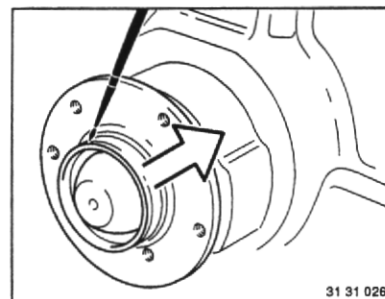
If bearing inner race remains on the stub axle, bend dust cover, insert wrench key and unscrew guard.



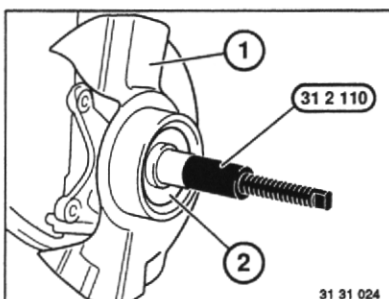
Screw on new collar nut with correct tightening torque* and lock by punching.



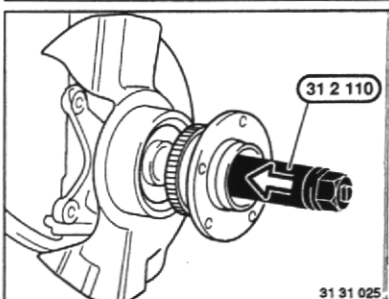
Pull off bearing inner race and dust cover with Special Tools 31 2 100 / 102.



Install new cap with a sealing compound**.



Screw on guard (1).
Install new dust cover (2).
Screw on Special Tool 31 2 110 whole length of threads.



Slide and pull on new bearing unit with Special Tool 31 2 110.

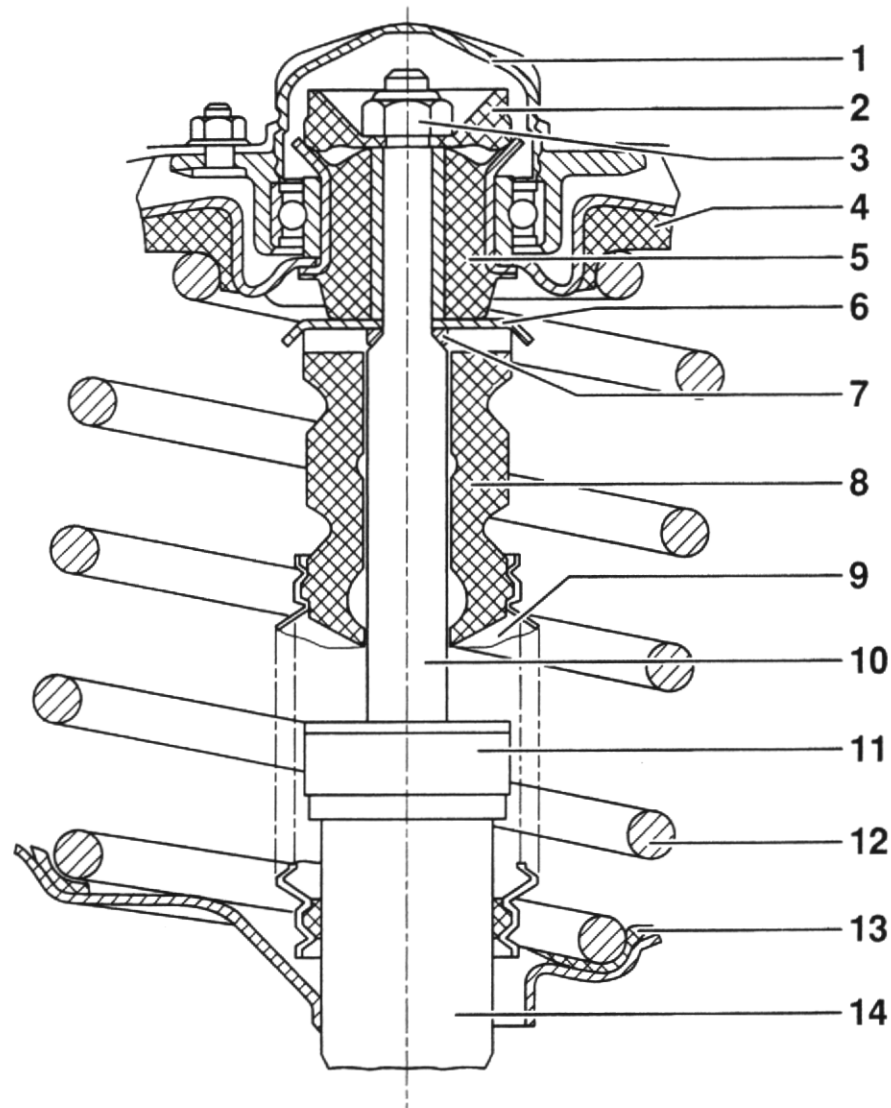
* See Specifications

** Source of Supply: HWB

31-31/1

SPRING STRUT ASSEMBLY DRAWING

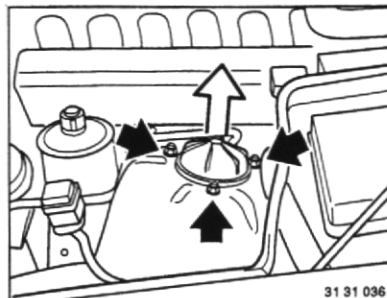
- 1 Cap
- 2 Stop washer
- 3 Nut
- 4 Upper spring ring
- 5 Mount
- 6 Support
- 7 Ring for hollow piston rod
- 8 Rubber damper
- 9 Dust cover
- 10 Shock absorber
- 11 Screw-on ring
- 12 Coil spring
- 13 Lower spring ring
- 14 Spring strut



31-31/2

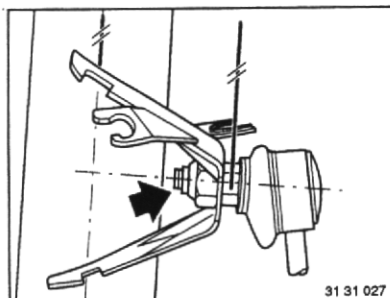
31 31 000 REMOVING AND INSTALLING LEFT OR RIGHT FRONT SPRING STRUT ASSEMBLY

Unscrew brake calliper (line remains connected) – see Group 34.
Remove ABS pulse sender – see Group 34.
Disconnect EDC wire – see Group 37.



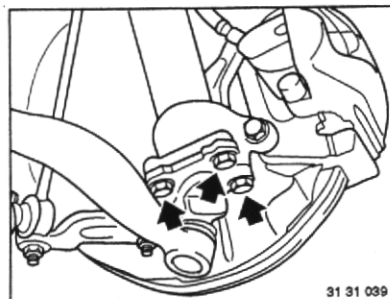
Lift off cap.
Support spring strut.
Unscrew spring strut mount on wheel house.

Installation:
Replace self-locking nuts.
Tightening torque*.



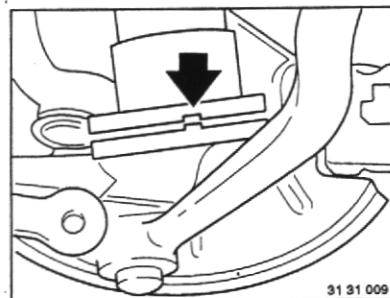
Unscrew stabilizer push rod — counter-hold with fork wrench.

Installation:
Wrench surface on ball pin must be parallel to the absorber axis.
Replace self-locking nut.
Tightening torque*.



Unscrew bolts.

Installation:
Clean threads of bores and bolts.
Install bolts with a bolt cement**.
Tightening torque*.



Check for correct installed position.

* See Specifications
** Source of Supply: HWB

Important!
Always store shock absorbers standing upright. If shock absorbers are stored laying down with piston rods run in, they could cause a rattling noise when used again.

Correction:
Store shock absorbers standing upright with piston rods run out at room temperature 24 hours.

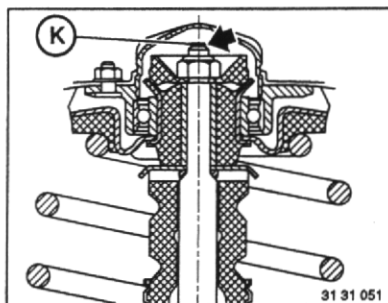
* See Specifications

31 31 031 REPLACING LEFT OR RIGHT FRONT SPRING STRUT SHOCK ABSORBER

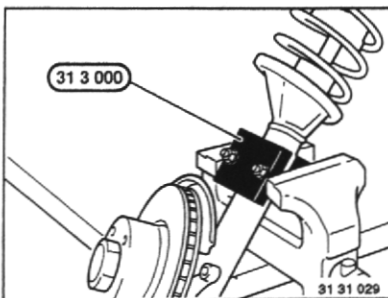
Note:
Shock absorber and spring strut make up a single unit and cannot be replaced separately.

Shock absorbers must be tested either with a shock absorber tester in car or after removal with a shock absorber testing machine, in order to determine whether a shock absorber has to be replaced.

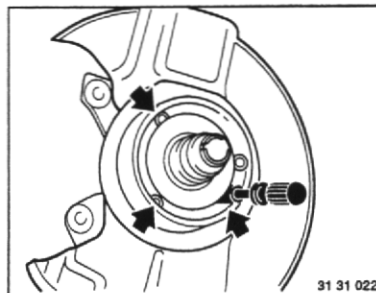
Both shock absorbers on one axle must always be replaced together.



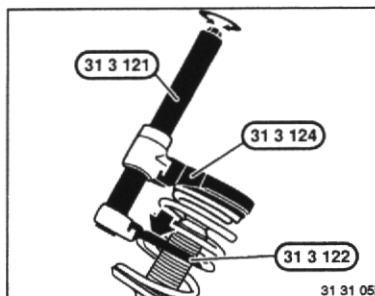
When replacing a shock absorber, it must always be replaced with one having the same paint dot code (K).



Remove spring strut assembly – see 31 31 000.
Clamp spring strut in a vise with Special Tool 31 3 000.

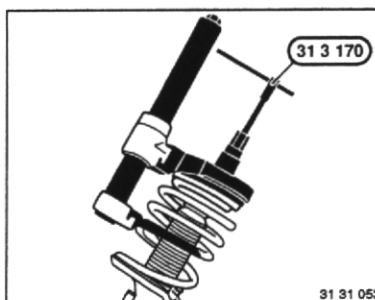


Remove bearings (wheel hub) for front wheel only when the guard is to be re-used – see 31 21 180.



Compress coil spring with Special Tools 31 3 121 / 122 / 124.

Important!
Lowest coil spring winding must bear safely in the special tool and flat on the mount.

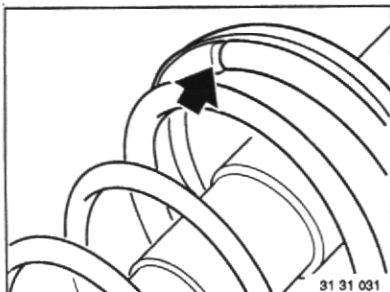


Unscrew self-locking nut with Special Tool 31 3 170 – counterhold on piston rod.

Installation:
Replace self-locking nut.
Tightening torque*.

* See Specifications

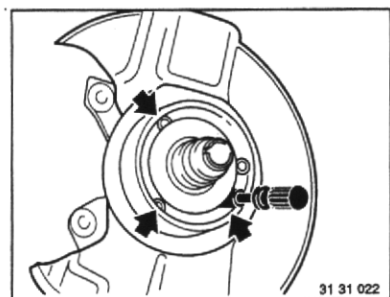
31-31/4



Take coil spring and rubber damper off of the shock absorber.
Install removed parts on new spring strut.

Installation:

Check arrangement on page 31-31/1.
Inspect upper and lower spring rings, dust cover and rubber damper, replacing if necessary.
End of coil spring must bear on shoulder in lower spring retainer.



Install guard and new bearings (wheel hub) for front wheel – see 31 21 180.

Check front wheel alignment after installation.

* See Specifications

31-33/1

31 33 001 REPLACING LEFT OR RIGHT FRONT SPRING STRUT MOUNT

Procedures are identical with those for
replacing spring strut shock absorber –
see 31 31 031.

31 33 100 REMOVING AND INSTALLING OR REPLACING COIL SPRING FOR LEFT OR RIGHT FRONT SPRING STRUT

Procedures are identical with those for
replacing spring strut shock absorber –
see 31 31 031.

Important!

Always install only pairs of coil
springs with the same BMW number
(1) on one axle (number located on
end of spring).

Refer to the Parts Catalog for a cross
reference of springs and vehicle types
as well as special equipment such as,
for example, air conditioner, sport sus-
pension, etc. and introduction dates.



31 33 095 CHECKING AND CORRECTING CAR RIDE LEVEL HEIGHT

- Höhe
gauf-

(Soll-

Grund
hen-

Additional ride level height correction by installing spring rings of different thickness is not possible.

A = Equipment after correction
B = Equipment of delivered car
a = Adjusted higher
b = Adjusted lower

Grafik 31.1
138.028

- **See Specifications**

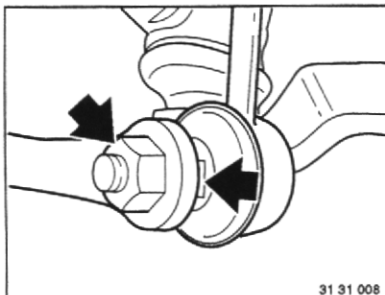
31-33/3

Table for Absorbing Force Control,
850 l:

Explanations – see page 31-33/2.

		A							
b		1 136 536	1 136 538						
		1 136 536	+ 6						
B		1 136 538	- 7						
Grafik 31 1 138 029									

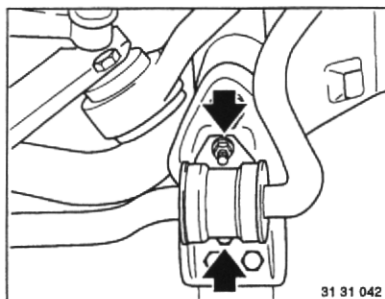
31-35/1



31 35 000 REMOVING AND INSTALLING FRONT STABILIZER

Unscrew left and right thrust struts.

Installation:
Wrench surface on ball pin must be
parallel to the absorber axis.
Replace self-locking nut.
Tightening torque*.



Unscrew left and right nuts.
Take off stabilizer.

* See Specifications

31-90/1

TROUBLESHOOTING FRONT AXLE

Condition	Cause	Correction
Grinding noise (louder in curves)	a) Wheel bearings faulty	a) Replace wheel bearings
Vibration	a) Imbalance of wheels b) Lateral and radial runout of rims c) Radial runout of tires	a) Balance wheels b) Replace rims, if necessary c) Match or replace tires
Steering wheel shake	a) Imbalance of wheels b) Radial and lateral runout of rims c) Shock absorbing effect insufficient d) Thrust strut mounts faulty e) Wrong thrust strut mounts installed f) Steering gear play excessive	a) Balance wheels b) Replace rims, if necessary c) Replace shock absorbers d) Replace thrust strut mounts e) Replace thrust strut mounts f) Adjust pressure point
Rattling noise	a) Shock absorber cartridge in spring strut loose b) Ball joint on control arm worn c) Ball joint on thrust strut worn d) Stabilizer rubber mounts worn e) Ball joints of thrust rod worn f) Front axle carrier mounted loose on body	a) Tighten screw-on ring (inspect threads) b) Replace control arm c) Replace thrust strut d) Replace rubber mounts e) Replace thrust rod f) Tighten (inspect threads)

31-90/2

TROUBLESHOOTING FRONT AXLE

Condition	Cause	Correction
Body swing long time after driving on rough road	Shock absorbing effect insufficient (see "Trouble-shooting Shock Absorbers" on page 31-90/3)	Replace shock absorbers
Body wip when driving over successive rough road surfaces		
Body rise while accelerating		
Wheel jump even on normal road surfaces		
Car breaking out while braking		
Breaking out (skidding) in curves due to poor track holding		

TROUBLESHOOTING SHOCK ABSORBERS

The condition of shock absorbers can only be checked with a shock absorber tester in car or with a shock absorber testing machine after removal.

Condition	Cause	Correction
Shock absorbers knocking (bottoming)	a) Rubber dampers faulty b) Shock absorbing effect insufficient	a) Check or replace rubber dampers b) Replace shock absorbers
Shock absorber noise	a) Shock absorber cartridge loose b) Installed shock absorbers had been stored laying down with piston rods run in c) Shock absorbers faulty	a) Tighten screw-on ring; inspect threads b) Store shock absorbers standing upright with piston rods run out at room temperature for 24 hours c) Replace shock absorbers
Poor handling	a) Weak shock absorbers	a) Replace shock absorbers
Flat spots on tire treads	a) Shock absorbers faulty	a) Replace shock absorbers