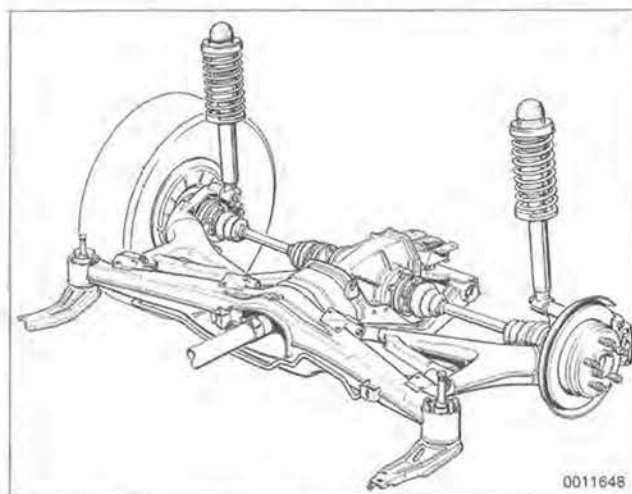


330 Rear Suspension

GENERAL	330-1	DRIVE AXLES	330-11
SHOCK ABSORBERS AND SPRINGS	330-2	Drive axle, removing and installing	330-11
Rear strut assembly, removing and installing (except cars with EDC III)	330-2	CV joint and boot, replacing	330-12
Rear strut assembly, removing and installing (cars with EDC III)	330-4	TRAILING ARMS	330-13
Rear strut, disassembling and assembling	330-6	Trailing arm, removing and installing	330-14
RIDE HEIGHT	330-7	Trailing arm bushings, replacing	330-16
REAR WHEEL BEARINGS	330-8	TABLES	
Rear wheel bearing, replacing	330-8	a. Rear Ride Height Specifications	330-8



GENERAL

For a general description of the rear suspension, see **300 Suspension, Steering and Brakes-General**.

➤ Rear suspension assembly.

Special service tools are required for most of the work described in this repair group. Read the procedures through before beginning any job.

NOTE—

- Service and repair information on the final drive unit can be found in **331 Final Drive**.
- General suspension and steering troubleshooting can be found in **300 Suspension, Steering, and Brakes-General**.

Long wheelbase (iL) models are equipped with a self leveling rear suspension system called LAD (Load Absorption Damping). The hydro-mechanical LAD system uses the power steering system to automatically adjust the rear suspension ride height based on load and driving conditions. The system is in operation whenever the engine is running. For more information on the LAD system see **370 Integrated Suspension Systems**.

GENERAL

WARNING —

- Personal injury may result if procedures described in this repair group are undertaken without the proper service tools and equipment. Be sure to have the right tools on hand before beginning the job.
- Do not install bolts and nuts coated with undercoating wax, as correct tightening torque cannot be assured. Always clean the threads with solvent before installation, or install new parts.
- Do not attempt to weld or straighten any suspension components. Replace damaged parts.
- Do not reuse self-locking nuts. They are designed to be used only once and may fail if reused. Always replace them with new self-locking nuts.

SHOCK ABSORBERS AND SPRINGS

Most strut assembly components are available as replacement parts, although the most commonly replaced parts are the strut cartridges and the coil springs.

NOTE —

- Electronic damping control (EDC III) is installed as an option on some late E32 cars. EDC III cars do not have conventional struts. A separate replacement procedure is given below for these struts. For further information on EDC III, see 370 Integrated Suspension Systems.
- Shock absorber cartridges and springs should always be replaced in pairs.

Rear strut assembly, removing and installing (except cars with EDC III)

Various types of rear strut assemblies are fitted on the cars covered by this manual based on the suspension system installed: Conventional struts, Self levelling LAD struts, and EDC III struts. When replacing the strut assemblies, be sure to identify the suspension system installed.

NOTE —

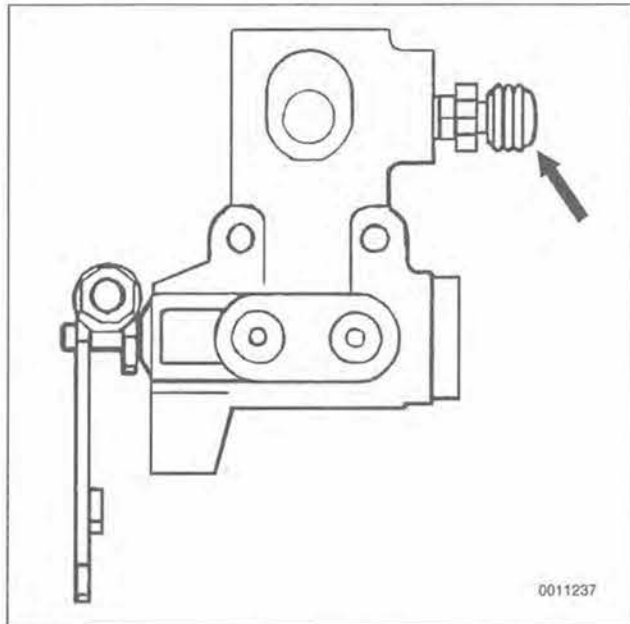
- Most long wheel base models are fitted with LAD struts. This system uses special hydraulic shocks. These struts can be identified by the hydraulic line to the lower section of the strut housing.
- Some late models cars covered by this manual are fitted with an electronic damping control system (EDC III). This suspension system uses special electro-hydraulic shocks at all four corners. These struts can be identified by the wiring leads to the switching solenoids.

- Raise car and remove rear wheel.

WARNING —

Make sure that the car is firmly supported on jack stands designed for the purpose. Place the jack stands beneath a structural chassis point. Do not place jack stands under suspension parts.

REAR SUSPENSION 330-3



- On LAD-equipped car: Place drain pan beneath pressure regulating valve on driver's side of axle subframe. Loosen bleeder screw (**arrow**) and allow hydraulic pressure to discharge.

CAUTION—

Clean the area around the bleeder screw and the hydraulic fittings on the struts before opening the LAD system.

- On LAD-equipped car: Place drain pan beneath strut and remove hydraulic line from lower section of strut.
- Support trailing arm from below.
- Remove rear seat cushion and backrest. See **520 Seats**.



- Peel back rubber strut top cap and remove strut upper mounting nuts (**arrows**).

- Working underneath car, remove lower strut mounting bolt and remove strut assembly.

NOTE—

Store the removed strut assembly upright. Do not allow it to lie horizontally or upside-down for any length of time. If incorrect storage has occurred, place the strut assembly upright with the rod fully extended for at least 24 hours.

- When installing rear strut, make sure all thread bores, bolts, nuts and mating surfaces are clean.
- Install strut assembly into strut tower using a new upper mounting gasket and new self-locking nuts.

Tightening torques

- Strut assembly to strut tower (self-locking nuts) 22 Nm (16 ft-lb)

- Install strut assembly to trailing arm but do not tighten to final torque.
- On LAD-equipped car: Install hydraulic fluid line to strut. Make sure bleeder screw on regulator valve is tightened.

Tightening Torque—with LAD Struts

- Hydraulic fluid line to strut assembly. 14 Nm (10 ft-lb)

330-4 REAR SUSPENSION

- Install road wheel and lower car. Load car to normal loaded position as described later in **Ride Height**. Tighten lower strut mounting bolt.

Tightening Torques

- Strut assembly to trailing arm
(car in normal loaded position) 127 Nm (94 ft-lb)
- Road wheel to hub 100 ± 10 Nm (74 ± 7 ft-lb)

- On LAD-equipped cars: Fill and bleed LAD system as described in **370 Integrated Suspension Systems**.
- The remainder of installation is reverse of removal.

Rear strut assembly, removing and installing (cars with EDC III)

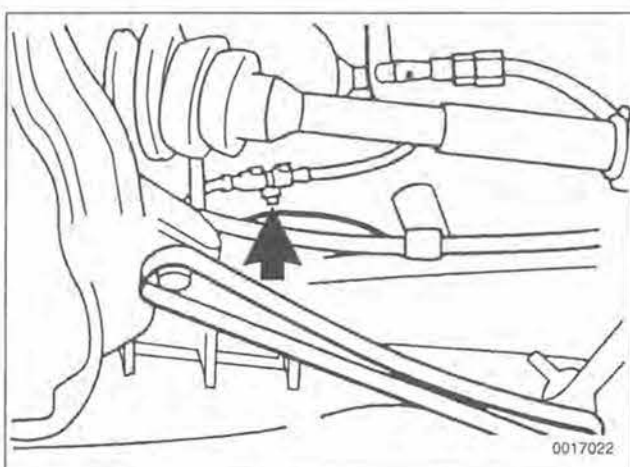
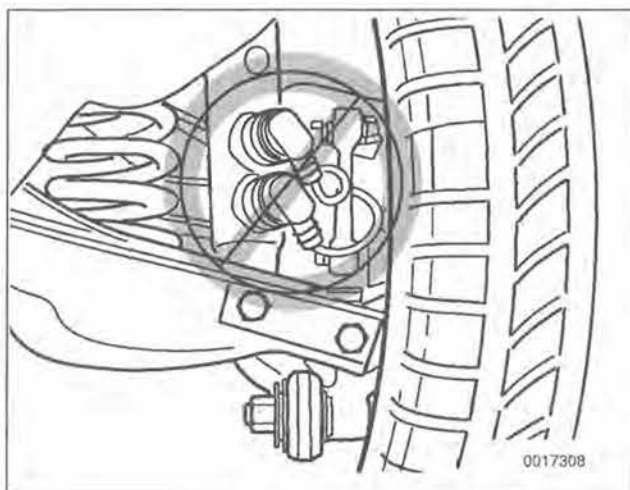
Electronic damping control (EDC III) cars are fitted with special electro-hydraulic shocks. Use care when removing and installing strut assemblies to prevent damaging the solenoid covers on the strut housings.

- Do not remove covers from EDC III solenoid valves on strut housing. If the covers are removed, the struts will be permanently damaged.

Raise car and remove rear wheel.

WARNING—

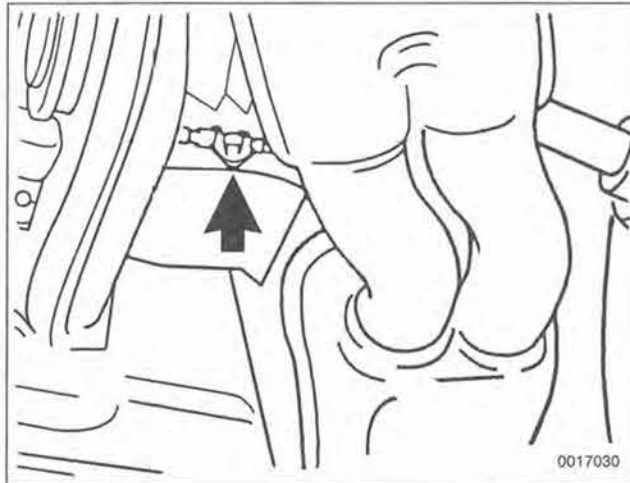
Make sure that the car is firmly supported on jack stands designed for the purpose. Place the jack stands beneath a structural chassis point. Do not place jack stands under suspension parts.



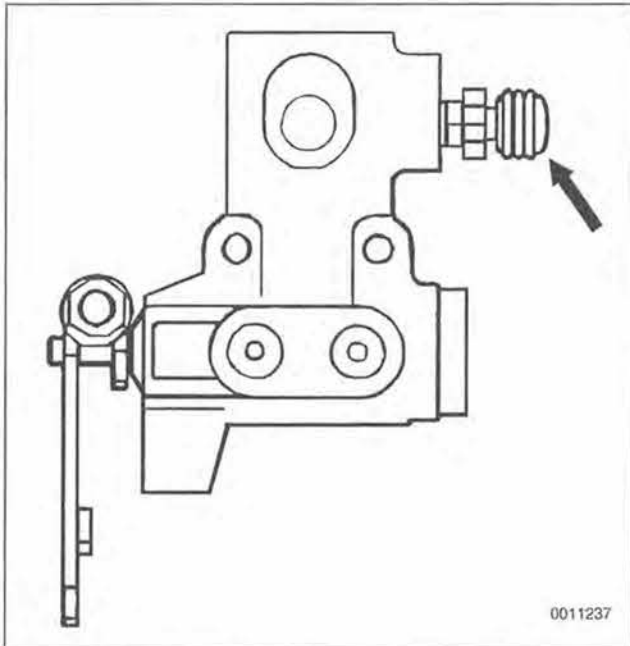
- Right side: Working underneath right rear of car, detach EDC harness connector (arrow).

SHOCK ABSORBERS AND SPRINGS

REAR SUSPENSION 330-5



- Left side: Working underneath left rear of car, detach EDC harness connector (**arrow**) in front of fuel tank.

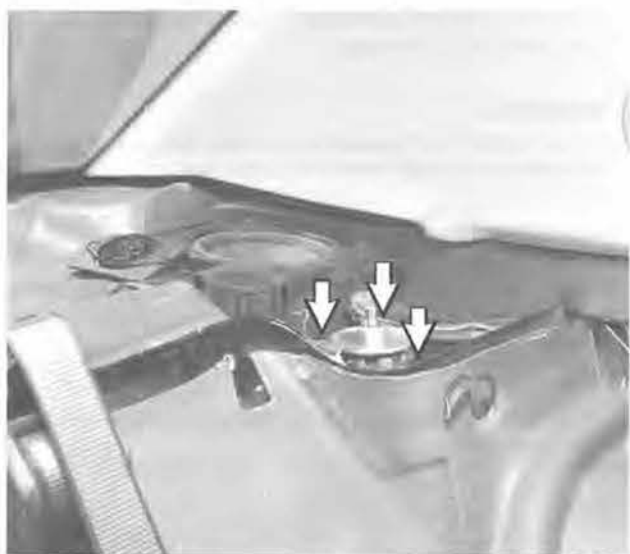


- On LAD-equipped car: Place drain pan beneath pressure regulating valve on driver's side of axle subframe. Loosen bleeder screw (**arrow**) and allow hydraulic pressure to discharge.

CAUTION—

Clean the area around the bleeder screw and the hydraulic fittings on the struts before opening the LAD system.

- On LAD-equipped car: Place drain pan beneath strut and remove hydraulic line from lower section of strut.
- Support trailing arm from below.
- Remove rear seat cushion and backrest. See **520 Seats**.
- Remove rear parcel shelf. See **513 Interior Trim**.



- Peel back rubber strut top cap and remove strut upper mounting nuts (**arrows**).
- Working underneath car, remove lower strut mounting bolt and remove strut assembly.

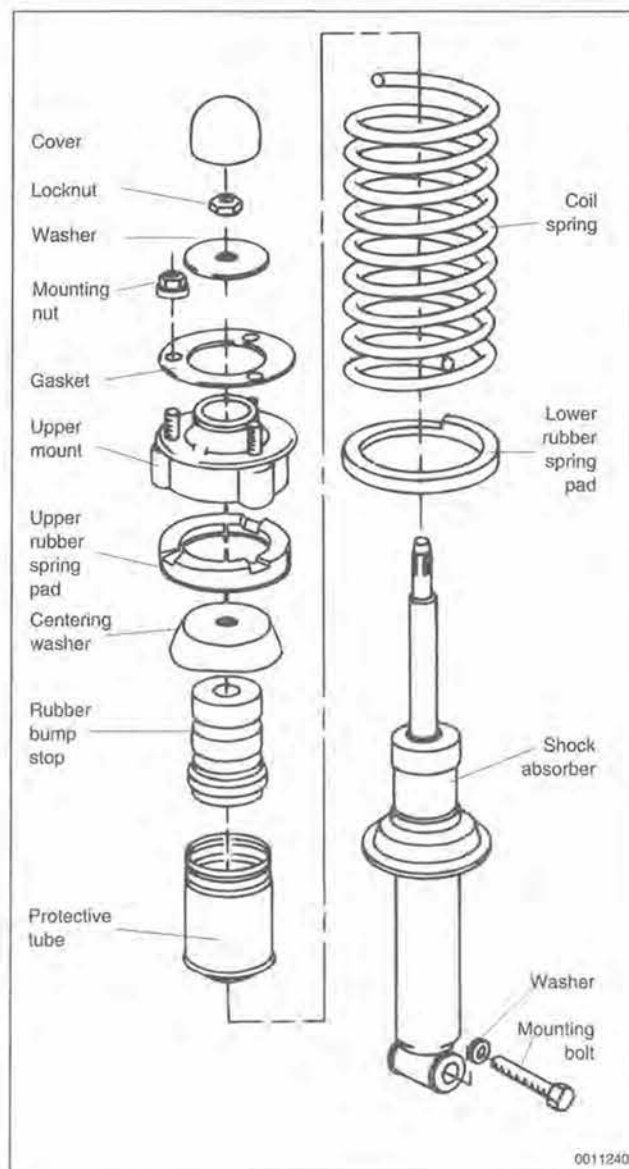
NOTE—

Store the removed strut assembly upright. Do not allow it to lie horizontally or upside-down for any length of time. If incorrect storage has occurred, place the strut assembly upright with the rod fully extended for at least 24 hours.

- When installing strut, make sure all thread bores, bolts, nuts and mating surfaces are clean.
- Install strut assembly into strut tower using a new upper mounting gasket and new self-locking nuts.

SHOCK ABSORBERS AND SPRINGS

330-6 REAR SUSPENSION



SHOCK ABSORBERS AND SPRINGS

Tightening torques

- Strut assembly to strut tower (self-locking nuts) 22 Nm (16 ft-lb)

- Install strut assembly to trailing arm but do not tighten to final torque.
- On LAD-equipped car: Install hydraulic fluid line to strut.

Tightening Torque

- Hydraulic fluid line to strut assembly 14 Nm (10 ft-lb)

- Install road wheel and lower car. Load car to normal loaded position as described later in **Ride Height**. Tighten lower strut mounting bolt.

Tightening Torques

- Strut assembly to trailing arm (car in normal loaded position) 127 Nm (94 ft-lb)
- Road wheel to hub 100±10 Nm (74±7 ft-lb)

- On LAD-equipped car: Fill and bleed LAD system as described in **370 Integrated Suspension Systems**.
- The remainder of installation is reverse of removal.

Rear strut, disassembling and assembling

- Rear strut assembly. (Conventional shock shown, self leveling and EDC III shocks are similar).
- Replacing the upper strut mount, spring and strut cartridge requires that the strut first be disassembled. This procedure requires a spring compressor specifically designed for the purpose.

WARNING—

Do not attempt to disassemble the struts without a spring compressor designed specifically for this job

- Remove strut assembly from car as described earlier.
- Using a spring compressor, compress spring until spring force on upper mount is relieved.

WARNING—

Make sure the spring compressor grabs the spring properly before compressing it.

REAR SUSPENSION 330-7

- Pry protective cap off top of strut assembly, then remove top (center) nut and washer.
- Release spring compressor carefully and evenly, allowing spring to expand slowly.
- Remove spring from shock absorber.

NOTE—

Store the removed shock absorber upright. Do not allow it to lie horizontally or upside-down for any length of time. If incorrect storage has occurred, place the shock absorber upright with the rod fully extended for at least 24 hours.

- Compress spring and install it and related components to shock absorber. Use a new self-locking top (center) nut.

WARNING—

Make sure the self-locking top nut is fully tightened before releasing the spring compressor.

Tightening Torque

- Upper strut mount to shock absorber shaft (self-locking nut) 25 Nm (18 ft-lb)

- Release spring compressor slowly, positioning spring ends in shoulders of spring seats. Install strut assembly as described above.

RIDE HEIGHT

- Rear ride height measurement (A) is taken from center of wheel arch to bottom of wheel rim. Measure ride height with car in normal loaded position on the ground.

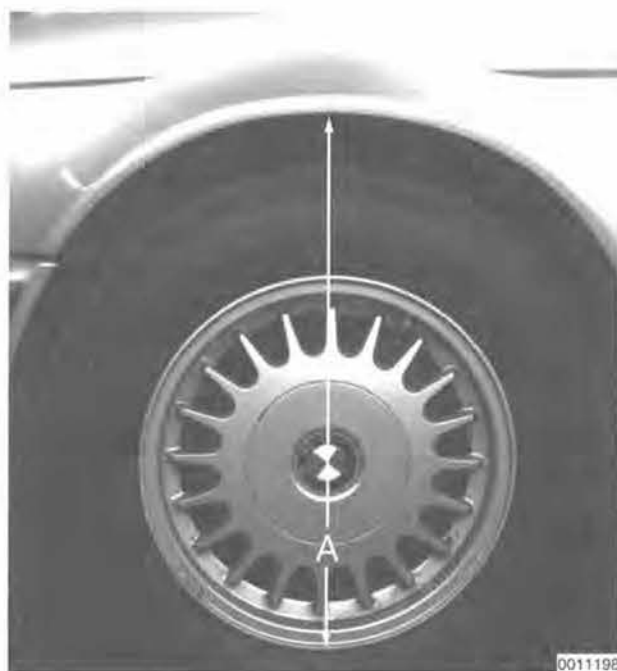
NOTE—

On cars with self levelling rear suspension (iL models), rear ride height is controlled by the LAD level height control system. For information on adjusting rear ride height on LAD-equipped cars, see 370 Integrated Suspension Systems.

Table a lists rear suspension ride height specifications. These specifications apply to a car in a normally loaded position, simulating a load of passengers, luggage and fuel. When checking ride height or installing suspension components that require the car to be "normally loaded," load the car as follows:

Normal loaded position

- Each front seat 68 kg (150 lb)
- Center of rear seat 68 kg (150 lb)
- Trunk 21 kg (46 lb)
- Fuel tank full



RIDE HEIGHT

Table a. Rear Ride Height Specifications

Wheel installed	Rear ride height (A)
15 in. rims	522 ± 10 mm (20.55 ± 0.4 in.)
17 in. rims	550 ± 10 mm (21.65 ± 0.4 in.)
TRX 415 rims	536 ± 10 mm (21.10 ± 0.4 in.)

REAR WHEEL BEARINGS

- Rear wheel bearing assembly.
- The wheel bearing is pressed into the trailing arm and secured with a large circlip. The stub axle is pressed into the bearing and held in place by the drive flange collar nut.
- Special press tools are required to replace the wheel bearings. Read the procedure through before beginning the job.

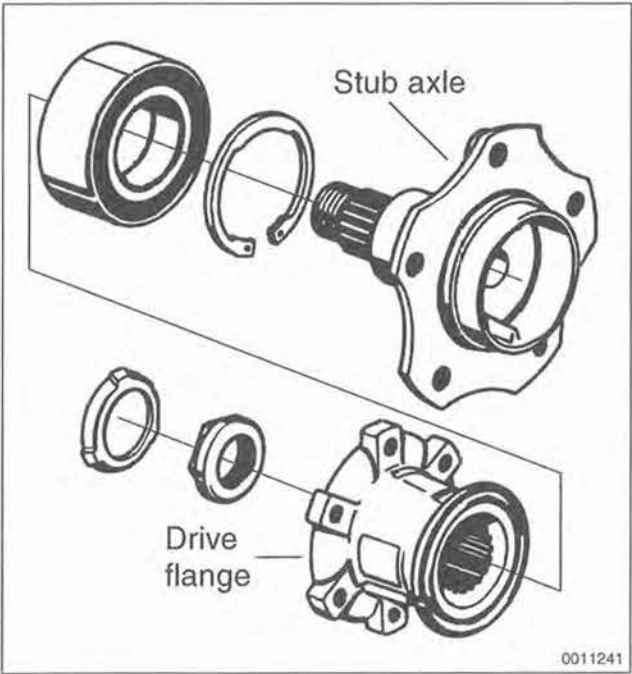
Rear wheel bearing, replacing

- Raise rear of car.

WARNING—

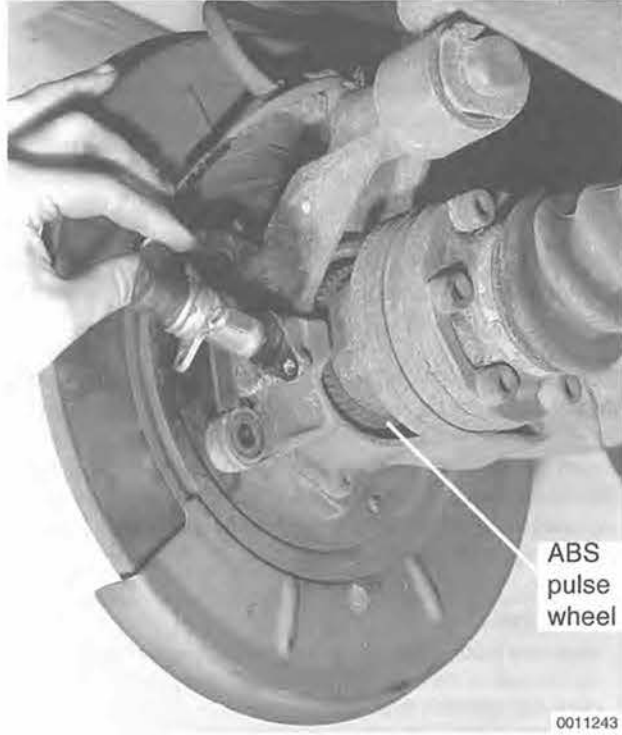
Make sure that the car is firmly supported on jack stands designed for the purpose. Place the jack stands beneath a structural chassis point. Do not place jack stands under suspension parts.

- Remove drive axle outer CV joint from wheel drive flange as described below under **Drive Axles**. Support drive axle from chassis with wire.
- Pry lockplate off drive flange collar nut.
- Lower car to ground. Apply parking brake to prevent wheel from turning. Loosen, but do not remove drive flange collar nut.
 - Raise car and remove wheel.
 - Remove brake caliper assembly and rotor as described in **340 Brakes**. Leave brake hose connected to caliper. Suspend caliper assembly from chassis with wire.

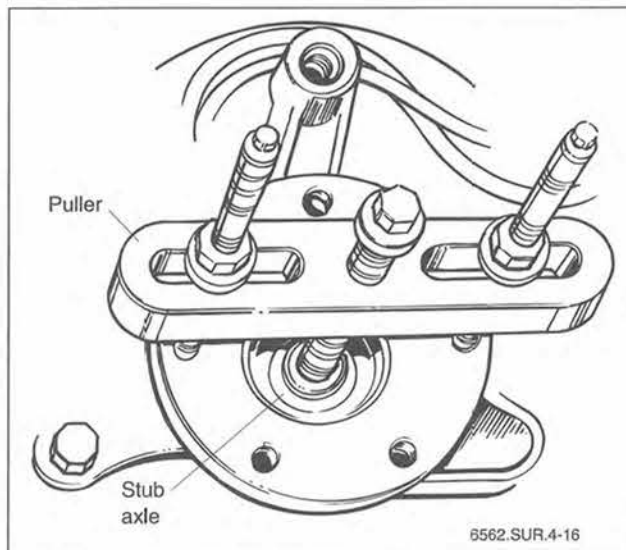


REAR WHEEL BEARINGS

REAR SUSPENSION 330-9



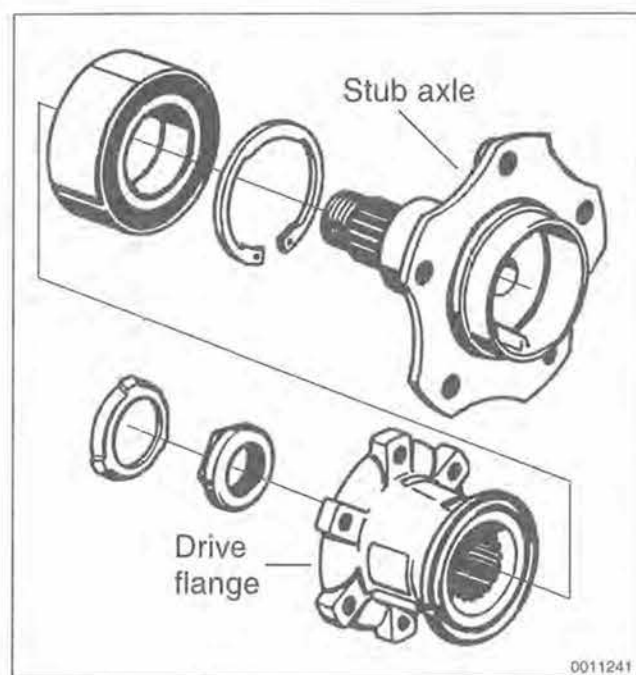
➤ Remove ABS pulse sensor from trailer arm.



➤ Remove drive flange collar nut and remove flange using a puller if necessary.

REAR WHEEL BEARINGS

330-10 REAR SUSPENSION



- Remove large circlip from trailing arm bearing housing.
- With drive flange removed, thread drive flange collar nut back onto stub axle until it is flush with end of axle. Using a soft-faced hammer, tap stub axle out of bearing.
- If necessary, use a puller to remove bearing inner race from stub axle.
- Remove bearing from trailing arm using a puller. (BMW special tool nos. 33 4 031, 33 4 033, and 33 4 038 or equivalents).
- Clean trailing arm bearing housing thoroughly. Make sure all thread bores, bolts, nuts and mating surfaces are clean.
- Install new wheel bearing into trailing arm using a press (BMW special tool nos. 33 4 030, 33 4 036, and 33 4 037 or equivalents). Apply force only to outer race when pressing in bearing. Install a new circlip.

CAUTION—

Make sure that the bearing is pressed in far enough to contact the shoulder at the back side of the housing and that the circlip is fully seated in its groove.

- Draw stub axle into bearing using a puller (BMW special tool nos. 33 4 080, and 33 4 020 or equivalents). Support bearing inner race when installing stub axle.

NOTE—

BMW specifies special tools to pull the stub axle through the wheel bearing into position. If using alternative tools to install the axle, be sure to support the bearing inner race when pressing or pulling the axle into place.

- Reinstall drive flange.
- Lightly oil the bearing surface of drive flange collar nut and install it to drive flange. Tighten collar nut firmly, but do not fully tighten it at this time.

WARNING—

For safety reasons, the axle collar nut should only be tightened to its final torque with the wheel installed and the car lowered to the ground. However, loading the bearing without the nut tightened sufficiently may damage the bearing.

- Install brake rotor and caliper as described in **340 Brakes**. Install ABS sensor. Install road wheel.

Tightening Torques

- Brake rotor to drive flange 16 Nm (12 ft-lb)
- Brake caliper to trailing arm 67 Nm (50 ft-lb)

REAR SUSPENSION 330-11

- Lower car to ground. Apply parking brake to prevent wheel from turning. Tighten drive flange collar nut to its final torque.

Tightening Torque

- Drive flange collar nut to wheel hub axle 250 Nm (184 ft-lb)

- Install a new lock plate over drive flange collar nut.
- Install drive axle as described later.

DRIVE AXLES

The drive axles use constant-velocity (CV) joints on both ends. The CV joints and associated components are the same on both ends of the drive axle. To replace a CV joint or dust boot, the drive axle must be removed from the car.

Drive axle, removing and installing

- Raise rear of car.

WARNING—

Make sure that the car is firmly supported on jack stands designed for the purpose. Place the jack stands beneath a structural chassis point. Do not place jack stands under suspension parts.

- Remove drive axle CV joint bolts from both ends of drive axle and remove drive axle from car.
- Installation is reverse of removal. Make sure all thread bores, bolts and mating surfaces are clean. Make sure lock-plate is reinstalled.

Tightening Torque

- Drive axle to differential and drive flange
Standard M10 bolt 83 Nm (61 ft-lb)
Lock-tooth M10 bolt 100 Nm (74 ft-lb)



0011245

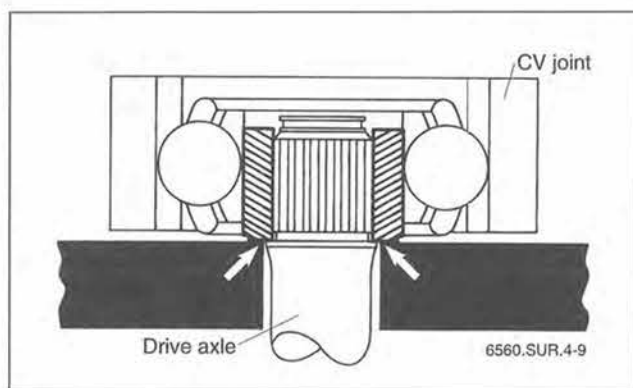
DRIVE AXLES

CV joint and boot, replacing

- Remove drive axle from car as described above.
- Remove boot clamping bands and cut old boot off joint and shaft.
- Lift off outer dust cover from joint and remove circlip (arrow) retaining joint inner hub to shaft.



0011246



- While supporting inner hub (arrows) press drive out of joint.
- Clean all old lubricant off shaft splines and joint's inner splines.

NOTE —

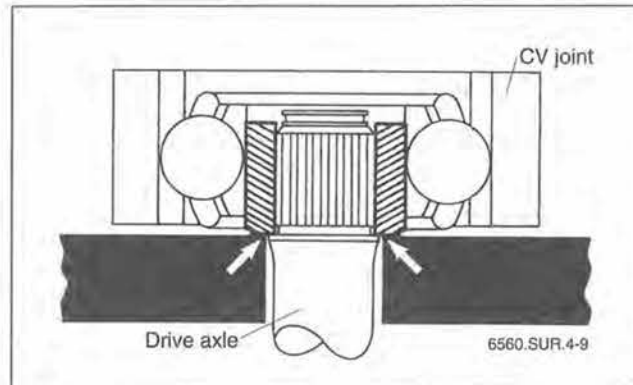
To inspect a CV joint, clean away the grease and look for galling, pitting and other signs of wear or damage. Polished interior surfaces or visible ball tracks alone are not necessarily cause for replacement. Discoloration due to overheating indicates lack of lubrication. A joint that is otherwise in good condition may be reinstalled if thoroughly cleaned and repacked with new grease. Before reinstalling the joint to the shaft, inspect the drive axle and the splines for wear or damage.

- Place small clamping band, boot and inner joint cover over drive axle.

NOTE —

When replacing the CV joint boot, use a complete CV joint boot repair kit. The kit will include a new boot, clamps, special lubricant, and a new inner CV joint circlip. The kit is available from an authorized BMW dealer parts department.

REAR SUSPENSION 330-13



- Apply Loctite®270 or an equivalent heavy-duty locking compound to drive axle splines. Position new CV joint on shaft so that hub with raised or taller side (**arrows**) is facing shaft.

WARNING—

Do not let the locking compound contact the balls in the joint. Apply only a thin coat to cover the splines.

- Press shaft into joint while supporting inner hub of joint. Install new circlip.

NOTE—

Do not let the ball hub pivot more than 20° in the outer ring of the joint. The balls will fall out if the hub is pivoted too far.

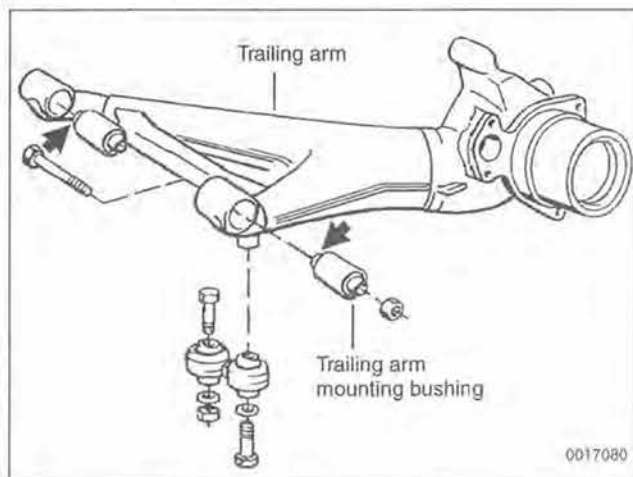
- Pack each CV joint and rubber boot with specified amount of lubricant supplied in boot kit. Apply adhesive to large end of boot and mount it on joint. Secure boot with clamps. Then apply sealer to joint end cover(s) and install them.

NOTE—

BMW recommends Bostik®1513 or Epple®4851 adhesive, and Epple®39 or Curil®T sealer.

CV Joint Lubricant Capacity

- Each joint 80 gm (2.8 oz.)



TRAILING ARMS

- The trailing arms and their mounting bushings control the position of the rear wheels. A damaged trailing arm or worn bushings will change the rear wheel alignment and may adversely affect handling and stability.

WARNING—

Do not attempt to straighten a damaged trailing arm. Bending or heating may weaken the original part.

The rear brake lines must be disconnected to remove a trailing arm. This means the complete brake system must be bled as part of the installation procedure.

NOTE—

- When installing trailing arm bushings, make sure longer section of inner sleeve (**arrows**) faces center of car.
- On cars with Automatic Stability Control+Traction (ASC+T), a special procedure is needed to properly bleed the brakes. See **340 Brakes** for additional information before opening the brake hydraulic system.

330-14 REAR SUSPENSION



Trailing arm, removing and installing

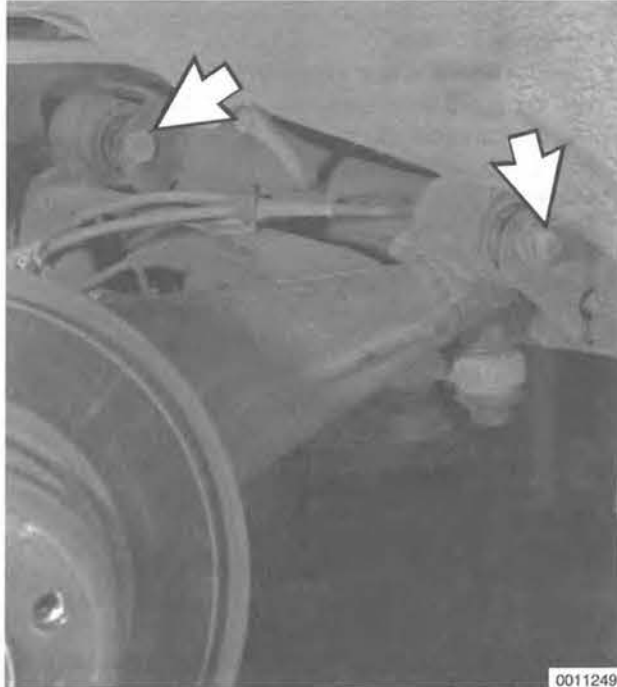
- Raise rear of car and remove wheel.

WARNING—

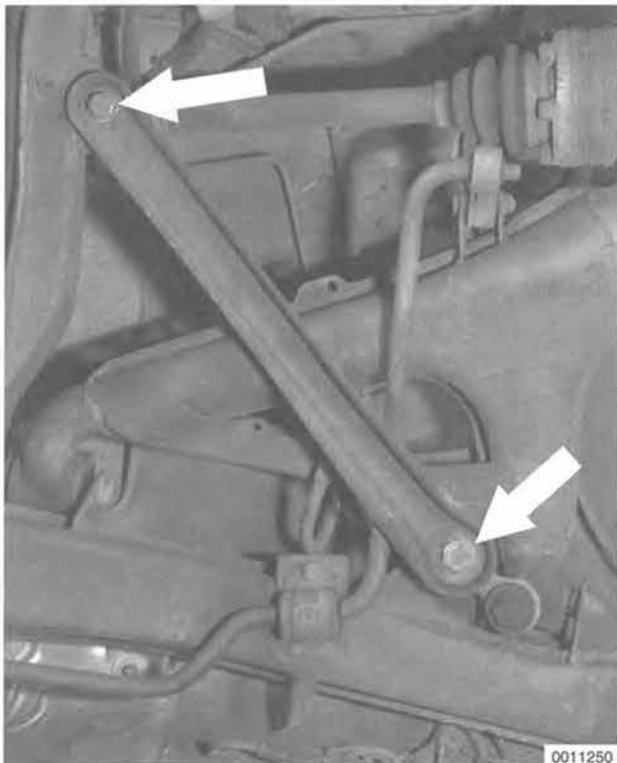
Make sure that the car is firmly supported on jack stands designed for the purpose. Place the jack stands beneath a structural chassis point. Do not place jack stands under suspension parts.

- Remove outer CV joint from drive flange as described above.
- Disconnect rear brake line at union (**arrow**) on top of trailing arm. Drain brake fluid or plug line.
- Remove brake caliper and brake rotor. See **340 Brakes**. Disconnect parking brake cable from parking brake actuator. Unclip parking brake cable from trailing arm.
- Remove ABS pulse sensor from brake caliper and unclip sensor's wiring from trailing arm.
- If removing right trailing arm, separate brake pad wear sensor connector.
- Disconnect stabilizer bar link from trailing arm.
- Trailing arm connecting link (**arrow**).
 - Remove connecting link mounting bolt from trailing arm.
- Disconnect rear strut lower mounting bolt. Pull strut away from trailing arm.

REAR SUSPENSION 330-15



- Remove two trailing arm through-bolts (**arrows**) and nuts and remove trailing arm from car.



- If removing right side trailing arm, unbolt diagonal support arm from connecting link (**arrows**), then loosen other end of arm and swing it aside.

— Installation is reverse of removal.

- Always use new self-locking nuts.
- When installing trailing arm mounting bolts, install inner bolt first. Tighten mounting bolts to final tightening torque with car on ground and loaded as specified under **Ride Height**.
- Bleed brake system as described in **340 Brakes**.
- If trailing arm is being replaced, transfer attached brake system components to new arm as described in **340 Brakes** and install a new wheel bearing as described earlier under **Rear Wheel Bearings**.

NOTE—

BMW-supplied replacement trailing arms come with the bushings installed. A new wheel bearing will have to be installed.

Tightening Torques

- Connecting link to rear axle subframe
(car in normal loaded position) 127 Nm (94 ft-lb)
- Diagonal support arm to
rear axle subframe 110 Nm (81 ft-lb)
- Drive axle to wheel drive flange
Standard M10 bolt 83 Nm (61 ft-lb)
Lock-tooth M10 bolt 100 Nm (74 ft-lb)
- Rear strut to trailing arm
(car in normal loaded position) 127 Nm (94 ft-lb)
- Road wheel to wheel hub . . . 100±10 Nm (74±7 ft-lb)
- Trailing arm to rear axle subframe
(car in normal loaded position)
M12 bolts (except 10.9) 67 Nm (50 ft-lb)
10.9 bolts 77 Nm (57 ft-lb)

Trailing arm bushings, replacing**NOTE —**

Special offset (eccentric) trailing arm bushings are available from BMW to correct for slight out-of-tolerance rear toe-in settings. See an authorized BMW dealer for additional parts information.

- Remove trailing arm as described earlier.
- Note installed position of bushings, then press them out of trailing arm.
- Press new bushings in so that longer end of inner sleeve faces center of car (when trailing arm is installed).
- Install trailing arm as described above.

