

330 Rear Suspension

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GENERAL

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

NOTE —

A general description of the rear suspension and a troubleshooting guide can be found in **300 Suspension, Steering and Brakes—General**.

RIDE HEIGHT

Rear suspension ride height is controlled by the rear springs. If the rear ride height is not within the specifications listed, the rear springs should be replaced.

Ride height is measured from the lower edge of the wheel arch to the bottom edge of the wheel rim. See Fig. 1.

Table a lists rear suspension ride height specifications. These specifications apply to a car in a normally loaded position. When checking ride height or installing suspension components, load the car as follows:

Normal loaded position

- Each front seat 68 kg (150 lb)
- Rear seat (center) 68 kg (150 lb)
- Trunk 21 kg (46 lb)
- Fuel tank full

NOTE —

M3 ride height is measured with the car unladen.

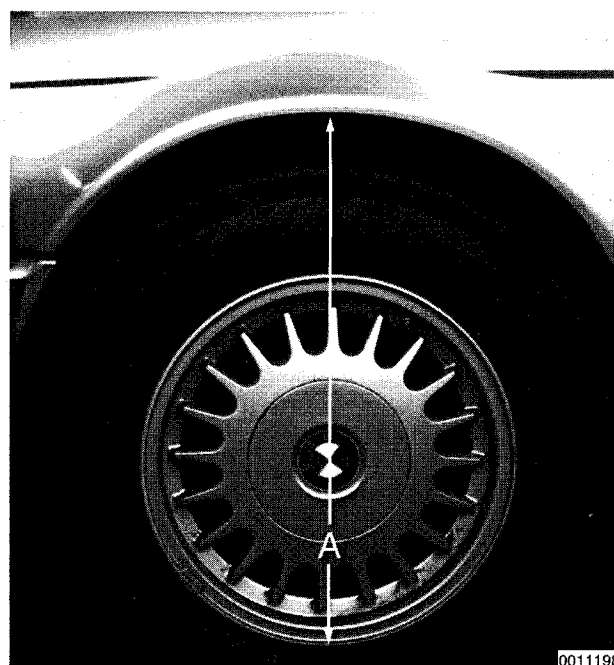


Fig. 1. Ride height measurement (A) is taken from center of wheel arch to bottom of wheel rim.

Table a. Rear Ride Height Specifications

Wheel size	318, 323, 325, 328 models	M3 models
15 inch		
std. suspension	518 mm (20.39 in)	
sport suspension	507 mm (19.96 in)	
16 inch		
std. suspension	531 mm (20.91 in)	
sport suspension	520 mm (20.47 in)	

Continued

RIDE HEIGHT

Table a. Rear Ride Height Specifications

Wheel size	318, 323, 325, 328 models	M3 models
17 inch std. suspension sport suspension	546 mm (21.69 in) 535 mm (21.06 in)	540 mm (21.26 in)
Maximum variation between sides: 10 mm (0.4 in) Maximum deviation from specifications: 10 mm (0.4 in)		

WARNING —

- Do not reuse self-locking nuts. They are designed to be used only once and may fail if re-used. Always replace them with new self-locking nuts.
- Personal injury may result if procedures described here 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.

SHOCK ABSORBERS AND SPRINGS

The BMW E36 independent rear suspension is shown in Fig. 2. Refer to this illustration while performing repairs on components covered in this repair group.

NOTE —

Shock absorbers and/or springs should always be replaced in pairs

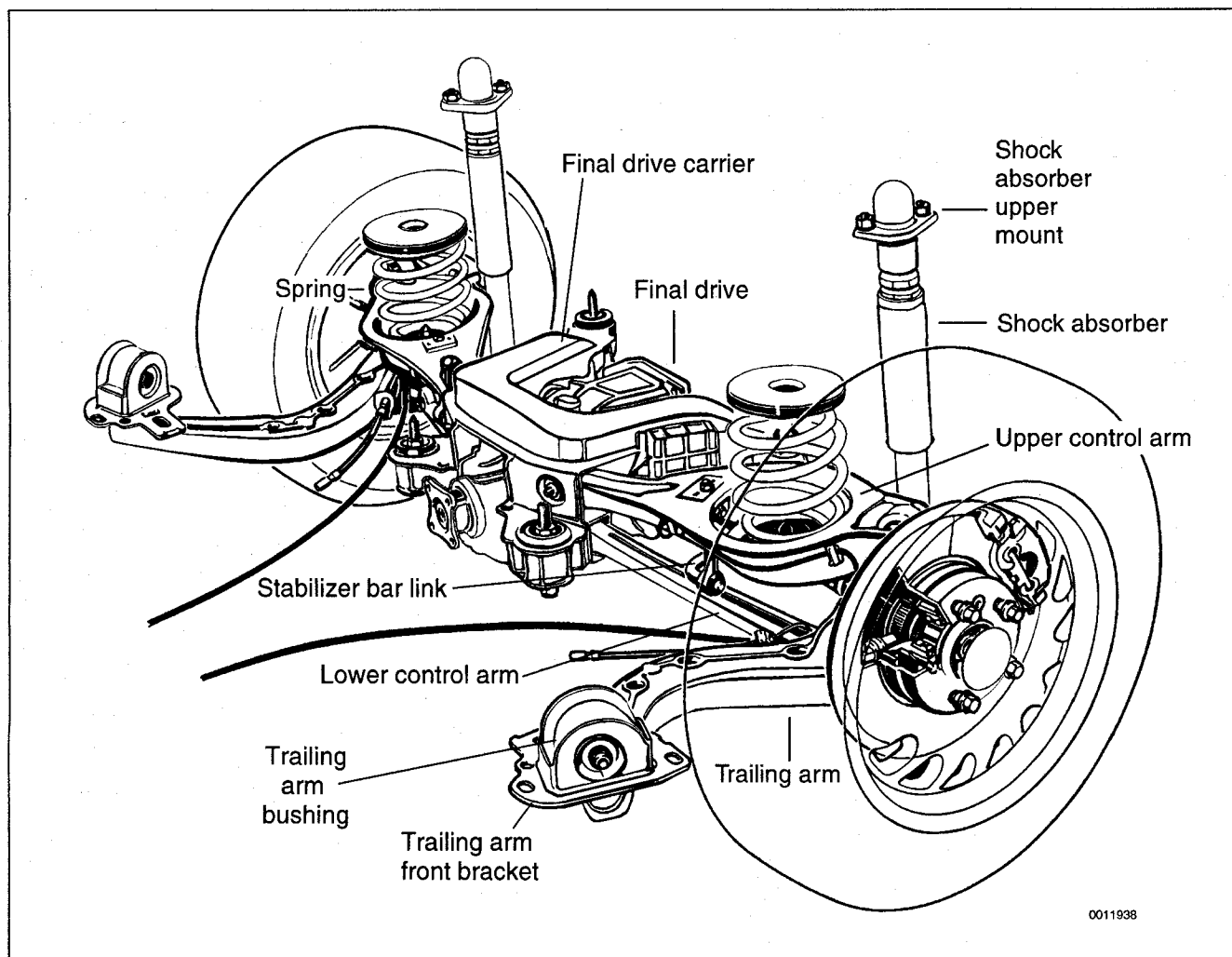


Fig. 2. BMW E36 rear suspension.

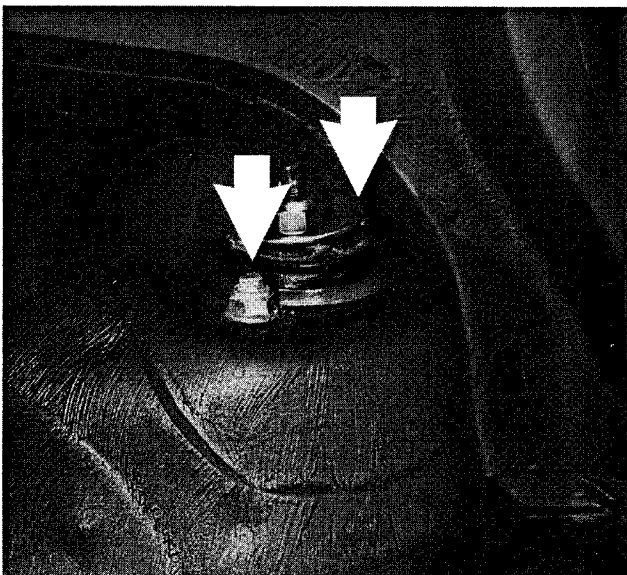
Rear shock absorber, removing and installing

1. Raise car and remove rear wheels.

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.

2. Remove rear speakers. See 650 Radio.
3. Pry out luggage compartment liner retaining clips and peel back liner to gain access to upper shock absorber mounting nuts. See Fig. 3.



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Fig. 3. Rear shock upper mounting nuts (arrows) in luggage compartment. Liner has been peeled back.

NOTE —

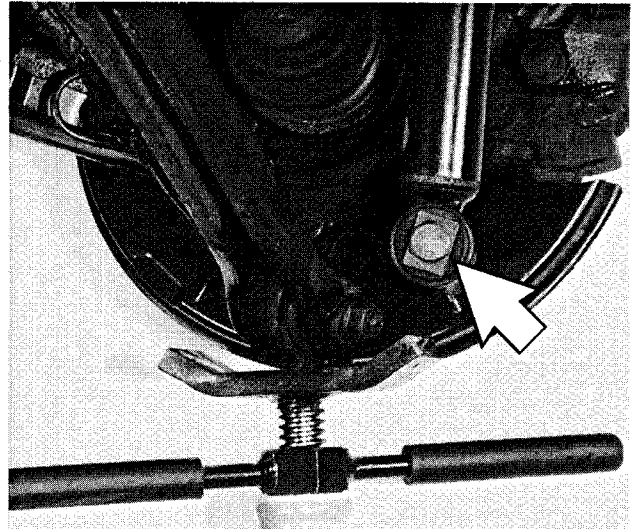
On convertible models, the upper shock absorber mount is in the convertible top compartment behind the rear seat.

4. Support trailing arm from below using a transmission jack or equivalent. See Fig. 4. Remove shock absorber upper mounting nuts.

CAUTION —

The shock absorber prevents the drive axle and trailing arm from drooping too far, so always support the trailing arm before removing the shock. Damage to drive axle CV joints can result.

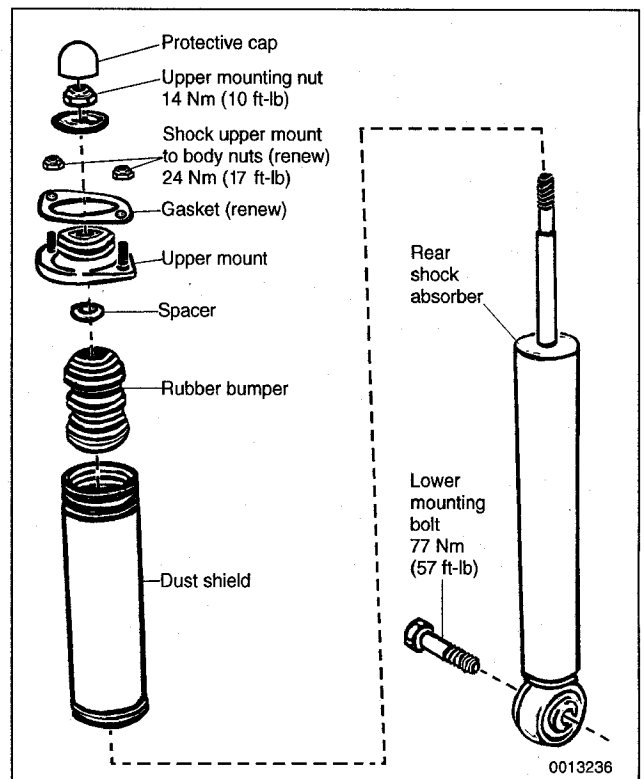
5. While supporting shock absorber, carefully remove lower mounting bolt. Lower shock absorber out of wheel well.



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Fig. 4. Support rear trailing arm from below before removing upper or lower (arrow) shock mounting.

6. Transfer shock top mounting plate, dust cover and related components to new shock absorber. See Fig. 5.



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Fig. 5. Rear shock absorber assembly.

330-4 REAR SUSPENSION

7. Installation is reverse of removal, noting the following:
 - Make sure all threaded bolts, nuts and mating surfaces are clean.
 - Install shock absorber into shock tower using a new upper mounting gasket and new self-locking nuts.
 - Tighten lower bolt to its final torque once car is on ground.

Tightening Torques

- Road wheel to hub 100 ± 10 Nm (74 ± 7 ft-lb)
- Shock absorber to trailing arm (car in normal loaded position) 77 Nm (57 ft-lb)
- Shock absorber to upper mount 14 Nm (10 ft-lb)
- Shock absorber upper mount to body (M8 self-locking nuts) 24 Nm (17 ft-lb)

Coil spring, removing and installing

WARNING —

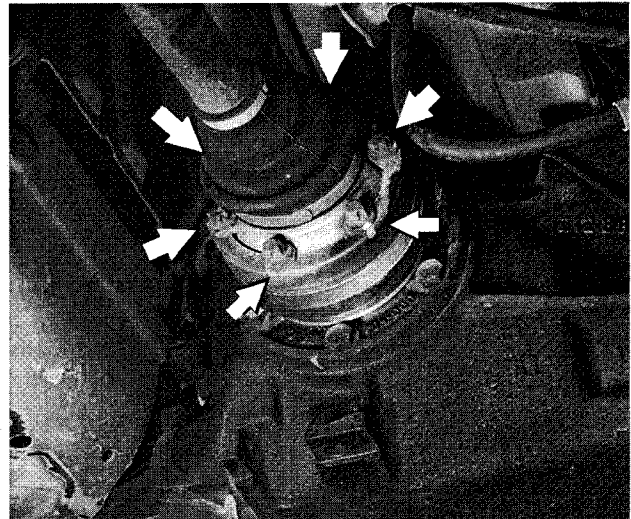
- The coil spring is under compressive force and is extremely dangerous until compression is removed.
- It is recommended that a restraining chain be installed between the bottom of the coil spring and the upper control arm to retain the spring in case of accidental release. Personal injury can result if the compressed coil spring is not released slowly and carefully.
- 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.

1. Raise car and remove rear wheel.
2. Support suspension arm from below using a transmission jack or equivalent.
3. Remove drive axle from final drive. See Fig. 6. Suspend drive axle from chassis using stiff wire.
4. Disconnect shock absorber from trailing arm.
5. Lower suspension slowly and carefully until the compressed coil spring is fully unloaded.

CAUTION —

The shock absorber prevents the drive axle and trailing arm from drooping too far, so always support the trailing arm before removing the shock. Damage to drive axle CV joints can result.

6. Remove restraining chain and remove coil spring.



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Fig. 6. Drive axle to final drive mounting bolts (arrows).

7. If spring is to be reused, carefully inspect it for any surface damage or corrosion. Inspect spring mounts for any signs of damage. Replace any parts showing evidence of wear or damage.
8. Fit coil spring to spring mounts and install restraining chain.
9. Slowly lift suspension back into position, making sure coil spring is correctly seated in upper and lower coil spring mounts.
10. When suspension has been lifted sufficiently, install shock absorber to trailing arm. Remove restraining chain.
11. The remainder of installation is reverse of removal.

Tightening Torques

- Drive axle to final drive flange
 - M8 Torx bolt 64 Nm (47 ft-lb)
 - M10 Torx bolt 83 Nm (62 ft-lb)
- Road wheel to hub 100 ± 10 Nm (74 ± 7 ft-lb)
- Shock absorber to trailing arm 77 Nm (57 ft-lb)

REAR WHEEL BEARINGS

The rear wheel bearing is a unitized assembly and is not repairable separately. See Fig. 7.

Special press tools, to be used with the trailing arm attached to the car, are required to replace the wheel bearings. Read the procedure through before beginning the job.

REAR WHEEL BEARINGS

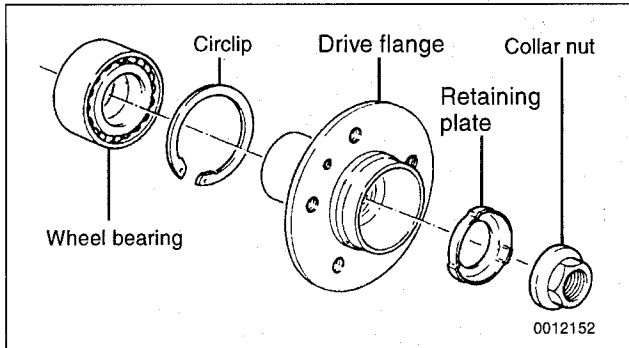


Fig. 7. Rear wheel bearing assembly.

Rear wheel bearing, replacing

1. Raise car and support safely. Remove rear wheel.
2. Remove drive axle as described later.
3. Remove brake caliper assembly and rotor as described in **340 Brakes**. Leave brake hose connected to caliper. Suspend caliper assembly from chassis using stiff wire.
4. Remove ABS pulse sensor. See Fig. 8.

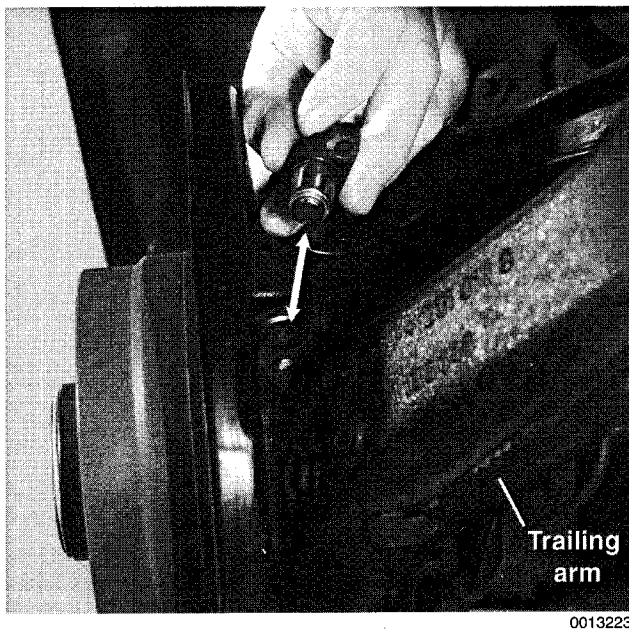


Fig. 8. ABS pulse sensor being removed.

5. Remove drive flange from bearing assembly. See Fig. 9.

NOTE —

If the inner bearing race remains attached to the drive flange, use BMW special tool nos. 00 7 500 and 33 1 312 or equivalents to separate inner race from flange.

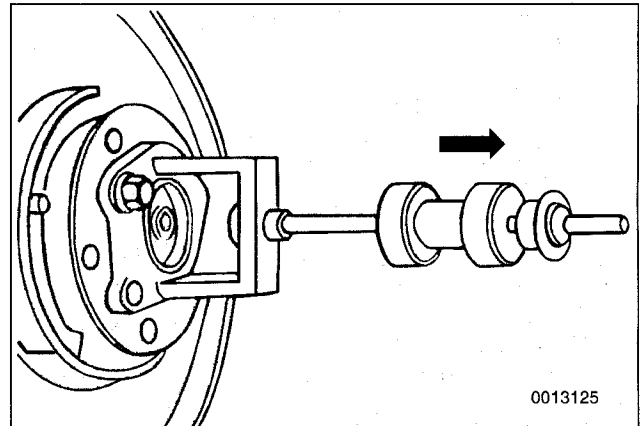


Fig. 9. Drive flange being removed from bearing assembly using impact style puller.

6. Remove bearing retainer circlip from trailing arm.
7. Using appropriate press tools, pull bearing assembly out of trailing arm bearing housing.
8. Inspect bearing housing for any damage or contamination. Clean housing bore thoroughly before installing new bearing. Make sure all thread bores, bolts, nuts and mating surfaces are clean.
9. Install new bearing assembly using press tools. Apply force only to outer race when installing bearing.

WARNING —

M3 installation: red sealing ring on rear wheel bearing must face outward. Otherwise ABS will not function.

10. Install new circlip. The old circlip should never be re-used.

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.

11. Draw drive flange into bearing using appropriate press tools. Support bearing inner race when pressing in drive flange.

NOTE —

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

330-6 REAR SUSPENSION

12. Install brake caliper assembly and rotor as described in **340 Brakes**.
13. Install drive axle as described below.

Tightening Torques

- Brake rotor to drive flange 16 Nm (12 ft-lb)
- Brake caliper to trailing arm 67 Nm (50 ft-lb)
- Drive axle collar nut to drive flange 250 Nm (184 ft-lb)
- M3 300 Nm (221 ft-lb)
- Road wheel to hub 100 ± 10 Nm (74 ± 7 ft-lb)

DRIVE AXLES

The drive axles use constant-velocity (CV) joints on both ends. To replace a CV joint or dust boot, the drive axle must be removed from the car. The components of the drive axle are illustrated in Fig. 10.

Drive axle, removing and installing

1. Raise rear of car. 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.

2. Pry off dust cap from center of wheel hub.
3. Remount wheel and lug bolts.
4. Lower car to ground. With an assistant applying brakes, loosen collar nut. Do not remove completely. See Fig. 11.

The drive flange collar nut is tightened to a torque of 250 Nm (184 ft-lb). Make sure the car is firmly on the ground.

5. Raise car and remove wheel.
6. Remove brake caliper assembly and rotor as described in **340 Brakes**. Leave brake hose connected to caliper. Suspend caliper assembly from chassis using stiff wire.
7. Remove drive axle from drive flange. See Fig. 12. Suspend drive axle from chassis using stiff wire.

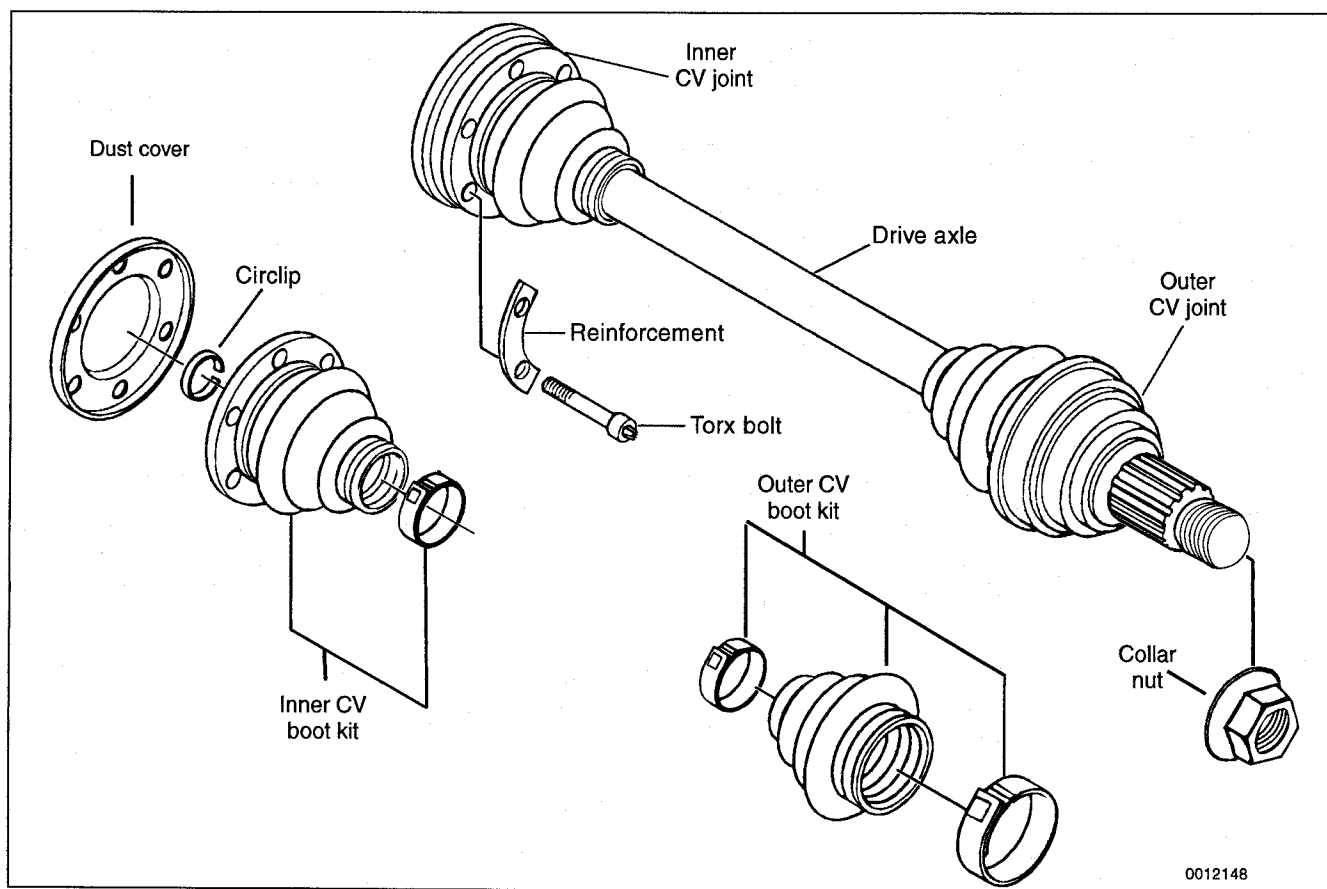


Fig. 10. Drive axle assembly.

DRIVE AXLES

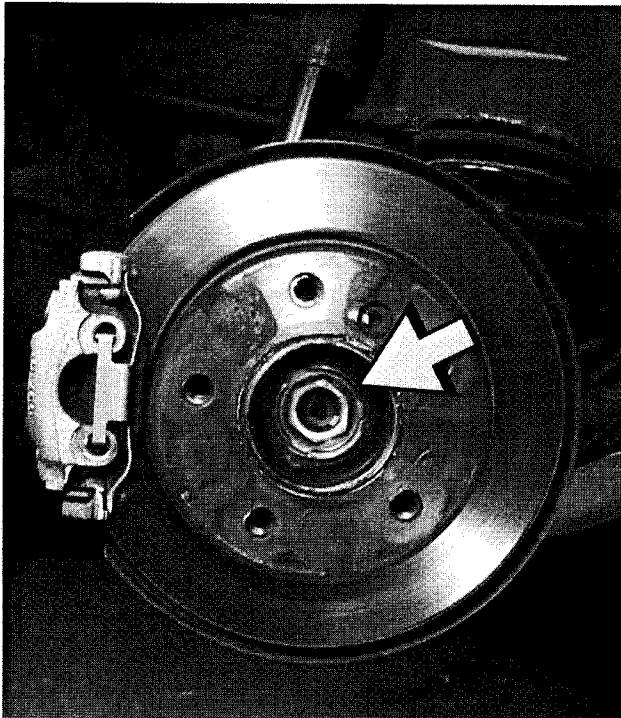


Fig. 11. Drive flange collar nut (arrow).

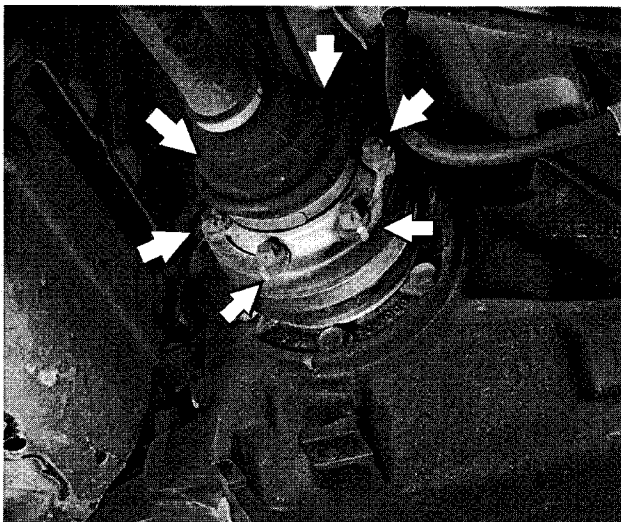


Fig. 12. Drive axle to final drive mounting bolts (arrows).

8. Support trailing arm from below, using a transmission jack or equivalent. Remove shock absorber to trailing arm bolt.

WARNING —

It is recommended that a restraining chain be installed between the bottom coil of the coil spring and the upper control arm to retain the spring in case of accidental release. Personal injury can result if the compressed coil spring is not released slowly and carefully.

9. Lower trailing arm sufficiently to gain clearance for removing drive axle. If necessary, use an appropriate puller to remove drive axle from wheel bearing housing. See Fig. 13.

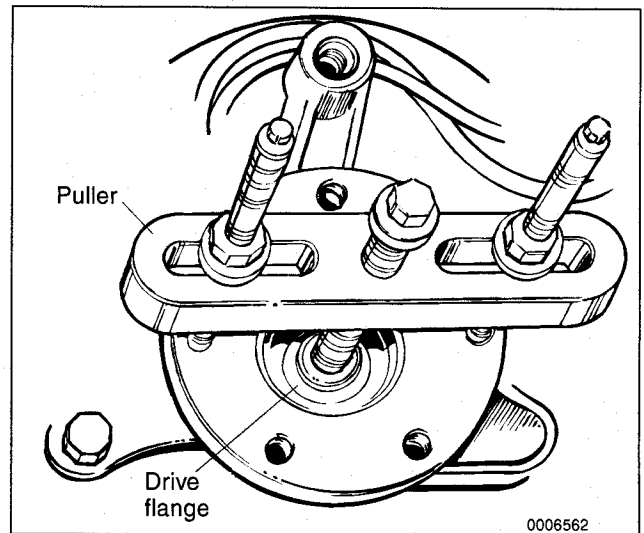


Fig. 13. Press drive axle from wheel bearing housing using puller.

10. Installation is reverse of removal.

- Apply a light coating of oil to contact face of collar nut, and install it loosely.
- Install road wheel and lower car to ground.
- With an assistant applying brakes, tighten drive axle collar nut to its final torque.
- Install a new collar nut retaining plate.

Tightening Torques

- Brake caliper to trailing arm 67 Nm (50 ft-lb)
- Brake rotor to drive flange 16 Nm (12 ft-lb)
- Drive axle collar nut to drive flange 250 Nm (184 ft-lb)
- M3 300 Nm (221 ft-lb)
- Drive axle to final drive unit mounting flange
- M8 Torx bolt 64 Nm (47 ft-lb)
- M10 Torx bolt 100 Nm (74 ft-lb)
- Road wheel to hub 100 ± 10 Nm (74 ± 7 ft-lb)
- Shock absorber to trailing arm 77 Nm (57 ft-lb)

CV boot, replacing

NOTE —

- The outer CV joint cannot be removed from the axle shaft. In order to replace the outer CV boot, it is necessary to remove the inner joint and boot first.
- If the CV joints are worn or defective, a complete rebuilt axle shaft is available from an authorized BMW dealer parts department.

1. Remove drive axle from car as described above.
2. Remove inner and outer CV boot clamping bands and cut old boots off joints and shaft. Clean grease from joints.
3. Lift off dust cover from inner CV joint and remove circlip retaining joint inner hub to axle shaft. See Fig. 14.

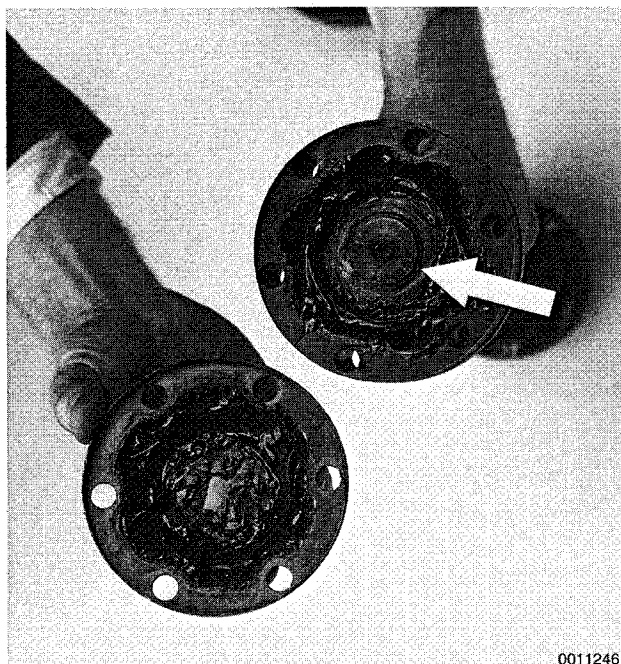


Fig. 14. Dust cover shown removed from inner CV joint. Clean away grease and remove circlip (arrow) from shaft end.

4. While supporting inner hub, press axle shaft out of joint. See Fig. 15.

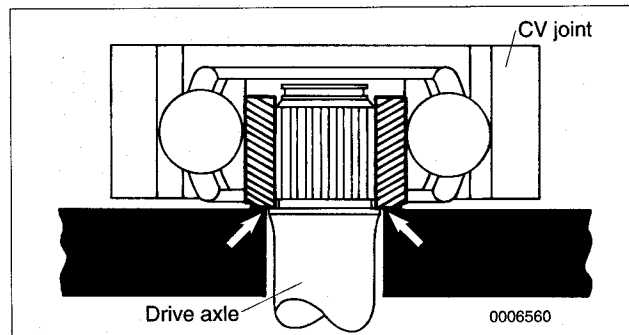


Fig. 15. Support CV joint at inner hub during pressing operation (arrows).

5. Clean all old lubricant off shaft splines and inner joint's splines.

NOTE —

To inspect a CV joint, clean away the grease and look for galling, pitting and other signs of wear or physical damage. Polished surfaces or visible ball tracks alone are not necessarily cause for replacement. Discoloration due to overheating indicates lack of lubrication.

6. Place new clamping bands and CV boots over drive axle.

NOTE —

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

7. Apply Loctite® 270 or an equivalent heavy-duty locking compound to drive axle splines. Position new CV joint on shaft so that raised or taller side of hub 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.

8. While supporting axle shaft, press inner hub of CV joint onto shaft. 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.

9. Pack each CV joint and rubber boot with specified amount of lubricant supplied. Apply adhesive to large end of boot and mount it on joint. Secure boot with clamps. Apply sealer to inner CV joint dust cover and install.

NOTE —

- Before installing each small boot clamp be sure to "burp" the boot by flexing the CV joint as far over as it will go. A small screw-driver inserted between the boot and the axle-shaft will help the process.
- BMW recommends Bostik®1513 or Eppler®4851 adhesive, and Eppler®39 or Curil®T sealer.

CV Joint Lubricant Capacity

- Wheel hub end
 - ex. M3 80 gram (2.8 oz.)
 - M3 100 gram (3.5 oz.)
- Final drive end 85 gram (3.0 oz.)

REAR SUSPENSION ARMS

The trailing arms, control arms and their mounting bushings control the position of the rear wheels. A damaged suspension 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 suspension arm. Bending or heating may weaken the original part. If the suspension arm shows any signs of damage or excessive corrosion, it must be replaced.

If the rear brake line is disconnected to remove a trailing arm, the complete braking system must be bled as part of the installation procedure.

When performing repairs to rear suspension components, refer to Fig. 16.

10. Install drive axle as described earlier.

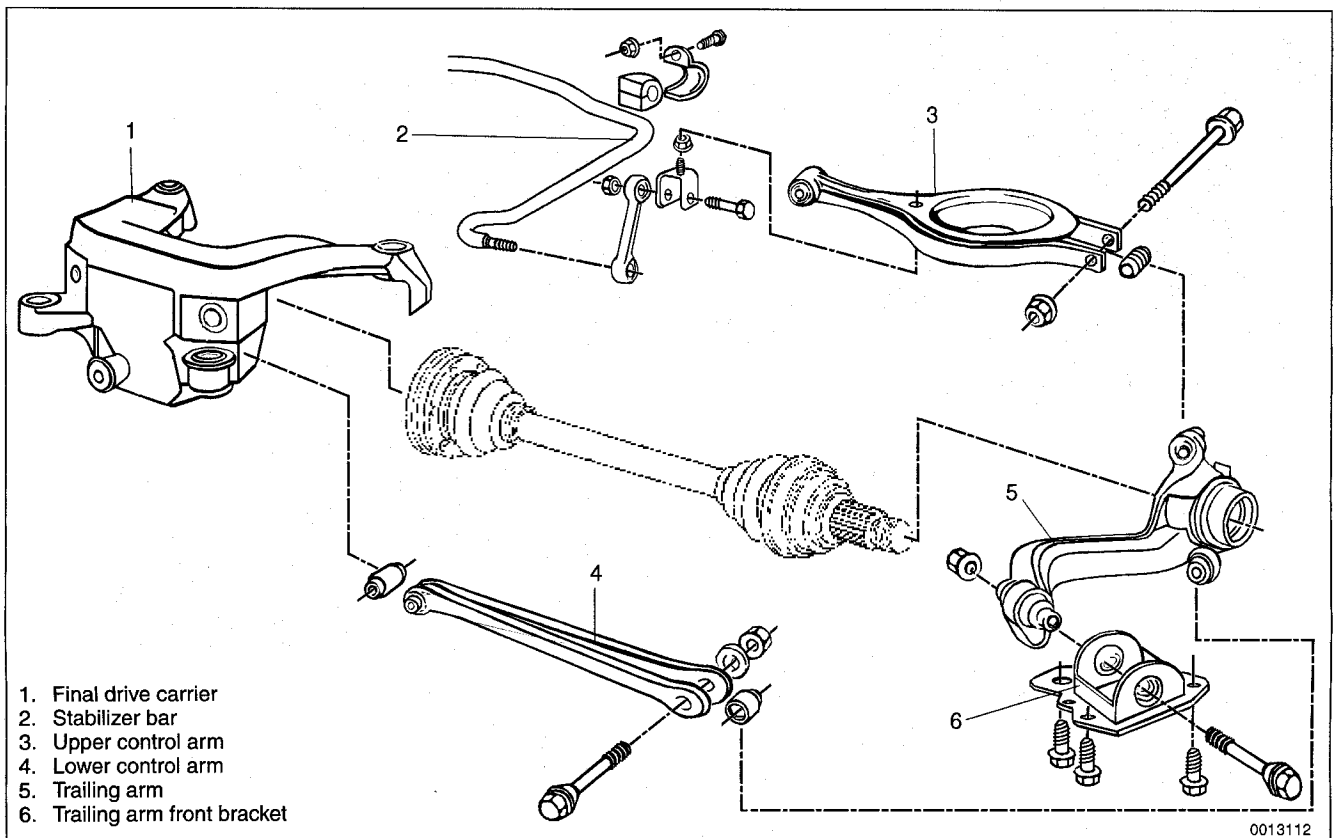


Fig. 16. Rear trailing arms, control arms and final drive carrier.

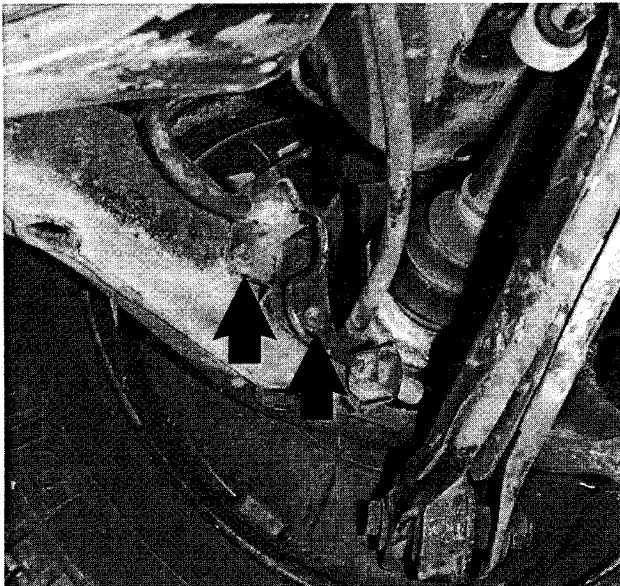
Trailing arm, removing and installing

1. Raise rear end 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.

2. Remove drive axle as described earlier.
3. Remove brake rotor and caliper as described in **340 Brakes**. Do not remove brake line from caliper. Hang caliper from body with wire.
4. Remove parking brake cable from brake shoe expander. See **340 Brakes**.
5. Remove rear brake line bracket from trailing arm. See Fig. 17.



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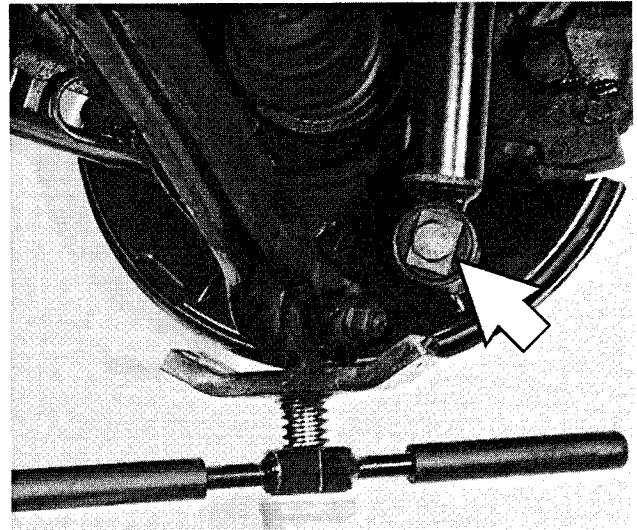
Fig. 17. Brake line bracket bolts on trailing arm (arrow).

6. Support trailing arm from below with a transmission jack or equivalent.

WARNING —

It is recommended that a restraining chain be installed between the bottom coil of the coil spring and the upper control arm to retain the spring in case of accidental release. Personal injury can result if the compressed coil spring is not released slowly and carefully.

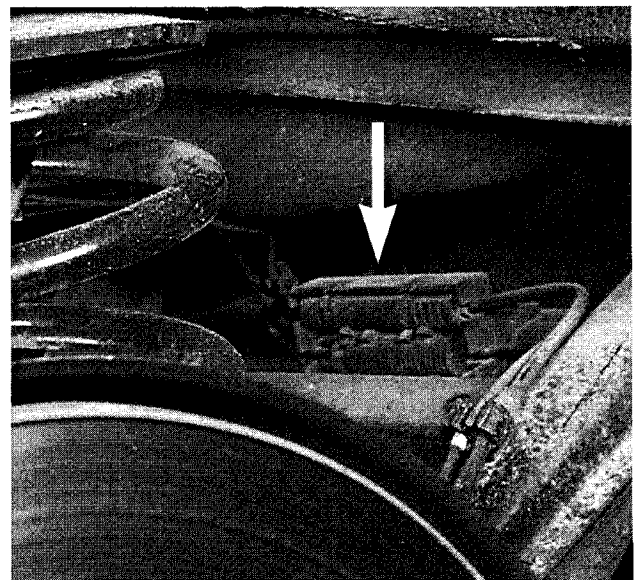
7. Remove shock absorber to trailing arm bolt. See Fig. 18. Slowly lower suspension until coil spring can be safely removed.



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Fig. 18. Support trailing arm before removing lower shock bolt (arrow).

8. Unbolt upper and lower control arms from trailing arm, as described later.
9. Remove ABS wheel speed sensor from rear wheel bearing housing. Unclip sensor wiring from trailing arm. If removing right trailing arm, separate brake pad wear sensor connector. See Fig. 19.



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Fig. 19. Brake pad wear sensor and ABS wheel speed sensor connectors (arrow).

10. Remove three bolts holding trailing arm front bracket to body. See Fig. 20. Remove trailing arm.

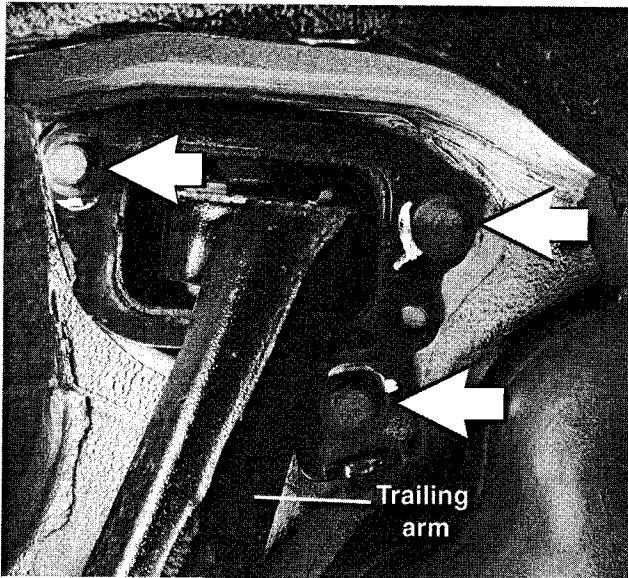


Fig. 20. Trailing arm front bracket bolts (arrows).

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11. If trailing arm is being replaced, transfer trailing arm front bracket. Transfer attached brake system components to new arm as described in **340 Brakes**. 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.

12. Installation is reverse of removal.
 - Always use new self-locking nuts.
 - Have car professionally aligned when job is complete.

Tightening Torques

- Drive axle to final drive unit mounting flange
 - M8 Torx bolt 64 Nm (47 ft-lb)
 - M10 Torx bolt 100 Nm (74 ft-lb)
- Road wheel to wheel hub 100±10 Nm (74±7 ft-lb)
- Shock absorber to trailing arm 77 Nm (57 ft-lb)
- Trailing arm to front bracket 110 Nm (81 ft-lb)
- Trailing arm bracket to body 77 Nm (57 ft-lb)
- Trailing arm to upper or lower control arm (M12 bolt) 110 Nm (81 ft-lb)

Trailing arm bushing, replacing

NOTE —

When replacing any bushing in the rear trailing arm, measure and record the orientation and protrusion of the bushing from its boss. Press in new bushing to match the position of the old one.

1. Remove trailing arm as described above.
2. Press bushing out of trailing arm using appropriate press tools.
3. Coat new bushing with Circolight® lubricant or equivalent.
4. Using appropriate press tools, draw new bushing into trailing arm until previously measured protrusion is achieved.
5. If front bracket bushing was replaced, align front bracket before tightening bolt. See Fig. 21.

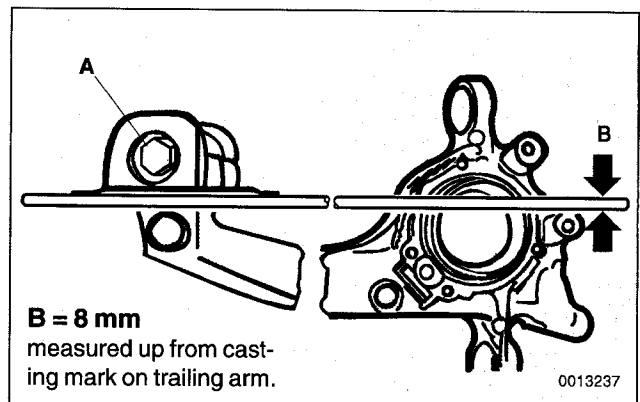


Fig. 21. When installing trailing arm front bracket using 8mm bar stock.

6. Installation is reverse of removal.
 - Have car professionally aligned when job is complete.

Tightening Torques

- Trailing arm to front bracket 110 Nm (81 ft-lb)
- Trailing arm bracket to body 77 Nm (57 ft-lb)

Upper control arm, removing and installing

1. Raise rear end 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.

2. Remove drive axle as described earlier.
3. Remove stabilizer bar link from upper control arm.
4. Support trailing arm from below with a transmission jack or equivalent.

WARNING —

It is recommended that a retaining chain be installed between the bottom coil of the coil spring and the upper control arm to retain the spring in case of accidental release. Personal injury can result if the compressed coil spring is not released slowly and carefully.

5. Remove lower shock absorber bolt. Refer to Fig. 18. Slowly lower trailing arm until coil spring is fully released. Remove restraining chain and remove spring.
6. Remove both upper control arm mounting bolts. Remove control arm.
7. Installation is reverse of removal.
 - Always use new self-locking nuts.
 - Have car professionally aligned when job is complete.
 - Install drive axle as described earlier.

Tightening Torques

- Drive axle to final drive flange
 - M8 Torx bolt 64 Nm (47 ft-lb)
 - M10 Torx bolt 100 Nm (74 ft-lb)
- Shock absorber to trailing arm 77 Nm (57 ft-lb)
- Upper control arm to final drive carrier (M12 bolt) 77 Nm (57 ft-lb)
- Upper control arm to trailing arm (M12 bolt) 110 Nm (81 ft-lb)

Lower control arm, removing and installing

1. Raise rear end of car and support it securely on jack stands. Remove rear wheel.
2. Remove both lower control arm mounting bolts.

3. Use a soft hammer to tap control arm out of its mounting points.
4. Installation is reverse of removal.

NOTE —

Use a new bolt and washer assembly at the final drive carrier mounting point for the control arm.

Tightening Torque

- Lower control arm to final drive carrier (M12 bolt) 77 Nm (57 ft-lb)
- Lower control arm to trailing arm (M12 bolt) 110 Nm (81 ft-lb)

FINAL DRIVE CARRIER

Final drive carrier, removing and installing

1. Raise rear end of car and support it securely on jack stands. Remove rear wheels.
2. Remove driveshaft. See **260 Driveshaft**.
3. Remove both drive axles as described earlier.
4. Disconnect stabilizer bar from upper control arms. Remove stabilizer bar mounts.
5. Disconnect speedometer harness connector on final drive (where applicable).
6. Remove rear section of exhaust system. See **180 Exhaust System**.

NOTE —

*It may be easier to remove complete exhaust as one piece. See **180 Exhaust System**.*

7. Remove upper and lower control arms as described earlier.
8. Support final drive carrier with transmission jack. Remove mounting bolts and nuts at final drive carrier bushing mounts. See Fig. 22.
9. Slowly lower final drive and final drive carrier, detaching wire harness and connectors as necessary.
10. Final drive may now be unbolted from final drive carrier.

FINAL DRIVE CARRIER

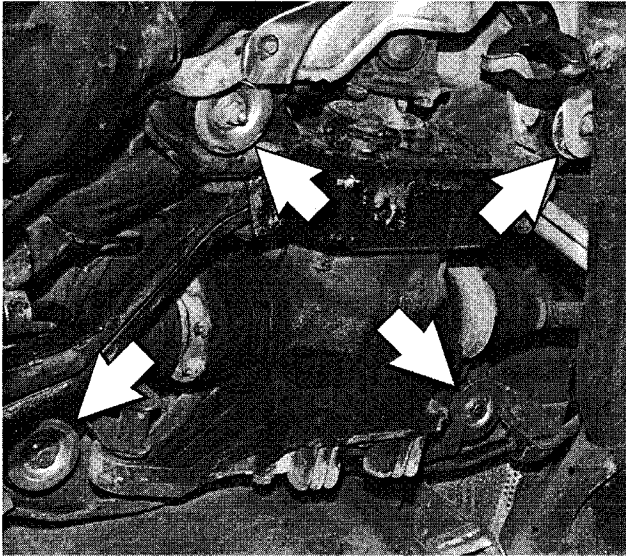


Fig. 22. Final drive carrier mounts (arrows).

11. Installation is reverse of removal.

- Check and adjust parking brake as described in **340 Brakes**.
- Always use new self-locking fasteners.
- Have car professionally aligned when job is complete.

Tightening Torques

- Drive axle to final drive flange
 - M8 Torx bolt 64 Nm (47 ft-lb)
 - M10 Torx bolt 100 Nm (74 ft-lb)
- Driveshaft to final drive flange ... See **260 Driveshaft**
- Final drive carrier to body 77 Nm (57 ft-lb)
- Final drive to final drive carrier (M12 bolts)
 - Front mount. 95 Nm (70 ft-lb)
 - Rear mounts 77 Nm (57 ft-lb)
- Road wheel to wheel hub. ... 100±10 Nm (74±7 ft-lb)
- Upper or lower control arm
to final drive carrier (M12 bolts) 77 Nm (57 ft-lb)



