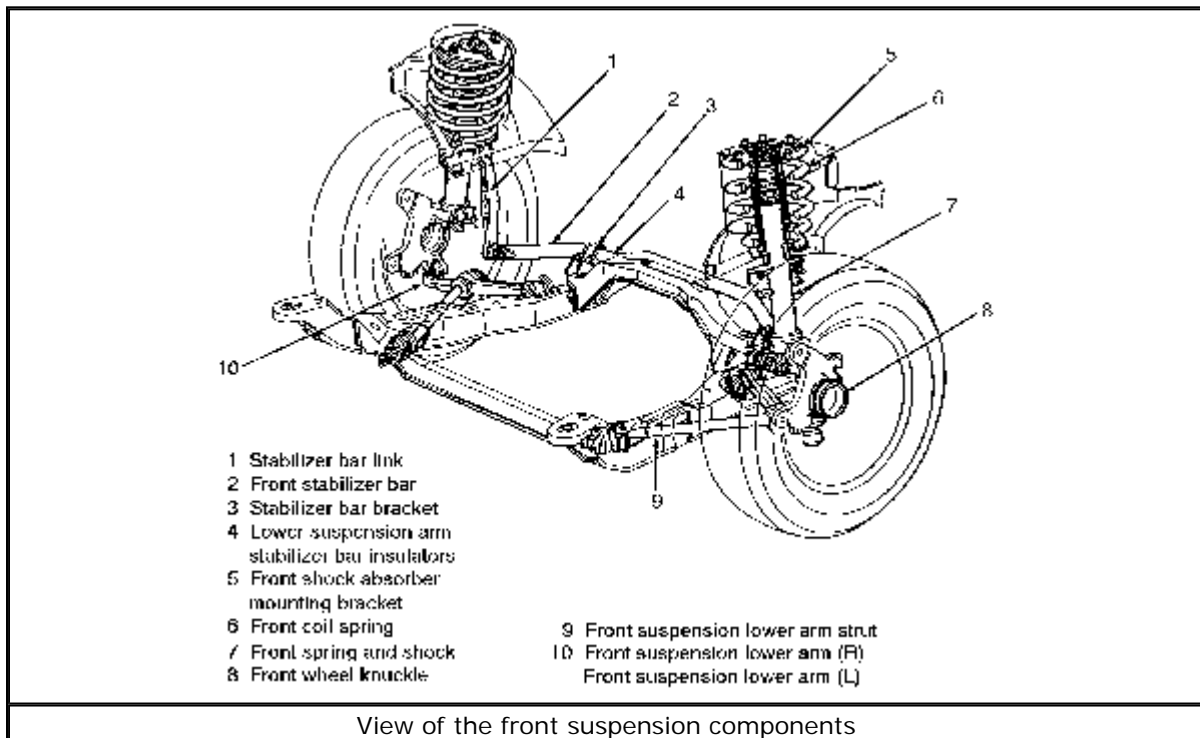


FRONT SUSPENSION

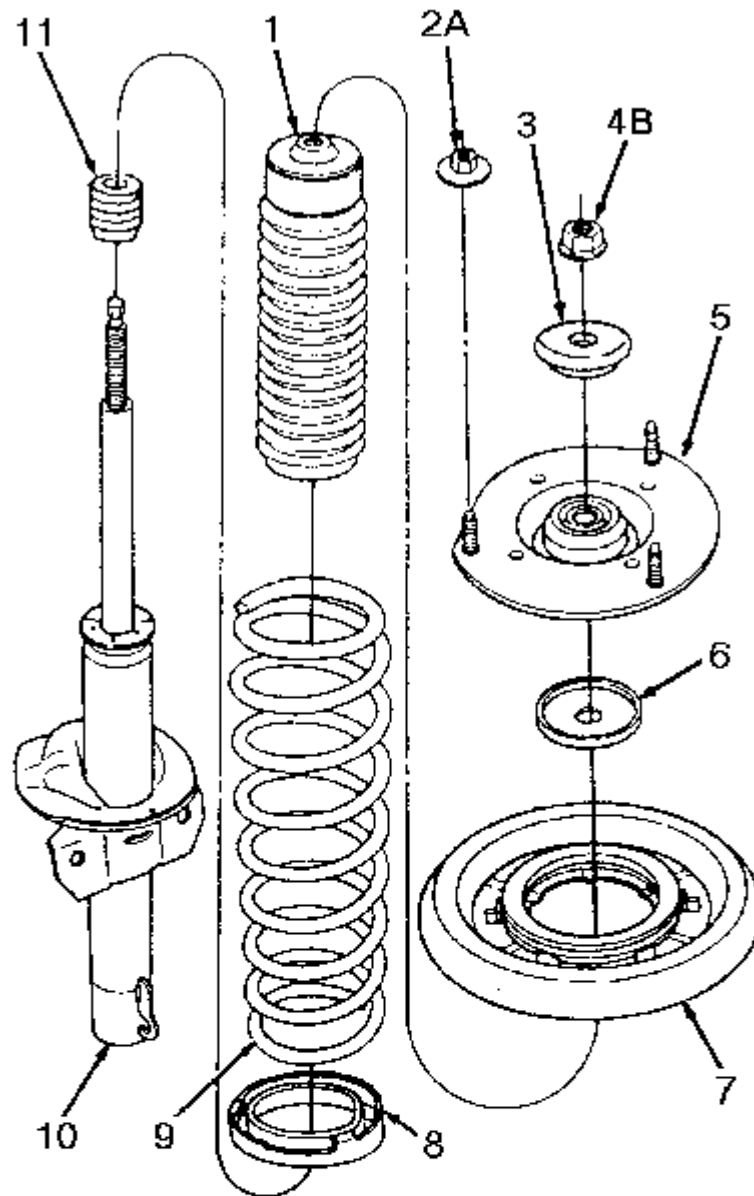
MacPherson Struts

REMOVAL & INSTALLATION

1. Place the ignition switch in the OFF position and the steering column in the UNLOCKED position.



[Click to enlarge](#)

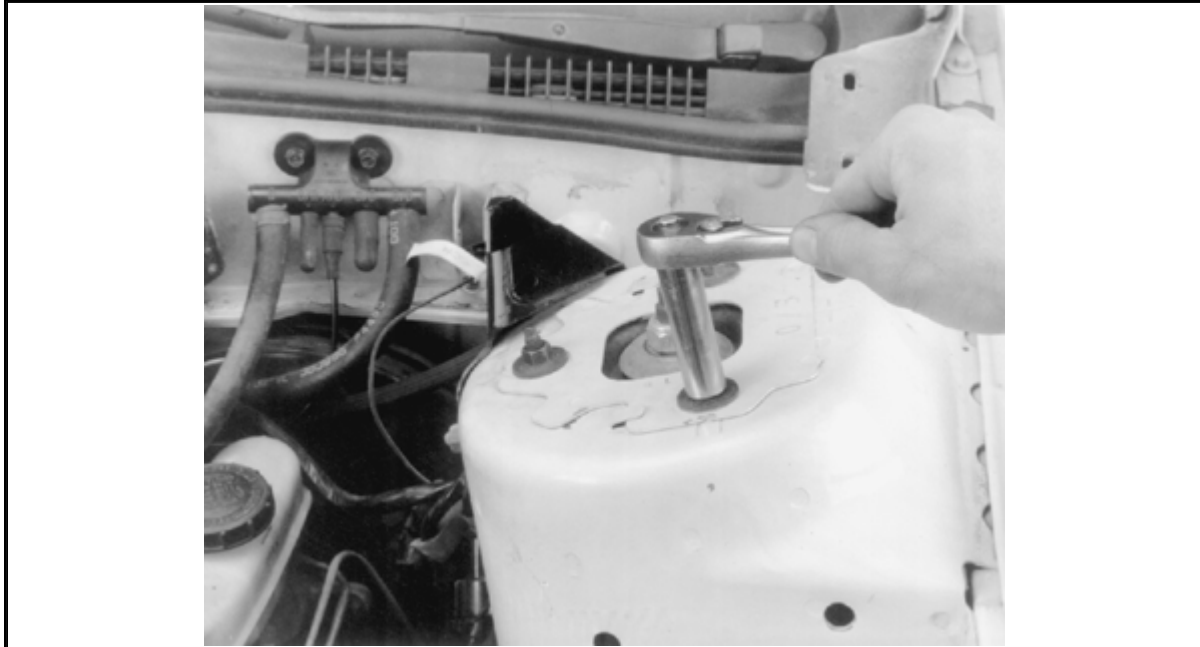


- 1 Dust boot
- 2 Nut (3 req'd)
- 3 Washer
- 4 Nut
- 5 Front shock absorber mounting bracket
- 6 Washer
- 7 Front suspension bearing and seal
- 8 Front spring insulator
- 9 Front coil spring
- 10 Front spring and shock
- 11 Jounce bumper
- A Tighten to 30-40 Nm (23-29 lb.ft.)
- B Tighten to 53-72 Nm (40-53 lb.ft.)

Exploded view of a MacPherson strut assembly

[Click to enlarge](#)

2. Remove the hub nut.
3. Loosen the 3 top mount-to-shock tower nuts; but do not remove the nuts at this time.



Loosen, but do not remove, the 3 top mount-to-shock tower nuts

4. Raise and safely support the vehicle.

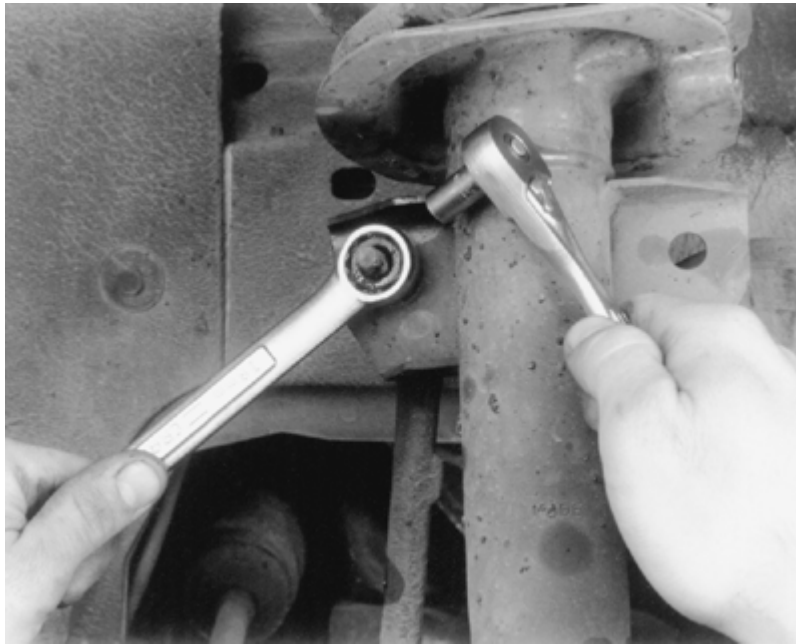
When raising the vehicle, do not lift by using the lower control arms.

5. Remove the tire and wheel assembly.
6. Remove the brake caliper, then support it on a wire, out of the way. Remove the rotor.
7. At the tie rod end, remove the cotter pin and the castle nut. Discard the cotter pin and nut, and replace with new ones during installation.
8. Using tie rod end remover tool 3290-D and the tie rod remover adapter tool T81P-3504-W or equivalents, separate the tie rod from the steering knuckle.

WARNING

Use extreme care not to damage the link ball joint boot seal.

9. Unfasten the stabilizer bar link nut, then remove the stabilizer bar link from the strut.



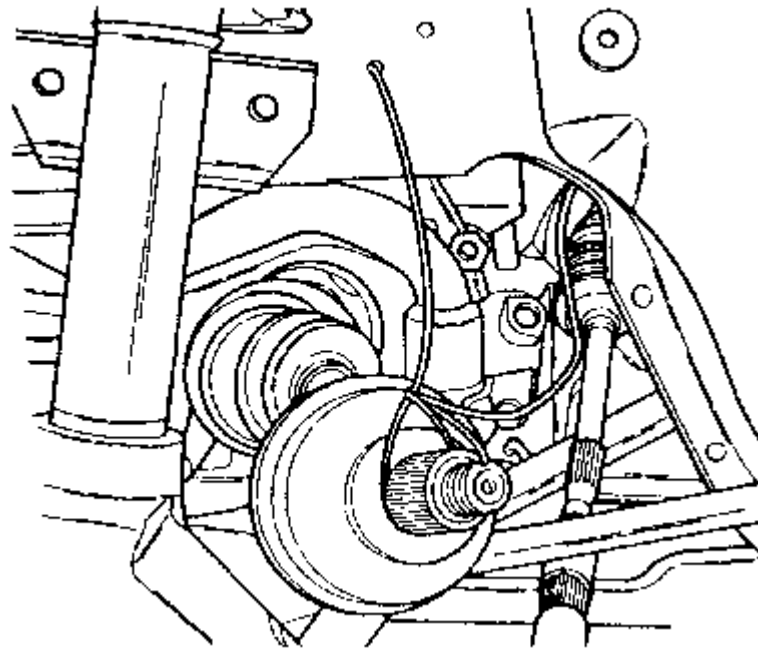
Remove the stabilizer bar link nut, then ...



... remove the stabilizer bar link from the strut

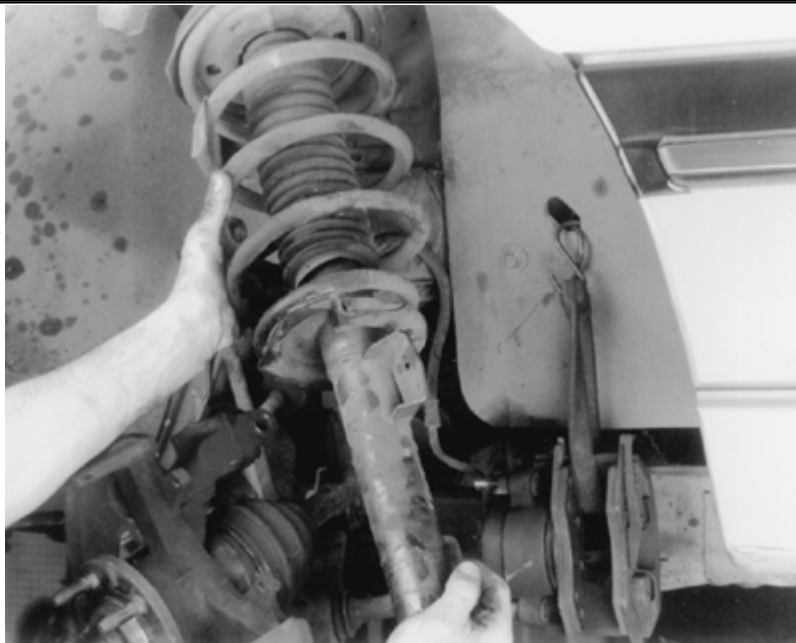
10. Remove the lower arm-to-steering knuckle pinch bolt and nut; it may be necessary to use a drift punch to remove the bolt. Using a suitable tool, spread the knuckle-to-lower arm pinch joint, then remove the lower arm from the steering knuckle. Discard the pinch nut/bolt and replace with a new one during installation.
11. Remove the halfshaft from the hub and support it with a wire to maintain a level position.

When removing the halfshaft, do not allow it to move outward as the internal parts of the tripod CV-joint could separate, causing failure of the joint.



Remove the halfshaft from the hub and support it on a wire to maintain a level position

12. Remove the strut-to-steering knuckle pinch bolt. Using a small prybar, spread the pinch bolt joint and separate the strut from the steering knuckle. Remove the steering knuckle/hub assembly from the strut.
13. Remove the 3 top mount-to-shock tower nuts, then remove the strut and coil spring assembly from the vehicle.



After removing the 3 top mount-to-shock tower nuts, remove the strut and spring assembly from the vehicle

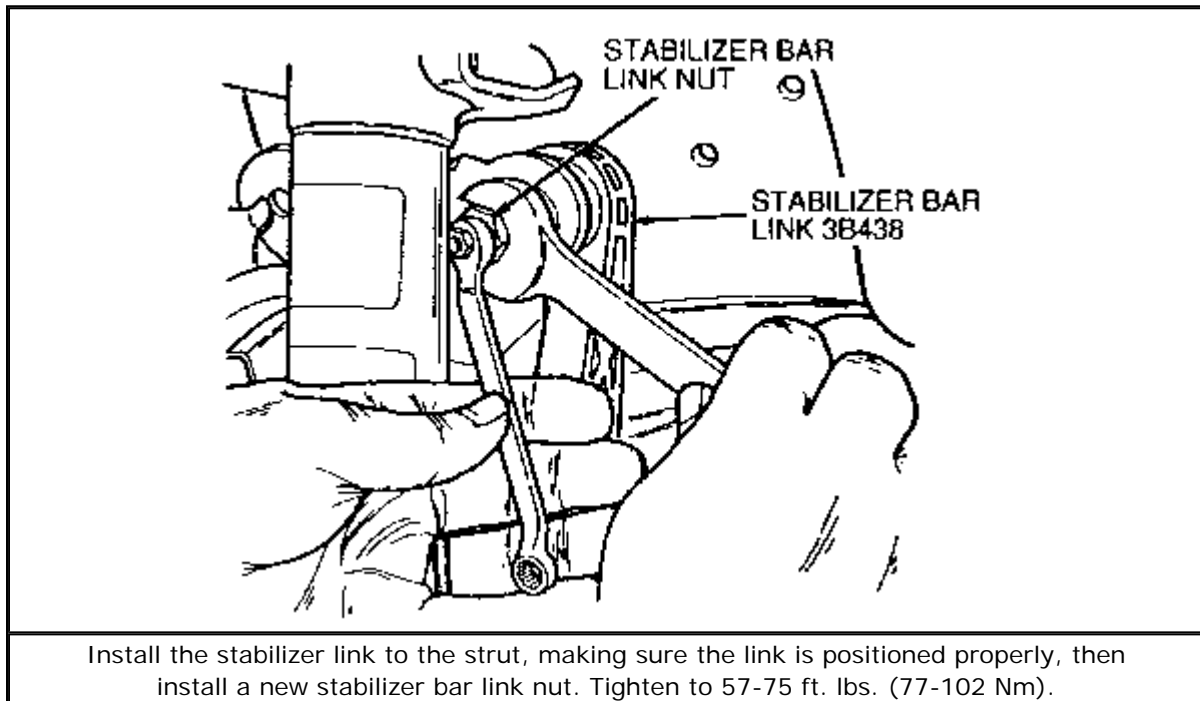
To install:

14. Install the strut and coil spring assembly and the 3 top mount-to-shock tower nuts.
15. Install the steering knuckle and hub assembly to the strut.

16. Install a new strut-to-steering knuckle pinch bolt. Tighten the bolt to 73-97 ft. lbs. (98-132 Nm).
17. Install the halfshaft into the hub.
18. Install the lower arm to the steering knuckle, making sure the ball stud groove is properly positioned. Be very careful not to damage the ball joint seal. Fasten using a new pinch bolt and nut. Tighten to 40-53 ft. lbs. (54-72 Nm).

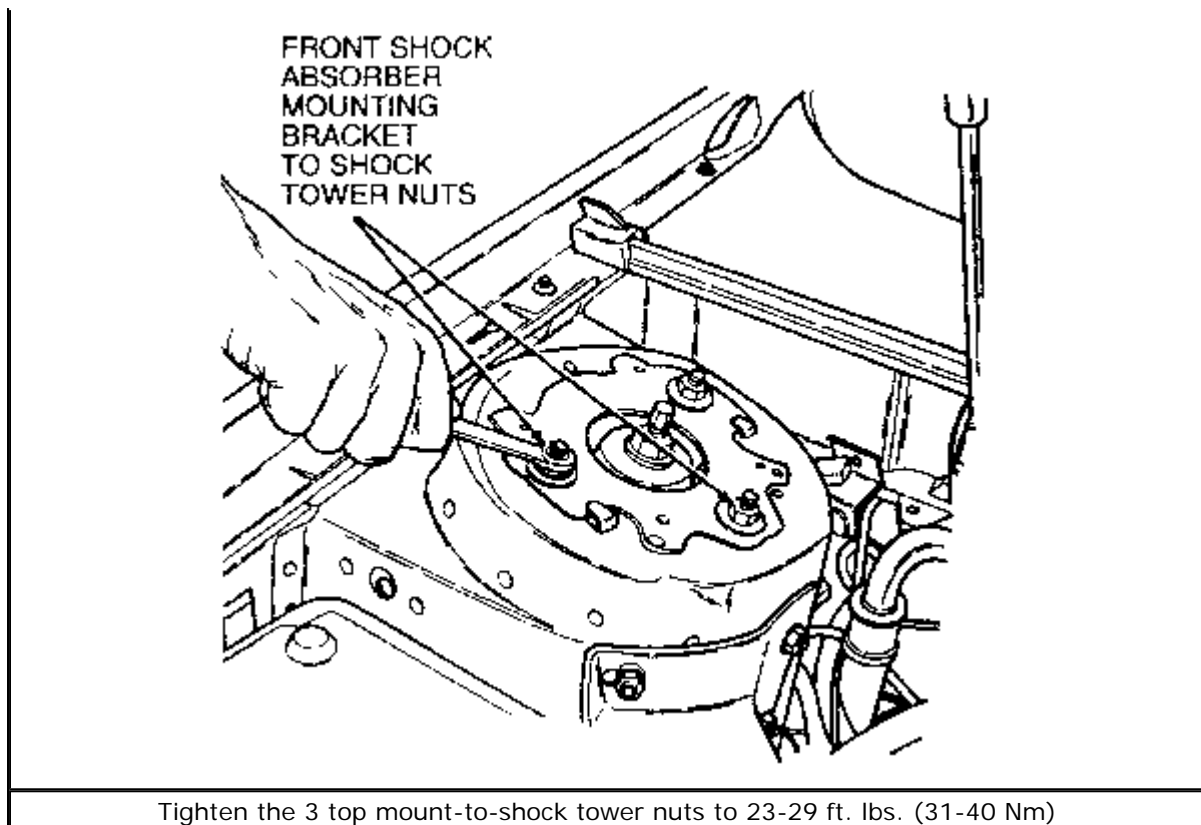
The letters "Top LH" and "Top RH" are moulded into the stabilizer bar link for correct assembly to the strut.

19. Install the stabilizer link to the strut, making sure the link is positioned properly, then install a new stabilizer bar link nut. Tighten to 57-75 ft. lbs. (77-102 Nm).



[Click to enlarge](#)

20. Using a new castle/slotted nut, install the tie rod end onto the knuckle. Tighten the nut to 23-35 ft. lbs. (31-47 Nm) for vehicles through 1994. For 1995 vehicles, tighten the nut to 35-46 ft. lbs. (47-63 Nm). Retain the castle/slotted nut with a new cotter pin.
21. Install the disc brake rotor, caliper and tire/wheel assembly. Tighten the wheel lug nuts to 85-105 ft. lbs. (115-142 Nm).
22. Tighten the 3 top mount-to-shock tower nuts to 23-29 ft. lbs. (31-40 Nm).



[Click to enlarge](#)

23. Lower the vehicle, then tighten the hub nut to 170-203 ft. lbs. (230-275 Nm).
24. Depress the brake pedal a few times before moving the vehicle.

OVERHAUL

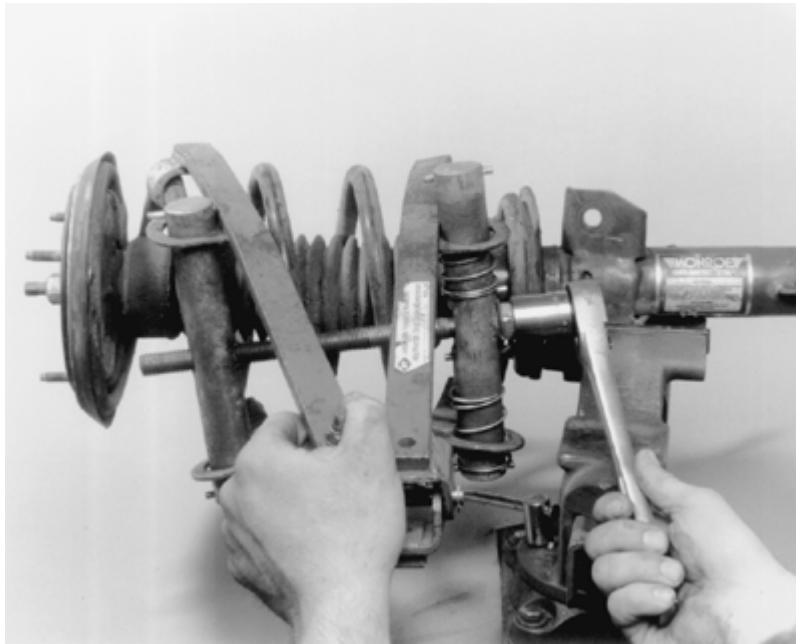
CAUTION

NEVER attempt to disassemble the spring or top mount without first compressing the spring using Strut Compressor Tool No. D85P-7178-A, Rotunda Spring Compressor 086-00029B or equivalent. Failure to properly compress the spring before disassembly can result in serious injury or death.

The following procedure is performed with the strut assembly removed from the car.

A MacPherson Strut compression tool is required for the disassembly of the strut, a cage type tool such as part No. D85P-7178-A or equivalent is required.

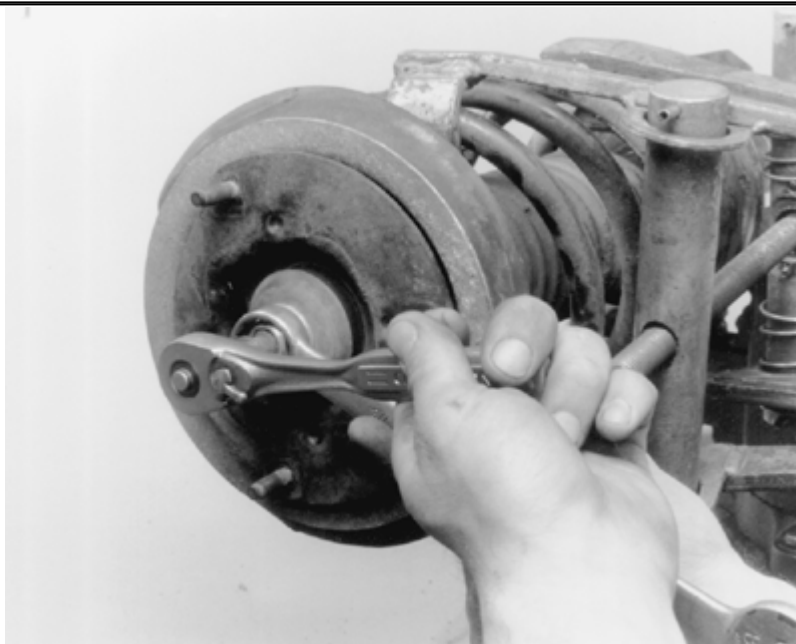
1. Compress the spring with the coil spring compressor part No. D85P-7178-A or equivalent.



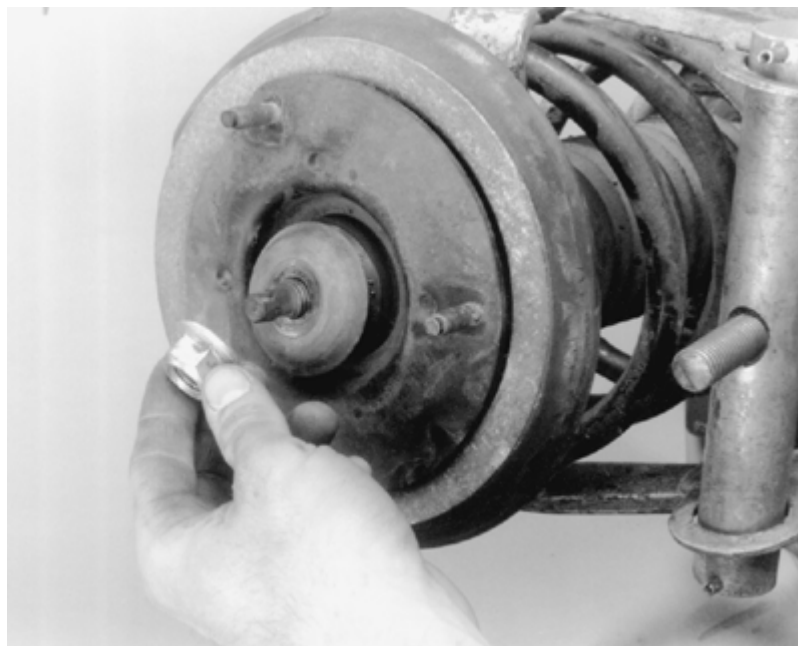
Carefully compress the spring using a suitable spring compressor tool

2. Place a 10mm box wrench on top of the shock strut shaft and hold while removing the top shaft mounting nut with a 21mm 6-point crow's foot wrench and ratchet.

It is important that the mounting nut be turned and the rod held still to prevent fracture of the rod at the base of the hex.

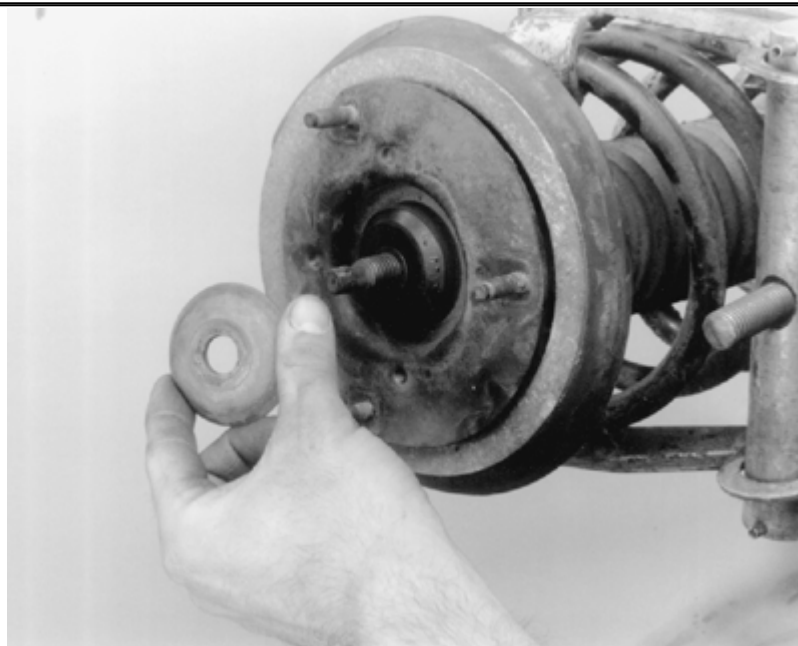


Place a 10mm box wrench on top of the shock strut shaft and hold while loosening the top shaft mounting nut with a 21mm 6-point crow's foot wrench and ratchet, then ...

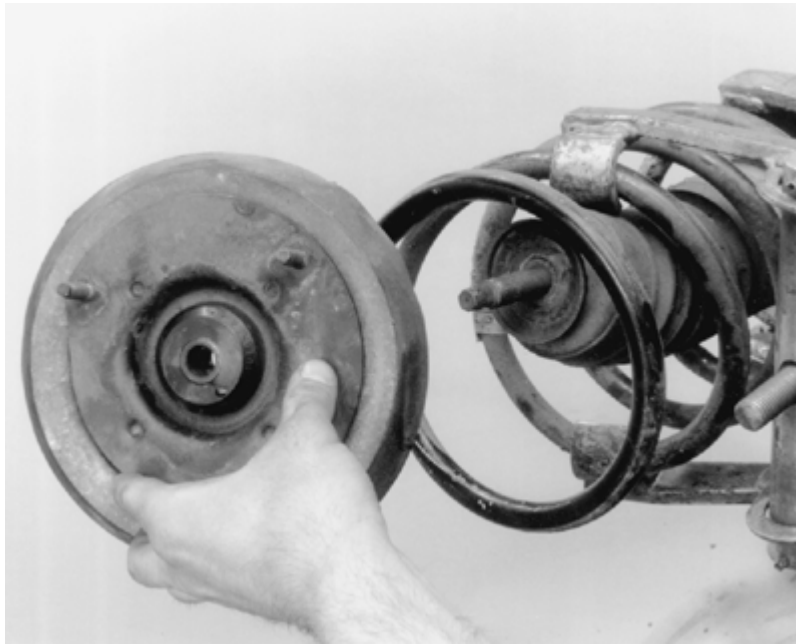


... remove the mounting nut

- 27. Loosen the spring compressor tool, then remove the top mounting bracket assembly, bearing plate assembly and spring.**



After loosening the spring compressor tool, remove the washer, then ...

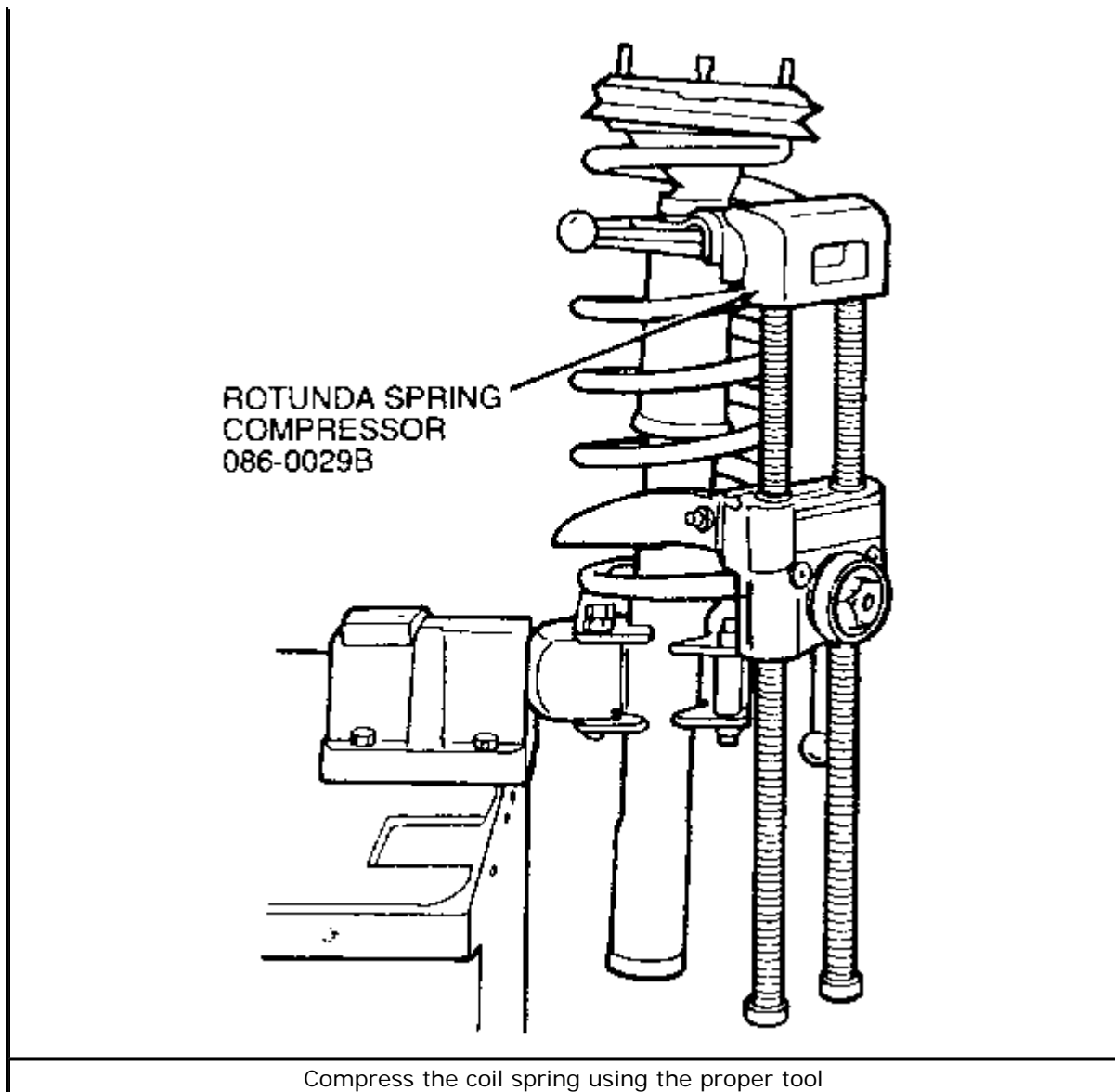


... remove the mounting bracket and bearing plate assembly

To assemble:

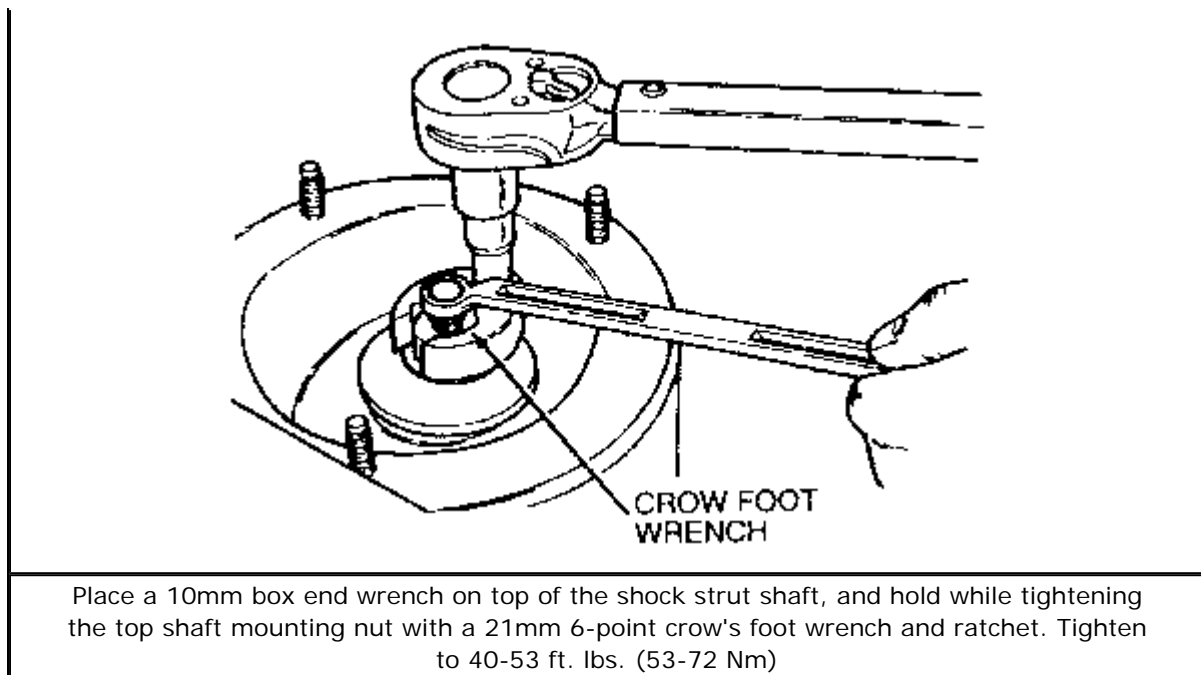
Ensure that the correct assembly sequence and proper positioning of the bearing and seat assembly are followed. The bearing and seat assembly is press-fit onto the upper mount. The mount washers must be installed with the correct orientation.

- 4. Install the spring compressor tool part No. D85P-7178-A or equivalent.**
- 5. Install the spring, bearing plate assembly, lower washer and top mount bracket assembly.**
- 6. Compress the spring with the coil spring compressor tool.**



[Click to enlarge](#)

7. Install the upper washer and nut on the shock strut shaft.
8. Place a 10mm box end wrench on the top of the shock strut shaft and hold while tightening the top shaft mounting nut with a 21mm 6-point crow's foot wrench and a ratchet. Tighten to 40-53 ft. lbs. (53-72 Nm).



[Click to enlarge](#)

33. The strut assembly may now be installed in the vehicle. For details, please refer to the procedure located earlier in this section.

Lower Ball Joint

INSPECTION

1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle so the wheels fall to the full-down position.
3. Have an assistant grasp the lower edge of the tire, then move the wheel and tire assembly in and out.
4. Observe the lower end of the knuckle and the lower control arm as the wheel is being moved in and out. Any movement indicates abnormal ball joint wear.
5. If there is any movement, install a new lower control arm assembly.
6. Lower the vehicle, then connect the negative battery cable.

REMOVAL & INSTALLATION

Ball joints are integral parts of the lower control arms. If inspection reveals an unsatisfactory ball joint, the entire lower control arm assembly must be replaced.

Stabilizer Bar

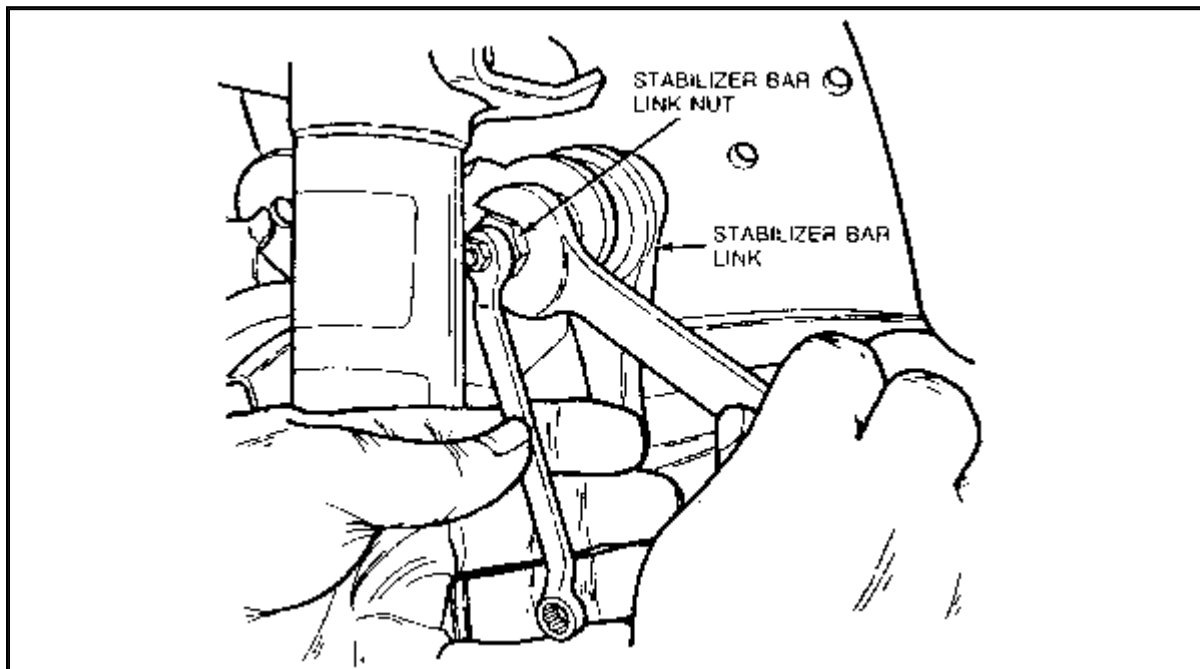
REMOVAL & INSTALLATION

1. Raise and safely support the vehicle. Support the vehicle with jackstands behind the front subframe.

Do NOT raise or support the vehicle by the front control arms.

2. Remove the stabilizer bar link-to-stabilizer bar nut, the stabilizer bar link-to-strut nut and the link from the vehicle with an 8mm closed-end wrench and an 18mm open-end wrench. Discard the nuts, and replace with new ones during installation.

Be very careful not to damage the line ball joint boot seal.

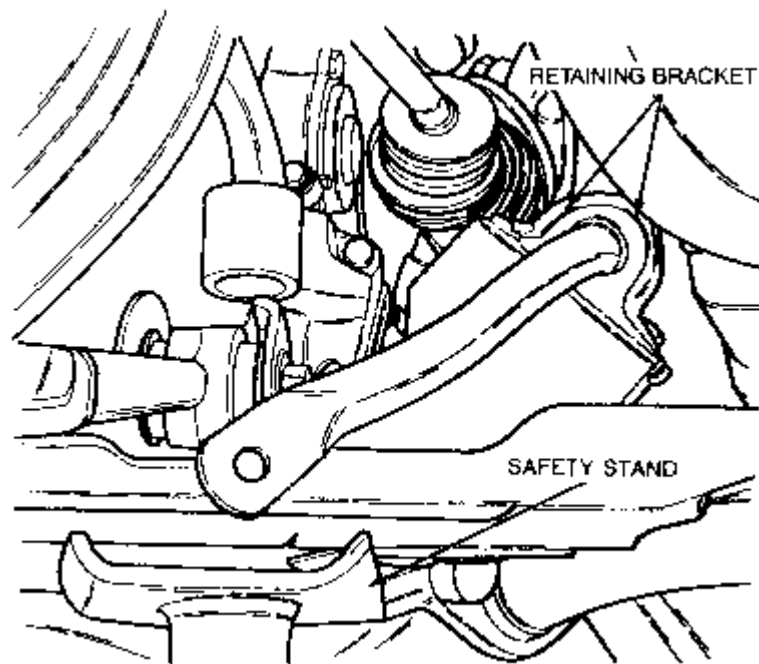


Remove the stabilizer bar link-to-stabilizer bar nut, the stabilizer bar link-to-strut nut and the link from the vehicle with an 8mm closed-end wrench and an 18mm open-end wrench. Discard the nuts, and replace with new ones during installation

[Click to enlarge](#)

3. Remove the steering gear-to-subframe nuts, then move the gear from the subframe.
4. Position another set of jackstands under the front subframe, then remove the rear subframe-to-frame bolts. Lower the rear or the subframe to access the stabilizer bar brackets.





Position another set of jackstands under the front subframe, then remove the rear subframe-to-frame bolts. Lower the rear or the subframe to access the stabilizer bar brackets

[Click to enlarge](#)

5. Remove the stabilizer bar U-bracket bolts and the stabilizer bar from the vehicle.

When removing the stabilizer bar, replace the insulators and the U-bracket bolts with new ones.

To install:

6. Clean the stabilizer bar to remove dirt and debris.
7. To install, reverse the removal procedure. Tighten the bolts to the following torque specifications:
 - U-bracket-to-subframe 23-29 ft. lbs. (30-40 Nm)
 - Subframe-to-steering gear 85-100 ft. lbs. (115-135 Nm)
 - Stabilizer bar-to-stabilizer bar link 35-48 ft. lbs. (47-65 Nm)
 - Stabilizer bar-to-strut 55-75 ft. lbs. (75-101 Nm)
8. Prior to assembly, coat the inside diameter of the new insulators with No. E25Y-19553-A or equivalent lubricant. Do not use any mineral or petroleum base lubricants, as they will cause deterioration of the rubber insulators.

Lower Control Arm

REMOVAL & INSTALLATION

1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle.

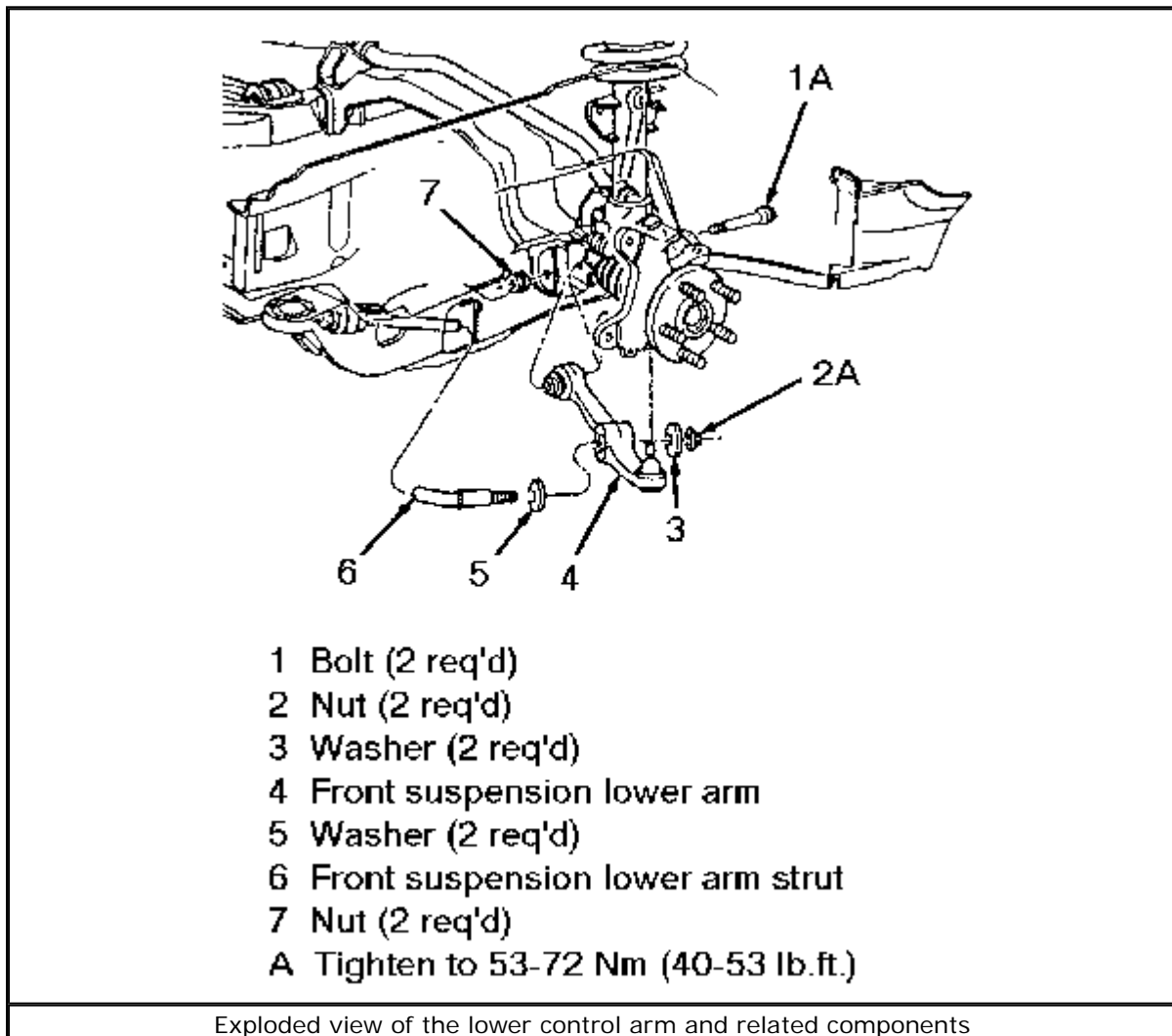
3. Remove the wheel and tire assembly.
4. Remove and discard the tension strut-to-control arm nut, then pull off the dished washer.

When separating the control arm from the steering knuckle, do not use a hammer. Be careful not to damage the ball joint boot seal.

5. Remove and discard the control arm-to-steering knuckle pinch bolt. Using a small prybar, spread the pinch joint slightly, then separate the control arm from the steering knuckle. A drift punch may be used to remove the bolt, but be very careful not to damage the ball joint boot seal.

Do not allow the halfshaft to move outward, or the tripod CV-joint internal parts could separate, causing failure of the joint.

6. Remove and discard the lower control arm inner pivot bolt and nut.
7. Remove the lower control arm from the frame and the tension strut.



[Click to enlarge](#)

To install:

Make sure the front washer is at the strut-to-lower control arm

attachment.

8. Insert the strut into the inner bushing.
9. Position the lower control arm into the subframe bracket, using a new nut and bolt. Tighten to 73-97 ft. lbs. (98-132 Nm).
10. Assemble the lower control arm ball joint stud to the steering knuckle, making sure the ball stud groove is positioned properly. Be very careful not to damage the lower control arm seal.
11. Insert a new pinch bolt and nut, then tighten to 40-53 ft. lbs. (53-72 Nm).
12. Clean the strut threads to remove dirt and/or debris.
13. Install the dished washer, with its dished side away from the control arm bushing. Install a new nut on the strut and tighten to 73-97 ft. lbs. (98-132 Nm).
14. Install the wheel and tire assembly, tightening the lug nuts to 85-105 ft. lbs. (115-142 Nm), then carefully lower the vehicle.

BUSHING REPLACEMENT

Inner Pivot Bushing

1. Remove the lower control arm from the vehicle.
2. Using bushing removal tools T86P-5493-A3 and T86P-5493-A2, or equivalents, and a C clamp assembly, remove the old bushings from the control arm assembly.

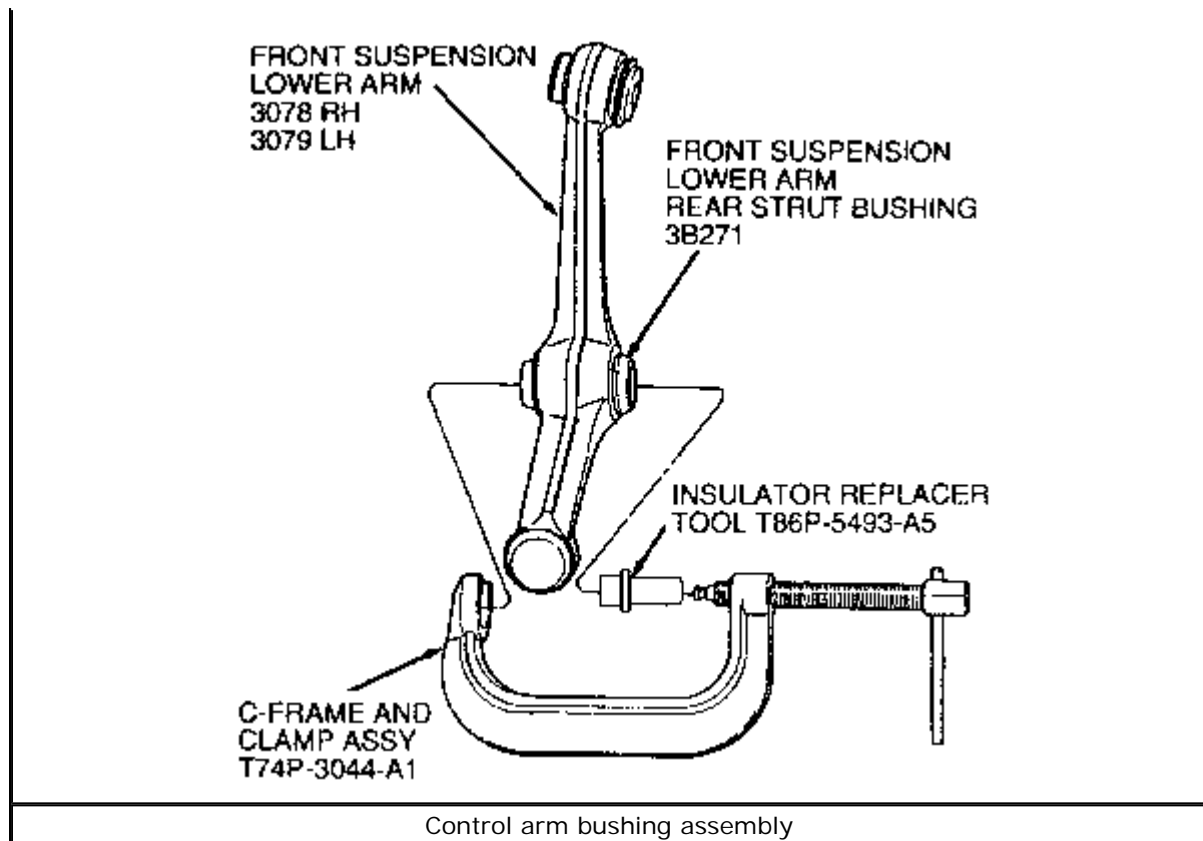
To install:

3. Use the bushing removal tool and press new bushings in place on the lower control arm assembly.
4. Be sure that the bushing flange is at the front of the arm.
5. Install the lower control arm on the vehicle.

Control Arm/Tension Strut Bushing

1. Remove the lower control arm from the vehicle.
2. Using bushing removal tools T86P-5493-A5 and T86P-5493-A, or equivalents, and a C clamp assembly, remove the old bushings from the control arm assembly. Be sure that the C clamp is positioned tightly in a bench vise.





[Click to enlarge](#)

To install:

3. Before installing the new bushing, saturate it in vegetable oil, as this will aid in the installation process. Use only vegetable oil; do NOT use mineral or petroleum based oil, as these will deteriorate the rubber.
4. Use the bushing removal tool and install new bushings in place on the lower control arm assembly. Stop tightening the C clamp when the bushing pops in place.
5. Install the lower control arm on the vehicle.

Tension Strut/Sub Frame Insulators

1. Remove the lower control arm from the vehicle.
2. Remove and discard the nut, washer and insulator from the front of the tension strut. Pull the strut rearward to remove it from the subframe.
3. Remove and discard the insulator from the tension strut.

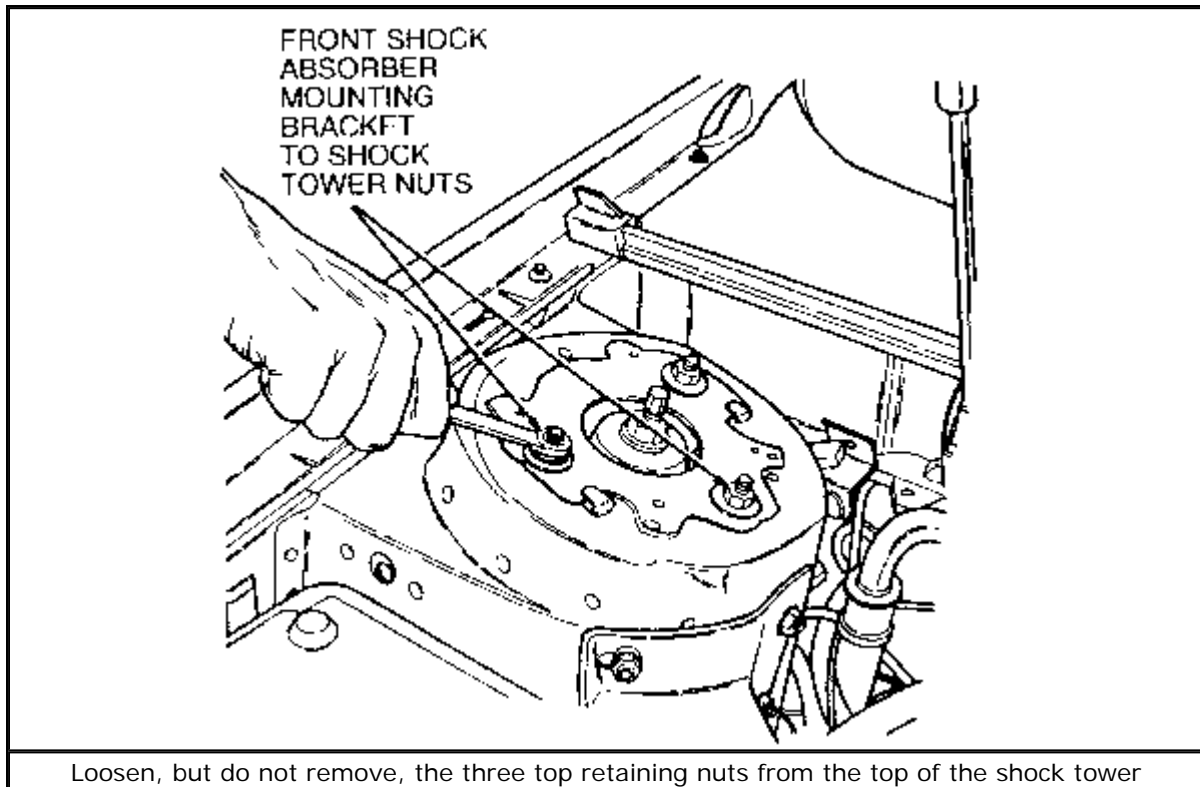
To install:

4. Install a new insulator on the tension strut end and insert it into the subframe.
5. Install a new front insulator. Clean the tension strut threads. Install a new washer and nut. Tighten to 70-95 ft. lbs. (95-129 Nm).
6. Install the lower control arm on the vehicle.

Knuckle and Spindle

REMOVAL & INSTALLATION

1. Turn the ignition switch to the OFF position. Position the steering wheel in the unlocked position.
2. Remove the hub nut.
3. Raise and safely support the vehicle, then remove the tire and wheel assembly.
4. Remove the cotter pin from the tie rod end stud, then remove the slotted nut. Discard the cotter pin and nut.
5. Using Tie Rod End Remover TOOL-3290-D or equivalent, remove the tie rod end from the steering knuckle.
6. Remove the stabilizer bar link assembly from the strut.
7. Remove the brake caliper, then wire it aside in order to gain working clearance. Remove the brake rotor.
8. Loosen, but do not remove, the three top retaining nuts from the top of the shock tower.



[Click to enlarge](#)

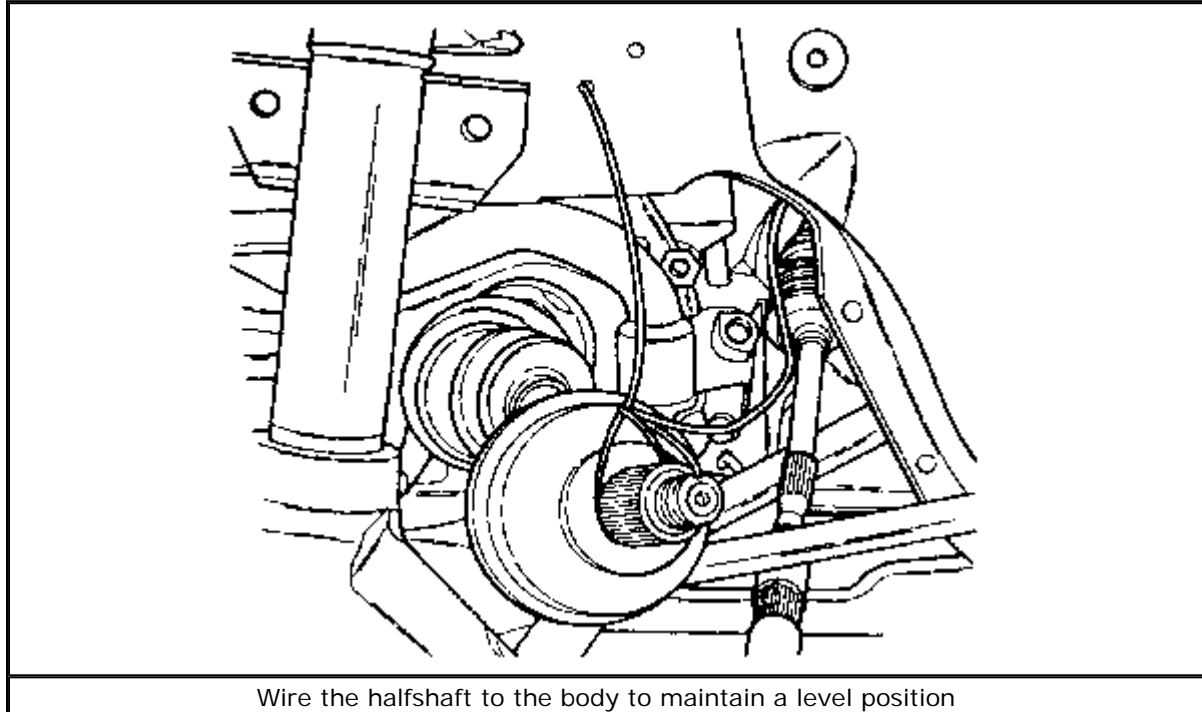
9. Remove and discard the lower arm to steering knuckle pinch bolt and nut. A drift may be used to remove the bolt. Using a small prybar, spread the knuckle-to-lower arm pinch joint. Remove the lower arm from the steering knuckle.

Be sure that the steering column is in the unlocked position. Do not use a hammer to perform this operation. Use extreme care not to damage the boot seal.

10. Remove the shock absorber strut-to-steering knuckle pinch bolt.

Do NOT allow the halfshaft to move outboard. Overextension of the CV joint could result in separation of internal parts, causing failure of the joint.

11. Press the halfshaft from the hub. Wire the halfshaft to the body to maintain a level position.

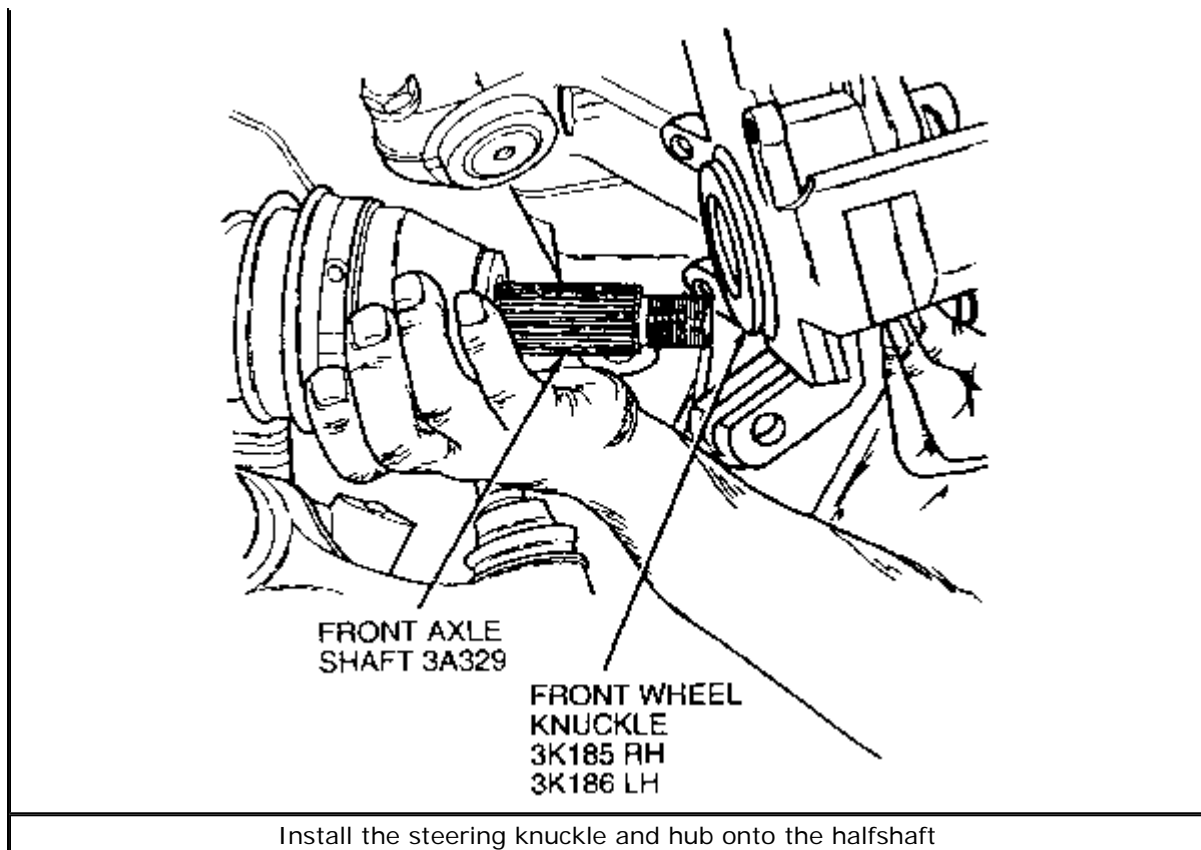


12. If equipped, remove the rotor splash shield from the steering knuckle.
13. Remove the steering knuckle and hub assembly from the shock absorber strut.
14. Position the assembly on a workbench, then remove the hub retainer ring and front wheel bearing.

To install:

15. If equipped, install the rotor splash shield using new rivets and Heavy Duty Riveter D80L-23200-A or equivalent.
16. Install the front wheel bearing, retainer ring and hub. If necessary, replace the seal on the outboard CV-joint.
17. Install the steering knuckle onto the shock absorber strut, then loosely install a new pinch bolt in the knuckle to retain the strut.
18. Install the steering knuckle and hub onto the halfshaft.





[Click to enlarge](#)

19. Install the lower control arm to the knuckle, making sure that the ball stud groove is properly positioned. Install a new nut and bolt, then tighten to 40-53 ft. lbs. (53-72 Nm). Tighten the strut-to-knuckle pinch bolt to 73-97 ft. lbs. (98-132 Nm).
20. Install the rotor and brake caliper. For vehicles equipped with caliper retaining pins, tighten them to 18-25 ft. lbs. (24-34 Nm). For vehicles equipped with caliper retaining bolts, tighten them to 85 ft. lbs. (115 Nm).
21. Position the tie rod into the knuckle, then install a new slotted nut and tighten. If necessary, advance the nut to align a slot, then install a cotter pin. Tighten the nut to 23-35 ft. lbs. (31-47 Nm) for vehicles through 1994. For 1995 vehicles, tighten the nut to 35-46 ft. lbs. (47-63 Nm).
22. Install the stabilizer link bar assembly to the front shock absorber assembly. Tighten to 57-75 ft. lbs. (77-103 Nm).
23. Install the tire and wheel assembly, tightening the lug nuts to 85-105 ft. lbs. (115-142 Nm).
24. Carefully lower the vehicle.
25. Install the three top mount shock tower retaining bolts, and tighten to 23-29 ft. lbs. (30-40 Nm).
26. Tighten the hub nut to 170-203 ft. lbs. (230-275 Nm).
27. Pump the brake pedal prior to moving the vehicle, in order to reposition the brake linings.

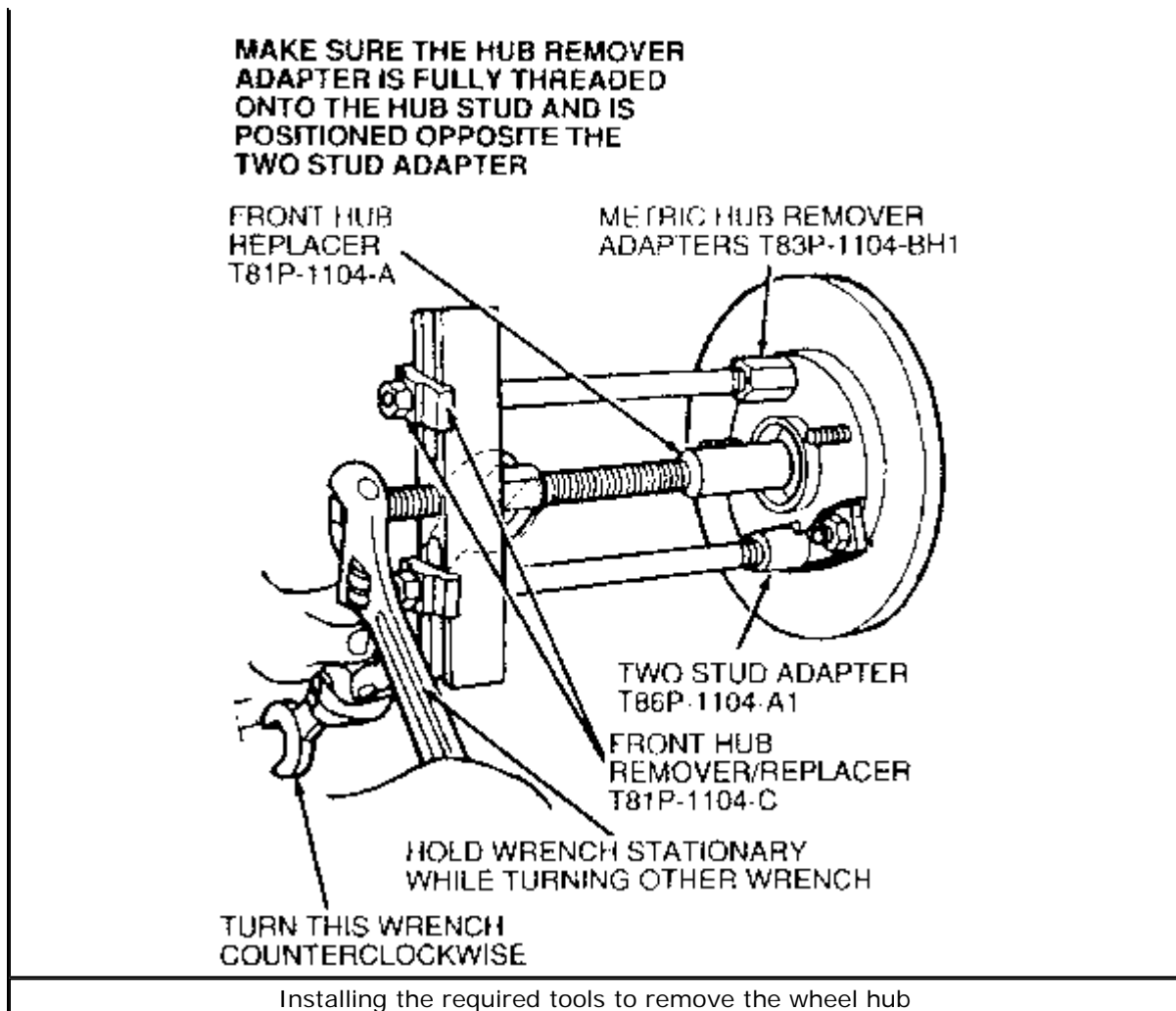
Front Hub and Bearing

REMOVAL & INSTALLATION

Do NOT start this procedure unless a new wheel hub retainer and washer as well as a new inboard CV-joint circlip are available. These components cannot be reused because their holding or retention ability is decreased during removal.

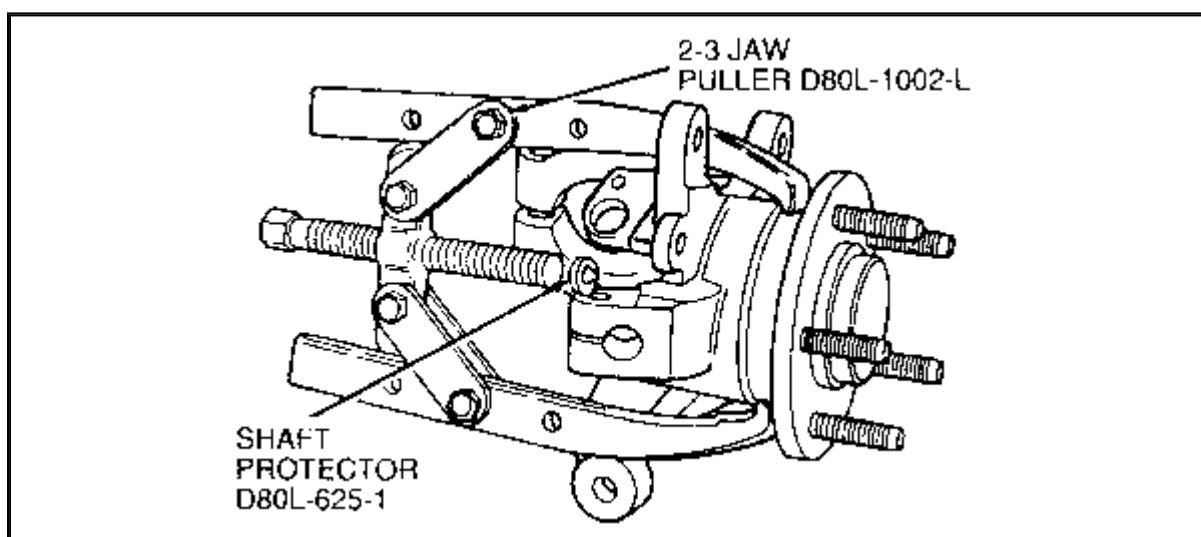
1. Remove the wheel cover/hub cover and loosen the wheel nuts.
2. Remove the hub nut retainer and washer by applying sufficient torque to the nut to overcome the prevailing torque feature of the crimp in the nut collar. Do not use an impact-type tool to remove the hub nut retainer. The hub nut retainer is not reusable and must be discarded after removal.
3. Raise and safely support the vehicle. Remove the wheel and tire assembly.
4. If equipped with caliper locating pins, remove the brake caliper by loosening the pins and rotating the caliper off of the rotor, starting from the lower end of the caliper and lifting upwards. Do not remove the pins from the caliper assembly. If equipped with bolted-on calipers, remove the caliper by loosening, then rotating the mounting bolts. Lift the caliper off of the rotor. Once the caliper is free of the rotor, support it with a length of wire. Do not allow the caliper to hang from the brake hose.
5. Remove the rotor from the hub by pulling it off of the hub bolts. If the rotor is difficult to remove, strike it sharply between the studs with a rubber or plastic hammer. If the rotor will not pull off, apply a suitable rust penetrator to the inboard and outboard rotor hub mating surfaces. Install a suitable 3-jaw puller and remove the rotor by pulling on the rotor outside diameter and pushing on the hub center. If excessive force is required to remove the rotor, check it for lateral run-out prior to installation. Lateral run-out must be checked with the nuts clamping the stamped hat section of the rotor.
6. Remove the rotor splash shield.
7. Disconnect the lower control arm and tie rod from the knuckle, but leave the strut attached. Loosen the two strut top mount-to-apron nuts.
8. Loosen the three shock/strut tower retaining nuts.
9. Install Front Hub Replacer T81P-1104-A with Front Hub Remover/Replacer T81P-1104-C and Metric Hub Remover Adapters T83P-1104-BH1 and Two Stud Adapter T86P-1104-A1 or equivalents, then remove the wheel hub, bearing and knuckle assembly by pushing out the CV-joint outer shaft until it is free of the assembly.





[Click to enlarge](#)

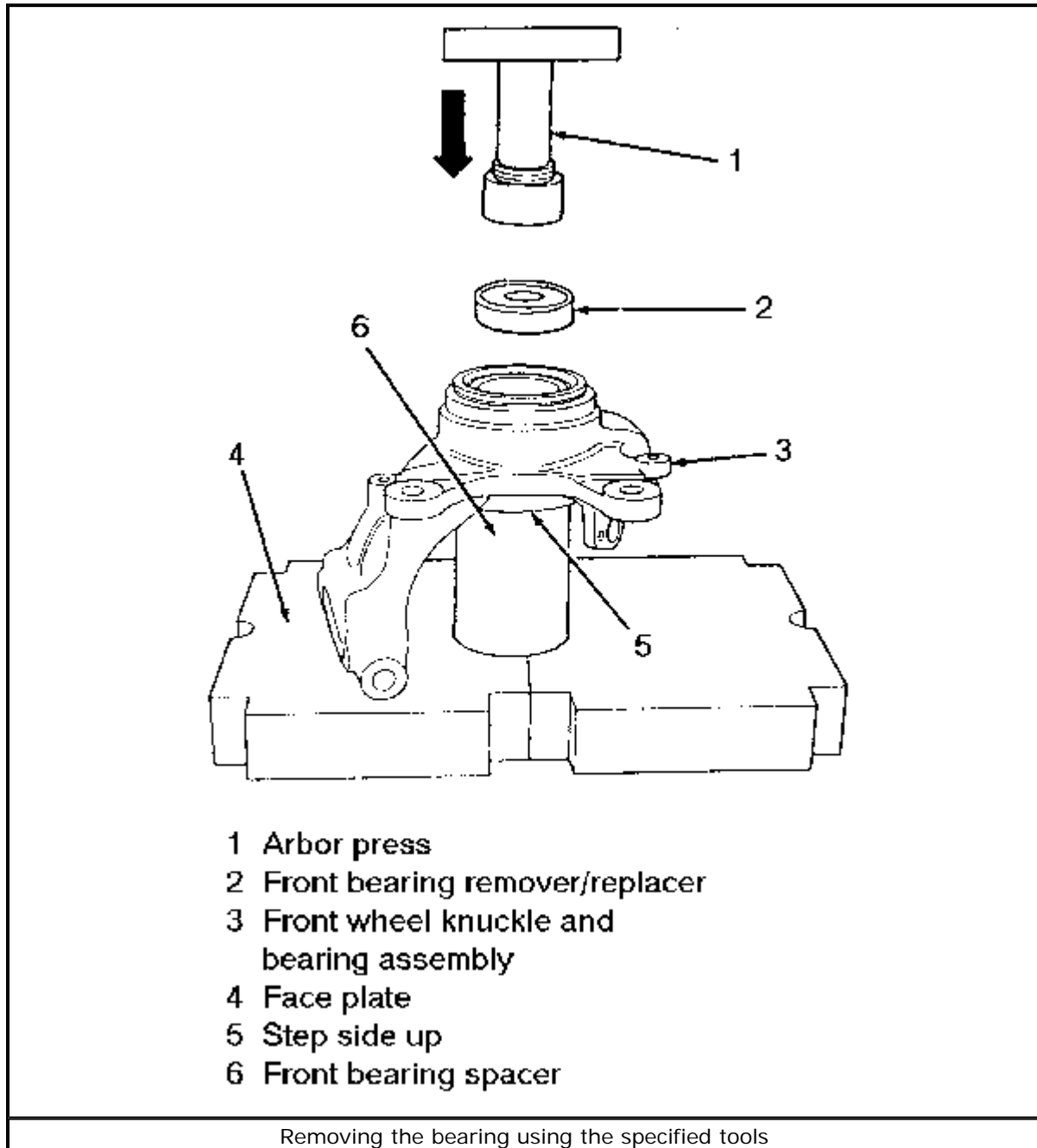
10. Support the knuckle with a length of wire, remove the strut bolt and slide the hub/bearing/knuckle assembly off of the strut. Remove the support wire and carry the hub/bearing/knuckle assembly to a bench.
11. Install 2-3 Jaw Puller D80L-1002-L and Shaft Protector D80L-625-1 or equivalent, with the jaws of the puller on the knuckle bosses. Make sure the shaft protector is centered, clears the bearing inside diameter, and rests on the end face of the hub journal. Remove the hub.



Installation of the 2-3 Jaw Puller and Shaft Protector

[Click to enlarge](#)

12. Using snapping pliers, remove the snapping that retains the bearing in the knuckle assembly, then discard the ring.
13. Using a suitable hydraulic press, place Front Bearing Spacer T86P-1104-A2, or equivalent, on the press plate with the step side facing up, then position the knuckle with the outboard side up on the spacer. Install Front Bearing Remover/Replacer T83P-1104-AH2 or equivalent, centered on the bearing inner race, then press the bearing out of the knuckle and discard.

[Click to enlarge](#)

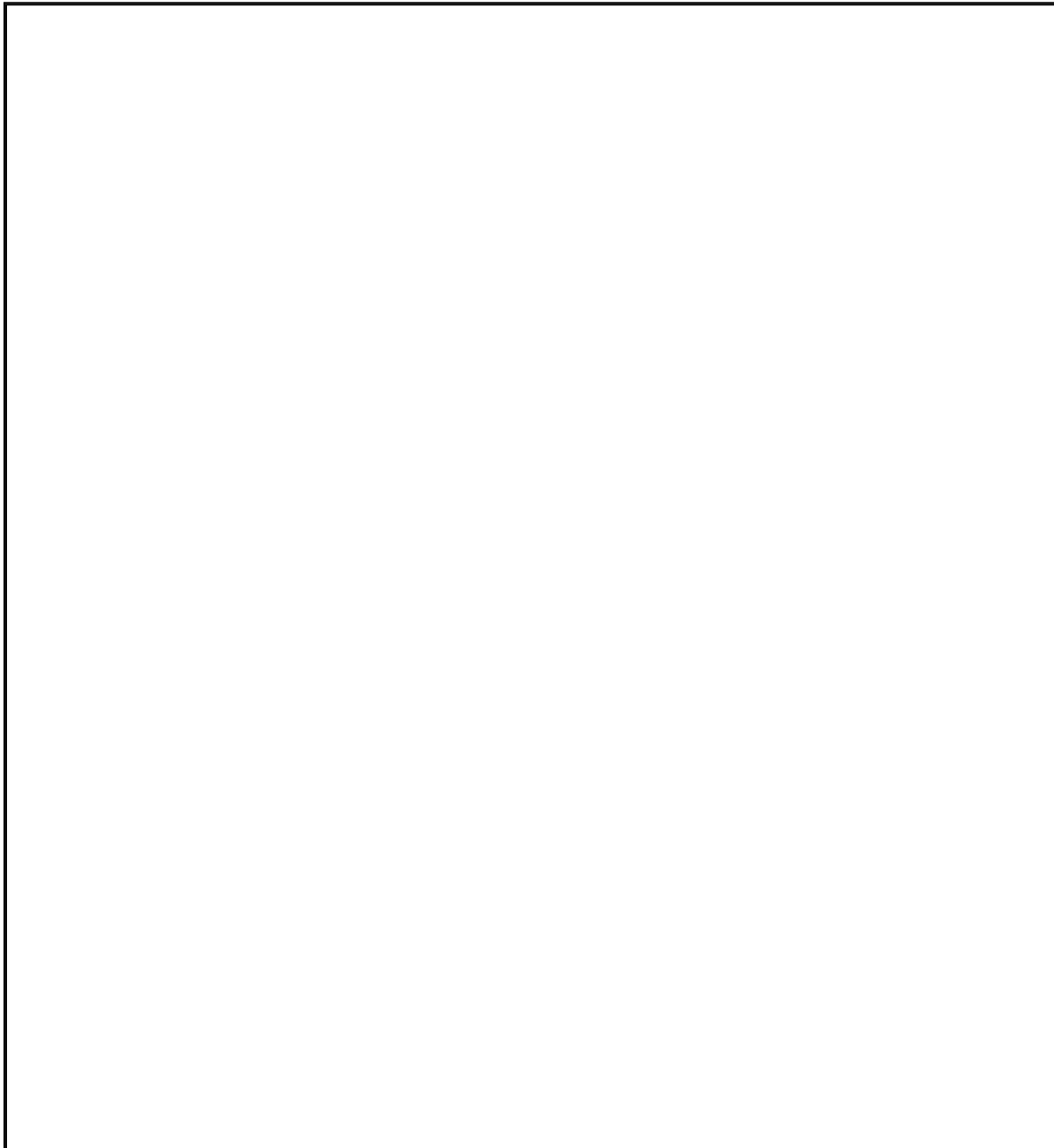
To install:

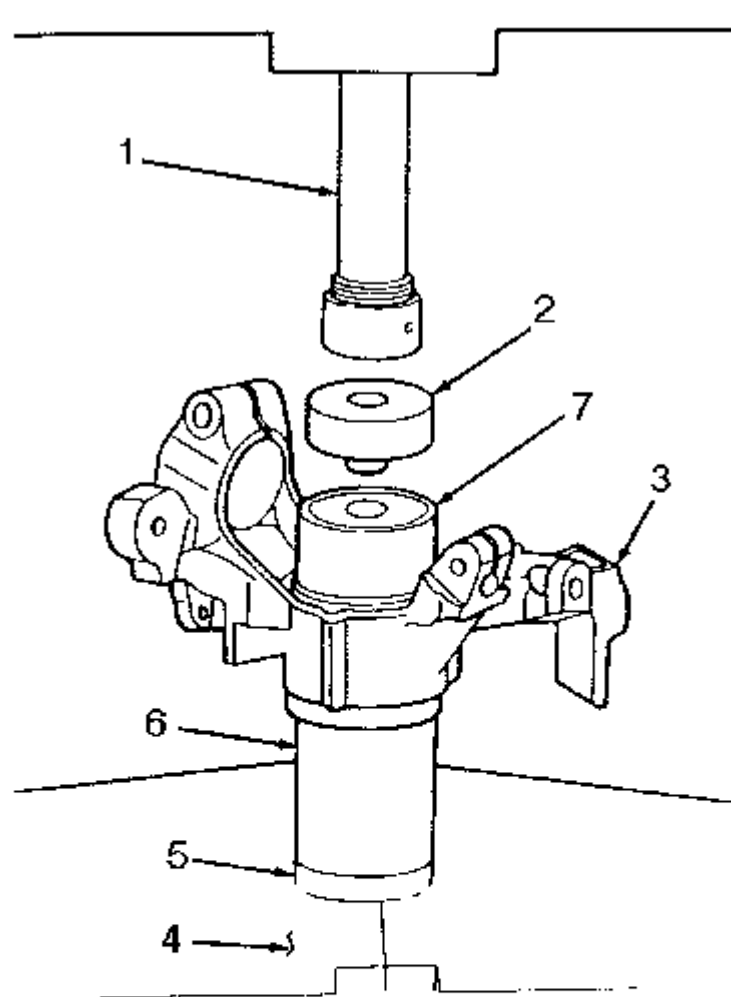
14. Remove all foreign material from the knuckle bearing bore and hub bearing journal to be sure of correct seating of the new bearing.

If the hub bearing journal is scored or damaged, it must be replaced. The front wheel bearings are pre-greased and sealed, and require no scheduled maintenance. The bearings are preset and cannot be adjusted. If a bearing is disassembled for any reason, it must be replaced as a unit, since individual service seals, rollers and races are not available.

15. Place Front Bearing Spacer T86P-1104-A2 or equivalent, with the step side down on the hydraulic press plate, then position the knuckle with the outboard side down on the spacer. Position a new bearing in the inboard side of the knuckle. Install Bearing Installer T86P-1104-A3 or equivalent, with the undercut side facing the bearing, on the bearing outer race, then press the bearing into the knuckle. Make sure the bearing seats completely against the shoulder of the knuckle bore.

Bearing installer T86P-1104-A3 or equivalent, must be positioned as indicated to prevent bearing damage during installation.



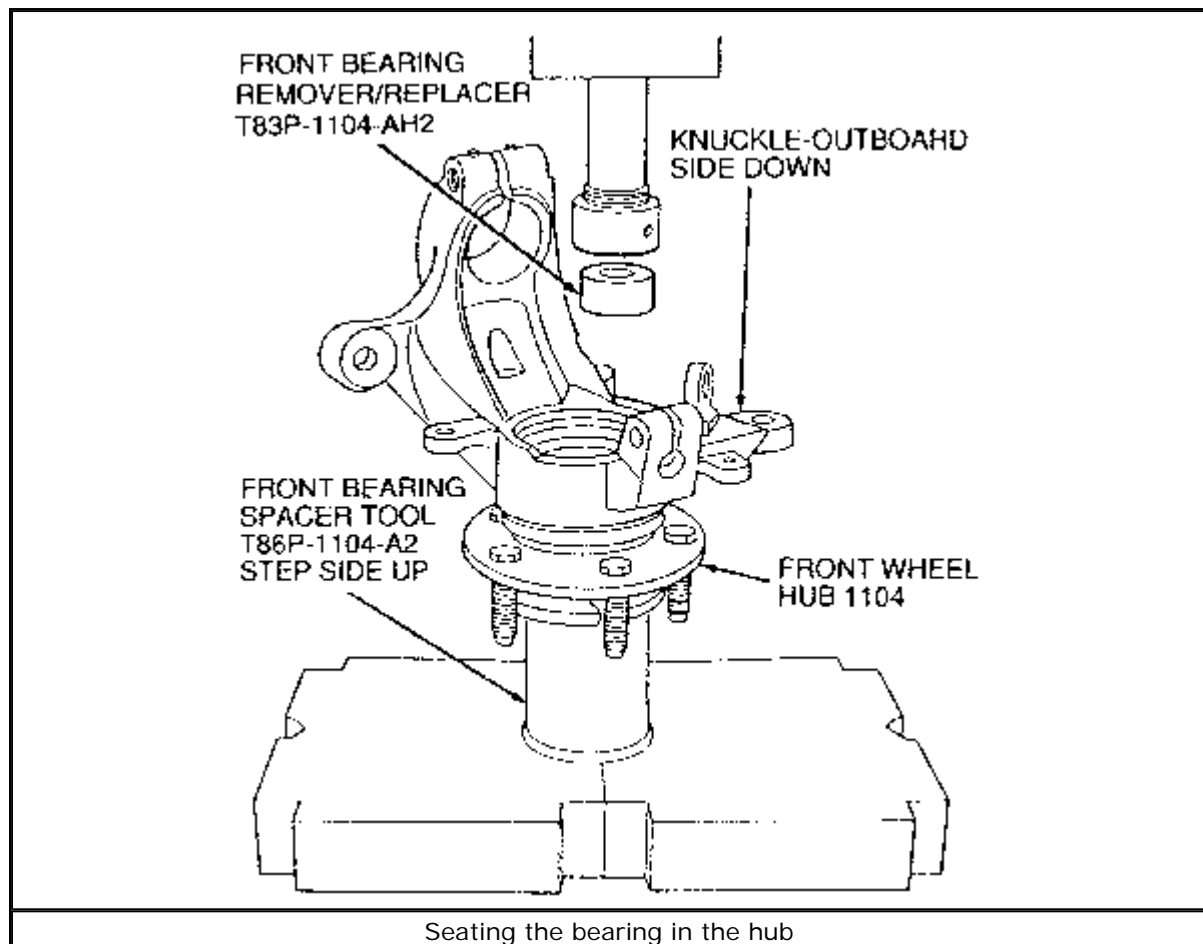


- 1 Arbor press
- 2 Bearing replacer (must be positioned with undercut side facing bearing)
- 3 Front wheel knuckle - outboard side
- 4 Face plate
- 5 Step side down
- 6 Front bearing spacer
- 7 Front wheel bearing

To prevent damage to the bearing during installation, the replacer tool must be positioned as shown

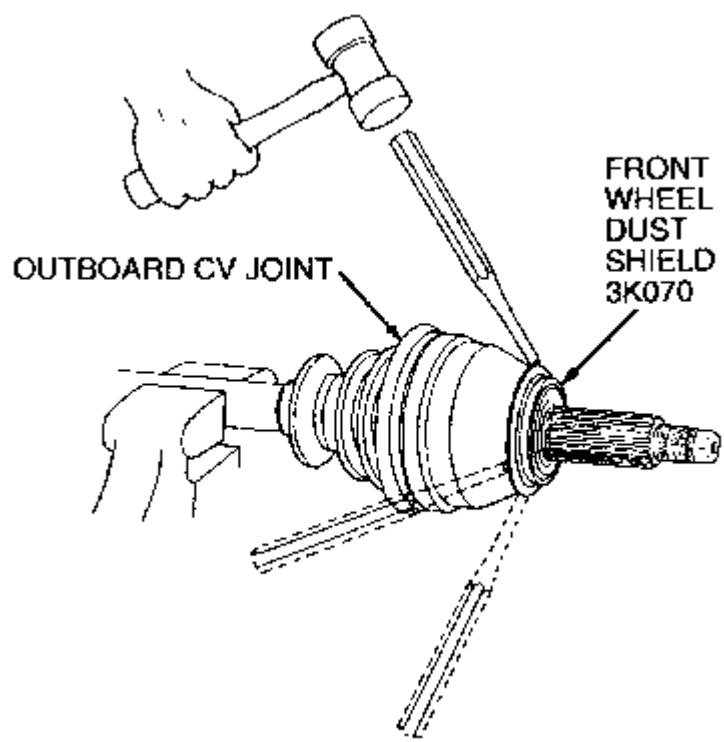
[Click to enlarge](#)

- 16. Install a new snapping (part of the bearing kit) in the knuckle groove using snapping pliers.
- 17. Place Front Bearing Spacer T86P-1104-A2 or equivalent, on the press plate, then position the hub on the tool with the lugs facing downward. Position the knuckle assembly with the outboard side down on the hub barrel. Place Bearing Remover T83P-1104-AH2 or equivalent, with its flat side down, centered on the inner race of the bearing, then press down on the tool until the bearing is fully seated onto the hub. Make sure the hub rotates freely in the knuckle after installation.

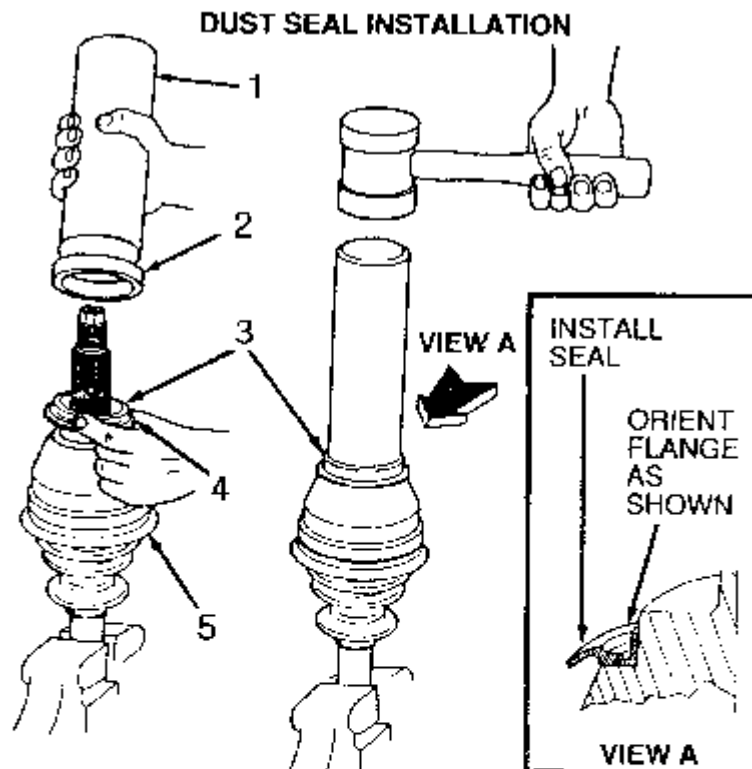


[Click to enlarge](#)

18. Prior to hub/bearing/knuckle installation, replace the bearing dust seal on the outboard CV-joint with a new seal from the bearing kit. Make sure the seal flange faces outboard toward the bearing. Use Drive Tube T83T-3132-A1 and Front Bearing Dust Seal Installer T86P-1104-A4 or equivalent.



Removing the bearing dust seal on the outboard CV-joint



NOTE: CLAMP HALFSHAFT IN VISE AND INSTALL USING SPINDLE AXLE SEAL REPLACER T83T-3132-A1 AND FRONT BEARING DUST SEAL REPLACER T89P-1104-A4 WITH SEAL FLANGE FACING OUTBOARD.

- 1 Spindle axle seal replacer
- 2 Front bearing dust seal replacer
- 3 Front bearing dust seal
- 4 Front bearing dust seal flange
- 5 Front wheel driveshaft joint

Replacing the bearing dust seal using the correct installation tools

[Click to enlarge](#)

19. Suspend the hub/bearing/knuckle assembly on the vehicle with wire, then attach the strut loosely to the knuckle. Lubricate the CV-joint stub shaft with SAE 30 weight motor oil, then using hand pressure only, insert the shaft into the hub splines as far as possible. Make sure the splines are properly engaged.
20. Temporarily secure the rotor to the hub with washers and two wheel lug nuts. Insert a steel rod into the rotor diameter, then rotate clockwise to contact the knuckle.
21. Install the hub nut washer and a new hub nut retainer. Rotate the nut clockwise to seat the CV-joint. Tighten the nut to 170-203 ft. lbs. (230-275 Nm). Remove the steel rod, washers and lug nuts.

Do not use power or impact tools to tighten the hub nut.

22. Install the remainder of the front suspension components.
23. Install the brake rotor splash shield.

Apply a small amount of Disc Brake Caliper Slide Grease D7AZ-19590-A or equivalent, to the pilot diameter of the rotor.

24. Install the disc brake rotor and caliper. Make sure the outer brake pad spring hook is seated under the upper arm of the knuckle.
25. Install the wheel and tire assembly, then finger-tighten the wheel nuts.
26. Carefully lower the vehicle, then block the wheels to prevent the car from rolling. Tighten the wheel lug nuts to 85-105 ft. lbs. (115-142 Nm). Install the wheel cover/hub cover, then remove the wheel blocks.

Upper Mount and Bearing Assembly

REMOVAL & INSTALLATION

CAUTION

When servicing the front suspension, keep in mind that brake shoes may contain asbestos which has been determined to be a cancer causing agent. Never clean the brake surfaces with compressed air! Avoid inhaling any dust from any brake surface! When cleaning brake surfaces, use a commercially available brake cleaning fluid.

1. Place the ignition switch in the OFF position and the steering column in the unlocked position.
2. Remove the hub nut. Loosen, but do not remove, the strut-to-fender apron nuts.
3. Raise and safely support the front of the vehicle on jackstands. Remove the wheel and tire assembly.

When raising the vehicle, do not lift it by the lower control arms.

4. Remove the brake caliper (support it by a wire) and the rotor.
5. At the tie rod end, remove the cotter pin and the castle nut. Discard the cotter pin and replace it with a new one during installation.
6. Using Tie-Rod End Remover tool No. 3290-C and the Tie Rod Remover Adapter tool No. T81P-3504-W, or equivalent, separate the tie rod from the steering knuckle.
7. Remove the stabilizer bar link nut and the link from the strut.
8. Remove the lower arm-to-steering knuckle pinch bolt and nut; it may be necessary to use a drift punch to remove the bolt. Using a small prybar, slightly spread the knuckle-to-lower arm pinch joint and remove the lower arm from the steering knuckle.
9. Remove the halfshaft from the hub, then support it by a wire.

When removing the halfshaft, DO NOT allow it to move outward, as the tripod CV-joint could separate from the internal parts, causing failure of the joint.

10. Remove the strut-to-steering knuckle pinch bolt. Using a small pry bar, spread the pinch bolt joint and separate the strut from the steering knuckle. Remove the steering knuckle/hub assembly from the strut assembly.

11. **Remove the strut-to-fender apron nuts and the strut assembly from the vehicle.**

CAUTION

NEVER attempt to disassemble the spring or top mount without first compressing the spring using a Universal MacPherson Strut Spring Compressor D85P-7178-A or a Rotunda Spring Compressor 086-00029 or equivalent. Failure to properly compress the spring before disassembly can result in serious injury or death.

12. **Place a 10mm box-end wrench on top of the shock strut shaft and hold while removing the top shaft mounting nut with a 21mm 6-point crow foot wrench and ratchet.**
13. **Loosen the MacPherson Strut Spring Compressor slowly. Remove the top mount bracket assembly, bearing plate and spring.**

When servicing the shock absorber strut, check the spring insulator for damage before assembly. If the outer metal splash shield is bent or damaged, it must be bent back carefully so that it does not touch the locator tabs on the bearing and seal assembly.

To install:

14. **Place the MacPherson Strut Spring Compressor on the base of the strut.**
15. **Install the upper mount and bearing assembly on top of the strut and tighten the spring compressor far enough to install the shaft mounting nut.**
16. **Install the washer and nut on the shock strut shaft, then tighten with the 10mm box-end and the 21mm 6-point crow's foot wrench and ratchet.**
17. **Install the "MacPherson Strut", as previously outlined.**

Front End Alignment

CASTER

Caster is a measurement of the angle between the steering axis and vertical, as viewed from the side of the vehicle when the wheels are in the straight ahead position. Stated another way, it is the tilting of the front steering axis either forward or backward from the vertical. A backward tilt is said to be positive (+) and a forward tilt is said to be negative (-).

Although it is measured using a special instrument, it can usually be seen by observing the location of the upper and lower control arm ball joints. A line drawn through the center of these two points represents the steering axis. When looking straight downward from the top of the upper control arm, you can see if the ball joints are not aligned, indicating that the caster angle is more or less than 0 degrees. If the vehicle has positive caster, the lower ball joint would be located behind the upper joint center line. If the vehicle has negative caster, the lower ball joint would be located in front of the upper joint center line.

CAMBER

Camber is a measurement of the wheel tilt from the vertical direction, when the wheel is viewed from the rear of the vehicle. Camber is negative when the top of

the wheel is inboard and positive when the top is outboard. Always check for bent, damaged or worn suspension components before determining that adjustment is necessary. The amount of tilt is measured in degrees from the vertical, and this measurement is called the camber angle.

TOE-IN

Toe is a measurement of how far a wheel is turned in or out from the straight ahead direction. When the front of the wheel is turned in, the toe is positive. When the front of the wheel is turned out, toe is negative. An incorrect toe setting can affect steering feel and cause excessive tire wear.

Stated another way, toe-in is the amount that the front of the wheels are closer together than the backs of the same wheels. The actual amount of toe-in is normally only a fraction of a degree.

Chilton® Automotive Information Systems. © 2004 Thomson Delmar Learning.