

STEERING

Steering Wheel

REMOVAL & INSTALLATION

CAUTION

If equipped with an air bag, the negative battery cable must be disconnected before working on the system. On 1990-95 vehicles, the backup power supply must also be disconnected. Failure to do so may result in deployment of the air bag and possible personal injury. Always wear safety glasses when servicing an air bag vehicle and when handling an air bag.

1986-89 Vehicles

1. Disconnect the negative battery cable.



Steering wheel assembly-1986 Taurus shown

2. Unfasten the two screws from the back of the steering wheel, then remove the steering wheel horn pad cover. Disengage the electrical connector. If equipped with cruise control, disengage the connector from the slip ring terminal.



Remove the two steering wheel horn pad cover retaining screws from the back of the steering wheel, then ...



... disengage the electrical connector and remove the steering wheel horn pad cover

3. Remove and discard the steering wheel retaining bolt/nut.

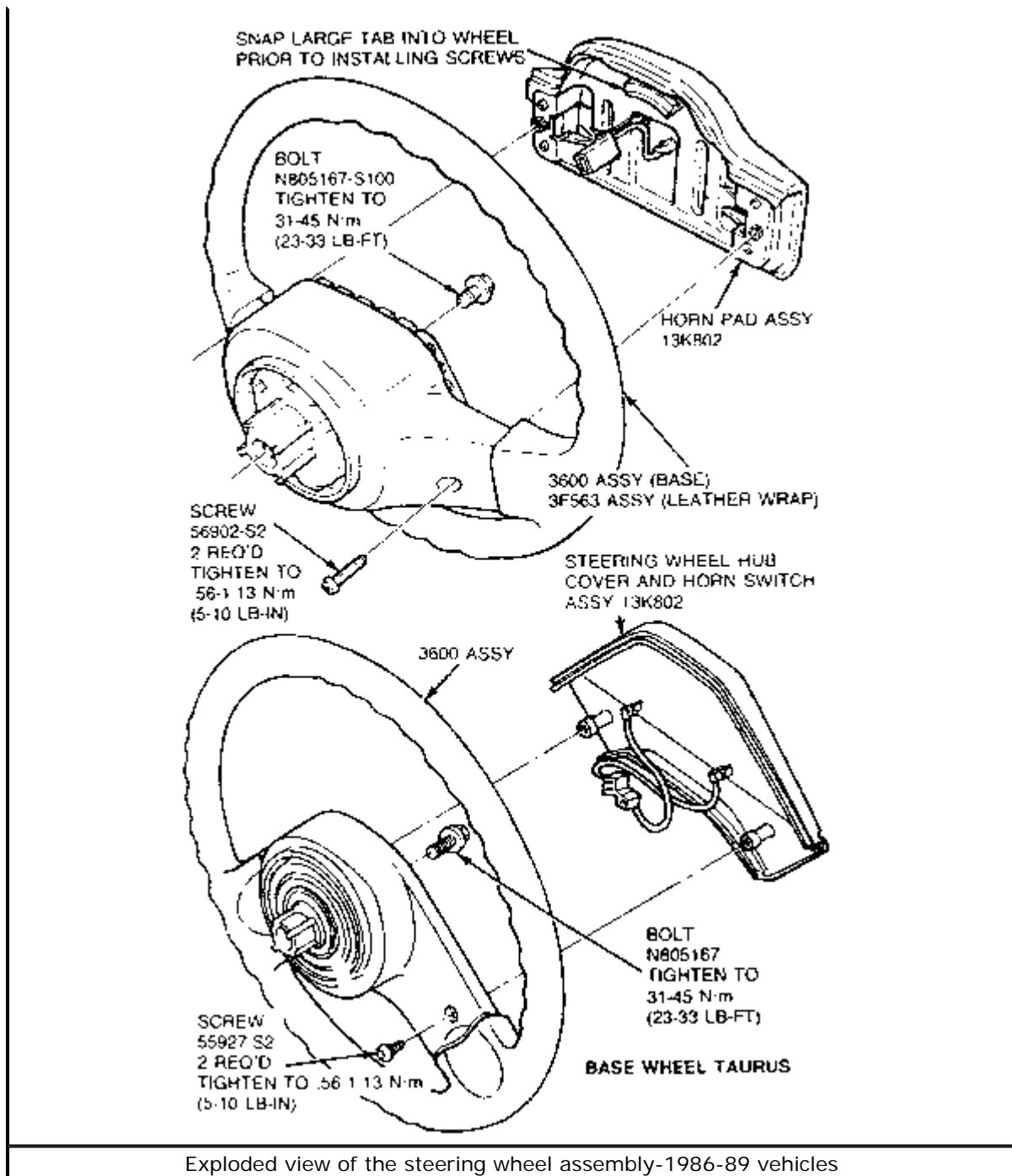


Unfasten the wheel retaining nut, then ...



... remove the steering wheel by grasping the rim and pulling it off

- 4. Remove the steering wheel from the upper shaft by grasping the rim of the steering wheel and pulling it off. A steering wheel puller is not required.**



[Click to enlarge](#)

To install:

5. Position the steering wheel on the end of the shaft. Align the mark on the steering wheel with the mark on the shaft to ensure that the straight-ahead steering wheel position corresponds to the straight-ahead position of the front wheels.

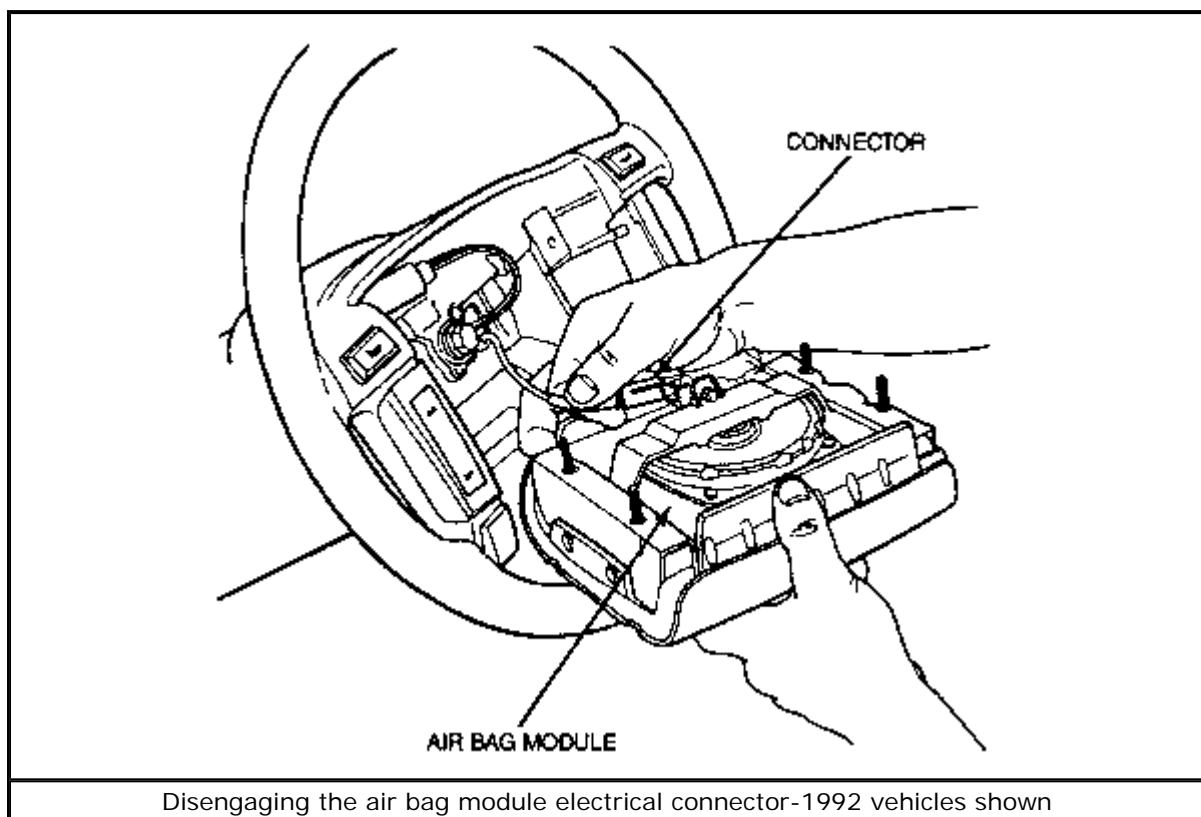
The combination switch lever must be in the middle (neutral) position before installing the steering wheel or damage to the switch cam may result.

6. Install a new steering wheel retaining bolt, then tighten it to 23-33 ft. lbs. (31-45 Nm).

7. If equipped with cruise control, engage the connector to the slip ring terminal.
8. Install the steering wheel horn pad cover with the two retaining screws. Tighten to 5-10 inch lbs. (0.5-1.1 Nm).
9. Connect the negative battery cable, then check the steering wheel for proper operation.

1990-95 Vehicles

1. Center the front wheels in the straight-ahead position.
2. Disconnect the negative battery cable. Lower the glove compartment past its stops, then disconnect the air bag backup power supply.
3. For 1990-93 vehicles except SHO, remove the four air bag module retaining nuts and lift the module from the wheel. Disconnect the air bag wire harness from the air bag module, then remove the module from the steering wheel.



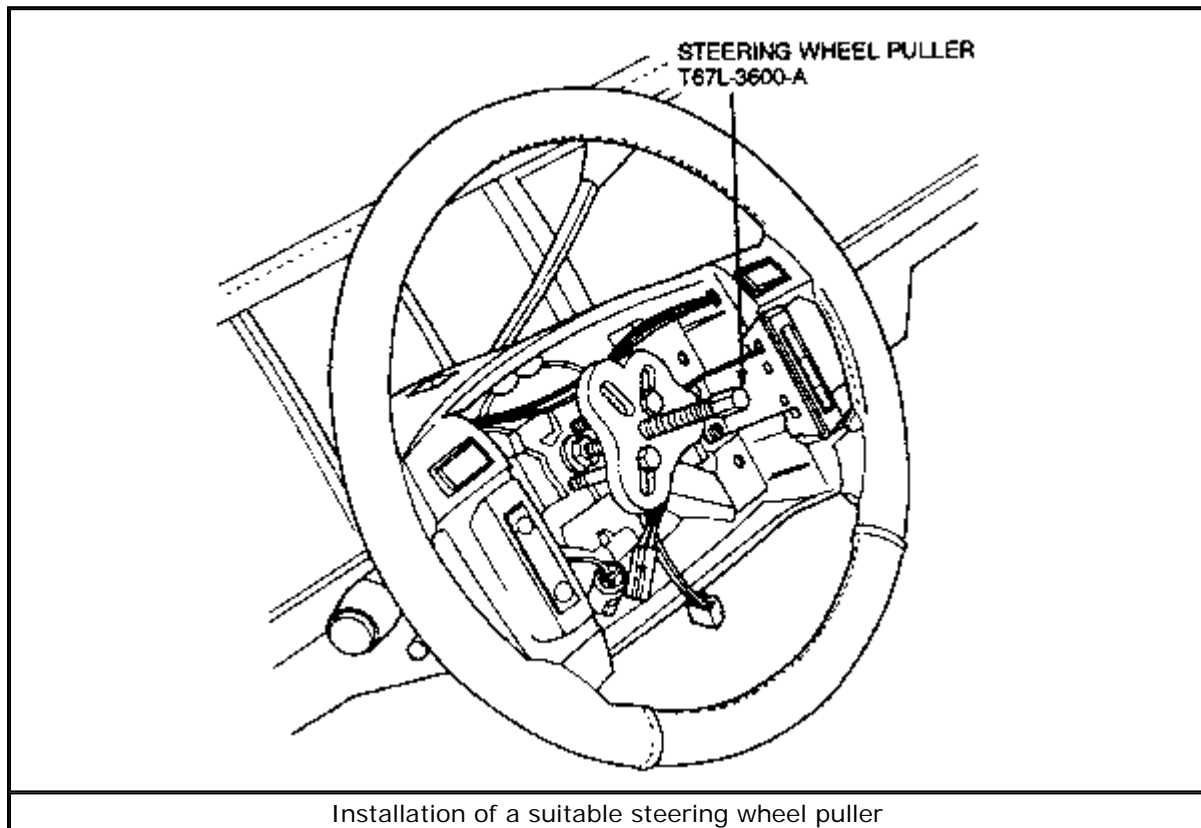
[Click to enlarge](#)

4. For 1994-95 vehicles and SHO vehicles only, remove the two steering wheel back cover plugs. Remove the two air bag module retaining bolts, then lift the module off of the steering wheel. Disconnect the air bag wire harness from the air bag module, then remove the module from the steering wheel.

CAUTION

When carrying a live air bag, make sure the bag and trim cover are pointed away from the body. In the unlikely event of an accidental deployment, the bag will then deploy with minimal chance of injury. In addition, when placing a live air bag on a bench or other surface, always face the bag and trim cover up, away from the surface. This will reduce the chance of personal injury if it is accidentally deployed.

5. Disconnect the cruise control wire harness from the steering wheel. Remove and discard the steering wheel retaining bolt.
6. Install Steering Wheel Puller T67L-3600-A or equivalent, and remove the steering wheel. Route the contact assembly wire harness through the steering wheel as the wheel is lifted off the shaft.



[Click to enlarge](#)

To install:

7. Make sure the vehicle's front wheels are in the straight-ahead position.
8. Route the contact assembly wire harness through the steering wheel opening at the 3 o'clock position and install the steering wheel on the shaft. The steering wheel and shaft alignment marks should be aligned. Make sure the air bag contact wire is not pinched.
9. Install a new steering wheel retaining bolt, then tighten to 23-33 ft. lbs. (31-45 Nm).

Be sure the wiring does not get trapped between the steering wheel and the contact assembly.

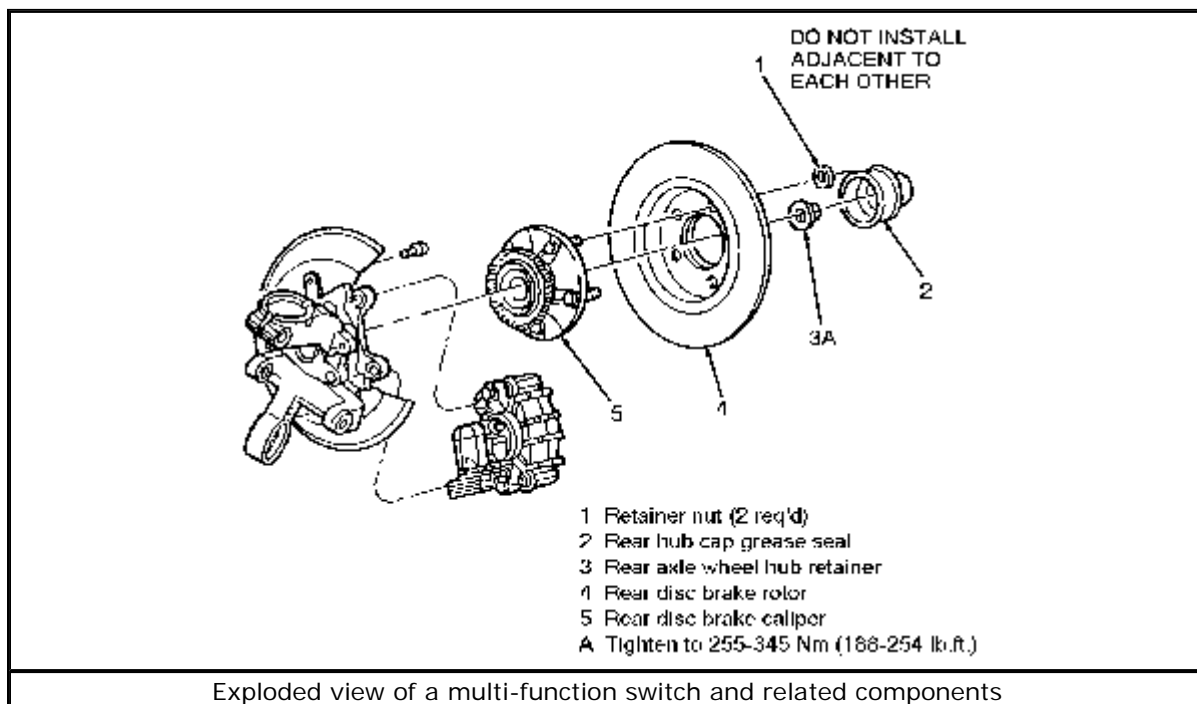
10. Connect the cruise control wire harness to the wheel, then snap the connector assembly into the steering wheel clip.
11. Connect the air bag wire harness to the air bag module, then install the module to the steering wheel. For 1990-93 vehicles except SHO, tighten the module retaining nuts to 36-47 inch lbs. (4-5.4 Nm). For 1994 vehicles and 1990-94 SHO vehicles, tighten the retaining screws to 7.5-10 ft. lbs. (10-14 Nm), then install the back cover plugs. For 1995 vehicles, tighten the retaining screws to 36-47 inch lbs. (4-5 Nm).
12. Connect the air bag backup power supply and the negative battery cable. Check the air bag warning indicator.

Multi-Function Switch

The multi-function switch incorporates the turn signal, headlight dimmer, headlight flash-to-pass, hazard warning, cornering lights and windshield washer/wiper functions.

REMOVAL & INSTALLATION

1. Disconnect the negative battery cable.
2. If equipped with a tilt steering column, set the tilt column to its lowest position, then remove the tilt lever by removing the Allen® head retaining screw.
3. Remove the ignition lock cylinder.
4. Remove the steering column shroud screws, then remove the upper and lower shrouds.
5. For vehicles through 1989, unfasten the wiring harness retainer, then disengage the three electrical connectors.
6. Remove the self-tapping screws attaching the switch to the steering column, then disengage the switch from the steering column casting.
7. For 1990-95 vehicles, disengage the two or three electrical connectors, depending upon vehicle application.



[Click to enlarge](#)

To install:

8. For 1990-95 vehicles, engage the electrical connectors.
9. Align the turn signal switch mounting holes with the corresponding holes in the steering column and install self-tapping screws. Tighten the screws to 17-26 inch lbs. (2-3 Nm).
10. For vehicles through 1989, engage the electrical connectors, then install the wiring

harness retainer.

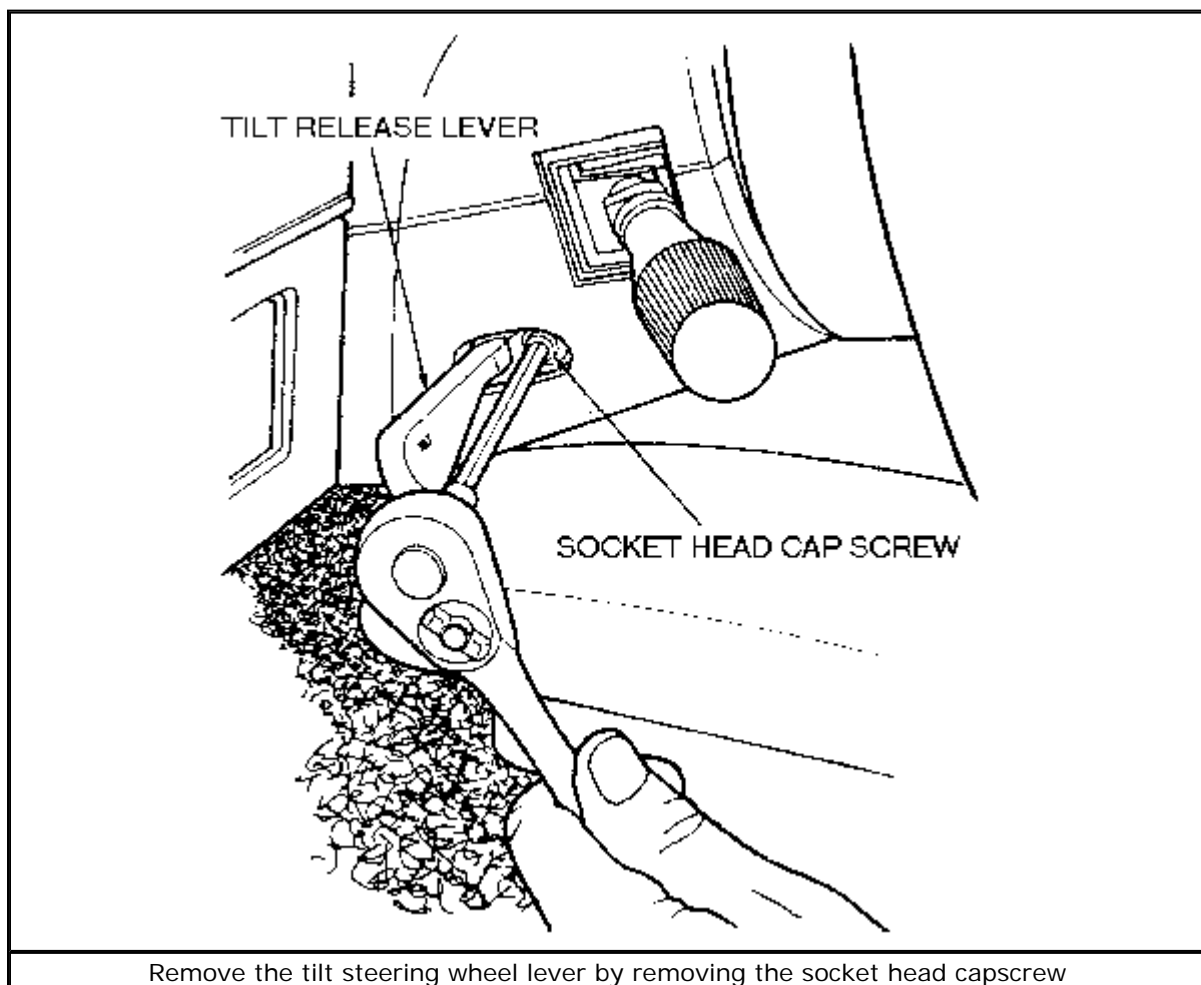
11. Install the upper and lower steering column shroud and shroud retaining screws; tighten the screws to 6-10 inch lbs. (0.7-1.1 Nm).
12. Install the ignition lock cylinder.
13. Attach the tilt lever, if removed, then tighten the tilt lever Allen® head retaining screw to 6-9 inch lbs. (0.7-1.0 Nm).
14. Connect the negative battery cable. Check the switch and the steering column for proper operation.

Ignition Switch

REMOVAL & INSTALLATION

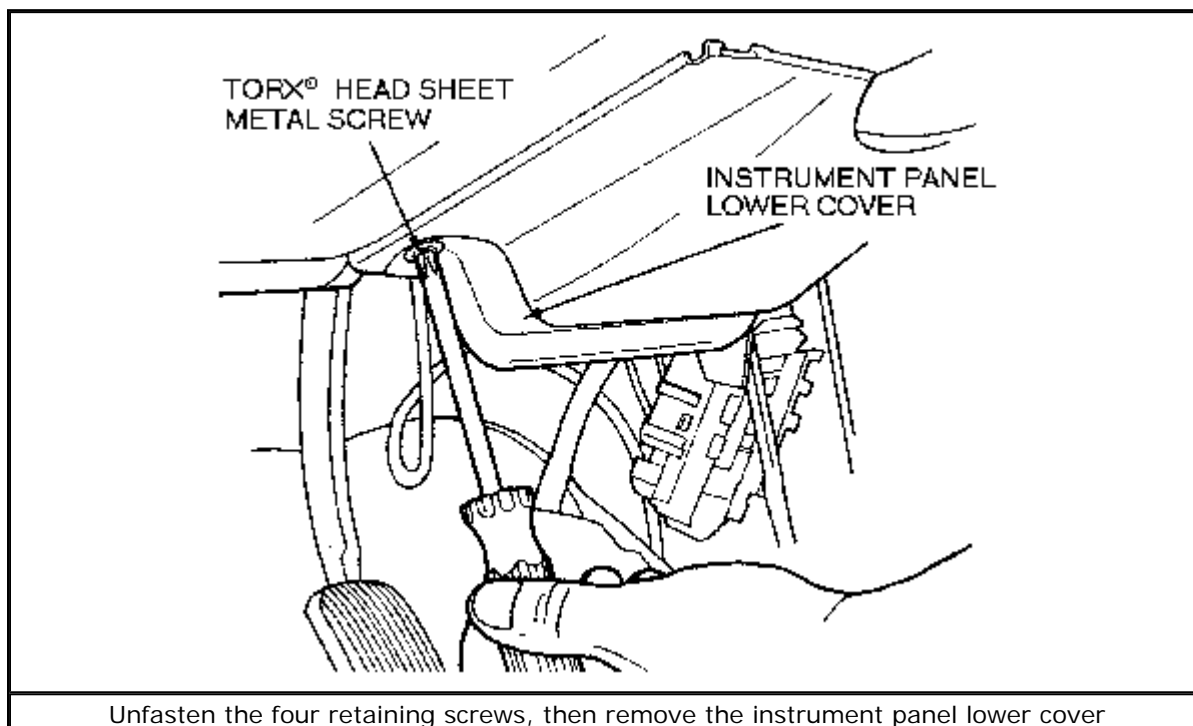
1986-89 Vehicles

1. Disconnect the negative battery cable.
2. Turn the ignition lock cylinder to the RUN position. Depress the lock cylinder retaining pin through the access hole in the shroud with a $\frac{1}{8}$ diameter punch, then remove the lock cylinder.
3. If equipped with tilt columns, remove the tilt release lever after unfastening the retaining screw.

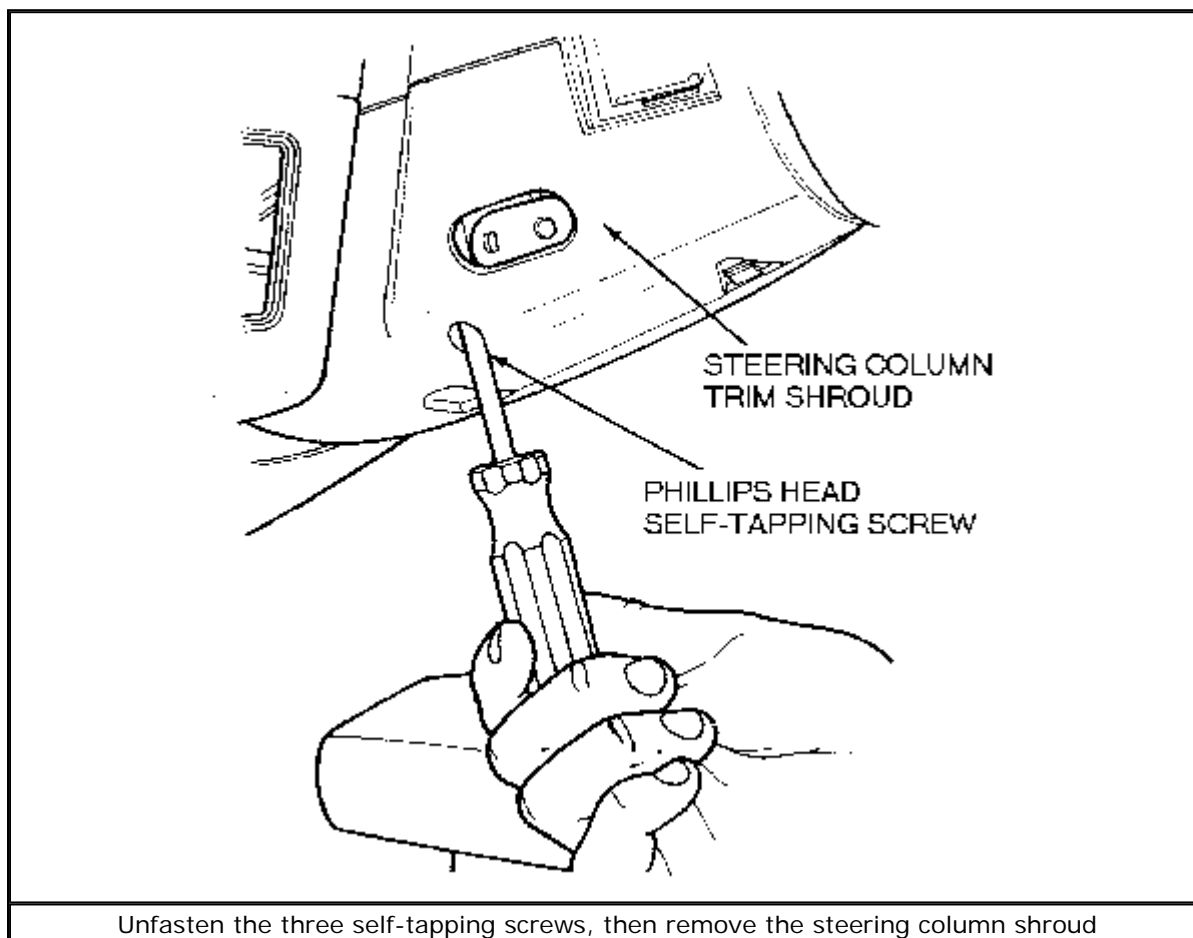


[Click to enlarge](#)

4. Remove the instrument panel lower cover and the steering column shroud after removing the retaining screws.

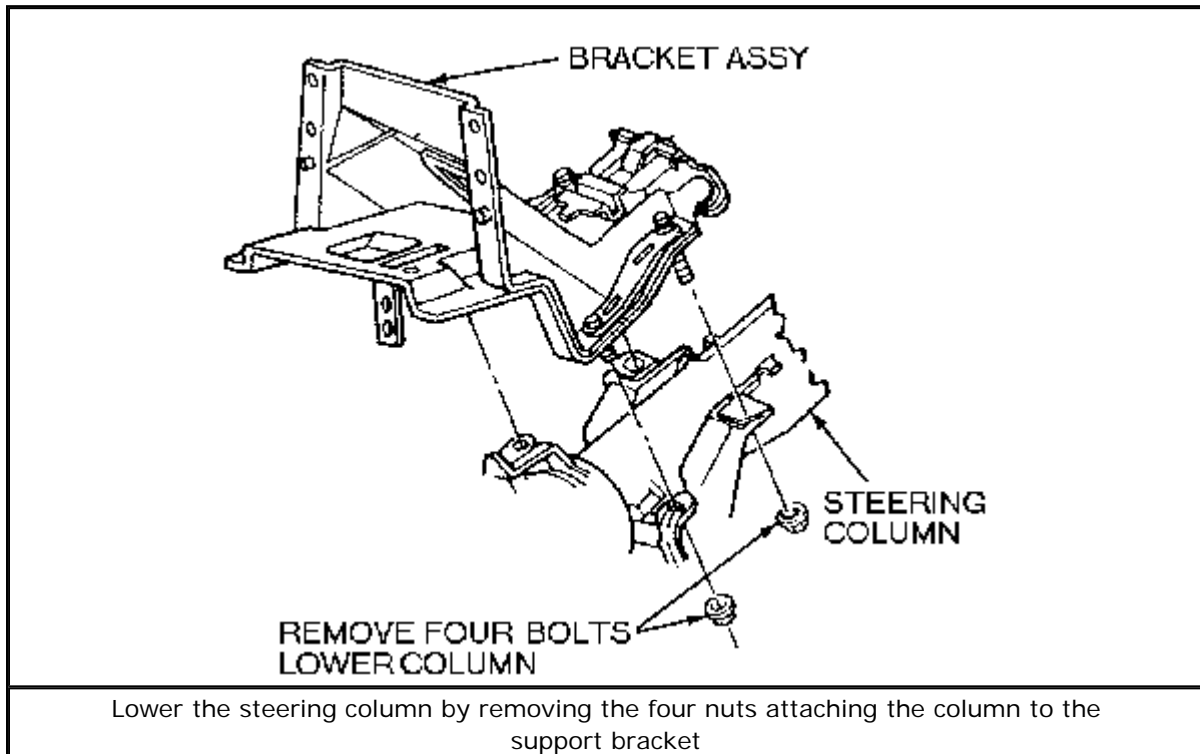


[Click to enlarge](#)



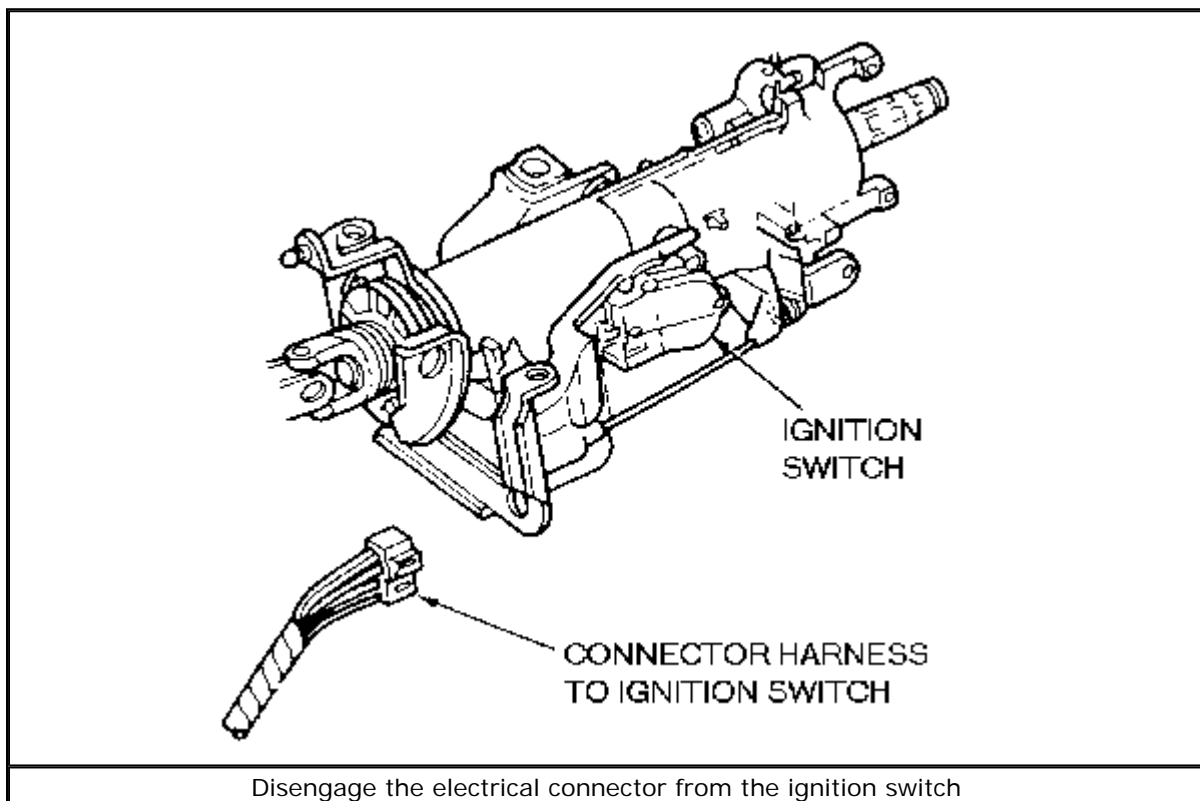
[Click to enlarge](#)

5. Remove the four nuts attaching the steering column to the support bracket, then lower the column.



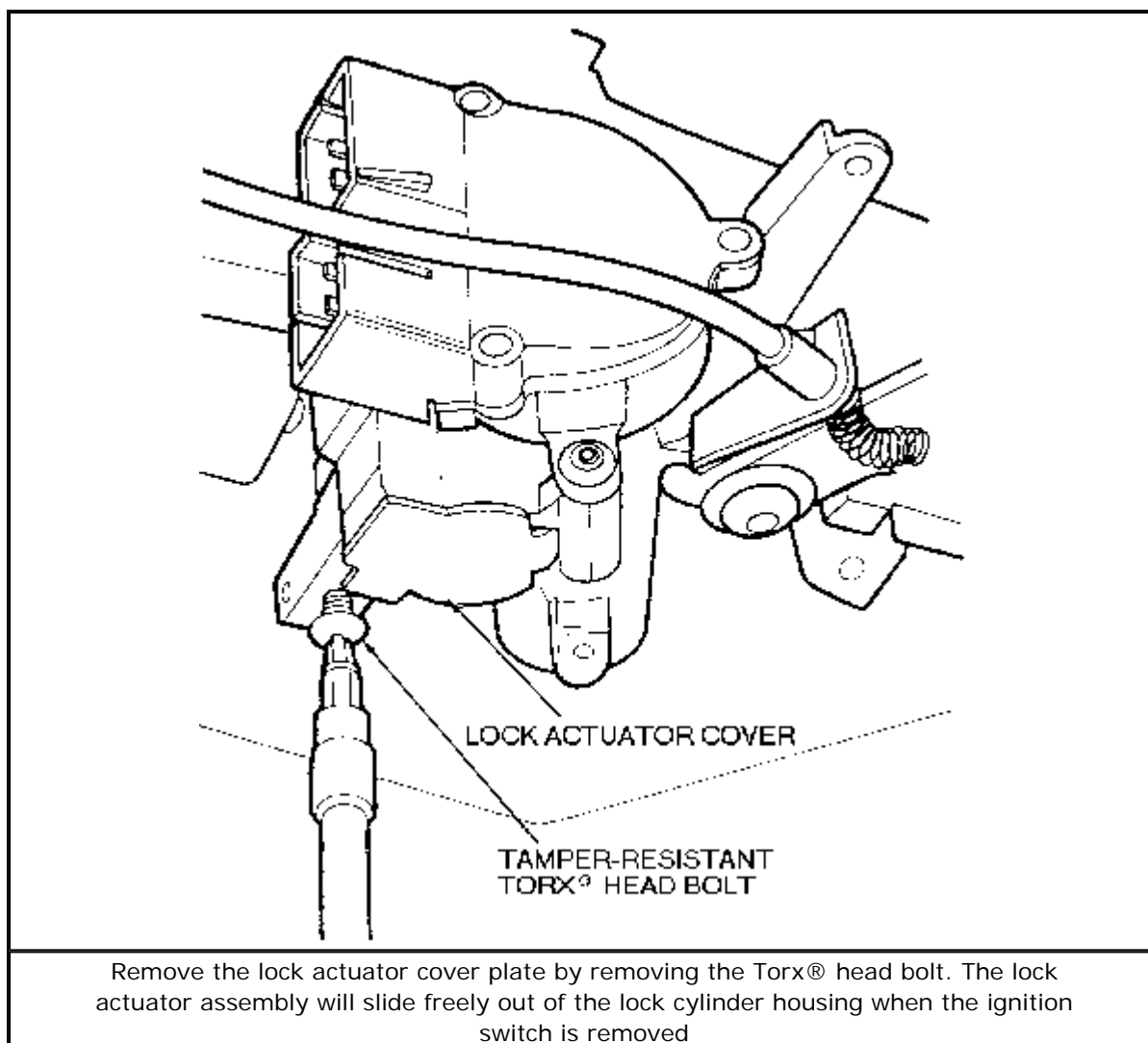
[Click to enlarge](#)

6. Disengage the ignition switch electrical connector.



[Click to enlarge](#)

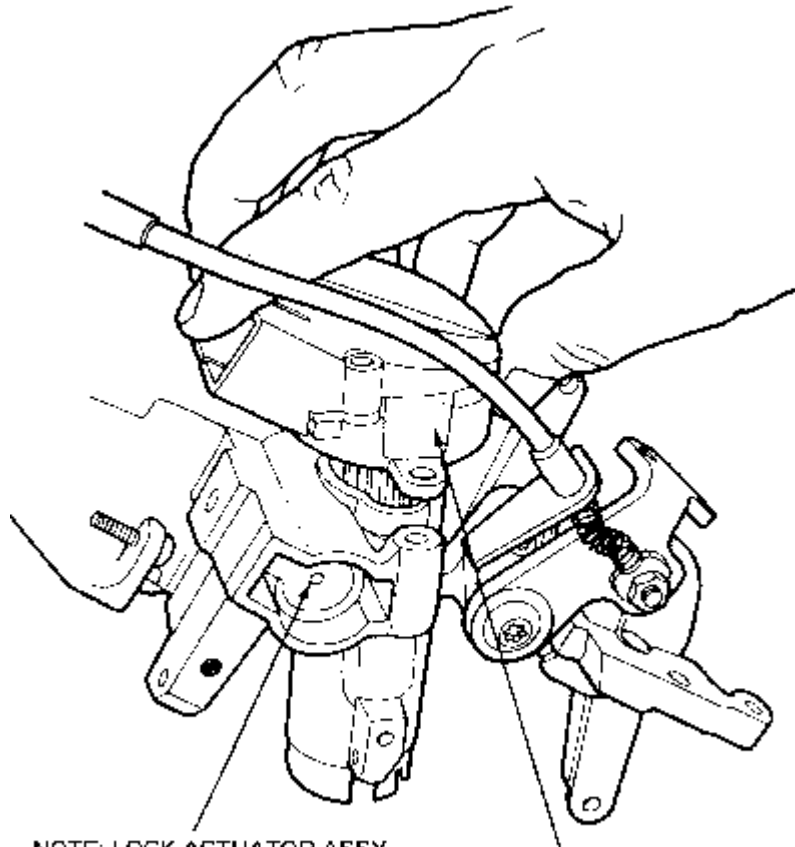
7. Remove the lock actuator cover plate by removing the Torx® head bolt. The lock actuator assembly will slide freely out of the lock cylinder housing when the ignition switch is removed.



[Click to enlarge](#)

8. Remove the ignition switch and cover after unfastening the two bolts with Torx® Driver D83L-2100-A or equivalent.





NOTE: LOCK ACTUATOR ASSY
WILL SLIDE OUT WHEN
IGNITION SWITCH IS REMOVED

REMOVE IGNITION
SWITCH AND COVER

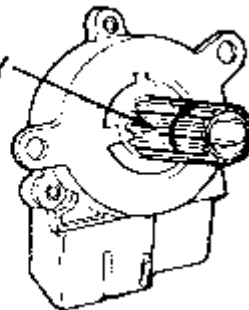
Remove the ignition switch and cover by removing the two bolts with Torx® Driver D83L-2100-A or equivalent

[Click to enlarge](#)

To install:

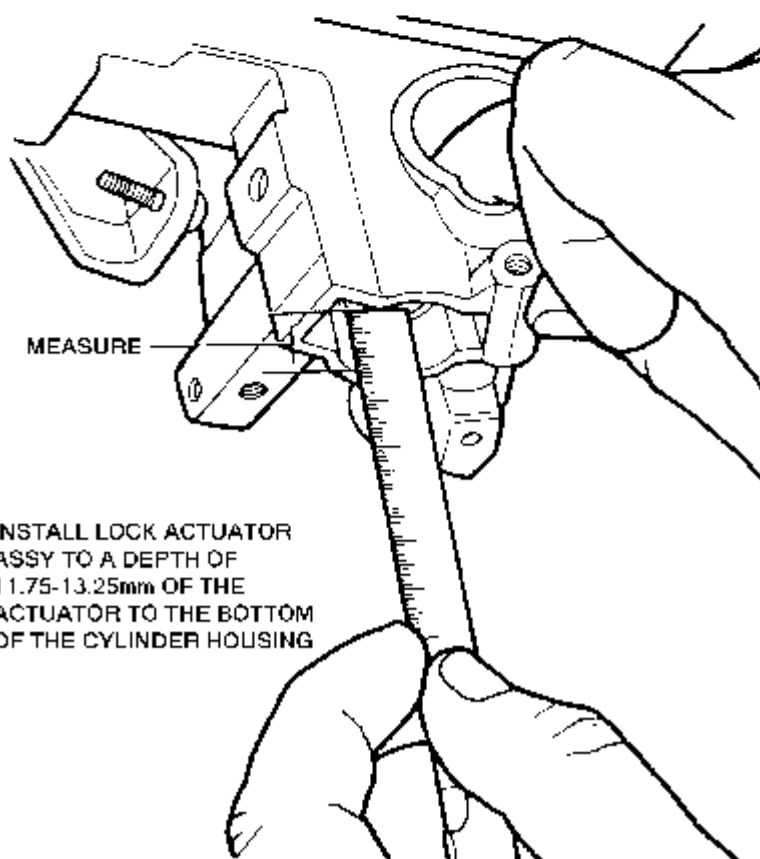
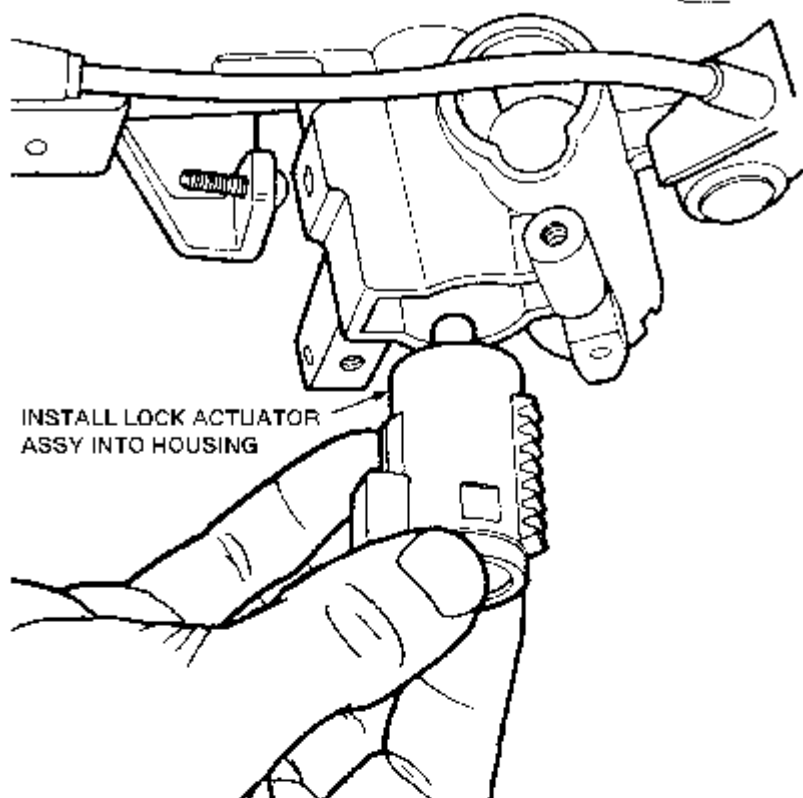
9. Make sure the ignition switch is in the RUN position by rotating the driveshaft fully clockwise to the START position and releasing.

ROTATE SHAFT CLOCKWISE
UNTIL IT STOPS AND SLOWLY
RELEASE TO POSITION
SWITCH IN RUN



Make sure the ignition switch is in the "RUN" position by rotating the driveshaft fully clockwise to the "START" position and releasing

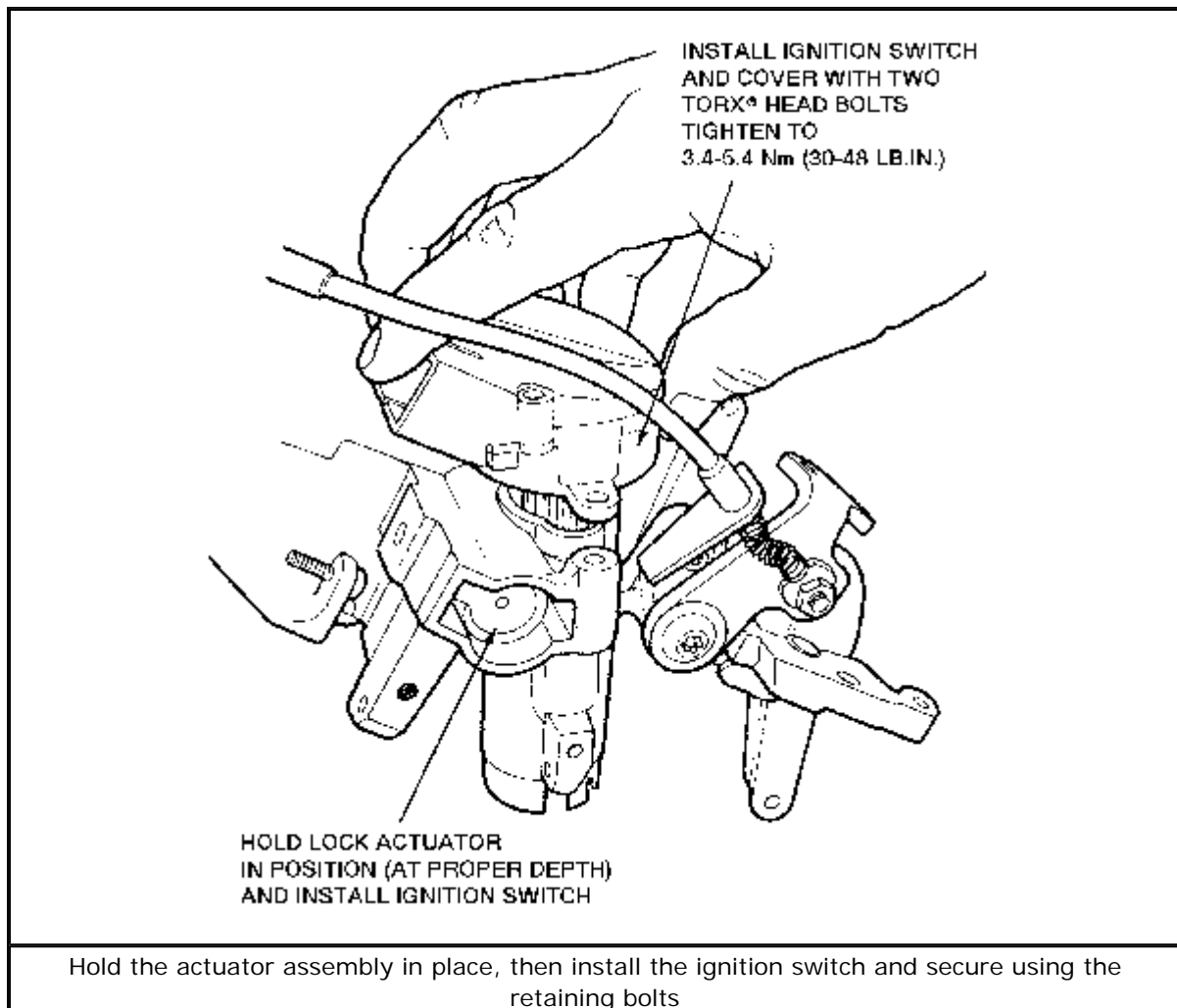
10. Install the lock actuator assembly at a depth of 0.46-0.52 in. (11.75-13.25mm) from the bottom of the actuator assembly to the bottom of the lock cylinder housing.



Installing and measuring the depth of the lock actuator assembly

[Click to enlarge](#)

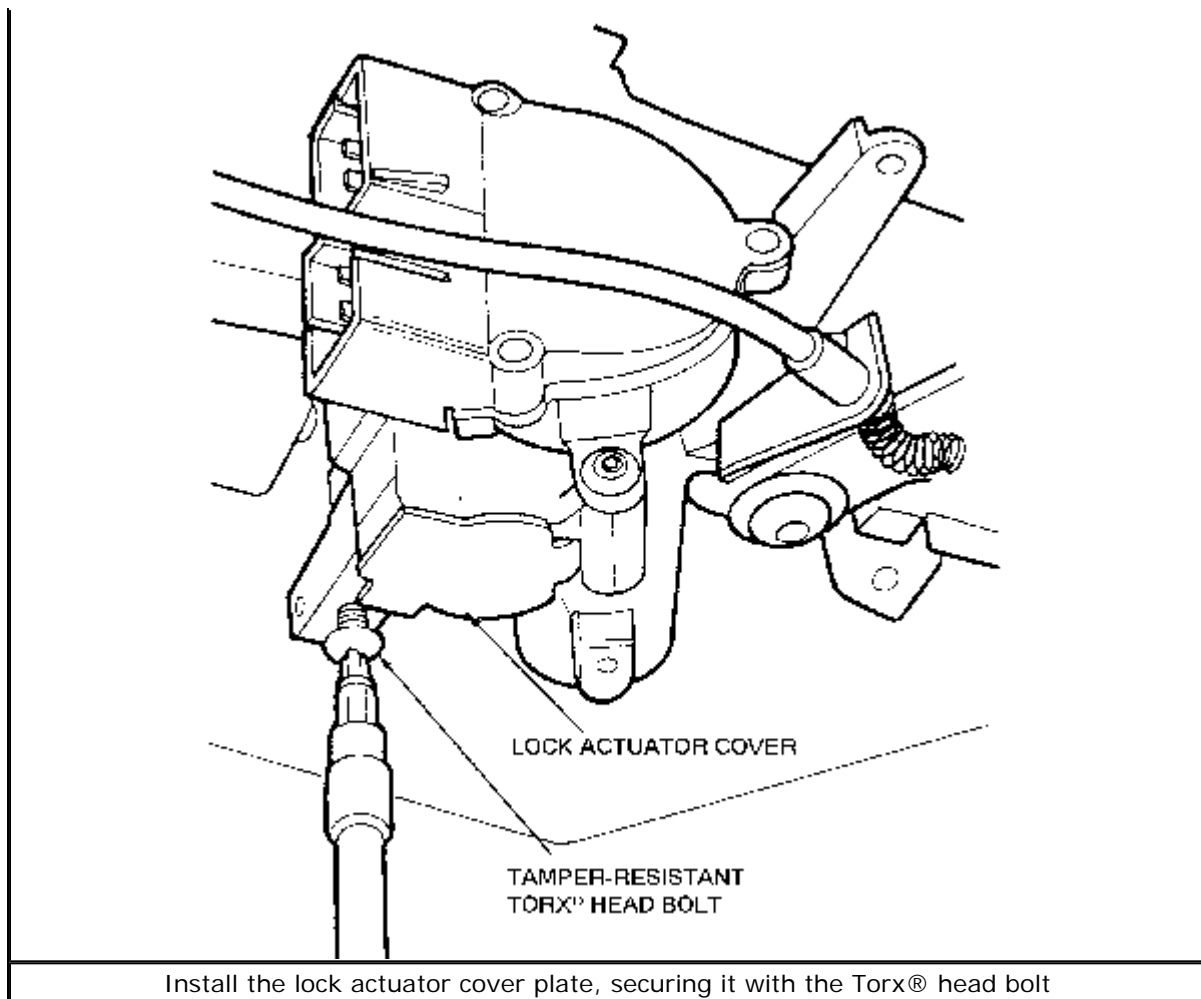
11. While holding the actuator assembly at the proper depth, install the ignition switch. Install the ignition switch cover and tighten the retaining bolts to 30-48 inch lbs. (3.4-5.4 Nm).



[Click to enlarge](#)

12. Install the lock cylinder. Rotate the ignition lock cylinder to the LOCK position and measure the depth of the actuator assembly as in Step 10. The actuator assembly must be 0.92-1.00 in. (23.5-25.5mm) inside the lock cylinder housing. If the depth measured does not meet specification, the actuator assembly must be removed and installed again.
13. Install the lock actuator cover plate, then tighten the bolt to 30-48 inch lbs. (3.4-5.4 Nm).

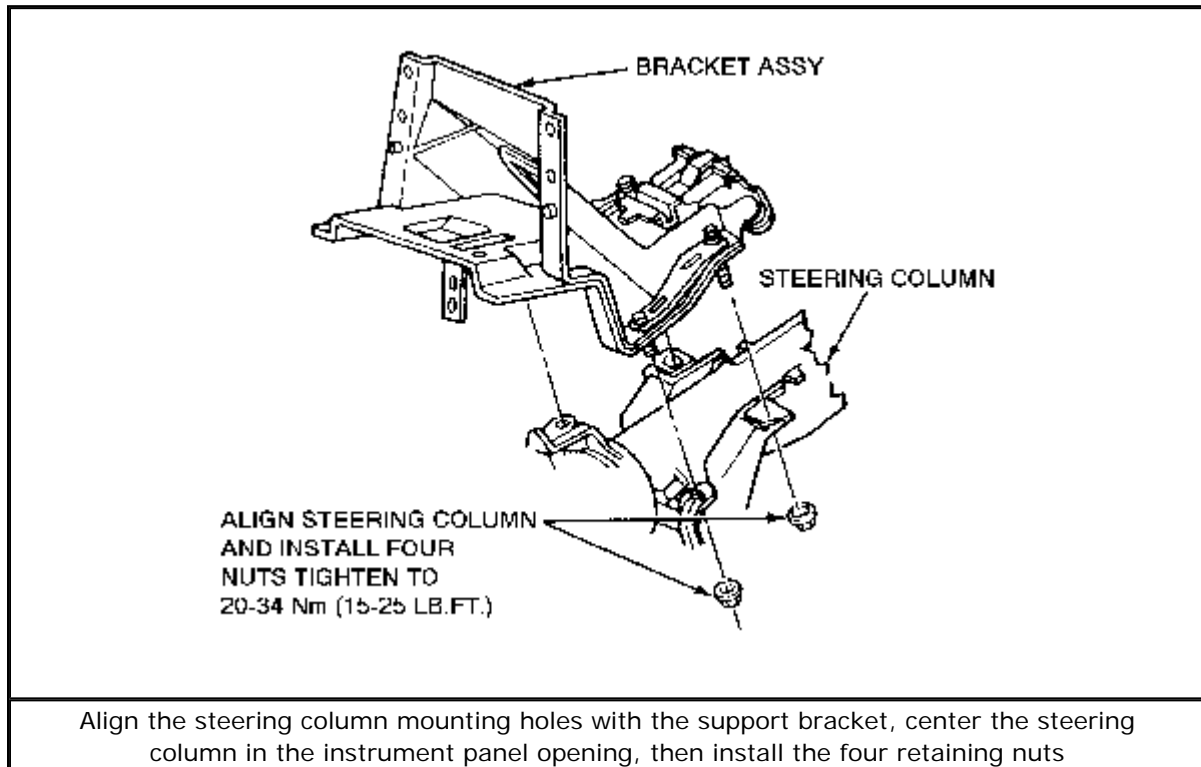




[Click to enlarge](#)

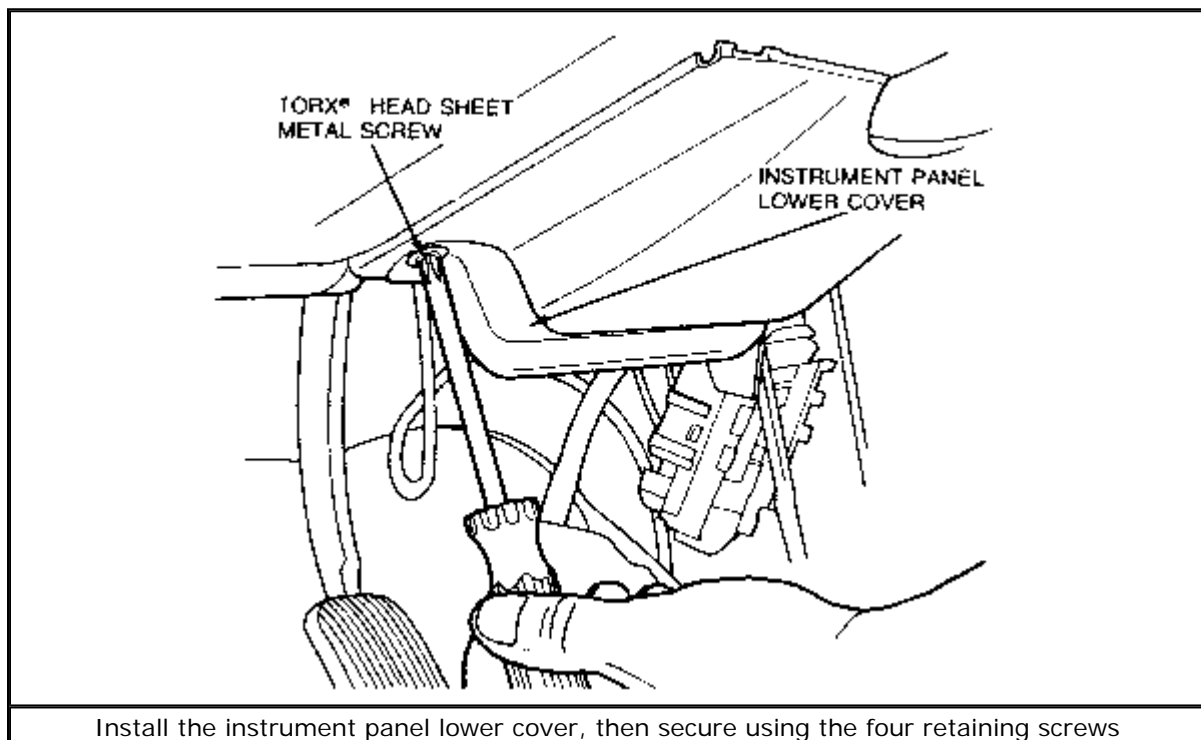
14. Engage the ignition switch electrical connector.
15. Connect the negative battery cable. Check the ignition switch for proper function in all positions, including START and ACC.
16. Check the column function as follows:
 1. With the column shift lever in the P position or with the floor shift key release button depressed, and with the ignition lock cylinder in the LOCK position, make certain the steering column locks.
 2. Position the column shift lever in the D position or the floor shift key release button fully extended, and rotate the cylinder lock to the RUN position. Continue to rotate the cylinder toward the LOCK position until it stops. In this position, make certain the engine and all electrical accessories are OFF and that the steering shaft does not lock.
 3. Turn the radio power button ON. Rotate the cylinder counterclockwise to the ACC position to verify that the radio is energized.
 4. Place the shift lever in P and rotate the cylinder clockwise to the START position to verify that the starter energizes.
17. Remove the ignition lock cylinder.

18. Align the steering column mounting holes with the support bracket, center the steering column in the instrument panel opening, then install the four nuts. Tighten the nuts to 15-25 ft. lbs. (20-34 Nm).



[Click to enlarge](#)

19. Install the column trim shrouds and the instrument panel lower cover. Install the tilt release lever, if equipped.



[Click to enlarge](#)

20. Install the ignition lock cylinder.
21. For vehicle equipped with tilt columns, check the tilt travel to be sure there is no interference between the column and the instrument panel.

1990-95 Vehicles

1. Disconnect the negative battery cable.
2. Remove the upper steering column shroud after removing the four or five self-tapping screws.
3. If equipped, remove the tilt lever.
4. Remove the instrument panel lower steering column cover.
5. Disengage the ignition switch electrical connector.
6. Turn the ignition key lock cylinder to the RUN position.
7. Remove the two screws attaching the ignition switch, then disengage the switch from the actuator pin.

To install:

8. Adjust the ignition switch by sliding the carrier to the RUN position. A new replacement switch assembly will already be set in the RUN position.
9. Make sure the ignition key lock cylinder is in the RUN position. The RUN position is achieved by rotating the key lock cylinder approximately 90 degrees from the lock position.
10. Install the ignition switch into the actuator pin. It may be necessary to move the switch slightly back and forth to align the switch mounting holes with the column lock housing threaded holes.
11. Install the attaching screws and tighten to 50-69 inch lbs. (5.6-7.9 Nm).
12. Engage the ignition switch electrical connector.
13. Connect the negative battery cable.
14. Check the ignition switch for proper function, including START and ACC positions. Make sure the column is locked with the switch in the LOCK position.
15. Install the instrument panel lower steering column cover, the steering column trim shrouds and, if applicable, the tilt lever.

Ignition Lock Cylinder

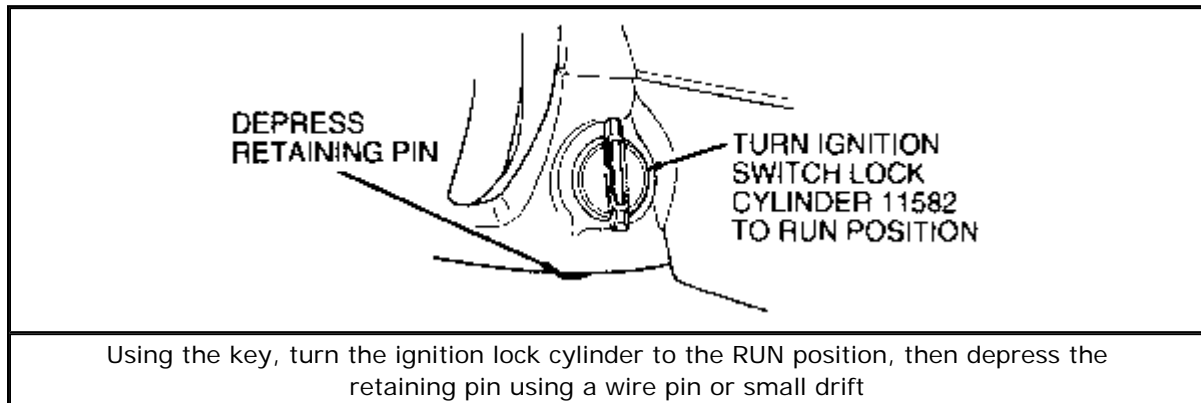
REMOVAL & INSTALLATION

Functional Lock

The following procedure applies to vehicles that have functional lock cylinders. Such cylinders either have a key available or known key numbers from which a key can be made.

1. Disconnect the negative battery cable.
2. Turn the lock cylinder key to the RUN position.
3. Using a $\frac{1}{8}$ in. (3mm) diameter wire pin or a small drift, depress the lock cylinder retaining pin through the access hole in the upper steering column shroud (under

the ignition lock cylinder) while pulling out on the lock cylinder. Remove the lock cylinder from the column.



[Click to enlarge](#)

To install:

4. Install the lock cylinder by turning it to the RUN position and depressing the retaining pin. Insert the lock cylinder into its housing. Make sure the cylinder is fully seated and aligned in the interlocking washer before turning the key to the OFF position. This will permit the cylinder retaining pin to extend into the cylinder housing.
5. Rotate the lock cylinder using the lock cylinder key, to ensure correct mechanical operation in all positions.
6. Connect the negative battery cable.

Non-Functional Lock

The following procedure applies to vehicles in which the ignition lock is inoperative and the lock cylinder cannot be rotated due to a lost or broken key, unknown key number or a lock cylinder cap that has been damaged and/or broken to the extent that the lock cylinder cannot be rotated.

1986-90 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the steering wheel. For details, please refer to the procedure located earlier in this section.
3. Remove the two trim shroud halves after removing the three attaching screws.
4. Disengage the electrical connector from the key warning switch.
5. Using a $\frac{1}{8}$ in. (3mm) diameter drill, carefully drill out the retaining pin, being careful not to drill deeper than $\frac{1}{2}$ in. (13mm).
6. Place a suitable chisel at the base of the ignition lock cylinder cap, then, using a suitable hammer, strike the chisel with sharp blows to break the cap away from the lock cylinder.
7. Using a $\frac{3}{8}$ in. (10mm) diameter drill, carefully drill down the middle of the ignition key slot approximately $1\frac{3}{4}$ in. (44mm) until the lock cylinder breaks loose from its breakaway base. Remove the lock cylinder and drill shavings from the lock cylinder housing.
8. Remove the retainer, washer, ignition switch and actuator. Thoroughly clean all

the drill shavings from the casting.

9. Inspect the lock cylinder housing for damage from the removal operation.

To install:

10. Replace the lock cylinder housing if it was damaged.
11. Install the actuator and ignition switch.
12. Install the trim and electrical parts.
13. Install a new ignition lock cylinder.
14. Install the steering wheel. For details, please refer to the procedure located earlier in this section.
15. Connect the negative battery cable.
16. Check the lock cylinder operation.

1991-95 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the steering wheel.
3. Using locking pliers, twist the cylinder cap until it separates from the lock cylinder.
4. Using a $\frac{3}{8}$ in. (10mm) diameter drill bit, drill down the middle of the ignition lock key slot approximately $1\frac{3}{4}$ in. (44mm) until the lock cylinder releases from its breakaway base. Remove the lock cylinder and drill shavings from the lock cylinder housing.
5. Remove the retainer, washer, ignition switch and actuator. Thoroughly clean all drill shavings and other foreign materials from the casting.
6. Inspect the lock cylinder housing for damage from the removal operation. If the housing is damaged, it must be replaced.

To install:

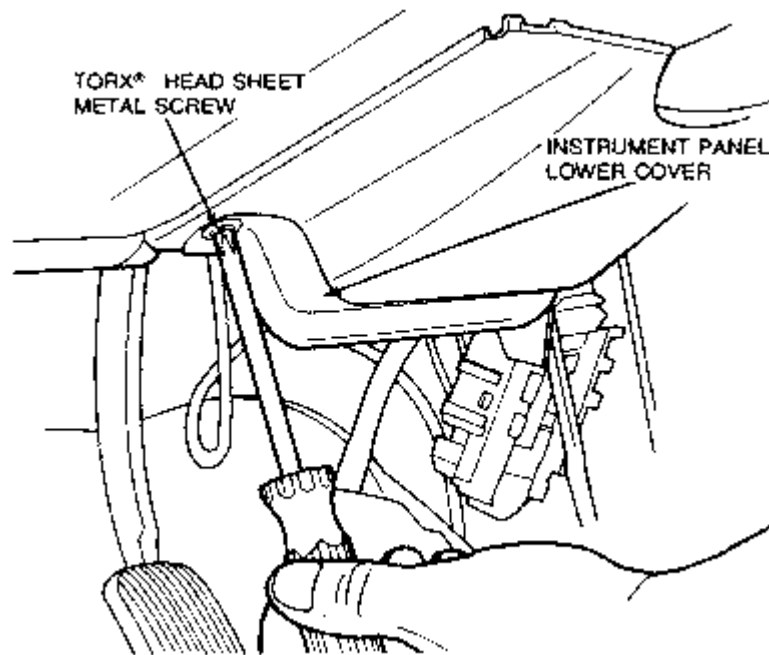
7. Replace the lock cylinder housing, if damaged.
8. Install the actuator and ignition switch.
9. Install the trim and electrical parts.
10. Install the ignition lock cylinder.
11. Install the steering wheel.
12. Connect the negative battery cable, then check the lock cylinder operation.

Steering Column

REMOVAL & INSTALLATION

1986-89 Vehicles

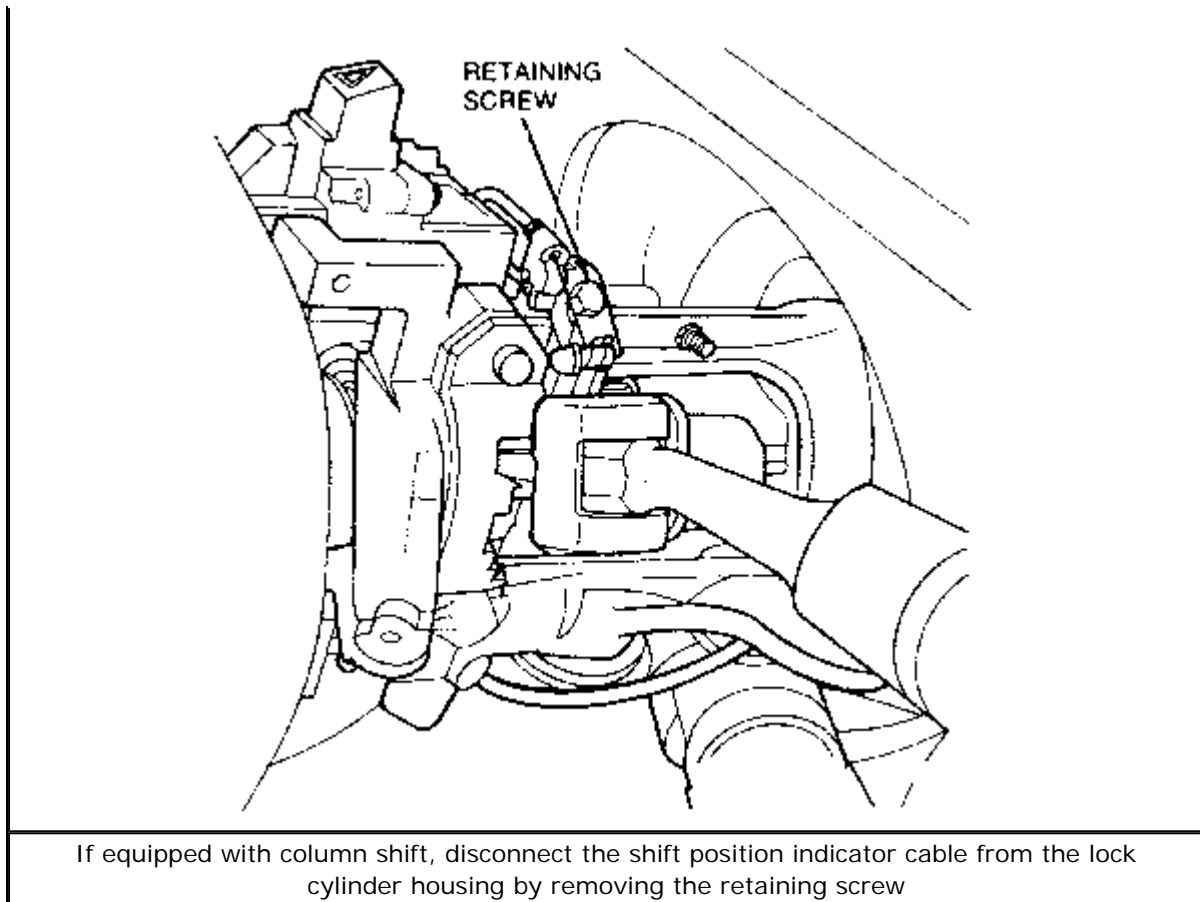
1. Disconnect the negative battery cable.
2. Remove the four self-tapping screws, then remove the steering column cover from the lower portion of the instrument panel.



Remove the four self-tapping screws, then remove the steering column cover from the lower portion of the instrument panel

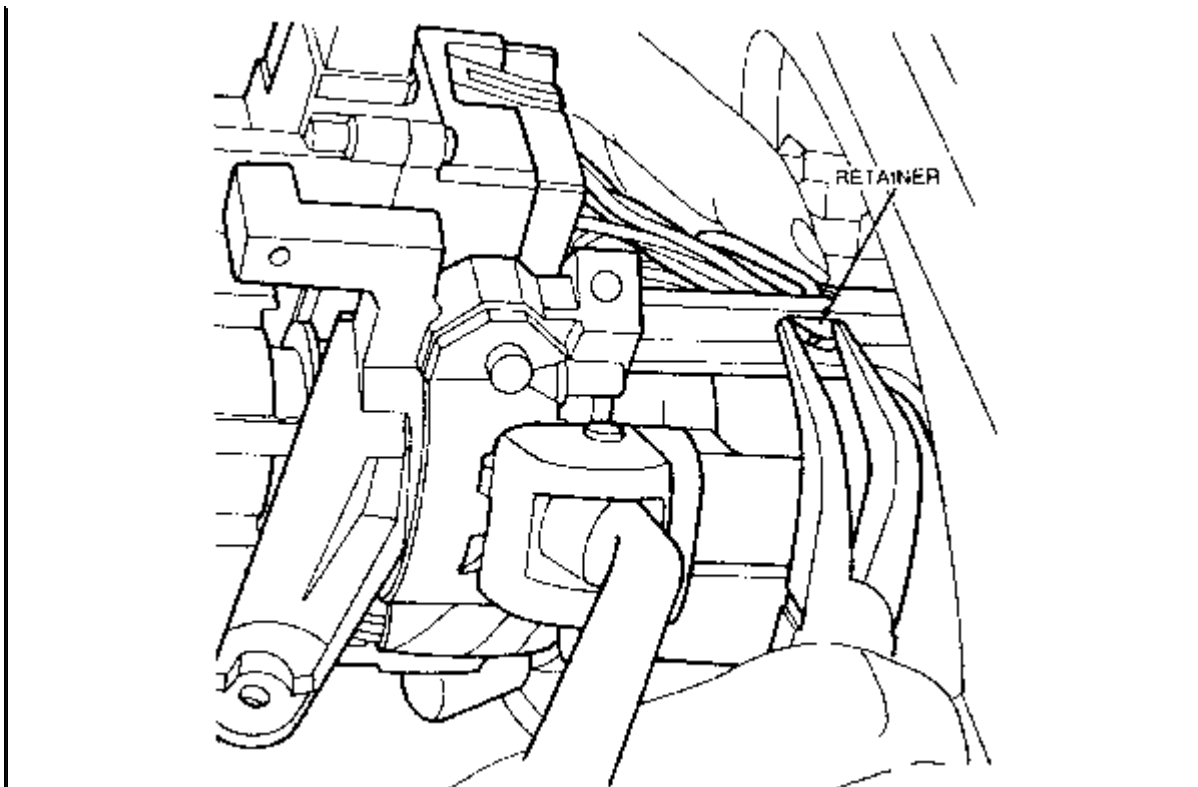
[Click to enlarge](#)

3. Unfasten the retaining screw, then remove the tilt release lever.
4. Remove the ignition lock cylinder.
5. Remove the 3 self-tapping screws from the bottom of the lower shroud, then remove the steering column trim shrouds. Remove the horn pad and steering wheel assembly.
6. If equipped with column shift, perform the following:
 1. Disconnect the shift position indicator cable from the lock cylinder housing by removing the retaining screw.
 2. Disconnect the shift position indicator cable from the shift socket.
 3. Remove the shift position indicator cable from the retaining hook on the bottom of the lock cylinder housing.



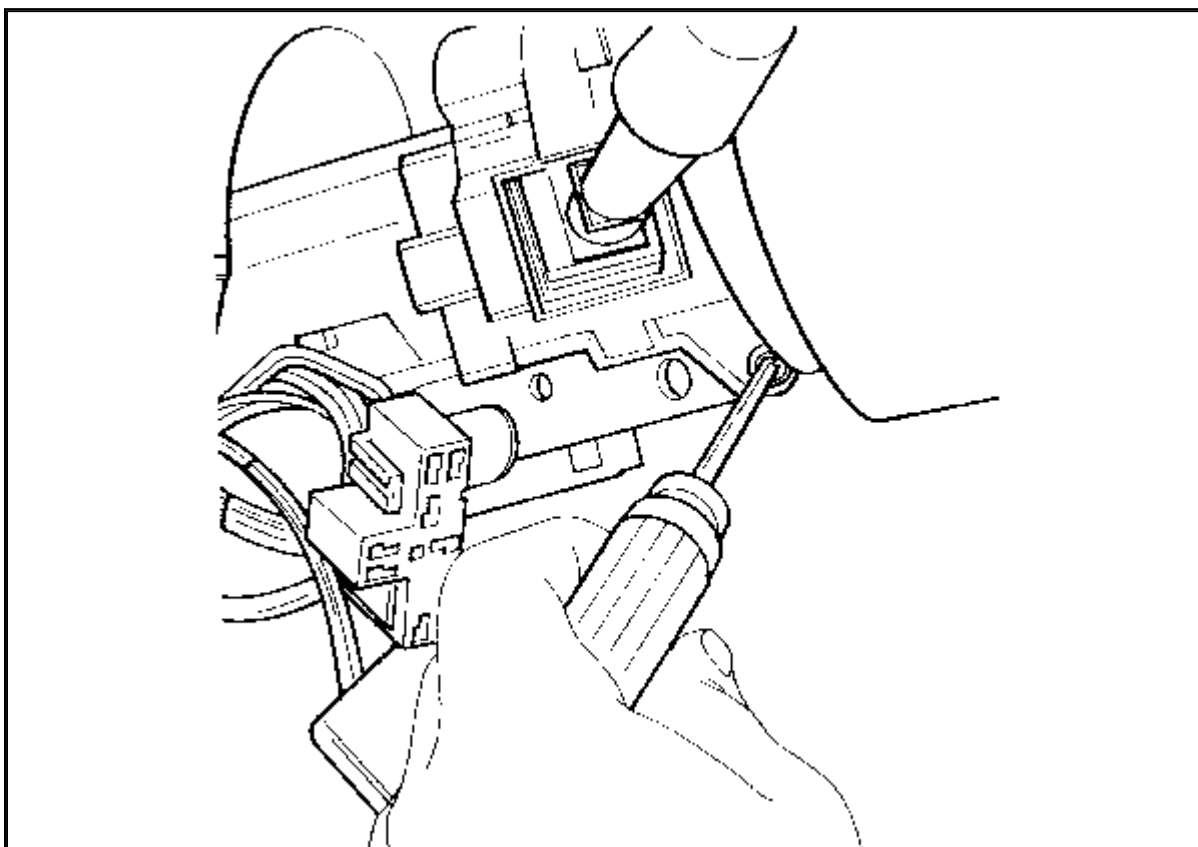
[Click to enlarge](#)

7. Using a punch, remove the shift lever-to-shift socket retaining pin, then remove the shift lever.
8. Disengage the cruise control/horn brush wiring connector from the main wiring harness.
9. Remove the multi-function/combination switch wiring harness retainer from the lock cylinder housing by squeezing the end of the retainer and pushing out. Disengage the multi-function/combination switch connector, then unfasten the two self-tapping retaining screws and remove the multi-function/combination switch.



Remove the multi-function/combination switch wiring harness retainer from the lock cylinder housing by squeezing the end of the retainer and pushing out

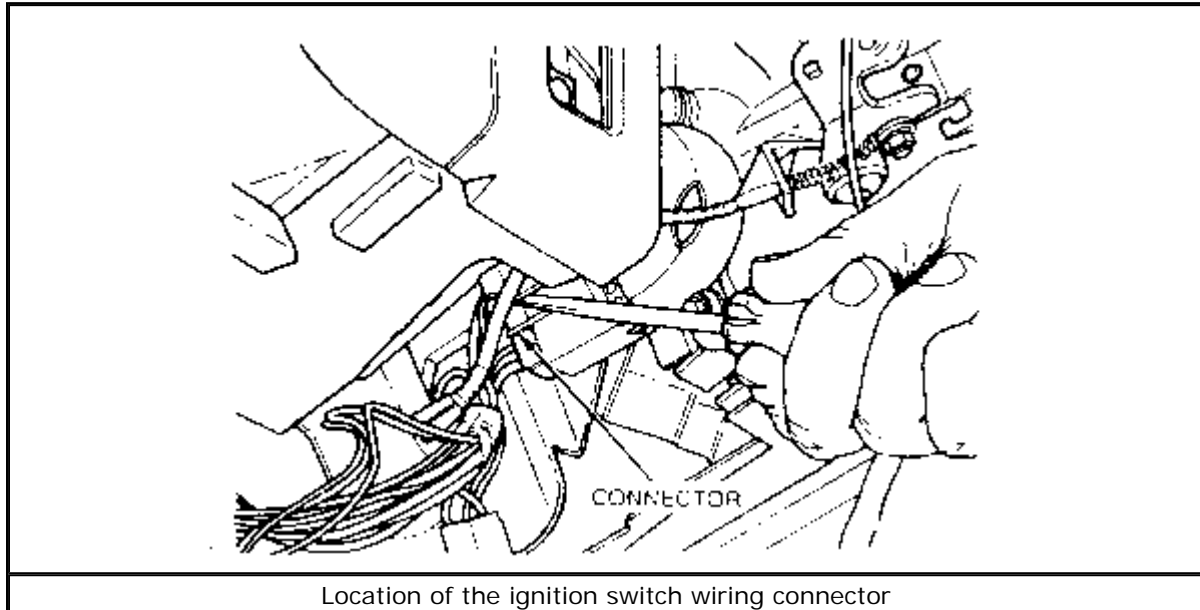
[Click to enlarge](#)



Disengage the multi-function/combination switch connector, remove the two self-tapping retaining screws, then remove the multi-function/combination switch

10. Disengage the key warning buzzer switch wiring connector from the main wiring

harness and the wiring connector from the ignition switch.



Location of the ignition switch wiring connector

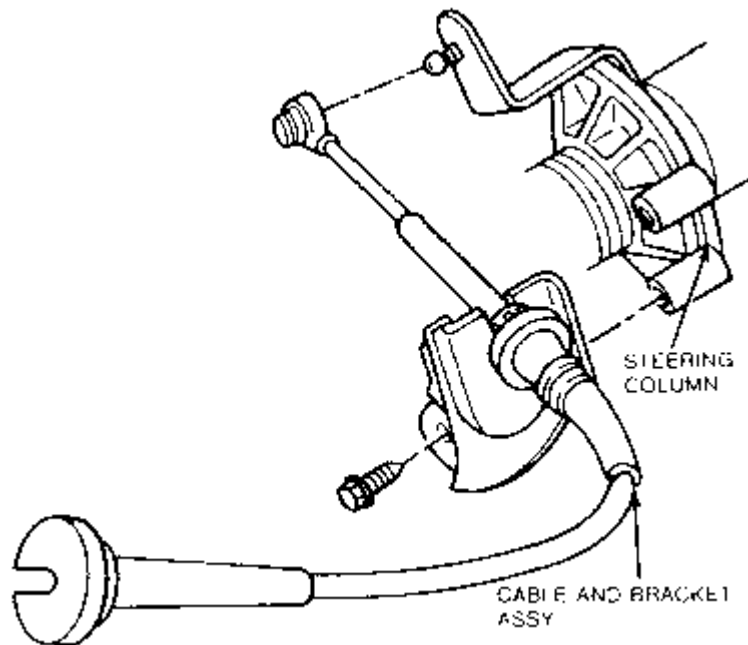
[Click to enlarge](#)

11. Disconnect the steering shaft from the intermediate shaft after removing the two nuts and U-clamp. If equipped with an air bag, wire the lower end of the steering shaft to the column housing to prevent rotation of the steering shaft.

Rotating the steering shaft could damage the air bag contact clockspring if the steering wheel is attached to the column.

12. If equipped with column shift, perform the following:
 1. Remove the shift cable plastic terminal from the column selector lever pivot ball using a small prybar and prying between the plastic terminal and the selector lever. Be careful not to damage the cable during or after assembly.
 2. Remove the shift cable bracket, with shift cable still attached, from the lock cylinder housing by removing the two retaining screws.



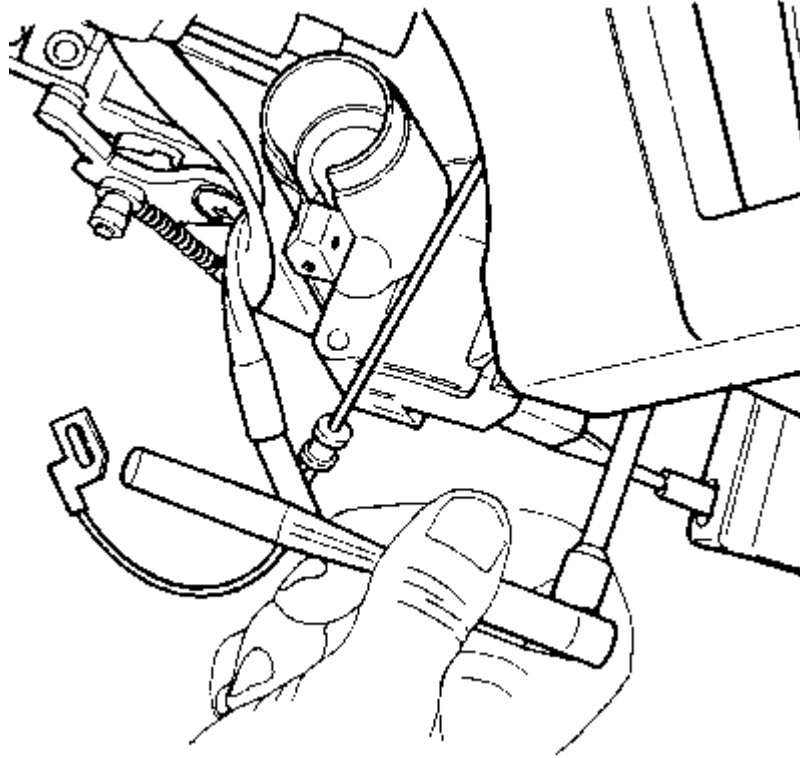


Remove the shift cable plastic terminal from the column selector lever pivot ball using a small prybar between the plastic terminal and the selector lever. Be careful not to damage the cable during or after assembly

[Click to enlarge](#)

13. If equipped with an automatic parking brake release mechanism, remove the vacuum hoses from the parking brake release switch.
14. Remove the two nuts retaining the rear column assembly. Loosen the two nuts retaining the front column assembly to the end of the studs, but do not remove them at this time.
15. Use a downward force to disengage the column assembly push-on clips from the rear attachments, then remove the two remaining nuts.

When forcing downward, be careful to avoid damaging the safety slip-clips on the steering column.



Use a downward force to disengage the column assembly push-on clips from the rear attachments, then remove the two remaining nuts

16. Carefully lower the steering column assembly, then remove it from the vehicle.

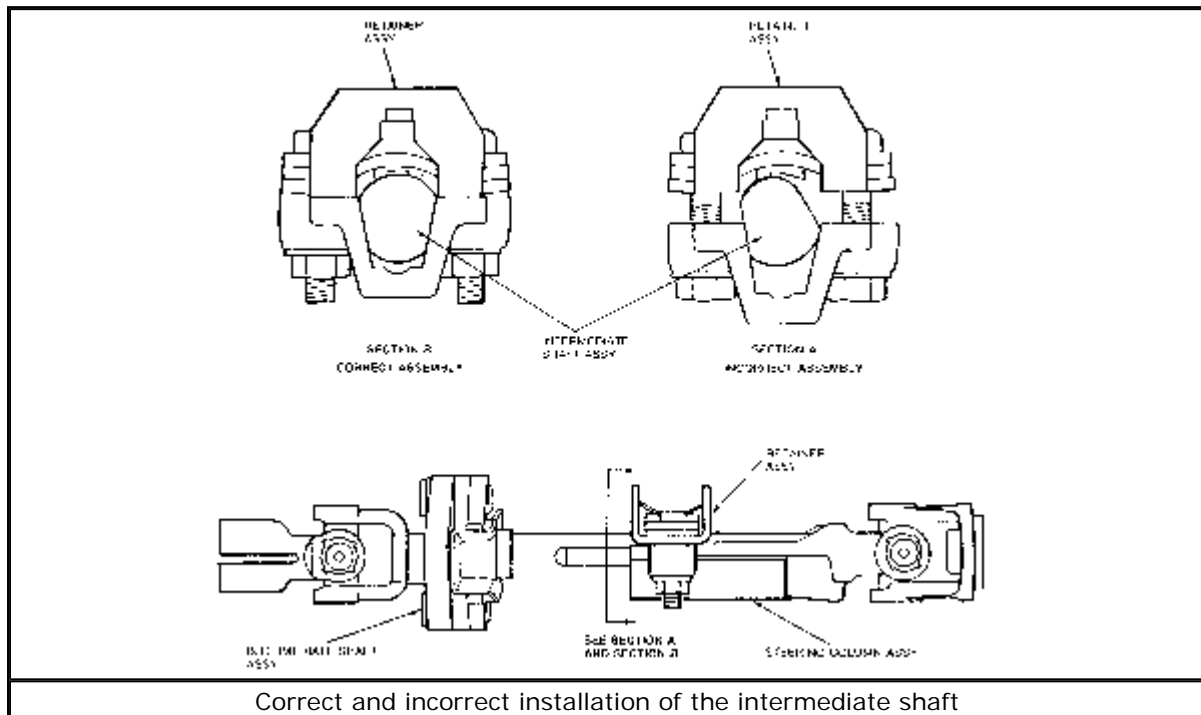
To install:

17. Raise the steering column assembly into position, and align the four mounting holes over the four support bracket studs. Hand-start the 4 retaining nuts.
18. Center the column assembly in the instrument panel opening, then tighten the four nuts to 15-25 ft. lbs. (21-33 Nm).
19. If equipped with an automatic parking brake release mechanism, install the vacuum hoses on the parking brake release switch.
20. If equipped with column shift, perform the following:
1. Attach the cable shift bracket, with the shift cable attached, to the lock cylinder housing, then tighten the retaining screws to 5-7 ft. lbs. (7-9 Nm).
 2. Snap the transaxle shift cable terminal to the selector lever pivot ball on the steering column.
21. Apply a generous amount of grease to the V-shaped steering shaft yoke. Connect the steering shaft to the intermediate shaft with the U-clamp and the two hex nuts. When installing the steering column to the intermediate shaft, connect the intermediate shaft to the steering column with the retainer assembly and two nuts.

Make sure the V-angle of the intermediate shaft fits correctly into the V-angle of the mating steering column yoke. If the V-angle is misaligned and the retainer is tightened, the retainer plate will be bent, necessitating replacement.

22. After correctly installing the steering column to the intermediate shaft, tighten the

nuts to 15-25 ft. lbs. (21-33 Nm).



[Click to enlarge](#)

Tilt columns must be in the middle tilt position before the nuts are tightened.

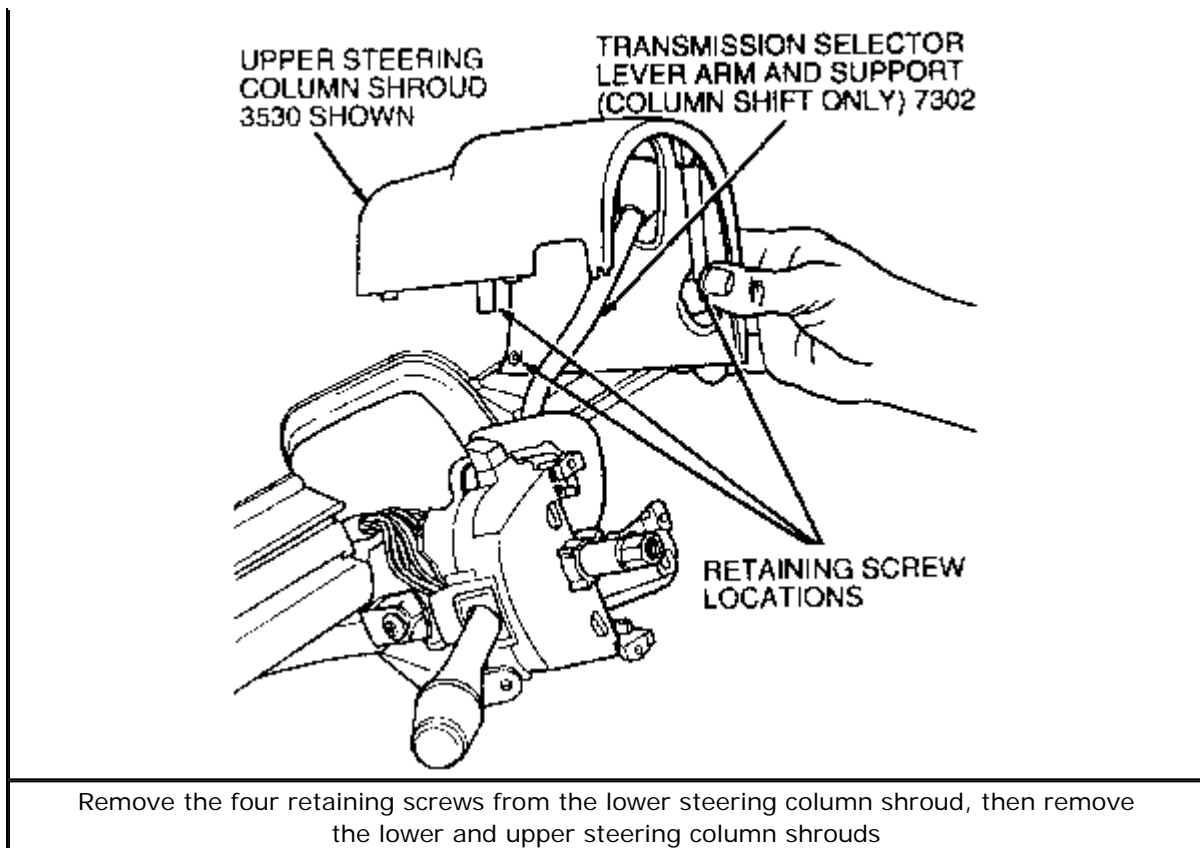
23. Engage the main wiring harness connector to the ignition switch, and the key warning buzzer switch wiring connector to the main harness. Attach the steering sensor wire connector to the sensor lead connector.
24. Install the combination switch, then tighten the two self-tapping screws to 18-26 inch lbs. (2.0-2.9 Nm). Install the combination switch wiring harness retainer over the shroud mounting boss, and snap it into the slot in the lock cylinder housing.
25. Engage the cruise control/horn brush wiring connector to the main wiring harness.
26. If equipped with column shift, install the shift position indicator cable into the retaining hook on the lock cylinder housing, connect the cable to the shift socket and loosely install the cable onto the lock cylinder housing with the screw. Adjust the shift position indicator cable as follows:
 1. Place the shift lever in D on Taurus equipped with the 2.5L engine. On all others, place the shift lever in OD. A weight of 8 lbs. (4 kg) should be hung on the shift selector lever to make sure the lever is firmly against the D or OD drive detent.
 2. Adjust the cable until the indicator pointer completely covers the D or OD, then tighten the screw to 18-30 inch lbs. (2.0-3.4 Nm).
 3. Cycle the shift lever through all positions and check that the shift position indicator completely covers the proper letter or number in each position.
27. Install the shift lever into the shift lever socket, then insert a new shift lever retaining pin. Use care to avoid damaging the shift position indicator post on the shift socket.

28. Place the combination switch in the middle position, then install the steering wheel and horn pad assembly.
29. Install the shrouds with the retaining screws. Tighten to 6-10 inch lbs. (0.7-1.1 Nm). If equipped with a tilt column, install the tilt release lever and tighten the screw to 6.5-9.0 ft. lbs. (8.8-12 Nm).
30. Install the ignition lock cylinder. Install the steering column cover on the lower portion of the instrument panel with 4 self-tapping screws.
31. Connect the negative battery cable. Check the column function as follows:
 1. With the column shift lever in P position or the floor shift key release button depressed, and with the ignition switch in the LOCK position, make sure the steering column locks.
 2. With the column shift lever in D or with the floor shift key release button extended, and with the ignition switch in the RUN position, rotate the ignition switch toward the LOCK position until it stops. In this position, make sure that there is no power to the engine and/or accessories and that the steering shaft does not lock.
 3. On tilt columns, check column tilt travel through its entire range to make sure there is no interference between the column and instrument panel.
 4. Cycle the combination switch through all of its functions.

1990-95 Vehicles

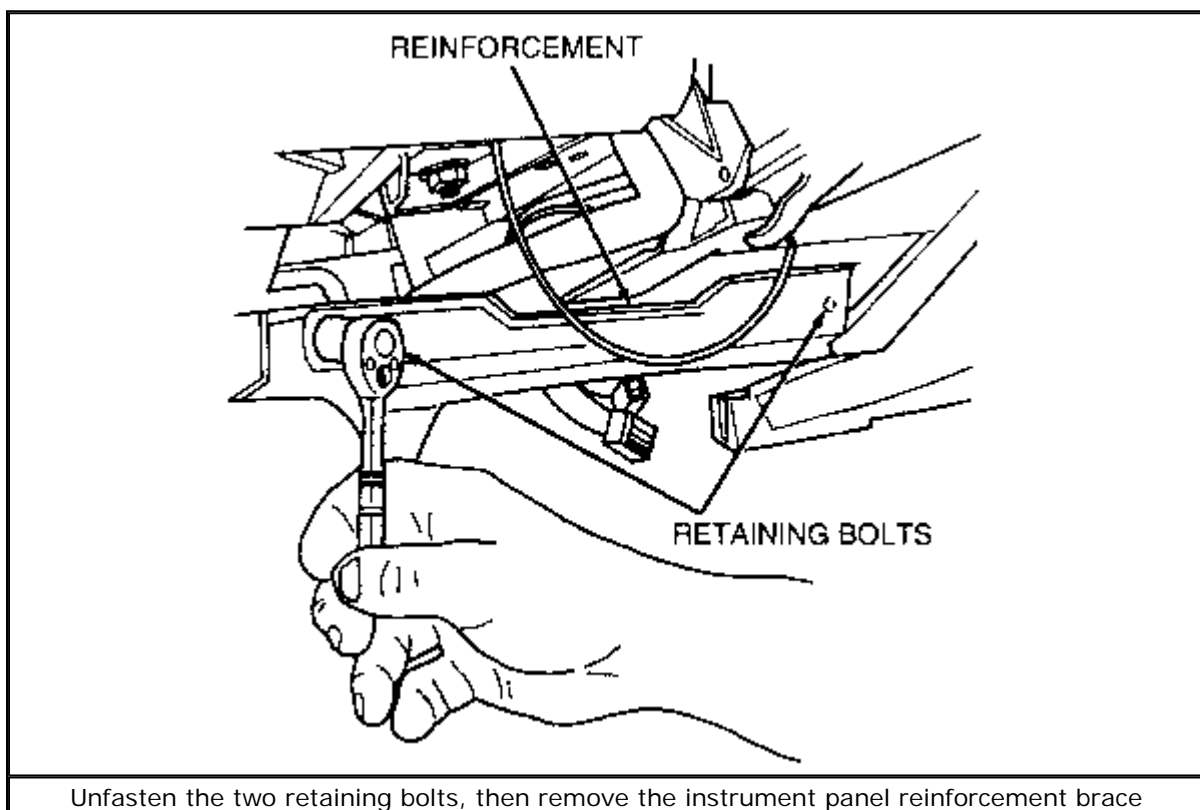
1. Disconnect the negative battery cable. Lower the glove compartment past its stops and disconnect the air bag backup power supply.
2. Make sure the vehicle's front wheels are in the straight-ahead position. Remove the steering wheel.
3. Remove the left and right lower mouldings from the instrument panel by pulling up and snapping out of the retainers.
4. Remove the instrument panel lower trim cover and the lower steering column shroud.
5. Disconnect the air bag clockspring contact assembly wire harness. Apply two strips of tape across the contact assembly stator and rotor to prevent accidental rotation. Remove the three contact assembly retaining screws, then pull the contact assembly off the steering column shaft.
6. Remove the tilt lever by unscrewing it from the column, then remove the four screws.
7. Rotate the ignition lock cylinder to the RUN position. Using a $\frac{1}{8}$ in. (3mm) drift, depress the lock cylinder retaining pin through the access hole, then remove the lock cylinder.
8. Remove the four retaining screws from the lower steering column shroud, then remove the lower and upper steering column shrouds.





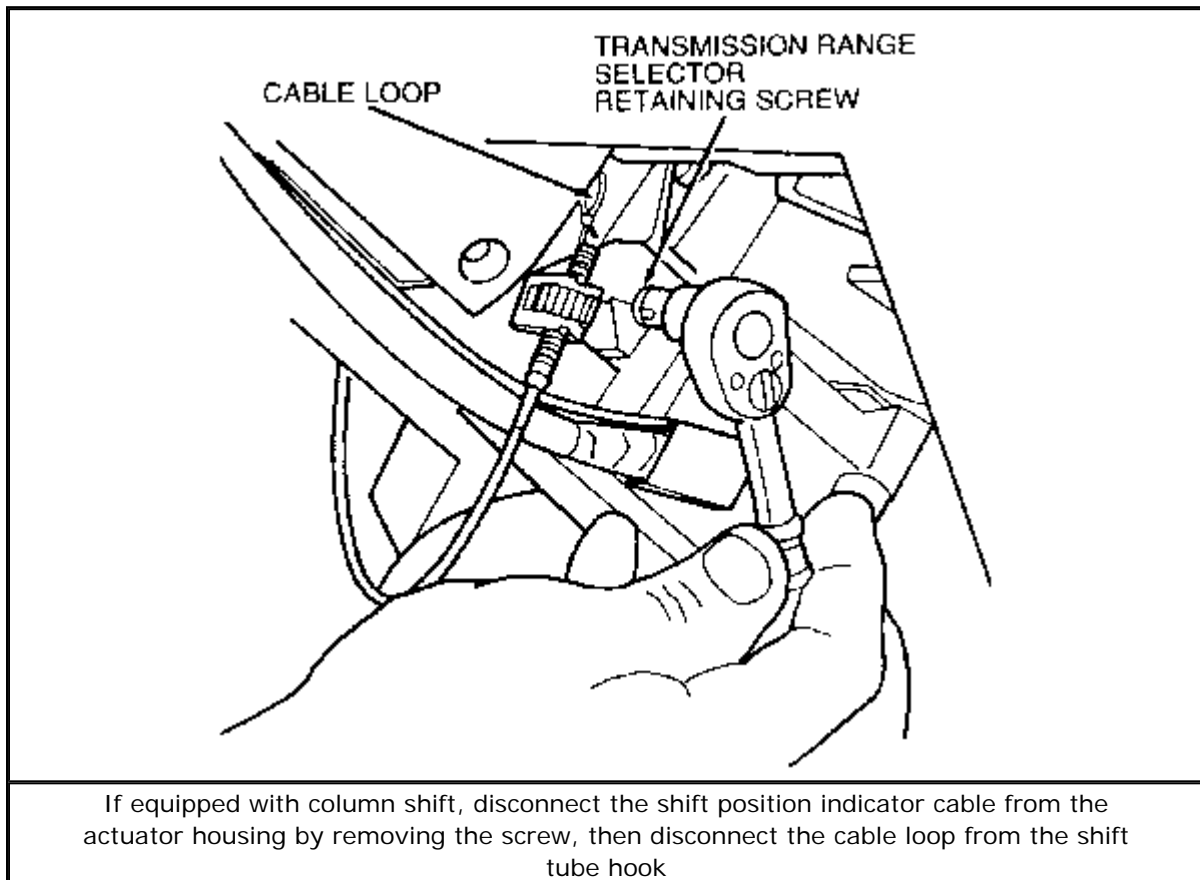
[Click to enlarge](#)

9. Remove the two instrument panel reinforcement brace retaining bolts, then remove the reinforcement.



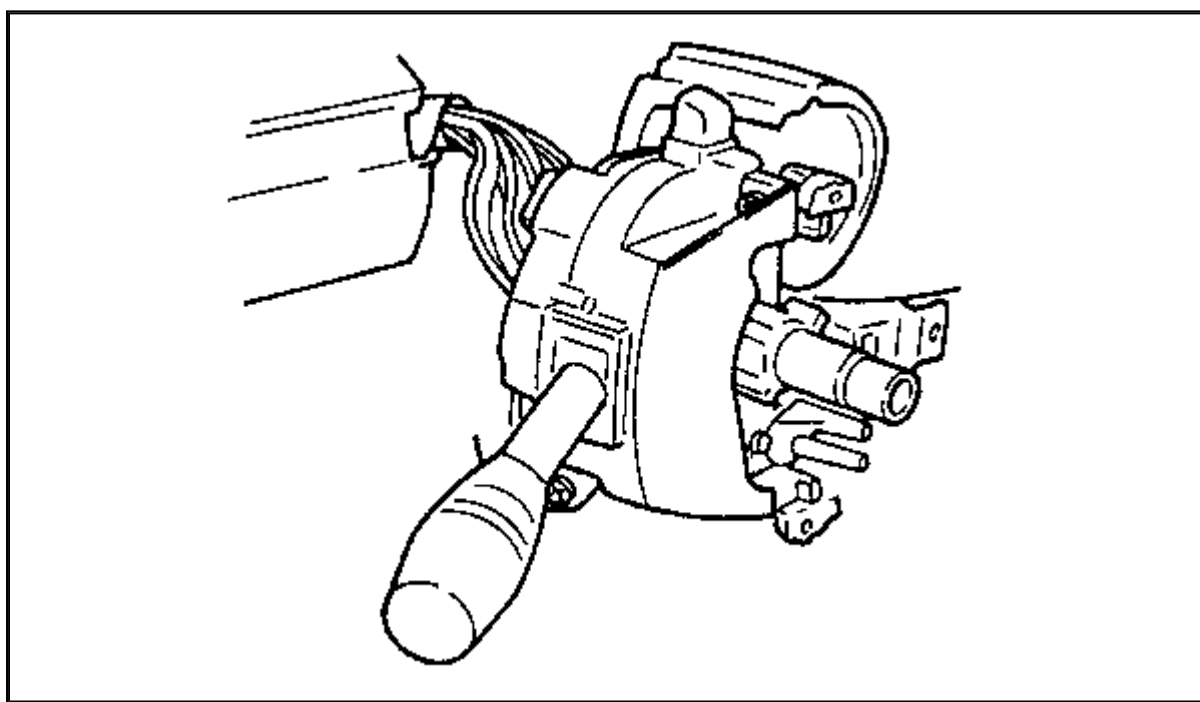
[Click to enlarge](#)

10. If equipped with column shift, disconnect the shift position indicator cable from the actuator housing by removing the screw, then disconnect the cable loop from the shift tube hook. If equipped with console shift, remove the interlock cable retaining screws, then remove the cable.



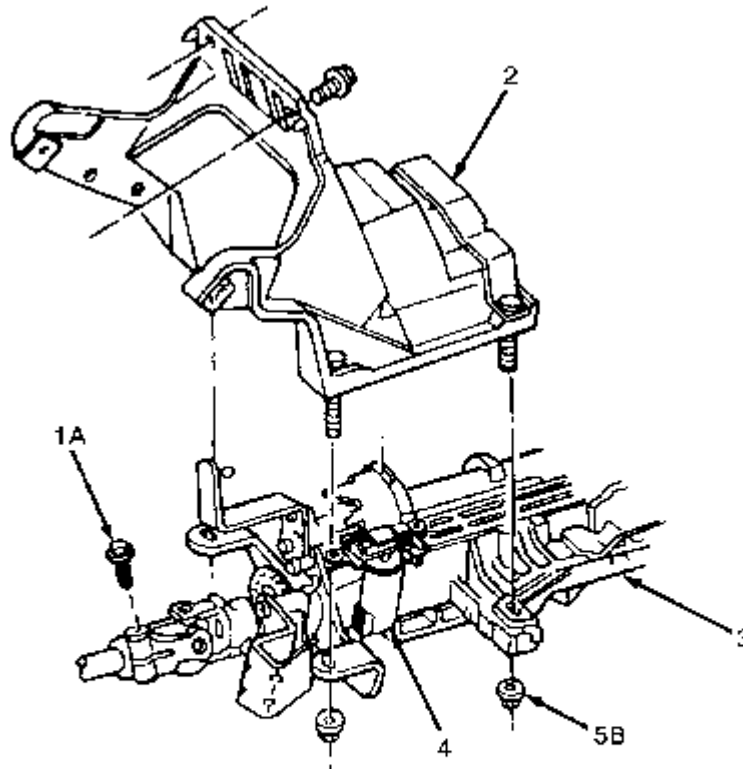
[Click to enlarge](#)

11. Remove the two multi-function/combination switch retaining screws, then set the switch aside.



Remove the two multi-function/combination switch retaining screws, then set the switch aside

12. Disengage the wiring connector from the ignition switch.
13. Remove the four nuts securing the column skid plate, then remove the plate.
14. Remove the pinch bolt from the steering column lower yoke.
15. While supporting the steering column, remove the four steering column tube retaining nuts. Lower the steering column, then disconnect hoses at the parking brake release switch or remove the vacuum release assembly.
16. Disconnect the shift cable and bracket from the transmission column shift selector tube lever pivot.
17. For vehicles equipped with console shift, remove the two shift lock actuator cable retaining screws, then remove the actuator.
18. Remove the column from the vehicle.



- 1 Screw
- 2 Steering column support bracket
- 3 Steering column tube flange assy
- 4 Shift lock actuator solenoid
- 5 Nut (4 req'd)
- A Tighten to 41-56 Nm (31-41 lb.ft.)
- B Tighten to 13-19 Nm (9-14 lb.ft.)

Exploded view of the steering column mounting-1990-95 vehicles

[Click to enlarge](#)

To install:

19. Place the steering column in the vehicle, then align the column lower yoke to the

- lower steering column shaft. Install the bolt, then tighten to 31-41 ft. lbs. (41- 56 Nm).
20. Connect the parking brake release vacuum hoses.
 21. For console shift, position the shift lock actuator, then install the two retaining screws.
 22. Position the steering column assembly to the column support bracket. Install the four retaining nuts, then tighten to 9-13 ft. lbs. (13-17 Nm).
 23. Position the shift cable bracket, with the shift cable attached, to the lower two screws of the column. Tighten to 5-8 ft. lbs. (7-11 Nm). Snap the shift cable onto the shift selector pivot ball.
 24. Position the multi-function/combination switch, then install the two retaining screws. Tighten to 18-26 inch lbs. (2-3 Nm). Engage all electrical connectors.
 25. Fasten the transmission shift cable and bracket loop on the shift selector hook, then install the transmission range selector cable bracket to the steering actuator housing. Install the retaining screw and tighten to 5-8 ft. lbs. (7-11 Nm).
 26. Connect the steering column-to-parking brake control shake brace.
 27. Install the instrument panel reinforcement brace, then secure with the two retaining bolts.
 28. Attach the upper and lower steering column shrouds.
 29. Install the ignition switch lock cylinder.
 30. Connect the tilt steering column lock lever onto the steering column flange tube.
 31. Attach the air bag sliding contact with the three retaining screws, then tighten the screws to 18-26 inch lbs. (2-3 Nm).

If a new contact assembly is being installed, remove the plastic lock mechanism after the contact assembly is secured to the column.

32. Install the steering wheel onto the steering gear input worm gear and rack, using a new bolt. Tighten the new bolt to 22-33 ft. lbs. (31-48 Nm).
33. Position the drivers side air bag module to the steering wheel. Install the two retaining screws, then tighten to 36-47 inch lbs. (4-5 Nm).
34. Connect the air bag backup power supply and the negative battery cable. Verify the air bag warning indicator.

Steering Linkage

REMOVAL & INSTALLATION

Tie Rod Ends

1. Remove and discard the cotter pin and nut from the worn tie rod end ball stud.
2. Disconnect the tie rod end from the steering knuckle, using Tie Rod End Remover tool 3290-D or equivalent.
3. Hold the tie rod end with a wrench, then loosen the tie rod jam nut.
4. Note the depth to which the tie rod is located by using the jam nut as a marker, then grip the tie rod with a pair of suitable pliers and remove the tie rod end assembly from the tie rod.

To install:

5. Clean the tie rod threads. Thread the new tie rod end onto the tie rod to the same depth as the removed tie rod end.
6. Make sure the front wheels are pointed straight-ahead, then place the tie rod end stud into the steering spindle.
7. Install a new nut on the tie rod end stud. Tighten the nut to 35 ft. lbs. (48 Nm), then continue tightening until the next castellation on the nut is aligned with the cotter pin hole in the stud. Install a new cotter pin.
8. Set the toe to specification. Tighten the jam nut to 35-50 ft. lbs. (47-68 Nm).

Power Steering Rack

ADJUSTMENTS

Except 1990-92 Taurus and Sable LX with 3.8L Engine, 1993-95 Taurus GL (high series only), LX and SHO models, and Sables

RACK YOKE PLUG CLEARANCE

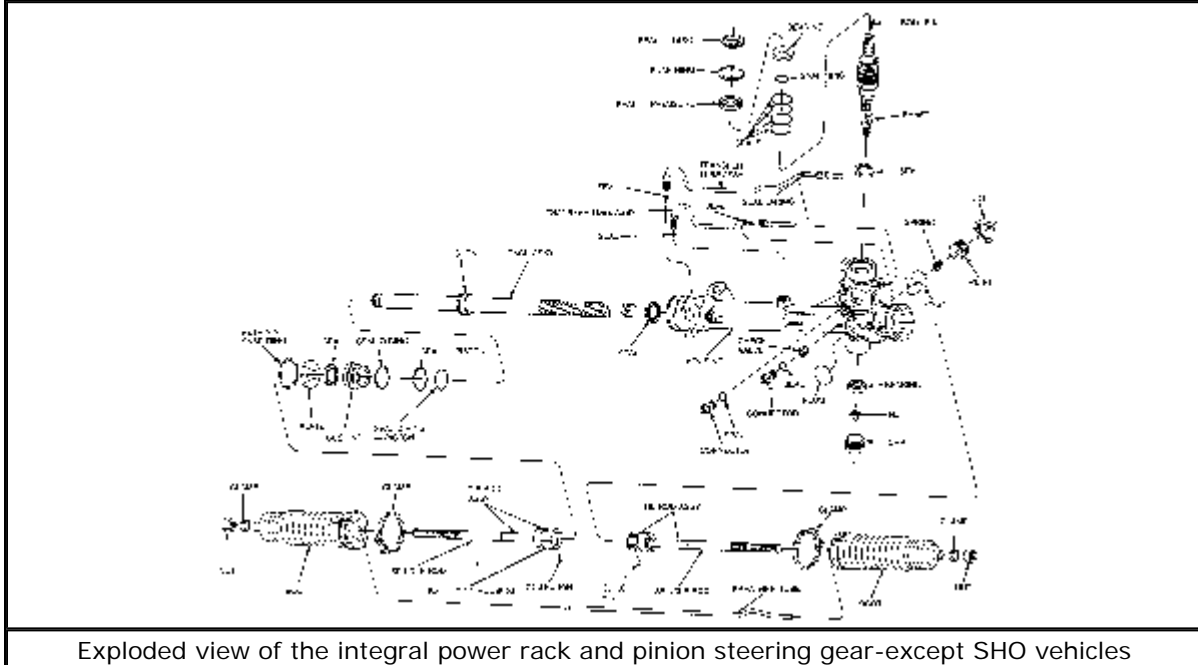
The rack yolk clearance adjustment is not a normal service adjustment. It is only required when the input shaft and valve assembly is removed.

1. Remove the steering gear from the vehicle. Clean the exterior of the steering gear thoroughly.
2. Install the steering gear in a suitable holding fixture. Do not remove the external transfer tubes unless they are leaking or damaged. If these lines are removed, they must be replaced with new ones.
3. Drain the power steering fluid by rotating the input shaft lock-to-lock twice, using a suitable tool. Cover the ports on the valve housing with a shop cloth while draining the gear to avoid possible oil spray.
4. Insert an inch pound torque wrench with a maximum capacity of 60 inch lbs. (6.77 Nm) into the Pinion Shaft Torque Adapter T74P-3504-R or equivalent. Position the adapter and wrench on the input shaft splines.
5. Loosen the yoke plug locknut and then the yoke plug.
6. Clean the threads of the yoke plug before tightening, to prevent a false reading. With the rack at the center of travel, tighten the yoke plug to 45-50 inch lbs. (5.0-5.6 Nm).
7. Back off the yoke plug approximately $\frac{1}{8}$ turn (44-54 degrees) until the torque required to initiate and sustain rotation of the input shaft is 7-18 inch lbs. (0.78-2.03 Nm).
8. Place a suitable wrench on the yoke plug locknut. While holding the yoke plug, tighten the locknut to 44-66 ft. lbs. (60-89 Nm). Do not allow the yoke plug to move while tightening or preload will be affected. Check the input shaft torque as in step 7 after tightening the locknut.
9. Install the steering gear.

REMOVAL & INSTALLATION

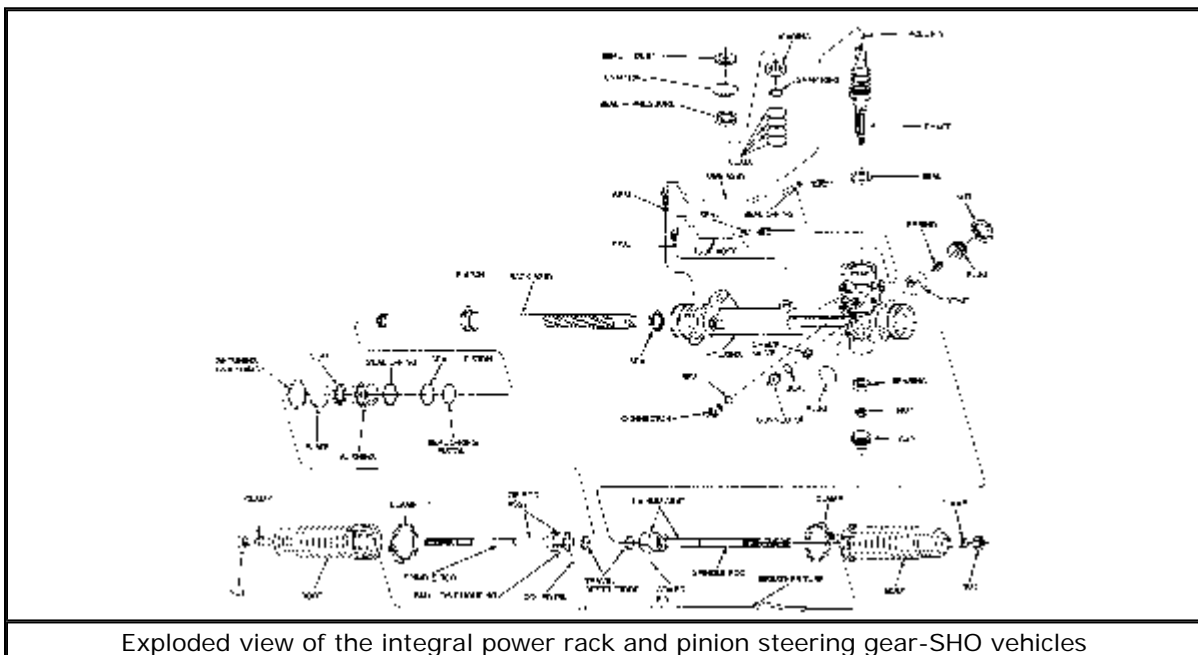
Except 1990-92 Taurus and Sable LX with 3.8L Engine, 1993-95 Taurus GL (high series only), LX and SHO models, and Sables

1. Disconnect the negative battery cable. Working from inside the vehicle, remove the nuts retaining the steering shaft weather boot to the dash panel.
2. Remove the bolts retaining the intermediate shaft to the steering column shaft. Set the weather boot aside.
3. Remove the pinch bolt at the steering gear input shaft, then remove the intermediate shaft. Raise the vehicle and support safely.



[Click to enlarge](#)

4. Remove the left front wheel and tire assembly. Remove the steering shaft U-joint/heat shield. Cut the bundling strap retaining the lines to the gear.



[Click to enlarge](#)

5. Remove the tie rod ends from the spindles. Place a drain pan under the vehicle,

then remove the hydraulic pressure and return lines from the steering gear.

The pressure and return lines are on the front of the housing. Do not confuse them with the transfer lines on the side of the valve.

6. Remove the nuts from the gear mounting bolts. The bolts are pressed into the gear housing and should not be removed during gear removal.
7. Push the weather boot end into the vehicle and lift the gear out of the mounting holes. Rotate the gear so the input shaft will pass between the brake booster and the floor pan. Carefully start working the steering gear out through the left fender apron opening.
8. Rotate the input shaft so it clears the left fender apron opening, then complete removal of the steering gear. If the steering gear seems to be stuck, check the right tie rod to ensure the stud is not caught on anything.

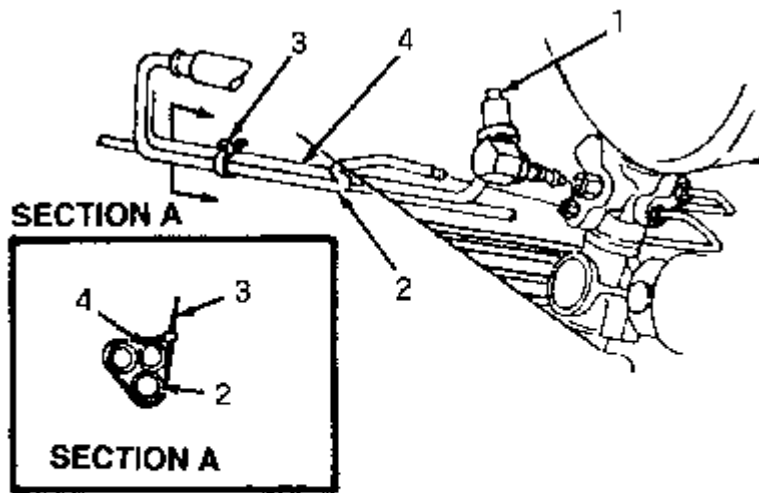
To install:

9. Install new plastic seals on the hydraulic line fittings.
10. Insert the steering gear through the left fender apron. Rotate the input shaft forward to completely clear the fender apron opening.
11. To allow the gear to pass between the brake booster and the floorpan, rotate the input shaft rearward. Align the steering gear bolts to the bolt holes. Install the mounting nuts and tighten them to 85-100 ft. lbs. (115-135 Nm). Lower the vehicle.
12. From inside the engine compartment, install the hydraulic pressure and return lines. Tighten the power steering pressure line to 15-25 ft. lbs. (20-35 Nm) and the return line to 15-25 ft. lbs. (20-35 Nm).

Swivel movement of the lines is normal when the fittings are properly tightened.

13. Raise and safely support the vehicle. Secure the power steering pressure and return lines to the transfer tube with the bundle strap. Install the steering shaft U-joint/heat shield.





- 1 Power steering pressure switch
- 2 Power steering return hose
- 3 Strap
- 4 Power steering left turn pressure hose

Secure the power steering pressure and return lines to the transfer tube with the bundle strap

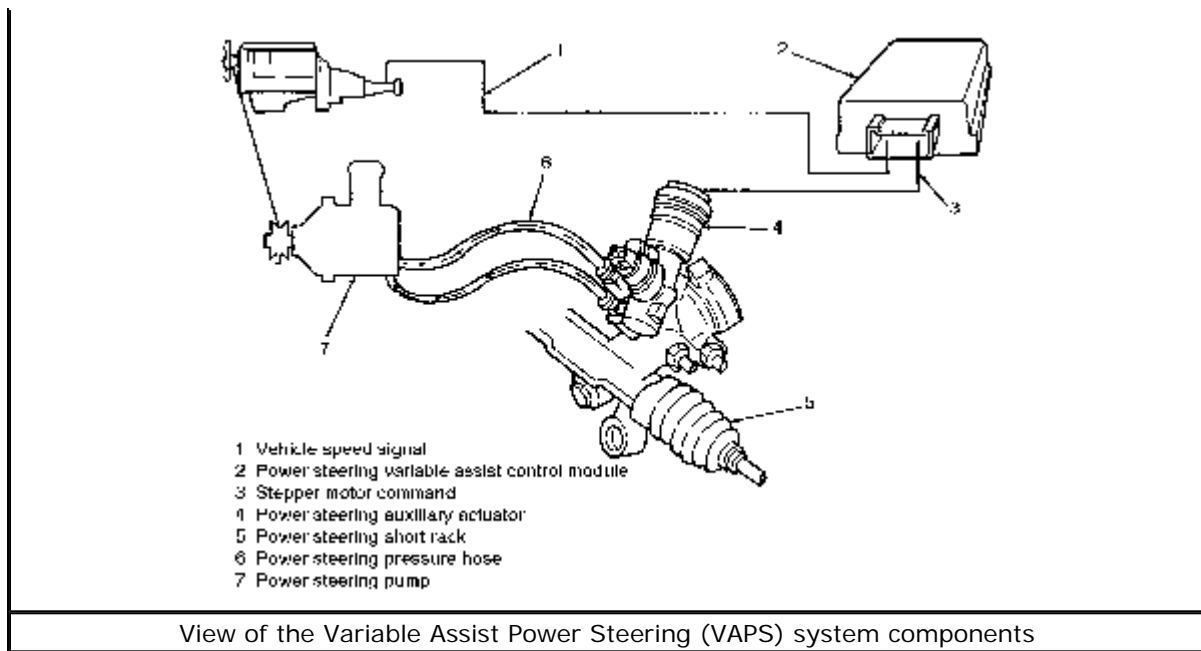
[Click to enlarge](#)

14. Install the tie rod ends to spindles. Tighten the castle nuts to 35 ft. lbs. (48 Nm) and, if necessary, tighten the nuts a little bit more to align the slot in the nut for the cotter pin. Install the cotter pin.
15. Install the left front wheel and tire assembly, then carefully lower the vehicle. Working from inside the vehicle, pull the weather boot end out of the vehicle and install it over the valve housing. Install the intermediate shaft to the steering gear input shaft. Install the inner weather boot to the floor pan.
16. Install the intermediate shaft to the steering column shaft. Fill the power steering system.
17. Connect the negative battery cable. Check the system for leaks and proper operation. Adjust the toe setting as necessary.

1990-92 Taurus LX and Sable with 3.8L Engine, 1993-95 Taurus GL (high series only), LX and SHO models, and Sables

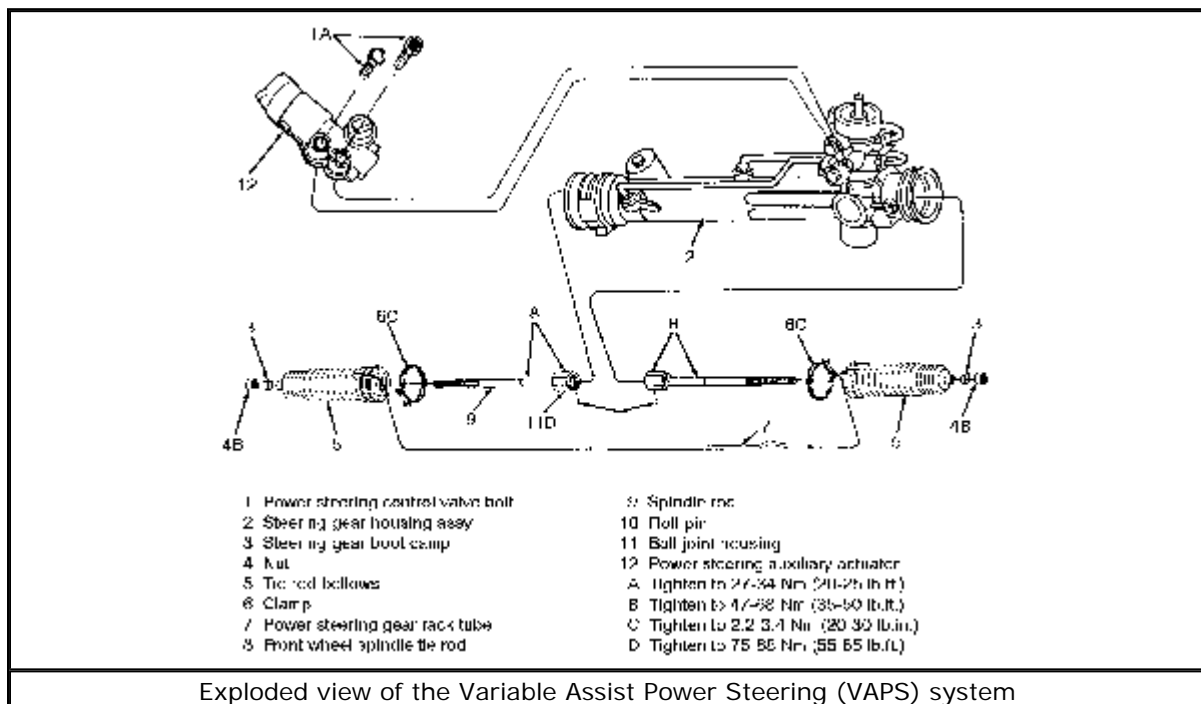
The Variable Assist Power Steering (VAPS) system used on these vehicles consists of a micro-processor based module, a power rack and pinion steering gear, an actuator valve assembly, hose assemblies and a high efficiency power steering pump.

1. Disconnect the negative battery cable.



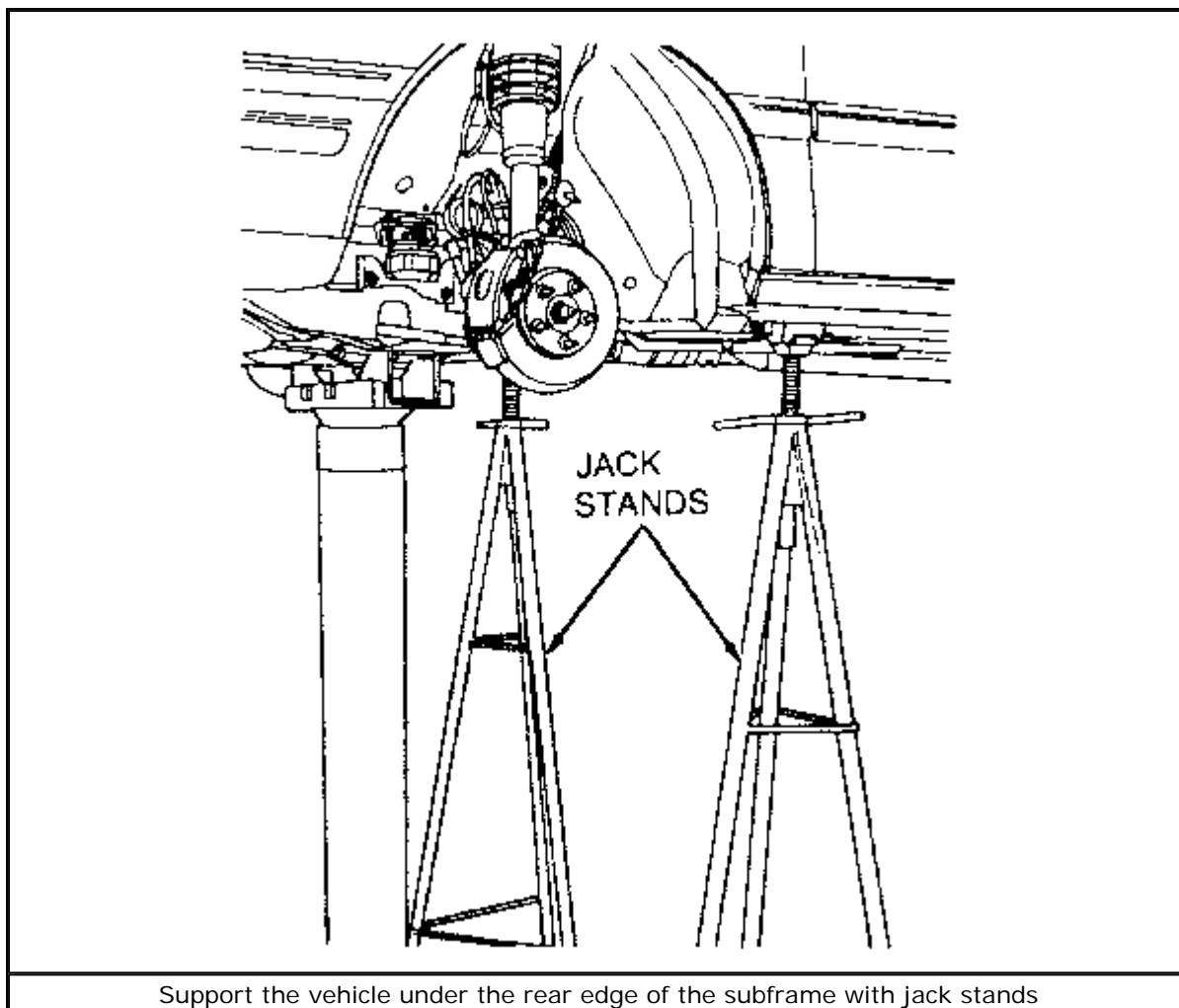
[Click to enlarge](#)

2. From inside the vehicle, remove the nuts securing the steering column tube boot to the cowl panel.



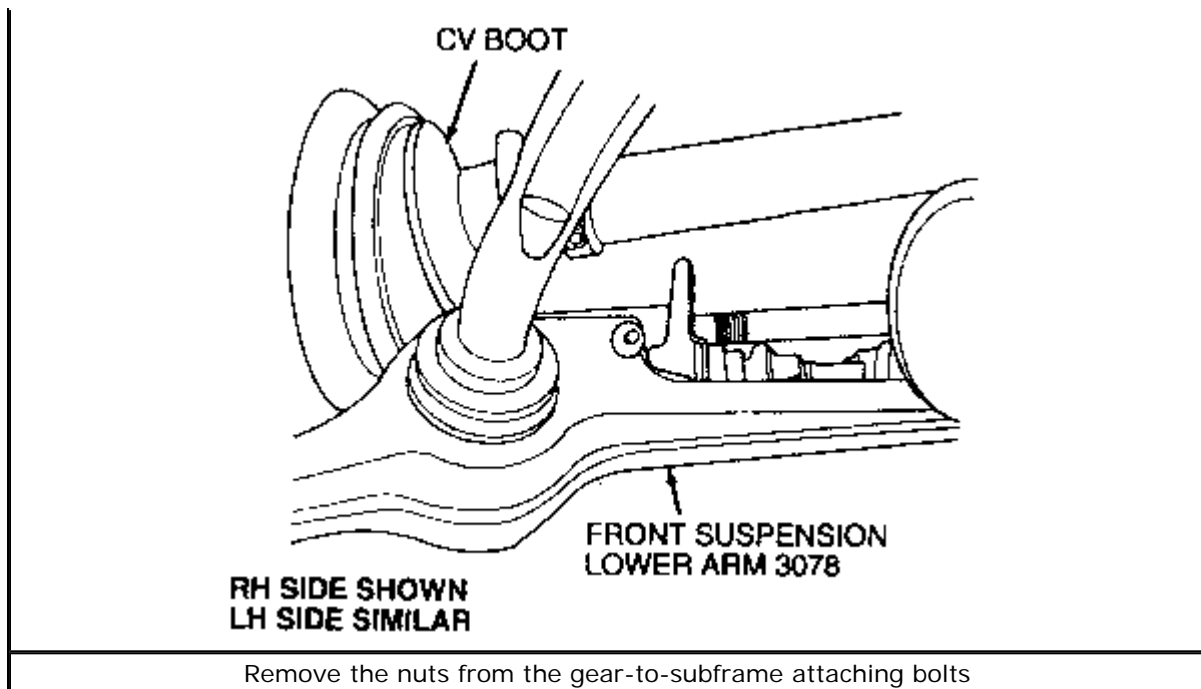
[Click to enlarge](#)

3. Remove the two bolts retaining the steering column gear input shaft coupling to the power steering gear shaft and yoke assembly.
4. Set the steering column tube boot aside. Remove the pinch bolt at the power steering gear shaft and yoke assembly, then remove the steering column gear input shaft coupling.
5. Raise the vehicle and support safely. Remove the front wheel and tire assemblies. Support the vehicle under the rear edge of the subframe with jack stands.



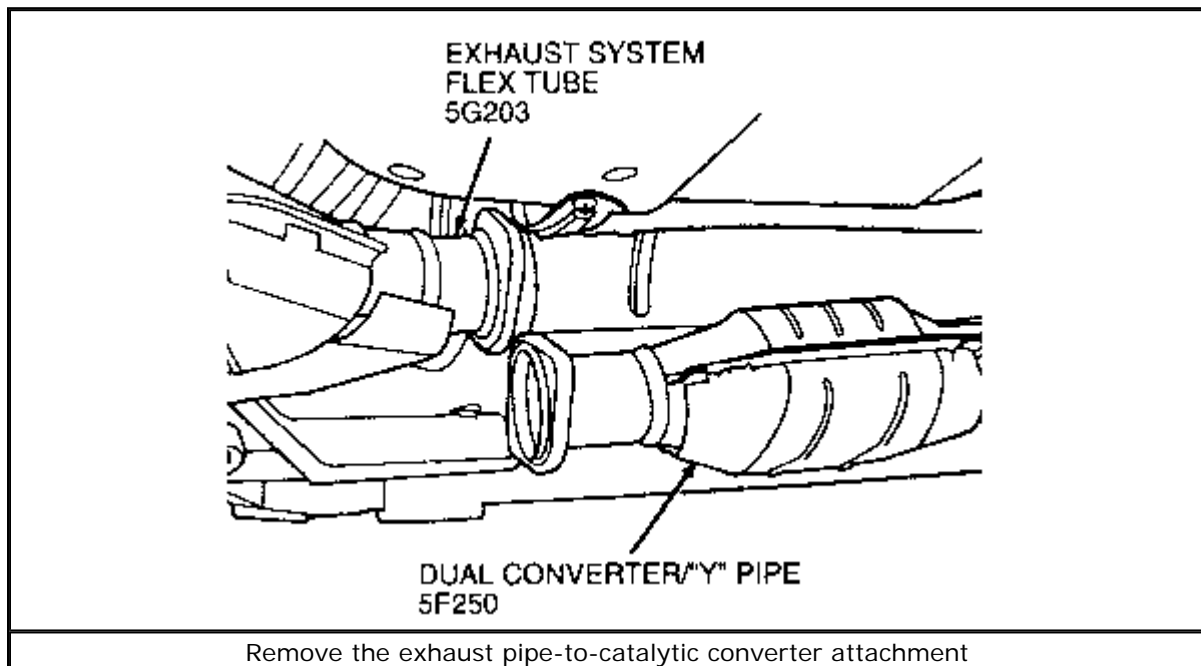
[Click to enlarge](#)

6. Remove the tie rod cotter pins and nuts. Remove the left and right-side tie rod ends from the steering knuckle.
7. Mark the position of the jam nut (to maintain the alignment), then remove the tie rod ends from the spindle tie rod.
8. Remove the nuts from the gear-to-subframe attaching bolts.



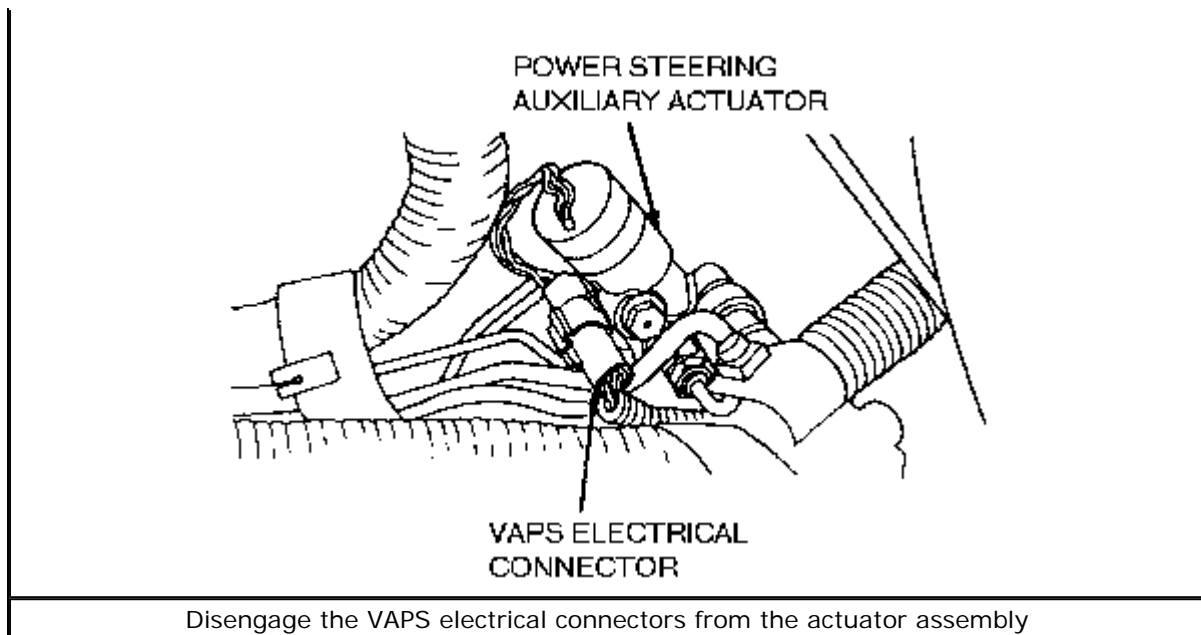
[Click to enlarge](#)

9. Remove the rear subframe-to-body attaching bolts.
10. Remove the exhaust pipe-to-catalytic converter attachment.



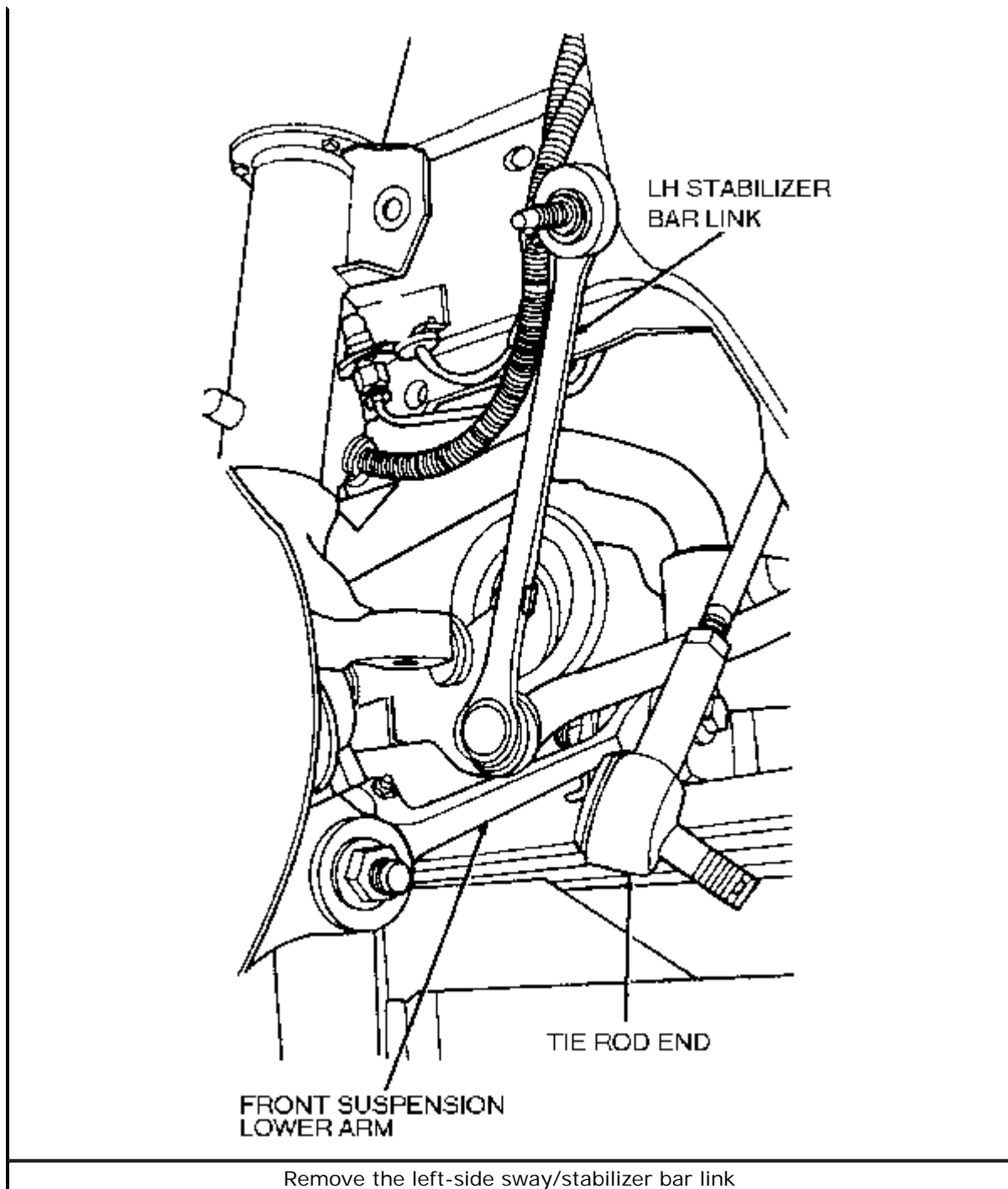
[Click to enlarge](#)

11. Lower the vehicle carefully until the subframe separates from the body approximately 4 in. (102mm).
12. Remove the heat shield band, then fold the shield down.
13. Disengage the VAPS electrical connectors from the actuator assembly.



[Click to enlarge](#)

14. Rotate the gear to clear the bolts from the subframe and pull to the left to facilitate line fitting removal.
15. Position a suitable drain pan under the vehicle, then remove the line fittings. Remove the O-rings from the fitting connections, then replace with new ones during installation.
16. Remove the left-hand side sway/stabilizer bar link.



[Click to enlarge](#)

17. Remove the steering gear assembly through the left wheel well.

To install:

18. Install new Teflon® O-rings into the line fittings.
19. Place the gear attachment bolts in the gear housing.
20. Install the steering gear assembly through the left wheel well.
21. Connect and tighten the line fittings to the steering gear assembly.
22. Engage the VAPS electrical connectors.
23. Position the steering gear into the subframe.

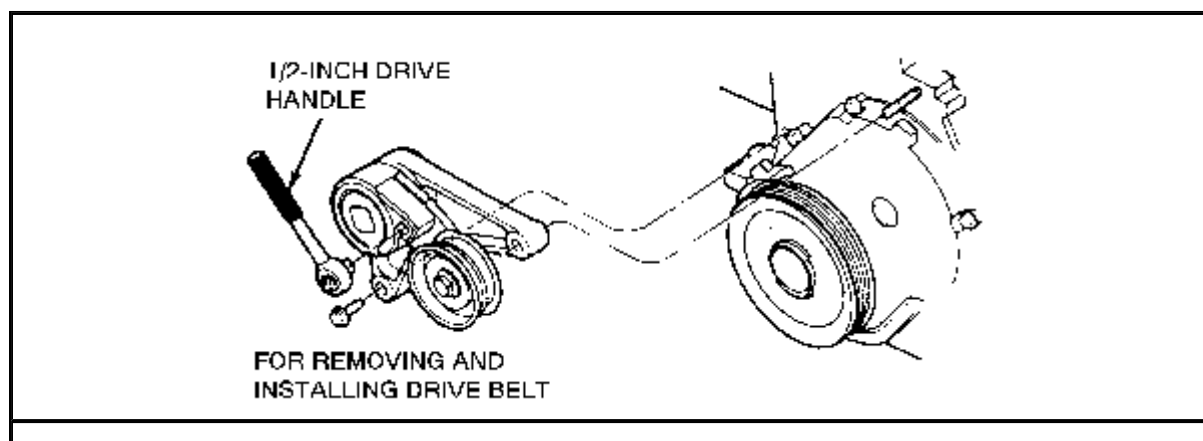
24. Install the tie rod ends onto the front wheel spindle tie rod.
25. Install the heat shield band.
26. Attach the tie rod ends onto the knuckle. Install the nuts and secure with new cotter pins.
27. Attach the sway/stabilizer bar link.
28. Raise the vehicle until the subframe contacts the body. Install the rear subframe attaching bolts.
29. Install the gear-to-front subframe nuts, then tighten to 85-100 ft. lbs. (115-135 Nm).
30. Attach the exhaust pipe to the catalytic converter.
31. Install the wheels, then remove the jackstands and carefully lower the vehicle. Tighten the lug nuts to 85-105 ft. lbs. (115-142 Nm).
32. From inside the vehicle, push the steering column tube boot end out of the vehicle, then install over the steering gear housing.
33. Install the steering column gear input shaft coupling to the power steering gear shaft and yoke assembly. Tighten the bolt to 30-38 ft. lbs. (41-51 Nm).
34. Install the inner steering column tube boot to the cowl panel.
35. Install the input shaft coupling to the steering gear shaft and yoke assembly.
36. Fill the power steering system with Premium Power Steering Fluid E6AZ-19582-AA or equivalent.
37. Bleed the power steering system. For details, please refer to the procedure located later in this section.
38. Connect the negative battery cable, then check the system for leaks and proper operation.
39. If necessary, have the alignment checked by a reputable repair shop.

Power Steering Pump

REMOVAL & INSTALLATION

2.5L Engines

1. Disconnect the negative battery cable.
2. Loosen the tensioner pulley attaching bolts. Using the $\frac{1}{2}$ in. drive hole provided in the tensioner pulley, rotate the tensioner clockwise, then remove the belt from the alternator and power steering pulley.



Remove the belt from the pulleys-2.5L engine only

[Click to enlarge](#)

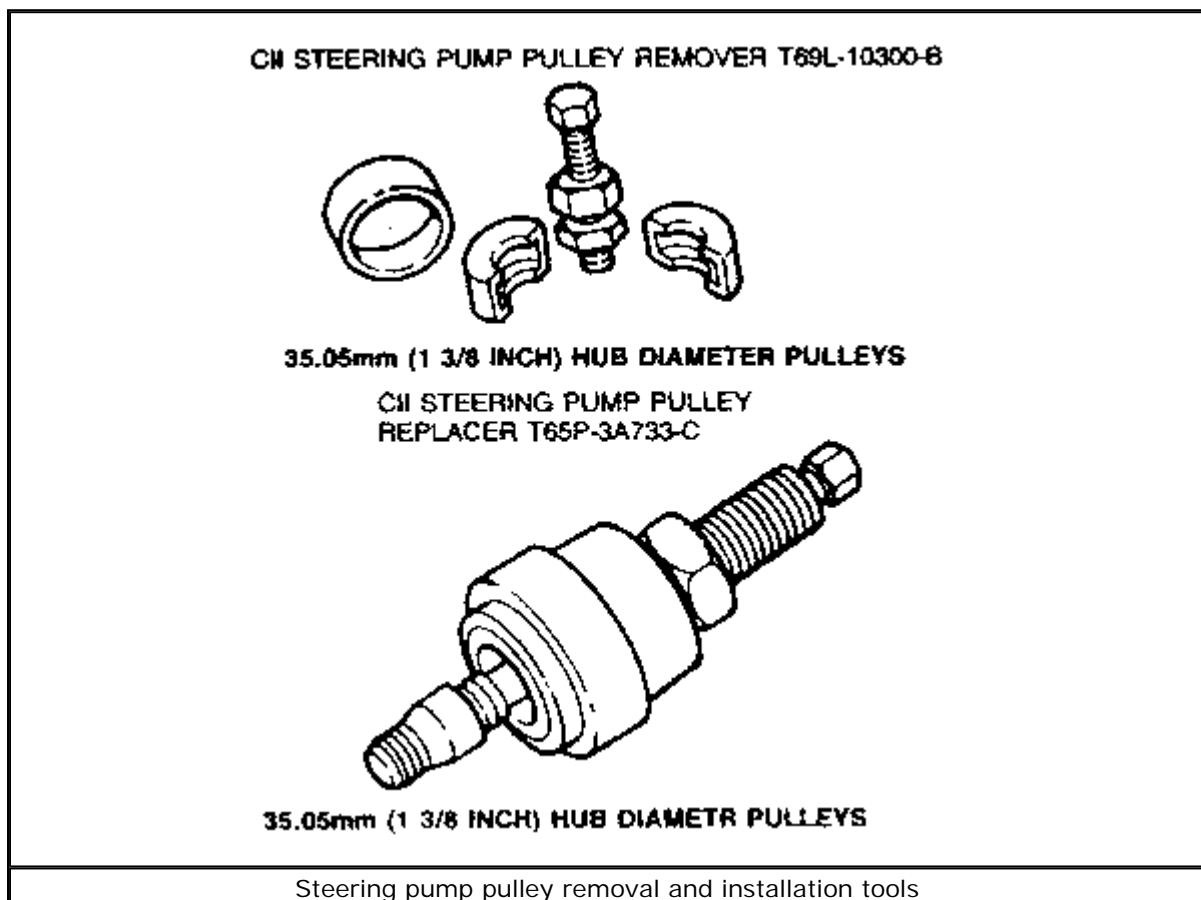
3. Position a drain pan under the power steering pump beneath the vehicle. Disconnect the hydraulic pressure and return lines.
4. Remove the pulley from the pump shaft using Steering Pump Pulley Tool T69L-10300-B or equivalent.
5. Remove the three bolts retaining the pump to the bracket, then remove the power steering pump.

To install:

6. Install the pump on the mounting bracket, then install the three pump-to-bracket retaining bolts.

To install the power steering pump pulley, use steering pump pulley replacer T65P-3A733-C or equivalent. When using this tool, the small diameter threads must be fully engaged in the pump shaft before pressing on the pulley. Hold the screw head and turn the nut to install the pulley. Install the pulley face flush with the pump shaft or within 0.100 in. (0.25mm).

7. Install the pulley on the pump shaft using Steering Pump Pulley Replacer T65P-3A733-C or equivalent.

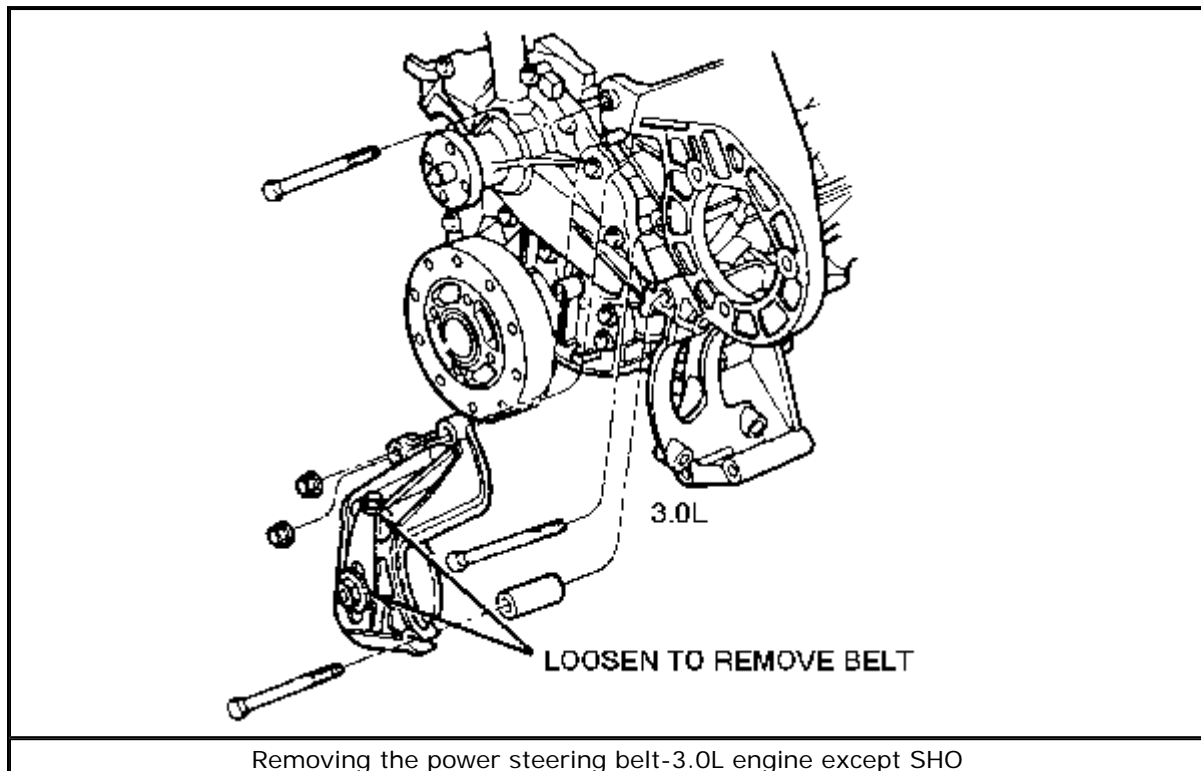


[Click to enlarge](#)

8. Connect the hydraulic pressure and return lines.
9. Position the belt over the alternator and power steering pulleys, then, using the $\frac{1}{2}$ in. drive hole in the tensioner pulley, rotate the tensioner counterclockwise to install the belt.
10. Connect the negative battery cable, then fill to the correct level with the proper type of fluid and check operation. Remove the drain pan.

3.0L Engine-Except SHO

1. Disconnect the negative battery cable.
2. Loosen the idler pulley, then remove the power steering belt.



[Click to enlarge](#)

3. For vehicles through 1993 remove the pulleys from the hub as follows:
 1. Remove the radiator overflow bottle in order to gain access to the 3 screws/bolts attaching the pulleys to the pulley hub.
 2. Matchmark both pulley-to-hub positions with a grease pencil or dot of paint for installation purposes.
 3. Remove the bolts and pulleys from the pulley hub.
4. For 1994-95 vehicles remove the pulley from the hub using Steering Pump Pulley Remover T69L-10300-B or equivalent.
5. Position a drain pan under the pump, then remove the return line from the pump. Be prepared to catch any spilled fluid in a suitable container.
6. Back off the pressure line attaching nut completely. The line will separate from the pump connection when the pump is removed.
7. Remove the three pump mounting bolts, then remove the pump.

To install:

8. Install the pump on the mounting bracket. Guide the pressure hose into the pump outlet fitting while installing the pump.
9. Install the pressure and return lines to the pump.
10. For vehicles through 1993, install the pulley on the hub as follows:
 1. Install the pulleys on the hub, aligning the marks made during removal.
 2. Install the three bolts, then tighten to 15-24 ft. lbs. (21-32 Nm).
 3. Install the radiator overflow bottle.
11. For 1994-95 vehicles, install the pulley on the hub using Steering Pump Pulley Replacer T65P-3A733-C or equivalent. The small diameter threads must be fully engaged in the pump shaft before pressing on the pulley. Screw the tool into the threads in the end of the pump shaft. Hold the small nut on the end of the tool, then turn the large nut to install the pulley on the shaft. Install the pulley face flush with the pump shaft or within 0.010 in. (0.25mm).
12. Install the power steering belt.
13. Connect the negative battery cable. Fill with the proper type of fluid and check for proper operation.

3.0L and 3.2L SHO Engines

1. Disconnect the negative battery cable.
2. Remove the engine damper strut.
3. Remove the power steering belt.
4. Raise and safely support the vehicle.
5. Remove the front right-side wheel and tire assembly.
6. Position a suitable jack under the engine, then remove the right rear engine mount.
7. Remove the power steering pump pulley as follows:
 1. Loosen the idler pulley, then remove the drive belt.
 2. Remove the power steering pump pulley from the power steering pump shaft using Steering Pump Pulley Remover T69L-10300-B or equivalent.
8. Place a drain pan under the pump, then remove the pressure and return lines from the pump.
9. Remove the four pump retaining bolts (three in the front and one in the rear), then remove the pump.

To install:

10. Position the pump, then install the retaining bolts. Tighten to 15-24 ft. lbs. (20-33 Nm).
11. Install the power steering pressure and return hoses to the power steering pump, then remove the drain pan.
12. Install the power steering pump pulley as follows:
 1. Install the pulley to the pump using Steering Pump Pulley Replacer T65P-3A733-C or equivalent. The

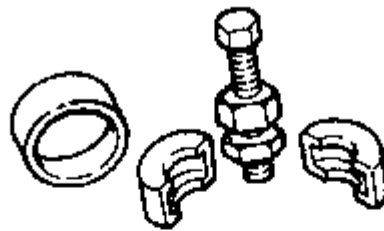
small diameter threads must be fully engaged in the pump shaft before pressing on the pulley. Screw the tool into the threads in the end of the pump shaft. Hold the small nut on the end of the tool, then turn the large nut to install the pulley on the shaft. Install the pulley face flush with the pump shaft or within 0.010 in. (0.25mm).

13. Install the right rear engine mount, then remove the jack.
14. Install the right front wheel and tire assembly. Lower the vehicle, then tighten the lug nuts to 85-105 ft. lbs. (115-142 Nm).
15. Install the drive belt to the power steering pump pulley.
16. Install the engine damper strut.
17. Connect the negative battery cable, then check the fluid and fill to the proper level.

3.8L Engine

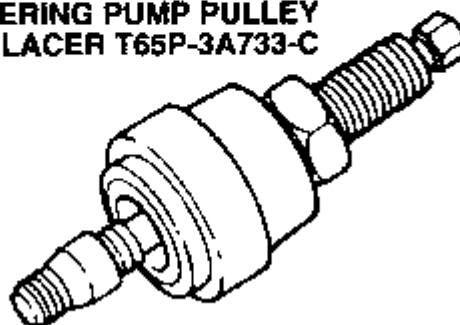
1. Disconnect the negative battery cable.
2. Remove the engine damper mounting body bracket.
3. Remove the power steering drive belt.
4. Raise and safely support the vehicle.
5. Remove the right-side wheel and tire assembly.
6. Position a suitable jack under the engine. Remove the right rear engine mount.
7. Remove the power steering pump pulley from the power steering pump shaft using Steering Pump Pulley Remover T69L-10300-B or equivalent.

STEERING PUMP PULLEY REMOVER T69L-10300-B



35.05 mm (1 3/8 INCHES) HUB DIAMETER PULLEYS

STEERING PUMP PULLEY REPLACER T65P-3A733-C



35.05 mm (1 3/8 INCHES) HUB DIAMETER PULLEYS

Power steering pump pulley removal and installation tools

[Click to enlarge](#)

8. Position a suitable drain pan under the vehicle. Remove the pressure and return hoses from the pump, and allow it to drain into the pan.
9. Remove the four pump retaining bolts (three in front, one in rear), then remove the pump.

To install:

10. Position the power steering pump, then install the retaining bolts. Tighten the bolts to 15-24 ft. lbs. (20-33 Nm).
11. Install the pulley to the pump using Steering Pump Pulley Replacer T65P-3A733-C or equivalent. The small diameter threads must be fully engaged in the pump shaft before pressing on the pulley. Screw the tool into the threads in the end of the pump shaft. Hold the small nut on the end of the tool, then turn the large nut to install the pulley on the shaft. Install the pulley face flush with the pump shaft or within 0.010 in. (0.25mm).
12. Install the right rear engine mount, then remove the jack.
13. Install the right front wheel and tire assembly. Lower the vehicle, then tighten the lug nuts to 85-105 ft. lbs. (115-142 Nm).
14. Install the power steering pump belt to the pulley.
15. Install the engine damper mounting body bracket.
16. Connect the negative battery cable, then fill the power steering reservoir to the proper level with the correct type of fluid.

BLEEDING

If air bubbles are present in the power steering fluid, bleed the system by performing the following:

1. Fill the reservoir to the proper level.
2. Operate the engine until the fluid reaches normal operating temperature of 165-175°F (74-79°C).
3. Turn the steering wheel all the way to the left, then all the way to the right several times. Do not hold the steering wheel in the far left or far right position stops.
4. Check the fluid level and recheck the fluid for the presence of trapped air. If it is apparent that air is still in the system, fabricate or obtain a vacuum tester and purge the system as follows:
 1. Remove the pump dipstick cap assembly.
 2. Check and fill the pump reservoir with fluid to the COLD FULL mark on the dipstick.
 3. Disconnect the ignition wire, then raise the front of the vehicle and support safely.
 4. Crank the engine with the starter and check the fluid level. Do not turn the steering wheel at this time.
 5. Fill the pump reservoir to the COLD FULL mark on the dipstick. Crank the engine with the starter while cycling the steering wheel lock-to-lock. Check the

fluid level.

6. **Tightly insert a suitable size rubber stopper and air evacuator pump into the reservoir fill neck. Connect the ignition coil wire.**
 7. **With the engine idling, apply a 15 in. Hg (51 kPa) vacuum to the reservoir for 3 minutes. As air is purged from the system, the vacuum will drop off. Maintain the vacuum on the system as required throughout the 3 minutes.**
 8. **Remove the vacuum source. Fill the reservoir to the COLD FULL mark on the dipstick.**
 9. **With the engine idling, reapply 15 in. Hg (51 kPa) vacuum source to the reservoir. Slowly cycle the steering wheel to lock-to-lock stops for approximately 5 minutes. Do not hold the steering wheel at the stops during cycling. Maintain the vacuum as required.**
 10. **Release the vacuum and disconnect the vacuum source. Add fluid as required.**
 11. **Start the engine and cycle the wheel slowly, then check for leaks at all connections.**
 12. **Lower the front wheels.**
5. **In cases of severe aeration, repeat the procedure.**
-

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