7

DRIVE TRAIN

AUTOMATIC TRANSMISSION

Fluid Pan and Filter Service

REMOVAL & INSTALLATION

Refer to Section 1 for transmission pan removal and filter service.

Neutral Safety Switch

REMOVAL & INSTALLATION

1988–91 Models Only

➡On 1992 and later models, the neutral safety switch is incorporated into the Manual Lever Position or Transmission Range MLP/TR sensor. Refer to the MLP/TR sensor procedure in this section.

The neutral safety switch is located on the transmission case above the manual lever.

1. Set the parking brake.
2. Place the selector lever in the manual **L** position.
3. Remove the air cleaner assembly.
4. Disconnect the negative battery cable.
5. Disconnect the neutral safety switch electrical harness from the switch by lifting the harness straight up off the switch without side-to-side motion.
6. Reach in the area of the left hand dash panel, using a 24 inch extension, universal adapter and socket tool T74P–77247–A or equivalent, and remove the neutral safety switch and O-ring.

➡Use of different tools could crush or puncture the walls of the switch.

To install:

7. Install the neutral safety switch and new O-ring using socket tool T74P–77247–A or equivalent.
8. Tighten the switch to 8–11 ft. lbs. (11–15 Nm).
9. Connect the neutral safety switch to the wiring harness.
10. Connect the negative battery cable.
11. Check that the vehicle starts in the **N** or **P** position.

ADJUSTMENT

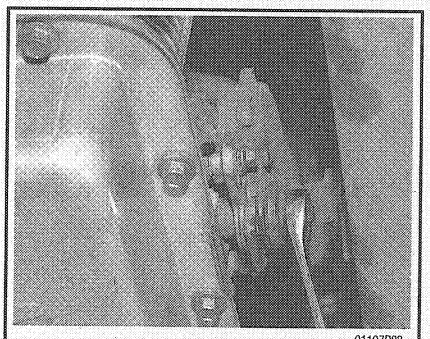
No adjustment is possible on the neutral safety switch.

Manual Lever Position (MLP) Sensor/Transmission Range (TR) Sensor

REMOVAL & INSTALLATION

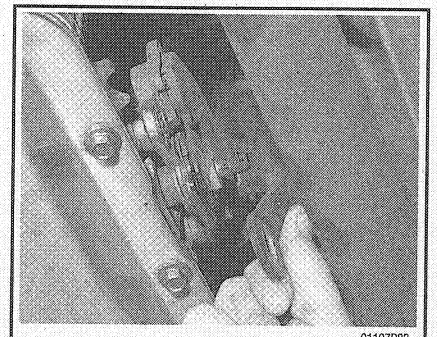
◗ See Figures 1, 2, 3, 4 and 5

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



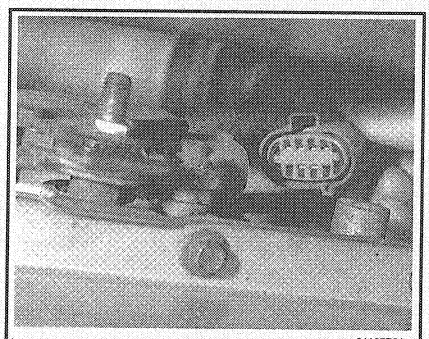
91197P03

Fig. 1 Unfasten the nut for the manual control lever and . . .



91197P02

Fig. 2 . . . remove the lever from the sensor



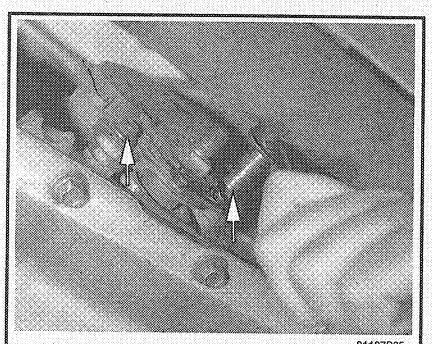
91197P01

Fig. 3 Detach the connector from the TR sensor

3. Place the transmission in Neutral.
4. Remove and discard the manual control lever nut, then remove the lever from the transmission.
5. Detach the TR sensor electrical harness connector, remove the TR sensor retaining bolts, and then pull the TR sensor off the transmission case.

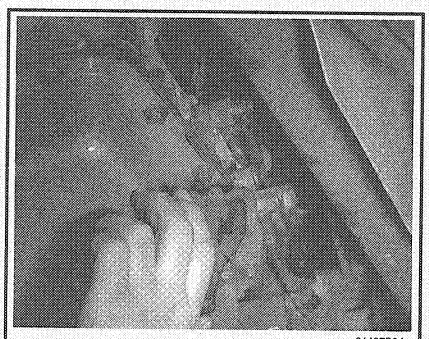
To install:

6. Position the TR sensor against the transmission case and loosely install the 2 retaining screws.



91197P05

Fig. 4 Unfasten the retaining bolts and . . .



91197P04

Fig. 5 . . . remove the sensor from the transmission

7. Attach the TR sensor electrical harness connector.
8. Use an alignment tool, such as the TR Sensor Alignment Tool T93P-70010-A, to align the TR sensor slots.
9. Tighten the TR sensor bolts to 80–100 inch lbs. (9–11 Nm).
10. Position the manual control lever onto the TR sensor, then install the new lever nut to 22–26 ft. lbs. (30–35 Nm).
11. Lower the vehicle.
12. Connect the negative battery cable.

ADJUSTMENT

◗ See Figure 6

➡Park is the last detent when the manual control lever is full forward. Return 2 detents toward the output shaft for Neutral.

1. Position the manual control lever in **Neutral**.
2. Raise and safely support the vehicle.
3. Loosen the sensor retaining bolts.
4. Insert Gear Position Sensor Adjuster tool T93P-700 10-A or equivalent, into the slots.
5. Align all 3 slots on the MLP sensor with 3 tabs on the tool.
6. Tighten the attaching screws to 80–100 inch lbs. (9–11 Nm).
7. Lower the vehicle.

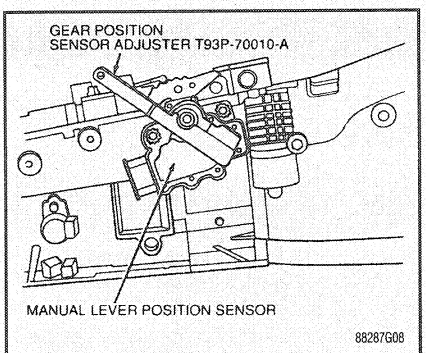


Fig. 6 Adjusting the MLP sensor

Extension Housing Seal

REMOVAL & INSTALLATION

1. Raise and safely support the vehicle.
2. Remove the driveshaft according to the procedure in this section.
3. Carefully remove the seal, using a suitable seal removal tool.
4. Inspect the sealing surface of the driveshaft yoke for scoring or damage. If scored or damaged, the yoke must be replaced.
5. Inspect the seal bore in the extension housing for burrs or damage. Burrs can be removed with crocus cloth.

To install:

6. Install the seal in the housing using a suitable seal installer; the seal should be firmly seated in the bore.
7. Coat the inside diameter of the rubber portion of the seal with grease.
8. Install the driveshaft as described in this Section.
9. Lower the vehicle. Operate the vehicle and check for leaks.

Automatic Transmission Assembly

REMOVAL & INSTALLATION

1. Disconnect the negative battery cable.
2. Raise the vehicle and support safely.
3. Drain the fluid from the transmission by removing all the transmission pan bolts except for one on each corner. Loosen the 4 bolts on the corner and drop the oil pan to allow the fluid to drain into a container. When drained, reinstall a few of the bolts to hold the pan in place.
4. Remove the converter bottom cover and remove the converter drain plug, to allow the converter to drain. After the converter has drained, reinstall the drain plug and tighten.
5. Remove the converter to flywheel nuts by turning the converter to expose the nuts.

➨Crank the engine over with a wrench on the crankshaft pulley-attaching bolt.

6. Mark the position of the driveshaft on the rear axle flange and remove the driveshaft. Install a suitable plug in the transmission extension housing to prevent fluid leakage.
7. Disconnect the starter cable and remove the starter.
8. Disconnect the wiring from the neutral safety switch.
9. Remove the mount-to-crossmember and crossmember-to-frame bolts.
10. Remove the mount-to-transmission bolts.
11. On 1988–89 vehicles, disconnect the manual rod from the transmission manual lever using grommet removal tool T84P–7341–A or equivalent. On 1990–92 vehicles, disconnect the shift cable from the transmission. If equipped, disconnect the throttle valve cable from the transmission throttle valve lever.
12. On 1993–00vehicles, detach the wiring connectors.
13. Remove the bellcrank bracket from the converter housing.
14. Position a suitable jack and raise the transmission.
15. Remove the transmission mount and crossmember.

➨It may be necessary to disconnect or remove interfering exhaust system components.

16. Lower the transmission to gain access to the oil cooler lines.
17. Disconnect the oil cooler lines from the transmission.
18. If equipped, disconnect the speedometer cable from the extension housing.
19. Remove the transmission dipstick tube-to-engine-block retaining bolt and remove the tube and dipstick from the transmission.
20. Secure the transmission to the jack with a chain and remove the transmission-to-engine bolts.
21. Carefully pull the transmission and converter assembly rearward and lower them from the vehicle.

To install:

22. Tighten the converter drain plug to 21–23 ft. lbs. (28–30 Nm).
23. If removed, position the converter on the transmission and rotate into position to make sure the drive flats are fully engaged in the pump gear.

➨Lubricate the pilot with chassis grease.

24. Raise the converter and transmission assembly.
25. Rotate the converter until the studs and drain plug are in alignment with the holes in the flywheel. Align the orange balancing marks on the converter stud and flywheel boltholes if balancing marks are present.
26. Move the converter and transmission assembly forward into position, being careful not to damage the flywheel and converter pilot.

➨The converter face must rest squarely against the flywheel. This indicates that the converter pilot is not binding in the engine crankshaft. To ensure the converter is properly seated, grasp a converter stud. It should move freely back and forth in the flywheel hole. If the converter will not move, the transmission must be removed and the converter repositioned so the impeller hub is properly engaged in the pump gear.

27. Install the transmission-to-engine attaching bolts. Tighten the bolts to 40–50 ft. lbs. (55–68 Nm).
28. Remove the safety chain from around the transmission.
29. Install a new O-ring on the lower end of the transmission dipstick tube and install the tube to the transmission case.
30. If equipped, connect the speedometer cable to the transmission case.
31. Connect the oil cooler lines to the right side of the transmission case.
32. Position the crossmember on the side supports.
33. Position the rear mount on the crossmember and install the attaching bolt/nut.
34. Secure the engine rear support to the transmission extension housing.
35. Install any exhaust system components, if removed.
36. Lower the transmission and remove the jack.
37. Secure the crossmember to the side supports with the attaching bolts.
38. If equipped, connect the throttle valve linkage to the throttle valve lever. On 1993–00 vehicles, attach the wiring harness connectors.
39. On 1988–89 vehicles, connect the manual linkage rod to the transmission manual lever using grommet installation tool T84P–7341–B or equivalent. On 1990–92 vehicles, connect the shift cable.
40. Install the converter to flywheel attaching nuts and tighten to 20–34 ft. lbs. (27–46 Nm).
41. Install the converter housing cover.
42. Secure the starter motor in place and attach all electrical connections.
43. Install the driveshaft, aligning the marks that were made during removal.
44. Install the transmission fluid pan bolts and tighten, evenly, to 107–119 inch lbs. (12–13.5 Nm).
45. Lower the vehicle.
46. Fill the transmission with the proper type and quantity of fluid, start the engine, and check the transmission for leakage.
47. Adjust the linkage as required.

AUTOMATIC TRANSAXLE

Fluid Pan

REMOVAL & INSTALLATION

Refer to Section 1 for transaxle pan removal and filter service.

Adjustments

SHIFT LINKAGE

AXOD And AXOD-E Transaxle

1. Position the selector lever in the **OD** position against the rearward stop. The shift lever must be held in the rearward position using a constant force of 3 lbs. (1.4 Kg) while the linkage is being adjusted.
2. Loosen the manual lever-to-control cable-retaining nut.
3. Move the transaxle manual lever to the **OD** position, second detent from the most rearward position.
4. Tighten the retaining nut to 11–19 ft. lbs. (15–26 Nm).
5. Check the operation of the transaxle in each selector lever position. Make sure the park and neutral start switch are functioning properly.

THROTTLE CABLE

➨Transaxle downshift control is controlled through the throttle position switch on 1991–95 vehicles equipped with the electronic automatic overdrive transaxle.

1988–90 Continental

◗ See Figures 7 and 8

The Throttle Valve (TV) cable normally does not need adjustment. The cable should be adjusted only if one of the following components is removed for service or replacement:

- Main control assembly
- Throttle valve cable
- Throttle valve cable engine mounting bracket
- Throttle control lever link or lever assembly
- Engine throttle body
- Transaxle assembly

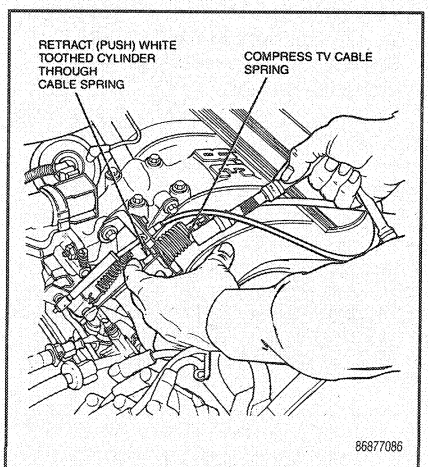


Fig. 7 While the spring is compressed, push the threaded shank toward the spring with the index and middle fingers of the left hand. Do not pull on the cable sheath

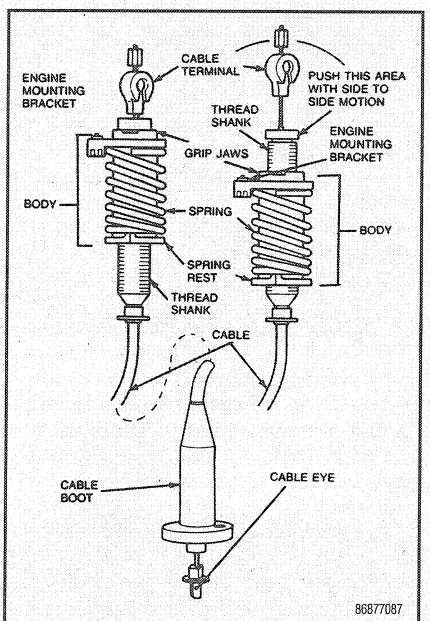


Fig. 8 The threaded shank must show movement or "ratchet" out of the grip jaws. If there is no movement, inspect the TV cable system for broken or disconnected components then repeat the procedure

1. Connect the TV cable eye to the transaxle throttle control lever link, then attach the cable boot to the chain cover.
2. The TV cable must be unclipped from the right intake manifold clip. To retract the shank, span the crack between the two 180 degree segments of the adjuster spring rest with a suitable tool. Compress the spring by pushing the rod toward the throttle body with the right hand. While the spring is compressed, push the threaded shank toward the spring with the index and middle fingers of the left hand. Do not pull on the cable sheath.
3. Attach the end of the TV cable to the throttle body.
4. Rotate the throttle body primary lever by hand, the lever to which the TV-driving nailhead is attached, to the wide-open-throttle position. The white adjuster shank must be seen to advance. If not, look for cable sheath/foam hang-up on engine/body components. Attach the TV cable into the top position of the right intake manifold clip.

➨The threaded shank must show movement or "ratchet" out of the grip jaws. If there is no movement, inspect the TV cable system for broken or disconnected components then repeat the procedure.

THROTTLE VALVE CONTROL LINKAGE

AXOD and AXOD-E Transaxles

1. Position the selector lever in the OVERDRIVE position against the rearward stop.
2. Loosen the manual lever to control cable-retaining nut. Be sure that the transaxle lever is in the OVERDRIVE position. Tighten the retaining nut to 11–19 ft. lbs. (15–26 Nm).
3. Check operation of the transaxle in each range. Be sure that the park switch and neutral safety switch are working properly.

Neutral Safety Switch

REMOVAL & INSTALLATION

◗ See Figures 9 and 10

1. Make sure the shift selector in the **Park** position, then apply the emergency brake.
2. Disconnect the negative battery cable.
3. Disengage the neutral start switch electrical connector, then remove the shift control lever on top of the switch.
4. Remove the two neutral switch-attaching bolts, then remove the switch.

To install:

5. Install the switch on the manual shaft.
6. Loosely install the two attaching bolts and washers.

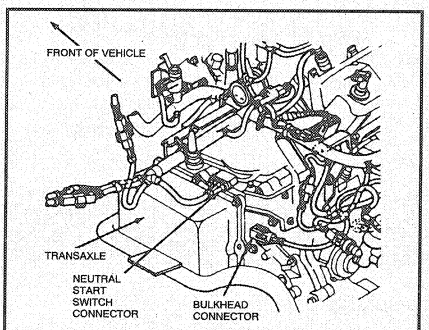


Fig. 9 Neutral safety switch location—vehicles equipped with automatic transaxle

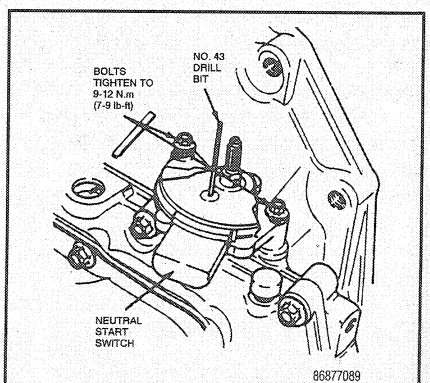


Fig. 10 Adjusting the neutral safety switch

7. Insert a No. 43 drill (0.089 in.) through the hole.
8. Tighten the attaching bolts to 7–9 ft. lbs. (9–12 Nm), then remove the drill.
9. Engage the switch electrical connector, then connect the negative battery cable.

Transaxle

REMOVAL & INSTALLATION

1988–94 Vehicles

See Figures 11 thru 20

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Remove the bolt retaining the shift cable and bracket assembly to the transaxle.

Hold the bracket with a prybar in the slot to prevent the bracket from moving.

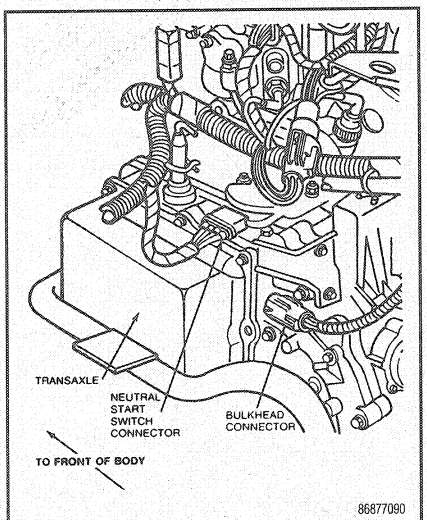


Fig. 11 Detach the connectors from the neutral safety switch and the bulkhead connector

4. Remove the shift cable bracket bolts and bracket from the transaxle.
5. Disengage the electrical connector from the neutral safety switch.
6. Detach the electrical bulkhead connector from the rear of the transaxle.
7. Remove the oil dipstick.
8. Remove the throttle valve cable cover. Unsnap the throttle valve cable from the throttle body lever. Remove the throttle valve cable from the transaxle case
9. Carefully pull up on the throttle valve cable and disconnect the throttle valve cable from the TV link.

Pulling too hard on the throttle valve may bend the internal TV bracket.

10. Install engine-lifting brackets.
11. Disconnect the power steering pump pressure and return line bracket.
12. Remove the converter housing bolts from the top of the transaxle.
13. Install a suitable engine support fixture.
14. Raise the and safely support the vehicle.
15. Remove both front wheels. Remove the left-side outer tie rod end.
16. Remove the lower ball joint attaching nuts and bolts. Remove the lower ball joints and remove the lower control arms from each spindle. Remove stabilizer bar bolts.
17. Remove the nuts securing the steering rack to the subframe.
18. Disengage the oxygen sensor electrical connection, then remove the exhaust pipe, converter assembly and mounting bracket.
19. Remove the two 15mm bolts from the transaxle mount. Remove the four 15mm bolts from the left engine support, then remove the bracket.
20. Position a suitable subframe removal tool.
21. Remove the steering gear from the subframe and secure to the rear of the engine compartment. Remove the subframe-to-body retaining bolts, then remove the subframe.
22. Remove the dust cover retaining bolt and the starter retaining bolts then position the starter out of the way. Remove the dust cover.
23. Rotate the engine by the crankshaft pulley bolt to align the torque converter bolts with the starter drive hole. Remove the torque converter-to-flywheel retaining nuts.
24. Remove the transaxle cooler line fitting retaining clips. Using Cooler Line Disconnect Tool T86P-77265-AH or equivalent, disconnect the transaxle cooler lines.
25. Remove the engine-to-transaxle retaining bolts.
26. Remove the speedometer sensor heat shield.
27. Remove the vehicle speed sensor from the transaxle.

Vehicles with electronic instrument clusters do not use a speedometer cable.

28. Position a suitable transaxle jack.
29. Remove the halfshafts as follows:
    a. Screw Extension T86P-3514-A2 into CV Joint Puller T86P-3514-A1, and insert Slide Hammer D79P-100-A or equivalent into the extension.
    b. Position the puller behind the CV joint, then remove the joint.
    c. Install shipping plugs.
30. Remove the two remaining torque converter housing bolts.

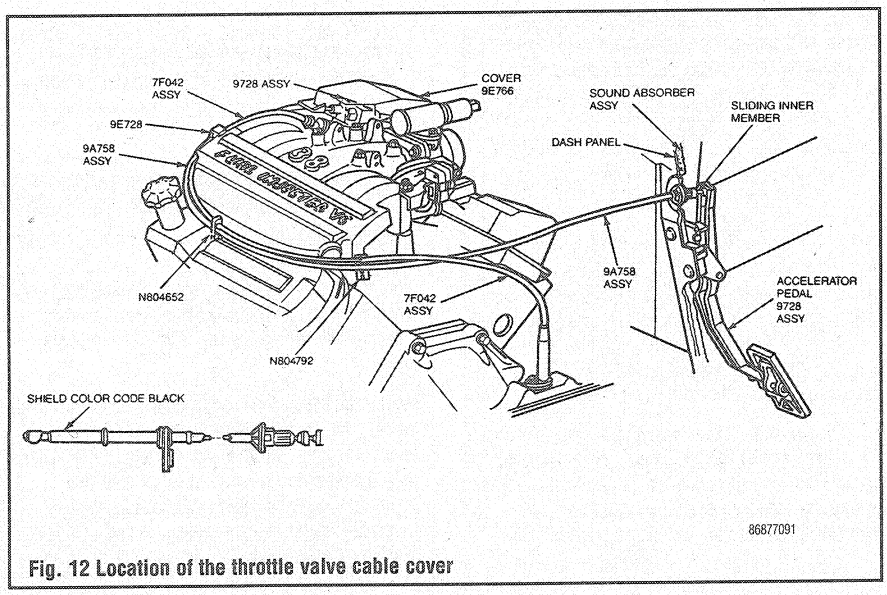


Fig. 12 Location of the throttle valve cable cover

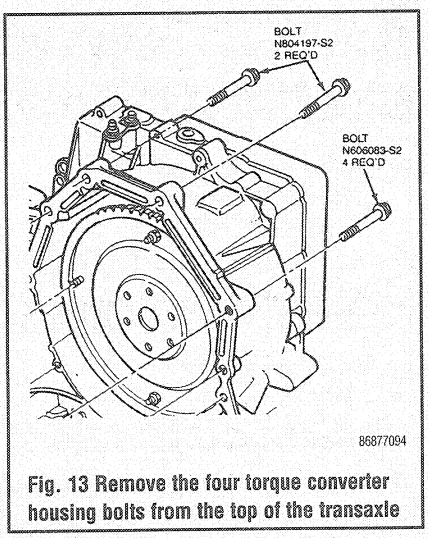


Fig. 13 Remove the four torque converter housing bolts from the top of the transaxle

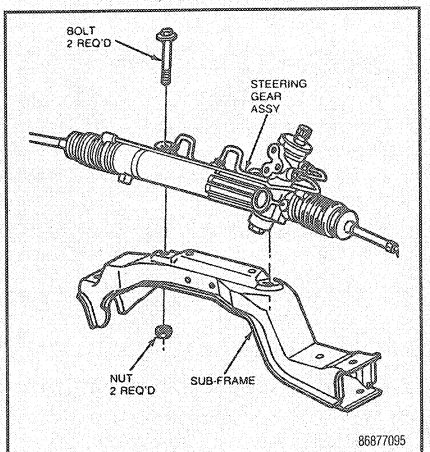


Fig. 14 Remove the nut securing the steering rack to the subframe

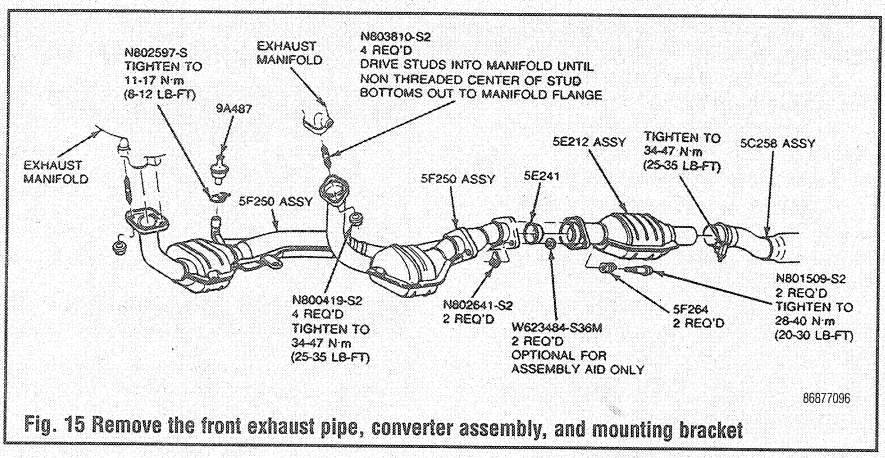


Fig. 15 Remove the front exhaust pipe, converter assembly, and mounting bracket

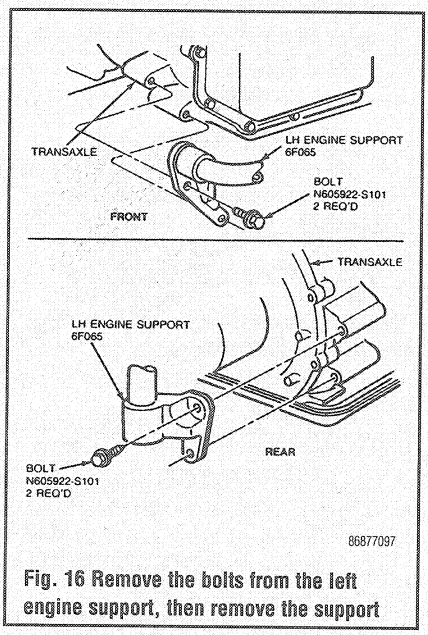


Fig. 16 Remove the bolts from the left engine support, then remove the support

31. Separate the transaxle from the engine, then carefully lower the transaxle from the vehicle.

To install:

a. Clean the transaxle oil cooler lines.

b. Install new circlips on the CV-joint seals.

c. Carefully install the halfshafts in the transaxle by aligning the splines of the CV-joint with the splines of the differential.

d. Attach the lower ball joint to the steering knuckle with a new nut and bolt. Tighten the nut to 37–44 ft. lbs.

e. When installing the transaxle to the engine, verify that the converter-to-transaxle engagement is maintained. Prevent the converter from moving forward and disengaging during installation.

f. Adjust the TV and manual linkages. Check the transaxle fluid level.

g. Tighten the following bolts to the torque specifications listed:

- Transaxle-to-engine bolts: 41–50 ft. lbs. (55–68 Nm)
- Control arm-to-knuckle bolts: 36–44 ft. lbs. (49–60 Nm)
- Stabilizer U-clamp-to-bracket bolts: 60–70 ft. lbs. (81–95 Nm)
- Tie rod-to-knuckle nut: 23–35 ft. lbs. (31–47 Nm)
- Starter-to-transaxle bolts: 30–40 ft. lbs. (41–54 Nm)
- Converter-to-flywheel bolts: 23–39 ft. lbs. (31–53 Nm)
- Insulator-to-bracket bolts: 55–70 ft. lbs. (75–95 Nm)

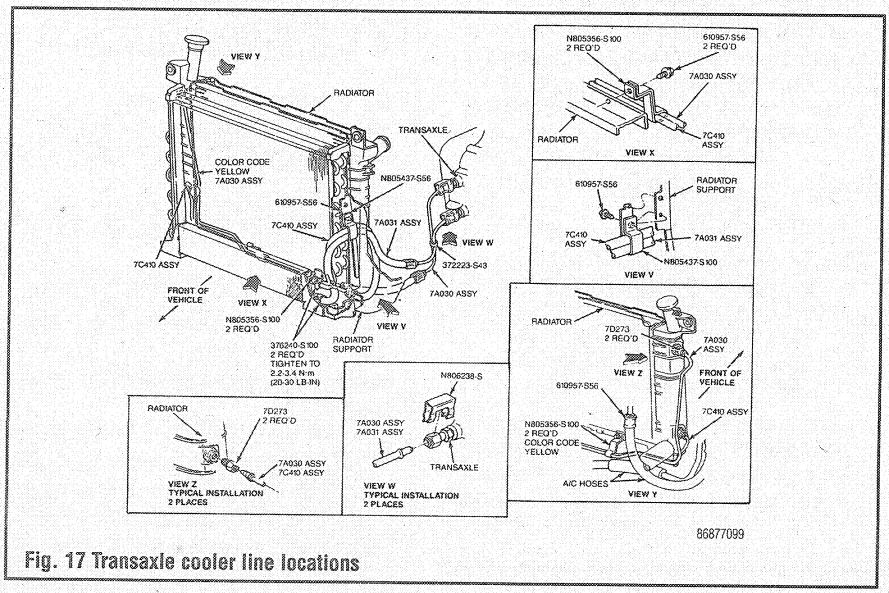


Fig. 17 Transaxle cooler line locations

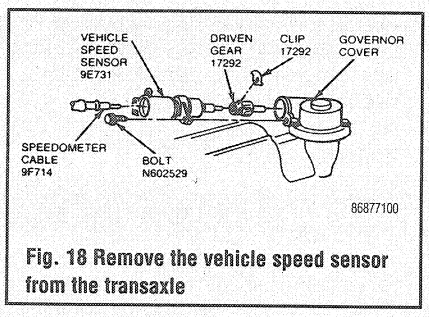


Fig. 18 Remove the vehicle speed sensor from the transaxle

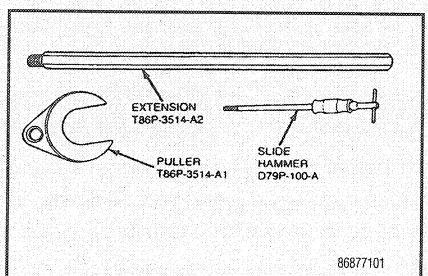


Fig. 19 Tools necessary to remove the halfshafts

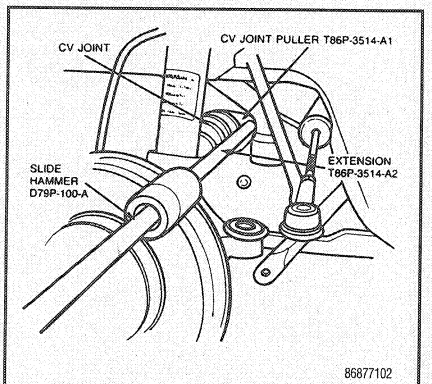


Fig. 20 Position the puller behind the CV-joint, then remove the joint

Continental 1995–00

1. Transaxle removal in these vehicles necessitates the dropping of the sub-frame assembly.

2. If it is necessary to remove the transaxle for repair, follow the same procedure as the engine removal.

Halfshafts

When removing both the left and right halfshafts, install suitable shipping plugs to prevent dislocation of the differential side gears. Should the gears become misaligned, the differential will have to be removed from the transaxle to re-align the side gears.

➡Due to the automatic transaxle case configuration, the right halfshaft assembly must be removed first. Differential Rotator T81P-4026-A or equivalent is then inserted into the transaxle to drive the left inboard CV-joint assembly from the transaxle. If only the left halfshaft assembly is to be removed for ser-

vice, remove only the right halfshaft assembly from the transaxle. After removal, support it with a length of wire. Then, drive the left halfshaft assembly from the transaxle.

REMOVAL & INSTALLATION

See Figures 21 thru 39

1. Disconnect the negative battery cable.
2. Remove the wheel cover/hub cover from the wheel and tire assembly, then loosen the lug nuts.
3. Raise and safely support the vehicle, then remove the wheel and tire assembly. Insert a steel rod in the rotor to prevent it from turning, then remove the hub nut and washer. Discard the old hub nut.

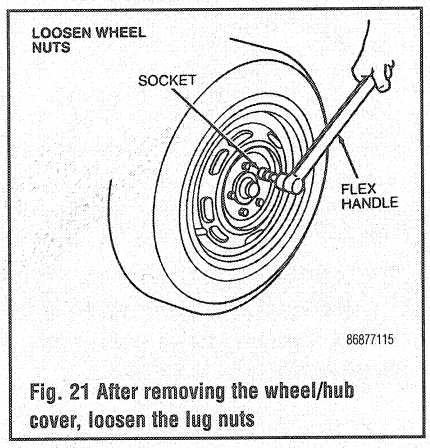


Fig. 21 After removing the wheel/hub cover, loosen the lug nuts

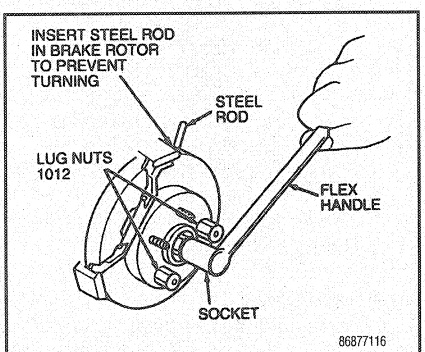


Fig. 22 Before removing the hub nut and washer, insert a steel rod in the rotor to prevent it from turning

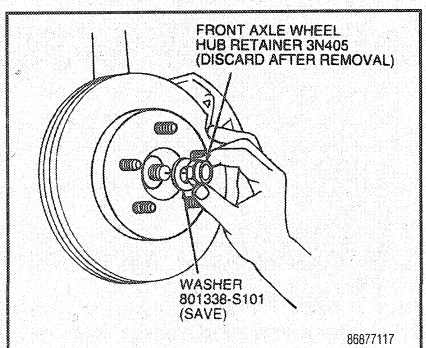


Fig. 23 Remove the hub nut and washer, then discard the nut, and replace with a new one during installation

4. Remove the nut from the ball joint to steering knuckle attaching bolts.
5. Drive the bolt out of the steering knuckle using a punch and hammer. Discard this bolt and nut after removal.
6. If equipped with anti-lock brakes, remove the anti-lock brake sensor and position it aside. If equipped with air suspension, remove the height sensor bracket retaining bolt and wire sensor bracket to inner fender. Position the sensor link aside.
7. Separate the ball joint from the steering knuckle using a suitable prybar. Position the end of the prybar outside of the bushing pocket to avoid damage to the bushing. Use care to prevent damage to the ball joint boot. Remove the stabilizer bar link at the stabilizer bar.
   a. Slide the link shaft out of the transaxle. Support the end of the shaft by suspending it from a convenient underbody component with a piece of wire. Do not allow the shaft to hang unsupported, damage to the outboard CV-joint may occur.
   b. Separate the outboard CV-joint from the hub using front hub remover tool T81P-1104-C or equivalent and metric adapter tools T83P-1104-BH, T86P-1104-AI and T81P-1104-A or equivalent.

Never use a hammer to separate the outboard CV-joint stub shaft from the hub. Damage to the CV-joint threads and internal components may result. The halfshaft assembly is removed as a complete unit.

   c. Install the CV-joint puller tool T86P-3514-A1 or equivalent, between CV-joint and transaxle

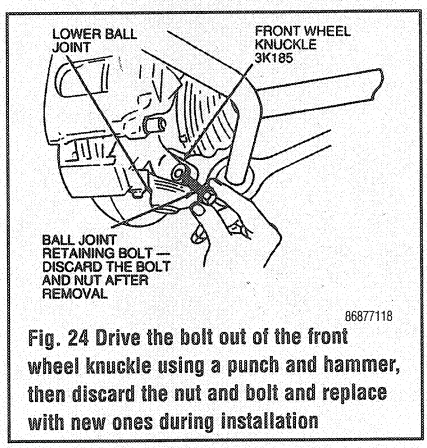


Fig. 24 Drive the bolt out of the front wheel knuckle using a punch and hammer, then discard the nut and bolt and replace with new ones during installation

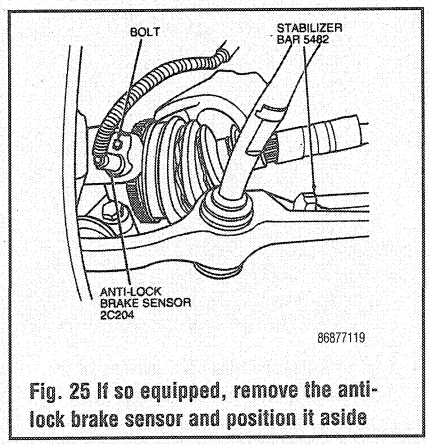


Fig. 25 If so equipped, remove the anti-lock brake sensor and position it aside

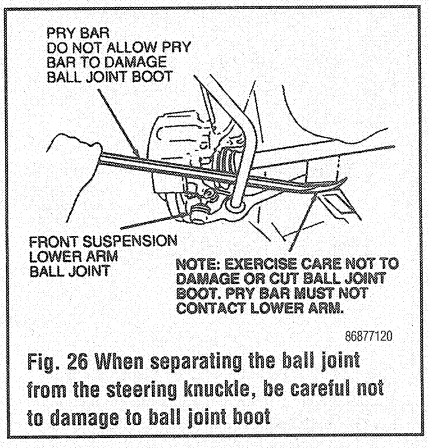


Fig. 26 When separating the ball joint from the steering knuckle, be careful not to damage to ball joint boot

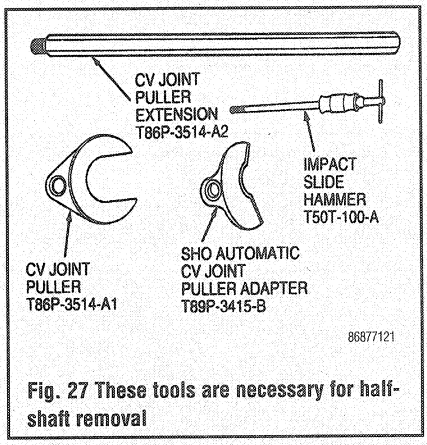


Fig. 27 These tools are necessary for halfshaft removal

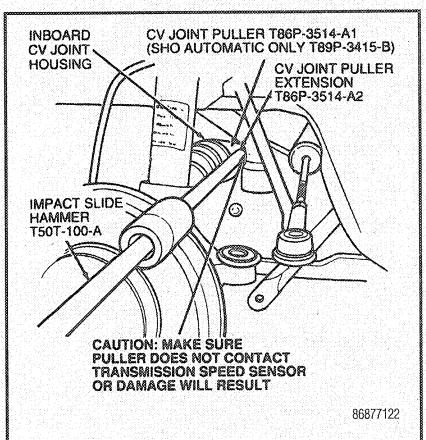


Fig. 28 Installing the specified tools to remove the halfshaft assembly from the vehicle

case. Turn the steering hub and/or wire strut assembly aside.
   d. Screw extension tool T86P-3514-A2 or equivalent, into the CV-joint puller and hand tighten. Screw an impact slide hammer onto the extension and remove the CV-joint.
   e. Support the end of the shaft by suspending it from a convenient underbody component with a piece of wire. Do not allow the shaft to hang unsupported, damage to the outboard CV-joint may occur.
   f. Separate the outboard CV-joint from the hub using front hub remover tool T81P-1104-C

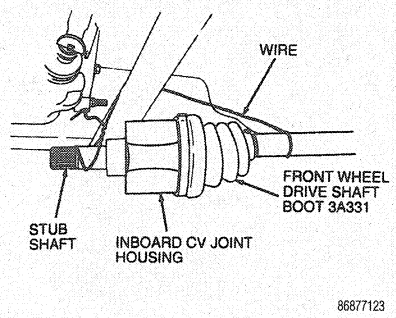


Fig. 29 Support the end of the shaft by suspending it from a convenient underbody component with a piece of wire. Do not allow the shaft to hang unsupported, since damage to the outboard CV-joint may occur

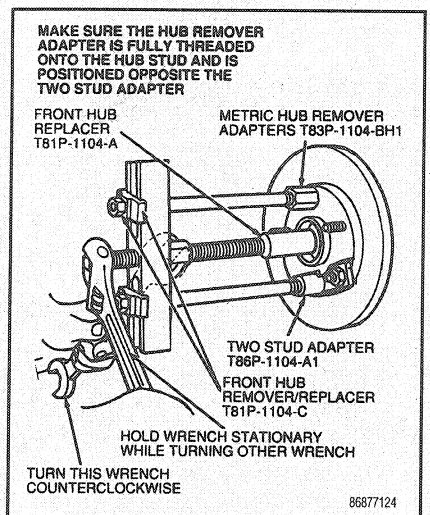


Fig. 30 Separate the outboard CV-joint from the hub using front hub remover tool T81P-1104-C or equivalent, and metric adapter tools T83P-1104-BH, T86P-1104-AI and T81P-1104-A or equivalent, then remove the halfshaft assembly from the vehicle

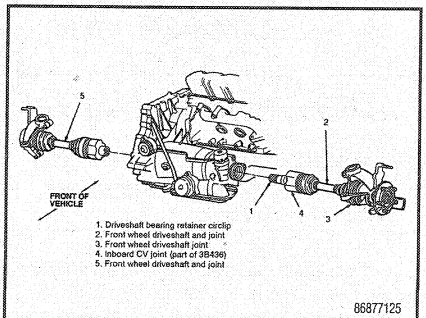


Fig. 31 Exploded view of the halfshaft assemblies and related components—automatic transaxle

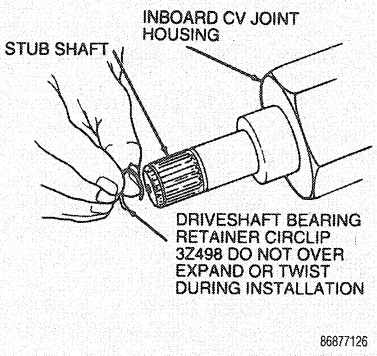


Fig. 32 Always use a new circlip on the inboard CV-joint stub shaft and/or link shaft. When installing the new circlip, start one end in the groove and work the circlip over the stub shaft end into the groove. This will avoid overexpanding the circlip

or equivalent and metric adapter tools T83P-1104-BH, T86P-1104-AI and T81P-1104-A or equivalent.

g. Remove the halfshaft assembly from the vehicle.

To install:

8. Install a new circlip on the inboard CV-joint stub shaft and/or link shaft. The outboard CV-joint does not have a circlip. When installing the circlip, start one end in the groove and work the circlip over the stub shaft end into the groove. This will avoid overexpanding the circlip.

➨The circlip must not be re-used. A new circlip must be installed each time the inboard CV-joint is installed into the transaxle differential.

9. Carefully align the splines of the inboard CV-joint stub shaft with the splines in the differential. Exerting some force, push the CV-joint into the differential until the circlip is felt to seat in the differential side gear. Use care to prevent damage to the differential oil seal. If equipped, tighten the link shaft bearing to 16–23 ft. lbs. (22–31 Nm).

➨A non-metallic mallet may be used to aid in seating the circlip into the differential side gear. If a mallet is necessary, tap only on the outboard CV-joint stub shaft.

10. Carefully align the splines of the outboard CV-joint stub shaft with the splines in the hub and push the shaft into the hub as far as possible.

11. Temporarily fasten the rotor to the hub with washers and two wheel lug nuts. Insert a steel rod into the rotor and rotate clockwise to contact the knuckle to prevent the rotor from turning during the CV-joint installation.

12. Install the hub nut washer and a new hub nut. Manually thread the retainer onto the CV-joint as far as possible.

13. Connect the control arm to the steering

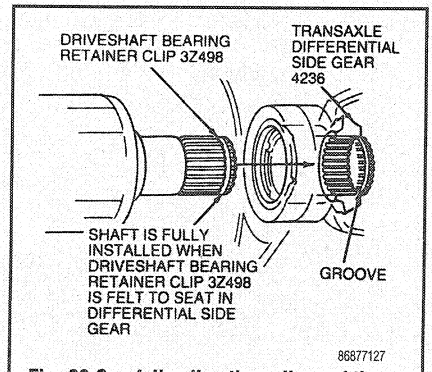


Fig. 33 Carefully align the splines of the inboard CV-joint stub shaft with the splines in the differential

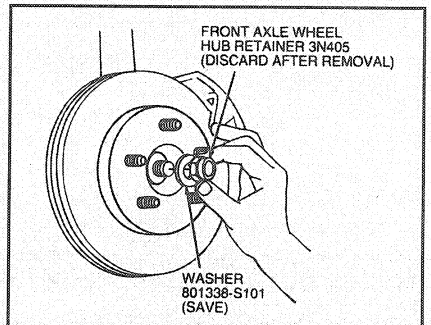


Fig. 34 Install the hub washer and a new hub nut, then thread the retainer by hand on the threads as far as possible

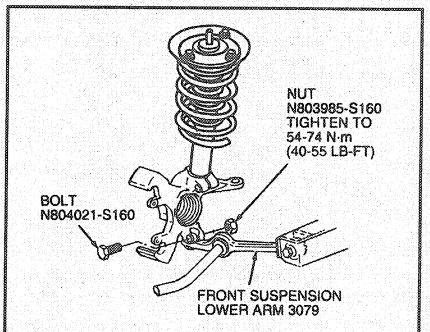


Fig. 35 Connect the control arm to the steering knuckle and install a new nut and bolt. Tighten to 40–55 ft. lbs. (54–74 Nm)

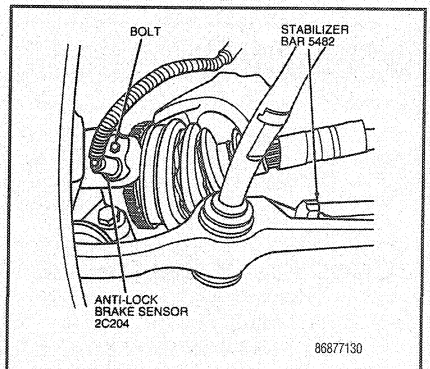


Fig. 36 If equipped, install the anti-lock brake sensor

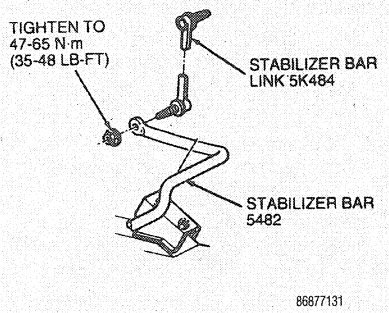


Fig. 37 Connect the stabilizer link to the stabilizer bar. Tighten to 35–48 ft. lbs. (47–65 Nm)

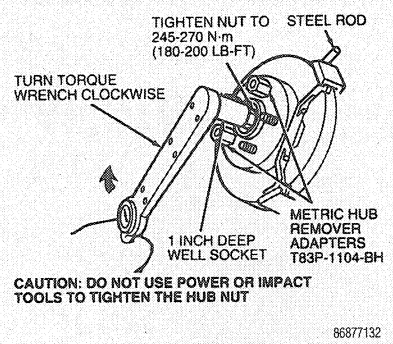


Fig. 38 Install a new hub retainer nut, then tighten to specification using a torque wrench. Do NOT use an air gun or impact tool to tighten the nut

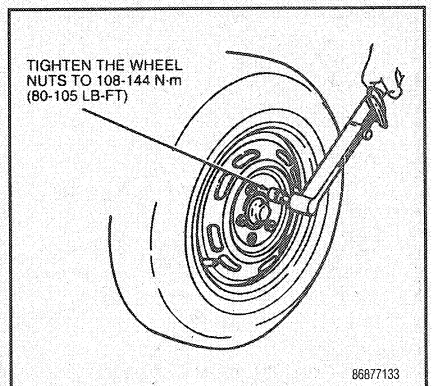


Fig. 39 After the vehicle is lowered, tighten the lug nuts to 80–105 ft. lbs. (108–142 Nm)

knuckle, then install a new nut and bolt. Tighten the nut to 40–55 ft. lbs. (54–74 Nm).

14. If equipped, install the anti-lock brake sensor and/or the ride height sensor bracket.

15. Connect the stabilizer link to the stabilizer bar. Tighten to 35–48 ft. lbs. (47–65 Nm).

16. Install a new hub retainer nut, then tighten the nut to 180–200 ft. lbs. (245–270 Nm). Remove the steel rod.

17. Install the wheel and tire assembly, snugging the lug nuts by hand, then lower the vehicle. Tighten the wheel lug nuts to 80–105 ft. lbs. (108–142 Nm). Fill the transaxle to the proper level with the specified fluid.

DRIVELINE

Driveshaft and U-Joints

REMOVAL & INSTALLATION

Town Car and Mark VII-VIII

▶ See Figures 40, 41, 42, 43 and 44

1. Raise and safely support the vehicle.
2. Mark the position of the driveshaft yoke on the axle companion flange so they can be reassembled in the same way to maintain balance.
3. Remove the flange bolts and disconnect the driveshaft from the axle companion flange.
4. Allow the rear of the driveshaft to drop down slightly.
5. Pull the driveshaft and slip yoke rearward until the yoke just clears the transmission extension housing seal. Mark the position of the slip yoke in relation to the transmission output shaft, then remove the driveshaft.

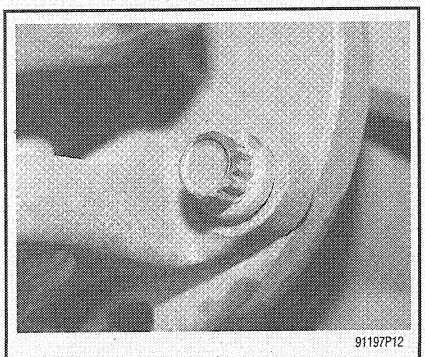


Fig. 40 The bolts retaining the rear driveshaft yoke-to-differential flange require a 12mm, 12 point wrench or socket to loosen them

6. Plug the transmission to prevent fluid leakage.

To install:

7. Lubricate the yoke splines with suitable grease.
8. Remove the plug from the transmission and inspect the extension housing seal; replace if necessary.
9. Align the slip yoke and output shaft with the marks made at removal and install the yoke into the transmission extension housing. Be careful not to bottom the slip yoke hard against the transmission seal.

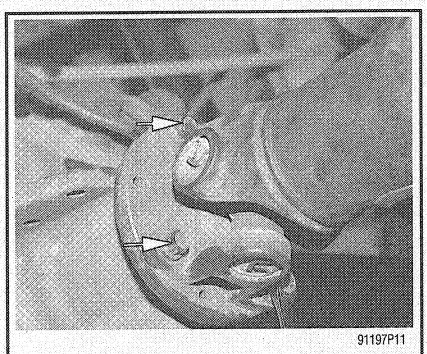


Fig. 41 Remove the bolts retaining the rear driveshaft yoke-to-differential flange

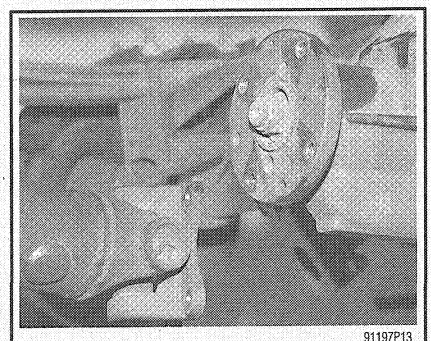


Fig. 42 Separate the driveshaft from the axle flange and . . .

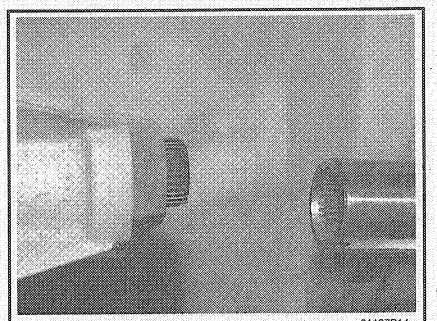


Fig. 43 . . . disengage the driveshaft from the transmission output shaft

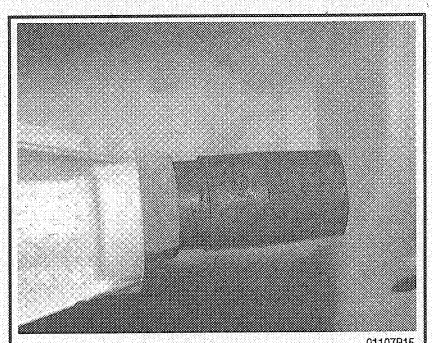


Fig. 44 Insert a plug onto the splines of the transmission output shaft to prevent fluid from leaking out

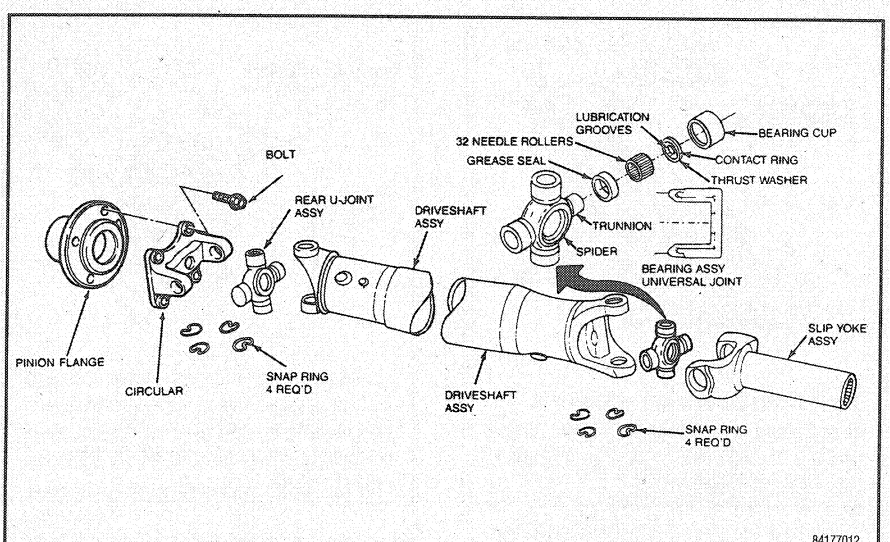


Fig. 45 Driveshaft assembly

10. Rotate the axle flange, as necessary, to align the marks made during removal.
11. Install the driveshaft yoke to the axle flange. Install the bolts and tighten to 71–95 ft. lbs. (95–130 Nm).
12. Lower the vehicle.

U-JOINT REPLACEMENT

See Figures 45, 46, 47, 48 and 49

1. Remove the driveshaft from the vehicle and place it in a vise, being careful not to damage it.
2. Mark the position of the yokes in relation to the driveshaft tube, so they can be reinstalled the same way.
3. Remove the snap-rings that retain the bearing cups in the yokes and in both ends of the driveshaft.
4. Remove the driveshaft tube from the vise and position the U-joint in the vise with a socket smaller than the bearing cup on one side and a socket larger than the bearing cup on the other side.
5. Slowly tighten the jaws of the vise so that the smaller socket forces the U-joint spider and the opposite bearing cup out of the driveshaft and into the larger socket.
6. Remove the U-joint from the vise and remove the socket from over the bearing cup. The bearing cup should be forced out of the driveshaft enough to grip and remove with pliers.
7. Drive the spider in the opposite direction in the same manner as in Step 4 in order to make the opposite bearing cup accessible, and pull it free with pliers. Use this procedure to remove all bearing cups from both U-joints.
8. After removing the bearing cups, remove the spiders from the driveshaft and yokes.
9. Thoroughly clean all dirt and foreign material from the yoke areas of the driveshaft and yokes.
10. Start a new bearing cup into the yoke of the driveshaft. Install the new spider in the driveshaft yoke and bearing. Position the yoke in the vise. Slowly close the vise, pressing the bearing cup into the yoke. Use the smaller socket to press the cup in far enough so that the retaining snapring can be installed.
11. Open the vise and start a new bearing cup in the opposite hole. Press the bearing cup into the yoke in the same manner as in Step 9. Make sure the spider assembly is in line with the bearing cup as it is pressed in.

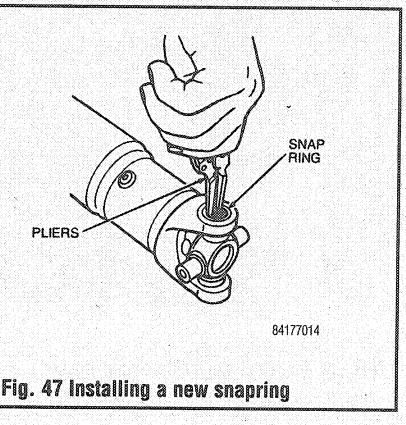


Fig. 47 Installing a new snapring

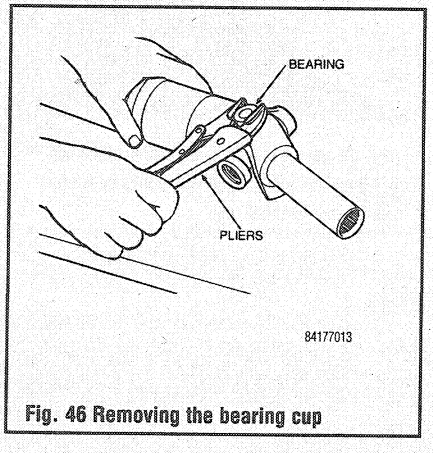


Fig. 46 Removing the bearing cup

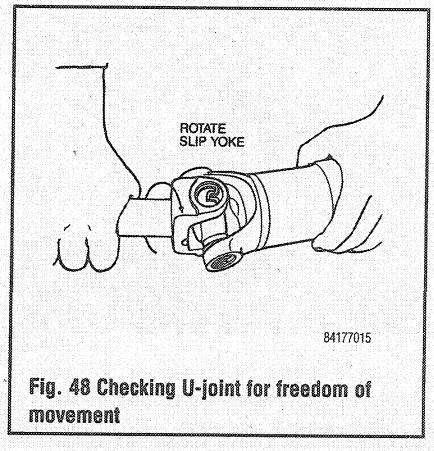


Fig. 48 Checking U-joint for freedom of movement

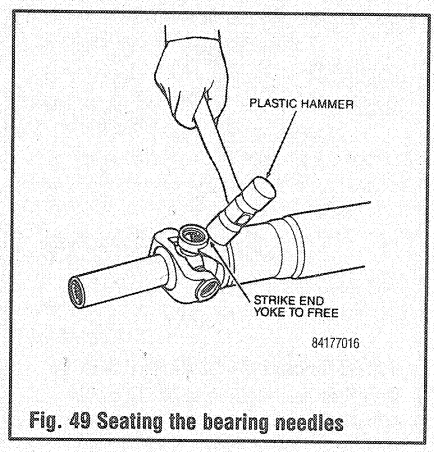


Fig. 49 Seating the bearing needles

WARNING

It is very easy to damage or misalign the needle rollers in the bearing cup if the spider assembly is not kept in line with the bearing cup during assembly. If the U-joint binds easily and/or the bearing cup cannot be pressed in far enough to install the snapring, one or more needle rollers has probably been knocked to the bottom of the cup. Remove the bearing cup, reposition the needle rollers and reinstall.

12. Install all remaining U-joint cups in the same manner. When installing the slip yoke and rear yoke, make sure the marks align that were made during removal. Make sure all snap-rings are properly installed.
13. Check the U-joints for freedom of movement. If binding has resulted from misalignment during assembly, a sharp rap on the yoked with a brass or plastic hammer will seat the bearing cups. Take care to support the shaft end and do not strike the bearing cups during this procedure. Make sure the U-joints are free to rotate easily without binding before installing the driveshaft.
14. If supplied, install the grease fittings in the U-joints.
15. Install the driveshaft.
16. Grease the new U-joints if they are equipped with grease fittings.

Axle Shaft, Bearing and Seal

REMOVAL & INSTALLATION

See Figures 50 thru 56

1. Raise and safely support the vehicle. Remove the wheel and tire assembly and remove the brake drum or brake rotor.

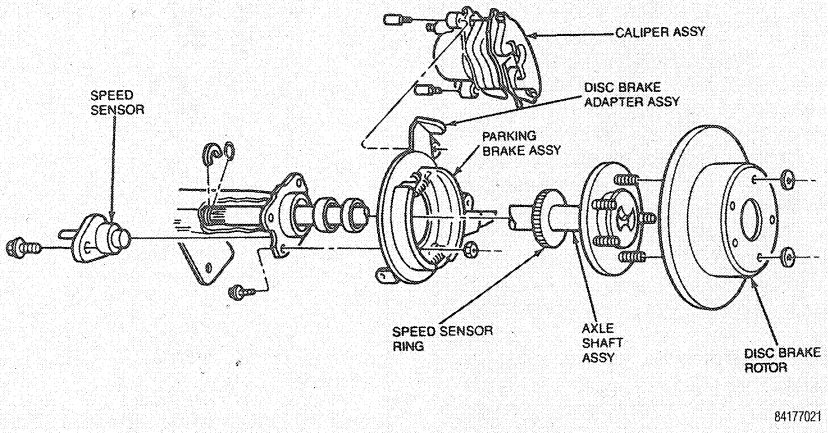


Fig. 50 Axle shaft, bearing, seal and related components—1992–93 vehicles with anti-lock brakes

2. If equipped, remove the anti-lock brake speed sensor.

3. Clean all dirt from the area of the carrier cover. Drain the axle lubricant by removing the housing cover.

4. Remove the differential pinion shaft lock bolt and differential pinion shaft.

5. Push the flanged end of axle shafts toward the center of the vehicle and remove the C-lock from the button end of the axle shaft. Remove the axle shaft from the housing, being careful not to damage the anti-lock brake sensor ring, if equipped.

6. Insert wheel bearing and seal replacer tool T85L–1225–AH or equivalent, in the bore and position it behind the bearing so the tangs on the tool engage the bearing outer race. Remove the bearing and seal as a unit using an impact slide hammer.

To install:

7. Lubricate the new bearing with rear axle lubricant. Install the bearing into the housing bore using a suitable bearing installer.

8. Install a new axle seal using a seal installer.

➨Check for the presence of an axle shaft O-ring on the splined end of the shaft and install, if not present.

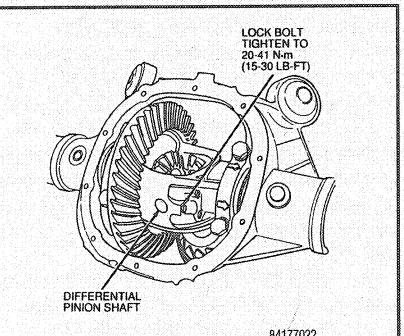


Fig. 51 Differential pinion shaft and lock bolt

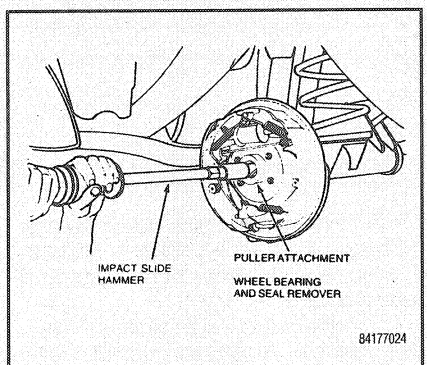


Fig. 53 Wheel bearing and seal removal—1989–91 vehicles shown

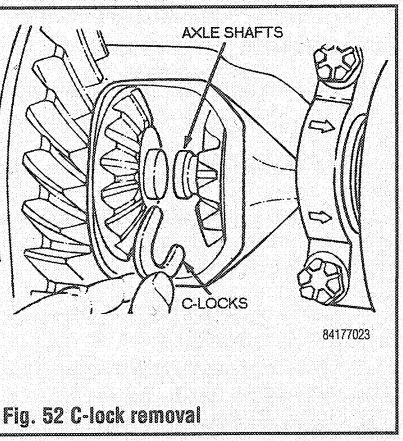


Fig. 52 C-lock removal

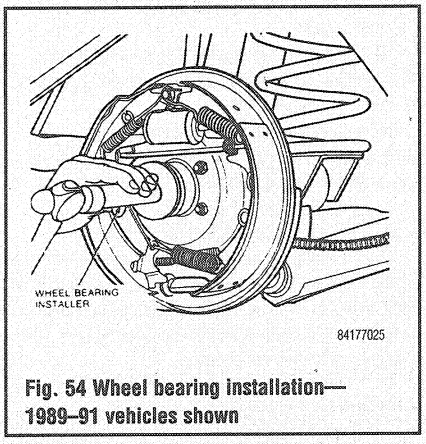


Fig. 54 Wheel bearing installation—1989–91 vehicles shown

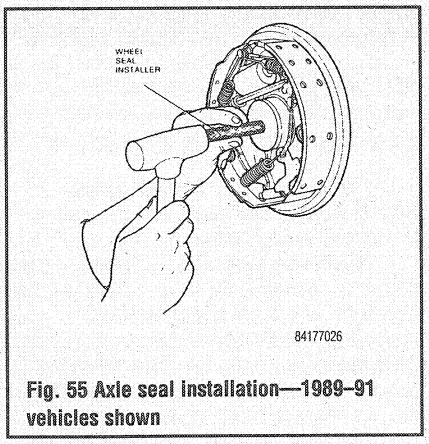


Fig. 55 Axle seal installation—1989–91 vehicles shown

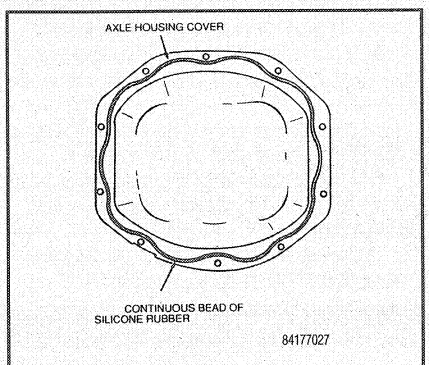


Fig. 56 Apply sealer to the axle housing cover before installation

9. Carefully slide the axle shaft into the axle housing, without damaging the bearing/seal assembly or anti-lock brake sensor ring, if equipped. Start the splines into the side gear and push firmly until the button end of the axle shaft can be seen in the differential case.

10. Install the C-lock on the button end of the axle shaft splines, then push the shaft outboard until the shaft splines engage and the C-lock seats in the counterbore of the differential side gear.

11. Insert the differential pinion shaft through the case and pinion gears, aligning the hole in the shaft with the lock bolt hole. Apply locking compound to the lock bolt and install in the case and pinion shaft. Tighten to 15–30 ft. lbs. (20–41 Nm).

12. Cover the inside of the differential case with a shop rag and clean the machined surface of the carrier and cover. Remove the shop rag.

13. Apply a 1/8–3/16 in. wide bead of silicone sealer to the cover and install on the carrier. Tighten the bolts in a crisscross pattern. Final torque the cover retaining bolts to 28–35 ft. lbs. (38–47 Nm).

14. Add rear axle lubricant to the carrier to a level 1/4–6/16 in. below the bottom of the fill hole. If equipped with limited slip differential, add friction modifier C8AZ–19B564–A or equivalent. Install the filler plug and tighten to 15–30 ft. lbs. (20–41 Nm).

15. Install the anti-lock brake speed sensor, if equipped. Tighten the retaining bolt to 40–60 inch lbs. (4.5–6.8 Nm).

16. Install the brake calipers and rotors or the brake drums, as required. Install the wheel and tire assembly and lower the vehicle.

Pinion Seal

REMOVAL & INSTALLATION

See Figures 57, 58, 59, 60 and 61

1. Raise and safely support the vehicle. Remove the wheel and tire assemblies and remove the brake drums or brake rotors.
2. Mark the position of the driveshaft yoke on the axle companion flange so they may be reassembled in the same way to maintain balance.
3. Disconnect the driveshaft from the rear axle companion flange, remove the driveshaft and remove the driveshaft from the extension housing. Plug the extension housing to prevent leakage.
4. Install an inch pound torque wrench on the pinion nut and record the torque required to maintain rotation of the pinion through several revolutions.
5. While holding the companion flange with holder tool T78P–4851–A or equivalent, remove the pinion nut.
6. Clean the area around the oil seal and place a drain pan under the seal.
7. Mark the companion flange in relation to the pinion shaft so the flange can be installed in the same position.
8. Remove the rear axle companion flange using tool T65L–4851–B or equivalent.

WARNING

Never strike the companion flange with a hammer.

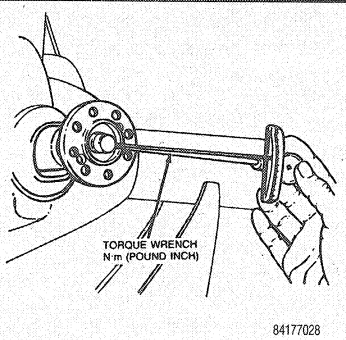


Fig. 57 Prior to disassembly, record the torque required to maintain pinion rotation through several revolutions

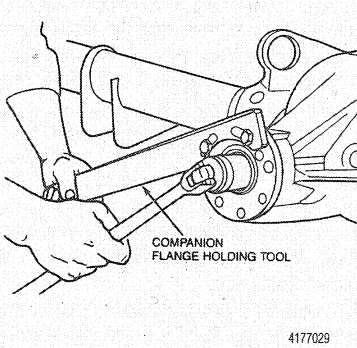


Fig. 58 Removing the pinion nut

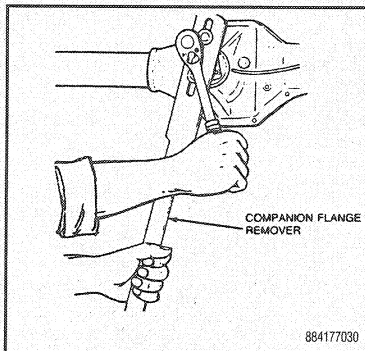


Fig. 59 Removing the rear axle companion flange

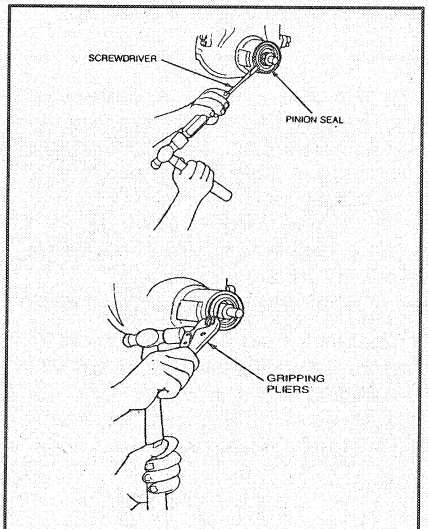


Fig. 60 Pinion seal removal

9. Position a small prybar under the flange of the pinion seal and carefully strike with a hammer to wedge the prybar between the seal flange and differential housing.
10. Pry up on the metal flange of the pinion seal. Install gripping pliers and strike with a hammer until the pinion seal is removed.

To install:

11. Clean the oil seal seat surface and install the seal in the carrier using seal replacer tool T79P–4676–A or equivalent. Apply grease to the lips of the seal.
12. Check the companion flange and pinion shaft splines for burrs. If burrs are evident, remove them using crocus cloth.
13. Apply a small amount of lubricant to the companion flange splines, align the marks on the flange and the pinion shaft and install the flange.
14. Install a new nut on the pinion shaft and apply lubricant on the washer side of the nut.
15. Hold the flange with the holder tool while tightening the nut. Rotate the pinion occasionally to ensure proper seating. Take frequent pinion bearing torque preload readings until the original recorded preload reading is obtained.
16. If the original recorded preload is less than 8–14 inch lbs. (0.9–1.6 Nm), then tighten the nut

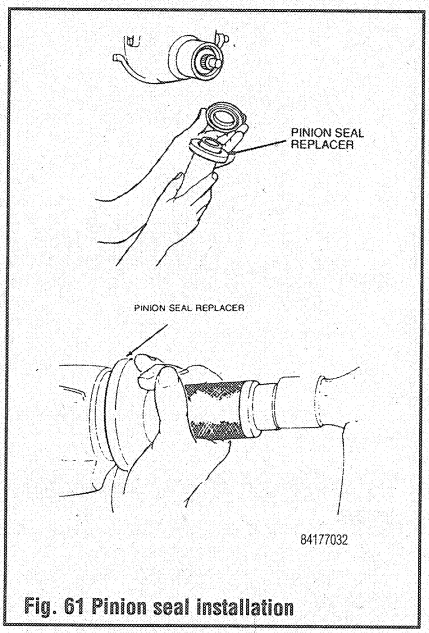


Fig. 61 Pinion seal installation

until the rotational torque of to 8–14 inch lbs. (0.9–1.6 Nm) is obtained. If the original preload is higher than 8–14 inch lbs. (0.9–1.6 Nm), tighten to the original recorded preload.

Under no circumstances should the pinion nut be backed off to reduce preload. If reduced preload is required, a new collapsible pinion spacer and pinion nut must be installed.

17. Remove the plug from the transmission extension housing and install the front end of the driveshaft on the transmission output shaft.
18. Connect the rear end of the driveshaft to the axle companion flange, aligning the scribe marks. Tighten the 4 bolts to 71–95 ft. lbs. (95–130 Nm).
19. Add lubricant to the axle until it is ¼–⅜ in. below the bottom of the fill hole with the axle in operating position. If equipped with limited slip differential, add friction modifier C8AZ–19B564–A or equivalent. Make sure the axle vent is not plugged with debris.
20. Install the brake drums or rotors. Install the wheel and tire assemblies and lower the vehicle.
21. Operate the vehicle and check for leaks.

Axle Housing

REMOVAL & INSTALLATION

See Figure 62

1. Raise and safely support the vehicle. Position safety stands under the rear frame crossmember.
2. Remove the cover and drain the axle lubricant.
3. Remove the wheel and tire assemblies. Remove the brake drums or brake rotors.
4. If equipped, remove the anti-lock brake speed sensors.
5. Remove the lock bolt from the differential pinion shaft and remove the shaft.
6. Push the axle shafts inward to remove the C-locks and remove the axle shafts.
7. If equipped with drum brakes, remove the 4

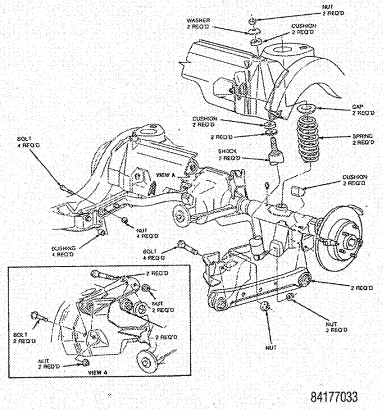


Fig. 62 Rear axle housing assembly—typical

retaining nuts from each backing plate and wire the backing plate to the underbody.

8. If equipped with disc brakes, remove the disc brake adapter bracket, bolts and J-nuts. Remove the 4 retaining nuts from each adapter and wire the adapters to the underbody.

9. Mark the position of the driveshaft yoke on the axle companion flange. Disconnect the driveshaft at the companion flange and wire it to the underbody.

10. Support the axle housing with jackstands. Disengage the brake line from the clips that retain the line to the axle housing.

11. Disconnect the vent from the rear axle housing.

12. If equipped with air springs, remove them according to the procedure in Section 8.

13. Disconnect the lower shock absorber studs from the mounting brackets on the axle housing.

14. Remove the nuts and bolts and disconnect the upper arms from the mountings on the axle housing ear brackets.

15. Lower the axle housing assembly until the springs are released and lift out the springs.

16. Remove the nuts and bolts and disconnect the suspension lower arms at the axle housing.

17. Lower the axle housing and remove it from the vehicle.

To install:

18. Position the axle housing under the vehicle and raise the axle with a hoist or jack. Connect the lower suspension arms to their mounting brackets on the axle housing. Do not tighten the bolts and nuts at this time.

19. Reposition the rear springs.

20. Raise the housing into position.

21. Connect the upper arms to the mounting ears on the housing. Tighten the nuts and bolts to 103–133 ft. lbs. (140–180 Nm). Tighten the lower arm bolts and nuts to 103–133 ft. lbs. (140–180 Nm).

22. Install the axle vent and install the brake line to the clips that retain the line to the axle housing. Secure the brake junction block to the housing cast boss.

23. Connect the air spring lines as described in Section 8.

24. If equipped with drum brakes, install the brake backing plates on the axle housing flanges. If equipped with disc brakes, install the disc brake adapters and tighten the nuts to 20–29 ft. lbs. (27–40 Nm). Install the disc brake adapter brackets, bolts and J-nuts. Tighten to 20–39 ft. lbs. (27–54 Nm).

25. Connect the lower shock absorber studs to the mounting bracket on the axle housing.

26. Connect the driveshaft to the companion flange and tighten the bolts and nuts to 70–95 ft. lbs. (95–130 Nm).

27. Slide the rear axle shafts into the housing until the splines enter the side gear. Push the axle shafts inward and install the C-lock at the end of each shaft splined. Pull the shafts outboard until the C-lock enters the recess in the side gears.

28. Install the pinion shaft. Apply locking compound to the pinion shaft lock bolt. Install and tighten to 15–30 ft. lbs. (20–41 Nm).

29. Install the rear brake drums or disc brake rotors and calipers.

30. Install the anti-lock brake speed sensor, if equipped.

31. Install the rear carrier cover using new silicone sealer. Tighten to 28–35 ft. lbs. (38–47 Nm).

32. Add rear axle lubricant to the carrier to a level ¼–⁶⁄₁₆ in. below the bottom of the fill hole. If equipped with limited slip, add friction modifier C8AZ–19B564–A or equivalent. Install the filler plug and tighten to 15–30 ft. lbs. (20–41 Nm).

33. Install the wheel and tire assemblies and lower the vehicle. Road test.

AXODE (AX4S) TORQUE SPECIFICATIONS

Components	English	Metric
Pump cover-to-pump body bolts	7-9 ft. lbs.	9-12 Nm
Filler tube-to-case retaining nut	7-9 ft. lbs.	9-12 Nm
Governor cover-to-case bolts	7-9 ft. lbs.	9-12 Nm
Park/Neutral position switch-to-case retaining bolts	7-9 ft. lbs.	9-12 Nm
Manual lever-to-manual shaft nut	12-16 ft. lbs.	16-22 Nm
Differential brace-to-case retaining bolts	25-35 ft. lbs.	55-68 Nm
Oil pan-to-case retaining bolts	8-11 ft. lbs.	13-15 Nm
Speedometer cover-to-case bolts	7-9 ft. lbs.	9-12 Nm
Transaxle-to-engine bolts	55-68 ft. lbs.	41-50 Nm
Stabilizer U-Clamp-to-bracket bolt	23-29 ft. lbs.	30-40 Nm
Brake hose routing clip bolt	8 ft. lbs.	11 Nm
Tie rod-to-knuckle bolt	23-35 ft. lbs.	31-47 Nm
Manual cable bracket bolt	10-20 ft. lbs.	14-27 Nm
Starter bolt	30-40 ft. lbs.	41-54 Nm
Dust cover bolt	7-9 ft. lbs.	9-12 Nm
Torque converter-to-flywheel bolt	23-29 ft. lbs.	31-53 Nm
Vehicle speed sensor bolt	31-39 inch. lbs.	3.4-4.5 Nm
Subframe bolts	55-75 ft. lbs.	75-102 Nm
Lower control arm pinch bolt	40-53 ft. lbs.	53-72 Nm
Power steering line bracket bolts	40-50 inch lbs.	4.5-5.7 Nm
Steering gear bolts	85-100 ft. lbs.	115-135 Nm
Engine mount bolts	60-85 ft. lbs.	81-116 Nm
LH engine support bolts	40-55 ft. lbs.	54-75 Nm
Lug nuts	80-105 ft. lbs.	108-144 Nm
Front hub retaining nut	180-200 ft. lbs.	245 – 270 Nm
Control arm-to-steering knuckle nut	40-55 ft. lbs.	54-75 Nm
Stabilizer link-to-stabilizer bar nuts	35-48 ft. lbs.	47-65 Nm
Ride height sensor bracket retaining bolts	8-12 ft. lbs.	11-16 Nm

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AX4N TORQUE SPECIFICATIONS

Components		
Manual lever-to-manual shaft	9-11 ft. lbs.	11.5-15.5 Nm
Fluid pan-to-case retaining bolts	7-9 ft. lbs.	9-12 Nm
Upper transaxle-to-engine bolts	25-34 ft. lbs.	34-46 Nm
Lower engine-to-transaxle bolts	80-106 in. lbs.	9-12 Nm
Stabilizer U-clamp-to-bracket bolts	23-29 ft. lbs.	30-40 Nm
Brake hose routing clip bolt	8 ft. lbs.	11 Nm
Tie rod-to-knuckle nuts	35-46 ft. lbs.	47-63 ft. lbs.
Manual cable bracket bolt	10-20 ft. lbs.	14-27 Nm
Starter bolt and stud	15-21 ft. lbs.	21-29 Nm
Torque converter-to-flywheel nuts	20-34 ft. lbs.	27-46 Nm
Shaft cable stud	20-26 ft. lbs.	27-35 Nm
Over-drive servo retaining bolts	7-9 ft. lbs.	9-12 Nm
Turbine Shaft speed sensor (TSS) retaining bolt	7-10 ft. lbs.	10-14 Nm
Fluid Filler tube retaining bolt	7-9 ft. lbs.	9-12 Nm
Rear Engine support-to-transaxle bolts	44-60 ft. lbs.	60-80 Nm
Ground strap nut	13-17 ft. lbs.	17-23Nm
Control arm-to-steering knuckle nuts	50-68 ft. lbs.	68-92 Nm
Stabilizer bar link nuts	35-46 ft. lbs.	47-63 Nm
Transaxle shift cable retaining nut	14-19 ft. lbs.	19-26 Nm
Subframe bolts	55-75 ft. lbs.	75-102 Nm
Lower control arm pinch bolt	40-53 ft. lbs.	53-72 Nm
Lug nuts	80-105 ft. lbs.	108-144 Nm
Steering gear bolts	85-100 ft. lbs.	115-135 Nm
Engine mount bolts	60-85 ft. lbs.	81-116 Nm
Rear engine support bolts	44-60 ft. lbs.	60-80 Nm
Engine mount-to-support retaining bolts	55-75 ft. lbs.	75-102 Nm
Y-Pipe assembly nuts and bolts	25-34 ft. lbs.	34-46 Nm

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AODE TORQUE SPECIFICATIONS

Components	English	Metric
Converter end play		
New or rebuilt	0.023 inches	0.58 mm
Used	0.050 inches	1.27 mm
Manual lever position sensor retaining bolts	62-88 in. lbs.	7-10 Nm
Extension housing bolts	18-22 ft. lbs.	25-30 Nm
Oil pan retaining bolts	107-132 in. lbs.	12-15 Nm
Crossmember-to-side support bolts	70-100 ft. lbs.	95-136 Nm
Crossmember-to-transmission mount nuts	64-81 ft. lbs.	87-110 Nm
Converter-to-flywheel nuts	20-34 ft. lbs.	27-46 Nm
Converter housing access cover retaining bolts	12 -16 ft. lbs.	16-22 Nm
Converter drain plug	21-23 ft. lbs.	28-30 Nm
Converter housing-to-engine bolts	40-50 ft. lbs.	55-68 Nm
Pressure tap plugs	6-12 ft. lbs.	8-16 Nm
Transmission speed sensor retaining bolt	5-7 ft. lbs.	7-10 Nm
Manual shift lever-to-case retaining nut	20-27 ft. lbs.	26-37 Nm

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