Chapter 8
Clutch and driveline

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Specifications

8

Clutch

Fluid type	DOT 3 brake fluid
Clutch disc maximum runout	0.8 mm
Clutch disc to rivet head depth minimum	0.3 mm
Diaphragm spring maximum tip out-of-alignment	0.5 mm
Flywheel maximum runout	0.1 mm

Rear axle shaft

Endplay (drum brakes)	0.02 to 0.15 mm
Maximum shaft runout	0.8 mm

Differential

Drive pinion preload (within backlash)	1.8 to 2.5 Nm

Torque specifications

	Nm
Automatic-lock hub cover bolts	54 to 59
Clutch pedal pivot nut	16 to 22
Clutch pressure plate-to-flywheel bolts	22 to 29
Clutch master cylinder mounting bolt	8 to 12
Clutch slave cylinder mounting bolt	30 to 40
Driveshaft to transfer case companion flange bolts	78 to 88
Driveshaft to front axle companion flange bolts	78 to 88
Driveshaft to rear axle companion flange bolts	93 to 108
Freewheel hub bolts	54 to 59
Front axle pinion nut	196 to 285
Front hub dust seal bolts	30 to 40
Front hub wheel hub bolts	50 to 68
Front hub drive flange bolts	54 to 64
Front hub bearing lock-nut	167 to 196
Manual -lock hub cover bolts	54 to 59
Rear axle flange to hub bolts (full-floating)	49 to 57
Rear axle hub lock-nut (full-floating)	167 to 196*
Rear axle shaft nuts (semi-floating)	53 to 63
Rear axle bearing nut (semi-floating)	441 to 490
Rear axle pinion nut	
Hardtop and station wagon	196 to 284
Utility and cab chassis	167 to 245
Swivel hub bearing cap bolts	30 to 40
Vacuum power booster nuts	8 to 12

**Use this torque only to seat the bearing, final torque should be 4 Nm.*

1 General information

The information in this Chapter deals with the components from the rear of the transfer case to the drive wheels. For the purposes of this Chapter, these components are grouped into three categories; clutch, driveshafts and axles. Separate Sections within this Chapter offer general descriptions and checking procedures for components in each of the three groups.

Since nearly all the procedures covered in this Chapter involve working under the vehicle, make sure it's securely supported on sturdy jackstands or on a hoist where the vehicle can be easily raised and lowered.

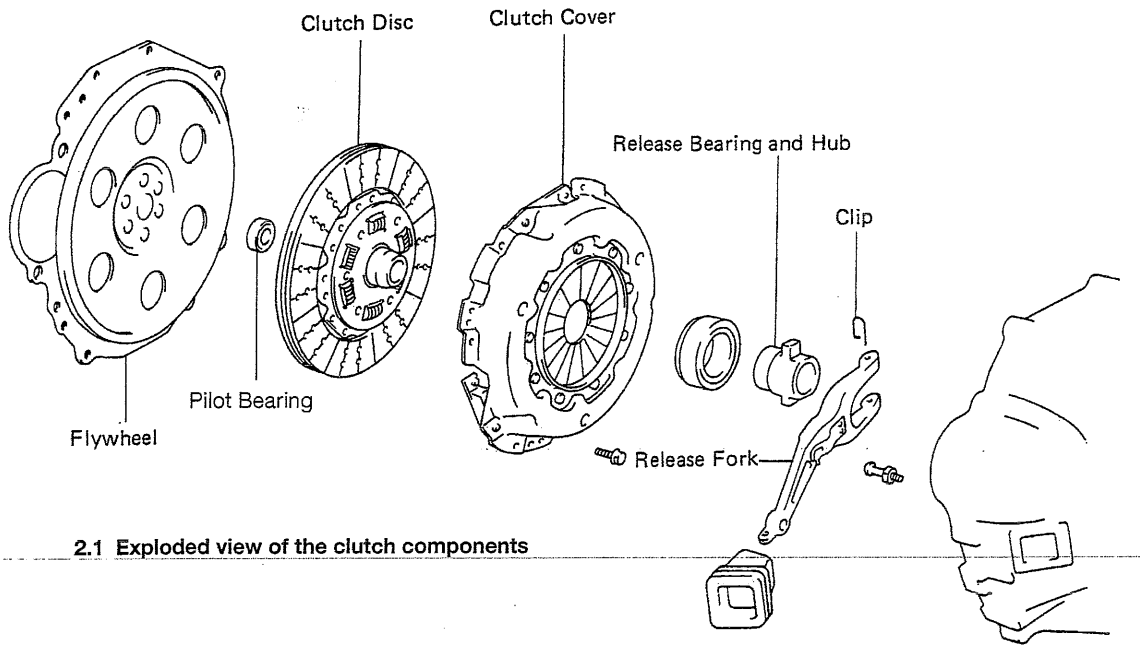
2 Clutch - description and check

Refer to illustration 2.1

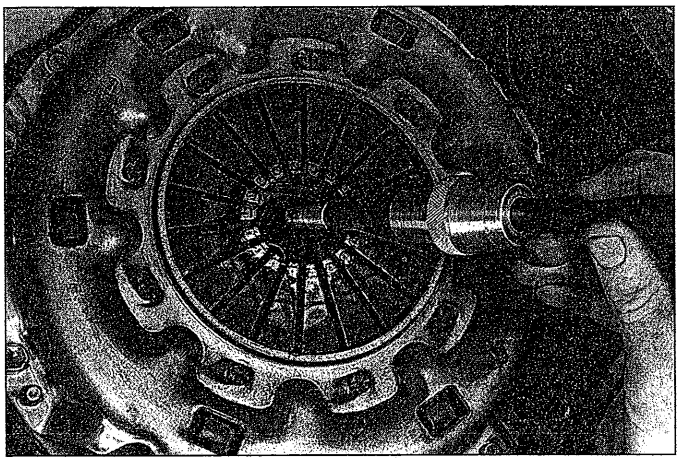
1 All models equipped with a manual transmission feature a single dry plate, diaphragm spring-type clutch. The actuation is through a hydraulic system. 4.2 litre models also use a vacuum power booster unit to decrease pedal effort **(see illustration)**.

2 When the clutch pedal is depressed, hydraulic fluid (under pressure from the clutch master cylinder) flows into the slave cylinder. Because the slave cylinder is connected to the clutch fork, the fork moves the release bearing into contact with the pressure plate release diaphragm, disengaging the clutch plate.

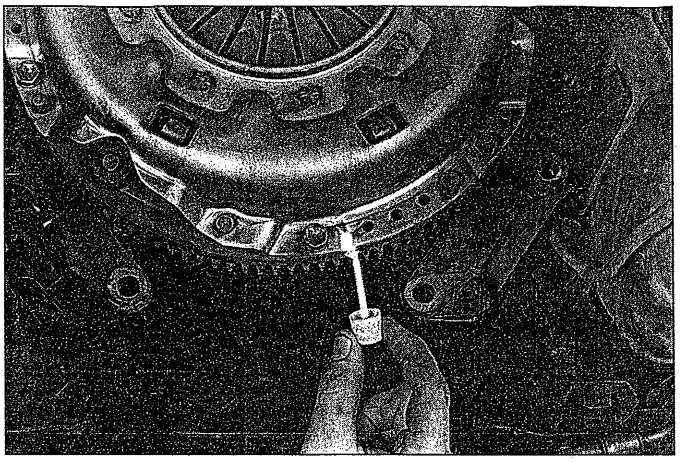
3 The hydraulic system locates the clutch pedal and provides clutch adjustment automatically, so no adjustment is required.



2.1 Exploded view of the clutch components



3.4 A clutch alignment tool can be used to prevent the disc from dropping out as the pressure plate is removed



3.5 Be sure to mark the pressure plate and flywheel in order to ensure proper alignment during refitting

4 Terminology can be a problem regarding the clutch components because common names have in some cases changed from that used by the manufacturer. For example, the driven plate is also called the clutch plate or disc, the clutch release bearing is sometimes called a throwout bearing or release bearing, the slave cylinder is sometimes called the operating or release cylinder. Also, the pilot bearing is sometimes called the spigot bearing.

5 Due to the slow wearing qualities of the clutch, it is not easy to decide when to go to the trouble of removing the transmission in order to check the wear on the friction lining. The only positive indication that something should be done is when it starts to slip or when squealing noises during engagement indicate that the friction lining has worn down to the rivets. In such instances it can only be hoped that the friction surfaces on the flywheel and pressure plate have not been badly worn or scored.

6 A clutch will wear according to the way in which it is used. Much intentional slipping of the clutch while driving - rather than the correct selection of gears - will accelerate wear. It is best to assume, however, that the disc will need renewal at about 120,000 km.

7 Because of the clutch's location between the engine and transmission, it cannot be worked on without removing either the engine or transmission. If repairs which would require removal of the engine are not needed, the quickest way to gain access to the clutch is by removing the transmission, as described in Chapter 7A.

8 Other than to renew components with obvious damage, some preliminary checks should be performed to diagnose a clutch system failure.

a) The first check should be of the fluid level in the clutch master cylinder. If the fluid level is low, add fluid as necessary and re-test. If the master cylinder runs dry, or if any of the hydraulic components are serviced, bleed the hydraulic system as described in Section 8.

b) To check "clutch spin down time", run the engine at normal idle speed with the transmission in Neutral (clutch pedal up-engaged). Disengage the clutch (pedal down), wait nine seconds and shift the transmission into Reverse. No grinding noise should be heard. A grinding noise would indicate component failure in the pressure plate assembly or the clutch disc.

c) To check for complete clutch release, run the engine (with the brake on to prevent movement) and hold the clutch pedal approximately 12 mm from the floor mat. Shift the transmission between 1st gear and Reverse several times. If the shift is not smooth, component failure is indicated. Measure the slave cylinder pushrod travel. With the clutch pedal completely depressed the slave cylinder pushrod should extend substantially. If the pushrod will not extend very far or not at all, check the fluid level in the clutch master cylinder.

d) Visually inspect the clutch pedal bush at the top of the clutch pedal to make sure there is no sticking or excessive wear.

e) Under the vehicle, check that the clutch fork is solidly mounted on the ball stud.

Note: *Because access to the clutch components is an involved process, any time either the engine or transmission is removed, the clutch disc, pressure plate assembly and release bearing should be carefully inspected and, if necessary, renewed. Since the clutch disc is normally the item of highest wear, it should be renewed as a matter of course if there is any question about its condition.*

3 Clutch components - removal, inspection and refitting

Warning: *Dust produced by clutch wear and deposited on clutch components contains asbestos, which is hazardous to your health. DO NOT blow it out with compressed air and DO NOT inhale it. DO NOT use petrol or petroleum-based solvents to remove the dust. Brake system cleaner should be used to flush the dust into a drain pan. After the clutch components are wiped clean with a rag, dispose of the contaminated rags and cleaner in a covered container.*

Removal

Refer to illustrations 3.4 and 3.5

1 Access to the clutch components is normally accomplished by removing the transmission, leaving the engine in the vehicle. If, of course, the engine is being removed for major overhaul, then the opportunity should always be taken to check the clutch for wear and renew worn components as necessary. The following procedures assume that the engine will stay in place.

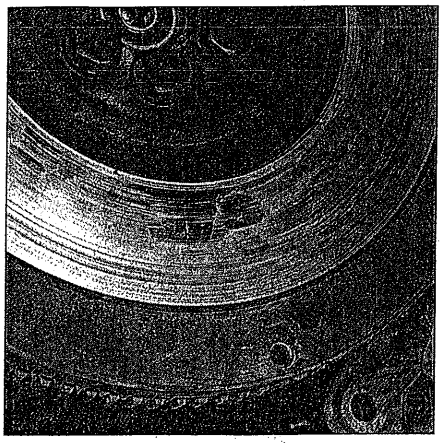
2 Referring to Chapter 7A, remove the transmission from the vehicle. Support the engine while the transmission is out. Preferably, an engine hoist should be used to support it from above. However, if a jack is used underneath the engine, make sure a piece of wood is used between the jack and sump to spread the load. **Caution:** *The pickup for the oil pump is very close to the bottom of the sump. If the pan is bent or distorted in any way, engine oil starvation could occur.*

3 Remove the release fork and the release bearing from the clutch housing.

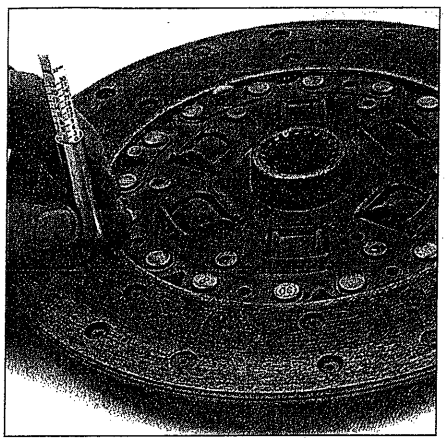
4 Disconnect the release bearing from the fork. To support the clutch disc during removal, refit a clutch alignment tool through the clutch disc hub **(see illustration)**.

5 Carefully inspect the flywheel and pressure plate for indexing marks. The marks are usually an X, an O or a white letter. If they cannot be found, apply marks yourself so the pressure plate and the flywheel will be in the same alignment during refitting **(see illustration)**. (This applies only if you will be refitting the same clutch).

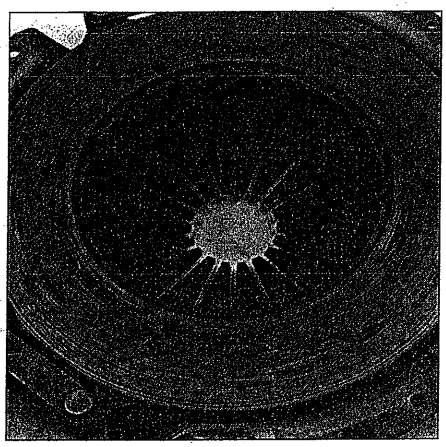
6 Turning each bolt only 1/2-turn at a time, slowly loosen the pressure plate-to-flywheel bolts. Work in a diagonal pattern and loosen each bolt a little at a time until all spring pressure is relieved. Then hold the pressure plate securely and completely remove the bolts, followed by the pressure plate and clutch disc.



3.8 Check the flywheel for cracks, hot spots (as seen in this photo) and other obvious defects. Slight imperfections can be removed by a machine shop



3.10 Once the clutch disc is removed, the rivet depth can be measured and compared to the Specifications



3.12a Examine the pressure plate friction surface for score marks, cracks and evidence of overheating

Inspection

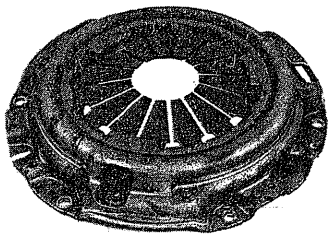
Refer to illustrations 3.8, 3.10, 3.12a and 3.12b

7 Ordinarily, when a problem occurs in the clutch, it can be attributed to wear of the clutch driven disc assembly. However, all components should be inspected at this time.

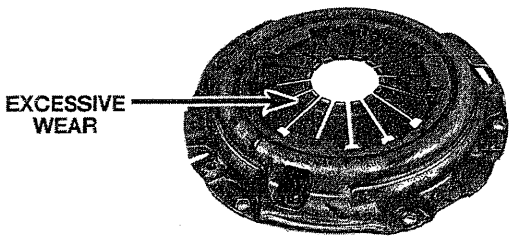
8 Inspect the flywheel for cracks, heat checking, grooves or other signs of obvious defects **(see illustration)**. If the imperfections are slight, a machine shop can machine the surface flat and smooth, which is highly recommended regardless of the surface appearance. Refer to Chapter 2 for the flywheel removal and refitting procedure.

9 Inspect the pilot bearing (see Section 5).

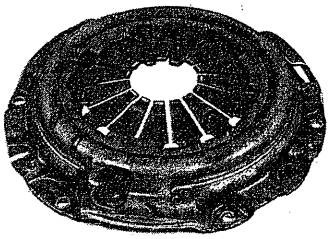
10 Inspect the lining on the clutch disc. There should be at least 0.3 mm of lining above the rivet heads **(see illustration)**. Check for loose rivets, warpage, cracks, distorted springs or damper bushes and other



NORMAL FINGER WEAR

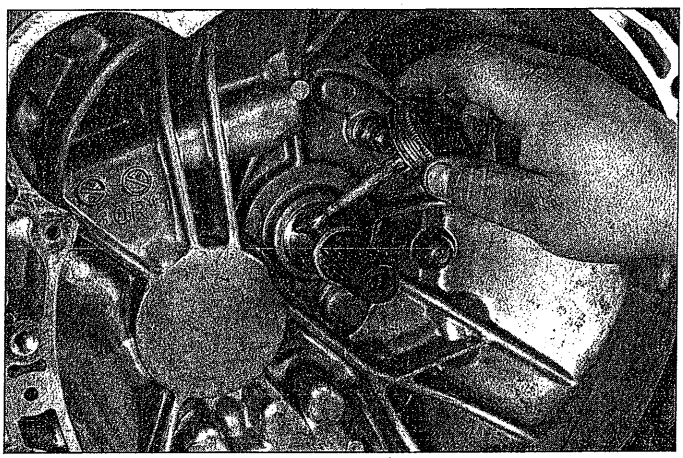


EXCESSIVE FINGER WEAR

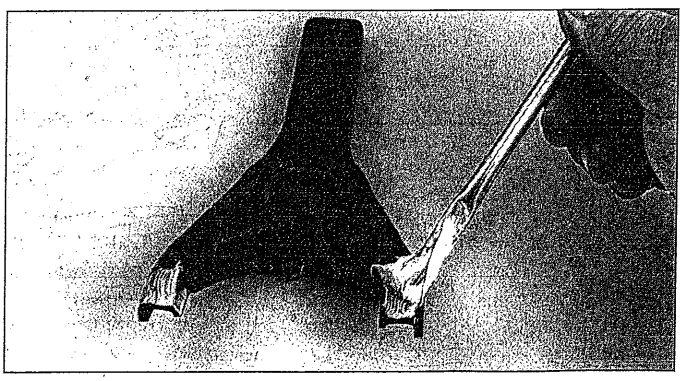


BROKEN OR BENT FINGERS

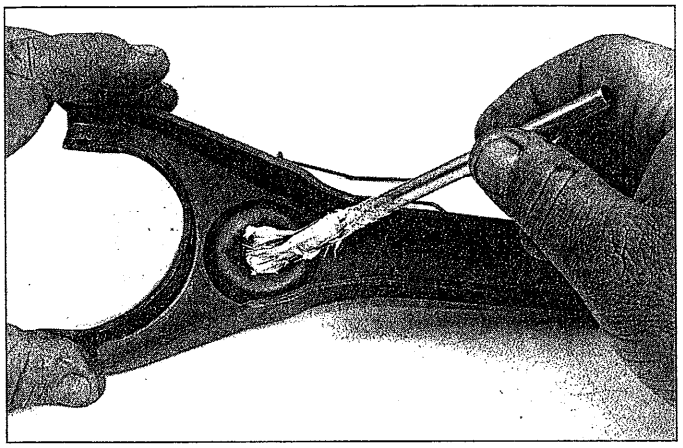
3.12b Renew the pressure plate if excessive wear is noted



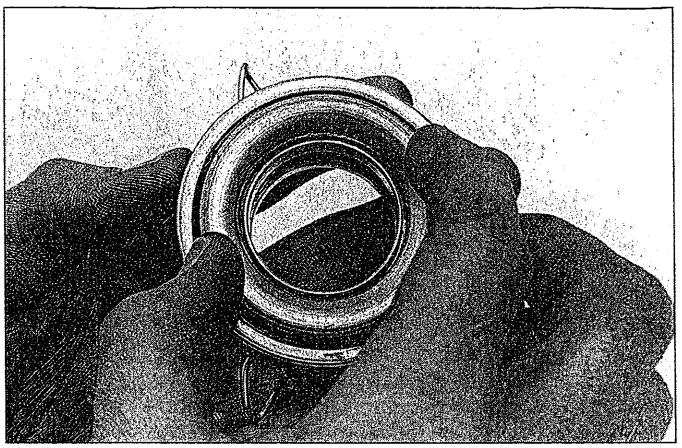
3.17a Apply a light coat of high-temperature grease to the bearing surface of the retainer . . .



3.17b . . . the lever ends and the depression for the release cylinder pushrod (before refitting the transmission, apply the same grease to the input shaft splines to help the shaft slide through the clutch hub)



3.17c Use high-temperature grease to lubricate the ball stud socket in the back of the release lever



4.6 To check the bearing, hold it by the outer race and rotate the inner race while applying pressure; if the bearing doesn't turn smoothly or if it's noisy, renew the bearing

obvious damage. As mentioned above, ordinarily the clutch disc is renewed as a matter of course, so if in doubt about the condition, renew.

11 Ordinarily, the release bearing is also renewed along with the clutch disc (see Section 4).

12 Check the machined surfaces and the diaphragm spring fingers of the pressure plate **(see illustrations)**. If the surface is grooved or otherwise damaged, renew the pressure plate. Also check for obvious damage, distortion, cracking, etc. Light glazing can be removed with medium grit emery cloth. If a new pressure plate is indicated, new or factory-rebuilt units are available.

Refitting

Refer to illustrations 3.17a, 3.17b and 3.17c

13 Before refitting, carefully wipe the flywheel and pressure plate machined surfaces clean with a rubbing-alcohol dampened rag. It's important that no oil or grease is on these surfaces or the lining of the clutch disc. Handle these parts only with clean hands.

14 Position the clutch disc and pressure plate with the clutch held in place with an alignment tool. Make sure it's refitted properly (most new clutch discs will be marked "flywheel side" or something similar-if not marked, refit the clutch with the damper springs or bushes toward the transmission).

15 Tighten the pressure plate-to-flywheel bolts only finger tight, working around the pressure plate.

16 Centre the clutch disc by ensuring the alignment tool is through the splined hub and into the pilot bearing in the crankshaft. Wiggle the tool up, down or side-to-side as needed to bottom the tool in the pilot bush. Tighten the pressure plate-to-flywheel bolts a little at a time, working in a criss-cross pattern to prevent distorting the cover. After all of the bolts are snug, tighten them to the specified torque. Remove the alignment tool.

17 Using high temperature grease, lubricate the inner groove of the release bearing (refer to Section 4) and the front bearing retainer **(see illustration)**. Also place grease on the fork fingers **(see illustrations)**.

18 Refit the clutch release bearing as described in Section 4.

19 Refit the transmission, clutch release cylinder and all components removed previously, tightening all fasteners to the proper torque specifications.

20 Check the pedal height and freeplay and adjust them if necessary (refer to Chapter 1).

4 Clutch release bearing - renewal

Warning: *Dust produced by clutch wear and deposited on clutch components may contain asbestos, which is hazardous to your health. DO NOT blow it out with compressed air and DO NOT inhale it. DO NOT use petrol or petroleum-based solvents to remove the dust. Brake system cleaner should be used to flush it into a drain pan. After the clutch components are wiped clean with a rag, dispose of the contaminated rags and cleaner in a labeled, covered container.* **Note:** *Because of its relatively low cost and the amount of work required for access, it is good practice to renew the release bearing any time the clutch assembly is exposed.*

Removal

1 Disconnect the negative cable from the battery.

2 Remove the transmission (see Chapter 7A).

3 The release fork which holds the release bearing is retained to the pivot stud by a clip. Remove this clip and take the fork assembly from the clutch housing.

4 The release bearing is held to the fork by another clip. Note the position of this clip and then remove it. The bearing can now be serviced separately.

5 Use a conventional gear puller to pull the bearing from the release sleeve, if necessary.

Inspection

Refer to illustration 4.6

6 Hold the bearing by the outer race and rotate the inner race while applying force **(see illustration)**. If the bearing doesn't turn smoothly or if it's noisy, renew the bearing/hub assembly. Wipe the bearing with a clean rag and inspect it for damage, wear and cracks. Don't immerse the bearing in solvent; it's sealed for life, to do so would ruin it. Also check the release lever for cracks and bends.

Refitting

7 The bearing can be refitted onto the release sleeve by a shop with a hydraulic press and the correct adapter. It is possible to do this without a press if care is taken and the proper size pipe or other adapter is used to drive the bearing onto the sleeve.

8 Lubricate the bearing surface of the retainer with high-temperature grease.

9 Lubricate the release lever ball socket, lever ends and release cylinder pushrod socket with small amounts of high-temperature grease.

10 Attach the retaining clip and the release bearing to the release lever.

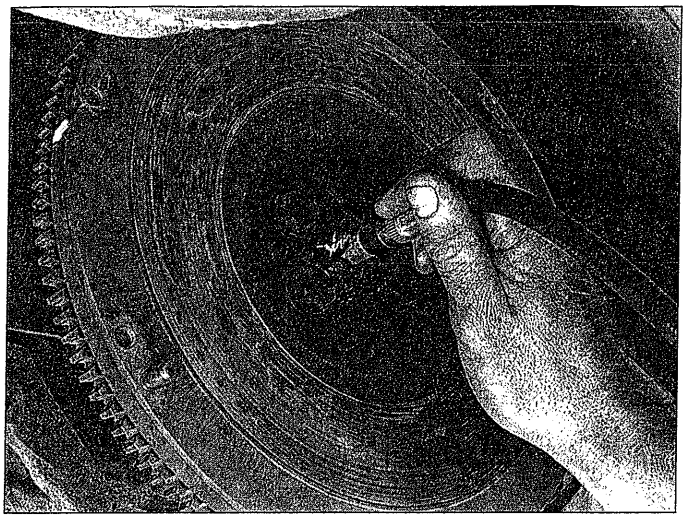
11 Slide the release bearing onto the transmission input shaft bearing retainer while passing the end of the release lever through the opening in the clutch housing. Push the clutch release lever onto the ball stud until it's firmly seated and refit he clip.

12 The remainder of refitting is the reverse of removal.

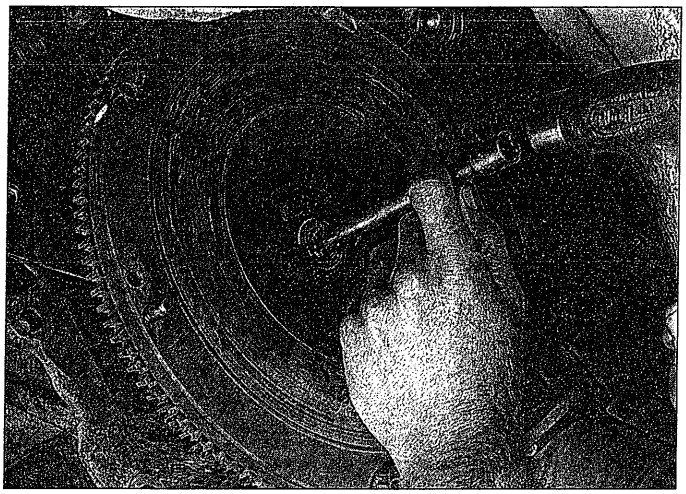
5 Pilot bearing - inspection, removal and refitting

Refer to illustrations 5.9, 5.10 and 5.11

1 The clutch pilot bearing is pressed into the rear of the crankshaft. Its primary purpose is to support the front of the transmission input shaft. The pilot bearing should be inspected whenever the clutch components



5.9 To remove the pilot bearing without a puller, fill the opening behind the bearing with grease . . .



5.10 . . . then force the bearing out hydraulically with a steel rod slightly smaller than the bore in the bearing - when the hammer strikes the rod, the grease will transmit force to the backside of the bearing and push it out

are removed from the engine. Due to its inaccessibility, if you are in doubt as to its condition, renew it. **Note:** *If the engine has been removed from the vehicle, disregard the following steps which do not apply.*

2 Remove the transmission (see Chapter 7A).

3 Remove the clutch components (see Section 3).

4 Using a clean rag, wipe the bearing clean and inspect for any excessive wear, scoring or obvious damage. A flashlight will be helpful to direct light into the recess.

5 If the transmission input shaft contact surface is worn or damaged a new unit should be refitted. **Note:** *Ordinarily, the pilot bearing is also renewed along with the clutch disc. A bearing is inexpensive and provides insurance against having to do the job over again.*

6 Removal can be accomplished with a special puller but an alternative method also works well.

7 Find a solid steel bar which is slightly smaller in diameter than the bearing. Alternatives to a solid bar would be a wood dowel or a socket with a bolt fixed in place to make it solid.

8 Check the bar for fit - it should just slip into the bearing with very little clearance.

9 Pack the bearing and the area behind it (in the crankshaft recess) with heavy grease **(see illustration)**. Pack it tightly to eliminate as much air as possible.

10 Insert the bar into the bearing bore and lightly hammer on the bar, which will force the grease to the backside of the bearing and push it out **(see illustration)**. Remove the bearing and clean all grease from the crankshaft recess.

11 To refit the new bearing, lubricate the outside surface with oil, then drive it into the recess with a hammer and a socket with an outside diameter that matches the bearing outer race **(see illustration)**. The end of the bearing should be 5.8 mm inside of the crankshaft flange.

12 Refit the clutch components, transmission and all other components removed to gain access to the pilot bearing.

6 Clutch master cylinder - removal, overhaul and refitting

Caution: *Do not allow brake fluid to contact any painted surfaces of the vehicle, as damage to the finish may result.* **Note:** *Before beginning this procedure, contact local parts stores and dealer service departments concerning the purchase of a rebuild kit or a new master cylinder. Availability and cost of the necessary parts may dictate whether the cylinder is rebuilt or a brand new one is refitted. If you decide to rebuild the cylinder, inspect the bore as described in Step 8 before purchasing parts.*

Removal

1 Disconnect the hydraulic line from the master cylinder and drain the fluid into a suitable container.

2 On models without a vacuum power booster, disconnect the master cylinder pushrod from the clutch pedal.

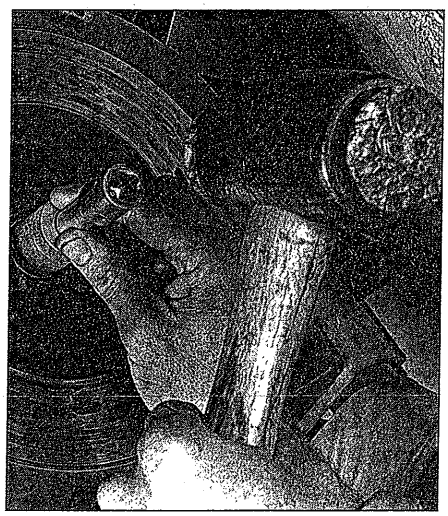
3 Remove the master cylinder flange mounting nuts and withdraw the unit from the engine compartment.

Overhaul

4 Detach the reservoir from the unit by loosening the clamp.

5 Remove the rubber seal from the pushrod end of the cylinder.

6 Push the piston inward with a screwdriver and remove the snap-ring. **Note:** *On early models, there is a valve stopper which must be removed from the bottom of the cylinder in order for the internal parts to be released.*



5.11 Using a hammer and socket to carefully drive the new bearing into place

7 Tap the internal components out onto a block of wood. Keep them in order.

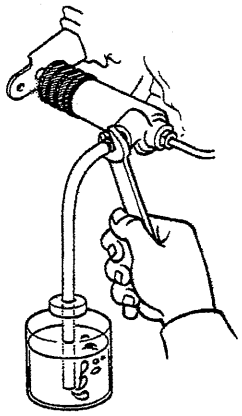
8 Pull out the pushrod, washer and piston.

8 Examine the inner surface of the cylinder bore. If it is scored or exhibits bright wear areas, the entire master cylinder should be renewed.

9 If the cylinder bore is in good condition, obtain a clutch master cylinder rebuild kit.

10 Renew all parts included in the rebuild kit, following any instructions in the kit. Clean all reused parts with new brake fluid, brake system cleaner or denatured alcohol. **Warning:** *Do not use any petroleum-based solvents. During reassembly, lubricate all parts liberally with clean brake fluid.*

11 Refitting of the parts in the cylinder is the reverse of removal. **Note:** *On early models with a valve stopper, align the groove in the piston with the valve stopper when reassembling the unit.*



8.4 When bleeding the clutch hydraulic system, a hose is connected to the bleeder valve at the release cylinder and then submerged in brake fluid - when the pedal is depressed and the valve is opened, air will be seen as bubbles in the hose and container

Refitting

12 Refitting is the reverse of removal, but check the pedal height and freeplay as described in Chapter 1 and bleed the hydraulic system (see Section 8).

7 Clutch release cylinder - removal, overhaul and refitting

Note: *Before beginning this procedure, contact local parts stores and dealer service departments concerning the purchase of a rebuild kit or a new release cylinder. Availability and cost of the necessary parts may dictate whether the cylinder is rebuilt or a new one is refitted. If you decide to rebuild the cylinder, inspect the bore as described in Step 8 before purchasing parts.*

Removal

1 Disconnect the cable from negative terminal of the battery.
2 Raise the vehicle and support it securely on jackstands. Remove the heat shield, if equipped.
3 Disconnect the hydraulic line at the release cylinder. If available, use a flare-nut wrench on the fitting, which will prevent the fitting from being rounded off. Have a small can and rags handy, as some fluid will be spilled as the line is removed.
4 Remove the release cylinder mounting bolts.
5 Remove the release cylinder.

Overhaul

6 Remove the pushrod and the boot.
7 Tap the cylinder on a block of wood to eject the piston and seal. Remove the spring and the seat from inside the cylinder. Make noes of the refitted positions of all of the components.
8 Carefully inspect the bore of the cylinder. Check for scratches, score marks and ridges. The bore must be perfectly smooth to the touch. If any imperfections are found, the release cylinder must be renewed.
9 Using the new parts in the rebuild kit, assemble the components using plenty of fresh brake fluid for lubrication. Note the refitted direction of the spring and the seal.

Refitting

10 Refit the release cylinder on the clutch housing. Make sure the pushrod is seated in the release fork pocket.
11 Connect the hydraulic line to the release cylinder. Tighten the connection.
12 Fill the clutch master cylinder with brake fluid (conforming to DOT 3 specifications).
13 Bleed the system (see Section 8).
14 Lower the vehicle and connect the cable to the negative terminal of the battery.

8 Clutch hydraulic system - bleeding

Refer to illustration 8.4

1 The hydraulic system should be bled of all air whenever any part of the system has been removed or if the fluid level has been allowed to fall so low that air has been drawn into the master cylinder. The procedure is very similar to bleeding a brake system.
2 Fill the master cylinder with new brake fluid conforming to DOT 3 specifications. **Caution:** *Do not re-use any of the fluid coming from the system during the bleeding operation or use fluid which has been inside an open container for an extended period of time.*
3 Raise the vehicle and place it securely on jackstands to gain access to the release cylinder, which is located on the clutch housing.
4 Remove the dust cap which fits over the bleeder valve and push a length of plastic hose over the valve. Place the other end of the hose into a clear container with about 50 mm of brake fluid in it. The hose end must be submerged in the fluid **(see illustration)**.
5 Have an assistant operate the clutch pedal slowly several times. Then have the assistant depress the clutch pedal and hold it. Open the bleeder valve on the release cylinder, allowing fluid to flow through the hose. Close the bleeder valve when fluid stops flowing from the hose. Once closed, have your assistant release the pedal.
6 Continue this process until all air is evacuated from the system, indicated by a full, solid stream of fluid being ejected from the bleeder valve each time and no air bubbles in the hose or container. Keep a close watch on the fluid level inside the clutch master cylinder reservoir; if the level drops too low, air will be sucked back into the system and the process will have to be started all over again.
7 Tighten the bleeder valve, refit the dust cap and lower the vehicle. Check carefully for proper operation before placing the vehicle in normal service.

9 Clutch pedal assembly - removal and refitting

1 Disconnect the master cylinder pushrod from the pedal by removing the spring clip and pulling out the pushrod pin.
2 Remove the pivot bolt. Note how the return spring is positioned.
3 Remove the pedal shaft.
4 Remove the clutch pedal with its spring, bushes and collar.
5 Clean the parts in solvent and renew any that are damaged or excessively worn.
6 Refitting is the reverse of the removal procedure. During refitting, apply multi-purpose grease to the pedal boss, return spring, pedal shaft and pushrod pin.

10 Clutch vacuum power booster unit - check, renewal and adjustment

Check

1 Check all vacuum hoses including those to the inlet manifold and the brake booster for cracks and other damage. Renew any that show wear.
2 Remove the tee check valve from the vacuum system and note the positions of the hoses.
3 Blow through the clutch vacuum port. Air should flow through the other ports freely. If it does not, renew the check valve. It should not be possible to suck air through the clutch port.
4 Start the engine and allow it to idle. Pull the vacuum hose from the clutch power booster and place a finger over the end of the hose. There should be strong vacuum present.

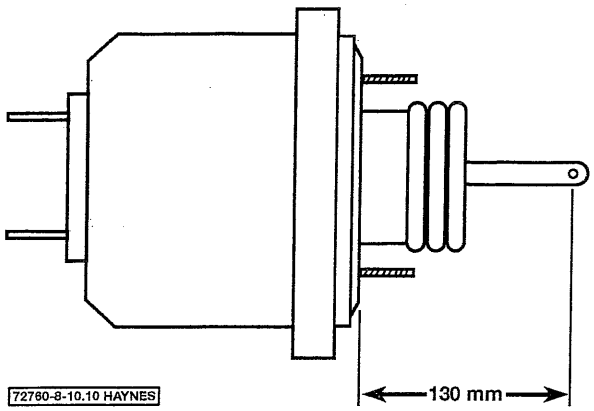
Renewal

5 Remove the clutch master cylinder (refer to Chapter 6).
6 Disconnect the clutch pushrod from the clutch pedal.
7 Remove the mounting nuts from under the dash.
8 Disconnect the vacuum hose from the unit.
9 Refitting is the reverse of removal.

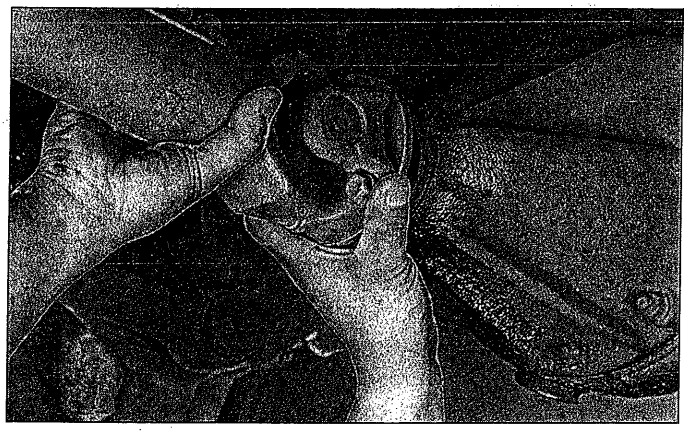
Adjustment

Refer to illustration 10.10

10 Loosen the lock-nut on the input rod and adjust the distance from the centre of the clutch pedal pin hole to the firewall mounting surface as shown **(see illustration)**.



10.10 Adjust the clutch power booster input rod to 130 mm. The measurement must be taken from the centre of the pivot pin hole to the surface that seats against the firewall



12.5 Use a twisting motion to check for freeplay in the U-joint - any movement is evidence of wear

11 Measure the distance from the end of the output rod to the master cylinder mounting surface. This distance should be 130 mm to 1.55 mm. If adjustment is required, hold the pushrod rod with pliers and adjust the tip.

11 Driveshafts, differentials and axles - general information

All 4WD vehicles use two driveshafts; one shaft runs between the transfer case and the front differential and the rear driveshaft runs between the transfer case and the rear differential.

All universal joints are of the solid type and can be renewed separate from the driveshaft. Some models use a double Cardan type front joint.

The driveshafts are finely balanced during production and whenever they are removed or disassembled, they must be reassembled and refitted in the exact manner and positions they were originally in, to avoid excessive vibration.

Both front and rear axles have a 'banjo' style differential which transfers the turning torque of the driveshaft to the axleshafts. The axleshafts are splined at their inner ends to fit into the splines in the differential gears and the outer ends of the rear axles are either of the full-floating or semi-floating design. All front axles are of the full floating design.

Because of the complexity and critical nature of the differential adjustments, as well as the special equipment needed to perform the operations, we recommend any disassembly of the differential be done by a Nissan/Ford dealer service department or other qualified repair facility.

12 Driveline inspection

Refer to illustration 12.5

1 Raise the vehicle and support it securely on jackstands.

2 Slide under the vehicle and visually inspect the condition of the driveshafts. Look for any dents or cracks in the tubing. If any are found, the driveshaft must be renewed.

3 Check for any oil leakage at the front and rear of the driveshaft. Leakage at the transfer case indicates a defective output shaft seal (see Chapter 7C). Leakage from the differential indicates a defective pinion seal (see Section 17).

4 While you're under the vehicle, have an assistant turn a rear wheel so the driveshaft will rotate. As it rotates, make sure the U-joints are functioning properly; they should not be binding, noisy or loose.

5 The U-joints can also be checked with the driveshaft motionless. First, make sure the U-joint bolts at both ends are tight, then grip each side of each joint and try to twist it **(see illustration)**. Any movement in the U-joint is evidence of considerable wear. Lifting up on the shaft will also indicate movement in the universal joints.

6 Inspect for leakage around both sliding yokes. Grease in this area indicates failure of the yoke seal.

7 While you're under the vehicle, inspect both ends of both axle tubes for leaks. Gear oil leakage onto the brake backing plate or brakes indicates a leaking axleshaft seal.

8 The front hub assemblies of these vehicles are quite complex. Inspect the front axle carefully for leaks and other signs of wear.

9 Remove the jackstands and lower the vehicle.

13.2a Make sure you mark the U-joint trunnion and companion flange . . .

13.2b . . . at both ends of the driveshaft to ensure the driveshaft retains its balance when you refit it

13.2c Note how all the removable parts are marked clearly

13.3 Use two spanners to immobilise the driveshaft when you break the flange nuts loose

13 Driveshafts - removal and refitting

Refer to illustrations 13.2a, 13.2b, 13.2c and 13.3

1 Raise the vehicle and support it securely on jackstands. Place the transmission and transfer case in Neutral with the parking brake off.

2 Use a scribe, white paint or a hammer and punch to place alignment marks on all driveshaft flanges and slip joints **(see illustrations)** to ensure that the driveshaft is refitted in the same position so its dynamic balance is maintained.

3 Detach the bolts from the differential and transfer case flanges and remove the drive shaft(s) from the vehicle **(see illustration)**. Because the bolts are very tight, it will be necessary to hold the driveshaft with a long bar to prevent it from turning.

4 While the driveshaft is removed, check the U-joints: While pushing and pulling on them, try to move them back and forth and side to side simultaneously. If there is any play in the U-joints, renew the U-joints (see Section 14).

5 Refitting is the reverse of removal.

a) *Make sure you match up the marks you made on all flanges.*

b) *Tighten all fasteners to the torque listed in this Chapter's Specifications.*

14 Universal joint - renewal

Refer to illustrations 14.2, 14.3a and 14.3b

Note: *A press or large vice will be required for this procedure. It may be a good idea to take the driveshaft to a repair or machine shop where the U-joints can be renewed for you, usually at a reasonable charge.*

1 Remove the driveshaft (see Section 13).

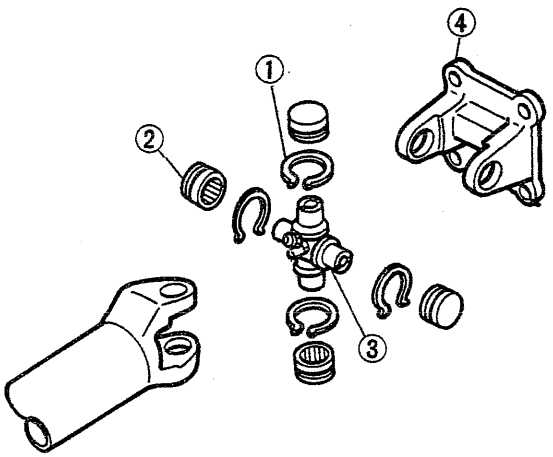
2 Place the driveshaft in a sturdy vice, mark the shaft and yoke for proper reassembly and, using a hammer and punch, drive the snap rings off the bearing cups **(see illustration)**.

3 Place a piece of pipe or a large socket with the same inside diameter over one of the bearing cups. Position a socket which is of slightly smaller diameter than the cup on the opposite bearing cup **(see illustration)** and use the vice to force the cup out (inside the pipe or large socket), stopping just before it comes completely out of the yoke. Use the vice or large pliers to work the cup the rest of the way out **(see illustration)**.

4 Transfer the sockets to the other side and press the opposite bearing cup out in the same manner.

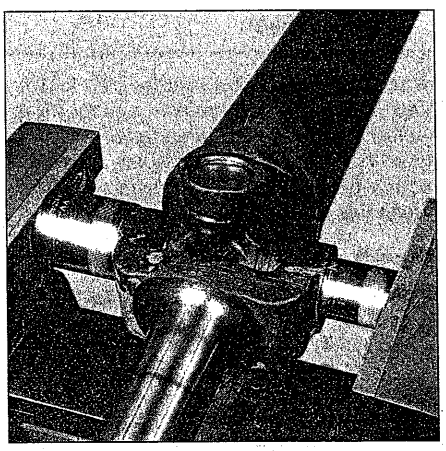
5 After the bearing cups have been removed, lift the U-joint from the yoke and thoroughly clean all dirt and debris from the yokes on both ends of the driveshaft. Be sure to remove any metal burrs from the yoke bores.

6 Pack the new U-joint bearing cups with

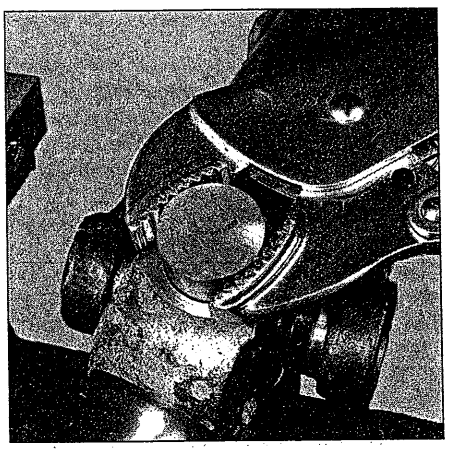


14.2 An exploded view of a U-joint assembly

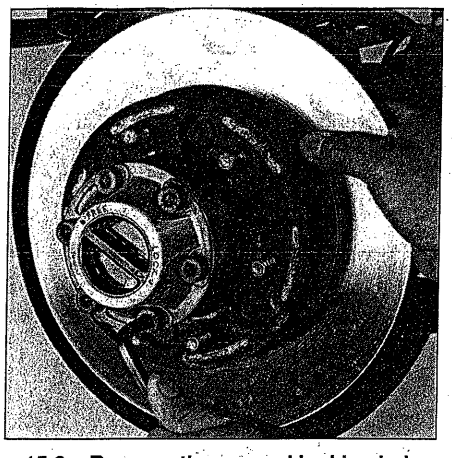
1 Snap-ring
2 Bearing cup
3 U-joint body
4 U-joint yoke



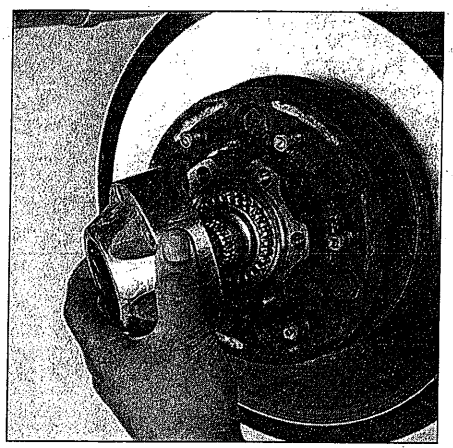
14.3a Press out the U-joint bearing cups with a vice and sockets



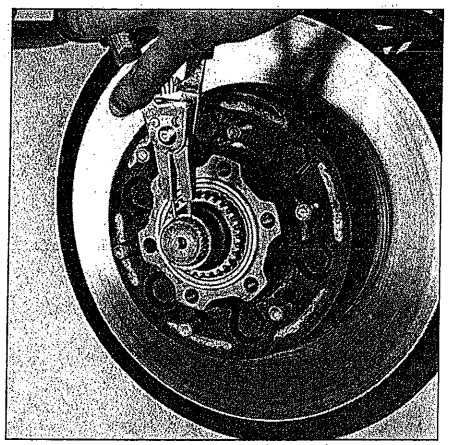
14.3b Extract the bearing cup with locking pliers



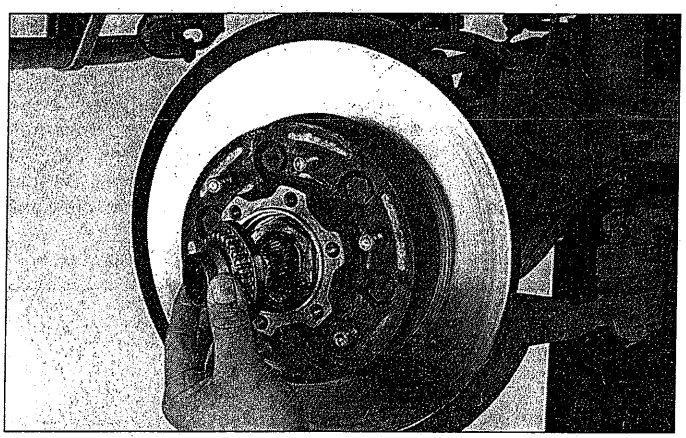
15.6a Remove the manual locking hub outer assembly bolts . . .



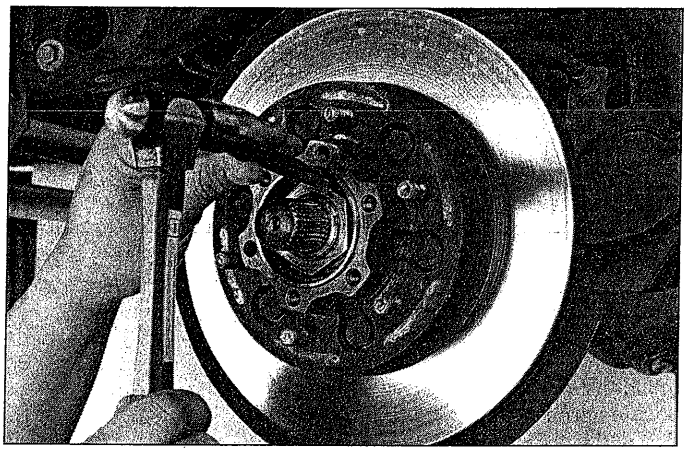
15.6b . . . and lift the unit off



15.7 Snap-ring pliers are necessary to remove the outer snap-ring



15.8 The drive clutch is removed next. Place all of the components in order on a clean working area to avoid confusion later



15.10a The locking washer will have to be flattened with a hammer and drift

grease, this will allow the needle bearings to be held in place while you're refitting the bearing cups. Ordinarily, specific instructions for lubrication will be included with the U-joint servicing kit and should be followed carefully.

7 Position the U-joint body in the yoke and partially refit one bearing cup in the yoke. If the U-joint is equipped with a grease fitting, be sure it points in the same direction as the grease fitting on the opposite end of the driveshaft.

8 Start the U-joint body into the bearing cup and then partially refit the other cup. Align the U-joint body between the bearing cups and press the bearing cups into position, being careful not to damage the dust seals.

9 Refit the snap-rings. Tap the unit sharply with a hammer to centre the U-joint after assembly. **Note:** *If you have difficulty seating the snap-rings, one of the small needle bearings may have become stuck between the bearing cap and the end of the spider. Disassemble and inspect.*

10 Check the endplay of the assembly. Endplay should not exceed 0.02 mm. Snap-rings of various sizes are available to obtain the proper endplay. The difference between the thicknesses of the two snap-rings used on opposite ends of a trunnion should not exceed 0.06 mm.

11 Refit the driveshaft (see Section 13). If the U-joint is equipped with a grease fitting, lubricate it as described in Chapter 1.

15 Front hub, bearings and axle assembly - check, lubrication and renewal

Note: *Models with front automatic locking hubs require a special factory tool for disassembly. Both the manual and automatic hub assemblies are quite complex and may require the renewal of seals and snap-rings during this procedure.*

Disassembly and repack

Refer to illustrations 15.6a, 15.6b, 15.7, 15.8, 15.10a, 15.10b, 15.10c, 15.16, 15.17a, 15.17b, 15.17c, 15.17d, 15.18, 15.19, 15.21a, 15.21b, 15.26a and 15.26b

1 In most cases the front wheel bearings will not need servicing until the brake pads are changed. However, the bearings should be checked whenever the front of the vehicle is raised for any reason. Several items, including a torque wrench and special grease, are required for this procedure.

2 With the vehicle securely supported on jackstands, spin each wheel and check for noise, rolling resistance and freeplay.

3 Grasp the top of each tyre with one hand and the bottom with the other. Move the wheel in and out on the spindle. If there's any noticeable movement, the bearings should be checked and then repacked with grease, or renewed if necessary.

4 Remove the wheel.

5 Unbolt the disc brake caliper (see Chapter 9) and hang it out of the way on a piece of wire. **Caution:** *Do not touch the brake pedal while the caliper is removed. The caliper piston will be ejected.*

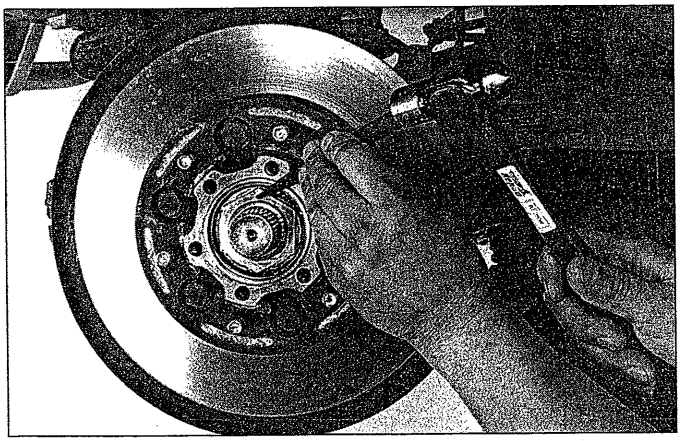
Models with manual locking hubs

6 Turn the hub to the FREE setting. Remove the retaining bolts and remove the locking hub assembly **(see illustrations).**

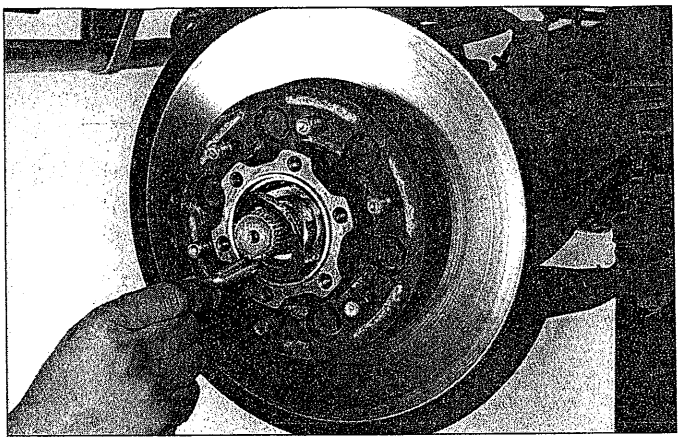
7 Use snap-ring pliers to remove the snap-ring from the end of the axle shaft **(see illustration).**

8 Remove the drive clutch assembly **(see illustration).**

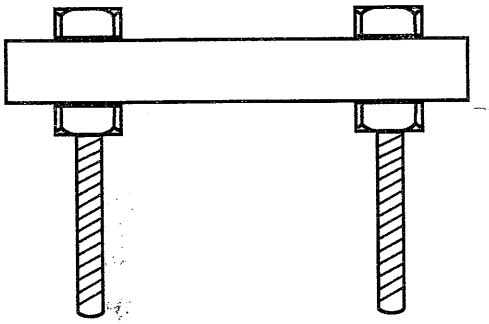
9 Remove the bush and the spacer behind it.



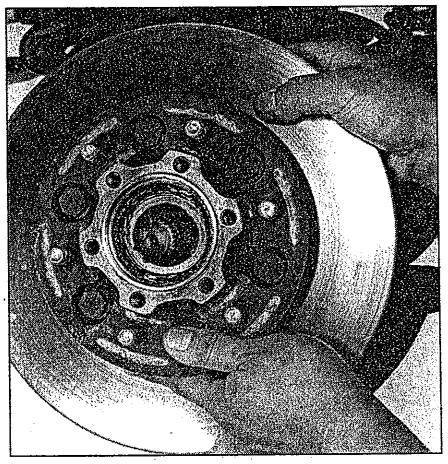
15.10b This nut may be tight. It is best to use the proper socket to remove it, but a hammer and drift will also work



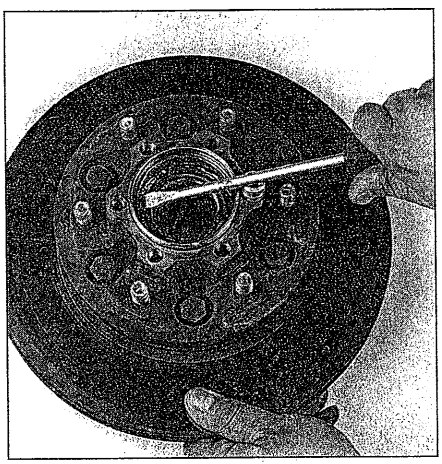
15.10c Use a magnet to extract the lock washer



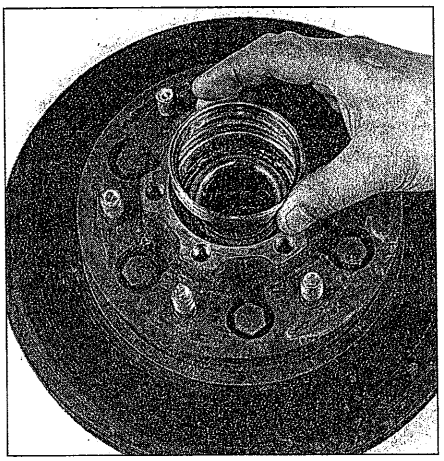
15.16 To properly tighten the adjusting nut for models with automatic locking front hubs, you will have to purchase a special tool or else fabricate one out of scrap to these specifications. Use a stout piece of steel for the main body, then drill it for two bolts as shown. The distance between the bolts has to match the spacing of the holes in the nut. Use an adjustable spanner to turn the tool



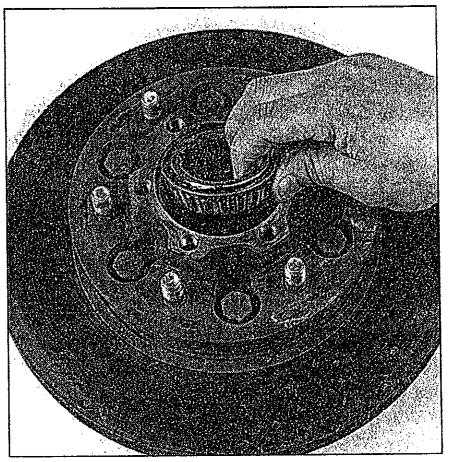
15.17a Lift the rotor assembly from the spindle



15.17b A screwdriver can be used to prise out the spacer



15.17c Lift the spacer from the hub . . .



15.17d . . . then pull out the outer wheel bearing

10 Release the tab on the lock washer and then remove the outer lock nut **(see illustrations)**. It is screwed on very tightly. Remove the lock washer **(see illustration)**.

11 Remove the inner adjusting nut and the washer.

Models with automatic locking hubs

12 Adjust the hub to the LOCK setting. Remove the retaining bolts and remove the locking hub, the O-ring, the spring and the outer brake.

13 Use snap-ring pliers to remove the snap-ring from the end of the axle shaft.

14 Remove the hub brake unit. This consists of two washers and the inner brake. Place all the components on a clean surface in order so that they can be easily reassembled in the correct sequence.

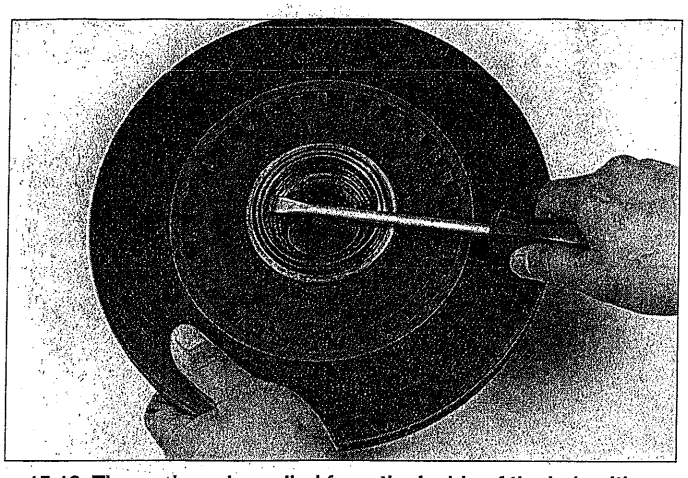
15 Remove the lock washer.

16 Obtain the special tool shown or fabricate an equivalent **(see illustration)**. Use it to loosen and then remove the adjusting nut.

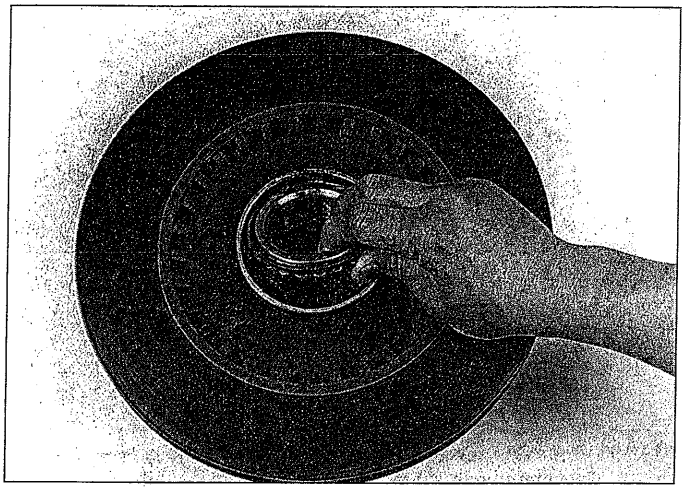
Note: *It may be possible to remove this nut with other means, but the tool will be needed to tighten it upon reassembly.*

All models

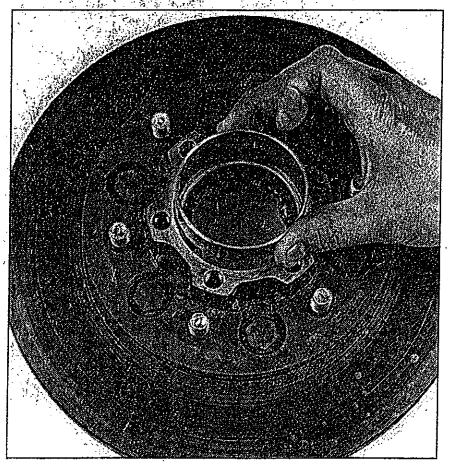
17 Support the outer bearing to prevent it from falling and remove the hub/rotor assembly from the vehicle **(see illustration)**. Unbolt



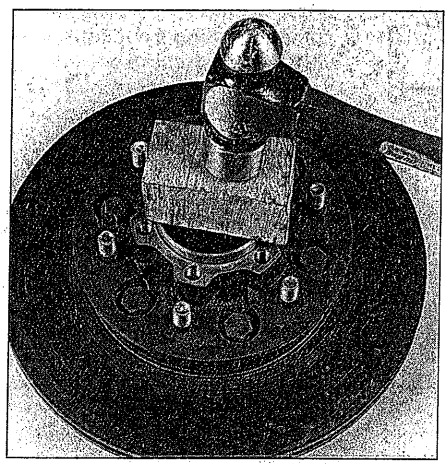
15.18 The seal can be pulled from the inside of the hub with a seal puller or a screwdriver. It will have to be renewed, so don't worry about damaging it



15.19 Lift the inner wheel bearing from its race

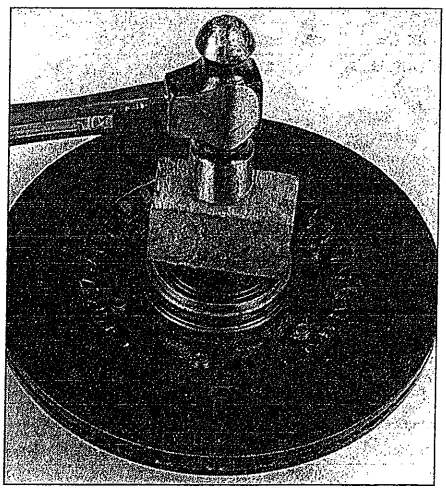


15.21a Both inner and outer races can be driven out with a drift and renewed if required



15.21b Fit new races with a block of wood. They are precision components and cannot be tapped directly with a hammer

15.26a It is good practice to always renew the grease seals



15.26b A hammer and a block of wood will drive the new seals in squarely

the rotor from the hub if necessary. Remove the outer bearing assembly **(see illustrations)**.

18 Use a screwdriver or a seal puller tool to prise the seal out of the inside of the brake disc or drum **(see illustration)**. Note how the seal is refitted. The seal should be marked "bearing side".

19 Remove the inner wheel bearing from the disc **(see illustration)**.

20 Use solvent to remove all traces of the old grease from the bearings, hub and spindle. A small brush may prove helpful; however make sure no bristles from the brush embed themselves inside the bearing rollers. Allow the parts to air dry.

21 Carefully inspect the bearings for cracks, heat discolouration, worn rollers, etc. Check the bearing races inside the hub for wear and damage. If the bearing races are defective, drive the bearing race out of the hub using a brass drift **(see illustration)**. Drive the new race into the hub using the appropriate size bearing driver (inexpensive bearing driver sets are available at most automotive parts stores) **(see illustration)**. Note that the bearings and races are renewed as matched sets; used bearings should never be refitted on new races.

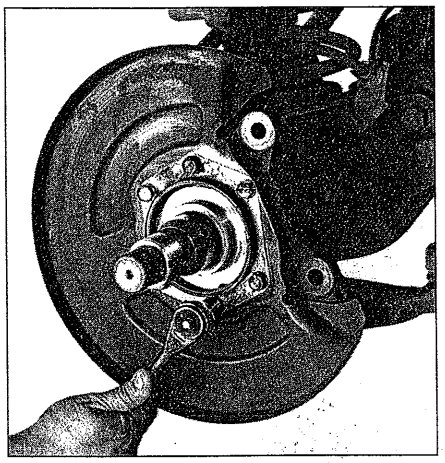
22 Use only high-temperature front wheel bearing grease to pack the bearings. Inexpensive bearing packing tools are available at automotive parts stores, but not entirely necessary. If one is not available, pack the grease by hand completely into the bearings, forcing it between the rollers, cone and cage from the back side.

23 Apply a thin coat of grease to the spindle at the outer bearing seat, inner bearing seat, shoulder and seal seat.

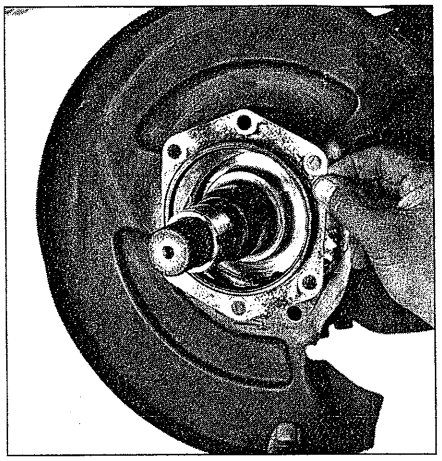
24 Place a small quantity of grease inboard of each bearing race inside the hub. Using your finger, form a dam at these points to provide extra grease availability and to keep thinned grease from flowing out of the bearing.

25 Place the grease-packed inner bearing into the rear of the hub and put a little more grease outboard of the bearing.

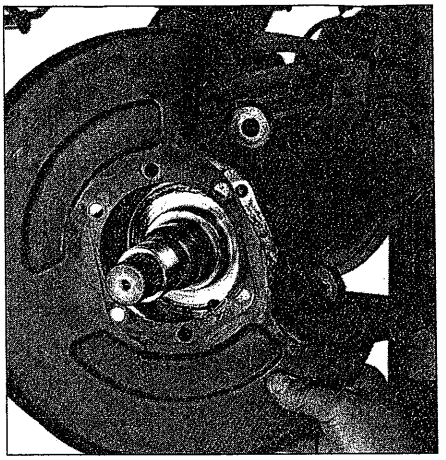
26 Place a new seal over the inner bearing and tap the seal evenly into place with a hammer and block of wood until it's flush with the hub **(see illustrations)**.



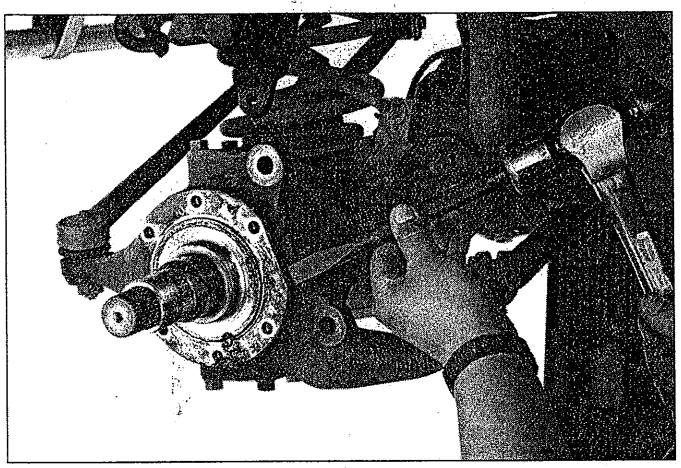
15.28a Remove these bolts . . .



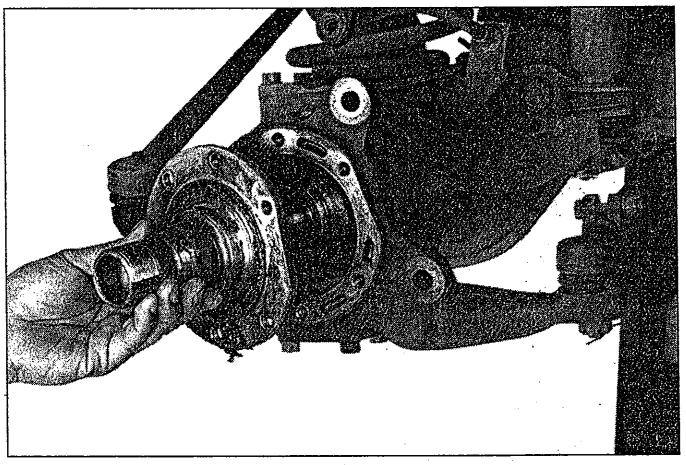
15.28b . . . to remove the dust seal . . .



15.28c . . . and the large baffle plate



15.28d The seal on the spindle can be broken with a hammer and chisel . . .



15.28e . . . and then the spindle can be lifted off

Axleshaft lubrication and renewal

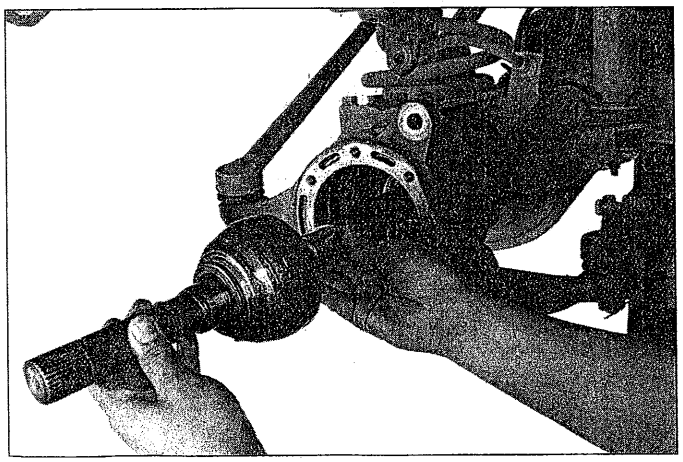
Refer to illustrations 15.28a, 15.28b, 15.28c, 15.28d, 15.28e, 15.29, 15.30, 15.31, 15.33a, 15.33b, 15.42, 15.45 and 15.46

27 Drain two litres of lubricant from the front differential.

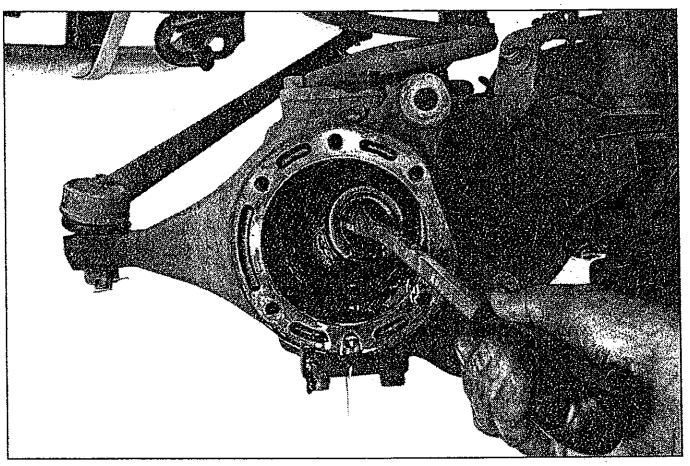
28 Remove the dust seal, the large baffle plate and the knuckle spindle from the end of the axle assembly **(see illustrations)**.

29 Carefully slide the axle out of the housing until the axle joint is accessible. Take care to not damage the grease seals **(see illustration)**. Pack the joint with the recommended grease.

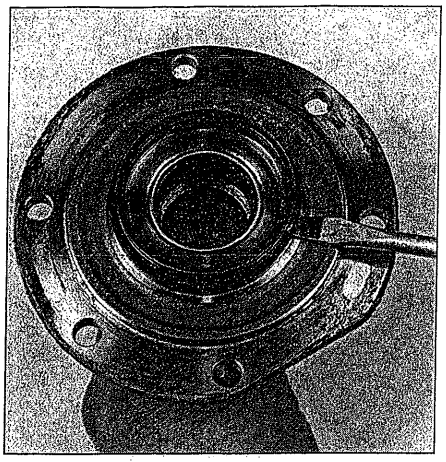
30 To renew the inner seal, remove the axle completely and prise the seal from the axle housing **(see illustration)**.



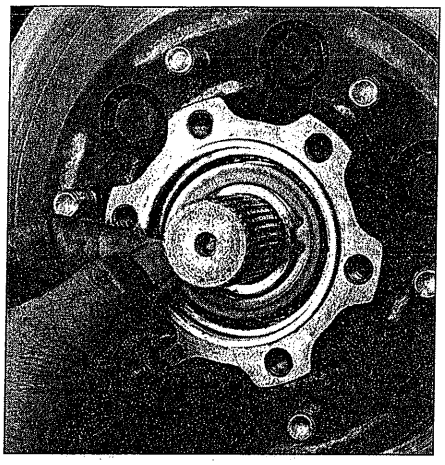
15.29 Do not drag the axle over the inner seal as you slide it out - the seal will be ruined



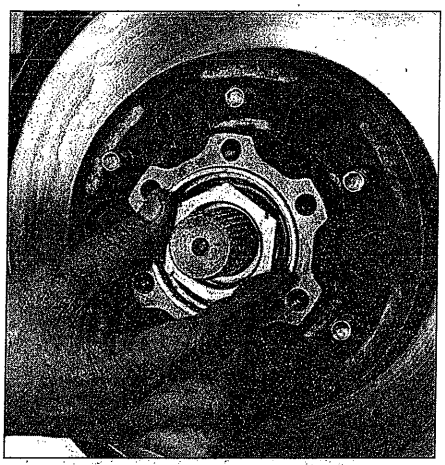
15.30 If the inner seal has shown signs of leakage, it can be renewed after the axle has been completely removed from the housing



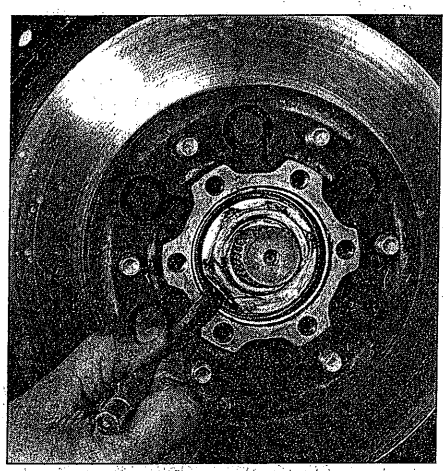
15.31 The spindle seal should be checked and renewed at this time



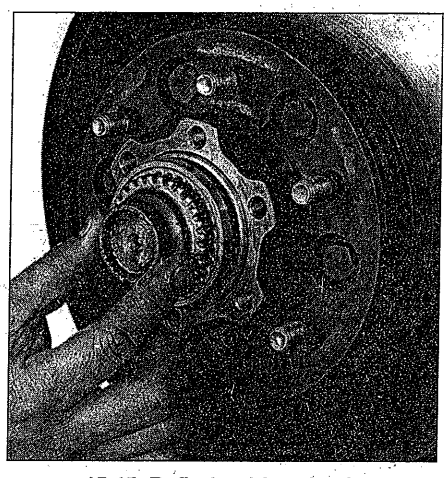
15.33a Refit the thrust washer . . .



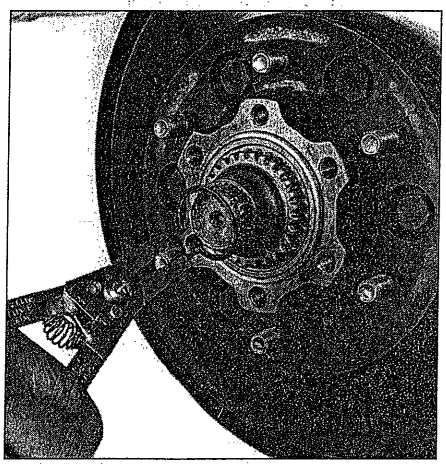
15.33b . . . and the nut



15.42 Secure the nut by bending up a corner of the lock washer



15.45 Refit the drive clutch



15.46 Use a new snap-ring to complete the assembly

31 Refitting is the reverse of removal. If necessary, renew the seal on the spindle **(see illustration)**.

Adjustment

32 Carefully place the brake rotor assembly onto the spindle and push the grease-packed outer bearing into position.

33 Refit the thrust washer and the locknut onto the spindle **(see illustrations)**.

34 Tighten the nut to 167 to 196 Nm.

35 Spin the hub in both directions.

36 Loosen the nut fully.

37 Torque the nut again, but this time to only 4 Nm.

38 Again spin the hub in both directions.

39 Again torque the nut to 4 Nm.

40 Again spin the hub in both directions. The hub should turn smoothly with only a very slight amount of drag.

41 Mount a dial indicator with the tip on the end of the hub and pointing parallel with the axle shaft.

42 Grasp the hub and push it in and out. The total movement must be less than 0.08 mm. Bend the lock washer over to secure the nut **(see illustration)**.

Reassembly

Models with manual locking hubs

43 Place a new lock washer over the adjusting nut. Apply lubricant to the side of the outer locking nut and refit it to the listed torque in the Specifications of this Chapter. Bend the lock washer to secure both nuts.

44 Liberally grease the bush, then tap it and the spacer into place.

45 Refit the complete drive clutch assembly **(see illustration)**. Make sure that you grease it thoroughly before refitting.

46 Refit a new snap-ring **(see illustration)**.

47 Use feeler gauges to verify that the total free play of the hub (as measured between the snap-ring and the hub) is less than 0.02 mm. Snap-rings of various thicknesses are available to set the correct freeplay if it is not within the 0.0 to 0.02 mm range.

48 The remainder of refitting is the reverse of removal. **Note:** *Grease the internal components of the manual locking hub assembly with the recommended chassis grease. DO NOT pack the hubs full of grease or poor operation may occur. If the locking hub is disassembled, be sure to mark the relationship of the clutch to the housing with a dab of paint before unscrewing it. The clutch must be refitted with the marks aligned and to the same depth as when removed.*

Models with automatic locking hubs

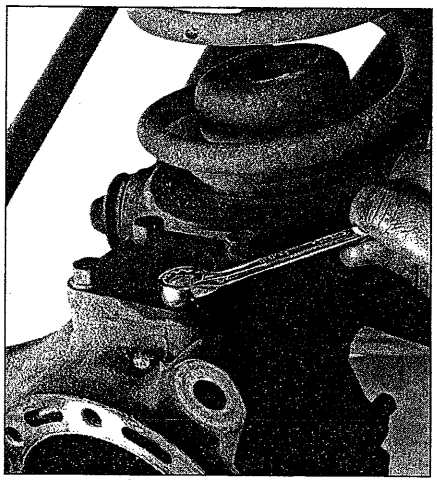
49 Refit the inner brake and the two washers. The washer with the two internal tangs goes on first, with the tangs directed inwards.

50 Refit a new snap-ring. Use feeler gauges to verify that the total free play of the hub (as measured between the snap-ring and the hub) is less than 0.02 mm. Snap-rings of various thicknesses are available to set the correct freeplay if it is not within the 0.0 to 0.02 mm range.

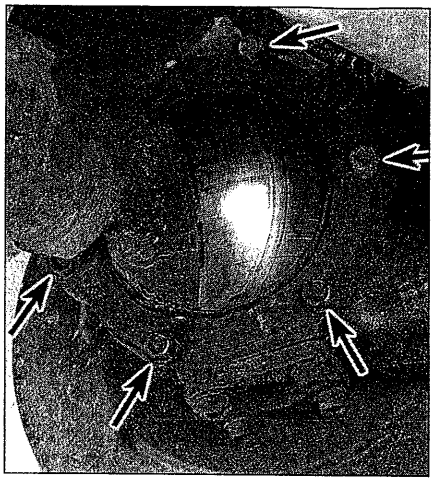
51 Refit the locking hub assembly, complete with a new O-ring, the large spring and the outer brake. Make sure the hub is still set to the LOCK position. Tighten the bolts to the torque listed in this Chapter's Specifications. **Note:** *The automatic locking hub assembly must be renewed as a unit if it is damaged. Do not disassemble it.*

52 Set the hubs to the AUTO position.

53 The remainder of refitting is the reverse of removal.



16.3 Both the upper and lower bearing caps are secured by four bolts. Do not let the shims beneath these caps get out of order as you remove them



16.4 These bolts secure the seal guard plate. One of them acts as the steering travel stopper

16 Swivel hub assembly - removal and refitting

Refer to illustrations 16.3 and 16.4

1 Remove the axle shaft (refer to Section 15).

2 Disconnect the tie-rod ends from the swivel hub (refer to Chapter 10).

3 Remove the bearing caps with their shim stacks **(see illustration)**. Keep all of the components in order so the shims and caps can be returned to their original positions.

4 Remove the bolts from the seal guard **(see illustration)**. **Note:** *One of the bolts is used as a steering stop. Mark the threads on this bolt so that it can be refitted to the same depth later. Remember the location where it was refitted.*

5 Pull the swivel hub off and remove the seal guard, scraper, seal and support ring.

6 Use a brass drift to drive out the upper and lower bearing races and kingpin plugs.

7 Carefully check all components for wear and damage. Renew any that require it. Always renew the scraper and the seal, as they are prone to rapid wear.

8 Always renew the plugs. Renew the races if the bearings were renewed.

9 Pack the bearings with grease prior to refitting. All other moving components should also receive a light application of grease as they are refitted. The swivel area itself should receive 50 g of grease. Refit the scraper and support ring with the openings facing downwards.

10 After refitting the bearing caps, check the turning effort by attaching a spring scale (fish scale) to the tie-rod connection hole of the knuckle.

11 It should require from 6 to 17 N of force to rotate the swivel hub assembly. The force required can be adjusted by adding or subtracting shims from the bearing caps. Always add or subtract shims equally from the top and bottom caps.

12 Refitting is the reverse of removal. Tighten the fasteners to the torques listed in this Chapter's Specifications. The steering stop bolt and lock-nut must be refitted on the stopper side of the axle housing.

17 Axle assembly (front or rear) - removal and refitting

Removal

Refer to illustrations 17.3 and 17.8

1 Loosen the wheel lug nuts, raise the vehicle and support it securely on jackstands positioned under the frame rails. Remove the wheels.

2 Remove the brake components, if desired (see Chapter 9). If you decide to leave the brake assemblies refitted on the axle housing, disconnect the brake lines from the axle and plug all of the openings.

3 On front axles, disconnect the tie-rod ends and centre link **(see illustration)** from the steering knuckles (see Chapter 10).

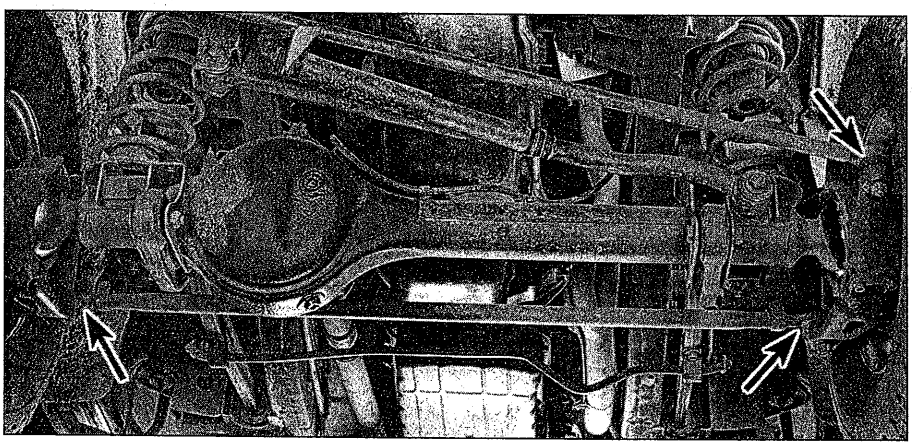
4 Disconnect the driveshaft from the pinion flange (see Section 13).

5 Remove the stabiliser bar if equipped (see Chapter 10).

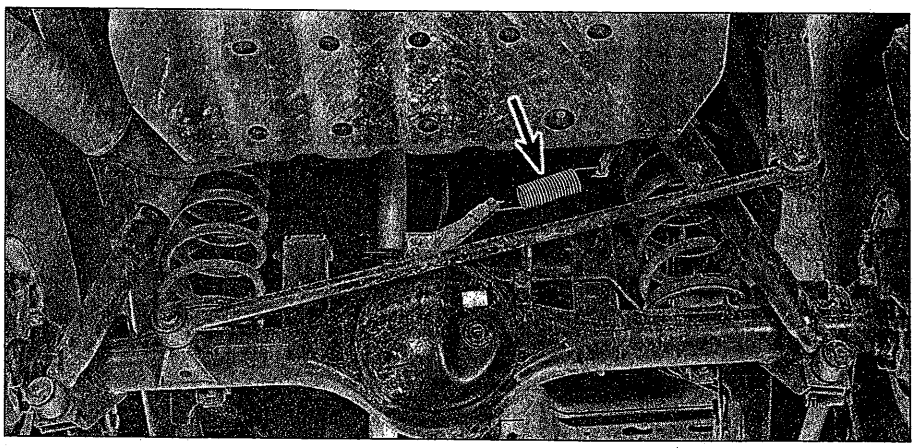
6 If the axle is equipped with a Panhard bar, disconnect it from the axle (see Chapter 10).

7 Drain the lubricant from the axle housing. Disconnect the vent hose.

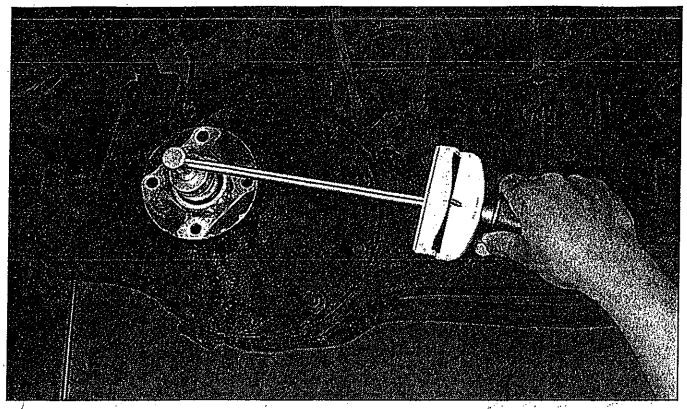
8 If equipped, disconnect the load level



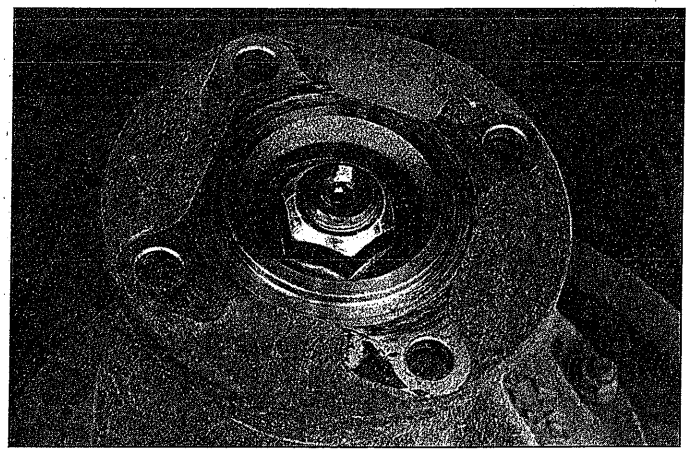
17.3 You will probably have to use a tie-rod puller or a "pickle-fork" to disconnect the tie-rod ends and the steering link (arrows)



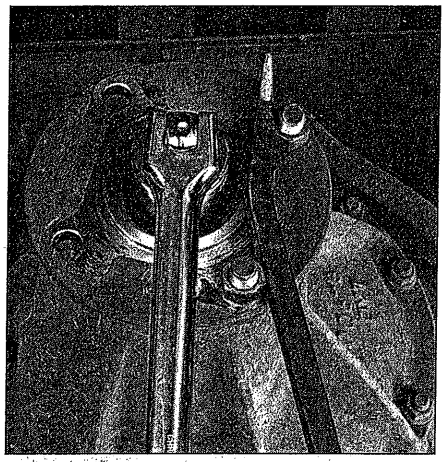
17.8 The load level sensor spring has to be disconnected. Check that all vent hoses, etc., are also free before lowering the axle assembly



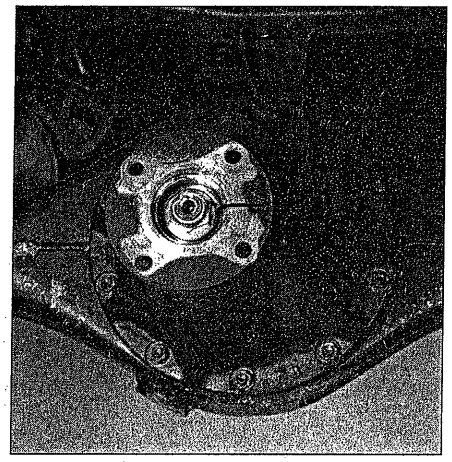
18.5 Using a kg-cm torque wrench, measure and record the break away torque required to turn the pinion nut before renewing the pinion oil seal



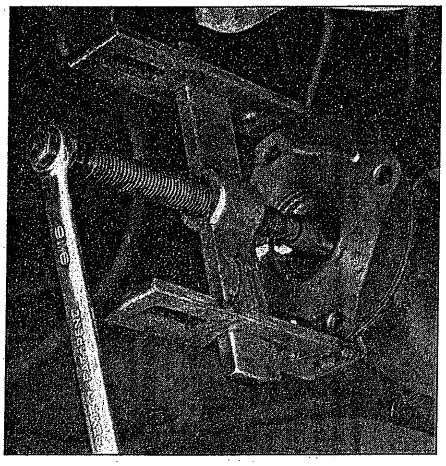
18.6 Mark the position of the nut on the pinion shaft



18.7a A large screwdriver, positioned as shown, can be used to hold the companion flange stationary while the nut is loosened



18.7b Mark the relationship of the flange to the pinion shaft



18.8 Remove the companion flange from the pinion shaft with a two-jaw puller

sensor spring from the rear axle **(see illustration)**.

9 Place a floor jack under the differential and raise the rear axle assembly slightly.

10 Disconnect the lower ends of the shock absorbers from the axle assembly (see Chapter 10).

11 If equipped with coil springs Carefully lower the axle assembly until the coil springs are fully extended, then remove the springs (see Chapter 10).

12 If equipped with leaf springs, unbolt the U-bolts and tie plates from the axle (see Chapter 10). Remove the bolts attaching the front spring shackles to the springs and lower the springs to the ground. **Caution:** *Once the leaf springs are disconnected from the axle assembly, it's no longer stable. Have an assistant help balance the axle on the floor jack pad.*

13 On coil spring equipped vehicles, Disconnect the upper and or lower suspension arms from the axle assembly (see Chapter 10). **Caution:** *Once the suspension arms are disconnected from the axle assembly, it's no longer stable. Have an assistant help balance the axle on the floor jack pad.*

14 Slowly lower the axle assembly and wheel it out from under the vehicle.

Refitting

15 Refitting is the reverse of the removal procedure. When refitting the axle, make sure it's positioned properly. For fasteners with specified torque values, be sure they are tightened to the torque listed in the Chapter 8, 9 and 10 Specifications.

18 Pinion oil seal - renewal

Refer to illustrations 18.5, 18.6, 18.7a, 18.7b, 18.8, 18.9 and 18.10

1 A pinion shaft oil seal failure results in the leakage of differential gear lubricant past the seal and onto the driveshaft yoke or flange. The seal can be renewed without removing or disassembling the differential.

2 Raise the vehicle and support it securely on jackstands.

3 Drain the differential lubricant (see Chapter 1). After draining is complete, refit the drain plug and tighten it securely.

4 Disconnect the driveshaft from the pinion shaft yoke (see Section 13). Support the driveshaft out of the way with a piece of wire.

5 Using a kg-cm torque wrench, measure the torque required to move the pinion shaft within its backlash (break-loose torque This is the area of movement in which no movement of the ring gear or axles takes place). Record this figure, as it will be used to set the pinion shaft preload during refitting **(see illustration)**.

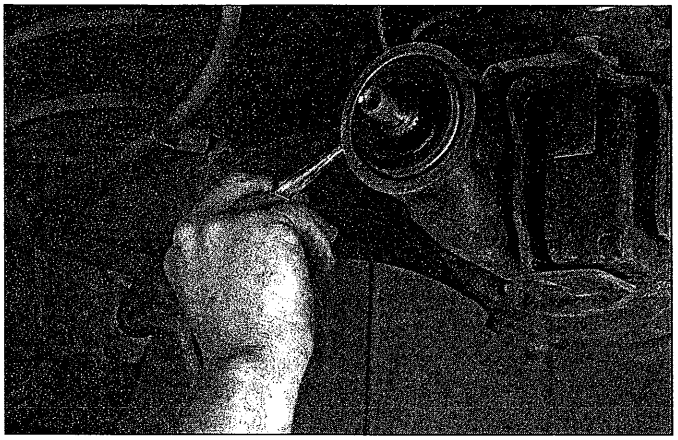
6 Mark the position of the companion flange nut to the pinion shaft **(see illustration)**.

7 Using a large screwdriver or lever acting on two bolts in the flange, hold the companion flange stationary, then remove the companion flange nut **(see illustration)**. Mark the relationship of the pinion shaft to the companion flange **(see illustration)**.

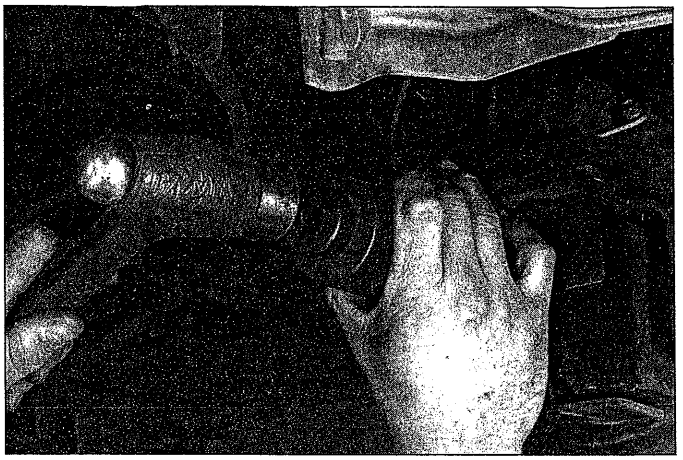
8 Remove the companion flange from the pinion shaft with a two-jaw puller **(see illustration)**.

9 Carefully prise the seal out of the differential with a screwdriver or seal puller. Be careful not to damage the splines on the pinion shaft **(see illustration)**.

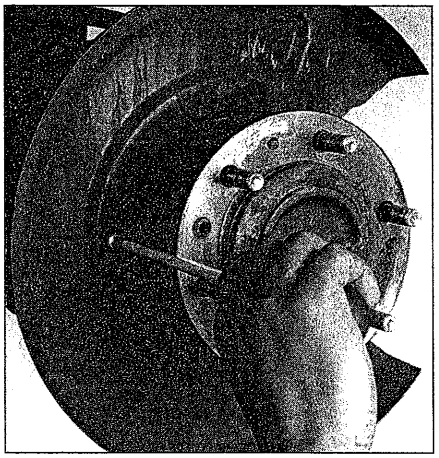
10 Lubricate the new seal lip with multi-purpose grease or differential lubricant and



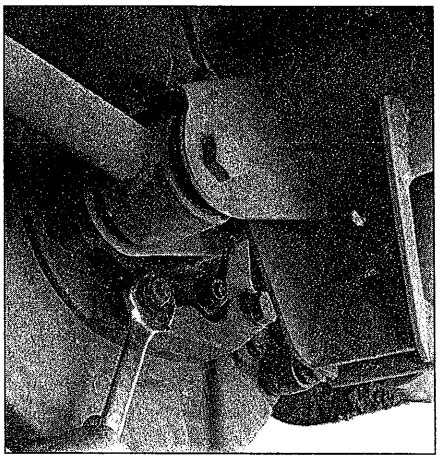
18.9 It'll probably be necessary to drive the seal out with a hammer and punch - be careful not to damage the splines or threads on the pinion shaft



18.10 A hammer and a socket of the proper diameter can be used to drive the seal into place



19.3 There are outer screws securing the dust shield to the rear axle housing



19.5 Remove the bolts from the axle bearing housing . . .

19.6a . . . then carefully slide the axle out of the housing. Take care to not drag the axle over the seal as you do so

carefully refit it in position in the differential. Using a hammer and a seal driver, large socket or a short section of pipe of the proper diameter, carefully drive the seal into place **(see illustration)**.

11 Clean the sealing lip contact surface of the companion flange. Apply a thin coat of multi-purpose grease to the seal contact surface and the shaft spines. Slide the companion flange onto the shaft, making sure the match marks line up.

12 Coat the threads of the pinion shaft with multi-purpose grease. Refit a new nut and, holding the flange stationary, tighten the nut to the initial torque listed in this Chapter's Specifications. Turn the companion flange several times to seat the bearing.

13 Using a torque wrench, see how much torque is required to turn the pinion shaft within its backlash (break-loose torque). The desired preload is the previously recorded torque value plus 6 kg-cm. If the preload is less than desired, retighten the nut in small increments until the desired preload is reached. If the maximum torque on the pinion shaft nut (see this Chapter's Specifications) is reached before the desired preload is obtained, the bearing spacer must be renewed by a repair shop. **Note:** *Do not back-off the pinion nut to reduce the preload. After the preload is properly adjusted, proceed to the next Step.*

14 Connect the driveshaft to the companion flange (see Section 13).

15 Fill the differential with the recommended lubricant (see Chapter 1).

16 Lower the vehicle to the ground and test drive the vehicle. Check around the companion flange for evidence of leakage.

19 Rear axle bearing and seal (semi-floating) - removal and refitting

Refer to illustrations 19.3, 19.5, 19.6a, 19.6b, 19.7, 19.8, 19.9, 19.10a, 19.10b, 19.11 and 19.12

Axle assembly removal

1 The axleshafts can be removed without disturbing the differential assembly. They must be removed in order to renew the bearings and oil seals and when removing the differential carrier from the rear axle housing. **Note:** *Read the entire Section before starting work.*

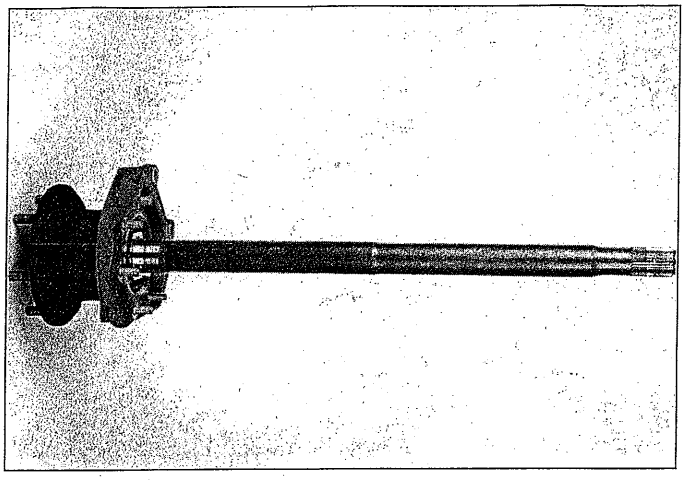
2 Raise the rear of the vehicle and support it securely on jackstands. Block the front wheels to keep the vehicle from rolling.

3 Remove the rear wheels, then remove the brake drum or disc brake caliper and rotor as well as the dust shield **(see illustration)** (see Chapter 9 for details). On drum brake models, disconnect the brake line from the wheel cylinder and plug the openings.

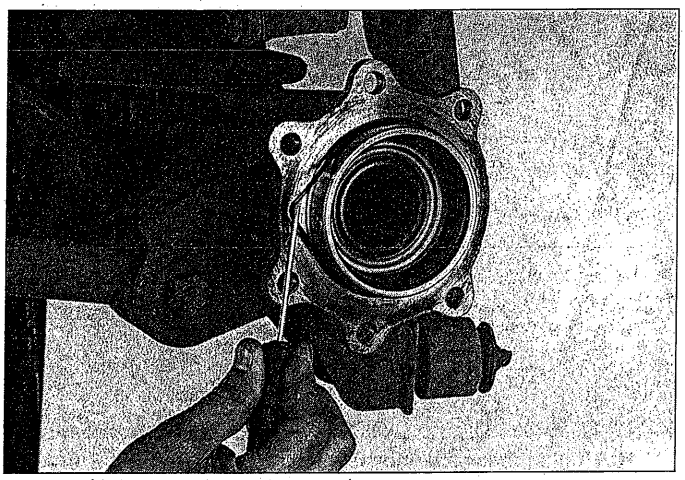
4 Remove the drain plug and drain the differential oil into a suitable container. When the draining is complete, tighten the drain plug in place.

5 Remove the nuts from the axle retainer **(see illustration)**.

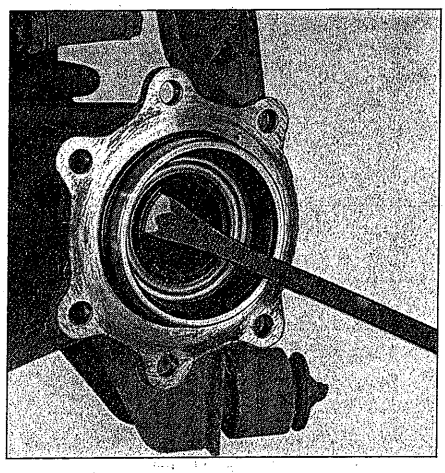
6 Use a slide hammer to pull the axle from the housing **(see illustrations)**. **Note:** *If a slide hammer is not available, it may be possible to temporarily refit a brake drum or rotor onto the end of the axle with the nuts loose. Grasp the drum or rotor and attempt to free the axle in this manner.*



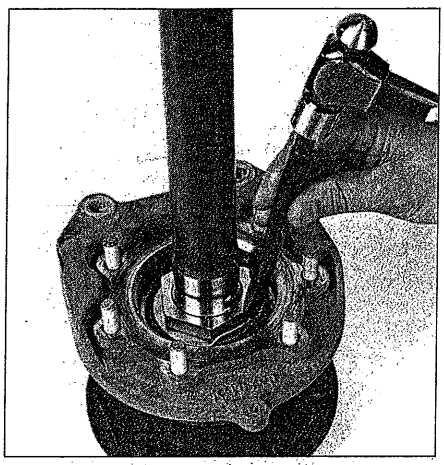
19.6b The axle bearing and seal can now be worked on



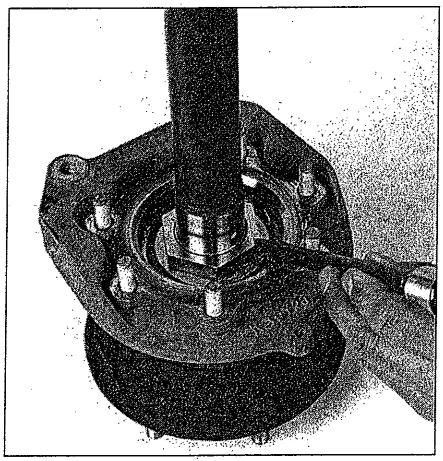
19.7 Disc brake models use an O-ring which should be renewed



19.8 the axle seal must be renewed if there are signs of leakage onto the brakes or on the backing plate



19.9 Flatten the lock washer with a hammer and drift



19.10a This nut is extremely tight. A special factory tool (ST38080001) is available to remove it, but a hammer and drift may work if it is not available

7 On disc brake models, remove the O-ring **(see illustration)**. On drum brake models, remove the shims and dust seal.

8 Use a screwdriver or lever to remove the housing oil seal **(see illustration)**.

Axle bearing

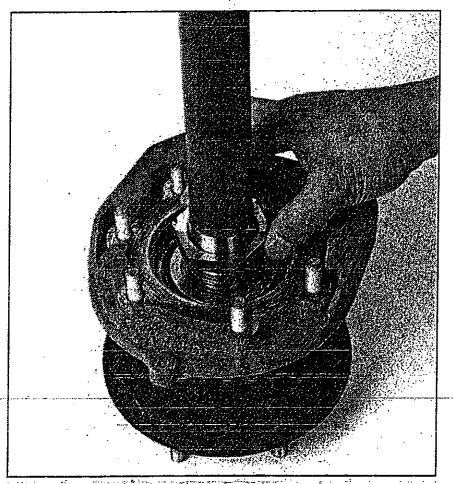
Renewal

9 Flatten the nut washer with a screwdriver and hammer **(see illustration)**.

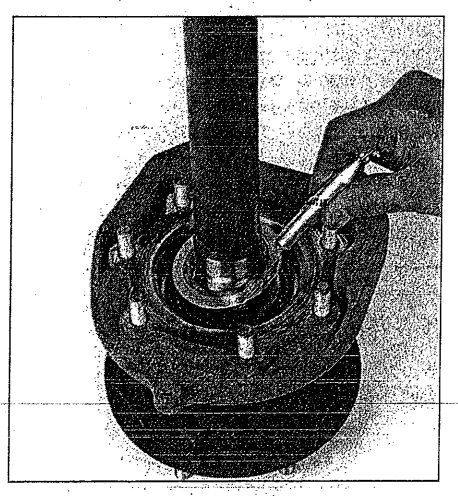
10 Use a hammer and drift to loosen and then remove the bearing nut **(see illustrations)**. It is extremely tight.

11 Remove the lock washer **(see illustration)**.

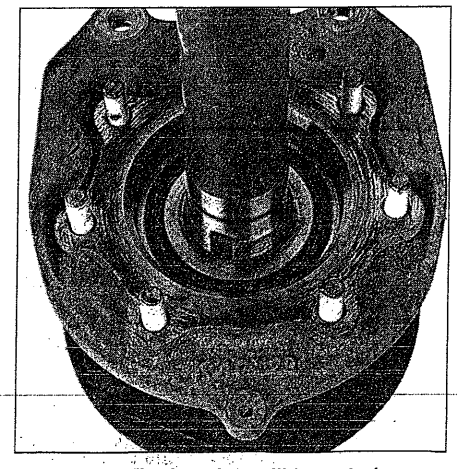
12 Take the axle to a shop equipped with a



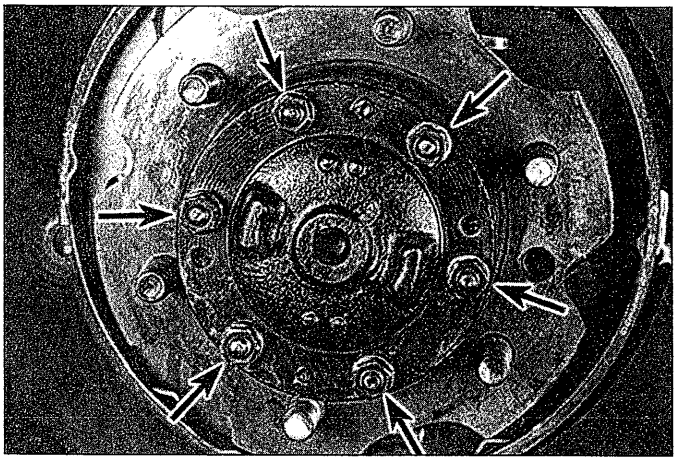
19.10b Remove the nut from the axle . . .



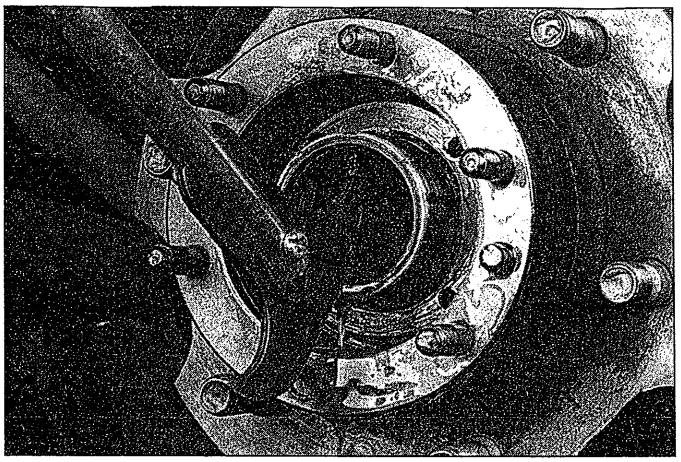
19.11 . . . then remove the lock washer



19.12 The bearing will have to be removed with a hydraulic press



20.3 Remove the axle flange retaining nuts (arrows)



20.4 Use a hook shaped seal puller to prise out the oil seal

hydraulic press and the proper press plates to have the bearing housing pressed off of the axle **(see illustration)**.

13 Drive the bearing(s) and the outer race from the housing and renew the components as necessary. A new race can be driven into place with a hammer and a brass drift.

14 Apply grease to the bearing and race. On all models, renew the seal and refit it after the spacer.

15 Refitting is the reverse of removal. Tighten the fasteners to the torques listed in this Chapter's specifications. Unless special equipment is available, simply tighten the axle bearing nut with a hammer and drift as much as possible, then secure it with a new locking washer. Check the bearing for smooth operation - it must turn easily by hand.

Refitting

Disc brake models

16 Refer to the beginning of this Chapter for the torque specifications, then refit the components in the reverse order of removal. Renew the O-rings.

17 Be very careful to not allow the axle to contact the seal when sliding it into place. Fill the rear axle with the lubricant specified in Chapter 1.

Drum brake models

18 Refit the backing plate for the brake assembly. Connect the brake line.

19 Put a new dust seal onto the bearing housing and refit the axle. Be very careful to not allow the axle to contact the seal when sliding it into place. **Note:** *This is only a temporary refitting to check endplay.*

20 Tighten the axle retaining nuts to the torque listed in this Chapter's Specifications.

21 Remove the opposite axle if it was not already removed. Renew the dust seal and place a stack of shims on it equal to 1.6 mm. (The shims fit between the dust seal and the main axle housing - not outboard of the dust seal). Refit that axle as well and tighten the axle retaining nuts until contact is made or the axle binds. Do not overtighten the nuts.

22 Attach a dial indicator to the axle housing and measure axle endplay.

23 Refit the necessary shim stack on the axle with no shims in order to achieve endplay of 0.02 to 0.15 mm. **Note:** *There must be a relatively equal amount of shims on each axle. There should not be a shim stack difference of more than 1 mm.*

24 After all the shims are refitted, check the axle endplay again to verify all measurements.

25 Refitting of the remaining components is the reverse of removal. On drum brake models, bleed the brakes (refer to Chapter 9).

20 Rear axle and wheel bearing (full-floating) - removal and refitting

Refer to illustrations 20.3 and 20.4

1 Raise the vehicle and support it securely with jackstands.

2 Remove the wheel. Drain the lubricant from the rear axle housing.

3 Remove the outer bolts and remove the axle shaft **(see illustration)**.

4 Remove the oil seal, O-ring and lock washer (with its screw) from the end of the bearing housing **(see illustration)**.

5 Use a special factory tool KV40104600 or its equivalent to loosen and remove the round lock-nut.

6 Remove the wheel bearing and hub assembly. Do not allow the outer bearing to fall.

7 Remove the inner bearing outer race, the grease seal and the outer wheel bearing race.

8 Use a hammer and a brass drift to drive out the other races. New races can be refitted with a large socket or a brass drift and a hammer. Make sure to pack the inside of the bearing housing and the bearings with grease prior to assembly.

9 Renew the grease seal, carefully driving it into the housing with a hammer. It should be marked as to the bearing side.

10 Position the bearing and hub assembly on the axle housing. Screw the round lock-nut into place.

11 Tighten the lock-nut to the torque listed in this Chapter's Specifications using the correct tool or its equivalent. Rotate the hub several times.

12 Loosen the nut completely and then tighten it to 4 Nm.

21 Rear locking differential - general information

1 Some vehicles are equipped with a locking differential. This type of mechanism is different from a conventional differential and a limited slip differential in that both rear wheels are solidly locked when the unit is energised.

2 A switch in the vehicle operates two vacuum solenoids which direct engine vacuum to the operator on the rear axle housing. This device moves a shift fork inside the differential to lock the rear wheels. **Note:** *Operate the differential lock switch only when the vehicle is stopped.*

3 Internal repair of the differential should be left to a well-equipped shop. However, if the unit is not functioning, check the external components of the system as follows.

4 Inspect all vacuum lines from the engine compartment to the rear axle for damage. Check the vacuum solenoids for obvious leaks. Starting at the engine compartment and with the engine idling, disconnect vacuum connections until a point of zero vacuum is located. The leak will be on the upstream side of this point.

5 Check the operating unit on the rear axle housing for signs of vacuum leaks or other damage. The unit can be removed from the axle housing and renewed or rebuilt if necessary.

Notes