

CHAPTER EIGHT

CLUTCH

The RX-2 and RX-3 use a single-dry-plate clutch with diaphragm spring. Major components are the pressure plate, disc, release mechanism, and hydraulic linkage.

Engagement and disengagement are controlled by a release mechanism consisting of bearing and release fork. The release mechanism is in turn controlled by the hydraulic linkage, which transmits pedal pressure through the clutch master cylinder, hydraulic line, and release (slave) cylinder. On 1973 models, the release cylinder was moved from the left side of the clutch housing to the top. However, service procedures remain basically the same.

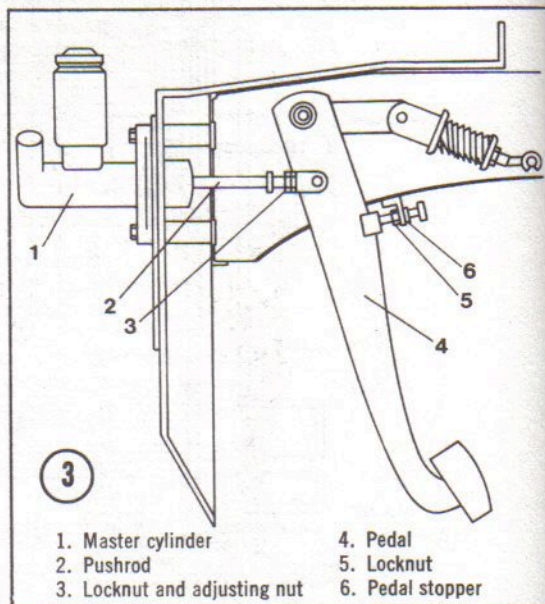
Figure 1 shows the 1971-72 clutch and housing; **Figure 2** shows the 1973-74 version.

This chapter includes service procedures for the clutch pedal, hydraulic linkage, release mechanism, pressure plate, and disc. See **Table 1** at the end of the chapter for specifications.

ADJUSTMENTS

Pedal Adjustment

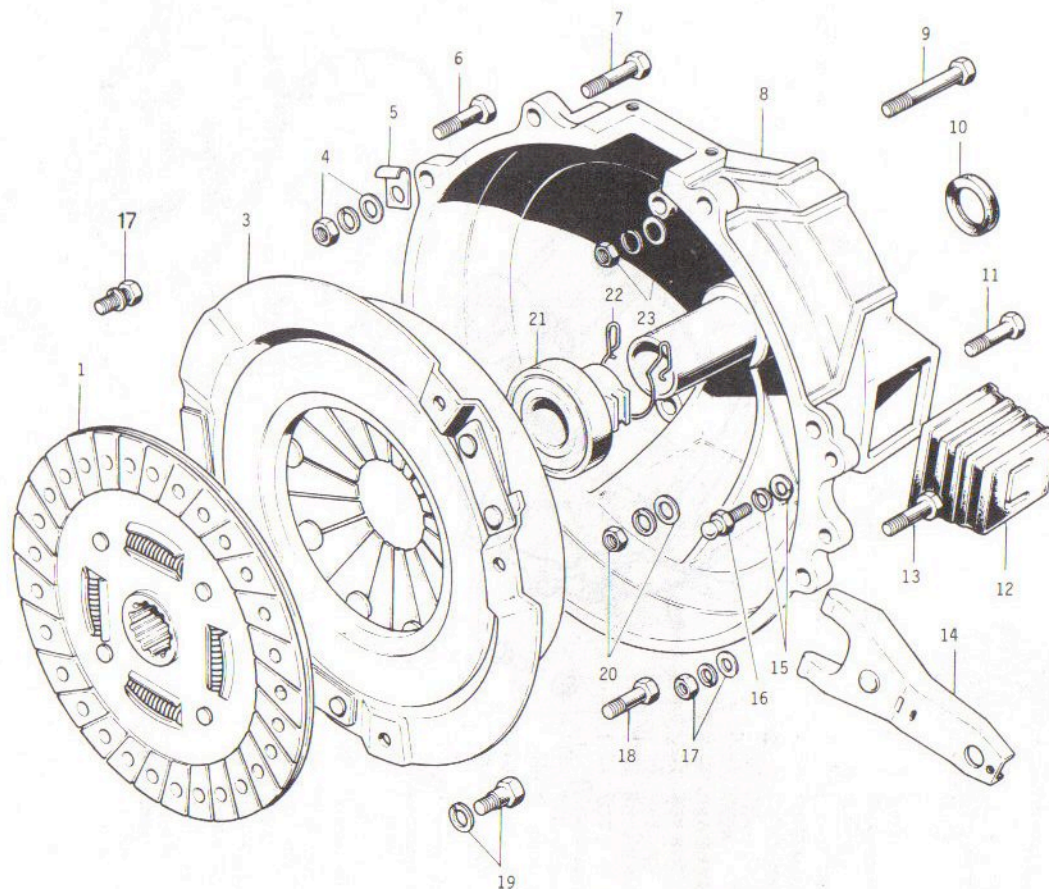
Pedal adjustment consists of setting pedal free-play at 0.8-1.2 in. (20-30mm). To adjust, loosen the locknut (3, **Figure 3**) and rotate the master cylinder pushrod as needed. Then tighten the locknut.



Release Fork Adjustment

Correct release fork adjustment is essential, since it directly affects free travel between the release bearing and diaphragm spring fingers. Insufficient free travel will cause the clutch to slip, while excessive free travel will prevent full disengagement of the clutch.

1. Remove release cylinder return spring (35, **Figure 4**).

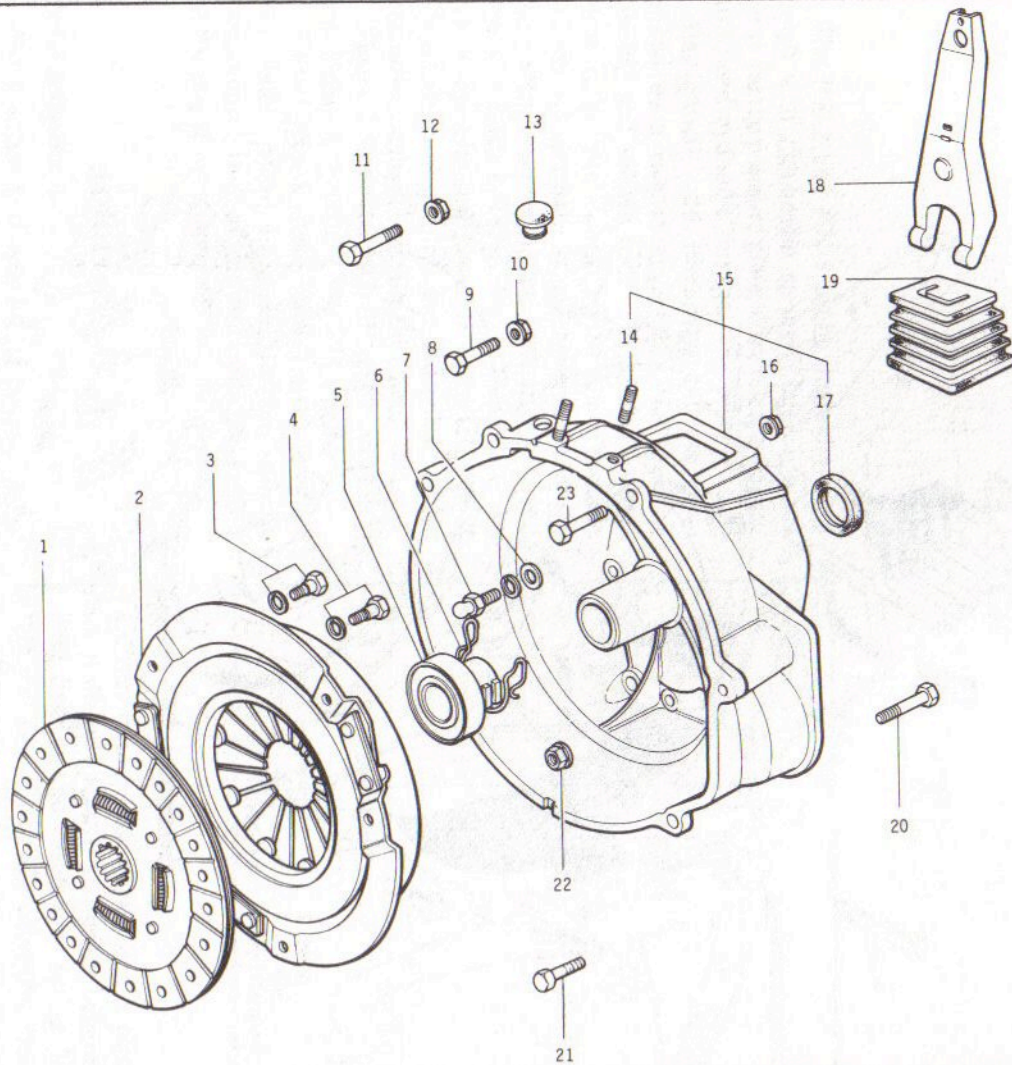


1971-1972 CLUTCH

1. Clutch disc
2. Bolt and washer
3. Pressure plate
4. Nut and washers
5. Clip
6. Bolt
7. Bolt
8. Clutch housing
9. Bolt
10. Oil seal
11. Bolt
12. Dust cover
13. Bolt
14. Release lever
15. Washers
16. Release lever pivot
17. Nut and washers
18. Bolt
19. Bolt and washer
20. Nut and washers
21. Release bearing
22. Release bearing clip
23. Nut and washers

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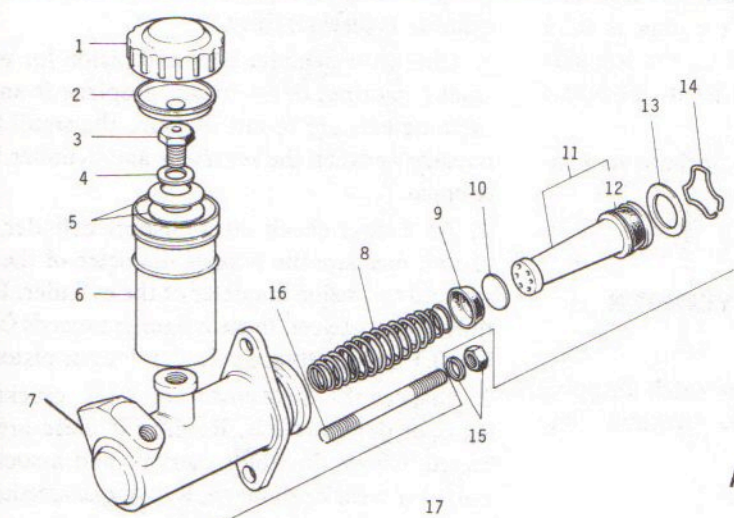
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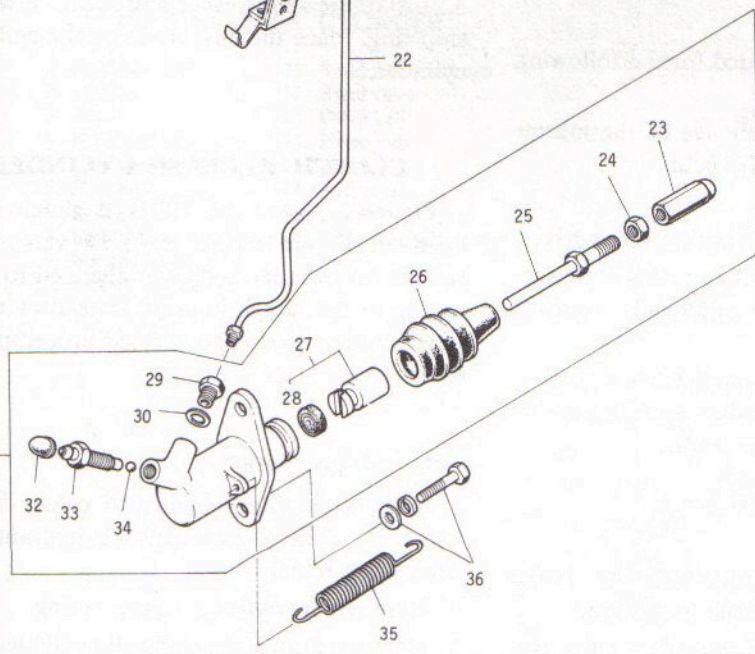
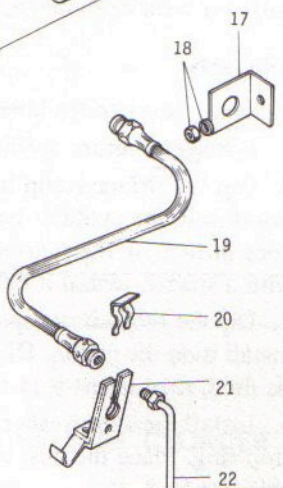
1973-1974 CLUTCH

1. Clutch disc
2. Pressure plate
3. Bolt and washer
4. Bolt and washer
5. Release bearing
6. Release bearing clip
7. Release lever pivot
8. Washer
9. Bolt
10. Nut
11. Bolt
12. Nut
13. Plug
14. Stud
15. Clutch housing
16. Nut
17. Oil seal
18. Release lever
19. Dust cover
20. Bolt
21. Bolt
22. Nut
23. Bolt

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CLUTCH MASTER AND RELEASE CYLINDERS



1. Reservoir cap
2. Baffle
3. Plug
4. Washer
5. Cone spring
6. Reservoir
7. Cylinder body
8. Piston spring
9. Primary piston cup
10. Spacer
11. Piston
12. Secondary piston cup
13. Stop washer
14. Stop ring
15. Nut and washer
16. Stud
17. Hose bracket
18. Nut and washer
19. Flexible hose
20. Hose clip
21. Tube bracket
22. Tube
23. Pushrod adjusting nut
24. Locknut
25. Pushrod
26. Dust cover
27. Release cylinder piston
28. Piston cup
29. Fluid tube fitting
30. Gasket
31. Release cylinder
32. Bleed valve dust cap
33. Bleed valve
34. Check ball
35. Spring
36. Bolt and washers

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2. Loosen the locknut (24). Turn the adjusting nut (23) as needed. Correct free-play is 0.12 in. (3mm) if the release fork is on the left side of the clutch housing; 0.16-0.20 in. (4-5mm) if it is on top.
3. After adjusting, tighten the locknut and install the return spring.

CLUTCH MASTER CYLINDER

Removal/Installation

1. With a container handy to catch dripping hydraulic fluid, disconnect the hydraulic line from the master cylinder.

CAUTION

Hydraulic fluid will damage paint. Wipe up any spilled fluid immediately, then wash the area of the spill with soap and water.

2. Remove both master cylinder installation nuts. Pull the master cylinder straight forward until it is clear, then lift it out.
3. Install by reversing Steps 1 and 2. Adjust pedal free-play. Bleed the air out of the hydraulic system as described later in this chapter.

Disassembly

Refer to Figure 4 as needed for the following procedures.

1. Thoroughly clean the outside of the master cylinder. Drain the hydraulic fluid.
2. Remove the dust boot.
3. Remove piston stop ring with a screwdriver.
4. Take out the stop washer, piston and secondary cup, spacer (if so equipped), primary cup, and return spring.
5. Separate the reservoir from the cylinder body. Remove the baffle, plug, washer, and cone spring (if so equipped) from the reservoir.

Inspection and Repair

1. Thoroughly clean all parts in alcohol or brake fluid. Do *not* clean in kerosene or gasoline.
2. Inspect the primary and secondary cups. Replace if swollen, worn, softened, or damaged. It

is a good idea to replace the cups whenever the cylinder is disassembled.

3. Check the cylinder bore and piston for wear, cracks, scoring, or corrosion. Replace if any of these defects are found. Be sure the small fluid passage between the reservoir and cylinder bore is open.
4. As a final check on a suspect cylinder and piston, measure the outside diameter of the piston and the inside diameter of the cylinder. If the difference between these 2 figures exceeds 0.006 in. (0.15mm), replace cylinder and/or piston.
5. Inspect the dust cover for wear, cracks, or signs of deterioration. Replace if these are detected. Check the fluid reservoir and associated parts for wear or damage. Replace as needed.

Assembly

1. Coat the cylinder bore with hydraulic fluid.
2. Install the return spring.
3. Dip the primary cup in hydraulic fluid, then install it in the cylinder bore. The lip of the cup goes in first. If the master cylinder is equipped with a spacer, install it behind the cup.
4. Dip the secondary cup in hydraulic fluid, then install it on the piston. Dip the piston in hydraulic fluid, then insert it in the cylinder bore.
5. Install the stop washer and secure it with the stop ring. Place the dust cover on the end of the cylinder.

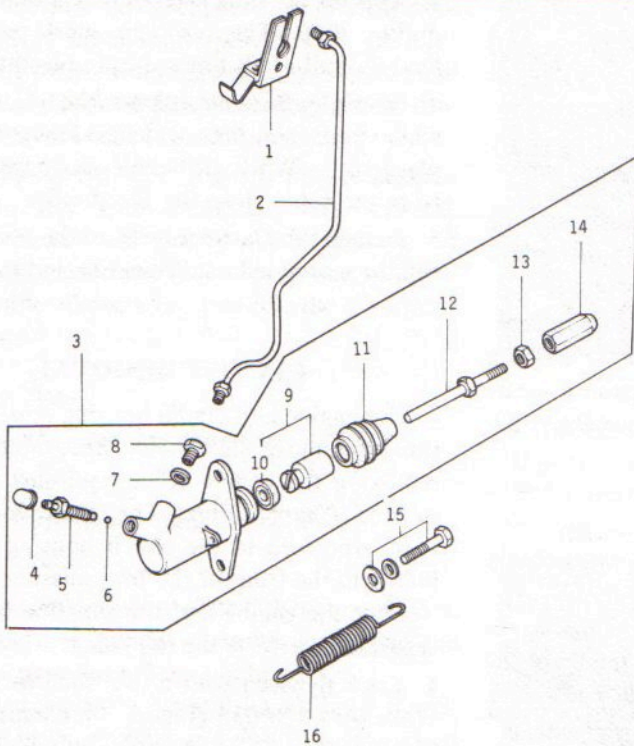
CLUTCH RELEASE CYLINDER

Figure 5 shows the 1971-72 clutch release cylinder, **Figure 6** the 1973-74 version. Although the cylinder body was changed to mount on top of the clutch housing instead of the left side, internal parts and service procedures are the same for both.

Removal/Installation

1. With a container handy to catch dripping hydraulic fluid, disconnect the hydraulic line from the cylinder.
2. Remove the cylinder return spring.
3. Remove 2 nuts attaching the cylinder to the clutch housing, then lift the cylinder off.

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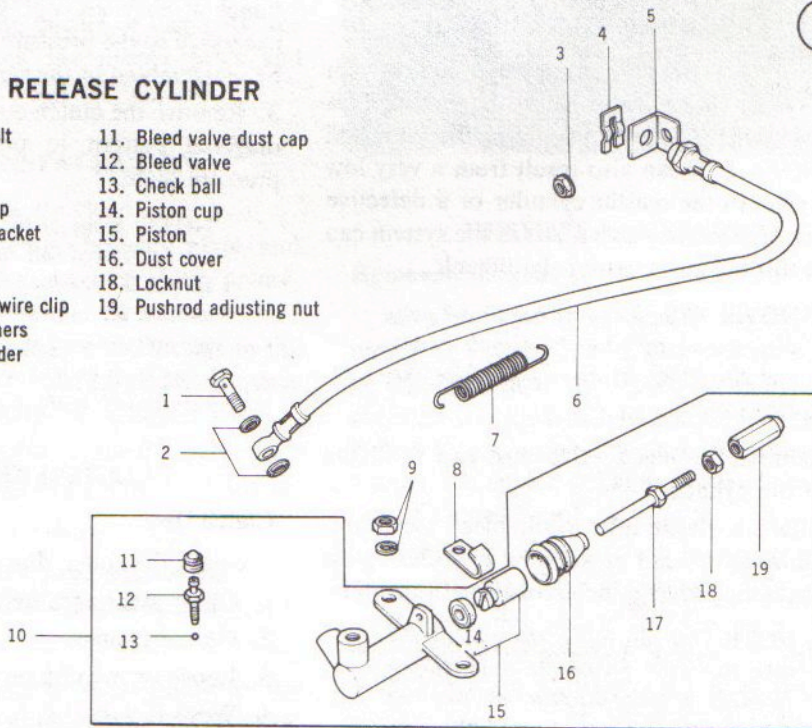
**1971-1972
RELEASE CYLINDER**

- 1. Tube bracket
- 2. Fluid tube
- 3. Release cylinder
- 4. Bleed valve dust cap
- 5. Bleed valve
- 6. Check ball
- 7. Gasket
- 8. Fluid tube fitting
- 9. Piston
- 10. Piston cup
- 11. Dust cover
- 12. Pushrod
- 13. Locknut
- 14. Pushrod adjusting nut
- 15. Bolt and washers
- 16. Spring

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1973 RELEASE CYLINDER

- 1. Fluid hose bolt
- 2. Gaskets
- 3. Nut
- 4. Fluid hose clip
- 5. Fluid hose bracket
- 6. Fluid hose
- 7. Spring
- 8. Backup light wire clip
- 9. Nut and washers
- 10. Release cylinder
- 11. Bleed valve dust cap
- 12. Bleed valve
- 13. Check ball
- 14. Piston cup
- 15. Piston
- 16. Dust cover
- 17. Locknut
- 18. Pushrod adjusting nut



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Disassembly and Inspection

1. Remove the pushrod, dust cover, piston, and cup from the cylinder bore. Unscrew the bleed valve and dump out the steel valve ball.
2. Thoroughly clean all parts in alcohol or brake fluid. Do not clean in kerosene or gasoline.
3. Check the piston cup. Replace if wear or damage is evident. It is a good idea to replace the cup whenever the cylinder is disassembled.
4. Check the piston and cylinder for wear, scoring, or corrosion. Replace if these defects are evident. Replace the cylinder or piston if clearance between bore and piston exceeds 0.006 inch (0.15mm).

Assembly

Assembly is the reverse of the disassembly procedure, plus the following.

1. Dip the piston cup in brake fluid before installing it on the piston. Make sure the lip of the cup faces into the cylinder bore when installed.
2. Coat the cylinder bore and piston with hydraulic fluid before installing the piston.

BLEEDING THE CLUTCH

Bleeding air out of the clutch hydraulic system is necessary whenever air enters the system. This occurs whenever a hydraulic line is disconnected at either end. It can also result from a very low fluid level in the master cylinder or a defective master or release cylinder. Air in the system can make shifting gears extremely difficult.

NOTE: This procedure requires 2 people, one to operate the clutch pedal, and the other to open and close the bleed valve.

1. Remove the bleed valve dust cap from the operating cylinder.
2. Attach a plastic tube to the bleed valve. Immerse the other end of the tube in a clear glass jar containing several inches of clean brake fluid.

NOTE: Do not allow the end of the tube to come out of the fluid during bleeding. If this happens, air may be sucked into the system, and the procedure will have to be repeated.

3. Top up the clutch master cylinder with hydraulic fluid. The reservoir must be kept at least $\frac{3}{4}$ full at all times during bleeding.
4. Slowly press and release the clutch pedal while your assistant watches the end of the plastic tube. When air bubbles no longer emerge from the tube, close the bleed valve.
5. Detach the plastic tube from the bleed valve. Fill the master cylinder reservoir and install cap.

CLUTCH REMOVAL

The engine and clutch housing must be separated to remove the clutch. This can be done by removing the engine (Chapter Four) or transmission (Chapter Nine). The release mechanism is incorporated in the clutch housing which is bolted to the front of the transmission.

Once the engine and transmission have been separated, perform the following.

1. Lock flywheel with a tool such as ring gear brake 49 0820 035 (Figure 18, Chapter Four). The tool can be made from $\frac{3}{8}$ inch thick steel.
2. Look for match marks on the flywheel and clutch cover. Make your own mark with a sharp punch if they are not visible. The marks are necessary so the pressure plate and flywheel can be reassembled in the same positions later.
3. Remove the clutch cover bolts gradually in a diagonal pattern to prevent warping of the pressure plate.

NOTE: Four of the clutch cover bolts are threaded all the way up their shafts; 2 are threaded partway. There should be punch marks next to the partially-threaded bolts. If not, make your own marks so the bolts can be reinstalled in the correct holes.

CLUTCH INSPECTION

Clutch Disc

Check the clutch disc for the following.

1. Oil or grease on the facings.
2. Glazed facings.
3. Loose or missing rivets.
4. Worn facings.
5. Broken springs.

6. A worn hub. To check, slide the disc over the transmission input shaft splines. Turn the disc back and forth, watching for play between the disc hub and input shaft splines. Replace the disc if play exceeds 0.012 in. (0.3mm).

Small amounts of oil or grease may be cleaned from the disc with trichlorethylene, and the facings dressed with a wire brush. However, if the facings are soaked with oil or grease, or if any of the other defects are present, the disc must be replaced.

Pressure Plate

Check the pressure plate for:

1. Scoring
2. Burn marks (blue-tinted areas)
3. Cracks

Replace the pressure plate if these are evident. Minor defects may be removed by having the pressure plate turned on a lathe.

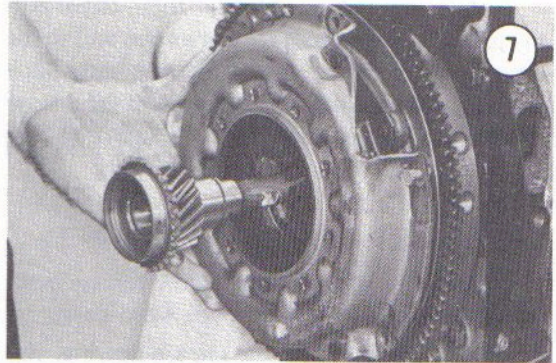
If the clutch trouble still hasn't been found, take the pressure plate and disc to a competent garage and have the disc checked for facing run-out, and the pressure plate checked for proper diaphragm spring height and warping. Do not attempt to readjust the fingers or dismantle the pressure plate without the proper tools and experience.

CLUTCH INSTALLATION

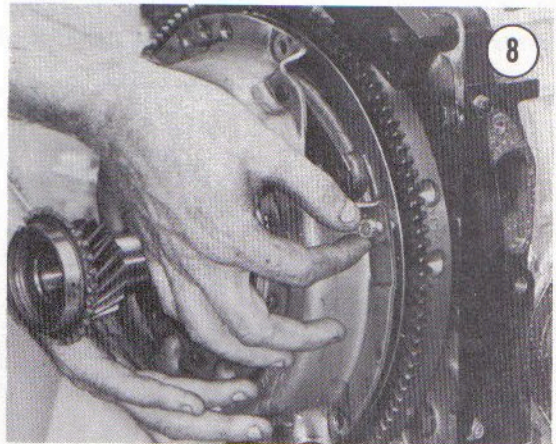
1. Be sure your hands are clean.
2. Inspect the disc facings, pressure plate, and flywheel to be sure they are free of oil, grease, or other foreign material.
3. Inspect the pilot bearing and oil seals in the rear end of the engine eccentric shaft. Replace them if damaged or worn. See Chapter Four.
4. Position the clutch disc on the flywheel. Hold it in place with an aligning bar such as Mazda tool 49 0813 310.

NOTE: *If the tool is not available, use an input shaft from a junk transmission (Figure 7).*

5. Position the pressure plate assembly on the flywheel. Line up the clutch cover and flywheel alignment marks.



6. Install the clutch cover bolts (Figure 8). Tighten gradually in a diagonal pattern to prevent warping the pressure plate. Once the bolts are tight, torque to 13-20 ft.-lb. (1.8-2.7 mkg).



RELEASE MECHANISM

Removal/Installation

As with the clutch, release mechanism removal requires that the engine and transmission be separated first. The release mechanism is incorporated in the clutch housing, which is in turn bolted to the front of the transmission. Either remove the engine (Chapter Four) or transmission (Chapter Nine).

1. Referring to Figure 1 or 2, remove the dust cover from the clutch housing.
2. Remove the release bearing return spring, then remove the release bearing.
3. Pull the release fork away from the clutch housing until its retaining spring separates from the pivot pin. Lift the release fork out.

4. Installation is the reverse of these steps. Apply grease to the release fork pivot pin and to the contact points of the release bearing and clutch housing. After installation, make sure the release mechanism moves smoothly back and forth.

Inspection

Check release mechanism for the following.

1. Wear at the contact point of the release bearing and clutch housing. Replace worn parts.
2. Grease leaking from the release bearing. Replace the bearing if this is evident.

NOTE: Do not clean the release bearing in solvent, since it is pre-lubricated at the factory. Clean with a lint-free cloth.

3. A worn release bearing. To check, hold the inner race with fingers and rotate the outer race

while applying light pressure to it. Replace the bearing if it feels rough or makes noise.

4. Bends or cracks in the release fork. Replace the fork if these are found.

Table 1 CLUTCH SPECIFICATIONS

Type	Single dry plate, diaphragm spring
Pressure plate	
Diameter, outside	8.543 in. (217mm)
Lateral runout, maximum	0.002 in. (0.05mm)
Clutch disc	
Facing diameter	8.465 in (217mm)
Thickness (single facing)	0.138 in. (3.5mm)
Lateral runout, maximum	0.039 in (1.0mm)
Master cylinder bore	5/8 in. (15.87mm)
Release cylinder bore	11/16 in. (17.46mm)