# SERVICE MANUAL

Datsun

MODEL 510 SERIES

CHASSIS and BODY

# SECTION CL

# CLUTCH

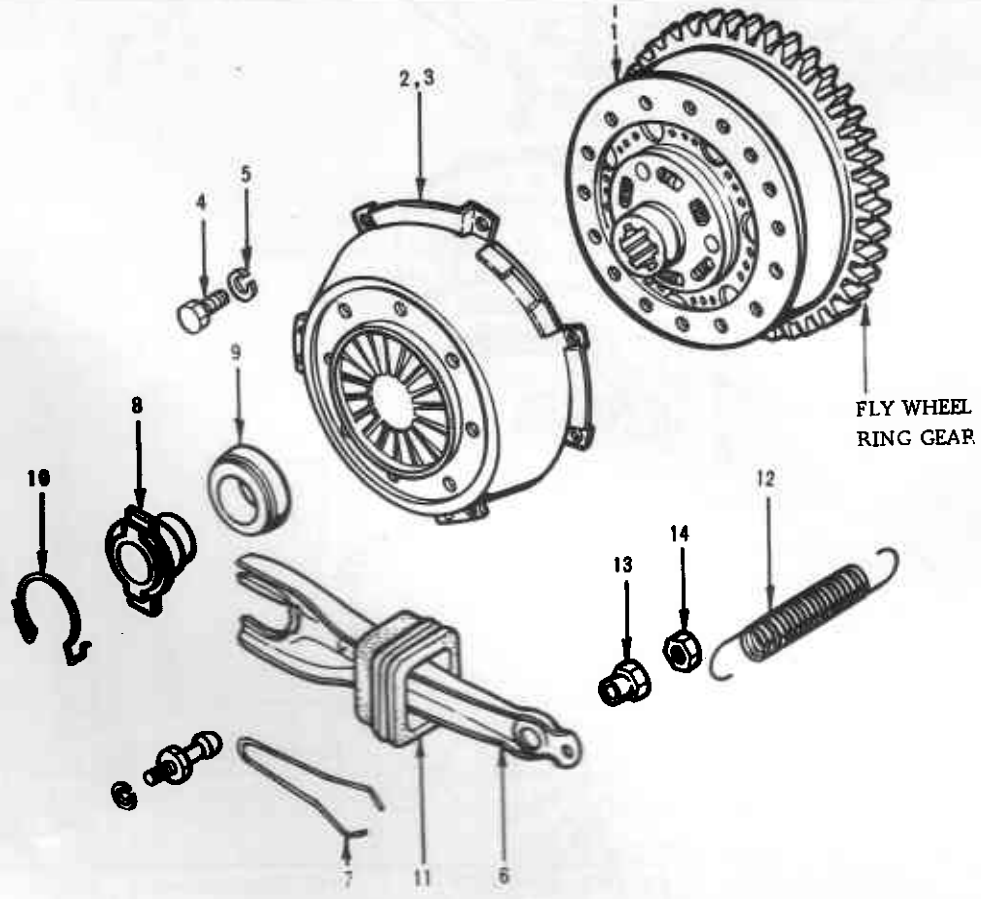
CL



# CLUTCH

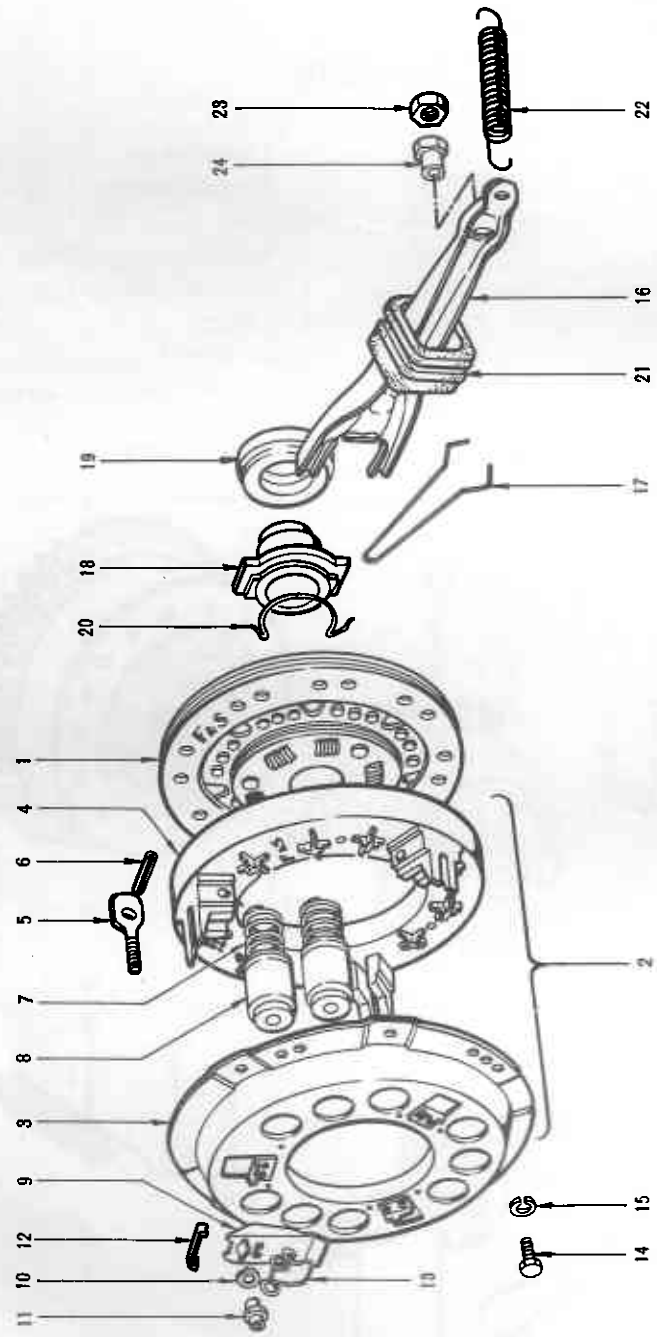
## CONTENTS






| | | | |
|---|---|---|---|
| 1 | Clutch disc | 8 | Bearing sleeve |
| 2 | } Clutch cover assembly with plate | 9 | Clutch release bearing |
| 3 | | 10 | Bearing sleeve holder spring |
| 4 | Bolt | 11 | Dust cover |
| 5 | Lock washer | 12 | Return spring |
| 6 | Clutch withdrawal lever | 13 | Withdrawal lever push |
| 7 | Retainer spring | 14 | Lock nut |

*Fig. CL-1 Clutch (Diaphragm spring type)*




| | | | | | |
|---|---|---|---|---|---|
| 1 | Clutch disc | 9 | Release lever | 17 | Retainer spring |
| 2 | Clutch assembly | 10 | Release lever seat | 18 | Bearing sleeve |
| 3 | Clutch cover | 11 | Lock nut | 19 | Clutch release bearing |
| 4 | Pressure plate | 12 | Release lever support | 20 | Bearing sleeve holder spring |
| 5 | Pressure plate bolt | 13 | Retaining spring | 21 | Dust cover |
| 6 | Eye bolt pin | 14 | Bolt | 22 | Return spring |
| 7 | Pressure spring | 15 | Lock washer | 23 | Lock nut |
| 8 | Pressure spring retainer | 16 | Clutch withdrawal lever | 24 | Withdrawal lever push nut |

*Fig. CL-2 Clutch (Coil spring type)*

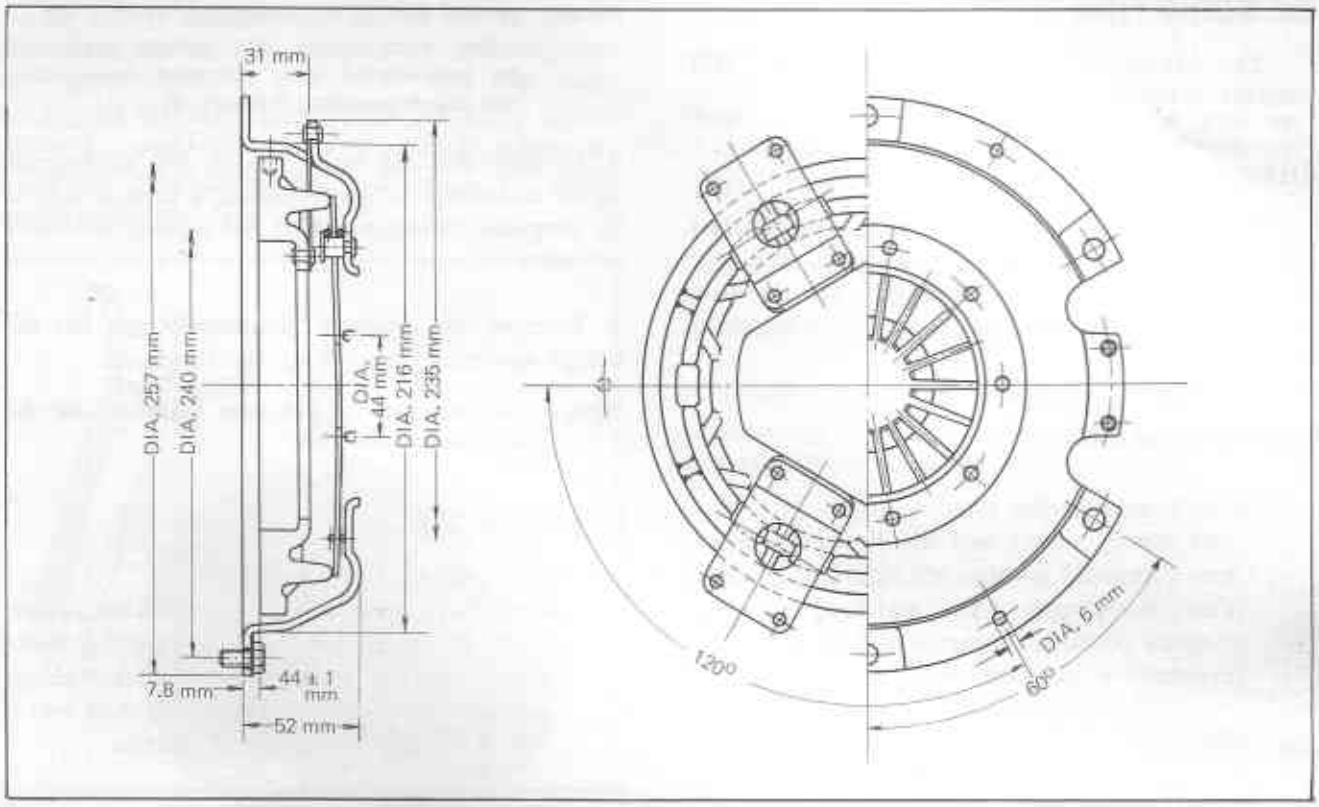



*Fig. CL-3 Clutch cover assembly (Diaphragm spring type)*

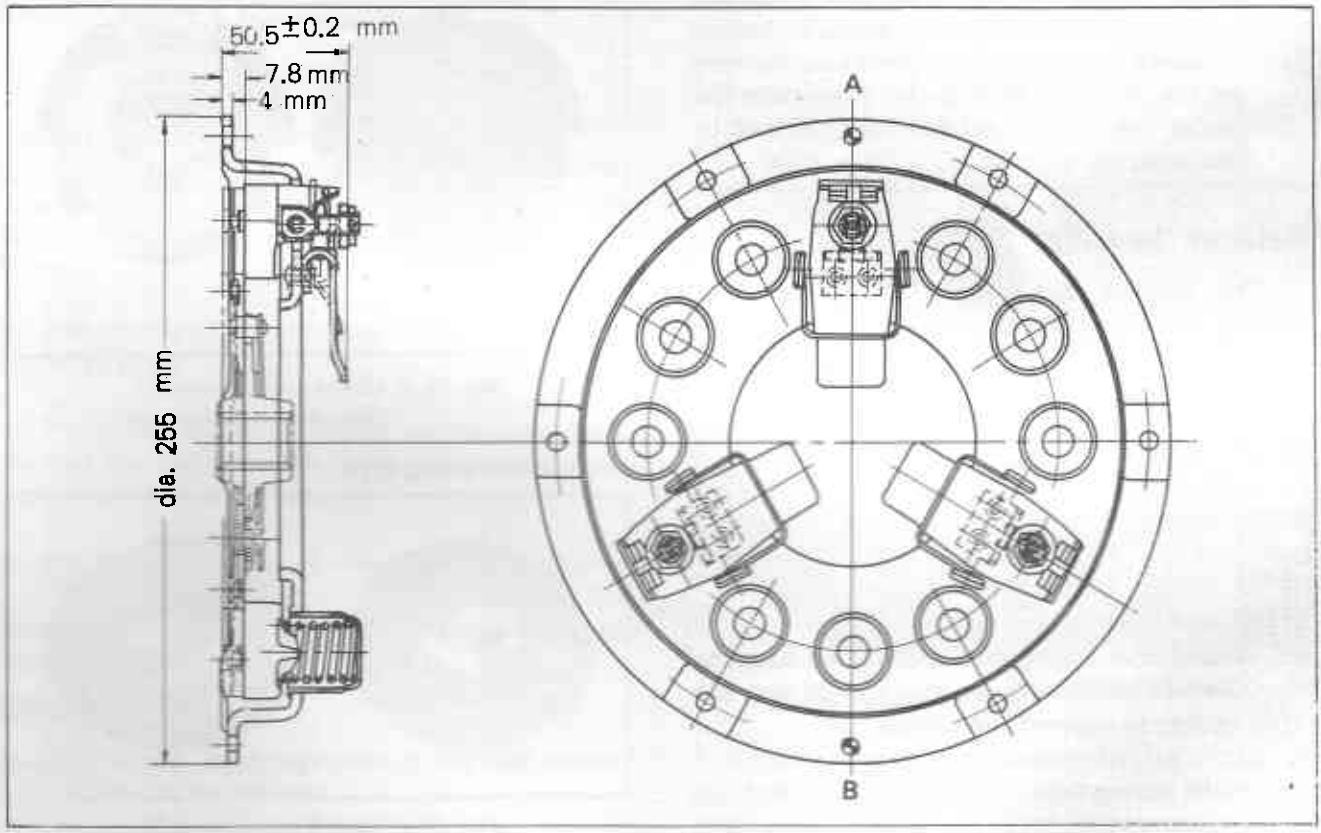



*Fig. CL-4 Clutch cover assembly (Coil spring type)*

## DESCRIPTION

The clutch is a single dry plate type, and consist of the following main parts.

### Disc assembly

This is the flexible type in which the splined hub is indirectly attached to a disc, and the power is transmitted through six torsion springs. Two friction linings are riveted to the disc.

### Cover assembly

(a) Diaphragm spring type
The clutch cover and the pressure plate are combined by nine spring setting bolts. The diaphragm has eighteen tapering fingers pointing inwards and is dished to maintain a constant pressure on the pressure plate, which in turn holds the driven plate in contact with the flywheel face.

(b) Coil spring type
The clutch cover and the pressure plate are combined by nine pressure springs with its retainer. Three release levers retained by eye-bolts and pins are screwed on the pressure plate by the eye-bolt nuts. Outer edge of the release lever is hold by the seat and stopper.

### Release bearing

The release bearing is sealed type ball bearing and fitted on the bearing sleeve. They are operated by the withdrawal lever.

## REMOVAL

1. Remove the transmission assembly from the engine.

2. (a) Diaphragm spring type
Fully insert a special tool Clutch Aligning Bar (ST49090000) on the clutch disc hub spring to support the clutch.

(b) Coil spring type
Temporarily lock the release lever with the release lever stopper.

**Note: If the release lever stopper is not placed under each levers, the release lever will be over-loaded with excessive force when the clutch assembly is removed.**

3. Loosen the six bolts which are holding the cover assembly to the flywheel, a turn at a time by diagonal selection until the spring pressure is relieved.

4. Remove the screws completely and lift the clutch assembly away from the flywheel.

**Note: Be sure not to soil with grease or oil the surface of the disc.**

## DISASSEMBLY

(a) Diaphragm spring type
The diaphragm spring type clutch is assembled with nine spring setting bolts after correct balance being maintained, replace the cover assembly by new one if out of specification is confirmed.

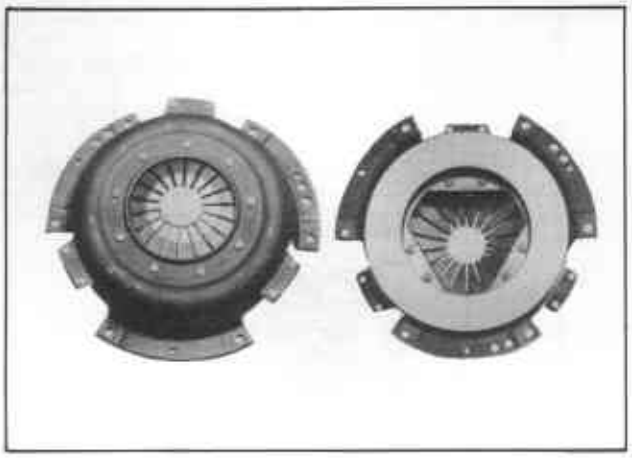


*Fig. CL-5 Clutch cover assembly (Diaphragm spring type)*

(b) Coil spring type

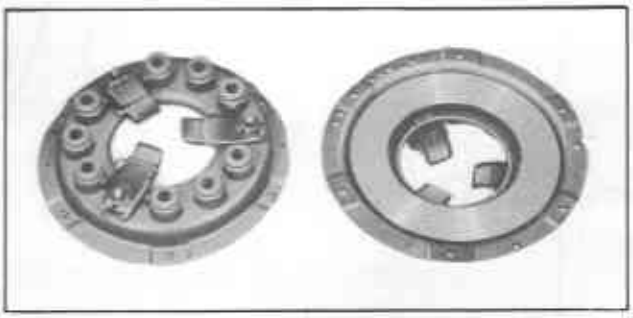


*Fig. CL-6 Clutch cover assembly (Coil spring type)*

By using a special tool the clutch can be quickly disassembled, assembled and adjusted to a high degree of accuracy. The tool comprises the following parts; base plate ①, center pillar ②, distance pieces ③, height gauge ④, actuating mechanism ⑤, set bolts ⑥, speed brace and metal box.

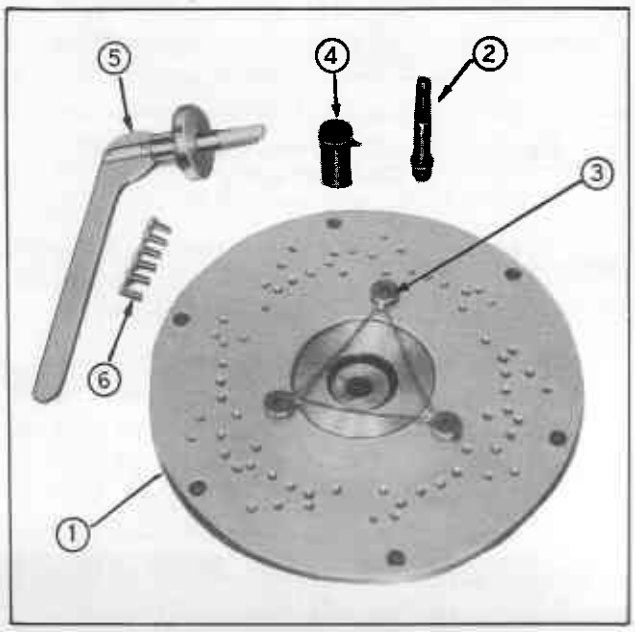



*Fig. CL-7 Clutch assembly tool*

As this tool is universal, a chart indicating the particular parts to be used for particular types of clutch will be found on the inside of the lid of the box. (Tool No. ST47990000)

1. Put the distance pieces on the Model Mark of the base plate.

2. Place the clutch assembly on the base plate so that the holes in the cover coincide with the tapped holes in the plate.

3. Insert the set bolts provided and tighten them a little at a time, by diagonal selection until the cover is firmly attached to the base plate at all possible points.

**Note: This is most important if the best results are to be achieved.**

4. Mark the cover, pressure plate lugs and release levers with a center punch.

**Note: The parts can be assembled in their relative position in order to maintain the balance of the clutch.**

5. Remove the release lever stopper.

6. Remove the three eye-bolt nuts.

7. Slowly release the pressure on the springs unscrewing by diagonal selection the set bolts, securing the cover to the base plate.

## INSPECTION

### Cleaning parts

Clean all the parts except the release bearing and clutch disc.

### Checking clutch disc assembly

1. Check the disc deflection and replace or repair, if the deflection at the outer circumference of the facing is more than 0.5 mm (0.0197 in.) at radius 95 mm (3.740 in.).

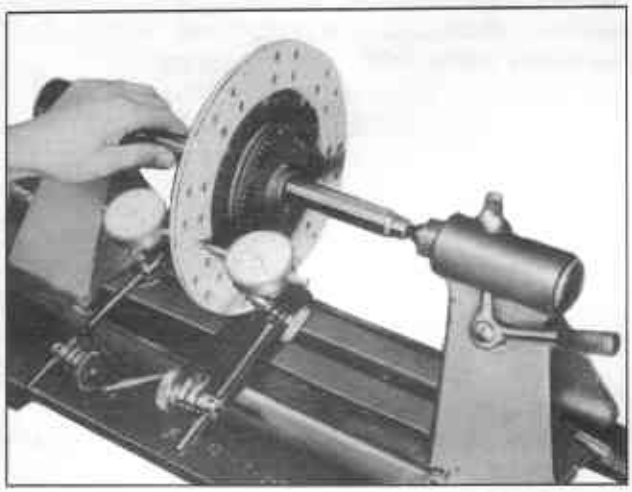


*Fig. CL-8 Checking disc deflection*

2. Replace the disc assembly or the facing if the facing is worn to the extent at which the

facing height above rivet is less than 0.3 mm (0.0118 in.) or there is abnormal wear or loss rivet.

3. Check the disc hub to drive shaft spline lash in rotational direction if exceeding 0.4 mm (0.0157 in.), replace the hub.

4. If the facing is soiled with grease or oil, clean with gasoline tetrachroide and dress with a wire brush provided soiling is superficial, otherwise replace the facing.

## Pressure plate

Inspect the pressure plate for coil spring type only as follows:

1. Check that the pressure plate is not damaged and the friction face with the driven plate perfectly flat and smooth, because otherwise the clutch will be noisy. If dents or nicks are not sever, remedy by lapping with a surface grinder.

Take care to remove as little stock as possible. Also examine the flywheel friction face for rough sports.

2. Place the pressure plate on a surface plate, with the friction face toward down, and press it at one portion and measure the twist by inserting filler gauge of 0.1 mm (0.0039 in.) thickness in between the pressure plate and the surface plate. If the gauge can be inserted, repair or replace the pressure plate.

## Clutch spring

(a) Diaphragm spring

With the diaphragm spring assembled to the pressure plate, inspect the design height and load of the spring by using the special tool.

1 Put the distance pieces (7.8 mm (0.307 in.) thick) on the base plate (flat surface) and then tightening the clutch cover assembly on the base plate by using the set bolts.

2 Measure the height "B" on the diameter 44 mm (1.732 in.) at several points. If the height "B" of the tapering fingers is beyond the standard height 43 to 45 mm (1.693 to 1.772 in.), replace by new one.

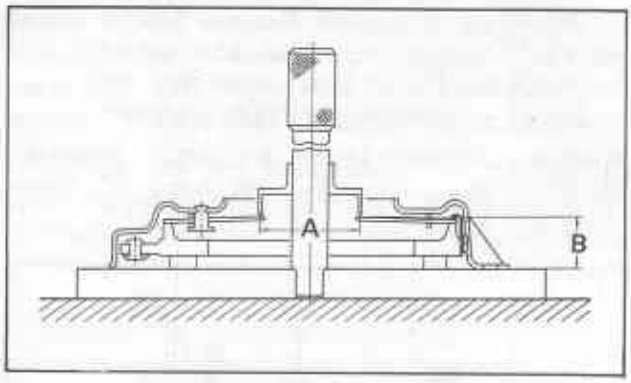



*Fig. CL-9 Checking design height of fingers of diaphragm spring*

3 Place a disc plate to prevent the pressure plate assembly from damage when the load is applied as mentioned below.

4 Press the clutch disc down by 7.8 mm (0.307 in.): Otherwise until the upper surface of the clutch disc lines up with the installing face to the flywheel of the clutch cover, and measure the load applied. If the load is less than 350 kg (770 lbs), replace the diaphragm spring with new one.

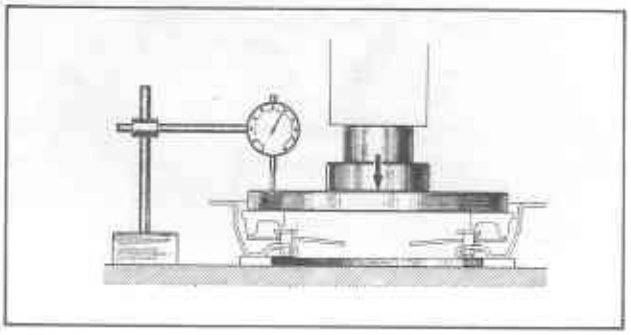


*Fig. CL-10 Checking design load of diaphragm spring*

**Note: Take care not to press the clutch disc down by over 9 mm (0.35 in.), otherwise the diaphragm spring will be broken.**

(b) Coil spring type

Checking for the yield deformation or defect of the clutch springs: The spring is defective, if at assembled condition the load is reduced more than 15%; if the free length has changed more than 1.5 mm (0.0590 in.) or the deflection (B to A in Fig. CL-11) is more than 5 mm to 100 mm (0.1968 to 3.937 in.).

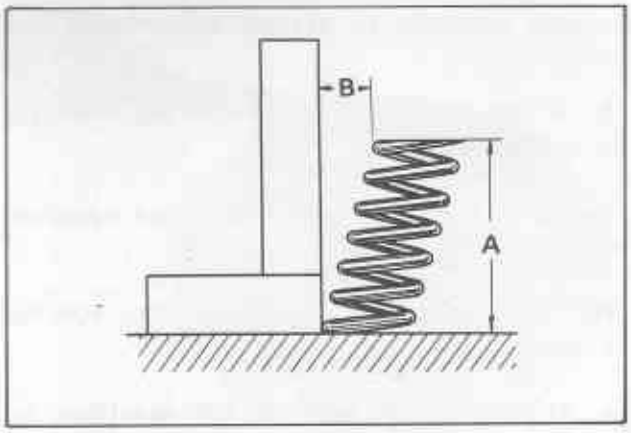



*Fig. CL-11 Inspection clutch spring*

If the clutch springs are found to be weak beyond limits, replace them in set.

## Release bearing

1. Replace if there is rough spot or wear on the release lever control surface or if the inside wear causes too much play.

2. If it is judged that the remaining grease is not enough because of the leakage, replace the bearing.

If the clearance between the transmission front cover and the inside diameter of the sleeve is more than 0.5 mm (0.0197 in.) or there is step wear at the contacting surface with the withdrawal lever, replace or repair.

Replace if there is excessive wear or deformation.

# REPAIR

## Refacing pressure plate

The pressure plate can be refaced if the surface is rough or has uneven wear. In this case, the tension of clutch springs working on the pressure plate will be weakened.

The refacing limits is 1.0 mm (0.0394 in.) from specified standard dimension.

If it needs to be cut more than 1.0 mm (0.0394 in.) the unit must be replaced. After refacing the out of flatness should be less than 0.1 mm (0.0039 in.).

**Note:** **In case of the diaphragm spring type, the pressure plate should not reface at any times.**

## Replacing release bearing

1. Removing the bearing

Remove the bearing by using universal puller.

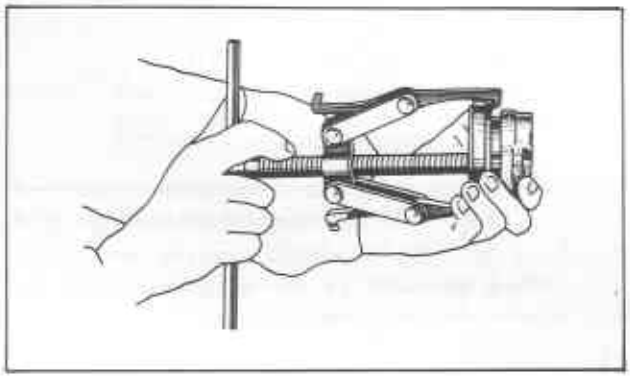


*Fig. CL-12 Removing release bearing*

2. Pressing the bearing in

There are two types of the release bearing. Specification of both bearings is quite same, but particular attention is required because of different construction when installing the bearing into the bearing sleeve as follows.

(a) Diaphragm spring type

**Using a special tool Release Bearing Fitting press-fit the bearing in place on the bearing sleeve, with the force of 400 kg (880 lbs) applied at the outer race as shown in Fig. CL-13.**

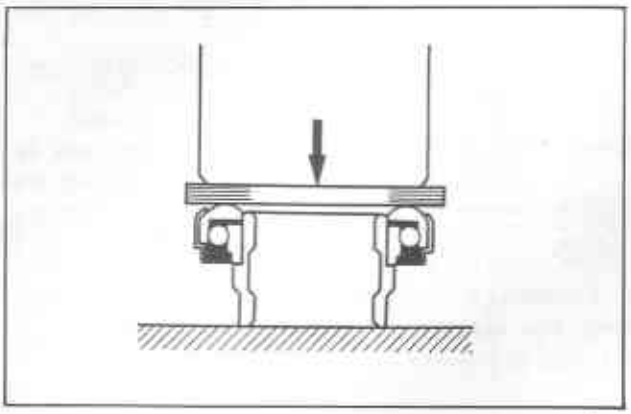


*Fig. CL-13 Installing release bearing*

(b) Coil spring type

With a force of 400 kg (880 lbs) applied at the inner race, press-fit the bearing on to the bearing sleeve as shown in Fig. CL-14.

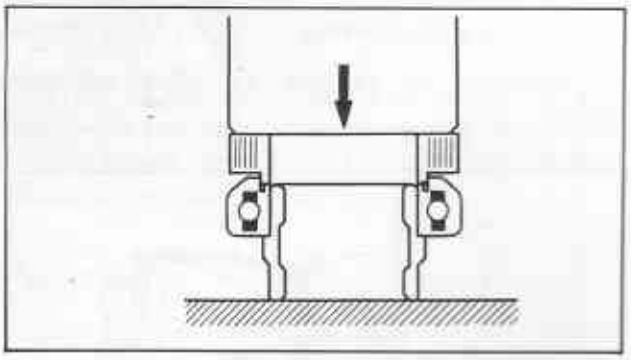


*Fig. CL-14 Installing release bearing*

After pressed in the bearing, check for the smooth running by turning with fingers.

## ASSEMBLY

To assemble the coil spring type clutch, proceed as follows.

1. Press the pin into the eye-bolt hole through the lug on the pressure plate.

2. Put the three distance pieces on the Model mark of the base plate.

3. Place the pressure plate on the base plate together with pressure springs and retainers.

4. Set the retracting springs on the cover and insert the release levers through the spring.

5. Place the cover over the pressure plate with pressure springs and retainers.

**Note: Ensure that the retracting springs are in position, and that the pressure springs are surely in position without any distortion.**

6. Compress the pressure springs by screwing down the special set bolts placed through each holes of the cover.

7. Tighten the screws, a little at a time, by diagonal selection to prevent distortion of the cover.

8. Set the release lever on the eye-bolt with the eye-bolt nut.

9. Secure the eye-bolt nuts after complete adjusting.

10. Temporarily lock the release lever with the release lever stopper.

11. Release the set bolt, a little at a time, by diagonal selection, and remove the clutch assembly from the base plate.

## ADJUSTMENT (Gauging)

1. Screw the center pillar into the base plate and slip the high finger over the pillar.

2. Adjust the height of the release levers by screwing or unscrewing the eye-bolt nuts until the height, when rotated, just contact the highest point on the tip of the release levers.

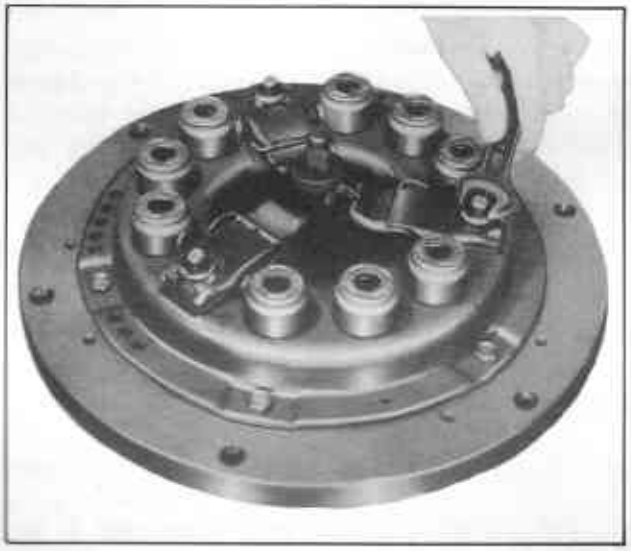


*Fig. CL-15 Adjusting release lever height*

3. Replace the height finger and pillar by the clutch actuating mechanism and actuate the clutch several times by operating the handle.

**Note: This will enable the parts to settle down on their knife edges.**

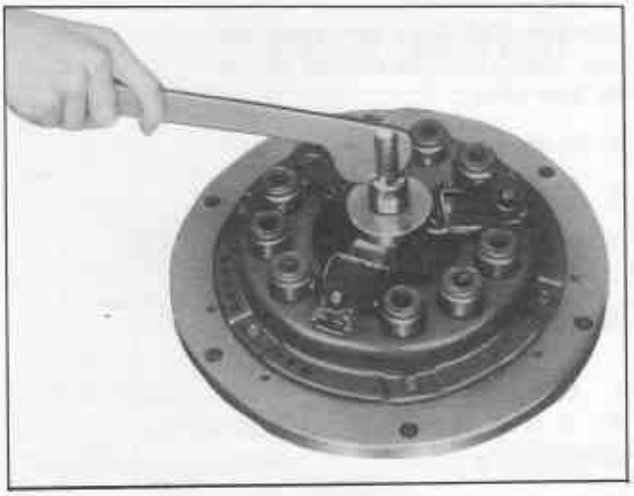


*Fig. CL-16 Actuating clutch*

4. Replace the height finger and recheck the height of the release levers, checked for "run out" as near the edge as possible; if the error is more than 0.4 mm (0.0157 in.) adjust until it is true within spec. limit.

## INSTALLATION

**It is important to keep friction facings free from oil or grease.**

1. Place the disc assembly on the flywheel with the longer chamfered splined end of the disc assembly towards the transmission.

2. Set the position of the disc assembly by a dummy drive shaft which fit the splined bore of the disc assembly hub and the pilot bearing of the flywheel.

3. Tighten six bolts which are holding the clutch cover assembly to the flywheel a turn at a time by diagonal selection.

**Note: There are two dowels on the flywheel to locate the clutch cover.**

4. Remove dummy shaft after these bolts are fully tightened.
Tightening torque should be 2.4 to 2.6 kg-m (17.4 to 18.8 lb/ft).

5. Remove the clutch aligning bar (release lever stopper).

6. Refit the release bearing and transmission case.

# CLUTCH CONTROL

## CONTENTS

## DESCRIPTION

The hydraulic clutch control consists of a pendent pedal, master cylinder, operating cylinder and withdrawal lever.

When the clutch pedal is depressed the piston of the master cylinder forwards the fluid to the operating cylinder via a pipe line. The movement of the operating cylinder piston is transmitted to the withdrawal lever through the push rod, thus disengaging the clutch.

## CLUTCH PEDAL

When depressing the pedal, the return spring works to pull back until the pedal comes to half way, but when the pedal goes over this position, it works reversely therefore it will assist to push down the pedal.

As the spring is adjusted so that the lower end of the pedal has tension of 2.0 to 2.5 kg toward release position 182 mm (7.17 in.) from the toe board, required strength on the pedal is about 15 kg (33 lb.) in a full depressing, but it becomes 12 to 17% lighter due to the operation of this return spring.

If any trouble is found repair or replace.

### Removal

1. Remove the clevis pin installed at the push rod and then disconnect the push rod end.

2. Remove the assist spring.

3. Remove the assist spring push rod after loosening the rod adjuster (only for coil spring type).

4. Remove the pedal lever after the pedal lever fixing bolt has been removed and loosening the bracket fixing bolts of the parking brake.

**Note: Ensure to measure the pedal height from the toe board before removing the pedal.**

### Inspection

After disassembly, clean all the following parts and thoroughly check them for wear, damage and other abnormal conditions. Should any conditions be dected on them, replace them by new ones.

1. Rubber parts
2. Assist spring
3. Pedal lever sleeve etc.

### Adjustment

1. Adjust the pedal height to 183 mm (7.205 in.) for R.H. drive and 208 mm (8.189 in.) for L.H. by adjusting the master cylinder push rod length.

**Note: The pedal stopper should be free.**

2. Adjust the pedal height to 182 mm (7.165 in.) for R.H. and 207 mm (8.150 in.) for L.H. by screwing the pedal stopper and lock up the lock nut.

3. Adjust the length of assist spring push rod to 203 mm (7.992 in.) for R.H. and 183 mm (7.205 in.) for L.H. by turning the rod adjuster. (only for coil spring type)

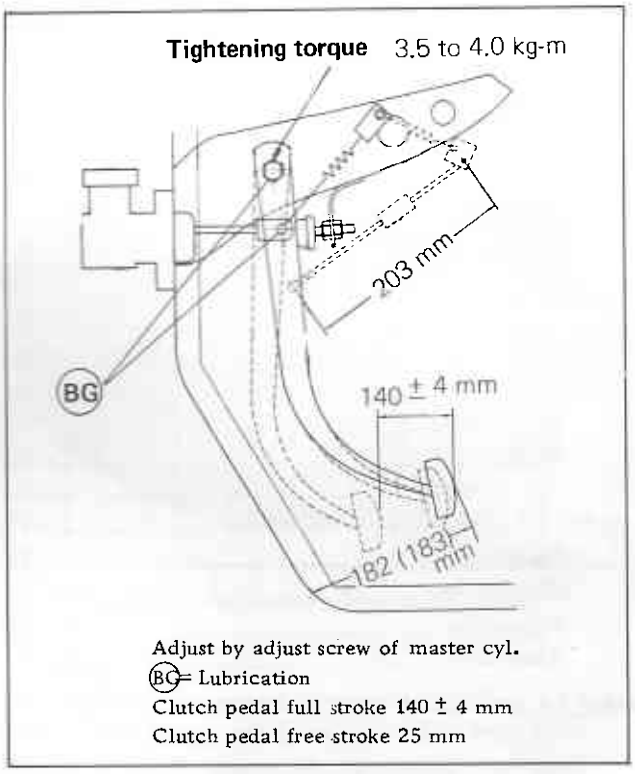
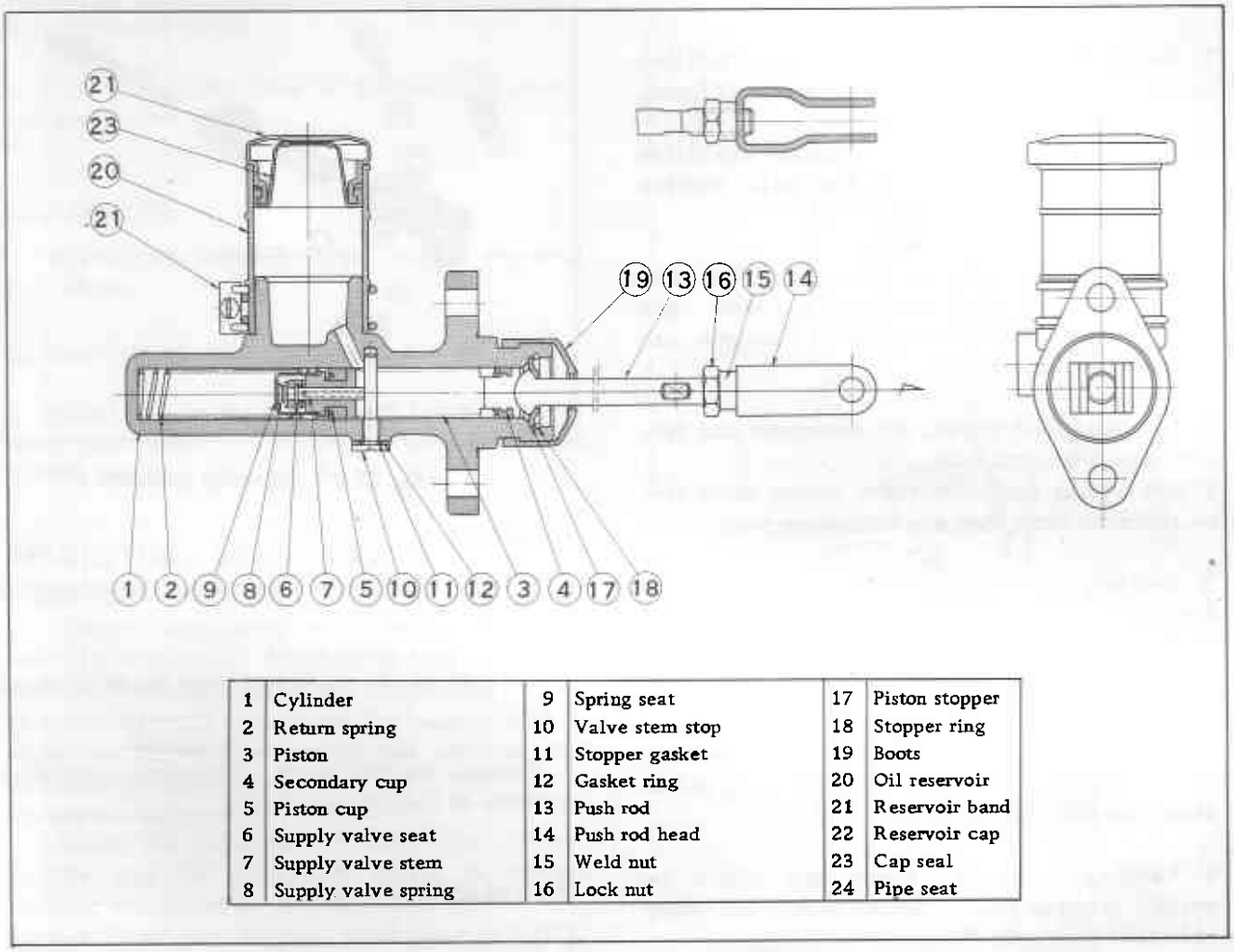



*Fig. CL-17 Pedal height adjustment*

## MASTER CYLINDER - CLUTCH




| | | | | | |
|---|---|---|---|---|---|
| 1 | Cylinder | 9 | Spring seat | 17 | Piston stopper |
| 2 | Return spring | 10 | Valve stem stop | 18 | Stopper ring |
| 3 | Piston | 11 | Stopper gasket | 19 | Boots |
| 4 | Secondary cup | 12 | Gasket ring | 20 | Oil reservoir |
| 5 | Piston cup | 13 | Push rod | 21 | Reservoir band |
| 6 | Supply valve seat | 14 | Push rod head | 22 | Reservoir cap |
| 7 | Supply valve stem | 15 | Weld nut | 23 | Cap seal |
| 8 | Supply valve spring | 16 | Lock nut | 24 | Pipe seat |

*Fig. CL-18 Clutch master cylinder*

### Removal

1. Remove the clevis pin installed at the push rod.

2. Disconnect the clutch hose from the master cylinder and drain out the fluid.

3. Remove the securing bolts and take off the master cylinder assembly from the car.

### Disassembly

1. Remove the filler cap and drain out the fluid.

2. Pull back the rubber boot and remove the snap ring, and then the push rod and ring can be removed.

3. Unscrew the piston stopper screw and remove the piston assembly complete.

4. The piston assembly can be separated by lifting the spring seat edge over the shouldered end of the piston.

### Inspection

Prior to inspection all parts should be cleaned or washed.

**Note:** **To clean or wash all parts of master cylinder, operating cylinder and pipings, clean brake fluid mast be used. Never use mineral oils such as gasoline and kerosene, etc. as**

**to do so will ruin the rubber parts of the hydraulic system.**

1. Check cylinder and piston for abnormal one sided wear and damage and replace if found.

2. If the clearance between cylinder and piston is more than 0.13 mm (0.005 in.), replace cylinder.

3. Renew piston cup, in principle, when disassembled. It must also be replaced when swell, wear, deformation due to fatigue and damage, etc. are found.

4. Damaged dust cover, oil reservoir and cap, etc. should be replaced.
Piston spring and inlet valve spring must also be replaced when they are broken or weak.

5. **Replace clutch hose and tube if any abnormal signs of damage or deformation are found.**

### Assembly

This is accomplished by reversing the disassembling procedure, but the following points should be observed.

1. Prior to assembly piston cup should be soaked in brake fluid. Install piston cup taking care it is correctly faced.

2. Coat well brake fluid to cylinder and piston and assemble them.

### Installation

Installation is a reversal of the removal procedure, but the following operation should be added.

1. Adjust the pedal height by changing the push rod length.

2. Bleed air out of the hydraulic system.

## OPERATING CYLINDER

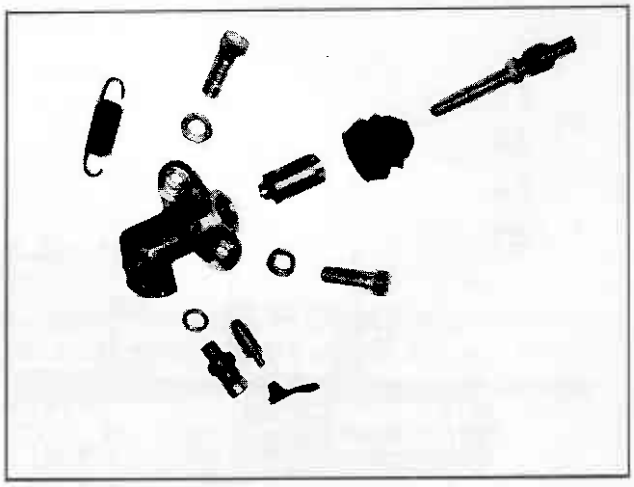


*Fig. CL-19 Operating cylinder*

### Removal

1. Detach the clutch tube from the operating cylinder.

2. Disconnect the push rod from the withdrawal lever.

3. Release the two bolts which mount operating cylinder to the clutch housing.

### Disassembly

1. Remove the dust cover.

2. Remove the snap ring and all other parts are ready to be disassembled.

### Inspection

Check all parts especially the piston cup and replace if worn or damaged.

### Assembly

Assembly is a reversal of the disassembling procedure, but the following points should be observed.

1. Prior to assembly piston cup should be soaked in fluid. Install piston cup taking care it is correctly faced.

2. Coat well brake fluid to cylinder and piston and assembled them.

## Installation

Installation is a reversal of the removal procedure.

1. Bleed air out of the hydraulic system.

2. Adjust the push rod so that the withdrawal lever end play is 2.0 to 2.3 mm (0.0787 to 0.0906 in.).

## ADJUSTING WITHDRAWAL LEVER

Correct adjustment of the clutch withdrawal lever is essential. **Insufficient free travel between the release bearing and diaphragm fingers or release levers can cause the clutch to slip, while excessive free travel can prevent full disengagement of the clutch.**
To adjust, proceed as follows.

Adjust the clearance between the release bearing and the diaphragm spring or release lever at the end of the withdrawal lever.
Loosen lock nut, screw in the push rod fully while fixing the adjusting nut and then screw out 1 3/4 turns to adjust the play at the end of the clutch withdrawal lever to 2.0 to 2.3 mm (0.0787 to 0.0906 in.). This will give a clearance of approximately 1.3 mm (0.0512 in.) between the release bearing and diaphragm spring fingers or release levers.

**Note:** **When adjusting the clutch pedal free travel at the clutch withdrawal lever end, the clutch disc thickness should be checked. If the clutch disc is worn in excess of 2 mm (0.08 in.), it must be replaced; otherwise the clutch will be slippery even if the clutch is adjusted correctly; that is, the clutch disc is no longer recommendable to use continuously.**
**The clutch disc thickness with new parts is 7.8 mm (0.307 in.)**

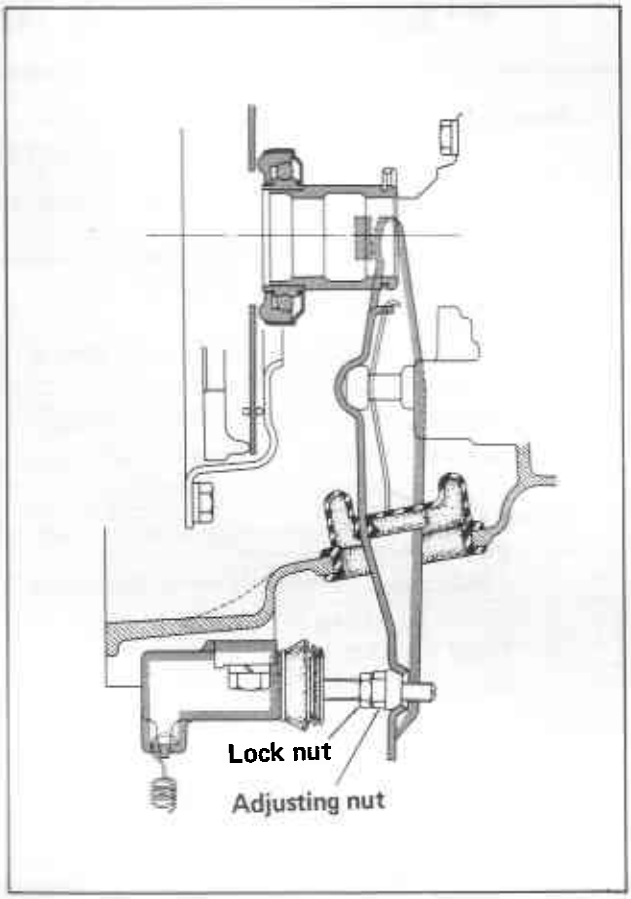



*Fig. CL-20 Adjusting withdrawal lever*

## BLEEDING CLUTCH SYSTEM

1. Remove the bleed screw dust cap of the operating cylinder, open the bleed screw approximately three-quarters of a turn and attach a tube immersing the open end into a clean receptacle containing a small amount of brake fluid.

2. Fill the master cylinder reservoir with the recommended fluid and by using slow, full strokes, pump the clutch pedal until the fluid entering the container is free from air bubbles.

3. Screw up the bleed screw on a down stroke of the pedal, remove the bleed tube and replace the dust cap.

# SERVICE DATA AND SPECIFICATIONS

| | |
|---|---|
| **Pressure spring** | |
| Free length | 52.3 mm (2.059 in.) |
| Fitted length & load | 29.2 mm/44 ± 2 kg(1.149in./97 ± 4.4 lb) |
| Out-of-right angle | 5/100 mm (0.1968/3.937 in.) |
| Allowable min. spring force | 15% |
| **Clutch release lever** | |
| Release bearing-to-diaphragm spring (release lever) clearance | 1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in.) |
| Diaphragm spring-to-flywheel height | 44.0 ± 1.0 mm (1.732 ± 0.0394 in.) |
| Release lever-to-flywheel height | 50.5 ± 0.05 mm (1.988 ± 0.0197 in.) |
| **Clutch disc** | |
| Facing size | |
| Outer dia. × inside dia. × thickness | 200 × 130 × 3.5 mm (7.87 × 5.120 × 0.140 in.) |
| Total friction area | 362 $cm^2$ (56.11 $in^2$) |
| Thickness of disc assembly | |
| Free | 8.6 ~ 9.0 mm (0.3386 ~ 0.3543 in.) |
| Compressed | 7.65 ~ 7.95 mm (0.3012 ~ 0.3130 in.) |
| Material | TEXTER |
| Number of torsion spring | 6 |
| Allowable min. depth of rivet head from facing surface | 0.3 mm (0.0118 in.) |
| Allowable facing run-out | 0.5 mm (0.0197 in.) |
| Allowable free play of spline | 0.4 mm (0.0157 in.) |
| **Pressure plate** | |
| Allowable refacing limit | 1.0 mm (0.0394 in.) |
| **Clutch pedal** | |
| Pedal height when not depressed | 182 mm (7.17 in.) (R.H.), 207 mm (8.150 in.) (L.H.) |
| Free stroke of pedal head | 25 mm (0.984 in.) |
| Pressing strength at full stroke | 15 kg (33 lb ) |
| **Master cylinder - clutch** | |
| Dia. master cylinder | 15.87 mm (5/8 in.) |
| Allowable max. clearance between cylinder and piston | 0.13 mm (0.0051 in.) |
| **Tightening torque** | |
| Clutch assembly securing bolt | 2.4 ~ 2.6 kg-m (17.4 ~ 18.8 ft-lb ) |

# TROUBLE DIAGNOSES AND CORRECTIONS

| Troubles | Possible causes | Remedies |
|---|---|---|
| Slipping | Insufficient clutch pedal free travel. | Adjust pedal free travel. |
| | Improper adjustment of withdrawal lever end play. | Adjust end play. |
| | Oil or grease on linings. | Remove cause of leakage and replace lining if necessary. |
| | Disc lining worn or burned. | Replace linings. |
| | Clutch diaphragm spring and pressure springs weak or broken. | Replace springs. |
| | Pressure plate or flywheel worn. | Reface or replace. |
| Insufficient clutch release | Excessive free travel of clutch pedal. | Adjust correctly. |
| | Excessive play of withdrawal lever. | Adjust correctly. |
| | Pilot bushing sticking. | Replace pilot bearing. |
| | Spline of clutch disc hub worn. | Replace clutch disc assembly. |
| | Clutch disc warped. | Set level of clutch disc or replace clutch disc assembly. |
| | Leaking from master cylinder cup. | Replace cylinder cup. |
| | Leaking from operating cylinder cup. | Replace cup. |
| | Air infiltrations into the hydraulic line. | Bleed out completely. |
| | Roughness on linings. | Rub linings with a metal brush or replace them. |
| | Low fluid level in oil reservoir. | Top up with brake fluid. |
| Grabbing | Oil on facing or burned or glazed facings. | Install new disc assembly. |
| | Loose disc linings due to poor rivet tighteness. | Replace defective rivets or replace linings. |
| | Pressure plate or flywheel warped or cracked. | Replace them. |
| | Improper adjustment of release lever. | Adjust release lever. |
| | Loose engine mountings. | Tighten or replace mountings. |
| | Wear or damage of clutch disc torsion spring. | Replace disc assembly. |
| Noisy | Worn release bearing. | Replace bearing. |
| | Cracked clutch disc plate. | Replace disc assembly. |
| | Wear or damage of clutch disc torsion spring. | Replace disc assembly. |
| | Loose clutch disc hub. | Replace disc assembly. |

# CHASSIS

## SERVICE JOURNAL OR BULLETIN REFERENCE

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