

SECTION 5

CLUTCH

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5-2 CLUTCH

a. Structure

The clutch is of a dry, single-disk type, which uses a diaphragm spring.

Engine power is transmitted from the crankshaft by means of the primary drive chains to rotate the clutch drum and pressure disk assembly, bolted to the primary driven sprocket (which is fitted freely on the transmission mainshaft).

As the driver releases pressure on the clutch pedal, the pressure disk applies pressure to the friction plate causing the friction disk and the mainshaft to rotate together with the clutch drum.

1. Diaphragm spring

The diaphragm spring not only applies pressure to squeeze the friction plate to the clutch drum but serves as a coil spring type clutch release lever. Its weight being distributed uniformly, the spring is well balanced and can therefore apply its load evenly.

2. Friction plate

The friction plate lined with friction material on both sides is located between the pressure disk and the clutch drum. The plate, when pressed hard between these disks, turns to transmit the engine power to the transmission.

The friction material on one side differs from that on the other so that they may be worn and disperse heat evenly. In the hub flange are installed four pieces of torsional rubber to absorb torsional vibrations at the time of clutch engagement and disengagement.

3. Pressure disk

The pressure disk is secured to the pressure disk retainer with three torque springs. These torque springs serve to absorb engagement and disengagement shocks in the direction of thrust as well as to transmit power from the pressure disk retainer to the pressure disk.

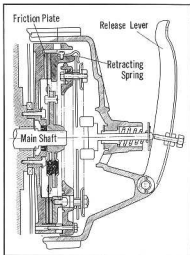


Fig. 5A-2

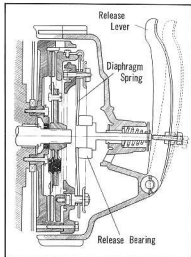


Fig. 5A-3

b. Operation

Fig. 5A-2 shows the clutch in the engaged state. In this state, the diaphragm spring squeezes the pressure disk, through the friction plate splined-connected on the mainshaft, against the clutch drum which is bolted to the driven sprocket being driven with engine power through the primary chains. Accordingly, the clutch drum, friction plate, and pressure disk rotate together, revolving the mainshaft.

Fig. 5A-3 shows the clutch in the disengaged state with the clutch pedal depressed. When the clutch pedal is depressed, the release lever connected to the pedal through a cable is actuated to slide the release bearing inward, pushing the finger section of the diaphragm spring. The edge of the diaphragm spring moves in the opposite direction (outward) with the fulcrum rings as its pivot. The diaphragm spring is secured around its edge to the pressure disk by means of four retracting springs so that the movement mentioned above for the diaphragm spring moves the pressure disk outward and away from the friction plate. Thus, no engine power is transmitted to the friction plate.

B. Technical Data

	360/400	600
Type	Single dry plate	
Clutch Spring Type	Diaphragm Spring	
Pressure	320~370kg (706~816 lb)	350~380kg (772~838 lb)
Friction Plate		
Facing O.D.	165 mm (6.50 in)	
Facing I.D.	110 mm (4.33 in)	
Facing Area	118 cm ² (18.4 in ²)	
Thickness	7 mm (0.28 in)	
Number of Torsion Rubber	4	
Release Bearing	Sealed Ball bearing	
Pedal Lash	3 mm (0.2 in) at the tip of the release lever	



Fig. 5C-1



Fig. 5C-2

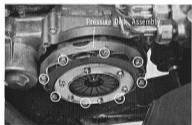


Fig. 5C-3



Fig. 5C-4

C. Maintenance

a. Disassembly

1. Loosen the release lever lock nut and sufficiently loosen the adjusting bolt so that release lever play is maximum. Hold the clutch cable manually, remove the rubber cushion from the release lever while pushing in the release lever, and separate the clutch cable and the release lever. (Fig. 5C-1)
2. Pull the clutch cable on the engine side, and separate it from the clutch cover.
3. Remove the clutch housing cover.
Tightening torque:
0.9 to 1.2 kg-m (6.5 to 8.7 lb-ft)
4. After removing the clutch housing cover, disassemble the clutch pressure disk by removing bolts.
Bolt torque value:
0.9 to 1.2 kg-m (6.5 to 8.7 lb-ft)
5. Pull off the friction plate from the splined shaft.

6. Remove the clutch drum, with care not to damage the oil seal.

Bolt torque value:

0.9 to 1.2 kg-m (6.5 to 8.7 lb-ft)

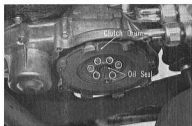


Fig. 5C-5

7. Remove retracting springs, the diaphragm setting plate and fulcrum ring, followed by disassembly of the pressure disk and diaphragm spring.

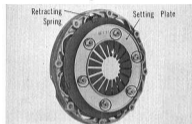


Fig. 5C-6

8. Extract the cotter pin from the clutch housing, detach the release bearing shaft and spring from the housing.



Fig. 5C-7

9. Remove the circlip and push out the release bearing shaft bushing from the housing.



Fig. 5C-8

5-6 CLUTCH

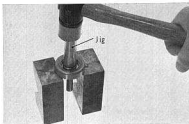


Fig. 5C-9



Fig. 5C-10



Fig. 5C-11



Fig. 5C-12

10. Remove the release bearing by tapping lightly with a hammer and appropriate jigs.

b. Inspection

1. Check the release lever pivot pin for excessive play.
2. Check the clutch housing bushing for excessive wear. Excessively worn bushing and/or pivot pin (Fig. 5C-10) may be attributable to the vibration and the rattling noise from the clutch.
3. Inspect the clutch drum and the pressure disk to see that they are free of oil and grease. If oil is on the faces, clean them with alcohol or grind the faces. Note the clutch drum and pressure disk face cannot return to the original condition even if oil is wiped off completely with cloth.

4. Check the clutch drum for excessive scores and cracked surface. If the clutch drum is scored excessively, refinish the surface by grinding.

Standard Dial Gauge Reading: 0 to 0.05mm (0 to 0.002 in).

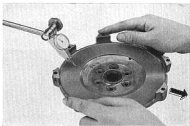


Fig. 5C-13

5. Check the condition of the clutch drum oil seal (67x82x8) and replace the seal if it is found to be excessively worn or damaged. The oil seal incorporates helical grooves to prevent the oil leakage hydrodynamically.

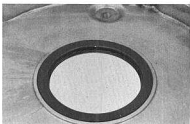


Fig. 5C-14

Apply a light coat of high melting point grease to the oil seal lips. Fit the oil seal to the special tool—oil seal Driver B with the side lip upward.

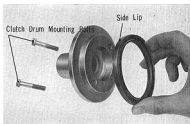


Fig. 5C-15

Screw in the clutch drum mounting bolts and force the oil seal into the LH crankcase side cover with oil seal driver B.



Fig. 5C-16

5-8 CLUTCH



Fig. 5C-17



Fig. 5C-18



Fig. 5C-19

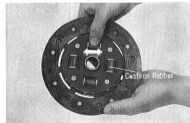


Fig. 5C-20

6. Check the condition of another clutch drum oil seal (20x30x5) and replace the seal if it is found to be excessively worn or damaged. When installing a new oil seal, use a special tool, oil seal driver A, and carefully drive in the oil seal.

Apply a light coat of high melting point grease to the oil seal lips.

7. Check friction plate fit to the transmission mainshaft for excessive looseness and binding.

8. Inspecting the friction plate for wear. Measure the thickness of the facing at four points, 90° apart using vernier calipers. Replace the friction plate if it is found to be excessively worn, or if walk spring tension is lost, or if there is a loose or damaged rivet.

Thickness of friction plate

Standard tolerance:

7.15 to 7.85mm (0.28 to 0.31 in)

Serviceable limit:

Replace if under 5.75mm (0.23 in)

The friction disk is serviceable if the disk is flat and there is proof of surface contact over the entire area of the drum and pressure disk.

9. Check cushion rubber

If it is excessively worn, or if the play on both sides is excessive, replace with a new friction plate.

Excessive play on either the right or left may result in the generation of abnormal noise and vibration when the clutch is being engaged.

10. Check the contact condition of the clutch facing if the facing is unevenly worn (waveform) or is otherwise abnormal, replace it with a new one. Waveform wear may result in the generation of noise.

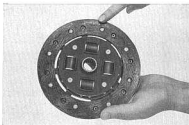


Fig. 5C-21

11. Check the pressure plate for excessive wear and warpage.

Position the dial gauge on the surface table and measure the amount of wear by moving the surface of the pressure disk under the dial gauge. Check the warpage by placing the surface of the pressure disk against a flat surface plate and measuring with a thickness gauge.

	Standard tolerance	Serviceable limit
Wear of the disk	0~0.05mm (0~0.002 in)	Replace if over 0.1mm (0.004 in)
Warpage	0~0.03mm (0~0.0012 in)	Replace if over 0.05mm (0.002 in)

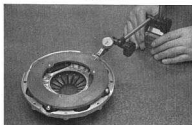


Fig. 5C-22

12. Check the release bearing. If it is noisy or excessively worn, replace the bearing.



Fig. 5C-23

13. Inspecting the wear of the clutch housing bushing and the release bearing shaft.

	Standard tolerance	Serviceable limit
Bushing inside dia.	12.07~12.12mm (0.475~0.477 in)	Replace if over 12.5mm (0.49 in)
Bearing shaft dia.	11.95~11.98mm (0.470~0.472 in)	Replace if over 11.5mm (0.453 in)



Fig. 5C-24

5-10 CLUTCH

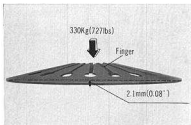


Fig. 5C-25

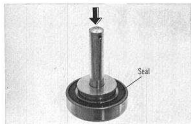


Fig. 5C-26

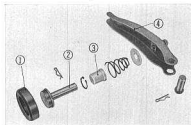


Fig. 5C-27



Fig. 5C-28

11. Check the condition of the diaphragm spring and if damaged or excessively worn at the fingers, replace it. If the diaphragm spring is distorted or worn, the spring force should be measured. Measure the force required to compress the spring to the height of 2.1mm (0.0827 in). The spring should be replaced if the force is less than 300kg (662 lbs) for 360/400, 330kg (727 lbs) for 600.

c. Assembly

Reassembly is the reverse of disassembly.

1. When installing the shaft on the release bearing, be careful that the bearing is not installed in reverse. The shaft should be installed from the side which has the bearing seal.

2. ① Release bearing
② Release bearing shaft
③ Release bearing bushing
④ Release lever

Install the shaft after applying grease between the shaft and bearing bushing.

3. When installing the pressure disk assembly on the clutch drum, perform the job depending on the aligning marks.

Remarks:

The clutch drum and the pressure disk assembly are balanced in order to eliminate vibration and abnormal noise.

d. Adjustment

1. Pedal Height Adjustment

Clutch pedal height adjustment should be made before pedal lash adjustment.

By tightening in or out of the adjusting bolt after loosening the lock nut, adjustment of pedal height is made. Adjust the pedal height to brake pedal height.



Fig. 5C-29

2. Clutch Pedal Lash

Check the clutch release lever for pedal lash at the tip of the lever. The specified pedal lash is 3mm (0.12 in). Adjust the pedal lash by means of the adjusting bolt. Check the clutch cable for movement and damage at the release lever end and the clutch pedal end.

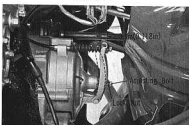
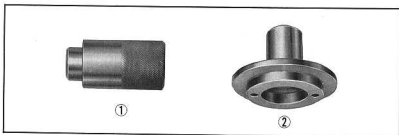


Fig. 5C-30

D. Special Tool



Ref. No.	Tool No.	Description	360 400 600	Ref. Page
1.	07054-55102	Oil seal driver A	○	5-7
2.	07057-55103	Oil seal driver B	○	5-7

E. Trouble Diagnosis

Possible Cause	Corrective Action
Fail to release	
Improper adjustment	Adjust release lever
Weak retracting spring	Replace springs
Faulty friction plate	Replace plate
Oil leakage	Install new friction plate
	Replace oil seal
Bound release bearing shaft	Correct
Slipping	
Improper adjustment	Adjust release lever
Oil leakage	Replace oil seal
	Install new friction plate
Worn facing or facing torn from disk	Replace friction plate
Warped pressure disk	Replace pressure disk
Weak diaphragm spring	Replace diaphragm spring
Bound release bearing shaft	Correct
Battling	
Weak retracting spring	Replace springs
Weak friction disk cushion rubber	Replace friction disk
Abnormal worn facing	Replace friction plate
Noisy	
Worn release bearing	Replace bearing
Abnormal worn facing	Replace friction plate
Difficult to disengage	
Improper clutch adjustment	Adjust release lever
Warped friction disk	Replace
Bound release bearing shaft	Correct

A. Description

Clutch Assembly-Disassembled View

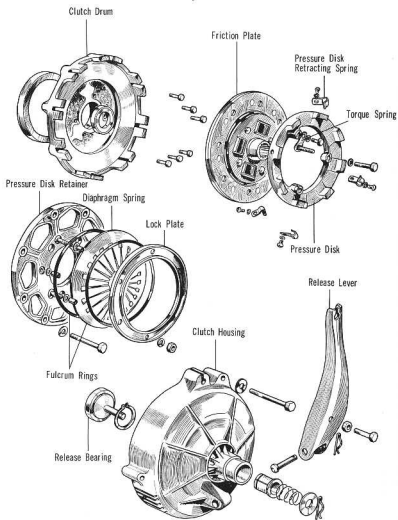


Fig. 5A-1