

CHAPTER FIVE

CLUTCH

This chapter provides complete service procedures for the clutch and clutch release mechanism.

The clutch is a wet multi-plate type which operates immersed in the engine oil. It is mounted on the right-hand end of the transmission main shaft. The inner clutch hub is splined to the main shaft and the outer housing can rotate freely on the main shaft. The outer housing is geared to the crankshaft. The clutch pushrod rides within the channel in the transmission main shaft.

The clutch release mechanism is hydraulic and requires no adjustment. The mechanism consists of a clutch master cylinder on the left-hand handlebar, a slave cylinder on the left-hand side of the engine and a pushrod that rides within the channel in the transmission mainshaft.

Specifications for the clutch are listed in **Table 1**. **Tables 1-2** are located at the end of this chapter.

CLUTCH

Removal/Disassembly

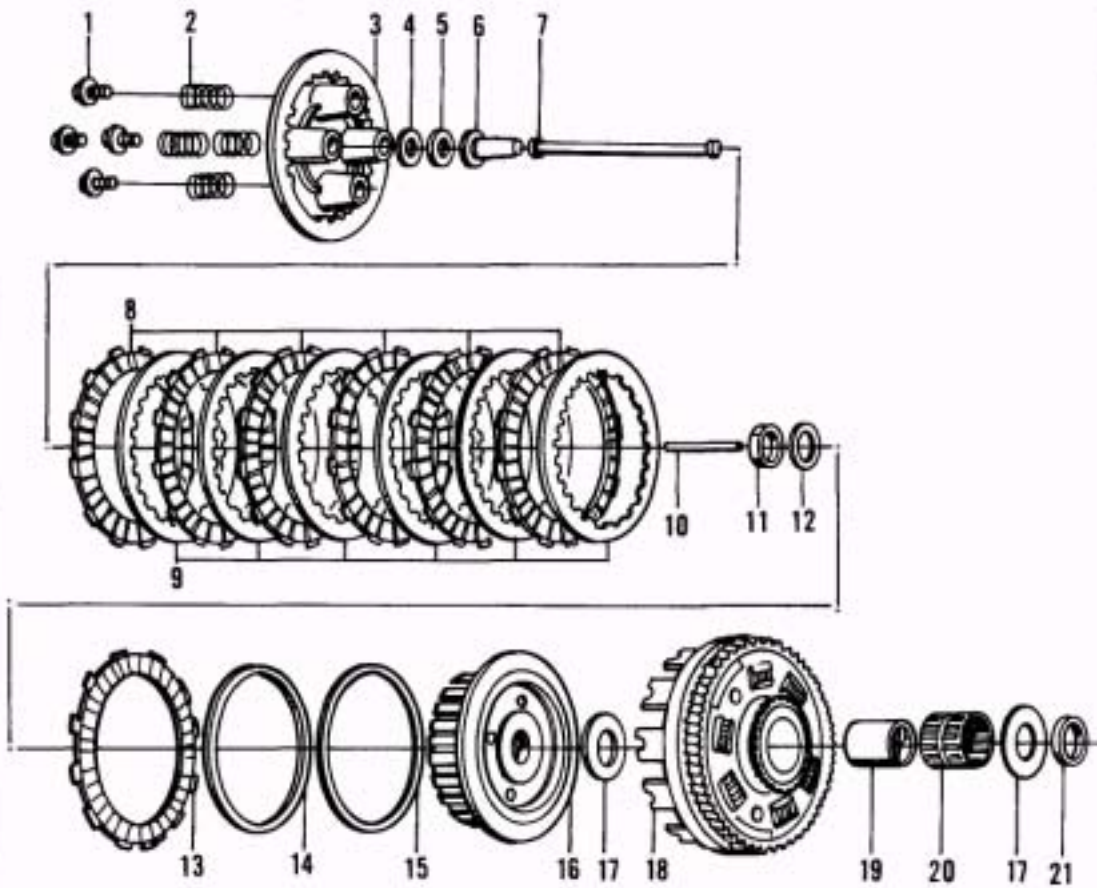
The clutch assembly can be removed with the engine in the frame. This procedure is shown with the engine removed and partially disassembled for clarity.

Refer to **Figure 1** for this procedure.

1. Drain the engine oil as described under *Engine Oil and Filter Change* in Chapter Three.
2. Shift the transmission into gear.

1

CLUTCH ASSEMBLY



- | | |
|----------------------------|---------------------------------|
| 1. Bolt | 12. Washer |
| 2. Spring | 13. Friction disc No. 2 |
| 3. Pressure plate | 14. Judder spring (wave washer) |
| 4. Washer | 15. Judder spring seat |
| 5. Bearing | 16. Clutch center |
| 6. Lifter guide | 17. Washer |
| 7. Lifter rod (right-hand) | 18. Outer housing |
| 8. Friction discs No. 1 | 19. Collar |
| 9. Clutch plates | |

- | | |
|----------------------------|--------------------|
| 10. Litter rod (left-hand) | 20. Needle bearing |
| 11. Clutch nut | 21. Spacer |

3. Remove the footpeg and rear brake pedal assembly as described under *Footpeg Assembly Removal/Installation* in Chapter Thirteen.

NOTE

*There is a sealing washer under 3 bolts securing the clutch cover (A, **Figure 2**). During assembly these sealing washers must be reinstalled under all 3 bolts to prevent an oil leak.*

4. Remove the bolts securing the clutch cover (B, **Figure 2**). Remove the clutch cover and gasket. Don't lose the locating dowels.
5. Place a shop rag between the primary drive gear and the clutch outer housing (**Figure 3**) to keep the clutch assembly from rotating.
6. Using a crisscross pattern loosen the clutch bolts (**Figure 4**). Remove the shop rag.
7. Remove the bolts and washers.
8. Remove the clutch springs (**Figure 5**) and the pressure plate (**Figure 6**).
9. Remove the friction discs, clutch plates, wave washer and wave washer seat.





10. Remove the thrust washer, bearing and clutch push piece (**Figure 7**).

11. If necessary, remove the clutch pushrod (**Figure 8**) from the transmission shaft.

CAUTION

Do not clamp the "Grabbit" on too tight as it may damage the grooves in the clutch hub.

12. To keep the clutch hub from turning in the next step, attach a special tool such as the "Grabbit" (**Figure 9**) to it.

13. Loosen, then remove the clutch locknut (**Figure 10**) and wave washer (**Figure 11**).

14. Remove the special tool from the clutch center.

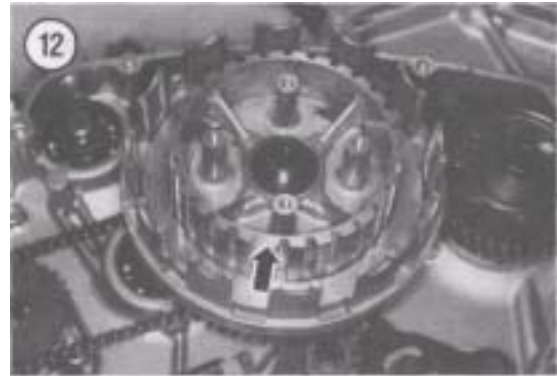
15. Remove the clutch hub (**Figure 12**).

16. Remove the thrust washer (**Figure 13**).

17. Remove the circlip (**Figure 14**) securing the oil pump driven gear.

NOTE

If the oil pump is not going to be serviced, place a piece of duct tape over the oil pump shaft locating pin and washer to avoid misplacing them.



18. Remove the clutch outer housing, oil pump drive chain and oil pump driven gear as an assembly (**Figure 15**).

19. Remove the needle bearing (**Figure 16**), bushing (**Figure 17**), washer (**Figure 18**) and spacer (**Figure 19**) from the transmission shaft.

20. Inspect all components as described in this chapter.

Inspection

Refer to **Table 1** for clutch specifications.

1. Clean all clutch parts in petroleum-based solvent such as kerosene and thoroughly dry with compressed air.

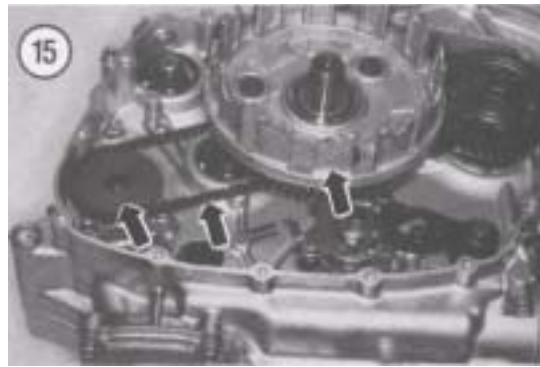
2. Measure the free length of each clutch spring as shown in **Figure 20**. Compare to the specifications listed in **Table 1**. Replace any springs that have sagged to the service limit or less.

NOTE

*The thickness of the No. 2 inner narrow friction disc (13, **Figure 1**) is different from all other No. 1 friction discs. Be sure to measure and record its thickness separately.*

3. Measure the thickness of each friction disc at several places around the disc as shown in **Figure 21**. Compare to the specifications listed in **Table 1**. Replace any friction disc that is worn to the service limit or less.

4. Measure the claw width of all claws on each friction disc as shown in **Figure 22**. Compare to the specifications listed in **Table 1**. Replace any friction disc that is worn to the service limit or less.





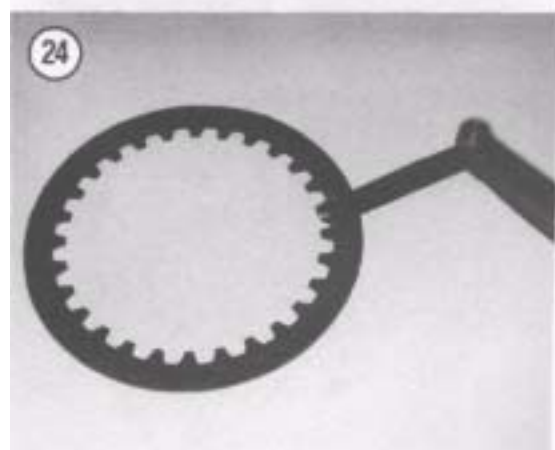
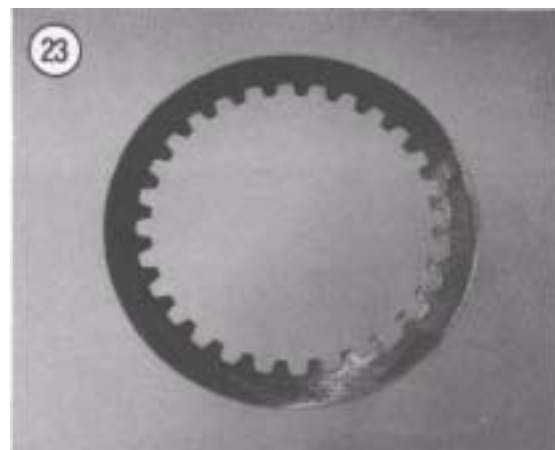
5. Check the clutch plates (**Figure 23**) for surface damage from heat or lack of oil. Replace any plate that is damaged in any way.

6. Check the clutch plates for warpage with a flat feeler gauge on a surface plate such as a piece of plate glass (**Figure 24**). Compare to the specifications listed in **Table 1**. Replace any plate that is warped to the service limit or more.

NOTE

If any of the friction discs, clutch plates or clutch springs require replacement, you should consider replacing all of them as a set to retain maximum clutch performance.

1. Inspect the slots (**Figure 25**) in the clutch outer housing for cracks, nicks or galling where they come in contact with the friction disc tabs. If any severe damage is evident, the housing must be replaced.



8. Inspect the driven gear teeth (A, **Figure 26**) and oil pump drive chain sprocket teeth (B, **Figure 26**) on the clutch outer housing for damage. Remove any small nicks with an oilstone. If damage is severe, the clutch outer housing must be replaced.

9. Inspect the damper springs (**Figure 27**). If they are sagged or broken the housing must be replaced.

10. Inspect the outer grooves (**Figure 28**) and studs (**Figure 29**) in the clutch hub. If either show signs of wear or galling the clutch hub should be replaced.

11. Inspect the inner splines (**Figure 30**) in the clutch hub for damage. Remove any small nicks with an oilstone. If damage is severe, the clutch hub must be replaced.

12. Inspect the spring receptacles (**Figure 31**) in the clutch pressure plate for wear or damage. Replace the clutch pressure plate if necessary.

13. Check the inner surface (C, **Figure 26**) of the clutch outer housing, where the needle bearing rides, for signs of wear or damage. Replace the clutch outer housing if necessary.

14. Check the needle bearing (**Figure 32**). Make sure it rotates smoothly with no signs of wear or damage. Replace if necessary.





15. Check the inner and outer surfaces of the spacer (**Figure 33**) for signs of wear or damage. Replace if necessary.

16. Install the spacer into the needle bearing and rotate the spacer (**Figure 34**) and check for wear. Replace either/or both parts if necessary.

17. Check the clutch release rack (**Figure 35**) for wear or damage. Replace if necessary.

18. Check the clutch release rack bearing (**Figure 36**). Make sure it rotate smoothly with no signs of wear or damage. Replace if necessary.

19. Install the bearing (**Figure 37**) and washer (**Figure 38**) onto the release rack and rotate them by



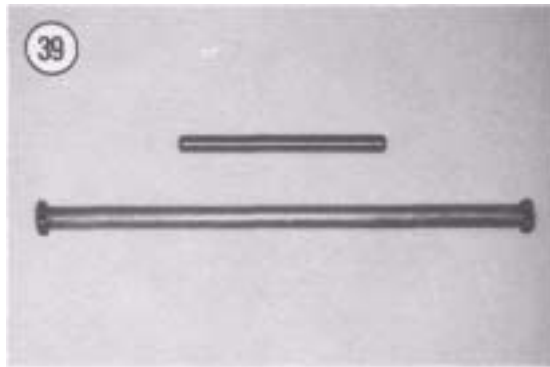
hand. Make sure all parts rotate smoothly. Replace any worn part.

20. Inspect the clutch right-hand push rod and left-hand push rod for bending (**Figure 39**). Roll it on a surface plate or piece of plate glass. Suzuki does not provide service information for this component, but if the rod(s) is bent or deformed in any way it must be replaced. Otherwise it may hang up in the channel within the transmission shaft, causing erratic clutch operation.

Assembly/Installation

Refer to **Figure 1** for this procedure.

1. Install the spacer (**Figure 19**), the washer (**Figure 18**) and bushing (**Figure 17**) onto the transmission shaft.
2. Apply a good coat of clean engine oil to the needle bearing and install the needle bearing (**Figure 16**).
3. If used, remove the duct tape from the oil pump shaft locating pin and washer. Make sure the locating pin and washer (**Figure 40**) are still in place on the oil pump drive shaft.
4. Position the oil pump driven gear with the shoulder (A, **Figure 41**) facing toward the engine and mesh the drive chain (B, **Figure 41**) onto the gear.
5. Mesh the drive chain onto the sprocket on the backside of the clutch outer housing (C, **Figure 41**).
6. Hold this assembly together and install it onto the transmission shaft as well as the oil pump drive shaft (**Figure 15**). Push the clutch outer housing down until it stops.
7. Make sure the oil pump driven gear is properly meshed with the locating pin (**Figure 42**) on the oil pump drive shaft.





8. Install the circlip (**Figure 14**) securing the oil pump driven gear and make sure it is properly seated.

9. Install the thrust washer (**Figure 13**).

10. Install the clutch hub (**Figure 12**).

11. Position the wave washer with the dished side facing out and install the wave washer (**Figure 11**).

12. Use the same special tool (**Figure 9**) set-up used in Step 12 of *Removal/Disassembly* to hold the clutch hub for the following step.

13. Install the clutch locknut (**Figure 10**) and tighten to the torque specification listed in **Table 2**.

14. Remove the special tool from the clutch hub.

15. If removed, install the clutch pushrod (**Figure 8**) into the transmission shaft.

16. Install the clutch push piece (**Figure 7**).

17. Apply a good coat of clean engine oil to the needle bearing and install the needle bearing (**Figure 43**) and washer (**Figure 44**) onto the clutch push piece.

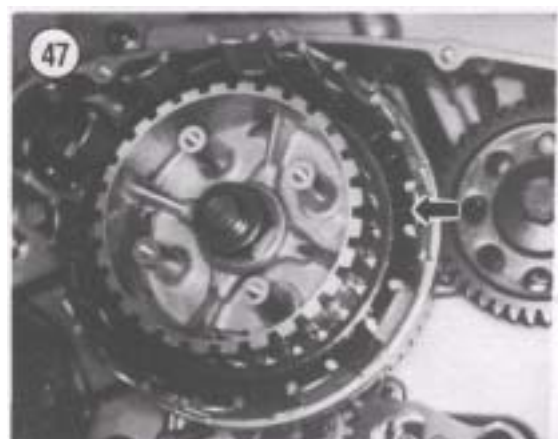
18. Install the wave washer seat (**Figure 45**) onto the clutch hub.

19. Position the wave washer with the dished side going on first and install the wave washer (**Figure 46**) onto the clutch hub.

NOTE

If new friction discs and clutch plates are being installed, apply new engine oil to all surfaces to avoid having the clutch lock up when used for the first time.

20. Install the No. 2 narrow friction disc (**Figure 47**) onto the clutch hub. Make sure it seats correctly next to the wave washer (**Figure 48**).



21. Install a clutch plate (**Figure 49**) then a friction disc onto the clutch hub. At this point the assembled parts should look like those in **Figure 50**.
22. Continue to install the clutch plates and friction discs, alternating them until all are installed. The last item installed is a friction disc (**Figure 51**).
23. Install the clutch pressure plate (**Figure 6**).
24. Install the springs (**Figure 5**), washers and bolts (**Figure 4**).
25. Place a shop rag between the primary drive gear and the clutch outer housing to keep the clutch assembly from rotating.
26. Using a crisscross pattern tighten the clutch bolts (**Figure 4**) to the torque specification listed in **Table 2**. Remove the shop rag.
27. Make sure the locating dowels (A, **Figure 52**) are in place.
28. Install a new clutch cover gasket (B, **Figure 52**).

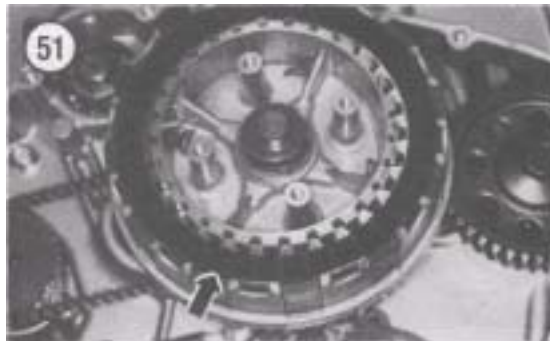
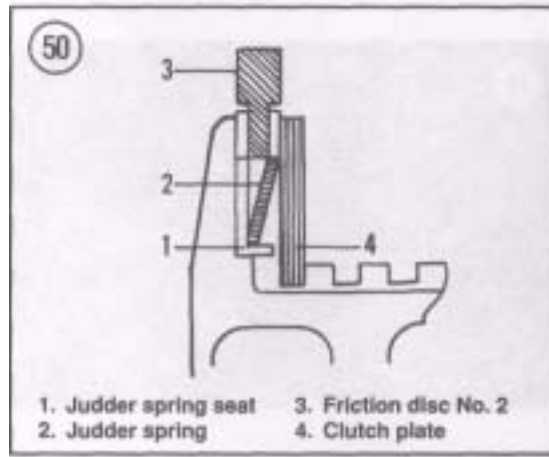
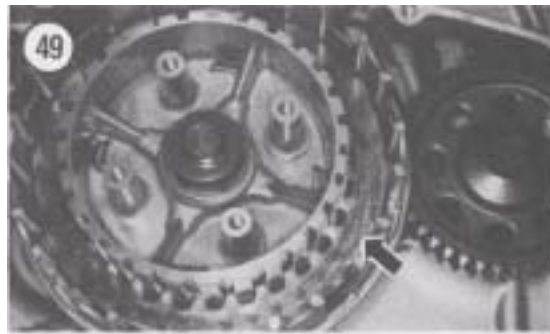
NOTE

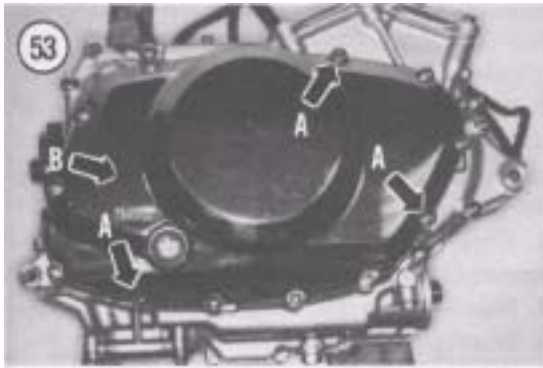
*Be sure to install the gasket under the 3 bolts (A, **Figure 53**). Refer to **Figure 54**, **Figure 55** and **Figure 56**. If not installed, an oil leak will result.*

29. Install the clutch cover and the bolts (B, **Figure 53**). Tighten the bolts securely.
30. Install the footpeg and rear brake pedal assembly as described under *Footpeg Assembly Removal/Installation* in Chapter Thirteen.
31. Refill the engine oil as described under *Engine Oil and Filter Change* in Chapter Three.

CLUTCH HYDRAULIC SYSTEM

The clutch is actuated by hydraulic fluid pressure and is controlled by the hand lever on the clutch





master cylinder located on the left-hand handlebar. As clutch components wear, the fluid level in the reservoir will be lower as it automatically adjusts for wear. There is no routine adjustment necessary nor possible.

When working on the clutch hydraulic system, it is necessary that the work area and all tools be absolutely clean. Any tiny particles or foreign matter and grit in the clutch slave cylinder or the master cylinder can damage the components. Also, sharp tools must not be used inside the slave cylinder or on the piston. If there is any doubt about your ability to correctly and safely carry out major service on the clutch hydraulic components, take the job to a dealer or other qualified specialist.

WARNING

*Throughout the text, reference is made to hydraulic fluid. Hydraulic fluid is the same as DOT 3 or DOT 4 brake fluid. Use only DOTS or DOT 4 brake fluid; **do not use other types of fluids** as they are not compatible. Do not intermix silicone based (DOTS) brake fluid as it can cause clutch component damage leading to clutch system failure.*

MASTER CYLINDER

Removal/Installation

CAUTION

Cover the fuel tank, front fender and instrument cluster with a heavy cloth or plastic tarp to protect them from accidental hydraulic fluid spills. Wash hydraulic fluid from any painted or plated surfaces or plastic parts immediately, as it will destroy the finish. Use soapy water and rinse completely.

1. Remove the screws, washers and lockwashers securing the clutch interlock switch cover (**Figure 57**). Remove the cover and electrical cable from the master cylinder body.
2. If you have a shop syringe, draw all of the hydraulic fluid out of the master cylinder reservoir.
3. Place a shop cloth under the union bolt to catch any spilled hydraulic fluid that will leak out.
4. Unscrew the union bolt (**Figure 58**) securing the clutch hose to the master cylinder. Don't lose the sealing washer on each side of the hose fitting. Tie

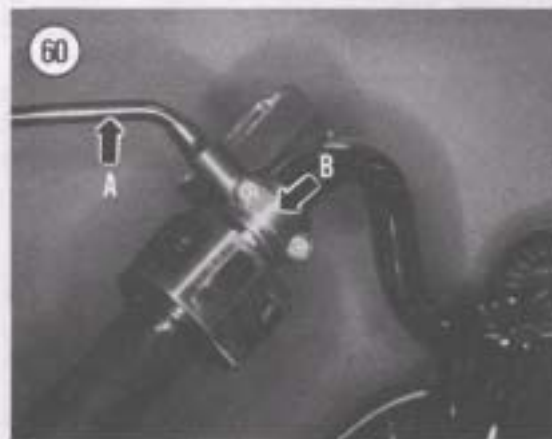
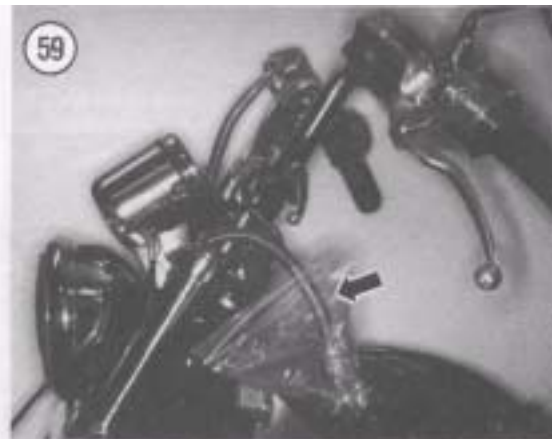
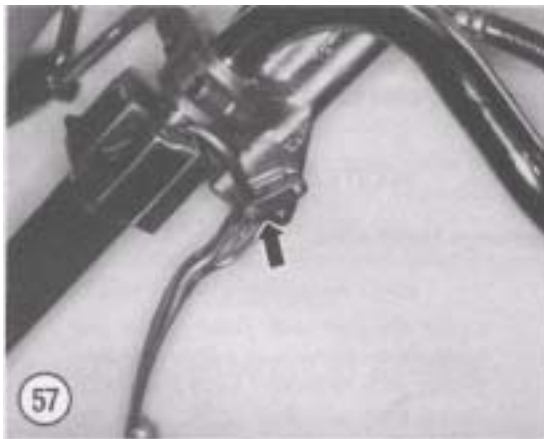
the loose end of the hose up to the handlebar and place the loose end in a reclosable bag (**Figure 59**) to prevent the entry of moisture and foreign matter.

5. Remove the rear view mirror (A, **Figure 60**).
6. Remove the caps, clamping bolts and the clamp (B, **Figure 60**) securing the master cylinder to the handlebar and remove the master cylinder.
7. Install by reversing these removal steps while noting the following:
 - a. Tighten the upper clamp bolt first, then the lower to the torque specification listed in **Table 1**.
 - b. Place a sealing washer on each side of the clutch hose fitting and install the union bolt.
 - c. Tighten the union bolt to the torque specification listed in **Table 2**.
 - d. Bleed the clutch as described under *Bleeding The System* in this chapter.

Disassembly

Refer to **Figure 61** for this procedure.

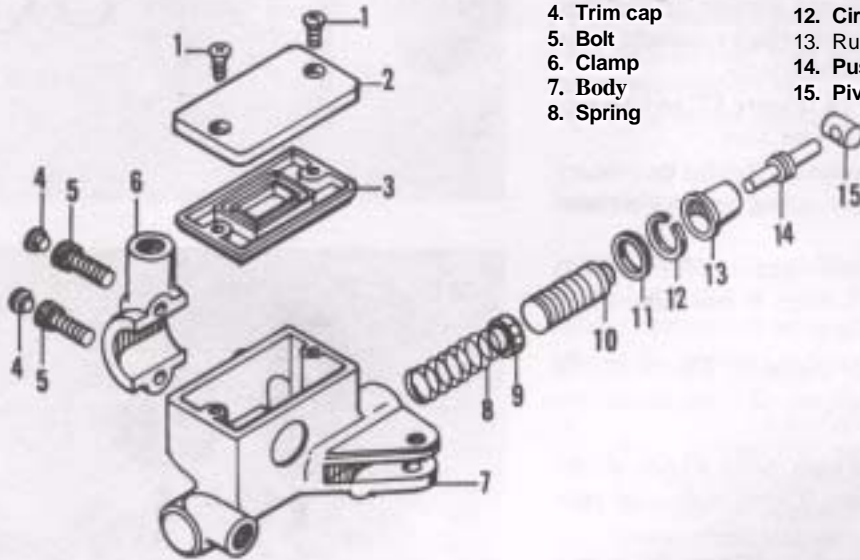
1. Remove the master cylinder as described in this chapter.
2. Remove the starter interlock switch plunger (**Figure 62**) from the master cylinder.
3. Remove the screws securing the top cover and remove the top cover and the diaphragm.
4. Pour out any residual hydraulic fluid and discard it. *Never* re-use hydraulic fluid.
5. Remove the bolt and nut (A, **Figure 63**) securing the hand lever and remove the lever (B, **Figure 63**).
6. Remove the push rod (A, **Figure 64**) and rubber boot (B, **Figure 64**) from the area where the hand lever actuates the piston assembly.
7. Using circlip pliers, remove the internal circlip (**Figure 65**) from the body. Remove the washer behind the circlip.
8. Remove the piston assembly and the spring.



61

CLUTCH MASTER CYLINDER

- | | |
|--------------|-----------------|
| 1. Screw | 9. Primary cap |
| 2. Cover | 10. Piston |
| 3. Diaphragm | 11. Washer |
| 4. Trim cap | 12. Circlip |
| 5. Bolt | 13. Rubber boot |
| 6. Clamp | 14. Pushrod |
| 7. Body | 15. Pivot |
| 8. Spring | |



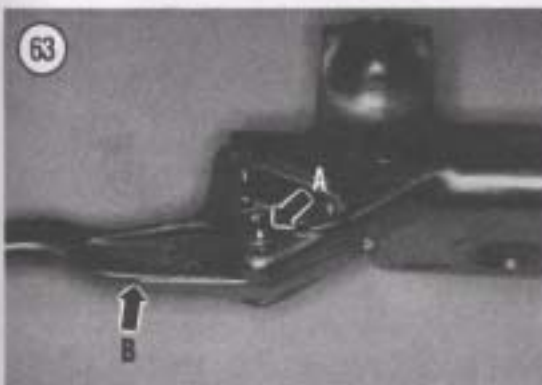
62



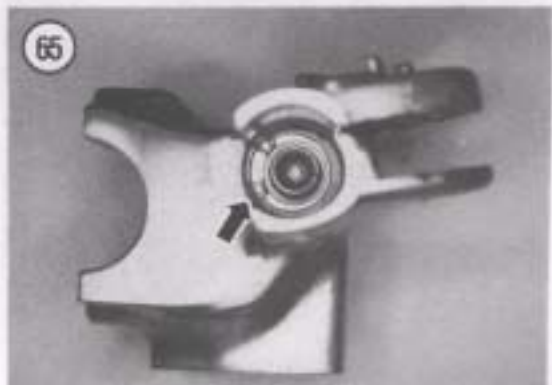
64



63

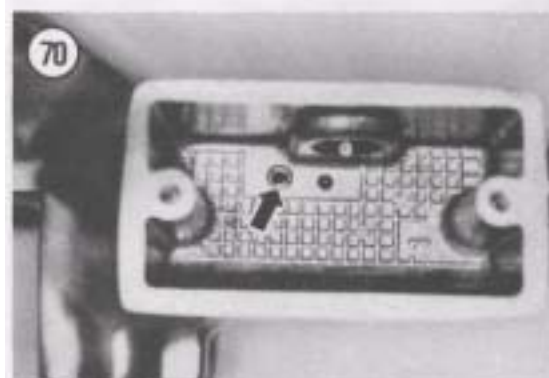
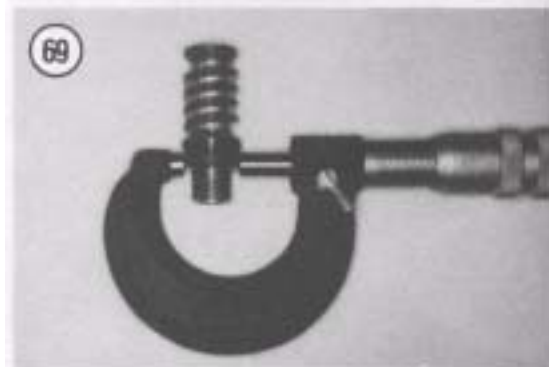
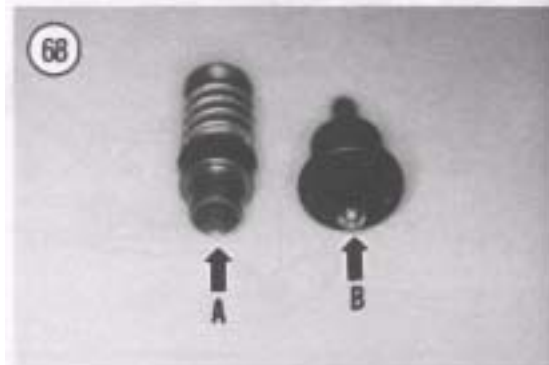
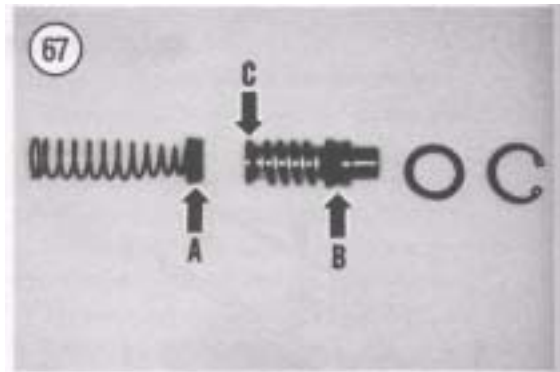
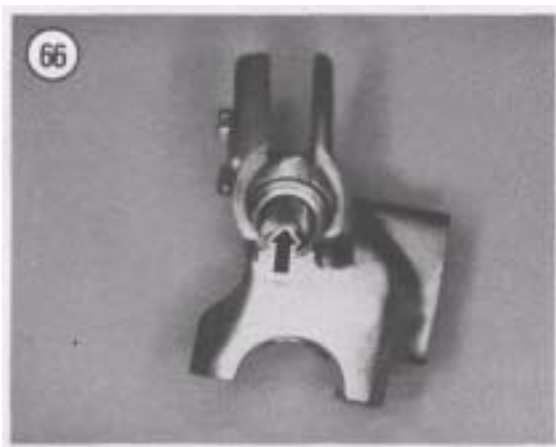


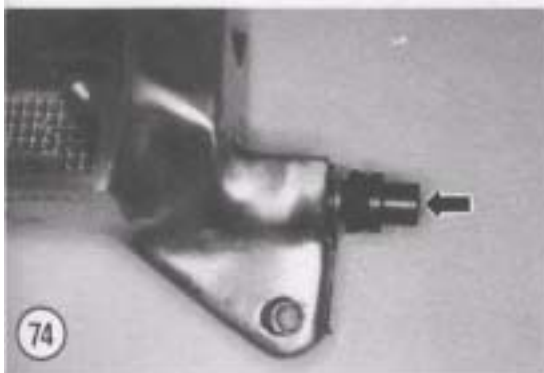
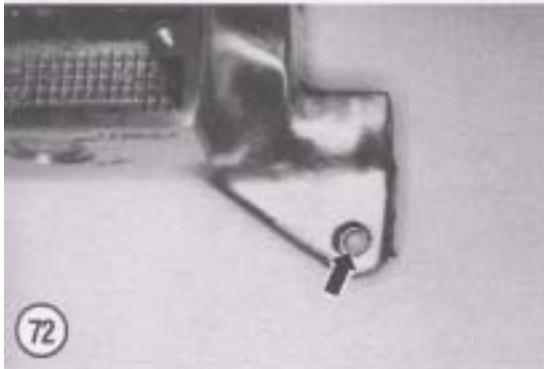
65



Inspection

1. Clean all parts in denatured alcohol or fresh hydraulic fluid.
2. Inspect the body cylinder bore (**Figure 66**) surface for signs of wear and damage. If less than perfect, replace the master cylinder assembly. The body cannot be replaced separately.
3. Inspect the primary (A, **Figure 67**) and the secondary cup (B, **Figure 67**) for wear.
4. Replace the piston assembly if either the primary or secondary cup and/or spring requires replacement.
5. Inspect the piston contact surfaces (C, **Figure 67**) for signs of wear and damage. If less than perfect, replace the piston assembly.
6. Check the end of the piston (A, **Figure 68**) for wear caused by the push rod. If worn, replace the piston assembly.
7. Check the end of the push rod (B, **Figure 68**) for wear caused by the piston. If worn, replace the push rod.
8. Measure the cylinder bore (**Figure 66**) with a bore gauge. Replace the master cylinder if the inside diameter is worn to the service limit dimension listed in **Table 2** or greater.
9. Measure the outside diameter of the piston with a micrometer (**Figure 69**). Replace the piston assembly if the outside diameter is worn to the service limit dimension listed in **Table 2** or less.
10. Make sure the passage (**Figure 70**) in the bottom of the master cylinder body is clear. Clean out if necessary.
11. Inspect the pivot hole on the hand lever. If worn or elongated the lever must be replaced.





12. Check the top cover and diaphragm (**Figure 71**) for damage and deterioration and replace as necessary.

13. Inspect the threads in the bore for the union bolt. If worn or damaged, clean out with a thread tap or replace the master cylinder assembly.

14. Check the hand lever pivot lugs (**Figure 72**) on the master cylinder body for cracks. If damaged, replace the master cylinder assembly.

Assembly

1. Soak the new cups in fresh hydraulic fluid for at least 15 minutes to make them pliable. Coat the inside of the cylinder bore with fresh hydraulic fluid prior to the assembly of parts.

CAUTION

When installing the piston assembly, do not allow the cups to turn inside out as they will be damaged and allow hydraulic fluid leakage within the cylinder bore.

2. Install the spring and primary cup assembly into the cylinder together. Install the spring with the tapered end (**Figure 73**) facing toward the primary cup.

3. Install the piston assembly into the cylinder (**Figure 74**).

4. Install the washer (**Figure 75**) and the circlip (**Figure 76**). Make sure the circlip is correctly seated in the groove (**Figure 65**).

5. Slide in the rubber boot (B, **Figure 64**) and install the pushrod (A, **Figure 64**).



6. Install the diaphragm and top cover. Do not tighten the cover screws at this time as hydraulic fluid will have to be added later when the system is bled.
7. Install the starter interlock switch plunger (**Figure 77**) into the receptacle in the master cylinder body.
8. Install the master cylinder as described in this chapter.

Clutch Hose Assembly Removal/Installation

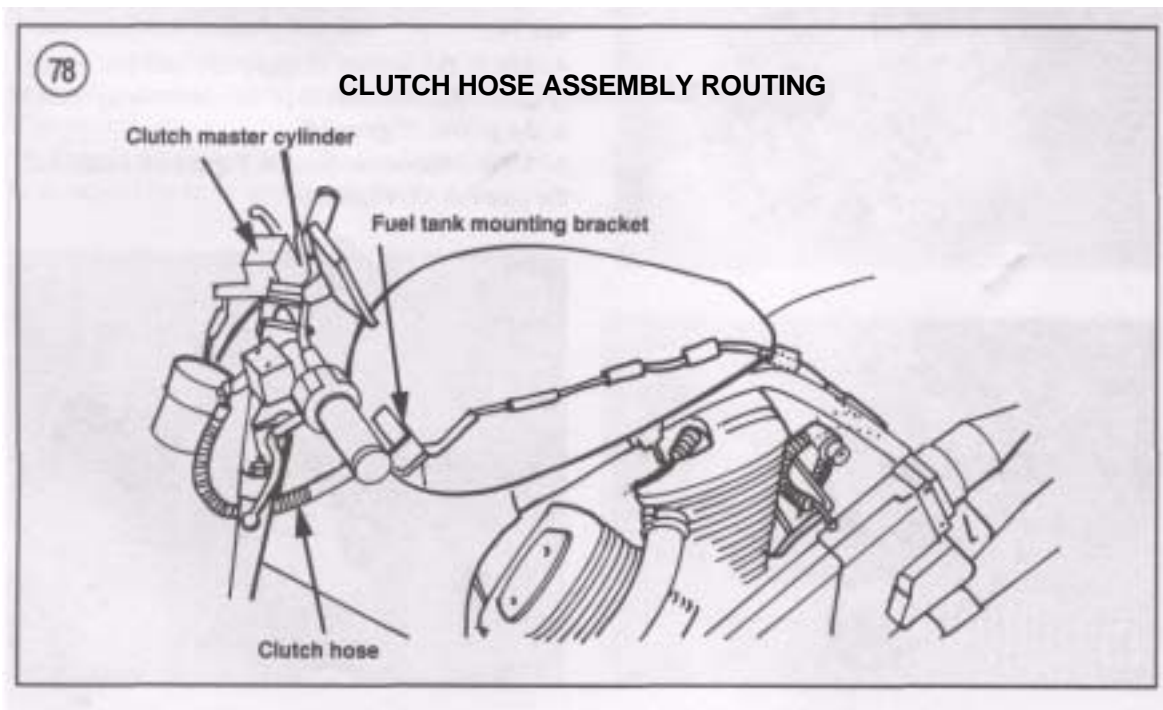
There is no factory-recommended replacement interval but it is a good idea to replace the clutch hose

assembly every four years or when either flexible section shows signs of cracking or damage.

The clutch hose assembly is made up of flexible hose that is attached to each end of a metal pipe. This assembly cannot be serviced and if any portion is defective the entire hose assembly must be replaced.

CAUTION

Cover the front fender and instrument cluster with a heavy cloth or plastic tarp to protect them from accidental hydraulic fluid spills. Wash hydraulic fluid off any painted or plated surfaces or plastic parts immediately, as it will destroy the finish. Use soapy water and rinse completely.





Refer to **Figure 78** for this procedure.

1. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Seven.
2. Remove the bolts securing the secondary drive cover (**Figure 79**) and remove the cover.
3. Remove the cap and attach a hose to the bleed valve (**Figure 80**) on the slave cylinder and place the loose end in a container.
4. Open the bleed valve and apply the lever on the clutch master cylinder to pump the hydraulic fluid out of the master cylinder and the clutch hose assembly. Continue to operate the lever until the fluid is pumped out of the hose assembly. Close the bleed valve and remove the hose. Dispose of this hydraulic fluid—never re-use hydraulic fluid.
5. Clean the top of the master cylinder of all dirt and foreign matter.
6. Loosen the screws (**Figure 81**) securing the master cylinder top cover. Pull up and loosen the cover and the diaphragm. This will allow air to enter the reservoir and allow any residual hydraulic fluid to drain out more quickly in the next steps.
7. Place a container under the clutch hose at the slave cylinder.
8. Remove the union bolt and sealing washers (**Figure 82**) securing the clutch hose to the slave cylinder.
9. Remove the clutch hose and let any residual hydraulic fluid drain out into the container. Dispose of this hydraulic fluid—never re-use hydraulic fluid. To prevent the entry of moisture and dirt, tape over the threaded bore in the slave cylinder.

WARNING

Dispose of this hydraulic fluid—never re-use hydraulic fluid. Contaminated hydraulic fluid can cause clutch problems.

10. Place a shop cloth under the union bolt to catch any spilled hydraulic fluid that will leak out.
11. Unscrew the union bolt (**Figure 83**) securing the clutch hose to the master cylinder. Don't lose the sealing washer on each side of the hose fitting.
12. Remove any tie wraps or hose clamps securing the hose assembly to the frame.

NOTE

Prior to removing the clutch hose make a drawing of the hose routing through the frame. It is very easy to forget how it was, once it has been removed. Re-

place the hose exactly as it was, avoiding any sharp turns.

13. Pull the clutch hose (**Figure 84**) out from the front fork area and from along the top of the frame.
14. Install a new hose, sealing washers and union bolts in the reverse order of removal, noting the following:
 - a. Be sure to install new sealing washers (**Figure 85**) and in the correct positions.
 - b. Tighten the fittings and union bolts to the torque specifications listed in **Table 2**.
 - c. Bleed the clutch system as described under *Bleeding the System* in this chapter.
 - d. Test ride the bike slowly at first to make sure the clutch is operating correctly.

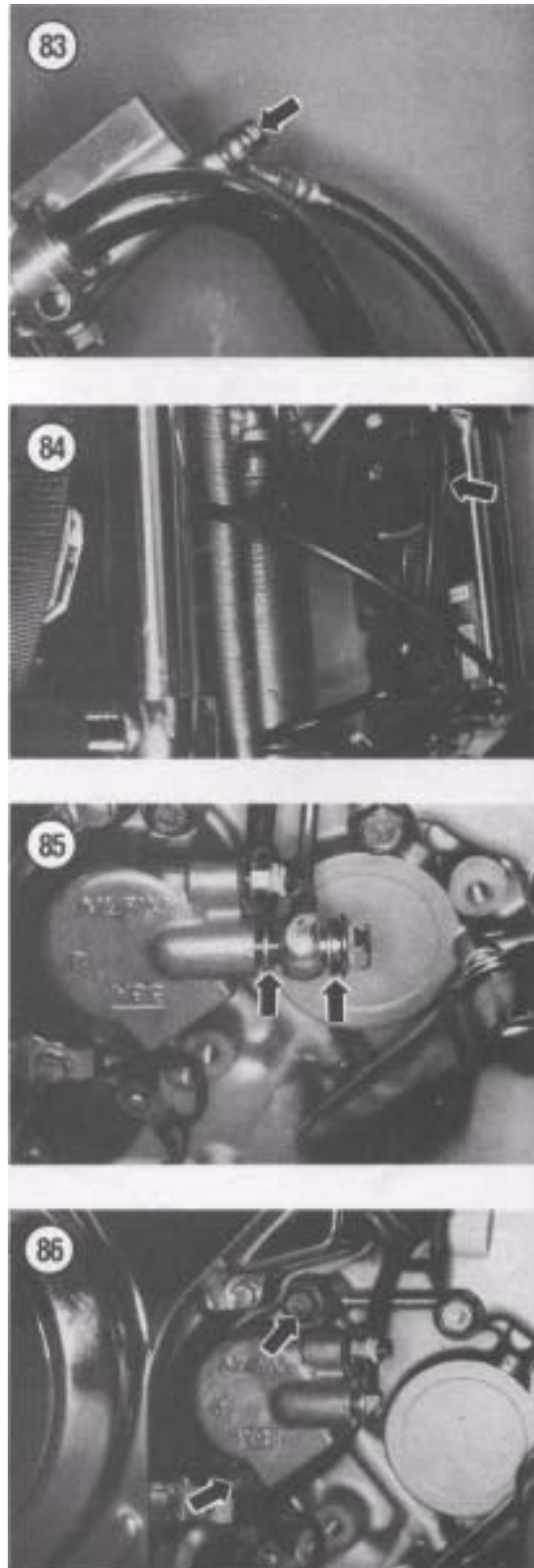
SLAVE CYLINDER

Removal

CAUTION

Cover the fuel tank, front fender and instrument cluster with a heavy cloth or plastic tarp to protect them from accidental hydraulic fluid spills. Wash hydraulic fluid from any painted or plated surfaces or plastic parts immediately, as it will destroy the finish. Use soapy water and rinse completely.

1. Remove the bolts securing the left-hand chrome cover (**Figure 79**) and remove the cover.
2. Remove the cap and attach a hose to the bleed valve (**Figure 80**) on the slave cylinder, then place the loose end in a container.
3. Open the bleed valve and apply the lever on the clutch master cylinder to pump the hydraulic fluid out of the master cylinder and the clutch hose assembly. Continue to operate the lever until the fluid is pumped out of the hose assembly. Close the bleed valve and remove the hose. Dispose of this hydraulic fluid—never re-use hydraulic fluid.
4. Clean the top of the master cylinder of all dirt and foreign matter.
5. Loosen the screws (**Figure 81**) securing the master cylinder top cover. Pull up and loosen the cover and the diaphragm. This will allow air to enter the reservoir and allow any residual hydraulic fluid to drain out more quickly in the next steps.
6. Place a container under the clutch hose at the slave cylinder.



7. Remove the union bolt and sealing washers (Figure 82) securing the clutch hose to the slave cylinder.
8. Remove the clutch hose and let any residual hydraulic fluid drain out into the container. Dispose of this hydraulic fluid—never re-use hydraulic fluid. To prevent the entry of moisture and dirt, tape over the threaded bore in the slave cylinder.

WARNING

Dispose of this hydraulic fluid—never re-use hydraulic fluid. Contaminated hydraulic fluid can cause clutch problems.

9. Remove the bolts (Figure 86) securing the slave cylinder to the crankcase and remove the slave cylinder assembly.

Disassembly/Inspection/Assembly

Refer to **Figure 87** for this procedure.

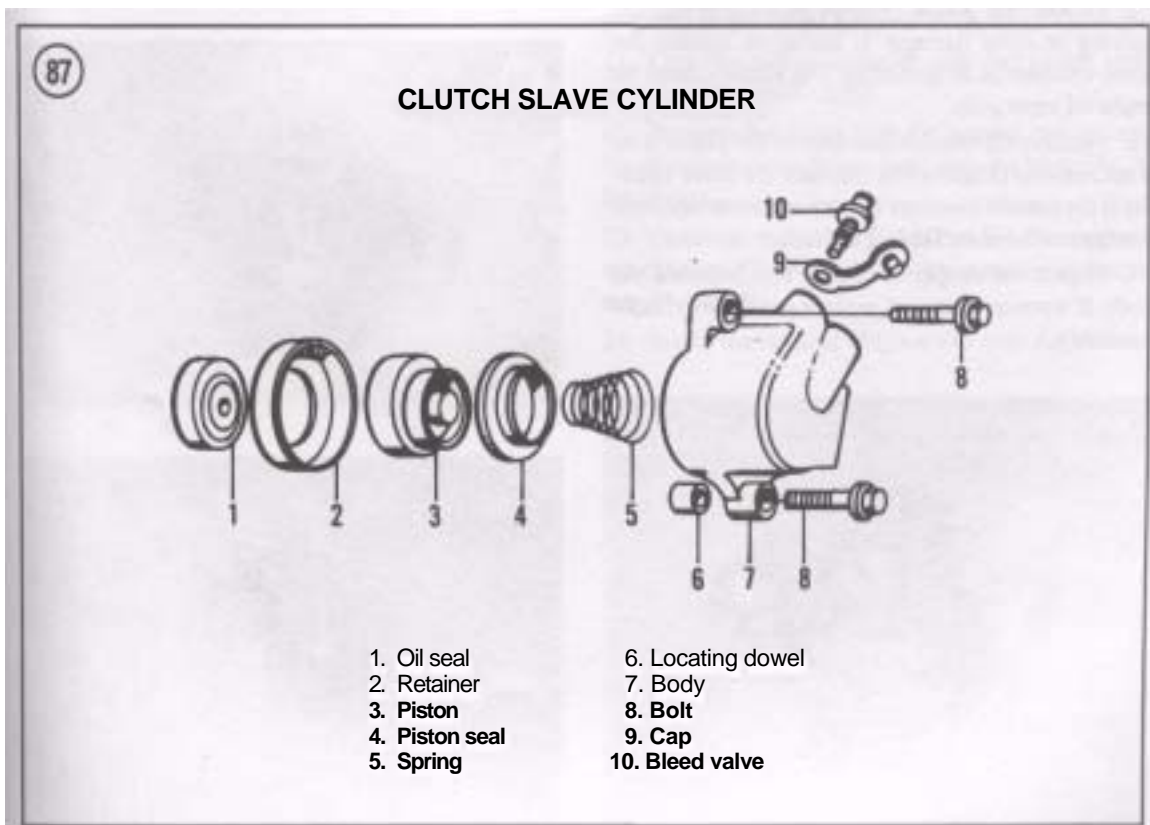
1. Remove the spring.
2. Remove the retainer (Figure 88) from the top of the piston.

3. Place a shop cloth or piece of soft wood at the end of the slave cylinder against the piston.
4. Place the slave cylinder assembly on the work bench with the piston facing down.

WARNING

In the next step, the piston may shoot out of the slave cylinder body like a bullet. Keep your fingers out of the way. Wear shop gloves and apply air pressure gradually. Do not use high pressure air or place the air hose nozzle directly against the hydraulic line fitting inlet in the slave cylinder body. Hold the air nozzle away from the inlet allowing some of the air to escape.

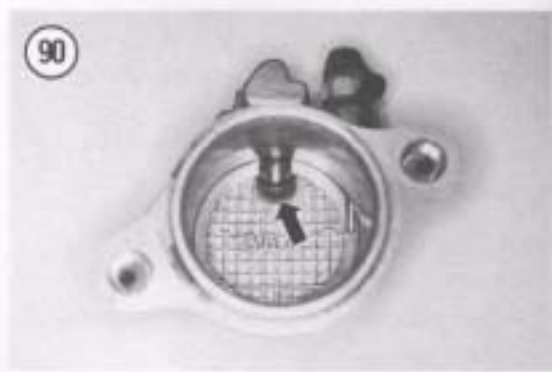
5. Apply the air pressure in short spurts to the hydraulic line fitting inlet and force the piston out. Use a service station air hose if you don't have an air compressor.
6. Remove the piston and seal.

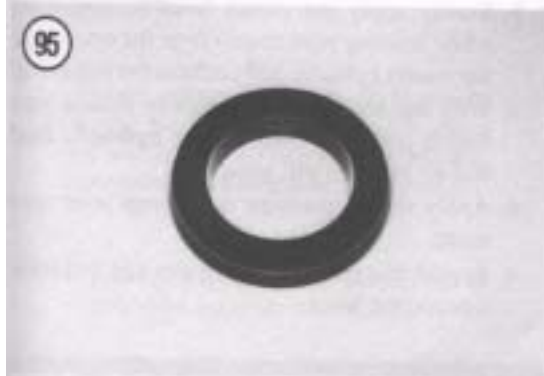
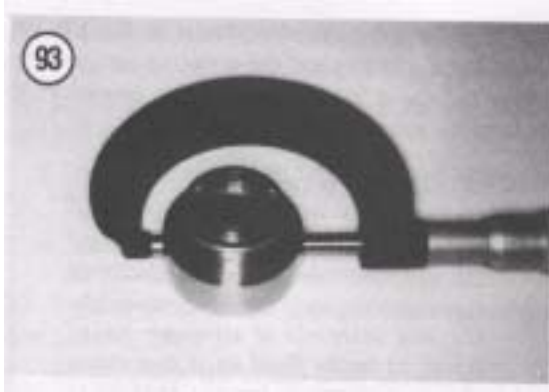


CAUTION

In the following step, do not use a sharp tool to remove the piston seal from the piston. Do not damage the piston surface.

7. Use a piece of plastic or wood and carefully remove the piston seal from the piston. Discard the piston seal as it must be replaced.
8. Inspect the slave cylinder body (**Figure 89**) for damage. If damaged, replace the slave cylinder as an assembly. The body cannot be replaced separately.
9. Inspect the hydraulic fluid passageway (**Figure 90**) at base of the piston bore. Make sure it is clean and open. Apply compressed air to the opening and make sure it is clear. Clean out passage, if necessary, with fresh hydraulic fluid.
10. Inspect the cylinder wall (**Figure 91**) for scratches, scoring or other damage. If either rusty or corroded, replace the slave cylinder as an assembly.
11. Measure the cylinder bore with a bore gauge. Replace the slave cylinder if the inside diameter is worn to the service limit dimension listed in **Table 2** or greater.
12. Inspect the piston (**Figure 92**) for scratches, scoring or other damage. If damaged, replace the slave cylinder as an assembly. The piston cannot be replaced separately.
13. Measure the outside diameter of the piston with a micrometer (**Figure 93**). Replace the slave cylinder if the outside diameter is worn to the service limit dimension listed in **Table 2** or less.
14. Inspect the caliper mounting bolt holes on the body. If worn or damaged, replace the slave cylinder assembly.





15. Remove the bleed screw (A, **Figure 94**). Make sure it is clean and open. Apply compressed air to the opening and make sure it is clear. Clean out if necessary with fresh hydraulic fluid.

16. Inspect the threads in the bore (B, **Figure 94**) for the union bolt. If worn or damaged, clean out with a metric thread tap or replace the slave cylinder assembly.

17. Inspect the spring for damage or sagging. Replace if necessary. Suzuki does not provide service information for spring free length.

18. If serviceable, clean the slave cylinder with rubbing alcohol and rinse with clean hydraulic fluid.

NOTE

Never reuse the old piston seal. Very minor damage or age deterioration can make the seal useless.

19. Coat the new piston seal (**Figure 95**) with fresh hydraulic fluid.

20. Carefully install the new piston seal in the groove in piston (**Figure 96**). Make sure the seal is properly seated in the groove.

21. Coat the piston, cylinder wall and piston seal with fresh hydraulic fluid.

22. Position the spring with the tapered end toward the piston and install the spring into the backside of the piston.

23. Carefully install the piston into the slave cylinder (**Figure 97**). Push the piston in until it bottoms out (**Figure 98**).

24. Install the retainer (**Figure 88**) over the piston.



Installation

1. Make sure the clutch push rod seal (A, **Figure 99**) is in place and is not leaking.
2. Push the clutch push rod (B, **Figure 99**) all the way in until it bottoms out.
3. If removed, install the locating dowels (C, **Figure 99**).
4. Install the slave cylinder assembly onto the crankcase.
5. Install the bolts (**Figure 86**) securing the slave cylinder to the crankcase. Tighten the bolts securely.
6. Install a sealing washer (**Figure 85**) on each side of the hose fitting. Install the union bolt securing the clutch hose to the slave cylinder. Tighten the union bolt to the torque specification listed in **Table 2**.
7. Install the chrome cover and tighten the bolts securely.

BLEEDING THE SYSTEM

This procedure is not necessary unless the clutch feel spongy, there has been a leak in the system, a component has been replaced or the hydraulic fluid has been replaced.

1. Remove the bolts securing the left-hand chrome cover (**Figure 79**) and remove the cover.
2. Remove the dust cap (**Figure 80**) from the bleed valve on the slave cylinder.
3. Connect a piece of clear tubing to the bleed valve on the slave cylinder.
4. Place the other end of the tube into a clean container.
5. Fill the container with enough fresh hydraulic fluid to keep the end submerged.

CAUTION

Cover the wheel with a heavy cloth or plastic tarp to protect it from the accidental spilling of hydraulic fluid. Wash any fluid from any plastic, painted or plated surface immediately; as it will destroy the finish. Use soapy water and rinse completely.

6. Clean the top cover of the master cylinder of all dirt and foreign matter.
7. Remove the screws securing the master cylinder top cover (**Figure 81**). Remove the top cover and diaphragm.

8. Fill the master cylinder almost to the top lip; insert the diaphragm and the cover, or cap, loosely. Leave the cover in place during this procedure to prevent the entry of dirt.

WARNING

Use hydraulic fluid from a sealed container marked DOT 3 or DOT 4 only. Do not intermix different brands or types as they may not be compatible. Do not intermix a silicone based (DOT 5) brake fluid as it can cause clutch component damage leading to clutch system failure.

NOTE

During this procedure, it is very important to check the fluid level in the clutch master cylinder reservoir often. If the reservoir runs dry, you'll introduce more air in the system which will require starting over.

9. If the clutch master cylinder was drained, it must be bled first as follows:
 - a. Remove the union bolt and hose from the master cylinder.
 - b. Slowly apply the clutch lever several times while holding your thumb over the opening in the master cylinder and perform the following:
 - c. With the lever applied, slightly release your thumb pressure. Some of the hydraulic fluid and air bubbles will escape.
 - d. Apply thumb pressure and pump lever once more.
 - e. Repeat this procedure until you can feel resistance at the lever.



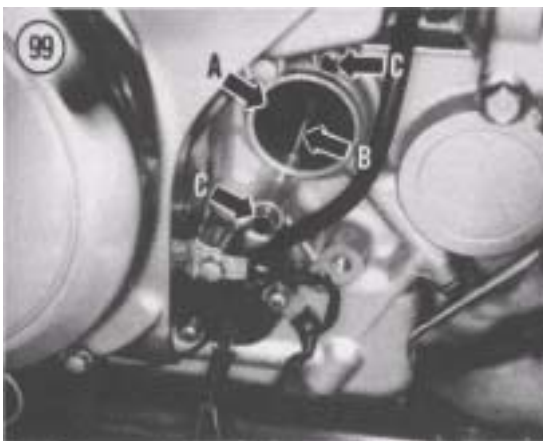
10. Quickly reinstall the hose, sealing washers and the union bolt. Tighten the union bolt.
11. Refill the master cylinder. Pump the lever again and perform the following:
 - a. Loosen the union bolt 1/4 turn. Some hydraulic fluid and air bubbles will escape.
 - b. Tighten the union bolt and repeat this procedure until no air bubbles escape.
12. Tighten the union bolts to the torque specification listed in **Table 2**.
13. Slowly apply the clutch lever several times as follows:
 - a. Pull the lever in and hold it in the applied position.
 - b. Open the bleed valve about one-half turn. Allow the lever to travel to its limit.
 - c. When this limit is reached, tighten the bleed valve.
14. As the fluid enters the system, the level will drop in the reservoir. Maintain the level to just about the top of the reservoir to prevent air from being drawn into the system.
15. Continue to pump the lever and fill the reservoir until the fluid emerging from the hose is completely free of bubbles.

NOTE

Do not allow the reservoir to empty during the bleeding operation or more air will enter the system. If this occurs, the entire procedure must be repeated.

NOTE

If you are having trouble getting all of the bubbles out of the system, refer to the



Reverse Flow Bleeding at the end of this section.

16. Hold the lever in, tighten the bleed valve, remove the bleed tube and install the bleed valve dust cap.
17. If necessary, add fluid to correct the level in the reservoir.
18. Install the diaphragm and the cover. Tighten the screws securely.
19. Test the feel of the clutch lever. It should be firm and should offer the same resistance each time it's operated. If it feels spongy, it is likely that there is still air in the system and it must be bled again. When all air has been bled from the system and the fluid level is correct in the reservoir, make sure all fittings and connections are tight, then double-check for leaks.
20. Test ride the bike slowly at first to make sure that the clutch is operating properly.

Reverse Flow Bleeding

This bleeding procedure can be used if you are having a difficult time freeing the system all of bubbles.

Using this procedure, the hydraulic fluid will be forced into the system in a reverse direction. The fluid will enter the slave cylinder, flow through the clutch hose assembly and into the clutch master cylinder reservoir. If the system is already filled with hydraulic fluid, the existing fluid will be flushed out of the top of the master cylinder by the new hydraulic fluid being forced into the slave cylinder. Siphon the fluid from the reservoir, then hold a shop cloth under the clutch master cylinder reservoir to catch any additional fluid that will be forced out.

A special reverse flow tool called the EZE Bleeder is available or a home made tool can be fabricated for this procedure.

To make this home made tool, perform the following:

NOTE

The brake fluid container must be plastic—not metal. Use vinyl tubing of the correct inner diameter to ensure a tight fit on the caliper bleed valve.

- a. Purchase a 12 oz. (345 ml) plastic bottle of DOT 3 or DOT 4 brake fluid.

- b. Remove the cap, drill an appropriate size hole and adapt a vinyl hose fitting onto the cap.
 - c. Attach a section of vinyl hose to the hose fitting on the cap and secure it with a hose clamp. This joint must be a tight fit as the plastic brake fluid bottle will be squeezed to force the hydraulic fluid out past this fitting and through the hose.
 - d. Remove the moisture seal from the plastic bottle of brake fluid and screw the cap and hose assembly onto the bottle.
1. Clean the top cover of the master cylinder of all dirt and foreign matter.
 2. Remove the screws securing the master cylinder top cover (**Figure 81**). Remove the top cover and diaphragm.
 3. Fill the master cylinder almost to the top lip; insert the diaphragm and the cover, or cap, loosely. Leave the cover in place during this procedure to prevent the entry of dirt.
 4. Remove the dust cap (**Figure 80**) from the bleed valve on the slave cylinder.
 5. Attach the vinyl hose to the bleed valve on the caliper. Make sure the hose is tight on the bleed valve.

6. Open the bleed valve and squeeze the plastic bottle forcing this hydraulic fluid into the clutch system.

NOTE

If necessary, siphon hydraulic fluid from the reservoir to avoid overflow of fluid.

1. Observe the hydraulic fluid entering the clutch master cylinder reservoir. Continue to apply pressure from the bottle, until the fluid entering the reservoir is free of all air bubbles.
8. Close the bleed valve, then disconnect the hose from the bleed valve.
9. Install the dust cap onto the bleed valve on the slave cylinder.
10. At this time the clutch system should be free of bubbles. Apply the clutch lever and check for proper clutch operation. If the system still feels spongy, perform the typical bleeding procedure in the beginning of this section.

Table 1 CLUTCH SPECIFICATIONS

Hem	Standard	Wear limit
Friction disc		
Disc No. 1	2.92-3.08 mm (0.115-0.121 in.)	2.62 mm (0.103 in.)
Disc No. 2	3.45-3.55 mm (0.136-0.140 in.)	3.15 mm (0.124 in.)
Friction disc claw width	15.8-16.0 mm (0.622-0.630 in.)	15.0 mm (0.591 in.)
Clutch plate thickness	1.55-1.65 mm (0.0628-0.0632 in.)	—
Clutch plate warpage	—	0.10 mm (0.004 in.)
Clutch spring free length	—	34.0 mm (1.34 in.)
Clutch master cylinder		
Piston OD	13.957-13.984 mm (0.5495-0.5506 in.)	—
Cylinder bore ID	14.000-14.043 mm (0.5512-0.5524 in.)	—
Clutch slave cylinder		
Piston OD	38.042-38.075 mm (1.4977-1.4990 in.)	—
Cylinder bore ID	38.100-38.162 mm (1.5000-1.5024 in.)	—

Table 2 CLUTCH TIGHTENING TORQUES

Item	N.m	ft-lb.
Clutch locknut	50-70	36-50.5
Clutch spring bolts	11-13	8-9.5
Clutch union bolt	20-25	14.5-18
Clutch master cylinder clamp bolt	5-8	3.5-6.0