10. CLUTCH/GEARSHIFT LINKAGE

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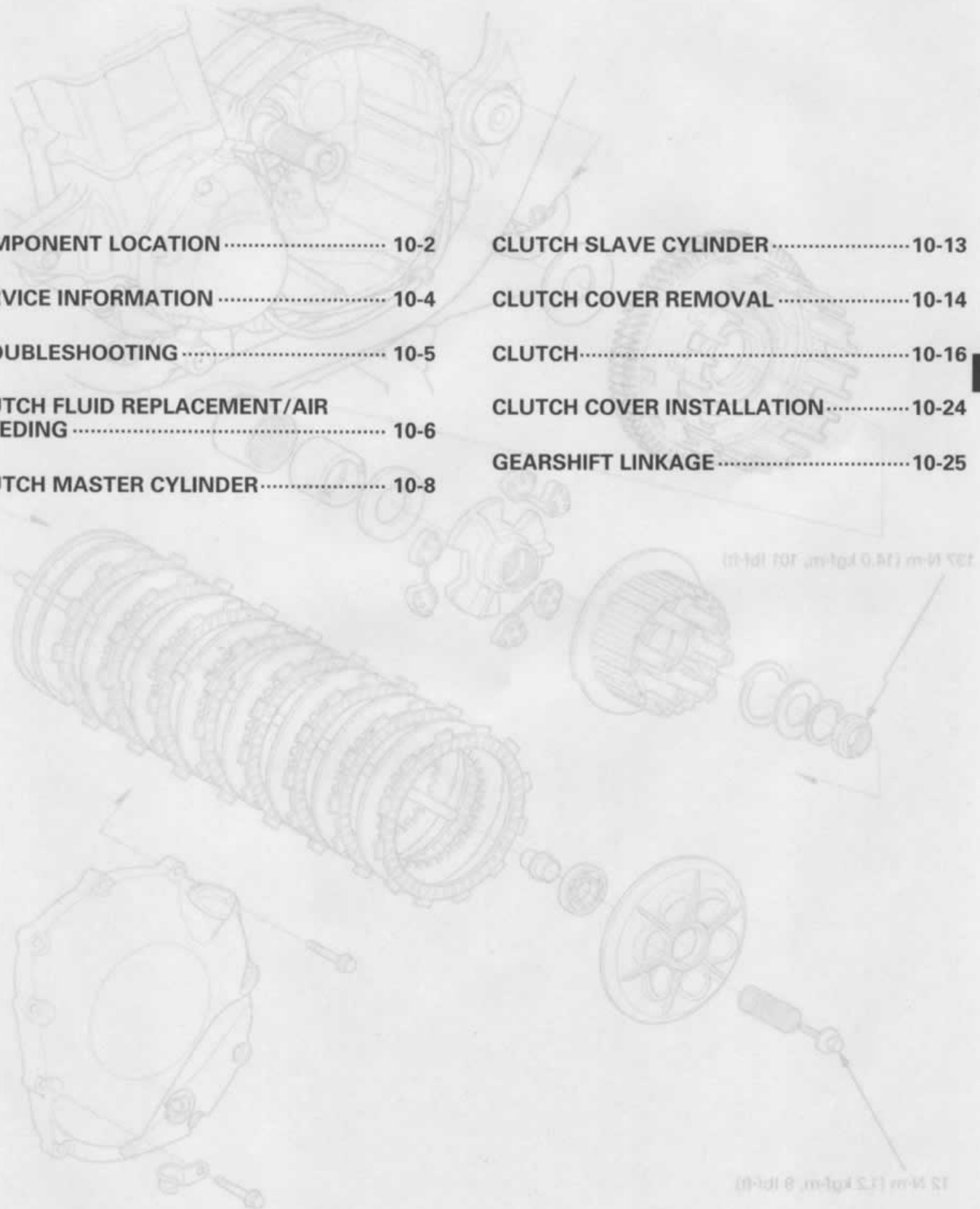
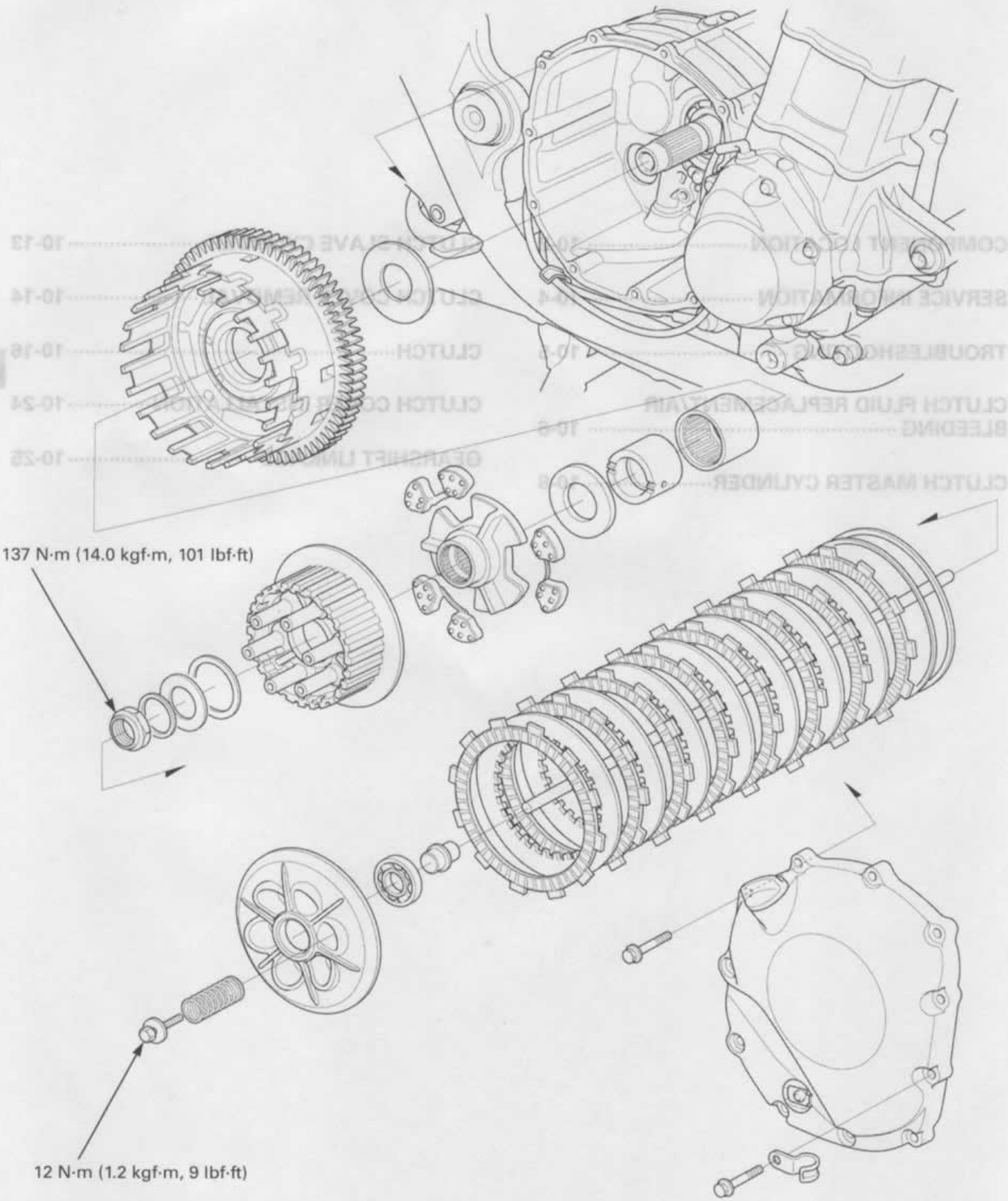
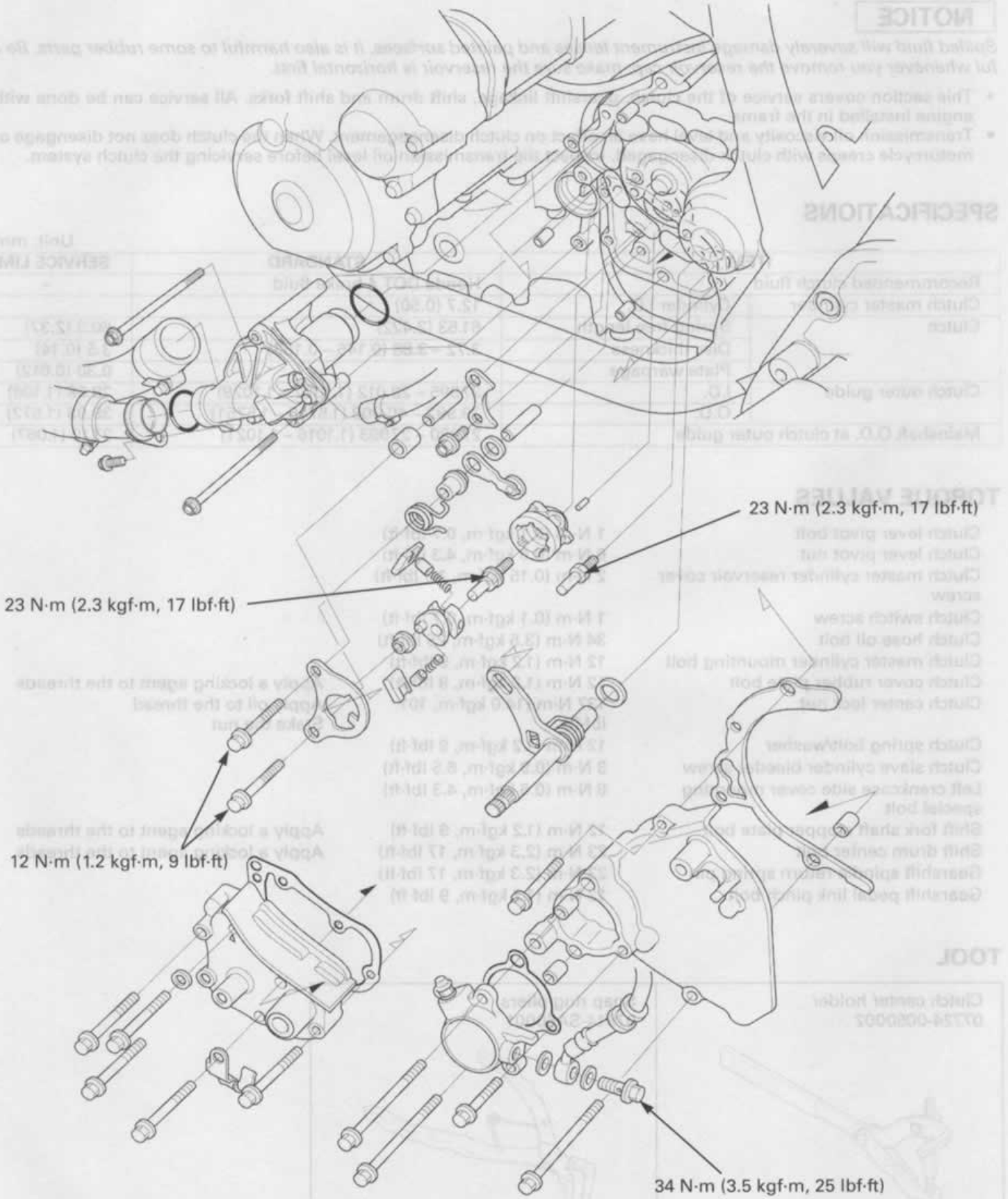


COMPONENT LOCATION




23 N·m (2.3 kgf·m, 17 lbf·ft)
23 N·m (2.3 kgf·m, 17 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)

SERVICE INFORMATION

GENERAL

NOTICE

Spilled fluid will severely damage instrument lenses and painted surfaces, It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.

- This section covers service of the clutch, gearshift linkage, shift drum and shift forks. All service can be done with the engine installed in the frame.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

SPECIFICATIONS

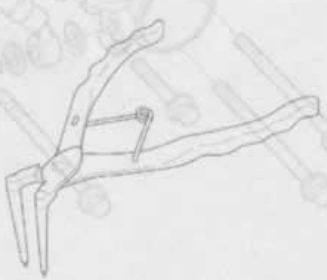
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended clutch fluid		Honda DOT 4 brake fluid	–
Clutch master cylinder	Cylinder I.D.	12.7 (0.50)	
Clutch	Spring free length	61.53 (2.422)	60.3 (2.37)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	–	0.30 (0.012)
Clutch outer guide	I.D.	27.995 – 28.012 (1.1022 – 1.1028)	28.08 (1.106)
	O.D.	39.992 – 40.008 (1.5745 – 1.5751)	39.93 (1.572)
Mainshaft O.D. at clutch outer guide		27.980 – 27.993 (1.1016 – 1.1021)	27.10 (1.067)

TORQUE VALUES

Clutch lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Clutch master cylinder reservoir cover screw	2 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Clutch switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Clutch master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch cover rubber plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Clutch center lock nut	137 N·m (14.0 kgf·m, 101 lbf·ft)	Apply oil to the thread Stake the nut
Clutch spring bolt/washer	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch slave cylinder bleeder screw	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Left crankcase side cover mounting special bolt	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Shift fork shaft stopper plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Shift drum center bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads
Gearshift spindle return spring pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Gearshift pedal link pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOL

Clutch center holder 07724-0050002	Snap ring pliers 07914-SA50001
	

TROUBLESHOOTING

Clutch lever soft or spongy
- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking

Clutch lever too hard to pull in
- Sticking master cylinder piston
- Sticking slave cylinder
- Clogged hydraulic system
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

Clutch slips when accelerating
- Hydraulic system sticking
- Worn clutch disc
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking or clogged
- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

Hard to shift
- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

Transmission jumps out of gear
- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

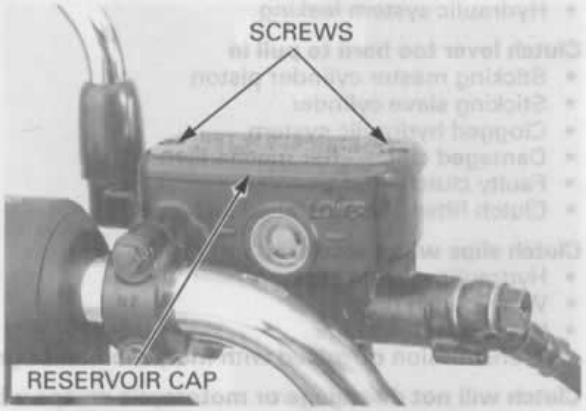
CLUTCH FLUID REPLACEMENT/AIR BLEEDING

CLUTCH FLUID DRAINING

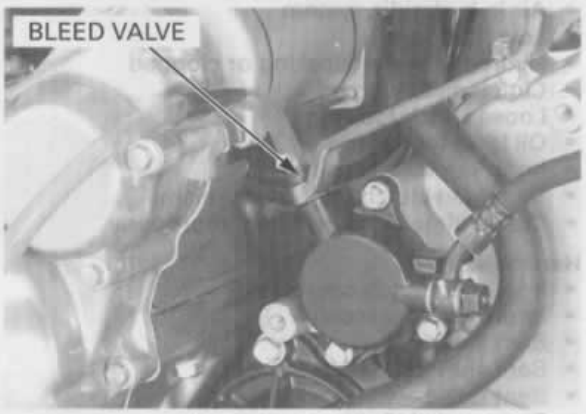
Remove the left crankcase side cover (page 8-4).

Turn the handlebar to the right until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws, reservoir cap, set plate and diaphragm.



Connect a bleed hose to the bleed valve of the clutch slave cylinder.
Loosen the bleed valve and pump the clutch lever until fluid stops flowing out of the bleed valve.



CLUTCH FLUID FILLING/AIR BLEEDING

Use only DOT 4 brake fluid from a sealed container.

Fill the reservoir with DOT 4 Brake fluid from a sealed container.

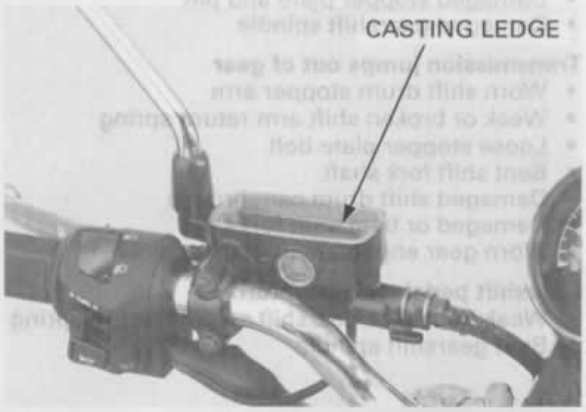
Connect a commercially available brake bleeder to the bleed valve.

Do not mix different types of fluid. They are not compatible.

Pump the brake bleeder and loosen the bleed valve.

Add brake fluid when the fluid level in the reservoir is low.

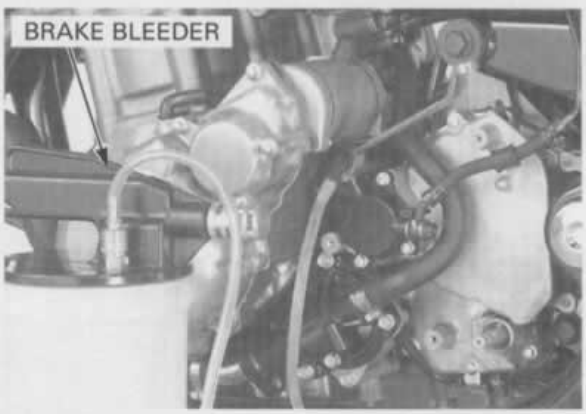
- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instruction.



If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Repeat the above procedures until new fluid flows out of the bleed valve and air bubbles do not appear in the plastic hose.

Close the bleed valve and operate the clutch lever. If it is still spongy, bleed the system again.



If a brake bleeder is not available, use the following procedure.
Pump the clutch lever until lever resistance is felt.

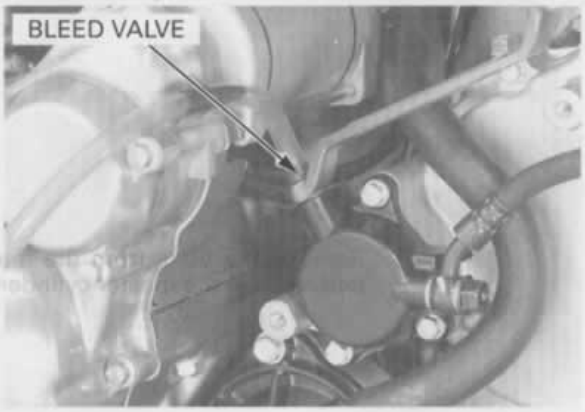
Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the clutch lever, open the bleed valve 1/4 of a turn and then close it. Do not release the clutch lever until the bleed valve has been closed.
2. Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.

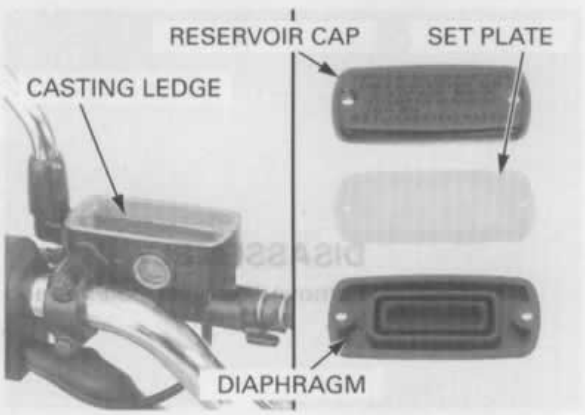
Tighten the bleed valve to the specified torque.

TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)



Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.

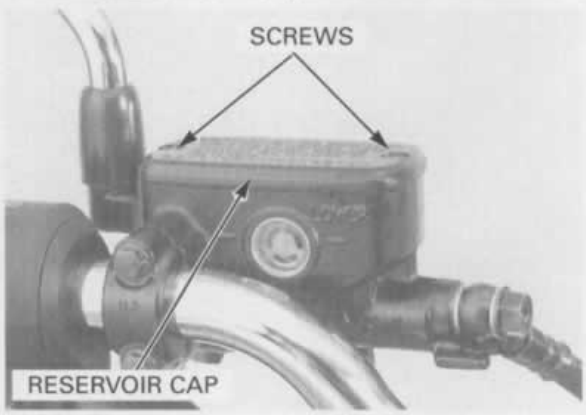
Install the diaphragm, set plate and reservoir cap.



Install and tighten the cap screws to the specified torque.

TORQUE: 2 N·m (0.15 kgf·m, 1.1 lbf·ft)

Check the clutch operation (page 4-28).



CLUTCH MASTER CYLINDER

REMOVAL

NOTICE

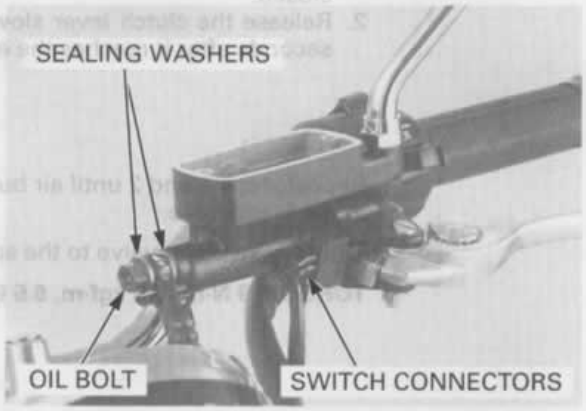
Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Drain the clutch hydraulic system (page 10-6).

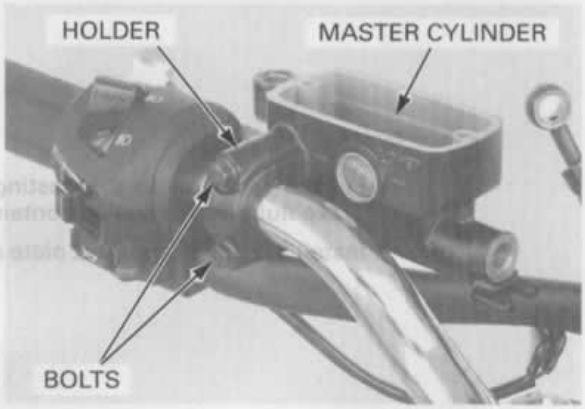
Remove the left rearview mirror.

Disconnect the clutch switch wire connectors.

Remove the clutch hose oil bolt, sealing washers and clutch hose eyelet.

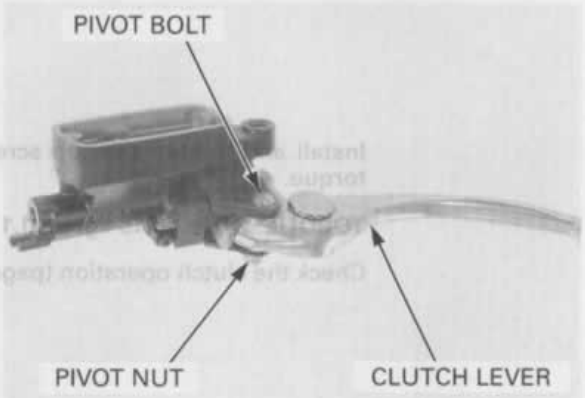


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

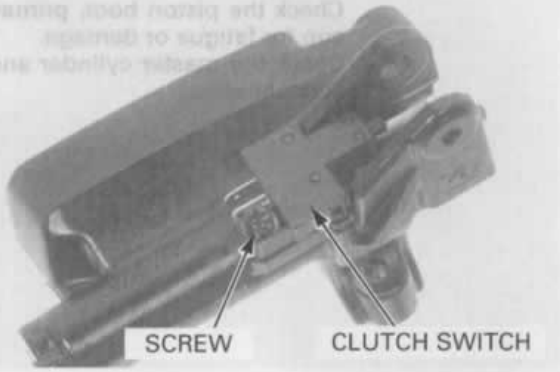


DISASSEMBLY

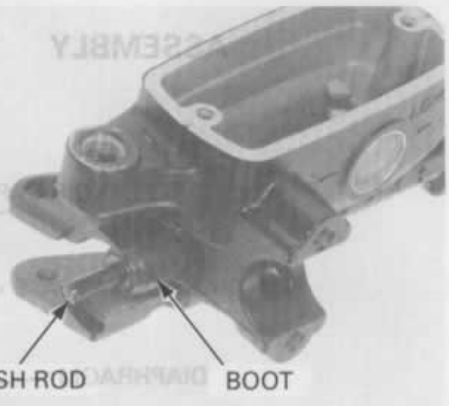
Remove the pivot bolt/nut and clutch lever assembly.



Remove the screw and clutch switch.

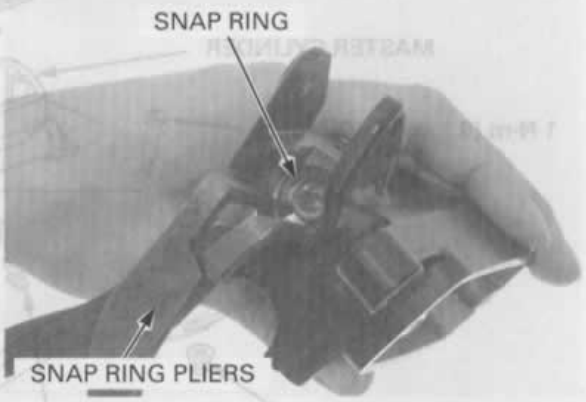


Remove the boot and push rod.



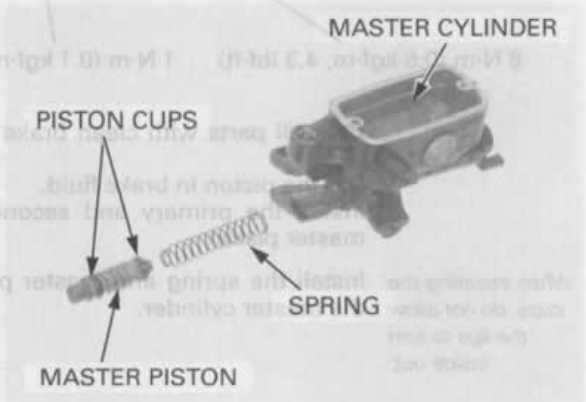
Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers **07914–SA50001**



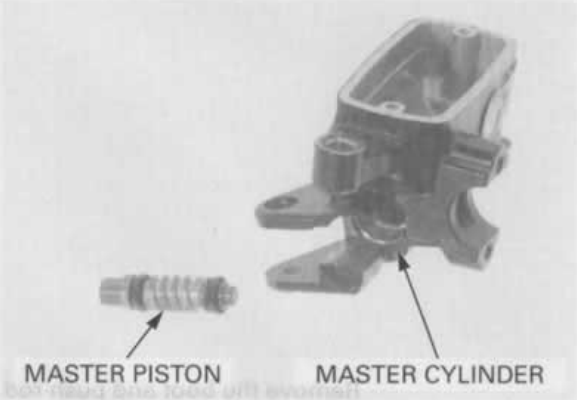
Remove the master piston assembly and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

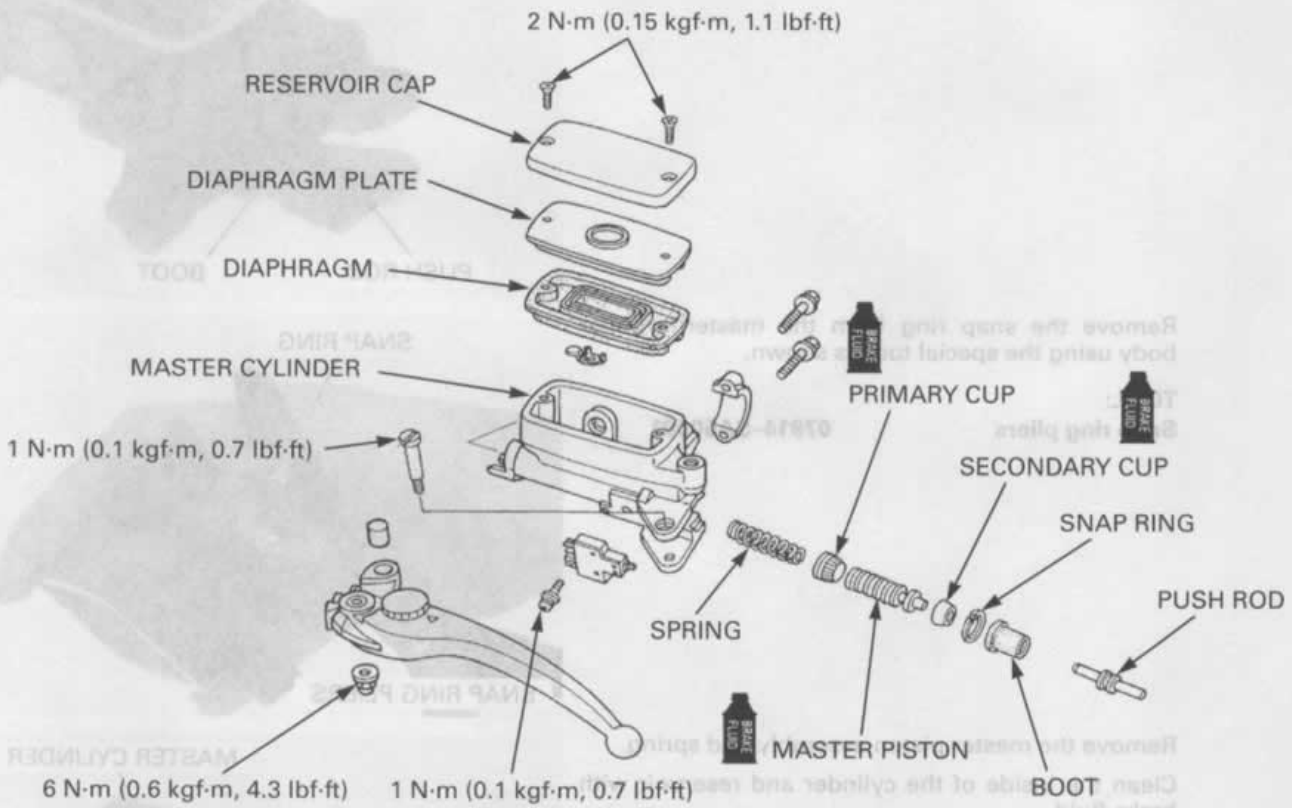


INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.



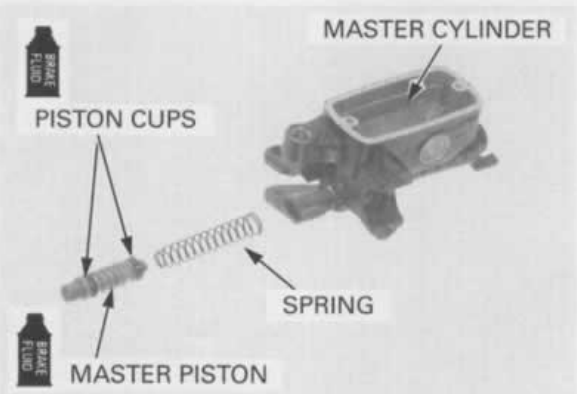
ASSEMBLY



Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the primary and secondary cups onto the master piston.

When installing the cups, do not allow the lips to turn inside out.

Install the spring and master piston assembly into the master cylinder.

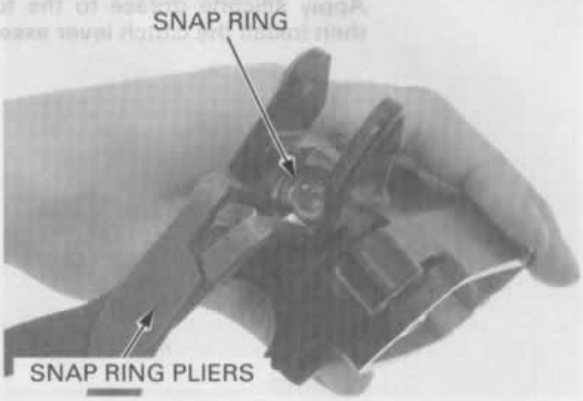


Be certain the snap ring is firmly seated in the groove.

Install the snap ring using the special tool.

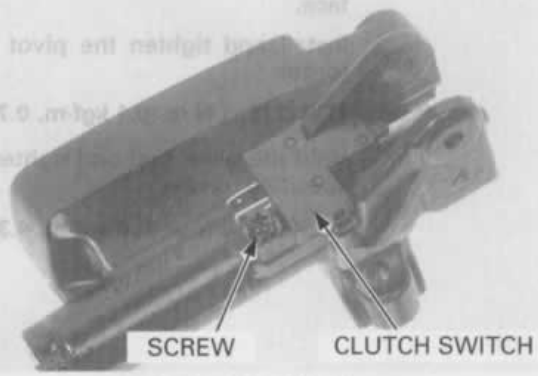
TOOL:

Snap ring pliers	**07914–SA50001**



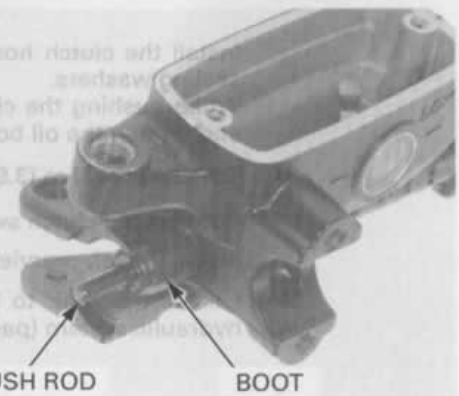
Install the clutch switch and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

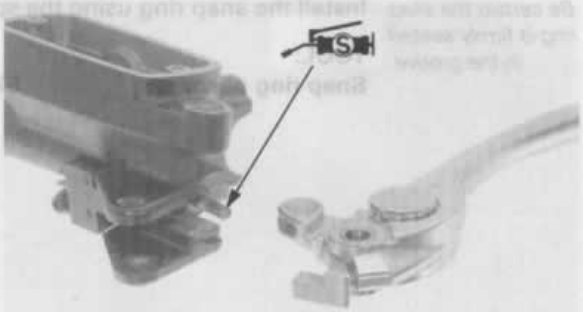


Apply silicone grease to the boot inside and tip of the push rod.

Install the push rod and boot.



Apply silicone grease to the top of the push rod, then install the clutch lever assembly.



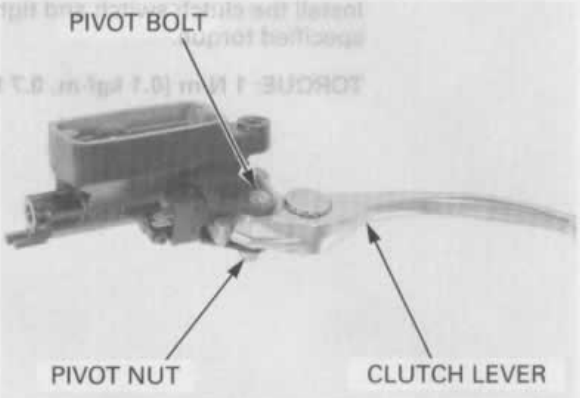
Apply grease to the clutch lever pivot sliding surface.

Install and tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Hold the pivot bolt and tighten the pivot nut to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

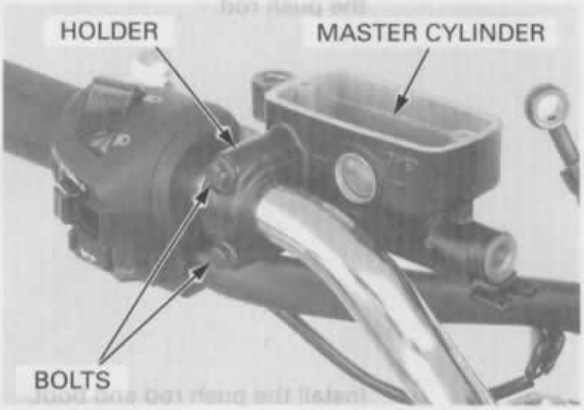


INSTALLATION

Place the master cylinder assembly onto the handlebar.
Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



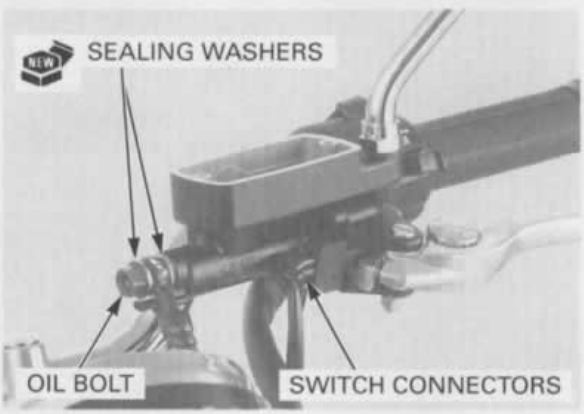
Install the clutch hose eyelet the oil bolt and new sealing washers.
While pushing the clutch hose against the stopper and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the clutch switch connectors.

Install the left rearview mirror.

Fill the reservoir to the upper level and bleed the hydraulic system (page 10-6).



CLUTCH SLAVE CYLINDER

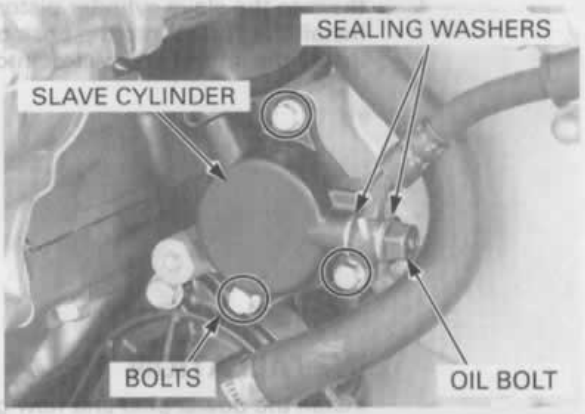
REMOVAL

Drain the clutch hydraulic system (page 10-6).

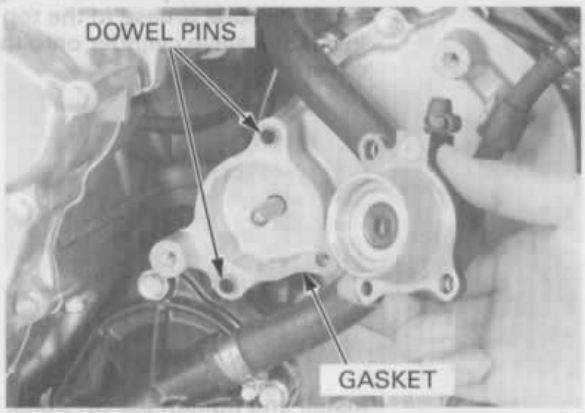
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Remove the clutch hose oil bolt, sealing washers and brake hose eyelet.

Remove the bolts and clutch slave cylinder assembly.



Remove the gasket and dowel pins.

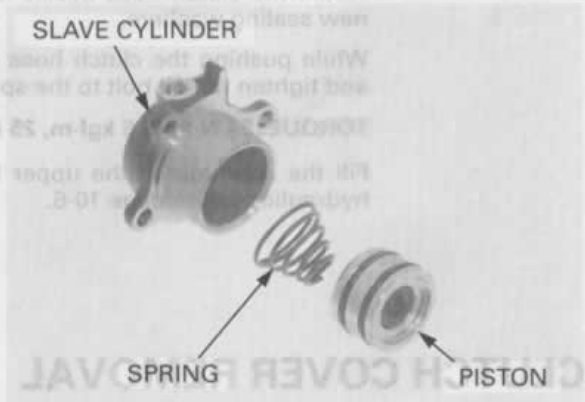


DISASSEMBLY

Remove the slave cylinder piston and spring.
If the piston is hard to remove, remove the following:
Place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.

Do not use high pressure air or bring the nozzle to close to the inlet.

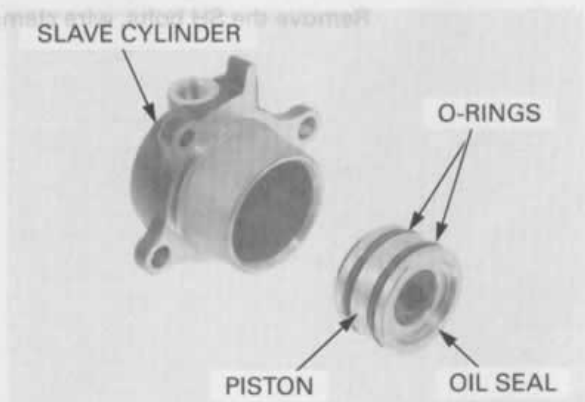
Apply small squirts of air pressure to the fluid inlet to remove the pistons.



INSPECTION

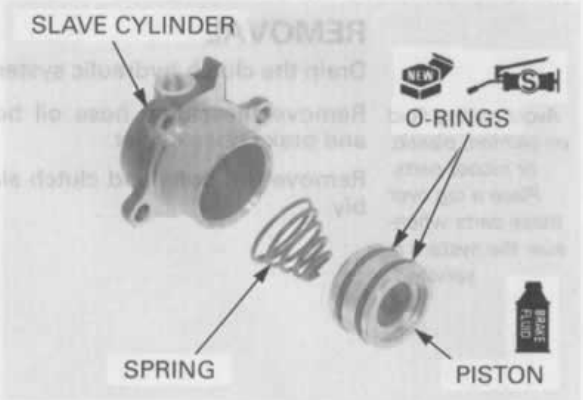
Check the piston spring for weakness or damage.
Inspect the oil seal and O-rings for damage or deterioration, replace if necessary.
Clean the O-ring grooves with clean brake fluid.

Check the slave cylinder for scoring or other damage.
Check the slave cylinder piston for scratches, scoring or other damage.



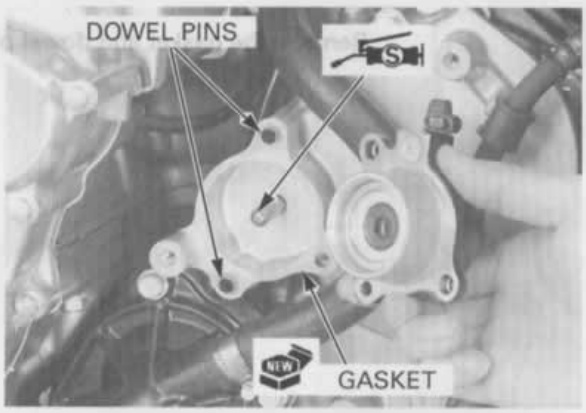
ASSEMBLY

Lubricate the piston with brake fluid.
Apply silicone grease to the new O-rings and install them to the slave cylinder piston grooves.
Install the spring into the boss of the piston.
Install the spring and piston into the slave cylinder



INSTALLATION

Install the dowel pins and new gasket.
Apply silicone grease to the top of the push rod.
Install the slave cylinder onto the left crankcase rear cover.



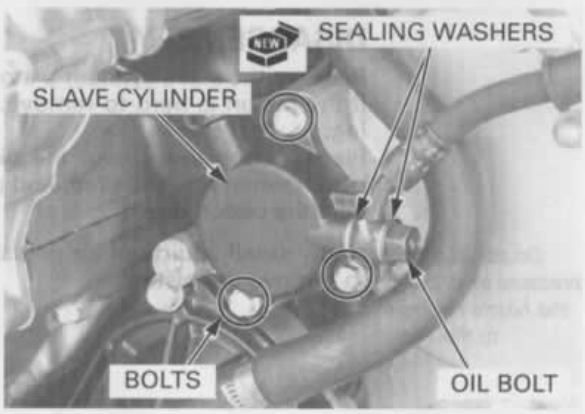
Install and tighten the SH bolts.

Install the clutch hose eyelet with the oil bolt and new sealing washers.

While pushing the clutch hose against the stopper and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

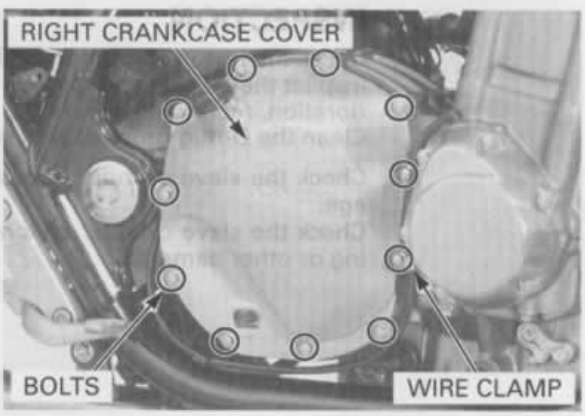
Fill the reservoir to the upper level and bleed the hydraulic system page 10-6.



CLUTCH COVER REMOVAL

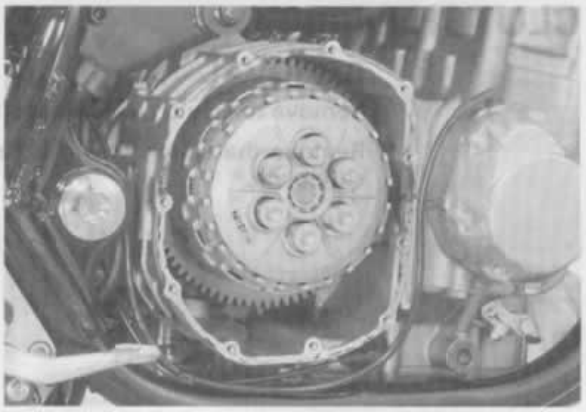
Drain the engine oil (page 4-15).

Remove the SH bolts, wire clamp and clutch cover.



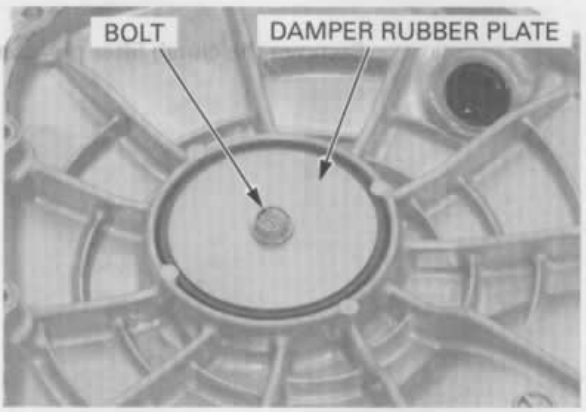
Be careful not to damage the mating surface.

Clean any sealant off from the clutch cover mating surfaces.



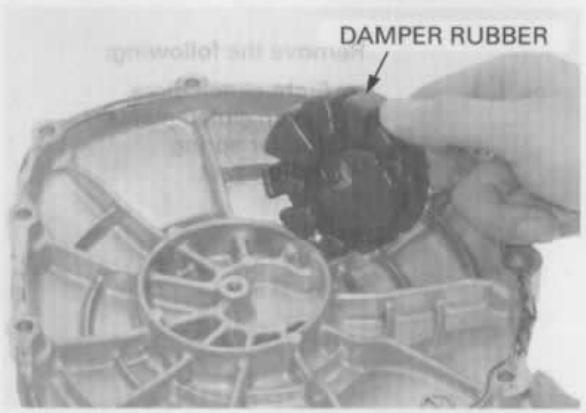
CLUTCH DAMPER RUBBER REPLACEMENT

Remove the bolt and clutch damper rubber plate.



Remove the damper rubber from the clutch cover.

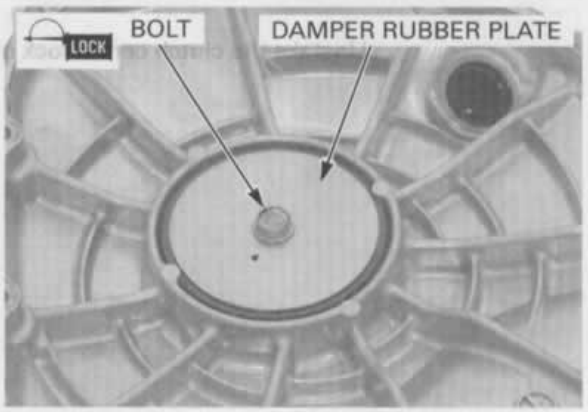
Install the damper rubber into the clutch cover while aligning the rubber with the groove on the clutch cover.



Install the damper rubber plate.

Apply a locking agent to the plate bolt threads. Install and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

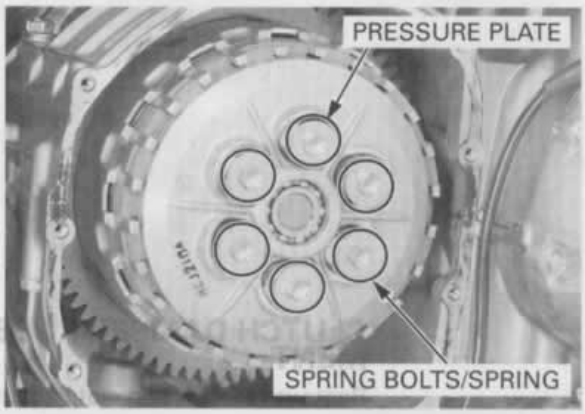


CLUTCH

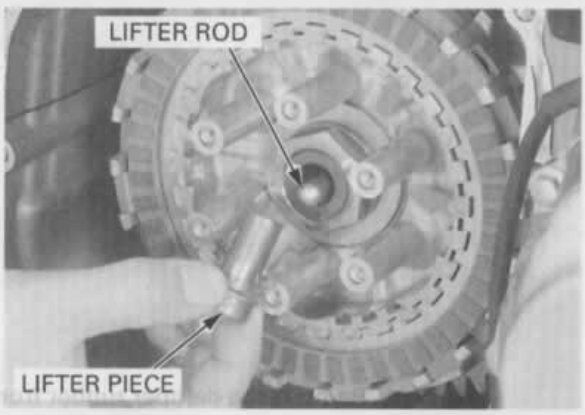
REMOVAL

Remove the clutch cover (page 10-14).

Remove the clutch spring bolts, springs and pressure plate.

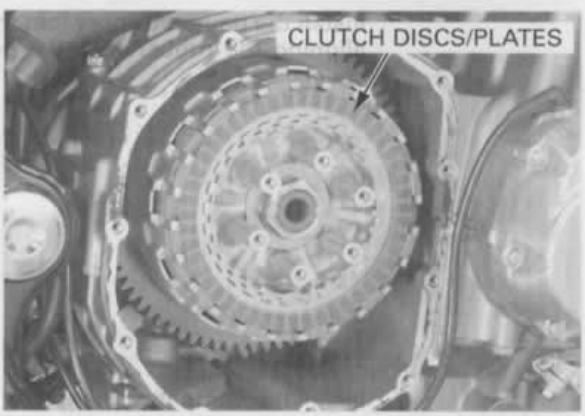


Remove the clutch lifter piece and clutch lifter rod.

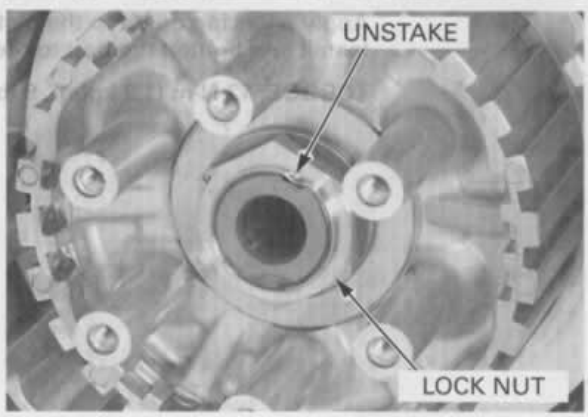


Remove the following:

- Eight clutch discs
- Seven clutch plates
- Judder spring
- Spring seat

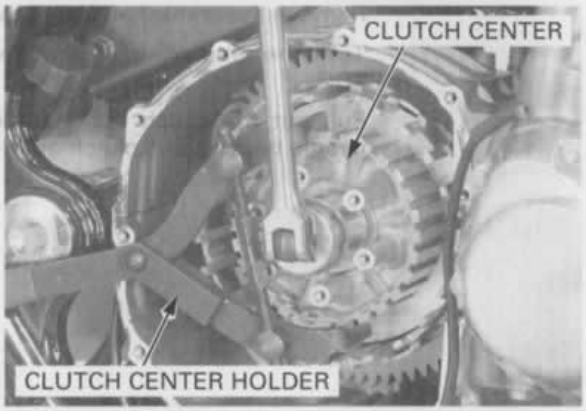


Unstake the clutch center lock nut.



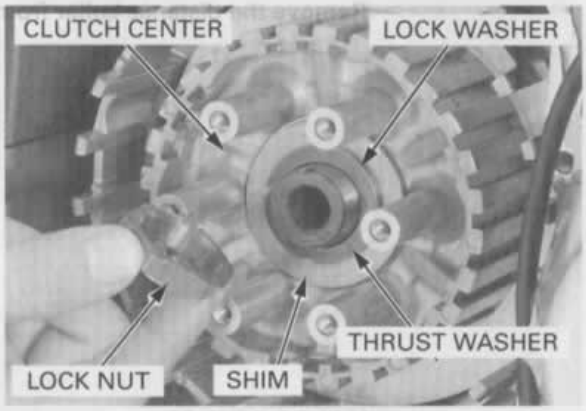
Hold the clutch center with the clutch center holder, then loosen the lock nut.

TOOL:
Clutch center holder **07724–0050002**

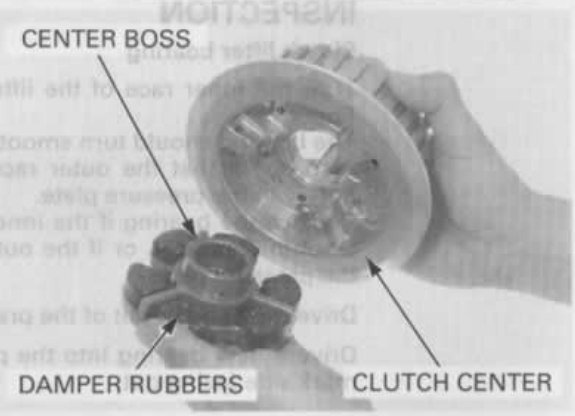


Remove and discard the lock nut.

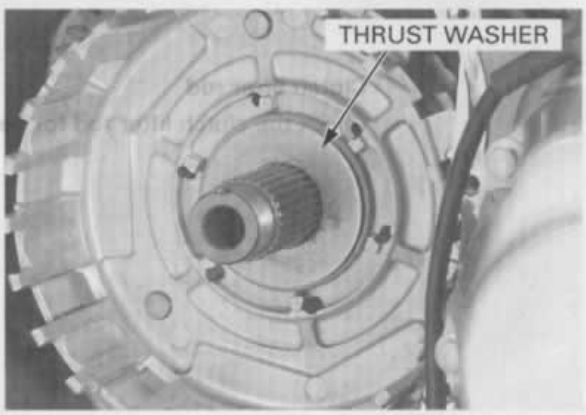
Remove the lock washer, thrust washer, shim and clutch center assembly.



Remove the clutch center boss and damper rubbers from the clutch center.



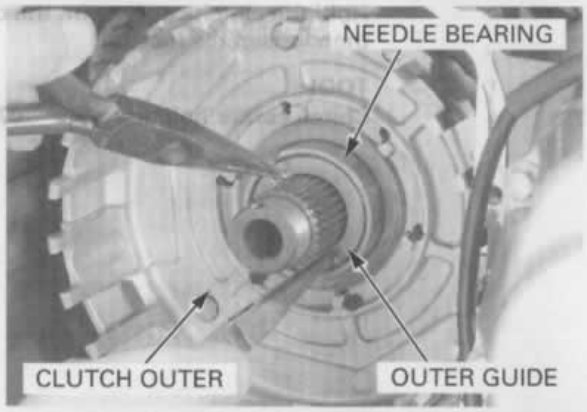
Remove the thrust washer.



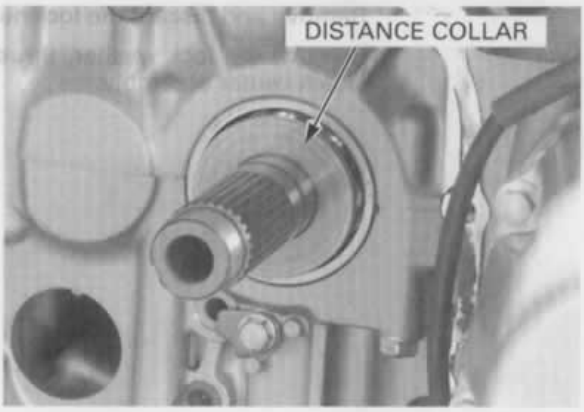
Remove the crankshaft hole cap (page 4-10).

Turn the crankshaft so that the No.1 piston is at TDC.

Pull out the clutch outer guide, then remove the needle bearing and clutch outer.



Remove the distance collar from the mainshaft.



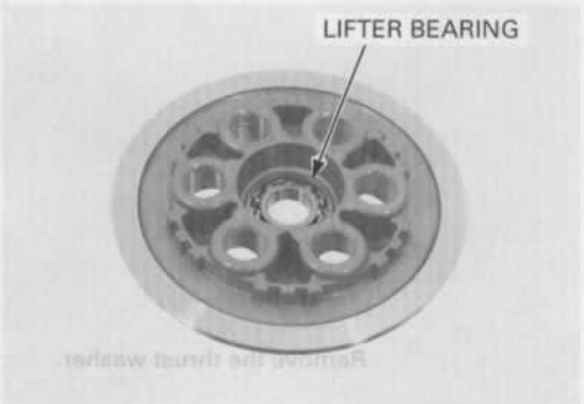
INSPECTION

Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the pressure plate.
Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fit loosely in the pressure plate.

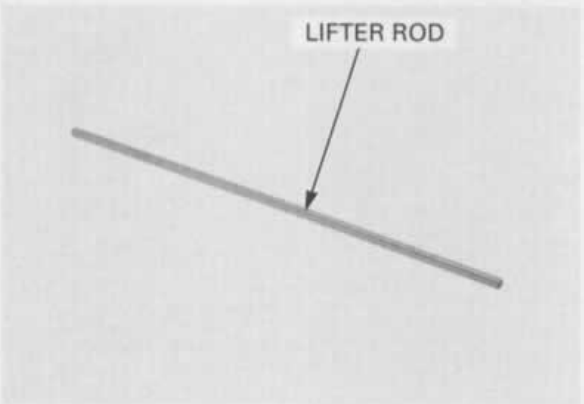
Drive the bearing out of the pressure plate.

Drive a new bearing into the pressure plate with it mark side facing out.



Clutch lifter rod

Check the clutch lifter rod for bent or other damage.

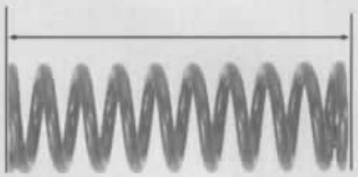


Clutch spring

Replace the clutch spring as a set.

Measure the clutch spring free length.

SERVICE LIMIT: 60.3 mm (2.37 in)



Clutch center

Check the grooves of the clutch center for damage or wear caused by the clutch plates.
Replace if necessary.

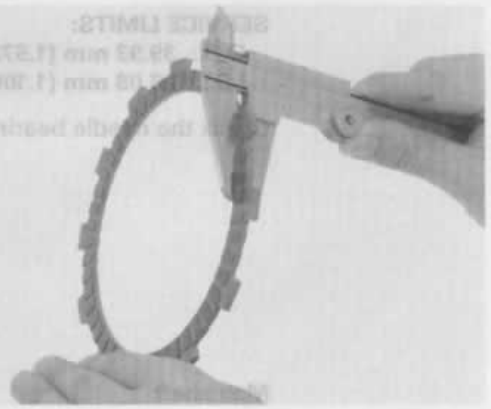
Clutch disc

Replace the clutch discs and plates as a set.

Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of each disc.

SERVICE LIMIT: 3.5 mm (0.14 in)

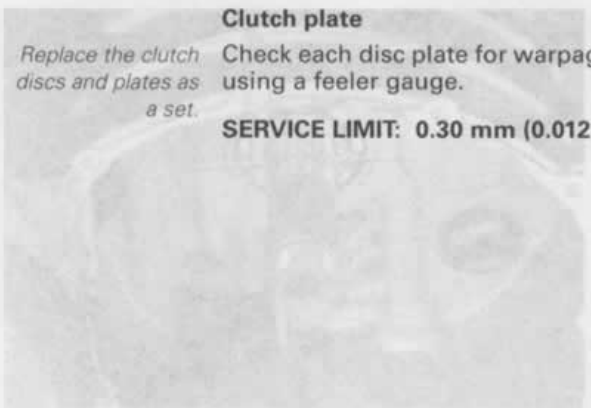


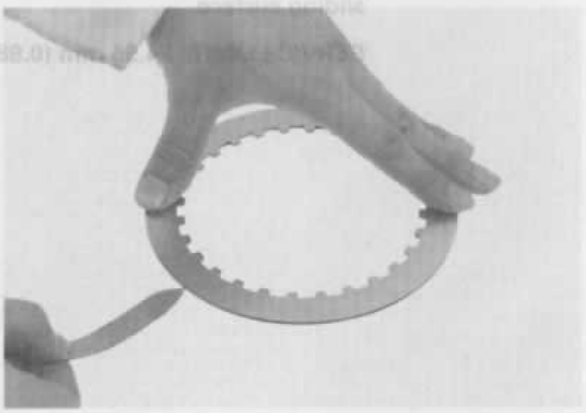
Clutch plate

Replace the clutch discs and plates as a set.

Check each disc plate for warpage on a surface plate using a feeler gauge.

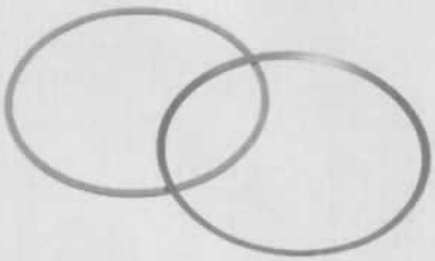
SERVICE LIMIT: 0.30 mm (0.012 in)





Judder spring/spring seat

Check the judder spring and spring seat for wear or other damage, replace if necessary.



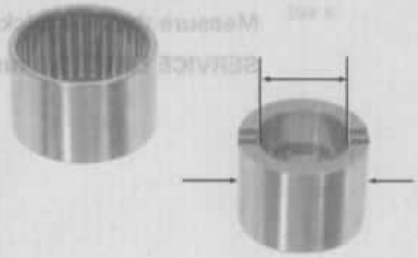
Clutch outer/clutch outer guide

Check the slots of the clutch outer for damage or wear caused by the clutch discs.
Replace if necessary.

Measure the O.D. and I.D. of the clutch outer guide.

SERVICE LIMITS:
O.D.: 39.93 mm (1.572 in)
I.D.: 28.08 mm (1.106 in)

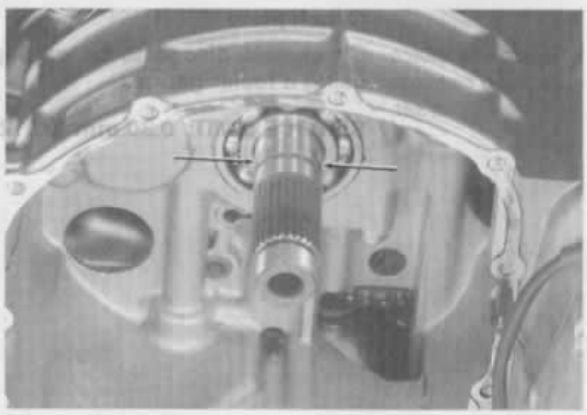
Check the needle bearing for wear or damage.



Mainshaft

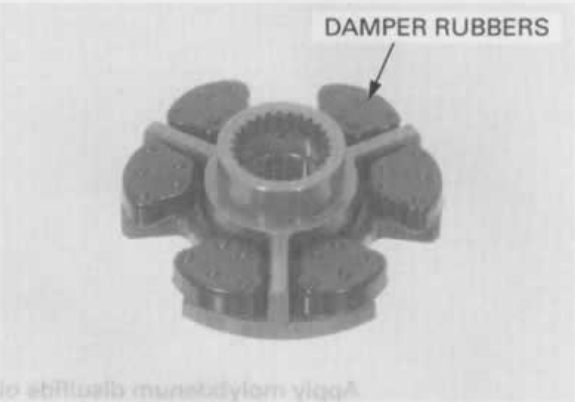
Measure the mainshaft O.D. at clutch outer guide sliding surface.

SERVICE LIMIT: 24.96 mm (0.983 in)

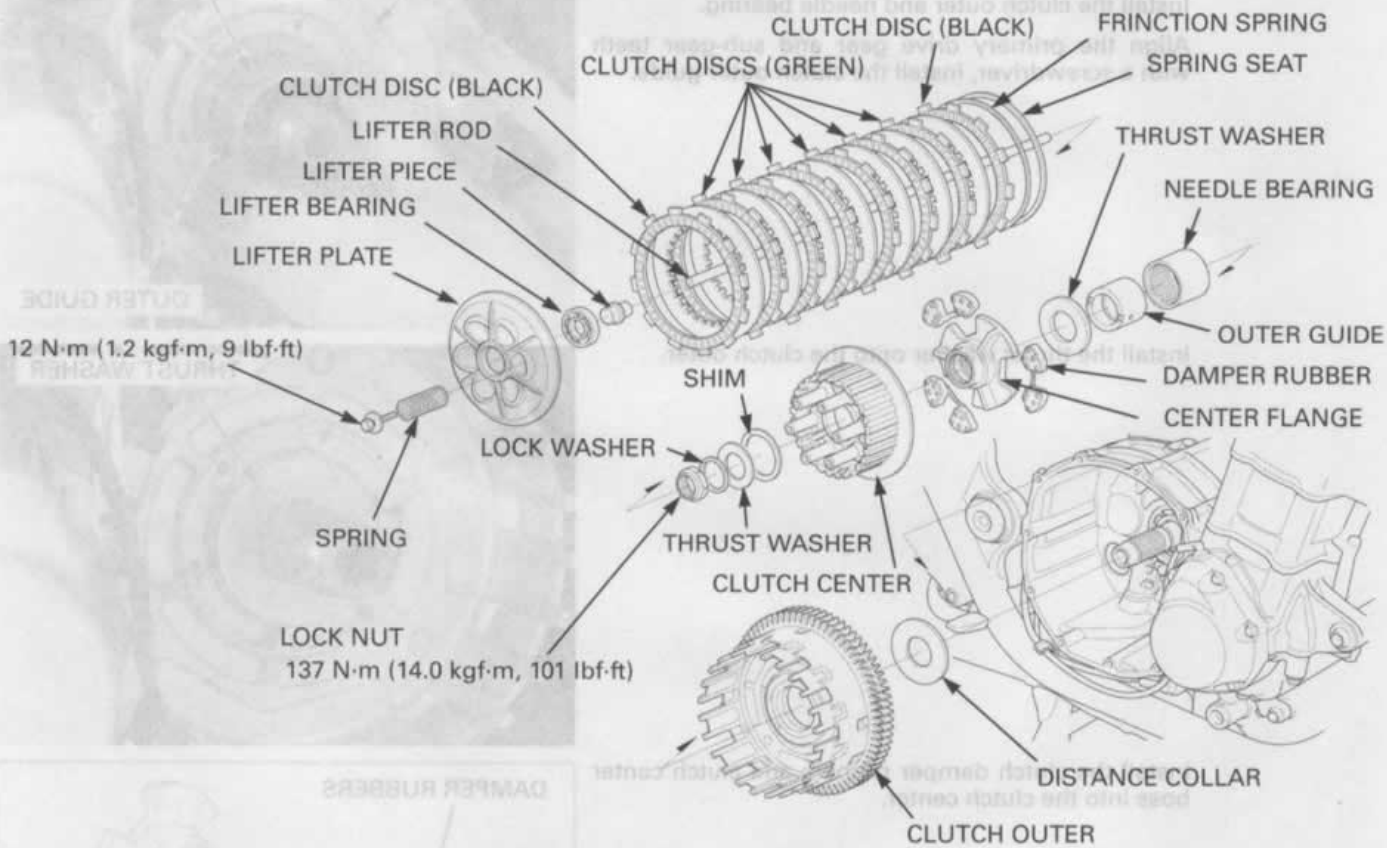


Clutch damper rubber

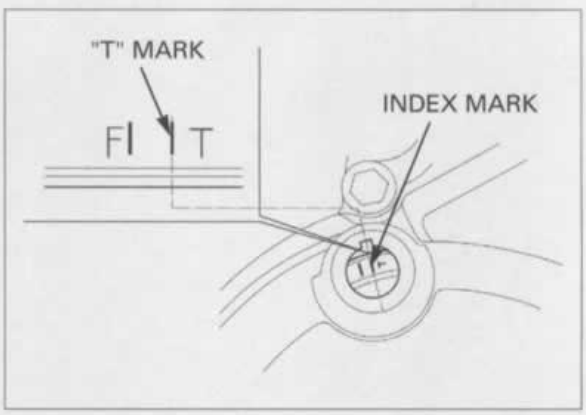
Check the clutch damper rubber for wear or damage, replace them if necessary.



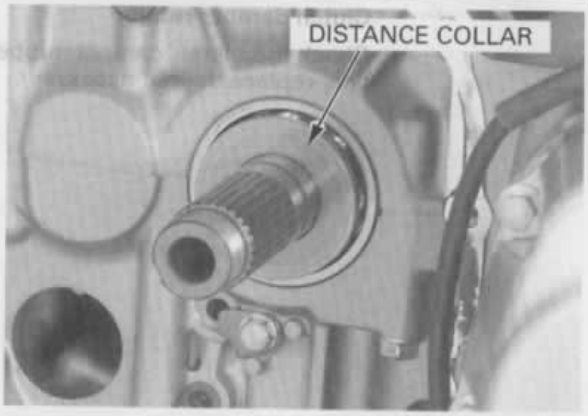
INSTALLATION



Turn the crankshaft so that the No.1 piston is at TDC.



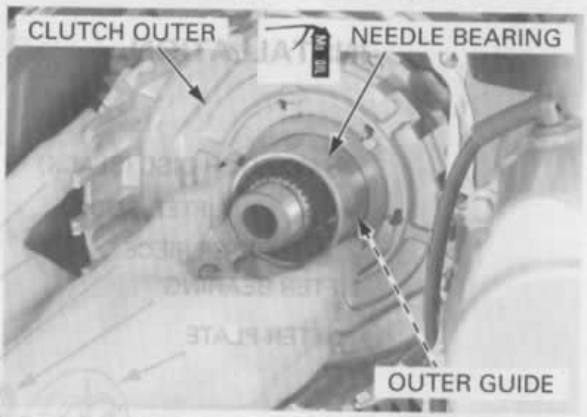
Install the distance collar onto the mainshaft.



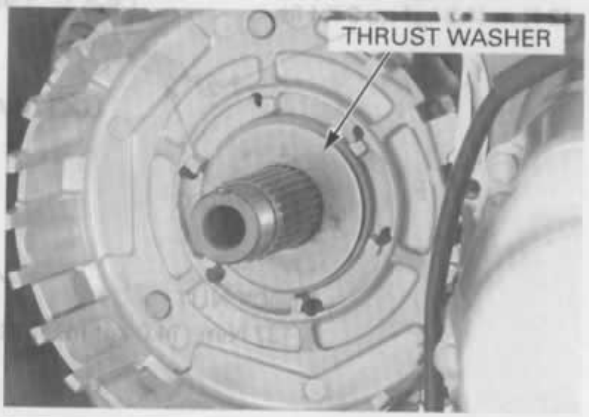
Apply molybdenum disulfide oil to the outer surface of the needle bearing.

Install the clutch outer and needle bearing.

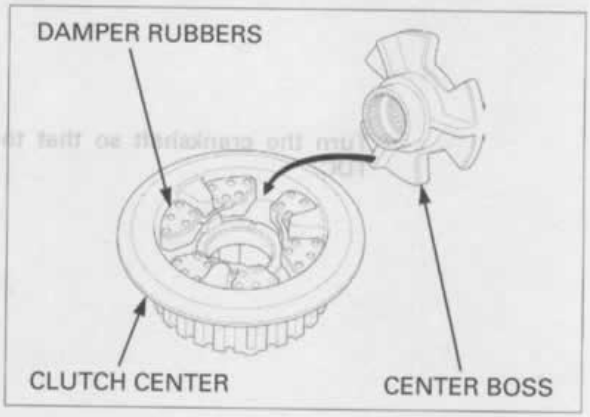
Align the primary drive gear and sub-gear teeth with a screwdriver, install the clutch outer guide.



Install the thrust washer onto the clutch outer.



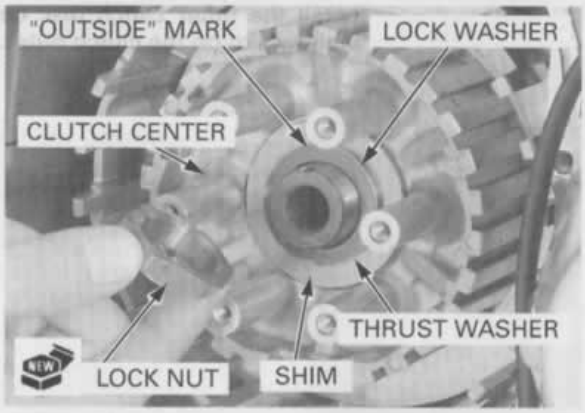
Install the clutch damper rubbers and clutch center boss into the clutch center.



Install the clutch center assembly.

Install the shim and thrust washer.
Install the lock washer with its "OUTSIDE" mark facing out.

Install the new lock nut.

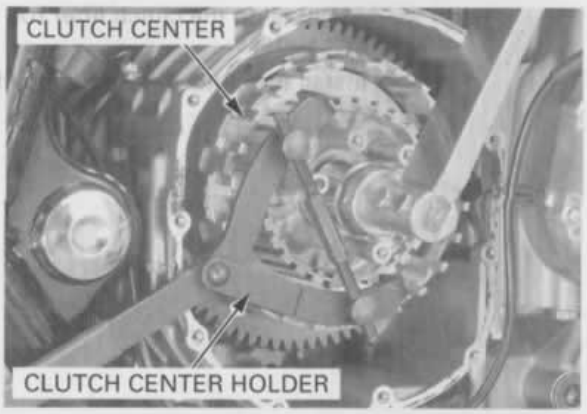


Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

TOOL:

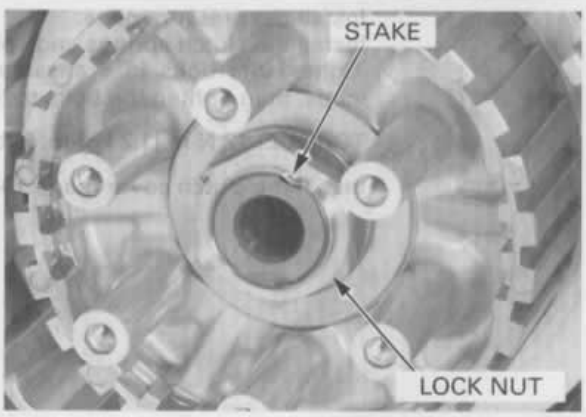
Clutch center holder	**07724–0050002 (Equivalent commercially available)**

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)



Be careful not to damage the mainshaft threads.

Stake lock nut into the mainshaft groove with a punch.



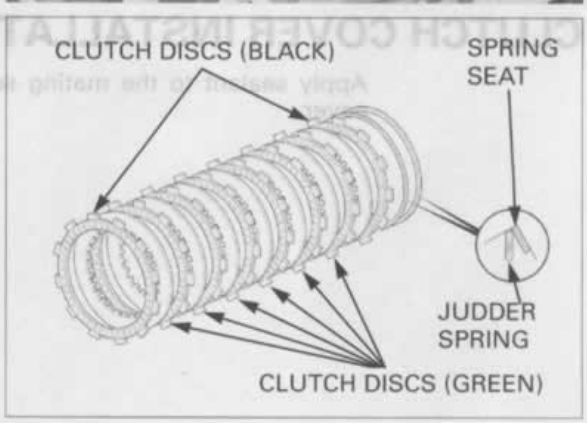
Note the direction of the judder spring.

Install the clutch spring seat and clutch judder spring.

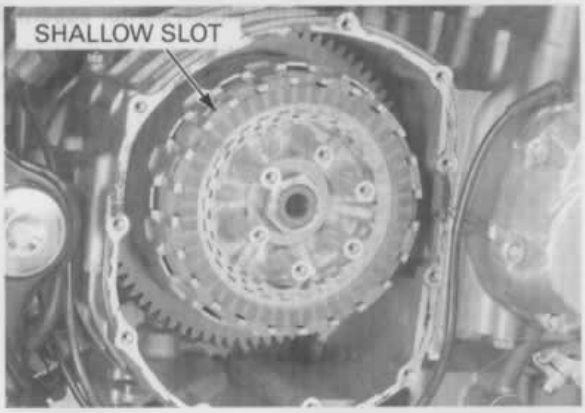
Coat the clutch discs and plates with clean engine oil.

Install the discs colored "Black" on both ends.

Stack the clutch discs and plates alternately.

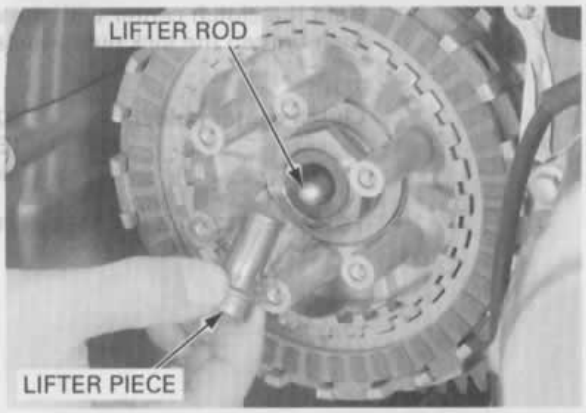


Install the outer clutch disc colored "Black" in the shallow slot on the clutch outer.



Apply oil to the clutch lifter rod and lifter piece contact surface.

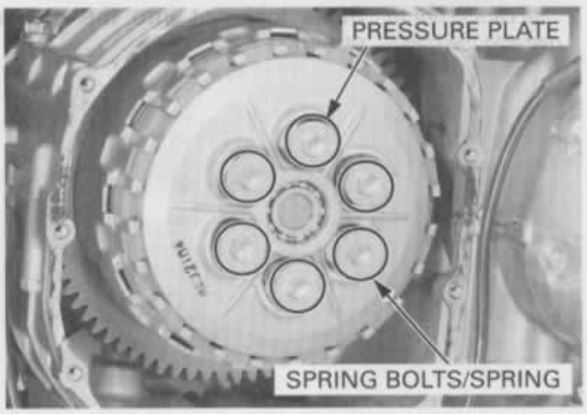
Install the clutch lifter rod and lifter piece.



Install the pressure plate.
Install the clutch springs and spring bolts.
Tighten the bolts in a crisscross pattern in 2 – 3 steps, then tighten the bolts to the specified torque.

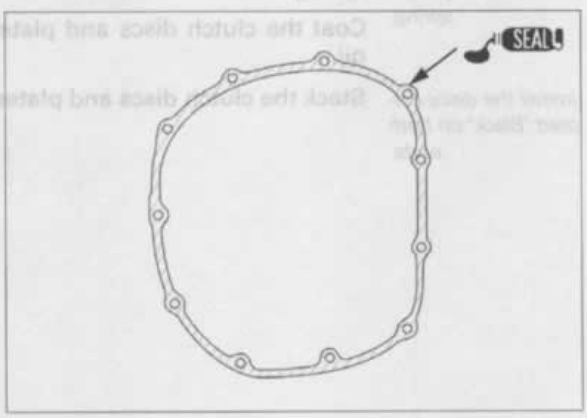
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the clutch cover (page 10-24).



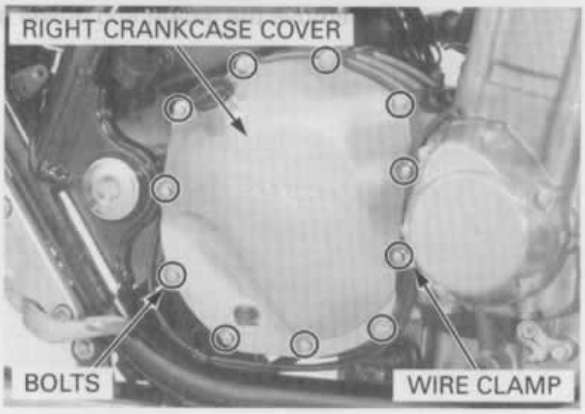
CLUTCH COVER INSTALLATION

Apply sealant to the mating surface of the clutch cover.



Install the clutch cover, wire clamp and mounting bolts.
Tighten the clutch cover bolts in a crisscross pattern in 2-3 steps.

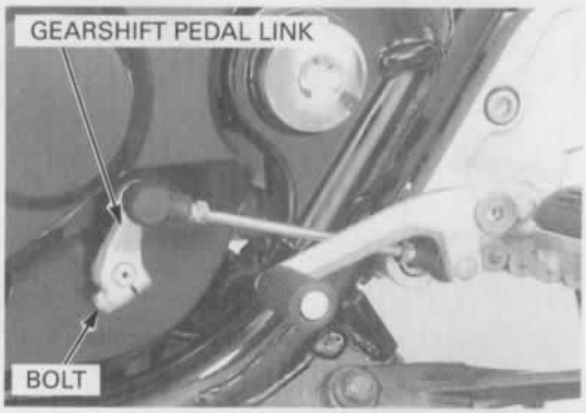
Pour the recommended engine oil (page 4-14).



GEARSHIFT LINKAGE

REMOVAL

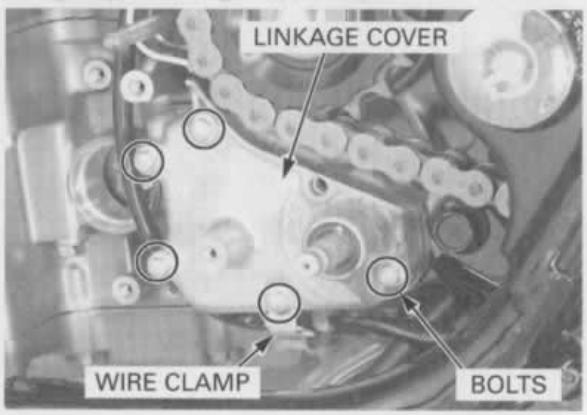
Remove the bolt and gearshift pedal link.



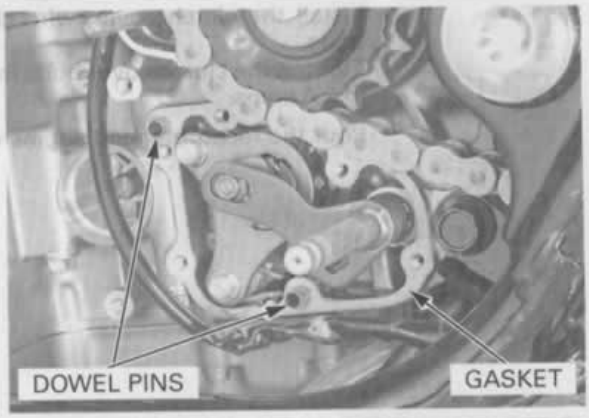
Remove the bolts and left crankcase side cover.

Remove the left crankcase rear cover (page 8-4).

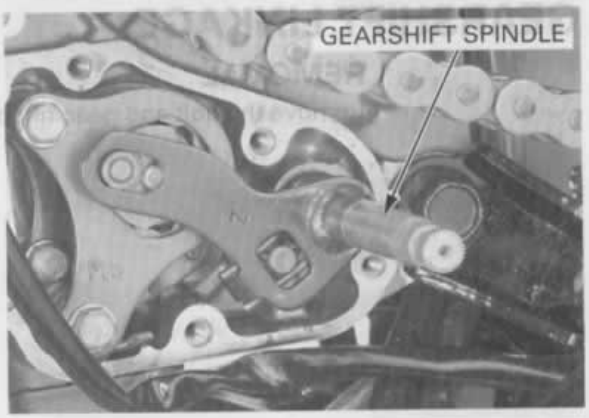
Remove the bolts, wire clamp and gearshift linkage cover.



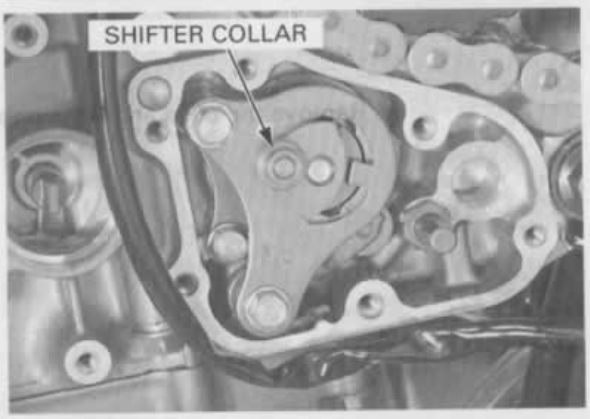
Remove the gasket and dowel pins.



Pull the gearshift spindle assembly and thrust washer out of the crankcase.

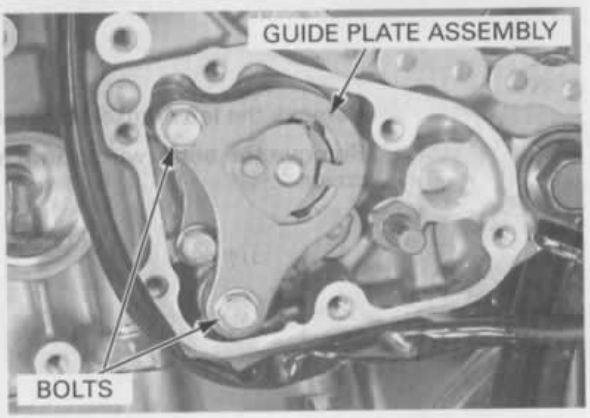


Remove the shifter collar.



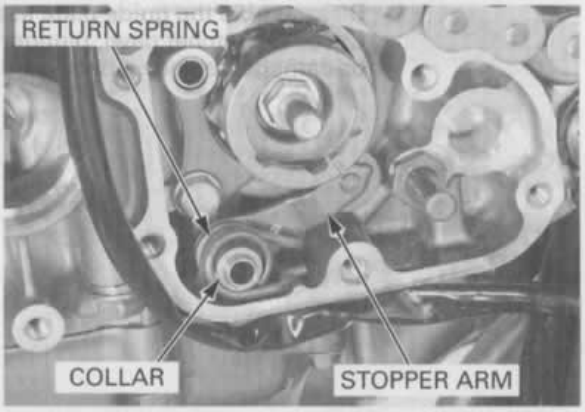
Remove the guide plate bolts.

Remove the guide plate, drum shifter, ratchet pawls, plungers and springs as an assembly.



Remove the following:

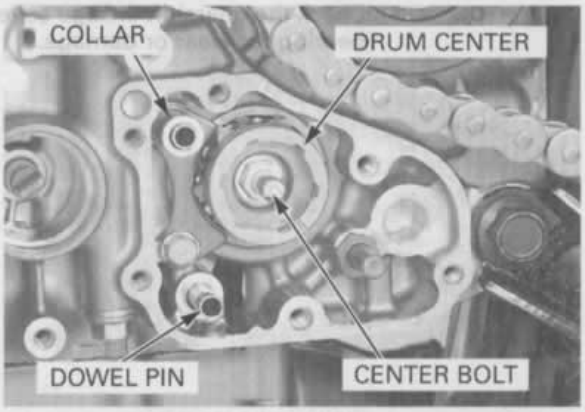
- Return spring
- Collar
- Shift drum stopper arm



Remove the shift drum center bolt, then remove the shift drum center.

Remove the following:

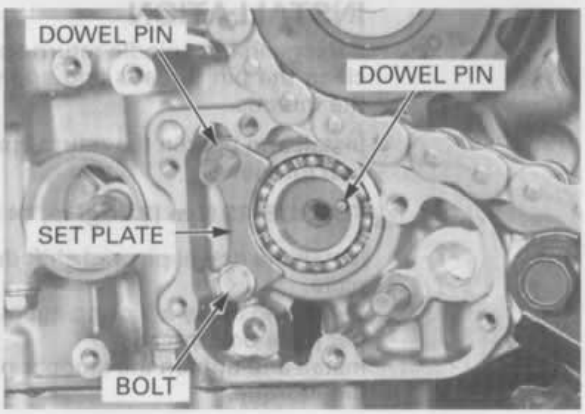
- Guide plate dowel pin
- Collar
- Washer



Remove the dowel pin from the set plate.

Remove the dowel pin from the shift drum.

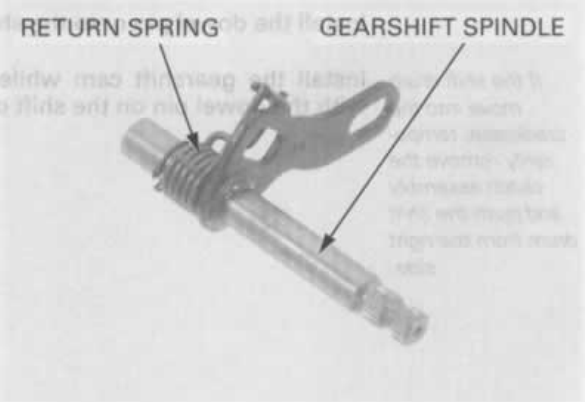
Remove the bolt and shift drum bearing set plate.



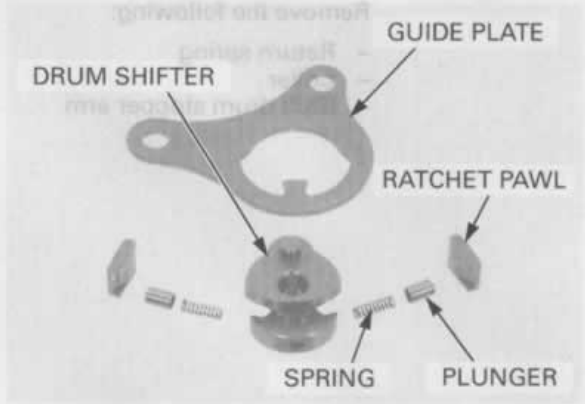
INSPECTION

Check the gearshift spindle for wear, damage or bending.

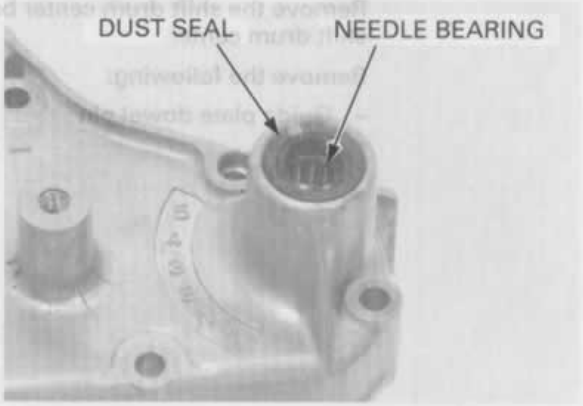
Check the return spring for fatigue or damage.



Disassemble the guide plate assembly.
Check the ratchet pawl, plunger and spring for wear or damage, replace if necessary.



Check the gearshift linkage cover oil seal and needle bearing for wear or damage.



INSTALLATION

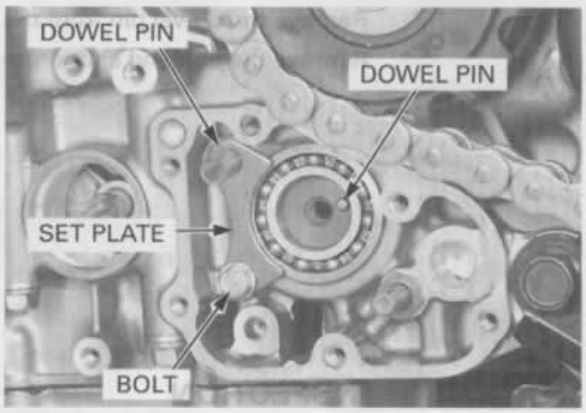
If the gearshift spindle return spring pin is removed, clean the pin threads and apply a locking agent to the threads.

Install and tighten the return spring pin to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 14 lbf·ft)

Install the dowel pin and shift drum bearing stopper plate.
Clean and apply a locking agent to the bearing stopper plate bolt threads.
Install and tighten the stopper plate bolt to the specified torque.

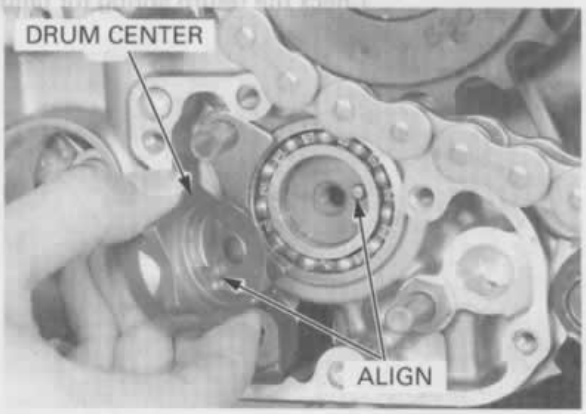
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the dowel pin onto the shift drum.

If the shift drum move into the crankcase, temporarily remove the clutch assembly and push the shift drum from the right side.

Install the gearshift cam while aligning its cutout with the dowel pin on the shift drum.



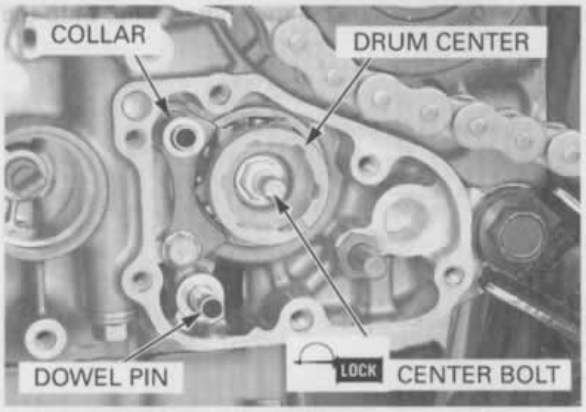
Apply a locking agent to the shift drum center bolt threads.

Install and tighten the shift drum center bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

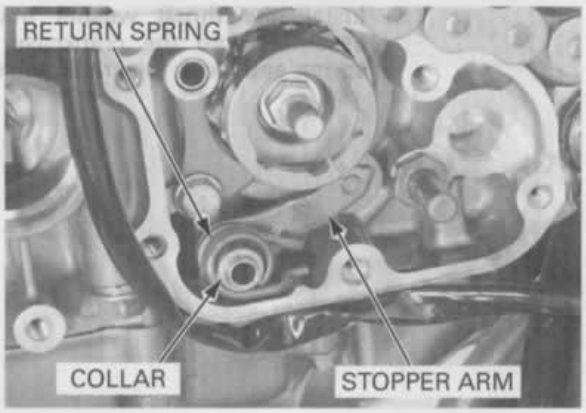
Install the following:

- Washer
- Guide plate dowel pin
- Collar



Install the following:

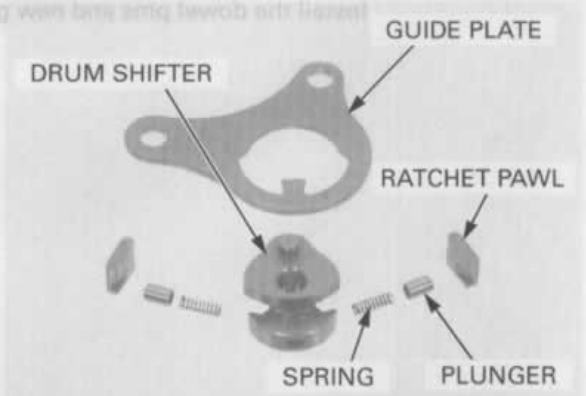
- Collar
- Shift drum stopper arm
- Return spring



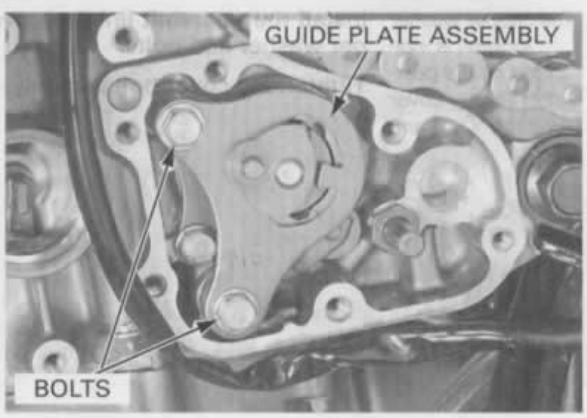
Apply engine oil to the drum shifter, ratchet pawls, plungers and springs.

Note the direction of the ratchet pawl.

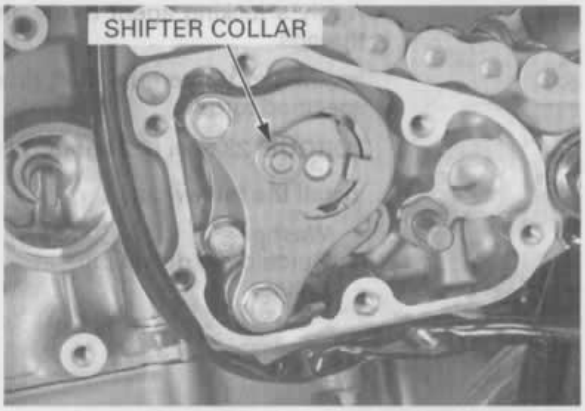
Assemble the guide plate.



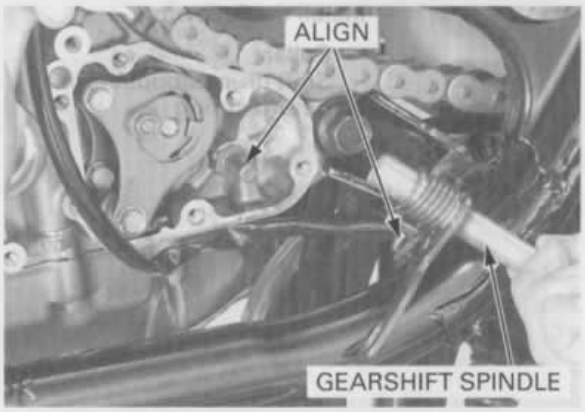
Install the guide plate assembly while aligning the drum shifter hole with the shift drum center bolt. Make sure the dowel pin is installed properly, install and tighten the guide plate bolts.



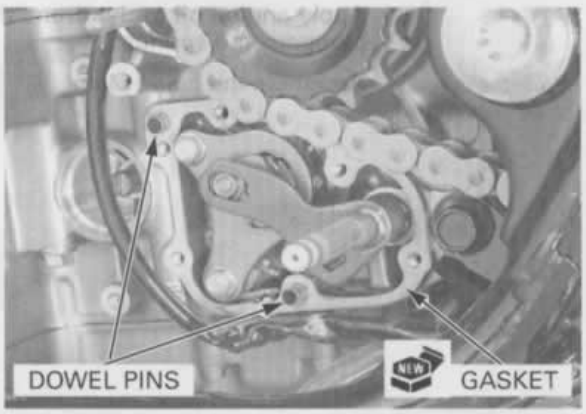
Install the shifter collar onto the drum shifter.



Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin.



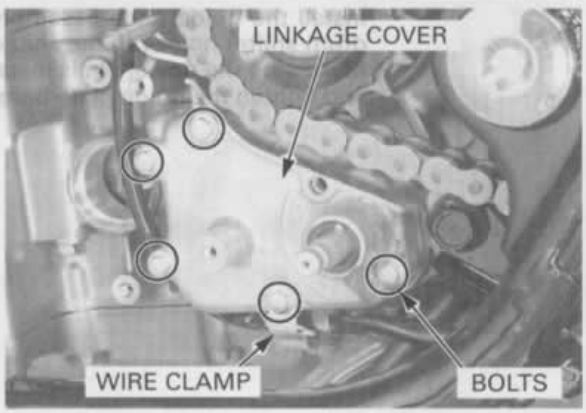
Install the dowel pins and new gasket.



The copper washer location is indicated on the gearshift linkage cover using the "△" mark.

Install the gearshift linkage cover, wire clamp, copper washer and bolts.

Tighten the cover bolt securely.



Install the following:

- Left crankcase rear cover (page 8-12)
- Clutch slave cylinder (page 10-14)
- Water pump (page 7-16)

Install the left crankcase side cover and tighten the bolts to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install the gearshift pedal link to the gearshift spindle while aligning the punch marks.

Install and tighten the pinch bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)