

# 15. HYDRAULIC BRAKES

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## SHOCK ABSORBER

### REMOVAL

#### WARNING

- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

- The brake calipers can be removed without disconnecting the hydraulic system.
- Bleed the hydraulic system if it is disassembled or if the brake feels spongy.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling brake fluid on painted surfaces or instrument lenses, as severe damage can result.
- Always check brake operation before riding the motorcycle.

### SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Front disc thickness	4.8–5.2 mm (0.19–0.20 in)	4.0 mm (0.16 in)
Front disc runout	—	0.3 mm (0.012 in)
Front master cylinder I.D.	12.700–12.743 mm (0.500–0.5016 in)	12.755 mm (0.502 in)
Front master piston O.D.	12.657–12.684 mm (0.4983–0.4993 in)	12.645 mm (0.498 in)
Front caliper cylinder I.D.	30.230–30.280 mm (1.1902–1.2913 in)	30.29 mm (1.193 in)
Front caliper piston O.D.	30.148–30.198 mm (1.1869–1.1889 in)	30.14 mm (1.187 in)

### TORQUE VALUES

Bleed valve	4–7 N·m (40–70 kg-cm, 35–61 in-lb)
Brake hose bolt	25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Front brake caliper bracket	30–45 N·m (3.0–4.5 kg-m, 22–33 ft-lb)
Front brake caliper bolt	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Front brake caliper pivot bolt	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)

#### TOOL

#### Special

Snap ring pliers 07914–3230001 or equivalent commercially available in U.S.A.

### TROUBLESHOOTING

#### Brake lever soft or spongy

- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking

#### Brake lever too hard

- Sticking piston(s)
- Clogged hydraulic system
- Pads glazed or worn excessively

#### Brakes drag

- Hydraulic system sticking
- Sticking piston(s)
- Incorrect rear brake pedal adjustment

#### Brakes grab or pull to one side

- Pads contaminated
- One side of front brake faulty
- Disc or wheel misaligned

#### Brake chatter or squeal

- Pads contaminated
- Excessive disc runout
- Caliper installed incorrectly
- Disc or wheel misaligned

## BRAKE FLUID REPLACEMENT/ AIR BLEEDING

### WARNING

- *A brake fluid contaminated brake disc or pad reduces stopping power. Discard pads and clean a contaminated disc with a high quality brake degreasing agent.*

### CAUTION

- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

### NOTE

- Be sure the fluid reservoir is parallel to the ground before removing the cover and diaphragm.

## BRAKE FLUID DRAINING

Connect a bleed hose to the bleed valve.

Loosen the caliper bleed valve and slowly pump the brake lever or pedal.

Stop operating the lever or pedal when fluid stops flowing out of the bleed valve.

## BRAKE FLUID FILLING

Fill the reservoir with DOT 3 or DOT 4 brake fluid from a sealed container.

### NOTE

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using the Brake Bleeder, follow the manufacturer's instructions.

### CAUTION

- *Use only DOT 3 or DOT 4 brake fluid from a sealed container.*
- *Do not mix brake fluid types and never reuse contaminated fluid.*

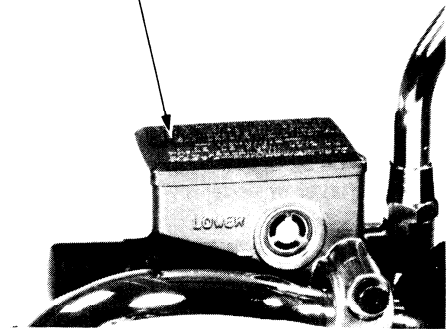
Connect a mytyvac breeder or equivalent to the bleed valve.

Pump the brake bleed and loosen the bleed valve. Add fluid when the fluid level in the master cylinder reservoir is low. Repeat above procedures until no air bubbles appear in the plastic hose.

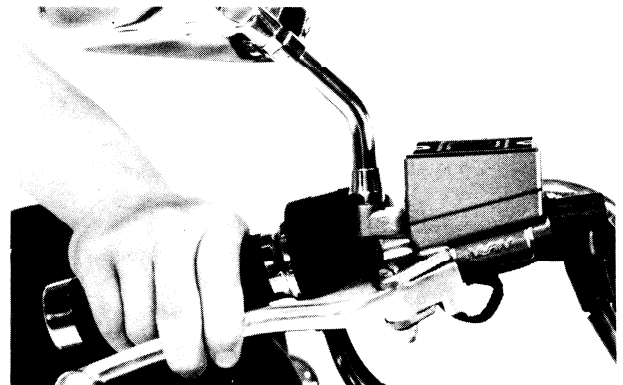
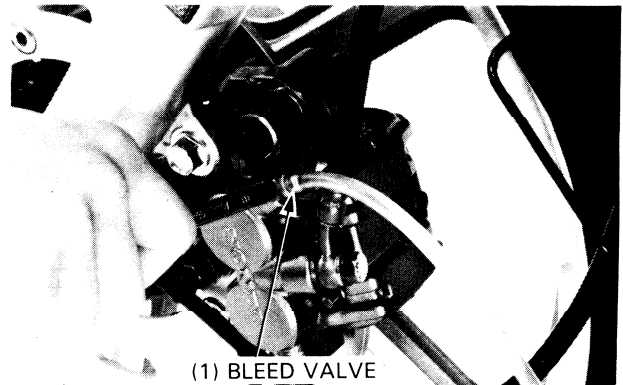
### NOTE

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

(1) RESERVOIR COVER



(1) BLEED VALVE



(1) MYTYVAC BLEEDER

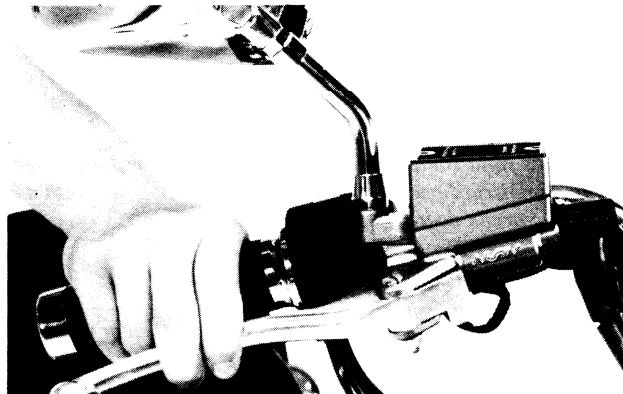


## HYDRAULIC BRAKES

Close the bleed valve and operate the brake lever or pedal. If it feels spongy, bleed the system again using the air bleeder procedure.

If a brake bleeder is not available, fill the system as follows:

Pump up the system pressure with the lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir hole and lever or pedal resistance is felt.



## AIR BLEEDING

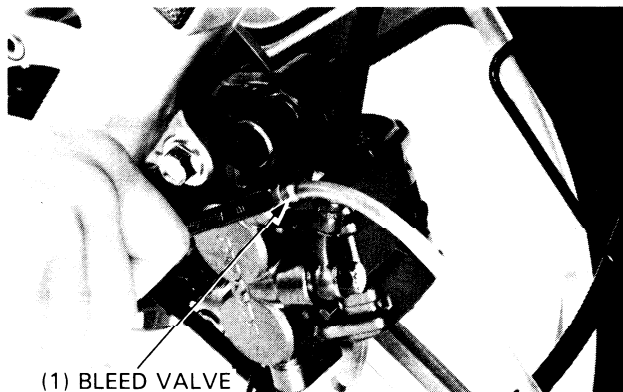
Bleed the system as follows:

- 1) Connect a bleed tube to the bleed valve.
- 2) Squeeze the brake lever (or depress the brake pedal), open the bleed valve 1/2 turn and then close the valve.

### NOTE

- Do not release the brake lever (or pedal) until the bleed valve has been closed.

- 3) Release the brake lever (or pedal) slowly and wait several seconds after it reaches the end of its travel.



Repeat steps 2 and 3 until bubbles cease to appear in the fluid at the end of the hose.

Tighten the bleed valve.

**TORQUE: 4–7 N·m (40–70 kg·cm, 35–61 in·lb)**

Fill the fluid reservoir to the upper level mark.

Reinstall the diaphragm and master cylinder cover.

## BRAKE PAD/DISC

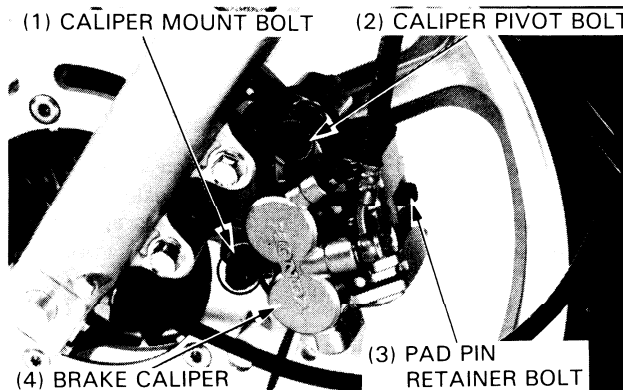
### FRONT PAD REPLACEMENT

### NOTE

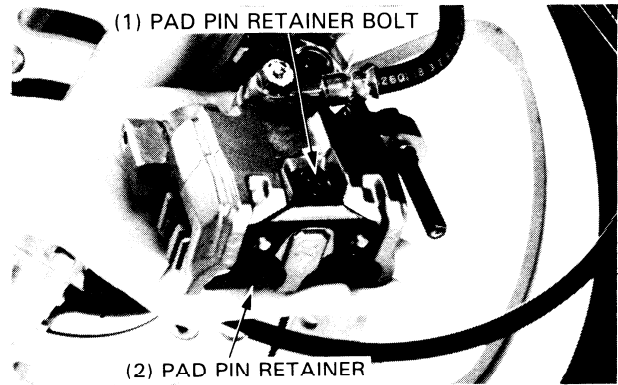
- Always replace the brake pads in pairs to assure even disc pressure.

Loosen the pad pin retainer bolt.

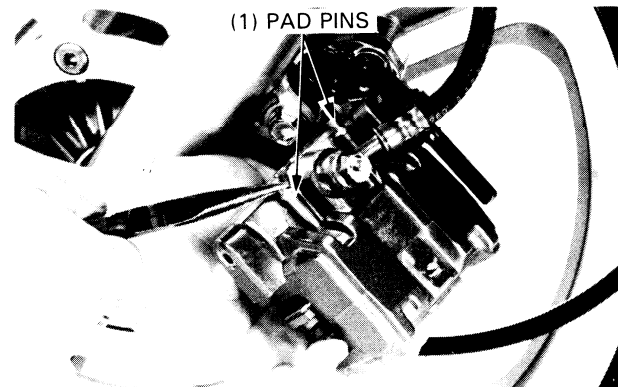
Remove the caliper mount bolt and caliper pivot bolt.



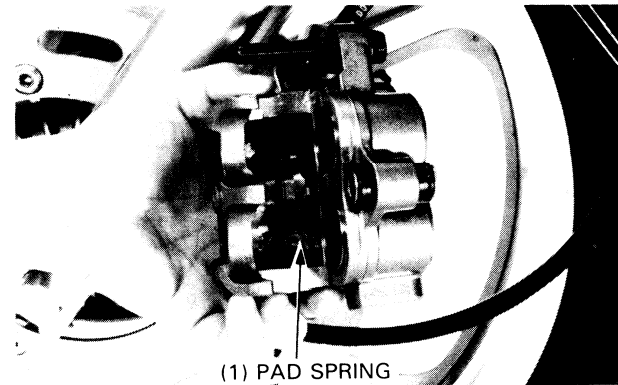
Remove the pad pin retainer bolt and retainer.



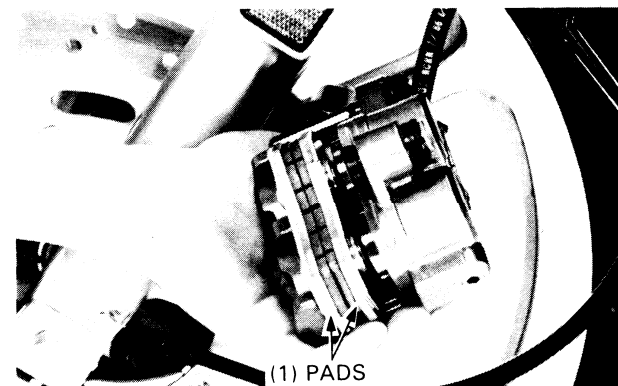
Remove the pad pins and pads from the caliper.



Push the caliper pistons in all the way.  
Position the pad spring in the caliper as shown.

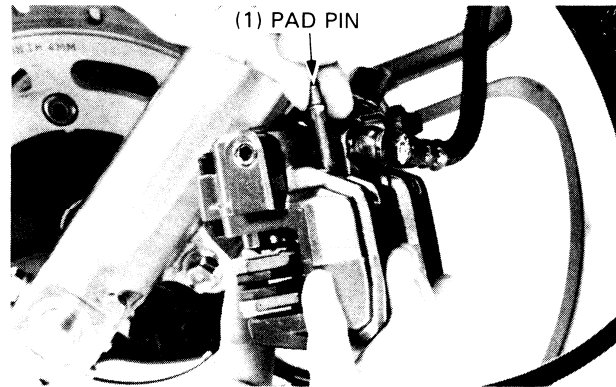


Install the new pads in the caliper.

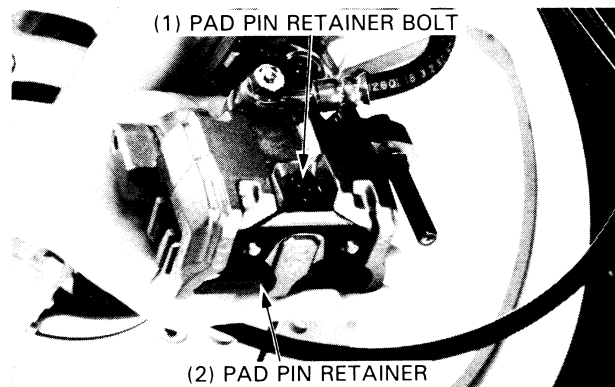


## HYDRAULIC BRAKES

Install one pad pin first, then install the other pin by pushing the pads against the caliper the depress the pad spring.



Install the pad pin retainer over the pad pins, and push it down to secure the pad pins.  
Tighten the pad pin retainer bolt.



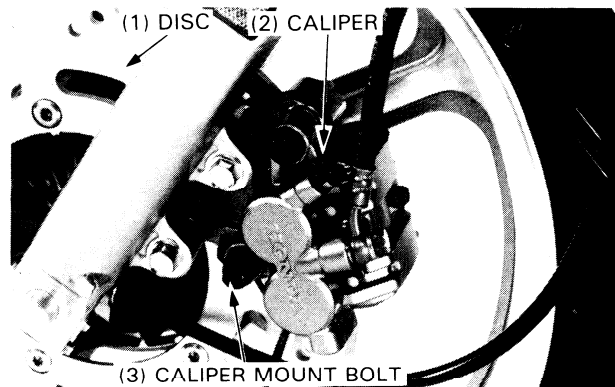
### NOTE

- Check the brake fluid level in the reservoir of new brake fluid.
- Wrap the pads with a rag to prevent damage to the pads.

Install the caliper to the bracket so the disc is positioned between the pads, being careful not to damage the pad.  
Tighten the caliper mount bolt and caliper pin bolt.

**TORQUE: 25–30 N·m (2.5–3.0 kg·m, 18–22 ft·lb)**

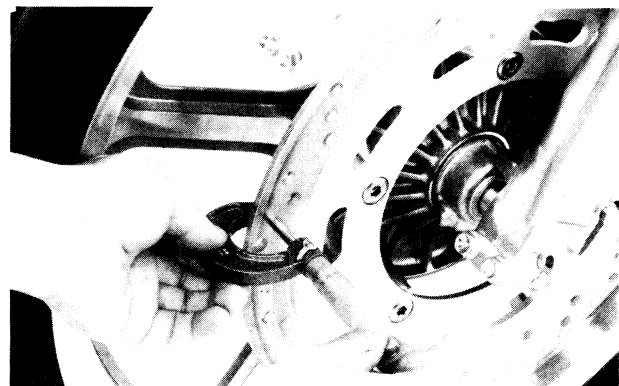
Tighten the pad pin retainer bolt securely.  
Operate the brake lever to seat the pistons against the pads.



### DISC THICKNESS

Measure the thickness of each disc.

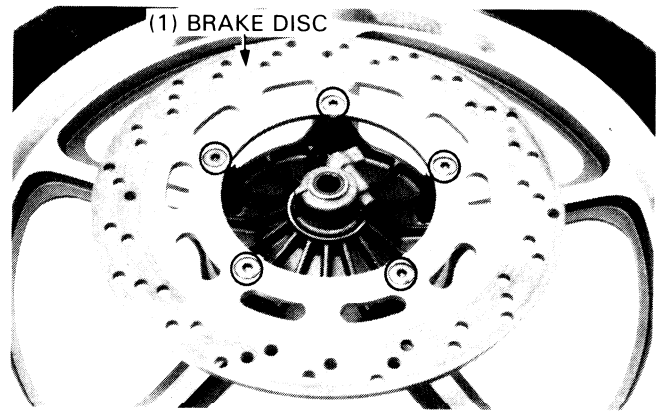
**SERVICE LIMIT: 4.0 mm (0.16 in)**



## BRAKE DISC REPLACEMENT

Remove the front wheel (page 13-7).  
Remove the brake disc.

Install the brake disc in the reverse order of removal.

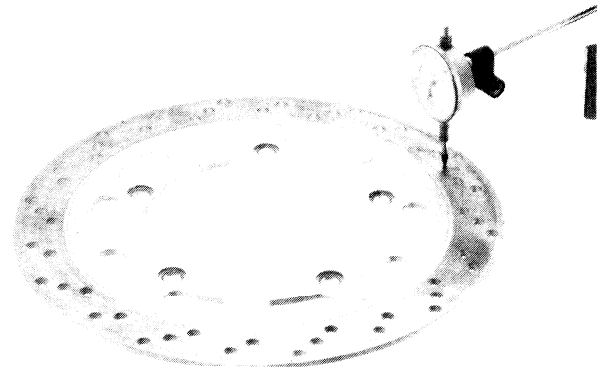


## BRAKE DISC WARPAGE

Remove the brake disc from the wheel.  
Measure the brake disc for warpage.

**SERVICE LIMIT: 0.30 mm (0.012 in)**

Refer to page 13-10 for brake disc installation.



## MASTER CYLINDER

### REMOVAL

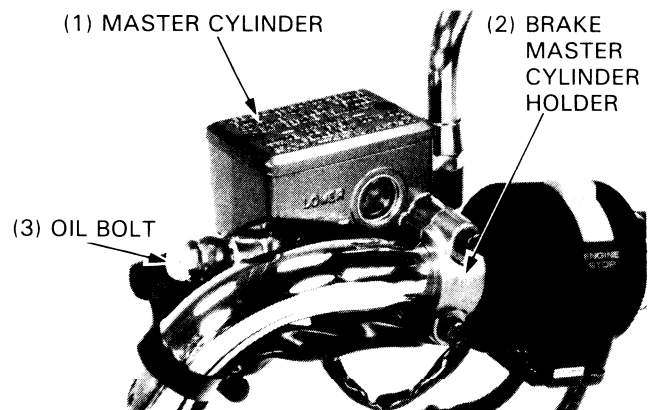
Drain the fluid from the brake system (page 15-3).  
Disconnect the front brake switch wires.  
Remove the oil bolt and disconnect the brake hose.  
Remove the rear view mirror.  
Remove the brake master cylinder holder and master cylinder.

### CAUTION

- *Avoid spilling brake fluid on painted surfaces. Place a rag over the fuel tank whenever the brake system is being serviced.*

### NOTE

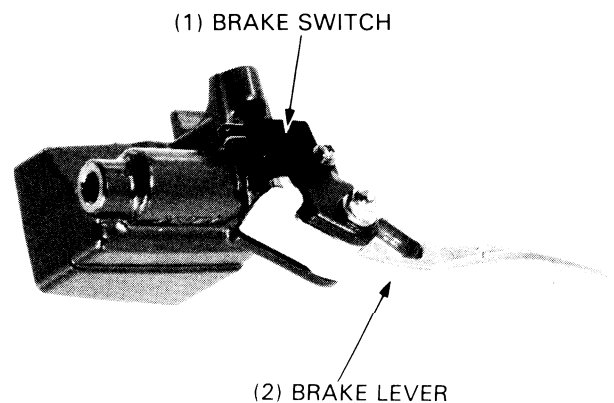
- When removing the fluid hose bolt, cover the end of the hose to prevent contamination. Secure the hose in an up-right position to prevent fluid from leaking out.



### DISASSEMBLY

Remove the following:

- brake lever from the master cylinder.
- brake switch from the master cylinder.
- boot.





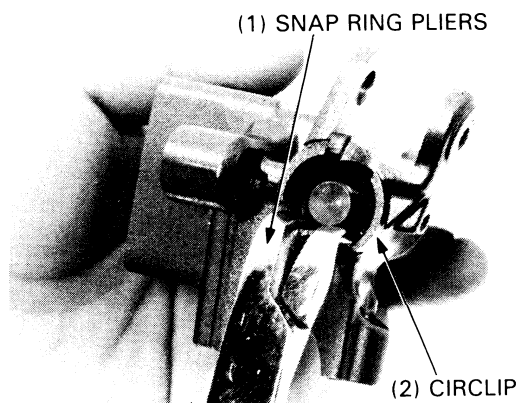
## HYDRAULIC BRAKES

Remove the circlip from the master cylinder body.

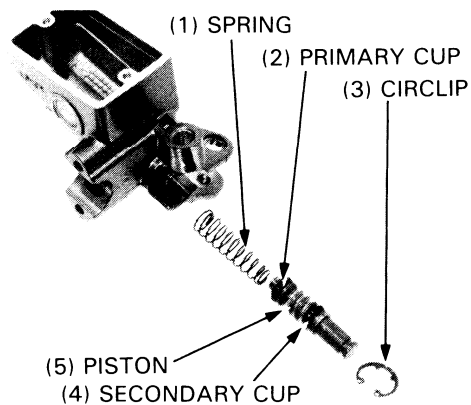
### TOOL:

**SNAP RING PLIERS**

**07914—3230001 or  
EQUIVALENT COMMERCIAL-  
LY AVAILABLE IN U.S.A.**



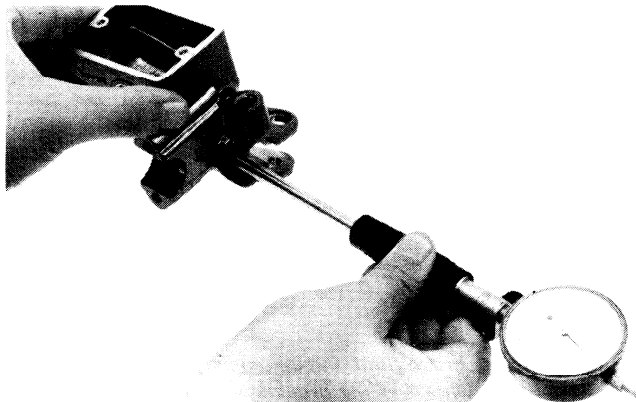
Remove the piston and spring from the master cylinder body.  
Clean the inside of the master cylinder and reservoir with clean brake fluid.



### INSPECTION

Check the master cylinder for scores, scratches or nicks.  
Measure the master cylinder I.D.

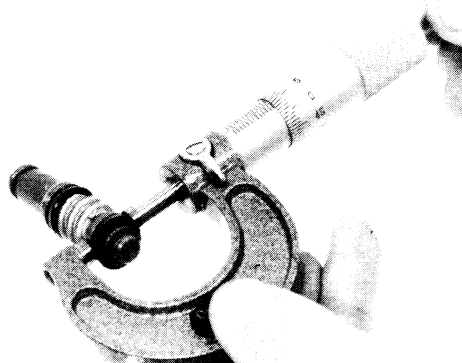
**SERVICE LIMIT: 12.755 mm (0.502 in)**



Measure the master piston O.D.

**SERVICE LIMIT: 12.645 mm (0.498 in)**

Check the primary and secondary cups for damage before assembly.



## ASSEMBLY

## CAUTION

- *Replace the master cylinder piston, piston cup and spring as a set; don't replace individual parts.*

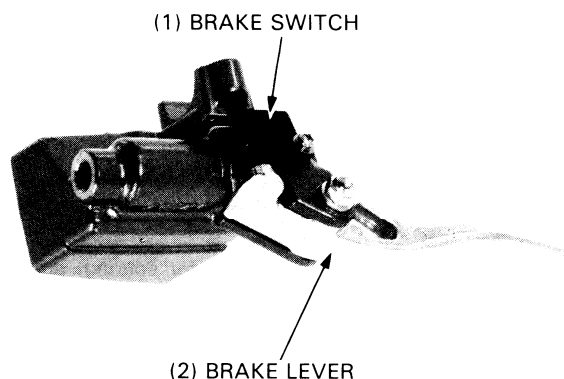
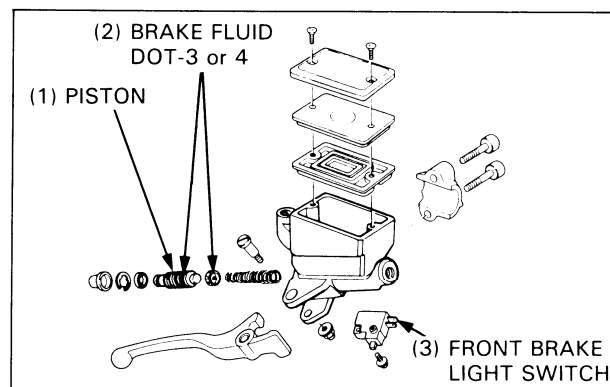
Assemble the master cylinder. Coat all parts with clean brake fluid before assembly install the spring and primary cup together.

## CAUTION

- *When installing the cups, do not allow the lips to turn inside out and be certain the circlip is firmly seated in the groove.*

Install the following:

- the piston and circlip.
- the boot.
- the brake lever.
- the brake light switch.



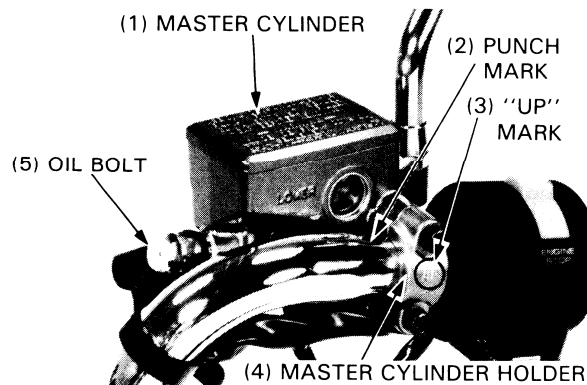
## INSTALLATION

Place the master cylinder on the handlebar.  
Install the holder with "UP" mark facing upward.  
Install the two mounting bolts.  
Align the end of the holder with the punch mark on the handlebar.  
Tighten the top bolt first then tighten the lower bolt.

Connect the hose with the oil bolt and two sealing washers.

**TORQUE: 25–35 N·m (2.5–3.5 kg·m, 18–25 ft·lb)**

Install the mirror.  
Connect the brake light switch wires.  
Fill the reservoir to the upper level and bleed the brake system according to page 15-3.



## BRAKE CALIPERS

## BRAKE CALIPER REMOVAL

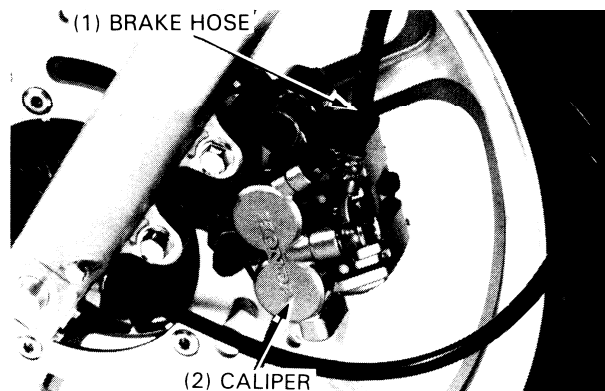
Place a clean container under the caliper and disconnect the brake hose from the caliper.

## CAUTION

- *Avoid spilling brake fluid on painted surfaces.*

Remove the caliper mount bolt and caliper pin bolt.

Remove the caliper.

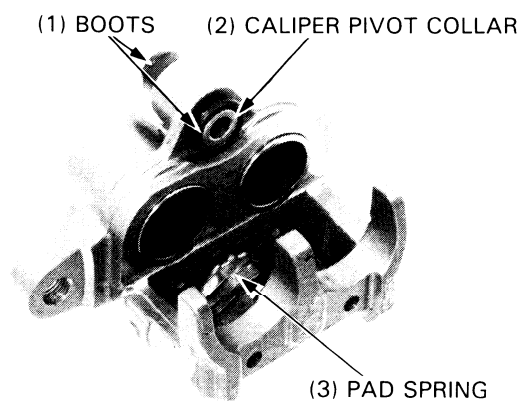


## HYDRAULIC BRAKES

### DISASSEMBLY

Remove the following:

- brake pads (page 15-4)
- pad spring
- caliper pivot collar and boots



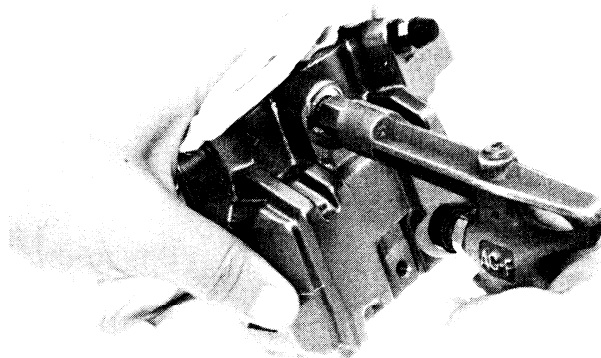
Remove the pistons from the caliper.

If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is forced out. Use the air in short spurts.

#### WARNING

- *Do not bring the nozzle too close to the inlet.*

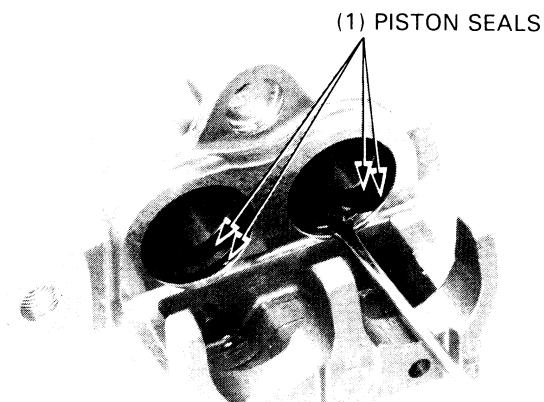
Examine the pistons and cylinders for scoring, scratches or other damage and replace if necessary.



Push the piston seals in and lift them out, then discard them. Clean the piston seal grooves with clean brake fluid.

#### CAUTION

- *Be careful not to damage the piston sliding surfaces.*



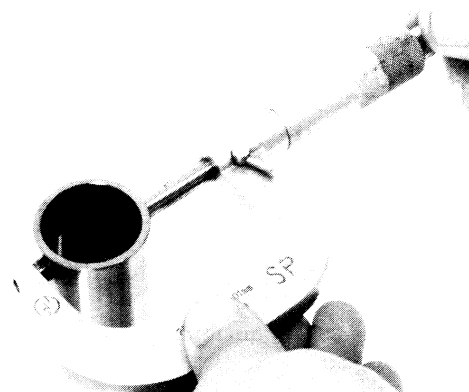
### INSPECTION

#### Piston

Check the pistons for scoring, scratches or other damage. Measure the piston with a micrometer.

#### SERVICE LIMIT:

FRONT: 30.14 mm (1.187 in)

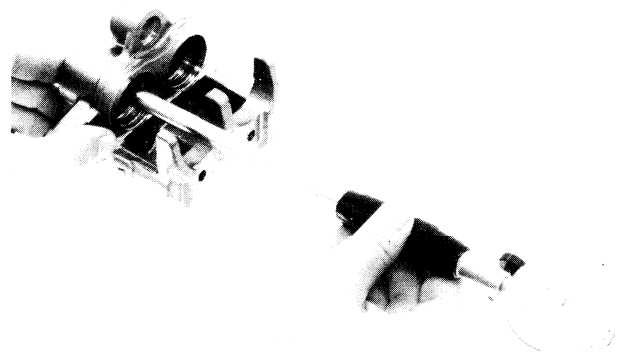


## Cylinder

Check the caliper cylinder for scoring, scratches or other damage. Measure the caliper cylinder bore.

## SERVICE LIMIT:

FRONT: 30.29 mm (1.193 in)



## ASSEMBLY

The piston seals must be replaced with new ones whenever they are removed. Coat the seals with clean grease or brake fluid before assembly.

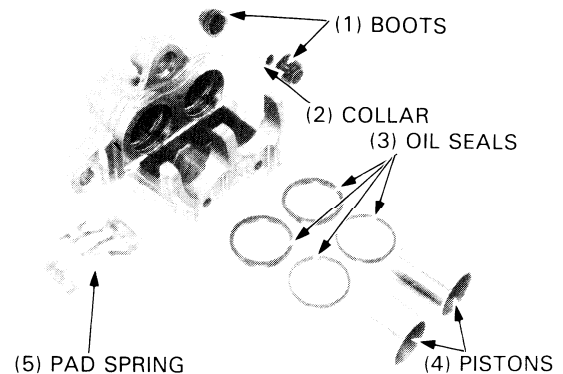
Install the pistons with the dished ends towards the pads.

Then install the piston boots.

Install the collar boots and collar making sure that the boots are seated in the collar and caliper grooves properly.

Install the pad spring.

Install the pads (page 15-5).



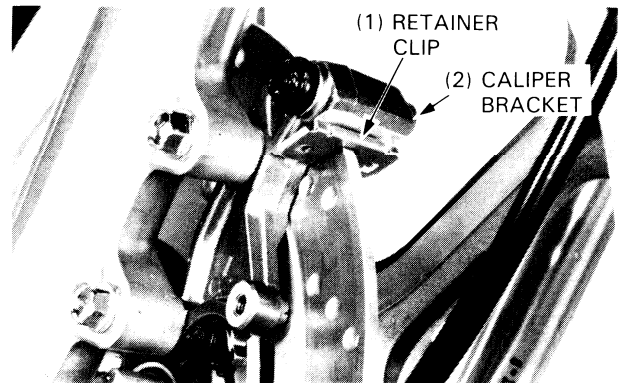
## FRONT BRAKE CALIPER INSTALLTION

Make sure that the retainer clip is in position on the caliper bracket.

Inspect the condition of the caliper pivot bolt.

Apply silicone grease to the caliper pivot bolt and pivot boot.

Install the caliper assembly over the brake disc so that the disc is positioned between the pads.



## CAUTION

- *Be careful not to damage the pads.*

Tighten the caliper mount bolt and pivot bolts.

Connect the brake hose to the caliper with the bolt and two sealing washers.

Fill the brake fluid reservoir and bleed the brake system (page 15-3).