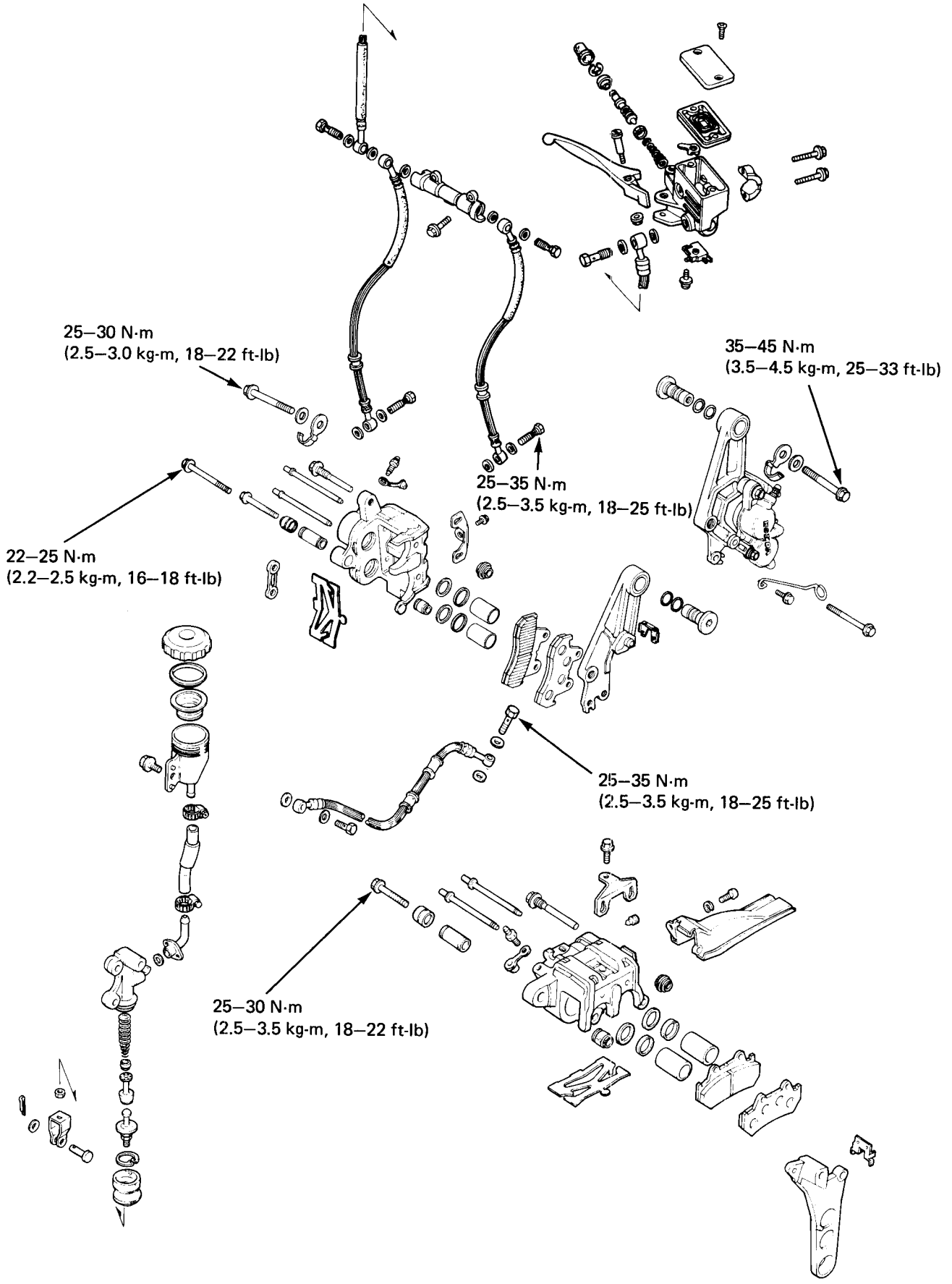

Date of Issue: August, 1982

16. HYDRAULIC BRAKES

SERVICE INFORMATION

GENERAL

- The front and rear brakes can be removed without disconnecting the hydraulic system.
- Once the hydraulic systems have been opened, or if the brakes feel spongy, the system must be bled.
- Do not allow foreign material to enter the system when filling the reservoirs.
- Avoid spilling brake fluid on painted surfaces or instrument lenses, as severe damage will result.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

	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	———	0.30 mm (0.012 in)
Front master cylinder I.D.	15.870–15.913 mm (0.6248–0.6265 in)	15.925 mm (0.6270 in)
Front master piston O.D.	15.827–15.854 mm (0.6231–0.6242 in)	15.815 mm (0.6226 in)
Front caliper piston O.D.	30.148–30.198 mm (1.1869–1.1889 in)	30.140 mm (1.1866 in)
Front caliper cylinder I.D.	30.23 –30.28 mm (1.1902–1.1921 in)	30.29 mm (1.1925 in)
Rear master cylinder I.D.	14.000–14.043 mm (0.5512–0.5529 in)	14.055 mm (0.5533 in)
Rear master piston O.D.	13.957–13.984 mm (0.5495–0.5506 in)	13.945 mm (0.5490 in)
Rear caliper cylinder I.D.	27.000–27.050 mm (1.0630–1.0650 in)	27.060 mm (1.0654 in)
Rear caliper piston O.D.	26.918–26.968 mm (1.0598–1.0617 in)	26.910 mm (1.0594 in)
Rear disc thickness	6.9–7.1 mm (0.272–0.280 in)	6.0 mm (0.24 in)
Rear disc runout	———	0.30 mm (0.012 in)

TORQUE VALUES

Brake hose bolt	25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Front brake caliper bracket	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Brake caliper bolt	20–25 N·m (2.0–2.5 kg-m, 13–18 ft-lb)
Brake caliper pirot bolt	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Rear master cylinder	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Rear brake torque rod nut	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Rear axle nut	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

TOOL

Special	
Snap ring pliers	07914–3230001

16

TROUBLESHOOTING

Brake Lever/Pedal Soft or Spongy
1. Air bubbles in hydraulic system
2. Low fulid level
3. Hydraulic system leaking

Brake Lever/Pedal Too Hard
1. Sticking piston(s)
2. Clogged hydraulic system
3. Pads glazed or worn excessively

Brakes Drag
1. Hydraulic system sticking
2. Incorrect adjustment of lever or pedal
3. Sticking piston(s)

Brakes Grab or Pull to One Side
1. Pads contaminated
2. One side front brake faulty
3. Disc or wheel misaligned

Brakes Chatter or Squeal
1. Pads contaminated
2. Excessive disc runout
3. Caliper installed incorrectly
4. Disc or wheel misaligned

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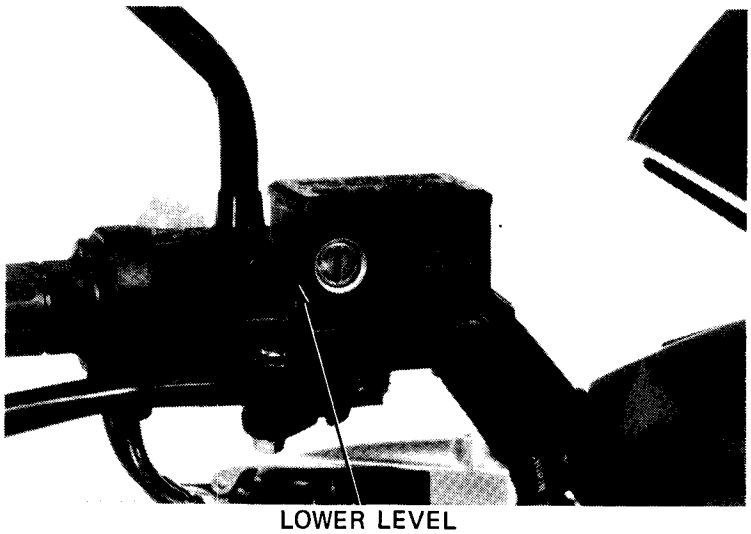
BRAKE FLUID REPLACEMENT/ AIR BLEEDING

Check the fluid level with the fluid reservoir parallel to the ground.

CAUTION:

- *Install the diaphragm on the reservoir when operating the brake level/pedal. Failure to do so will allow brake fluid to squirt out of the reservoir during brake operation.*
- *Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.*



LOWER LEVEL

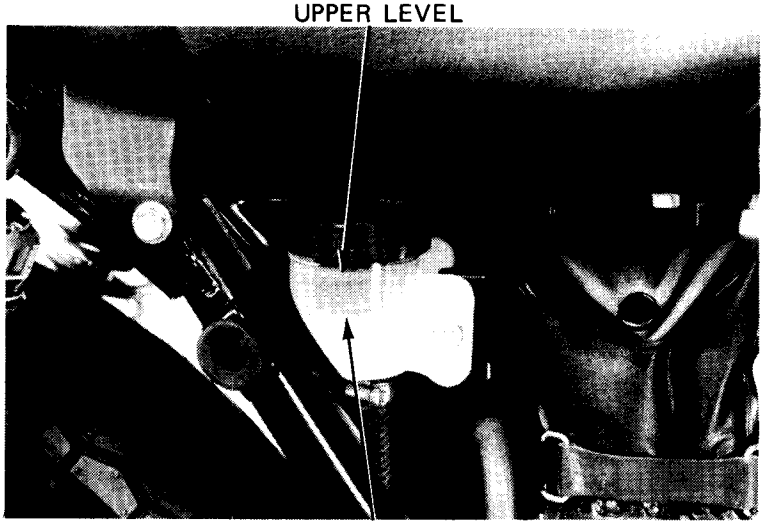
BRAKE FLUID DRAINING

Connect a bleed hose to the bleeder valve.
Loosen the caliper bleeder valve and pump the brake lever (or pedal).
Stop operating the lever (or pedal) when no fluid flows out of the bleeder valve.

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.

UPPER LEVEL



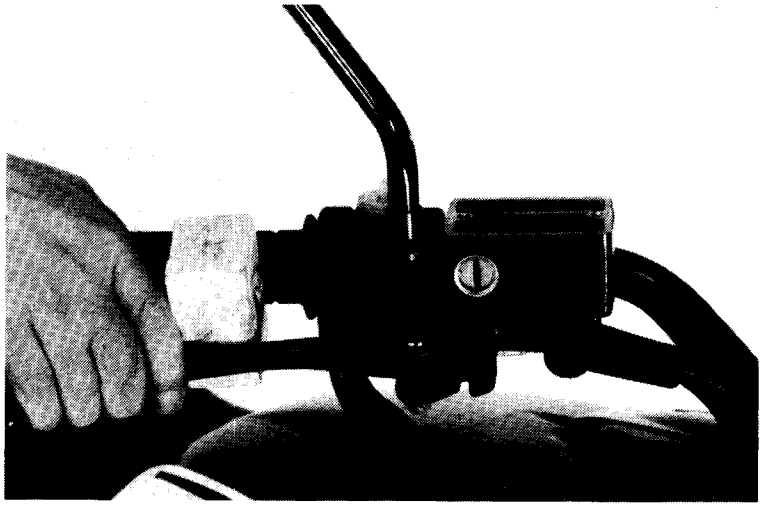
LOWER LEVEL

BRAKE FLUID FILLING

NOTE:

Do not mix different types of fluid, they are not compatible.

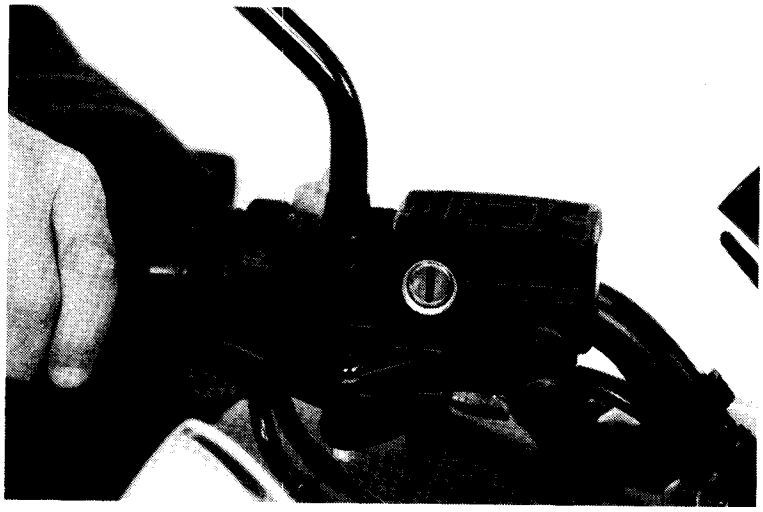
Close the bleeder valve, fill the reservoir, and install the diaphragm.
To prevent piston overtravel and brake fluid seepage, keep a 20 mm (3/4 in) space between the lever and the handlebar grip when bleeding the front brake system. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever (or pedal) resistance is felt.



AIR BLEEDING

NOTE:

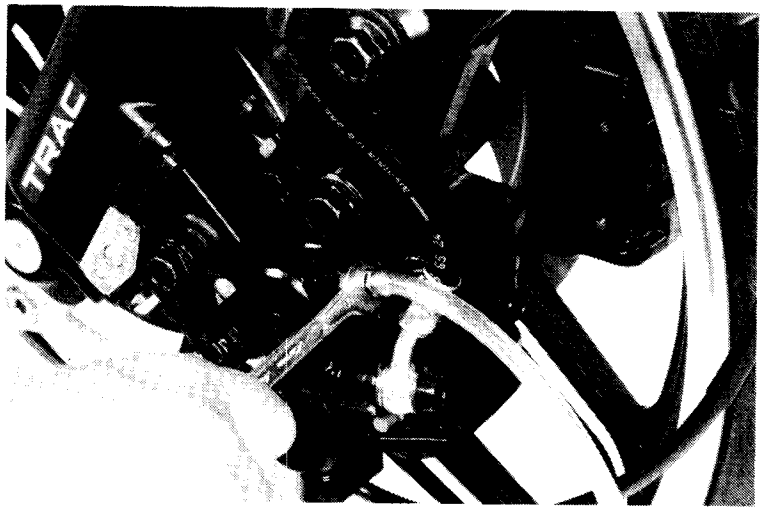
- Use this procedure for the front and rear brakes.
- Check the fluid level often while bleeding the system to prevent air from being pumped into the system.
- Use only SAE J1703 or DOT 3 brake fluid from a sealed container.
- Do not mix brake fluid types and never re-use the contaminated fluid which has been pumped out during brake bleeding, because this will impair the efficiency of the brake system.



i) Pull the brake lever (or depress the brake pedal), open the bleeder valve 1/2 turn, then close the valve.

NOTE:

Do not release the brake lever (or pedal) until the bleeder, valve has been closed again.



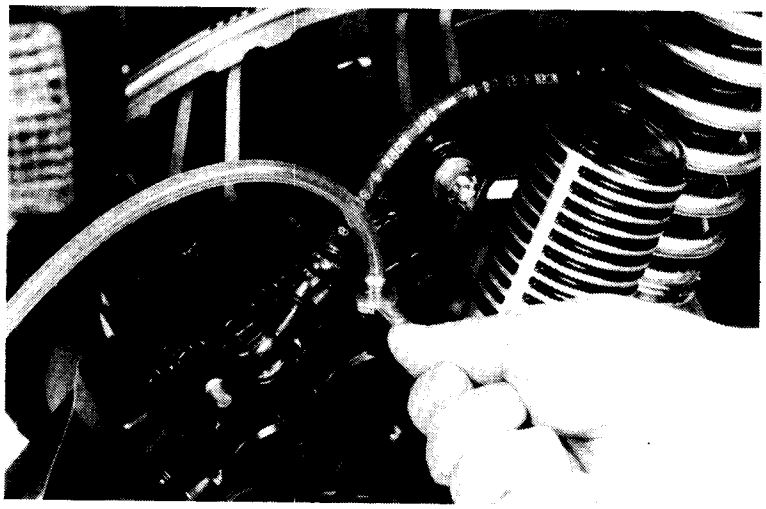
ii) Release the brake lever (or pedal) slowly and wait several seconds after it reaches the end of its travel.

Repeat the above steps i) and ii) until bubbles cease to appear in the fluid at the end of the hose.

Fill the fluid reservoir to the upper level mark.

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.



Date of Issue: August, 1982

BRAKE PAD/DISC

FRONT PAD REPLACEMENT

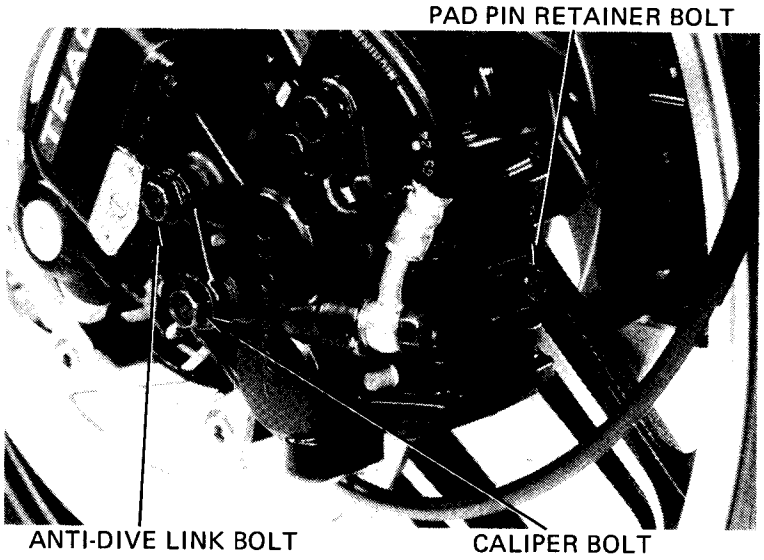
NOTE:

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

Remove the pad pin retainer bolt and the caliper bolt.

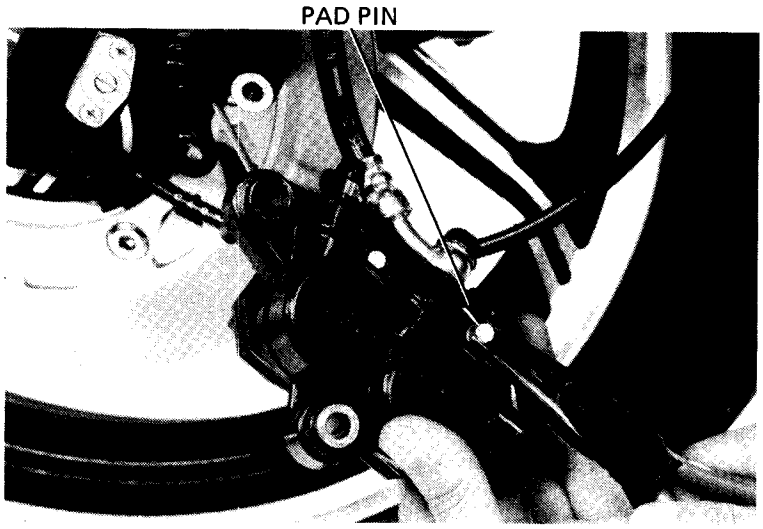
Loosen the anti-dive link bolt.

Pivot the caliper up out of the way and remove the caliper from the bracket.



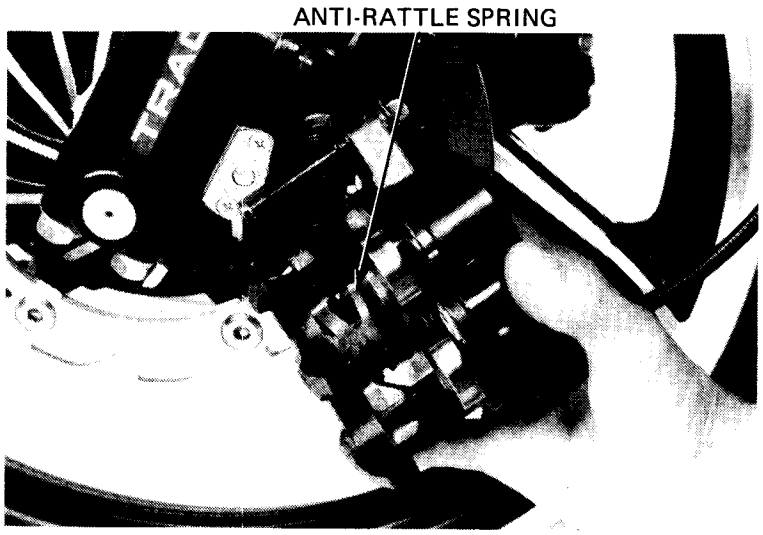
Remove the pad pin retainer and pull the pad pins out of the caliper.

Remove the brake pads.



Position the anti-rattle spring in the caliper as shown.

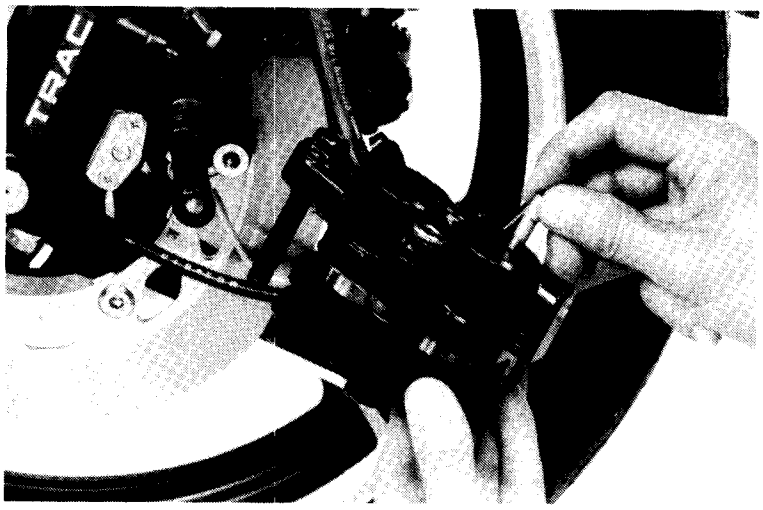
Push the caliper pistons in all the way.



Install the new pads in the caliper and install the pad pins.

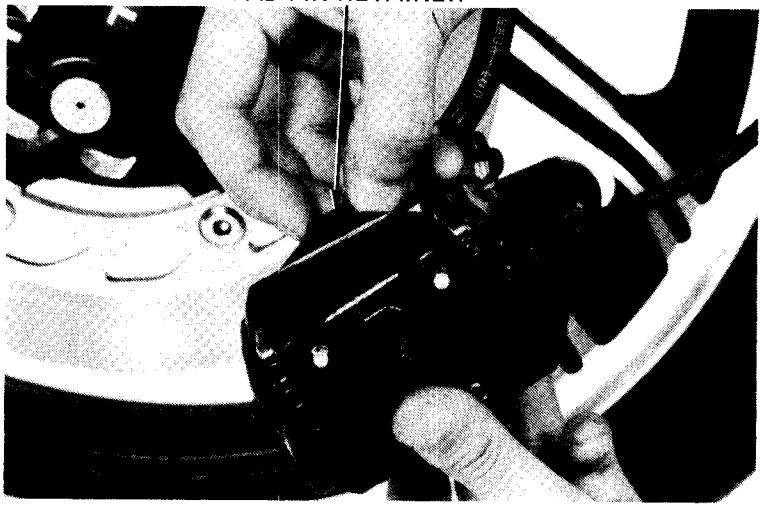
NOTE:

> Install one pad pin first then install the other pin by pushing the pads against the caliper to depress the anti-rattle spring.

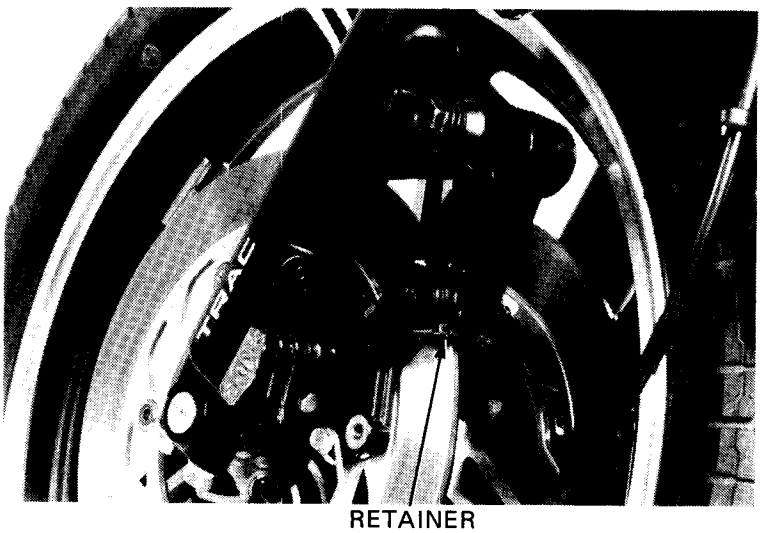


Place the pad pin retainer over the pad pins. Push the retainer down to secure the pins.

PAD PIN RETAINER



Install the retainer in the bracket.

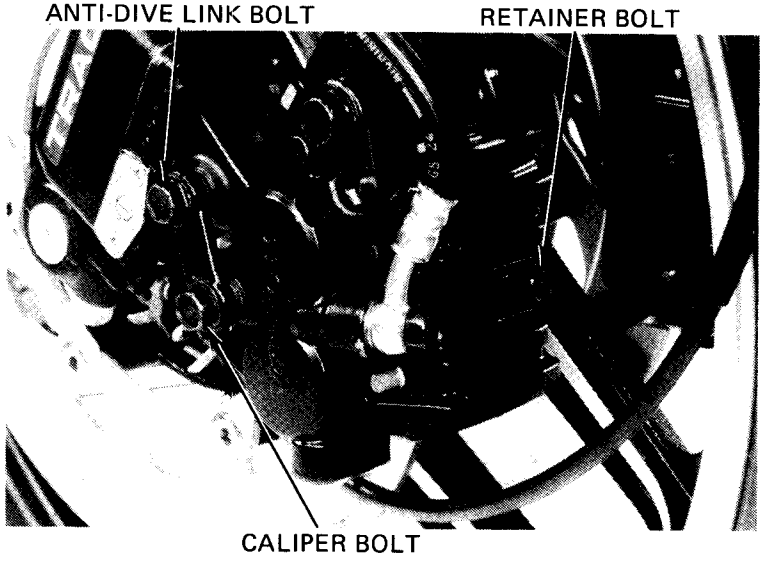


RETAINER

Install the pad pin retainer bolt.
Pivot the caliper down so the brake disc is positioned between the pads, making sure not to damage the pads.
Install the caliper bolt and tighten it.

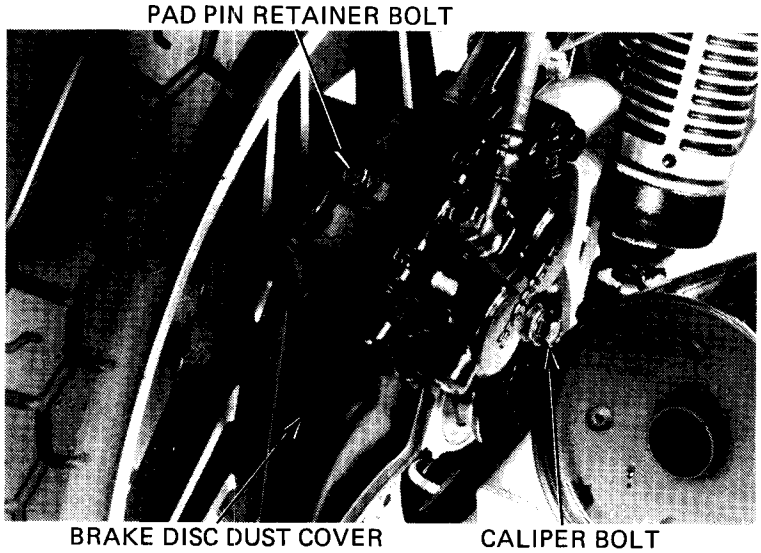
TORQUE: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)

Tighten the anti-dive link bolt.



REAR PAD REPLACEMENT

Remove the brake disc dust cover.
Replace the rear brake pads using the same method as used for front brake pad replacement (page 16-5).



DISC THICKNESS

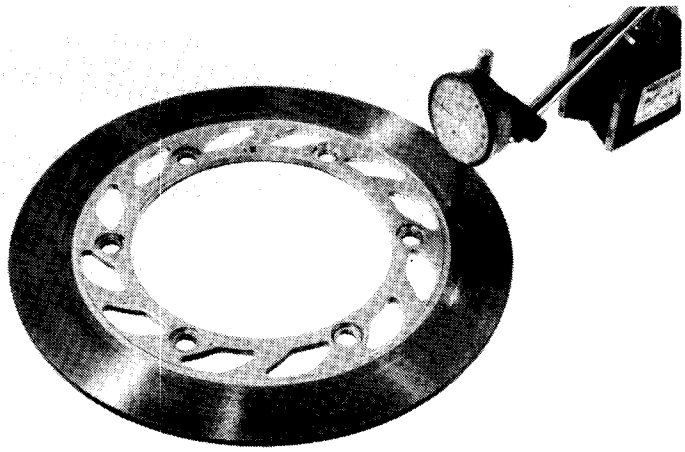
Measure the disc thickness with a micrometer.

SERVICE LIMIT:
FRONT: 4.0 mm (0.16 in)
REAR: 6.0 mm (0.24 in)

BRAKE DISC WARPAGE

Measure brake disc warpage on a surface plate with a feeler gauge.

SERVICE LIMIT: 0.3 mm (0.012 in)



FRONT MASTER CYLINDER

DISASSEMBLY

Drain brake fluid from the hydraulic system.

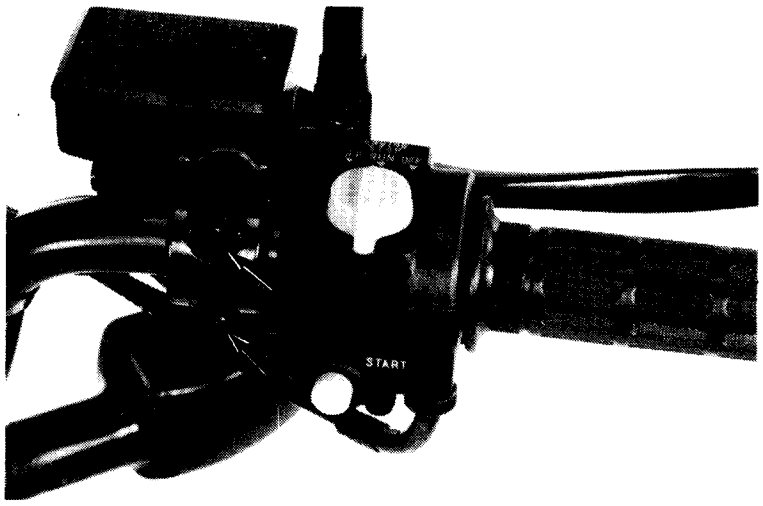
Remove the brake lever and rear view mirror from the master cylinder. Disconnect the brake hose.

CAUTION:

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

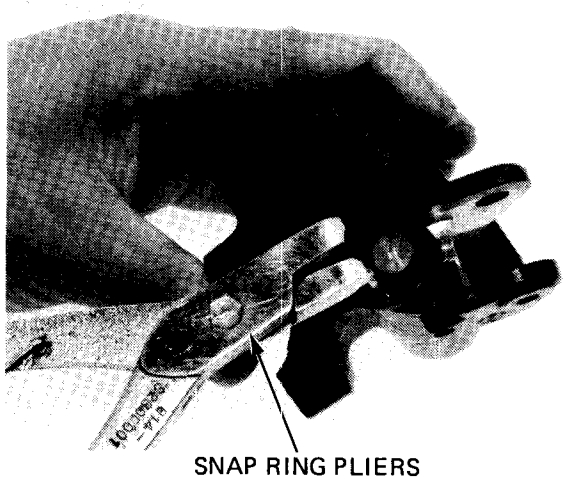
NOTE:

When removing the oil bolt, cover the end of the hose to prevent contamination and secure the hose.



Remove the master cylinder.

Remove the boot and circlip from the master cylinder body.

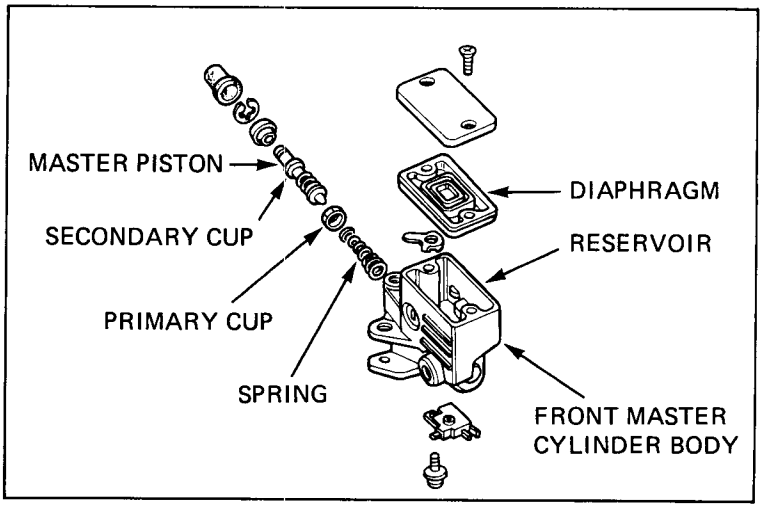


SNAP RING PLIERS
07914–3230001

Remove the stop plate, secondary cup and master piston. Then remove the primary cup and spring.

Remove the brake fluid reservoir from the master cylinder body, if necessary.

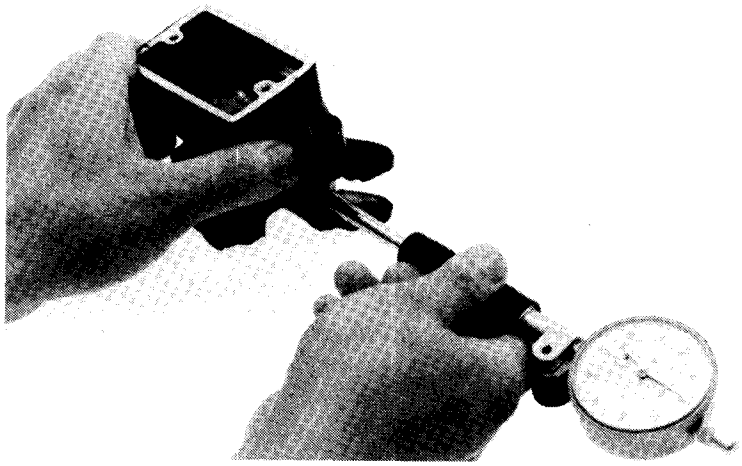
Clean the inside of the master cylinder and reservoir with brake fluid.



FRONT MASTER CYLINDER I.D. INSPECTION

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

SERVICE LIMIT: 15.925 mm (0.6270 in)

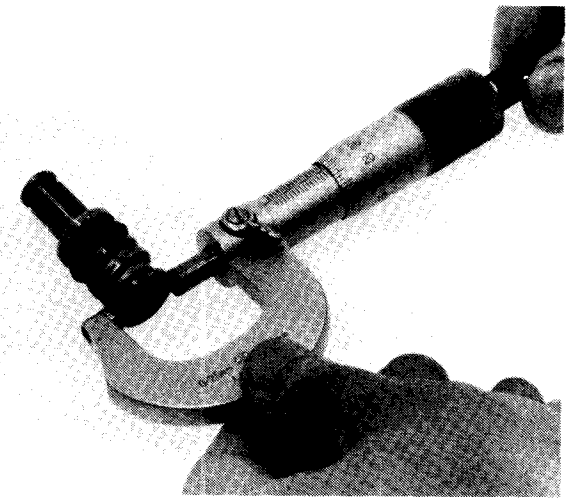


FRONT MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 15.815 mm (0.6226 in)

Check the primary cup and secondary cup for damage before assembly.



ASSEMBLY

CAUTION:

Handle the master cylinder piston, cylinder and spring as a set.

Assemble the master cylinder. Coat all parts with clean brake fluid before assembly. Install the spring and valve together.

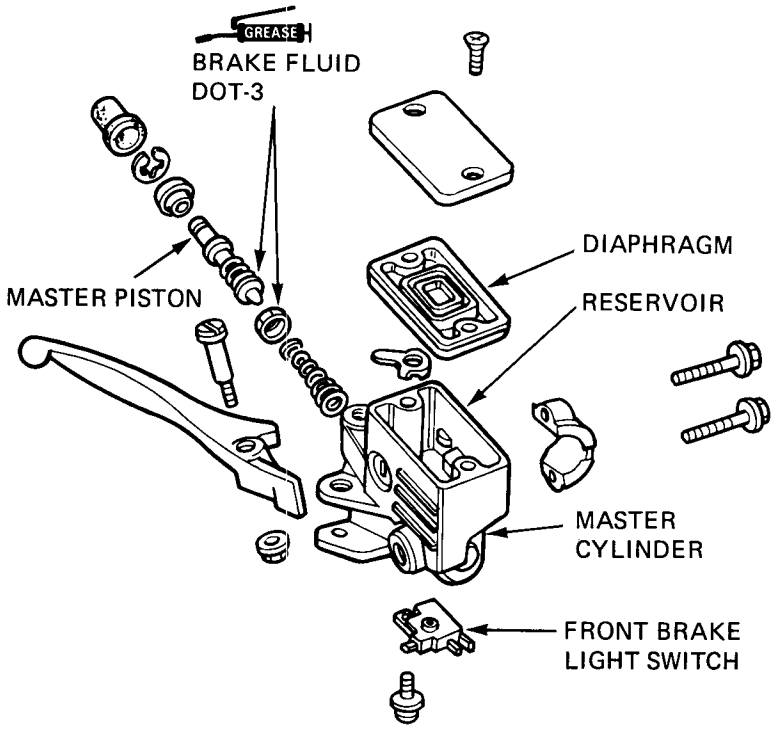
Dip the piston cup in brake fluid before assembly.

CAUTION:

When installing the cups, do not allow the lips to turn inside out. Be certain the circlip is seated fimly in the groove.

Install the boot, washer and clip.

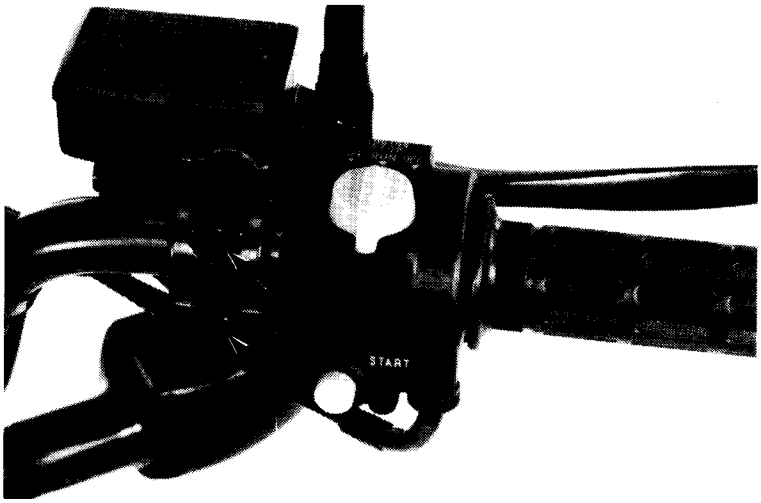
Install the reservoir on the master cylinder making sure that the O-ring is in good condition.



Place the master cylinder on the handlebar and install the holder and the two mounting bolts. Tighten the top bolt first. Install the oil hose with the bolt and its two sealing washers.

Install the brake lever. Before installing the lever nut, install the rubber tube from the bottom side of the cylinder, the plate, and nut.

Fill the reservoir to the upper level and bleed the brake system according to page 16-4.



BRAKE CALIPER

FRONT BRAKE CALIPER REMOVAL

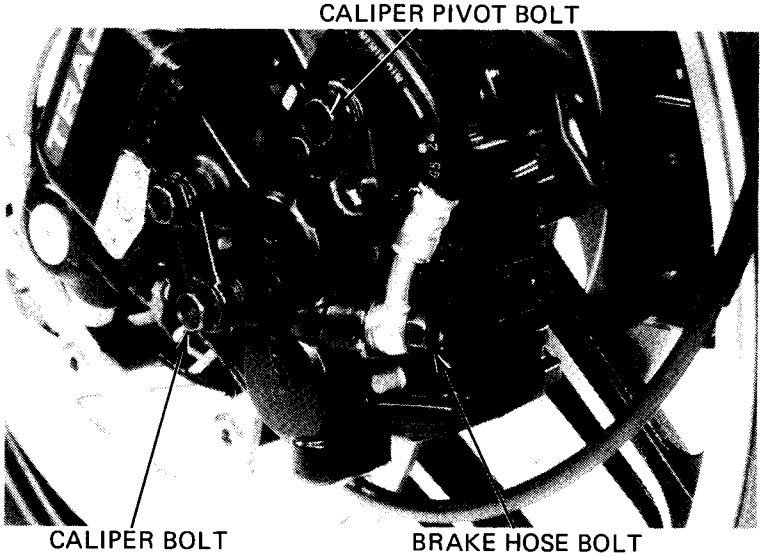
Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION:

Avoid spilling brake fluid on painted surfaces to prevent paint damage.

Remove the caliper bolt and caliper pivot bolt.

Remove the caliper.



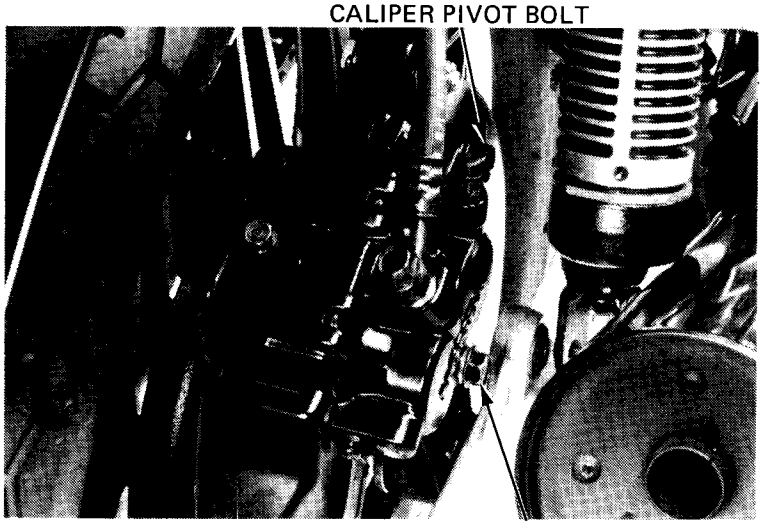
REAR BRAKE CALIPER REMOVAL

Remove the right rear shock absorber lower mounting bolt and move the shock absorber forward far enough to remove the caliper pivot bolt. Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION:

Avoid spilling brake fluid on painted surfaces to prevent paint damage.

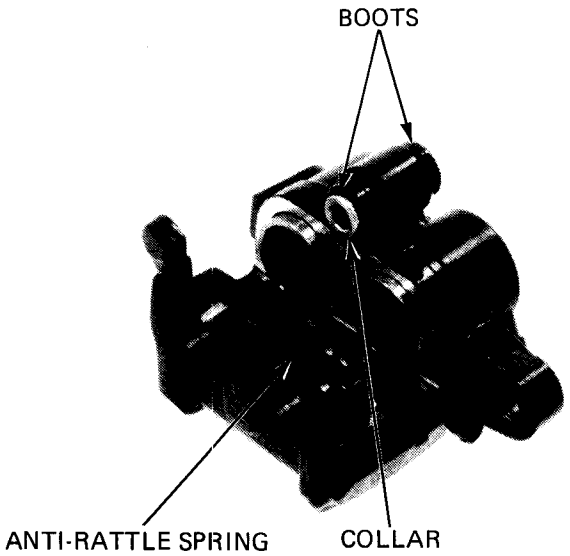
Remove the caliper and pivot bolts, and remove the caliper.



CALIPER DISASSEMBLY

Remove the pads and anti-rattle spring.

Remove the caliper pivot collar and boots.



Position the caliper with the piston down and apply small squirts of air pressure to the fluid inlet.

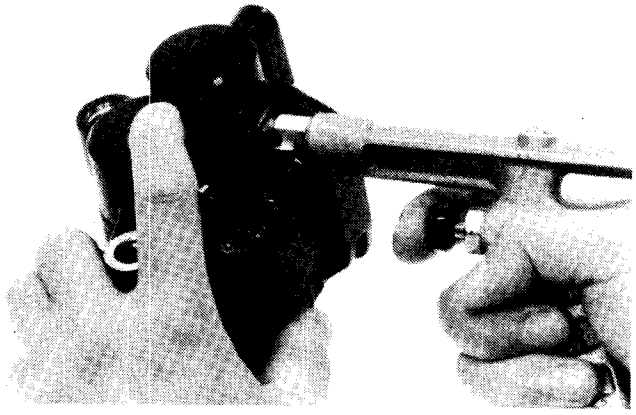
WARNING

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

NOTE:

Place a shop towel over the pistons to prevent the pistons from becoming projectiles.

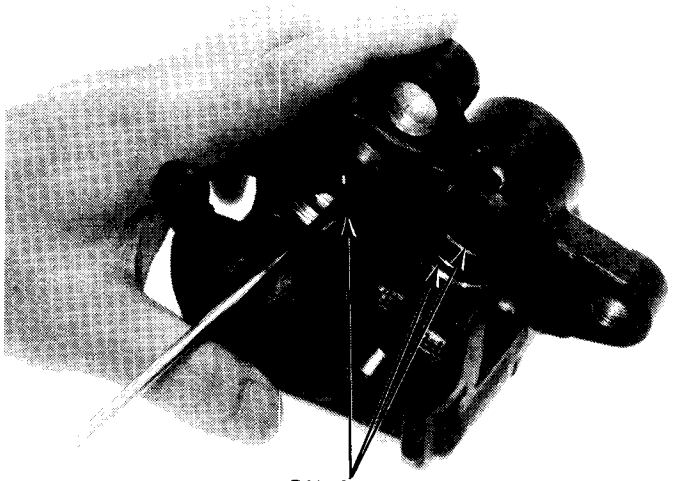
Examine the pistons and cylinders for scoring, scratches or other damage and replace if necessary.



Push the oil seals in and then lift them out. Clean the oil seal grooves with brake fluid.

CAUTION:

Do not damage the piston sliding surfaces.

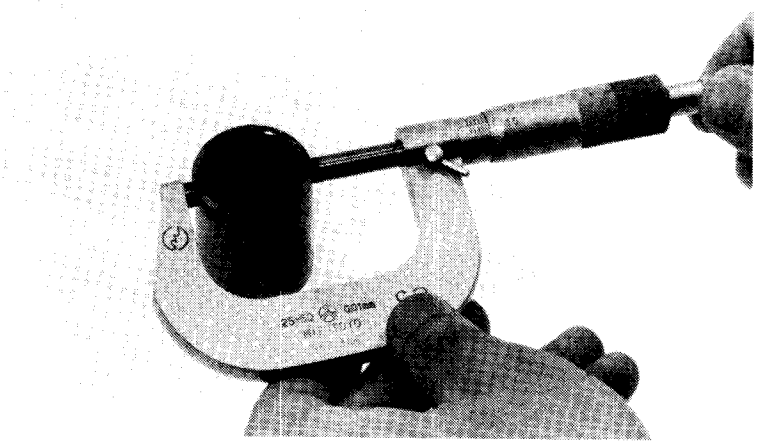


OIL SEALS

CALIPER PISTON O.D. INSPECTION

Check the piston for scoring, scratches or other faults. Measure the piston diameter with a micrometer.

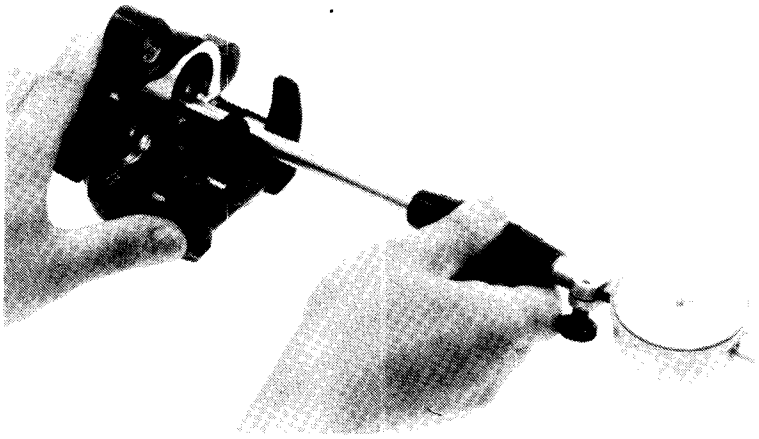
SERVICE LIMIT: FRONT: 30.14 mm (1.187 in)
REAR: 26.91 mm (1.059 in)



CALIPER CYLINDER I.D. INSPECTION

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

SERVICE LIMIT: FRONT: 30.29 mm (1.193 in)
REAR: 27.06 mm (1.065 in)



CALIPER ASSEMBLY

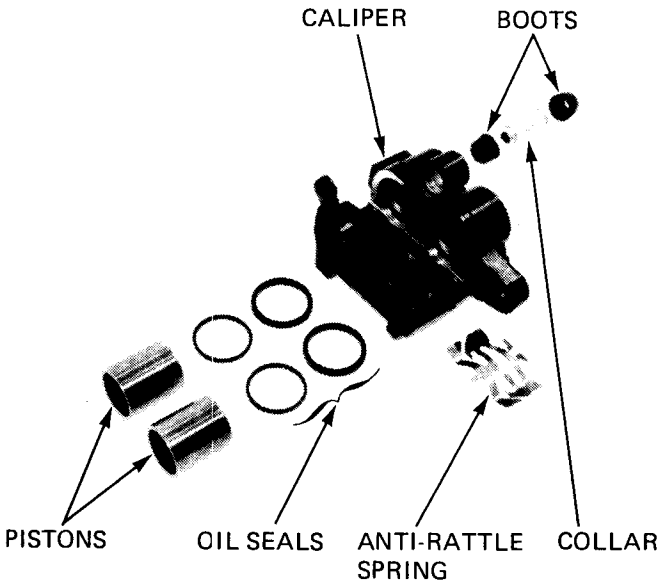
The oil seals must be replaced with new ones whenever they are removed.

Coat the oil seals with silicone grease or brake fluid before assembly.

Install the pistons with the dished ends toward the pads.

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

Install the anti-rattle spring and pads.

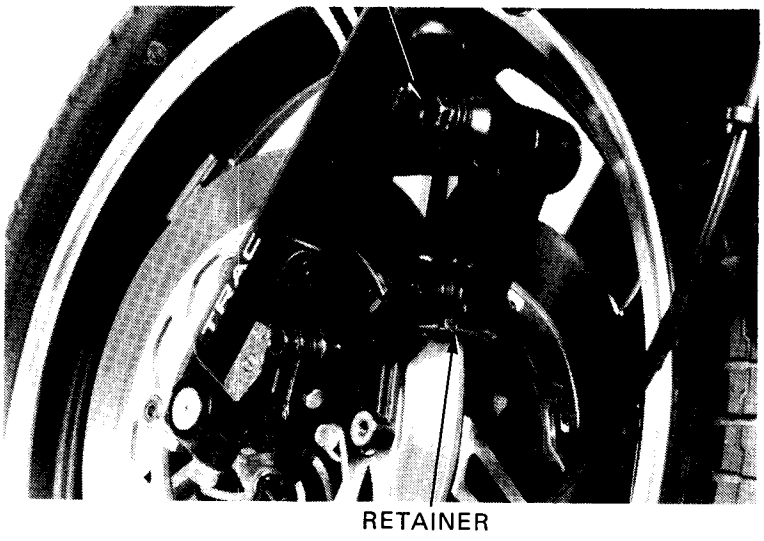


FRONT CALIPER INSTALLATION

Inspect the condition of the caliper pivot bolt boot. Apply silicone grease or brake fluid to the caliper pivot bolt.
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.



Install the caliper pivot bolt.

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

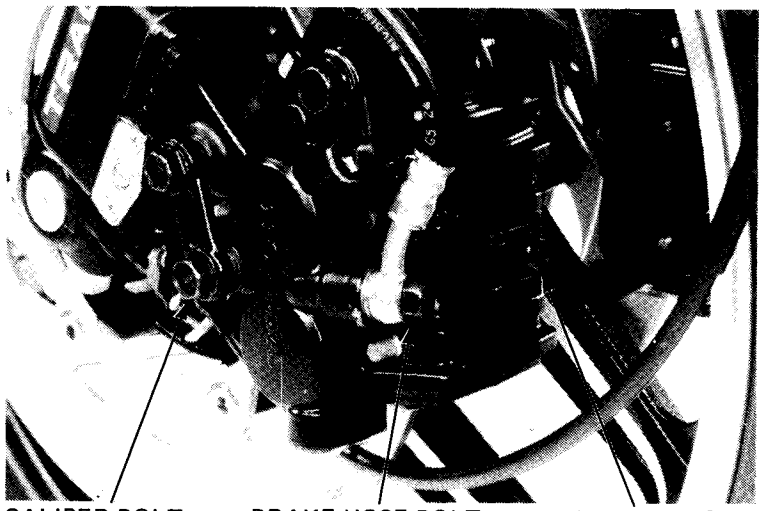
Install the caliper bolt.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

Connect the brake hose and tighten the brake hose bolt.

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

Fill the brake fluid reservoir and bleed the front brake system (page 16-4).



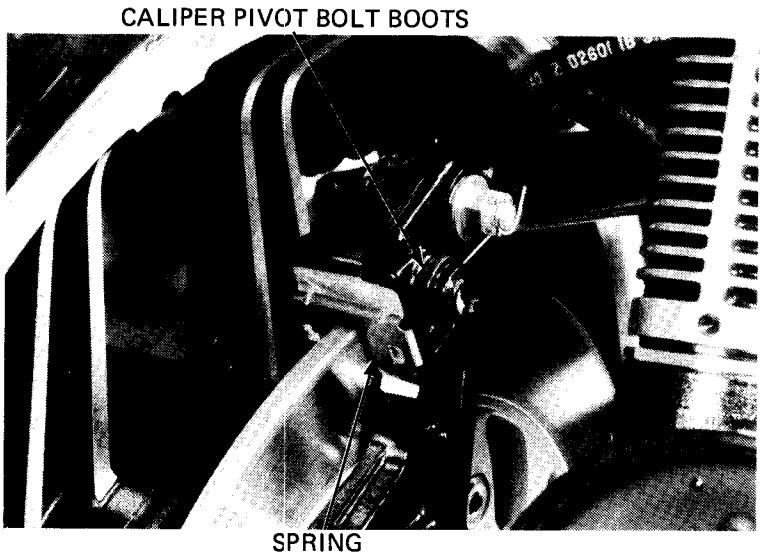
REAR CALIPER INSTALLATION

Inspect the condition of the caliper pivot bolt 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.

Apply silicone grease or brake fluid to the caliper pivot bolt.



Install the caliper pivot bolt.

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

Install the caliper bolt.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

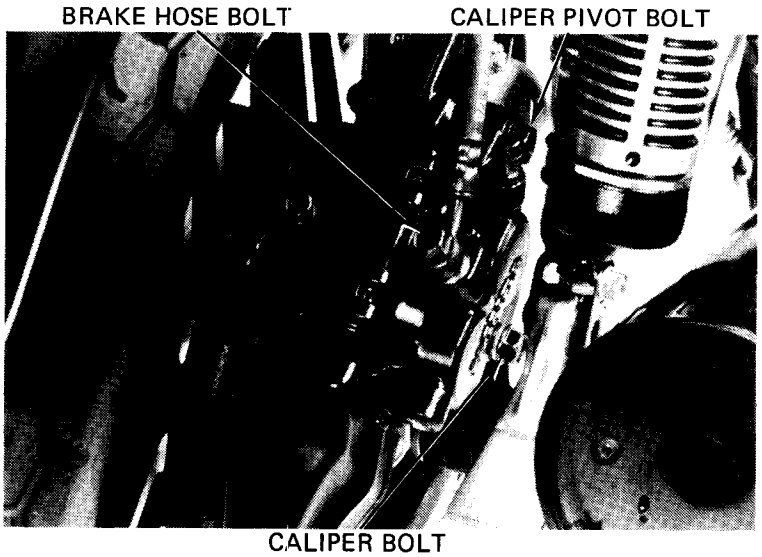
Connect the brake hose and tighten the brake hose bolt.

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

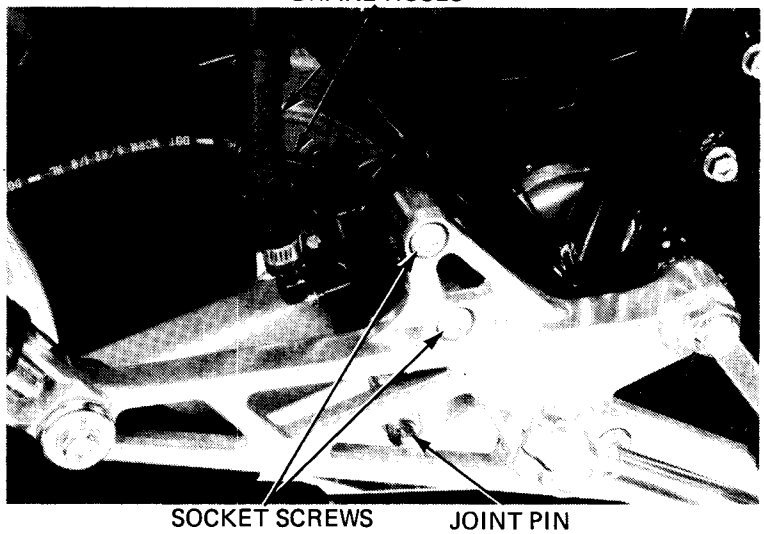
Fill the brake fluid reservoir and bleed the rear brake system (page 16-4).

Install the right rear shock absorber lower mounting bolt.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)



REAR MASTER CYLINDER



REMOVAL

Remove the right side cover.

Place a clean drain pan under the master cylinder and disconnect the brake hoses from the master cylinder.

CAUTION:

Avoid spilling brake fluid on painted surfaces to prevent paint damage.

Remove the cotter pin and pull out the joint pin connecting the master cylinder push rod end and rear brake pedal shaft.

Remove the socket screws and the master cylinder.

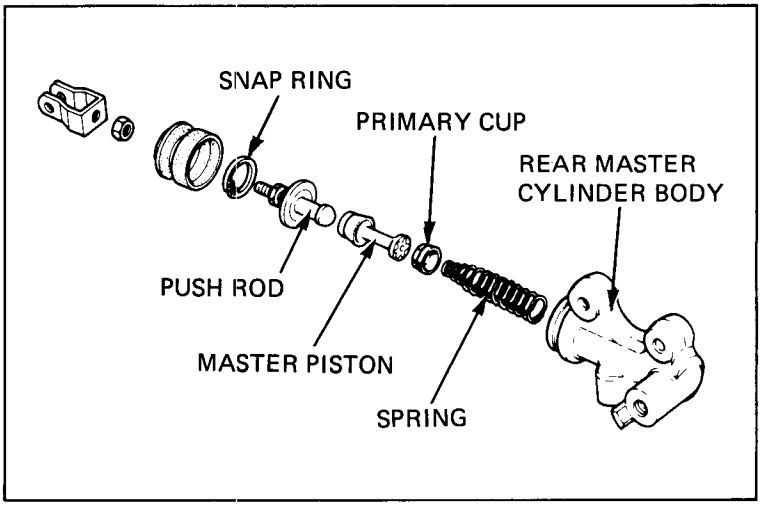
DISASSEMBLY

Remove the rubber cover.
Remove the snap ring and push rod from the master cylinder body.

Remove the master piston, primary cup and spring.

It may be necessary to apply a small amount of air pressure to the fluid outlet to remove the master piston and primary cup.

Clean all parts with brake fluid.

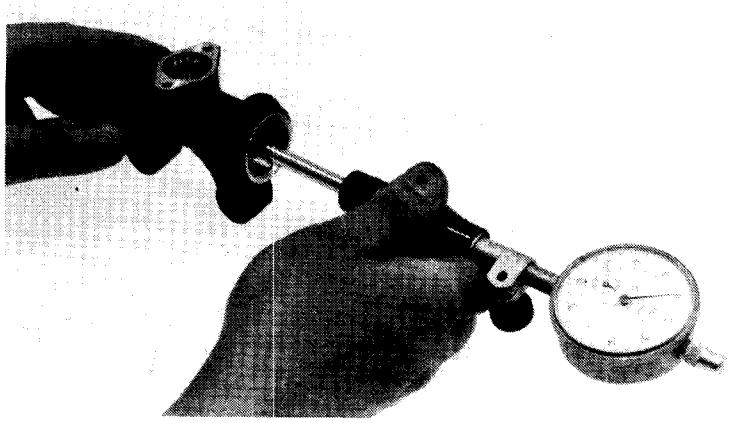


REAR MASTER CYLINDER I.D. INSPECTION

Measure the inside diameter of the master cylinder bore.

SERVICE LIMIT: 14.055 mm (0.5533 in)

Check for scores, scratches or nicks.

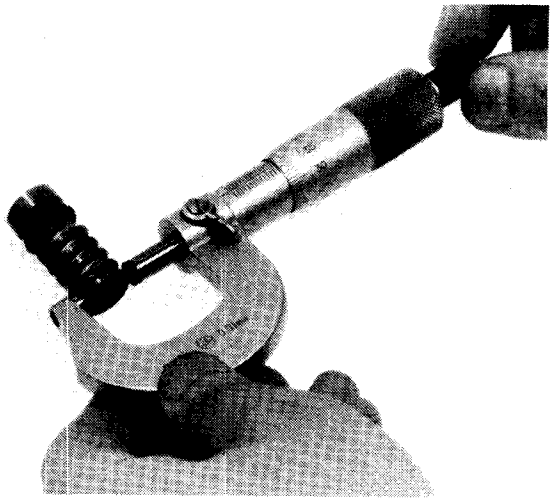


REAR MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.549 in)

Check the primary cup and secondary cup for damage before assembly.



ASSEMBLY

CAUTION:

Handle the master cylinder piston, cylinder and spring as a set.

Assemble the master cylinder.
Coat all parts with clean brake fluid.

Dip the piston cup in brake fluid before assembly.

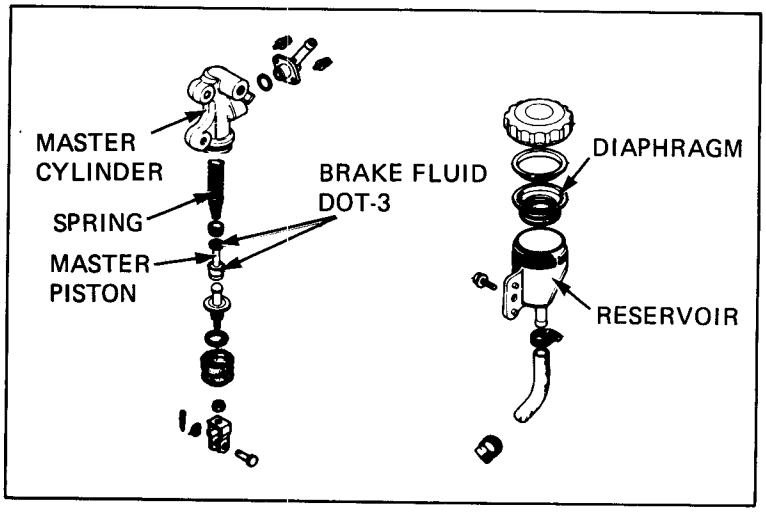
CAUTION:

When installing the cups, do not allow the lips to turn inside out. Be certain the snap ring is seated firmly in the groove.

Install the primary cup and piston.

Install the push rod and snap ring.

Install the boot, nut and rod eye.



INSTALLATION

Install the master cylinder and tighten the socket screws.

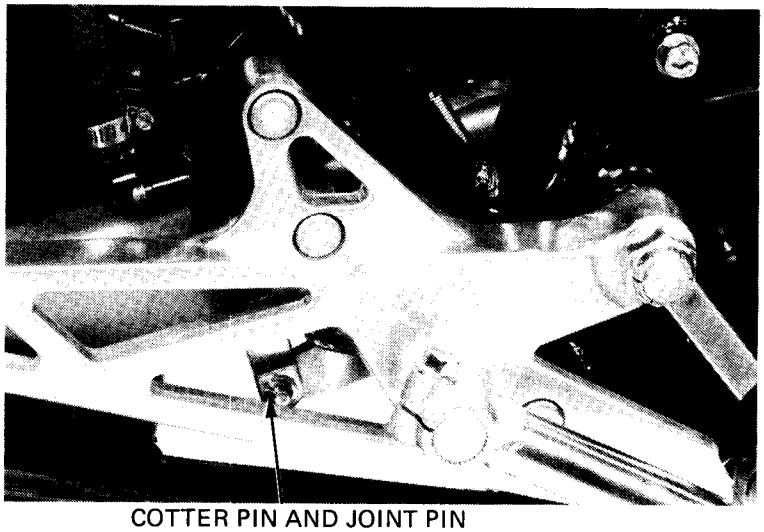
TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)

Connect the push rod end and brake pedal shaft with the joint pin. Secure the joint pin with a new cotter pin.
Connect the brake hose to the master cylinder and tighten the brake hose bolt.

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

Fill the brake fluid reservoir and bleed the rear brake system (page 16-4).

Install the right side cover.



COTTER PIN AND JOINT PIN

BRAKE PEDAL SHAFT

REMOVAL

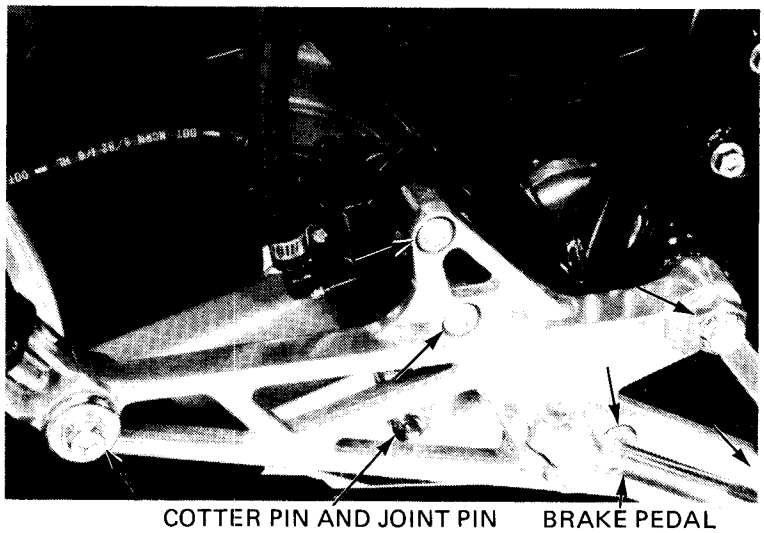
Remove the brake pedal.

Remove the cotter pin and joint pin, and then disconnect the pedal shaft from the master cylinder push rod end.

Unhook the brakelight switch spring and brake return spring.

Remove the right foot peg holder.

Remove the brake pedal shaft from the foot peg holder.

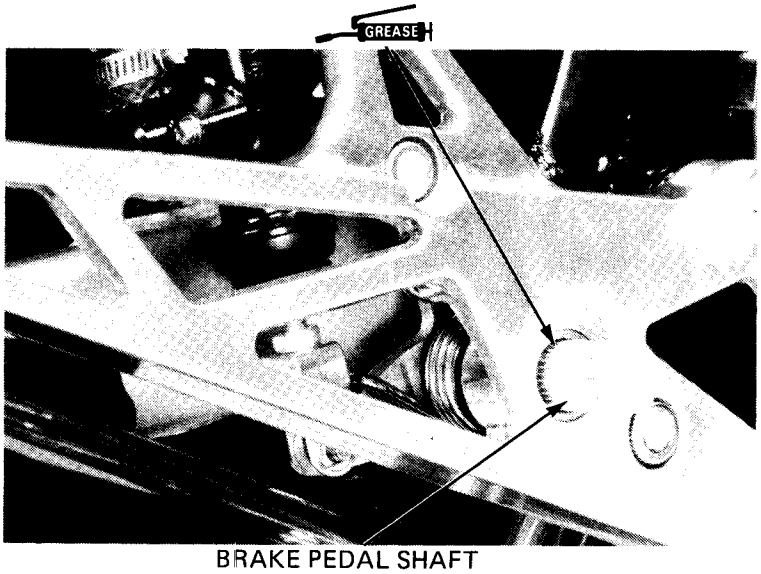


COTTER PIN AND JOINT PIN BRAKE PEDAL

INSTALLATION

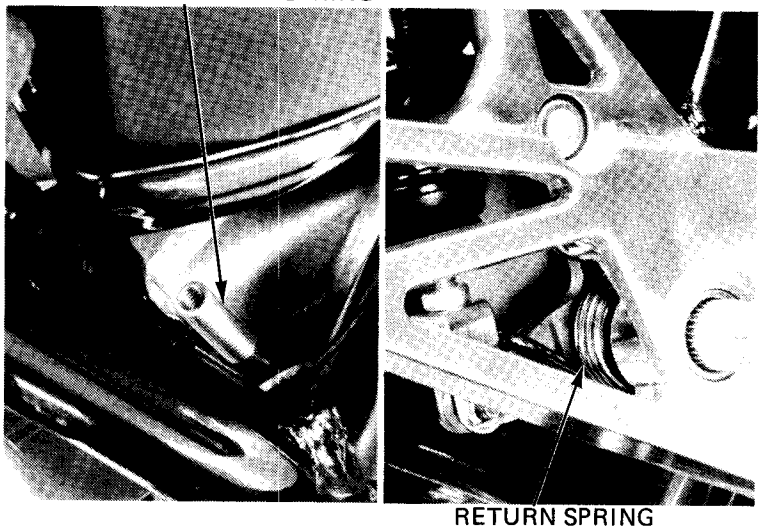
Apply grease to the brake pedal shaft and install it in the foot peg holder.

Install the foot peg holder.



BRAKE PEDAL SHAFT

Hook the brakelight switch spring and return spring as shown.



Connect the pedal shaft to the master cylinder push rod end and install the joint pin.
Secure the joint pin with a new cotter pin.
Install the brake pedal aligning the punch marks of the pedal and shaft.