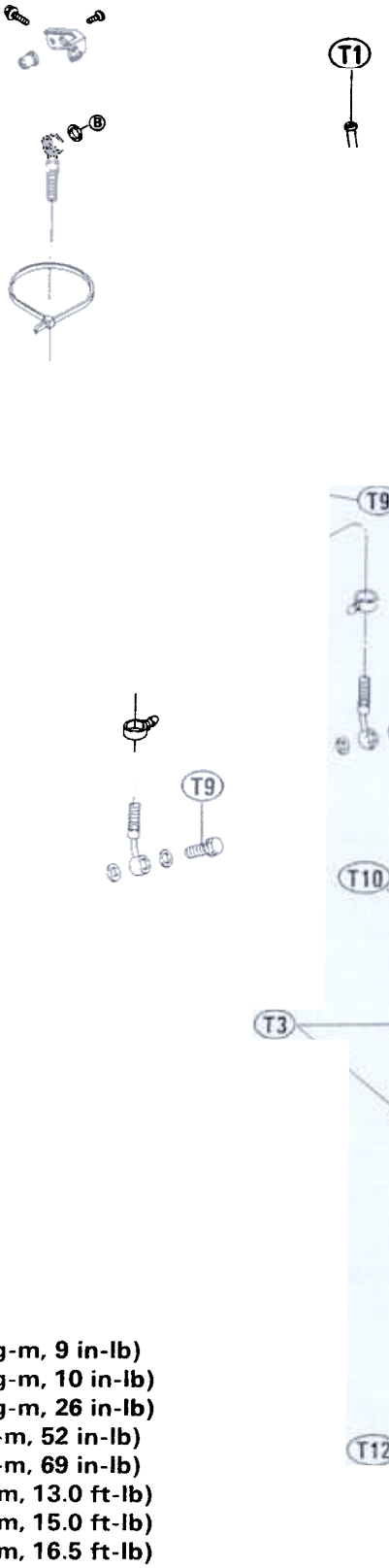
Brakes

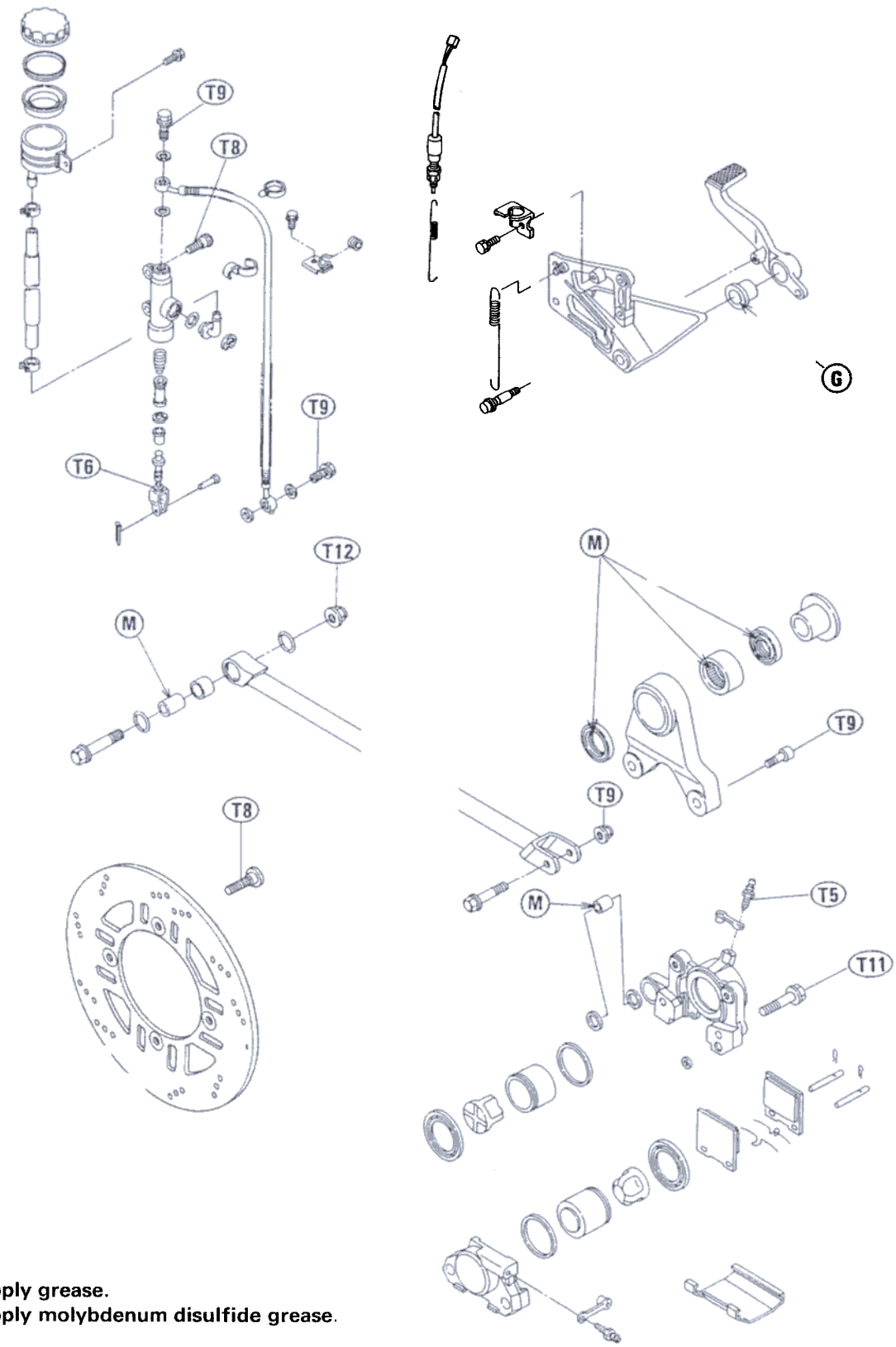
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Exploded View



T1: 1.0 N-m (0.10 kg-m, 9 in-lb)
T2: 1.2 N-m (0.12 kg-m, 10 in-lb)
T3: 2.9 N-m (0.30 kg-m, 26 in-lb)
T4: 5.9 N-m (0.6 kg-m, 52 in-lb)
T5: 7.8 N-m (0.8 kg-m, 69 in-lb)
T6: 18 N-m (1.8 kg-m, 13.0 ft-lb)
T7: 21 N-m (2.1 kg-m, 15.0 ft-lb)
T8: 23 N-m (2.3 kg-m, 16.5 ft-lb)
T9: 25 N-m (2.5 kg-m, 18.0 ft-lb)
T10: 27 N-m (2.8 kg-m, 20 ft-lb)
T11: 32 N-m (3.3 kg-m, 24 ft-lb)
T12: 34 N-m (3.5 kg-m, 25 ft-lb)



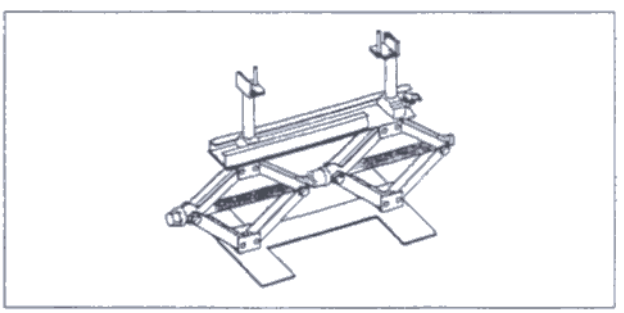
G : Apply grease.
M : Apply molybdenum disulfide grease.

Specifications

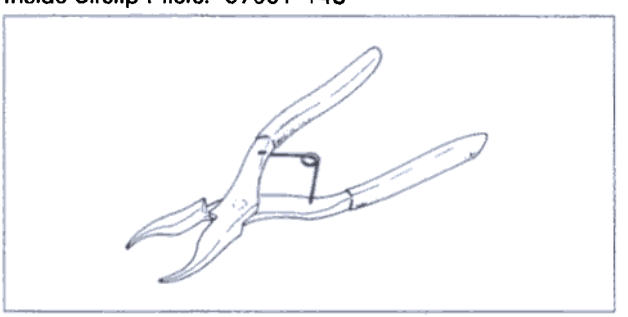
Item	Standard	Service Limit
Brake Fluid:		
Grade	D.O.T.3	– – –
Brand (recommended)	Atlas Extra Heavy Duty Shell Super Heavy Duty Texaco Super Heavy Duty Wagner Lockheed Heavy Duty Castrol Girling-Universal Castrol GT (LMA) Castrol Disc Brake Fluid	– – –
Brake Lever Free Play:	Non-adjustable	– – –
Brake Pedal:		
Brake pedal free play	Non-adjustable	– – –
Brake pedal position	43 mm below from center of brake pedal shaft	– – –
Brake Light Switch:		
Front	Non-adjustable	– – –
Rear	ON after about 10 mm pedal travel	– – –
Brake Pad Lining Thickness:		
Front	4 mm	1 mm
Rear	4 mm	1 mm
Brake Discs:		
Disc thickness:		
Front	4.3 ~ 4.6 mm	4 mm
Rear	5.8 ~ 6.1 mm	5 mm
Disc runout	0.2 mm or under	0.3 mm

Special Tools

Jack: 57001-1238



Inside Circlip Pliers: 57001-143



Brake Fluid

Fluid Level Inspection

In accordance with the Periodic Maintenance Chart, inspect the brake fluid level in the front and rear brake fluid reservoir.

● Check the brake fluid level in the reservoir.

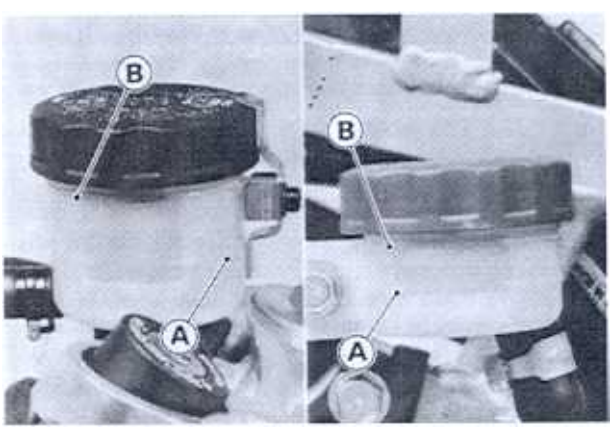
NOTE

○ *Hold the reservoir horizontal when checking brake fluid level.*

★ The fluid level must be kept above the lower level lines. If the fluid level is lower than the lower level line, fill the reservoir to the upper level line of the reservoir.

⚠WARNING

Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that already is in the reservoir are unidentified. After changing the fluid, use only the same type and brand of fluid thereafter. Mixing different types and brands of brake fluid lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.



A. Lower Level Line B. Upper Level Line

Brake Fluid Change

In accordance with the Periodic Maintenance Chart, change the brake fluid. The brake fluid should also be changed if it becomes contaminated with dirt or water.

Brake Fluid Requirement:

Recommended fluids are given in the table below. If none of the recommended brake fluids are available, use extra heavy-duty brake fluid only from a container marked D.O.T.3.

Recommended Disc Brake Fluid

Type	D.O.T.3
Brand	Atlas Extra Heavy Duty
	Shell Super Heavy Duty
	Texaco Super Heavy Duty
	Wagner Lockheed Heavy Duty
	Castrol Girling-Universal
	Castrol GT (LMA)
	Castrol Disc Brake Fluid

Changing Brake Fluid:

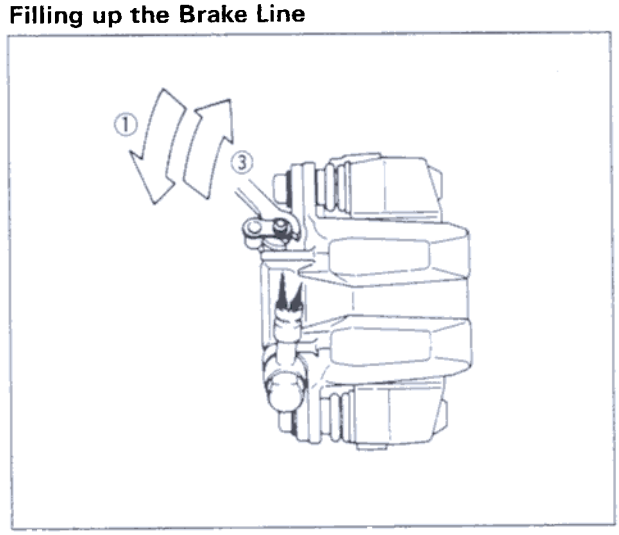
● Remove the rubber cap on the bleed valve.
● Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
● Open the bleed valve (counterclockwise to open), and pump the brake lever or pedal until all the fluid is drained from the line.
● Close the bleed valve.
● Remove the reservoir cap.
● Fill the reservoir with fresh brake fluid.
● Install the reservoir cap.
● Open the bleed valve, apply the brake by the brake lever or pedal, close the valve with the brake held applied, and then quickly release the lever or pedal. Repeat this operation until the brake line is filled and fluid starts coming out of the plastic hose.

NOTE

○ *Replenish the fluid in the reservoir as often as necessary to keep it from running completely out.*

● Bleed the air from the lines (continue with Bleeding the Brake).

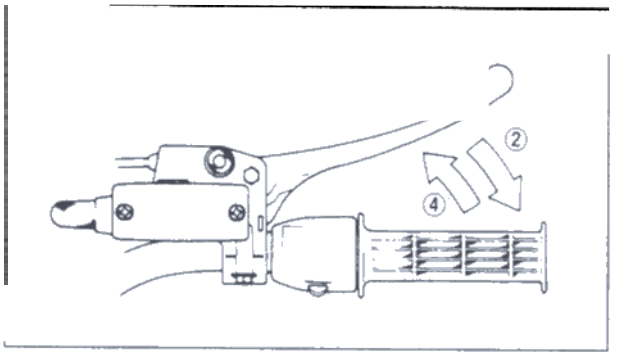
Filling up the Brake Line



Bleeding the Brake Line

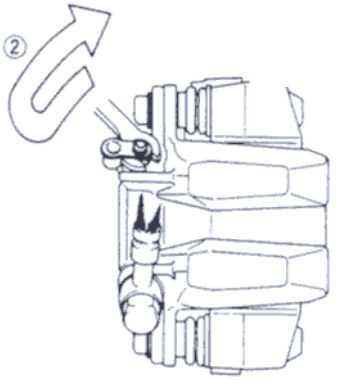
The brake fluid has a very low compression coefficient so that almost all the movement of the brake lever or pedal is transmitted directly to the caliper for braking action. Air, however, is easily compressed. When air enters the brake lines, brake lever or pedal movement will be partially used in compressing the air. This will make the lever or pedal feel spongly, and there will be a loss in braking power.

- ● Bleed the air from the brake whenever brake lever or pedal action feels soft or spongy, after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.
- ● Check that there is plenty of fluid in the reservoir.
- ○ The fluid level must be checked several times during the bleeding operation and replenished as necessary (see Brake Fluid Change).
- ★ If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.
- ● With the reservoir cap off, slowly pump the brake lever or pedal several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir. This bleeds the air from the master cylinder end of the line.
- ★ If brake lever or pedal action still feels soft or spongy, bleed the remaining air as follows.
- ○ Connect a clear plastic hose to the bleed valve at the caliper, running the other end of the hose into a container.
- ○ Pump the brake lever or pedal a few times until it comes hard.
- ○ Holding the brake applied, quickly open (turn counter-clockwise) and close the bleed valve.
- ○ Repeat this operation until no more air can be seen coming out into the plastic hose.
- ○ Check the fluid level in the reservoir every so often, replenishing it as necessary.



1. Open the bleed valve.
2. Apply the brake and hold it.
3. Close the bleed valve.
4. Then quickly release the brake.

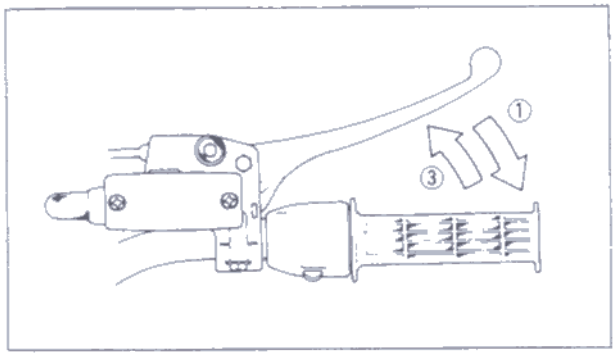
Bleeding the Brake Line



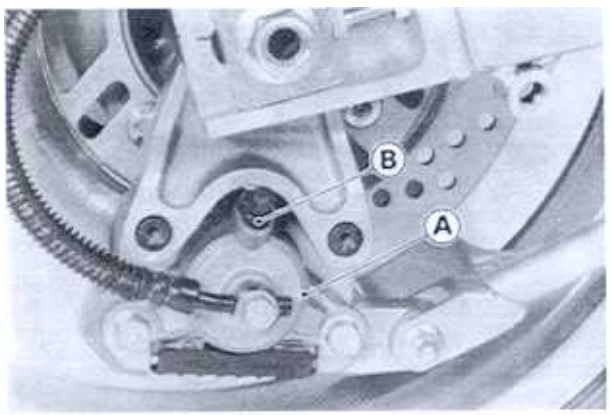
⚠WARNING

When working with the disc brake, observe the precautions listed below.

1. Never reuse old brake fluid.
2. Do not use fluid from a container that has been left unsealed or that has been open for a long time.
3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be in effective. It may also cause the rubber brake parts to deteriorate.
4. Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.
5. Don't change the fluid in the rain or when a strong wind is blowing.
6. Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely and will eventually deteriorate the rubber used in the disc brake.
7. When handling the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high-flash point solvent. Do not use one which will leave an oily residue. Replace the pads with new ones if they cannot be cleaned satisfactorily.
8. Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely wiped up immediately.
9. If any of the brake line fittings or the bleed valve is opened at any time, the **AIR MUST BE BLED FROM THE BRAKE.**



1. Hold the brake applied.
2. Quickly open and close the valve.
3. Release the brake.



A. Caliper B. Bleed Valve

●When air bleeding is finished, install the rubber caps on the bleed valve, and check that the brake fluid is filled to the upper level line marked in the reservoir (handlebar turned so that the reservoir is level).

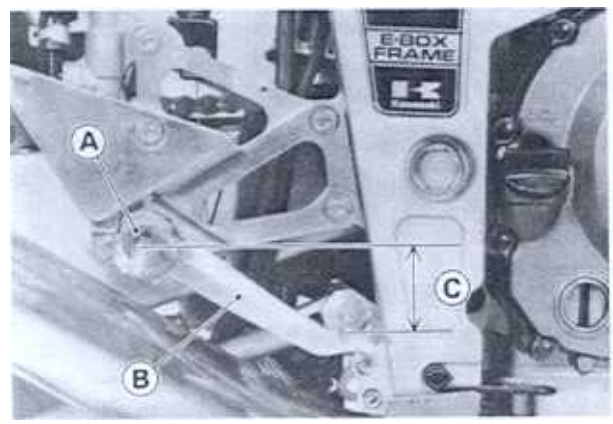
Brake Pedal

Brake Pedal Position Adjustment

●Check that the brake pedal is in the correct position.

Pedal Position

Standard: **About 43 mm below from center of brake pedal shaft**



A. Footpeg C. Pedal Position
B. Brake Pedal

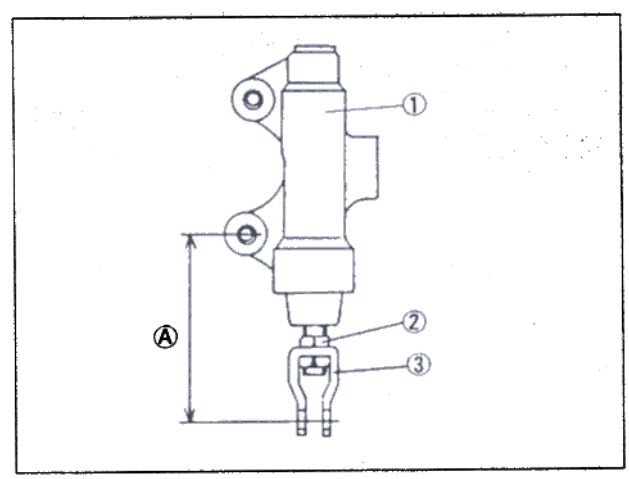
NOTE

○*Usually it is not necessary to adjust the pedal position, but always adjust it when the master cylinder is disassembled.*

○*If the pedal position cannot be adjusted by turning the clevis, the brake pedal may be deformed or incorrectly installed.*

●When the brake pedal is in its rest position, measure the length (A) indicated in the figure.

★If the length (A) is not within the specified length, adjust a nut.



1. Master Cylinder 3. Clevis
2. Locknut

Rear Brake Light Switch Adjustment

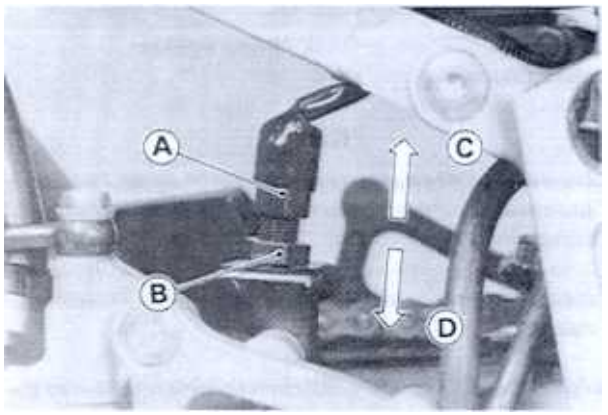
●Check the operation of the rear brake light switch by depressing the brake pedal. The brake light should go on after about **10 mm** of pedal travel.



A. Brake Pedal B. 10 mm

★If it does not, adjust the brake light switch.

●Turn the adjusting nut to adjust the switch.



A. Switch Body C. Light sooner.
B. Adjusting Nut D. Light later.

CAUTION

To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.

Calipers

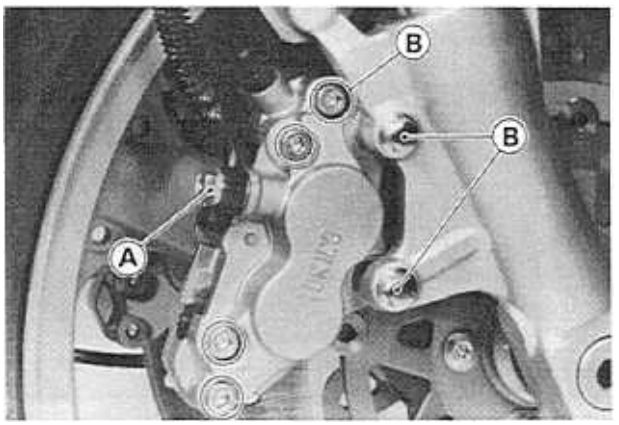
Front Caliper Removal

●Remove the following.
Banjo Bolt (at the caliper)
Caliper Mounting Bolts

CAUTION

Do not loosen the caliper bolts. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper bolts will cause brake fluid leakage.

●Remove the caliper.



A. Banjo Bolt C. Caliper Mounting Bolts
B. Caliper Assembly Bolts

CAUTION

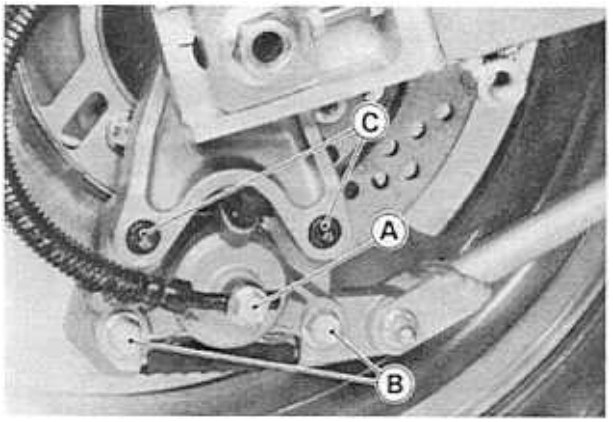
Immediately wipe up any brake fluid that spills.

Rear Caliper Removal

●Remove the rear caliper in the same way as the front caliper.

CAUTION

Do not loosen the caliper bolts. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper bolts will cause brake fluid leakage.



A. Banjo Bolt
B. Caliper Assembly Bolts
C. Caliper Mounting Bolts

Caliper Installation

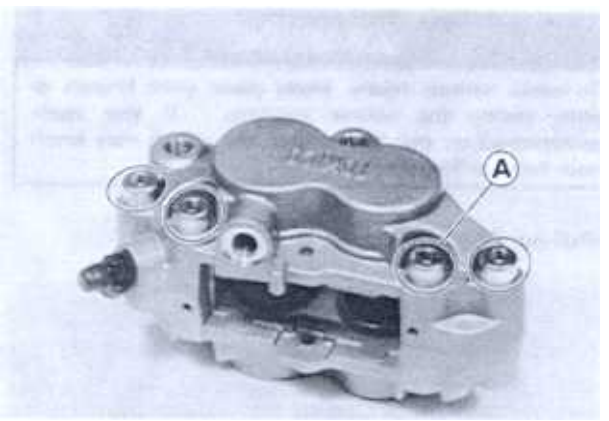
- Tighten the caliper mounting bolts to the specified torque (see Exploded View).
- Connect the brake hose to the caliper putting a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolt to the specified torque (see Exploded View).
- Check the fluid level in the master cylinder (reservoir), and bleed the brake line (see Bleeding the Brake).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠WARNING

Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brakes will not function on the first application of the lever or pedal if this is not done.

Front Caliper Disassembly

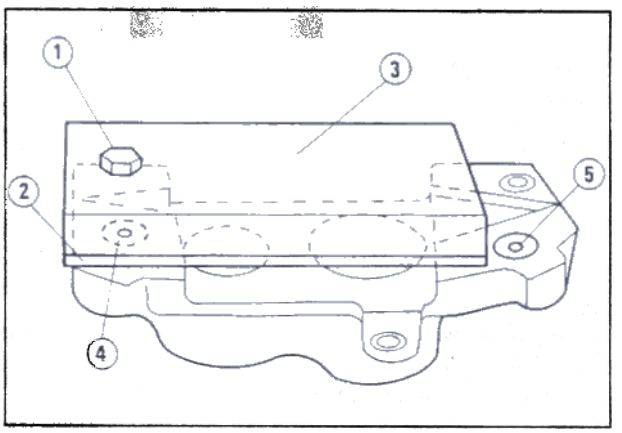
- Remove the following.
  - Front Brake Pads (see this chapter)
  - Front Caliper (see this chapter)
- Remove the caliper assembly bolts and split the front caliper.



A. Caliper Assembly Bolts

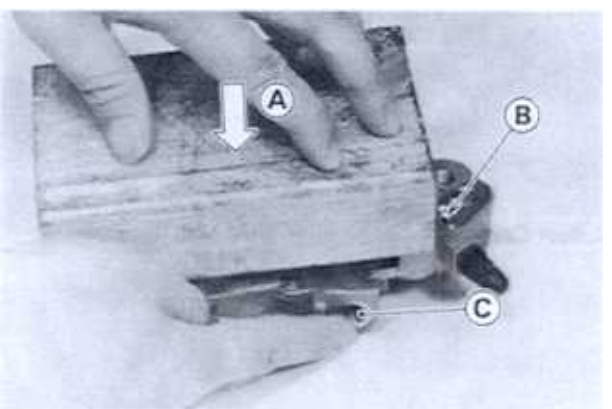
- Remove the piston insulator and the O-rings.
- Using compressed air, remove the pistons. One way to remove the pistons is as follows.

○ Install a wooden board more than 10 mm thick and a rubber gasket on the caliper half as shown. Leave one of the oil passages open.



1. Bolt and Nut
2. Rubber Gasket
3. Wooden Board
4. Oil Passage sealed by Rubber Gasket
5. Oil Passage

○ Lightly apply compressed air to the oil passage until the pistons hit the rubber gasket. Block the hose joint opening during this operation.

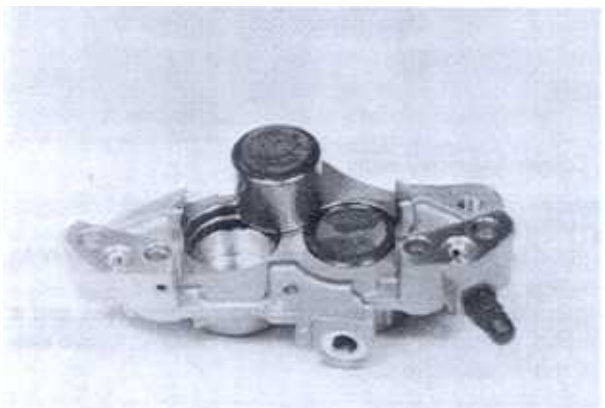


A. Push down
B. Apply compressed air.
C. Hose Joint Opening

⚠WARNING

To avoid serious injury, never place your fingers or palm inside the caliper opening. If you apply compressed air into the caliper, the piston may crush your hand or fingers.

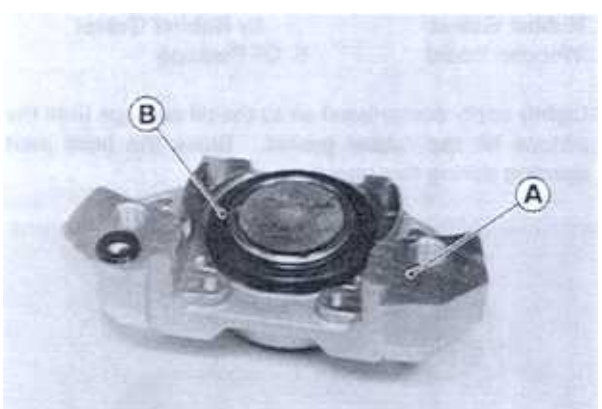
○Pull out the pistons by hand.



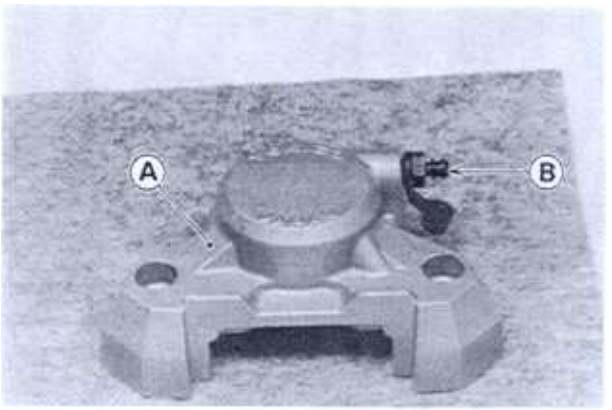
●Remove the following.
Dust Seals
Fluid Seals
●Repeat the previous step to remove the pistons from the other side of the caliper body.

Rear Caliper Disassembly

●Disassemble the rear caliper in the same manner as the front caliper (see Front Caliper Disassembly). Note the additional information below.
○Remove the piston dust seal before piston removal.



A. Rear Caliper B. Dust Seal

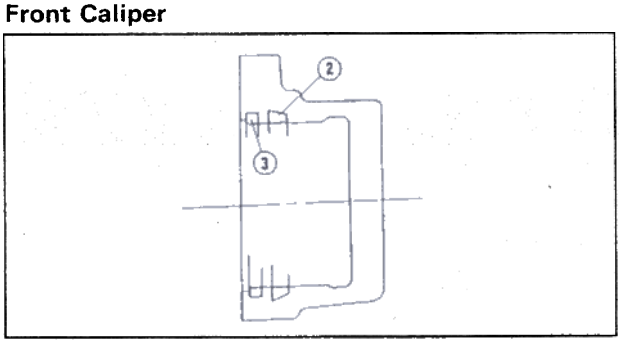


A. Rear Caliper B. Apply compressed air.

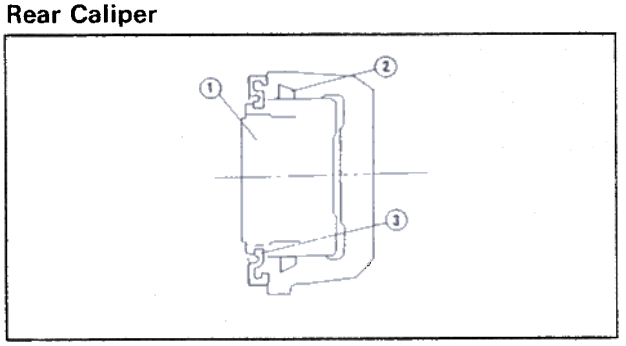
Assembly Notes

●Apply brake fluid to the cylinders, pistons, and fluid seals, and push the pistons into the cylinders by hand. Take care that neither the cylinder nor the piston skirt get scratched.
○For the rear caliper, install the dust seal around the piston and push them into the cylinder. Check that the dust seal is properly fitted into the grooves in the piston and caliper body.

Front Caliper

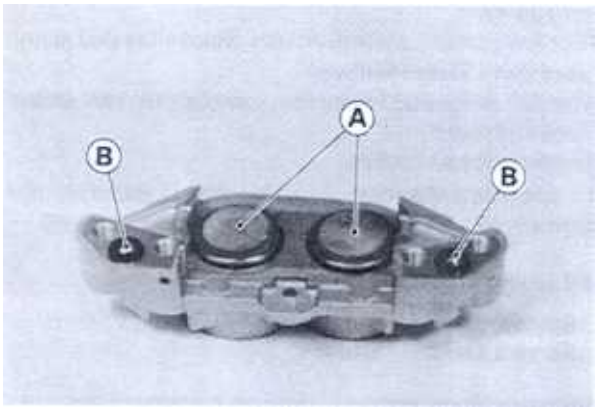


Rear Caliper



1. Piston 3. Dust Seal
2. Fluid Seal

●Be sure to install the following.



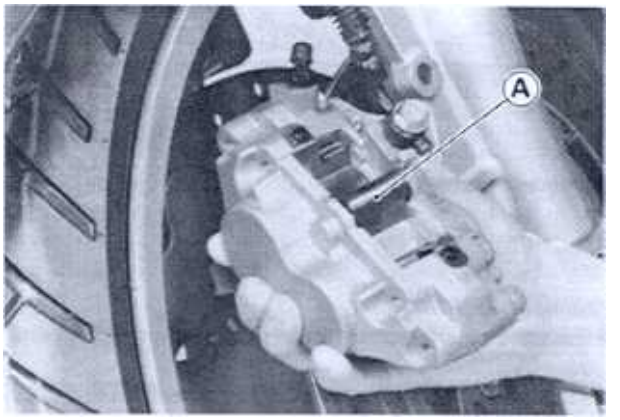
A. Piston Insulators B. O-Rings

● Tighten the caliper assembly bolts to the specified torque (see Exploded View).

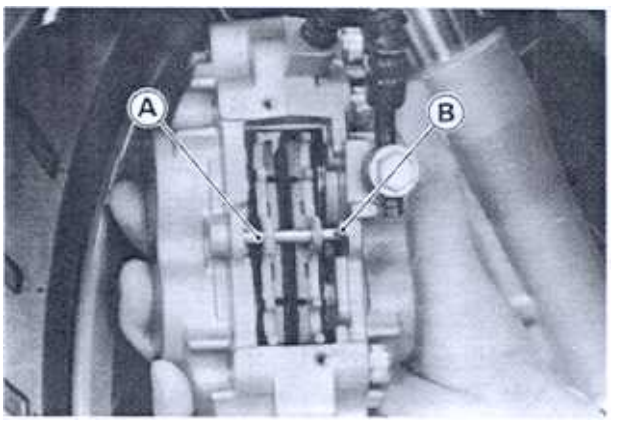
Brake Pads

Front Brake Pad Removal

● Remove the following.
Pad Spring
Clip
Pad Pin



A. Pad Spring

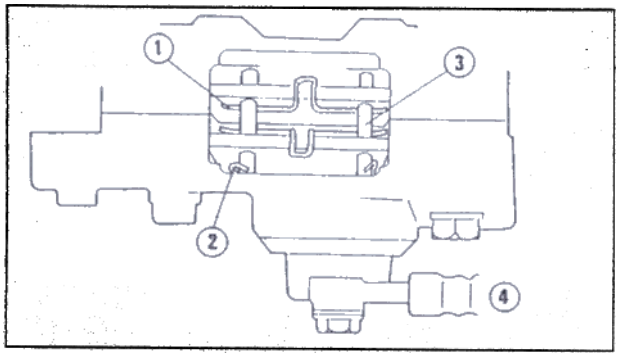


A. Pad Pin B. Clip

● Remove the brake pads.

Rear Brake Pad Removal

● Remove the following.
Rear Caliper (see this chapter)
Plastic Pad Cover
Clips
Pad Pins
Springs

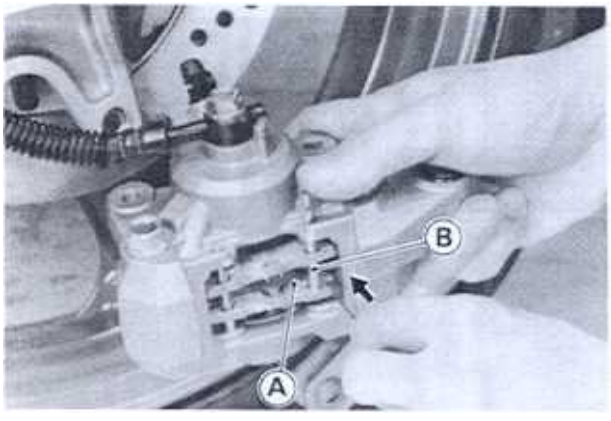


1. Springs
2. Clips
3. Pad Pins
4. Outside

● Remove the brake pads .

Installation Notes

● Push the caliper pistons in by hand as far as they will go.
● Install the pad pin(s) and clip(s) as shown. The clip(s) must be "outside" of the pads.



A. Spring
B. Pad Pin

● For the rear caliper, install the springs, pad pins, and clips on the original position shown (see Rear Brake Pad Removal).

⚠WARNING

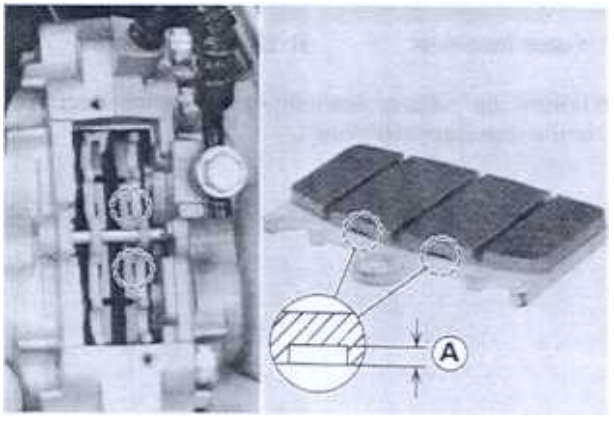
Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brake will not function on the first application of the lever or pedal if this is not done.

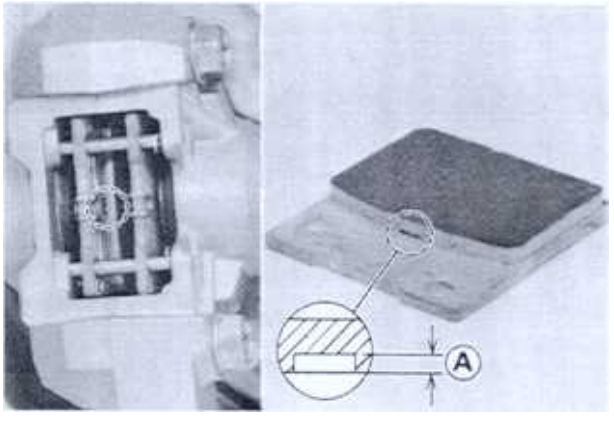
Lining Wear

● For front caliper pad inspection, remove the pad spring (see Front Caliper Removal).
● For rear caliper pad inspection, remove the rear caliper (see this chapter).
● Remove the pad cover.
★ If the lining thickness of either pad is less than the service limit, replace both pads in the caliper as a set.

Pad Lining Thickness (front and rear)

Standard:	**4 mm**
Service Limit:	**1 mm**



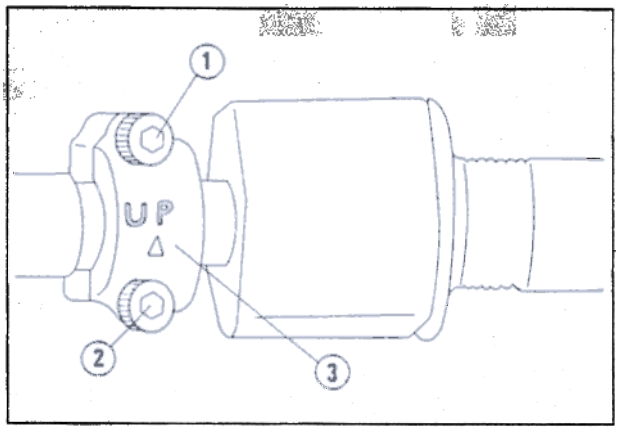


A. Service Limit

Master Cylinders

Front Master Cylinder Installation

- The master cylinder clamp must be installed with the arrow mark upward.
- Tighten the upper clamp bolt first, and then the lower clamp bolts to the specified torque (see Exploded View). There will be a gap at the lower part of the clamp after tightening.

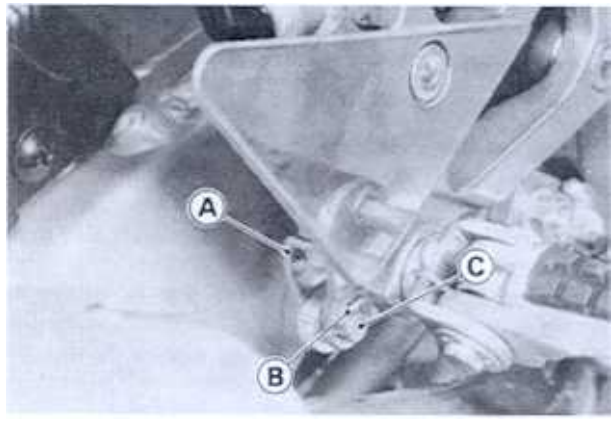


1. Tighten upper clamp bolts first.
2. Lower Clamp Bolt
3. Arrow Mark

- Use a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolts to the specified torque (see Exploded View).

Rear Master Cylinder Removal Notes

- Remove the cotter pin and then pull the joint pin out of the push rod clevis and brake pedal.



A. Clevis
B. Cotter Pin
C. Joint Pin

- Remove the master cylinder by taking off the mounting bolts.

Rear Master Cylinder Installation Notes

- Use a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolts to the specified torque (see Exploded View).
- Tighten the rear master cylinder mounting bolts (2) to the specified torque (see Exploded View).

Inspection and Adjustment after Installation

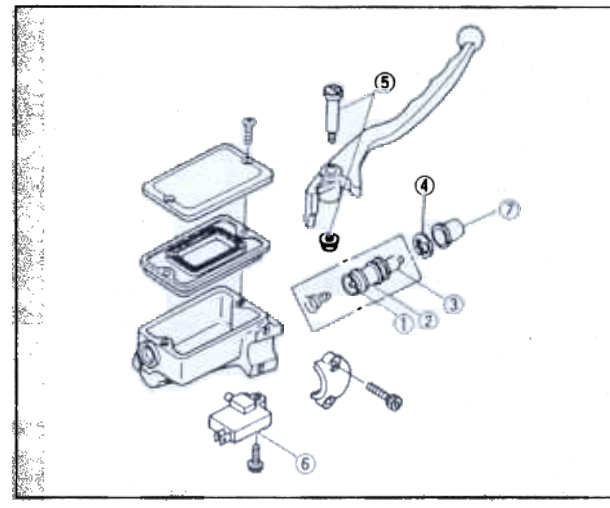
- Check and adjust the following items after installation.
  - Brake Pedal Position
  - Rear Brake Light Switch Position
  - Brake Line Air Bleed
  - Brake Drag
  - Braking Power
  - Brake Fluid Leakage

Disassembly

- Remove the following parts.
  - Dust Cover
  - Retainer
  - Piston with Secondary Cup
  - Primary Cup
  - Spring

CAUTION

Do not remove the secondary cup from the piston since removal will damage them.



1. Primary Cup
2. Piston
3. Secondary Cup
4. Retainer
5. Brake Lever Pivot Bolt, Nut
6. Front Brake Light Switch
7. Boot

Assembly

- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.
- Apply brake fluid to the removed parts and to the inner wall of the cylinder.

CAUTION

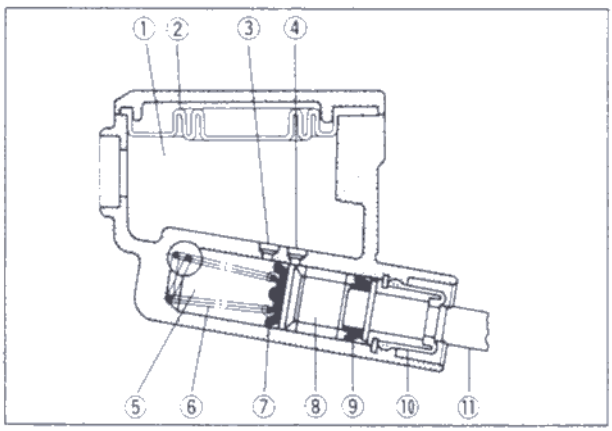
Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the disc brake.

- Take care not to scratch the piston or the inner wall of the cylinder.

Inspection (Visually)

- Check that there are no scratches, wear, rust, or pitting on the following parts.
  - Inside of the Master Cylinder
  - Outside of the Piston
  - Primary Cups
  - Secondary Cups
  - Dust Covers
  - Return Springs
  - Relief and Supply Port Plugged

★If they are damaged, replace them.

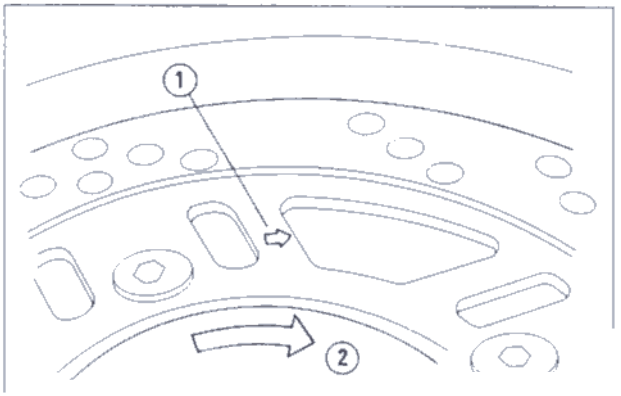


1. Reservoir
2. Diaphragm
3. Relief Port
4. Supply Port
5. Cylinder
6. Return Spring
7. Primary Cup
8. Piston
9. Secondary Cup
10. Dust Cover
11. Brake Lever

Brake Discs

Installation

- Install the brake disc on the wheel so that the rotation mark aligns with the tire rotation.



1. Rotation Mark
2. Rotation Direction

- Tighten the disc mounting bolts to the specified torque (see Exploded View).

Wear

★Replace the disc if the sliding surfaces have worn past the service limit.

Front Disc Thickness

Standard:	4.3 ~ 4.6 mm
Service Limit:	4.0 mm

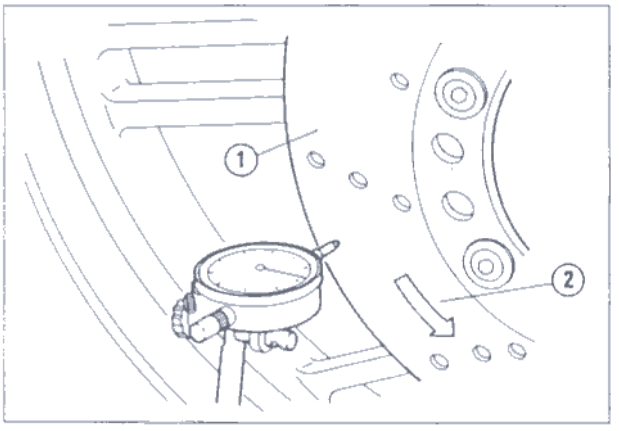
Rear Disc Thickness

Standard:	5.8 ~ 6.1 mm
Service Limit:	5.0 mm

Warp

- Jack up the motorcycle so that the wheel is off the ground (see Wheels/Tires chapter and Final Drive chapter).
- For front disc inspection, turn the handlebar fully to one side.
- Set up a dial gauge against the disc as shown and measure disc runout.

★If runout exceeds the service limit, replace the disc.



1. Brake Disc
2. Turn the wheel by hand.

Disc Runout

Standard:	**Under 0.2 mm**
Service Limit:	**0.3 mm**