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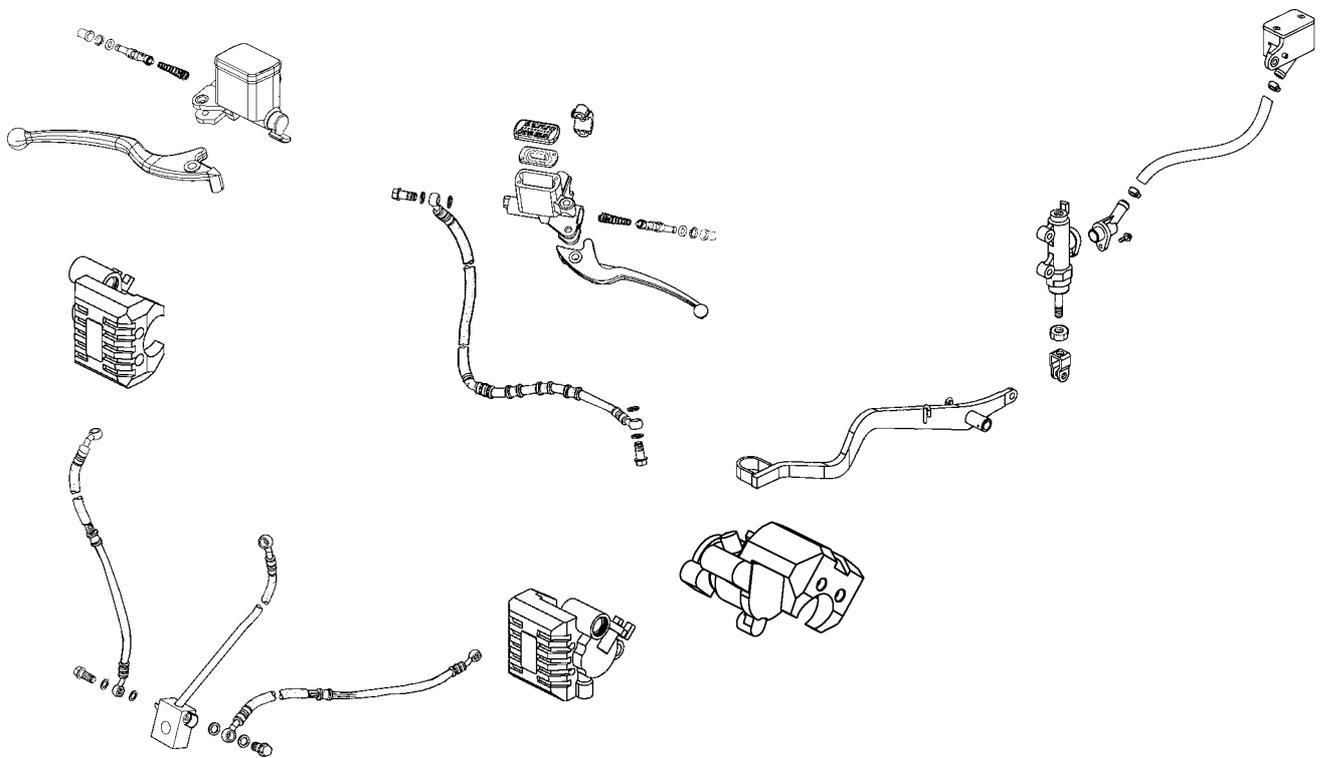
## BRAKE SYSTEM

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# 13. BRAKE SYSTEM

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# 13. BRAKE SYSTEM

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- During servicing, keep oil or grease off the brake pads and brake disk.
- Drain the brake fluid from the hydraulic brake system before disassembly.
- Contaminated brake disk or brake pads reduce stopping power. Clean the contaminated brake disk with high-performance brake degreaser and replace the brake pads.
- Do not use brake fluid for cleaning.
- Bleed air from the brake system if the brake system is removed or the brake is soft.
- Do not allow any foreign matters entering the brake reservoir when filling the brake reservoir with brake fluid.
- Brake fluid will damage painted, coated surfaces and plastic parts. When working with brake fluid, use shop towels to cover and protect painted, rubber and plastic parts. Wipe off any splash of brake fluid with a clean towel. Do not wipe the machine with a towel contaminated by brake fluid.
- Make sure to use recommended brake fluid. Use of other unspecified brake fluids may cause brake failure.
- Inspect the brake operation before riding.

### SPECIFICATIONS

Unit: mm (in)

Item	Standard	Service Limit
Brake disk thickness	3.8~4.2 (0.152~0.168)	3 (0.12)
Brake disk runout	—	0.3 (0.012)

## TROUBLESHOOTING

### Loose brake lever

- Air in hydraulic brake system
- Brake fluid level too low
- Hydraulic brake system leakage

### Poor brake performance

- Air in brake system
- Deteriorated brake fluid
- Contaminated brake pads and brake disk
- Worn brake pads
- Worn brake master cylinder piston oil seal
- Clogged brake fluid line
- Deformed brake disk
- Unevenly worn brake caliper

### Tight brake lever

- Seized piston
- Clogged hydraulic brake system
- Smooth or worn brake pad

### Brake noise

- Contaminated brake pad surface
- Excessive brake disk run out
- Incorrectly installed caliper
- Brake disk or wheel not aligned

### Hard braking

- Seized hydraulic brake system
- Seized piston

## 13. BRAKE SYSTEM

### FRONT HYDRAULIC BRAKE

#### BRAKE PADS REMOVAL

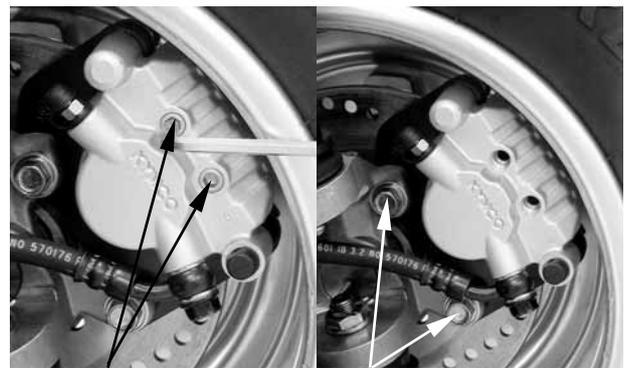
Remove the front wheel. (⇒chapter 14)

Remove the two brake pad pins from the brake caliper.

Remove the two bolts attaching the brake caliper and then remove brake caliper.

Compress the brake caliper holder and remove brake pads.

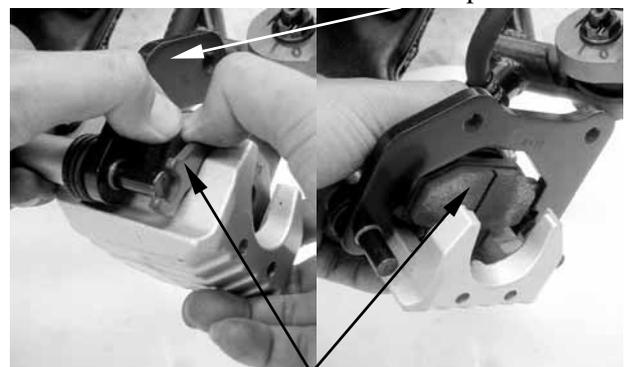
A wear indicator is provided on each brake. The indicators allows checking of brake pads wear. Check the position of the indicator.



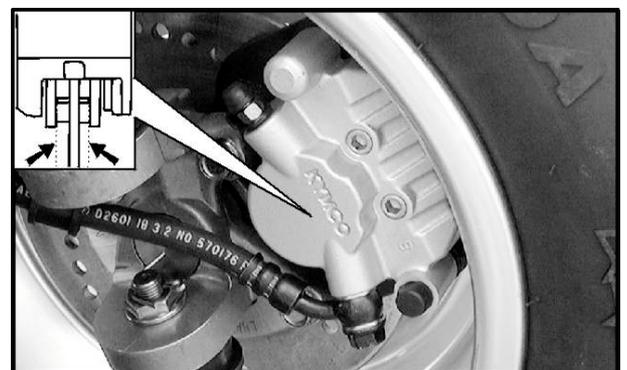
Brake Pad Pins

Bolts

Brake Caliper Holder



Brake Pads



## 13. BRAKE SYSTEM

### BRAKE DISK

Measure the brake disk thickness.

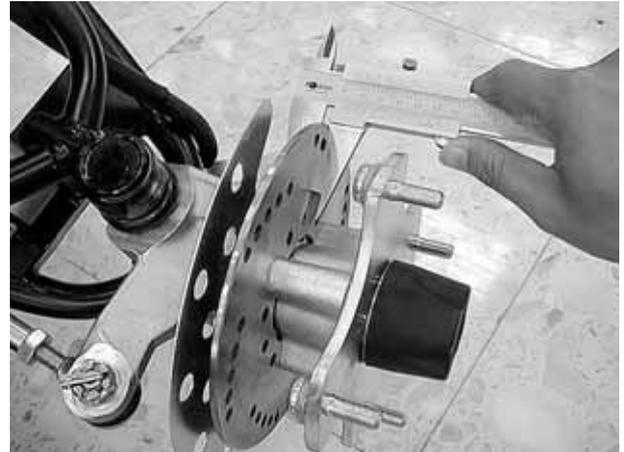
**Service Limit:** 3 mm (0.12 in)

Measure the brake disk run out.

**Service Limit:** 0.3 mm (0.012 in)

### INSTALLATION

Reverse the “BRAKE PADS REMOVAL” procedures.



### FRONT BRAKE FLUID CHANGE/AIR BLEED

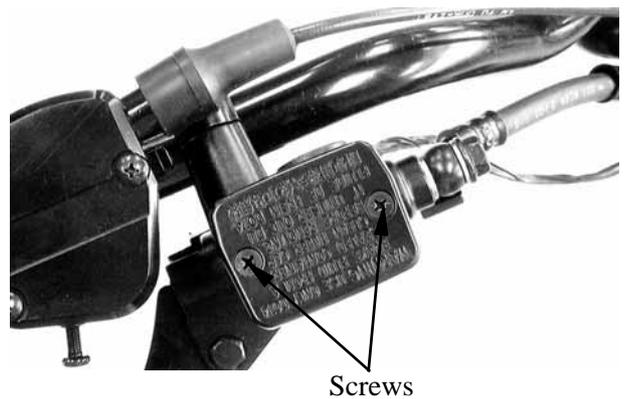
#### BRAKE FLUID DRAINING

Place the machine on the level ground and set the handlebar upright.

Remove the two screws attaching the brake fluid reservoir cap.

✱

Use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.



Connect a transparent hose to the brake caliper bleed valve and then loosen the bleed valve nut.  
Use a syringe to draw the brake fluid out through the hose.



Bleed Valve

## 13. BRAKE SYSTEM

### BRAKE FLUID REFILLING

Connect a transparent hose and syringe to the brake caliper bleed valve and then loosen the bleed valve nut.

Fill the brake reservoir with brake fluid and use the syringe to draw brake fluid into it until there is no air bubbles in the hose.

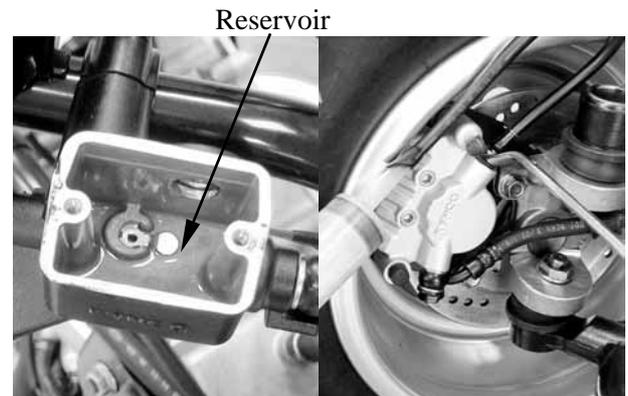
Then, tighten the bleed valve nut.

**Torque:** 0.6 kgf-m (6 Nm, 4.32 lbf-ft)

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- When drawing brake fluid with the syringe, the brake fluid level should be kept over 1/2 of the brake reservoir height.
- Use only the recommended brake fluid.

**Recommended Brake Fluid:** DOT-4

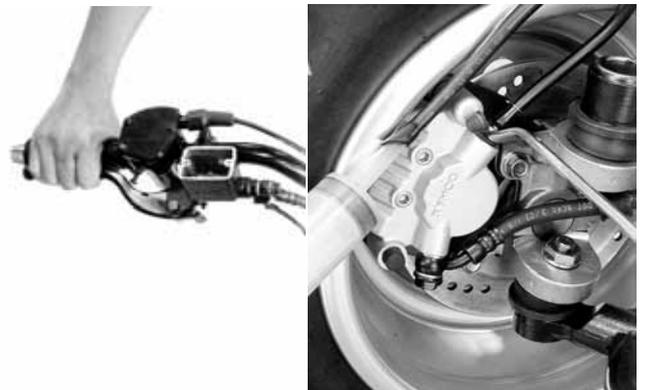


### BRAKE SYSTEM BLEEDING

Connect a transparent hose to the bleed valve and fully apply the brake lever after continuously pull it several times. Then, loosen the bleed valve nut to bleed air from the brake system. Repeat these steps until the brake system is free of air.

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- When bleeding air from the brake system, the brake fluid level should be kept over 1/2 of the brake reservoir height.



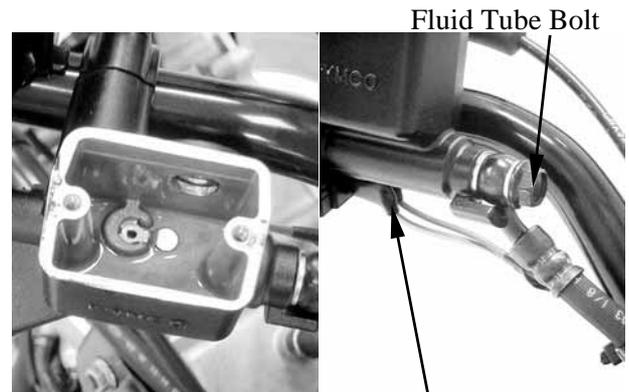
## 13. BRAKE SYSTEM

### BRAKE MASTER CYLINDER

#### DISASSEMBLY

Remove the brake reservoir cover  
Drain the brake fluid from the hydraulic brake system. (⇒13-4)

\* Do not splash brake fluid onto any rubber, plastic and coated parts. When working with brake fluid, use shop towels to cover these parts.



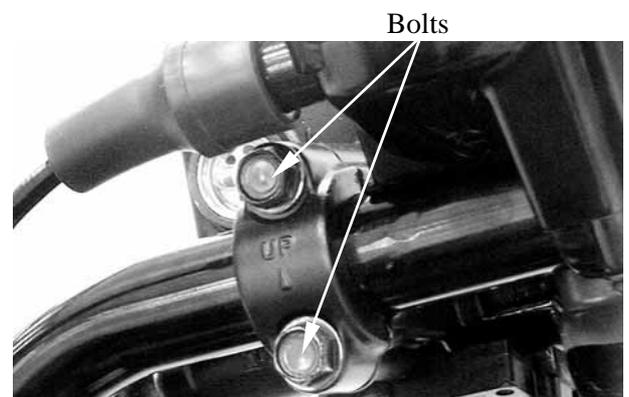
Fluid Tube Bolt  
Stop Light Switch Wire

Remove fluid tube bolt and then disconnect the fluid tube.

\* When removing the brake fluid tube bolt, be sure to place towels under the tube and plug the tube end to avoid brake fluid leakage and contamination.

Disconnect the stop light switch wires.

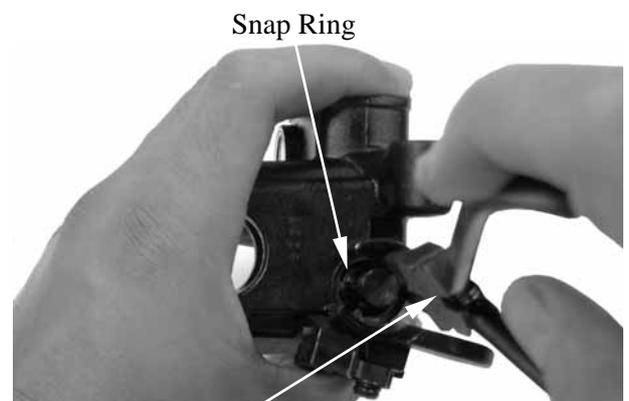
Remove the two master cylinder holder bolts and remove the master cylinder.



Bolts

Remove the brake lever bolt and the brake lever.

Remove the piston rubber cover and snap ring from the brake master cylinder.

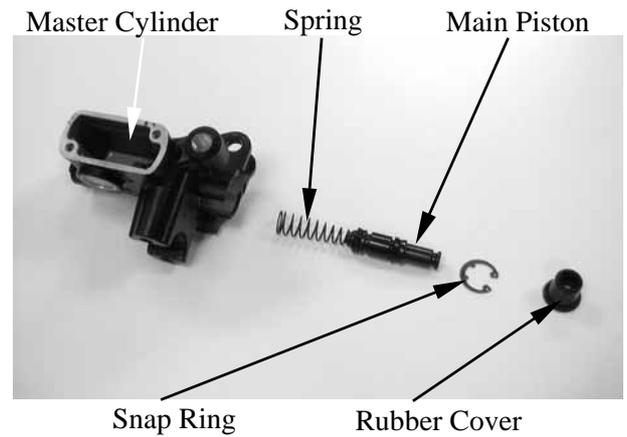


Snap Ring

Snap Ring Pliers (Close)

## 13. BRAKE SYSTEM

Remove the washer, main piston and spring from the brake master cylinder.  
Clean the inside of the master cylinder and brake reservoir with brake fluid.



### INSPECTION

Check the cylinder inside wall, and spring for scratch, corrosion or other abnormal condition.

If any abnormal condition is found, replace the inner parts or master cylinder.



# 13. BRAKE SYSTEM

## ASSEMBLY

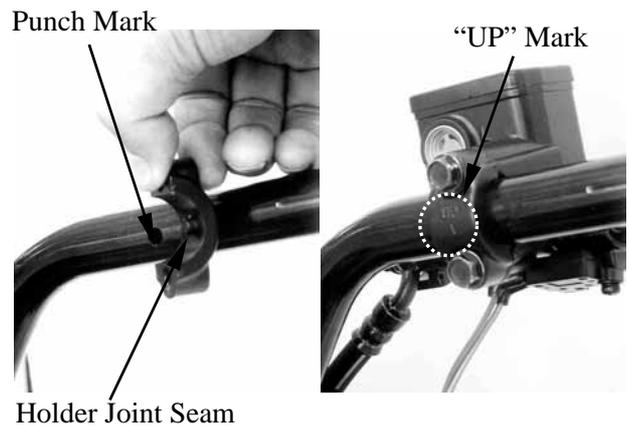
Before assembly, apply brake fluid to all removed parts.

- \*
  - During assembly, the main piston and spring must be installed as a unit without exchange.
  - When assembling the piston, soak the cups in brake fluid for a while.
  - Install the cups with the cup lips facing the correct direction.

Install the main piston, spring and snap ring.  
 Install the rubber cover.  
 Install the brake lever.

Place the brake master cylinder on the handlebar and install the holder with the "UP" mark facing up. Also align the punch mark with the holder joint seam. First tighten the upper bolt and then tighten the lower bolt.

**Torque:** 1 kgf-m (10 Nm, 7.2 lbf-ft)



Install the brake fluid tube with the attaching bolt and two sealing washers, then tighten the bolt.

**Torque:** 3.4 kgf-m (34 Nm, 25 lbf-ft)



Connect the front stop switch wire connector.

Fill the brake reservoir with the specified brake fluid and bleed air from the brake system. (⇒13-4)

Install the brake reservoir cover.

## 13. BRAKE SYSTEM

### FRONT BRAKE CALIPER REMOVAL

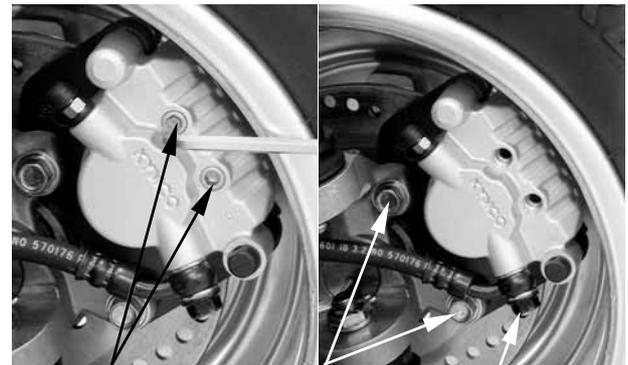
Remove the front wheel. (⇒ chapter 14)

First drain the brake fluid from the hydraulic brake system. (⇒13-4)

Remove the brake pad pins.

Remove the brake fluid tube bolt.  
Remove the two bolts attaching the brake caliper.

Remove the brake caliper.



Brake Pad Pins

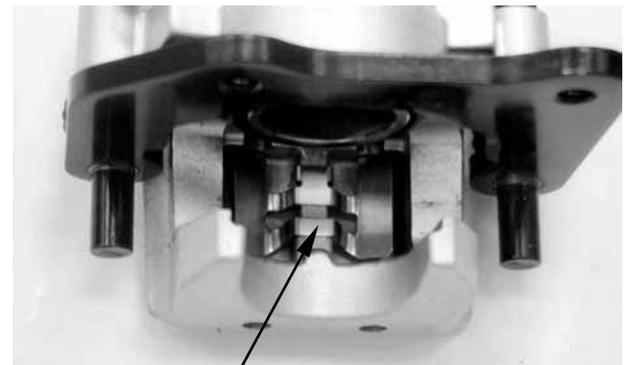
Bolts

Fluid Tube Bolt

### DISASSEMBLY

Remove the brake pads. (⇒13-3)

Remove the brake pad spring plate.



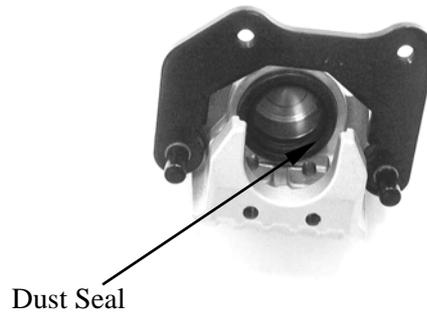
Spring Plate

Remove the piston from the brake caliper.  
If necessary, use compressed air to squeeze out the piston through the brake fluid inlet opening and place a shop towel under the caliper to avoid contamination caused by the removed piston.  
Check the piston cylinder for scratches or wear and replace if necessary.



## 13. BRAKE SYSTEM

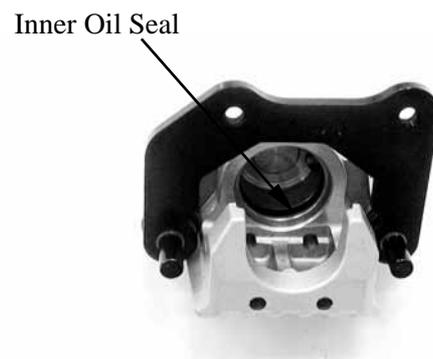
Push the piston dust seal inward to remove.



Pushing the piston oil seal outward to remove it.

Clean the seals groove with brake fluid.

\* Be careful not to damage the piston surface.



### INSPECTION

Inspect the caliper cylinder wall and piston surface for scratch, corrosion or other damages.

If any abnormal condition is noted, replace the caliper.



## 13. BRAKE SYSTEM

### ASSEMBLY

Clean all removed parts.

Apply silicon grease to the piston and oil seals. Lubricate the brake caliper cylinder inside wall with brake fluid.

Install the oil seal and dust seal.

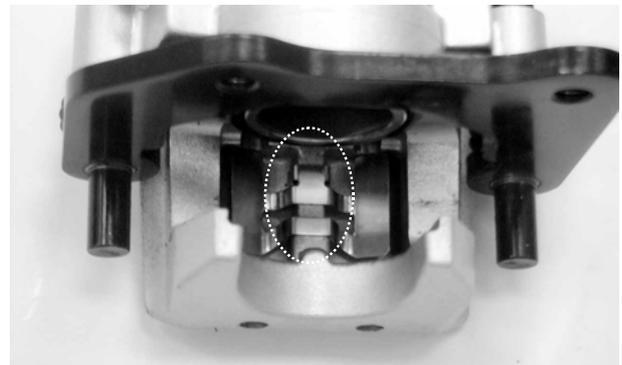
Install the brake caliper piston with grooved side facing out.

- \* Install the piston with its outer end protruding 3~5 mm beyond the brake caliper.

Wipe off excessive brake fluid with a clean shop towel.

Install the caliper spring plate into the caliper.

- \* Make sure that the boss on the caliper correctly engages with the locating slot on the caliper spring plate.



### INSTALLATION

Reverse the "FRONT BRAKE CALIPER REMOVAL" procedures.

- \* When installing the brake caliper, be sure to position the brake disk between the two brake pads.

Connect the brake fluid tube to the brake caliper and tighten the fluid tube bolt.

**Torque:** 3.4 kgf-m (34 Nm, 25 lbf-ft)

Fill the brake reservoir with the specified brake fluid and bleed air from the brake system. (⇒13-4)

- \* When installing the brake fluid tube, be sure to install the two sealing washers.



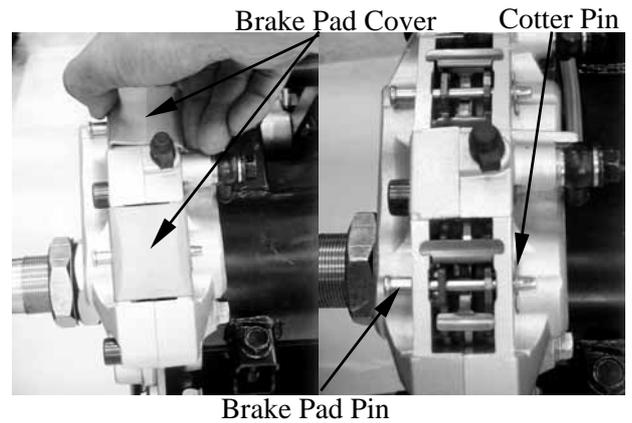
## 13. BRAKE SYSTEM

### REAR HYDRAULIC BRAKE

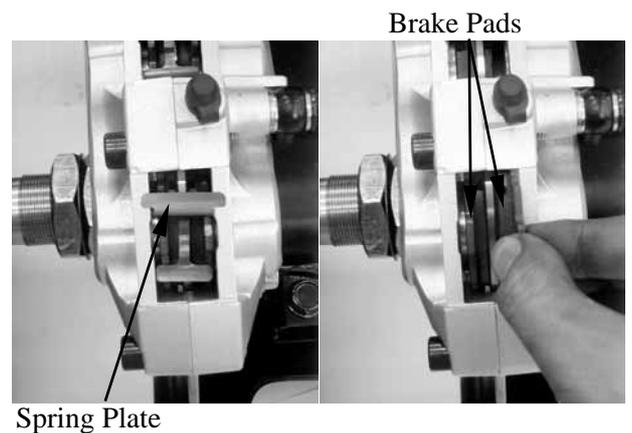
#### REAR BRAKE PADS REMOVAL

Remove the brake pads cover.

Remove the cotter pin and then pull out the brake pad pin from the caliper.



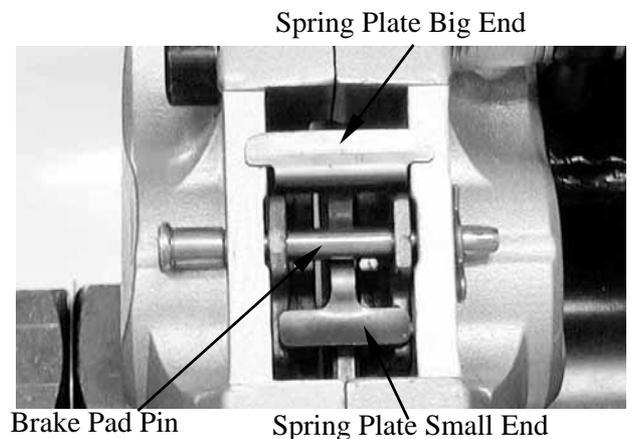
Remove the brake spring plate and then remove brake pads.



#### INSTALLATION

Reverse the “REAR BRAKE PADS REMOVAL” procedures.

- \* • Make sure put the spring plate big end on the rear caliper.
- Make sure put the spring plate small end on the rear pads.
- Make sure brake pad pin over the spring plate.



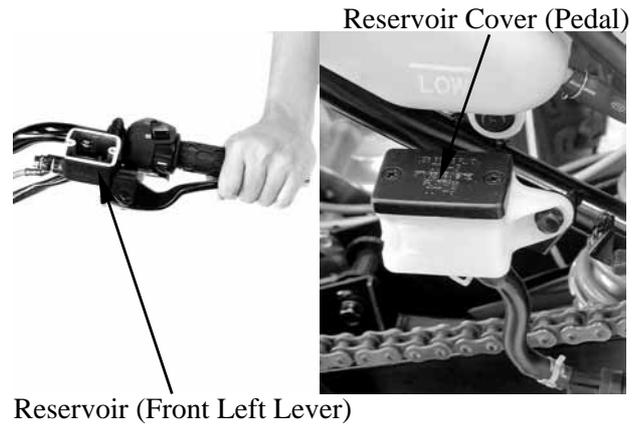
## 13. BRAKE SYSTEM

### BRAKE FLUID DRAINING

Place the machine on the level ground.  
Remove the two screws attaching the brake fluid reservoir cap (brake lever and brake pedal).

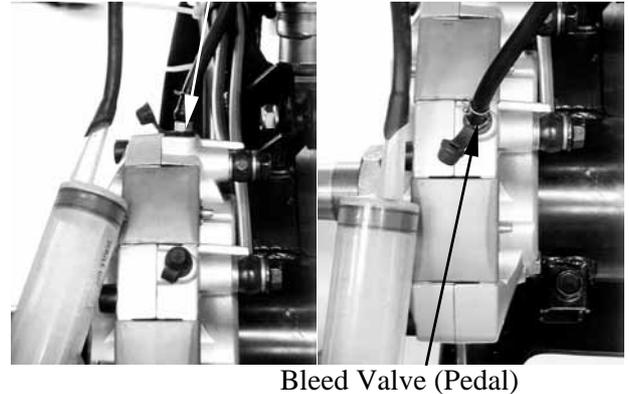
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Use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.



Connect a transparent hose to the brake caliper bleed valve and then loosen the bleed valve nut.  
Use a syringe to draw the brake fluid out through the hose.

Bleed Valve (Front Left Lever)



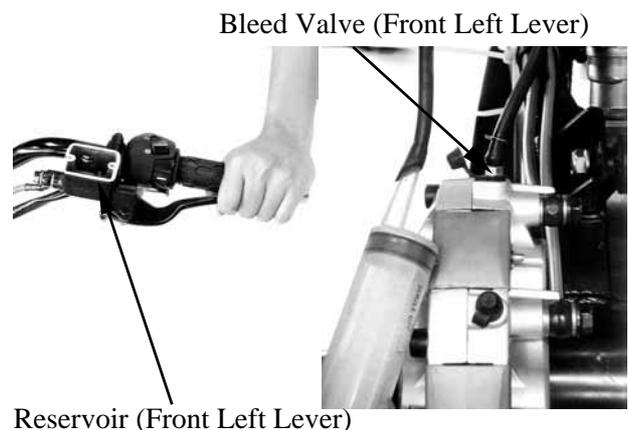
### BRAKE FLUID REFILLING

Connect a transparent hose and syringe to the brake caliper bleed valve and then loosen the bleed valve nut.  
Fill the brake reservoir with brake fluid and use the syringe to draw brake fluid into it until there is no air bubbles in the hose.  
Then, tighten the bleed valve nut.

**Torque:** 0.6 kgf-m (6 Nm, 4.32 lbf-ft)

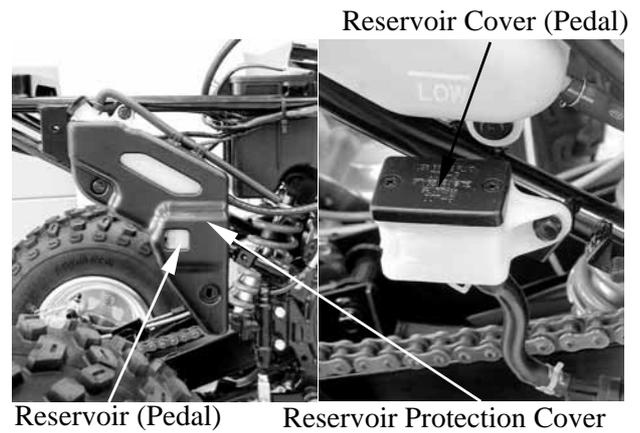
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- When drawing brake fluid with the syringe, the brake fluid level (pedal) should be kept over 1/2 of the brake reservoir height.
- Use only the recommended brake fluid.



# 13. BRAKE SYSTEM

**Recommended Brake Fluid: DOT-4**

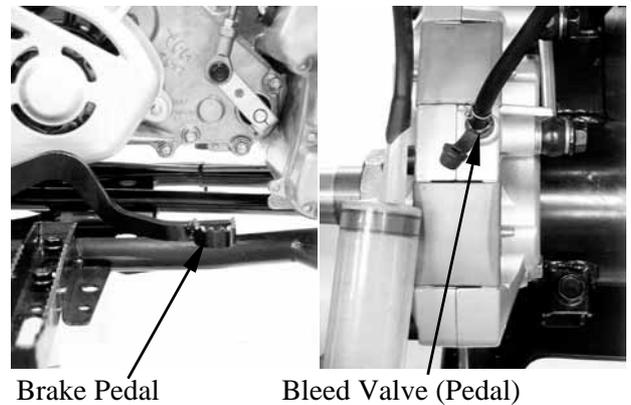


## BRAKE SYSTEM BLEEDING

Connect a transparent hose to the bleed valve and fully apply the brake lever (pedal) after continuously pull it several times. Then, loosen the bleed valve nut to bleed air from the brake system. Repeat these steps until the brake system is free of air.

**\***

When bleeding air from the brake system, the brake fluid level (pedal) should be kept over 1/2 of the brake reservoir



# 13. BRAKE SYSTEM

## REAR BRAKE MASTER CYLINDER (REAR BRAKE PEDAL)

### REAR MASTER CYLINDER ON THE LEFT HANDGRIP DISASSEMBLY

Refer to the “FRONT BRAKE MASTER CYLINDER DISASSEMBLY” section in the chapter 13.

### ASSEMBLY

Refer to the “FRONT BRAKE MASTER CYLINDER ASSEMBLY” section in the chapter 13.

### REAR MASTER CYLINDER ON THE REAR BRAKE PEDAL DISASSEMBLY

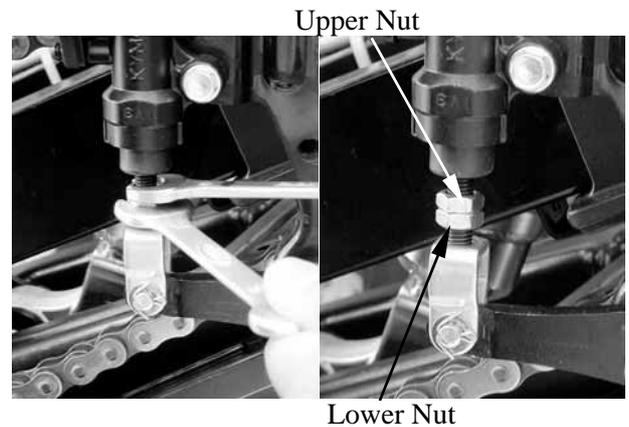
Remove the brake reservoir cover.

Drain the brake fluid from the hydraulic brake system. (⇒13-13)

Loosen the upper and lower nuts.

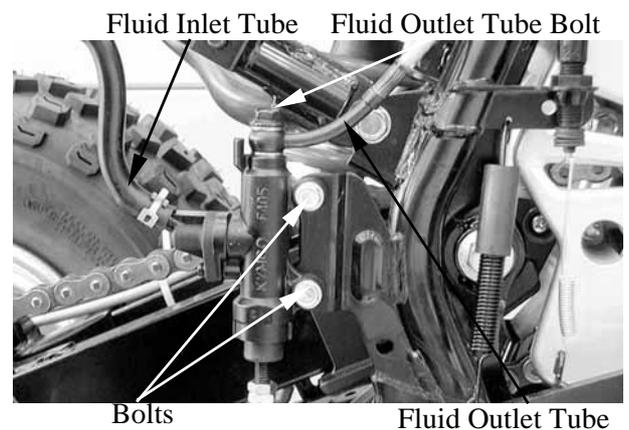
Hold the lower nut to turn clockwise and tighten upper nut.

Turn the lower nut counterclockwise disconnect the rear brake pedal.



Disconnect the fluid inlet tube and remove the fluid bolt to disconnect the fluid outlet tube.

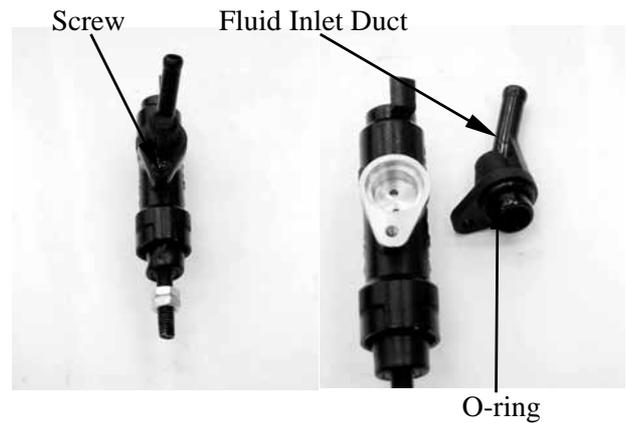
Remove the two bolts and remove the master cylinder.



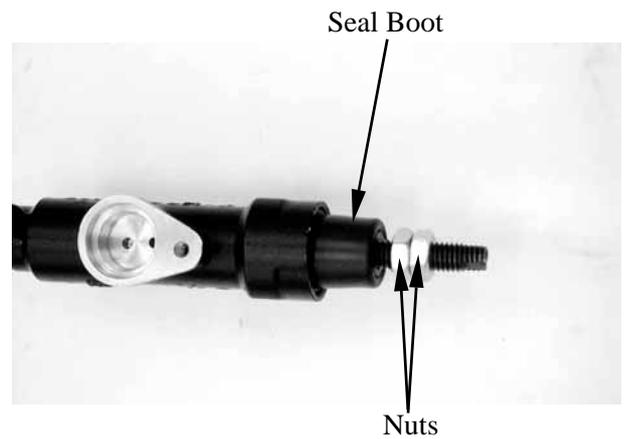
## 13. BRAKE SYSTEM

Remove the screw and remove the fluid inlet duct.

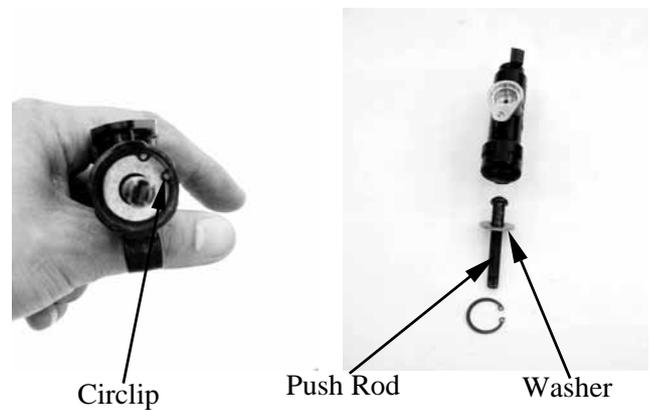
Check the O-ring for wear or damage and replace if necessary.



Remove the two nuts and remove the seal boot.



Remove the circlip and then pull out the push rod, washer, piston and spring.



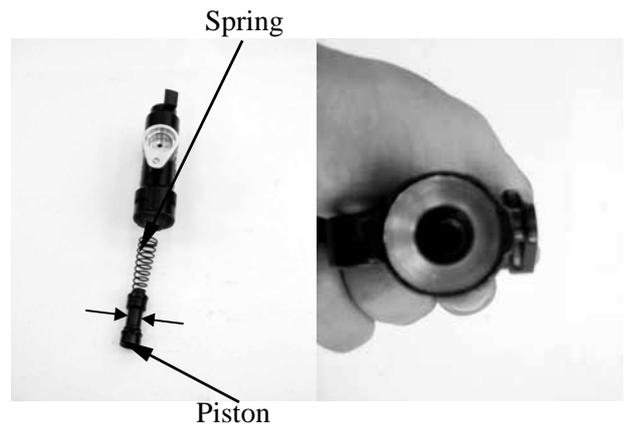
## 13. BRAKE SYSTEM

### INSPECTION

Check the cylinder inside wall, and spring for scratch, corrosion or other abnormal condition.

If any abnormal condition is found, replace the inner parts or master cylinder.

Before assembly, inspect the 1st and 2nd rubber cups for wear.



### ASSEMBLY

Before assembly, apply brake fluid to all removed parts.

- \* During assembly, the master cylinder, piston and spring must be installed as a unit without exchange.



Reverse the “MASTER CYLINDER ON THE REAR BRAKE PEDAL DISASSEMBLY” procedures.

Connect the brake fluid tube to the master cylinder with the fluid bolt and new sealing washers.

Tighten the fluid tube bolt.

**Torque:** 3.4 kgf-m (34 Nm, 25 lbf-ft)

Fill the brake reservoir with recommended brake fluid to the upper level.

Bleed air from the hydraulic brake system.  
(⇒13-13)

## REAR BRAKE CALIPER REMOVAL

Drain brake fluid of both the rear brake side and the combination brake side. (⇒13-13)

\* To prevent brake fluid from splashing on the parts nearby, cover the parts with cloth.

Remove the brake pads. (⇒13-12)

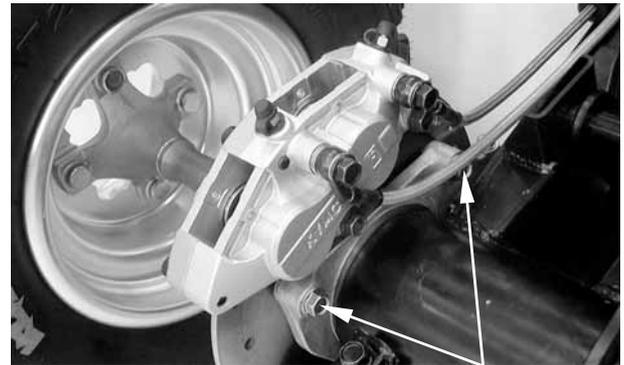
Remove the caliper mounting bolts and remove the caliper.

\* Slightly loosen the caliper housing bolts before removing the caliper mounting bolts to facilitate later disassembly.

Remove the caliper housing bolts.

Using an air blow gun, pressurize the caliper fluid chamber to push out the piston.

\* Place a rag over the piston to prevent it from popping out and flying and keep hand off the piston.  
Be careful of brake fluid which can possibly splash.  
Do not use high pressure air but increase the pressure gradually.



Bolts



Bolts

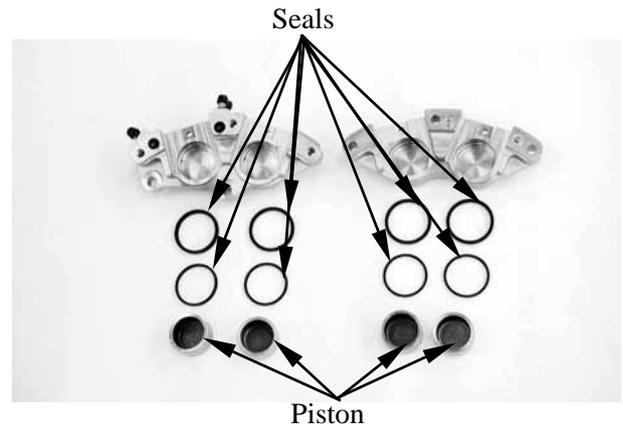


## 13. BRAKE SYSTEM

Remove the dust seals and piston seals.

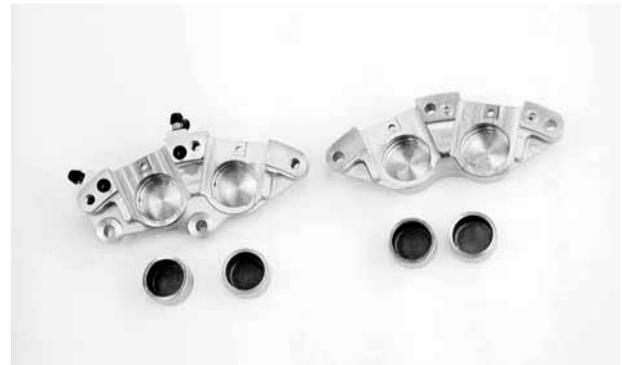
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Use care not to cause scratch on the cylinder bore.  
Do not reuse the piston seal and dust seal that have been removed.



### INSPECTION

Inspect the caliper cylinder wall and piston surface for scratch, corrosion or other damages.  
If any abnormal condition is noted, replace the caliper.



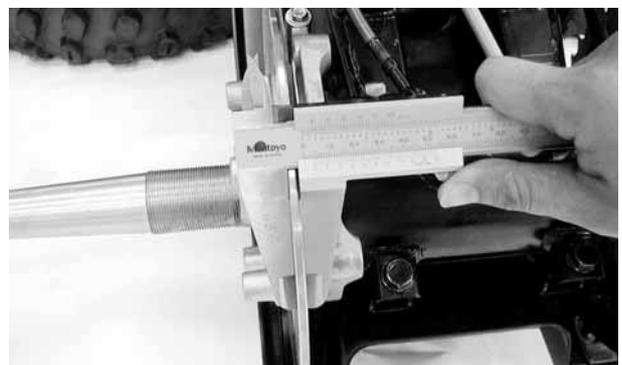
### BRAKE DISK

Measure the brake disk thickness.

**Service Limit:** 3.0 mm (0.12 in)

Measure the brake disk run out.

**Service Limit:** 0.3 mm (0.012in)

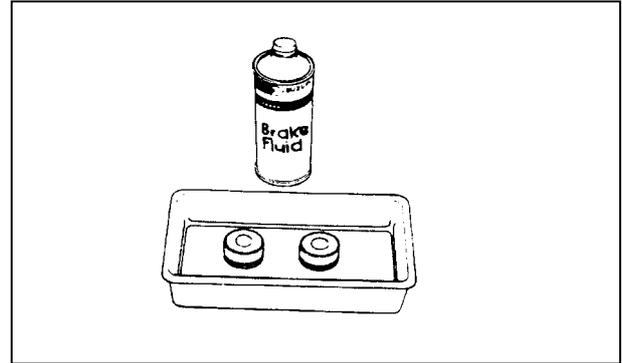


## 13. BRAKE SYSTEM

### ASSEMBLY

Reassemble the caliper in the reverse order of disassembly procedures and observe the following points.

- \* Wash the caliper components with fresh brake fluid before assembly. Do not wipe off brake fluid after washing the components.  
Replace the piston seal and dust seal with new ones with brake fluid applied.



### Brake fluid specification and classification: DOT4

Fit the O-ring.  
Install and tighten the caliper housing bolts.  
**Torque:** 2.2 kgf-m (22 Nm, 16 lbf-ft)



### INSTALLATION

Install the rear caliper and tighten the two mounting bolts.

With the tube ends contacted to the caliper and install the washers and tighten the fluid tube bolts.

**Torque:** 3.4 kgf-m (34 Nm, 25 lbf-ft)

Fill the system with brake fluid and bleed air. (⇒13-13)

