

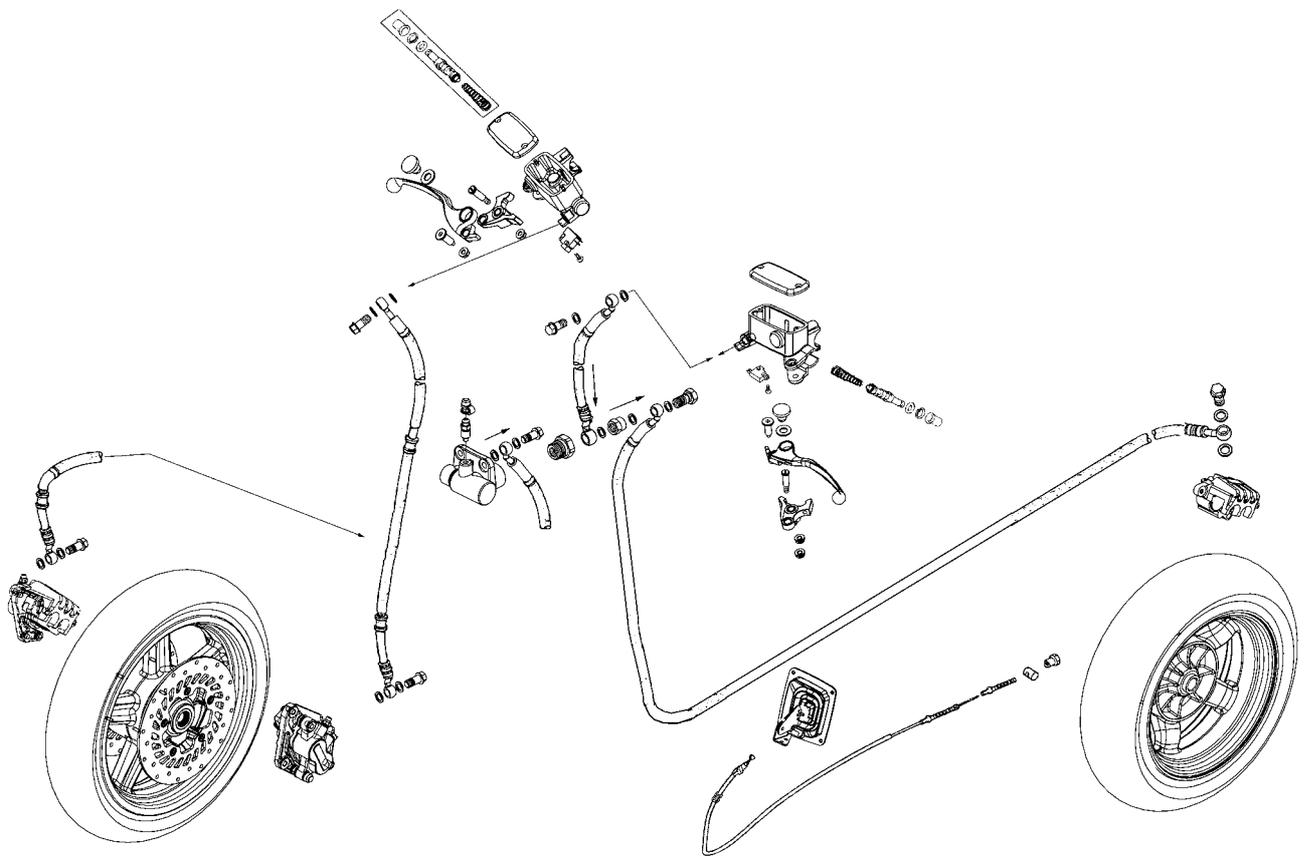
16. BRAKE SYSTEM

BRAKE SYSTEM

| | |
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16. BRAKE SYSTEM

SCHEMATIC DRAWING



16. BRAKE SYSTEM

SERVICE INFORMATION

GENERAL

* Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.
Avoid breathing dust particles.

- A contaminated brake disc or pad reduces stopping power. Discard contaminated parts and clean a contaminated disc with high quality brake degreasing agent.
- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.
- This section covers maintenance of the front and rear hydraulic brake system.
- Never allow contamination (dirt, water, etc.) to get into and open reservoir.
- Once the hydraulic system has been opened, or if the brake feel spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the vehicle.

SPECIFICATIONS

Unit: mm (in)

| ITEM | | STANDARD | SERVICE LIMIT |
|-------|-----------------------|-------------------------|---------------|
| Front | Specified brake fluid | DOT 4 | — |
| | Brake disc thickness | 4.8 – 5.2 (0.19 – 0.20) | 4 (0.16) |
| | Brake disc runout | — | 0.03 (0.012) |
| Rear | Specified brake fluid | DOT 4 | — |
| | Brake disc thickness | 4.8 – 5.2 (0.19 – 0.20) | 4 (0.16) |
| | Brake disc warpage | — | 0.03 (0.012) |

16. BRAKE SYSTEM

TORQUE VALUES

| | |
|---------------------------------------|------------------------------------|
| Master cylinder reservoir cover screw | 2 N•m (0.2 kgf•m, 1.4 lbf•ft) |
| Master cylinder holder bolt | 12 N•m (1.2 kgf•m, 9 lbf•ft) |
| Brake lever pivot bolt | 6 N•m (0.6 kgf•m, 4.3 lbf•ft) |
| Brake lever pivot nut | 6 N•m (0.6 kgf•m, 4.3 lbf•ft) |
| Brake light switch screw | 1 N•m (0.1 kgf•m, 0.7 lbf•ft) |
| Brake caliper mounting bolt | 32 N•m (3.2 kgf•m, 23 lbf•ft) |
| | ALOC bolt: replace with a new one. |
| Brake caliper bleed screw | 6 N•m (0.6 kgf•m, 4.3 lbf•ft) |
| Brake pad pin | 18 N•m (1.8 kgf•m, 13 lbf•ft) |
| Front/Rear caliper pad pin plug | 2 N•m (0.2 kgf•m, 1.4 lbf•ft) |
| Brake hose oil bolt | 35 N•m (3.5 kgf•m, 25 lbf•ft) |
| Delay valve bleed screw | 6 N•m (0.6 kgf•m, 4.3 lbf•ft) |

TROUBLESHOOTING

Brake lever soft or spongy

- Air in the hydraulic system
- Low brake fluid level
- Clogged fluid passage
- Contaminated brake disc/pad
- Warped/deformed brake disc
- Worn brake disc/pad
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Contaminated caliper
- Caliper not sliding properly
- Leaking hydraulic system
- Worn caliper piston seal
- Worn master cylinder piston cups
- Bent brake lever

Brake lever hard

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever

Brake drag

- Contaminated brake disc/pad
- Worn brake disc/pad
- Warped/deformed brake disc
- Caliper not sliding properly

16. BRAKE SYSTEM

BRAKE FLUID

Check

Brake fluid: (page 3-18)

Brake hose:

Cracks/wear/damage → Replace.

Apply the brake lever several times.

Fluid leakage → Replace.

Brake hose clamp:

Loosen → Tighten

FLUID REPLACEMENT

Front brake

★

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

Place the scooter on a level surface and keep the handlebar straight.

Remove the master cylinder reservoir cap and diaphragm.

Suck up the old brake fluid as much as possible.

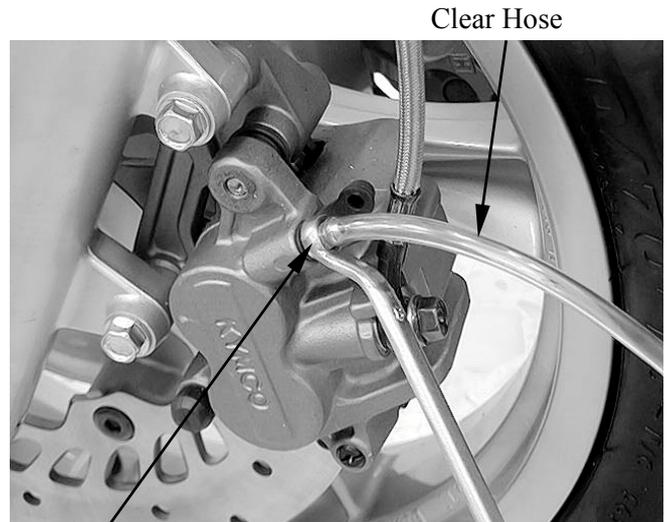
Fill the reservoir with new brake fluid.

Specification and classification: DOT 4



16. BRAKE SYSTEM

Connect a clear hose to the left front caliper air bleed screw and insert the other end of the hose into a receptacle.



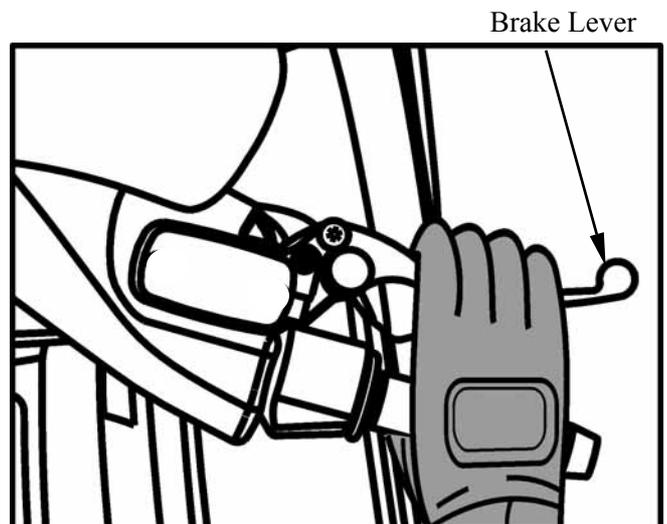
Left Front Caliper Air Bleed Screw

Loosen the air bleed screw and pump the brake lever until the old brake fluid is completely out of the brake system.

Close the air bleed screw and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper end of the inspection window.

Tighten the bleed screw to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)



Shock Absorber Lower Mount Bolt

Combination brake

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

Place the scooter on a level surface and keep the handlebar straight.

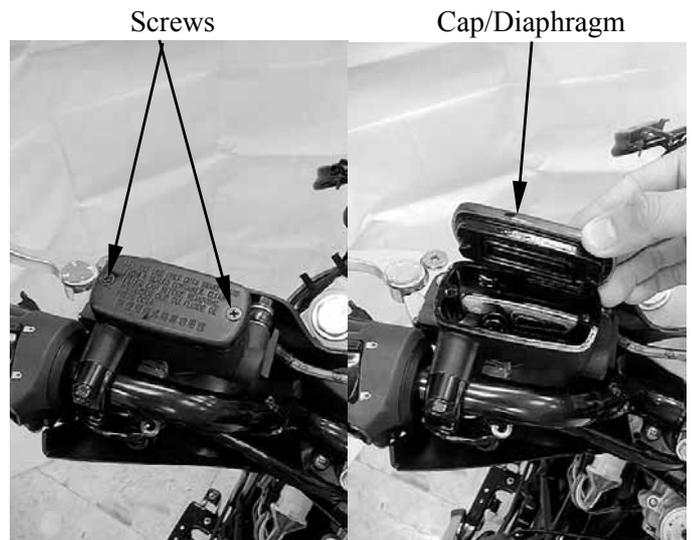
16. BRAKE SYSTEM

Remove the master cylinder reservoir cap and diaphragm.

Suck up the old brake fluid as much as possible.

Fill the reservoir with new brake fluid.

Specification and classification: DOT 4



Step 1:

Connect a clear hose to the delay valve air bleed screw and insert the other end of the hose into a receptacle.

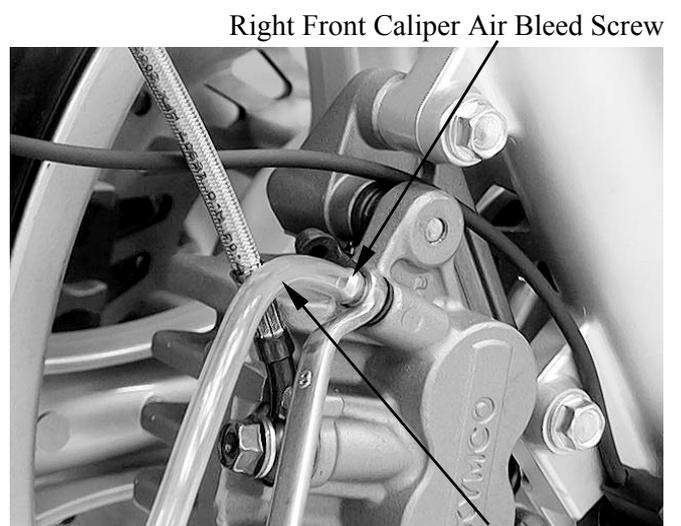
Loosen the air bleed screw and pump the brake lever until the old brake fluid is completely out of the brake system. Close the air bleed screw and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper end of the inspection window.



Relay Valve Air Bleed Screw

Step 2:

Connect a clear hose to the right front caliper air bleed screw. The right brake fluid replacement is the same way as that of the step 1.



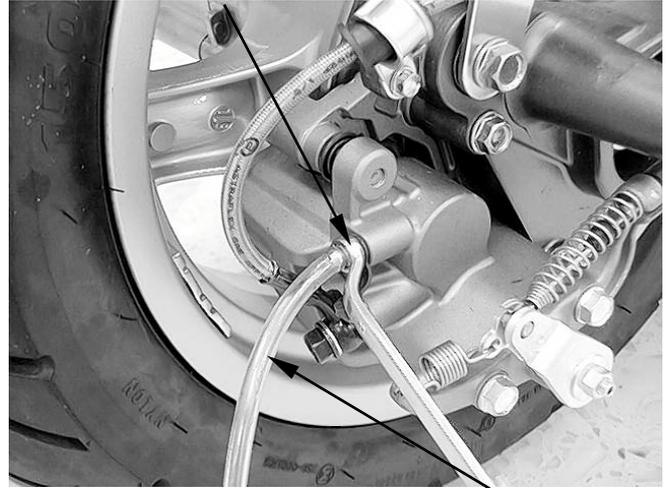
Clear Hose

16. BRAKE SYSTEM

Step 3:

Connect a clear hose to the rear caliper air bleed screw. The rear brake fluid replacement is the same way as that of the step 1.

Rear Caliper Air Bleed Screw



Clear Hose

BLEEDING THE HYDRAULIC BRAKE SYSTEM

★

Bleed the brake fluid circuit:

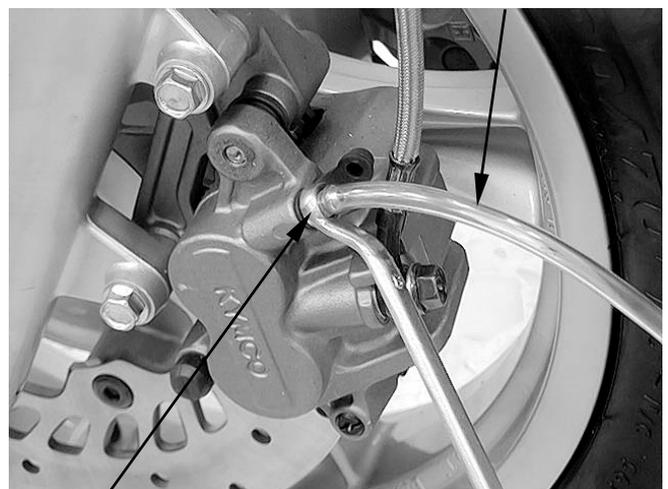
- The system has been disassembled.
- A brake hose or brake pipe have been loosened or removed.
- The brake fluid has been very low.
- The brake operation has been faulty.

A loss of braking performance may occur if the brake system is not properly bled.

Air bleeding steps (Front brake):

1. Add the proper brake fluid to the reservoir.
2. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
3. Connect the clear plastic hose tightly to the left front caliper air bleed screw.
4. Place the other end of the hose into a container.
5. Slowly apply the brake lever several times.
6. Pull the lever in and hold it.
7. Loosen the bleed screw and allow the lever to travel towards its limit.

Clear Hose



Left Front Caliper Air Bleed Screw

16. BRAKE SYSTEM

8. Tighten the bleed screw when the lever limit has been reached, then release the lever.

9. Repeat steps (5) to (7) until all the air bubbles have disappeared from the fluid.

10. Tighten the bleed screw.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)

★

If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours.
Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

12. Add brake fluid to the proper level and install the master cylinder reservoir cap and diaphragm.

★

Check the operation of the brake after bleeding the brake system.

Air bleeding steps (combination brake):

The combination brake system air bleeding is the same manner as that of the front brake one.

Bleed the air from the rear side (rear caliper) and then the front side (right front caliper and delay valve).

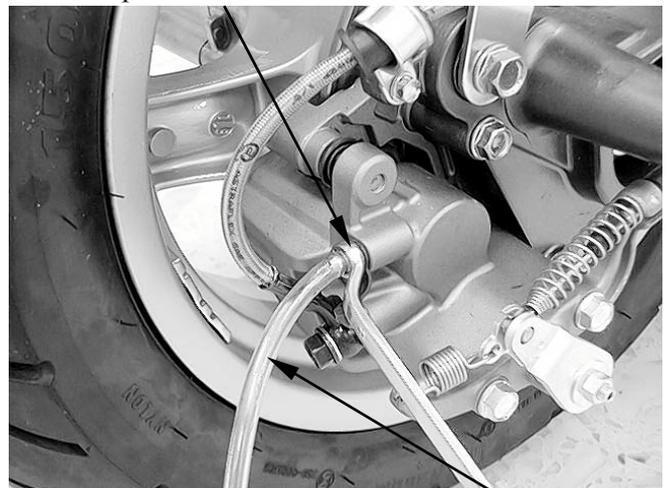
Tighten the bleed screw.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)

★

If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours.
Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

Rear Caliper Air Bleed Screw



Clear Hose

16. BRAKE SYSTEM

Add brake fluid to the proper level.

- *

| |
|-------------------------------------------------------------------|
| Check the operation of the brake after bleeding the brake system. |
|-------------------------------------------------------------------|

Install the master cylinder reservoir cap and diaphragm.

Right Front Caliper Air Bleed Screw



Clear Hose

Clear Hose



Relay Valve Air Bleed Screw

16. BRAKE SYSTEM

BRAKE PAD

BRAKE PAD REPLACEMENT

Front brake:

Push the caliper pistons all the way in by pushing the caliper body inward to provide clearance for new pads.

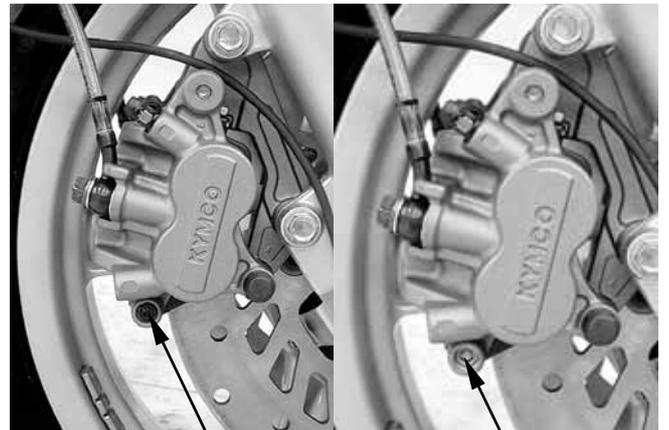
*

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



Caliper body

Remove the pad pin plug and loosen the pad pin.



Pad Pin Plug

Pad Pin

Remove the pad pin and the brake pads.

Make sure that the pad spring is installed in original position.

Install new pads so that their ends rest on the pad retainer on the bracket properly.

Install the pad pin by pushing the pads against the pad spring to align the pad pin holes in the pads and caliper.



Brake Pads

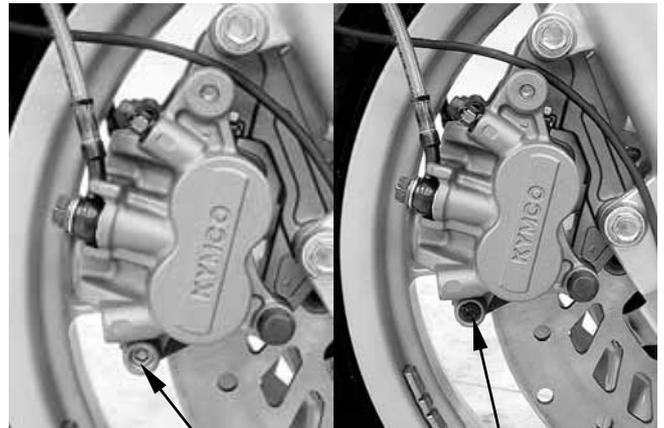
16. BRAKE SYSTEM

Tighten the pad pin to the specified torque.

Torque: 18 N•m (1.8 kgf•m, 13 lbf•ft)

Install the pad pin plug to the specified torque.

Torque: 3 N•m (0.3 kgf•m, 2.2 lbf•ft)



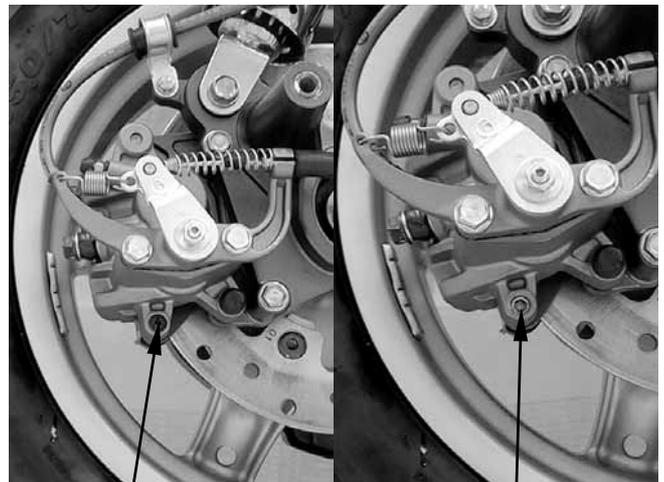
Pad Pin

Pad Pin Plug

Rear/Parking brake:

Remove the pad pin plug and loosen the pad pin.

* Always replace the brake pads in pairs to ensure even disc pressure.

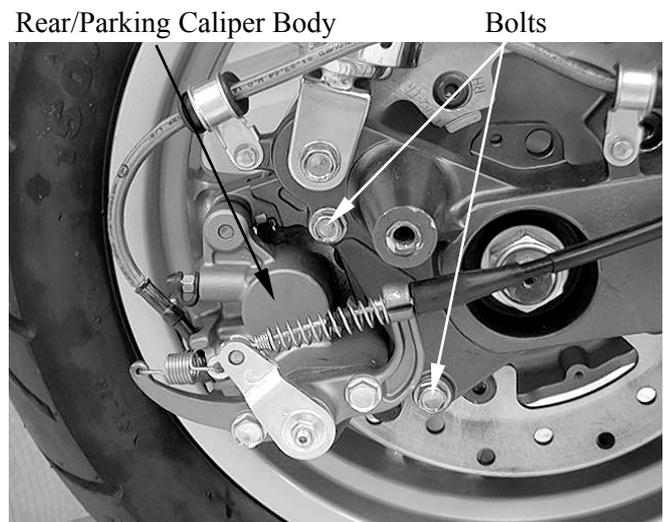


Pad Pin Plug

Pad Pin

Remove the mount bolts and rear/parking brake caliper from the rear fork.

Remove the pad pin and brake pads.



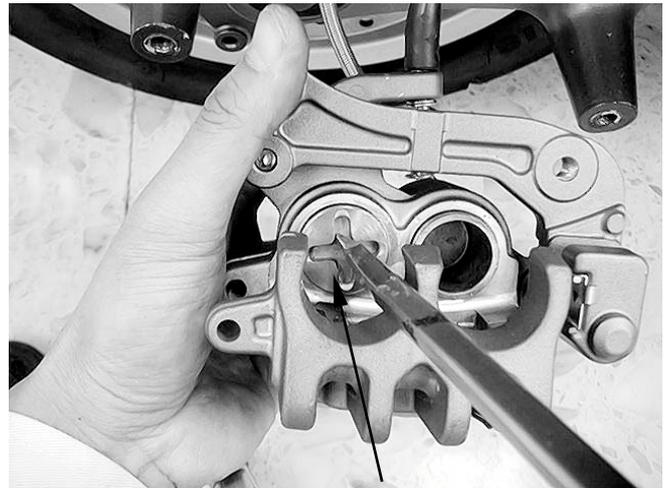
Rear/Parking Caliper Body

Bolts

16. BRAKE SYSTEM

Installation steps:

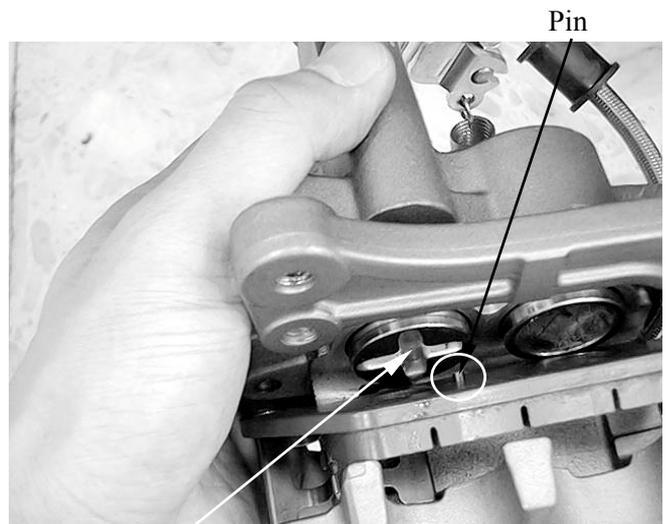
Turn the parking brake caliper piston clockwise and push it into the parking brake caliper.



Parking Brake Caliper Piston

Install the pad pin by pushing the pads against the pad spring to align the pad pin holes in the pads and caliper.

* Align the pin on the pad with the groove on the parking brake caliper piston.

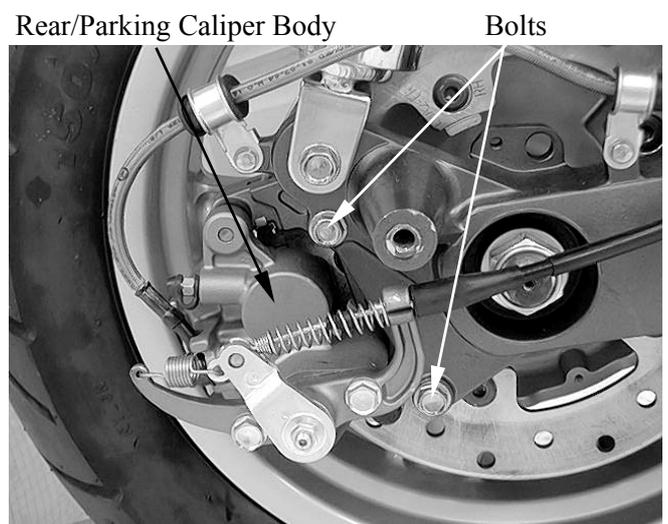


Groove

Install the rear/parking brake caliper to the rear fork.

Install and tighten the new rear/parking brake caliper mounting bolts to the specified torque.

Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)



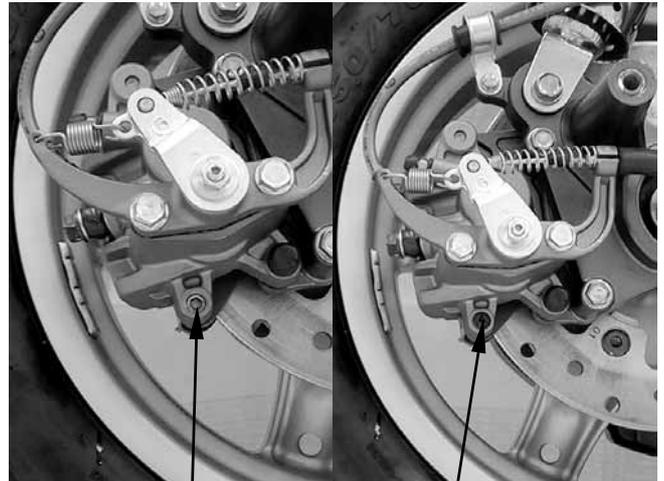
16. BRAKE SYSTEM

Tighten the pad pin to the specified torque.

Torque: 18 N•m (1.8 kgf•m, 13 lbf•ft)

Install the pad pin plug to the specified torque.

Torque: 3 N•m (0.3 kgf•m, 2.2 lbf•ft)



Pad Pin

Pad Pin Plug

BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

Measure the brake disc thickness.

Service limits:Front: 4mm (0.16 in)

Rear: 4mm (0.16 in)

Replace the brake disc if the smallest measurement is less than the service limit.

Measure the brake disc warpage.

Service limits:0.30 mm (0.012 in)



16. BRAKE SYSTEM

FRONT MASTER CYLINDER REMOVAL

When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

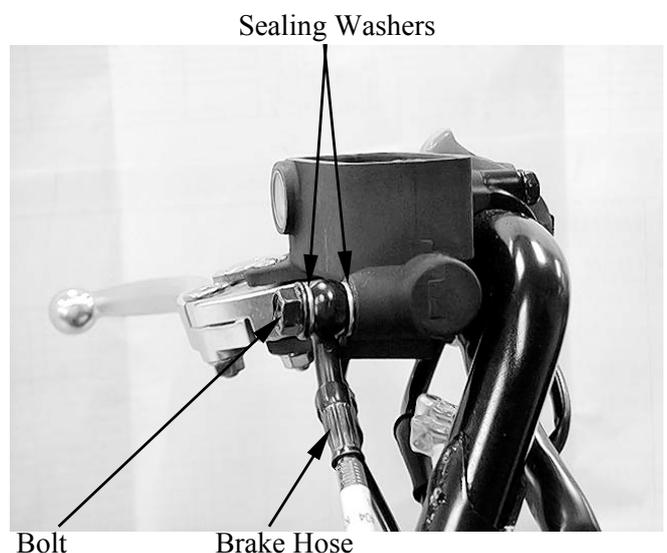
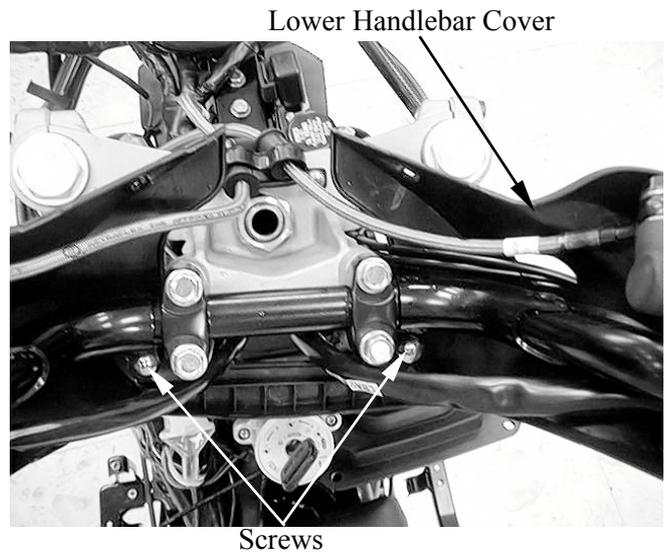
Remove the upper handlebar cover (page 2-5).

Drain the front brake hydraulic system (page 16-4).

Remove the two screws and lower handlebar cover.

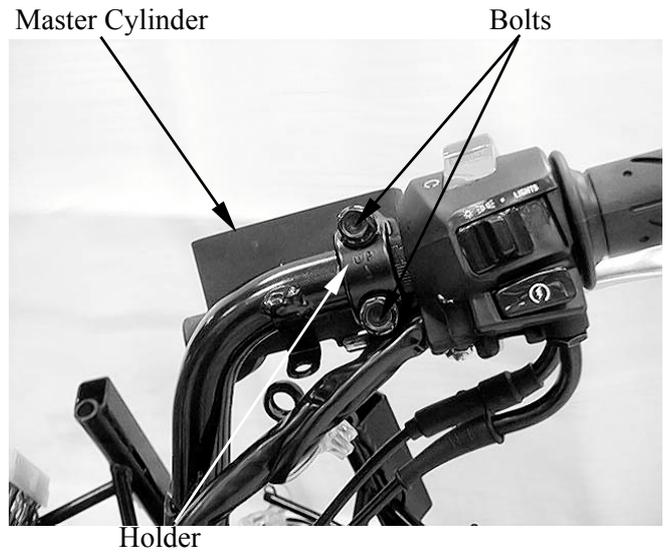
Disconnect the brake light connectors from front master cylinder.

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



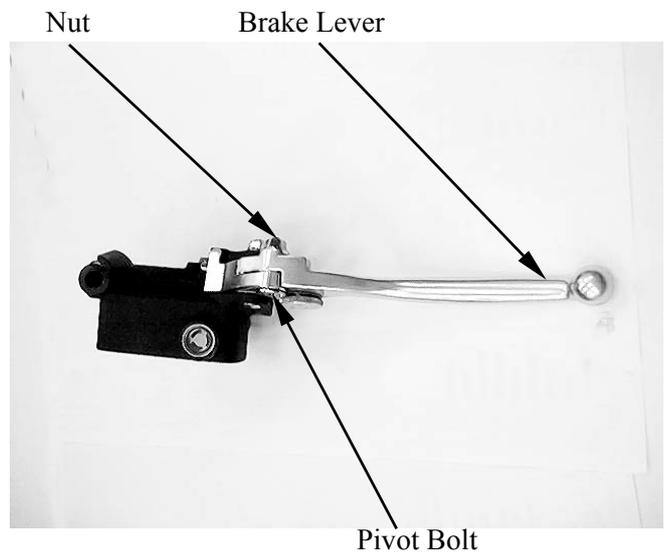
16. BRAKE SYSTEM

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

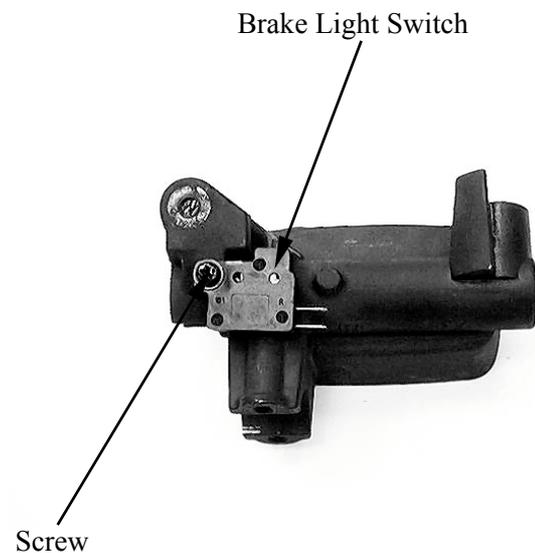


DISASSEMBLY

Remove the brake lever pivot bolt and nut.
Remove the brake lever.



Remove the screw and brake light switch.

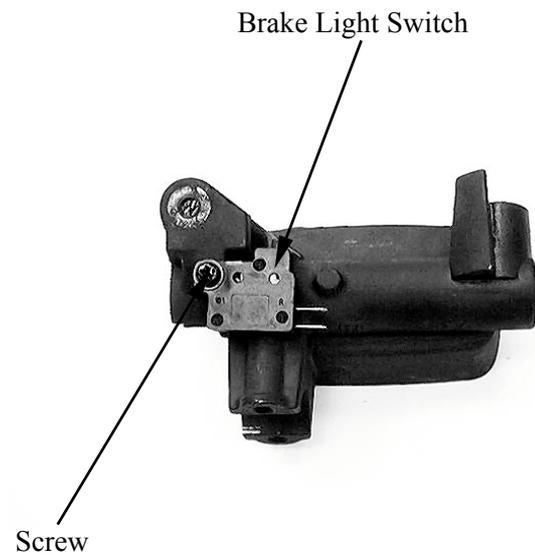


16. BRAKE SYSTEM

ASSEMBLY

Install the brake light switch and tighten the screw to the specified torque.

Torque: 1 N•m (0.1 kgf•m, 0.7 lbf•ft)



Apply silicone grease to the master piston tip.
Install the brake lever.

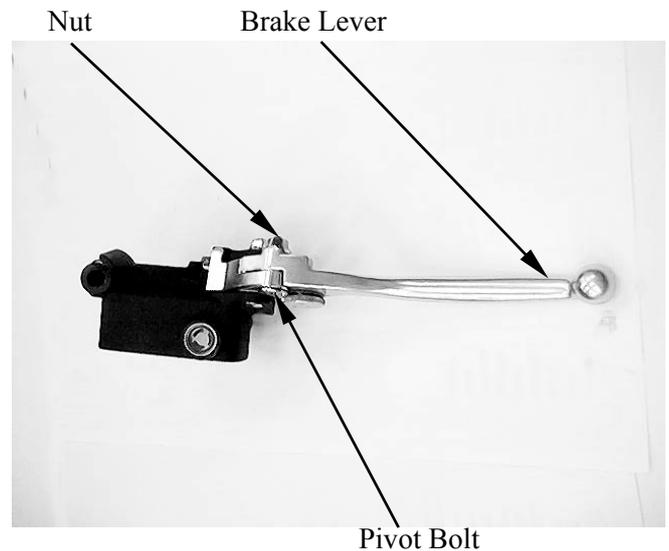
Apply silicone grease to the brake lever pivot bolt sliding surface.

Install and tighten the pivot bolt to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)

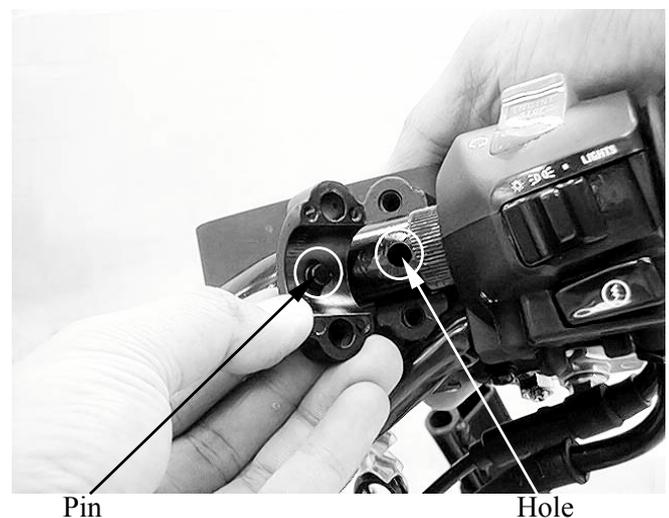
Install and tighten the pivot nut to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)



INSTALLATION

Align the pin on the master cylinder holder with the hole on the handlebar.

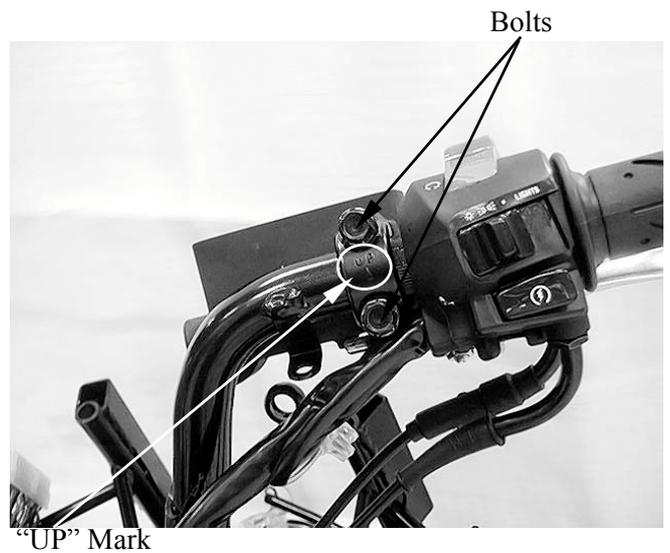


16. BRAKE SYSTEM

Install the front master cylinders and holders with the “UP” mark facing up.

Install the bolts and tighten the upper bolt first then tighten the lower bolt to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)

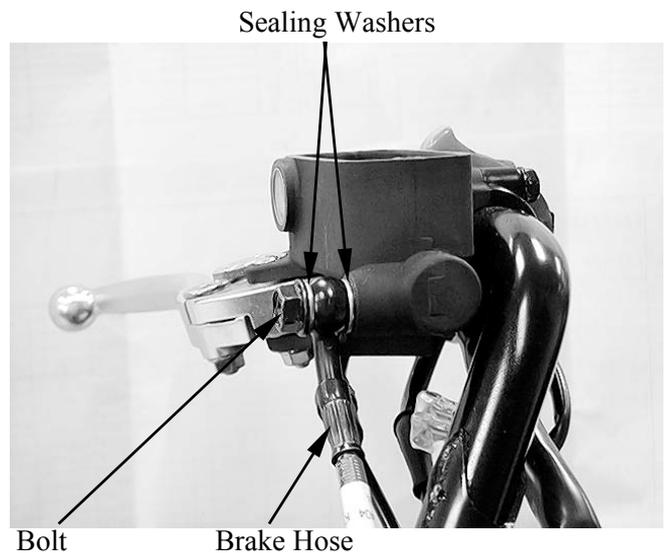


Rest the brake hose eyelet against the stopper.

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

Tighten the oil bolt to the specified torque.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)



Connect the brake light switch connectors.

Fill the reservoir to the upper level and bleed the brake system (page 16-7).



16. BRAKE SYSTEM

REAR MASTER CYLINDER REMOVAL

When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

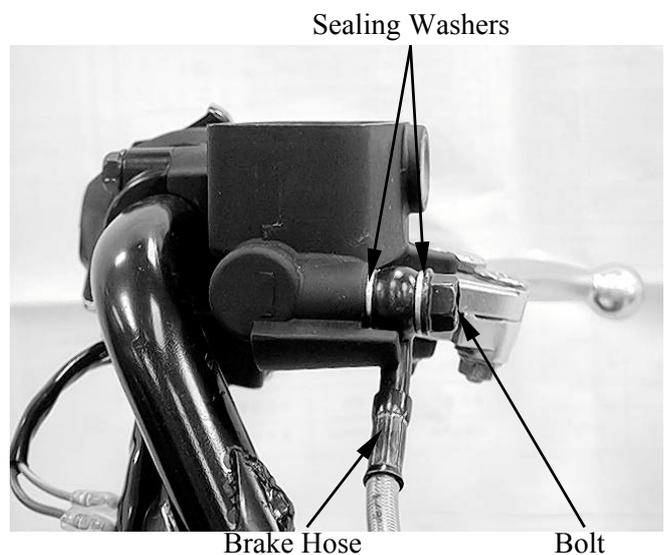
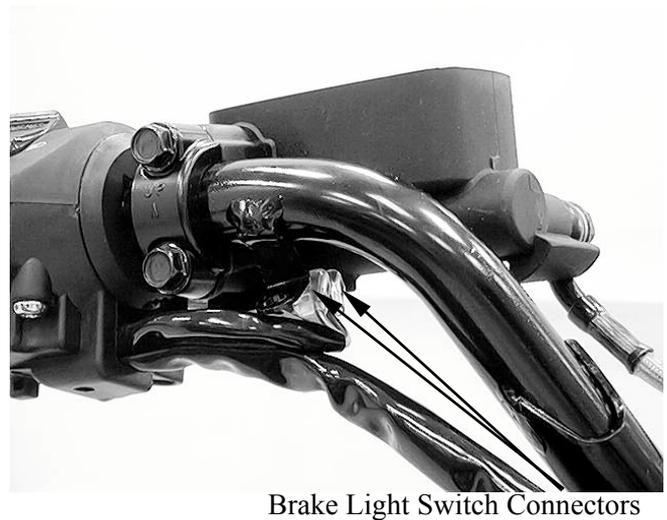
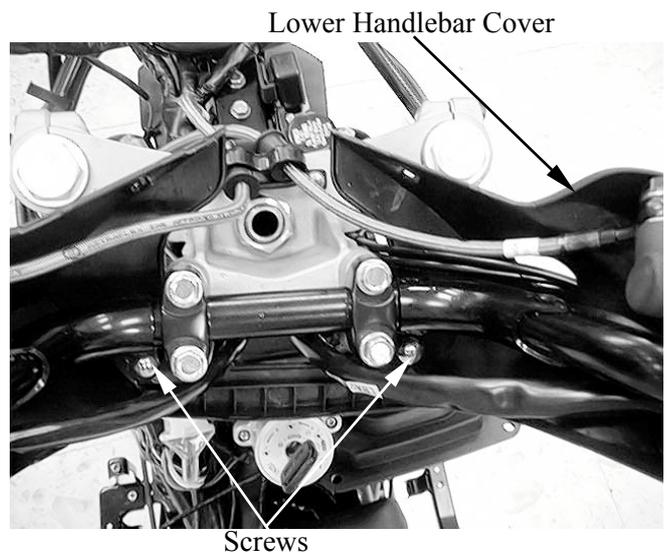
Remove the upper handlebar cover (page 2-5).

Drain the combination brake hydraulic system (page 16-5).

Remove the two screws and lower handlebar cover.

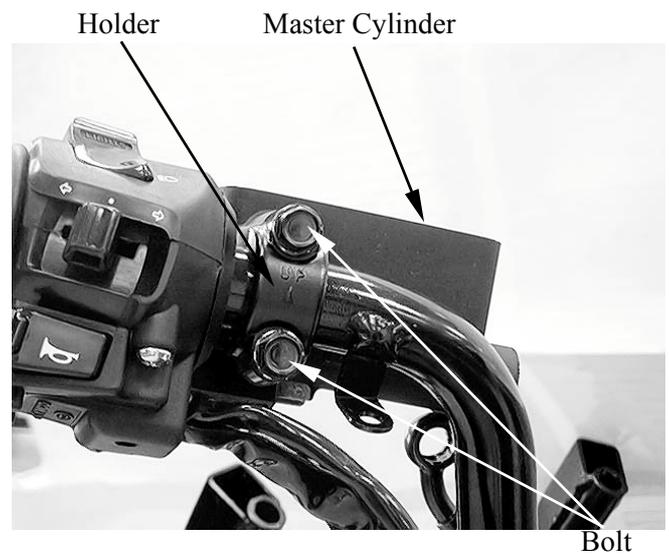
Disconnect the brake light switch connectors from master cylinder.

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



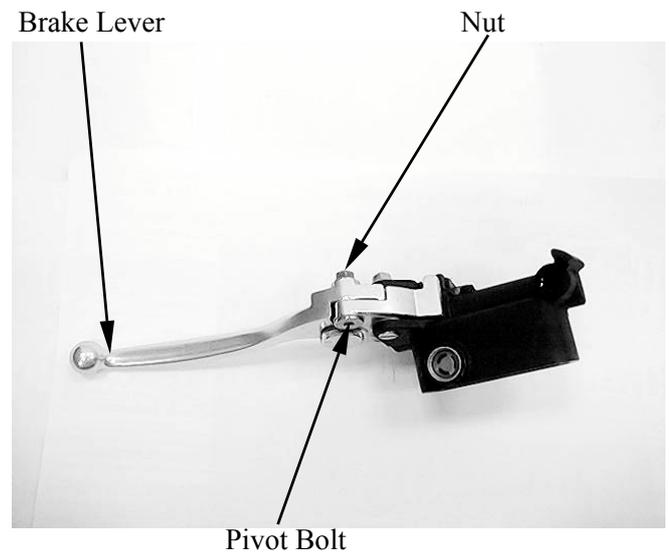
16. BRAKE SYSTEM

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

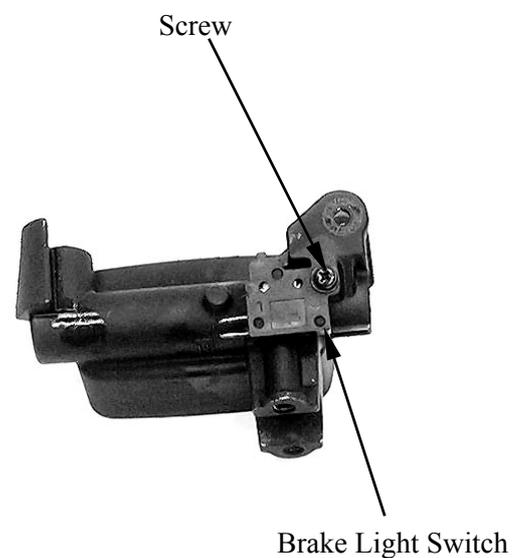


DISASSEMBLY

Remove the brake lever pivot bolt and nut.
Remove the brake lever.



Remove the screw and brake light switch.

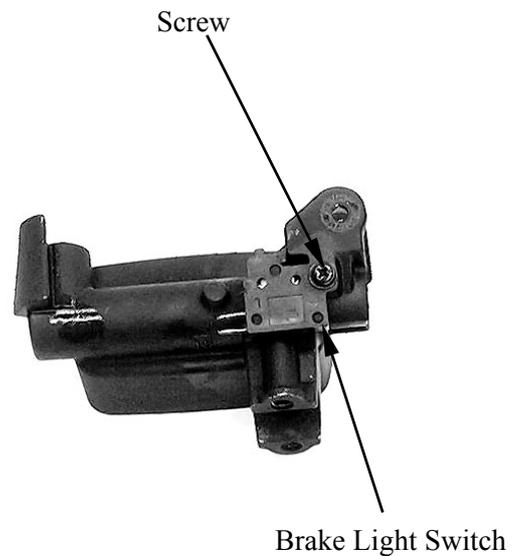


16. BRAKE SYSTEM

ASSEMBLY

Install the brake light switch and tighten the screw to the specified torque.

Torque: 1 N•m (0.1 kgf•m, 0.7 lbf•ft)



Apply silicone grease to the master piston tip.
Install the brake lever.

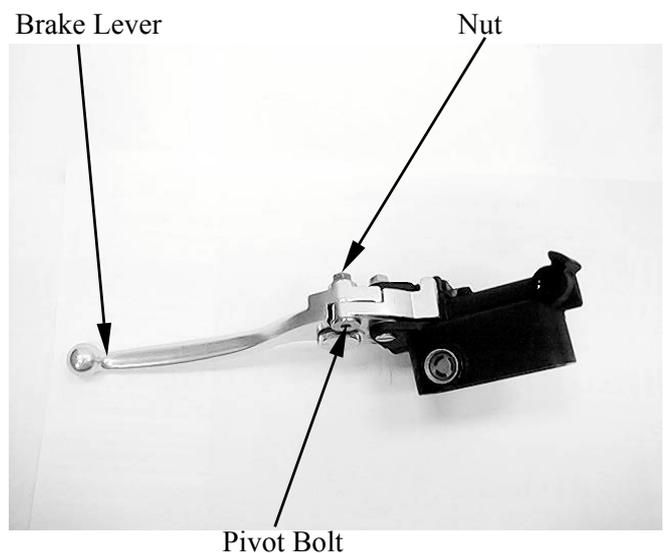
Apply silicone grease to the brake lever pivot bolt sliding surface.

Install and tighten the pivot bolt to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)

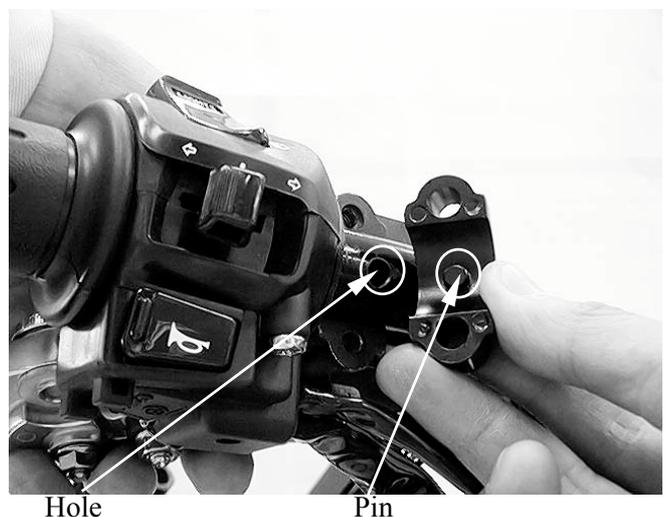
Install and tighten the pivot nut to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)



INSTALLATION

Align the pin on the master cylinder holder with the hole on the handlebar.

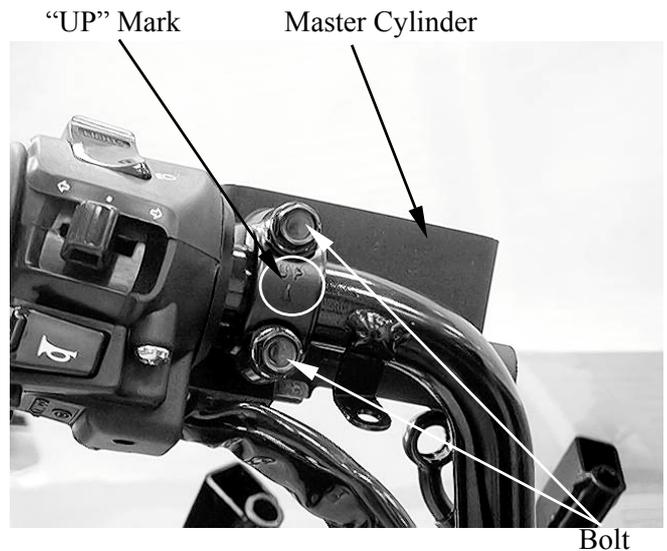


16. BRAKE SYSTEM

Install the rear master cylinders and holders with the “UP” mark facing up.

Install the bolts and tighten the upper bolt first then tighten the lower bolt to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)

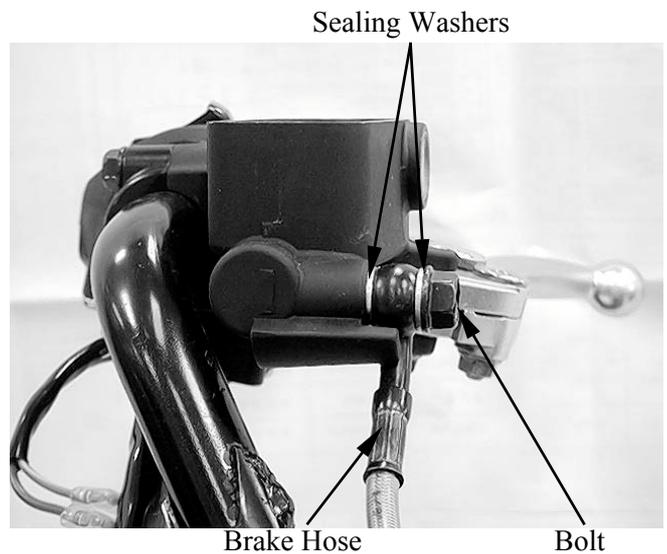


Rest the brake hose eyelet against the stopper.

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

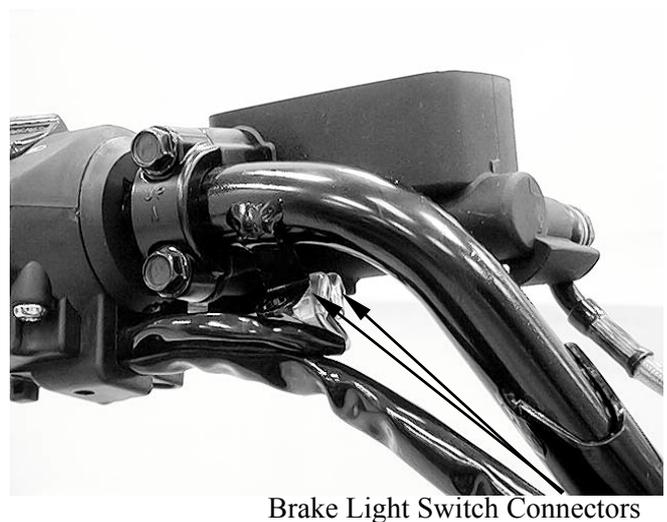
Tighten the oil bolt to the specified torque.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)



Connect the brake light switch connectors.

Fill the reservoir to the upper level and bleed the brake system (page 16-8).



16. BRAKE SYSTEM

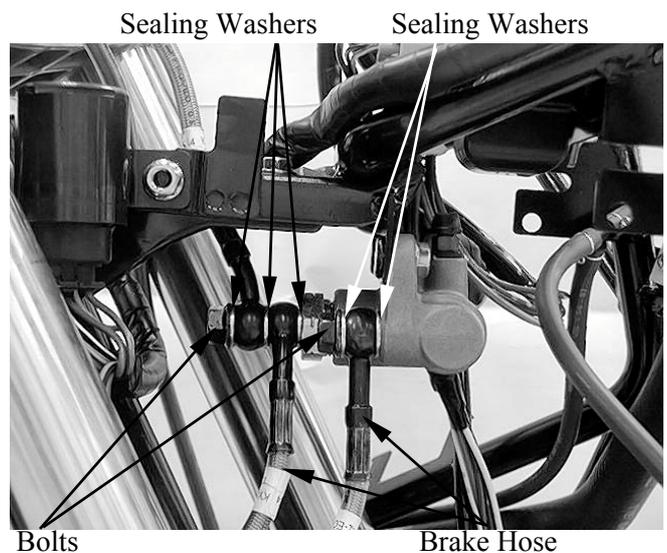
DELAY VALVE

REMOVAL

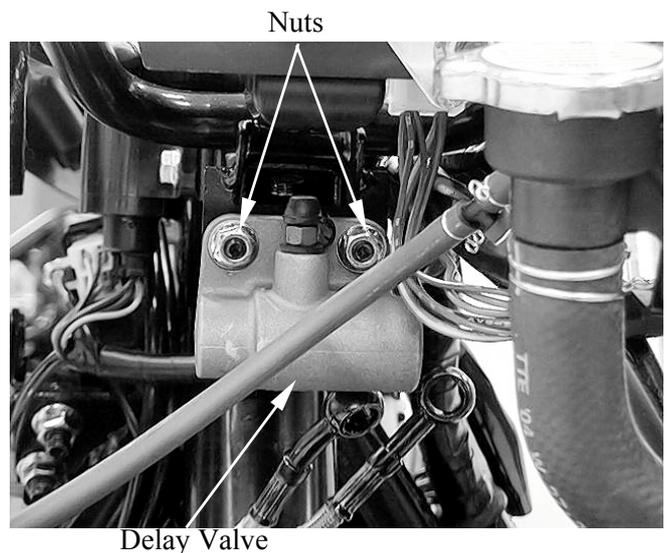
When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Remove the front cover (page 2-11).
 Drain the combination brake hydraulic system (page 16-5).

Remove the brake hose oil bolt, sealing washers and brake hose eyelets.



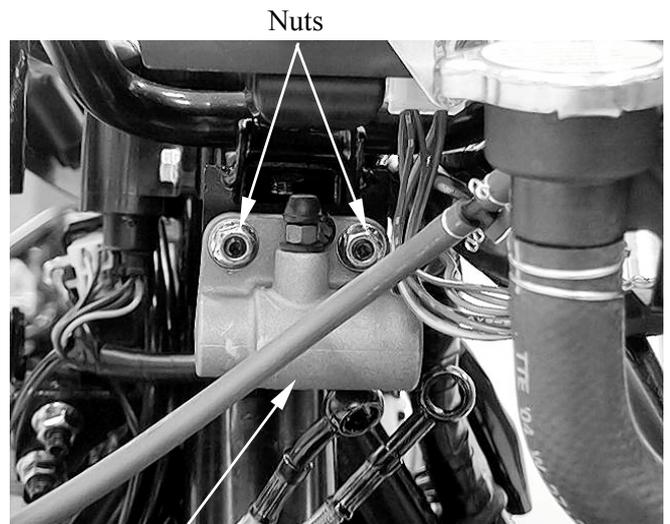
Remove the two nuts and delay valve.



16. BRAKE SYSTEM

INSTALLATION

Install the delay valve and tighten the nuts securely.



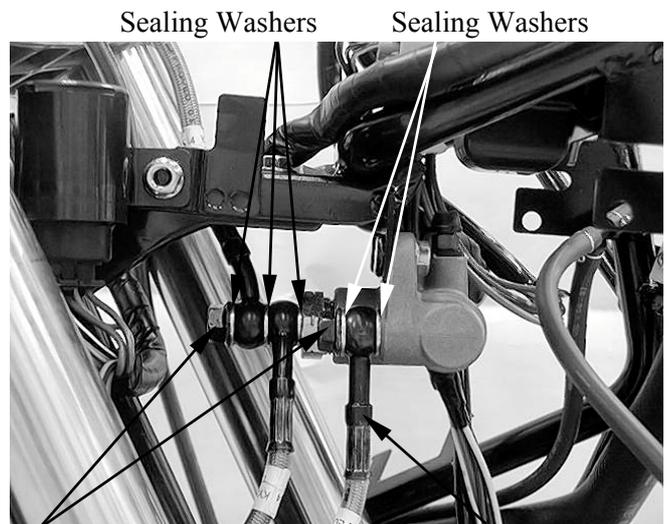
Nuts
Delay Valve

Install the brake hose eyelets and new sealing washers.

Tighten the brake hose bolt to the specified torque while rest the brake hose eyelet against the stopper on the delay valve.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

Fill the reservoir to the upper level and bleed the brake system (page 16-8).



Sealing Washers
Sealing Washers
Bolts

Brake Hose

16. BRAKE SYSTEM

FRONT BRAKE CALIPER

REMOVAL

Drain the front brake hydraulic system (left front brake caliper: page 16-4) or combination brake hydraulic system (right front brake caliper: page 16-5).

Remove the brake pads (page 16-10).

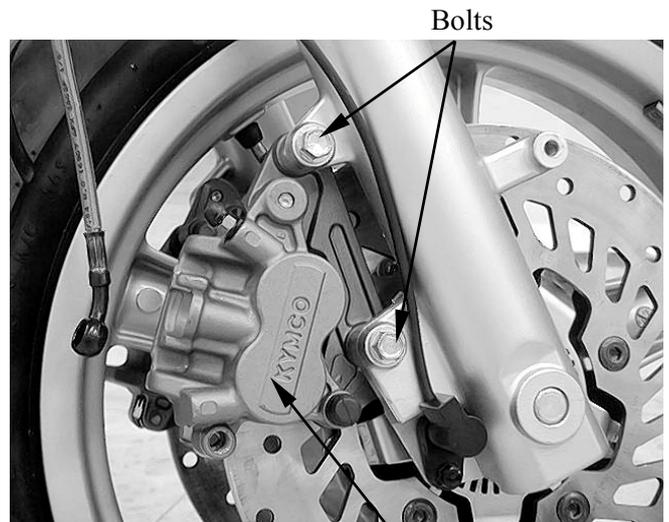
Remove the oil bolts, sealing washers and brake hose from the brake caliper.



Brake Hose

Bolts Sealing Washers

Remove the mount bolts and front brake caliper.



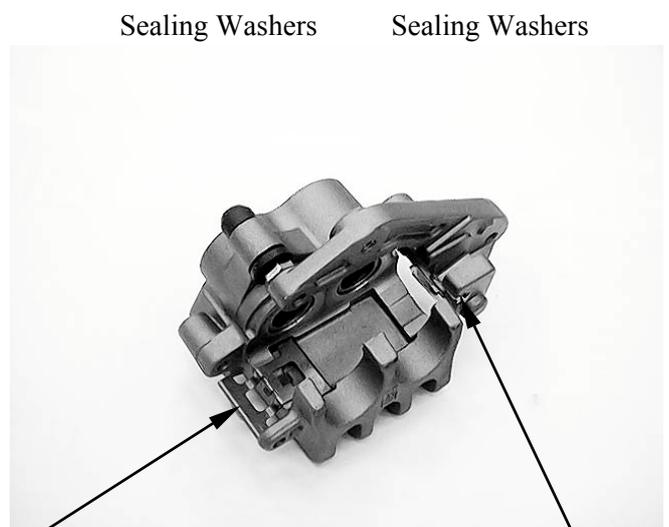
Bolts

Brake Caliper

DISASSEMBLY

Remove pad spring from the caliper body.

* Do not remove the retainer from the bracket unless replacement.



Sealing Washers

Sealing Washers

Pad Spring

Retainer

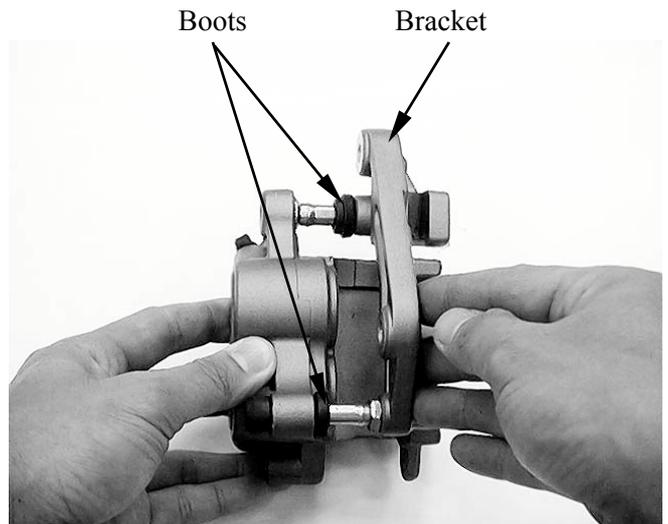
16. BRAKE SYSTEM

Remove the caliper bracket from the caliper body.

* Do not remove the caliper and bracket pins unless replacement.

ASSEMBLY

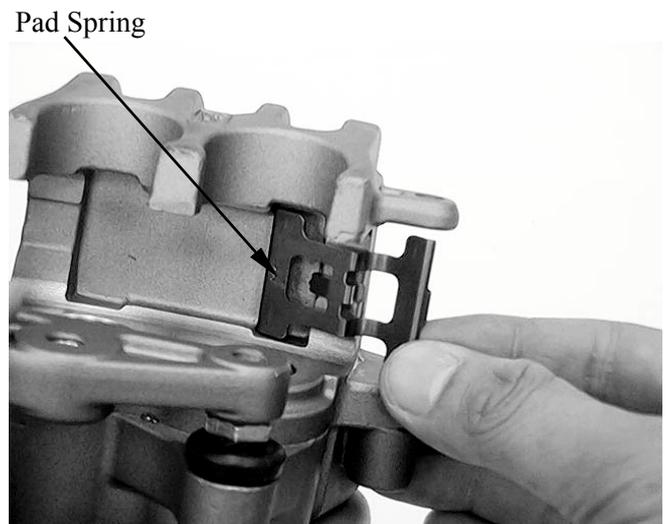
Apply silicone grease to the boots inside.
Install the caliper bracket to the caliper.



Bolts

Brake Hose

Install the pad spring into the caliper body as shown.



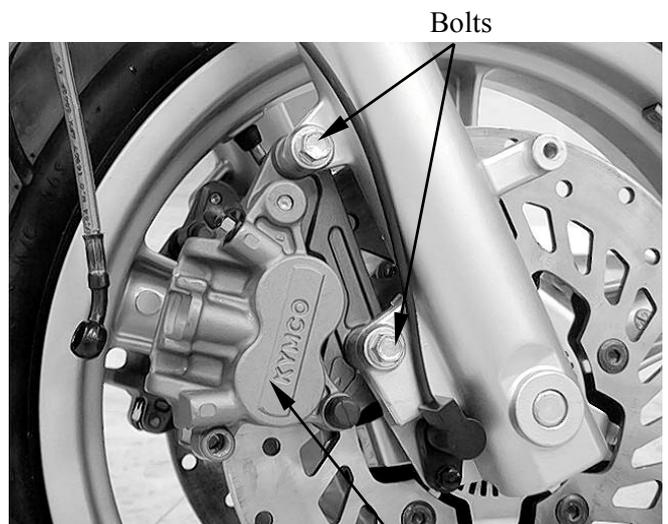
Bolts

Brake Hose

INSTALLATION

Install the front caliper onto the fork leg.
Install and tighten the new front caliper mount bolts to the specified torque.

Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)



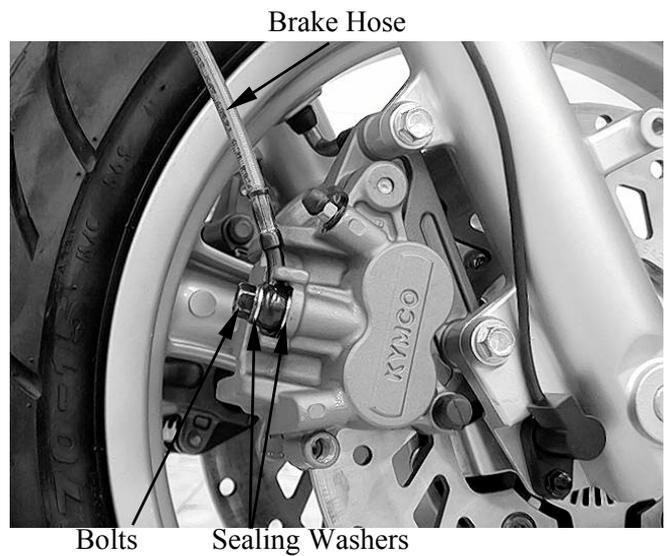
Brake Caliper

16. BRAKE SYSTEM

Install the brake hose eyelet to the caliper body with new sealing washers and oil bolts. Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolts to the specified torque.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

Install the brake pads (page 16-10).
 Fill and bleed the hydraulic system (page 16-7 or page 16-8).



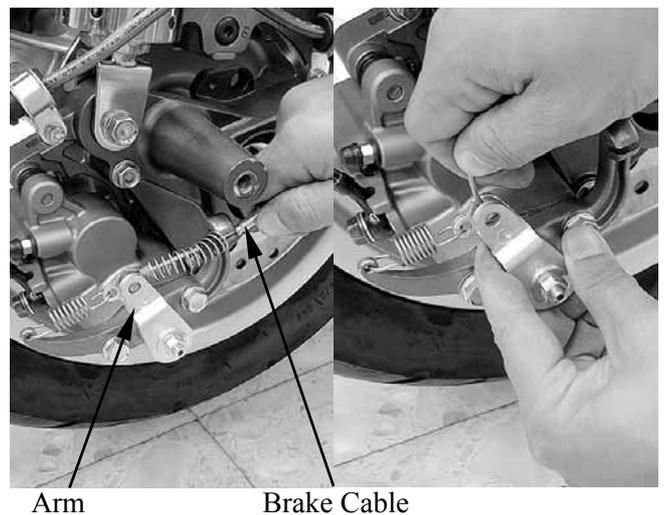
REAR/PARKING BRAKE CALIPER REMOVAL

REMOVAL

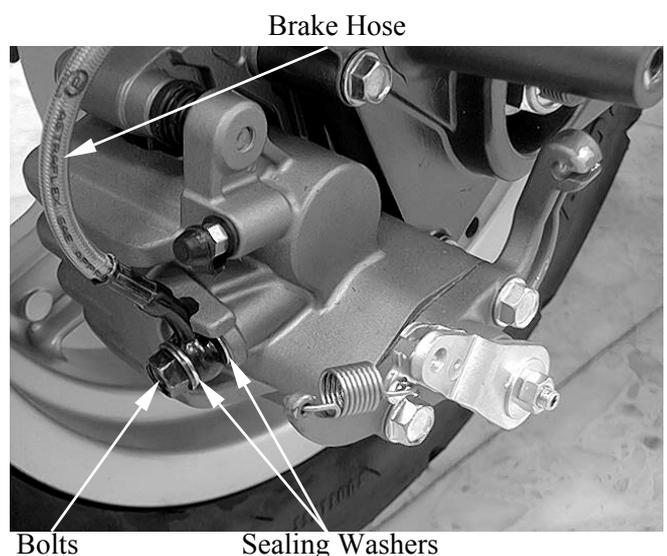
Remove the muffler (page 2-15).
 Drain the rear brake hydraulic system (page 16-5).

Disconnect the parking brake cable from the brake arm.

Remove the pad pin plug and loosen the pad pin.
 Remove the brake pad (page 16-11).



Remove the oil bolt, sealing washers and brake hose from the brake caliper.



16. BRAKE SYSTEM

Remove the mount bolts and rear/parking brake caliper from the rear fork.

Rear/Parking Brake Caliper

Bolts

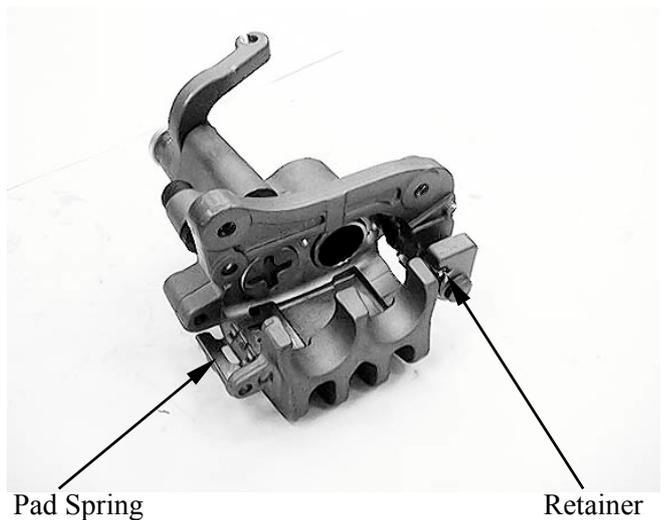


DISASSEMBLY (REAR BRAKE)

Remove the pad spring from the caliper body.

- * Do not remove the retainer from the bracket unless replacement.

Brake Hose



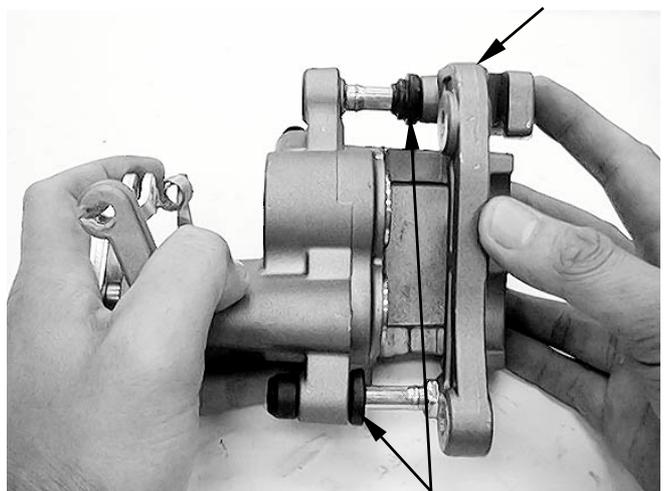
Pad Spring

Retainer

Remove the caliper bracket from the caliper body.

- * Do not remove the caliper and bracket pins unless replacement.

Bracket



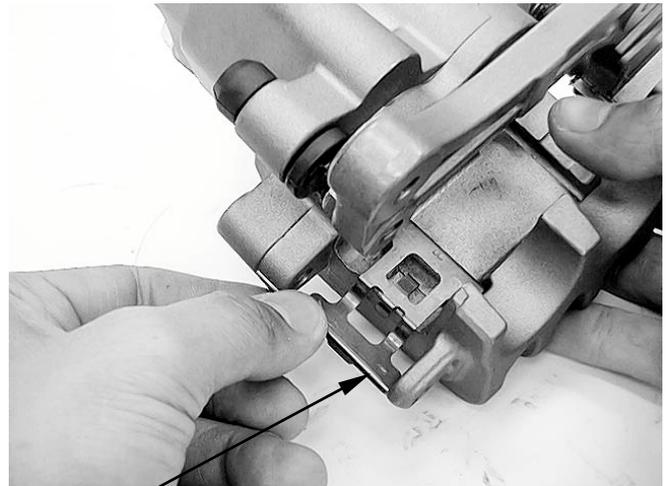
Boots

ASSEMBLY (REAR BRAKE)

Apply silicone grease to the boot inside.
Apply silicone grease to the boot inside.
Install the caliper bracket to the caliper.

16. BRAKE SYSTEM

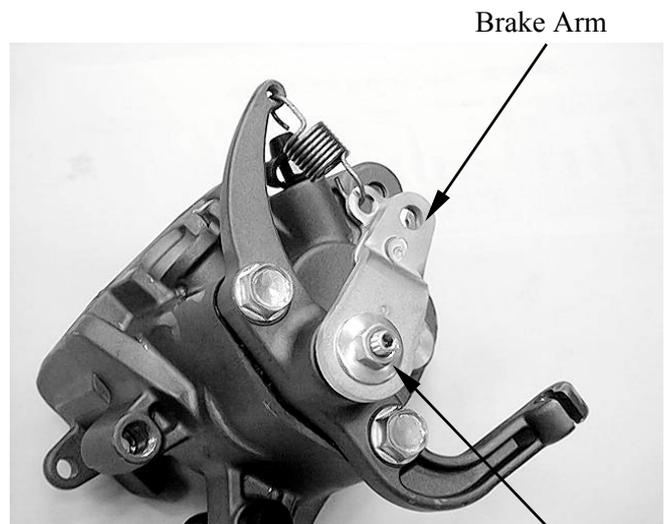
Install the pad spring into the caliper body as shown.



Pad Spring

DISASSEMBLY (PARKING BRAKE)

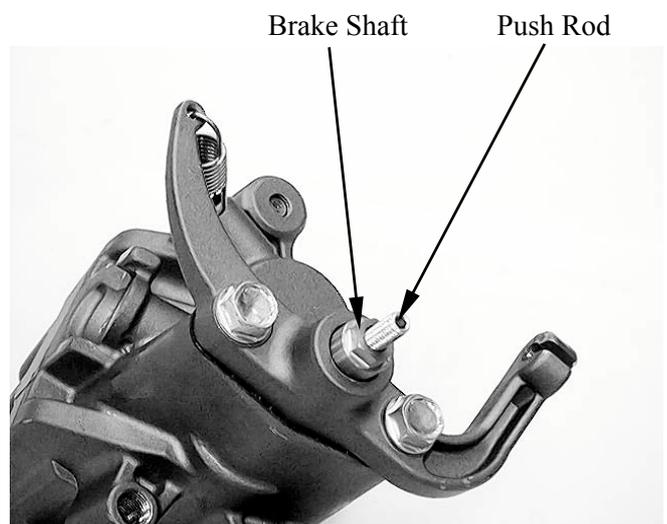
Remove the lock nut and parking brake arm.



Brake Arm

Lock Nut

Remove the parking brake shaft and push rod.

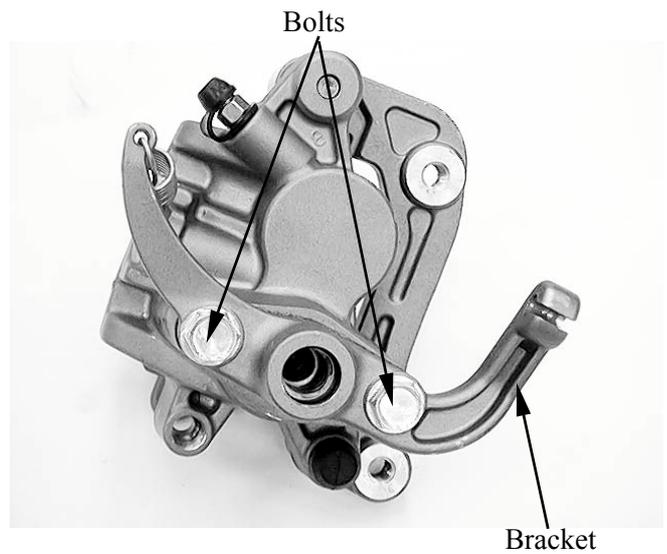


Brake Shaft

Push Rod

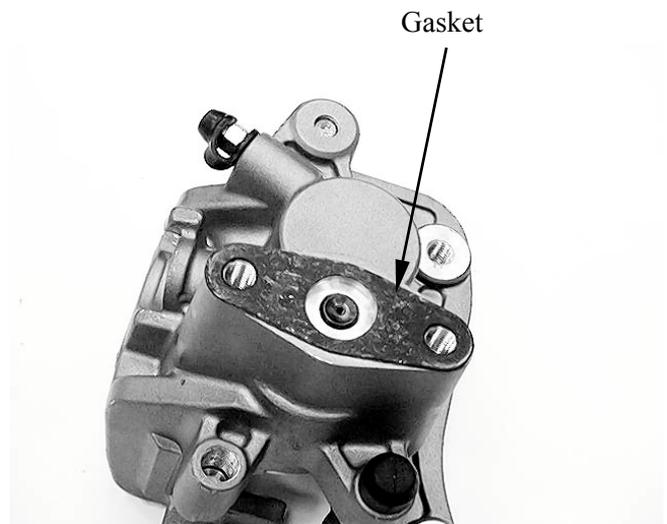
16. BRAKE SYSTEM

Removed the two bolts, gasket and parking brake bracket.



ASSEMBLY (PARKING BRAKE)

Install the gasket.

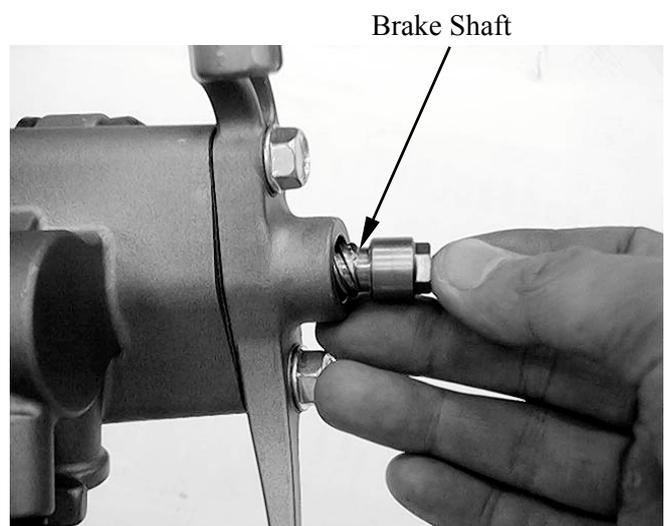


Install the parking brake bracket and tighten the bolts to the specified torque.

Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)

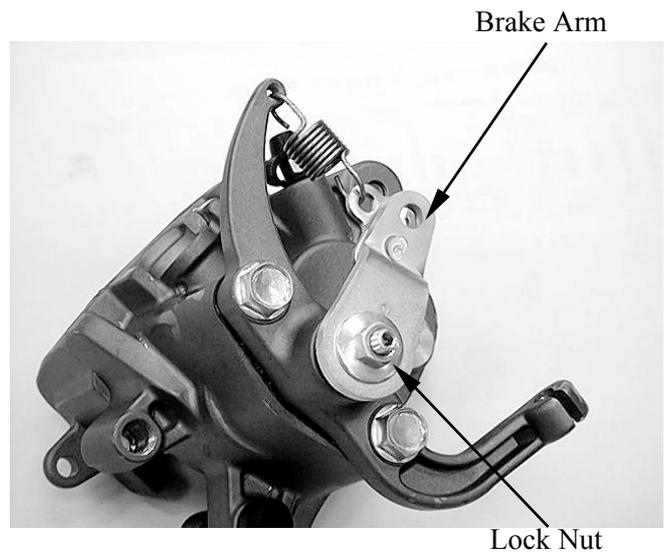
Apply silicone grease to the parking brake shaft rolling surface.

Install the parking brake shaft.



16. BRAKE SYSTEM

Temporarily install the brake arm and the lock nut.

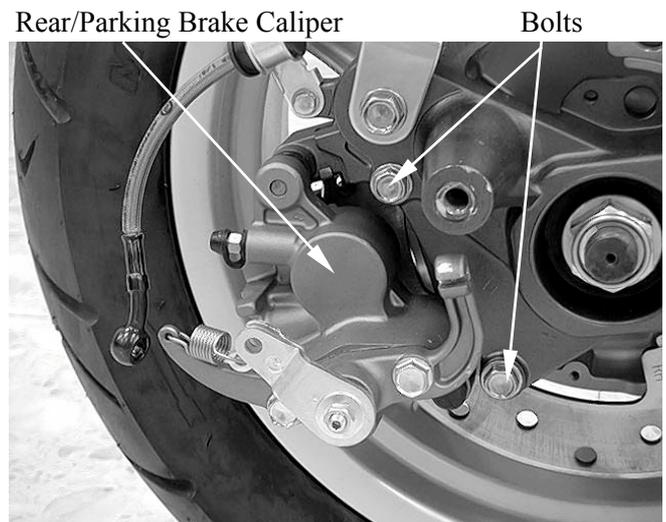


INSTALLATION

Install the brake pads (page 16-12).

Install the rear/parking brake caliper to the rear fork and tighten the new mount bolts to specified torque.

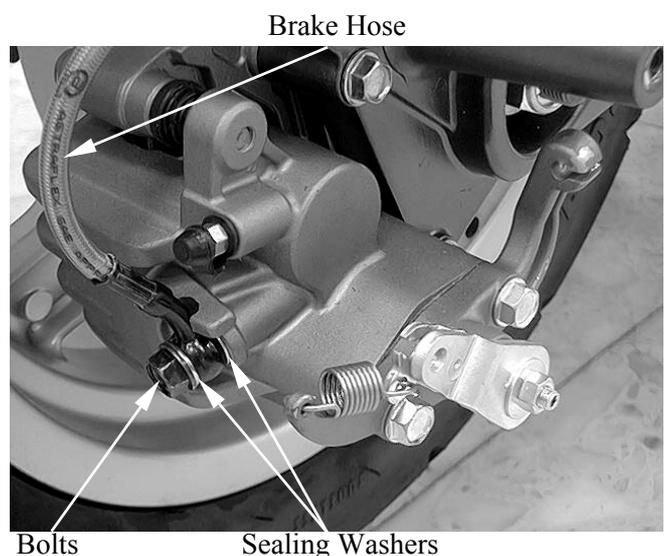
Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)



Install the brake hose eyelet to the caliper body with new sealing washers and oil bolts. Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolts to the specified torque.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

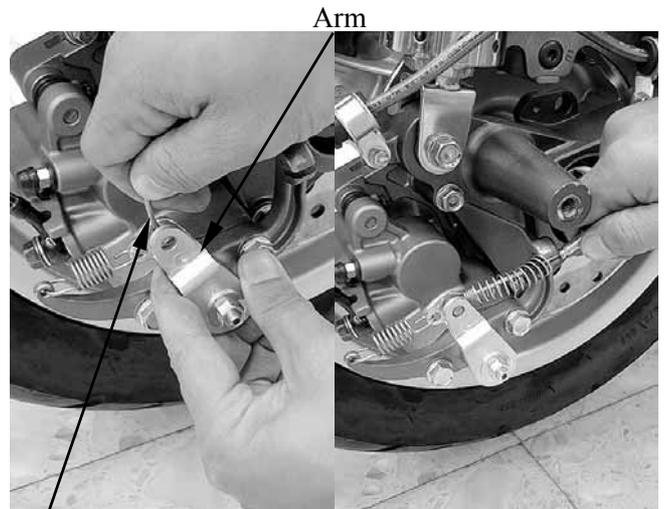
Fill and bleed the hydraulic system (page 16-8).



16. BRAKE SYSTEM

Connect the parking brake cable.

Adjust the parking brake (page 3- 21).

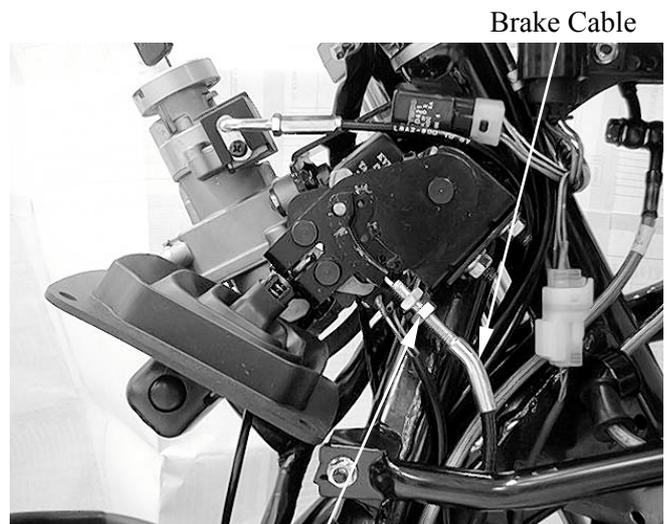


Brake Cable

PARKING BRAKE LEVER LINK REMOVAL

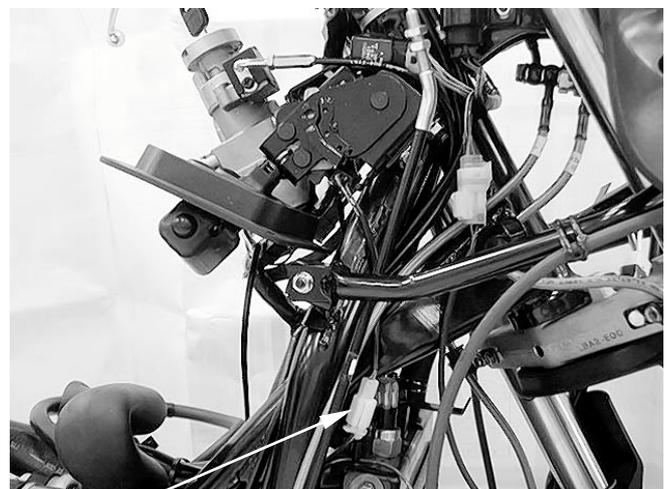
Remove the inner cover (page 2-14).

Loosen the lock nut and disconnect the parking brake cable from the parking braking brake lever link.



Lock Nut

Disconnect the parking brake switch connector.



Parking Brake Switch Connector

16. BRAKE SYSTEM

Remove the two nuts and parking brake lever link.

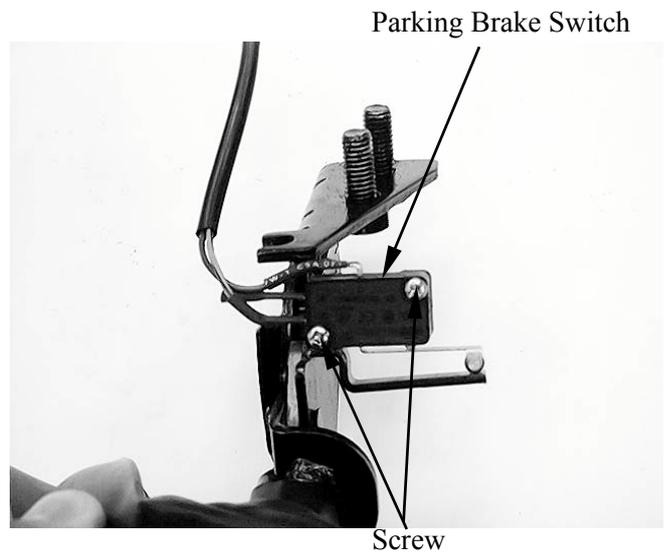


DISASSEMBLY

Remove the two screws and parking brake switch.

ASSEMBLY

Assembly is in the reverse order of disassembly.



INSTALLATION

Installation is in the reverse order of removal.