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## **STEERING HANDLEBAR/FRONT WHEEL/FRONT BRAKE/FRONT SHOCK ABSORBER/FRONT FORK**

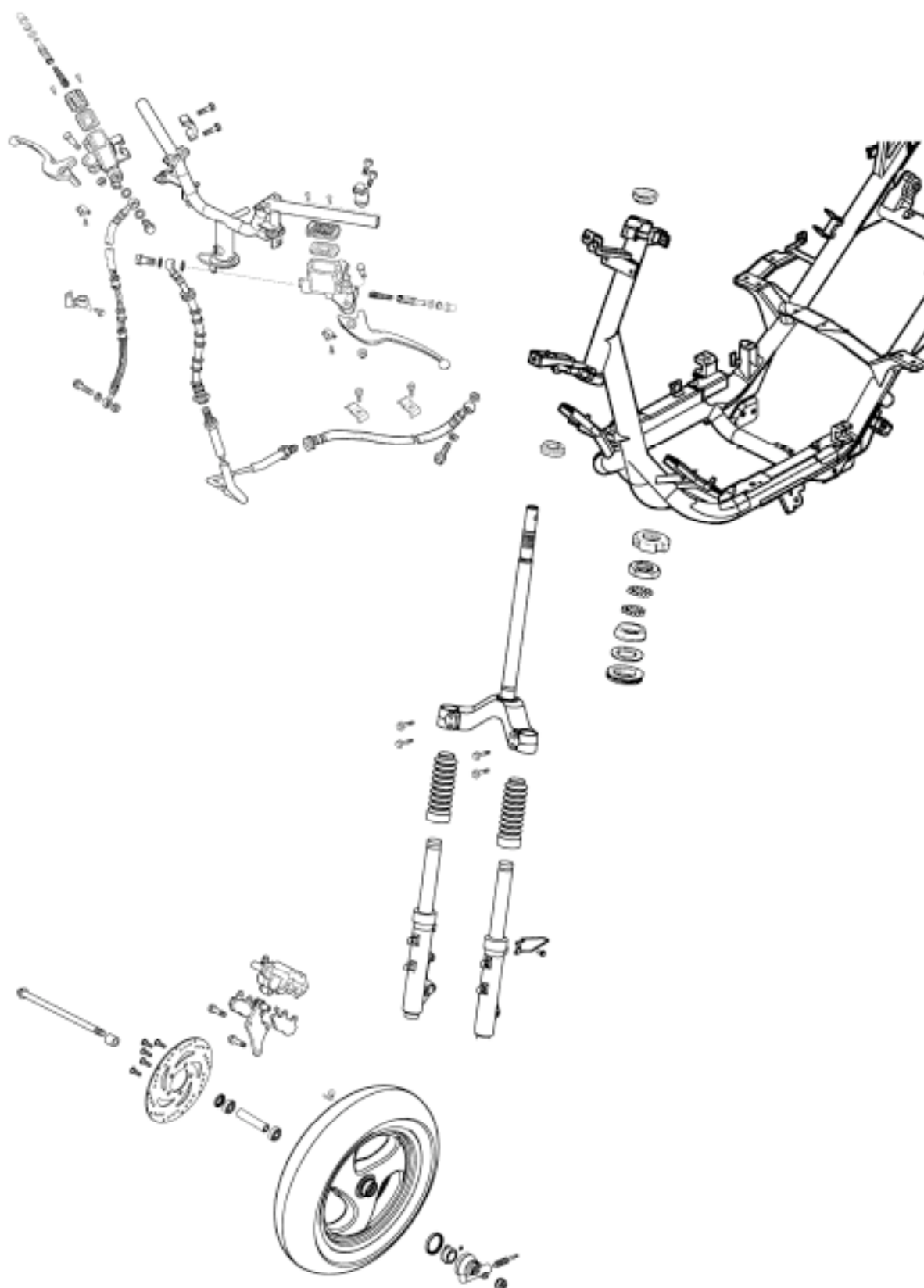
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## 14. STEERING HANDLEBAR/FRONT WHEEL/FRONT BRAKE/FRONT SHOCK ABSORBER/FRONT FORK

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### SCHEMATIC DRAWING



## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- Remove the motorcycle frame covers before removing the front wheel, steering handlebar, front shock absorber and front fork. Jack the motorcycle front wheel off the ground and be careful to prevent the motorcycle from falling down.
- During servicing, keep oil or grease off the brake pads and brake disk.

### SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Axle shaft runout		□	0.2
Front wheel rim runout	Radial	□	2.0
	Axial	□	2.0
Front shock absorber spring free length		240.6	233
Brake disk thickness		3.8_ 4.2	3.0
Brake disk runout		□	0.30
Brake master cylinder I.D.		12.70_ 12.74	12.75
Brake master cylinder piston O.D.		12.65_ 12.68	12.64
Brake caliper piston O.D.		25.33_ 25.36	25.30
Brake caliper cylinder I.D.		25.40_ 25.45	25.45

### TORQUE VALUES

Steering stem lock nut	78.4_	117.6N-m
Steering top cone race	4.9_	12.7N-m
Front shock absorber bolt	19.8_	24.5N-m
Front axle nut	44.1_	49N-m
Brake caliper bolt	24.5N_	34.3N-m

### SPECIAL TOOLS

Lock nut wrench  
 Front shock absorber compressor  
 Ball race remover  
 Driver handle  
 Outer driver, 37x40mm  
 Pilot, 12mm  
 Bearing remover  
 Bearing remover head, 12mm

## **TROUBLESHOOTING**

### **Hard steering (heavy)**

- Excessively tightened steering stem top cone race
- Broken steering balls
- Insufficient tire pressure

### **Steers to one side or does not track straight**

- Uneven front shock absorbers
- Bent front fork
- Bent front axle or uneven tire

### **Poor brake performance**

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

### **Front wheel wobbling**

- Bent rim
- Loose front axle
- Bent spoke plate
- Faulty tire
- Improperly tightened axle nut

### **Soft front shock absorber**

- Weak shock springs
- Insufficient damper oil

### **Front shock absorber noise**

- Slider bending
- Loose fork fasteners
- Lack of lubrication

### STEERING HANDLEBAR

#### REMOVAL

Remove the handlebar front and rear covers.

(⇒2-6)

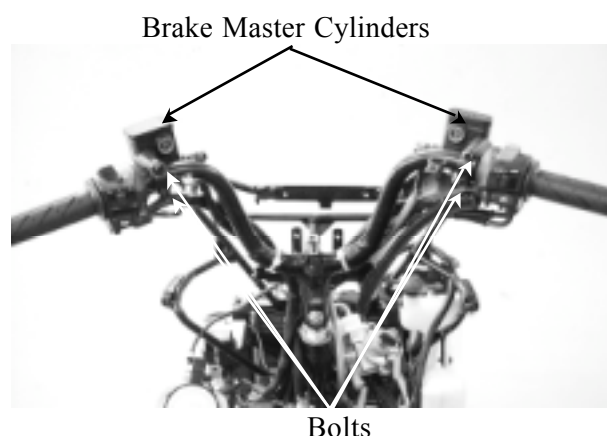
Remove the front and rear brake master cylinder attaching bolts.

Remove the front upper cover. (⇒2-5)

Remove the front lower cover. (⇒2-5)

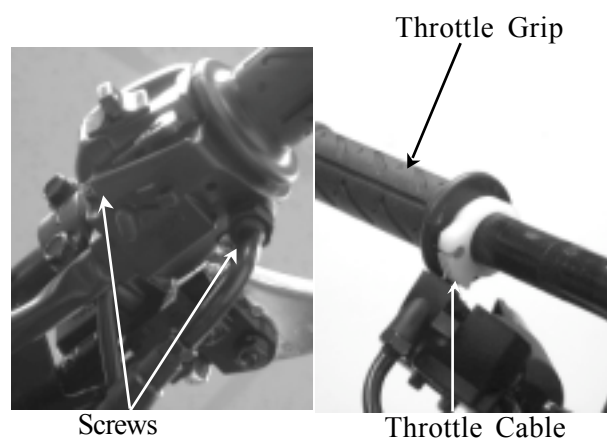
Remove the floor board. (⇒2-4)

Remove the leg shield. (⇒2-5)



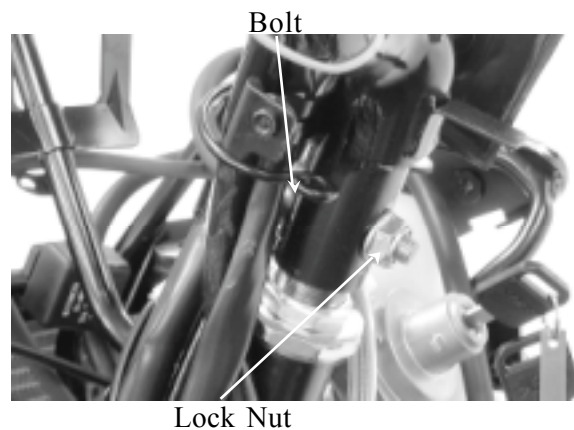
Remove the four screws attaching the right and left handlebar switches.

Disconnect the throttle cable from the throttle grip and remove the throttle grip from the handlebar.



Remove the handlebar lock nut and take out the bolt.

Remove the handlebar.

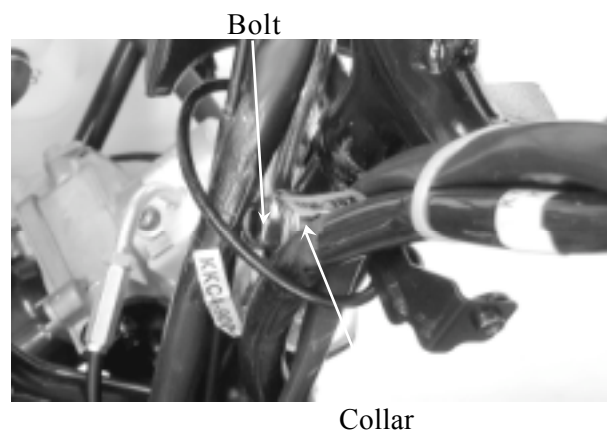


#### INSTALLATION

Install the handlebar onto the steering stem and install the handlebar collar, lock nut and bolt.

Tighten the bolt to the specified torque.

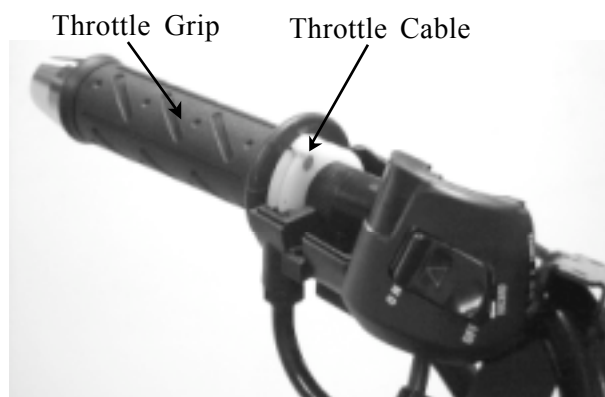
**Torque:** 39.2\_ 49N-m



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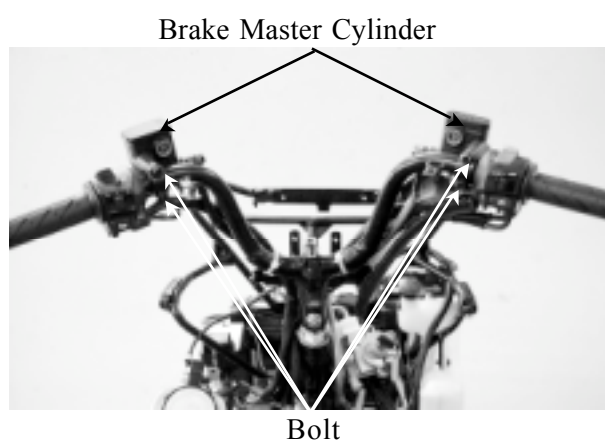
Lubricate the throttle grip front end with grease and then install the throttle grip. Connect the throttle cable to the throttle grip. Install the right and left handlebar switches and tighten the screws.

- \* Adjust the throttle grip free play to the specified range of 2\_ 6mm.



Install the front and rear brake master cylinders.

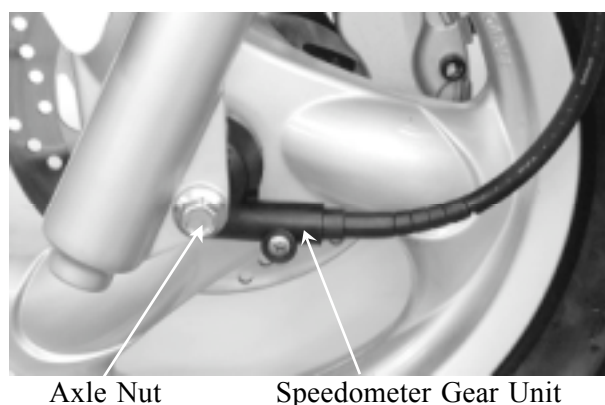
- \* Install the brake master cylinders by aligning the index marks.



### FRONT WHEEL

#### REMOVAL

Jack the motorcycle front wheel off the ground. Remove the front axle nut to pull out the axle. Remove the front wheel and the speedometer gear unit.

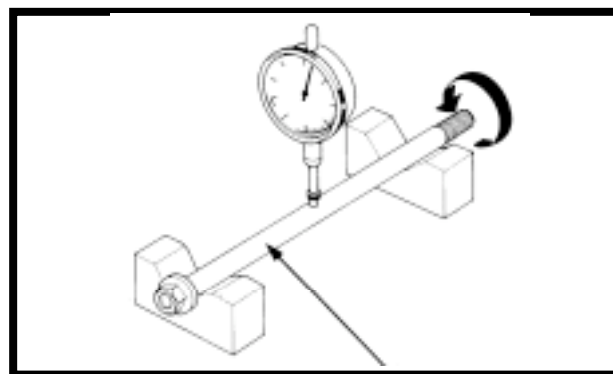


#### INSPECTION

##### AXLE RUNOUT

Set the axle in V blocks and measure the runout using a dial gauge. The actual runout is \_ of the total indicator reading.

**Service Limit:** 0.2mm replace if over



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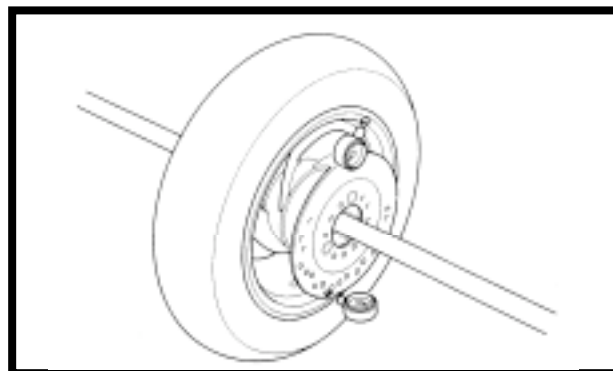
### WHEEL RIM

Check the wheel rim runout.

#### Service Limits:

**Radial:** 2.0mm replace if over

**Axial:** 2.0mm replace if over



### FRONT WHEEL BEARING

Remove the side collar and dust seal.



Turn the inner race of each bearing with your finger to see if they turn smoothly and quietly. Also check if the outer race fits tightly in the hub.

Replace the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.



Wheel Bearing

### BEARING REPLACEMENT

Remove the front wheel bearings and distance collar.

#### Special Tools

Bearing Remover

Bearing Remover Head, 12mm



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Pack all bearing cavities with grease.  
Drive in the left bearing.  
Install the distance collar.  
Drive in the right bearing.

- Do not allow the bearings to tilt while driving them in.
- Drive in the bearing squarely with the sealed end facing out.

### Special Tools

Outer driver  
Driver handle

### INSTALLATION

Apply grease to the speedometer gear unit.  
Install the speedometer gear unit by aligning its retaining pawl with the hub cutout.

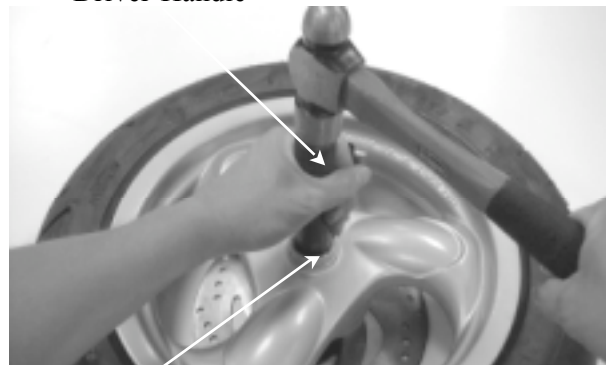
- If not aligned, the retaining pawl will be deformed when the axle nut is tightened.
- After installing the axle, turn the wheel to make sure that the speedometer drive shaft rotates freely.

Install the front wheel by aligning the speedometer gear unit groove with the front shock absorber tab.  
Insert the axle and tighten the axle nut.

- When installing the front wheel, position the brake disk between the two brake pads.

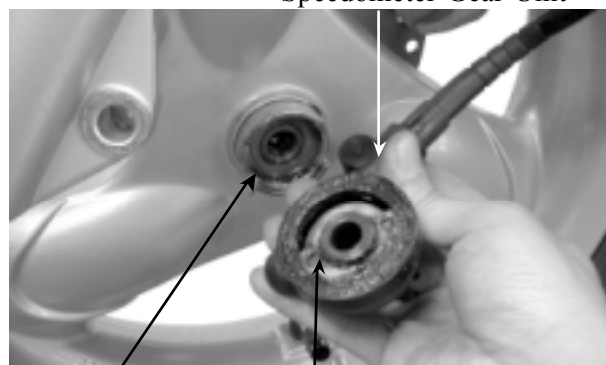
**Torque:** 44.1\_ 49N-m

Driver Handle



Outer Driver

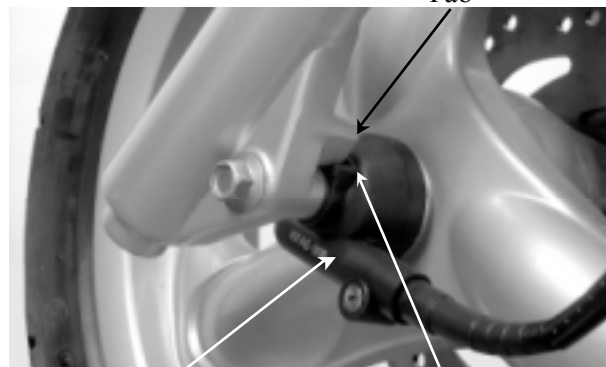
Speedometer Gear Unit



Hub Cutout

Pawl

Tab



Speedometer Gear Unit

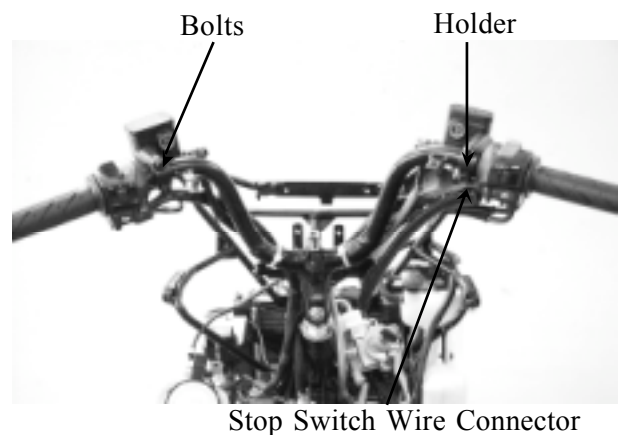
Groove

## FRONT BRAKE

### BRAKE MASTER CYLINDER

#### REMOVAL

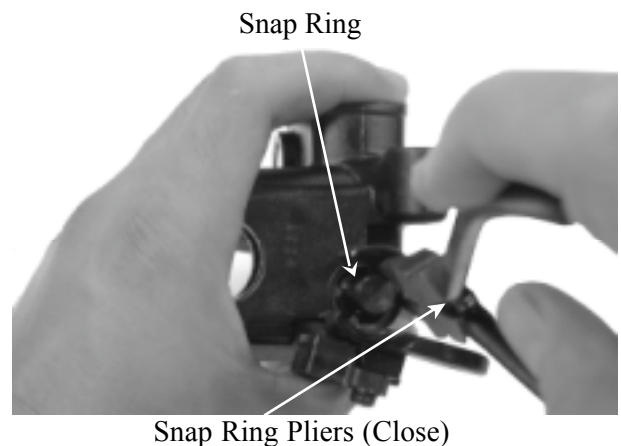
Remove the handlebar covers. (⇒ 2-6)  
First drain the brake fluid from the hydraulic brake system.  
Disconnect the front stop switch wire connector.  
Remove the brake fluid tube bolt.  
Remove the two bolts attaching the brake master cylinder  
Remove the brake master cylinder.



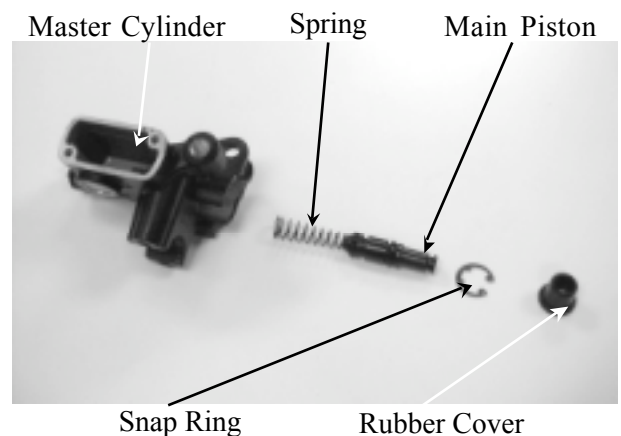
- \* When servicing the brake system, use shop towels to cover rubber and plastic parts and coated surfaces to avoid being contaminated by brake fluid.
- \* When removing the brake fluid tube bolt, be sure to plug the tube end to avoid brake fluid leakage.

#### DISASSEMBLY

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



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.



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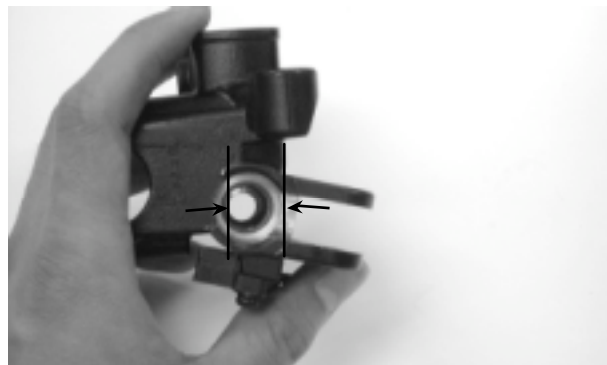


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### INSPECTION

Measure the brake master cylinder I.D.  
Inspect the master cylinder for scratches or cracks.

**Service Limit:** 12.75mm



Measure the brake master cylinder piston O.D.

**Service Limit:** 12.645mm

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



### ASSEMBLY

Before assembly, apply brake fluid to all removed parts.  
Install the spring together with the 1st rubber cup.

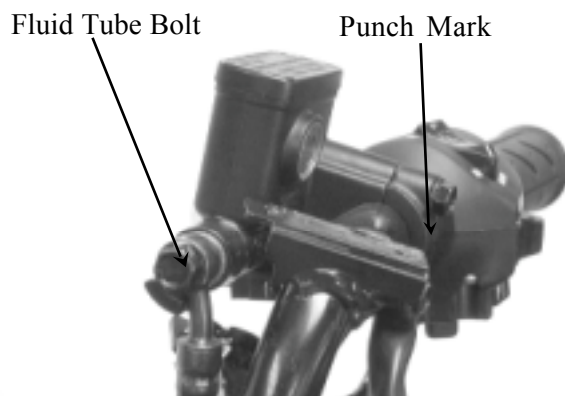
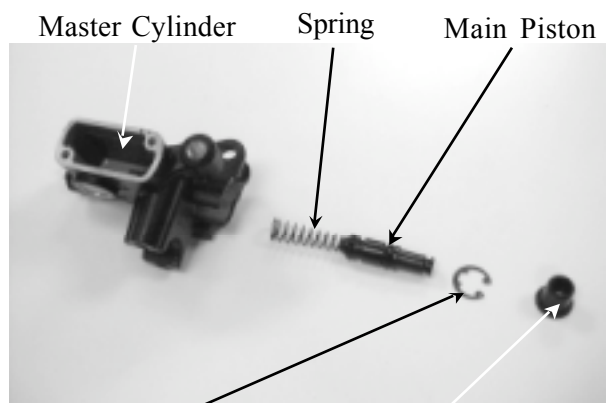
\*

- 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:** 9.8\_ 13.7N-m

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



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Connect the front stop switch wire connector.

Install the handlebar covers. (⇒2-6)



Stop Switch Wire Connector

### BRAKE FLUID REFILLING

Keep the handlebar upright and remove the brake reservoir cover and diaphragm. Add DOT-4 brake fluid to the brake reservoir.

- \* When bleeding, be careful not to allow air in the brake reservoir flowing into the brake system.
- \* When using a brake bleeder, follow the manufacturer's instructions.
- \* Never use dirty or unspecified brake fluid or mix different brake fluids because it will damage the brake system.



### BRAKE FLUID BLEEDING

Keep the handlebar upright and remove the brake reservoir cover and diaphragm. Add the specified brake fluid to the upper limit.

- \* Do not allow dust or water to enter the brake system during refilling.
- \* When servicing the brake system, use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.

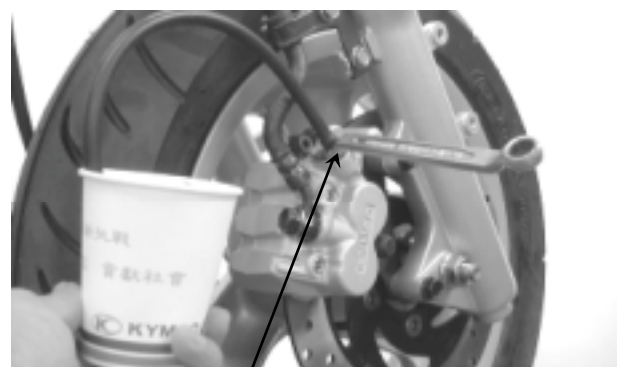


In order to avoid spilling brake fluid, connect a transparent hose to the bleed valve.

#### Warning

Brake fluid spilled on brake pads or brake disk will reduce the braking effect. Clean the brake pads and brake disk with a high quality brake degreaser.

Fully apply the brake lever and then loosen the brake caliper bleed valve to drain the brake fluid until there is no air bubbles in the brake fluid. Then, tighten the bleed valve. Repeat these steps until the brake system is free of air.



Bleed Valve

## 14. STEERING HANDLEBAR/FRONT WHEEL/FRONT BRAKE/FRONT SHOCK ABSORBER/FRONT FORK



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### BRAKE CALIPER

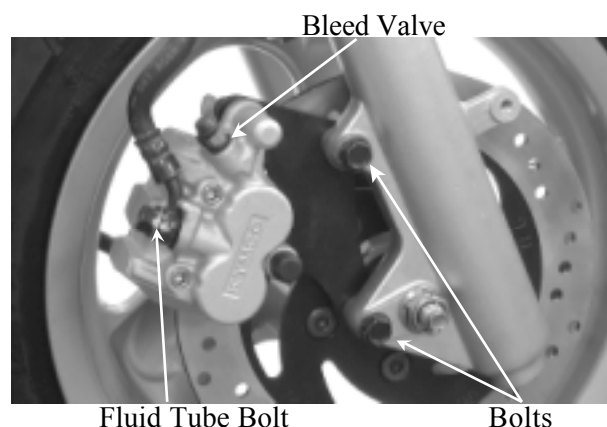
#### REMOVAL

First drain the brake fluid from the hydraulic brake system.

Remove the brake fluid tube bolt.

Remove the two bolts attaching the brake caliper.

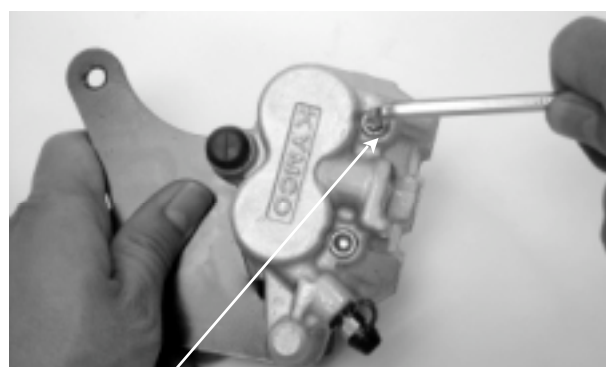
Remove the brake caliper.



#### DISASSEMBLY

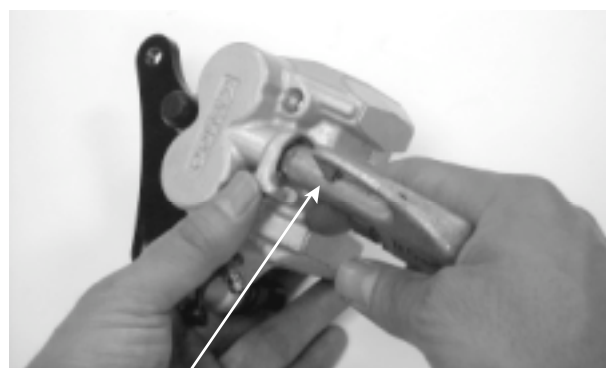
Remove the two brake pads dowel pins from the brake caliper.

Remove the brake pads.



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.

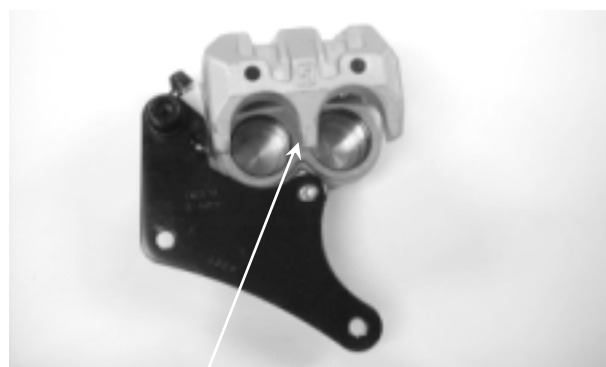
Check the piston cylinder for scratches or wear and replace if necessary.



Push the piston oil seal outward to remove it. Clean the oil seal groove with brake fluid.

\*

Be careful not to damage the piston surface.



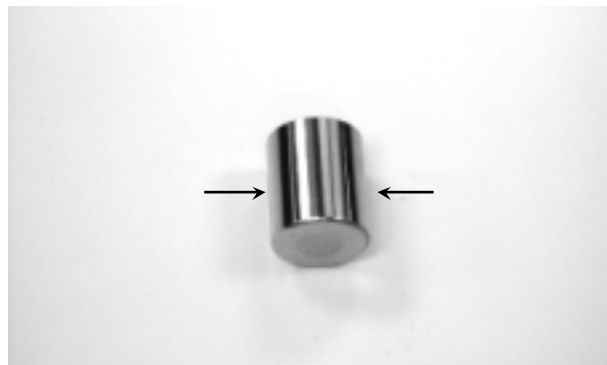
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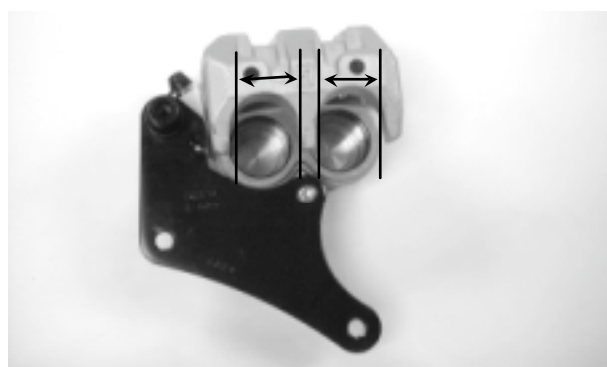
Check the piston for scratches or wear.  
Measure the piston O.D. with a micrometer gauge.

**Service Limit:** 25.30mm



Check the caliper cylinder for scratches or wear and measure the cylinder bore.

**Service Limit:** 25.45mm



### ASSEMBLY

Clean all removed parts.

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

Install the brake caliper piston with grooved side facing out.

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



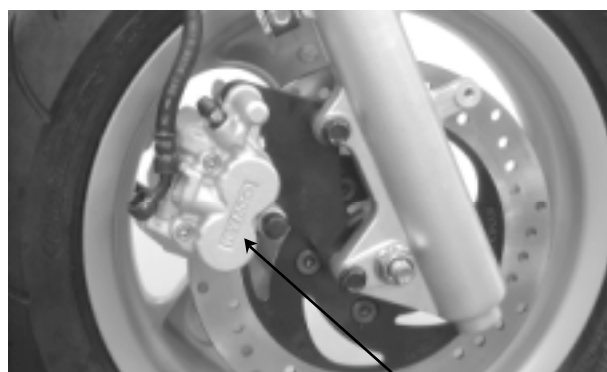
Wipe off excessive brake fluid with a clean shop towel. Apply silicon grease to the brake caliper seat pin and caliper inside. Install the brake caliper seat.

### INSTALLATION

Install the brake caliper to the shock absorber and tighten the two bolts.

**Torque:** 24.5\_ 34.3N-m

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



Brake Caliper

## 14. STEERING HANDLEBAR/FRONT WHEEL/FRONT BRAKE/FRONT SHOCK ABSORBER/FRONT FORK



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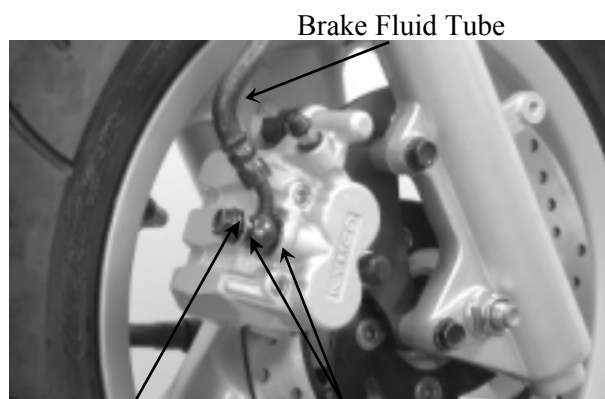
Connect the brake fluid tube to the brake caliper and tighten the fluid tube bolt.

**Torque:** 24.5\_ 34.3N-m

Fill the brake reservoir with the specified brake fluid and bleed air from the brake system. (⇒ 14-10)

\*

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



Fluid Tube Bolt

Washers

## FRONT SHOCK ABSORBER

### REMOVAL

Remove the front upper cover. (⇒2-5)

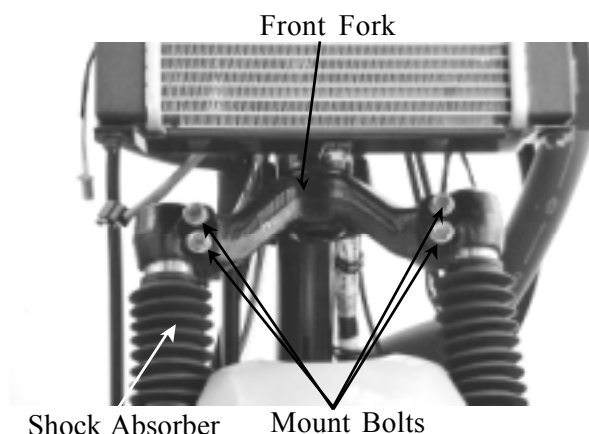
Remove the front lower cover. (⇒2-5)

Remove the front wheel. (⇒14-5)

Remove the front brake caliper. (⇒14-11)

Remove the front shock absorber upper mount bolts.

Loosen the lower mount bolts to remove the front shock absorbers.

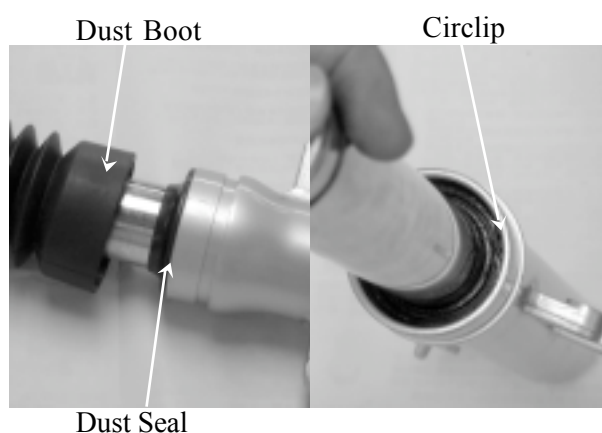


### DISASSEMBLY

Remove the dust boot.

Remove the dust seal.

Remove the circlip.



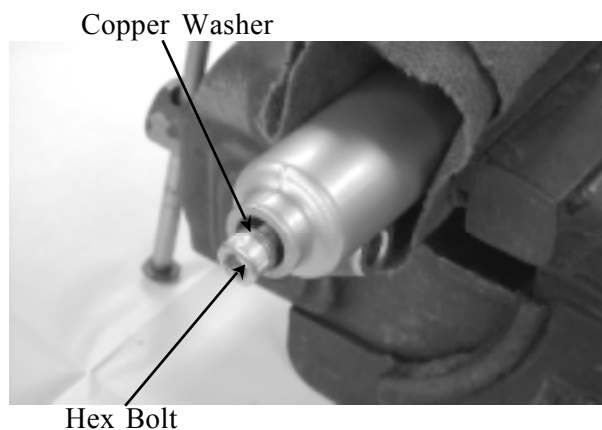
Set the front shock absorber in a vise.

Remove the damper rod hex bolt and copper washer.

Pull out the front shock absorber tube.

**\***

After the hex bolt is removed, place a container under the front shock absorber to drain the engine oil from it.



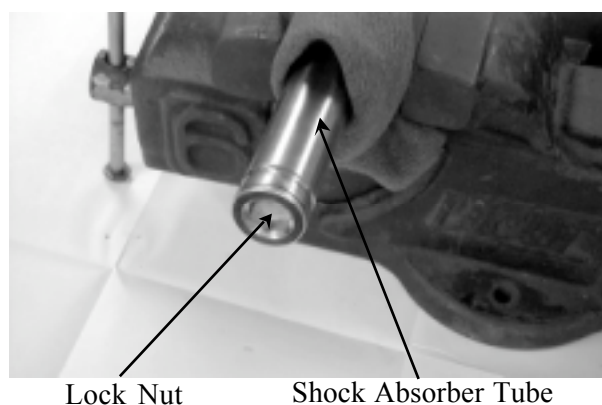
Set the front shock absorber tube in a vise.

Remove the lock nut on the front shock absorber tube.

Take out the shock absorber spring and damper rod.

**\***

When holding the shock absorber tube, place a shop towel to protect it and do not apply too much force.



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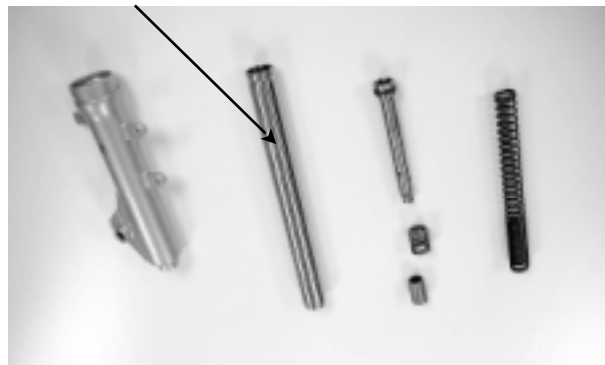
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### INSPECTION

Inspect the following items and replace if necessary.

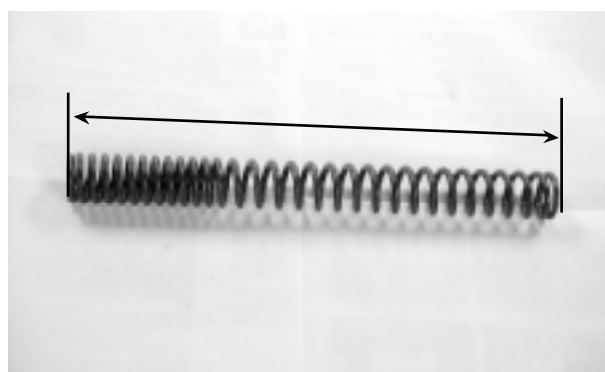
- Front shock absorber tube bending, damage or wear
- Weak front shock absorber spring
- Damper and damper rod bending
- Oil seal damage or wear

Shock Absorber Tube



Measure the front shock absorber spring free length.

**Service Limit:** 233mm replace if below



## 14. STEERING HANDLEBAR/FRONT WHEEL/FRONT BRAKE/FRONT SHOCK ABSORBER/FRONT FORK

### ASSEMBLY

Install the damper spring onto the damper rod and then install them into the front shock absorber tube.

Install the shock absorber spring onto the front shock absorber tube.

Set the front shock absorber tube in a vise and then tighten the lock nut.

\*

When holding the shock absorber tube, place a shop towel to protect it and do not apply too much force.



Set the front shock absorber in a vise.

Insert the shock absorber tube into the shock absorber and then install the copper washer and tighten the damper rod hex bolt.

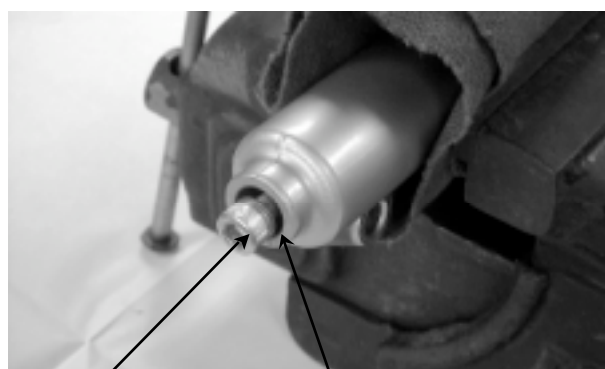
\*

Apply locking agent to the washer and hex bolt and install them together.

Add engine oil into the front shock absorber.

**Torque:** 4.9\_ 29.4N-m

**Specified Oil:** SAE30



Hex Bolt

Copper Washer

**Oil Capacity:** 81cc

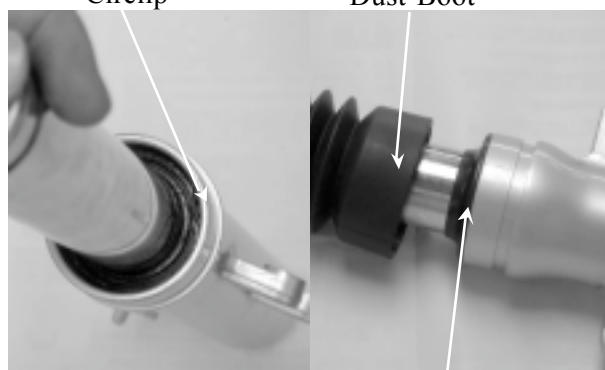
Install the oil seal

Install the circlip.

Install the dust seal and dust boot.

Circlip

Dust Boot



Dust Seal

### INSTALLATION

Install the front shock absorbers onto the front fork.

Install and tighten the front shock absorber upper mount bolts.

Tighten the lower mount bolts.

\*

Align the upper mount bolt hole with the groove on the front fork.

Install the front wheel. (⇒ 14-7)

### FRONT FORK

#### REMOVAL

Remove the handlebar covers. (⇒2-6)  
Remove the steering handlebar. (⇒14-4)  
Remove the front upper cover. (⇒2-5)  
Remove the front lower cover. (⇒2-5)  
Remove the front inner fender. (⇒2-6)  
Remove the front wheel. (⇒14-5)  
Remove the front brake caliper. (⇒14-11)  
Hold the steering stem top cone race and remove the steering stem lock nut.  
Remove the top cone race and remove the front fork.

- \* Be careful not to lose the steel balls (26 on top race and 19 on bottom race).

Inspect the ball races, cone races and steel balls for wear or damage. Replace if necessary.

#### BOTTOM CONE RACE REPLACEMENT

Remove the bottom cone race using a chisel.

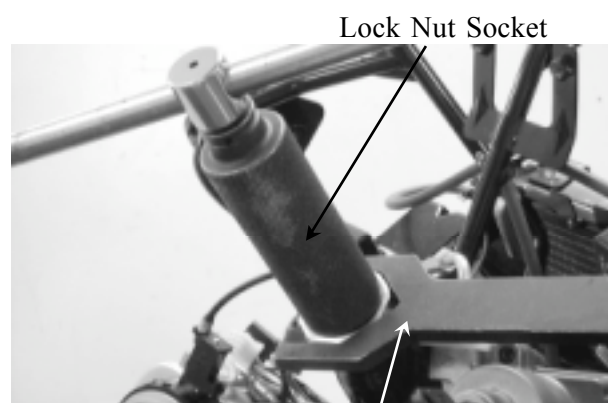
Drive a new bottom cone race into place with a proper driver.

- \* Be careful not to damage the steering stem and front fork.

#### BALL RACE REPLACEMENT

Drive out the ball races.  
Drive in new ball races.

- \* Be sure to drive the ball races into place completely.



Lock Nut Socket  
Lock Nut Wrench



Top Cone Race



Bottom Cone Race

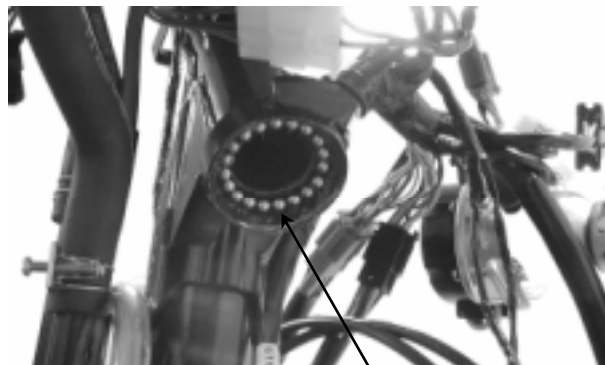


Top Ball Race

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### INSTALLATION

Apply grease to the top and bottom ball races and install 26 steel balls on the top ball race and 19 steel balls on the bottom ball race. Then, install the front fork.



Bottom Ball Race

Apply grease to the top cone race and install it.

Tighten the top cone race and then turn the steering stem right and left several times to make steel balls contact each other closely.

\*

Check that the steering stem rotates freely without vertical play.



Install the steering stem lock nut and tighten it while holding the top cone race.

**Torque:** 78.4\_ 117.6N-m

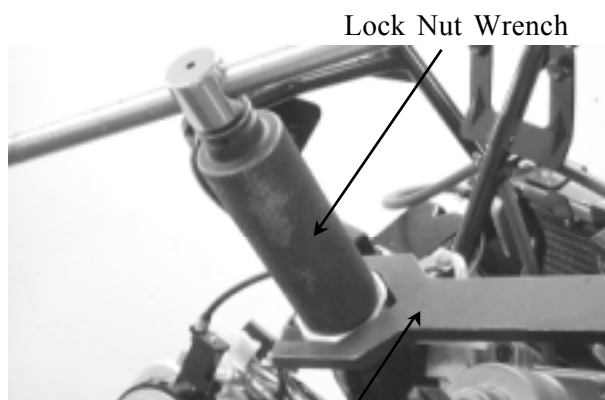
Install the front wheel. (⇒ 14-7)

Install the front brake caliper. (⇒ 14-12)

Install the front inner fender. (⇒ 2-6)

Install the throttle grip and the right and left handlebar switches. (⇒ 14-5)

Install the right and left brake master cylinders. (⇒ 14-5)



Lock Nut Wrench