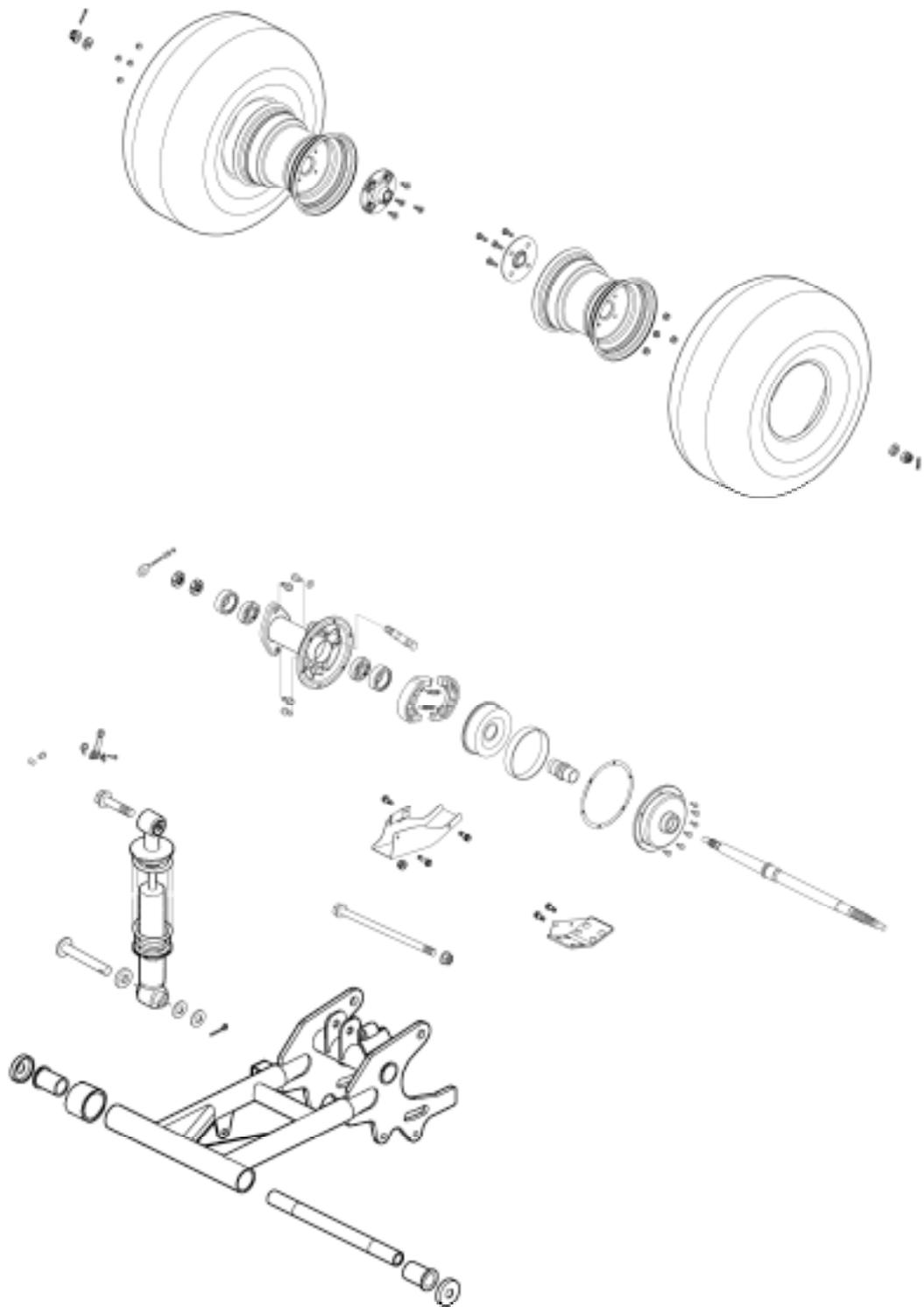

**REAR WHEEL/SWING ARM/
HYDRAULIC BRAKE**

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REAR WHEEL	13- 4
SWING ARM	13- 13
HYDRAULIC BRAKE	13- 17

13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- During servicing, keep oil or grease off the brake drum and brake linings.
- 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 motorcycle 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

Item		Standard (mm)	Service Limit (mm)
Rear wheel	Rim run out	Radial	□
		Axial	□
	Rear brake drum I.D.		130
Rear brake lining thickness		4.5	2.0

Item	Standard Limit (mm)	Service Limit (mm)
Brake disk thickness	3.7	3.0
Brake disk runout	0.15	0.3
Brake master cylinder I.D.	12.7_ 12.743	12.75
Brake master cylinder piston O.D.	12.657_ 12.684	12.64
Brake caliper piston I.D.	33.95_ 33.99	34.05
Brake caliper cylinder O.D.	33.88_ 33.92	33.85

TORQUE VALUES

Rear wheel nut	6.0_ 8.0kgf-m
Rear shock absorber upper mount bolt	3.5_ 4.5kgf-m
Rear swing arm axle	6.0_ 8.0kgf-m
Rear wheel hub nut	6.0_ 8.0kgf-m
Rear wheel shaft nut	11.0_ 13.0kgf-m
Brake arm bolt	1.8_ 2.5kgf-m
Caliper holder bolt	2.4_ 3.0kgf-m
Brake fluid tube bolt	2.5_ 3.5kgf-m
Caliper bleed valve	0.4_ 0.7kgf-m
Master cylinder bolt	1.0_ 1.4kgf-m

13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

SPECIAL TOOLS

Nut wrench F010

TROUBLESHOOTING

Rear wheel wobbling

- Bent rim
- Faulty tire
- Axle not tightened properly

Soft rear shock absorber

- Weak shock absorber spring
- Faulty damper

Loose brake lever

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

Hard braking

- Seized hydraulic brake system
- Seized piston

Brake noise

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

Poor brake performance (Disk Brake)

- 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

Poor brake performance

- Brake not adjusted properly
- Worn brake linings
- Worn brake shoes at cam contacting area
- Worn brake cam
- Worn brake drum

Tight brake lever

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

Poor brake performance

Contaminated brake pad surface

13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

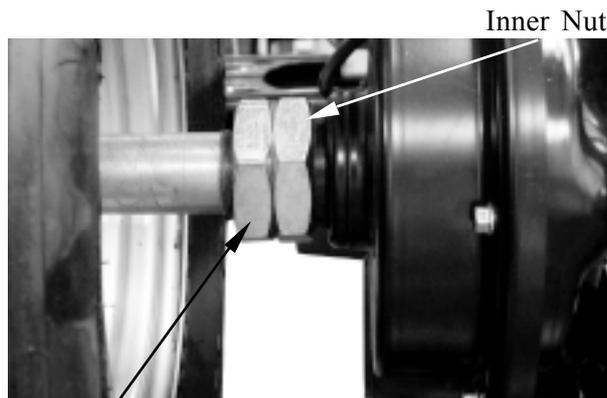
REAR WHEEL

REMOVAL

Place the machine on a level place.
Use the nut wrench to loosen two nuts
(inner and outer) of the rear axle.

Special

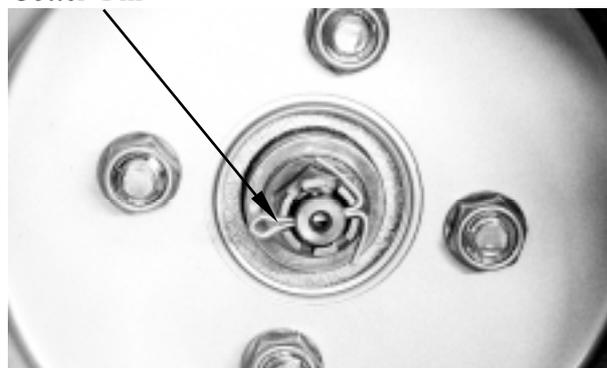
Nut wrench F010



Outer Nut

Cotter Pin

Remove the cotter pin.

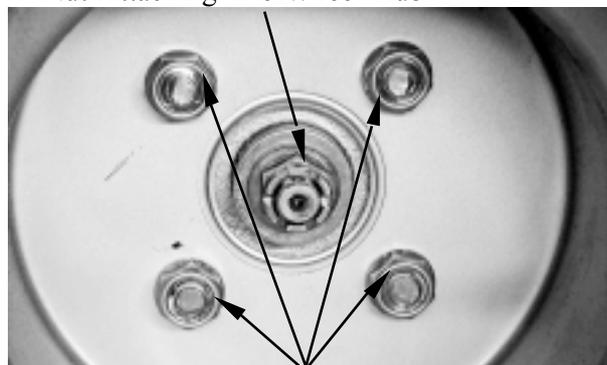


Remove four nuts attaching the wheel panel
of the both rear wheels.
Loosen nut attaching the wheel hub of the
both rear wheels.



Elevate the rear wheels by placing a
suitable stand under the rear of frame.
Support the machine securely so there is
no danger of it falling over.

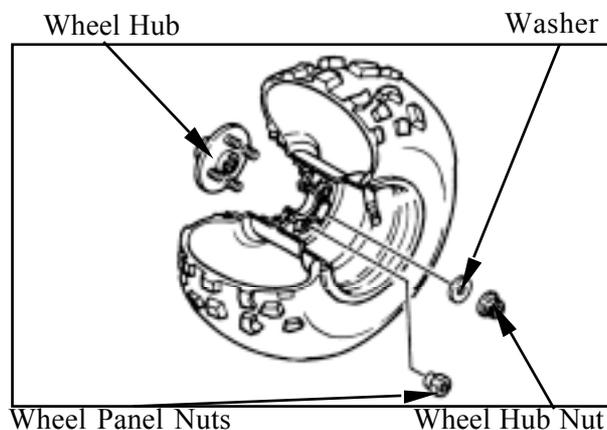
Nut Attaching The Wheel Hub



Nuts Attaching The Wheel Panel

Remove

Remove four nuts attaching the wheel panel
and rear wheel.
Remove nut attaching the wheel hub and
washer.
Remove the wheel hub.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

Inspection

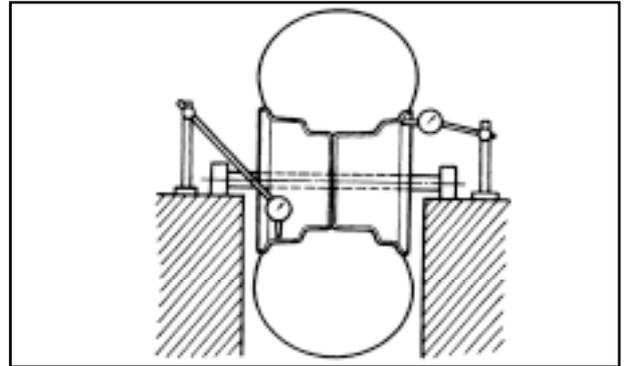
Measure the wheel runout.

Service Limit:

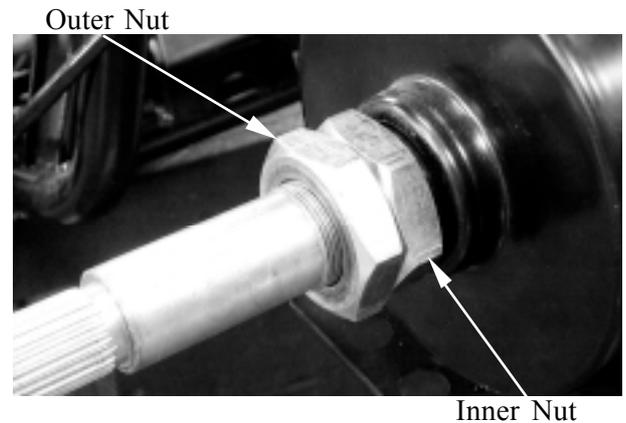
Vertical: 2.0 mm

Lateral: 2.0mm

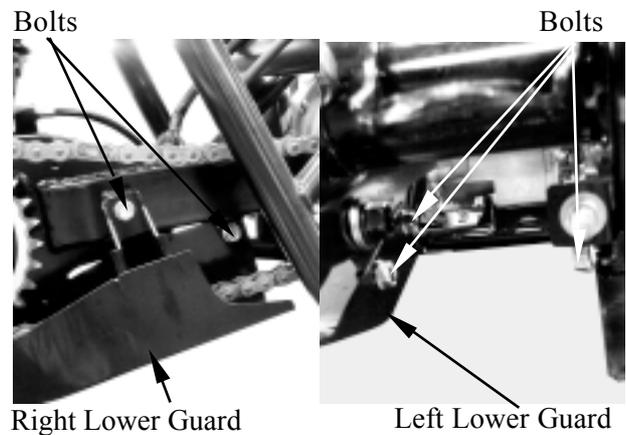
Replace wheel or check bearing play if out of specification.



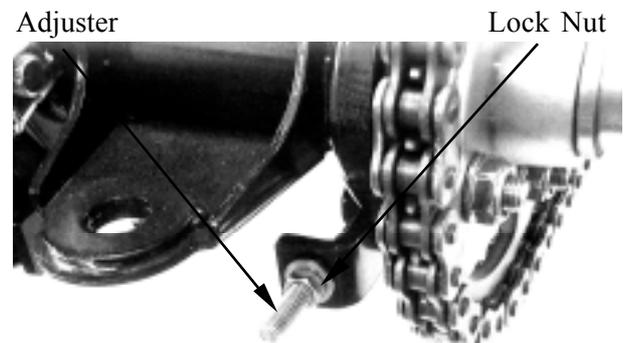
Remove two nuts of the rear axle (outer and inner).



Remove five bolts attaching left and right lower guard.

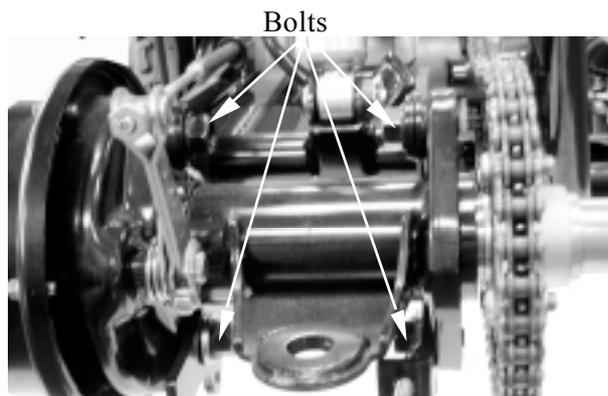


Loosen the lock nut for the adjuster of the drive chain slack.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

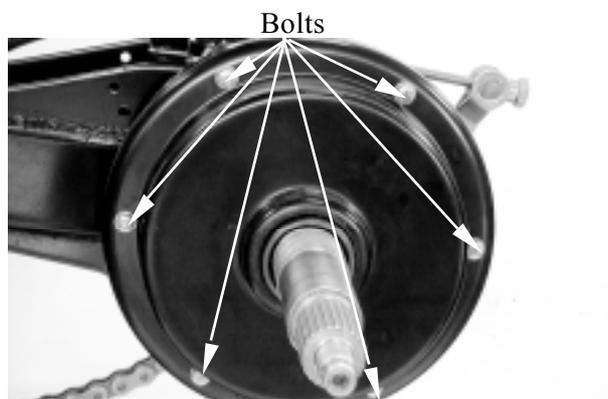
Loosen four bolts attaching rear axle hub.



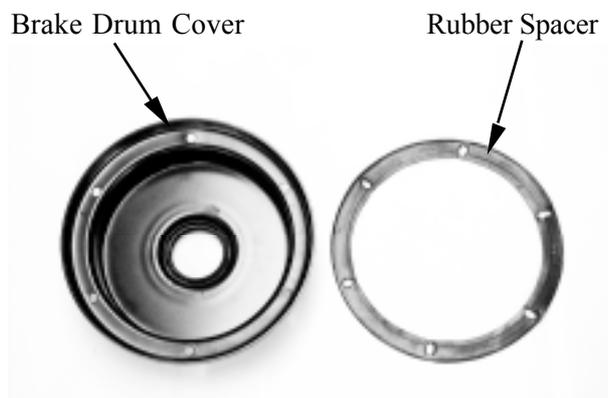
Remove the drive chain from driven sprocket.



Remove six bolts attaching brake drum cover.



Remove brake drum cover and rubber spacer.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

Inspection

Inspect the inner surface of the brake drum is scratches, polish brake drum lightly and evenly with emery cloth.

Measure the inside diameter of the brake drum.

Service limit: 131mm

Replace if it is out of specification.



Disconnect the rear brake cable from the camshaft lever.

Brake Cable



Remove the brake shoes.

INSPECTION

Measure lining thickness of the brake shoes.

Service limit: 2.0 mm

Replace if it is out of specification.

Brake Shoes



Remove the rear axle from left side.



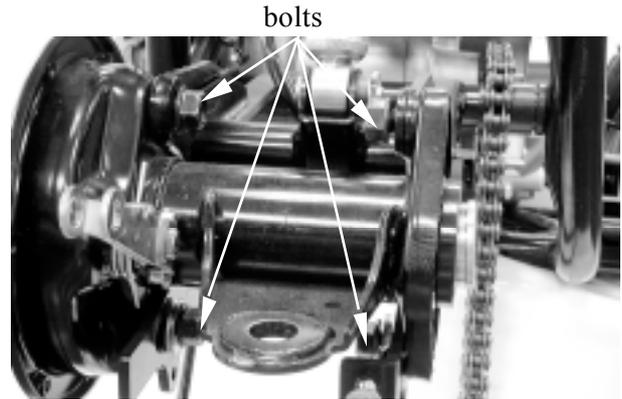
Tap the axle and with a rubber hammer, this will avoid damage the axle thread.

Rear Axle



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

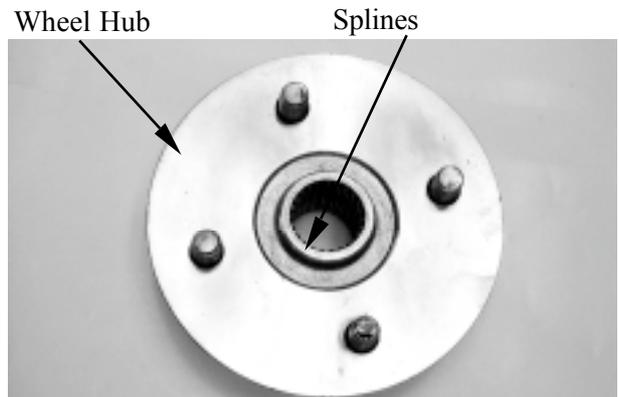
Remove four bolts and the rear axle hub.



INSPECTION

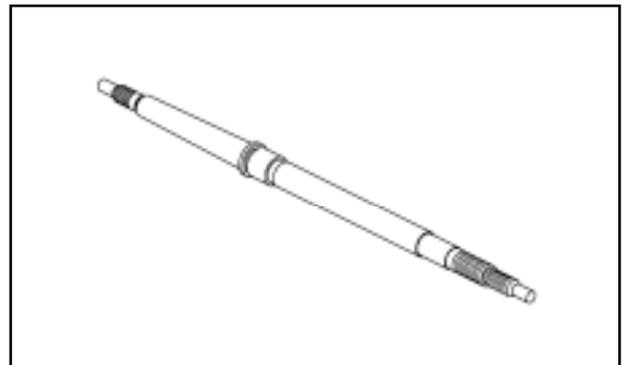
Replace if the wheel hub is cracked or damaged.

Replace if splines of the wheel hub is wear or damaged.



Replace if the rear axle is scratched (excessively) or damaged.

Replace if splines and threads of the rear axle is wear or damaged.

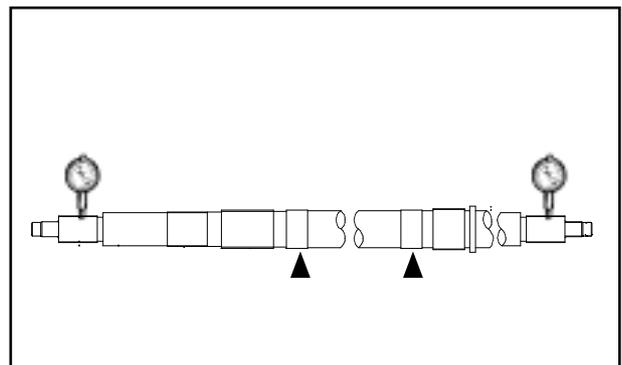


Measure the rear axle run out.

Service limit: less than 1.5mm

Replace if it is out of specification.

Do not attempt to straighten a bent axle.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

DRIVE CHAIN INSPECTION

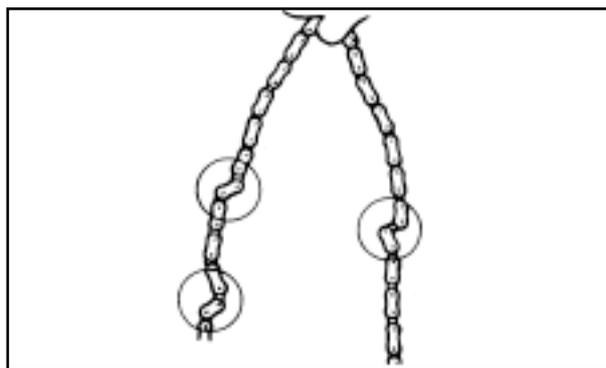
Remove rear wheels, rear hub (with rear axle) and swing arm.

Refer to the "REAR WHEEL°- REMOVAL" and "SWING ARM REMOVAL" section.

Remove right foot board.

Remove the drive sprocket.

Remove the drive chain.

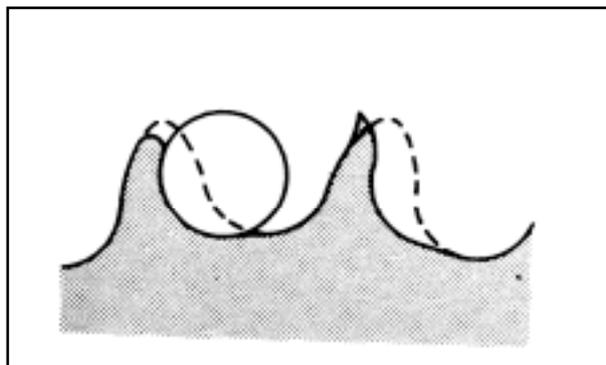


Inspect the drive chain stiffness.

Clean and lubricate or replace if stiff.

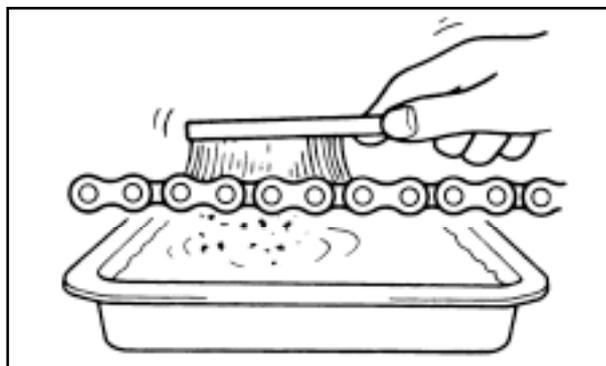
Inspect the drive sprocket and the driven sprocket.

Replace sprocket if more than 1/4 teeth wear or bent teeth.



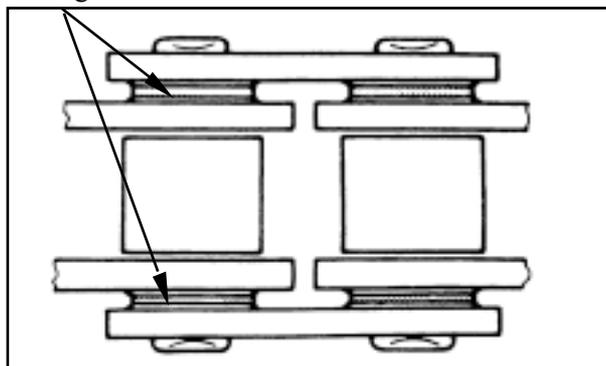
CLEAN

Place it in kerosene, and brush off as much dirt as possible. Then remove the chain from the kerosene and dry the chain.



This machine has a drive chain with small rubber O-rings between the chain plates. Steam cleaning, high-pressure washes, and certain solvent can damage these O-rings. Use only kerosene to clean the drive chain.

O-ring



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

Inspect rear axle hub.

Replace if bearings allow play in the axle hub or the bearing turns roughly.

Replace if oil seals is wear or damage.

Replace if rear axle hub is cracks, bend or damage.

Bearing and oil seal replacement steps:

Clean the outside of the rear axle.

Remove the oil seal by a flat-head screw driver.



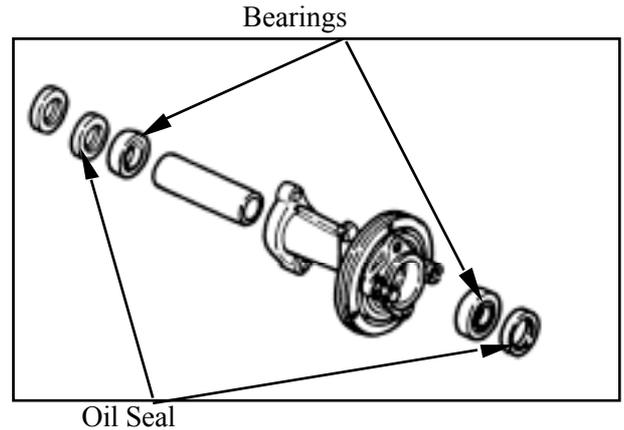
Place a wood block against the outer edge to protect this edge.

Remove the bearing by a general bearing puller.

Install the new bearings and oils seal by reversing the previous steps.



Do not strike the center race or balls of the bearing.
Contact should be made only with the outer race.



INSTALLATION

Reverse the "REMOVAL" procedures.

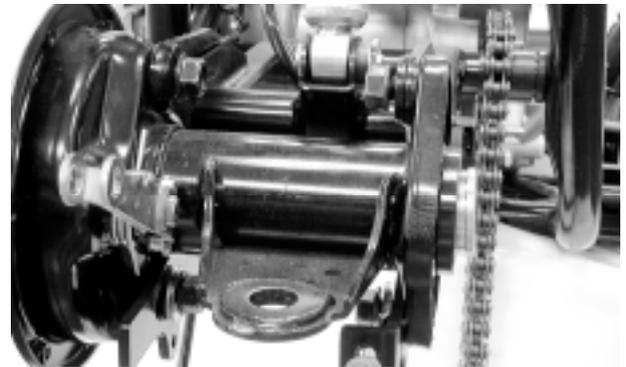


Apply grease onto the oil seal lips, bearings and bushes.

Install the rear axle hub.



At this time, the rear axle hub should not be tightened completely.
Final tightening is done after the chain slack adjustment.



Install the rear axle.



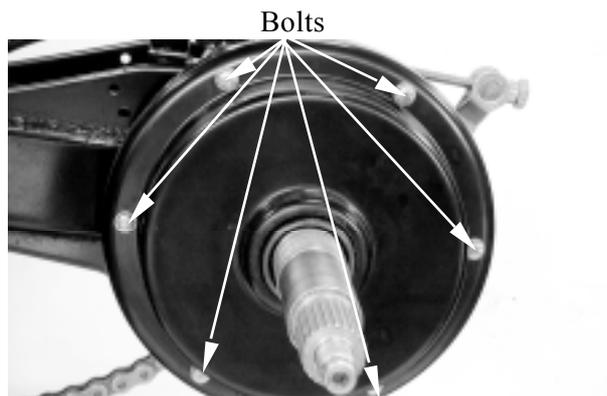
Tap the axle and with a rubber hammer, this will avoid damage the axle thread.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

Install the brake drum.
Install the rubber spacer and brake drum cover.

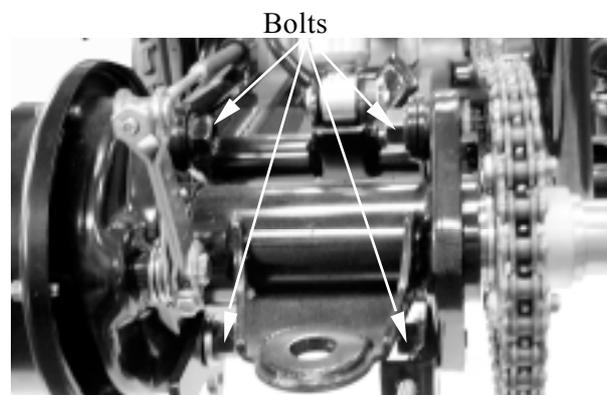
Torque: 0.8_ 1.2kgf-m



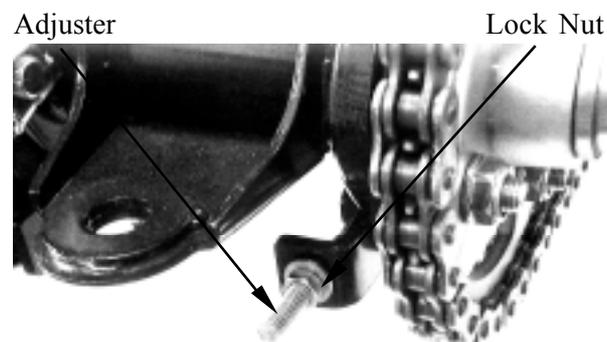
Adjust drive chain slack.
Approximately: 30 mm



Tighten the bolts.
Torque: 6.0_ 8.0kgf-m
Torque: 6.0_ 8.0kgf-m



Tighten the lock nut.
Torque: 1.8_ 2.5kgf-m



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

Tighten the two nuts with the nut wrench.

Special

Nut wrench F010

Torque: 11.0_ 13.0kgf-m



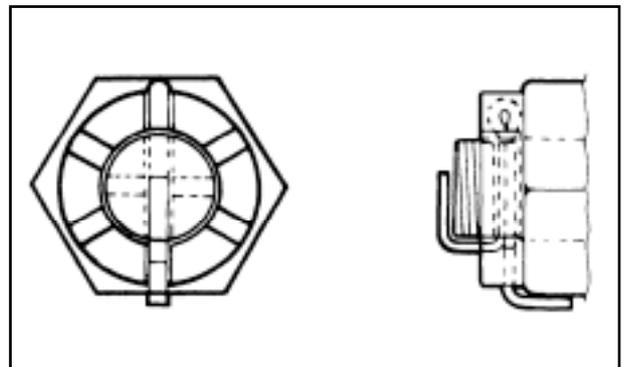
Install wheel hub, plate washer and nut (wheel hub).

Torque: 6.0_ 8.0kgf-m

Install cotter pins.



Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening it on the axle nut.



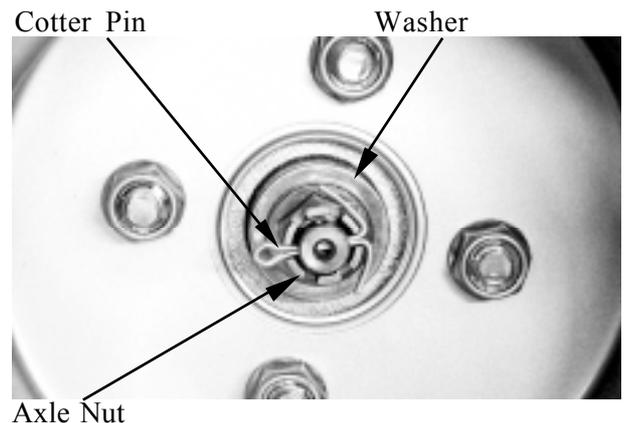
Always use a new cotter pin.

Install the rear wheel and tighten the nuts (wheel).

Torque: 6.0_ 8.0kgf-m



Tapered wheel nuts are used for rear wheels. Install the nuts with its tapered side towards the wheel.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

SWING ARM

Place the machine on a level place.

Elevate the rear wheels by placing a suitable stand under the rear of frame.

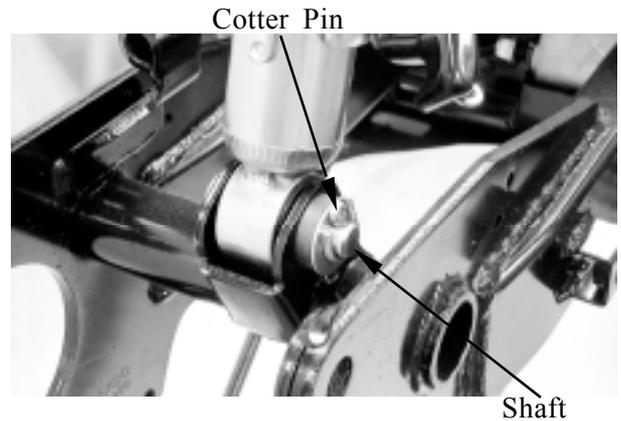
- Support the machine securely so there is no danger of it falling over.

Remove the rear wheels, rear hub with rear axle.

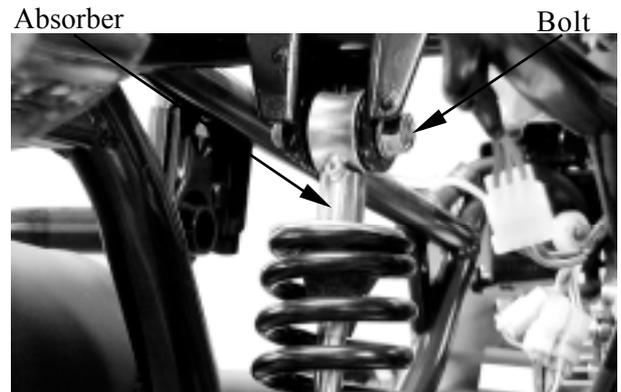
Refer to the "REAR WHEEL - REMOVAL" section

Remove the cotter pin, washer and shaft.

- When removing the lower shaft, hold the swing arm so that it does not drop downwards when the shaft is removed.

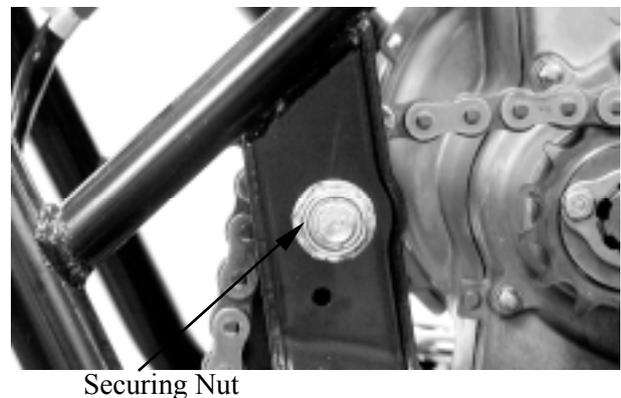


Remove the bolt, then remove the shock absorber.



Check the tightening torque of the pivot shaft (swingarm) securing nut.

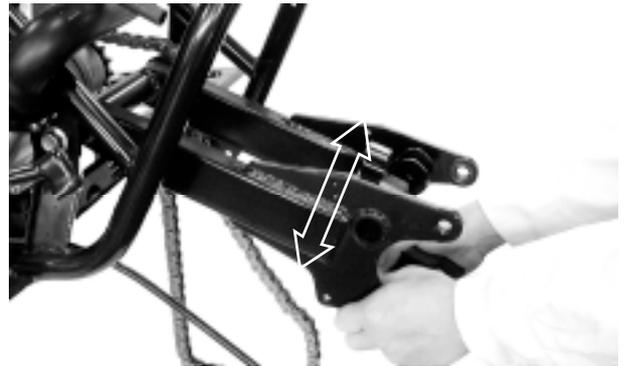
Torque: 6.0_ 8.0kgf-m



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

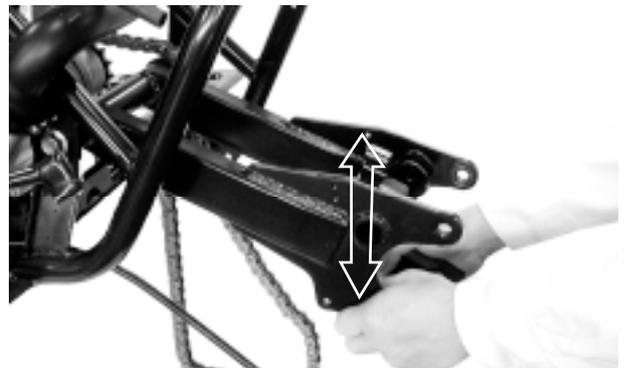
Check the swing arm side play by moving it from side to side.

If side play noticeable, check the inner collar, bearing, bushing and thrust cover, or adjust the shim.



Check the swing arm vertical movement by moving it up and down.

If vertical movement is tight, binding or rough, check the inner collar, bearing, bushing and thrust cover, or adjust the shim.

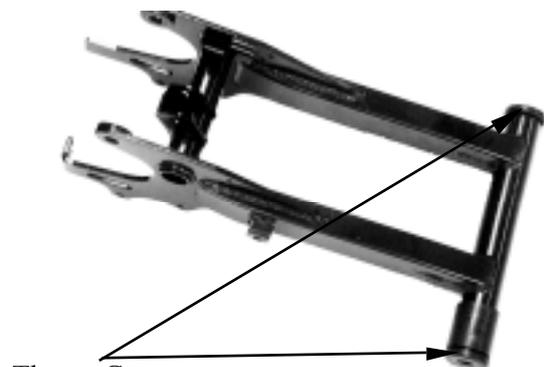


Remove the nut and pivot shaft, then remove swing arm.



Swing arm

Remove the thrust covers.

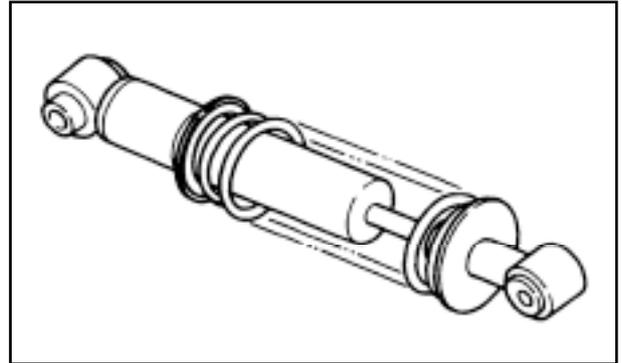


Thrust Covers

13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

INSPECTION

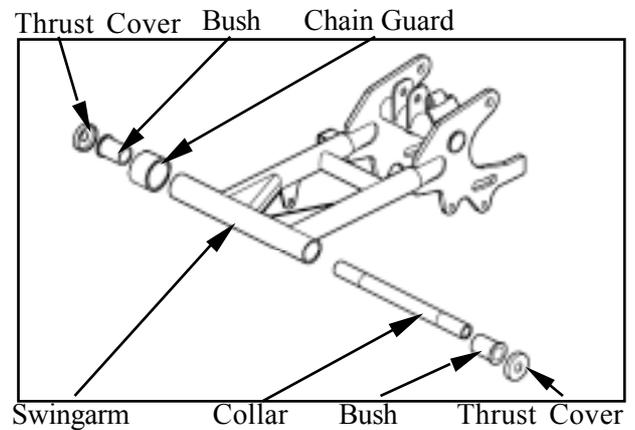
Inspect the shock absorber rod.
Replace the shock absorber assembly if bends or damage.
Inspect the shock absorber.
Replace the shock absorber assembly if oil leaks
Inspect the spring.
Replace the shock absorber assembly if fatigue.
Move the spring up and down.



Inspect the swing arm.
Replace if crack, bend or damage.
Roll the axle on a flat surface to inspect the pivot shaft.
Replace if bends.

ⓘ Do not attempt to straighten a bent axle.

Inspect the thrust cover, chain guard, collar and bush.
Replace if wear or damage.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

INSTALLATION

Reverse the "REMOVAL" procedure.
Apply grease onto the collar, bush, pivot shaft and thrust cover.
Install the swing arm and tightening the nut.
Torque: 6.0_ 8.0kgf-m

Pivot Shaft



Install the shock absorber and tightening the bolt.
Torque: 3.5_ 4.5kgf-m



Install the shaft, washer and cotter pin.



Always use a new cotter pin.



Install the rear hub and rear wheels.
Refer to the "REAR WHEEL
INSTALLATION" section.

Adjust the drive chain slack.
Refer to the "DRIVE CHAIN SLACK
ADJUSTMENT" section in the CHAPTER
3.

Approximately: 30 mm

HYDRAULIC BRAKE

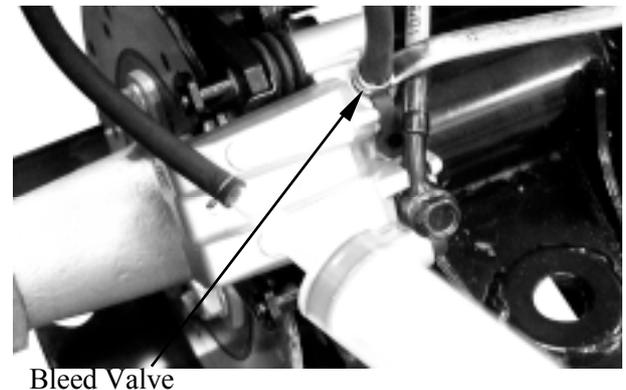
BRAKE FLUID CHANGE/AIR BLEED

Place the motorcycle on its main stand on 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.



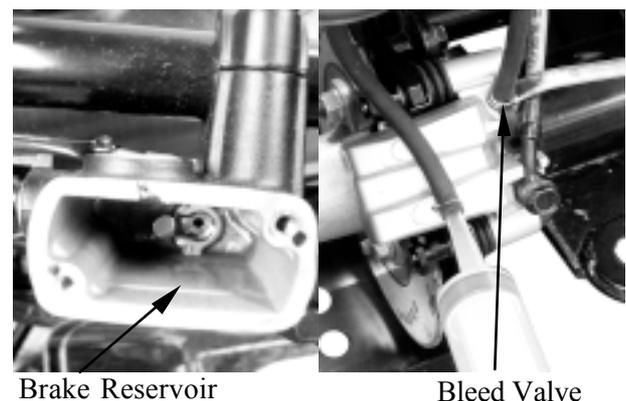
BRAKE FLUID REFILLING

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: 0.4_ 0.7kg-m

*

- 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

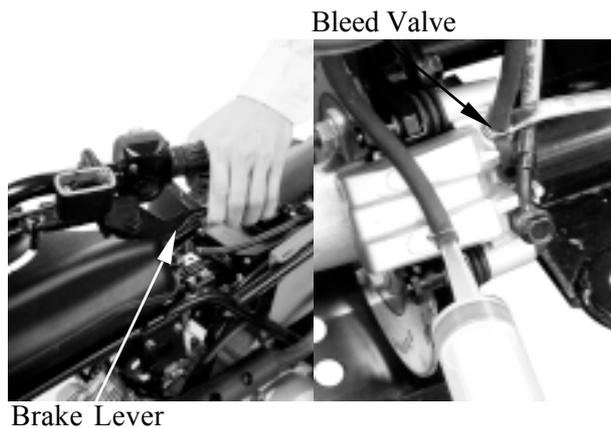
13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

HYDRAULIC BRAKE

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.

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

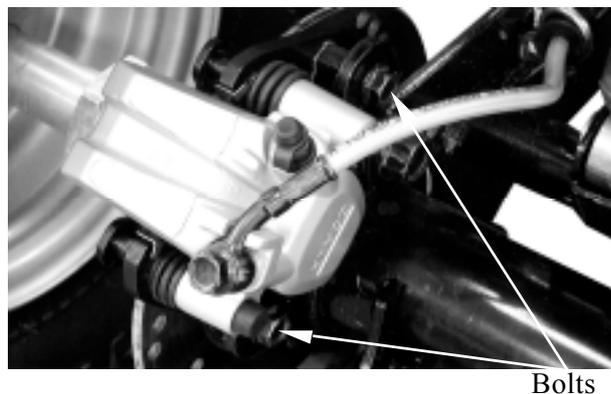


BRAKE PAD/DISK

BRAKE PAD REPLACEMENT

Remove the two bolts attaching the brake caliper holder.

- * The brake pads can be replaced without removing the brake fluid tube.

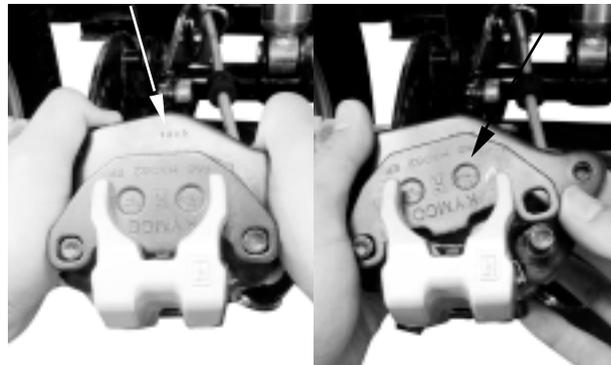


Remove the brake caliper.

Brake Caliper Holder

Brake Pad

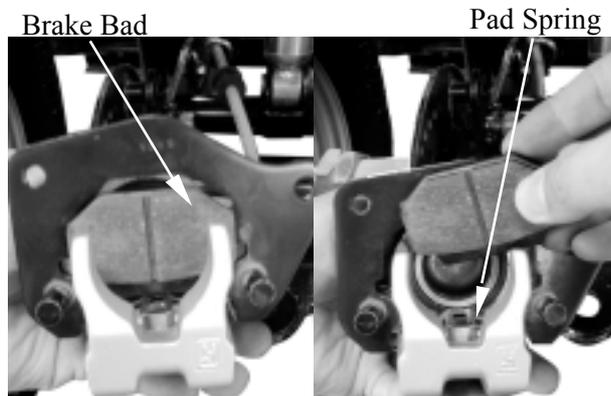
Push the brake caliper holder and then remove brake pad.



Remove the other brake pad and pad springs.

ASSEMBLY

Assemble the brake pads in the reverse order of removal.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

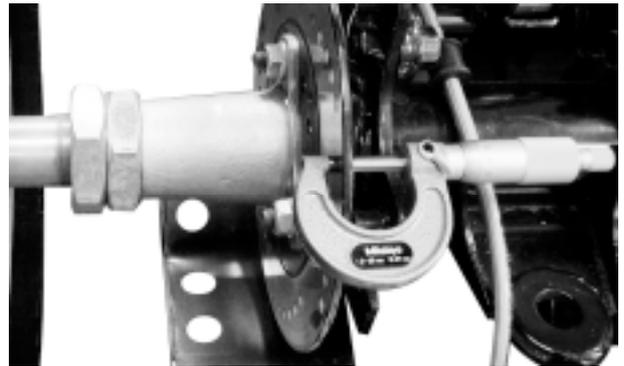
BRAKE DISK

Measure the brake disk thickness.

Service Limit: 3.0mm

Measure the brake disk run out.

Service Limit: 0.3mm



BRAKE MASTER CYLINDER

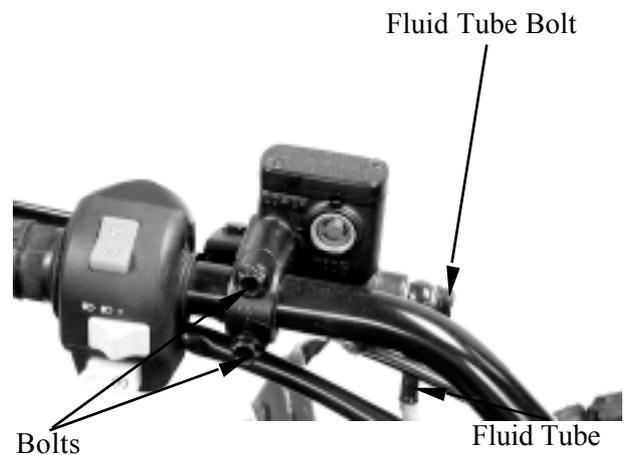
REMOVAL

Drain the brake fluid from the hydraulic brake system.

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

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

- * 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.



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

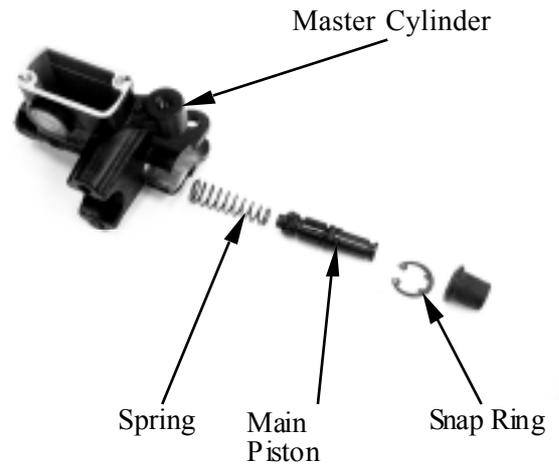
DISASSEMBLY

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



Snap Ring Pliers

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

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

Service Limit: 12.75mm replace if over



Measure the brake master cylinder piston O.D.

Service Limit: 12.64mm replace if below



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

ASSEMBLY

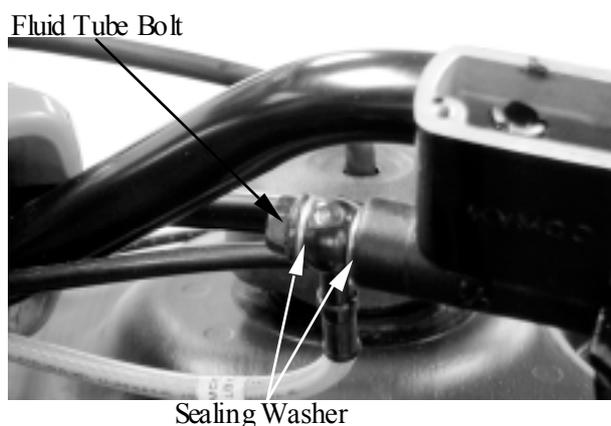
Before assembly, apply brake fluid to all removed parts.

Install the spring together with the 1st rubber cup.

- * During assembly, the master cylinder, 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 main piston and snap ring.
Install the rubber cover.
Install the brake lever.
Install the brake fluid tube with the bolt and two sealing washers. Then, install the rearview mirror.
Fill the brake reservoir with recommended brake fluid to the upper level.
Bleed air from the hydraulic brake system.
(Refer to 13-17.)



Place the brake master cylinder on the handlebar and install the master cylinder holder with the "UP" mark facing up, aligning the tab on the holder with the hole in the handlebar.
First tighten the upper bolt and then tighten the lower bolt.

Torque: 1.0_ 1.4kg-m



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

BRAKE CALIPER

REMOVAL

Remove the brake caliper, brake pads and pad spring.

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

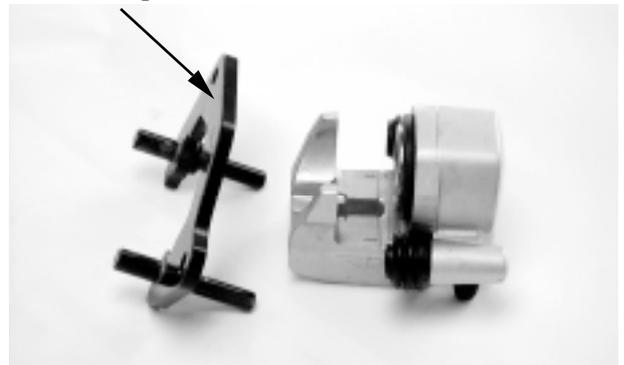
* Be careful not to splash brake fluid on any coated surfaces.



DISASSEMBLY

Remove the brake caliper holder from the brake caliper.

Brake Caliper Holder



Remove the pistons from the brake caliper. Use compressed air to press out the pistons through the brake fluid inlet opening and place a shop towel under the caliper to avoid contamination caused by the removed pistons.



Push the piston oil seals inward to remove them. Clean each oil seal groove with brake fluid.

* Be careful not to damage the piston surface.

Piston Oil Seals



13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

INSPECTION

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

Service limit: 33.85mm replace if below



Check the caliper cylinder for scratches or wear and measure the caliper cylinder I.D.

Service limit: 34.05mm replace if over



ASSEMBLY

Clean all removed parts.
Apply silicon grease to the pistons and oil seals. Lubricate the brake caliper cylinder inside wall with brake fluid.
Install the oil seals and then install the brake caliper pistons with the 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 holder pin and caliper inside.
Install the brake caliper holder.

13. REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

INSTALLATION

Connect the brake fluid tube to the brake caliper, aligning the fluid tube with groove in the caliper and tighten the fluid tube bolt.

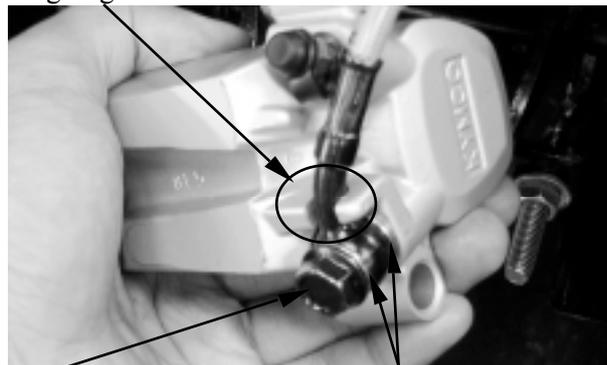
Torque: 2.8_ 3.5kg-m

Add the recommended brake fluid into the brake reservoir and bleed air from the brake system. (Refer to 13-17.)

Install the brake caliper onto rear axle hub and tighten the bolts.

Torque: 2.4_ 3.0kg-m

Aligning The Fluid Tube With Groove



Fluid Tube Bolt

Washer

