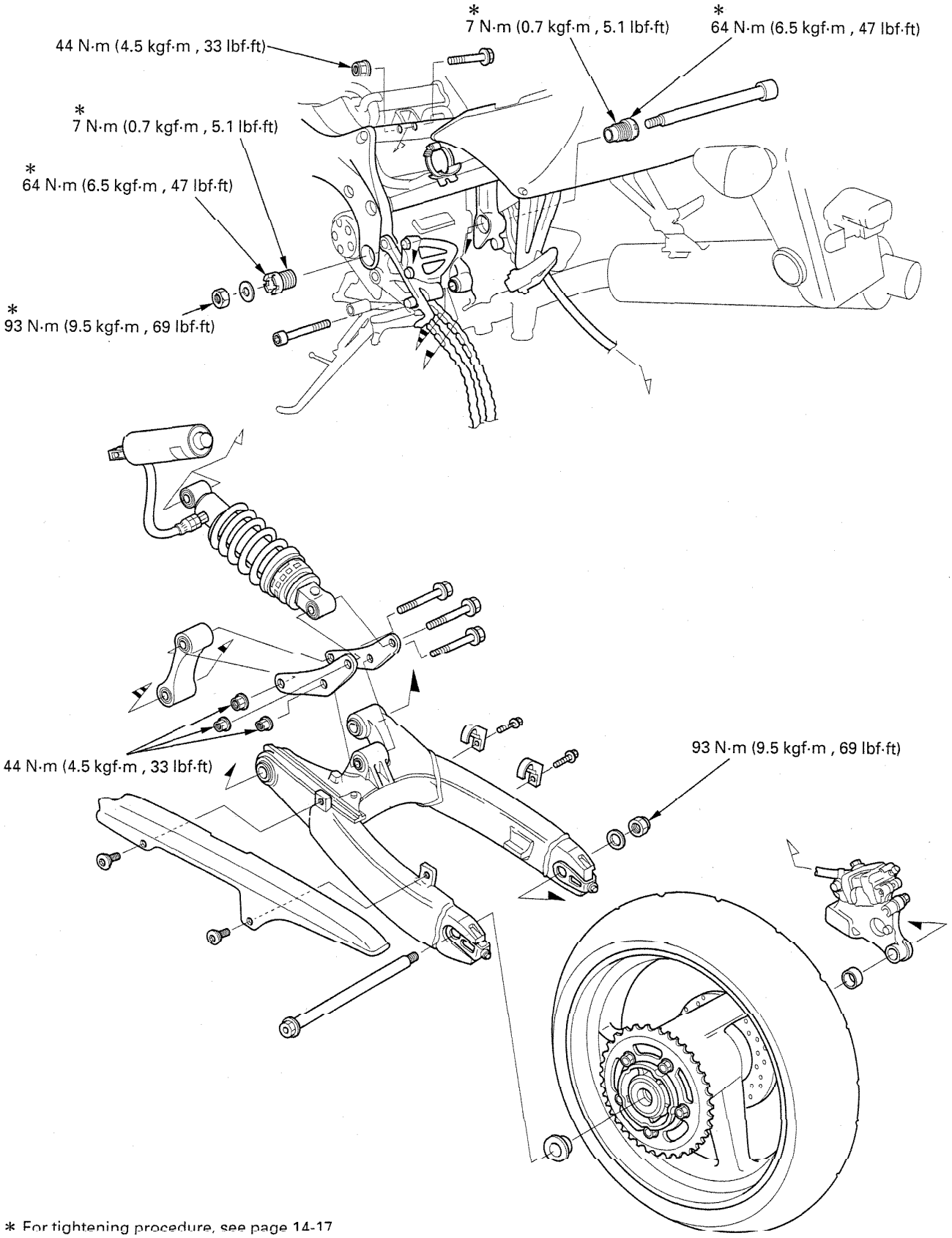


* For tightening procedure, see page 14-17

14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-9
TROUBLESHOOTING	14-2	SUSPENSION LINKAGE	14-11
REAR WHEEL	14-3	SWINGARM	14-13

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***Riding on damaged rims impairs safe operation of the vehicle.***
- ***A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.***
- ***The shock absorber contains nitrogen gas under high pressure. Do not allow fire or heat near the shock absorber.***
- ***Before disposal of the shock absorber, release the nitrogen.***
- ***The damper unit is filled with nitrogen gas under high pressure, do not try to disassemble.***

- A hoist or equivalent is required to support the motorcycle when servicing the rear wheel and suspension.
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- When using the lock nut wrench for the adjusting bolt lock nut, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.
- When installing the swingarm, be sure to tighten the swingarm pivot fasteners to the specified torque in the specified sequence. If you mistake the tightening torque or sequence, loosen all pivot fasteners, then tighten them again to the specified torque in the correct sequence.
- Refer to section 15 for brake system service.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		————	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lbs) load	290 kPa (2.90 kgf/cm², 42 psi)	————
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm², 42 psi)	————
Axle runout		————	0.2 (0.01)
Wheel rim runout	Radial	————	2.0 (0.08)
	Axial	————	2.0 (0.08)
Wheel balance weight		————	60 g (2.1 oz)max.
Drive chain slack		25—35 (1—1 3/8)	————

TORQUE VALUES

Rear brake disc bolt	42 N·m (4.3 kgf·m , 31 lbf·ft)	ALOC bolt: replace with a new one
Final driven sprocket nut	88 N·m (9.0 kgf·m , 65 lbf·ft)	U-nut
Rear axle nut	93 N·m (9.5 kgf·m , 69 lbf·ft)	U-nut
Shock absorber mounting nut	44 N·m (4.5 kgf·m , 33 lbf·ft)	U-nut
Shock arm-to-swingarm nut	44 N·m (4.5 kgf·m , 33 lbf·ft)	U-nut
Shock arm-to-shock link nut	44 N·m (4.5 kgf·m , 33 lbf·ft)	U-nut
Shock link-to-bracket nut	44 N·m (4.5 kgf·m , 33 lbf·ft)	U-nut
Drive chain slider bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	ALOC bolt: replace with a new one
Swingarm pivot adjusting bolt	7 N·m (0.7 kgf·m , 5.1 lbf·ft)	page 14-17
Swingarm pivot lock nut	64 N·m (6.5 kgf·m , 47 lbf·ft)	
Swingarm pivot nut	93 N·m (9.5 kgf·m , 69 lbf·ft)	U-nut

TOOLS

Bearing remover shaft	07746-0050100	┐ or equivalent commercially available in U.S.A.
Bearing remover head, 20 mm	07746-0050600	┘
Driver	07749-0010000	
Attachment, 22 × 24 mm	07746-0010800	
Attachment, 28 × 30 mm	07946-1870100	
Attachment, 32 × 35 mm	07746-0010100	
Attachment, 37 × 40 mm	07746-0010200	
Attachment, 42 × 47 mm	07746-0010300	
Attachment, 52 × 55 mm	07746-0010400	
Pilot, 17 mm	07746-0040400	
Pilot, 20 mm	07746-0040500	
Pilot, 28 mm	07746-0041100	
Driver attachment handle	07949-3710001	
Bearing remover set	07LMC-KV30100	
Lock nut wrench	07908-4690003 or 07908-4690002	
Driver shaft	07946-MJ00100	
Driver head	07946-MJ00200	
Needle bearing remover	07HMC-MR70100	

TROUBLESHOOTING

Soft suspension
- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

Hard suspension
- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Incorrect swingarm pivot fasteners tightening
- Tire pressure too high

Rear wheel wobbling
- Bent rim
- Worn or damaged rear wheel bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

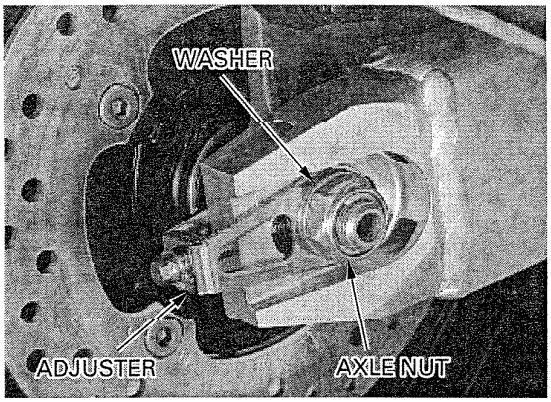
Rear wheel turns hard
- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

Rear suspension noise
- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

REAR WHEEL

REMOVAL

Raise the rear wheel off the ground and support the motorcycle securely with a hoist or equivalent.
Loosen the drive chain adjusters and rear axle nut.
Remove the axle nut and washer.

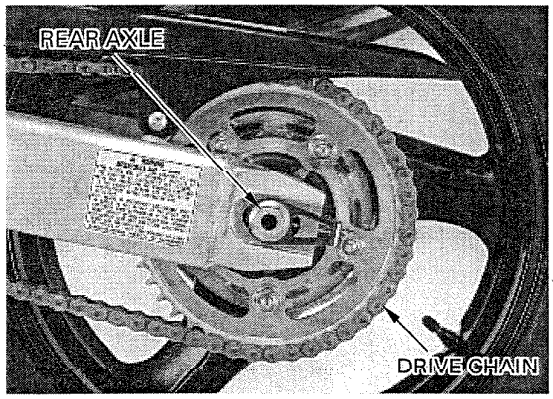


Push the rear wheel forward and derail the drive chain from the final driven sprocket.

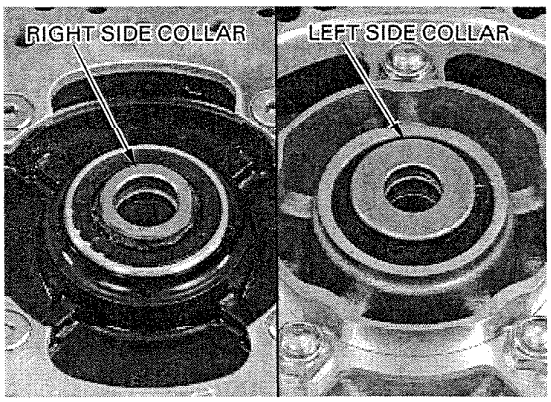
Remove the rear axle and the rear wheel.

NOTE:

Do not operate the brake pedal after removing the rear wheel.



Remove the side collars.

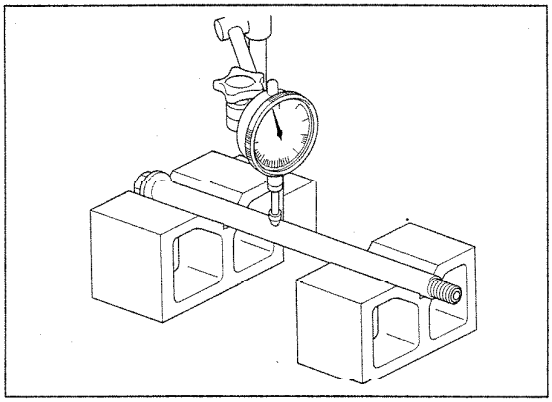


INSPECTION

AXLE

Place the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

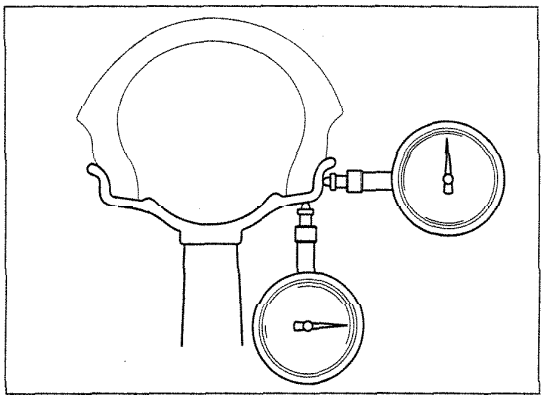
SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL

Check the rim runout by placing the wheel in a truing stand. Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS: RADIAL: 2.0 mm (0.08 in)
AXIAL: 2.0 mm (0.08 in)

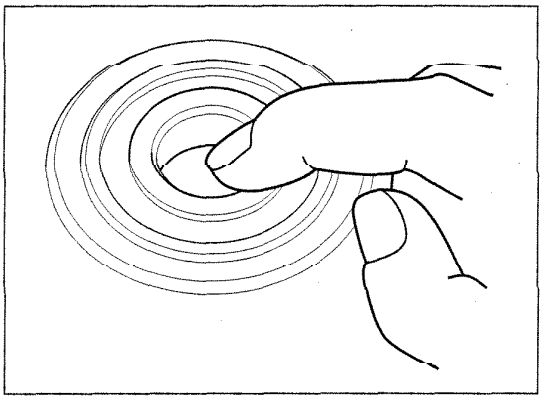


WHEEL BEARING

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Replace the wheel bearings in pairs.

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

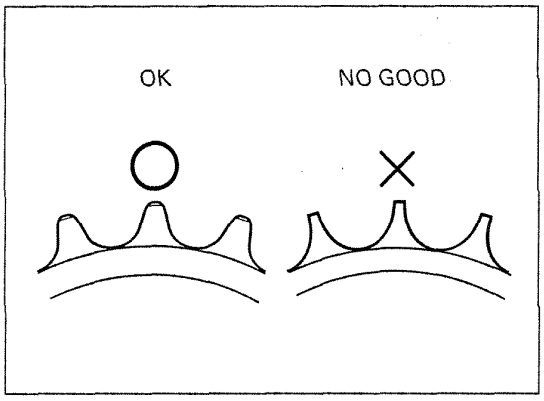


DRIVEN SPROCKET

Check the condition of the driven sprocket teeth. Replace the sprocket if worn or damaged.

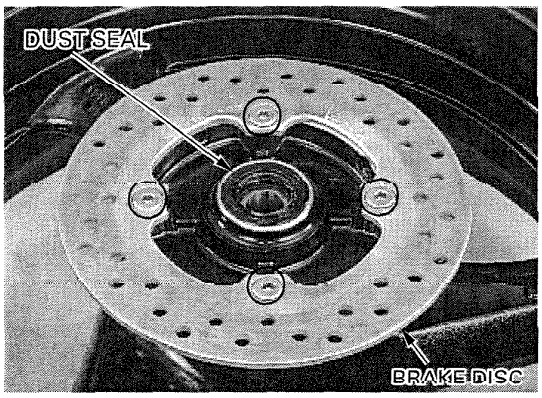
NOTE:

- If the driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition, or the replacement chain or sprocket will wear rapidly.



DISASSEMBLY

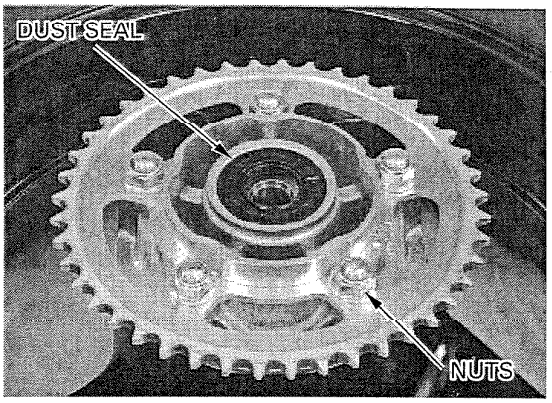
Remove the right dust seal.
Remove the bolts and brake disc.



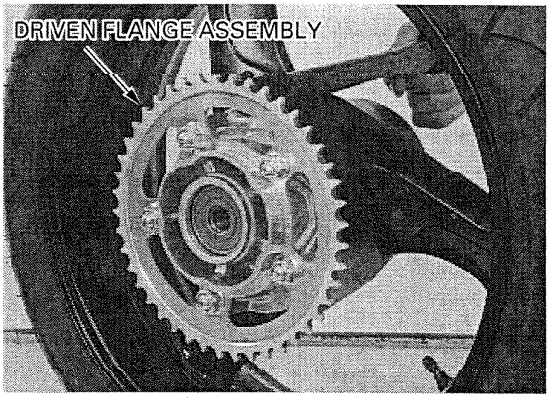
Remove the left dust seal.

NOTE:

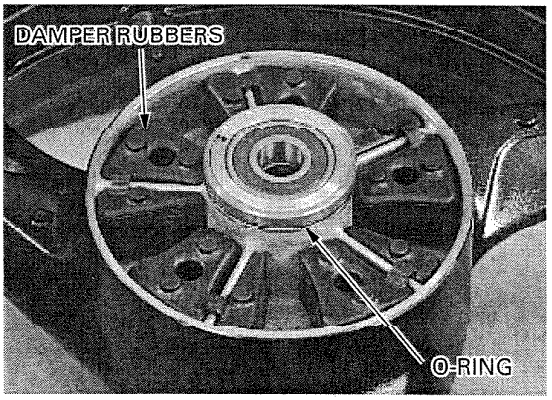
If you will replace the final driven sprocket, loosen the driven sprocket nuts.



Remove the final driven flange assembly from the left wheel hub.



Remove the damper rubbers and O-ring.

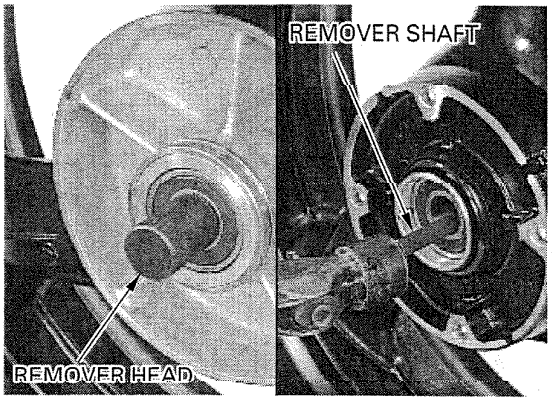


Replace the wheel bearings in pairs. Do not reuse old bearings.

Install the bearing remover head into the bearing. From opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft	07746-0050100 or equivalent commercially available in U.S.A.
Bearing remover head, 20 mm	07746-0050600 or equivalent commercially available in U.S.A.

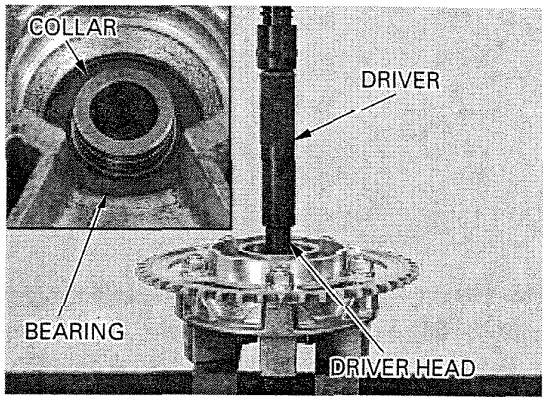


Press the driven flange collar out of the driven flange bearing.

TOOLS:

Driver	07749-0010000
Driver head	07946-MJ00200

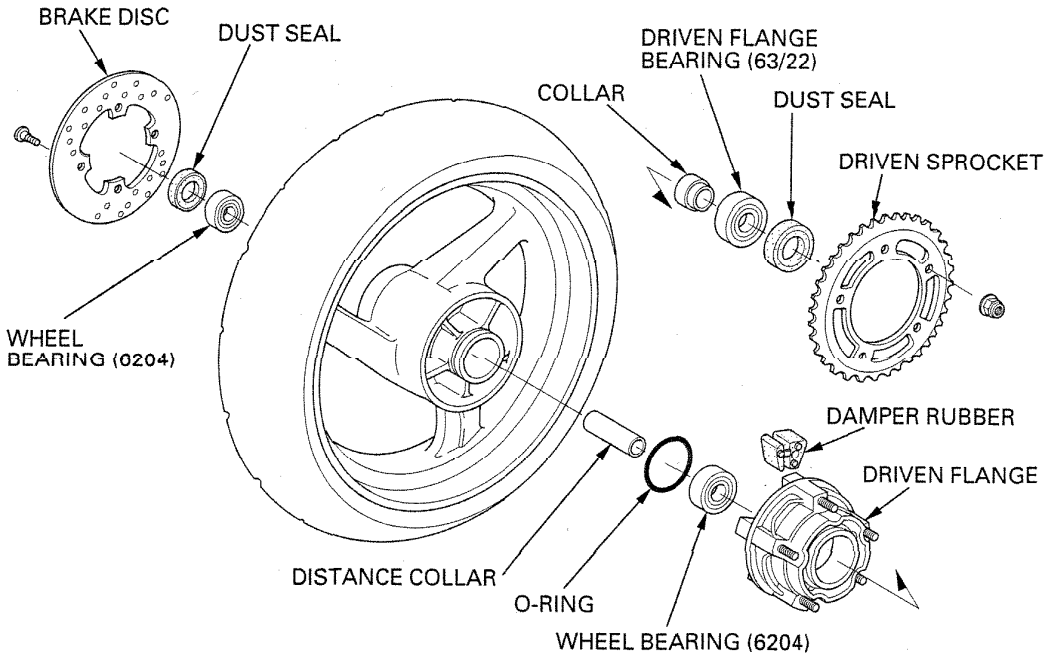
Remove the driven flange bearing.



ASSEMBLY

NOTE:

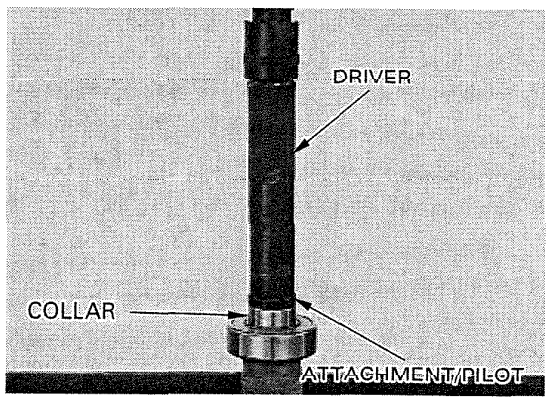
Refer to page 13-10 for wheel balance.



Press the driven flange collar in a new driven flange bearing until it is fully seated.

TOOLS:

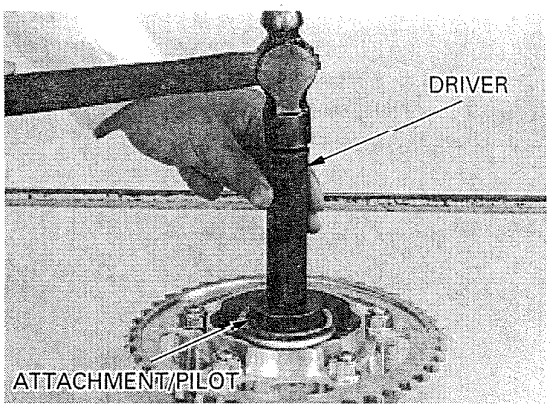
Driver	07749-0010000
Attachment, 28 × 30 mm	07946-1870100
Pilot, 20 mm	07746-0040500



Drive in the driven flange bearing squarely with the marking side facing up until it is fully seated.

TOOLS:

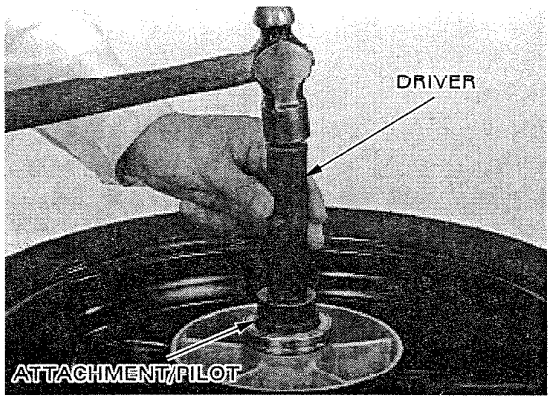
Driver	07749-0010000
Attachment, 52 × 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500



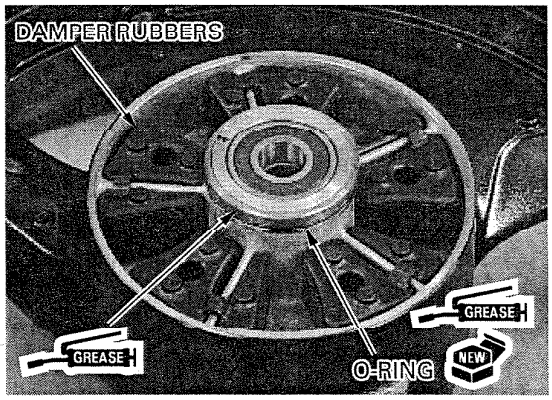
Drive in a new right bearing squarely with the marking side facing up until it is fully seated.
Install the distance collar.
Drive in a new left bearing squarely with the marking side facing up until it is fully seated.

TOOLS:

Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



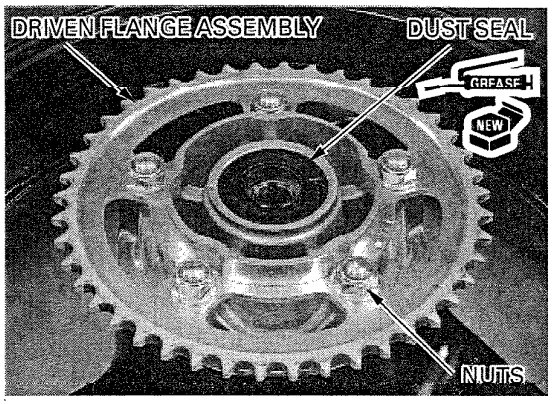
Install the damper rubbers into the left wheel hub.
Coat a new O-ring with grease and install it into the hub groove.
Apply grease to the mating surface of the wheel hub (side surface) and final driven flange.



Install the driven flange assembly into the left wheel hub.
When the driven sprocket is replaced, install a new sprocket and tighten the nuts.

TORQUE : 88 N·m (9.0 kgf·m , 65 lbf·ft)

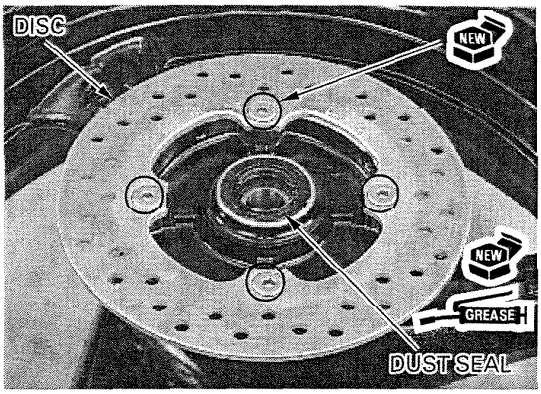
Apply grease to a new dust seal lip and install it until it is flush with the driven flange.



Install the brake disc onto the right wheel hub.
Install new disc bolts and tighten them in a criss-cross pattern in 2 or 3 steps.

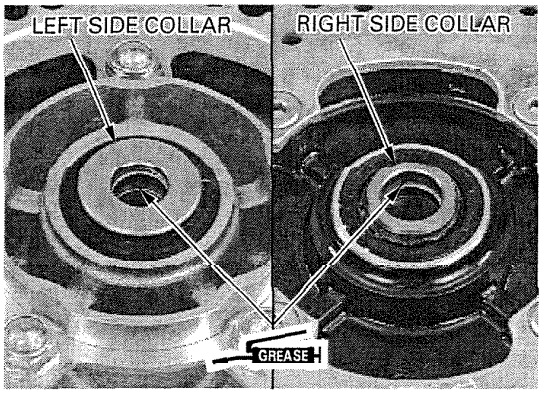
TORQUE : 42 N·m (4.3 kgf·m , 31 lbf·ft)

Apply grease to a new dust seal lip and install it until it is flush with the hub.

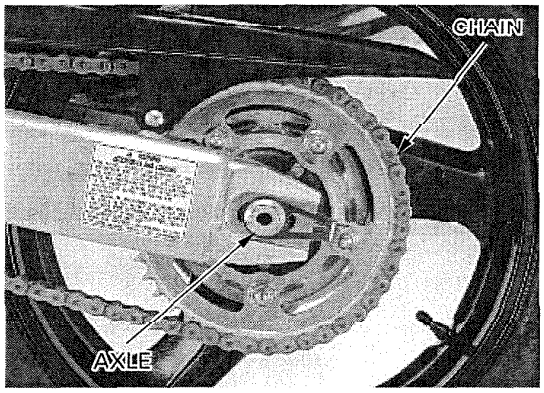


INSTALLATION

Apply grease to the groove in the side collar inner surface.
Install the side collars.

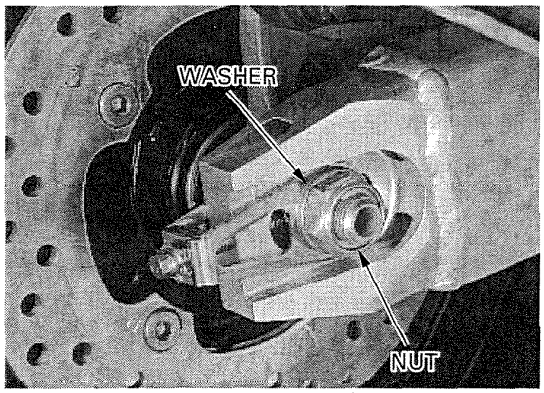


Make sure that the rear brake caliper is in position.
Place the rear wheel in the swingarm and install the drive chain over the driven sprocket.
Insert the rear axle from the left side through the swingarm, wheel and caliper bracket.



Install the washer and axle nut.

Adjust the drive chain slack (page 3-16).

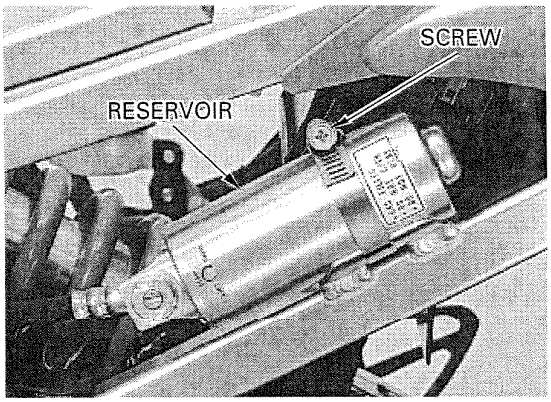


SHOCK ABSORBER

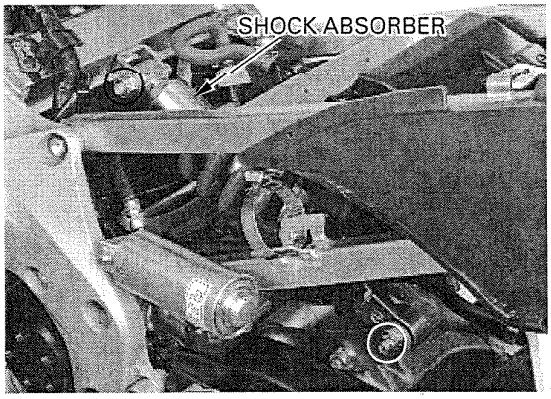
REMOVAL

Support the motorcycle securely with a hoist or equivalent.
Remove the fuel tank (page 2-3).

Loosen the reservoir band screw and remove the shock absorber reservoir from the frame.



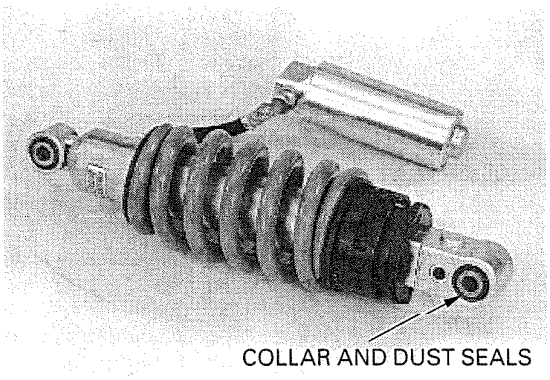
Support the swingarm securely.
Remove the shock absorber mounting nuts and bolts, and the shock absorber.



INSPECTION

Check the damper unit, reservoir hose and reservoir for leakage or other damage.
Check the upper joint bushing for wear or damage.
Replace the shock absorber assembly if necessary.

Remove the lower joint pivot collar.
Check the needle bearing, pivot collar and dust seals for wear or damage.



NEEDLE BEARING REPLACEMENT

Remove the dust seals.

Set the lower joint in a hydraulic press with the rebound damping adjuster facing up when pressing in and out the bearing.

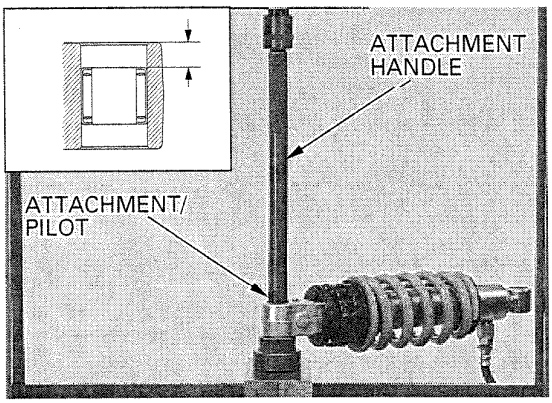
Press in the bearing with the marking side facing up.

Press the needle bearing out of the lower joint using the special tools.

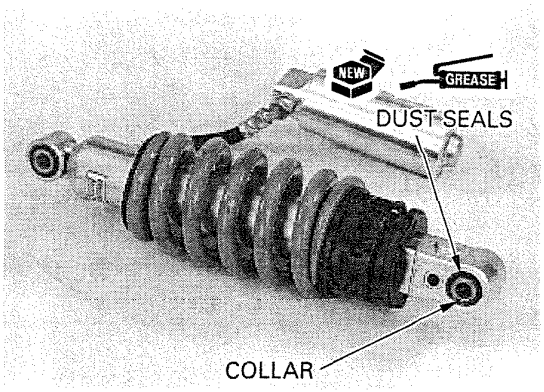
TOOLS:

Driver attachment handle	07949-3710001
Attachment, 22 × 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

Apply grease to the needle rollers of a new bearing.
Carefully press the needle bearing in the lower joint until the depth from the lower joint outer surface is 7.8–8.2 mm (0.31–0.32 in), using the same tools.



Apply grease to new dust seal lips and install them until they are flush with the lower joint.
Install the pivot collar.



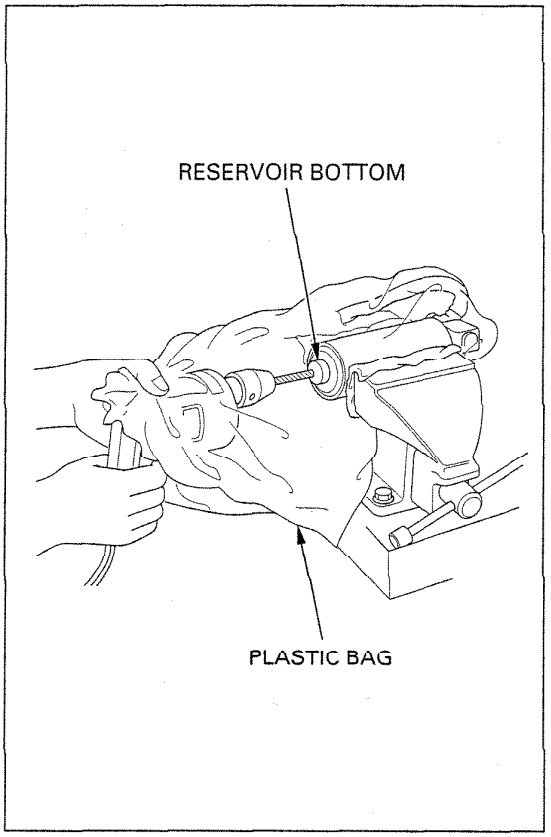
SHOCK ABSORBER DISPOSAL

Center punch the center of the reservoir bottom to mark the drilling point.

Wrap the shock absorber inside a plastic bag and support the reservoir in a vise as shown.
Through the open end of the bag, insert a drill motor with a sharp 2–3 mm (5/64–1/8 in) drill bit.

⚠WARNING

- ***Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the reservoir, leading to explosion and severe personal injury.***
- ***The shock absorber contains nitrogen gas and oil under high pressure. Do not drill the side of the reservoir or the damper case, or you may drill into the oil chamber (bladder); oil escaping under high pressure may cause serious personal injury.***
- ***Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.***



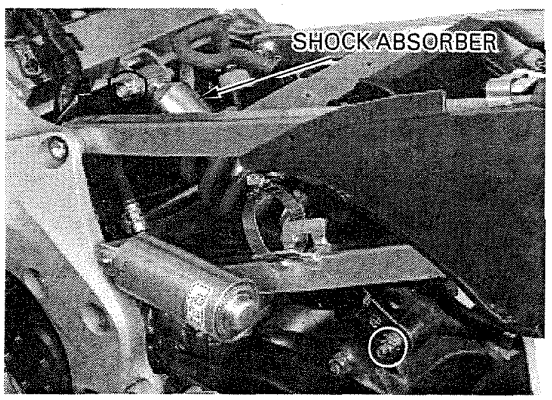
Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from the getting caught in the bit when you start.

INSTALLATION

Install the shock absorber in the frame and shock arm with the rebound damping adjuster facing to the right.
Install the upper and lower mounting bolts from the right side.

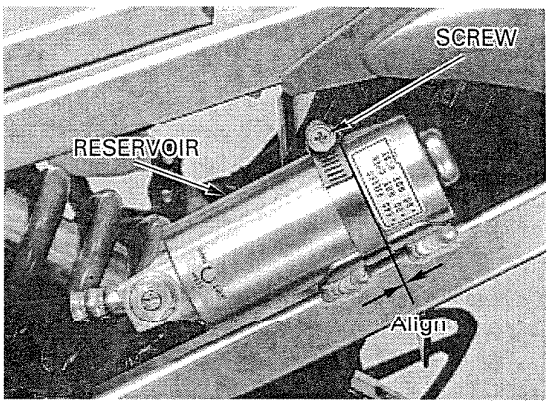
Install the mounting nuts and tighten them.

TORQUE: 44 N·m (4.5 kgf·m , 33 lbf·ft)



Install the reservoir into the reservoir band by aligning the label edge with the band and tighten the band screw securely.

Install the fuel tank (page 2-3).

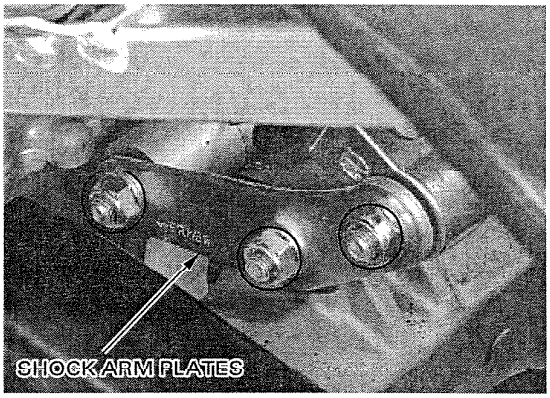


SUSPENSION LINKAGE

REMOVAL

Support the motorcycle securely with a hoist or equivalent.

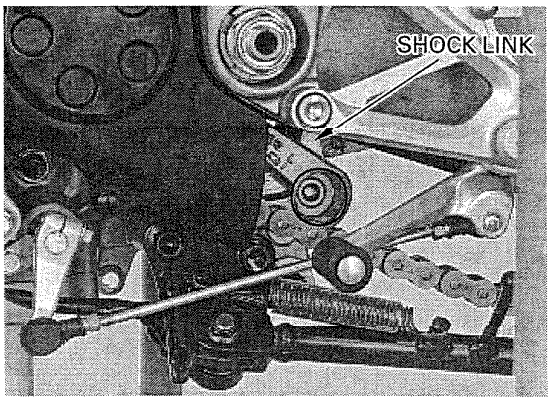
Remove the following:
- shock absorber lower mounting nut and bolt
- shock arm-to-swing arm nut and bolt
- shock arm-to-shock link nut and bolt
- shock arm plates



- shock link-to-bracket nut and bolt
- shock link.

NOTE:

If the shock link can not be removed, loosen the shock link bracket nuts to get the clearance between the shock link and brackets (page 7-5).

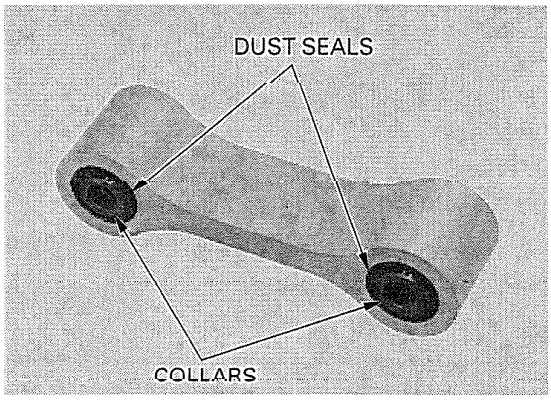


INSPECTION

Remove the pivot collars.
Check the needle bearings, pivot collars and dust seals for wear or damage.
Check the shock arm plates for deformation or damage.

SHOCK LINK PIVOT BEARING REPLACEMENT

Remove the dust seals.



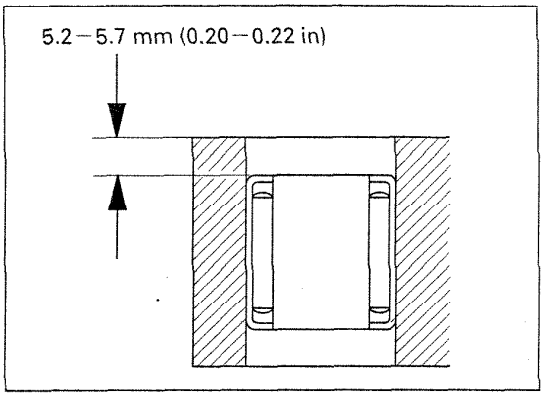
Press the needle bearing out of the shock link pivot using the special tools.

TOOLS:

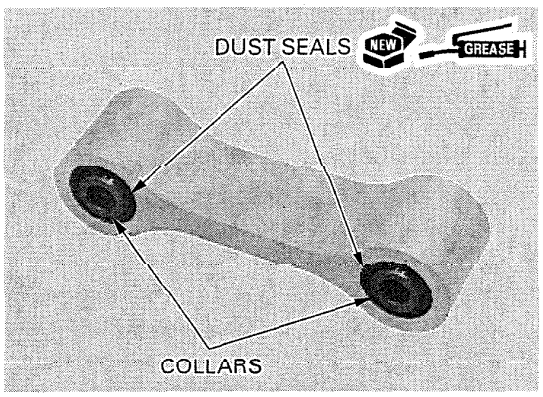
Driver attachment handle	07949-3710001
Attachment, 22 × 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

Press in the bearing with the marking side facing up.

Apply grease to the needle rollers of a new bearing. Carefully press the needle bearing in the link pivot until the depth from the shock link outer surface is 5.2−5.7 mm (0.20−0.22 in), using the same tools.

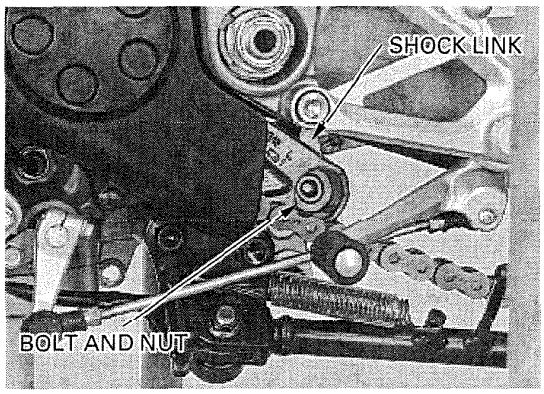


Apply grease to new dust seal lips and install them into the shock link pivots until they are seated.
Install the pivot collars.



INSTALLATION

Install the shock link into the link brackets and the bolt from the left side.
Install the nut.

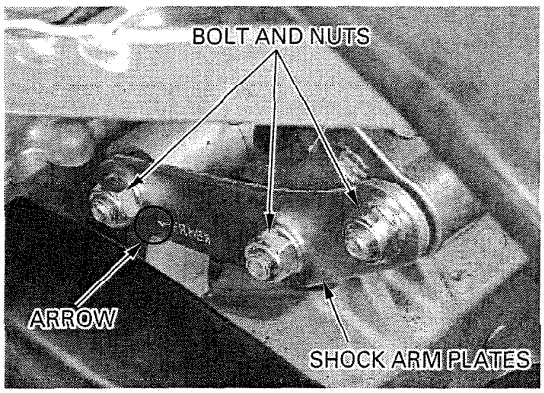


Install the shock arm plates with the arrow facing the left and front side and the bolts from the right side.
Install the nuts.

Tighten the link bracket nuts if they were loosened (page 7-8).

Tighten the all suspension linkage nuts.

TORQUE : 44 N·m (4.5 kgf·m , 33 lbf·ft)



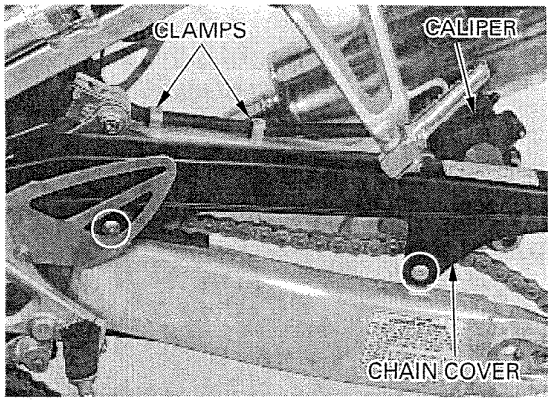
SWINGARM

REMOVAL

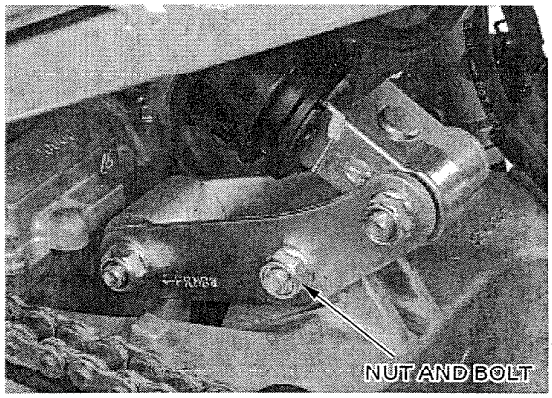
Remove the rear wheel (page 14-3).

Remove the two bolts and drive chain cover.

Remove the bolts and brake hose clamps.
Remove the rear brake caliper/bracket assembly from the swingarm.



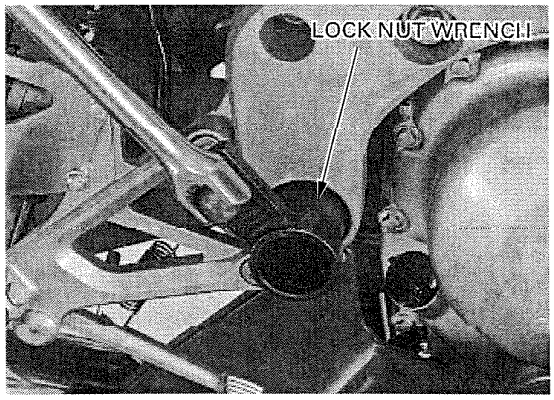
Support the swingarm securely.
Remove the shock arm-to-swingarm nut and bolt.



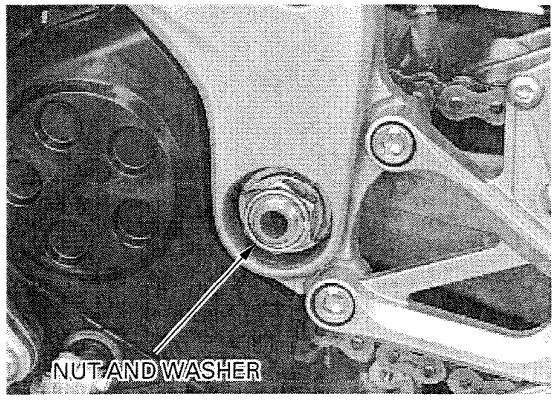
Loosen the left and right pivot lock nuts.

TOOL:

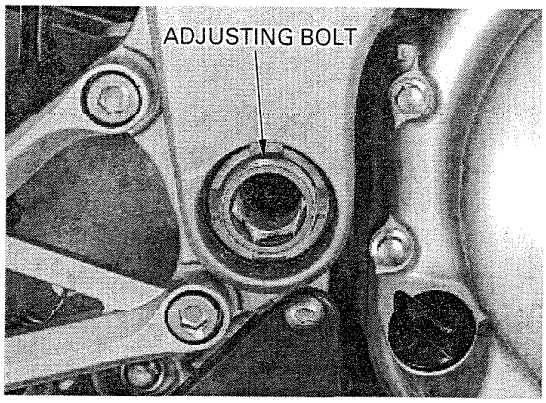
Lock nut wrench	07908-4690003 or 07908-4690002



Remove the swingarm pivot nut and washer.
Remove the pivot bolt.

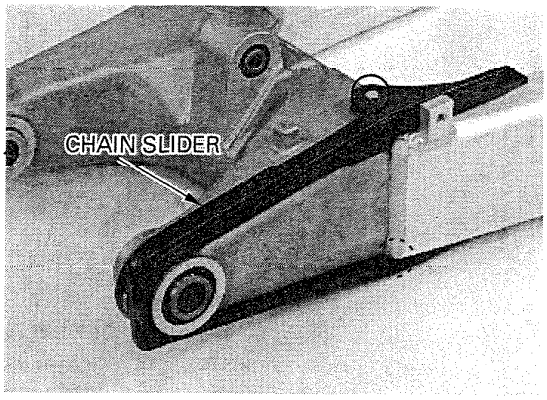


Loosen the pivot adjusting bolts and remove the swingarm.

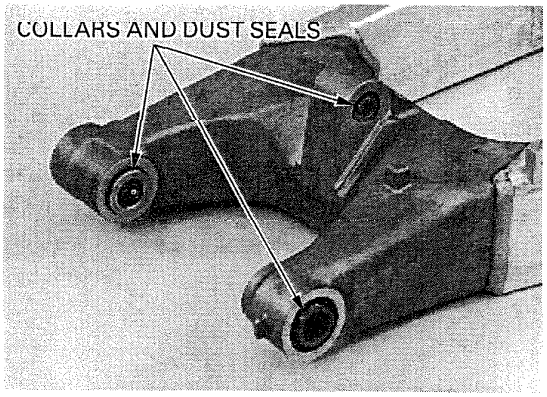


DISASSEMBLY

Remove the two bolts and drive chain slider if necessary.

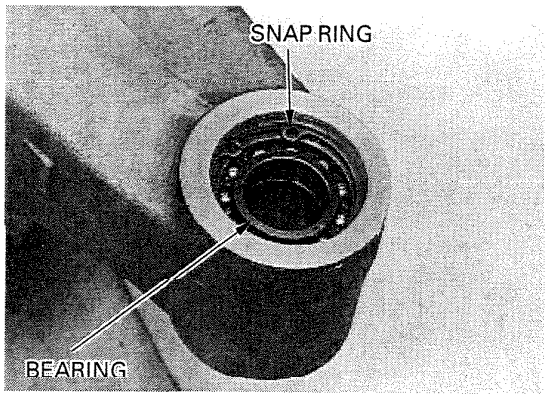


Remove the pivot collars and dust seals.



PIVOT BEARING REPLACEMENT

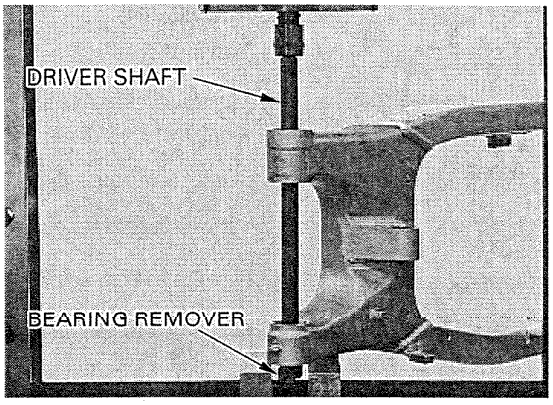
Remove the snap ring.
Drive ball bearings and distance collar out of the right pivot.



Press the needle bearing out of the left pivot using the special tools.

TOOLS:

Driver shaft	07946-MJ00100
Needle bearing remover	07HMC-MR70100

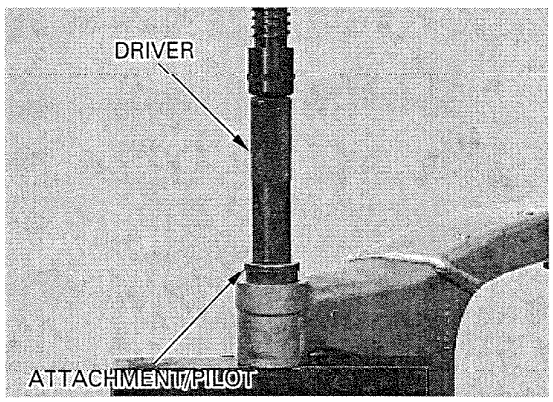


Pack new ball bearing cavities with grease.
Press the inner bearing into the right pivot with the marking side facing up until it is fully seated, using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 20 mm	07746-0040500

Install the distance collar.
Press the outer bearing into the right pivot with the marking side facing up until it is seated, using the special tools.



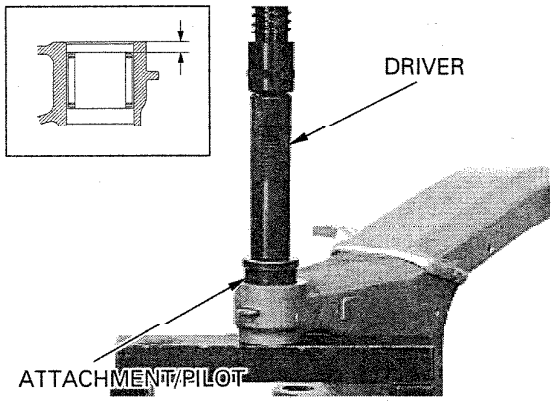
TOOLS:

Driver	07749-0010000
Attachment, 37 × 40 mm	07746-0010200
Pilot, 20 mm	07746-0040500

Install the snap ring.

Press in the bearing with the marking side facing up.

Apply grease to the needle rollers of a new bearing. Carefully press the needle bearing into the left pivot until the depth from the swingarm outer surface is 5—6 mm (0.20—0.24 in), using the special tools.



TOOLS:

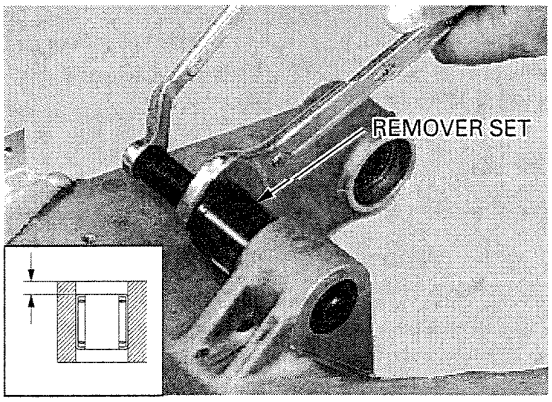
Driver	07749-0010000
Attachment, 37 × 40 mm	07746-0010200
Pilot, 28 mm	07746-0041100

SHOCK ARM BEARING REPLACEMENT

Draw the needle bearing out of the swingarm using the special tool.

TOOL:

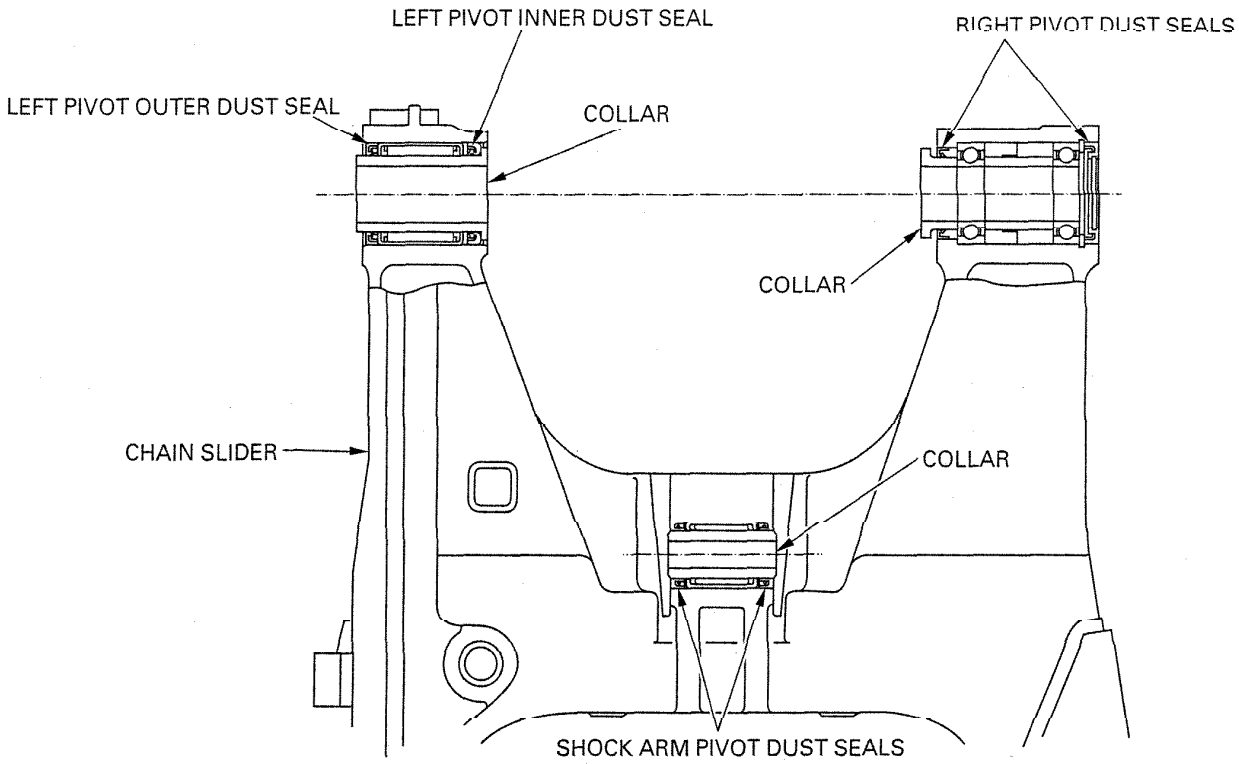
Bearing remover set	07LMC-KV30100



Draw in the bearing with the marking side facing the flange of the special tool.

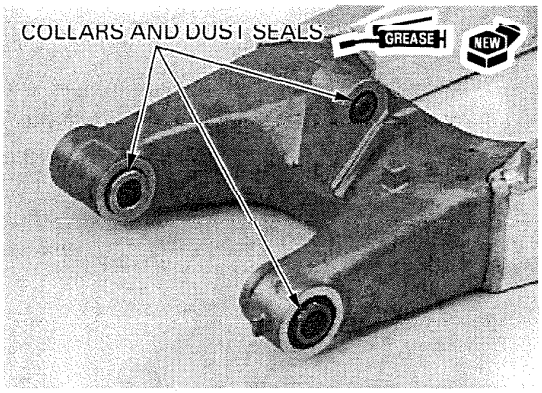
Apply grease to the needle rollers of a new bearing. Install the needle bearing into pivot until the depth from the swingarm outer surface is 5.5—6.0 mm (0.22—0.24 in), using the same tool.

ASSEMBLY



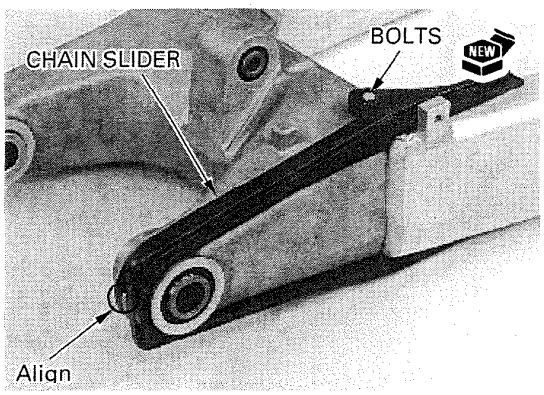
Apply grease to new dust seal lips and install them as follows:
- shock arm pivot and swingarm right pivot dust seals until they are flush with swingarm outer surface
- left pivot outer dust seal until it is seated onto bearing
- left pivot inner dust seal until depth from swingarm outer surface is 4 mm (0.2 in).

Install the pivot collars as shown.



Install the drive chain slider if removed, aligning the hole with the boss of the swingarm.
Install new slider bolts and tighten them.

TORQUE : 9 N·m (0.9 kgf·m , 6.5 lbf·ft)



INSTALLATION

NOTE:

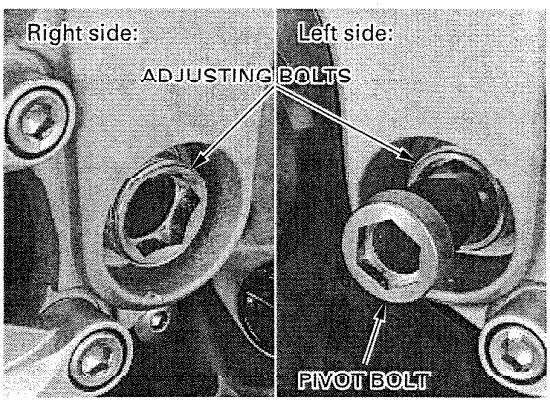
When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 14-1 "SERVICE INFORMATION".

CAUTION:

Be sure to tighten all swingarm pivot fasteners to the specified torque in the specified sequence described below. If you mistake the tightening torque or sequence, loosen all pivot fasteners, then tighten them again to the specified torque in the specified sequence.

1. Install the left and right adjusting bolts so that they do not project out of the frame inner surface.

2. Obtain a spare pivot bolt (P/N 52101-MBW-000) for this model or use a 20 mm (0.8 in) O.D. shaft. Set the swingarm into the frame and the shock arm plates and temporarily insert the spare pivot bolt or 20 mm O.D. shaft from the left side to support the swingarm.
   Be sure that the swingarm is properly aligned.

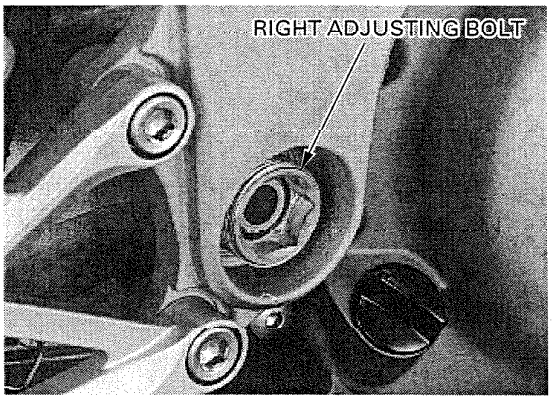


3. Tighten the right adjusting bolt.

TORQUE : 12 N·m (1.2 kgf·m , 9 lbf·ft)

Loosen the right adjusting bolt and retighten it to the specified torque.

TORQUE : 7 N·m (0.7 kgf·m , 5.1 lbf·ft)

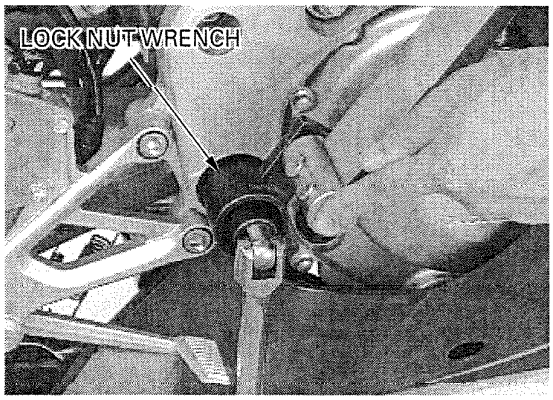


4. Install the right lock nut.
   Hold the right adjusting bolt and tighten the right lock nut.

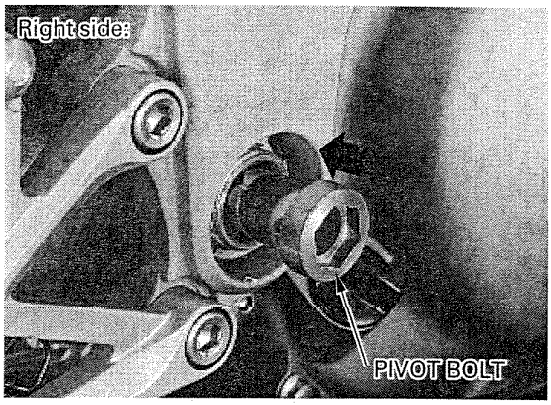
TOOL:

Lock nut wrench	07908-4690003 or 07908-4690002

TORQUE: Actual: 64 N·m (6.5 kgf·m , 47 lbf·ft)
Indicated: 58 N·m (5.9 kgf·m , 43 lbf·ft)



5. Insert the other pivot bolt from the right side gradually pushing the left side pivot bolt out from the left side.

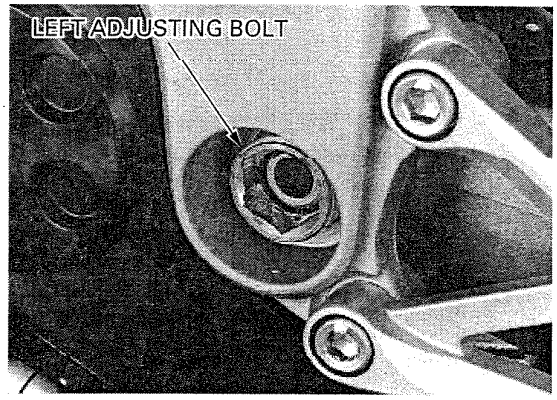


6. Tighten the left adjusting bolt.

TORQUE : 12 N·m (1.2 kgf·m , 9 lbf·ft)

Loosen the left adjusting bolt and retighten it to the specified torque.

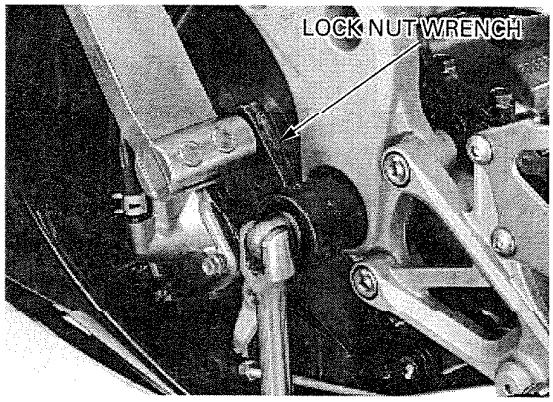
TORQUE : 7 N·m (0.7 kgf·m , 5.1 lbf·ft)



7. Install the left lock nut.
Hold the left adjusting bolt and tighten the left lock nut.

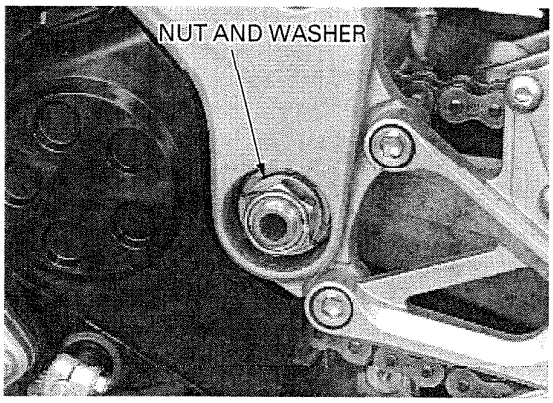
TOOL:
Lock nut wrench 07908-4690003 or
07908-4690002

TORQUE: Actual: 64 N·m (6.5 kgf·m , 47 lbf·ft)
Indicated: 58 N·m (5.9 kgf·m , 43 lbf·ft)



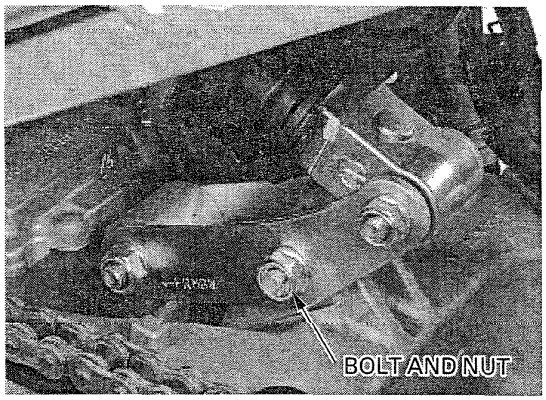
8. Push in the pivot bolt until it is seated.
Install the pivot nut with the washer and tighten it.

TORQUE : 93 N·m (9.5 kgf·m , 69 lbf·ft)

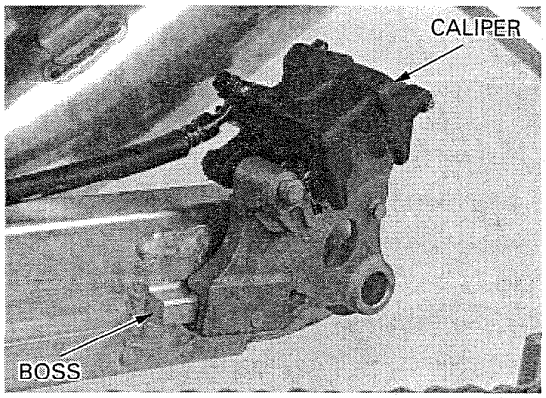


Install the shock arm-to-swingarm bolt and nut. Tighten the nut.

TORQUE : 44 N·m (4.5 kgf·m , 33 lbf·ft)

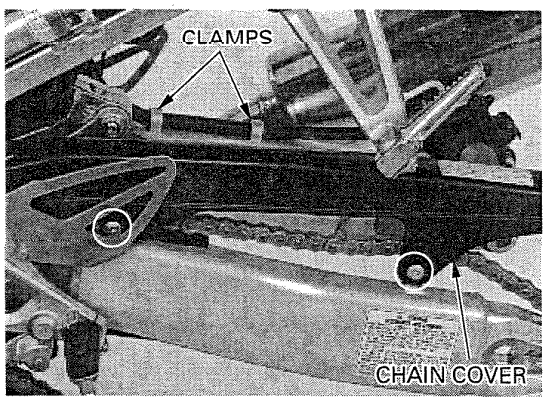


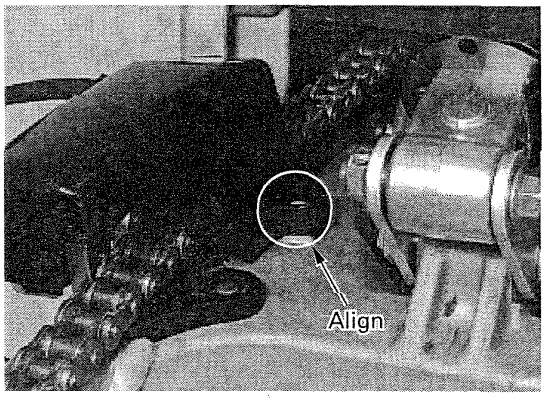
Install the brake caliper/bracket assembly onto the boss of the swingarm.

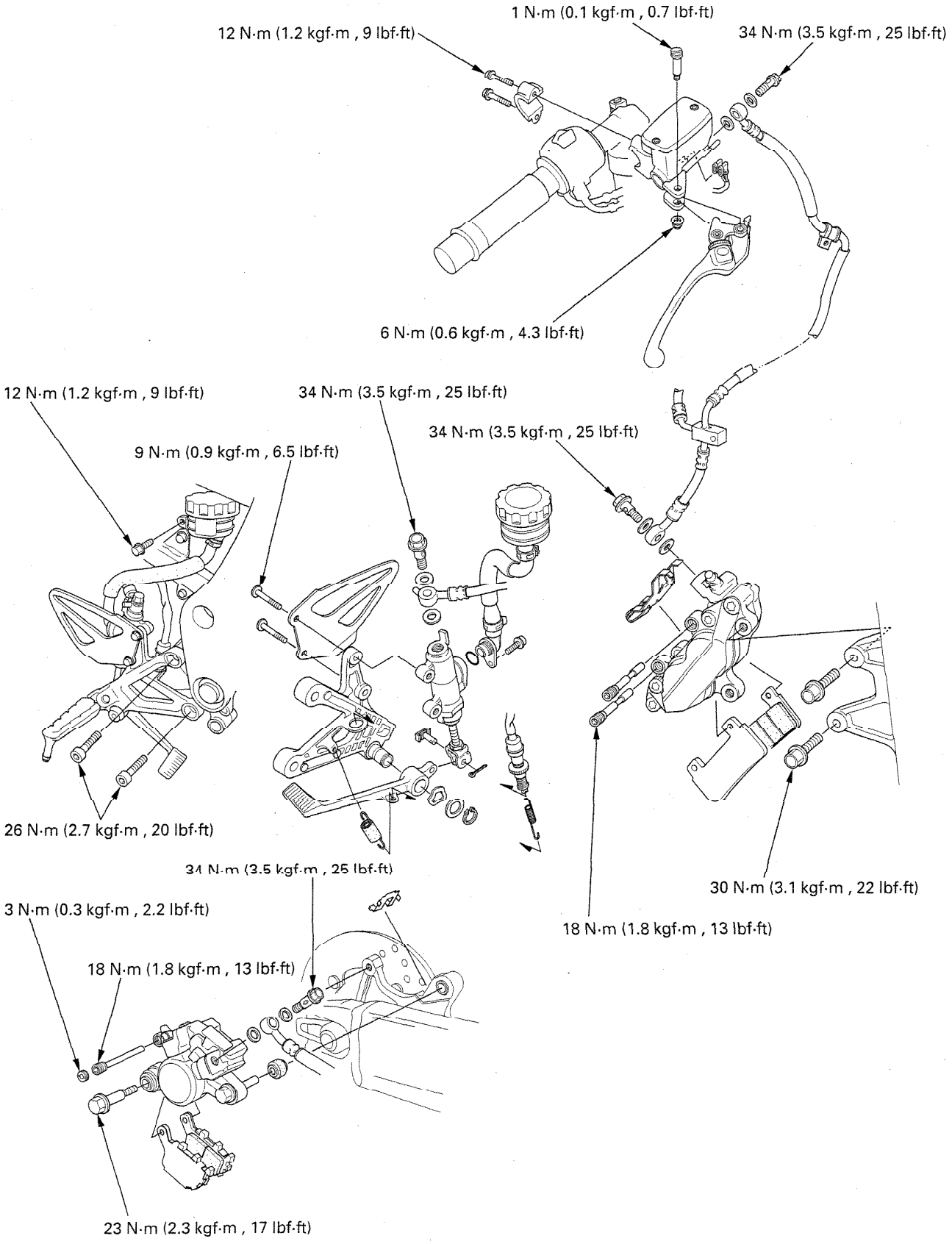


Install the brake hose clamps with the bolts.
Install the chain cover by aligning the hole with the boss of the swingarm, and tighten the two bolts.

Install the rear wheel (page 14-8).






1 N·m (0.1 kgf·m , 0.7 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
34 N·m (3.5 kgf·m , 25 lbf·ft)
6 N·m (0.6 kgf·m , 4.3 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
34 N·m (3.5 kgf·m , 25 lbf·ft)
34 N·m (3.5 kgf·m , 25 lbf·ft)
9 N·m (0.9 kgf·m , 6.5 lbf·ft)
26 N·m (2.7 kgf·m , 20 lbf·ft)
34 N·m (3.5 kgf·m , 25 lbf·ft)
30 N·m (3.1 kgf·m , 22 lbf·ft)
18 N·m (1.8 kgf·m , 13 lbf·ft)
3 N·m (0.3 kgf·m , 2.2 lbf·ft)
18 N·m (1.8 kgf·m , 13 lbf·ft)
23 N·m (2.3 kgf·m , 17 lbf·ft)

15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-1	FRONT MASTER CYLINDER	15-8
TROUBLESHOOTING	15-2	REAR MASTER CYLINDER/ BRAKE PEDAL	15-12
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-3	FRONT BRAKE CALIPER	15-16
BRAKE PAD/DISC	15-5	REAR BRAKE CALIPER	15-19

SERVICE INFORMATION

GENERAL

⚠WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

- Spilled brake fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels 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 motorcycle.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	———
	Brake disc thickness		4.4 – 4.6 (0.17 – 0.18)	3.5 (0.14)
	Brake disc runout		———	0.30 (0.012)
	Master cylinder I.D.		15.870 – 15.913 (0.6248 – 0.6265)	15.925 (0.6270)
	Master piston O.D.		15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
	Caliper cylinder I.D.	A	33.96 – 34.01 (1.337 – 1.339)	34.02 (1.339)
		B	32.030 – 32.080 (1.2610 – 1.2630)	32.09 (1.263)
	Caliper piston O.D.	A	33.895 – 33.928 (1.3344 – 1.3357)	33.87 (1.333)
		B	31.965 – 31.998 (1.2585 – 1.2598)	31.94 (1.257)
Rear	Specified brake fluid		DOT 4	———
	Brake disc thickness		4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
	Brake disc runout		———	0.30 (0.012)
	Master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Caliper cylinder I.D.		38.18 – 38.23 (1.503 – 1.505)	38.24 (1.506)
	Caliper piston O.D.		38.098 – 38.148 (1.4999 – 1.5019)	38.09 (1.500)

TORQUE VALUES

Brake caliper bleed valve	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Pad pin	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Pad pin plug	3 N·m (0.3 kgf·m , 2.2 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m , 25 lbf·ft)	
Front brake lever pivot bolt	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Front brake lever pivot nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Front brake light switch screw	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Front brake caliper assembly bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads
Rear master cylinder joint nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Rear master cylinder mounting bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Rear brake caliper bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Front master cylinder reservoir cap screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	
Front master cylinder mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m , 22 lbf·ft)	ALOC bolt: replace with a new one
Rear brake reservoir mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear brake caliper pin bolt	27 N·m (2.8 kgf·m , 20 lbf·ft)	
Driver footpeg bracket bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)	

TOOLS

Snap ring pliers	07914-SA50001

TROUBLESHOOTING

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

Brake lever/pedal hard
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Sticking/worn master piston
- Caliper not sliding properly
- Bent brake lever/pedal

Brake drag
- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

⚠WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

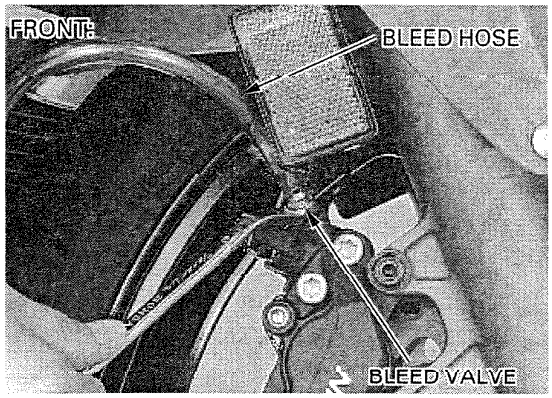
CAUTION:

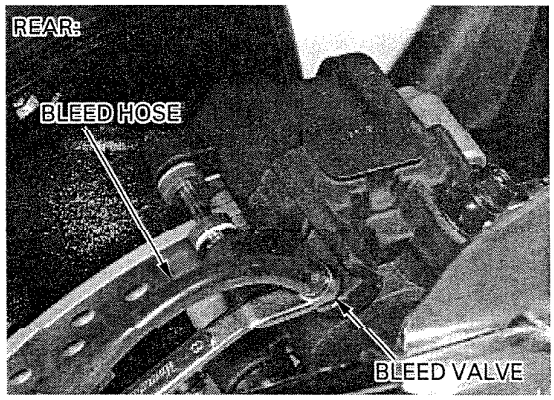
- ***Do not allow foreign material to enter the system when filling the reservoir.***
- ***Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***
- ***Use only DOT 4 brake fluid from a sealed container.***
- ***Do not mix different types of fluid. They are not compatible.***

BRAKE FLUID DRAINING

Remove the reservoir cap, set plate and diaphragm (page 3-20 for front, page 3-21 for rear).

Connect the bleed hose to the bleed valve.
Loosen the bleed valve and pump the brake lever or pedal until no more fluid flows out of the bleed valve.





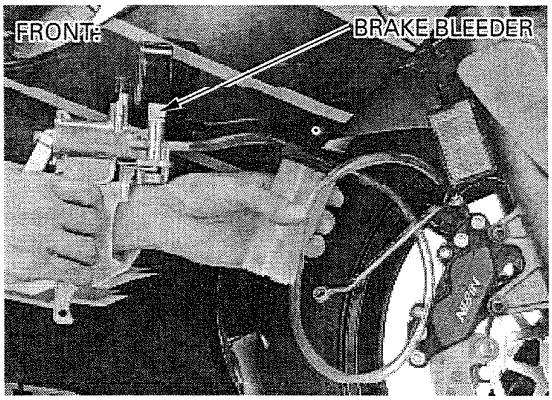
BRAKE FLUID FILLING/BLEEDING

Close the bleed valve.
Fill the reservoir with DOT 4 brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve.
Pump the brake bleeder and loosen the bleed valve. Add brake fluid when the fluid level in the reservoir is low.

NOTE:

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

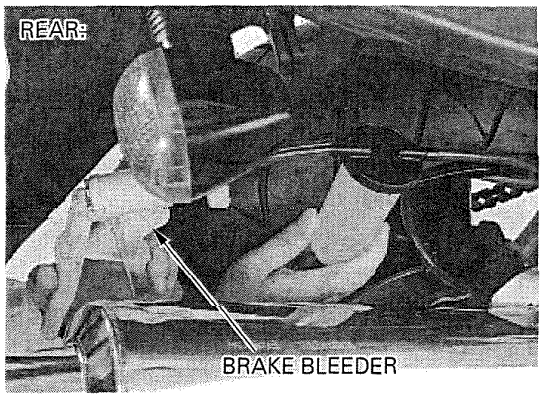


Repeat the previous procedures until air bubbles do not appear in the plastic hose.

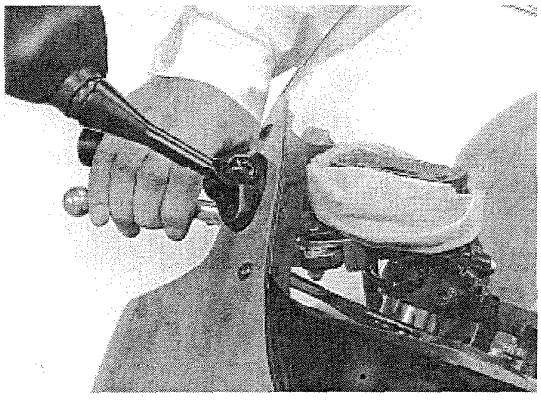
NOTE:

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever or pedal. If it still feels spongy, bleed the system again.



If a brake bleeder is not available, use the following procedure:
Pump up the system pressure with the brake lever or pedal until lever or pedal resistance is felt.



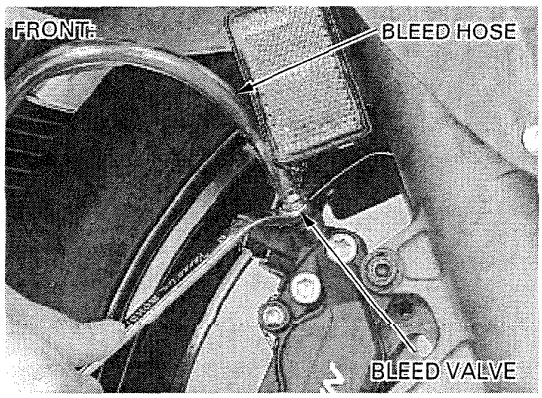
Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the brake lever or depress the brake pedal, open the bleed valve 1/2 turn and then close it.

NOTE:

Do not release the brake lever or pedal until the bleed valve has been closed.

2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.



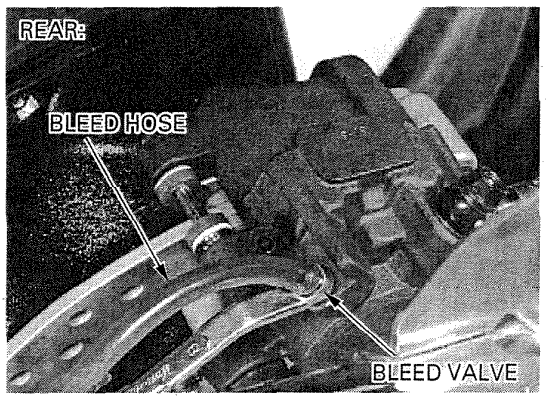
Repeat the steps 1 and 2 until air bubbles do not appear in the bleed hose.

Tighten the bleed valve.

TORQUE : 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

Fill the reservoir to the upper level line with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap (page 3-20 for front, page 3-21 for rear).

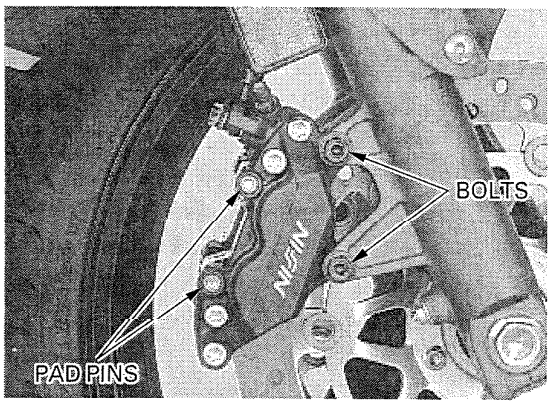


BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

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

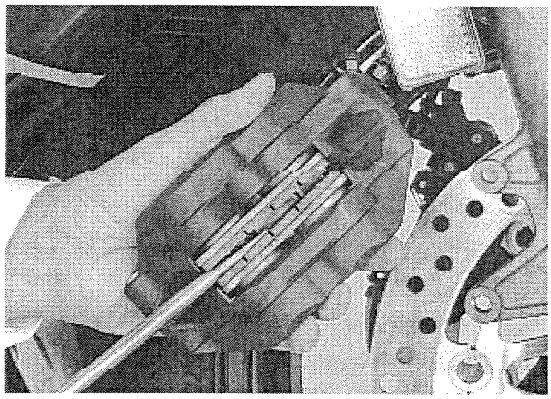
Loosen the pad pins.
Remove the bolts and brake caliper.



Push the caliper pistons all the way in to allow installation of new brake pads.

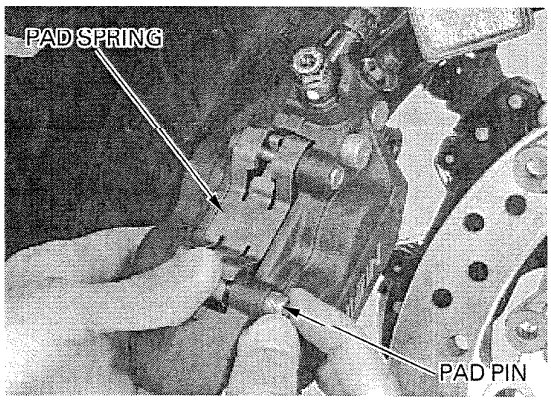
NOTE:

Check the brake fluid level in the brake reservoir as this operation causes the level to rise.



Remove the pad pins while pushing in the pad spring, then remove the pad spring and brake pads.

Install new brake pads and the pad spring with the arrow facing up.
Install the pad pin while pushing in the pad spring.



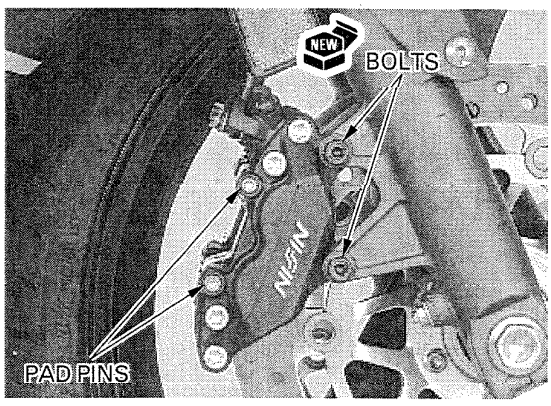
Install the front brake caliper so the disc is positioned between the pads, being careful not to damage the pads.
Install and tighten new mounting bolts.

TORQUE : 30 N·m (3.1 kgf·m , 22 lbf·ft)

Tighten the pad pins.

TORQUE : 18 N·m (1.8 kgf·m , 13 lbf·ft)

Operate the brake lever to seat the caliper pistons against the pads.



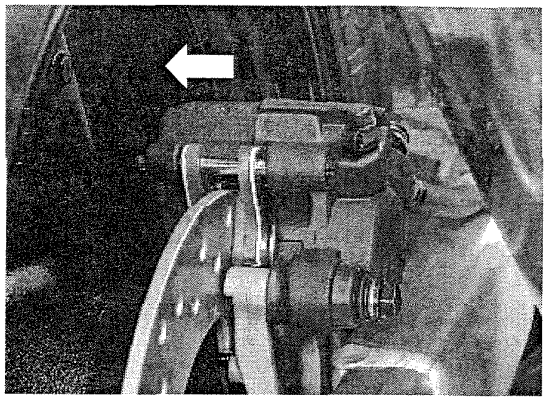
REAR BRAKE PAD REPLACEMENT

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

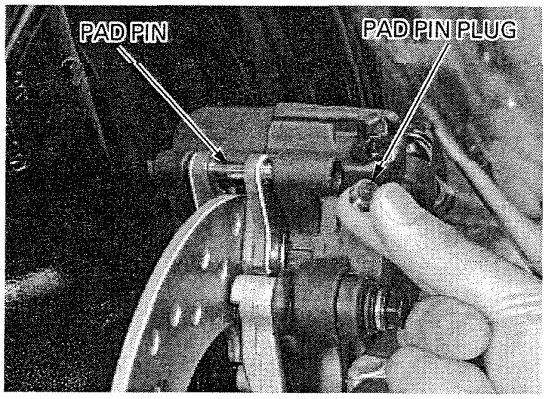
Push the caliper piston all the way in to allow installation of new brake pads.

NOTE:

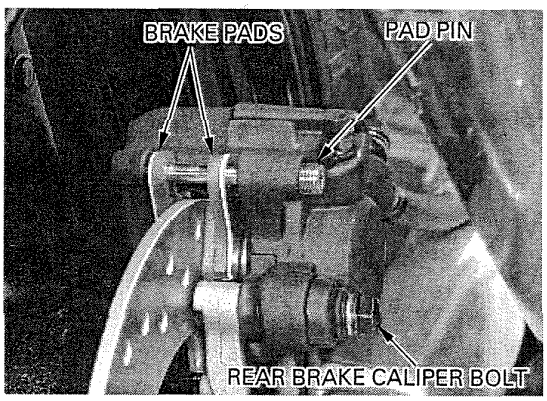
Check the brake fluid level in the brake reservoir as this operation causes the level to rise.



Remove the pad pin plug and loosen the pad pin.

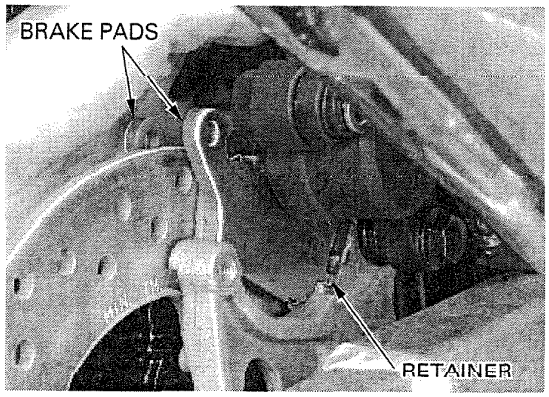


Remove the rear brake caliper bolt.
Pivot the caliper up, and remove the pad pin and brake pads.



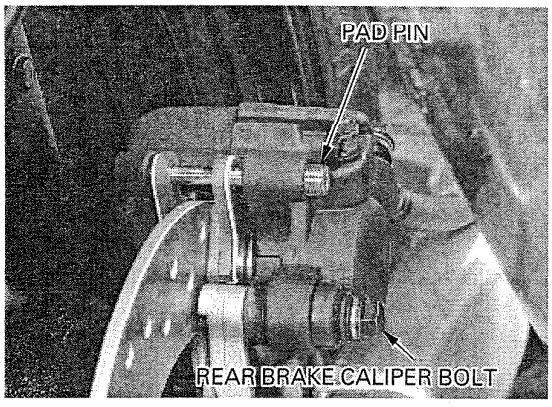
Be careful not to lose the pad spring.

Install new brake pads so that their ends are positioned on the retainer on the caliper bracket as shown.



Lower the caliper and install the pad pin.
Install and tighten the rear brake caliper bolt.

TORQUE : 23 N·m (2.3 kgf·m , 17 lbf·ft)



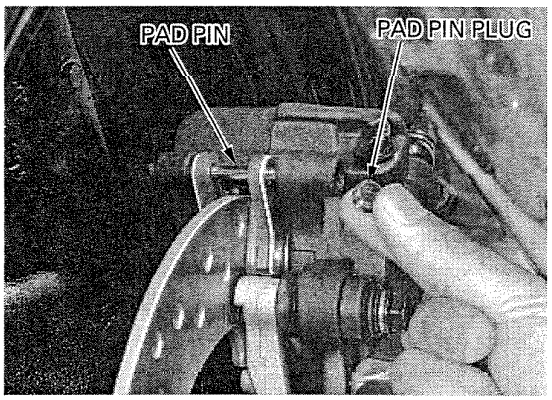
Tighten the pad pin.

TORQUE : 18 N·m (1.8 kgf·m , 13 lbf·ft)

Install and tighten the pad pin plug.

TORQUE : 3 N·m (0.3 kgf·m , 2.2 lbf·ft)

Operate the brake pedal to seat the caliper piston against the pads.

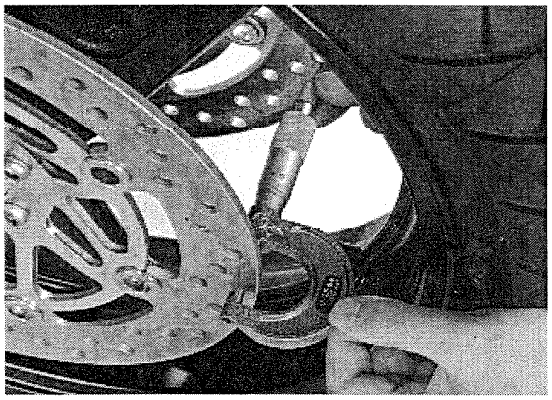


BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

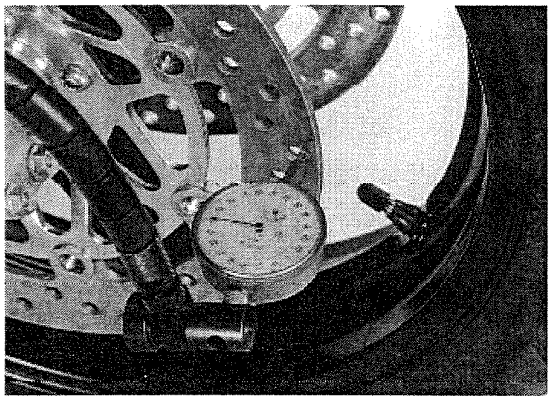
SERVICE LIMITS: Front: 3.5 mm (0.14 in)
Rear: 4.0 mm (0.16 in)



Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: 0.30 mm (0.012 in)

Check the wheel bearing for excessive play, if the warpage exceeds the service limit.
Replace the brake disc if the wheel bearings are normal.



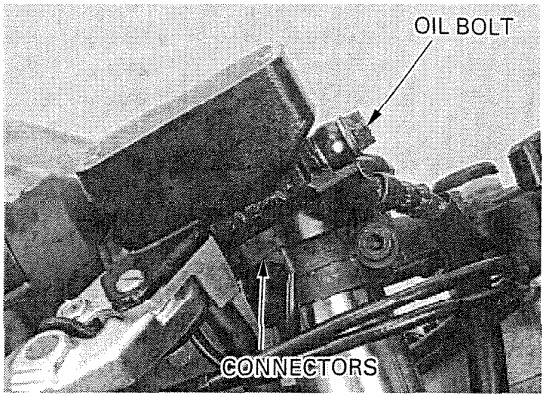
FRONT MASTER CYLINDER

CAUTION:

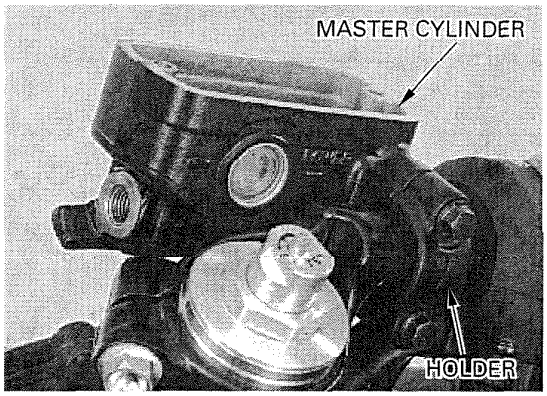
- ***Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***
- ***When removing the oil bolt, cover the end of the hose to prevent contamination.***

DISASSEMBLY

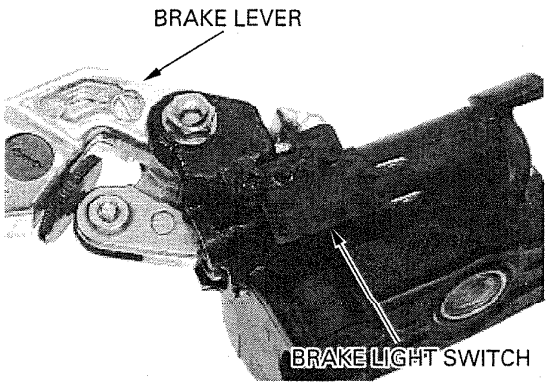
Drain the brake fluid from the front brake hydraulic system (page 15-3).



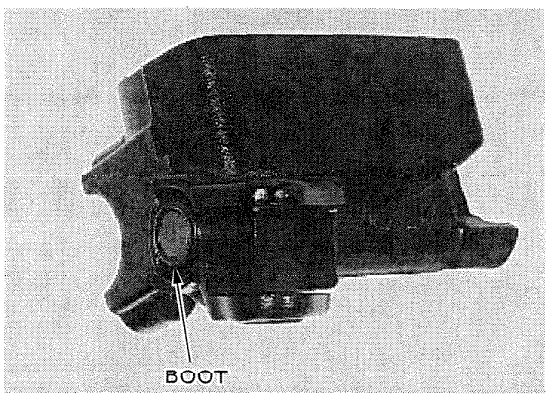
Disconnect the front brake light switch connectors.
Disconnect the brake hose from the master cylinder by removing the oil bolt and sealing washers.
Remove the master cylinder holder bolts, holder and the master cylinder.



Remove the pivot nut, bolt and brake lever assembly.
Remove the screw and front brake light switch.

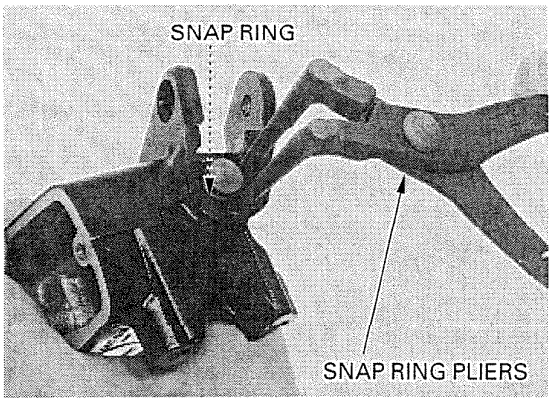


Remove the piston boot from the master piston and master cylinder.



Remove the snap ring using the special tool.

TOOL:
Snap ring pliers 07914-SA50001

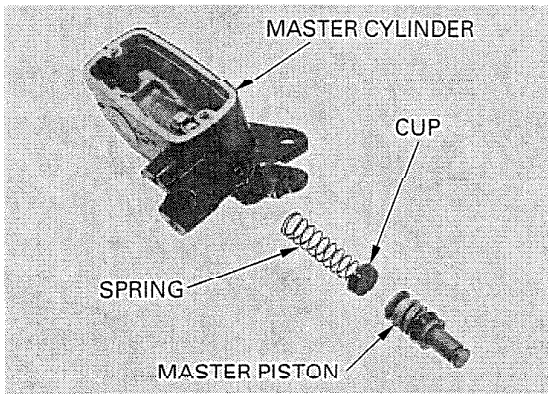


Remove the master piston, cup and spring from the master cylinder.

Clean the master cylinder and master piston with clean brake fluid.

INSPECTION

Check the cups for wear, deterioration or damage.
Check the spring for damage.

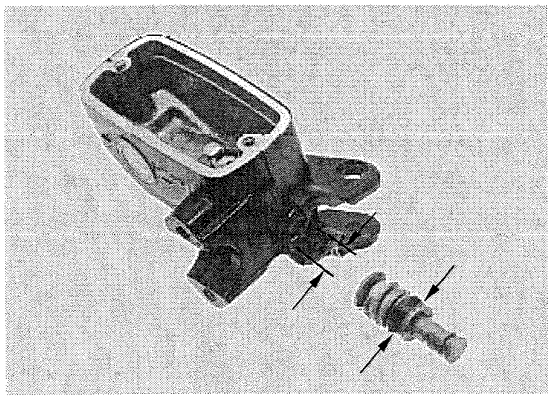


Check the master cylinder and piston for scoring, scratches or damage.
Measure the master cylinder I.D.

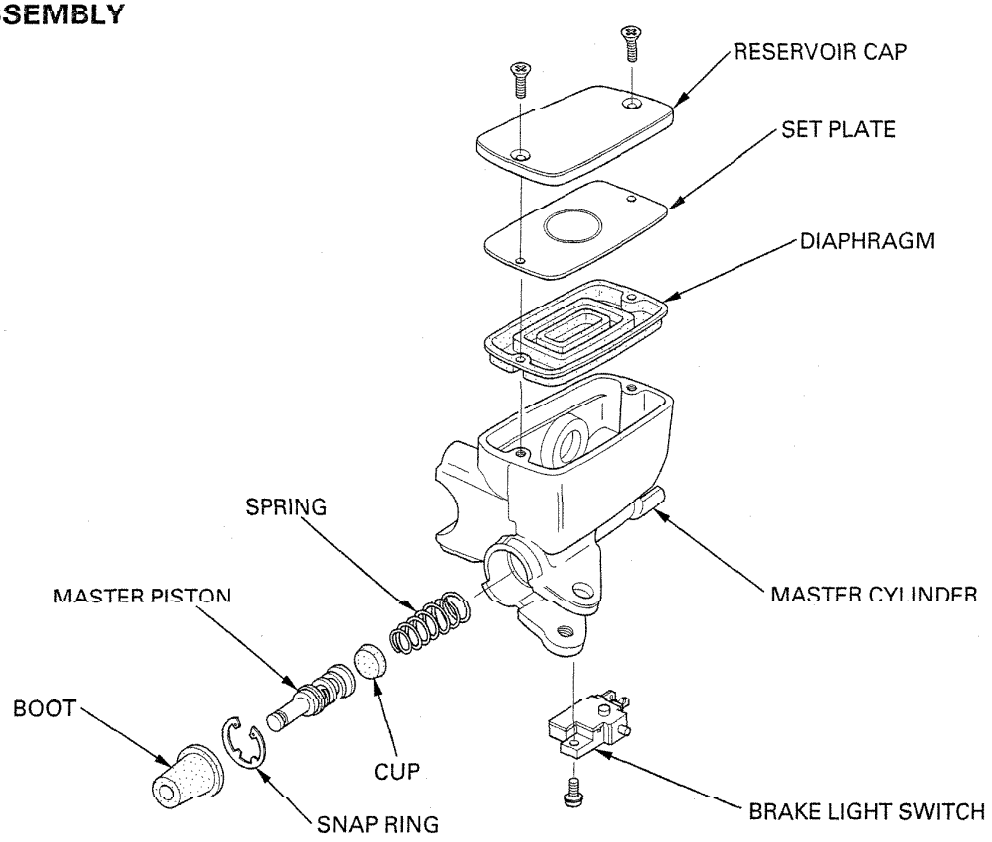
SERVICE LIMIT: 15.925 mm (0.6270 in)

Measure the master piston O.D.

SERVICE LIMIT: 15.815 mm (0.6226 in)



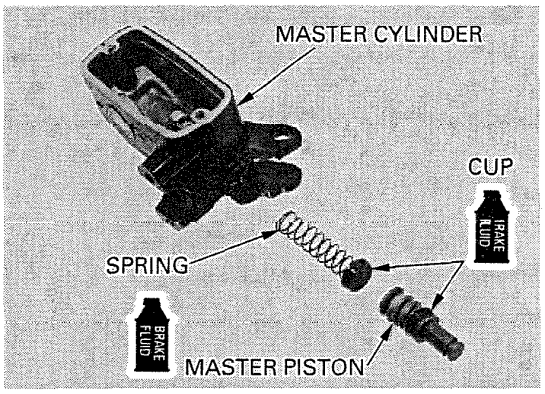
ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.
Install the spring, cup and master piston into the master cylinder.

CAUTION:

Do not allow the piston cup lips to turn inside out.

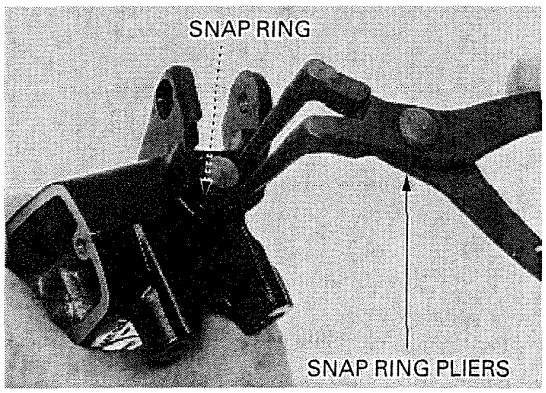


Install the snap ring into the groove in the master cylinder, using the special tool.

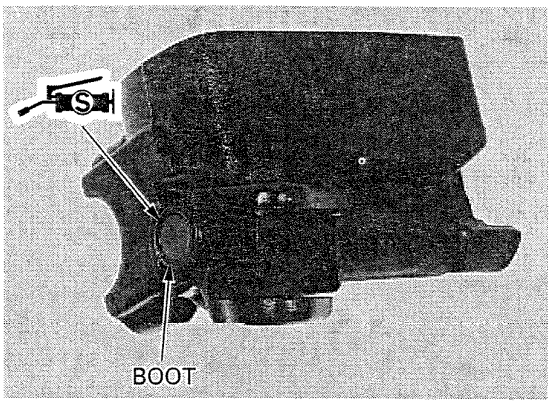
TOOL:
Snap ring pliers 07914-SA50001

CAUTION:

Be certain the snap ring is firmly seated in the groove.



Install the boot onto the piston and into the master cylinder.
Apply silicone grease to the brake lever contacting area of the master piston.



Apply silicone grease to the pivot bolt sliding surface.
Install the brake lever assembly and pivot bolt.
Tighten the pivot bolt.

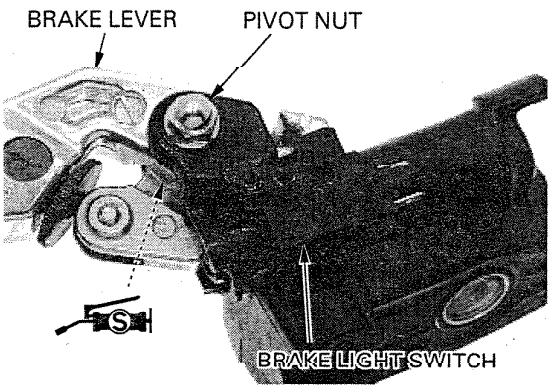
TORQUE : 1 N·m (0.1 kgf·m , 0.7 lbf·ft)

Install and tighten the pivot nut.

TORQUE : 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

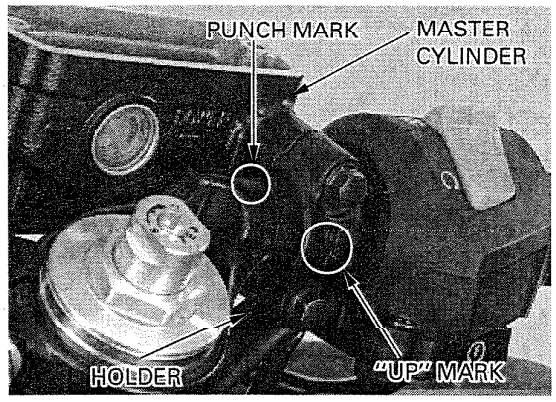
Install the front brake light switch with the screw.

TORQUE : 1 N·m (0.1 kgf·m , 0.7 lbf·ft)



Install the master cylinder and holder with the "UP" mark facing up.
Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

TORQUE : 12 N·m (1.2 kgf·m , 9 lbf·ft)

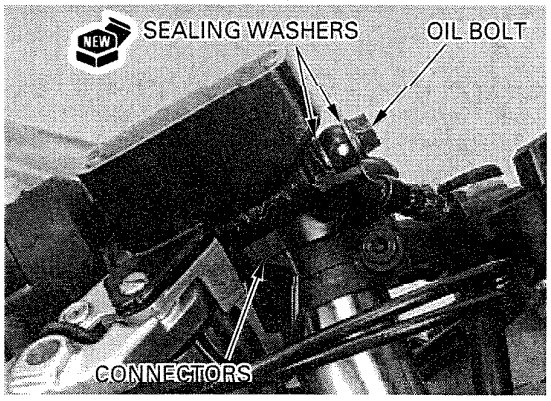


Connect the brake hose to the master cylinder with the oil bolt and new sealing washers and tighten the oil bolt.

TORQUE : 34 N·m (3.5 kgf·m , 25 lbf·ft)

Connect the front brake light switch connectors.

Fill and bleed the front hydraulic system (page 15-3).



REAR MASTER CYLINDER/ BRAKE PEDAL

CAUTION:

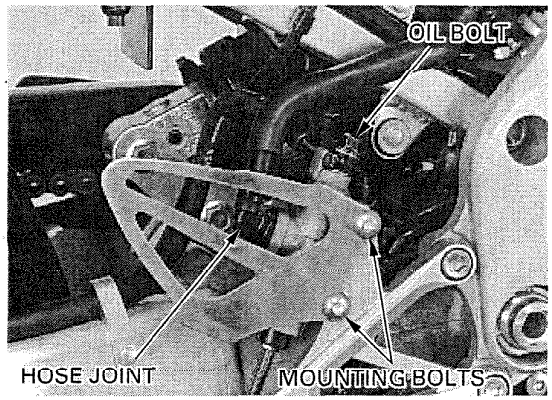
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over those parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the hose to prevent contamination.*

DISASSEMBLY

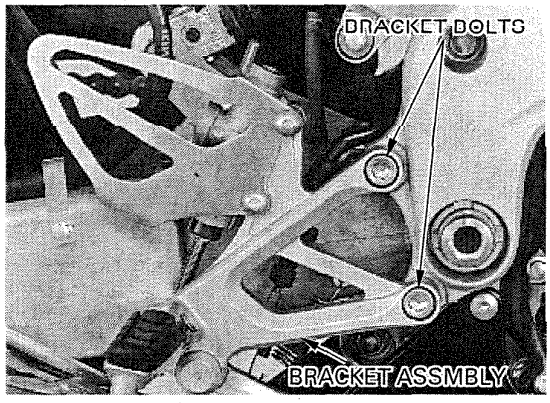
Drain the brake fluid from the rear brake hydraulic system (page 15-3).

Disconnect the brake hose from the master cylinder by removing the oil bolt and sealing washers.
Remove the screw and reservoir hose joint from the master cylinder.
Remove the O-ring.

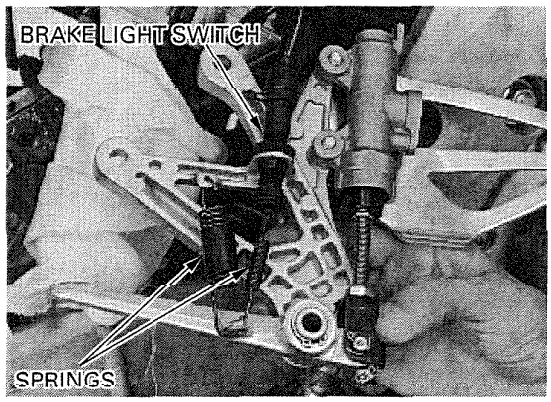
Loosen the master cylinder mounting bolts.



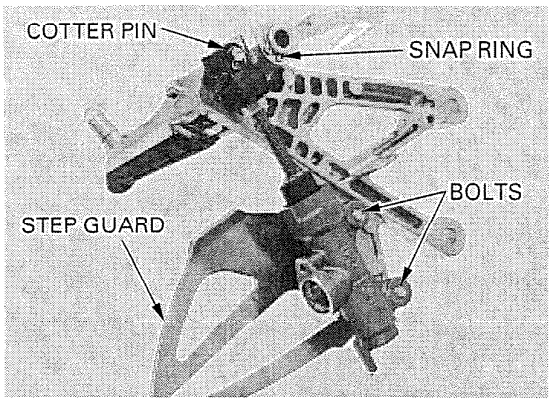
Remove the footpeg bracket bolts and footpeg bracket assembly.



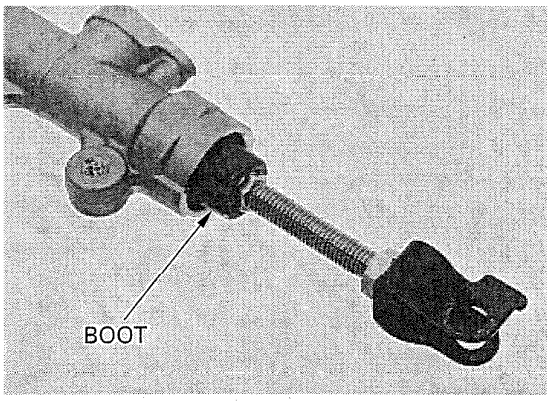
Remove the rear brake light switch spring and brake pedal return spring.
Remove the brake light switch from the footpeg bracket.



Remove the master cylinder mounting bolts and step guard.
Remove the snap ring, washers and brake pedal from the footpeg bracket.
Remove the cotter pin from the joint pin.
Remove the joint pin and master cylinder from the brake pedal.

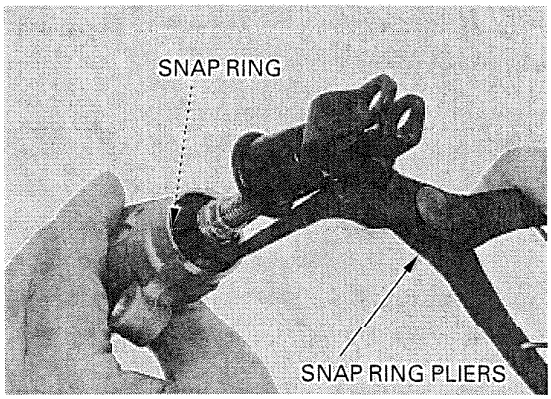


Remove the boot from the master cylinder.



Remove the snap ring using the special tool.

TOOL:
Snap ring pliers 07914-SA50001

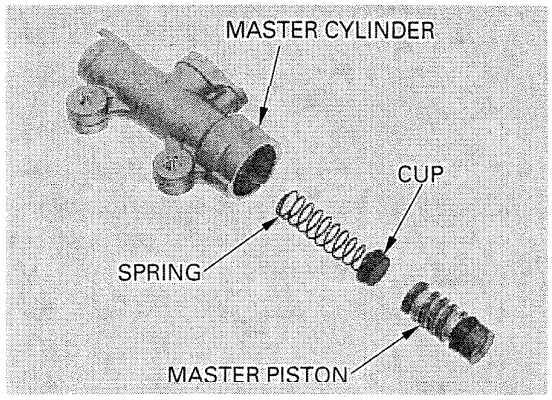


Remove the master piston, cup and spring.

Clean the master cylinder and master piston in clean brake fluid.

INSPECTION

Check the cups for wear, deterioration or damage.
Check the spring for damage.



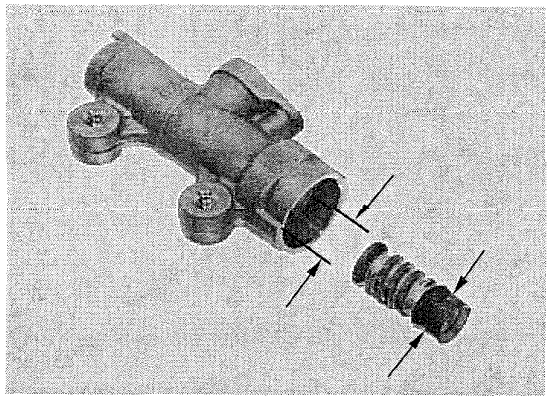
Check the master cylinder and piston for scoring or damage.

Measure the master cylinder I.D.

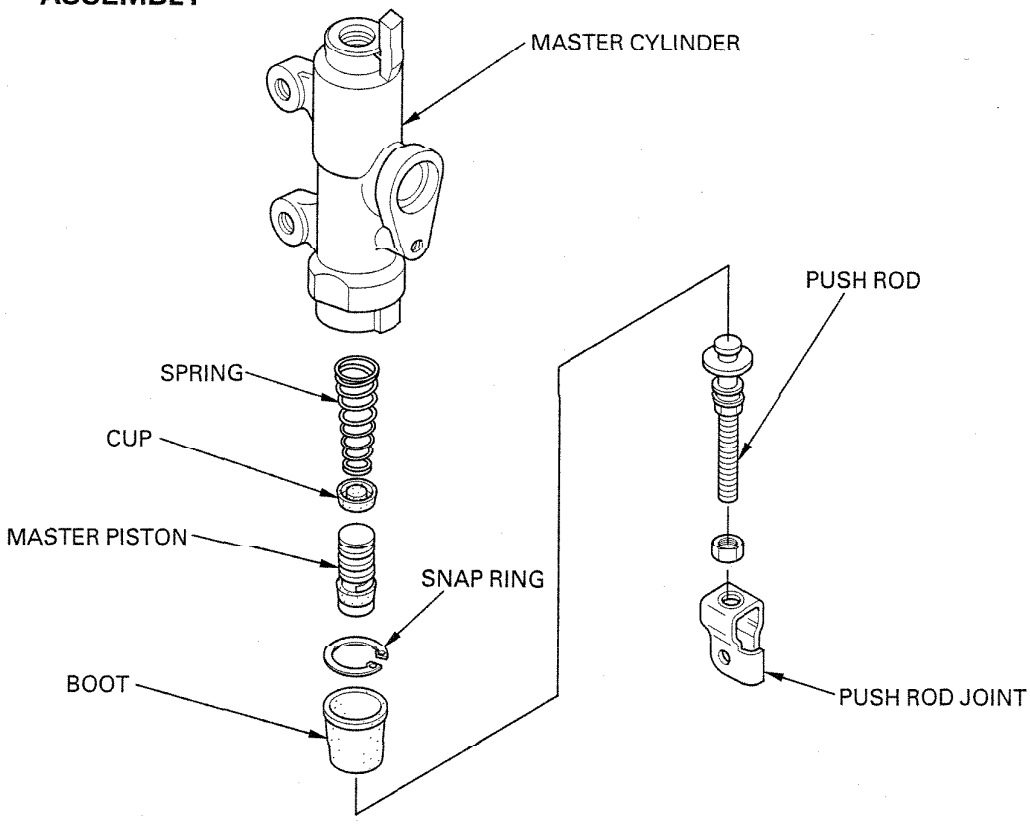
SERVICE LIMIT: 14.055 mm (0.5533 in)

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



ASSEMBLY

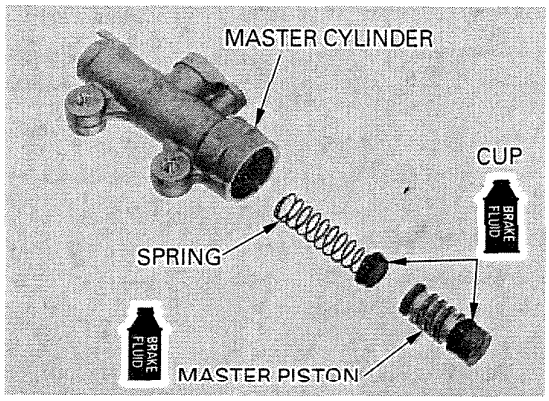


Coat the master piston and piston cups with clean brake fluid.
Install the spring, cup and master piston into the master cylinder.

CAUTION:

Do not allow the piston cup lips to turn inside out.

Apply silicone grease to the push rod contacting area of the master piston.

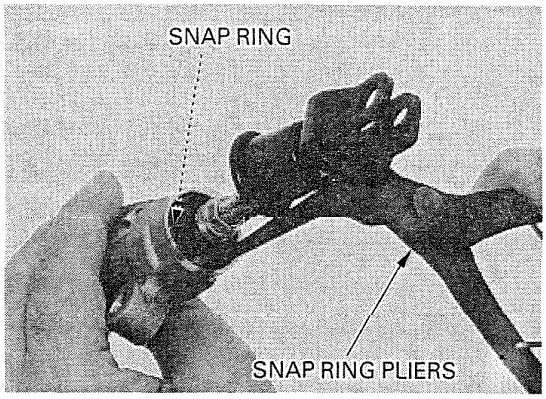


Install the push rod into the master cylinder.
Install the snap ring into the groove in the master cylinder, using the special tool.

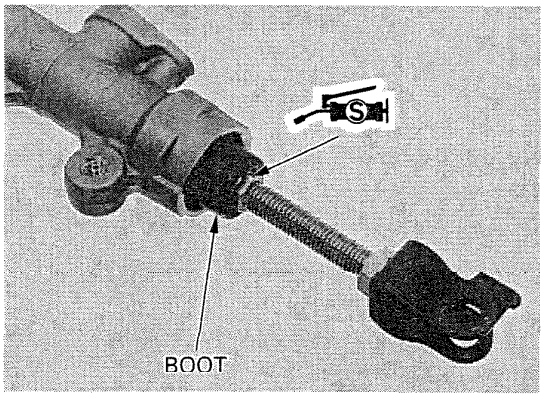
TOOL:
Snap ring pliers 07914-SA50001

CAUTION:

Be certain the snap ring is firmly seated in the groove.

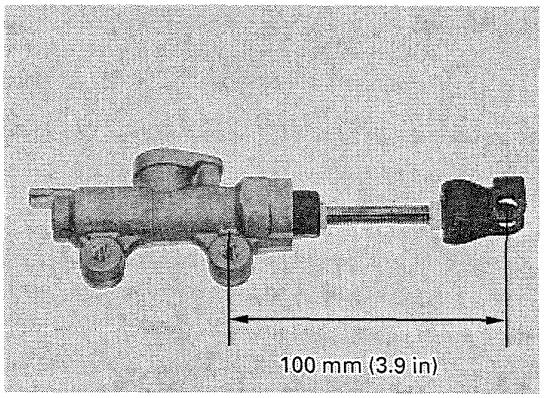


Apply silicone grease to the boot groove in the push rod and install the piston boot into the master cylinder and the groove in the push rod.



If the push rod joint is reintalled, adjust the push rod length so that the distance from the center of the master cylinder lower mounting hole to the center of the joint pin hole is 100 mm (3.9 in). After adjustment, tighten the joint nut.

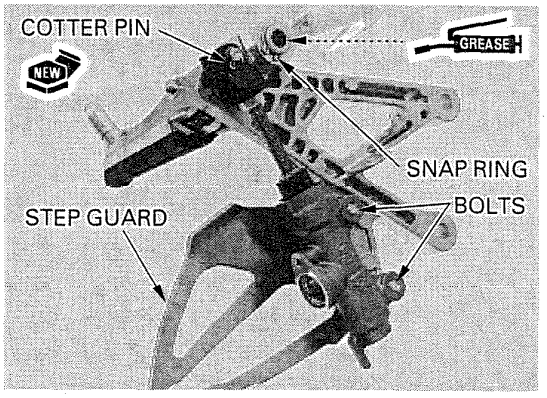
TORQUE : 18 N·m (1.8 kgf·m , 13 lbf·ft)



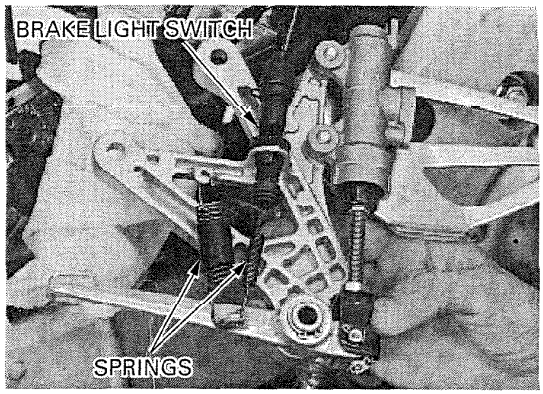
Connect the master cylinder push rod joint to the brake pedal with the joint pin and a new cotter pin.

Apply grease to the brake pedal pivot.
Install the brake pedal onto the pivot shaft.
Install the wave washer, plain washer and snap ring onto the pivot shaft.

Install the master cylinder with the mounting bolts and step guard.



Connect the pedal return spring as shown.
Install the rear brake light switch into the footpeg bracket and connect the rear brake light switch spring.

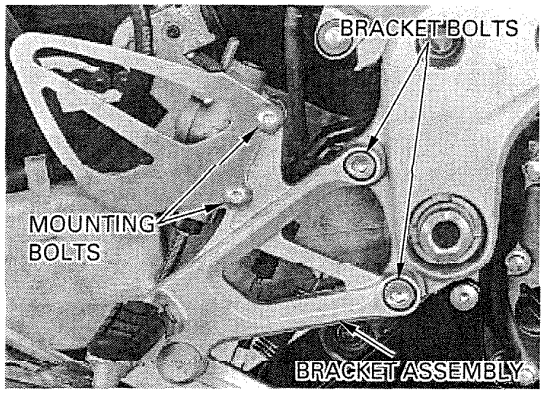


Install the footpeg bracket assembly onto the frame and tighten the bracket bolts.

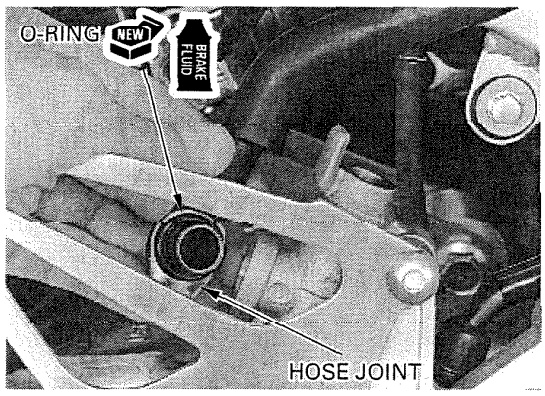
TORQUE : 26 N·m (2.7 kgf·m , 20 lbf·ft)

Tighten the master cylinder mounting bolts.

TORQUE : 9 N·m (0.9 kgf·m , 6.5 lbf·ft)



Apply brake fluid to a new O-ring and install it onto the reservoir hose joint.
Install the hose joint into the master cylinder.

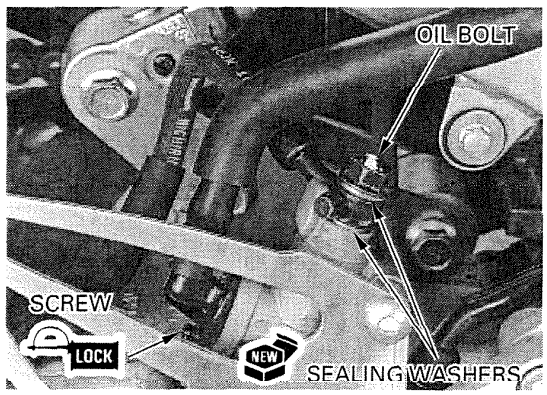


Apply locking agent to the hose joint screw.
Install the screw and tighten it.

Connect the brake hose to the master cylinder with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE : 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill and bleed the rear brake hydraulic system (page 15-3).



FRONT BRAKE CALIPER

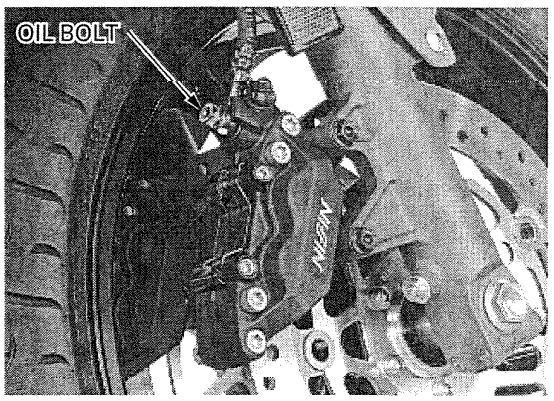
CAUTION:

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

DISASSEMBLY

Drain the brake fluid from the front brake hydraulic system (page 15-3).

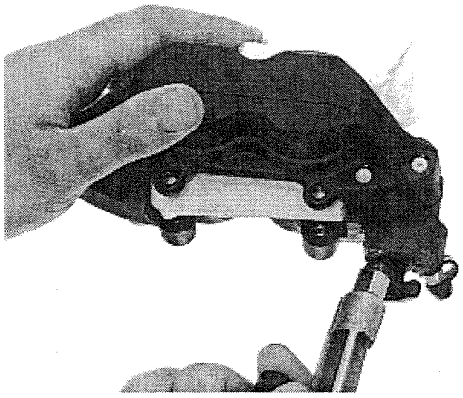
Disconnect the brake hose from the front brake caliper by removing the oil bolt and sealing washers.
Remove the brake pads (page 15-5).



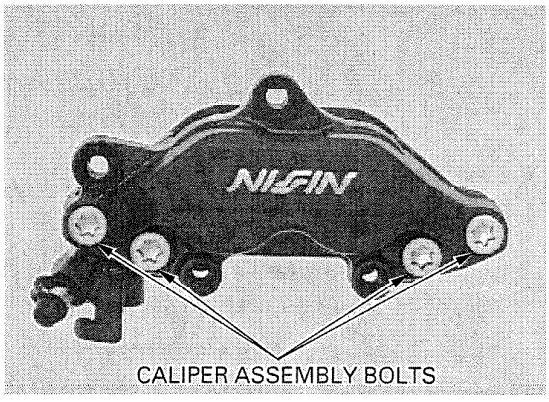
Install a corrugated cardboard or soft wood sheet between the pistons.
Apply small squirts of air pressure to the fluid inlet to remove the pistons.

⚠WARNING

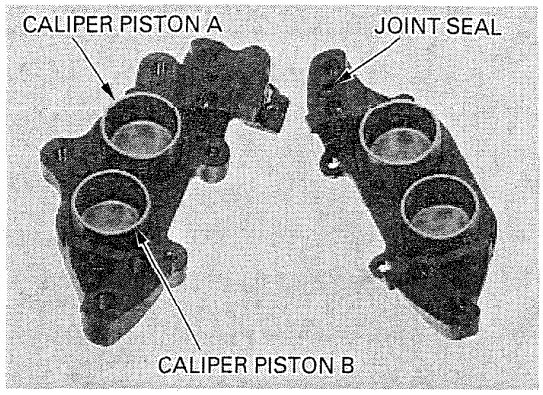
Do not use high pressure air or bring the nozzle too close to the inlet.



Remove the four caliper assembly bolts and separate the caliper body halves.



Remove the following:
– joint seal
– caliper piston A
– caliper piston B

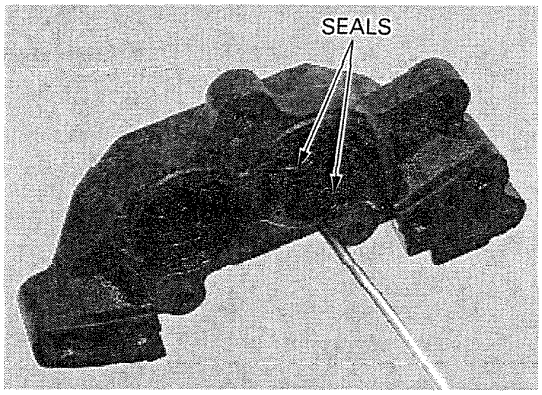


Push the dust seals and piston seals in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves, caliper cylinders and piston with clean brake fluid.

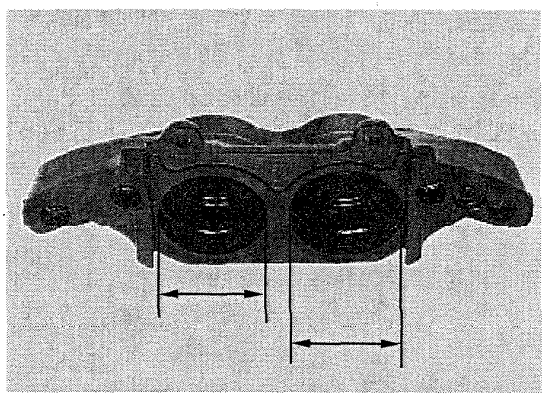


INSPECTION

Check the caliper cylinders and pistons for scoring, scratches or damage.

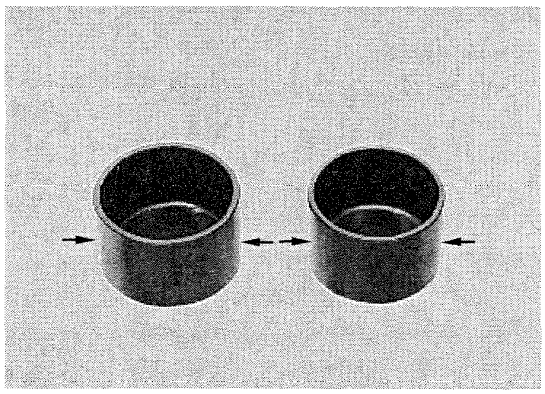
Measure the caliper cylinder I.D.

SERVICE LIMITS:
Cylinder A: 34.02 mm (1.339 in)
Cylinder B: 32.09 mm (1.263 in)

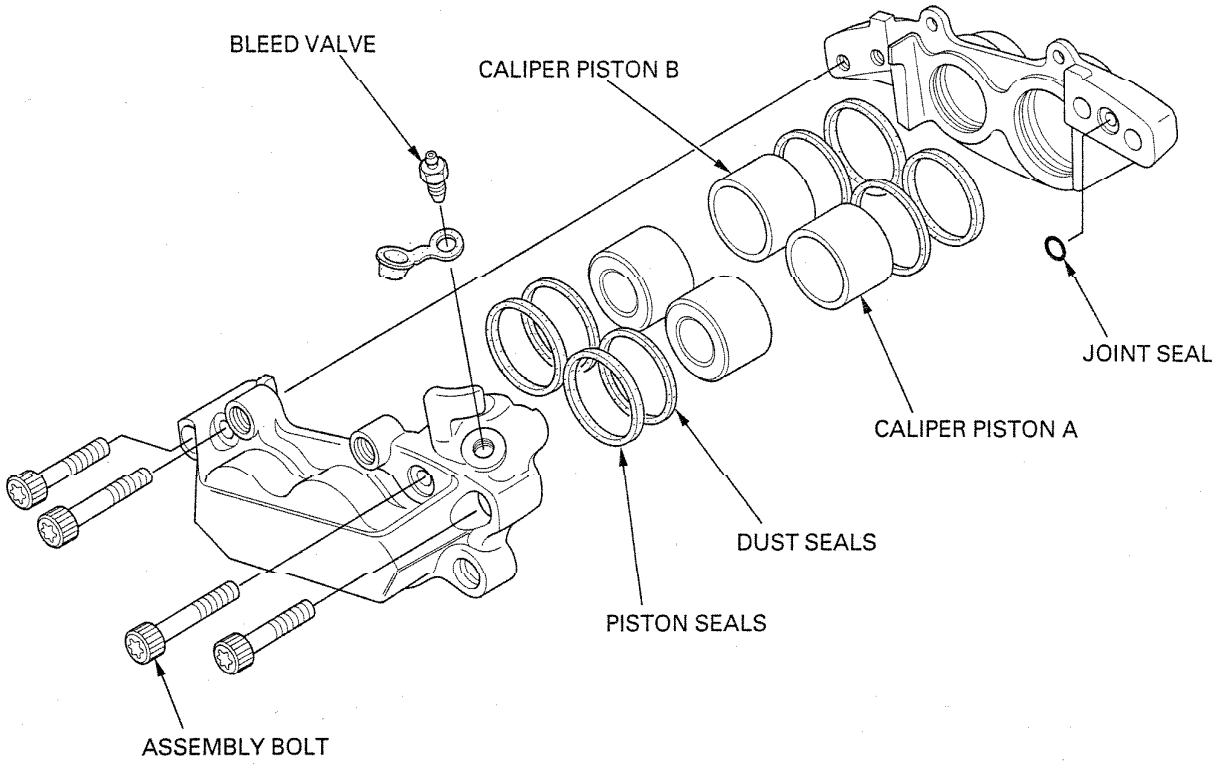


Measure the caliper piston O.D.

SERVICE LIMITS: **Piston A:** 33.87 mm (1.333 in)
Piston B: 31.94 mm (1.257 in)

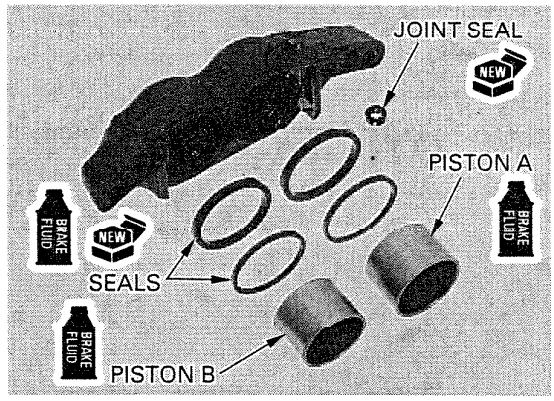


ASSEMBLY



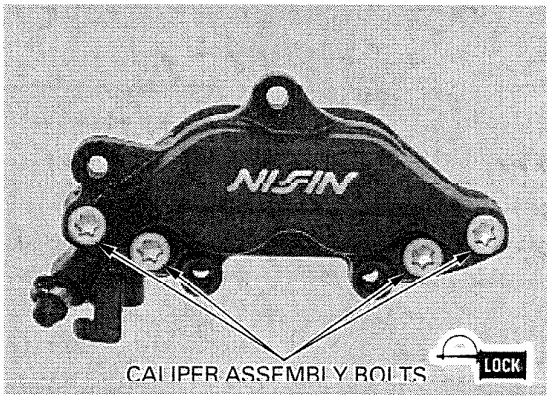
Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper. Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.

Install a new joint seal into the fluid passage groove in the caliper body.



Assemble the caliper body halves.
Apply locking agent to the caliper assembly bolt threads.
Install and tighten the assembly bolts.

TORQUE : 23 N·m (2.3 kgf·m , 17 lbf·ft)

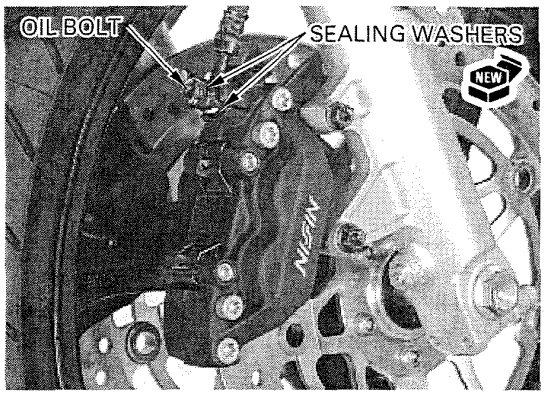


Install the brake pads (page 15-5).

Connect the brake hose to the brake caliper with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE : 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill and bleed the front brake hydraulic system (page 15-3).



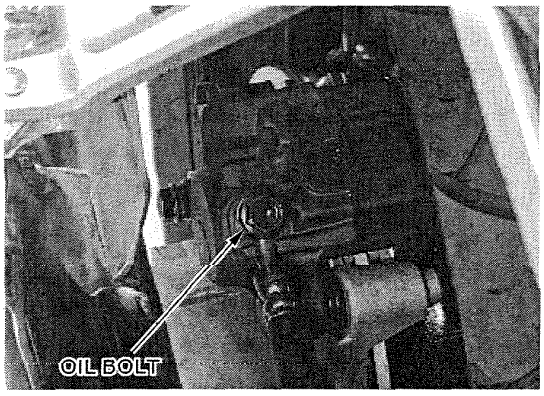
REAR BRAKE CALIPER

CAUTION:

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

DISASSEMBLY

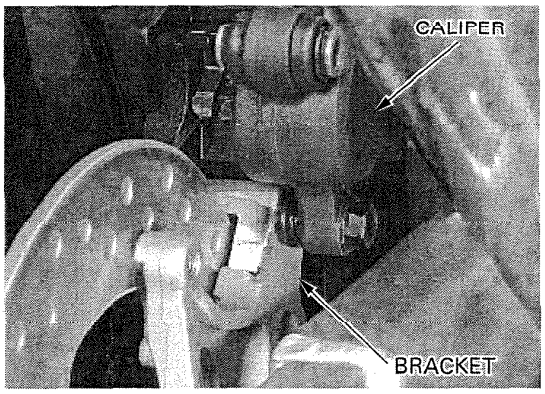
Drain the brake fluid from the rear brake hydraulic system (page 15-3).



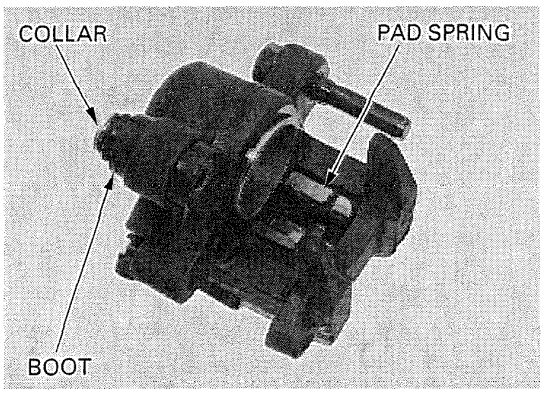
Disconnect the brake hose from the rear brake caliper by removing the oil bolt and sealing washers.

Remove the rear brake pads (page 15-6).

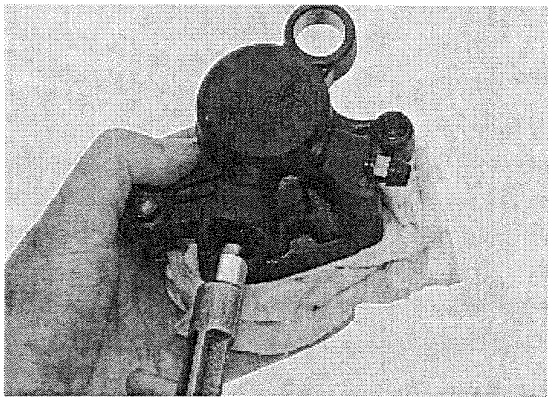
Remove the rear brake caliper from the bracket.



Remove the pad spring, collar and boot from the caliper body.



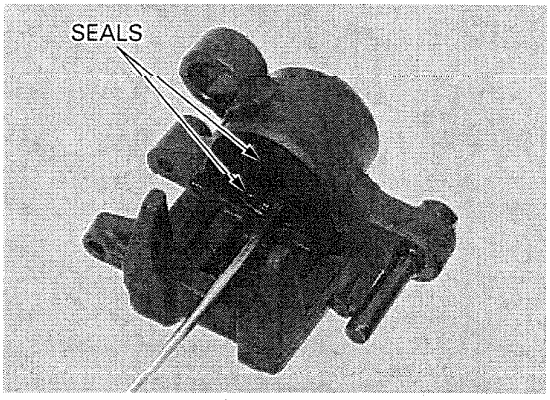
Place a shop towel over the piston.
Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.



⚠WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

Push the dust seal and piston seal in and lift them out.

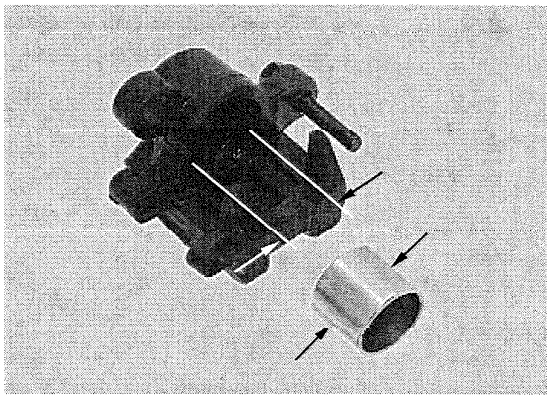


CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves, caliper cylinder and piston with clean brake fluid.

INSPECTION



Check the caliper cylinder and piston for scoring, scratches or damage.

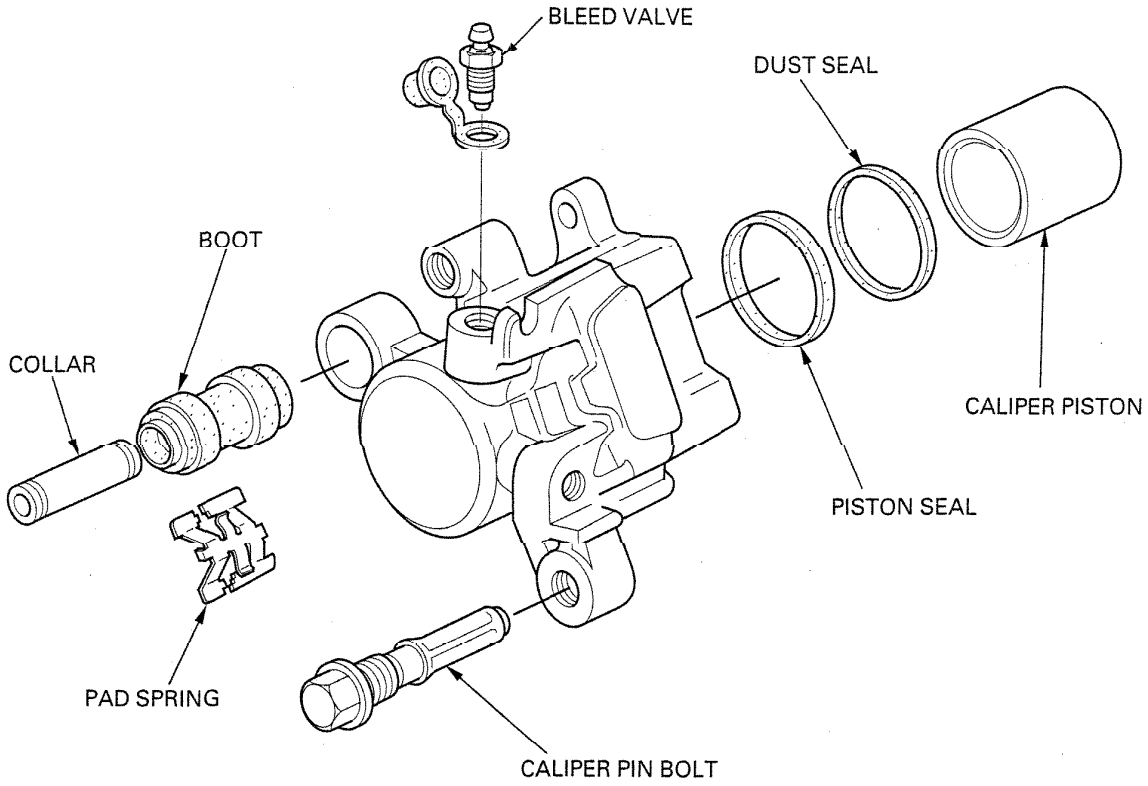
Measure the caliper cylinder I.D.

SERVICE LIMIT: 38.24 mm (1.506 in)

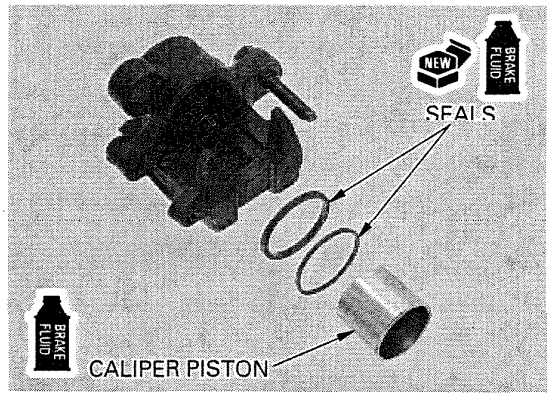
Measure the caliper piston O.D.

SERVICE LIMIT: 38.09 mm (1.500 in)

ASSEMBLY

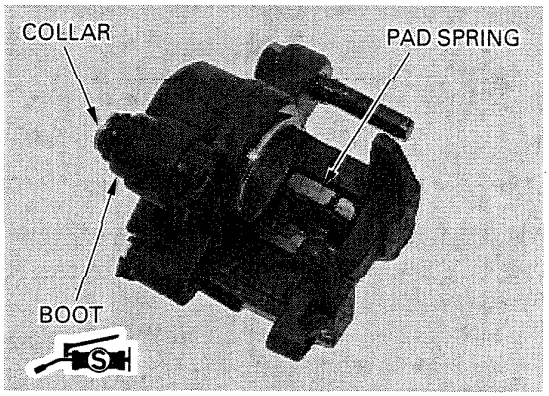


Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper. Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with the opening toward the pads.



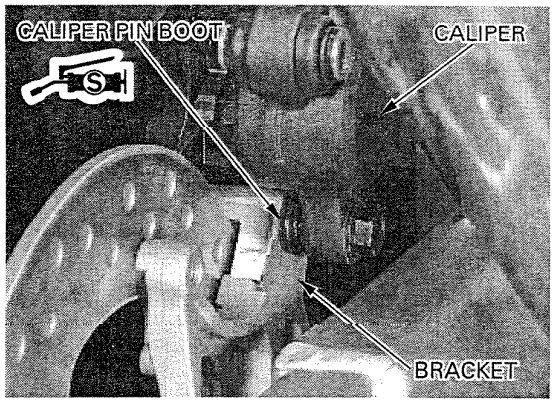
Install the pad spring onto the caliper body as shown.

Check the caliper boot and replace it if it is hard, deteriorated or damaged.
Apply silicone grease to the inside of the boot.
Install the boot and collar into the caliper.



Check the caliper pin boot and replace it if it is hard, deteriorated or damage.
Apply silicone grease to the inside of the boot and install the caliper onto the bracket.

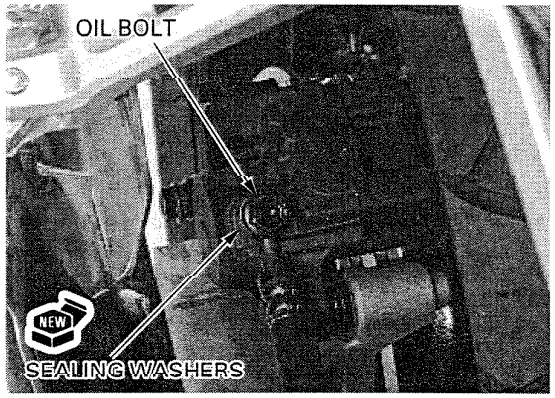
Install the rear brake pads (page 15-6).

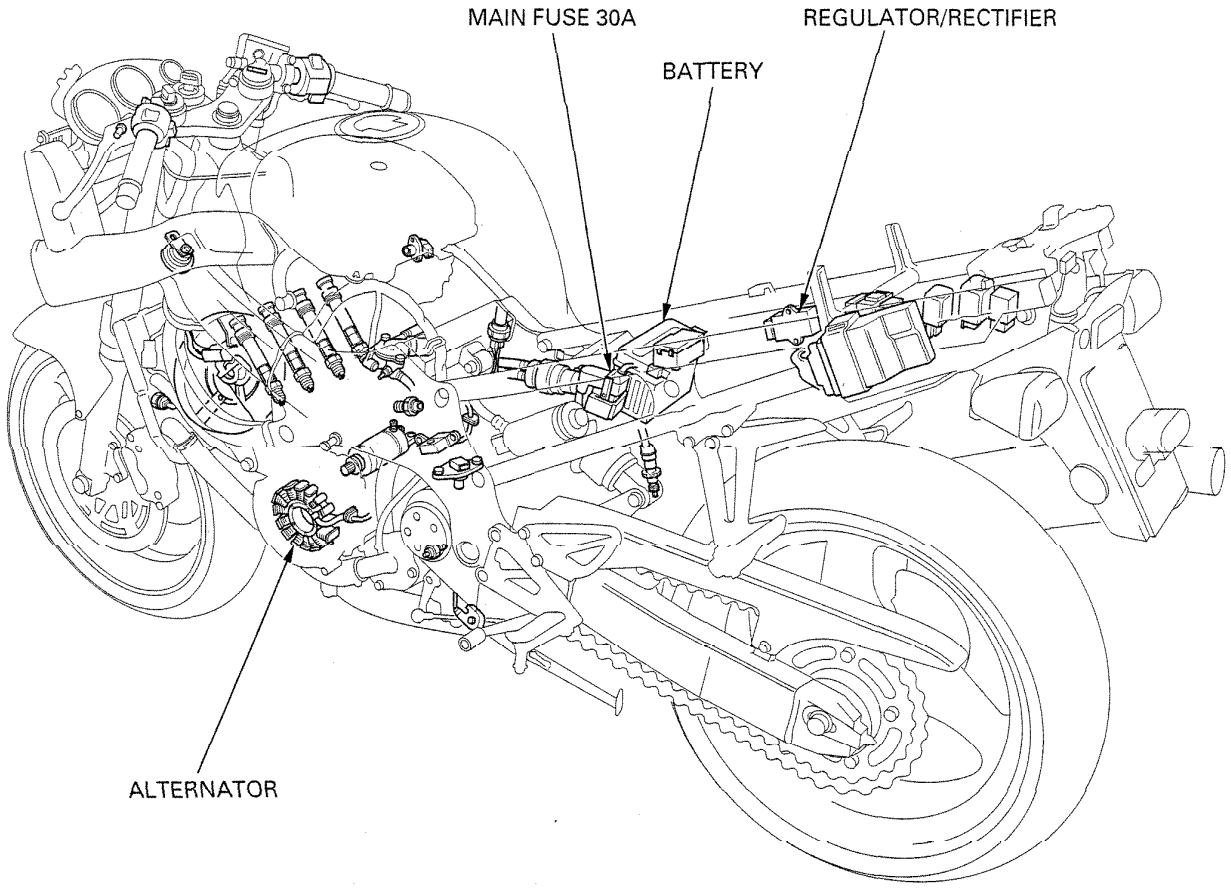


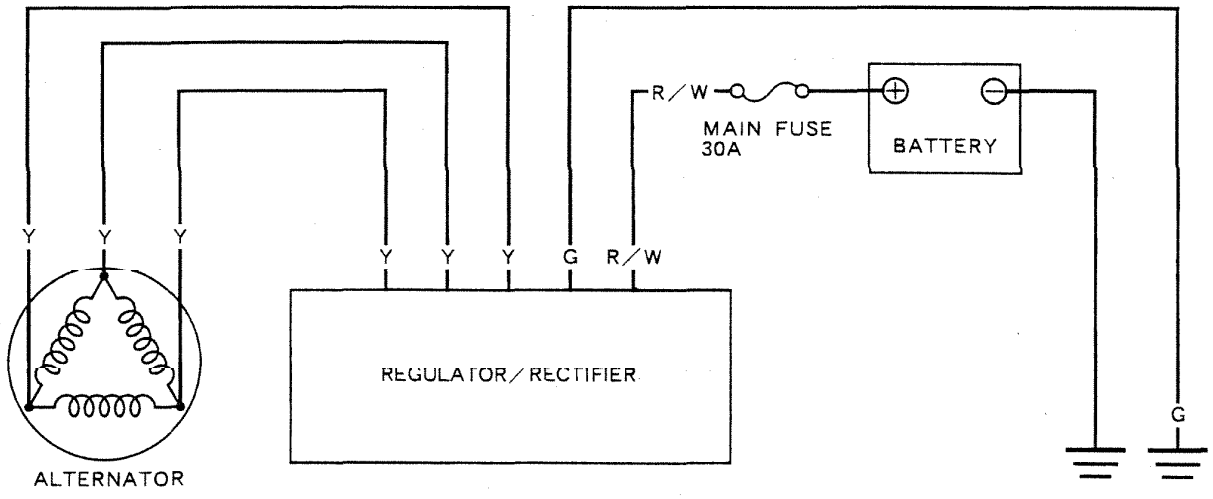
Connect the brake hose to the brake caliper with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE : 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill and bleed the rear brake hydraulic system (page 15-3).







Y : Yellow
G : Green
R : Red
W : White

16. CHARGING SYSTEM

SERVICE INFORMATION	16-1	CHARGING SYSTEM INSPECTION	16-5
TROUBLESHOOTING	16-3	ALTERNATOR CHARGING COIL	16-6
BATTERY	16-4	REGULATOR/RECTIFIER	16-7

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.***
- ***The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.***
  - ***—If electrolyte gets on your skin, flush with water.***
  - ***—If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.***
- ***Electrolyte is poisonous.***
  - ***—If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.***

- Always turn off the ignition switch before disconnecting any electrical component.

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery

NOTE:

The maintenance free battery must be replaced when it reaches the end of its service life.

16

CAUTION:

The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2—3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).
- For alternator service, refer to section 10.

CHARGING SYSTEM

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  —Use only the electrolyte that comes with the battery.
  —Use all of the electrolyte.
  —Seal the battery properly.
  —Never open the seals again.

BATTERY TESTING

Refer to the instructions in the Operation Manual for the recommended battery tester for details about the battery testing.
The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

Recommended battery tester BM-210-AH, BM-210, or BATTERY MATE or equivalent

CAUTION:

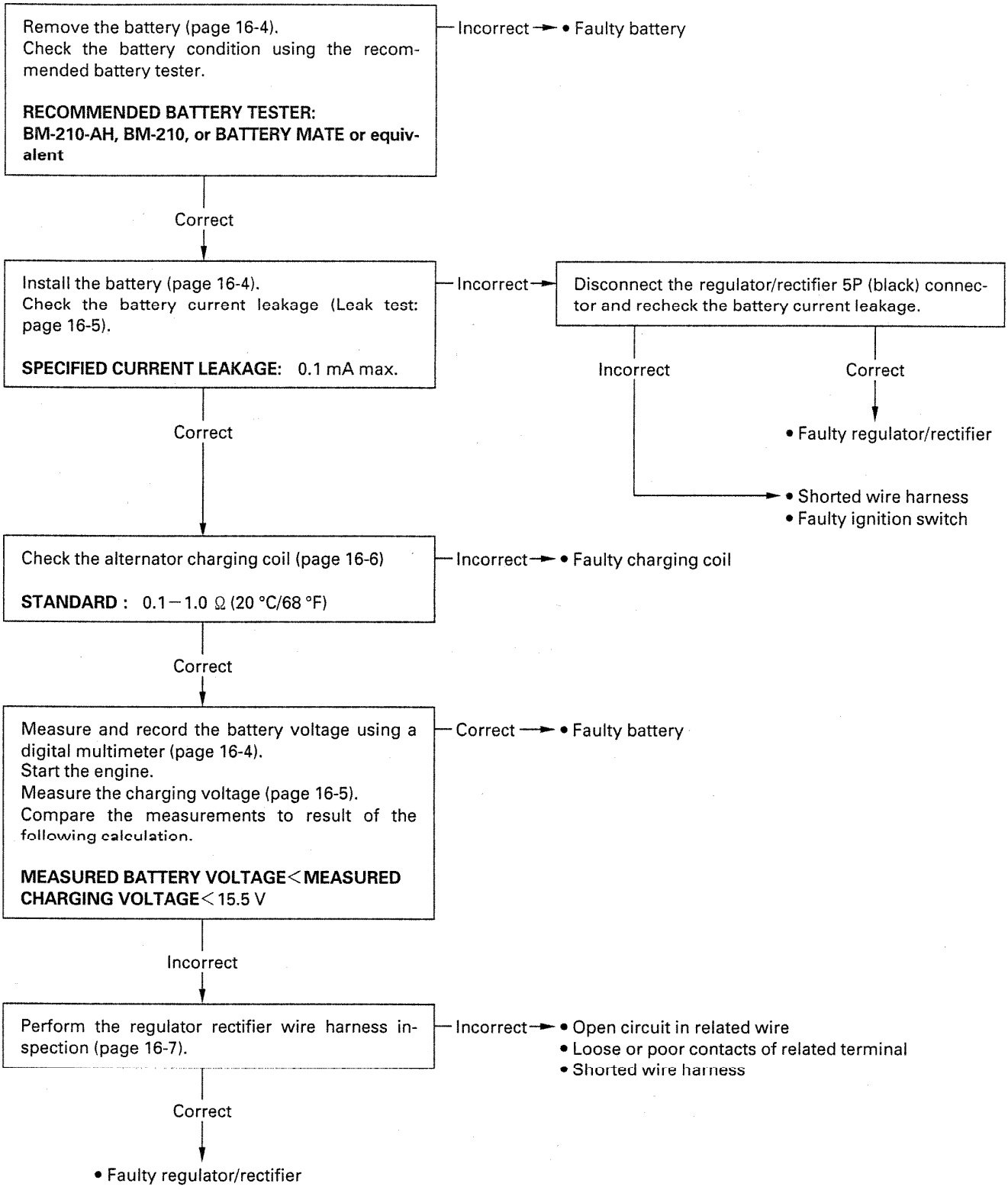
For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V − 8 AH
	Current leakage		0.1 mA max.
	Voltage (20 °C/68 °F)	Fully charged	13.0 − 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A × 5 − 10 h
		Quick	4.0 A × 1.0 h
Alternator	Capacity		343 W/5,000 min^{-1} (rpm)
	Charging coil resistance (20 °C/68 °F)		0.1 − 1.0 Ω

TROUBLESHOOTING

Battery is damaged or weak

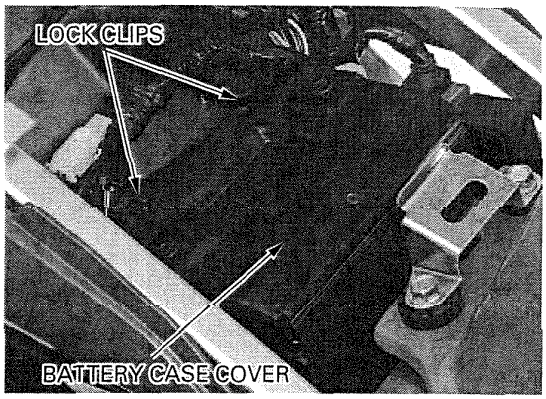


BATTERY

REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Open the battery case cover by releasing the two lock clips.

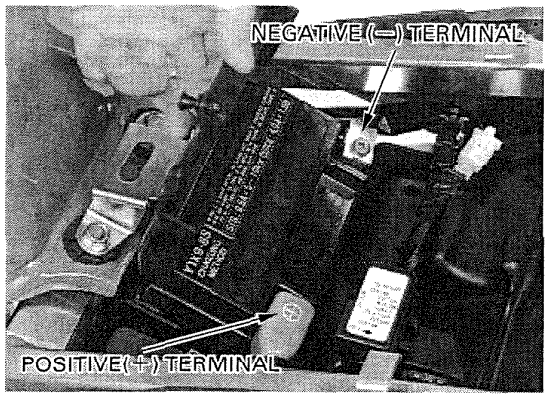


With the ignition switch OFF, disconnect the negative (−) cable first, then disconnect the positive (+) cable.
Remove the battery from the battery case.

Install the battery in the reverse order of removal.

NOTE:

- Connect the positive (+) cable first, then connect the negative (−) cable.
- After connecting the battery cables, coat the terminals with grease.



VOLTAGE INSPECTION

Open the battery case cover.
Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20 °C/68 °F):
Fully charged: 13.0 − 13.2 V
Under charged: Below 12.3 V

BATTERY CHARGING

⚠WARNING

- ***The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.***
- ***Turn the power ON/OFF at the charger, not at the battery terminals.***

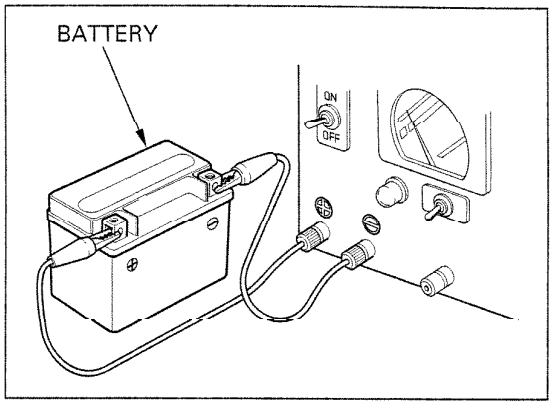
Remove the battery.

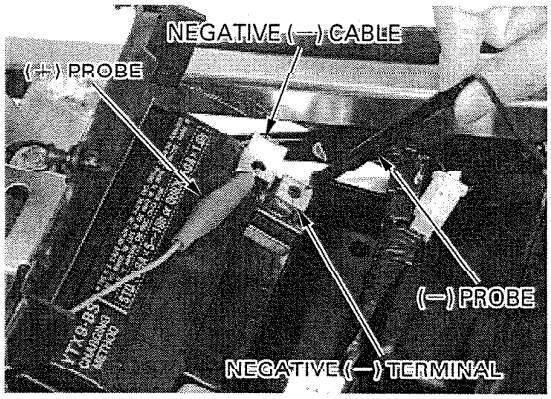
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (−) cable to the battery negative (−) terminal.

CHARGING CURRENT/TIME:
Standard: 0.9 A × 5−10 h
Quick: 4.0 A × 1.0 h

CAUTION:

- ***Quick charging should only be done in an emergency; slow charging is preferred.***
- ***For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.***





CHARGING SYSTEM INSPECTION

Open the battery case cover (page 16-4).

CURRENT LEAKAGE TEST

Turn the ignition switch OFF, and disconnect the negative (−) cable from the battery.
Connect the ammeter (+) probe to the negative (−) cable and the ammeter (−) probe to the battery (−) terminal.
With the ignition switch OFF, check for current leakage.

NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 0.1 mA max

If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.

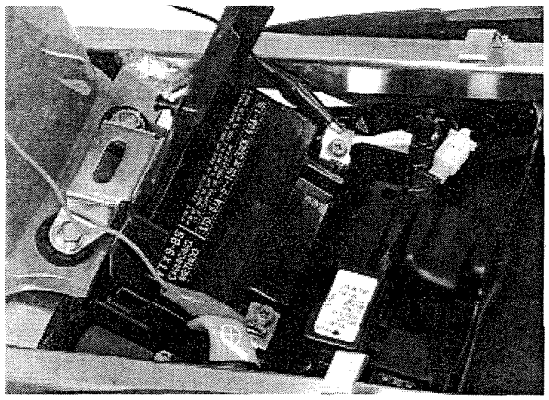
CHARGING VOLTAGE INSPECTION

⚠WARNING

When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

Be sure that the battery is in good condition before performing this test.

Start the engine and warm it up to the operating temperature; stop the engine.
Connect the multimeter between the positive and negative terminals of the battery.



CAUTION:

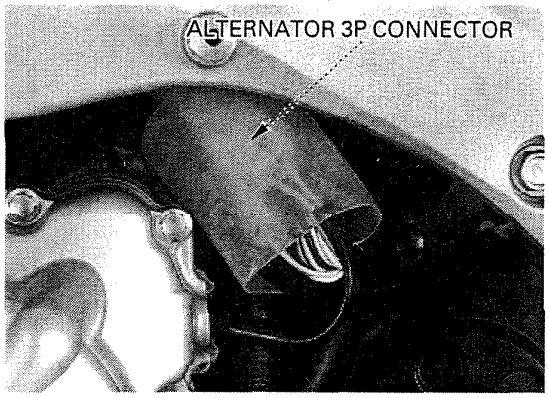
- ***To prevent short, make absolutely certain which are the positive and negative terminals or cable.***
- ***Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.***

With the headlight on Hi beam, restart the engine.
Measure the voltage on the multitester when the engine runs at 5,000 rpm.

STANDARD:
Measured battery voltage (page 16-4)＜Measured charging voltage (see above)＜15.5 V

ALTERNATOR CHARGING COIL

INSPECTION



Remove the left side fairing (page 2-4).

Disconnect the alternator 3P (white) connector.

Measure the resistance between the wire terminals of the alternator side connector.

STANDARD: 0.1 — 1.0 Ω (20 °C/ 68 °F)

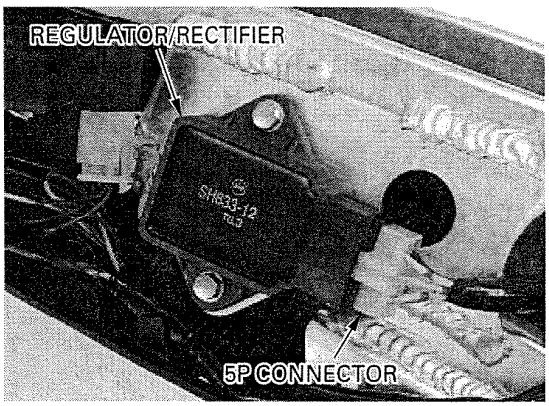
Check for continuity between each wire terminal of the alternator side connector and ground.
There should not be continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

Refer to section 10 for alternator stator replacement.

REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION



Remove the seat cowl (page 2-2).

Disconnect the regulator/rectifier 5P (black) connector.
Check the connector for loose contacts or corroded terminals.

BATTERY LINE

Measure the voltage between the red/white wire terminal and ground.
There should be battery voltage at all times.

GROUND LINE

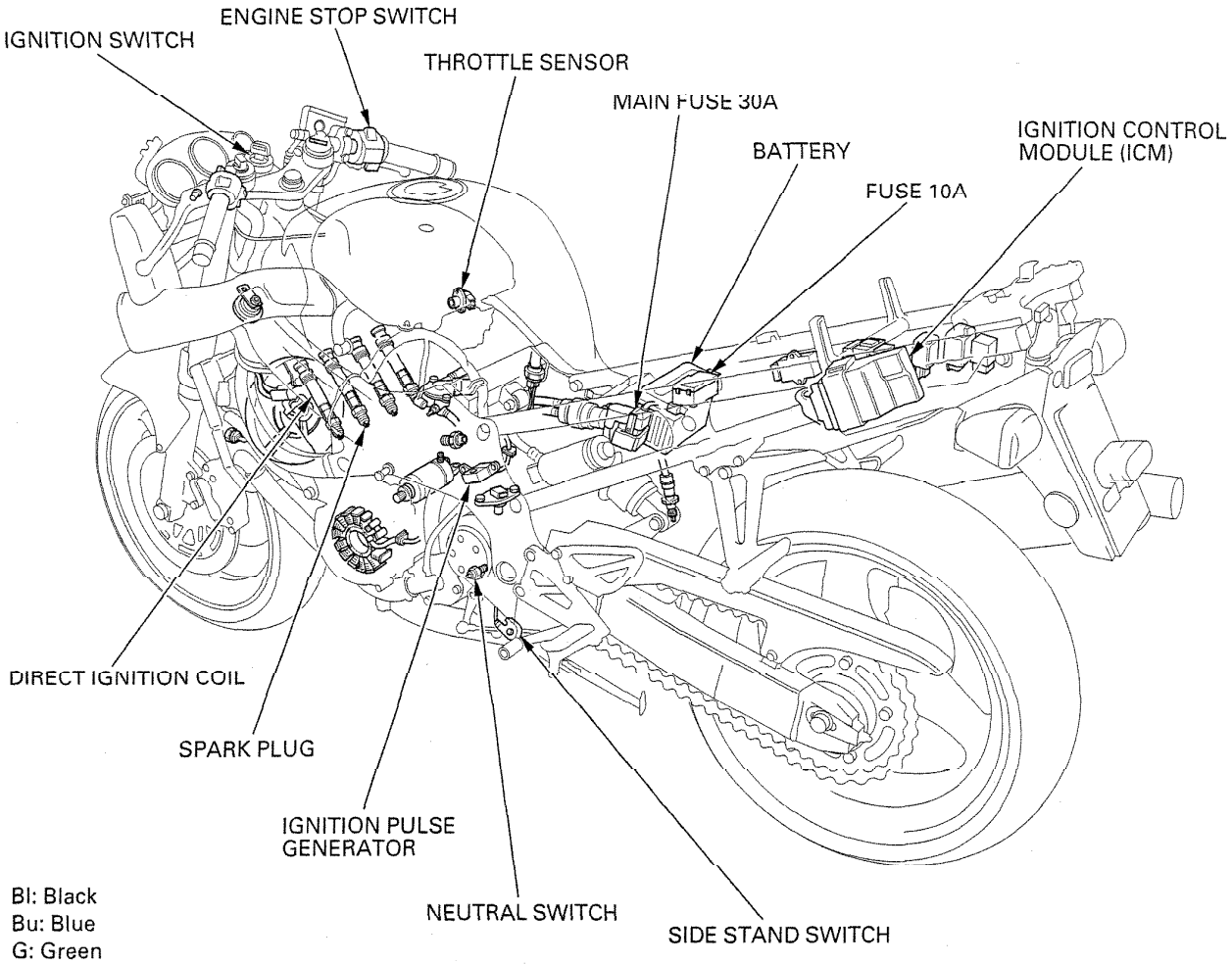
Check the continuity between the green wire terminal and ground.
There should be continuity at all times.

CHARGING COIL LINE

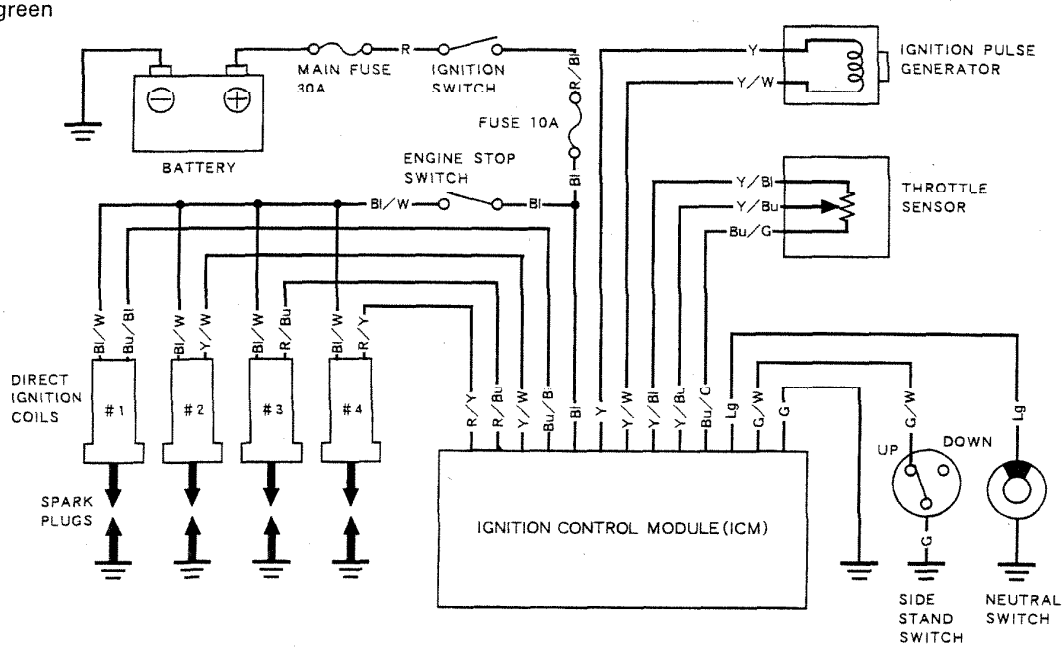
Measure the resistance between the yellow wire terminals.

STANDARD: 0.1 – 1.0 Ω (20 °C/68 °F)

Check for continuity between each yellow wire terminal and ground.
There should not be continuity.



Bl: Black
Bu: Blue
G: Green
Lg: Light green
R: Red
W: White
Y: Yellow



17. IGNITION SYSTEM

SERVICE INFORMATION	17-1	IGNITION PULSE GENERATOR	17-7
TROUBLESHOOTING	17-3	IGNITION TIMING	17-7
IGNITION SYSTEM INSPECTION	17-4	THROTTLE SENSOR	17-7

SERVICE INFORMATION

GENERAL

⚠WARNING

When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 17-3.
- The transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- The ignition control module (ICM) varies ignition timing according to the engine speed. The throttle sensor signals the ICM to compensate the ignition timing according to the throttle opening.
- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ICM. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- The direct ignition coil that the ignition coil and spark plug cap are integrated, is adopted on this motorcycle.
- Use the spark plugs of the correct heat range. Using a spark plug of an incorrect heat range can damage the engine.
- The California type's spark plug is equipped with platinum type electrodes. Do not use spark plugs other than specified (California type only).
- For spark plug inspection and direct ignition coil removal/installation, see section 3.
- See section 19 for following components:
  - Ignition switch
  - Engine stop switch
  - Neutral switch
  - Side stand switch
  - Clutch switch

SPECIFICATION

ITEM		SPECIFICATIONS
Spark plug	49 state/Canada type	CR9EH-9 (NGK), U27FER-9 (DENSO)
	California type	CR9EHVX-9 (NGK)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		10° BTDC at idle
Throttle sensor	Resistance (20 °C/68 °F)	4 – 6 kΩ
	Input voltage	4.7 – 5.3 V

TORQUE VALUE

Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads

TOOL

Peak voltage tester (U.S.A. only) or Peak voltage adaptor	07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

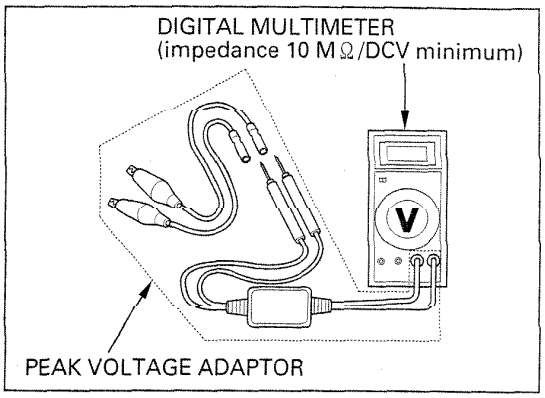
TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - —Faulty spark plug
  - —Loose direct ignition coil connections
  - —Water got into the direct ignition coil (ignition coil secondary voltage leak)
- If there is no spark at any cylinder, temporarily exchange the direct ignition coil with another good one and perform the spark test. If there is spark, the exchanged direct ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch ON and engine stop switch at RUN (when the engine is not cranking by the starter motor).

NO SPARK AT SPARK PLUGS

UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch ON and engine stop switch at RUN. (Other electrical components are normal.)	1. Faulty engine stop switch. 2. An open circuit in black/white wire between the direct ignition coil and engine stop switch. 3. Loose or poor connection of the ignition coil primary wire terminal, or an open circuit in primary coil. (Check at the ignition control module (ICM) connector.) 4. Faulty ICM when the initial voltage is normal while disconnecting ICM connector.
	Initial voltage is normal, but it drops down to 2—4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Battery is undercharged. (Large voltage drops when the engine is started.) 3. No voltage between the black (+) and ground (—) of the ICM connector, or loose or poorly connected ICM. 4. Poor connection or open circuit in green (ground) wire of the ICM. 5. Loose or poor connections, or open circuit in blue/black, yellow/white, red/blue and red/yellow between the direct ignition coils and ICM. 6. Faulty side stand switch or neutral switch. 7. An open circuit or loose connection in No. 6 related circuit wires. • Side stand switch line: green/white wire • Neutral switch line: light green wire 8. Faulty ignition pulse generator. (Measure peak voltage.) 9. Faulty ICM (when above No. 1 thru. 8 are normal).
	Initial voltage is normal, but no peak voltage exists while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ICM (when above No. 1 and 2 are normal).
	Initial voltage is normal, but peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ICM (when above No. 1 thru. 3 are normal)
	Initial voltage and peak voltage are normal, but no spark jumps at plug.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty direct ignition coil(s).
Ignition pulse generator	Peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged). 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (when above No. 1 thru. 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION



NOTE:

- If no spark jumps at the plugs, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter (impedance 10 MΩ/DCV minimum).
- The display value differs depending upon the internal impedance of the multimeter.

Connect the peak voltage adaptor to the digital multimeter, or use the peak voltage tester.

TOOLS:
Peak voltage tester (U.S.A. only) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 MΩ /DCV minimum)

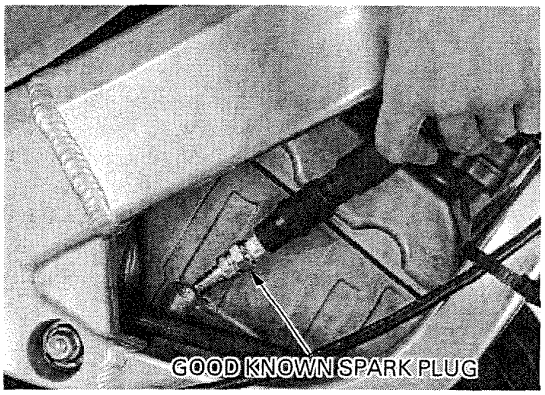
IGNITION PRIMARY PEAK VOLTAGE

NOTE:

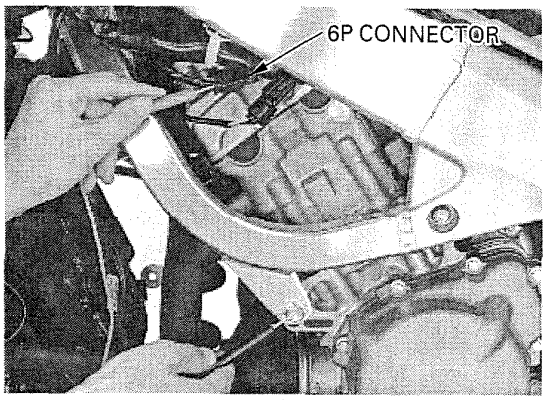
- Check all system connections before this inspection. Poor connected connectors can cause incorrect readings.
- Check the cylinder compression at each cylinder and check that the spark plugs are installed correctly in each cylinder.

Disconnect the direct ignition coils from the spark plugs (page 3-6).
Connect the 2P connectors to the direct ignition coils.

Connect good known spark plugs to the direct ignition coils and ground the spark plugs to the cylinder head as done in a spark test.



With the 6P (black) connector connected, connect the peak voltage adaptor or tester probes to the ignition coil primary wire terminal and ground.



TOOLS:
Peak voltage tester (U.S.A. only) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 MΩ /DCV minimum)

CONNECTION:
- **# 1 ignition coil:** Blue/black wire terminal (+)-to-Ground (−)
- **# 2 ignition coil:** Yellow/white wire terminal (+)-to-Ground (−)
- **# 3 ignition coil:** Red/blue wire terminal (+)-to-Ground (−)
- **# 4 ignition coil:** Red/yellow wire terminal (+)-to-Ground (−)

Turn the ignition switch ON and engine stop switch to RUN.
Check for the initial battery voltage.
If battery voltage is not present, follow the checks described in the troubleshooting on page 17-3.

Shift the transmission into neutral.
Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

⚠WARNING

Avoid touching the spark plugs and tester probes to prevent electric shock.

NOTE:

Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than standard value, follow the checks described in the troubleshooting chart (page 17-3).

Install the removed parts in the reverse order of removal.

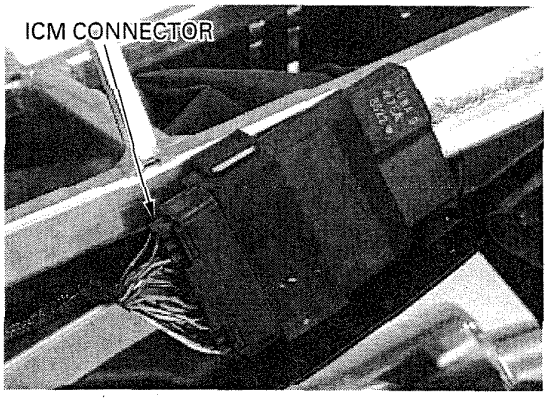
IGNITION PULSE GENERATOR PEAK VOLTAGE

NOTE:

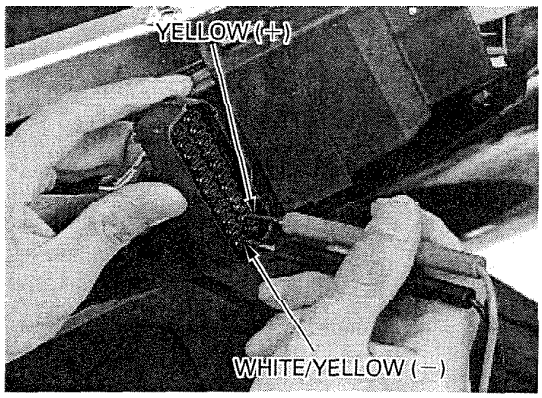
Check cylinder compression at each cylinder and check that the spark plugs are installed correctly in the cylinders.

Remove the seat cowl (page 2-2).

Disconnect the ignition control module (ICM) connector.



Connect the peak voltage adaptor or tester probes to the connector terminals of the wire harness side.



TOOLS:
Peak voltage tester (U.S.A. only) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 MΩ /DCV minimum)

CONNECTION:
Yellow wire terminal (+)-to-White/yellow wire terminal (–)

Turn the ignition switch ON and engine stop switch to RUN.
Shift the transmission into neutral.
Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

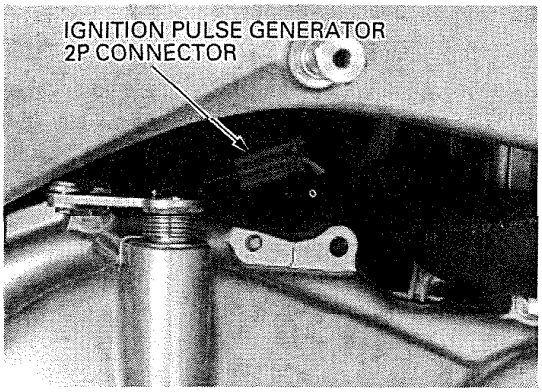
PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ICM connector is abnormal, measure the peak voltage at the pulse generator connector.

Remove the right side fairing (page 2-4).

Disconnect the clutch cable (page 9-3).

Disconnect the ignition pulse generator 2P (red) connector and connect the peak voltage adaptor or tester probes to the connector terminals of the ignition pulse generator side.
In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.



- If the peak voltage measured at the ICM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open or short circuit, or loose connection.
- If both peak voltages are lower than standard value, follow the checks described in the troubleshooting chart (page 17-3).

Install the removed parts in the reverse order of removal.

IGNITION PULSE GENERATOR

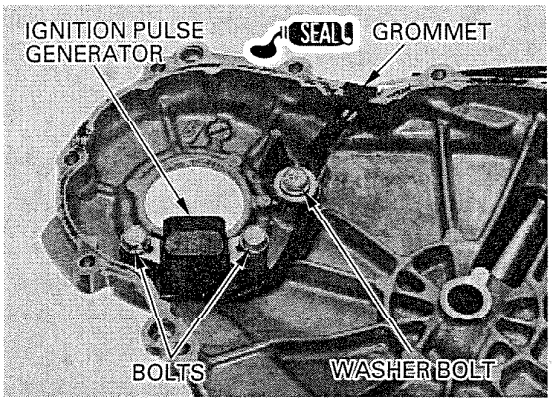
REPLACEMENT

Remove the right crankcase cover (page 9-3).

Remove the wire setting washer bolt.
Remove the two bolts and ignition pulse generator.

Apply sealant to the grommet seating surfaces.
Install a new ignition pulse generator and the grommet into the cover groove properly.
Tighten the bolts securely.

Install the right crankcase cover (page 9-14).



IGNITION TIMING

Remove the right side fairing (page 2-4).

Start the engine and warm it up to operating temperature.
Stop the engine and remove the timing hole cap.

Read the instructions for timing light operation.

Connect the timing light to the #1 or #4 direct ignition coil wire (black/white).

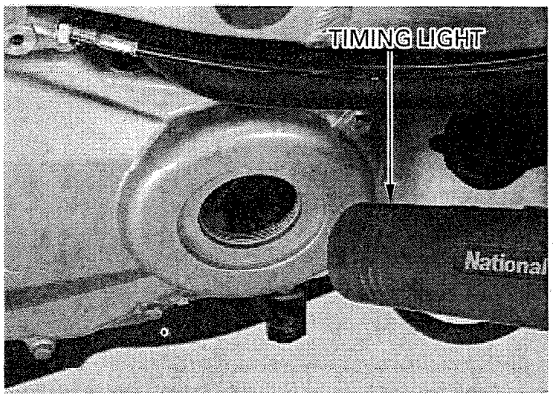
Start the engine, let it idle and check the ignition timing.

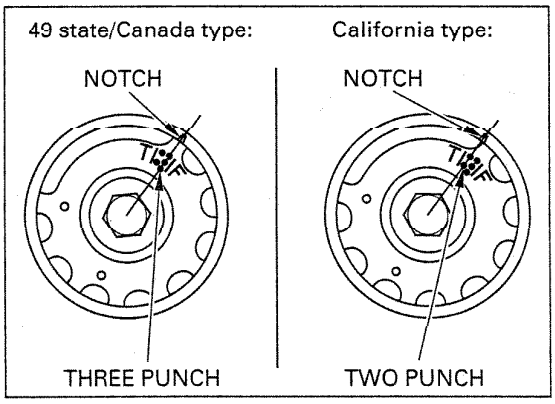
The ignition timing is correct if the F mark on the ignition pulse generator rotor aligns with the index notch on the right crankcase cover at idle as shown.

Coat a new O-ring with grease and install it onto the timing hole cap.
Apply grease to the timing hole cap threads.
Install and tighten the timing hole cap.

TORQUE : 18 N·m (1.8 kgf·m , 13 lbf·ft)

Install the right side fairing (page 2-4).





THROTTLE SENSOR

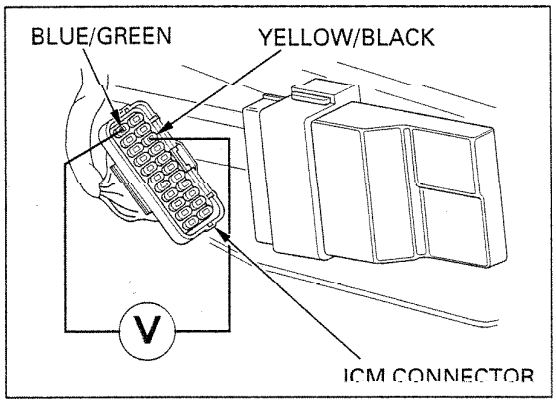
SYSTEM INSPECTION

Remove the seat cowl (page 2-2).

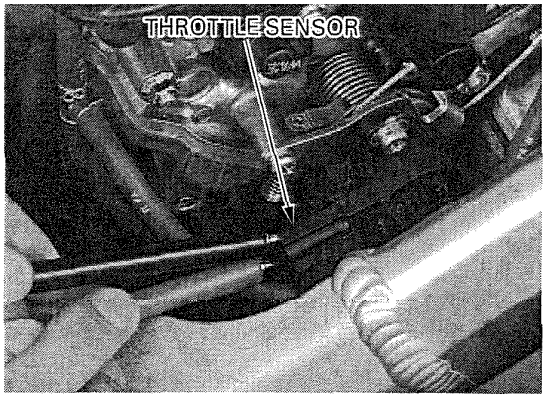
Disconnect the ignition control module (ICM) connector.

Measure the resistance between the yellow/black and blue/green wire terminals of the wire harness side connector.

STANDARD: 4 – 6 kΩ (20 °C/68 °F)



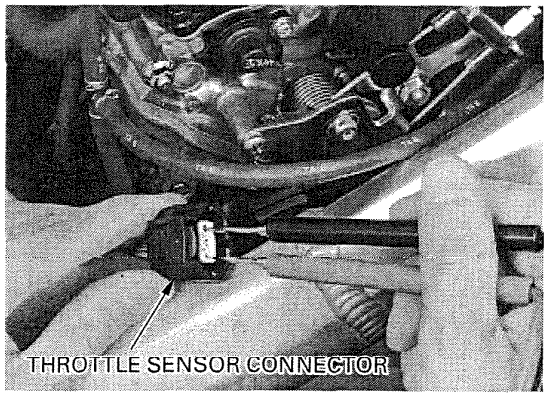
Check that the resistance between the yellow/blue and blue/green wire terminals of the ICM connector varies with the throttle position while operating the throttle grip.



Fully open – Fully closed position: Resistance decreases
Fully closed – Fully open position: Resistance increases

If the correct measurements cannot be obtained, raise the fuel tank (page 2-3), disconnect the throttle sensor 3P connector and perform the same inspections at the sensor terminals.

- If the measurement at the ICM is abnormal and the one at the throttle sensor is normal, check for open or short circuit, or loose or poor connections in the wire harness.
- If both measurements are abnormal, replace the throttle sensor.



Connect the ICM connector.
Turn the ignition switch ON.
Measure the input voltage between the yellow/black (+) and blue/green (−) wire terminals of the wire harness side throttle sensor connector.

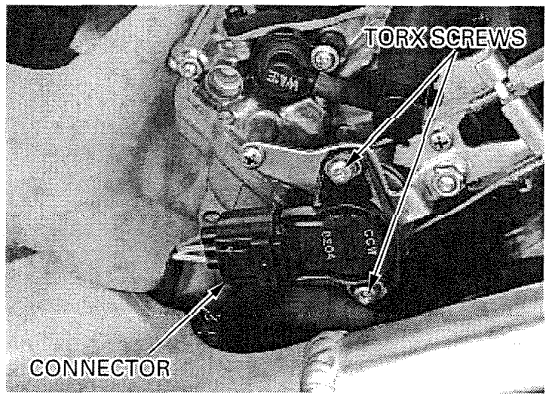
STANDARD: 4.7 – 5.3 V

If the input voltage is abnormal, or if there is no input voltage, check for open or short circuit in the wire harness, or loose or poor ICM connector contact.

REPLACEMENT

Remove the carburetor assembly from the cylinder head intake ports (page 5-15).

Disconnect the throttle sensor connector.
Remove the two torx screws and the throttle sensor.

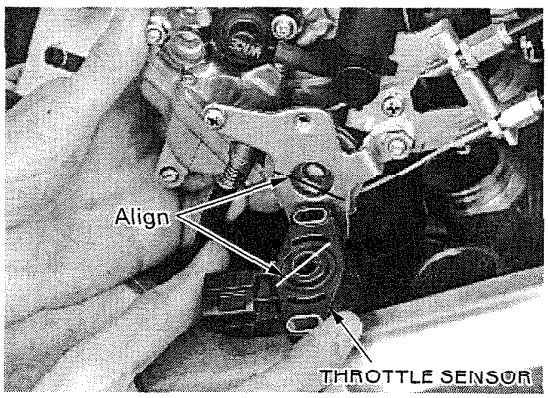


Install the throttle sensor by aligning the tabs of the sensor with the flat of the shaft as shown.

Apply locking agent to the torx screw threads and loosely install the screws.

CAUTION:

Install the throttle sensor properly. Improper installation can cause damage to the throttle sensor.



Adjust the throttle sensor position so that the resistance between terminals A and B is 490−510Ω, and tighten the torx screws.

Connect the throttle sensor connector.

Install the removed parts in the reverse order of removal.