By KWANG YANG Motor Co., Ltd.
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PREFACE

This Service Manual describes the technical features and servicing procedures for the KYMCO XCITING ***500***.

Section 1 contains the precautions for all operations stated in this manual. Read them carefully before any operation is started.

Section 2 is the removal/installation procedures for the frame covers which are subject to higher removal/installation frequency during maintenance and servicing operations.

Section 3 describes the inspection/ adjustment procedures, safety rules and service information for each part, starting from periodic maintenance.

Sections 7 through 13 give instructions for disassembly, assembly and adjustment of engine parts. Section 14 through 16 is the removal/ installation of chassis. Section 17 through 21 states the testing and measuring methods of electrical equipment.

Most sections start with an assembly or system illustration and troubleshooting for the section. The subsequent pages give detailed procedures for the section.

The information and contents included in this manual may be different from the motorcycle in case specifications are changed.

KYMCO reserves the right to make changes at any time without notice and without incurring any obligation.

KWANG YANG MOTOR CO., LTD.
OVERSEAS SALES DEPARTMENT
OVERSEAS SERVICE SECTION

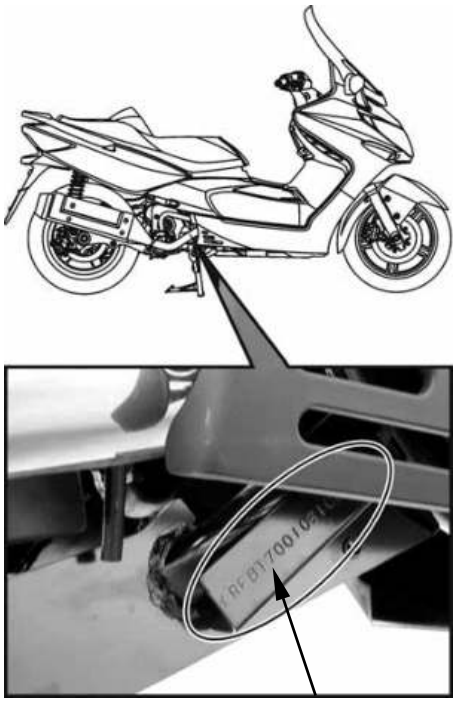
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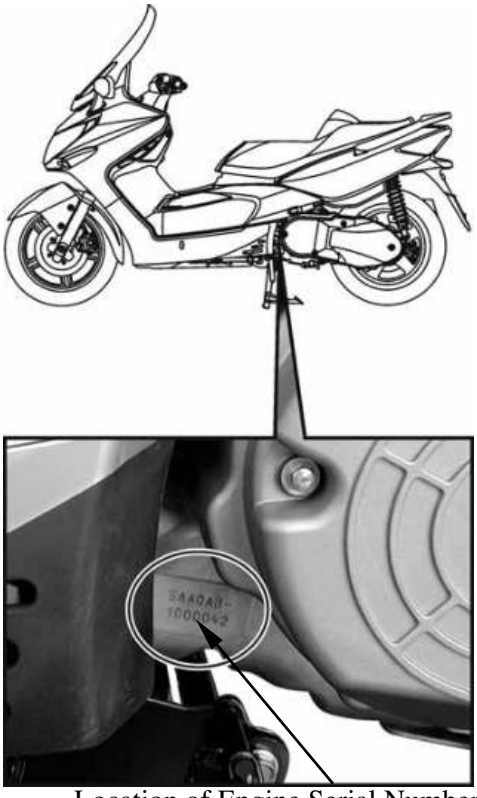
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SERIAL NUMBER



Location of Frame Serial Number



Location of Engine Serial Number

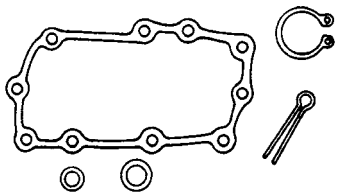
SPECIFICATIONS

ITEM				SPECIFICATIONS
Name				XCITING 500
Overall length				2250 mm (90 in)
Overall width (mm)				815 mm (33 in)
Overall height (mm)				1450 mm (58 in)
Wheel base (mm)				1570 mm (63 in)
Engine type				O.H.C.
Displacement				498.5 cm^3 (30.4 cu-in)
Fuel Used				92# nonleaded gasoline
Dry weight		Front wheel		83 kg (183 lbs)
		Rear wheel		132 kg (290 lbs)
		Total		215 kg (473 lbs)
Curb weight		Front wheel		90 kg (198 lbs)
		Rear wheel		141 kg (310 lbs)
		Total		231 kg (508 lbs)
Tires		Front wheel		120/70-15
		Rear wheel		150/70-14
Ground clearance				150 mm (6 in)
Min. turning radius				2750 mm (110 in)
Engine	Starting system			Electric starter motor
	Type			Gasoline, 4-stroke
	Cylinder arrangement			Single cylinder
	Combustion chamber type			Semi-sphere
	Valve arrangement			O.H.C., chain drive
	Bore x stroke (mm)			92 x 75 mm (3.7 x 3 in)
	Compression ratio			10.5:1
	Compression pressure			13 kgf/cm² (1300kPa, 185 psi)
	Valve timing	Intake	Open	2° BTDC
			Close	45° ABDC
		Exhaust	Open	45° BBDC
			Close	5° ATDC
	Valve clearance (cold)		Intake	0.1 mm (0.004 in)
			Exhaust	0.1 mm (0.004 in)
	Idle speed (rpm)			1400rpm
	Lubrication System	Lubrication type		Forced pressure & Wet sump
		Oil pump type		Trochoid
		Oil filter type		Full-flow filtration
		Oil capacity		2.5 L (2.2 lmp qt, 2.65 Us qt)
		Final reduction oil capacity		0.55 L (0.5 lmp qt, 0.58 Us qt)
	Cooling Type			Liquid cooled

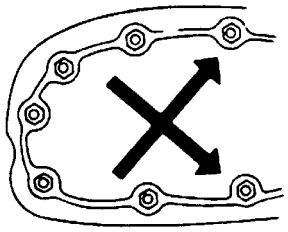
ITEM				SPECIFICATIONS
Fuel System	Air cleaner type & No			Wet paper type element
	Fuel capacity			12.8 L (3.38 lmp gal, 2.82 US gal
	Carburetor	Type		CVK
		Main jet NO.		98
		Venturi dia.		ϕ36 mm (ϕ1.44 in)
		Throttle type		PISTON
Electrical Equipment	Ignition System	Type		Full transistor digital ignition
		Spark plug		CR8E
		Ignition timing		Throttle position sensor
		Spark plug gap		0.6～0.7mm (0.002～0.003 in)
	Battery	Capacity		12V12AH
Power Drive System	Clutch	Type		Dry, centrifugal automatic
	Transmission Gear	Type		Helical gear/spur gear
		Operation		Automatic centrifugal Type
	Reduction Ratio	Type		CVT
		Preliminary		2.68 – 1
		Final		5.4
Moving Device	FR/RR tire rolling circumference			1724/1778 mm (69/71 in)
	Tire pressure (rider only/60 kg)		Front	2 kg/cm² (200 Kpa, 28 psi)
			Rear	2.5 kg/cm² (250 Kpa, 36 psi)
	Turning angle		Left	40°
			Right	40°
Brake system type			Rear	Disk brake
			Front	Disk brake
Damping Device	Suspension type		Front	Telescopic fork
			Rear	Unit swing
Frame type				Back born

SERVICE PRECAUTIONS

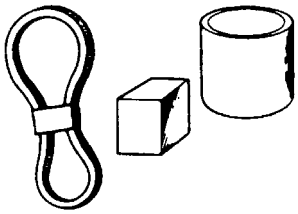
■ Make sure to install new gaskets, O-rings, circlips, cotter pins, etc. when reassembling.



■ When tightening bolts or nuts, begin with larger-diameter to smaller ones at several times, and tighten to the specified torque diagonally.



■ Use genuine parts and lubricants.



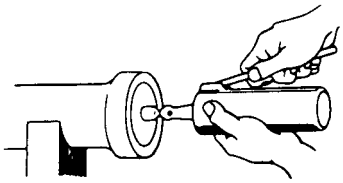
■ When servicing the motorcycle, be sure to use special tools for removal and installation.



■ After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.



■ Apply or add designated greases and lubricants to the specified lubrication points.



■ After reassembly, check all parts for proper tightening and operation.

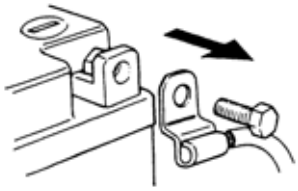


■ When two persons work together, pay attention to the mutual working safety.



■ Disconnect the battery negative (-) terminal before operation.

■ When using a spanner or other tools, make sure not to damage the motorcycle surface.

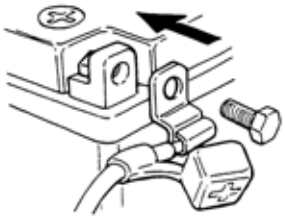


■ After operation, check all connecting points, fasteners, and lines for proper connection and installation.

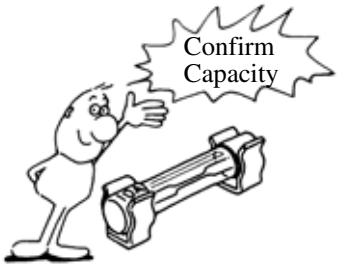
■ When connecting the battery, the positive (+) terminal must be connected first.

■ After connection, apply grease to the battery terminals.

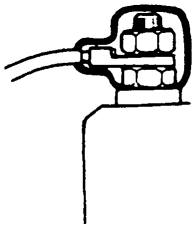
■ Terminal caps shall be installed securely.



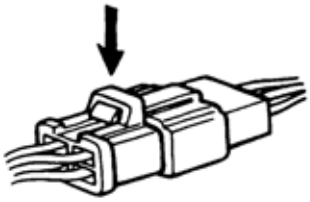
■ If the fuse is burned out, find the cause and repair it. Replace it with a new one according to the specified capacity.



■ After operation, terminal caps shall be installed securely.



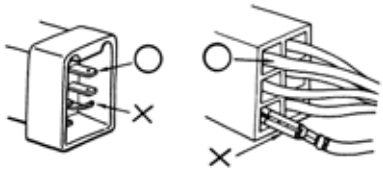
■ When taking out the connector, the lock on the connector shall be released before operation.



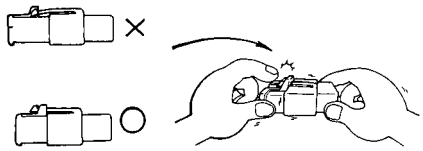
■ Hold the connector body when connecting or disconnecting it.
■ Do not pull the connector wire.



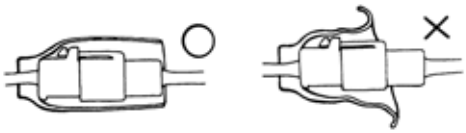
■ Check if any connector terminal is bending, protruding or loose.



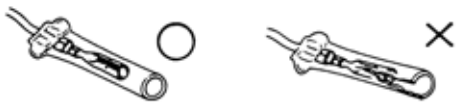
■ The connector shall be inserted completely.
■ If the double connector has a lock, lock it at the correct position.
■ Check if there is any loose wire.



■ Before connecting a terminal, check for damaged terminal cover or loose negative terminal.



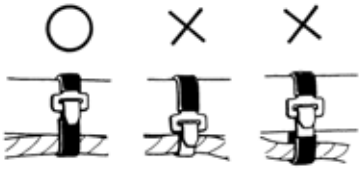
■ Check the double connector cover for proper coverage and installation.



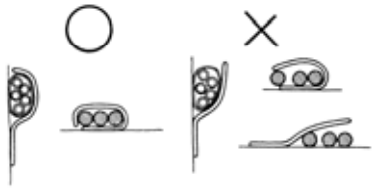
■ Insert the terminal completely.
■ Check the terminal cover for proper coverage.
■ Do not make the terminal cover opening face up.



■ Secure wire harnesses to the frame with their respective wire bands at the designated locations.
Tighten the bands so that only the insulated surfaces contact the wire harnesses.



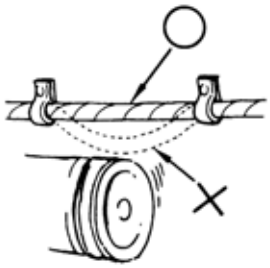
■ After clamping, check each wire to make sure it is secure.



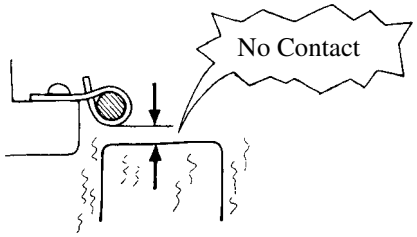
■ Do not squeeze wires against the weld or its clamp.



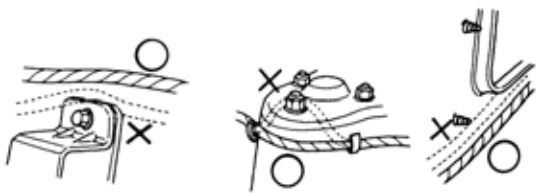
■ After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.



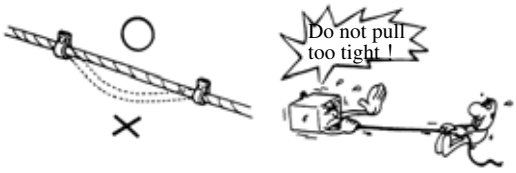
■ When fixing the wire harnesses, do not make it contact the parts which will generate high heat.



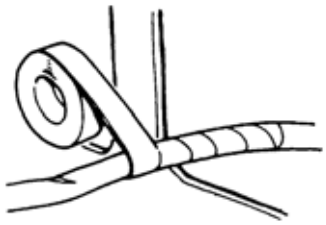
■ Route wire harnesses to avoid sharp edges or corners. Avoid the projected ends of bolts and screws.
■ Route wire harnesses passing through the side of bolts and screws. Avoid the projected ends of bolts and screws.



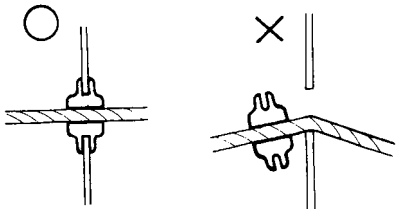
■ Route harnesses so they are neither pulled tight nor have excessive slack.



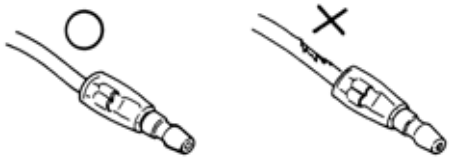
■ Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner.



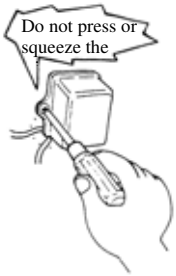
■ When rubber protecting cover is used to protect the wire harnesses, it shall be installed securely.



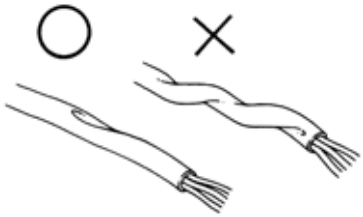
■ Do not break the sheath of wire.
■ If a wire or harness is with a broken sheath, repair by wrapping it with protective tape or replace it.



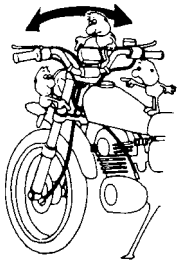
■ When installing other parts, do not press or squeeze the wires.



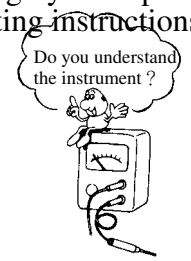
■ After routing, check that the wire harnesses are not twisted or kinked.



■ Wire harnesses routed along with handlebar should not be pulled tight, have excessive slack or interfere with adjacent or surrounding parts in all steering positions.



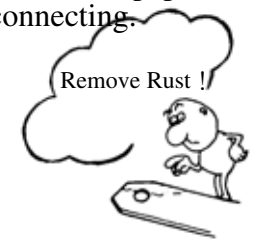
■ When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.



■ Be careful not to drop any parts.



■ When rust is found on a terminal, remove the rust with sand paper or equivalent before connecting.



■ Symbols:

The following symbols represent the servicing methods and cautions included in this service manual.


Engine Oil : Apply engine oil to the specified points. (Use designated engine oil for lubrication.)


Grease : Apply grease for lubrication.


Gear Oil : Transmission Gear Oil (90#)

* : Note

TORQUE VALUES

STANDARD TORQUE VALUES

Item	Torque N•m (kgf•m, lbf•ft)	Item	Torque N•m (kgf•m, lbf•ft)
5mm bolt and nut	5(0.5, 4)	4mm screw	3 (0.3, 2)
6mm bolt and nut	10 (1, 7)	5mm screw	4 (0.4, 3)
8mm bolt and nut	22 (2.2, 16)	6mm screw, SH bolt	9 (0.9, 6.5)
10mm bolt and nut	35 (3.5, 25)	6mm flange bolt and nut	12 (1.2, 9)
12mm bolt and nut	55 (5.5, 40)	8mm flange bolt and nut	27 (2.7, 20)
14mm bolt and nut	70 (7, 50)	10mm flange bolt and nut	40 (4, 29)

Torque specifications listed below are for important fasteners.

ENGINE

Item	Q'ty	Thread dia. (mm)	Torque N•m (kgf•m, lbf•ft)	Remarks
MAINTENANCE:				
Engine oil drain plug	1	12	25 (2.5, 18)	
Oil strainer screen cap	1	30	15 (1.5, 11)	
Oil filter cartridge	1	20	10 (1, 7)	
Transmission oil drain bolt	1	8	24 (2.4, 18)	
Transmission oil filler bolt	1	8	24 (2.4, 18)	
Spark plug	1	10	12 (1.2, 9)	
Tappet adjust nut	4	5	9 (0.9, 6)	
LUBRICATION SYSTEM:				
Oil pump screw	1	4	3 (0.3, 2)	
Oil cooler bolt	2	16	35 (3.5, 25)	Apply oil
COOLING SYSTEM:				
Water pump cover bolt	2	6	13 (1.3, 9)	
CYLINDER HEAD:				
Breather separator bolt	3	6	13 (1.3, 9)	Apply oil
Cylinder head bolt (1 – 4)	4	10	48 (4.8, 35)	Apply oil
Cylinder head bolt (5 – 13)	9	8	23 (2.3, 17)	Apply oil
Cylinder head cover bolt	4	6	10 (1, 7)	
Cam chain tensioner bolt	2	6	12 (1.2, 9)	
Tensioner pivot bolt	1	8	10 (1, 7)	
Rocker arm shaft	2	18	45 (4.5, 32)	
DRIVE/DRIVEN PULLEY:				
Drive face nut	1	18	135 (13.5, 97)	Apply oil
Clutch out nut	1	14	80 (8, 58)	Apply oil

ENGINE (Cont'd)

Item	Q'ty	Thread dia. (mm)	Torque N•m (kgf•m, lbf•ft)	Remarks
Drive plate nut	1	28	78 (7.8, 56)	
ALTERNATOR				
ACG flywheel nut	1	14	55 (5.5, 40)	
FINAL REDUCTION:				
Transmission cover bolt	8	8	27 (2.7, 20)	
CRANKCASE:				
Crankcase bolt	13	6	12 (1.2, 9)	Apply oil
Oil pipe bolt	2	16	43 (4.3, 31)	Apply oil
Cam chain guide	2	8	20 (2, 15)	
SWITCH:				
Oil pressure switch	1	PT 1/8	22 (2.2, 16)	Apply seal

FRAME

Item	Q'ty	Thread dia.(mm)	Torque N•m (kgf•m, lbf•ft)	Remarks
STEERING:				
Handlebar bolt	4	8	23 (2.3, 17)	
Upper pinch bolt	2	8	23 (2.3, 17)	
Lower pinch bolt	4	8	23 (2.3, 17)	
Bridge stem nut	1	22	62 (6.2, 45)	
Steering stem lock nut	1	26	45 (4.5, 32)	
Top thread	1	26	17 (1.7, 12)	
WHEEL:				
Front axle bolt	1	18	55 (5.5, 40)	
Front fork bolt	2	8	23 (2.3, 17)	
Rear axle nut	1	20	180 (18, 130)	
SUSPENSION:				
Rear shock absorber bolt	4	10	40 (4, 29)	
Rear fork	2	8	32 (3.2, 23)	
BRAKE:				
Front caliper mounting bolt	4	8	32 (3.2, 23)	Replace a new one
Rear caliper mounting bolt	2	8	32 (3.2, 23)	Replace a new one
Brake fluid bolt	6	10	35 (3.5, 25)	
Master cylinder bolt	4	6	12 (1.2, 9)	

FRAME (Cont'd)

Item	Q'ty	Thread dia.(mm)	Torque N•m (kgf•m, lbf•ft)	Remarks
ENGINE HANGER:				
Engine hanger bolt	4	10	50 (5, 36)	
Engine mounting bolt	1	14	80 (8, 58)	
Engine mounting nut	1	14	80 (8, 58)	
Engine hanger rod nut	1	10	35 (3.5, 25)	
MUFFLER				
Exhaust pipe nut	2	8	20 (2, 14)	
Muffler mount bolt	3	10	35 (3.5, 25)	

SPECIAL TOOLS

Tool Name	Tool No.	Remarks
Clutch spring compressor	E053	Clutch disassembly
Bearing puller 10,12,15,18mm	E037	Bearing removal
Valve spring compressor	E040	Valve removal
Oil seal & bearing installer	E014	Oil seal & bearing install
Tappet adjuster	E036	Tappet adjustment
Flywheel puller	E054	A.C. generator flywheel removal
Universal holder	E017	Holding clutch for removal
Oil filter cartridge wrench	E052	Cartridge removal or install
Flywheel holder	E021	A.C. generator flywheel holding
Lock nut socket wrench	F002	Steering stem removal or install

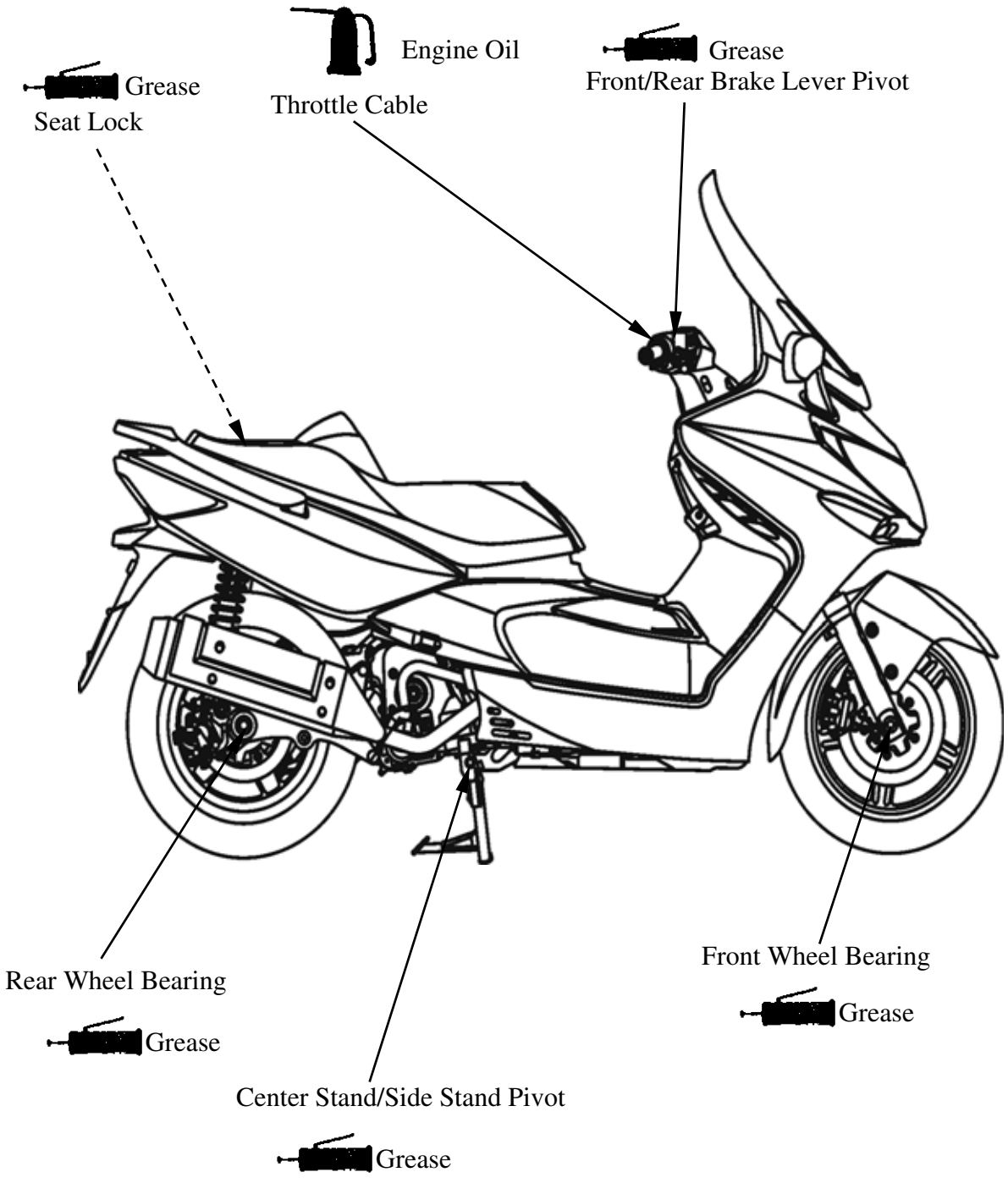
LUBRICATION POINTS

ENGINE

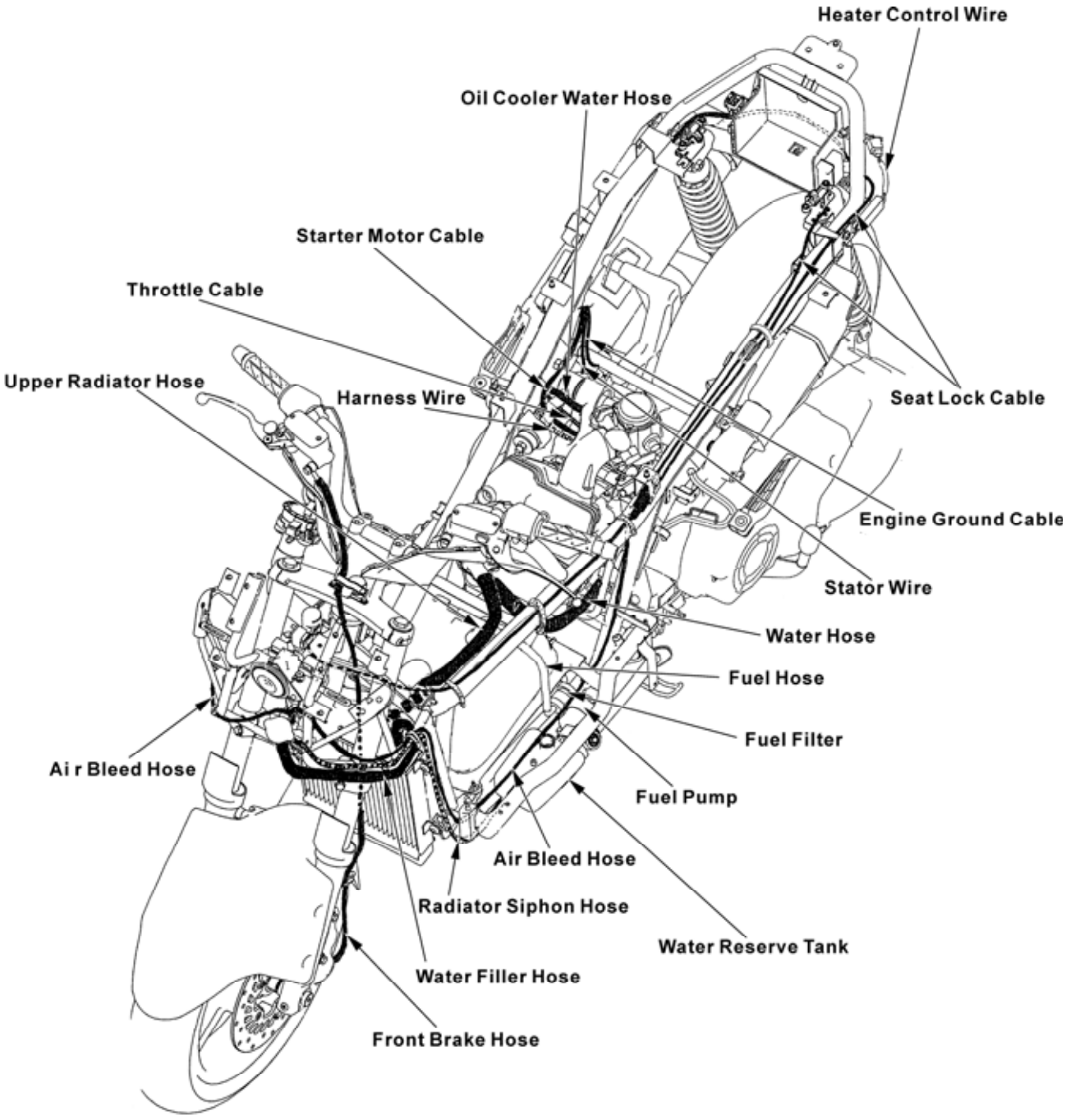
Lubrication Points	Lubricant
Valve guide/valve stem movable part Camshaft protruding surface Valve rocker arm friction surface Camshaft drive chain Cylinder lock bolt and nut Piston surroundings and piston ring grooves Piston pin surroundings Cylinder inside wall Connecting rod/piston pin hole Connecting rod big end Crankshaft Balancer shaft Crankshaft one-way clutch movable part Oil pump drive chain Starter reduction gear engaging part O-ring face Oil seal lip	•Genuine KYMCO Engine Oil (SAE 5W-50) •API SJ Engine Oil
Drive gear shaft Countershaft Final gear Final gear shaft Transmission gearshaft bearing part	Transmission oil: SAE 90
A.C. generator connector	Adhesive

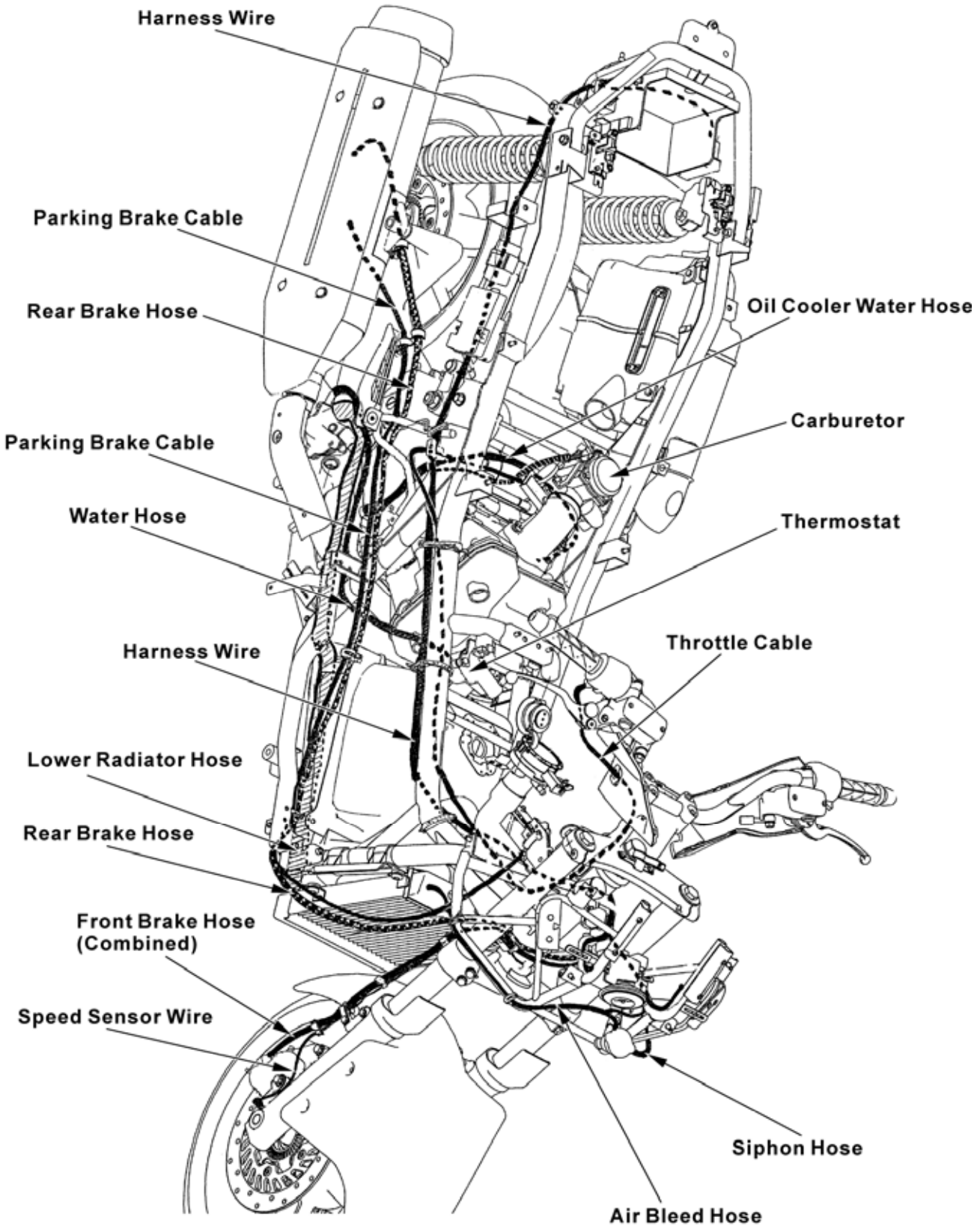
FRAME

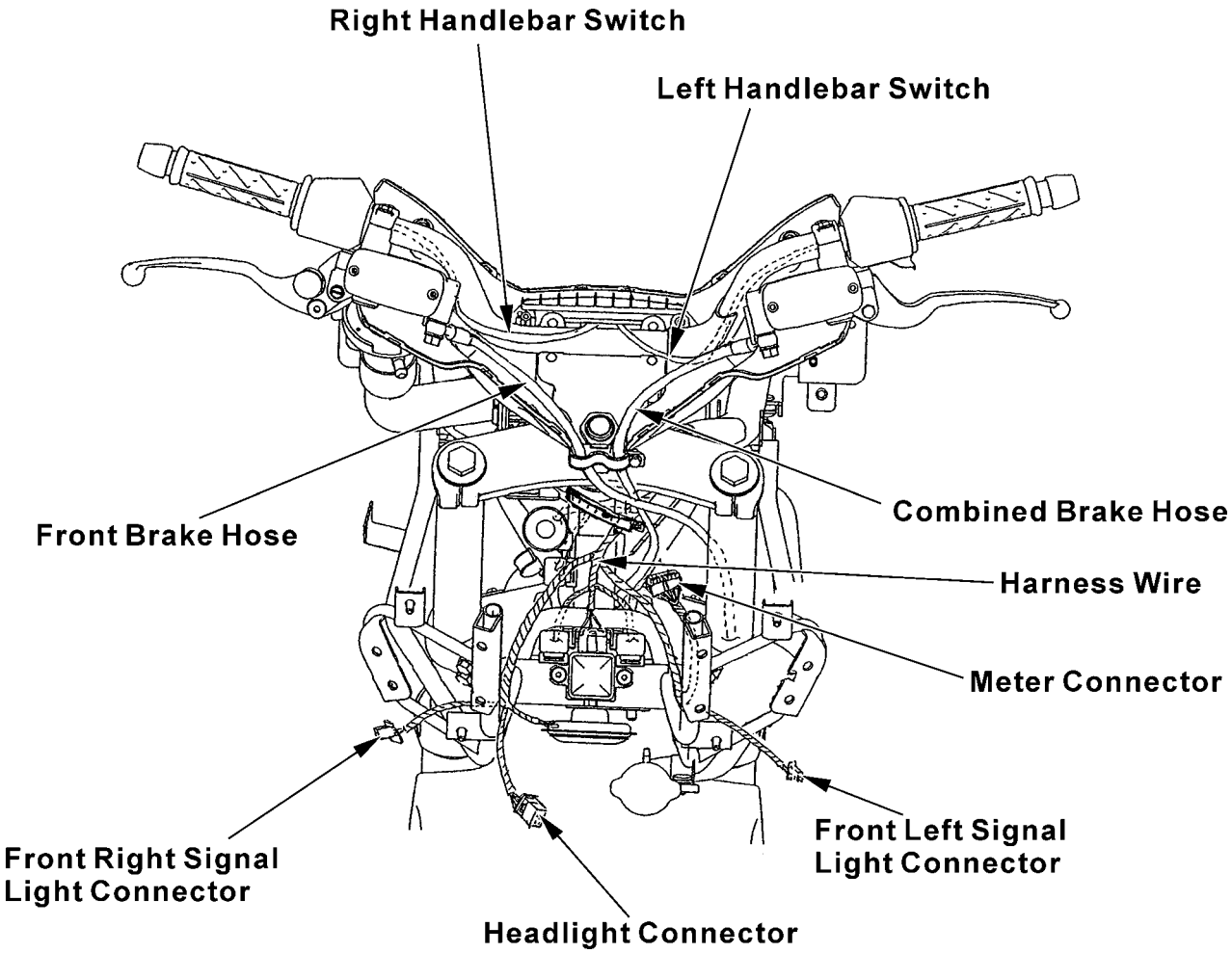
The following is the lubrication points for the frame.
Use general purpose grease for parts not listed.
Apply clean engine oil or grease to cables and movable parts not specified. This will avoid abnormal noise and rise the durability of the motorcycle.

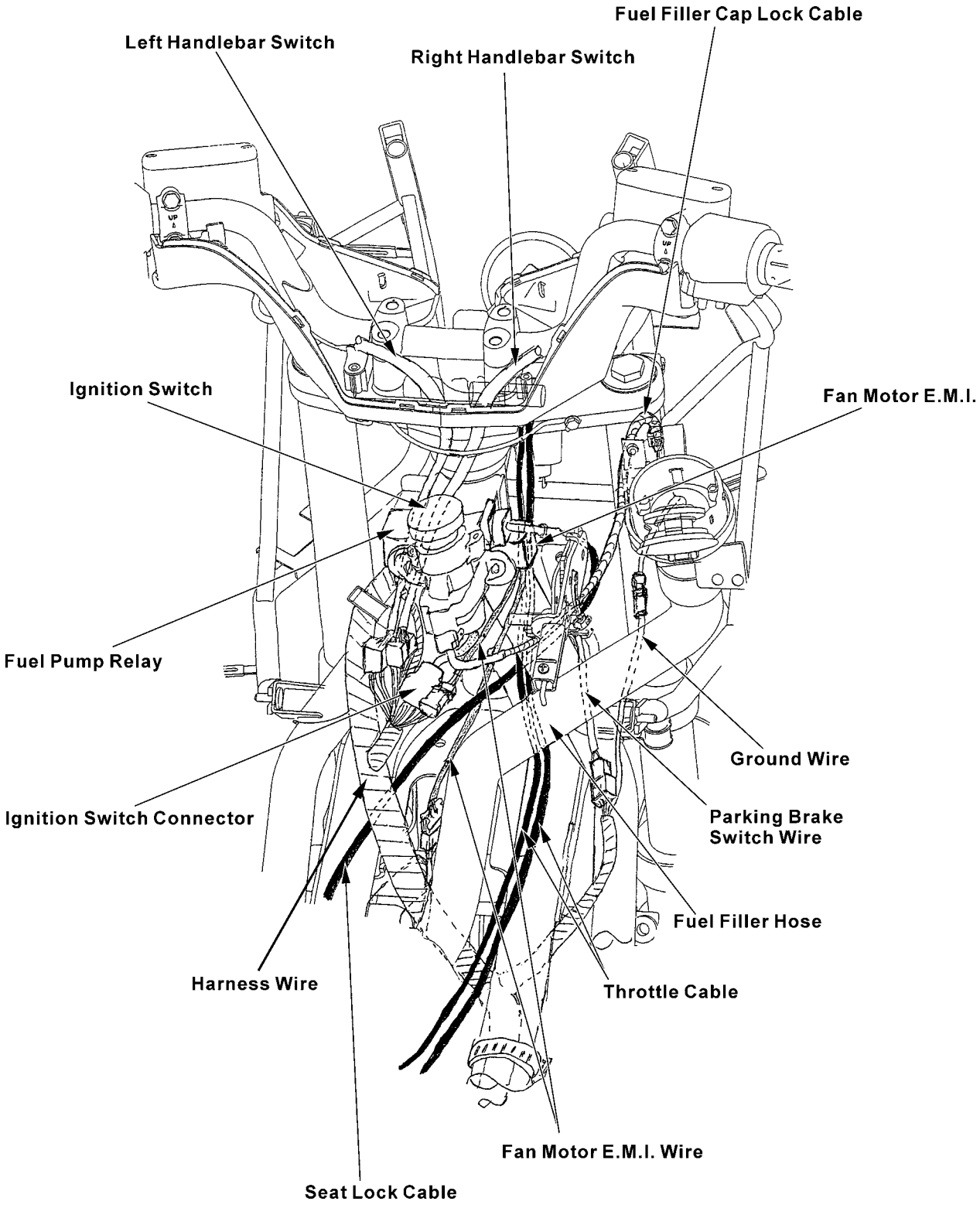


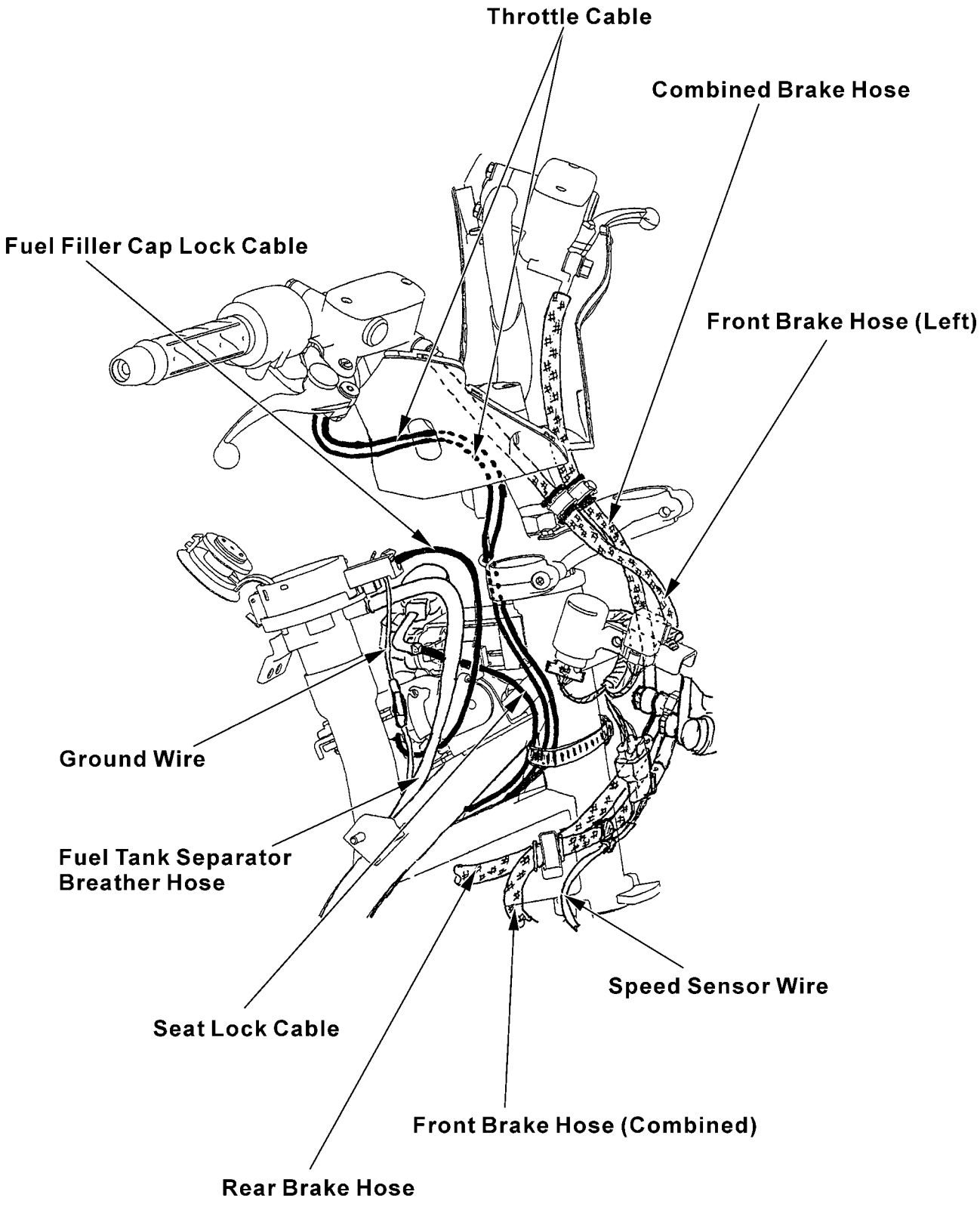
CABLE & HARNESS ROUTING

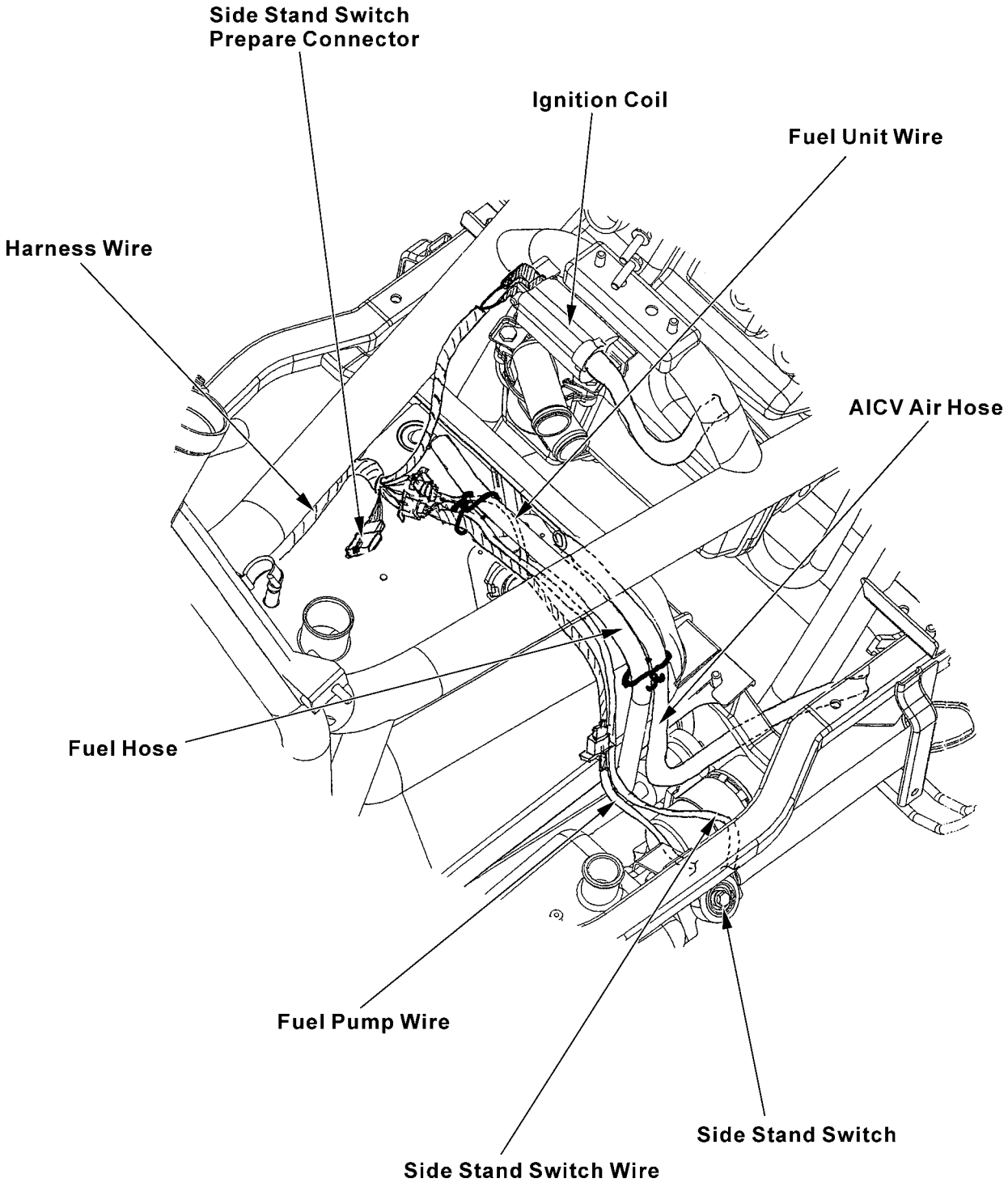


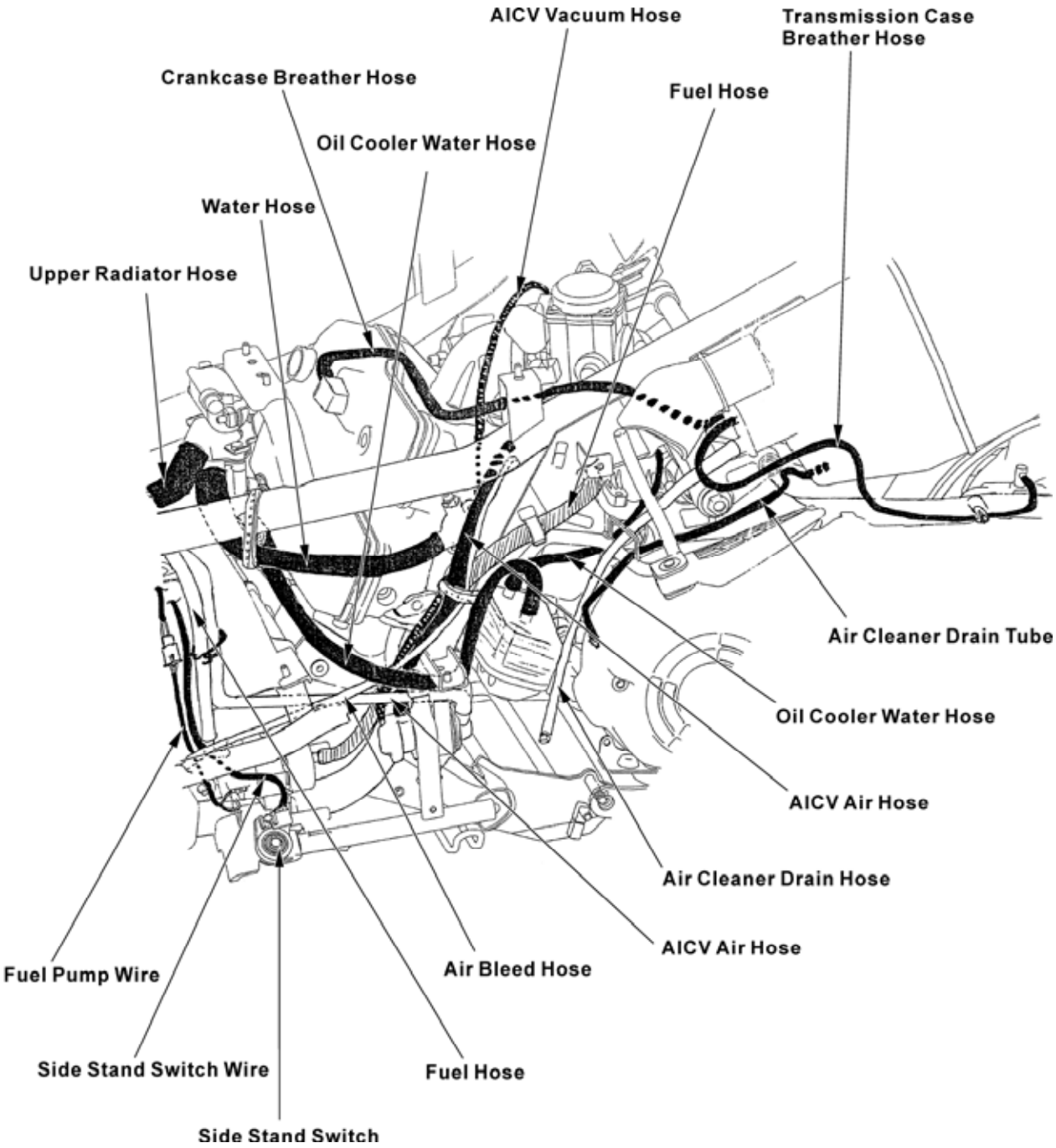

Harness Wire
Parking Brake Cable
Rear Brake Hose
Oil Cooler Water Hose
Carburetor
Parking Brake Cable
Water Hose
Thermostat
Throttle Cable
Harness Wire
Lower Radiator Hose
Rear Brake Hose
Front Brake Hose
(Combined)
Speed Sensor Wire
Siphon Hose
Air Bleed Hose

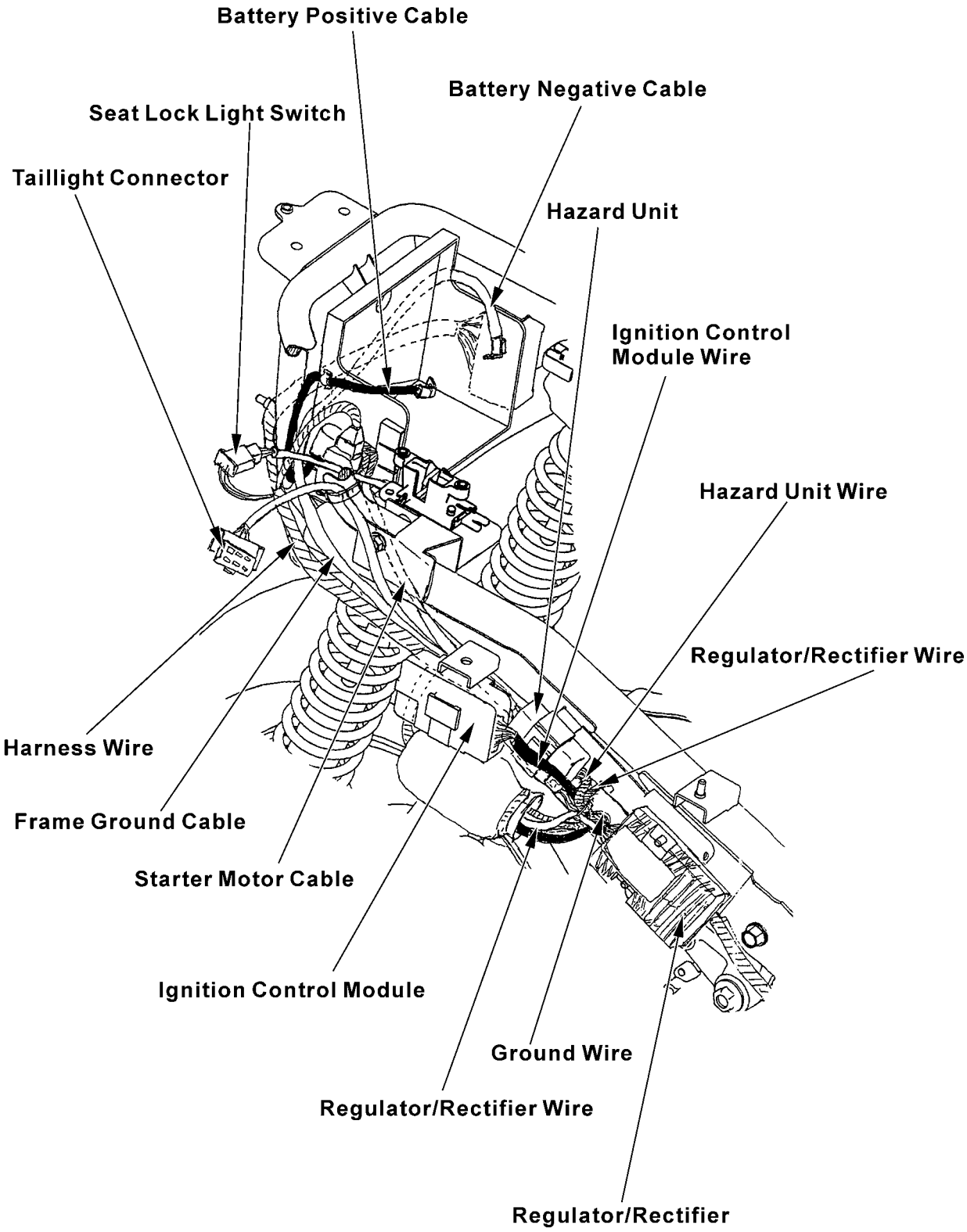

Right Handlebar Switch
Left Handlebar Switch
Front Brake Hose
Combined Brake Hose
Harness Wire
Meter Connector
Front Right Signal
Light Connector
Front Left Signal
Light Connector
Headlight Connector

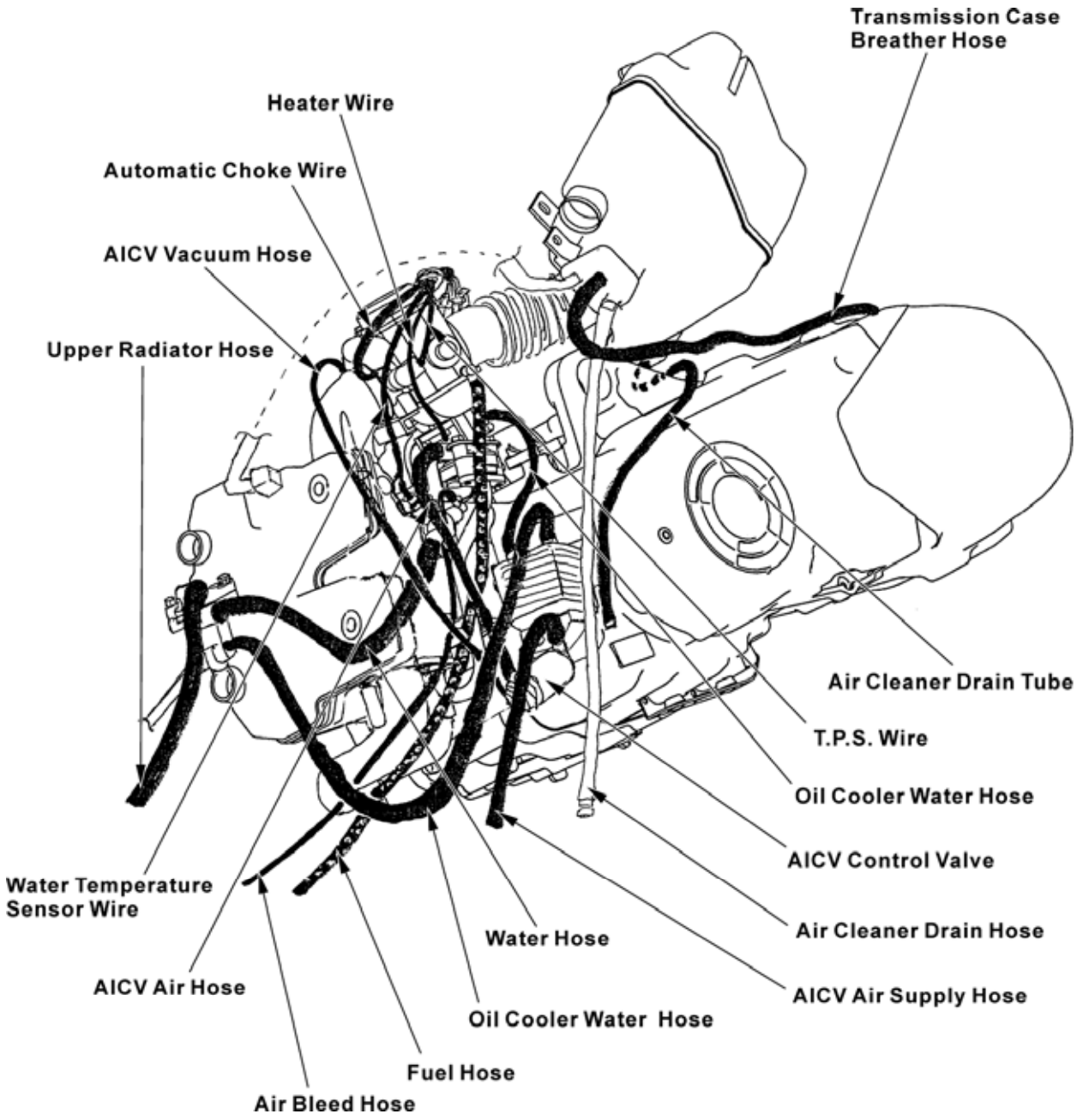

Fuel Filler Cap Lock Cable
Left Handlebar Switch
Right Handlebar Switch
Ignition Switch
Fan Motor E.M.I.
Fuel Pump Relay
Ground Wire
Ignition Switch Connector
Parking Brake Switch Wire
Fuel Filler Hose
Harness Wire
Throttle Cable
Fan Motor E.M.I. Wire
Seat Lock Cable

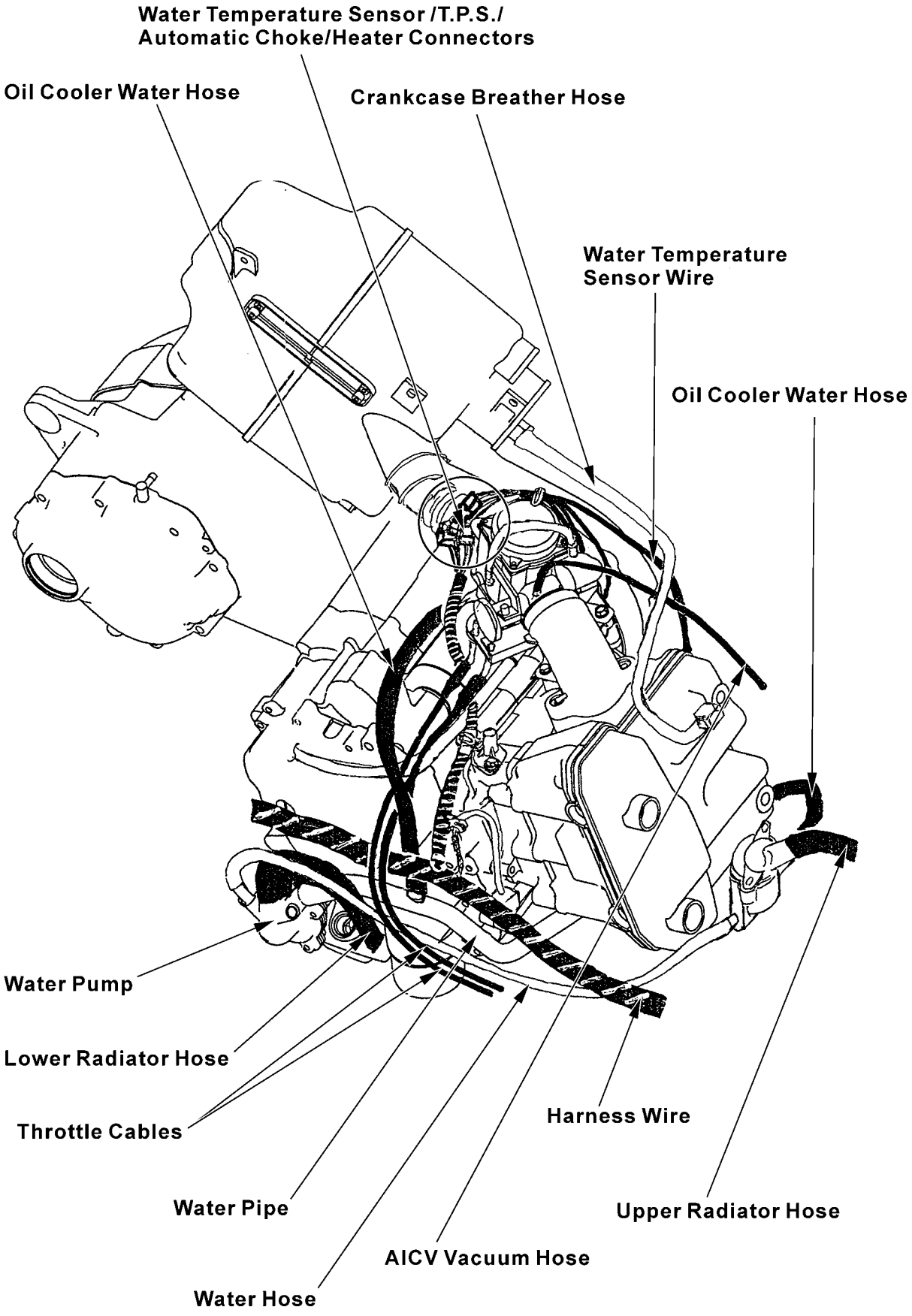

Throttle Cable
Combined Brake Hose
Fuel Filler Cap Lock Cable
Front Brake Hose (Left)
Ground Wire
Fuel Tank Separator
Breather Hose
Speed Sensor Wire
Seat Lock Cable
Front Brake Hose (Combined)
Rear Brake Hose


Side Stand Switch
Prepare Connector
Ignition Coil
Fuel Unit Wire
Harness Wire
AICV Air Hose
Fuel Hose
Fuel Pump Wire
Side Stand Switch
Side Stand Switch Wire


AICV Vacuum Hose
Transmission Case Breather Hose
Crankcase Breather Hose
Fuel Hose
Oil Cooler Water Hose
Water Hose
Upper Radiator Hose
Air Cleaner Drain Tube
Oil Cooler Water Hose
AICV Air Hose
Air Cleaner Drain Hose
AICV Air Hose
Fuel Pump Wire
Air Bleed Hose
Side Stand Switch Wire
Fuel Hose
Side Stand Switch

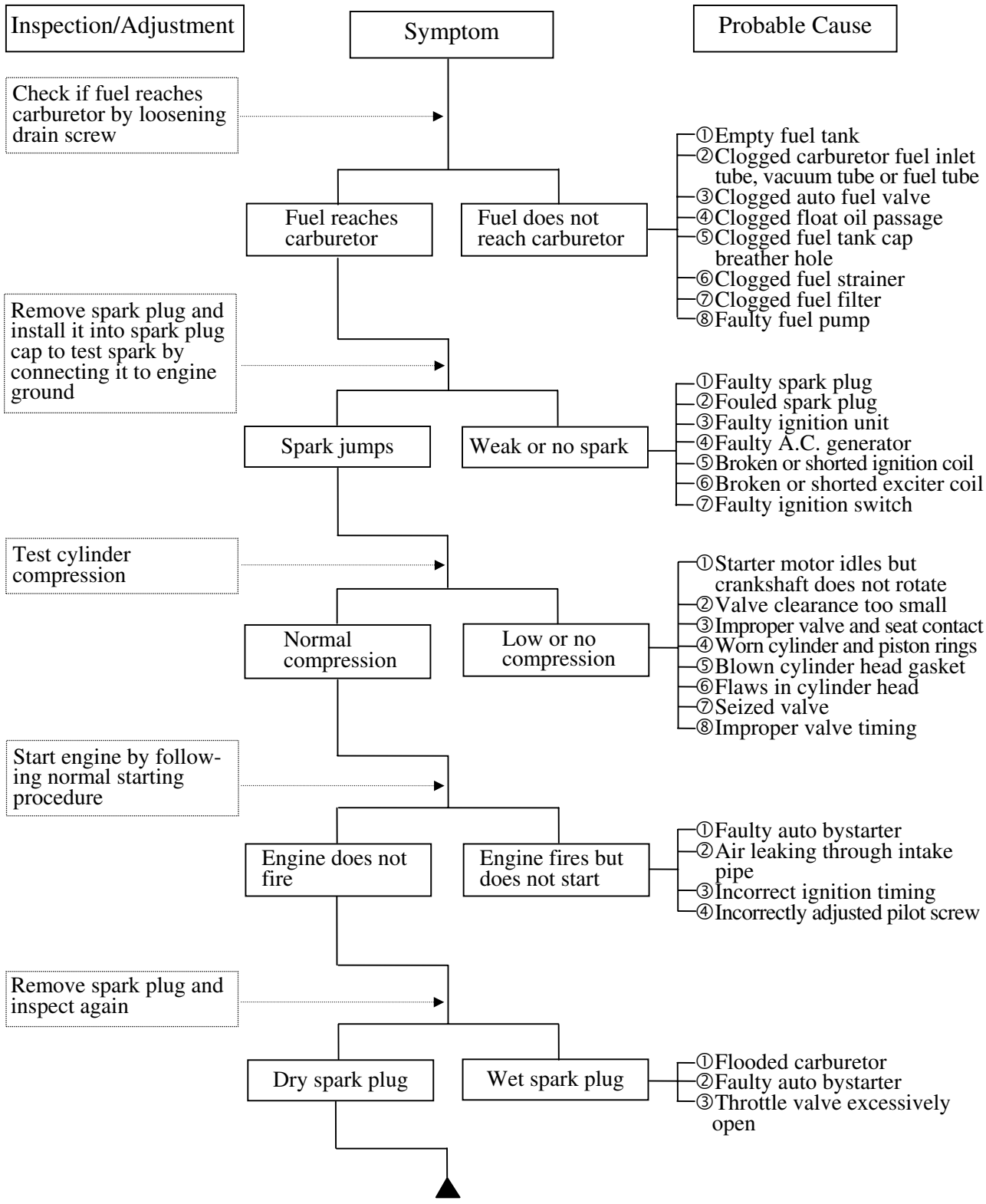

Battery Positive Cable
Battery Negative Cable
Seat Lock Light Switch
Taillight Connector
Hazard Unit
Ignition Control Module Wire
Hazard Unit Wire
Regulator/Rectifier Wire
Harness Wire
Frame Ground Cable
Starter Motor Cable
Ignition Control Module
Ground Wire
Regulator/Rectifier Wire
Regulator/Rectifier


Transmission Case Breather Hose
Heater Wire
Automatic Choke Wire
AICV Vacuum Hose
Upper Radiator Hose
Air Cleaner Drain Tube
T.P.S. Wire
Oil Cooler Water Hose
AICV Control Valve
Water Temperature Sensor Wire
Air Cleaner Drain Hose
Water Hose
AICV Air Hose
AICV Air Supply Hose
Oil Cooler Water Hose
Fuel Hose
Air Bleed Hose

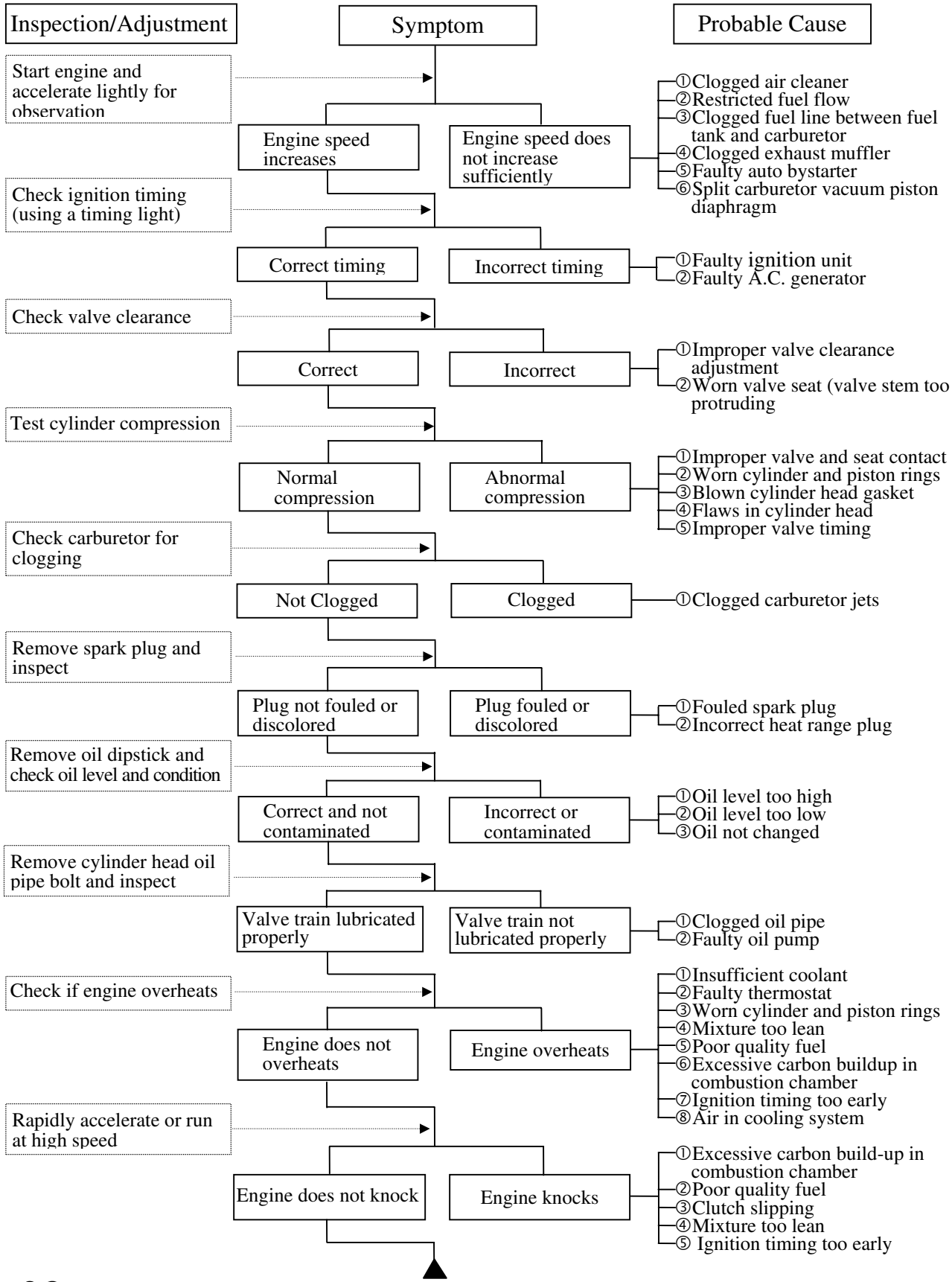

Water Temperature Sensor /T.P.S./
Automatic Choke/Heater Connectors
Oil Cooler Water Hose
Crankcase Breather Hose
Water Temperature
Sensor Wire
Oil Cooler Water Hose
Water Pump
Lower Radiator Hose
Throttle Cables
Water Pipe
Water Hose
AICV Vacuum Hose
Harness Wire
Upper Radiator Hose

TROUBLESHOOTING

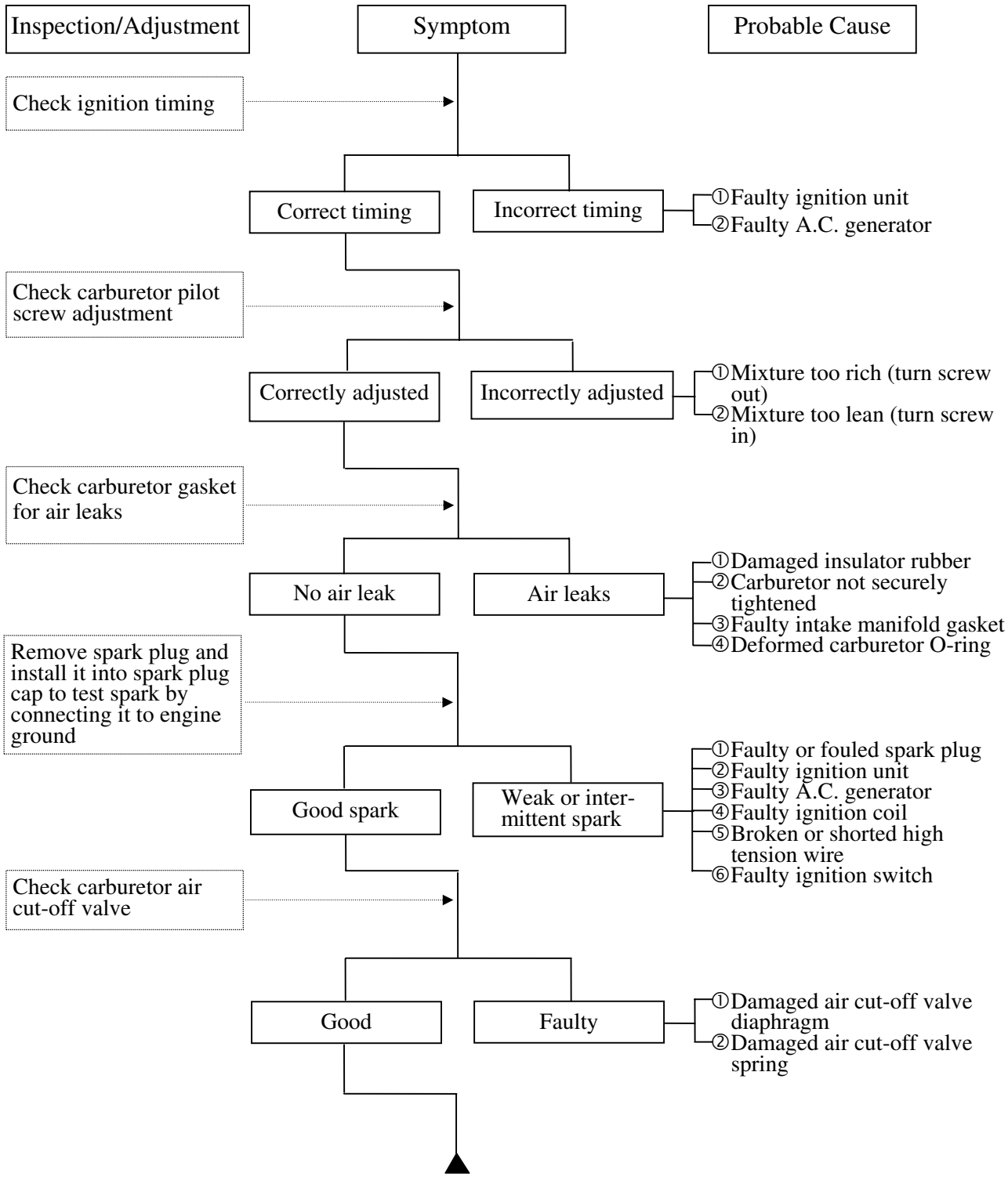
ENGINE WILL NOT START OR IS HARD TO START



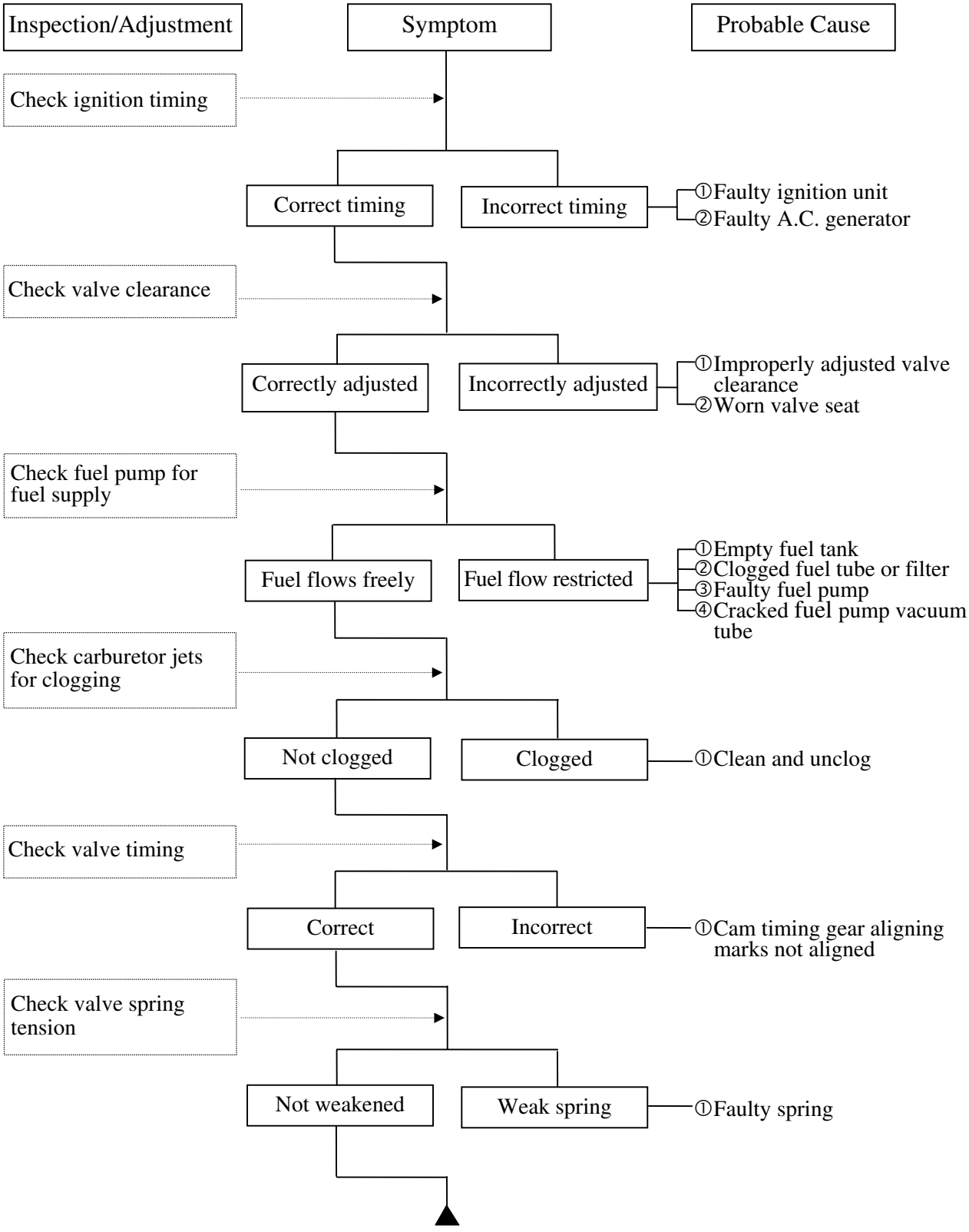
ENGINE LACKS POWER



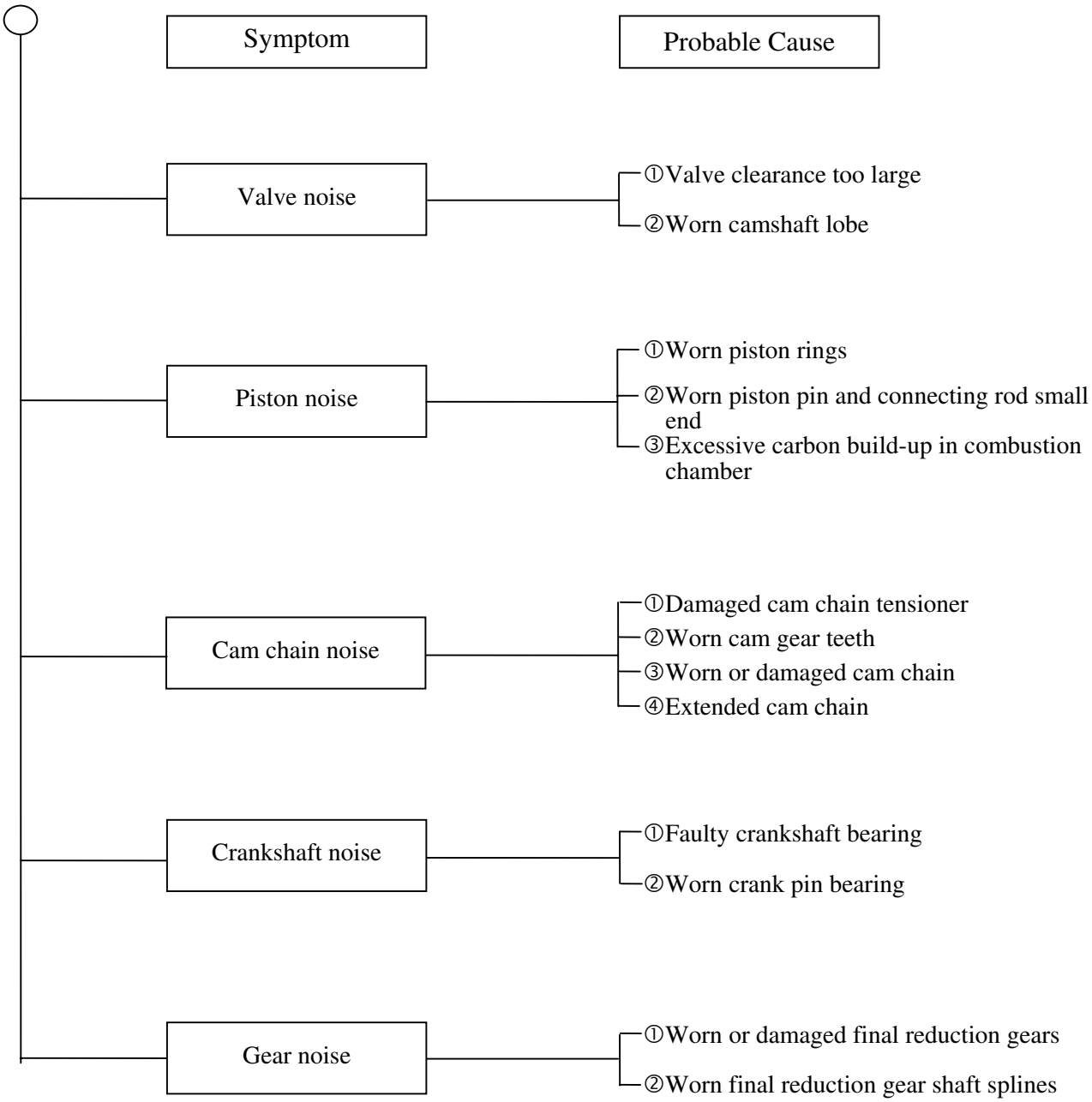
POOR PERFORMANCE (ESPECIALLY AT IDLE AND LOW SPEEDS)



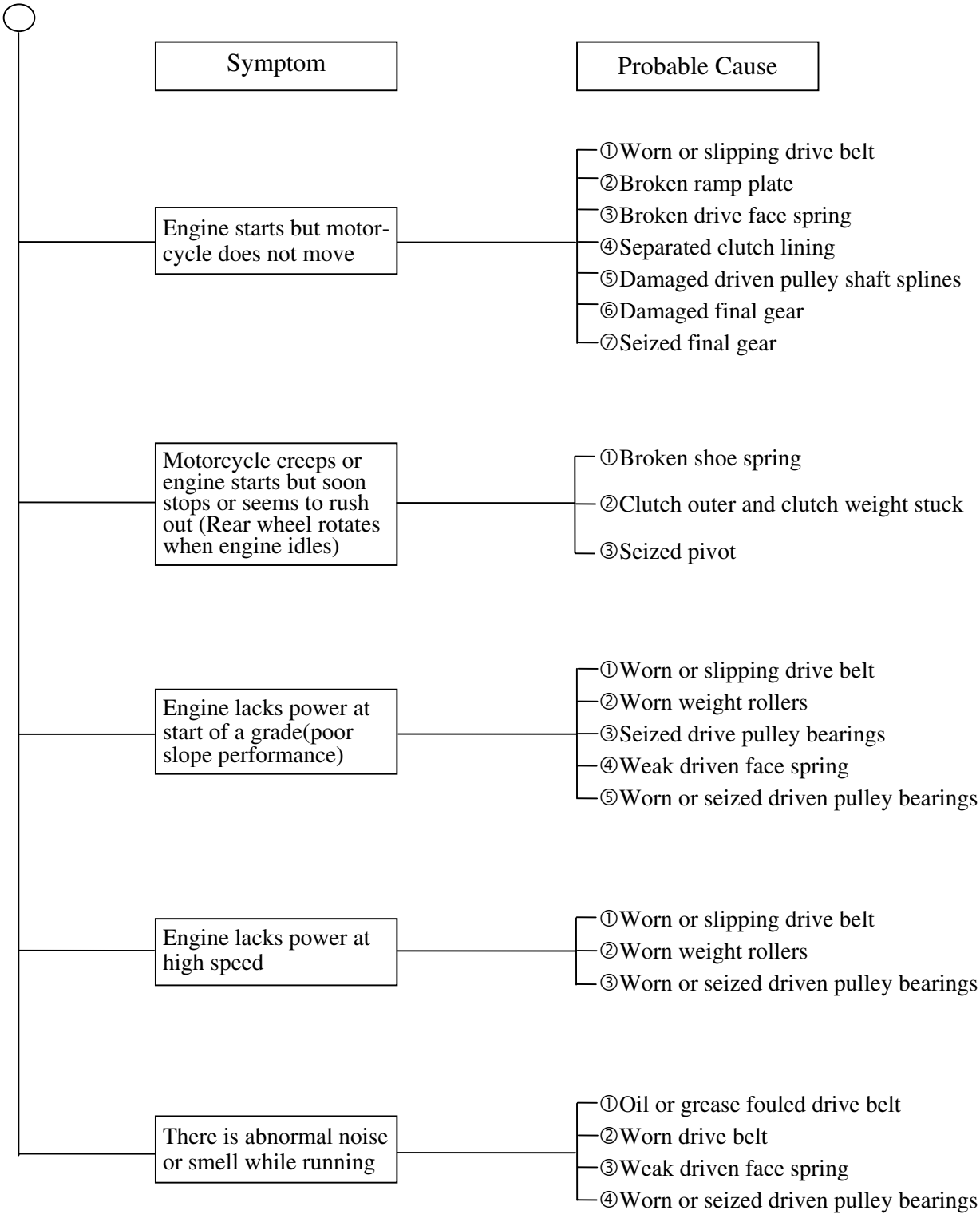
POOR PERFORMANCE (AT HIGH SPEED)



ENGINE NOISE

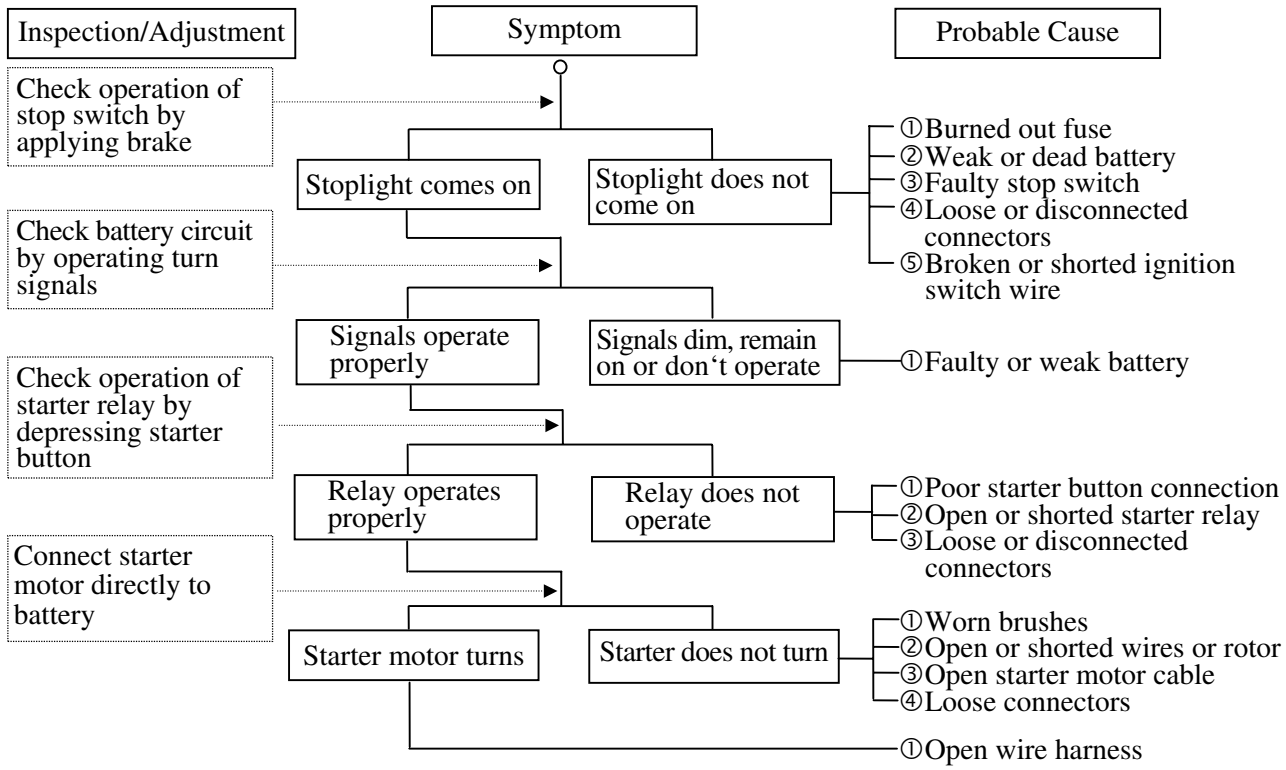


CLUTCH, DRIVE AND DRIVEN PULLEYS

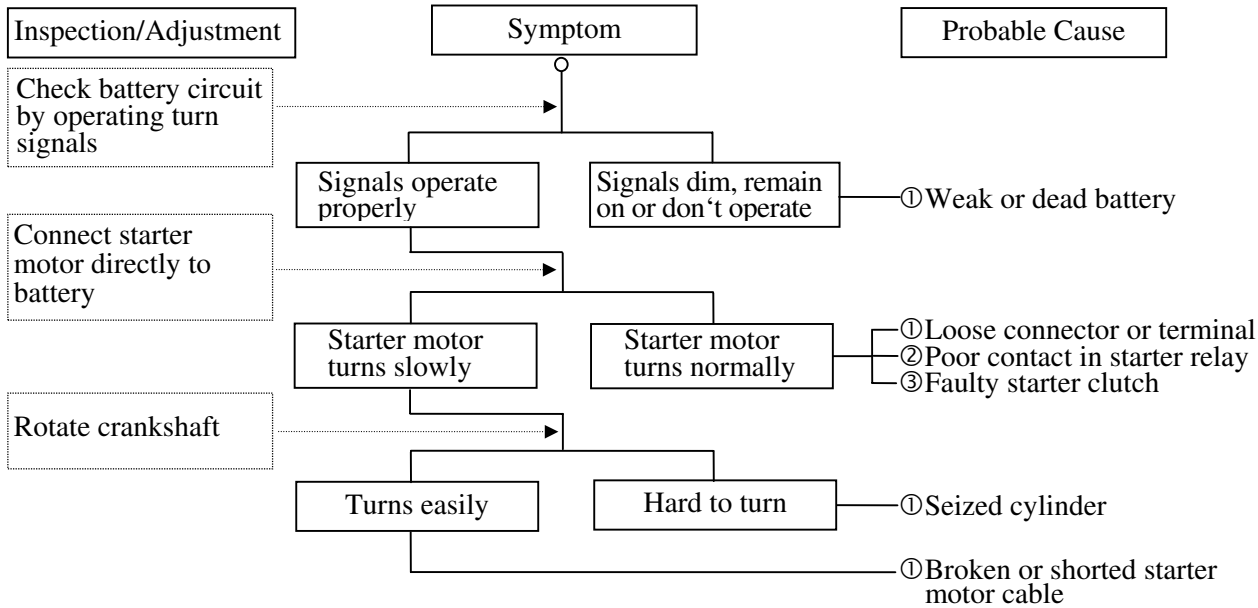


STARTER MOTOR

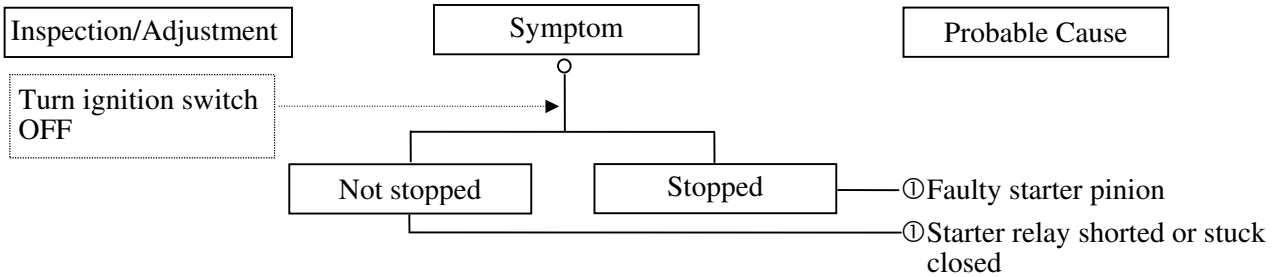
1. Starter motor won't turn



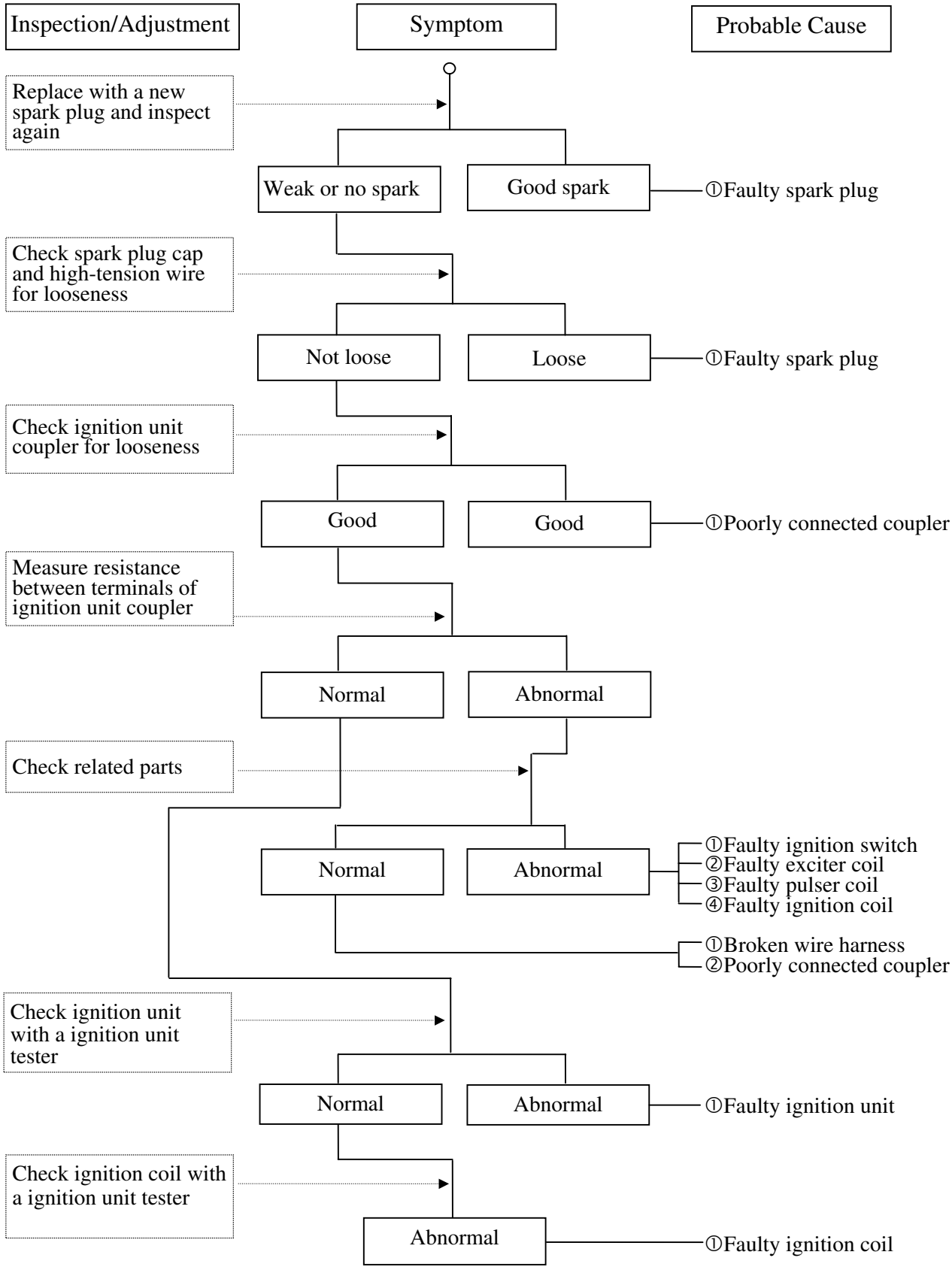
2. Starter motor turns slowly or idles



3. Starter motor does not stop turning

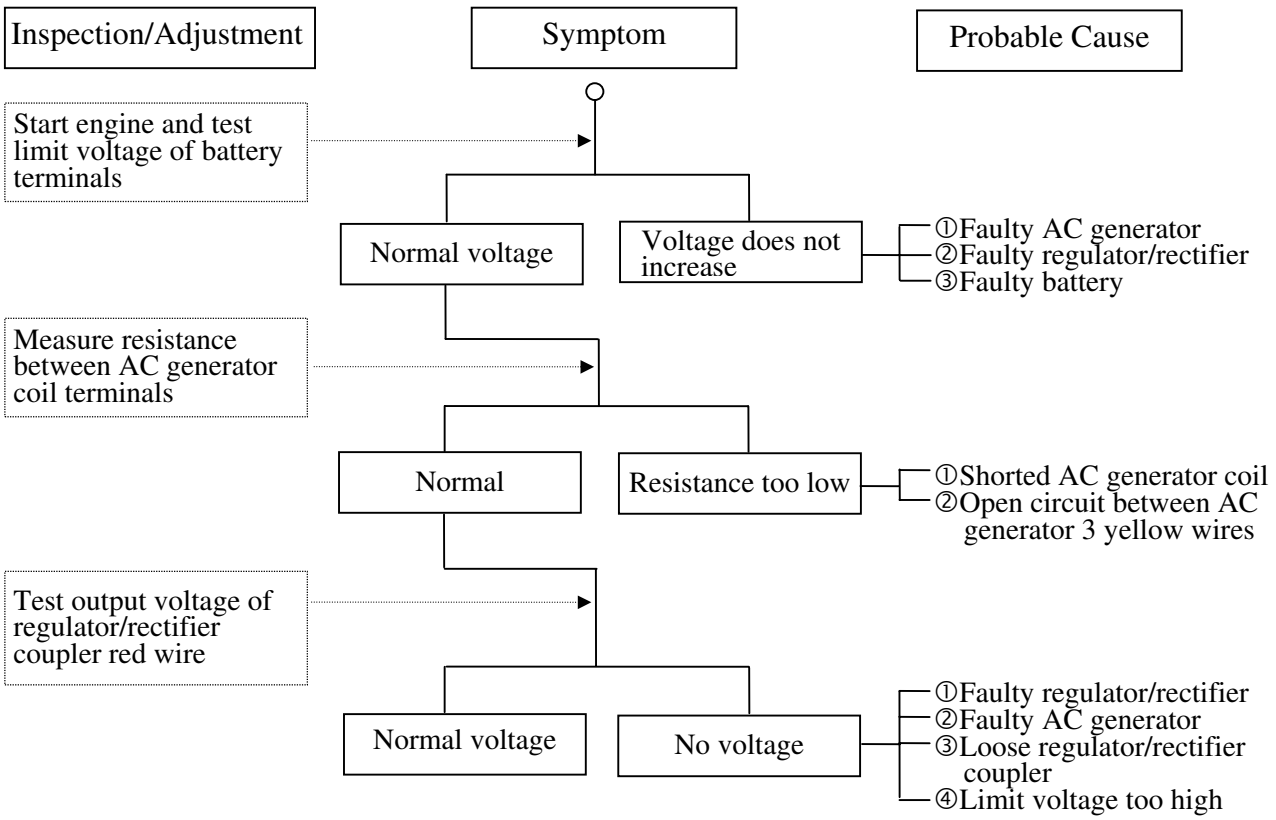


NO SPARK AT SPARK PLUG

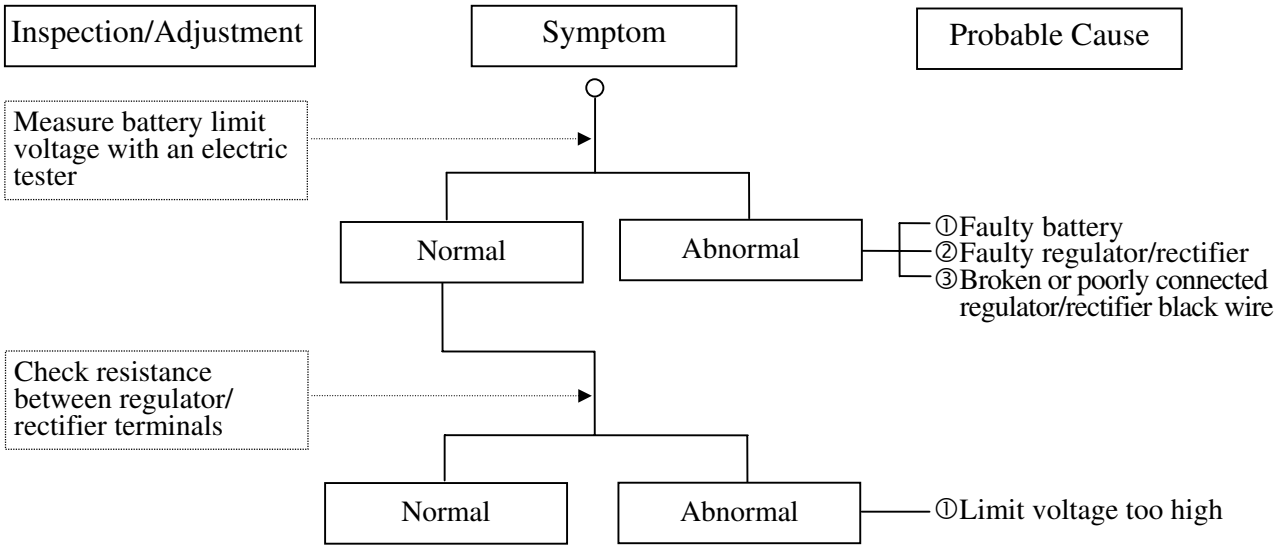


POOR CHARGING (BATTERY OVER DISCHARGING OR OVERCHARGING)

Undercharging

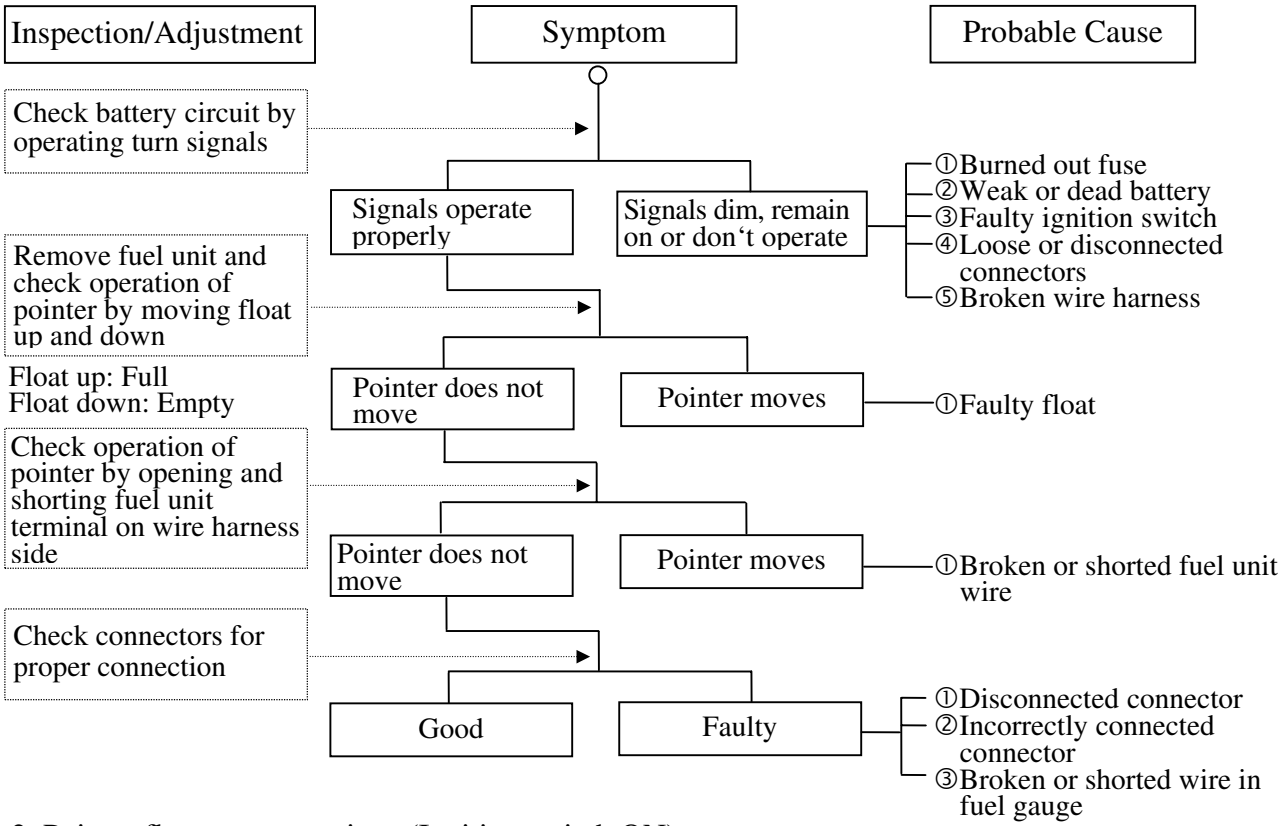


Overcharging

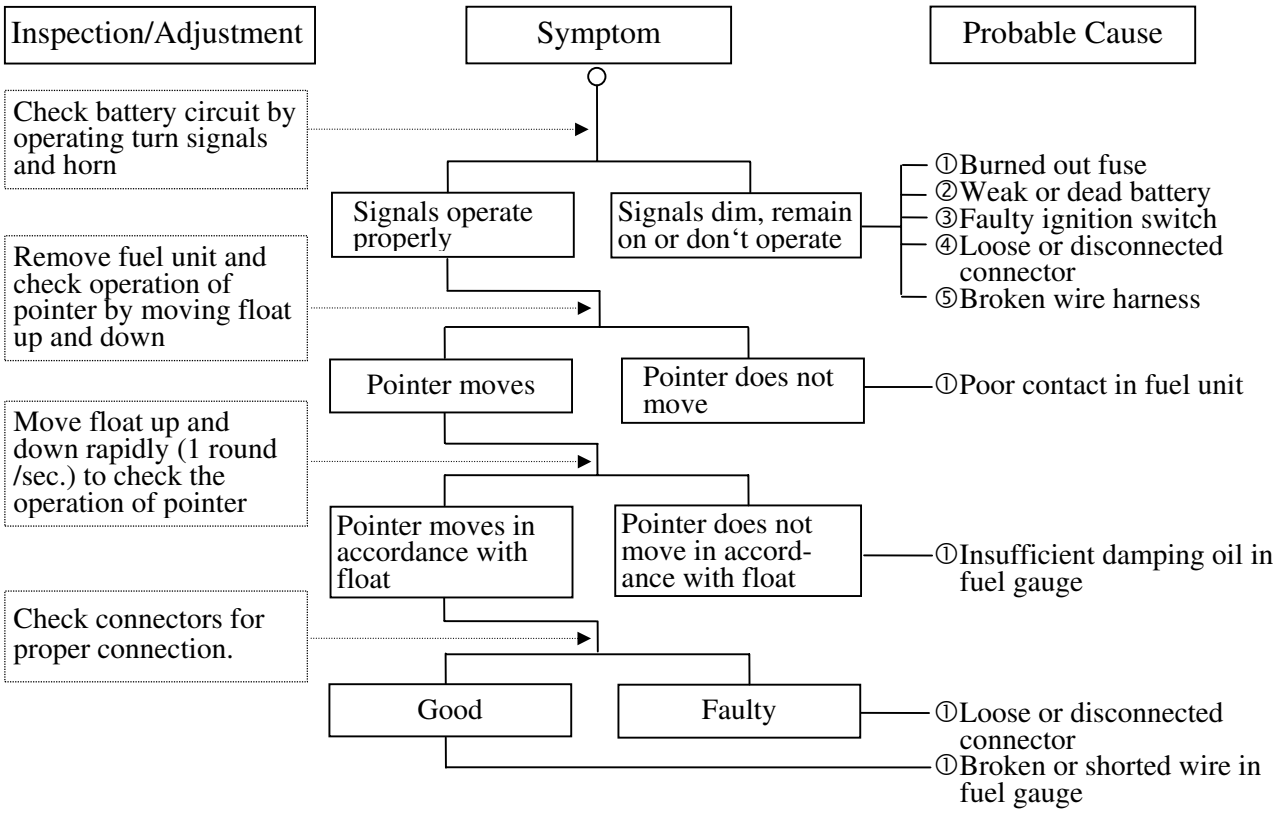


FUEL GAUGE

1. Pointer does not register correctly (Ignition switch ON)



2. Pointer fluctuates or swings (Ignition switch ON)



STEERING HANDLEBAR DOES NOT TRACK STRAIGHT

Symptom	Probable Cause
	(Front and rear tire pressures are normal)
Steering is heavy	①Steering stem nut too tight ②Broken steering steel balls
Front or rear wheel is wobbling	①Excessive wheel bearing play ②Bent rim ③Loose axle nut
Steering handlebar pulls to one side	①Misaligned front and rear wheels ②Bent front fork

POOR SUSPENSION PERFORMANCE

Symptom	Probable Cause
	(Front and rear tire pressures are normal)
Suspension is too soft	①Weak shock spring ②Excessive load ③Shock damper oil leaking
Suspension is too hard	①Bent fork tube or shock rod
Suspension is noisy	①Fork tube and slider binding ②Fork spring and slider binding ③Damaged shock stopper rubber ④Loose steering stem nut

POOR BRAKE PERFORMANCE

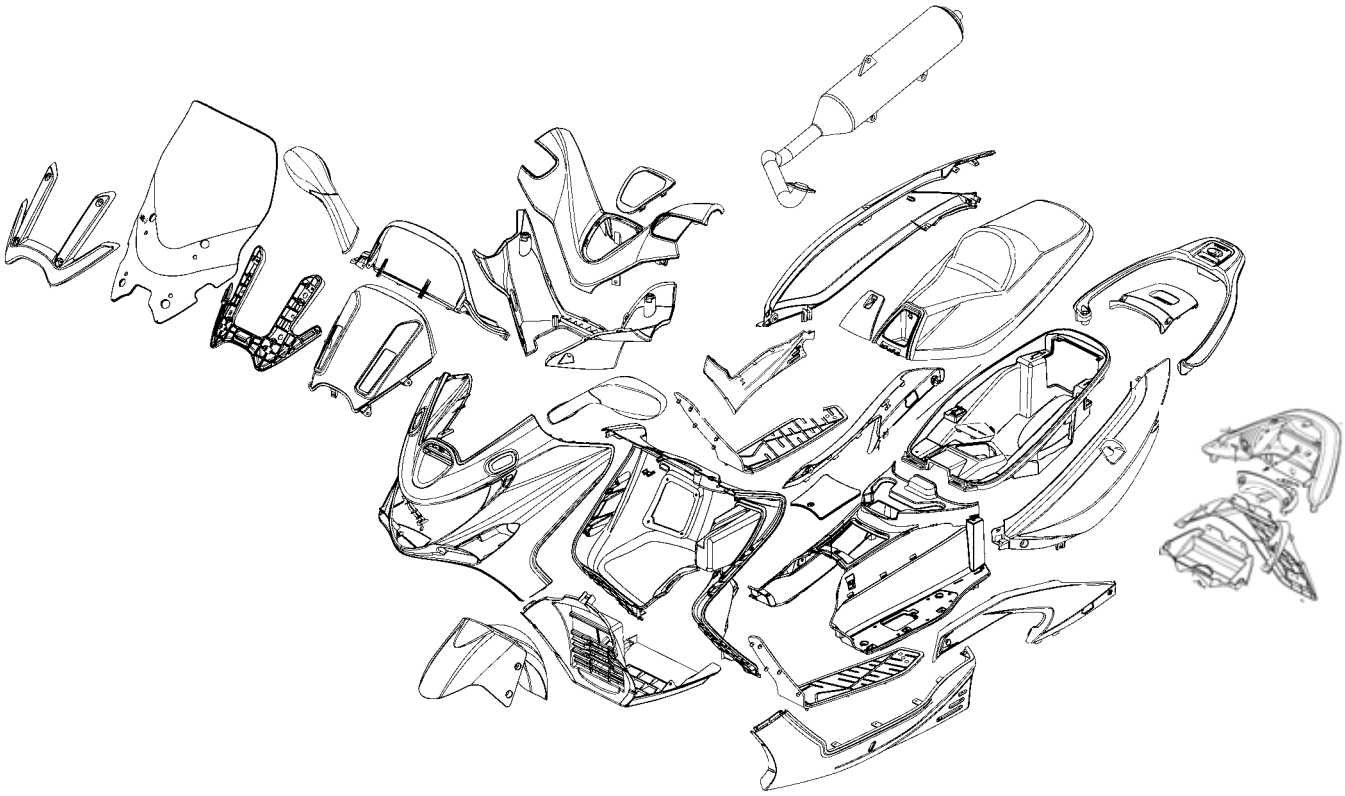
Symptom	Probable Cause
Soft brake lever	①Worn brake linings ②Foreign matter on brake linings ③Rough brake drum contacting area
Hard brake lever	①Worn brake linings ②Foreign matter on brake linings ③Rough brake drum contacting area
Hard to brake	①Worn brake linings ②Worn brake cam contacting area on
Poor brake performance	①Worn brake linings ②Foreign matter on brake linings
Brake squeaks	①Sluggish or elongated brake cables ②Brake shoes improperly contact ③Water and mud in brake system ④Oil or grease on brake linings

2

FRAME COVERS/EXHAUST MUFFLER

SCHEMATIC DRAWING ---------- 2- 1
SERVICE INFORMATION---------- 2- 2
TROUBLESHOOTING---------- 2- 2
FRAME COVERS REMOVAL ---------- 2- 3
EXHAUST MUFFLER ---------- 2-15

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- When removing frame covers, use care not to pull them by force because the cover joint claws may be damaged.
- Make sure to route cables and harnesses according to the Cable & Harness Routing.

TORQUE VALUES

Muffler mount bolt	35 N•m (3.5 kgf•m, 25 lbf•ft)
Exhaust pipe joint nut	20 N•m (2 kgf•m, 14 lbf•ft)
Exhaust pipe band bolt	21 N•m (2.1 kgf•m, 15 lbf•ft)

TROUBLESHOOTING

Noisy exhaust muffler

- Damaged exhaust muffler
- Exhaust muffler joint air leaks

Lack of power

- Caved exhaust muffler
- Clogged exhaust muffler
- Exhaust muffler air leaks

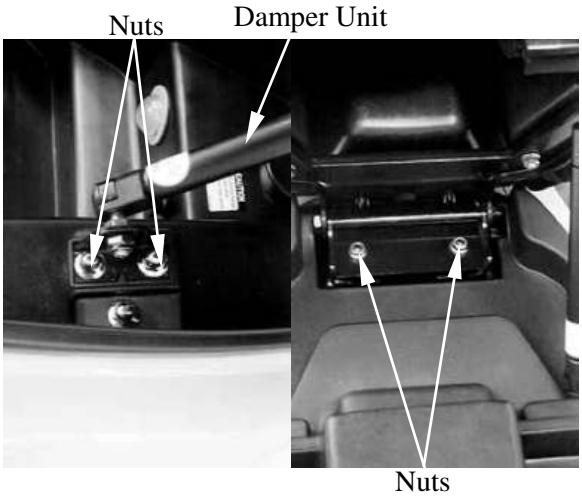
FRAME COVERS REMOVAL

SEAT

REMOVAL
Unlock the seat with the ignition key.
Open the seat.

Remove the two nuts and seat damper unit.

Remove the two nuts and the seat.



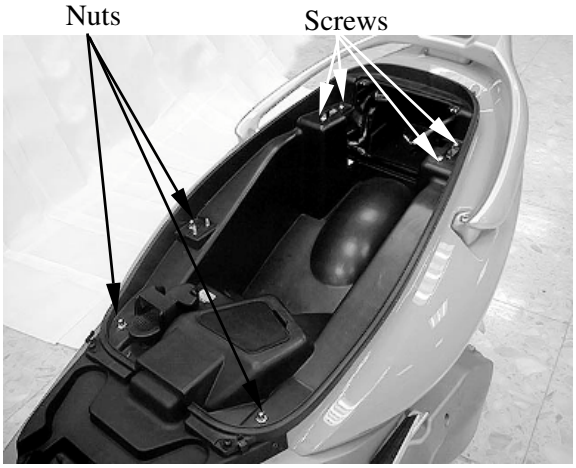
INSTALLATION
Installation is in the reverse order of the removal.

After installation, check the seat installation by moving the seat.

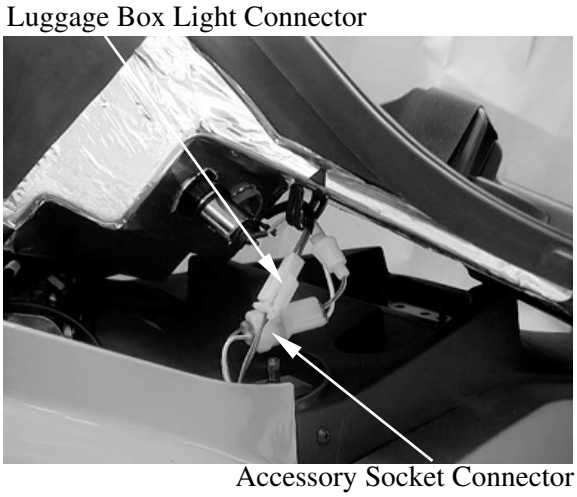
LUGGAGE BOX

REMOVAL
Remove the seat (page 2-3).

Remove the four screws and three nuts.



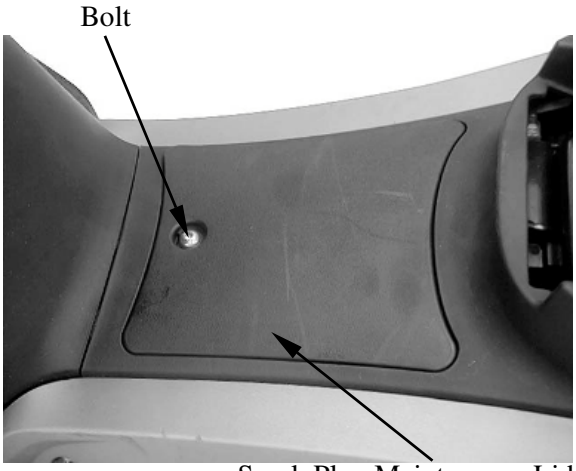
Raise the luggage box, disconnect the luggage box light and accessory socket connectors.



INSTALLATION
Installation is in the reverse order of removal.

SPARK PLUG MAINTENANCE LID
REMOVAL
Remove the bolt and lid.

INSTALLATION
Installation is in the reverse order of removal.

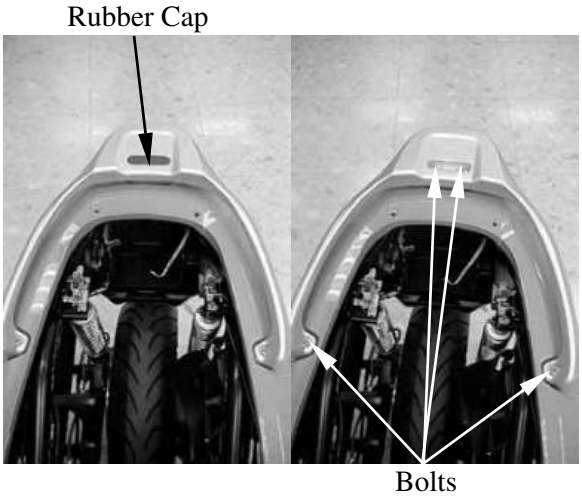


REAR SPOILER
REMOVAL
Unlock the seat with the ignition key.
Open the seat.

Remove the rubber cap.

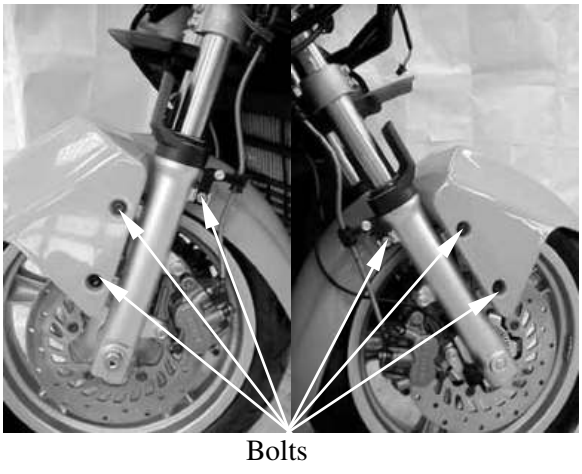
Remove four bolts and rear spoiler.

INSTALLATION
Installation is in the reverse order of removal.



FRONT FENDER
RE MOVAL
Remove the six bolts and front fender.

INSTALLATION
Installation is in the reverse order of removal.



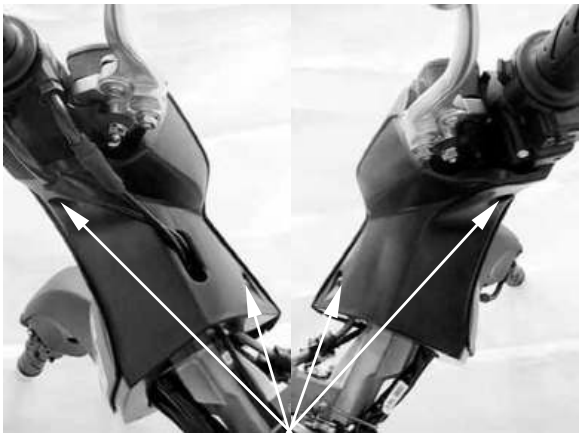
UPPER HANDLEBAR COVER

REMOVAL

Remove four screws and upper handlebar cover.

INSTALLATION

Installation is in the reverse order of removal.



Screws

RIGHT/LEFT CENTER BODY COVER

REMOVAL

Remove the two bolts and right/left center body cover.

* Be careful not to damage the tabs on the center body cover.

INSTALLATION

Installation is in the reverse order of removal.

Bolts



Center Body Cover

RIGHT/LEFT FLOOR SKIRT

REMOVAL

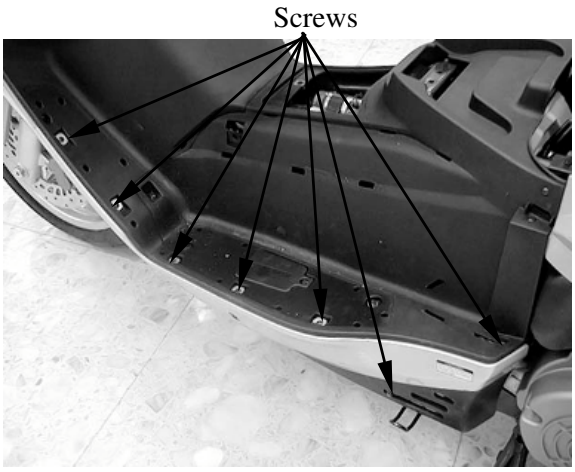
Remove the floor mat.

Remove the center body cover (page 2-5).

Floor Mat

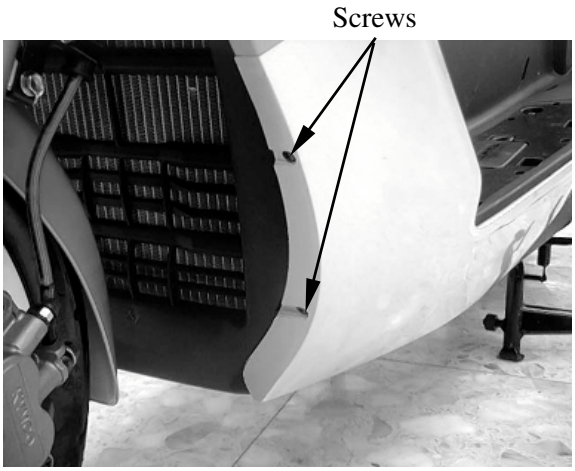


Remove the seven screws.



Remove two screws.

Remove the floor skirt.



* Be careful not to damage the tabs on the floor skirt.

INSTALLATION
Installation is in the reverse order of removal.

FLOORBOARD

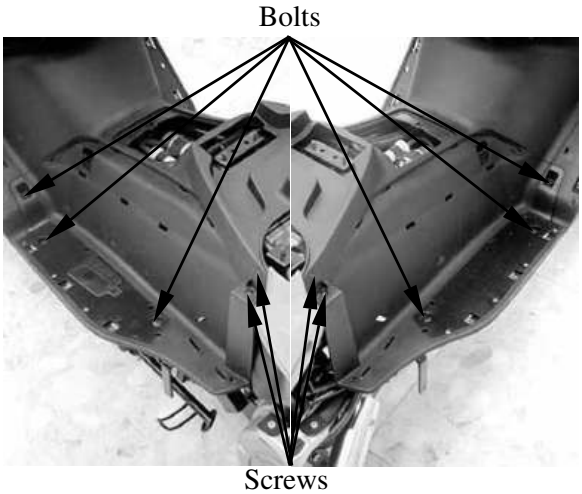
REMOVAL

Remove right and left center body cover (page 2-5).

Remove the right and left floor skirt (page 2-5).

Remove the luggage box (page 2-3).

Remove six bolts, four screws and floorboard.

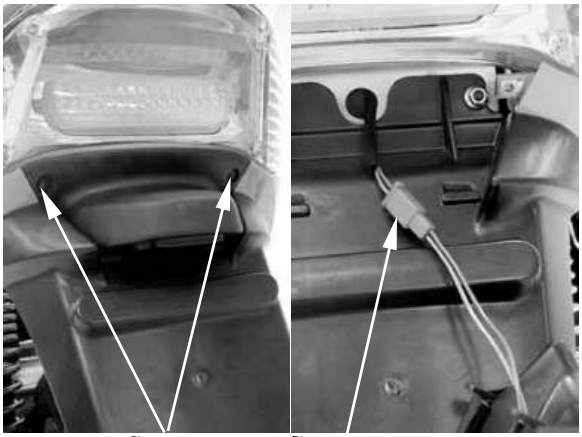


INSTALLATION

Installation is in the reverse order of removal.

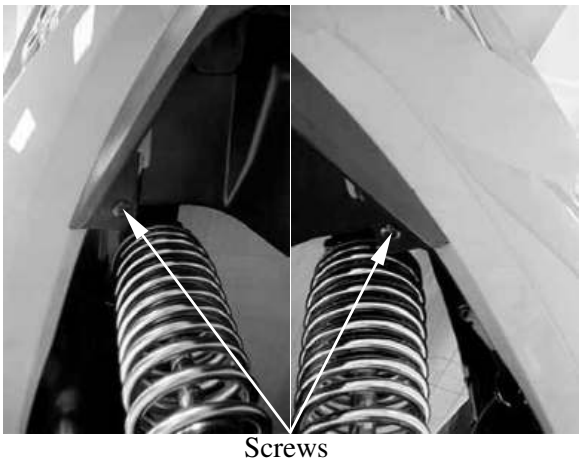
LICENCE LIGHT
REMOVAL
Remove two screws.
Disconnect the license light connector and remove the license light.

INSTALLATION
Installation is in the reverse order of removal.


Screws Connector

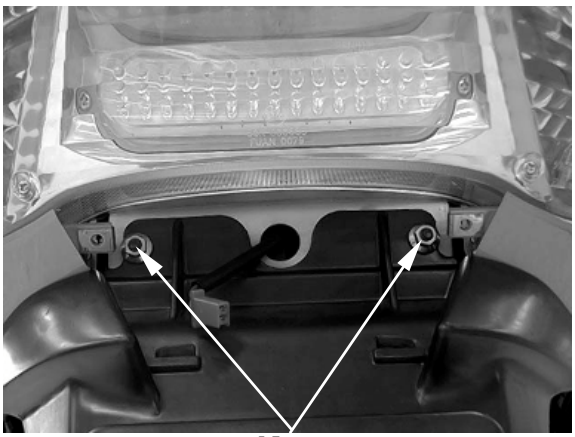
REAR FENDER
REMOVAL
Remove the licence light (page 2-7).

Remove two screws.


Screws

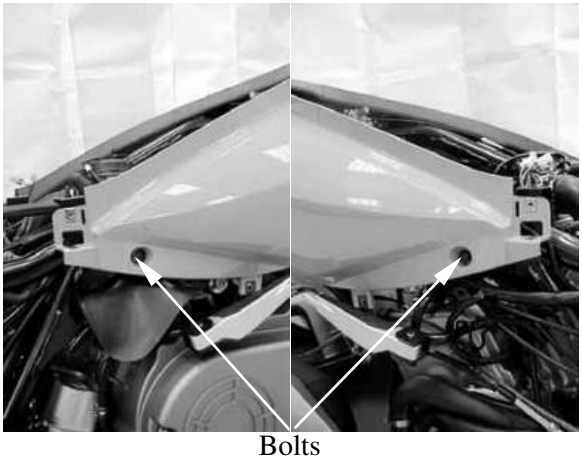
Remove two nuts and rear fender.

INSTALLATION
Installation is in the reverse order of removal.


Nuts

RIGHT/LEFT SIDE BODY COVER
REMOVAL
Remove the luggage box (page 2-3).
Remove the floorboard (page 2-6).
Remove the rear spoiler (page 2-4).

Remove two bolts.


Bolts

Raise the side body cover, disconnect the taillight/rear turn signal light connector and remove the side body cover.

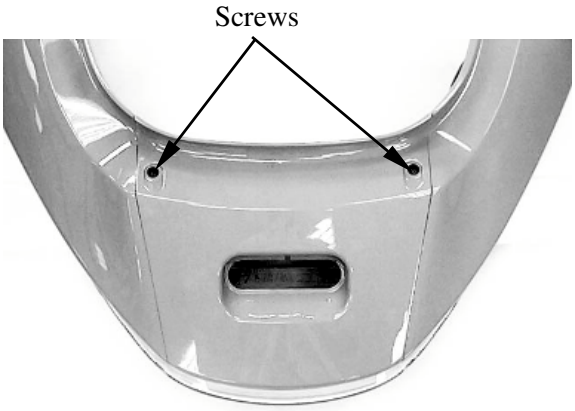
INSTALLATINON
Installation is in the reverse order of removal


Taillight/Rear Turn Signal Light Connector

REAR BODY COVER
REMOVAL
Remove the luggage box (page 2-3).
Remove the rear spoiler (page 2-4).

Remove two screws and rear body cover.

* Be careful not to damage the tabs on the rear body cover.



INSTALLATION
Installation is in the reverse order of removal.

TAILIGHT/REAR TURN SIGNAL LIGHT

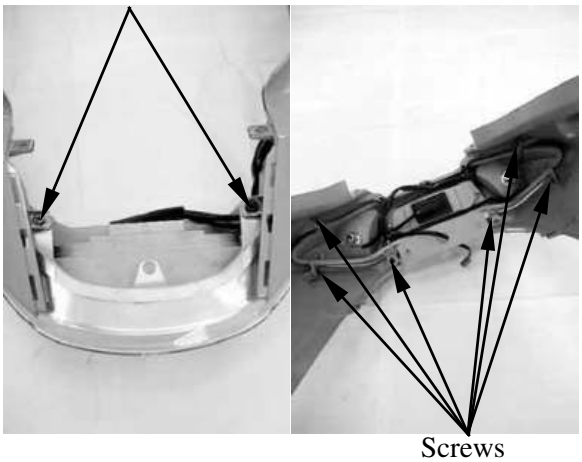
REMOVAL

Remove the side and rear body cover (page 2-8).

Remove eight screw and taillight/rear turn signal light.

INSTALLATION

Installation is in the reverse order of removal.

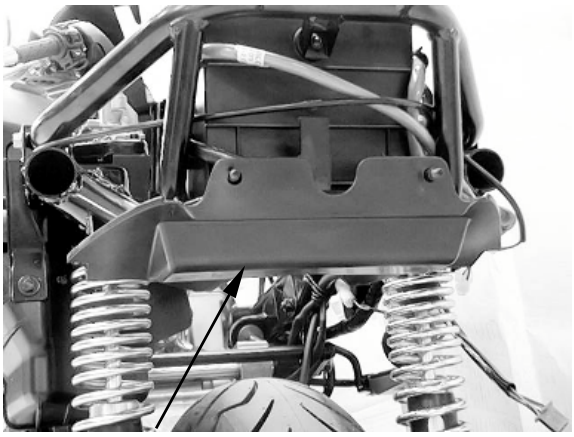


REAR LOWER COVER

REMOVAL

Remove the side body cover (page 2-8).

Remove the rear lower cover.

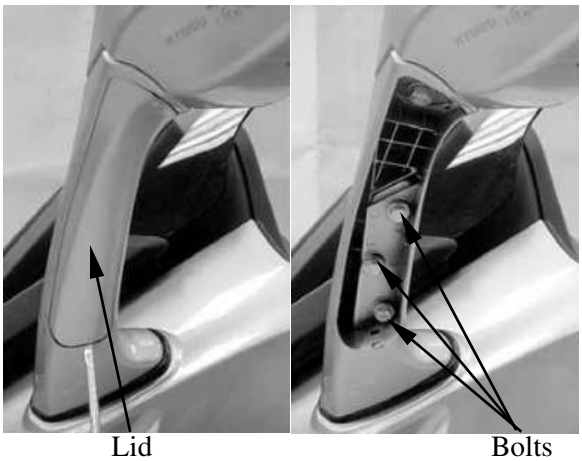


REARVIEW MIRROR

REMOVAL

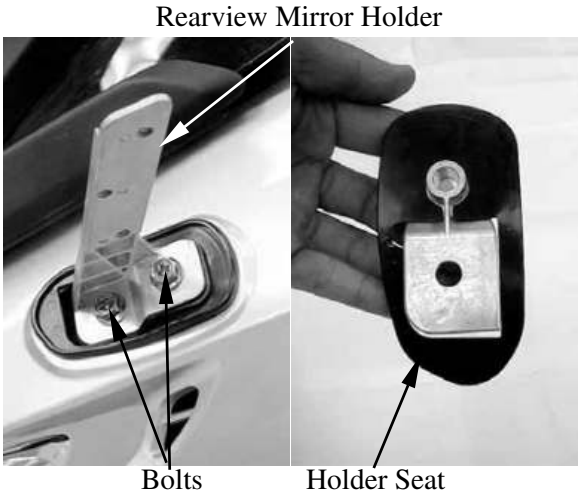
Remove bolts lid.

Remove three bolts and rearview mirror.



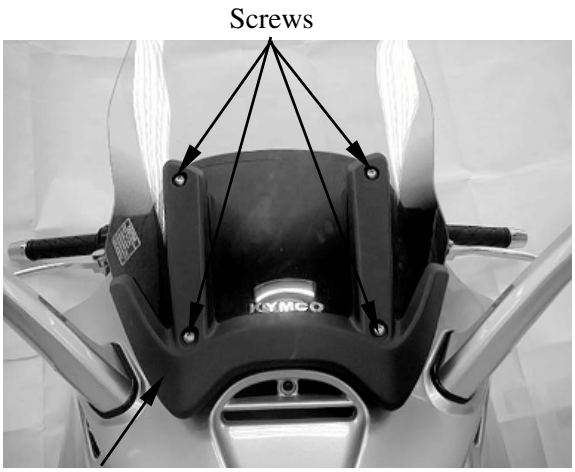
Remove the two bolts, rearview mirror holder and seat.

INSTALLATION
Installation is in the reverse order of removal



WINDSHIELD

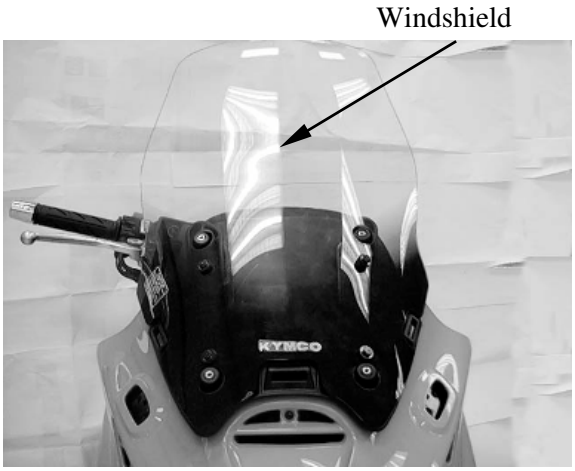
REMOVAL
Remove four screws and windshield garnish.



Remove four bolts and windshield.

* Be careful not to scratch or damage the windshield surface.

INSTALLATION
Installation is in the reverse order of removal.

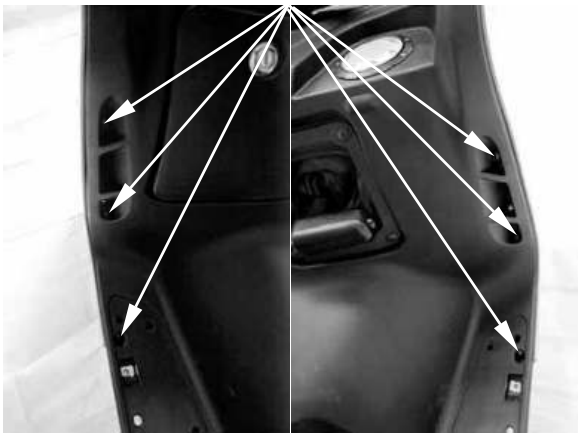


FRONT COVER

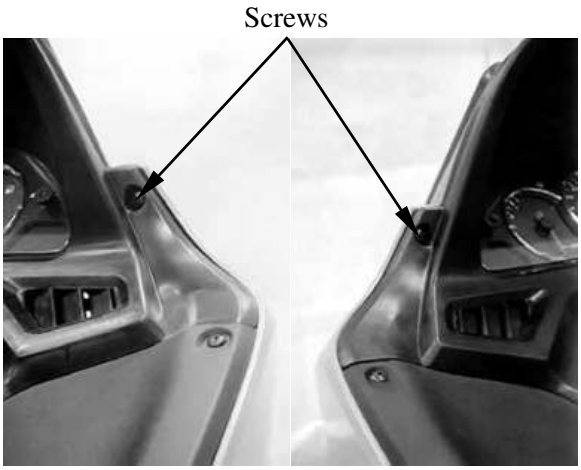
REMOVAL

Remove the rearview mirrors (page 2-9).

Remove six screws.



Remove two screws.

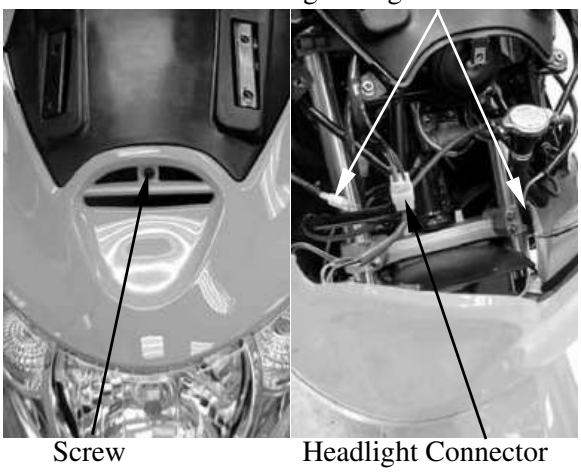


Remove one screw.

Disconnect headlight and turn signal light connectors.

INSTALLATION

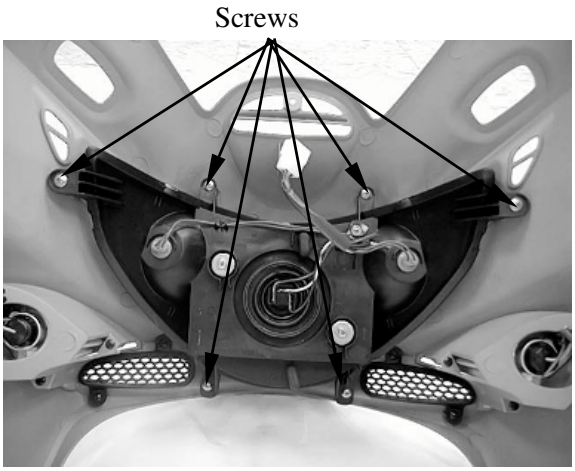
Installation is in the reverse order of removal.



HEADLIGHT
REMOVAL
Remove the front cover (page 2-11).

Remove six screws and headlight.

INSTALLATION
Installation is in the reverse order of removal.



TURN SIGNAL LIGHT
REMOVAL
Remove the front cover (page 2-11).

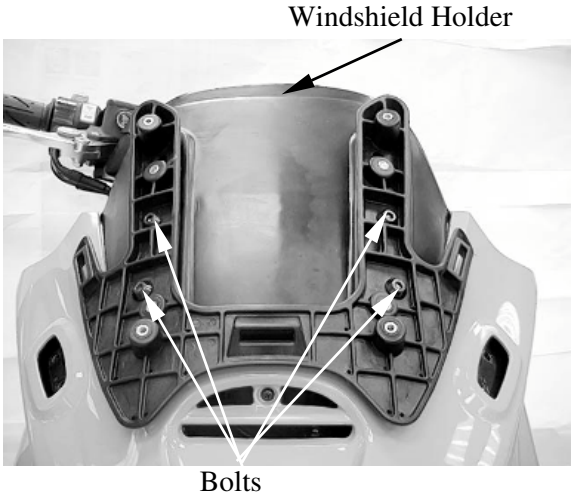
Remove three screws and turn signal light.

INSTALLATION
Installation is in the reverse order of removal.

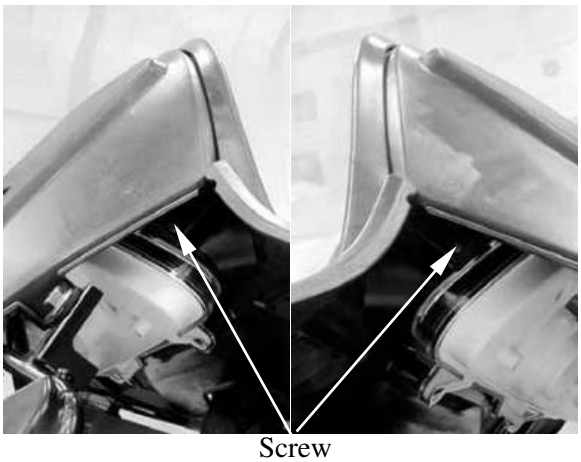


FRONT METER VISOR
REMOVAL
Remove the windshield (page 2-10).
Remove the front cover (page 2-11).

Remove four bolts and windshield holder.



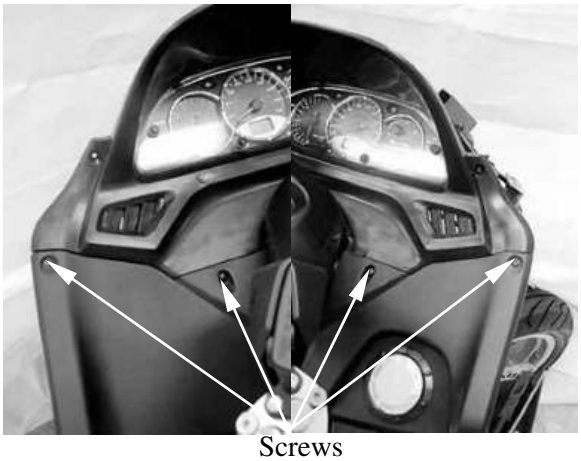
Remove two screws and front meter visor.


Screw

INSTALLATION
Installation is in the reverse order of removal.

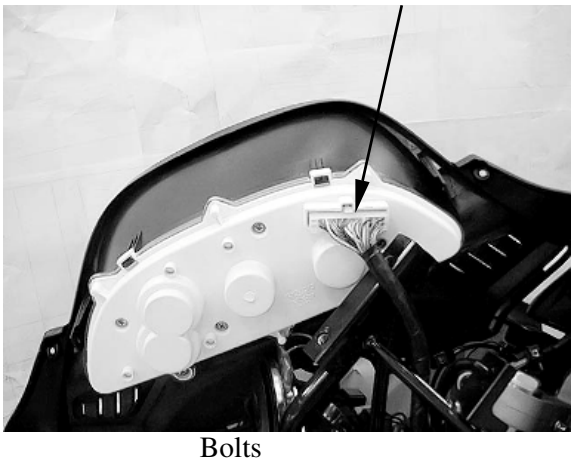
MEER PANEL
REMOVAL
Remove the front cover (page 2-11).
Remove the front meter visor (page 2-12).

Remove four screws.


Screws

Speedometer Connector

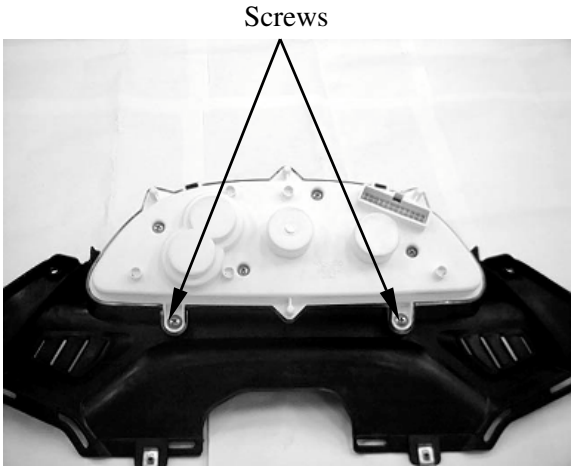
Disconnect the speedometer connector and remove meter panel.


Bolts

INSTALLATION
Installation is in the reverse order of removal.

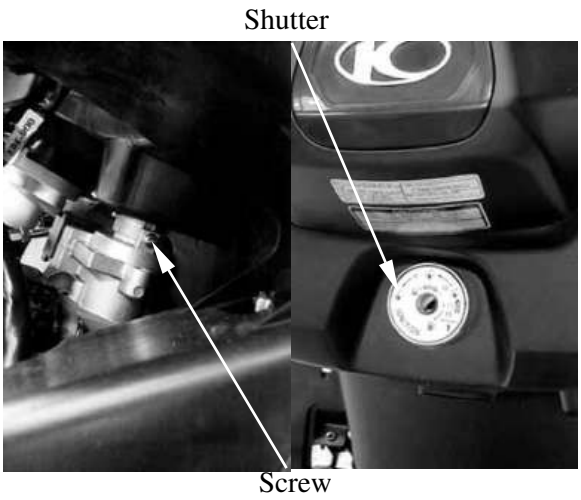
METER
REMOVAL
Remove the meter panel (page 2-13).

Remove two screws and meter.

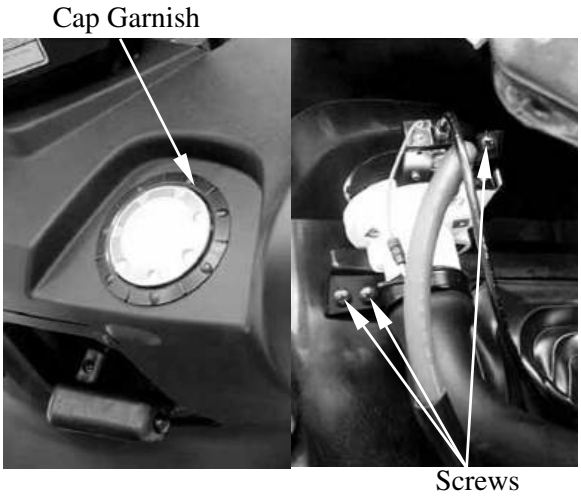


INNER COVER
REMOVAL
Remove the front cover (page 2-11).
Remove the floorboard (page 2-6).
Remove the meter panel (page 2-13).

Remove the shutter screw and shutter.

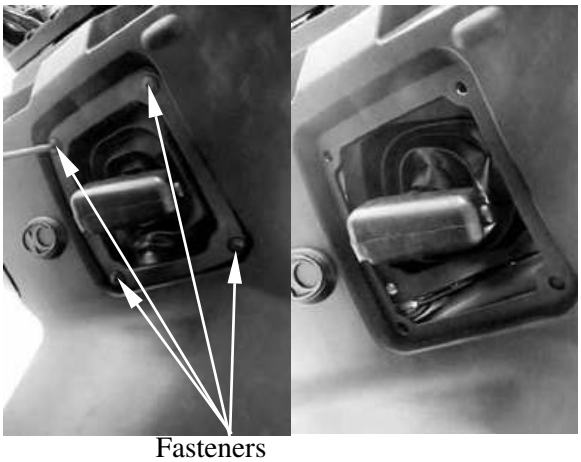


Turn the fuel fill cap garnish counterclockwise and remove it.
Remove three screws and disconnect the fuel fill duct.



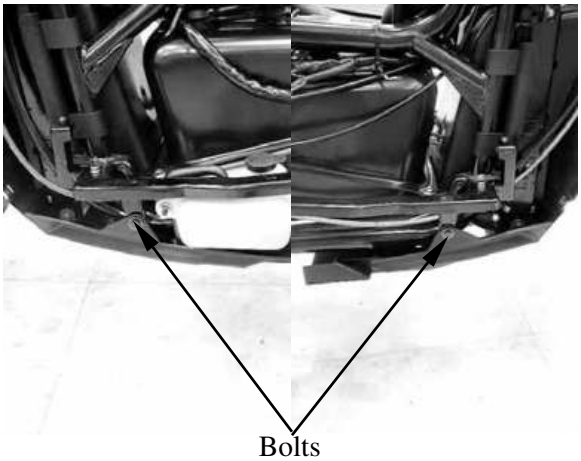
Remove four fasteners.
Remove the inner cover.

INSTALLATION
Installation is in the reverse order of removal.


Fasteners

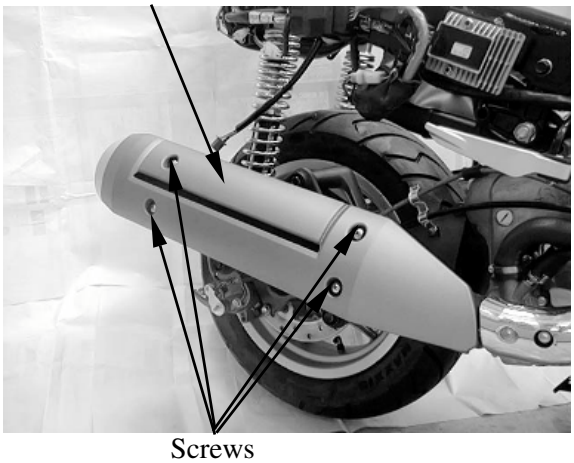
FRONT LOWER COVER
REMOVAL
Remove the front cover (page 2-11).
Remove the right and left floor skirt (page 2-5).

Remove two bolts and front lower cover.

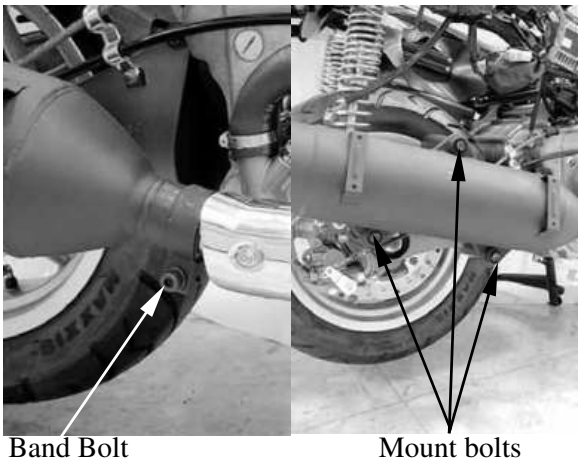

Bolts

Muffler Protector

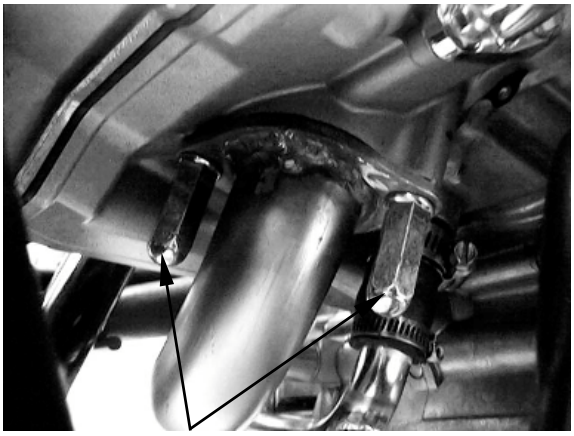
EXHAUST MUFFLER
REMOVAL
Remove four screws and muffler protector.


Screws

Loosen the exhaust pipe band bolt.
Remove three muffler mount bolts and muffler from the exhaust pipe.



Remove the exhaust pipe joint nuts and exhaust pipe.



Remove the gaskets.

INSTALLATION
Replace the gaskets with new ones.
Install the exhaust pipe and tighten the joint nuts.
Torque: 20 N•m (2 kgf•m, 14 lbf•ft)

Install the muffler and tighten the mount bolts.
Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

Install and tighten the band bolts.
Torque: 21 N•m (2.1 kgf•m, 15 lbf•ft)



3

INSPECTION/ADJUSTMENT

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SERVICE INFORMATION

GENERAL

- Place the scooter on al level ground before starting any work.
- Gasoline is extremely flammable and is explosive under certain conditions.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.
- If 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 may lead to death. Run the engine in an open area or with an exhaust evacuation sustem in and enclosed area.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle free play			2-6 mm (1/16 – 1/4 in)
Spark plug	NGK		CR8E
Spark plug gap			0.6 – 0.7 mm (0.024 – 0.028 in)
Valve clearance	IN		0.1 mm (0.004 in)
	EX		0.1 mm (0.004 in)
Engine oil capacity	At draining		2.0 liter (2.1 US pt, 1.8 lmp qt)
	At draining/oil filter change		2.1 liter (2.2 US pt, 1.9 lmp qt)
	Total amount		2.5 liter (2.6 US pt, 2.3 lmp qt)
Recommended engine oil			KYMCO 4-stroke oil or equivalent motor oil API service classification: SJ Viscosity: 5W50
Engine idle speed			1400±100 rpm
Final reduction oil capacity	At draining		0.45 liter (0.48 US pt, 0.4 lmp qt)
	Total amount		0.55 liter (0.57 US pt, 0.5 lmp qt)
Recommended final reduction oil			SAE 90
Recommended brake fluid			DOT 4
Parking brake lever stroke			3 – 6 notch
Tire size		Front	120/70-15
		Rear	150/70-14
Tire air pressure	Solo riding	Front	200 kPa (2 kgf/cm^2, 29 psi)
		Rear	250 kPa (2.5 kgf/cm^2, 36 psi)
	Two up riding	Front	225 kPa (2.25 kgf/cm^2, 32 psi)
		Rear	250 kPa (2.5 kgf/cm^2, 36 psi)
Minimum tire tread depth		Front	1.6 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQURE VALUES

Engine oil drain plug	25 N•m (2.5 kgf•m, 18 lbf•ft)
Oil strainer screen cap	15 N•m (1.5 kgf•m, 11 lbf•ft) Apply oil to the threads and seating surface.
Oil filter cartridge	10 N•m (1 kgf•m, 7 lbf•ft) Apply oil to the threads and seating surface.
Transmission oil drain bolt	24 N•m (2.4 kgf•m, 18 lbf•ft)
Transmission oil filler bolt	24 N•m (2.4 kgf•m, 18 lbf•ft)
Spark plug	12 N•m (1.2 kgf•m, 9 lbf•ft)
Tappet adjust nut	9 N•m (0.9 kgf•m, 6 lbf•ft)

SPECIAL TOOLS

Tappet adjuster	E036
Oil filter cartridge wrench	E052

MAINTENANCE SCHEDULE

Perform the pre-ride inspection in the owner's manual at each scheduled maintenance period.
This interval should be judged by odometer reading or months, whichever comes first.
I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY
C: CLEAN R: REPLACE A: ADJUST L: LUBRICATE

FREQUENCY / ITEM	WHICHEVER COMES FIRST		ODOMETER READING [NOTE (1)]						
		X 1000 km	1	6	12	18	24	30	36
		X 1000 mi	0.6	4	8	12	16	20	24
ITEM	NOTE	MONTH		6	12	18	24	30	36
AIR CLEANER	NOTE 2			R	R	R	R	R	R
SPARK PLUGS					R		R		R
THROTTLE OPERATION					I		I		I
VALVE CLEARANCE							I		
FUEL LINE					I		I		I
CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	C
ENGINE OIL			R	R	R	R	R	R	R
ENGINE OIL FILTER			R	R	R	R	R	R	R
ENGINE OIL STRAINER SCREEN			C	C	C	C	C	C	C
ENGINE IDLE SPEED			I	I	I	I	I	I	I
RADIATOR COOLANT	NOTE 6				I		I		R
COOLING SYSTEM					I		I		I
SECONDARY AIR SUPPLY SYSTEM					I		I		I
TRANSMISSION OIL	NOTE 5		R						
DRIVE BELT	NOTE 4					I			I
CLUTCH SHOE WEAR				I	I	I	I	I	I
BRAKE FLUID	NOTE 7			I	I	I	R	I	I
BRAKE PAD WEAR				I	I	I	I	I	I
BRAKE SYSTEM			I		I		I		I
BRAKE LIGHT SWITCH					I		I		I
BRAKE LOCK OPERATION			I	I	I	I	I	I	I
SIDE STAND					I		I		I
SUSPENSION					I		I		I
HEADLIGHT AIM					I		I		I
NUTS, BOLTS, FASTENERS			I		I		I		I
WHEELS/TIRES					I		I		I
STEERING BEARINGS			I		I		I		I

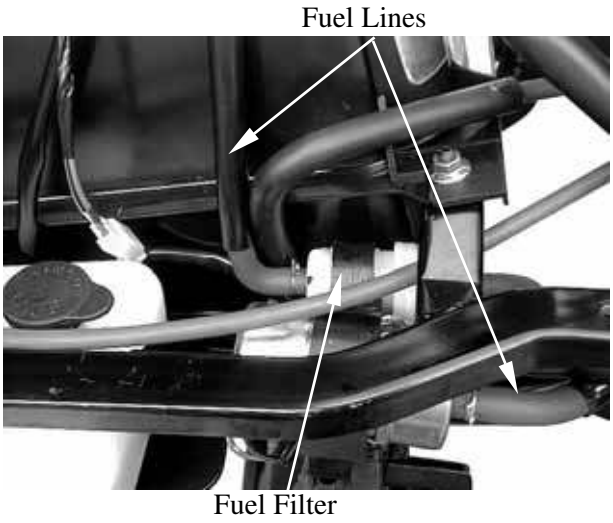
NOTE:
1 At higher odometer readings, repeat at the frequency interval established here.
2 Service more frequently if the scooter is ridden in unusually wet or dusty areas.
3 Service more frequently when riding in rain or at full throttle.
4 Inspect every 18000 km (12000 mi) after replacement.
5 Replace every 1 year, or every 10000km (6000mi), whichever comes first.
6 Replace every 2 year, or at indicated odometer interval, whichever comes first.
7 Replace every 2 years. Replacement requires mechanical skill.

FUEL LINE

Remove the floorboard. (page 2-6).

Check the fuel lines for deterioration, damage or leakage. Replace the fuel line if necessary.

* • Do not smoke or allow flames or sparks in your working area.



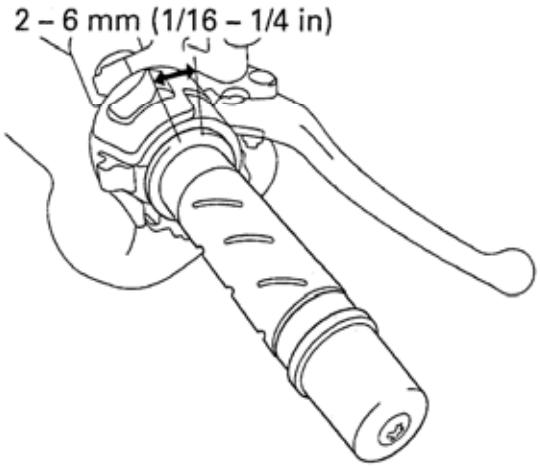
FUEL FILTER

Visually check the fuel filter. If accumulation of sediment or clogging is found, replace the fuel filter with a new one.

THROTTLE OPERATION

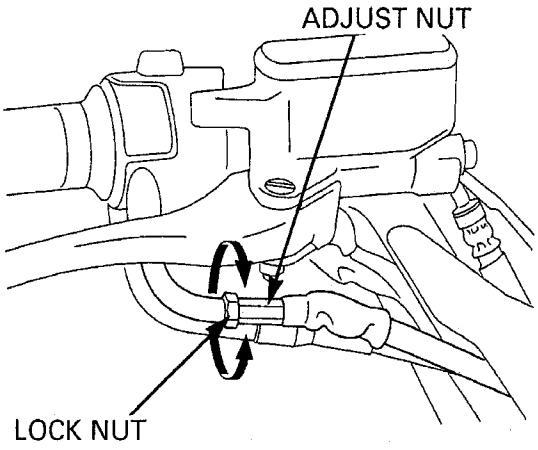
Check for smooth throttle grip full opening and automatic full closing in all steering positions.
Check the throttle cables and replace them if they are deteriorated, kinked or damaged.
Lubricate the throttle cables, if throttle operation is not smooth.

Measure the throttle grip free play.
Free Play: 2～6 mm (1/16～1/4 in)



Throttle grip free play can be adjusted at either end of the throttle cable.

Minor adjustment is made with the upper adjuster.
Slide the rubber sleeve back to expose the throttle cable adjuster.
Adjust the free play by loosening the lock nut and turning the adjuster.



Major adjustments are made with the lower adjuster.

Remove the seat luggage box (page 2-3).

Adjust the free play by loosening the lock nut and turning the adjuster.
After adjustment, tighten the lock nut securely.
Recheck the throttle operation.
Replace any damaged parts, if necessary.

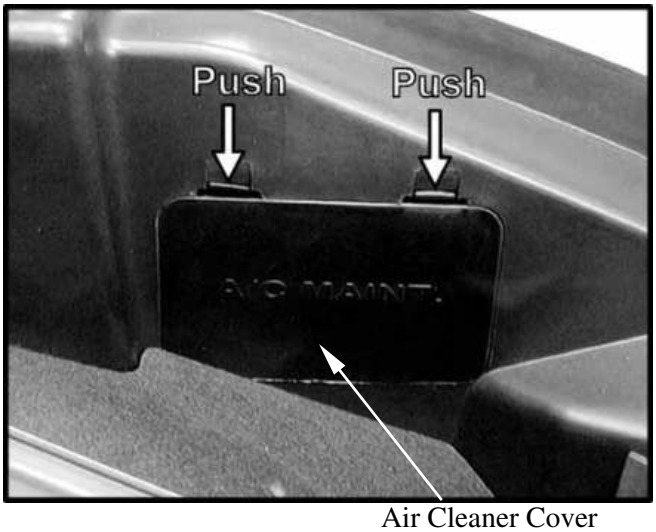


AIR CLEANER

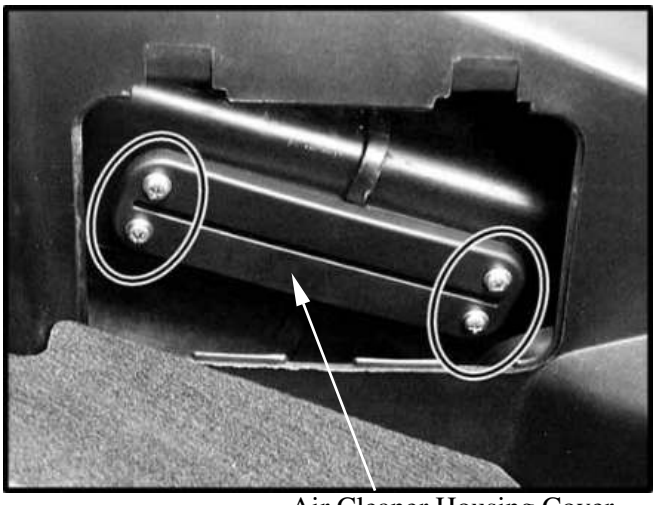
The air cleaner should be serviced at regular intervals. Service more frequently when riding in unusually wet or dusty areas.

Unlock the seat with the ignition key.
Open the seat.

Remove the air cleaner cover.



Remove the screws and air cleaner housing cover

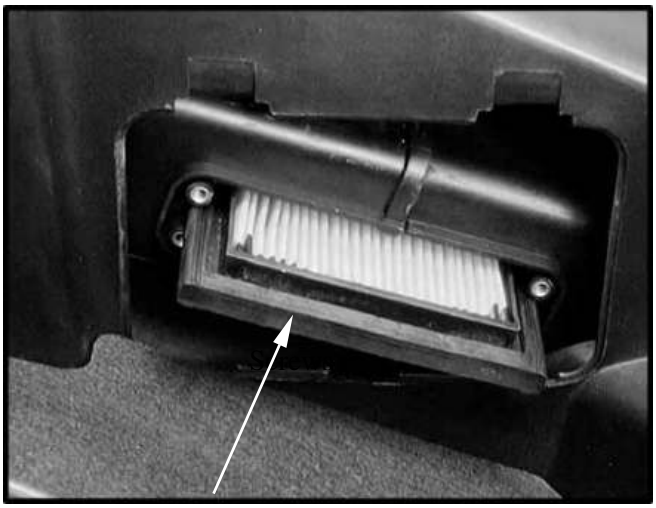


Remove the air cleaner element by pull it out.

Discard the air cleaner element.

Install a new air cleaner element. Use the KYMCO genuine air cleaner element or an equivalent air cleaner element specified for your model. Using the wrong. KYMCO air cleaner element or a non-KYMCO air cleaner which is not of equivalent quality may cause premature engine wear or performance problems.

Install the removed parts in the reverse order of removal.



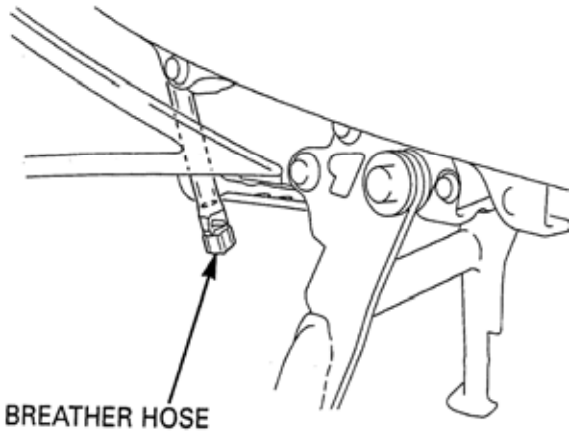
Air Cleaner Element

CRANKCASE BREATHER

Remove the crankcase breather tube plug from the tube and drain deposits into a suitable container.

Reinstall the crankcase breather tube plug.

Service more frequently when riding in rain, at full throttle, or after the scooter is washed or overturned. Service if the deposit level can be seen in the transparent section of the drain tube.



SPARK PLUG

REMOVAL

Remove the spark plug maintenance lid (page 2-4).

Disconnect the spark plug cap and clean around the spark plug base.

* Clean around the spark plug base with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.



Spark Plug Cap

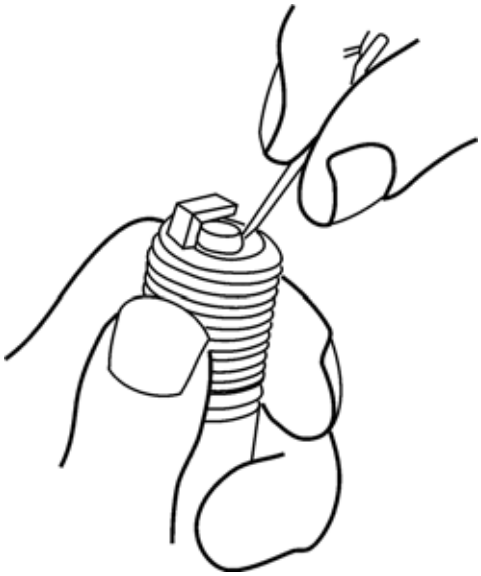
Remove the spark plug using a equipped spark plug wrench or an equivalent tool.

Inspect or replace as described in the maintenance schedule.


Spark Plug Cap

INSPECTION

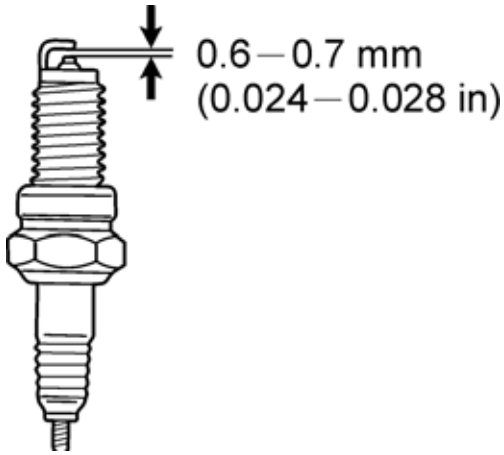
Remove the carbon deposits from the spark plug with a small wire brush or a spark plug cleaning machine.



The spark plug should be replaced periodically. Whenever removing the carbon deposits, be sure to observe the operational color of the spark plug's porcelain tip. This color tells you whether or not the standard spark plug is suitable for your type of usage. A normal operating spark plug should be light brown or tan color. If the spark plug is very white or glazed appearing, then it has been operating much too hot. This spark plug should be replaced with the colder plug.

Recommended spark plug: NGK: CR8E

Measure the spark plug gap between the center and side electrodes with the feeler gauge.
If necessary, adjust the gap by bending the side electrode carefully.



Spark plug gap:
0.6－0.7 mm (0.024－0.028 in)

Install the spark plug in the cylinder head and hand tighten, then torque to the specification.

Torque: 12 N•m (1.2kgf•m, 9 lbf•ft)

Install the spark plug cap.

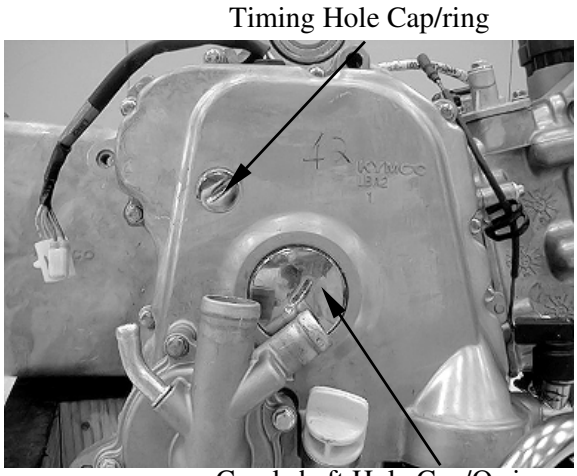
Install the removed parts in the reverse order of removal.

VALVE CLEARANCE

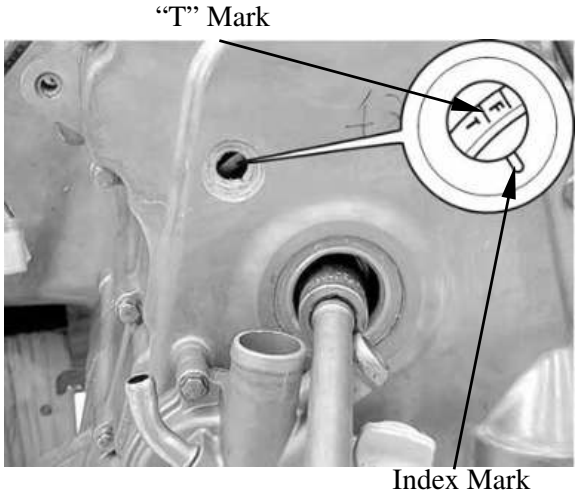
* Inspect and adjust the valve clearance while the engine is cold (Below 35°C/95°F).

Remove the floorboard (page 2-6).
Remove the cylinder head cover (page 8-5).

Remove the timing hole cap and O-ring.
Remove the crankshaft hole cap and O-ring.

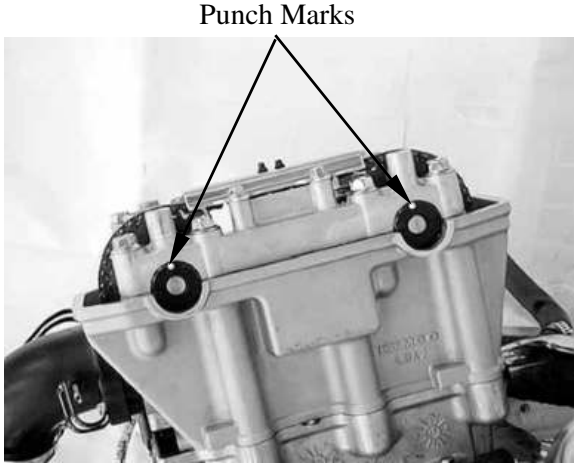


Turn the crankshaft clockwise and align the "T" mark on the flywheel with the index mark on the right crankcase cover.



The punch marks on the camshaft should face upward as shown.

If the punch marks on the camshaft are facing downward, turn the crankshaft clockwise one full turn (360°) and the punch marks are facing upward.



Adjust by loosening the valve adjusting screw lock-nut and turning the adjusting screw until there is a slight drag on the thickness gauge.

Valve clearance (when cold):
IN.: 0.1 mm (0.004 in)
EX.: 0.1 mm (0.004 in)

Apply oil to the valve adjusting screw lock-nut threads and seating surface.

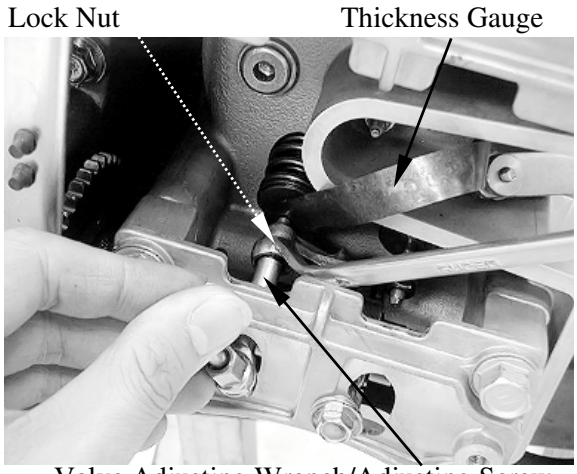
Hold the adjusting screw and tighten the lock nut.

Special tool:
Valve adjusting wrench E012

Torque: 9N•m (0.9 kgf•m, 6 lbf•ft)

After tightening the lock nut, recheck the valve clearance.

Install the removed parts in the reverse order of removal.



Valve Adjusting Wrench/Adjusting Screw

ENGINE OIL

OIL LEVEL INSPECTION

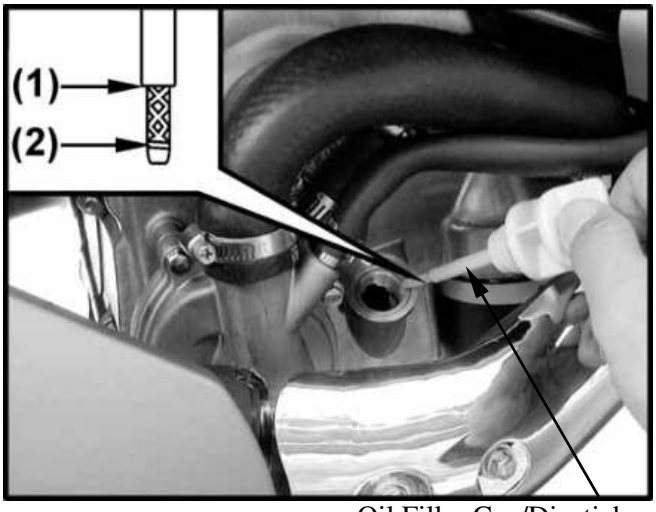
Start the engine and let it idle for 2－3 minutes.

Turn off the engine and support the scooter level surface.

Remove the oil filler cap/dipstick and wipe the oil from the dipstick with a clean cloth.

Insert the dipstick into the oil filler hole without screwing it in.

If the oil level is below or near the lower level line (1) he dipstick, add the recommended engine oil until the oil level is to the upper level line (2)

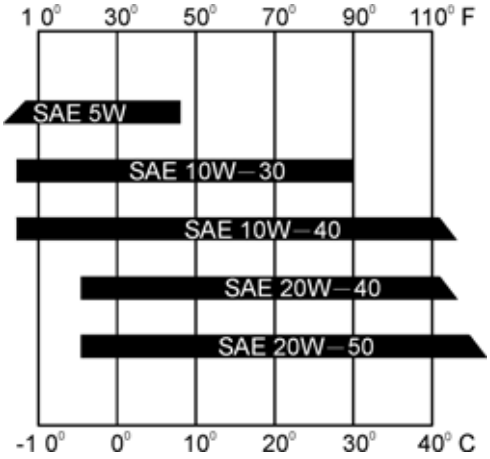


Oil Filler Cap/Dipstick

Recommended engine oil:

KYMCO 4-stroke oil or equivalent motor oil API service classification: SJ

Viscosity: SAE 5W50



* Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

Reinstall the filler cap/dipstick.

ENGINE OIL & STARINER SCREEN

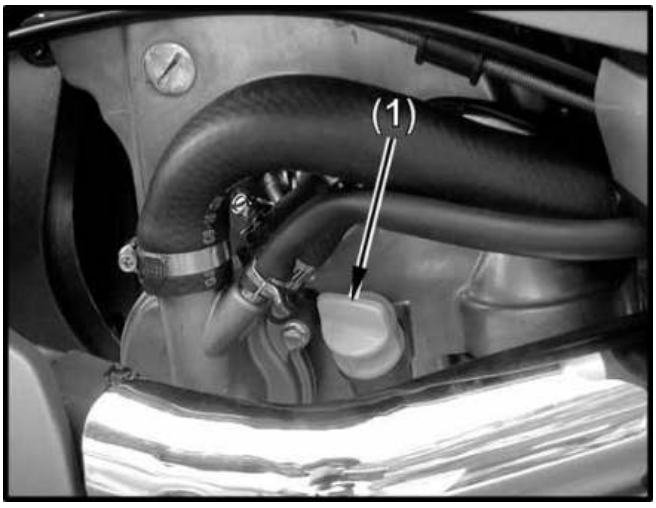
When running in very dusty conditions, oil changes should be performed more frequently than specified in the maintenance schedule.

Please dispose of used engine oil in a manner that is compatible with the environment. We suggest you take it in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash or pour it on the ground or down a drain.

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

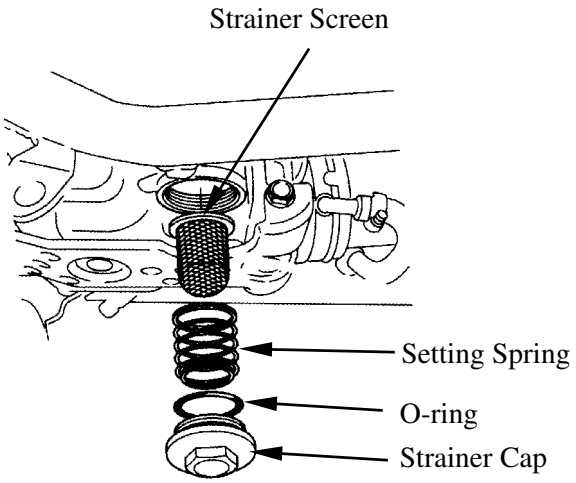
Change the engine oil with the engine at normal operating temperature and the scooter on its center stand to assure complete and rapid draining.

Remove the oil filler cap/dipstick (1) from the right crankcase cover.



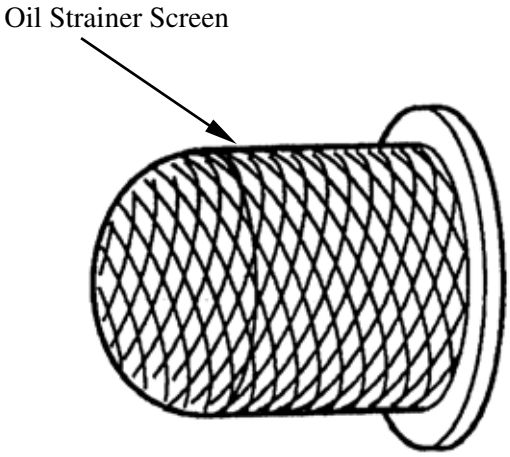
Place a drain pan under the crankcase and remove the oil strainer cap.

The setting spring and oil strainer screen will come out when the oil strainer cap is removed.



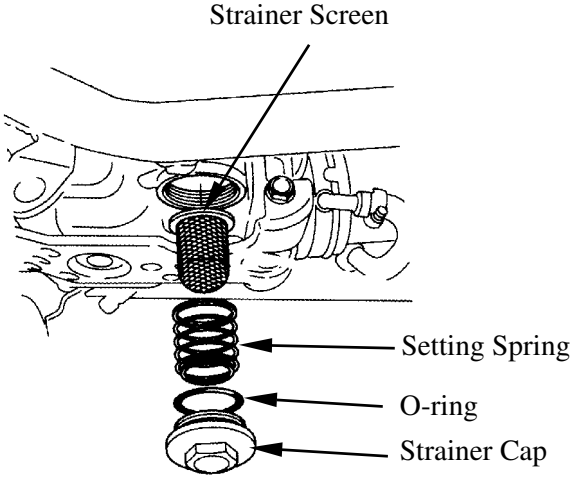
Clean the oil strainer screen.

After draining the oil completely, install the strainer screen and setting spring into the engine.



Apply clean engine oil to the strainer cap threads, flange surface and a new O-ring. Install and tighten the strainer cap with a new O-ring.

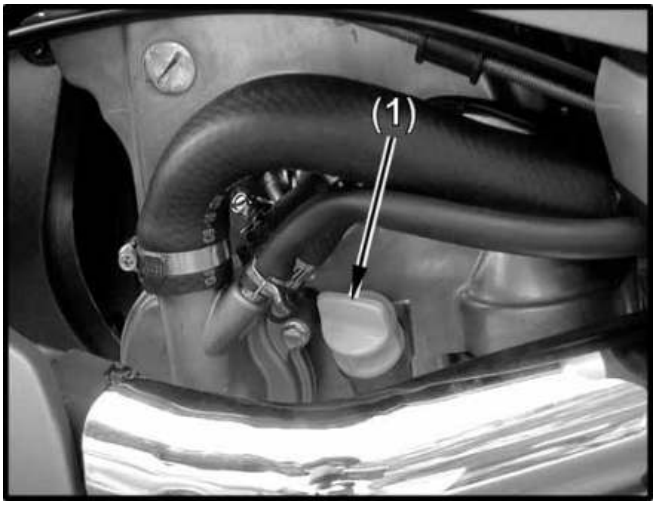
Torque: 15N•m (1.5 kgf•m, 11 lbf•ft)



Fill the crankcase with the recommended engine oil.

Oil capacity:
2.0 liter (2.1 US qt, 1.8 lmp qt) at draining
2.1 liter (2.2 US qt, 1.9 lmp qt) at oil filter cartridge change

Install the oil filler cap/dipstick (1).
Check the engine oil level (page 3-11).
Make sure there are no oil leaks.



ENGINE OIL FILTER CARTRIDGE

REPLACEMENT

Drain the engine oil (page 3-11).

Remove the rubber sleeve (2) by removing the clip (1).



Remove and discard the oil filter cartridge (3) using the special tool.

Tool:
Oil filter wrench: E052

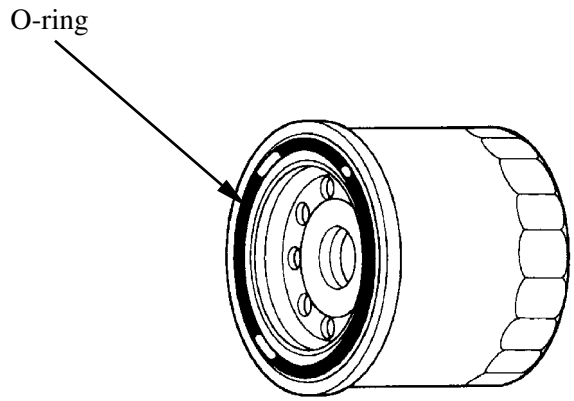


Apply clean engine oil to the new oil filter cartridge threads, flange surface and a new O-ring.
Install the new oil filter cartridge and tighten it to the specified torque.

Tool:
Oil filter cartridge wrench E052

Torque: 10N•m (1 kgf•m, 7 lbf•ft)

Refill the engine oil (page 3-13)

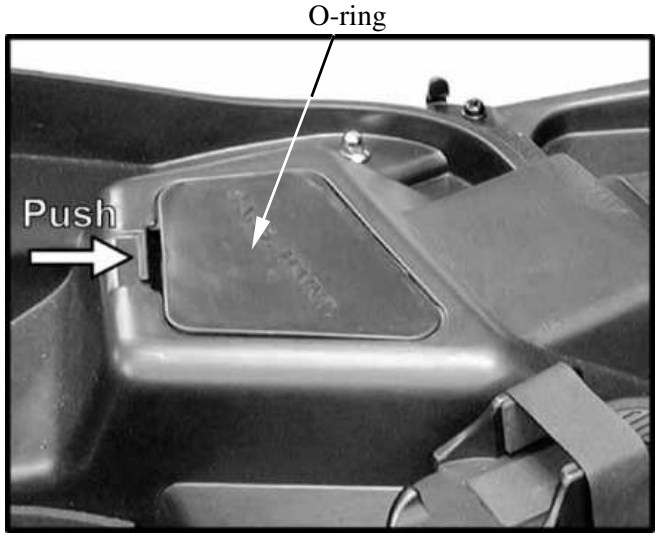


ENGINE IDLE SPEED

- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specification.
- The engine must be warm for accurate idle speed inspection and adjustment.

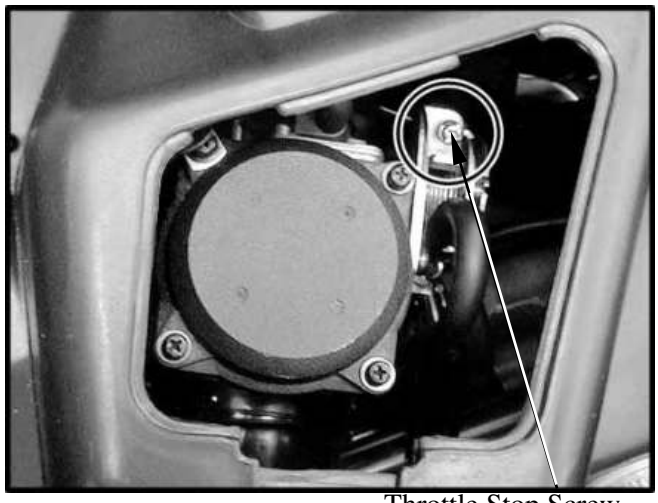
Warm up the engine.
Place the scooter on its center stand.

Unlock the seat with the ignition key.
Open the seat and remove carburetor cover.



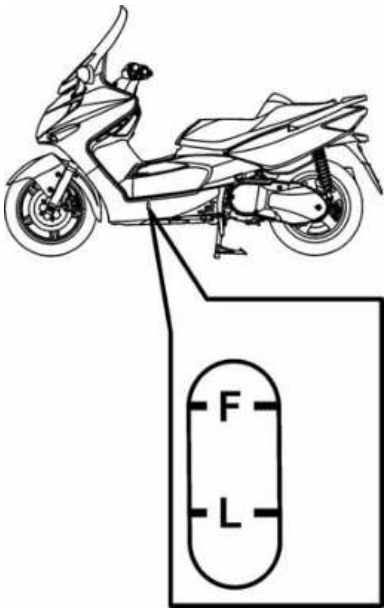
Turn the throttle stop screw as required to obtain the specified idle speed.

Idle speed: 1400±100 rpm



RADIATOR COOLANT

Place the scooter on its center stand.



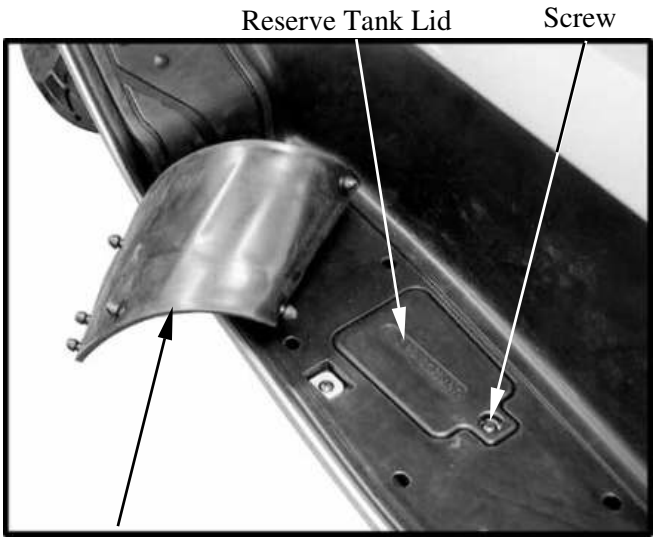
Check the coolant level through the inspection window at the left floor skirt while the engine is at the normal operating temperature.

The level should be between the "**F**" and "**L**" level surface.

If the level is low, remove the reserve tank cap and fill the tank to the "**F"** level line with 1:1 mixture of distilled water and antifreeze (coolant mixture preparation: page 6-5)

* Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

Remove the left floor mat and remove screw and reserve tank lid.



Remove reserve tank cap.

Reserve Tank Cap



Check to see if there are any coolant leaks when the coolant level decrease very rapidly.

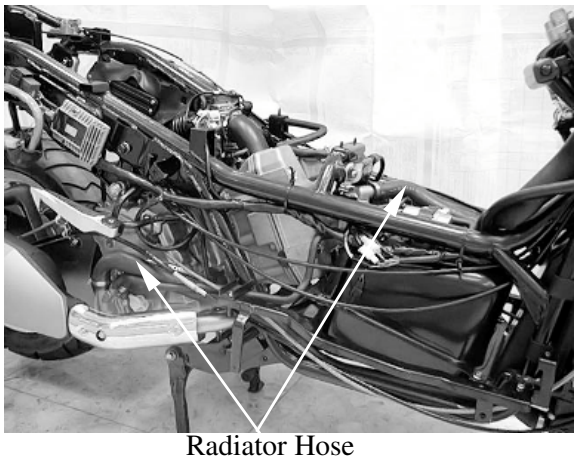
If reserve tank becomes completely empty, there is a possibility of air getting into the cooling system.

Be sure to remove all air from the cooling system (page 6-6).

Reinstall the filler cap.

COOLING SYSTEM

Remove the floorboard (page 2-6).



Radiator Hose

Check for any coolant leakage from the water pump, radiator hoses and hose joints.

Check the radiator hoses for cracks or deterioration and replace if necessary.

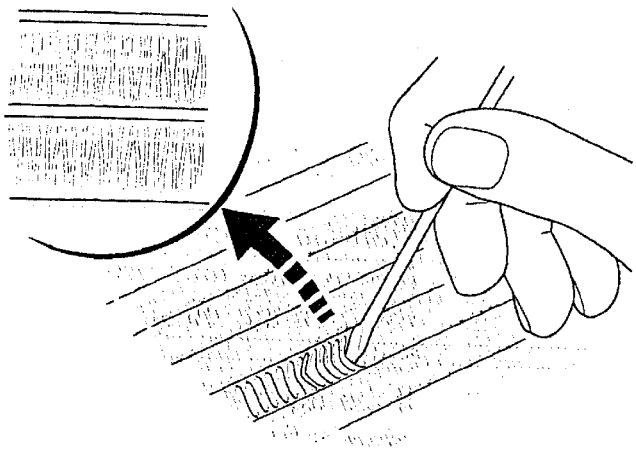
Check that all hose clamps are tight.

Remove the front lower cover (page 2-15).

Check the radiator air passages for clogs or damage.

Straighten any bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

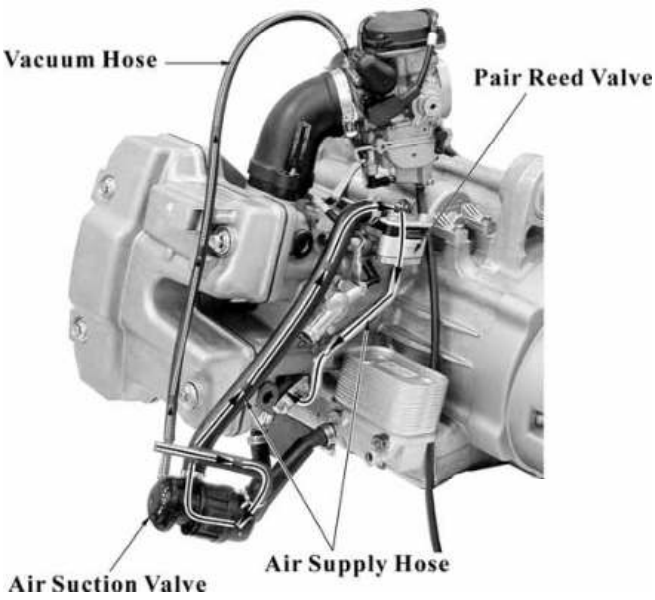
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



SECONDARY AIR SUPPLY SYSTEM

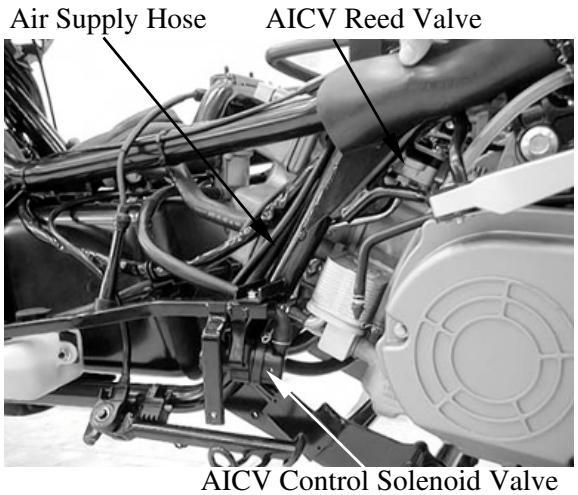
This model is equipped with a built-in secondary air supply system.

The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.



Check the AICV (air injection control valve) hoses between the AICV control solenoid valve and cylinder head cover for deterioration, damage or loose connections. Make sure the hoses are not cracked.

If the hoses show any signs of heat damage, inspect the AICV check valve in the AICV reed valve cover damage.



TRANSMISSION OIL

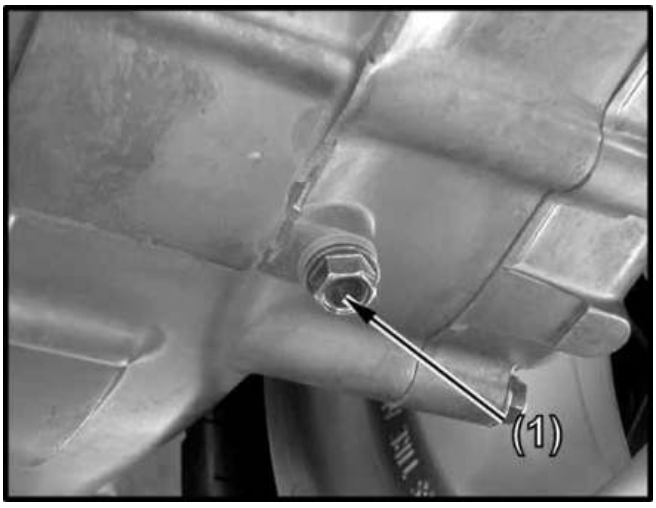
OIL CHANGE

Place the scooter in its center stand.

Remove the transmission oil drain bolt (1) and the transmission oil filler bolt (2), slowly turn the rear wheel and drain the oil.

After draining the oil completely, install the oil drain bolt with a new sealing washer and tighten it.

Torque: 24 N•m (2.4 kgf•m, 18 lbf•ft)



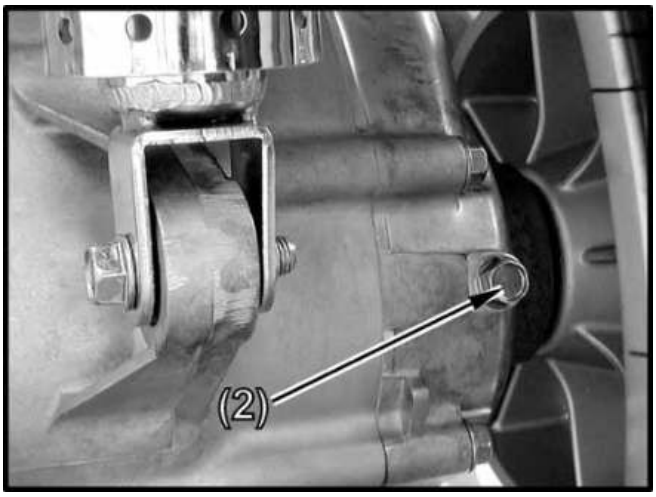
Fill the transmission case with recommended oil.

Recommended transmission oil: SAE 90

Oil capacity (at draining):
0.45 liter (0.48 US qt, 0.4 lmp qt)

Install the transmission oil filler bolt with a new sealing washer and tighten it.

Torque: 24 N•m (2.4 kgf•m, 18 lbf•ft)



BRAKE FLUID

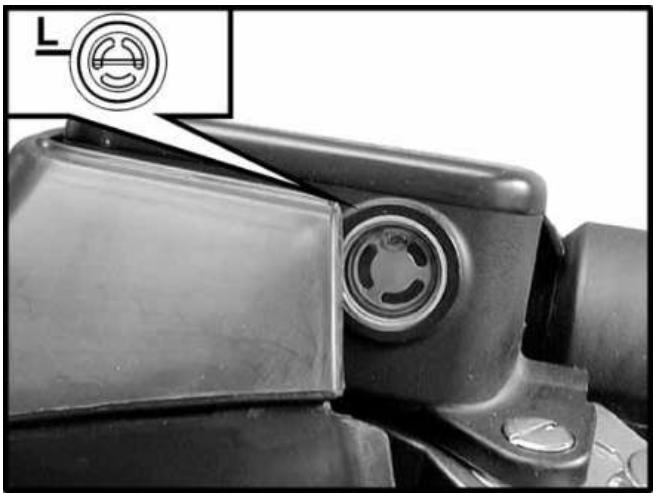
* ♦ Do not mix different type of fluid, as they are not compatible with each other.
  ♦ Do not allow foreign material to enter the system when filling the reservoir.
  ♦ Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

When the fluid level is low, check the brake pads for wear. A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks.

FRONT BRAKE

Turn the handlebar so the reservoir is level and check the front brake fluid reservoir level.

If the level is near the lower level line "**L**", check brake pad wear.



REAR BRAKE

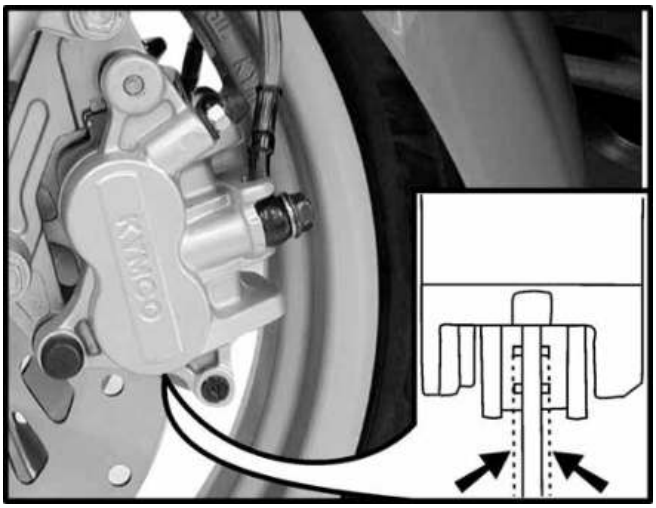
Place the scooter on a level surface and support it in an upright position.

Check the rear brake fluid reservoir level.

If the level is near the lower level line"**L**", check brake pad wear.

BRAKE PAD WEAR

Brake pad wear depends upon the severity of usage, the type of riding, and road conditions. (Generally, the pads will wear faster on wet and dirty roads.) Inspect the pads at each regular maintenance interval.



FRONT RIGHT/LEFT BRAKE

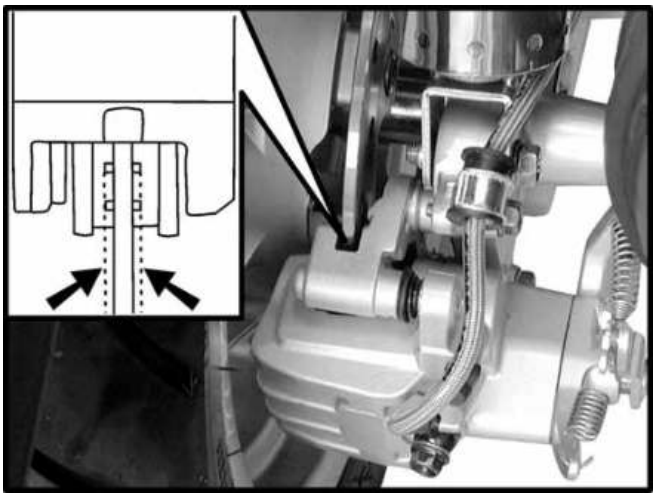
Check the cutout in each pad.

If either pad is worn to the cutout, replace both pads as a set.

REAR BRAKE

Check the cutout in each pad.

If either pad is worn to the cutout, replace both pads as a set.



BRAKE SYSTEM

INSPECTION

This model equipped with a linked brake system.

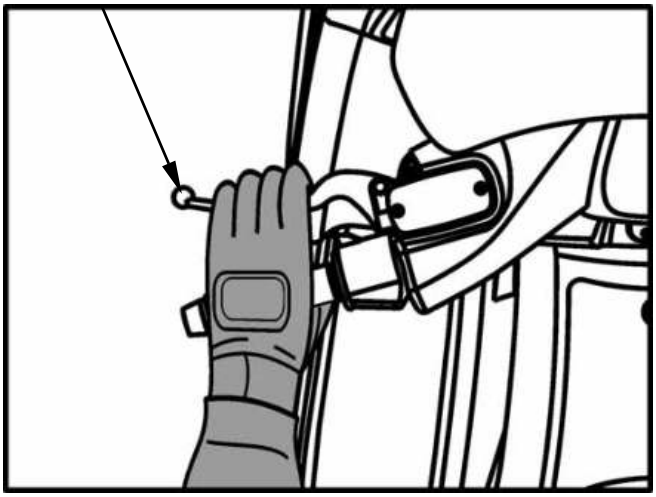
Check the rear brake operation as follows:

Place the scooter on its center stand.

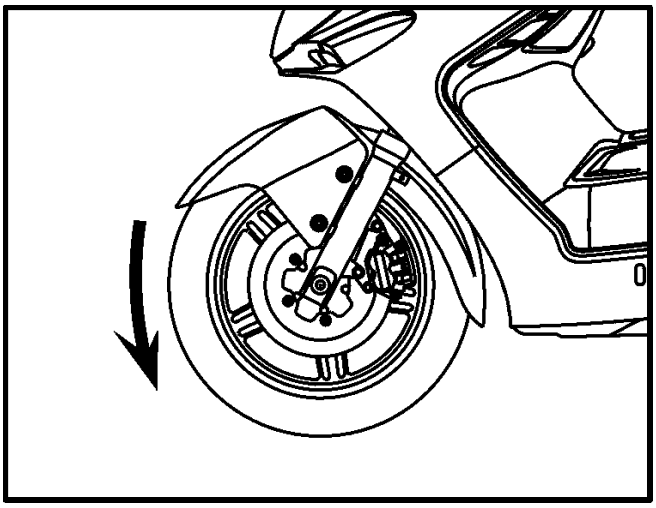
Jack-up the scooter to raise the front wheel off the ground.

* Do not use the oil filter as a jack point.

Rear Brake Lever

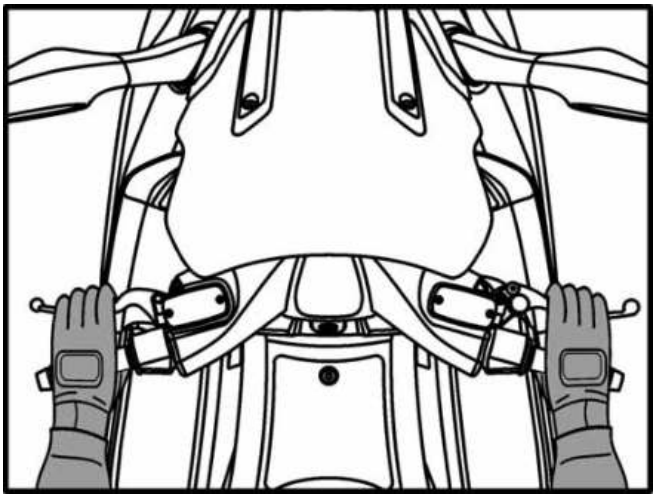


Operate the rear brake lever.
Make sure the front wheel does not turn while the rear brake lever is operated.



Firmly apply the brake lever and check that no air has entered the system.
If the lever feels soft or spongy when operated, bleed the air from the system.

Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.
Tighten any loose fittings.
Replace hoses and fittings as required.



BRAKE LOCK OPERATION



INSPECTION

Stop the engine and put the scooter on its center stand on level ground.

Pull up the parking brake lever slowly and check the parking brake lever stroke.

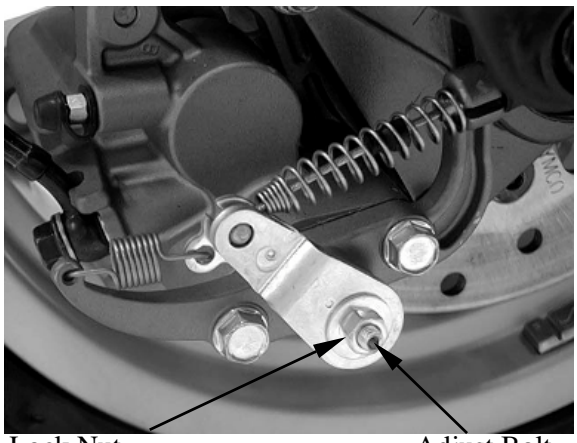
Parking brake lever stroke: 3－6 notches

If out of specification, adjust the parking brake lever.

ADJUSTMENT

Place the scooter on its center stand.
Release the parking brake lever lock.
Pull up the parking brake lever until 1 notch.

Loosen the lock nut.
Turn the adjust bolt until you feel resistance when turn the rear wheel by your hand.
Hold the adjust bolt and tighten the lock nut securely.


Lock Nut Adjust Bolt

Release the parking brake lever.
Make sure the rear wheel turns smoothly.

Pull the parking brake lever slowly and check the lever stroke.

Standard: 3－6 notches
All stroke: 9 notches

If there is out of specification, adjust again.

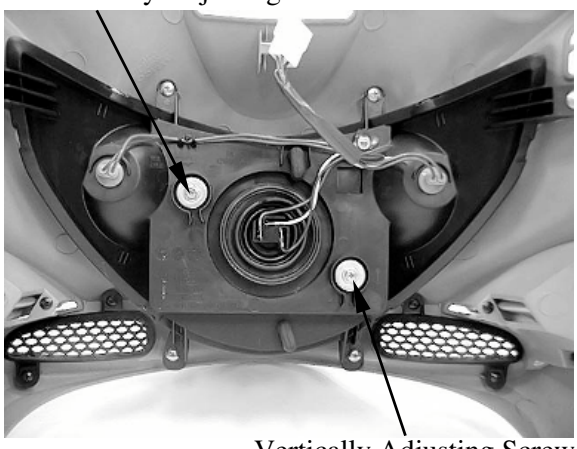
HEADLIGHT AIM

Place the scooter on a level surface.

Adjust the headlight beam vertically by turning the vertical beam adjuster.
A clockwise rotation moves the beam up and counterclockwise rotation moves the beam down.

Adjust the headlight beam horizontally by turning the horizontal beam adjuster.
A clockwise rotation moves the beam toward the right side of the rider.

Horizontally Adjusting Screw


Vertically Adjusting Screw

* Adjust the headlight beam as specified by local laws and regulations.

SIDE STAND



Support the scooter on a level surface.

Check the side stand spring for fatigue or damage.

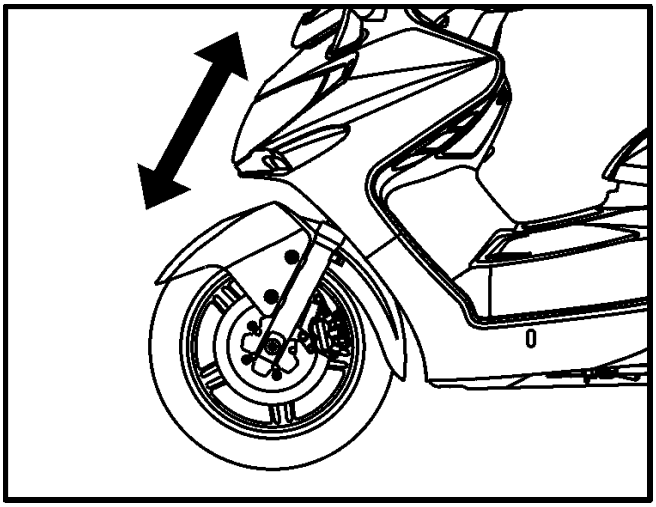
Check the side stand assembly for smooth movement and lubricate the side stand pivot if necessary.

Check the side stand ignition cut-off system:

- ✓ Start the engine.
- ✓ Fully lower the side stand while running the engine.
- ✓ The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 20-15).

SUSPENSION



FRONT SUSPENSION INSPECTION

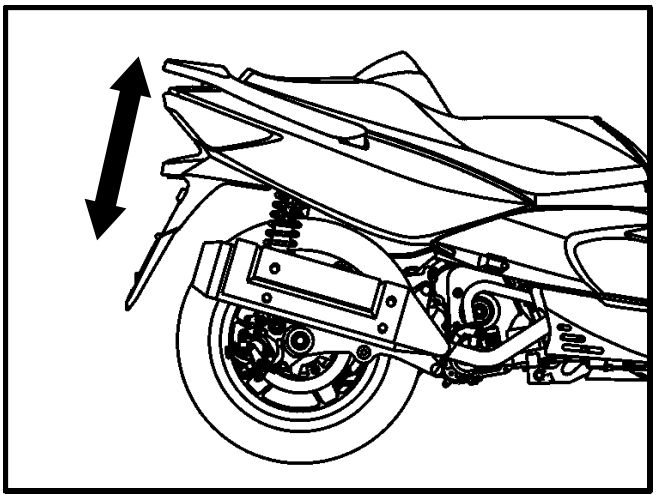
Check the action of the forks by operating the front brakes and compressing the front suspension several times.

Check the entire assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

REAR SUSPENSION INSPECTION



Check the action of the shock absorber by compressing it several times.

Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-7).

Check that all safety clips, hose clamps and cable stays are in place and properly secured.

WHEELES/TIRES

Tire pressure should be checked when the tires are cold.

Recommended tire pressure:

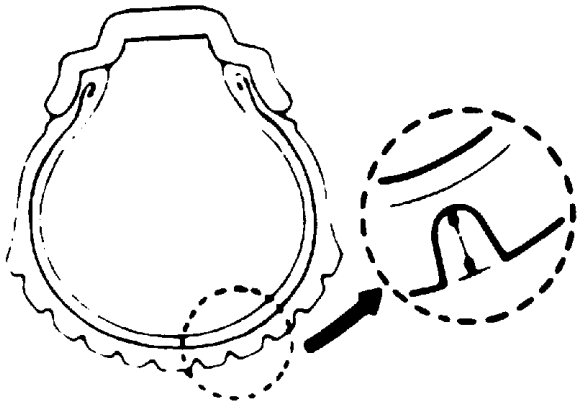
	Solo riding	Two-up riding
Front	200 kpa (2 kgf/cm^2, 29 psi)	225 kpa (2.25 kgf/cm^2, 32 psi)
Rear	250 kpa (2.5 kgf/cm^2, 36 psi)	250 kpa (2.5 kgf/cm^2, 36 psi)

Recommended tire size:

	Front	Rear
Size	120/70-15	150/70-14
Type	TUBELESS	TUBELESS

Check the tires for cuts, embedded nails, or other damage.

Check the front and rear wheels for trueness.

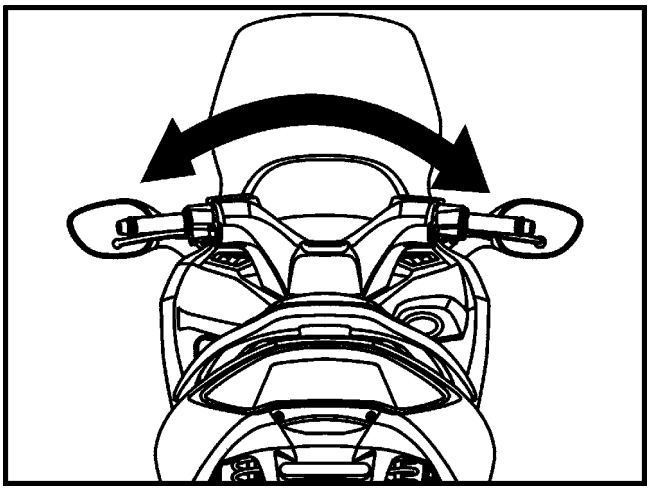


Measure the tread depth at the center of the tires.

Replace the tires when the tread depth reaches the following limits.

Minimum tread depth:
Front: 1.6 mm (0.06 in)
Rear: 2.0 mm (0.08 in)

STEERING HEAD BEARINGS



Check that the control cables do not interfere with handlebar rotation.

Support the scooter securely and raise the front wheel off the ground.

Check that the handlebar moves freely from side to side.

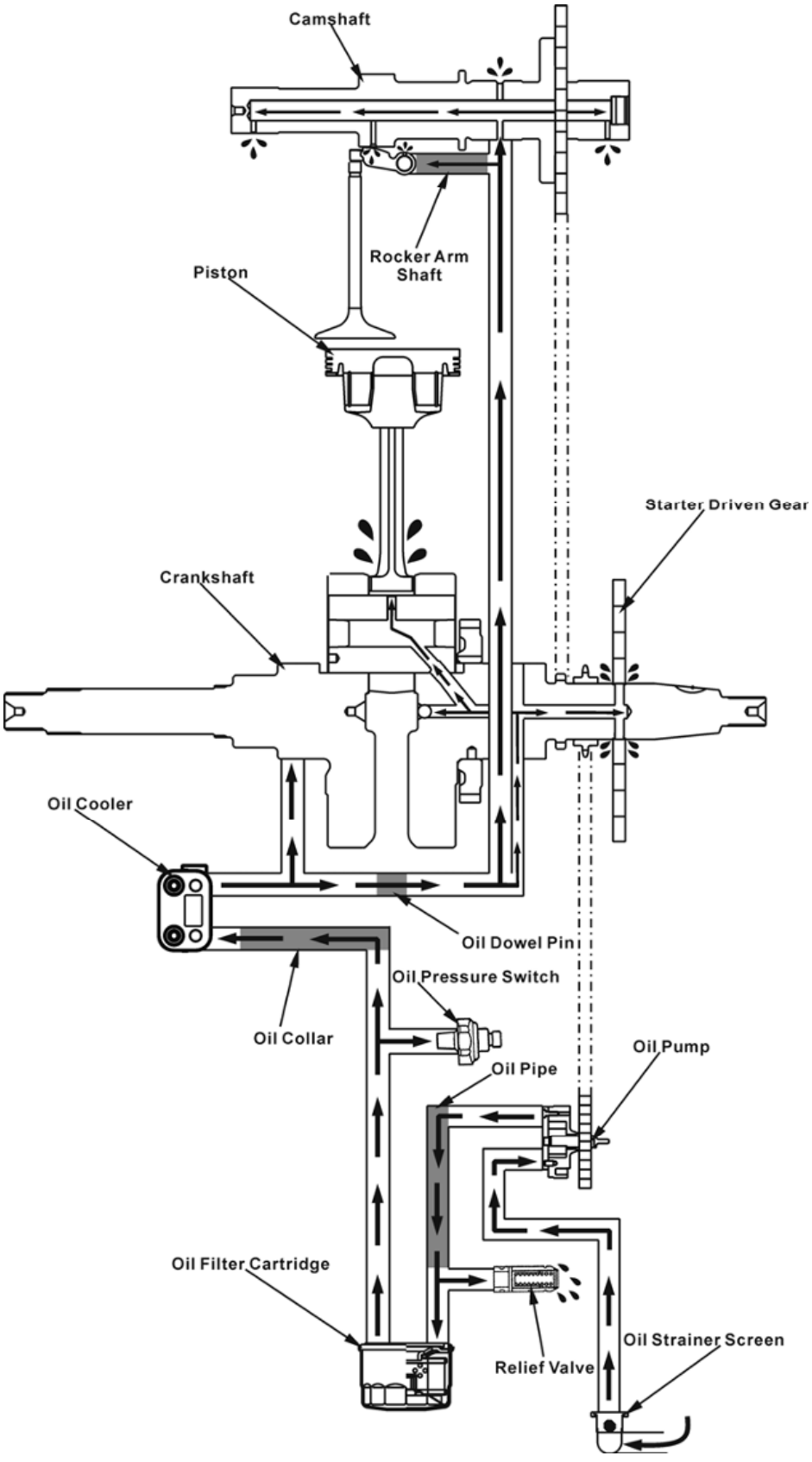
If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings.

4

LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM ---------- 4-1
SERVICE INFORMATION ---------- 4-2
TROUBLESHOOTING ---------- 4-3
OIL PRESSURE SWITCH ---------- 4-4
OIL PRESSURE RELIEF VALVE ---------- 4-4
OIL PUMP ---------- 4-5
OIL COOLER ---------- 4-10

LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The oil pump service may be done with the engine installed in the frame.
- When removing and installing the oil pump use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the engine has been installed check that there are no oil leaks and that oil pressure is correct.
- For oil pressure indicator inspection, refer to section 20 of this manual.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	2.0 liter (2.1 US qt, 1.8 lmp qt)	—
	At disassembly	2.5 liter (2.7 US qt, 2.2 lmp qt)	—
	At oil filter change	2.1 liter (2.2 US qt, 1.9 lmp qt)	—
Recommended engine oil		KYMCO 4-stroke oil or equivalent motor oil API service classification SJ Viscosity: SAE 5W-50	—
Oil pump rotor	Tip clearance	0.15 (0.006) max	0.2 (0.008)
	Body clearance	0.15 – 0.2 (0.006 – 0.008)	0.25 (0.01)
	Side clearance	0.04 – 0.09 (0.0016 – 0.0036)	0.12 (0.0048)

TORQUE VALUES

Oil pump screw	3 N•m (0.3kgf•m, 2 lbf•ft)	
Oil cooler bolt	35 N•m (3.5 kgf•m, 25 lbf•ft)	
Oil pressure switch	22 N•m (2.2 kgf•m, 16 lbf•ft)	Apply sealant to threads.
Oil strainer screen cap	15 N•m (1.5 kgf•m, 11 lbf•ft) Apply oil to the threads and seating surface.	
Oil filter cartridge	10 N•m (1 kgf•m, 7 lbf•ft) Apply oil to the threads and seating surface.	

TOOLS

Oil filter wrench	E052

TROUBLESHOOTING

Oil level low

- Oil consumption
- External oil leak
- Worn piston ring
- Incorrect piston ring installation
- Worn valve guide or seal

Oil contamination (White appearance)

- From coolant mixing with oil
  - ─ Faulty water pump mechanical seal
  - ─ Faulty head gasket
  - ─ Water leak in crankcase

No oil pressure

- Oil level too low
- Oil pump drive chain broken
- Oil pump drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

Low oil pressure

- Pressure relief valve stuck open
- Clogged oil filter and strainer screen
- Oil pump worn or damaged
- Internal oil leak
- Incorrect oil being used
- Oil level too low

High oil pressure

- Pressure relief valve stuck closed
- Plugged oil filter, gallery, or metering orifice
- Faulty oil pump

Seized engine

- No or low oil pressure
- Clogged oil orifice/passage
- Internal oil leak
- Non-recommended oil used

Oil contamination

- Deteriorated oil
- Faulty oil filter
- Worn piston ring (White appearance with water or moisture)
  - ─ Damaged water pump mechanical seal
  - ─ Damaged head gasket
  - ─ Oil relief not frequent enough

Oil pressure warning indicator does not work

- Faulty oil pressure switch
- Short circuit in the indicator wire
- Low or no oil pressure

OIL PRESSURE SWITCH

CHECK

Start the engine.
Check the oil pressure indicator goes out after one or two seconds. If the oil pressure indicator stay on, stop the engine immediately and determine the cause (section 20).



OIL PRESSURE RELIEF VALVE

REMOVAL

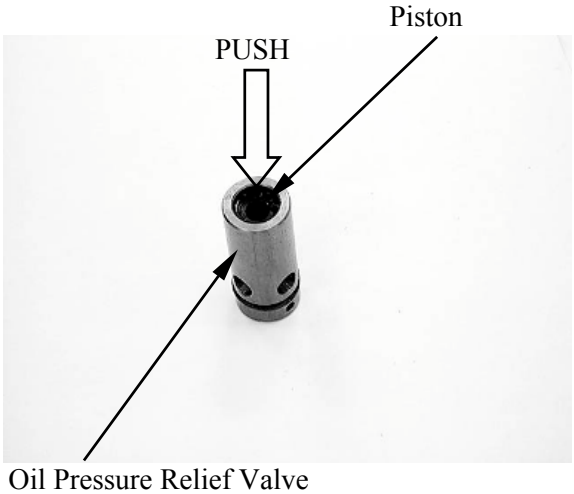
Remove the right crankcase cover (page 12-3).

Remove the pressure relief valve and O-ring from the right crankcase



INSPECTION

Check the operation of the pressure relief valve buy pushing on the piston.



INSTALLATION

Apply oil to a new O-ring and install the pressure relief valve groove, and install the relief valve to the right crankcase.

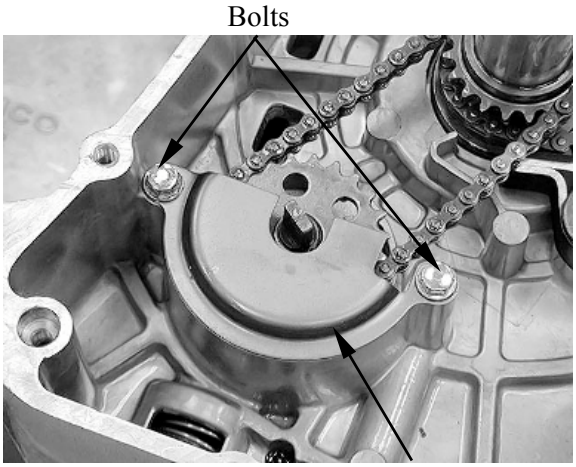
OIL PUMP

REMOVAL

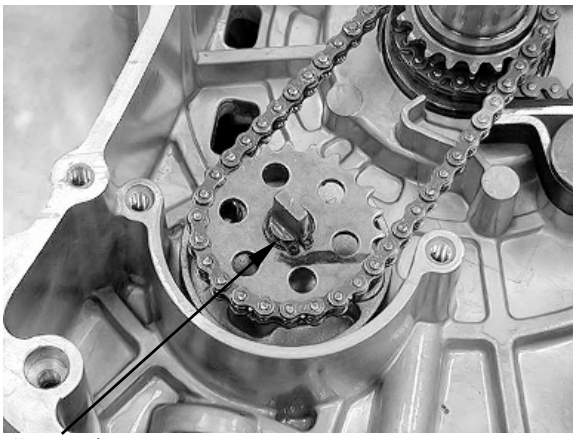
Remove the flywheel (page 12-4).

Remove the attaching bolt and oil separator cover.

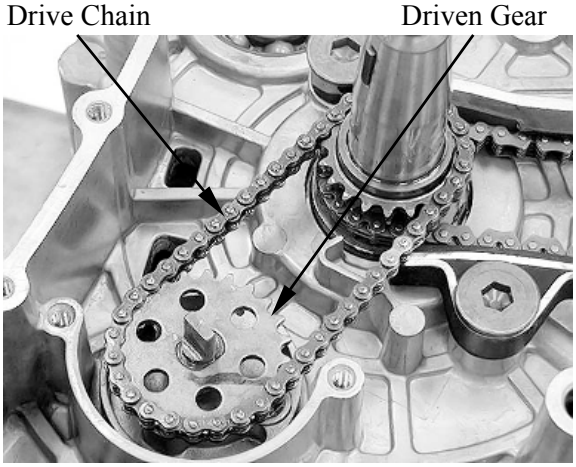
* When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine..



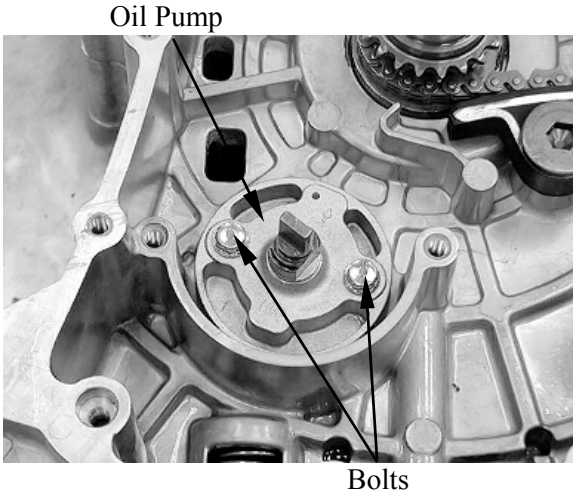
Remove snap ring.



Remove the oil pump driven gear, then remove the oil pump drive chain.

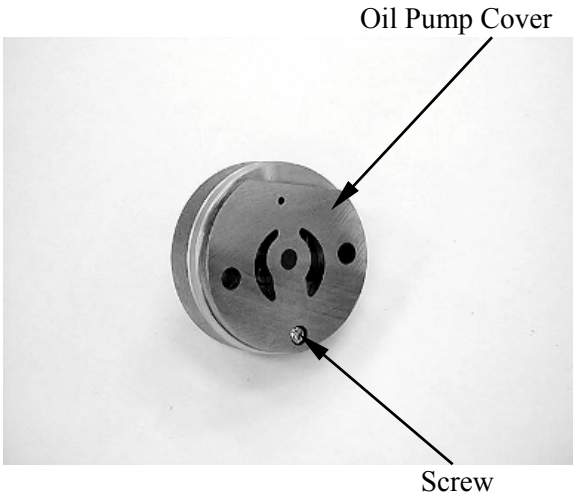


Remove the two oil pump bolts to remove the oil pump.

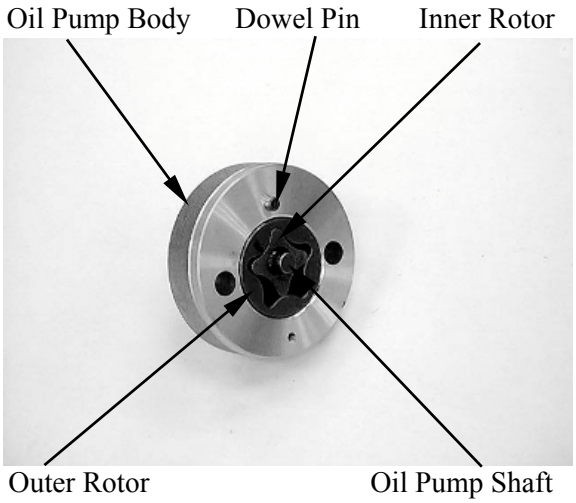


DISASSEMBLY

Remove the screw and oil pump cover.



Remove the dowel pin, oil pump shaft, oil pump outer rotor and inner rotor.

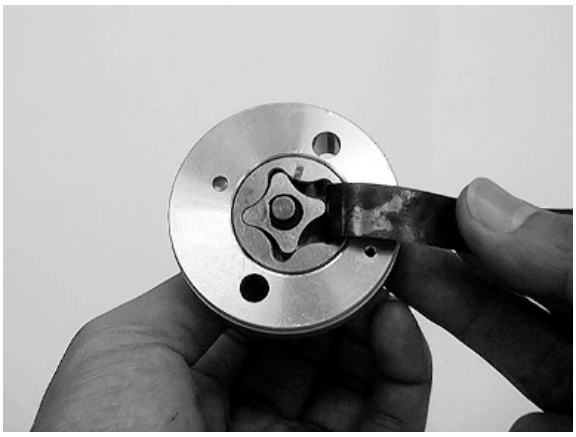


INSPECTION

Temporarily install the oil pump shaft. Install the outer and inner rotors into the oil pump body.

Measure the tip clearance.

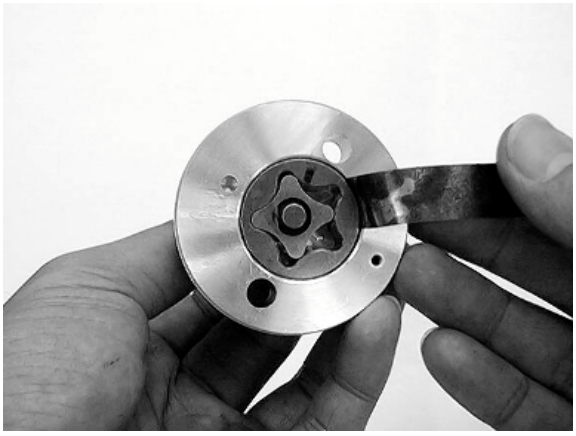
Service limit: 0.2 mm (0.008 in)



* Measure at several points and use the largest reading to compare the service limit.

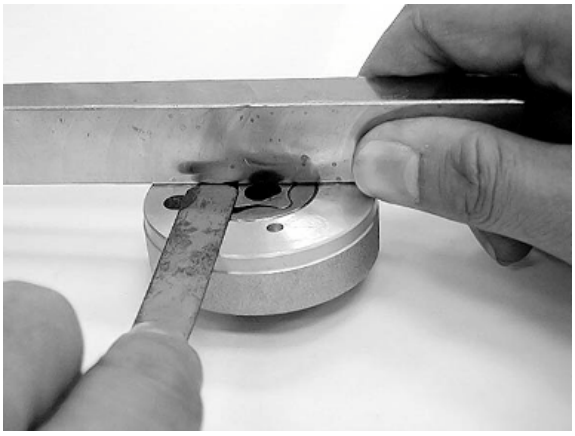
Measure the pump body clearance.

Service limit: 0.25 mm (0.01 in)



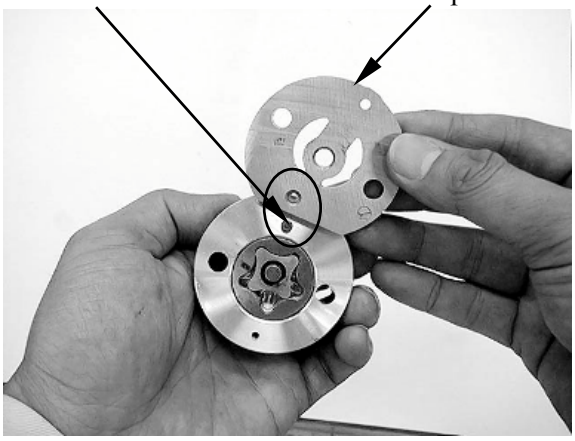
Measure the side clearance with the straight edge and feeler gauge.

Service limit: 0.12 mm (0.0048 in)



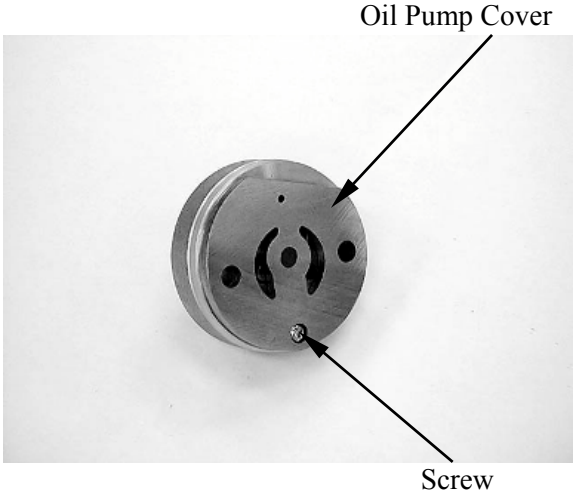
ASSEMBLY
Dip all parts in clean engine oil.

Install the outer rotor into the oil pump body.
Install the inner rotor into the outer rotor.
Install the oil pump shaft.
Install the dowel pin onto the oil pump body.
Install the oil pump cover onto the oil pump body by aligning the dowel pin.



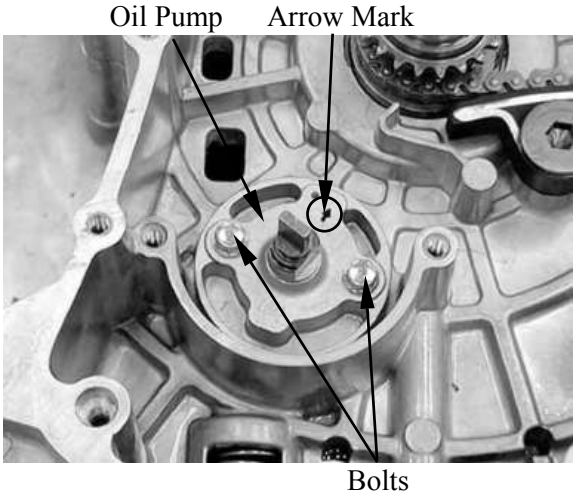
Install and tighten the screw to the specified torque.

Torqur: 3 N•m (0.3kgf•m, 2 lbf•ft)



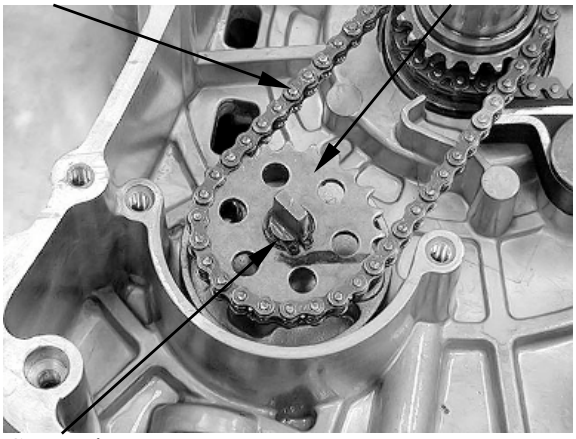
INSTALLATION
Install the oil pump and tighten the two bolts securely.

* Make sure the pump shaft rotates freely and arrow on the oil pump is upside.

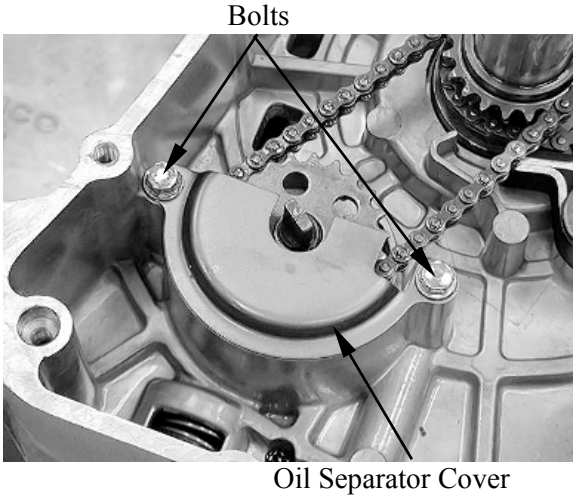


Install the oil pump driven sprocket and drive chain.

Install the snap ring.



Install the oil separator cover properly and tighten two bolts securely as shown.



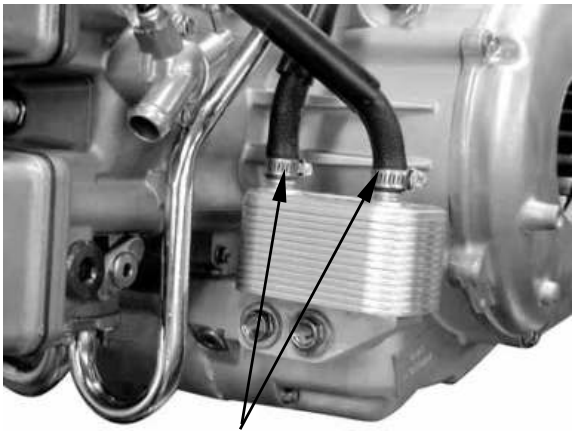
OIL COOLER

REMOVAL

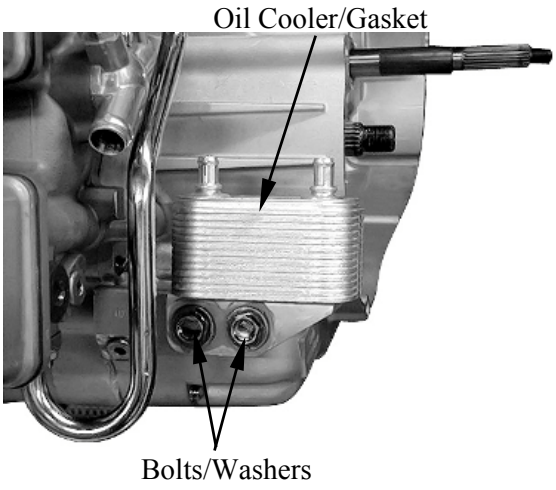
Drain the engine oil and remove the oil filter cartridge (page 3-13).

Drain the coolant from the system (page 6-6).

Loosen the hose bands and disconnect the oil cooler water hoses from the cooler.

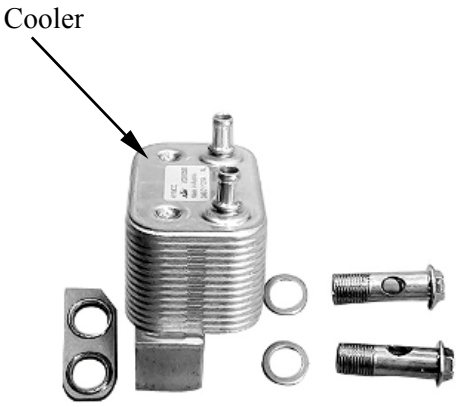


Remove the oil cooler mounting bolts, washers, oil cooler and gasket.



INSPECTION

Check the cooler for damage.



INSTALLATION

Install the gasket and oil cooler.

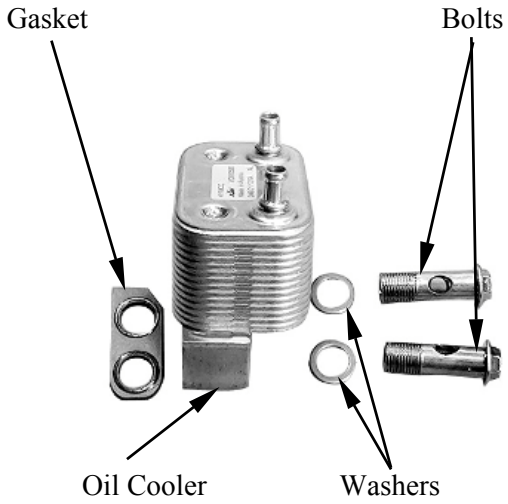
Install the washers and tighten the oil cooler bolts to the specified torque.

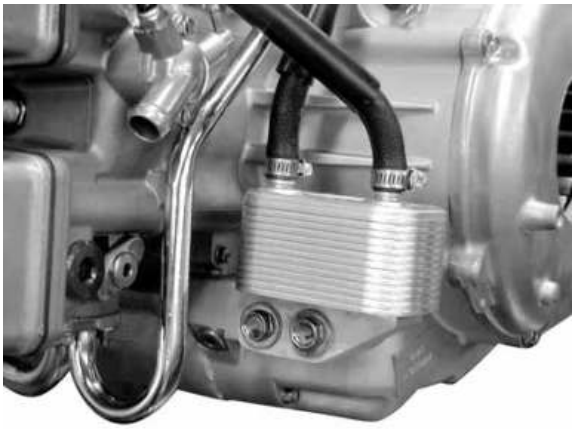
Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

Connect the oil cooler water hoses, tighten the hose band securely.

Install the oil filter cartridge and fill the crankcase with recommended engine oil (page 3-11).

Fill the cooling system and bleed air (page 6-6).



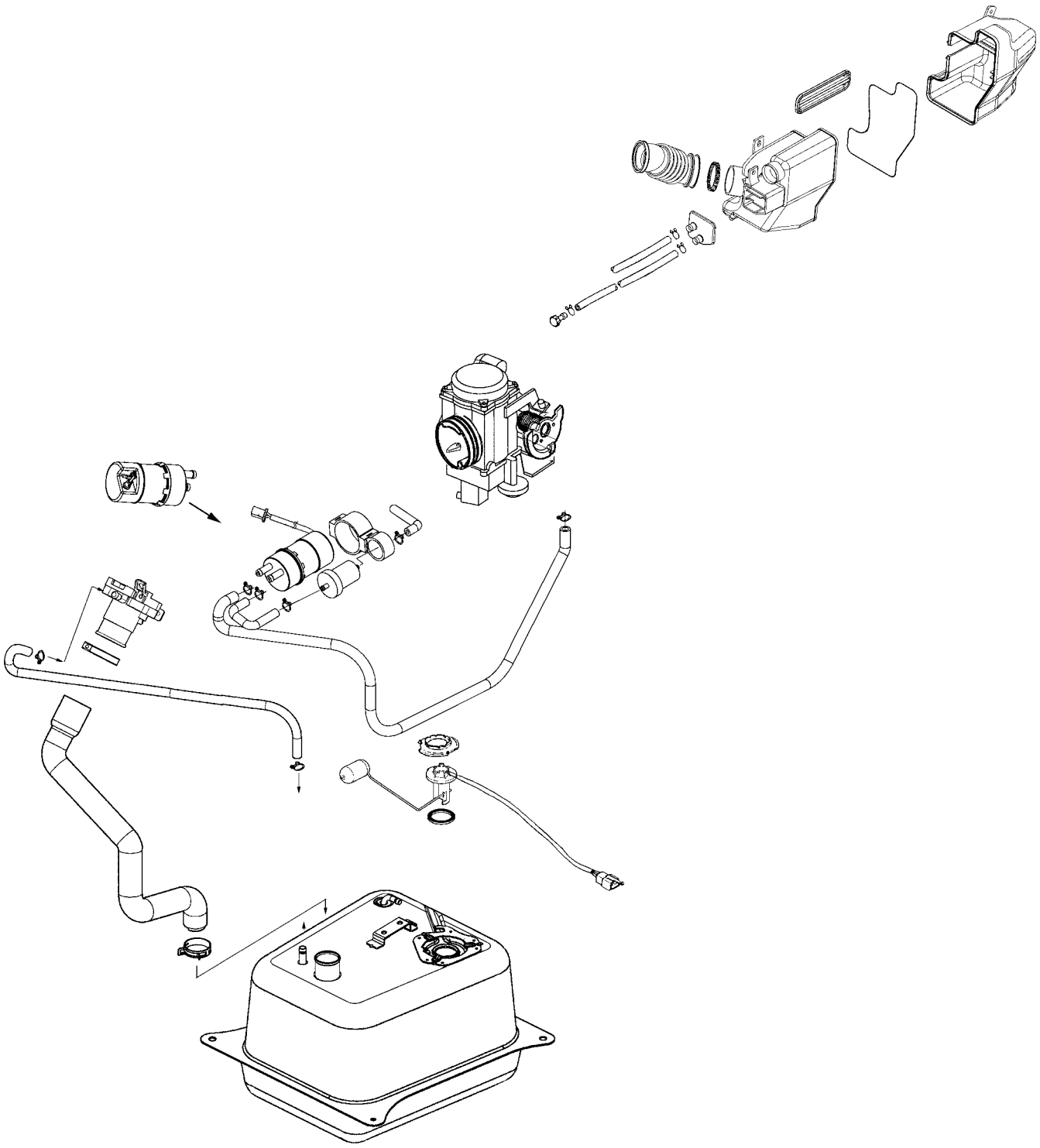


5

FUEL SYSTEM/FUEL PUMP/ FUEL TANK/CARBURETOR

SCHEMATIC DRAWING---------- 5- 1
FUEL SYSTEM ---------- 5- 2
FUEL PUMP CONSTRUCTION ---------- 5- 2
SERVICE INFORMATION ---------- 5- 3
TROUBLESHOOTING ---------- 5- 4
CARBURETOR ---------- 5- 5
FUEL FILTER/FUEL PUMP---------- 5-16
FUEL TANK---------- 5-18

SCHEMATIC DRAWING

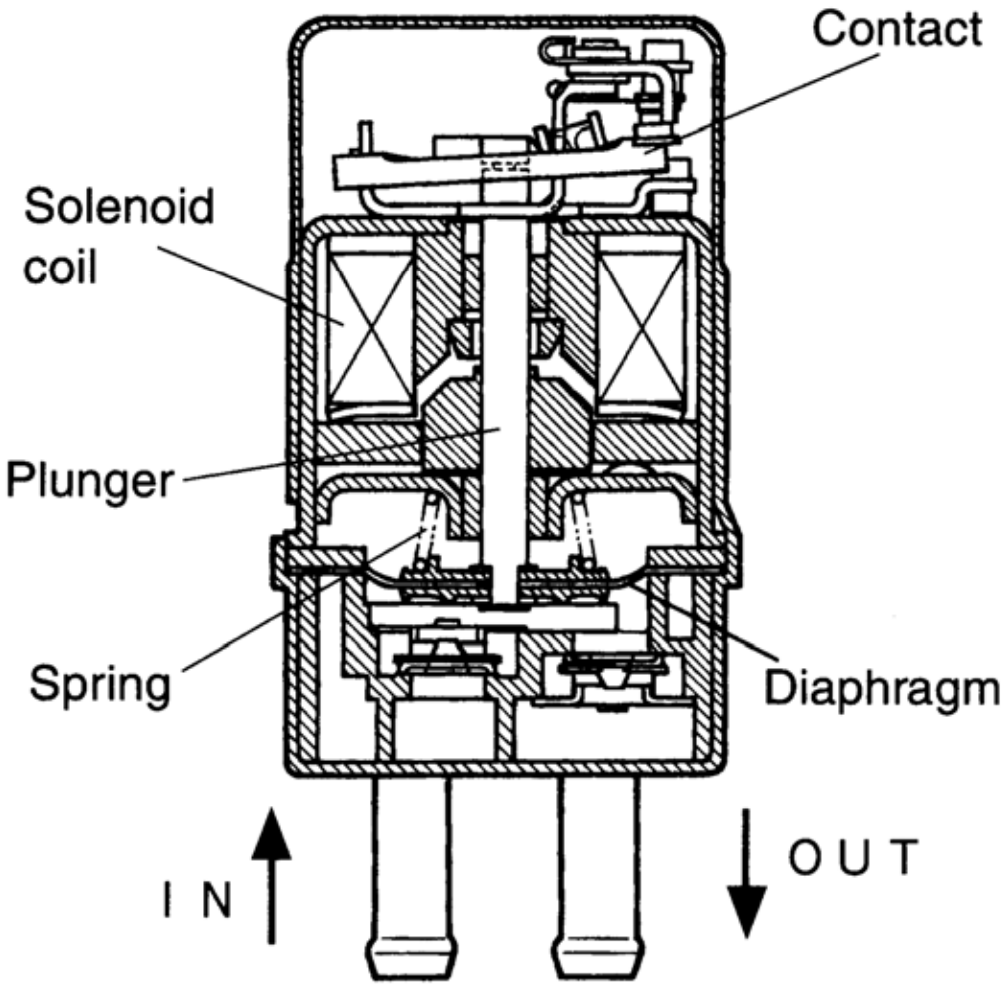


FUEL SYSTEM

The fuel pump is operated by an electromagnetic force and its electrical energy is supplied from the battery. The fuel sent under pressure by the fuel pump flows into the float chamber when the float of the carburetor has dropped and the needle valve is open. When the needle valve closes, the pressure of the fuel in the hose connecting the carburetor and the fuel pump increases, and when the set pressure is reached, the operation of the fuel pump is stopped by the fuel pressure to prevent excessive supply.

FUEL PUMP CONSTRUCTION

When voltage is applied between the fuel pump terminals, current flows into the solenoid coil which then pulls up the plunger together with the diaphragm allowing fuel to be drawn into the pump. At this time, the contact which is linked with the plunger opens and interrupts current causing the coil to be de-energized. This allows the diaphragm to go down by the spring force, thereby pressurizing and delivering fuel to the outlet. When the fuel pressure builds up and overcomes the spring force, the plunger stops at pulled up position with the contact in open position.



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- When working with gasoline, keep away from sparks and flames.
- Note the locations of O-rings when disassembling and replace them with new ones during assembly.
- Before float chamber disassembly, drain the residual gasoline from the float chamber.
- Do not try to disassemble the automatic choke.
- When assembling the vacuum chamber and air cut-off valve, be careful not to damage the diaphragms.
- All cables, fuel lines and wires must be routed and secured at correct locations.
- When removing the fuel tank, keep sparks and flames away from the working area.
- When removing the fuel tank, the remaining fuel in the tank must be lower than 1/2 of the fuel tank capacity to avoid gasoline overflowing.
- Fuel tank capacity: 12.8 liters

SPECIFICATIONS

	XCITING 500
Type	CVK
Carburetor identification number	15F8 SD8
Size of bore (mm)	Ø36
Main jet	#108
Slow jet	#38
Idle speed	1400±100
Pilot screw opening	3½ ± ½ turns out
Fuel pump flow (at 12V)	370 ml (12.6 US oz, 13 lmp oz)/min

TROUBLESHOOTING

Engine does not start
- No fuel in tank
- Restricted fuel line
- Too much fuel getting to cylinder
- Clogged air cleaner
- Contaminated fuel
- Faulty fuel pump

Engine idles roughly, stalls or runs poorly
- Incorrect idle speed
- Rich mixture
- Lean mixture
- Clogged air cleaner
- Intake air leak
- Contaminated fuel
- Faulty air-cut off valve
- Damaged vacuum tube and connectors
- Damaged carburetor insulator

Throttle does not open fully, so engine stalls
- Damaged vacuum piston diaphragm
- Clogged diaphragm hole

Lean mixture
- Clogged fuel jets
- Clogged fuel tank cap breather hole
- Clogged fuel filter
- Bent, kinked or restricted fuel line
- Faulty float valve
- Float level too low
- Faulty fuel pump or insufficient output

Rich mixture
- Automatic valve opens excessively
- Faulty float valve
- Float level too high
- Clogged air jets
- Automatic choke valve set plate installed in the wrong groove
- Clogged air cleaner

Engine is hard to start
- No fuel in tank
- Restricted fuel line
- Clogged fuel strainer
- Faulty fuel pump
- Broken or clogged vacuum tube
- Faulty or clogged charcoal canister

Lean mixture
- Clogged charcoal canister
- Bent, kinked or restricted fuel line
- Clogged fuel strainer
- Float level too low

CARBURETOR

REMOVAL

Remove the luggage box (page 2-3)

Loosen the air cleaner clamp screw.
Loosen the carburetor clamp screw.
Disconnect the vacuum hose from the carburetor.
Pull the carburetor out from the air cleaner and intake manifold.

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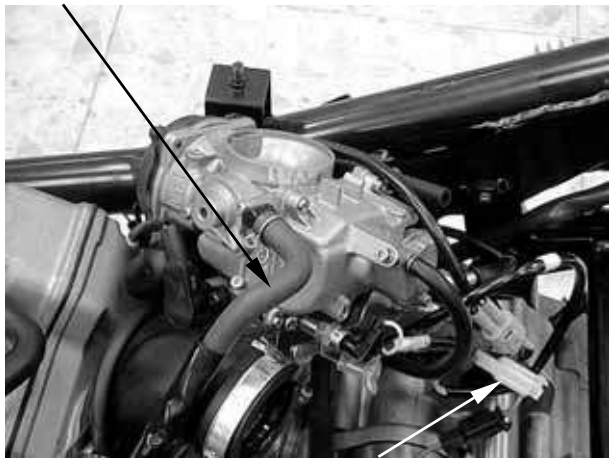
Carburetor Clamp Screw



Air Cleaner Clamp Screw Vacuum Hose

Disconnect the fuel hose from the carburetor.
Disconnect the carburetor heater connector.

Fuel Hose



Carburetor Heater Connector

Disconnect the throttle cables.
Disconnect the automatic choke connector.
Disconnect the T.P.S connector.
Remove the carburetor.

T.P.S Connector Throttle Cables

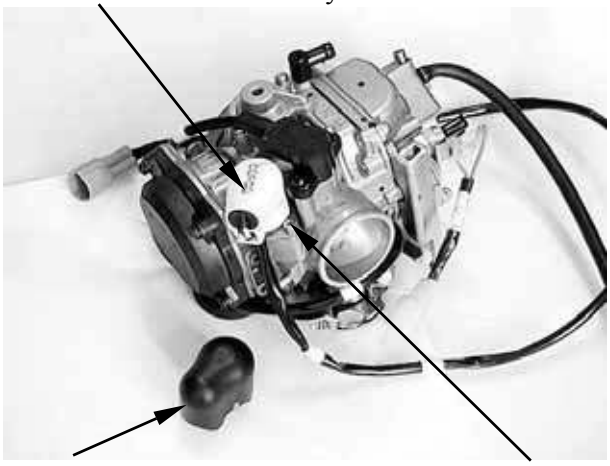


Automatic Choke Connector

DISASSEMBLY
With the automatic choke cover removed, remove the screw and automatic choke assembly.

* The automatic choke assembly is a non-disassemblable type

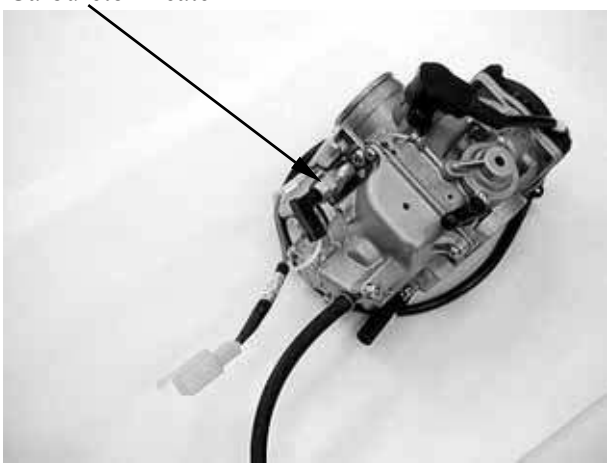
Automatic Choke Assembly



Automatic Choke Cover Screw

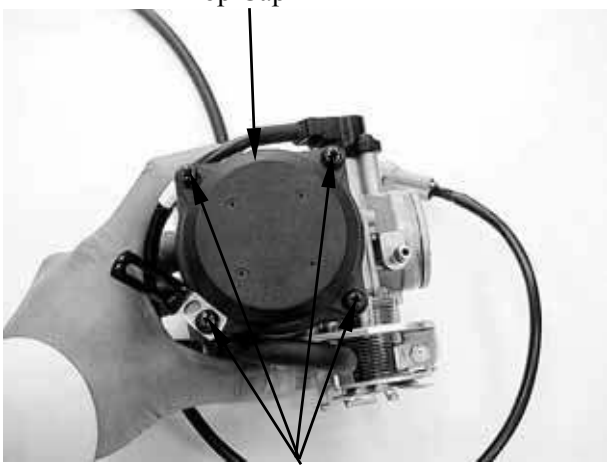
Remove the carburetor heater.

Carburetor Heater



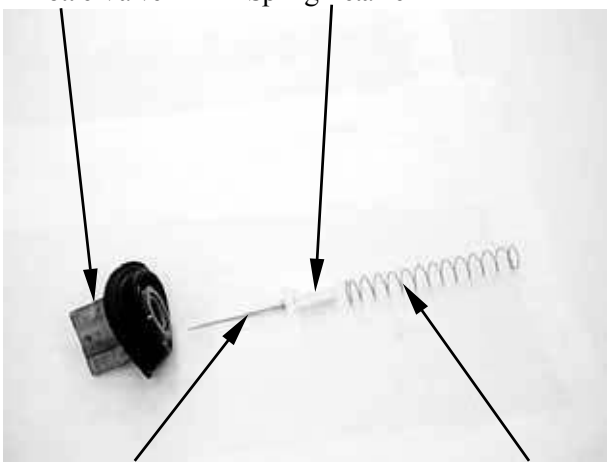
Remove the four screws and top cap.

Top Cap

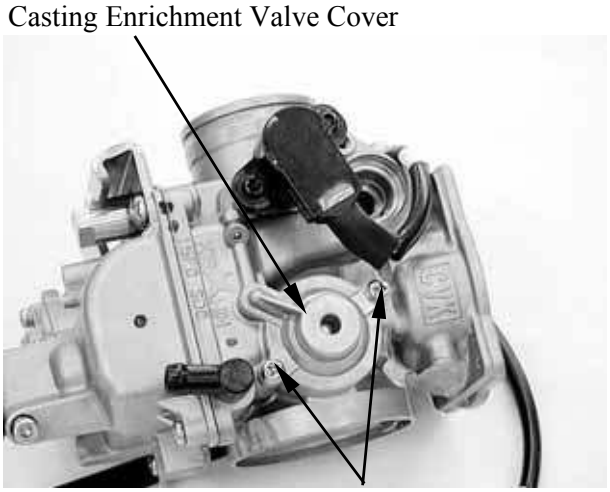


Screws

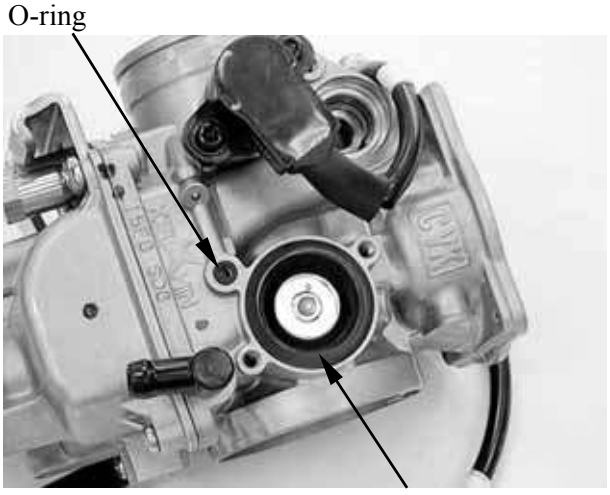
Remove the spring , spring retainer, jet needle and throttle valve.



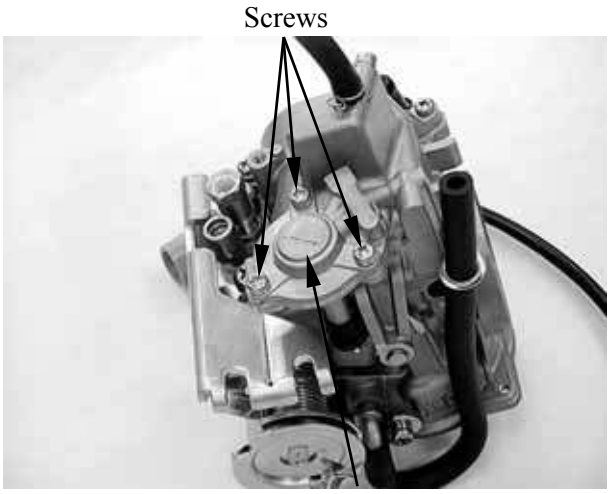
Remove the two screws and casting enrichment valve cover and then take out the spring.



Remove the casting enrichment valve and O-ring.

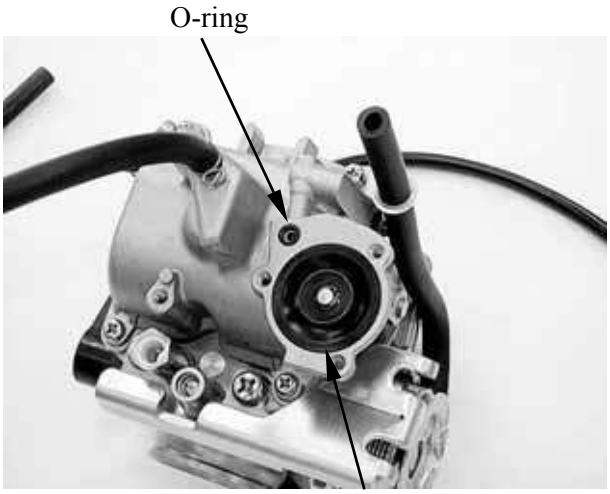


Remove the three screws and accelerating pump cover.



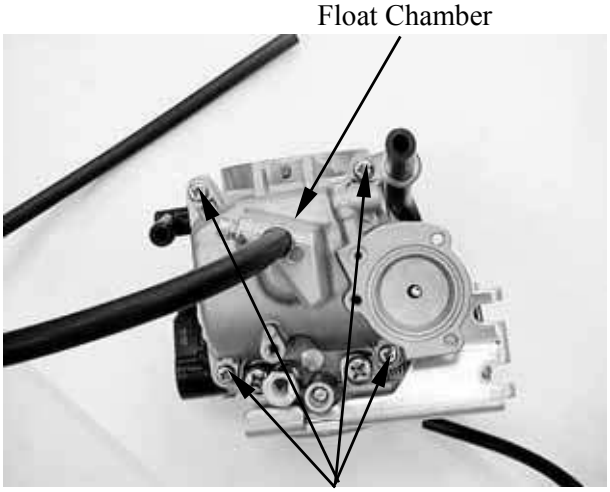
Accelerating Pump Cover

Remove the accelerating pump diaphragm and O-ring.



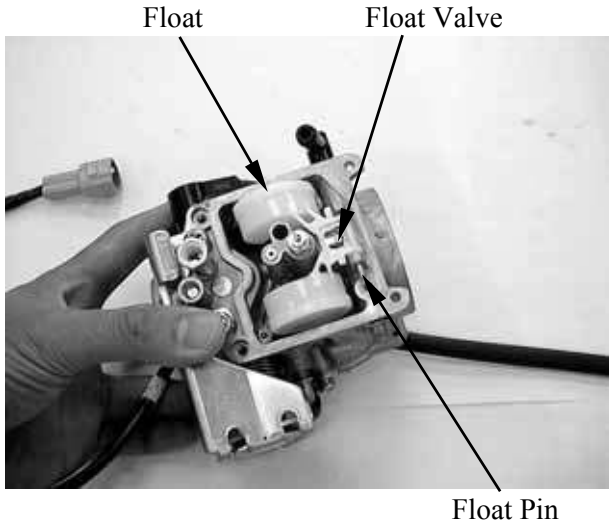
Accelerating Pump Diaphragm

Remove the four screws and float chamber.

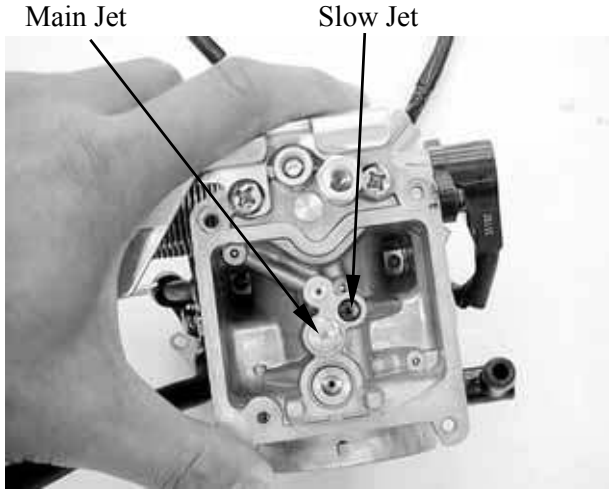


Screws

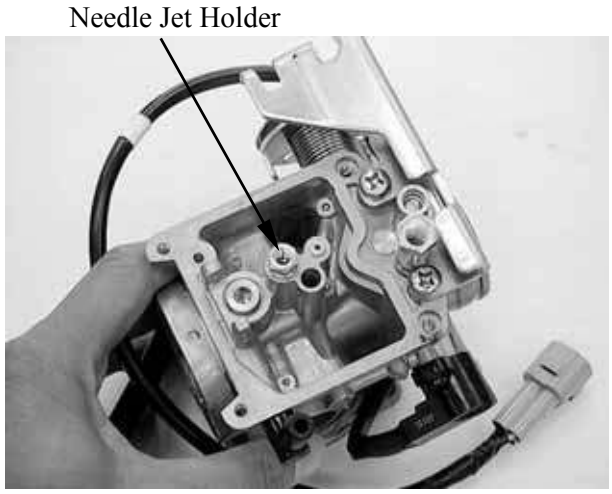
Pull float pin outs, then remove the float and float valve.



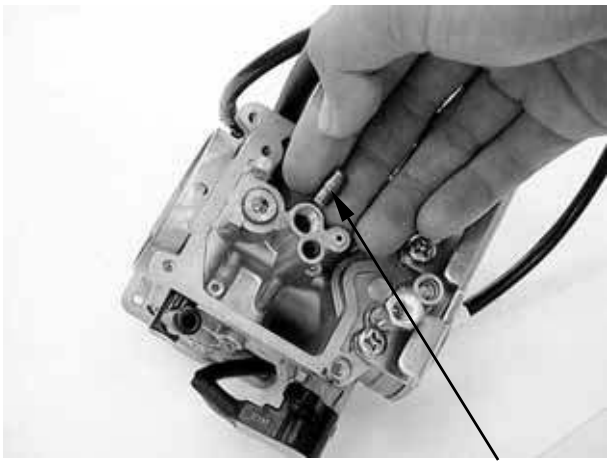
Remove the slow jet.
Remove the main jet.



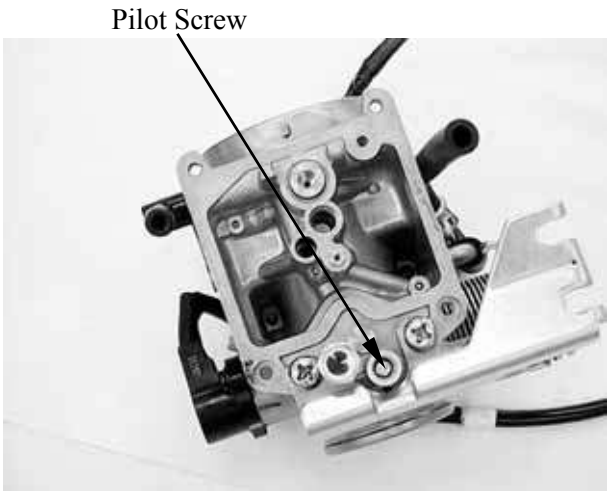
Remove the needle jet holder.



Remove the needle jet.

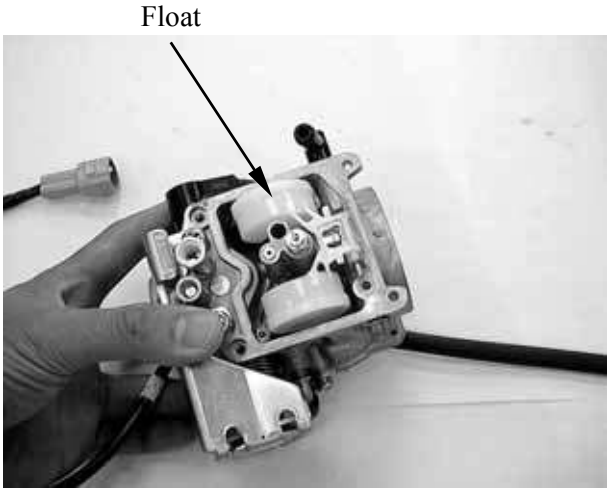


Remove the pilot screw, spring, washer and O-ring.



* Before pilot screw removal, slowly turn the pilot screw clockwise and count the number of turns until the screw is lightly seated. Make a note of how many turns were made so the screw can be reset correctly.

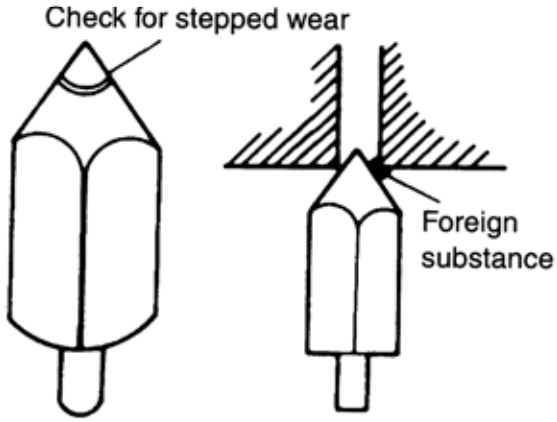
FLOAT/FLOAT VALVE INSPECTION
Inspect the float for deformation or damage.



Check the float valve and valve seat for foreign substance, clogging or damage.

Check the tip of the float valve, where it contacts the valve seat, for stepped wear or contamination.

Check the operation of the float valve.



CARBURETOR BODY/JETS INSPECTION AND CLEANING

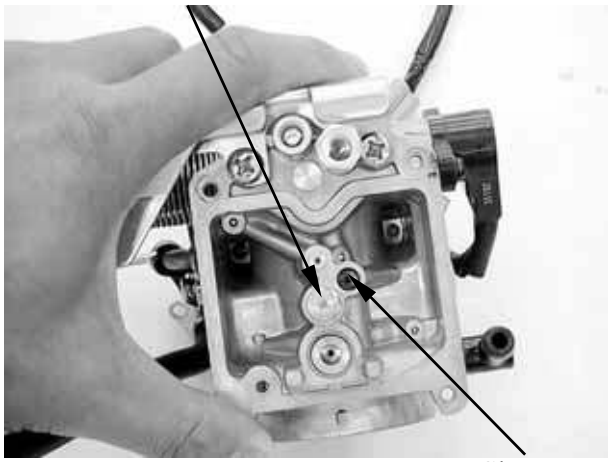
Check carburetor body and each jet for wear or damage.

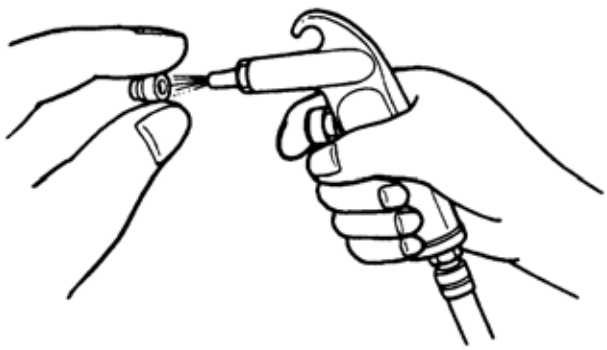
Clean all jets with a spray-type carburetor cleaner and dry them using compressed air.

Clean all circuits of the carburetor thoroughly-not just the perceived problem area. Clean the circuits in the carburetor body with a spray-type cleaner and allow each circuit to soak, if necessary, to loosen dirt and varnish. Blow the body dry using compressed air.

*
- Some carburetor cleaning chemicals , especially dip type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions on proper use, handling and storage.
- Do not use a wire to clean the jets or passageways. A wire can damage the jets and passageways. If the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning of the carburetor components.

Main Jet/Needle Jet Holder/Needle Jet





After cleaning, reassemble the carburetor with new seals.

PILOT SCREW INSPECTION

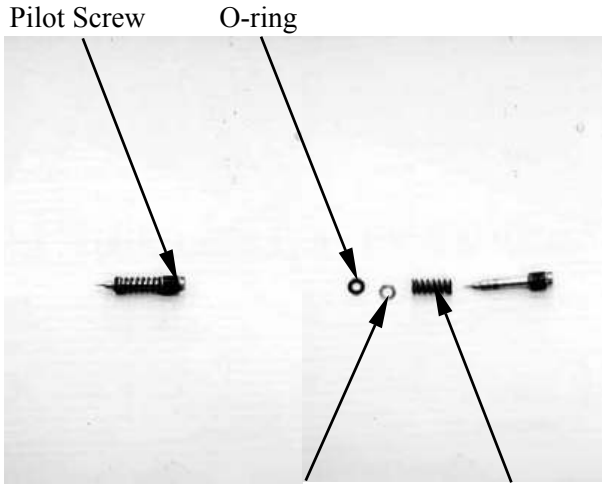
Remove the O-ring from the pilot screw.

Check the pilot screw for wear or damage.

*

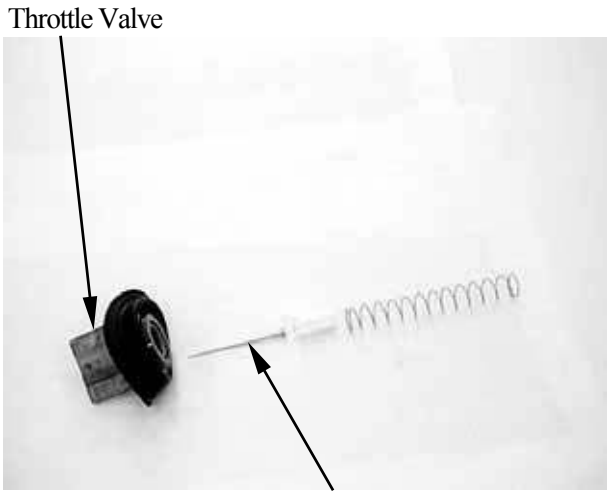
The pilot screw is factory pre-set and should not be removed unless the carburetor is overhauled.

Damage to the pilot screw is tightened against the seat.



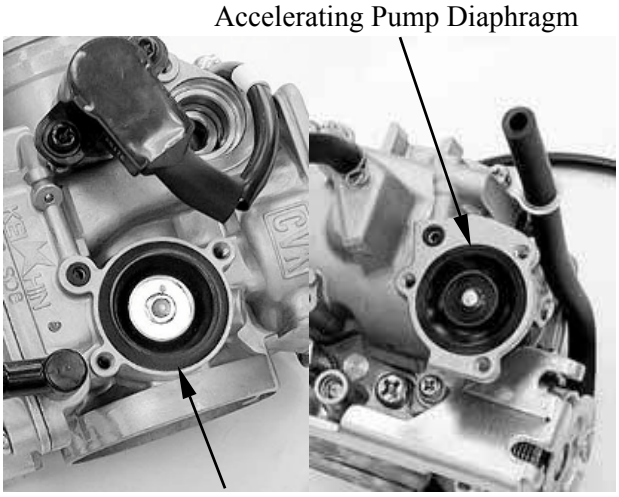
THROTTLE VALVE/JET NEEDLE INSPECTION

Check the throttle valve and jet needle for scratches, wear or damage.



CASTING ENRICHMENT VALVE/ACCELERATING PUMP DIAPHRAGM INSPECTION

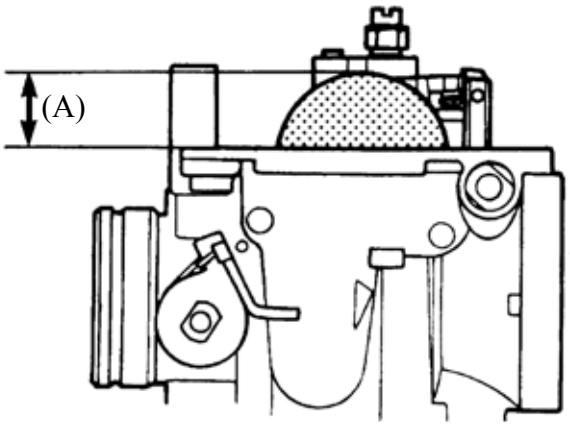
Check the casting enrichment valve/accelerating pump diaphragm for damage and clogging.
If any abnormal condition is found, wash the part clean. If damage or clogging is found, replace the part with a new one.



FLOAT LEVEL INSPECTION

Check the float level after checking the float valve, valve seat and float.

Set the carburetor so that the float valve end just contacts the float arm lip. Make sure the float valve tip is securely in contact with the valve seat.
Measure the float level with the float level gauge.
Float level (A): 18.5mm (0.74 in)



The float level cannot be adjusted.
Replace the float assembly if the float level is out of specification.

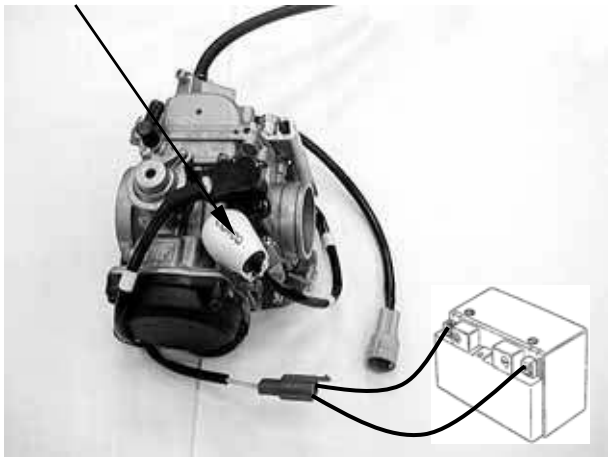
AUTO-BYSTARTER INSPECTION

Disconnect the connector.
Remove the automatic choke cover.

Connect the positive (+) terminal of a 12 V battery to Yellow lead and the negative (-) terminal to the other Yellow lead.
Check that the automatic choke section is heated in 5 minutes after the battery has been connected.
To inspect the function, check for change of temperature from the cold condition.

* Do not attempt to disassemble the automatic choke for the purpose of checking temperature.

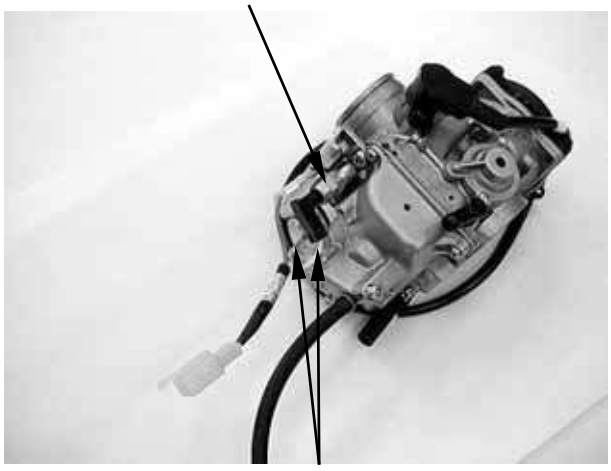
Automatic Choke



CARBURETOR HEATER INSPECTION

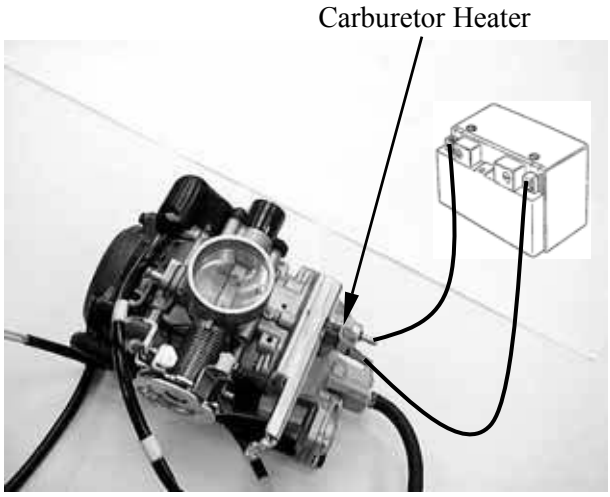
Disconnect the carburetor heater terminal leads.

Carburetor Heater



Carburetor Heater Terminal Leads

Connect the positive (+) terminal of a 12 V battery to the terminal of the carburetor heater and the battery negative (-) terminal to the terminal.
Check that the heater section is heated in 5 minutes after the battery has been connected.



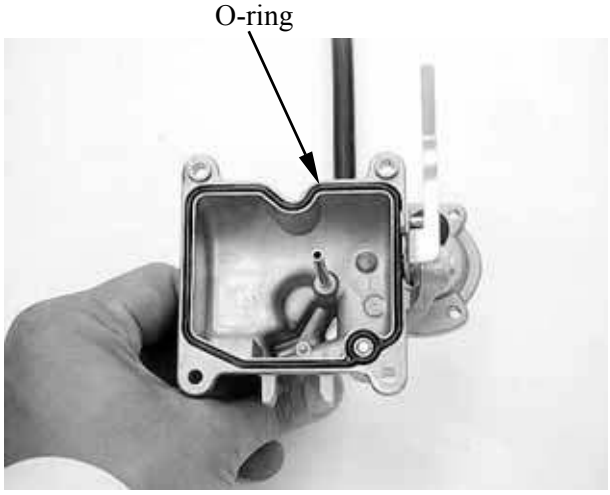
REASSEMBLY

Carburetor reassembly can be performed in the reverse order of disassembly. When reassembling, carefully observe the following instructions.

*

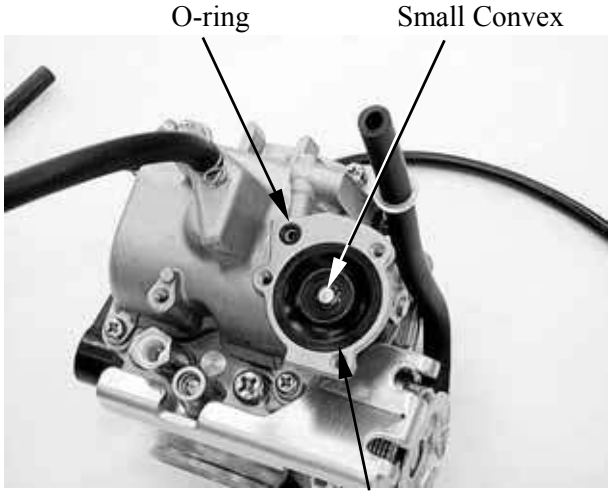
- Assemble the parts taking consideration of their function.
- Replace O-rings and seals with new ones.

Fit a new O-ring in to the float chamber groove securely.



Assemble the accelerating pump diaphragm and new O-ring.

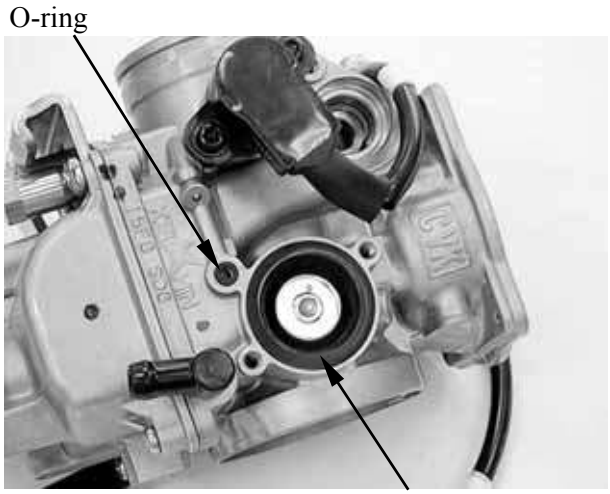
* Install the accelerating pump diaphragm with the small convex facing up.



Accelerating Pump Diaphragm

Assemble the coasting enrichment valve and new O-ring.

Assemble the jet needle, spring retainer, spring and throttle valve



Casting Enrichment Valve

Apply thermo-grease to the threads and tighten the carburetor heater securely.

After cleaning, reinstall the pilot screw to the original setting by turn the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.

* Replace the O-ring with a new one.

After the assembly and installation on the engine have been completed, perform the following adjustment.

Throttle cable adjustment (page 3-5)

Idle speed adjustment (page 3-14)

INSTALLATION

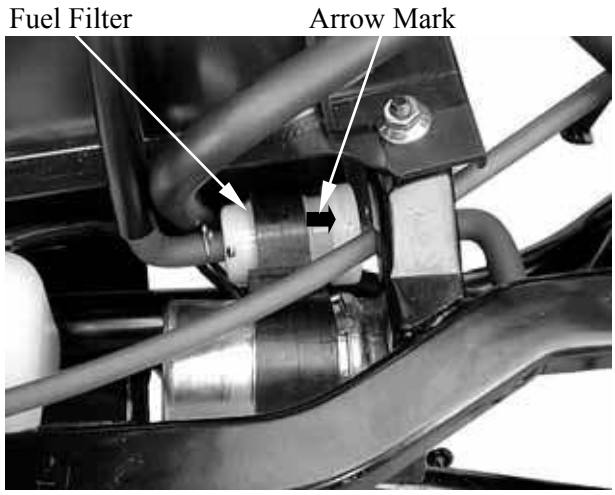
Installation is in the reverse order of removal.

FUEL FILTER/FUEL PUMP

FUEL FILTER INSPECTION

Visually check the fuel filter. If accumulation of sediment or clogging is found, replace the fuel filter with a new one.

Install the fuel filter with the arrow mark facing forward.

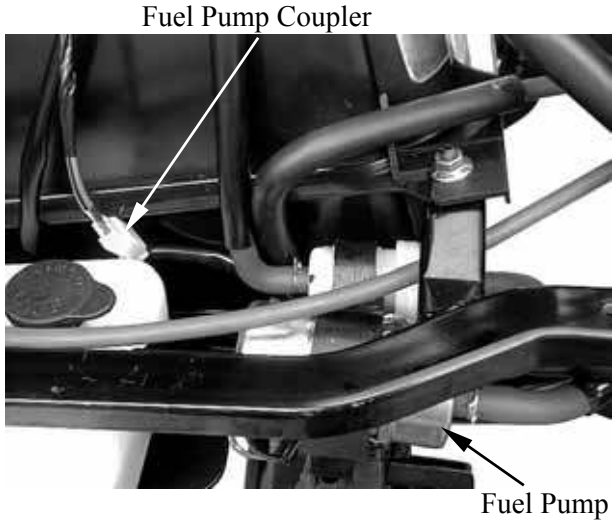


FUEL PUMP INSPECTION

Measure resistance between the terminals of fuel pump lead wire coupler.

If the measurement is out of specification replace the fuel pump.

Fuel pump resistance: 1 - 2.5Ω



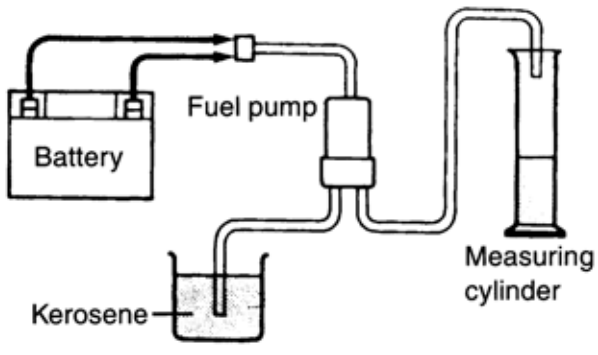
As shown in the right illustration, connect the battery to the fuel pump and measure the pump discharge amount per minute using kerosene.

Battery (+) to Black/Red

Battery (-) to Green

Discharge amount per minute:

370 ml (12.6 US oz, 13 lmp oz)

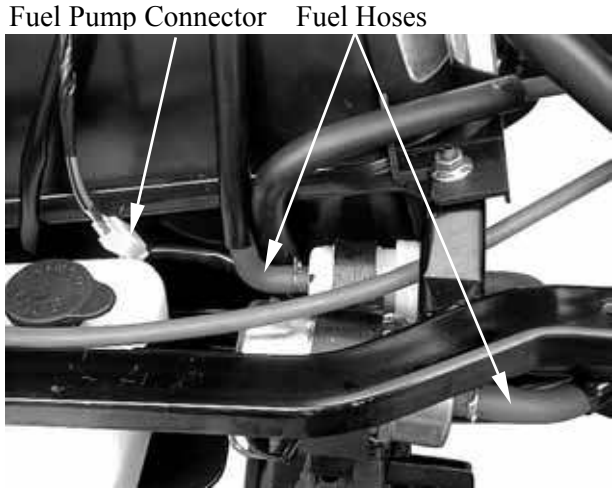


If the measurement is less than the standard value, replace the fuel pump with a new one.

* Do not use gasoline in this test as its is highly combustible.

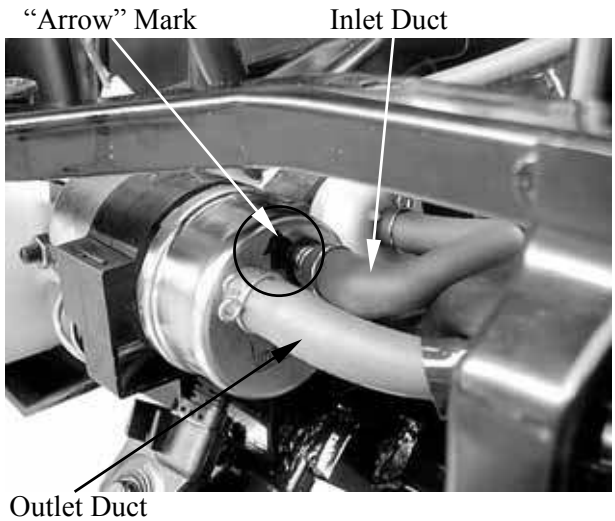
REMOVAL
Remove the floorboard (page 2-6)

Disconnect the fuel hoses.
Disconnect the fuel pump connector.
Remove the fuel pump and filter.



INSTALLATION
Installation is in the reverse order of removal.

*
- Install the fuel pump with the arrow mark facing up.
- Connect the fuel inlet hose between the inlet duct of the fuel pump and fuel filter.
- Connect the fuel outlet hose between the outlet duct of the fuel pump and carburetor.

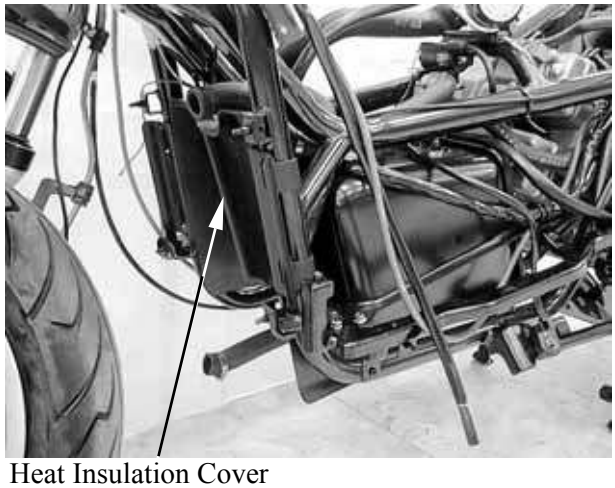


FUEL TANK

REMOVAL

Remove the floorboard (page 2-6).
Remove the inner cover (page 2-14).
Remove the front lower cover (page 2-15).
Remove the fuel pump and fuel filter (page 5-17).

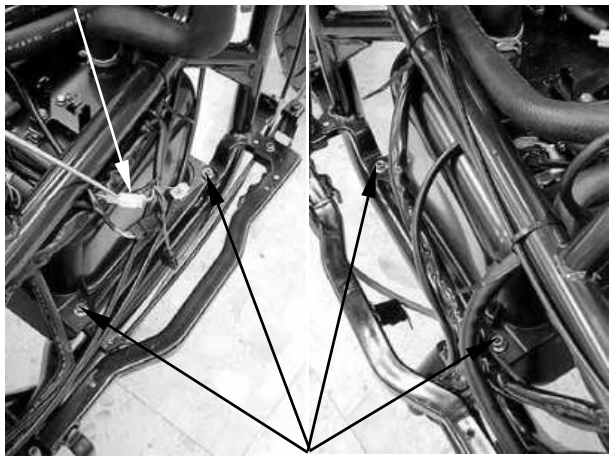
Remove the front heat insulation cover.



Disconnect the fuel unit connector.

Remove the four nuts from the fuel tank.

Fuel Unit Connector



Nuts

Disconnect the ground wire connector.
Disconnect the fuel filler cap open cable.

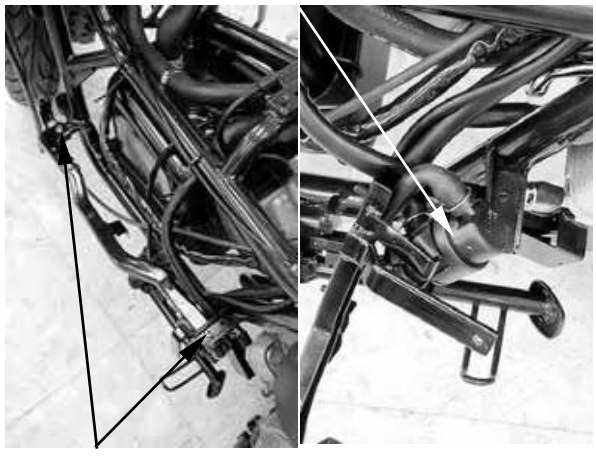
Ground Wire Connector



Fuel Filler Cap Open Cable

Remove the two nuts and left floorboard set holder from the frame.
Remove the AICV control solenoid valve from the left floorboard set holder.

ACIV Control Solenoid Valve



Nuts

Remove the fuel tank from the frame left side.





Fuel Tank

INSTALLATION

Installation is in the reverse order of removal.

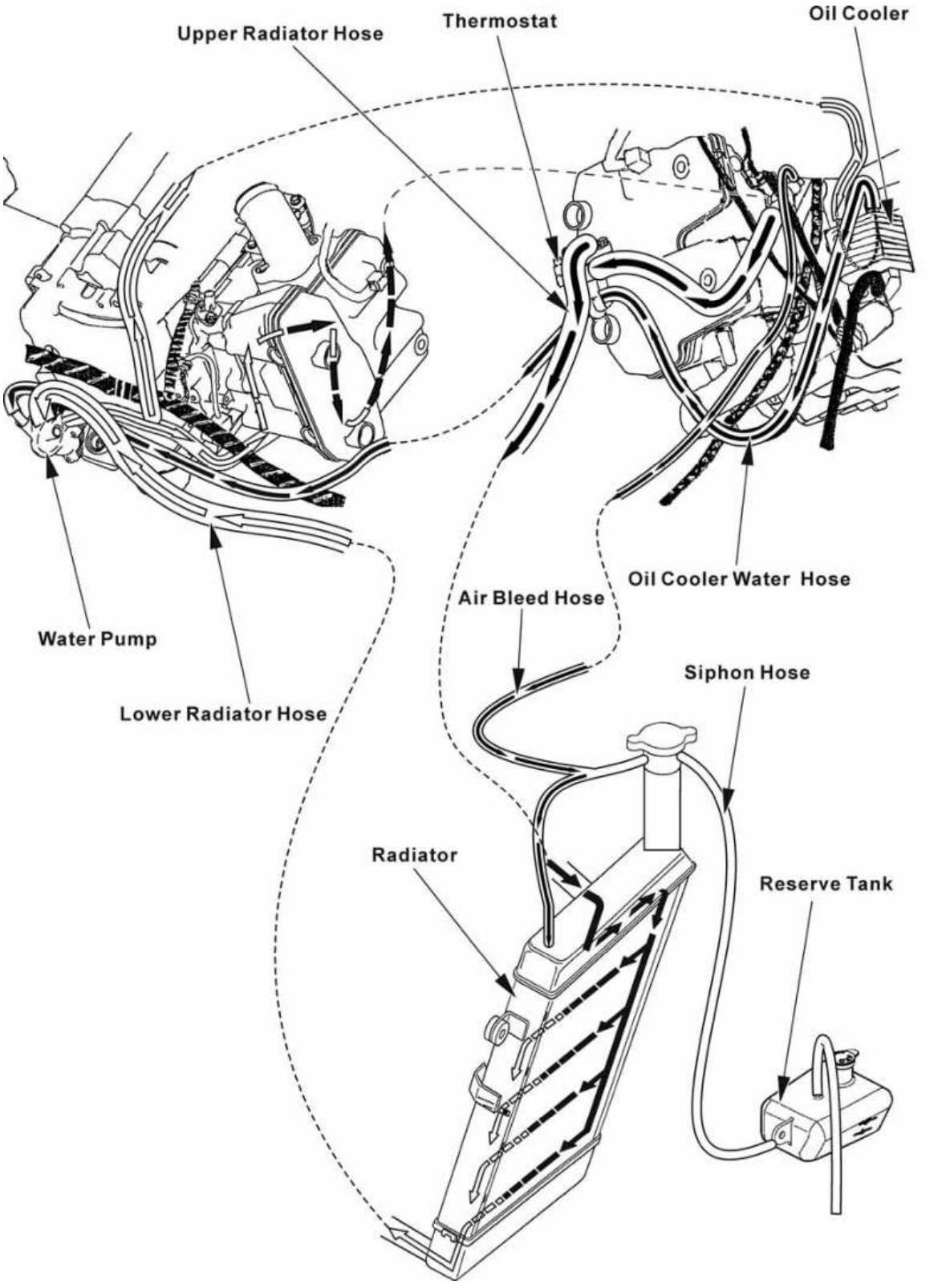


COOLING SYSTEM

6

SYSTEM FLOW PATTERN---------- 6- 1
SERVICE INFORMATION---------- 6- 2
TROUBLESHOOTING---------- 6- 4
COOLING SYSTEM TESTING---------- 6- 5
COOLANT REPLACEMENT ---------- 6- 5
THERMOSTAT---------- 6- 8
WATER PUMP ---------- 6-10
RADIATOR ---------- 6-13
FAN MOTOR SWITCH ---------- 6-16
WATER TEMPERATURE SENSOR ---------- 6-17
RAIDATOR RESERVE TANK ---------- 6-18

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

WARING:
Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

CAUTION:
Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.

- If any coolant gets in your eyes, rinse them with water and consult a physician immediately.
- If any coolant in swallowed, induce vomiting, gargle and consult a physician immediately.
- If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.

NOTE:
Use coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

- This section covers service of the cooling system.
- These services can be done with the engine installed in the frame.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.

6. COOLING SYSTEM

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2 liter (2.1 US qt, 1.76 lmp qt)
	Reserve tank	0.37 liter (0.4 US qt, 0.33 lmp qt)
Radiator cap relief pressure		108 kPa (1.1 kgf/cm^2, 16 psi)
Thermostat	Begin to open	80 - 84°C (176 - 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Standard coolant concentration		1:1 mixture with soft water

COOLANT GRAVITY CHART

Temp. ℃ / Coolant concentration	0	5	10	15	20	25	30	35	40	45	50
5%	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.009	0.997
10%	1.018	1.107	1.017	1.016	1.015	1.014	0.013	1.011	1.009	1.007	1.005
15%	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20%	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25%	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30%	1.053	1.051	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
35%	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40%	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45%	1.080	1.078	1.076	1.074	1.072	1.069	1.056	1.063	1.062	1.057	1.054
50%	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55%	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60%	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

COOLANT MIXTURE (WITH ANTI-RUST AND ANTI-FREEZING EFFECTS)

Freezing Point	Mixing Rate	KYMCO SIGMA Coolant Concentrate	Distilled Water
-9℃	20%		
-15℃	30%	425cc	975cc
-25℃	40%		
-37℃	50%		
-44.5℃	55%		

Cautions for Using Coolant:
- Use coolant of specified mixing rate. (The mixing rate of 425cc KYMCO SIGMA coolant concentrate + 975cc distilled water is 30%.)
- Do not mix coolant concentrate of different brands.
- Do not drink the coolant which is poisonous.
- The freezing point of coolant mixture shall be 5℃lower than the freezing point of the riding area.

TORQUE VALUES

Water pump cover bolt	13 N•m (1.3 kgf•m, 9 lbf•ft)
Fan motor bolt	5 N•m (0.53 kgf•m, 3.8 lbf•ft)
Radiator shroud mounting nut	9 N•m (0.9 kgf•m, 6.5 lbf•ft)

TROUBLESHOOTING

Engine temperature too high
- Faulty radiator cap
- Faulty temperature gauge or thermosensor
- Air in system
- Thermostat stuck closed
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

Engine temperature too low
- Faulty temperature gauge or thermosensor
- Thermostat stuck open
- Faulty fan motor switch

Coolant leak
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hoses

COOLING SYSTEM TESTING

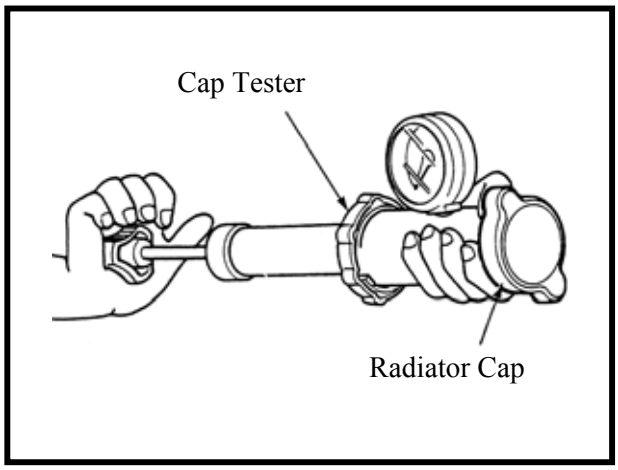
RADIATOR CAP INSPECTION

Remove the radiator cap (page 6-6).

Pressure test the radiator cap.
Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low.
It must hold the specified pressure for at least six seconds.

*

Before installing the cap in the tester, wet the sealing surfface.



Radiator Cap Relief Pressure:

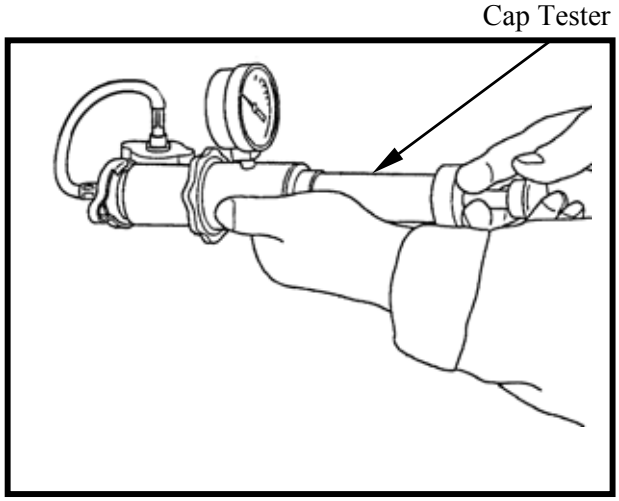
108 kPa (1.1 kg/cm², 16 psi)

Pressurize the radiator, engine and hoses, and check for leaks.

*

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kg/cm², 20 psi).

Repair or replace components if the system will not hold the specified pressure for at least six seconds.



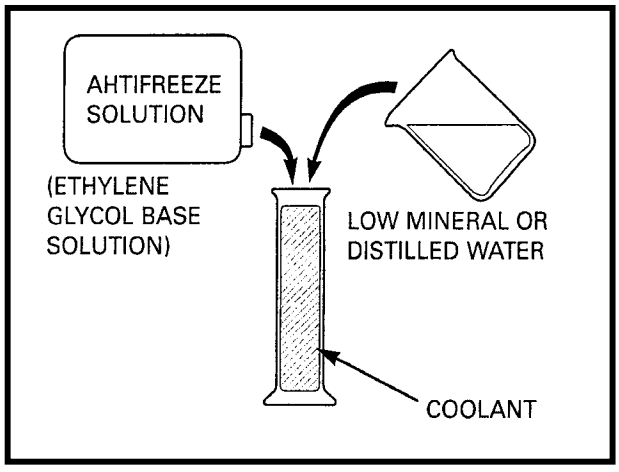
COOLANT REPLACEMENT

PREPARATION

- The effectiveness of coolant decreases with the accumulation of rest or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in he maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

Recommended mixture:

1:1 (Distilled water and antifreeze)



REPLACEMENT/AIR BLEEDING

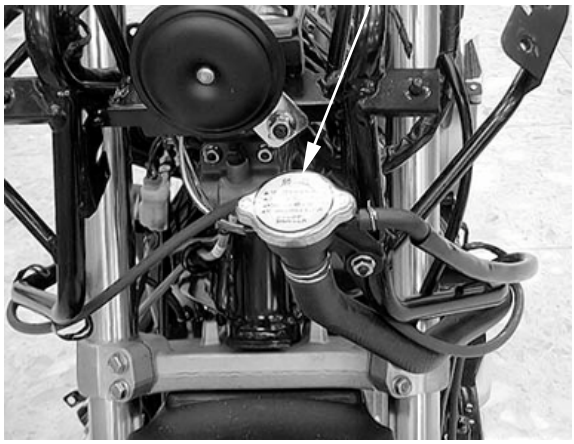
Remove the front cover (page 2-11).

Remove the front lower cover (page 2-15).

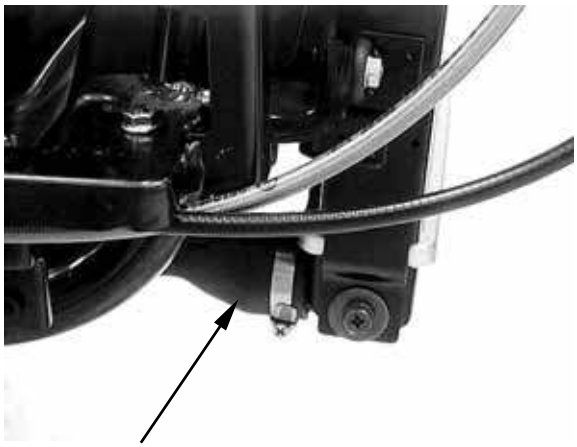
*

When filling the system or reserve tank with coolant (checking the coolant level), place the scooter in a vertical position on a flat, level surface.

Remove the radiator cap.

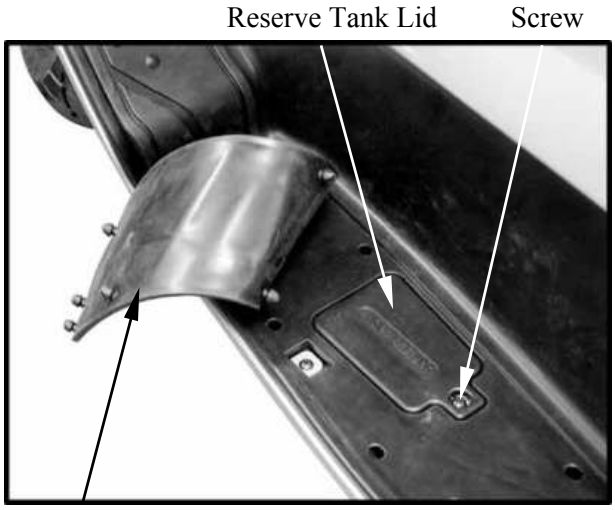


Disconnect the water lower hose and drain the coolant from the system.



Remove the floor mat.

Remove the screw and reserve tank lid.

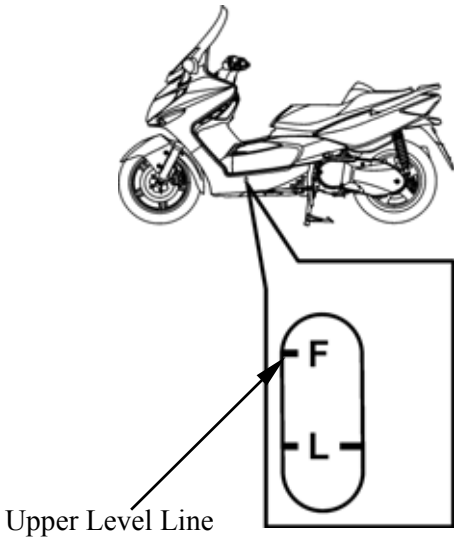


Remove the reserve tank cap and drain the coolant from the reserve tank.

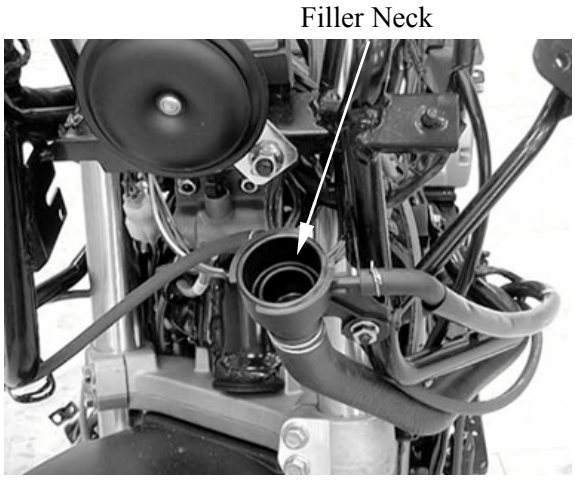
Reconnect the water lower hose securely.



Place the scooter on its center stand on a flat, level surface.
Fill the reserve tank to the upper level line.



Fill the system with the recommended coolant through the filler opening up to the filler neck.



Bleed air from the system as follow:

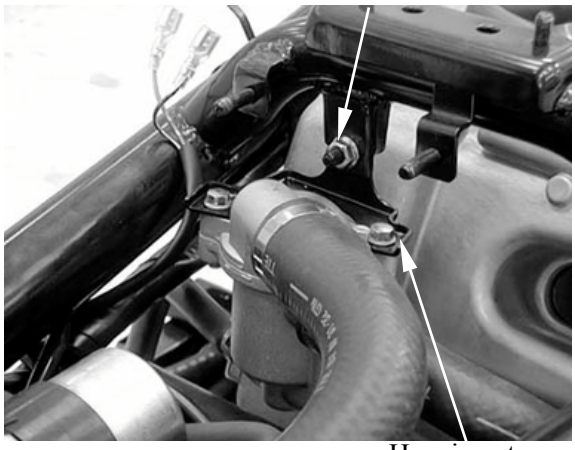
1. Start the engine and let it idle for 2–3 minutes.
2. Snap the throttle three to four times to bleed air from the system.
3. Stop the engine and add coolant to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

THERMOSTAT

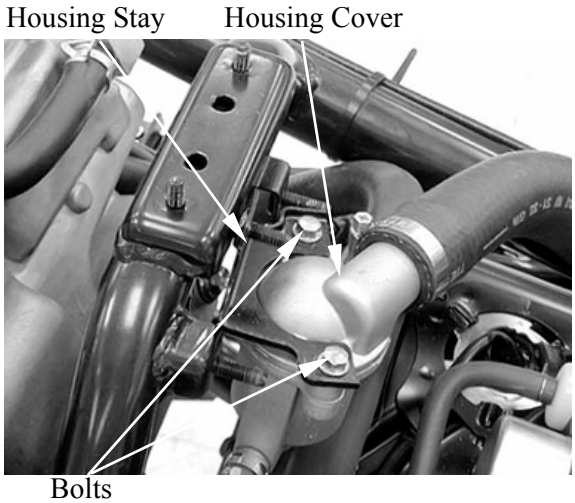
REMOVAL

Remove the floorboard (page 2-6).
Remove the ignition coil (page 18-5).

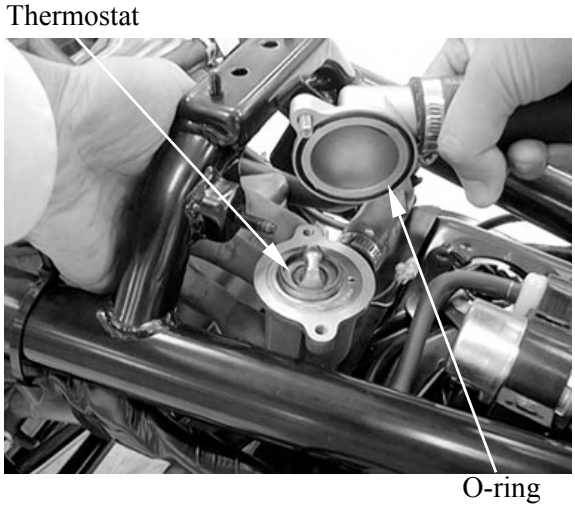
Remove the nut and thermostat housing stay from the frame.



Remove the bolts, housing stay and thermostat housing cover.



Remove the O-ring from the housing cover.
Remove the thermostat.

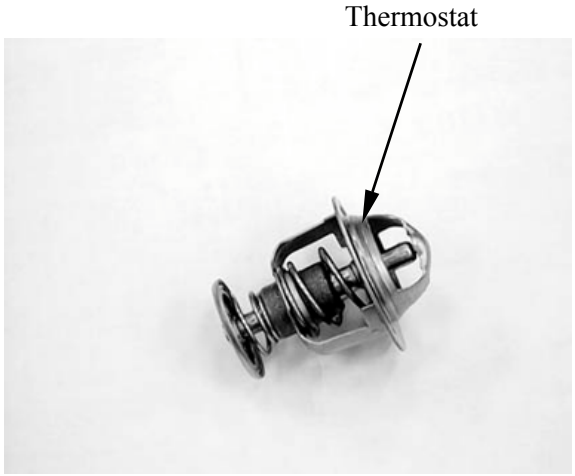


INSPECTION

Visually inspect the thermostat for damage.

Heat the water with an electric heating element to operating temperature for five minutes.

Suspend the thermostat in heated water to check its operation.



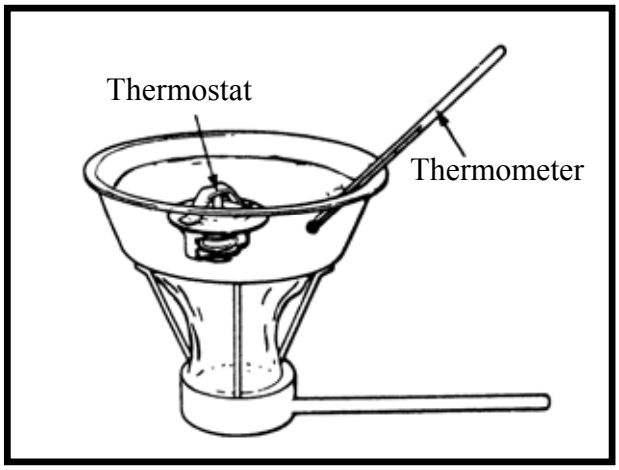
*

- Keep flammable materials away from the electric heating element.
- Do not let the thermostat or thermometer touch the pan, or you will get false readings.

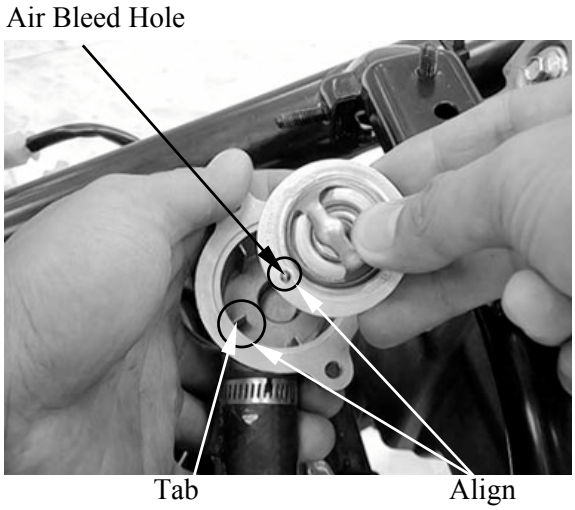
Replace the thermostat if the valve stays open at room temperature, or if it respond at temperatures other than those specified.

Thermostat begin to open:
80–84°C (176–183°F)

Valve lift:
8 mm (0.3 in) minimum at 95°C (203°F)



INSTALLATION
Install the thermostat into the housing with its air bleed hole facing up and aligning bleed hole with the tab in the housing.

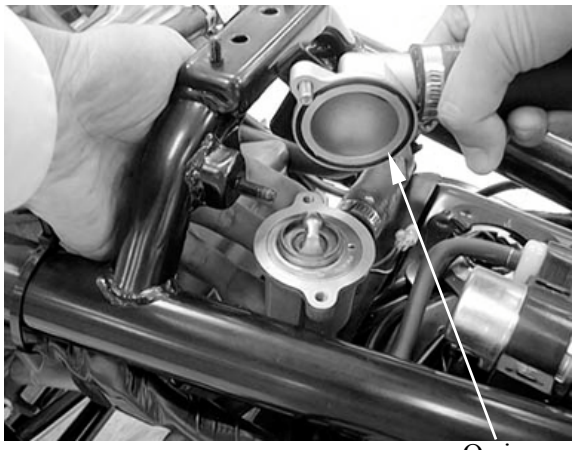


Install a new O-ring into the housing cover groove.

Install the housing cover and housing stay to the housing.
Tighten the bolts securely.

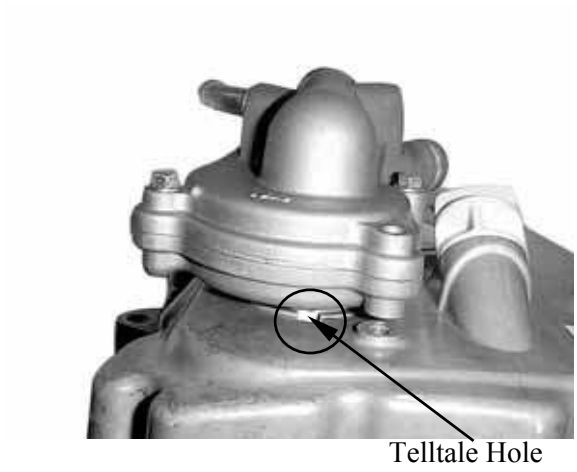
Install the housing stay to the frame.
Tighten the nut securely.

Fill the system with recommended coolant and bleed the air (page 6-6).



WATER PUMP

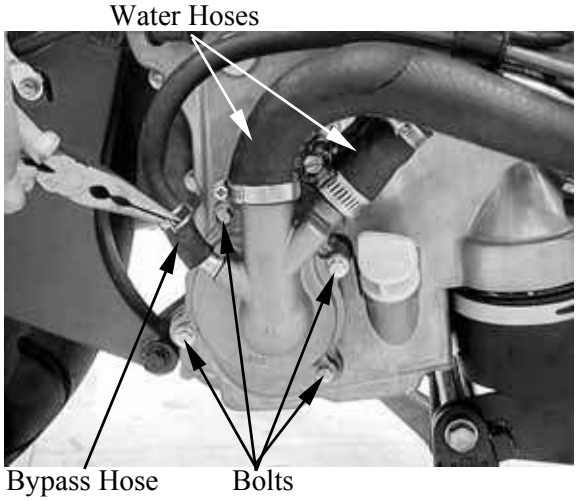
MECHANICAL SEAL INSPECTION
Inspect the telltale hole for sign of coolant leakage.
If there is leakage, the mechanical seal is defective, and water pump should be replaced



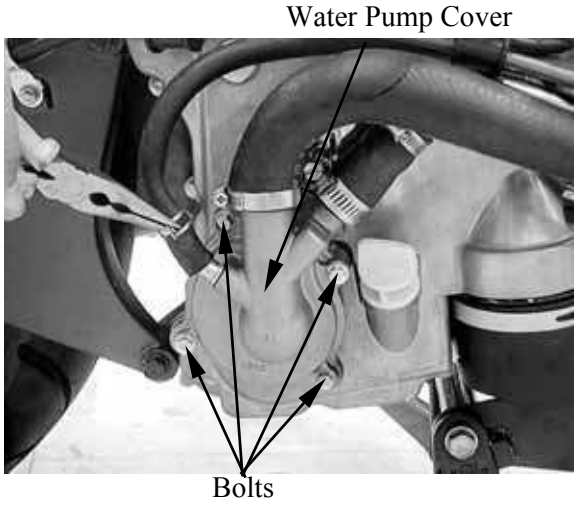
REMOVAL
Remove the exhaust muffler (page 2-15)

Drain the coolant (page 6-6).

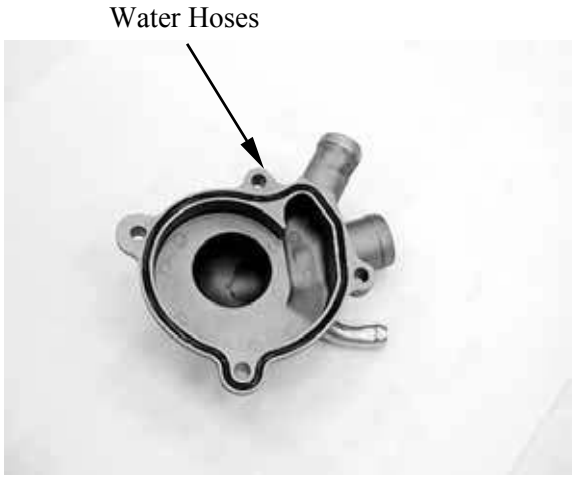
Loosen the hose bands and disconnect the water hoses and bypass hose from the water pump.



Remove he bolts and water pump cover.



Remove the O-ring from the water pump cover.



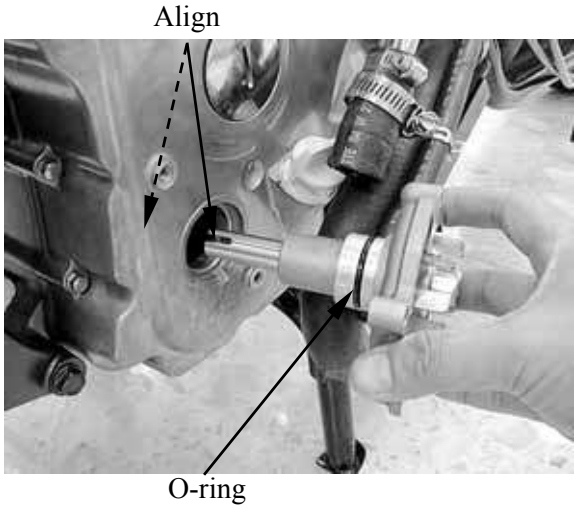
Remove the water pump body from the crankcase.



INSTALLATION

Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

Install the water pump into the crankcase while aligning the water pump shaft groove with oil pump shaft end.



Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.

Install a new O-ring into the groove in the water pump cover.

Install the water pump cover and tighten the bolts to the specified toque.

Torque: 13 N•m (1.3 kgf•m, 9 lbf•ft)



Connect the water hoses and bypass hose, then tighten the hose bands.

Fill the system with recommended coolant and bleed the air (page 6-6).

RADIATOR

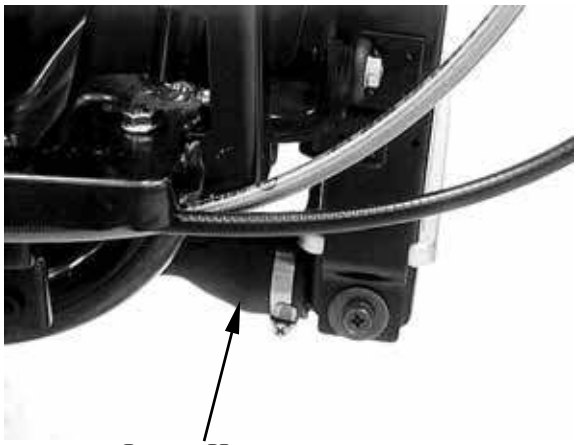
REMOVAL

Drain the coolant (page 6-6).
Remove the inner cover (page 2-14).
Remove the front lower cover (page 2-15)

Disconnect the fan motor connector.


Fan Motor

Loosen the hose band and disconnect the radiator lower hose from the radiator.


Lower Hose

Loosen the hose band and disconnect the coolant filler hose from the radiator.

Filler Hose



Disconnect the fan motor switch connectors.
Disconnect the air bleed hose.

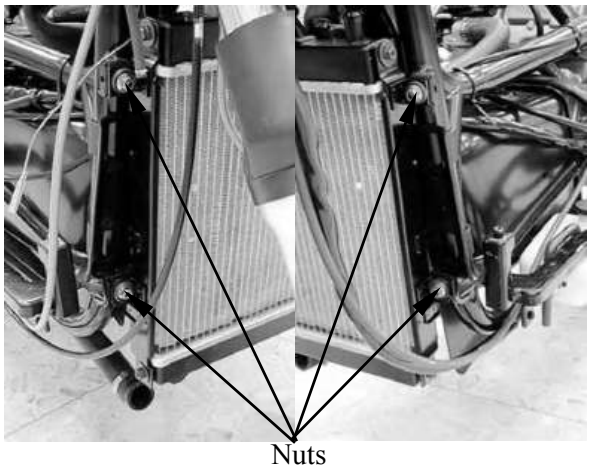
Fan Motor Switch Connectors



Air Bleed Hose

Remove the four nuts and radiator from the frame.

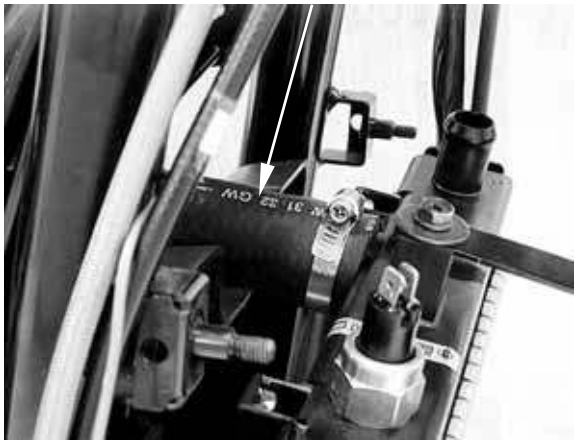
* Be careful not to damage the radiator core.



Nuts

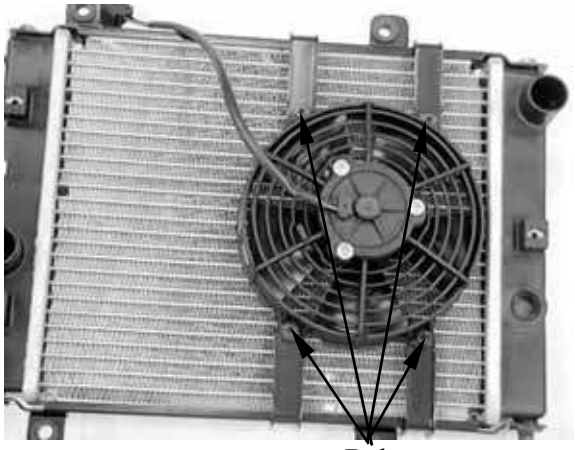
Loosen the hose band and disconnect the radiator upper hose from the radiator.

Upper Hose

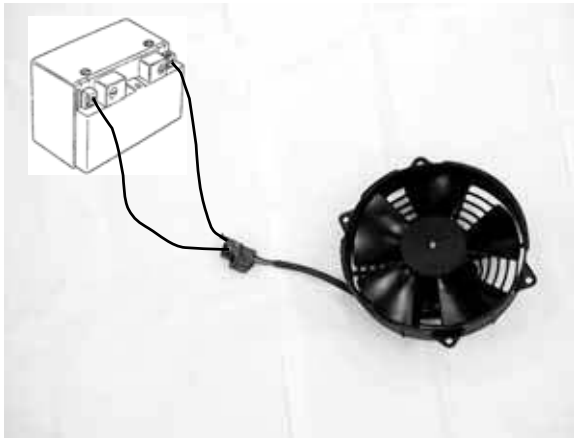


DISSASSEMBLY

Remove the four bolts and fan motor/shroud assembly.



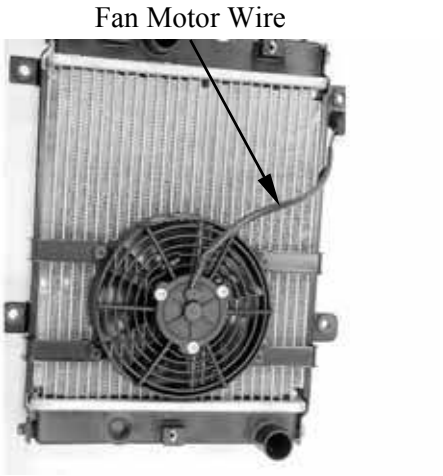
Check the fan motor to operate using an available battery.



ASSEMBLY

Install the fan motor/shroud assembly to the radiator with the fan motor wire facing up.

Install and tighten the bolts securely.

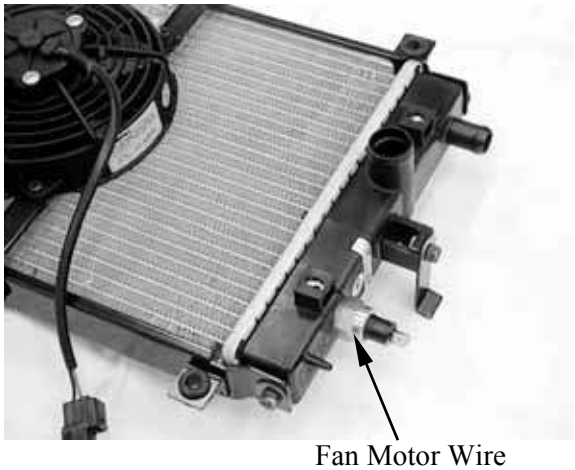


FAN MOTOR SWITCH

REMOVAL

Disconnect the fan motor switch connector (page 6-14).

Remove the fan motor switch.

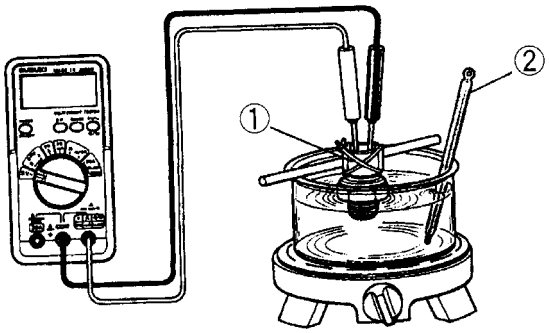


INSPECTION

Place the fan motor switch in oil contained in a pan as shown and raise the oil temperature gradually to check for the temperature at which the switch starts to operate.

If the switch operating temperature is not within the specified range, replace the switch with a new one.

OFF→ON	Over 88–92°C
ON→OFF	Lower 88–92°C



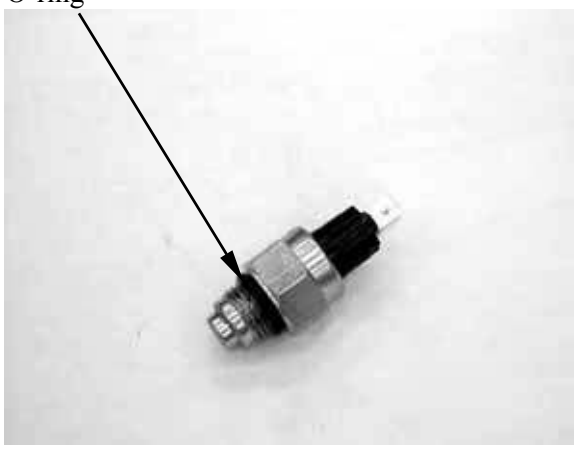
*
- Handle the cooling fan motor switch carefully as it is vulnerable to impact.
- Do not allow the cooling fan motor switch ①and the thermometer ②to come in contact with the bottom of the pan.

INSTALLATION

Fit the O-ring.

Tighten the cooling fan motor switch to specified torque.

Torque: 17 N•m (1.8 kgf•m, 13 lbf•ft)



*
- Replace the O-ring a new one.
- Do not coat grease to the O-ring.

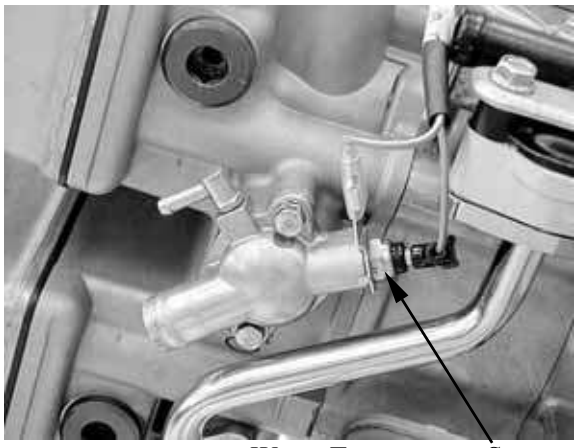
WATER TEMPERATURE SENSOR

REMOVAL

Remove the side body cover (page 2-8)

Disconnect the water temperature sensor connector.

Remove the water temperature sensor.

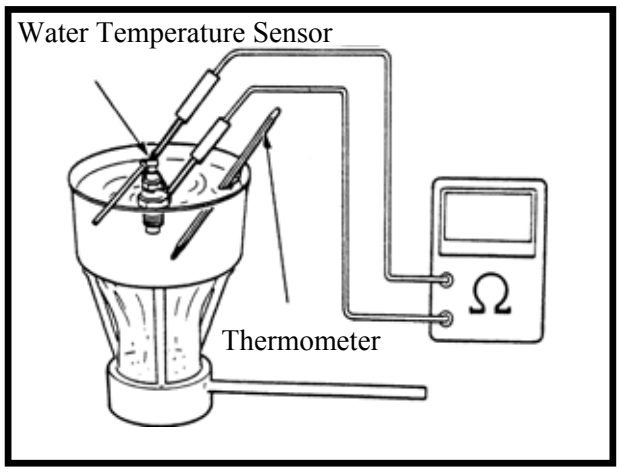


Water Temperature Sensor

INSPECTION

Connect the water temperature sensor to the ohmmeter and dip it in oil contained in a pan which is placed on an electric heater.

Gradually raise oil temperature while reading the thermometer in the pan and the ohmmeter connected. If the resistance measured is out of specification, replace the temperature gauge with a new one.



Temperature	Standard resistance
50℃	140– 310Ω
115℃	24.1– 28.2Ω

*

- Handle the water temperature sensor carefully as it is vulnerable to impact.
- Do not allow the water temperature sensor and the thermometer to come in contact with the bottom of the pan.

After the water temperature sensor has been installed, fill coolant and perform air bleeding (page 6-6).

INSTALLATION

With thread lock applied to the threaded part, tighten the water temperature sensor.

Torque: 8 N•m (0.8 kgf•m, 5.8 lbf•ft)

RADIATOR RESERVE TANK

REMOVAL

Remove the floorboard (page 2-6).

Remove the two nuts and radiator reserve tank from the frame.


Nuts

Open the reserve tank cap and drain the coolant from the reserve tank.

Disconnect the siphon hose.


Siphon Hose

INSTALLATION

Installation is in the reverse order of removal.

Pour the recommended coolant to the upper level line with the center stand applied

ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION---------- 7- 1
ENGINE REMOVAL ---------- 7- 2
ENGINE HANGER ---------- 7-11

7

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- During engine removal and installation, support the scooter on its main stand.
- Support the frame using a jack or other adjustable support to ease of engine hanger bolt removal.
- The following components require engine removal for serviced with the engine installed in the frame.

_ Oil pump (Section 4)
_ Water pump (Section 6)
_ Cylinder head (Section 8)
_ Cylinder/Piston (Section 9)
_ Drive and driven pulleys/clutch (Section 10)
_ Final reduction (Section 11)
_ Alternator/Starter clutch (Section 12)

- The following components require engine removal for service.

_ Crankshaft/Crankcase/Balancer (Section 13)

SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		66 kg (145.2 lbs)
Engine oil capacity	At draining	2.0 liter (2.1 US qt, 1.8 lmp qt)
	At disassembly	2.5 liter (2.7 US qt, 2.2 lmp qt)
	At oil filter cartridge change	2.1 liter (2.2 US qt, 1.9 lmp qt)

TORQURE VALUES

Engine mounting bolt	80 N•m (8 kgf•m, 58 lbf•ft)
Engine mounting nut	80 N•m (8 kgf•m, 58 lbf•ft)
Rear shock absorber lower mounting bolt	40 N•m (4 kgf•m, 29 lbf•ft)
Rear/parking brake caliper mounting bolt	32 N•m (3.2 kgf•m, 23 lbf•ft) ALOCK bolt: replace with a new one
Engine hanger mounting bolt	50 N•m (5 kgf•m, 36 lbf•ft)
Engine hanger rod nut	35 N•m (3.5 kgf•m, 25 lbf•ft)

ENGINE REMOVAL

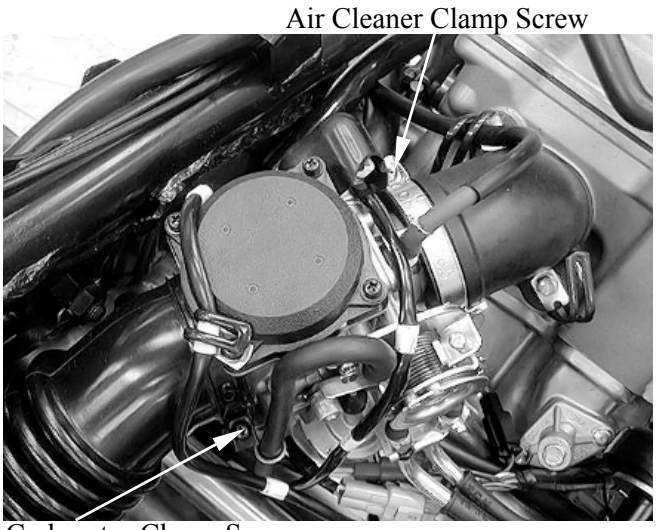
Remove the following:
Luggage box (page 2-3)
Floorboard (page 2-6)
Rear fender (page 2-7)
Side/rear body cover (page 2-8)
Exhaust muffler (page 2-15)

Drain the coolant from the system (page 6-6).

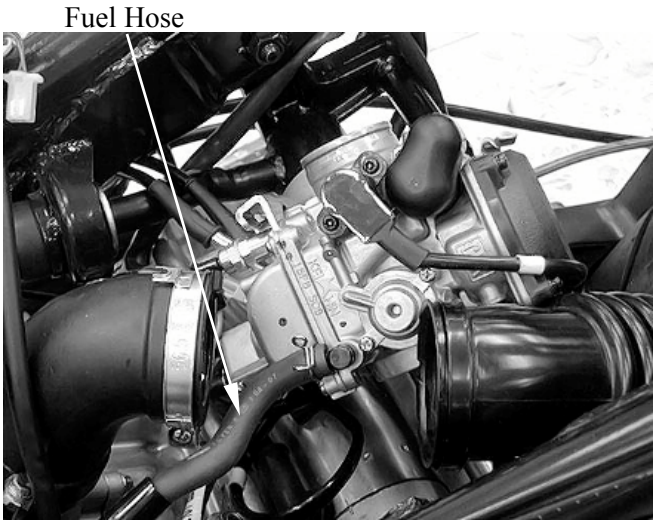
Support the scooter on its main stand.

Loosen the air cleaner clamp screw.
Loosen the carburetor clamp screw.

Remove the carburetor.



Disconnect the fuel hose from the carburetor.



Disconnect the water temperature sensor connector.
Disconnect AICV air supply hose from the AICV check valve.

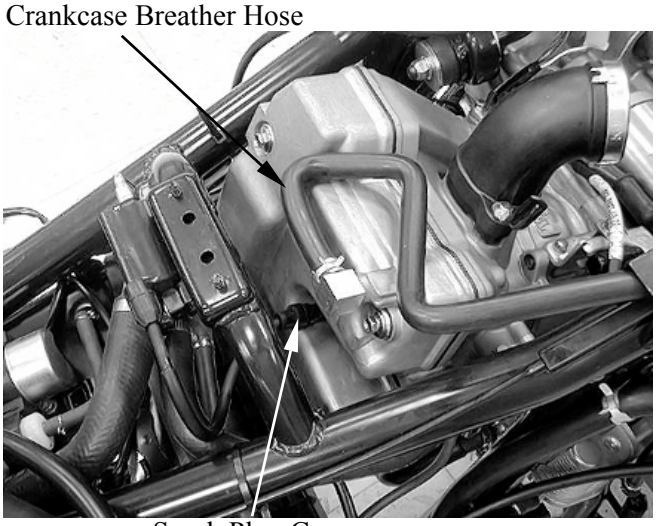
AICV air Supply Hose



Water Temperature Sensor Connector

Disconnect the spark plug cap from the cylinder head.
Disconnect the crankcase breather hose form the cylinder head cover.

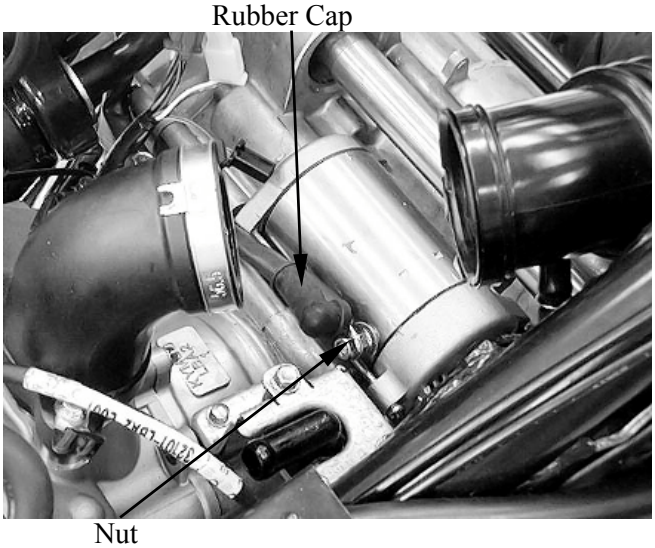
Crankcase Breather Hose



Spark Plug Cap

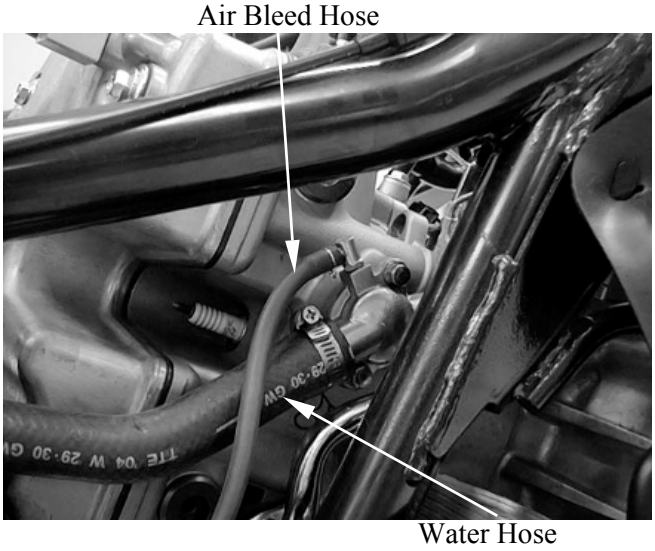
Release the rubber cap and remove the terminal nut to disconnect the starter motor cable.

Rubber Cap

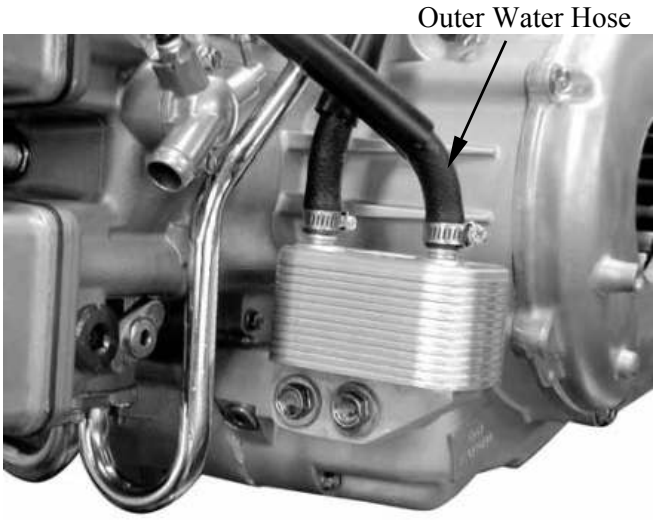


Nut

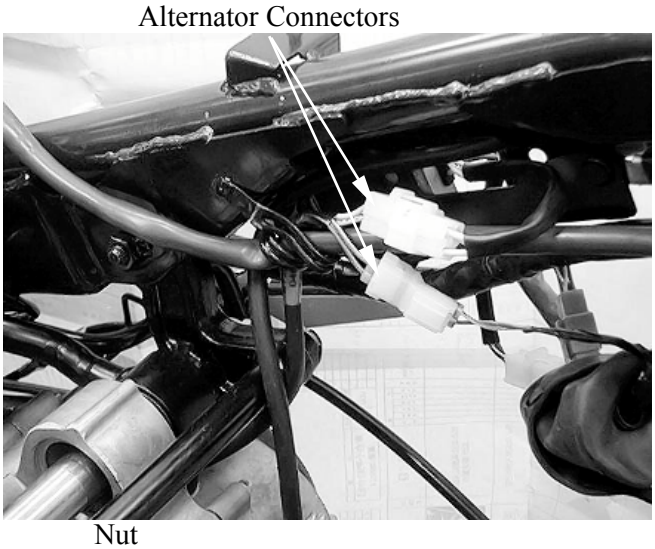
Disconnect the air bleed hose and water hose from the water joint.



Disconnect the outer water hose from the oil cooler.

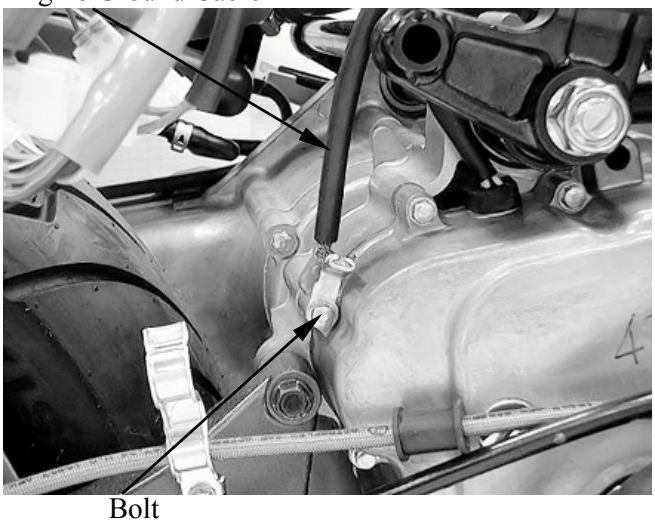


Loosen the wire bands and disconnect the alternator connectors.



Remove the bolt and engine ground cable.

Engine Ground Cable

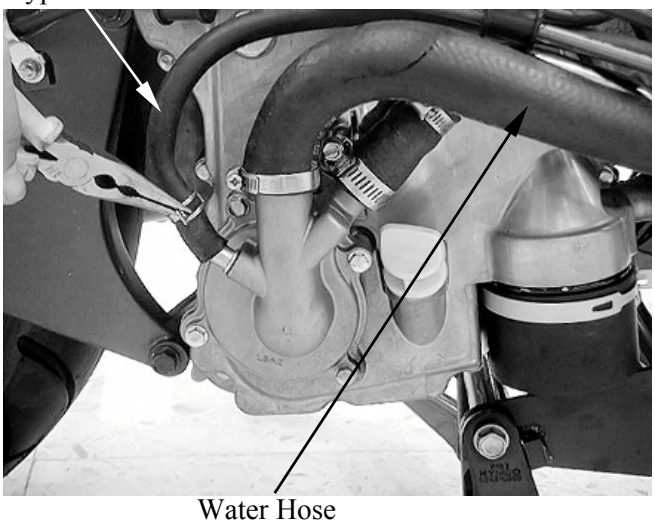


Bolt

.

Loosen the hose bands and disconnect the bypass hose and water hose

Bypass Hose

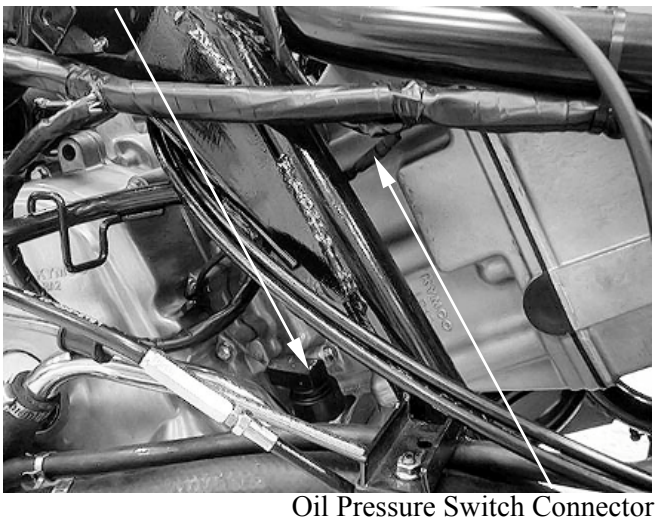


Water Hose

.

Disconnect the oil pressure switch connector.

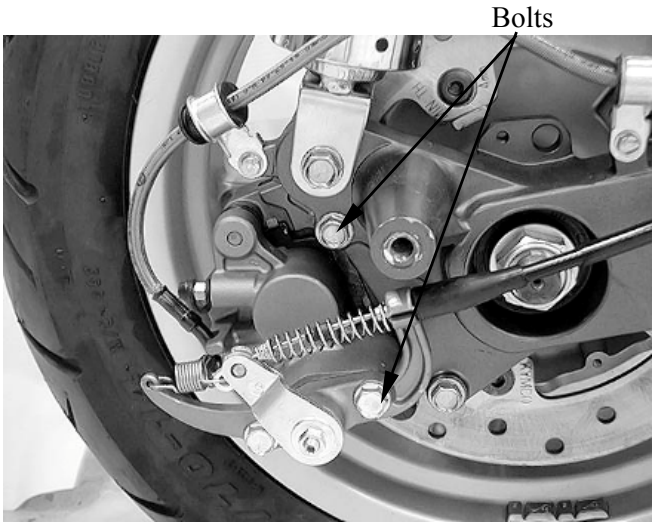
Oil Pressure Switch



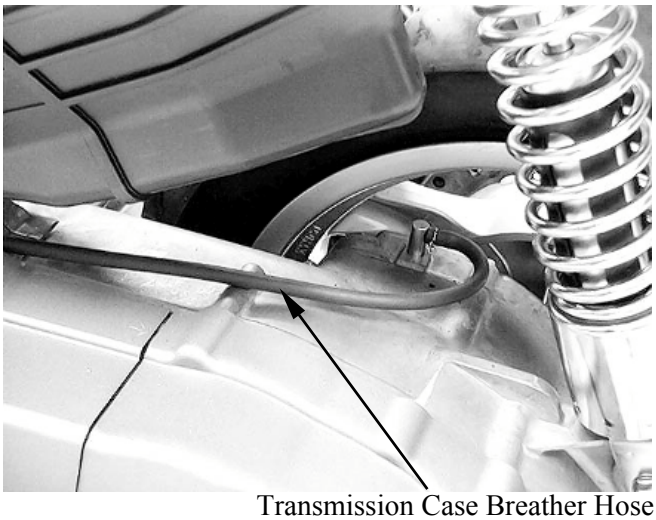
Oil Pressure Switch Connector

Remove the bolts and rear/parking brake caliper.

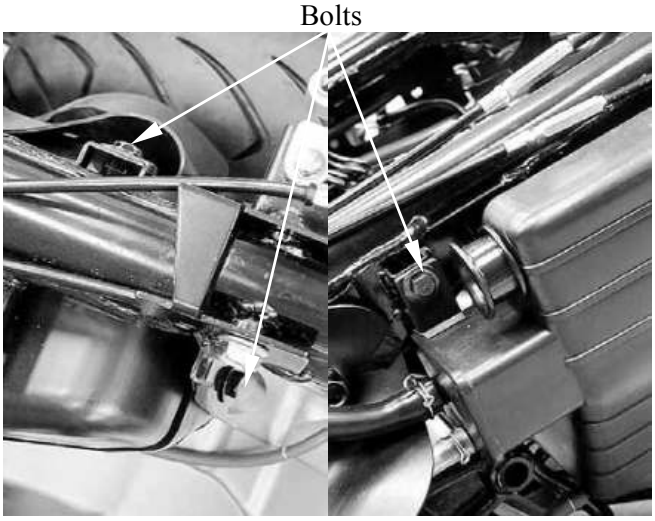
Remove the brake hose from clamps.



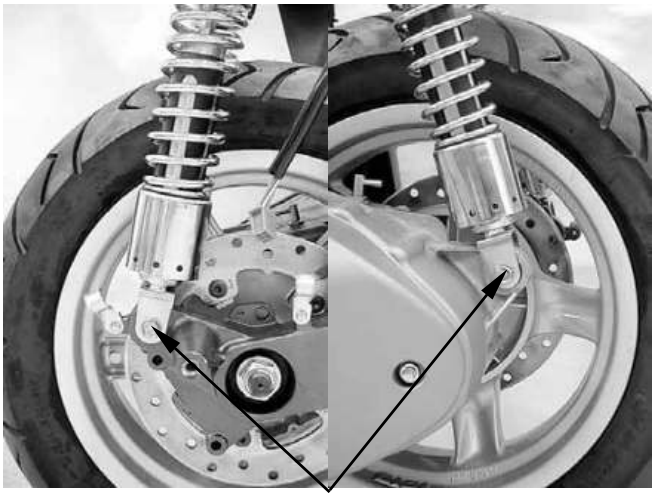
Disconnect the transmission case breather hose from transmission case.



Remove the bolts and air cleaner.



Remove the rear cushion lower mount bolts



Lower Mount Bolts

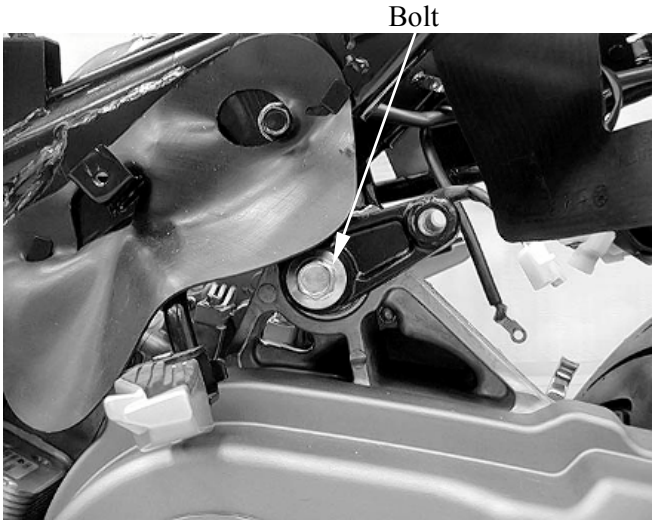
Remove the engine mount nut.



Turn the engine mount bolt counterclockwise and loosen it.

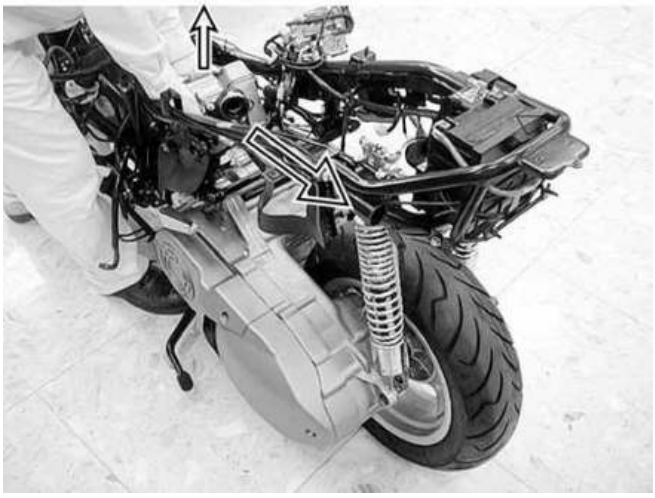
Pull out the engine mount bolt then removes the engine from the frame.

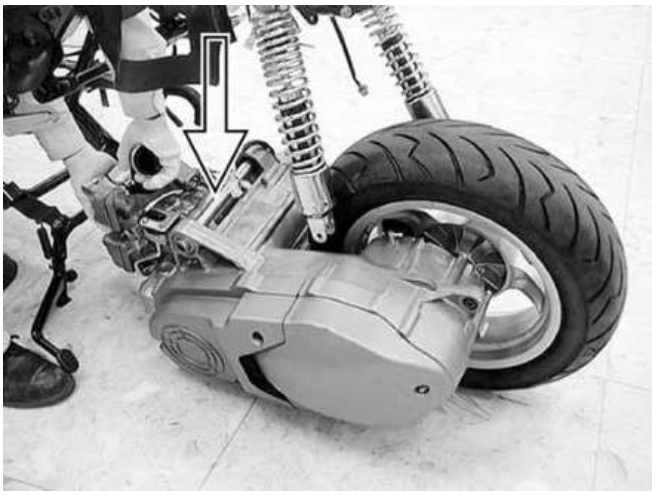
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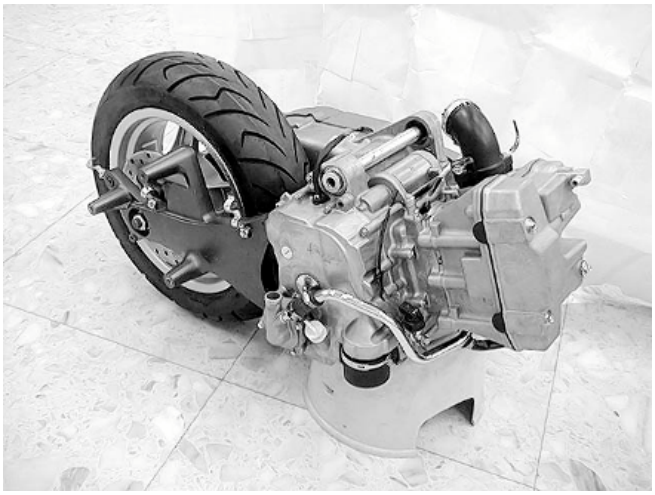
7. ENGINE REMOVAL/INSTALLATION

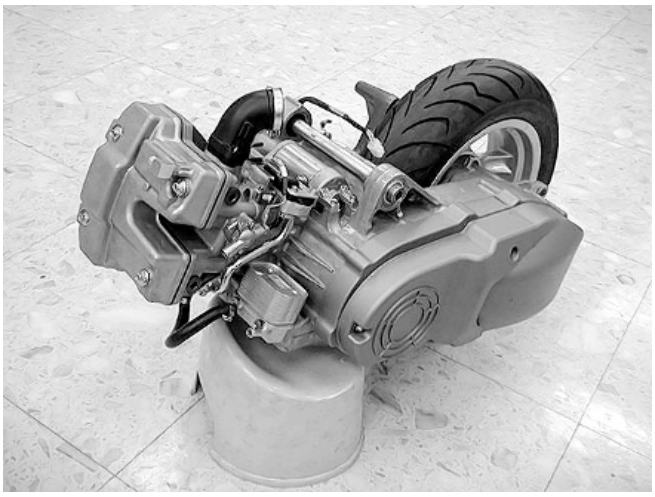
* At removing the engine, be careful not to catch your hand or finger between the engine hanger and crankcase.



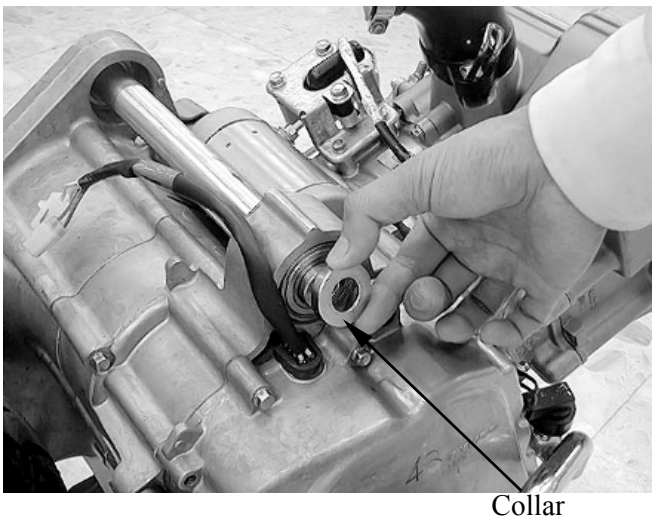






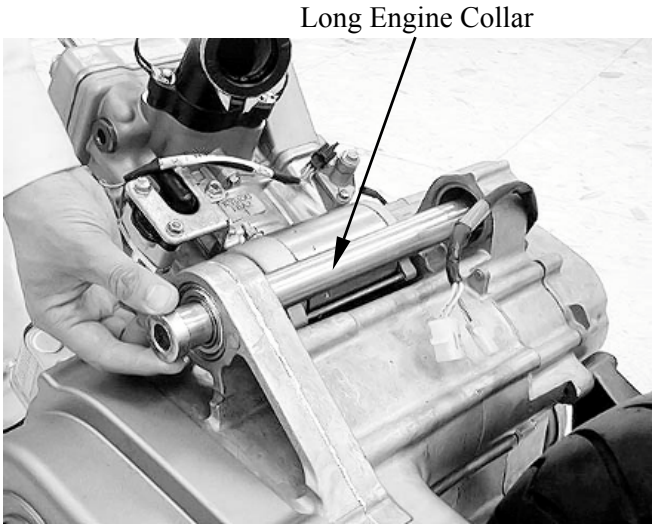


Remove the collar.



Collar

Pull out the long engine collar.



INSTALLATION

Installation is in the reverse order of removal.

*

- At installing the engine, be careful not to catch your hand or finger between the engine hanger and crankcase.
- Check for leakage of the engine oil and engine coolant.

Torque:

Engine mounting bolt:

80 N•m (8 kgf•m, 58 lbf•ft)

Engine mounting nut:

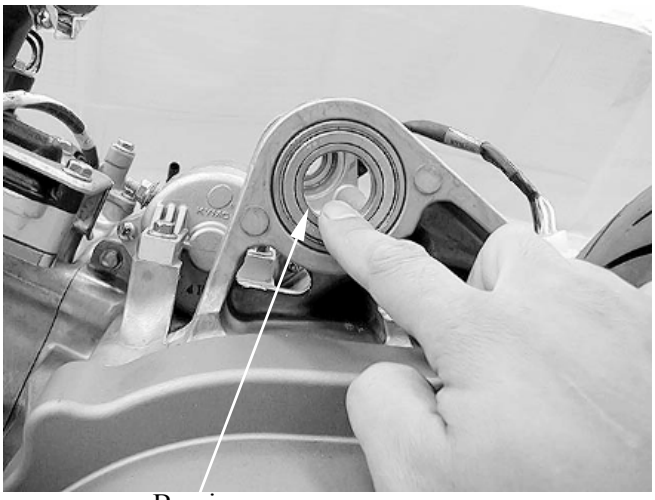
80 N•m (8 kgf•m, 58 lbf•ft)

Route the brake hoses and wires properly (page 1-12).

INSPECTION

Inspect the bearing:

Bearings allow play in the right/eft crankcase or the bearing turns roughly → Replace.

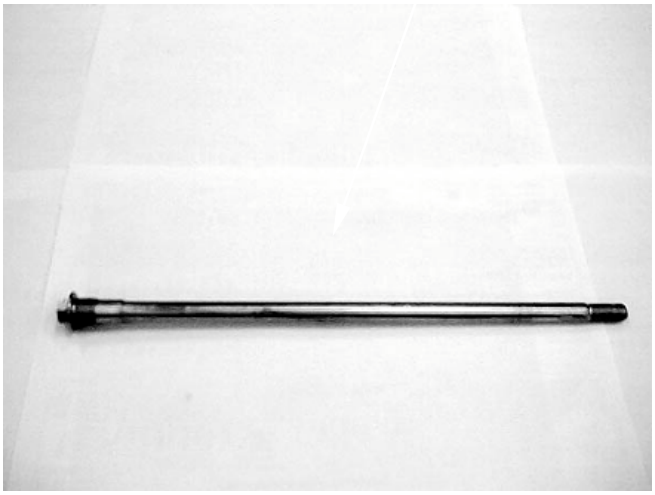


Inspect the engine mount bolt:

Band/Damage → Replace

*

Do not attempt to straighten a bent engine mount bolt.



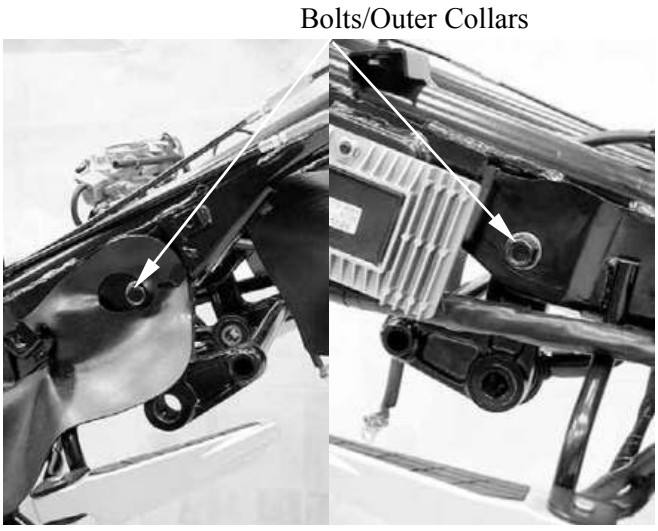
ENGINE HANGER

REMOVAL

Loosen and remove the engine mount nut (page 7-7).

Loosen and remove the engine mount bolt (page 7-7).

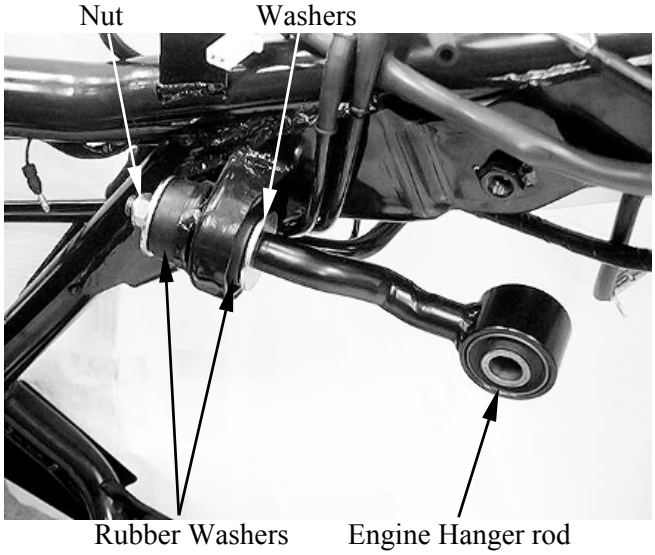
Remove the engine hanger mount bolts and outer collars.



Remove the engine hanger and inner collars.



Remove the nut, washers, rubber washers and engine hanger rod.



INSTALLATION

Installation is in the reverse order of removal.

Torque:

Engine hanger mounting bolt:

50 N•m (5 kgf•m, 36 lbf•ft)

Engine hanger rod nut:

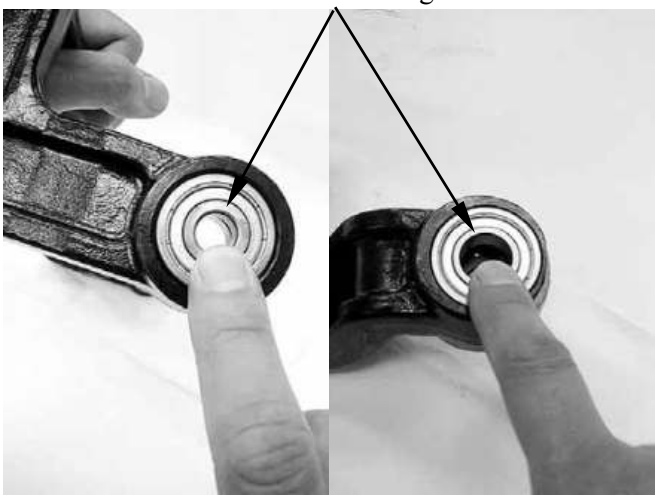
35 N•m (3.5 kgf•m, 25 lbf•ft)

INSPECTION

Inspect the bearing:

Bearings allow play in the engine hanger or the bearing turns roughly → Replace.

Outer/Inner Bearings



Inspect the bush:

Wear/Damage → Replace.

Bush

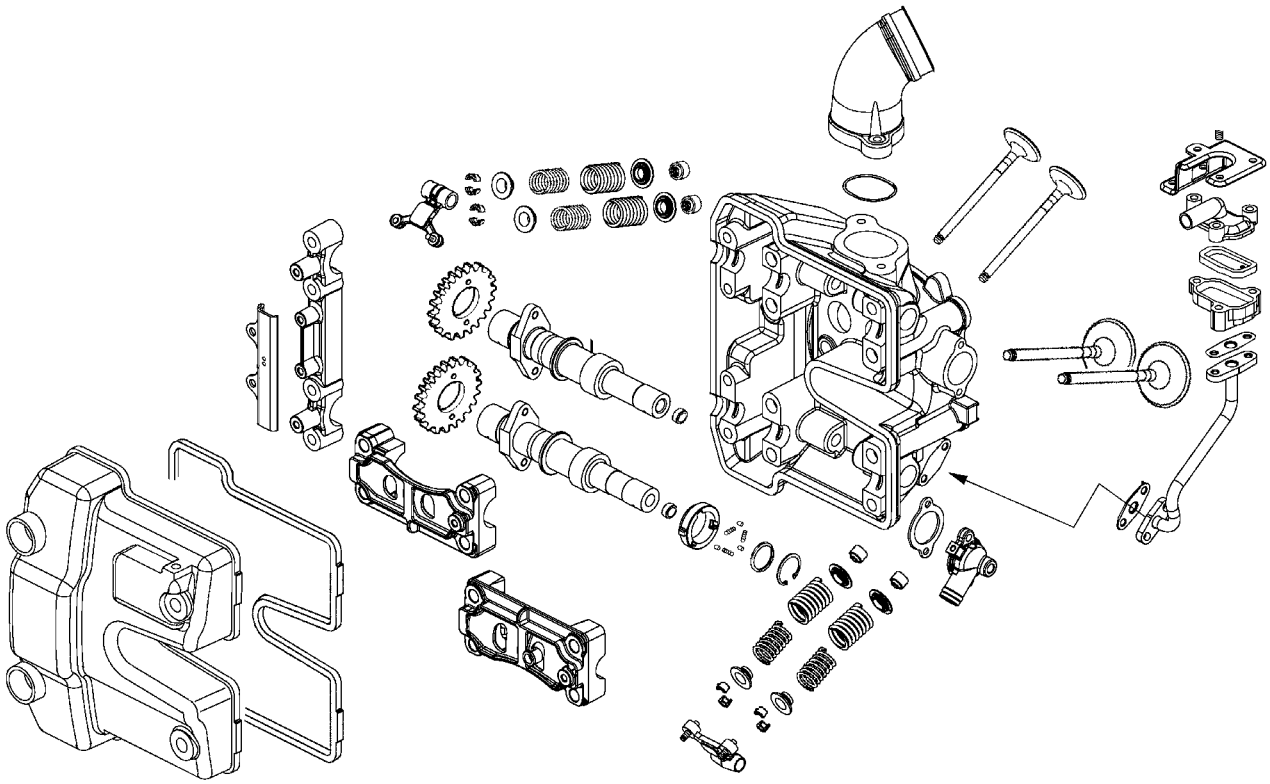


CYLINDER HEAD/VALVES

SCHEMATIC DRAWING ---------- 8- 1
SERVICE INFORMATION---------- 8- 2
TROUBLESHOOTING---------- 8- 3
CYLINDER COMPRESSION TEST ---------- 8- 4
CYLINDER HEAD COVER---------- 8- 5
CAMSHAFT REMOVAL ---------- 8- 6
ROCKER ARM REMOVAL---------- 8-10
CYLINDER HEAD REMOVAL ---------- 8-11
CYLINDER HEAD INSTALLATION ---------- 8-16
ROCKER ARM INSTALLATION---------- 8-18
CAMSHAFT INSTALLATION ---------- 8-19
CYLINDER HEAD COVER INSTALLATION ---------- 8-23

8. CYLINDER HEAD/VALVES

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder head can be serviced with the engine installed in the frame. Coolant in the radiator and water jacket must be drained first.
- When assembling, apply molybdenum disulfide grease or engine oil to the valve guide movable parts and valve arm sliding surfaces for initial lubrication.
- The valve rocker arms are lubricated by engine oil through the cylinder head engine oil passages. Clean and unclog the oil passages before assembling the cylinder head.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.
- After removal, mark and arrange the removed parts in order. When assembling, install them in the reverse order of removal.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Valve clearance (cold)	IN	0.1 mm (0.004 in)	—
	EX	0.1 mm (0.004 in)	—
Cylinder head compression pressure		13 kg/cm^2 (185 psi, 1300 kPa)	—
Cylinder head warpage		—	0.05 (0.002)
Camshaft cam height	IN	37.2614 (1.4905)	37.11 (1.4844)
	EX	37.0084 (1.4803)	36.86 (1.4744)
Valve rocker arm I.D.	IN	10 (0.4)～10.015 (0.4006)	10.1 (0.404)
	EX	10 (0.4)～10.015 (0.4006)	10.1 (0.404)
Valve rocker arm shaft O.D.	IN	9.975 (0.399)～9.99 (0.3996)	9.9 (0.396)
	EX	9.975 (0.399)～9.99 (0.3996)	9.9 (0.396)
Valve stem O.D.	IN	4.975 (0.199)～4.99 (0.1996)	4.925 (0.197)
	EX	4.955 (0.1982)～4.97 (0.1988)	4.915 (0.1966)
Valve guide I.D.	IN	5 (0.2)～5.015 (0.2006)	5.03 (0.2012)
	EX	5 (0.2)～5.015 (0.2006)	5.03 (0.2012)
Valve stem-to-guide clearance	IN	0.01 (0.004)～0.037 (0.0015)	0.08 (0.0032)
	EX	0.03 (0.0012)～0.057 (0.0023)	0.1 (0.004)

TORQUE VALUES

Cylinder head bolt (13)	13 N•m (1.3 kgf•m, 9 lbf•ft)	Apply engine oil to threads
Cylinder head bolt (1 – 4)	48 N•m (4.8 kgf•m, 35 lbf•ft)	Apply engine oil to threads
Cylinder head bolt (5 – 12)	23 N•m (2.3 kgf•m, 17 lbf•ft)	Apply engine oil to threads
Cylinder head cover bolt	10 N•m (1 kgf•m, 7 lbf•ft)	
Cylinder head cover bolt	10 N•m (1 kgf•m, 7 lbf•ft)	
Breather separator bolt	13 N•m (1.3 kgf•m, 9 lbf•ft)	
Cam chain tensioner bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Tensioner pivot bolt	10 N•m (1 kgf•m, 7 lbf•ft)	
Rocker arm shaft	45 N•m (4.5 kgf•m, 32 lbf•ft)	

SPECIAL TOOLS

Valve spring compressor E040

TROUBLESHOOTING

- The poor cylinder head operation can be diagnosed by a compression test or by tracing engine top-end noises.

Poor performance at idle speed
- Compression too low

Compression too low
- Incorrect valve clearance adjustment
- Burned or bend valves
- Incorrect valve timing
- Broken valve spring
- Poor valve and seat contact
- Leaking cylinder head gasket
- Warped or cracked cylinder head
- Poorly installed spark plug

Compression too high
- Excessive carbon build-up in combustion chamber

White smoke from exhaust muffler
- Worn valve stem or valve guide
- Damaged valve stem oil seal

Abnormal noise
- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Worn cam chain tensioner
- Worn camshaft and rocker arm

CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.
Stop the engine and remove the spark plug cap and remove the spark plug (page 3-7).



Park Plug Cap

Compression Gauge

Install a compression gauge into the spark plug hole.



Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.
The maximum reading is usually reached 4 – 7 seconds.

* To avoid discharging the battery, do not operate the starter motor for more than seven seconds.

Compression pressure:
13 kg/cm^2 (185 psi, 1300 kPa)

Low compression can be caused by:
- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

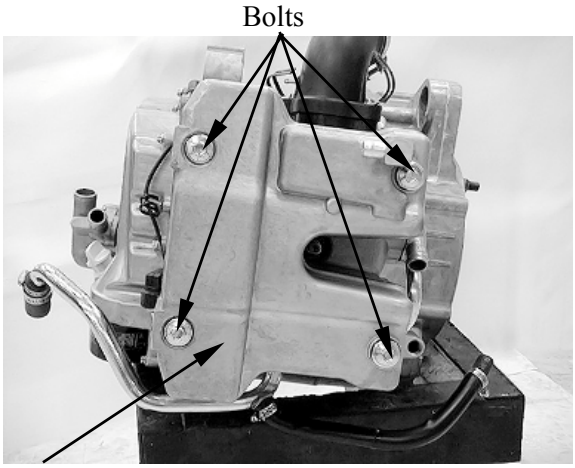
High compression can be caused by:
- Carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER

DISASSEMBLY

Remove the floorboard (page 2-6).
Remove the spark plug caps (page 8-4)
Disconnect the crankcase breather hose from the cylinder head cover (page 7-3).

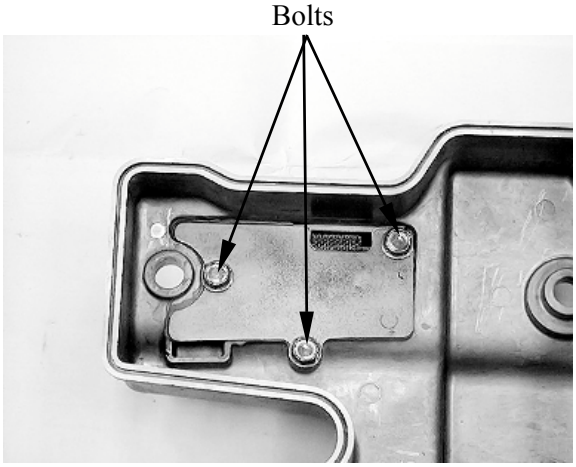
Remove the four bolts and head cover.



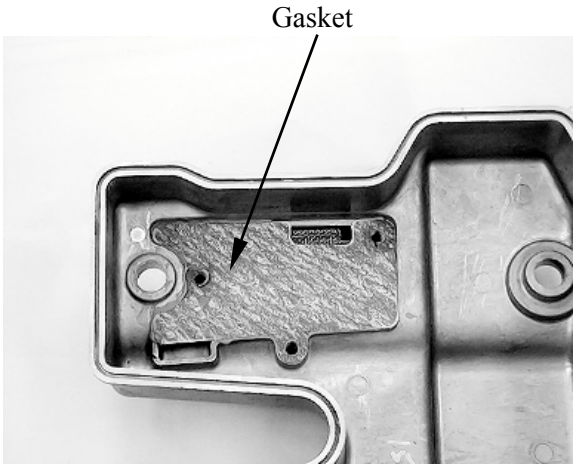
Remove the cylinder head cover packing.



Remove the bolts and breather separator.



Remove the gasket.



ASSEMBLY

Assembly is in the reverse order of disassembly.

Torque:

Breather separator bolt:

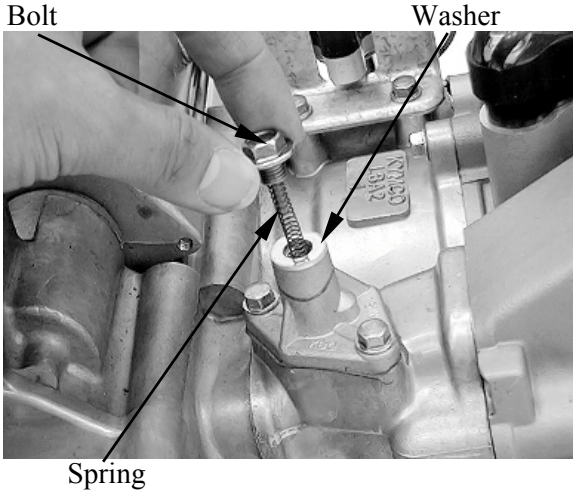
13 N•m (1.3 kgf•m, 9 lbf•ft)

CAMSHAFT REMOVAL

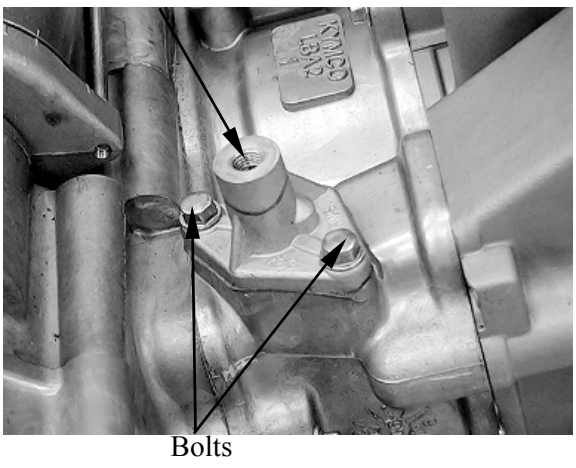
Remove the cylinder head cover (page 8-5).

Turn the crankshaft clockwise and align the "T" mark on the flywheel with the index mark on the right crankcase cover (page 3-9).

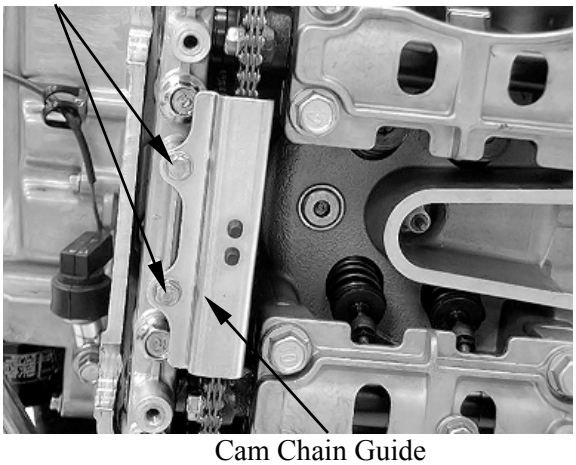
Remove the cam chain tensioner lifter sealing bolt, spring and sealing washer.



Remove the two bolts, cam chain tensioner and gasket.

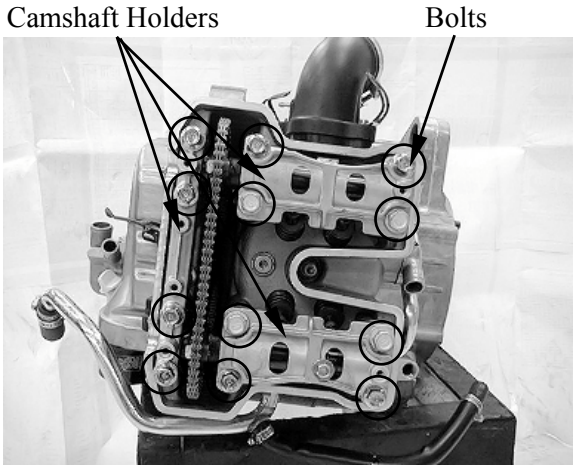


Remove the two bolts and cam chain guide.

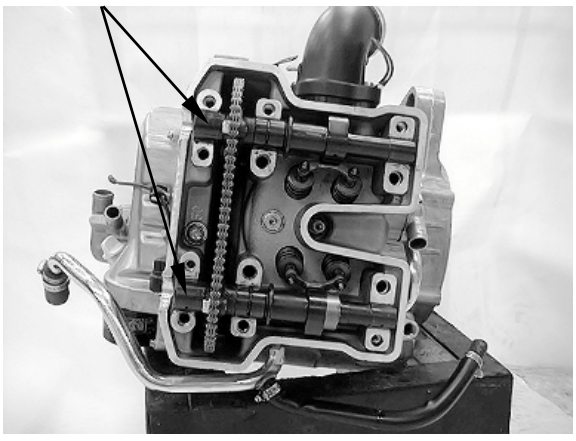


Loosen and remove the twelve camshaft holder bolts in a crisscross pattern in several steps, then remove the camshaft holders.

* Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.



Remove the camshafts



INSPECTION

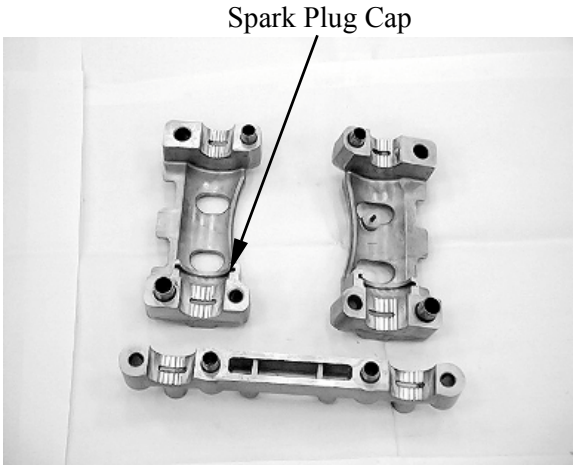
Cam chain guide

Inspect the am chain slipper surface of the cam chain guide for wear or damage.



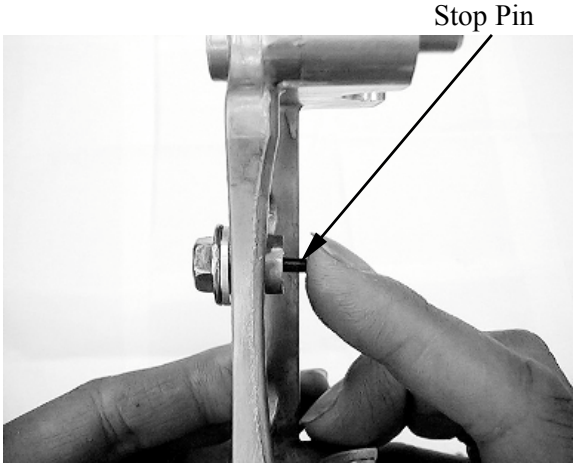
Camshaft holder

Inspect the bearing surface of each camshaft holder for scoring, scratches, or evidence of insufficient lubrication.



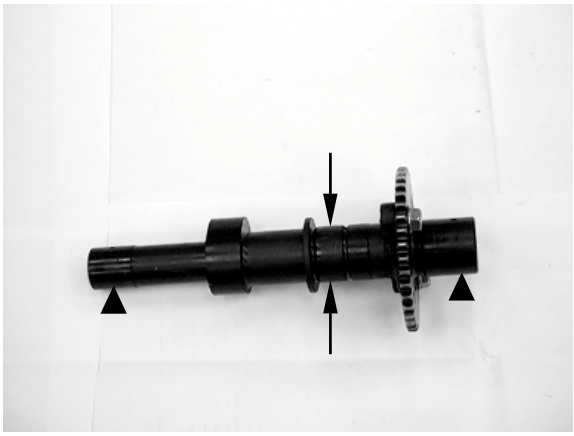
Check the stop pin spring on the exhaust camshaft holder for damage.

Replace the stop pin assembly with a new one if the spring is damage.



Camshaft
Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial gauge.

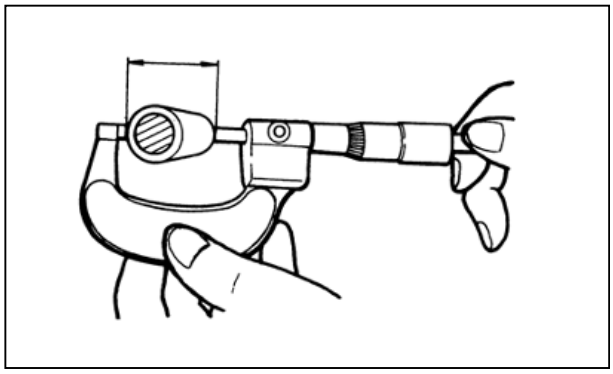
Service limit: 0.05 mm (0.002 in)



Inspect camshaft lobes for pitting/scratches/blue discoloration.

Measure the cam lobe height.
Service Limits: IN : 37.11 mm (1.4844 in)
EX: 36.86 mm (1.4744 in)

If any defects are found, replace the camshaft with a new one, then inspect lubrication system.



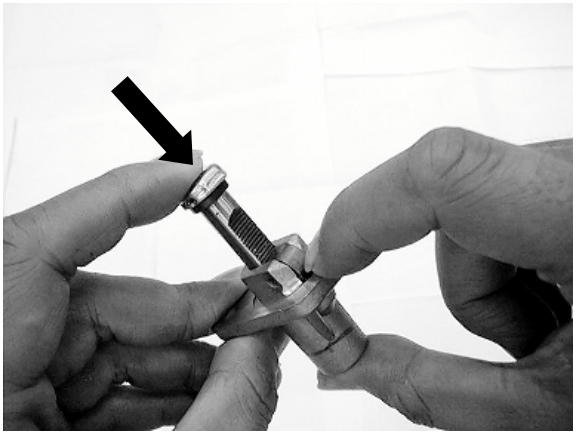
Check the decompression system by turning the decompressor cam on the exhaust camshaft.
You should be able to turn the decompressor cam clockwise smoothly, but the decompressor should not turn counterclockwise.



Cam chain tensioner

Check the one-way cam operation (tensioner)

Unsmooth operation → Replace.

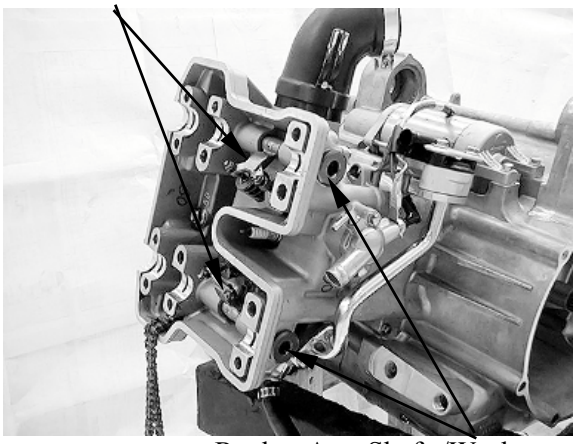


ROCKER ARMS REMOVAL

Remove the camshaft (page 8-6)

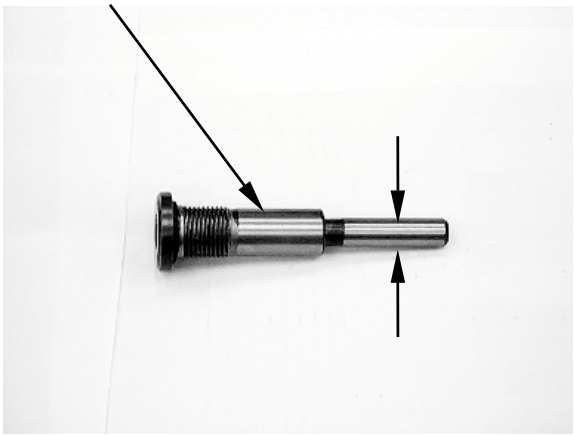
Remove the rocker arm shafts and washers, then remove the rocker arms.

Rocker Arms



Rocker Arm Shafts/Washers

Rocker Arm Shaft



INSPECTION

Rocker arm shaft

Inspect the rocker arm shaft for blue discoloration or grooves.

If any defects are found, replace the rocker arm shaft with a new one, then inspect lubrication system.

Measure each rocker arm shaft O.D.

Measure the I.D. of each rocker arm.

Measure arm to shaft clearance.

Replace as a set if out of specification.

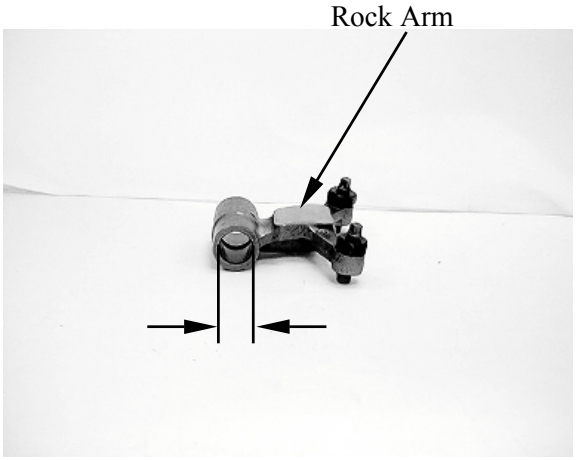
Service limits: 0.1 mm (0.004 in)

Inspect the rocker arm bore, cam lobe contact surface and adjuster surface for wear/pitting/scratches/blue discoloration.

If any defects are found, replace the rocker arm shaft with a new one, then inspect lubrication system.

Measure each rocker arm shaft O.D.
Measure the I.D. of each rocker arm.
Measure arm to shaft clearance.
Replace as a set if out of specification.

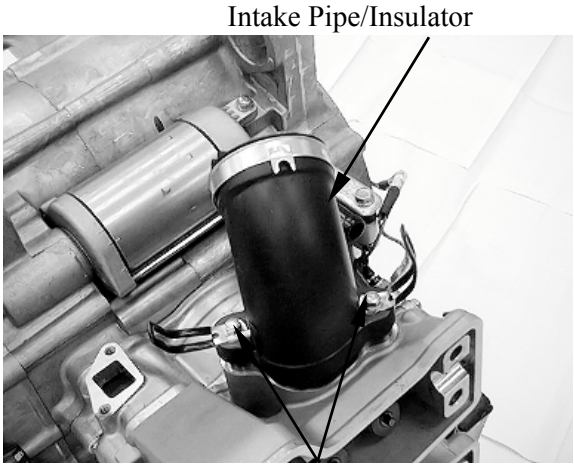
Service limits: 0.1 mm (0.004 in)



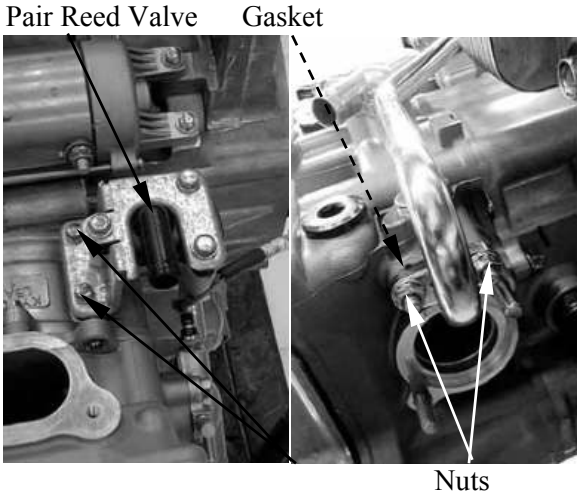
CYLINDER HEAD REMOVAL

Remove the rock arms (page 8-10).

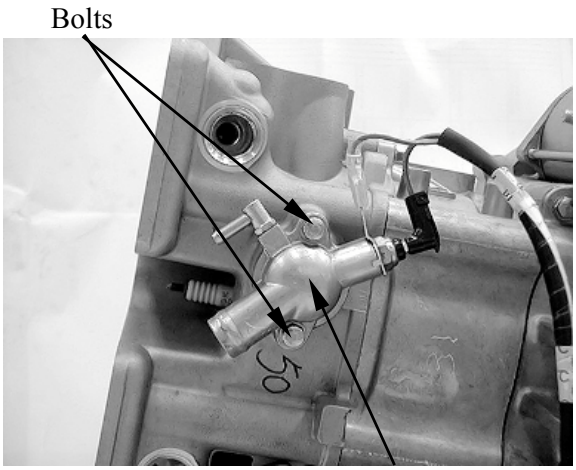
Remove the two bolts, intake pipe and insulator.



Remove the two bolts, two nuts, pair reed valve and gasket.

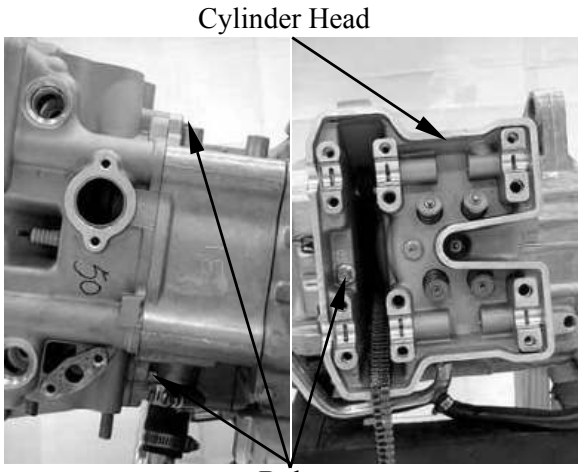


Remove the two bolts, water joint, gasket and water stop collar.

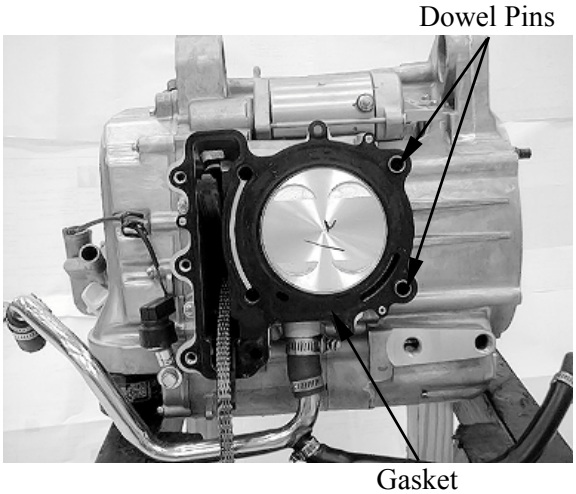


Water Joint/Gasket/Water Stop Collar

Remove the three bolts and cylinder head.



Remove the dowel pins and cylinder head gasket.

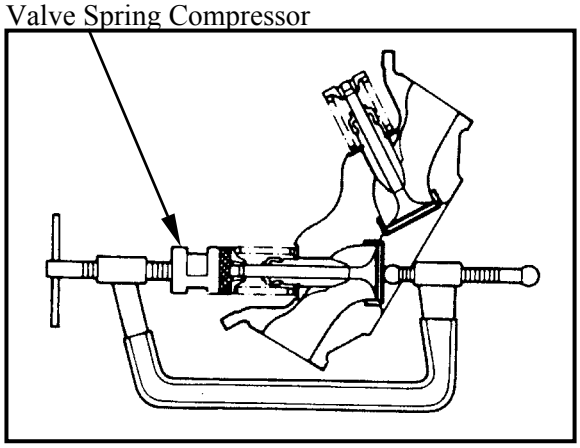


DISSASEMBLY
CYLINDER HEAD DISASSEMBLY

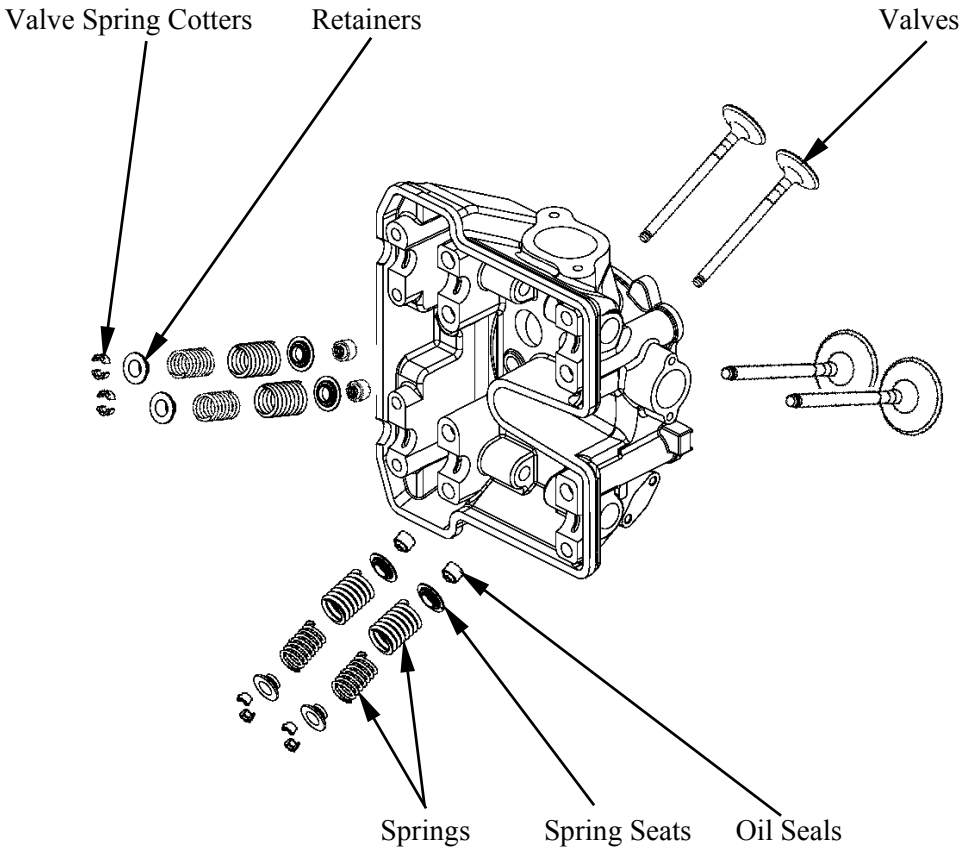
Remove the valve spring cotters, retainers, springs, spring seats, oil seals and valves using a valve spring compressor.

*
- Be sure to compress the valve springs with a valve spring compressor.
- Mark all disassembled parts to ensure correct reassembly.

Valve Spring Compressor

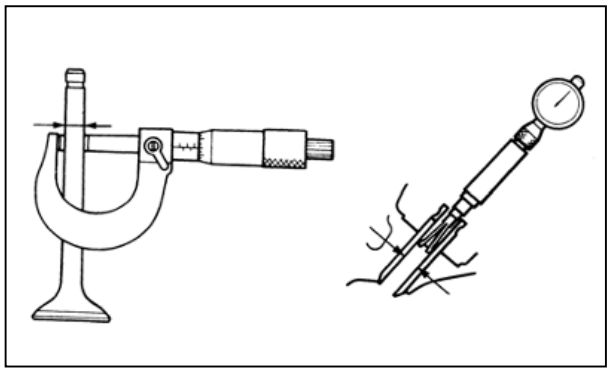


Special tool:
Valve Spring Compressor E040



VALVE /VALVE GUIDE INSPECTION

Inspect each valve for bending, burning, scratches or abnormal stem wear.
If any defects are found, replace the valve with a new one.



Check valve movement in the guide.

Measure each valve stem O.D.

Measure each valve guide I.D.

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

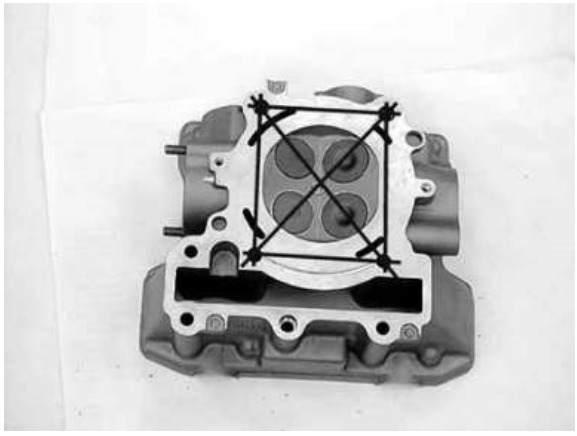
Service limits:

IN: 0.08 mm (0.0032 in)
EX: 0.1 mm (0.004 in)

* If the stem-to-guide clearance exceeds the service limits, replace the cylinder head is necessary.

CYLINDER HEAD INPECTION

Check the spark plug hole and valve areas for cracks.

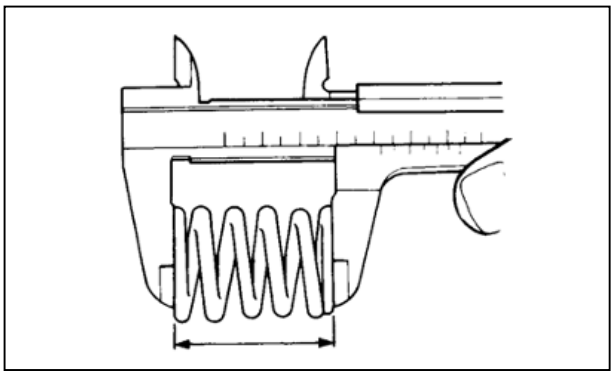


Check the cylinder head for warpage with a straight edge and feeler gauge.

Service Limit: 0.05 mm (0.002 in)

VALVE SPRING INSPECTION

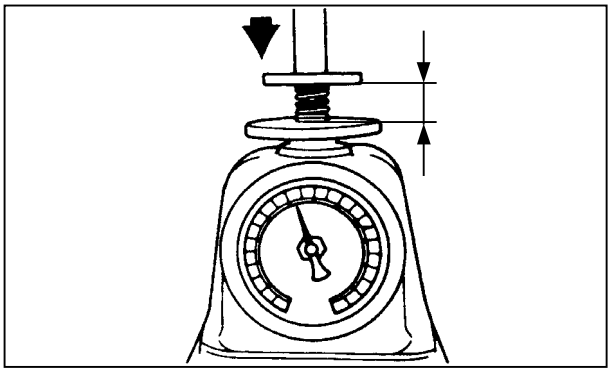
Measure the free length of the inner and outer valve springs.



Service Limit: Inner: 35.2 mm (1.408 in)
Outer: 39.8 mm (1.592 in)

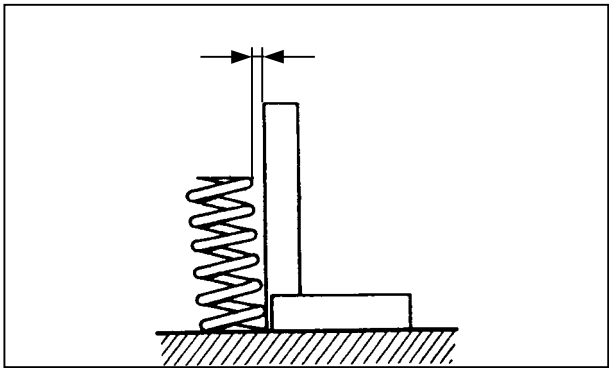
Measure compressed force (valve spring) and installed length.
Replace if out of specification.

Standard:
Inner: 3.5 kg (at 28.7 mm, 1.148 in)
Outer: 13 kg (at 31.43 mm, 1.2572 in)



Measure the spring tilt.
Replace if out of specification.

Standard: Inner: 1.2 mm (0.048)
Outer: 1.2 mm (0.048)



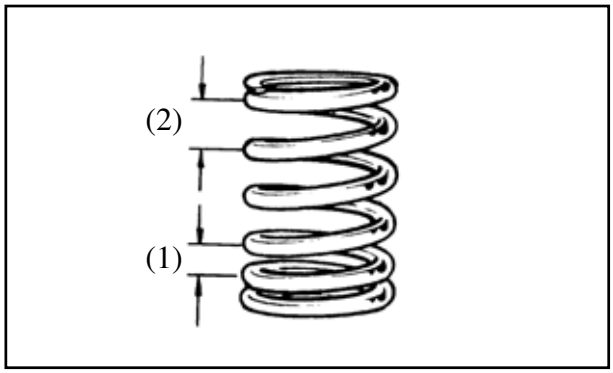
ASSEMBLY

Install the valve spring seats and oil seal.

* Be sure to install new oil seal.

Lubricate each valve with engine oil and insert the valves into the valve guides.

Install the valve springs with the small-pitch portion (1) facing cylinder head. (2) Large-pitch portion.

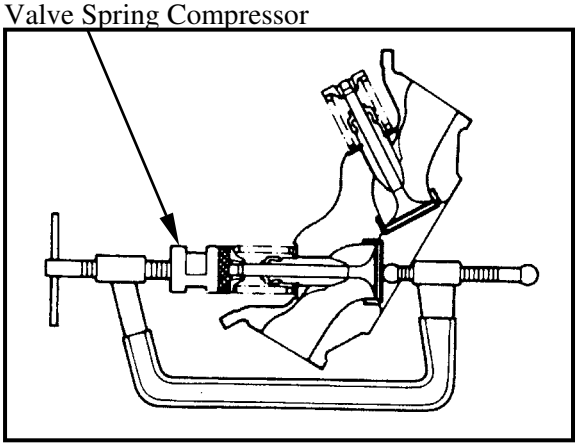


Put on the valve sparing retainers.
Compress the valve springs using the valve spring compressor, then install the valve cotters.

* • When assembling, a valve spring compressor must be used.
  • Install the cotters with the pointed ends facing down from the upper side of the cylinder head.

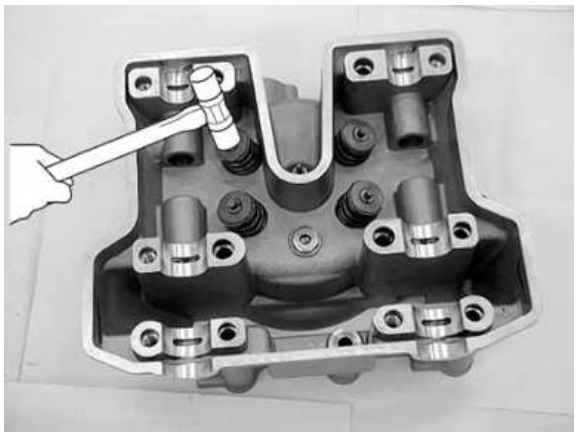
Special tool:
Valve Spring Compressor E040

Valve Spring Compressor



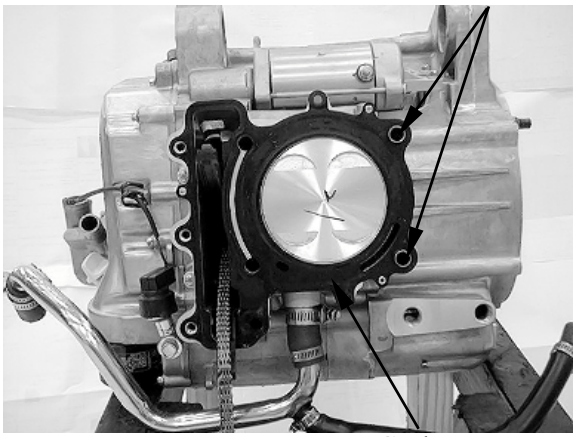
Tap the valve stems gently with a plastic hammer for 2～3 times to firmly seat the cotters.

* Be careful not to damage the valves.



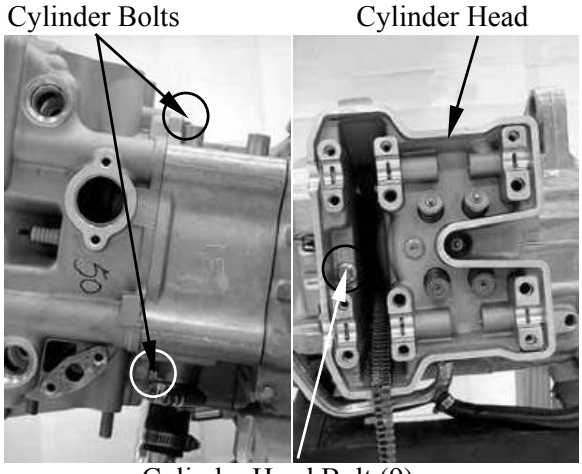
CYLINDER HEAD INSTALLATION

Install the dowel pins and new cylinder head gasket as shown.



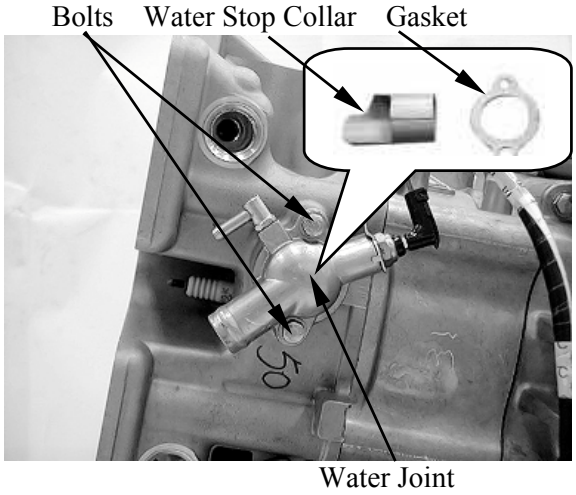
Install the cylinder head.

Apply engine oil to the cylinder head bolt (9) threads.
Install the two cylinder bolts and cylinder head bolt (9) but do not tighten them.

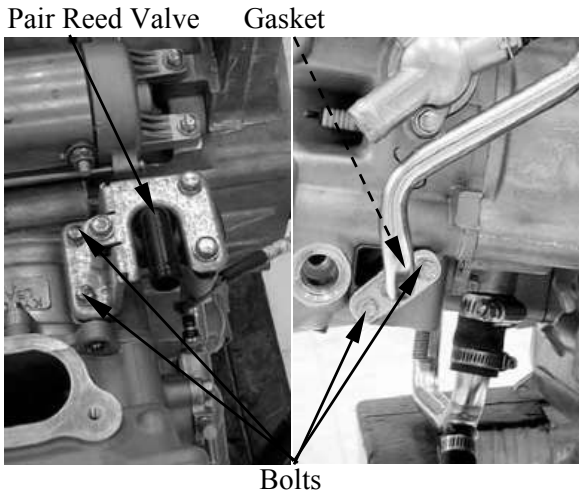


Install the water stop collar, gasket and water joint.
Install and tighten the two bolts to the specified torque.

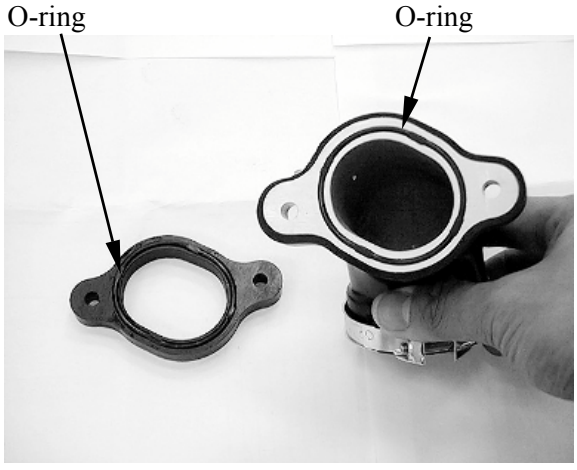
Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)



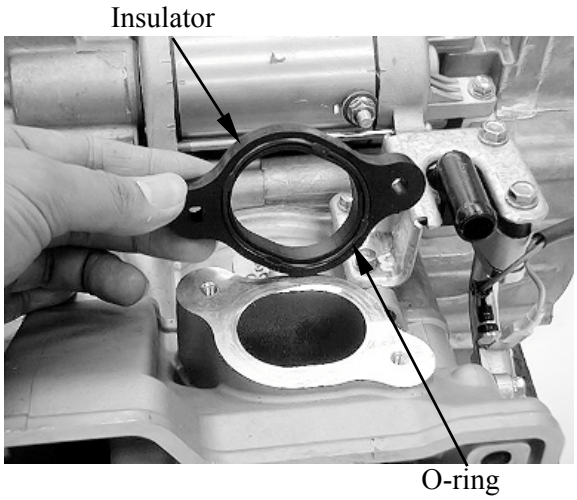
.
Install gasket and pair reed valve.
Install and tighten the four bolts securely.



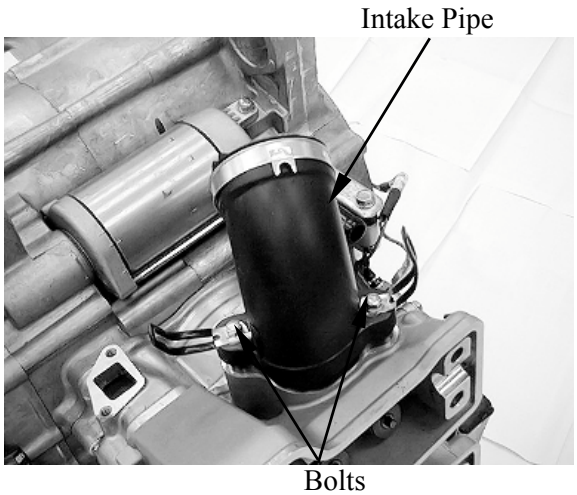
Install the new O-rings onto the insulator and intake pipe.



Install the insulator with the O-ring face the cylinder head.



Install the intake pipe and tighten the two bolts securely.

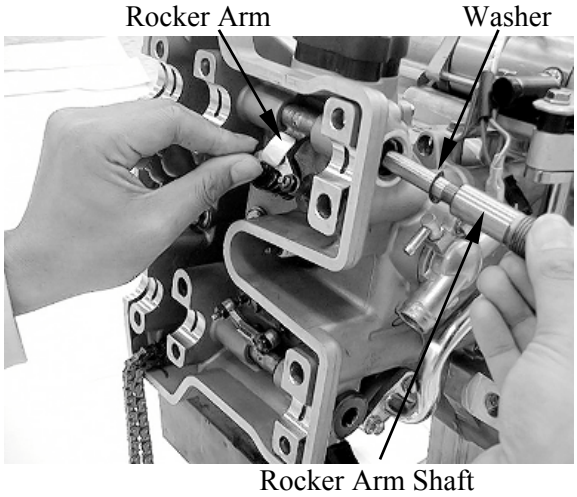


ROCKER ARM INSTALLATION

Apply engine oil to the rocker arms and rocker arm shafts

Install the rocker arms, rocker arm shafts and washers.
Tighten the rocker arm shaft to the specified torque.

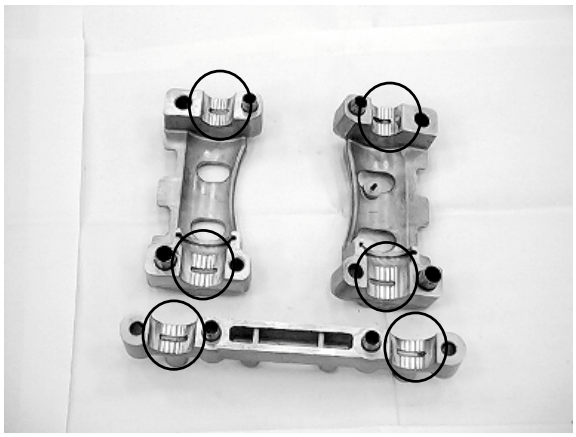
Torque: 45 N•m (4.5 kgf•m, 32 lbf•ft)



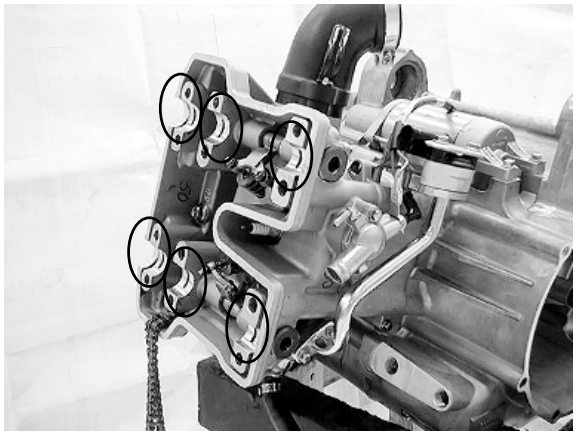
CAMSHAFT INSTALLATION

Turn the crankshaft clockwise, align the "T" mark on the flywheel with the index mark on the right crankcase cover (page 3-9).

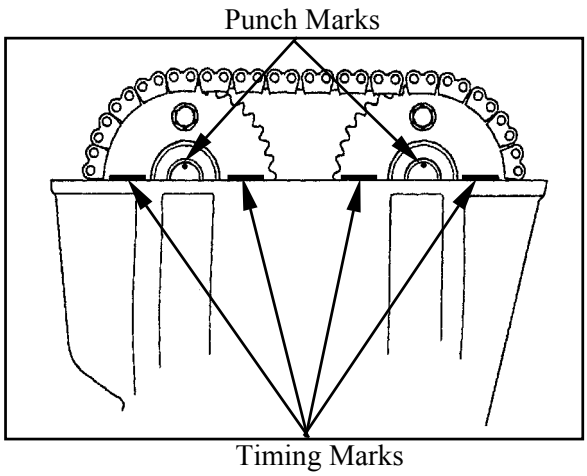
Apply molybdenum disulfide oil to the camshaft journals of the camshaft holder.



Apply molybdenum disulfide oil to the camshaft journals of the cylinder head.



Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.



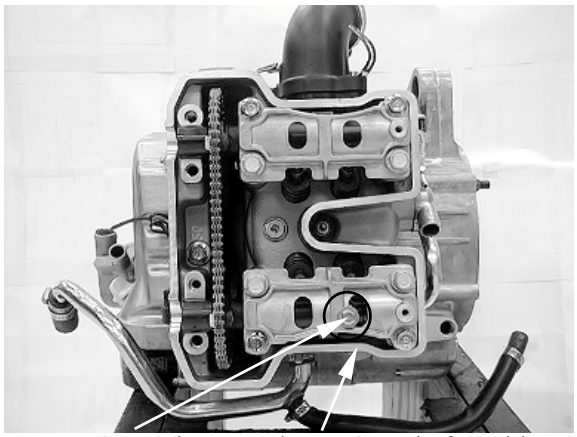
* ♦ Install each camshafts to the correct locations.
  "IN": no decompressor cam
  "EX": has a decompressor cam (page 8-9)
  ♦ Make sure the timing marks on the cam sprockets are flush with the cylinder head upper surface and punch marks face upward as shown.

Install intake and exhaust camshaft holders to the correct locations.

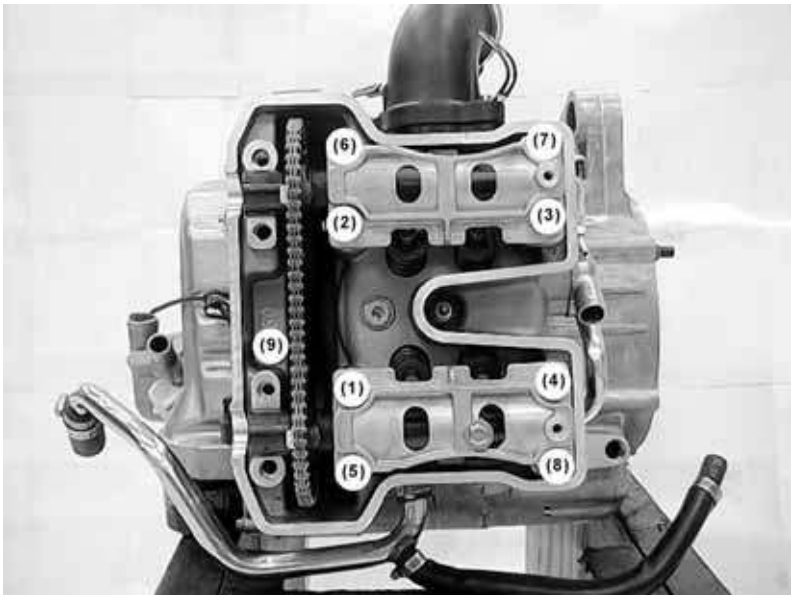
* Install each camshaft holders to the correct locations.
"IN": no stop pin.
"EX": has a stop pin.

Apply engine oil to cylinder head bolt (No. 1 – 9) threads.

Install and tighten the holder bolts (No. 1 – 9) in a crisscross pattern in four steps to the specified torque as follow diagram.


Stop Pin Exhaust Camshaft Holder

	Tighten the bolts to the specified torque in sequence N•m (kgf•m, lbf•ft)								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Step 1	18 (1.8, 13)	←	←	←	12 (1.2, 9)	←	←	←	←
Step 2	48 (4.8, 35)	←	←	←	23 (2.3, 17)	←	←	←	←

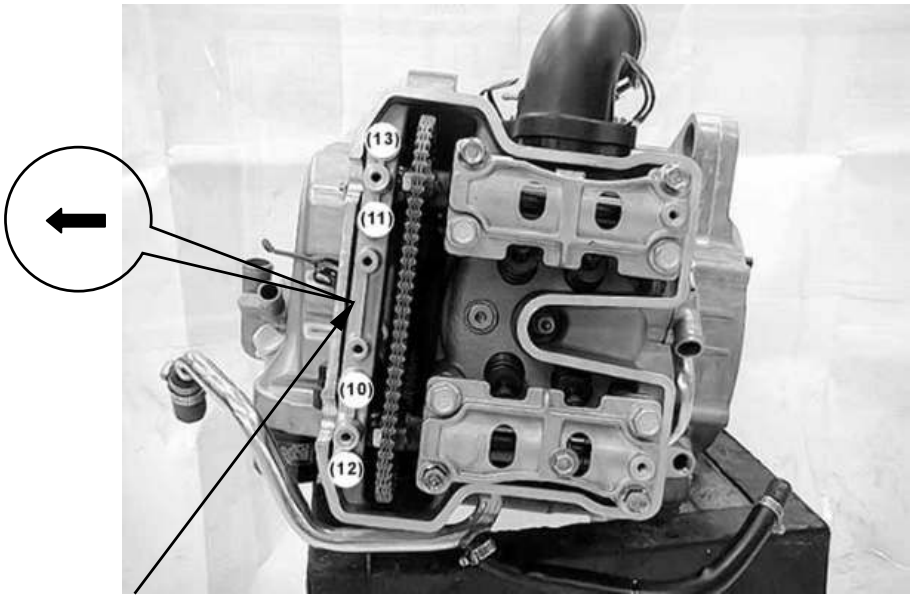


Install the common camshaft holder by arrow mark facing outside.

Install and tighten the holder bolts (No. 10 – 13) in a crisscross pattern in four steps to the specified torque as follow diagram.

* Apply engine oil to cylinder head bolt (No. 10 – 13) threads.

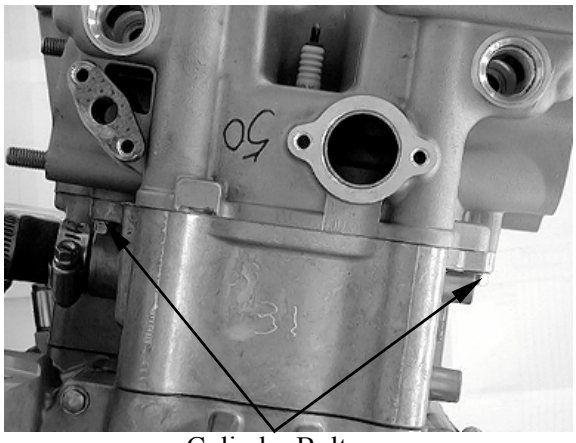
	Tighten the bolts to the specified torque in sequence N•m (kgf•m, lbf•ft)								
	(10)	**(11)**	**(12)**	**(13)**					
Step 1	12 (1.2, 9)	←	←	←					
Step 2	23 (2.3, 17)	←	←	←					



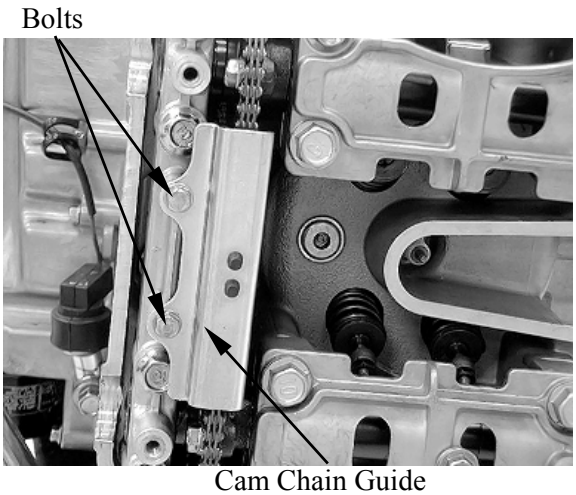
"Arrow" Mark

Tighten the two cylinder bolts to the specified torque.

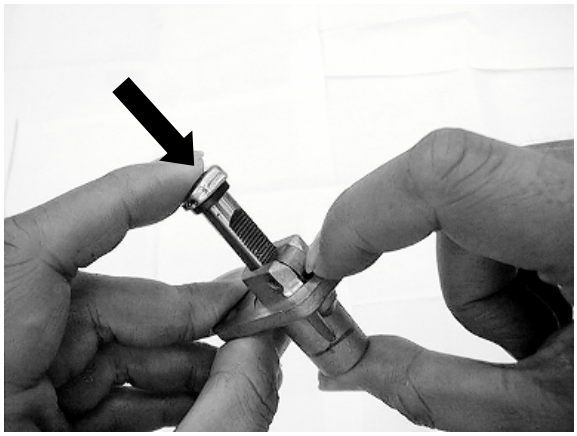
Torque: 10 N•m (1 kgf•m, 7 lbf•ft)


Cylinder Bolts

Install the cam chain guide and tighten the two bolts securely.

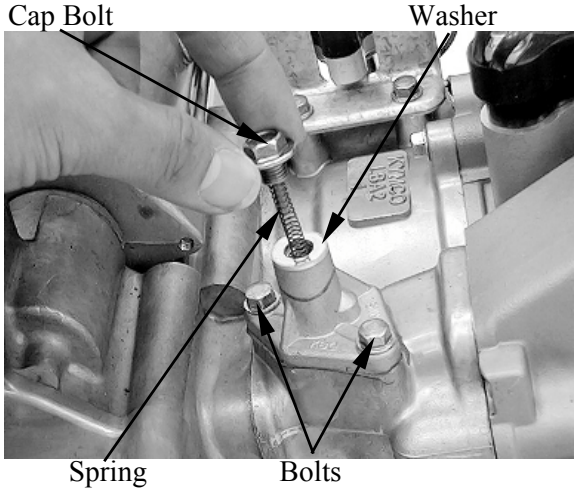


Release the timing chain tensioner one-way cam and push the tensioner rod all the way in.



Install the tensioner with a new gasket onto the cylinder.
Install and tighten the tensioner bolts to specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)



Install the spring, washer and timing chain tensioner cap bolt to specified torqur.

Torque: 10 N•m (1 kgf•m, 9 lbf•ft)

Adjust the valve clearance (page 3-9).

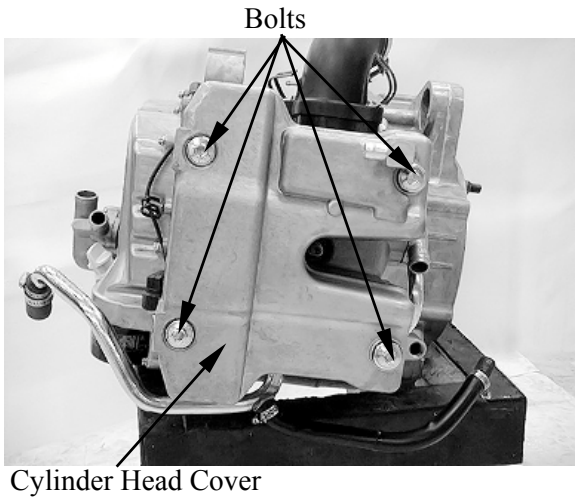
CYLINDER HEAD COVER INSTALLATION

Install the cylinder head packing into the groove of the cylinder head cover.



Install the cylinder head cover onto the cylinder head and tighten the cylinder head cover bolts to the specified torque.

Torque: 10 N•m (1 kgf•m, 7 lbf•ft)

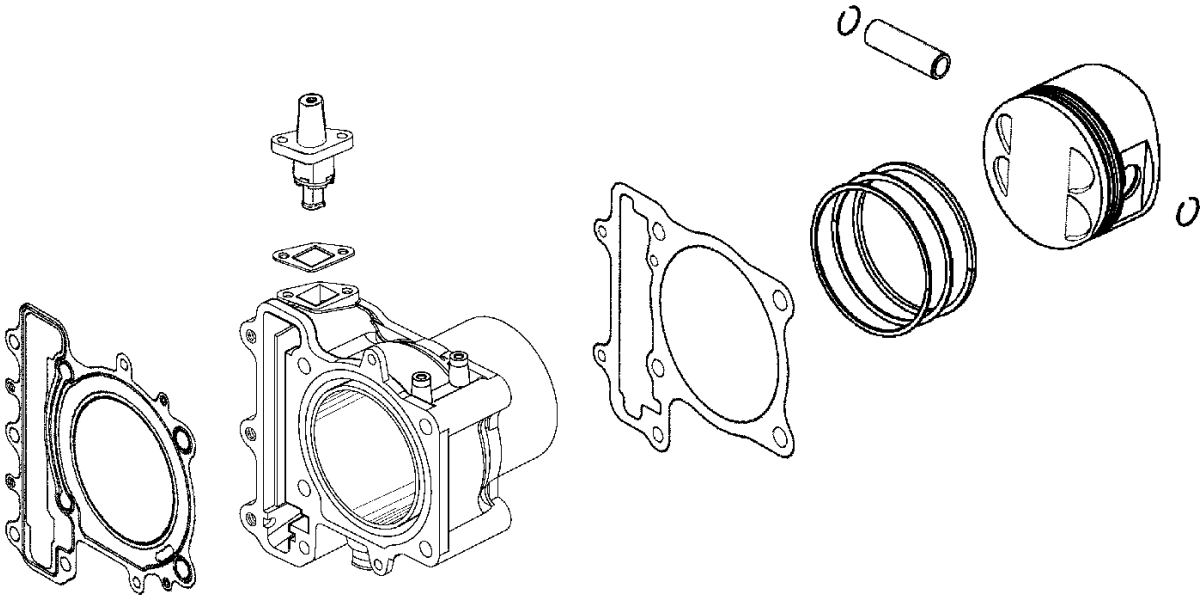


CYLINDER/PISTON

SCHEMATIC DRAWING ---------- 9-1
SERVICE INFORMATION---------- 9-2
TROUBLESHOOTING---------- 9-2
CYLINDER/PISTON REMOVAL---------- 9-3
CYLINDER/PISTON INSTALLATION---------- 9-7

9. CYLINDER/PISTON

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder and piston can be serviced with the engine installed in the frame.
- When installing the cylinder, use a new cylinder gasket and make sure that the dowel pins are correctly installed.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.

SPECIFICATIONS

Unit: mm (in)

Item			Standard	Service Limit
Cylinder	I.D.		92.005 (3.6802)～92.015 (3.6806)	92.1 (3.684)
	Warpage		0.01 (0.0004)	0.05 (0.002)
	Cylindricity		0.01 (0.0004)	0.1 (0.004)
	True roundness		0.01 (0.0004)	0.1 (0.004)
Piston, piston ring	Ring-to-groove clearance	top	0.03 (0.0012)～0.065 (0.0026)	0.08 (0.003)
		Second	0.015 (0.0006)～0.05 (0.002)	0.065 (0.0026)
	Ring end gap	top	0.15 (0.006)～0.3 (0.012)	0.5 (0.02)
		Second	0.03 (0.012)～0.45 (0.018)	0.65 (0.026)
		Oil side rail	0.2 (0.008)～0.7 (0.028)	1 (0.04)
	Piston O.D.		91.96 (3.6784)～91.98 (3.6793)	91.9 (3.676)
	Piston O.D. measuring position		10 mm from bottom of skirt	—
	Piston-to-cylinder clearance		0.01 (0.0004)～0.045 (0.0018)	0.1 (0.004)
	Piston pin hole I.D.		22.002 (0.8801)～22.008 (0.8803)	22.04 (0.8826)
Piston pin O.D			21.994 (0.8798)～22 (0.88)	21.96 (0.8784)
Piston-to-piston pin clearance			0.002 (0.0001)～0.014 (0.0006)	0.02 (0.001)
Connecting rod small end I.D. bore			22.016 (0.8806)～22.034 (0.8814)	22.06 (0.8824)

TROUBLESHOOTING

- When hard starting or poor performance at low speed occurs, check the crankcase breather for white smoke. If white smoke is found, it means that the piston rings are worn, stuck or broken.

Compression too low or uneven compression

- Worn or damaged cylinder and piston rings
- Worn, stuck or broken piston rings

Compression too high

- Excessive carbon build-up in combustion chamber or on piston head

Excessive smoke from exhaust muffler

- Worn or damaged piston rings
- Worn or damaged cylinder and piston

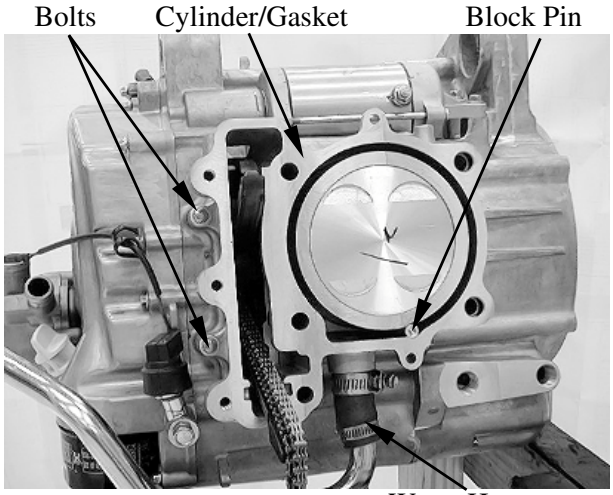
Abnormal noisy piston

- Worn cylinder, piston and piston rings
- Worn piston pin hole and piston pin
- Incorrectly installed piston

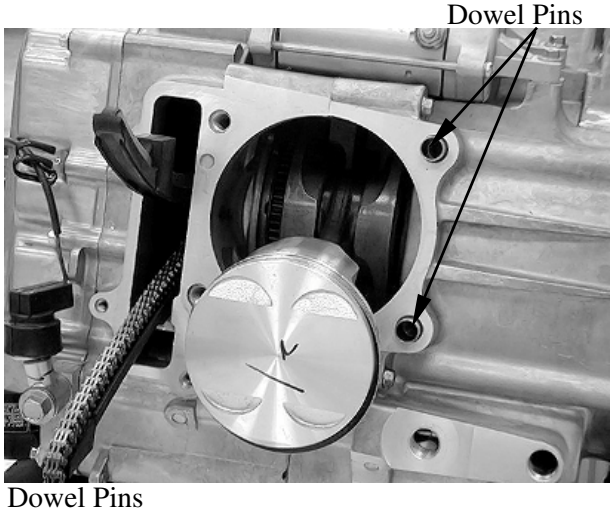
CYLINDER/PISTON REMOVAL

Remove the cylinder head (page 8-11).

Take the block pin out.
Remove the water hose from the cylinder.
Remove the two cylinder bolts.
Remove the cylinder and gasket.



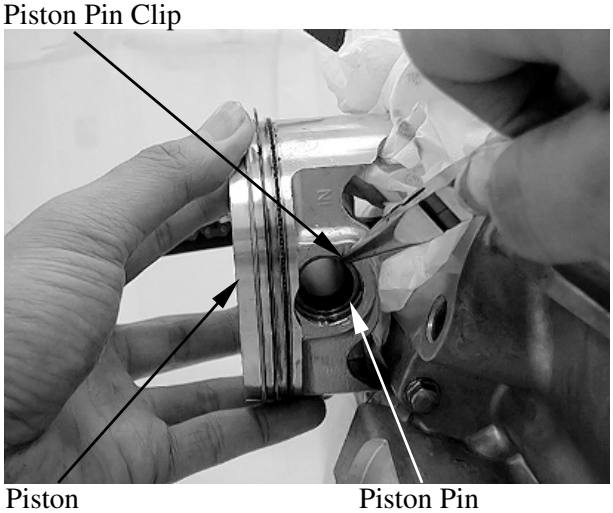
Remove the dowel pins



Remove the piston pin clip.

* Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.

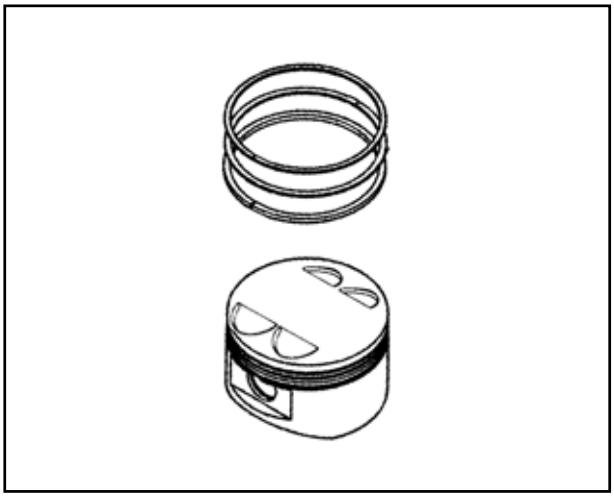
Press the piston pin out of the piston and remove the piston.



Spread each piston ring and remove it by lifting up at a point opposite the gap

* Do not damage the piston ring by spreading the ends too far.

Clean carbon deposits from the piston ring grooves.



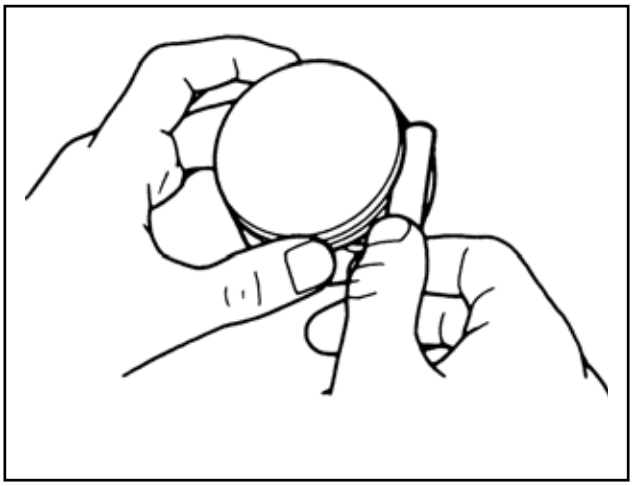
INSPECTION

Piston ring

Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-groove clearance.

Service Limits: Top: 0.08 mm (0.003 in)
2nd: 0.065 mm (0.0026 in)

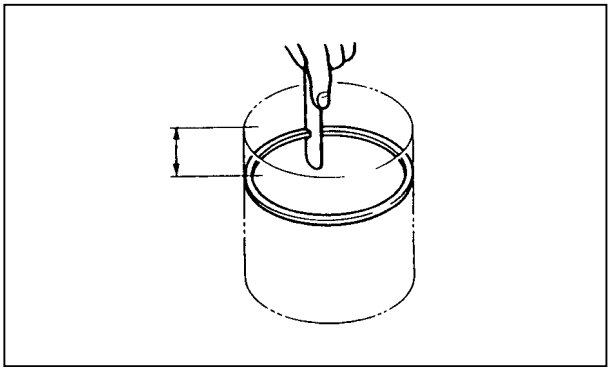


Insert each piston ring into the bottom of the cylinder squarely.

* Use the piston head to push each piston ring into the cylinder.

Measure the piston ring end gap.

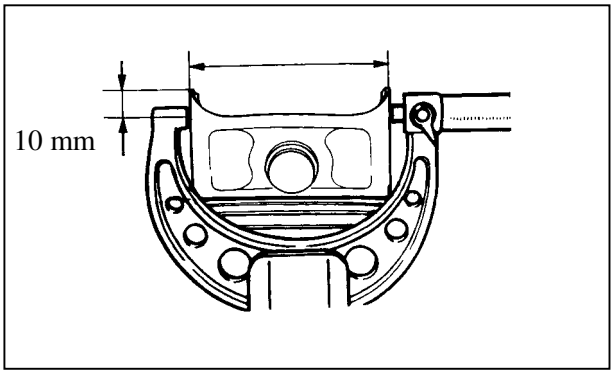
Service Limit:
Top: 0.5 mm (0.02 in)
2nd: 0.65 mm (0.026 in)
Oil ring: 1 mm (0.04 in)



Piston/Piston pin
Measure the piston O.D. at the point 10 mm from the bottom and 90° to the piston pin hole.

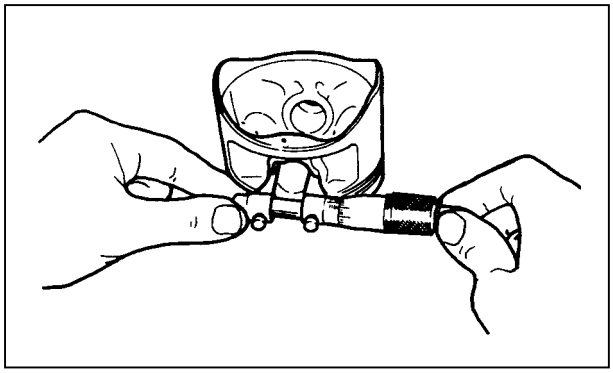
Service Limit: 91.9 mm (3.676 in)

Calculate the cylinder-to-piston clearance (cylinder I.D.: page 9-6)



Measure the piston pin hole. Take the maximum reading to determine the I.D..

Service Limit: 22.04 mm (0.8826 in)

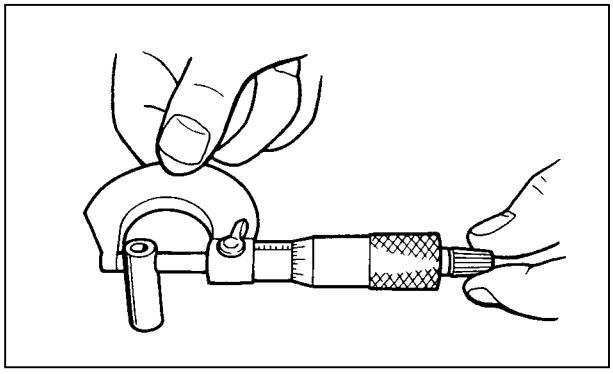


Measure the piston pin O.D. at piston and connecting rod sliding areas.

Service Limit: 21.96 mm (0.8784 in)

Measure the piston-to-piston pin clearance.

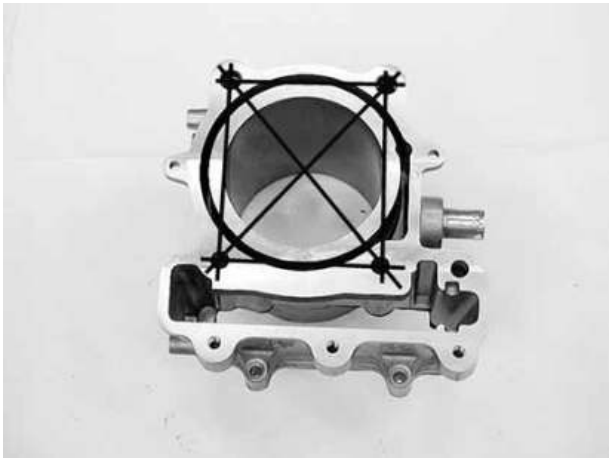
Service Limit: 0.002 mm (0.0001 in)



Cylinder

Check the cylinder for warpage with a straight edge and feeler gauge in the directions shown.

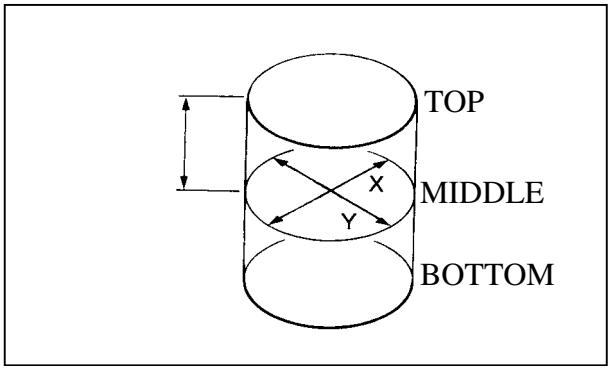
Service Limit: 0.05 mm (0.002 in)



Check the cylinder wall for wear or damage.

Measure and record the cylinder I.D. at three levels in an X and Y axis. Take the maximum reading to determine the cylinder wear.

Service Limit: 92.1 mm (3.684 in)



Calculate the piston-to-cylinder clearance.

Take a maximum reading to determine the clearance. Refer to page 9-5 for measurement of the piston O.D..

Service Limit: 0.1 mm (0.004 in)

Calculate the taper and out-of-round at three levels in an X and Y axis. Take the maximum reading to determine them.

Service Limit:

Taper: 0.1 mm (0.004 in)

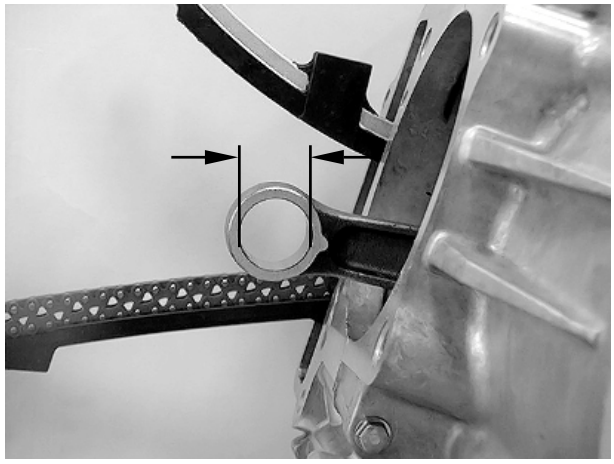
Out-of-round: 0. 1 mm (0.004 in)

Measure the connecting rod small end I.D..

Service Limit: 22.06 mm (0.8824 in)

Calculate the connecting rod-to-piston pin clearance.

Service Limit: 0.06 mm (0.002 in)



CYLINDER/PISTON INSTALLATION

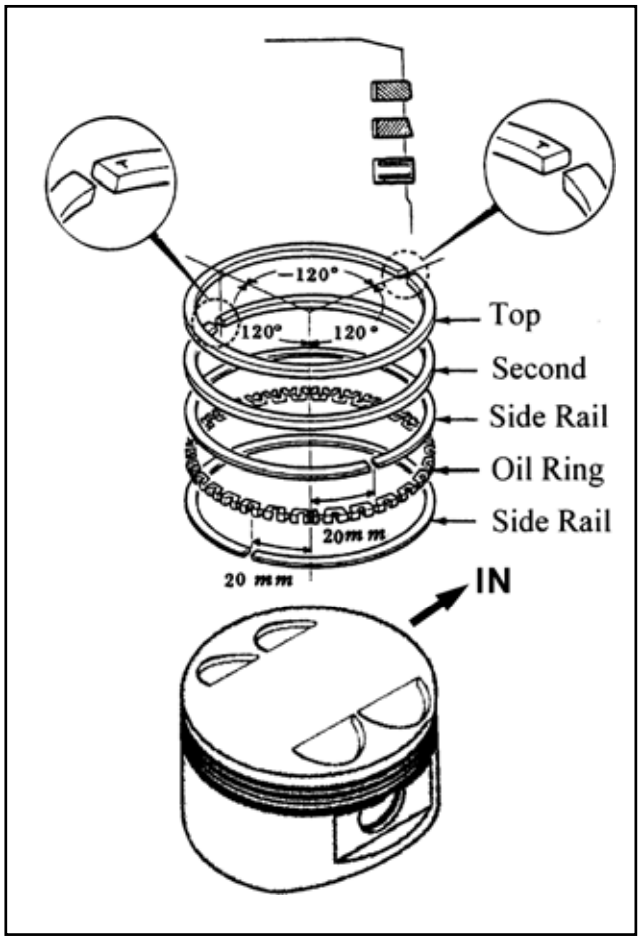
PISTON RING INSTALLATION

Carefully install the piston rings into the piston ring grooves with the markings facing up.

* Be careful not to damage the piston and rings.

- Do not confuse the top and second rings.
- To install the oil ring, install the oil ring, then install the side rails.

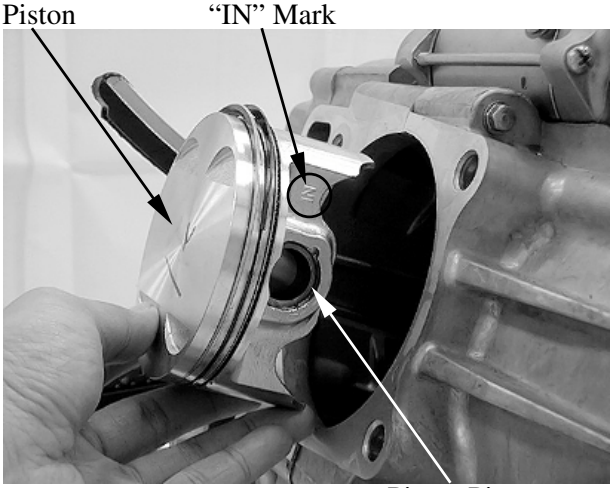
Stagger the piston ring end gaps 120° degrees apart from each other.
Stagger the side rail end gaps as shown.



CYLINDER/PISTON INSTALLATION
Clean any gasket material from the cylinder mating surfaces of the crankcase and oil passage.

Apply engine oil to the piston pin.
Apply engine oil to the connecting rod small end and piston pin hole.

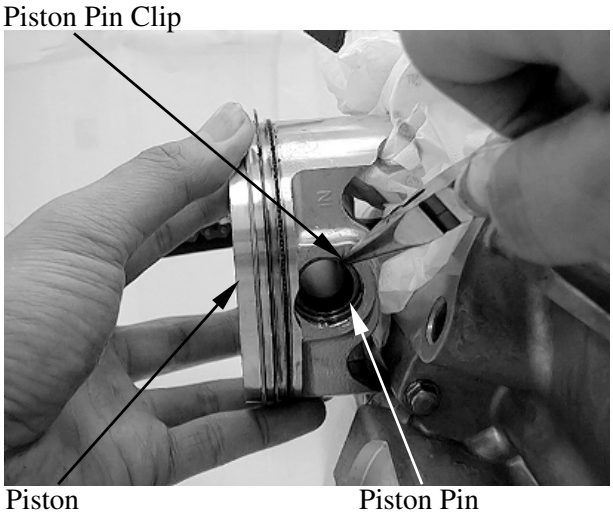
Install the piston with the "IN" mark face intake side and piston pin.



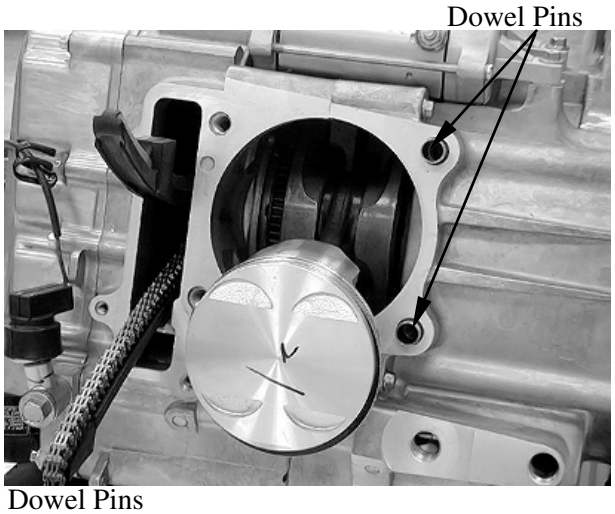
Place a clean shop towel over the crankcase prevent the clip from falling into the crankcase.

Install the new pin clip.

* ♦Make sure that the piston pin clips are seated securely.
  ♦Do not align the piston pin clip end gap with the piston cut-out



Install the dowel pins.



Install the gasket.

Apply engine oil to the cylinder wall, piston and piston ring outer surfaces.

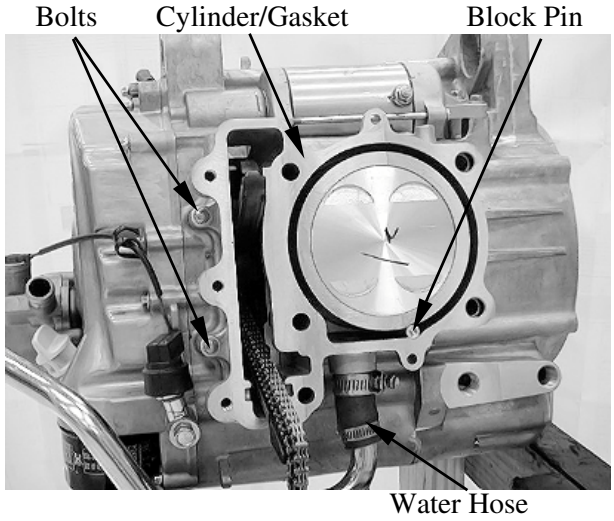
Pass the cam chain through the cylinder and install the cylinder over the piston.

* Be careful not to damage the piston rings and cylinder walls.

Install and tighten the two cylinder bolts to specified torque.

Torque: 10 N•m (1 kgf•m, 7 lbf•ft)

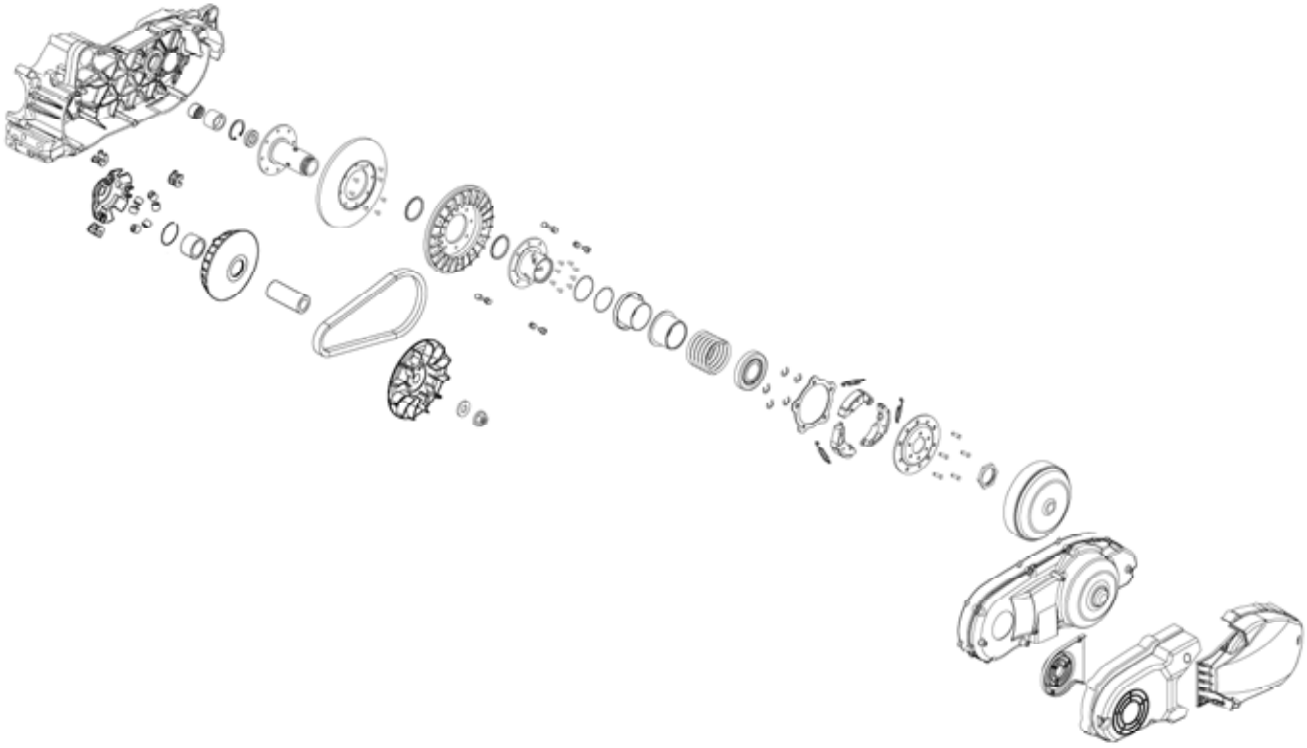
Install the block pin.
Connect the water hose.



DRIVE AND DRIVEN PULLEY

SCHEMATIC DRAWING ---------- 10- 1
SERVICE INFORMATION---------- 10- 2
TROUBLESHOOTING---------- 10- 2
LEFT CRANKCASE COVER ---------- 10- 3
DRIVE PULLEY ---------- 10- 5
CLUTCH/DRIVEN PULLEY---------- 10-13

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The drive pulley, clutch and driven pulley can be serviced with the engine installed.
- Avoid getting grease and oil on the drive belt and pulley faces. Remove any oil or grease from them to minimize the slipping of drive belt and drive pulley.
- Do not apply grease to the movable drive face and weight rollers.

SPECIFICATIONS

Unit: mm (in)

Item	Standard	Service Limit
Movable driven face bushing I.D.	48 (1.89)～48.025 (1.891)	48.06 (1.892)
Driven face collar O.D.	47.965 (1.888)～47.985 (1.889)	47.94 (1.887)
Drive belt width	28.9 (1.156)	27.9 (1.116)
Clutch lining thickness	4 (0.16)	1 (0.04)
Clutch outer I.D.	160 (6.3)～160.2 (6.31)	160.5 (6.32)
Drive pulley collar O.D.	28.96 (1.158)～28.974 (1.159)	28.9 (1.156)
Weight roller O.D.	29.98 (1.1992)～30.08 (1.203)	29.5 (1.18)

TORQUE VALUES

Drive face nut	135 N•m (13.5 kgf•m, 97 lbf•ft)
Clutch outer nut	80 N•m (8 kgf•m, 58 lbf•ft)
Clutch drive plate nut	78 N•m (7.8 kgf•m, 56 lbf•ft)

SPECIAL TOOLS

Universal holder	E017
Clutch spring compressor	E053
Oil seal & bearing install	E014

TROUBLESHOOTING

Engine starts but motorcycle won‘t move

- Worn drive belt
- Broken ramp plate
- Worn or damaged clutch lining
- Broken driven face spring

Engine stalls or motorcycle creeps

- Broken clutch weight spring

Lack of power

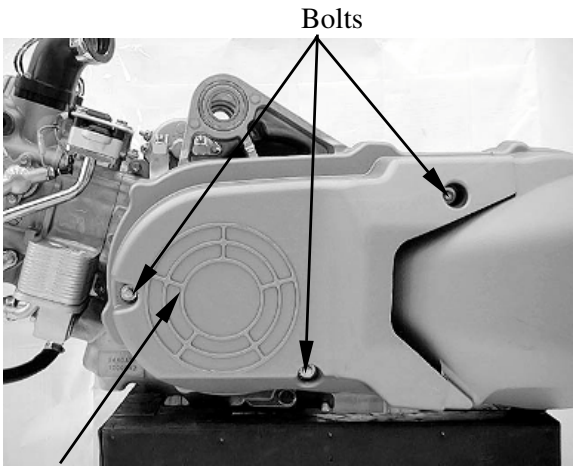
- Worn drive belt
- Weak driven face spring
- Worn weight roller
- Faulty driven face

LEFT CRANKCASE COVER

REMOVAL

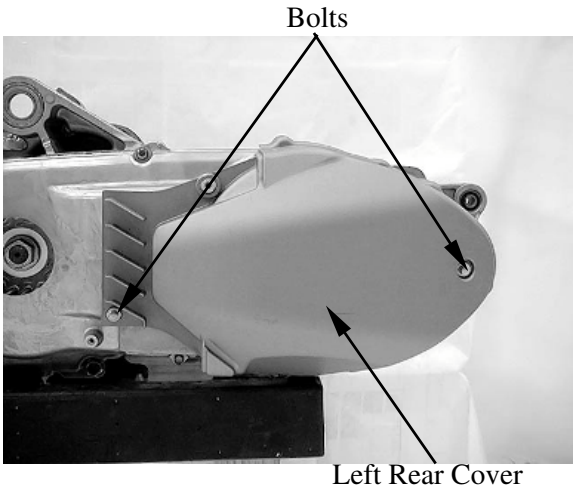
Remove the left center body cover (page 2-5).

Remove the three bolts and the left front cover.

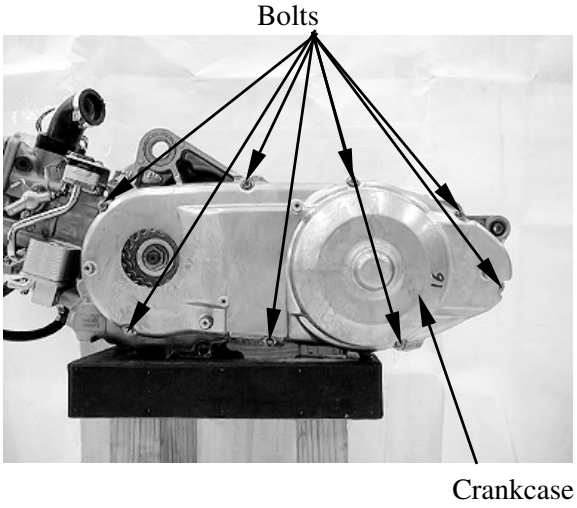


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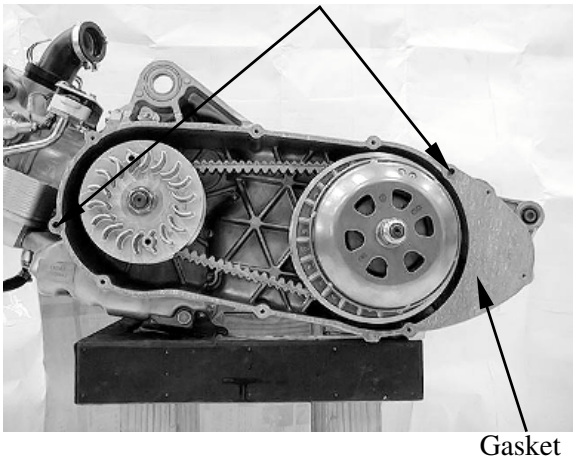
Remove the two bolts and left rear cover



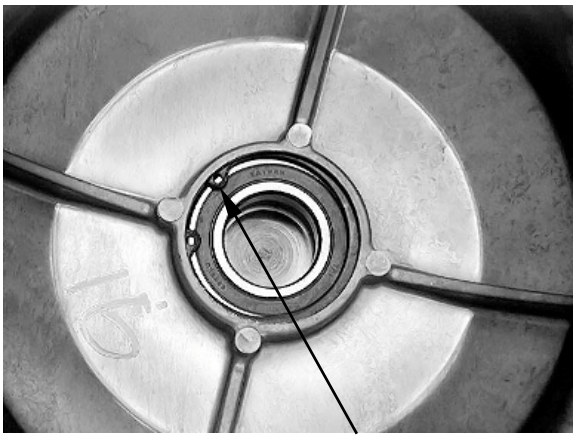
Remove the eight bolts and left crankcase cover.



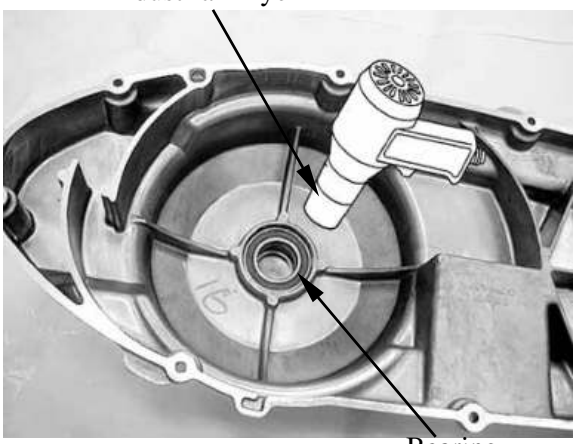
Remove the dowel pins and gasket.



DRIVESHAFT BEARING REPLACEMENT
Remove the snap ring.



Heat the left crankcase cover around the driveshaft bearing with industrial dryer.
Remove the driveshaft bearing from the left crankcase cover.



Install the new driveshaft bearing into the left crankcase cover using a special tool.

Special tool:
Oil seal & bearing install E014


Bearing Install

INSTALLATION
Installation is in the reverse order of removal.

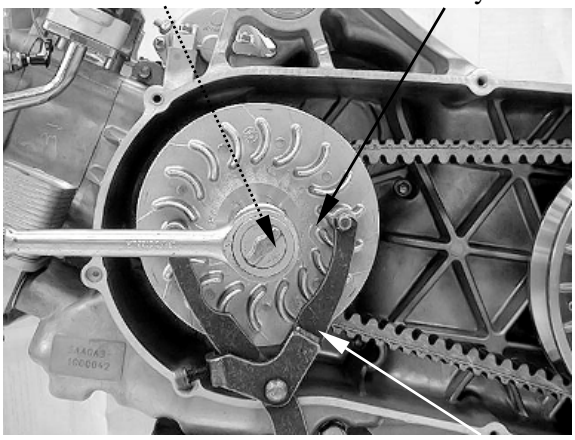
* Clean the gasket on the left crankcase before installation.

DRIVE PULLEY
REMOVAL
Remove the left crankcase cover (page 10-3).

Hold the drive pulley face with the special tool and loosen the drive pulley face nut.

Special tool:
Universal holder E017

Remove the nut, washer and drive pulley face.

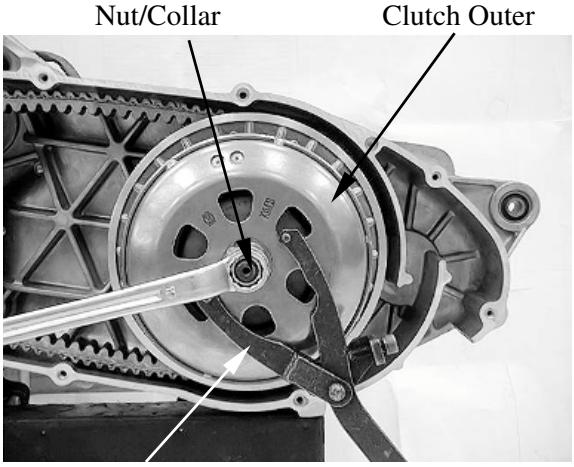


Hold the clutch outer with the special tool as shown.

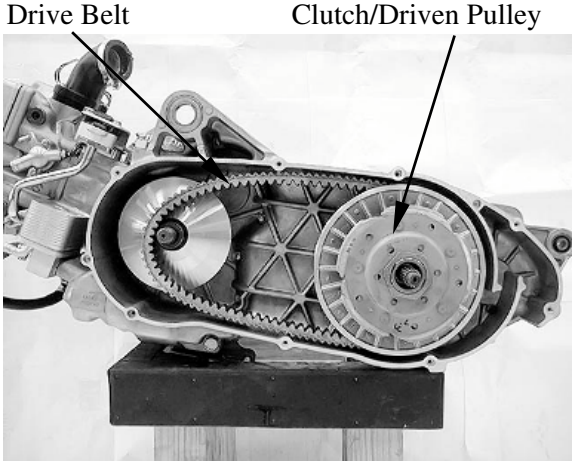
Special tool:

Universal holder E017

Remove the nut, collar and clutch outer.



Remove the clutch/driven pulley assembly and drive belt.



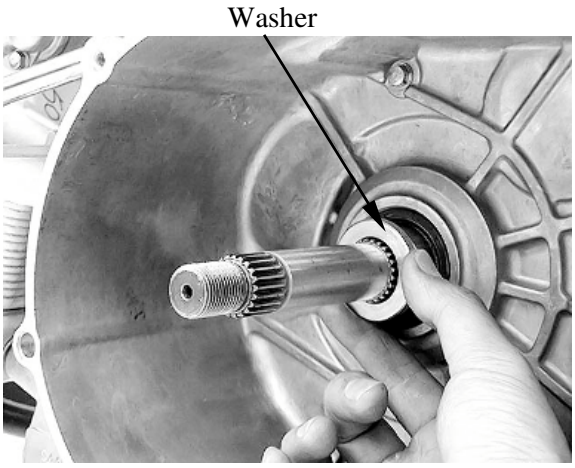
Remove the washer.



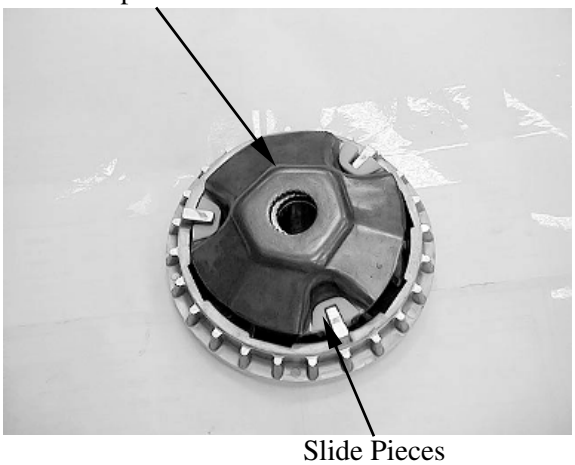
Remove the movable drive face assembly while holding the back of the face (ramp plate).



Remove the washer.



DISASSEMBLY
Drive pulley
Remove the ramp plate and slide pieces.



Remove the weight rollers.


Weight Rollers

Remove the drive face boss from the movable drive face.

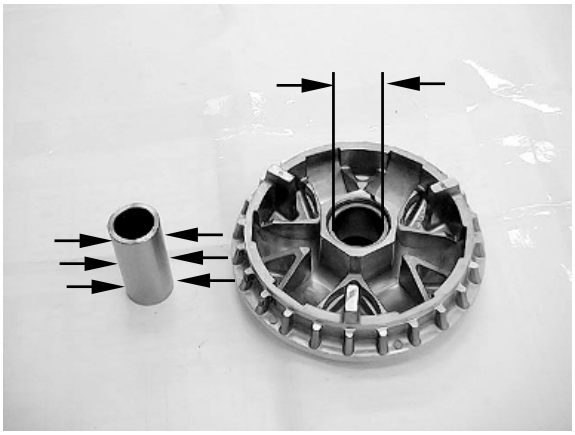


INSPECTION
Movable Drive Face
Check the drive face boss for wear or damage.
Measure the boss O.D..

Service limit: 28.9 mm (1.156 in)

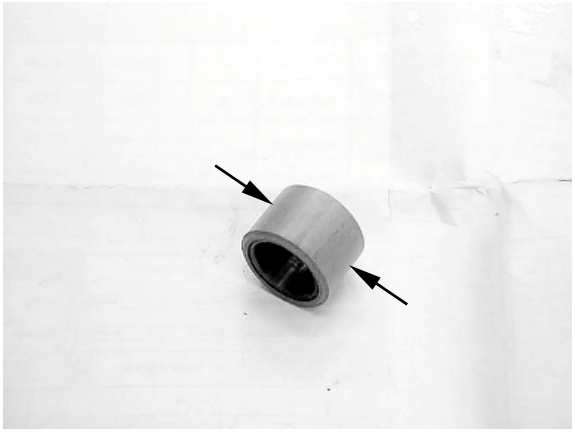
Measure the face bushing I.D..

Service limit: 29.1 mm (1.164 in)

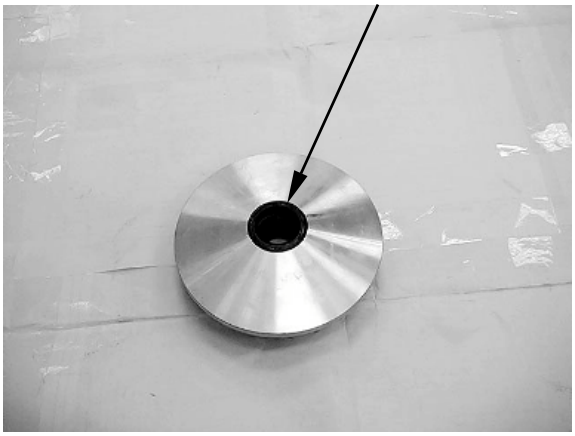

Slide Pieces

Weight Roller
Check each roller for wear or damage.
Measure the weight roller O.D..

Service limit: 29.5 mm (1.18 in)

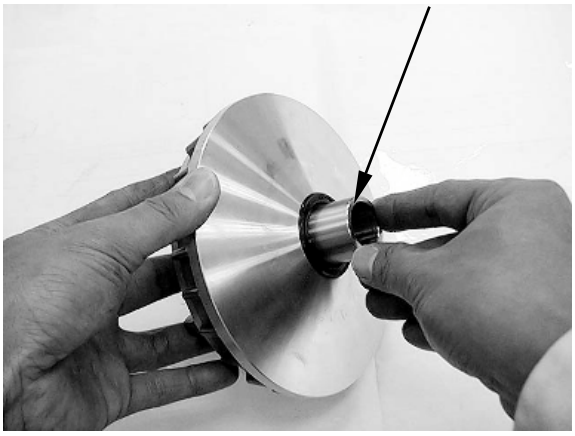


Movable Drive Face
Check the dust seal for wear or damage.



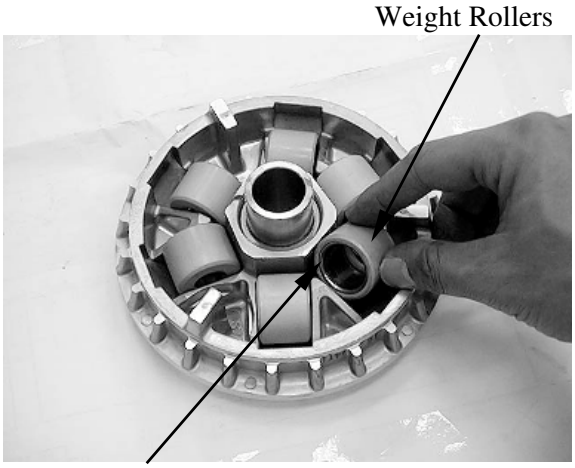
ASSEMBLY
Clean any oil and grease from the pulley faces and weight rollers.

Install the drive face boss into the movable drive face.

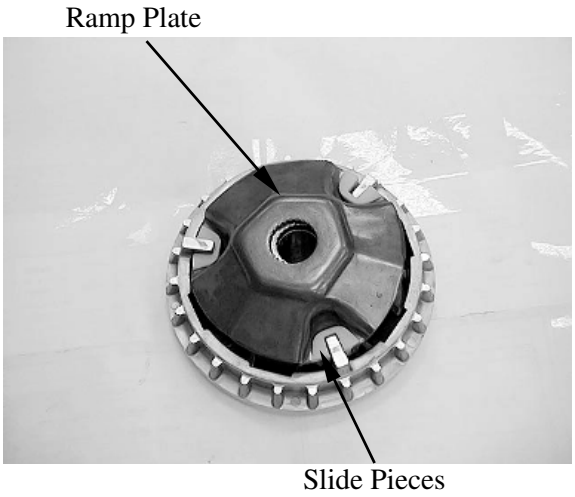


Install the weight rollers to the movable drive face.

* The direction of all weight rolls is the same. The thin side is towards to clockwise.

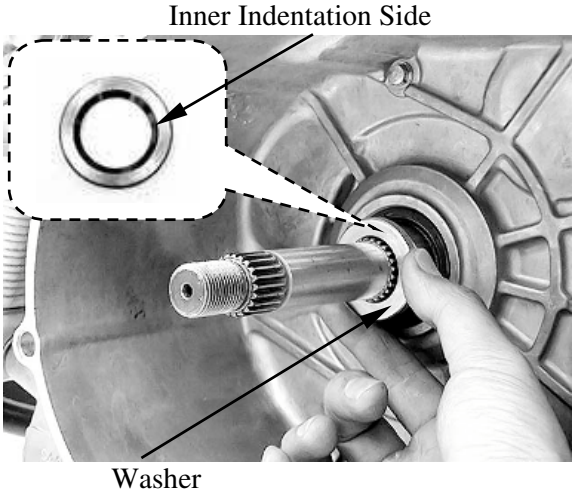


Install the slide pieces to ramp plate.
Install the ramp plate to the movable drive face.



INSTALLATION
Install the washer.

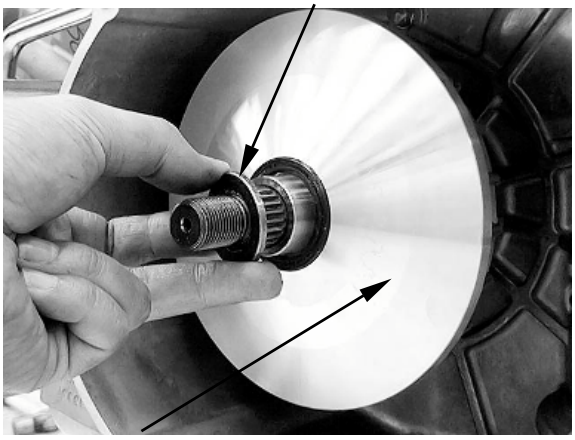
* The inner indentation side on the washer faces the left crankcase.



Clean any oil and grease from the pulley faces and the drive belt.

Install the movable drive face assembly onto the crankshaft while holding the ramp plate.

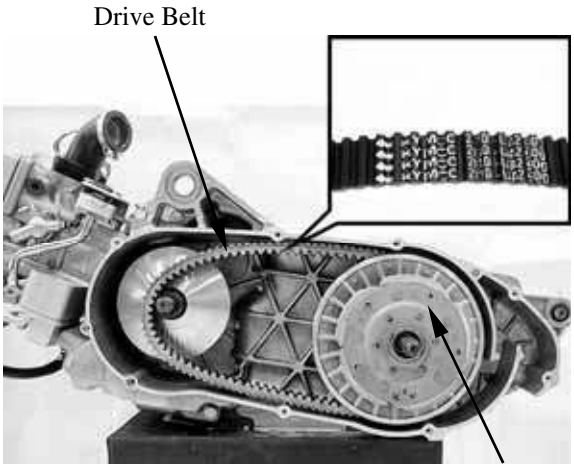
Install the washer.



Movable Drive Face Assembly

Install the drive belt and clutch/driven pulley assembly.

* Install the drive belt with the arrow mark facing up and towards to clockwise.



Clutch/Driven Pulley Assembly

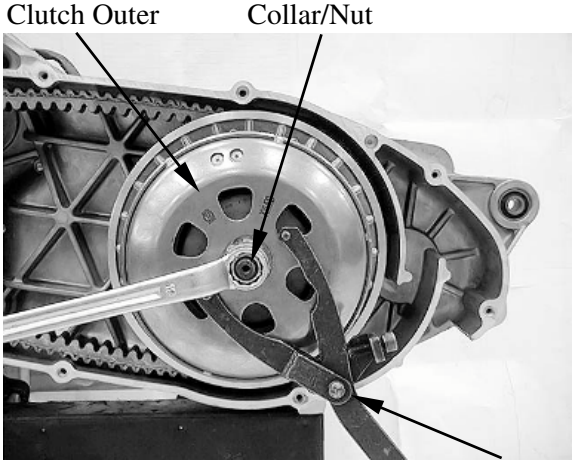
Hold the clutch outer with the special tool as shown.

Special tool:

Universal holder E017

Install the collar and nut.
Tighten the nut to the specified torque.

Torque: 80 N•m (8 kgf•m, 58 lbf•ft)



Universal Holder

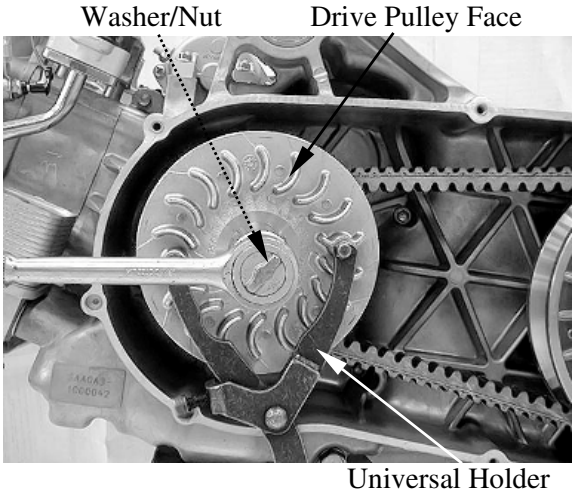
Install the drive pulley face and washer.
Apply oil to the drive pulley face nut threads and seating surface and install the nut.

Hold the drive face with the special tool and tighten the bolt to the specified torque.

Special tool:

Universal holder E017

Torque: 135 N•m (13.5 kgf•m, 97 lbf•ft)



CLUTCH/DRIVEN PULLEY

REMOVAL

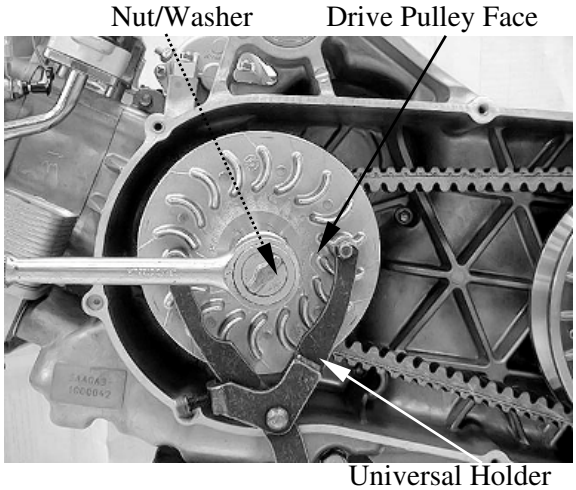
Remove the left crankcase cover (page 10-3).

Hold the drive pulley face with the special tool and loosen the drive pulley face nut.

Special tool:

Universal holder E017

Remove the nut, washer and drive pulley face.

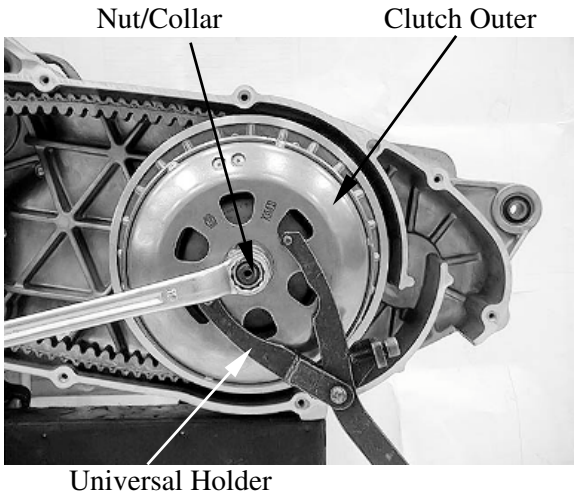


Hold the clutch outer with the special tool as shown.

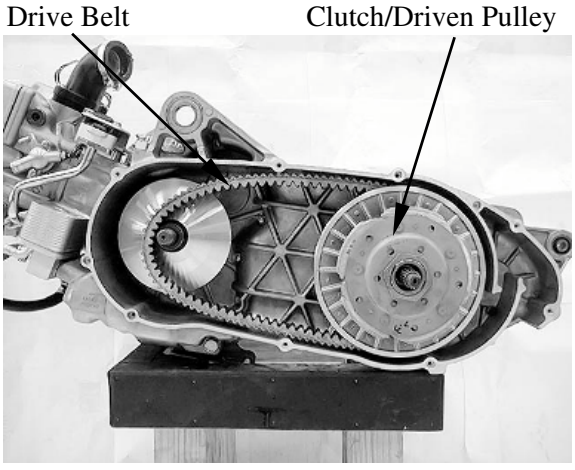
Special tool:

Universal holder E017

Remove the nut, collar and clutch outer.



Remove the clutch/driven pulley assembly and drive belt.



DISASSEMBLY
Clutch/Driven Pulley

Hold the clutch/driven pulley assembly with the clutch spring compressor.

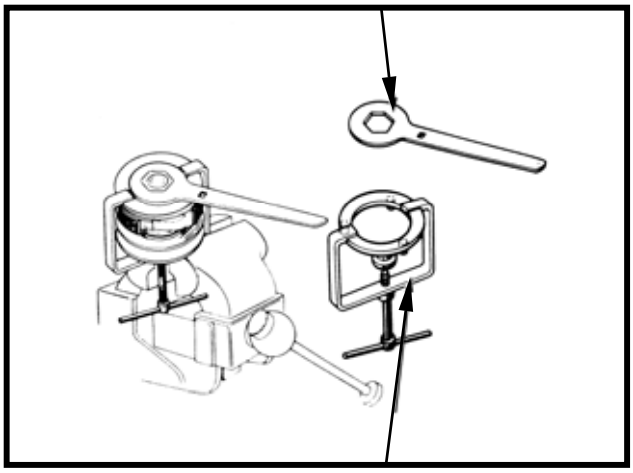
* Be sure to use a clutch spring compressor to avoid spring damage.

Special tool:
Clutch Spring Compressor E053

Set the tool in a vise and remove the clutch drive plate nut.

.

Lock Nut Wrench

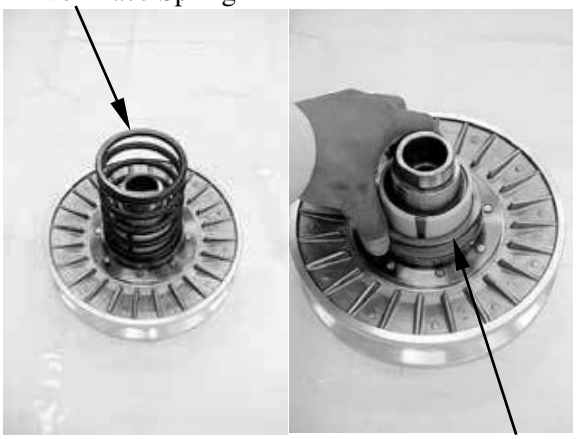


Clutch spring compressor

Remove the spring compressor and disassemble the following:
- Clutch assembly
- Driven face spring
- Driven pulley

Remove the washer

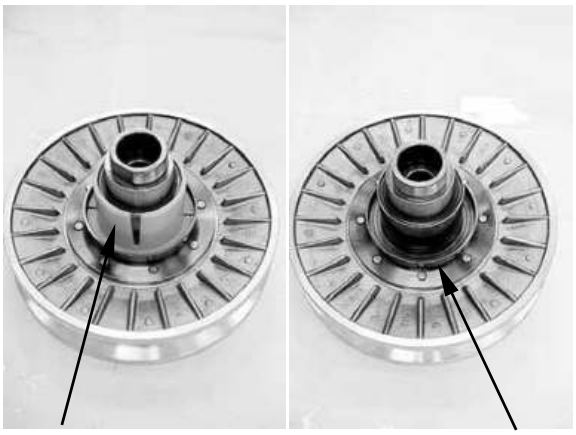
Driven Face Spring



Washer

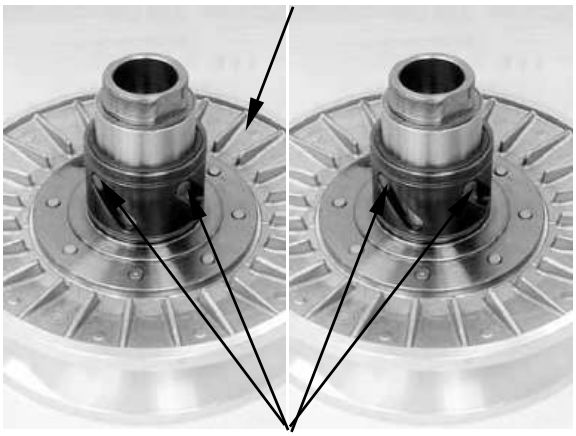
Remove the spring collar.

Remove the seal collar.



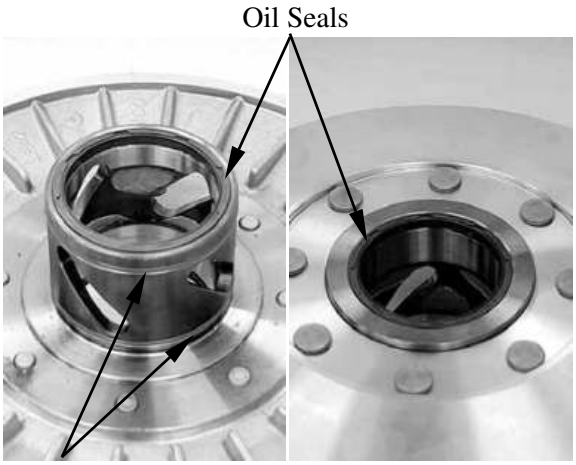
Spring Collar Seal Collar

Remove the guide roller pins, guide rollers and the movable driven face.



Guide Roller Pins/Guide Rollers

Remove the O-rings and oil seals from the movable driven face.



O-rings

Driven Face Bearing Replacement

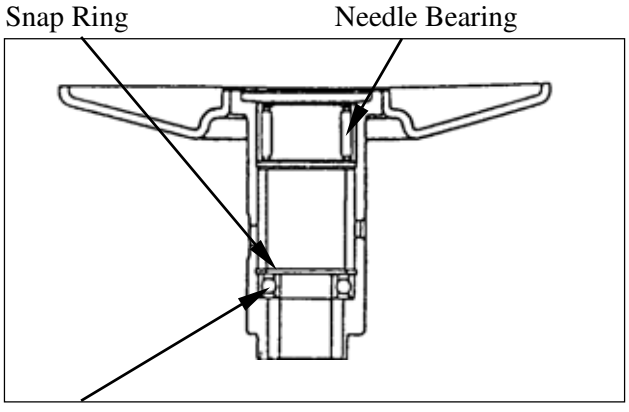
Remove the driven face needle bearing.

Remove the snap ring, then remove the ball bearing.

Apply grease to new ball bearing.

Install the ball bearing into the driven face.

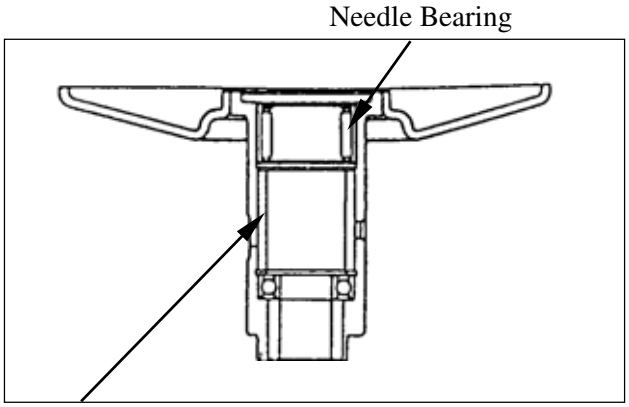
Install the snap ring to groove in the driven face securely.



Ball Bearing

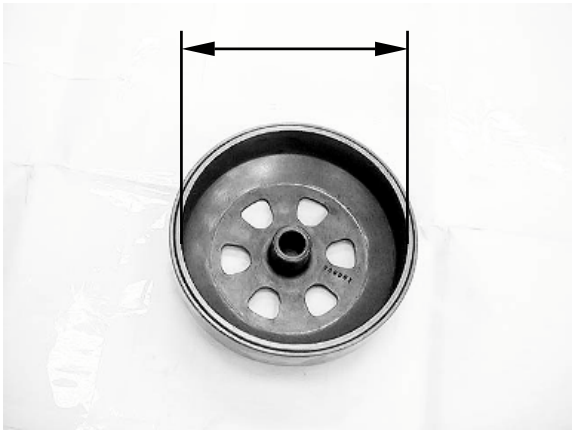
Filling 25 g of grease to the driven face inner surface.

Apply grease to new needle bearing.
Press the needle bearing into the driven.



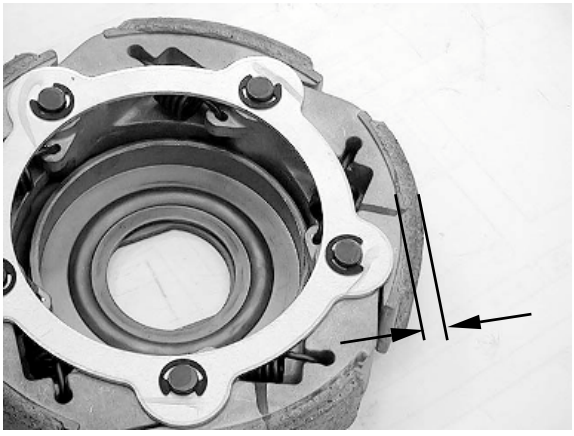
INSPECTION
Clutch Outer
Check the clutch outer for wear or damage.
Measure the clutch outer I.D..

Service limit: 160.5 mm (6.32 in)



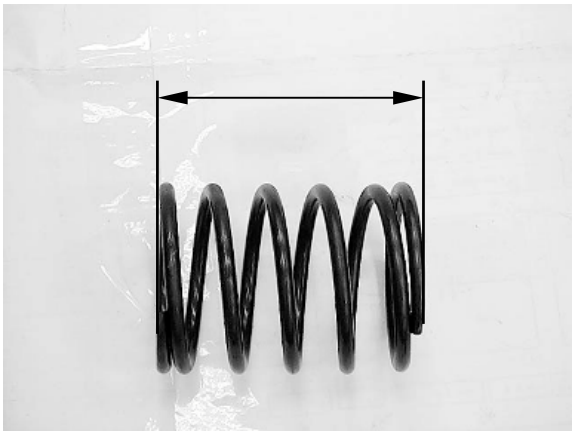
Clutch Shoe Lining
Check the clutch shoe for wear or damage.
Measure the thickness of each shoe.

Service limit: 1 mm (0.04 in)



Driven Face Spring
Measure the driven face spring free length.

Service limit: 100.7 mm (4.028 in)



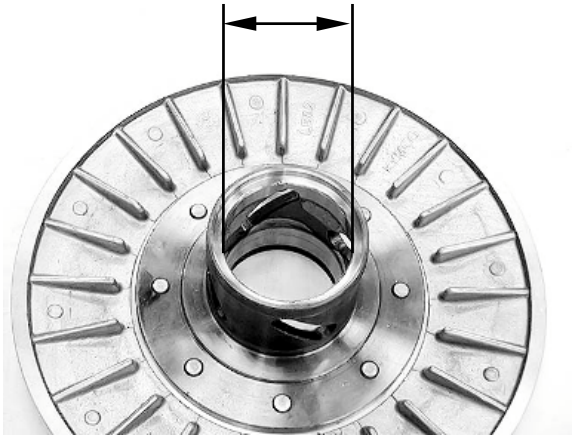
Driven Face
Check the driven face for scratches, scoring or damage.
Measure the driven face boss O.D..

Service limit: 47.94 mm (1.887 in)



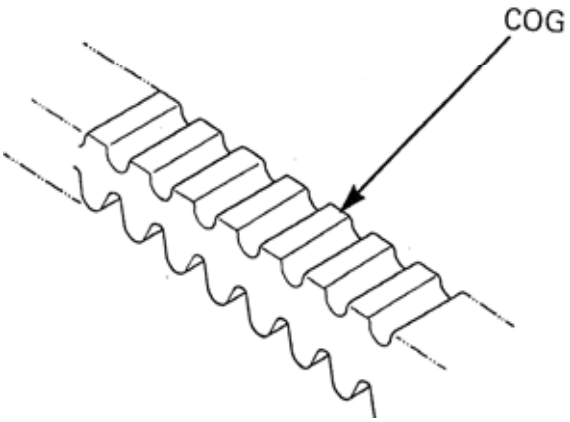
Movable Driven Face
Check the movable driven face for scratches, scoring or damage.
Check the guide grooves for stepped wear or damage.
Measure the movable driven face I.D..

Service limit: 48.06 mm (1.892 in)



Drive Belt

Check the drive belt for cracks, separation or abnormal or excessive wear.

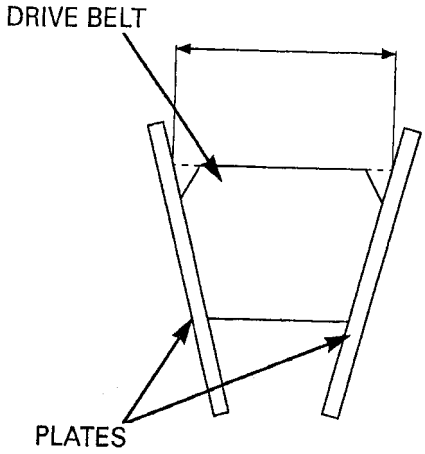


Attach the suitable plates ad shown.

Measure the drive belt width.

Service limit: 27.9 mm (1.116 in)

Remove the clutch/driven pulley, then replace the drive belt if necessary.

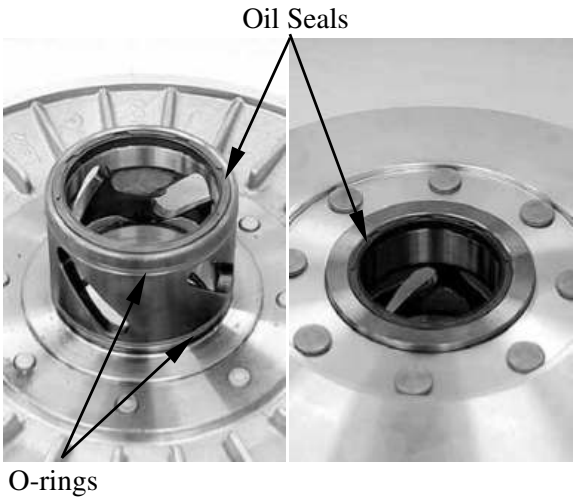


ASSEMBLY

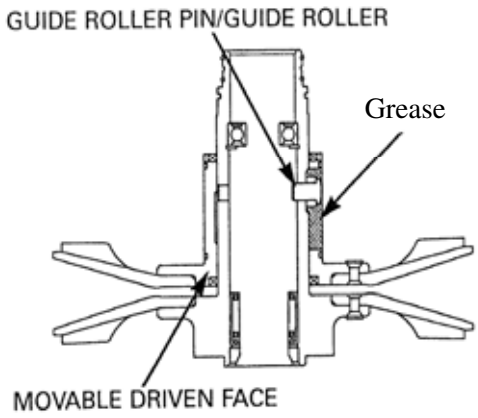
Clean any oil from the drive belt sliding surfaces on the driven face.

Apply grease to new oil seal lips and install into the movable driven face.

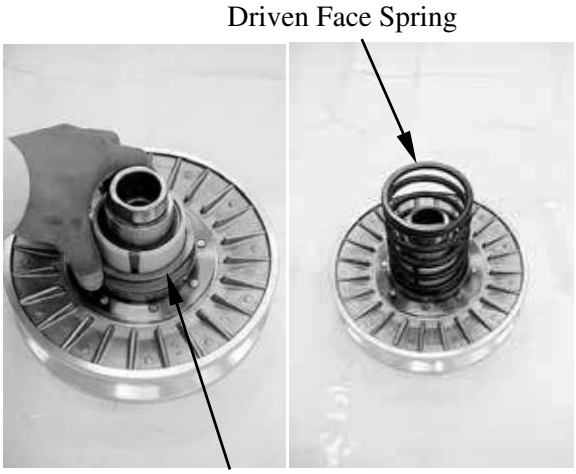
Coat new O-rings with grease and install them into the movable driven face grooves.



Install the movable driven face onto the driven face.
Install the guide rollers and guide roller pins.
Filling 8 g of grease to each guide groove.



Install the seal collar.
Install spring collar.
Install washer.
Install driven face spring.



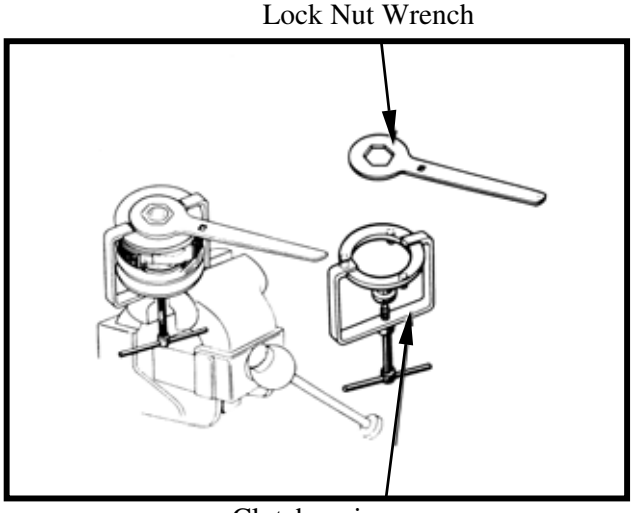
Install the drive belt into the driven pulley.
Squeeze and hold the drive belt your hand.

Set the clutch spring compressor over the clutch/driven pulley assembly and hold the spring compressor in a vice.

Special tool:
Clutch Spring Compressor E053

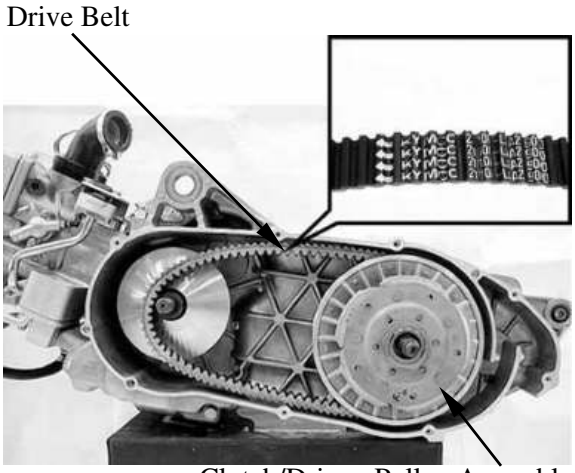
Compress the driven face spring.
Install and tighten the clutch drive plate nut to the specified torque.

Torque: 78 N•m (7.8 kgf•m, 56 lbf•ft)



* Install the drive belt with the arrow mark facing up and towards to clockwise.

Install the drive belt and clutch/driven pulley assembly.



Hold the clutch outer with the special tool as shown.

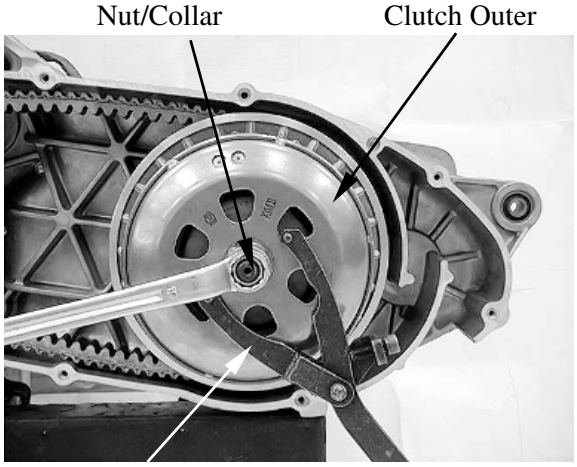
Special tool:

Universal holder E017

Install the collar and nut.

Tighten the nut to the specified torque.

Torque: 80 N•m (8 kgf•m, 58 lbf•ft)



Install the drive pulley face and washer.

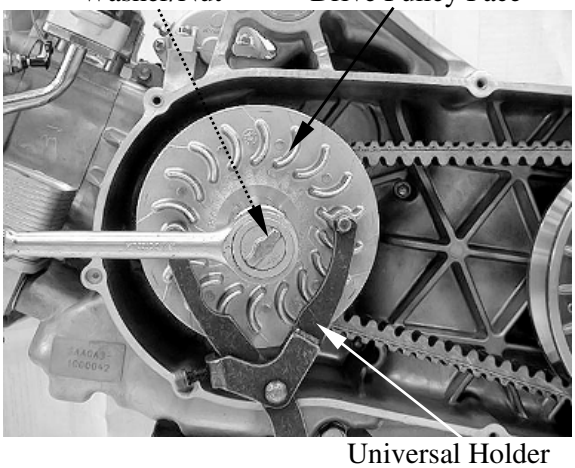
Apply oil to the drive pulley face nut threads and seating surface and install the nut.

Hold the drive face with the special tool and tighten the bolt to the specified torque.

Special tool:

Universal holder E017

Torque: 135 N•m (13.5 kgf•m, 97 lbf•ft)

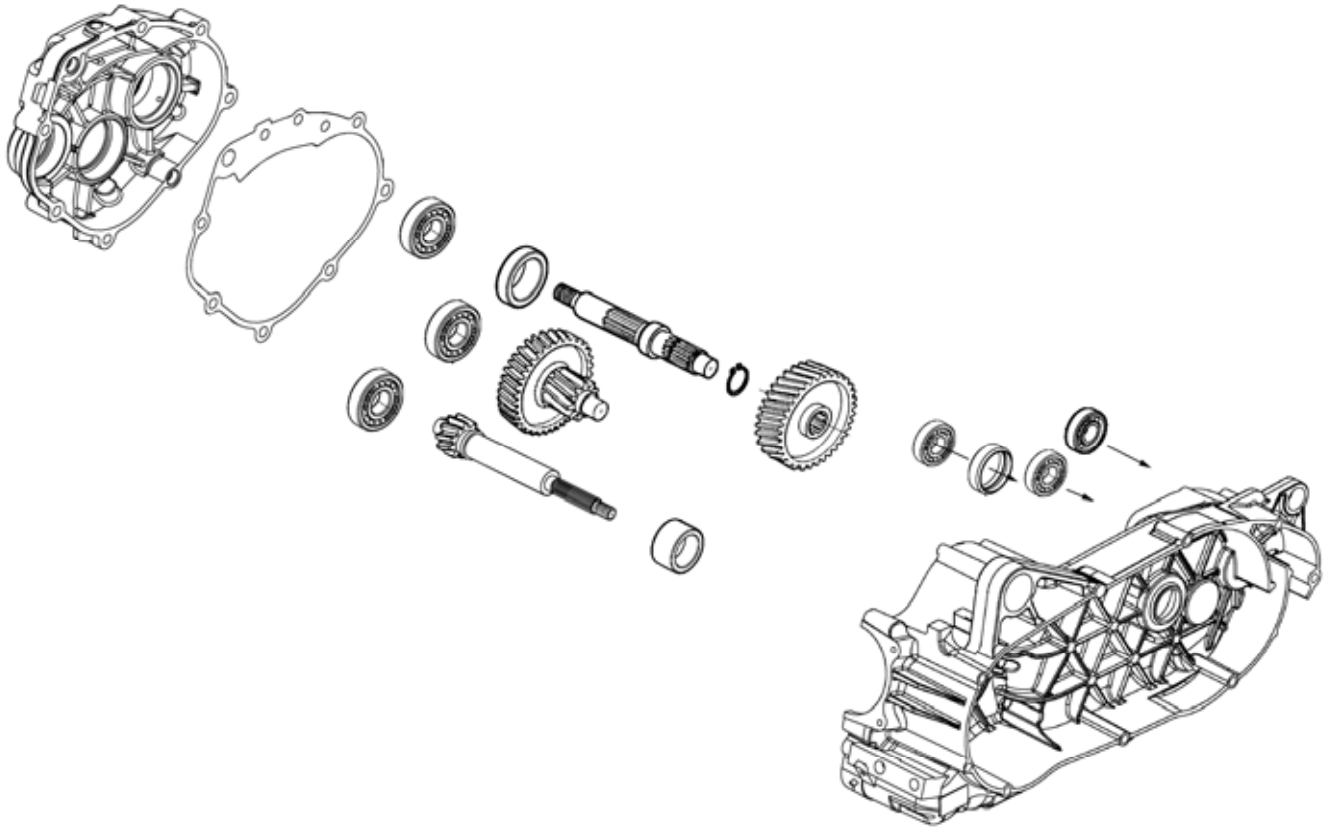


FINAL REDUCTION

SCHEMATIC DRAWING ---------- 11-1
SERVICE INFORMATION---------- 11-2
TROUBLESHOOTING---------- 11-2
FINAL REDUCTION DISASSEMBLY ---------- 11-3
FINAL REDUCTION INSPECTION---------- 11-5
FINAL REDUCTION ASSEMBLY ---------- 11-9

11. FINAL REDUCTION

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The servicing operations of this section can be made with the engine installed.
- When replacing the drive shaft, use a special tool to hold the bearing inner race for this operation.

SPECIFICATIONS

Specified Oil: SAE 90#
Oil Capacity:
At disassembly : 0.55 L (0.57 US qt, 0.5 Imp qt)
At change : 0.45 L (0.48 US qt, 0.4 Imp qt)

TORQUE VALUES

Transmission case cover bolt	27 N•m (2.7 kgf•m, 20 lbf•ft)
Oil drain bolt	24 N•m (2.4 kgf•m, 18 lbf•ft)
Oil filler bolt	24 N•m (2.4 kgf•m, 18 lbf•ft)

SPECIAL TOOLS

Bearing puller	E037
Oil seal & bearing driver	E014
Universal bearing puller	E030

TROUBLESHOOTING

Engine starts but motorcycle won‘t move

- Damaged transmission
- Seized or burnt transmission
- Faulty drive and driven pulleys/clutch

Abnormal noise

- Worn, seized or chipped gears
- Worn bearing

Oil leaks

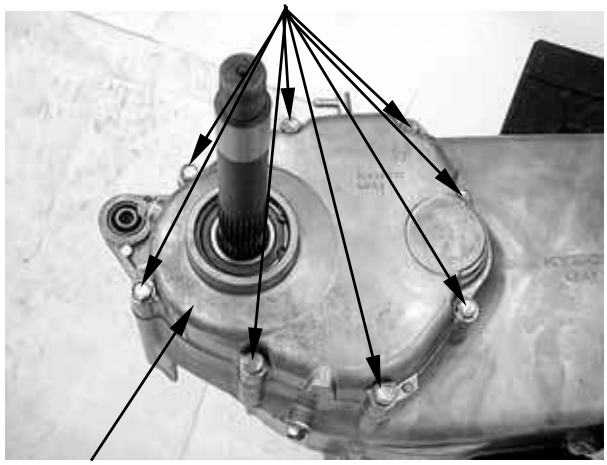
- Oil level too high
- Worn or damaged oil seal
- Cracked crankcase

FINAL REDUCTION DISASSEMBLY

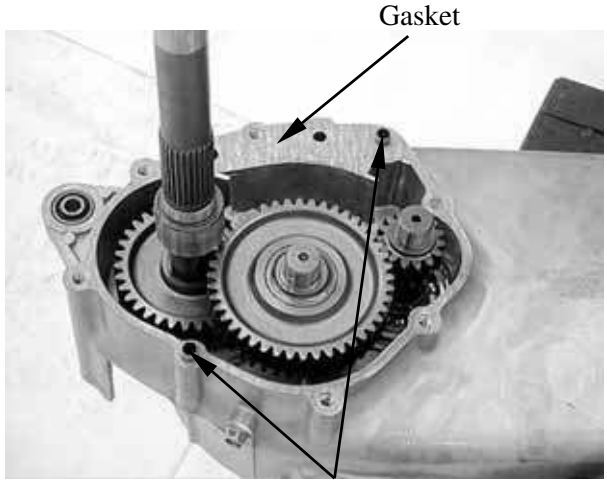
Remove the exhaust muffler (page 2-15).
Remove the rear brake caliper (page 16-26).
Remove the right rear shock absorber (page 15-10).
Remove the rear fork (page 15-4).
Remove the rear wheel (page 15-4).

Drain the transmission gear oil into a clean container.

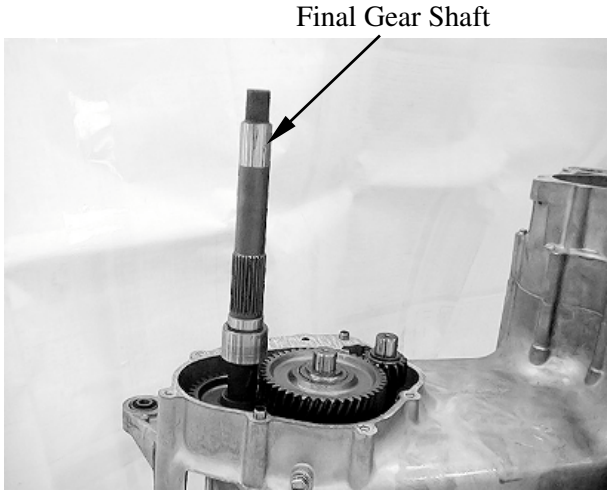
Remove the eight bolts and transmission cover.



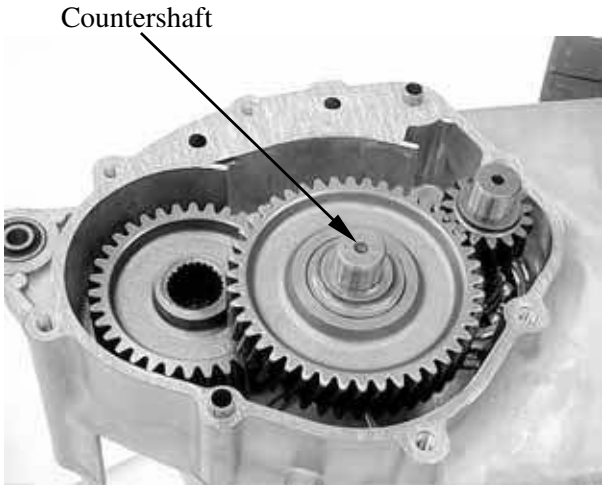
Remove the gasket and dowel pins.



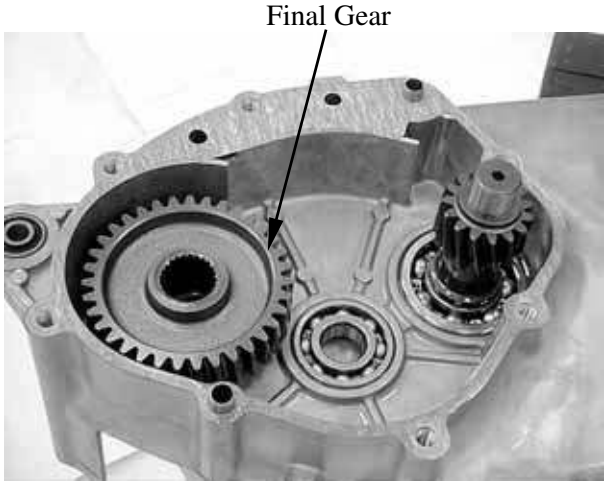
Remove the final gear shaft.



Remove the countershaft.



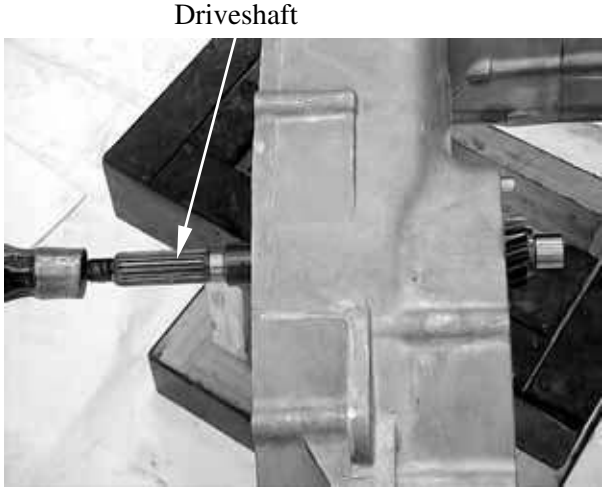
Remove the final gear.



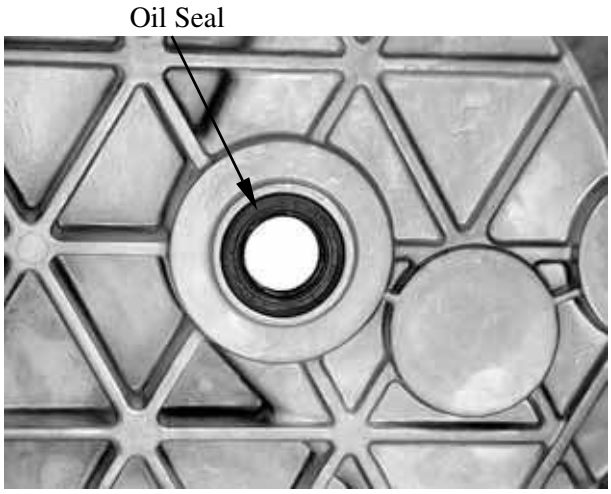
Remove the driven pulley (page 10-13).

Press the driveshaft out or the left crankcase.

Check the drive shaft for wear or damage.

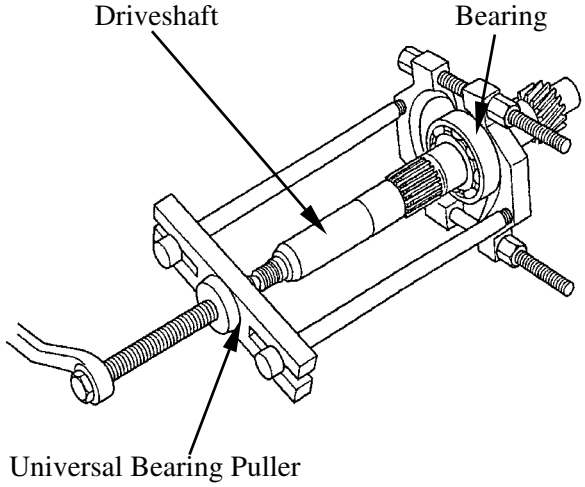


Remove the driveshaft oil seal and bearing from the transmission case.



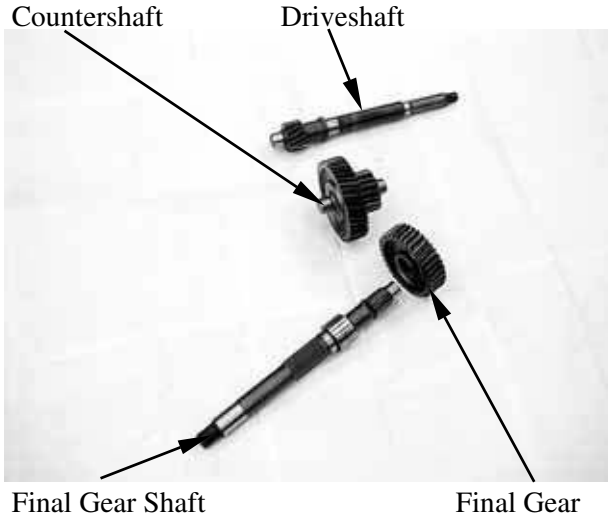
If the bearing is left on the driveshaft, remove it with the special tool.

Special tool:
Universal bearing puller E030



FINAL REDUCTION INSPECTION

Check the driveshaft, countershaft, final gear and final gear shaft for wear or damage.



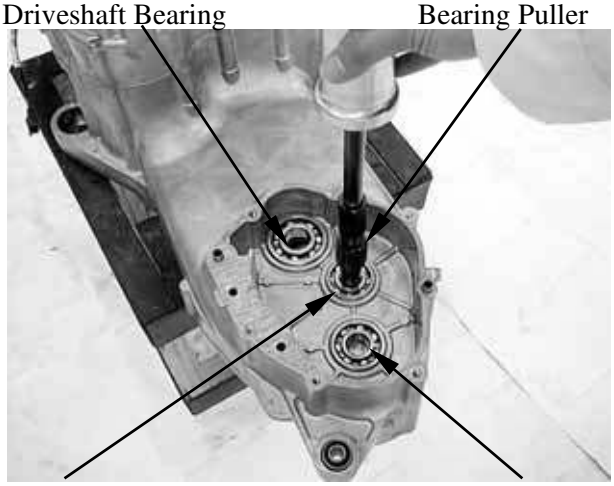
Check the oil seal and bearings in the left crankcase for wear or damage.

BEARING REPLACEMENT (TRANSMISSION CASE)

Remove the countershaft or final gear shaft bearing using the special tool.

Special tool:
Bearing puller E037

Driveshaft Bearing Bearing Puller

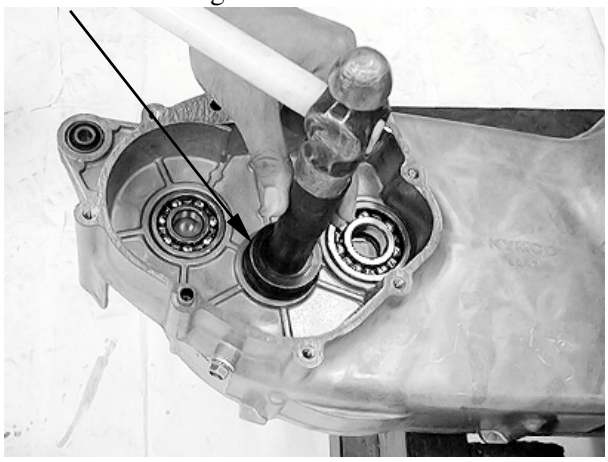


Countershaft Bearing Final Gear Shaft Bearing

Apply engine oil to new bearings cavities.
Drive new bearings into the transmission case.

Special tool:
Oil seal & bearing driver E014

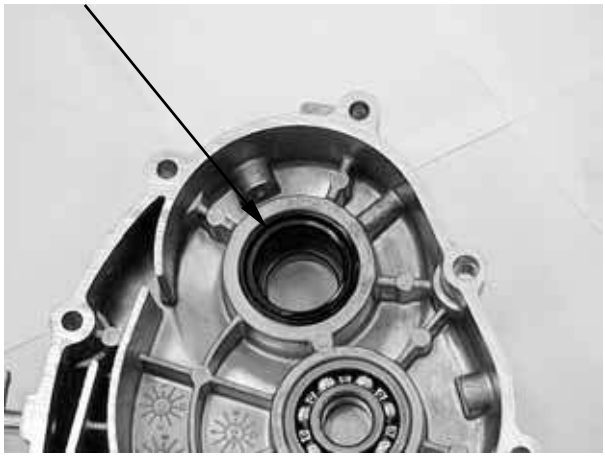
Oil Seal & Bearing Driver



BEARING REPLACEMENT (TRANSMISSION COVER)

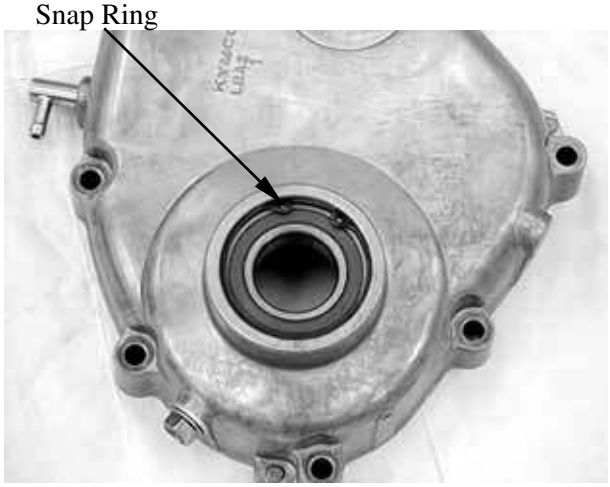
Remove the final gear shaft oil seal.

Oil Seal



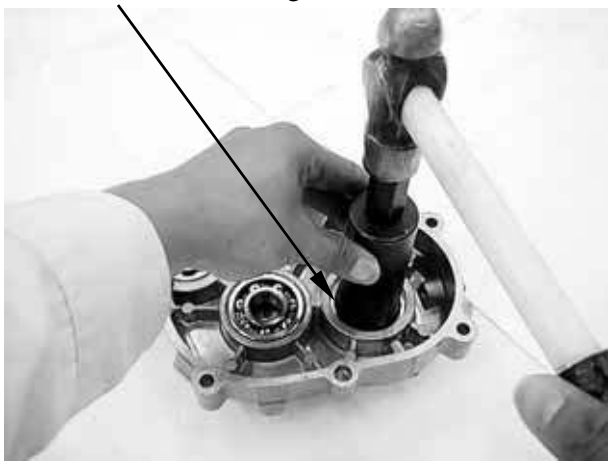
Remove the bearing snap ring.

Snap Ring



Remove the final gear shaft bearing.

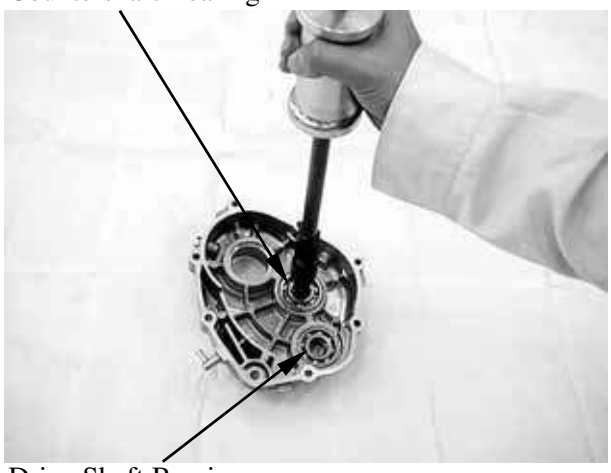
Final Gear Shaft Bearing



Remove the countershaft or drive shaft bearing using the special tool.

Special tool:
Bearing puller E037

Countershaft Bearing

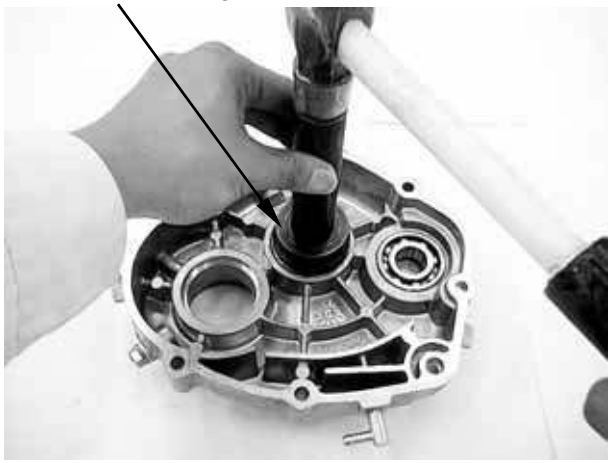


Drive Shaft Bearing

Apply engine oil to new bearings cavities.
Drive new bearings into the transmission cover.

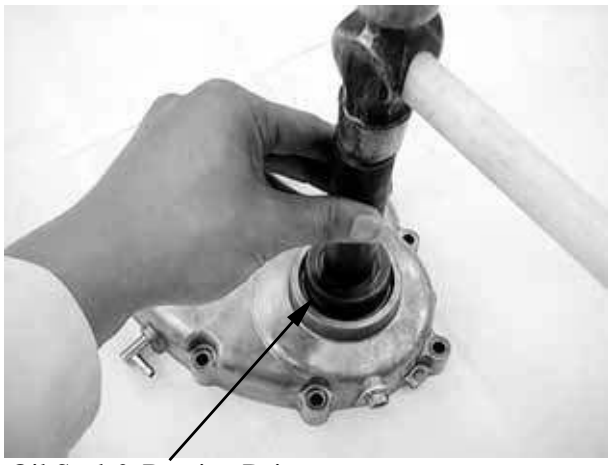
Special tool:
Oil seal & bearing driver E014

Oil Seal & Bearing Driver



Apply engine oil to new final gear shaft bearing cavity.
Drive new bearing into the transmission cover.

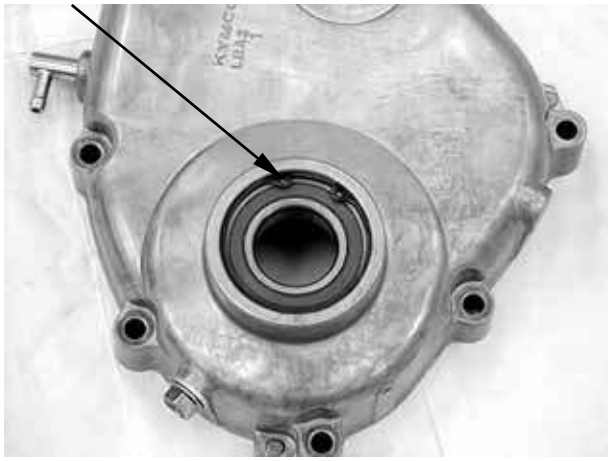
Special tool:
Oil seal & bearing driver E014



Oil Seal & Bearing Driver

Install the bearing snap ring.

Snap Ring

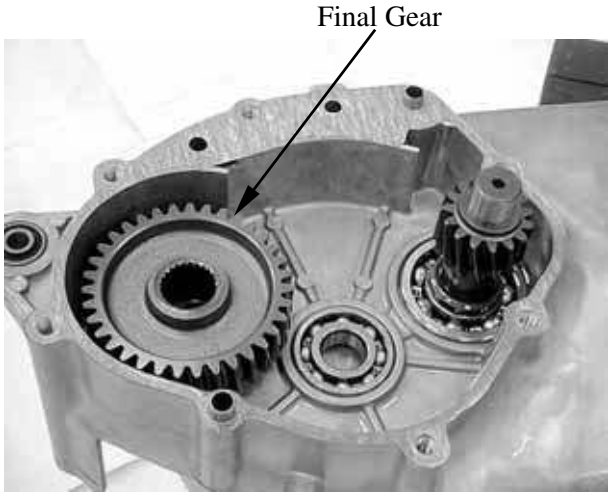


Apply oil to a new final gear shaft oil seal lip and outer surface.
Install the final gear shaft oil seal.

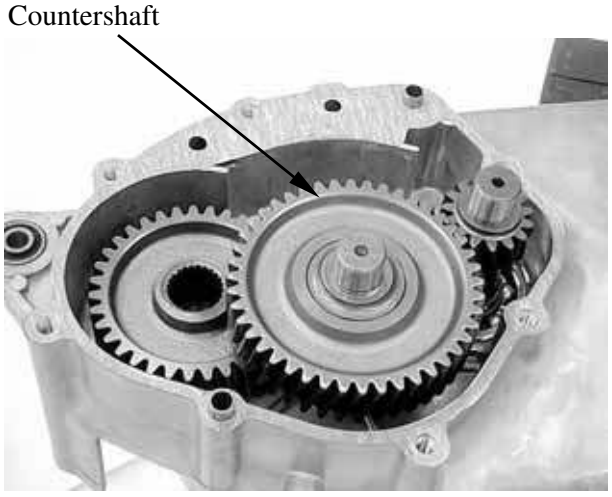


FINAL REDUCTION ASSEMBLY

Install the final gear to the transmission case.



Install the countershaft to the transmission case.



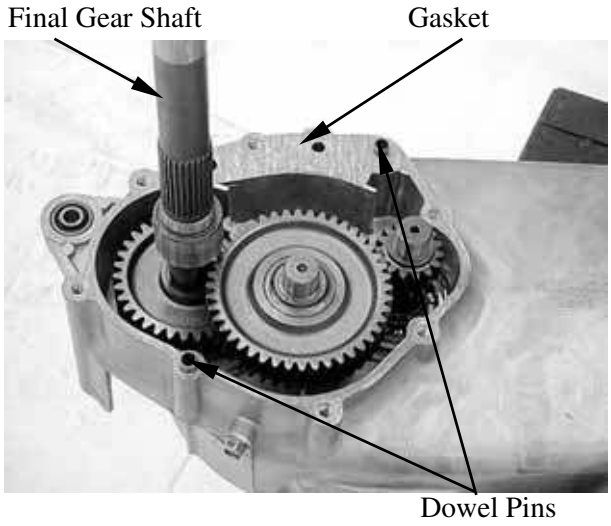
11. FINAL REDUCTION

Install the final gear shaft to transmission case.

Install the dowel pins.

Clean the mating surfaces of the left crankcase and transmission cover.

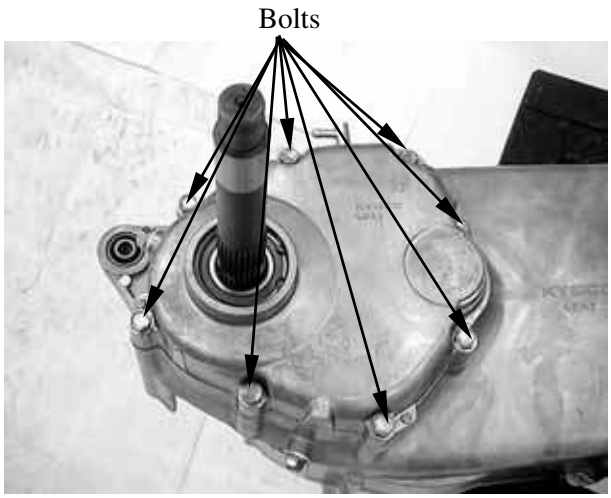
Install the new gasket.



Install the transmission cover and tighten the eight bolts in a crisscross pattern in 2 – 3 steps to the specified torque.

Torque: 27 N•m (2.7 kgf•m, 20 lbf•ft)

Fill the transmission case with the recommended oil (page 3-17).



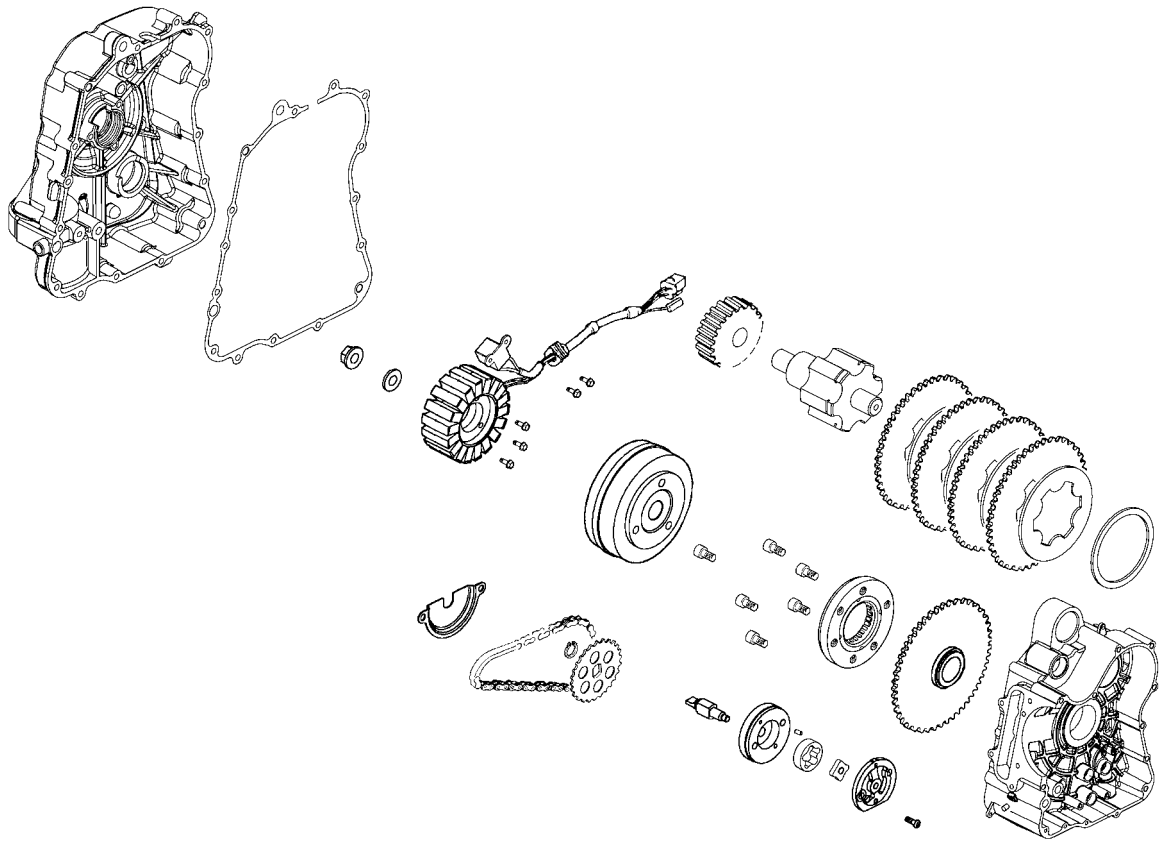
12

A.C. GENERATOR/STARTER CLUTCH

SCHEMATIC DRAWING ---------- 12-1
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TROUBLESHOOTING---------- 12-2
ALTERANTOR STATOR---------- 12-3
FLYWHEEL/STARTER CLUTCH---------- 12-4

12. A.C. GENERATOR/STARTER CLUTCH

SCHEMATIC DRAWING



12. A.C. GENERATOR/STARTER CLUTCH

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- All servicing operations and inspections in this section can be made with the engine installed.
- Drain the coolant before removing the right crankcase cover.
- Be careful not to drain the coolant when the engine temperature is high. (Perform this operation when the engine is cold.)
- Drain the coolant into a clean container.
- Drain the engine oil into a clean container before removing the right crankcase cover.
- When the right crankcase cover is installed, fill with the recommended engine oil and coolant. Then, bleed air from the water jacket.
- Refer to section 17 for alternator inspection, and to section 18 for ignition pulse generator inspection.

SPECIFICATIONS

Unit: mm (in)

Item	Standard	Service Limit
Starter driven gear I.D.	27.026 (1.081)～27.045 (1.0818)	27.1 (1.084)
Starter driven gear O.D.	45.66 (1.8264)～45.673 (1.8292)	45.6 (1.824)

SPECIAL TOOLS

Flywheel puller	E054
Flywheel holder	E021

TORQUE VALUES

Flywheel nut: 55 N•m (5.5 kgf•m, 40 lbf•ft)

TROUBLESHOOTING

Starter motor turns, but engine does not turn

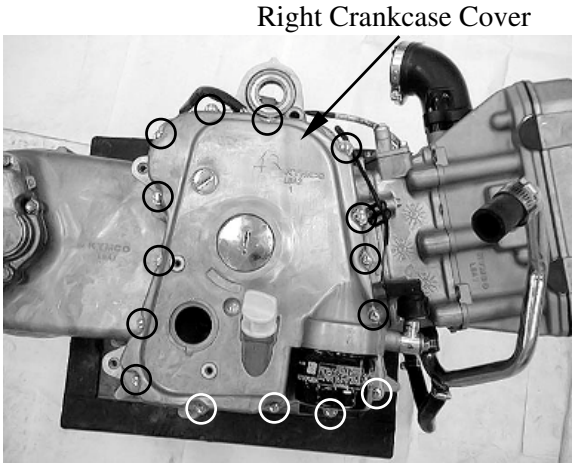
- Faulty starter clutch
- Damaged starter reduction gear

ALTERNATOR STATOR

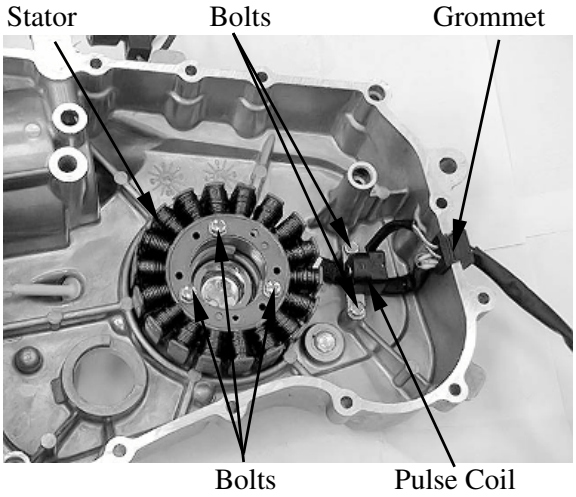
REMOVAL

Remove the right center body cover (page 2-5).
Remove the exhaust muffler (page 2-15).
Remove water pump (page 6-10).

Remove the fifteen bolts and right crankcase cover, dowel pins and gasket.



Remove the two pulse coil mount bolts.
Remove the three stator mount bolts, grommet and the stator from the right crankcase cover.



INSTALLATION

Install the stator and tighten the stator mount bolts to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)

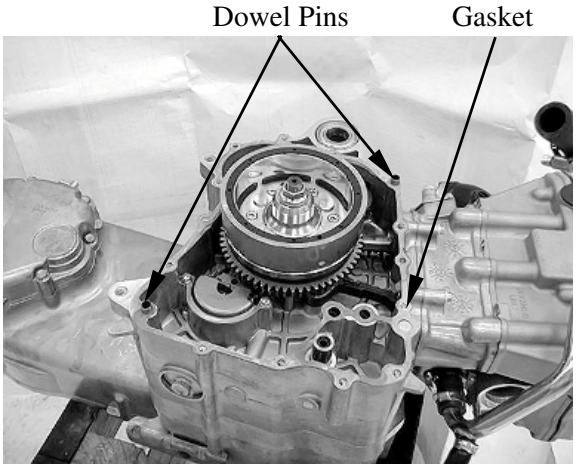
Apply sealant to the grommet seating surface and install it to the cover groove properly.

Install the pulse coil and tighten mount bolts to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)

Clean the mating surfaces of the right crankcase and cover.

Install the dowel pins and gasket.
Install the right crankcase cover and tighten the bolts in a crisscross pattern in 2 or 3 steps.



FLYWHEEL/STARTER CLUTCH

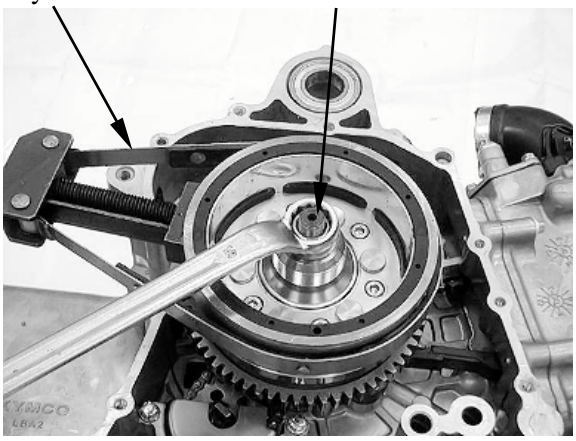
REMOVAL

Remove the right crankcase cover (page 12-3).

Hold the flywheel with the special tool and loosen the flywheel nut.

Special tool:

Flywheel holder E021

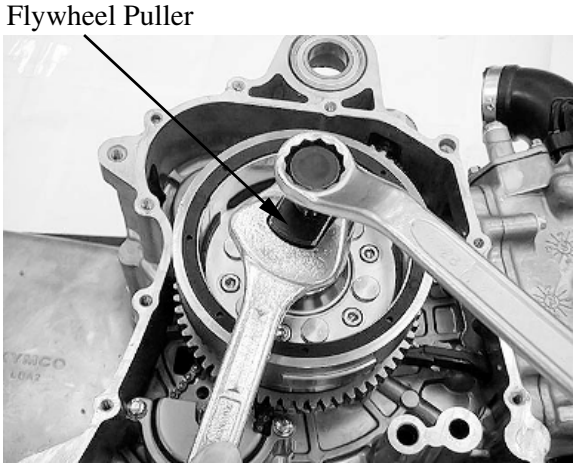


Remove the flywheel nut and washer.

Remove the flywheel/starter driven gear assembly using the special tool.

Special tool:

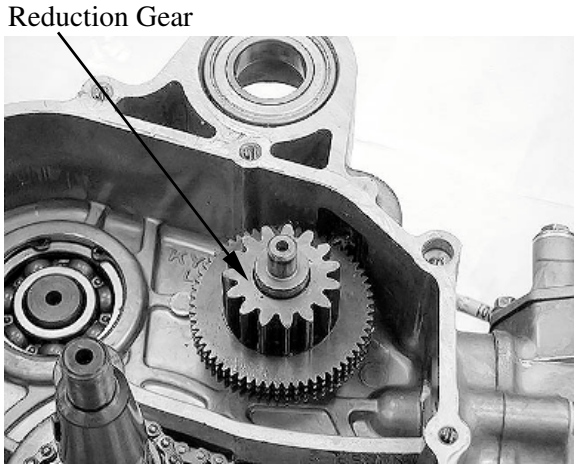
Flywheel puller E054



Remove the woodruff key.

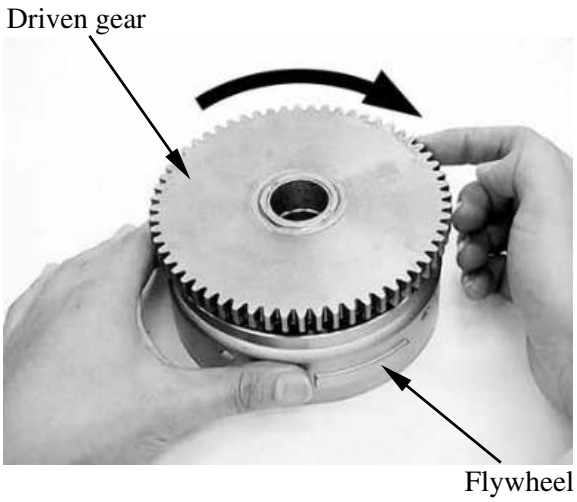


Remove the reduction gear.



INSPECTION
Check the operation of the sprag clutch by turning the driven gear.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.

Remove the starter driven gear by turning the driven gear.



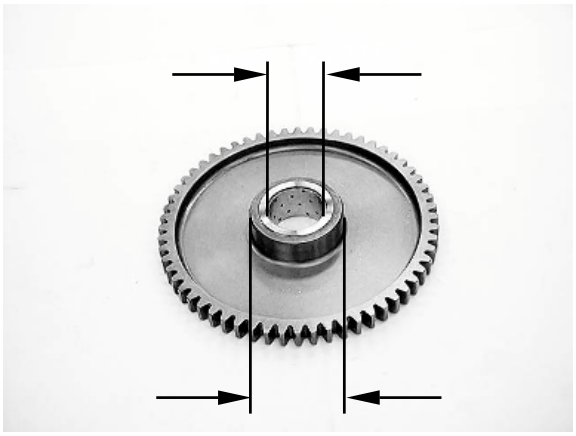
Check the starter driven gear teeth for wear or damage.

Measure the starter driven gear boss O.D..

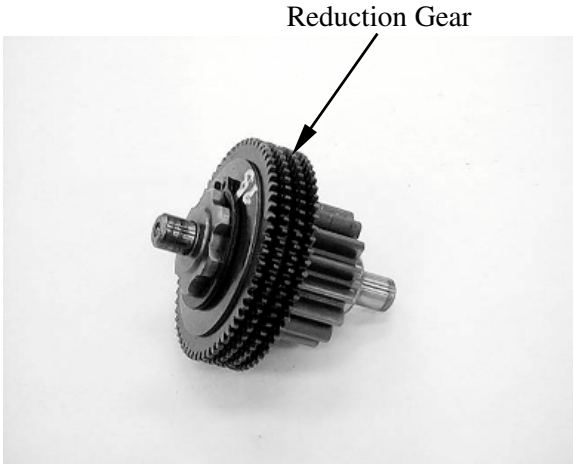
Service limit: 45.6 mm (1.824 in)

Measure the starter driven gear bushing I.D..

Service limit: 27.1 mm (1.084 in)

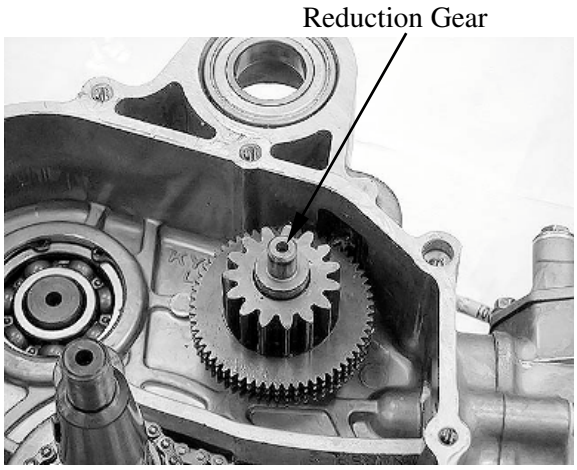


Check the starter reduction gear teeth and shaft for wear or damage.



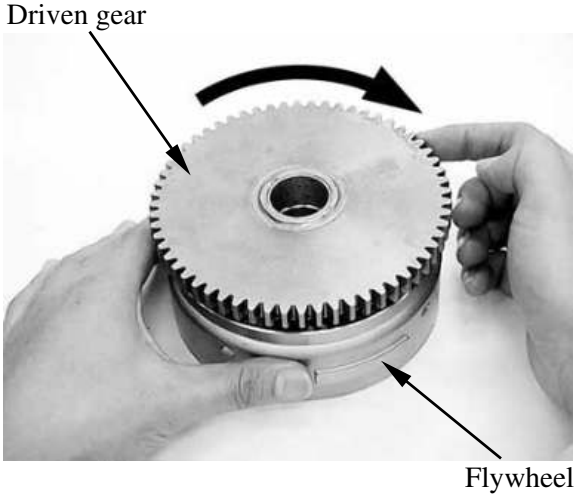
Apply oil to the starter reduction gear.

Install the starter reduction gear to the right crankcase.



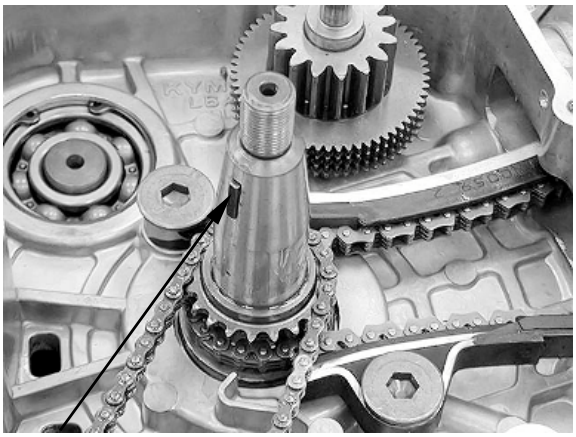
Apply molybdenum oil solution to the starter driven gear bushing.

Install the starter driven gear by turning the driven gear clockwise.



Clean any oil from tapered portion of the crankshaft.

Install the woodruff key in the crankshaft key groove.


Woodruff Key

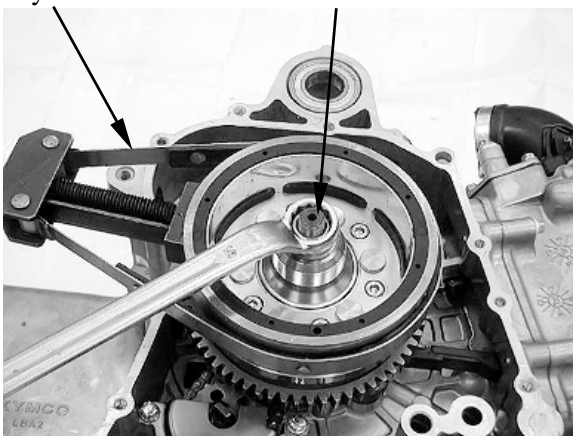
Clean any oil from the tappered portion of the flywheel I.D..

Install the flywheel/driven gear onto the crankshaft, aligning the key way with woodruff key.

Apply oil to the washer and flywheel nut threads and seating surface.

Install the washer and flywheel nut to the crankshaft.

Hold the flywheel with the special tool and tighten the flywheel nut to the specified torque.



Special tool:

Flywheel holder E021

Torque: 55 N•m (5.5 kgf•m, 40 lbf•ft)

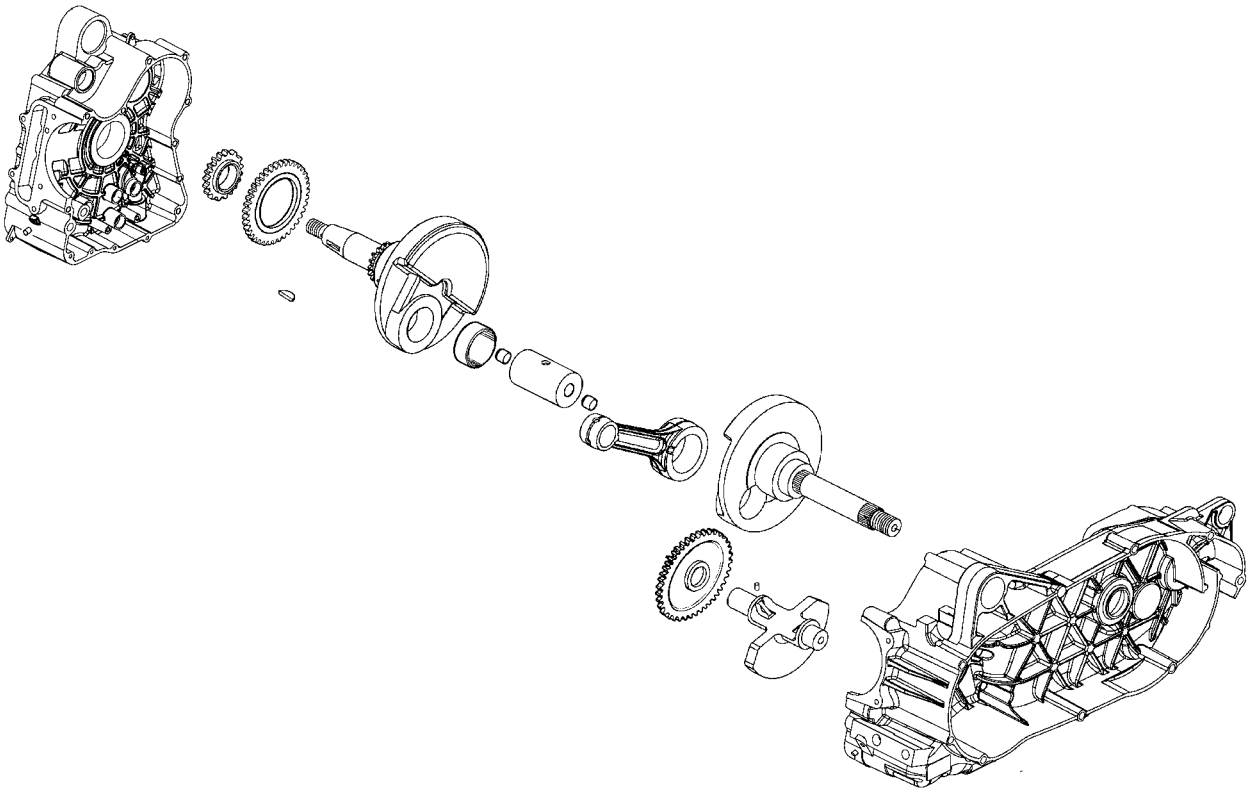
13

CRANKCASE/CRANKSHAFT

SCHEMATIC DRAWING ---------- 13- 1
SERVICE INFORMATION---------- 13- 2
TROUBLESHOOTING---------- 13- 2
CAM CHAIN/CAM CHAIN GUIDE REMOVAL ---------- 13- 3
CRANKCASE SEPARATION ---------- 13- 4
CRANKCASE ASSEMBLY ---------- 13-11

13. CRANKCASE/CRANKSHAFT

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- This section covers crankcase separation to service the crankshaft and balancer. The engine must be removed for this operation.
- When separating the crankcase, never use a driver to pry the crankcase mating surfaces apart forcedly to prevent damaging the mating surfaces.
- When installing the crankcase, do not use an iron hammer to tap it.
- The following parts must be removed before separating the crankcase.

  Cylinder head (section 8)
  Cylinder/piston (section 9)
  Drive and driven pulley (section 10)
  A.C. generator/starter clutch (section 12)
  Starter motor (section 19)
  Oil pump (section 4)

SPECIFICATIONS

Unit: mm (in)

	Item	Standard	Service Limit
Crankshaft	Main bearing oil clearance	0.025 (0.001)～0.041 (0.0016)	0.07 (0.003)
	Connecting rod big end side clearance	0.05 (0.002)～0.5 (0.02)	0.8 (0.031)
	Runout	—	0.06 (0.002)

TORQUE VALUES

Crankcase bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)
Cam chain guide bolt	20 N•m (2 kgf•m, 15 lbf•ft)
Oil pipe bolt	43 N•m (4.3 kgf•m, 31 lbf•ft)

SPECIAL TOOLS

Bearing puller	E037
Oil seal & bearing driver	E014

TROUBLESHOOTING

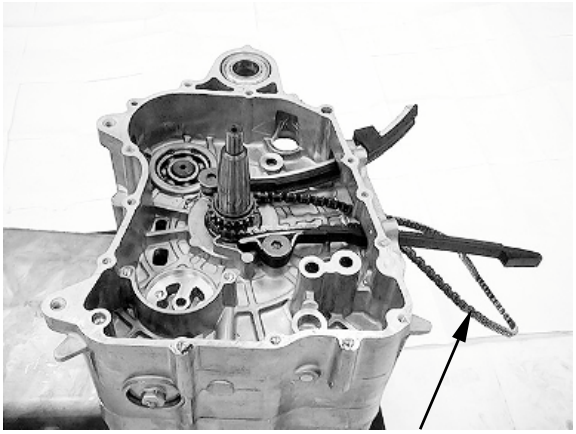
Excessive engine noise

- Worn connecting to small end
- Worn or damaged crankshaft bearings

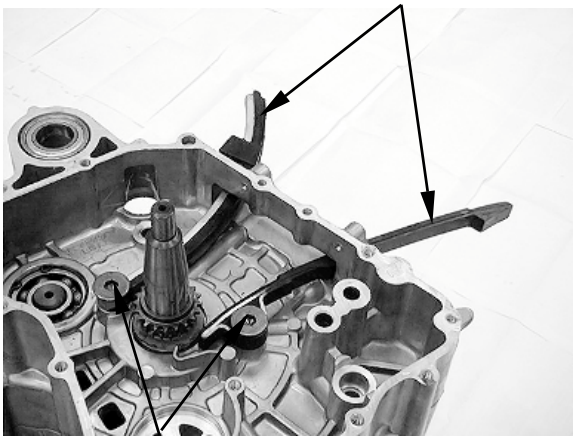
CAM CHAIN/CAM CHAIN GUIDE REMOVAL

Remove the starter driven gear (page 12-4).
Remove the cylinder (page 9-3).

Remove the cam chain from the right crankcase.


Cam Chain

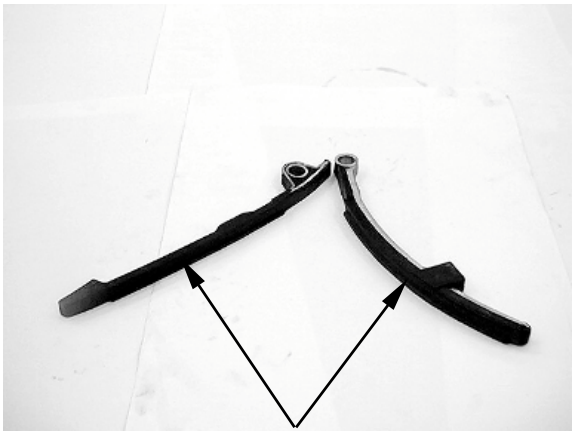
Remove the bolts and cam chain guides.



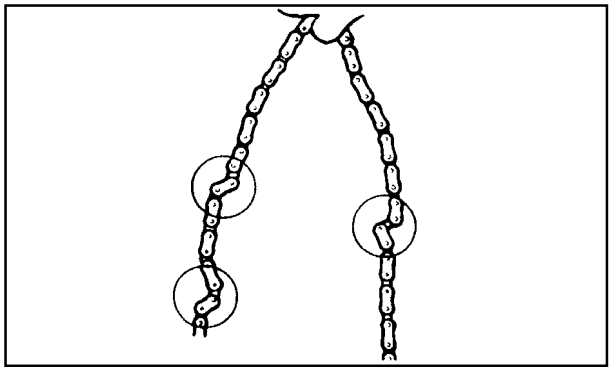
INSPECTION

Cam chain guide

Inspect the cam chain slipper surface of the cam chain guide for wear or damage.


Slipper Surface

Cam chain
Inspect the cam chain for cracks or stiff.

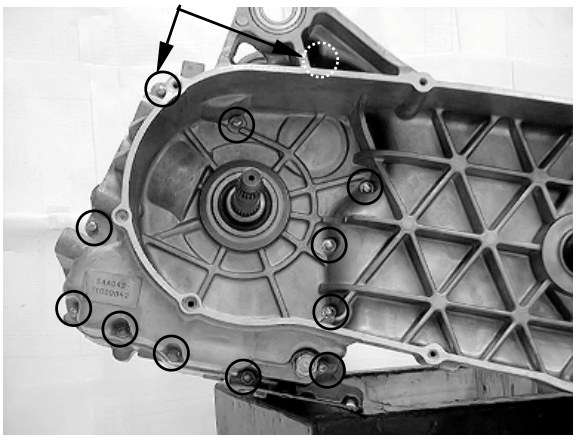


CRANKCASE SEPARATION

Remove the parts required for crankcase separation (page 13-2).

Remove the twelve bolts from left crankcase.

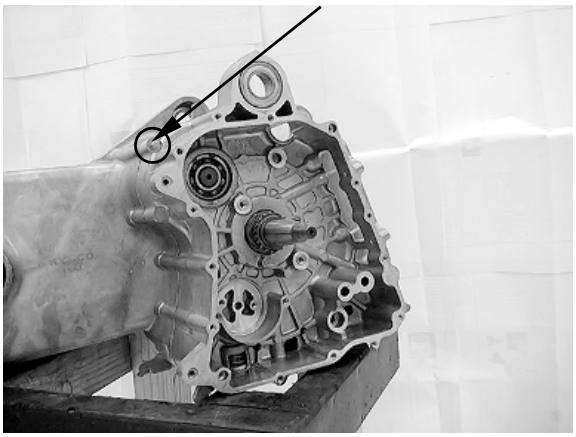
* Loosen the bolts in a crisscross pattern in several steps.



Remove the bolt from right crankcase.

Place the crankcase assembly with the left side down and separate the right crankcase from the left crankcase.

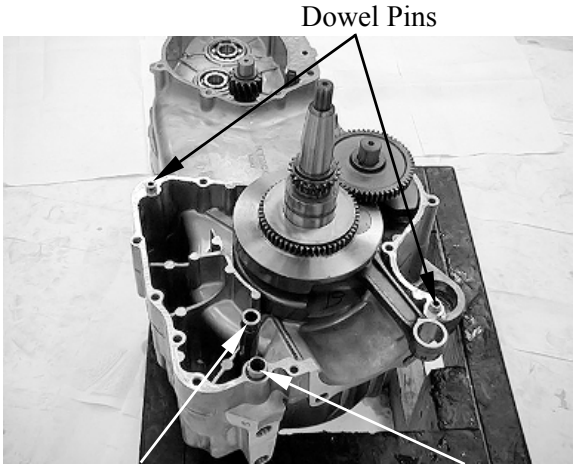
* Separate the right crankcase from the left crankcase while tapping them at several locations with a soft hammer.



Remove the dowel pins and O-ring.

Remove the oil collar and O-rings from the left crankcase.

Clean of the sealant from the left and right crankcase mating surfaces.

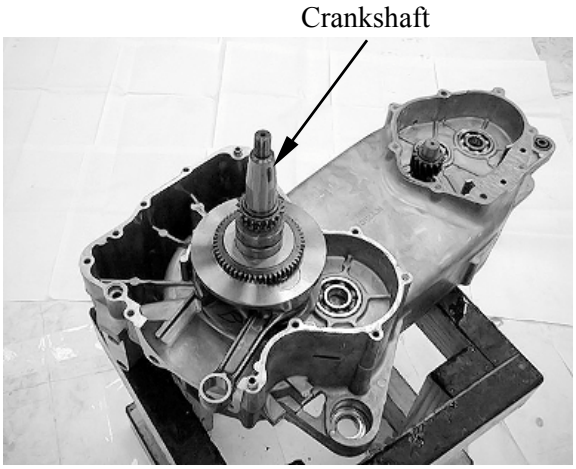


Remove the washer from the crankshaft.

Remove the balancer shaft from the left crankcase.

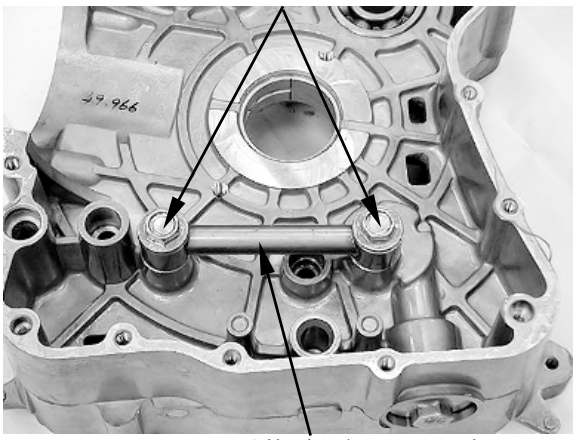


Remove the crankshaft from the left crankcase.



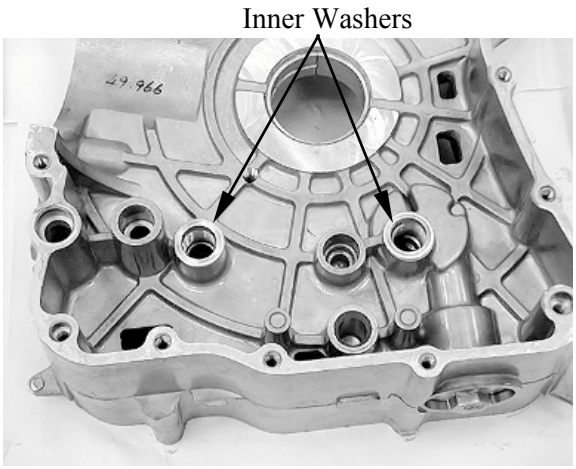
RIGHT CRANKCASE DISASSEMBLY

Remove the two bolts, outer washer, oil pipe and inner washers.

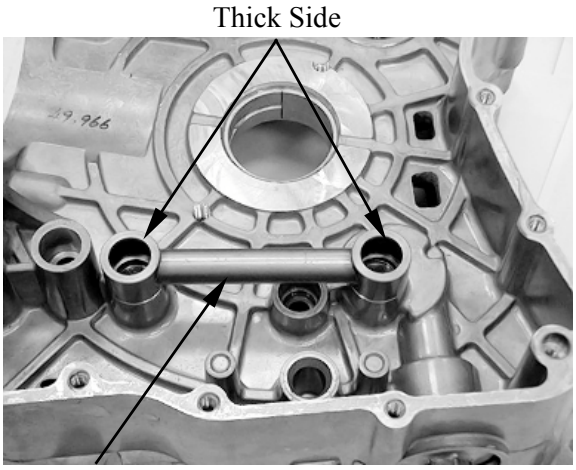


RIGHT CRANKCASE ASSEMBLY

Install the inner washers onto the right crankcase.



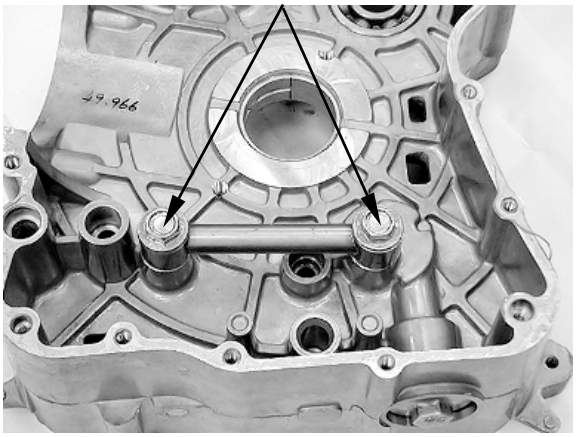
Install the oil pipe with the thick side face upward.



Install the outer washers and two bolts.
Tighten the two bolts to the specified torque.

Torque: 43 N•m (4.3 kgf•m, 31 lbf•ft)

Bolts/Outer Washer



CRANKSHAFT/CRANKCASE SELECTION

Crankcase and crankshaft are select fitted.

Record the main journal O.D. code (－ or ＋)

Record the main journal bearing I.D. color code (green, brown or yellow).

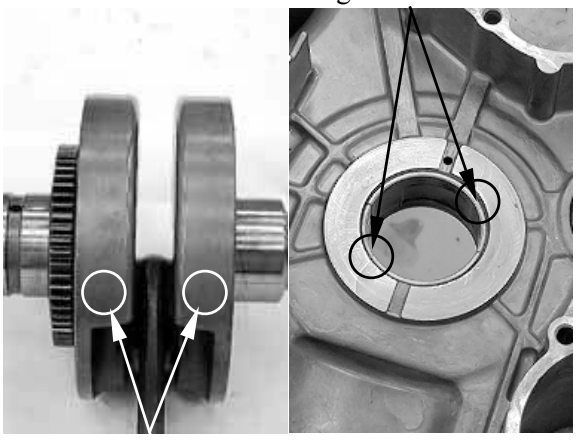
Record the right or left crankcase main journal I.D. code (A or B).

If the crankcase and/or crankshaft are replaced, select them with the following fitting table.

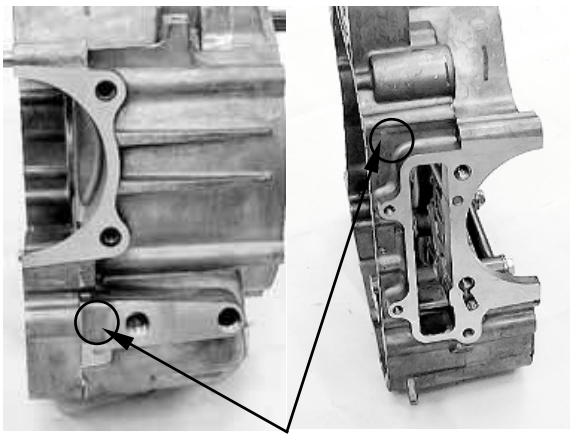
The "✔" mark in the table indicates that mating is possible in the crossed code.

Main journal O.D. code / Main journal bearing I.D. color code /Crankcase main journal I.D. code	＋	－
Green/A	✔	
Green/B		✔
Brown/A		✔
Yellow/B	✔	

Main Journal Bearing I.D. Color Code



Main Journal O.D. Code



Crankcase Main Journal I.D. Code

MAIN BEARING INSPECTION

Inspect the bearing inserts for unusual wear, damage or peeling and replace the crankcase if necessary.

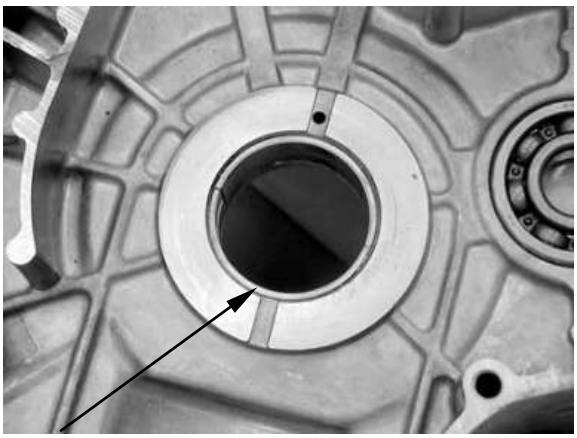
Main bearing oil clearance

Clean off any oil from the main bearing inserts and crankshaft journals.

Measure and record the crankshaft main journal O.D..

Measure and record the main bearing I.D..

Calculate the oil clearance by subtracting the journal O.D. from bearing I.D..



Bearing

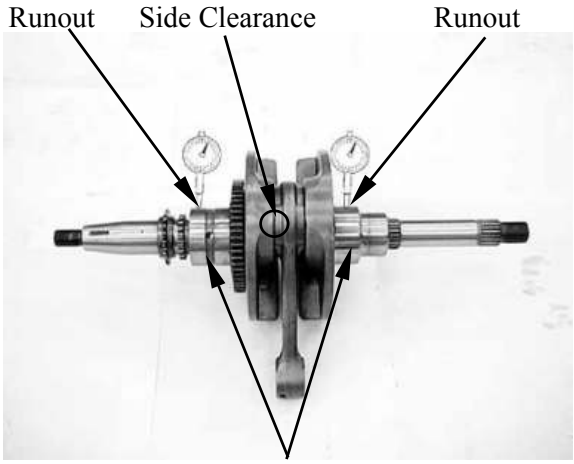
Standard:

0.025 – 0.041 mm (0.001 – 0.0016 in)

Service limit: 0.07 mm (0.003 in)

Replace the crankcase if the service limit is exceeded.

Select the replacement crankcase (page 13-7).



CRANKSHAFT INSPECTION

Measure the connecting rod big end side clearance.

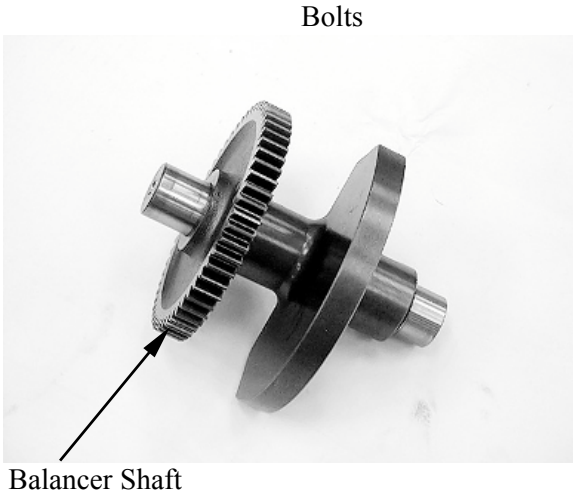
Service limit: 0.8 mm (0.031 in)

Measure the crankshaft runout.

Service limit: 0.06 mm (0.002 in)

BALANCER SHAFT INSPECTION

Inspect the balance shaft gear teeth.
Burrs/chips/roughness/wear → Replace.



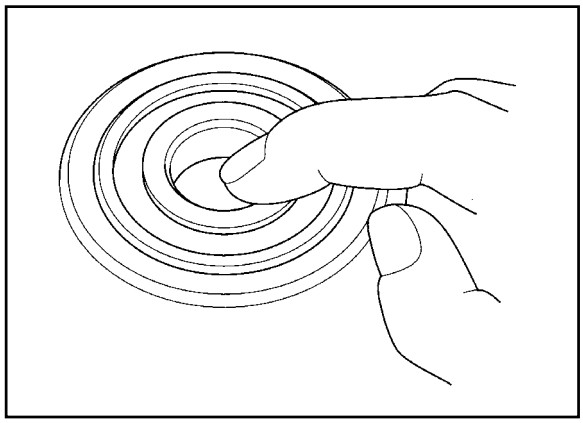
Balancer Shaft

BALANCER SHAFT BEARING REPLACMENT

Remove the crankshaft and balancer shaft (page 13-4).

Turn the inner race of each bearing with your finger.

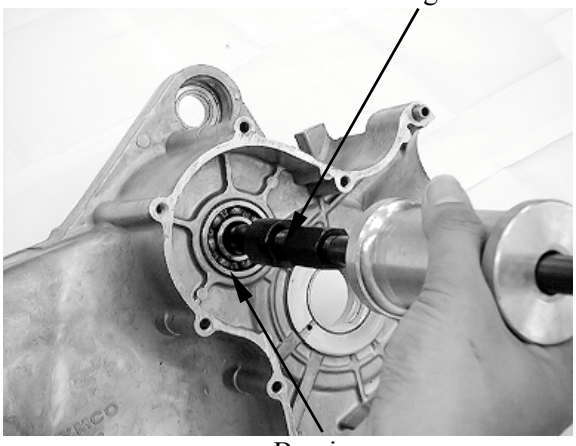
The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the crankcase.



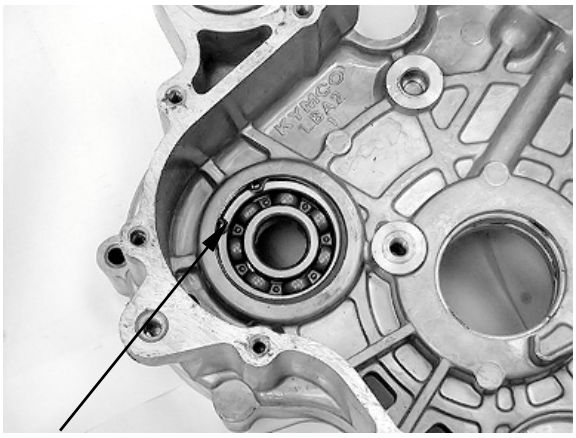
Replace the bearings if the races does not turn smoothly and quietly, or if they fit loosely in the crankcase.

Remove the balancer shaft bearing from the left crankcase using the special tool.

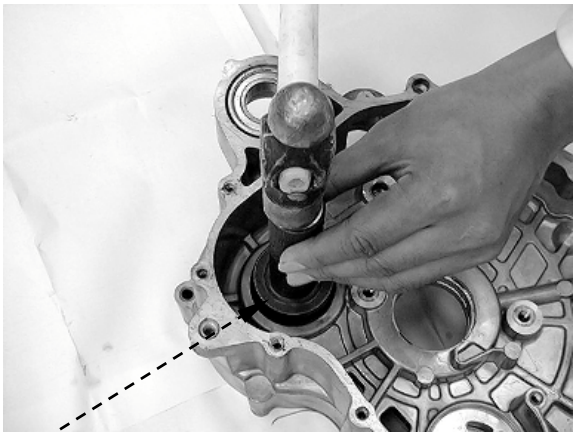
Special tool: Bearing puller E037



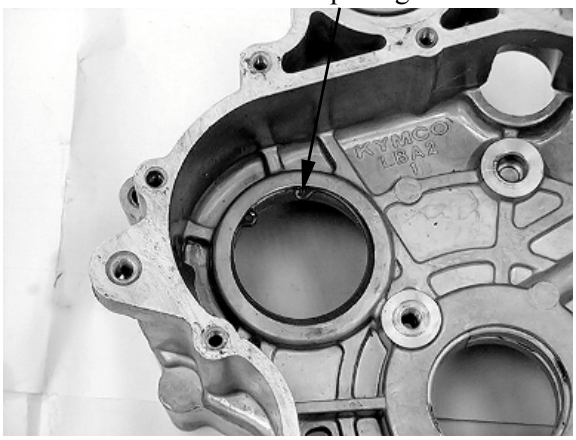
Remove the bearing snap ring from right crankcase.



Remove the balancer shaft bearing from the right crankcase.

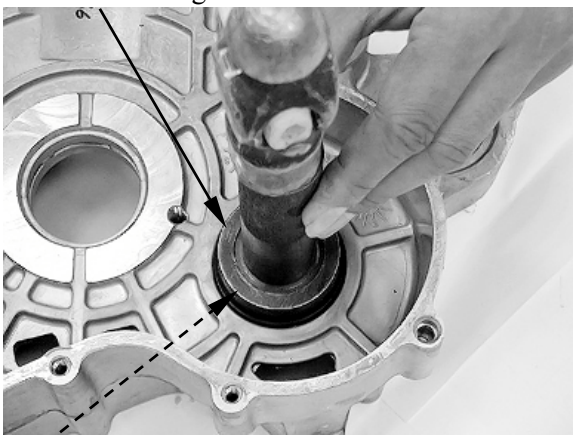

Bearing

Install the snap ring into the right crankcase.



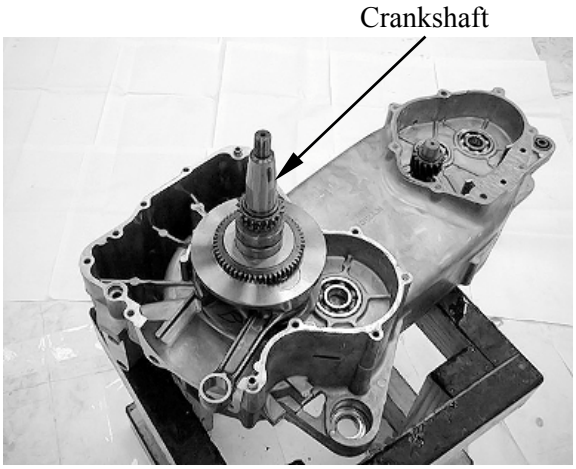
Install the new bearings to the right and left crankcase using special tool.

Special tool:
Oil seal & bearing driver E014

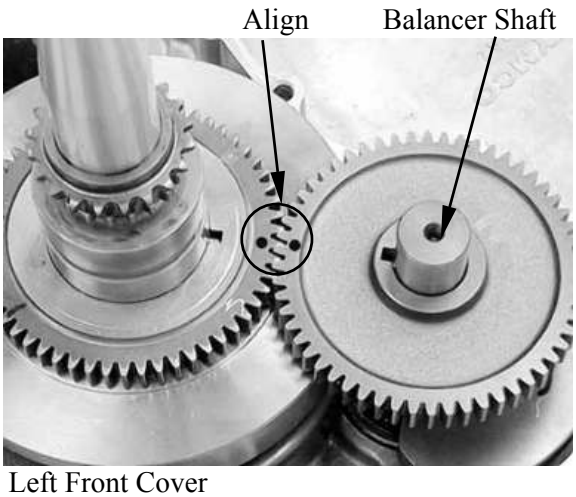


CRANKCASE ASSEMBLY

Install the crankshaft to the left crankcase.



Install the balancer shaft to align the punch mark with the “O” mark on the crankshaft.



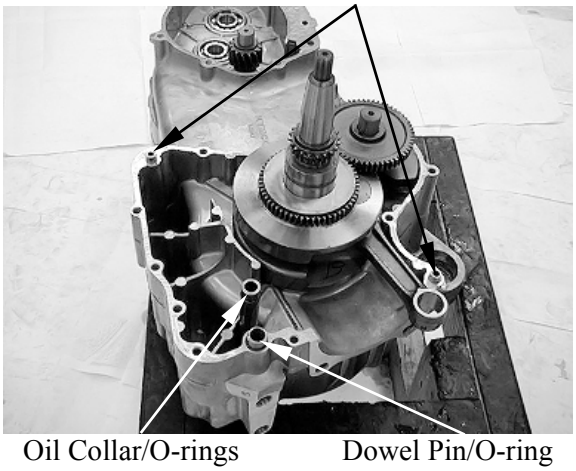
Install the washer onto the crankshaft.



Install the oil collar and O-rings

Clean the right and left crankcase mating surface thoroughly, being careful not to damage them.

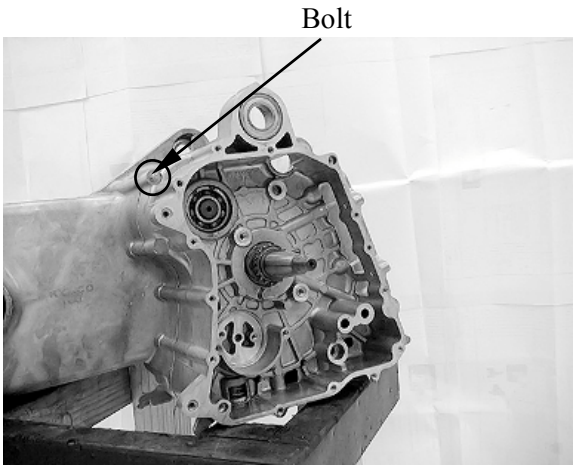
Install the dowel pins and O-ring.



Apply a light but through coating of sealant (Threebond 1215 or equivalent) to all crankcase mating surfaces except the oil passage area.

Install the right crankcase over the left crankcase.

Install and turn in the right crankcase bolt but do not tighten it.



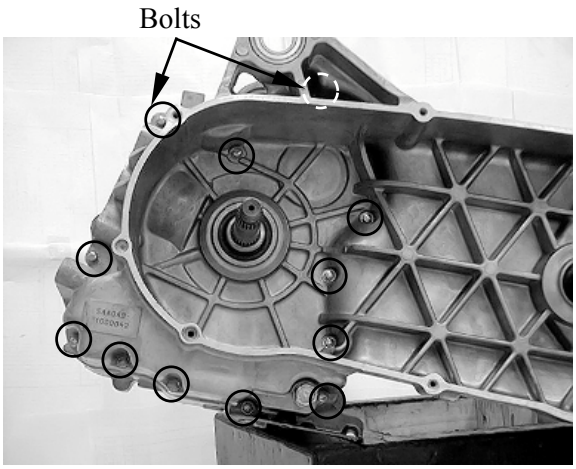
Install and tighten the left crankcase bolts in a crisscross pattern in 2 – 3 steps to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)

Tighten the right crankcase bolt to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)

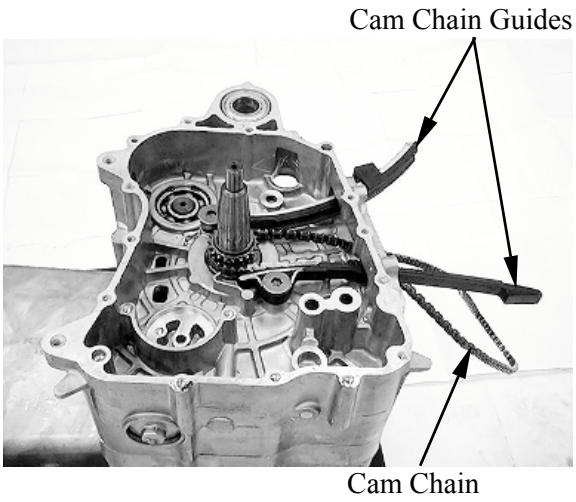
Make sure that the crankshaft turns smoothly.



Install the cam chain guides to the right crankcase and tighten the bolts to the specified torque.

Torque: 20 N•m (2 kgf•m, 15 lbf•ft)

Install the cam chain to right crankcase.

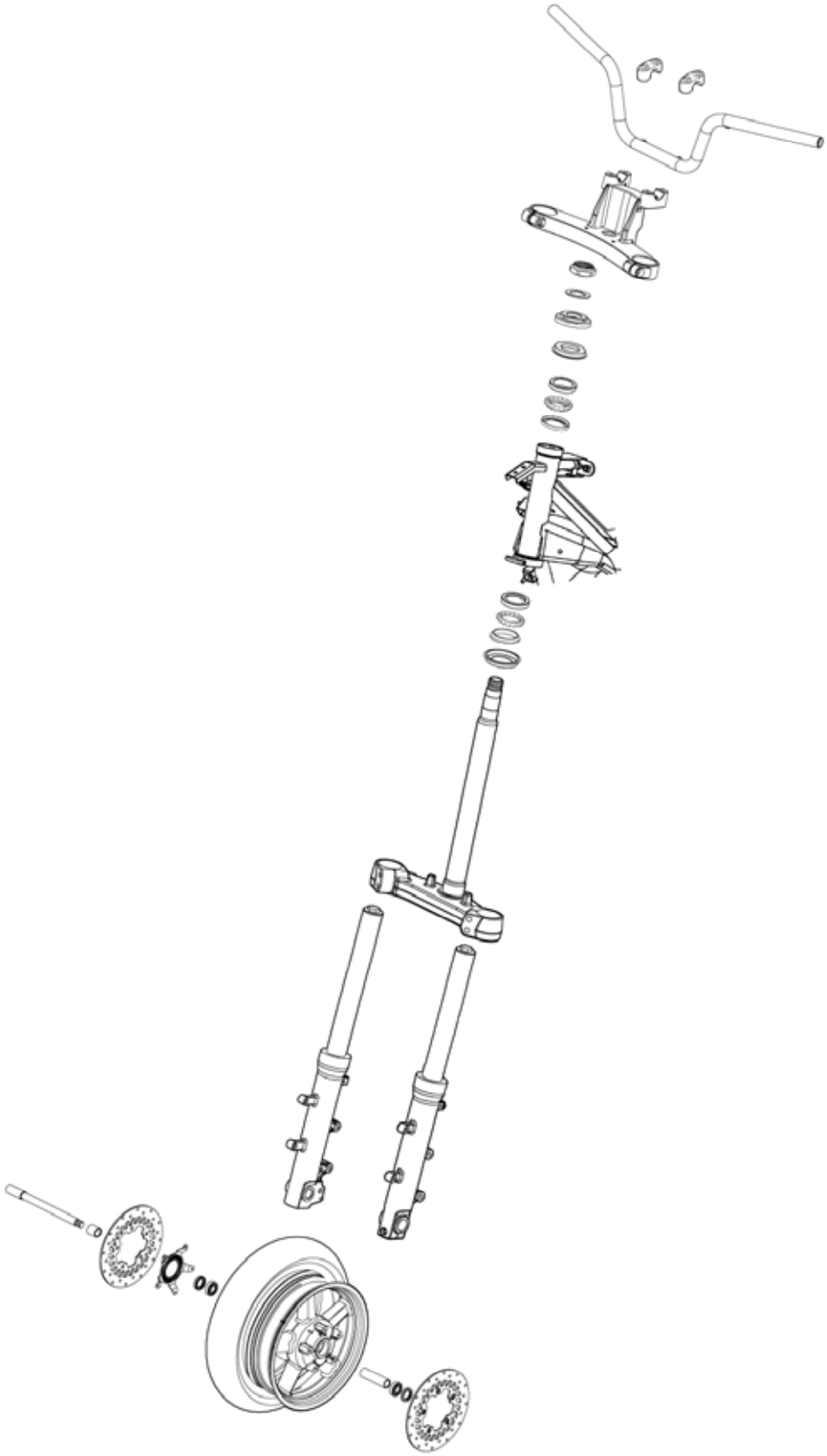


14

STEERING HANDLEBAR/FRONT WHEEL/ FRONT SHOCK ABSORBER

SCHEMATIC DRAWING ---------- 14- 1
SERVICE INFORMATION---------- 14- 2
TROUBLESHOOTING---------- 14- 3
FRONT WHEEL---------- 14- 4
FORK---------- 14-12
STEERING HANDLEBAR ---------- 14-14
STEERING STEM---------- 14-20

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- A contaminated brake disc or pad reduces stopping power. Discard contaminated parts and clean a contaminated disc with a high quality brake degreasing agent.
- This section covers of the front wheel , fork, handlebar, and steering.
- A jack or other support is required to support the vehicle.
- Do not twist or bend the brake hose and pipe when servicing.
- Use genuine KYMCO replacement bolts and nuts for all suspension pivots and mounting points
- Refer to section 16 for brake system information.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.6 (0.06)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm^2, 29 psi)	—
	Driver and passenger	225 kPa (2.25kgf/cm^2, 32 psi)	—
Axle runout		—	0.2 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)

TORQUE VALUES

Handlebar bolt	23 N•m (2.3 kgf•m, 17 lbf•ft)
Steering stem nut	62 N•m (6.2 kgf•m, 45 lbf•ft)
Steering stem lock nut	45 N•m (4.5 kgf•m, 32 lbf•ft)
Steering top thread	17 N•m (1.7 kgf•m, 12 lbf•ft)
Steering stem pinch bolt	23 N•m (2.3 kgf•m, 17 lbf•ft)
Front axle bolt	55 N•m (5.5 kgf•m, 40 lbf•ft)
Front brake disc bolt	42 N•m (4.3 kgf•m, 31 lbf•ft) Lock bolt: replace with a new one.
Front fork bolt	23 N•m (2.3 kgf•m, 17 lbf•ft)

SPECIAL TOOLS

Long socket wrench	E015
Bearing remover	E037
Oil seal & bearing install driver	E014

TROUBLESHOOTING

Hard steering
- Steering stem top thread too tight
- Worn or damaged steering bearings
- Worn or damaged steering bearing races
- Bent steering stem
- Insufficient tire pressure
- Faulty front tire

Steers to one side or does not track straight
- Damaged or loose steering bearings
- Bent fork
- Bent front axle: wheel installed incorrectly
- Bent frame
- Faulty front tire
- Worn or damaged front wheel bearings
- Worn or damaged engine mounting bushings

Front wheel wobbling
- Bent rim
- Worn or damaged front wheel bearings
- Faulty front tire
- Loose front axle fasteners

Wheel turns hard
- Faulty front wheel bearings
- Bent front axle
- Brake drug

Soft suspension
- Weak fork spring
- Insufficient fluid in fork
- Deteriorated fork fluid
- Incorrect fork fluid weight
- Low tire pressure

Hard suspension
- Bent fork tube
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage
- High tire pressure

Front suspension noise
- Worn slider or fork tube bushing
- Insufficient fluid in fork
- Loose fork fastener

FRONT WHEEL

REMOVAL

Loosen the front axle holder bolt.

Holder bolt



Loosen the front axle bolt.

Support the scooter securely using a hoist or equivalent and raise the front wheel off the ground.

Front Axle



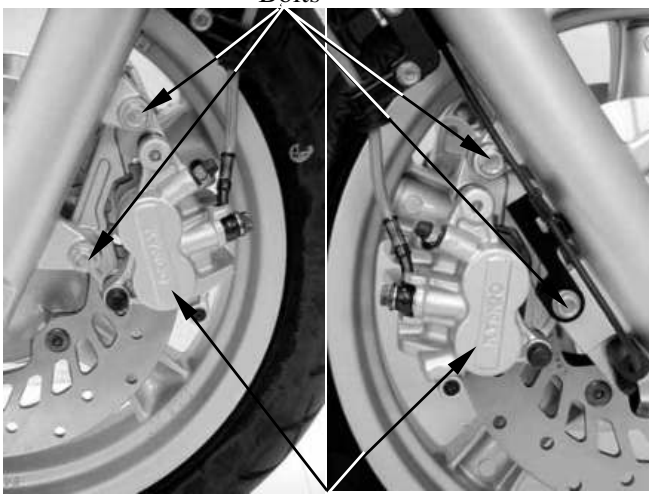
Remove the right and left mount bolts and front brake calipers.

Pull off the front axle out and remove the front wheel.

NOTE:

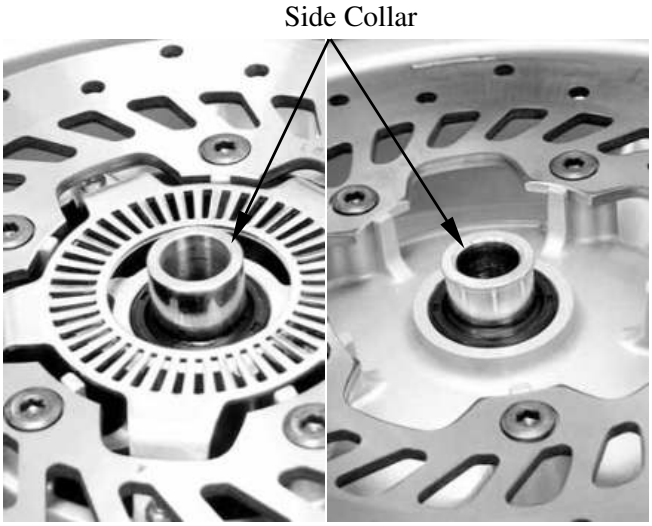
Do not operate the front and rear brake lever after removing the front wheel.

Bolts



Calipers

Remove the right and left side collar from the wheel hub.



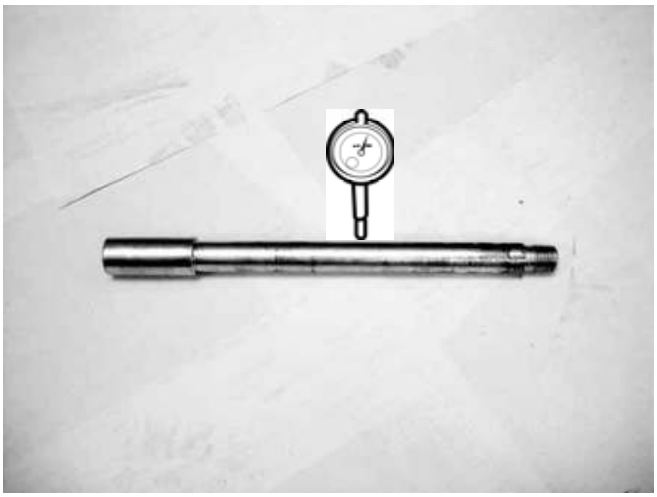
INSTECTION

Axle

Place the axle in V-blocks and measure the runout.

Actual runout is 1/2 the total indicator reading.

Service limit: 0.20 mm (0.008 in)



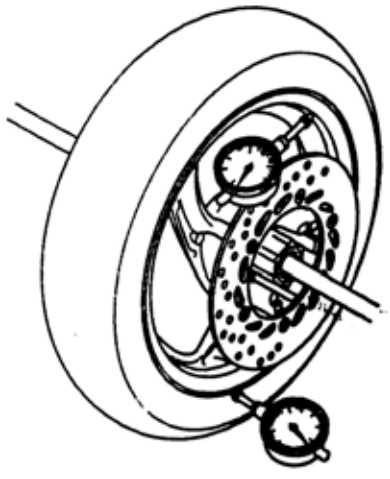
Wheel

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.

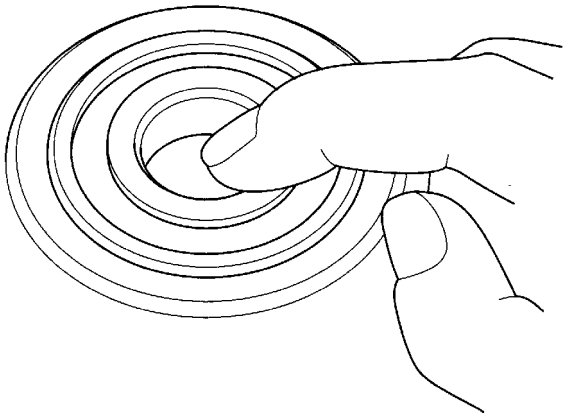
Service limit: Radial: 0.20 mm (0.008 in)
Axial: 0.20 mm (0.008 in)



Wheel Bearing

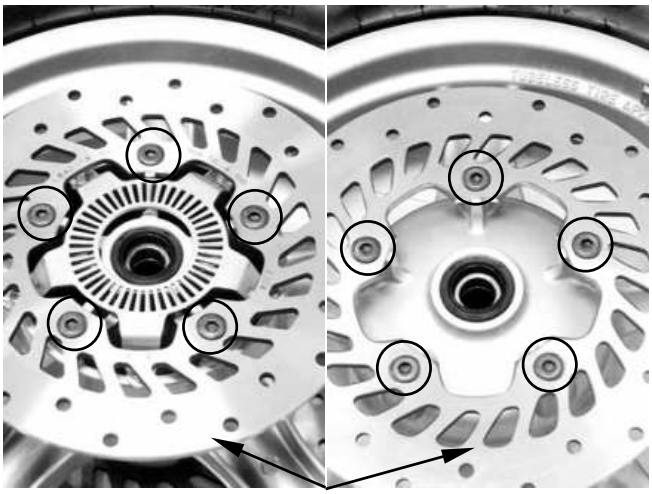
Turn the inner race of each bearing with your finger.

The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.



DIASSEMBLY

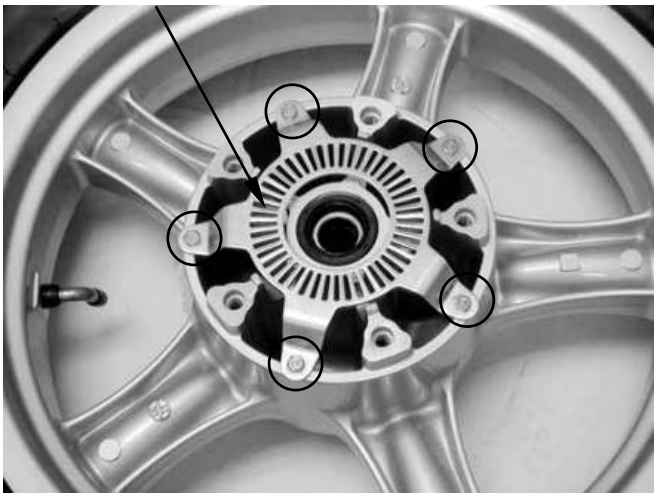
Remove the right and left disc bolts and brake discs.



Discs

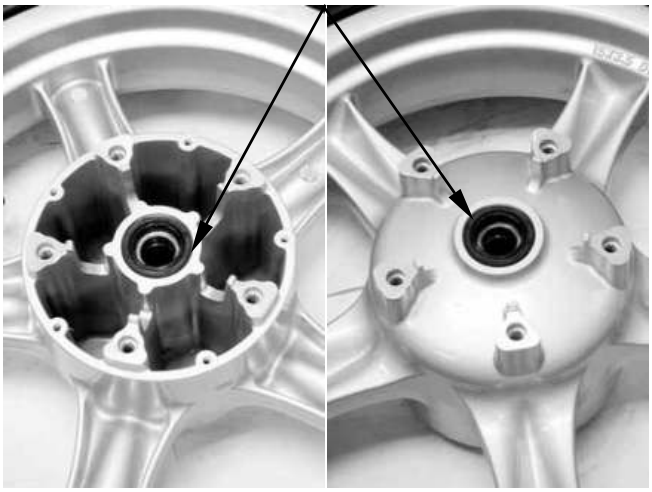
Remove the bolts and speed sensor guide.

Speed Sensor Guide



Remove the dust seals

Dust Seals



Install the bearing remover into the bearing.
Drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

Special tool: Bearing remover E037

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



ASSEMBLY

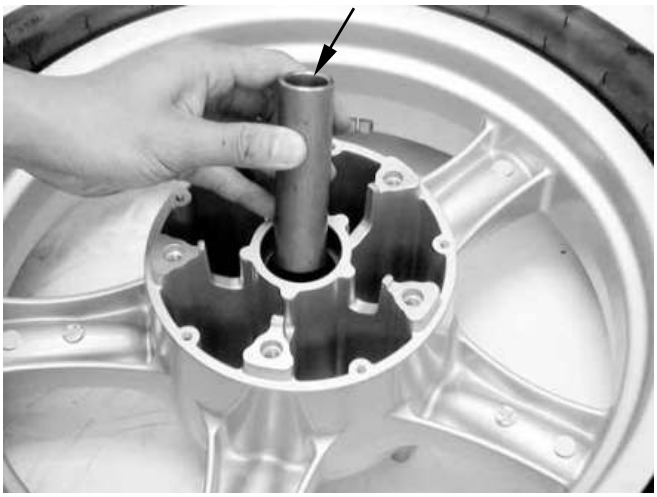
Pack a new bearing cavities with grease.
Drive the new left bearing squarely with the sealed side facing up until it is fully seated.

Special tool:
Oil seal & bearing install driver E014



Install the distance collar.

Distance Collar



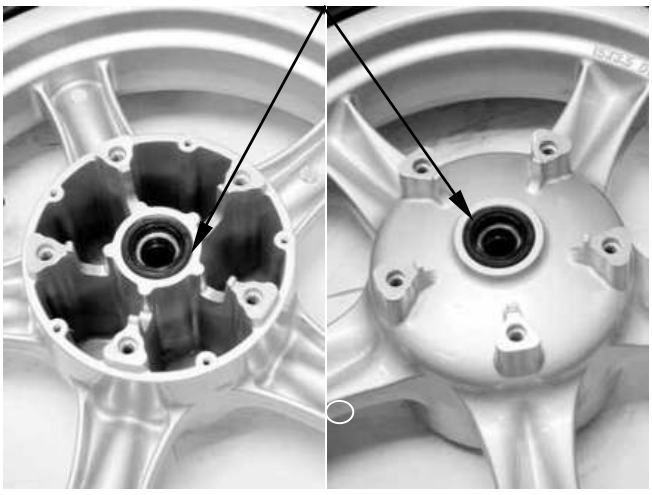
Pack a new bearing cavities with grease.
Drive the new right bearing squarely with the sealed side facing up until it is fully seated.

Special tool:
Oil seal & bearing install driver E014



Apply grease to the new dust seal lips.
Install the dust seals into the wheel hub until there are flush with the wheel hubs.

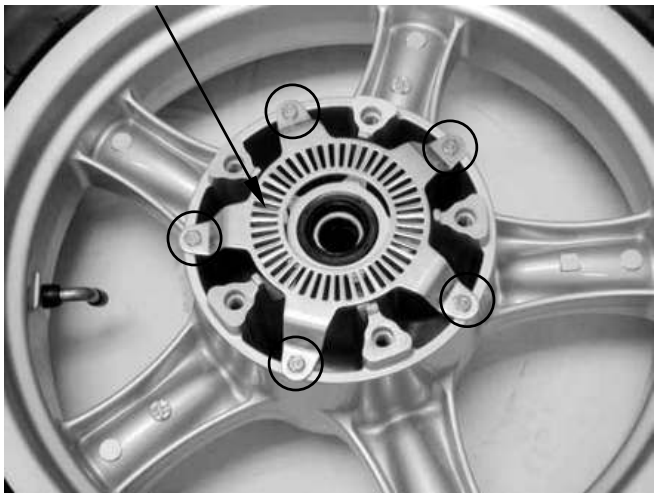
Dust Seals



Install the speed sensor guide.
Install the plate blots and tighten them to the specified torque.

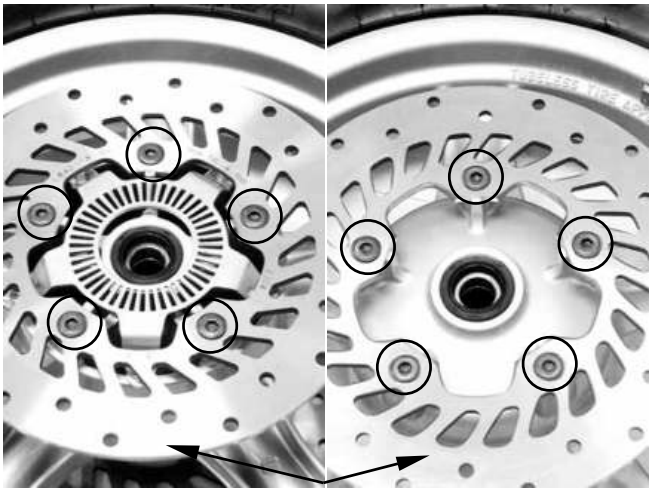
Torque: 10 N•m (1.0 kgf•m, 7 lbf•ft)

Speed sensor guide



Install the brake discs into wheel hub.
Install new disc bolts and tighten them to the specified torque.

Torque: 42 N•m (4.3 kgf•m, 31 lbf•ft)

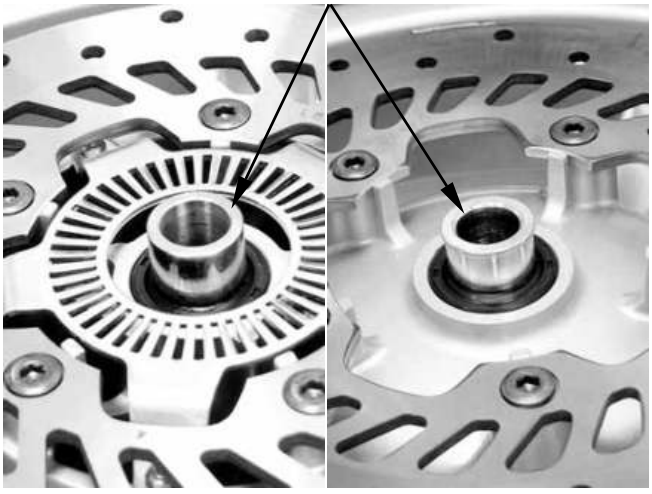


Discs

INSTALLATION

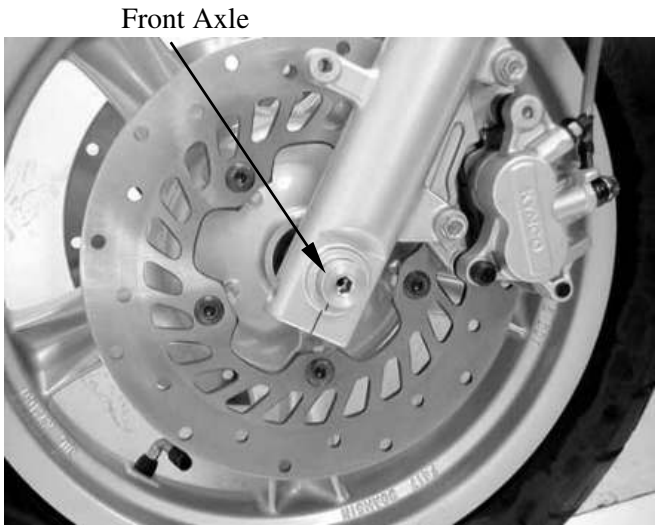
Install the side collars into the wheel hub.

Side Collar



Install the front wheel between the fork leg.
Install the front axle front left side.
Tighten the axle bolt to the specified torque.

Torque: 55 N•m (5.5 kgf•m, 40 lbf•ft)



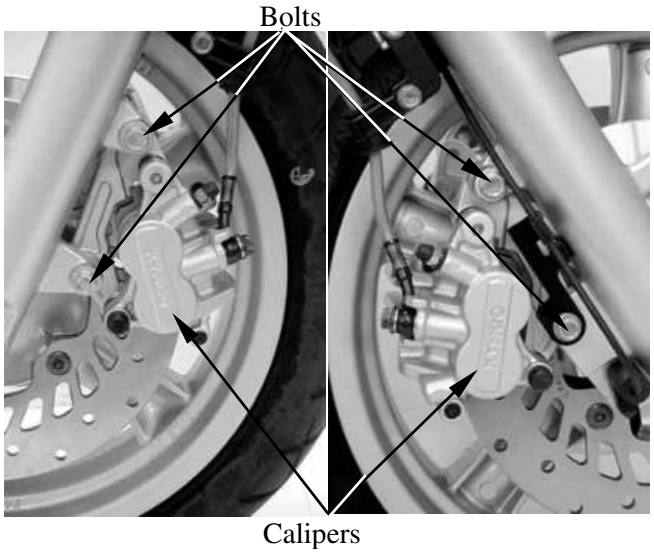
Tighten the front axle holder to the specified torque.

Torque: 23 N•m (2.3 kgf•m, 17 lbf•ft)

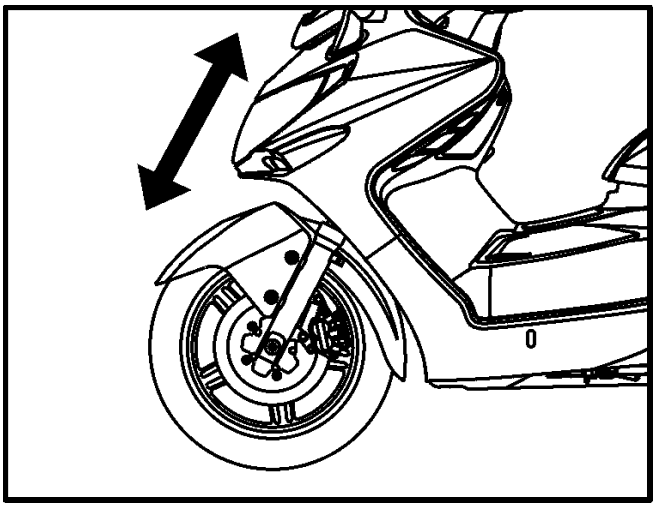


Install the right and left front calipers onto the fork leg.
Install and tighten the new front caliper mount blots to the specified torque.

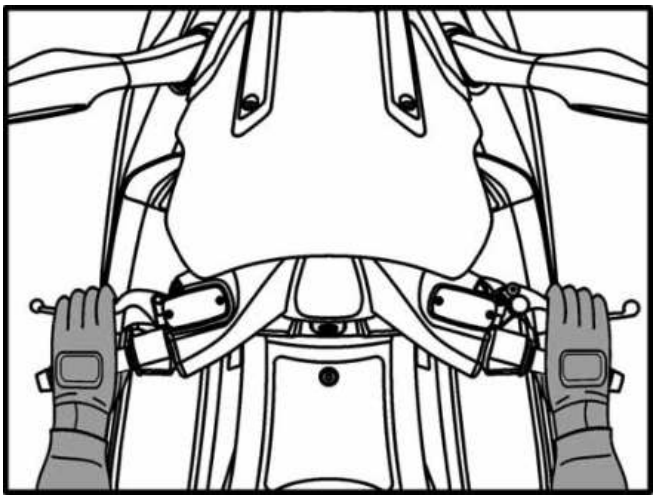
Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)



With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation.



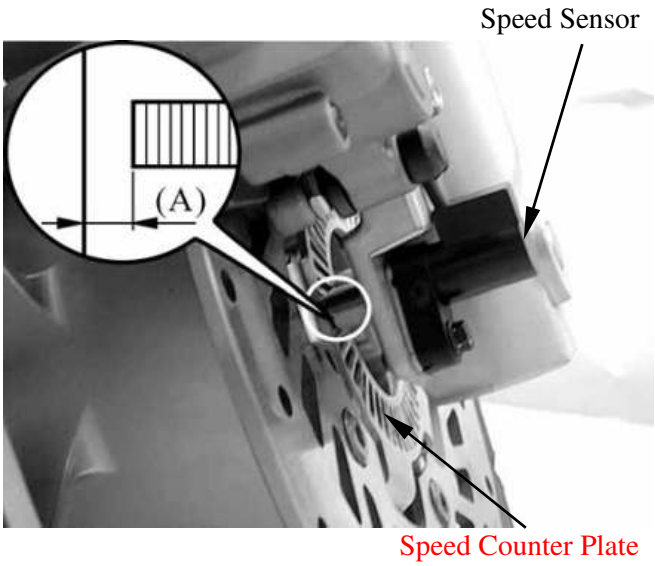
Check the brake operation by applying the brake lever.



Measure the speed sensor to speed sensor guide clearance.

Standard (A): 0.3 – 1.2 mm (0.0012 – 0.048 in)

Adjust it if necessary (page 20-5).

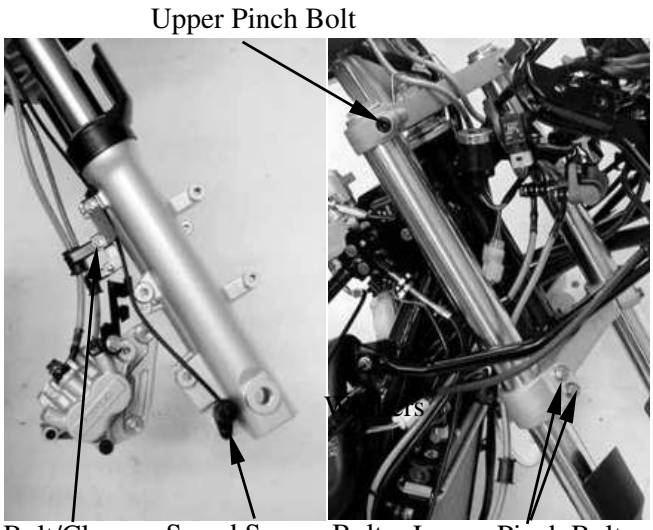


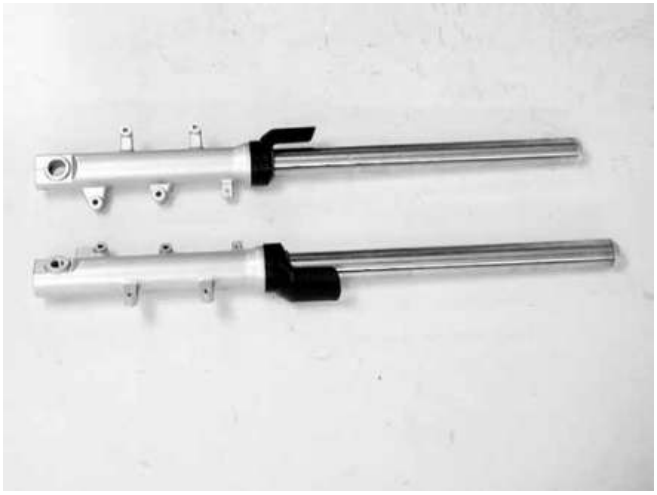
FORK

REMOVAL

Remove the front wheel (page 14-4).
Remove the front fender (page 2-4).

Remove the bolt and hose clamp.
Remove the bolt and speed sensor (only right fork).
Remove the upper fork pinch bolt.
Remove the lower fork pinch bolts.
Remove the fork from the handlebar post and steering stem.



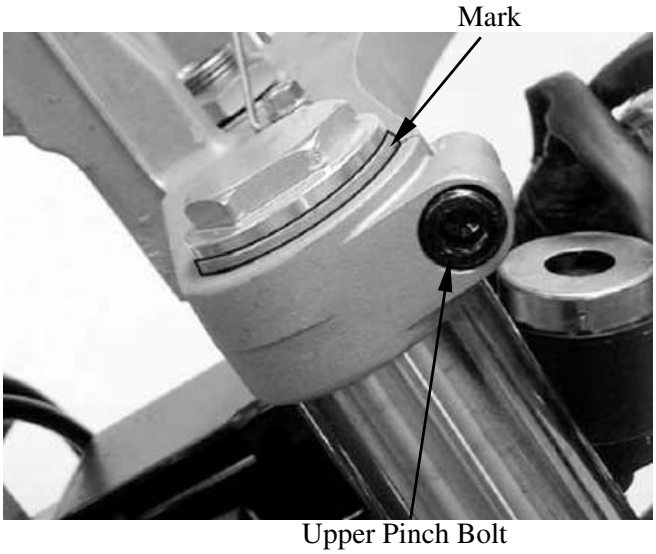


INSTALLATION

Install the fork tube into steering stem and handlebar post and align the mark on the fork tube with the handlebar post surface as shown.

Install and tighten the upper pinch bolt to the specified.

Torque: 23 N•m (2.3 kgf•m, 17 lbf•ft)



Tighten the lower pinch bolts to specified torque.

Torque: 23 N•m (2.3 kgf•m, 17 lbf•ft)

Install the brake caliper onto the fork leg with new mount bolts**.**

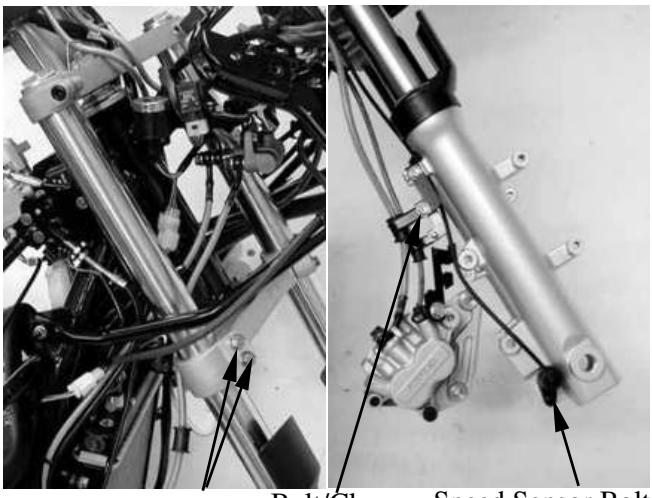
Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)

Install the brake hose clamp onto the fork leg with the bolt.

Install the speed sensor onto the right fork leg and tighten the bolt.

Install the front fender.

Install the front wheel.

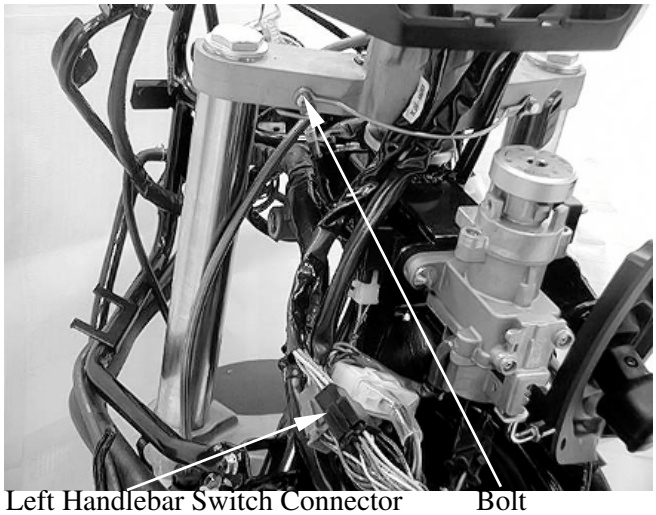


STEERING HANDLEBAR

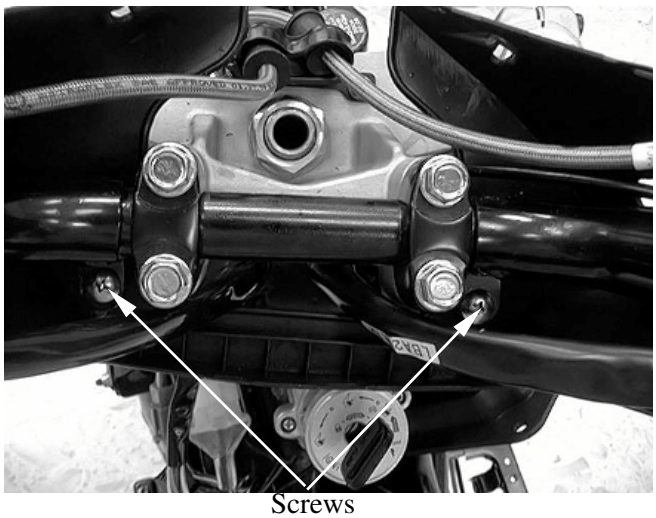
REMOVAL

Remove the front cover (page 2-11).
Remove the upper handlebar cover (page 2-5).

Remove the band bolt and disconnect the left handlebar switch connector.



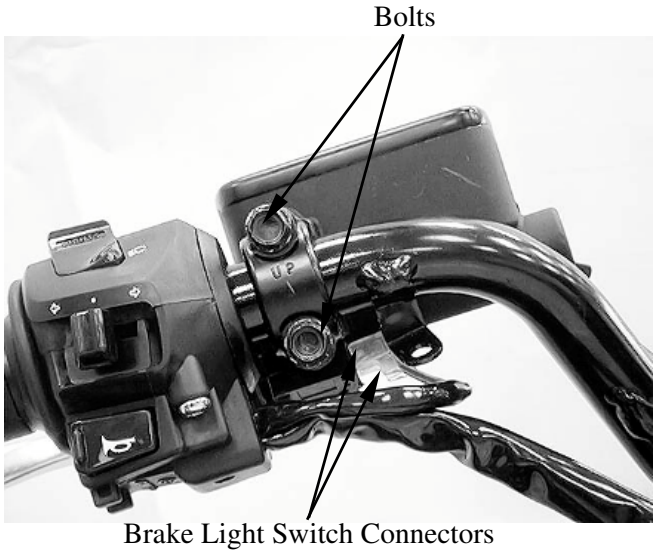
Remove the two screws and lower handlebar cover.



Remove the bolts, master cylinder holders and rear master cylinders.
Disconnect the left brake light switch connectors.

NOTE:

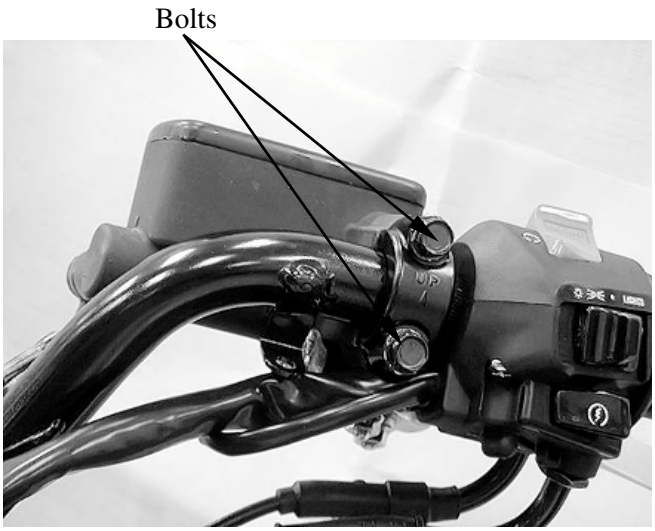
Keep the master cylinder upright to prevent air from entering the hydraulic system.



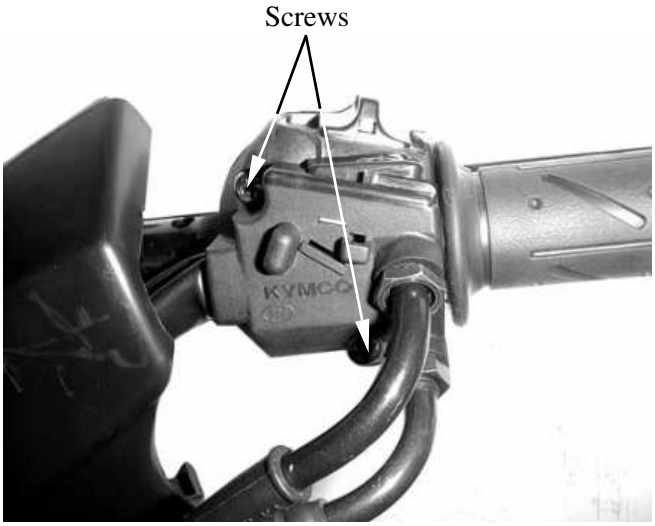
Remove the bolts, master cylinder holders and front master cylinders.

NOTE:

Keep the master cylinder upright to prevent air from entering the hydraulic system.



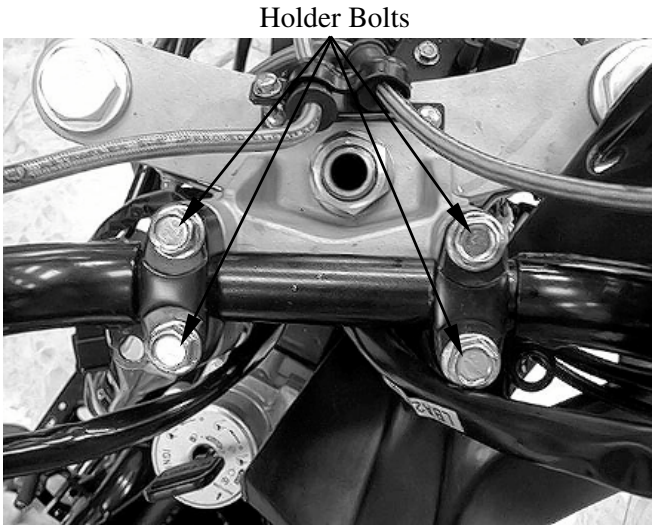
Remove the screws and right handlebar switch housing.



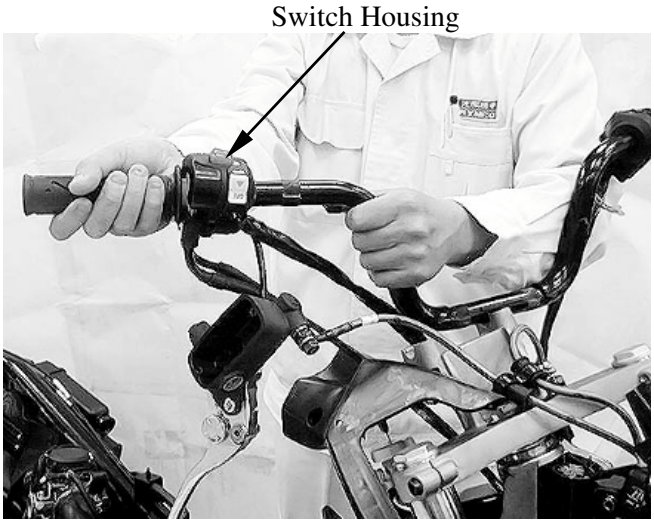
Remove the bolt/right handlebar weight.



Remove the bolts and upper holders.

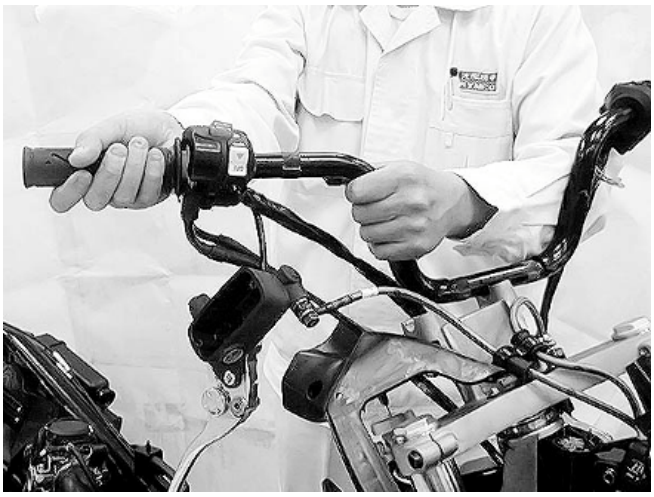


Remove the handlebar from the handlebar post and right handlebar switch housing.

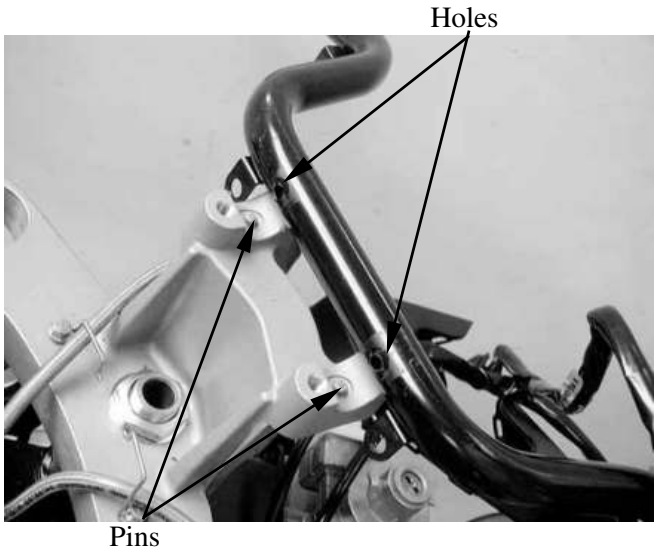


INSTALLATION

Pass the handlebar through the right handlebar switch housing.



Align the holes on the handlebar with the pins on the handle post.



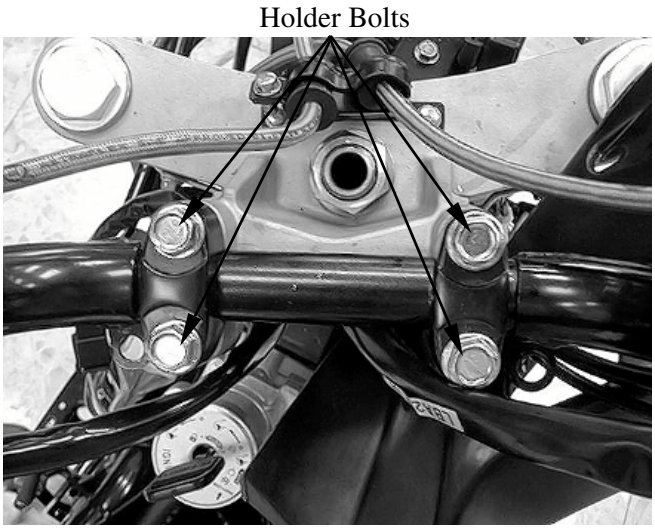
Install the handlebar to the handle post.

Install the upper holders with its punch marks facing toward.

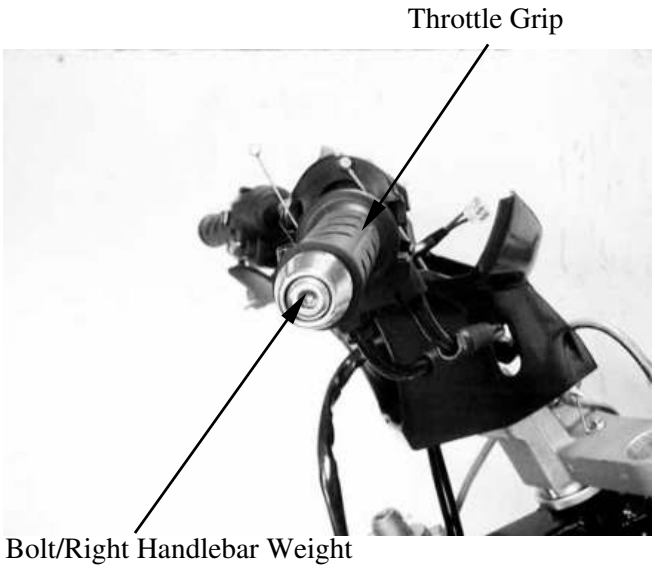
Install the upper holder bolts.

Tighten the front bolts first, then tighten the rear bolts.

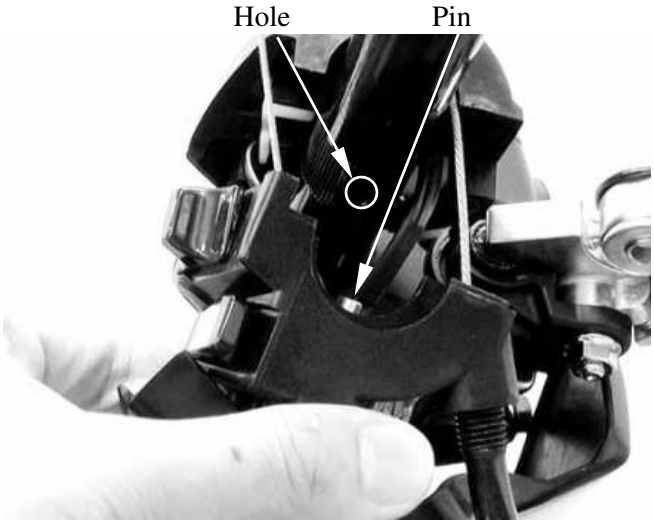
Torque: 23 N•m (2.3 kgf•m, 17 lbf•ft)



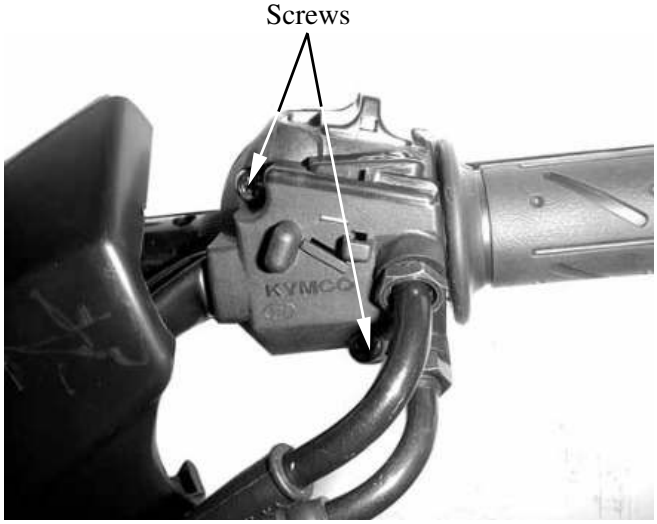
Install the throttle grip and bolt/right handlebar weight and tighten the bolt.



Align the pin on the right handlebar switch housing with the hole on the steering handle.



Install the screws and tighten the forward screw first, then tighten the rear screw.

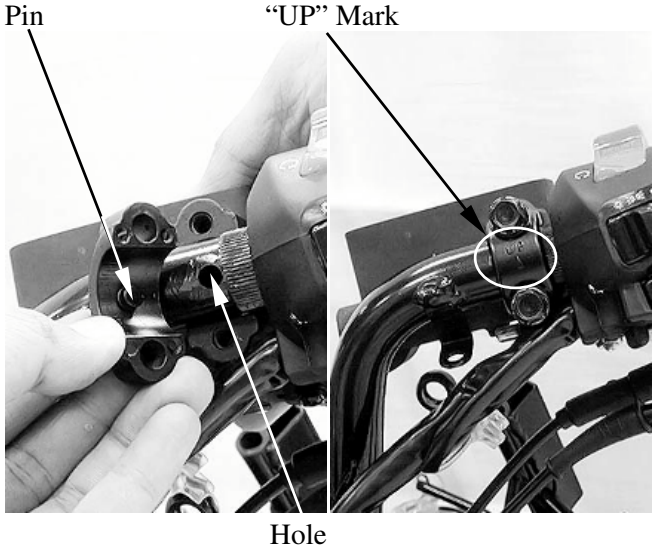


Align the pin on the rear master cylinder holder with the hole on the handlebar.

Install the front master cylinders and holder with the "UP" mark facing up.

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

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)



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



Install the rear master cylinders and holder with the "UP" mark facing up.

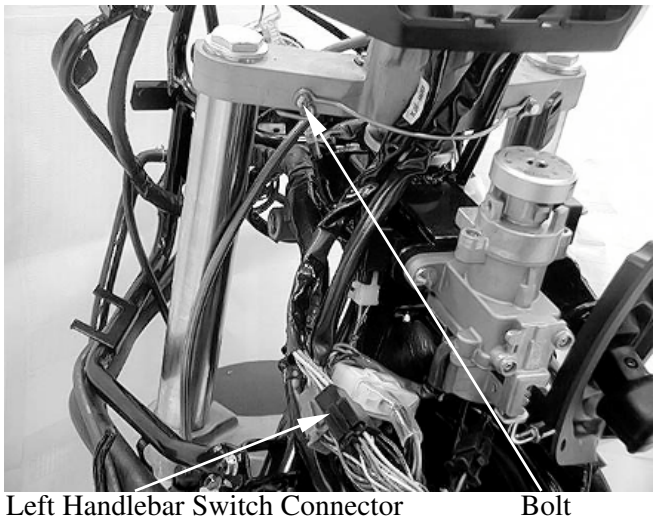
Install the bolts and tighten the upper bolt first then tighten the lower bolt to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)

Connect the brake light switch connectors.



Connect the left handlebar switch connector and tighten the band bolt.

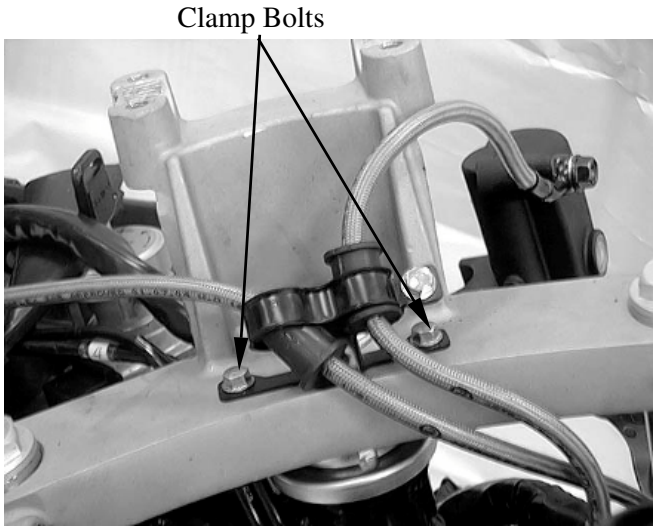


STEERING STEM

REMOVAL

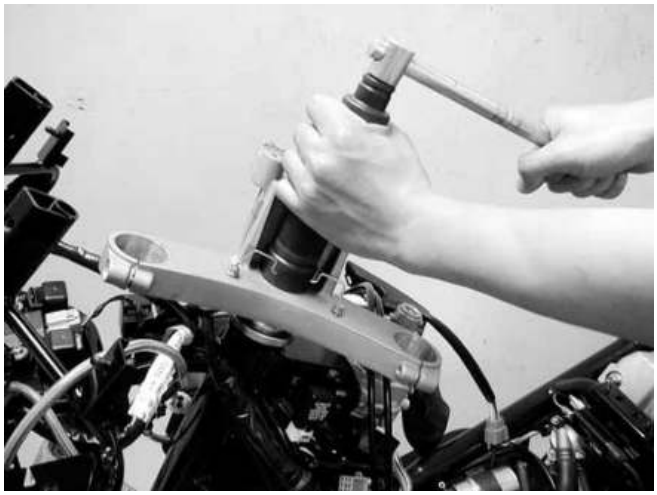
Remove the front fork (page 14-12).
Remove the steering handle (page 14-14).

Remove the bolts and brake hoses clamp.



Remove the nut, washer and handle post.

Special tool: Long socket wrench E015

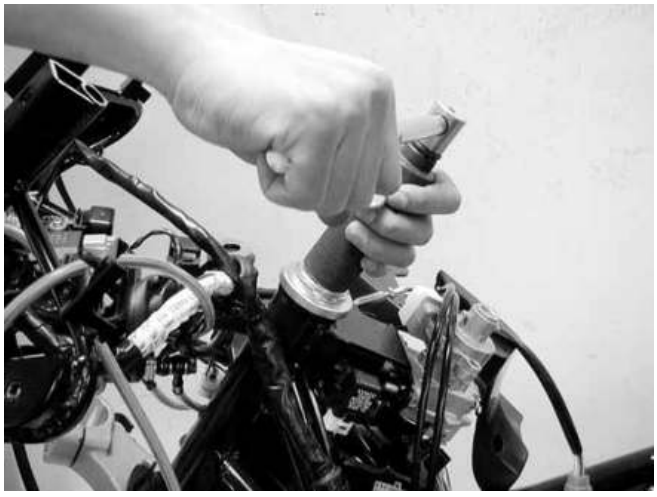


Remove the brake hoses from the clamps on the steering stem.



Remove the steering stem lock nut.

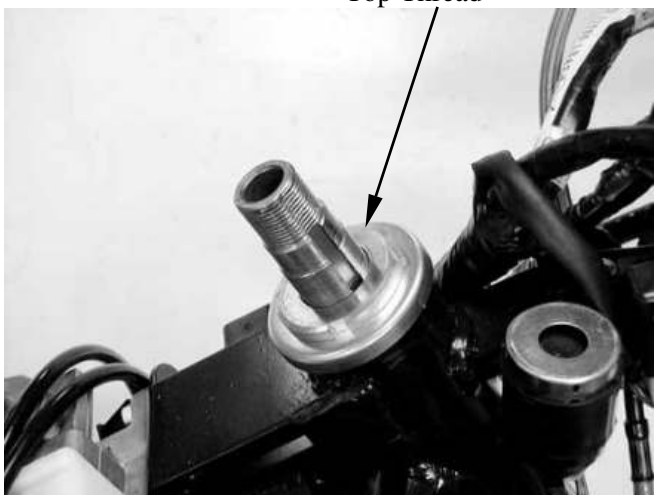
Special tool: Long socket wrench F007



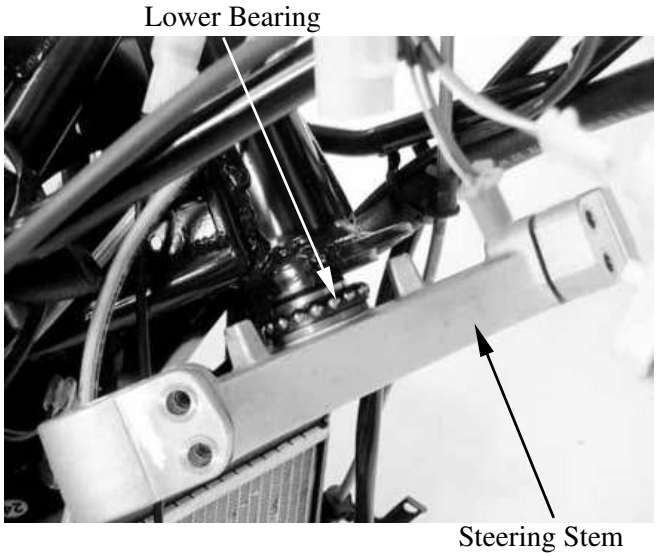
Remove the lock washer.



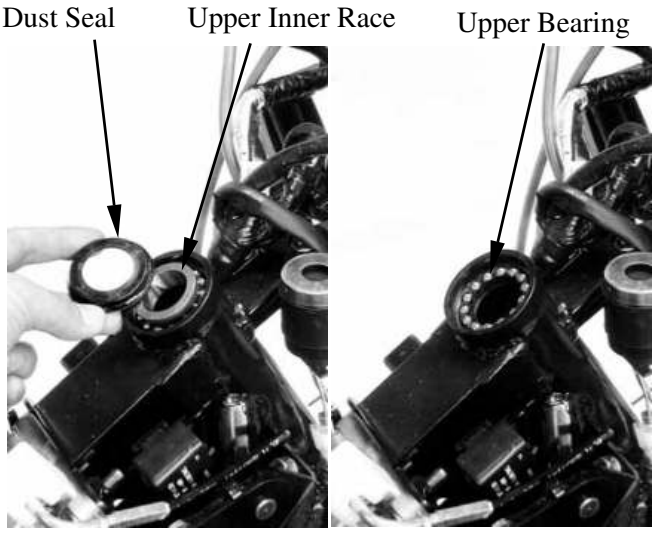
Loosen the steering top thread.
Hold the steering stem and remove the steering stem top thread.



Remove the steering stem and lower bearing.



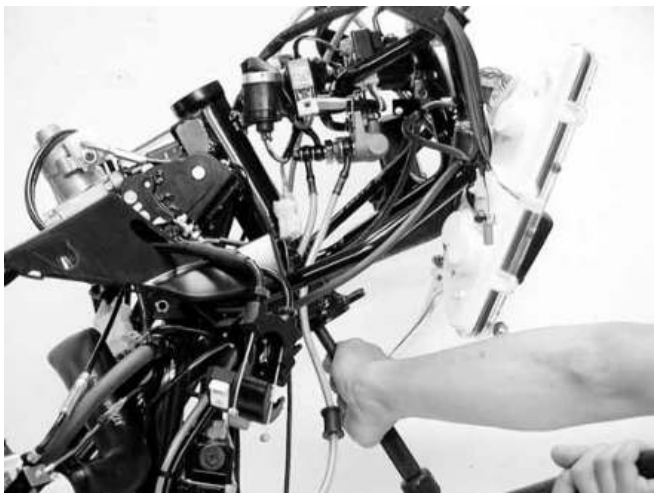
Remove the dust seal, upper inner race and upper bearing



BEARING REPLACEMENT

Remove the upper bearing outer race.

NOTE:
Always replace the bearings and races as a set.



Remove the lower bearing outer race.



Lower Outer Race

Drive a new upper bearing race into the steering head pipe.



Upper Outer Race

Drive a new lower bearing race into the steering head pipe.

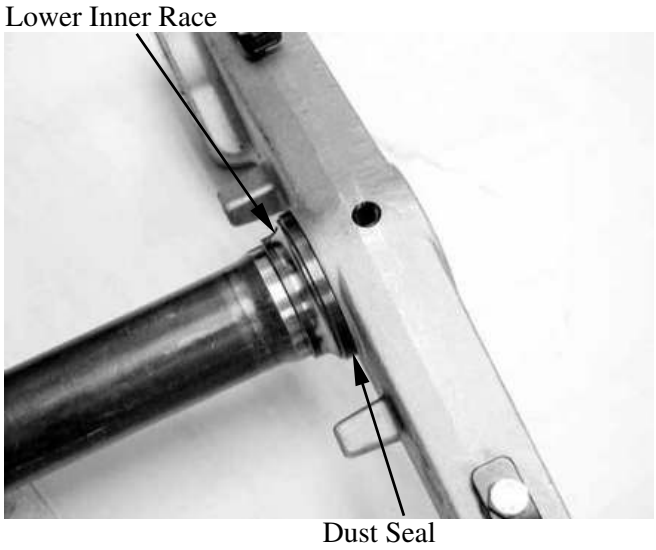


Lower Outer Race

Install the steering stem lock nut onto the steering to prevent the threads from being damaged when removing the lower bearing inner race from the steering stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the steering stem.

Remove the dust seal.



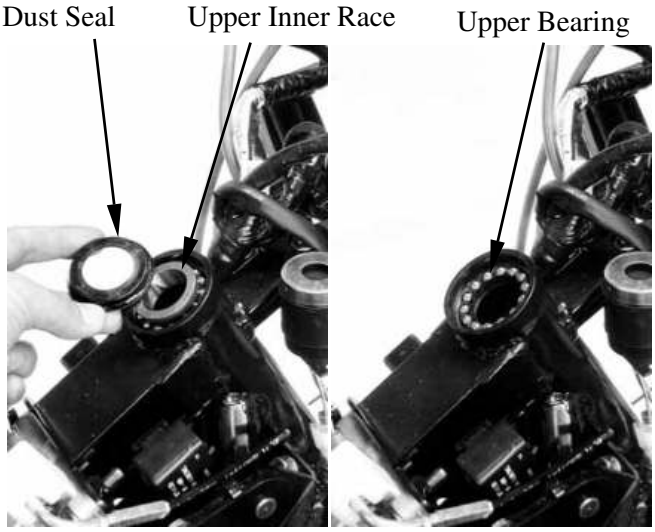
Install the dust seal.

Apply grease to a new lower bearing inner race using a hydraulic press.

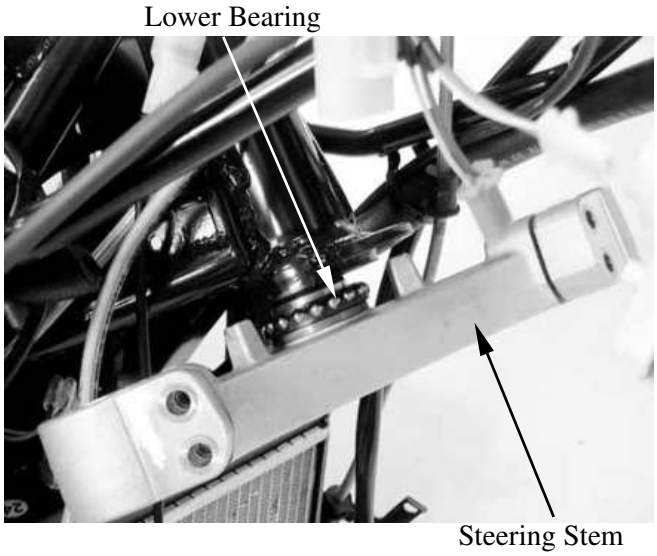
INSTALLATION

Apply grease to each new bearings and inner races.

Install the upper bearing, upper inner race and dust seal.

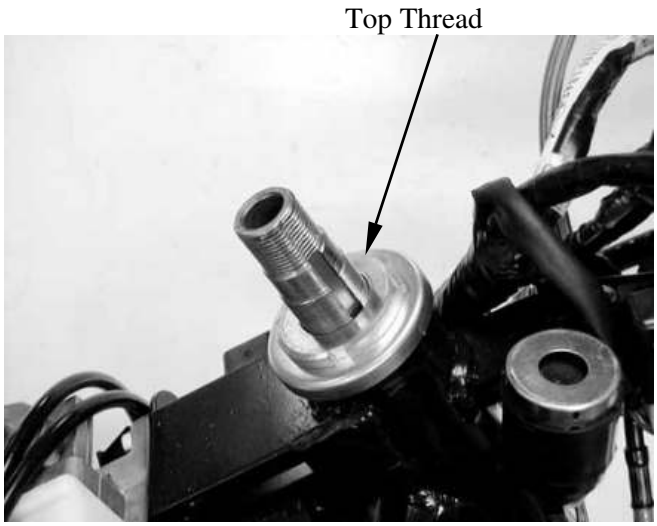


Install the lower bearing onto the stem.
Insert the steering stem into the steering head pipe.



Install the steering top thread and tighten it to the specified torque.

Torque: 17 N•m (1.7 kgf•m, 12 lbf•ft)

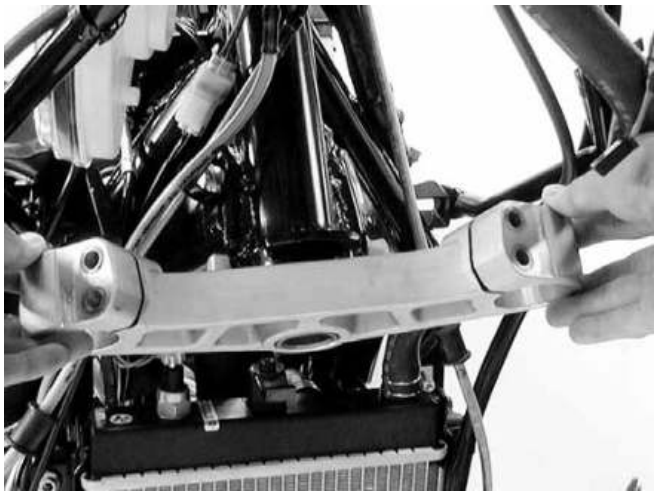


Turn the steering stem lock-to-lock several times to seat the bearings.

Temporarily loosen the steering stem top thread.

Install the fork (page 14-12).
Install the front wheel (page 14-9).
Install the steering top thread to the specified torque with the front wheel is grounded.

Torque: 17 N•m (1.7 kgf•m, 12 lbf•ft)



Install the lock washer aligning its tab into the groove on the steering stem.

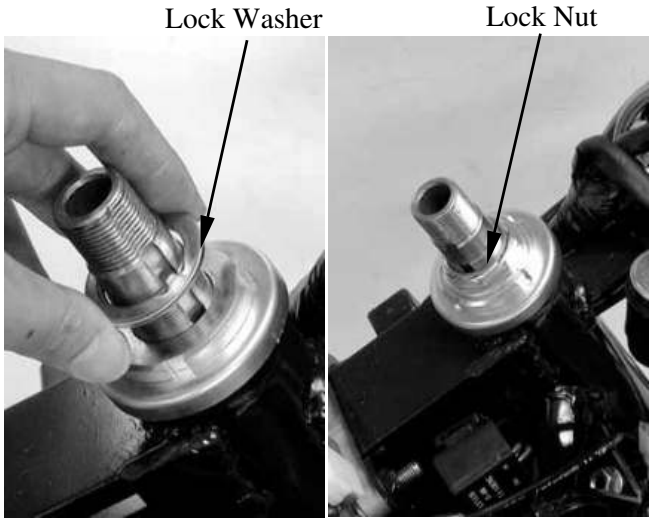
Install the steering stem lock nut.

Hold the steering stem top thread and tighten the steering stem lock nut to the specified torque.

Special tool: Long socket wrench F007

Torque: 45 N•m (4.5 kgf•m, 32 lbf•ft)

Make sure that the steering stem moves smoothly without play or binding.



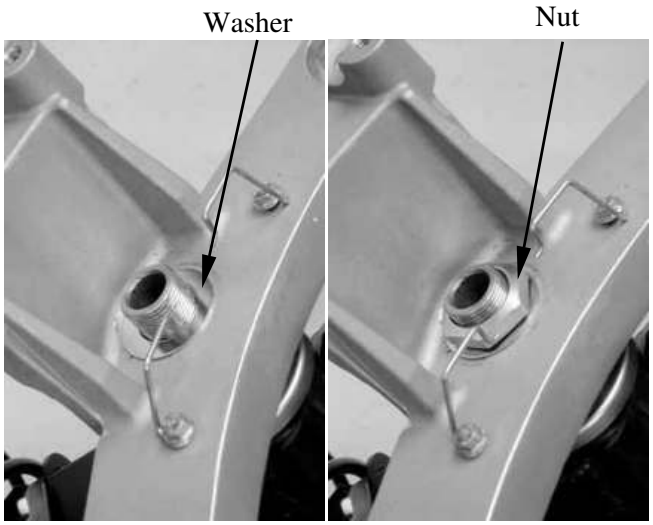
Install the handle post to the steering stem and front forks.

Install the washer and nut.

Tighten the handle post nut to the specified torque.

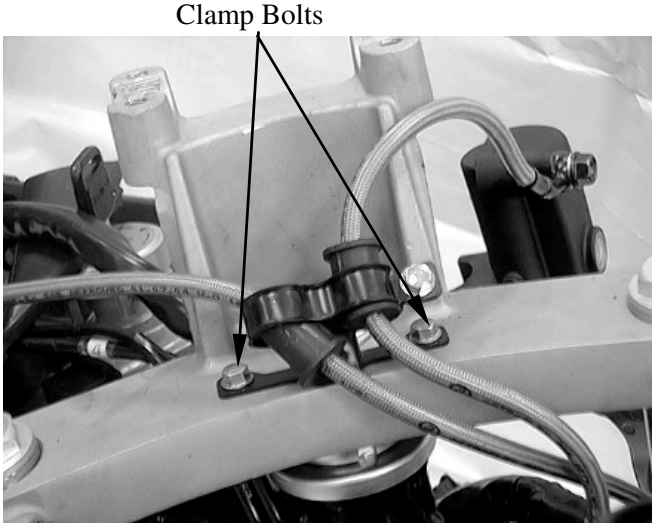
Special tool: Long socket wrench E015

Torque: 62 N•m (6.2 kgf•m, 45 lbf•ft)



Install the brake hose clamp and tighten the bolts securely.

Route the brake hoses and wires properly (page 1-12).

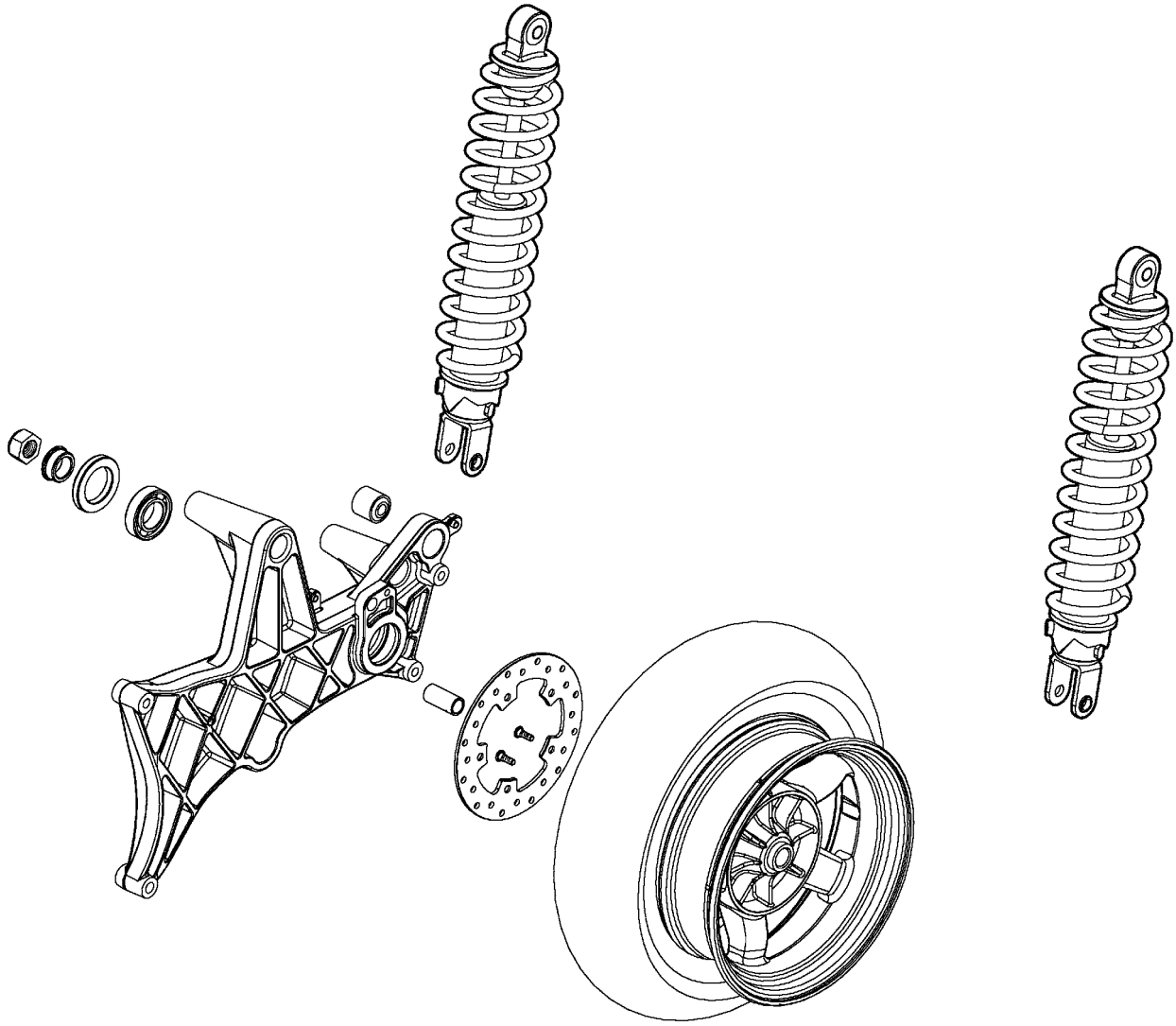


15

REAR FORK/REAR WHEEL/ REAR SHOCK ABSORBER

SCHEMATIC DRAWING ---------- 15- 1
SERVICE INFORMATION---------- 15- 2
TROUBLESHOOTING---------- 15- 3
REAR WHEEL/REAR FORK ---------- 15- 4
REAR SHOCK ABSORBER ---------- 15-10

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- A contaminated brake disc or pad reduces stopping power. Discard contaminated parts and clean a contaminated disc with a high quality brake degreasing agent.
- Riding on damaged rims impairs safe operation of the vehicle.
- This section covers of the rear wheel and rear suspension.
- A jack or other support is required to support the vehicle.
- Do not twist or bend the brake hose when servicing.
- Use genuine KYMCO replacement bolts and nuts for all suspension pivots and mounting points.
- Refer to section 16 for brake system information.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Rider only	250 kPa (2.50 kgf/cm^2, 36 psi)	—
	Rider and passenger		—
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)

TORQUE VALUES

Rear brake disc bolt	42 N•m (4.3 kgf•m, 31 lbf•ft) ALOC bolt: replace with a new one.
Rear axle nut	180 N•m (18 kgf•m, 130 lbf•ft)
Rear shock absorber upper mounting bolt	40 N•m (4 kgf•m, 29 lbf•ft)
Rear shock absorber lower mounting bolt	40 N•m (4 kgf•m, 29 lbf•ft)
Final shaft holder bolt	32 N•m (3.2 kgf•m, 23 lbf•ft)
Right/parking brake caliper mounting bolt	32 N•m (3.2 kgf•m, 23 lbf•ft) ALOC bolt: replace with a new one.

TROUBLESHOOTING

Rear wheel wobbling
- Bent rim
- Faulty tire
- Axle not tightened properly
- Engine mount bolt not tightened properly
- Loose or worn final gear shaft bearing
- Insufficient tire pressure
- Unbalanced tire and wheel

Soft suspension
- Weak rear shock absorber spring
- Oil leakage from damper unit

Rear wheel noise
- Worn rear wheel axle bearings
- Worn rear fork bearings
- Deformed rear fork

Hard suspension
- Bent damper rod
- Worn or damaged engine mount bushings
- High tire pressure

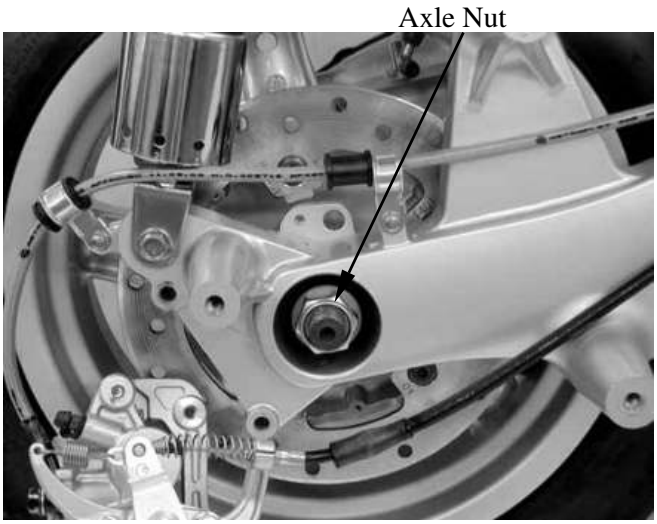
Rear suspension noisy
- Loose mounting fasteners
- Faulty shock absorber
- Weak rear suspension mount bushings

REAR WHEEL/REAR FORK

REMOVAL

Remove the muffler (page 2-15).
Remove the rear/parking brake caliper (page 16-26).

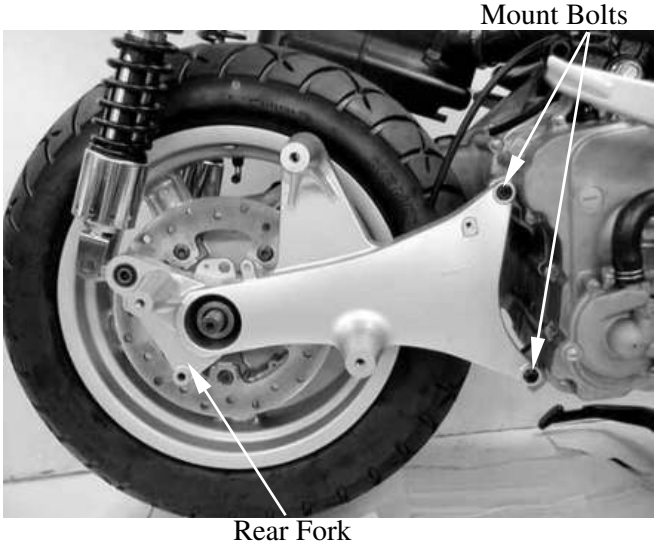
Loosen the rear axle nut.
Support the scooter securely on its main stand.



Remove the bolts and brake hose/cable clamps from the rear fork.
Remove the rear shock absorber lower mount bolt.
Remove the rear axle nut.



Remove the rear fork mount bolts and rear fork.



Remove the inner side collar.



Inner Side Collar

Remove the rear wheel.



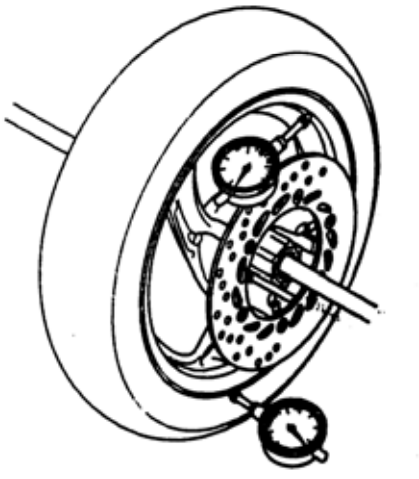
Rear Wheel

INSTECTION

Wheel

Check the wheel rim runout using dial indicator.

Actual urnout is 1/2 the total indicator reading.



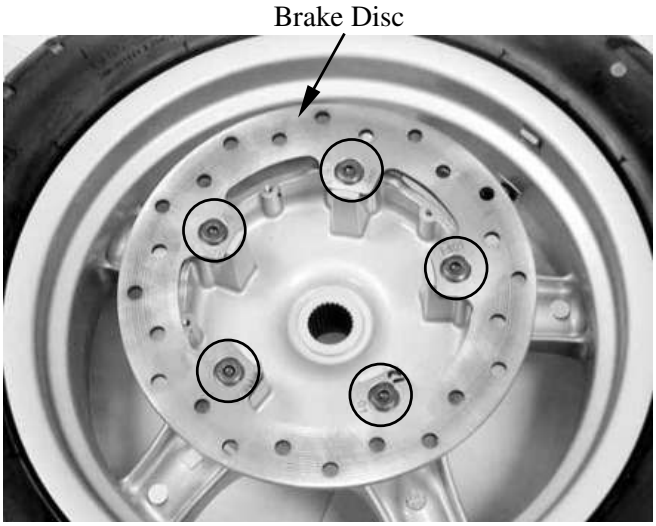
Service Limits:

Radial: 2.0mm (0.08 in)

Axial: 2.0mm (0.08 in)

DISASSEMBLY

Wheel
Remove the brake disc bolts and rear brake disc.

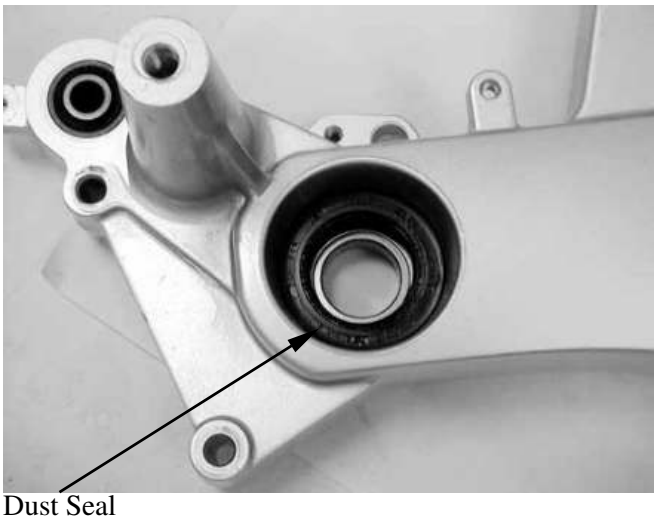


REAR FORK BEARING REPLACEMENT

Remove the outer side collar from the rear fork.



Remove the dust seal from the rear fork.

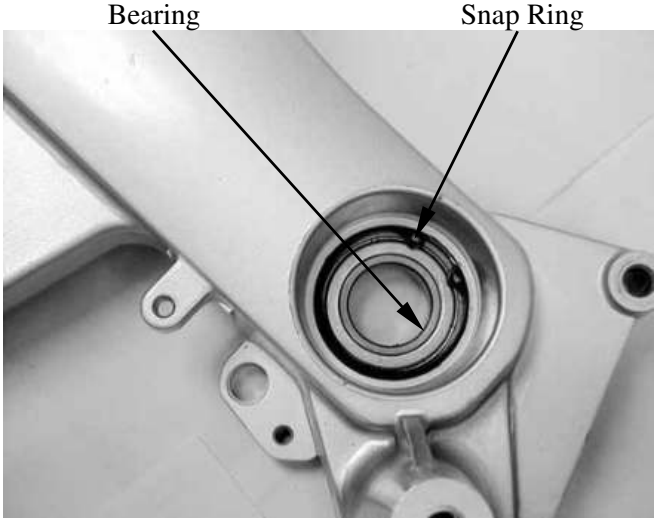


Remove the snap ring.

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

Remove and discard the bearing if the race does not turn smoothly and quietly, or if it fits loosely in the rear fork.

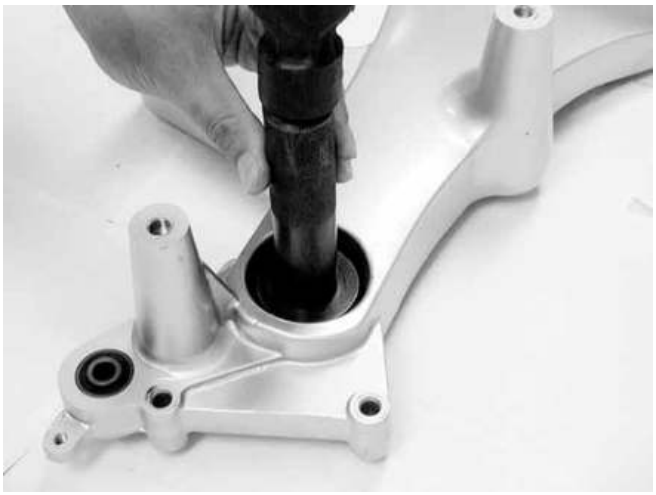
Remove the bearing from the rear fork.



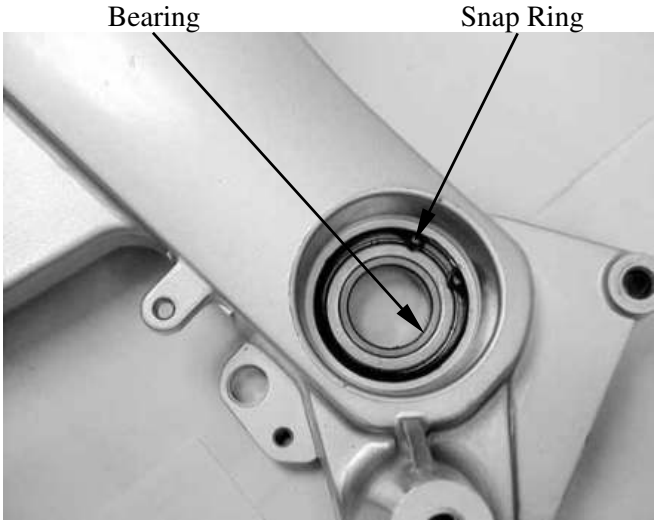
Drive in a new bearing squarely until it is fully seated, using the special tools.

Special tool:

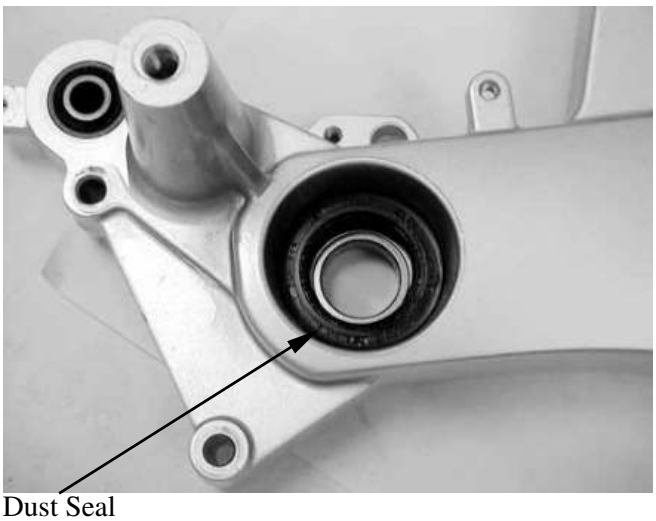
Oil seal & bearing install E014



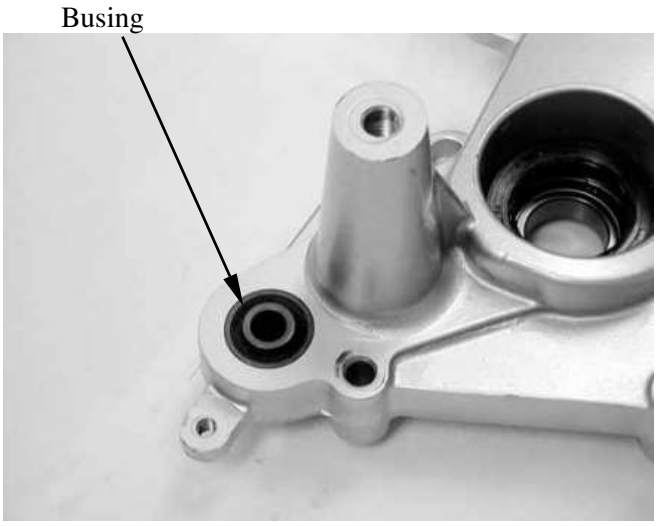
Install the snap ring to the groove of the rear fork securely.



Apply grease to the new dust seal lip and install it to the rear fork.



Check the bushing for wear or damage.



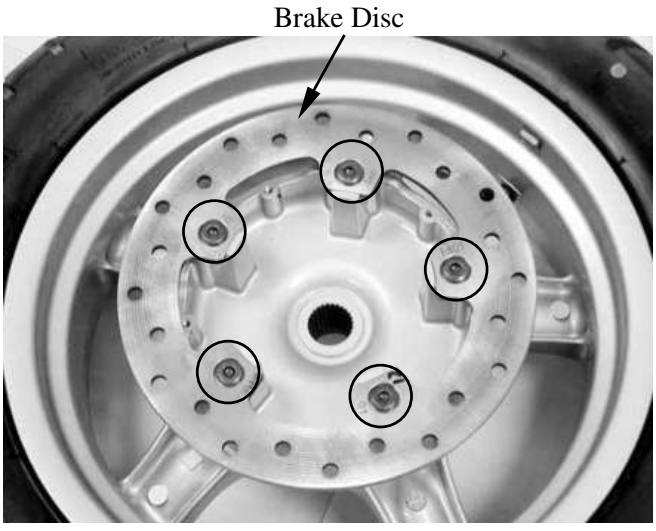
ASSEMBLY

Wheel

Install the brake disc onto the wheel hub.

Install the new brake disc bolts and tighten them to the specified torque.

Torque: 42 N•m (4.3 kgf•m, 31 lbf•ft)



INSTALLATION

Install the rear wheel onto the final gear shaft, aligning the spline.



Rear Wheel

Install the inner side collar.
Apply grease to the final gear shaft.



Inner Side Collar

Install the rear fork and tighten the bolts to the specified torque.

Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)

Mount Bolts

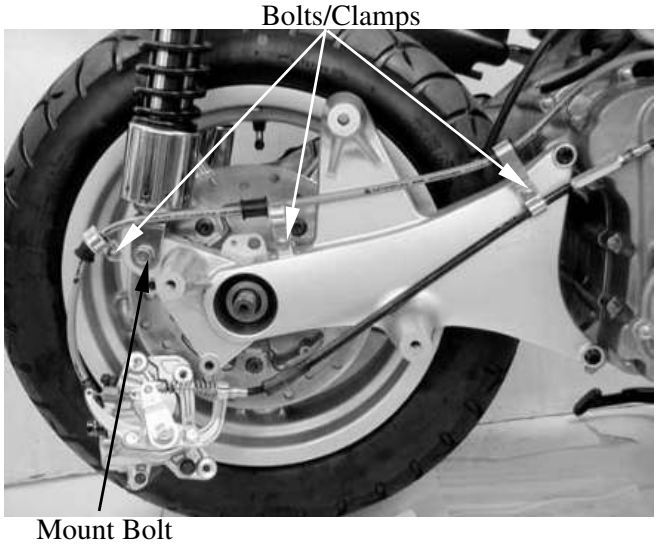


Rear Fork

Install and tighten the rear axle nut to temporarily.
Install and tighten the rear shock absorber lower mount bolt to the specified torque.

Torque: 40 N•m (4.0 kgf•m, 29 lbf•ft)

Install the brake hose/cable clamps to the rear fork and tighten the bolts securely.

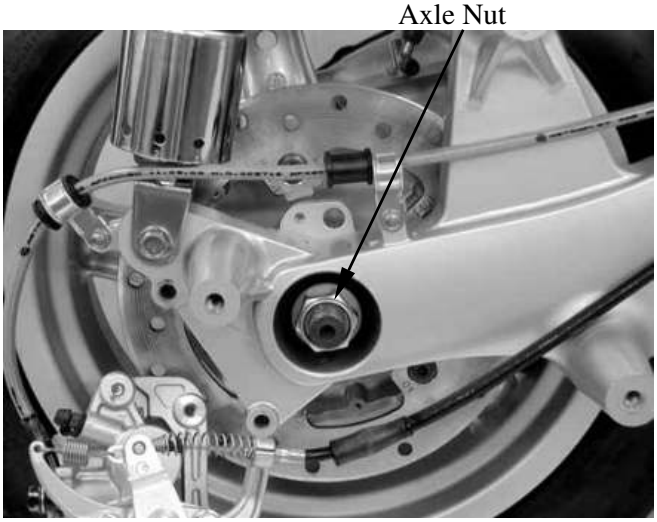


Release the main stand and support the scooter securely on its side stand.

Tighten the rear axle nut to the specified torque.

Torque: 180 N•m (18 kgf•m, 130 lbf•ft)

Install the rear/parking brake caliper (page 16-30).
Install the muffler (page 2-16).



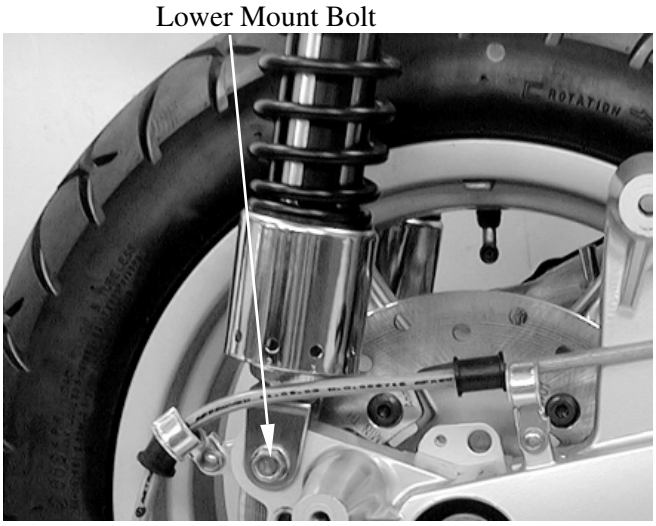
REAR SHOCK ABSORBER

REMOVAL

Remove he luggage box (page 2-3).

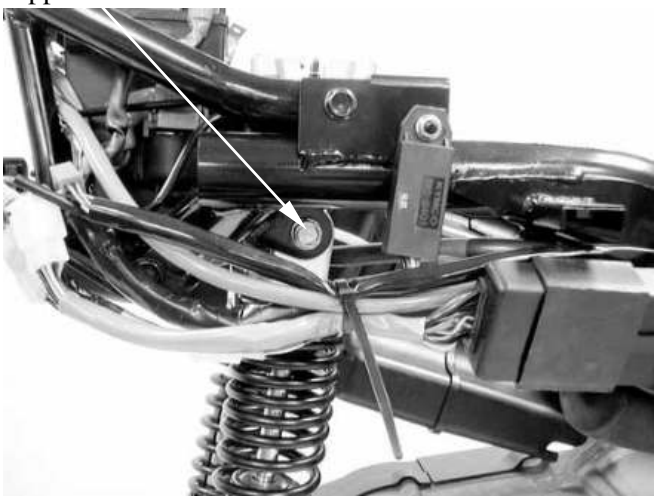
Support the scooter securely on its center stand.
Support the engine securely with a hoist or equivalent.

Remove the rear shock absorber lower mount bolt.

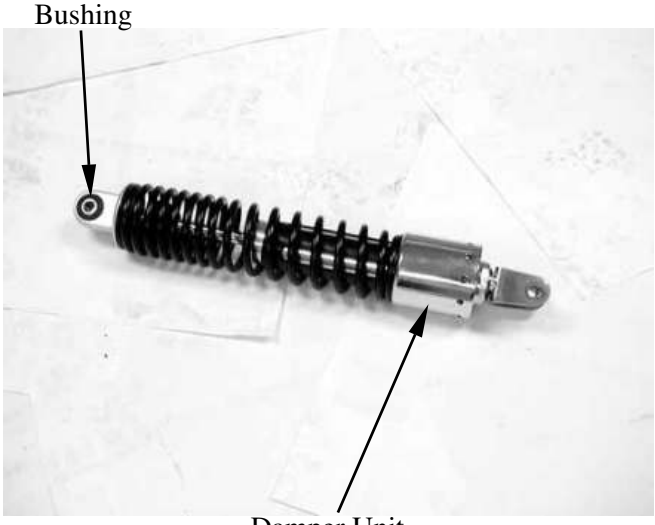


Remove the rear shock absorber upper mount bolt and shock absorber.

Upper Mount Bolt



Bushing



Damper Unit

INSTECTION

Check the damper unit for leakage or other damage.

Check the upper joint bushing for wear or damage.

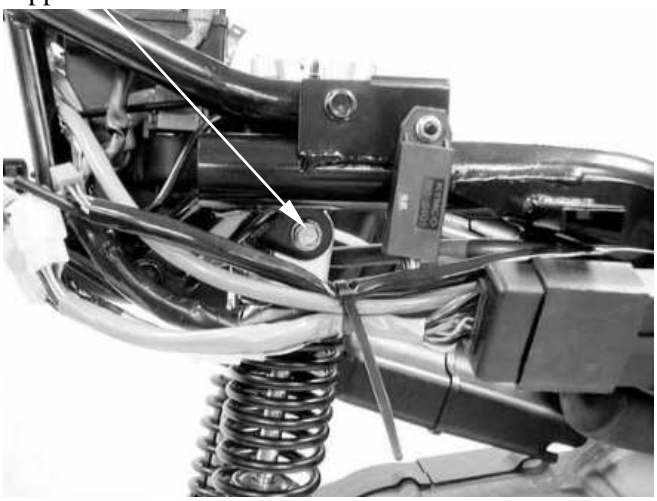
Replace the shock absorber assembly if necessary.

INSTALLATION

Install the rear shock absorber tighten the upper mount bolt to the specified torque.

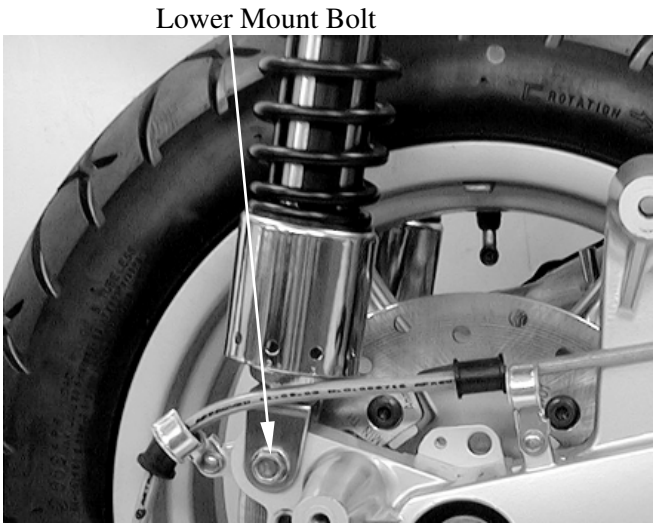
Torque: 40 N•m (4 kgf•m, 29 lbf•ft)

Upper Mount Bolt



Install and tighten the lower mount bolt to the specified torque.

Torque: 40 N•m (4 kgf•m, 29 lbf•ft)

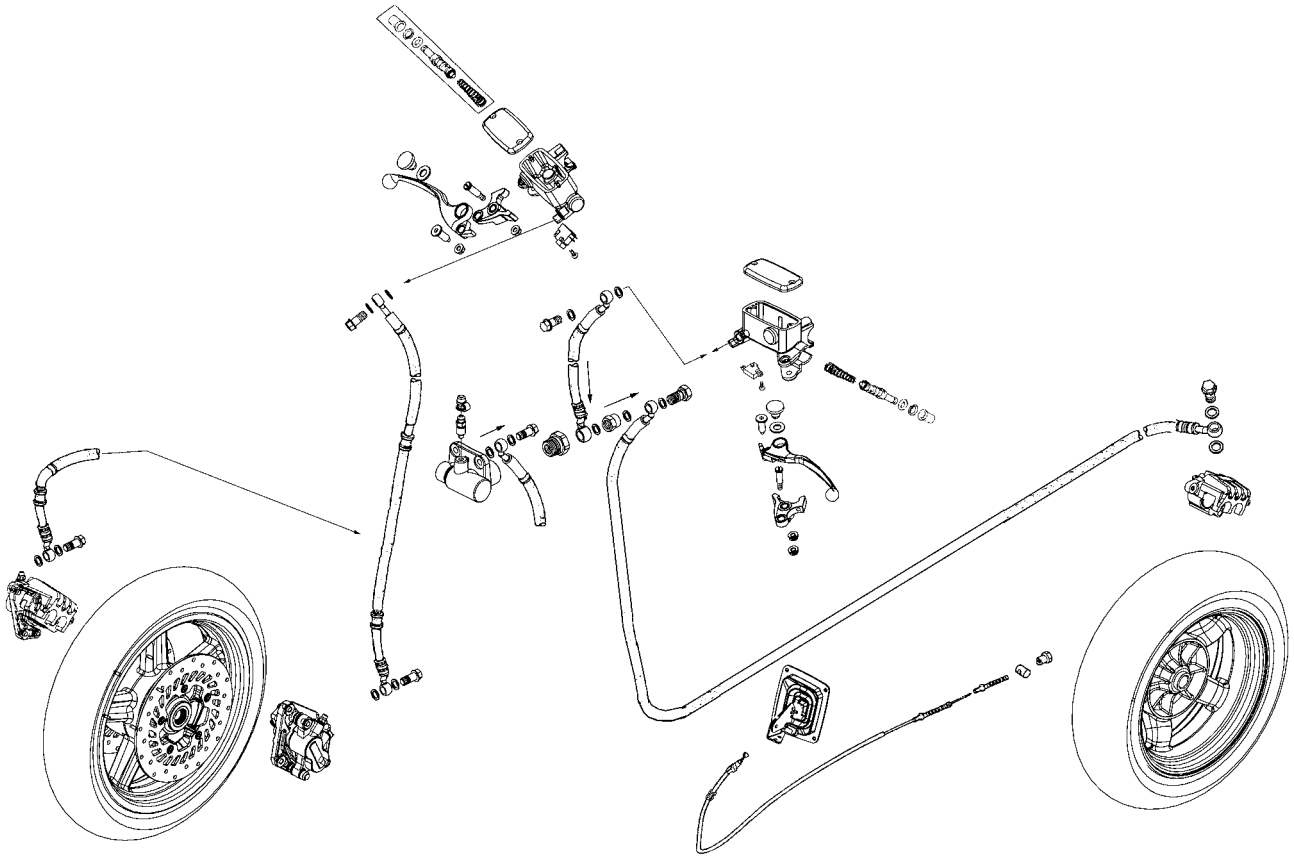


BRAKE SYSTEM

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SERVICE INFORMATION---------- 16- 2
TROUBLESHOOTING---------- 16- 3
BRAKE FLUID ---------- 16- 4
BRAKE PAD---------- 16-10
BRAKE DISC INSPECTION---------- 16-13
FRONT MASTER CYLINDER ---------- 16-14
REAR MASTER CYLINDER ---------- 16-18
DELAY VALVE---------- 16-22
FRONT BRAKE CALIPER---------- 16-24
REAR/PARKING BRAKE CALIPER---------- 16-26
PARKING BRAKE LEVER LINK ---------- 16-31

16. BRAKE SYSTEM

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL

*

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

Avoid breathing dust particles.

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

SPECIFICATIONS

Unit: mm (in)

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

16. BRAKE SYSTEM

TORQUE VALUES

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

TROUBLESHOOTING

Brake lever soft or spongy

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

Brake lever hard

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

Brake drag

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

BRAKE FLUID

Check

Brake fluid: (page 3-18)
Brake hose:
Cracks/wear/damage → Replace.
Apply the brake lever several times.
Fluid leakage → Replace.
Brake hose clamp:
Loosen → Tighten

FLUID REPLACEMENT

Front brake

*

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

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

Remove the master cylinder reservoir cap and diaphragm.
Suck up the old brake fluid as much as possible.
Fill the reservoir with new brake fluid.

Specification and classification: DOT 4



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



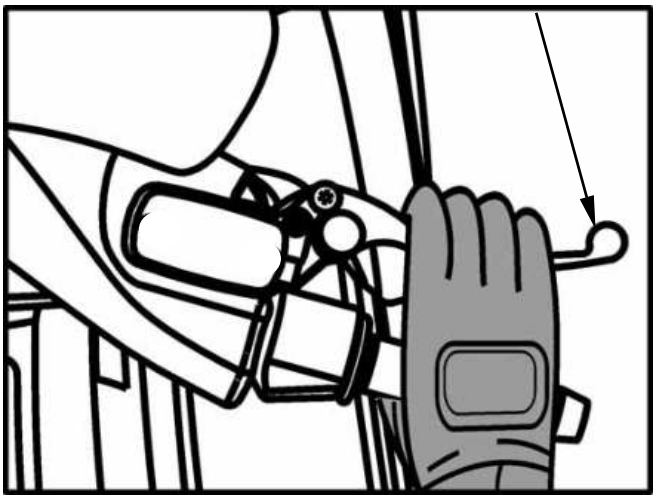
Left Front Caliper Air Bleed Screw

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

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

Tighten the bleed screw to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)



Shock Absorber Lower Mount Bolt

Combination brake

*

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

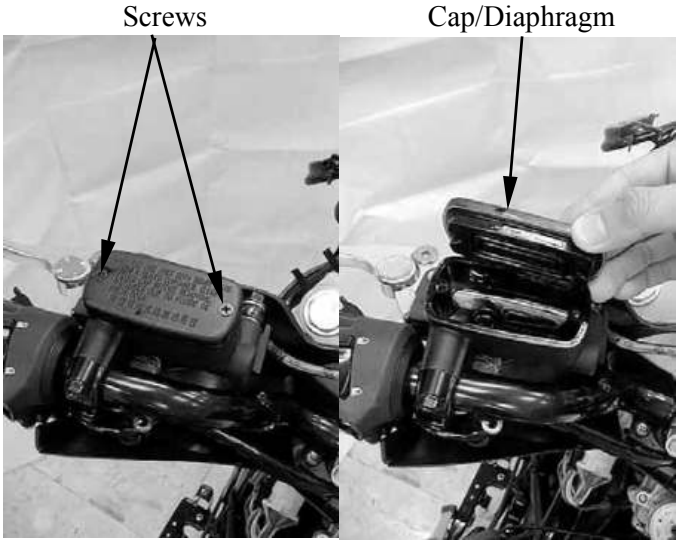
Place the scooter on a level surface and keep the handlebar straight.

Remove the master cylinder reservoir cap and diaphragm.

Suck up the old brake fluid as much as possible.

Fill the reservoir with new brake fluid.

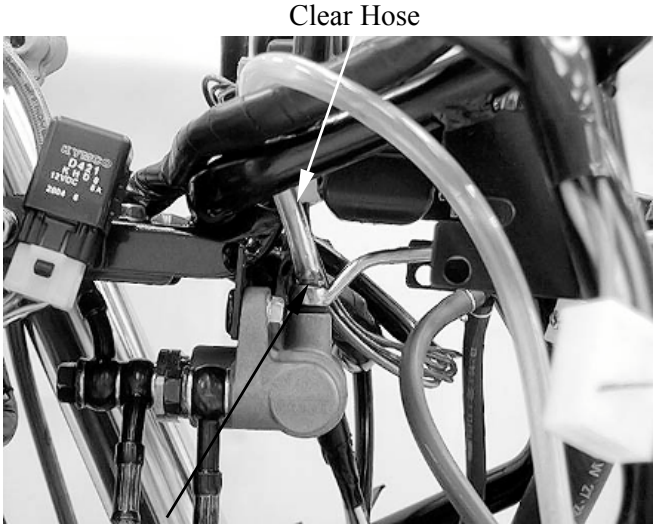
Specification and classification: DOT 4



Step 1:

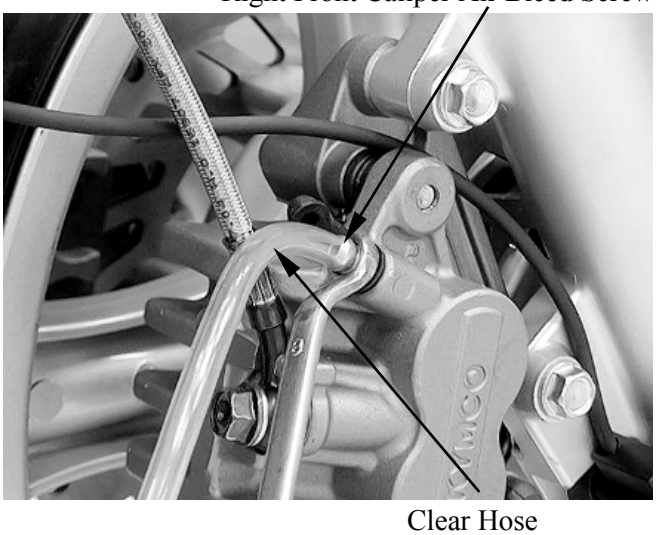
Connect a clear hose to the delay valve air bleed screw and insert the other end of the hose into a receptacle.

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



Step 2:

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



Step 3:

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

Rear Caliper Air Bleed Screw



Clear Hose

BLEEDING THE HYDRAULIC BRAKE SYSTEM

*

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

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

Air bleeding steps (Front brake):

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

Clear Hose



Left Front Caliper Air Bleed Screw

8.Tighten the bleed screw when the lever limit has been reached, then release the lever.
9.Repeat steps (5) to (7) until all the air bubbles have disappeared from the fluid.
10.Tighten the bleed screw.
Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)

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

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

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

Air bleeding steps (combination brake):
The combination brake system air bleeding is the same manner as that of the front brake one.
Bleed the air from the rear side (rear caliper) and then the front side (right front caliper and delay valve).

Tighten the bleed screw.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)

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

Rear Caliper Air Bleed Screw



Clear Hose

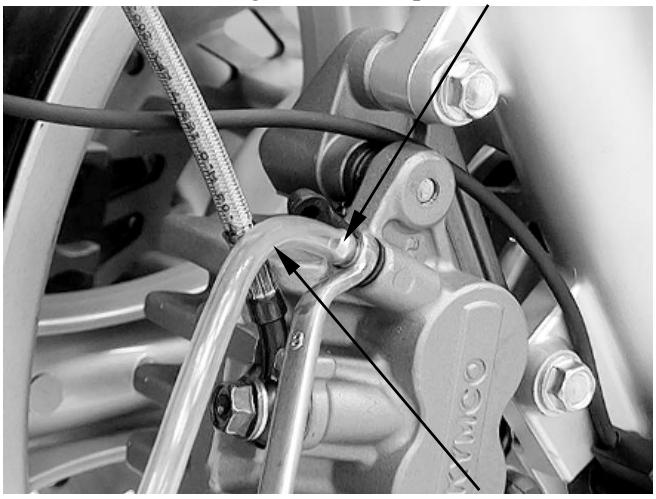
Add brake fluid to the proper level.

*

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

Install the master cylinder reservoir cap and diaphragm.

Right Front Caliper Air Bleed Screw



Clear Hose

Clear Hose



Relay Valve Air Bleed Screw

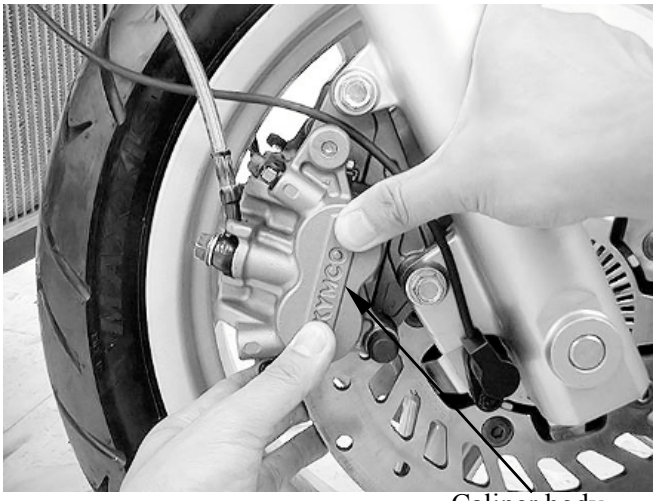
BRAKE PAD

BRAKE PAD REPLACEMENT

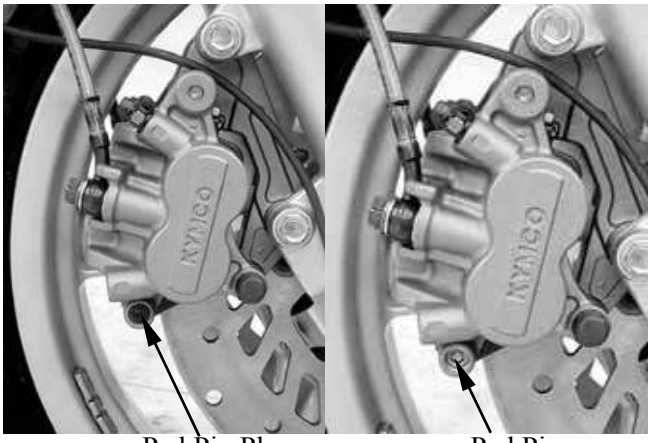
Front brake:

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

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



Remove the pad pin plug and loosen the pad pin.

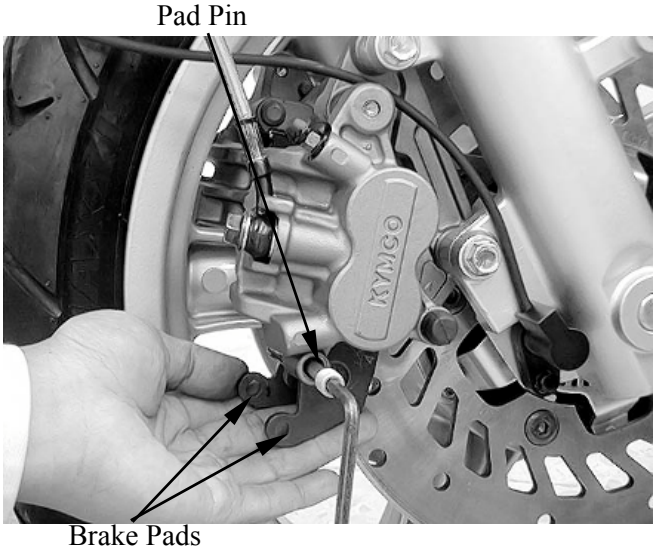


Remove the pad pin and the brake pads.

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

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

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

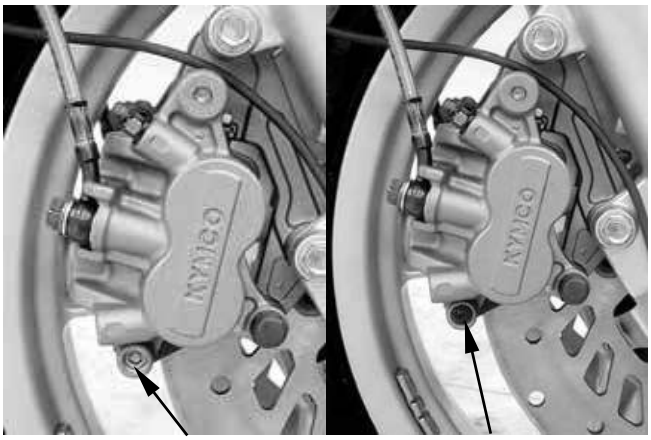


Tighten the pad pin to the specified torque.

Torque: 18 N•m (1.8 kgf•m, 13 lbf•ft)

Install the pad pin plug to the specified torque.

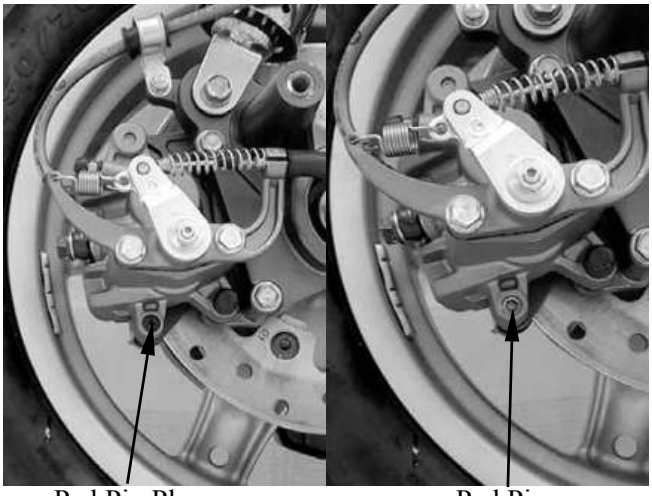
Torque: 3 N•m (0.3 kgf•m, 2.2 lbf•ft)



Rear/Parking brake:

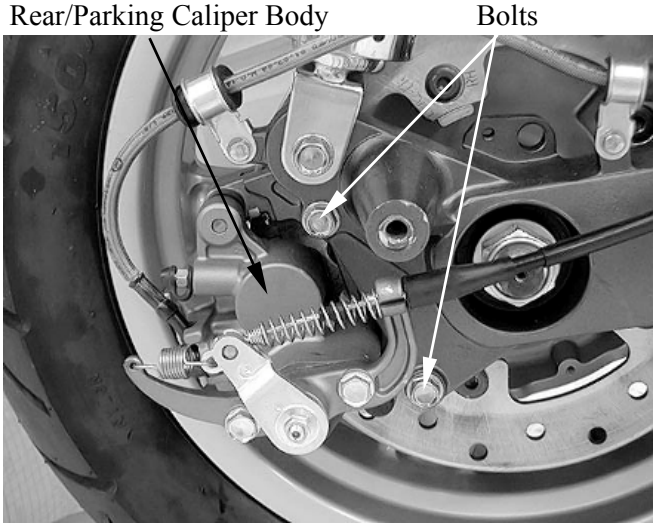
Remove the pad pin plug and loosen the pad pin.

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



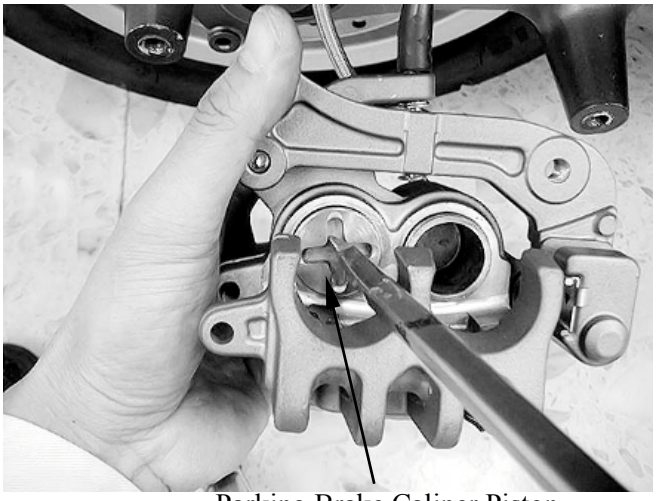
Remove the mount bolts and rear/parking brake caliper from the rear fork.

Remove the pad pin and brake pads.



Installation steps:

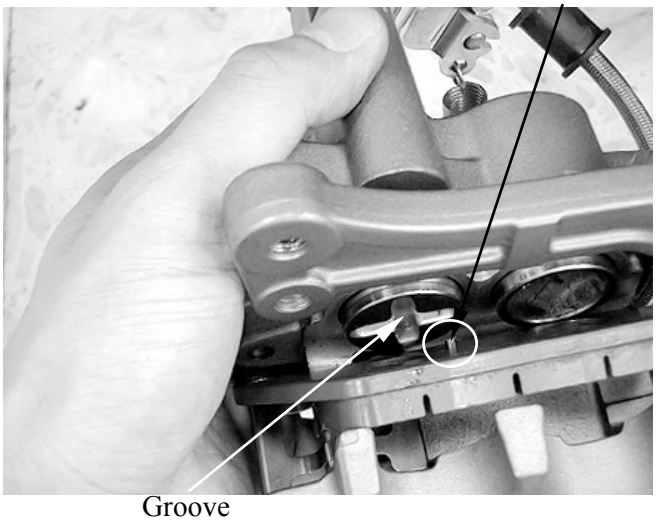
Turn the parking brake caliper piston clockwise and push it into the parking brake caliper.



Parking Brake Caliper Piston

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

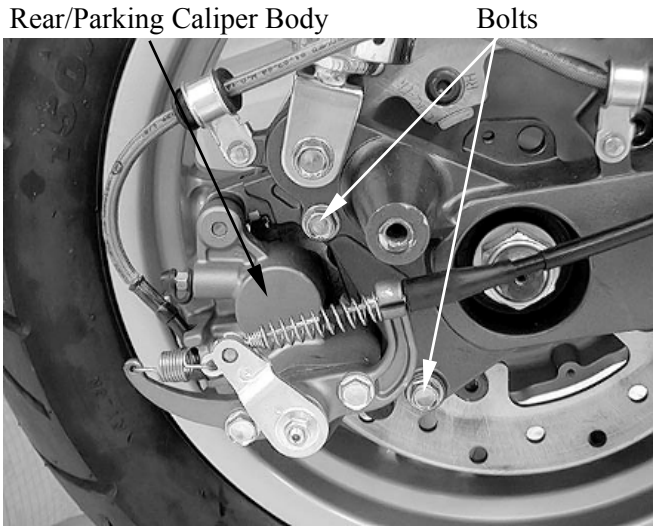
* Align the pin on the pad with the groove on the parking brake caliper piston.



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

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

Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)

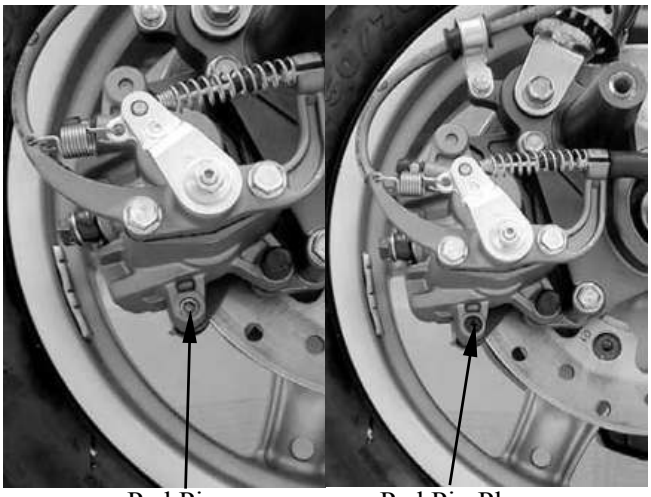


Tighten the pad pin to the specified torque.

Torque: 18 N•m (1.8 kgf•m, 13 lbf•ft)

Install the pad pin plug to the specified torque.

Torque: 3 N•m (0.3 kgf•m, 2.2 lbf•ft)



Pad Pin Pad Pin Plug

BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.
Measure the brake disc thickness.

Service limits:Front: 4mm (0.16 in)
Rear: 4mm (0.16 in)

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

Measure the brake disc warpage.

Service limits:0.30 mm (0.012 in)



FRONT MASTER CYLINDER

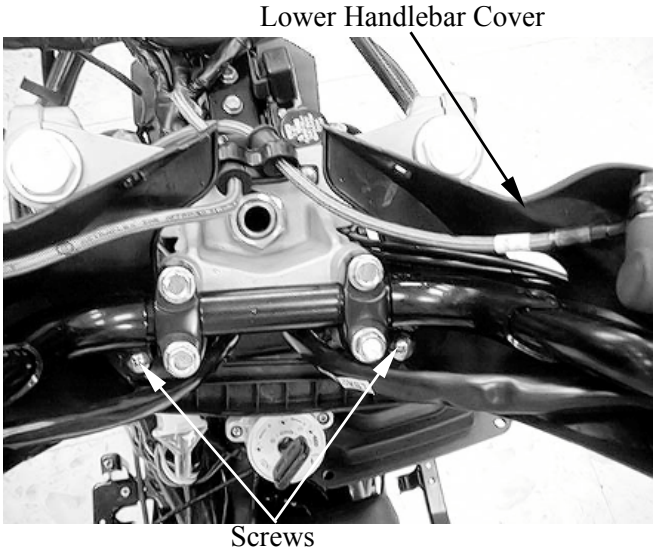
REMOVAL

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

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

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

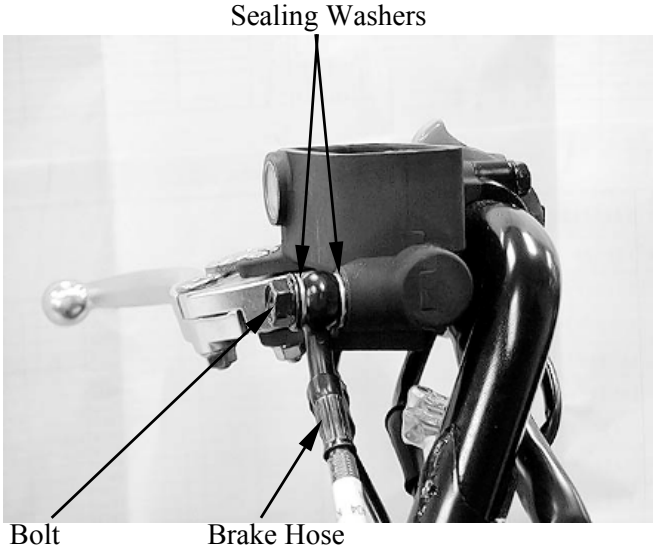
Remove the two screws and lower handlebar cover.



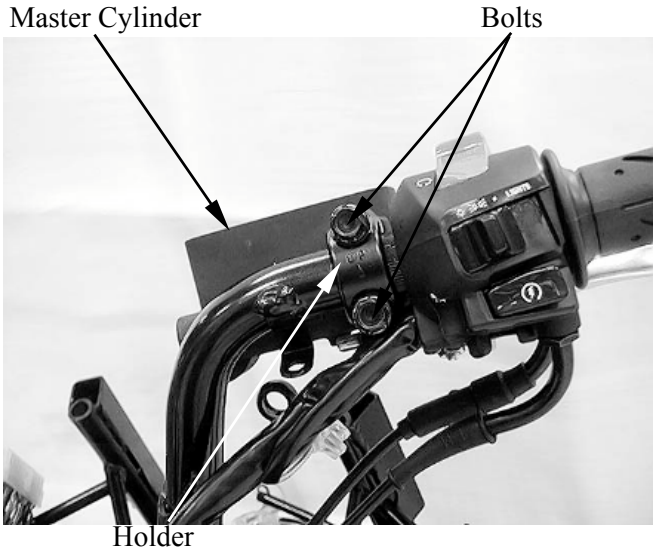
Disconnect the brake light connectors from front master cylinder.



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



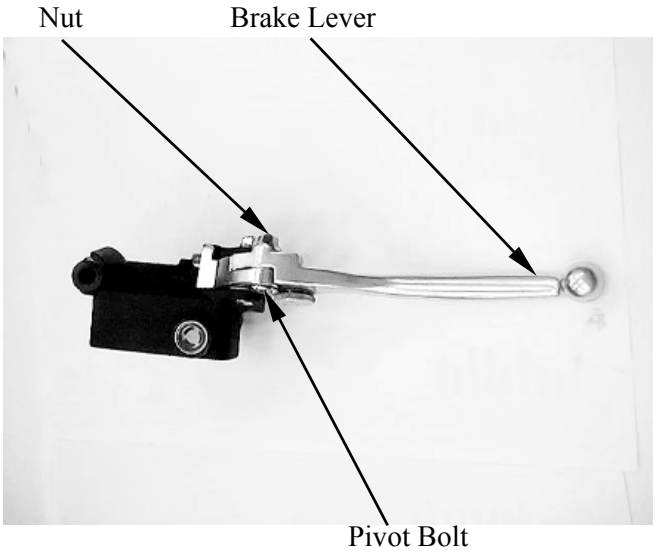
Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



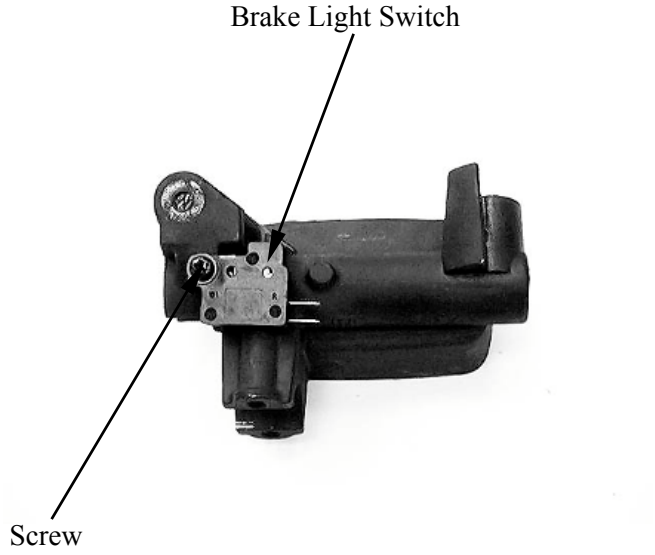
DISASSEMBLY

Remove the brake lever pivot bolt and nut.

Remove the brake lever.



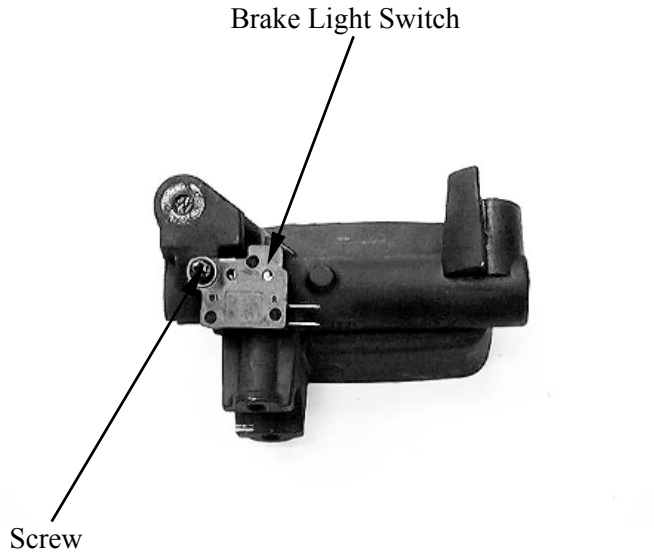
Remove the screw and brake light switch.



ASSEMBLY

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

Torque: 1 N•m (0.1 kgf•m, 0.7 lbf•ft)



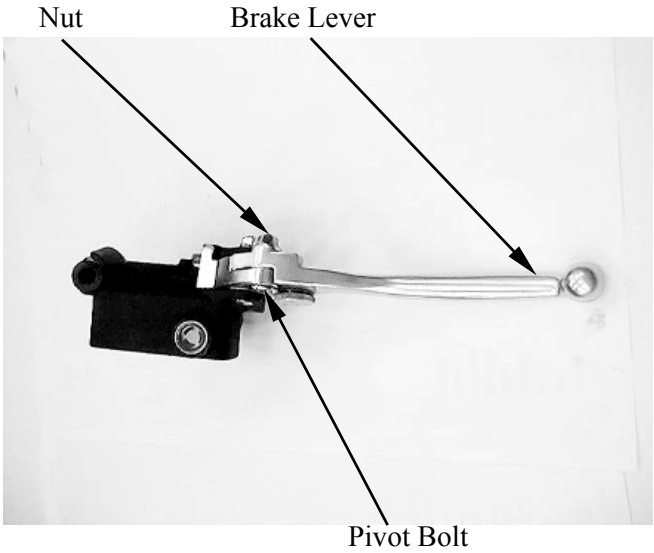
Apply silicone grease to the master piston tip.
Install the brake lever.

Apply silicone grease to the brake lever pivot bolt sliding surface.
Install and tighten the pivot bolt to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)

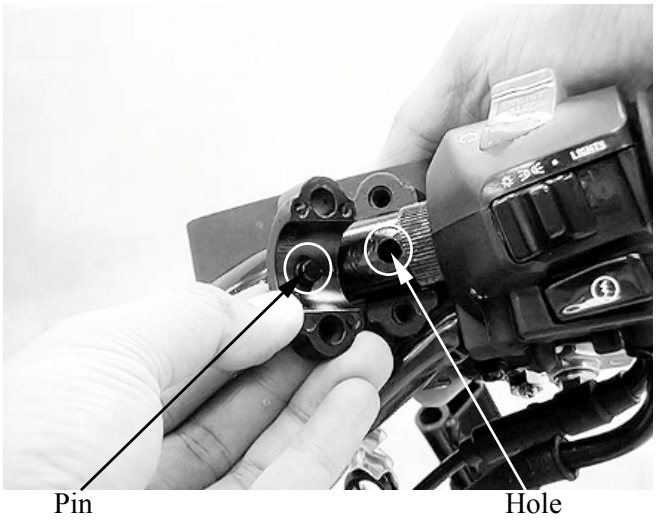
Install and tighten the pivot nut to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)



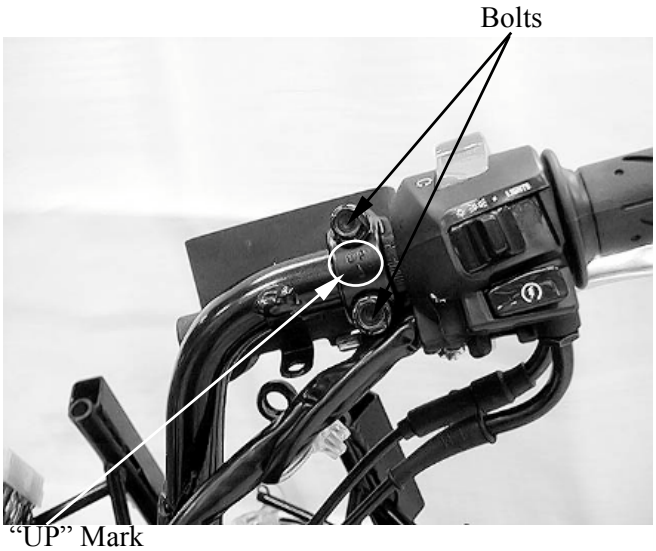
INSTALLATION

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



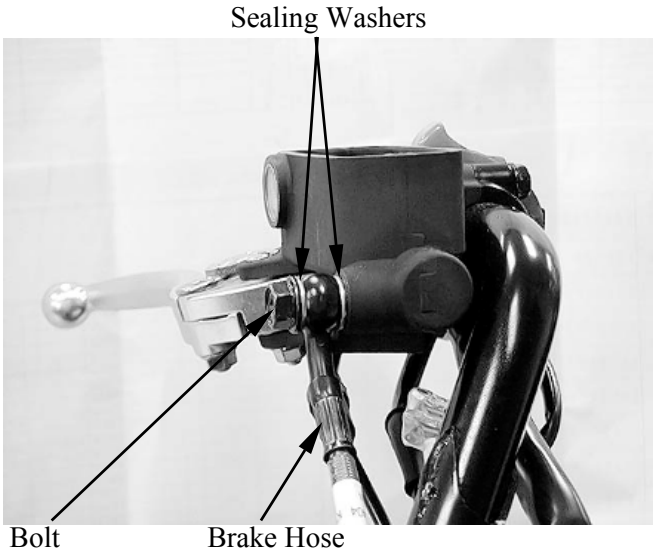
Install the front master cylinders and holders with the “UP” mark facing up.
Install the bolts and tighten the upper bolt first then tighten the lower bolt to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)



Rest the brake hose eyelet against the stopper.
Install the brake hose eyelet with the oil bolt and new sealing washers.
Tighten the oil bolt to the specified torque.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)



Connect the brake light switch connectors.

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



REAR MASTER CYLINDER

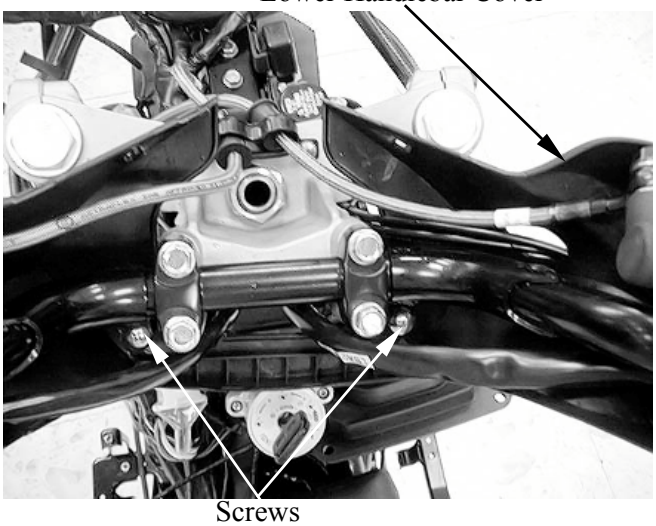
REMOVAL

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

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

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

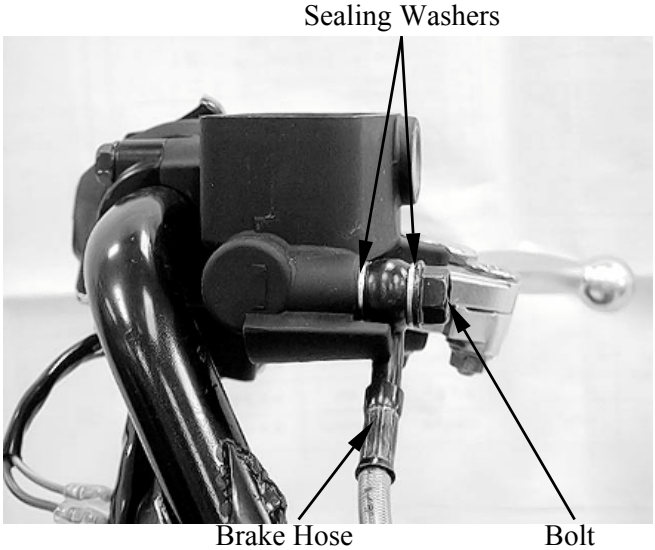
Remove the two screws and lower handlebar cover.



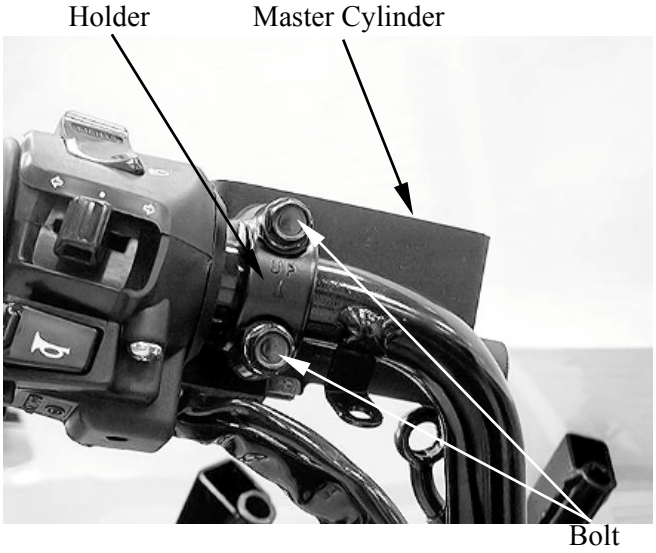
Disconnect the brake light switch connectors from master cylinder.



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



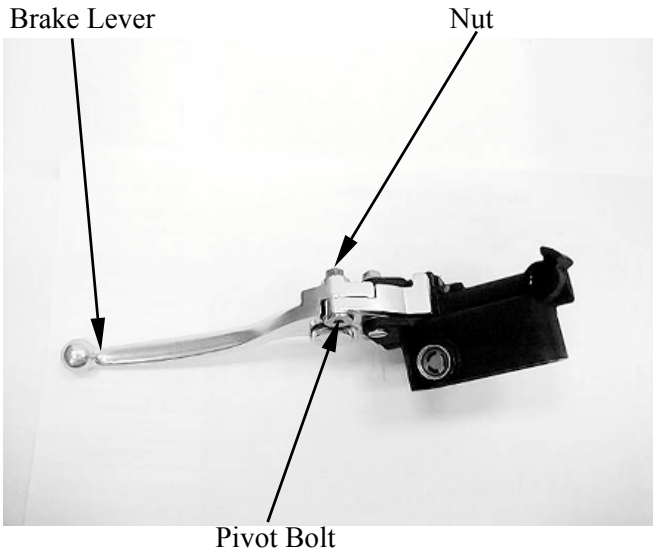
Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



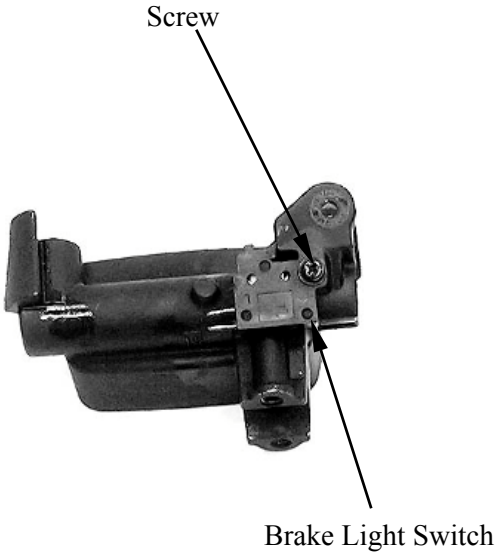
DISASSEMBLY

Remove the brake lever pivot bolt and nut.

Remove the brake lever.



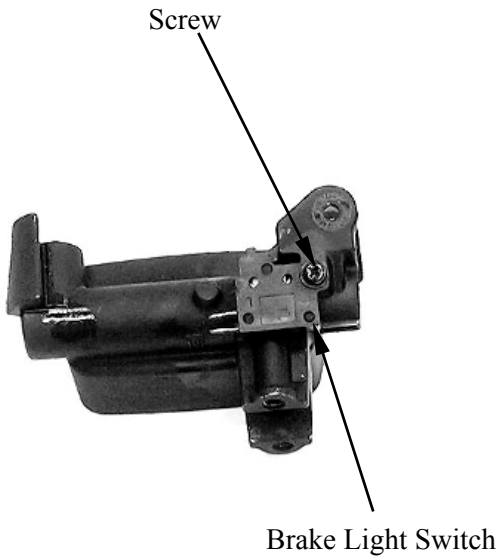
Remove the screw and brake light switch.



ASSEMBLY

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

Torque: 1 N•m (0.1 kgf•m, 0.7 lbf•ft)



Apply silicone grease to the master piston tip.

Install the brake lever.

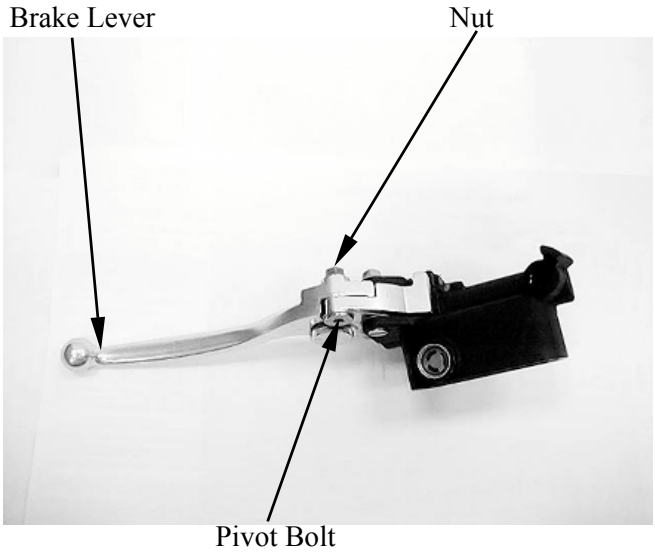
Apply silicone grease to the brake lever pivot bolt sliding surface.

Install and tighten the pivot bolt to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)

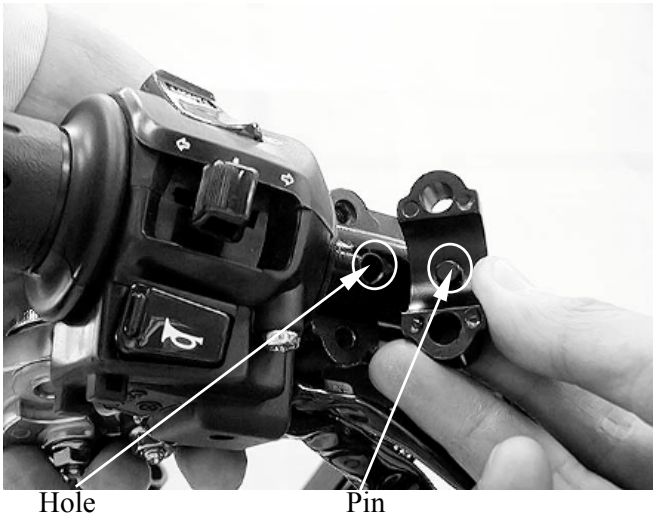
Install and tighten the pivot nut to the specified torque.

Torque: 6 N•m (0.6 kgf•m, 4.3 lbf•ft)



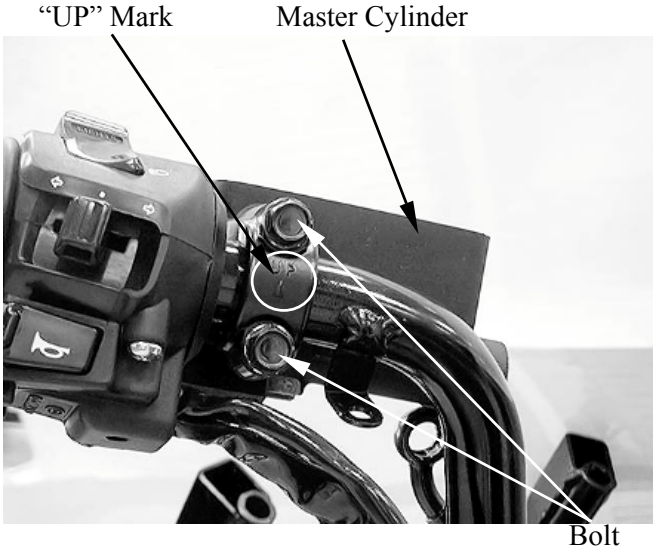
INSTALLATION

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



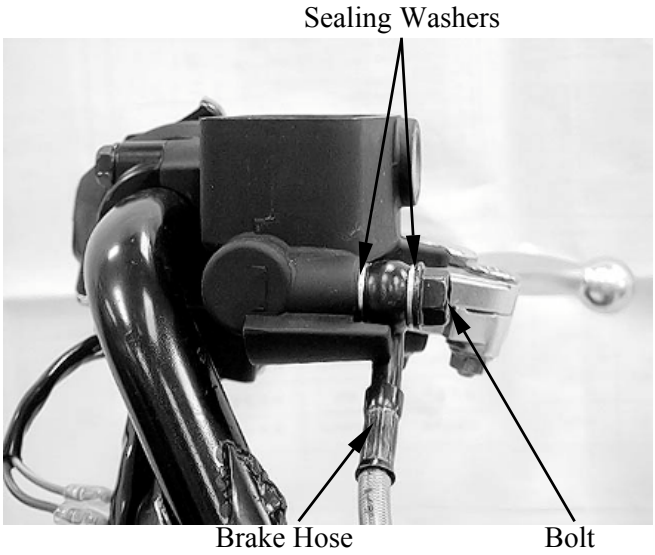
Install the rear master cylinders and holders with the “UP” mark facing up.
Install the bolts and tighten the upper bolt first then tighten the lower bolt to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)



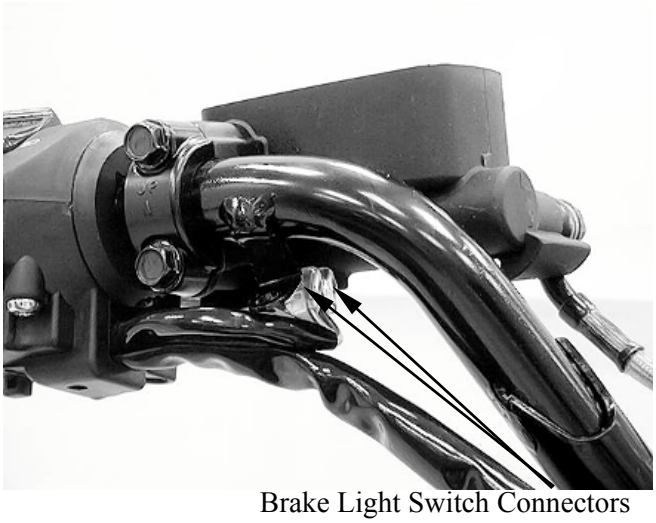
Rest the brake hose eyelet against the stopper.
Install the brake hose eyelet with the oil bolt and new sealing washers.
Tighten the oil bolt to the specified torque.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)



Connect the brake light switch connectors.

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



DELAY VAVLE

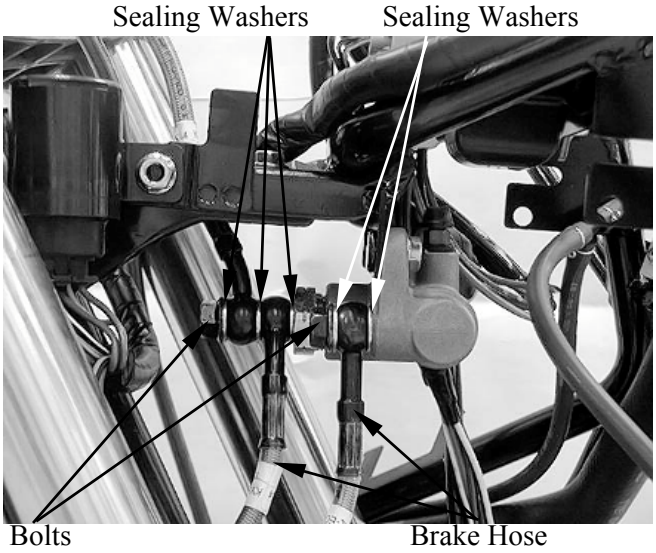
REMOVAL

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

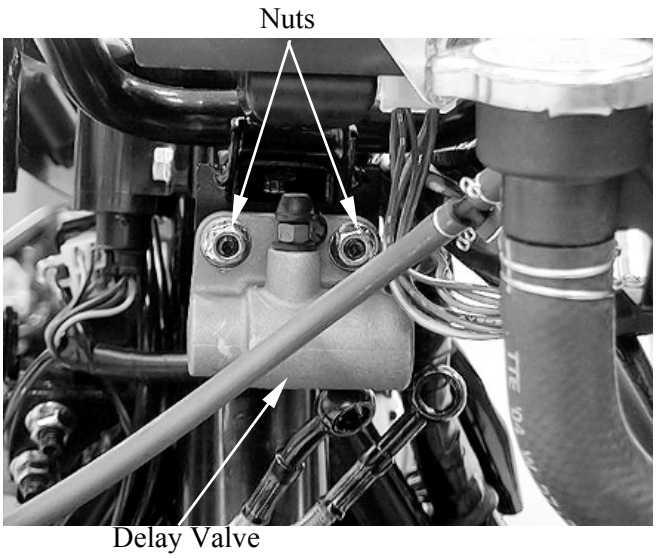
Remove the front cover (page 2-11).

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

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



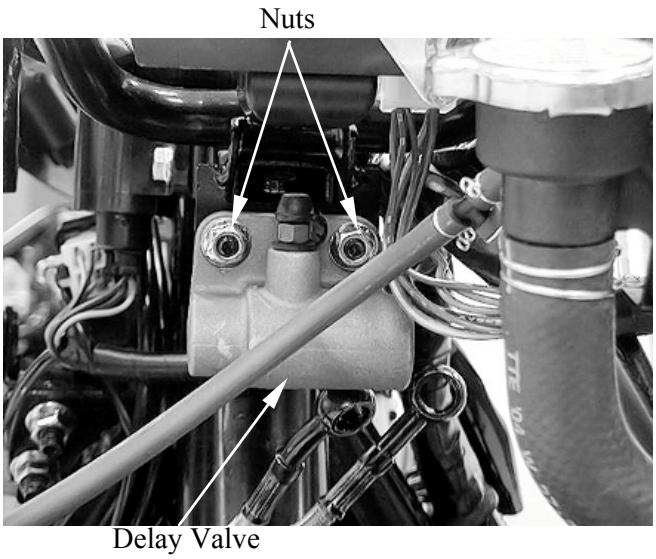
Remove the two nuts and delay valve.





INSTALLATION

Install the delay valve and tighten the nuts securely.

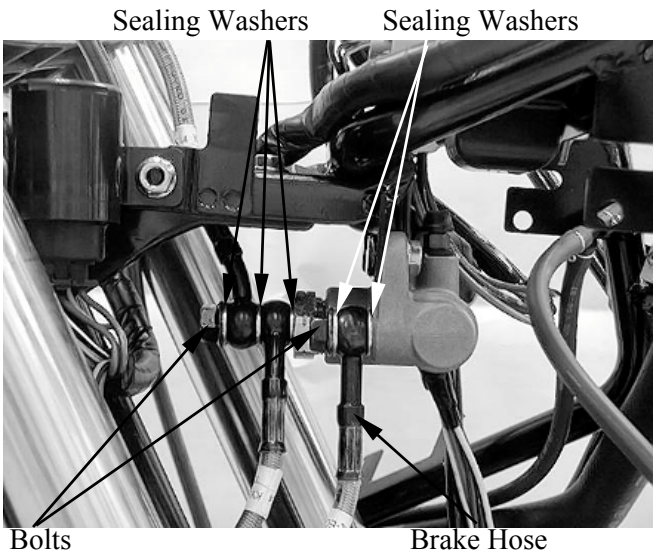


Install the brake hose eyelets and new sealing washers.

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

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

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



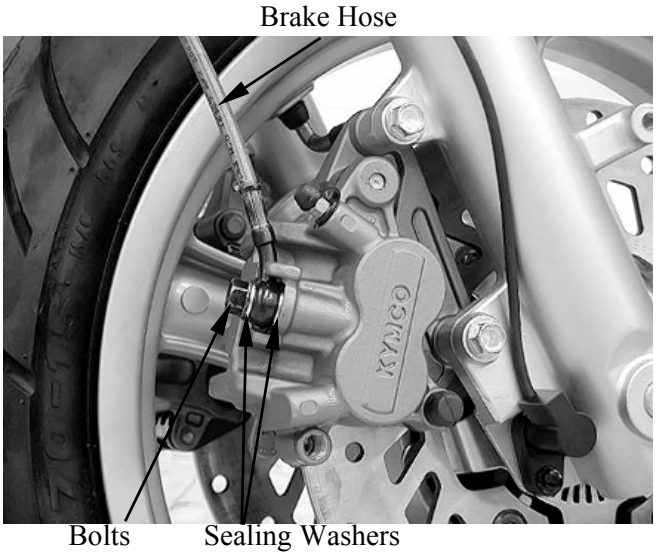
FRONT BRAKE CALIPER

REMOVAL

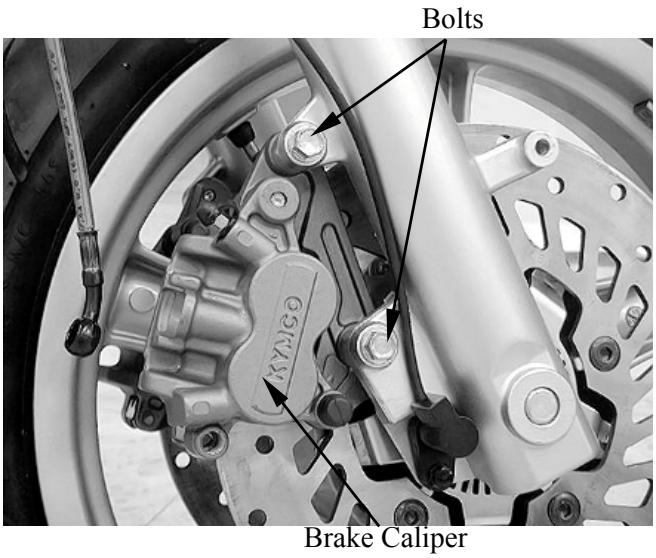
Drain the front brake hydraulic system (left front brake caliper: page 16-4) or combination brake hydraulic system (right front brake caliper: page 16-5).

Remove the brake pads (page 16-10).

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



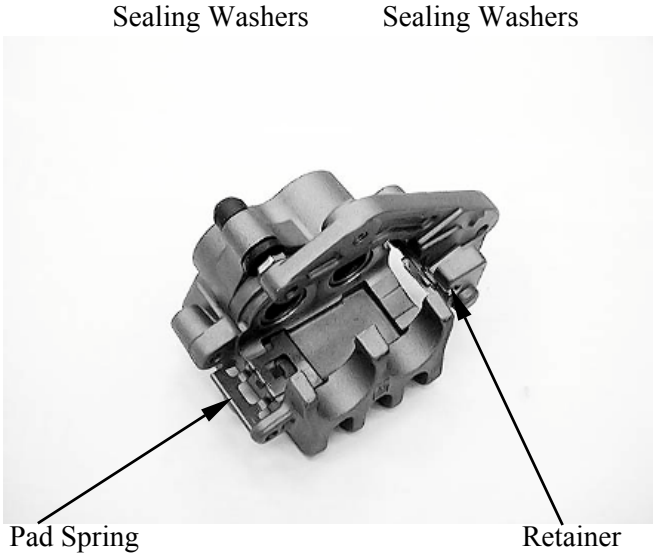
Remove the mount bolts and front brake caliper.



DISASSEMBLY

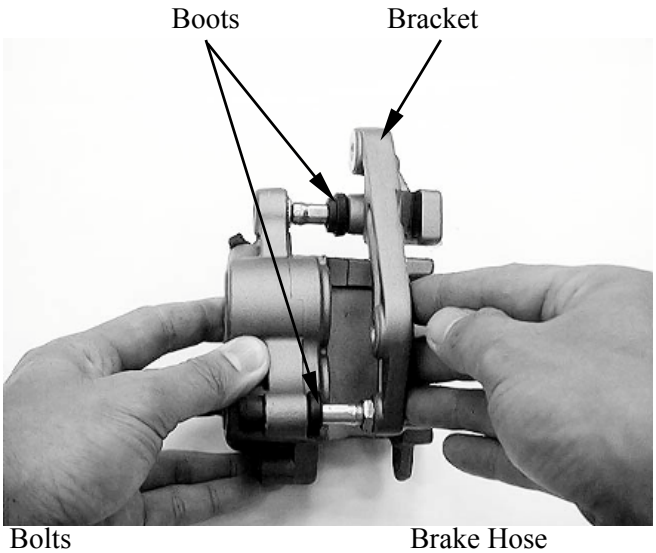
Remove pad spring from the caliper body.

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



Remove the caliper bracket from the caliper body.

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

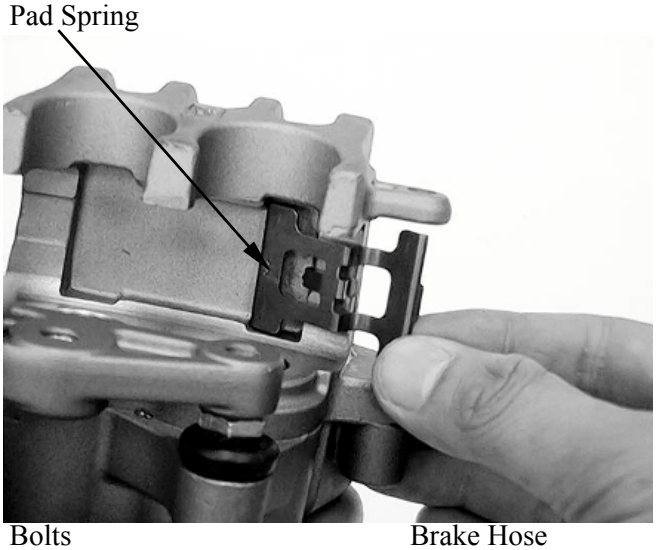


ASSEMBLY

Apply silicone grease to the boots inside.

Install the caliper bracket to the caliper.

Install the pad spring into the caliper body as shown.

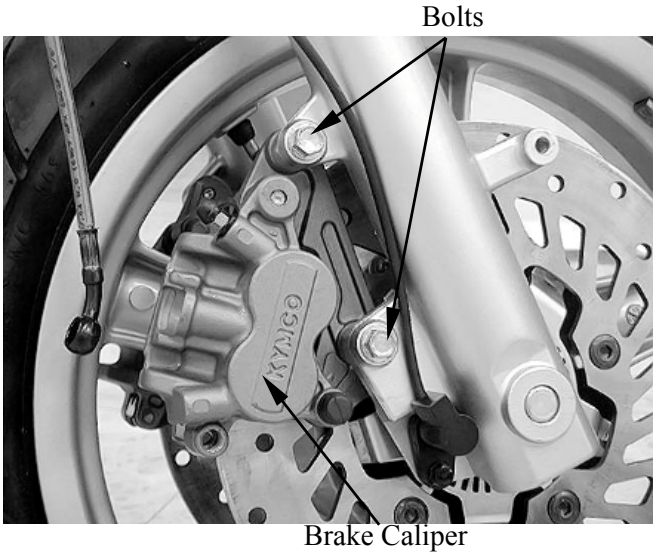


INSTALLATION

Install the front caliper onto the fork leg.

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

Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)



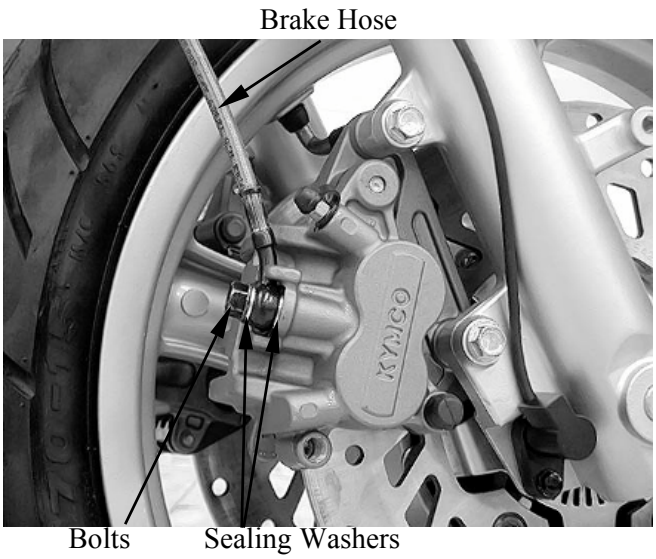
Install the brake hose eyelet to the caliper body with new sealing washers and oil bolts.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolts to the specified torque.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

Install the brake pads (page 16-10).

Fill and bleed the hydraulic system (page 16-7 or page 16-8).



REAR/PARKING BRAKE CALIPER

REMOVAL

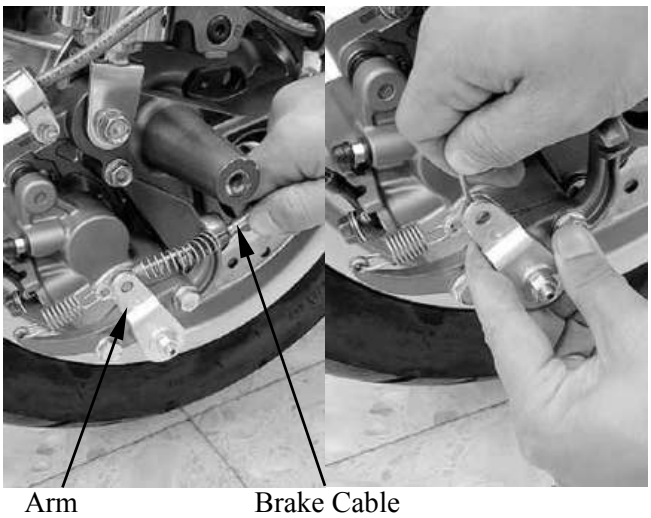
Remove the muffler (page 2-15).

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

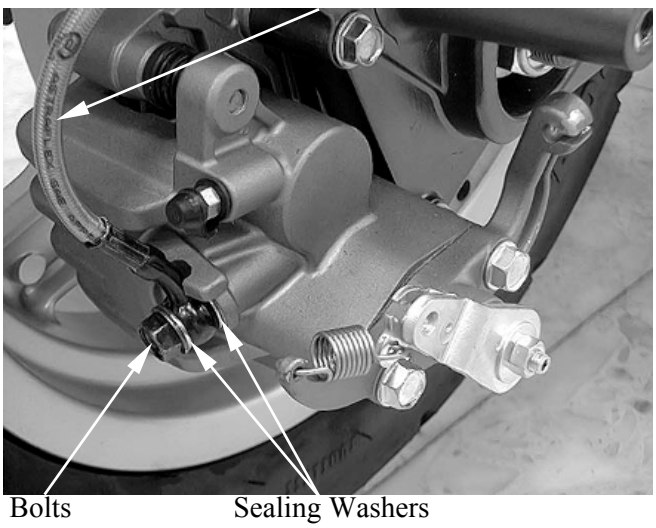
Disconnect the parking brake cable from the brake arm.

Remove the pad pin plug and loosen the pad pin.

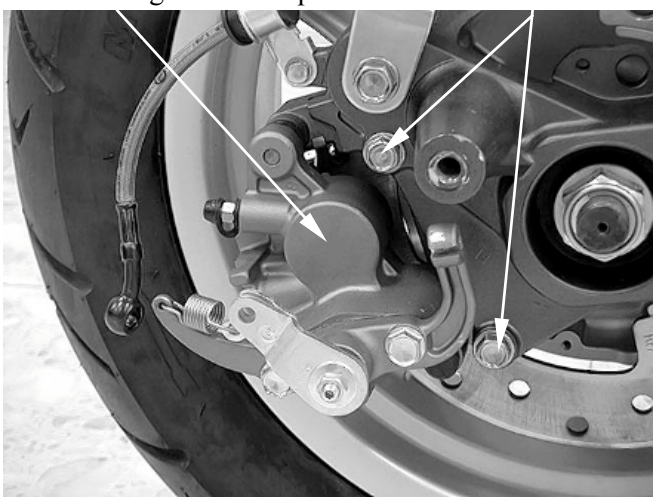
Remove the brake pad (page 16-11).



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



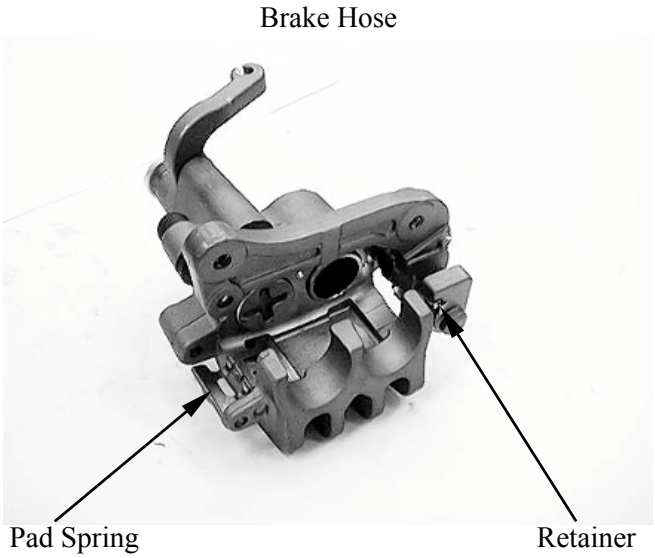
Remove the mount bolts and rear/parking brake caliper from the rear fork.



DISASSEMBLY (REAR BRAKE)

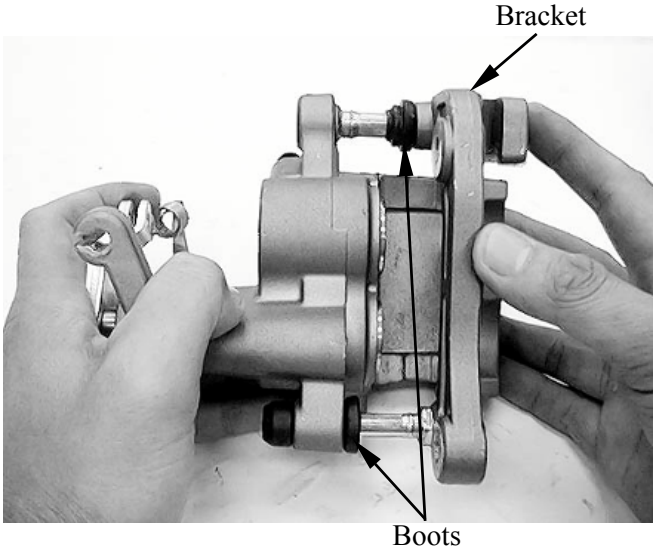
Remove the pad spring from the caliper body.

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



Remove the caliper bracket from the caliper body.

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



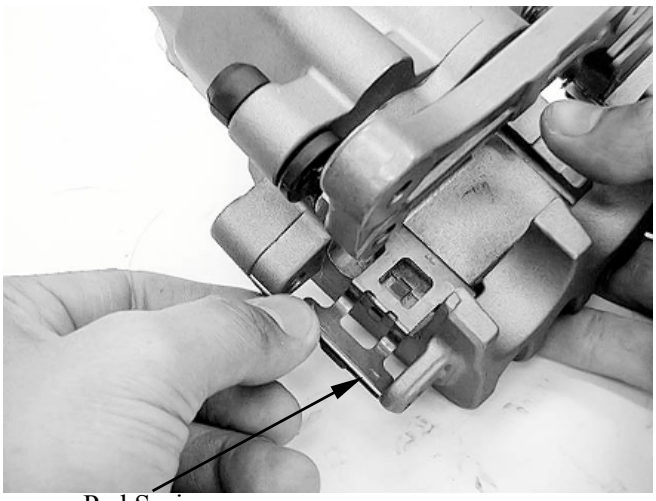
ASSEMBLY (REAR BRAKE)

Apply silicone grease to the boot inside.

Apply silicone grease to the boot inside.

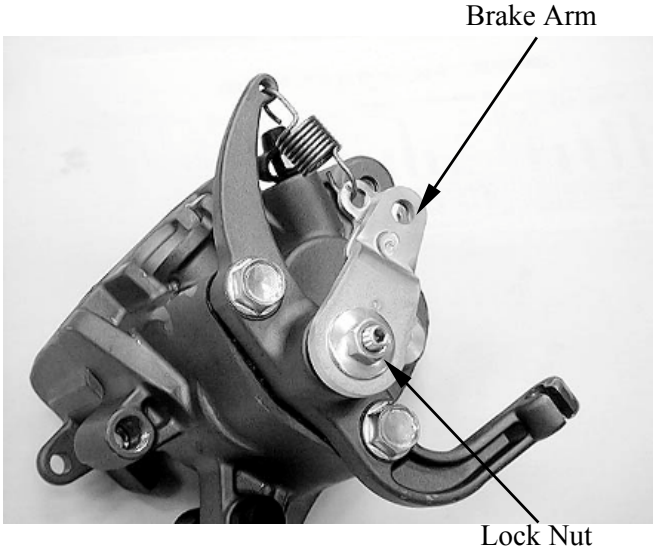
Install the caliper bracket to the caliper.

Install the pad spring into the caliper body as shown.

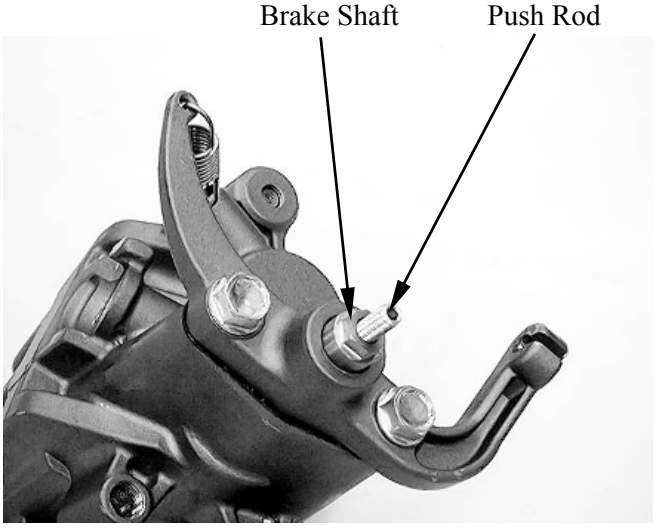


DISASSEMBLY (PARKING BRAKE)

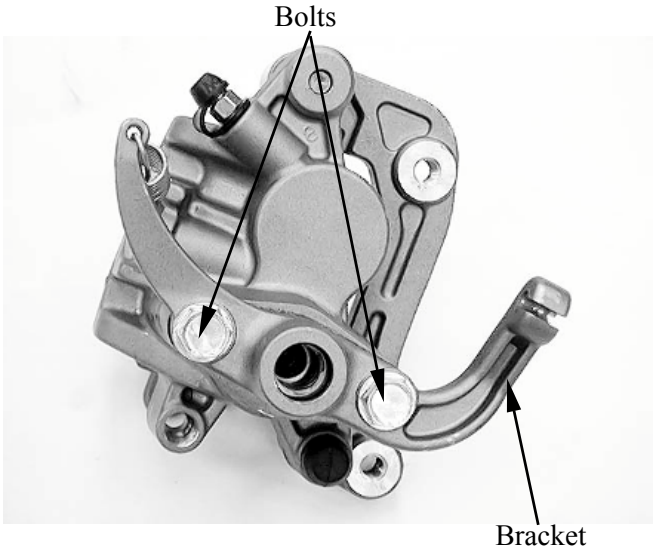
Remove the lock nut and parking brake arm.



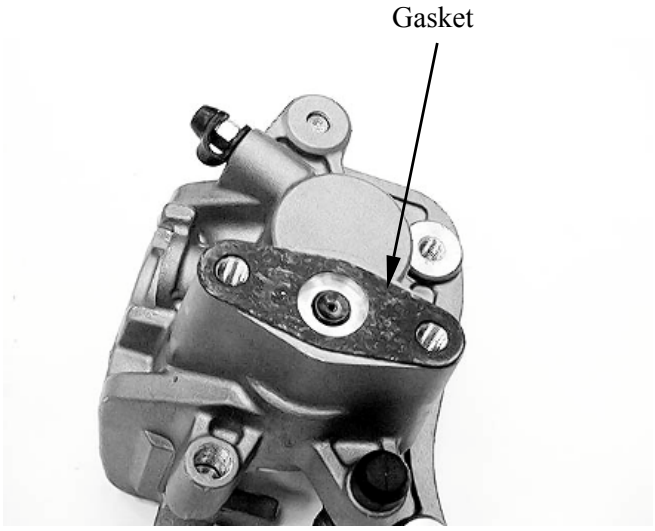
Remove the parking brake shaft and push rod.



Removed the two bolts, gasket and parking brake bracket.



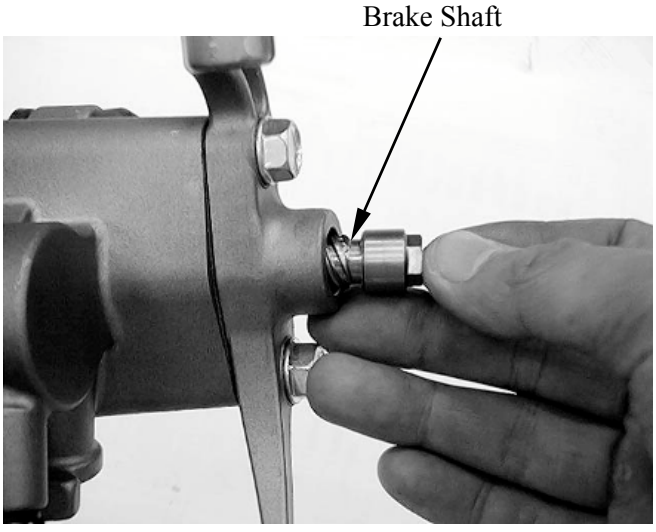
ASSEMBLY (PARKING BRAKE)
Install the gasket.



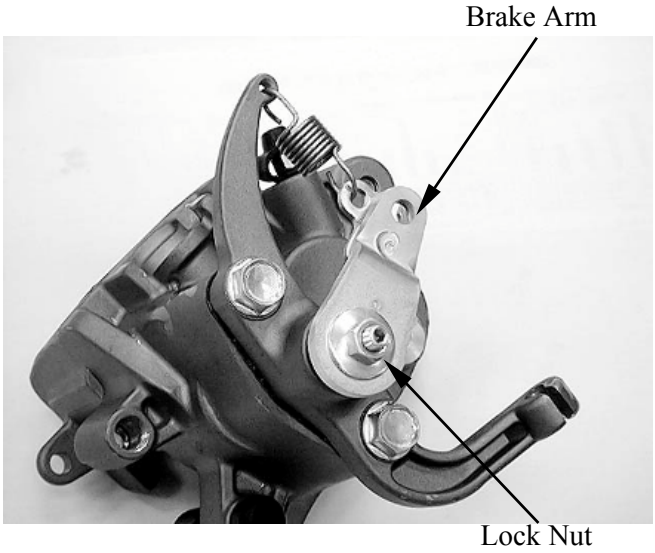
Install the parking brake bracket and tighten the bolts to the specified torque.

Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)

Apply silicone grease to the parking brake shaft rolling surface.
Install the parking brake shaft.



Temporarily install the brake arm and the lock nut.

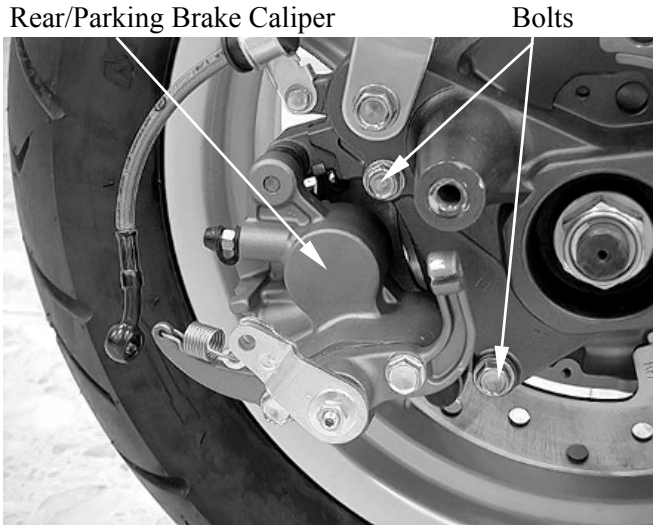


INSTALLATION

Install the brake pads (page 16-12).

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

Torque: 32 N•m (3.2 kgf•m, 23 lbf•ft)

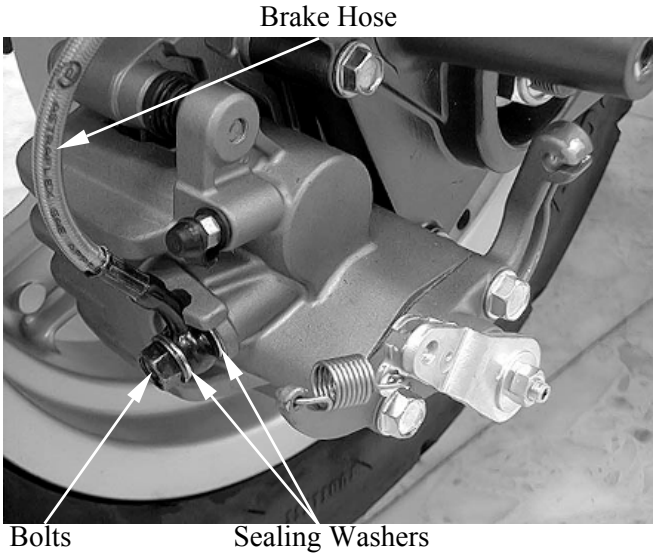


Install the brake hose eyelet to the caliper body with new sealing washers and oil bolts.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolts to the specified torque.

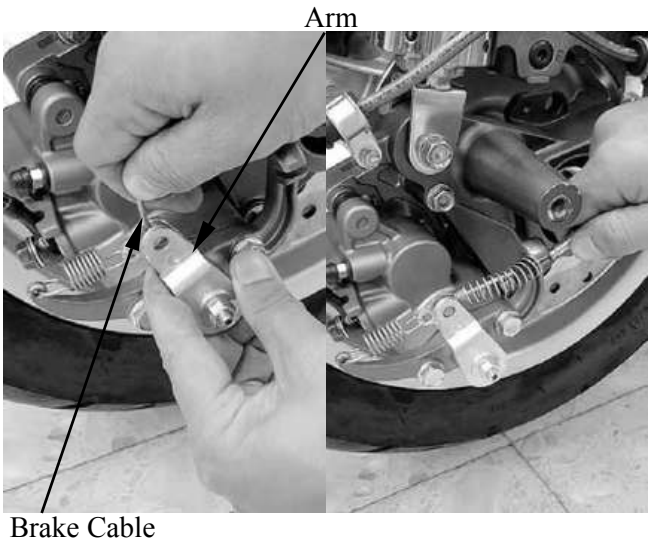
Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

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



Connect the parking brake cable.

Adjust the parking brake (page 3- 21).

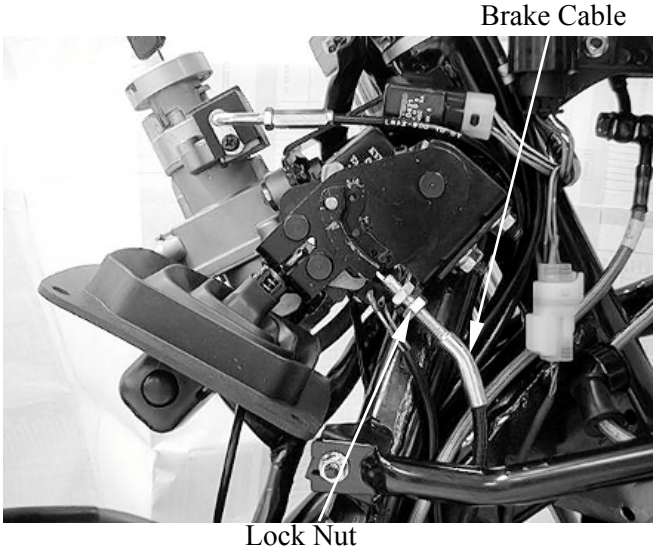


PARKING BRAKE LEVER LINK

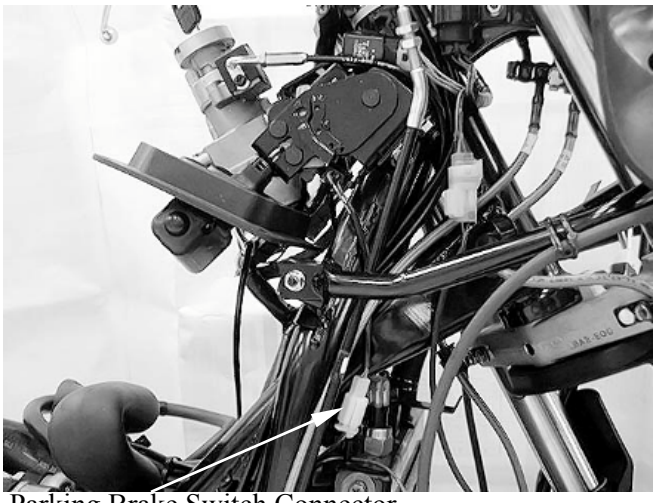
REMOVAL

Remove the inner cover (page 2-14).

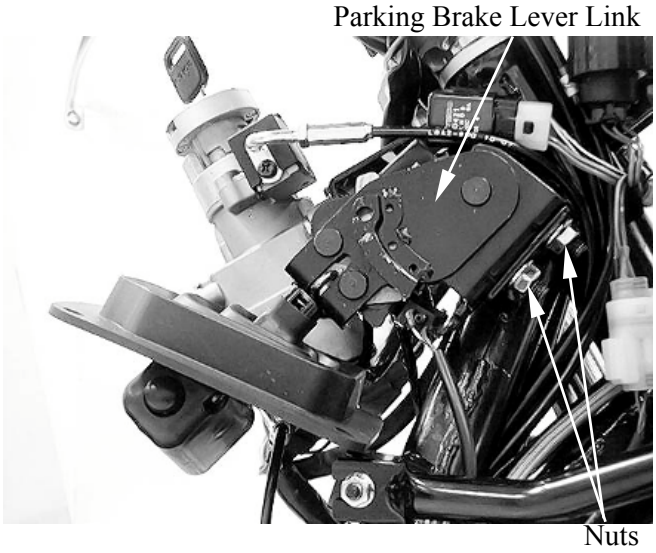
Loosen the lock nut and disconnect the parking brake cable from the parking braking brake lever link.



Disconnect the parking brake switch connector.

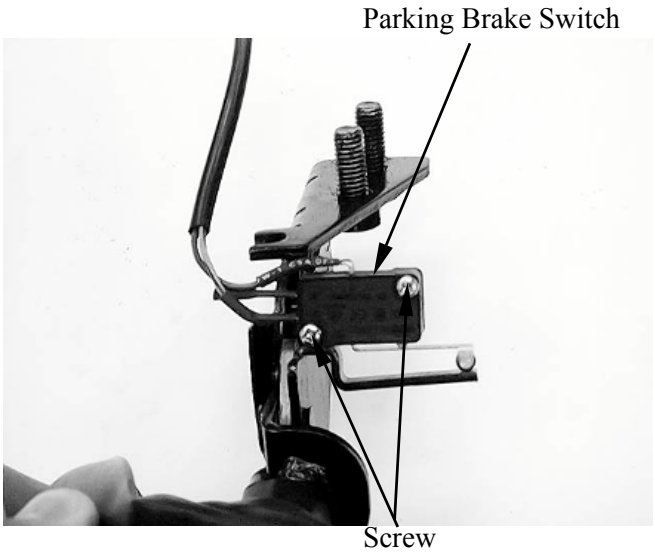


Remove the two nuts and parking brake lever link.



DISASSEMBLY

Remove the two screws and parking brake switch.



ASSEMBLY

Assembly is in the reverse order of disassembly.

INSTALLATION

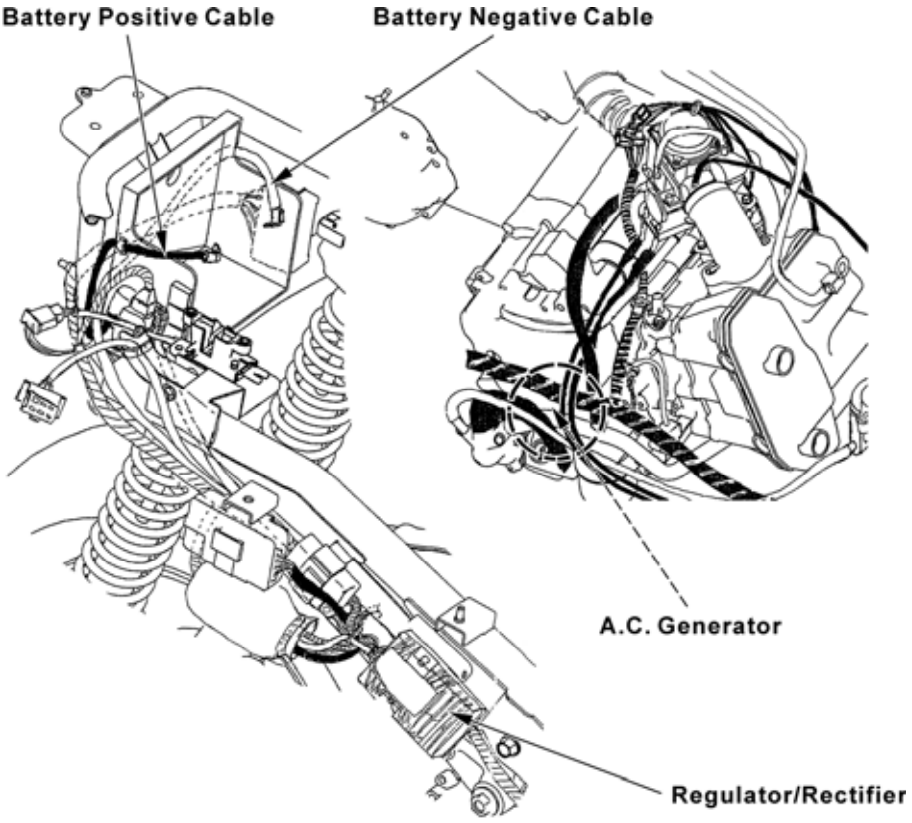
Installation is in the reverse order of removal.

BATTERY/CHARGING SYSTEM

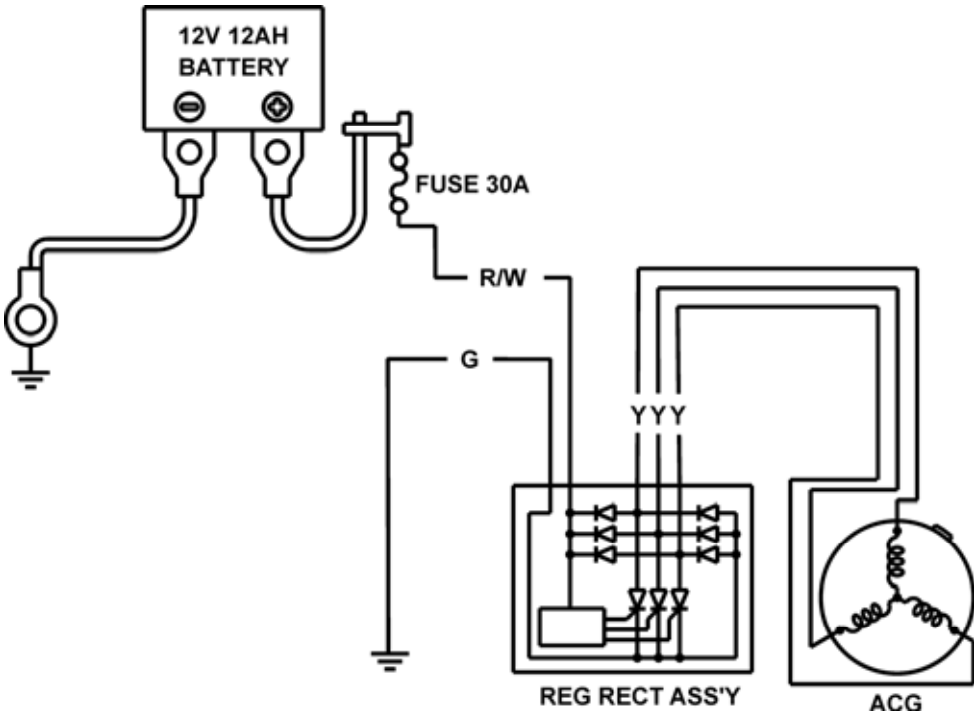
CHARGING SYSTEM LAYOUT ---------- 17-1
SERVICE INFORMATION---------- 17-2
TROUBLESHOOTING---------- 17-4
BATTERY ---------- 17-5
CHARGING SYSTEM INSPECTION ---------- 17-6
ALTERNATOR CHARGING COIL---------- 17-7
REGULATOR/RECTIFIER---------- 17-8

17. BATTERY/CHARGING SYSTEM

CHARGING SYSTEM LAYOUT



CHARGING CIRCUIT



SERVICE INFORMATION

GENERAL

CAUTION

- 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 call your local Poison Control Center or physician immediately, KEEP OUT OF REACH OF CHILDREN.

- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "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 shorted vehicle, disconnect the negative battery cable from the battery.
- The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- 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 vehicle.
- The battery self-discharge when the vehicle is not in use, for this reason, charge the battery every 2 weeks to prevent sulfate 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 17-4)
- For alternator service, refer to section 12

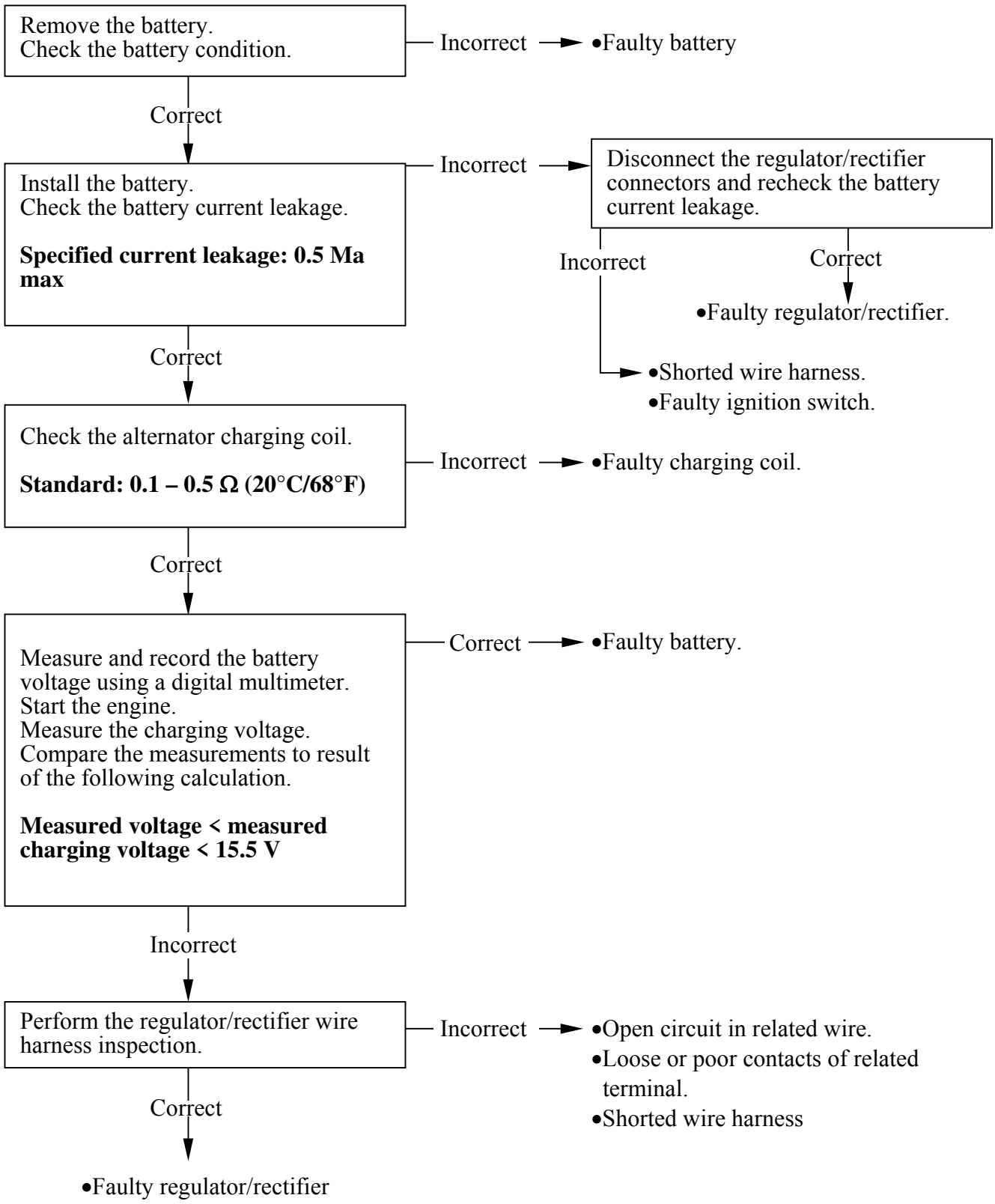
BATTERY CHARGING
- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  - ─ Use only the electrolyte that comes with the battery.
  - ─ Use all of the electrolyte
  - ─ Seal the battery properly
  - ─ Never open the seals again
- For battery charging, do 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 – 12 Ah
	Current leakage		0.5 Ma max.
	Voltage (20°C/68°F)	Full charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.4 A/5 – 10 h
		Quick	5.5 A/0.5 h
Alternator	Capacity		240 W/5000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 0.5Ω

TROUBLESHOOTING

Battery is damaged or weak



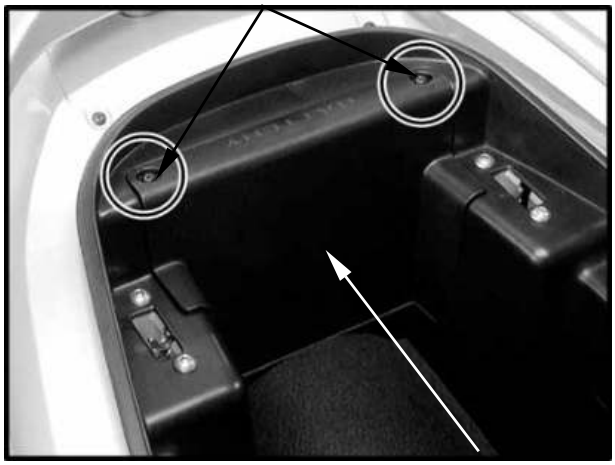
BATTERY

REMOVAL/INSTALLATION

Unlock and open the seat (page 2-3).

Turn ignition switch OFF.

Remove the screws and battery box cover.



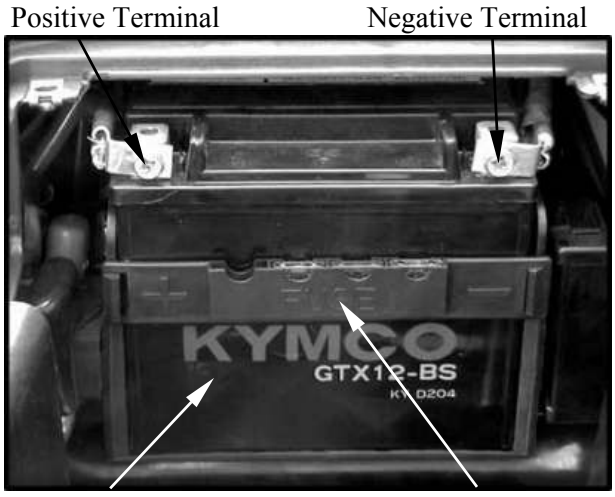
Remove the battery retainer.

With the ignition switch to "OFF" disconnect the negative (-) terminal lead from the battery first, then disconnect the positive (+) terminal lead.

Pull out the battery from the battery box.

Installation is in the reverse order of removal.

After connecting the battery cables, coat the terminals with grease.



VOLTAGE INSPECTION

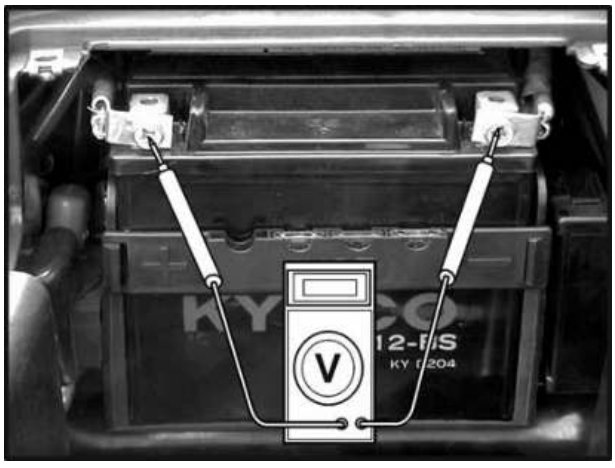
Remove the battery cover (see above).

Measure the battery voltage using a commercially available digital multimeter.

Voltage (20ºC/68ºC):

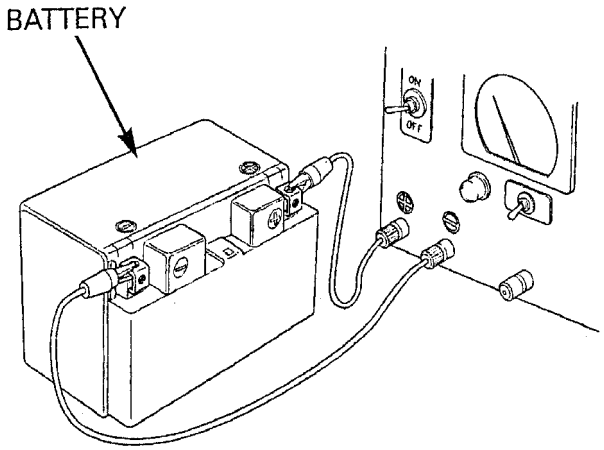
Fully charged: 13.0 - 13.2 V

Under charged: below 12.3 V



BATTERY CHARGING

Remove the battery (page 17-5).



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

* Turn the power ON/OFF at the chatger, not at the battery terminals.

Charging current time:

Standard: 1.4 A/5 - 10 hours
Quick: 5.5 A/0.5 hours

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

Remove the battery cover (page 17-5).



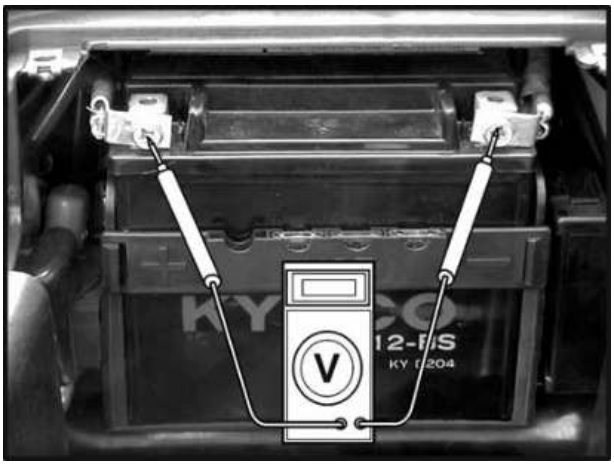
CURRENT LEAKAGE TEST

Turn the ignition switch OFF, 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.
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: 0.5 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

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



* 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.

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.

To prevent short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on and turned to the high beam position, restart the engine.

Measure the voltage on the multimeter when the engine runs at 5000 min-1 (rpm).

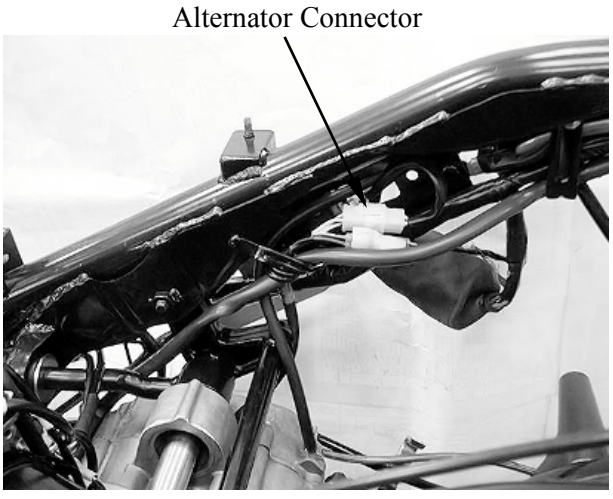
Standard:

Measured battery voltage (page 17-5) < Measure charging voltage (see above) <15.5 V

ALTERNATOR CHARGING COIL INSPECTION

Remove the luggage box (page 2-3).

Disconnect the alternator connector.



Measure the resistance between each Yellow wire terminals.

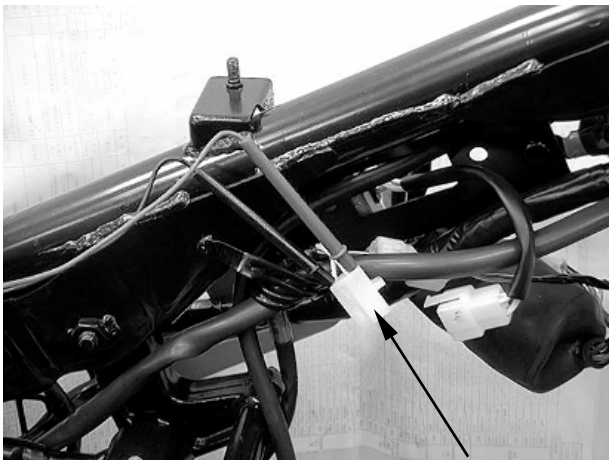
Standard: 0.1 - 0.5 Ω (20ºC/68ºF)

Check for continuity between each Yellow wire terminal of the alternator side connector and ground.

There should be continuity.

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

Refer to section 12 for alternator stator replacement.



Alternator Connector

REGULATOR/RECTIFIER

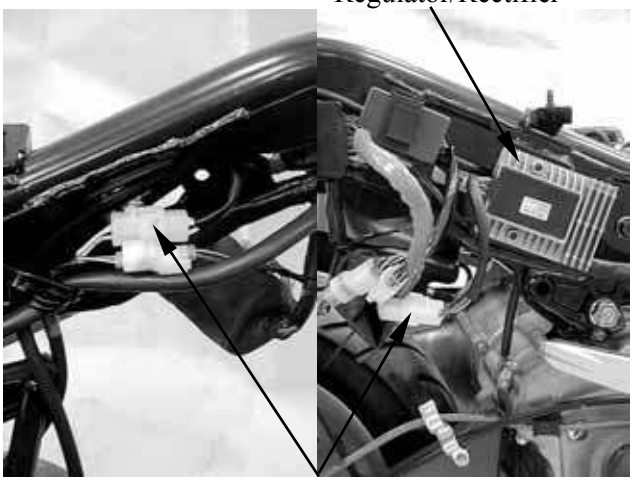
WIRE HARNESS INSPECTION

Remove the luggage box (page 2-3).

Disconnect the regulator/rectifier connectors.

Check the connectors for loose contacts of corroded terminals.

Regulator/Rectifier



Regulator/Rectifier Connectors

Battery line

Measure the voltage between the Red/White wire terminal and ground.

There should be battery voltage at all times.



Regulator/Rectifier Connector

Ground line

Check the continuity between the Green wire terminal and ground.

There should be continuity at all times.

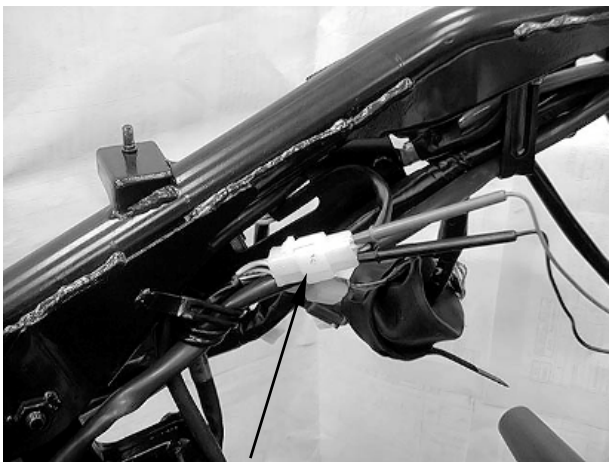


Regulator/Rectifier Connector

Charging coil line

Measure the resistance between each Yellow wire terminals.

Standard: 0.1 - 0.5 Ω (20ºC/68ºF)

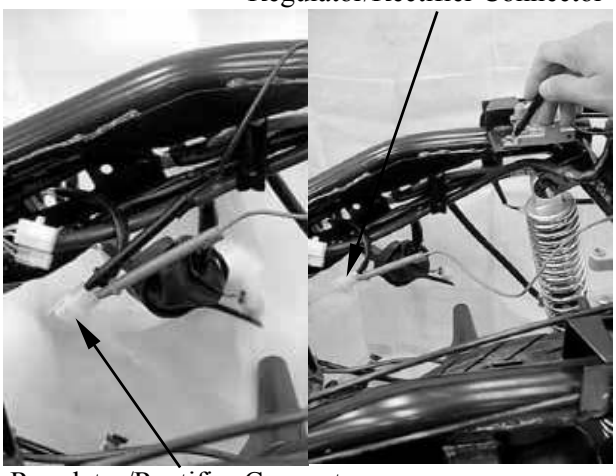


Regulator/Rectifier Connector

Check for continuity between each Yellow wire terminal and ground.

There should be no continuity.

Regulator/Rectifier Connector



Regulator/Rectifier Connector

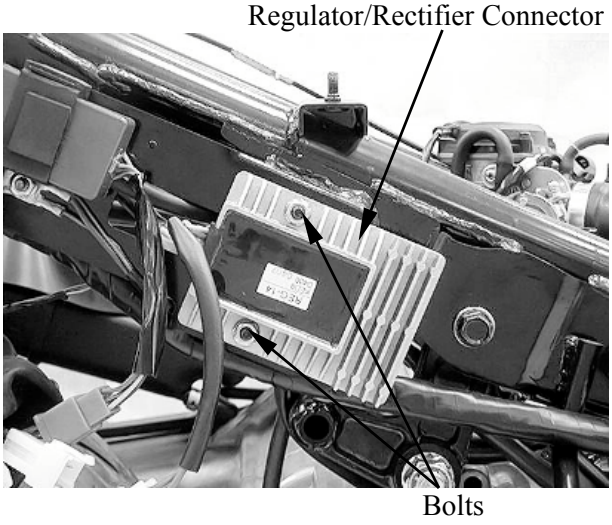
REMOVAL/INSTALLATION

Remove the side body cover (page 2-8).

Disconnect the regulator/rectifier connectors.

Remove the two bolts, regulator/rectifier and stay.

Installation is in the reverse order of removal.

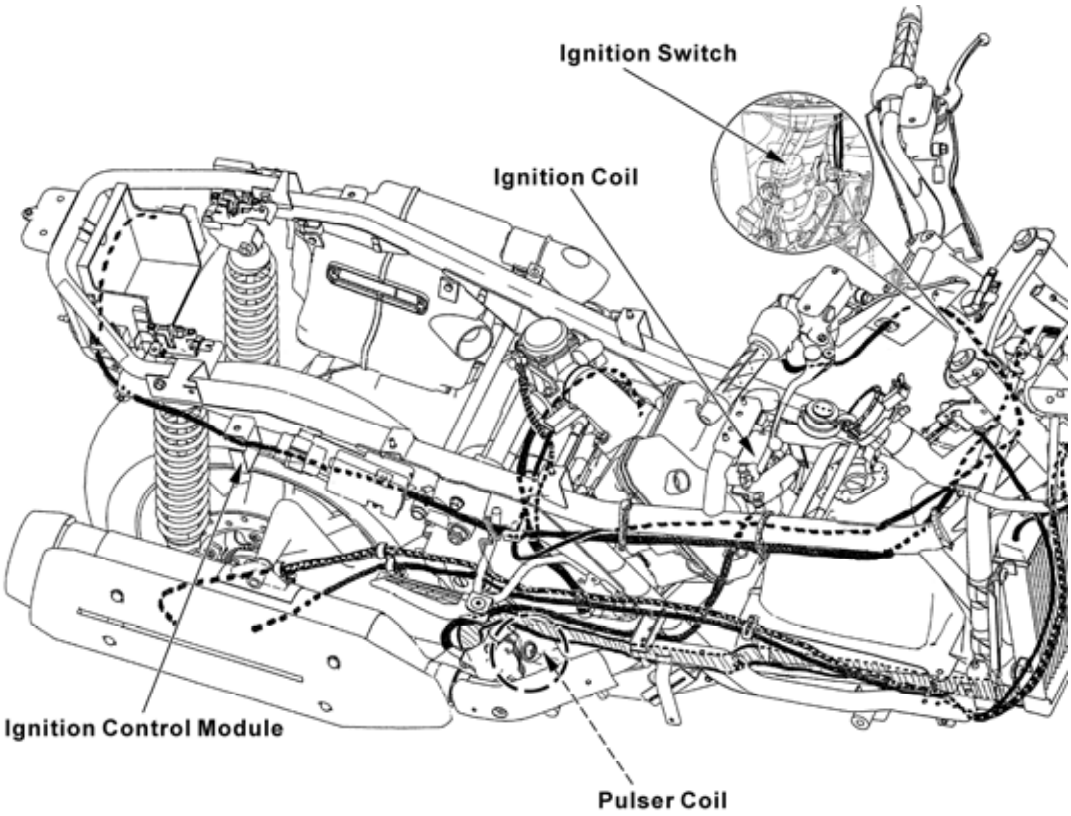


IGNITION SYSTEM

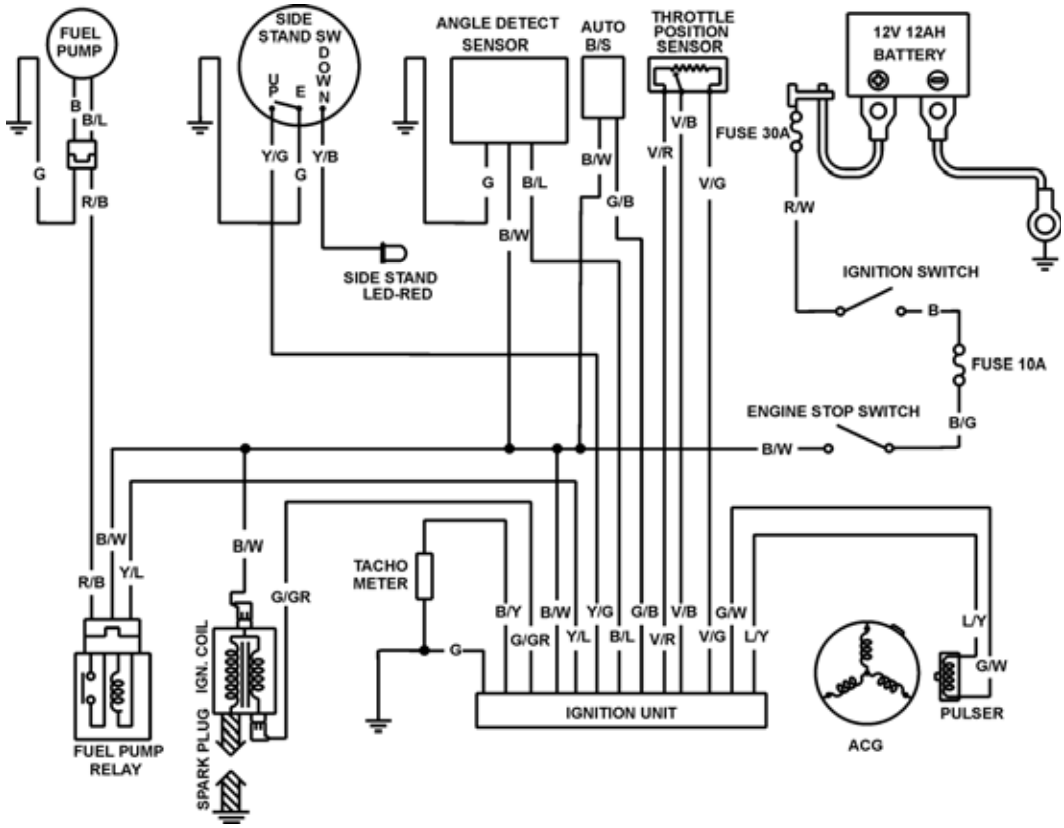
IGNITION SYSTEM LAYOUT ---------- 18-1
SERVICE INFORMATION ---------- 18-2
TROUBLESHOOTING ---------- 18-2
IGNITION COIL INSPECTION ---------- 18-4
IGNITION CONTROL MODULE ---------- 18-5

18. IGNITION SYSTEM

IGNITION SYSTEM LAYOUT



IGNITION CIRCUIT



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- 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 on page ???.
- The ignition timing cannot be adjusted since the ignition control module is factory preset.
- The ignition control module may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ignition control module. 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 plug.
- Use a spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- See section 12 for ignition pulse generator removal/installation.
- See section 20 for following components:

_ Ignition switch
_ Engine stop switch

SPECIFICATIONS

Item	Standard
Spark plug	NGK-CR8E
Spark plug gap	0.7 mm (0.028 in)
Ignition system	Full transistor digital ignition
Ignition timing	TPS

TROUBLESHOOTING

LOW PEAK VOLTAGE

- Cranking speed is too low (battery is undercharged).
- Poorly connected connectors or an open circuit in the ignition system.
- Faulty ignition-coil.
- Faulty ignition control module.

NO PEAK VOLTAGE

- Short circuit in engine stop switch or ignition switch wire.
- Faulty engine stop switch or ignition switch.
- Loose or poorly connected ignition control module connectors.
- Open circuit or poor connection in ground wire of the ignition control module.
- Faulty ignition pulse generator.
- Faulty ignition control module.

PEAK VOLTAGE IS NORMAL, BUT NO SPARK JUMPS AT THE PLUG

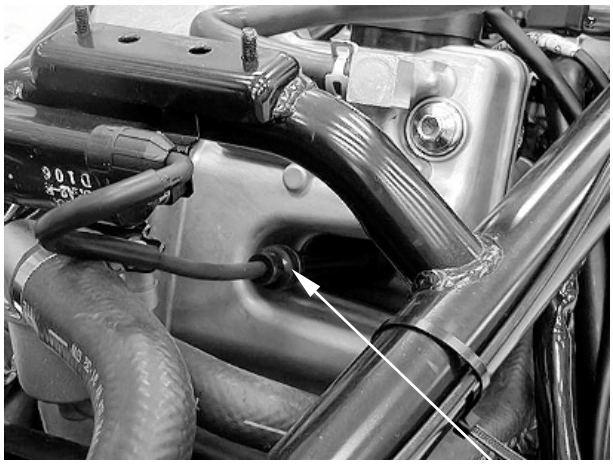
- Faulty spark plug or leaking ignition coil secondary current.
- Faulty ignition coil.

IGNITION COIL INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

Remove the floorboard (page 2-6).

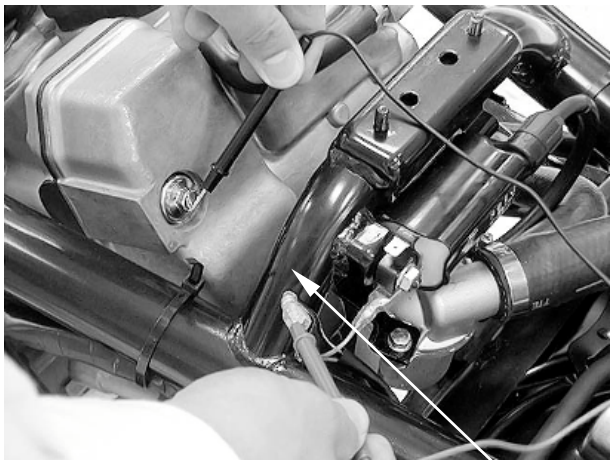
Check cylinder compression and check that the spark plugs is installed correctly in the cylinder.
Disconnect the spark plug cap from the spark plug.


Spark Plug Cap

Connect known good spark plug to the spark plug cap and ground the spark plugs to the cylinder as done in the spark test.

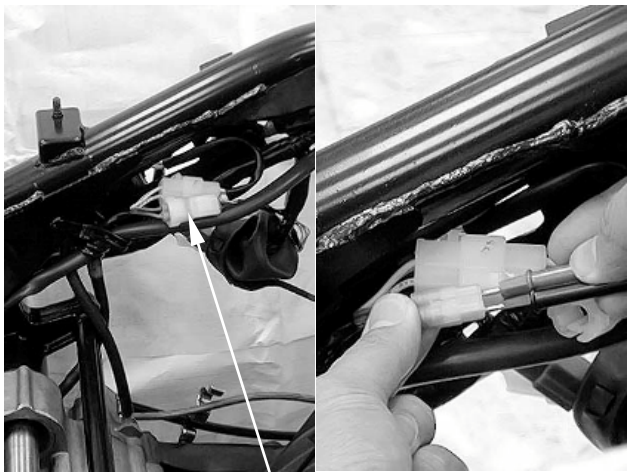

Spark Plug Cap

Turn the ignition switch to “ON” and engine stop switch ON.
Connect the multimeter (+) probe to the Black/White wire and the multimeter (-) to the body ground.
Check for initial voltage at this time.
The battery voltage should be measured.
If the initial voltage cannot be measured, check the power supply circuit.


Spark Plug Cap

IGNITION PULSE GENERATOR INSPECTION

Remove the luggage box (page 2-3).
Disconnect the ignition pulse generator connector.
Measure the ignition pulse generator resistance between the Green/White wire and Blue/Yellow wire.
Standard: 516Ω (20ºC/68ºF)


Ignition Pulse Generator Connector

IGNITION COIL REMOVAL/INSTALLATION

Remove the floorboard (page 2-6).
Disconnect the spark plug cap from the spark plug (page 18-4).

Disconnect the ignition coil primary connectors.
Remove the two nuts and the ignition coil.

Installation is in the reverse order of removal.


Spark Plug Cap

IGNITION CONTROL MODULE

REMOVAL/INSTALLATION

Remove the side body cover (page 2-8).

Disconnect the ignition control module connectors and remove the ignition control module.

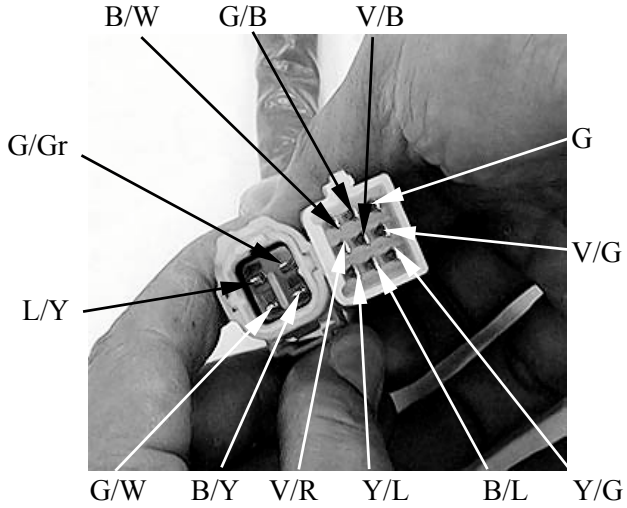
Ignition Control Module Connectors


Ignition Control Module

RESISTANCE INSPECTION

Measure the resistance between the terminals.

* Due to the semiconductor in circuit, it is necessary to use a specified tester for accurate testing. Use of an improper tester in an improper range may give false readings.



Unit: Ω

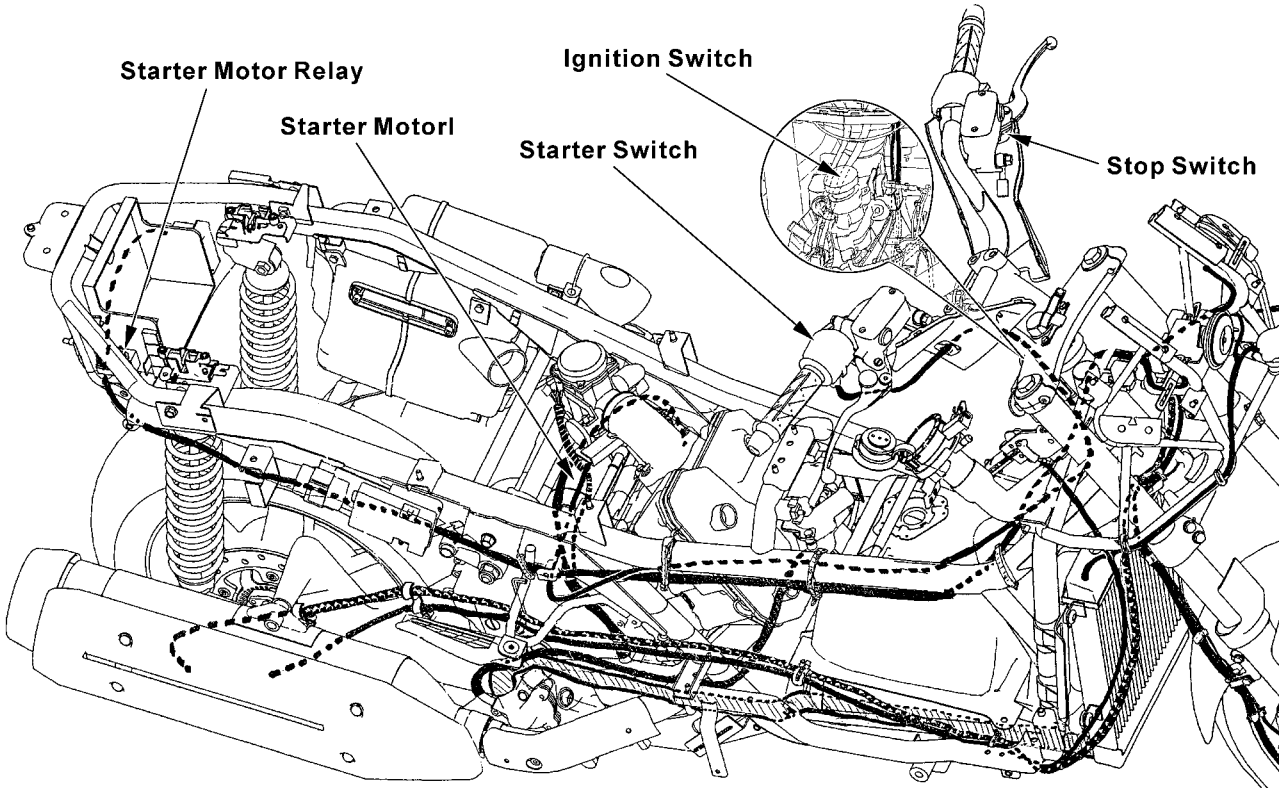
(+) / (-)	L/Y	G/GR	G/W	B/Y	B/W	G/B	G	V/R	V/B	V/G	Y/L	B/L	Y/G
L/Y			91.6K	6.67M	6.68M		46.2K	49.5K	150K	46.2K	12.59M	49.7K	
G/GR	9.5M		9.3M		←	↑	9.23M	9M	9.16M	8.97M		8.96M	↑
G/W	91.8K			6.67M	6.68M	↑	47K	50.3K	150.9K	47K	12.59M	50.3K	↑
B/Y	15.96M	↑	15.6M		994	↑	15.33M	14.88M	15.04M	14.74M	3.35M	14.7M	↑
B/W	15.96M	↑	15.6M	994		↑	14.96M	14.88M	15.02M	14.74M	3.35M	14.7M	↑
G/B		↑		←	←		←	←	←	←	←	←	↑
G	44.3K	↑	44.9K	6.62M	6.63M	↑		3.54K	103.9K	∞	12.51M	3.54K	↑
V/R	47.5K	↑	48.4K	6.62M	6.63M	↑	3.53K		100.2K	3.54K	12.51M	1.99K	↑
V/B	148.5K	↑	149.4K	6.75M	6.76M	↑	102.8K	99.3K		102.7K	12.67M	101.2K	↑
V/G	44.3K	↑	44.9K	6.62M	6.63M	↑	∞	3.55K	103.9K		12.51M	3.55K	↑
Y/L	8.13M	↑	8.1M		←	↑	7.81M	7.77M	7.91M	7.72M		7.72M	↑
B/L	47.5K	↑	48.4K	6.62M	6.62M	↑	3.53K	1.99K	102.2K	3.53K	12.51M		↑
Y/G		↑		←	←	←	←	←	←	←	←	←	

ELECTRIC STARTER

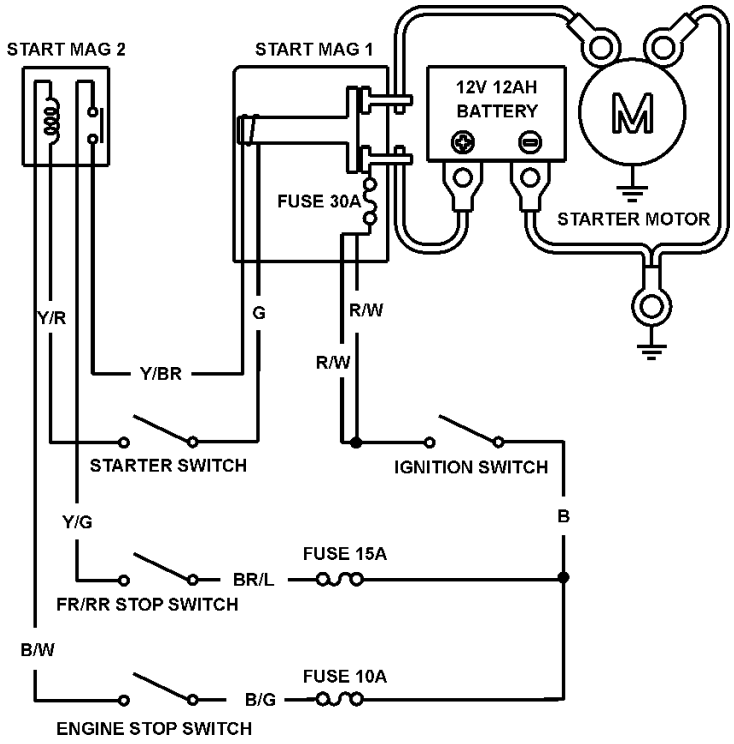
STARTING SYSTEM LAYOUT ---------- 19-1
SERVICE INFORMATION---------- 19-2
TROUBLESHOOTING---------- 19-2
STARTER MOTOR ---------- 19-5
STARTER RELAY SWITCH---------- 19-7

19. ELECTRIC STARTER

STARTING SYSTEM LAYOUT



STARTING CIRCUIT



SERVICE INFORMATION

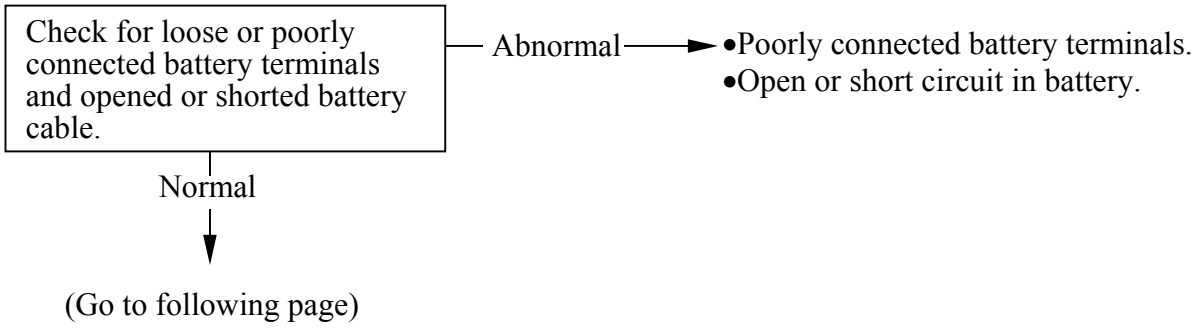
GENERAL

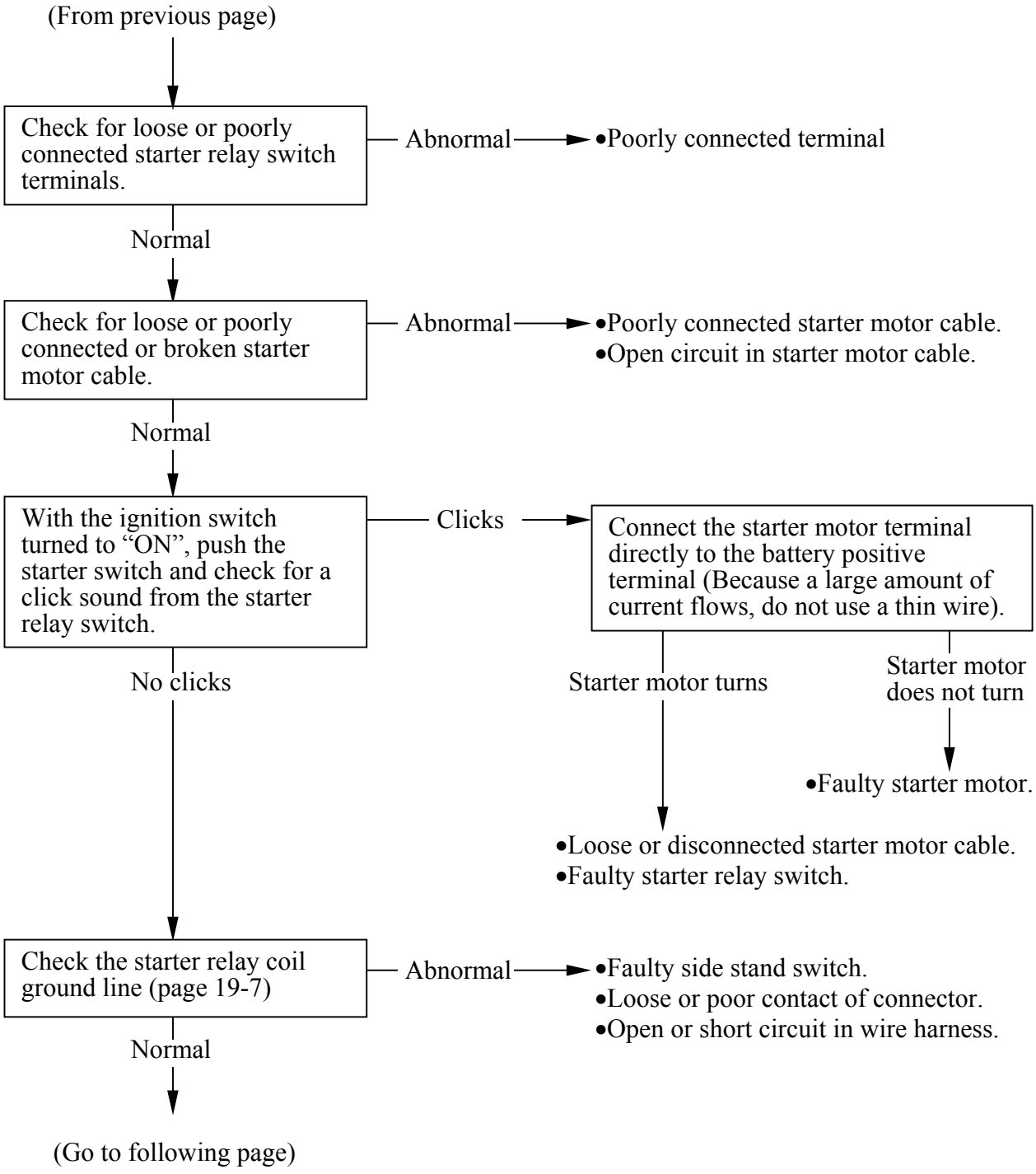
- Always turn the ignition switch to "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 12 for starter clutch servicing.
- See section 20 for following components:
  - Ignition switch
  - Starter switch
  - Brake light switch

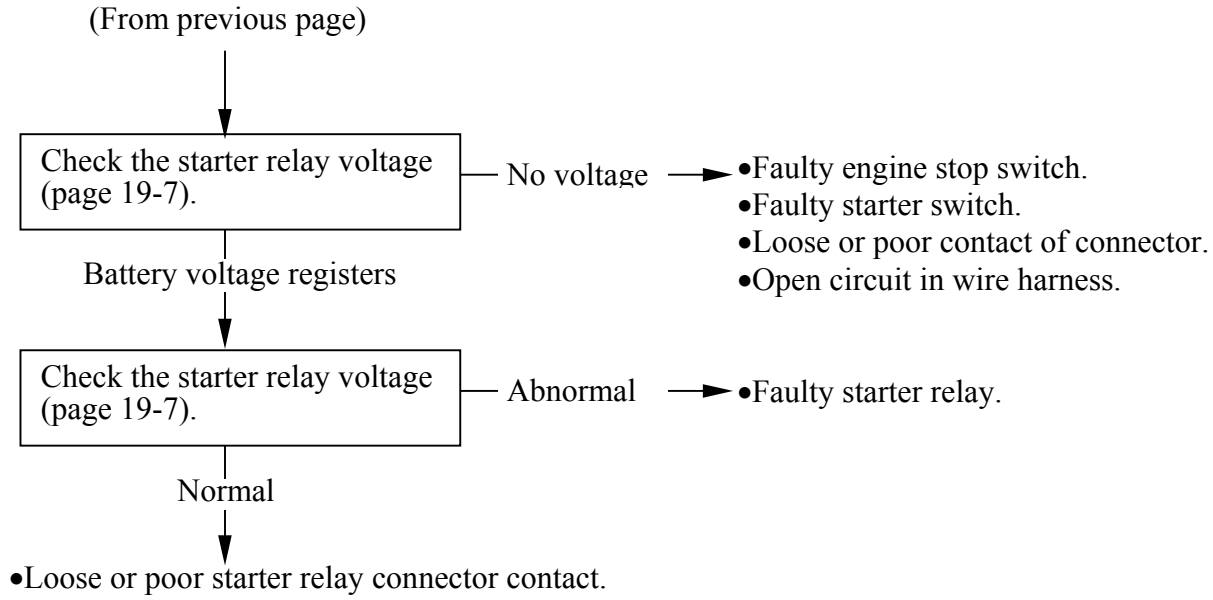
TROUBLESHOOTING

- Check for the following before troubleshooting:
  - Blown main fuse (30A) and sub fuse (10 A)
  - Loose battery and starter motor cable
  - Discharged battery
- The starter motor can turn with the following conditions:
  - Ignition switch ON
  - Engine stop switch in RUN
  - Rear brake lever fully squeezed
  - Side stand retracted
  - Starter switch pushed

Starter motor will not turn




(From previous page)
Check for loose or poorly connected starter relay switch terminals.
Abnormal
•Poorly connected terminal
Normal
Check for loose or poorly connected or broken starter motor cable.
Abnormal
•Poorly connected starter motor cable.
•Open circuit in starter motor cable.
Normal
With the ignition switch turned to "ON", push the starter switch and check for a click sound from the starter relay switch.
Clicks
Connect the starter motor terminal directly to the battery positive terminal (Because a large amount of current flows, do not use a thin wire).
Starter motor turns
Starter motor does not turn
•Faulty starter motor.
•Loose or disconnected starter motor cable.
•Faulty starter relay switch.
No clicks
Check the starter relay coil ground line (page 19-7)
Abnormal
•Faulty side stand switch.
•Loose or poor contact of connector.
•Open or short circuit in wire harness.
Normal
(Go to following page)


(From previous page)
Check the starter relay voltage (page 19-7).
No voltage
•Faulty engine stop switch.
•Faulty starter switch.
•Loose or poor contact of connector.
•Open circuit in wire harness.
Battery voltage registers
Check the starter relay voltage (page 19-7).
Abnormal
•Faulty starter relay.
Normal
•Loose or poor starter relay connector contact.

STARTER MOTOR

INSPECTION

Remove the luggage box (page 2-3).

Disconnect the starter motor cable from the starter relay switch.
Turn the ignition switch to "ON".
Connect the starter motor cable directly to the battery positive terminal.
If the starter motor does not turn, the starter motor is faulty.

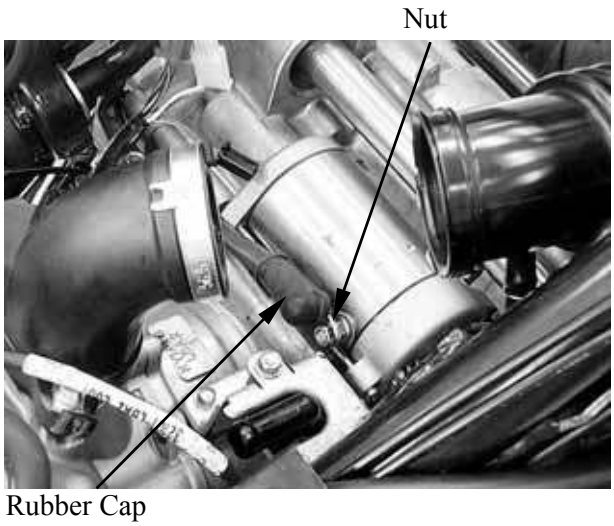


REMOVAL

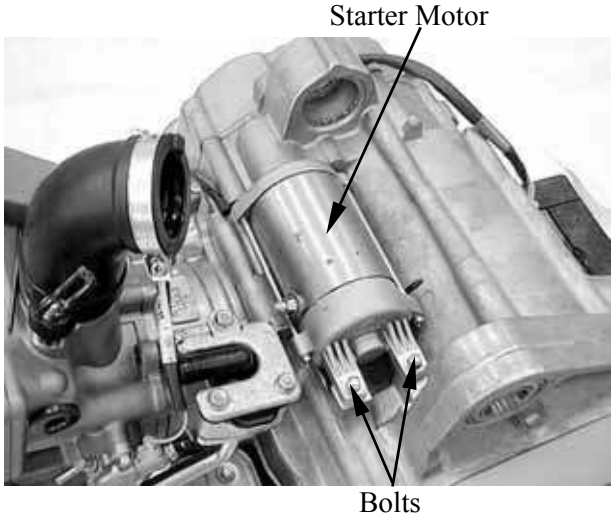
Remove the carburetor (page 5-5).

Turn the ignition switch turned to "OFF"

Release the rubber cap and remove the terminal nut to disconnect the starter motor cable from the starter motor.



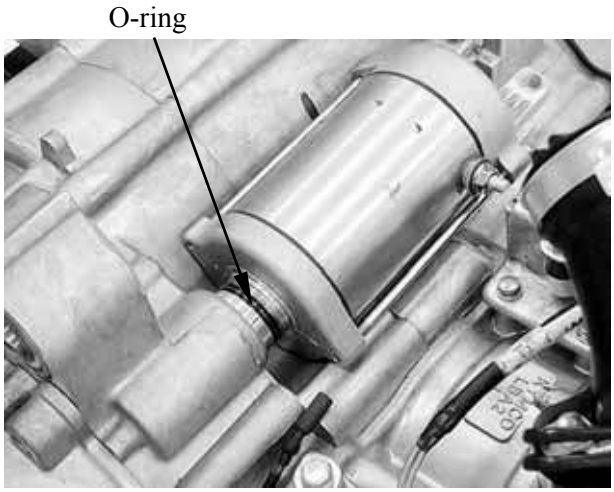
Remove the two bolts and starter motor.



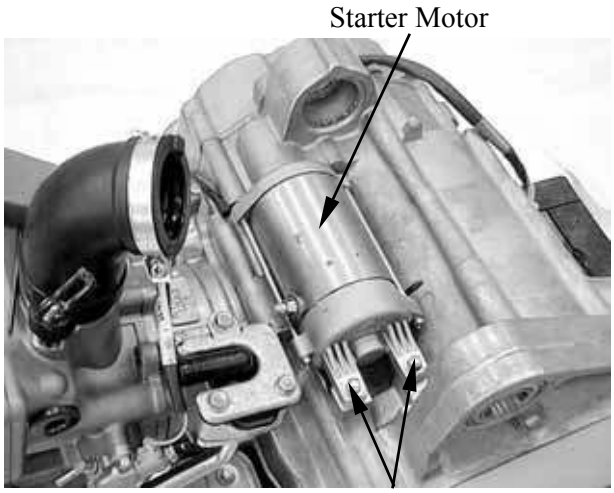
INSTALLATION

Coat a new O-ring with engine oil and install it into the starter motor groove.

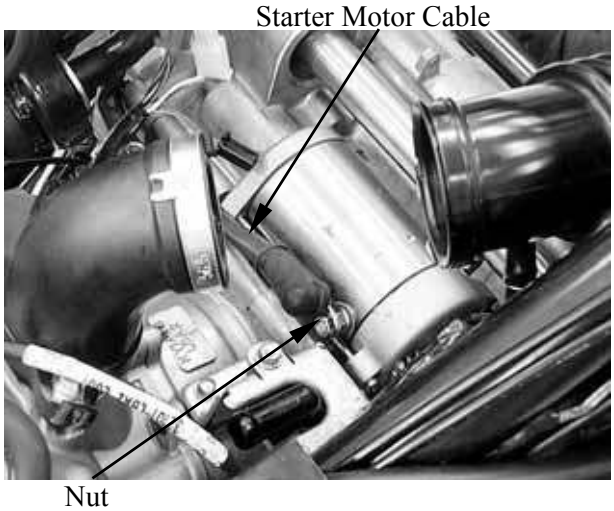
Install the starter motor into the crankcase.



Install the two bolts and tighten them securely.



Connect the starter motor cable to motor terminal with the terminal nut and tighten it.



STARTER RELAY SWITCH

INSPECTION

Remove the luggage box (page 2-3).

Retracted the side stand.
Turn the ignition switch to “ON” and engine stop switch on.
Squeeze the rear brake lever fully and push the starter switch.

The coil is normal if the starter relay switch clicks.

If you do not hear the switch click. Inspect the relay switch using the procedure below.

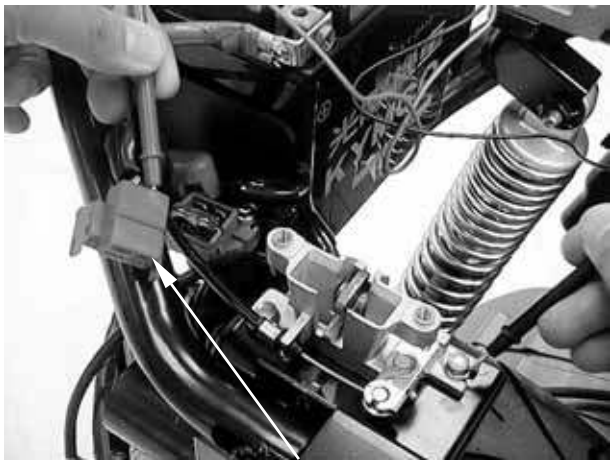
Starter Relay Switch



GROUND LINE INSPECTION

Disconnect the starter relay switch connector.
Check for continuity between the Green wire terminal and ground.

There should be continuity.



Starter Relay Connector

VOLTAGE INSPECTION

Connect the starter relay switch connector.
Turn the ignition switch ON and engine stop switch to RUN.

Measure the starter relay switch Yellow/Red wire terminal and ground.

If the battery voltage appears only when the rear brake lever is squeezed fully and starter switch is pushed, the circuit is normal.



Starter Relay Switch

19. ELECTRIC STARTER

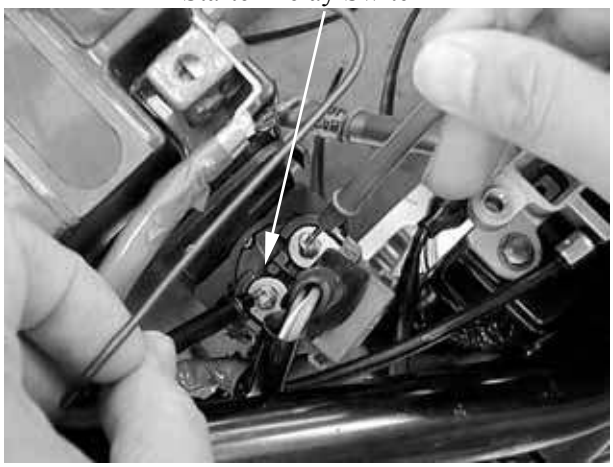
CONTINUTY INSPECTION

Disconnect the starter relay switch connector and cables.

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Green wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.

Starter Relay Switch



LIGHTS/METERS/SWITCHES

SERVICE INFORMATION ---------- 20- 1
BULB REPLACEMENT ---------- 20- 2
SPEED SENSOR ---------- 20- 5
BRAKE LIGHT SWITCH ---------- 20- 7
IGNITION SWITCH ---------- 20- 7
HANDLEBAR SWITCH ---------- 20- 8
PARKING SWITCH ---------- 20-10
LUGGAGE BOX LIGHT SWITCH ---------- 20-10
OIL PRESSURE SWITCH ---------- 20-10
FUEL UNIT ---------- 20-13
SIDE STAND SWITCH ---------- 20-15
HORN ---------- 20-16
BANK ANGLE SENSOR ---------- 20-17
HEATER CONTROL UNIT ---------- 20-18

SERVICE INFORMATION

GENERAL

*

A halogen head light bulb becomes very hot while the head light is on, and remains for a while after it is turned off. Be sure to let it cool down before servicing.

- Note the following when replacing the halogen headlight bulb
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.

- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the scooter.
- Route the wires and cables properly after servicing each component.

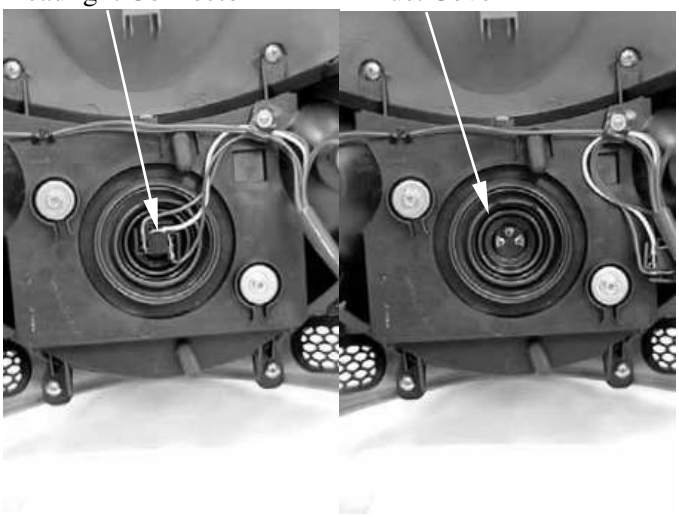
BULB REPLACEMENT

HEADLIGHT

* A halogen headlight bulb becomes very hot while the headlight is ON, and remain for a while after it is turned OFF. Be sure to let it cool down before servicing.

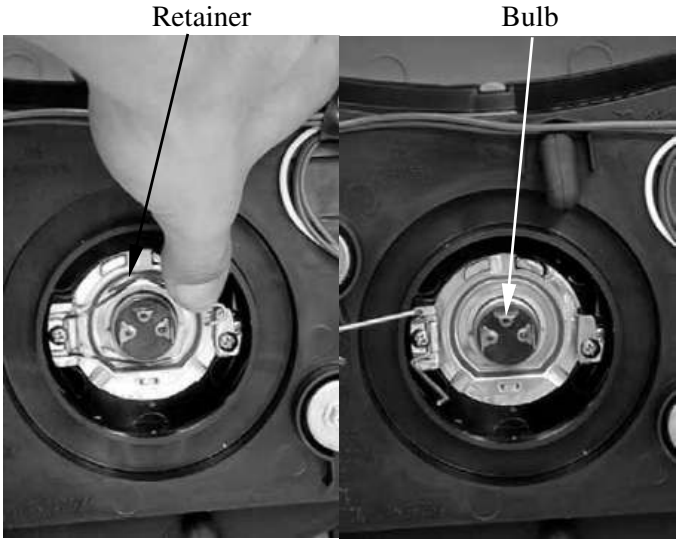
Remove the front cover (page 2-11)

Disconnect the headlight connector from the headlight bulb and remove the dust cover.



Unhook the retainer and remove the bulb from the headlight case.

* Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.



Install a new bulb in the headlight case, by aligning the bulb tab with the case groove.

Hook the retainer.

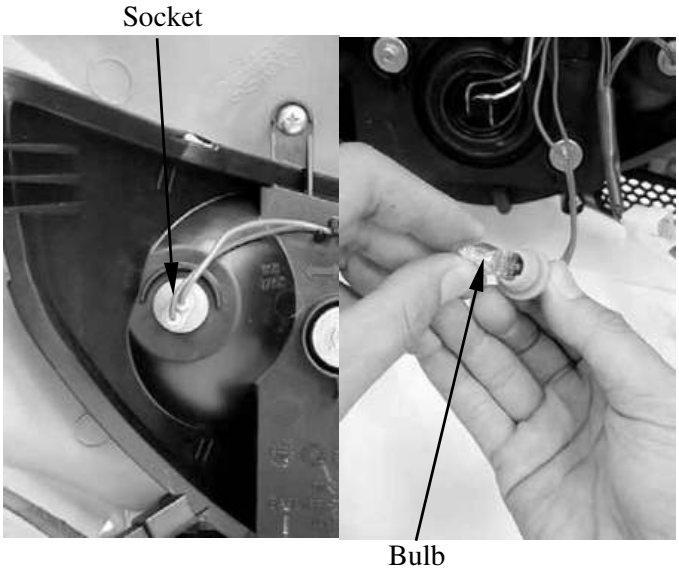
Install the dust cover properly on to the headlight and connect the headlight connector

POSITION LIGHT

Remove the front cover (page 2-11).

Remove the bulb socket and position light bulb. Remove the bulb and replace with a new one.

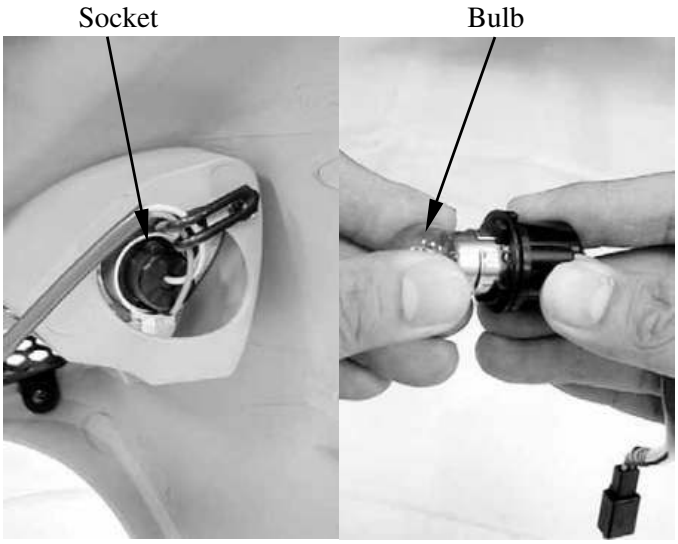
Installation is in the reverse order of removal.



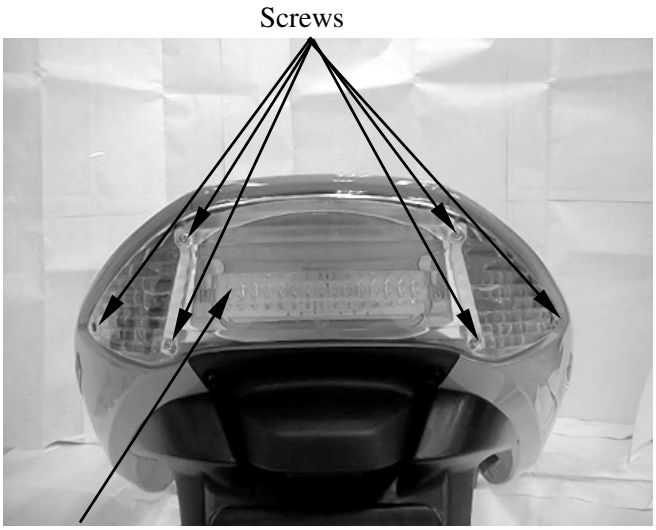
FRONT TURN SIGNAL
Remove the front cover (page 2-11).

Turn the bulb socket counterclockwise to remove it.
Remove the bulb and replace with a new one.

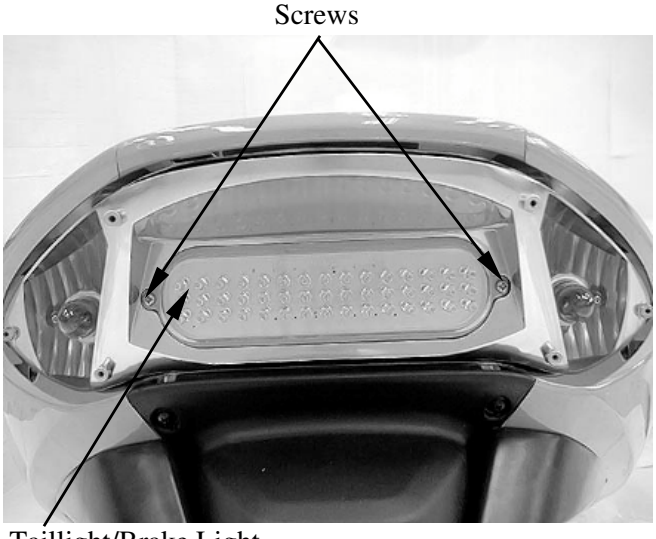
Installation is in the reverse order of removal.



TAILLIGHT/BRAKE LIGHT, REAR TURN SIGNAL
Remove the six screws and lens.

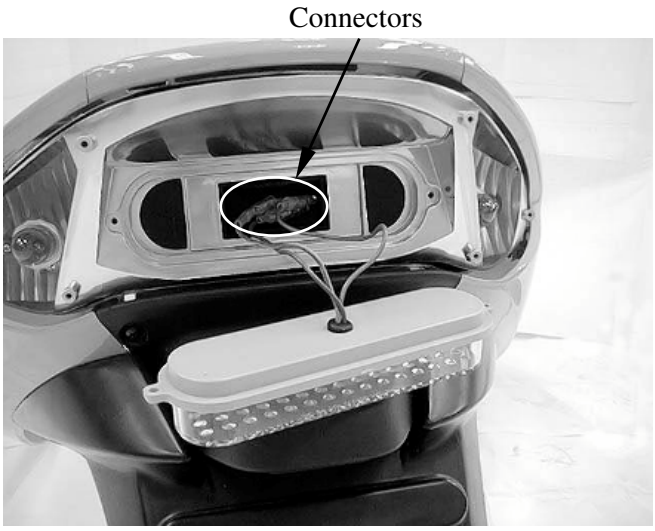


Taillight/Brake light
Remove the two screws and remove the taillight/brake light.



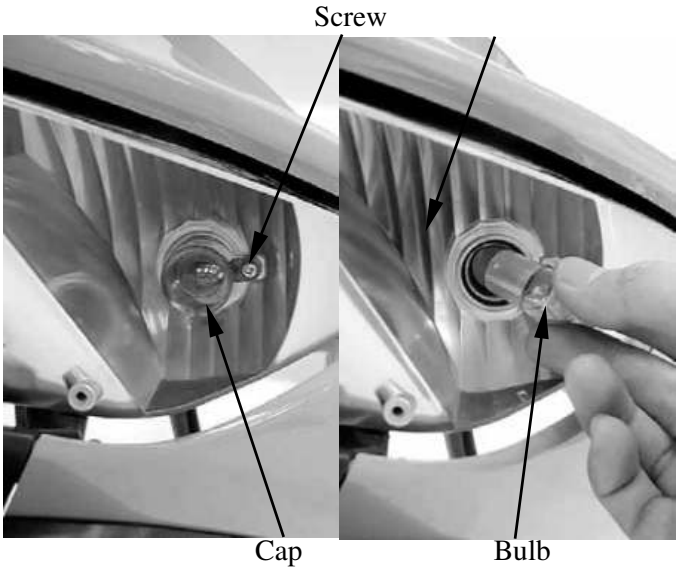
Disconnect the taillight/brake light connectors.

Installation is in the reverse order of removal.

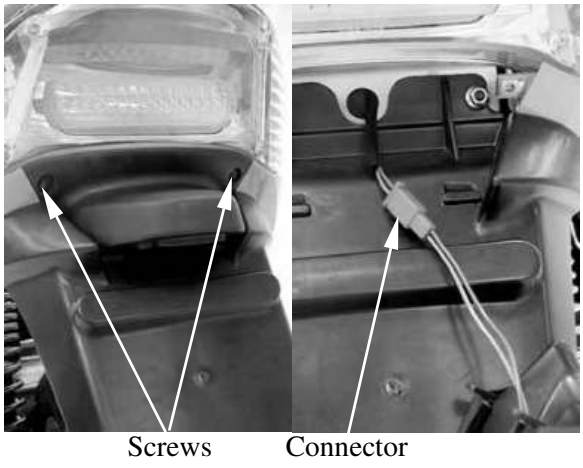


Rear turn signal
Remove the screw and bulb cap.
Remove the bulb and replace with a new one.

Installation is in the reverse order of removal.

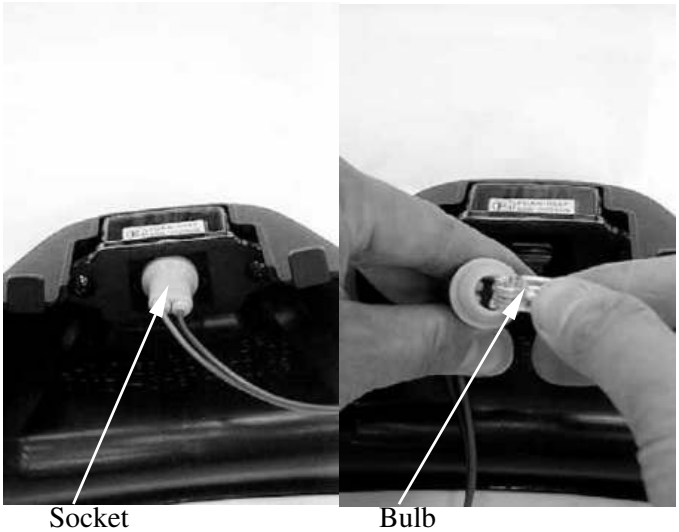


LICENSE LIGHT
Remove two screws.
Disconnect the license light connector and remove the license light.



Remove the bulb socket and license light bulb.
Remove the bulb and replace with a new one.

Installation is in the reverse order of removal.



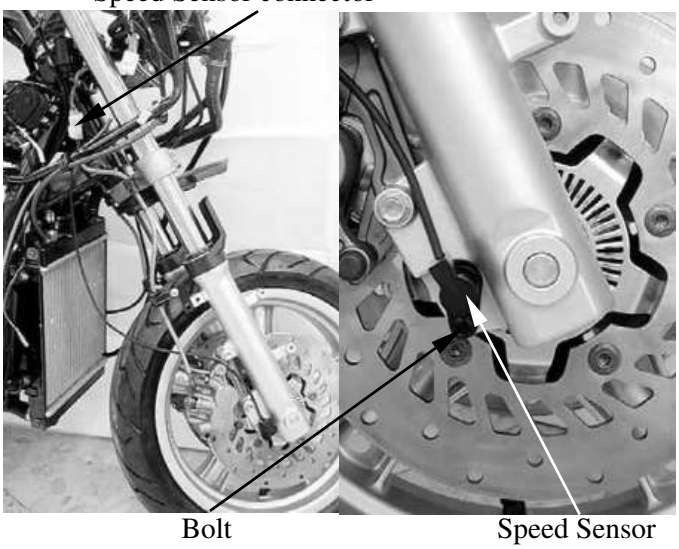
SPEED SENSOR

REMOVAL/INSTALLATION

Remove the front cover (page 2-11).

Disconnect the speed sensor connector.
Remove the bolt and speed sensor.

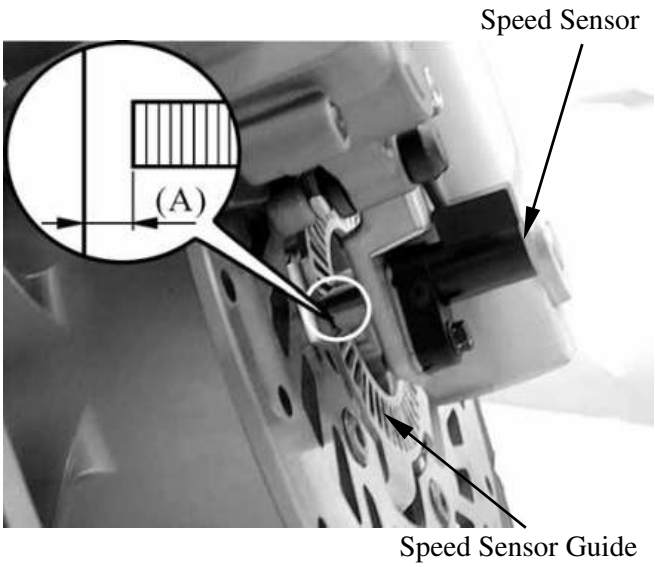
Installation is in the reverse order of removal.



INSPECTION

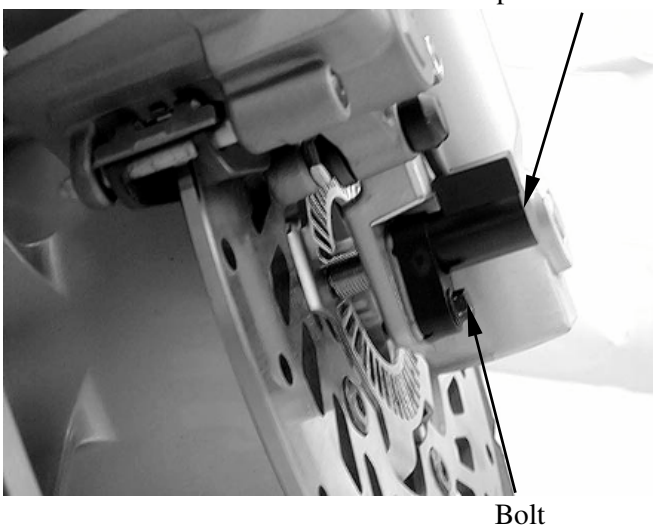
Measure the speed sensor to speed sensor guide clearance.

Standard (A): 0.3 – 1.2 mm (0.0012 – 0.048 in)

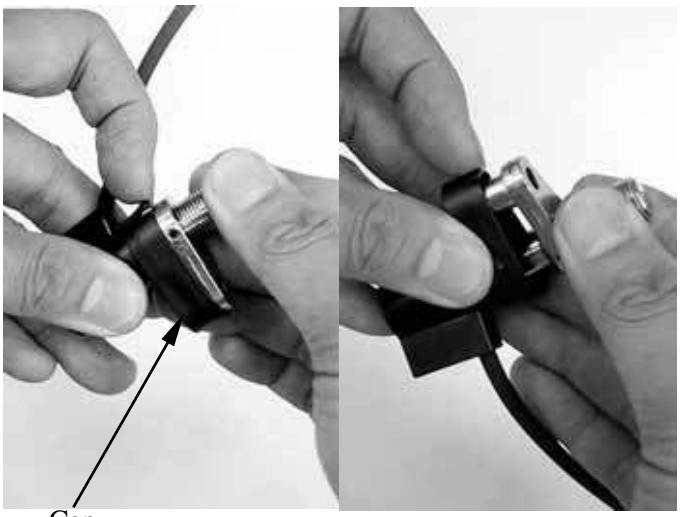


ADJUSTMENT

Remove the bolt and speed sensor.

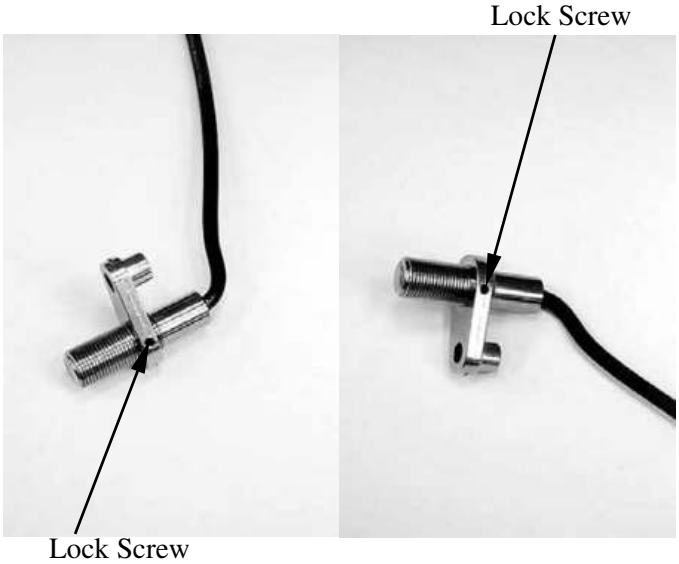


Remove the speed sensor cap.



Loosen the lock screws and adjust speed sensor to the standard clearance.

Standard: 0.3 – 1.2 mm (0.0012 – 0.048 in)

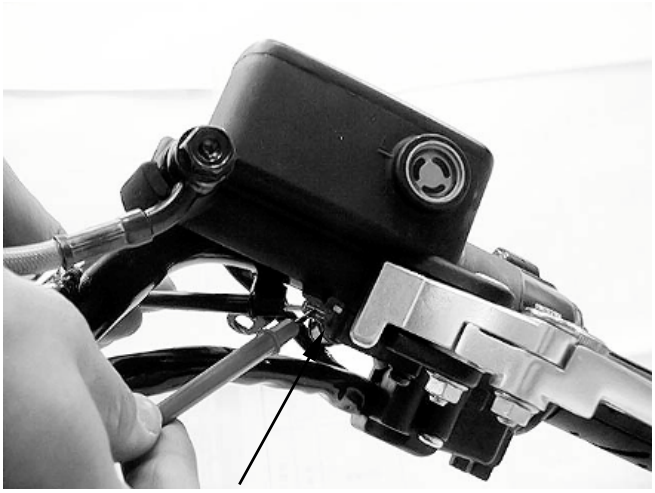


BRAKE LIGHT SWITCH

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

Disconnect front or rear light switch connector and check for continuity between the switch terminals.

There should be continuity with the front or rear brake lever squeezed, and there should be no continuity with the front or rear brake lever is released.



Brake Light Switch

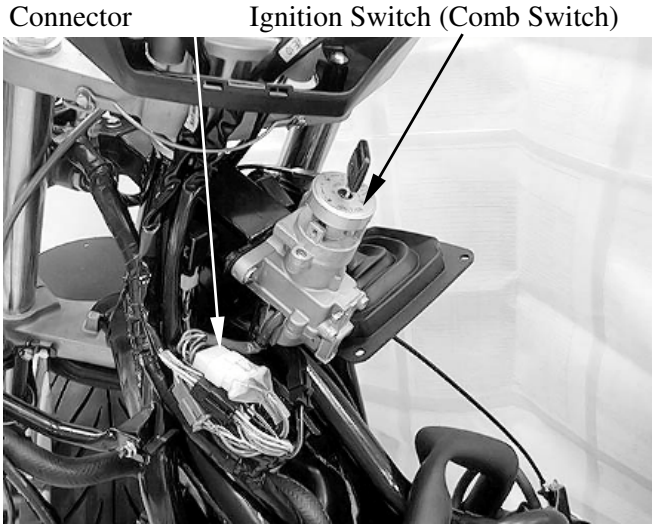
IGNITION SWITCH

INSPECTION

Remove the front cover (page 2-11).

Disconnect the ignition switch connector and check for continuity at the switch side connector terminals.

Continuity should exist between the color code wires as follows:



COMB SW

	BAT2	IG	E	BAT1	HA
LOCK		○—○			
OFF		○—○		○—○	
ON	○			○—○	
COLOR	B	B/W	G	R	B/L

HANDLEBAR SWITCH

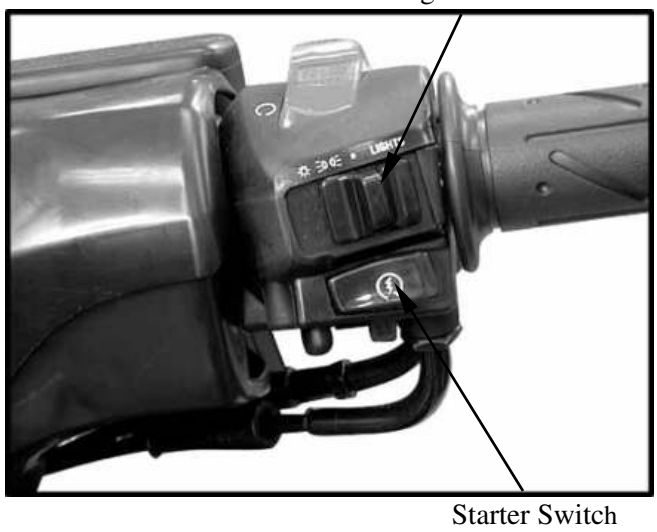
INSPECTION

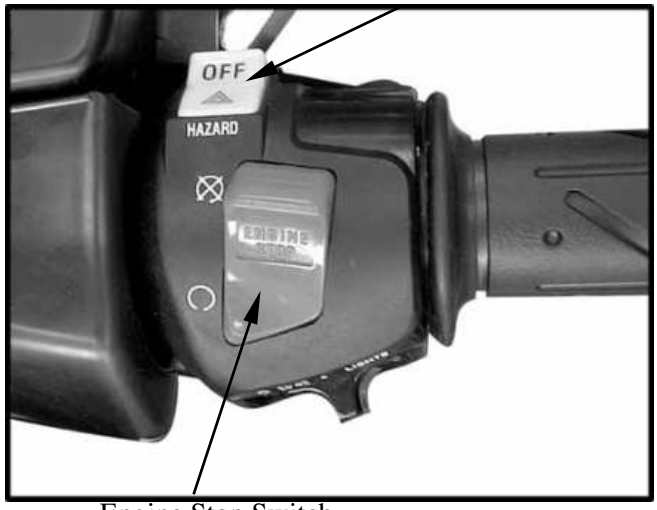
Remove the front cover (page 2-11).

Right handlebar switch

Disconnect the right handlebar switch connector and check for continuity at switch side connector terminals.

Continuity should exist between the color code wires as follows:





LIGHTING SW

	BAT4	PO	TL	HL
•				
(N)				
P	○	○	○	
(N)	○	○	○	○
H	○		○	○
COLOR	BR/L	BR/W	BR	W/L

STARTER SW

	E	ST
FREE		
PUSH	○	○
COLOR	G	Y/R

HAZARD SW

	WR	HA
△	○	○
OFF	○	○
COLOR	B/L	Y/B

ENGINE STOP SW

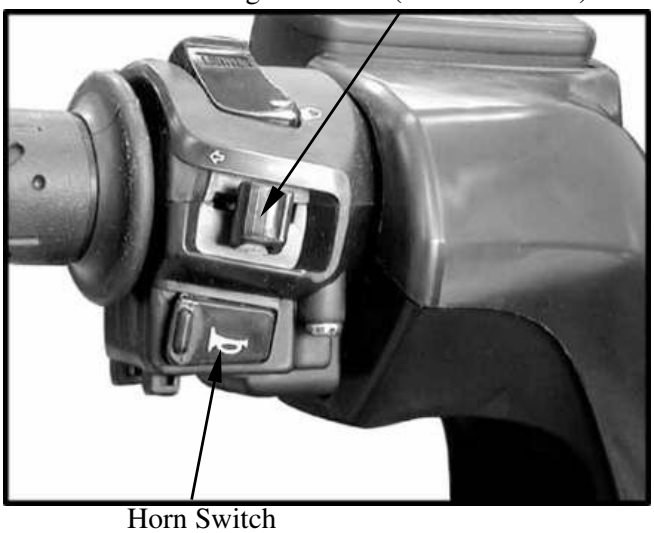
	IG	BAT3
0FF		
RUN	○	○
COLOR	B/W	B/G

Left handlebar switch

Disconnect the left handlebar switch connector and check for continuity at switch side connector terminals.

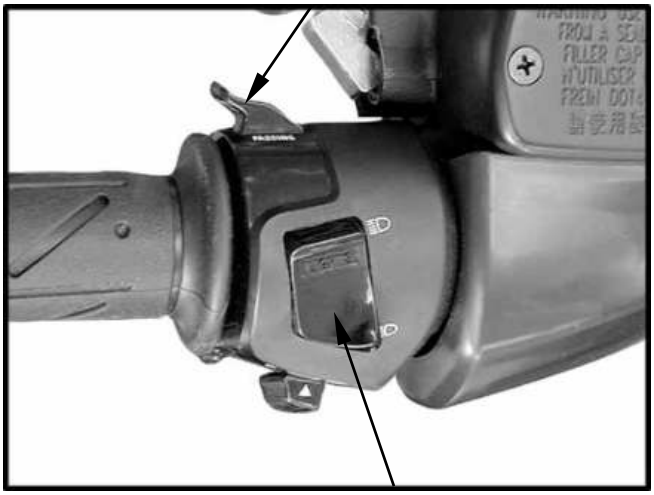
Continuity should exist between the color code wires as follows:

Turn Signal Switch (Winker Switch)



Horn Switch

Passing Switch



Dimmer Switch

WINKER SW

	WR	R	L
R	○	○	
N			
L	○		○
COLOR	GR	SB	O

HORN SW

	BAT4	HO
FREE		
PUSH	○	○
COLOR	BR/L	LG

PASSING SW

	BAT4	HI
FREE		
PUSH	○	○
COLOR	BR/L	L

DIMMER SW

	HL	HI	LO
LO	○		○
(N)	○	○	○
HI	○	○	
COLOR	W/L	L	W

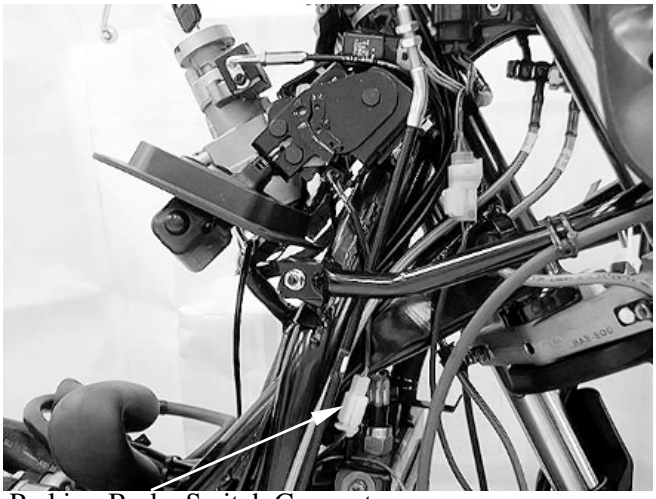
PARKING SWITCH

INSPECTION

Remove the front cover (page 2-11).

Disconnect the parking switch connector and check for continuity between the switch terminals.

There should be continuity with the parking lever pull up, and there should be no continuity with the front brake lever is push down.



Parking Brake Switch Connector

LUGGAGE BOX LIGHT SWITCH

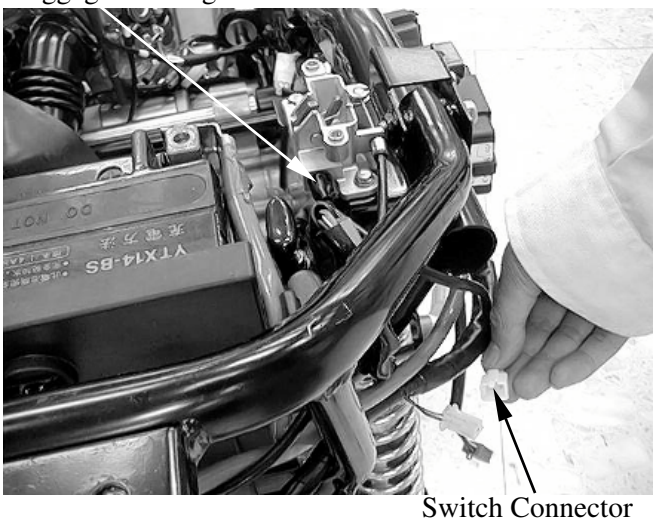
INSPECTION

Remove the luggage box (page 2-3).

Disconnect the luggage box light switch connector and check for continuity between the switch terminals.

There should be no continuity with the luggage box light switch pushed, and there should be continuity with the luggage box light switch is released.

Luggage Box Light Switch



Switch Connector

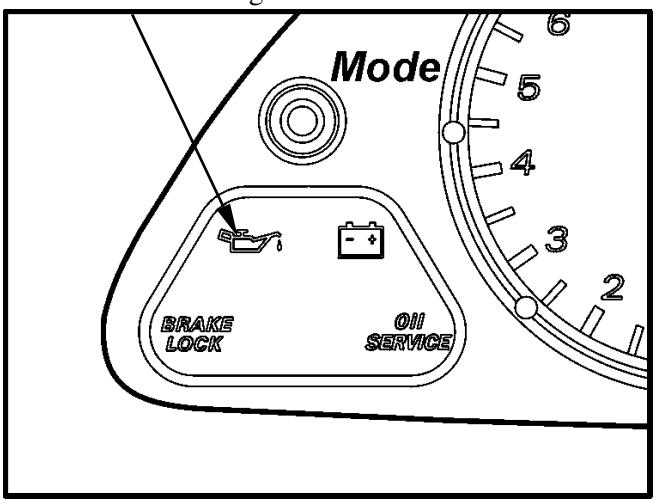
OIL PRESSURE SWITCH

INSPECTION

If the oil pressure warning indicator stays on while the engine running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator come on with the ignition switch ON.

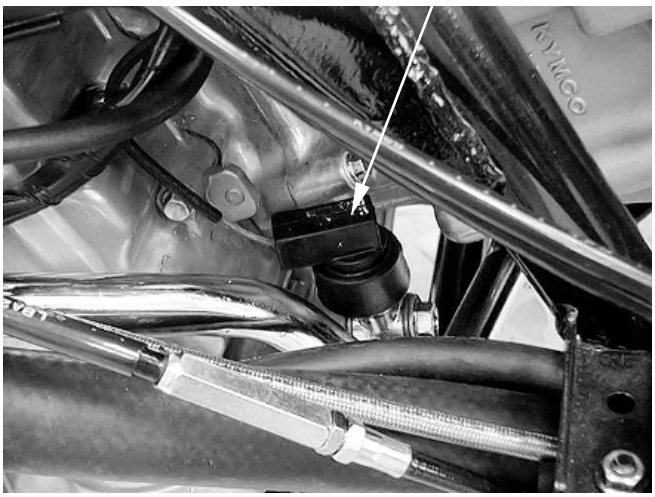
Oil Pressure Warning Indicator



If the indicator does not come on, inspect as follow:

Remove the dust cover and disconnect oil pressure switch terminal.

Dust Cover



Short the oil pressure switch wire terminal with the ground using a jumper wire.

The oil pressure warning indicator comes on with the ignition switch is ON.

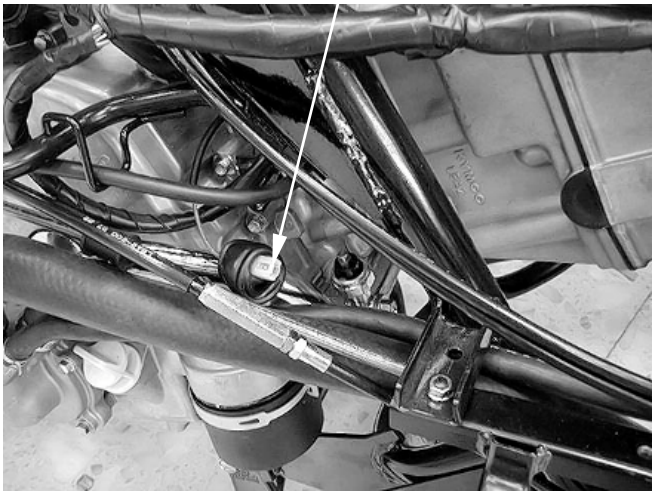
If the light does not comes on, check the fuse and wires for a loose connection or an open circuit.

Start the engine and make sure that the light goes out.

If the light does not go out, check the internal oil for leak.

If the engine oil does not leak, replace the oil pressure switch (see below).

Oil Pressure Switch Terminal



REMOVAL/INSTALLATION

Remove the dust cover and disconnect oil pressure switch terminal.

Remove the oil pressure switch from the crankcase.

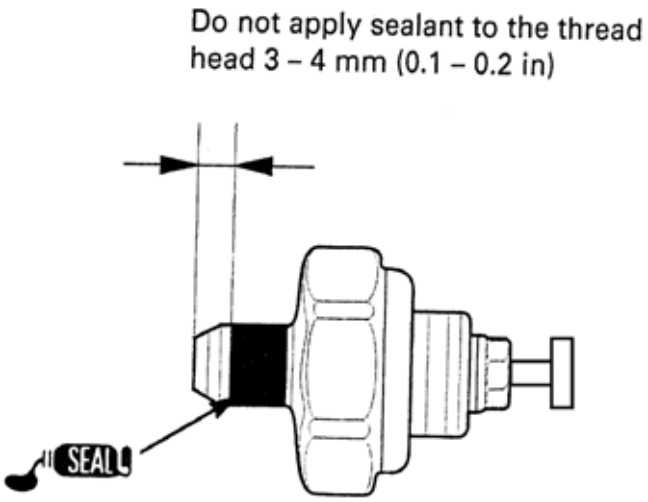
Oil Pressure Switch



Apply sealant to the oil pressure switch threads as shown.

Install the oil pressure switch onto the crankcase, tighten it to the specified torque.

Torque: 22 N•m (2.2 kgf•m, 16 lbf•ft)



Connect the oil pressure switch terminal to the switch.

Oil Pressure Switch Terminal



Install the dust cover.

Dust Cover

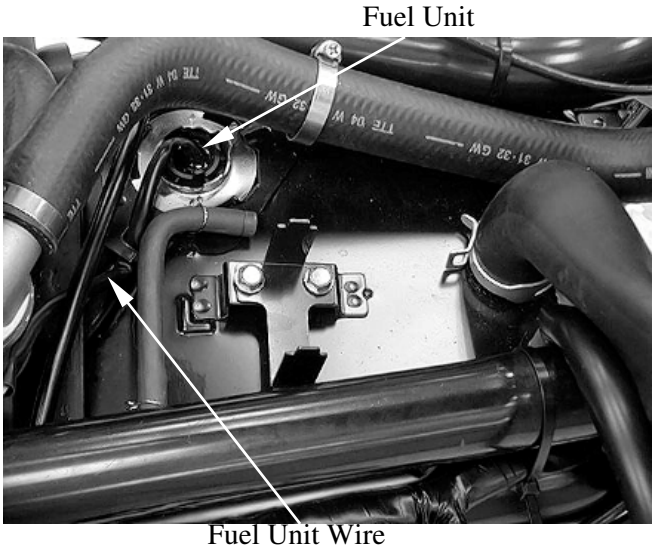


FUEL UNIT

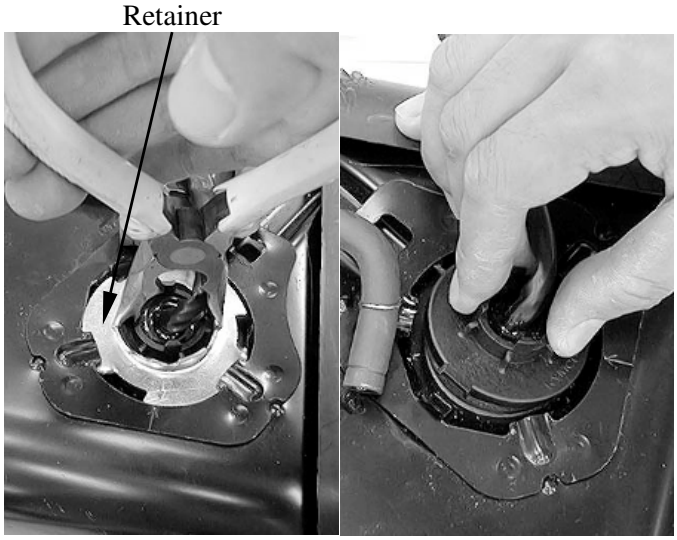
REMOVAL

Remove the floorboard (page 2-6).

Disconnect the fuel unit connector.



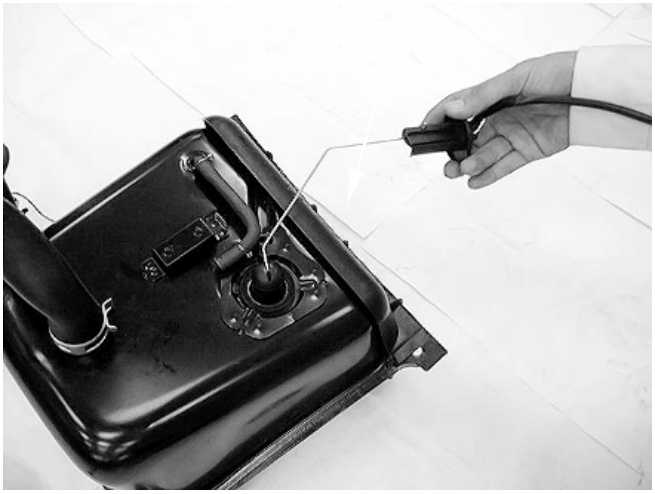
Turn the fuel unit retainer counterclockwise and remove it.



Remove the fuel unit.

*

Be careful not to bend or damage the fuel unit float arm.



INSPECTION

Connect the fuel unit wire connectors and turn the ignition switch "ON".

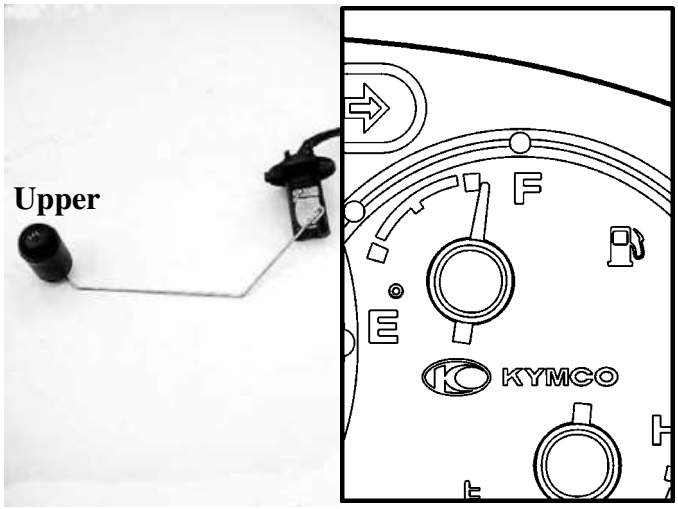
* Before performing the following test, operate the turn signals to determine that the battery circuit is normal.

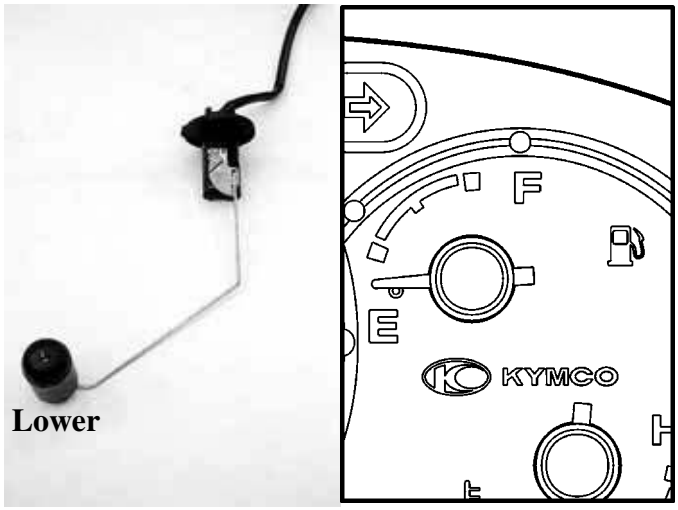
Check the fuel meter for correct indication by moving the fuel unit float up and down.

Float Position	Display
Upper	Much (Full)
Lower	Less (Empty)

Wire Terminals	Display
Free	From Much to Less
Apply	From Less to Much

The fuel meter is normal if it operates as above indicated. If not, check for poorly connected terminals or shorted wires.

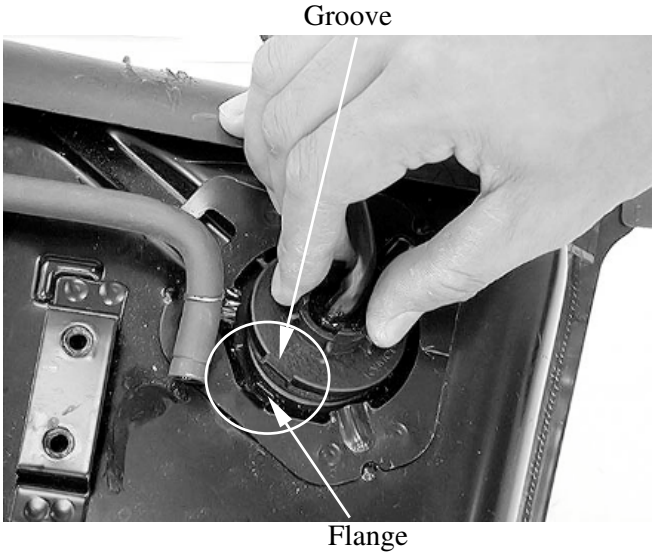




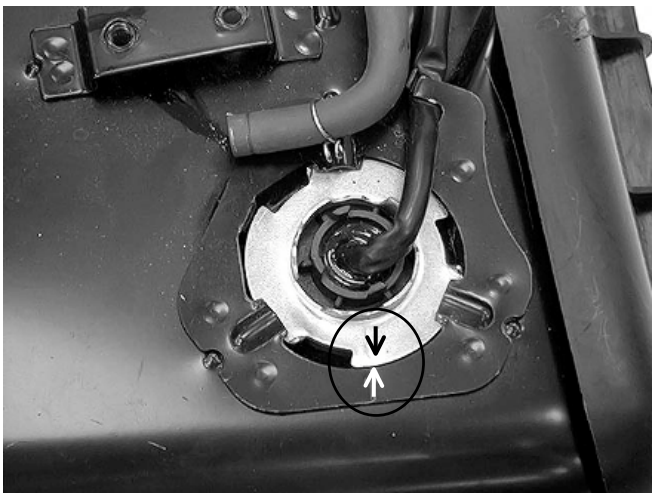
INSTALLATION

Install the O-ring and fuel unit.

* Align the groove on the fuel unit with the flange on the fuel tank.



Install the fuel unit retainer.



*

Align the arrow mark on the fuel unit retainer with the arrow mark on the fuel tank.

SIDE STAND SWITCH

INSPECTION

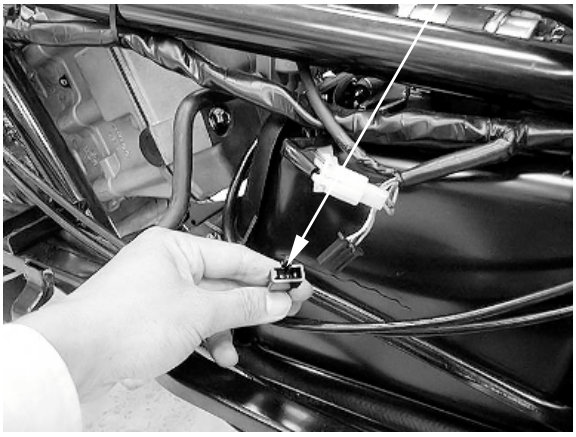
Remove the left floor skirt (page 2-5).

Disconnect the side stand switch connector.

There should be continuity between the Yellow/Green and Green with the side stand retracted.

There should be continuity between the Yellow/Black and Green with the side stand applied.

Side Stand Switch Connector



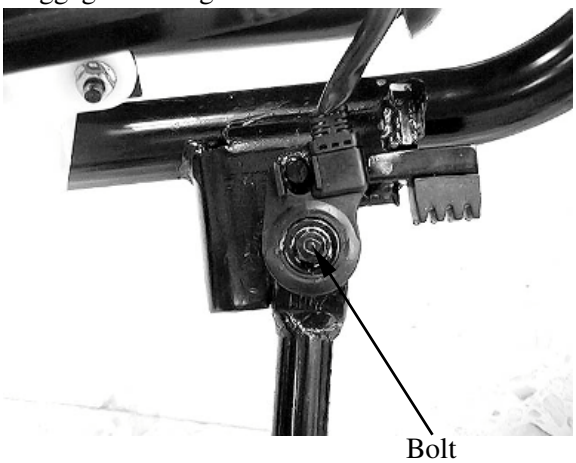
REMOVAL

Remove the left floor skirt (page 2-5).

Disconnect the side stand switch connector.

Remove the bolt and side stand switch from the side stand.

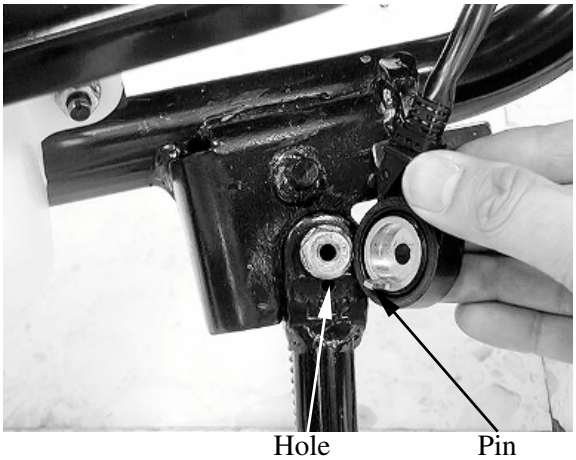
Luggage Box Light Connector



Bolt

Installs the side stand switch aligning the switch pin with the side stand hole.

Install and tighten the side stand switch bolt securely.



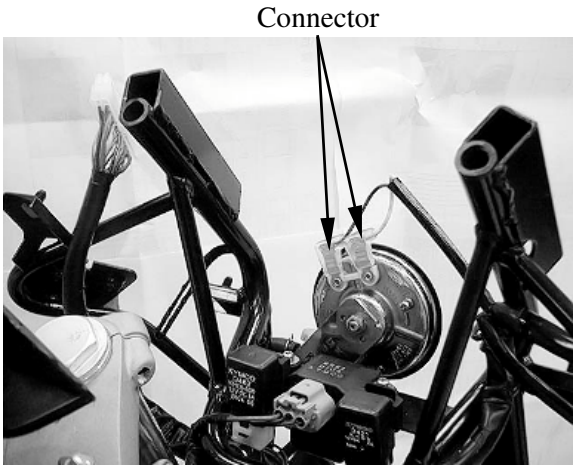
HORN

INSPECTION

Remove the front cover (page 2-11)

Disconnect the horn connectors from the horn.

Connect a 12 V battery to the horn terminals.
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.

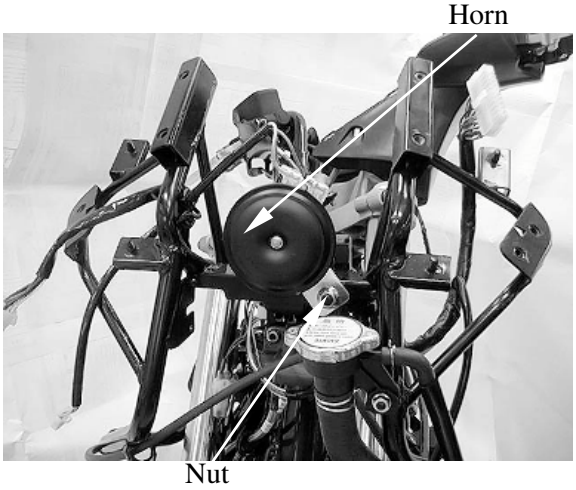


REMOVAL/INSTALLATION

Remove the front cover (page 2-11)

Disconnect the horn connectors from the horn.
Remove the nut and horn.

Installation is in the reverse order of removal.



BANK ANGLE SENSOR

INSPECTION

Support the scooter level surface.

Remove the meter panel (page 2-13).

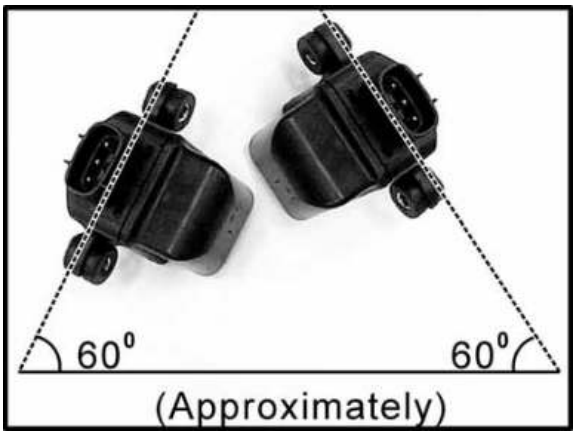
Turn the ignition switch to "ON" and measure the voltage between the following terminals of the bank angle sensor connector with the connector connected.

TERMINAL	STANDARD
Black/Blue	Battery voltage
Black/White	Battery voltage – (0-1 V)



Bank Angle Sensor

The engine should stop as you incline the bank angle sensor approximately degrees to the left or right.



REMOVAL/INSTALLATION

Disconnect the bank angle sensor connector.

Remove the two screws, washers and bank angle sensor.



Bank Angle Sensor Screws/Washers

Installation is in the reverse order of removal.

*

Install the bank angle sensor with its "UP" mark facing up.



Tighten the mounting screws securely.

HEATER CONTROL UNIT

INSPECTION

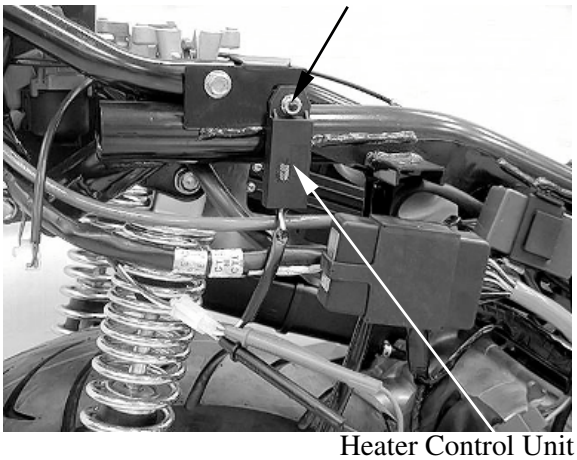
Heater control unit inspection

1.Open ignition switch to check if the brown /blue wire of it is enough voltage.

2.Put the heater controller unit in refrigerator. Start engine after keeping the temperature under 10 ± 4℃.

3.Check if the yellow wire of heater controller unit has output voltage.

Start engine and if the temperature of heater controller unit is under 10 ± 4℃. Check if the white/yellow wire of heater controller unit has output voltage. If it has not any voltage. It is damaged.

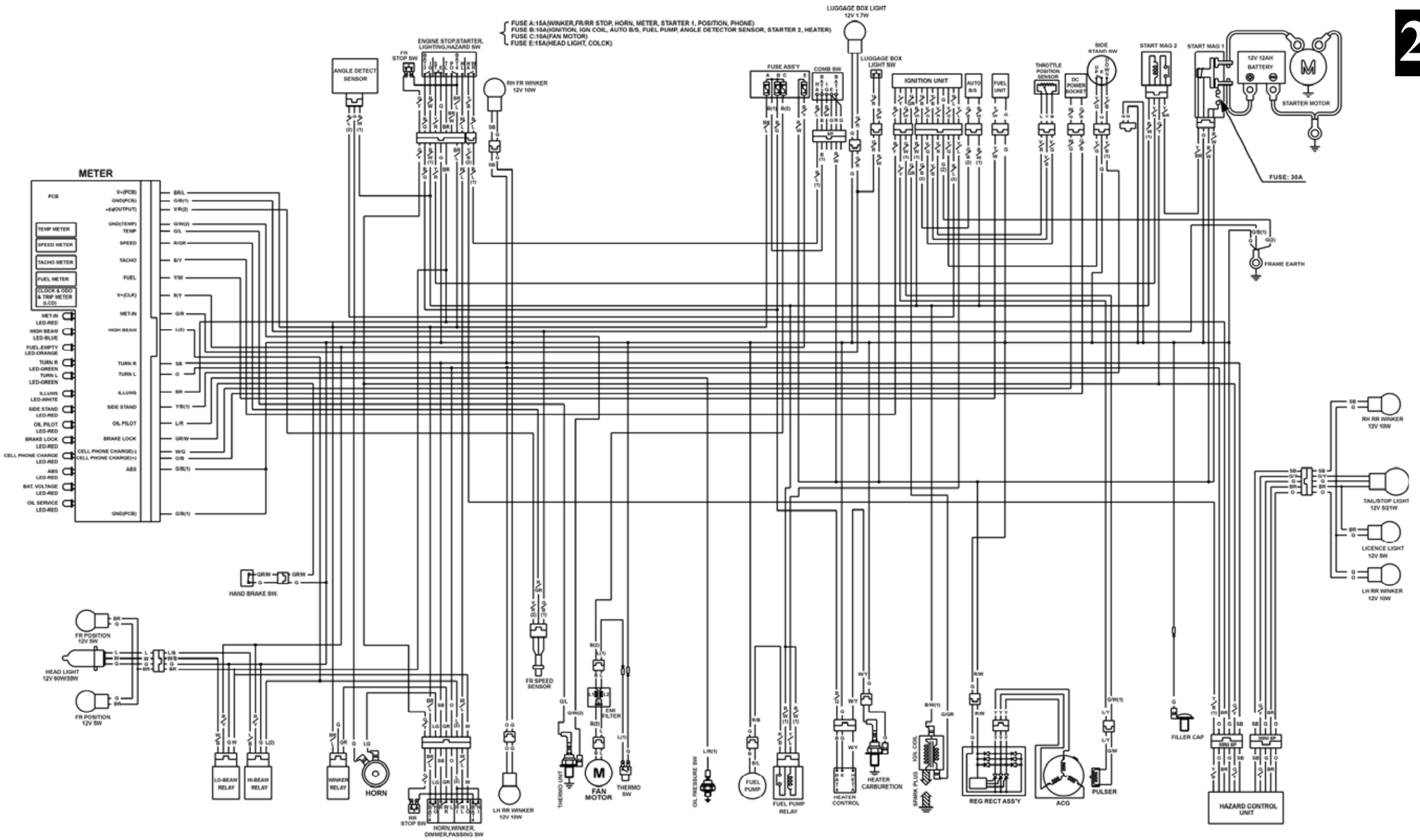


REMOVAL/INSTALLATION

Remove the side body cover (page 2-8).

Remove the nut and heater control unit.

Installation is in the reverse order of removal.



B	BLACK	BR	BROWN
G	GREEN	GR	GRAY
O	ORANGE	SB	SKY BLUE
L	BLUE	LG	LIGHT GREEN
W	WHITE	V	VIOLET
Y	YELLOW	R	RED

HAZARD SW

	WR	HA
⚠	○	○
OFF	○	○
COLOR	B/L	Y/B

PASSING SW

	BAT4	HI
FREE		
PUSH	○	○
COLOR	BR/L	L

STARTER SW

	E	ST
FREE		
PUSH	○	○
COLOR	G	Y/R

ENGINE STOP SW

	IG	BAT3
OFF		
RUN	○	○
COLOR	B/W	B/G

HORN SW

	BAT4	HO
FREE		
PUSH	○	○
COLOR	BR/L	LG

WINKER SW

	WR	R	L
R	○		
N			
L	○		○
COLOR	GR	SB	O

DIMMER SW

	HL	HI	LO
LO	○		○
(N)	○	○	○
HI	○	○	
COLOR	W/L	L	W

COMB SW

	BAT2	IG	E	BAT1	HA
LOCK		○	○		
OFF		○	○	○	○
ON	○			○	○
COLOR	B	B/W	G	R	B/L

LIGHTING SW

	BAT4	PO	TL	HL
•				
(N)				
P	○	○	○	
(N)	○	○	○	○
H	○		○	○
COLOR	BR/L	BR/W	BR	W/L