PREFACE

This Service Manual describes the technical features and servicing procedures for the KYMCO NEXXON **50**.
Section 1 contains the precautions for all operations stated in this manual. Read them carefully before starting any operation.

Section 2 is the inspection/ adjustment procedures, safety rules and service information for each part, starting from periodic maintenance.

Sections 3 and 4 state the servicing procedures and cautions for the removal and installation of lubrication and fuel systems.

Sections 5 through 18 give instructions for disassembly, assembly and inspection of engine, chassis frame and 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.

Our company reserves right to make any alteration in the design. The information and contents included in this manual may be different from the motorcycle in case specifications are changed.

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

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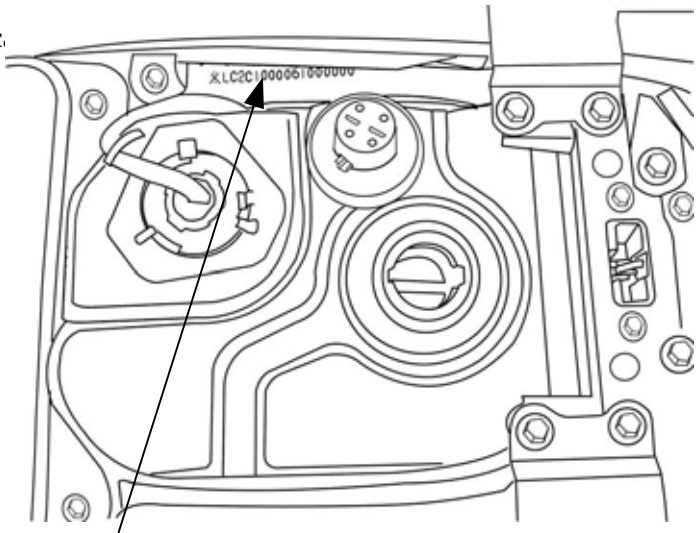
GENERAL INFORMATION

ENGINE SERIAL NUMBER

Location of Engine Serial Number

Loc



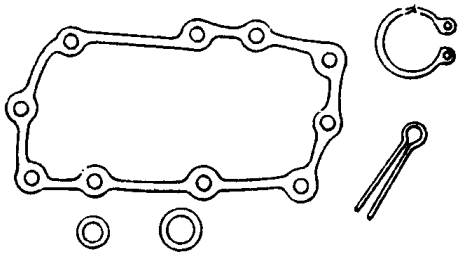
Location of Frame Serial Number

SPECIFICATIONS

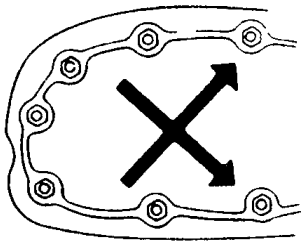
Motorcycle name & Model No.				LFA3
Motorcycle name				NEXXON 50
Overall length (mm)				1975
Overall width (mm)				710
Overall height (mm)				1125
Wheel base (mm)				1285
Engine type				4∞
Displacement (cc)				49
Fuel type				nonleaded gasoline
Dry weight (kg)		Front wheel		46.5
		Rear wheel		58
Gross weight(kg)		Front wheel		48.5
		Rear wheel		63.5
Tires		Front wheel		2.5-17
		Rear wheel		2.75/17
Ground clearance (mm)				120
Perform-ance	Braking distance (m)			7under
	Min. turning radius (mm)			3800(R/L)
Engine	Starting system			Starting motor & kick starter
	Type			OHC
	Cylinder arrangement			Single cylinder
	Combustion chamber type			Semi-sphere
	Valve arrangement			Single cam, OHC
	Bore x stroke (mm)			ϕ52.4x 49.5
	Compression ratio			8
	Compression pressure (kg/cm²)			13
	Max. output			1.8/7000kw(r/min)
	Max. torque			2.6/4500kgm/rpm
	Port timing	Intake (1mm)	Open	0°
			Close	35°
		Exhaust (1mm)	Open	30°
			Close	5°
	Valve clearance (cold)		Intake	0.02mm
			Exhaust	0.02mm
	Idle speed (rpm)			1700rpm
	Lubrication System	Lubrication type		Forced pressure & wet sump
		Oil pump type		Inner/Outer rotor
		Oil filter type		Wire gauze filter
		Oil capacity		0.9 liter
	Cooling Type			Air cooling

Fuel System	Air cleaner type			Wet, single
	Fuel capacity			4liter
	Carburetor	Type		PIF
		Piston dia. (mm)		13
		Venturi dia.(mm)		ϕ11equivalent
		Throttle type		Plunger type
Electrical Equipment	Ignition System	Type		CDI
		Ignition timing		15±2°/1700rpm
		Spark plug		CHAMPION-P-PZ9HC
		Spark plug gap		0.6～0.7mm
	Battery	Capacity		12V5AH
Power Drive System	Clutch	Type		Wet multi-disc clutch
	Transmission Gear	Type		Permanent gear meshing
		Operating method		Foot operated
		Type		Cycle type
		Reduction ratio	1st gear	2.92
			2nd gear	1.67
			3rd gear	1.17
			4th gear	0.92
			5th gear	-------
Moving Device	Front Axle	Caster angle		27°
		Wheel base		1305
	Tire pressure (kg/cm²)(2 riders)		Front	1.75
			Rear	2.25
	Turning angle		Left	45°
			Right	45°
	Brake system type		Front	Disk brake
			Rear	Drum brake
Damping Device	Shock absorber type		Front	Telescope
			Rear	Mono Shock
Frame type				Back bone

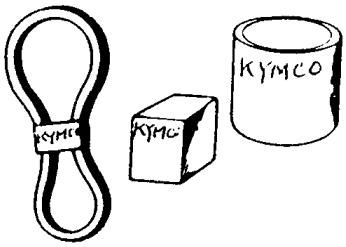
SERVICE PRECAUTIONS



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

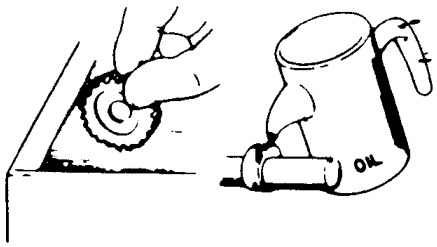


■ When tightening bolts or nuts, begin with larger-diameter to smaller ones at several times, and tighten to the specified torque diagonally.



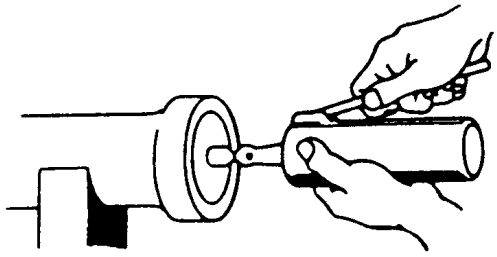
■ Use genuine parts and lubricants.

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

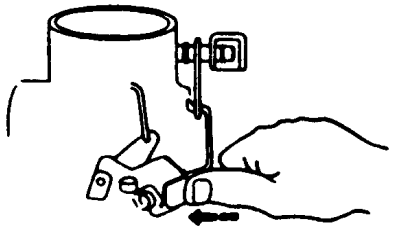


■ After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.

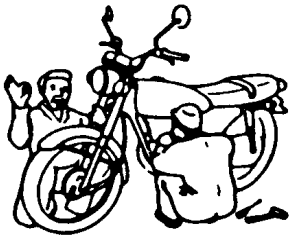
■ Apply or add designated greases and lubricants to the specified lubrication points.



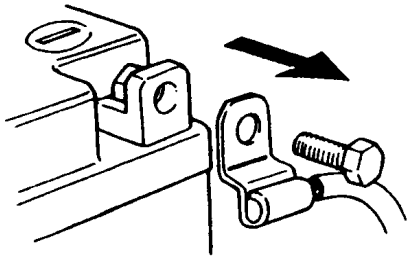
■ After reassembly, check all parts for proper tightening and operation.



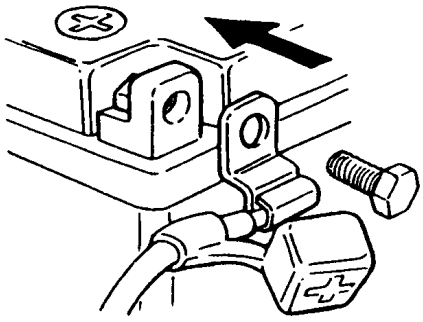
■ When two persons work together, pay attention to the mutual working safety.



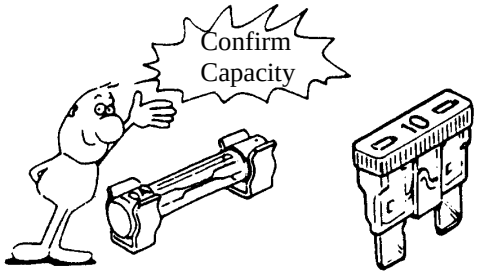
■ Disconnect the battery negative (-) terminal before operation.
■ When using a spanner or other tools, make sure not to damage the motorcycle surface.



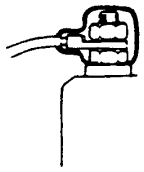
■ After operation, check all connecting points, fasteners, and lines for proper connection and installation.
■ When connecting the battery, the positive (+) terminal must be connected first.
■ After connection, apply grease to the battery terminals.
■ Terminal caps shall be installed securely.



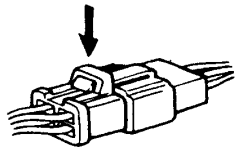
■ If the fuse is burned out, find the cause and repair it. Replace it with a new one according to the specified capacity.



■ After operation, terminal caps shall be installed securely.

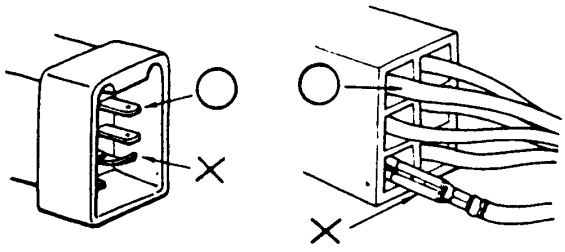


■ When taking out the connector, the lock on the connector shall be released before operation.

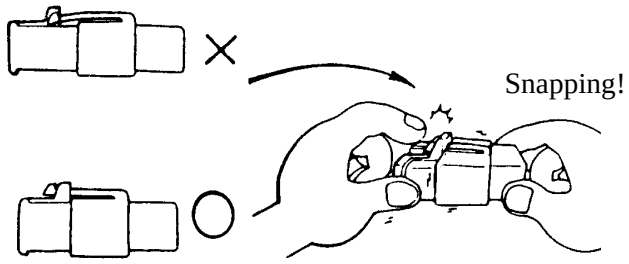


■ Hold the connector body when connecting or disconnecting it.
■ Do not pull the connector wire.

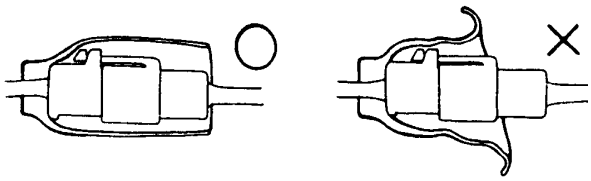
■ Check if any connector terminal is bending, protruding or loose.



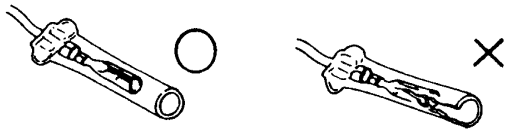
- The connector shall be inserted completely.
- If the double connector has a lock, lock it at the correct position.
- Check if there is any loose wire.



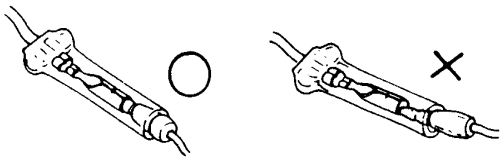
- Before connecting a terminal, check for damaged terminal cover or loose negative terminal.



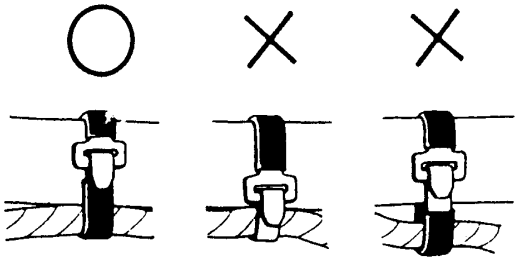
- Check the double connector cover for proper coverage and installation.



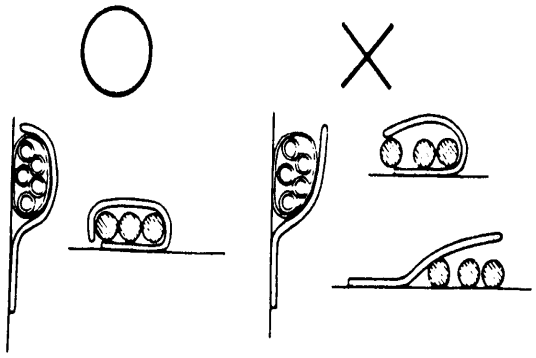
- Insert the terminal completely.
- Check the terminal cover for proper coverage.
- Do not make the terminal cover opening face up.



- 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.

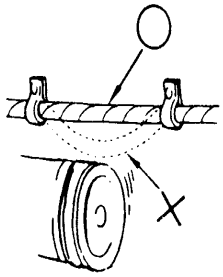


■ After clamping, check each wire to make sure it is secure.

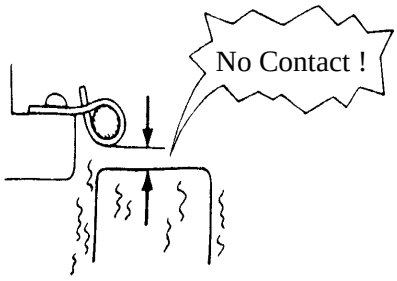


■ Do not squeeze wires against the weld or its clamp.

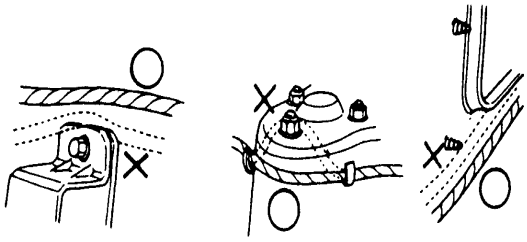
■ After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.



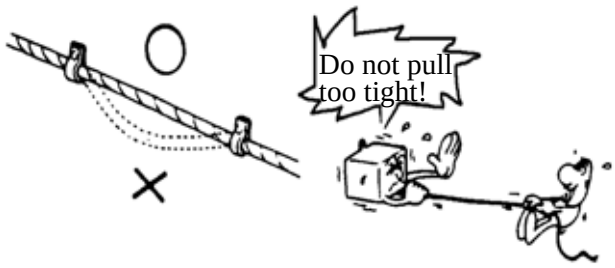
■ When fixing the wire harnesses, do not make it contact the parts which will generate high heat.



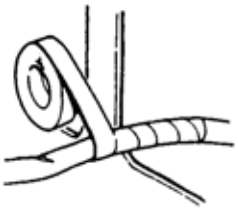
■ Route wire harnesses to avoid sharp edges or corners. Avoid the projected ends of bolts and screws.
■ Route wire harnesses passing through the side of bolts and screws. Avoid the projected ends of bolts and screws.



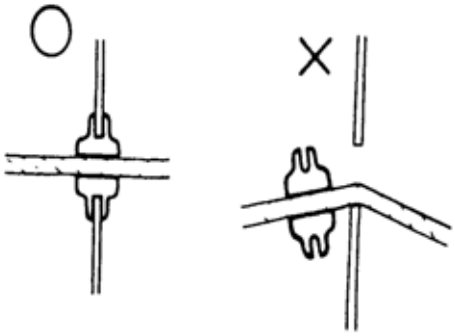
■ Route harnesses so they are neither pulled tight nor have excessive slack.



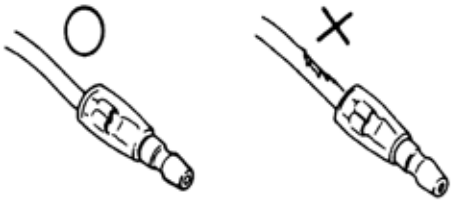
■ Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner.



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

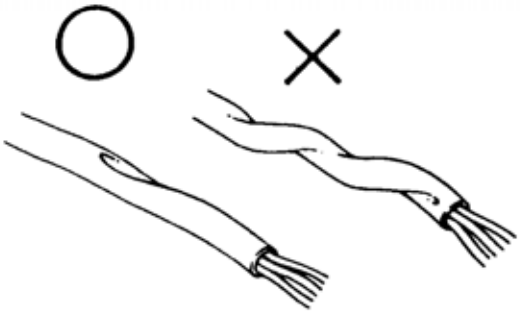


■ Do not break the sheath of wire.
■ If a wire or harness is with a broken sheath, repair by wrapping it with protective tape or replace it.

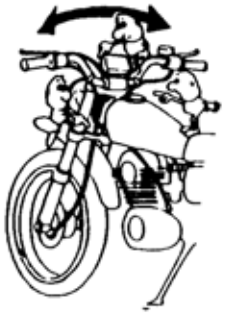


■ When installing other parts, do not press or squeeze the wires.

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

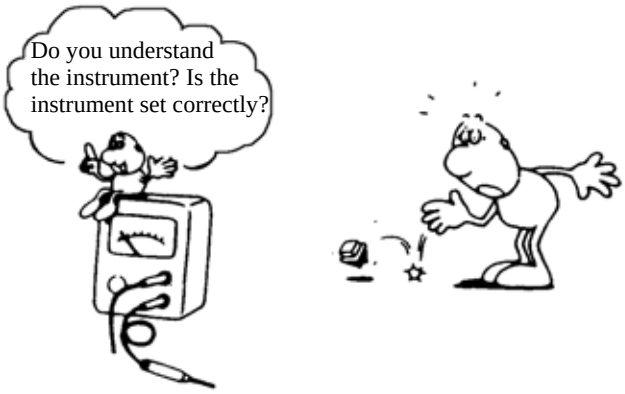


■ Wire harnesses routed along with handlebar should not be pulled tight, have excessive slack or interfere with adjacent or surrounding parts in all steering positions.



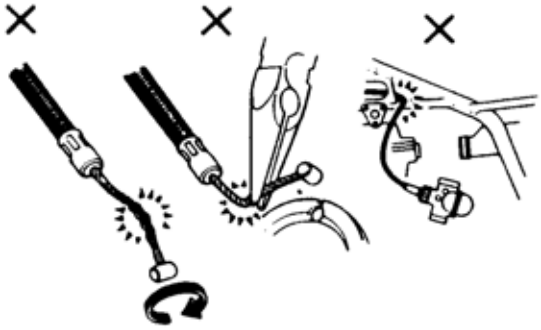
■ When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.

■ Be careful not to drop any parts.



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

■ Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.



■ 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.

: Use special tool.

✳ : Caution

: Warning

TORQUE VALUES

STANDARD TORQUE VALUES

Item	Torque (kg-m)	Item	Torque (kg-m)
5mm bolt, nut	0.45～0.6	5mm screw	0.35～0.5
6mm bolt, nut	0.8～1.2	6mm nut, SH bolt	0.7～1.1
8mm bolt, nut	1.8～2.0	6mm flange bolt, nut	1.0～1.4
10mm bolt, nut	3.0～4.0	8mm flange bolt, nut	2.0～3.0
12mm bolt, nut	5.0～6.0	10mm flange bolt, nut	3.5～4.5

Torque specifications listed below are for important fasteners.

ENGINE

Item	Quantity	Thread	Torque (kg-m)	Remarks
Kick plate bolt	2	6	0.8～1.2	
R/L case bolt	8	6	0.8～1.2	
Stopper shift bolt	1	6	0.8～1.2	
Cam gear shift bolt	1	6	1.0～1.4	
Pin guide bolt	1	8	0.8～1.2	
Oil pump bolt	3	6	0.8～1.2	
Clutch nut	1	10	3.8～4.5	
Rotor oil nut	1	10	3.8～4.5	
Rotor oil cover bolt	3	6	0.45～0.6	
Motor bolt	3	6	0.8～1.2	
Head stud bolt	4	7	0.7～1.1	
Cam sprocket bolt	3	5	0.7～1.1	
Head cover cap nut	4	7	1.2～1.6	
Pivot cam chain bolt	1	8	1.3～1.8	
Tensioner bolt	1	14	1.5～2.5	
Cylinder head bolt	2	6	0.6～0.9	
Hole TP cap nut	2	30.8	1.0～2.0	
Plate L case screw	2	6	0.8～1.2	
Sprocket drive bolt	2	6	1.0～1.6	
Fly wheel nut	1	10	3.2～4.0	
L cover bolt	9	6	0.8～1.2	
Head side cover L bolt	2	6	0.8～1.2	
Inlet pipe bolt	2	6	0.8～1.2	
Carburetor bolt	2	6	0.8～1.2	
Head stud bolt	2	8	0.7～1.1	
Head side cover R bolt	2	6	0.8～1.2	
R cover oil bolt	1	14	2.0～3.0	
Filter hole cap	1	30.8	1.0～2.0	
Outer starting	3	6	1.0～1.5	

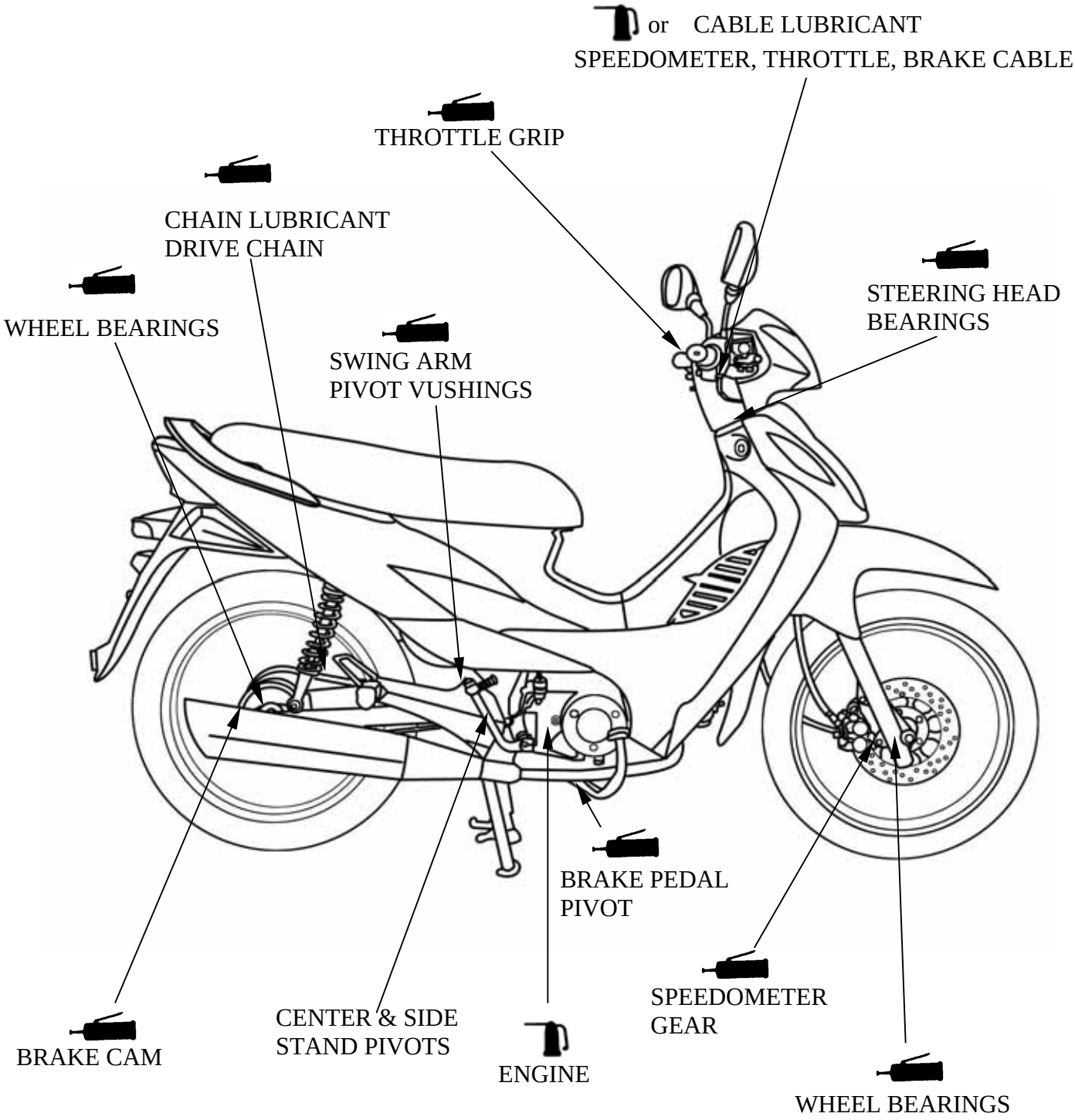
FRAME

Item	Quantity	Thread	Torque (kg-m)	Remarks
Steering stem lock nut	1	25.4	6.0～9.0	
Steering top cone race	1	25.4	0.5～1.3	
Front axle nut	1	14	5.5～7.0	
Rear axle nut	1	16	6.0～8.0	
Rear shock absorber upper mount bolt	1	10	3.0～4.0	
Rear shock absorber lower mount bolt	1	10	3.0～4.0	
Rear fork pivot nut	1	12	5.5～7.0	
Handlebar lock nut	1	10	6.0～9.0	
Rear driven gear bolt	4	8	1.8～2.0	
Rear brake panel nut	1	8	1.8～2.5	
Intake pipe mounting bolt	2	6	1.8～2.5	
Engine hanger upper nut	1	1	1.8～2.5	
Engine hanger lower nut	1	1	1.8～2.5	

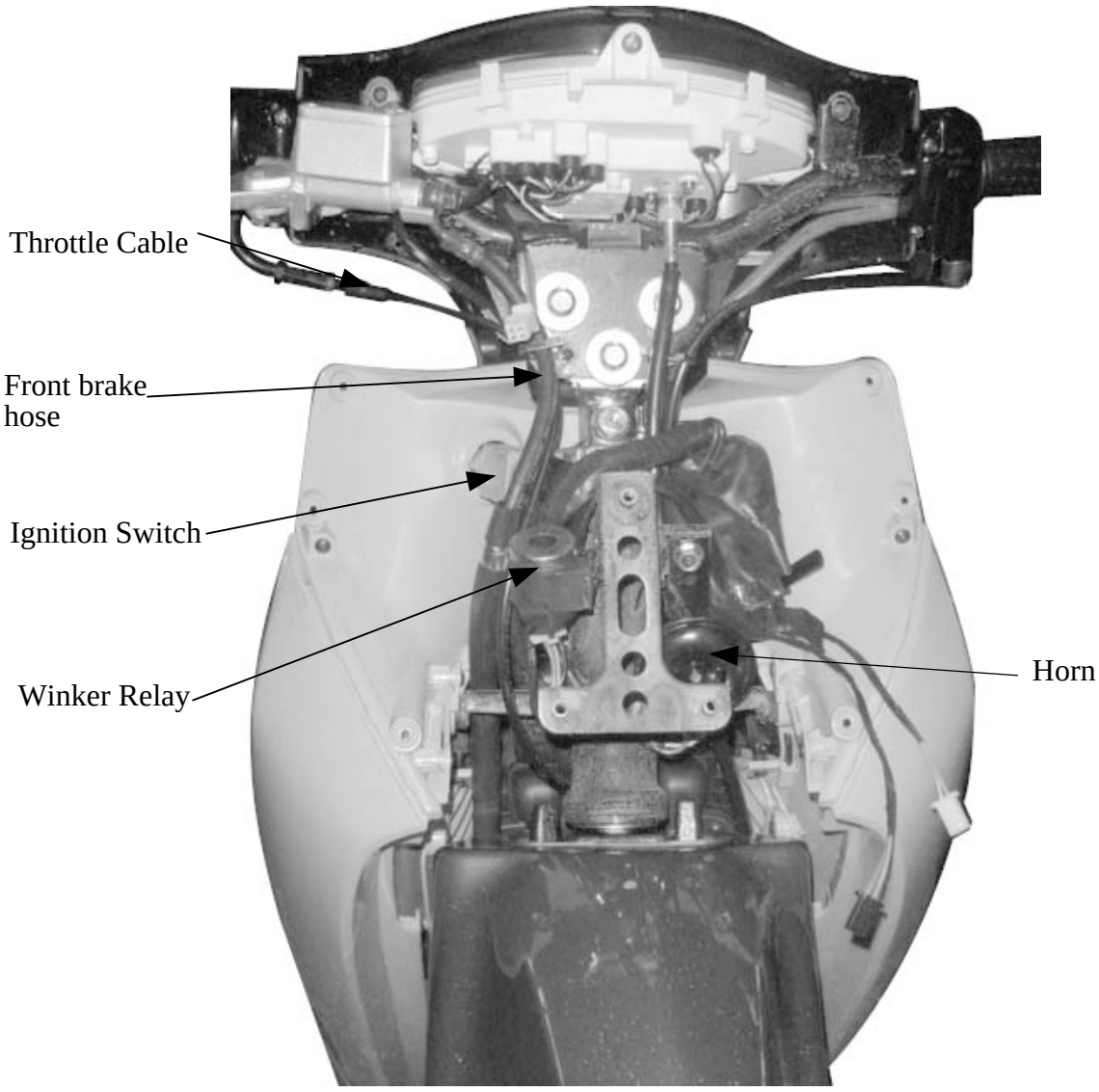
SPECIAL TOOLS

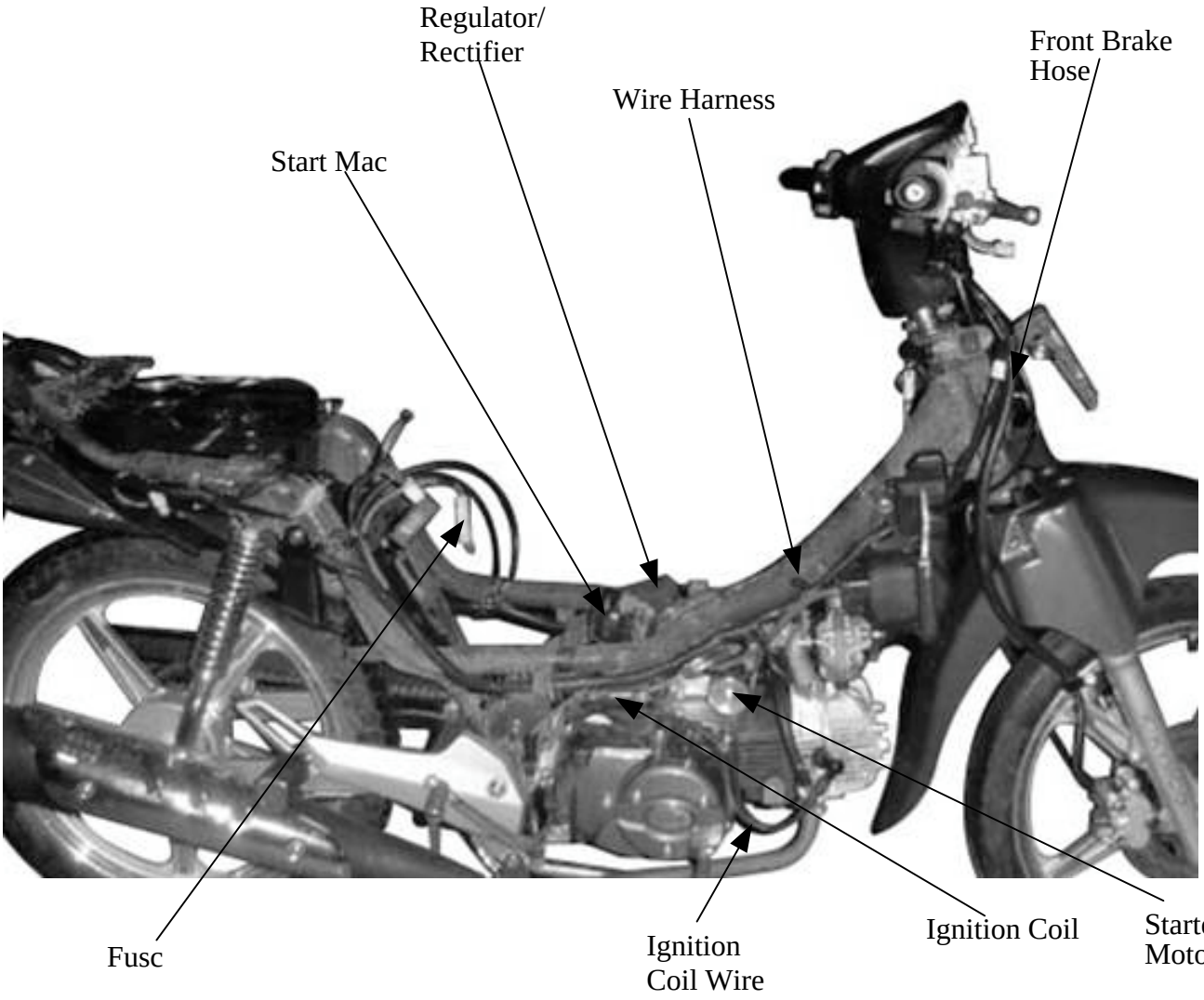
Tool Name	Tool No.	Ref. Page	Remarks
Flywheel puller	E003	8-4	
Bearing puller 18mm	E008	10-10	
Lock nut socket wrench	F007、E010、E049	9-5、11-16、11-18	
Tappet adjuster	E012	2-5	
Oil seat & bearing install	E014	10-11、11-9	
Bearing puller 15mm	E018	10-10	
Bearing puller 12mm	E020	10-10	
Flywheel holder	E021	8-3、8-7、9-6	
Bearing puller 10mm	E031	10-10	
Clutch holder	E039	9-5	
Gear holder	E038	9-9	
Bearing driver handle & Bearing installer	E014	11-9、11-17	
Race cone install	F005		

LUBRICATION POINTS

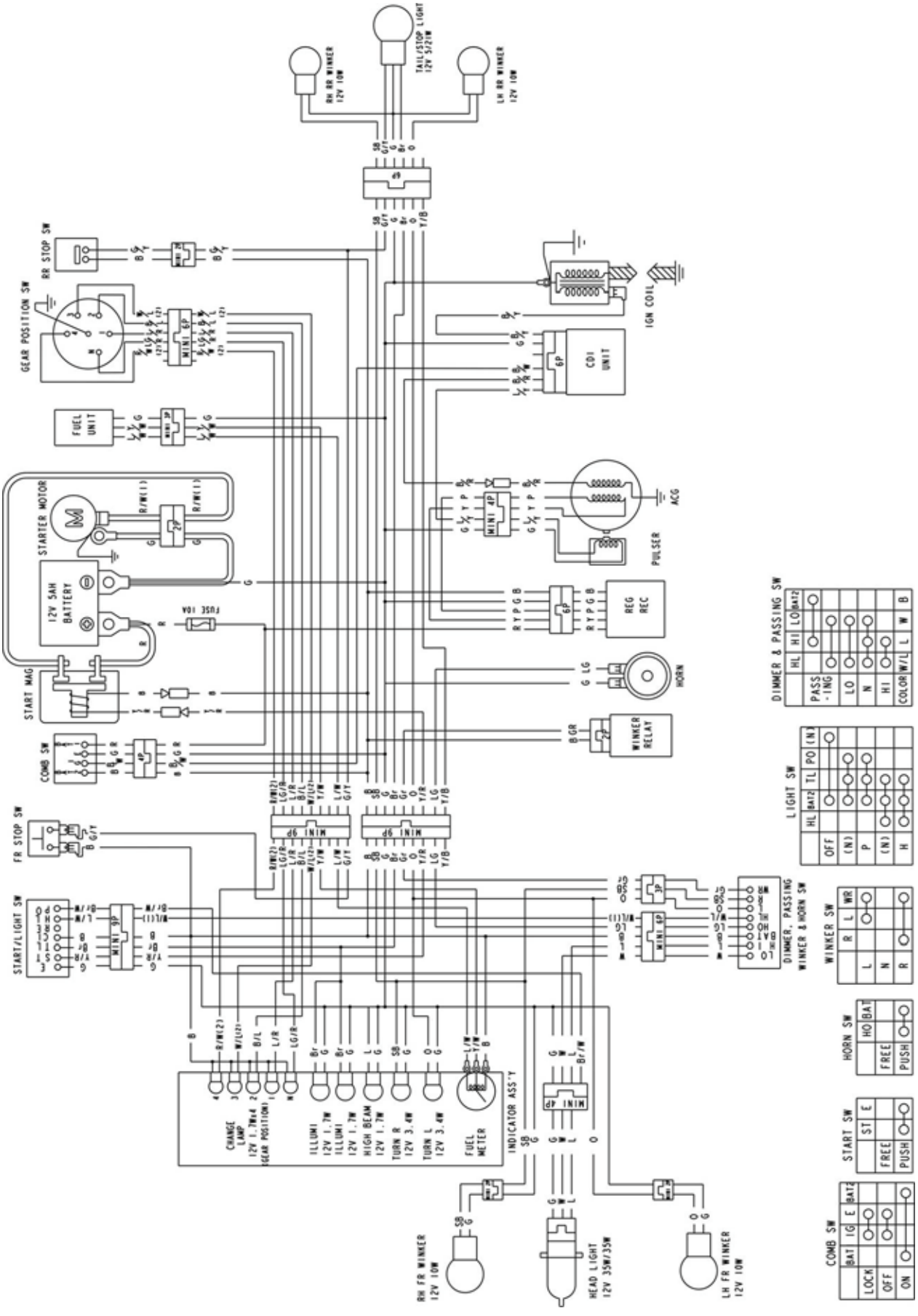


CABLE & HARNESS ROUTING



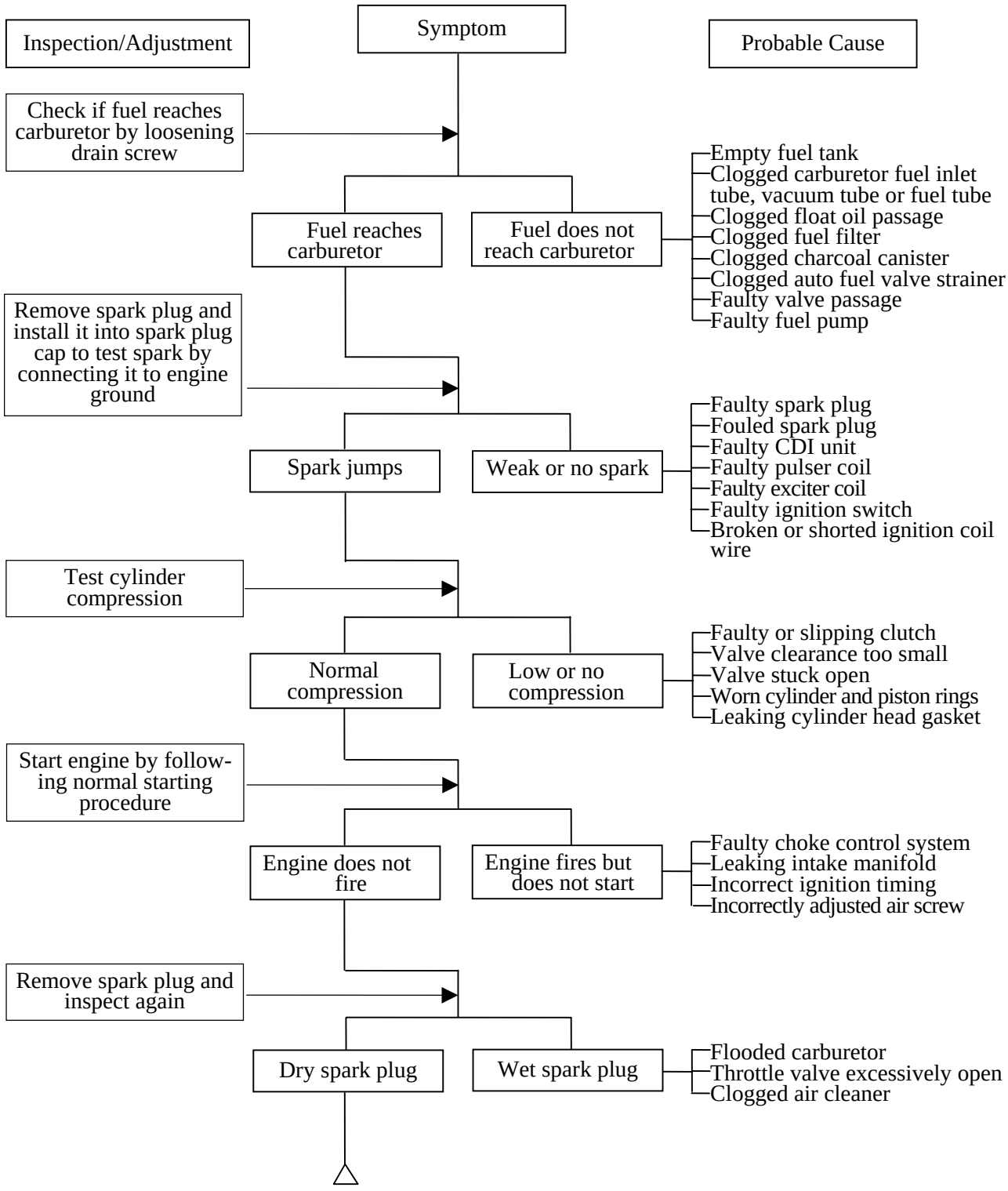

Regulator/
Rectifier
Front Brake
Hose
Wire Harness
Start Mac
Fusc
Ignition
Coil Wire
Ignition Coil
Starter
Motor

WIRING DIAGRAM

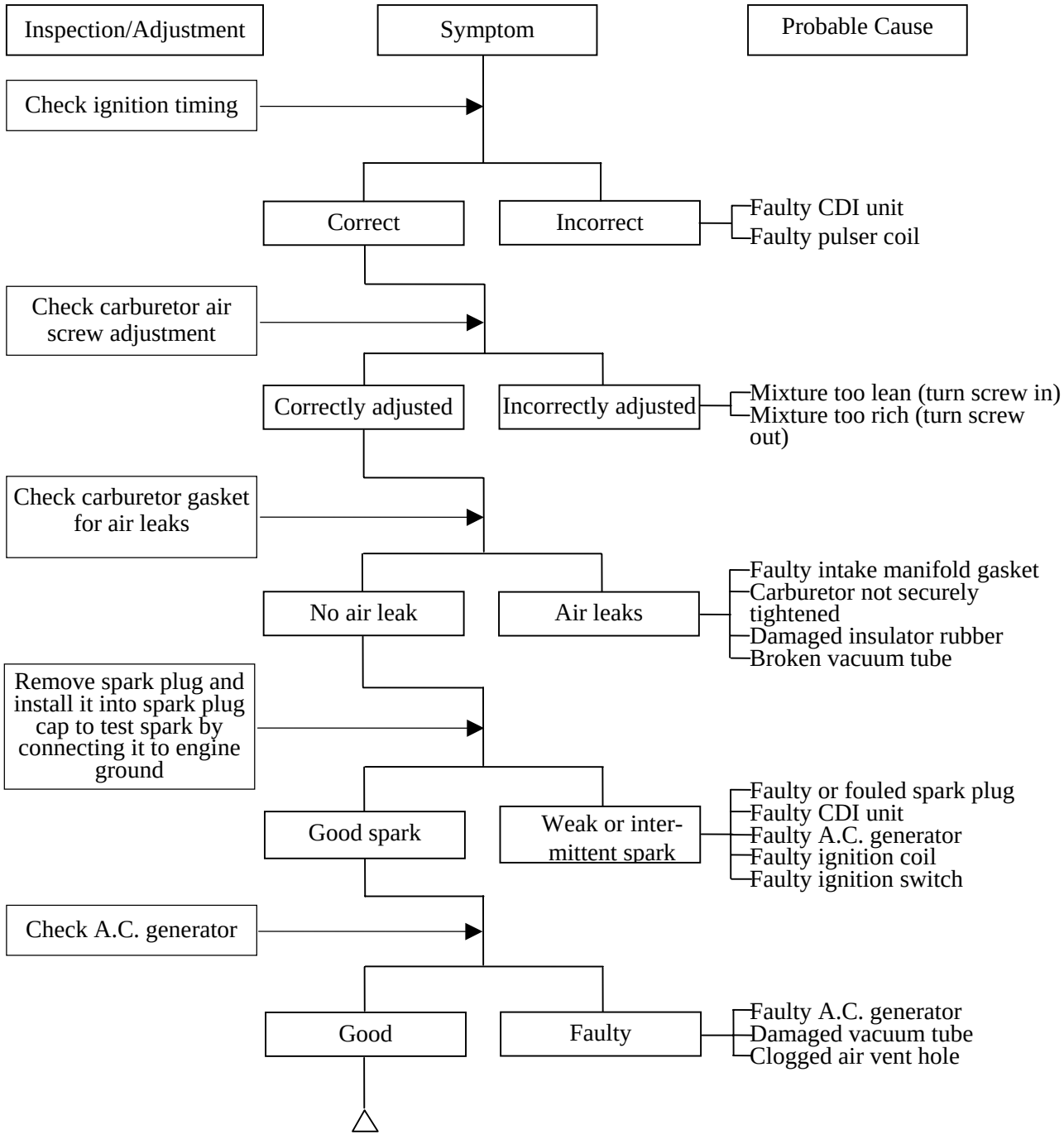


TROUBLESHOOTING

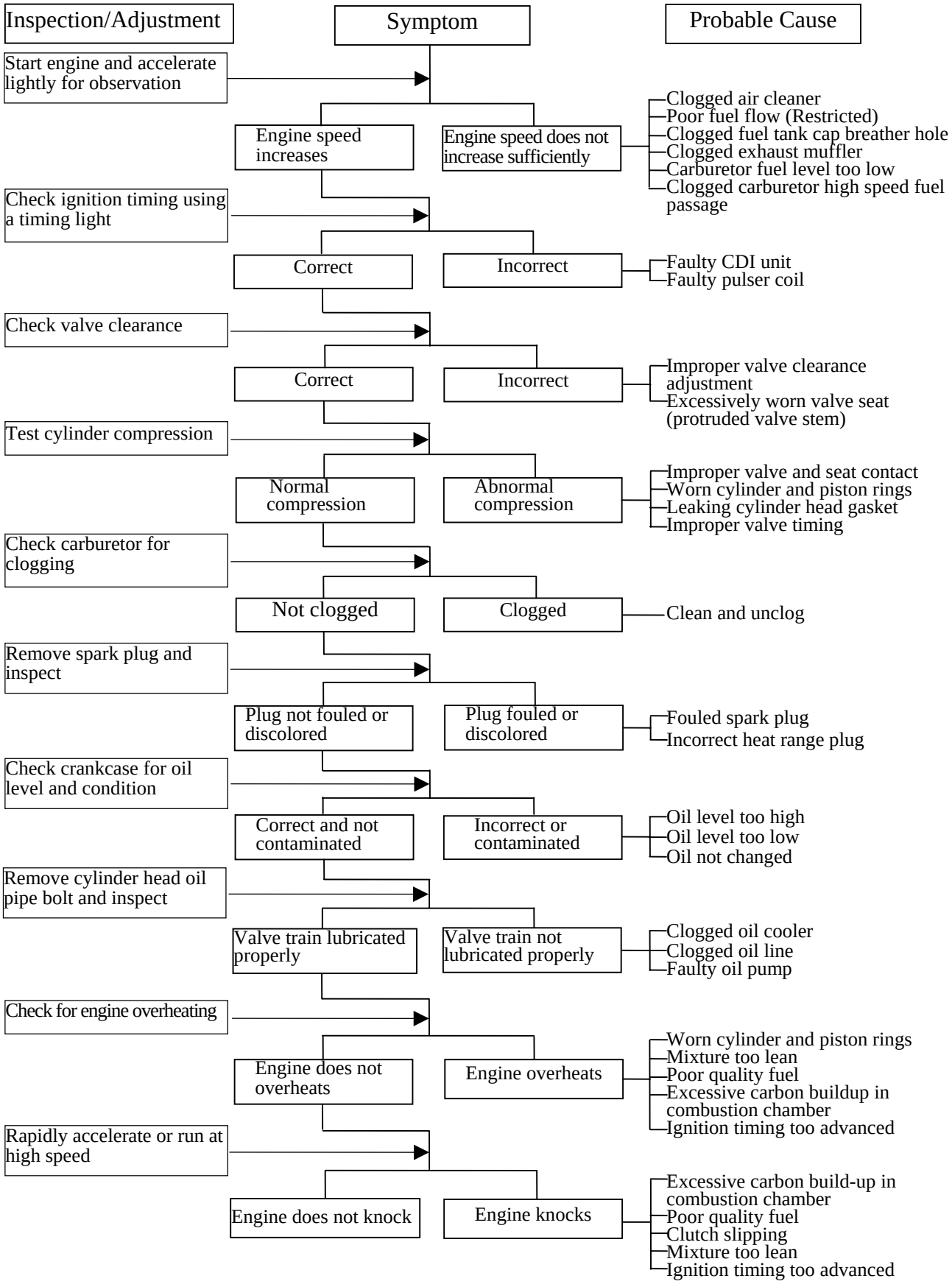
ENGINE WILL NOT START OR IS HARD TO START



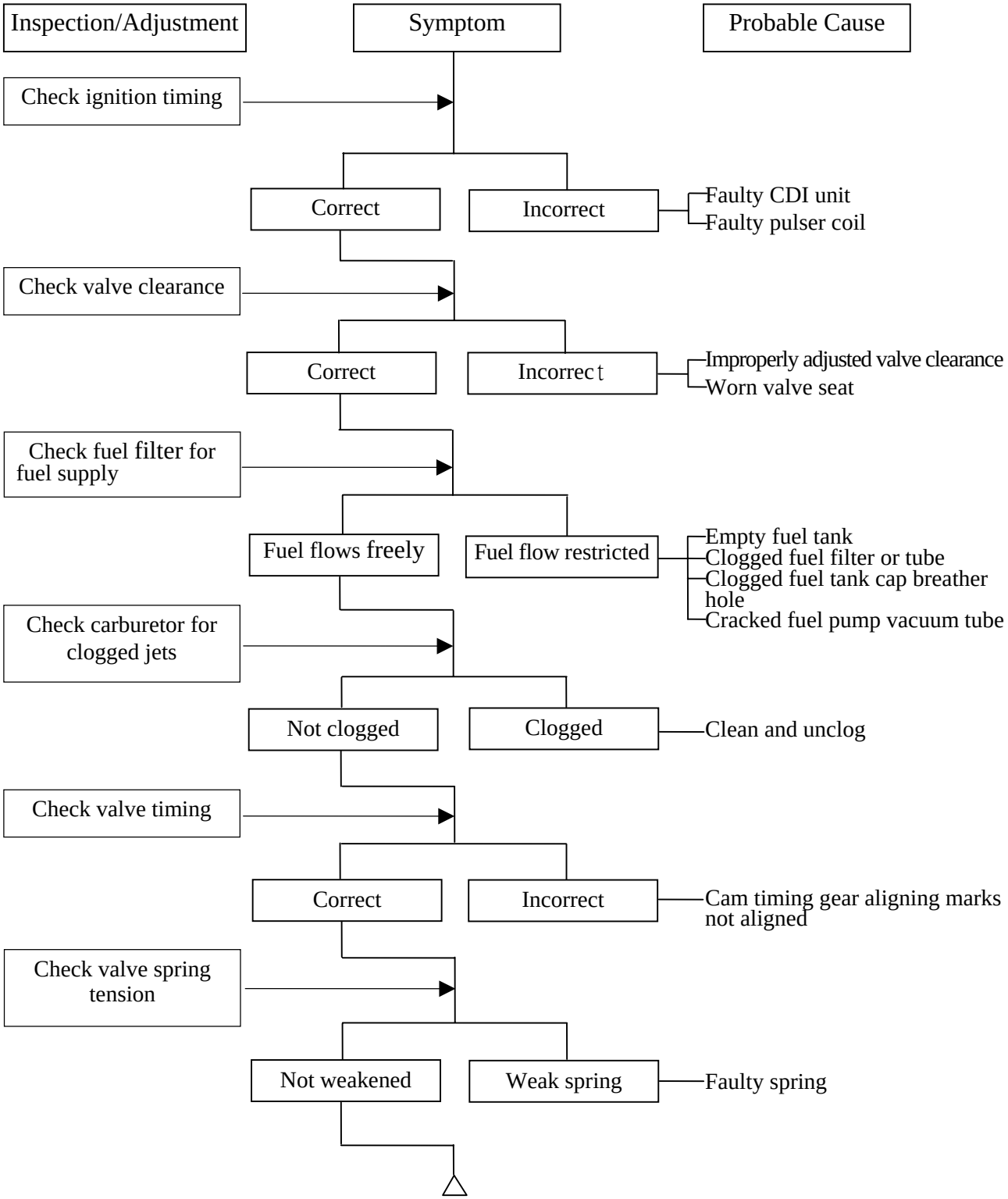
POOR PERFORMANCE (ESPECIALLY AT IDLE AND LOW SPEEDS)



POOR PERFORMANCE (ENGINE LACKS POWER)

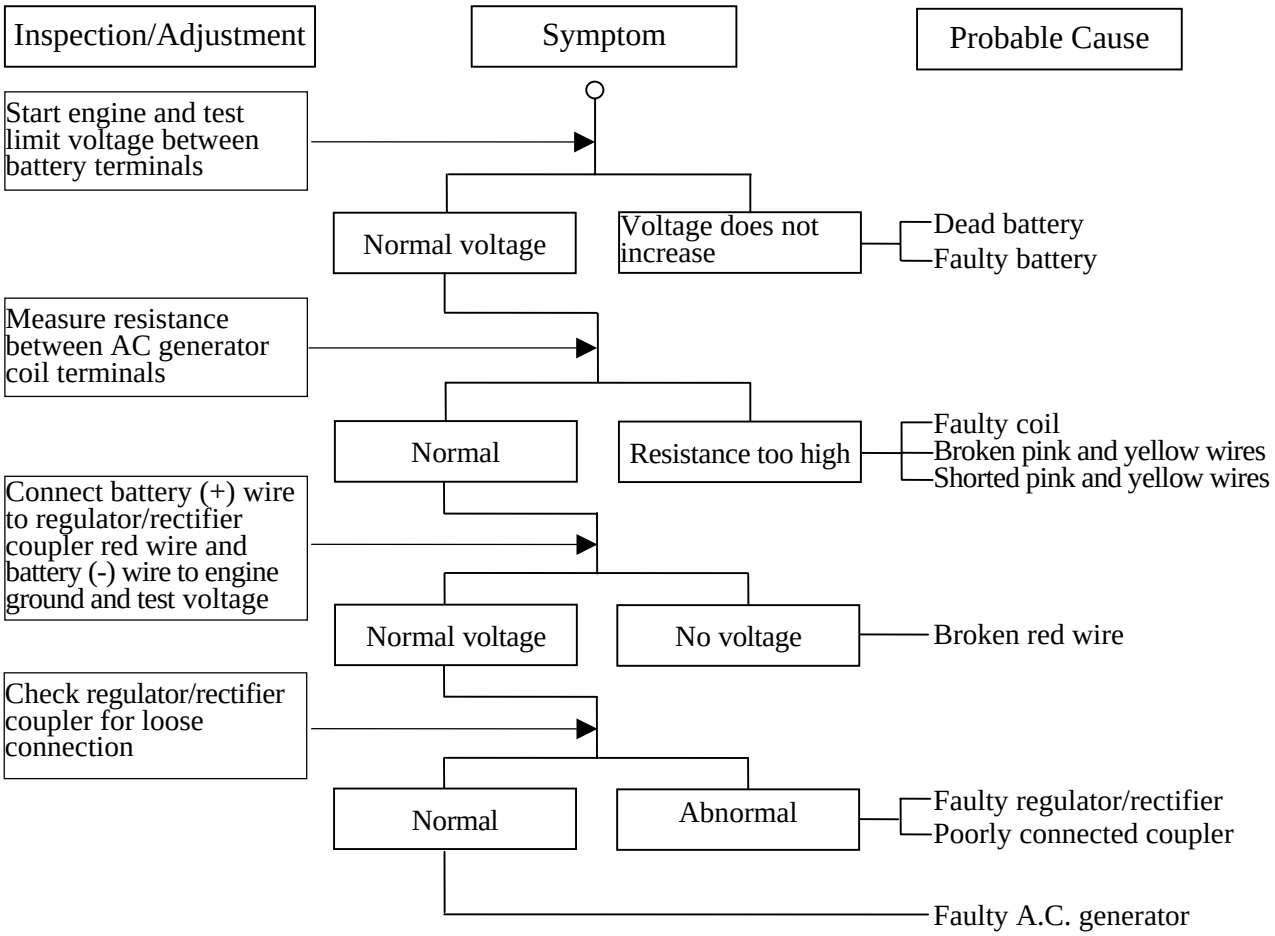


POOR PERFORMANCE (AT HIGH SPEED)

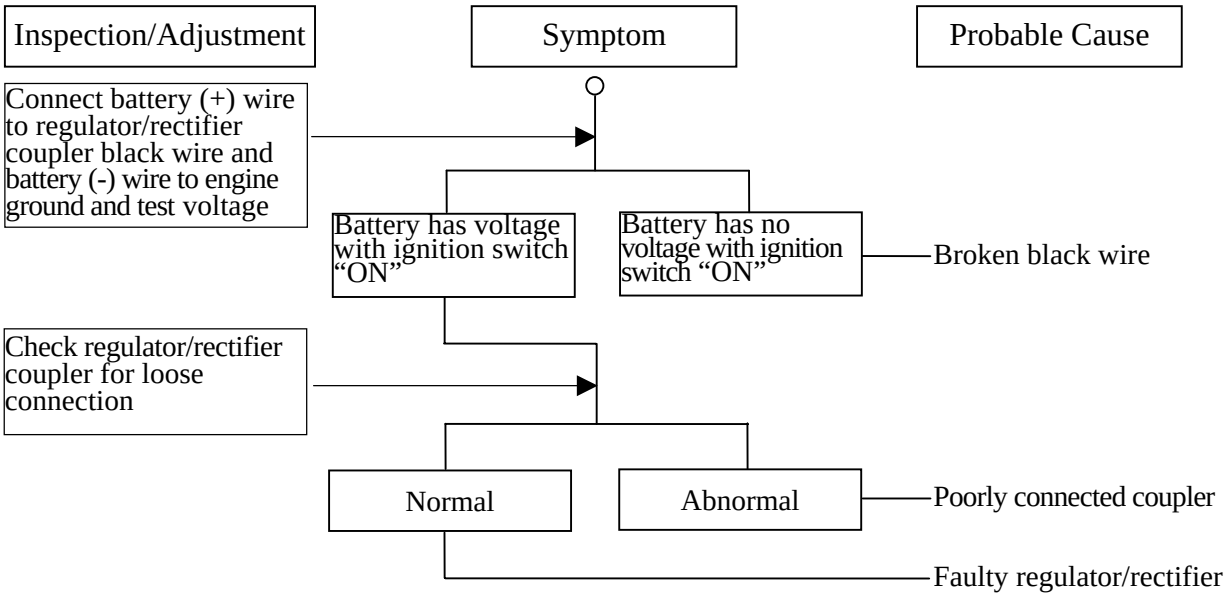


POOR CHARGING (BATTERY OVER DISCHARGING OR OVERCHARGING)

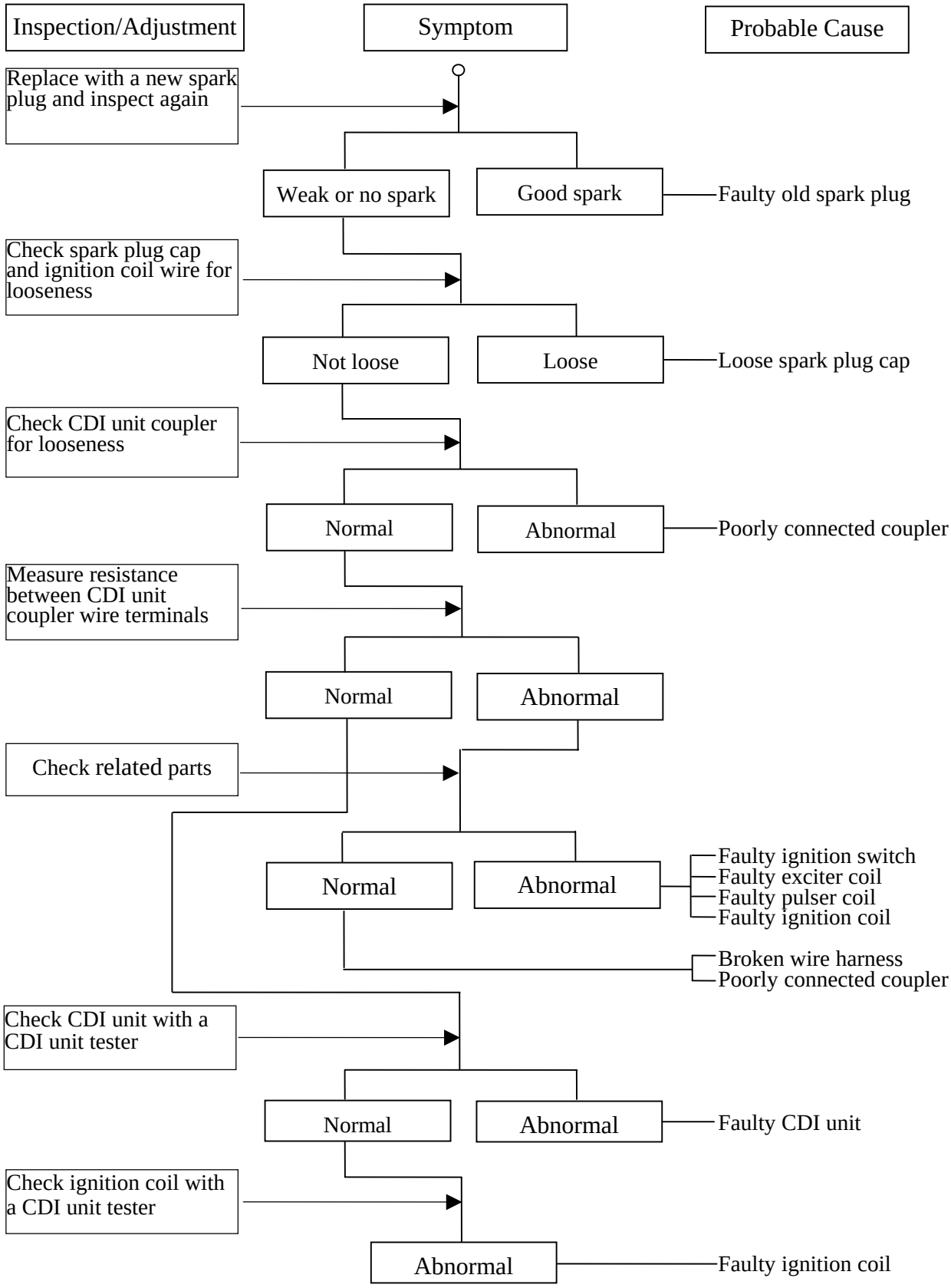
Undercharging



Overcharging



NO SPARK AT SPARK PLUG



2

INSPECTION/ADJUSTMENT

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Before running the engine, make sure that the working area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas which may cause death to people.
- Gasoline is extremely flammable and is explosive under some conditions. The working area must be well-ventilated and do not smoke or allow flames or sparks near the working area or fuel storage area.

SPECIFICATIONS

ENGINE

Throttle grip free play : 2～6mm
Spark plug gap : 0.6～0.7mm
Spark plug specification : NGK–DR8EA
Valve clearance : IN: 0.10mm
EX: 0.10mm
Cylinder compression : 14±2kg/cm²
Ignition timing : 15±2°/1700rpm
Idle speed : 1700±100rpm
Engine oil capacity:
At disassembly : 1.0 liter
At change : 0.9 liter

CHASSIS

Front brake free play: 10～20mm
Rear brake free play : 20～30mm
Brake fluid : DOT-4

TIRE PRESSURE

	1 Rider	2 Riders
Front	1.75kg/cm²	2.0kg/cm²
Rear	2.25kg/cm²	2.25kg/cm²

TIRE SIZE:
Front : 2.5-17
Rear : 2.75-17

TORQUE VALUES

Front axle nut 5.5～7.0kg-m
Rear axle nut 6.0～8.0kg-m

MAINTENANCE SCHEDULE

Perform the periodic maintenance at each scheduled maintenance period.
I: Inspect, and Clean, Adjust, Lubricate, Refill, Repair or Replace if necessary.
A: Adjust C: Clean R: Replace T : Tighten

Item \ Frequency	Whichever comes first ⇨ ⇩	Regular Service Mileage (km)											
		1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
Engine oil		R	R	R	R	R	R	R	R	R	R	R	R
Engine oil filter screen		C		C				C				C	
Fuel filter screen	Replace at every 8000km												
Valve clearance	Inspect at every 5000km and adjust if necessary												
Carburetor		I		I				I				I	
Air Cleaner	Note 2,3	C		R		C		R		C		R	
Spark plug	Clean at every 4000km and replace at every 8000km												
Brake system		I		I		I		I		I		I	
Drive chain		A		A		A		A		A		A	
Suspension		I		I				I				I	
Nuts, bolts, fasteners	Inspect at every 8000km												
Tire		I		I				I				I	
Steering head bearing		I		I				I				I	

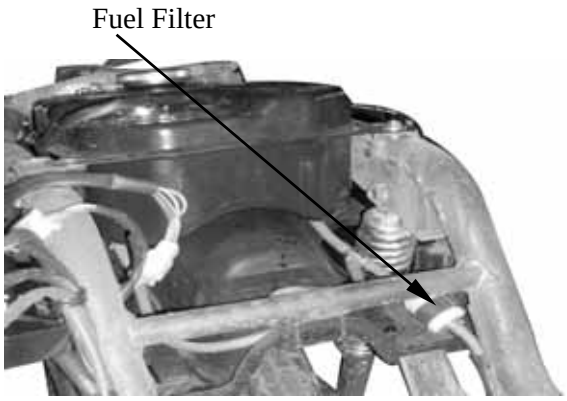
- In the interest of safety, we recommend these items should be serviced only by an authorized KYMCO motorcycle dealer.

Note: 1. For higher odometer readings, repeat at the frequency interval established here.
2. Service more frequently when riding in dusty or rainy areas.
3. Service more frequently when riding for long distance, in rain or at full throttle.

FUEL LINE/FILTER

Check the fuel lines and replace any parts which show signs of deterioration, damage or leakage.

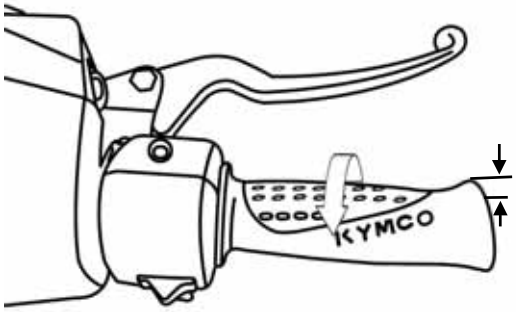
✳ Do not smoke or allow flames or sparks in your working area.



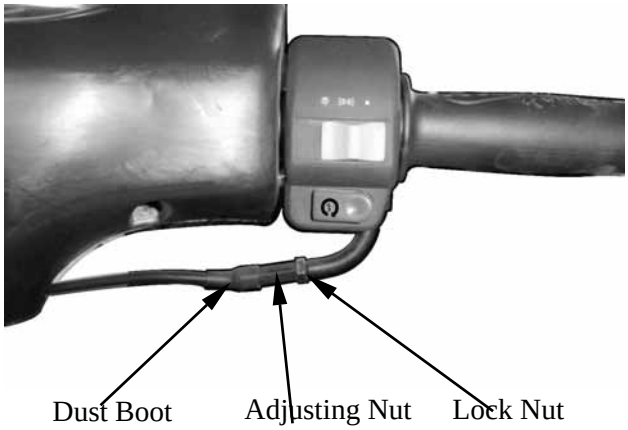
THROTTLE OPERATION

Check for smooth throttle grip movement in all steering positions.
Measure the throttle grip free play.

Free Play: 2～6mm



Adjust the throttle grip free play by turning the adjusting nut on the throttle cable.
Slide the dust boot out and adjust by loosening the lock nut and turning the adjusting nut.

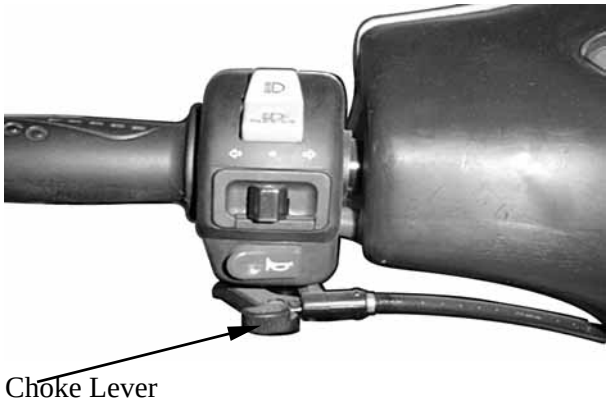


CHOKE

Check choke lever operation.

If the choke lever moves stiffly, clean and lubricate the pivot.

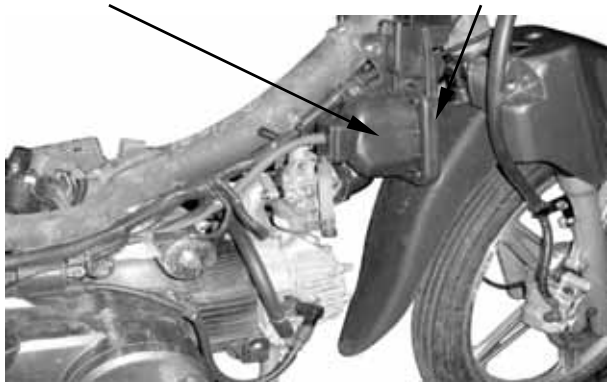
After cleaning, recheck the lever movement.



AIR CLEANER

AIR CLEANER REPLACEMENT

Remove the right center cover. (page 14-3)
Remove the air cleaner case. (page 4-5)
Remove the air cleaner case cover screws and the cover. (page 4-5)
Remove the air cleaner screen and element.
Check the element and replace it with a new one if it is excessively dirty or damaged.

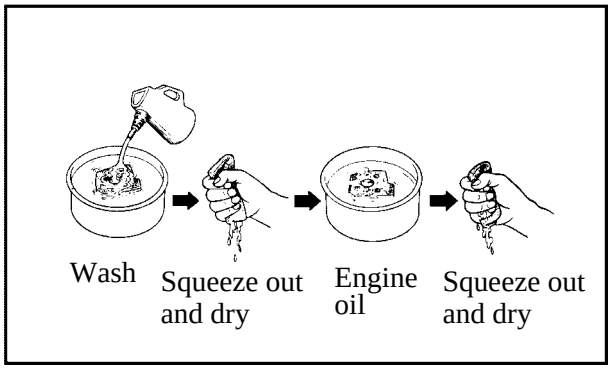


CHANGE INTERVAL

Wash the air cleaner element in detergent oil, squeeze out and allow to dry.

✳ Never use gasoline or organic vaporable oil with acid or alkali for washing.

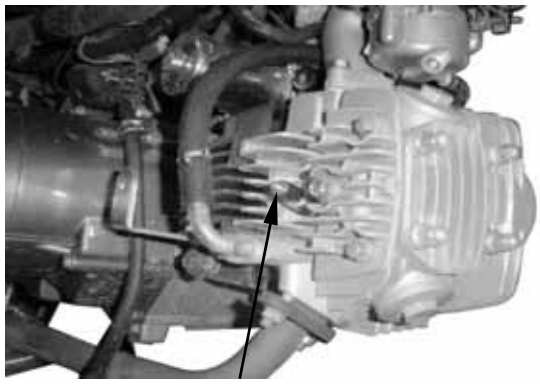
After washing, soak the element in clean engine oil SAE 15W-40# and squeeze out excess oil. Reinstall the element.



SPARK PLUG

Remove the spark plug.
Check the spark plug for wear, damage and fouling deposits.
Clean any fouling deposits with a spark plug cleaner or a wire brush.

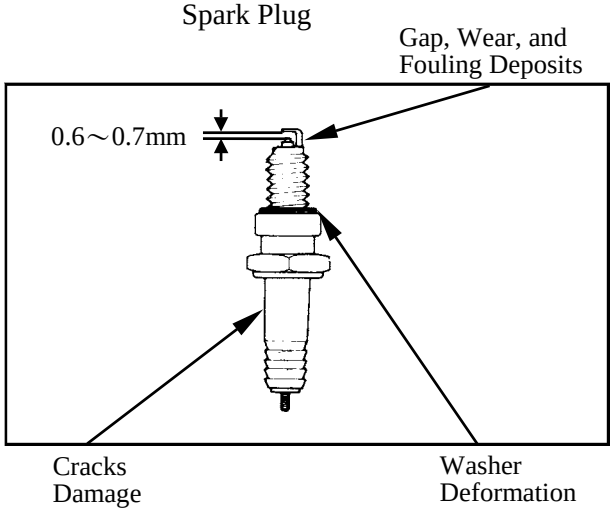
Specified Spark Plug: CHAMPION-P-PZ9HC



Measure the spark plug gap.

Spark Plug Gap: 0.6～0.7mm

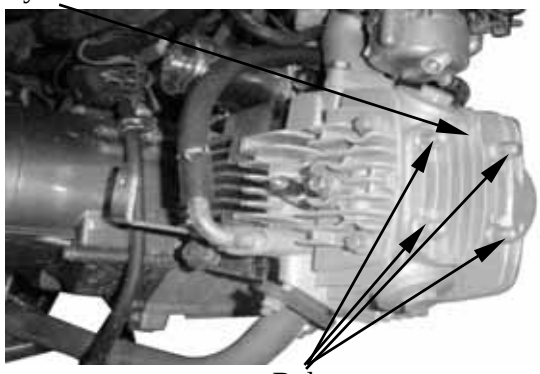
✳ When installing, first screw in the spark plug by hand and then tighten it with a spark plug wrench.



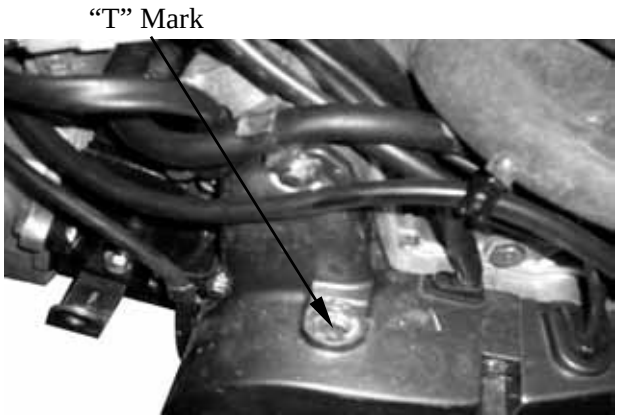
VALVE CLEARANCE

✳ Inspect and adjust valve clearance while the engine is cold (below 35℃).

Remove the cylinder head cover.



Rotate the generator flywheel to locate the camshaft on the top dead center (TDC) and align the "T" mark on the flywheel with the mark on the left crankcase cover.



✳ After adjustment, rotate the crankshaft several turns to make sure that the valve clearance is correct.

Inspect and adjust the valve clearance.

Valve Clearance: IN : 0.02mm
EX: 0.02mm

Loosen the lock nut and adjust by turning the adjusting bolt.

Special
Tappet adjuster E012

✳ Check the valve clearance again after the lock nut is tightened.

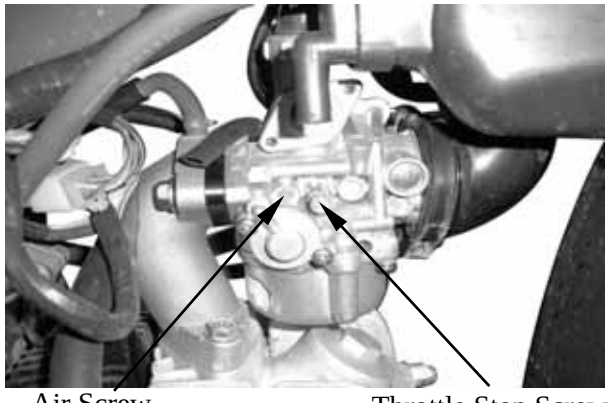
CARBURETOR IDLE SPEED

✳ The engine must be warm for accurate idle speed inspection and adjustment.

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

Idle Speed: 1700±100rpm

When the engine misses or run erratic, adjust the air screw.

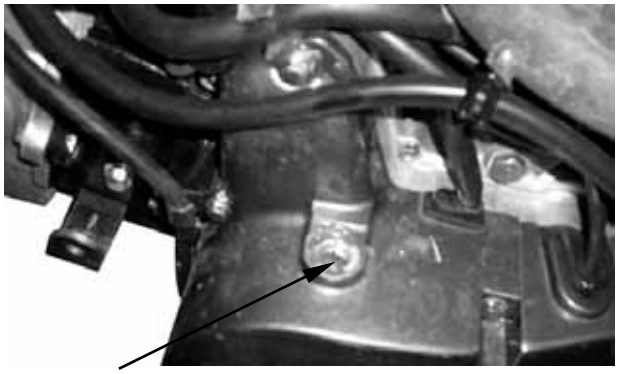


✳ When adjusting the carburetor, make sure to use a E/M tester.

IGNITION TIMING

✳
- The CDI unit is not adjustable.
- If the ignition timing is incorrect, check the ignition system.

Remove the ignition timing eye hole cap on the left crankcase cover.



Eye Hole

Check the ignition timing with a timing light. When the engine is running at idle speed, the ignition timing is correct if the index mark on the left crankcase cover aligns with the "F" mark on the flywheel.

Timing Light

"F" Mark

CYLINDER COMPRESSION

Warm up the engine before compression test. Stop the engine, then remove the spark plug and insert a compression gauge.
Open the throttle valve fully and crank the engine with the starter motor or kick lever. Measure the compression.

Compression: 13±2kg/cm²

Compression Gauge

If the compression is low, check for the following:

- Leaky valves
- Valve clearance to small
- Leaking cylinder head gasket
- Worn piston rings
- Worn piston/cylinder

If the compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and the piston head.

ENGINE OIL

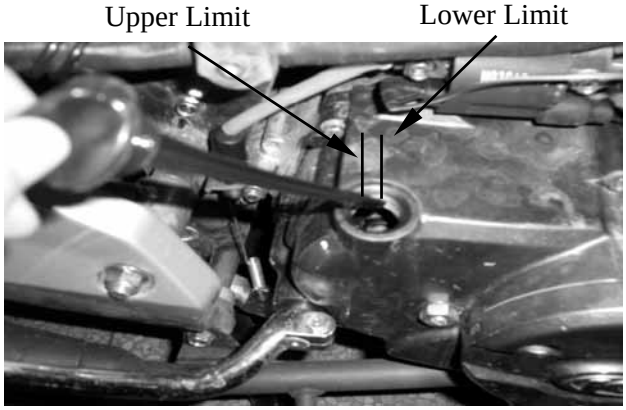
✳ When checking the oil level, place the motorcycle on its main stand on level ground for oil level check.

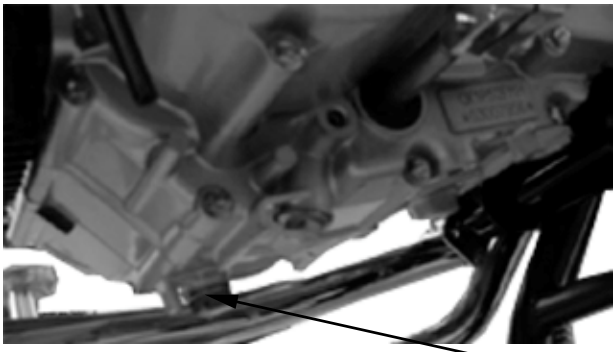
After the engine is stopped for 10 minutes, check if the oil level is between the upper and lower limits.
If the oil level is low, add the recommended oil to the proper level.

Recommended Oil: SAE15W40#
API: SG

After oil change, be sure to tighten the drain bolt securely.
Check the drain bolt washer for damage.

Oil Capacity: At disassembly : 1.0 liter
At change : 0.9 liter





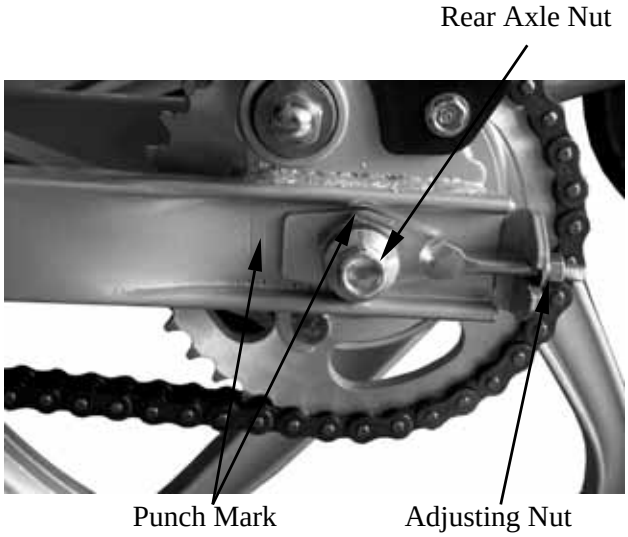
DRIVE CHAIN

Check the drive chain slack.

Specified Slack: 1～2cm

Drive Chain Adjustment:
1. Loosen the rear axle nut.
2. Adjust the right and left adjusting nuts to align the right punch mark with the left punch mark.
3. Turn the rear wheel to see if the drive chain slack is within the specified range.
4. Tighten the rear axle nut.

✳ After drive chain adjustment, check the rear brake pedal free play and adjust if necessary.



BRAKE SHOE

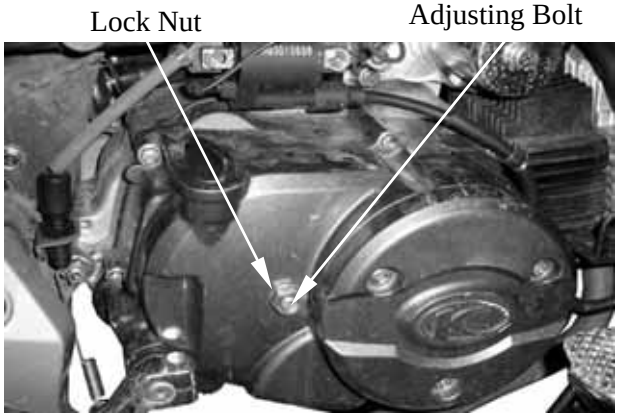
Inspect the front brake linings for wear.

BRAKE LEVER/PEDAL

Measure the rear brake pedal free play.
Free Play: 20～30mm

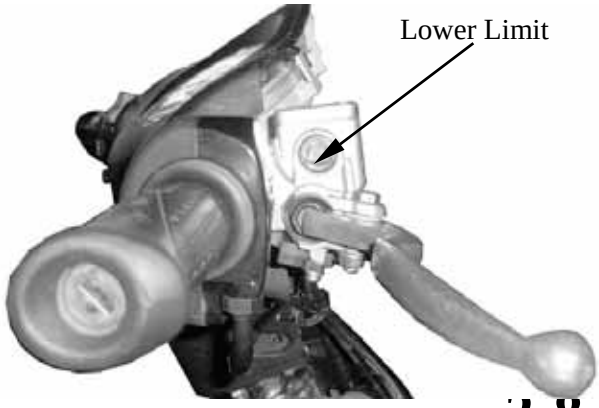
CLUTCH

Stop the engine.
Loosen the lock nut.
Slowly turn the adjusting bolt counterclockwise and stop when resistance is felt,
From this point, turn the adjusting bolt clockwise 1/8 turn and tighten the lock nut,
Check that the clutch is not slipping and is properly disengaging.



BRAKE FLUID

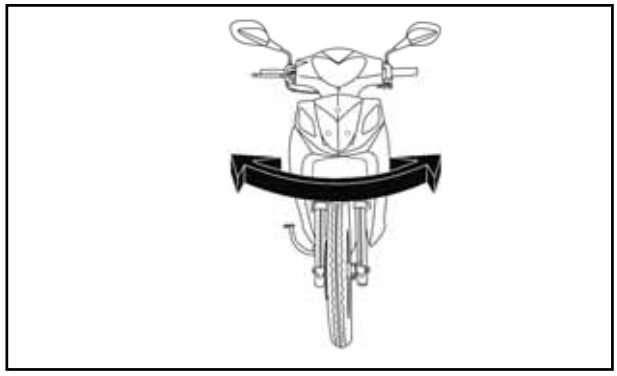
Turn the steering handlebar upright and check if the brake fluid level is between the upper and lower limits.
Specified Brake Fluid: DOT-4



SUSPENSION

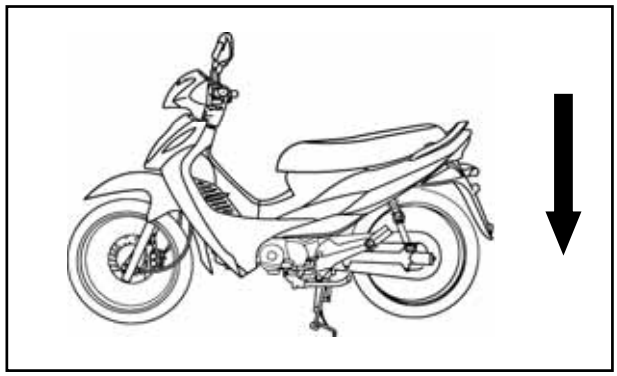
FRONT

Fully apply the front brake lever and check the action of the front shock absorbers by compressing them several times.
Check the entire shock absorber assembly for oil leaks, looseness or damage.



REAR

Check the action of the rear shock absorber by compressing it several times.
Check the entire shock absorber assembly for oil leaks, looseness or damage.
Jack the rear wheel off the ground and move the rear wheel sideways with force to see if the engine hanger bushings are worn.



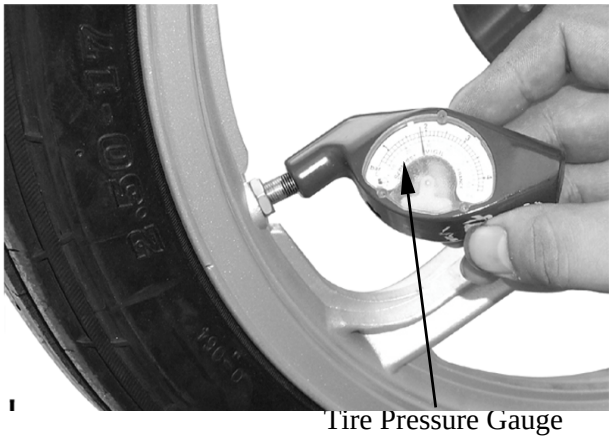
NUTS/BOLTS/FASTENERS

Check all important chassis nuts and bolts for looseness.
Tighten them to their specified torque values if any looseness is found.

WHEELS/TIRES

Check the tires for cuts, imbedded objects or other damages.
Check the tire pressure.

* Tire pressure should be checked when tires are cold.



Tire Pressure Gauge

TIRE PRESSURE

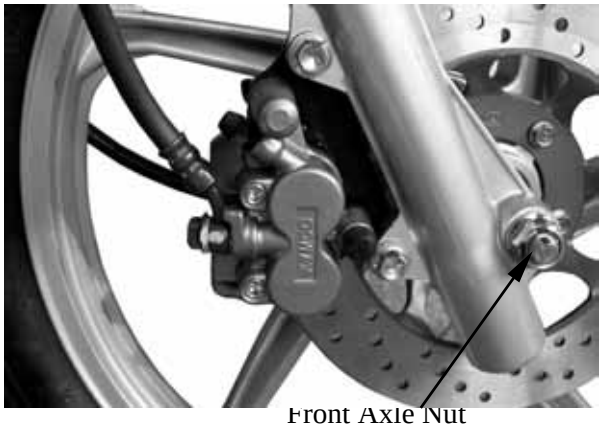
	1 Rider	2 Riders
Front	1.75kg/cm^2	1.75kg/cm^2
Rear	1.75kg/cm^2	2.25kg/cm^2

TIRE SIZE

Front: 2.5-17
Rear: 2.75-17

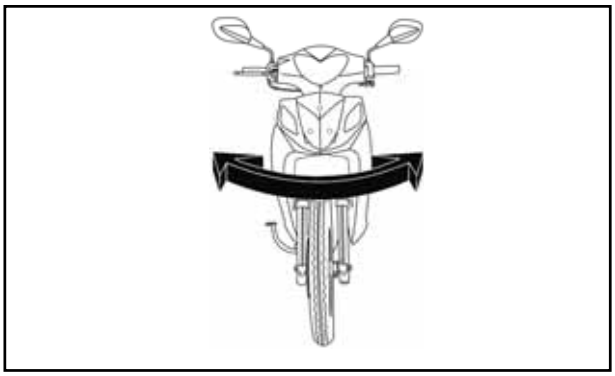
Check the front and rear axle nuts for looseness.
If the axle nuts are loose, tighten them to the specified torques.

Torques: **Front** : 5.5～7.0kg-m
Rear : 6.0～8.0kg-m


Front Axle Nut

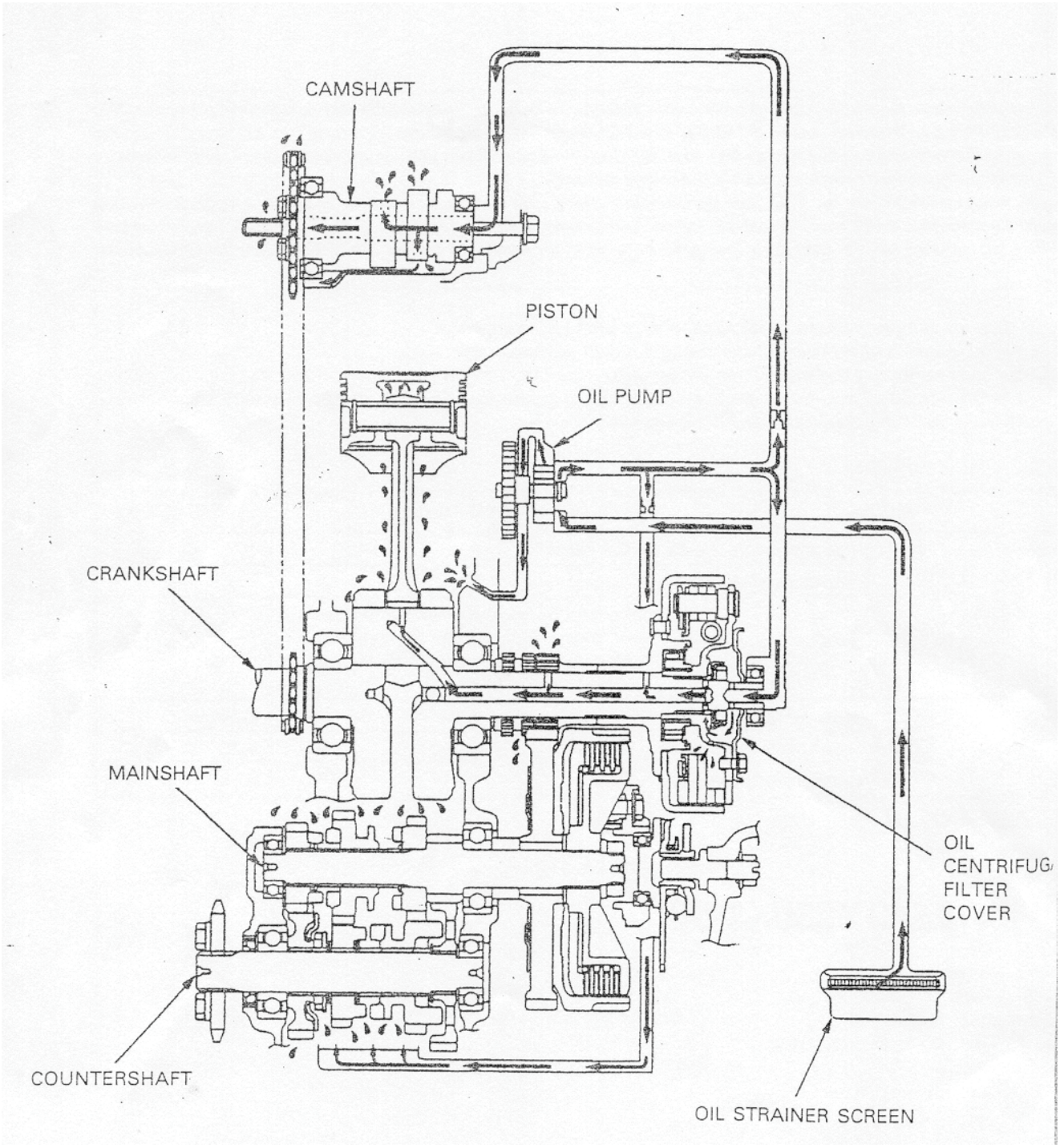
STEERING HANDLEBAR

Check that the control cables do not interfere with handlebar rotation.
Raise the front wheel off the ground and check that the steering handlebar rotates freely.
If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing.



3

LUBRICATION SYSTEM


CAMSHAFT
PISTON
OIL PUMP
CRANKSHAFT
MAINSHAFT
OIL
CENTRIFUG
FILTER
COVER
COUNTERSHAFT
OIL STRAINER SCREEN

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The service and maintenance of this section can be performed with the engine installed in the frame.
- Use care when removing and installing the oil pump not to allow dust and foreign matters to enter the engine and oil line.
- The oil pump must be replaced as a set when it reaches its service life.
- After the oil pump is installed, check each part for oil leaks and improper lubrication.
- When removing and installing the oil cooler, be careful not to bend or deform the oil pipe.

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Oil pump	Tip clearance	—	0.20
	Body clearance	—	0.20
	End clearance	0.10～0.15	0.15

TROUBLESHOOTING

Oil level too low

- External oil leak
- Worn valve guide or seal
- Worn piston rings

Engine burns

- Oil not changed often enough
- Head gasket faulty
- Worn piston rings

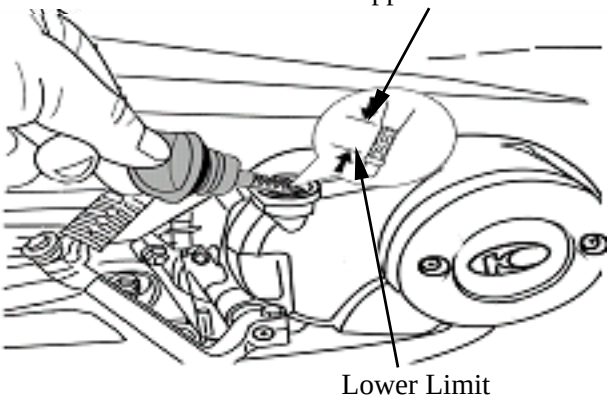
3. LUBRICATION SYSTEM

ENGINE OIL/OIL FILTER

OIL LEVEL

✳
- Place the motorcycle upright on level ground for engine oil level check.
- Run the engine for 2～3 minutes and check the oil level after the engine is stopped for 2～3 minutes.

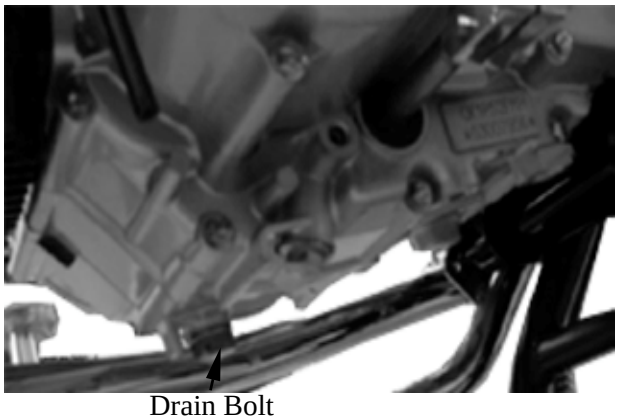
Check the oil level. If the level is near the lower limit, fill to the upper limit with the specified engine oil.



OIL CHANGE

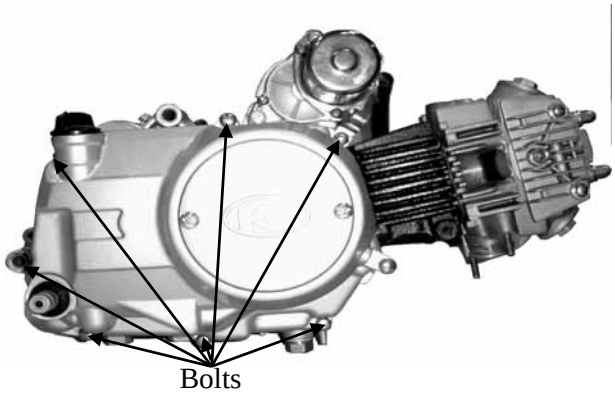
✳ The engine oil will drain more easily while the engine is warm.

Remove the drain bolt to drain the engine oil thoroughly.
Check the drain bolt washer for damage or deformation and replace with a new one if necessary.



ENGINE OIL FILTER

Remove the right crankcase cover attaching bolts and right crankcase cover.
Remove the dowel pins and gasket.
Clean oil filter screen.



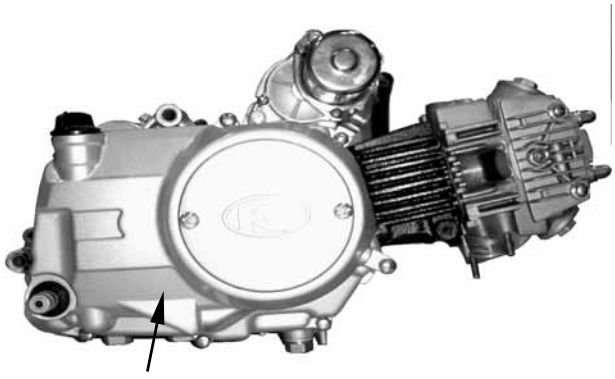
Specified Oil: SAE15W40
API service classification: SG
Oil Capacity: At disassembly : 1.0 liter
At change : 0.9 liter
Check for oil leaks and then start the engine and let it idle for few minutes.
Stop the engine and recheck the oil level.

OIL PUMP/OIL FILTER ROTOR

REMOVAL

Remove the right crankcase cover (page 9-3)

* When installing, make sure to use a new right crankcase cover gasket.



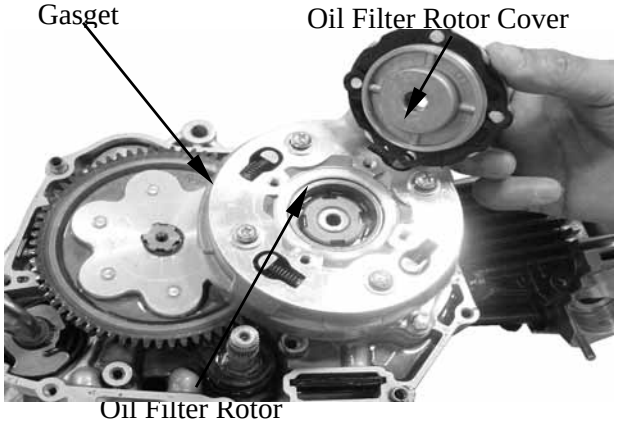
OIL FILTER ROTOR

Remove the filter rotor cover and gasket (pqge 9-3).

Clean the oil filter rotor cover and rotor.

Install the oil filter rotor cover (page 9-9).

Install the right crankcase cover (page 9-11).



OIL PUMP

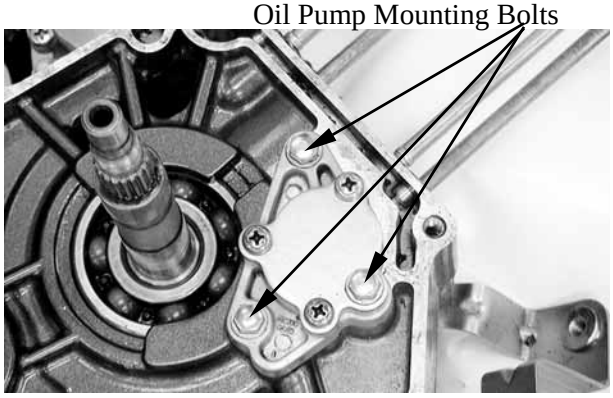
* The oil pump can be removed with the engine mounted in the frame.

Remove the oil drain bolt and drain the oil from the engine (page 3-3).

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

Remove the clutch drum (page 9-3)

Remove the three oil pump mounting bolts and oil pump.



DISASSEMBLY

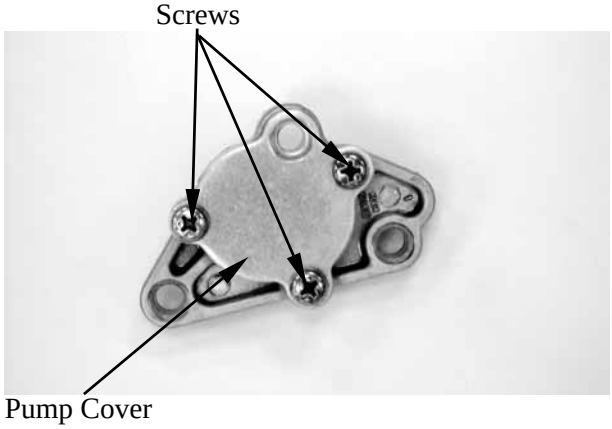
Remove the three cover screws and cover.

Remove the rotor shaft.

Remove the inner and outer rotors from the pump body.

Clean the disassembled parts in non-flammable or high flash-point solvent.

Check all parts for damage or wear.

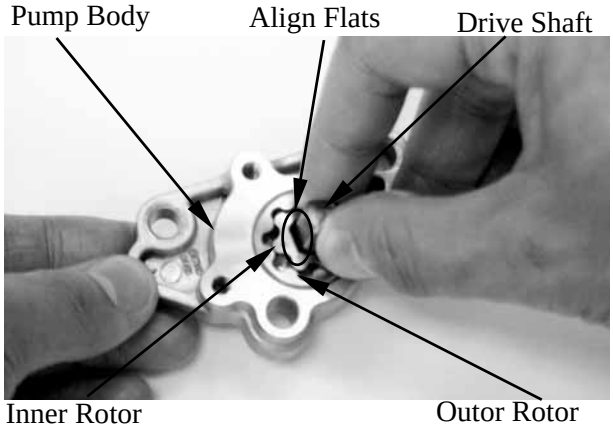


INSPECTION
Install the drive shaft and rotors.
Measure the rotor tip clearance.
Service limit: 0.2mm

Measure the pump body clearance.
Service limit: 0.2mm

Install the gasket and measure the rotor end clearance.
Service limit: 0.15mm

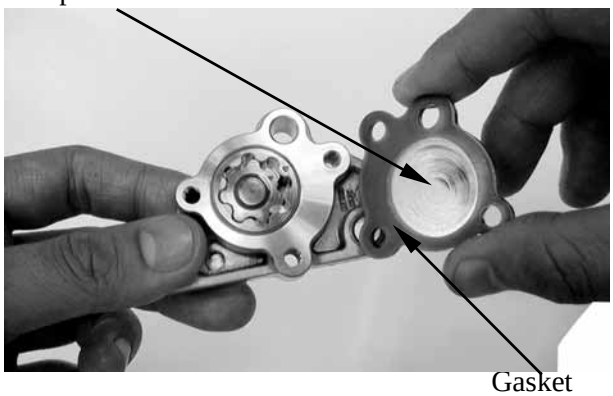
OIL PUMP ASSEMBLY
Install the outer and inner rotors.
Insert the drive shaft and align the flat on the shaft with the flat in the inner rotor,



Install a new pump body cover gasket and the cover.

✳ Make sure that the pump rotates freely without binding.

Pump Cover

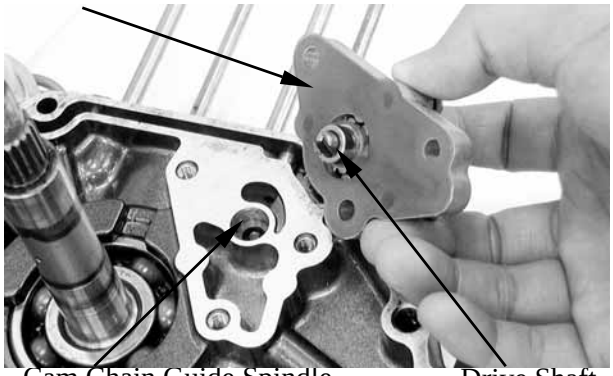


Gasket

INSTALLATION

Install the oil pump with a new gasket under it by aligning the slot if the drive shaft with the cam chain guide spindle.

Gasket



Cam Chain Guide Spindle

Drive Shaft

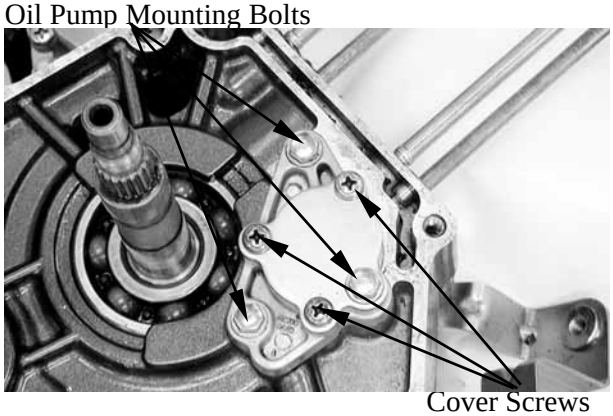
Tighten the oil pump mounting bolts securely.

Check the cover screws for loose, retighten if necessary.

Install the right crankcase cover, kick starter pedal.

Fill the crankcase with the recommended engine oil.

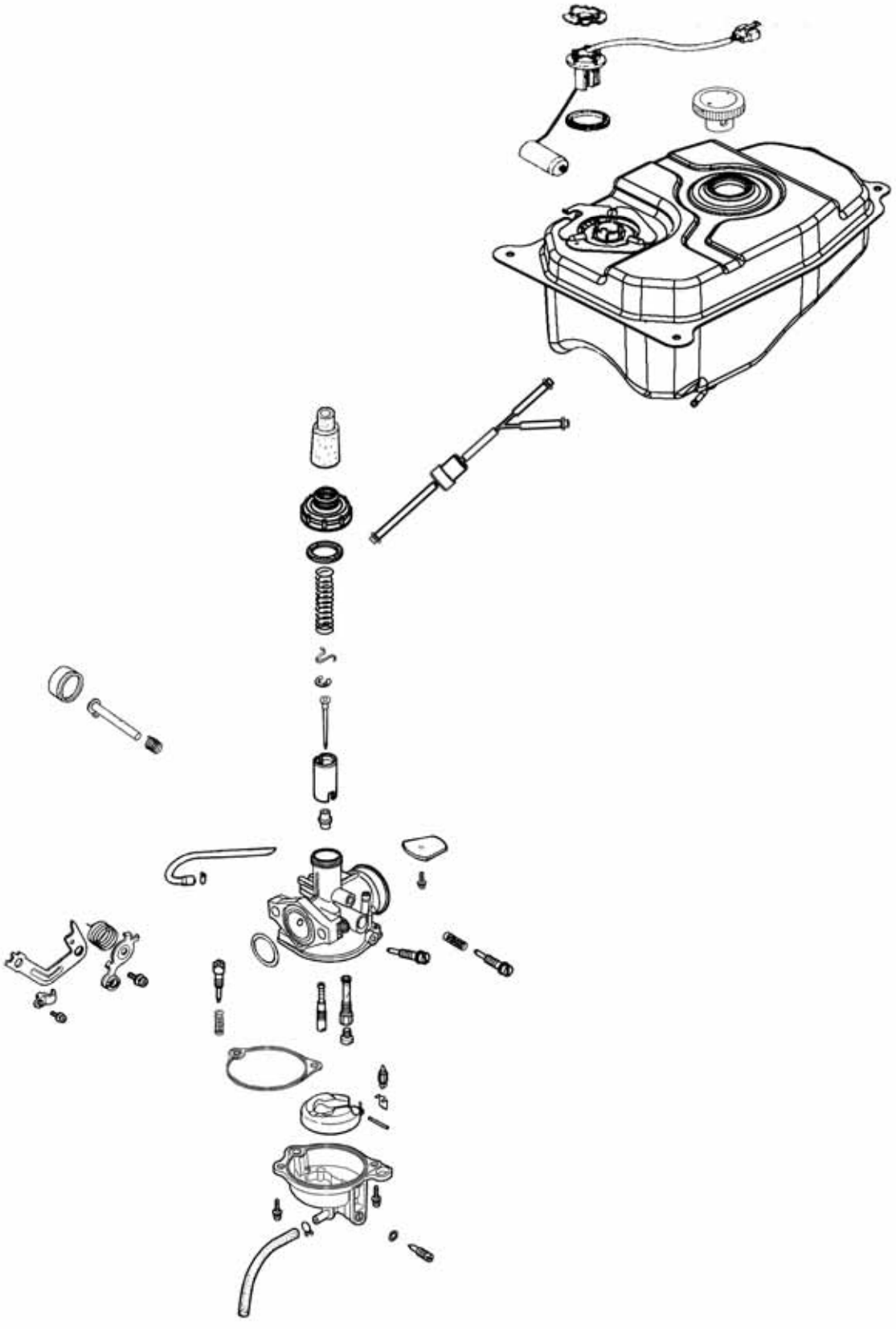
Oil Pump Mounting Bolts



Cover Screws

4

FUEL SYSTEM



SERVICE INFORMATION

GENERAL INSTRUCTIONS

Gasoline is very dangerous. When working with gasoline, keep sparks and flames away from the working area.
Gasoline is extremely flammable and is explosive under certain conditions. Be sure to work in a well-ventilated area.

- Do not bend or twist control cables. Damaged control cables will not operate smoothly.
- When disassembling fuel system parts, note the locations of O-rings. Replace them with new ones during reassembly.
- Before float chamber disassembly, loosen the drain screw to drain the residual gasoline into a clean container.
- After the carburetor is removed, plug the intake manifold side with a clean shop towel to prevent foreign matters from entering.
- The carburetor air jets and fuel jets must be cleaned with compressed air.
- When the motorcycle is not used for over one month, drain the residual gasoline from the float chamber to avoid erratic idling and clogged slow jet due to deteriorated fuel.

SPECIFICATIONS

Item	Standard
Carburetor type	PIF
Venturi dia.	ϕ11
Piston dia	ϕ13
Main jet	65#
Idle speed	1700±100rpm
Throttle grip free play	2～6mm
Air screw opening	1¾±½

SPECIAL TOOL

Float level gauge

TROUBLESHOOTING

Engine cranks but won't start
- No fuel in tank
- No fuel to carburetor
- Cylinder flooded with fuel
- No spark at plug
- Faulty fuel pump
- Clogged air cleaner
- Intake air leak
- Improper throttle operation

Engine idles roughly, stalls or runs poorly
- Faulty charcoal canister
- Ignition malfunction
- Faulty carburetor
- Poor quality fuel
- Lean or rich mixture
- Clogged air cleaner
- Incorrect idle speed
- Worn throttle needle

Misfiring during acceleration
- Faulty ignition system
- Faulty carburetor
- Faulty accelerating pump
- Faulty charcoal canister

Backfiring at deceleration
- Float level too low
- Incorrectly adjusted carburetor
- Faulty exhaust muffler

Engine lacks power
- Clogged air cleaner
- Faulty carburetor
- Faulty ignition system

Lean mixture
- Clogged carburetor fuel jets
- Float level too low
- Intake air leak
- Faulty charcoal canister
- Restricted fuel line

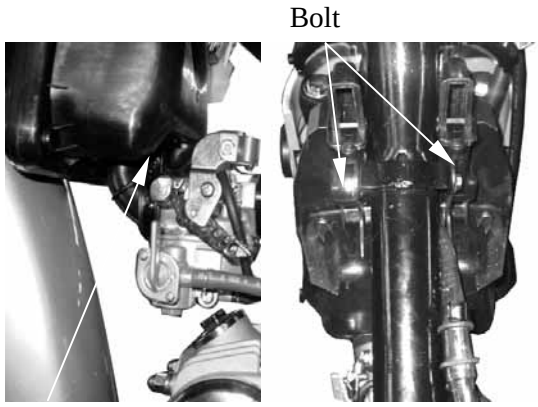
Rich mixture
- Float level too low
- Clogged air jets
- Clogged air cleaner

AIR CLEANER REMOVAL

Remove the front cover (page 14-3).

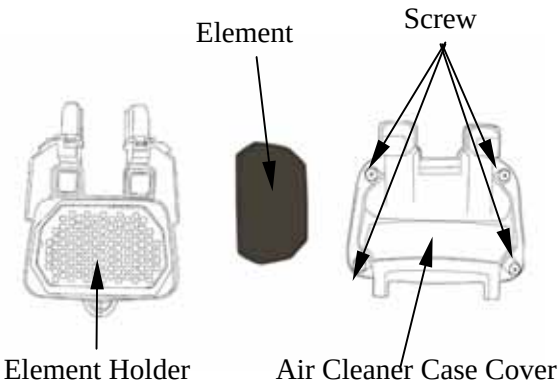
Remove the screw attaching the carburetor.

Remove the air cleaner case by removing the attaching bolts.



.

Remove the four screws with the air cleaner case cover.



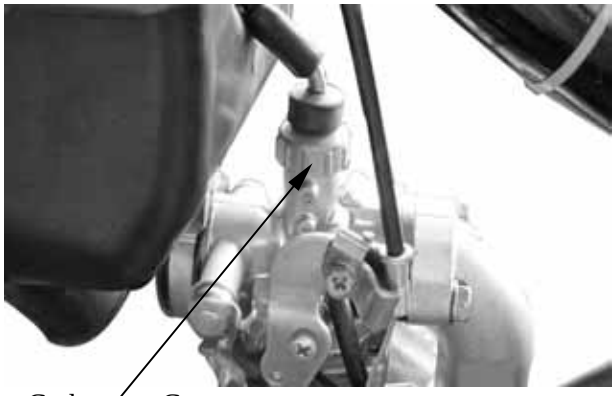
Remove the element and the element holder from the air cleaner case.

INSTALLATION

Install the air cleaner case in the reverse order of removal.

THROTTLE VALVE DIS-ASSEMBLY

Remove the front cover (page 14-3).
Loosen the carburetor cap and remove the throttle valve.

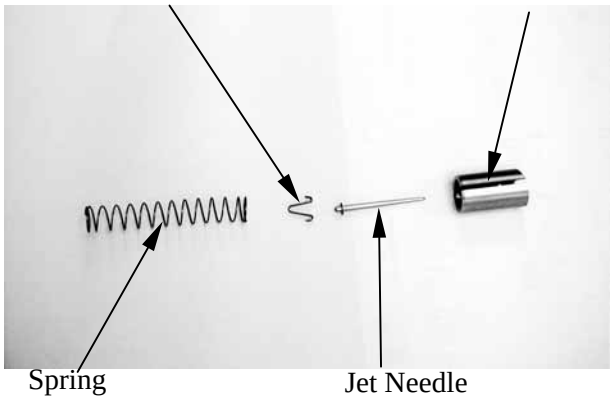


Disconnect the throttle cable from the throttle valve.

Remove the throttle valve, spring and carburetor top.

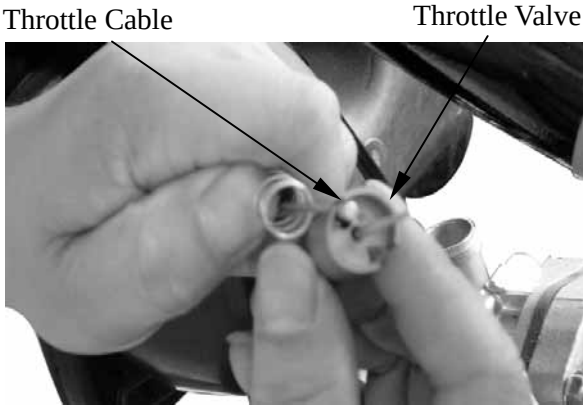
✳ The carburetor top is an integral part of the throttle cable assembly. The top can not be separated from the assembly without causing damage to the cable.

Remove the jet needle by removing the needle clip.
Check the jet needle and throttle valve for wear or damage.

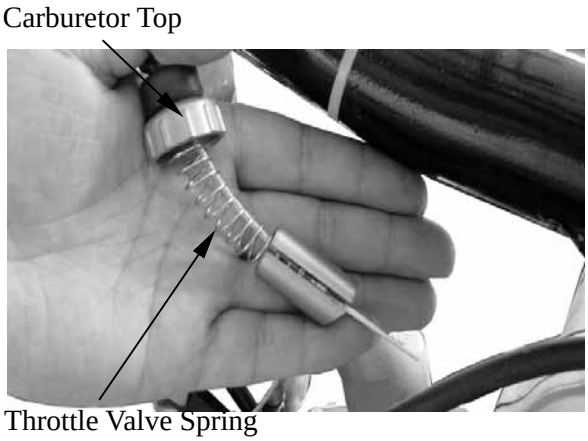


THROTTLE VALVE INSTALLATION

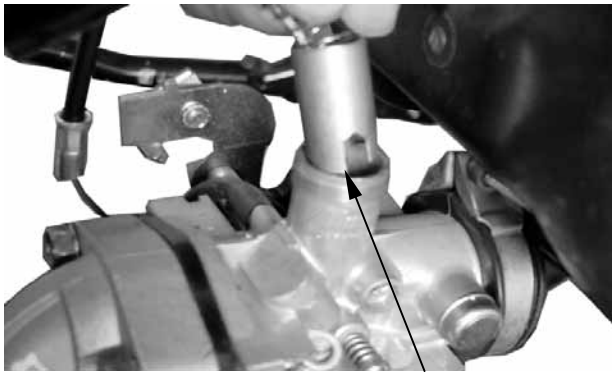
Set the needle clip on the jet needle clip.
Standard podition: 3rd groove from the top
Install the jet needle on the throttle valve.
Install the retainer on the throttle valve and secure the jet needle.



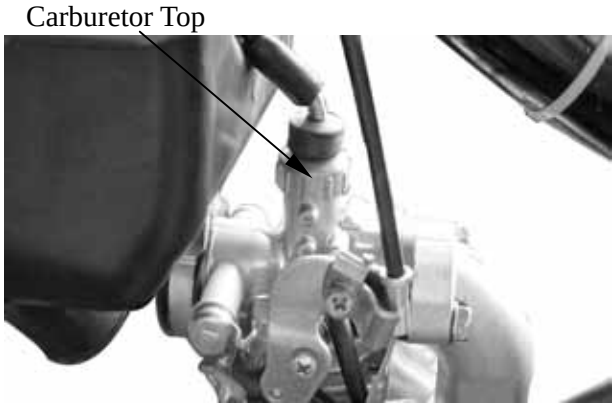
Install the throttle cable to the throttle valve while depressing the throttle valve spring.



Insert the throttle valve into the carburetor, aligning the throttle valve groove with the throttle stop screw.



Install the carburetor top onto the carburetor.



✳ After installing the carburetor and throttle valve, perform the following adjustments:
-Throttle grip free play (page 2-3).
-Carburetor air screw adjustment if the carburetor was overhauled or cleaned.

CARBURETOR REMOVAL

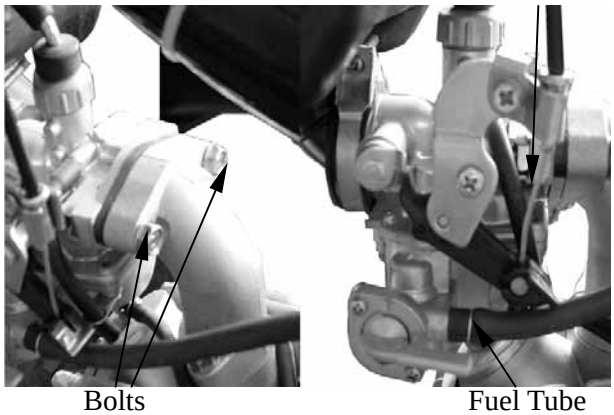
Remove the front cover (page 14-3).
Loosen the air cleaner connecting tube band.

Remove the carburetor top (page 4-6).

Carburetor top

Choke Cable

Remove the fuel tube from the carburetor.
Remove the choke cable.
Remove the carburetor mounting bolts.
Remove the insulator, O-ring and carburetor.



Bolts

Fuel Tube

CARBURETOR DISASSEMBLY

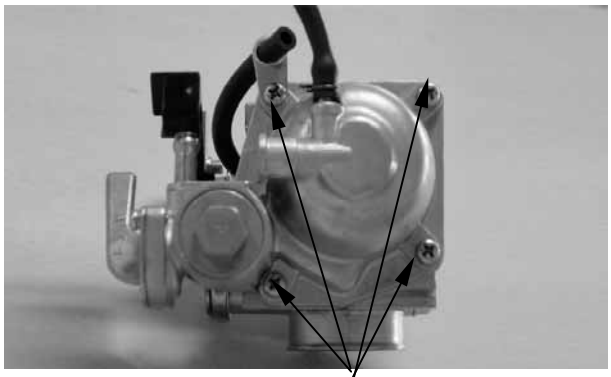
Loosen the drain screw to drain the gasoline from the float chamber.

✳
- Keep sparks and flames away from the work area.
- Drain gasoline into a clean container.

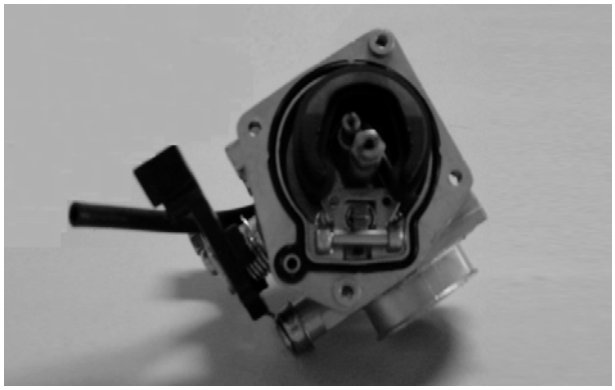
Drain Screw

Float/Float Valve Disassembly

Remove the four float chamber attaching screws and remove the float chamber.

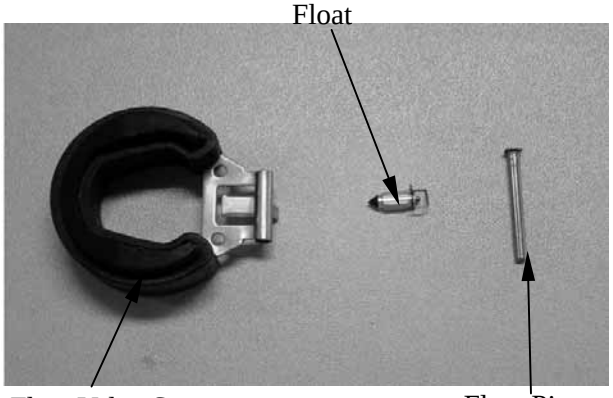


Remove the float pin, float and float valve.



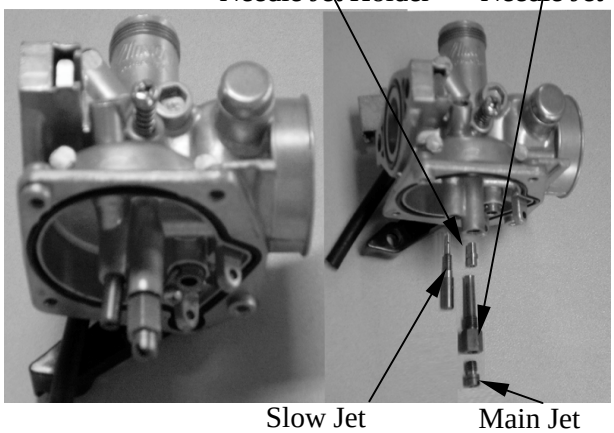
FLOAT/FLOAT VALVE INSPECTION

Inspect the float valve seat for wear or damage.
Inspect the float for damage or fuel level inside the float chamber.

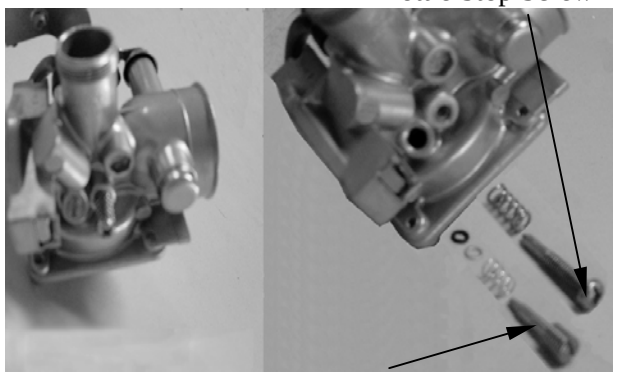


MAIN JET/SLOW JETS/AIR SCREW/THROTTLE STOP SCREW REMOVAL

Remove the main jet, needle jet holder, and needle jet.
Remove the slow jet.



Remove the air screw and throttle stop screw.

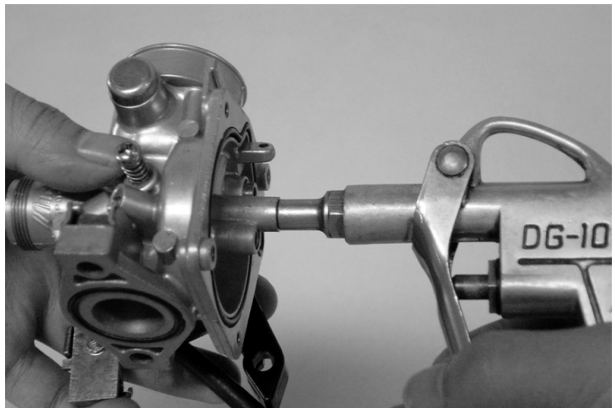


CAUTIONS !

- Be careful not to damage the jets and jet holder when removing them.
- Before removing, turn the throttle stop screw and air screw in and carefully count the number of turns until they seat lightly and then make a note of this.
- Do not force the screw against its seat to avoid seat damage.
- Be sure to install the O-ring in the reverse order of removal.

Carburetor Cleaning

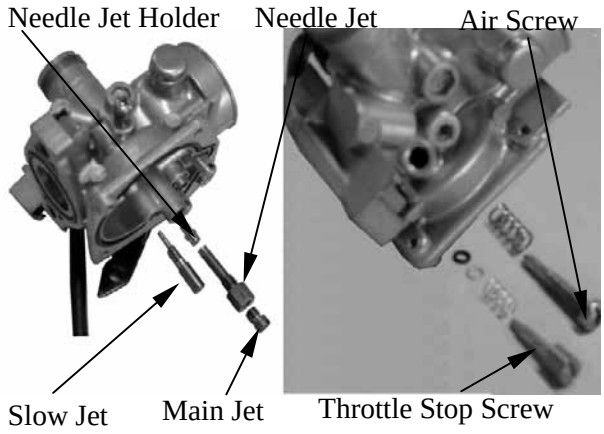
Blow compressed air through all passages of the carburetor body.



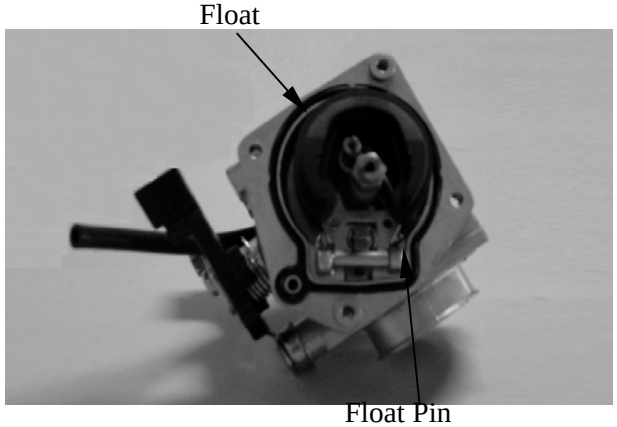
Slow Jet/Main Jet Installation

Install the slow jet.
Install the needle jet, needle jet holder and main jet.
Install the throttle stop screw and air screw.

- When installing the air screw, return it to the original position as noted during removal
- After the carburetor is installed, be sure to perform the Exhaust Emission Test.



Install the float valve, float and float pin.



FLOAT LEVEL INSPECTION

Turn the carburetor upside down so that the float will go down to make the float valve contact the float valve seat.
Then slowly tilt the carburetor and measure the float level with the float level gauge while the float pin just contacts with float valve.

Float Level: 20mm


Float Level Gauge

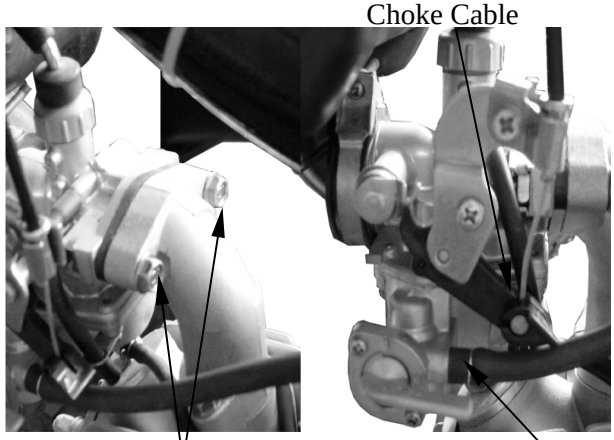
When adjusting, carefully bend the float pin.
Check the float for proper operation and then install the float chamber.

CARBURETOR INSTALLATION

Install the carburetor onto the intake manifold and tighten the two mounting bolts.
Install the fuel tube and the choke cable..

Torque: 0.8～1.2kg-m

Install the air cleaner connector and tighten the band screw.



Assemble the carburetor top and throttle valve spring.
Connect the throttle cable to the throttle valve.

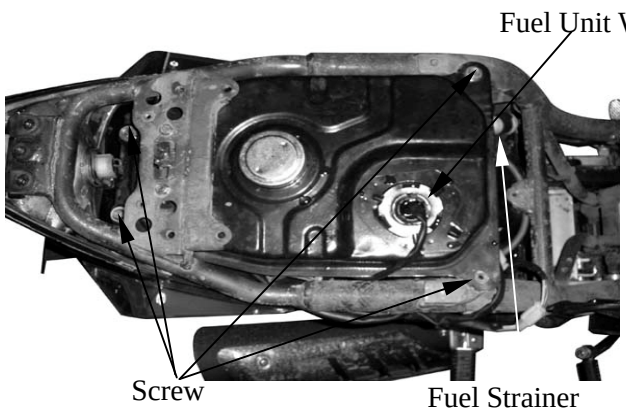
FUEL TANK

FUEL TANK REMOVAL

Warning

- Keep sparks and flames away from the work area.
- Wipe off any spilled gasoline.

Turn the fuel valve to “OFF”.
Remove the three bolts attaching the rear carrier.
Remove the four seat lock nuts.
Remove the tool box mounting bolt and tool box.
Disconnect the fuel strainer and remove the nuts on the end of the fuel tank.
Disconnect the fuel unit wire connector and fuel gauge wire.
Remove the fuel tank.



FUEL STRAINER REMOVAL

Remove the fuel strainer from the fuel tank.

INSPECTION

Inspect if the fuel strainer is clogged and clean it with compressed air.

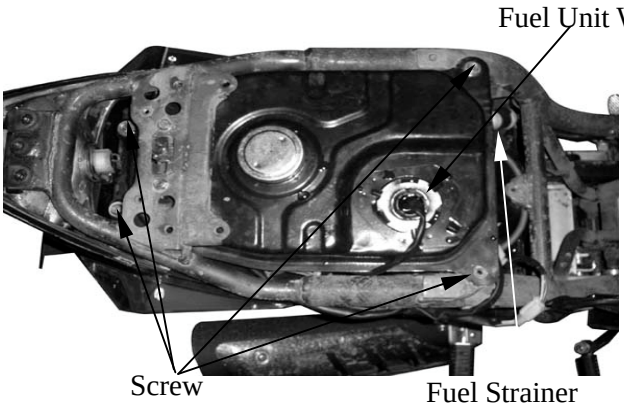
- When removing the fuel strainer, do not allow flames or sparks near the working area and drain the residual gasoline into a container.

INSTALLATION

Install the fuel strainer with its arrow mark toward the fuel pump.

FUEL TANK INSTALLATION

Install the fuel tank in the reverse order of removal.
Check that there is no fuel leakage.
Check the wire connectors for proper connection.



5

ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- A engine stand or floor jack is required to support and maneuver the engine.
- The following parts can be serviced with the engine installed in the frame:
  — Cylinder head/valves (Section 6)
  — Cylinder/piston (Section 7)
  — Alterantor/cam chain tensioner (Section 8)
  — Clutch/gear shift mechanism (Section 9)
- When removing and installing the engine, do not use a hammer or screw driver to strike or pry the engine.
- Do not damage the crankcase mating surfaces and clean off all gasket materials from the mating surfaces.
- After crankcase assembly, check that the transmission system operates smoothly.
- After engine installation, start the engine and check that the lubrication system is normal.

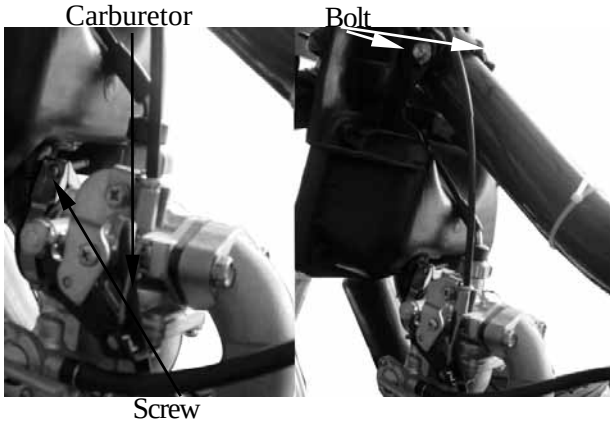
Engine oil capacity:
At disassembly : 1.0 liter
At change : 0.9 liter

TORQUE VALUES

Engine bracket bolt	2.0～2.5kg-m
Drive gear lock bolt	0.8～1.2kg-m
Exhaust muffler hanger lock bolt	2.4～3.0kg-m
Rear fork pivot nut	5.5～6.5kg-m
Exhaust muffler joint lock nut	0.8～1.2kg-m

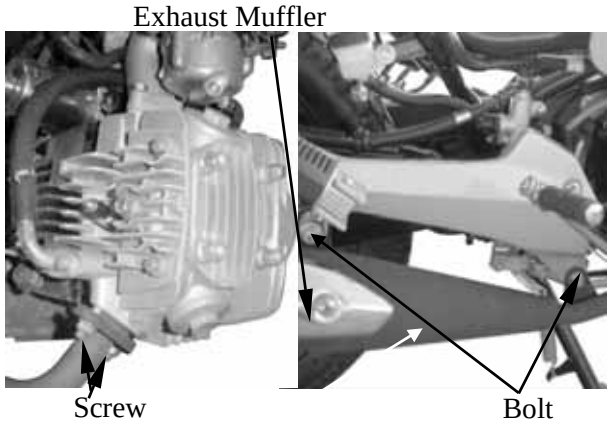
ENGINE REMOVAL

Remove the right and left decorative covers under the seat.
Remove the carburetor (page 4-5).

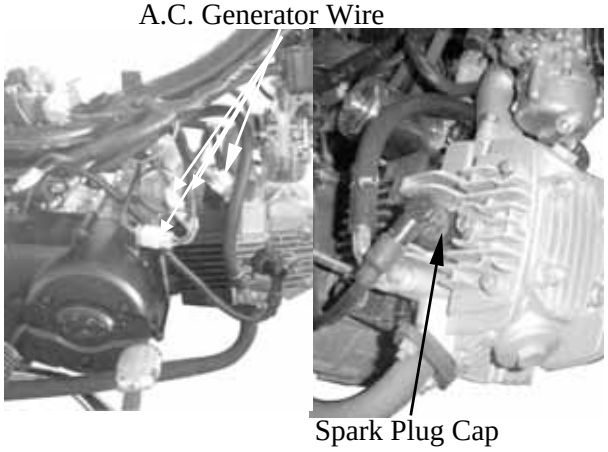


Remove the two exhaust muffler joint lock nuts.
Remove the exhaust muffler hanger lock bolt and exhaust muffler.

✳
- Drain the engine oil before engine removal.
- The exhaust muffler temperature is extremely high. Remove it when the engine is cold.

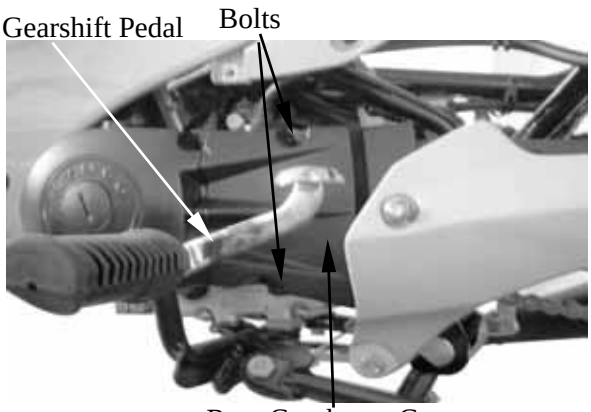


Remove the spark plug cap.
Disconnect the A.C. generator wire connector.

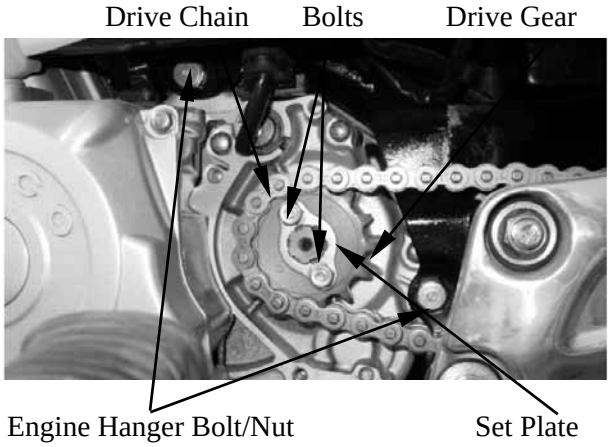


Loosen the rear axle nut and adjust the drive chain slack (page 2-7).

Remove the gear shift lever bolt and gear shift lever.
Remove the two bolts attaching the left rear crankcase cover and remove the rear crankcase cover.



Remove the two bolts attaching the drive gear set plate and the set plate.
Remove the drive gear and chain.
Remove the engine hanger nuts and pull out the engine hanger bolts.
Remove the engine.



ENGINE INSTALLATION

Install the engine in the reverse order of removal. Install the engine to its original position with a jack or other adjustable support.

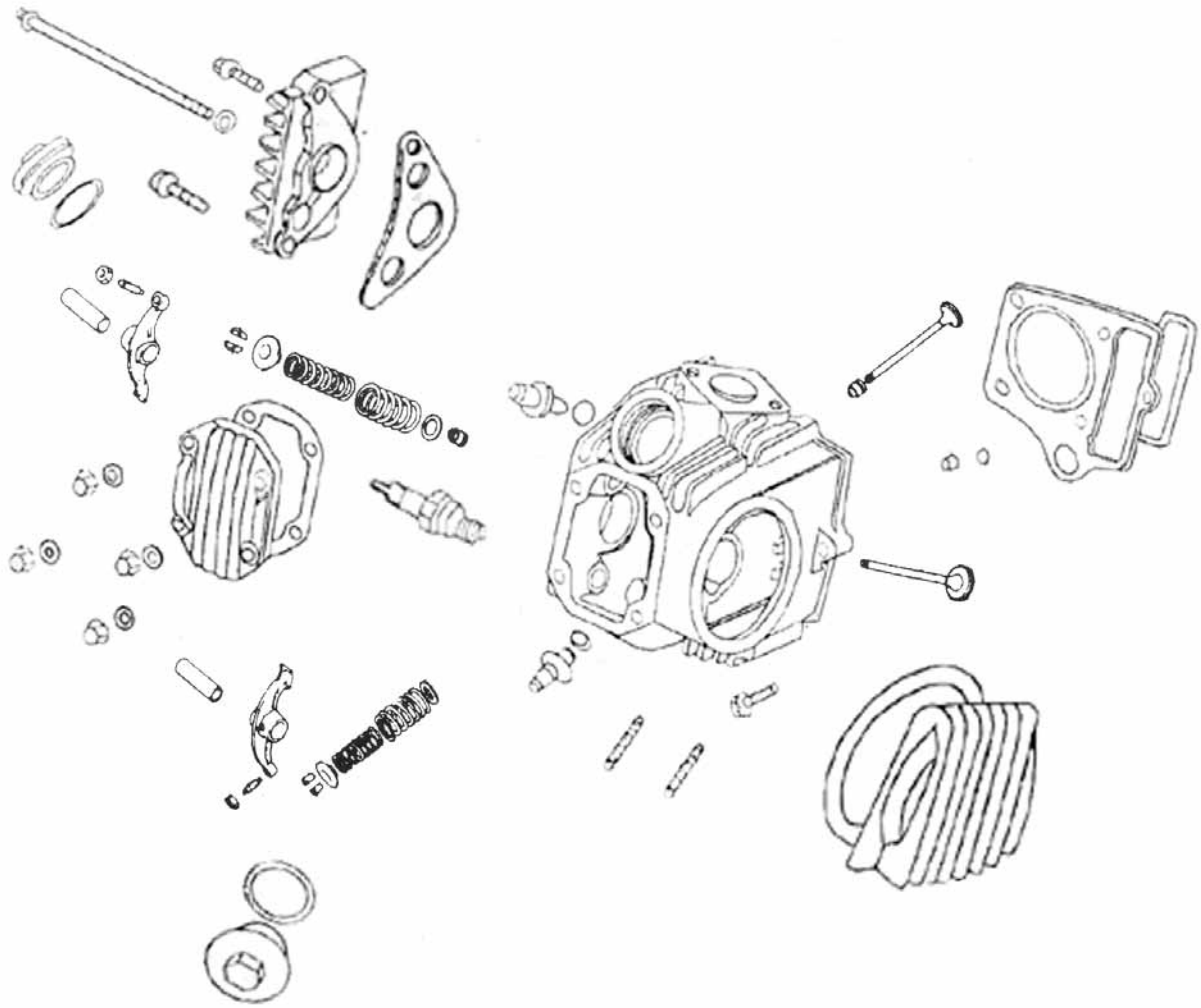
✳

- When installing the engine, do not damage the bolt thread and route the wires and cables properly.
- Install the gear shift lever by align the punch mark on the lever with that on the spindle.
- Fill the crankcase to the proper level with recommended engine oil.
- After installation, perform the following inspections and adjustments:
  1. Throttle operation
  2. Drive chain adjustment

6

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.

Item		Standard (mm)	Service Limit (mm)
Valve clearance (cold)	IN	0.02	0.04
	EX	0.02	0.04
Cylinder head compression pressure		13kg/cm²	
Cylinder head warpage		—	0.05
Camshaft cam height	IN	—	25.8
	EX	—	25.6
Valve rocker arm I.D.	IN	—	10.
	EX	—	10.
Valve rocker arm shaft O.D.	IN	—	9.78
	EX	—	9.78
Valve stem O.D.	IN	4.92～4.970	4.9
	EX	4.90～4.950	4.9
Valve guide I.D.	IN	—	5.
	EX	—	5.
Valve stem-to-guide clearance	IN	—	0.1
	EX	—	0.1

TORQUE VALUES

Cylinder head cap nut	1.0～2.0kg-m
Valve clearance adjusting nut	0.9kg-m
Cylinder head cover nut	1.2～1.6kg-m

SPECIAL TOOLS

Valve spring compressor

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

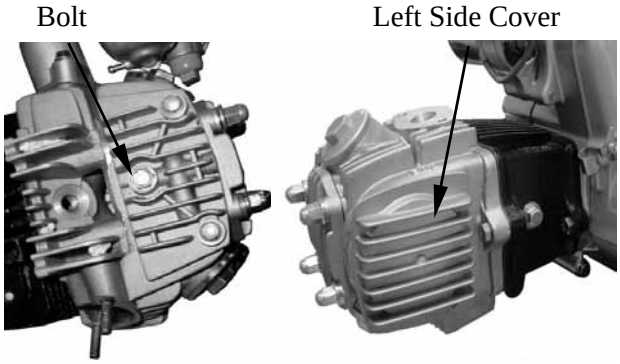
Compression too high
- Excessive carbon build-up in combustion chamber

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 HEAD REMOVAL

Remove the left crankcase cover bolt.
Remove the left crankcase cover.
Remove the crankshaft hole cap and timing hole cap.
Remove the left side cover and gasket.
Remove the cam chain tensioner sealing bolt, washer, spring and tensioner shaft.(See the diagramp6-4-4)
Remove the valve inspection hole caps.

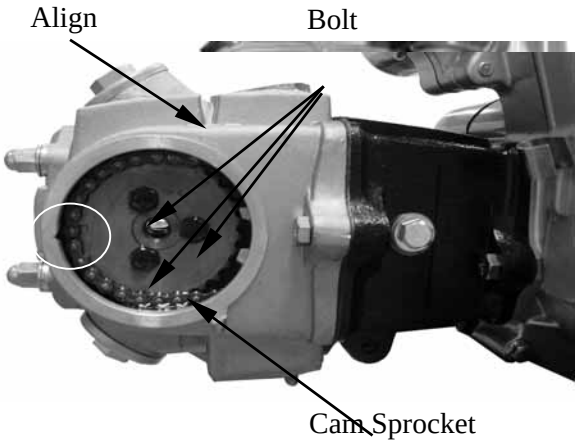


Turn the crankshaft counterclockwise until the “o” mark on the cam sprocket aligns with the index mark on the cylinder head.

Make sure there slight clearances between the valve stems and rocker arms by moving the rocker arms up and down.

If the rocker arms are tight, turn the crankshaft counterclockwise one full turn and realign the “o” mark with the index mark.

Remove the cam sprocket bolts and cam sprocket.



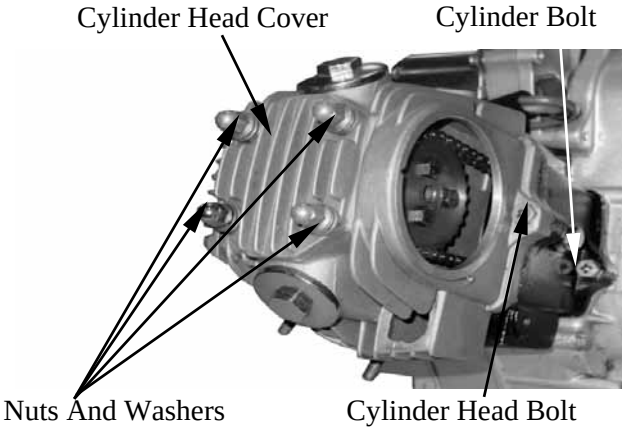
✳
- Suspend the cam chain with a wire or cord to prevent it from falling into the cylinder.

Loosen the cylinder bolts.

Remove the bolt attaching the cylinder head to the cylinder,

Remove the four nuts holding the cylinder head cover,

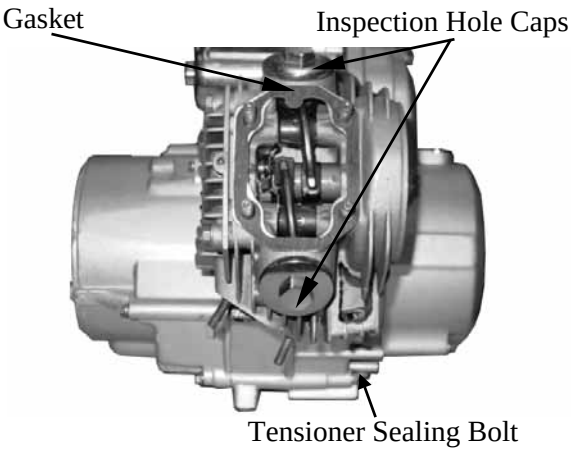
Remove the cylinder head cover.



Remove the cylinder head cover gasket.

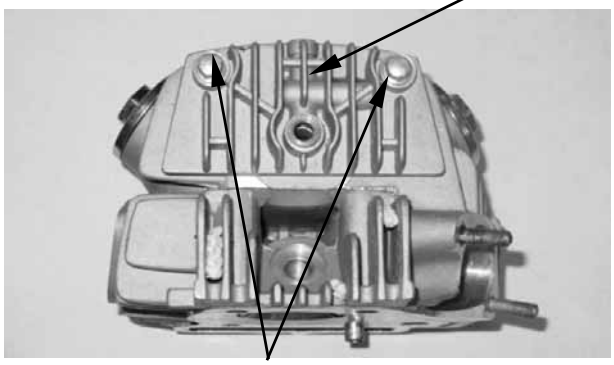
Remove the cylinder head.

Remove the cylinder head gasket and dowel pins.

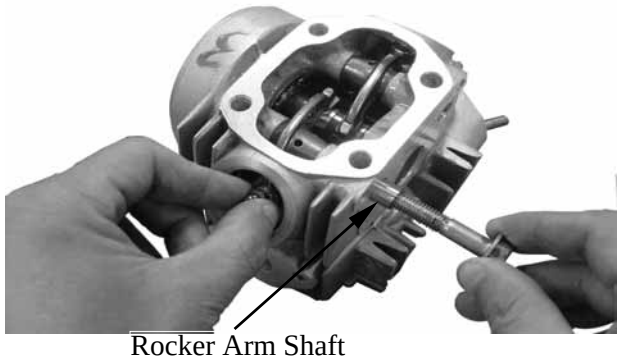


CYLINDER HEAD DISASSEMBLY

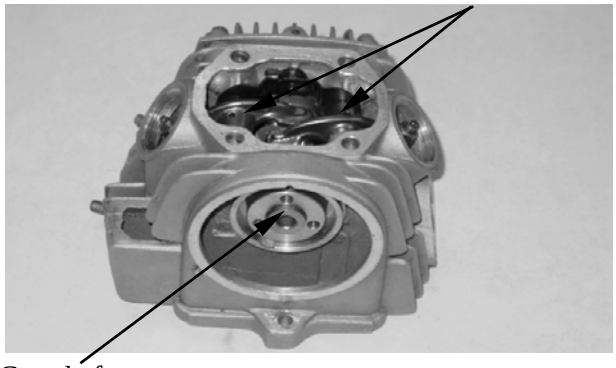
Remove the two bolts and the right side cover.



Screw a 8mm bolt into the rocker arm shaft, and pull it out of the cylinder head.

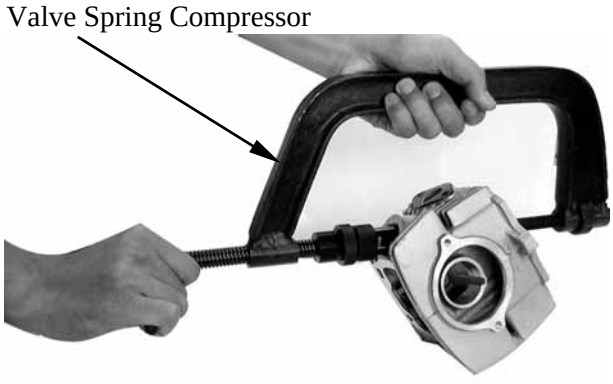


Remove the rocker arms and camshaft from the cylinder head.



While compressing the valve spring with a valve spring compressor, remove the valve cotters.

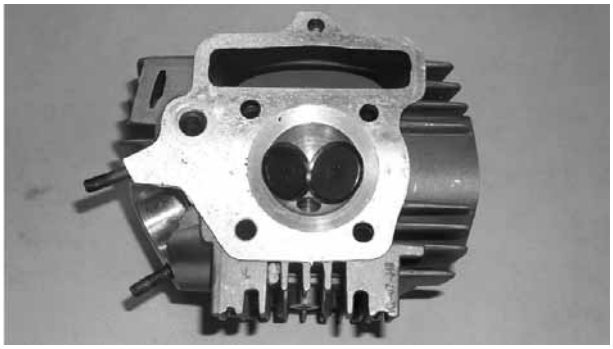
Loosen the valve spring compressor and remove the valve retainers, valve springs, spring seats, stem seals and valves.



✳
- To prevent loss of tension, do not compress the valve springs more than necessary to remove the valve spring cotters.
- Mark all parts to insure original assembly.

6. CYLINDER HEAD/VALVES

Remove carbon deposits from the combustion chamber.
Clean any gasket material from the cylinder head mating surface.



✳ Be careful not to damage the cylinder head mating surface and valve seat.

CYLINDER HEAD INSPECTION

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: 0.05mm repair or replace if over

CAMSHAFT INSPECTION

Check each camshaft bearing for play or damage. Replace the camshaft assembly with a new one if the bearings are noisy or have excessive play.

Camshaft Bearing

Check each cam lobe for wear or damage.
Measure the cam lobe height.

Service Limits:

IN: 25.8mm replace if below

EX:25.6mm replace if below

6. CYLINDER HEAD/VALVES

ROCKER ARM INSPECTION

Measure the I.D. of each valve rocker arm.

Service Limits: IN: 10. mm replace if over
EX: 10. mm replace if over

ROCKER ARM SHAFT INSPECTION

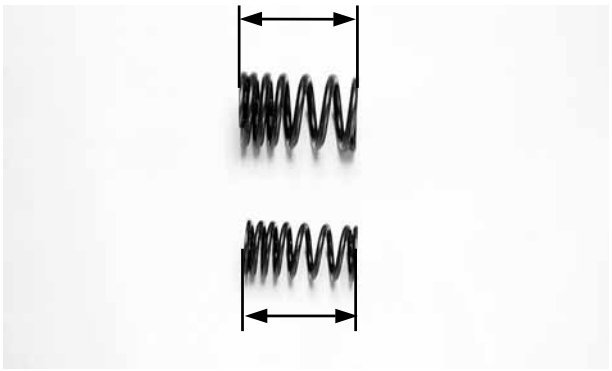
Measure each rocker arm shaft O.D.

Service Limits: IN: 9.78mm replace if below
EX: 9.88mm replace if below

VALVE SPRING INSPECTION

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

Service Limits:
Inner (IN, EX) : 32.41mm replace if below
Outer (IN, EX): 35.25mm replace if below



VALVE /VALVE GUIDE INSPECTION

Inspect each valve for bending, burning, scratches or abnormal stem wear.
Check valve movement in the guide.

Measure each valve stem O.D.

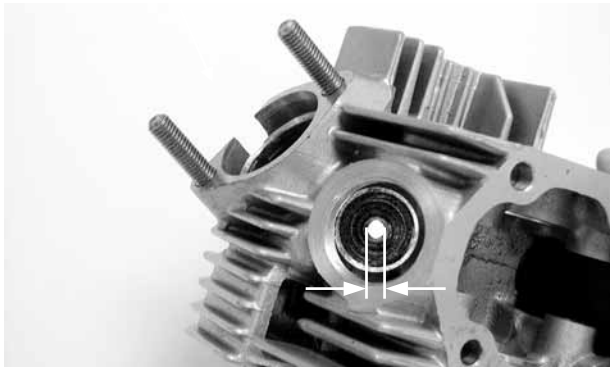
Service Limits:
IN: 4.90mm replace if below
EX: 4.90mm replace if below

Measure each valve guide I.D.

Service Limits: IN: 5.00mm replace if over
EX: 5.00mm replace if over

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

Service Limits: IN: 0.10mm replace if over
EX: 0.10mm replace if over



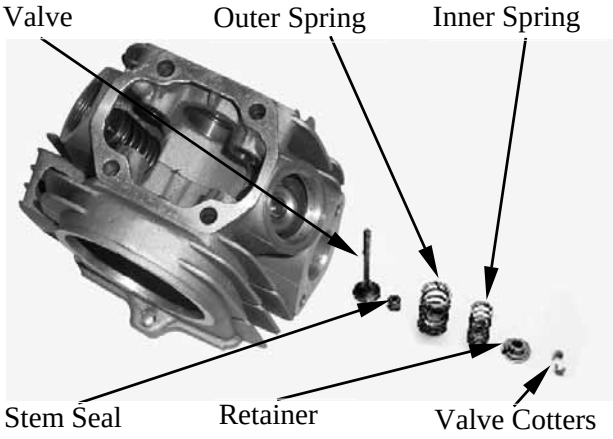
✻ If the stem-to-guide clearance exceeds the service limits, replace the guides as necessary. Reface the valve seats whenever the valve guides are replaced.

CYLINDER HEAD ASSEMBLY

✻ Install new valve stem seals when assembling.

Lubricate each valve stem with oil.

Insert the valves into the valve guides.



Install the valve spring seats and valve stem seals.

✻ Be sure to install new valve stem seals.

Apply engine oil to the inside of the valve stem seals and insert the valves into the valve guides.

Install the valve springs and 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

6. CYLINDER HEAD/VALVES

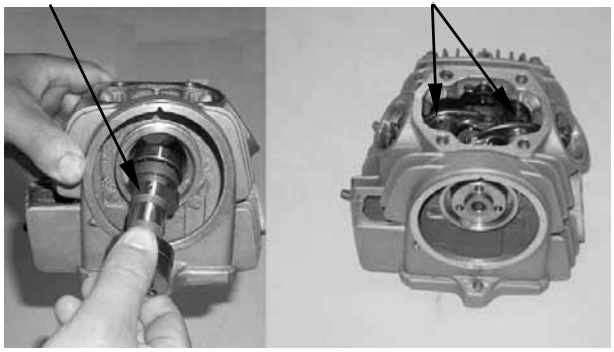
Tap the valve stems gently with a plastic hammer to firmly seat the cotters.

✳ Be careful not to damage the valves.

Coat the camshaft, camshaft bearings and automatic decompressor cam with clean engine oil.

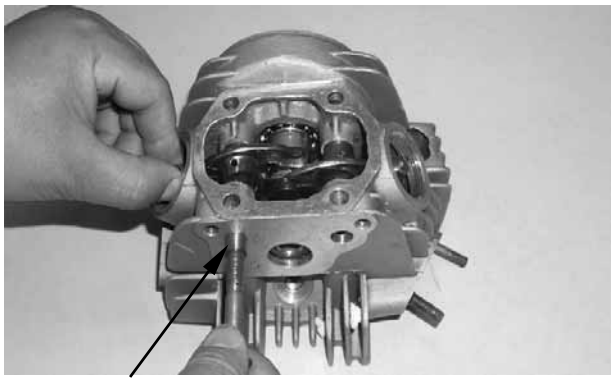
Install the camshaft into the cylinder head with the cam lobes facing the piston.

Install the rocker arms as shown.



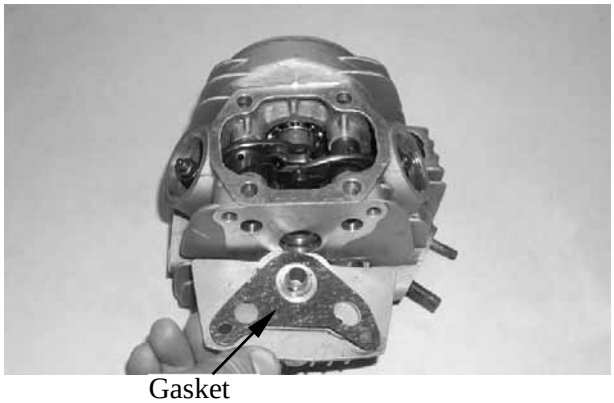
Coat the rocker arm shafts with clean engine oil.

Install the rocker arm shafts by screwing an 8 mm bolt into the thread end as shown.



Install a new Gasket on the right side cover.

Install the right side cover.

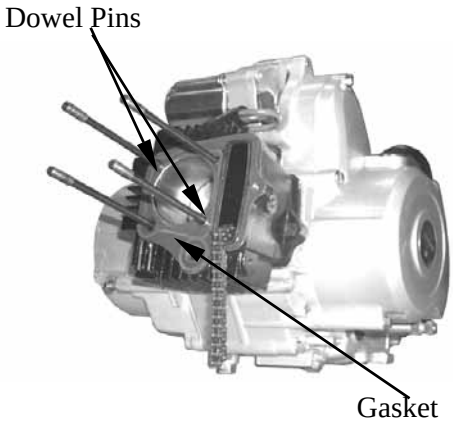


CYLINDER HEAD INSTALLATION

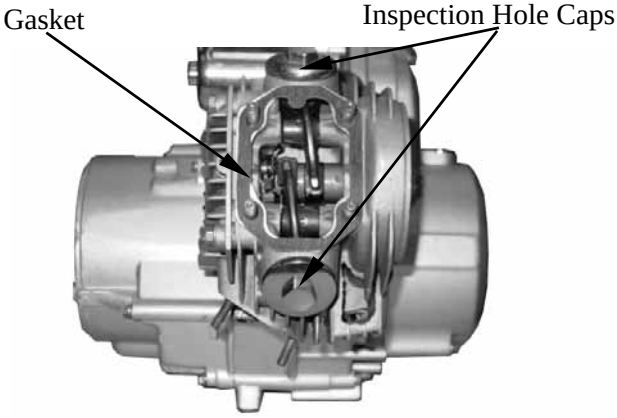
Clean the cylinder head gasket surface of any gasket material.

✳ Be careful not to enter dust and dirt into the cylinder.

Install the dowel pins and a new cylinder head gasket.



Install the cylinder head.
Install the new cylinder head cover gasket.



Install the cylinder head cover with its arrow mark facing the inlet side.

Install one copper washer and three washers.

Install the four cylinder head cover cap nuts, cylinder head bolt and cylinder bolt.

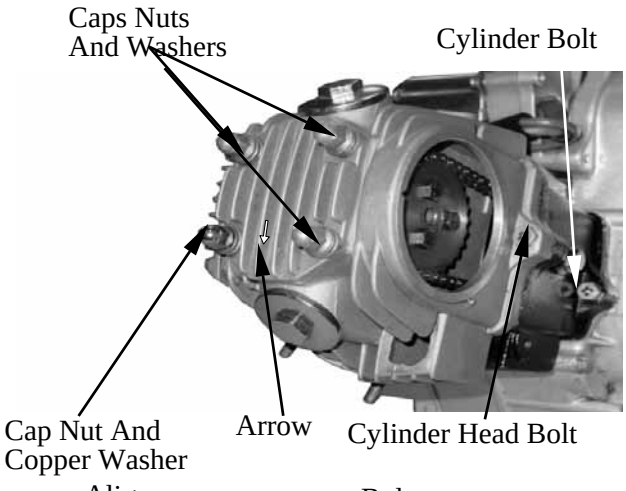
Tighten the four cap nuts in a crisscross pattern in 2-3 steps first, then tighten the cylinder head bolt and cylinder bolt.

TORQUE

Cylinder head cover cap nut: 1.2～1.6kg-m

Cylinder head bolt: 0.6～0.9kg-m

Cylinder bolt: 0.6～0.9kg-m

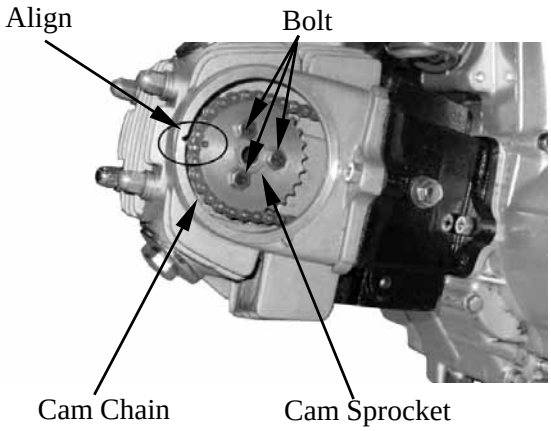


Rotate the flywheel counterclockwise to align the “T” mark on the cylinder head.

Install the cam chain over the cam sprocket, and install the cam sprocket on the camshaft.

Install and tighten the cam sprocket bolts.

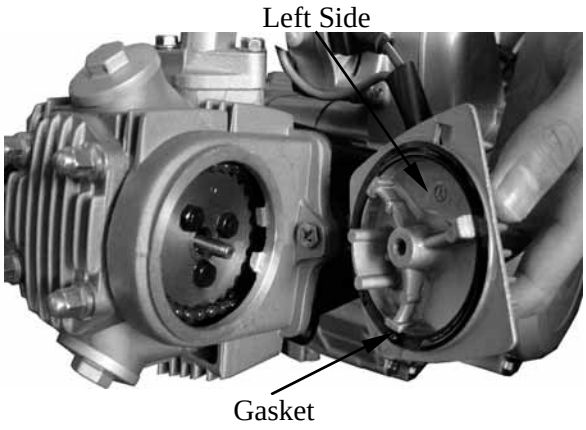
TORQUE: 0.7～1.1 kg-m



Install the left side cover Gasket on the left side cover.

Install the left side cover.

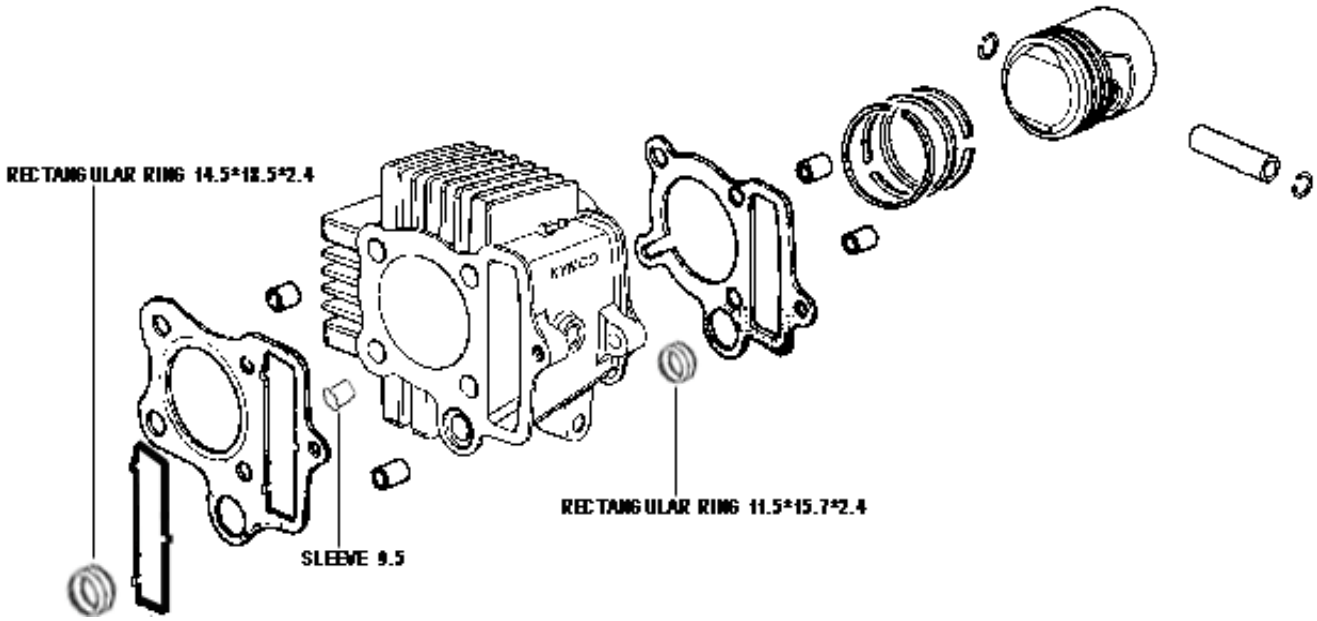
Adjust the valve clearance.



CYLINDER/PISTON

7

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

Item			Standard Limit (mm)	Service Limit (mm)
Cylinder	I.D.		—	52.4
	Warpage		—	0.05
	Cylindricity		—	0.05
	True roundness		—	0.05
Piston, piston ring	Ring-to-groove clearance	top	—	0.12
		Second	—	0.12
	Ring end gap	top	0.1～0.25	0.5
		Second	0.1～0.25	0.5
		Oil side rail	0.1～0.25	0.5
	Piston O.D.		55.58～55.95	51.6
	Piston O.D. measuring position		5mm from bottom of skirt	5mm from bottom of skirt
	Piston-to-piston pin clearance		0.005～0.014	0.1
	Piston pin hole I.D.		0.01～0.35	13.00
Piston pin O.D			12.994～13.000	12.944
Connecting rod small end I.D. bore			13.016～13.034	13.08

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

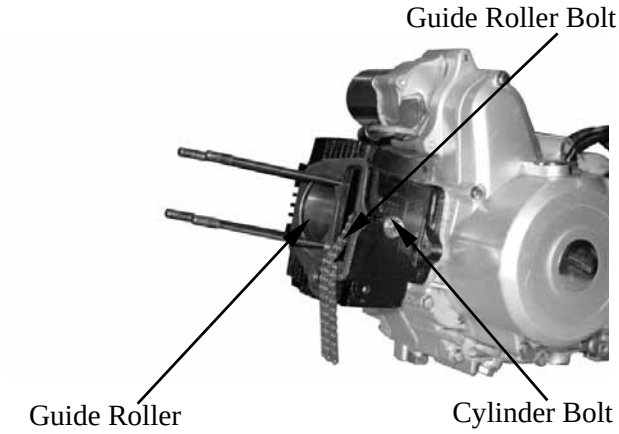
Abnormal noisy piston

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

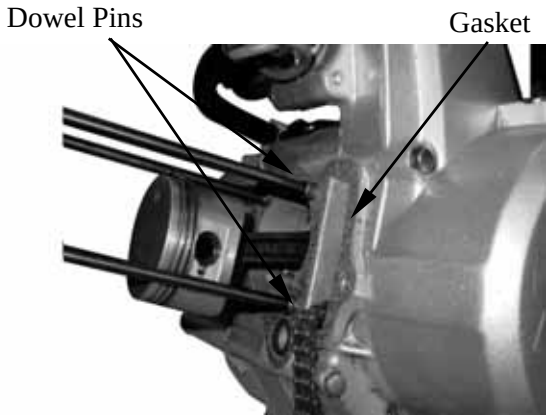
7. CYLINDER/PISTON

CYLINDER REMOVAL

Remove the cylinder head.
Remove the cam chain guide roller.
Remove the cylinder by removing the cylinder bolt.
Remove all gasket material from the cylinder surface.



Remove the gasket and dowel pins.



CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D. at three levels of top, middle and bottom at 90° to the piston pin (in both X and Y directions).

Service Limit: 52.4mm repair or replace if over

52.4mm repair or replace if below

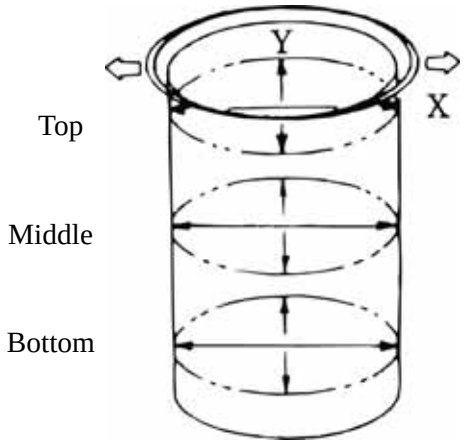
Measure the cylinder-to-piston clearance.

Service Limit: 0.35mm repair or replace if over

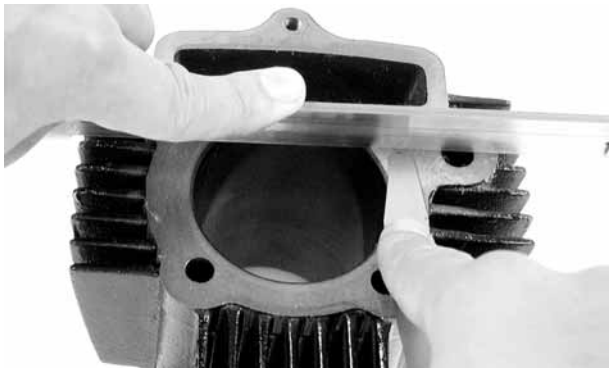
The true roundness is the difference between the values measured in X and Y directions.
The cylindricity (difference between the values measured at the three levels) is subject to the maximum value calculated.

Service Limits:

True Roundness: 0.05mm repair or replace if over
Cylindricity: 0.05mm repair or replace if over



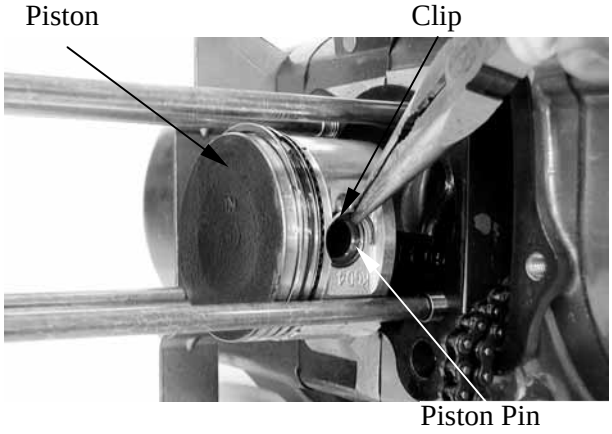
Inspect the top of the cylinder for warpage.
Service Limit: 0.05mm repair or replace if over



PISTON REMOVAL

Remove the piston pin clip.
Press the piston pin out of the piston.

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



Install the piston rings onto the piston and measure the piston ring-to-groove clearance.
Service Limits:

Top: 0.12mm replace if over
2nd: 0.12mm replace if over

Remove the piston rings and insert each piston ring into the cylinder bottom.

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

Measure the piston ring end gap.
Service Limit: 0.5mm replace if over

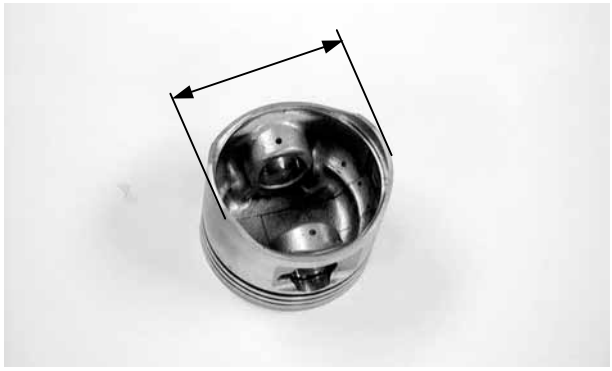
7. CYLINDER/PISTON

Measure the piston O.D.

* • Take measurement at 5mm from the bottom and 90° to the piston pin hole.

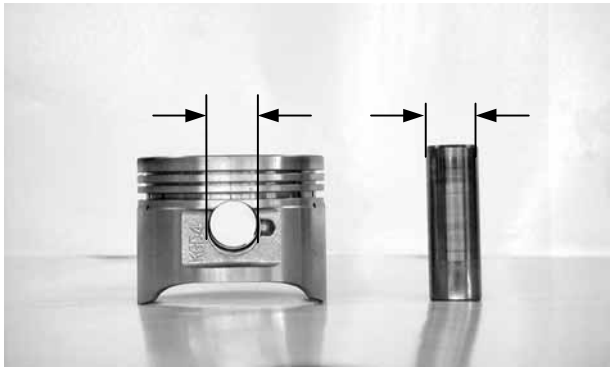
Service Limit: 51.6mm replace if below

Measure the piston-to-piston pin clearance.
Service Limit: 0.10mm replace if over

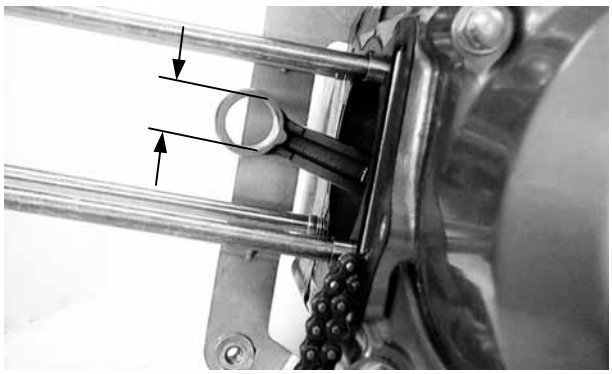


Measure the piston pin hole I.D.
Service Limit: 13.06mm replace if over

Measure the piston pin O.D.
Service Limit: 12.944mm replace if below



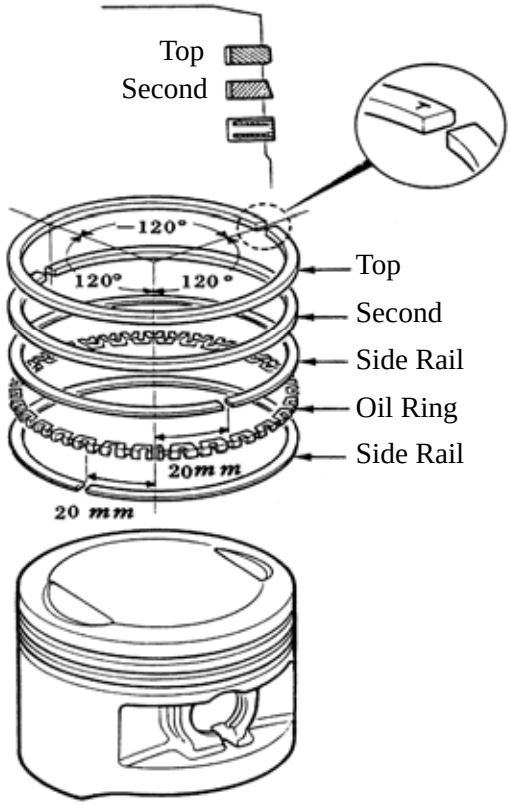
Measure the connecting rod small end I.D.
Service Limit: 13.016mm replace if over



PISTON RING INSTALLATION

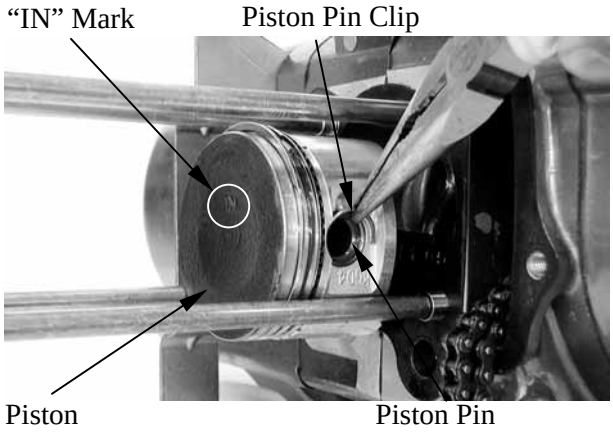
Install the piston rings onto the piston.
Apply engine oil to each piston ring.

* • Be careful not to damage the piston and piston rings during assembly.
  • All rings should be installed with the markings facing up.
  • After installing the rings, they should rotate freely without sticking.
  • Stagger the ring end gaps as the figure shown.



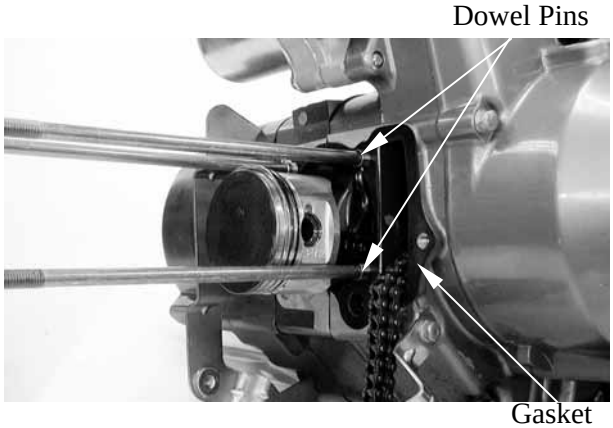
Install the piston, piston pin and a new piston pin clip.

* • Position the piston "IN" mark on the intake valve side.
  • Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.



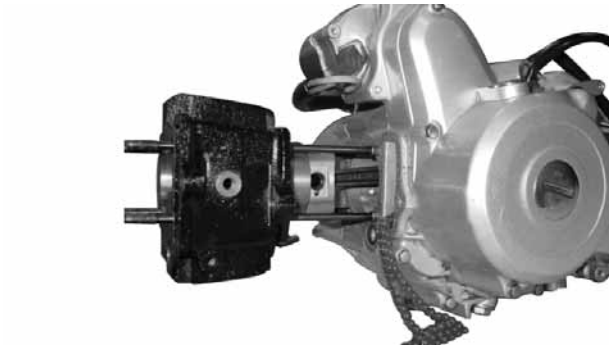
CYLINDER INSTALLATION

Install the dowel pins and a new cylinder gasket on the crankcase.



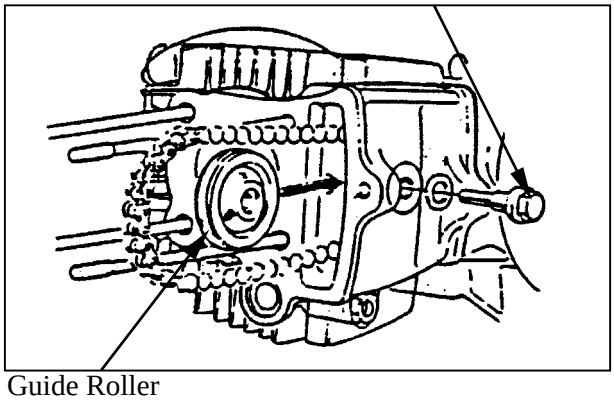
7. CYLINDER/PISTON

Coat the cylinder bore, piston and piston rings with clean engine oil.
Carefully lower the cylinder over the piston by compressing the piston rings.

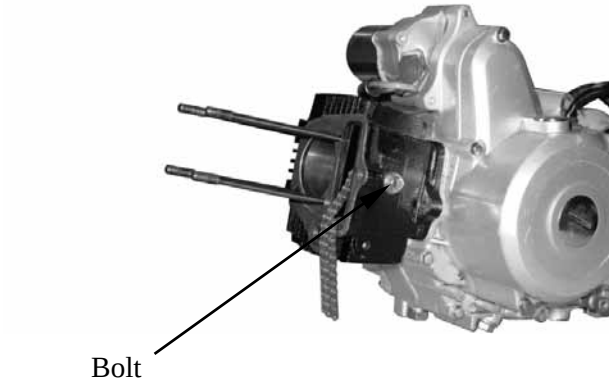


* • Be careful not to damage or break the piston rings.
  • The piston ring end gaps should not be parallel with or at 90° to the piston pin.

Install the cam chain guide roller and tighten the roller bolt.

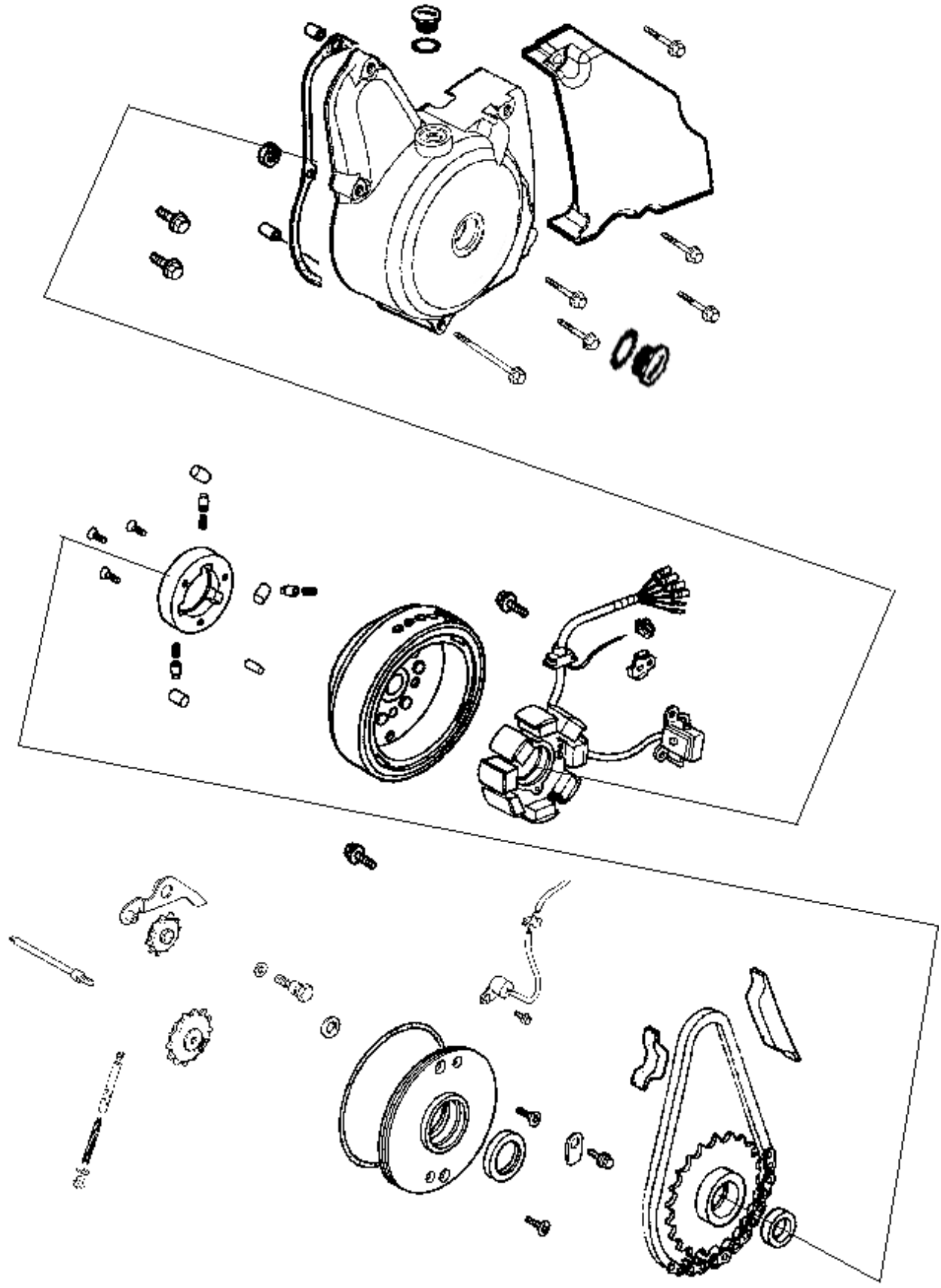


Temporarily install the cylinder bolts.
Install the cylinder head (page 6-10).
Tighten the cylinder bolt to the specified torque.
TORQUE: 0.6～0.9kg-m



ALTERNATOR/STARTER CLUTCH/ CAM CHAIN TENSIONER

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The starter motor, generator, left crankcase and starter clutch can be serviced in the frame.
- Do not install the starter clutch forcedly.
- Install the generator by aligning the groove in the flywheel with the key on the crankshaft.
- Install the starter motor reduction gear shaft by aligning the shaft pin with the shaft seat groove.

SPECIFICATIONS

Item	Standard (mm)	Service Limit (mm)
Push rod O.D.	11.985～12.00	11.945
Driven sprocket O.D.	37.87～37.90	37.60
Driven sprocket I.D.	19.01～19.02	19.041
Tensioner spring free length	110～107	90

TORQUE VALUES

Flywheel lock nut 3.2～4.0kg-m

SPECIAL TOOLS

Flywheel holder E021
Flywheel puller E003

TROUBLESHOOTING

Hard starting and poor performance at high speed

- Improperly tightened flywheel lock bolt

Starter clutch slips

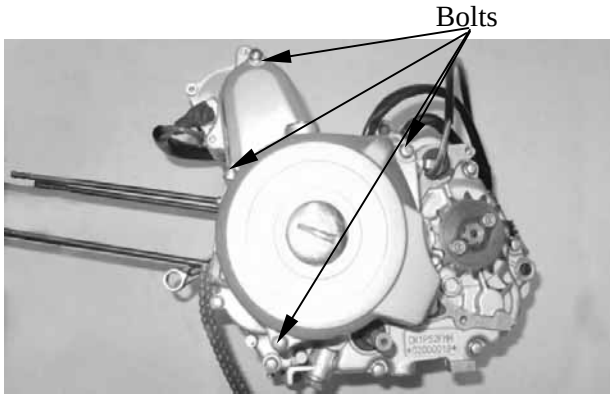
- Worn starter clutch roller
- Faulty starter clutch roller or spring
- Worn starter gear shaft O.D.

Starting noise

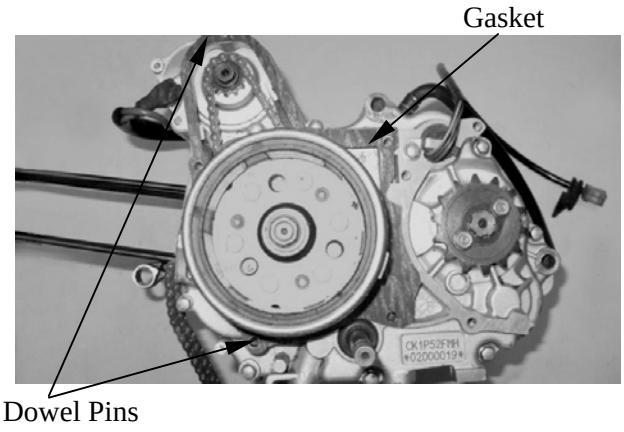
- Worn reduction gear
- Worn starter gear
- Worn starter clutch roller
- Faulty reduction gear shaft bearing

ALTERNATOR REMOVAL

Remove the four bolts.
Remove the left crankcase cover.



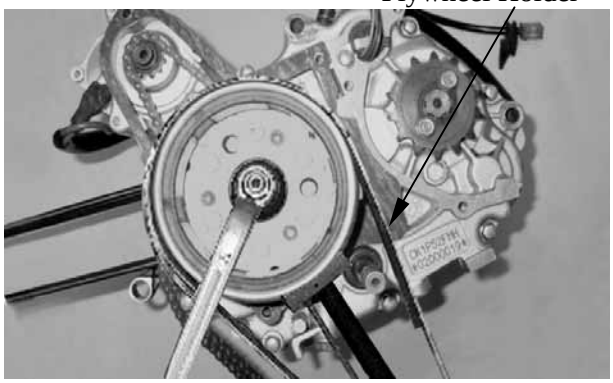
Remove the gasket and dowel pins.



Remove the flywheel nut and washer while holding the flywheel with a flywheel holder.

Special

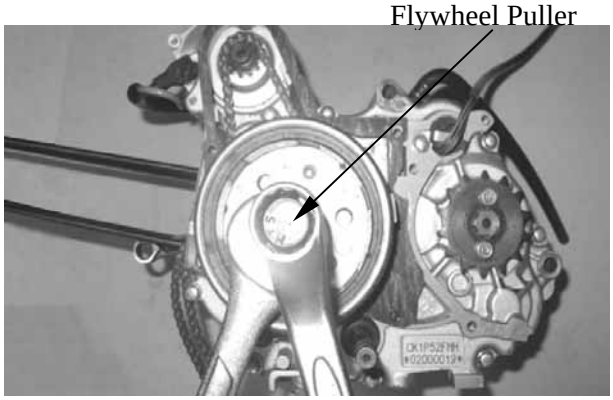
Flywheel holder



Remove the flywheel using a flywheel puller as shown.

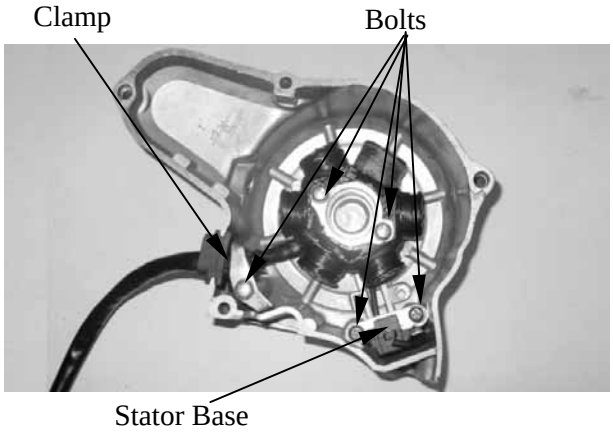
Special

Flywheel puller



Remove the clamp.
Remove the five bolts and alternator stator base from the crankcase cover.

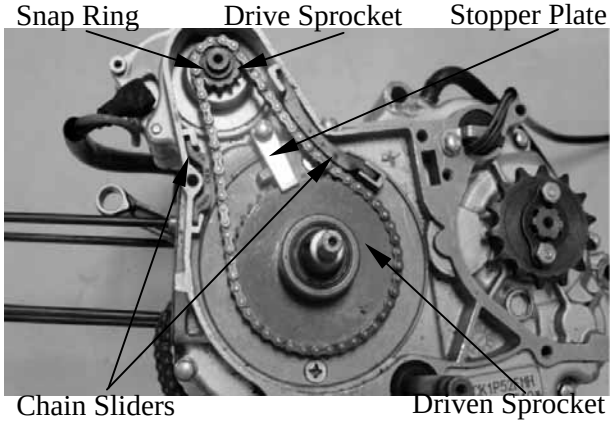
✳
- Do not disassemble the stator and pulse generator coils.



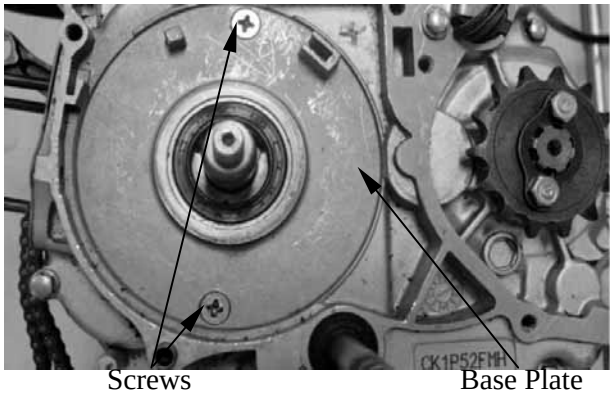
STARTER CLUTCH REMOVAL

REMOVAL

Drain the engine oil (page 3-3)
Remove the alternator (page 8-3)
Remove the stopper plate and chain sliders.
Remove the snap ring.
Remove the chain, starter drive sprocket and driven sprocket as an assembly.

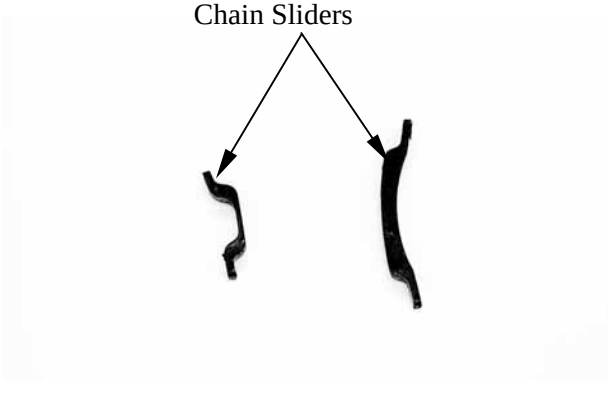


Remove the two screws, base plate and three O-rings.



INSPECTION

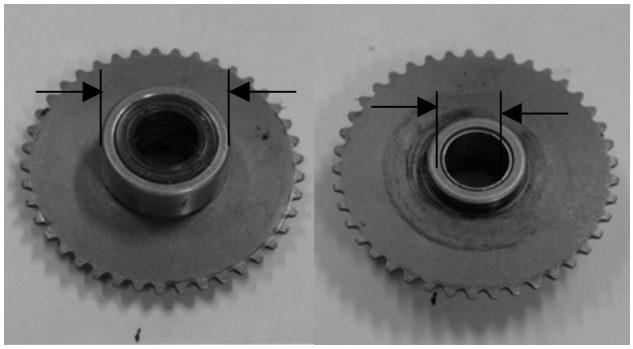
Inspect the chain sliders for wear or damage.
Replace them if necessary.



INSPECTION

Measure the driven sprocket O.D.
Service Limit:37.83mm replace if over

Measure the driven sprocket I.D.
Service Limit:19.06mm replace if over

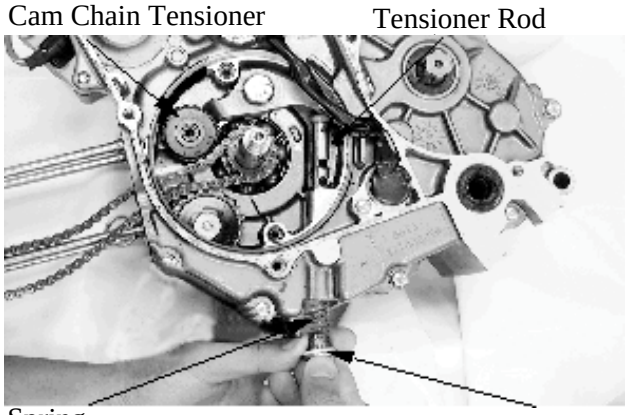


Check the one-way clutch rollers, spring caps and springs for wear or damage.

CAM CHAIN TENSIONER

REMOVAL

Drain the engine oil (page 3-3)
Remove the alternator (page 8-3)
Remove the starter clutch (page 8-4)
Remove the tensioner sealing bolt, washer, spring and tensioner rod.
Remove the pivot bolt and cam chain tensioner.

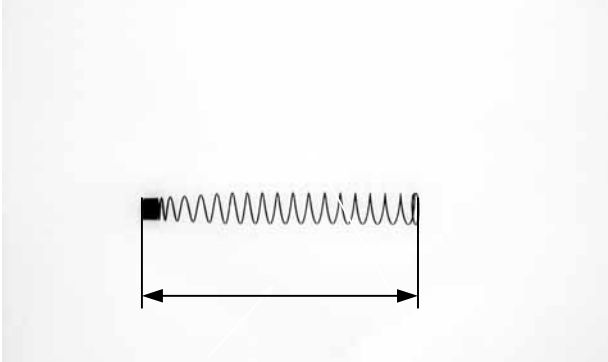


TENSIONER SPRING AND PUSH ROD

INSPECTION

Measure the tensioner spring free length.

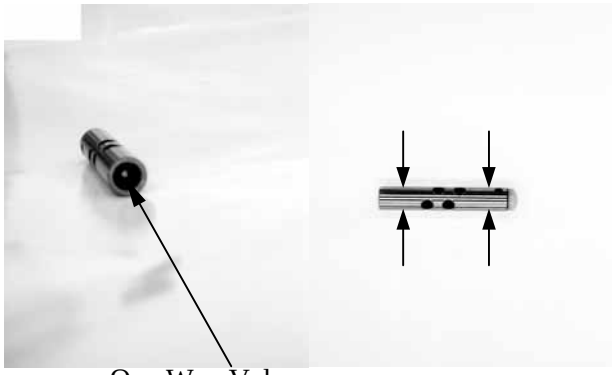
Service limit: 90mm



Check the push rod valve for clogged

Check the push rod for wear or scraches.

Measure the push rod O.D.
Service limit: 11.945 mm



INSTALLATION

Install the cam chain tensioner and secure it with the pivot bolt.

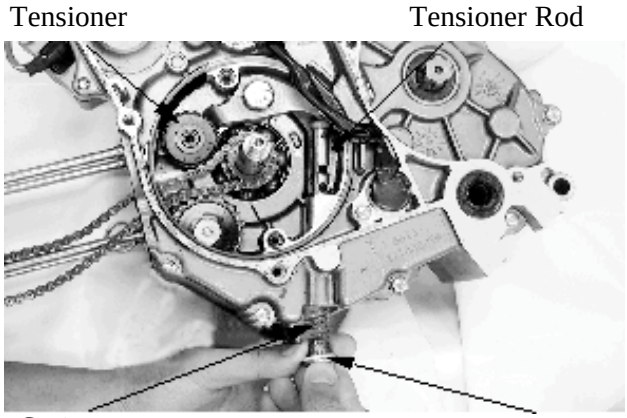
Install the tensioner rod, spring, sealing washer bolt.

Tighten the tensioner sealing bolt.

TORUQE: 1.5～2.5 kg-m

✳ Install the tensioner spring with its small coil end up.

Install the starter clutch and alternator (page 8-6)

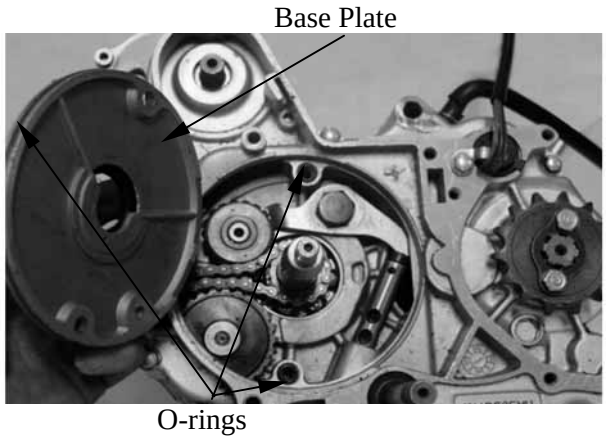


STARTER CLUTCH INSTALLATION

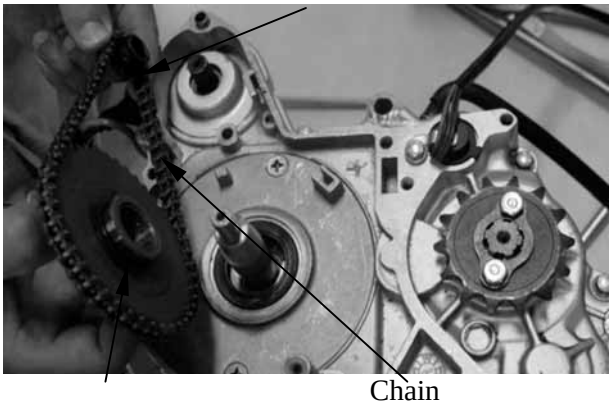
Install the new O-rings onto the left crankcase and base plate,

Install the base plate, being careful not to damage the O-ring.

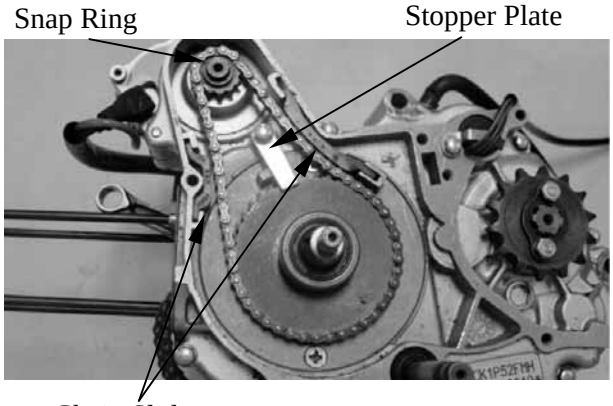
Tighten the base plate screws.



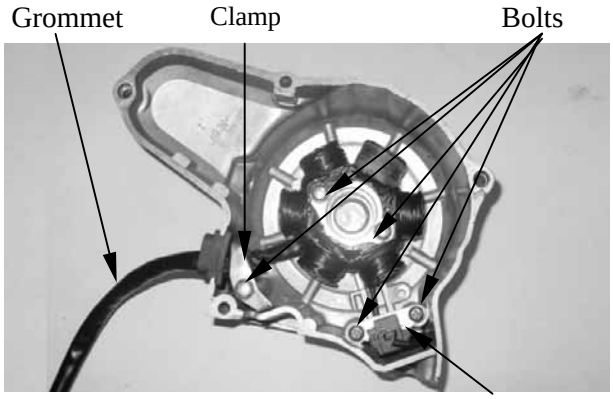
Install the chain, drive sprocket and driven sprocket as an assembly.



Install the following components:
-snap ring.
-stopper plate.
-chain sliders.



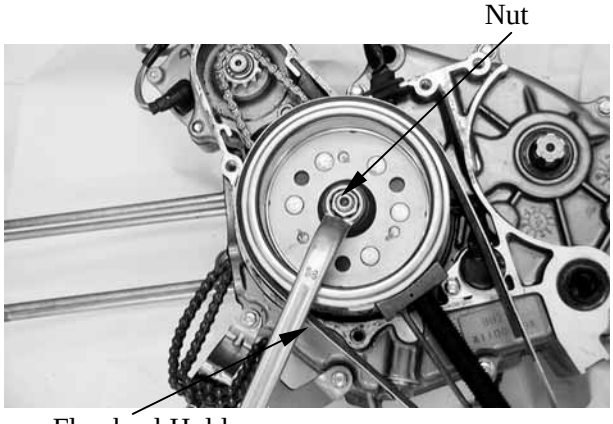
Install the alternator stator base and secure it with the two bolts.
Install the grommet into the grove of the left crankcase cover.
Install the wire clamp.



Install the woodruff key on the crankshaft,
Wipe all oil lff the inside of the flywheel amd crankshaft, and install the flywheel aligning its groove with the woodruff key.

✳ Install the flywheel, turning it counterclockwise.

Install and tighten the flywheel nut while holding the flywheel with a flywheel holder.
TORQUE: 3.2～4.0 kg-m

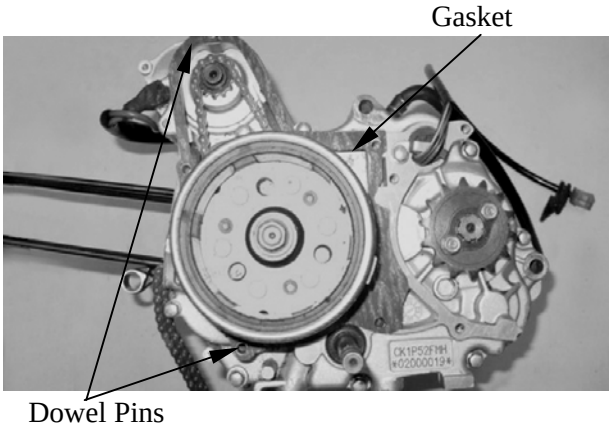


Special

Flywheel Holder

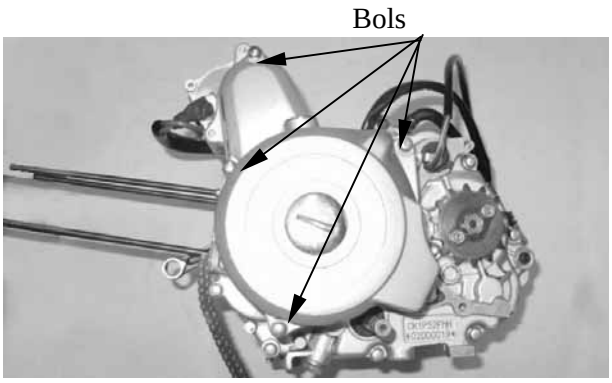
Drive Sprocket

Install the dowel pins and a new gasket.

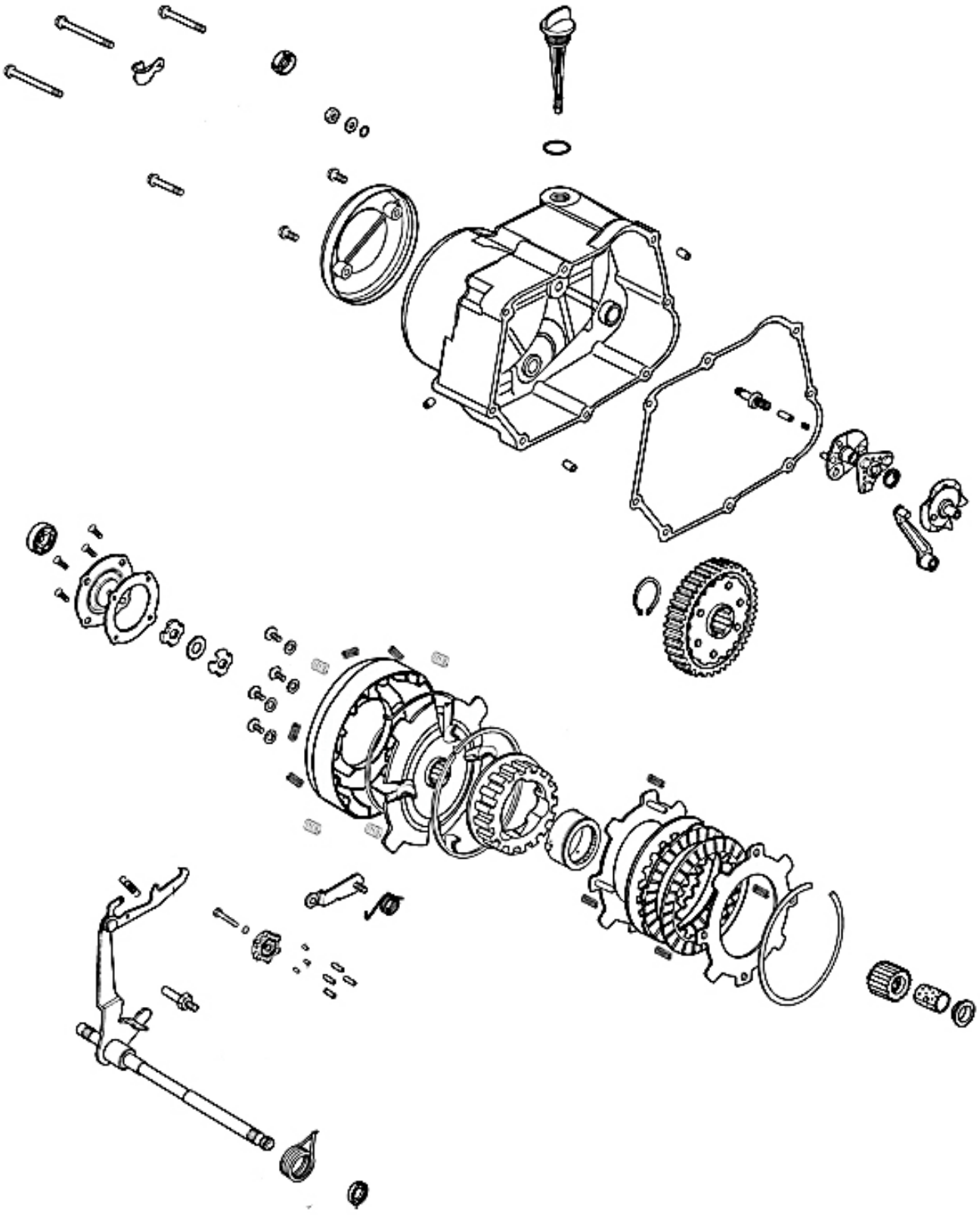


Install the left crankcase cover and tighten the four bolts.

Torque: 0.8～1.2kg-m



CLUTCH/GEAR SHIFT MECHANISM



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The clutch and gear shift mechanism can be serviced in the frame.
- Install the clutch plates in the same chamfer direction.
- Install the thrust washer with the chamfer facing up and the flat facing down.

SPECIFICATIONS

mm

ITEM		STANDARD	SERVICE LIMIT
Centrifugal clutch	Clutch outer. I.D.	110mm	110.4mm
	Driven gear outer.O.D	46.0mm	45.80mm
	Gear primary drive.O.D.	34.25mm	34.15
	Center clutch. O.D.	68.00mm	67.7mm
	Guide clutch center.O.D	21.00	20.97~20.93
	Spring clutch damper	11.3mm	
	Spring clutch	17.5mm	
	Spring clutch free	21mm	
	Disc A clutch friction thickness	2.7~2.73mm	2.5~2.53
	Disc B clutch friction thickness	3.7~3.73mm	3.5~3.53mm

TORQUE VALUES

Centrifugal clutch lock nut	3.8～4.5kg-m
Manual clutch lock nut	3.8～4.5kg-m
Drum stopper bolt	0.8～1.2kg-m

SPECIAL TOOLS

Clutch holder	E017
Lock nut wrench 18mm	E010
Gear holder	
Lock nut wrench 20mm	E009
Flywheel holder	E021

TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the clutch.

Clutch slips when accelerating
- Faulty clutch lifter mechanism
- Discs worn
- Weak spring
- Incorrect clutch adjustment

Clutch will not disengage
- Faulty clutch lifter
- Incorrect clutch adjustment
- Plates warped

ATC creeps with engine idling
- Faulty centrifugal clutch

Clutch operation feels rough
- Rough manual clutch outer slots
- Worn or damaged centrifugal clutch shoes or drum

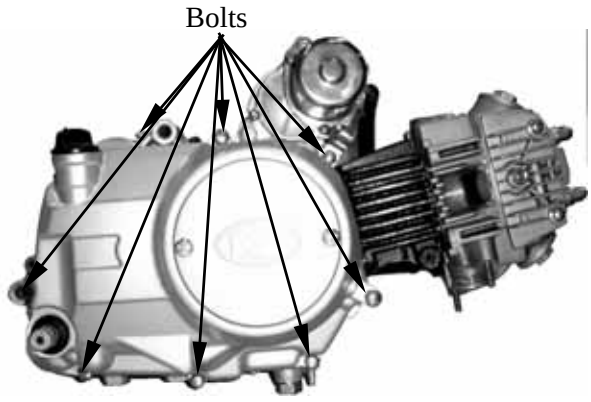
Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Binding gearshift spindle

Hard to shift
- Gearshift spindle damaged
- Stopper plate and pin damaged
- Stopper plate bolt loosened
- Clutch adjustment incorrect

Transmission jumps out of gear
- Stopper arm damaged
- Stopper plate damaged
- Stopper plate bolt loosen

RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-3).
Remove the kickstarter pedal.
Remove the right crankcase cover attaching bolts and right crankcase cover.
Remove the dowel pins and gasket.

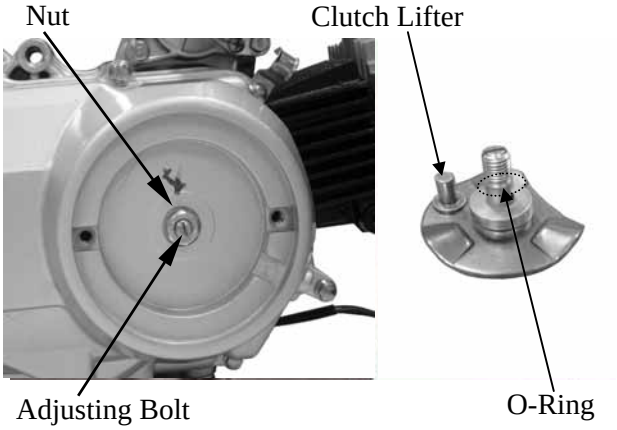


CLUTCH LIFTER REMOVAL/INSPECTION

Remove the lock nut, and O-ring.

Remove the clutch adjusting bolt and clutch lifter.

Check the removed parts for wear or damage and replace them if necessary.

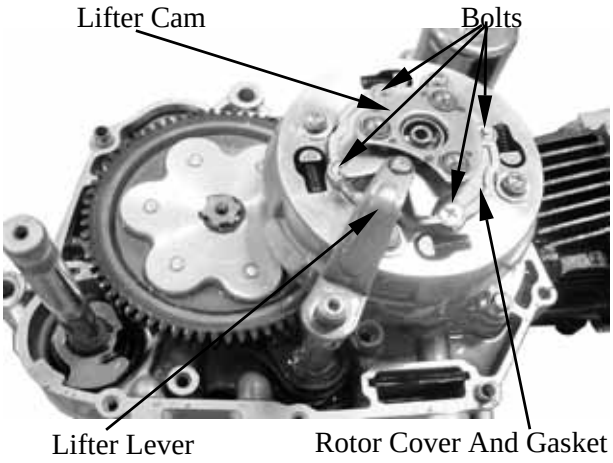


CENTRIFUGAL CLUTCH/MANUAL CLUTCH REMOVAL

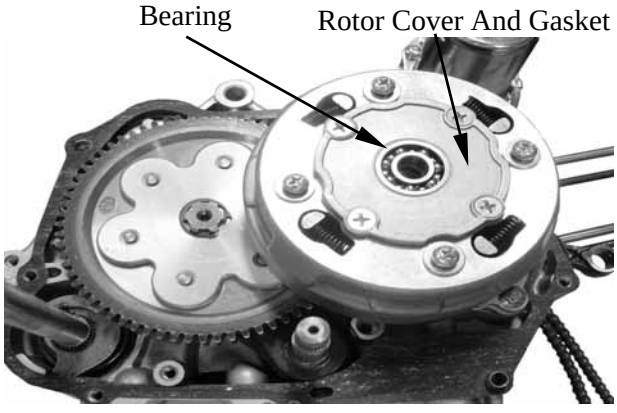
REMOVEAL

Remove the clutch lifter lever and clutch lifter cam.

Remove the four bolts, oil filter rotor cover and gasket.



Remove the clutch lifter bearing.

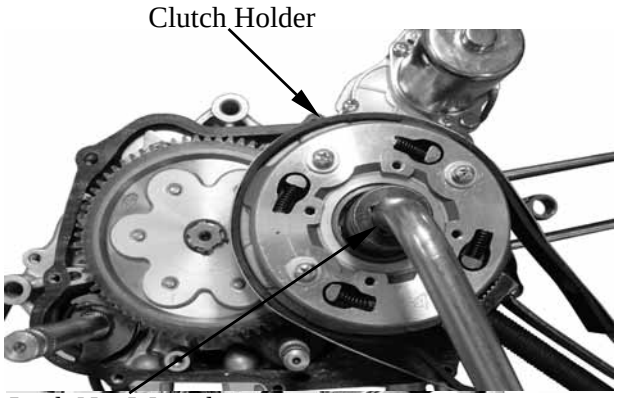


Install the clutch holder and secure it with the bolts.

Remove the lock nut and plane washer using a lock nut wrench.
Remove the clutch.

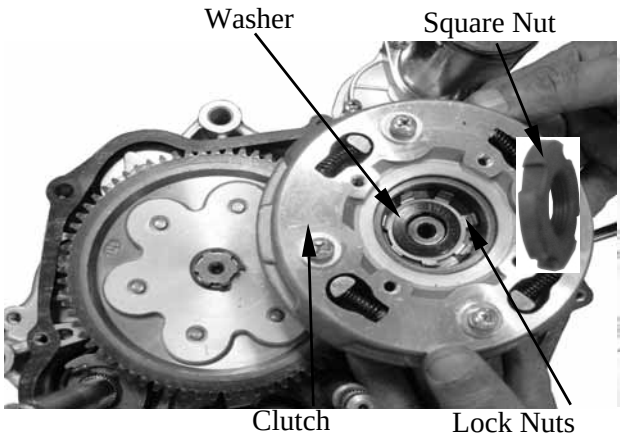
Special

Clutch holder
Lock nut wrench

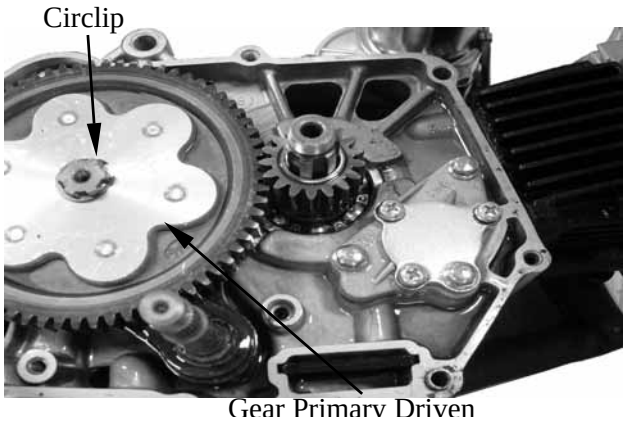


Remove the clutch square nut.

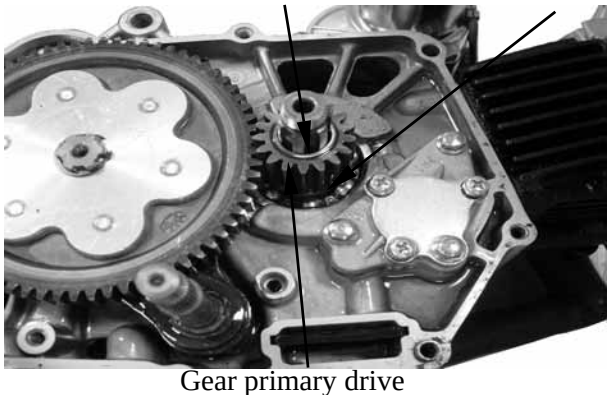
Remove the washer and clutch square nut lock nuts.
Remove the clutch.



Remove the clutch circlip.
Remove the gear primarv driven.

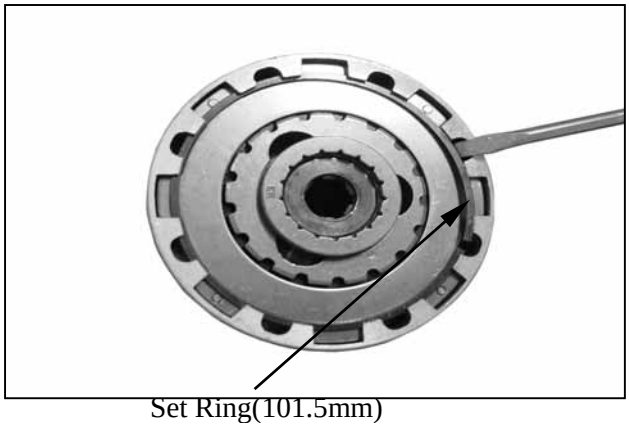


Remove the follows:
- Gear primary drive.
-Guide clutch center.
- Washer

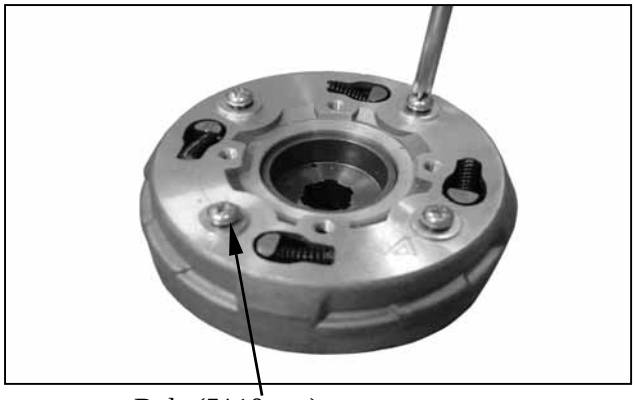


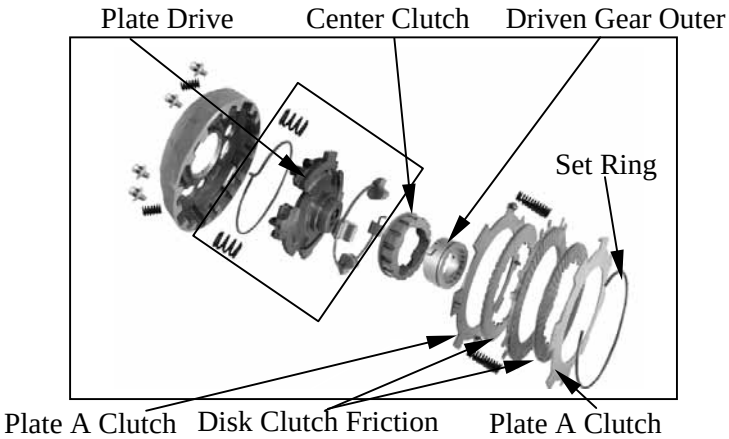
MANUAL CLUTCH DISASSEMBLY

Remove the set ring(101.5mm)

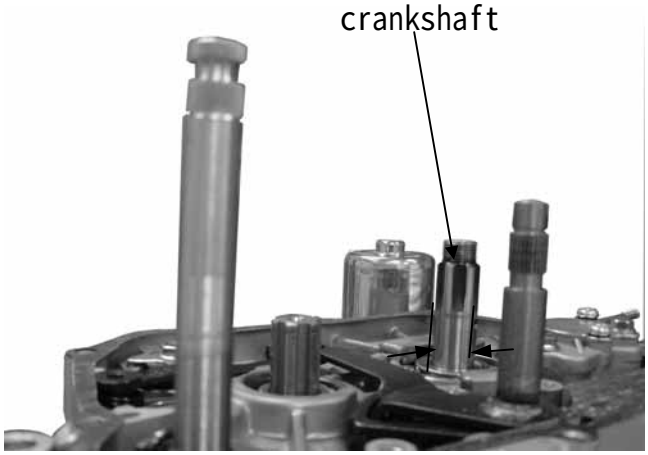


Remove the four bolts(5*10mm)





Measure the O.D. of the crankshaft at the primary drive gear.
SERVICE LIMIT: 17.00mm



INSPECTION CLUTCH GEAR O.D/I.D

Inspect the clutch outer groove for scratches caused by the friction disks.
Measure the clutch outer I.D.

Service Limit: 110mm

Measure the driven gear outer O.D.

Service Limits: 46mm

Measure the gear primary drive O.D.

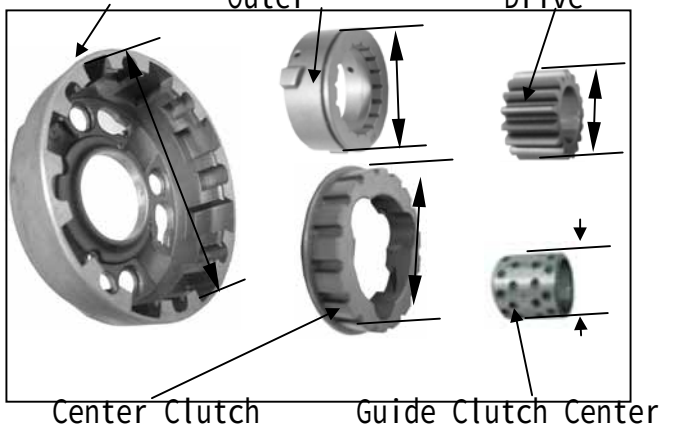
Service Limits:34.25 mm

Measure the center clutch O.D.

Service Limits: 68mm

Measure the center clutch O.D

Service Limits:21 mm



INSPECTION
CLUTCH TENSION SPRING

Measure each spring clutch damper.

Service Limit:11.3 mm

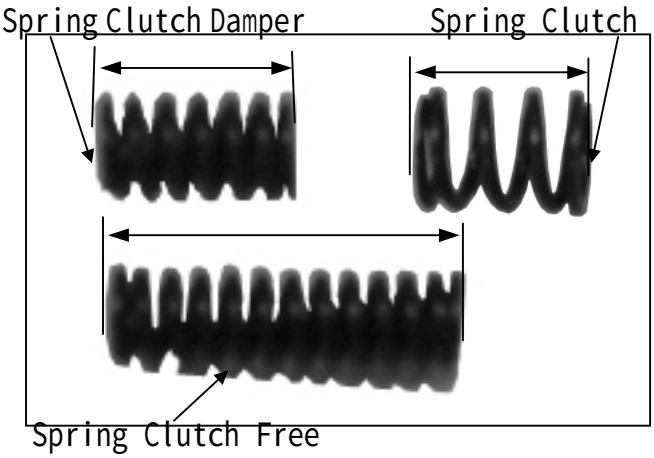
Measure each spring clutch.

Service Limit: 17.5mm

Measure each spring clutch free

Service Limit: 21mm

Replace the spring with a new one if it is shorter than the service limit.



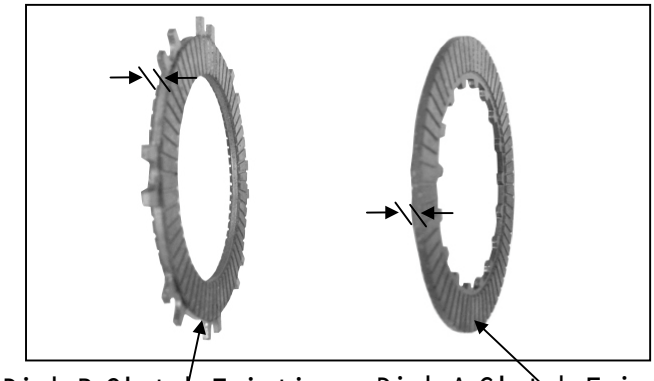
CLUTCH FRICTION DISK

Measure each disk B clutch friction thickness.

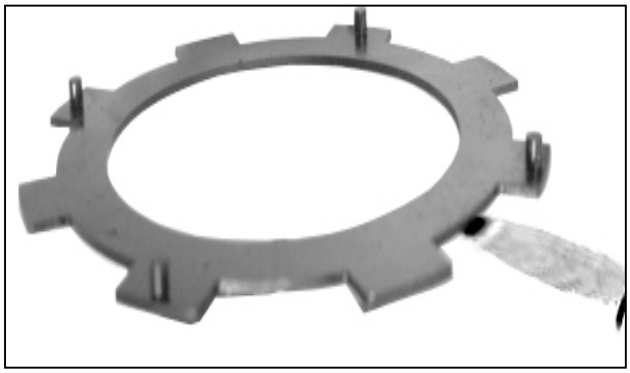
Service Limit:3.7 mm

Measure each disk A clutch friction thickness.

Service Limit:2.7 mm

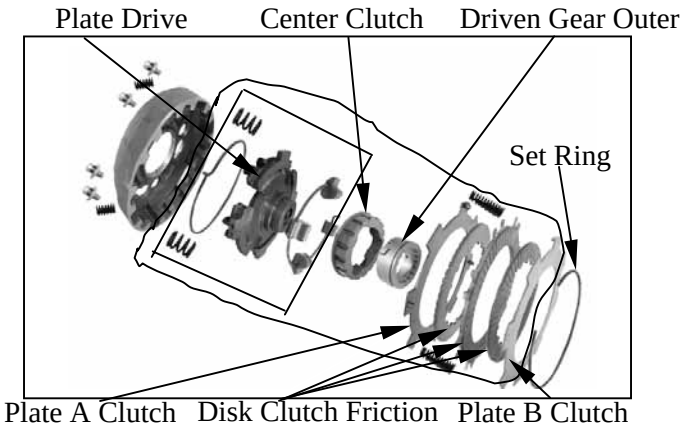


CLUTCH A PLATE/ CLUTCH A PLATE
Measure each clutch plate bending using a feeler gauge.
Service Limit: 0.20mm

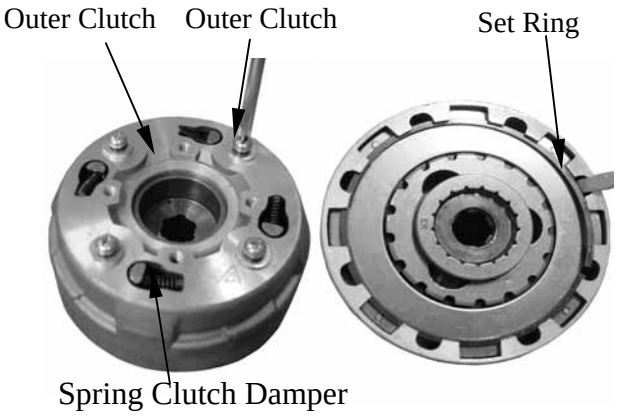


CENTRIFUGAL CLUTCH/MANUAL CLUTCH INSTALLATION

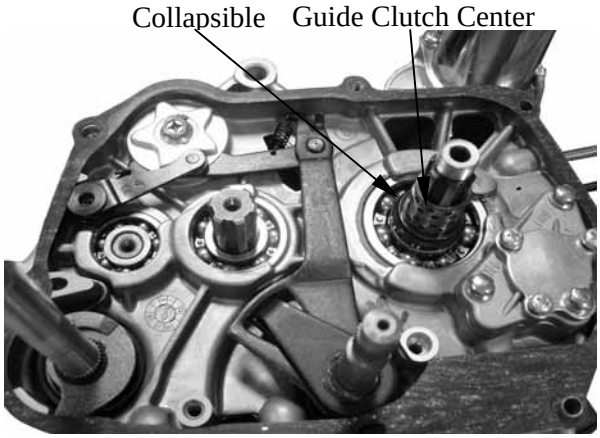
MANUAL CLUTCH ASSEMBLY
Coat the clutch discs and plates with clean engine oil.
Assemble the clutch plate drive, driven gear outer, center clutch, plate A clutch, disk clutch friction, plate B clutch and set ring.



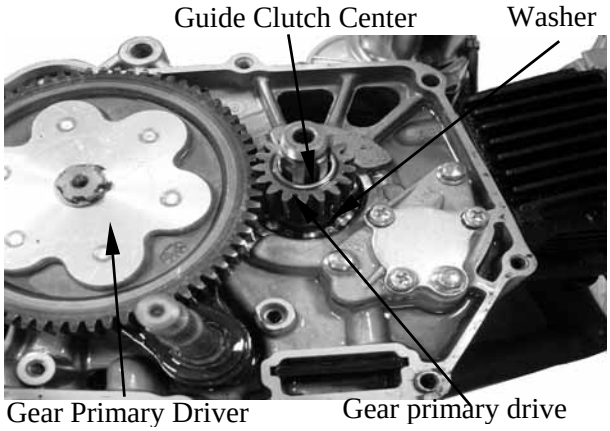
Install the clutch four bolts.
Install the four spring clutch damper
Install the clutch Set Ring.



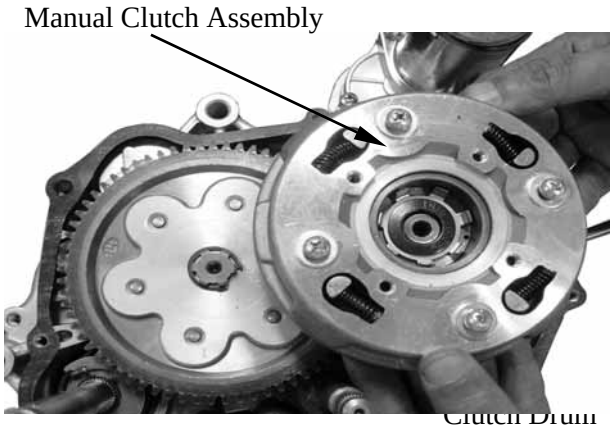
INSTALLATION
Install the collapsible.
Install the guide clutch center



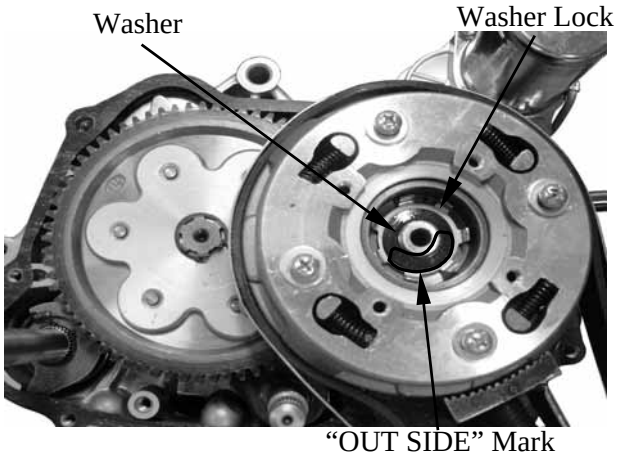
Install the clutch outer guide onto the main shaft.
Install the washer over the crankshaft.



Install the clutch drum and manual clutch assembly.



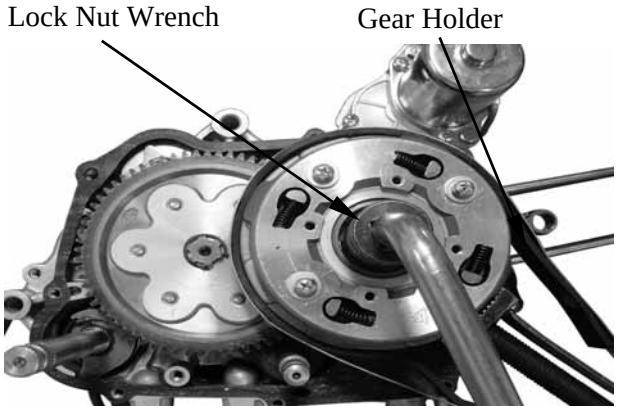
Install the washer with the “OUT SIDE” mark facing out.



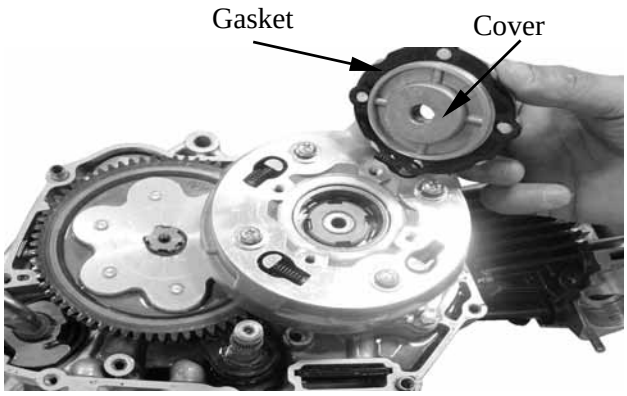
Install the plane washer and centrifugal clutch lock nut.
Install the clutch holder and secure it with two bolts.
Tighten the lock nut to the specified torque.
TORQUE: 3.8～4.5kg-m

Special

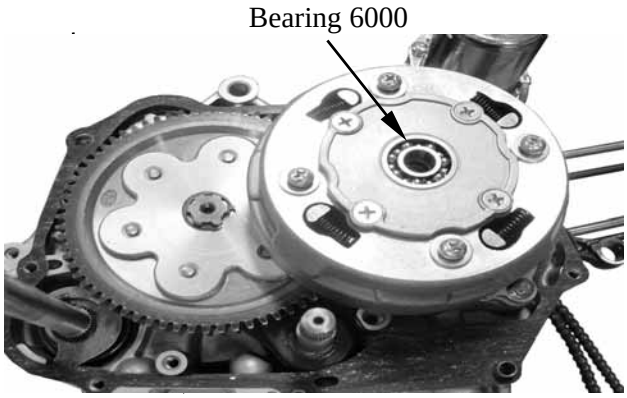
Clutch holder
Lock nut wrench



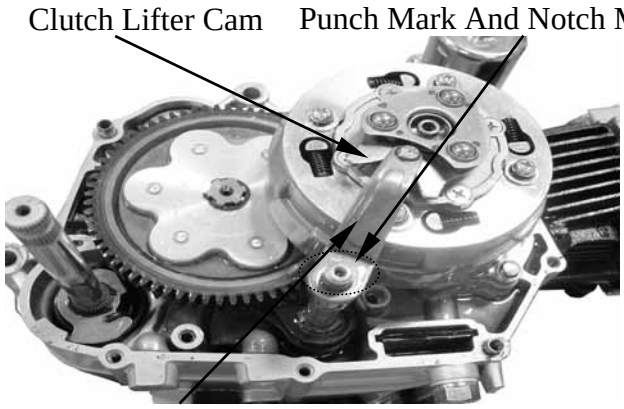
Install the oil filter rotor cover and a new gasket.
Secure the oil filter rotor with the three bolts.



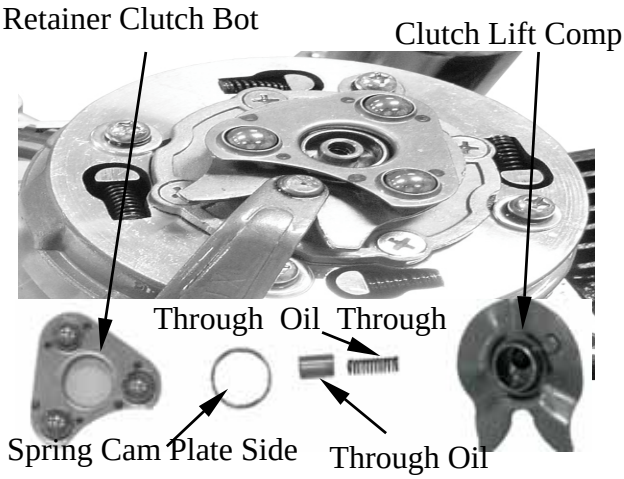
Install the clutch Bearing.



Install the clutch lifter bearing and clutch lifter Cam.(page9-10-4)
Install the clutch lifter lever onto the Gearshift spindle,aligning its punch mark with The notch mark on the spindle.
Install the right crankcase cover(page9-12).



Install the clutch lift comp.
Install the through oil through and through oil.
Install the spring cam plate sid.e
Install the Retainer Clutch Bot.



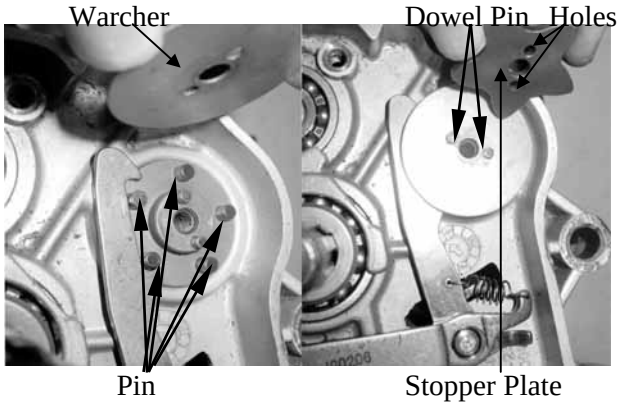
GEAR SHIFT MECHANISM

Remove the cenrifugal clutch and manual clutch (page 9-3)
Remove the warcher.
Remove the gear shift spindle and washer.
Remove the gear shift pedal.

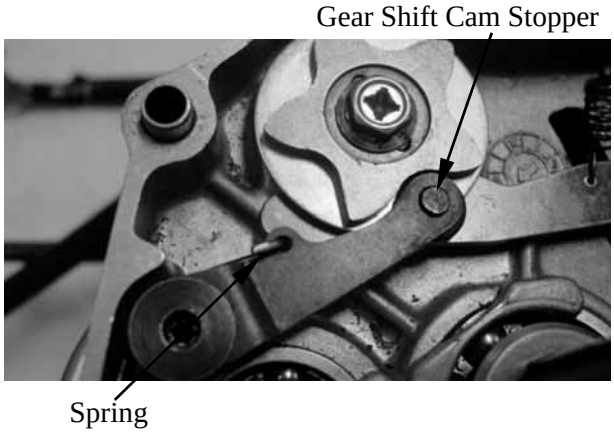
Remove the bolt, drum stopper and spring.
Remove the gearshift stopper plate bolt and the plate.

INSTALL

Install the pin in the holes.
Install the warcher
Install the stopper plate, aligning the holes in the stopper plate with the dowel pin.
Tighten the stopper plate bolt security.

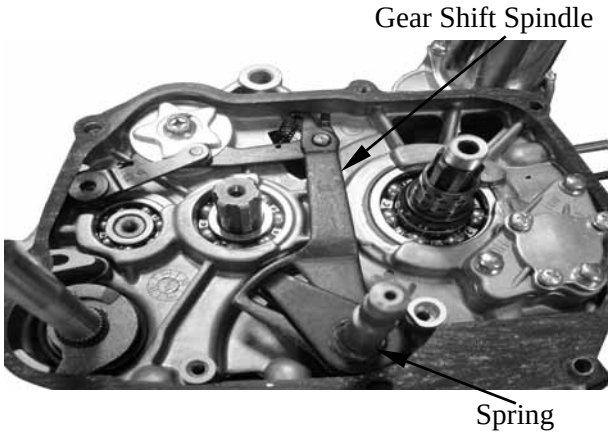


Install the gear shift cam stopper and spring.
Tighten the 6mm lock bolt.
Torque: 0.8~1.2kg-m



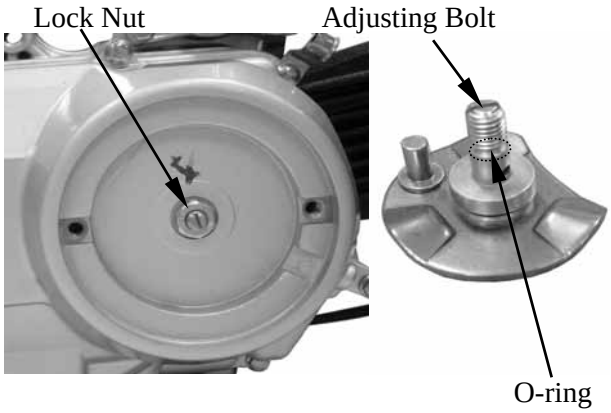
Install the gear shift spindle and washer.

During installation, make sure that the return spring aligns with the crankcase tab.

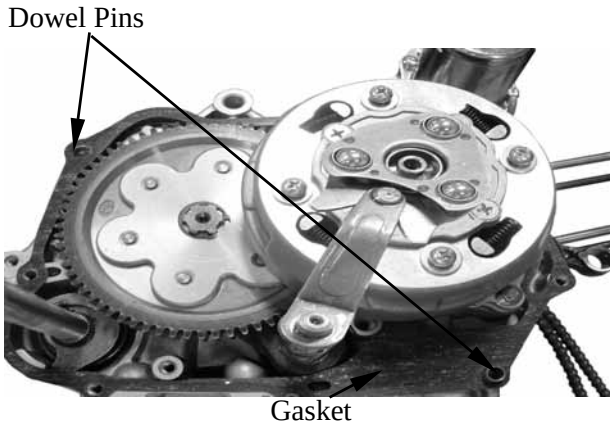


RIGHT CRANKCASE COVER INSTALLATION

Install the new O-ring and lock nut.



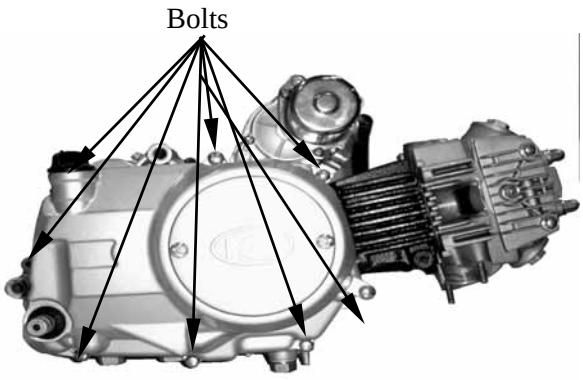
Install the dowel pin and a new gasket.



Install the right crankcase cover and tighten the cover bolts.

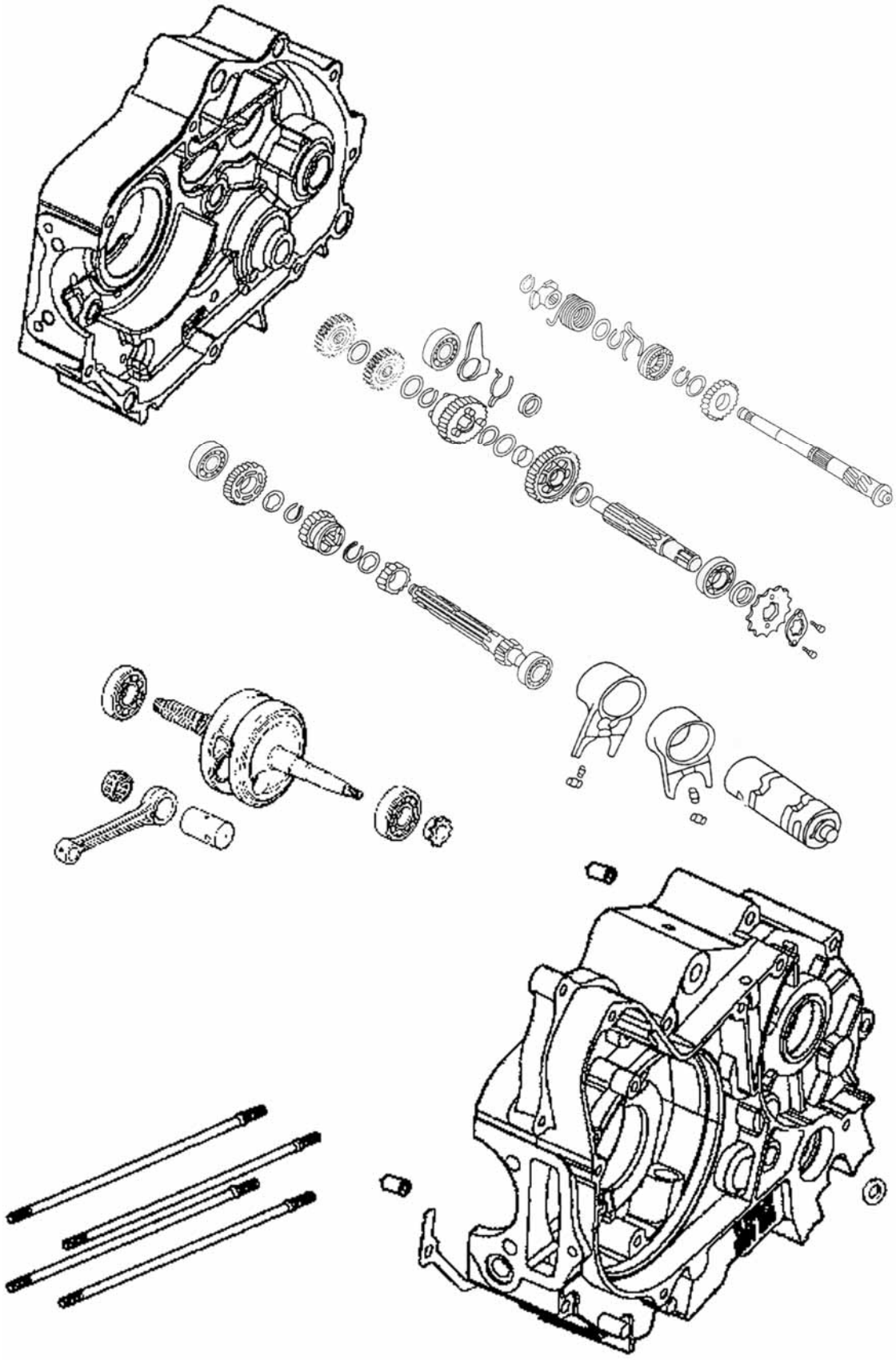
Install the kickstarter pedal.

Adjust the clutch (page 2-8).



CRANKCASE/GRANKSHAFT/TRANS-MISSION SYSTEM/STARTER SPINDLE

10



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- During crankcase separation, do not separate the crankcase halves with an iron hammer to avoid crankcase deformation or damage.
- After separation, be careful not to damage the right and left crankcase mating surfaces to avoid oil leakage.
- Replace the gasket with a new one during reassembly of the crankcase halves.
- After transmission system disassembly, make sure that the gear shifting operation is normal before reassembly of the remaining parts.
- Apply engine oil to the transmission system and crankshaft before reassembly.

SPECIFICATIONS

Item			Standard (mm)	Service Limit (mm)
Transmission fork	Claw thickness		4.93～5.0	4.43
	Shaft hole I.D.		34.02～34.05	34.05
Transmission fork shaft O.D.			33.90～33.96	33.96
Transmission drum O.D.	Left		13～13.02	13
	Right		16.10～16.12	16.04
Transmission gear	Gear I.D.	Main shaft 2nd gear	17.0～17.018	17.058
		Main shaft 3rd gear	17.0～17.018	17.058
		Main shaft 4th gear	17.016～17.034	17.074
		Countershaft 1st gear	23.020～23.041	23.081
		Countershaft 2nd gear	20.0～20.021	22.061
		Countershaft 3rd gear	23.020～23.041	23.081
		Countershaft 4th gear	20.0～20.021	22.061
	Main Shaft O.D.	Left crankcase side	11.978～11.9899	11.938
		Starter gear	25.30～25.50	25.20
		2nd /3rd/4th gear	16.966～16.984	16.926
	Countershaft O.D.	Right crankcase	11.978～11.989	11.938
		Left crankcase	16.978～16.989	16.938
		1st gear	16.978～16.989	16.938
		2nd gear	18.80～19.0	18.760
		3rd/4th gear	19.959～19.98	19.919
Crankshaft	Connecting rod big end side clearance		0.05～0.3	0.8
	Connecting rod big end radial clearance		0～0.05	0.05
	Runout		0.03	0.1

SPECIAL TOOLS

Bearing remover
Bearing remover block
Universal bearing puller
Bearing driver handle
Pilot, 15mm
Pilot, 17mm
Pilot, 20mm
Pilot, 22mm
Inner bearing driver handle
Bearing outer driver

TROUBLESHOOTING

Excessive engine noise

- Worn main shaft journal bearing
- Worn crankshaft pin bearing
- Worn transmission bearings

Transmission gear tripping

- Worn gear teeth
- Bent transmission fork
- Bent transmission fork shaft
- Damaged gear shift cam stopper

Hard shifting

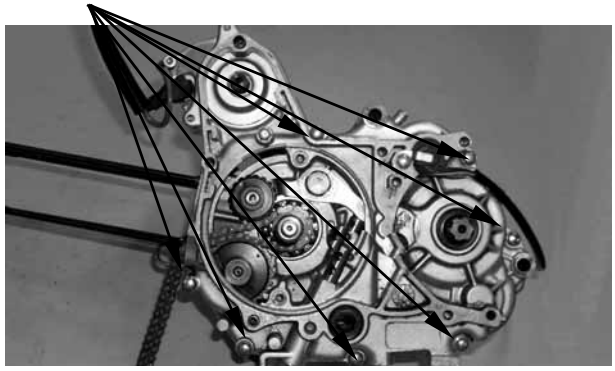
- Improperly adjusted clutch
- Bent or damaged transmission fork
- Bent transmission fork shaft
- Bent gear shift spindle
- Damaged transmission drum grooves

CRANKCASE REMOVAL

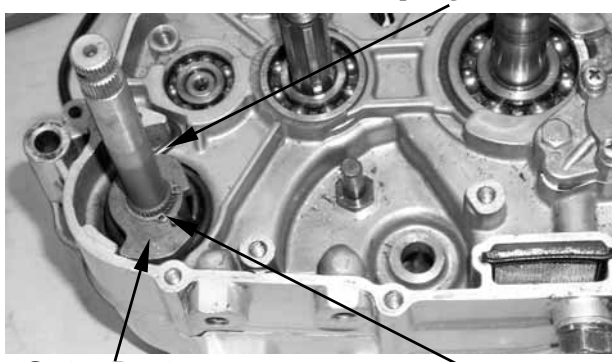
The following parts must be removed before removing the crankcase:

- Cylinder head (Refer to Section 6.)
- Cylinder/piston (Refer to Section 7.)
- Alterantor/cam chain tensioner (Refer to Section 8.)
- Clutch/gear shift mechanism (Refer to Section 9.)

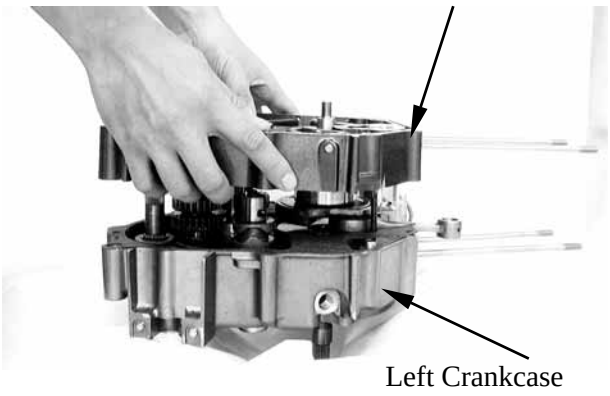
Turn the engine so that the left crankcase is facing up.
Remove the eight crankcase attaching bolts.



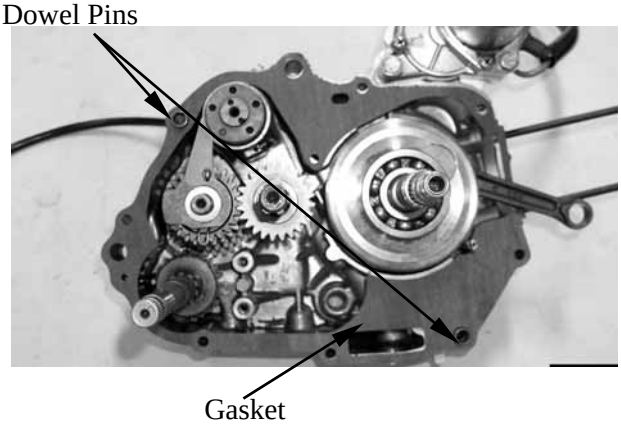
Lay the crankcase on the right side.
Remove the snap ring on the kick starter spindle.
Remove the spring retainer and spring.



Lay the crankcase on the left side.
Separate the right and the left crankcase halves.



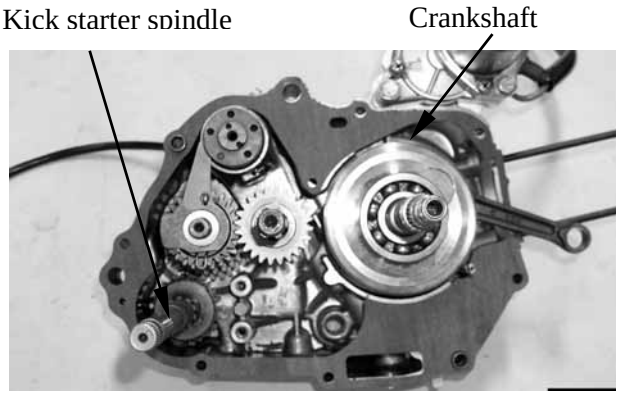
Remove the gasket and dowel pins.



CRANKSHAFT/KICK STARTER

REMOVAL

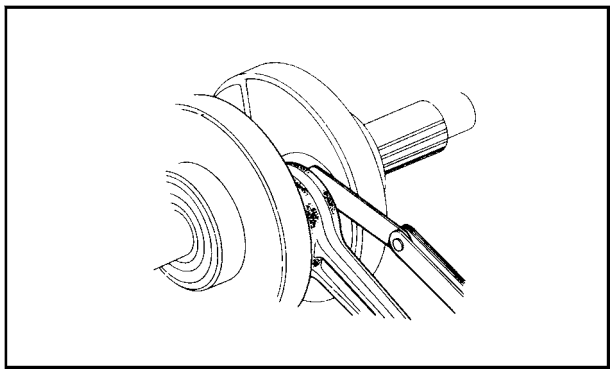
Remove the crankshaft.
Remove the kick starter spindle.



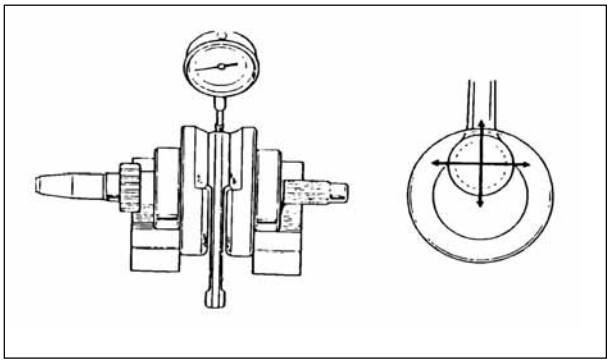
CRANKSHAFT

INSPECTION

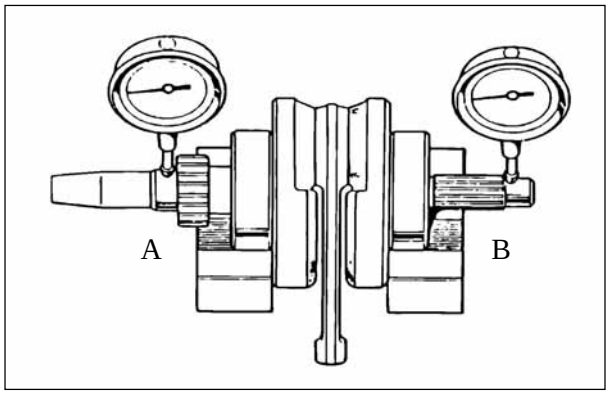
Measure the connecting rod big end side clearance.
Service Limit: 0.80mm replace if over



Measure the connecting rod big end radial clearance at two points at right angles to the shaft.
Service Limit: 0.05mm replace if over



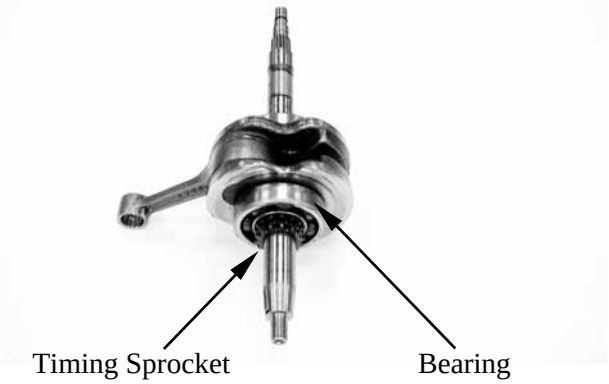
Measure the crankshaft runout.
Service Limit: 0.1mm replace if over



Turn the outer races of the crankshaft bearings with your fingers. The bearings should turn smoothly and quietly.

Also check that the inner races of the bearings fit tightly on the crankshaft.

Check the timing sprocket for wear or damage.

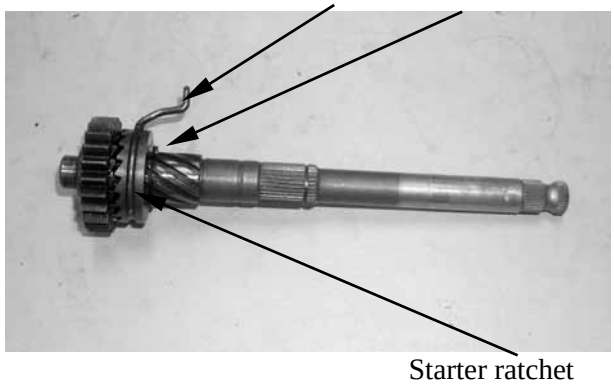


KICK STARTER DISASSEMBLY

Remove the Snap Ring.

Remove the circlip.

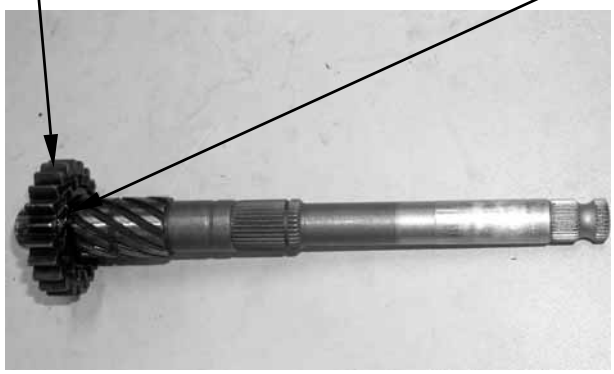
Remove the Starter ratchet



Remove the starter ratchet and spring.

Pry out the circlip and thrust washer.

Remove the kick starter pinion.



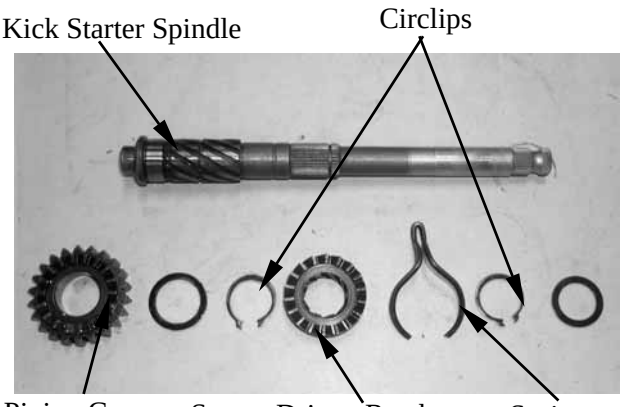
KICK STARTER ASSEMBLY

Assemble the kick starter spindle in the reverse order of disassembly.

INSTALLATION

Install the crankshaft and kick starter to the left crankcase.

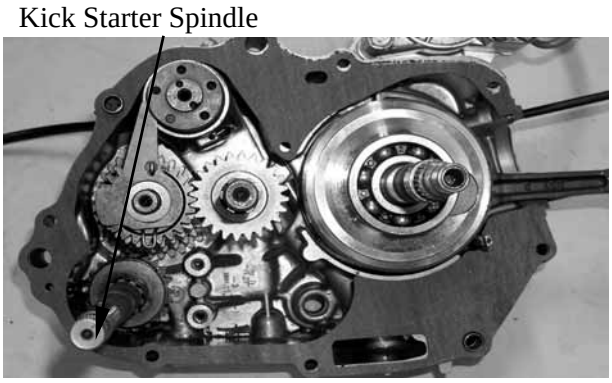
* Align the punch mark of the kick starter spindle with the punch mark on the starter driven ratchet.



TRANSMISSION

DISASSEMBLY

Remove the kick starter spindle from the left crankcase.



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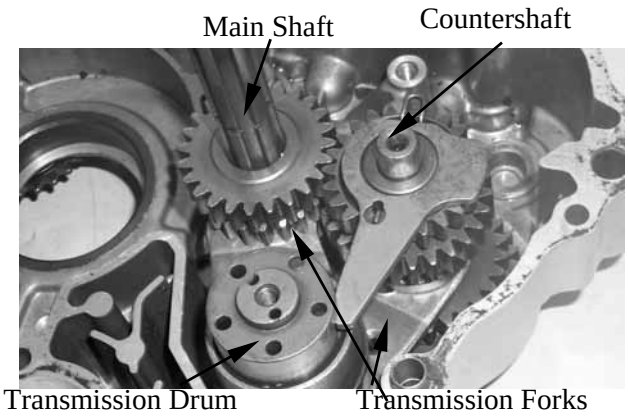
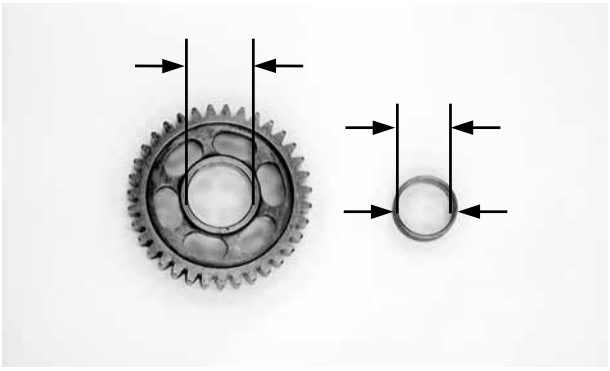
Remove the transmission main shaft and countershaft and transmission drum and transmission forks from the left crankcase.

✳ When removing, the transmission gears must be removed as a set.



INSPECTION

Inspect each gear for wear or damage and replace if necessary. Check the gear teeth and engagement dogs for wear or damage. Check the mainshaft and countershaft splines and sliding surfaces for wear or damage.



Measure the I.D, of each spinning gear.

Service limit:

M2:	17.058mm
M4:	17.074mm
C1:	23.081mm
C3:	20.081mm

Measure the I.D. and O.D. of C1 bushing.

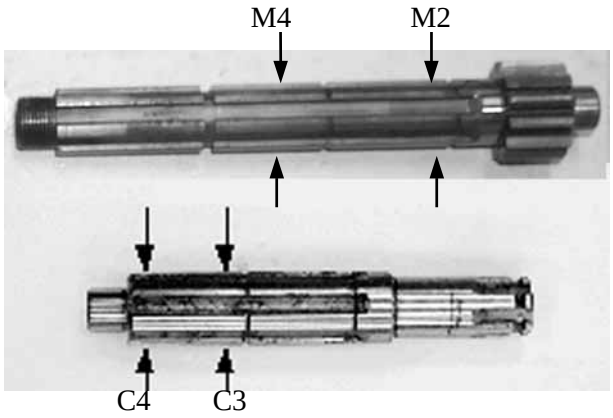
Service limit:

I.D.:	20.08mm
O.D.:	22.75mm

Measure the O.D. of the mainshaft and countershaft in the locations as shown.

Service limit:

M2, M4:	16.926mm
C3, C4:	19.919mm



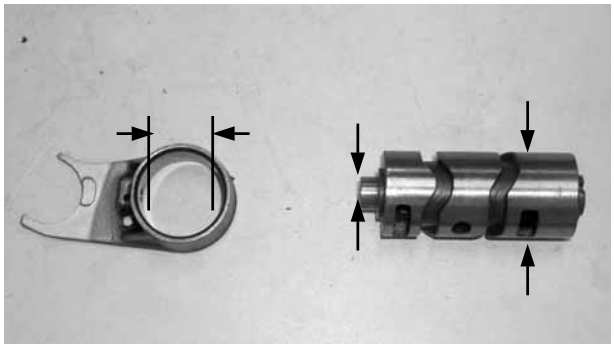
Measure each transmission fork shaft hole I.D.

Service Limit: 34.05mm replace if over

Check the transmission fork shaft for bending or damage.

Measure the transmission fork shaft O.D.

Service Limit: 33.96mm replace if below

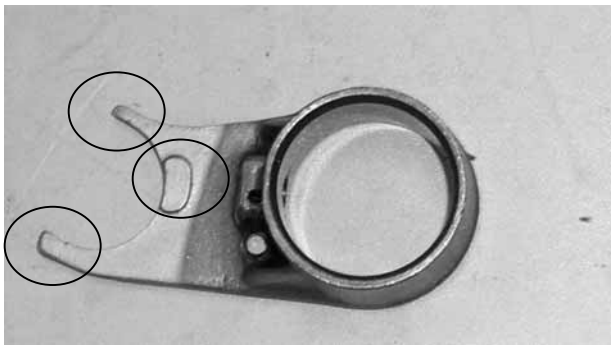


TRANSMISSION FORK/DRUM INSPECTION

Inspect each transmission fork for bending or damage.

Measure each transmission fork claw thickness.

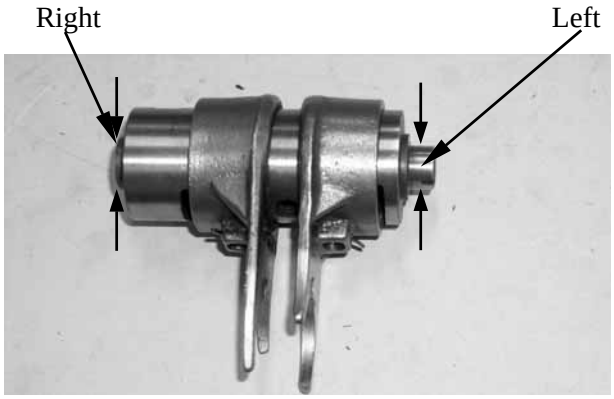
Service Limit: 5mm replace if below



Inspect the transmission drum for scratches or poor lubrication.
Check the transmission drum grooves for damage.
Check the bearing for excessive free play.
Measure the transmission drum O.D.

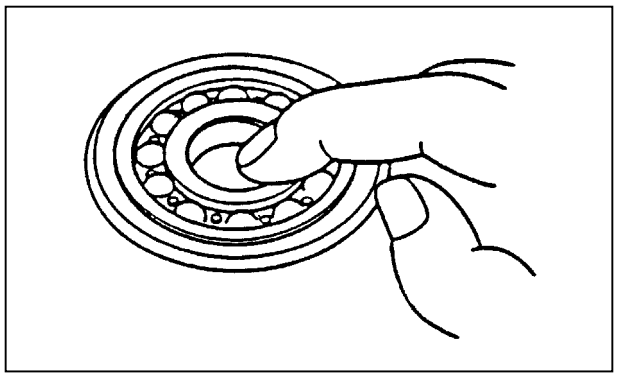
Service Limits:
Left : 13.05mm replace if below
Right : 16.10mm replace if below

Check the transmission drum and transmission fork shaft holes in the left and right crankcase halves for wear or damage.



TRANSMISSION BEARING INSPECTION

Turn the inner races of the bearings with your finger.
The bearings should turn smoothly and quietly.
Also check that the outer races of the bearings fit tightly in the crankcase.
Replace the bearings if they are abnormal (page 10-10)

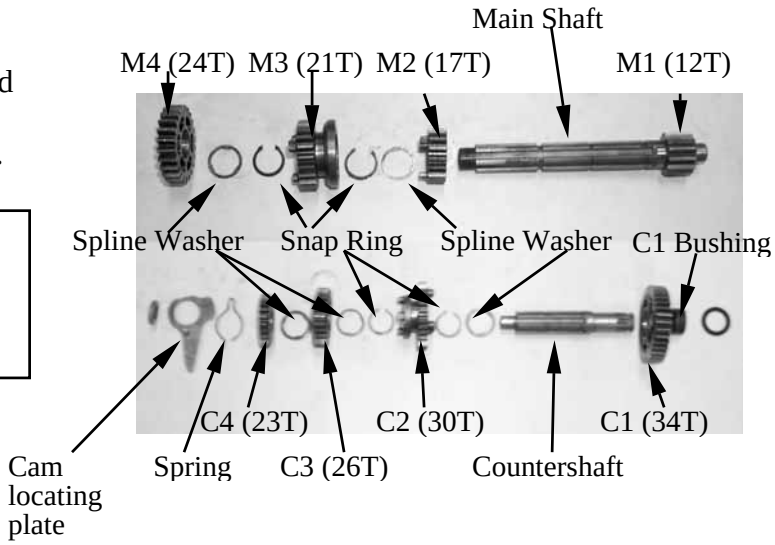


ASSEMBLY

Apply clean engine oil to the sliding and rotating surfaces of the gears, bushings and shafts.

Assemble the main shaft and countershaft.

✳ Install the snap rings aligning their end gaps between the shaft teeth as shown. Make sure the snap rings are seated securely in the grooves of the shafts.



Install the main shaft, countershaft and shift drum as an assembly.
Install the kick starter spindle (page 10-6)

CRANKCASE BEARING REPLACEMENT

Remove the oil pump drive shaft and drive sprocket.

LEFT CRANKCASE

Remove the countershaft oil seal.

Drive the countershaft bearing out of the left crankcase.

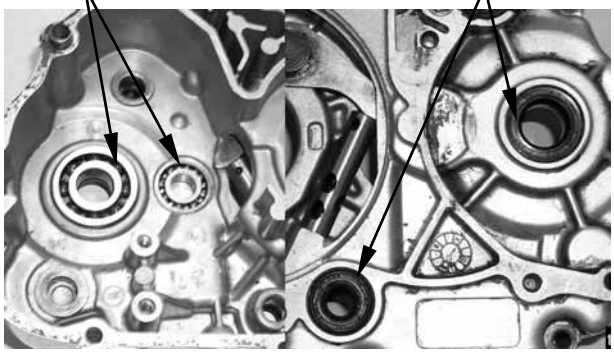
BEARING REPLACEMENT

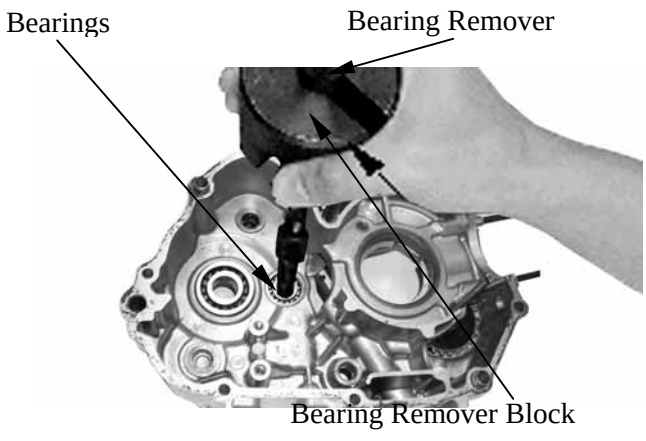
Remove the main shaft and countershaft bearings from the left and right crankcase halves using the following tools.

Special

Bearing Remover

Bearing Remover Block



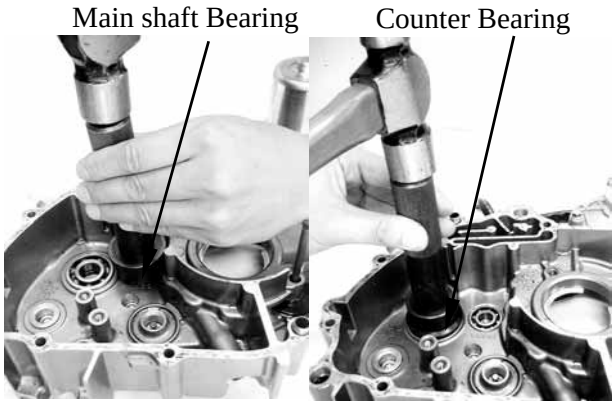


Drive in new bearings using a bearing installer.

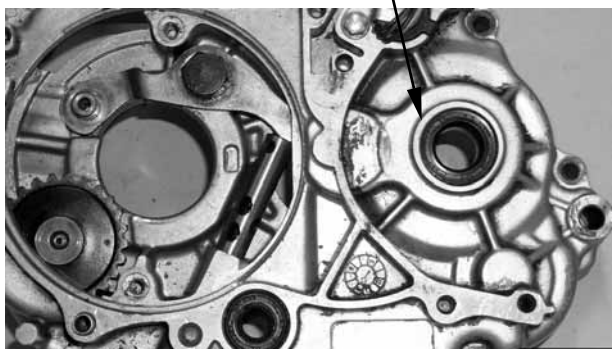
✻
- Apply engine oil to the bearings before installation.
- Drive in bearings squarely.

Special

Bearing installer

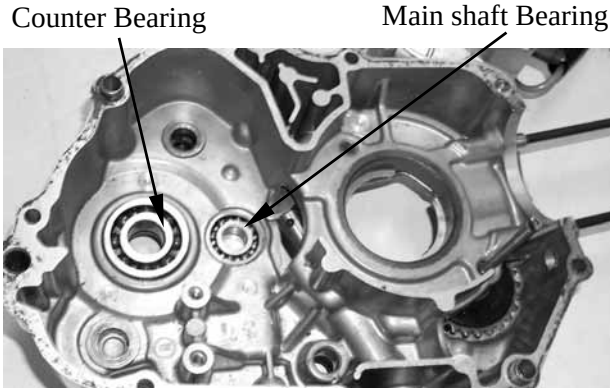


Install a new left countershaft oil seal in the left crankcase and grease the oil seal lip.



RIGHT CRANKCASE

Drive the mainshaft and countershaft bearings out of the right crankcase.

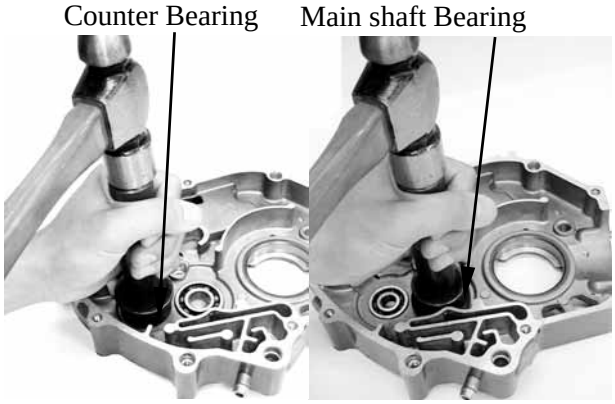


Drive in new bearings using a bearing installer.

✻
- Apply engine oil to the bearings before installation.
- Drive in bearings squarely.

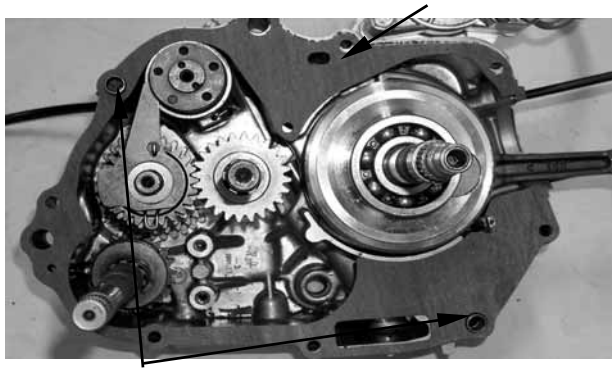
Special

Bearing Driver



CRANKCASE INSTALLATION

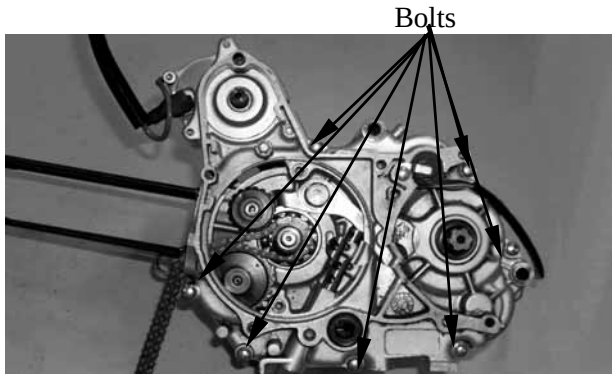
Install the dowel pins and a new gasket onto the left crankcase.



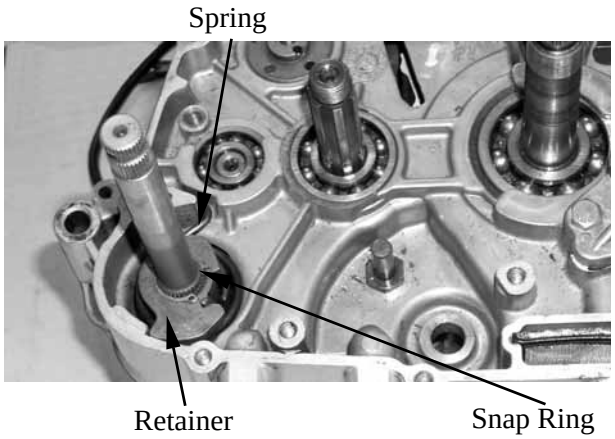
Install the right crankcase over the left crankcase.

✳ Make sure that the gasket stays in place.

Install and tighten the crankcase bolts securely in a crisscross pattern in 2-3 steps.

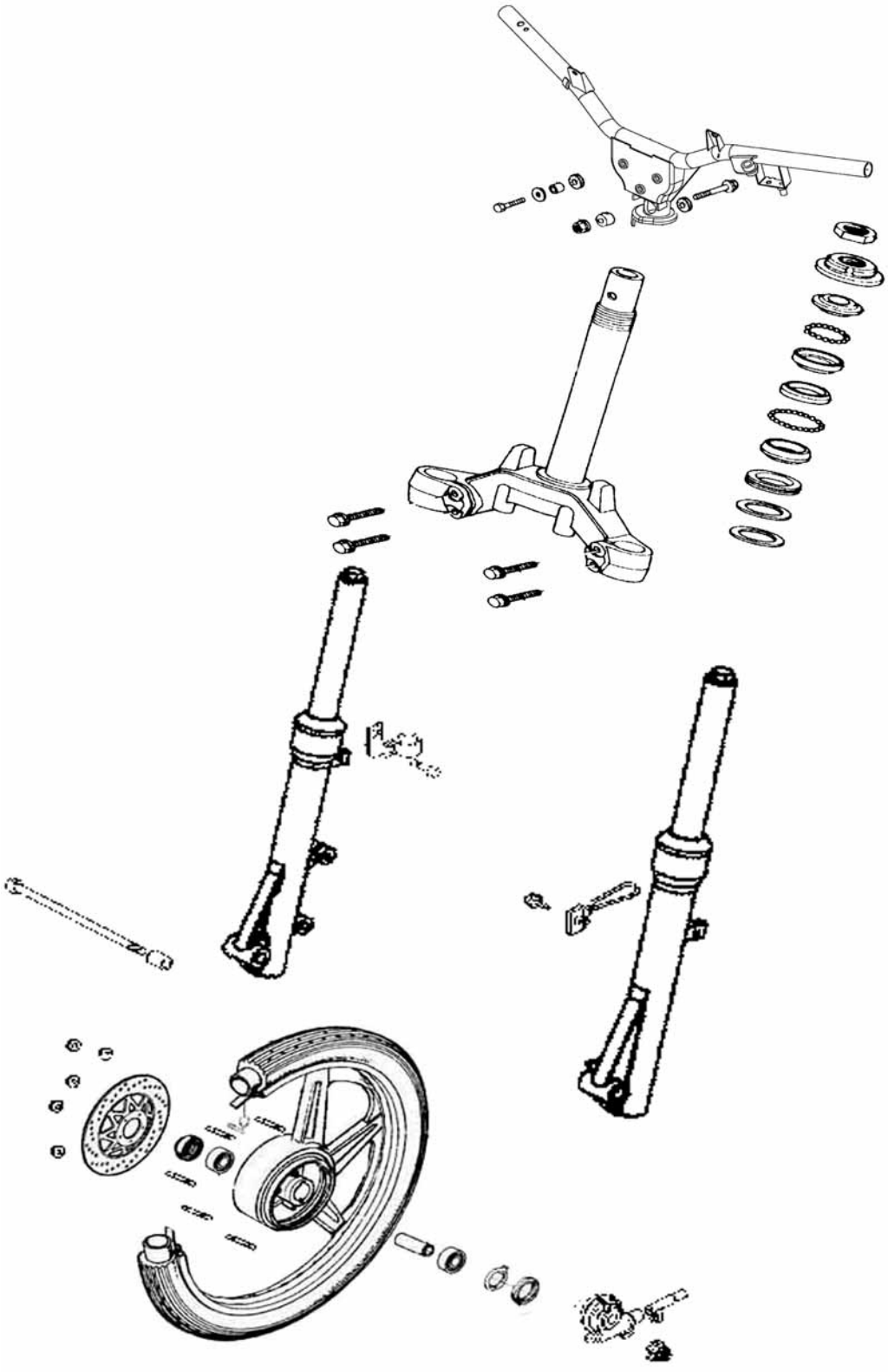


Install the return spring and spring retainer onto the kick starter spindle.
Install the snap ring.
Refer to the sections on page 10-4 for installation of the removed parts.



FRONT WHEEL/SUSPENSION/STEERING

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Front axle shaft runout		—	0.2
Front wheel rim runout	Axial	1	2.0
	Radial	1	2.0
Front fork spring free length		328.2	—
Front fork tube runout		—	0.2
Front fork oil capacity		55cc	—

TORQUE VALUES

Steering stem lock nut	6.0～8.0kg-m	Front axle nut	5.0～6.0kg-m
Steering top cone race	0.15～0.25kg-m	Front fork mount bolt	1.8～2.5kg-m
Master cylinder holder bolt	1.8～2.5kg-m		
Front brake disk nut	1.8～2.5kg-m		

SPECIAL TOOLS

Lock nut wrench
Lock nut socket wrench
Outer driver, 28×30mm
Rear shock absorber remover
Rear shock absorber compfressor
Ball race remover
Driver handle A
Outer driver, 37×40mm
Pilot, 10mm
Bearing puller
Snap ring pliers(close)
Damper compressor

TROUBLESHOOTING

Hard steering
- Insufficient tire pressure
- Excessively tightened steering stem nut
- Damaged steering stem bearings
- Damaged steering bearing races

Steers to one side or does not track straight
- Uneven front shock absorbers
- Bent front fork
- Bent front axle or uneven tire

Front wheel wobbling
- Improperly tightened axle nut
- Bent rim
- Worn front wheel bearing
- Faulty tire

Soft suspension
- Weak fork springs
- Insufficient front fork oil

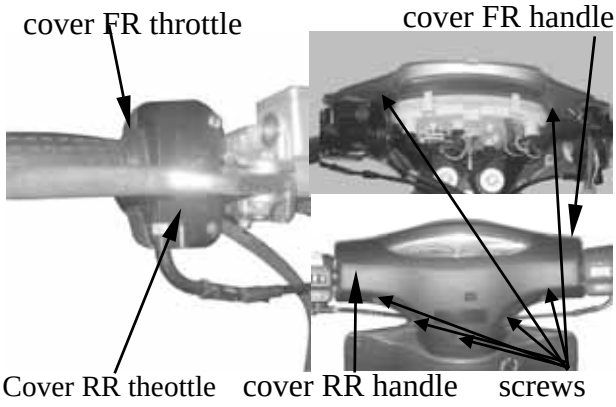
Hard suspension
- Incorrect front fork oil level
- Bent front fork tube
- Clogged front fork oil passages

Front suspension noise
- Slider bending
- Loose front fork fasteners
- Insufficient front fork oil
- Worn front fork bearing
- Insufficient speedometer gear grease

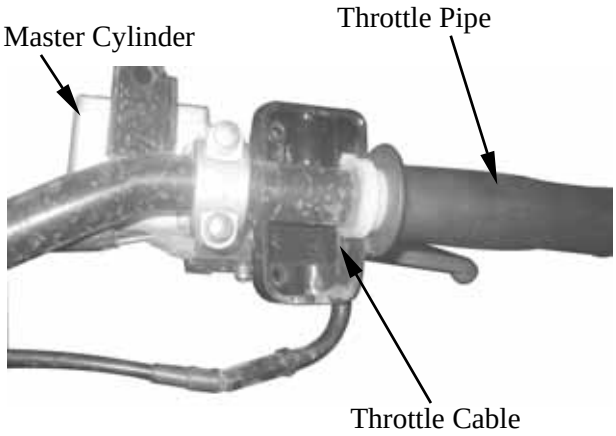
HANDLEBAR

REMOVAL

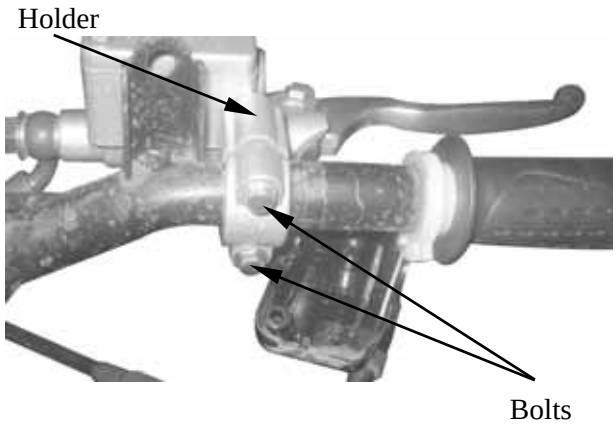
Remove the cover FR handle.
Remove the cover RR handle
Remove the handlele R switch.
Remove the cover top throttle.
Remove the cover low throttle.



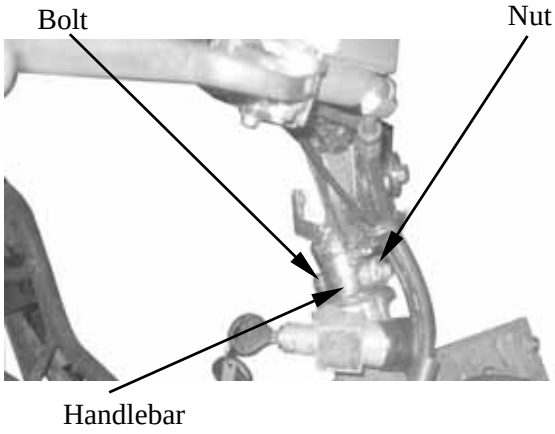
Disconnect the throttle cable from the throttle grip and then remove the throttle pipe from the handlebar.



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



Remove the handlebar lock nut to remove the handlebar.



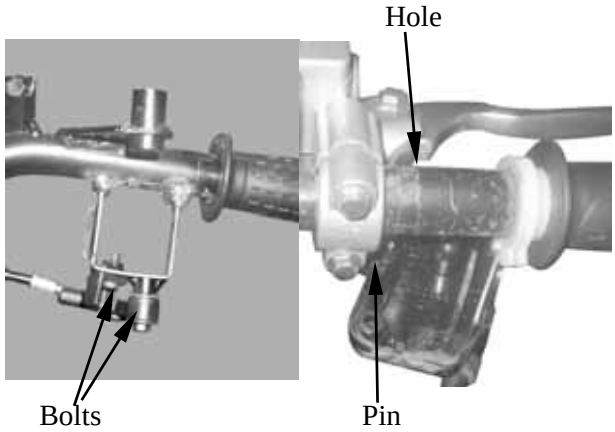
INSTALLATION

Install the handlebar, aligning the tabs of the handlebar with the grooves in the steering stem.

Install and tighten the handlebar lock nut.

Torque: 4.5~5.0kg-m

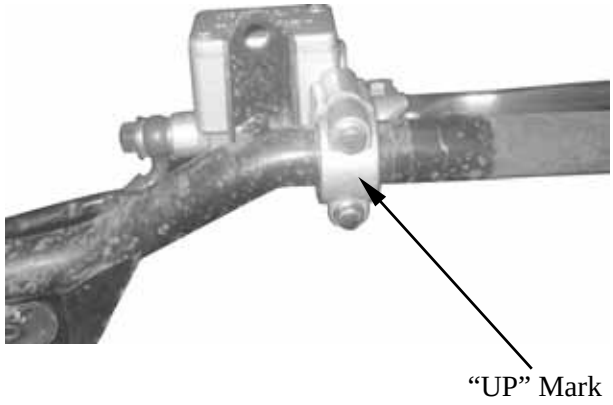
When installing the right and left handlebar switch housings, align the pin on the housing with the hole in the handlebar. Tighten the two switch housing screws.



When installing the master cylinder align the tab on the holder with the hole in the handlebar with the holder “UP” mark facing up.

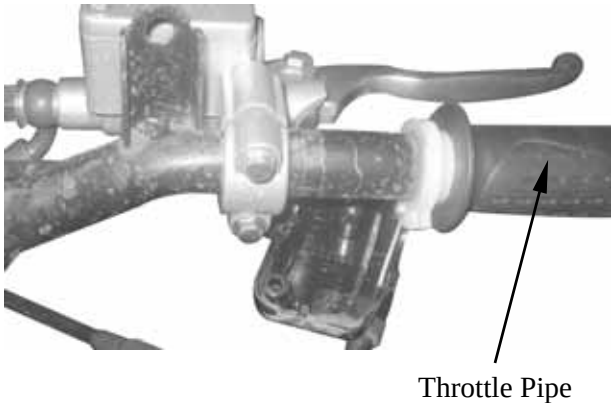
First tighten the upper bolt and then the lower bolt.

Torque: 1.0～1.4kg-m

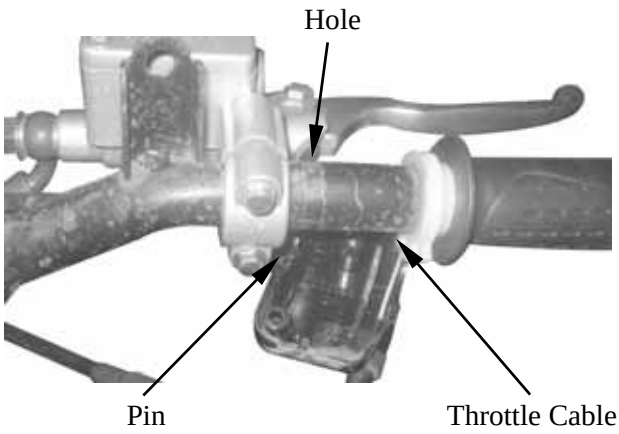


THROTTLE PIPE INSTALLATION

Clean the handlebar surface and install the throttle pipe. Check the throttle grip for proper operation.



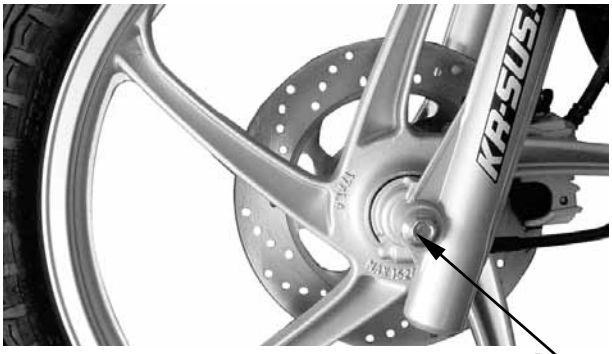
Connect the throttle cable to the throttle grip.
Apply grease to the throttle cable.
Install the throttle cover by aligning the pin on the cover with the hole in the handlebar and then tighten the one screws.



FRONT WHEEL

REMOVAL

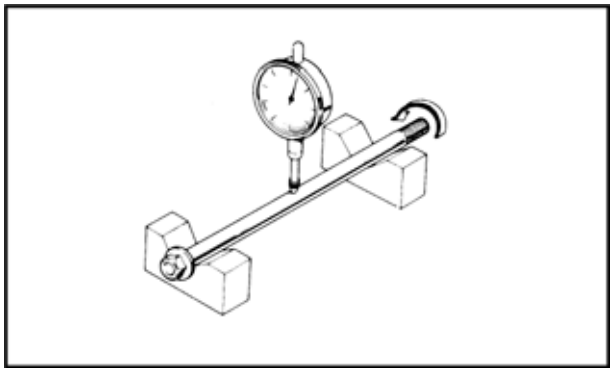
Place a jack or other adjustable support under the engine to raise the front wheel off the ground.
Remove the front axle nut and pull out the axle.
Remove the front wheel.



INSPECTION

Set the axle in V blocks and measure the runout using a dial gauge.

Service Limit: 0.2mm replace if over

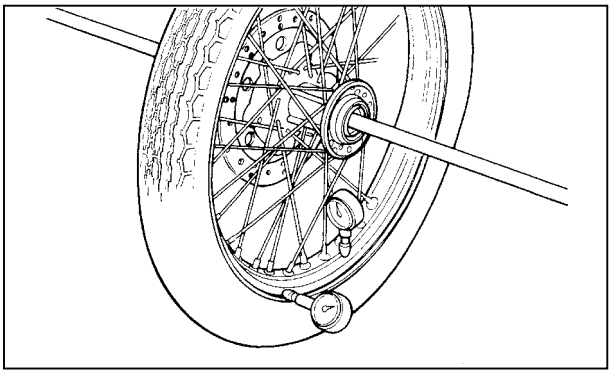


WHEEL RIM INSPECTION

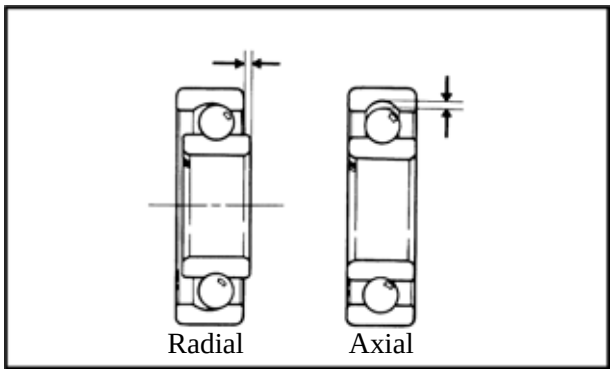
Place the front wheel in a turning stand.
Spin the wheel by hand and measure the rim runout using a dial gauge.

Service Limits:
Axial: 2.0mm adjust if over
Radial: 2.0mm adjust if over

Check the wheel spoke wires for looseness.
If the wheel rim is made of aluminum alloy, replace with a new one if necessary.

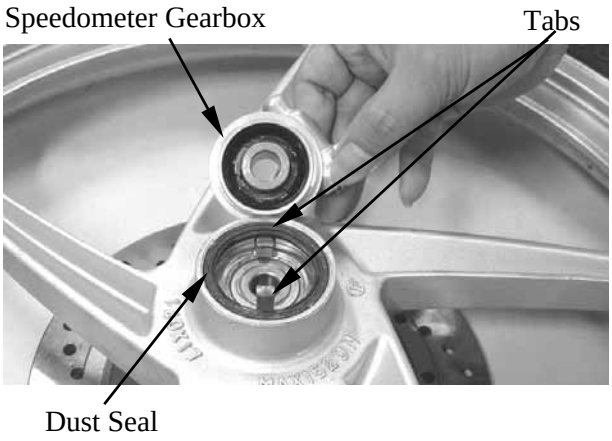


Check the wheel bearing play by placing the wheel in a turning stand and spinning the wheel by hand.
Replace the bearings if they are noisy or have excessive play.

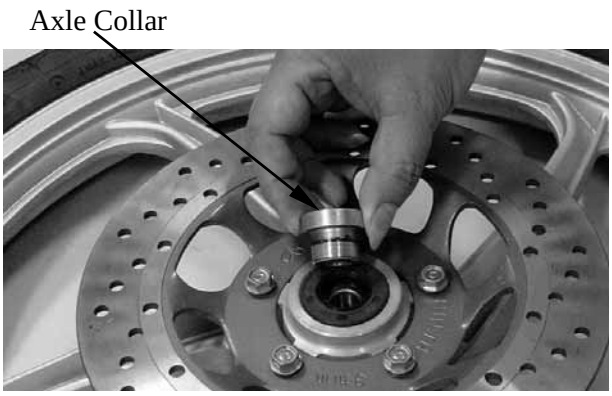


DISASSEMBLY

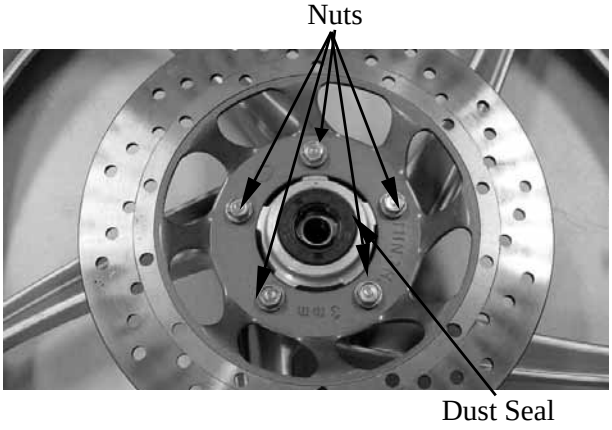
Remove the speedometer gearbox and dust seal from the left side of the wheel.



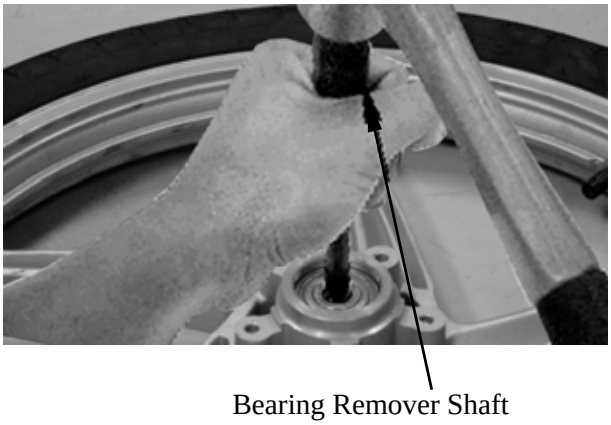
Remove the axle collar from the right side of the wheel.



Remove the dust seal.
Remove the five nuts and the brake disk.



Drive out the wheel bearings and distance collar.

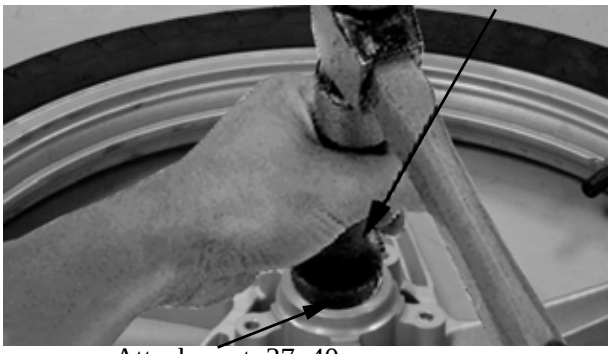


ASSEMBLY

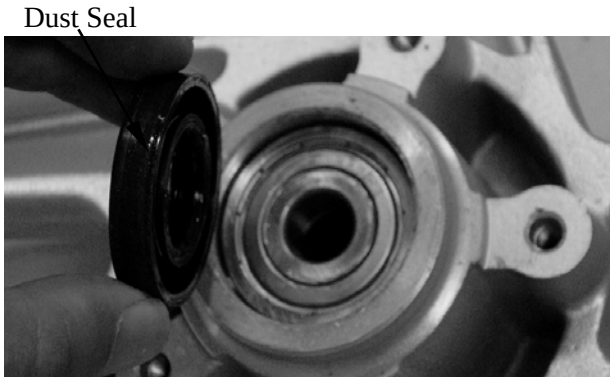
Pack all bearing cavities with grease. First drive in the right bearing and then install the distance collar. Finally, drive in the left bearing.

Special

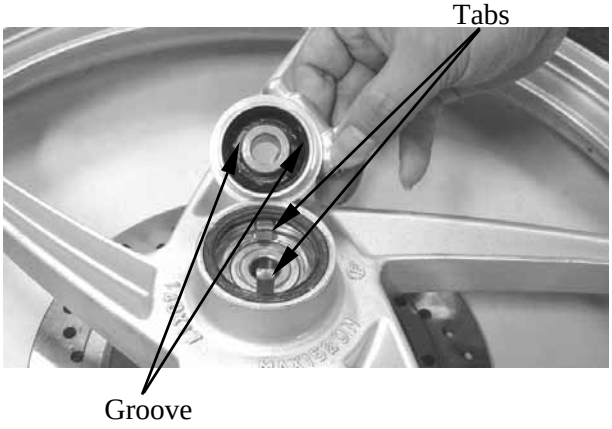
Bearing driver handle
Bearing installer



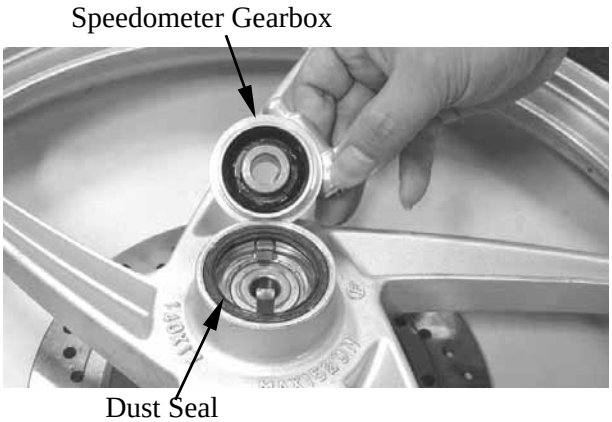
Apply grease to the dust seal and install the dust seal.
Install the brake disk and tighten the five nuts.



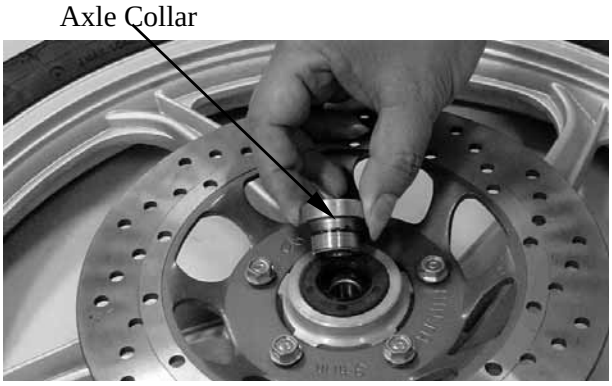
Install the speedometer gearbox by aligning the tabs with the grooves.



Apply grease to the speedometer gearbox and dust seal, then install them to the wheel from the left side.

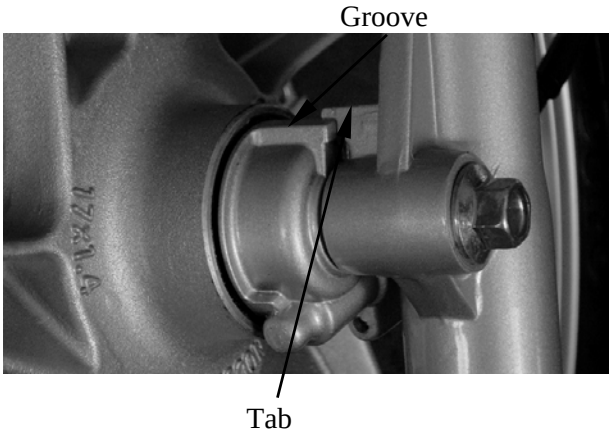


Install the axle collar to the right side of the wheel.



INSTALLATION

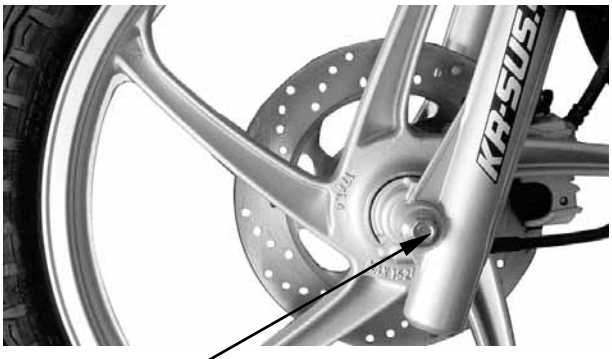
Install the front wheel onto the front fork, aligning the tab on the front fork with the groove in the speedometer gearbox.



Insert the axle shaft and tighten the axle nut.

Torque: 5.5～7.0kg-m

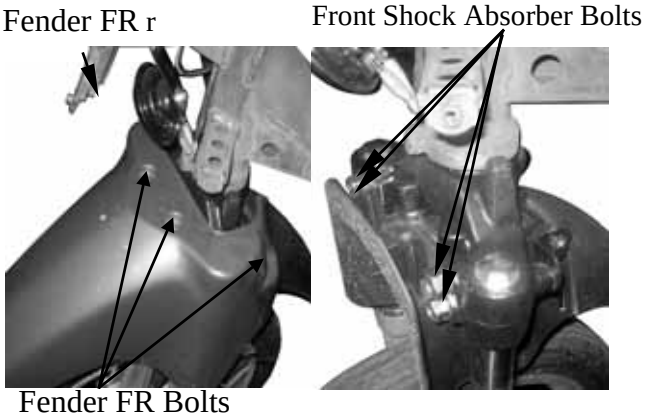
✳ Install the speedometer cable by aligning the groove with the tab.



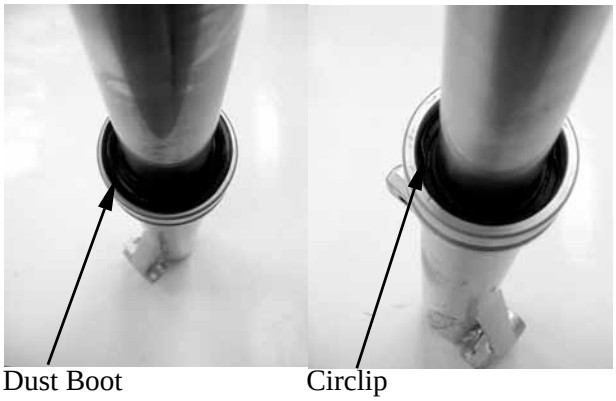
FRONT SHOCK ABSORBER

REMOVAL

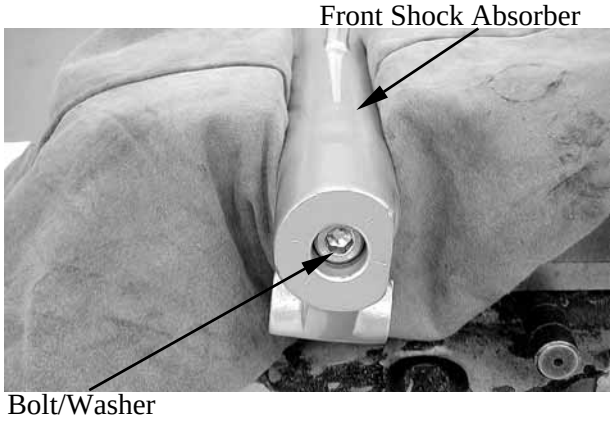
Remove the front wheel. (Refer to 11-7.)
Remove the fender FR (A) bolts.
Remove the fender (A)FR.
Remove the front shock absorber bolts.
Remove the front shock absorbers.



Remove the dust boot.
Remove the circlip.

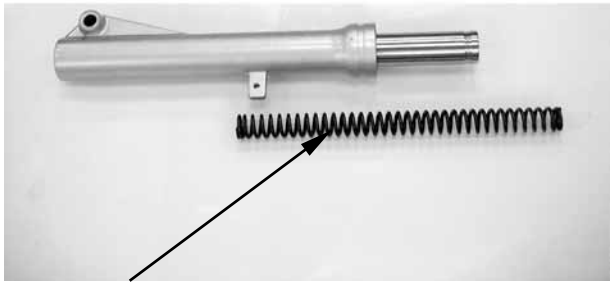


Use a vise to hold the front shock absorber and remove the shock absorber tube, hex bolt and copper washer from the front shock absorber.



Use a vise to hold the front shock absorber tube and remove the damper from the shock absorber tube.

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



Front Fork Spring

Use a vise to hold the front fork bottom tube and place shop towels under the bottom tube. Remove the socket head bolt.

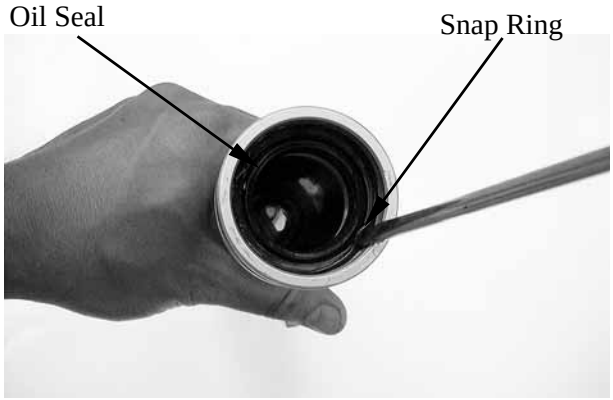
✳
- When using the vise, do not tighten the front fork bottom tube excessively.
- If it is difficult to remove the socket head bolt, temporarily install the front fork spring and front fork bolt.

Remove the front fork piston and return spring. Remove the front fork bottom tube and the oil stopper.

6mm Socket Spanner

Remove the dust seal and snap ring. Take out the oil seal and circlip.

✳
- Do not damage the bottom tube when taking out the oil seal and circlip.
- Be sure to replace the removed oil seal and circlip with new ones during assembly.

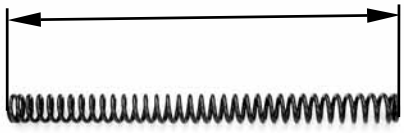


INSPECTION

Measure the front fork spring free length.

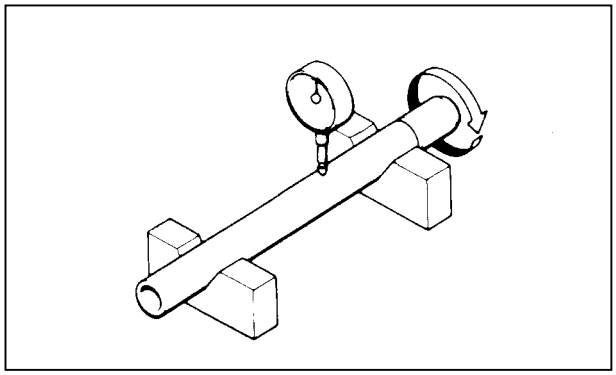
Service Limit: 328.2mm replace if below

Replace the spring with a new one if it exceeds the service limit.

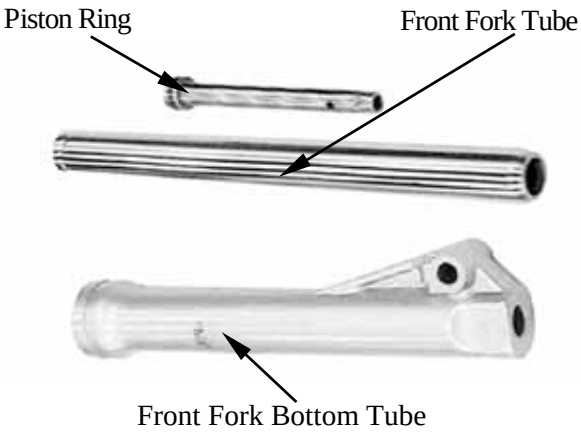


Set the front fork tube in V blocks and measure the tube runout.

Service Limit: 0.2mm replace if over



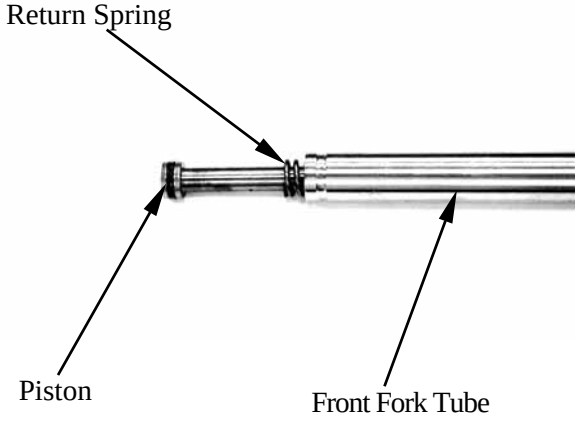
Check the front fork tube, bottom tube and piston for abnormal wear or damage and replace if necessary.
Check the front fork piston ring for wear.
Check the return spring for weakness or damage.



ASSEMBLY

Before assembly, clean the removed parts with high flash or non-flammable solvent.

Install the return spring and piston into the front fork tube and then install oil stopper to the piston end.
Install the front fork tube into the bottom tube.

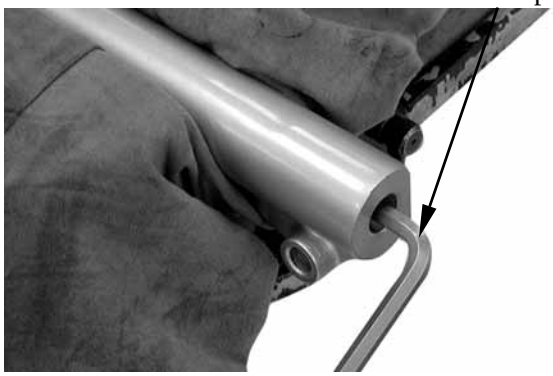


Place shop towels under the bottom tube and set it in a vise. Apply locking agent to the socket head bolt and then install it into the piston. Tighten the socket head bolt using the socket spanner.

✳ When tightening the socket head bolt, temporarily install the front fork spring and front fork tube.

Torque: 1.5～2.5kg-m

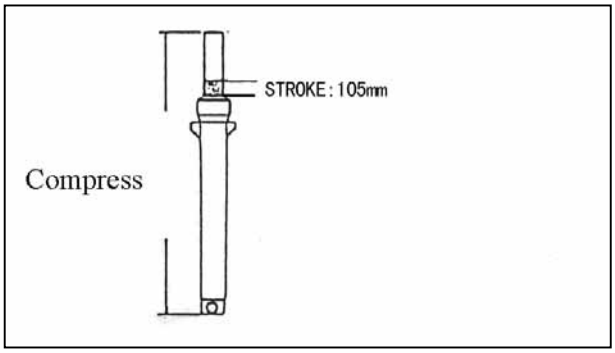
6mm Socket Spanner



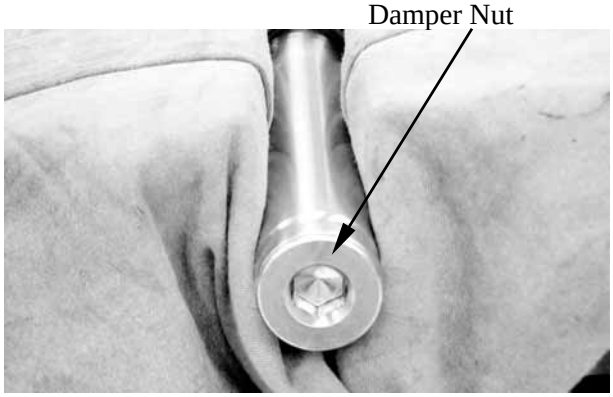
Apply engine oil to a new oil seal and install the oil seal using the fork seal driver.
Then, install the snap ring and dust seal.
Fully compress the front fork and fill SAE8# engine oil into the front fork tube.

✳ Do not fill too much engine oil.

Specified Capacity:55cc



Damper Nut



Install the damping spring to the damper and then install them into the front shock absorber tube.

Install the front shock absorber spring and tighten the damper mut.

Torque: 1.5～3.0kg-m

✳ Install the front shock absorber spring with the loosely wound coils facing up

INSTALLATION

Install the front shock absorbers onto the steering stem.
Tighten the lower mount bolts.
Install the front fender.
Install the front wheel.

STEERING STEM

REMOVAL

Remove the steering handlebar.
Disconnect the speedometer cable and front brake fluid pipe and remove the front brake caliper.
Remove the front wheel.
Hold the steering stem top cone race and remove the steering stem lock nut.

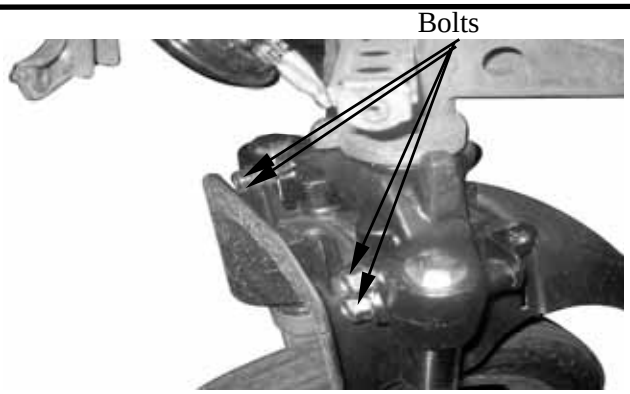
Special

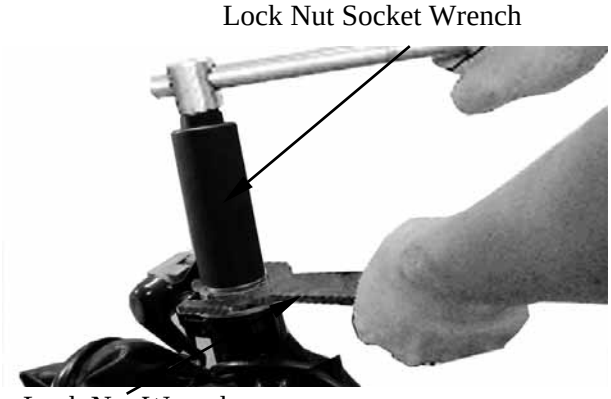
Lock nut socket wrench

Remove the top cone race and remove the steering stem.

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

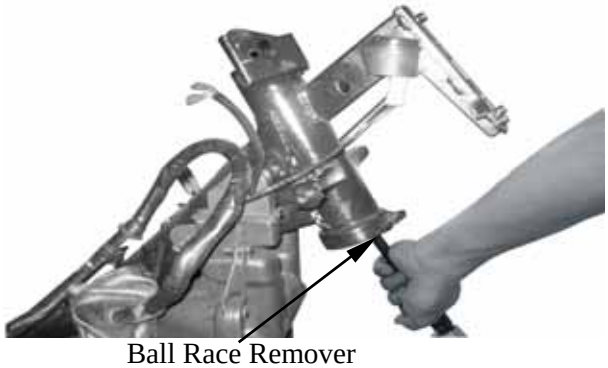
Inspect the ball races, cone races and steel balls for wear or damage.
Replace if necessary.





BALL RACE REPLACEMENT

Remove the top and bottom ball races.



Ball Race Remover

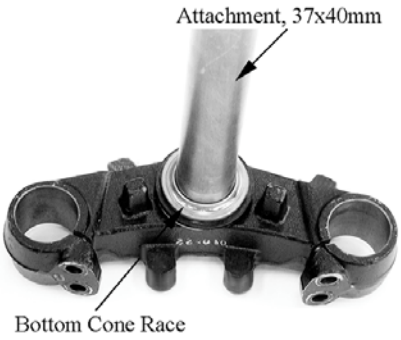
Drive the top and bottom ball races into the steering head using a bearing driver.

Special

Bearing driver handle
Bearing installer

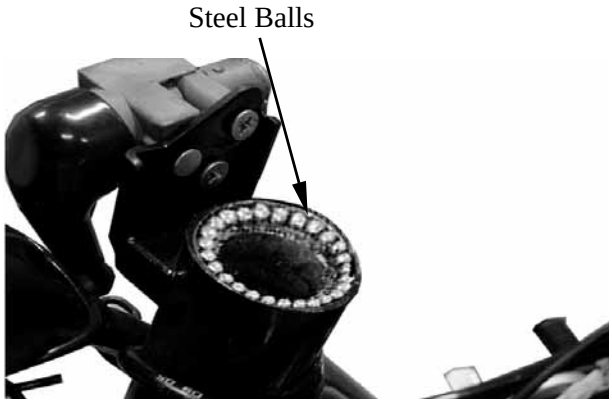
BOTTOM CONE RACE REPLACEMENT

Drive out the bottom cone race.
Install a new washer and dust seal onto the steering stem and then drive in a new bottom cone race onto the steering stem.



STEERING STEM INSTALLATION

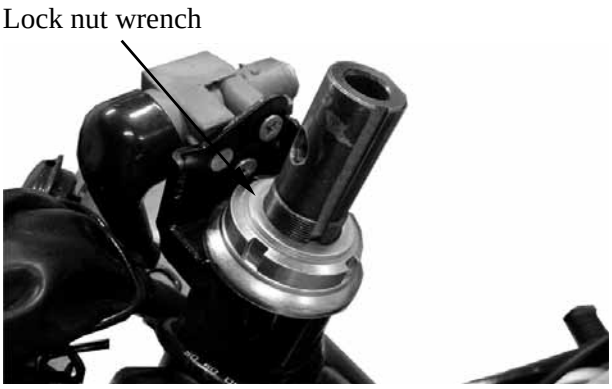
Apply grease to the top and bottom ball races and steel balls.
Install 23 steel balls each on the top and 29 steel balls on the bottom ball races. Apply grease to the ball races again and then install the steering stem.
Steel balls: 6mm



Apply grease to the top cone race and install it.

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

✳ Check that the steering stem rotates freely and that there is no vertical play.



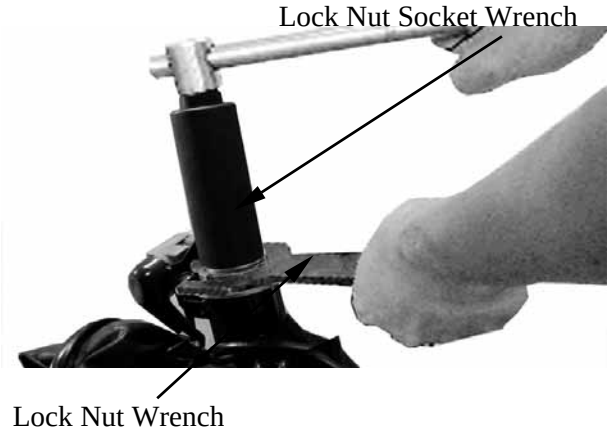
Install the steering stem lock nut and tighten it while holding the top cone race.

Torque: 6.0～8.0kg-m

Install the handlebar.
Install the speedometer cable.

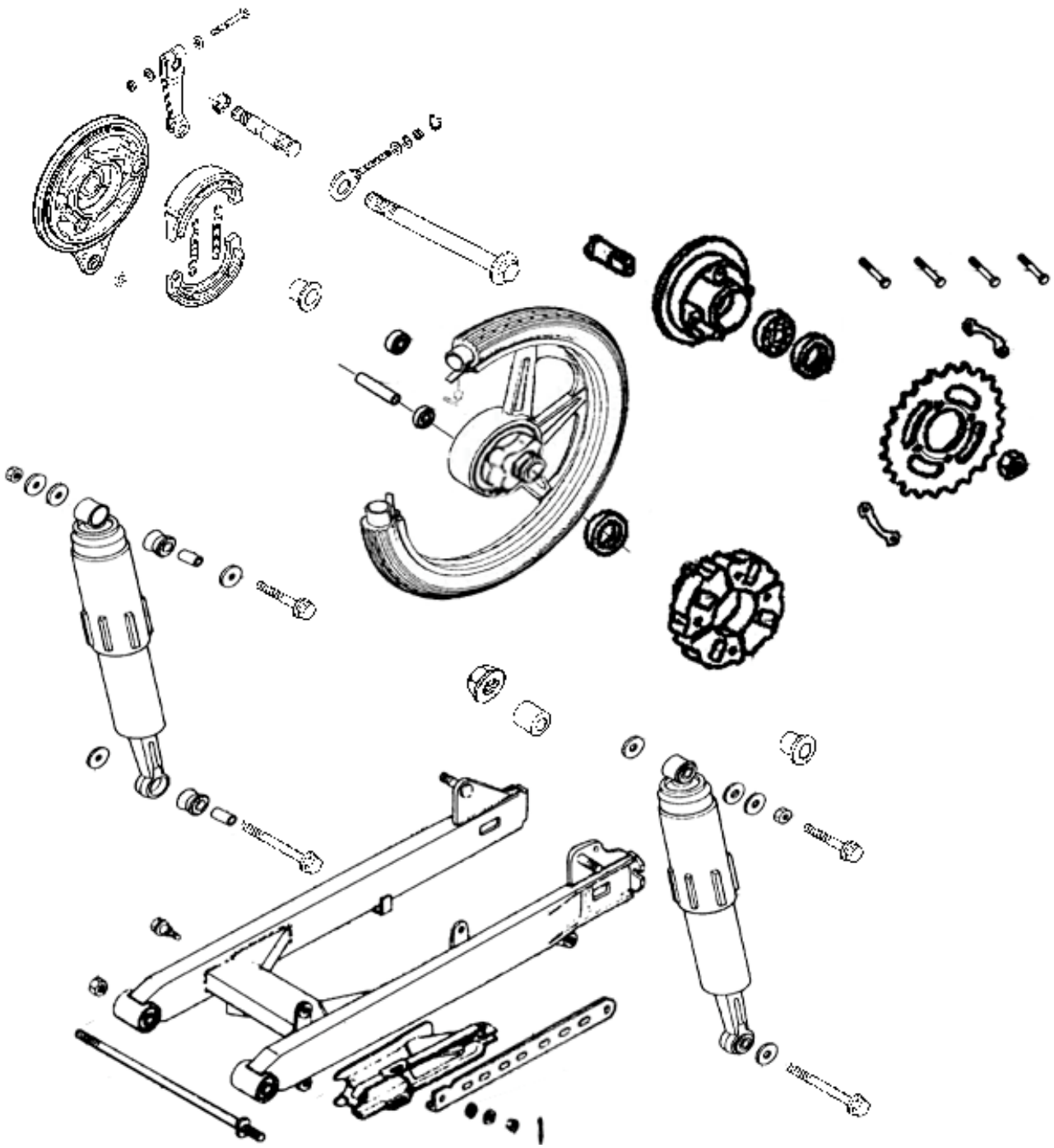
Special

Lock nut socket wrench



REAR WHEEL/BRAKE/SUSPENSION

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- When installing the drive chain joint clip, the cutout of the clip should be opposite to the rotating direction.
- After the drive chain is adjusted, make sure that the rear brake pedal free play is normal and adjust it if necessary.

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Rear axle shaft runout		—	0.2
Rear rim runout	Axial	0.5	2.0
	Radial	0.5	2.0
Rear brake drum I.D.		140	141
Rear brake lining thickness		4.5	2.0
Rear shock absorber spring free length		266	266

TORQUE VALUES

Rear shock absorber upper mount nut	3.0～4.0kg-m
Rear shock absorber lower mount nut	3.0～4.0kg-m
Rear axle nut	8.0～10.0kg-m
Rear fork pivot nut	6.0～8.0kg-m
Rear shock absorber damper nut	1.0～1.4kg-m

SPECIAL TOOLS

Bearing remover set
Pivot set
Remover handle
Block
Rear shock absorber attachment A
Rear shock absorber attachment
Bearing outer driver
Pilot
Rear shock absorber compressor
Bearing remover shaft
Bearing remover head

TROUBLESHOOTING

Rear wheel wobbling
- Bent rim
- Worn rear wheel bearing
- Loose or broken wheel spoke wires
- Faulty tire
- Improperly tightened axle nut
- Loose rear fork pivot nut

Soft suspension
- Weak shock absorber spring
- Improperly adjusted shock absorber
- Damper oil leaks

Hard suspension
- Improperly adjusted shock absorber

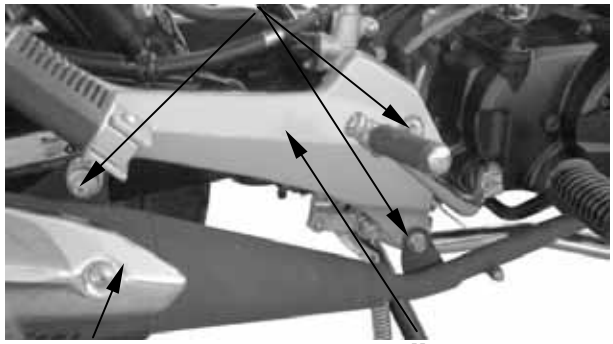
Rear suspension noise
- Bent rear shock absorber
- Loose shock absorber fasteners
- Insufficient damper oil

Poor brake performance
- Improperly adjusted brake
- Worn brake linings
- Contaminated or damaged brake linings
- Worn brake cam
- Worn brake drum
- Improperly installed brake linings
- Worn brake shoes at cam contacting area
- Worn camshaft

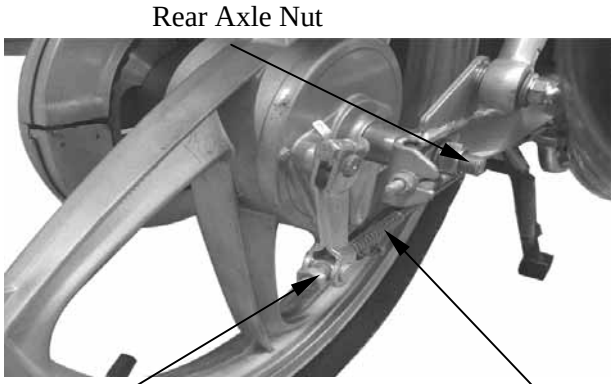
REAR WHEEL

REMOVAL

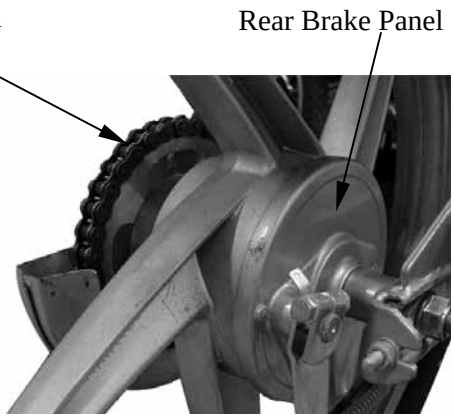
Remove the driver chain cover.
Remove the exhaust muffler.
Remove the rear pillion step stay.



Remove the rear axle nut.
Remove the rear brake adjusting nut.
Remove the pin, nut and rear panel fixing arm bolt.



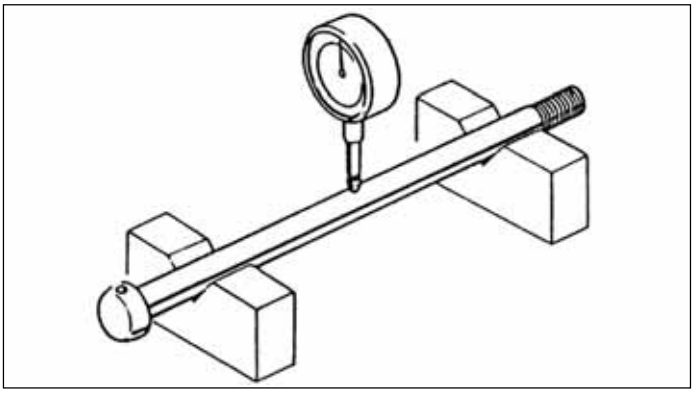
Remove the rear brake panel.
Remove the drive chain.
Remove the rear wheel.



INSPECTION

Set the rear axle in V blocks and measure the runout with a dial gauge.

Service Limit: 0.2mm



Nut

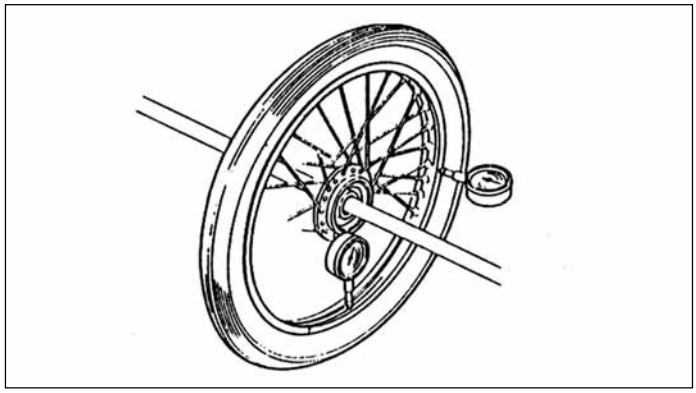
Place the rear wheel in a turning stand and measure the rim runout.

Service Limits:

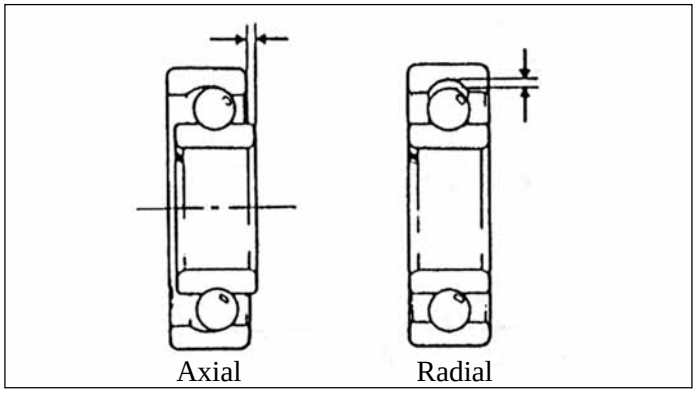
Axial: 2.0mm

Radial: 2.0mm

Check the wheel spoke wires for looseness.



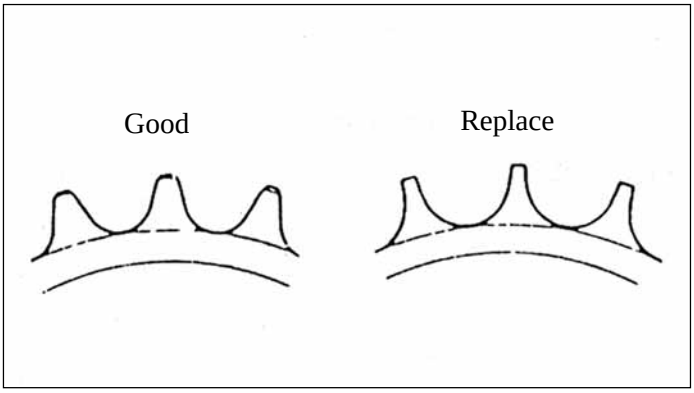
Check the wheel bearing play by placing the wheel in a turning stand and spinning the wheel by hand.



Check the drive chain gear teeth for wear or damage.

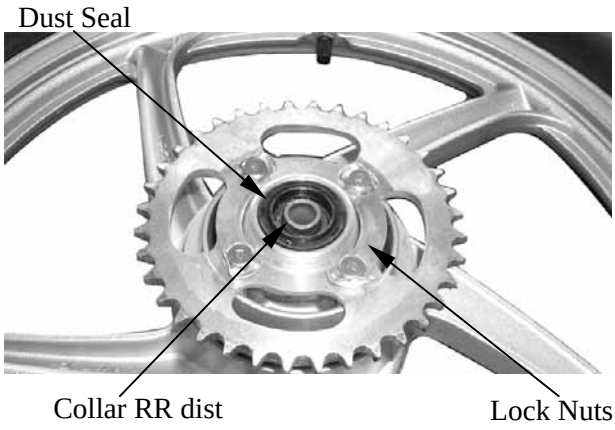
Replace the drive chain gear if necessary.

✳ If the drive chain gear teeth are worn or damaged, also check the drive chain and replace if necessary.

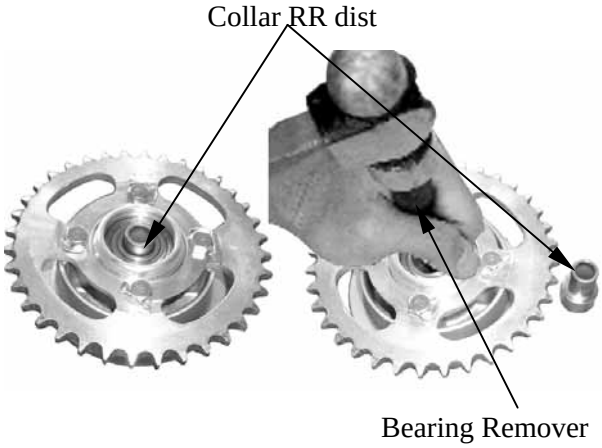


DISASSEMBLY

Remove the side collar and dust seal from the left side of the rear wheel.
First tap the safety piece flat and then remove the four drive chain gear lock nuts.
Remove the safety piece and drive chain gear.
Remove the snap ring and gear gasket.
Check the damping bushings for damage.



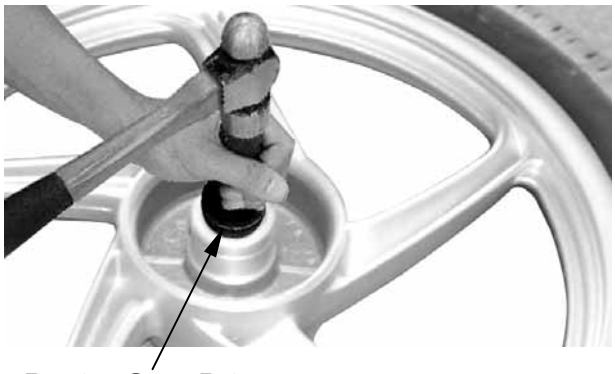
Remove the Collar RR dist.
Drive out the wheel bearings and remove the distance collar.



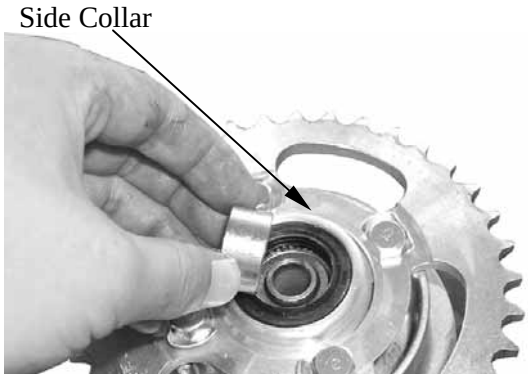
ASSEMBLY

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

* • Drive in the bearings squarely.
  • Install the bearings with the sealed end facing out.



Install the drive chain gear and secure it with the snap ring.
Apply grease to the dust seal and install it to the bearing.
Install the side collar.



INSTALLATION

Install the rear wheel in the reverse order of removal.

Drive Chain Slack: 1～2cm

✳ After rear wheel installation, be sure to adjust the drive chain slack and rear brake pedal free play.

Torque: 8.0～10.0kg-m

REAR BRAKE

REMOVAL

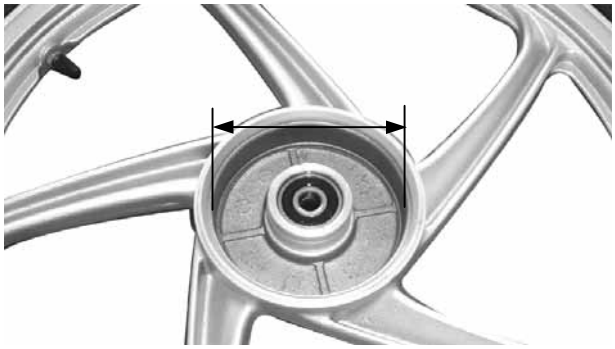
Remove the rear wheel and rear brake panel.

INSPECTION

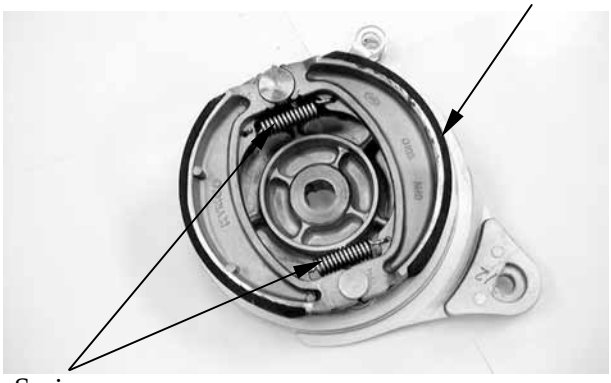
Measure the rear brake lining thickness.

Service Limit: 2.0mm replace if below

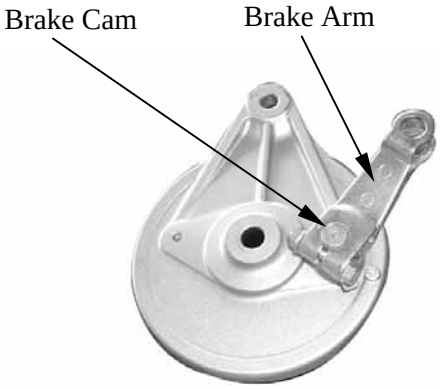
Measure the brake drum I.D.
Service Limit: 141mm replace if over



DISASSEMBLY
Remove the springs and brake shoes.



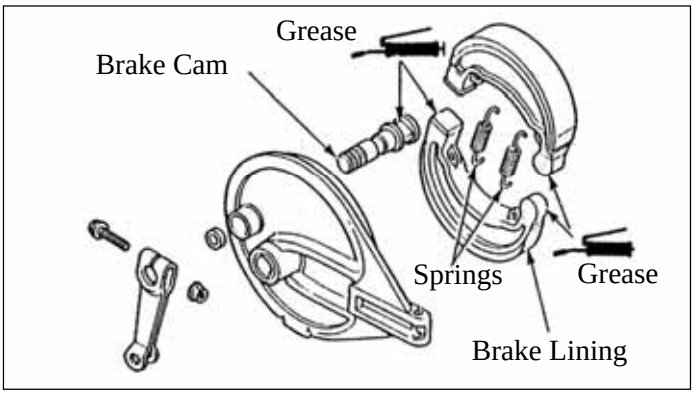
Remove the brake arm bolt to remove the brake arm.
Remove the oil seal.
Remove the brake cam.



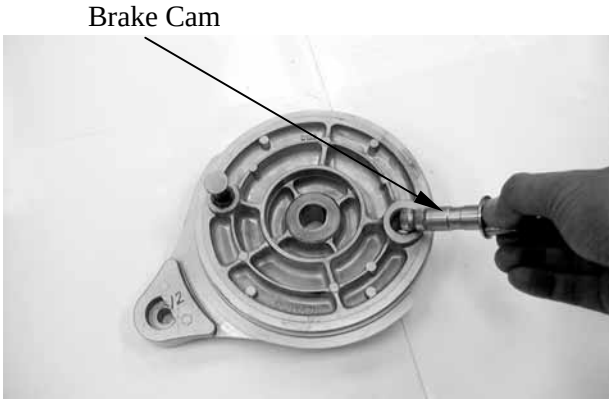
ASSEMBLY

✳

- Keep grease off the linings because contaminated brake linings reduce stopping power.
- During installation, wipe any excess grease off the brake cam.



Apply grease to the brake cam and anchor pin, then install the brake cam to the brake panel.



Apply engine oil to the oil seal and install it to the brake cam.

Install the brake arm onto the brake cam, aligning the punch mark on the cam with the scribed line on the arm.
Install and tighten the brake arm bolt.

Torque: 0.8～1.2kg-m

INSTALLATION

Install the brake panel and rear wheel in the reverse order of removal.

✳ After the rear wheel installation, check the drive chain slack and rear brake pedal free play.

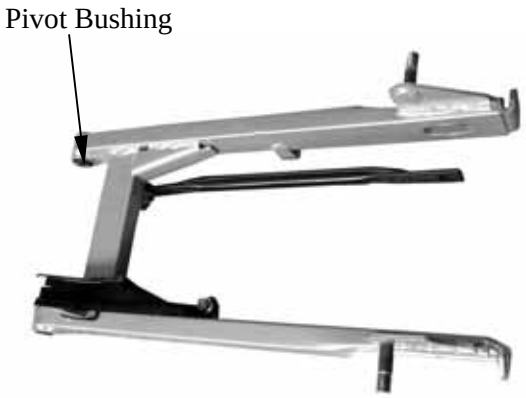
REAR FORK

REMOVAL

Remove the rear wheel.
Remove the rear shock absorbers.
Remove the cover the rear fork pivot nut to remove the pivot and rear fork.

Remove the drive chain slider and check for wear or damage.

✳ When replacing the rear fork pivot bushings, press in the new bushings to make them flush with the rear fork.



INSTALLATION

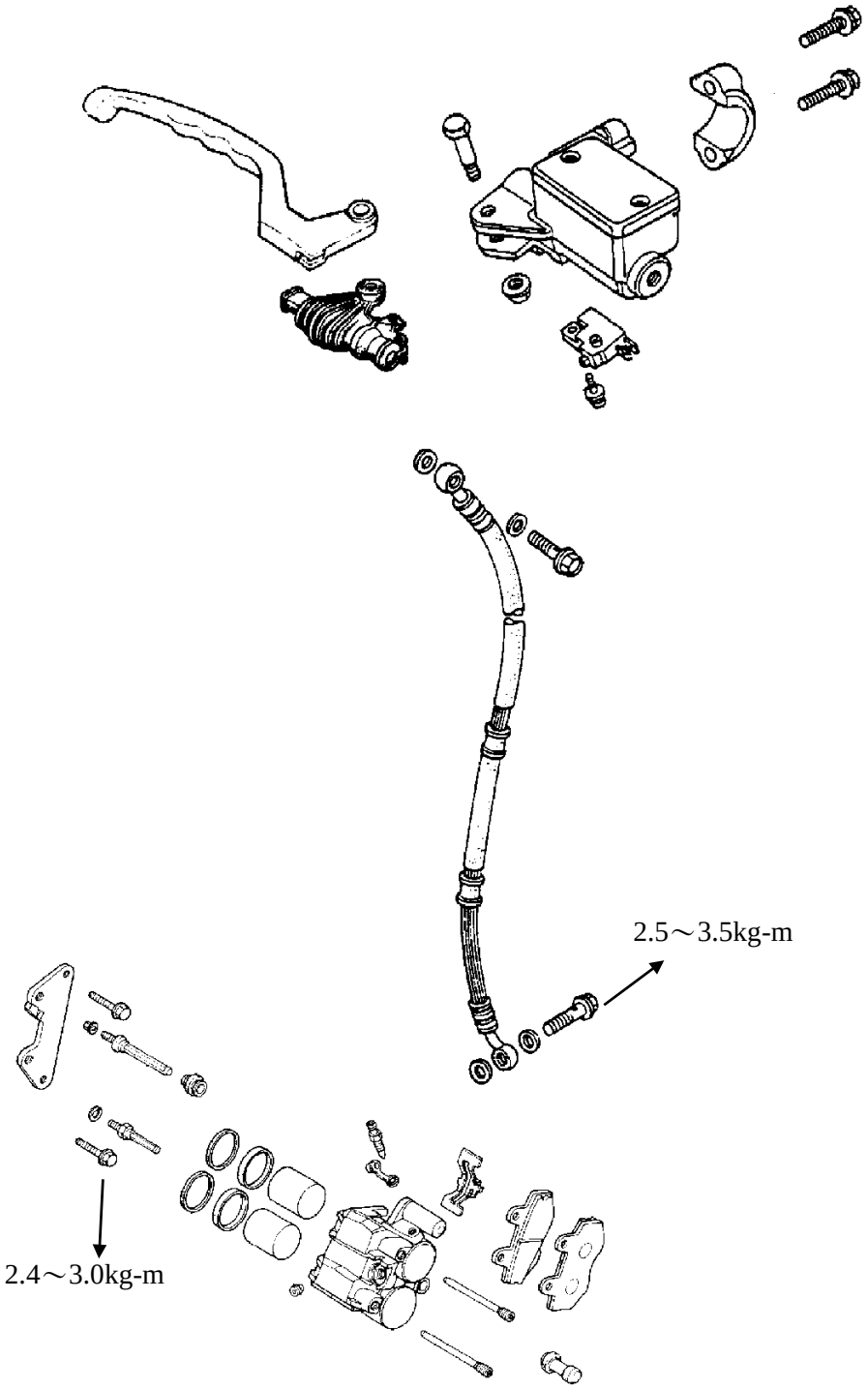
Install the rear fork in the reverse order of removal.
Tighten the rear fork pivot nut.

Torque: 5.5～7.0kg-m

After the rear fork is installed, install the following parts:
Rear shock absorbers
Rear wheel
Drive chain cover
Rear brake adjustment

HYDRAULIC BRAKE

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Drain the brake fluid from the hydraulic brake system before disassembly.
- Do not allow any foreign matters entering the brake reservoir when filling the brake reservoir with brake fluid.
- Be careful not to splash brake fluid on any coated surfaces and instrument covers to avoid damage.
- Inspect the brake operation before riding.
- Brake fluid will damage painted, coated surfaces and plastic parts. When working with brake fluid, use shop towels to cover and protect painted, rubber and plastic parts. Wipe off any splash of brake fluid with a clean towel. Do not wipe the motorcycle with a towel contaminated by brake fluid.
- Make sure to use recommended brake fluid. Use of other unspecified brake fluids may cause brake failure.

SPECIFICATIONS

Item	Standard Limit (mm)	Service Limit (mm)
Brake disk thickness	4	3.0
Brake disk runout	0.15	—
Brake master cylinder I.D.	12.7～12.743	12.75
Brake master cylinder piston O.D.	12.657～12.684	12.64
Brake caliper piston O.D.	25.4～25.45	25.50
Brake caliper cylinder I.D.	25.335～25.368	25.30

TORQUE VALUES

Caliper holder bolt	2.40～3.0kg-m
Pad pin bolt	1.5～2.0kg-m
Brake fluid tube bolt	2.5～3.5kg-m
Caliper bleed valve	0.4～0.7kg-m
Master cylinder holder bolt	1.0～1.4kg-m

SPECIAL TOOL

Snap ring pliers

TROUBLESHOOTING

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

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

Hard braking
- Seized hydraulic brake system
- Seized piston

Poor brake performance
- Contaminated brake pad surface
- Brake disk or wheel not aligned

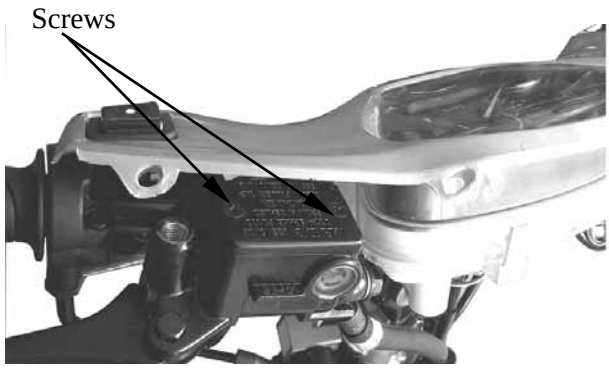
Brake noise
- Contaminated brake pad surface
- Excessive brake disk runout
- Incorrectly installed caliper
- Brake disk or wheel not aligned

13. HYDRAULIC BRAKE

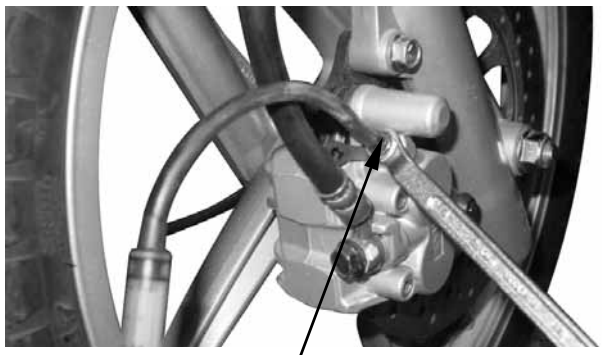
BRAKE FLUID CHANGE/AIR BLEED

Place the motorcycle on its main stand on level ground and set the handlebar upright.
Remove the two screws attaching the brake fluid reservoir cap.

✳ Use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.



Connect a transparent hose to the brake caliper bleed valve and then loosen the bleed valve nut.
Use a syringe to draw the brake fluid out through the hose.

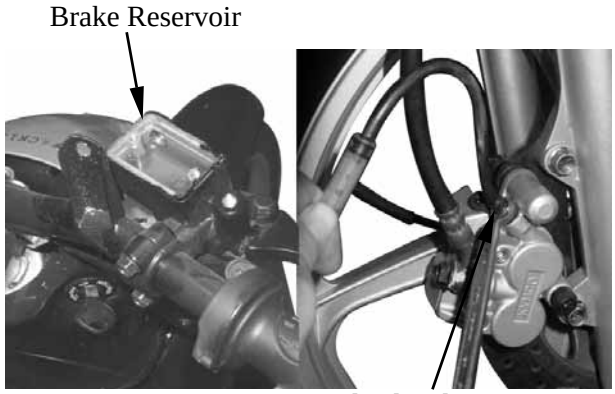


BRAKE FLUID REFILLING

Connect a transparent hose and syringe to the brake caliper bleed valve and then loosen the bleed valve nut.
Fill the brake reservoir with brake fluid and use the syringe to draw brake fluid into it until there is no air bubbles in the hose.
Then, tighten the bleed valve nut.

✳
- When drawing brake fluid with the syringe, the brake fluid level should be kept over 1/2 of the brake reservoir height.
- Use only the recommended brake fluid.

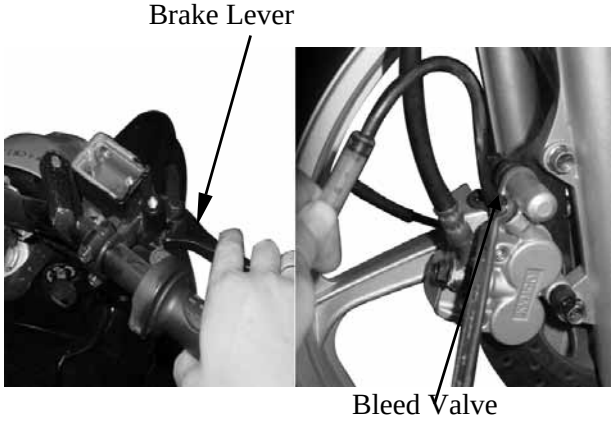
Recommended Brake Fluid: DOT-4



BRAKE SYSTEM BLEEDING

Connect a transparent hose to the bleed valve and fully apply the brake lever after continuously pull it several times. Then, loosen the bleed valve nut to bleed air from the brake system. Repeat these steps until the brake system is free of air.

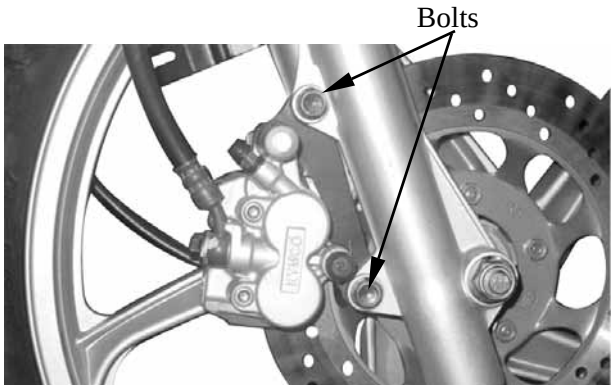
✳ When bleeding air from the brake system, the brake fluid level should be kept over 1/2 of the brake reservoir height.



BRAKE PAD/DISK

BRAKE PAD REPLACEMENT

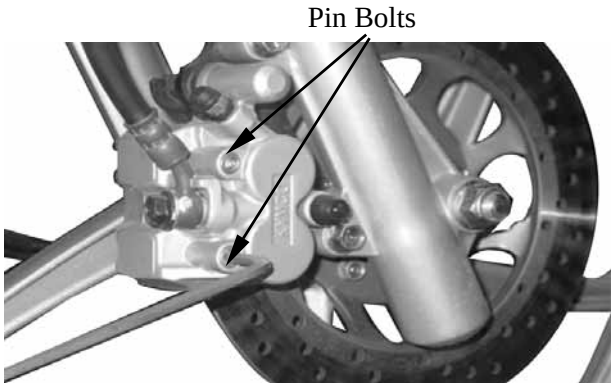
Remove the two bolts attaching the brake caliper holder.



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

Remove the brake caliper.

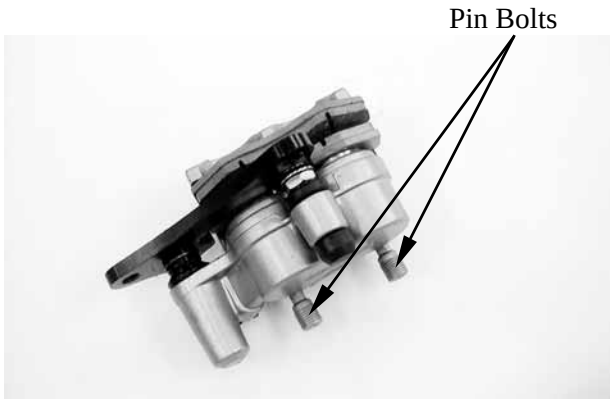
Remove the pad pin bolts and brake pads.



Remove the pad springs.

ASSEMBLY

Assemble the brake pads in the reverse order of removal.
Tighten the pad pin bolts.
Torque: 1.2～2.0kg-m
Tighten the pad pin bolt caps.



✳ Do not tighten the pad pin bolt caps excessively.

Torque: 0.2～0.4kg-m

BRAKE DISK

Measure the brake disk thickness.

Service Limit: 3.0mm

Measure the brake disk runout.

Service Limit: 0.3mm

BRAKE MASTER CYLINDER

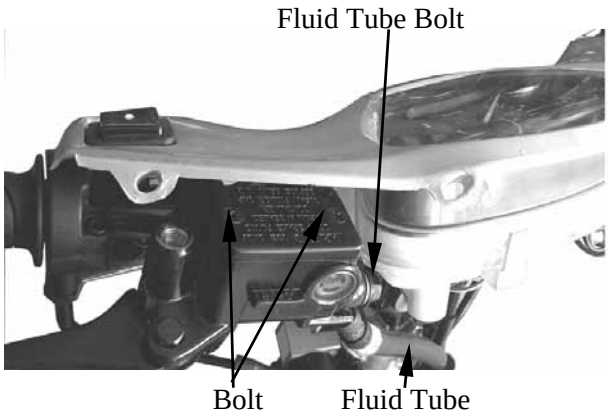
REMOVAL

Drain the brake fluid from the hydraulic brake system.

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

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

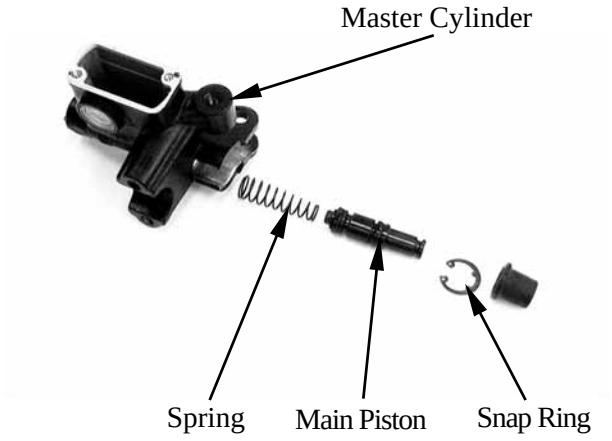
✳ When removing the brake fluid tube bolt, be sure to place towels under the tube and plug the tube end to avoid brake fluid leakage and contamination.



DISASSEMBLY

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

Remove the washer, main piston and spring from the brake master cylinder.
Clean the inside of the master cylinder and brake reservoir with brake fluid.



INSPECTION

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

Service Limit: 12.75mm replace if over

Measure the brake master cylinder piston O.D.

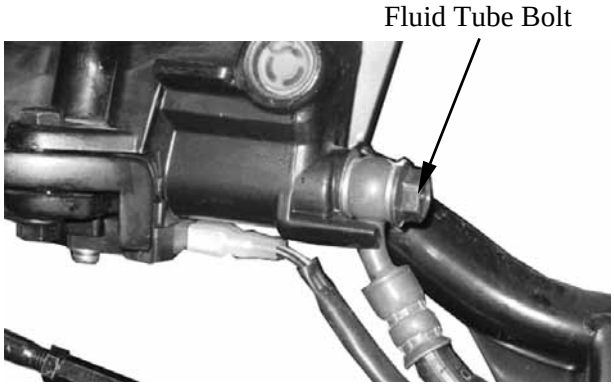
Service Limit: 12.64mm replace if below

ASSEMBLY

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

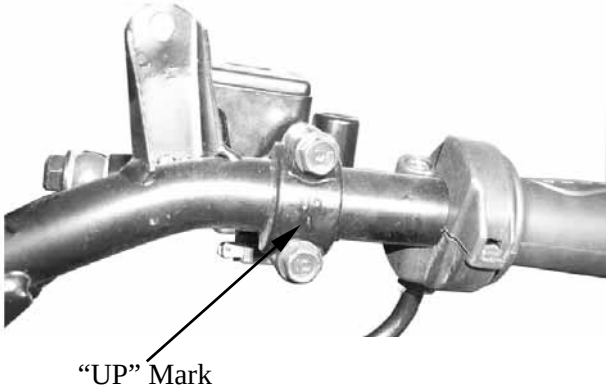
✳
- During assembly, the master cylinder, main piston and spring must be installed as a unit without exchange.
- When assembling the piston, soak the cups in brake fluid for a while.

Install the main piston and snap ring.
Install the rubber cover.
Install the brake lever.

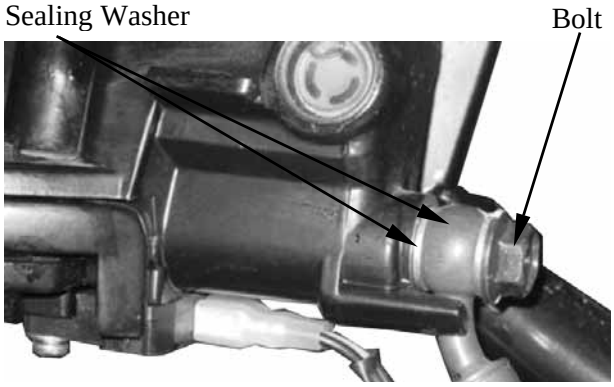


Place the brake master cylinder on the handlebar and install the master cylinder holder with the “UP” mark facing up, aligning the tab on the holder with the hole in the handlebar.
First tighten the upper bolt and then tighten the lower bolt.

Torque: 1.0～1.4kg-m



Install the brake fluid tube with the bolt and two sealing washers. Then, install the rearview mirror.
Fill the brake reservoir with recommended brake fluid to the upper level.
Bleed air from the hydraulic brake system. (Refer to 13-4.)

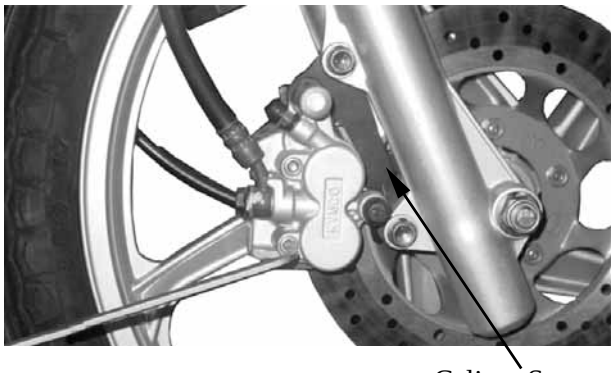


BRAKE CALIPER

REMOVAL

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

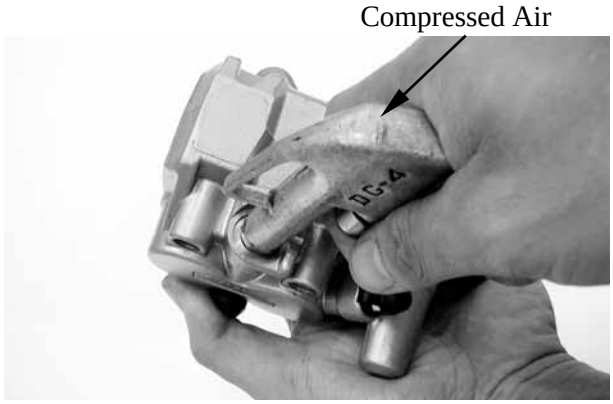
✳ Be careful not to splash brake fluid on any coated surfaces.



DISASSEMBLY

Remove the brake caliper seat from the brake caliper.

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



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

✳ Be careful not to damage the piston surface.

INSPECTION

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

Service Limit: 25.45mm replace if below

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

Service Limit: 25.30 mm replace if over

ASSEMBLY

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

✳ Install the piston with its outer end protruding 3～5mm beyond the brake caliper.

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

INSTALLATION

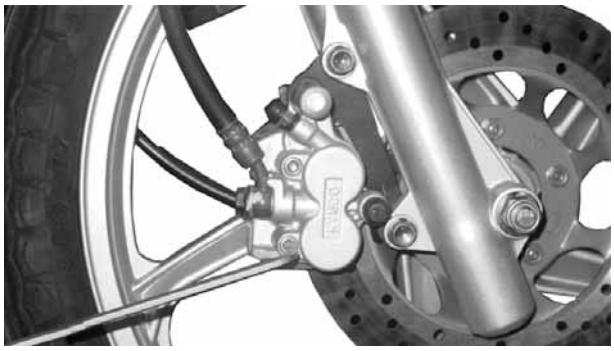
Install the brake caliper onto the right front fork and tighten the bolts.

Torque: 2.4～3.0kg-m

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

Torque: 2.4～3.0kg-m

Add the recommended brake fluid into the brake reservoir and bleed air from the brake system. (Refer to 13-4.)



14

FRAME COVER

SCHEMATIC DRAWING

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The exhaust muffler must be removed when it is cold to avoid burns.
- When installing the exhaust muffler, first tighten the exhaust muffler joint lock nuts and then tighten the exhaust muffler hanger lock bolt.

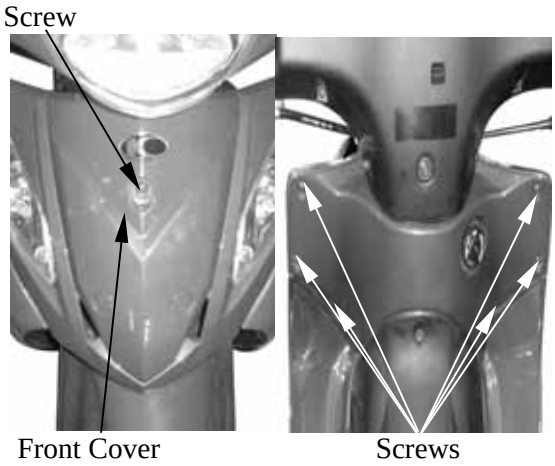
TORQUE VALUES

Rear carrier lock bolt	3.0～4.0kg-m
Exhaust muffler joint lock nut	0.8～1.2kg-m

FRAME COVERS

FRONT COVER REMOVAL

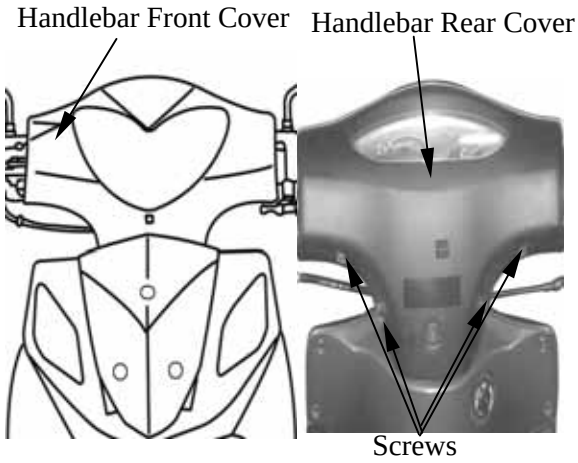
Remove the screw on the front cover.
Remove the six screws on the back of the front cover.
Remove the front cover.
The installation sequence is the reverse of removal.



HANDLEBAR FRONT/REAR COVER REMOVAL

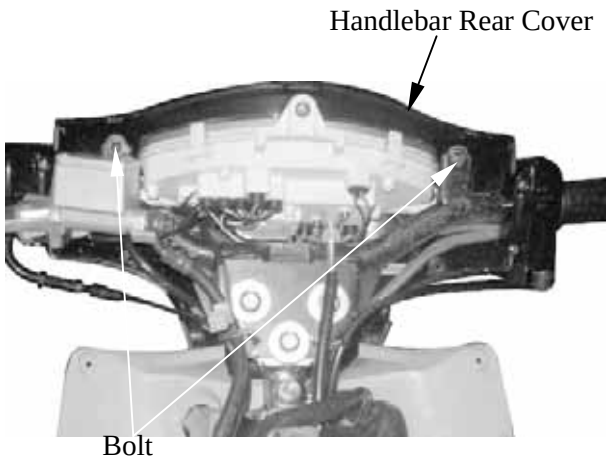
HANDLEBAR FRONT COVER REMOVAL

Remove the handlebar front cover screw.
Disconnect the headlight wire connector and remove the handlebar front cover.



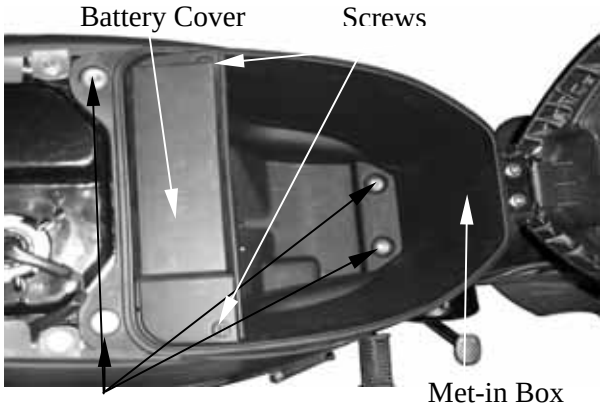
HANDLEBAR REAR COVER REMOVAL

Disconnect the speedometer cable, right and left handlebar switch couplers, and the stop switch wire connectors.
Remove the bolt attaching the handlebar rear cover.
Remove two screws inside the handlebar rear cover and remove the handlebar rear cover.
The installation sequence is the reverse of removal.



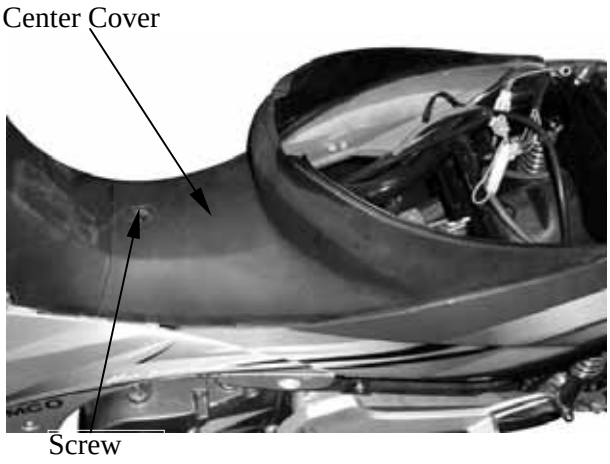
MET-IN BOX REMOVAL

Open the seat and remove the two screws attaching the battery cover
Remove the battery cover.
Remove the battery and C.D.I.
Remove the two nuts and three bolt attaching the met-in box.
Remove the met-in box .

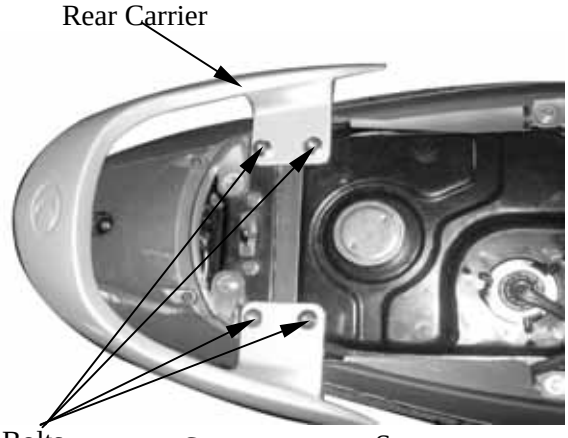


FRAME BODY COVER REMOVAL

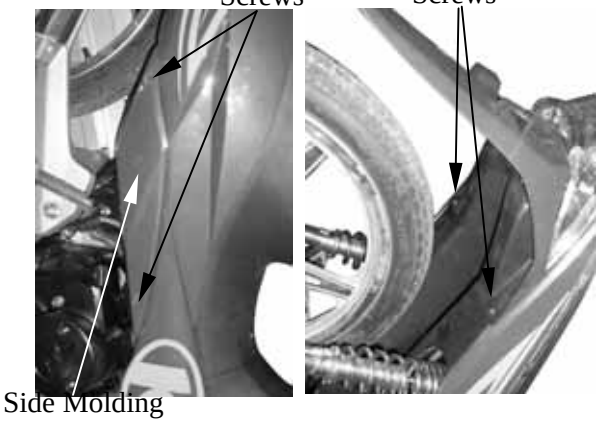
Remove the center cover screw and center cover..



Remove the four bolts attaching the rear carrier.
Remove the rear carrier.



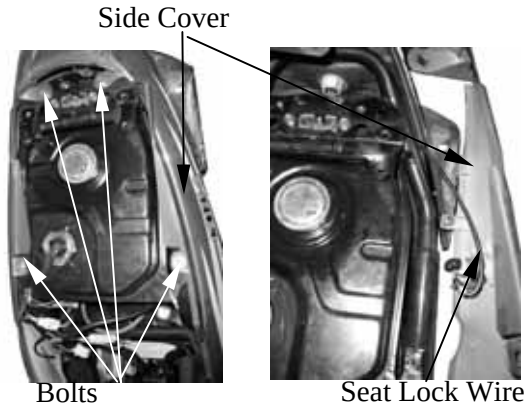
Remove the four screws on the left and right side molding.
Remove the left and right side molding.
Remove the two screws under rear fender.



Remove the four bolts attaching each of the

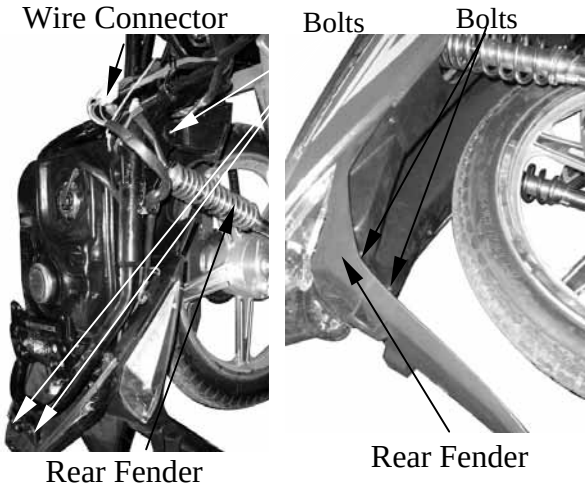
right and left side covers.
Remove the right and left side covers.
Disconnect the seat lock wire.
Remove the frame body cover.
The installation sequence is the reverse of remove .

* During removal, do not pull the joint claws forcedly to avoid damage. When installing, be sure to connect the seat lock wire.

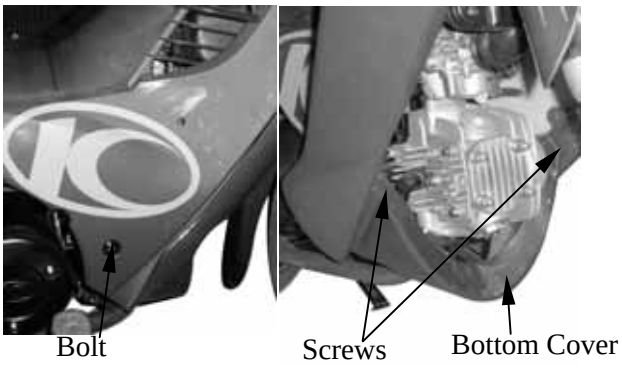


REAR FENDER REMOVAL

Remove the rear carrier and rear seat.
Remove the met-in box.
Remove the frame body cover.
Remove the six bolts attaching the rear fender .
Disconnect the taillight wire connector
Remove the rear shock absorber .
Remove the rear fender
The installation sequence is the reverse of remove .



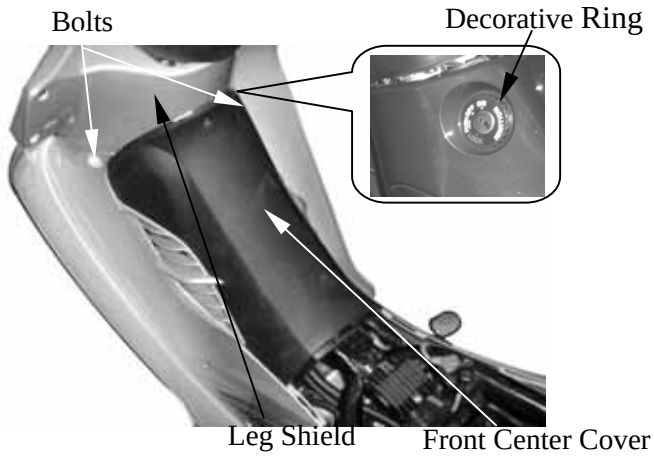
Remov the two bolts and two screws attaching the botton cover.
Remov the bottom cover.
The installation sequence is the reverse of remove



LEG SHIELD REMOVAL

Remove the front center cover

Remove the leg shield bolt.
Remove the ignition switch decorative ring
Remove the leg shield.
The installation sequence is the reverse of remove



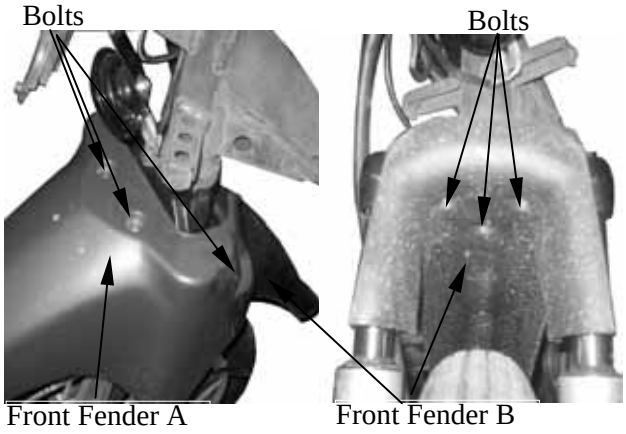
FRONT FENDER REMOVAL

Remove the four bolts attaching the front fender A and remove the front fender.

Remove the three bolts attaching the front fender B and remove the front fender.

The installation sequence is the reverse of remove

✳ During removal, do not pull the joint claws forcedly to avoid damage.
When installing, be sure to connect the seat lock wire.



EXHAUST MUFFLER REMOVAL

Remove the two exhaust muffler joint lock nuts.
Remove the two exhaust muffler lock bolts.
Remove the exhaust muffler.
Remove the exhaust muffler joint packing collar.

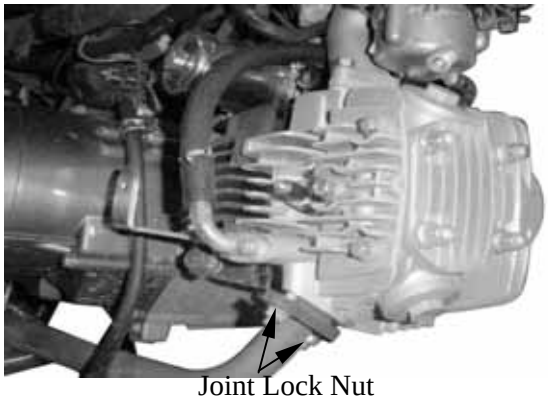
When installing, first install the exhaust muffler packing collar and then install the exhaust muffler.
First install and tighten the exhaust muffler joint lock nuts. Then, install and tighten the exhaust muffler lock bolts.

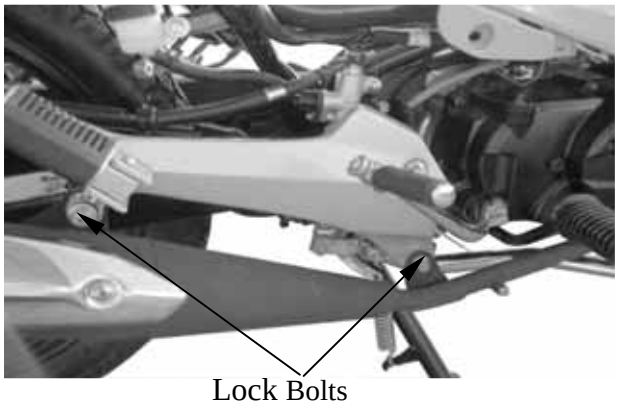
Torques:

Exhaust muffler lock bolt: 3.0~3.6kgf-m

Exhaust muffler joint lock nut: 1.0~1.4kgf-m

✳ Be sure to install a new exhaust muffler packing collar.

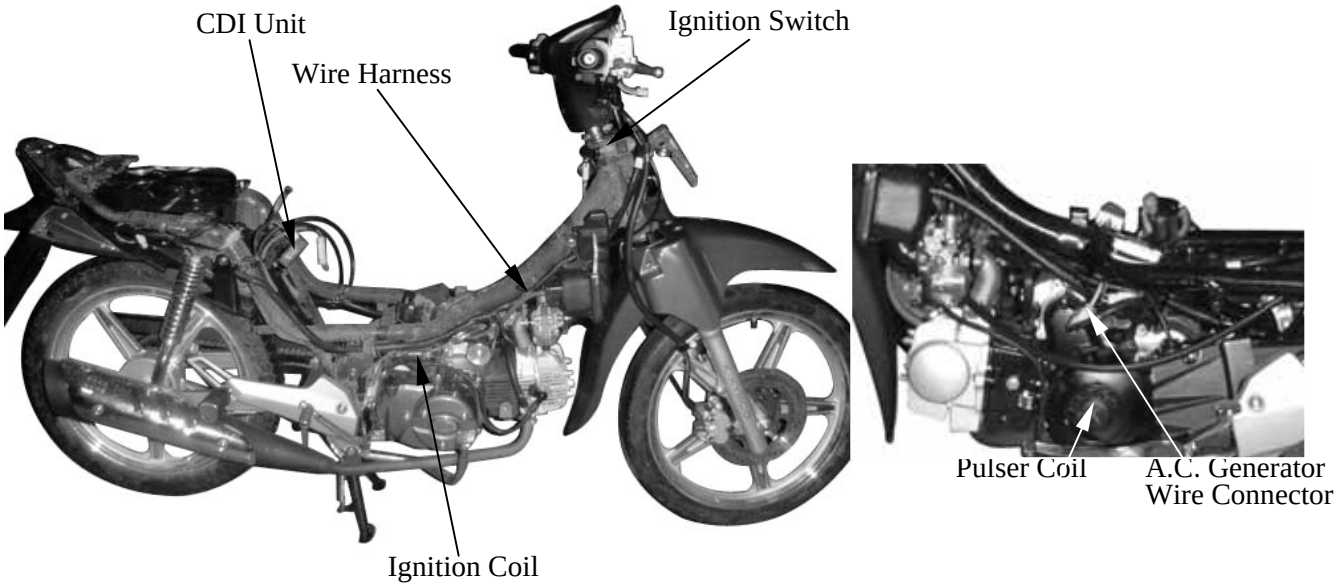


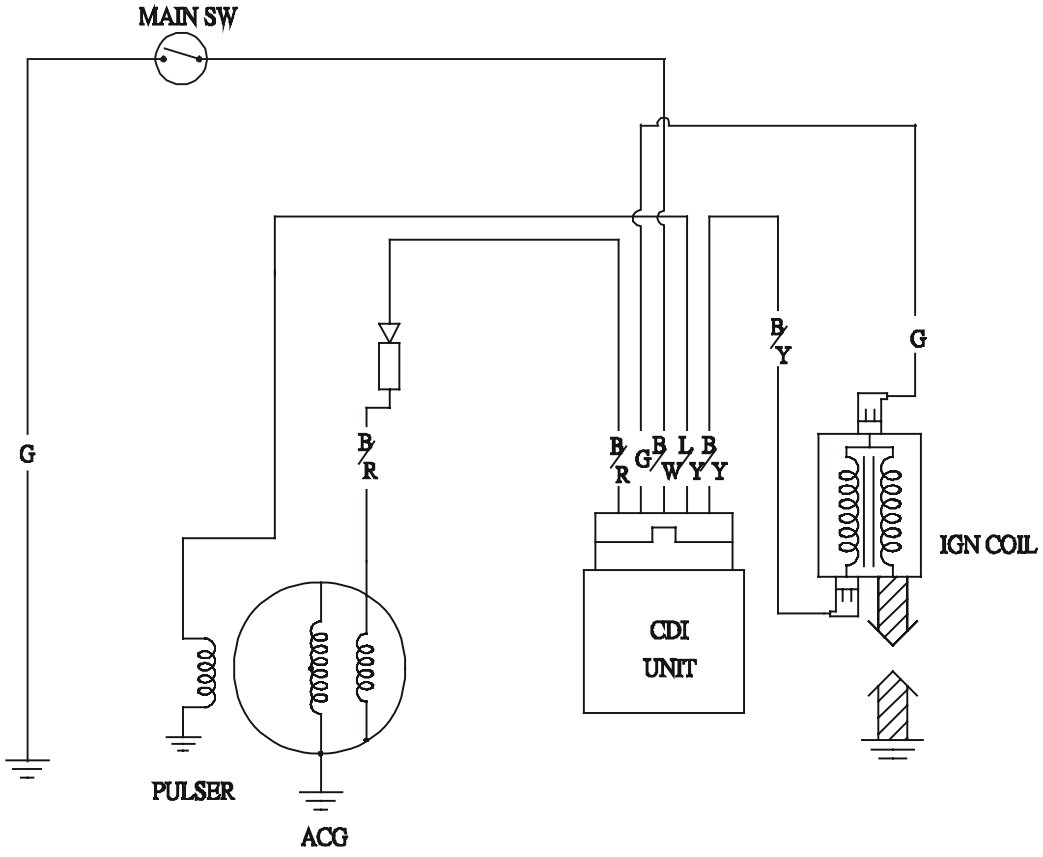


15

IGNITION SYSTEM

15. IGNITION SYSTEM





SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Inspect the ignition system according to the sequence specified in the Troubleshooting 15-2.
- The ignition system has an electrical auto aligner in the CDI unit, so the ignition timing is not adjustable.
- Do not drop or impact the CDI unit with strong force to avoid damage. Be careful when removing it.
- Loose connector and poor wire connection are the main causes of faulty ignition system. Check each connector before operation.
- Check the spark plug heat range. Use of spark plug with improper heat range is the main cause of poor engine performance or burned engine.
- Perform inspections according to the servicing procedures specified in each section.

SPECIFICATIONS

Item			Standard
Spark plug	Standard type		CHAMPION-P-RZ9HC
Spark plug gap			0.6～0.7mm
Ignition timing	"F" mark:15±2°/1,700rpm		—
Ignition coil resistance (20℃)	Primary coil		0.1～0.3Ω
	Secondary coil	with plug cap	10～15KΩ
		without plug cap	4.2～5.2KΩ
Pulser coil resistance (20℃)			80～160Ω
Exciter coil resistance (20℃)			550～650Ω
Ignition coil primary side max. voltage			140V min.
Pulser coil max. voltage			1.5V/300rpm min.
Exciter coil max. voltage			350～10000rpm 400V max.

TESTING INSTRUMENT

Electric Tester
Timing light
Tachometer

TROUBLESHOOTING

Engine stalls immediately after it starts

- Weak spark
- Improper ignition timing
- Faulty CDI unit

No spark at plug

- Faulty ignition switch
- Poorly connected, broken or shorted wire

–Between pulser coil, CDI unit and ignition coil
–Between exciter coil and CDI unit
–Between CDI unit and ignition coil
–Between CDI unit and ignition switch
–Between ignition coil and spark plug

Engine starts but runs poorly

- Faulty ignition coil
- Poorly connected wire
- Faulty spark plug
- Spark plug cap electricity leakage
- Faulty A.C. generator
- Stator not installed properly (Loose)
- Faulty CDI unit

IGNITION COIL

CONTINUITY TEST

✳ This test is to inspect the continuity of ignition coil.

Remove the right decorative cover.
Measure the resistance between the ignition coil primary coil terminals.
Resistance(20℃): 0.1～0.3Ω

Ignition Coil

Measure the secondary coil resistance between the spark plrg cap and the primary coil terminal as Figure A shown.
Resistance(20℃)(with plug cap): 10～15KΩ

Figure A

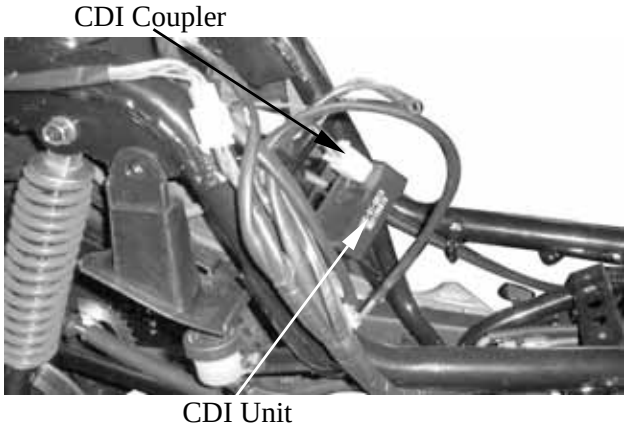
Figure B

Measure the secondary coil resistance between the ignition coil terminal and the primary coil terminal as Figure B shown.
Resistance(20℃) (without plug cap): 4.2～5.2KΩ

CDI UNIT

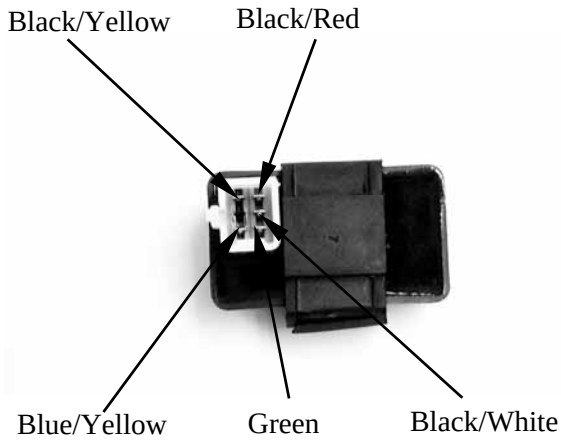
REMOVAL

Remove the left side cover (page 14-3).
Disconnect the CDI coupler and remove the CDI unit.



INSPECTION

Measure the resistance between the CDI unit terminals.
Replace the CDI unit if the readings are not within the specifications in the table below.



✳
- Due to the semiconductor in circuit, it is necessary to use a specified tester for accurate testing. Use of an improper tester or measurements in an improper range may give false readings.
- Use a Sanwa Electric Tester or Kowa Electric Tester TH-5H for testing
- In this table, "Needle swings then returns" indicates that there is a charging current applied to a condenser. The needle will then remain at "∞" unless the condenser is discharged.

Testing Range

Use the x1KΩ range

Unit: KΩ

(+)Probe / (-)Probe	Black/ Yellow	Black/ Red	Black/ White	Blue/ Yellow	Green
Black/ Yellow		∞	∞	∞	∞
Black/ Red	∞		2-8K	40-80K	10-30K
Black/ White	∞	10-30K		10-30K	8-24
Blue/Y ellow	∞	120-180K	80-120K		60-100K
Green	∞	2-8K	10-14K	6-12K	

EXCITER COIL/PULSER COIL

INSPECTION

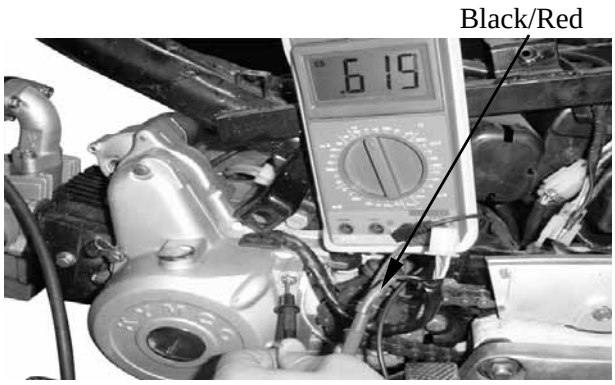
✳ This test is performed with the stator installed in the engine.

Remove the met-im box.
Disconnect the A.C. generator wire connector.
Measure the pulser coil resistance between the blue/yellow wire and ground.
Resistance: 80～160Ω

EXCITER COIL INSPECTION

Disconnect the exciter coil wire coupler and measure the resistance between the black/red wire terminal and ground.

Resistance: 550～650Ω



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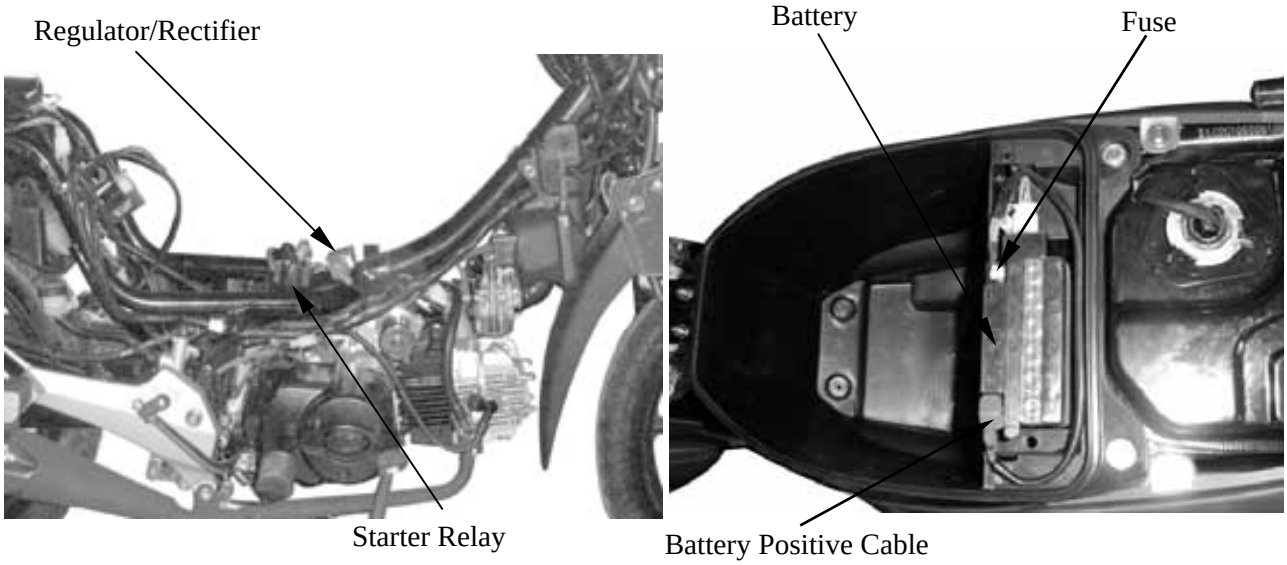
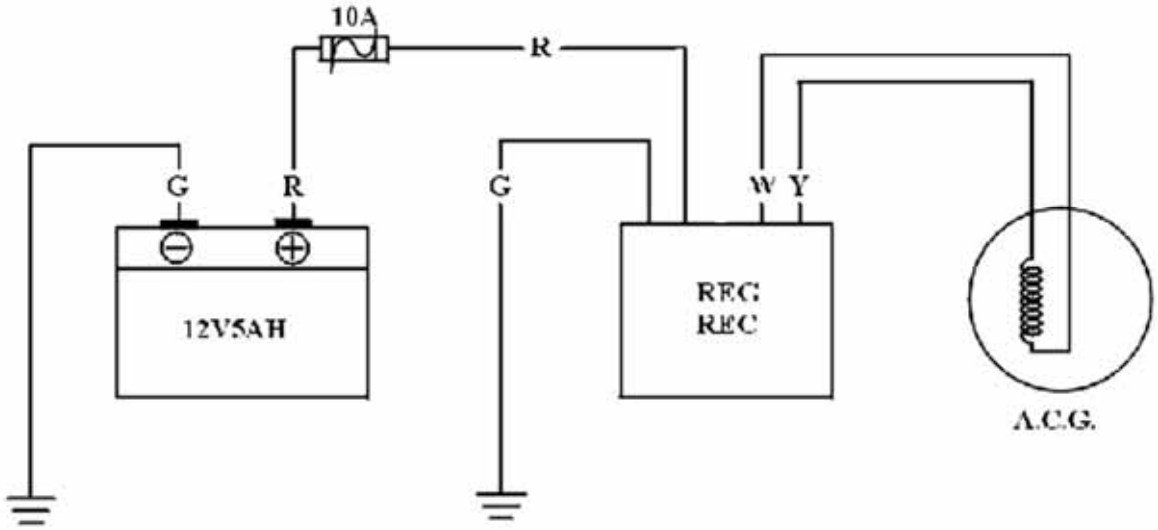
CHARGING SYSTEM

16. CHARGING SYSTEM





SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The battery is a MF battery which needs no refilling of distilled water.
- Do not quick charge the battery. Be sure to use a MF battery charger and the battery temperature should not exceed 45℃.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the motorcycle, keep sparks and flames away from a charging battery.
- When inspecting the A.C. generator, use an electric tester.
- Route the charging system wires properly to avoid shorted wire due to wires being twisted or kinked.

SPECIFICATIONS

Battery capacity		12V5AH
Electrolyte specific gravity		1.260～1.280　20℃
Charging current		10A max.
A.C. generator	Charging rpm	2,500 rpm (min.)
	Capacity	1.3A min./6,000 rpm
Regulator/Rectifier		No contact point type
Charging coil resistance		0.2～0.3Ω

TORQUE VALUES

A.C. generator stator bolt
A.C. generator rotor bolt

SPECIAL TOOLS

Flywheel holder
Flywheel puller

TESTING INSTRUMENTS

Kowa electric tester
Sanwa electric tester

TROUBLESHOOTING

No power
- Dead battery
- Fuse burned out
- Disconnected battery cable
- Faulty ignition switch

Low power
- Weak battery
- Loose battery connection (terminal)
- Charging system failure
- Faulty regulator/rectifier

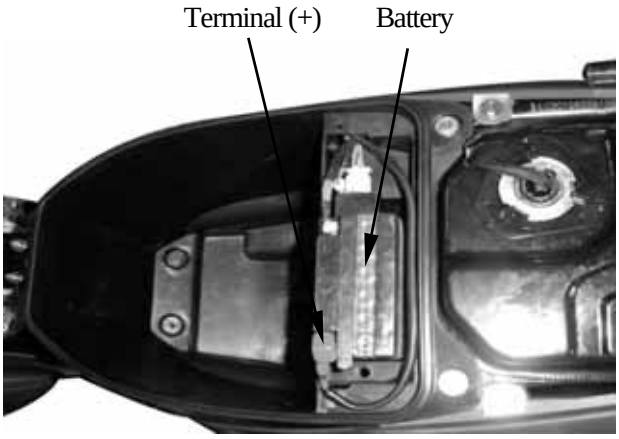
Intermittent power
- Loose battery cable connection
- Loose charging system connection
- Loose lighting system connection

Charging system failure
- Loose, broken or shorted wire or connector
- Faulty regulator/rectifier
- Faulty A.C. generator

BATTERY

REMOVAL

Open the seat and battery cover.
First disconnect the battery negative cable and then the positive cable.
Remove the battery.



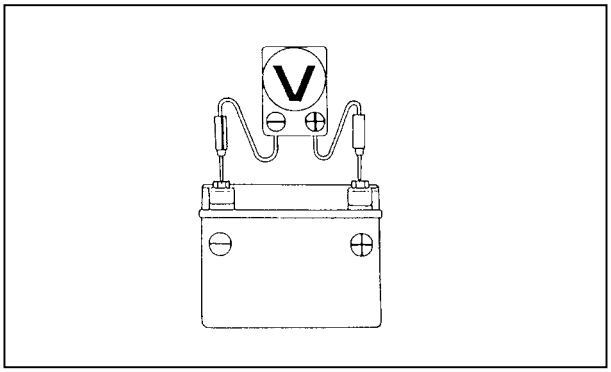
> When disconnecting the battery positive (+) cable, do not touch the frame with tool; otherwise it will cause short circuit and sparks to damage the battery and ignite the gasoline.

The installation sequence is the reverse of removal.

> First connect the positive (+) cable and then the negative (-) cable to avoid short circuit.

BATTERY VOLTAGE (OPEN CIRCUIT VOLTAGE) INSPECTION

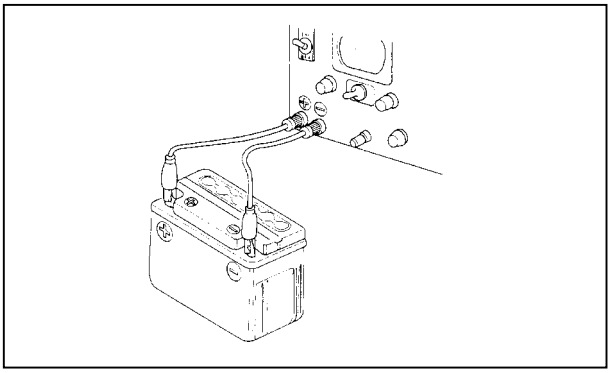
Remove the left side cover.
Disconnect the battery cables.
Measure the voltage between the battery terminals.
Fully charged : 13.1V
Undercharged: 12.3V



> Battery charging inspection must be performed with a voltmeter.

CHARGING

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



> - Keep flames and sparks away from a charging battery.
> - Turn power ON/OFF at the charger, not at the battery terminals to prevent sparks near the battery to avoid explosion.
> - Charge the battery according to the current specified on the battery.

> - Quick charging should only be done in an emergency.
> - Measure the voltage 30 minutes after the battery is charged.

Charging current: Standard : 0.5A

Charging time : Standard : 5～10 hours

After charging: Open circuit voltage: 12.8V min.

PERFORMANCE TEST

Perform this test with a fully charged battery. Start and warm up the engine for 10 minutes. Connect the battery positive cable to the ammeter positive probe and the battery negative cable to the ammeter negative probe.

Then connect the voltmeter across the battery terminals to test the charging voltage.

CHARGING PERFORMANCE:

Headlight Switch Position	Charging rpm	3000 rpm	8000 rpm
OFF (Day)	2150 rpm max.	4A 16V	6.3A 16.7V
ON (Night)	2150 rpm max.	1.1A 14V (1.0A min.)	2.1A 14V (3.7A min.)

Limit Voltage Test:

Start the engine and gradually increase the engine speed to measure the limit voltage.

Limit Voltage: 14.5±0.5V

Note: Test when the battery is fully charged.

✳ When testing the limit voltage, use a tachometer for operation.

A.C. GENERATOR

INSPECTION

Disconnect the A.C. generator white and green wires and measure the resistance between the white and green wires.

Resistance: 0.3～1.5Ω

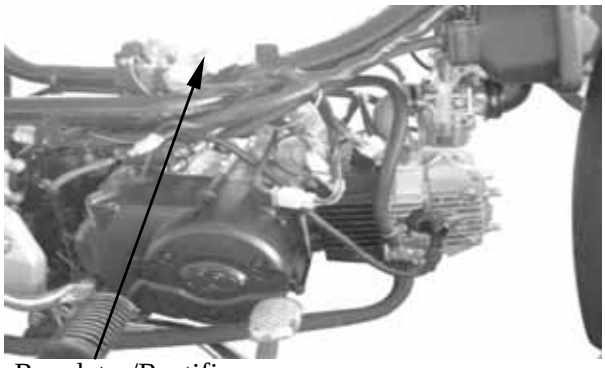
✳ Do not connect the A.C. generator pink and yellow wires to ground wire.

Positive Probe Negative Probe.

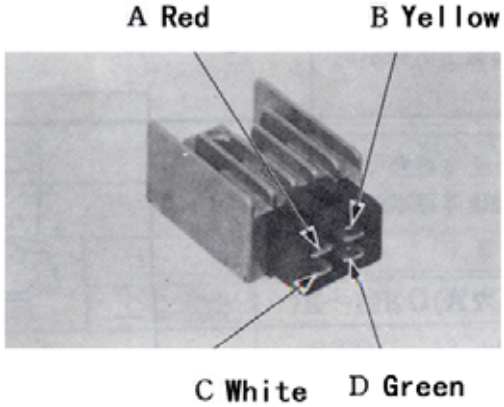
REGULATOR/RECTIFIER

REMOVAL

Remove the front cover(page 14-4).
Remove the regulator/rectifier lock nut and disconnect the regulator/rectifier wire coupler.
Measure the resistances between the regulator/rectifier wire terminals. Replace the regulator/rectifier if the readings are not within the specifications in the table below.


Regulator/Rectifier

✳
- Due to the semiconductor in circuit, it is necessary to use a specified tester for accurate testing. Use of an improper tester or measurements in an improper range may give false readings.
  Use a Sanwa Electric Tester or Kowa Electric Tester for testing.



Testing Range
Range for the Sanwa Tester: xKΩ
Range for the Kowa Tester: x100Ω

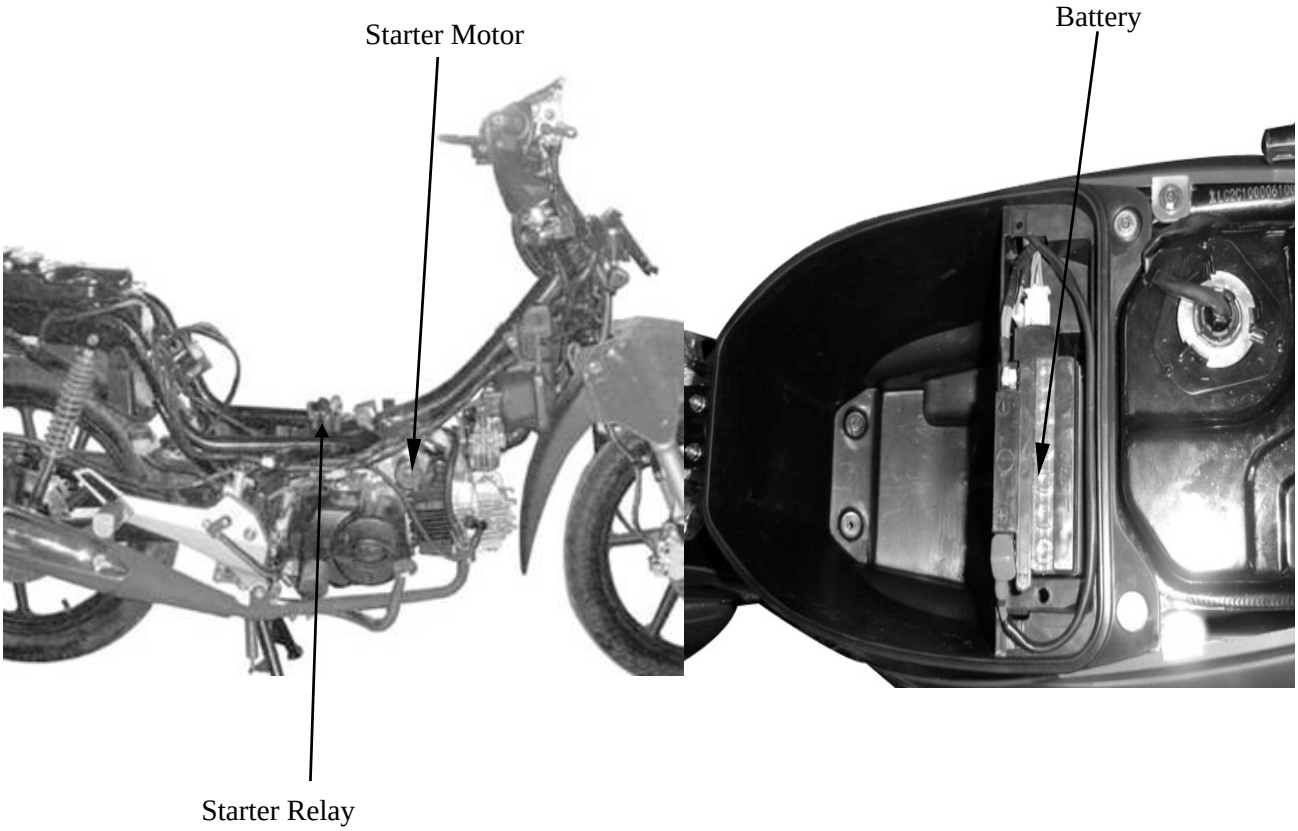
(+)Probe / (-)Probe	A (Red)	B (Yellow)	C (White)	D (green)
(Red)		∞	∞	∞
(Yellow)	∞		∞	5K-100K
(White)	3-50	∞		∞
(green)	∞	5-100K	∞	

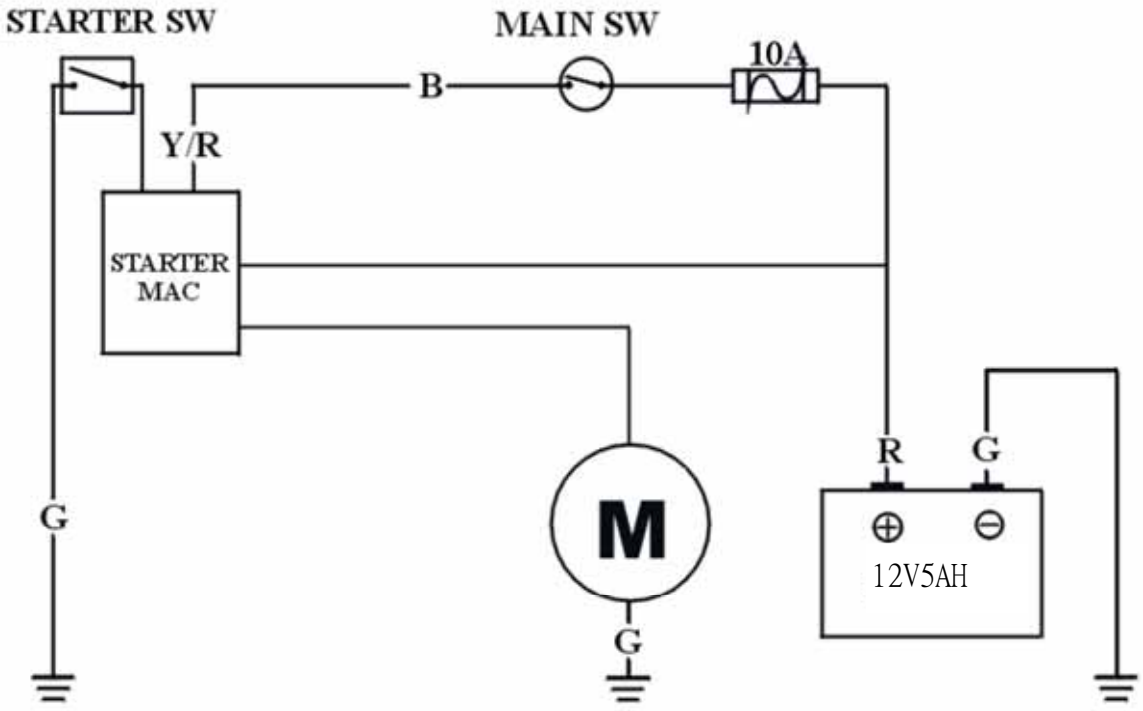
Note: The readings in this table are taken with a Sanwa Tester.

17

STARTING SYSTEM

STARTING SYSTEM DIAGRAM





SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The removal of starter motor can be accomplished with the engine installed in the frame.
- Refer to Section 8-3 for the removal of starter clutch.
- When connecting the starting system wires, connect them securely to avoid hard starting due to poor connection.

SPECIFICATIONS

Item	Standard Limit (mm)	Service Limit (mm)
Starter motor brush length	—	8.5

TORQUE VALUES

Starter motor bolt 0.8～1.2kg-m
Starter clutch lock nut 3.2～4.0kg-m

SPECIAL TOOLS

TROUBLESHOOTING

Starter motor won‘t turn

- Fuse burned out
- Weak battery
- Faulty ignition switch
- Faulty starter clutch
- Faulty starter relay
- Poorly connected, broken or shorted wire
- Faulty starter motor

Lack of power

- Weak battery
- Loose wire or connection
- Foreign matter stuck in starter motor or gear

Starter motor rotates but engine does not start

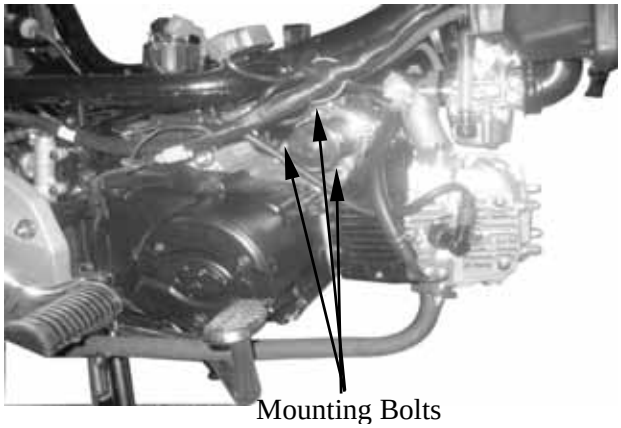
- Faulty starter clutch
- Reverse rotation of starter motor
- Weak battery

STARTER MOTOR

REMOVAL

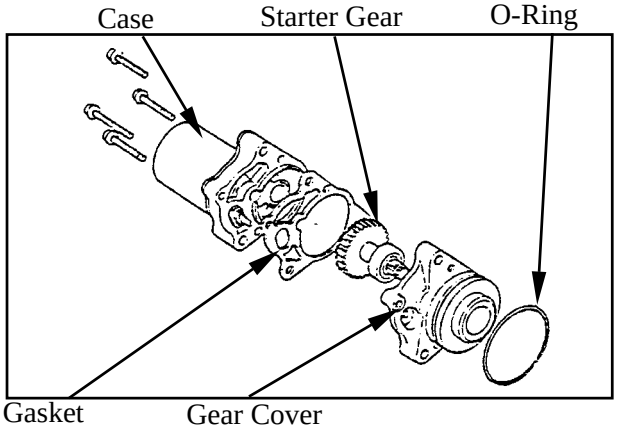
✳ Before removing the starter motor, turn the ignition switch OFF and remove the battery ground. Then, turn on the ignition switch and push the starter button to see if the starter motor operates properly.

Disconnect the starter motor wire.
Remove the three starter motor mounting bolts and the motor.



DISASSEMBLY

Remove the four starter motor case mounting screws, and disassemble them.

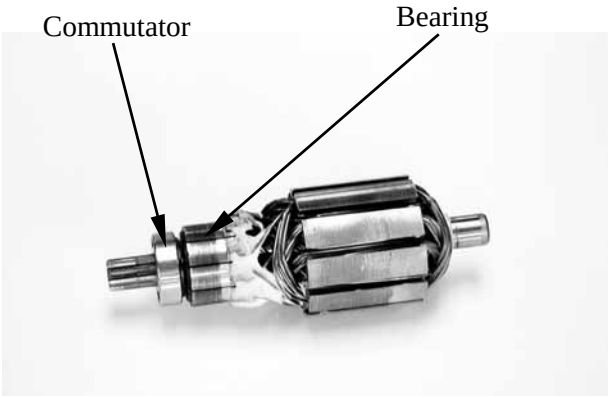


INSPECTION

Inspect the commutator bars for discoloration.

Bars discolored in pairs indicate grounded armature coils.
Turn the outer race of the bearing with your fingers.
The bearing should turn smoothly and quietly.

Also check that the inner race of the bearing fits tightly on the armature shaft.



Check for continuity between pairs of commutator bars.

Also, make a resistance check between individual commutator bars and the armature shaft.

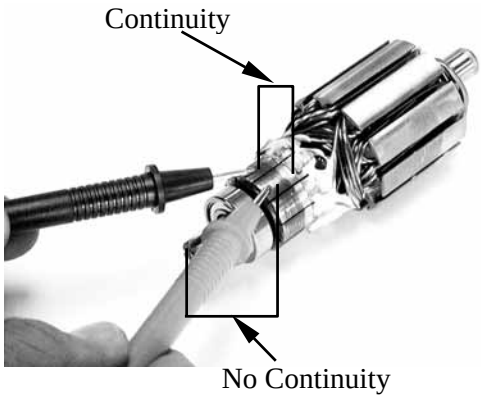
There should be no continuity.

Commutator bar pairs

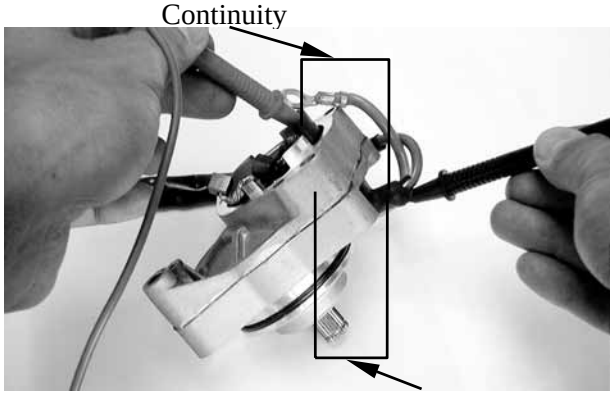
Continuity: normal

Commutator bars and armature shaft

No continuity: normal

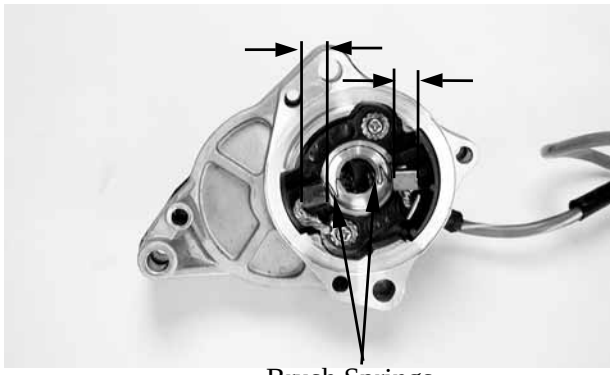


Check for continuity from the cable terminal to the brush holder and from the cable terminal to the brush.
Cable terminal and brush holder
No continuity: normal
Cable terminal and brush
Continuity: normal



Inspect the brushes for wear or damage.
Measure the brush length.
Service limit: 8.5mm

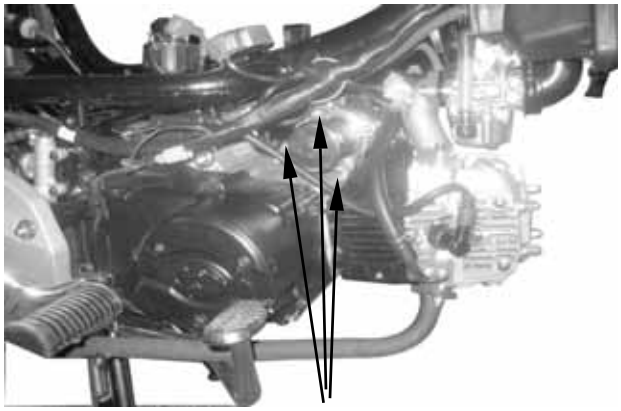
Inspect the brush springs for wear or fatigue.



INSDTALLATION
Install a new O-ring and apply oil to it.
Install the starter motor and tighten the three mounting bolts securely.

* Install the ground terminal properly as shown with starter motor mounting bolt.

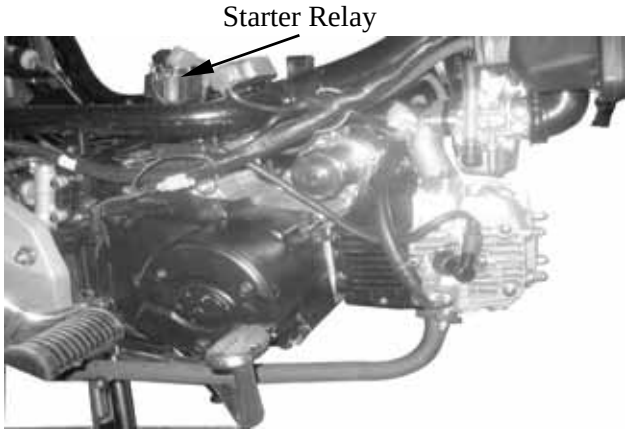
Connect the starter motor connector.
Install the starter clutch (page ?)
Install the front cover.



STARTER RELAY

INSPECTION

Remove the left side cover.
Disconnect the starter relay coupler and then remove the starter relay.



Connect the starter relay yellow/red terminal to the 12V battery positive (+) terminal and the relay green terminal to the battery negative (-) terminal. Check for continuity between the starter relay red and red/white terminals. The relay is normal if there is continuity.

18

LIGHTS/INSTRUMENTS/SWITCHES/HORN/ FUEL UNIT

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- All plastic plugs have locking tabs that must be released before disconnecting.
- An electric tester must be used for checking the continuity between two points. The electric tester also contains a voltmeter which can be used to measure voltage.
- Different bulbs have different specifications. When replacing, use a new bulb of the same specifications to avoid damage of the electrical equipment.
- The continuity check of switches can be made without removing the switches from the motorcycle.

SPECIFICATIONS

Headlight	12V 35/35W
Stoplight/Taillight	12V 21/5W
Turn signal light	12V 10Wx4
Turn signal indicator light	12V 3.4W x2
Instrument light	12V 1.7Wx2
High beam indicator light	12V 1.7W
Fuse	10A

TROUBLESHOOTING

Light does not come on when ignition switch is "ON"

- Burned bulb
- Faulty ignition or light switch
- Fuse burned out
- Dead battery or loose battery wire

Light comes on but dims

- Weak battery
- Wire or switch resistance too high
- Aged bulb or faulty lighting circuit

Headlight beam does not change when dimmer switch is operated

- Faulty or burned bulb
- Faulty dimmer switch
- Loose wire connection

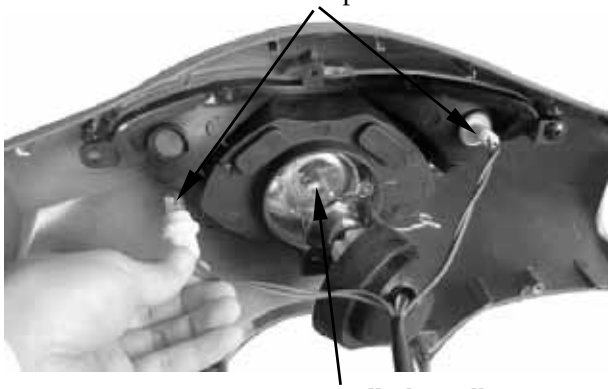
HEADLIGHT

REMOVAL

Remove the handlebar front cover (page 14-3).
Remove the headlight unit and disconnect the headlight wire coupler.

Remove the headlight bulb and bulb socket. Check the bulb for damage and replace with a new one if necessary.

Position Lamp Bulb



Headlight Bulb

INSTALLATION

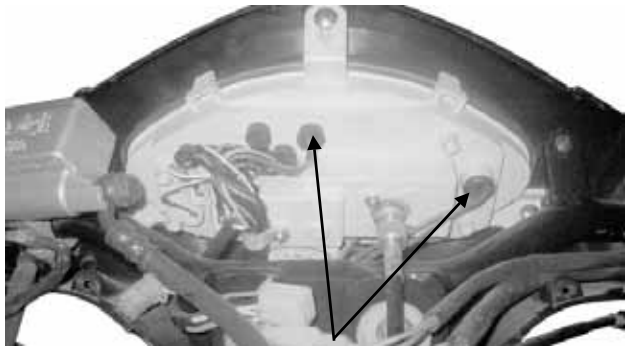
Install the headlight in the reverse order of removal.

* After installation, adjust the headlight beam.

INSTRUMENT

INSTRUMENT BULBS REPLACEMENT

Remove the handlebar rear cover (page 14-5).
Remove the bulbs and replace with new ones.



Nighttime light

SPEEDOMETER REMOVAL

Disconnect the speedometer cable.
Disconnect the speedometer wire connector.
Remove the three screws attaching the speedometer seat.
Remove the speedometer.

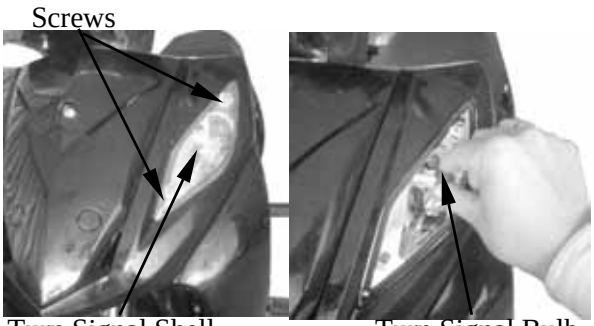
INSTALLATION

The installation sequence is the reverse of removal.

Screws

TURN SIGNAL LIGHT

Remove the two turn signal shell screws and turn signal shell.
Remove the two turn signal bulbs.
The installation sequence is the reverse of removal.

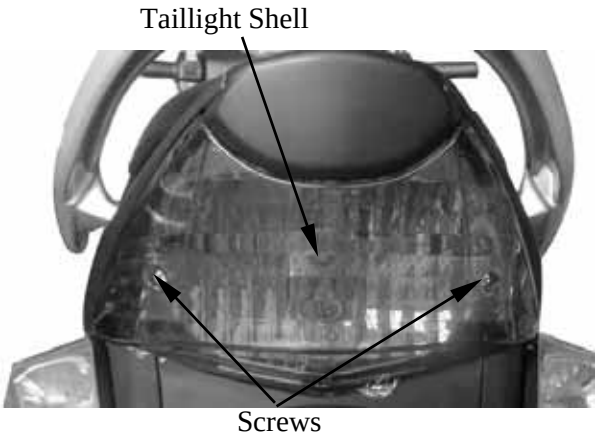


STOP LIGHT/TAILLIGHT

Remove the two taillight shell screws and the shell.
Remove the bulb and check the bulb for damage. Replace with a new one if necessary.

Bulb Specification: 12V.21/5W

The installation sequence is the reverse of removal.



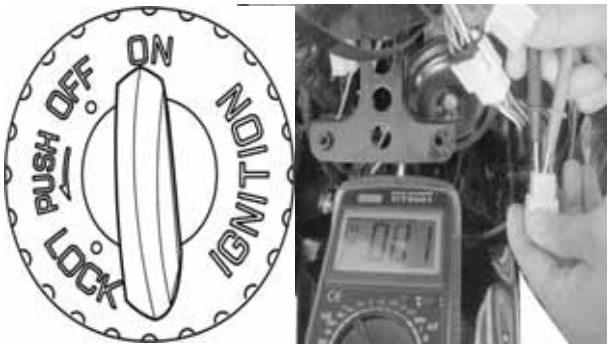
IGNITION SWITCH

Disconnect the ignition switch wire coupler.
Remove the two bolts attaching the ignition switch.
Remove the ignition switch.

INSPECTION

Check for continuity between the wires indicated below.

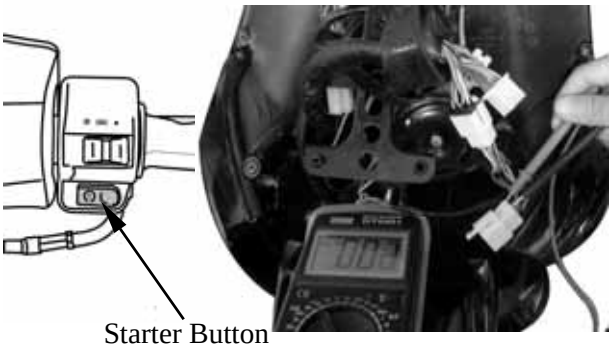
Color / Position	Black	Red	Black/ White	Green
OFF			○——	——○
ON	○——	——○		



STARTER BUTTON

Disconnect the right switch wire coupler.
Check for continuity between the black and yellow/red wires.

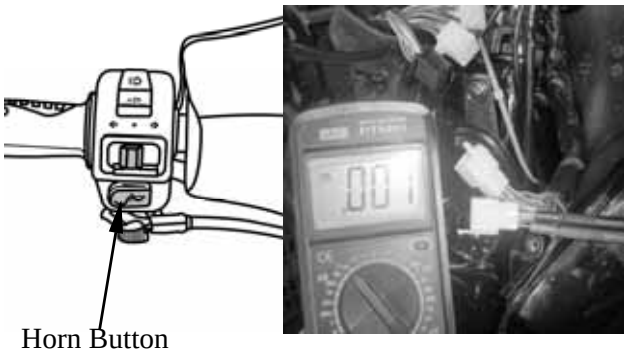
Color / Position	Green	Yellow/Red
FREE		
PUSH	○	○



HORN BUTTON

Remove the decorative covers under the fuel tank.
Disconnect the left switch wire coupler.
Check for continuity between the black and light green wires.

Color / Position	Black	Light Green
FREE		
PUSH	○	○



HORN

Remove the steering head decorative cover.
Disconnect the horn wire coupler.
The horn is normal if it sounds when a 12V battery is connected across the horn wire terminals. Replace the horn if it does not sound.

HANDLEBAR SWITCHES

FRONT STOP SWITCH

Disconnect the front stop switch wire coupler.
Check for continuity between the front stop switch wires.
Brake lever applied: There is continuity.
Brake lever released: There is no continuity.

Front Stop Switch

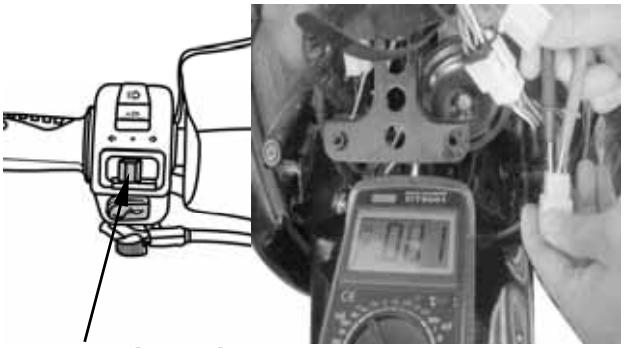
REAR STOP SWITCH

Remove the right side cover.
Disconnect the rear stop switch wire coupler.
Check for continuity between the rear stop switch wires.
Brake pedal depressed: There is continuity.
Brake pedal released: There is no continuity.

TURN SIGNAL SWITCH

Disconnect the turn signal switch wire coupler.
Check for continuity between the turn signal switch wires.

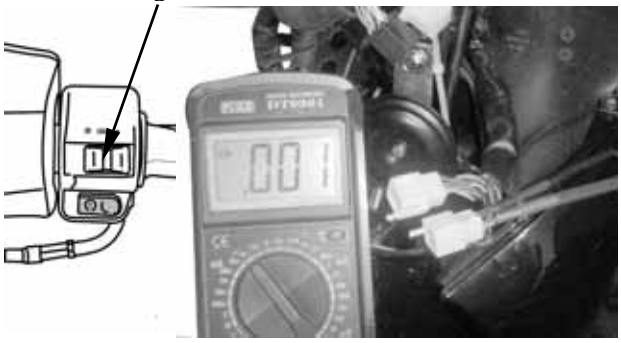
Color / Position	Orange	Gray	Light Blue
R		○——	——○
L	○——	——○	


Turn Signal Switch

HEADLIGHT SWITCH

Disconnect the headlight switch wire coupler.
Check for continuity between the headlight switch wires.

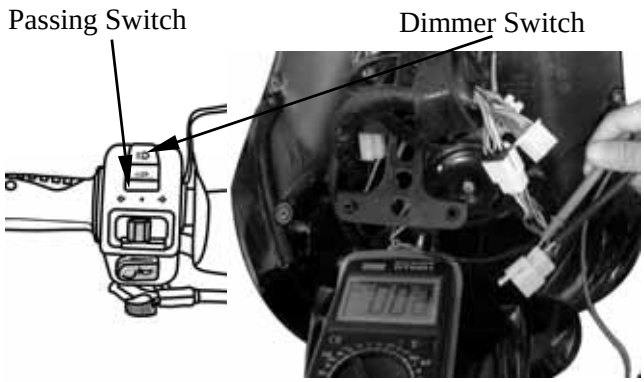
Color / Position	B	Br	Br/W	B	W/L
•					
≡D≡	○	○	○		
☼	○	○		○	○

Headlight Switch


DIMMER SWITCH

Disconnect the dimmer switch wire coupler. Check for continuity between the dimmer switch wires.

Color / Position	White/Blue	White	Blue
LO	○	○	
N	○	○	○
HI	○		○



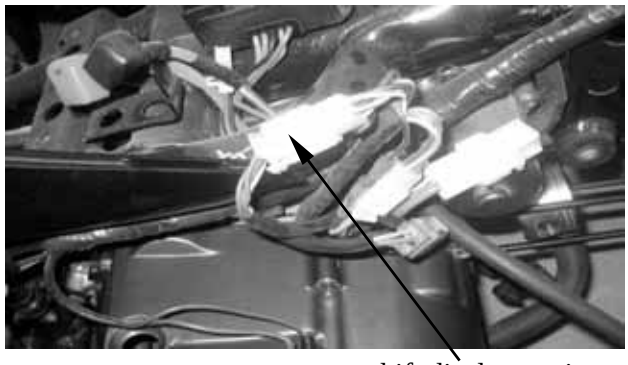
PASSING SWITCH

Position / Color	Blue	White
FREE		
PUSH	○	○

GEARSHIFT DISPLAYER

1.Disconnect the gearshift displayer wire coupler.
2.Check if all the gearshift displayer wire connect correctly or not.

	LG/R	L/R	B/L	W/L	R/W	B
N	○					○
1		○				○
2			○			○
3				○		○
4					○	○



FUEL UNIT

✳ No Smoking !

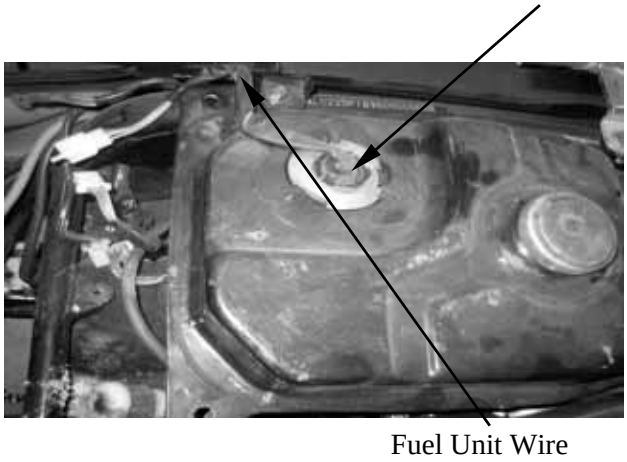
REMOVAL

Remove the seat.(Refer to 4-10.)
Disconnect the fuel unit wire connectors.

✳ Do not damage the fuel unit wire.

Remove the fuel unit.

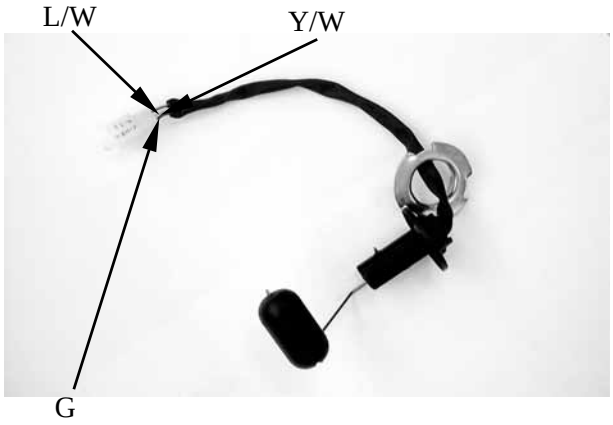
✳ Be careful not to bend or damage the fuel unit float arm.



INSPECTION

Remove the fuel unit.
Measure the resistance between the fuel unit wire terminals with the float at upper and lower positions.

Wire Terminals	Upper	Lower
G~Y/W	36Ω	700Ω
G~L/W	550Ω	160Ω
Y/W~L/W	600Ω	600Ω



FUEL GAUGE 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 gauge needle for correct indication by moving the fuel unit float up and down.

Float Position	Needle Position
Upper	“F”(Full)
Lower	“E”(Empty)

Fuel Unit

INSTALLATION

The installation sequence is the reverse of removal.

✳ Align the groove on the fuel unit with the flange on the fuel tank.