PREFACE

This Service Manual describes the technical features and servicing procedures for the KYMCO ***AGILITY 50***

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

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

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

Sections 6 through 17 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.

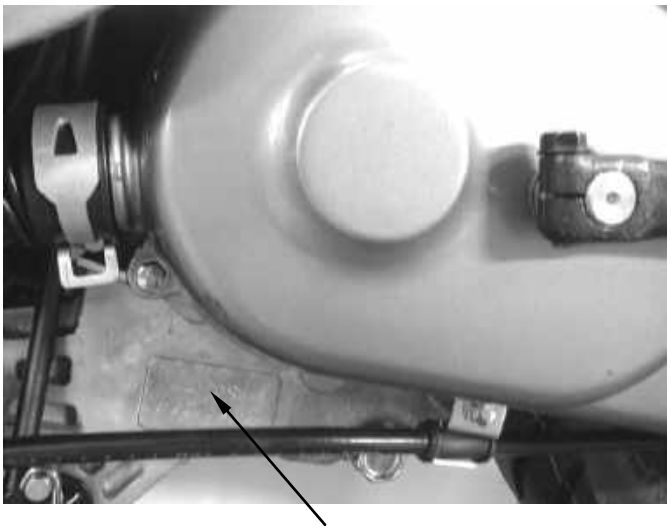
Our company reserves the right to make any alteration in the design. The information and contents included in this manual may be different from the motorcycle in case specifications are changed.

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

TABLE OF CONTENTS

ENGINE SERIAL NUMBER

AGILITY 50



Location of Engine Serial Number

SPECIFICATIONS-------45km/h

Motorcycle Name & Type			AGILITY 50
Name & Model No.			KN10A
Overall length (mm)			1920
Overall width (mm)			685
Overall height (mm)			1130 optional: 1150 mm
Wheel base (mm)			1320
Engine type			O.H.C.
Displacement			49.5cc
Fuel Used			92# nonleaded gasoline
Net weight (kg)		Front wheel	38
		Rear wheel	59
		Total	97
Gross weight(kg)		Front wheel	76
		Rear wheel	171
		Total	247
Tires		Front wheel	120/70-12 56J
		Rear wheel	130/70-12 59J
Ground clearance (mm)			110
Perform-ance	Braking distance (m)		4 (Initial speed 30km/h)
	Min. turning radius (mm)		2100/1810
Engine	Starting system		Starting motor & kick starter
	Type		Gasoline, 4-stroke
	Cylinder arrangement		Single cylinder
	Combustion chamber type		Semi-sphere
	Valve arrangement		O.H.C.
	Bore x stroke (mm)		ϕ39.0 x 41.4
	Compression ratio		10.5±0.2 : 1
	Compression pressure (kg/cm²-rpm)		15±2
	Max. output		2.2KW/7250(r/min)
	Max. torque		3.0N.M/7000rpm
	Port timing Intake	Open	4°
		Close	12°
	Port timing Exhaust	Open	20°
		Close	-8°
	Valve clearance (cold) (mm)	Intake	0.08
		Exhaust	0.08
	Idle speed (rpm)		2000±100rpm
	Lubrication System	Lubrication type	Forced pressure & wet sump
		Oil pump type	Inner/outer rotor type
		Oil filter type	Full-flow filtration
		Oil capacity	0.8 liter
	Cooling Type		Forced air cooling

Fuel System	Air cleaner type & No		Paper element, wet
	Fuel capacity		5.0L±0.5L
	Carburetor	Type	CVK
		Piston dia. (mm)	ϕ20
		Venturi dia.(mm)	ϕ17equivalent
		Throttle type	Butterfly type
Electrical Equipment	Ignition System	Type	E.C.U
		Ignition timing	12° ~25°
		Contact breaker	Non-contact point type
		Spark plug	NGK CR7HSA/CR6HSA
		Spark plug gap	0.7mm~0.8mm.
	Battery	Capacity	12V6AH
Power Drive System	Clutch	Type	Dry multi-disc clutch
	Transmission Gear	Type	Non-stage transmission
		Operation	Automatic centrifugal type
	Reduction Gear	Type	Two-stage reduction
		Reduction ratio 1st	1.04-2.47
		Reduction ratio 2nd	18.72
Moving Device	Front Axle	Caster angle	27°
		Trail length	—
	Tire pressure (kg/cm²)	Front	1.75
		Rear	2.25
	Turning angle	Left	45°
		Right	45°
Brake system type		Front	DISK（180 mm） brake
		Rear	Drum (110mm) brake
Damping Device	Suspension type	Front	TELESCOPE
		Rear	Under Swing
	Shock absorber distance	Front	80
		Rear	82
Frame type			Under Bone

SPECIFICATIONS-------25km/h

Motorcycle Name & Type			AGILITY 50
Name & Model No.			KN10A
Overall length (mm)			1920
Overall width (mm)			685
Overall height (mm)			1130 optional: 1150 mm
Wheel base (mm)			1320
Engine type			O.H.C.
Displacement			49.5cc
Fuel Used			92# nonleaded gasoline
Net weight (kg)		Front wheel	38
		Rear wheel	59
		Total	97
Gross weight(kg)		Front wheel	76
		Rear wheel	171
		Total	247
Tires		Front wheel	120/70-12 56J
		Rear wheel	130/70-12 59J
Ground clearance (mm)			110
Perform-ance	Braking distance (m)		4 (Initial speed 30km/h)
	Min. turning radius (mm)		2100/1810
Engine	Starting system		Starting motor & kick starter
	Type		Gasoline, 4-stroke
	Cylinder arrangement		Single cylinder
	Combustion chamber type		Semi-sphere
	Valve arrangement		O.H.C.
	Bore x stroke (mm)		ϕ39.0 x 41.4
	Compression ratio		10.5±0.2 : 1
	Compression pressure (kg/cm²-rpm)		15±2
	Max. output		2.0KW/7000(r/min)
	Max. torque		2.7N.M/6500rpm
	Port timing Intake	Open	4°
		Close	12°
	Exhaust	Open	20°
		Close	-8°
	Valve clearance (cold) (mm)	Intake	0.08
		Exhaust	0.08
	Idle speed (rpm)		2000±100rpm
	Lubrication System: Lubrication type		Forced pressure & wet sump
	Oil pump type		Inner/outer rotor type
	Oil filter type		Full-flow filtration
	Oil capacity		0.8 liter
	Cooling Type		Forced air cooling

Fuel System	Air cleaner type & No			Paper element, wet
	Fuel capacity			5.0L±0.5L
	Carburetor	Type		CVK
		Piston dia. (mm)		ϕ20
		Venturi dia.(mm)		ϕ17equivalent
		Throttle type		Butterfly type
Electrical Equipment	Ignition System	Type		E.C.U
		Ignition timing		12°～25°
		Contact breaker		Non-contact point type
		Spark plug		NGK CR7HSA/CR6HSA
		Spark plug gap		0.7mm~0.8mm.
	Battery	Capacity		12V6AH
Power Drive System	Clutch	Type		Dry multi-disc clutch
	Transmission Gear	Type		Non-stage transmission
		Operation		Automatic centrifugal type
	Reduction Gear	Type		Two-stage reduction
		Reduction ratio	1st	1.04-2.47
			2nd	18.72
Moving Device	Front Axle	Caster angle		27°
		Trail length		—
	Tire pressure (kg/cm²)		Front	1.75
			Rear	2.25
	Turning angle		Left	45°
			Right	45°
Brake system type			Front	DISK（180 mm） brake
			Rear	Drum (110mm) brake
Damping Device	Suspension type		Front	TELESCOPE
			Rear	Under Swing
	Shock absorber distance		Front	80
			Rear	82
Frame type				Under Bone

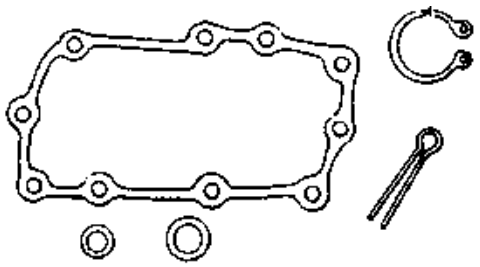
SPECIFICATIONS----45km/h E5

Motorcycle Name & Type			AGILITY 50 E5
Name & Model No.			KN10E
Overall length (mm)			1920
Overall width (mm)			685
Overall height (mm)			1130 optional: 1150 mm
Wheel base (mm)			1320
Engine type			O.H.C.
Displacement			49.5cc
Fuel Used			92# nonleaded gasoline
Net weight (kg)		Front wheel	38
		Rear wheel	59
		Total	97
Gross weight(kg)		Front wheel	76
		Rear wheel	171
		Total	247
Tires		Front wheel	120/70-12 56J
		Rear wheel	130/70-12 59J
Ground clearance (mm)			110
Perform-ance	Braking distance (m)		4 (Initial speed 30km/h)
	Min. turning radius (mm)		2100/1810
Engine	Starting system		Starting motor & kick starter
	Type		Gasoline, 4-stroke
	Cylinder arrangement		Single cylinder
	Combustion chamber type		Semi-sphere
	Valve arrangement		O.H.C.
	Bore x stroke (mm)		ϕ39.0 x 41.4
	Compression ratio		10.5±0.2 : 1
	Compression pressure (kg/cm²-rpm)		15±2
	Max. output		2.4KW/7000(r/min)
	Max. torque		3.4N.M/6500rpm
	Port timing	Intake Open	4°
		Intake Close	12°
		Exhaust Open	20°
		Exhaust Close	-8°
	Valve clearance (cold) (mm)	Intake	0.08
		Exhaust	0.08
	Idle speed (rpm)		2000±100rpm
	Lubrication System	Lubrication type	Forced pressure & wet sump
		Oil pump type	Inner/outer rotor type
		Oil filter type	Full-flow filtration
		Oil capacity	0.8 liter
	Cooling Type		Forced air cooling

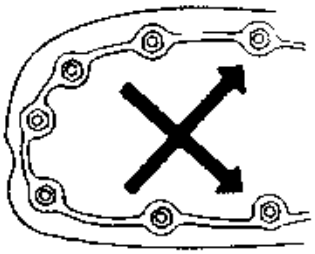
Fuel System	Air cleaner type & No			Paper element, wet
	Fuel capacity			5.0L±0.5L
	Carburetor	Type		CVK
		Piston dia. (mm)		ϕ20
		Venturi dia.(mm)		ϕ17equivalent
		Throttle type		Butterfly type
Electrical Equipment	Ignition System	Type		E.C.U
		Ignition timing		12°～25°
		Contact breaker		Non-contact point type
		Spark plug		NGK CR7HSA/CR6HSA
		Spark plug gap		0.7mm~0.8mm.
	Battery	Capacity		12V6AH
Power Drive System	Clutch	Type		Dry multi-disc clutch
	Transmis-sion Gear	Type		Non-stage transmission
		Operation		Automatic centrifugal type
	Reduction Gear	Type		Two-stage reduction
		Reduction ratio	1st	1.04-2.47
			2nd	18.72
Moving Device	Front Axle	Caster angle		27°
		Trail length		—
	Tire pressure (kg/cm²)		Front	1.75
			Rear	2.25
	Turning angle		Left	45°
			Right	45°
Brake system type			Front	DISK（180 mm） brake
			Rear	Drum (110mm) brake
Damping Device	Suspension type		Front	TELESCOPE
			Rear	Under Swing
	Shock absorber distance		Front	80
			Rear	82
Frame type				Under Bone

SERVICE PRECAUTIONS

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

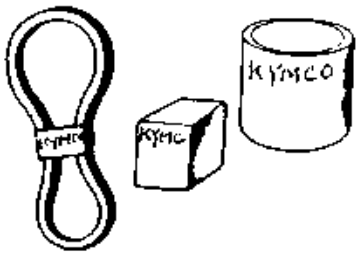


■ When tightening bolts or nuts, begin with larger-diameter to smaller ones at several times, and tighten to the specified torque diagonally.



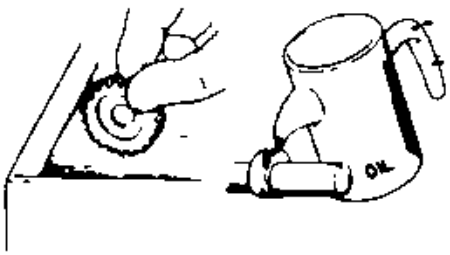
■ Use genuine parts and lubricants

.

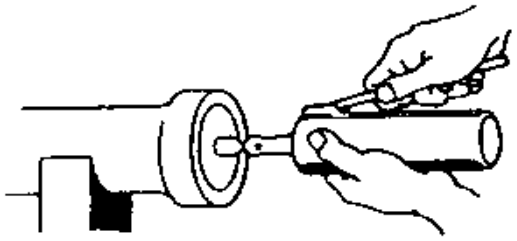


■ When servicing the motorcycle, be sure to use special tools for removal and installation.

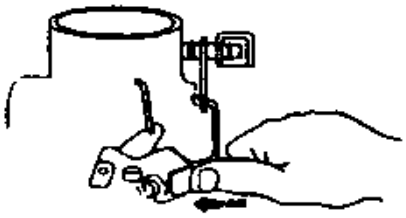
■ After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.



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

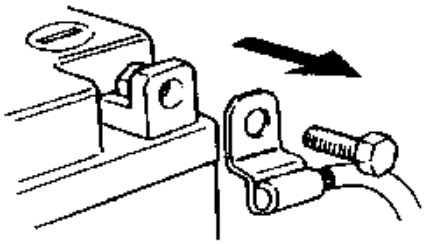


■ After reassembly, check all parts for proper tightening and operation.

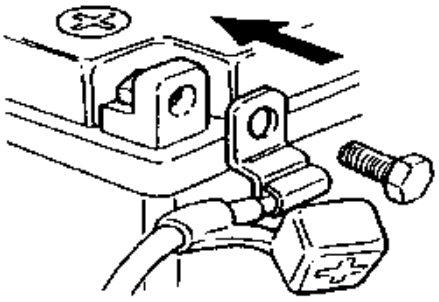


■ When two persons work together, pay attention to the mutual working safety.

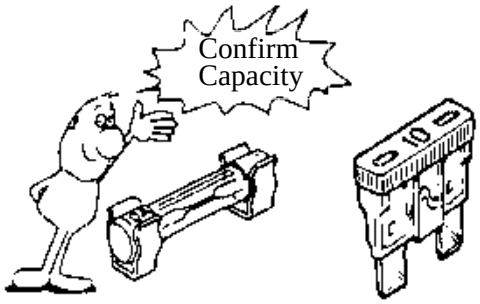
■ Disconnect the battery negative (-) terminal before operation.
■ When using a spanner or other tools, make sure not to damage the motorcycle surface.



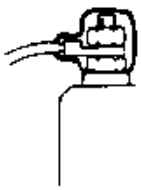
■ After operation, check all connecting points, fasteners, and lines for proper connection and installation.
■ When connecting the battery, the positive (+) terminal must be connected first.
■ After connection, apply grease to the battery terminals.
■ Terminal caps shall be installed securely.



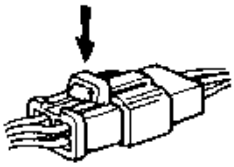
■ If the fuse is burned out, find the cause and repair it. Replace it with a new one according to the specified capacity.



■ After operation, terminal caps shall be installed securely.

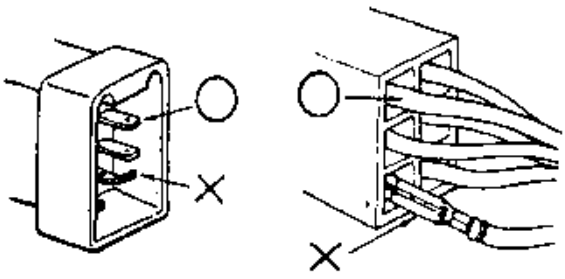


■ When taking out the connector, the lock on the connector shall be released before operation.

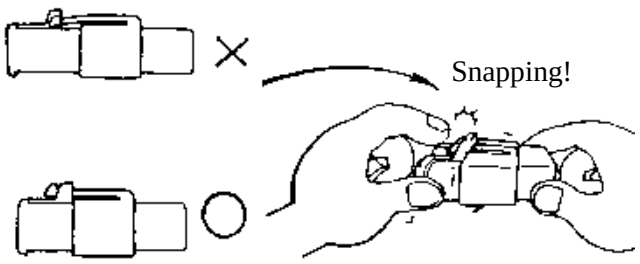


■ Hold the connector body when connecting or disconnecting it.
■ Do not pull the connector wire.

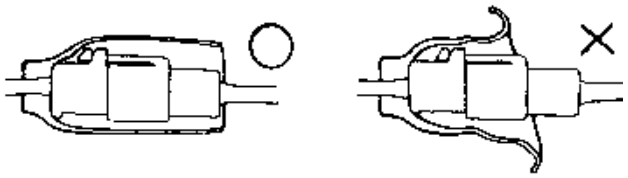
■ Check if any connector terminal is bending, protruding or loose.



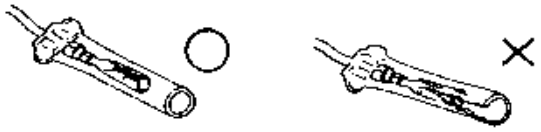
- The connector shall be inserted completely.
- If the double connector has a lock, lock it at the correct position.
- Check if there is any loose wire.



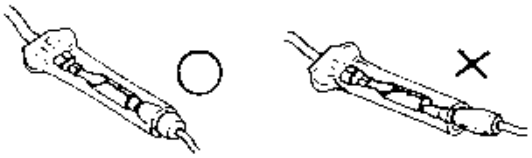
- Before connecting a terminal, check for damaged terminal cover or loose negative terminal.



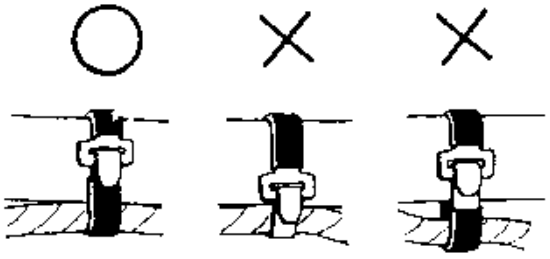
- Check the double connector cover for proper coverage and installation.



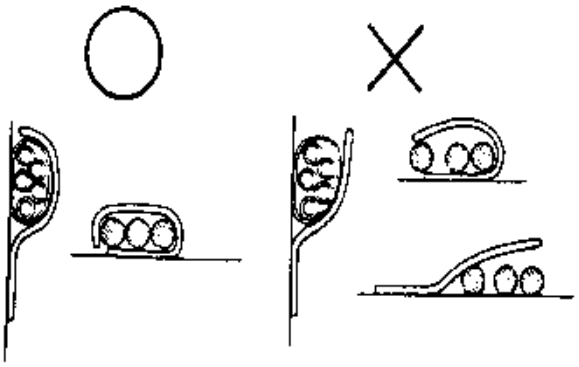
- Insert the terminal completely.
- Check the terminal cover for proper coverage.
- Do not make the terminal cover opening face up.



- 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.

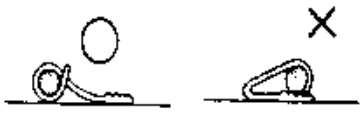


■ After clamping, check each wire to make sure it is secure.

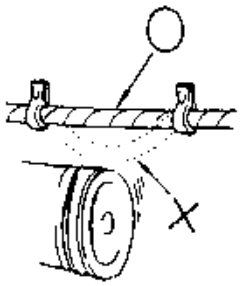


.

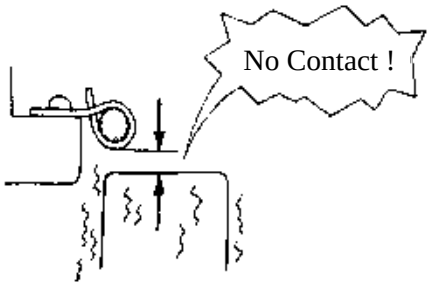
■ Do not squeeze wires against the weld or its clamp



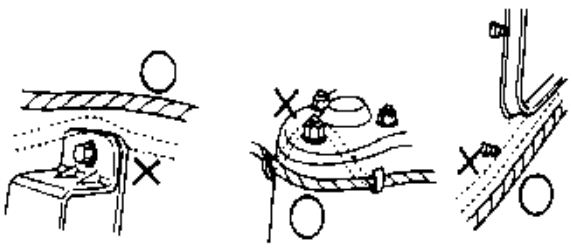
■ After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.



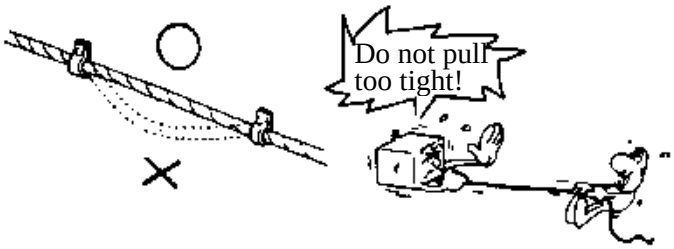
■ When fixing the wire harnesses, do not make it contact the parts which will generate high heat.



■ 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.

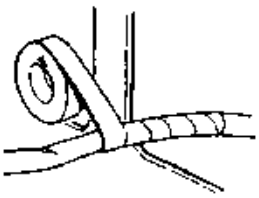


■ Route harnesses so they are neither pulled tight nor have excessive slack.

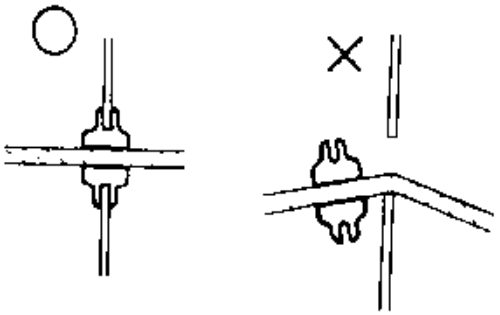


.

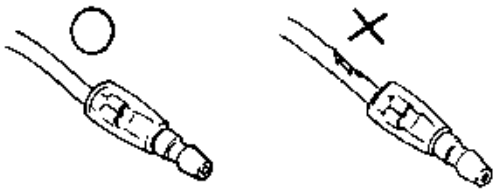
■ Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner



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

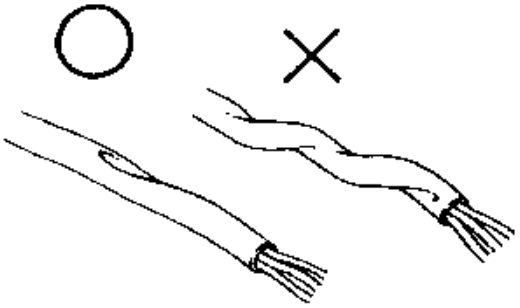


■ Do not break the sheath of wire.
■ If a wire or harness is with a broken sheath, repair by wrapping it with protective tape or replace it.

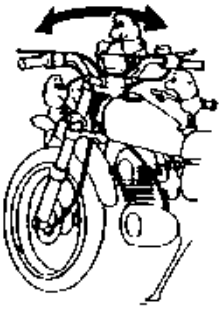


■ When installing other parts, do not press or squeeze the wires.

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

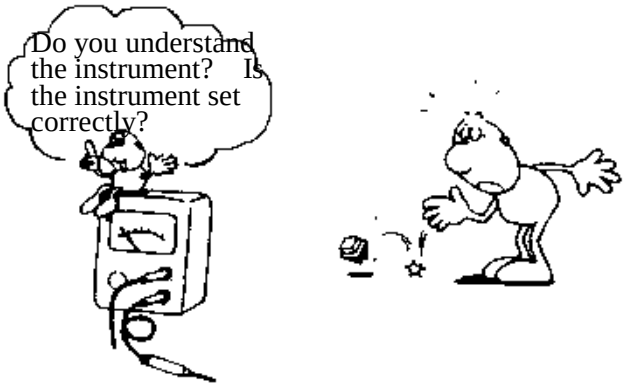


■ Wire harnesses routed along with handlebar should not be pulled tight, have excessive slack or interfere with adjacent or surrounding parts in all steering positions.



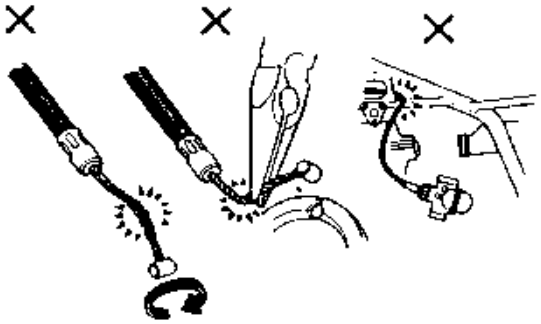
■ When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.

■ 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.

Gear Oil : Transmission Gear Oil (90#)

Special : Use special tool.

* : Caution

: Warning

(⇨12-3) : Refer to page 12-3.

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	0.6-1.2	6mm screw, SH bolt	0.7-1.1
8mm bolt, nut	1.8-2.5	6mm flange bolt, nut	1.0-1.4
10mm bolt, nut	3.0-4.0	8mm flange bolt, nut	2.4-3.0
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	Q'ty	Thread dia.(mm)	Torque (kg-m)	Remarks
Cylinder head bolt A	2	6	0.7-1.1	Double end bolt
Cylinder head bolt B	4	6	0.7-1.1	
Oil filter screen cap	1	30	1.0-2.0	
Exhaust muffler lock bolt	2	6	0.7-1.1	Double end bolt
Cylinder head flange nut	4	7	1.2-1.6	Apply oil to
Valve adjusting lock nut	2	3	0.07-0.09	threads
Cam chain tensioner slipper bolt	1	8	0.4-0.7	
Oil bolt	1	8	1.1-1.5	
Clutch outer nut	1	10	3.5-4.5	
Clutch drive plate nut	1	28	5.0-6.0	
Starter motor mounting bolt	2	6	0.8-1.2	
Oil pump bolt	3	4	0.1-0.3	
Drive face nut	1	10	5.5-6.5	
Spark plug	1	10	1.0-1.4	
A.C. generator stator bolt	2	6	0.8-1.2	
Cam chain tensioner bolt	1	6	0.8-1.2	

FRAME

Item	Q'ty	Thread dia.(mm)	Torque (kg-m)	Remarks
Steering stem lock nut	1	25.4	8.0-12.0	U-nut
Front axle nut	1	10	5.0-7.0	U-nut
Rear axle nut	1	14	11.0-13.0	U-nut
Rear shock absorber upper bolt	1	10	4.0-5.0	
Rear shock absorber lower bolt	1	8	2.0-3.0	
Speedometer cable set screw	1	5	0.45-0.6	
Rear shock absorber lock nut	1	8	3.0-3.6	Apply locking agent

SPECIAL TOOLS

Tool Name	Tool No.	Remarks	Ref. Page
Bearing puller 10.12.15.18 mm	E037	10.12.15.18mm bearing	10-3 10-4 12-6
Bushing remover L	E032	11102 bush engine hanger rubber	
Bushing remover S	EO19	11203 bush rear cushion under rubber	
Crankshaft bearing puller	E030	91005 radial bearing	
Crankshaft protector	E029	13000 crankshaft comp 12mm.14mm	
Clutch spring compressor	E027	2301a driven pully assy	9-9 9-12
Cushion assemble & disassemble tool	F004	52400 cushion assy	13-4
Flywheel holder	E017	31110 flywheel comp.2310a pully assy driven	9-5 9-9 9-13 14-7 14-9
Flywheel puller	E002	Left hand thread 27mm	14-7
Long socket wrench 32mm 8angle	F002	50306 steering stem	12-21 12-22
Oil seal & bearing installer	E014	Oil seal & bearing install	
Tool boox	E033	Special tools storage	
Tappet adjuster	E036	90012 screw tappet	3-5
Valve spring compressor	E038	Valve spring	7-7 7-8

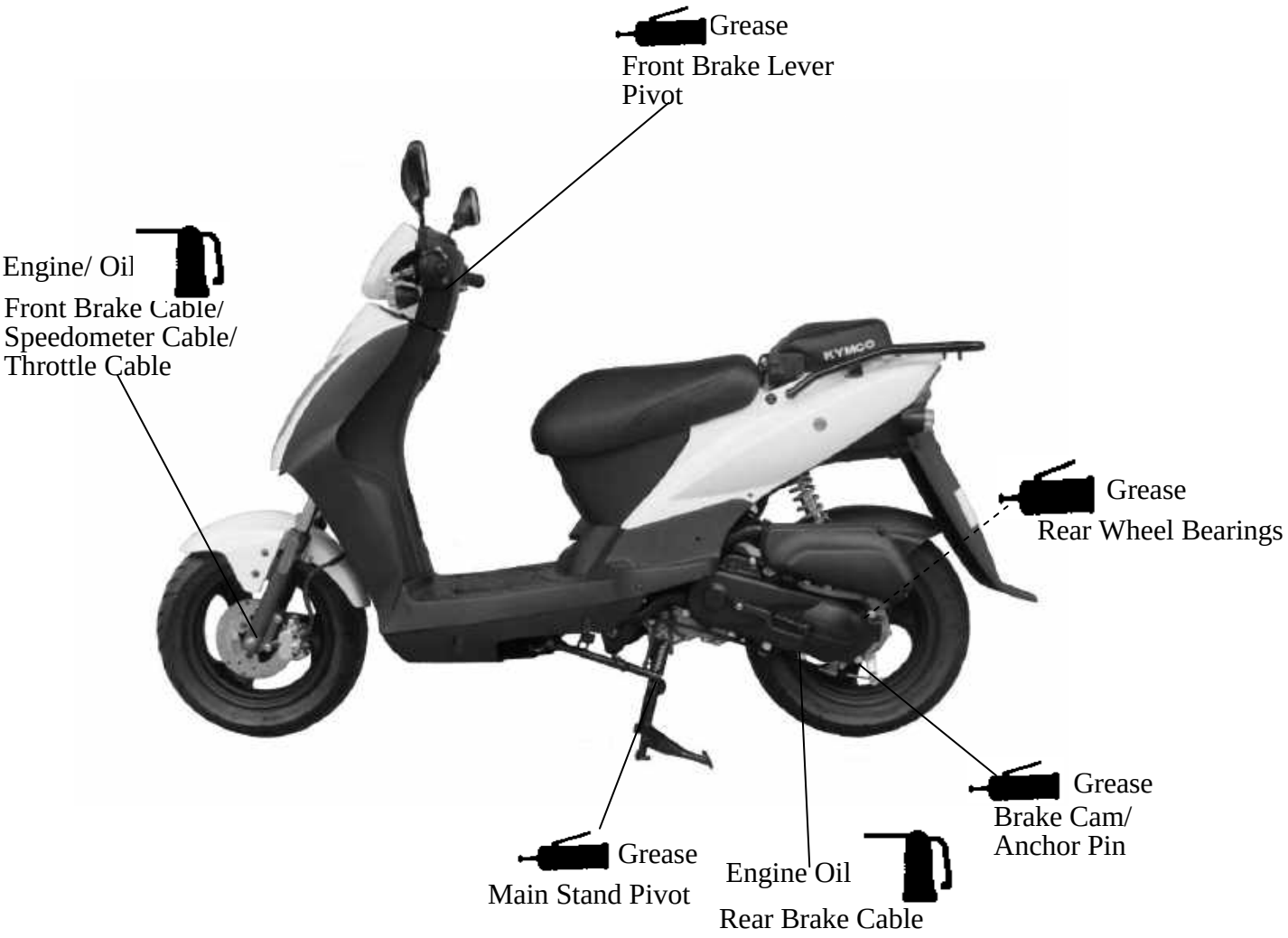
LUBRICATION POINTS

ENGINE

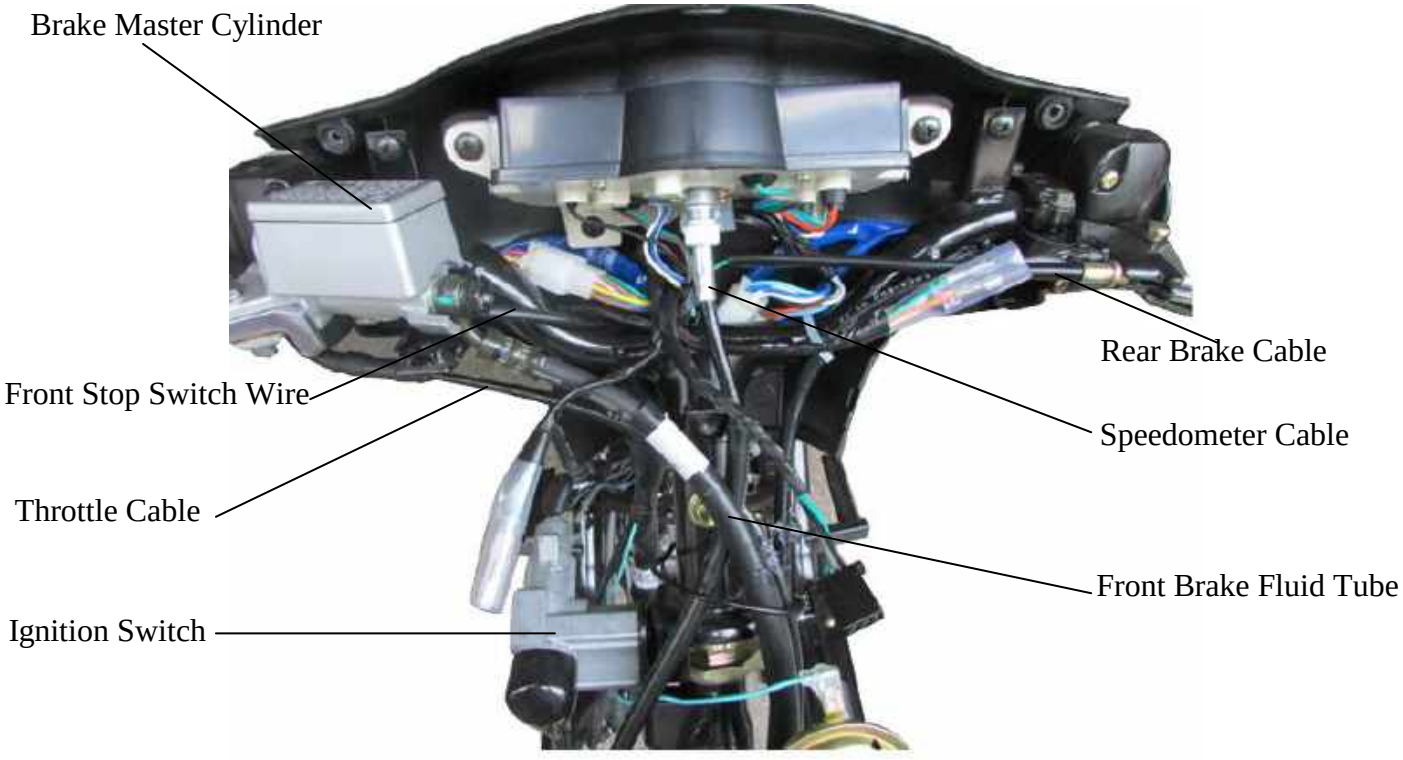
Lubrication Points	Lubricant
Valve guide/valve stem movable part Cam lobes Valve rocker arm friction surface Cam chain Cylinder lock bolt and nut Piston surroundings and piston ring grooves Piston pin surroundings Cylinder inside wall Connecting rod/piston pin hole Connecting rod big end Crankshaft R/L side oil seal Starter reduction gear engaging part Countershaft gear engaging part Final gear engaging part Bearing movable part O-ring face Oil seal lip	•Genuine KYMCO Engine Oil (SAE15W-40) •API–SL Engine Oil
Starter idle gear Friction spring movable part/shaft movable part Shaft movable grooved part Kick starter spindle movable part	High-temperature resistant grease
A.C. generator connector Transmission case breather tube	Adhesive

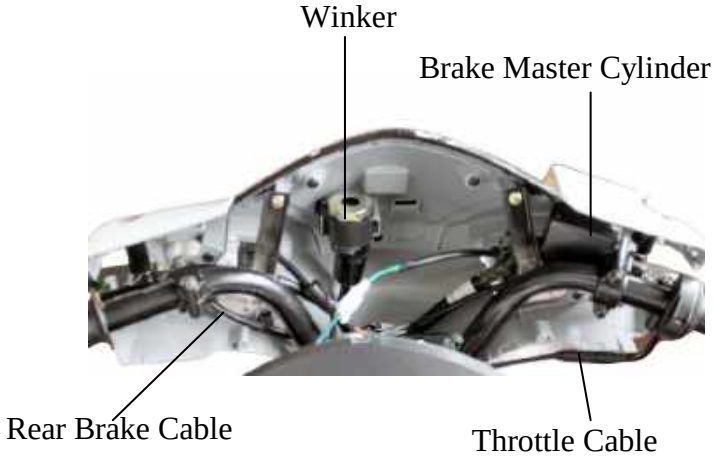
FRAME

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

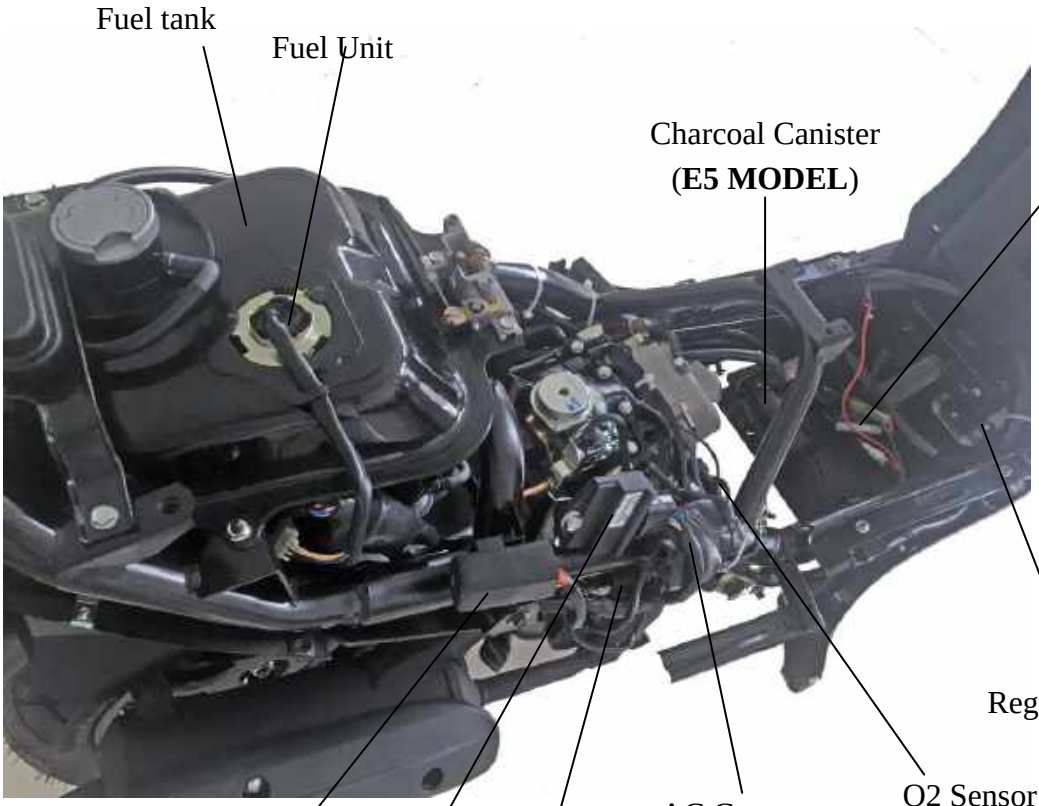


CABLE & HARNESS ROUTING

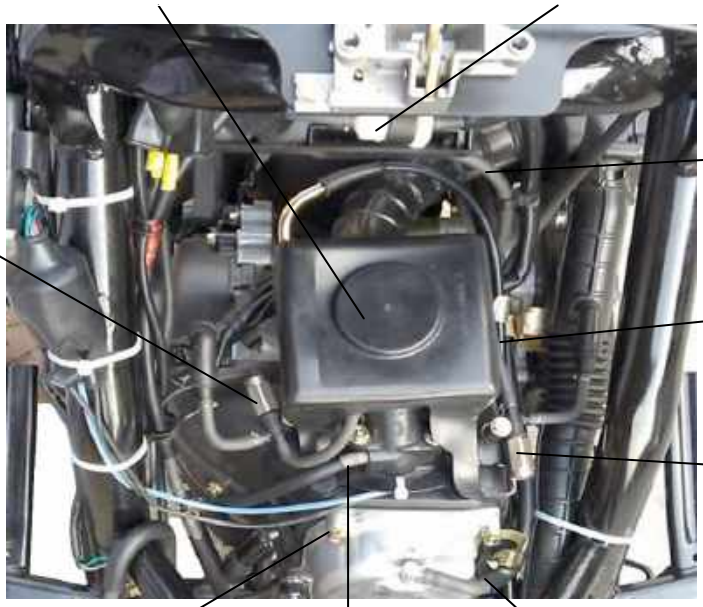





Fuse
Battery (+) Cable
Battery (-) Cable
Diagnostic tool connector

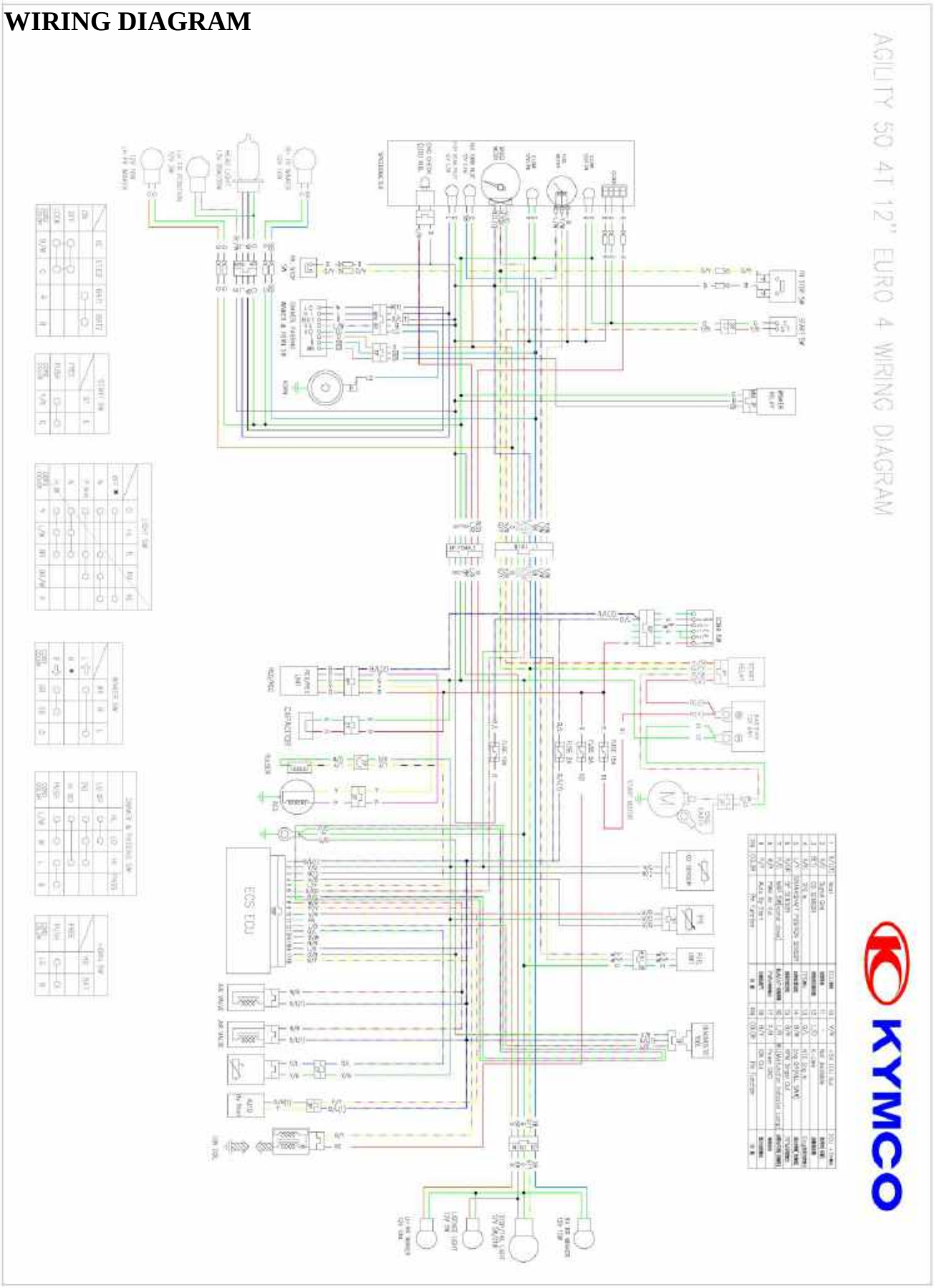

Fuel tank
Fuel Unit
Charcoal Canister
(E5 MODEL)
Fuse
(E4 MODEL)
15A*1 10A*1
5A*1 2A*1
(E5 MODEL)
15A*1 10A*1
5A*2
Regulator/Rectifier
O2 Sensor
AC Generator
/CPS Connector
Ignition Coil
ECU
Starter Relay

E4 MODEL

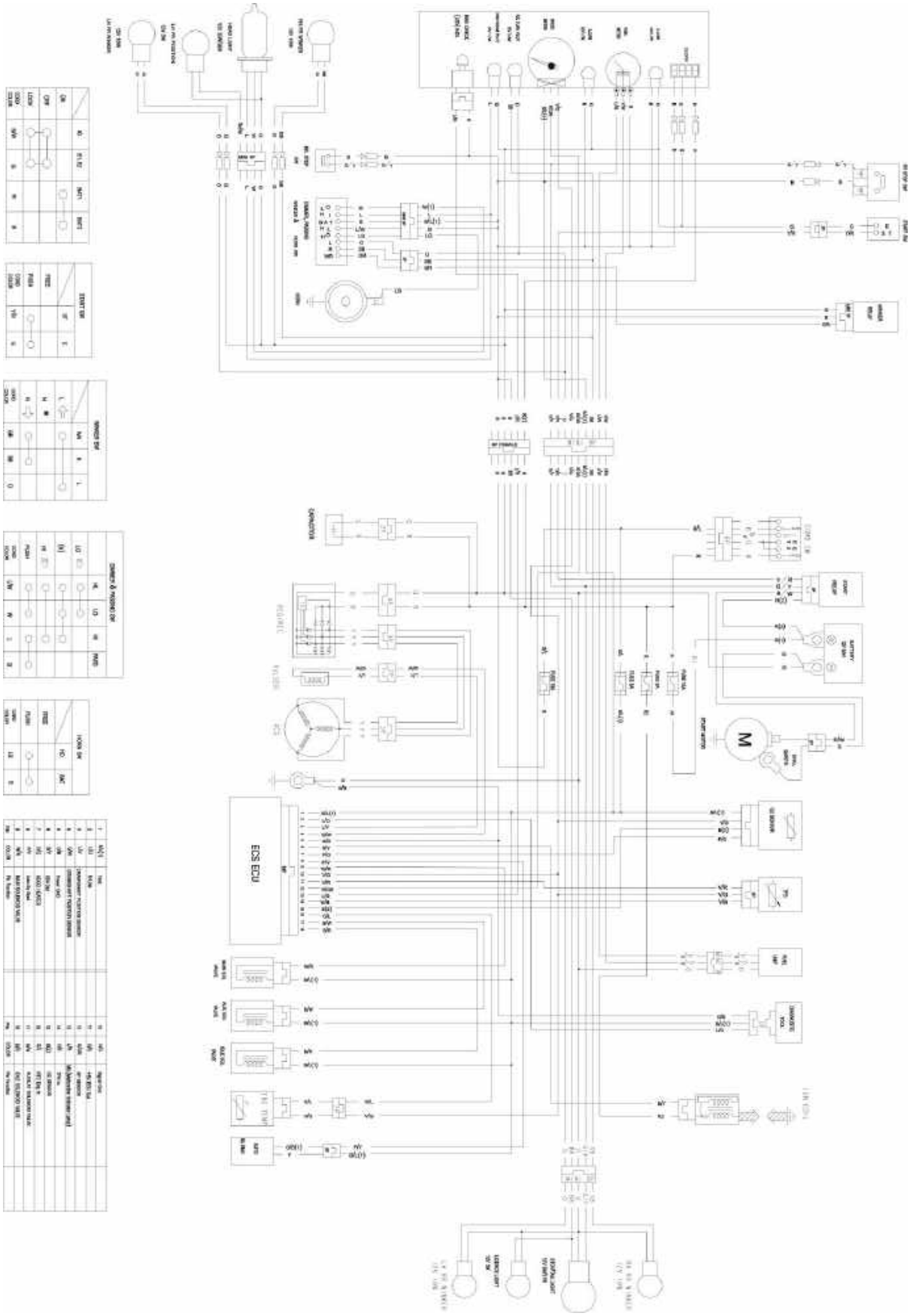


E5 MODEL

WIRING DIAGRAM

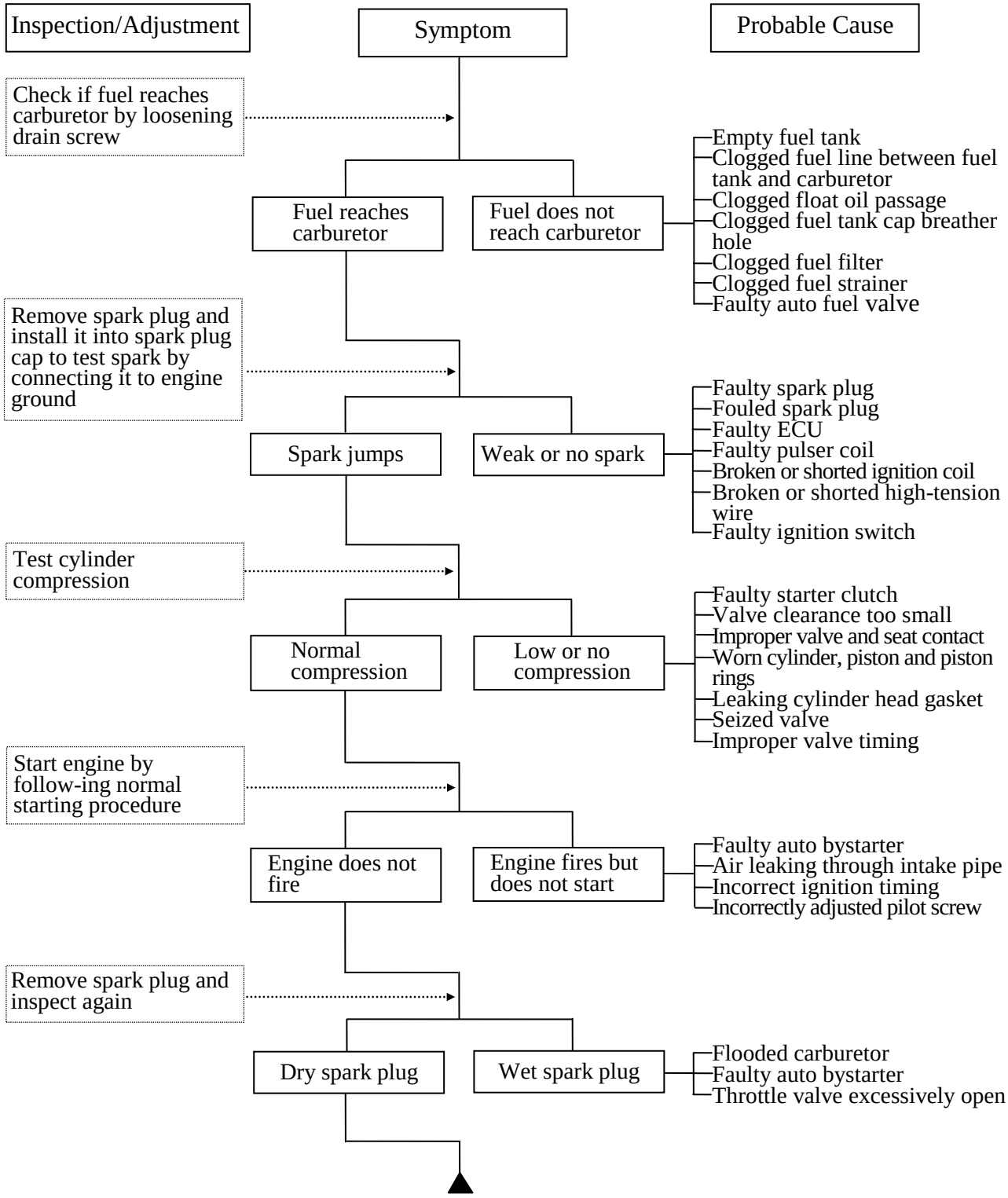


E5 MODEL

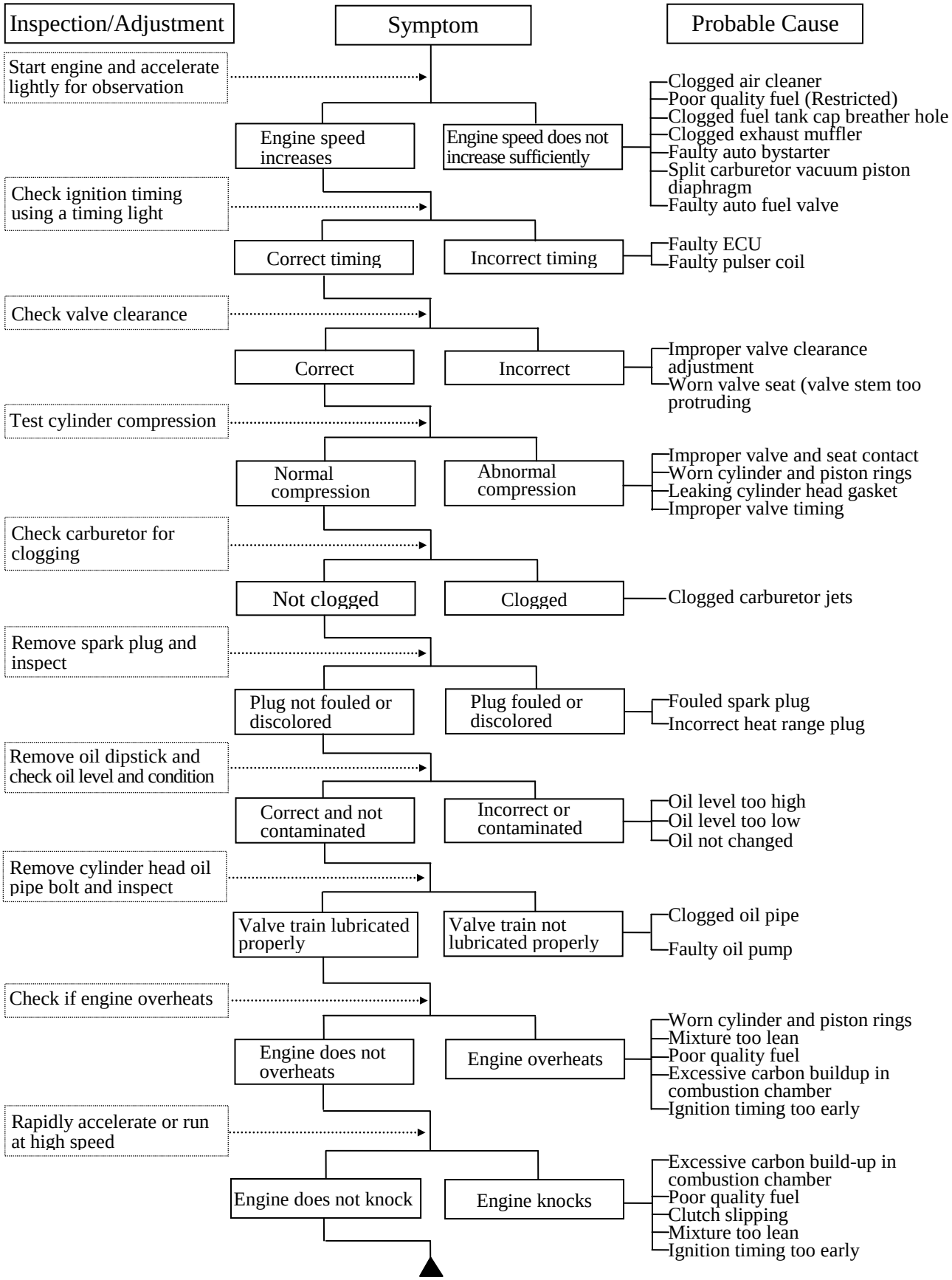


TROUBLESHOOTING

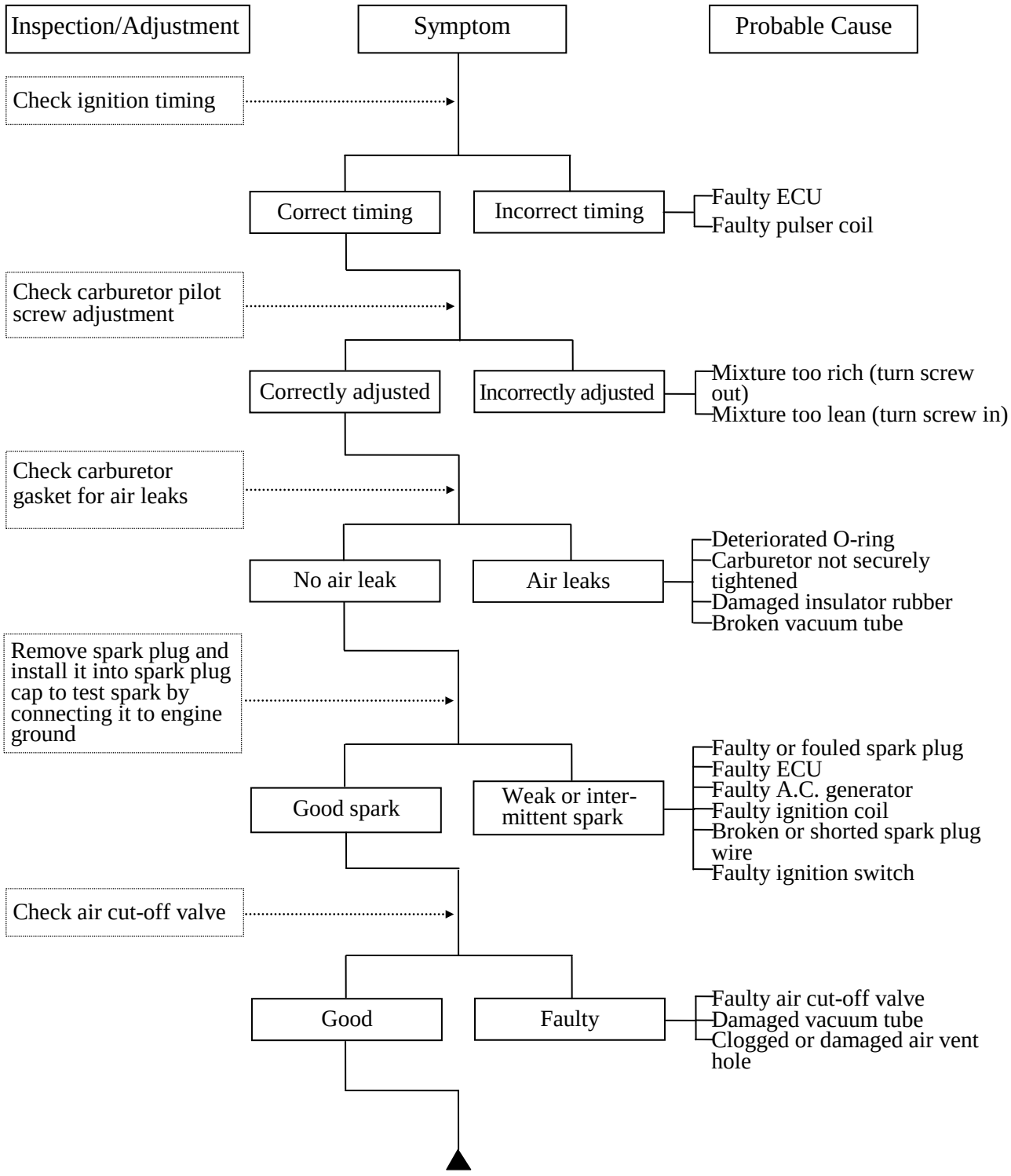
ENGINE WILL NOT START OR IS HARD TO START



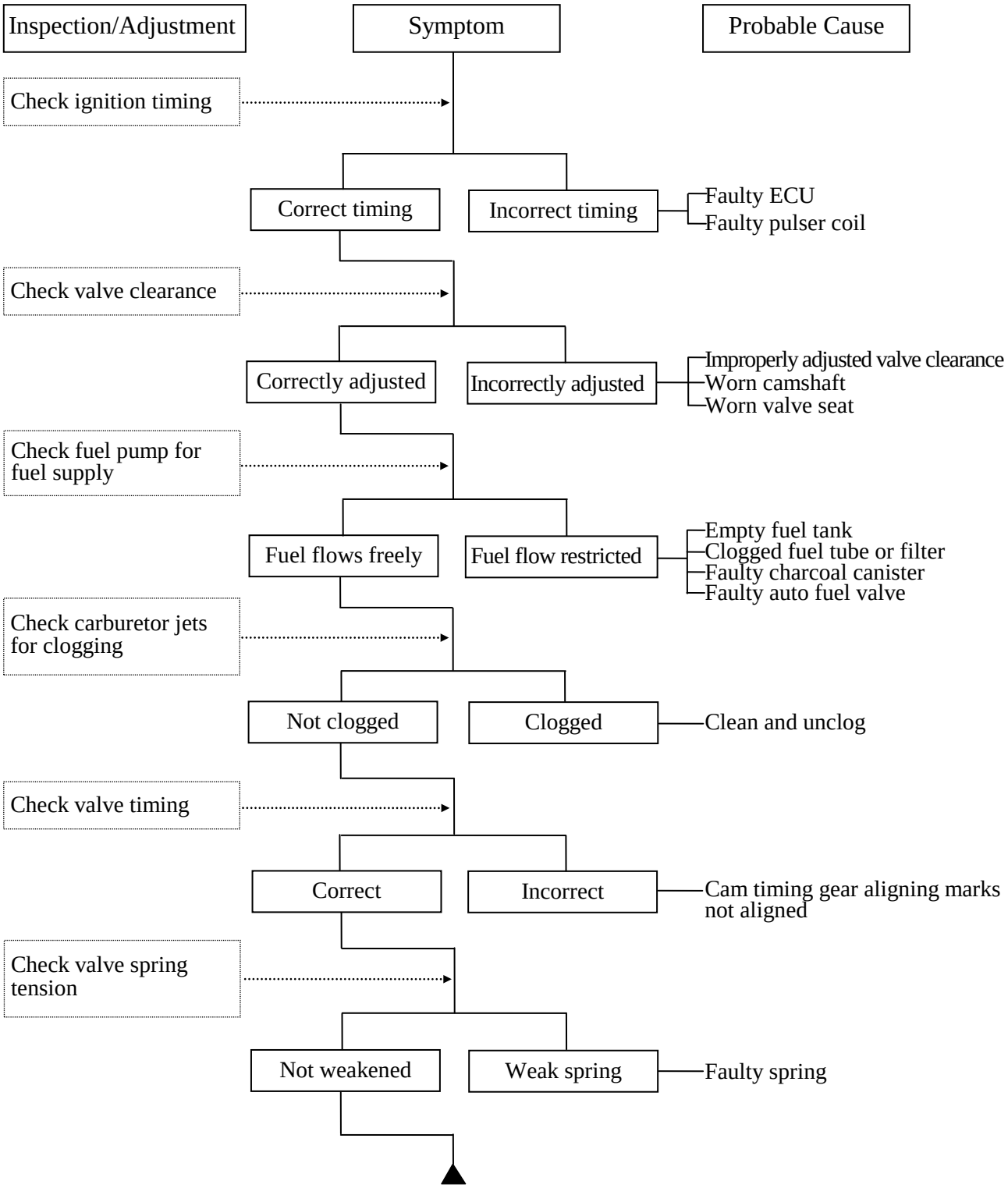
ENGINE LACKS POWER



POOR PERFORMANCE (ESPECIALLY AT IDLE AND LOW SPEEDS)

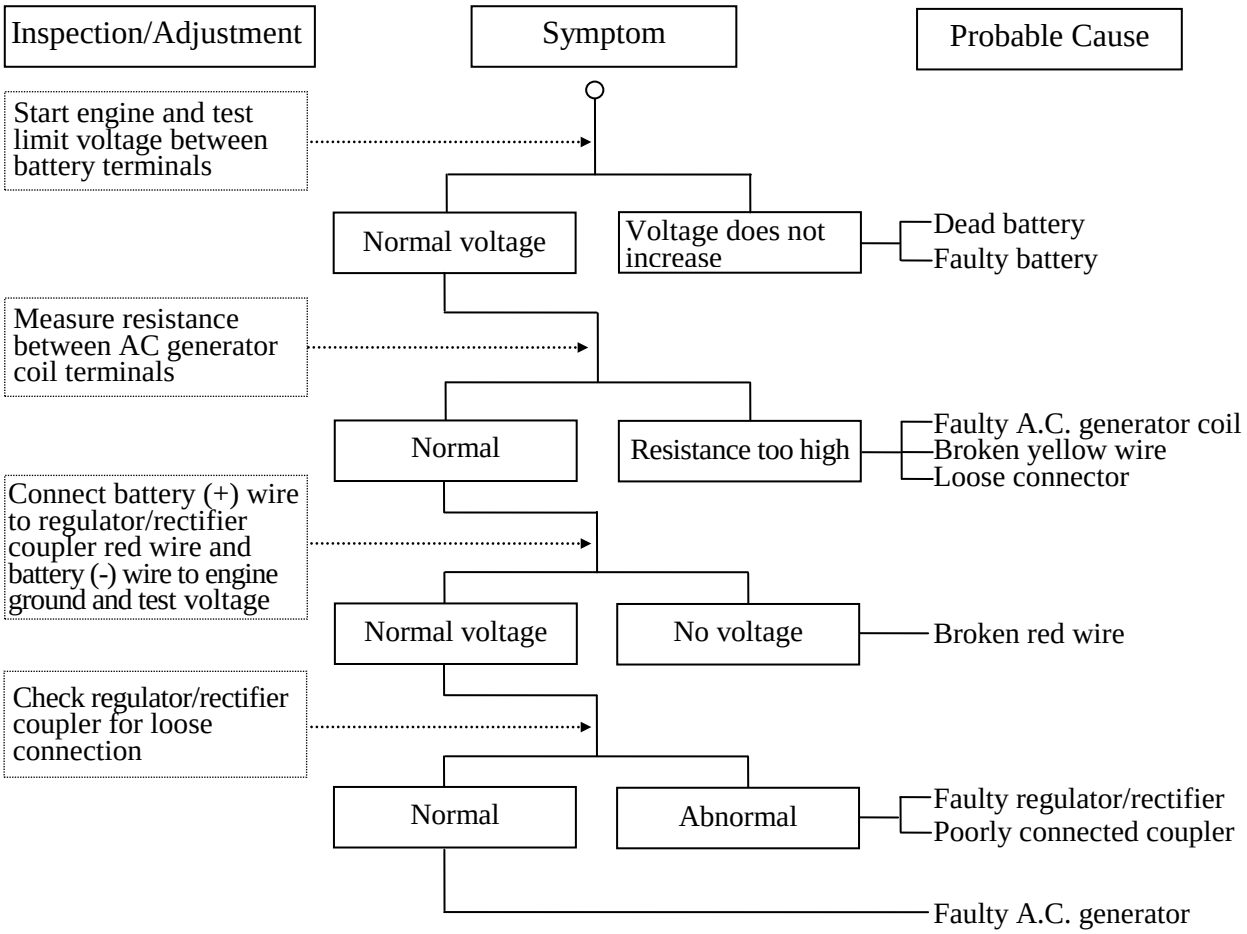


POOR PERFORMANCE (AT HIGH SPEED)

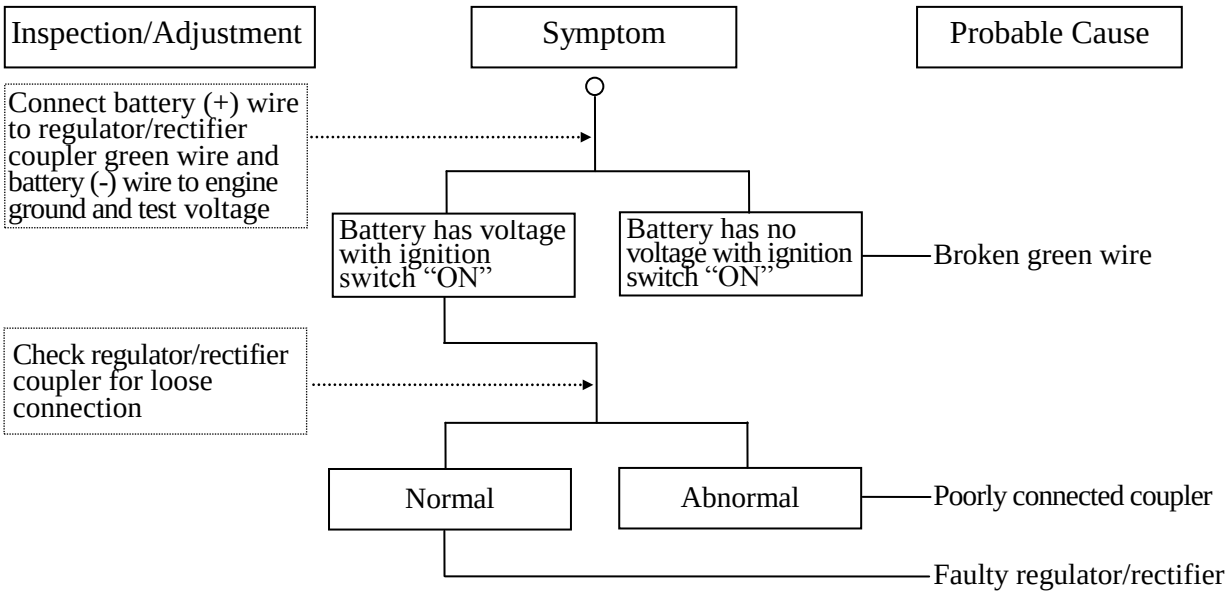


POOR CHARGING (BATTERY OVER DISCHARGING OR OVERCHARGING)

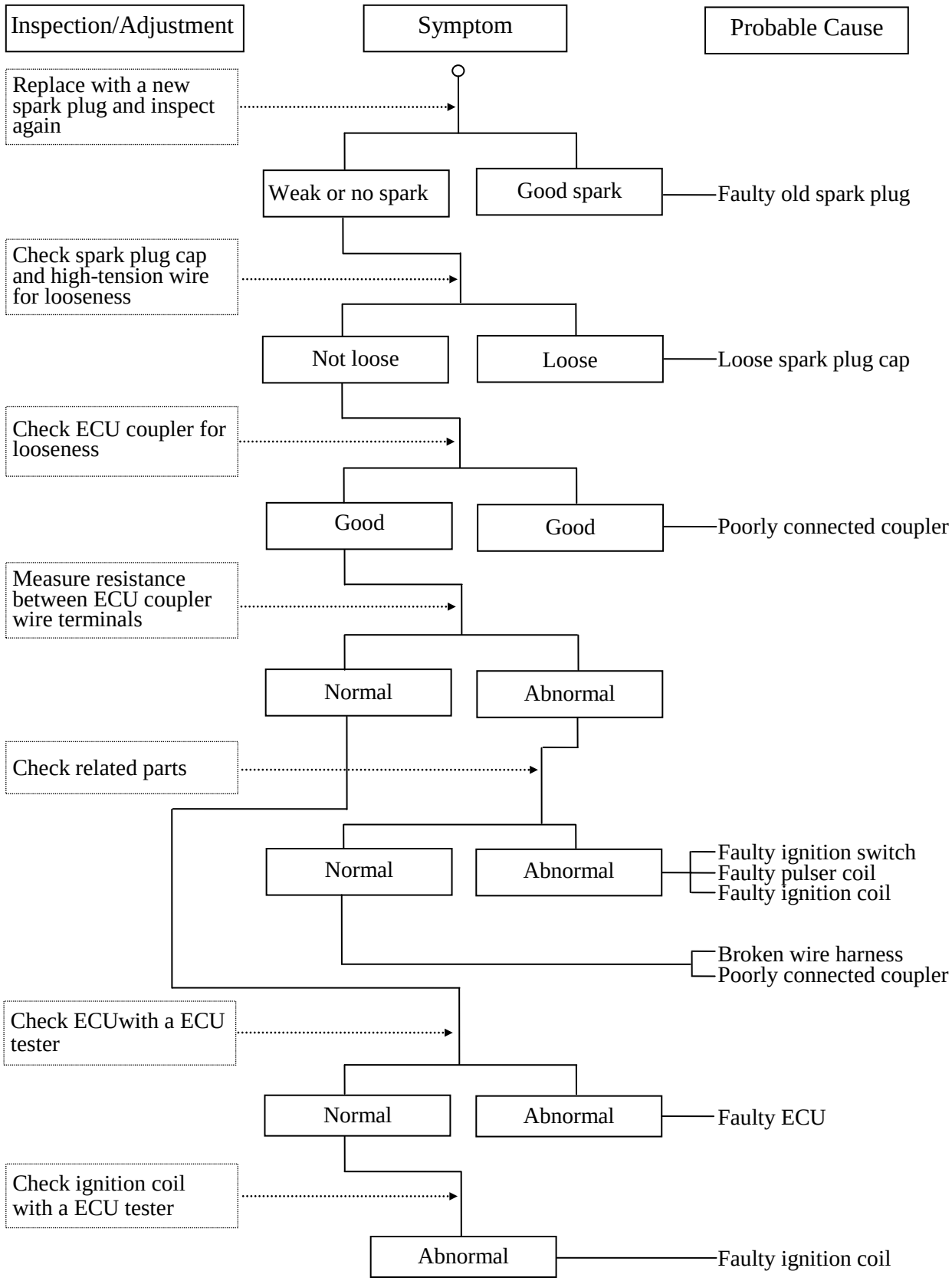
Undercharging



Overcharging

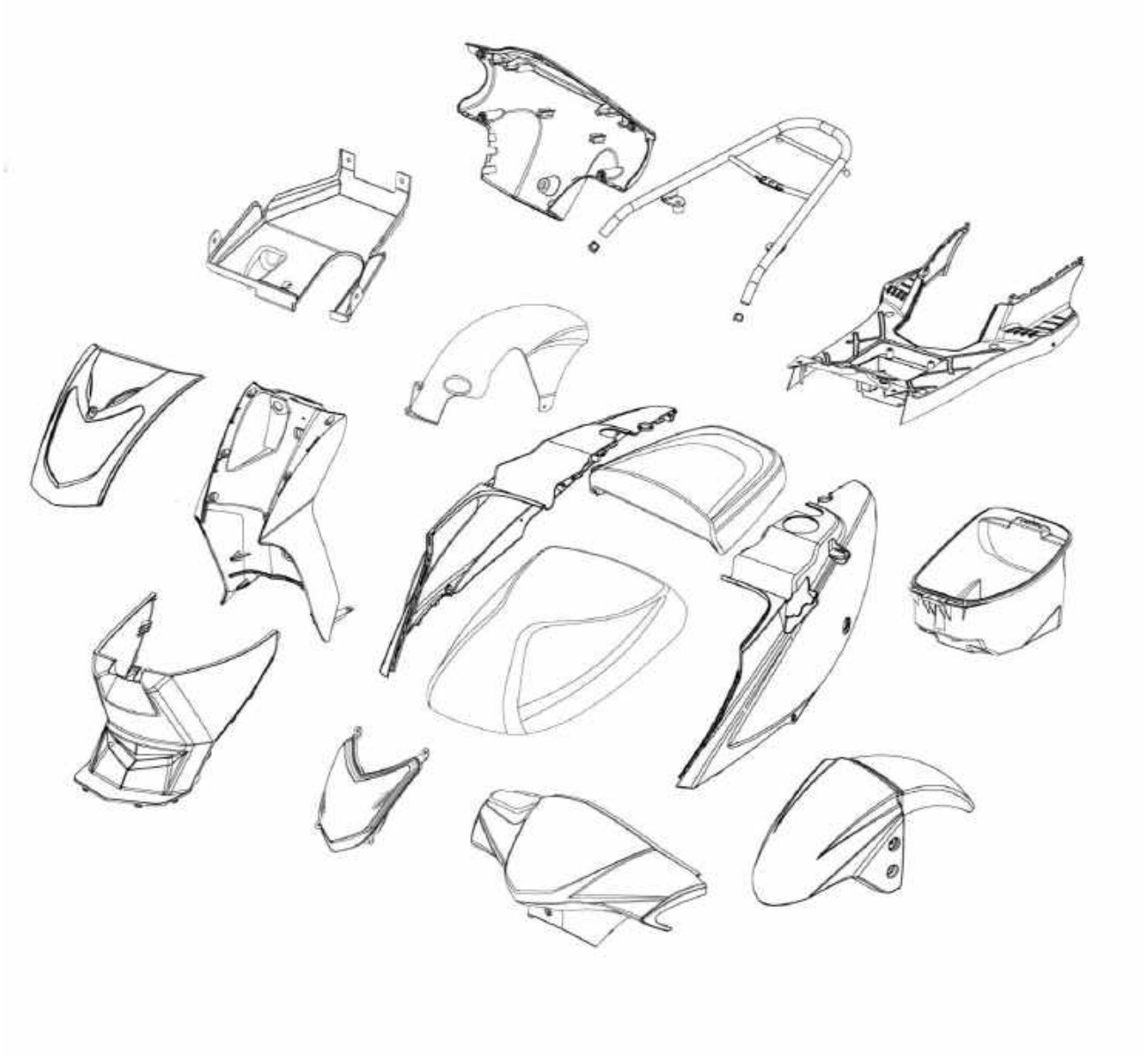


NO SPARK AT SPARK PLUG



SCHEMATIC DRAWING

2



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- When removing frame covers, use special care not to pull them by force because the cover joint claws may be damaged.

Items Related for Removal

- Handlebar front cover ——— Handlebar rear cover
  Headlight wire connector
- Handlebar rear cover ——— Speedometer cable and instrument light wire connectors, etc.
- Frame body cover ——— Met-in box, rear grip, rear turn signal lights, floor board
- Floor board ——— Frame body cover
  Battery and wire connectors
- Front tool box ——— Front cover, floor board

TORQUE VALUES

Exhaust muffler joint lock nut	1.0~1.4kgf-m
Exhaust muffler lock bolt	3.0~3.6kgf-m

FRAME COVERS

FRONT COVER REMOVAL

Remove the screw on the front of 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.

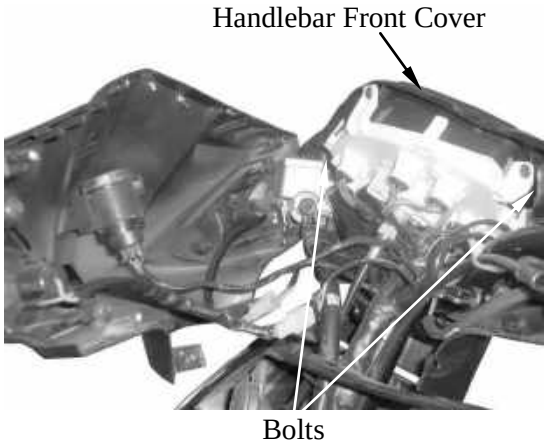
HANDLEBAR FRONT/REAR COVER REMOVAL

HANDLEBAR FRONT COVER REMOVAL

Remove the 5 screws attaching the handlebar front cover.
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.

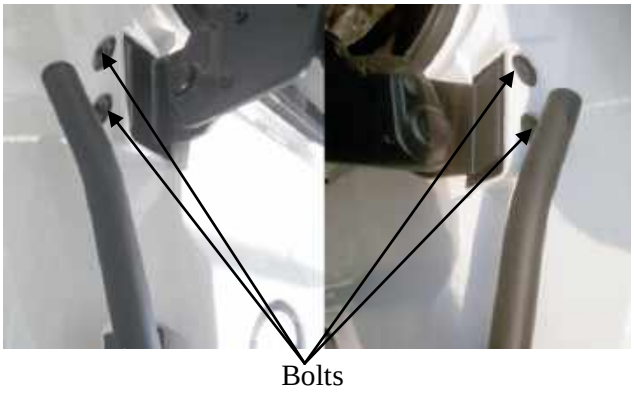


REAR SEAT REMOVAL

(apply to seprative seat model)

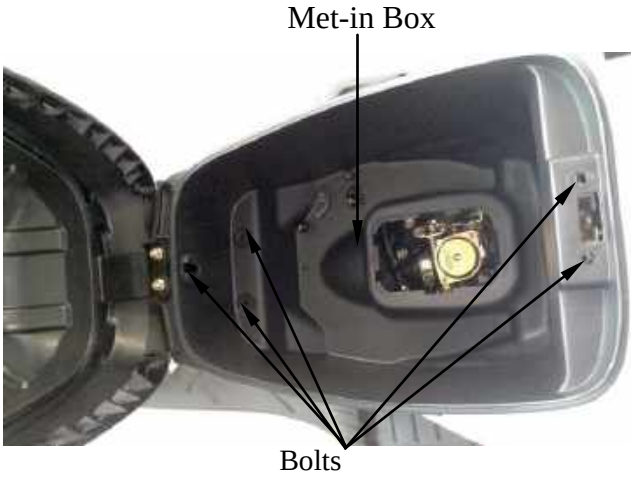
Open the seat.

Remove four bolt attaching the rear seat.
Remove rear seat.



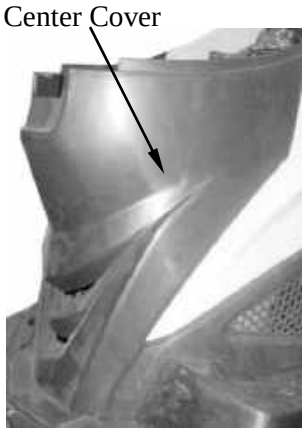
MET-IN BOX REMOVAL

Remove the 5 bolts attaching the met-in box.
Remove the met-in box .



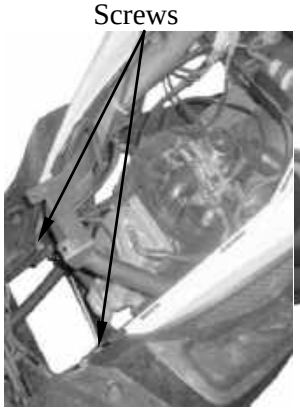
FRAME BODY COVER AND REAR CARRIER REMOVAL

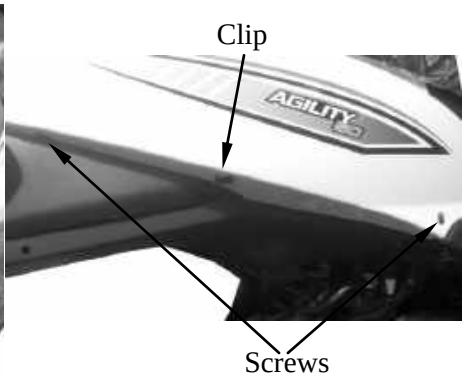
Remove the center cover.
Remove the three bolts attaching the rear carrier.



Remove the 4 screws and 2 clips on the rear

part of the frame body cover.
Remove 2 two screws on the front of the frame body cover.

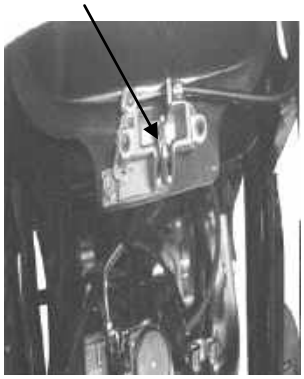


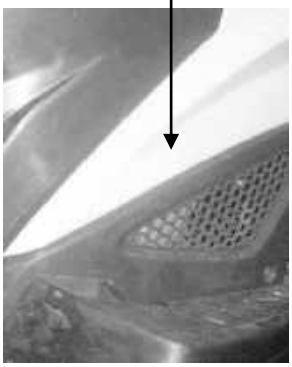


Discornnect the seat lock wire.
Remove the two screws on the frame body cover and frame body cover.

The installation sequence is the reverse of remove

Remove the three bolts attaching each of the right and left side covers.
Remove the right and left side covers.

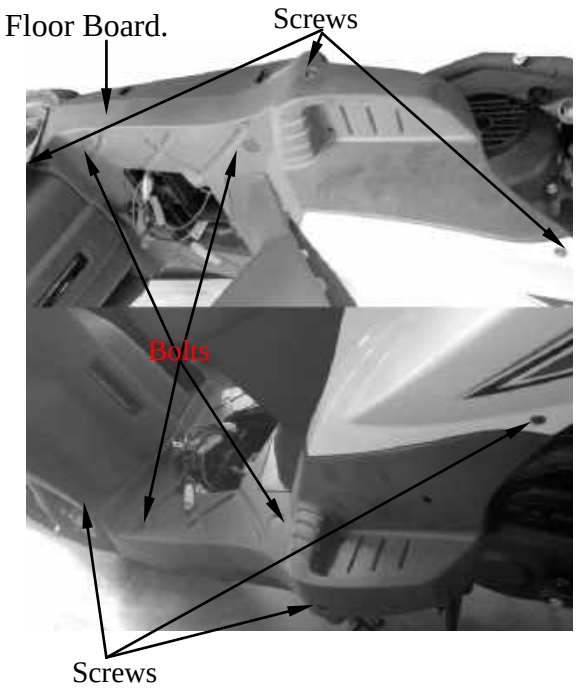




* During removal, do not pull the joint claws forcedly to avoid damage.
When installing, be sure to connect the seat lock wire.

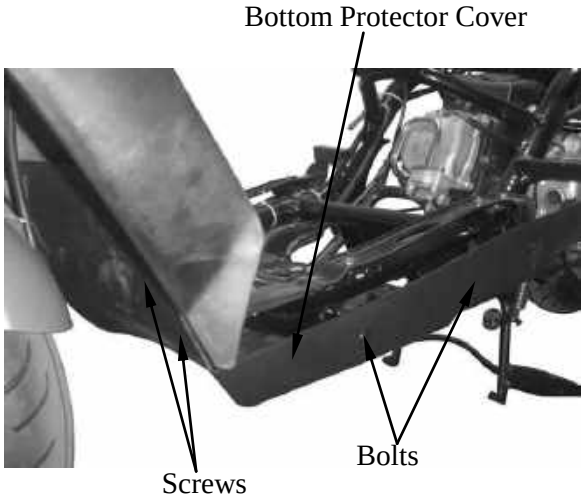
FLOOR BOARD REMOVAL

Remove the rear carrier and rear seat. (⇨2-3)
Remove the met-in box. (⇨2-3)
Remove the frame body cover. (⇨2-4)
Remove the four bolts and six screws attaching the floor board.
Remove the floor board.



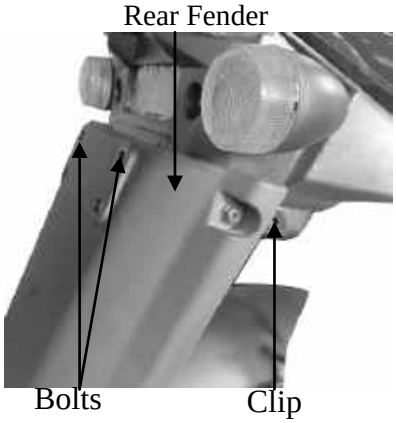
BOTTOM PROTECTOR COVER REMOVAL

Remove the 4 bolts and 4 screws on the bottom protector cover.
Remove the bottom protector cover.



REAR FENDER REMOVAL

Remove the 2 bolts and 2 clips.
Remove the rear fender.



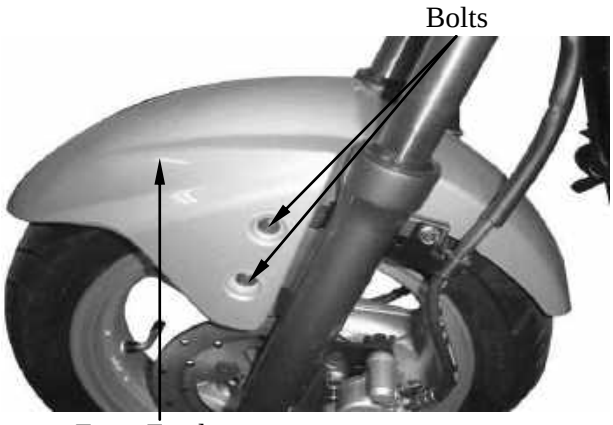
LEG SHIELD REMOVAL

Remove the 1 screw on the leg shield.
Remove the ignition switch decorative ring
Remove the leg shield.

FRONT FENDER REMOVAL

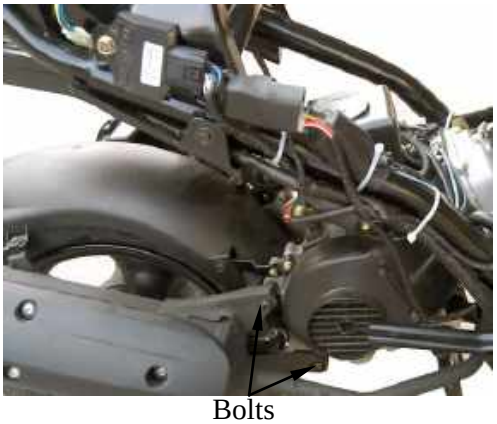
Remove the 4 bolts attaching the front fender bracket.

Remove the front fender.



EXHAUST MUFFLER REMOVAL

Remove the two exhaust muffler joint lock nuts.
Remove the two exhaust muffler lock bolts.
Discornnect the O_2 sensor.
Remove the exhaust muffler.
Remove the exhaust muffler joint packing collar.

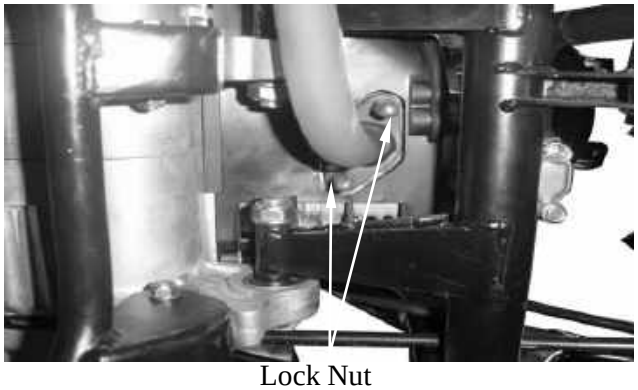


When installing, first install the exhaust muffler packing collar and then install the exhaust muffler.
First install and tighten the exhaust muffler joint lock nuts. Then, install and tighten the exhaust muffler lock bolts.

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.



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	: 0.7～0.8mm
Spark plug	: NGK CR7HSA/CR6HSA
Valve clearance	: IN: 0.08mm
	: EX: 0.08mm
Idle speed	: 2000 ±100rpm
Engine oil capacity:	
At disassembly	: 0.8 liter
At change	: 0.7 liter
Gear oil capacity	:
At disassembly	: 0.18 liter
At change	: 0.15 liter

Cylinder compression : 15±2 kg/cm^2
Ignition timing: BTDC 12°/2000 rpm
CHASSIS
Front brake free play: 10～20mm
Rear brake free play : 10～20mm

TIRE PRESSURE

	1 Rider	2 Riders
Front	1.75kg/cm^2	1.75kg/cm^2
Rear	2.0kg/cm^2	2.25kg/cm^2

TIRE SIZE:
Front : 120/70-12
Rear : 130/70-12

TORQUE VALUES
Front axle nut 5.0～7.0kgf-m
Rear axle nut 11～13kgf-m

MAINTENANCE SCHEDULE

Perform the periodic maintenance at each scheduled maintenance period.
I: Inspect, and Clean, Adjust, Lubricate 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 New Motorcycle 300km	R	R	R	R	R	R	R	R	R	R	R
Engine oil filter screen		C		C				C				C	
Fuel filter screen									R				
Gear oil	Note 3	R New motorcycle 300km				R					R		
Valve clearance									A				
Carburetor					I				I				C
Air Cleaner	Note 2,3	C	R	C	R	C	R	C	R	C	R	C	R
Spark plug		Clean at every 2000km and replace if necessary											
Brake system		I	I	I	I	I	I	I	I	I	I	I	I
Drive belt								I					
Suspension					I				I				I
Nut, bolt, fastener									I				
Tire					I				I				I
Steering head bearing		I					I						I

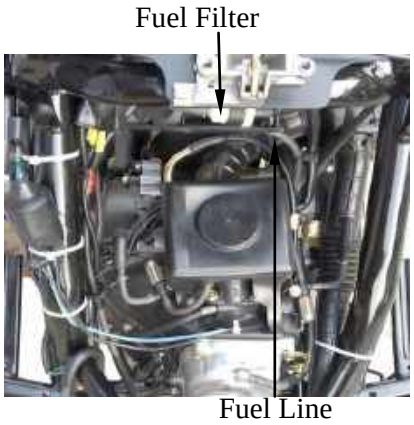
- In the interest of safety, we recommend these items should be serviced only by an authorized KYMCO motorcycle dealer.

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 in rain or at full throttle.

FUEL FILTER

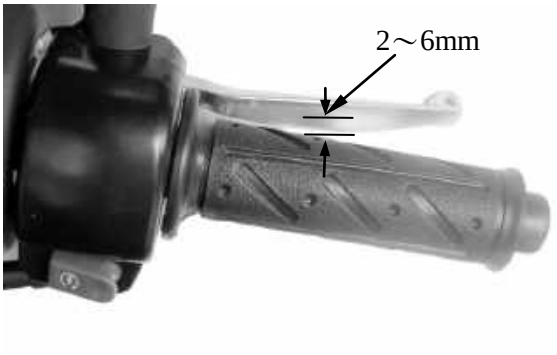
Remove the met-in box. (⇨2-3)
Check the fuel lines and replace any parts which show signs of deterioration, damage or leakage.

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

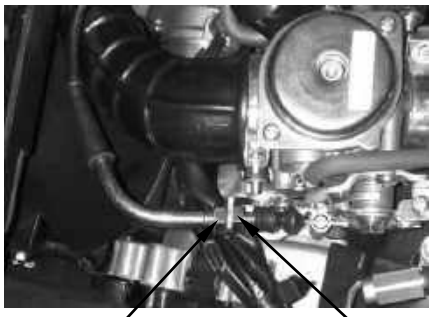


THROTTLE OPERATION

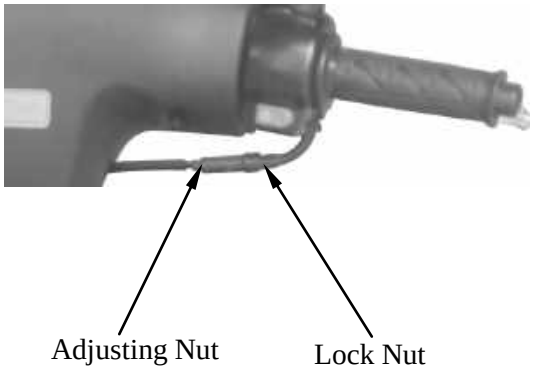
Check the throttle grip for smooth movement.
Measure the throttle grip free play.
Free Play: 2～6mm



Major adjustment of the throttle grip free play is made at the carburetor side.
Adjust by loosening the lock nut and turning the adjusting nut.

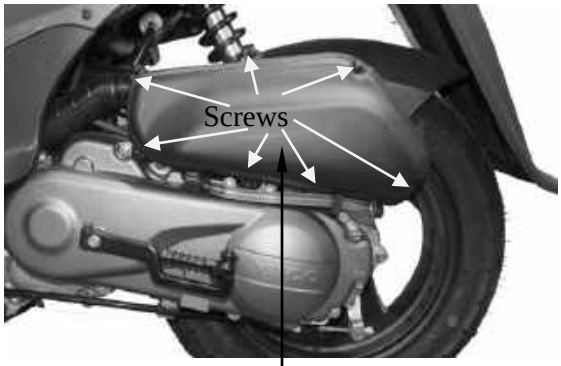


Minor adjustment is made with the adjusting nut at the throttle grip side.
Slide the rubber cover out and adjust by loosening the lock nut and turning the adjusting nut.



AIR CLEANER REPLACEMENT

Remove the air cleaner case cover screws and the cover by removing the seven screws.



Remove the air cleaner element by removing the four screws.
Check the element and replace it if it is excessively dirty or damaged.

CHANGE INTERVAL

More frequent replacement is required when riding in unusually dusty or rainy areas.

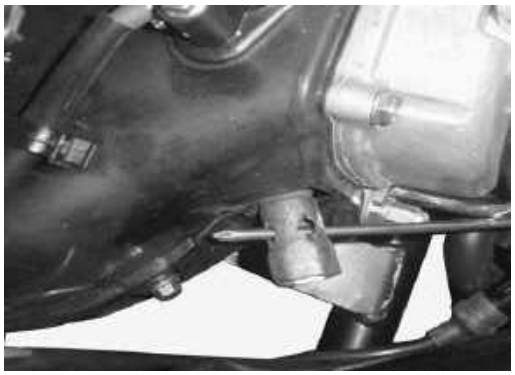
Air Cleaner Element

* • The air cleaner element has a viscous type paper element. Do not clean it with any fluid.
  • Be sure to install the air cleaner element and cover securely.

SPARK PLUG

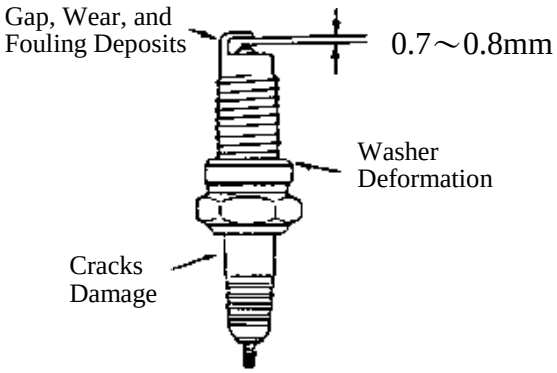
Remove the spark plug.
Check the spark plug for wear and fouling deposits.
Clean any fouling deposits with a spark plug cleaner or a wire brush.

Specified Spark Plug:
NGK CR7HSA/CR6HSA



Measure the spark plug gap.

Spark Plug Gap: 0.7～0.8mm

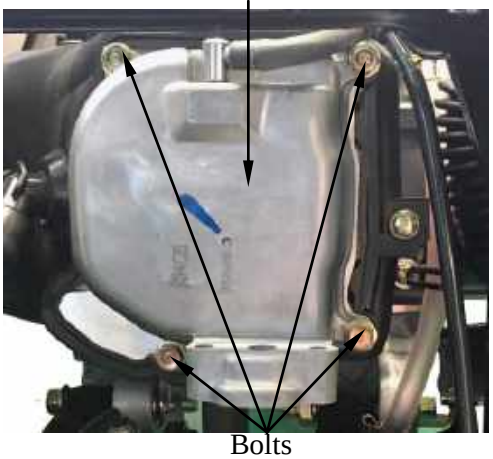


* When installing, first screw in the spark plug by hand and then tighten it with a spark plug wrench.

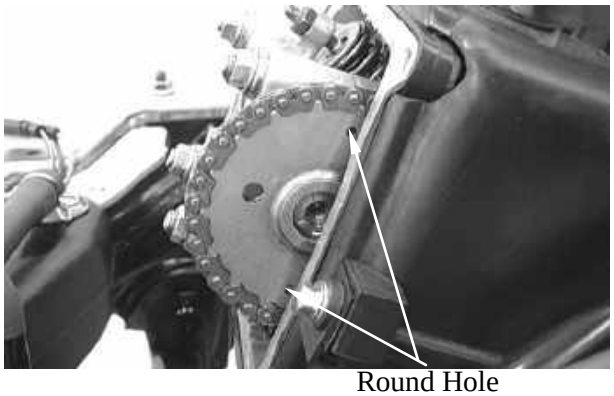
VALVE CLEARANCE

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

Remove the frame cover. (⇨2-3)
Remove the 4 bolts on the cylinder head cover.
Remove the cylinder head cover. (⇨7-3)
Remove the cylinder head cover..



Turn the flywheel counterclockwise so that the "T" mark on the flywheel aligns with the index mark on the crankcase to bring the round hole on the camshaft gear facing up to the top dead center on the compression stroke.



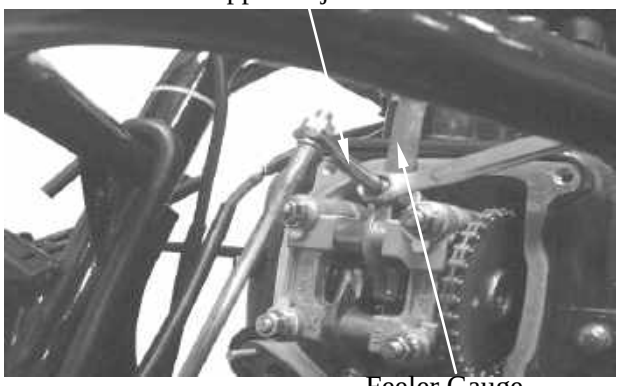
Inspect and adjust the valve clearance.
Valve Clearance: IN : 0.08mm
EX: 0.08mm

Loosen the lock nut and adjust by turning the adjusting nut

Special

Tappet Adjuster

* • Check the valve clearance again after the lock nut is tightened.



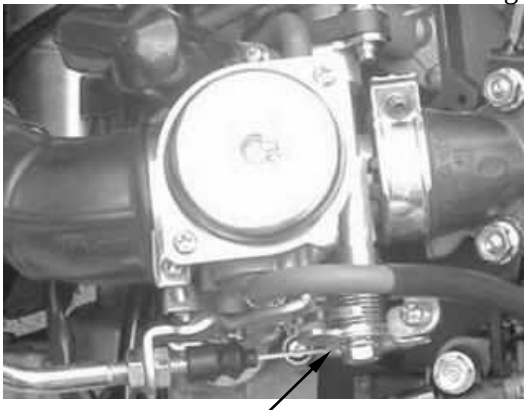
CARBURETOR IDLE SPEED

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

Remove the inspection cover.
Warm up the engine before this operation.
Start the engine and connect a tachometer.
Turn the throttle stop screw to obtain the specified idle speed.

Idle Speed: 2000±100rpm

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



IGNITION TIMING

* The CDI unit is not adjustable. If the ignition timing is incorrect, check the ignition system. (⇨15-5)

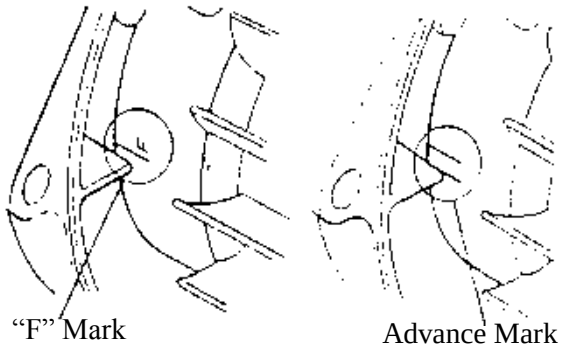
Remove the right of the fan cover.

Timing Hole Cap

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

Timing Light

Also use a timing light to check the advance. Raise the engine speed to 4,000rpm and the index mark on the crankcase cover should be aligned with the advance mark on the flywheel.



"F" Mark

Advance Mark

CYLINDER COMPRESSION

Warm up the engine before compression test.
Remove the met-in box and center cover. (⇨2-3)
Remove the spark plug.
Insert a compression gauge.
Open the throttle valve fully and push the starter button to test the compression.

Compression Gauge

Compression: 15±2 kg/cm²rpm

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.

FINAL REDUCTION GEAR OIL

OIL LEVEL CHECK

* Place the motorcycle on its main stand on level ground for oil level check.

Stop the engine and remove the oil check bolt.
The oil level shall be at the oil check bolt hole.
If the oil level is low, add the recommended oil to the proper level.

Recommended Oil: SAE90#


Oil Check Bolt/Sealing Washer

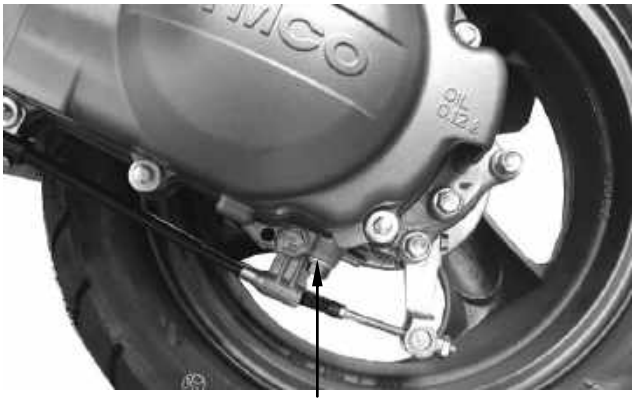
Install the oil check bolt.

* Make sure that the sealing washer is in good condition.

OIL CHANGE

Remove the oil check bolt.
Remove the oil drain bolt and drain the oil thoroughly.
Install the oil drain bolt.
Torque: 0.8~1.2kgf-m

* Make sure that the sealing washer is in good condition.


Oil Drain Bolt/ Sealing Washer

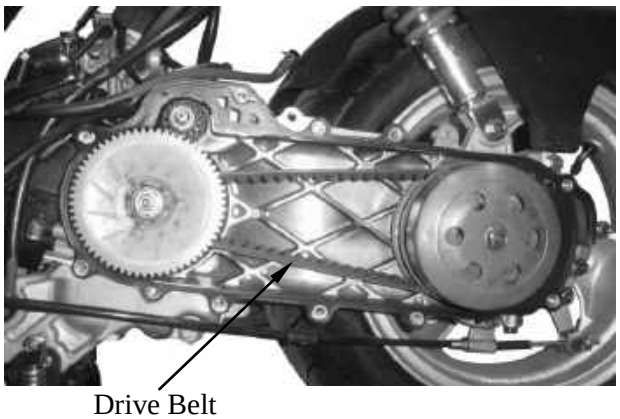
Fill with the recommended oil.

Oil Capacity: At disassembly : 0.18 liter
At change : 0.15 liter

Reinstall the oil check bolt and check for oil leaks.
Torque:0.8~1.2kgf-m

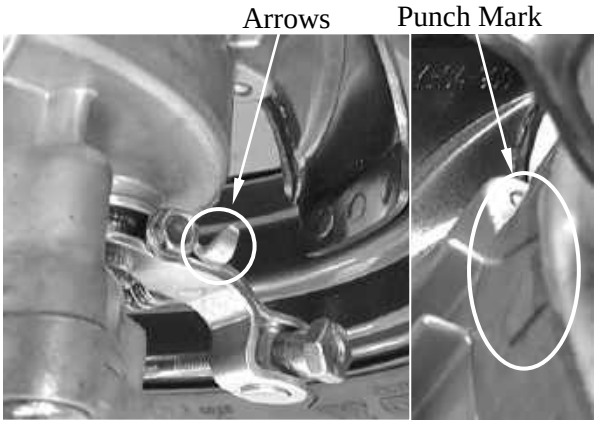
DRIVE BELT

Remove the left cr ankcase cover. (⇨9-2)
Inspect the drive belt for cracks or excessive wear.
Replace the drive belt with a new one if necessary and in accordance with the Maintenance Schedule.


Drive Belt

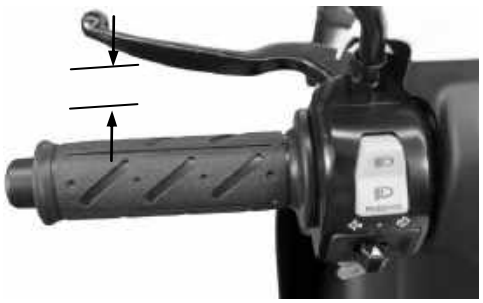
BRAKE SHOE

Replace the brake shoes if the arrow on the wear indicator plate aligns with the punch mark on the brake panel when the brake is fully applied.
Refer to page 12-7 and 13-3 for brake shoe replacement.



REAR BRAKE

Measure the rear brake lever free play.
Free Play: 10～20mm

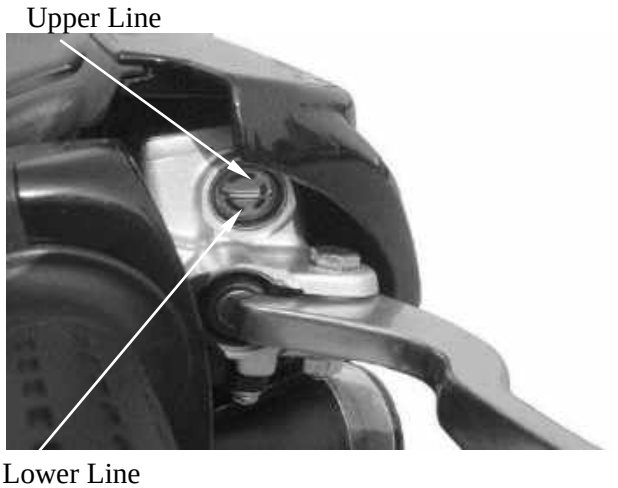


BRAKE ADJUSTING NUT

If the free play do not fall within the limit, adjust by turning the adjusting nut.

BRAKE FLUID

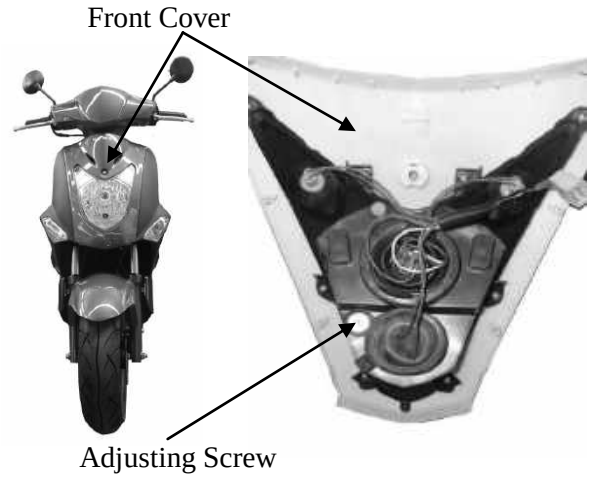
Turn the steering handlebar upright and check if the rear brake fluid level should be between the upper and lower level lines.
Specified Brake Fluid: DOT-4。



If the free play do not fall within the limit, adjust by turning the adjusting nut.

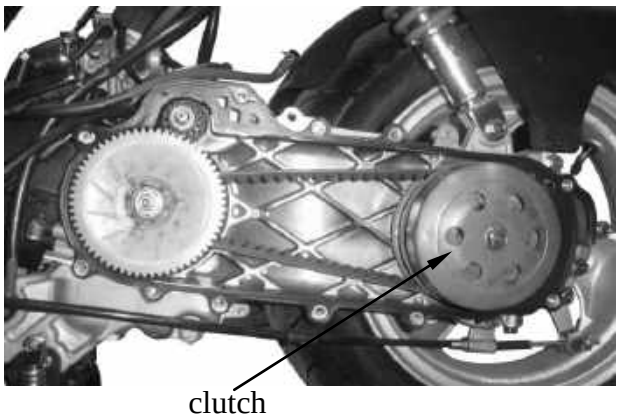
HEADLIGHT AIM

Turn the ignition switch ON and start the engine.
Turn on the headlight switch.
Adjust the headlight aim by turning the headlight aim adjusting screw.



CLUTCH SHOE WEAR

Start the engine and check the clutch operation by increasing the engine speed gradually.
If the motorcycle tends to creep, or the engine stalls, check the clutch shoes for wear and replace if necessary. (⇨9-11)



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. (⇨1-11)

WHEELS/TIRES

Check the tires for cuts, imbedded nails or other damages.

Check the tire pressure.

* Tire pressure should be checked when tires are cold.

TIRE PRESSURE

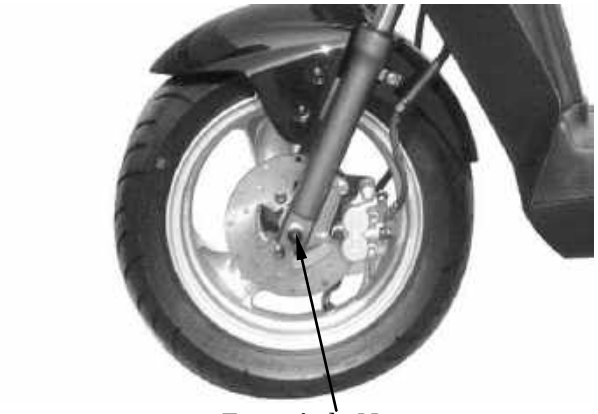
	1 Rider	2 Riders
Front	1.75kg/cm2	1.75kg/cm^2
Rear	2.00kg/cm^2	2.25kg/cm^2

TIRE SIZE

Front : 120/70-12
Rear : 130/70-12

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

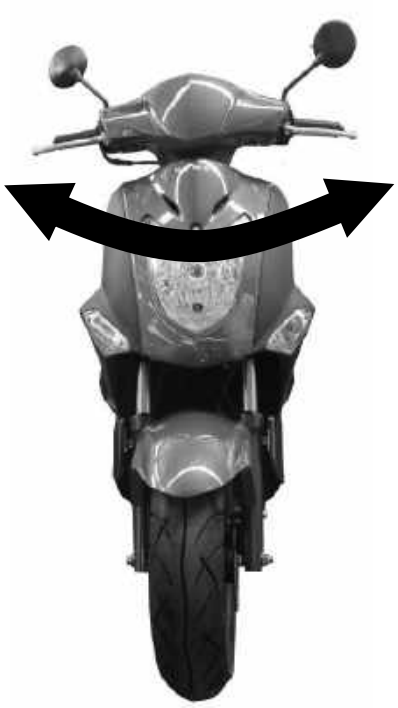
Torques: **Front** : 5.0～7.0kgf-m
Rear : 11～13kgf-m



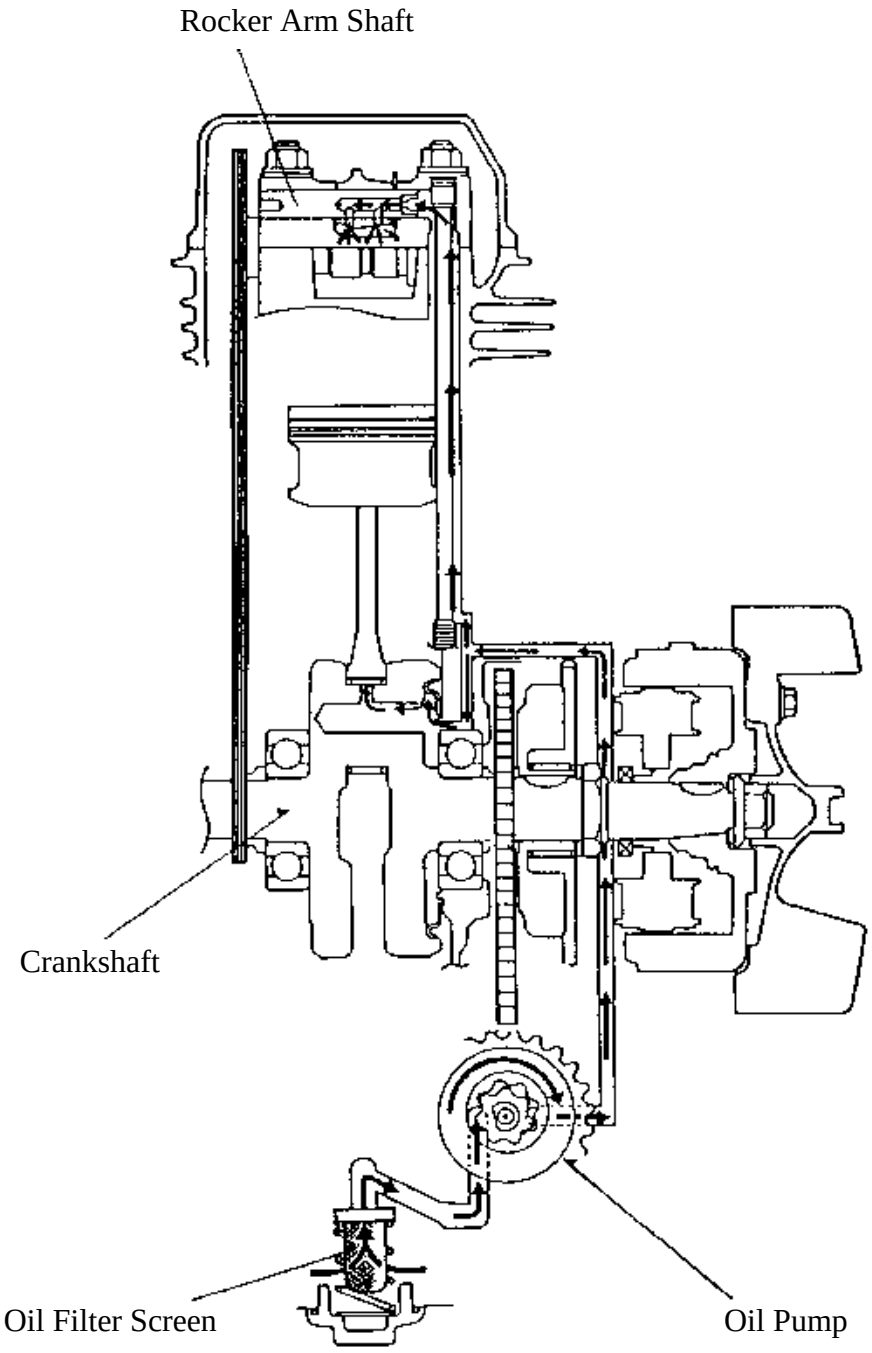
Front Axle Nut

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.



LUBRICATION SYSTEM



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The maintenance of lubrication system 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.
- Do not attempt to disassemble the oil pump. The oil pump must be replaced as a set when it reaches its service limit.
- After the oil pump is installed, check each part for oil leaks.

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Oil pump	Inner rotor-to-outer rotor clearance	—	0.12
	Outer rotor-to-pump body clearance	—	0.12
	Rotor end-to-pump body clearance	0.05～0.10	0.2

TROUBLESHOOTING

Oil level too low

- Natural oil consumption
- Oil leaks
- Worn or poorly installed piston rings
- Worn valve guide or seal

Poor lubrication pressure

- Oil level too low
- Clogged oil filter or oil passages
- Not use the specified oil

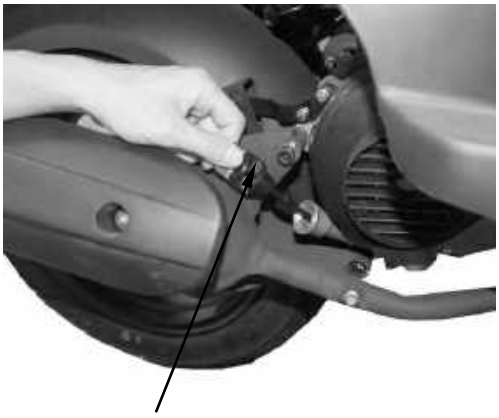
4. LUBRICATION SYSTEM

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.

Remove the oil dipstick and check the oil level with the oil dipstick.
If the level is near the lower level, fill to the upper level with the specified engine oil.


Oil Dipstick

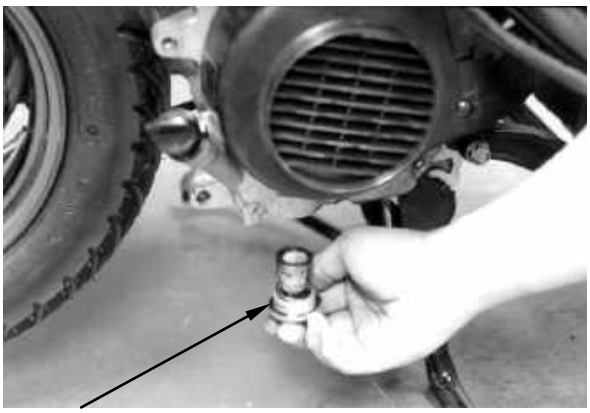
OIL CHANGE

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

Remove the drain bolt to drain the engine oil thoroughly.
Remove the oil filter screen cap and clean the oil filter screen with compressed air.


Oil Filter Screen Cap

Check the filter screen O-ring for damage and replace if necessary.
Install the oil filter screen, spring and filter screen cap.
Torque: 1.0~2.0kgf-m


O-ring

Fill the crankcase with the specified engine oil to the proper level.

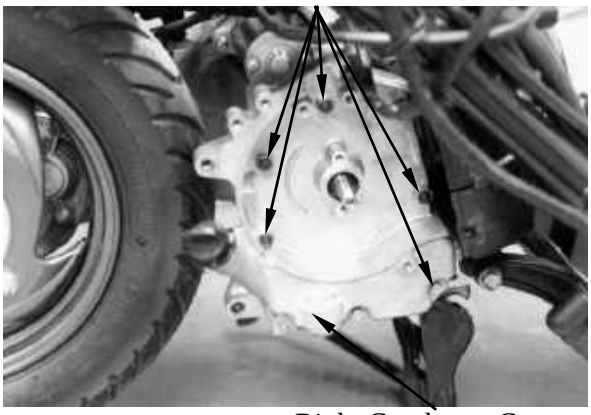
Oil Capacity: At disassembly : 0.8 liter
At change : 0.7 liter

Check for oil leaks and then start the engine and let it idle for few minutes.
Recheck the oil level.

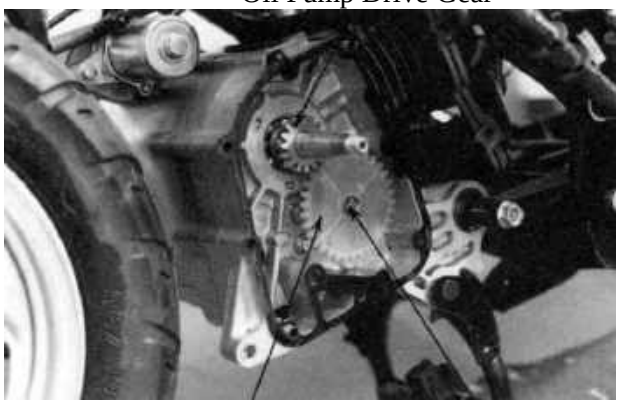
OIL PUMP

REMOVAL

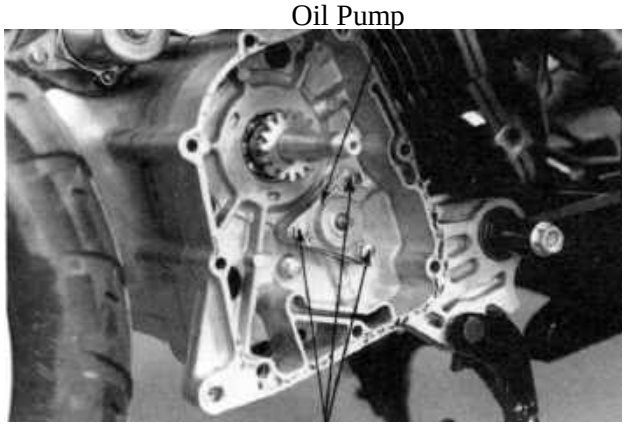
Remove the A.C. generator flywheel. (⇨14-7)
Remove the A.C. generator stator and pulsar coil. (⇨14-6)
Remove the eight right crankcase cover bolts and the right crankcase cover.



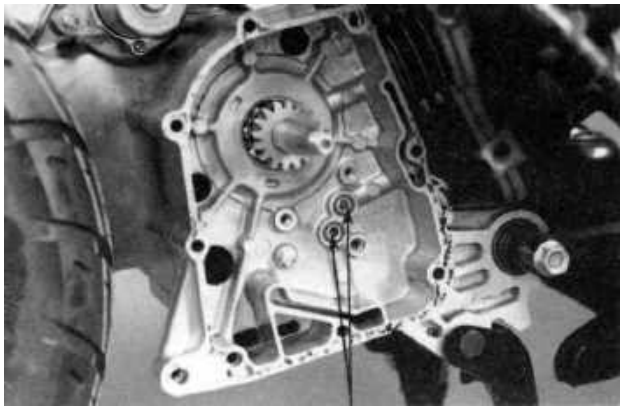
Remove the gasket and dowel pins.
Remove the oil pump drive gear circlip.
Remove the oil pump gear.



Remove the oil pump mounting bolts.
Remove the oil pump.



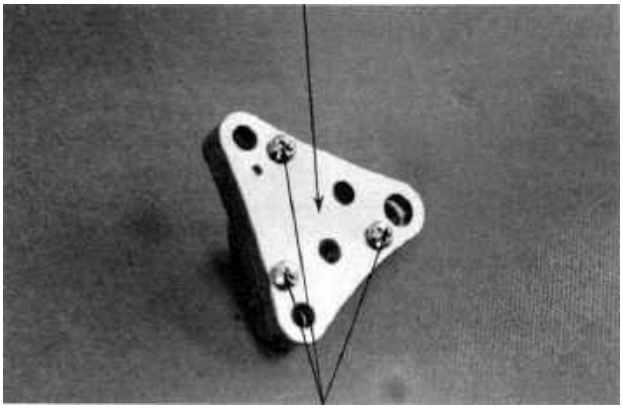
Remove the two O-rings.
Inspect the two O-rings for damage or deterioration.



DISASSEMBLY

Remove the three oil pump boby screws.
Disassembly the oil pump.

Oil Pump Boby

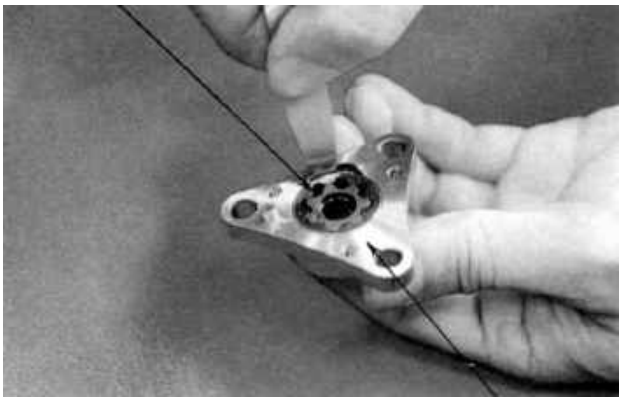


Screws

INSPECTION

Measure the pump boby-to-outer rotor clearance.
Service Limit: 0.12mm

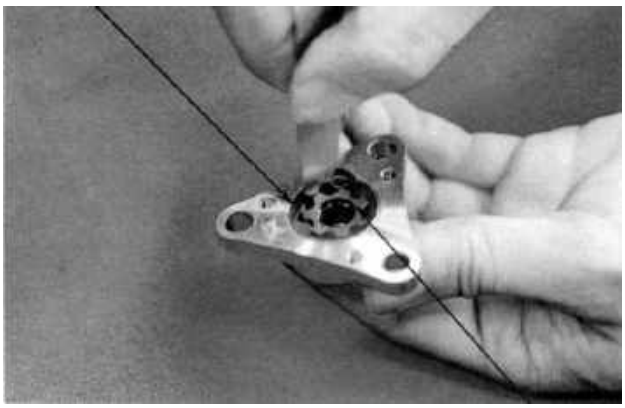
Outer Rotor



Oil Pump Boby

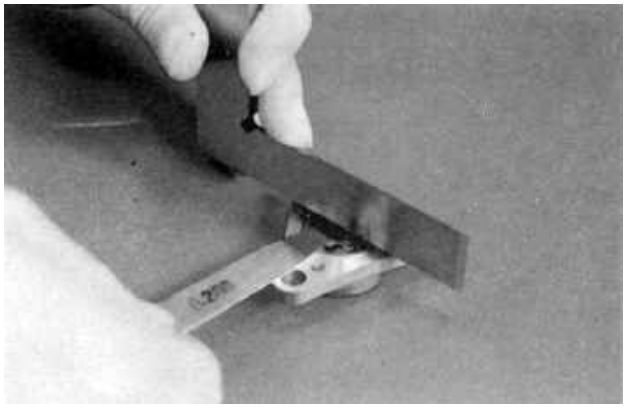
Measure the inner rotor-to-outer rotor clearance.
Service Limit: 0.12mm

Outer Rotor



Inner Rotor

Measure the rotor end-to- pump boby clearance.
Service Limit: 0.2mm

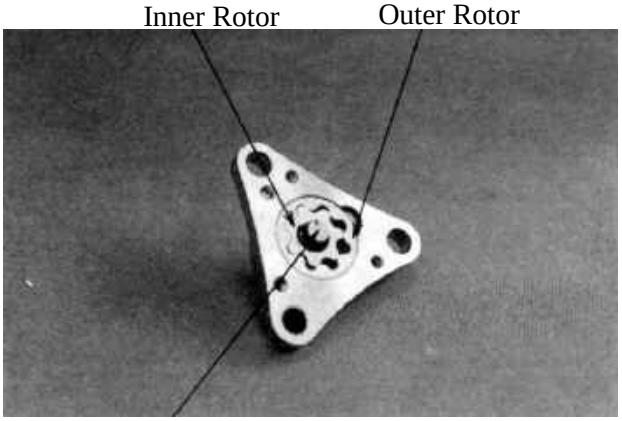


ASSEMBLY

Install the outer rotor, inner rotor and pump shaft into the pump boby.

* Install the pump shaft by aligning the flat on the shaft with the flat in the inner rotor.

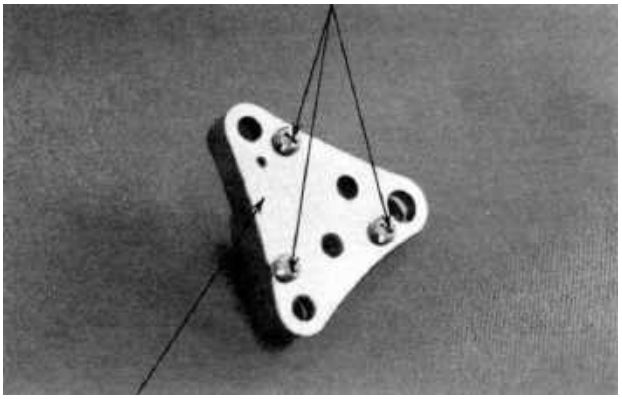
Inner Rotor Outer Rotor



Pump Shaft

Install the pump cover and tighten the screws to secure the pump cover.

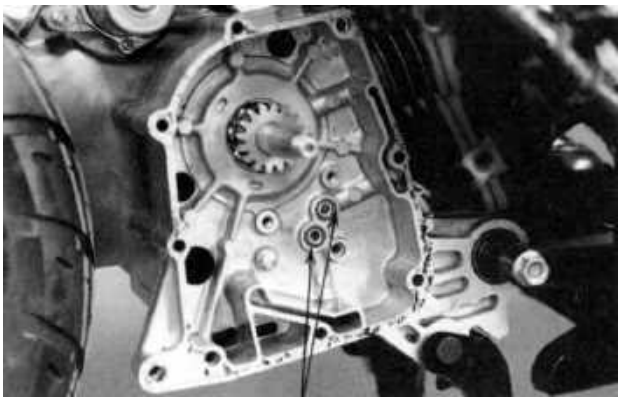
Screws



Pump Cover

INSTALLATION

First install the two O-rings onto the oil pump base.



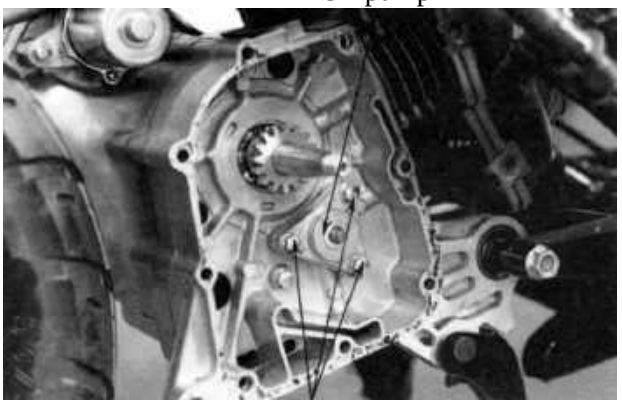
O-rings

Install the oil pump into the crankcase.

* Fill the oil pump with engine oil before installation.

After the oil pump is installed, tighten the three mounting bolts.

Oil pump



Bolts

Install the pump driven gear and secure it with the circlip.

Torque: 0.8～1.2kg-m

Pump Driven Gear

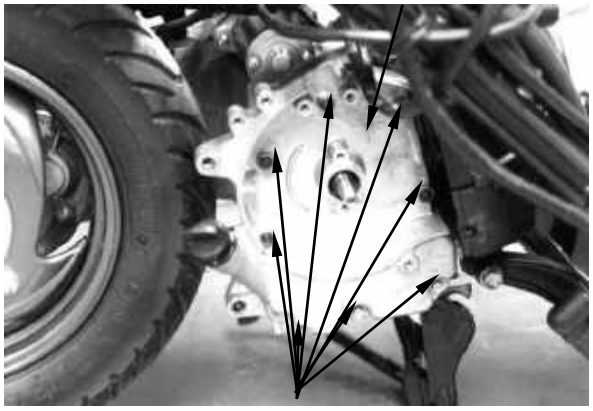
Circlip

Right Crankcase Cover

Install the right crankcase cover and tighten the eight bolts.

Torque: 0.8~1.2kgf-m

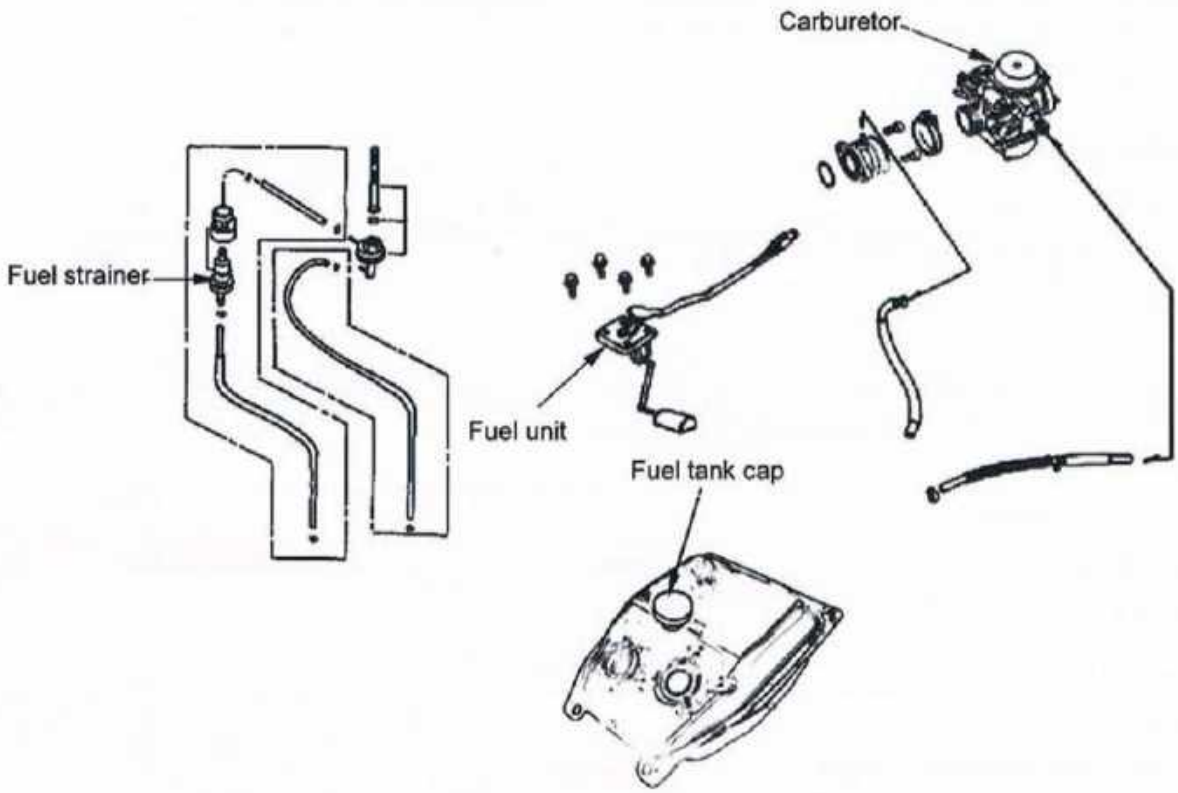
* Diagonally tighten the bolts in 2～3 times.



Bolts

5. FUEL SYSTEM

MECHANISM ILLUSTRATION



PRECAUTIONS IN OPERATION

General Information

⚠ Warning

Gasoline is a low ignition point and explosive materials, so always work in a well-ventilated place and strictly prohibit flame when working with gasoline.

⚠ Cautions

- Do not bend or twist throttle valve cable. Damaged cable will make unstable driveability.
- When disassembling fuel system parts, pay attention to O-ring position, replace with new one as re-assembly
- There is a drain screw in the float chamber for draining residual gasoline.
- Do not disassemble automatic by-starter and air cut-off valve arbitrarily.

Specification

Item	Specification
Main jet	84#
Needle jet	φ2.6#
Level in float chamber	10mm±1mm
Float needle	φ4.2±0.1mm
Mass of float	7.9g±0.2g
Idle speed	2000±100rpm
Slow jet	35#
Fuel quantity adjustment screw	2 1/4±0.5turns
Throttle handle free play	2-6mm

Torque value

Fuel valve tightening nut: 1.5~2.0 Kgf-m

Tool

Special service tools

Vacuum/air pressure pump

General service tools

Fuel level gauge

TROUBLE DIAGNOSIS

Poor engine start
- No fuel in fuel tank
- Clogged fuel tube
- Too much fuel in cylinder
- No spark from spark plug (malfunction of ignition system)
- Clogged air cleaner
- Malfunction of automatic by-starter
- Malfunction of throttle valve operation

Stall after started
- Malfunction of automatic by-starter
- Incorrect ignition timing
- Malfunction of carburetor
- Dirty engine oil
- Air existing in intake system
- Incorrect idle speed

Rough idle
- Malfunction of ignition system
- Incorrect idle speed
- Malfunction of carburetor
- Dirty fuel

Intermittently misfire as acceleration
- Malfunction of ignition system

Late ignition timing
- Malfunction of ignition system
- Malfunction of carburetor

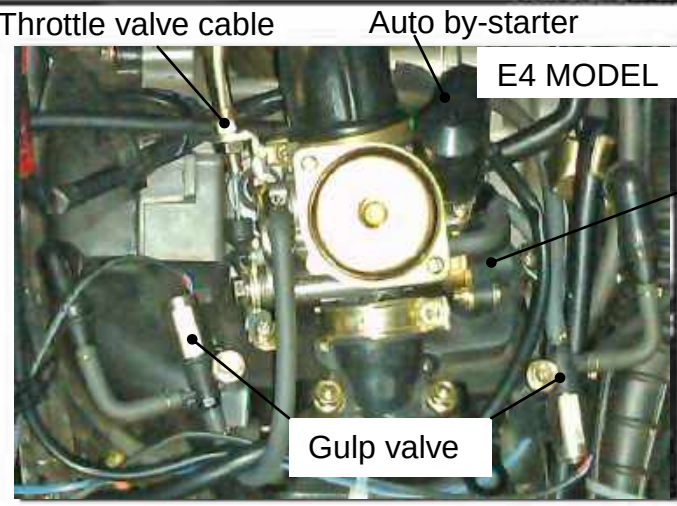
Power insufficiency and fuel consuming
- Fuel system clogged
- Malfunction of ignition system

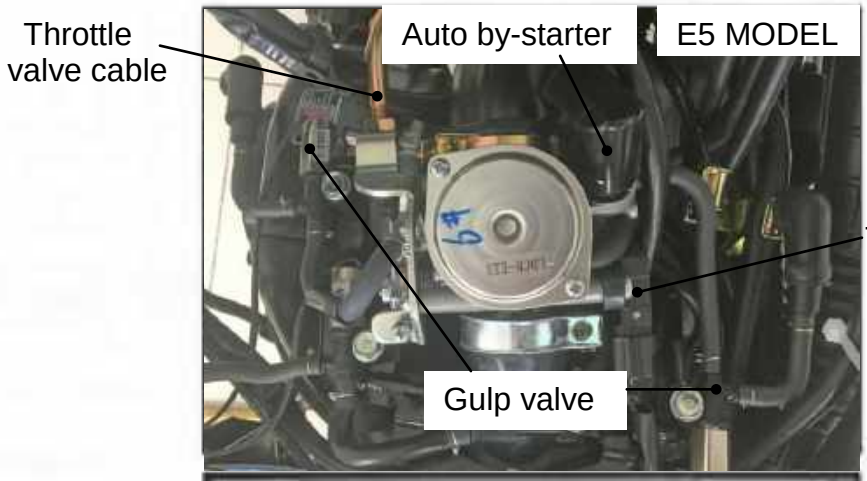
Mixture too lean
- Clogged fuel injector
- Vacuum piston stick and closed
- Malfunction of float valve
- Fuel level too low in float chamber
- Clogged fuel tank cap vent
- Clogged fuel filter
- Obstructed fuel pipe
- Clogged air vent hose
- Air existing in intake system

Mixture too rich
- Clogged air injector
- Malfunction of float valve
- Fuel level too high in float chamber
- Malfunction of automatic by-starter
- Dirty air cleaner

CARBURETOR REMOVAL

Remove the luggage box.
Loosen the adjustment nut and fixing nut of throttle valve cable, and release the cable from carburetor.
Remove fuel pipe, vacuum hose.
Disconnect auto by-starter connector.
Disconnect gulp valve connectors.
Disconnect TPS controller connector.
Release the clamp strip of air cleaner.
Release the clamp strip of carburetor isolator.
Take the carburetor out.

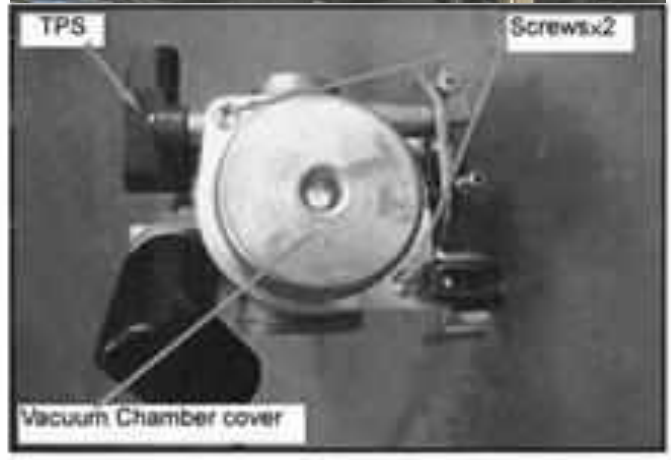




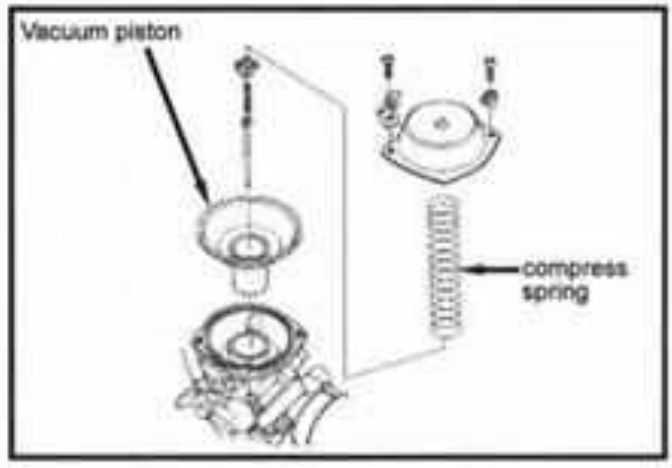
VACUUM CHAMBER

Removal

Loosen drain screw, and drain out residual fuel in float chamber.
Remove screws (2 screws) of vacuum chamber cover and the cover.



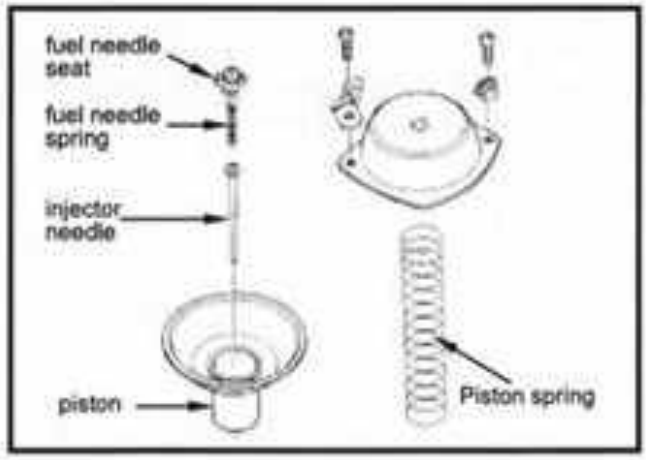
Remove compress spring and vacuum piston.



Remove fuel needle seat, spring, and injector needle.
Check if the vacuum piston for wear out, crack or other damage.
Check if the diaphragm for damage or crack.

⚠ Cautions

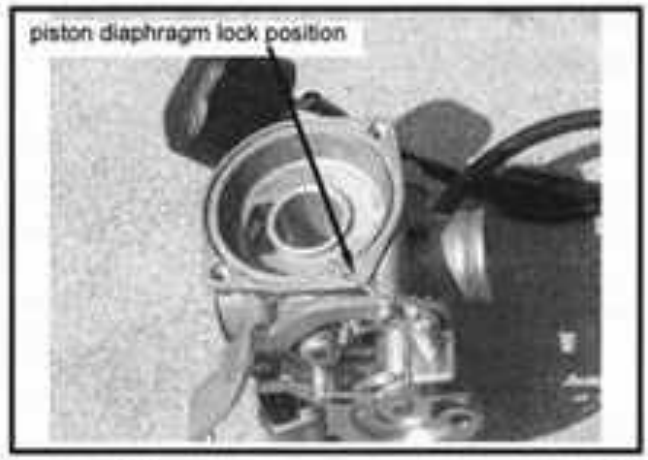
Do not damage vacuum diaphragm.



Installation
Install injector needle, spring and fuel needle seat to vacuum piston.

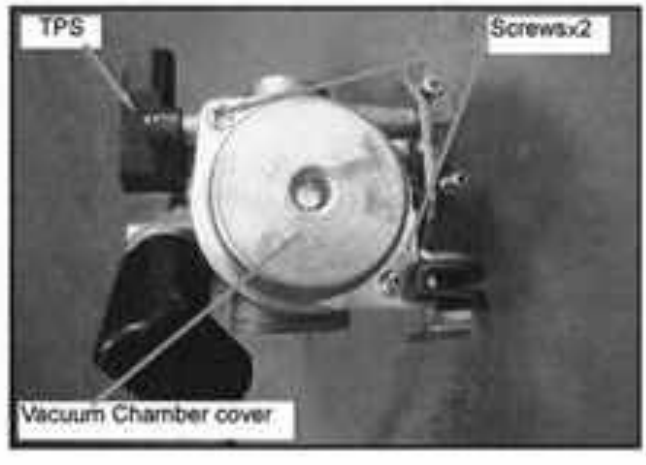
⚠ Cautions

- Note direction as installing the piston set because wrong direction of the piston cab not be installed.
- Align the indent of vacuum diaphragm with the carburetor body.



Install vacuum piston to carburetor body.
Install compress spring.

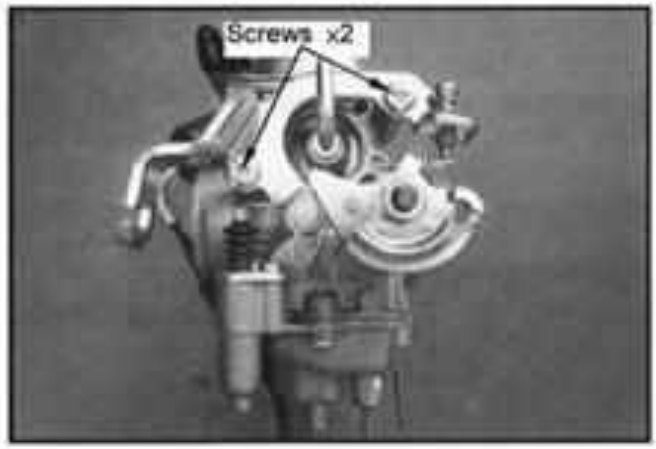
Install vacuum chamber cover and tighten 2 screws.



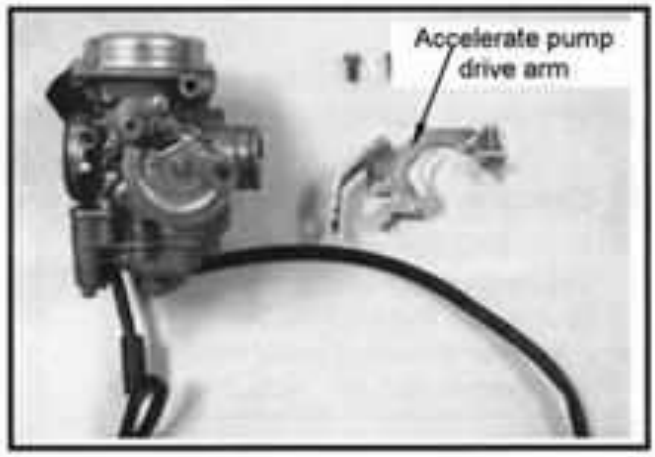
ACCELERATE PUMP

Removal

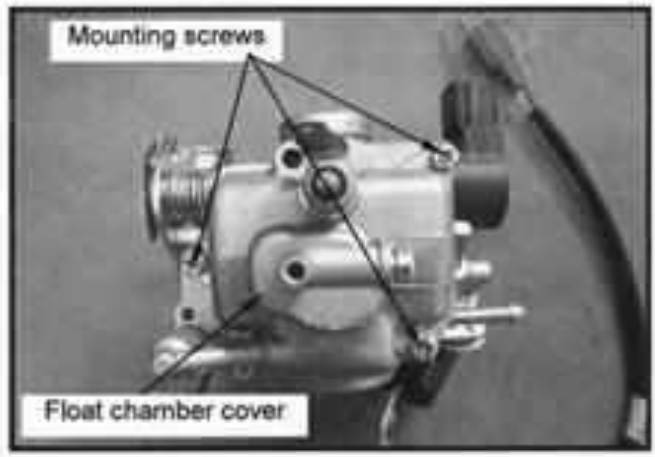
Loosen the fixing screws from carburetor.

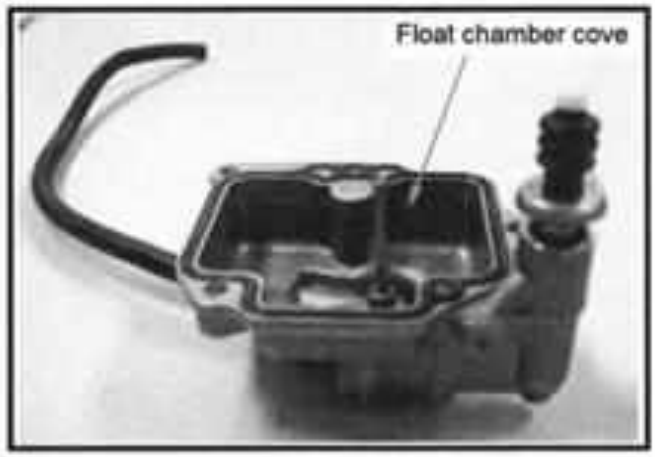


Remove the accelerate pump drive arm from the carburetor.



Remove 3 mounting screws and remove the float chamber cover.
Remove 3 mounting screws and remove the float chamber cover.





Installation

Install the valve as reverse order of removal.

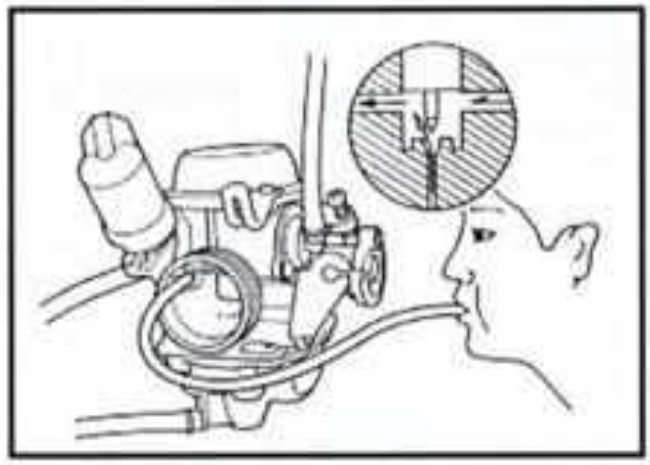
⚠ Cautions

Do not damage the vacuum diaphragm or in opposite installation direction.

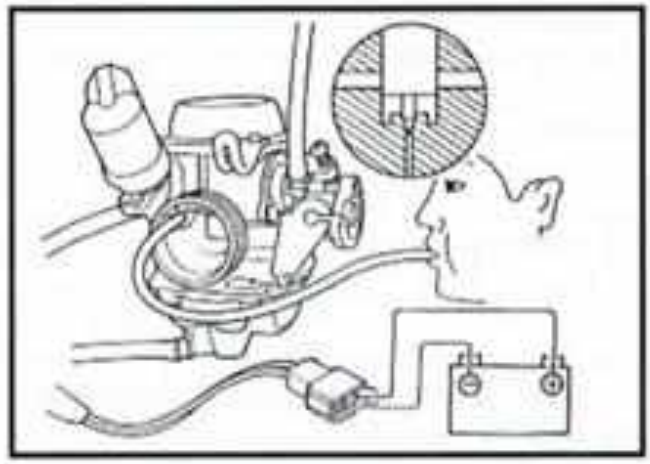
AUTO BY-STARTER

Inspection

Turn off engine and waiting for over 10 minutes for cooling.
Check resistance across the two terminals of the auto by-starter
Resistance value: Max. 10Ω (Measured after engine stopped for more than 10 minutes)
Replace the auto by-starter with a new one if resistance value exceeds standard.
Remove the carburetor, allow it to cool off for 30 minutes.
Connect a hose to fuel richment circuit.
Pump compressed air to the circuit.
Replace the auto by-starter if the circuit clogged.

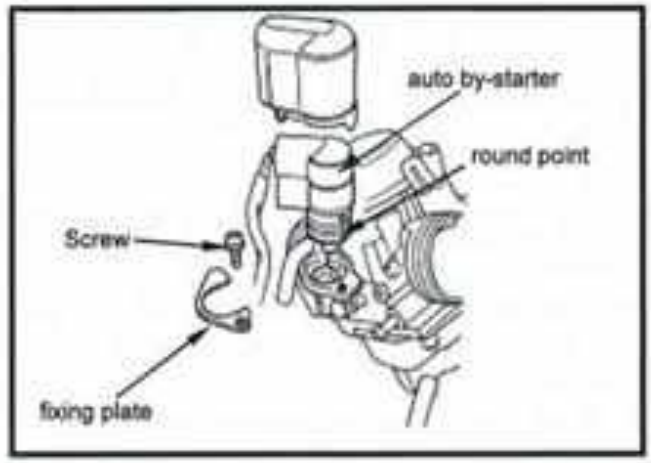


Connect battery posts (12V) to starter's connectors. After 5 minutes, test the rich circuit with compressed air. If air flow through the circuit, then replace the starter.



Removal

Remove fixing plate screw, and then remove the plate and auto by-starter from carburetor.



Valve inspection

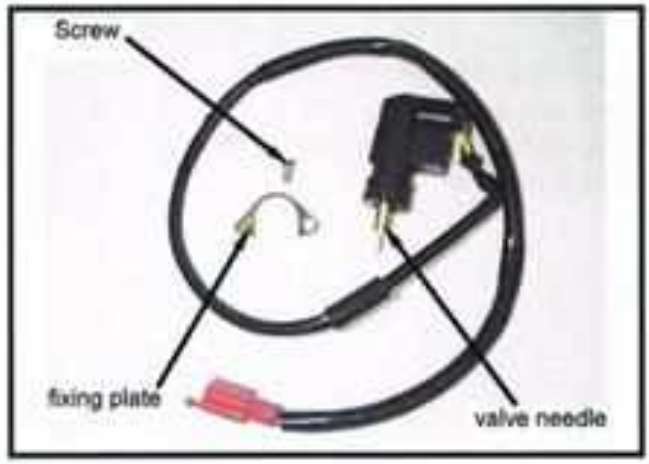
Check if auto by-starter and valve needle for damage or wear out.

Installation

Install auto by-starter to the carburetor body.
Install fixing plate to the upper groove of auto by-starter, and install its flat surface to carburetor. Install screw and tighten it.

⚠ Cautions

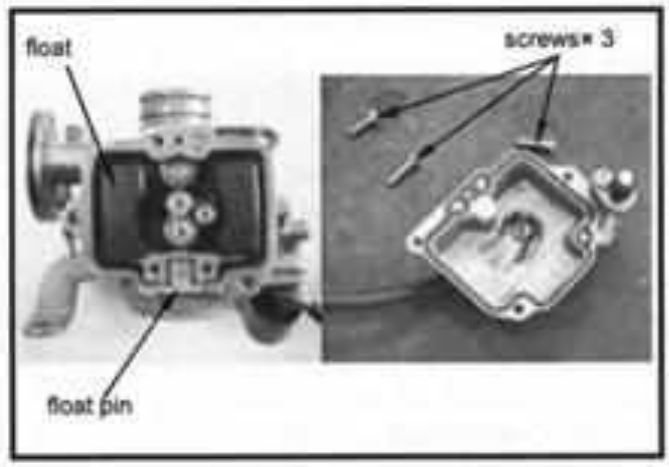
Align the round point of the starter with the screw hole of air intake side.



FLOAT CHAMBER

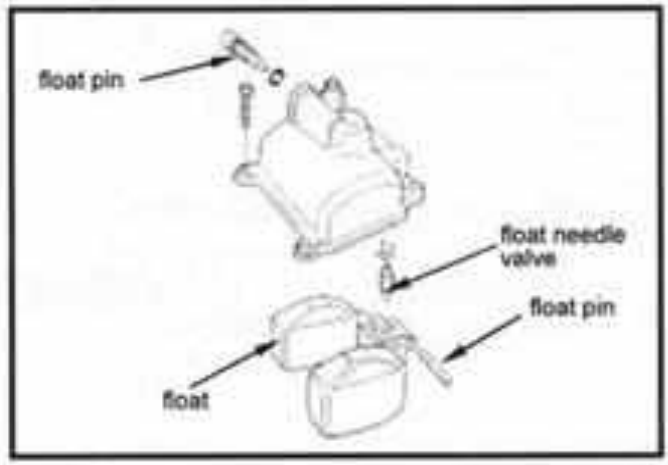
Disassembly

Remove 3 mounting screws and remove the float chamber cover.
Remove the float pin and float valve.



Checking

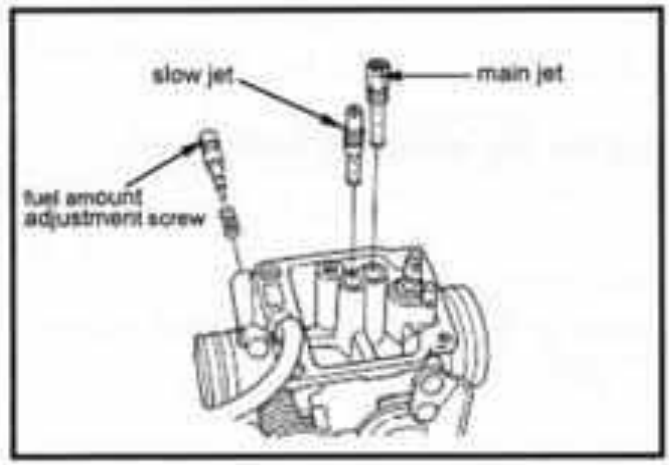
Check float needle valve and valve seat for drop difference damage, wear out, dirty or clogged.



⚠ Cautions

In case of worn out or dirt, the float needle valve and valve seat will not tightly close causing fuel level to increase and as a result, fuel flooding. A worn out or dirty float needle valve must be replaced with a new one.

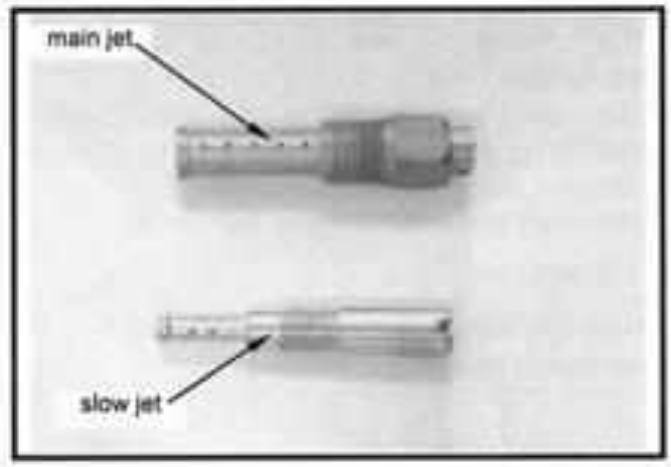
Remove main jet,slow jet, fuel amount adjustment screw.



⚠ Cautions

- Take care not to damage jets and adjust screw.
- Before removing adjustment screw, turn it all the way down and note the number of turns.
- Do not turn adjustment screw forcefully to avoid damaging valve seat face.

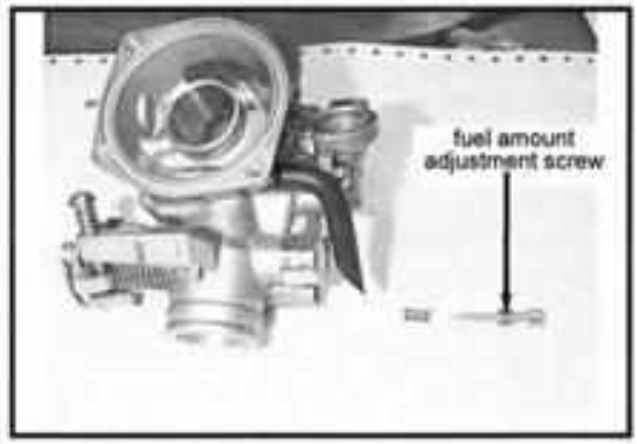
Clean jets with cleaning fluid.
Then use compressed air to blow dirt off.
Blow carburetor body passages with compressed air.



Installation
Install main jet, slow jet and fuel amount adjustment screw.

⚠ Cautions
Set the adjustment screw in according to number of turns noted before it was removed.

Install the float needle valve, float and float pin.



Checking Fuel Level

⚠ Cautions
- Check again to ensure float valve, float for proper installation.
- To ensure correct measurement, position the float meter in such a way so that float chamber face is vertical to the main jet.

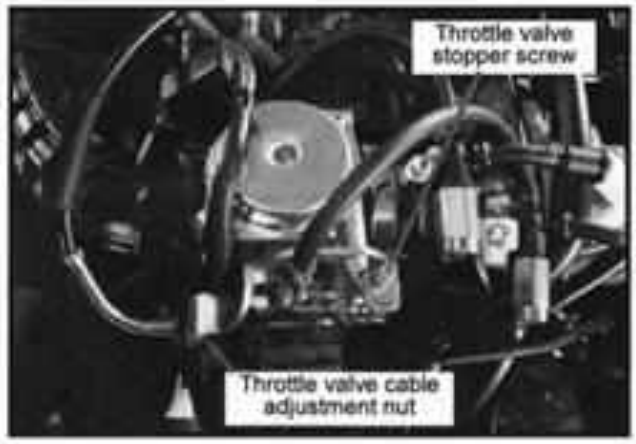
Fuel level: 3.5±1 mm

INSTALLATION OF CARBURETOR

Install carburetor in the reverse order of removal. Following adjustments must be made after installation.
- Throttle valve cable clearance adjustment
- Idle speed adjustment

IDLE SPEED ADJUSTMENT

⚠ Caution
- Fuel amount adjust screw was set at factory, so no adjustment is needed. Note the number of turns it takes to screw it all the way in for ease of installation.
- Never screw in forcedly to avoid damaging the screw seat.
- The main stand must be used to support the motorcycle to perform the adjustments.



Use a tachometer when adjusting engine RPM. Screw in adjustment screw gently, then back up to standard turns.

Standard turns: 2 1/4±0.5turns

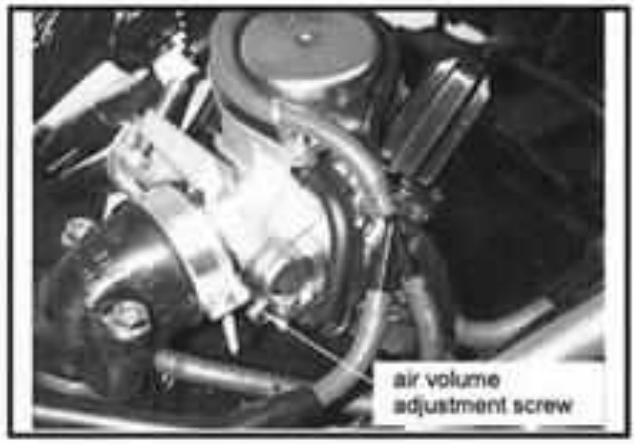
Warm up engine, adjust throttle valve stopper screw to standard RPM.

Idle speed rpm: 2000±100rpm

Connect the sampling hose of exhaust analyzer to exhaust front end. Press test key on the analyzer. Adjust the air volume adjustment screw and read CO reading on the analyzer.

CO standard value: 1.0~1.5 %

Accelerate in gradual increments, make sure both rpm and CO value are in standard values after engine running in stable. If rpm and CO value fluctuated, repeat the procedures described above for adjusting to standard value.



AIR CLEANER

Removal

Remove the seat .
Remove the luggage box assembly (4 bolts).
Loosen the clamp strip of air cleaner.
Remove evaporative return hose.
Remove the air cleaner body bolts (2 bolts).
Remove the air cleaner.

Installation

Install the air cleaner in the reverse order of removal.

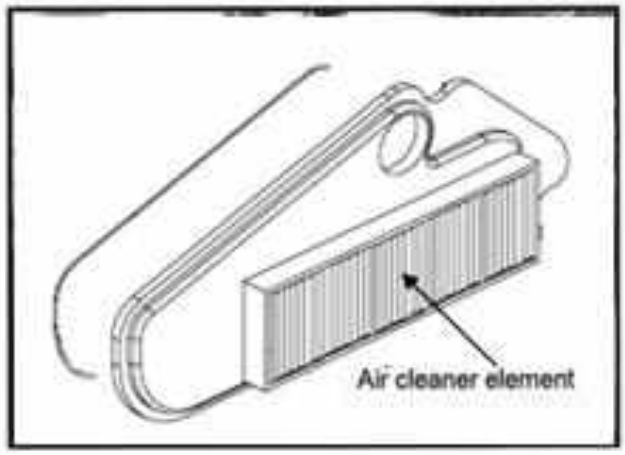
Air Cleaner Element Cleaning

Remove the air cleaner cover (6 screws).

Remove the air cleaner element (2 screws).
With compressed air to clean dirty around the element. Replace it if it is too dirty to clean.

⚠ **Cautions**

The air cleaner element is made of paper so do not soap it into water or wash it with water.



(E4 MODEL)

ELECTRIC CARBURETOR TPS RESET

1. TPS Mechanical adjustments

1) TPS Initial voltage: 0.66 ± 0.6V

2) If value not on this range loose bolt then adjust TPS body and check by diagnostic tool

(E4 MODEL)

2. Check MAP version

Before adjust the idle speed should be checking MAP version by diagnostics while turn the ignition switch on

3. TPS Reset procedure

1) Select Adjust icon

2) Select TPI Reset

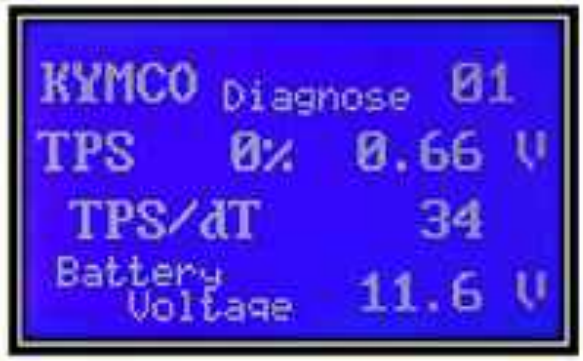
3) Complete throttle fully and closed within five seconds once

4) After throttle operation , the monitor display is completed

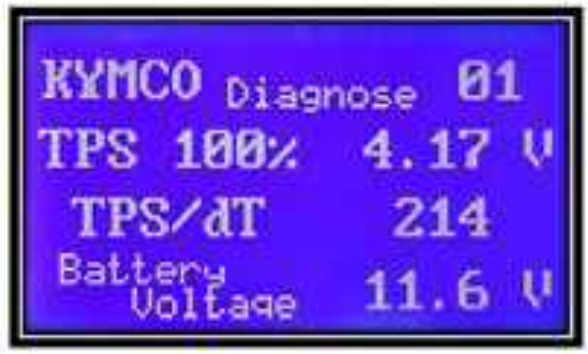
5) Go back to the Data Analyze and select it

4. Check TPS Position

1) Initial voltage of TPS : 0.6 V ~ 0.72 V



2) TPS full open: 95%-100%.
Voltage value: 3.7 V ~ 4.2 V



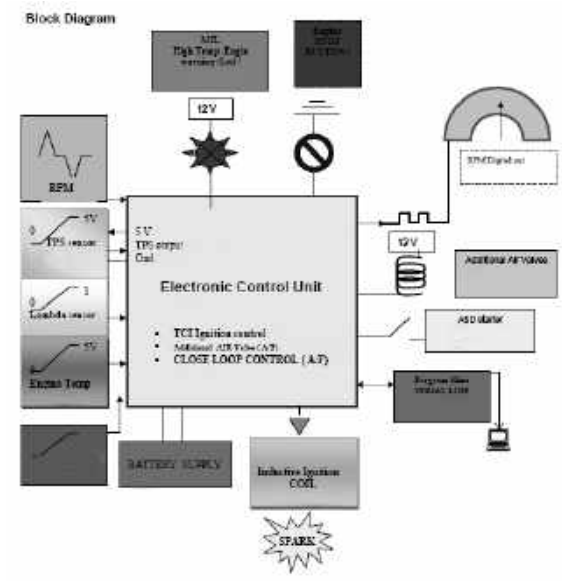
When you finish TPS reset and cranking the engine it can be starts then a little time engine stall

Electronic Carburetor System

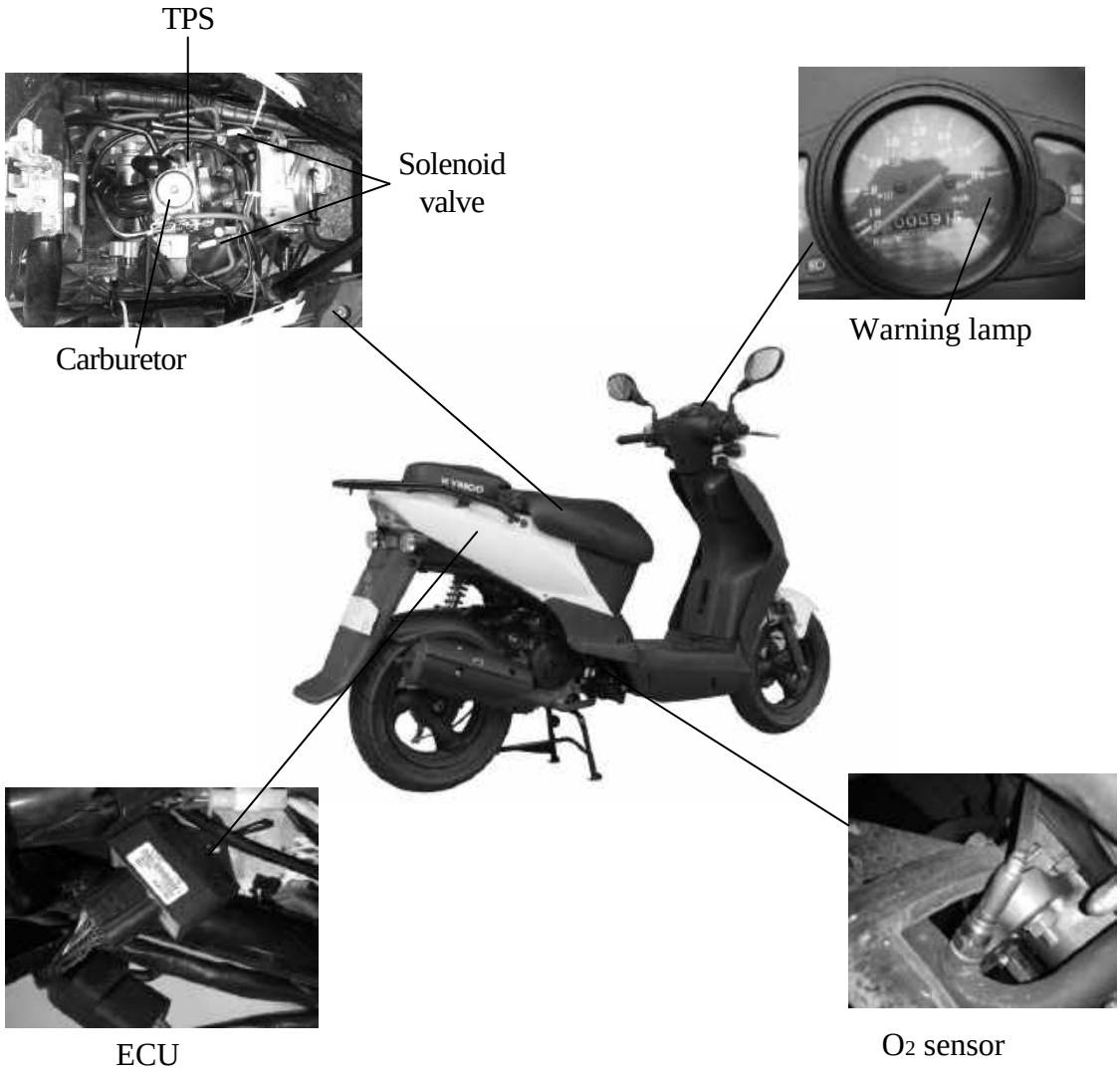
Collect engine speed signal, oxygen sensor signal, engine temperature signals, battery voltage, etc.,

Through the calculation of ECU control strategy, and ignition signal output PWM control signal,

Realize the solenoid valve for carburetor main oil system and idle oil system for real-time additional air, precision digital control of air-fuel ratio and ignition system.



Electronic Carburetor parts installation location



Fi Diagnostic Tool
Operation Instructions
Part No. 3620A-LEB2-E00

1 Model No.
2 Down Button
3 DTC indicator (Failure codes)
4 Enter or Exit
5 Power indicator
6 UP Button
7 Adjust(TPI Reset)
E4 MODEL
8 DATA Analyze
9 DTC Inspect
10 ECU Version

Diagnostic version

(E4 MODEL)

(E5 MODEL)

Warning Lamp

Electronically controlled carburetor fails, motorcycle running abnormal or cannot be started，
The warning lamp is up, Prompt the user for repair.

E4 MODEL

Error table			
Code	Error	MIL LED	Description
10	Err_Flash_Chk		Checksum error of data in flash memory The ECU usually reset the value in the default map, it could appear during a map loading interruption
11	Err_Flash_Dev		Flash error, it is possibile a hardware error
104	Err_Teng_CC	(0,3) 1.5 sec off 3 blinks	Engine temperature sensor in short circuit
105	Err_Teng_CA		Engine temperature sensor in open circuit
120	Err_Air_CC	(0,2) 1.5 sec off 2 blinks	Air valve in short circuit
121	Err_Air_CA		Air valve in open circuit The fault check is activated when: Air_En = 1 Output PWM air valve not 0 Engine is running
130	Err_Starter_CC	(0,5) 1.5 sec off 5 blinks	Starter in short circuit Check made if ASD starter PWM >= 5%, it works only if engine is running
131	Err_Starter_CA		Starter in open circuit Check made if ASD starter PWM <= 95%, it works even if engine is not running
138	Err_Speed_CC	(0,6) 1.5 sec off 6 blinks	Speed sensor in short circuit or open circuit
139	Err_Speed_CA		Detected if engine is running over certain RPM and signal is fixed low or high for at least 3s Every fault conditions is immediately deleted when activity sensor is detected
170	Err_Tps_Lo	(0,1)	TPS signal lower than 0,2V

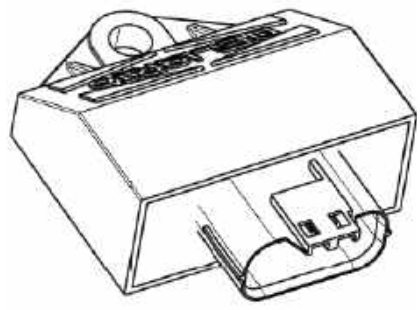
171	Err_Tps_Hi		TPS signal higher than 4,8V
190	Err_Lambda_CC	(0,4) 1.5 sec off 4 blinks	Lambda sensor short circuit to GND or 5 Volt Check if key on and engine is not running Fault detected after 5 seconds
192	Err_Lambda_NA		If TPS_En = 0, the conditions test are: RPM bigger than 3000 Engine run time bigger than 3 minutes If there's no sensor activity for ClcCheckTime_NoTps seconds, the fault is activated (default value 300 seconds) If TPS_En = 1, the conditions test are: RPM bigger than 3000 Engine run time bigger than 3 minutes TPS bigger than Clc_TPSEnLo_Diag If there's no sensor activity for ClcCheckTime_TpsPresent seconds, the fault is activated (default value 30 seconds) Sensor check for dialer: Key OFF > Key ON RPM bigger than 6000 for 1 minute within 2 minutes since 2 minutes engine's running If there's no sensor activity, the fault is activated Every fault conditions is immediately deleted when activity sensor is detected

E5 MODEL

Kymco Euro 5 ECS DTC					
NO.	DTC CODE	PART	Fault discrebtion	Current Fault/History Fault Indication	MIL Activate
1	P0031	Lambda sensor	Lambda sensor heater control circuit low, this DTC is set if a short to GND or disconnection is detect for at least 5s.	YES	NO
2	P0032		Lambda sensor heater control circuit high, this DTC is set if a short to battery is detect for at least 5s	YES	NO
3	P0117	EWT Sensor	Engine temperature circuit low input	YES	NO
4	P0118		Engine temperature circuit high input	YES	NO
5	P0122	TPS	TPS circuit low input	YES	NO
6	P0123		TPS circuit high input	YES	NO
7	P0132	Lambda sensor	O2 sensor circuit high voltage (bank I sensor 1)	YES	NO
8	P0134		O2 sensor circuit no activity detected	YES	NO
9	P0217	EWT Sensor	Engine over-temp condition, this DTC is set when EWT rises above 165 for at least 60s	YES	NO
10	P0219		Maximum engine speed	YES	NO
11	P0337	VRS	Crank- sensor short to Ground	YES	YES
12	P0338		Crank- sensor short to Supply	YES	YES
13	P0339		Crank sensor wires open circuit	YES	YES
14	P0387		Crank+ sensor short to Ground	YES	YES
15	P0388		Crank+ sensor short to Supply	YES	YES
16	P0501	Speed sensor	VSS (Vehicle Speed Sensor) No signal	YES	NO
17	P0504	Idle solenoid valve	Idle control circuit high	YES	NO
18	P0505		Idle control circuit low	YES	NO
19	P0562	Power Supply(Battery)	System voltage low	YES	NO
20	P0563		System voltage high	YES	NO
21	P0650	MIL	MIL LAMP short to Supply	YES	NO
22	P1501	sensor supply	Sensors supply short circuit to GND	YES	NO
23	P1502		Sensors supply short circuit to VBATT	YES	NO
24	P1536	VRS	VRS wrong signal polarity	YES	NO
25	P2257	Main solenoid valve	Main air valve control circuit Circuit High	YES	NO
26	P2258		Main air valve control circuit Circuit Low	YES	NO
27	P2259	AUX solenoid valve	Aux air valve control circuit Circuit High	YES	NO
28	P2260		Aux air valve control circuit Circuit Low	YES	NO
29	P2301	COIL	Coil short circuit to Vbatt	YES	YES
30	P2300		Coil open circuit / short circuit to Ground	YES	YES

ECU

ECU is the electronic control unit, and its maximum working voltage to 18 v. ECU is through a 16-bit chip,
The speed signal, oxygen sensor signal, engine temperature sensor signal, trigger signal, such as internal control logic rocessing, realize the ignition coil, solenoid valve, warning lamp etc.



* •Do not disconnect the battery negative (-) or positive (+) cable during the ignition switch “ON”, it may cause ECU damage.
  •Do not disconnect or connect the ECU connector while engine is running, it may cause the ECU damage.

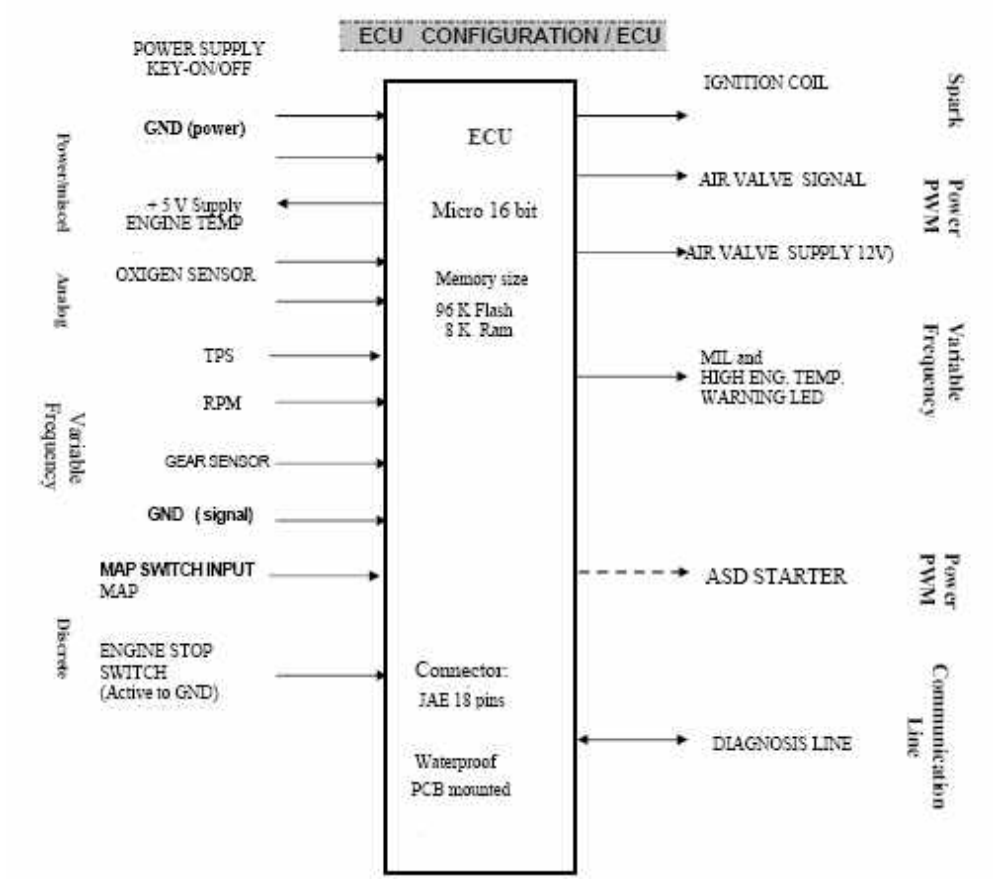
PIN ASSIGNEMENT E4

Pin Number	Signal
1	Vbat
2	Signal GND
3	O2Sen In
4	TPS In / TPS
5	Pick Up
6	Gear In
7	Tune Switch
8	PWM Air Out / PWM
9	ASD Starter
10	+5V Sensor Supply / +5V
11	Free In
12	K-Line
13	NTC Eng In
14	Eng Stop
15	Not Available
16	MIL Out
17	Power GND
18	IGN Out

PIN ASSIGNEMENT E5

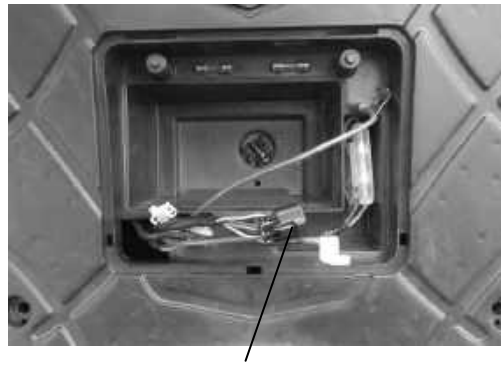
Pin Number	COLOR	Signal
1	B/L(1)	Vbat
2	L/O	K-Line
3	L/Y	CRANKSHAFT POSITION SENSOR
4	G/W	CRANKSHAFT POSITION SENSOR
5	G/B	Power GND
6	B/Y	IGN Out
7	P/G	HEGO HEATER
8	P/Y	Auto By Start
9	W/R	Main Solenoid Valve
10	V/G	Signal Gnd
11	V/R	+5V ECU Out
12	R/GR	SP SENSOR
13	L/R	MIL(Malfunction Indicator Lamp)
14	V/B	TPS In
15	B(2)	O2 Sensor
16	G/L	NTC Eng In
17	B/W	AUXILAY SOLENOID VALVE
18	B/R	IDLE SOLENOID VALVE

ECU CONFIGURATION



ECU INSPECT

1. Connect the diagnostic tool to the motorcycle diagnosis connector
2. Turn the main switch on,don't start the engine,make sure the diagnostic software detects the ECU.
3. Check if the ECU version. MAP ID is correct.
4. Check for any failure code in the diagnostic software
5. Inspect and repair the electric parts according to the failure code,make sure to eliminate the failure code with the software.
6. Start the engine,inspect all the parameters in the software.



Diagnosis tool joint

SOLENOID VALVE

Solenoid valve is driven by the air-fuel ratio signal of ECU,different amount of air is supplied to the carburetor idle speed air tube according to different PWM signal,to maintain the ideal air-fuel ratio 14.7.Air cleaner is connected to the inlet tube of the solenoid valve,it can prevent clog of carburetor by filtering dust in the air.

Solenoid valve

SOLENOID VALVE INSPECT

1.Check if the connecting tube betweent the solenoid valve and the carburetor is fit properly,if the solenoid valve wire is connected properly.
2. Check if the air cleaner is clogged
3.Measure the resistance between the solenoid valve wires with a multimeter.
RESISTANCE: 70Ω~85Ω

Solenoid valve clamp

Solenoid valve wire

Solenoid valve air cleaner malfunctions and solutions

1. The connecting tube betweent the solenoid valve and the carburetor loose →reconnect properly
2. The solenoid valve wires connector poor contact→reconnect properly
3. Air cleaner clogged→replace with a new one or clean the filter to make it impeded.
4. Resistance between the solenoid valve wires over 85Ω →replace the solenoid valve with a new one.
5. Unstable idle speed 、 poor acceleration→ check if the connecting tube betweent the solenoid valve and the carburetor is fit properly,if the carburetor is clogged,or replace the solenoid valve with a new one.

TPS FUNCTION

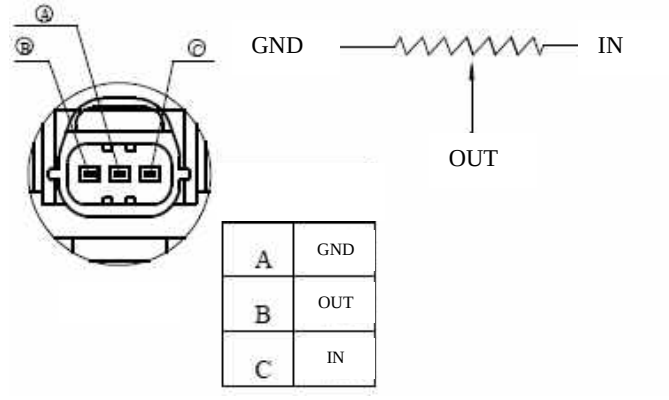
TPS mainly consists of a variable resistance chip.It is installed on the throttle axle,the resistance will vary corresponding to the rotation of the throttle and TPS will send a linear changing voltage signal,so the ECU can detect the throttle position and calculate how much air shall be supplied and control ignition timing.TPS has 3 pins,one 5V power input,one voltage output pin,one ground pin.

TPS

TPS INSPECTION

1. Use a three-phase multi-functional meter(V DC) to measure the voltage
   A.Connect the Three-phase meter – cable to TPS ground pin
   B.Connect the Three-phase meter+ cable to TPS input pin
   Working voltage： 5.0±0.1V

2. oltage output confirm(Use a probe tool)
   A.Connect the Three-phase meter – cable to TPS ground pin
   B. Connect the Three-phase meter+ cable to TPS output pin
   C. Measure the voltage when the throttle is fully open and fully closed.
   Voltage (fully closed)： 0.2~1.0 V
   Voltage (fully open)： 3.2~4.8V

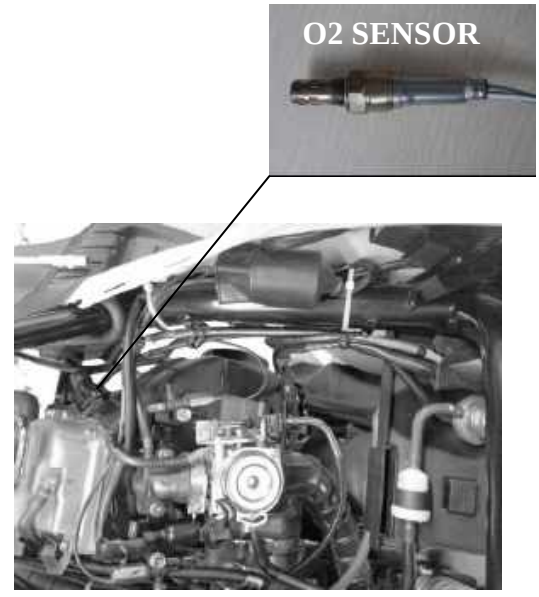


TPS MALFUNCTIONS AND SOLUTIONS

TPS working voltage is beyond normal range,or voltage output is abnormal when throttle is full open or fully closed→check if the main wiring is normal or replace the TPS with a new one.During installation,make sure the resistance of ETS is 0.6~0.8V when throttle is fully closed.After installation ,check the working voltage and voltage when throttle is fully open and fully closed.

O2 SENSOR

O2 SENSOR detects the level of O2 in the exhaust pipe and send the signal to ECU,to change air supply of the solenoid valve and change the air-fuel ratio in the carburetor.If the level of O2 is too low,it means the mixed air is too thick and there will be too much HC and CO in the exhaust gas.Otherwise it means the mixed air is too thin,and there will be too much NOx in the exhaust gas.ECU will maintain air-fuel ratio 14.5~14.7 according to the signal of O2 SENSOR,thus minimize CO/HC/Nox in the exhaust gas and reduce pollution.



O2 SENSOR INSPECTION

1. Start the engine
2. Keep full throttle for 3 minutes
3. Check if the fault light is flashing or not

If the flash frequency of the faulty light is 4 at a time,it means malfunction.

O2 SENSOR MALFUNCTIONS AND SOLUTIONS

1.Connector poor contact→check if the main wiring is normal
2. O2 SENSOR damaged→replace with a new one and check again

The input volt range is : 0V – 1V

ENGINE TEMPERATURE SENSOR

ETS mainly consists of a negative temperature coefficientthermistor(Resistance dimish when temperature rising).It has 2 pins,one voltage output pin and one ground pin.ETS is installed on the cylinder head and its resistance varies with changing temperature,it will send a voltage signal to ECU,ECU will change air supply of the solenoid valve and correct the ignition timing.

ETS INSPECTION

1.Disconncect the connector of the ETS
2.Measure the resistance between the 2 pins of ETS with a three-phase multi-functional meter.

Temperature(℃)	Resistance(KΩ)
-20	955±48.5
25	124.8 ±6.4
40	53.4±2.8
80	12.5 ±0.65

LDC8-45 E5 Dellorto ECS Diagnostic report

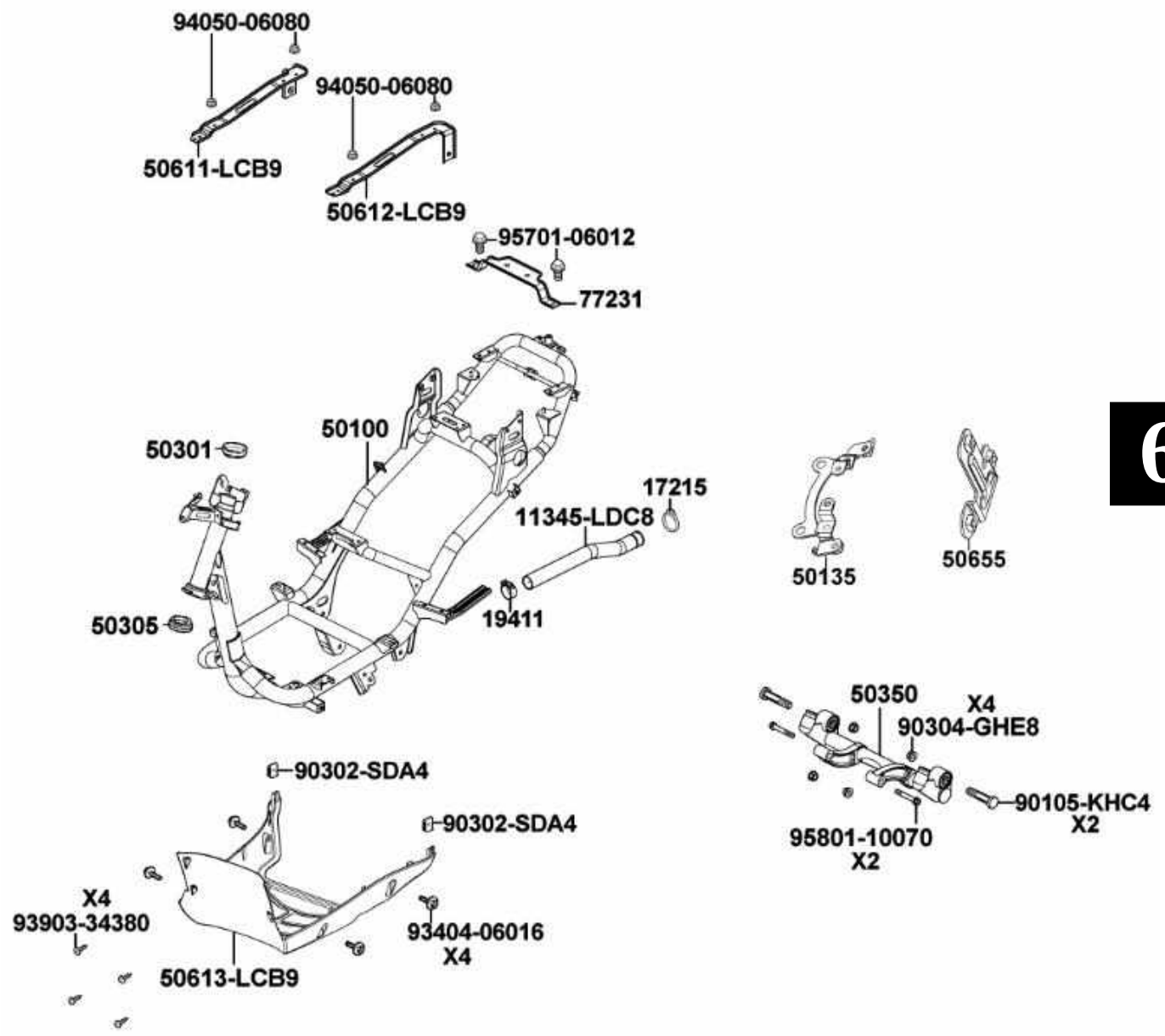
SF :	**Customer :**		**Eng. No:**
Production Date :	**Service Date :**		**Mileage :**
Reason of repair: □Maintenance □Breakdown			

Item		Data	Reference	Memo
ECU Version	ECU No		LDC8	LDC8
	Software Ver		0226	
	Calibration Ver		LDC84500	
DTC	Active			
	Occurred			
	History			
	Engine Temp.(Cooling)		Environ temp ±2 ℃	
	Throttle Position (%)		0 / 100%	IDLE/Throttle fully
	Battery Volt (V)		>12 V	
	Idle Speed Set point (RPM)		---	
(Hot Engine) Before Repair	Battery Volt (V)		>12 V	
	Engine Temp. (℃)		>80 ℃	Oil temperature 60±5℃
	EngineSpeed IDLE(rpm)		2100 ±100 rpm	1.When Engine Temp <80℃, Ign. Advance ≦15℃ (allow), and the Angle shall decrease with the increase of throttle opening (need to be adjusted). 2.Ign. Advance< 5°, the throttle opening shall be adjusted 1/4 turn counterclockwise. 3.Ign. Advance> 13°the throttle opening shall be adjusted 1/4 turn clockwise. 4.After each adjustment, steady idle speed for 20 seconds for adjustment and confirmation.
	Ign. Advance (°)		3-13°	
	Idle Solenoid valve		30-95%	Repeat the throttle for 2-3 times and return to the idle condition for more than 30 seconds to confirm: Idle Solenoid valve<30%, the PS Adjustment Screw shall be adjusted 1/4 turn counterclockwise. Idle Solenoid valve>95%,the PS Adjustment Screw shall be adjusted 1/4 turn clockwise.
	O2 sensor voltage (V)		0 ~ 1 V	
	PS Adjustment Screw		1 1/4±1/4	
	Idle stability		1200rpm	Engine from starting to Engine heat,AirTemp<5 ℃
(Hot Engine) After Repair	Battery Volt (V)		>12 V	
	Engine Temp. (℃)		>80 ℃	Oil temperature 60±5℃
	EngineSpeed IDLE(rpm)		2100 ±100 rpm	1.When Engine Temp <80℃, Ign. Advance ≦15℃ (allow), and the Angle shall decrease with the increase of throttle opening (need to be adjusted). 2.Ign. Advance< 5°, the throttle opening shall be adjusted 1/4 turn counterclockwise. 3.Ign. Advance> 13°the throttle opening shall be adjusted 1/4 turn clockwise. 4.After each adjustment, steady idle speed for 20 seconds for adjustment and confirmation.
	Ign. Advance (°)		3-13°	
	Idle Solenoid valve		30-95%	Repeat the throttle for 2-3 times and return to the idle condition for more than 30 seconds to confirm: Idle Solenoid valve<30%, the PS Adjustment Screw shall be adjusted 1/4 turn counterclockwise. Idle Solenoid valve>95%,the PS Adjustment Screw shall be adjusted 1/4 turn clockwise.
	O2 sensor voltage (V)		0 ~ 1 V	
	PS Adjustment Screw		1 1/4±1/4	
	Idle stability		1200rpm	Engine from starting to Engine heat,AirTemp<5 ℃

LDC8-45 E4 Diagnostic report

SF :	**Customer :**		**Eng. No:**
Production Date :	**Service Date :**		**Mileage :**
Reason of repair: □Maintenance □Breakdown			

Item		Data	Reference	Memo
ECU Version	ECU No		ACH5	ACH5
	Software Ver		14104-V500	
	Calibration Ver		V500ACH5AA	
DTC	Active			
	Occurred			
	History			
	Engine Temp.(Cooling)		Environ temp ±2 ℃	
	Throttle Position (%)		0 / 100%	IDLE/Throttle fully
	Battery Volt (V)		>12 V	
(Hot Engine) Before Repair	Engine Speed IDLE(rpm)		2000 ±100 rpm	
	Battery Volt (V)		>12 V	
	Engine Temp. (℃)		40 ±5 ℃(winter)	Oil temperature 60±5℃
	Negative pressure		>180mmHg	>220mmHg(After the motorcycle run-in period)
	IDLE CO(%)		0.3 ~1.2 %	After filling the air in the cylinder head
	HC ppm		<700ppm	
	PWM		45 ~90%	Engine Speed 5000~5500rpm
	O^2 sensor voltage (V)		0.2~ 0.6V	Engine Speed 5000~5500rpm
(Hot Engine) After Repair	Engine Speed IDLE(rpm)		2000 ±100 rpm	
	Battery Volt (V)		>12 V	
	Engine Temp. (℃)		40 ±5 ℃(winter)	Oil temperature 60±5℃
	Negative pressure		>180mmHg	>220mmHg(After the motorcycle run-in period)
	IDLE CO(%)		0.3 ~1.2 %	After filling the air in the cylinder head
	HC ppm		<700ppm	
	PWM		45 ~90%	Engine Speed 5000~5500rpm
	O^2 sensor voltage (V)		0.2~ 0.6V	Engine Speed 5000~5500rpm


94050-06080
94050-06080
50611-LCB9
50612-LCB9
95701-06012
77231
50301
50100
17215
11345-LDC8
50305
19411
50135
50655
50350
X4
90304-GHE8
90105-KHC4
X2
95801-10070
X2
90302-SDA4
90302-SDA4
X4
93903-34380
93404-06016
X4
50613-LCB9

6. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

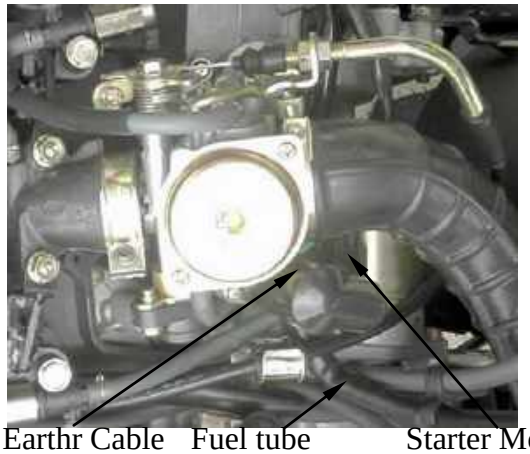
GENERAL INSTRUCTIONS

- A floor jack or other adjustable support is required to support and maneuver the engine. Be careful not to damage the motorcycle body, cables and wires during engine removal.
- Use shop towels to protect the motorcycle body during engine removal.
- Parts requiring engine removal for servicing:
  — Crankcase
  — Crankshaft

ENGINE REMOVAL

Disconnect the battery negative cable.
Remove the frame body cover. (⇨2-3)
Disconnect the spark plug high tension wire.
Disconnect the auto bystarter wire connector.
Disconnect the A.C. generator wire connector.

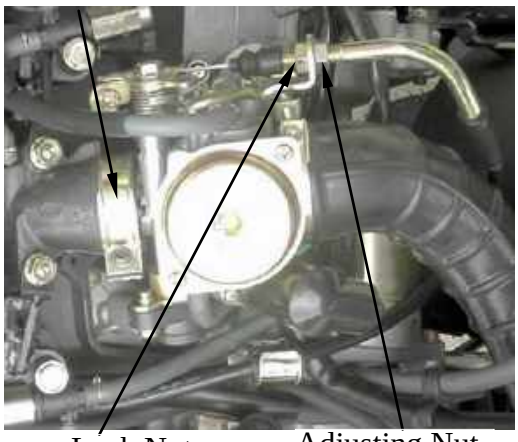
Disconnect the starter motor cable and earth cable from the starter motor.
Remove the fuel tube.



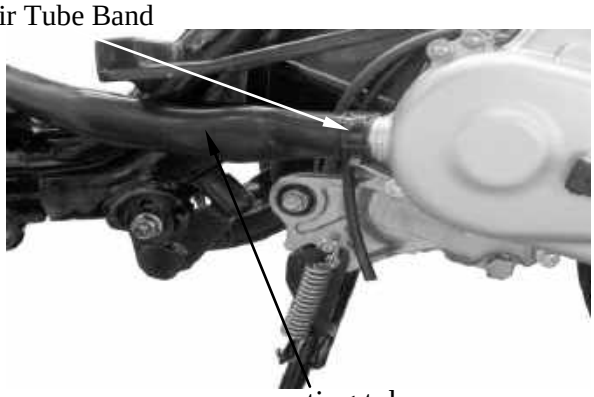
Remove the spark plug cap.

Remove the O_2 sensor.

Disconnect the vacuum tube.
Loosen the throttle cable adjusting nut and lock nut, and disconnect the throttle cable from the carburetor.
Disconnect the TPS and ETS.

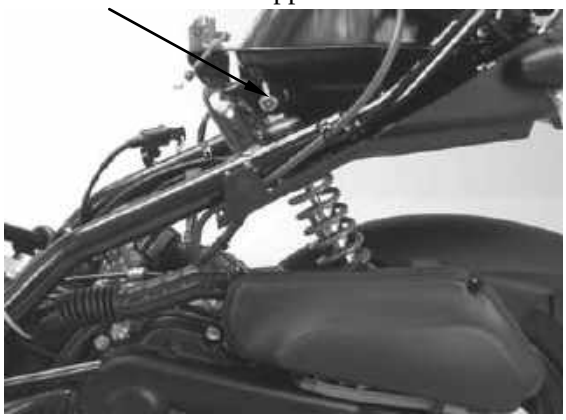


Loosen the drive belt air cleaner connecting tube band screw and remove the connecting tube.

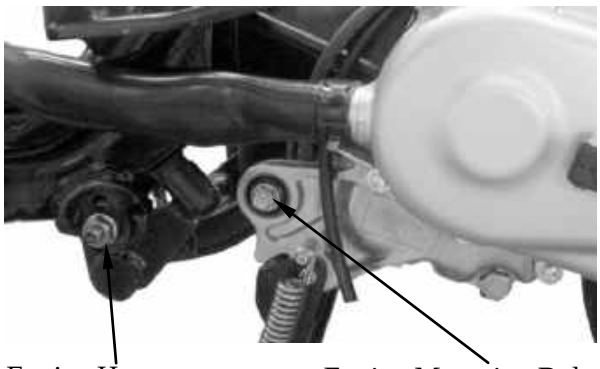


Remove the rear brake adjusting nut, connector pin rear brake cable.

Remove the rear shock absorber upper mount bolt.

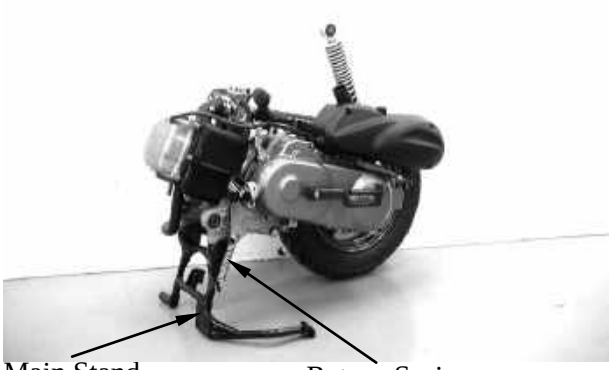


Remove the engine mounting bolt and move the motorcycle forward to separate it from the engine.
Support the motorcycle with a floor jack.

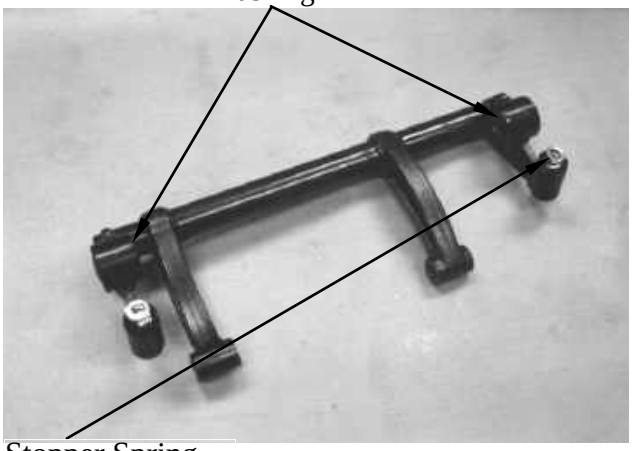


ENGINE HANGER BRACKET REMOVAL

Remove the return spring from the main stand.
Remove the main stand.

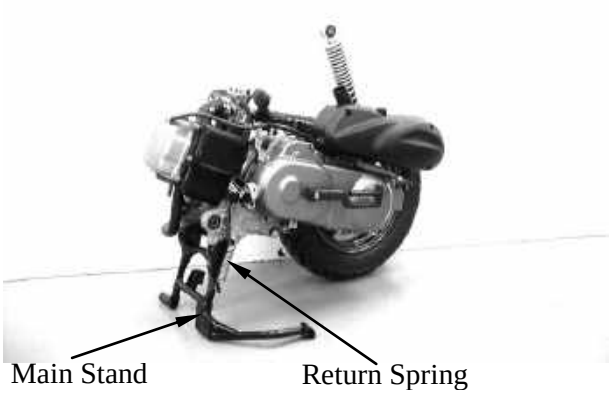


Remove the engine hanger bracket bolts and engine hanger bracket.
Inspect the engine hanger bushings and stopper spring for wear or damage.



ENGINE HANGER BRACKET INSTALLATION

Install the engine hanger bracket to the chassis and tighten the bolt.
Install the main stand onto the engine and install the return spring.



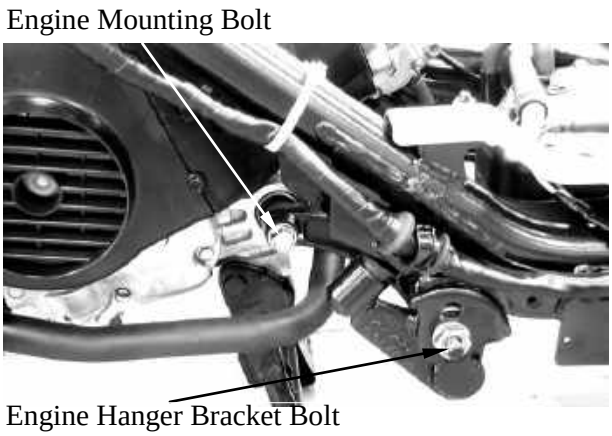
ENGINE INSTALLATION

Install the engine and tighten the engine mounting bolt.

Torque: 4.5~5.5kgf-m

Tighten the rear shock absorber upper mount bolt.

Torque: 4.5~5.5kgf-m



Install the removed parts in the reverse order of removal.

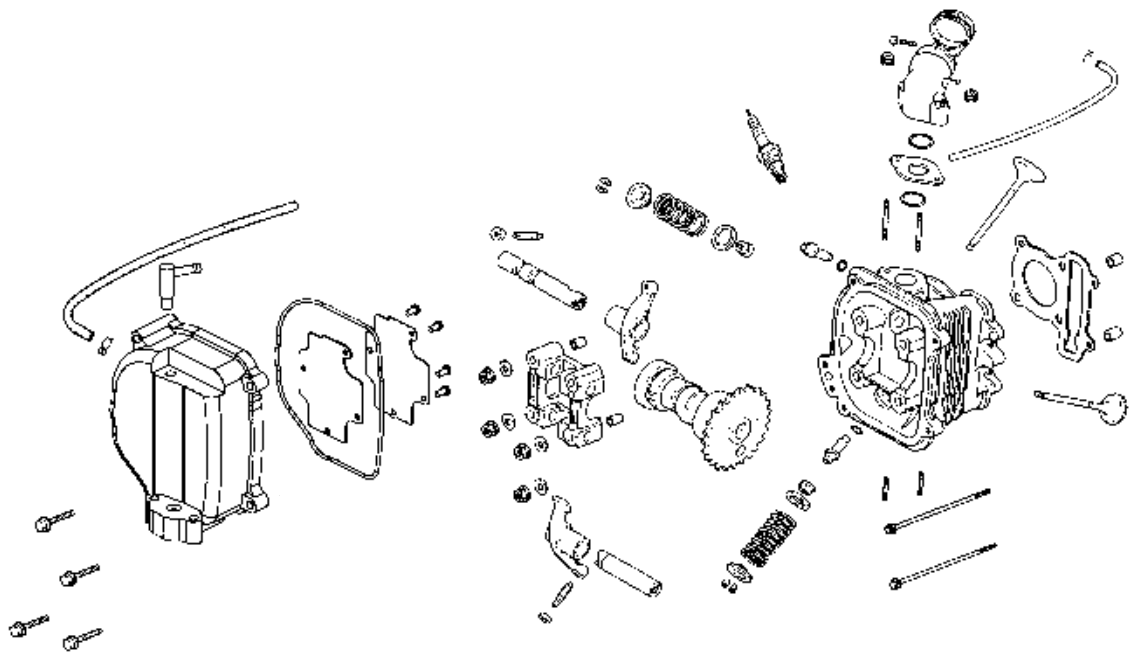
* Route the wires and cables properly.

After installation, inspect and adjust the following:

- Throttle grip free play (⇨3-3)
- Rear brake adjustment (⇨3-8)

Rear Shock Absorber Upper Mount Bolt

7. CYLINDER HEAD/VALVES



7. CYLINDER HEAD/VALVES

SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Valve clearance (cold)	IN	0.08	—
	EX	0.08	—
Cylinder head compression		15±2 kg/cm²	—
Cylinder head warpage		—	0.05
Camshaft cam height	IN	25.761±0.05	25.361
	EX	25.562±0.05	25.162
Valve rocker arm I.D.	IN	10.000-10.015	10.10
	EX	10.000-10.015	10.10
Valve rocker arm shaft O.D.	IN	9.972-9.987	9.91
	EX	9.972-9.987	9.91
Valve seat width	IN	1.0	1.8
	EX	1.0	1.8
Valve stem O.D.	IN	4.975-4.990	4.9
	EX	4.955-4.970	4.9
Valve guide I.D.	IN	5.000-5.012	5.03
	EX	5.000-5.012	5.03
Valve stem-to-guide clearance	IN	0.010-0.037	0.08
	EX	0.030-0.057	0.1
Valve spring free length		35.25	29.1

TORQUE VALUES

Cylinder head nut	1.8~2.2kgf-m	Apply engine oil to threads
Valve clearance adjusting nut	0.7~1.1kgf-m	Apply engine oil to threads

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

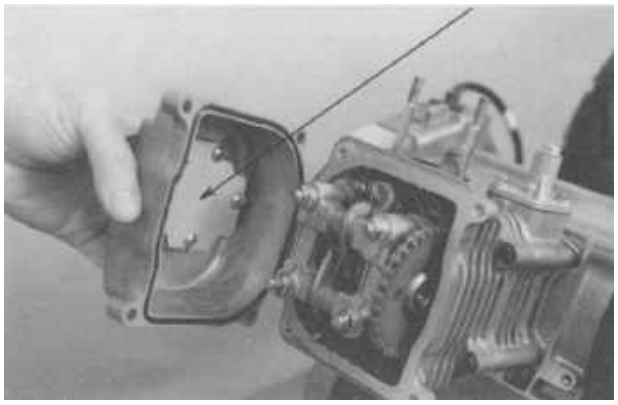
White smoke from exhaust muffler
- Worn valve stem or valve guide
- Damaged valve stem seal

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

CAMSHAFT REMOVAL

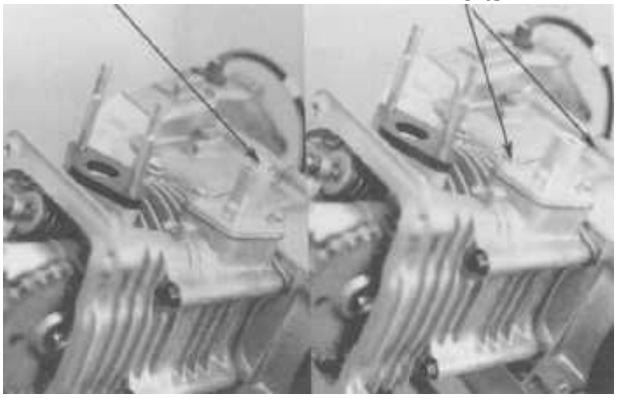
Remove the center cover. (⇨2-3)
Remove the frame center.
Remove the four cylinder head cover bolts to remove the cylinder head cover.

Cylinder Head Cover



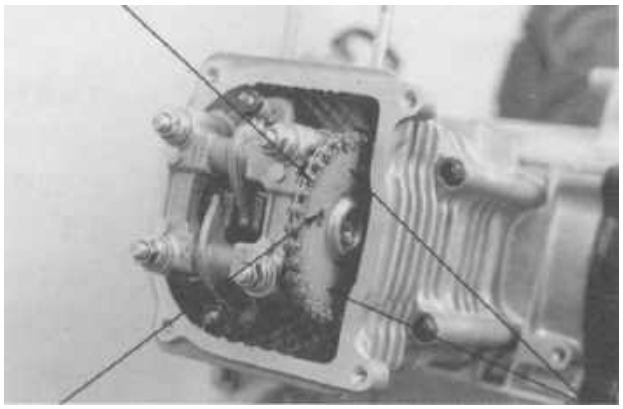
Remove the cam chain tensioner sealing bolt and spring.
Remove the two bolts attaching the cam chain tensioner and the tensioner.

Sealing Bolt Bolts



Turn the flywheel counterclockwise so that the "T" mark on the flywheel aligns with the index mark on the crankcase to bring the round hole on the camshaft gear facing up to the top dead center on the compression stroke.

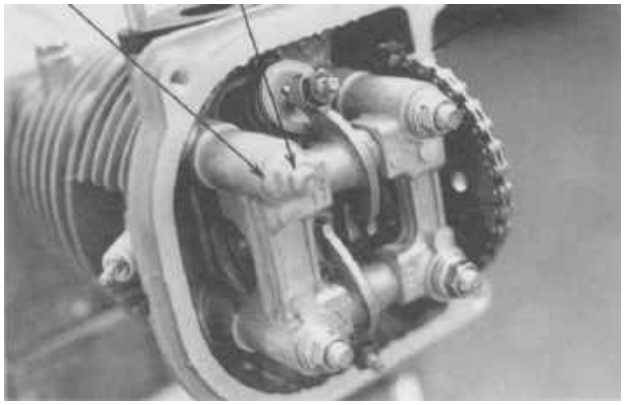
Camshaft Gear



Round Hole Punch Marks

Remove the two cylinder head bolts.
Remove the four cylinder head nuts and washers.
Remove the camshaft holder.

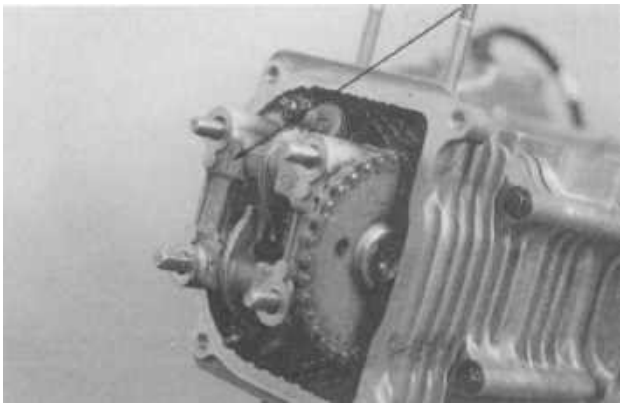
Washer Nut



* Diagonally loosen the cylinder head nuts in 2 or 3 times.

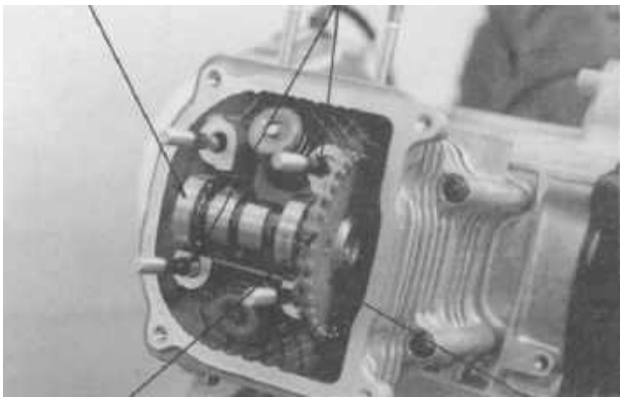
Remove the camshaft holder and dowel pins.

Camshaft Holder



Remove the camshaft gear from the cam chain and remove the camshaft.

Camshaft Dowel Pins



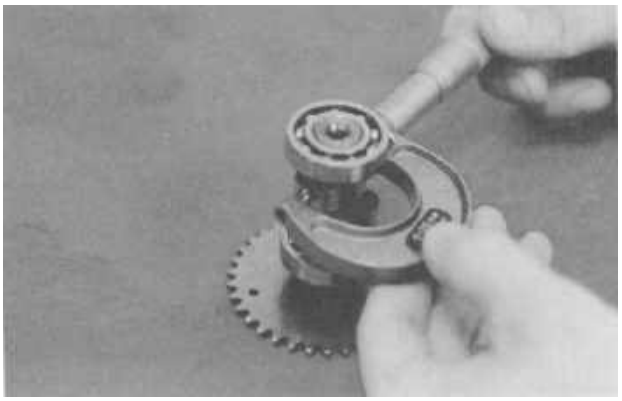
Cam Chain Camshaft Gear

CAMSHAFT INSPECTION

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

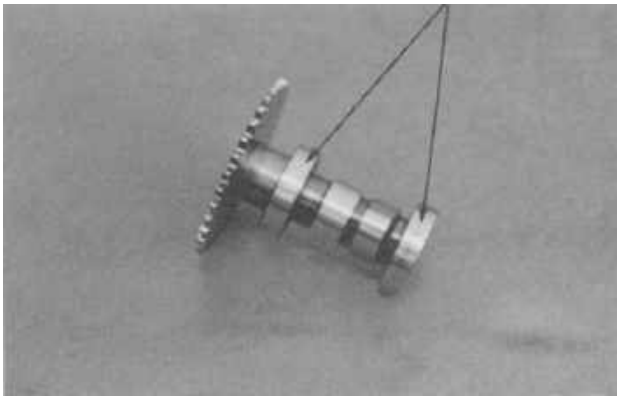
Service Limits:

IN : 25.361mm replace if below
EX: 25.162mm replace if below



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.

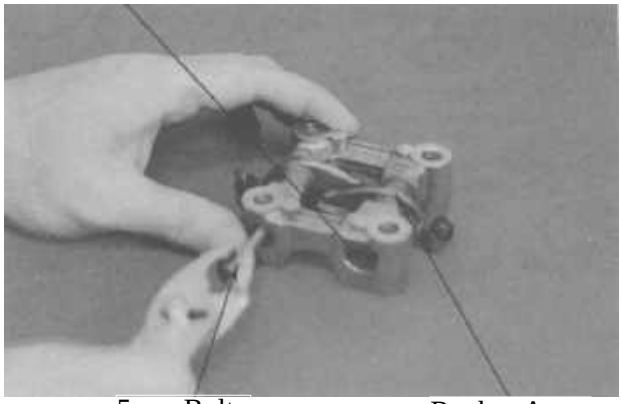
Camshaft Bearings



CAMSHAFT HOLDER DISASSEMBLY

Take out the valve rocker arm shafts using a 5mm bolt.
Remove the valve rocker arms.

Rocker Arm Shaft



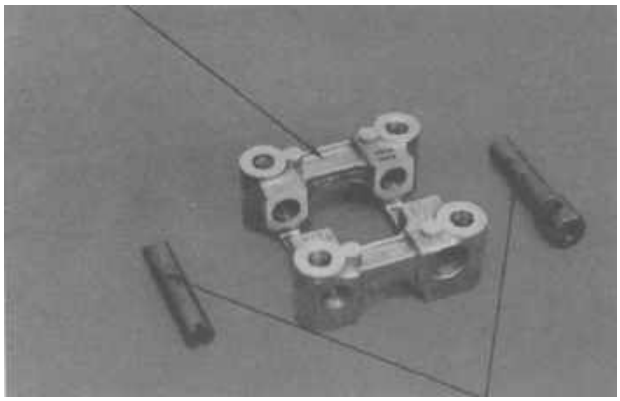
5mm Bolt Rocker Arm

CAMSHAFT HOLDER INSPECTION

Inspect the camshaft holder, valve rocker arms and rocker arm shafts for wear or damage.

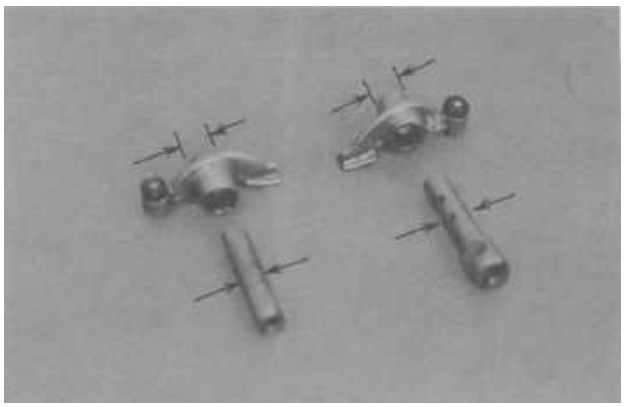
* If the valve rocker arm contact surface is worn, check each cam lobe for wear or damage.

Camshaft Holder



Rocker Arm Shafts

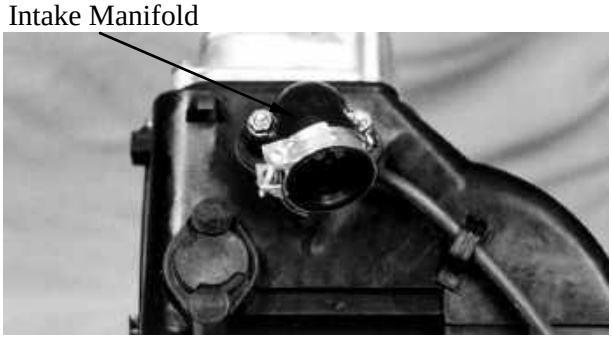
Measure the I.D. of each valve rocker arm.
Service Limits: IN:10.10mm replace if over
EX:10.10mm replace if over
Measure each rocker arm shaft O.D.
Service Limits: IN: 9.91mm replace if over
EX: 9.91mm replace if over



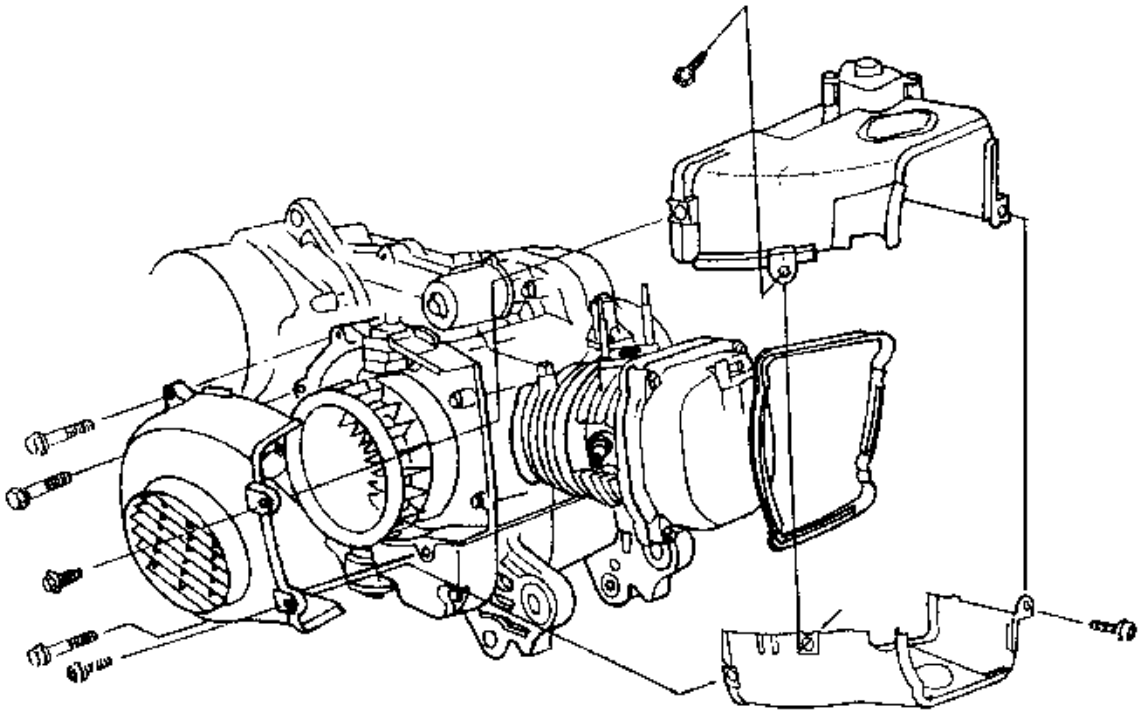
CYLINDER HEAD REMOVAL

Remove the camshaft. (⇨7-3)
Remove the carburetor. (⇨5-5)
Remove the exhaust muffler. (⇨2-5)
Remove the carburetor intake manifold.

Intake Manifold

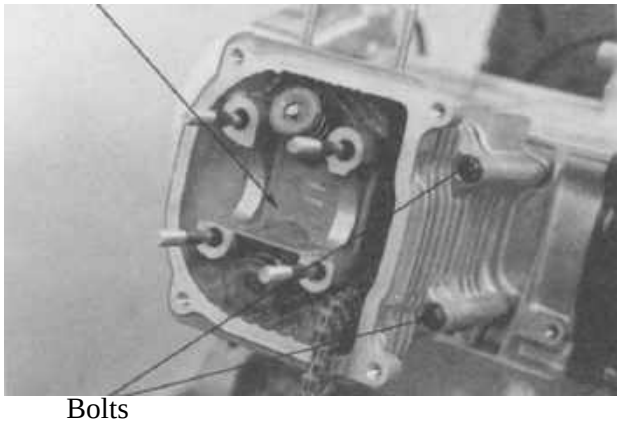


Remove the cooling fan cover. (⇨14-6)
Remove the engine cover bolts and screws.
Separate the engine cover joint claws.



Remove the cylinder head.

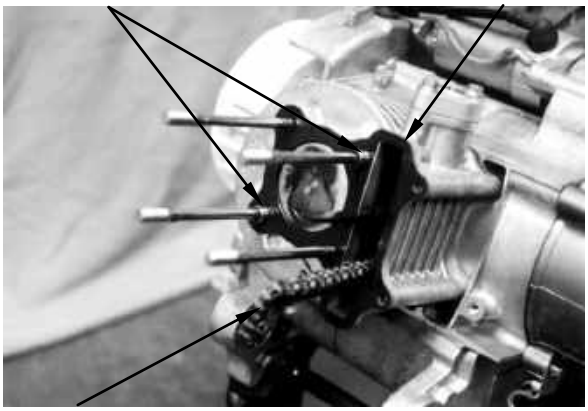
Cylinder Head



Bolts

Remove the dowel pins and cylinder head gasket.
Remove the cam chain guide.

Dowel Pins Cylinder Head Gasket



Cam Chain Guide

CYLINDER HEAD DISASSEMBLY

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

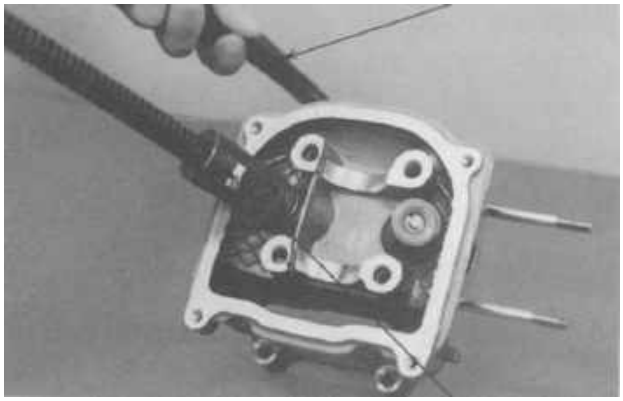
* • Be sure to compress the valve springs with a valve spring compressor.
  • Mark all disassembled parts to ensure correct reassembly.

Special

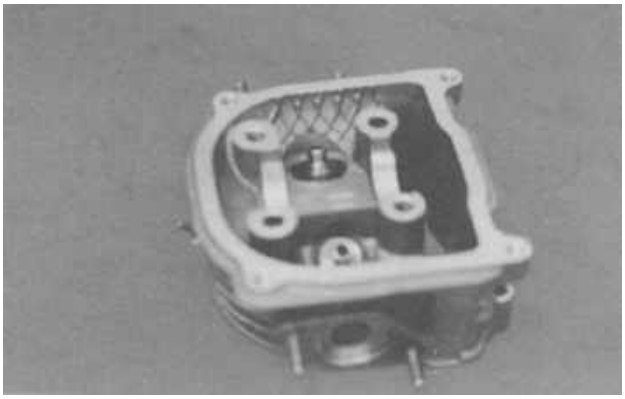
Valve Spring Compressor

Valve Spring Compressor Attachment

Valve Spring Compressor



Valve Spring Compressor Attachment



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

* Be careful not to damage the cylinder head mating surface.

INSPECTION

CYLINDER HEAD

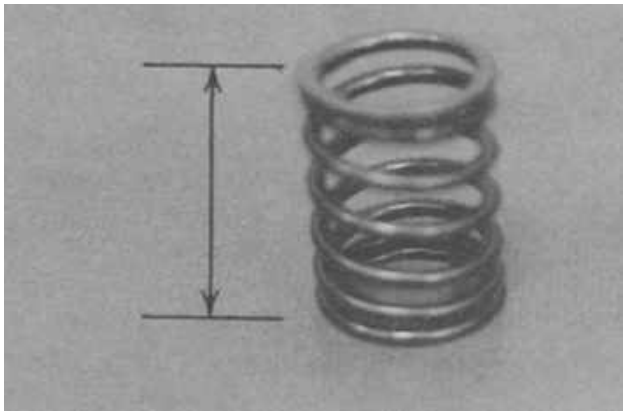
Check the spark plug hole and valve areas for cracks.
Check the cylinder head for warpage with a straight edge and feeler gauge.

Service Limit: 0.05mm repair or replace if over

VALVE SPRING FREE LENGTH

Measure the free length of the springs.

Service Limits: 29.1mm replace if below

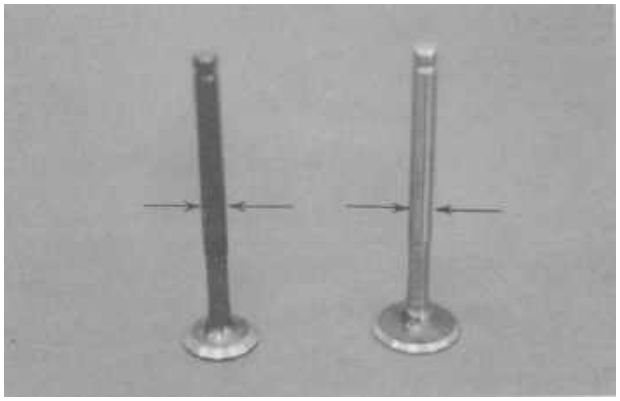


VALVE/ VALVE GUIDE

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 : 4.9mm replace if below
EX: 4.9mm replace if below



CYLINDER HEAD ASSEMBLY

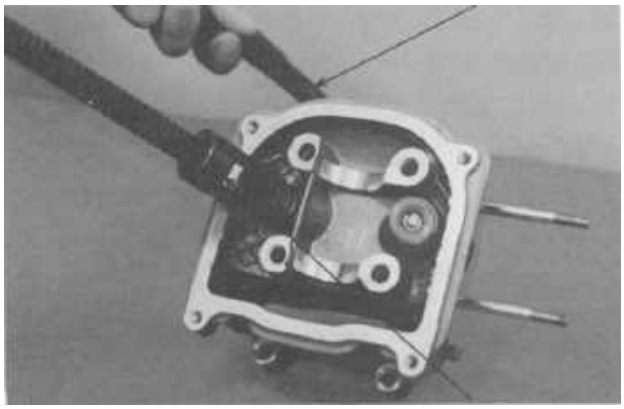
* • When assembling, a valve spring compressor must be used.
  • Install the cotters with the pointed ends facing down from the upper side of the cylinder head.

Special

Valve Spring Compressor

Val ve Spring Compressor Attachment

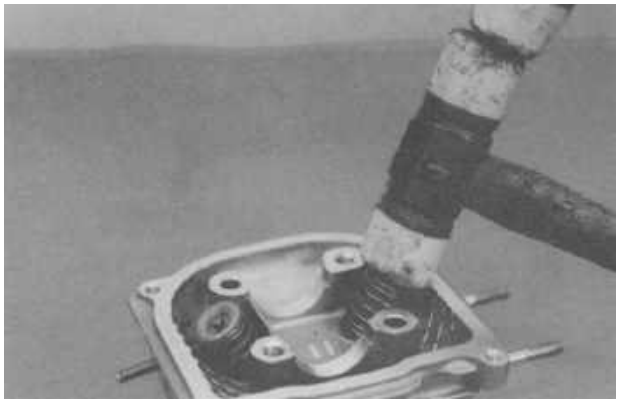
Valve Spring Compressor



Valve Spring Compressor Attachment

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

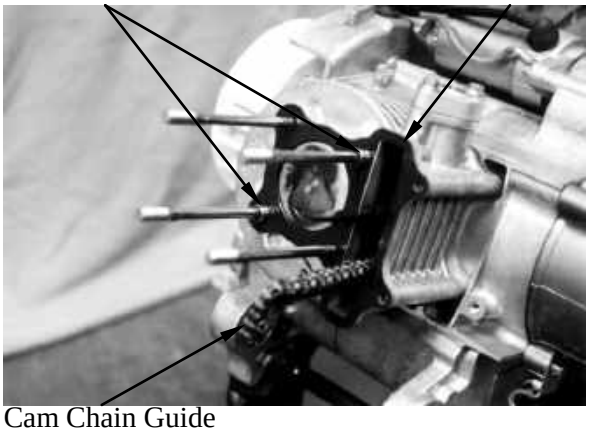
* Be careful not to damage the valves.



CYLINDER HEAD INSTALLATION

Install the dowel pins and a new cylinder head gasket.
Install the cam chain guide.

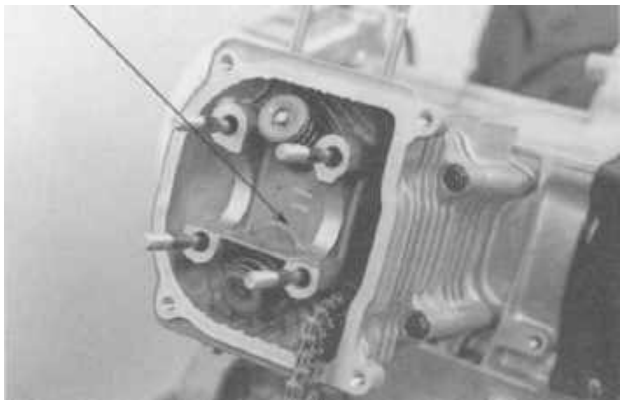
Dowel Pins Gasket



Cam Chain Guide

Install the cylinder head.

Cylinder Head

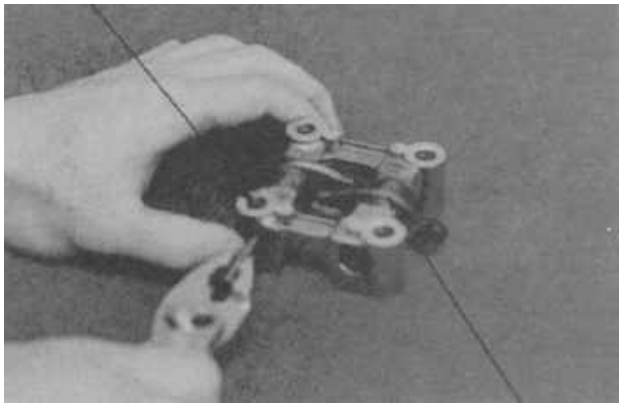


CAMSHAFT HOLDER ASSEMBLY

First assemble the camshaft holder.
Install the intake and exhaust valve rocker arms and rocker arm shafts.

* • When installing the rocker arm shaft, align the shaft front end with the bolt hole of the camshaft holder.

Camshaft Holder



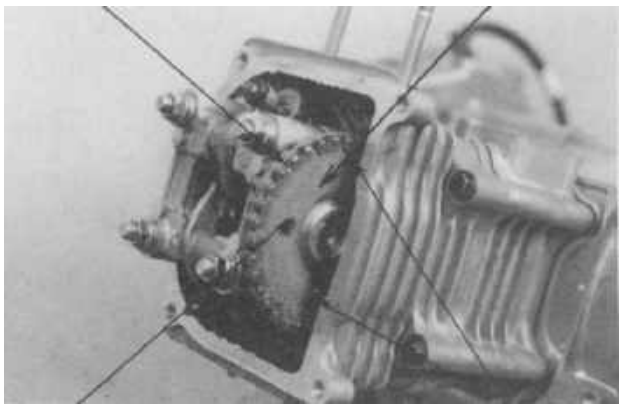
Valve Rocker Arm

CAMSHAFT INSTALLATION

Turn the flywheel so that the "T" mark on the flywheel aligns with the index mark on the crankcase.
Keep the round hole on the camshaft gear facing up and align the punch marks on the camshaft gear with the cylinder head surface (Position the intake and exhaust cam lobes down.) and install the camshaft onto the cylinder head.
Install the cam chain over the camshaft gear.

Cam Chain

Camshaft Gear

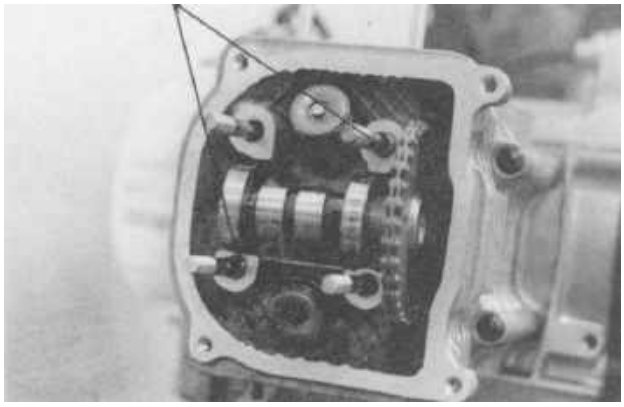


Round Hole

Punch Marks

Dowel Pins

Install the dowel pins.

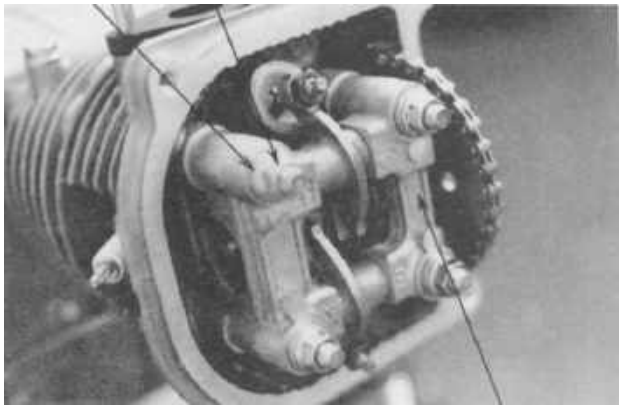


Install the camshaft holder, washers and nuts on the cylinder head.
Tighten the four cylinder head nuts and two bolts.

Torque: Cylinder head nut: 1.8~2.2kgf-m

* • Apply engine oil to the threads of the cylinder head nuts.
  • Diagonally tighten the cylinder head nuts in 2～3 times.

Washer Nut



Camshaft Holder

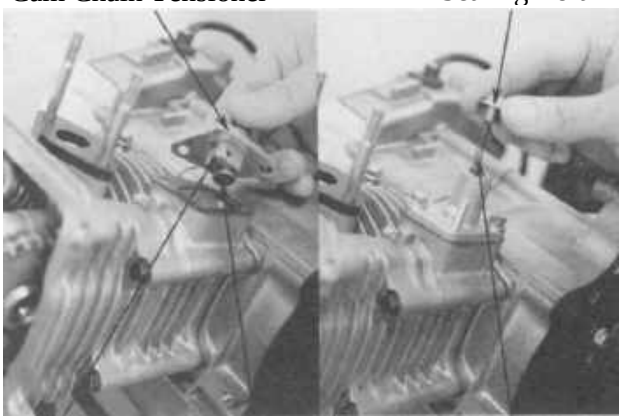
CAM CHAIN TENSIONER INSTALLATION

First install a new cam chain tensioner gasket.
Install the tensioner using the two bolts.
Install the tensioner spring.
Install the O-ring and sealing bolt.

* When installing the tensioner, release the lock pawl and push the push rod all the way in.

Torque:: 0.45~0.6kgf-m

Cam Chain Tensioner Sealing Bolt



Lock Pawl Push Rod Spring

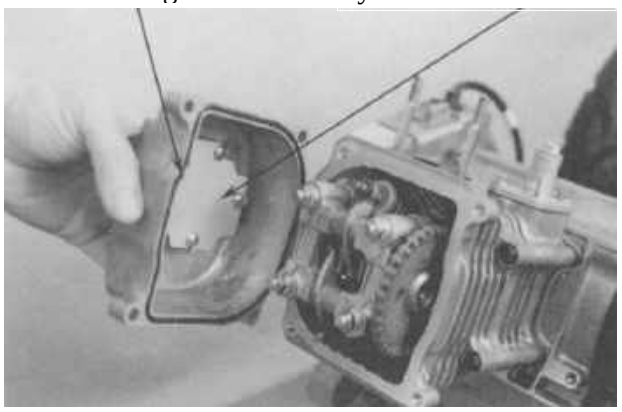
Adjust the valve clearance. (⇨3-5)
Install a new cylinder head cover O-ring and install the cylinder head cover.

* Be sure to install the O-ring into the groove properly.

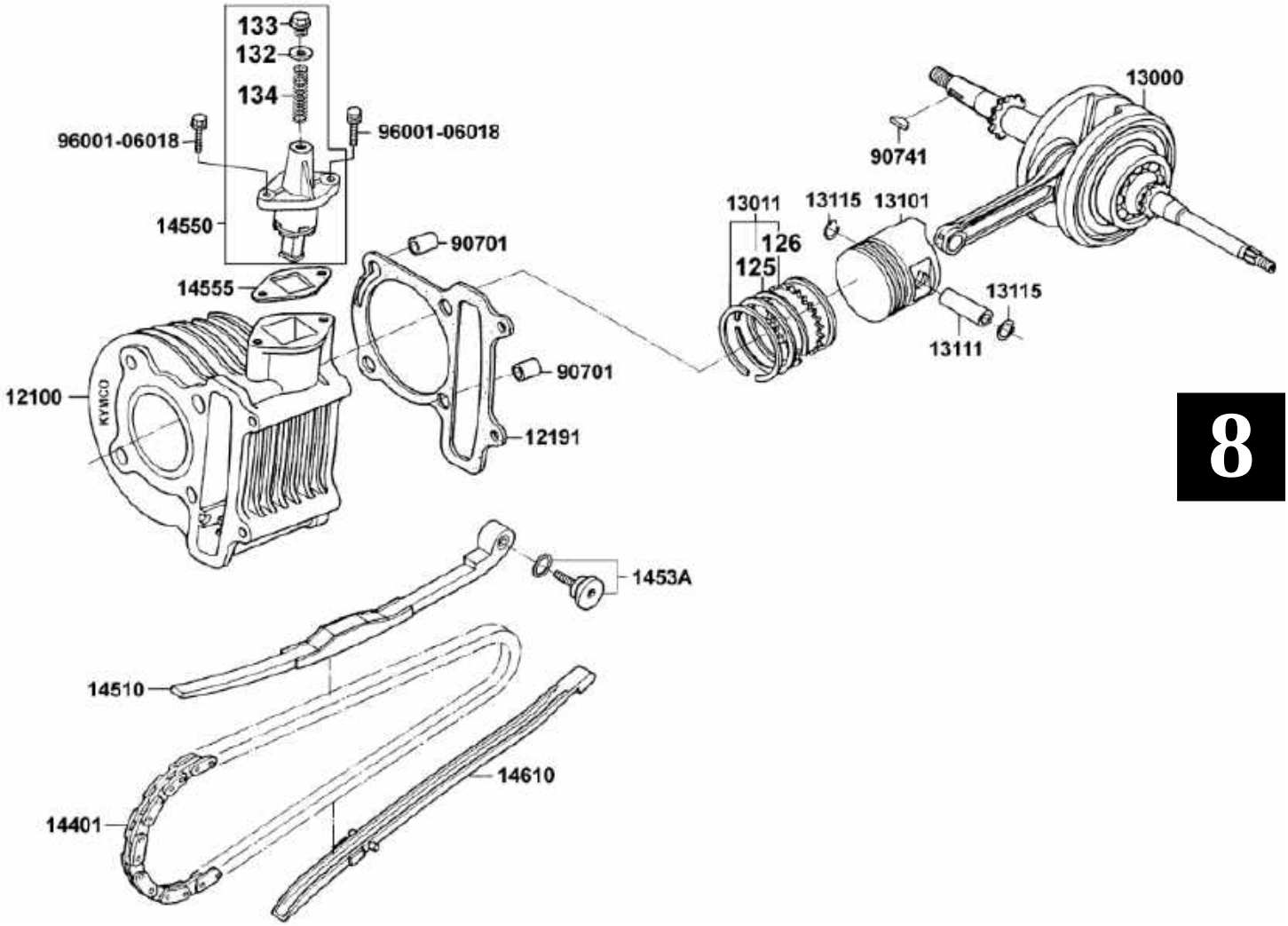
Install and tighten the cylinder head cover bolts.

Torque:: 0.8~1.2kgf-m

O-ring Cylinder Head Cover



8. CYLINDER/PISTON



8

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder and piston can be serviced with the engine installed in the frame.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.

SPECIFICATIONS

Item			Standard (mm)	Service Limit (mm)
Cylinder	I.D.		39.00	39.10
	Warpage		—	0.05
	Cylindricity		—	0.05
	True roundness		—	0.05
Piston, piston ring	Ring-to-groov clearance	Top	0.015-0.050	0.09
		Second	0.015-0.050	0.09
	Ring end gap	Top	0.08-0.20	0.45
		Second	0.05-0.20	0.45
		Oil side rail	0.20-0.70	—
	Piston O.D.		38.99-38.975	38.975
	Piston O.D. measuring		9mm from bottom of skirt	—
	Piston-to-cylinder clearance		0.010-0.040	0.1
	Piston pin hole I.D.		13.002-13.008	13.004
Piston pin O.D			12.994-13.000	12.96
Piston-to-piston pin clearance			0.002-0.014	—
Connecting rod small end I.D. bore			13.016-13.034	13.06

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

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

CYLINDER REMOVAL

Remove the cylinder head. (⇨7-6)
Remove the cam chain guide.
Remove the cylinder.

Remove the cylinder gasket and dowel pins.
Clean any gasket material from the cylinder surface.

PISTON REMOVAL

Remove the piston pin clip.

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

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

8. CYLINDER/PISTON

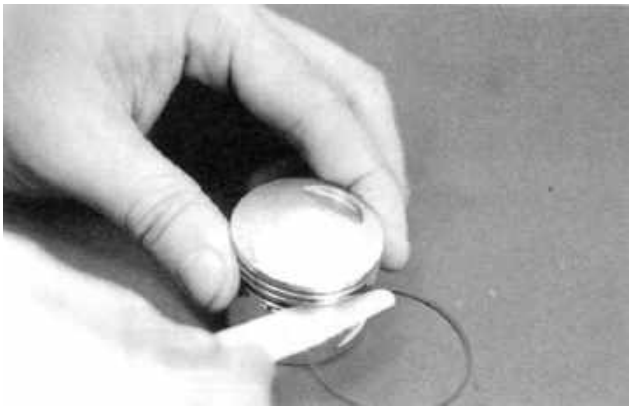
Inspect the piston, piston pin and piston rings. Remove the piston rings.

* Take care not to damage or break the piston rings during removal.

Clean carbon deposits from the piston ring grooves.

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

Service Limits: **Top**: 0.09mm replace if over
2nd: 0.09mm replace if over



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

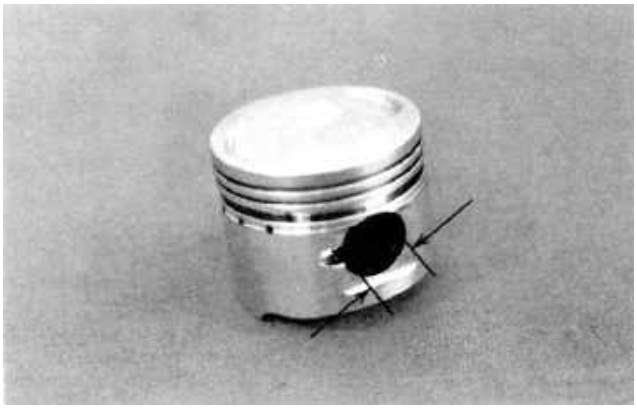
* Use the piston head to push each piston ring into the cylinder.

Measure the piston ring end gap.

Service Limit: 0.45mm replace if over

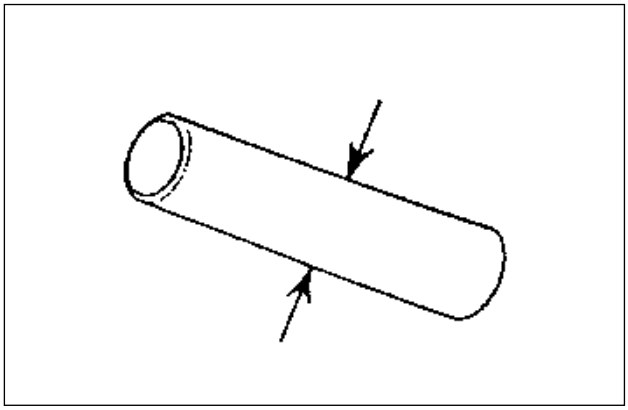
Measure the piston pin hole I.D.

Service Limit: 13.004mm replace if below



8. CYLINDER/PISTON

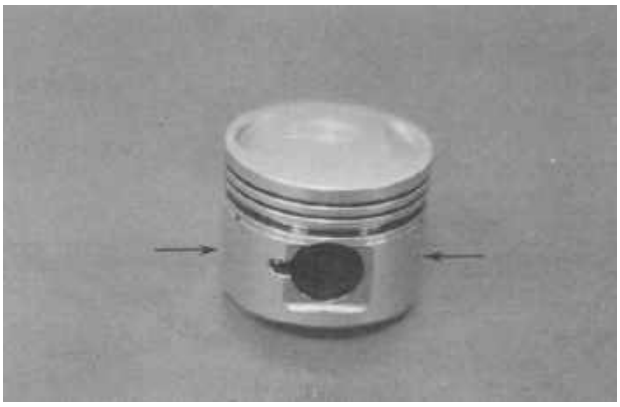
Measure the piston pin O.D.
Service Limit:12.96mm replace if below



Measure the piston O.D.

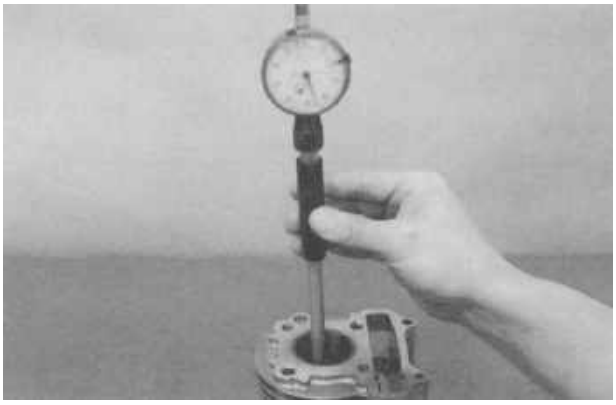
* Take measurement at 9mm from the bottom and 90° to the piston pin hole.

Service Limit: 38.9mm replace if below
Measure the piston-to-piston pin clearance.
Service Limit: 0.02mm replace if over

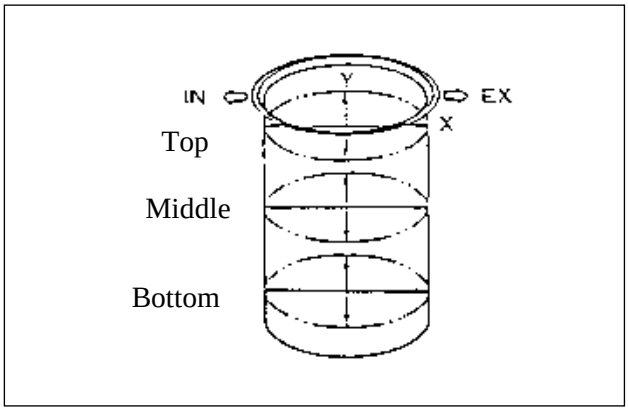


CYLINDER INSPECTION

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: 39.10mm repair or replace if over
Measure the cylinder-to-piston clearance.
Service Limit: 0.1mm repair or replace if over

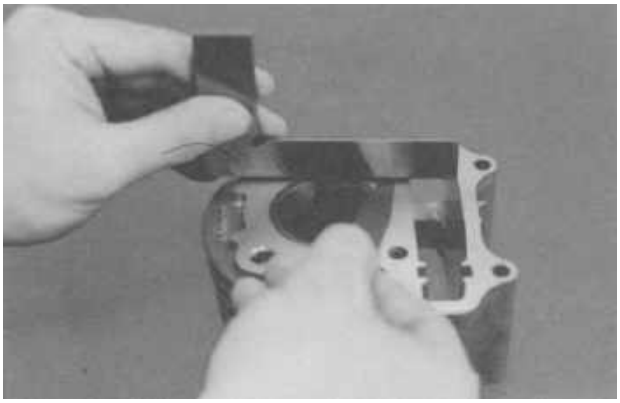


The true roundness is the difference between the values measured in X and Y directions.
The cylindricity (difference between the values measured at the three levels) is subject to the maximum value calculated.
Service Limits:
True Roundness: 0.05mm repair or replace if over
Cylindricity: 0.05mm repair or replace if over



8. CYLINDER/PISTON

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

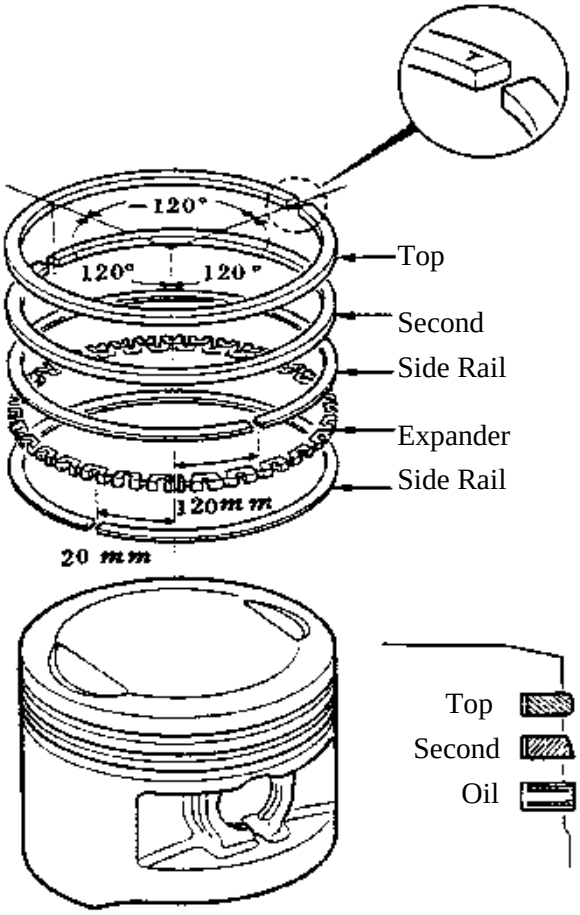


Measure the connecting rod small end I.D.
Service Limit: 13.06mm replace if over

PISTON RING INSTALLATION

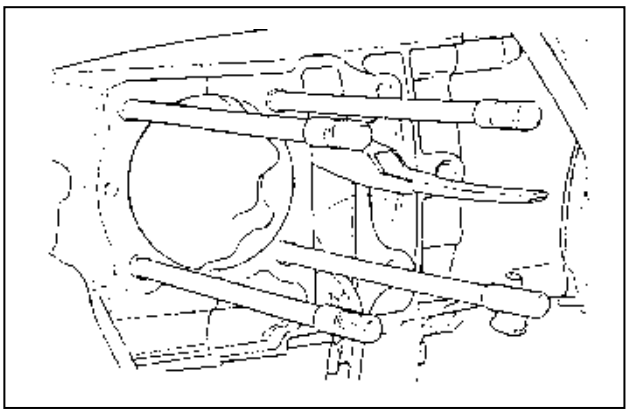
Install the piston rings onto the piston.
Apply engine oil to each piston ring.

*
- Be careful not to damage or break the piston and piston rings.
- All rings should be installed with the markings facing up.
- After installing the rings, they should rotate freely without sticking.



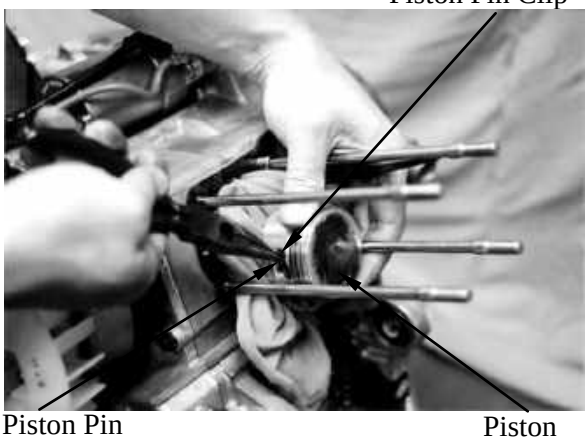
PISTON INSTALLATION

Remove any gasket material from the crankcase surface.



* Be careful not to drop foreign matters into the crankcase.

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.

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.
  • Do not align the ring end gaps with the intake/exhaust valve and piston pin.

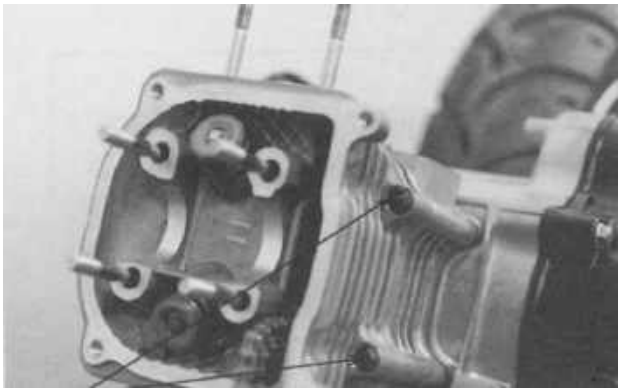
Install the cam chain guide.

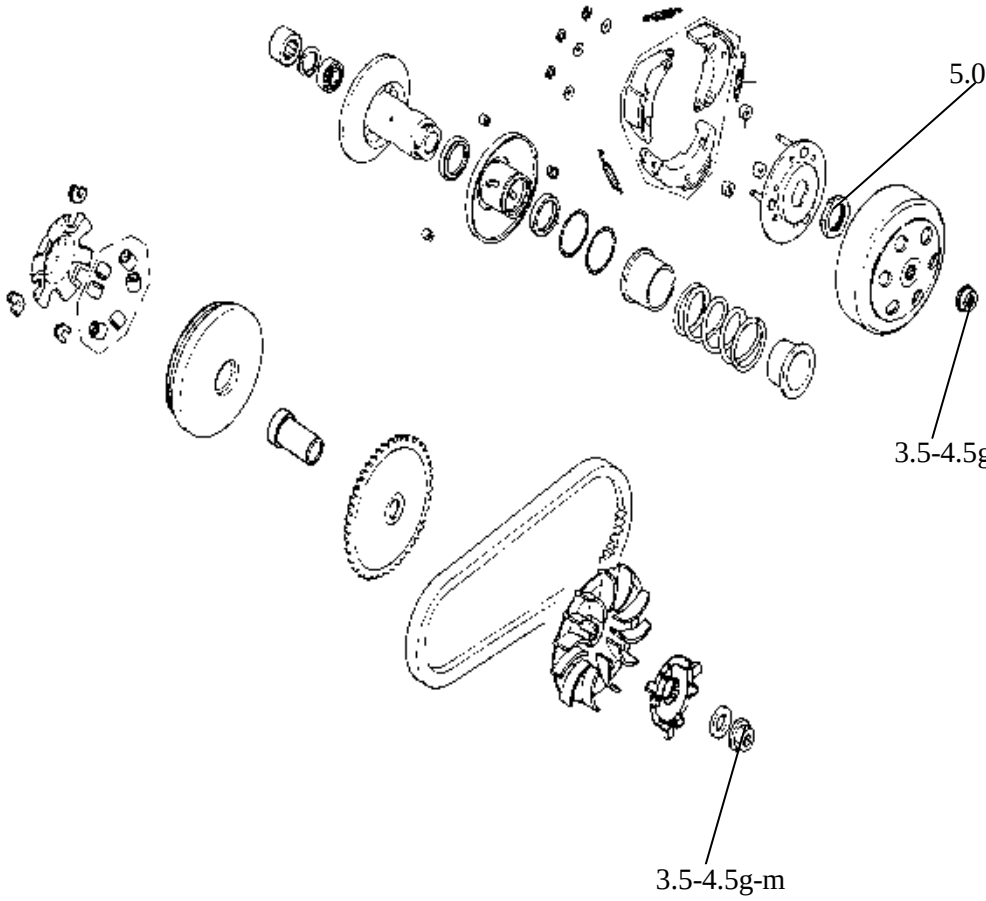
* Insert the tab on the cam chain guide into the cylinder groove.

Install the cylinder head. (⇨7-8)
Loosely install the cylinder base bolts.


Cam Chain Guide

Tighten the cylinder base bolts.


Cylinder Base Bolts


5.0～6.0kg-m
3.5-4.5g-m
3.5-4.5g-m

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The drive pulley, clutch and driven pulley can be serviced with the engine installed.
- Avoid getting grease and oil on the drive belt and pulley faces. Remove any oil or grease from them to minimize the slipping of drive belt and drive pulley.

SPECIFICATIONS

Item	Standard (mm)	Service Limit (mm)
Movable drive face bushing I.D.	23.989~24.025	24.06
Drive face collar O.D.	23.960~23.974	23.94
Drive belt width	17.5	16.5
Clutch lining thickness	—	1.5
Clutch outer I.D.	107.0-107.2	107.5
Driven face spring free length	—	154.6
Driven face O.D.	33.965-33.485	33.94
Movable driven face I.D.	34.0-34.025	34.06
Weight roller O.D.	15.920~16.080	15.4

TORQUE VALUES

Drive face nut	5.5~6.5kgf-m
Clutch outer nut	3.5~4.5kgf-m
Clutch drive plate nut	5.0-6.0kg-m

SPECIAL TOOLS

Universal holder

Clutch spring compressor

TROUBLESHOOTING

Engine starts but motorcycle won‘t move

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

Engine stalls or motorcycle creeps

- Broken clutch weight spring

Lack of power

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

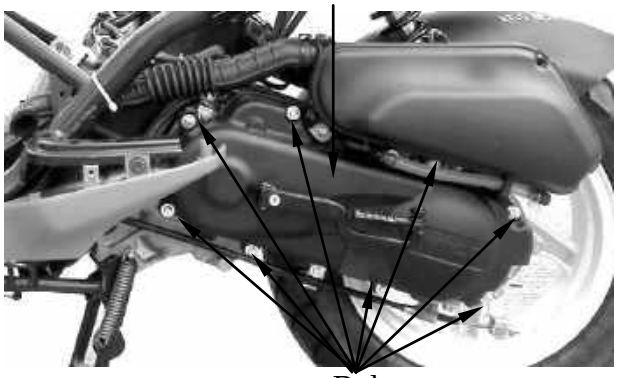
LEFT CRANKCASE COVER

REMOVAL

Loosen the drive belt air tube band screw.
Remove the eight left crankcase cover bolts and left crankcase cover.
Remove the seal rubber and dowel pins.
Inspect the seal rubber for damage or deterioration.

* Use specified genuine parts for replace-ment.

Left Crankcase Cover



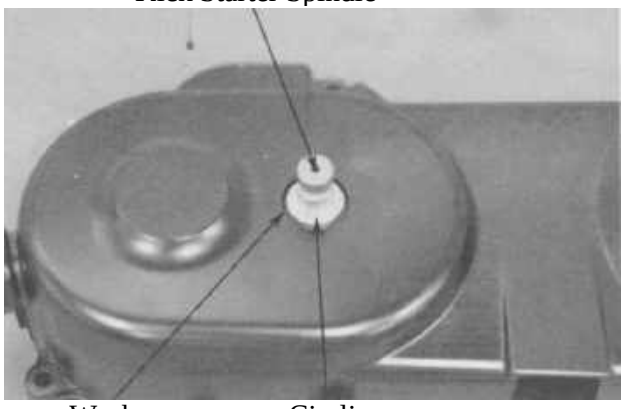
Bolts

KICK STARTER

REMOVAL

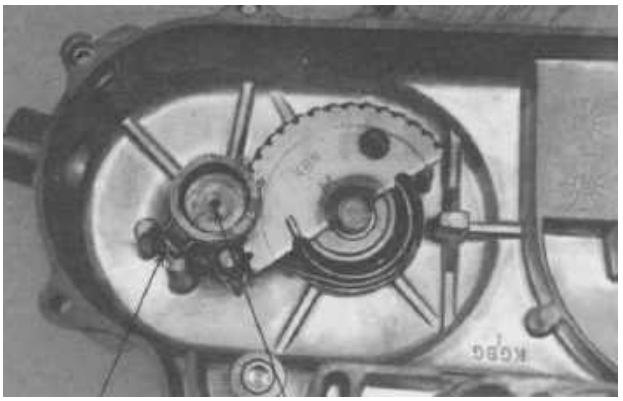
Remove the kick lever from the kick starter spindle.
Remove the circlip and washer from the kick starter spindle.

Kick Starter Spindle



Washer Circlip

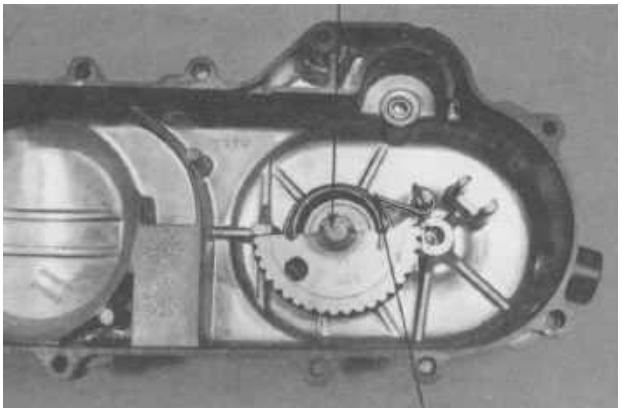
Gently turn the kick starter spindle to remove the starter driven gear together with the friction spring.



Friction Spring Starter Driven Gear

Remove the kick starter spindle and return spring from the left crankcase cover.
Remove the kick starter spindle bushings.

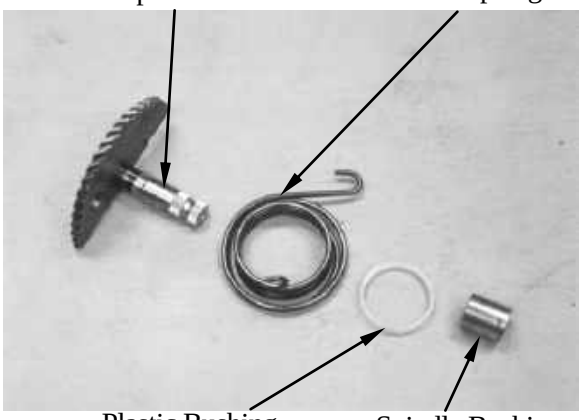
Kick Starter Spindle



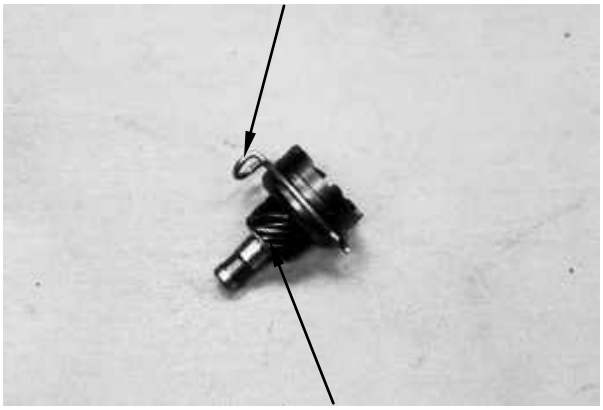
Return Spring

INSPECTION

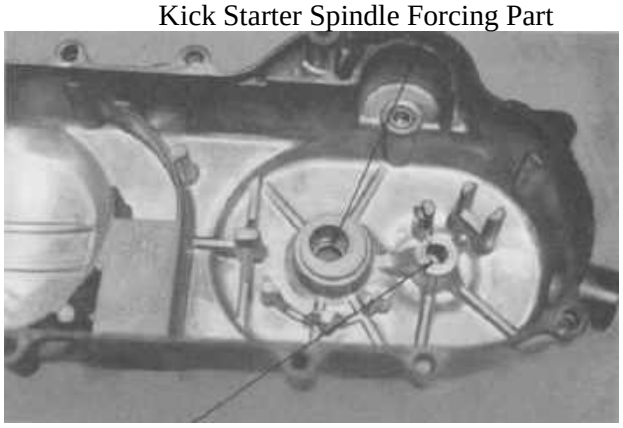
Inspect the kick starter spindle and gear for wear or damage.
Inspect the return spring for weakness or damage.
Inspect the kick starter spindle bushings for wear or damage.



Inspect the starter driven gear for wear or damage.
Inspect the friction spring for wear or damage.

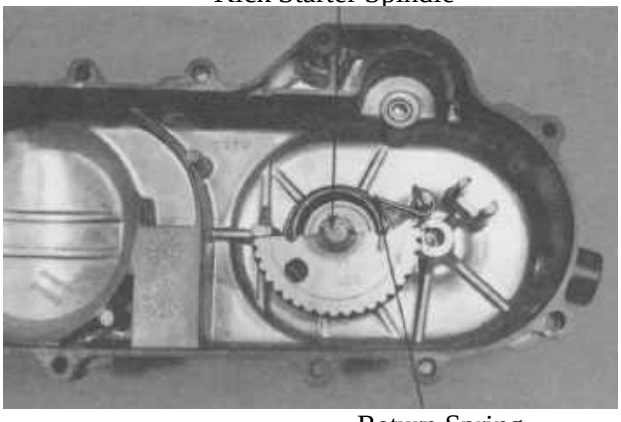


Inspect the kick starter spindle and starter driven gear forcing parts for wear or damage.

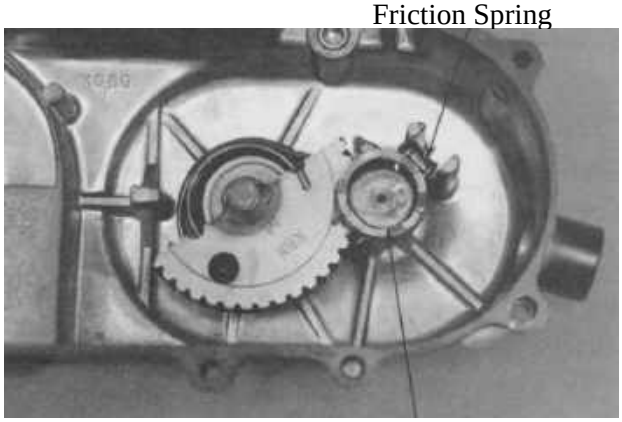


INSTALLATION

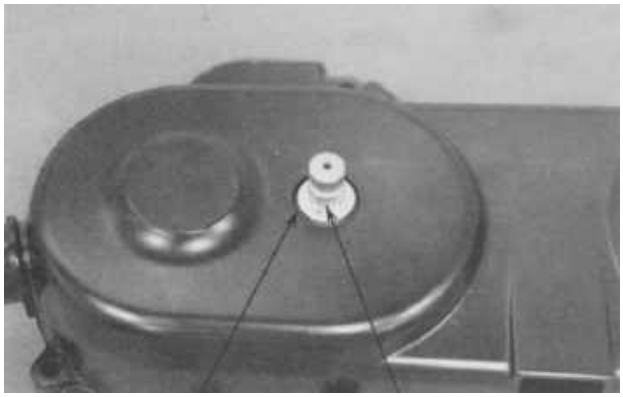
Install the kick starter spindle bushings and return spring onto the left crankcase cover.



Install the starter driven gear and friction spring onto the left crankcase cover as the figure shown.

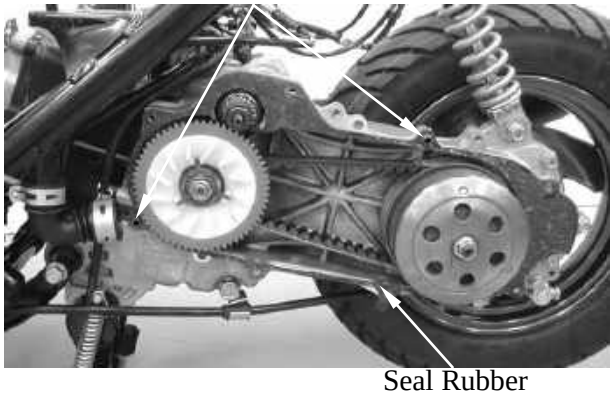


First install the washer and then install the circlip.
Install the kick lever.

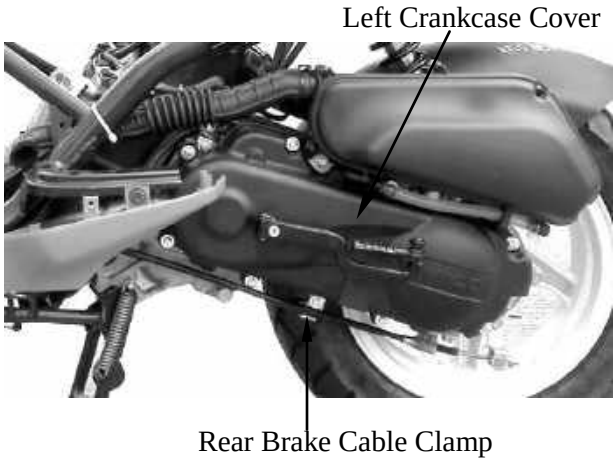


LEFT CRANKCASE COVER INSTALLATION

First install the dowel pins.
Install the seal rubber.



Install the left crankcase cover and tighten the eight left crankcase cover bolts diagonally.
Connect the drive belt air tube and tighten the tube band screw.
Install the rear brake cable clamp.



DRIVE BELT

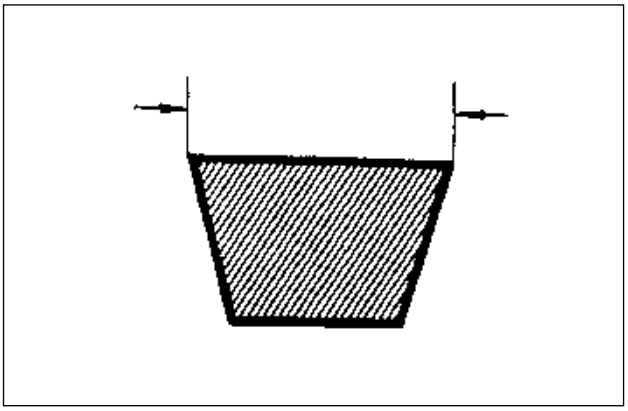
REMOVAL

Remove the left crankcase cover.

INSPECTION

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

Service Limit: 16.5mm

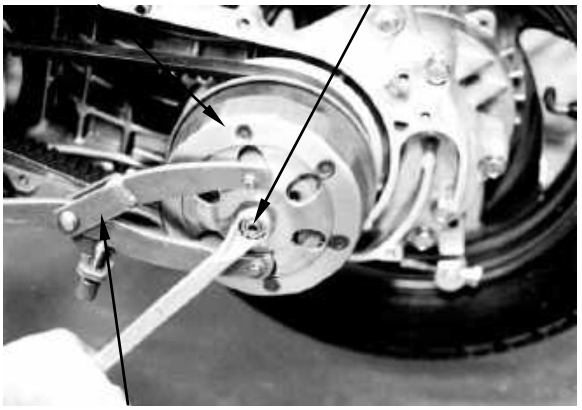


REPLACEMENT

Remove the eight left crankcase cover bolts and left crankcase cover. (⇨9-2)
Hold the clutch outer with an universal holder and remove the clutch outer nut.

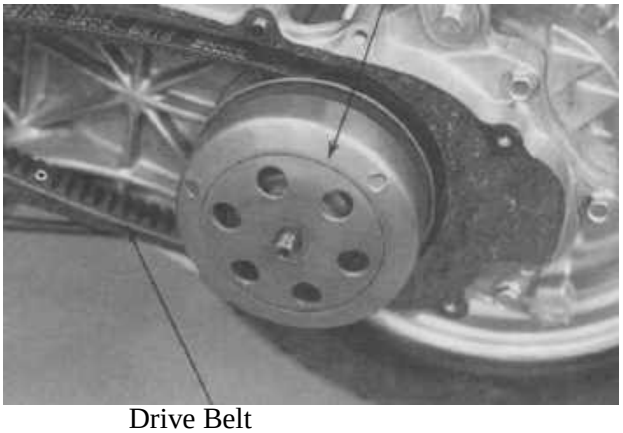
Special

Universal Holder



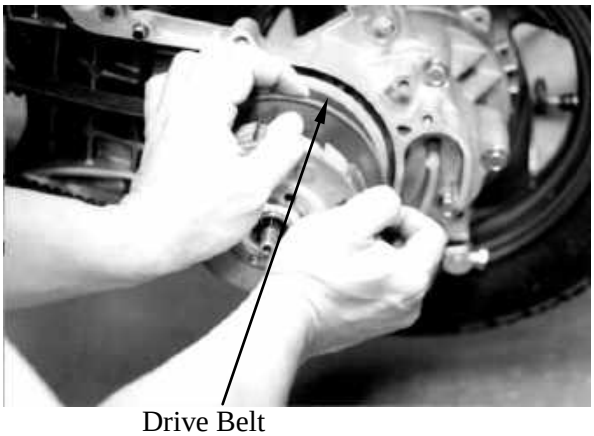
Hold the drive pulley using a holder and remove the drive face nut, starting ratchet and washer.
Remove the drive pulley face.

Remove the drive belt from the clutch/driven pulley.



INSTALLATION

Turn the driven pulley clockwise to widen the drive belt groove and lay a new drive belt on the driven pulley.

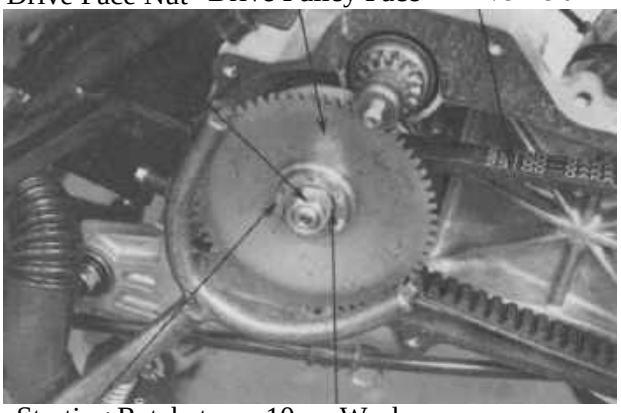


Drive Belt

Set the drive belt on the drive pulley face collar.
Install the drive pulley face, starting ratchet washer. Install and tighten the drive face nut.

* When installing, align the tooth space of the drive pulley face and starting ratchet with the crankshaft tooth and then tighten the nut.

Drive Face Nut Drive Pulley Face Drive Belt



Starting Ratchet 10mmWasher

DRIVE PULLEY

REMOVAL

Hold the drive pulley using a holder and remove the drive face nut, starting ratchet and washer.
Remove the drive pulley face.

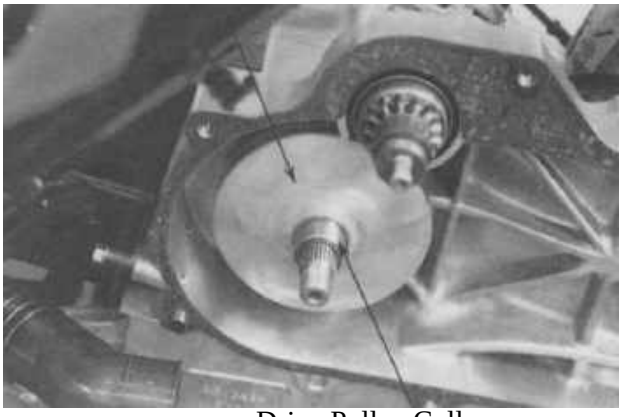
Drive Pulley Face Starting Ratchet

Drive Face Nut (10mm)

DISASSEMBLY

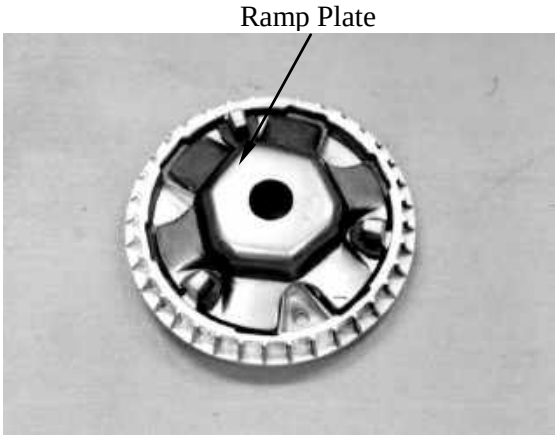
Remove the movable drive face assembly and drive pulley collar from the crankshaft.

Movable Drive Face Assembly

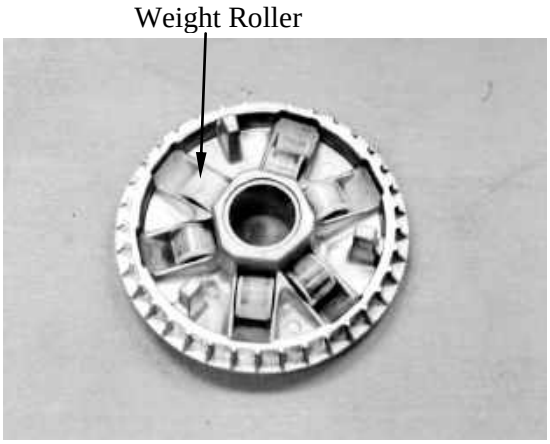


Drive Pulley Collar

Remove the ramp plate.



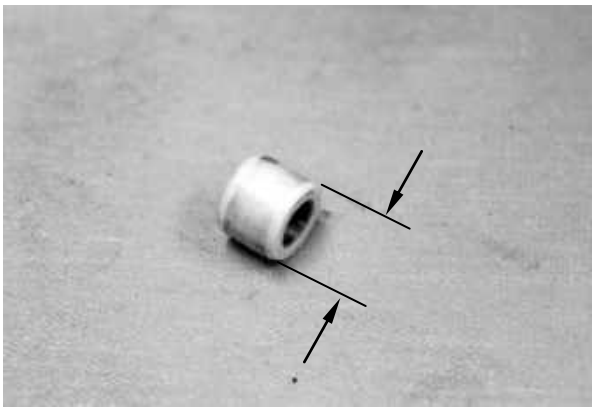
Remove the weight rollers.



INSPECTION

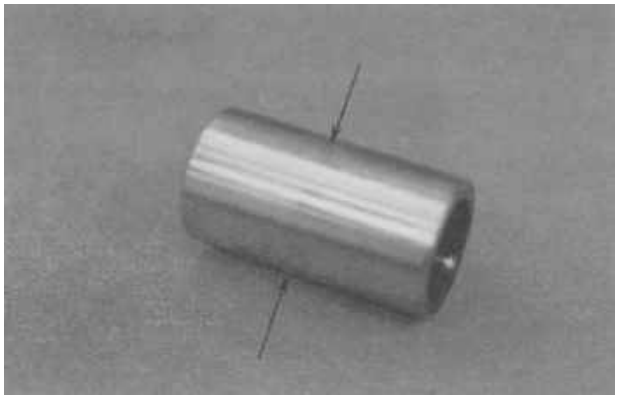
Check each weight roller for wear or damage.
Measure each weight roller O.D.

Service Limit: 12.4mm replace if below



Check the drive pulley collar for wear or damage.
Measure the O.D. of the drive pulley collar sliding surface.

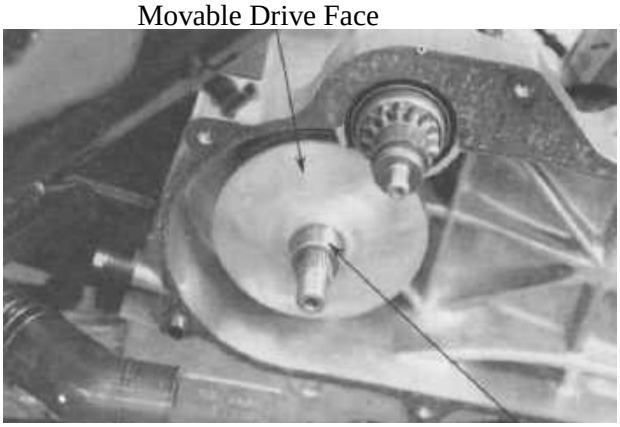
Service Limit: 19.97mm replace if below



INSTALLATION

Install the drive pulley collar and movable drive face onto the crankshaft.

Movable Drive Face

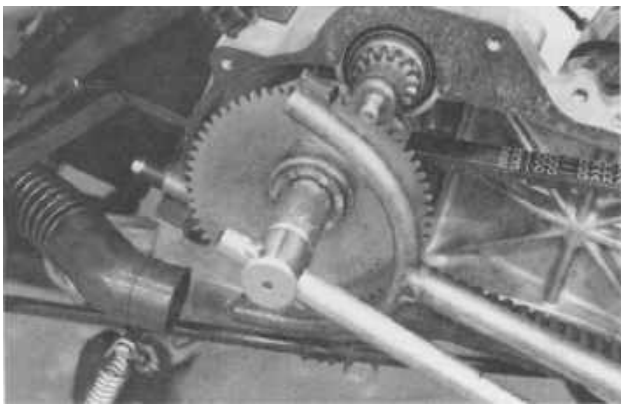


Drive Pulley Collar

Set the drive belt on the drive pulley collar. Install the drive pulley face and tighten the drive face nut. (⇨9-6)

Torque: 5.5~6.5kgf-m

* Do not get oil or grease on the drive belt or pulley faces.



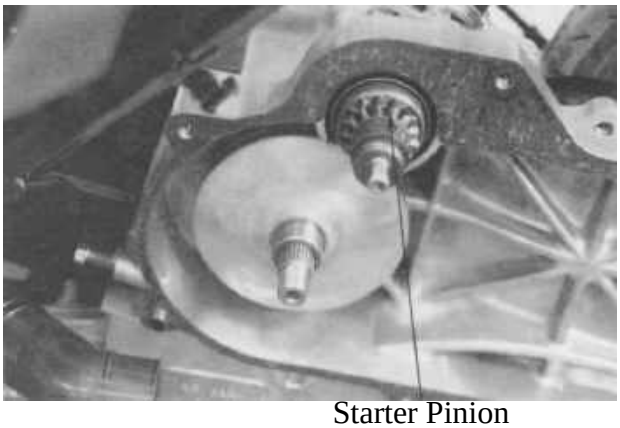
STARTER PINION

REMOVAL

Remove the left crankcase cover.
Remove the drive pulley.
Remove the starter pinion holder.
Remove the starter pinion.

INSPECTION

Inspect the starter pinion shaft forcing part for wear or damage.
Inspect the starter pinion for smooth operation.
Inspect the starter pinion and shaft for wear or damage.



Starter Pinion

Starter Pinion Shaft

INSTALLATION

Apply a small amount of grease to the starter pinion shaft and install it in the reverse order of removal.

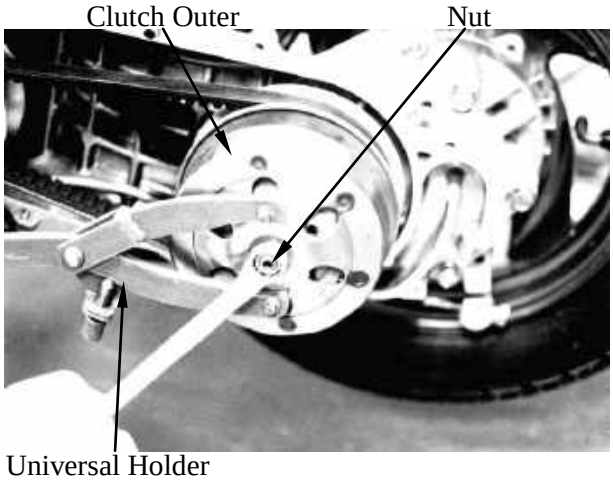
CLUTCH/DRIVEN PULLEY

REMOVAL

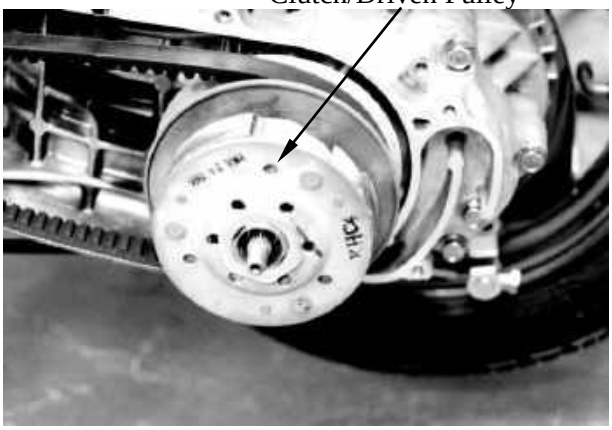
Remove the drive pulley. (⇨9-6)
Hold the clutch outer with the universal holder and remove the clutch outer nut.
Remove the clutch outer.

Special

Universal Holder



Remove the clutch/driven pulley assembly
Remove the drive belt from the clutch/driven pulley assembly.

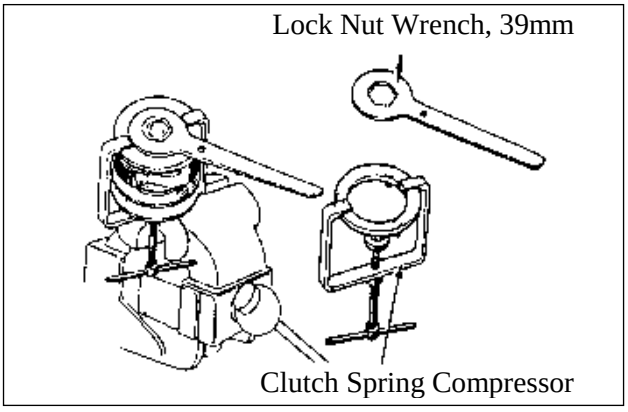


DISASSEMBLY

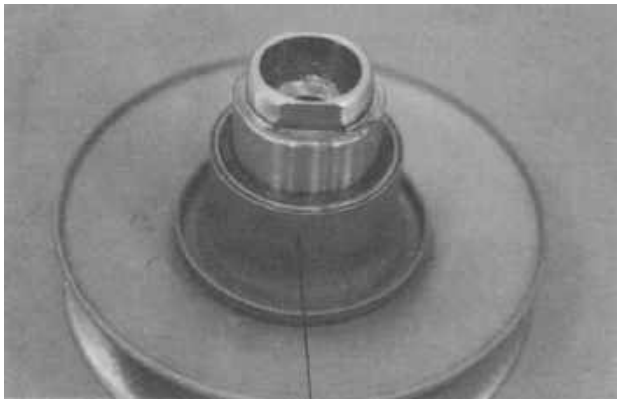
Hold the clutch/driven pulley assembly with the clutch spring compressor.
Set the clutch spring compressor in a vise and remove the 39mm clutch drive plate nut.
Loosen the clutch spring compressor and disassemble the driven pulley assembly.

Special

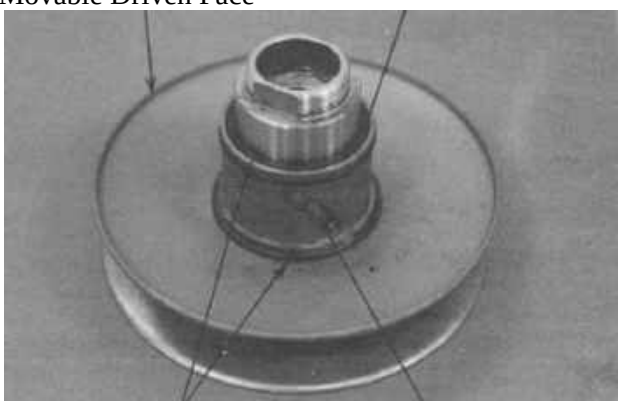
Clutch Spring Compressor



Remove the seal collar.

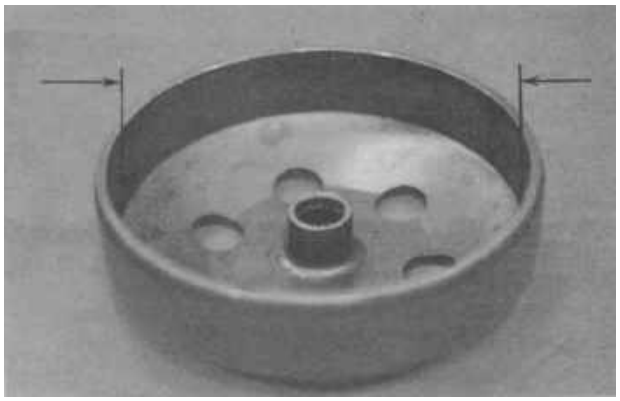


Pull out the guide roller pins and guide rollers.
Remove the movable driven face from the driven face.
Remove the O-rings and oil seal from the movable driven face.

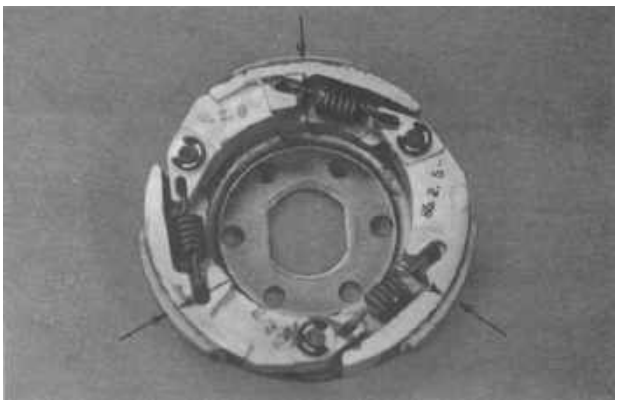


INSPECTION

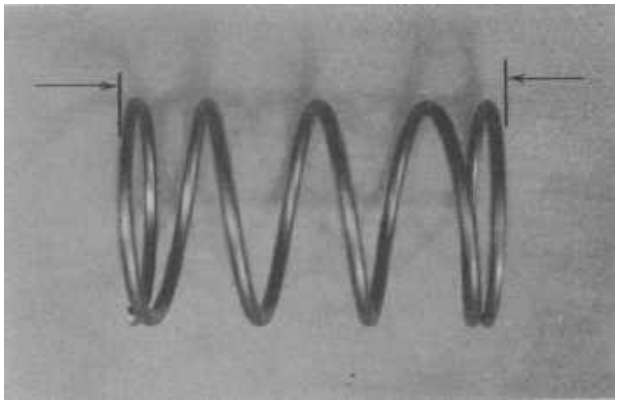
Inspect the clutch outer for wear or damage.
Measure the clutch outer I.D.
Service Limit: 107.5mm replace if over



Check the clutch shoes for wear or damage.
Measure the clutch lining thickness.
Service Limit: 2.0mm replace if below



Measure the driven face spring free length.
Service Limit: 92.8mm replace if below

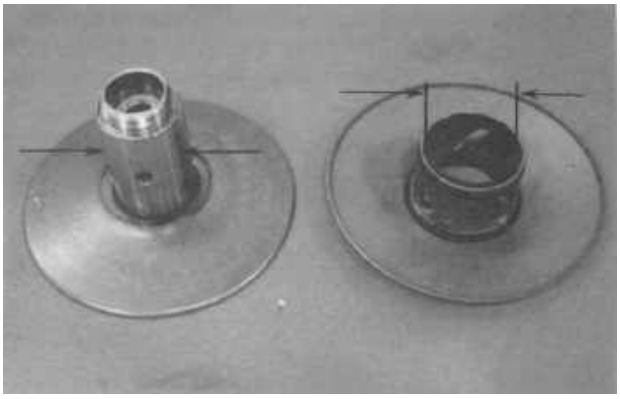


Check the driven face for wear or damage.
Measure the driven face O.D.

Service Limit: 33.94mm replace if below

Check the movable driven face for wear or damage.
Measure the movable driven face I.D.

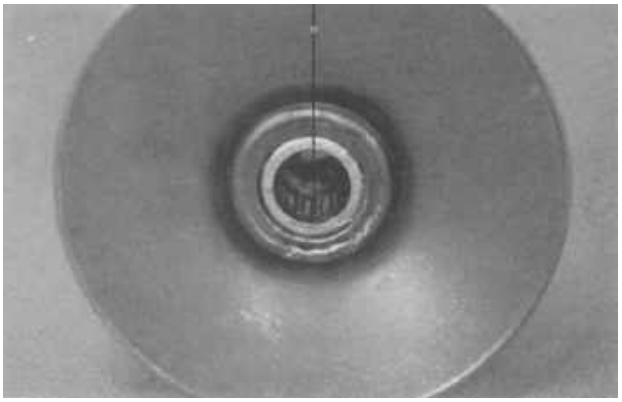
Service Limit: 34.06mm replace if over



Inner Bearing

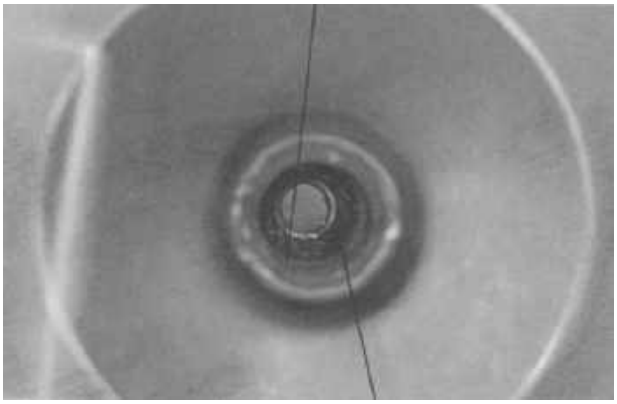
DRIVEN PULLEY FACE BEARING REPLACEMENT

Drive the inner needle bearing out of the driven pulley face.
Discard the removed bearing and replace with a new one.



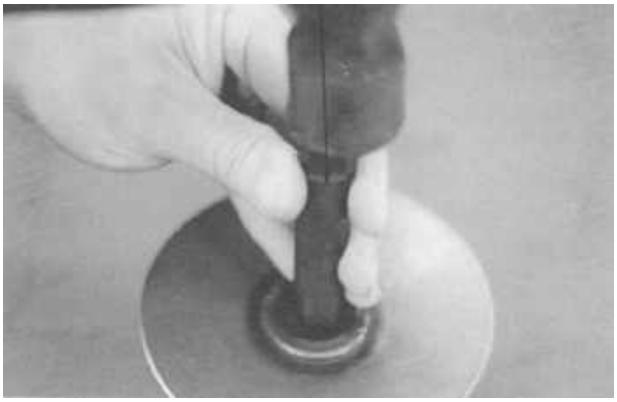
Snap Ring

Remove the snap ring and drive the outer bearing out of the driven face.



Outer Bearing
Bearing Remover

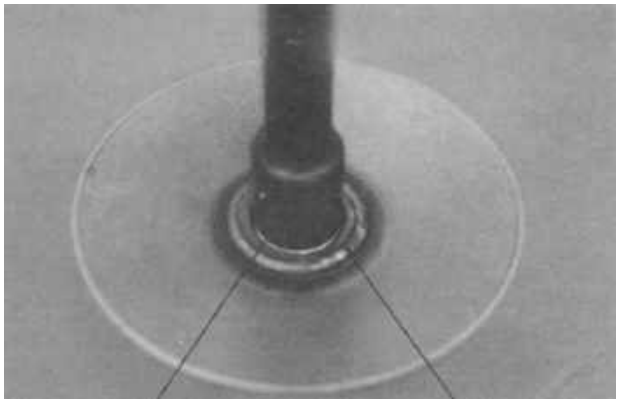
Apply grease to the outer bearing.
Drive a new outer bearing into the driven face with the sealed end facing up.
Seat the snap ring in its groove.



* Pack all bearing cavities with 5.0～5.6g grease.
  Specified grease: Heat resistance 230°C

Press a new needle bearing into the driven face.

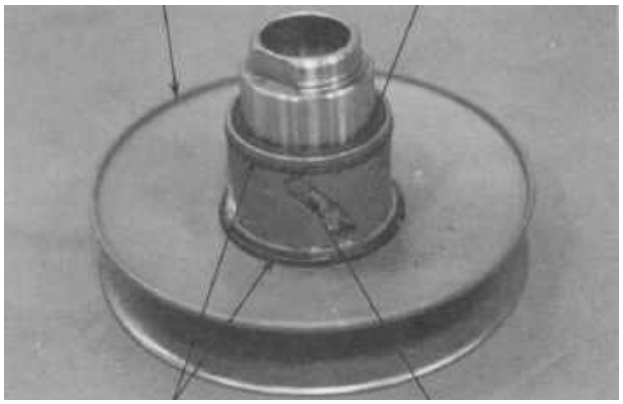
Driver Handle



Outer Driver, 24x26mm Pilot, 17mm
Movable Driven Face Oil Seal

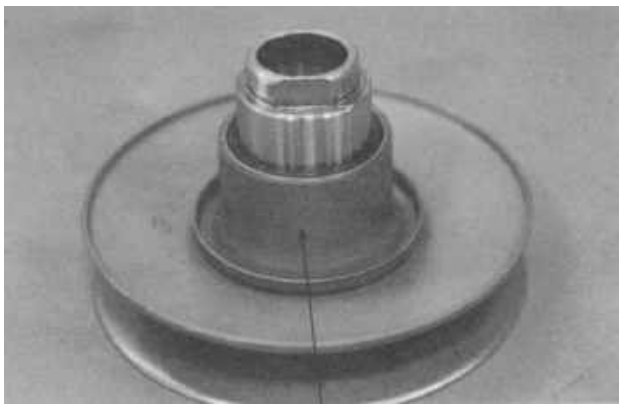
ASSEMBLY

Install the movable driven face onto the driven face.
Install the O-rings, guide rollers and guide roller pins.
Install the a new oil seal.



O-rings Guide Roller Pin

Install the seal collar.



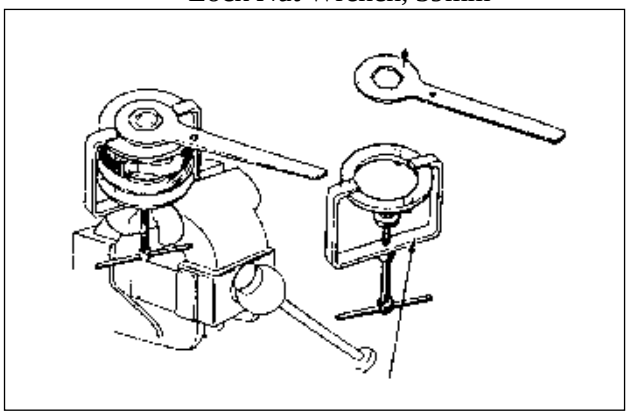
Seal Collar
Lock Nut Wrench, 39mm

Set the driven pulley assembly, driven face spring and clutch assembly onto the clutch spring compressor.
Compress the clutch spring compressor and install the 39mm drive plate nut.
Set the clutch spring compressor in a vise and tighten the drive plate nut to the specified torque.

Torque: 5.0～6.0kgf-m

Special

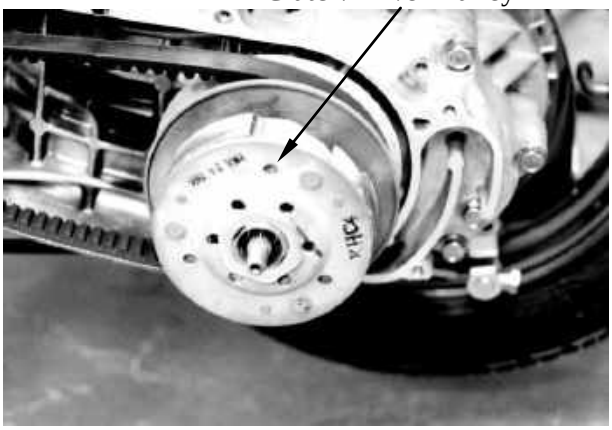
Clutch Spring Compressor



Clutch Spring Compressor

INSTALLATION

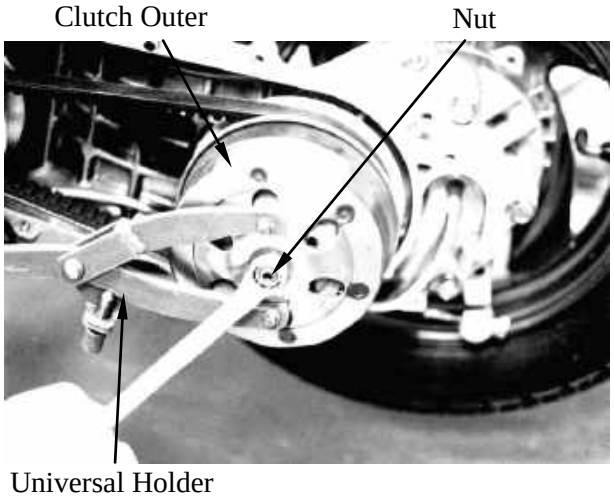
Lay the drive belt on the driven pulley and install the clutch/driven pulley onto the drive shaft.



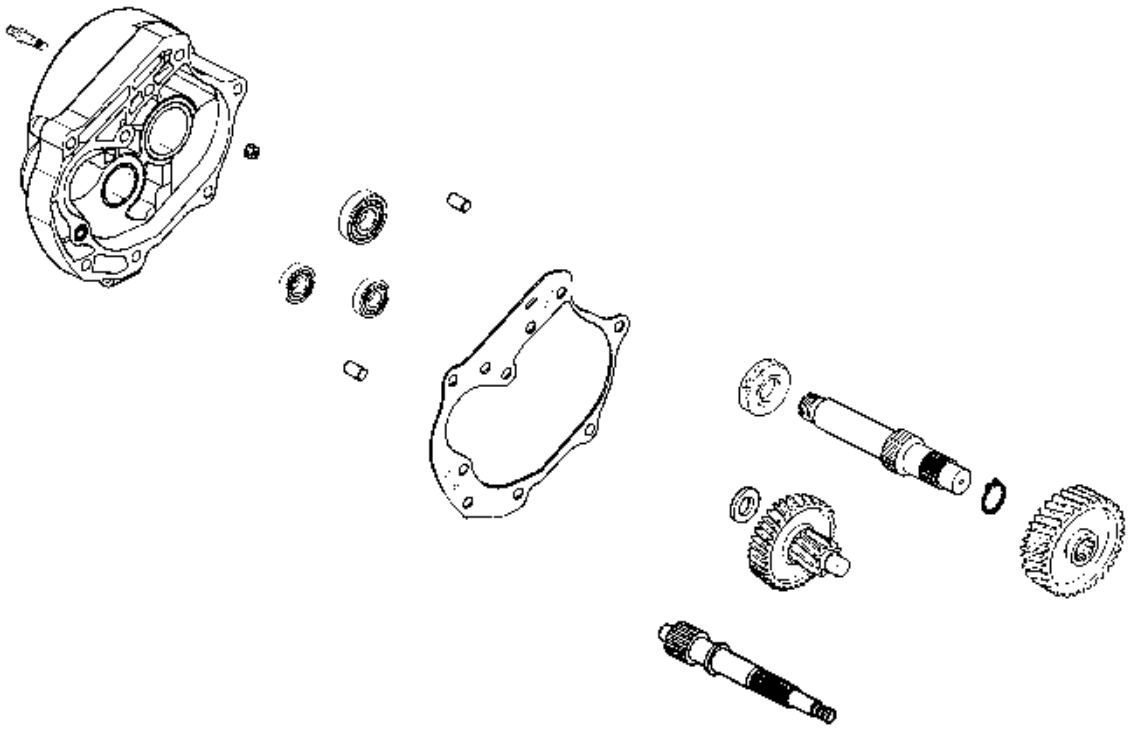
Install the clutch outer.
Hold the clutch outer with the universal holder.
Install and tighten the 10mm clutch outer nut.

Torque: 3.5~4.5kgf-m

Install the left crankcase cover. (⇨9-4)



10. FINAL REDUCTION



SERVICE INFORMATION

SPECIFICATIONS

Specified Oil: GEAR OIL SAE 90#
Oil Capacity: At disassembly : 0.18 liter
At change : 0.15 liter

SPECIAL TOOLS

Bearing puller, 10,12,15,18mm

TROUBLESHOOTING

Engine starts but motorcycle won‘t move
- Damaged transmission
- Seized or burnt transmission
- Faulty drive belt
- Faulty clutch

Abnormal noise
- Worn, seized or chipped gears
- Worn bearing

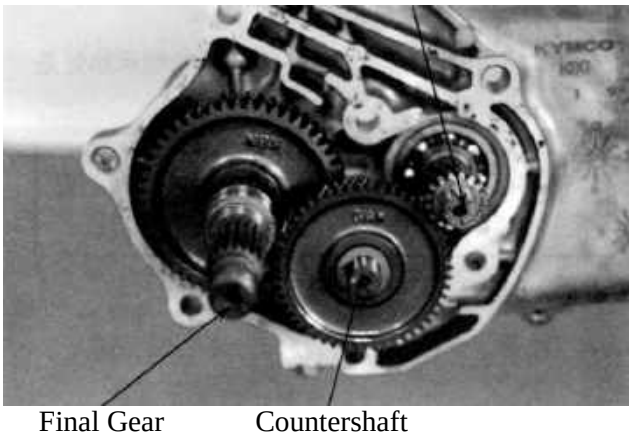
Oil leaks
- Oil level too high
- Worn or damaged oil seal

FINAL REDUCTION DISASSEMBLY

Remove the rear brake cable. (⇨13-3)
Remove the rear wheel. (⇨13-2)
Remove the left crankcase cover. (⇨9-2)
Remove the clutch/driven pulley. (⇨9-10)
Drain the transmission gear oil into a clean container.
Remove the transmission case cover attaching bolts.
Remove the transmission case cover.
Remove the gasket and dowel pins.

Drive Shaft

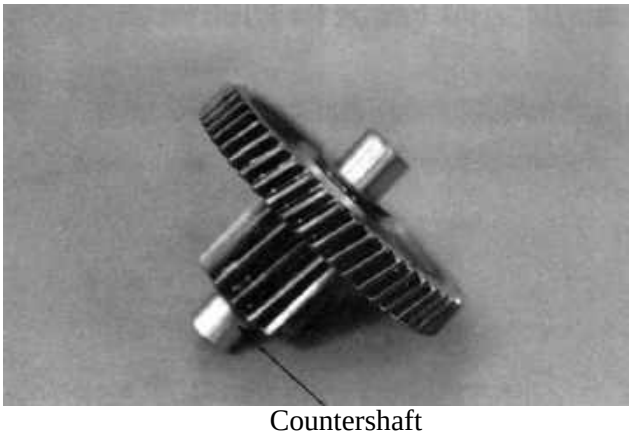
Remove the final gear and countershaft.



Final Gear Countershaft

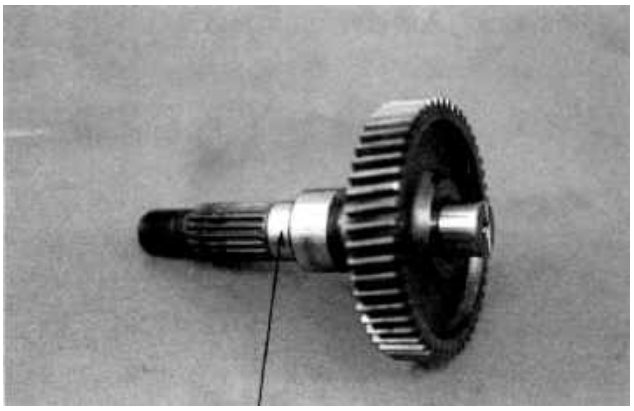
FINAL REDUCTION INSPECTION

Inspect the countershaft and gear for wear or damage.



Countershaft

Inspect the final gear and final shaft for wear, damage or seizure.

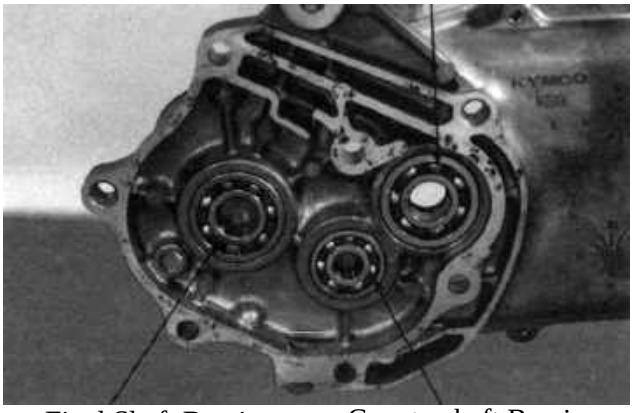


Final Shaft

Bolt

Check the left crankcase bearings for excessive play and inspect the oil seal for wear or damage.

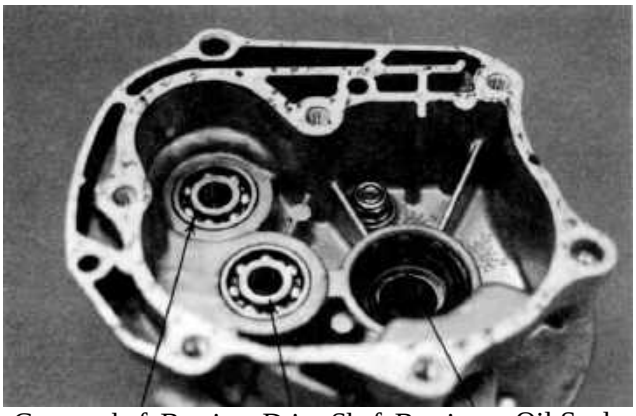
Drive Shaft Bearing



Final Shaft Bearing Countershaft Bearing

Inspect the drive shaft and gear for wear or damage.
Check the transmission case cover bearings for excessive play and inspect the final shaft bearing oil seal for wear or damage.

* Do not remove the transmission case cover except for necessary part replace-ment. When replacing the drive shaft, also replace the bearing and



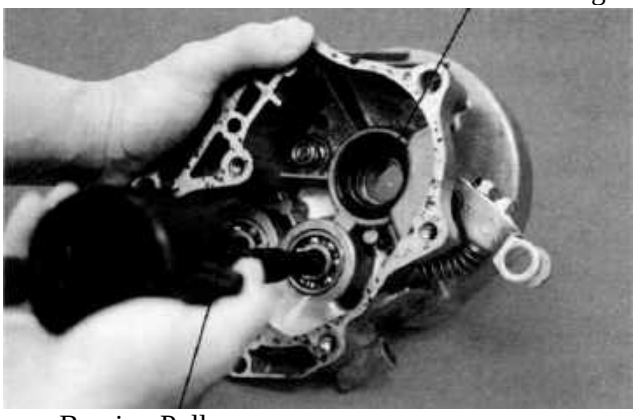
Countershaft Bearing Drive Shaft Bearing Oil Seal
Final Shaft Bearing

BEARING REPLACEMENT (TRANSMISSION CASE COVER)

Remove the transmission case cover bearings using a bearing puller.
Remove the final shaft oil seal.

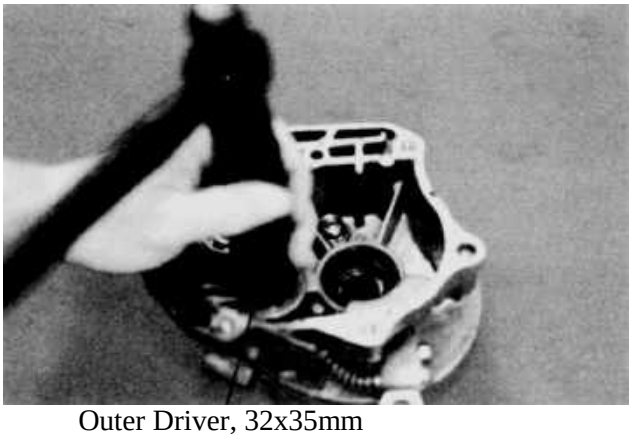
Special

Bearing Puller



Bearing Puller

Drive new bearings into the transmission case cover.



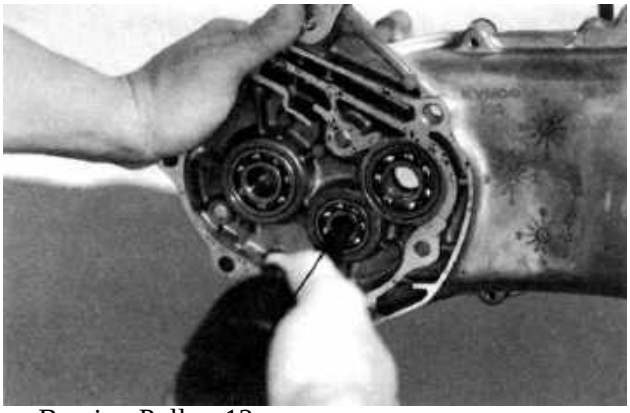
Outer Driver, 32x35mm

BEARING REPLACEMENT (LEFT CRANKCASE)

Remove the drive shaft.
Remove the drive shaft oil seal.
Remove the left crankcase bearings using a bearing puller.

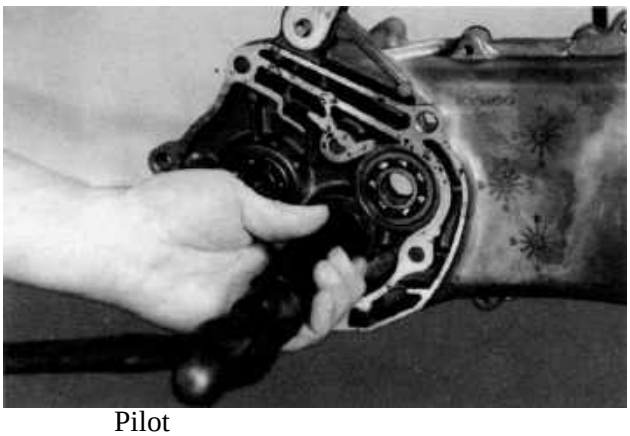
Special

Bearing Puller



Bearing Puller, 12mm

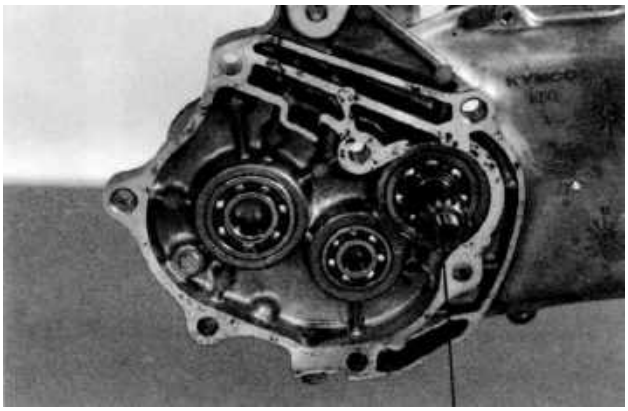
Drive new bearings into the left crankcase.
Install a new drive shaft oil seal.



Pilot

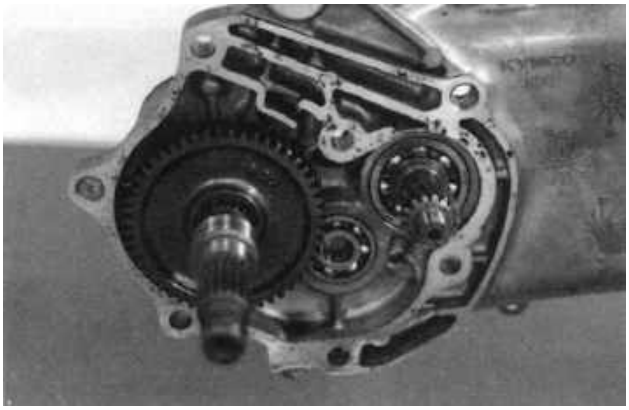
FINAL REDUCTION ASSEMBLY

Install the drive shaft into the left crankcase.

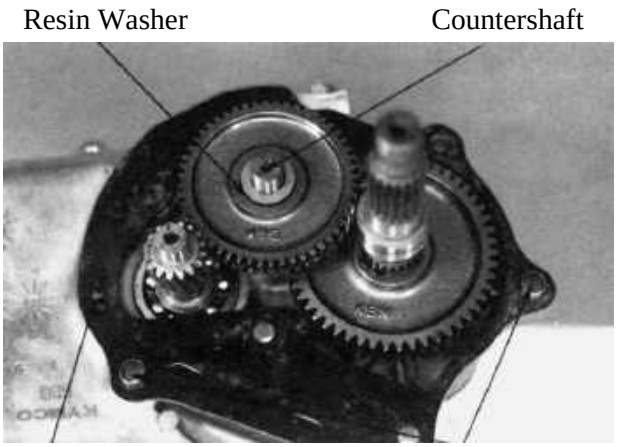


Drive Shaft

Install the final gear and final shaft into the left crankcase.

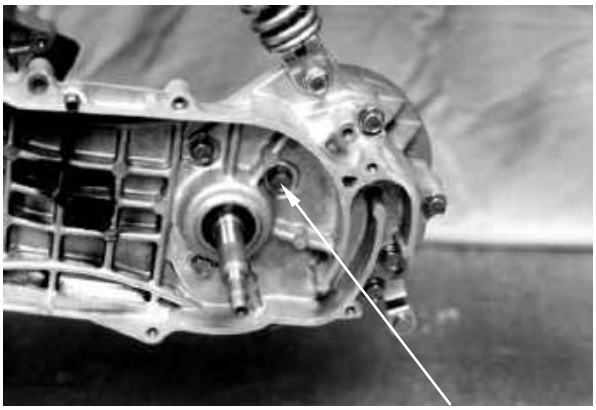


Install the countershaft and gear into the left crankcase.
Install the resin washer onto the countershaft.
Install the dowel pins and a new gasket.



Install the transmission case cover.

Install and tighten the transmission case cover bolts.
Install the clutch/driven pulley. (⇨9-13)



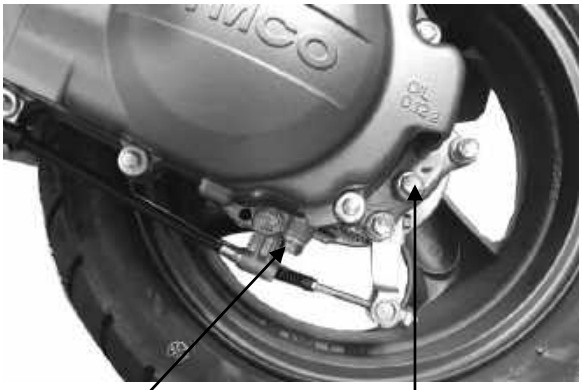
After installation, fill the transmission case with the specified oil. (⇨3-7)

✻
- Place the motorcycle on its main stand on level ground.
- Check the oil sealing washer for wear or damage.

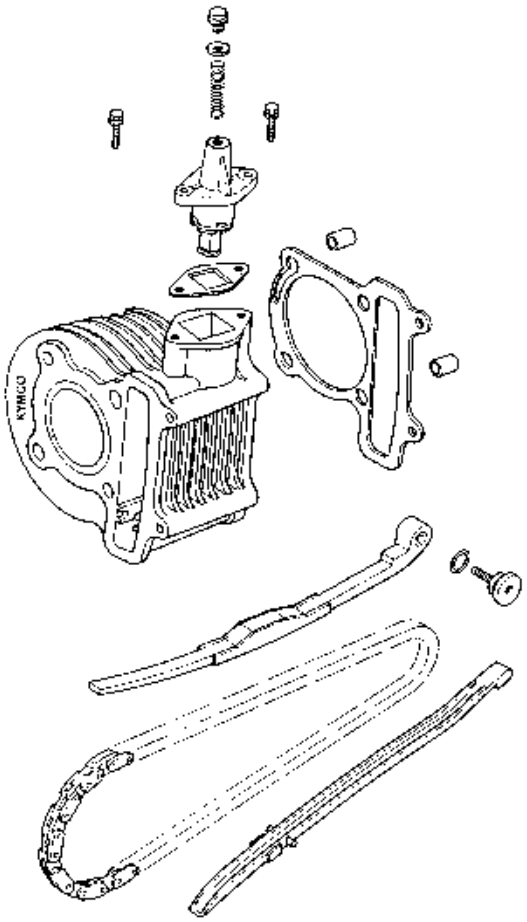
Specified Gear Oil: SAE90#
Oil Capacity:
At disassembly : 0.18 liter
At change : 0.15 liter

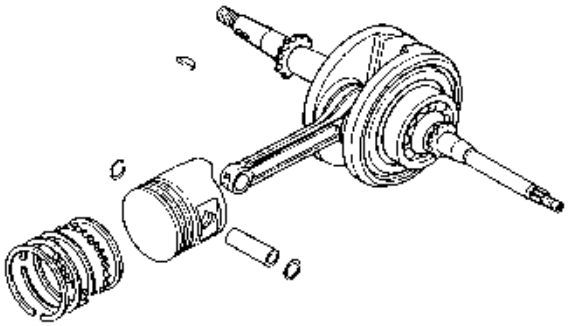
Install and tighten the oil check bolt.
Torque: 0.8～1.2kgf-m

Start the engine and check for oil leaks. Check the oil level from the oil check bolt hole and add the specified oil to the proper level if the oil level is low.



11. CRANKCASE/CRANKSHAFT





11

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- This section covers crankcase separation to service the crankshaft. The engine must be removed for this operation.
- The following parts must be removed before separating the crankcase.
  –Cylinder head (⇨Section 7)
  –Cylinder/piston (⇨Section 8)
  –Drive and driven pulleys (⇨Section 9)
  –A.C. generator (⇨Section 14)
  –Carburetor/air cleaner (⇨Section 5)
  –Rear wheel/rear shock absorber (⇨Section 13)
  –Starter motor (⇨Section 16)
  –Oil pump (⇨Section 4)

SPECIFICATIONS

	Item	Standard (mm)	Service Limit (mm)
Crankshaft	Connecting rod big end side clearance	0.10～0.35	0.55
	Connecting rod big end radial clearance	0-0.008	0.05
	Runout	—	0.10

TORQUE VALUES

Crankcase bolt	0.8~1.2kgf-m
Cam chain tensioner slipper bolt	0.8~1.2kgf-m

TROUBLESHOOTING

Excessive engine noise

- Excessive bearing play
- Excessive crankpin bearing play

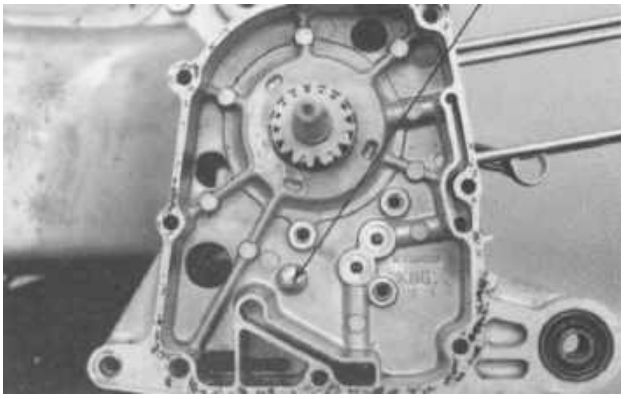
CRANKCASE SEPARATION

Remove the cam chain tensioner slipper bolt and cam chain tensioner slipper.

Cam Chain Tensioner Slipper Bolt

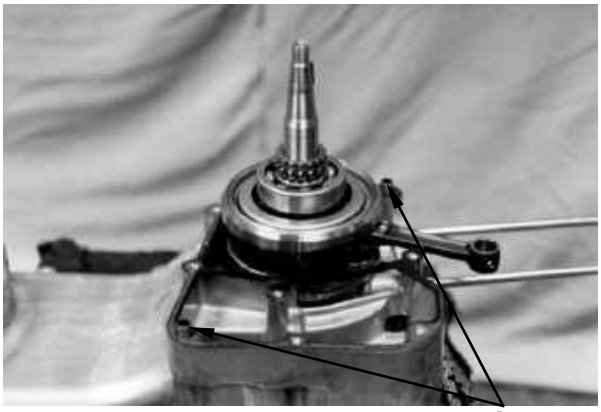
Crankcase Bolt

Remove the crankcase attaching bolt.
Separate the left and right crankcase halves.



* • Do not damage the crankcase gasket surface.
  • Never use a driver to pry the crankcase mating surfaces apart.

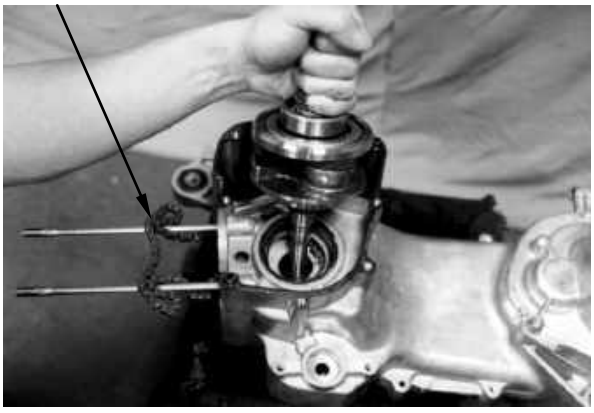
Remove the gasket and dowel pins.



Dowel Pins

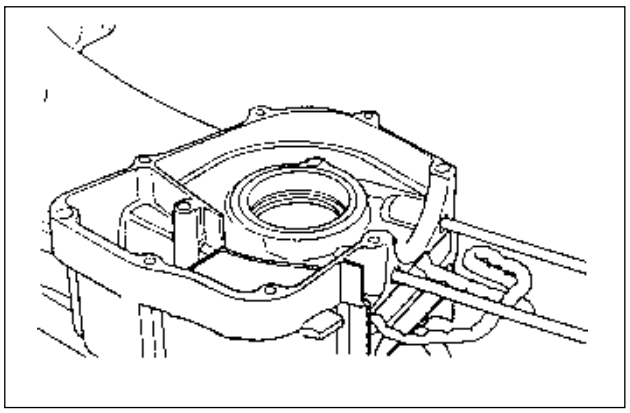
Cam Chain

Remove the crankshaft from the left crankcase.
Remove the cam chain.

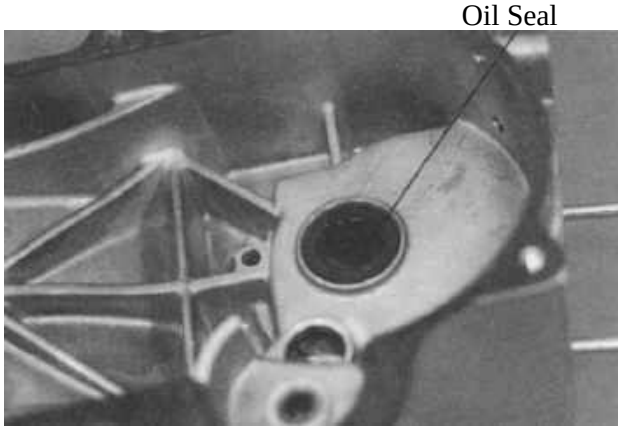


Clean off all gasket material from the crankcase mating surfaces.

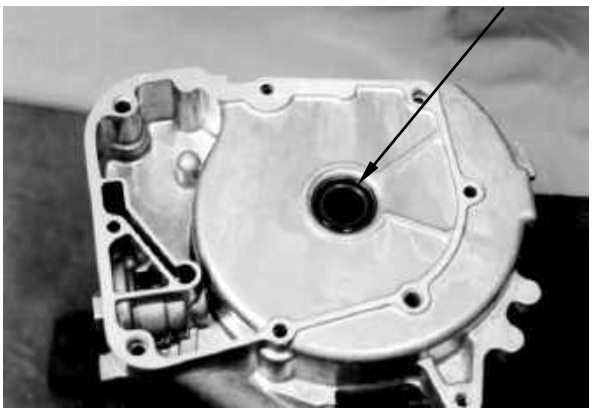
* Avoid damaging the crankcase mating surfaces.



Remove the oil seal from the left crankcase.



Remove the oil seal from the right crankcase.



CRANKSHAFT

Measure the connecting rod big end side clearance.

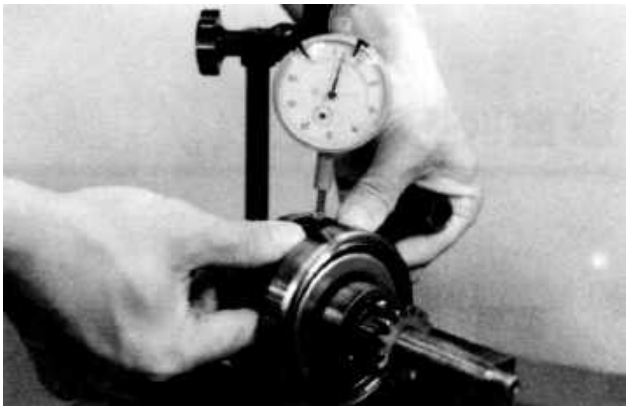
Service Limit: 0.55mm replace if over

Connecting Rod Big End

Measure the connecting rod big end radial clearance at two points at right angels to the shaft.

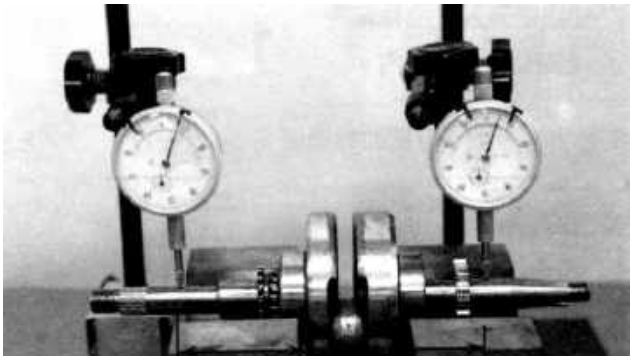
Service Limit: 0.05mm replace if over

Measuring Location



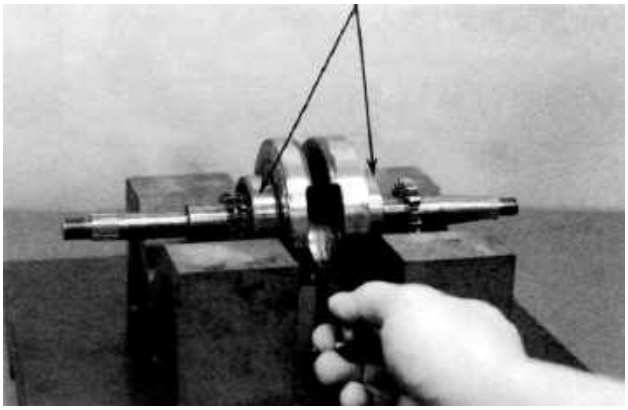
Measure the crankshaft runout.

Service Limit: 0.10mm replace if over



Turn the crankshaft bearings and check for excessive play.
If they do not turn smoothly, quietly or if they fit loosely in the crankshaft, replace the crankshaft as a set.

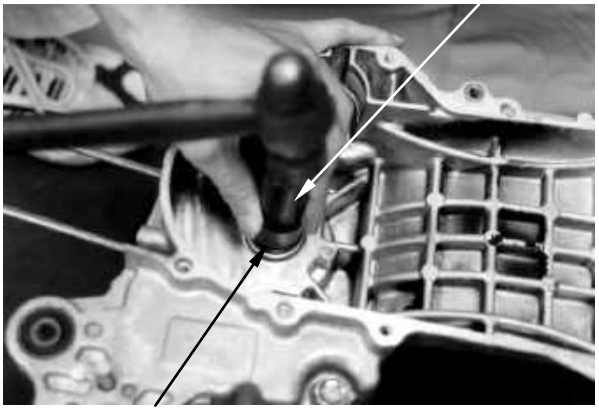
Crankshaft Bearings



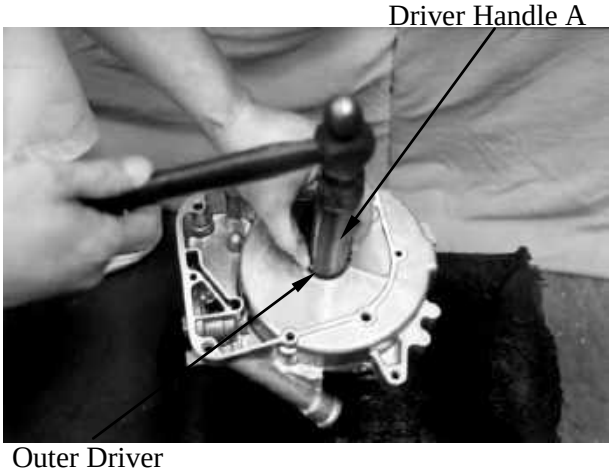
CRANKCASE ASSEMBLY

Install new oil seals into the right and left crankcase .

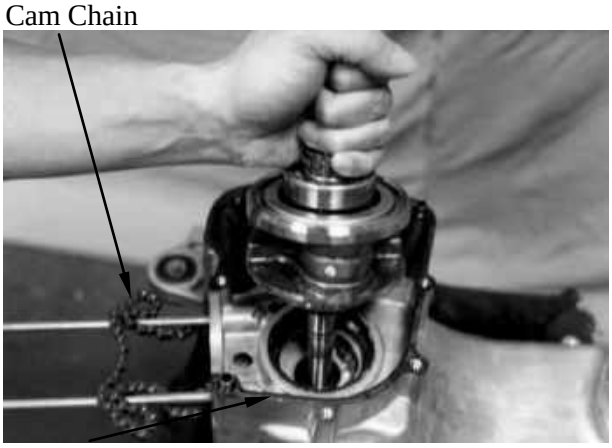
Driver Handle A



Outer Driver



Install the cam chain into the left crankcase.
Install the crankshaft into the left crankcase.

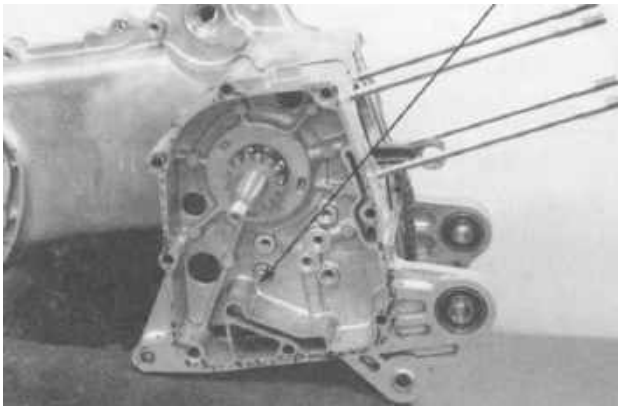


* When installing the cam chain, be careful not to damage the oil seal.

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

* Place the right crankcase over the crankshaft and onto the left crankcase.

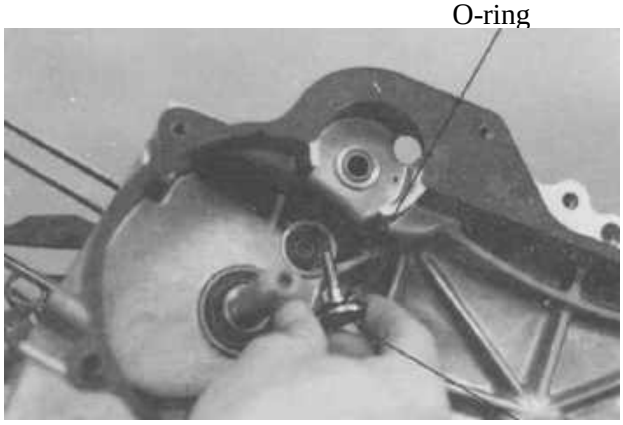
Tighten the crankcase attaching bolt.
Torque: 0.8~1.2kgf-m



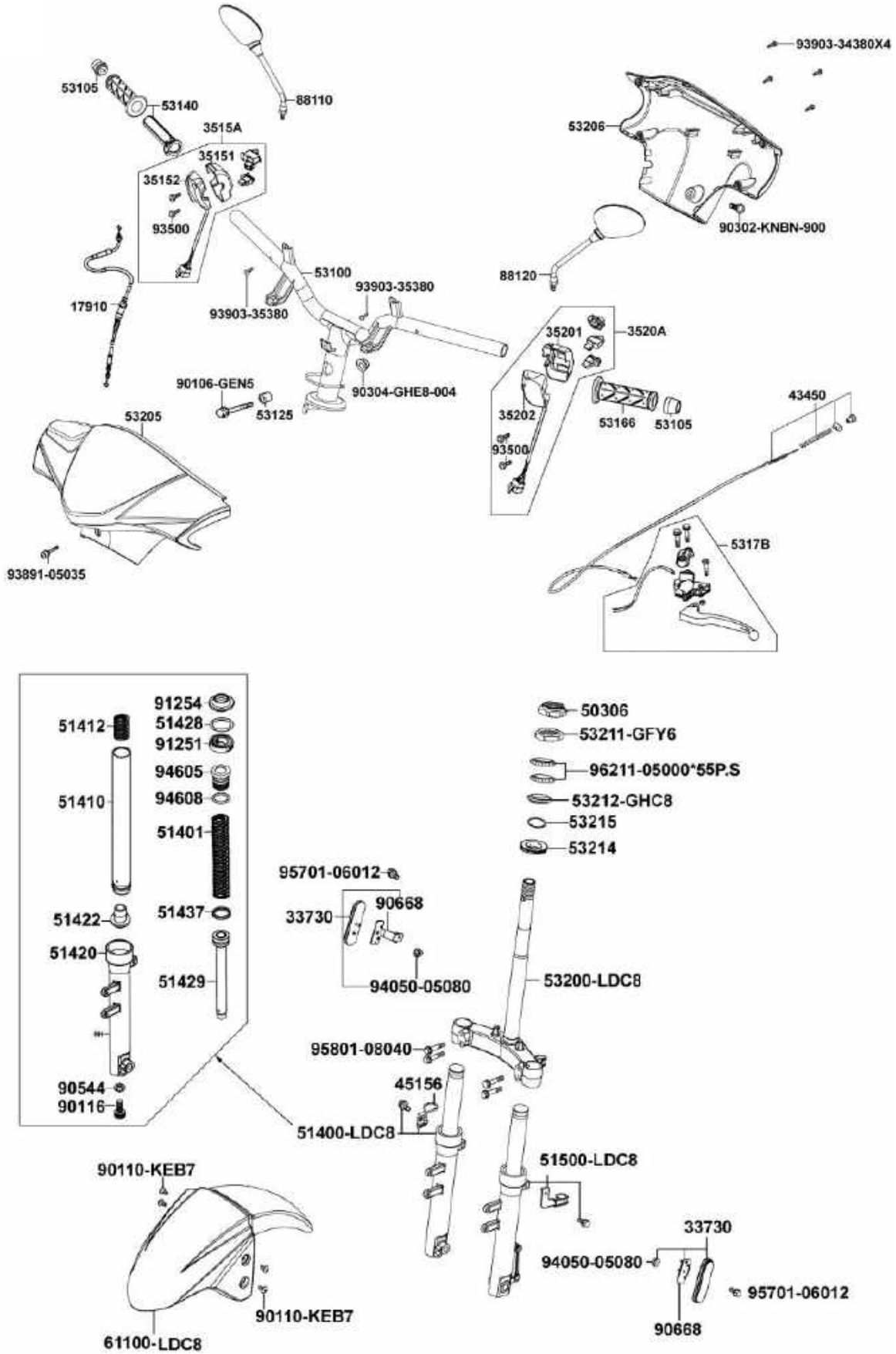
Install the cam chain tensioner slipper.
Install a new O-ring onto the cam chain tensioner slipper bolt.
Apply engine oil to the O-ring and tighten the bolt.

Torque: 0.8~1.2kgf-m

* Be sure to install the O-ring into the groove.



Cam Chain Tensioner Slipper Bolt


93903-34380X4
53105
53140
88110
3515A
35151
35152
93500
53206
90302-KNBN-900
88120
17910
53100
93903-35380
93903-35380
35201
3520A
90106-GEN5
53125
90304-GHE8-004
35202
53166
53105
43450
53205
93500
93891-05035
5317B
91254
51412
51428
91251
94605
51410
94608
51401
51422
51437
51420
51429
90544
90116
50306
53211-GFY6
96211-05000*55P.S
53212-GHC8
53215
53214
95701-06012
90668
33730
94050-05080
53200-LDC8
95801-08040
45156
51400-LDC8
51500-LDC8
90110-KEB7
33730
94050-05080
95701-06012
90668
90110-KEB7
61100-LDC8

12

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Remove the motorcycle frame covers before removing the front wheel. Jack the motorcycle front wheel off the ground and be careful to prevent the motorcycle from falling down.
- During servicing, keep oil or grease off the brake drum and brake linings.

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Axle shaft runout		—	0.2
Front wheel rim runout	Radial	—	2.0
	Axial	—	2.0
Front brake drum I.D		110	111
Front brake lining thickness		4.0	2.0
Front shock absorber spring free length		210.9	206.4

TORQUE VALUES

Handlebar bolt	4.5~5.5kgf-m
Steering stem lock nut	6.0~8.0kgf-m
Steering top cone race	0.5~1.3kgf-m
Front shock absorber bolt	3.0kgf-m
Front axle nut	5.0~7.0kgf-m
Brake arm bolt	0.8~1.2kgf-m

SPECIAL TOOLS

Long socket wrench,32mm 8angle

TROUBLESHOOTING

Hard steering (heavy)
- Excessively tightened steering stem top cone race
- Broken steering balls
- Insufficient tire pressure

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

Poor brake performance
- Incorrectly adjusted brake
- Worn brake linings
- Contaminated brake lining surface
- Worn brake shoes at cam contacting area
- Worn brake drum
- Poorly connected brake arm

Front wheel wobbling
- Bent rim
- Excessive wheel bearing play
- Bent spoke plate
- Faulty tire
- Improperly tightened axle nut

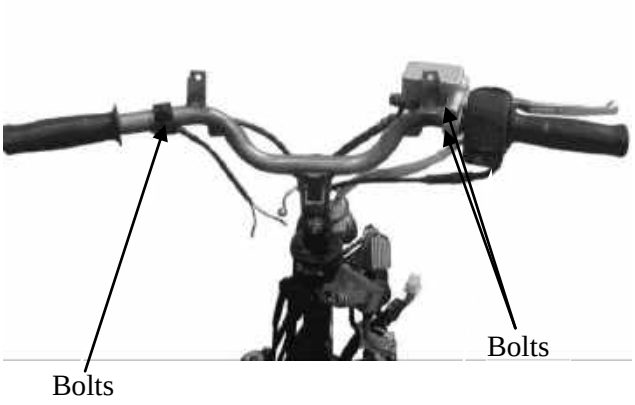
Soft front shock absorber
- Weak shock springs
- Insufficient damper oil

Front shock absorber noise
- Slider bending
- Loose fork fasteners
- Lack of lubrication

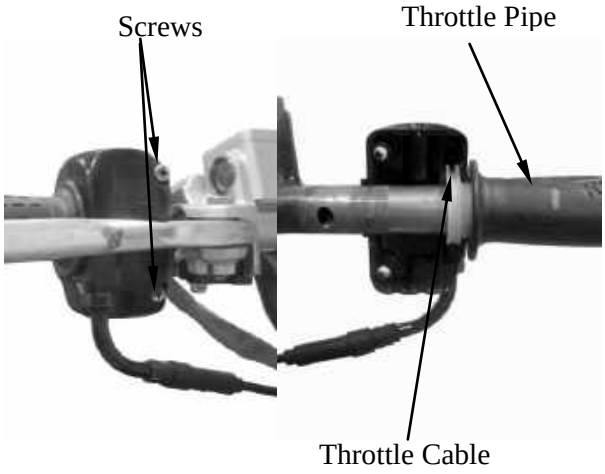
STEERING HANDLEBAR

REMOVAL

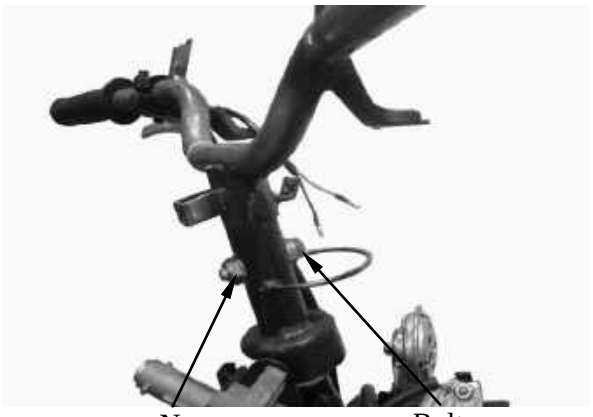
Remove the handlebar front and rear covers. (⇨2-2)
Remove the two bolts attaching each of the front and rear brake levers.
Remove the front and rear brake levers.



Remove the two throttle holder screws and throttle holder.
Disconnect the throttle cable from the throttle pipe and then remove the throttle pipe from the handlebar.

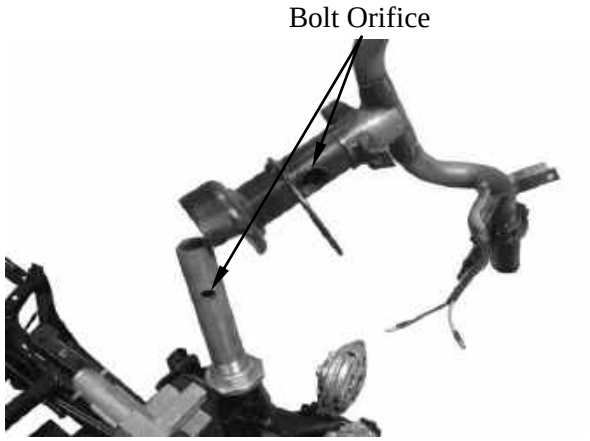


Remove the handlebar lock nut and bolt to remove the handlebar.

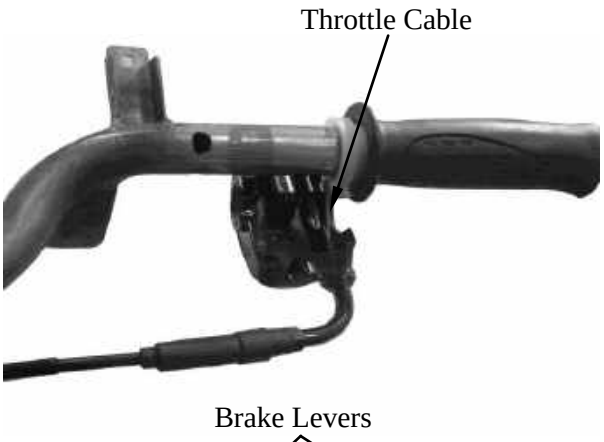


INSTALLATION

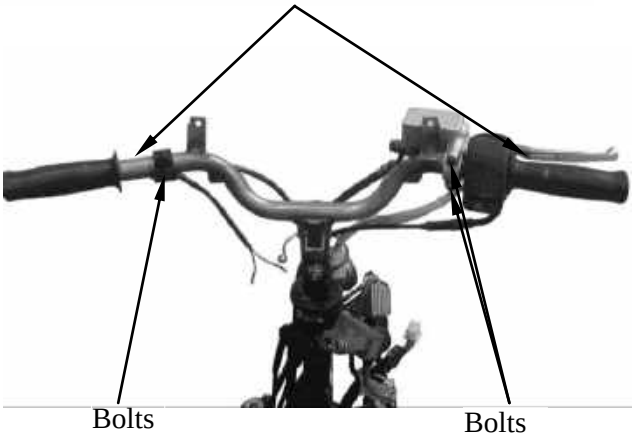
Install the handlebar onto the steering stem by aligning the tab on the handlebar with the bolt orifice on the steering stem.
Install and tighten the handlebar bolt and lock nut.
Torque: 4.5～5.5kgf-m



Apply grease to the tip of the throttle pipe.
Install the throttle pipe and connect the throttle cable.



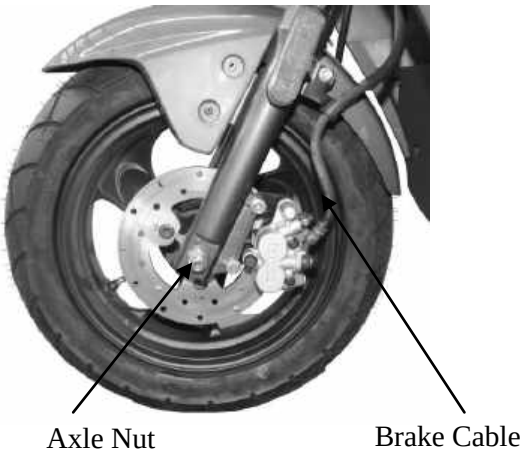
Install the front and rear brake levers in the reverse order of removal.



FRONT WHEEL

REMOVAL

Jack the motorcycle front wheel off the ground.
Remove the speedometer cable set screw and disconnect the speedometer cable.
Remove the front brake cable.
Remove the front axle nut and pull out the axle.
Remove the front wheel.
Remove the front brake panel and side collar.

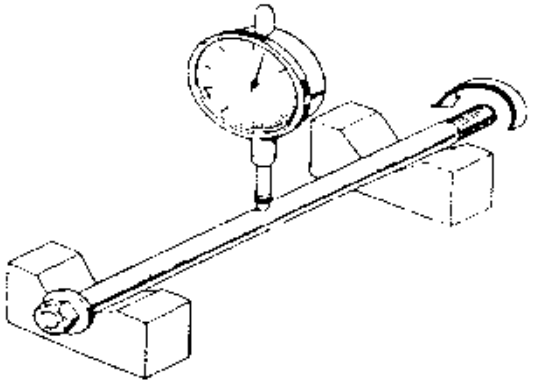


INSPECTION

AXLE RUNOUT

Set the axle in V blocks and measure the runout using a dial gauge.
The actual runout is $^1/_2$ of the total indicator reading.

Service Limit: 0.2mm replace if over



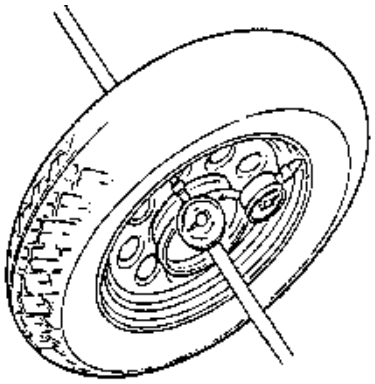
WHEEL RIM

Check the wheel rim runout.

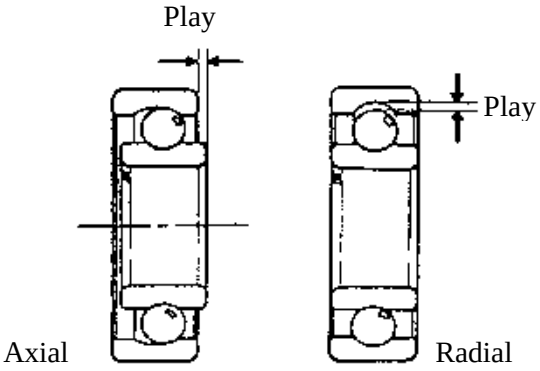
Service Limits:

Radial: 2.0mm replace if over

Axial: 2.0mm replace if over

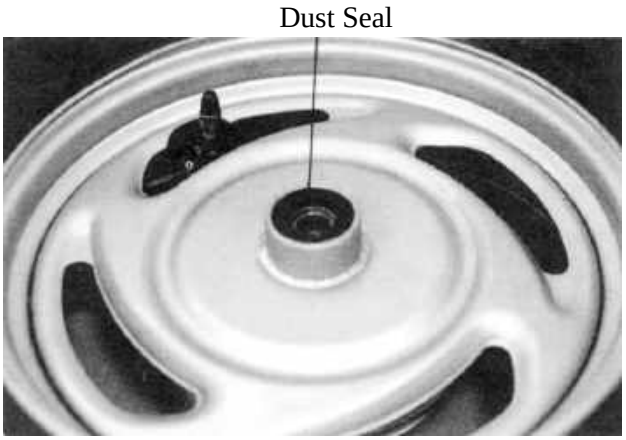


Turn the wheel bearings and replace the bearings if they are noisy or have excessive play.



DISASSEMBLY

Remove the dust seal.

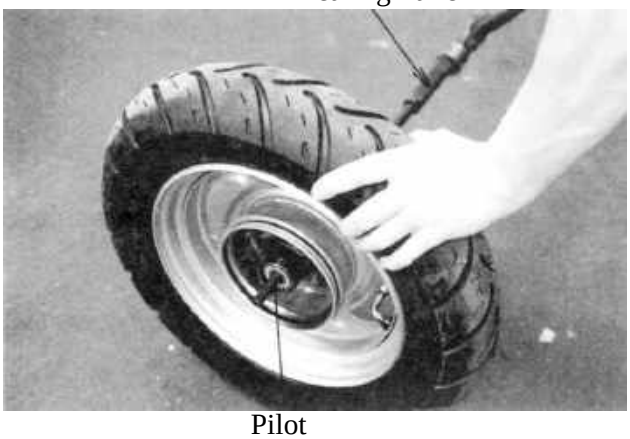


Remove the front wheel bearings and distance collar.

Special

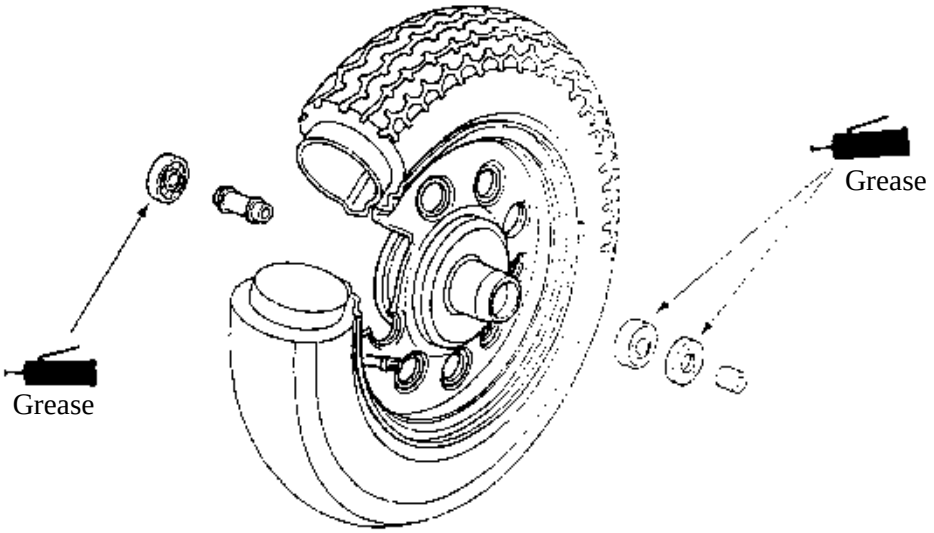
Bearing Puller

Bearing Puller



Pilot

ASSEMBLY

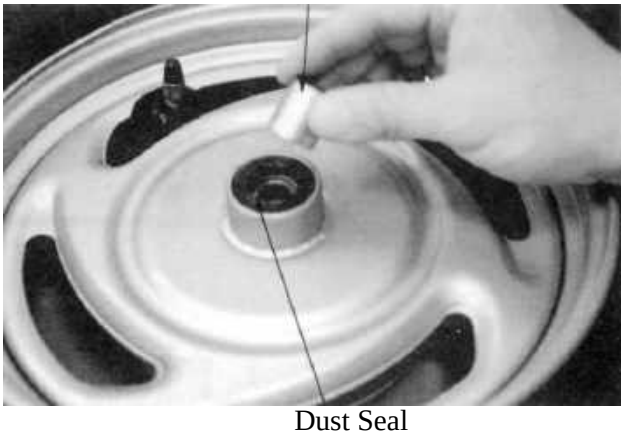


Pack all bearing cavities with grease.
Drive in the left bearing.
Install the distance collar.
Drive in the right bearing.

* Drive in the bearing squarely with the sealed end facing out.

Outer Driver
Pilot

Apply grease to a new dust seal lip and install the dust seal.
Install the side collar.

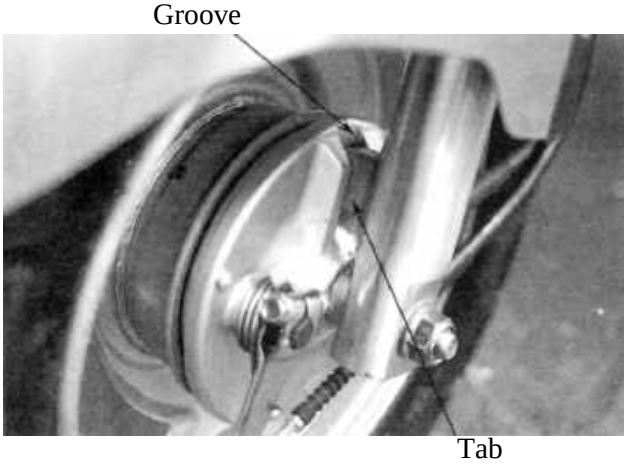


INSTALLATION

Install the front wheel by aligning the brake panel groove with the front fork tab.
Insert the axle shaft and tighten the axle nut.

Torque: 4.5kg-m

Connect the speedometer cable and secure it with the screw.
Install the front brake cable and adjust the front brake lever free play.



FRONT BRAKE

Remove the front wheel. (⇨12-4)
Remove the front brake panel.

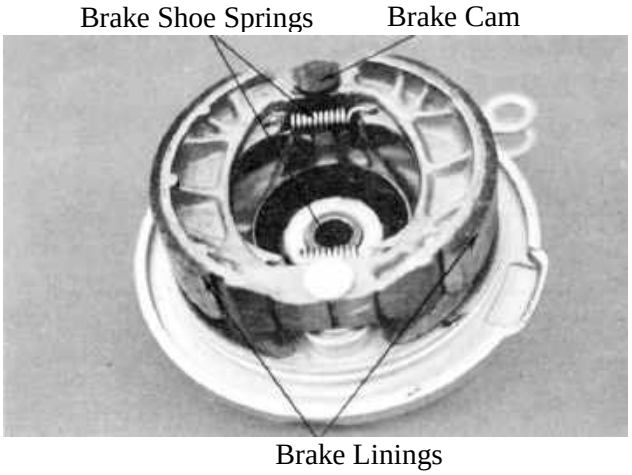
INSPECTION

Measure the brake drum I.D.

Service Limit: 111mm replace if over

Measure each brake lining thickness.

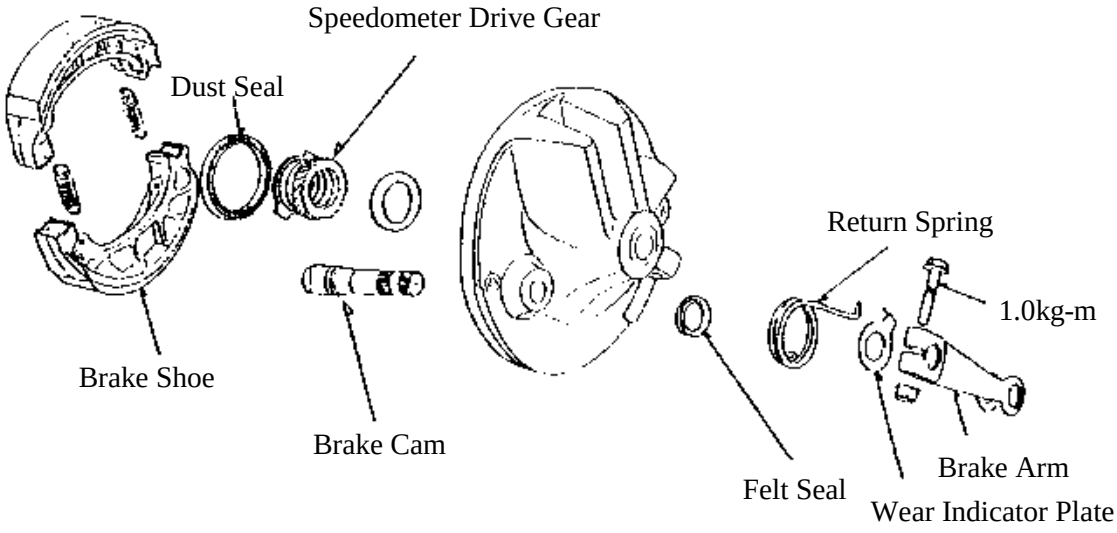
Service Limit: 2.00mmmm replace if below



* Keep oil or grease off the brake linings.

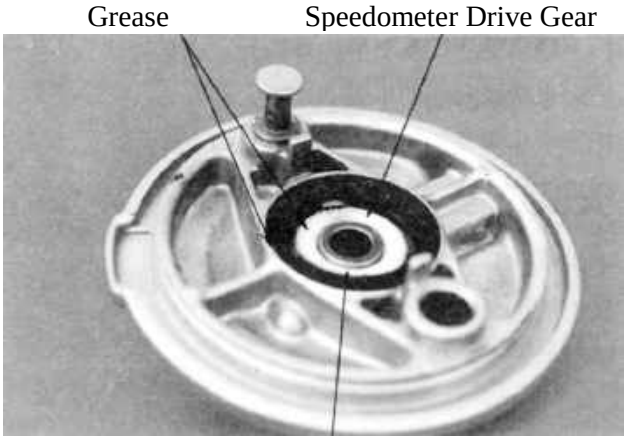
DISASSEMBLY

Do not swing the brake arm to expand the brake shoes.
Remove the brake shoes by removing the brake shoe springs using a screw driver.
Remove the brake arm and return spring.
Remove the wear indicator plate and felt seal.
Remove the brake cam.
Remove the dust seal and speedometer drive gear.

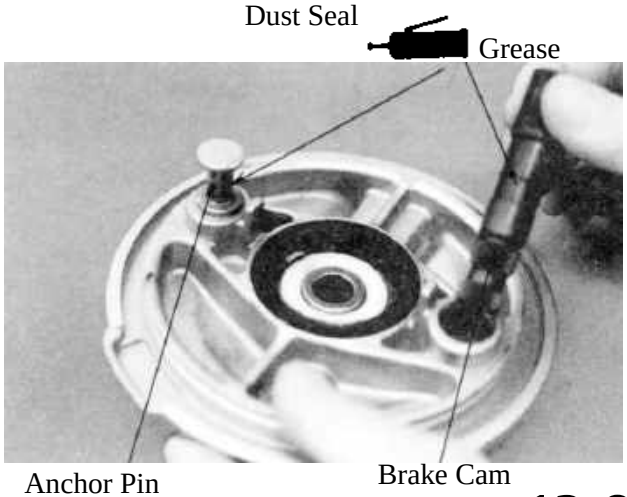


ASSEMBLY

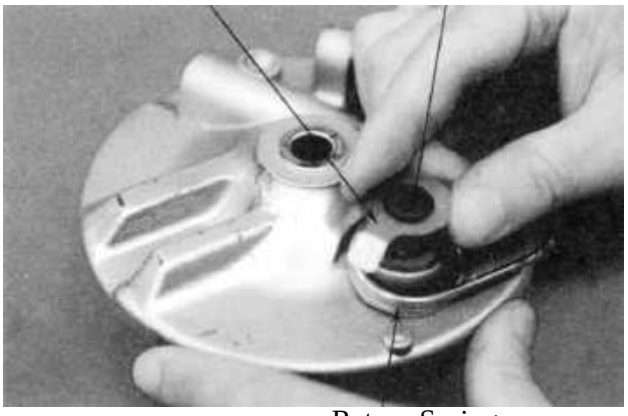
Apply grease to the speedometer drive gear and then install it into the brake panel.
Apply grease to the dust seal lip and install it into the brake panel.



Apply grease to the anchor pin and brake cam.
Install the brake cam.

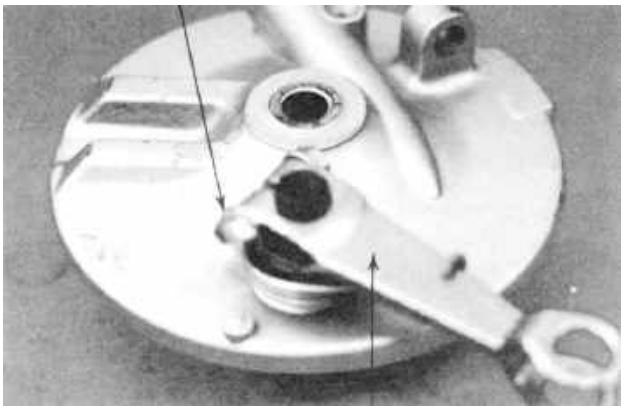


Install the return spring by aligning the spring hook end with the hole in the brake panel.
Apply a small amount of engine oil to the felt seal and install it to the brake panel.
Install the wear indicator plate on the brake cam by aligning the tooth on the plate with the groove on the brake cam.



Return Spring

Install the brake arm on the brake cam by aligning the punch mark on the brake arm and the scribed line on the brake cam.
Install and tighten the brake arm bolt.
Torque:0.8~1.2kgf-m

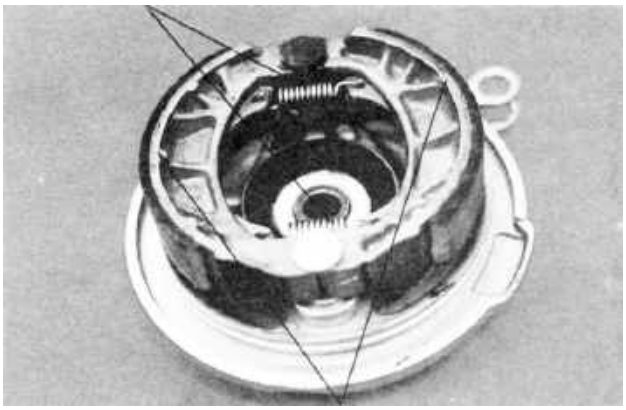


Brake Arm

Install the brake shoe springs to the brake shoes and then install the brake shoes into the brake panel.

INSTALLATION

Install the brake panel onto the front wheel.
Install the front wheel. (⇨12-7)
Adjust the front brake lever free play.



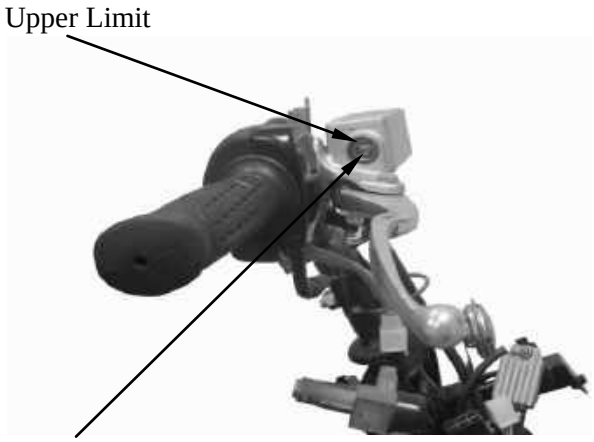
Brake Shoes

HYDRAULIC BRAKE (FRONT BRAKE)

Brake Fluid Replacement/Air Bleeding

Check the brake fluid level on level ground.

*
- When operating the brake lever, the brake reservoir cap must be tightened securely to avoid spill of brake fluid.
- When servicing the brake system, use shop towels to cover plastic parts and coated surfaces to avoid damage caused by spill of brake fluid.



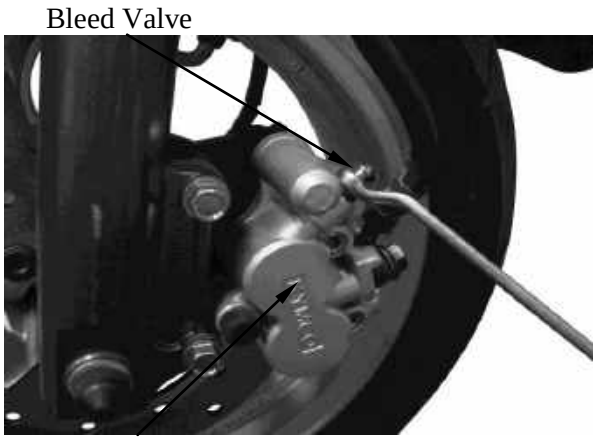
Brake Fluid Bleeding

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

Warning

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

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



Front Brake Caliper

Brake Fluid Refilling

Add DOT-4 brake fluid to the brake reservoir.

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

Make sure to bleed air from the brake system.

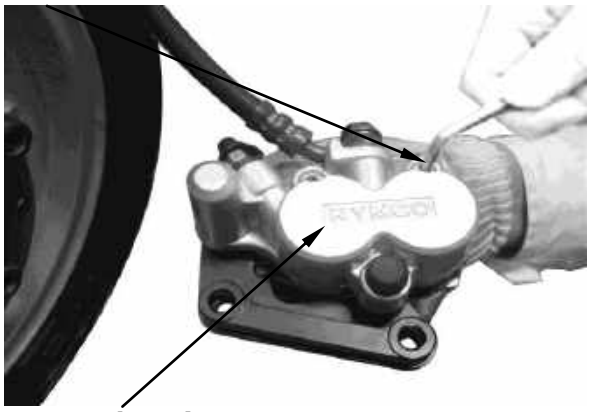
Brake Pad/Disk Replacement

* The brake pads must be replaced as a set to ensure the balance of the brake disk.

Remove the two bolts attaching the brake caliper.
Remove the brake caliper.

Remove the brake pad pins to remove the brake pads.

Pad Pin



Front Brake Caliper

Install the brake pads in the reverse order of removal.
Tighten the brake pad pin bolts.
Torque: 1.5～2.0kgf-m

* • Keep grease or oil off the brake pads to avoid brake failure.
  • Do not reuse the brake pad pin bolts that have been removed.

Brake Pads

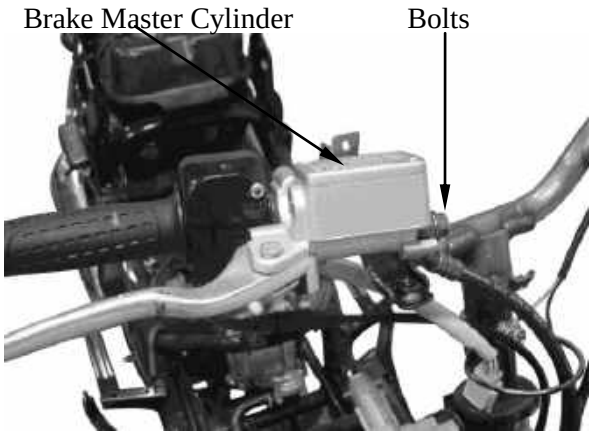
Front Brake Caliper

Brake Disk
Measure the brake disk thickness.
Service Limit: 3.0mm
Measure the brake disk runout.
Service Limit: 0.3mm

BRAKE MASTER CYLINDER

Removal

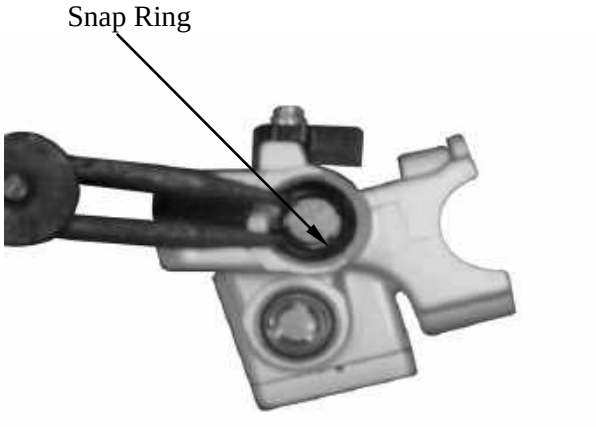
First drain the brake fluid from the hydraulic brake system.



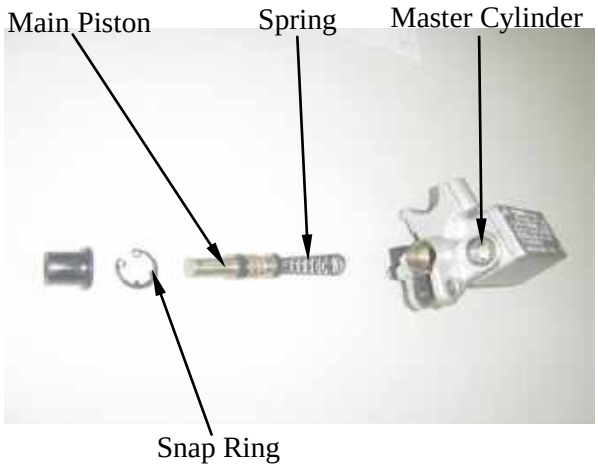
*
- When servicing the brake system, use shop towels to cover rubber and plastic parts and coated surfaces to avoid being contaminated by brake fluid.
- When removing the brake fluid pipe bolt, be sure to plug the pipe to avoid brake fluid leakage.

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.

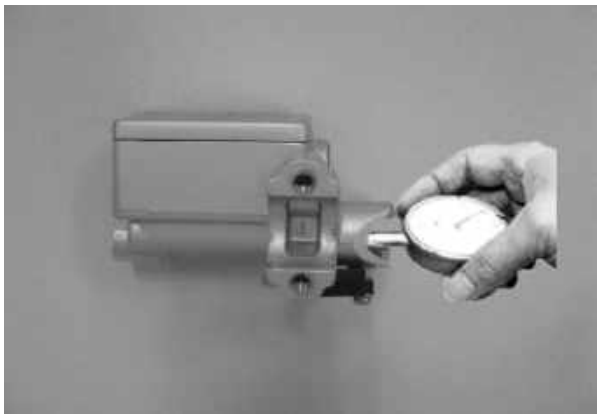


Inspection

Measure the brake master cylinder I.D.

Service Limit: 12.75mm

Inspect the master cylinder for scratch or crack.



Measure the brake master cylinder piston O.D.

Service Limit: 12.6mm

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

Assembly

Before assembly, apply brake fluid to all removed parts.

Install the spring together with the 1st rubber cup.

*
  - During assembly, the main piston and spring must be installed as a unit without exchange.
  - When assembling the piston, soak the cups in brake fluid for a while.
  - Install the cups with the cup lips facing the correct direction.

Install the main piston, spring and snap ring.

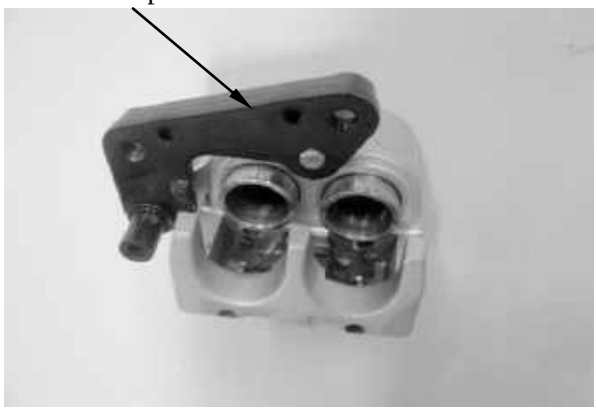
Install the rubber cover.

Install the brake lever.

Disassembly

Remove the brake caliper seat from the brake caliper.

Brake Caliper Seat



Remove the piston from the brake caliper.
If necessary, use compressed air to squeeze out the piston through the brake fluid inlet opening and place a shop towel under the caliper to avoid contamination caused by the removed piston.
Check the piston cylinder for scratch or wear and replace if necessary.

Compressed Air

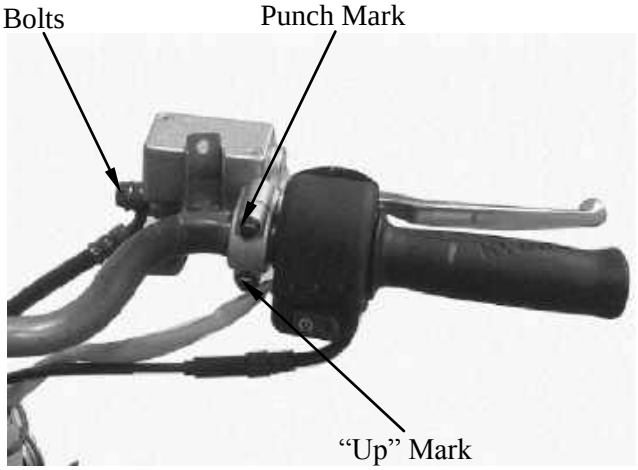
Push the piston oil seal outward to remove it.
Clean the oil seal groove with brake fluid.

Piston Oil Seal

* Be careful not to damage the piston surface.

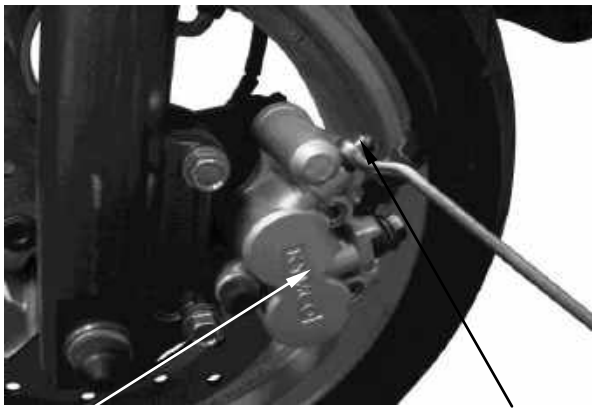
Place the brake master cylinder on the handlebar and install the holder with "up" mark facing up. Be sure to align the punch mark with the holder joint.
First tighten the upper bolt and then tighten the lower bolt.

Torque: 3.0～4.0kgf-m



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

Install the handlebar covers. (⇨12-3)
Fill the brake reservoir with recommended brake fluid to the upper limit and bleed air according to the method stated in 12-10.

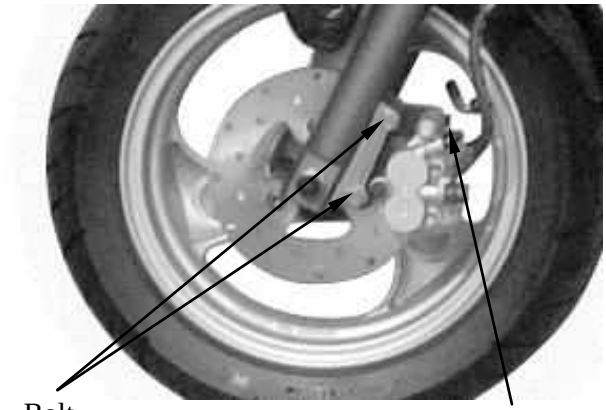


BRAKE CALIPER (FRONT)

Removal

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

* Do not spill brake fluid on any coated surfaces.



Check the piston for scratch or wear.
Measure the piston O.D. with a micrometer.
Service Limit: 26.3mm

Check the caliper cylinder for scratch or wear and measure the cylinder bore.
Service Limit: 26.45mm

Assembly
Clean all removed parts.
Apply silicon grease to the piston and oil seal.
Lubricate the brake caliper cylinder inside wall with brake fluid.
Install the brake caliper piston with grooved side facing out.

* Install the piston with its outer end 3～5mm protruding 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

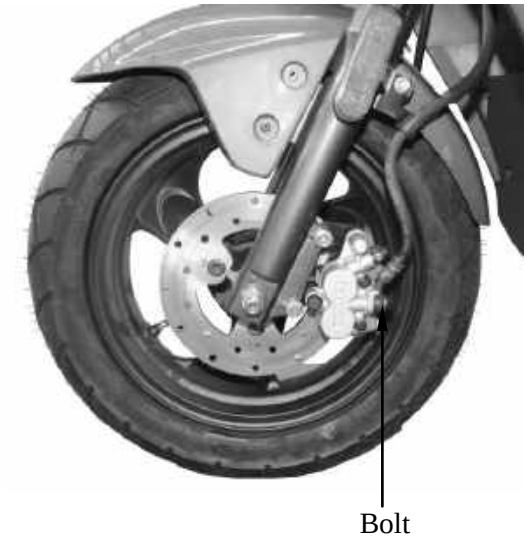
Install the brake caliper and tighten the two bolts.

Torque: 2.9～3.5kg-m

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

Torque: 2.5～3.5kg-m

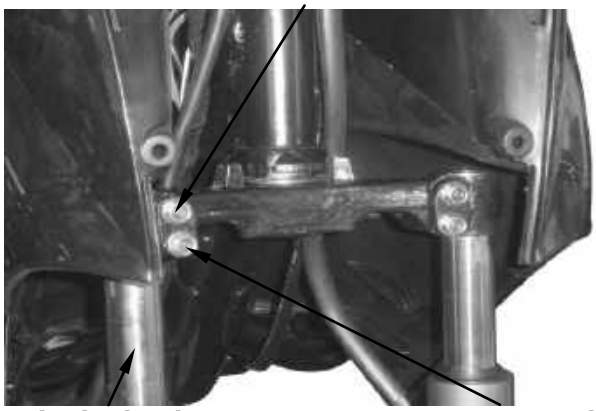
Fill the brake reservoir with recommended brake fluid and bleed air from the brake syst em. (⇨12-10)



FRONT SHOCK ABSORBER

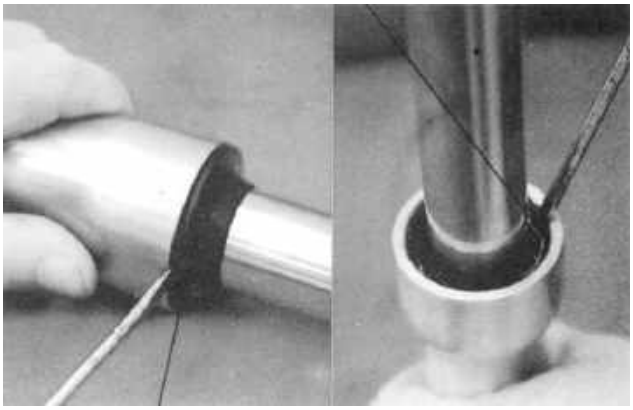
REMOVAL

Remove the front wheel. (⇨12-4)
Remove the front lower cover. (⇨2-2)
Remove the front inner fender.
Remove the front shock absorber upper mount bolts.
Loosen the lower mount bolts to remove the front shock absorbers.

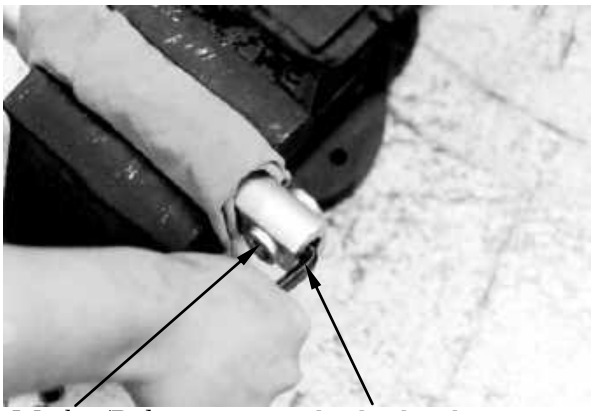


DISASSEMBLY

Remove the dust boot.
Remove the circlip.

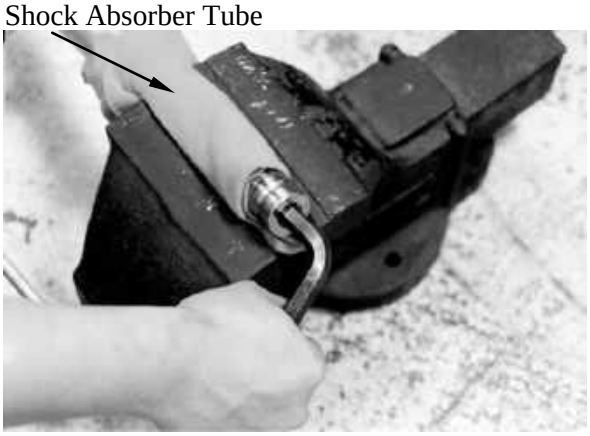


Set the front shock absorber in a vise.
Remove the damper rod, hex bolt and copper washer.
Pull out the front shock absorber tube.



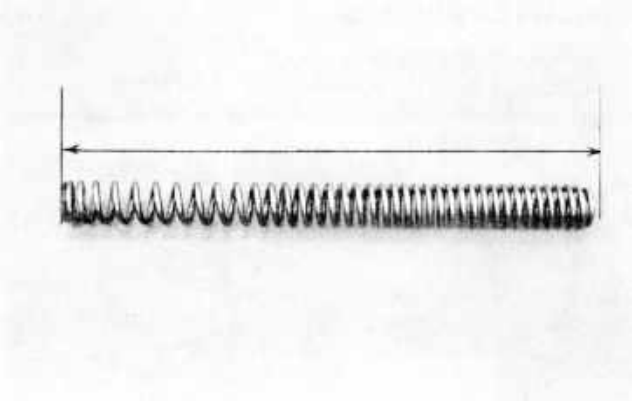
Set the front shock absorber tube in a vise.
Remove the top nut, shock spring, damper, and damper spring from the front shock absorber tube.

* • When holding the shock absorber tube, place a shop towel to protect it and do apply too much force .

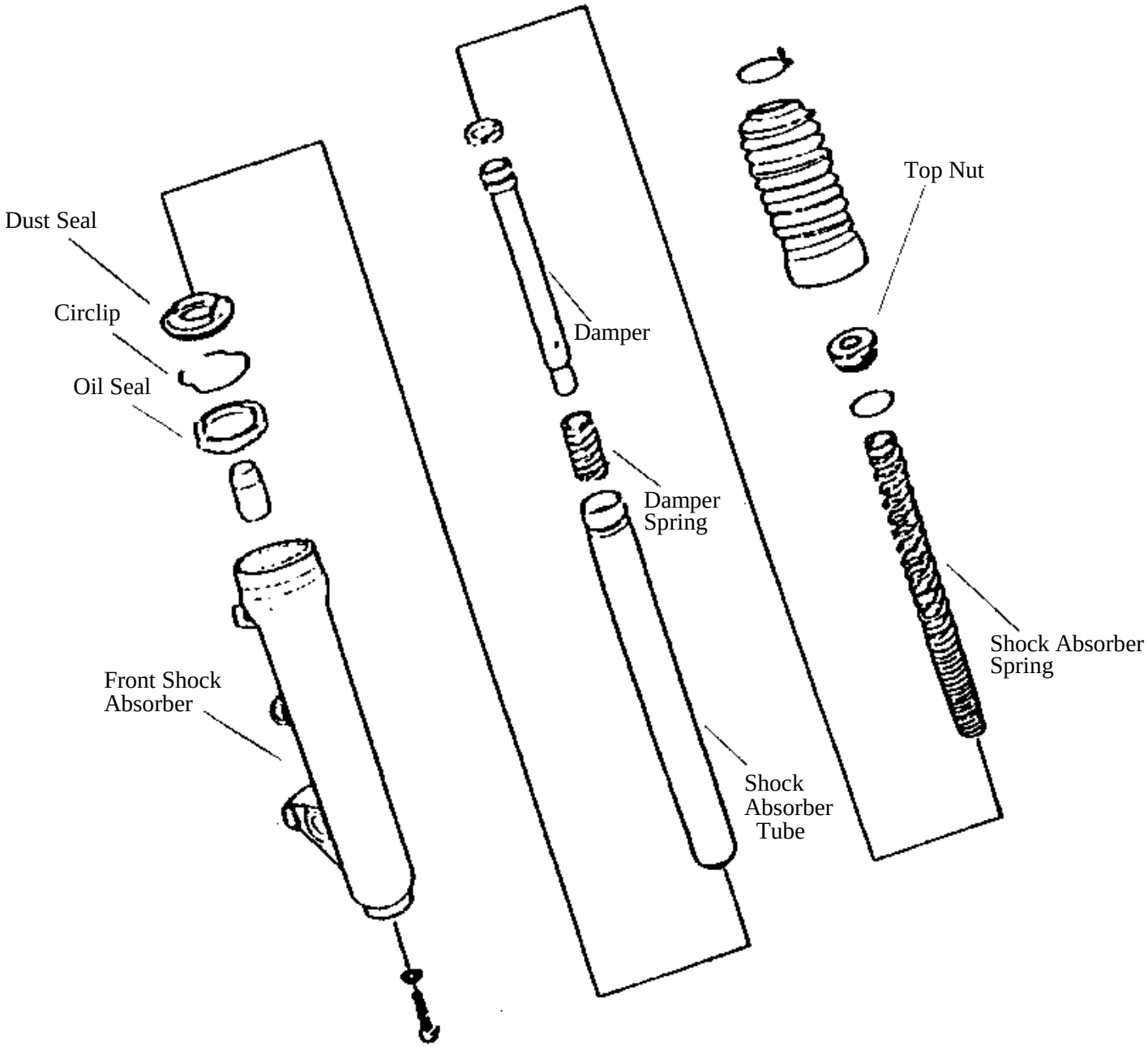


Measure the front shock absorber spring free length.

Service Limits: Right : 206.4mm
Left : 206.4mm



ASSEMBLY



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

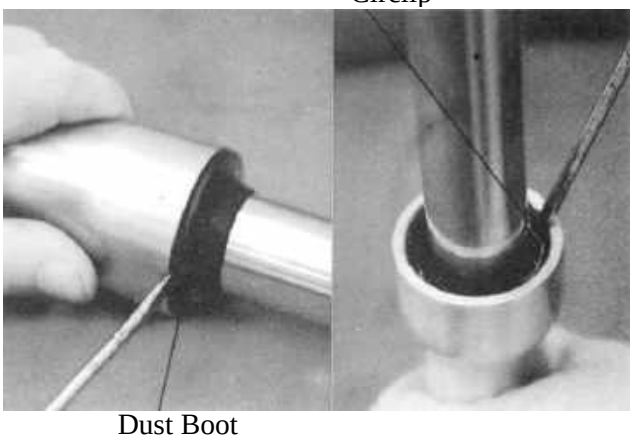
* Install the front shock absorber spring with the closely wound coils facing down.

Set the front shock absorber in a vise.
Insert the shock absorber tube into the shock absorber and tighten the hex bolt.
(Apply locking agent to the washer and install it together with the hex bolt.)
Torque: 3.0kgf-m

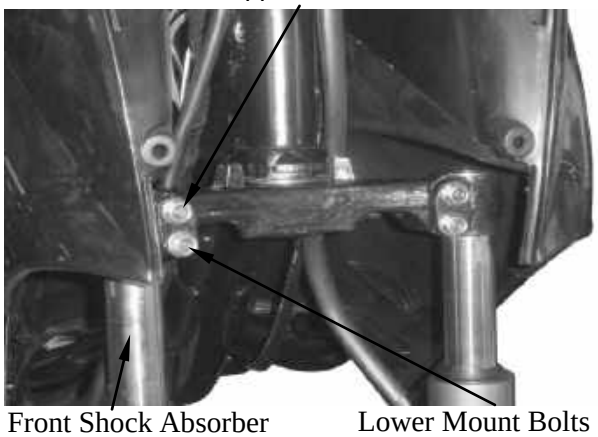
Add engine oil into the front shock absorber.

Specified Oil: SS#8

Oil Capacity: 38±1cc



Install the circlip.
Install the dust boot.



INSTALLATION

Install the front shock absorbers onto the steering stem.
Install and tighten the front shock absorber upper mount bolts.
Tighten the lower mount bolts.

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

Install the front wheel. (⇨12-7)

FRONT FORK

REMOVAL

Remove the steering handlebar. (⇨12-3)
Remove the front wheel. (⇨12-4)
Disconnect the speedometer cable.
Remove the steering stem lock nut using long socket wrench.

Special

Long Socket Wrench,32mm 8Angle

Long Socket Wrench

Lock Nut Wrench

Remove the top cone race and remove the steering stem.

* • Be careful not to lose the steel balls (26 on top race and 29 on bottom race).

Inspect the ball races and cone races for wear or damage and replace if necessary.

.

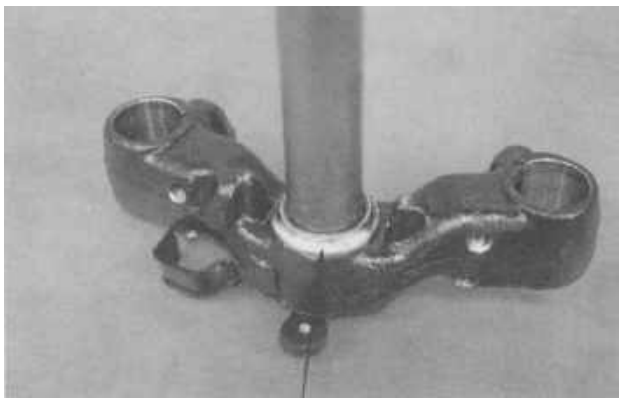
Top Cone Race

BOTTOM CONE RACE REPLACEMENT

Remove the bottom cone race using a chisel.

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

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

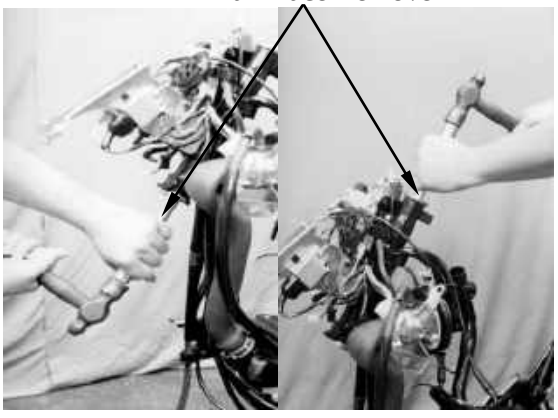


Bottom Cone Race

BALL RACE REPLACEMENT

Drive out the top and bottom ball races.

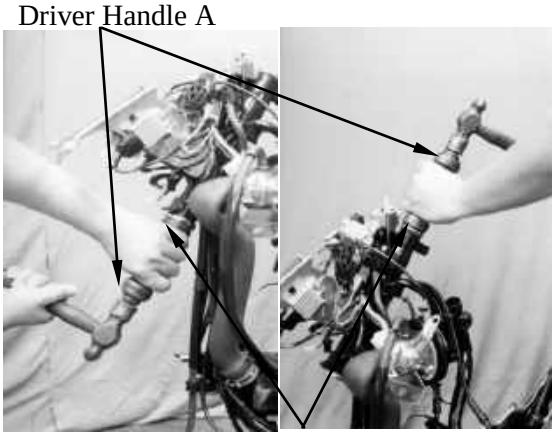
Ball Race Remover



Drive new top and bottom ball races into the steering head using the outer driver.

* Be sure to completely drive in the ball races.

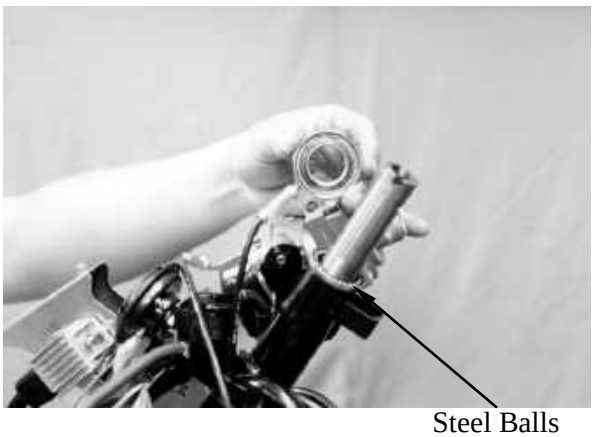
Driver Handle A



Outer Driver, 37x40mm

INSTALLATION

Apply grease to the top and bottom ball races and install 26 steel balls on the top ball race and 29 steel balls on the bottom ball race.
Apply grease to the ball races and install the front fork.



Steel Balls

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

* Check that the steering stem rotates freely without vertical play.

Top Cone Race

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

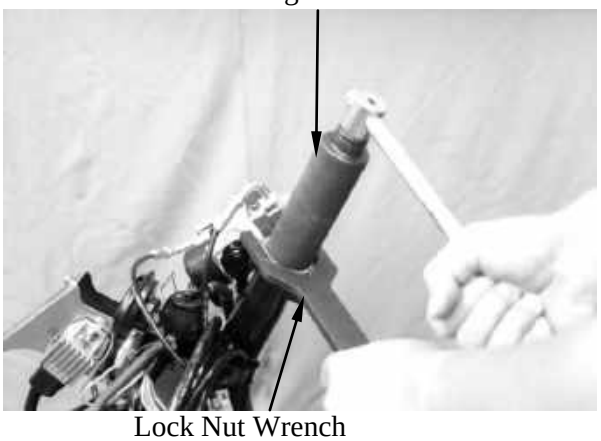
Torque: 6.0～8.0kgf-m

Install the front wheel. (⇨12-7)
Install the steering handlebar. (⇨12-3)
Install the speedometer cable. (⇨12-7)

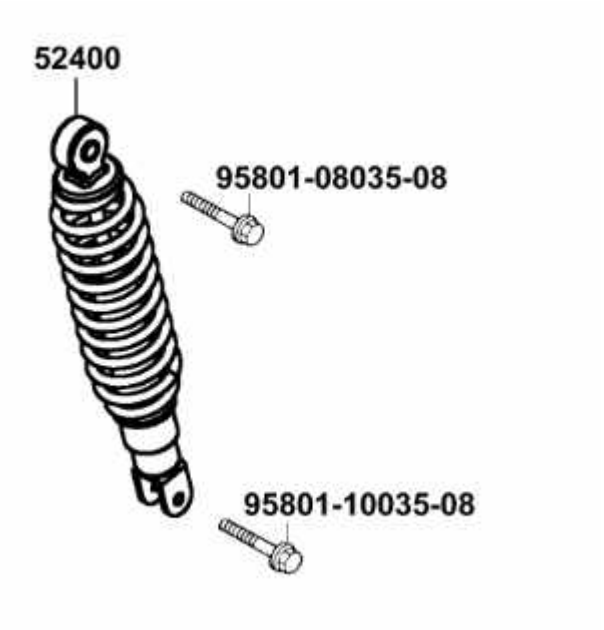
Special

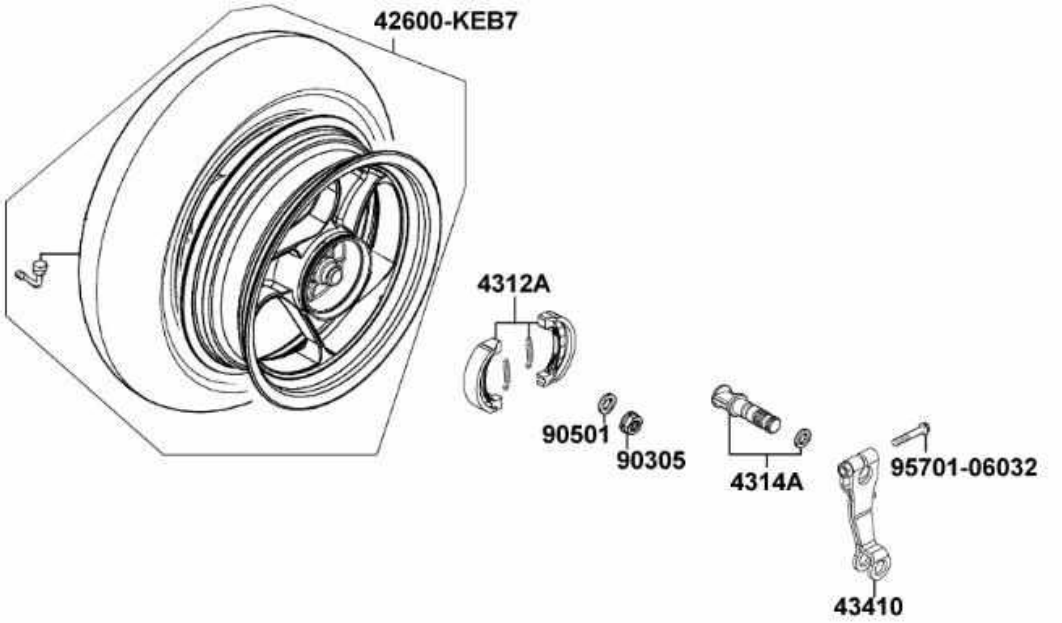
Long Socket Wrench,32mm 8Angle

Long Socket Wrench



Lock Nut Wrench


52400
95801-08035-08
95801-10035-08


42600-KEB7
4312A
90501
90305
4314A
95701-06032
43410

13

SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIFICATIONS

Item			Standard (mm)	Service Limit (mm)
Rear wheel	Rim runout	Radial	—	2.0
		Axial	—	2.0
	Rear brake drum I.D		110	111
Rear brake lining thickness			4.0	2.0
Rear shock absorber spring free length			227	220

TORQUE VALUES

Rear axle nut	11~13kgf-m
Rear shock absorber upper mount bolt	3.5~4.5kgf-m
Rear shock absorber lower mount bolt	2.4~3.0kgf-m
Exhaust muffler joint lock nut	1.0~1.4kgf-m
Exhaust muffler lock bolt	3.0~3.6kgf-m

Special Tool
Cushion Assemble & Disassemble Tool

TROUBLESHOOTING

Rear wheel wobbling
- Bent rim
- Faulty tire
- Axle not tightened properly

Soft rear shock absorber
- Weak shock absorber spring
- Faulty damper

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

REAR WHEEL

REMOVAL

Remove the exhaust muffler. (⇨2-5)
Remove the rear axle nut.
Remove the rear wheel.
.

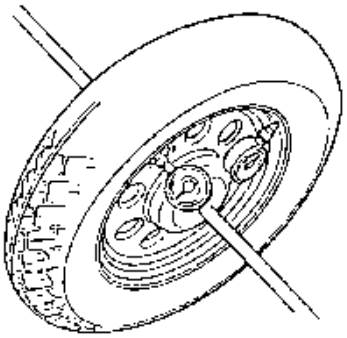
INSPECTION

Measure the rear wheel rim runout.

Service Limits:

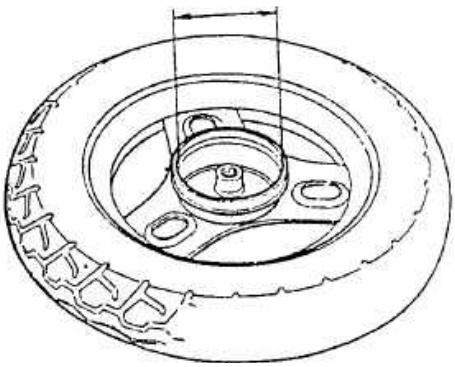
Radial: 2.0mm replace if over

Axial: 2.0mm replace if over



Inspect the rear brake drum.
Measure the rear brake drum I.D.

Service Limits: 130mm replace if over



INSTALLATION

Install the rear wheel in the reverse order of removal.
Tighten the rear axle nut.
Torque: 11.0-13.0kg-m
Install the exhaust muffler.
Torque:
Exhaust muffler joint lock nut: 1.0~1.4kgf-m
Exhaust muffler lock bolt: 3.0~3.6kgf-m

* First install and tighten the exhaust muffler joint lock nuts and then the exhaust muffler lock bolts.

REAR BRAKE

BRAKE LINING INSPECTION

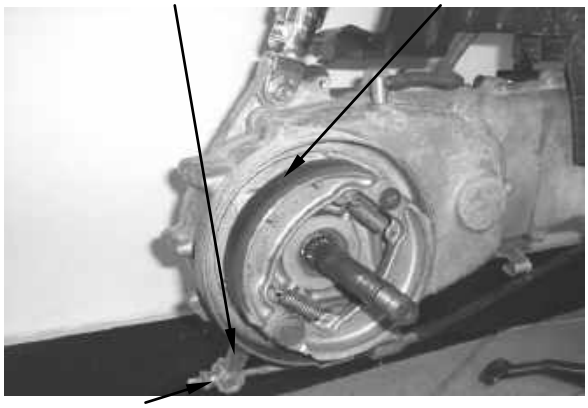
Measure the brake lining thickness.

Service Limit: 2.0mm replace if below

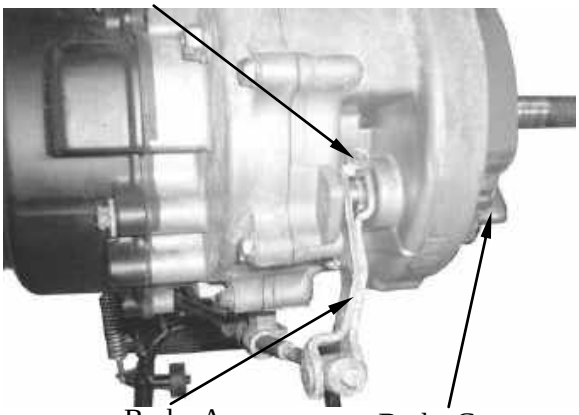
* Keep oil or grease off the brake linings.

REAR BRAKE DISASSEMBLY

Remove the rear brake adjusting nut and disconnect the rear brake cable.
Remove the rear brake shoes.

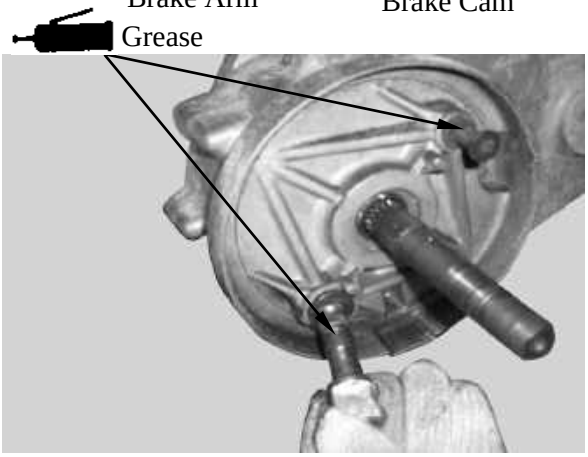


Remove the brake arm bolt to remove the brake arm.
Remove the brake cam.



REAR BRAKE ASSEMBLY

Apply grease to the anchor pin.
Apply grease to the brake cam and install it.
Install the brake shoes.

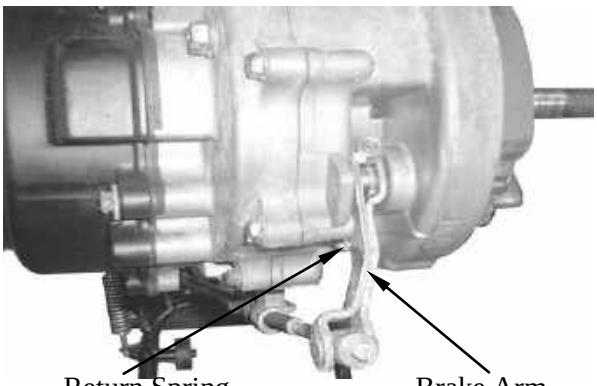


Apply a small amount of engine oil to the felt seal and install it to the brake cam.
Install the brake arm.

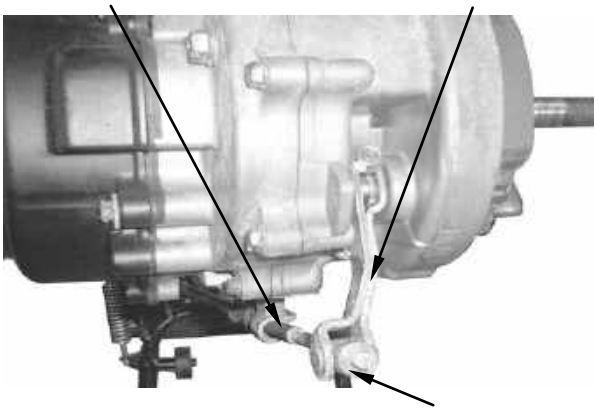
* Align the wide groove on the wear indicator plate with the wide tooth of the brake cam.

Install and tighten the brake arm bolt.

* Align the scribed line on the brake arm with the punch mark on the brake cam.



Install the brake arm return spring.
Install the brake arm pin.
Connect the brake cable and install the adjusting nut.
Install the rear wheel. (⇨13-2)
Adjust the rear brake lever free play. (⇨3-8)

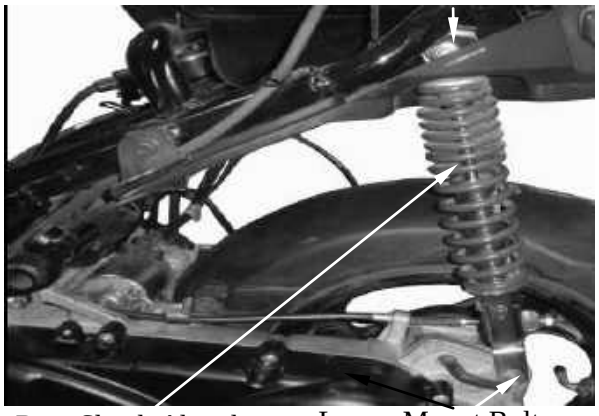


LEFT REAR SHOCK ABSORBER

REMOVAL

Remove the frame body cover. (⇨2-3)
Remove the air cleaner case. (⇨5-19)

Remove the rear shock absorber upper and lower mount bolts.
Remove the rear shock absorber.



DISASSEMBLY

Install the rear shock absorber compressor as the figure shown.

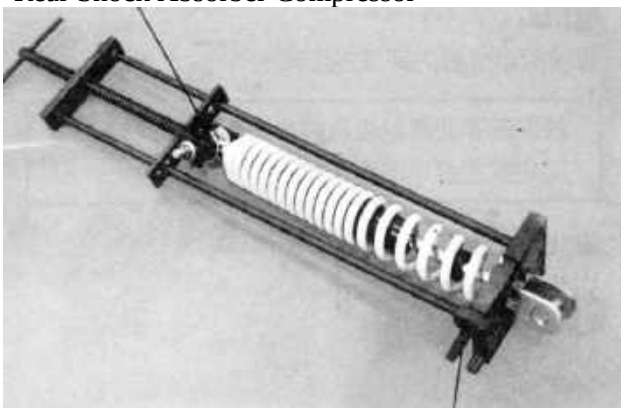
* Install the rear shock absorber lower joint into the rear shock absorber compressor.

Compress the rear shock absorber spring.

Special

Cushion Assemble & Disassemble Tool

Rear Shock Absorber Compressor

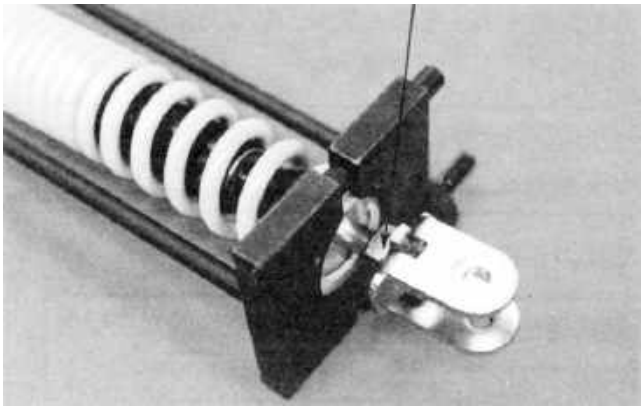


Cushion Assemble & Disassemble Too

INSPECTION

Inspect the damper rod for bending or damage.
Inspect the damper for oil leaks.
Inspect the damper rubber for deterioration or damage.

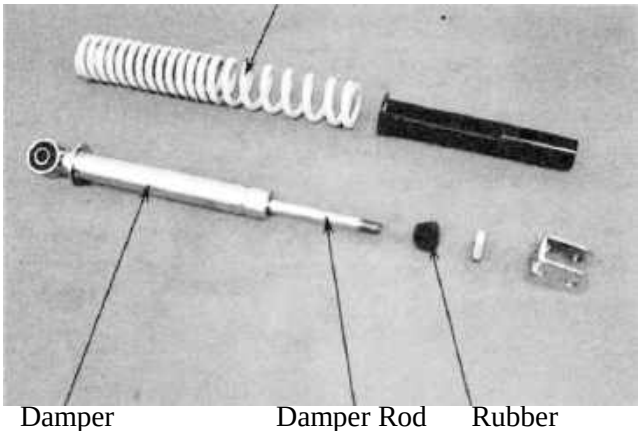
Lock Nut



Measure the rear shock absorber spring free length.

Service Limit: 210mm replace if over

Spring



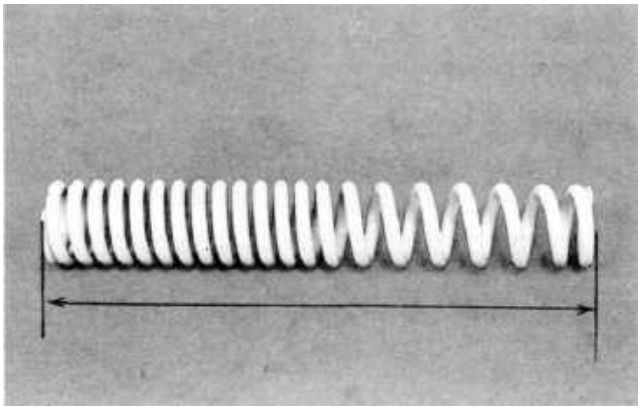
Damper Damper Rod Rubber

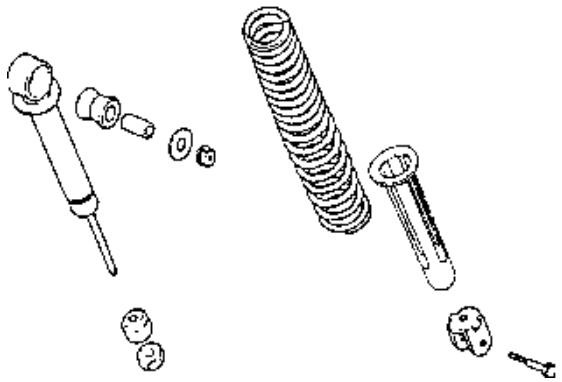
ASSEMBLY

Assemble the rear shock absorbers in the reverse order of disassembly.

*

- Install the shock absorber spring with loosely wound coils facing down.
- Apply locking agent to the lock nut threads and tighten the lock nut.





INSTALLATION

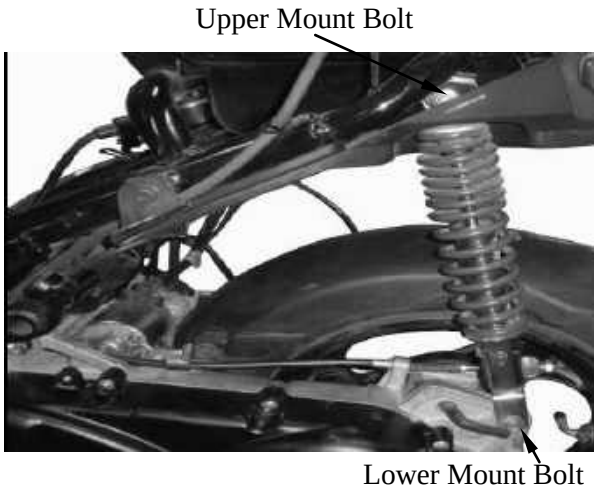
Install the rear shock absorber.
Install the rear shock absorber upper mount bolt and then the lower mount bolt.
Tighten the bolts.

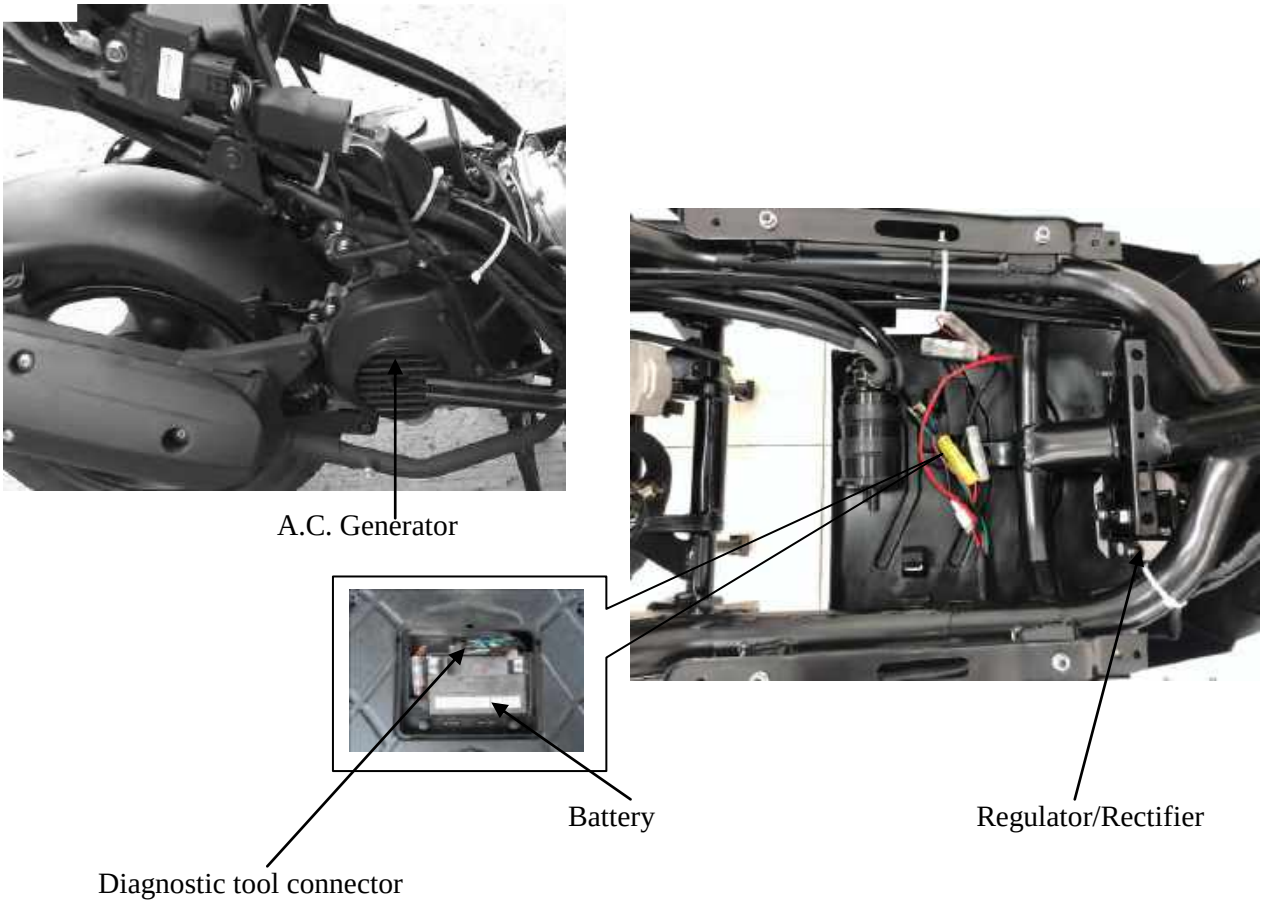
Torque:

Upper Mount Bolt: 3.5~4.5kgf-m

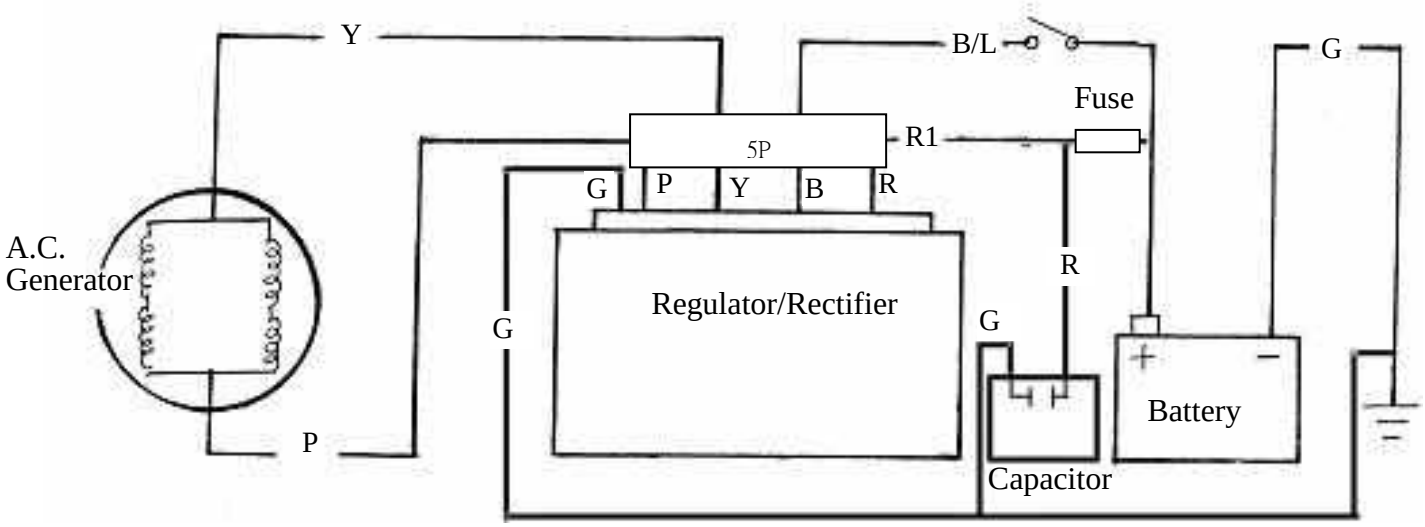
Lower Mount Bolt: 2.4~3.0kgf-m

Install the air cleaner case. (⇨5-15)
Install the frame body cover. (⇨2-3)




A.C. Generator
Battery
Regulator/Rectifier
Diagnostic tool connector

14


Y
B/L
G
Fuse
5P
R1
G
P
Y
B
R
A.C.
Generator
Regulator/Rectifier
R
G
G
Battery
P
Capacitor

SERVICE INFORMATION

GENERAL INSTRUCTIONS

The battery electrolyte (sulfuric acid) is poisonous and may seriously damage the skin and eyes. Avoid contact with skin, eyes, or clothing. In case of contact, flush with water and get prompt medical attention

- The battery can be charged and discharged repeatedly. If a discharged battery is not used for a long time, its service life will be shortened. Generally, the capacity of a battery will decrease after it is used for 2～3 years. A capacity-decreased battery will resume its voltage after it is recharged but its voltage decreases suddenly and then increases when a load is added.
- When a battery is overcharged, some symptoms can be found. If there is a short circuit inside the battery, no voltage is produced on the battery terminals. If the rectifier won't operate, the voltage will become too high and shorten the battery service life.
- If a battery is not used for a long time, it will discharge by itself and should be recharged every 3 months.
- A new battery filled with electrolyte will generate voltage within a certain time and it should be recharged when the capacity is insufficient. Recharging a new battery will prolong its service life.
- Inspect the charging system according to the sequence specified in the Troubleshooting.
- Do not disconnect and soon reconnect the power of any electrical equipment because the electronic parts in the regulator/rectifier will be damaged. Turn off the ignition switch before operation.
- It is not necessary to check the MF battery electrolyte or fill with distilled water.
- Check the load of the whole charging system.
- Do not quick charge the battery. Quick charging should only be done in an emergency.
- Remove the battery from the motorcycle for charging.
- When replacing the battery, do not use a traditional battery.
- When charging, check the voltage with an voltmeter.

SPECIFICATIONS

Item			Standard	
Battery	Capacity/Model		12V–6AH	
	Voltage (20℃)	Fully charged	13.1V	
		Undercharged	12.3V	
	Charging current		STD: 0.4A Quick: 4.0A	
	Charging time		STD: 5～10hr Quick: 30min	
A.C. Generator	Capacity		0.144KW/5000rpm	
	Charging coil resistance (20℃)		Yellow～Peach	0.1～1.0Ω
Regulator/Rectifier	Type		Single-phase full-wave SCR	
	Limit voltage			
		Charging	14.0±0.5V/5000rpm	
Resistor	Resistance (20℃)		5W5Ω	

TORQUE VALUES

Pulser coil bolt	0.45~0.6kgf-m
Stator bolt	0.8~1.2kgf-m
Flywheel nut	3.5~4.5kgf-m
Cooling fan bolt	0.8~1.2kgf-m

SPECIAL TOOLS

Universal holder
Flywheel puller

TESTING INSTRUMENTS

Kowa electric tester
Sanwa electric tester

TROUBLESHOOTING

No power

- Dead battery
- Disconnected battery cable
- Fuse burned out
- Faulty ignition switch

Low power

- Weak battery
- Loose battery connection
- Charging system failure
- Faulty regulator/rectifier

Intermittent power

- Loose battery cable connection
- Loose charging system connection
- Loose connection or short circuit in lighting system

Charging system failure

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

BATTERY

REMOVAL

Remove the battery cover screws on the floor board.
Open the battery cover and remove the battery by removing the bolt and band.
First disconnect the battery negative (-) cable and then the positive (+) cable.

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

The installation sequence is the reverse of removal.

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

BATTERY VOLTAGE (OPEN CIRCUIT VOLTAGE) INSPECTION

Remove the floor board.
Open the battery cover and disconnect the battery cables.
Measure the voltage between the battery terminals.
Fully charged : 13.1V
Undercharged: 12.3V max.

> * Battery charging inspection must be performed with a voltmeter.

CHARGING

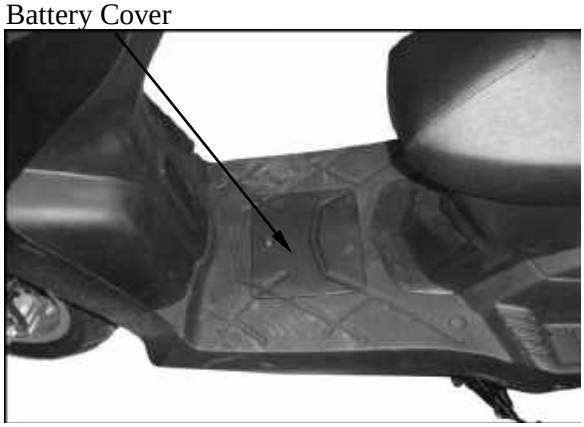
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (-) cable to the battery negative (-) terminal.

> • 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.

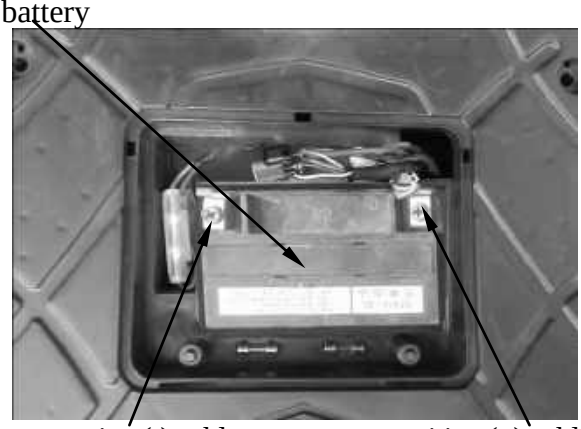
> * • Quick charging should only be done in an emergency.
> • Measure the voltage 30 minutes after the battery is charged.

Charging current: Standard : 0.4A
Quick : 4A
Charging time : Standard : 5～10 hours
Quick : 30 minutes
After charging: Open circuit voltage: 12.8V min.
Note: The battery temperature should not exceed 45℃ during charging.

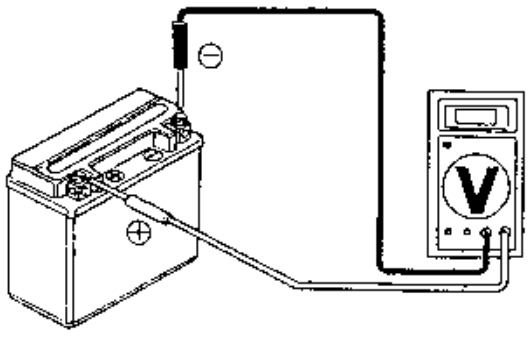
Battery Cover

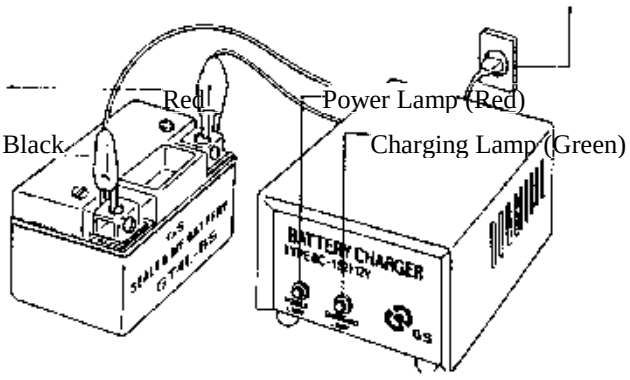


battery



negative (-) cable positive (+) cable





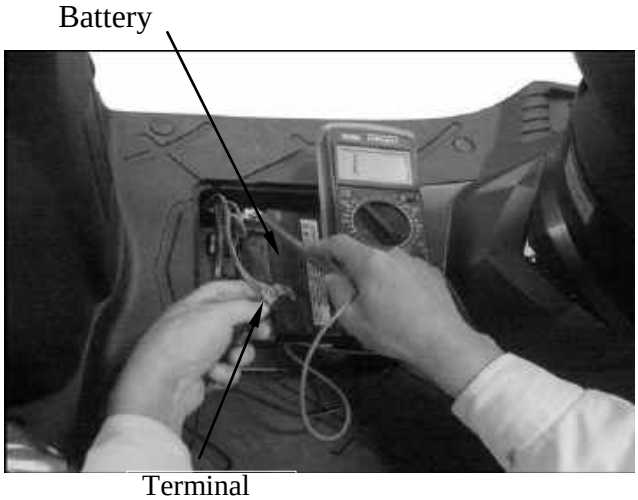
CHARGING SYSTEM

SHORT CIRCUIT TEST

Disconnect the ground wire from the battery and connect an ammeter across the battery negative (-) terminal and the ground wire. Turn the ignition switch OFF and check for short circuit.

* Connect the electric tester positive (+) terminal to ground wire and the tester negative (-) terminal to the battery negative (-) terminal.

If any abnormality is found, check the ignition switch and wire harness for short circuit .

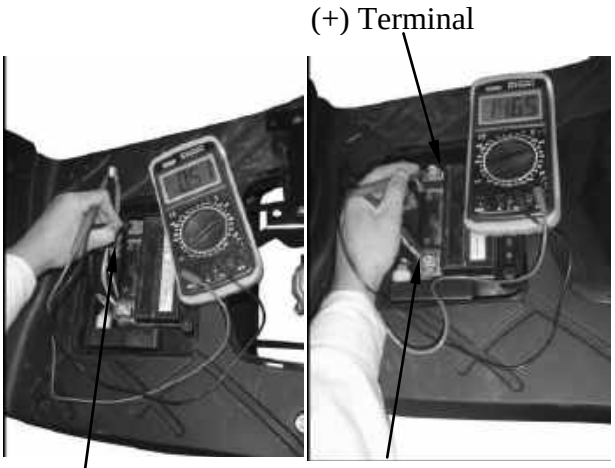


CURRENT TEST

This inspection must be performed with an electric tester when the battery is fully charged.
Warm up the engine for inspection.
Connect the electric tester across the battery terminals. Disconnect the fuse and connect an ammeter between the fuse terminals.
Attach a tachometer to the engine.
Start the engine and gradually increase the engine speed to measure the limit voltage and current.

Limit Voltage/Current: 14～15V/0.5A max.
(5000rpm max.)

If the limit voltage is not within the specified range, check the regulator/rectifier. (⇨14-5)



REGULATOR/RECTIFIER

INSPECTION

Remove the met-in box.

Remove the regulator/rectifier wire coupler.

Check the continuity between the wire terminals.

Normal Direction:Continuity

	(+)Probe	(-)Probe
I	Yellow	Green
II	Red	Yellow

Reverse Direction：No Continuity

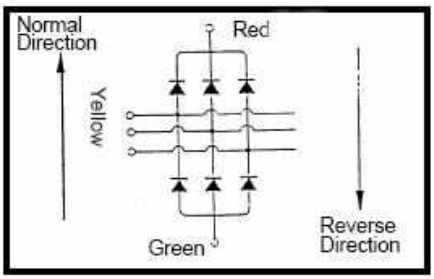
	(+)Probe	(-)Probe
I	Green	Yellow
II	Yellow	Red

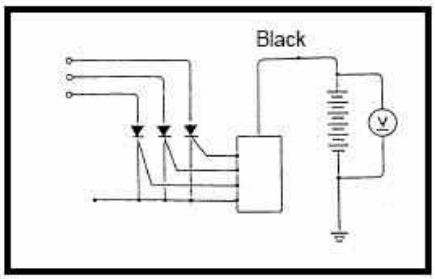
VOLTAGE REGULATION TEST

Connect a coltmeter across the battery terminals.

Start the engine and gradually increase the engine speed to 5000 rpm.

The battery terminal voltage should be within 14.0v~15.0V.





A.C. GENERATOR CHARGING COIL

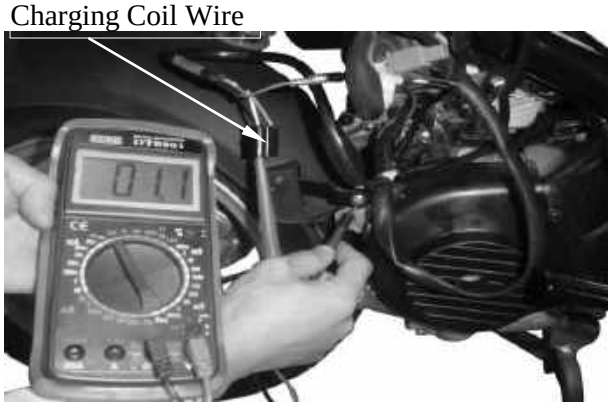
* The inspection of A.C. generator charging coil can be made with the engine installed.

INSPECTION

Disconnect the A.C. generator 2P connector. Measure the resistance between the A.C. generator white wire and engine ground with an electric tester.

Standard: 0.1～1.0Ω(at 20℃)

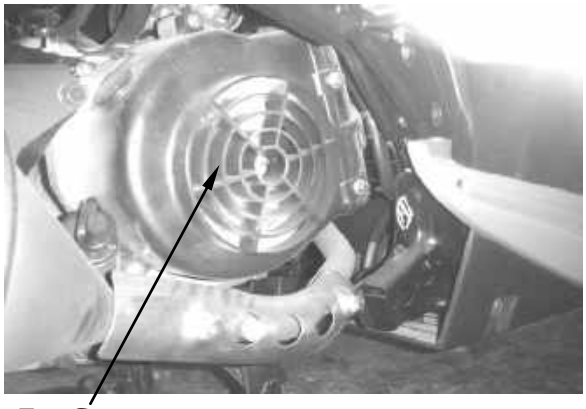
Replace the A.C. generator charging coil if the reading is not within the specifications.



A.C. GENERATOR

REMOVAL

Remove the right side cover. (⇨2-4)
Remove the four bolts attaching the cooling fan cover to remove the fan cover.



Remove the cooling fan by removing the four cooling fan attaching bolts.

Hold the flywheel with an universal holder.
Remove the flywheel nut.

Special

Universal Holder

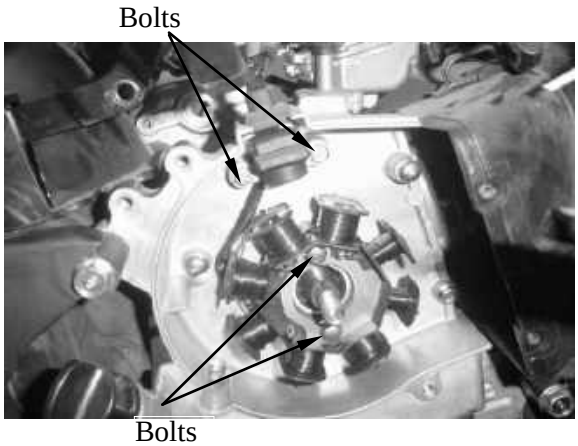
Remove the A.C. generator flywheel using the flywheel puller.
Remove the woodruff key.

Special

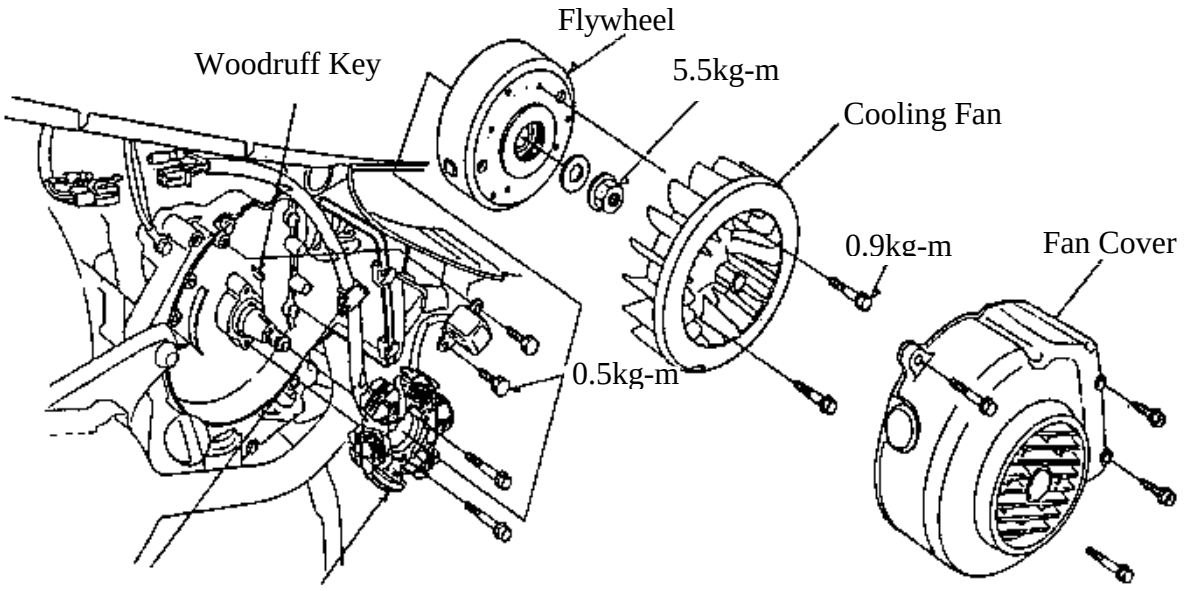
Flywheel Puller

Remove the A.C. generator wire connector.

Remove the A.C. generator wire set plate.
Remove the pulser coil bolts.
Remove the A.C. generator wire rubber sleeve and pulser coil from the right crankcase.
Remove the two bolts and A.C. generator stator.



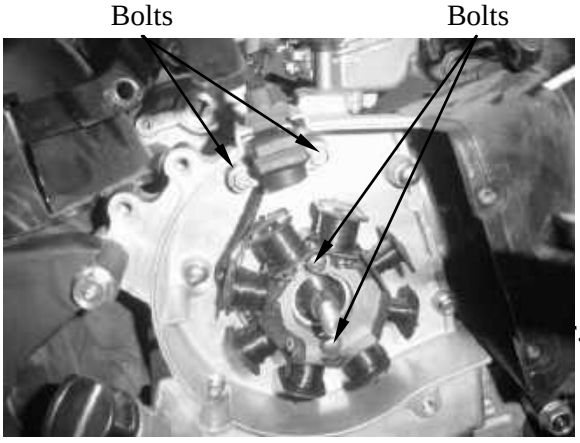
A.C. GNERATOR INSTALLATION



Install the A.C. generator stator and pulser coil onto the right crankcase.
Tighten the stator and pulser coil bolts.

Torques: Pulser Coil : 0.45~0.6kgf-m
Stator : 0.8~1.2kgf-m

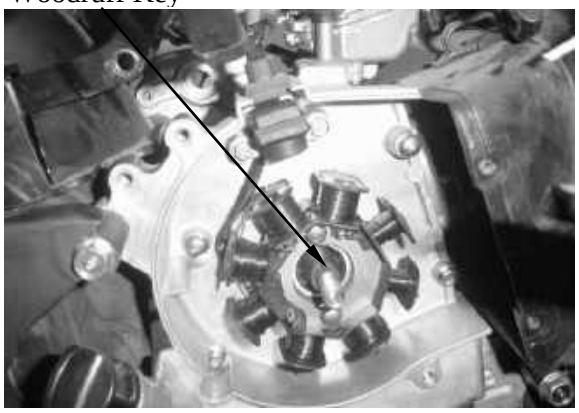
Install the A.C. generator wire rubber sleeve and A.C. generator wire set plate.



Clean the taper hole in the flywheel off any burrs and dirt.
Install the woodruff key in the crankshaft keyway.

A.C. Generator Wire Connector

Woodruff Key



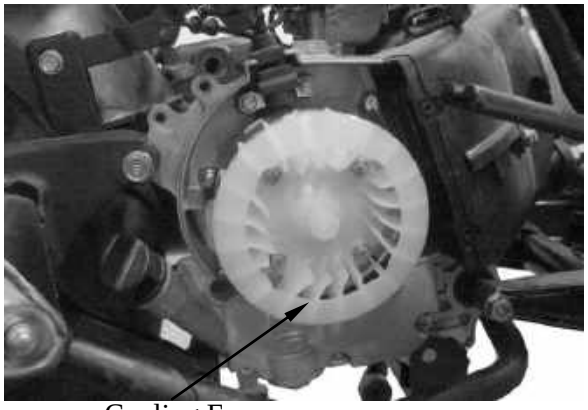
Install the flywheel onto the crankshaft with the flywheel hole aligned with the crankshaft woodruff key.

* The inside of the flywheel is magnetic. Make sure that there is no bolt or nut before installation.

Hold the flywheel with the universal holder and tighten the flywheel nut.
Torque: 3.5~4.5kgf-m

Universal Holder

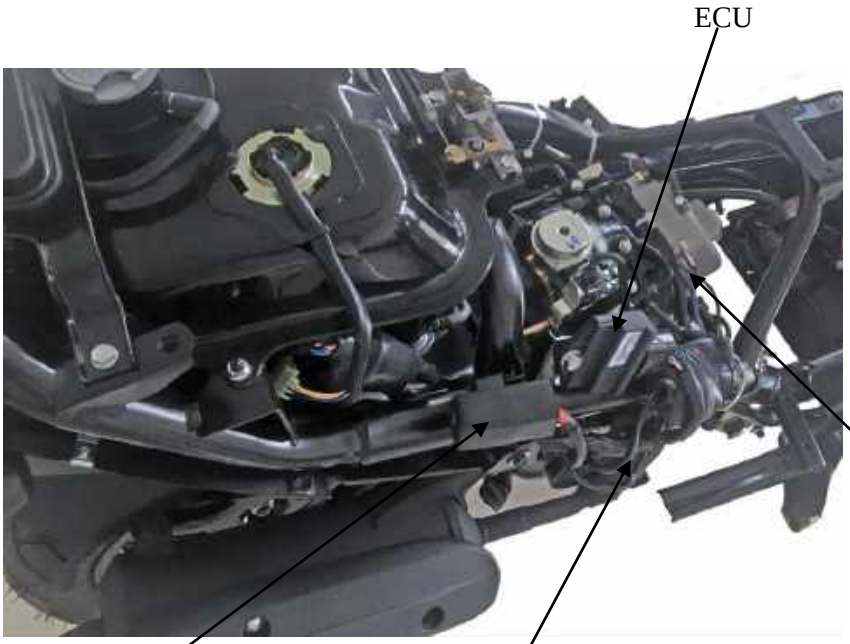
Special
Universal Holder
Install the cooling fan.
Torque: 0.8~1.2kgf-m

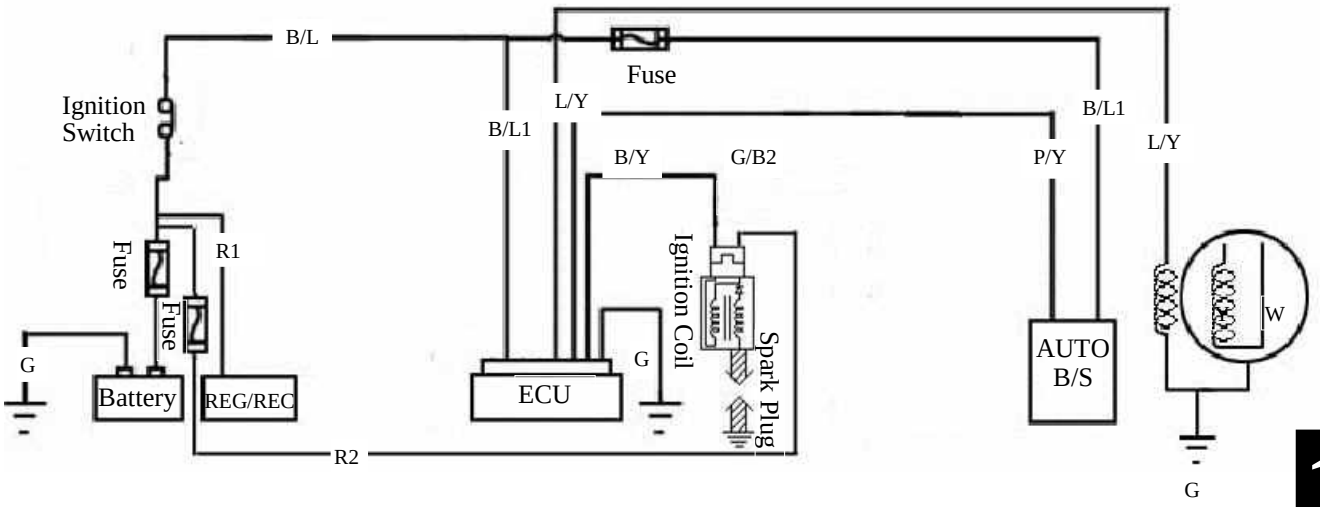


Cooling Fan

Install the fan cover.
Install the right side cover. (⇨2-4)

15. IGNITION SYSTEM





15

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Check the ignition system according to the sequence specified in the Troubleshooting. (⇨15-2)
- The ignition system adopts ECU and the ignition timing cannot be adjusted.
- If the timing is incorrect, inspect the ECU and A.C. generator and replace any faulty parts. Inspect the ECU with a ECU tester
- Loose connector and poor wire connection are the main causes of faulty ignition system. Check each connector before operation.
- Use of spark plug with improper heat range is the main cause of poor engine performance.
- The inspections in this section are focused on maximum voltage. The inspection of ignition coil resistance is also described in this section.
- Inspect the ignition switch according to the continuity table specified in page 17-3.
- Inspect the spark plug referring to Section 3.
- Remove the A.C. generator and pulser coil referring to Section 14.

SPECIFICATIONS

Item			Standard
Spark plug	Standard type		(NGK) CR7HSA
	Hot type		(NGK) CR6HSA
	Cold type		(NGK) CR8HSA
Spark plug gap			0.6～0.7mm
Ignition timing	"F" mark Full advance		12° BTDC /2000rpm±100RPM 25° BTDC /5000rpm±100RPM
Ignition coil resistance (20℃)	Primary coil		0.1～1.0Ω
	Secondary coil	with plug cap	7～12KΩ
		without plug cap	3～5KΩ
Pulser coil resistance (20℃)			40～300Ω
Ignition coil primary side max. voltage			12V min.
Pulser coil max. voltage			2.1V min.

TESTING INSTRUMENT

Kowa Electric Tester
or commercially available electric tester with resistance over 10MΩ/CDV

TROUBLESHOOTING

High voltage too low
- Weak battery or low engine speed
- Loose ignition system connection
- Faulty ignition coil
- Faulty ECU
- Faulty pulser coil

Intermittent high voltage
- Faulty ignition switch
- Poorly connected ECU coupler
- Poorly connected or broken ECU ground wire
- Faulty pulser coil
- Loose high tension wire connection
- Faulty ECU

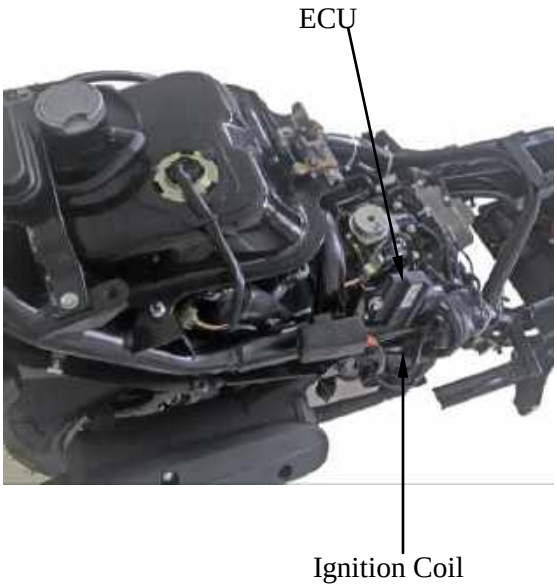
Normal high voltage but no spark at plug
- Faulty spark plug
- Faulty spark plug cap

No high voltage
- Faulty ignition switch
- Dead battery or faulty regulator/rectifier
- Faulty charging circuit
- Faulty ignition coil
- Faulty ECU

No or intermittent high voltage
- Faulty ignition coil
- Weak battery
- Faulty charging system

ECU

ECU is the electronic control unit, and its maximum working voltage to 18 v. ECU is through a 16-bit chip,
The speed signal, oxygen sensor signal, engine temperature sensor signal, trigger signal, such as internal control logic rocessing,
realize the ignition coil, solenoid valve, warning lamp etc.



IGNITION COIL

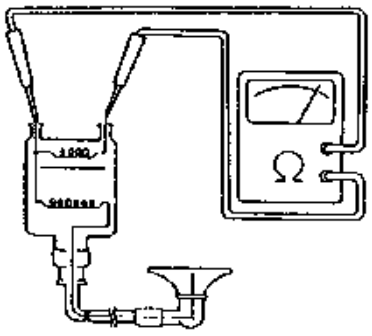
REMOVAL

Remove the met-in box. (⇨2-3)
Remove the spark plug cap.
Disconnect the ignition coil wires and remove the ignition coil bolt and ignition coil.

INSPECTION

CONTINUITY TEST

* The ECU is not adjustable. If the timing is incorrect, inspect the ECU, pulser coil and A.C. generator and replace any faulty parts.



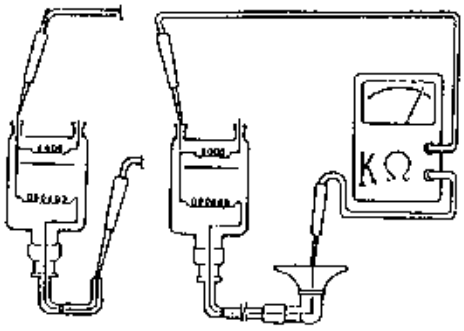
Measure the resistance between the ignition coil primary coil terminals.

Resistance: 0.1～1.0Ω

Measure the secondary coil resistances with and without the spark plug cap.

Resistances:

(with plug cap) : 7～12KΩ
(without plug cap) : 3～5KΩ



* Correctly operate the tester following the manufacturer‘s instructions.

PULSER COIL

INSPECTION

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

Remove the frame body cover. (⇨2-3)
Disconnect the A.C. generator connector.


Pulser Coil Coupler

Measure the pulser coil resistance between the blue/yellow and green wire terminals.
Resistance: 80～160Ω
Refer to page 14-6 for the A.C. generator removal.

IGNITION TIMING INSPECTION

* The ECU is not adjustable. If the ignition timing is incorrect, inspect the ECU, pulser coil and A.C. generator and replace any faulty parts.

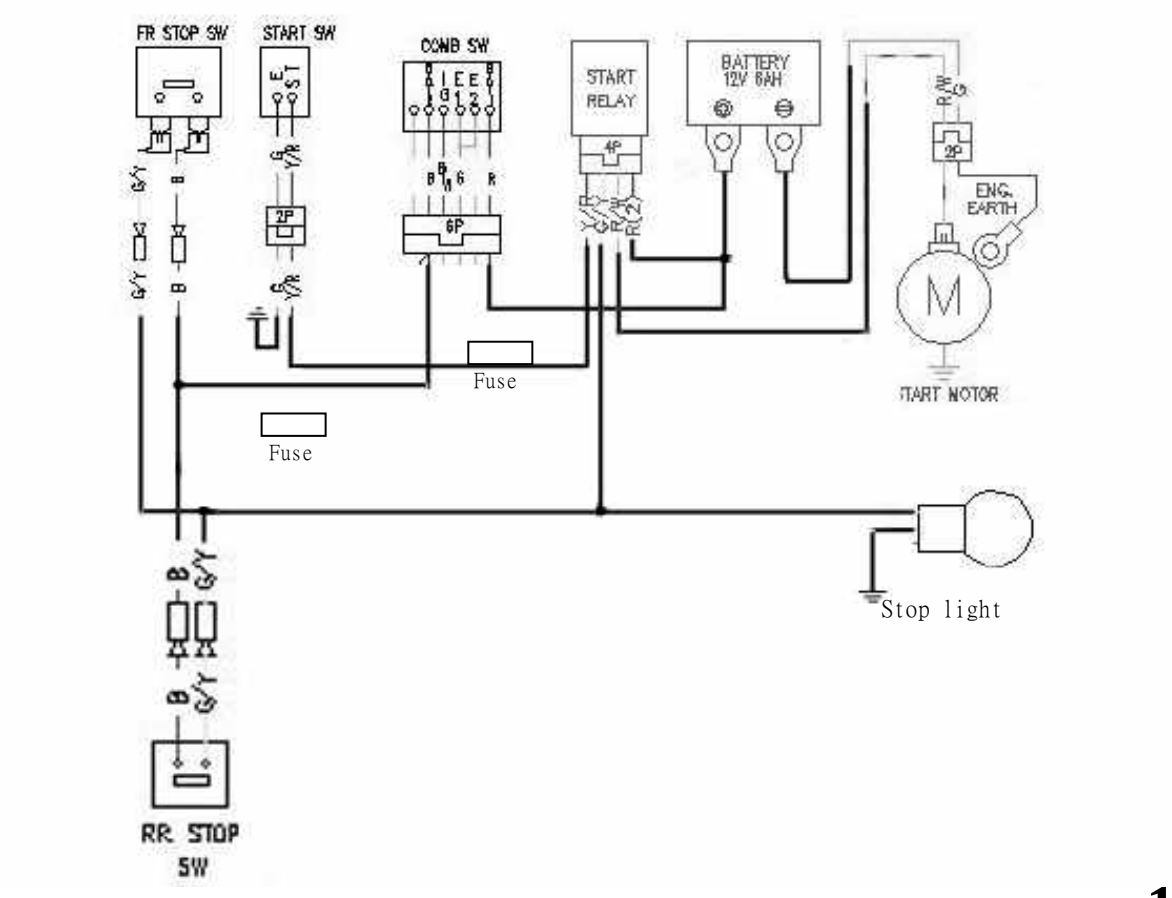
Remove the timing hole cap.

Timing Hole Cap


Warm up the engine and check the ignition timing with a timing light.
When the engine is running at the ignition timing is correct if the "F" mark aligns with the index mark within ±2°.
Ignition Timing: BTDC28°/4000rpm


"F" Mark

16. STARTING SYSTEM



16. STARTING SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The removal of starter motor can be accomplished with the engine installed.

SPECIFICATIONS

Item	Standard (mm)	Service Limit (mm)
Starter motor brush length	12.5	8.5

TROUBLESHOOTING

- Faulty ignition switch
- Faulty starter clutch
- Faulty front or rear stop switch
- Faulty starter relay

Starter motor won‘t turn

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

Starter motor rotates but engine does not start

- Foreign matter stuck in starter motor or gear

Lack of power

- Weak battery
- Loose wire or connection
- Faulty starter clutch
- Starter motor rotates reversely
- Weak battery

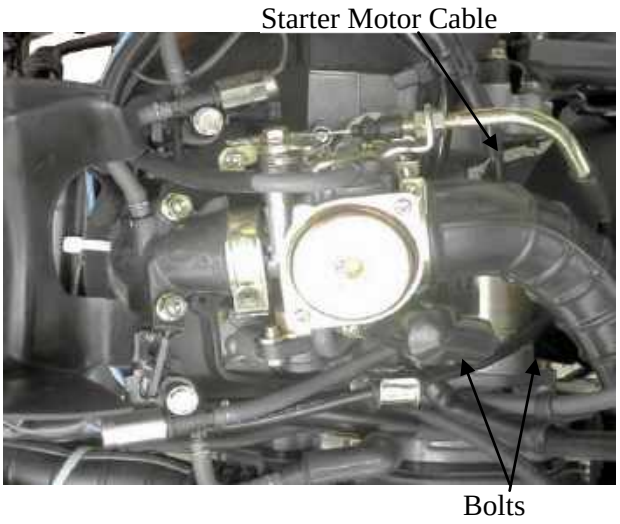
STARTER MOTOR

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.

Rfmove the mrt-in box.

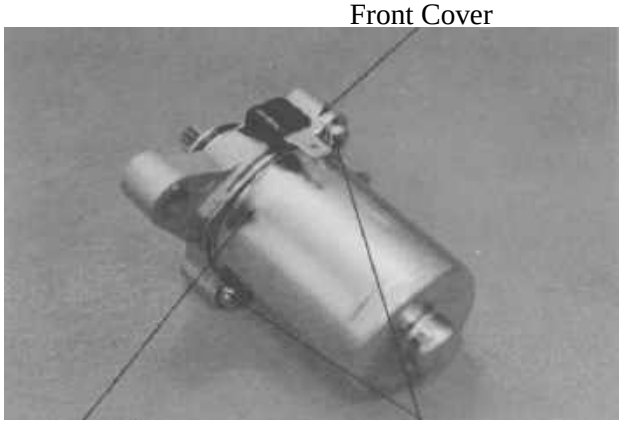
Remove the starter motor cable.
Remove the two starter motor mounting bolts and the motor.



Remove the waterproof rubber jacket and disconnect the starter motor cable connector.

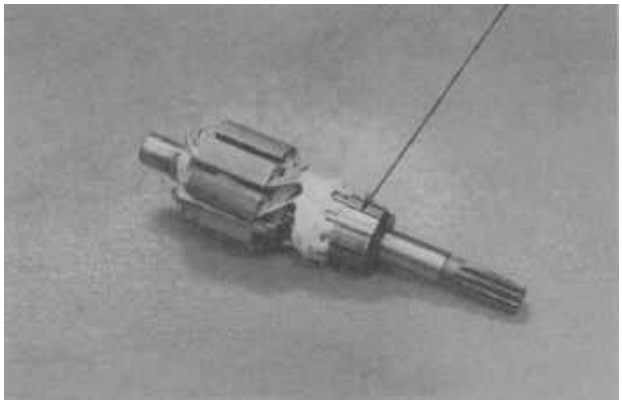
DISASSEMBLY

Remove the two starter motor case screws, front cover, motor case and other parts.

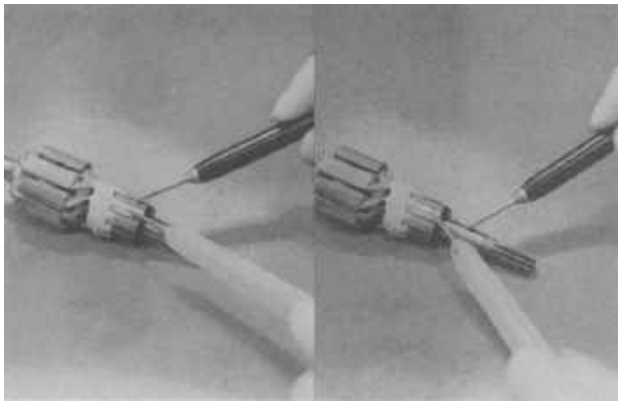


INSPECTION

Inspect the removed parts for wear, damage or discoloration and replace if necessary.
Clean the commutator if there is metal powder between the segments.

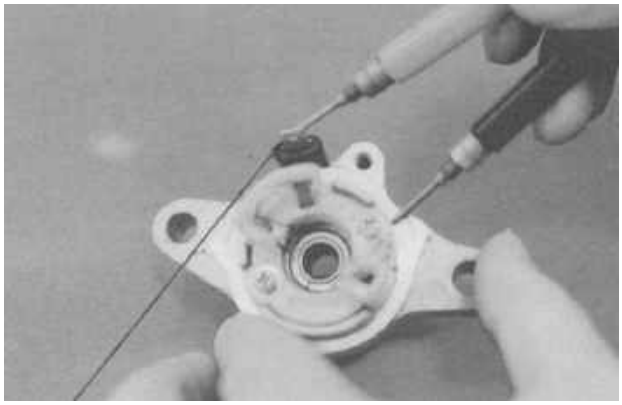


Check for continuity between pairs of the commutator segments and there should be continuity.
Also, make a continuity check between individual commutator segments and the armature shaft. There should be no continuity.



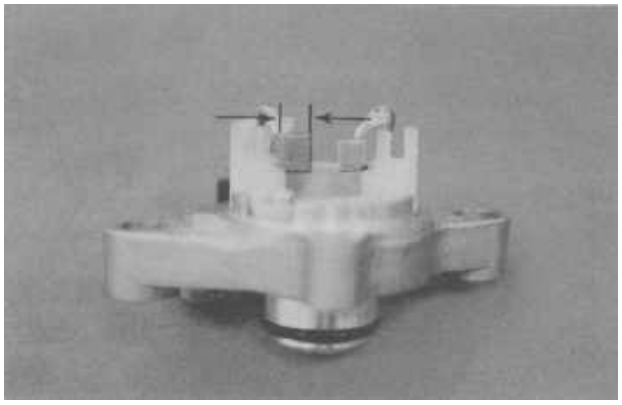
STARTER MOTOR CASE CONTINUITY CHECK

Check to confirm that there is no continuity between the starter motor wire terminal and the motor front cover.
Also check for the continuity between the wire terminal and each brush and there should be continuity.
Replace if necessary.

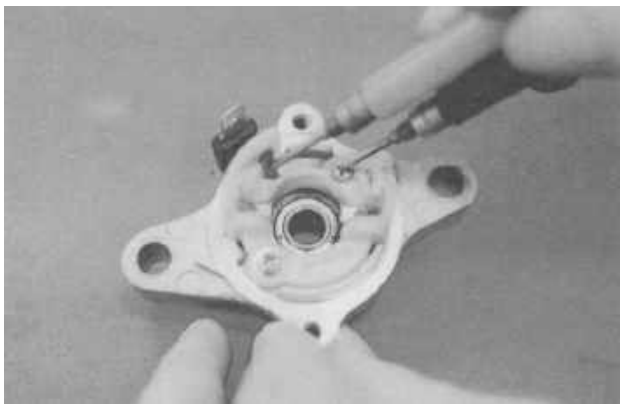


Wire Terminal

Measure the length of the brushes.
Service Limit: 8.5mm replace if below

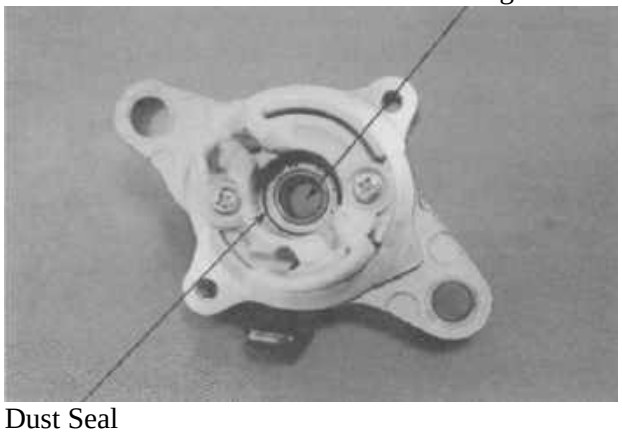


Check for continuity between the brushes. If there is continuity, replace with new ones.



Bearing

Check if the needle bearing in the front cover turns freely and has no excessive play.
Replace if necessary.
Check the dust seal for wear or damage.



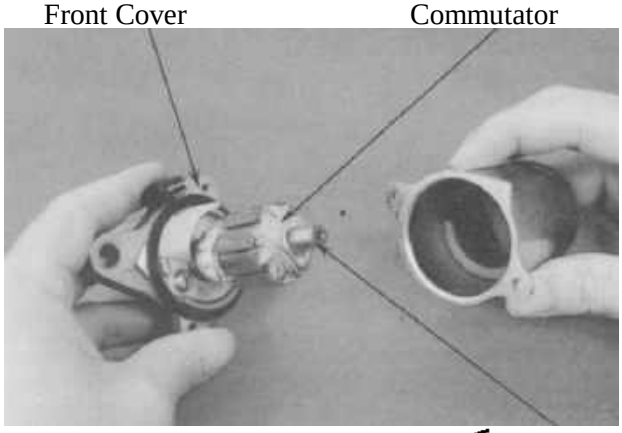
Dust Seal

ASSEMBLY

Apply grease to the dust seal in the front cover.
Install the brushes onto the brush holders.
Apply a thin coat of grease to the two ends of the armature shaft.
Insert the commutator into the front cover.

* • Be careful not to damage the brush and armature shaft mating surfaces.
  • When installing the commutator, the armature shaft should not damage the dust seal lip.

Front Cover Commutator

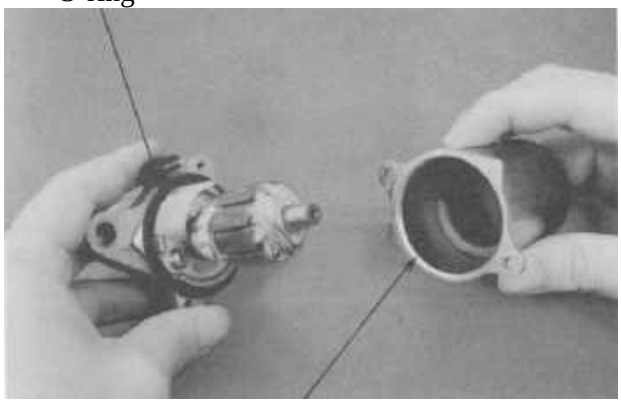


Grease

Install a new O-ring to the front cover.
Install the starter motor case, aligning the tab on the motor case with the tab on the front cover.
Tighten the starter motor case screws.

* When assembling the front cover and motor case, slightly press down the armature shaft to assemble them.

O-ring



Motor Case

STARTER RELAY

INSPECTION

Remove the met-in box.
Remove the battery cover.
Remove the frame body cover. (⇨2-2)
Turn the ignition switch ON and the starter relay is normal if you hear a click when the starter button is depressed.
If there is no click sound:

- Inspect the starter relay voltage
- Inspect the starter relay ground circuit
- Inspect the starter relay operation

Starter Relay

STARTER RELAY VOLTAGE INSPECTION

Place the motorcycle on its main stand.
Measure the voltage between the starter relay connector green/yellow wire (-) and engine ground.
Turn the ignition switch ON and the battery voltage should be normal when the brake lever is fully applied.
If the battery has no voltage, inspect the stop switch continuity and cable.

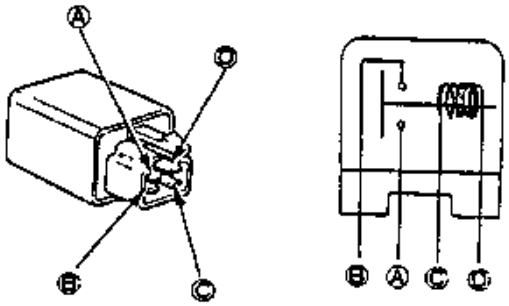
* Turn to the DCV position for the voltage meter, then inspect the starter relay.

Green/Yellow Wire

STARTER RELAY TEST

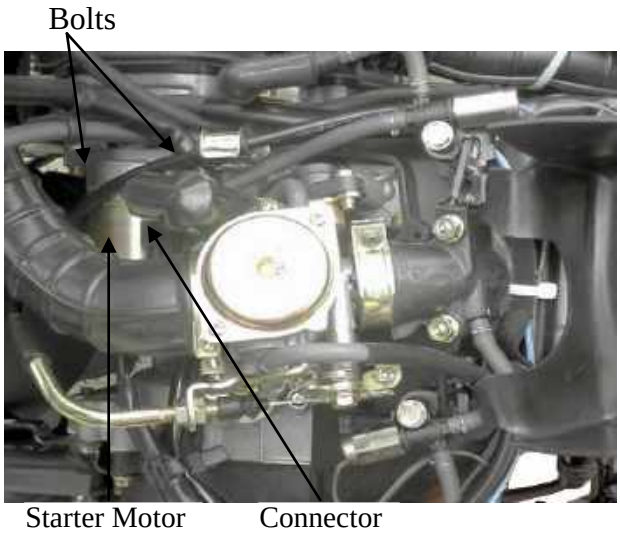
Remove the battery cover.
Disconnect the 4P connector from the starter relay and remove the starter relay.

Connect the starter relay (D) terminal to the 12V battery positive (+) terminal and the relay (C) terminal to the battery negative (-) terminal. Check for continuity between the starter relay (A) and (B) terminals. The relay is normal if there is continuity.



STARTER MOTOR INSTALLATION

Apply engine oil to the starter motor O-ring and install the starter motor.
Tighten the two mounting bolts.
Connect the starter motor cable connector.



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- An electric tester is needed to measure or test the electric equipment.
- Be sure to use fuses and bulbs of the same specifications to avoid damage of electrical equipment.
- After installation of each switch, a continuity check must be performed. A continuity check can usually be made without removing the part from the motorcycle.

TROUBLESHOOTING

Lights do not come on when ignition switch is "ON"

- Burned bulb
- Faulty switch
- Broken wire
- Fuse burned out
- Weak battery
- Poorly connected or shorted wire
- Faulty winker

Light dims

- Faulty ignition coil
- Wire or switch resistance too high
- Faulty regulator/rectifier

Headlight does not change when dimmer switch is turn to Hi or Lo

- Faulty or burned bulb
- Faulty dimmer switch

Fuel gauge pointer does not register correctly

- Disconnected wire or connector
- Broken wire
- Faulty float
- Faulty fuel unit
- Faulty instrument

Fuel gauge pointer fluctuates or swings

- Loose wire connection
- Faulty fuel unit
- Faulty instrument

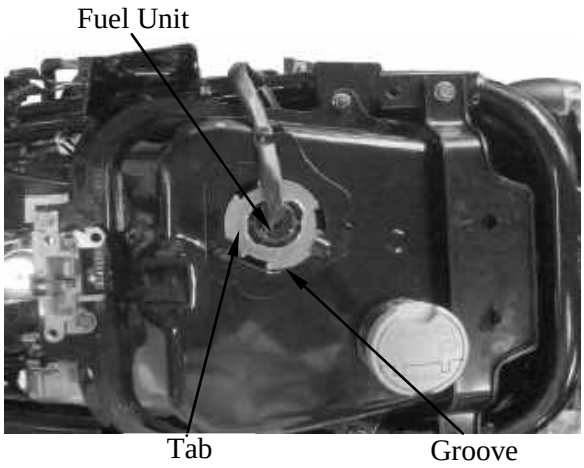
FUEL UNIT

* **No Smoking!**

REMOVAL

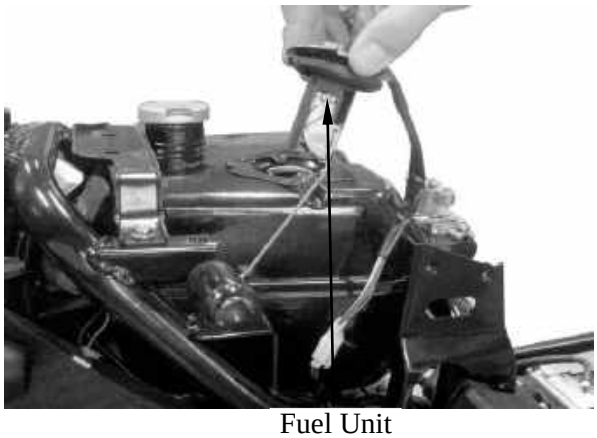
Remove the met-in box. (⇨2-3)
Remove the frame right side cover. (⇨2-4)
Disconnect the fuel unit wire connector.
Turn the fuel unit retainer counterclockwise to remove it.

* Do not damage the fuel unit wire.



Remove the fuel unit.

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



INSTALLATION

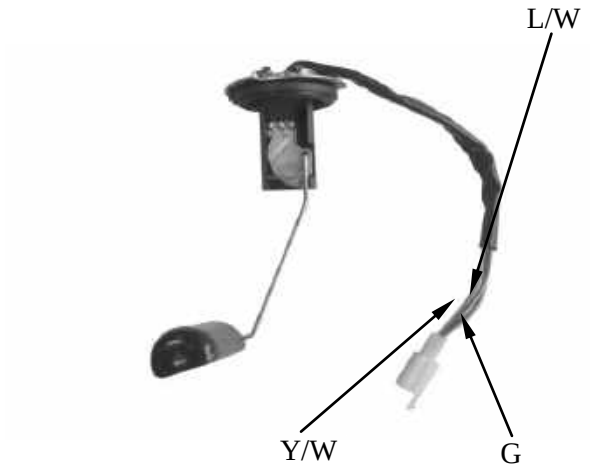
The installation sequence is the reverse of removal.

* • Align the groove on the fuel unit with the tab on the fuel tank.
  • Align the arrow on the retainer with the arrow on the fuel tank.
  • Turn the retainer clockwise to secure it.

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	30Ω	686Ω
G～L/W	566Ω	153Ω
Y/W～L/W	599Ω	599Ω



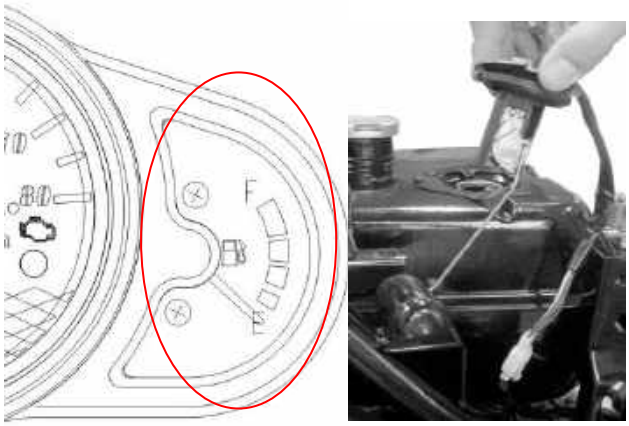
FUEL GAUGE INSPECTION

Connect the fuel unit wire connector 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)



HANDLEBAR SWITCHES

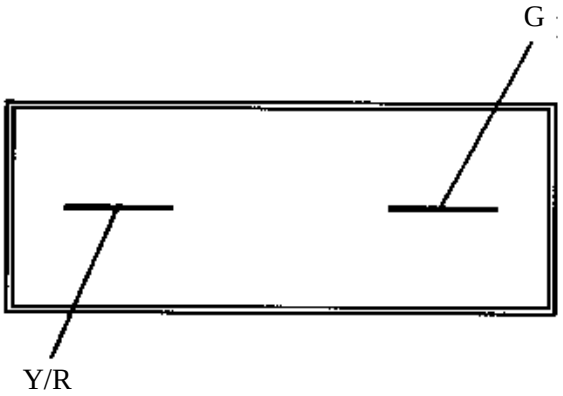
INSPECTION

Remove the handlebar front cover. (⇨2-2)
Disconnect the handlebar switch couplers and check for continuity between wire terminals. If there is any abnormality found, check each switch.

* Use the X1Ω range for test when using an electric tester.

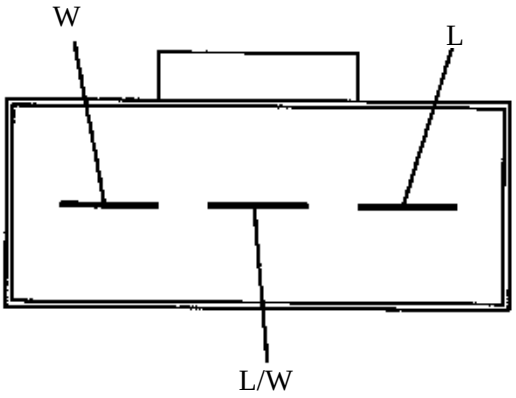
STARTER SWITCH

Color	Yellow/Red	Green
FREE		
PUSH	○	○



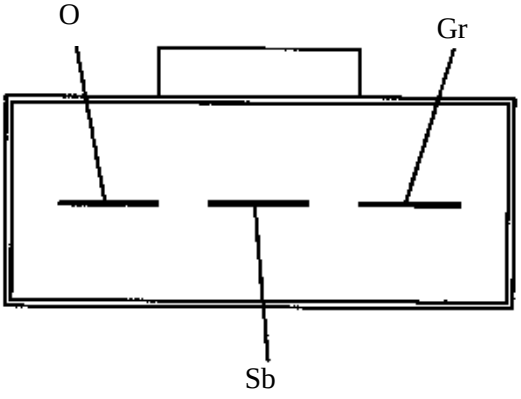
DIMMER SWITCH

Color	White	Blue/White	Blue
≡D	○	○	
≢D		○	○



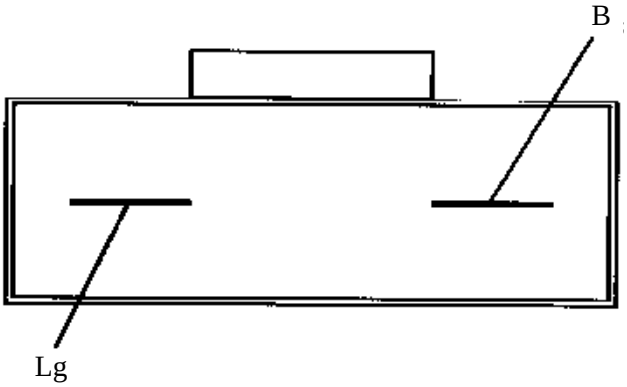
TURN SIGNAL SWITCH

Color	Gray	Light Blue	Orange
R	○	○	
N			
L	○		○



HORN SWITCH

Color	Light Green	Black
FREE		
PUSH	○———	———○



SWITCH REPLACEMENT

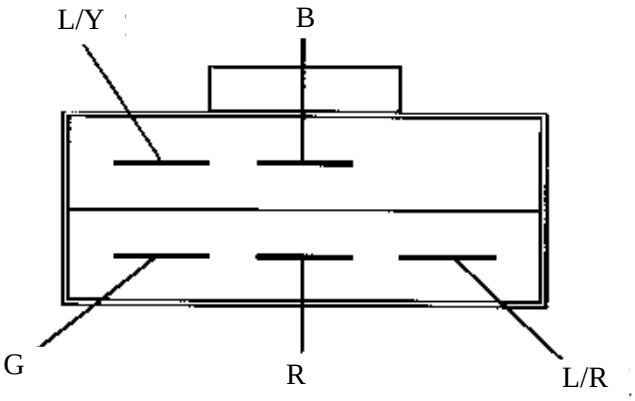
Remove the front covers. (⇨2-2)
Remove the handlebar front cover. (⇨2-2)
The installation sequence is the reverse of removal.

IGNITION SWITCH

INSPECTION

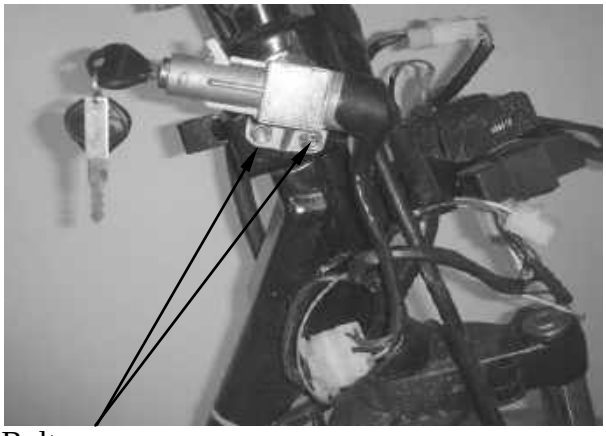
Remove the front covers. (⇨2-2)
Disconnect the ignition switch wire coupler.
Check for continuity between the wire terminals.

Color	Black	Red	Blue/ Yellow	Green
OFF			○———	———○
ON	○———	———○		
LOCK			○———	———○



IGNITION SWITCH REPLACEMENT

Remove the front covers. (⇨2-2)
Disconnect the ignition switch wire coupler.
Remove the two mounting bolts to remove the ignition switch decorative ring and holder.
Remove the two screws to remove the ignition switch from the ignition switch holder for replacement.
The installation sequence is the reverse of removal.


Bolts

STOP SWITCH

INSPECTION

Remove the handlebar front cover. (⇨2-2)
Disconnect the front stop switch wire coupler.
Check for continuity between the wire terminals when the front brake lever is applied. The switch is normal if there is continuity.
Disconnect the rear stop switch wire coupler.
Check for continuity between the wire terminals when the rear brake lever is applied.
The switch is normal if there is continuity.

HORN

INSPECTION

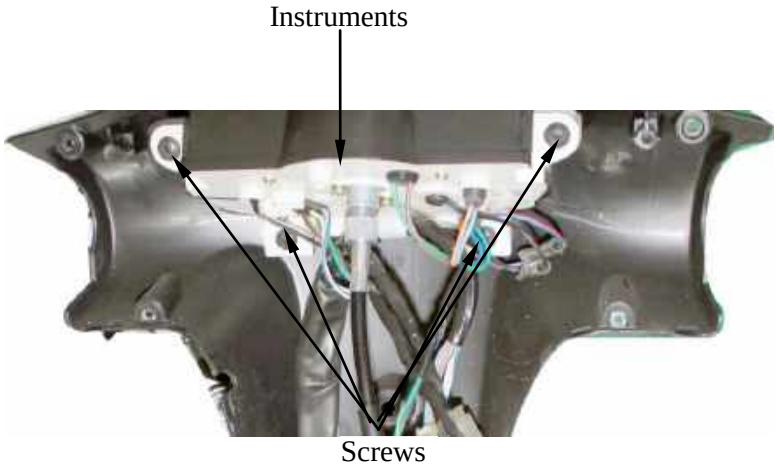
Remove the front covers. (⇨2-2)
Disconnect the horn wire coupler.
The horn is normal if it sounds when a 12V battery is connected across the horn wire terminals.

REPLACEMENT

Disconnect the horn wire coupler.
Remover the two bolts attaching the horn.
Remove the horn.
The installation sequence is the reverse of removal.

INSTRUMENTS

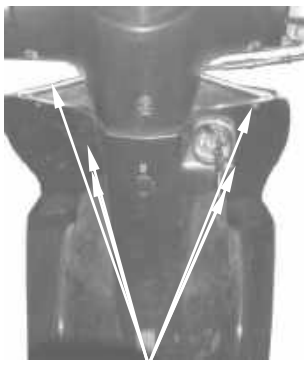
Remove the handlebar front cover. (⇨2-2)
Remove the handlebar rear cover. (⇨2-2)
Disconnect the handlebar switch couplers.
Remove the three screws to remove the instruments.
Install a new horn in the reverse order of removal.



HEADLIGHT

REMOVAL

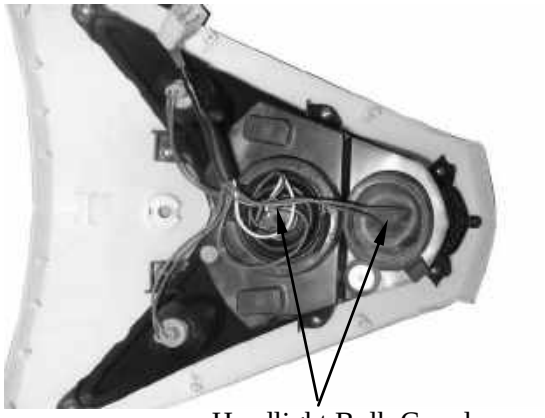
Remove the screw on the front of the front cover.
Remove the six screws on the back of the front cover.
Remove the front cover.
The installation sequence is the reverse of removal.



*
- Align the tab on the headlight with the groove on the handlebar cover.
- After installation, adjust the headlight beam. (⇨3-9)

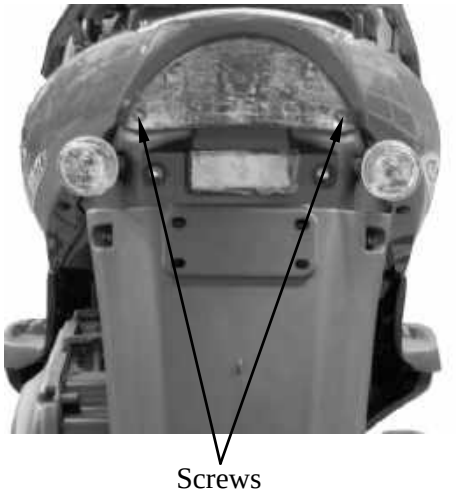
BULB REPLACEMENT

Remove the headlight bulb Coupler. (⇨2-2)
Remove the headlight replace with new bulbs.
The installation sequence is the reverse of removal.



TAILLIGHT/STOPLIGHT/REAR TURN SIGNAL LIGHT/LICENSE LIGHT

Remove the rear protector molding and remove the two nuts attaching the rear light shell.
The installation sequence is the reverse of removal.



18

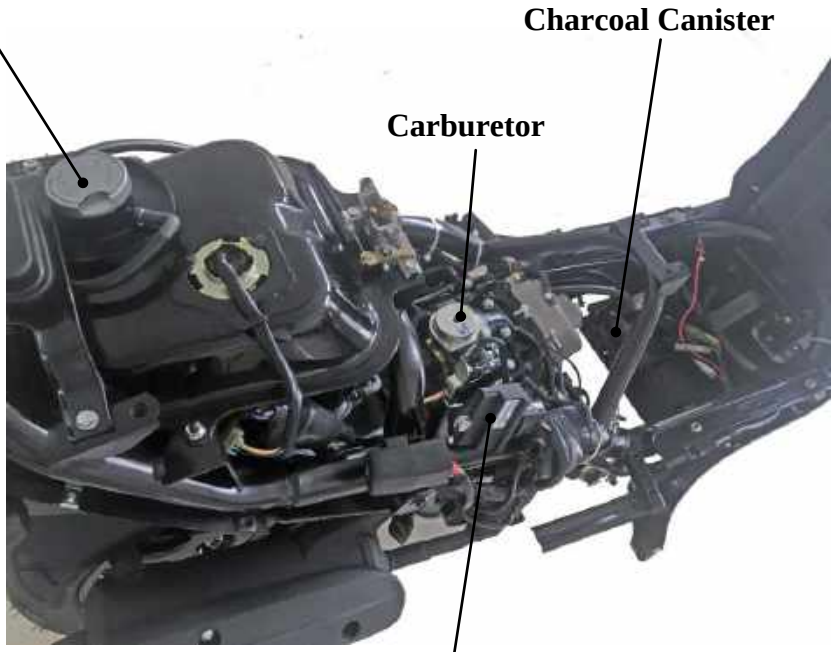
EVAPORATIVE EMISSION CONTROL SYSTEM

(Apply to models with evaporative emission control system)

SCHEMATIC DRAWING

Charcoal Canister/ Purge Control Valve

Air Cleaner



EVAPORATIVE EMISSION CONTROL SYSTEM FUNCTION

FOREWORD:

The Evaporative Emission Control System is abbreviated to E.E.C. System. This device collects the fuel vapor from the fuel tank and then the fuel vapor is drawn into the engine for re-burning to avoid air pollution caused by the fuel vapor diffused into the air.

FUNCTION

Item	Purpose	Function
Purge Control Valve	Control vaporized HC from fuel tank not to diffuse into the air.	The charcoal canister absorbs vaporized HC from the fuel tank. When the engine is running and the purge control valve is open, the fuel vapor in the charcoal canister is drawn into the engine for re-burning.
Charcoal Canister	Absorb and store the vaporized HC from the fuel tank and carburetor.	The vaporized HC is absorbed in the charcoal canister and the specified volume of HC in the emission should not exceed 2g.
P.C.V. System	Completely recover the HC from blow-by gas in the crankcase for re-burning.	Through the P.C.V. system, the blow-by gas from the crankcase is separated into fuel vapor and fuel and then drawn into the cylinder for re-burning.

TROUBLESHOOTING

Engine loses power or runs erratic at idle speed

1. Clogged P.C.V. system
2. Clogged air cleaner
3. Faulty purge control valve
4. Loose or broken E.E.C. system tubes

Engine idles or accelerates roughly

1. Faulty fuel cut-off valve
2. Faulty purge control valve
3. Clogged or faulty charcoal canister

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Do not smoke or allow flames or sparks near the working area.
- Note the locations of tubes for proper installation.
- Replace any damaged tube with a new one.
- Make sure to tighten the connector of each tube securely.

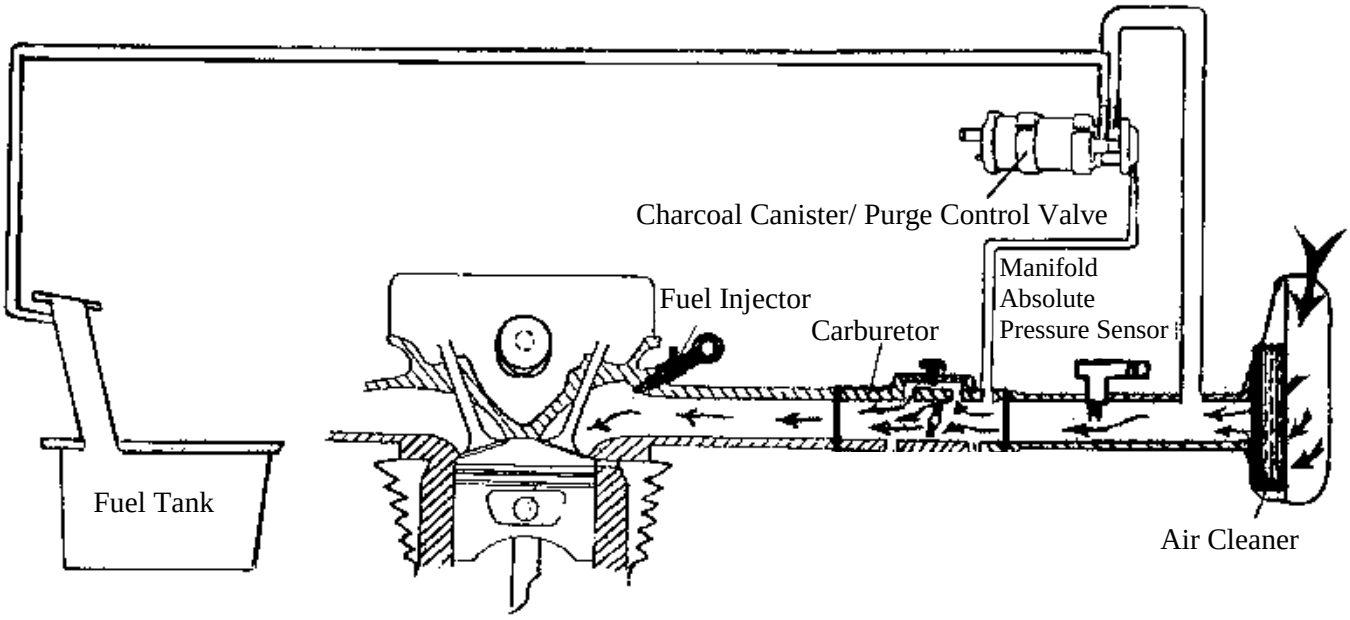
TOOLS

- Vacuum pump－A937X－014－XXXX
- Pressure pump－

SPECIFICATIONS

Purge control valve vacuum pressure	45mm/Hg
Charcoal canister capacity	90cc

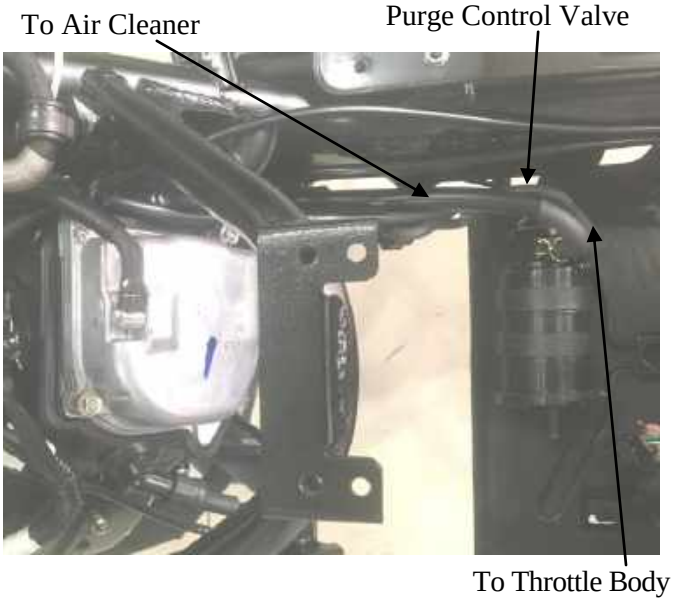
A. LEAKAGE TEST PIPING DIAGRAM



PURGE CONTROL VALVE

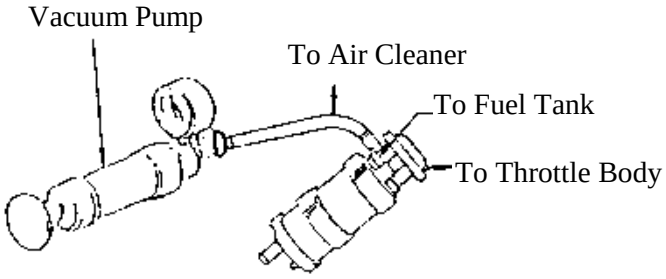
REMOVAL

1. Remove the body cover.
2. Disconnect the purge control valve vacuum tube that goes to the throttle body and the tubes that go to the air cleaner and charcoal canister. Remove the charcoal canister/purge control valve.

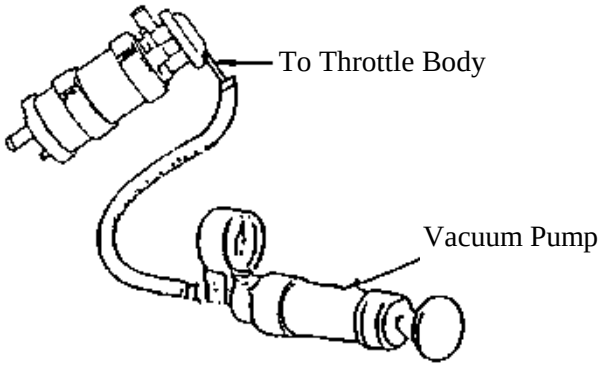


INSPECTION

Connect a vacuum pump to the purge control valve tube that goes to the air cleaner and apply vacuum pressure of 250mm/Hg. The specified vacuum must be maintained for one minute. Replace the purge control valve with a new one if vacuum is not maintained.

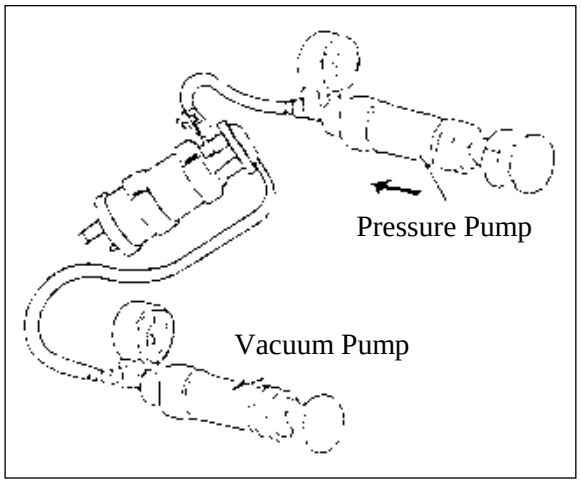


Connect a vacuum pump to the purge control valve tube that goes to the carburetor vacuum tube and apply vacuum pressure of 45mm/Hg. The specified vacuum must be maintained for one minute. Replace the purge control valve with a new one if vacuum is not maintained.



PURGE CONTROL VALVE FLOW INSPECTION

1. Connect a vacuum pump to the purge control valve vacuum tube and apply vacuum pressure of 45mm/Hg.
2. Connect a pressure pump to the tube that goes to the charcoal canister and apply pressure. The flow must be over 9.4 liters per minute and replace the purge control valve with a new one if the specified flow is not reached.



* To prevent damage to the purge control valve, do not use high air pressure sources. Use a hand operated pressure pump only.

INSTALLATION

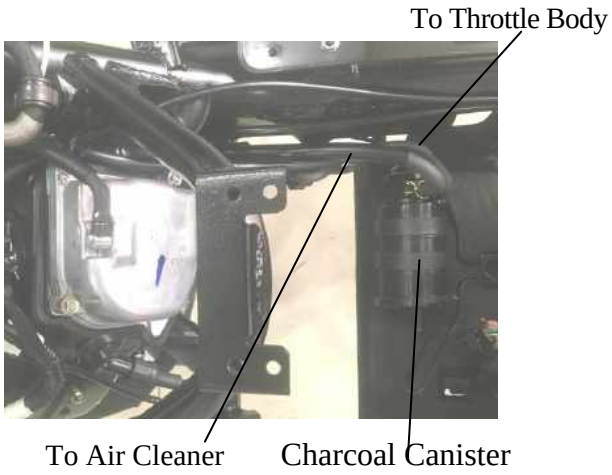
1. Install the purge control valve in the reverse order of removal.
2. Route and reconnect the purge control valve tubes properly and securely.

* Be careful not to bend, twist or kink the tubes during installation.

CHARCOAL CANISTER

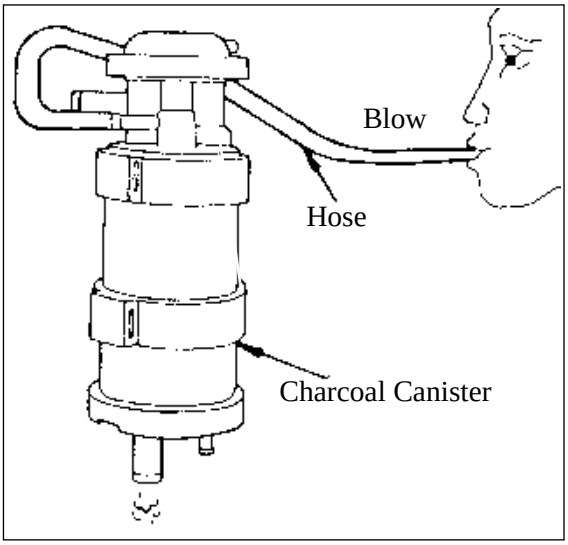
REMOVAL

1. Remove the front cover.
2. Disconnect the charcoal canister tubes that go to the fuel tank and purge control valve.
3. Remove the charcoal canister.



INSPECTION

1. Plug the tube that goes to the fuel tank and plug the blow-by tube. Then connect a hose to the canister. Blow the hose with mouth. The charcoal canister is normal if air can be blown into it. If clogged, replace it with a new one.
2. Check the charcoal for cracks and replace if necessary.



INSTALLATION

Install the charcoal canister in the reverse order of removal.

*
- The charcoal canister must be installed to its original position to avoid affecting its performance.
- Do not bend, twist or kink the tubes during installation.