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FOREWORD

This manual covers the structure, operation, inspection, maintenance and repair of LF200-10P motorcycle for use by the LIFAN dealers and qualified mechanics. With both the descriptions and figures/drawings, you may have a comprehensive understanding of the structure as well as service and repair skill.

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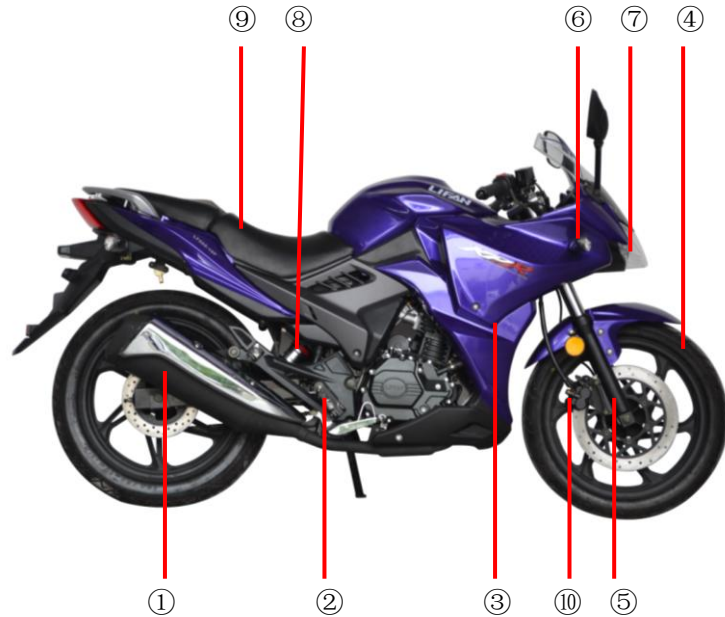
LIFAN INDUSTRY (GROUP) CO., LTD.

March, 2016

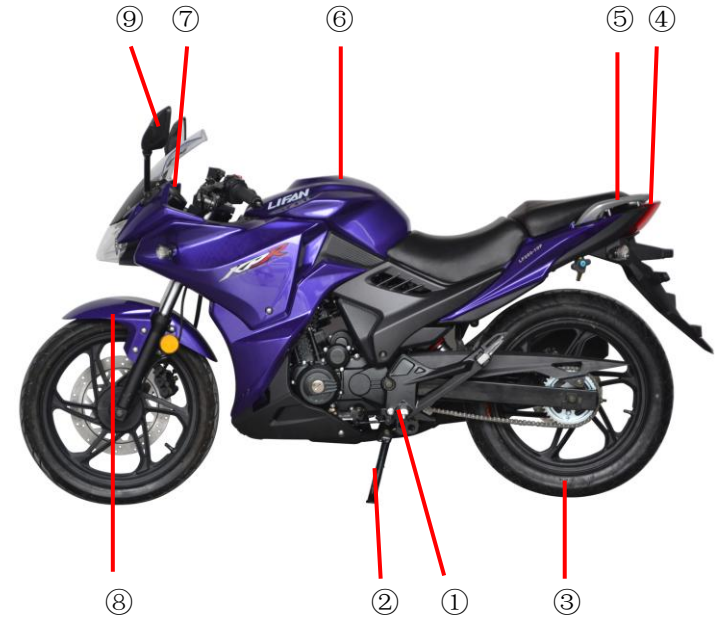
CHAPTER 1 GENERAL

1.1 VEHICLE INTRODUCTION

The LF200-10P motorcycle is one of the lately developed products with comfortable riding, easily operation and safe transportation. Installed on the vehicle is 165MJ-P engine which is of vertical single cylinder, 4-stroke and air cooled type. The vehicle



- ①Exhaust muffler ② Main step ③Radiator ④Front Wheel
- ⑤Front shock absorber ⑥Front winker ⑦Headlight
- ⑧Rear shock absorber ⑨Seat ⑩Front brake



- ①Gearshift pedal ②Side stand ③Rear wheel ④Taillight
- ⑤Rear handrail ⑥Fuel Tank ⑦Meter ⑧Front fender
- ⑨Rear mirror

1.2 SPECIFICATIONS

ITEM		SPECIFICATIONS
Dimension and Weight	Length × Width × Height	2060mm × 760mm × 1105mm
	Wheelbase	1330mm
	Ground clearance	160mm
	Kerb mass	138kg
	Max. weight capacity	150kg
Engine	Model	165ML-P
	Type	Single-cylinder, 4-stroke and water-cooled
	Bore × stroke	65.5mm × 58.8mm
	Displacement	198 ml
	Compression ratio	11: 1
	Carburetor type	/ (EFI)
	Air cleaner	Plastic housing with paper and foam element
	Lubrication	Press/splash
	Starting mode	Electric
	Max. net power	12.5kW/8000r/min
	Max. torque	17N m /6500r/min
	Idle speed	1500 r/min
Riding system	Front shock absorber	Telescopic type hydraulic drive
	Rear shock absorber	Spring type hydraulic drive
	Steering bar angle	≤36°
	Tyre size/pressure	Front
Rear		120/80-17-4PR/200kPa
Riding system	Drive mode	Chain

	Turning circle dia.	4860mm	
Drive Train	Clutch	Wet, multi-plate type	
	Transmission	6-speed, constant mesh	
	Primary reduction	3.333	
	Final reduction	2.800	
	Gear ratio	1st	2.909
		2nd	1.867
		3rd	1.316
		4th	1.000
5th		0.833	
Drive chain	Type	08MC	
	Link No.	126	
Brake	Front	Disk	
	Rear	Disk	
Electrical	Ignition	Inductive energy storage	
	Static ignition timing (° CA)	40°	
	Spark plug	CPR8EA	
	Spark plug gap	0.9±0.05mm	
	Battery	12N9-BS	
	Fuse	20A	
	Headlight	LED20W/10W	
	Front position light	LED/2.7W	
	Tail/stop light	LED0.3 W /1.7W	
	Winker	12V10W	
	Oil level warning light	LED/8mA	

	High beam indicator	LED/8mA	
	Turn signal indicator	LED/8mA	
	Meter light	LED/8mA	
Fuel/Oil	Fuel type	RQ-93	
	Fuel tank	Capacity	14L
		Reserve	2.8L
	Engine oil	Brand	15W/40-SF
		Capacity	1L
	Damping oil	Brand	HQ-10
Capacity		320ml	

CHAPTER 2 ENGINE

2.1 CYLINDER HEAD

2.1.1 Removal, Maintenance and Installation

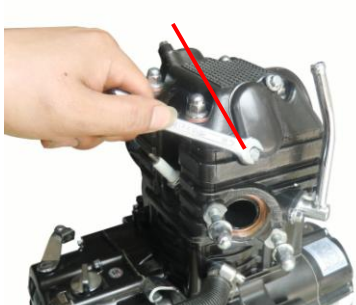
- 1) Remove the bolt of oil passage and kick the starter rod to run the engine. Check to see if oil flows from the view-hole. Clean the oil passage/line, if necessary.
- 3) Adjust the valve gap.

(NOTE: Bolt specification: M6×12 Tightening torque of bolt 8~12N • m)



- 2) Unscrew the fixing bolt of valve cover and remove the valve cover.

(NOTE: Bolt specification: M6×12 Tightening torque of bolt 8~12N • m)



- 4) Unscrew and remove the fixing bolt M8 of cylinder head.

(Tightening torque 30~40N.m)



5) Unscrew and remove the connecting bolt of cylinder head left cover and remove the valve cover.

(NOTE: Bolt specification: M6×14 Tightening torque of bolt 8~12N・m)



6) Check the cylinder head left cover, valve cover and the gasket for damage. Replace it if necessary.



7) Unscrew and remove the fixing bolt M6×10 of the timing driven sprocket. Remove the timing driven sprocket and camshaft assembly.

(Tightening torque of bolt 8~12N・m)



8) Check the timing drive sprocket and camshaft assembly for wear, damage or deformation. Replace them if necessary.



9) Structure of cylinder head assembly is as follows:



11) Remove the cylinder head assembly.



10) Unscrew and remove the connecting bolt of cylinder head.

(NOTE: Hexagon socket bolt specification: M6×14 Tightening torque of bolt 8~12N·m)



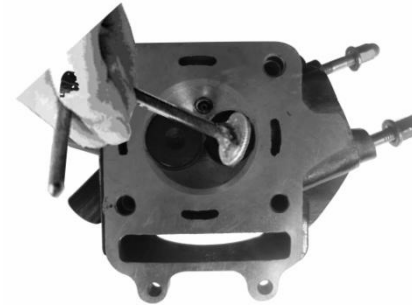
12) Remove the split cone, valve spring and valve. Check them for wear. Replace the worn parts if necessary.



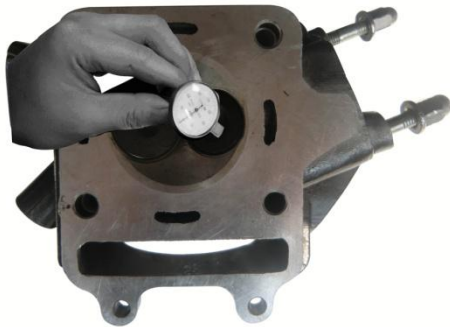
13) Measure the width of effective sealing face. Replace the cylinder head or valve if it is beyond the limit. Service limit: $>1.6\text{mm}$



15) Measure I.D. of valve guide. If it is out of the limit, replace the worn valve guide. Service limit: $>\Phi 5.54\text{mm}$



14) Ream the valve seat to specified value. Replace it if it is beyond the limit. Standard valve: intake $\Phi 29 \pm 0.05\text{mm}$, exhaust $\Phi 25 \pm 0.05\text{mm}$



16) Unscrew the spark plug M10 \times 1. Clear away carbon deposit around the spark plug. The spark plug gap should be controlled between the scope of 0.8~0.9mm.

(NOTE: Tightening torque of spark plug M10 \times 1:10~20N.m)



17) Unscrew and remove the bolt of thermostat and remove the thermostat.
(NOTE: Bolt specification: M6×16 Tightening torque of bolt 8~12N.m)



2.1.2 Troubleshooting to Cylinder Head

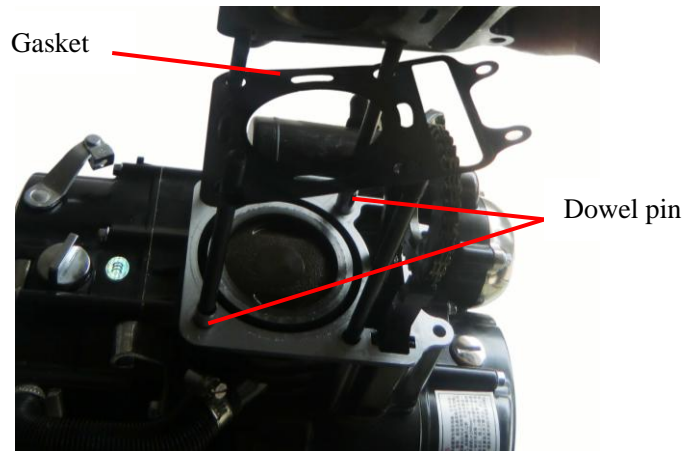
Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Motorcycle	Remedy
Cylinder Head	Carbon deposit in the combustion chamber		Engine overheats	Clear away the carbon deposit.
	Threaded hole of spark plug is damaged	Air leakage between spark plug and cylinder head	Engine fails or is hard to start	Repair threaded hole or replace the cylinder head
	Seriously deformation of cylinder head surface (i.e. the deformation is out of 0.05mm)	Air leakage between cylinder head and cylinder	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Grind the cylinder head surface or replace the cylinder head
	Defects such as pits, erosion, etc. are found on the contact area of valve seat.	Air leakage between valve and valve seat due to improper tightness	Do.	Grind the valve seat and valve
	I.D. of valve guide is out of specification (i.e. its I.D. is out of 5.54mm)	Valve stem-to-guide clearance is too large	Eccentric wear of valve seat cause air leakage of valve, hard starting of engine, and unstable idle speed	Replace valve guide or cylinder head
	Locknut of cylinder head is not properly tightened	Air leakage between cylinder head and cylinder	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Screw up the locknut

Spark plug	Improper gap between electrodes	Weak or no spark	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Adjust by slightly bend the side electrode till the gap is 0.8-0.9 mm
	Electrodes are jointed by carbon deposit	Weak or no spark	Engine fails to start.	Remove carbon deposit from electrodes
	Too much carbon deposit or over-oiled dirt around the spark plug	Weak or no spark	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Clear away carbon deposit or oiled dirt
	Spark plug is damaged	Weak or no spark	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Replace the damaged spark plug with a new one of the same type
	Loose park plug	Air leakage between spark and cylinder head	Engine is hard to start. Unstable idle speed	Tighten up spark plug
Camshaft assembly	Excessive wear for cam	Air intake and exhaust is not smooth	Engine lacks power. Too much noise from valve train.	Replace the cam
	Excessive wear for timing driven sprocket hole	Too much clearance between hole and shaft	Abnormal sound from camshaft assembly	Replace the timing driven sprocket
	Excessive wear for camshaft	Too much clearance between hole and shaft	Abnormal sound from camshaft assembly	Replace the camshaft and shaft sleeve
Thermostat	Thermostat is damaged or plug is loose	Poor rejection of heat	Engine overheats	Replace the thermostat or tighten up the plug

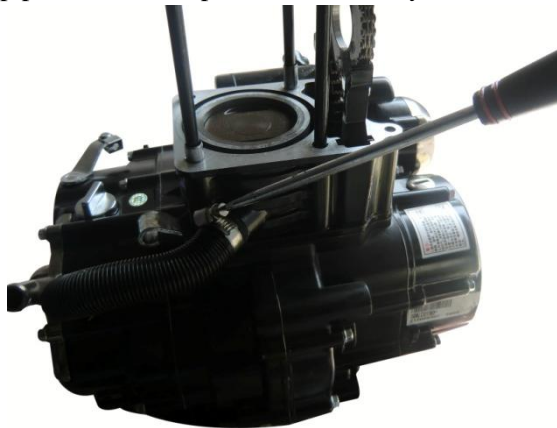
2.2 CYLINDER BLOCK

2.2.1 Removal, Maintenance and Installation

1) Remove the cylinder head gasket and dowel pins. Check them for damage. Replace them if necessary.



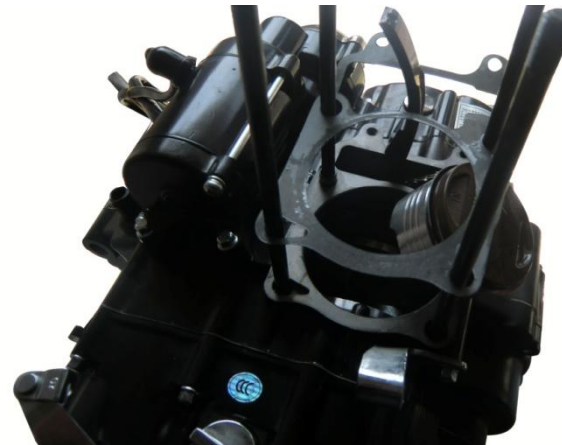
2) Unscrew and remove the fixing bolt of water pipe. Remove the water pipe and check the pipe for crack. Replace it if necessary.



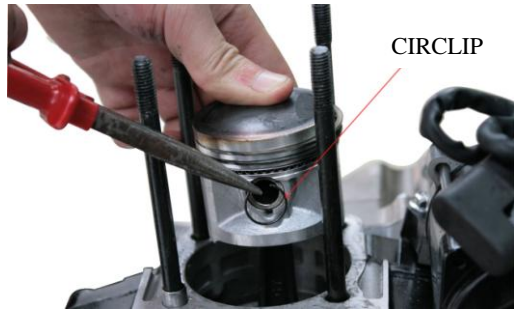
3) Remove the cylinder block.



4) Remove the gasket (thickness: 0.5mm) of cylinder block. Check it for wear. Replace it if necessary.



5) Remove the circlip of piston pin. (Caution: do not make the circlip falls into the crankcase)



6) Pull out the piston pin and check it for wear. Replace it if it is out of the service limit. Service limit: $< \Phi 14.95\text{mm}$



7) Check and measure the cylinder wall. If it is out of the service limit, replace the cylinder. Service limit: $> \Phi 65.55\text{mm}$



8) Check the water passage for blocking.



2.2.2 Troubleshooting to Cylinder Block

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Motorcycle	Remedy
Cylinder Block	Seriously deformation of cylinder joining surface	Air leakage between the cylinder head and block	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Grind the cylinder head jointing surface or replace the cylinder head
	The cylinder block is worn considerably	Cylinder block-to-piston/piston ring clearance is too large	Engine fails or is hard to start. Engine lacks power. Unstable idle speed. Thick blue and white smoke from the exhaust pipe	Replace the cylinder
	Cylinder gasket is damaged		Oil leakage between the cylinder block and crankcase	Replace the cylinder gasket

2.3 VALVE TRAIN

2.3.1 Removal, Maintenance and Installation

1) Check the intake/exhaust valve for air tightness. Grind the valve if necessary.



2) Remove the split cones, valve spring seat. Check them for wear. Repair or replace them according to the actual situation.



3) Remove the valve spring, and check it for wear or deformation. Repair or replace it if necessary.



4) Remove the valve stem seal, and check it for wear or damage. Replace it if necessary.



5) Remove the intake/exhaust valve. Check them for serious wear. Replace them if necessary.



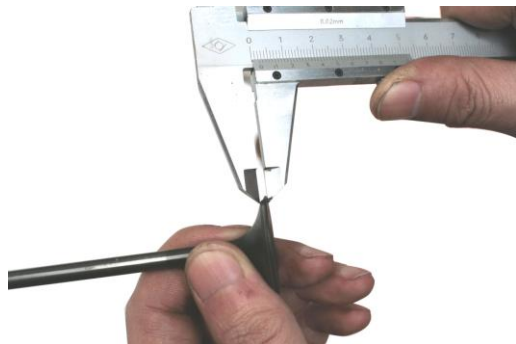
Measure the diameter of valve stem. If it is beyond the service limit, replace the valve. Service limit: $< \Phi 4.95\text{mm}$



6) Measure the margin and face of valve. If any one of the values is beyond the service limit, replace the valve.

Face angle: 45°

Margin: 1.6mm



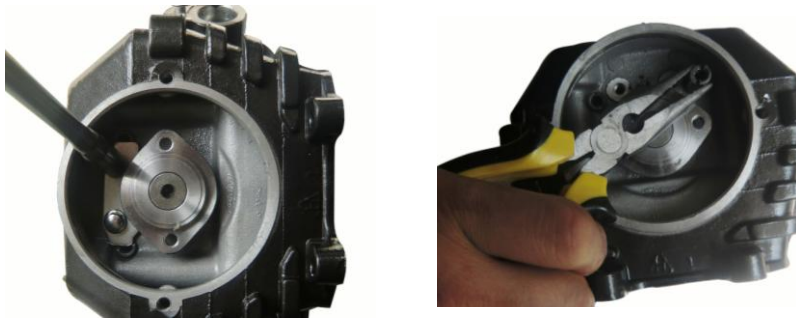
7) Measure the free length of the spring. If it is beyond the service limit (outer: $< 36\text{mm}$ inner: $< 34\text{mm}$), replace the spring with a new one.

NOTE: The loose wound coils face upward when installing the springs.



8) Unscrew and remove the fixing bolt M6×12 of valve rocker fixing plate and remove the rocker.

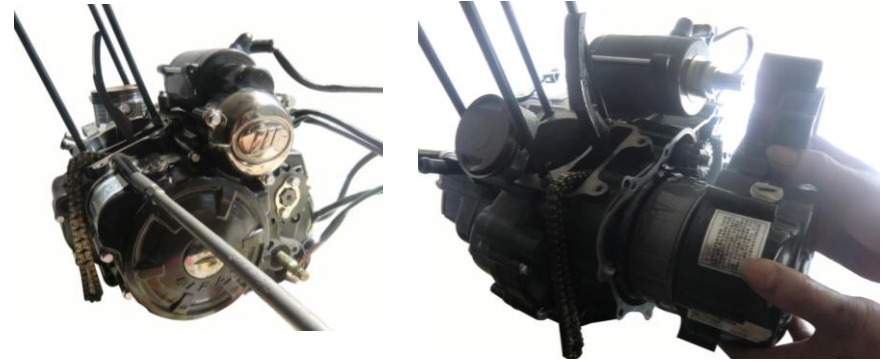
Tightening torque of bolt: 8~12N.m



9) The construction of rocker holder is shown in following figure. Check the rocker holder for excessive wear or inflexible rotation. Replace it if necessary. Then remove the camshaft assembly. Check it for wear and replace it if necessary. .



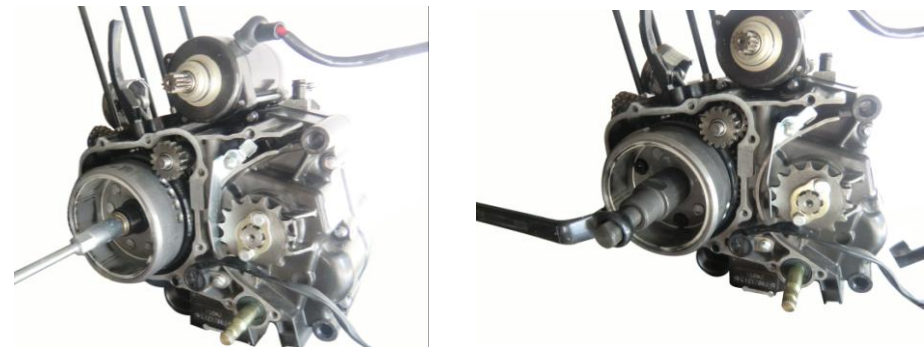
10) Unscrew the bolt M6 of left crankcase cover and remove the left crankcase cover. Tightening torque: 8~12N.m



11) Unscrew the bolt of magneto rotor. Remove the magneto rotor and gear with specified equipment.

Bolt specification: M10×35

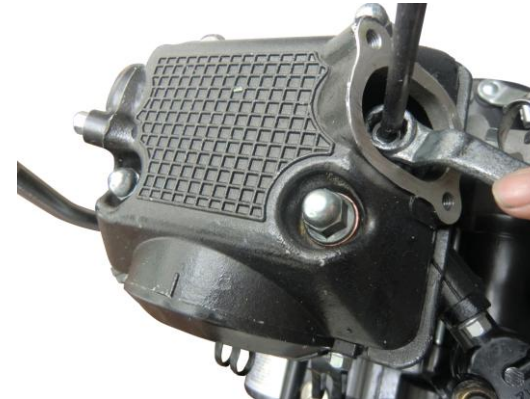
Tightening torque: 40~50N.m



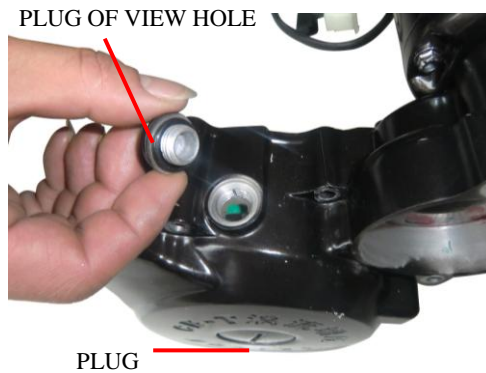
12) Unscrew the bolt of valve cover and remove the valve cover.



14) Adjust the intake/exhaust valve to 0.05 ± 0.02 mm, then tighten up the adjusting nut of valve.



13) Unscrew the plug on the left engine cover and plug of view hole. Rotate the rotor of magneto until "T" mark on the rotor aligns with the index mark on the left crankcase cover. In this case, both the intake and exhaust valves are closed.



15) Unscrew and remove the bolt M6×12 of timing chain tensioning plate. Tightening torque: 8~12N.m



16) Check the timing chain tensioning guard plate (chain tensioning plate, chain guide plate) for wear. Replace it if the wearing depth is beyond 0.5mm.



17) Check the timing driven sprocket and chain for wear. Replace them if necessary.



2.3.2 Troubleshooting to Valve Train

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Motorcycle	Remedy
Rockshaft and valve rocker	Excessive clearance between rockshaft and valve rocker		Knock sound	Replace the rockshaft and valve rocker
Valve	Little valve clearance	The valve is impossible to close completely	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Adjust the valve clearance to 0.03~0.05mm
	Excessive valve clearance		Knock sound	Do.
	Carbon deposit on the surface	Valve-to-valve seat fit is not tight	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Clear away carbon deposit, grind the valve seat
	Contact area is seriously worn or has defects such as pits, etc.	Do.	Do.	Do.
	Valve stem is seriously worn	Valve stem-to-guide clearance is too large	Thick blue smoke from exhaust pipe	Replace the valve
	The valve stem is deformed	Valve is not closed completely	Engine fails to start	Replace the valve
Valve Spring	Spring is broken	Valve-to-valve seat fit is not tight	Engine fails or is hard to start. Sound from the cylinder head	Replace the valve spring
Camshaft	Excessive wear for the cam	Air intake/exhaust is not smooth. Engine lacks power. Too much noise from valve train	Too much noise. Power lack when riding	Replace the camshaft
	Excessive wear for the camshaft	Hole-to-shaft clearance is too large. Abnormal sound from cam gear	Too much noise.	Replace the camshaft or shaft sleeve
Timing chain	It is too long	Too long, knock sound	Too much noise. Power lack when riding	Replace the timing chain

2.4 TRANSMISSION

2.4.1 Clutch

- Removal and Installation

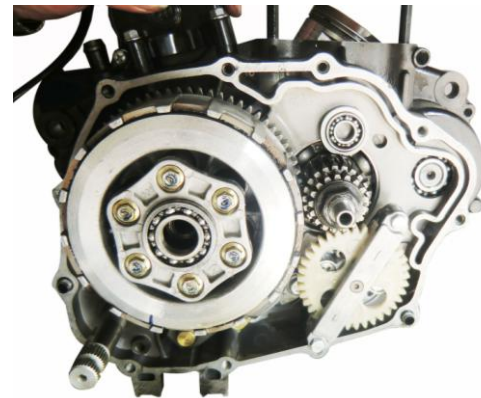
- 1) Remove the gasket of right crankcase cover and check it. Replace the damaged the gasket with a new one
- 3) Check the spring of clutch rod. Replace it if necessary.



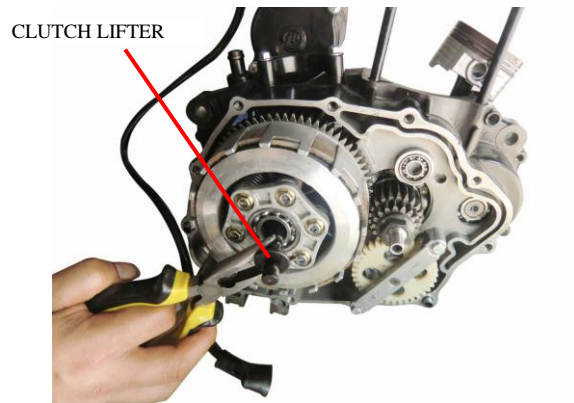
- 2) Check the clutch rod for wear. Replace it if necessary



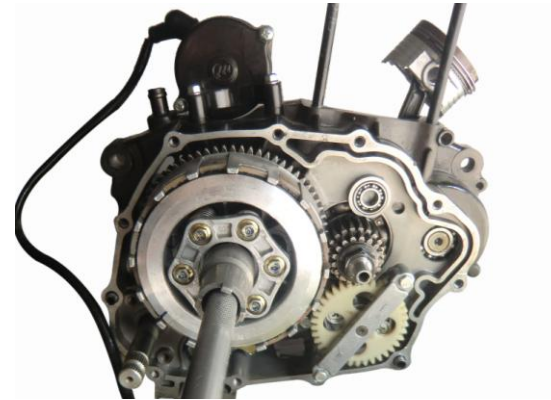
- 4) The construction of clutch is shown as follows:



5) Extract the clutch lifter, and check it for wear. Replace it if necessary.



7) Unscrew the clutch locknut with specified equipment. Replace it if it is deformed.



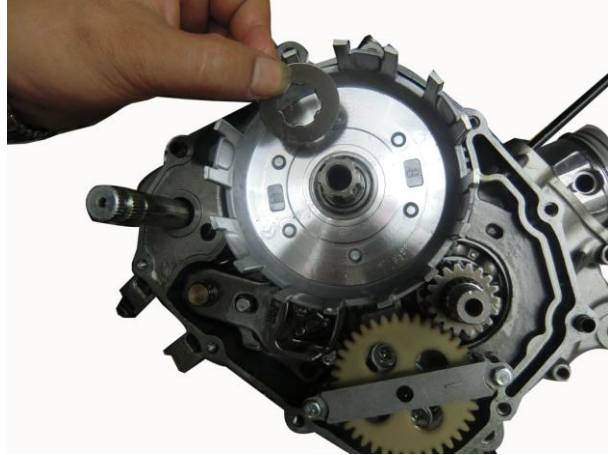
6) Remove the clutch bearing, and check it for wear. Replace it if necessary.



8) Remove the clutch driven disc comp., check it for wear. Replace it if necessary.



9) Remove the splined washer, and check it for wear. Replace it if necessary.



11) Remove the clutch outer comp., check the gear for wear. Replace the disc if necessary.



10) Unscrew the bolt of primary drive gear. Remove the primary drive gear, and check it. Replace the worn gear with a new one.

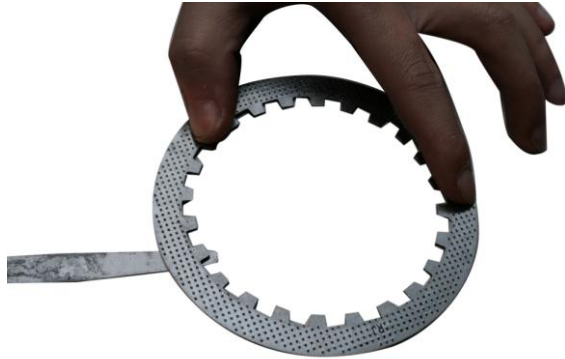


12) Remove the clutch drive plate. Measure the thickness of the clutch drive plate with the caliper. Replace the plate if the thickness is out of the limit.
Service limit: <math>< 2.8\text{mm}</math>



13) Check the thickness of clutch driven plate. Replace the plate if the thickness is out of the limit.

Service limit: $<1.4\text{mm}$



14) Measure the free length of clutch spring. Replace the spring if the length is out of the limit. Service limit: $<35\text{mm}$



2.4.2 Troubleshooting to clutch

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Motorcycle	Remedy
Clutch outer	Hub grooves are worn into saw teeth-shaped	Friction discs fail to remove freely in the hub grooves.	Clutch slipping. Out of function. Abnormal sound	Trim the grooves with saw or replace the clutch outer
Clutch drive plate	Excessively worn		Clutch slipping.	Replace the plates as a set
Clutch driven plate	Excessively worn (i.e. the thickness is less than 1.4mm)		Clutch slipping. Out of function.	Replace the plates as a set
	Heavily deformed		Clutch slipping.	
Clutch spring	Weak or broken		Clutch slipping.	Replace the spring

2.4.3 Transmission

- Removal and Installation

1) Remove the gearshift shaft, and check it for wear. Replace it if necessary.

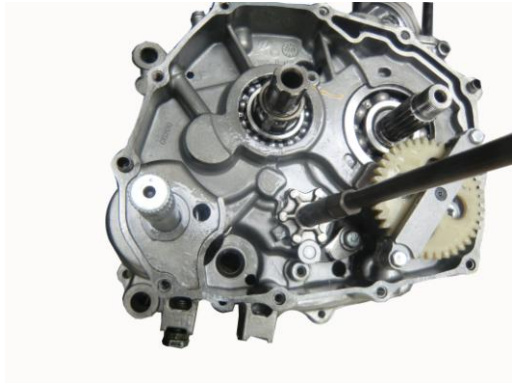


1) 2) Unscrew the bolt of gearshift drum stopper. Remove it.

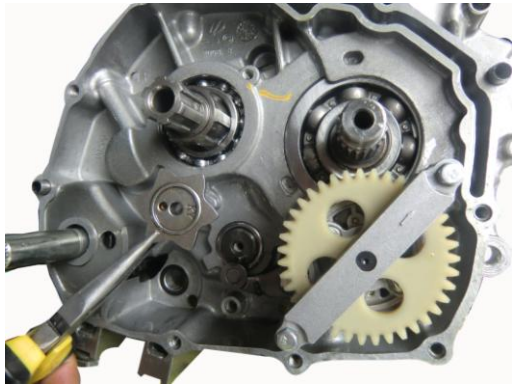
(NOTE: Specification of bolt : M6×20 Tightening torque: 8~12 N•m)



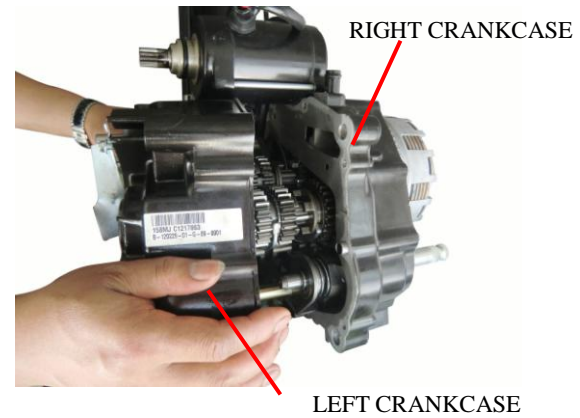
3) Unscrew the bolt of gearshift cam. Remove the gearshift cam
(NOTE: Specification of bolt : M6×25 Tightening torque: 8~12 N•m)



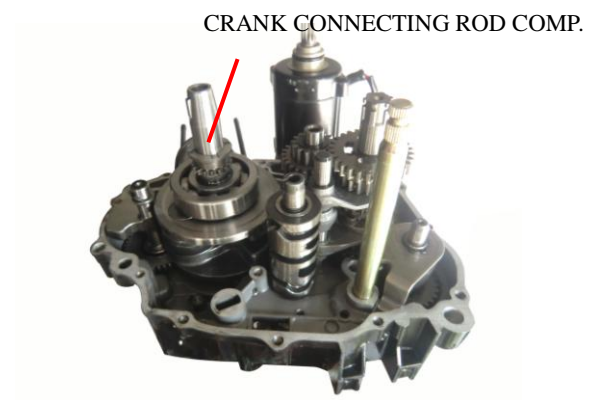
4) Check the gearshift cam for wear, and replace it if necessary.



5) Unscrew fixing bolts from the crankcase, remove the right crankcase, and check the gasket for damage. Replace the damaged gasket with a new one.
(Tightening torque: 8~12N.m)

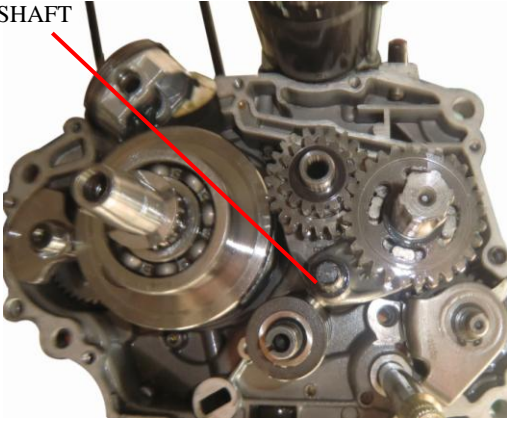


6) Remove the crank connecting rod comp.



7) Remove the gearshift fork shaft, and check it for wear. Replace it if necessary.

FORK SHAFT



8) Remove the fork I, and check it for wear. Replace it if necessary



9) Remove the fork II, and check it for wear. Replace it if necessary.



10) Remove the fork III, and check it for wear. Replace it if necessary.



11) Remove the gearshift drum, and check it for wear. Replace it if necessary.



12) Check the fork grooves in the gearshift drum for wear. Replace it if necessary.



13) Measure the O.D. of gearshift fork shaft. If it is beyond the service limit, replace the worn shaft with a new one.

Service limit: $< \Phi 11.90\text{mm}$



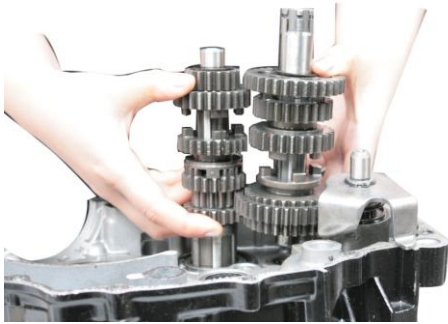
14) Measure the thickness of gearshift fork and I.D. of hole in the gearshift fork by using a micrometer and an inside micrometer separately. If any one of them is beyond the service limit, replace the fork.

Service limit of fork thickness: 4.8mm

Service limit of fork I.D.: $\Phi 12.5\text{mm}$



15) Remove the mainshaft comp. and countershaft comp., then check them for proper match gap. Replace the mainshaft comp. and countershaft comp. if the gap is too large.



16) Check the gears of mainshaft comp. and countershaft comp. for wear. Replace them if necessary (it needs to replace the gear if defects such as pits, teeth crack appear).



17) Remove the washer of starting mid-gears. Check it for wear and replace it if the worn part is out of the limit. Service limit: 0.8mm



18) Remove the starting mid-gears on the counter shaft. Check it for wear. Replace it if it is out of the limit.

Limit value of inner bore: $\Phi 20.1\text{mm}$



19) Remove the bush and washer of starting mid-gears. Check them for wear. Replace them if necessary.



21) Remove the bush of countershaft 1st gear and washer I, then check them for wear. Replace the worn part.



20) Remove the countershaft 1st gear, and then check it for wear. Replace the worn gear if necessary. Limit value of inner bore: $\Phi 19.6\text{mm}$



22) Remove the countershaft 3rd gear, and then check it for wear. Replace the worn gear if necessary.



23) Remove the washer II from the countershaft, and check it for wear. Replace the washer if necessary.



25) Remove the countershaft 5th gear, 4th gear and splined washer, then check them for wear. Replace the worn-out part if necessary.

Limit value of inner bore: Φ 20.1mm



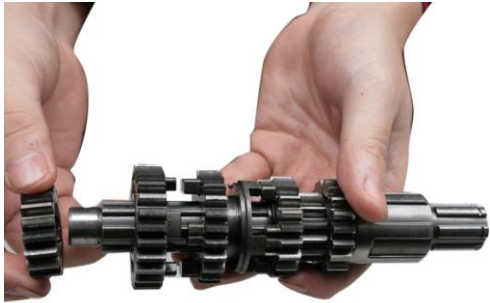
24) Remove the countershaft 2nd gear, and then check it for wear. Replace the worn gear if necessary. Limit value of inner bore: Φ 22.1mm



26) Remove the washer from the mainshaft, and check it for wear. Replace it if it is out of the limit. Service limit: 0.8mm



27) Remove the 2nd gear from the mainshaft, and check it for wear. Replace the washer if necessary.



29) Take the splined washer and circlip out of mainshaft, then check them for deformation. Replace the washer/circlip if necessary.



28) Remove the 5th gear from the mainshaft, and check it for wear. Replace the gear if necessary. Limit value of inner bore: $\Phi 20.1\text{mm}$



30) Remove the 4th gear from the mainshaft, then check it for wear. Replace the worn part.



31) Remove the starting driven gear set and washer, then check them for wear.
Replace the worn part.



2.4.4 Troubleshooting to transmission

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Vehicle	Remedy
Gear	Gear tooth surface or gear are worn-out or damaged		Abnormal sound during gearbox driving. Gear shifting with difficulty	Replace the gear
	Gear end face engagement claw edge is worn into arc		Transmission is easy to disengage	Do.
	Gear engagement hole is worn into trumpet shape	Shaft-to-hole clearance is too large	Do.	Do.
	Fork groove is worn-out	Fork-to-groove clearance is too large	Do.	Do.
Gearshift Fork	Claw is excessively worn	Do.	Do.	Replace the fork
	Fork is deformed	Deformed fork	Gear shifting with difficulty	Do.
	Fork hole is considerably worn	Fork-to-drum gap is too large	Do.	Do.
Gearshift Drum	Groove is worn-out		Do.	Replace the worn-out drum
Gearshift Drum Stopper	Excessively worn or damaged		Do.	Replace the stopper
	Spring is weak or broken	Gearshift pedal slipping	Transmission is easy to disengage	Replace the torque spring
Gearshift Shaft	Spline is damaged	Gearshift lever slipping	Transmission fails to engage	Replace the gearshift shaft
	Gearshift shaft is deformed		Gear shifting with difficulty	Do.
	Gearshift shaft is worn-out or broken		Do.	Do.
	Return spring is weak or broken		Gear shifting with difficulty. Pedal is not to return	Replace the return spring
Oil Seal	Oil seal is worn-out, damaged or aged		Oil leakage	Replace the oil seal
Bearing	Excessive wear or damage		Abnormal sound from the transmission	Replace the bearing

2.5 CRANKCASE

- 2.5.1 Removal, Maintenance and Installation

- 1) Unscrew the drain plug, empty the engine oil thoroughly.
(Specification of plug: M36×1.5 Tightening torque:20~30 N.m)



- 2) Unscrew the bolt M6 of right crankcase cover. Remove the cover by striking with a rubber hammer.

Tightening torque of bolt: 8~12N.m



- 3) Check the gasket of right crankcase cover for wear. Replace it if necessary.



- 4) The construction of right crankcase cover comp. is shown as following figure. Check the clutch rod for wear. Replace it if necessary.

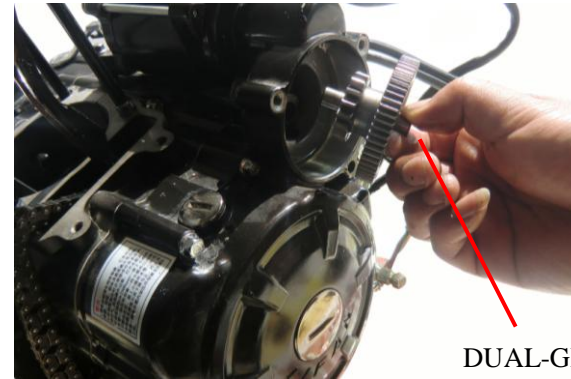
CLUTCH ROD COMP.



5) Unscrew the bolt M6 of left crankcase cover.
Tightening torque: 8~12N.m

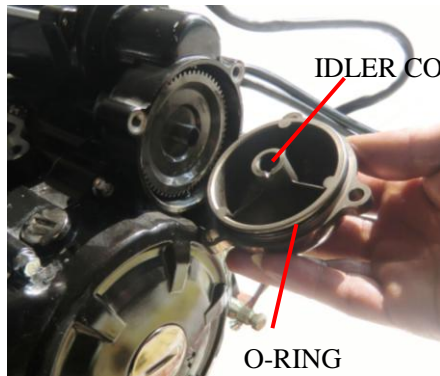


7) Check the dual-gear for wear. Replace the gear if there's pit or tooth breakage.



DUAL-GEAR

6) Unscrew the fixing bolt of starter motor and idler cover. Remove the starter motor and idler cover. Check the O-ring for wear. Replace it if necessary.



IDLER COVER

O-RING

8) Disconnect the magneto wire leads. Remove the left crankcase cover.



9) Check the gasket of left crankcase cover for damage. Replace it if necessary.



11) Unscrew and remove the bolt M6 of water inlet cover.
Tightening torque: 8~12N.m



10) Unscrew the connecting bolts from the crankcase.
Tightening torque: 8~12N.m



12) Remove the water inlet cover.



13) Check the water inlet cover and gasket for wear. Replace it if necessary.



15) Remove the right crankcase cover.



WATER PUMP GEAR

14) Unscrew and remove water pump gear.



16) Remove the water pump gear.



17) Check the water pump gear and O-ring for wear, replace them if necessary.

O-RING



2.5.2 Troubleshooting to Crankcase

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Motorcycle	Remedy
Crankcase	Cracks on the crankcase		Oil leakage through crankcase	Repair or replace
	Threads on the crankcase are damaged		Oil leakage between RH/LH crankcases	Repair or replace
	Threads of cylinder are damaged	Gas leakage between cylinder head and cylinder due to loose of cylinder nuts	Engine fails or is hard to start. Engine lacks power. Unstable idle speed	Trim the threaded hole or replace the crankcase
	Bolt of cylinder is broken	Do.	Do.	Replace the broken bolt with a new one
	Oil seal is damaged		Oil leakage through oil seal	Replace the oil seal
Right Crankcase Cover	Damaged or cracks on the right crankcase cover		Oil leakage through right crankcase cover	Repair or replace right crankcase cover
	Gasket is damaged		Oil leakage between right crankcase and cover	Replace the gasket with a new one
Left Crankcase Cover	Damaged or cracks on the left crankcase cover		Oil leakage through left crankcase cover	Repair or replace left crankcase cover
	Gasket is damaged		Oil leakage between left crankcase and cover	Replace the gasket with a new one
Water Pump Gear	Water pump gear is damaged	Coolant liquid fails to cycle	Engine overheats	Replace water pump gear
Water Inlet Cover & Gasket	Gasket is damaged		Water leakage	Replace the gasket with a new one
O-Ring of Water Pump Gear	O-ring is damaged		Water leakage	Replace the O-ring

2.6 CRANK MECHANISM

2.6.1 Removal, Maintenance and Installation

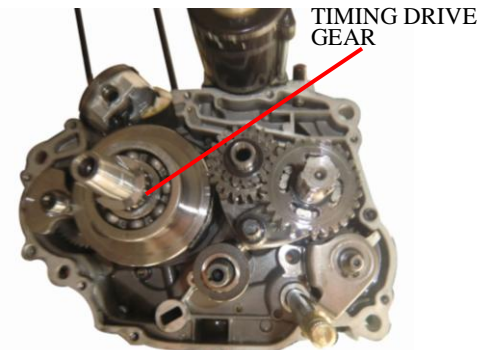
1) Check the mainshaft bearings, countershaft bearings and crankshaft bearing. Replace them if necessary



2) The construction of crankshaft, mainshaft comp., countershaft comp., gearshift drum, forks, etc. is shown as following figure.



3) Remove the crankshaft and connecting rod. Check the timing drive gear for wear. Replace the worn-out gear with a new one. Note: The “O” mark of timing drive gear should be aligned with crank woodruff groove.



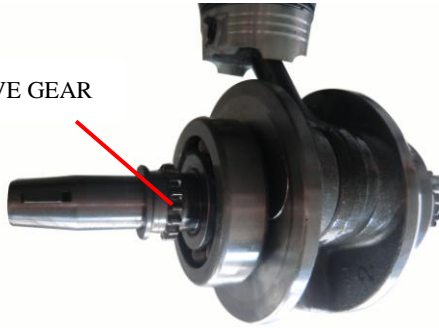
4) The construction of connecting rod is shown as following figure. Measure the gap of connecting rod big end. If it is out of the service limit, replace the connecting rod.

Service limit of radial play: 0.05mm Service limit of axial play: 0.60mm



5) Check the timing drive gear of crankshaft for wear. Replace it if necessary.

TIMING DRIVE GEAR



7) Measure the O.D. of the piston pin with a micrometer. If it is beyond the service limit, replace the worn pin with a new one.

Service limit: 14.95mm



6) Check LH/RH bearings of crankshaft and balance shaft for wear. Replace them if necessary.

BALANCE SHAFT



8) Clear away carbon deposit on the piston top.



9) Remove the piston rings from the piston. Check the piston rings for wear and elasticity. Measure the opening gap of the rings with a feeler gauge. If it is beyond the limit, replace the piston ring as a set.
(Limit value: Ring I & II : 0.5mm O-ring: 1.2mm)



Measure the diameter of piston skirt at the position which is 10mm away from the bottom. If it is beyond the limit, replace the piston.
Service limit: $< \Phi 63.3\text{mm}$



10) Measure the width of piston groove and diameter of piston skirt. If it is beyond the limit, replace the piston. Limit value of the ring: 0.85mm



2.6.2 Troubleshooting to Crankshaft Mechanism

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Vehicle	Remedy
Piston	Carbon deposit on the piston top		Engine overheats	Clear away carbon deposit
	Carbon deposit in the piston ring groove	The piston ring is seized in the ring groove	Engine fails or is hard to start. Engine lacks power. Thick blue smoke from the exhaust pipe	Do.
	Scuffing or scratches on the surface of piston skirt	Piston-to-cylinder clearance is too large	Do.	Replace the piston
	Seriously worn piston	Do.	Do.	Do.
	Seriously worn piston ring groove	Piston ring-to-groove clearance is too large	Thick blue smoke from the exhaust pipe	Do.
	Excessively worn piston pin hole	Piston pin-to-hole clearance is too large	Knocking sound of piston pin and of cylinder	Do.
Crank pin	Worn out	Radial and axial gap is too large	Knocking sound of big end bearing	Replace the crankshaft/ connecting
Bearing	Excessive wear of needle bearing	Do.	Do.	Do.
	Excessive wear or damage of crankshaft bearing		Abnormal sound from the crankshaft bearing	Replace the bearing
Piston Ring	Piston ring is broken		Engine fails or is hard to start. Engine lacks power. Thick blue smoke from the exhaust pipe	Replace the rings as a set
	Piston ring is seriously worn	End or side gap is too large	Do.	Do.
	Piston ring is out of elastic	Improper air-tightness of piston-to-cylinder	Do.	Do.
	Improper placing	Piston ring end gaps are not staggered	Engine lacks power. Thick blue smoke from the exhaust pipe	Offset the piston ring end gaps
Piston pin	Excessive wear	Piston pin-to-hole clearance is too large	Piston pin slap	Replace the piston pin
Connecting rod	Excessive wear of small-end hole	Piston pin-to-small end hole is too large	Do.	Replace the connecting rod
	Connecting rod is bent		Knocking of cylinder	Do.
	Excessive wear of big-end hole	Radial and axial gap is too large	Knocking sound of big-end bearing	Do.

2.7 STARTERS

2.7.1 Kick-starter

- 1 Removal, Maintenance and Installation
 - 1) Remove the crankshaft & connecting rod comp.



- 2) Remove the starting shaft, and check it for wear. Replace it if necessary.



- 3) Check the torque spring of starting for elasticity, and replace the spring if necessary. For which purpose, remove the spring, ring and seat of starting shaft.



- 4) Remove the washer III and ratchet seat of starting shaft, and check them for wear. Replace them if necessary.



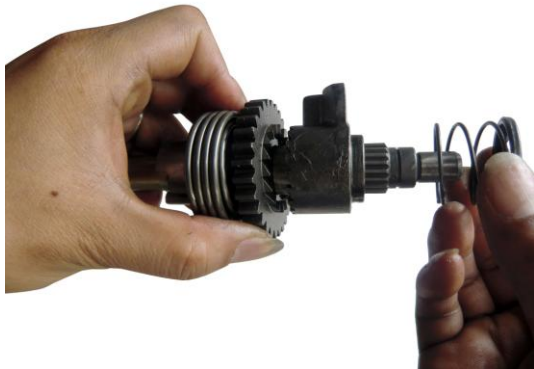
5) Remove the circlip, and check it for deformation. Replace it if necessary.



8) Remove the snap ring of starting shaft, and check it for deformation. Replace it if necessary.



6) Remove the friction spring of starting gear, and check it for elasticity. Replace it if necessary.



9) Remove the ratchet, and check it for wear. Replace it if necessary.



2.7.2 Troubleshooting to Kick-starter

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Vehicle	Remedy
Starting lever	Spline connected with starting lever slipping	Starting lever slipping	Starting is slipping	Replace the starting lever with a new one
Starting gear	Gear is worn	Starting is slipping	Starting is slipping	Replace the gear with a new one
	Gear is damaged		Starting is hard	
Ratchet	Ratchet is worn heavily	Starting is slipping	Starting is slipping	Replace the ratchet with a new one
	Friction spring of starting gear is broken	Starting is slipping	Starting is slipping	Replace the spring with a new one
Starting shaft	Spline of starting shaft is damaged	Starting is slipping	Starting is slipping	Replace the starting shaft with a new one
	Return spring is broken	Starting lever fails to return		Replace the return spring

2.7.3 Electric starter

- 1 Removal, Maintenance and Installation

1) Unscrew the fixing bolt of starting motor.

(Bolt specification M6×28 Tightening torque: 8~12N.m)



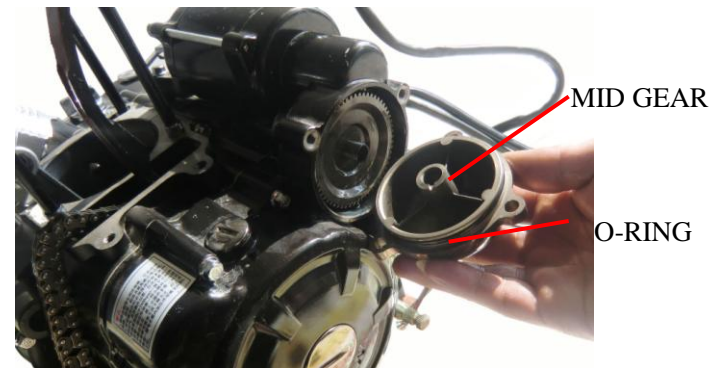
2) Knocking with a plastic hammer, remove the starting motor.



3) Unscrew bolts of left crankcase cover. (Tightening torque: 8~12N.m)



4) Unscrew bolts of mid gear cover, and remove the cover. Check the O-ring of cover, replace it if necessary. (Replace the O-ring if it is damaged or creased, otherwise there will be oil leakage)



5) Remove the dual-gear comp. I, a washer, dual-gear shaft and a washer in due succession. Check them for wear. Replace the worn part.



7) Remove the magneto wire plate from the left crankcase cover.



6) Remove the gear indicator, and check it. Replace or repair it if necessary.



8) Remove the left crankcase cover comp., and check the gasket of cover. Replace the gasket if necessary.



9) Remove the dual-gear II, and check it for wear. Replace it if necessary.



10) Unscrew bolt of magneto, remove the rotor of magneto with specified tools.
(Bolt specification M10×35 Tightening torque: 40~50N.m)

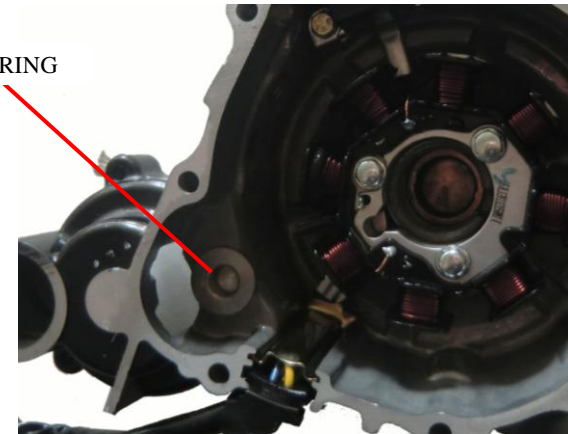


11) Check the starting clutch body, rollers and springs for wear. Replace the worn part if necessary.



12) Check the needle bearing of dual-gear II for wear. Replace the worn part.

NEEDLE BEARING



13) Check the coils of both rotor and stator of magneto for damage. Replace the damaged part.



2.7.4 Troubleshooting to Electric Starter

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Vehicle	Remedy
Starting motor	Carbon brush is worn heavily		Starting motor lacks power or is out of work	Replace the worn brush
	Spring of carbon brush is broken or is out of elasticity		Starting motor lacks power	Replace the spring
	Armature commutator surface is fouled		Do.	Clean the commutator surface with gasoline or alcohol
	Armature commutator surface is spotted, burnt or damaged		Do.	Polish the surface of commutator with fine abrasive paper. Make the cut on the mica plate between each commutator piece with broken saw bit 0.5-0.8 mm deeper than the commutator surface. Remove the chip and burr between each commutator
	Armature commutator surface is worn considerably		Starting motor lacks power or is out of work	Replace the starting motor
	Rotor coil is damaged by short circuit or broken circuit		Starting motor is out of work	Replace the starting motor
Starting clutch	The contact surface of starting clutch and roller is damaged or worn heavily	Starting clutch is slipping or has abnormal sound	Starting clutch is slipping or has abnormal sound	Replace the gear of starting clutch
	The contact surface of starting clutch and roller is worn into concave groove	Do.	Do.	Replace the starting clutch
	The roller is worn heavily or damaged	Do.	Do.	Replace the starting clutch

2.8 LUBRICATION SYSTEM

● 2.8.1 Removal, Maintenance and Installation

1) Unscrew the oil gallery bolt from the cylinder head.

(Bolt specification: M6×12 Tightening torque: 8~12N.m)



3) Unscrew and remove the locknut M8 of cylinder head.

(Tightening torque: 30~40N.m)



2) Unscrew and remove the bolt of valve cover, then remove the valve cover.

(Bolt specification: M6×12 Tightening torque: 8~12N.m)



4) Unscrew and remove the bolt of cylinder head connecting

(Bolt specification: hexagon socket head, M6×90

Tightening torque: 8~12N.m)



5) Dismantle the cylinder block, and check the oil gallery in the cylinder block for clogs.



6) Check the oil gallery in the crankcase, and clean it.



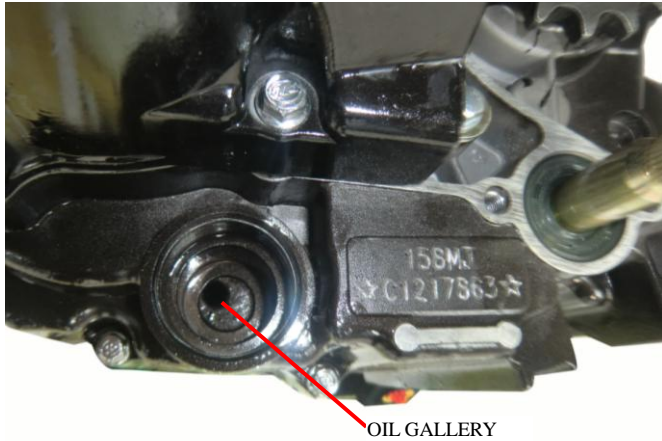
7) Remove the oil screen cap M36×1.5 from the crankcase. (Tightening torque: 20~30N.m)



8) Check the oil strainer, and clean it if necessary. Replace the damaged part if necessary.



9) Unscrew the drain plug, empty the engine. Check the oil gallery and clean it if necessary.



OIL GALLERY

10) Unscrew the bolts of right crankcase cover, then remove the right crankcase cover. (Tightening torque: 8~12N.m)



11) Check the oil sight glass for leakage, and replace it if necessary. Check the oil gallery in the right crankcase cover for foreign matter, and clean it.



12) Remove the clutch lifter rod and push rod. Check them for deformation and replace deformed part.



13) Remove the bearing, and check it for deformation. Replace it if necessary.



15) Remove the oil pump gear, then check it for wear and flexible turning. Replace it if necessary.



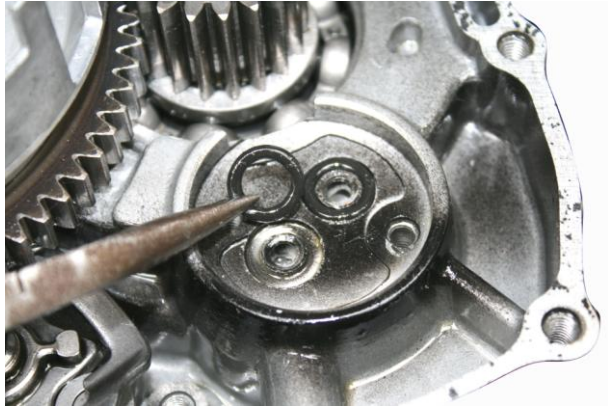
14) Turning the driven gear of oil pump, check the oil pump for proper functioning. Replace the pump if it is out of work..



16) Measure the gap between the inner rotor and outer rotor. Replace the oil pump if it is out of the service limit. Service limit: 0.075~0.165



17) Check the oil gallery in the oil pump for clogs or foreign matters. Clean it if necessary.



2.8.2 Troubleshooting to Lubrication System

Description	Damage Form	Trouble Symptom of Component	Trouble Symptom of Vehicle	Remedy
Oil pump	Inner/outer rotor of oil pump is worn heavily	Oil is delivered improperly by the oil pump	Engine lacks power, overheat, or excessive wear	Replace the oil pump
Oil strainer	Strainer is clogged	Oil is delivered improperly by the oil pump	Engine lacks power, overheat, or excessive wear	Clean the oil strainer
Lubrication system	Oil gallery is clogged	Insufficient oil supply	Engine lacks power, or overheats. Parts are damaged heavily	Clean the oil gallery

CHAPTER 3 CHASSIS

3.1 FRAME BODY

3.1.1 Motorcycle identification

1) VIN

The vehicle identification number (VIN) is stamped into the left of steering stem.



VIN

1.2 Nameplate

Nameplate is fixed in front of the steering stem.



Nameplate

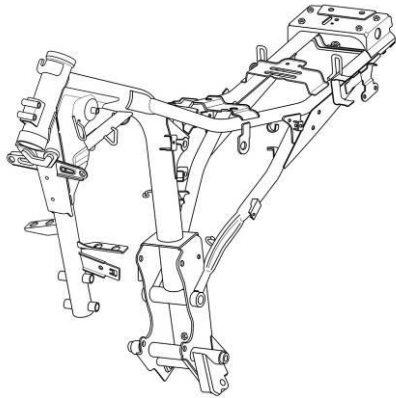
3.1.2 Maintenance of Frame

Description	Damage From	Trouble Symptom	Remedy
Frame	Frame is deformed or broken	Running off-tracking	Correct or replace
Side stand	Deformed or broken	Effect of parking	Replace the side stand
	Return spring is damaged	Side stand fails to return. Effect of parking	Replace the spring
Covering parts	Broken	Effect of appearance	Replace or repair the covering parts
Fender	Damaged	Effect of fending	Replace the fender
Seat	Broken	Decrease of riding comfort	Replace the seat
Footrest	Deformed or broken	Step bar is deformed or rubber is broken	Correct or replace

3.1.3 Maintenance of Frame and Accessories

- Removal, Maintenance and Installation

1) Check the frame and accessories. Repair or replace if necessary.



2) Check the rearview mirror for proper fastening. Tighten it and wipe the surface.



3) Check the free play of rear brake pedal to see if it is out of the service limit. If it is, exhaust the air in the rear brake system and check the free play of rear brake pedal again to make sure it is within the limit.

Free play of rear brake: 20-30mm



4) Check the front fender for damage. Replace it if necessary.



5) Check the rear fender for damage. Replace it if necessary.



REAR FENDER

6) Check the main footrest for wear. Replace it if necessary.



MAIN FOOTREST

7) Check the pillion footrest for wear. Replace it if necessary.



PILLION FOOTREST

8) Check the side stand for deformation. Replace it if necessary.



SIDE STAND

9) Check the pillion rail for damage. Replace it if necessary.



11) Check the fuel tank for leakage. Replace it if necessary.



10) Check the seat for break. Replace it if necessary.



12) Check the right side cover for damage. Replace it if necessary.



13) Check the left side cover for damage. Replace it if necessary.

LEFT SIDE COVER



14) Check the right ornament of fuel tank for break. Replace it if necessary.

RIGHT ORNAMENT



15) Check the left ornament of fuel tank for break. Replace it if necessary.

LEFT ORNAMENT



3.2 SUSPENSION SYSTEM

● 3.2.1 Removal, Installation and Maintenance of Steering Handle

1) Turning the steering handle, check it for proper functioning.



3) Unscrew the fixing bolt of steering stem top bridge.



2) Remove the steering handle, check it for deformation. Correct or replace it if necessary.



4) Unscrew adjusting nut from the steering stem and remove the lower bridge.



5) Check the top/bottom race of steering stem upper bearing for wear. Replace them if necessary.



7) Before installing the steering stem, apply a layer of grease to bottom race of the bearing.



6) Extract the steering stem and check it for wear or deformation. Replace it if necessary.



8) Tighten up the locknut of steering stem.
(Nut specification: M24×1 Tightening torque: 60-90N • m)



●3.2.2 Troubleshooting to Steering Stem and Accessories

Description	Damage Form	Trouble Symptom	Remedy
Bottom Race of Bearing	The bolt of steering stem is over tighten	Operation of steering handle is stiff.	Turn the adjusting nut by means of a wrench until the steering stem moves smoothly and easily, and no radial play between the steering and pipe is allowed
	The race is worn seriously. Such defects as pockmarks, dints, cracks are found	Steering handle shakes or vibrates. Steering handle runs stiffly	Replace the bottom race of bearing as a set
Bearing	Cone bearing is worn, deformed or damaged	Steering handle shakes or vibrates. Steering handle runs stiffly	Replace the bearing
Steering Stem	Deformed		Replace the steering stem

3.3 FRONT SUSPENSION

● 3.3.1 Removal, Installation and Maintenance of Front Shock Absorber

1) Unscrew the bolt of top bridge and steering bar.



2) Unscrew the bolt of bottom bridge.



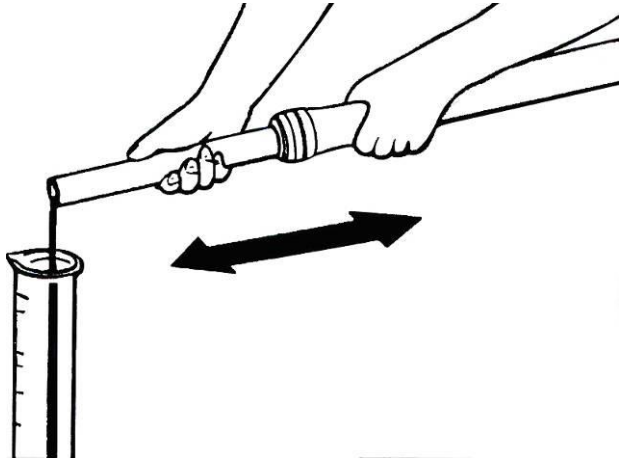
3)) Unscrew the locknuts of front axle. Remove the front axle and front wheel.



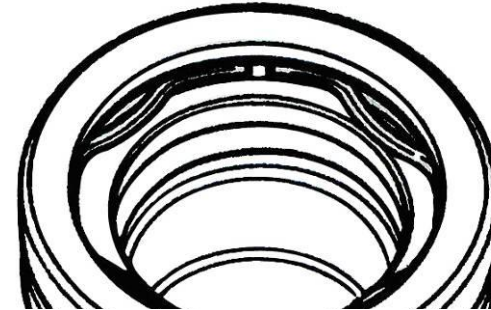
4) Unscrew the mounting bolt from front fender. Remove the front shock absorbers.



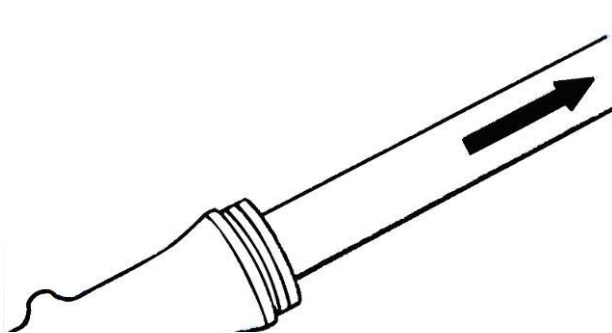
5) Remove the drain bolt, empty the damping oil from the pipe. Check the oil, and replace it if necessary.



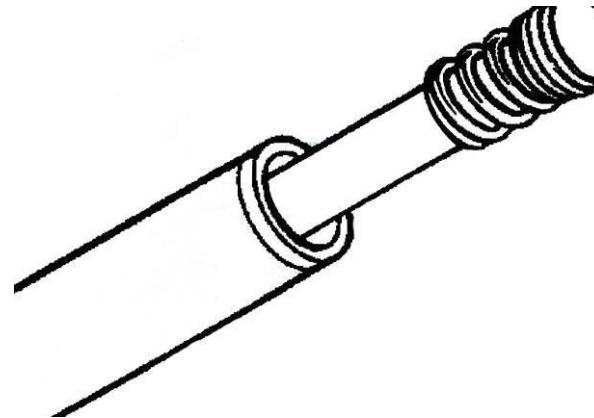
7) Remove the oil seal, check it for wear. Replace it with a new one if necessary.



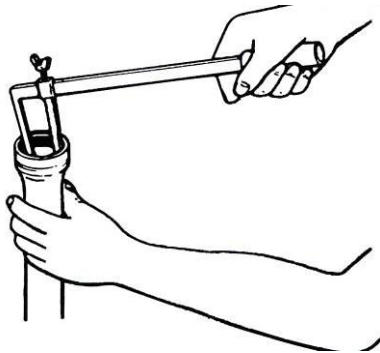
6) Remove the dust seal, circlip, bottom case, etc.



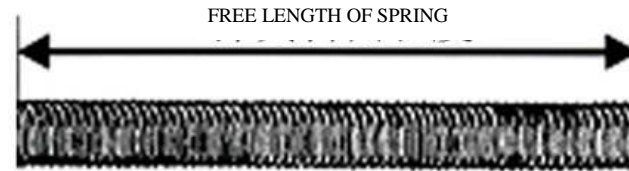
8) Remove the rebound spring, and check it for wear. Replace it if necessary.



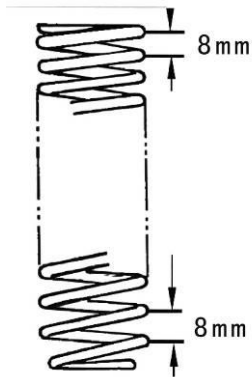
9) Measure the I.D. ($\Phi 37$) of bottom case. Replace it if it is out of the limit.
Service limit: 37.5mm



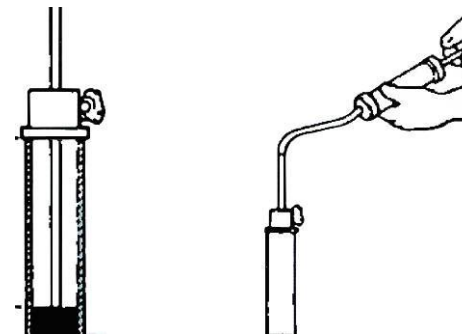
11) Measure the free length of damping spring. Replace it if it is out of the service limit. Free length of spring: 410 ± 2 mm



10) Measure the damping spring and replace it if it is out of the limit.
Service limit: 8mm



12) Pour 320 ± 2 ml of the recommended damping oil into the pipe



3.3.2 Troubleshooting to Front Shock Absorber

Description	Damage Form	Trouble Symptom	Remedy
Spring	The spring is non-elastic or damaged	Front shock absorber is too soft or abnormal sound comes out the bottom case	Replace the fork spring
Fork tube	Bending or deformed	Off-track in running	Correct or replace the part
	Working surface is damaged or scratched	Oil leakage through seal	Replace the fork tube
	Chromium-plated part is worn to expose the substrate	Oil leakage through seal	Replace the fork tube
Bottom case	Broken, deformed or damaged	Oil leakage through bottom case	Replace the bottom case
Damper rod	Heavily worn or damaged	Shock absorber is too soft	Replace the ring
	Ring is heavily worn or damaged	Shock absorber is too soft	Replace the ring
Oil seal	Heavily worn, damaged or aged	Oil leakage from front shock absorber	Replace the oil seal
Damping oil	Lack of oil	Shock absorber is too soft	Fill damping oil as per the specification

3.4 REAR SUSPENSION

● 3.4.1 Removal, Installation and Maintenance of Rear Shock Absorber

1) Check rear fork to see if it swings. Replace the rear fork shaft sleeve if necessary.



3) Remove the rear fork shaft.



2) Unscrew the locknut of rear fork shaft.



4) Check the rear fork shaft sleeve for wear. Replace the rear fork if necessary.



5) Unscrew the upper and lower connecting bolt of rear shock absorber. Check the bush for wear. Replace it if necessary.



6) Check the spring for functioning. Check the rear shock absorber for leakage. Replace the shock absorber if necessary.



3.4.2 Troubleshooting to Rear Suspension

Description	Damage Form	Trouble Symptom	Remedy
Rear Shock Absorber	Spring is weak or broken	Rear shock absorber is too weak or stiff	Replace the spring
	Oil leakage from rear shock absorber	Rear shock absorber is too weak	Replace the rear shock absorber
	Piston rod is bended, deformed or broken	Rear shock absorber is too stiff	Replace the rear shock absorber
Rear fork	Deformed	Off-tracking in running	Correct or replace the rear fork
	Broken	It fails to operate	Weld or replace the part

3.5 FRONT AND REAR WHEELS

● 3.5.1 Removal, Installation and Maintenance

1) Unscrew the locknut of front hydraulic brake. Remove the hydraulic brake.



3) Check the speed sensor for wear. Replace it if necessary.



2) Unscrew the locknut of front axle, and remove the front wheel.



4) Remove front axle bush and check it for wear. Replace it if necessary.



5) Remove the oil seal of front axle and check it for wear. Replace the oil seal if necessary.



6) Check the bearing of front axle for wear. Replace it if necessary.



BEARING

7) Unscrew the adjusting nut of chain. Remove the chain.



8) Unscrew the locknut of rear axle and extract rear axle



9) Remove the right bush of rear axle. Check it for wear. Replace it if necessary.



11) Remove the bolt M8 on the rear driven sprocket and remove the circlip. Check it for wear and replace it if necessary.

Tightening torque: 24-30 N · m



10) Remove the left bush of rear axle. Check it for wear. Replace it if necessary.



12) Check the depth of wheel tread. Replace the tire if the depth is less than 2mm.



13) Check the oil seal of rear axle. Replace it if necessary.



OIL SEAL

14) Check the bearing of rear axle for wear. Replace it if necessary.



BEARING

15) Check the mounting surface of brake disc. Replace the wheel hub if necessary.



MOUNTING SURFACE OF BRAKE DISC

16) Check the brake disc for wear. Replace the brake disc if necessary.



Front brake disc



Rear brake disc

17) Exhaust the air in the front brake after assembly.



18) At last, pull and loosen the front brake lever. Repeat this action for 10 times. Adjust the control force to the degree which is proper for users. (Less than 200N)



19) Exhaust the air in the rear brake after assembly.



20) At last, step and loosen the rear brake pedal. Repeat this action for 10 times. Adjust the control force to the degree which is proper for users. (Less than 350N)



3.5.2 Troubleshooting to Front and Rear Wheel

Description	Damage Form	Trouble Symptom	Remedy
Front Wheel	Speed sensor is damaged	Pointer of odometer doesn't turn	Replace the speedometer
	Oil seal of front axle is worn	Too much dirt in the oil seal of front axle	Replace the oil seal of front axle
	Poor braking performance	Wear braking effect of front hydraulic brake	Exhaust the air in the front hydraulic brake. See point 16 of 5.2 for detailed steps.
Rear Wheel	Oil seal of rear axle is worn	Too much dirt in the oil seal of rear axle	Replace the oil seal of rear axle
	Poor braking performance	Wear braking effect of rear hydraulic brake	Exhaust the air in the rear hydraulic brake. See point 17 of 5.2 for detailed steps.

3.6 INTAKE SYSTEM AND EXHAUST SYSTEM

● 3.6.1 Removal, Installation and Maintenance of Intake System

1) Open the seat lock.. Disassemble the seat.



2) Unscrew the screw of air filter cover. Remove the air filter cover and check it. Replace it if necessary.



3) Remove the element of air filter. Check it for damage. Replace it if necessary.



4) Check the air filter housing and clean the dirt. Replace it if necessary.



3.6.2 Trouble Shooting to Air Filter

Description	Damage Form	Trouble Symptom	Remedy	Remark
Air Filter	Too much dust deposited on the element	Engine is hard to start. Engine lacks power. Unstable idle speed. Excessive fuel consumption. Thick blue smoke from the exhaust pipe.	Remove the element according to 3.6.1. Clean it in cleansing solvent and dry it up. Then soak the element in engine oil SAE15W/40-SE until it becomes saturated, and then squeeze extra oil. At last, install the element to initial position	Never use water, gasoline or low flash point solvents for cleaning the air cleaner
	The element is fractured	Noise from the air suction of engine is too loud	Replace the damaged element	

3.6.3 Removal, Installation and Maintenance of Exhaust System

1) Unscrew locknut of exhaust pipe.



3) Remove the exhaust pipe. Check the muffler and mounting bracket for damage. Replace or repair if necessary.



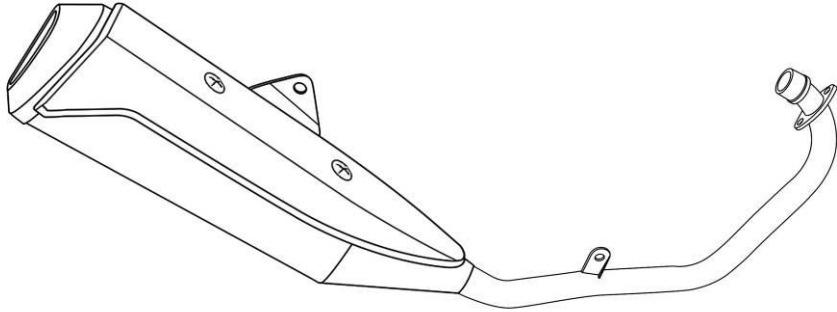
2) Unscrew bolt of muffler.



4) Remove the gasket of muffler, and replace it with a new one.



5) Shaking the muffler, check it for abnormal sound. Replace it if necessary.



3.6.4 Maintenance of Exhaust Muffler

Description	Damage Form	Trouble Symptom	Remedy	Remark
Gasket	Gasket is broken	Noise from the exhaust pipe is too loud	Replace the gasket with a new one	Replace the gasket whenever the ex. pipe is disassembled
Exhaust Muffler	The muffler case or mounting bracket is damage	Do.	Replace the exhaust muffler	
Exhaust Muffler	Sealing-off is found on the part	Abnormal sound from the inside of exhaust muffler	Replace the exhaust muffler	
Exhaust Muffler	Carbon deposit in exhaust pipe	Performance of engine is poor	Clean away carbon deposit in exhaust pipe with genuine cleansing solvent	

3.7 COOLING SYSTEM

● 3.7.1 Removal, Installation and Maintenance of Cooling System

1) Open the seat lock.. Remove the seat.



2) Unscrew the mounting screw on the left ornament of fuel tank. Remove the left ornament of fuel tank.



3) Unscrew the mounting screw on the right ornament of fuel tank. Remove the right ornament of fuel tank.



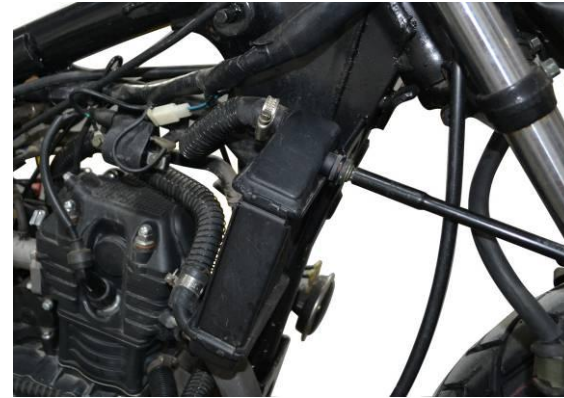
4) Unscrew the mounting screw of radiator cowl. Remove the radiator cowl.



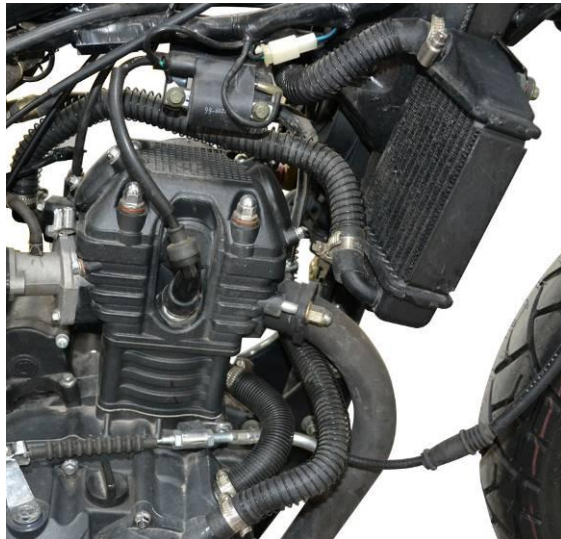
5) Remove the fuel tank.



7) Unscrew the mounting bolt M6×22 of radiator.



6) Remove the hoop of water pipe.



8) Remove the radiator and check it for damage or clog. Replace it if necessary.



9) Check the water pipe for damage and aging. Replace it if necessary.



10) Check the water reserve tank for damage or leakage. Replace it if necessary.

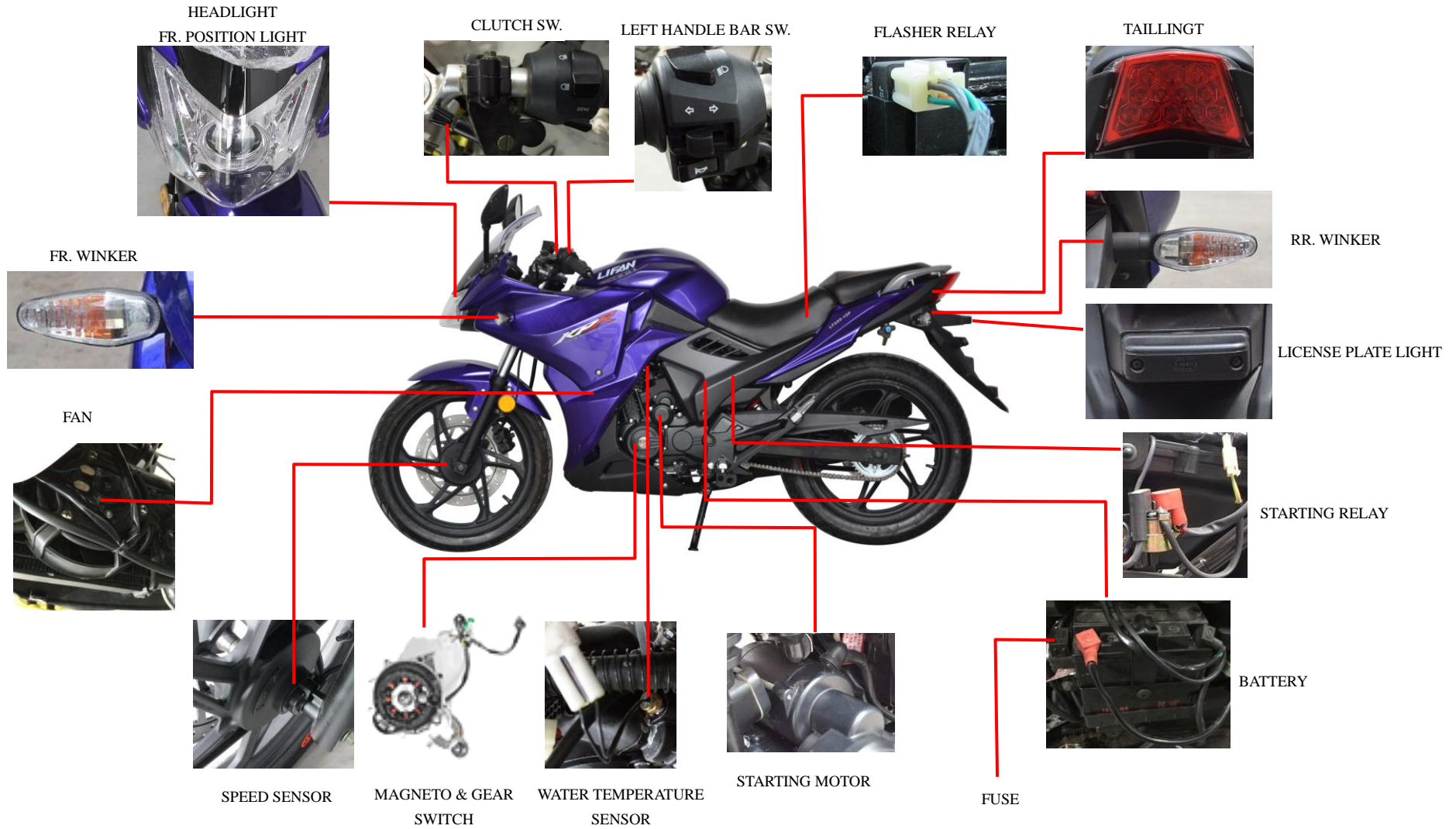


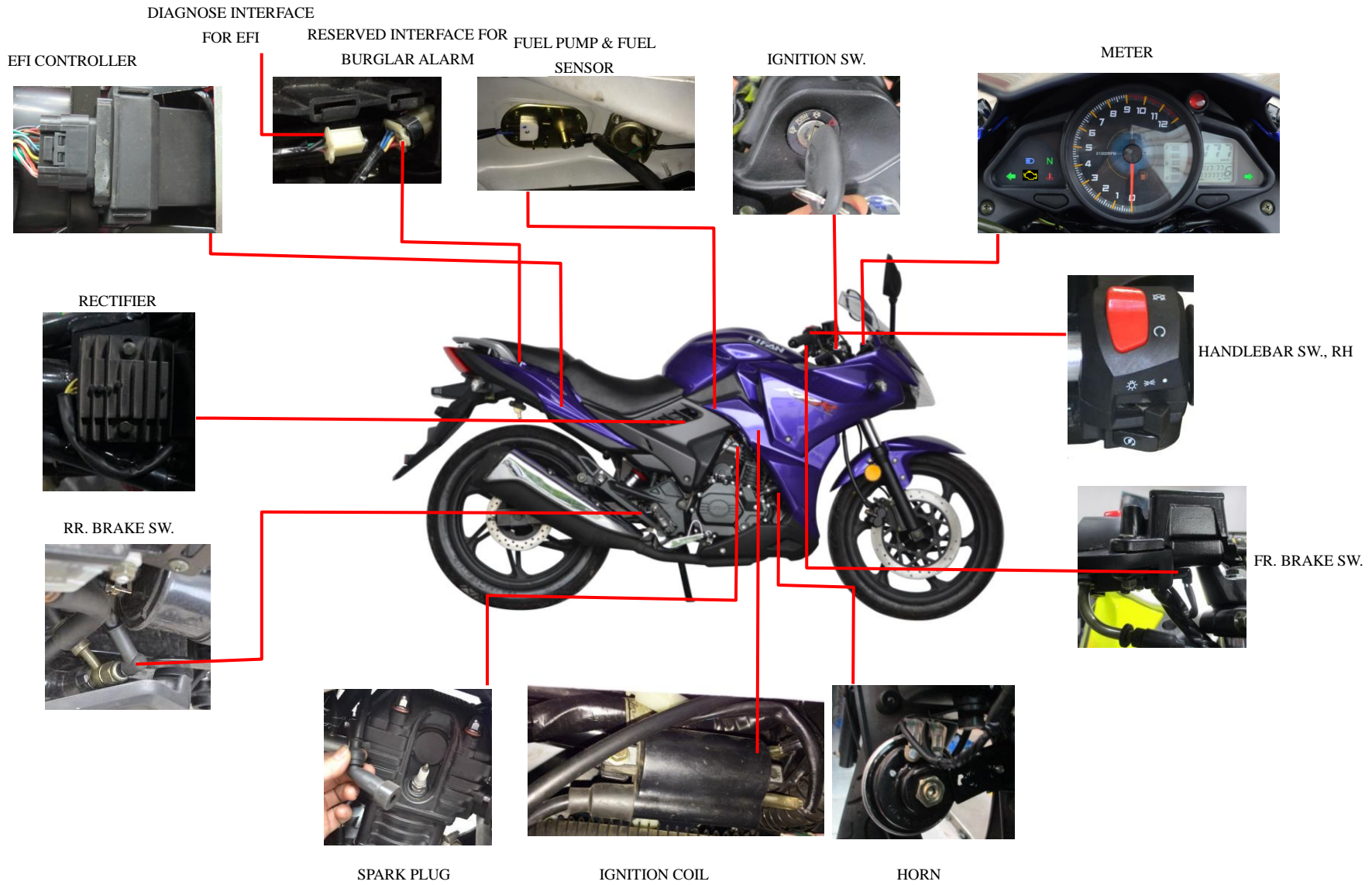
3.7.2 Troubleshooting to Cooling System.

Description	Damage Form	Trouble Symptom	Remedy	Remark
Radiator	Clogged	Too much dirt, coolant liquid, no circulation about coolant liquid, engine overheats	Clean the radiator or replace it	
	Damaged	No circulation about coolant liquid, engine overheats	Replace the radiator	
Water pipe	Aged, damaged	Water leakage	Replace the water pipe	
Water reserve tank	Water leakage, damaged	Water leakage	Replace the water reserve tank	

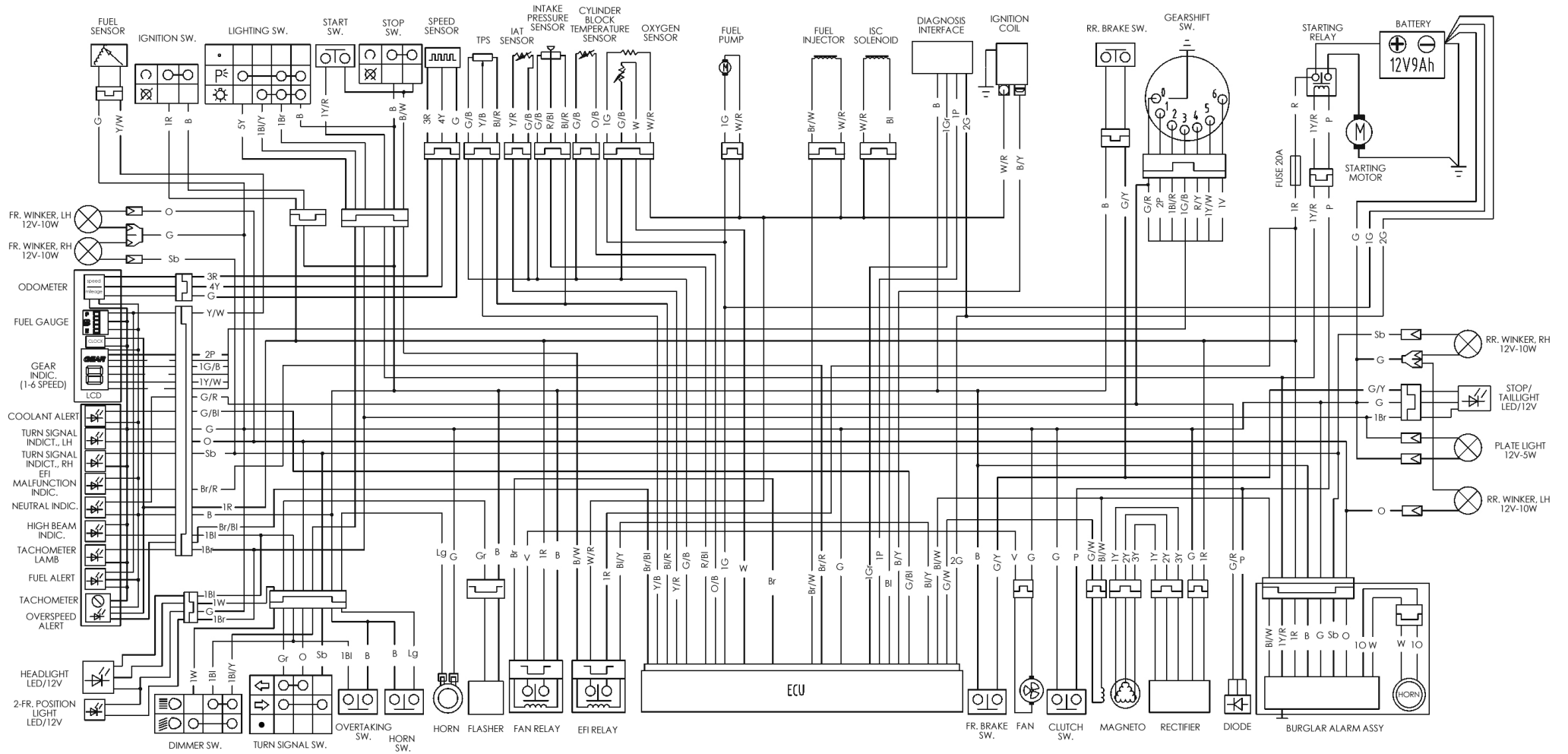
CHAPTER 4 ELECTRICAL COMPONENTS AND METER

● Configuration of Electrical Components on the Vehicle





● ELECTRIC DIAGRAM



4.1 CHARGING SYSTEM


4.1.1 ● The charging system consists of:

- 1) Battery(12V9Ah)
- 2) Magneto: AC permanent-magnet generator, magneto rotor and stator (including charging/lighting coil and exciter coil).
- 3) Rectifier with regulator: is of three-phases, full-wave switch type.
- 4) Fuse: chip fuse 20A, with a spare one.

The battery is connected with the magneto in parallel, and to the electric equipment with power.

4.1.2 ● Charging system is designed to supply the devices with power at the electric power that generator send out is enough, and charge toward the battery for storing a part of electric power. Therefore, make sure to supply the device with electric power when the generator runs at a lower speed or power is weak due heavy load.

4.1.3 ● Removal, Installation and Maintenance of Charging System

Turn the key from  to  to open the ignition switch. Turn the stop switch to 

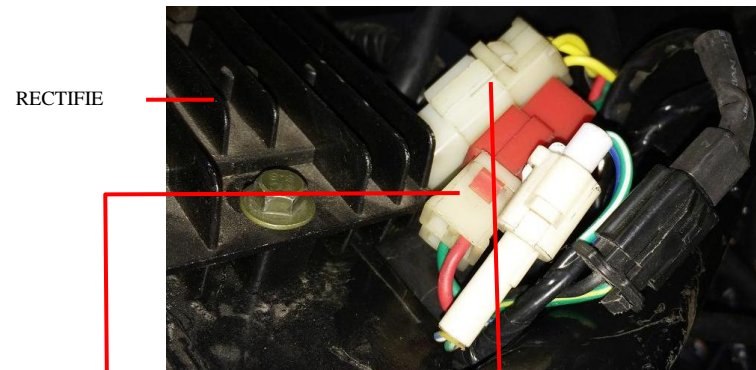


IGNITION SW.



STOP SW.

Disconnect the rectifier coupler from the main cable, check them for continuity. Replace the rectifier if necessary.

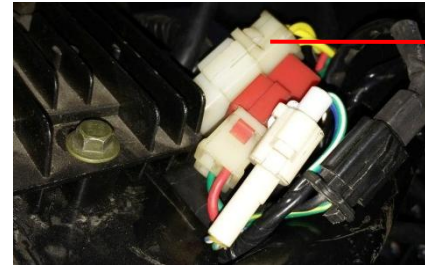


SOCKET OF RECTIFIER
AND MAIN CABLE

SOCKET OF MAGNETO
AND RECTIFIER

The charging voltage of rectifier is within 13V~15V. If it is less than 13V, and the malfunction is determined from the rectifier, replace the part with a new one.

Disconnect the connection between rectifier and charging coil from magneto; check the lighting coil for continuity. If not so, repair or replace it.



Charging coil coupler Y/Y/Y wire is charging/LIGHTING coil

Start the engine, measure the voltage between Y wire to W wire of charging/light coil with multimeter (A.C. 200V). The voltage of charging/lighting coil without load is: when rotate speed of engine changes within the scope of 1500 r/min~8000 r/min, the voltage between Y wire to Y wire of charging/light coil without load should be in the scope of 20 ± 5 V~ 100 ± 20 V. The voltage increases with the increase of the rotate speed.

The voltage will be different from the normal value considerably if a short circuit or broken circuit occurs on the charging/lighting coil, or the coil is connected with the metal housing. Replace the charging/lighting coil if necessary.

Replace the magneto rotor if the no-load voltage is different from the normal value considerably



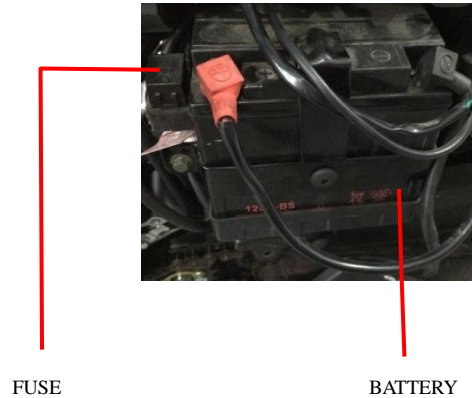
Remove the flywheel of magneto rotor and check it for magnetism. Replace it if necessary.



Check the voltage of battery. If it is below 12V, recharge the battery.

Check the fuse for continuity. Replace the blown fuse. Specially pay attention to use of the same specification fuse. Never use other material such as aluminium, iron or copper with instead.

Speciation of fuse: 20A

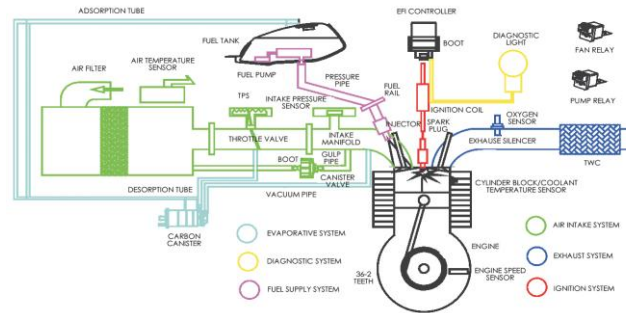


4.1.4 Troubleshooting of Charging System

Description	Damage From	Trouble Symptom	Remedy
Magneto	A broken circuit occurs on the charging/lighting coil	Output voltage of coil is low. Charging to battery is insufficient	Replace the charging/lighting coil
	Charging/lighting coil is broken (the resistance is ∞)	The coil has no output voltage. The battery power is insufficient, and electric components are out of work	Replace the charging/lighting coil
Rectifier with Regulator	The rectifier is faulty	Charging to battery is insufficient. Light is dim. The current is too high, and the battery is deformed.	Replace the rectifier
Battery	The battery is damaged	Starting motor fails to run	Replace the battery
	Shortage of electrolyte due to long-term storage	The starting motor fails to run or runs slowly. The signal system is out of work	Charging to battery or replace the battery

4.2 EFI SYSTEM

4.2.1 Working principal

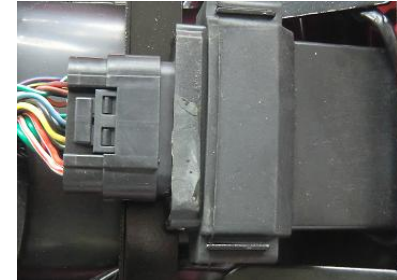
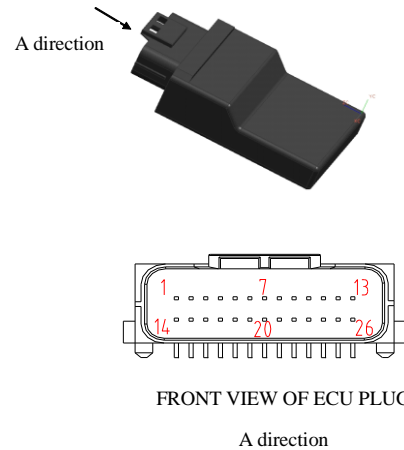


- EFI system including the following parts in the table.

Part Name	Major component and explanation	Mounting position and description
ECU controller	Computer program, chip, electronic components, circuit board	On the Vehicle
Throttle valve body	Throttle body, throttle position sensor (TPS)	Outside the intake valve of cylinder head
Oxygen sensor	Used for closed-loop control	On the muffler
Engine temperature sensor	To measure the engine temperature	On the cylinder head, cylinder block, or high temperature water passage.
IAT sensor	To measure the air inlet temperature	On the air filter
Intake pressure sensor	To measure the air inflow	On the Vehicle
Fuel pump	To generate the necessary high-pressure fuel	On the Vehicle
Fuel injector	To inject fuel	On the air inlet pipe of engine
Idle air control valve (IACV)	To compensate engine idle air intake	On the Vehicle
EFI main relay	Special-purpose components for EFI system	On the Vehicle
Ignition coil	Inductance type ignition coil	On the engine
Magneto	Including 36-2 teeth magnet steel, coil and rotation speed sensor	On the engine
Spark plug	Spark plug type: CPR8EA, standard valve of contact clearance: 0.85~0.95mm.	On the engine

1. ECU controller

PICTURE, APPEARANCE AND
STINCH OF ECU



21

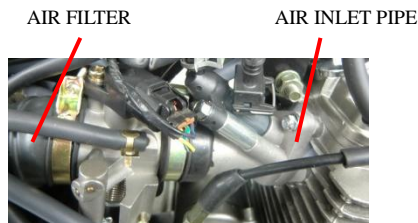
ECU is the control center of the entire EFI system. It is mounted on the vehicle. It determines the optimum injection time, injection quantity and ignition advance angle through the analysis and process about intake pressure sensor, engine temperature sensor, intake temperature sensor, engine rotation speed sensor, throttle position sensor (TPS) and oxygen sensor. Working condition of ECU: supply range DC 10~14V, ambient temperature -25°C ~85°C

● Note: Don't charged inserted ECU controller

Disassembly of ECU is forbidden. Don't pry the pin in the plug socket with hard matter.

Avoid bastinado or collision to ECU. Water or oil is forbidden to contact the ECU or its connector.

2. Throttle valve body



It consists of throttle position sensor (TPS), throttle valve body, and adjusting screw of air volume. And it is mounted between air inlet pipe and air filter.

Note: please clean throttle valve body regularly to make the system reach the best performance.

3. Oxygen sensor



OXYGEN SENSOR



MUFFLER

The oxygen sensor is mounted on muffler. It is used to detect the oxygen content in the exhaust gas from the engine and to realize closed-loop control and self-adaptation control of the system.

- Note: Knocking or colliding to the sensor is forbidden.

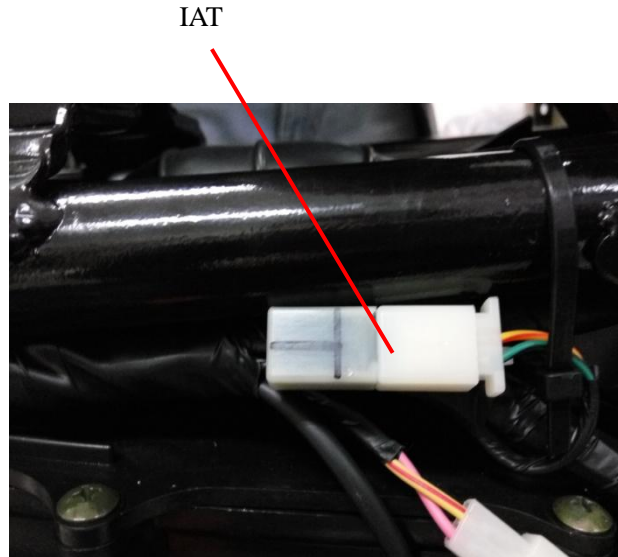
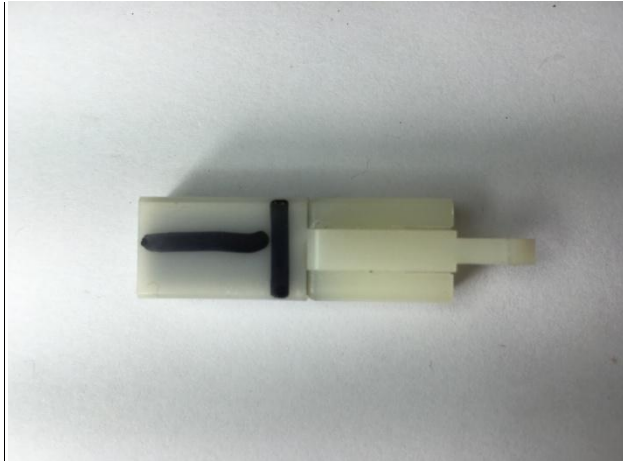
Washing the oxygen sensor with water is forbidden when the engine is heat.

4. Engine temperature sensor



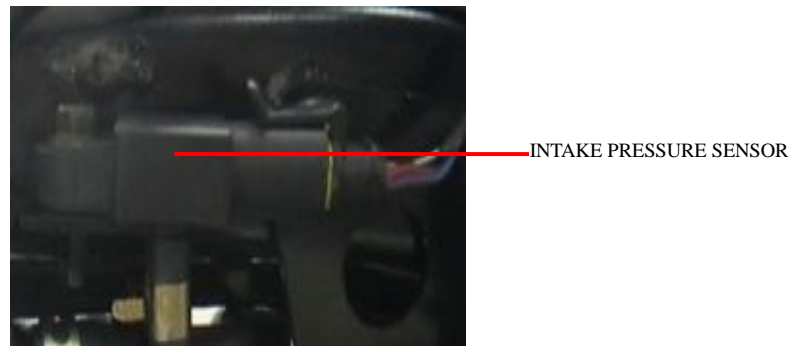
Engine temperature sensor is mounted on the engine cylinder block. It is used to detect engine temperature.

5. Intake air temperature sensor (IAT)



Intake air temperature sensor is mounted/connected on the air filter or the position close to the filter. It is used to detect intake air temperature.

6. Intake pressure sensor



Intake pressure sensor is used to detect the negative pressure of engine. It is connected with rubber pipe and air inlet pipe of engine.

- Note: No water, oil or other impurity in the intake pressure sensor. Make sure good sealing ability of joint.

7. Fuel pump, EFI main relay



FUEL PUMP (Mounted on the bottom of fuel tank)

EFI MAIN RELAY



EFI system is powered by an EFI main relay. The fan is powered by another EFI main relay. And the two EFI main relays are controlled by ECU controller. If there's no power about EFI system or fan, please check the connector about main cable and EFI main relay for poor contact or check the function of EFI main relay.

- Note: Keep the fuel pump body and fuel port clean.

8. Injector



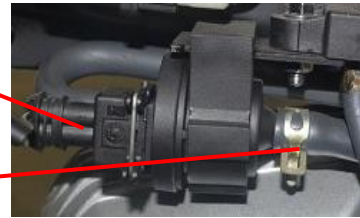
INJECTOR

9. Idle air control valve



AIR OUTLET

AIR INLET



It is used to compensate the air inflow at the engine idle condition by connecting with rubber pipe and air inlet pipe of engine.

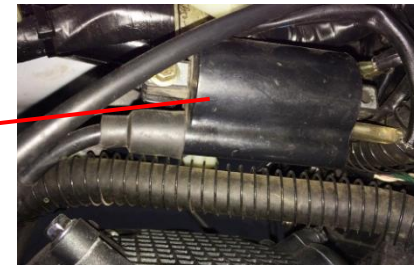
- Note: Direction of airflow

Make sure good sealing ability of joint.

10. Ignition coil



IGNITION COIL



It is inductance type ignition coil with strong ignition energy.

- Note: Replace with the same type of ignition coil only.

11. Magneto



It consists of rotor with 36-2 teeth, stator and rotation speed sensor.

- Note: Replace with the same type of rotor, stator and rotation speed sensor only.

Make sure that the clearance between rotor and rotation speed sensor is 0.7~1mm.

12. Spark plug



Spark plug type: CPR8EA, standard valve of contact clearance for spark plug is 0.85~0.95mm.

4.2.2 Removal, Maintenance and Installation of EFI

1. Basic principle of fault diagnosis

1) Fault message record

ECU detects the sensors, relevant circuits, fault indicating light, battery voltage and even ECU itself constantly. And it checks the reliability of output signals, internal signals from the sensor. Once the fault is found, ECU will record the fault message at the memorizer of chips.

2) Fault type: short circuit, broken circuit, lost of signal

3) Failure warning: There's fault indicating light on the meter, so almost all sensors on the EFI system can be detected. If fault is detected, the fault light will be lightened to warn until the fault is handled.

4) When open the key switch but didn't start the engine, the fault light will be lightened for 2~3 seconds. If there's no fault, the fault light will be extinguished.

Otherwise, the fault light will glitter according to the codes (see below table):



EFI FAULT INDICATING LIGHT

Type of sensor	Coding
Throttle position sensor	22 (2 short 2 long)
Intake pressure sensor	23 (2 short 2 long)
Oxygen sensor	24 (2 short 4 long)
Cylinder block temperature sensor	32 (3 short 2 long)
Air temperature sensor	33 (3 short 3 long)
System voltage	34 (3 short 4 long)

2. Troubleshooting:

First: Maintenance according to fault code from the fault light:

1) Maintenance of throttle position sensor

1. Fault code 22----throttle position sensor

The figure on the right is the electric diagram

Connect No.1 stitch to ECU No. 25 stitch

Connect No.2 stitch to ECU No. 13 stitch

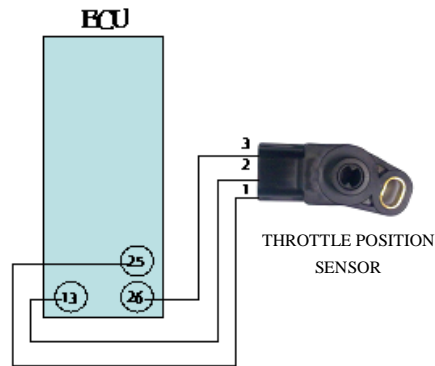
Connect No.3 stitch to ECU No. 26 stitch

Stitches:

1----output angle signal

2----sensor ground

3----power source 5V



2) Maintenance of pressure sensor

2. Fault code 23----pressure sensor

The figure on the right is the electric diagram

Connect No.1 stitch to ECU No. 26 stitch

Connect No.2 stitch to ECU No. 12 stitch

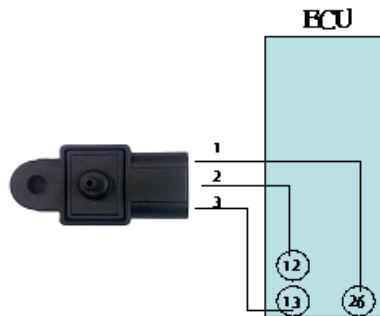
Connect No.3 stitch to ECU No. 23 stitch

Stitches:

1----power source 5V

2----output pressure signal

3----sensor ground



Maintenance steps

S/N	Steps	Result	Subsequent steps
1	Open the key switch, run the fuel pump for 3 seconds by listening (by touching is also ok)		Next step
2	Extract the sensor plug on the cable. Check with multimeter to see if the voltage between No.2 and No.3 stitches is 5V.	YES	Next step
		NO	5
3	Check with multimeter to see if the resistance value between No.2 and No.3 stitches is about 5K Ω .	YES	Next step
		NO	Replace the sensor
4	Turn the throttle position sensor from one side to another side gently. At the same time, check with multimeter to see if there's short circuit or broken circuit between No.1 and No.3 stitches or if the resistance value changed dramatically.	YES	Replace the sensor
		NO	Replace the ECU
5	Check with multimeter to see if there's short circuit or broken circuit between No.13, 25, 26 and No.1, 2, 3 stitches.	YES	Repair or replace the cable
		NO	Replace the ECU

Maintenance steps

S/N	Steps	Result	Subsequent steps
1	Open the key switch, run the fuel pump for 3 seconds by listening (by touching is also ok)		Next step
2	Check to see if the connection between sensor plug and cable plug is good.	YES	Next step
		NO	Repair or replace the plug
3	Extract the sensor plug on the cable. Check with multimeter to see if the voltage between No.1 and No.3 stitches is 5V.	YES	5
		NO	Next step
4	Check with multimeter to see if there's short circuit or broken circuit between No.12, 13, 26 and No.1, 2, 3 stitches.	YES	Repair or replace the cable
		NO	Next step
5	Replace the pressure sensor to see if the fault has been handled.	YES	Replace the sensor
		NO	Replace the ECU

3) Maintenance of oxygen sensor

3. Fault code 24----oxygen sensor

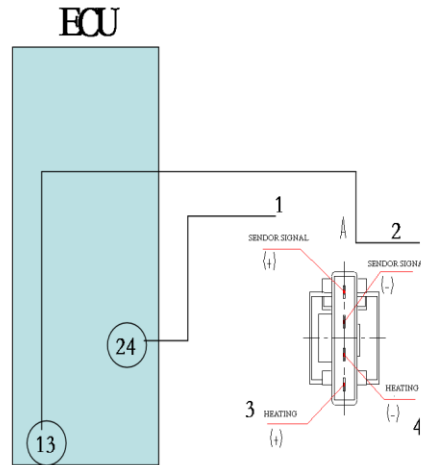
The figure on the right is the electric diagram

Connect No.1 stitch to ECU No. 24 stitch

Connect No.2 stitch to ECU No. 13 stitch

Connect No.3 stitch to power output (12V) of fuel pump relay

Connect No.4 stitch to vehicle ground wire (green)



Maintenance steps

S/N	Steps	Result	Subsequent steps
1	Open the key switch, run the fuel pump for 3 seconds by listening (by touching is also ok). Start the engine.		Next step
2	Extract the sensor plug on the cable. Check with multimeter to see if the voltage between No.3 and No.4 stitches is 12V.	YES	Next step
		NO	4
3	Check with multimeter to see if the resistance value between No.3 and No.4 stitches is about 6~25Ω.	YES	Replace the ECU
		NO	Next step
4	Check with multimeter to see if there's short circuit or broken circuit between No.3 stitch and power output (12V) of fuel pump relay; and between No.3 stitch and vehicle ground wire (green).	YES	Repair or replace the cable
		NO	Next step
5	Insert the oxygen sensor plug on the cable. Set it to neutral gear. Start the engine and make it in idle speed till the cylinder temperature is about 80°C.		Next step
6	Extract the sensor plug on the cable. Check with multimeter to see if there's voltage output (0.1~0.9V) between No.1 and No.2 stitches.	YES	Next step
		NO	Replace the sensor
7	Check with multimeter to see if there's short circuit or broken circuit between ECU No.13, 24 and sensor No.1, 2 stitches.	YES	Repair or replace the cable
		NO	Replace the ECU

4) Maintenance of cylinder temperature and air temperature sensor

Maintenance steps

S/N	Steps	Result	Subsequent steps
1	Open the key switch, run the fuel pump for 3 seconds by listening (by touching is also ok). Start the engine.		Next step
2	Check with multimeter to see if the resistance value between No.1 and No.2 stitches corresponds with the temperature (refer to the related part in this service manual).	YES	Replace the ECU
		NO	Next step
3	Check with multimeter to see if there's short circuit or broken circuit between ECU No.11, 13, 23 stitches and their corresponding stitches on the sensor.	YES	Repair or replace the cable
		NO	Replace the ECU

5) Test of system voltage

4. Fault code 34----system voltage

Maintenance steps

S/N	Steps	Result	Subsequent steps
1	Check with multimeter to see if the voltage between positive and negative terminals of the battery is about 12V.	YES	Next step
		NO	Charge/check the rectifier and its charging circuits; replace the battery
2	Open the key switch.		Next step
3	Check with multimeter to see if the voltage between the black power wire (which is behind the key switch) and the vehicle green ground wire is about 12V.	YES	Next step
		NO	Repair or replace the cable
4	Check with multimeter to see if the voltage between the black power wire of ECU No.6 stitch and the vehicle green ground wire is about 12V.	YES	Replace the ECU
		NO	Repair or replace the cable

Second: Maintenance according to engine failure form

Before diagnose according to the engine failure form please do the initial checks

1. Make sure that the ECU and fault indicating light is ok.
2. Make sure that there's no fault record by checking with fault diagnosis tester or diagnostic light.
3. Check the idle speed data of electronic control system when the engine is heat and make sure the data is in the normal range.
4. Make sure that the fault do exist and search it to find the exact position.

Then check the appearance:

1. Check the joint place between cable and ground to see if it is clean and tight.
2. Check the air pipes to see if it is broken, twisted or wrong connected.
3. Check the pipe for clogging.
4. Check the connection of throttle body and air inlet pipe for proper sealing.
5. Check the high voltage wire of ignition coil for breakage and aging.
6. Check the connection of the wires for proper position. Check the joints to see if it is loose or with poor contact.

Description		Reason		Remedy	
Engine is hard to start, engine stops automatically	Fuel pump fails to work	The system lacks power or the fuel pump plug has no power		Check the battery, fuse, fuel pump relay, cable. Replace ECU if all above is ok. Then check them again	
		Fuel pump plug has power	Fuel pump is damaged	Replace the fuel pump	
			The voltage is too low	Check the battery, relay and circuit	
	No fuel pressure	Fuel pump wire is inversely connected		Exchange the connection	
		The battery voltage is too low		Charge or replace the battery	
		Fuel tank lacks power		Add fuel, no less than 2.5L	
		Fuel passage is clogged heavily		Check the fuel coarse cleaner and fine filter	
		Failure of fuel pressure adjuster		Replace fuel pressure adjuster	
		Insufficient fuel pressure	Leakage of fuel passage		Replace or repair the loose fuel pipe clip or broken fuel pipe
			Clogging of fuel passage		Check the fuel coarse cleaner and fine filter
			Failure of fuel pump or fuel pressure adjuster		Replace fuel pump or fuel pressure adjuster
			Insufficient voltage		Check the battery, rectifier and magneto to see is it is charged
		Fuel pump is normal	Ignition voltage is normal	Spark plug is damp or choked	
	Electric leakage of spark plug insulation parts			Replace the spark plug	
	Spark plug is not tightened			Tighten	
	Too little clearance of spark plug electrodes			Adjust it to the standard value	
	Poor contact or electric leakage of cavity cap			Adjust or replace	
	Fuel pressure is normal		Failure of the circuit, poor contact of plug-in		Check the cable joint, throttle position sensor mounting and circuit connection or plug-in
			Engine temperature sensor is damaged		Replace
			Failure of the engine		Check the engine valve, piston ring and mounting.
No ignition voltage or ignition off	Poor contact of ignition circuit		Check the joint and restore		
	Too much clearance of magneto exciter coil		Adjust the exciter coil clearance		
	Ignition coil is damaged		Replace		

Electric leakage of ignition coil output	Replace the waterproof rubber cover and ignition coil
Poor contact of ECU or cable plug-in	Check and connect it well
Clog of fuel injector	Replace

Insufficient system voltage	Poor contact of circuit	Check
	The rectifier fails to charge	Check or replace
	Insufficient generated energy of magneto	Check it for short circuit
	The battery is too old and fails to store power	Maintenance or replace
	Electricity consumption is too large, battery losses too much power	Avoid long time low speed driving

Third: Safety matters when maintenance of system:

1. Disassembly requirements of ECU:

- 1) Remove the ECU before weldment.
- 2) The key switch should be set to off position to avoid damage when disassemble the ECU.
- 3) The power line should not be remove from the battery when engine or electric system is working.
- 4) The engine cannot be started by large current of battery charger.
- 5) Ambient temperature around ECU should not surpass 80°C.
- 6) Make sure the wire connection is right while voltage and grounding measurement of EFI system.

2. Fuel circuit system:

Disassembly of fuel pump: before operation, please drain out the fuel in the tank. And place the gasoline absorption equipment next to the fuel pump to absorb the leaked gasoline and avoid direct contact between skin and gasoline.

3. Cleanliness requirements:

Please comply with the following rules before operation to fuel supply system and EFI system.

- 1) Before loosen the connection position, clean the place and all around thoroughly.

- 2) Put a cleaning rag on the connection position to avoid fuel splash.
- 3) The removed components should be put in clean position and be covered well, but do not use the cloth which drops fiber.
- 4) If the opened components will not be repaired immediately, it should be covered or sealed carefully.
- 5) Only the clean components can be installed.
- 6) Do not damage the O-ring when install the fuel injector. A few lubricating oil is allowed to be coated on the O-ring for the convenience of assembly.

4.3 IGNITION SYSTEM

- Ignition system consists of:




Magneto with exciter coil: is of flying wheel convex plate with outer trigger type.

ECU: with other EFI system components, please refer to 4.2 EFI system

Ignition coil: transform low voltage from the igniter into high voltage. Inductive energy storage type

Spark plug: please refer to Motorcycle Owner's Manual for the spark plug type and contact clearance.

- Removal, Installation and Maintenance of Ignition System

Turn the key from  to  to open the ignition switch. Turn the stop switch to  to check the ignition system.



IGNITION SWITCH



STOP SWITCH

Remove the spark plug cap. Connect the multimeter ($\Omega \times 1k$) to the cap. Check it for specified resistance.

Spark plug cap resistance: $5k\Omega \pm 0.5 k\Omega$

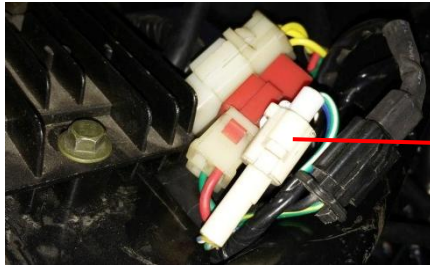


SPARK PLUG CAP

Please refer to Motorcycle Owner's Manual for the spark plug type and contact clearance



Check the couplers of magneto exciter coil to main cable for continuity. Replace the parts if necessary



MAIN CABLE TO
MAGNETO EXCITER
COIL COUPLER

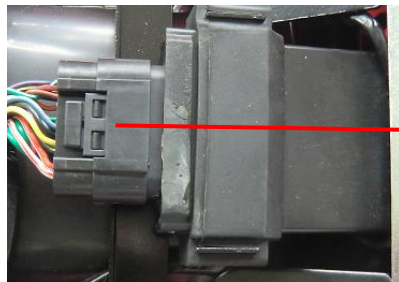
The Blue/White line and Green line is exciter coil. Repair or replace it if necessary.



EXCITER COIL

Extract the coupler between main cable and ECU. Check the plug and replace it if necessary

- Note: Don't charged inserted ECU controller.



MAIN CABLE TO ECU COUPLER

For other checking, please refer to 4.2 EFI System.

● **Trouble shooting to ignition system (For other checking, please refer to 4.2 EFI System)**

Description	Damage From	Trouble Symptom	Remedy
Power of Ignition	Broken circuit or poor connection	No spark or weak spark	Repair
Exciter Coil	Short circuit	Engine is hard or fails to start. Engine lacks power. Unstable idle speed.	Replace the exciter coil
	Broken circuit (i.e.: resistance is ∞)	Engine fails to start.	Replace the exciter coil
Ignition Switch/Engine Stop Switch	Short circuit	Engine stop switch is out of work	Replace the faulty switch
	Broken circuit	Engine fails to start.	Replace the faulty switch
Ignition Controller	Damaged	Engine fails to start.	Replace the controller
Ignition Coil	Short circuit	Engine is hard to start. Engine lacks power. Unstable idle speed.	Replace the ignition coil
	Broken circuit (i.e.: resistance is ∞)	Engine fails to start.	Replace the ignition coil
	Insulator burn-in	Engine is hard to start. Engine lacks power. Unstable idle speed. Leakage of electricity	Replace the ignition coil
Spark plug	Carbon deposit, leakage of electricity, insulator is broken	Engine is hard to start. Engine lacks power. Unstable idle speed.	Clean the carbon deposit. Properly dilute the mixture in the carburetor. And then check for burning engine oil. Or replace spark plug with the same model.
	Electrode wear		Adjust the spark plug gap or replace spark plug with the same model.
	Electrode erosion		Properly dilute the mixture in the carburetor. And then check for burning engine oil. Or replace spark plug with the same model.

4.3 SIGNAL SYSTEM, METER, RADIATOR FAN AND WATER TEMPERATURE INDICATOR

Signal system consists of:

Left handlebar switch, horn, winker, LED indicator, flasher relay, LED front position light (included in the headlight), LED taillight (LED brake light, LED rear position light), front brake switch, rear brake switch, fuel sensor, meter, speed sensor, water temperature sensor, fan, ECU, EFI main relay and so on.

● Removal, Installation and Maintenance of Signal System

Turn the key from  to  to open the ignition switch. Turn the stop switch to  to check the signal system.



IGNITION SWITCH



STOP SWITCH

LIGHTING SWITCH

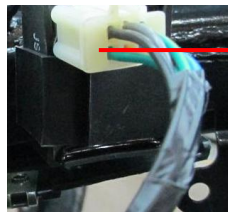
LEFT HANDLE BAR SWITCH



IGNAL SWITCH

HORN SWITCH

Remove the coupler of flasher relay to main cable. Check it for short circuit, broken circuit or poor contact. Replace it if necessary.



COUPLER OF
FLASHER RELAY
TO MAIN CABLE

LEFT HANDLE BAR SWITCH



OVERTAKING
SWITCH

Remove the coupler of handle bar switch, winker, and meter to main cable or remove and open the interior of handle bar switch. Check it for short circuit, broken circuit or poor contact. Replace it if necessary



COUPLER OF LEFT HANDLE BAR SW., FRONT LEFT WINKER, METER TO MAIN CABLE

COUPLER OF RIGHT HANDLE BAR SW., FRONT RIGHT WINKER, METER TO MAIN CABLE



MOUNTING SCREW OF LEFT HANDLE BAR SW.



INTERNAL PICTURE OF LEFT HANDLER BAR SW.



COUPLER OF LED FRONT POSITION LIGHT AND LED HEADLIGHT



COUPLER OF TAILLIGHT, REAR WINKER TO MAIN CABLE



TAILLIGHT



Disassemble the left and right side cover, back panel. Check or replace the rear brake light and rear position light.

Check the coupler of front brake switch and rear brake switch to main cable for continuity, and also front or rear brake switch. Repair or replace them if necessary.



COUPLER OF MAIN CABLE TO FRONT BRAKE SW.



COUPLER OF MAIN CABLE TO REAR BRAKE SW.



REAR BRAKE SW.

Check the coupler of winker to main cable for continuity. Repair or replace them if there's short circuit, broken circuit or poor contact. If the bulb has broken, disassemble the winker and replace the bulb with a new same-type one.



MOUNTING SCREW OF WINKER HOUSING



TURN SIGNAL BULB

Checking method of front and rear winker are the same.

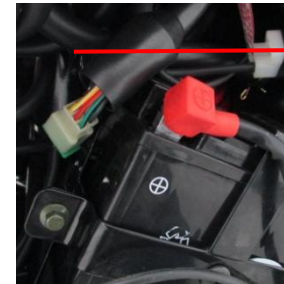
Check the coupler of horn to main cable for continuity. Replace the faulty part. Turning the adjusting screw to adjust the horn if the horn sound is weak or without sound.



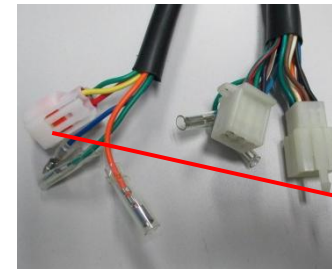
COUPLER OF HORN TO MAIN CABLE

ADJUSTING SCREW OF HORN SOUND

Check such couplers as connect to main cable, meter, gearshift switch, fuel sensor, front position light, taillight etc. for continuity. Check the coupler of speed sensor to meter for continuity. If there's short circuit, broken circuit, or poor contact, repair or replace the faulty parts with a new same-type



COUPLER OF MAIN CABLE TO GEARSHIFT SW.



COUPLER OF MAIN CABLE TO METER

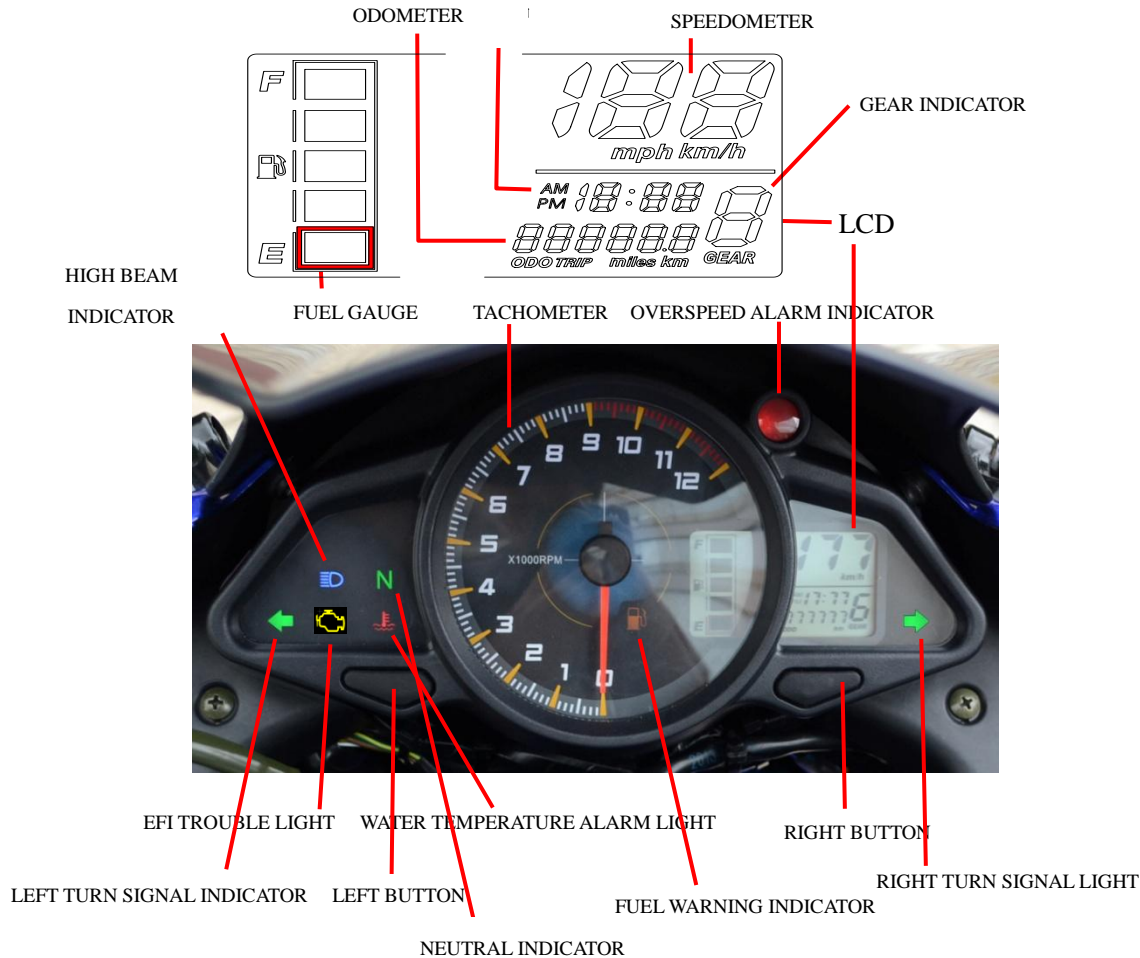
COUPLER OF METER TO SPEED SENSOR



FUEL SENSOR (under the fuel tank)



COUPLER OF MAIN CABLE TO FUEL SENSOR



Function description of LCD

1. Vehicle speed: maximum 199;
2. Total accumulative mileage ODO: 6 numbers, maximum 99999.9;
3. Temporary accumulative mileage TRIP: 6 numbers, maximum 99999.9;
4. Gear indicating: 1~6 gears
5. Fuel gauge: 5 level, the lowest level flashes when fuel starvation
6. Clock: 12 hours type (morning: AM; afternoon: PM)

Function description of buttons

1. Right button:
 - a. Short press the right button (less than 1 second) to change the LED backlight (blue or orange).
 - b. Long press the right button (more than 3 seconds) to set the clock. When the “hour” place flashes, short press the right button (less than 1 second) to set the hour. If there’s no operation within 5 seconds, clock setting mode exit. If long press the right button (more than 3 seconds), it will enter minute setting mode. Minute setting is the same with hour setting.
2. Left button:
 - a. Short press the left button (less than 1 second) to switch ODO and TRIP mode.
 - b. If it is in ODO mode, long press the left button (more than 3 seconds) to switch metric unit and British unit.
 - c. If it is in TRIP mode, long press the left button (more than 3 seconds) to reset subtotal mileage.
3. Requirements to left & right buttons

Operate the buttons flexibly. There’s should be reliable response for each operation.

The odometer is with electronic type speed sensor. Output signal of speed sensor: square-wave pulse. When the frequency if 18.5Hz, the speedometer indicates $65 \pm 1\text{km/h}$ or $39.8 \pm 1.6\text{mph}$.

Left & right turn signal indicator and neutral indicator are green; high beam indicator is blue; water temperature alarm light and overspeed alarm indicator are red; fuel warning indicator is yellow. LCD backlight is sky blue or orange. All the indicators and LCD backlight are LED lighting.

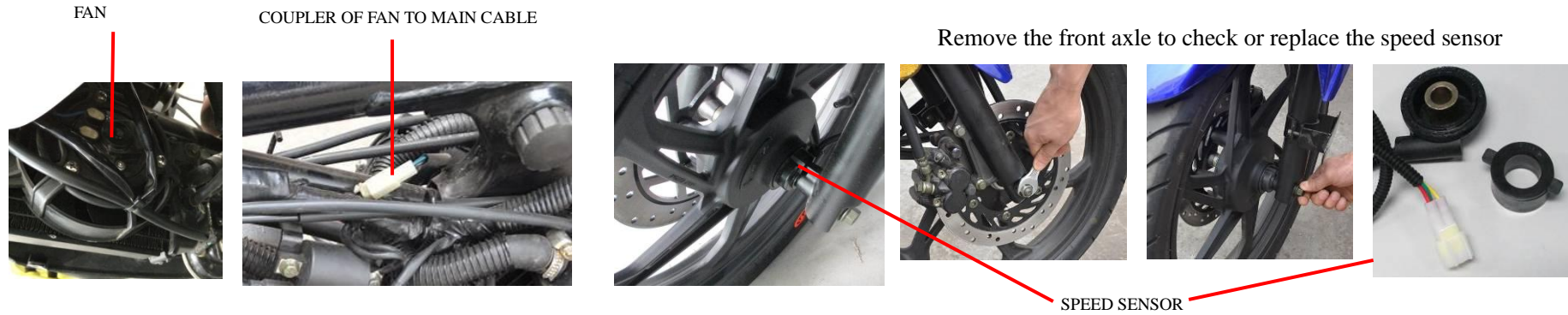
Checking of radiator fan, water temperature indicating system: check the function of fan, water temperature alarm indicator, water temperature sensor, and ECU.

If there's short circuit, broken circuit or poor contact of couplers, replace them with the same-type one.

Resistance of water temperature sensor: the resistance is $2.5 \pm 0.1k\Omega$ when it is 20°C

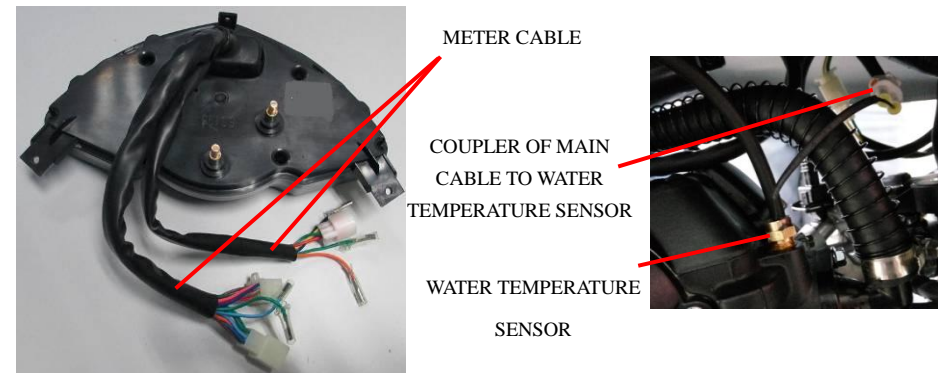
Check the water temperature alarm indicator to see if it lights after it is connected to ECU (it will light when green/blue wire connected to green wire)

ECU receives the signal and it controls the fan through EFI main relay (the fan runs when ECU is connected with brown and green wire of EFI main relay). If the water temperature on the outlet of cylinder head is above 92°C , the fan runs; if it is below 89°C , the fan stops to run.



Speed sensor is with electronic type and meter is full-electronic meter. Speedometer and odometer indicate vehicle current speed and accumulative mileage separately. They are driven by front wheel. Check the speed sensor. Replace it if necessary.

If there's fault about speedometer, odometer, tachometer or meter indicating, it needs to disassemble the meter to check. If the circuit is normal (no short circuit, broken circuit, poor contact), it needs to replace the meter.



● **Troubleshooting to Signal System**



Description	Damage Form	Trouble Symptom	Remedy
Winker	Damaged	The winker is out of work	Replace the bulb with the same type
Indicating lights	Damage of meter interior	LED indicating lights are out of work	Replace the meter
Turn signal switch	Poor connection of inner circuit or wire is broken or damaged	The winker is out of work	Repair or replace the turn signal switch
Flasher relay	Damage of interior	The winker is out of work or does not twinkle	Replace the flasher relay
Front/rear brake switch	Switch return is abnormal; the parts are damaged	Brake light keeps on or does not light	Replace the brake switch
Taillight/brake light	Damage of interior	LED taillight or LED brake light are out of work	Replace the taillight
Front position light	Damage of interior	The LED front position light is out of work or its light intensity is abnormal	Replace the headlight with the same type
Horn switch	Poor connection of inner circuit or wire is broken or damaged	The horn is out of work or has abnormal sound	Repair or replace the horn switch
Horn	Inner wire is broken or damaged	The horn is out of work or has abnormal sound	Replace the horn
Gear switch	Poor connection of gear switch when gear shifting	The gear indicator is out of work	Replace the gear switch
Gear indicator	Damage of meter interior	The gear indicator is out of work	Replace the meter
Fuel sensor	Damage of interior	Fuel gauge fails to indicate correctly	Replace fuel sensor
Water temperature alarm light	Damage of meter interior	LED water temperature alarm light keeps on or does not light	Replace the meter
EFI main relay	Damage of interior	The fan fails to run	Replace the EFI main relay with the same type
ECU	Damage of interior	The fan fails to run	Replace the ECU with the same type
Water temperature sensor	Damage of interior	Water temperature alarm light keeps on or does not light	Replace the water temperature sensor with the same type
Fan	Damage of interior	The fan fails to run	Replace the fan with the same type
Speed sensor	Damage of interior	Speedometer or odometer fail to indicate correctly	Replace the speed sensor with the same type
Meter cable	Cable is damaged, broken or short circuit, or poor contact	Lighting and signal indicating system fails to work correctly	Replace the meter cable

4.5 LIGHTING SYSTEM

Lighting system consists of:

Right handle bar switch, left handlebar switch, headlight assembly (high beam and low beam, front position light), license plate lamp and so on.

- Removal, Installation and Maintenance of Lighting System

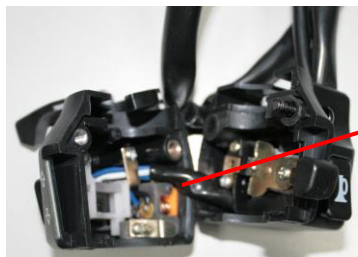
Turn the key from  to  to open the ignition switch. Check the signal system.



IGNITION SW.



MOUNTING SCREW OF
LEFT HANDLE BAR SW.



INNERIOR VIEW
OF LEFT HANDLE
BAR SW.

RIGHT HANDLE BAR SW.



LIGHTING SW.

LEFT HANDLE BAR SW.



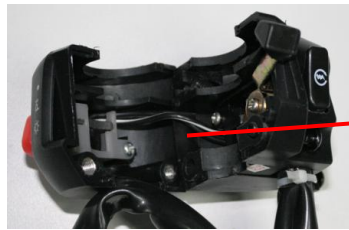
DIMMER SW.



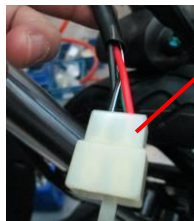
COUPLER OF LED FRONT
POSITION LIGHT TO LED
HEADLIGHT



MOUNTING SCREW OF
RIGHT HANDLE BAR SW.



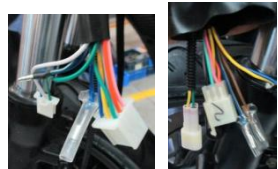
INNER VIEW
OF RIGHT
HANDLE BAR SW.



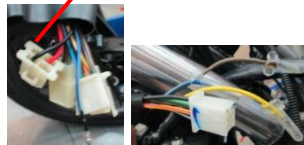
COUPLER OF IGNITION SW.



COUPLER OF MAIN CABLE TO
IGNITION S.



COUPLER OF LEFT HANDLE BAR
SW., HEADLIGHT TO MAIN CABLE



COUPLER OF RIGHT HANDLE
BAR SW. TO MAIN CABLE



COUPLER OF LICENSE
PLATE LIGHT TO MAIN
CABLE



MOUNTING SCREW OF LICENSE PLATE
LIGHT HOUSING



BULB OF LICENSE PLATE

Check the couplers of left & right handle bar switch, license plate light, and ignition switch to main cable. Check the couplers of left & right handle bar switch to headlight. Replace the coupler if there's short circuit, broken circuit or poor contact.

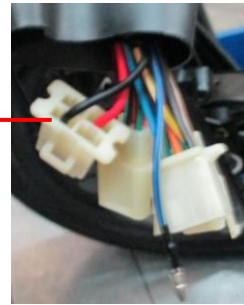
If necessary, disassemble the license plate light to check the bulb. Replace it with a same type one if necessary. If the interior of headlight has damaged and light beam is improper, it needs to remove the covering parts and replace headlight assembly.

If necessary, disassemble the left & right handle bar switch. Check it for short circuit, broken circuit or poor contact. Replace it if necessary.

Check the interior of main cable or ignition switch. Check them for short circuit, broken circuit or poor contact. Replace them if necessary.

Check the coupler of ignition switch to main cable for short circuit, broken circuit or poor contact. Replace them if necessary.

COUPLER OF MAIN CABLE
TO IGNITION SW.



● Troubleshooting to Lighting System



Description	Damage Form	Trouble Symptom	Remedy
Headlight	Adjusting screw of light length is loose	Light beam is improper (too near or too far)	Adjust the screw and fasten
	Damage of internal circuit or parts	LED light beam fails to light	Replace the headlight
License plate light	Bulb burnt out	Bulb fails to light	Replace the bulb with the same type
Lighting Switch or Dimmer Switch	Poor contacts or circuits damaged	Bulb fails to light or light improperly	Repair or replace the switch

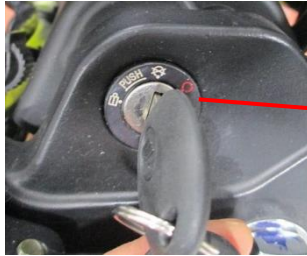
4.6 ELECTRIC STARTING SYSTEM

Electric starting system consists of:

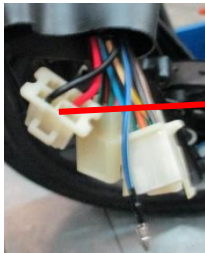
Starting motor, starting relay, stop switch, electric starter button (on the right handle bar switch), clutch switch, gear switch, diode, grounded cable, battery, fuse etc.

● Removal, Installation and Maintenance of Electric Starting System

Turn the key from  to  to open the ignition switch. Turn the stop switch to  to check the electric starting system.



IGNITION SW.



COUPLER OF MAIN CABLE TO
IGNITION SW.



GOUNDED CABLE TO ENGINE
HOUSING

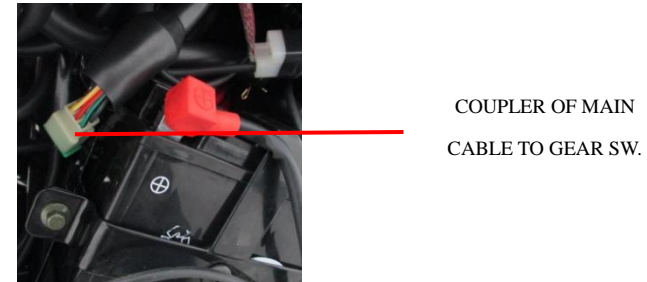
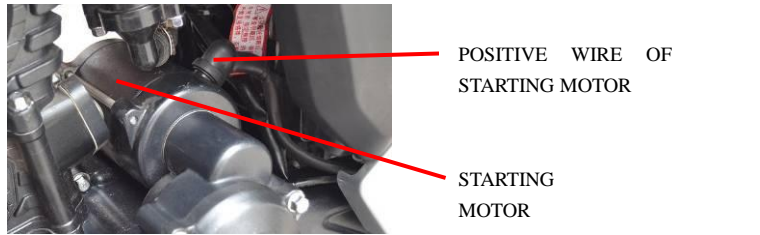
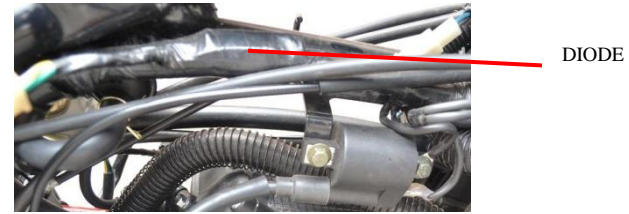
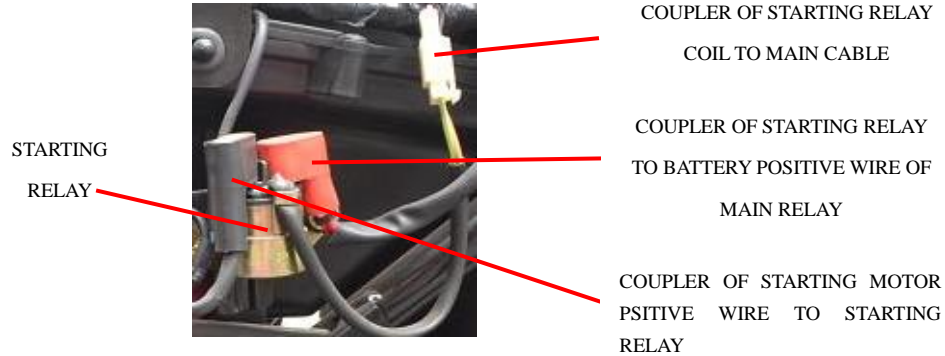


STOP SW.

ELECTRIC STARTER
BUTTON



INTERIOR VIEW OF RIGHT
HANDLE BAR SW.



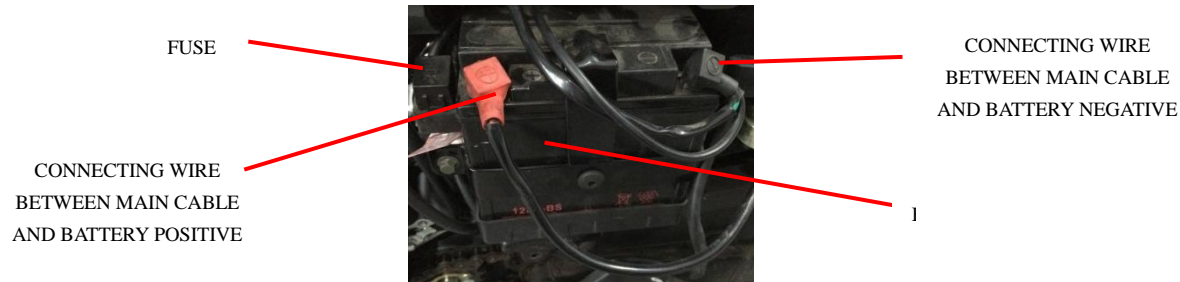
Check parts such as coupler of ignition switch, stop switch, starter button, clutch switch, gear switch, diode, starting relay, and engine housing (grounded cable) to main cable for continuity. Check the related parts for short circuit, broken circuit or poor contact. Repair or replace the part if necessary.

There are two ways for electric starting: when engine is in neutral, it can be electric started; when engine is not in neutral, it can be electric started by grasping the clutch lever (The clutch switch is on).

● **Troubleshooting to electric starting system**

Description	Damage Form	Trouble Symptom	Remedy
Starting Relay	Short circuit or broken circuit of internal coil	Motorcycle fails to electric start	Replace the relay
	Damaged of interior	Motorcycle fails to electric start	Replace the relay
All switches	Damaged or poor connection inside	Motorcycle fails to start	Replace the damaged switch
Diode	Diode is damaged or broken circuit	Motorcycle fails to start	Replace the diode
	Diode is damaged or short circuit	Neutral indicator lights when clench the clutch lever	Replace the diode
Battery	No voltage or voltage is too low	Motorcycle fails to start	Check the battery for proper function. Repair or replace the battery

4.7 BATTERY AND FUSE



Measure the voltage of the battery. If the voltage is below 12V, charge the battery. Check the fuse and replace it if necessary. Specially pay attention to specification (20A) of fuse when replace it. Never use other material such as aluminium, iron or copper wire instead. Otherwise the circuit may be burnt.

Battery (12V9Ah): free of maintenance

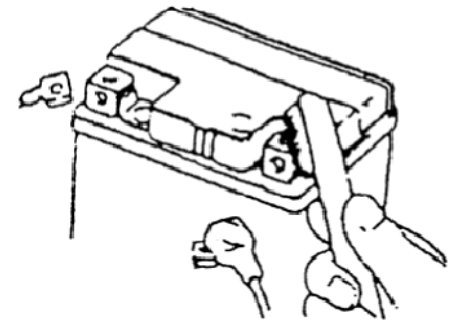
Specification of fuse: 20V. There is a fuse in the fuse box as a substitute.

Battery Maintenance:

(1) Battery 12V9Ah: is of maintenance-free type. The electrolyte has been added in delivery condition at the factory. Compared with the traditional one, the maintenance-free battery has many good properties such as free of adding distilled water, no corrosion of the terminal, less amount of self-discharge. The battery should be charged trimonthly if it is not used for a long time, because it will self-discharge and cause insufficient capacity. The battery capacity will also decline after using for 2~3 years. The voltage can be recovered by charging in this case.


(2) There's no need to check or repair the battery because it is of maintenance-free type. But remember never remove the sealed electrolyte cover. During long-term storage of vehicle which is not in use, please remove the battery and store the charged battery in a cool, well-ventilated place.

(3) Clean of battery terminals: Turn off the ignition switch, remove the left side cover; disconnect the negative lead and positive lead from the battery. Clean the battery terminals with wire brush as shown. This done, coats the terminals with a thin layer of grease or petrolatum. Connect the battery cables in reverse order of removal. Connect the battery cables in reverse order of removal.



Attention: If the battery is to be removed, disconnect the negative lead, then the positive lead.
Connection should be done in reverse order of removal.

Replacement of Fuse:


- (1) Before checking and replace the fuse, turn the ignition switch to “” so as to prevent an accidental short circuit.
- (2) Remove the left side cover. The fuse is in the fuse box. Open the fuse box to replace the fuse and check it for tightness.
- (3) If the fuse burns out repeatedly, there is probably a overload circuit or short circuit . The problem must be located, and remedy it.
- (4) Replace a fuse of the same rating. Specification of fuse: 20A . Never replace with the different rated current fuse. Never use wire to take the place of fuse.

WARNING: Never use other material such as aluminium, iron or copper wire instead. Never connect the circuit with out the fuse. Otherwise the circuit may be burnt.

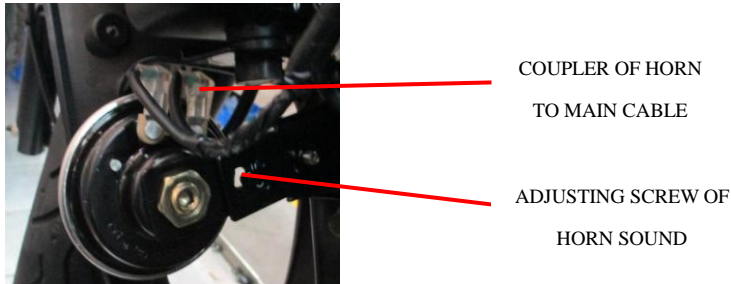
- (5) Reinstall the parts in the reverse order of removal. Check all wire clamps are secure.

4.8 ELECTRICAL HORN

Checking of electrical horn:

Turn the main switch to “”. The horn should sound when pressing the horn button.

Check the coupler of horn to main cable for continuity. Check the horn button for short or broken circuit and poor connection. If any trouble is detected, remedy it or replace the faulty part. If the horn fails to sound or sound weakly, turn the adjusting screw of horn sound until meeting the requirements. Replace the damaged horn with a new one of the same specification.



No sound of horn is one of commonly troubles. It can be divided into two kinds as follow: a electric circuit and a horn inside.

1) Check the electric circuit

When the horn is out of work, first check the fuse, then check the circuits of horn. If above-mentioned parts are good, it means that there is probably a problem on the horn.

2) Horn

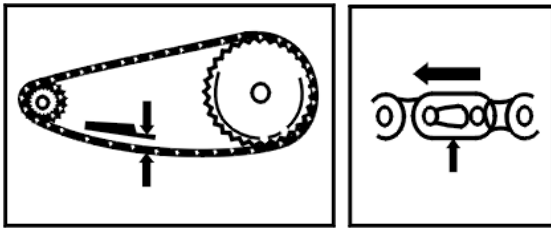
When examining the horn, the following faults are likely to be detected: erosion appeared on the connectors, damage to coil, diaphragm broken, etc. Among which, erosion appeared on connectors is the most common. Erosion forming on the surfaces of connectors has a process of development as follows: horn sounds later when pushing the button, no sound, small sound, discontinuous sound in due succession. In this case, erosion appeared on the connectors is considered as a trouble cause.

CHAPTER 5 SERVICE

5.1 ROUTINE MAINTENANCE AND ADJUSTMENT

5.1.1 Maintenance of Drive Chain:

For maximum service life, the chain should be cleaned, and adjusted before each outing. Lubricate the chain if it seems to be dry. Slack should be 15-25mm, support the motorcycle with center stand, and check slack in the lower drive chain run midway between the sprockets.



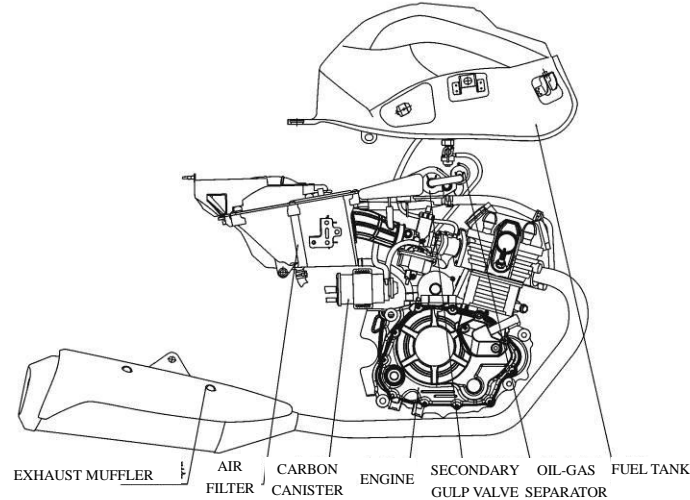
5.1.2 Adjustment

Loose the nut of rear axle and locknut of chain adjuster, turn both adjusting bolts until the chain slack meets the standard, and make sure left and right adjusters align with the same index marks. After checking, tighten up the rear axle nut. Tightening torque of rear axle nut: 70~90N m



5.1.3. Maintenance of Fuse System

5.1.3.1 Fuel system schematic of National stage III



1. Turn off the fuel cock; remove the fuel pipe and empty fuel inside the fuel tank.
2. Unscrew the bolt of seat, and remove the seat.
3. Remove the key fuel tank. Check the gasket for deformation and wear. Replace it if necessary.
4. Remove the fuel tank, check the fuel tank inside. Clean it if necessary.
5. Remove the fuel cap.
6. Remove the fuel pump; check the filter tube and strainer. Replace them if necessary.
7. Check the rubber pipes of evaporative system for twist, damage, and aging. Replace them if necessary.

5.1.3.2 Troubleshooting to fuel system

Description	Damage From	Trouble Symptom of Parts	Trouble Symptom of Motorcycle	Remedy	Remarks
Fuel Tank	Cracks on the tank due to erosion	Fuel leakage of fuel tank		Repair or replace	
	Vent in the fuel cap is clogged	No fuel supply	Engine fails to start	Clean the vent	Vent in the fuel cap is clogged (National stage III)
Fuel cock	Strainer is clogged	No fuel supply	Engine is hard or fails to start. Engine lacks power. Idle speed is unstable	Clean the fuel cock	
	Fuel cock is damaged or clogged	No fuel supply	Engine fails to start	Replace the fuel cock	

5.1.4 Clean and Installation of Fuel Filter:

Fuel filter is the strainer of fuel cock. Open the seat and remove it. Unscrew the mounting screw of left side cover, and remove the left side cover. Unscrew the mounting screw of fuel cock lever and remove it. Unscrew the fixing screw of fuel cock to remove the strainer. Clean the strainer with gasoline, and then assemble the strainer and fuel cock in the reverse order of removal.



5.1.5 Check of Fasteners

Lock nut of steering stem: 60-90 N m;

Nut of front axle: 60-80N m; Nut of rear axle:70-90 N m;

Nut of engine suspension axle: 24-30N m;

Nut of rear fork shaft: 70-90N m

Tighten the fasteners such as ones of upper connecting plate, front/rear wheel, engine etc. to specified torque(s) by means of torque wrench, and check.



Lock nut of steering stem



Nut of rear axle



Nut of front axle

Nut of engine suspension axle



Nut of rear fork shaft

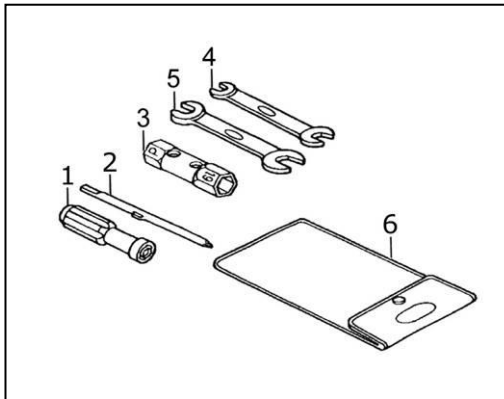
5.2 PRE-RIDE INSPECTION

Check the following before each ride:

1. Engine oil level—Add engine oil if necessary. check for leaks.
2. Fuel level—Refuel if necessary. Check for leaks.
3. Front and rear brakes—Check operation, and adjust free play if necessary.
4. Tyres—Check condition and pressure
5. Battery electrolyte—Check that the electrolyte level is suitable. (Between the upper and lower limit)
6. Throttle—Check for smooth opening and full closing in all steering positions. Adjust or replace it if necessary.
7. Lights and horn—Check that headlights, tail/stop light, wipers, parting light, indicators and horn function properly.
8. Drive chain—Check condition and slack. Adjust and lubricate if necessary.
9. Front and rear axles, shock absorbers, engine mounting and all fasteners—Check that the parts are mounted securely.
10. Steering system—Check for its smoothness and reliability.

5.3 GENERAL MAINTENANCE

5.3.1 Tool Kit



- | | |
|----------------------------------|-------|
| 1. Screw driver grip | 1 pc. |
| 2. Double-end screw driver | 1 pc. |
| 3. Spark plug wrench, 16#×18 # | 1 pc. |
| 4. Open-ended spanner, 8mm×10mm | 1 pc. |
| 5. Open-ended spanner, 13mm×15mm | 1 pc. |
| 6. Tool bag | 1 pc. |

5.3.2 Maintenance Schedule

REGULAR SERVICE ITEM		Item	ODOMETER READING, km (Note ②)				
		Period	1.000km	4.000 km	8.000 km	12.000 km	Note
•	Fuel line system			I	I	I	
•	Fuel filter		C	C	C	C	
•	Throttle operation		I	I	I	I	
•	Carburetor choke			I	I	I	
	Air cleaner element	Note ①		C	C	C	
	Spark plug		I	I	I	I	
•	Valve gap		I	I	I	I	
	Engine oil	Yearly	R	Every 2,000kmR			
	Strainer of lubricant	Yearly R			C		
•	Tension degree of cam chain		A	A	A	A	
•	Engine idle speed		I	I	I	I	
	Drive chain		I, L	I, L	I, L	I, L	
	Battery	Monthly	I	I	I	I	
	Brake shoes/pad wear			I	I	I	
	Brake system		I	I	I	I	
•	Stop light switch		I	I	I	I	
•	Headlight adjustment		I	I	I	I	
	Clutch		I	I	I	I	
	Side stand			I	I	I	
•	Suspension		I	I	I	I	
•	Nuts, bolts, fasteners		I	I	I	I	
••	Wheels/spokes		I	I	I	I	
••	Turn signal, steering and bearing		I			I	

Maintenance work should be performed in light of Maintenance Schedule.

Letters in the table indicate as follows:

I: Inspect and clean, adjust, lubricate or replace if necessary;

C: Clean;

R: Replace;

A: Adjust;

L: Lubricate

NOTES: ① Clean more frequently when riding in unusual wet or dusty areas;

② At higher odometer readings, still follow the frequency intervals established in this manual.

5.4 STORAGE

If you won't be riding for an extended period, take measures as following before storing the motorcycle.

1. Empty fuel inside the fuel tank, carburetor and other pipes.
2. Unscrew the spark plug, and pour a bit of clean engine oil into the cylinder. Turn off the ignition switch, and crank the engine several revolutions to scatter evenly the oil inside the cylinder.
3. Remove the drive chain, clean and oil it.
4. Lubricate all of the controlling cables.
5. Cover the motorcycle well (Do not cover with plastic cloth or cloth with coating). Store the motorcycle in a place which is with low temperature, dry and low daily temperature difference. Please do not store the motorcycle in the place which is with direct sunlight.
6. Seal the muffler outlet with a plastic bag to prevent moisture from entering.
7. Coat all surfaces of bare metal with a thin layer of rust-resisting oil if the motorcycle is to be exposed to sea air or salt water.
8. Remove the battery and store it in a dry, cool and well-ventilated place. Charge the battery once every 30-day.

5.5 UNPACKING

Place the packed motorcycle on a level ground. Unpack the packing case with a special tool to prevent scratching of the body surfaces. This done, check to see that all parts of the motorcycle are intact and good, and check the allotted tools for completeness.