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LIFAN

service manual

Model: LF125-26C (EU V)

FOREWORD

This manual covers the structure, operation, inspection, maintenance and repair of LF125-26C(Euro V) 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 TECHNOLOGY (GROUP) CO., LTD.

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CHAPTER 1 GENERAL

1.1 Vehicle Introduction

LF125-26C (Euro V) two-wheeled motorcycle, with beautiful and novel appearance, compact structure, bright colors, and smooth lines, brings people a strong visual impact. The large built-in inner trunk better meets the practical needs of users, further highlighting the beauty and practicality of the whole vehicle with full of charm. The vehicle is equipped with Lifan's self-developed horizontal engine of 1P53FMI with single cylinder, air cooler, 4 stroke, high-performance automatic dual clutch, wet multi-plate clutch, electric/kick start and four-speed transmission, which has greater power and torque than engines of the same displacement. In addition, the vehicle is equipped with front and rear disc brakes and hydraulic spring damping shock absorbers, which maximizes the user's riding safety, comfort, and other needs.

①Front wheel ②Rear brake pedal ③Front footrest ④Exhaust muffler ⑤Rear wheel ⑥Handrail ⑦VIN ⑧Seat

①Front fender ②Headlight ③Steering bar ④Fuel tank ⑤Rear fender ⑥Taillight ⑦Rear footrest ⑧Front hydraulic brake

1.2 Specifications

ITEM			SPECIFICATIONS
Dimension and Weight	Length×Width×Height		1960mm×715mm×1110mm
	Wheelbase		1245mm
	Ground clearance		130mm
	Kerb mass		177kg
	Max. weight capacity		150kg
Engine	Model		1P53FMI
	Type		Horizontal single cylinder, air-cooled, 4 stroke, auto dual clutch, electric/kick start
	Bore × stroke		53.5 mm×55.5mm
	Displacement		124.7 cm^3
	Compression ratio		10.5:1
	Air cleaner		Plastic housing with paper element
	Lubrication		Press/splash
	Starting mode		Electric/kick start
	Max. net power		6.7kW/8000r/min
	Max. torque		9.0N·m/6000r/min
	Idle speed		1500±100 r/min
Driving system	Front shock absorber		Hydraulic telescopic damping type
	Rear shock absorber		Hydraulic telescopic damping type
	Steering bar angle		≤42°
	Tyre size/pressure	Front	2.50-17-4PR/200kPa
		Rear	2.75-17-4PR/225kPa
	Drive mode		Chain
	Turning circle diameter		4060mm

Drive Train	Clutch		Wet, multi-plate type
	Transmission		4-speed, constant mesh
	Primary reduction		4.059
	Final reduction		2.571
	Gear ratio	1st	2.833
		2nd	1.706
		3rd	1.238
		4th	0.958
	Drive chain	Model	08MB
		Link No.	106
Braking system	Front		disc brake
	Rear		disc brake
Electrical system	Ignition		ECU
	Ignition advance angle		0-40 °
	Spark plug		CPR8EA
	Spark plug gap		0.8-0.9mm
	Battery		12V6Ah
	Fuse		15A
	Headlight		HS1/12V35W
	Front position light		LED
	Tail/brake light		LED
	Winker		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Gearshift indicator		LED

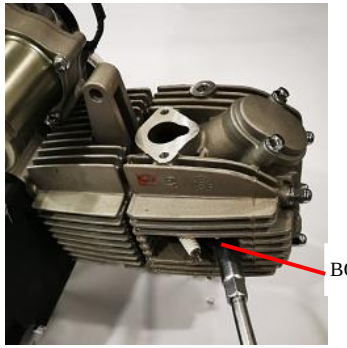
	Meter backlight		LED
Fuel/Oil	Fuel type		RQ-92
	Fuel tank	Capacity	3.0L
		Reserve	0.7L
	Engine oil	Type	SF 15W/40
		Capacity	0.9L
	Damping oil	Type	HQ-10
		Capacity	(60±1)mL

CHAPTER 2 ENGINE

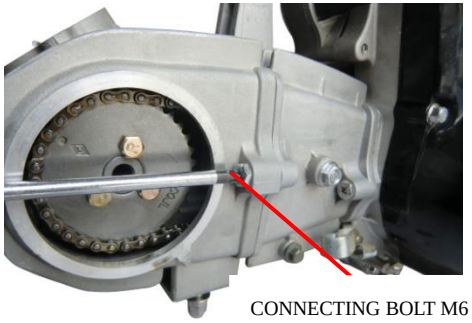
2.1 CYLINDER HEAD

2.1.1 Removal, Maintenance and Installation

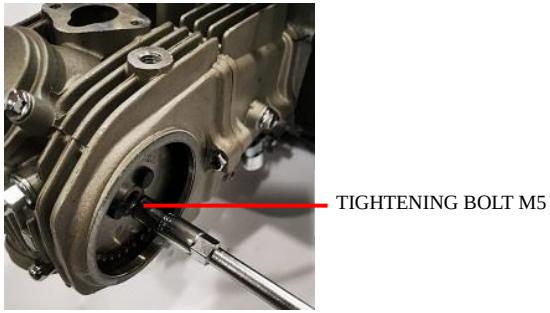
1) Unscrew the left cover bolt M6 from the cylinder head and remove the cover.
Tightening torque: 8~12N ṁ



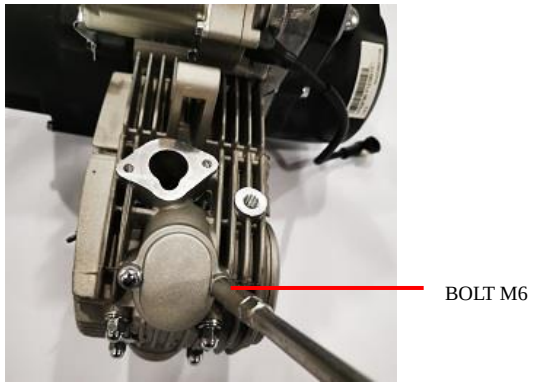
2) Unscrew the cylinder head connecting bolt M6.
Tightening torque: 8~12N ṁ



3) Unscrew the timing bolt M5 and timing driven sprocket.
Tightening torque: 6~10N ṁ



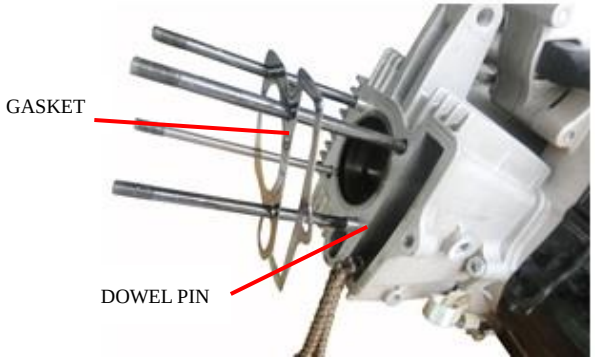
4) Unscrew the valve cover bolt M6 to remove the cover.
Tightening torque: 8~12N ṁ



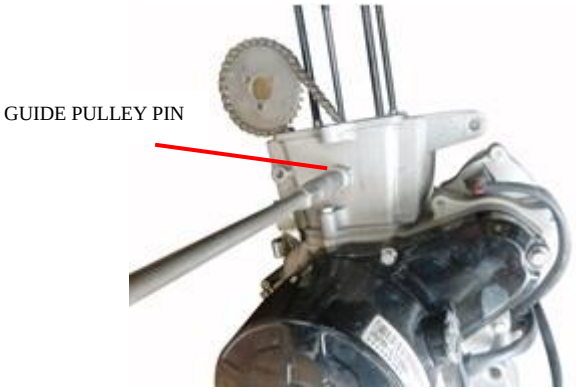
2.2 CYLINDER BLOCK

2.2.1 Removal, Maintenance and Installation

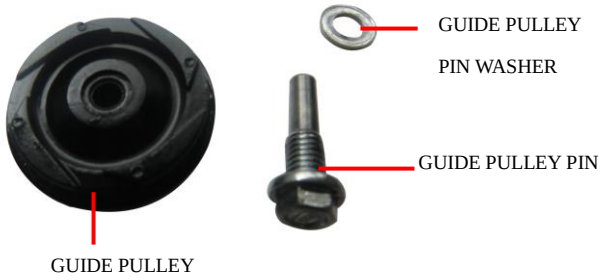
1) Remove and check the cylinder head gasket and dowel pin for damage, replace them if necessary.



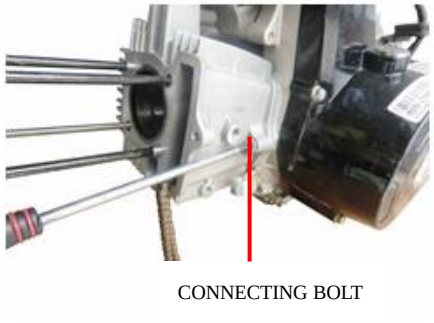
2) Remove the guide pulley pin M6 and guide pulley.
Tightening torque: 8~12N ·m



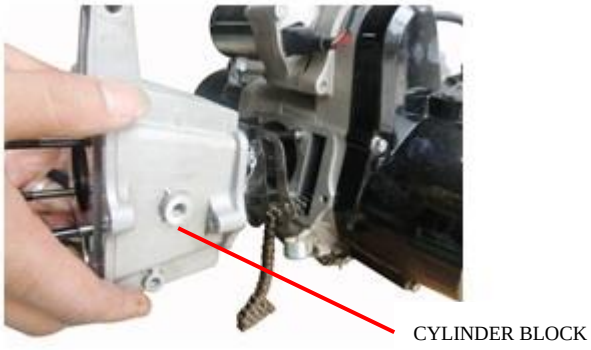
3) Check the guide pulley for wear, replace it if necessary.



4) Remove the connecting bolt M6 of cylinder block.
Tightening torque: 8~12N ·m

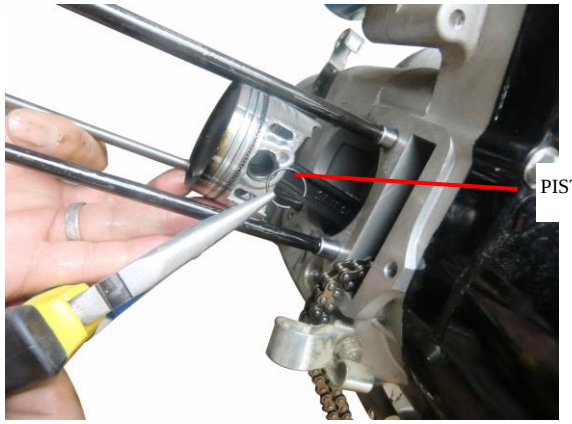


5) Remove the cylinder block.



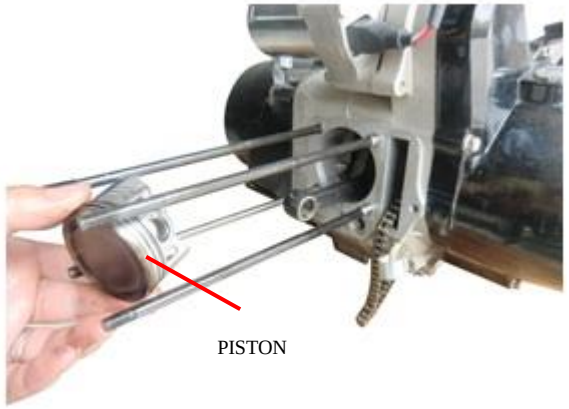
6) Measure the cylinder wall, replace the cylinder if it exceeds the service limit (Φ53.6mm).

7) Remove the piston pin circlip. (Attention! Dot not fall the circlip into the crankcase).

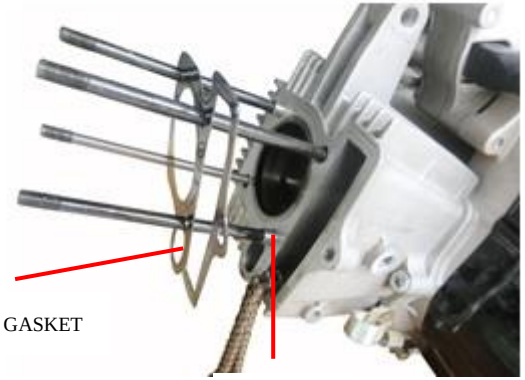


8) Pull out the piston pin and check it for wear, replace it if it is out of the service limit (Φ12.978mm).

9) Remove the piston and set aside after cleaning it with kerosene.



10) Remove and check the cylinder block gasket for damage, replace it if necessary.

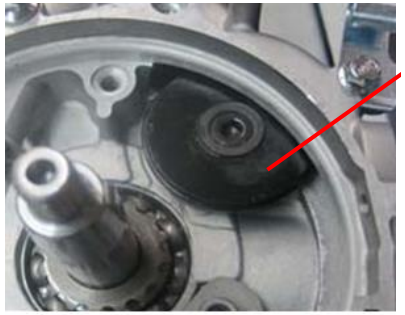


2.2.2 Troubleshooting to Cylinder Block

Description	Damage Form	Trouble	Service
Cylinder Block	Too much oil dirt and dusts on the radiating fins	Poor cooling and overheating engine	Clear away oil dirt and dusts
	Seriously deformation of upper end face of cylinder block	Air leaks between cylinder head and cylinder block. Engine fails or is hard to start. Engine lacks power, has unstable idle speed.	Grind the end face of cylinder head or replace the cylinder head
	Seriously wear of cylinder block	Large gap of cylinder block and piston, cylinder block and piston rings. Engine fails or is hard to start. Engine lacks power, has unstable idle speed. Blue or white smoke comes from the exhaust pipe.	Repair by a cylinder boring machine or replace with a new cylinder
	Broken cylinder block gasket	Oil leaks between cylinder block and crankcase.	Replace the gasket

2.2.3 Reference List of Standard Value and Limit Value for Cylinder Block Maintenance

Description	Test Item	Standard Value	Limit Value	Service	Picture
Cylinder Block	Bore ID	Φ53.5～Φ53.51	Φ53.6	Replace when beyond the limit value	 Cylinder block bore ID
	Flatness	0.05	0.08	Replace when beyond the limit value	 Flatness on upper & lower faces of cylinder block

Guide Pulley	Diameter	Φ45	Φ44	Replace when beyond the limit value	 Guide pulley diameter
Roller	Diameter	Φ47	Φ46	Replace when beyond the limit value	 Roller diameter

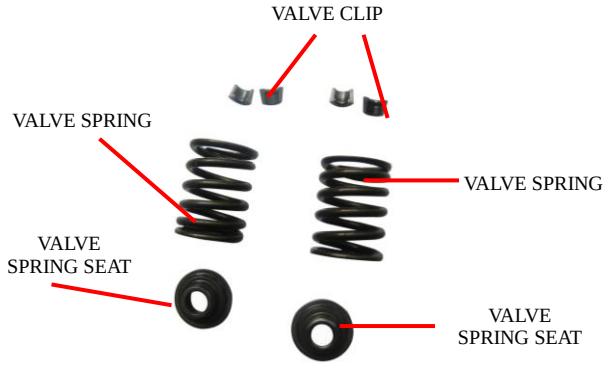
2.3 VALVE TRAIN

2.3.1 Removal, Installation and Maintenance

1) Check the intake & exhaust valves for air leakage, grind the sealing face of valves if necessary.

2) Remove and check the valve clip, valve spring upper seat for wear, repair or replace them if necessary.

3) Remove and check the valve springs for deformation and wear, replace the spring if it is worn or out of elasticity.

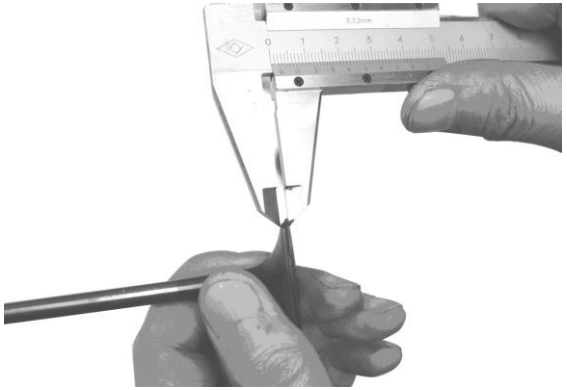


4) Remove and check the oil shield for wear and damage, replace it if necessary.

5) Remove and check the intake & exhaust valves for wear, replace them if necessary.

6) Measure the diameter of valve stem, replace the valve stem if it is beyond the service limit (intake valve＜Φ4.950mm, exhaust valve＜Φ4.950mm).

7) Measure the valve cone, replace it if values are beyond the service limit (upper valve zone: 32 °, lower valve zone: 60 °, valve seat face: 45 °, valve margin width: 1.6mm).



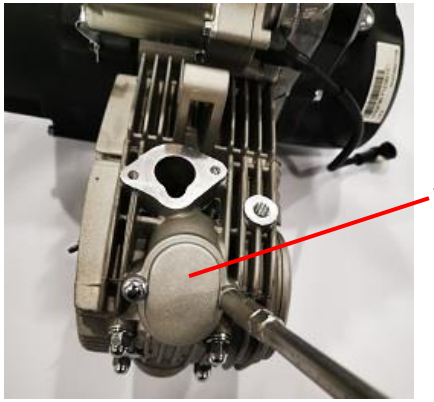
8) Measure the free length of valve spring, replace it if it is beyond the service limit (＜27.7mm).

NOTE: The dense coils face upward when installing the spring.

9) Check the timing driven sprocket for wear, replace it if necessary.

10) Measure the cam lobe length by means of a micrometer, replace it if it is out of the service limit (intake cam＜32.15mm, exhaust cam＜31.94mm).

11) To adjust the valve clearance, unscrew the valve cover firstly.
Tightening torque: 8~12N m



12) Unscrew the plug and view-hole plug from the engine left cover. Counterclockwise rotate the magneto rotor until “T” mark on it aligns with the sign of left crankcase cover, while both the intake and exhaust valves are closed.
Tightening torque: 8~12N m

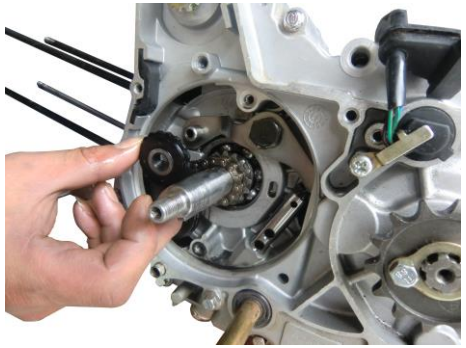
13) Adjust the clearance of intake & exhaust valves to 0.03~0.06mm, tighten up the adjusting nut. Tightening torque: 6~10N ṁ

14) Unscrew the bolt to remove the left crankcase cover.
Tightening torque: 8~12N ṁ

15) Unscrew the nut of magneto rotor to pull out the rotor.
Tightening torque: 40~50N ṁ

16) Unscrew the plate cover bolt to remove the starting chain, tensioning plate, guide plate and starting clutch sprocket weldment, and then remove the plate cover and seal ring. Tightening torque: 8~12N ṁ

17) Remove and check the tensioning wheel for wear, replace it if necessary.



18) Remove the timing chain, check its stretch and wear, replace it if necessary.

19) Remove the tensioning rod and check its head for wear, replace it if its OD exceeds service limit Φ11.94mm.

2.3.2 Troubleshooting to Valve Train

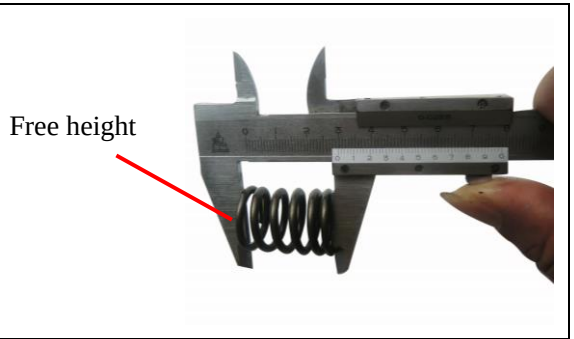
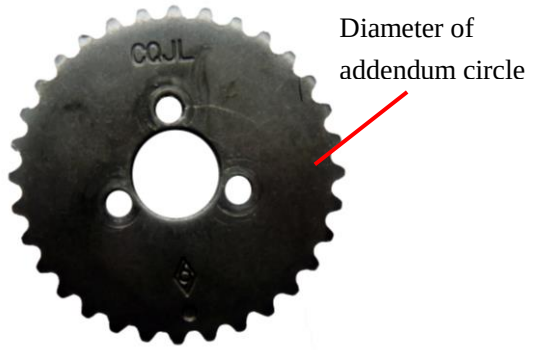
Description	Damage Form	Trouble	Service
Valve Train	Excessive wear of cam	Not smooth gas inlet and outlet. Engine lacks power. Large noises from valve train	Replace the cam
	Excessive wear of camshaft	Hole-to-shaft clearance is too large. Abnormal sound from cam	Replace the camshaft
Timing Chain	Loose	Timing chain is elongated and running with knocking sound	Replace the timing chain
Rocker Arm	Working surface is scratched or seriously worn	Abnormal sound from rocker arm, engine lacks power	Replace the rocker arm
	Rocker arm hole is worn	Abnormal sound from rocker arm, engine lacks power	Replace the rocker arm
	Rocker arm shaft is worn	Abnormal sound from rocker arm, engine lacks power	Replace the rocker arm shaft
Valve	Little valve clearance	Engine fails or is hard to start. Engine lacks power and has unstable idle speed.	Adjust the valve clearance to 0.03~0.06mm
	Large valve clearance	Knocking sound	Adjust the valve clearance to 0.03~0.06mm
	Too much carbon deposits on the surface	Engine fails or is hard to start. Engine lacks power and has unstable idle speed.	Clear away carbon deposits and grind the valve
	Working surface is seriously worn or has pits	Engine fails or is hard to start. Engine lacks power and has unstable idle speed.	Clear away carbon deposits and grind the valve
	Valve stem is seriously worn	Thick blue smoke from exhaust pipe	Replace the valve
	Valve stem is deformed	Engine fails to start.	Replace the valve
Valve Spring	Spring is broken	Engine fails or is hard to start. Noises from cylinder head	Replace the valve spring

2.3.3 Reference List of Standard Value and Limit Value for Valve Train Maintenance

Description	Test Item	Standard Value	Limit Value	Service	Picture
Camshaft Assembly	Height of intake valve lobe	32.25～32.37	32.15	Replace when beyond the limit value	Height of intake valve lobe 
	Height of exhaust valve lobe	32.04～32.16	31.94	Replace when beyond the limit value	Height of exhaust valve lobe 

Intake Valve	Intake valve clearance	0.03～0.06	0.10	Adjust valve clearance when beyond the limit value	 Valve clearance
	Diameter of intake valve	Φ4.975～Φ4.99	Φ4.950	Replace when beyond the limit value	 Diameter of intake valve
	Runout of valve stem	0～0.01	0.03	Replace when beyond the limit value	 Diameter

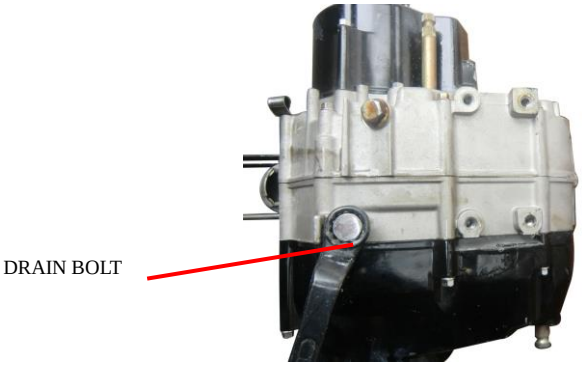
Exhaust Valve	Exhaust valve clearance	0.03～0.06	0.10	Adjust valve clearance when beyond the limit value	 Valve clearance
	Diameter of exhaust valve	Φ4.955～Φ4.97	Φ4.915	Replace when beyond the limit value	 Diameter of exhaust valve
	Runout of valve stem	0～0.01	0.03	Replace when beyond the limit value	 Diameter

Valve Spring	Free height	29.7～30.7	27.7	Replace when beyond the limit value	
Timing Driven Sprocket	Diameter of addendum circle	Φ67～Φ67.6	Φ66.5	Replace when beyond the limit value	

2.4 CRANKCASE

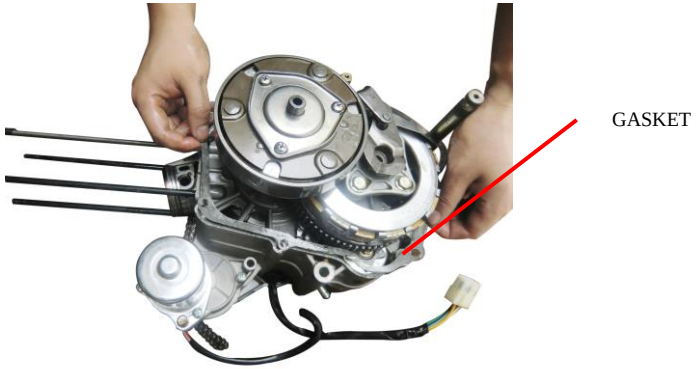
2.4.1 Removal, Maintenance and Installation

1) Unscrew the drain bolt to empty the engine oil thoroughly.
Tightening torque: 20~30N·m

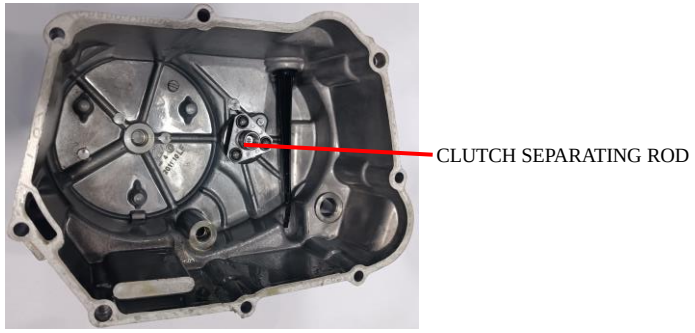


2) Unscrew the tightening bolt M6 from right crankcase cover, slightly tap the cover with a rubber hammer to remove it. Tightening torque: 8~12N·m

3) Check the right crankcase cover gasket for damage, replace it if necessary.

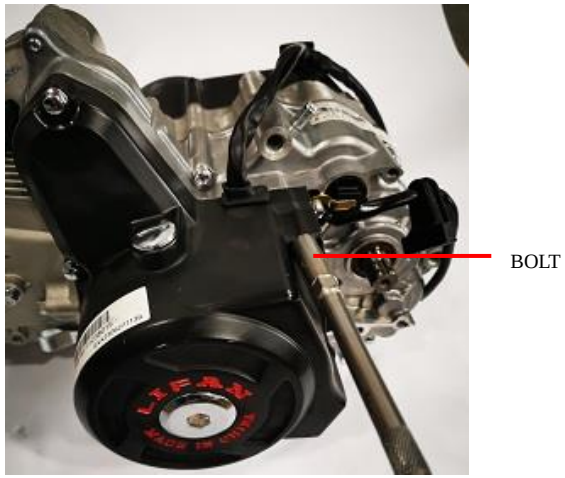


4) Configuration of right crankcase cover assembly is shown as follows. Check the clutch separating rod for wear, replace it if necessary.

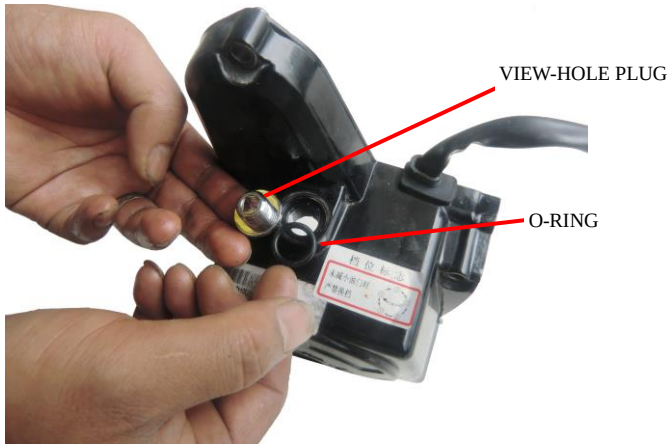


5) Check the oil seal of starting shaft for wear and damage, replace it if necessary.

6) Unscrew the bolt to remove the left crankcase cover.
Tightening torque: 8~12N ·m

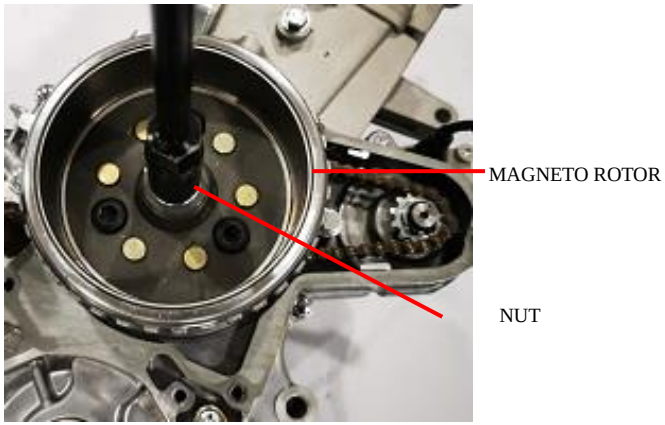


7) Unscrew the view-hole plug, remove the O-ring and check it for wear, replace it if necessary.

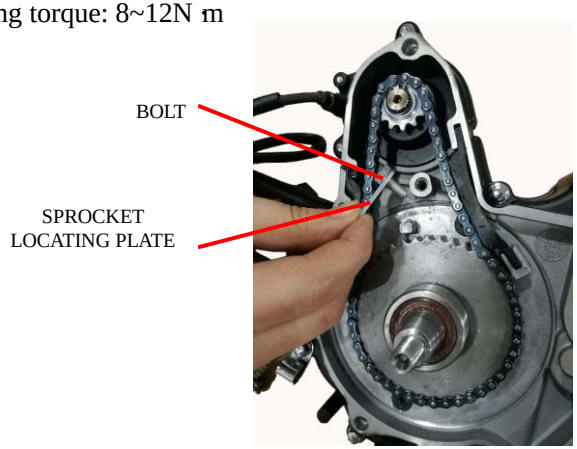


8) Remove and check the left crankcase cover gasket, replace it if necessary.

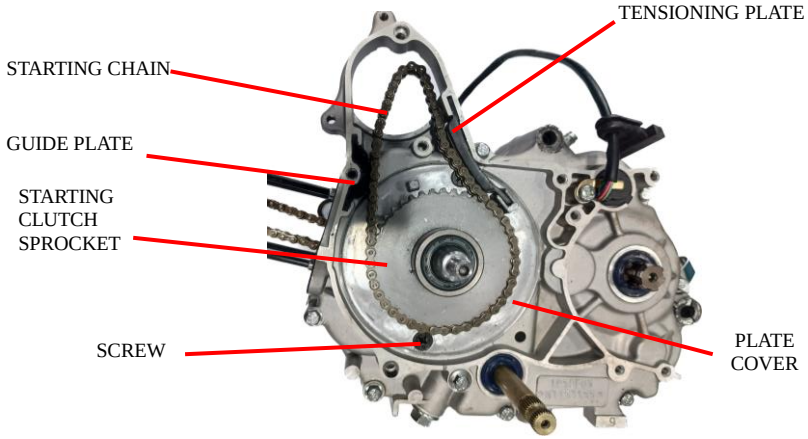
9) Unscrew the nut from the magneto rotor and pull out the rotor.
Tightening torque: 40~50N ṁ



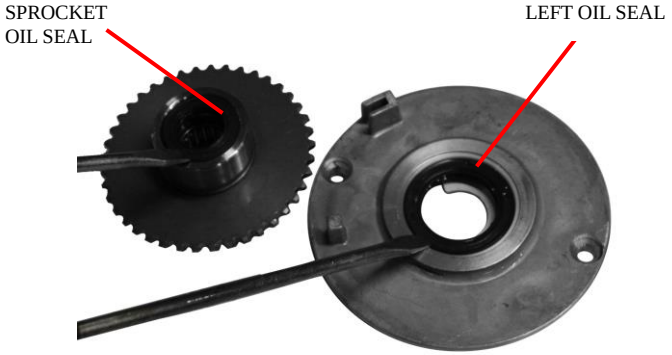
10) Unscrew the bolt to remove the sprocket locating plate.
Tightening torque: 8~12N ṁ



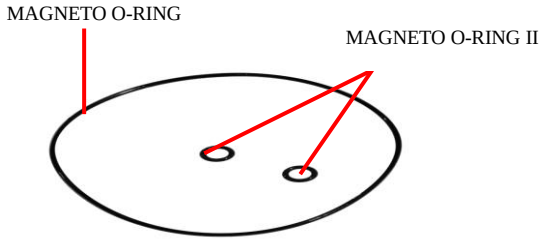
11) Remove the starting chain, tensioning plate, guide plate and starting clutch sprocket, unscrew the bolt to remove the plate cover and seal ring.
Tightening torque: 8~12N ṁ



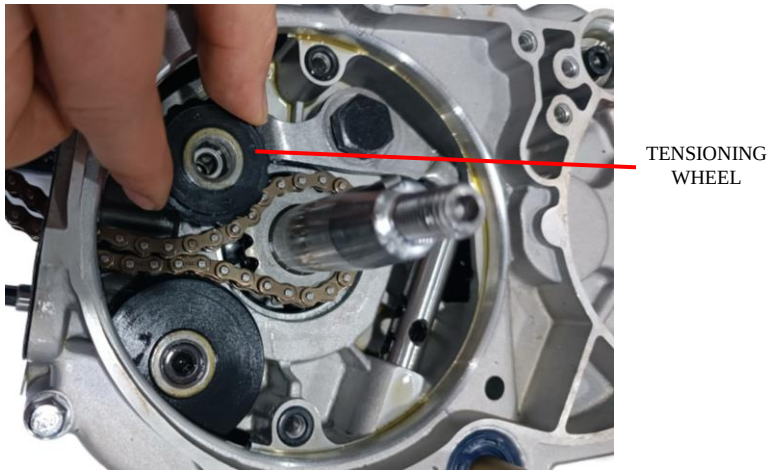
12) Check the left oil seal of crankshaft and oil seal of starting clutch sprocket for wear, replace them if necessary.



13) Check the plate cover seal ring for damage, replace it if necessary.



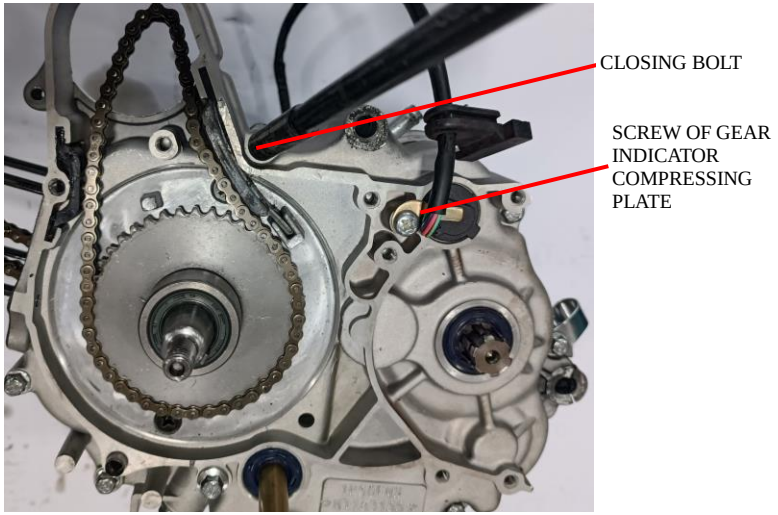
14) Remove the tensioning wheel and check it for wear, replace it if necessary.



15) Remove the tensioning rod, check its head for wear, replace it if OD exceeds the service limit (Φ11.975mm).

16) Remove and check the timing chain for stretch and wear, replace it if necessary.

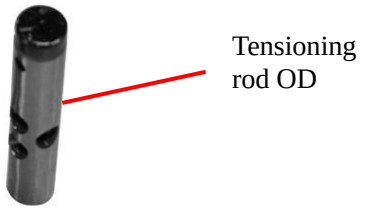
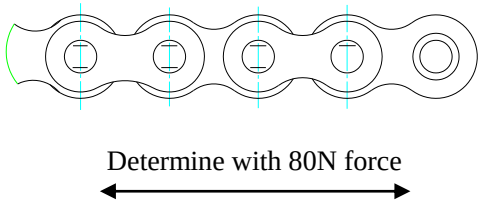
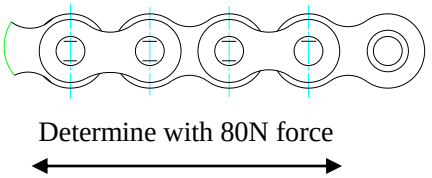
17) Unscrew the crankcase closing bolt and screw of gear indicator compressing plate. Tightening torque: 8~12N·m



2.4.2 Troubleshooting to Crankcase

Description	Damage Form	Trouble	Service
Crankcase	Cracks on crankcase	Oil leaks from crankcase	Repair or replace
	Damaged closing thread	Oil leaks from joint of left crankcase and right crankcase.	Repair or replace
	Damaged cylinder thread	Engine fails or is hard to start. Engine lacks power and has unstable idle speed.	Repair the thread hole or replace the crankcase
	Broken cylinder bolt	Engine fails or is hard to start. Engine lacks power and has unstable idle speed.	Replace the cylinder bolt
	Damaged oil seal	Oil leaks from oil seal.	Replace the oil seal
Right Crankcase Cover	Right crankcase cover is damaged or cracked	Oil leaks from right crankcase cover.	Repair or replace the right crankcase cover
	Damaged gasket	Oil leaks between right crankcase cover and crankcase.	Replace the gasket
Left Crankcase Cover	Left crankcase cover is damaged or cracked	Oil leaks from left crankcase cover.	Repair or replace the left crankcase cover
Plate Cover	Broken seal ring	Oil leaks from left crankcase cover.	Replace the seal ring

2.4.3 Reference List of Standard Value and Limit Value for Crankcase Maintenance

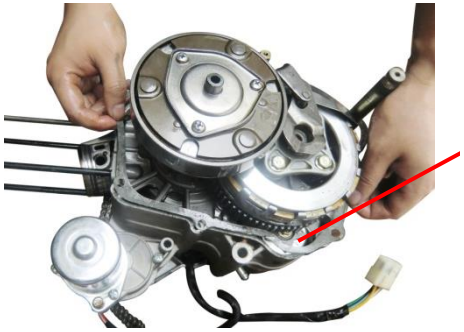
Description	Test Item	Standard Value	Limit Value	Service	Picture
Tensioning Rod	Tensioning rod OD	Φ11.985～Φ12	Φ11.975	Replace when beyond the limit value	
Starting Chain	Length of starting chain (62 links when determining with 80N force)	387.35~387.92 (62 links after stretch)	388.92	Replace when beyond the limit value	
Timing Chain	Length of timing chain (90 links when determining with 80N force)	527.4～527.84 (90 links after stretch)	529	Replace when beyond the limit value	

2.5 TRANSMISSION

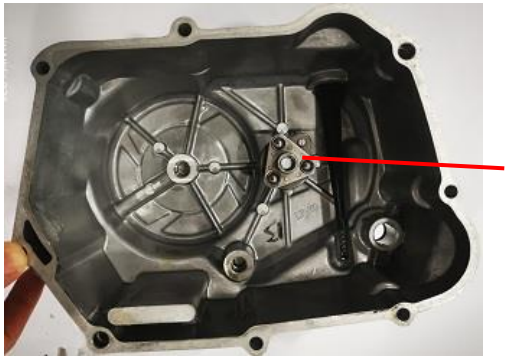
Clutch

2.5.1 Removal, Maintenance and Installation

1) Remove and check the gasket of right crankcase cover for wear. Replace it if necessary.



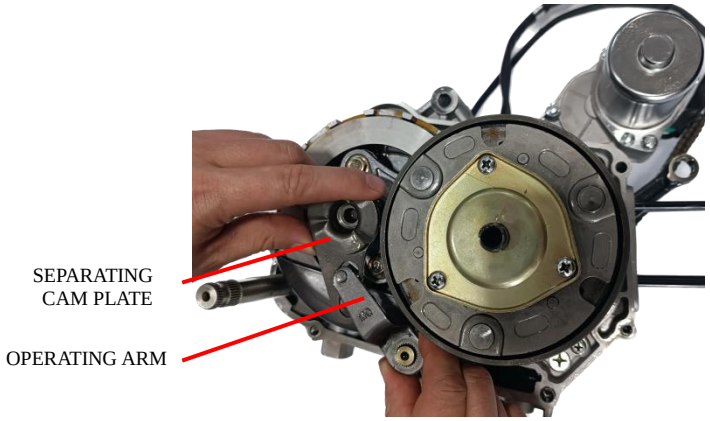
2) Check the separating tappet of clutch for wear. Replace it if necessary.



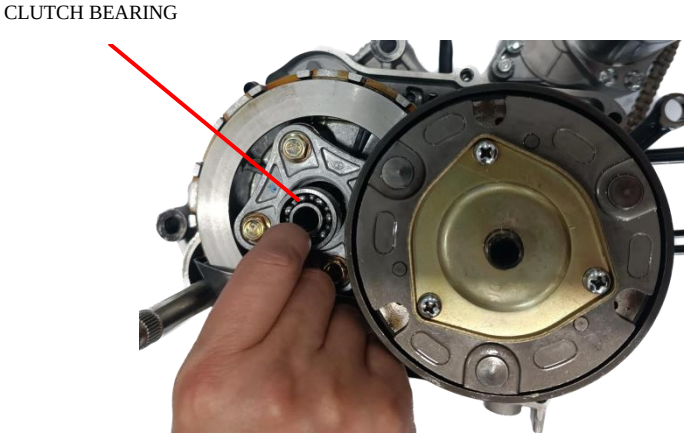
3) Check the O-ring of clutch adjusting bolt for damage. Replace it if necessary.

4) Construction of clutch assembly is shown as follows.

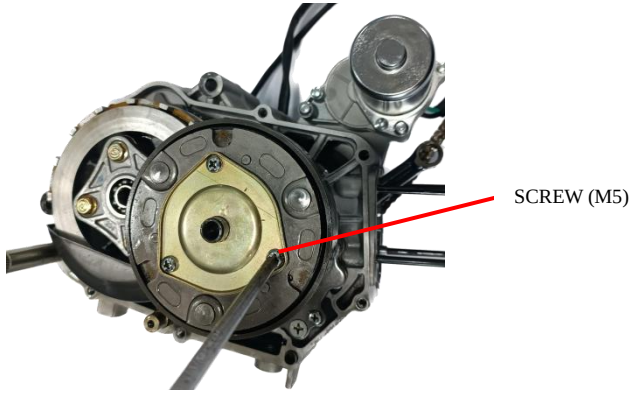
5) Remove and check the clutch operating arm and separating cam plate for wear. Replace them if necessary.



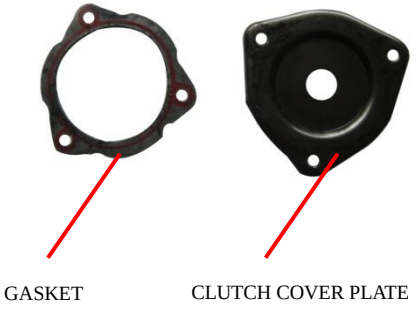
6) Pull out the clutch bearing, check the bearing for wear and replace it if necessary.



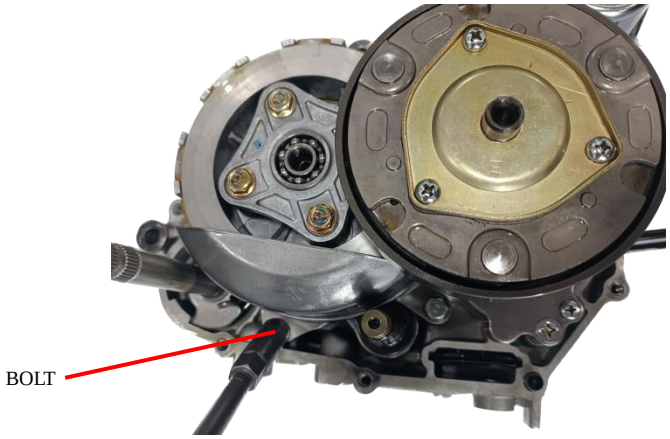
7) Remove the tightening screw (M5) from the auto clutch cover plate. (Tightening torque: 6-10N ·m)



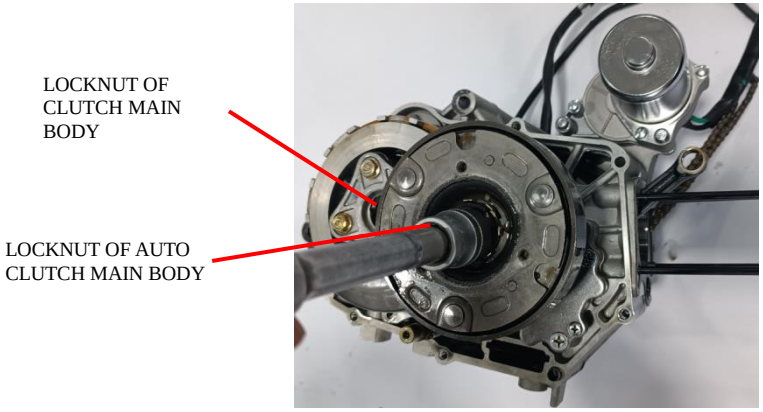
8) Check the auto clutch cover plate and its gasket for damage. Replace them if necessary.



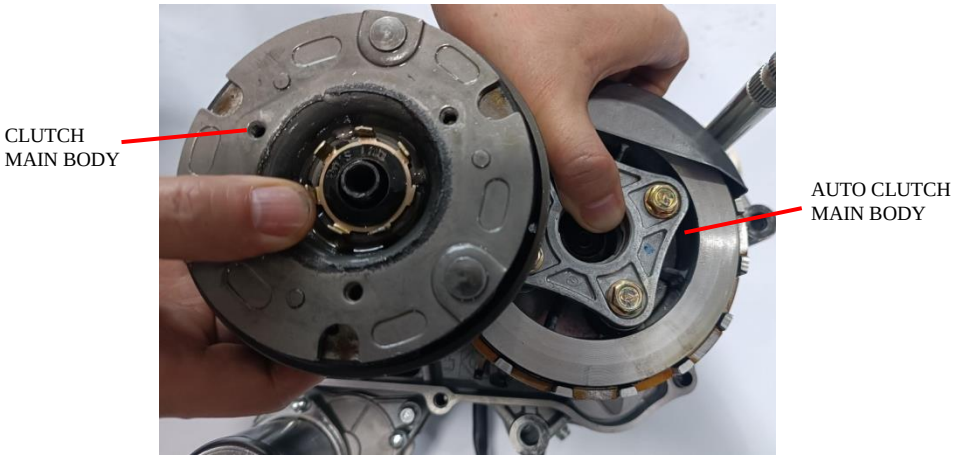
9) Remove the tightening bolt (M6) from the oil box.
(Tightening torque: 8-12N ·m)



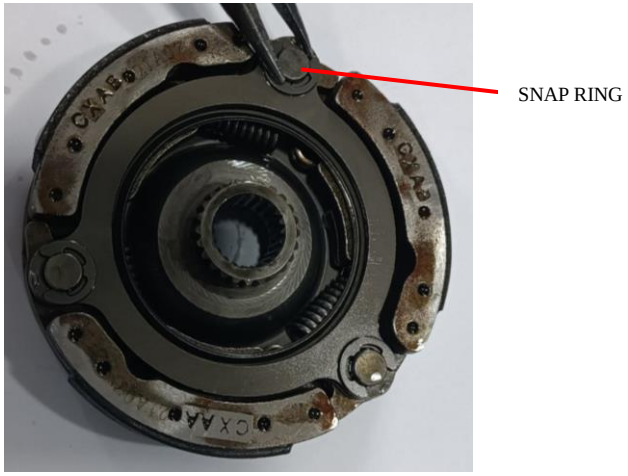
10) Unscrew the locknut from the clutch, check its thread for damage and replace the nut if necessary. (Locknut: M14×1, tightening torque: 45-55N ·m)



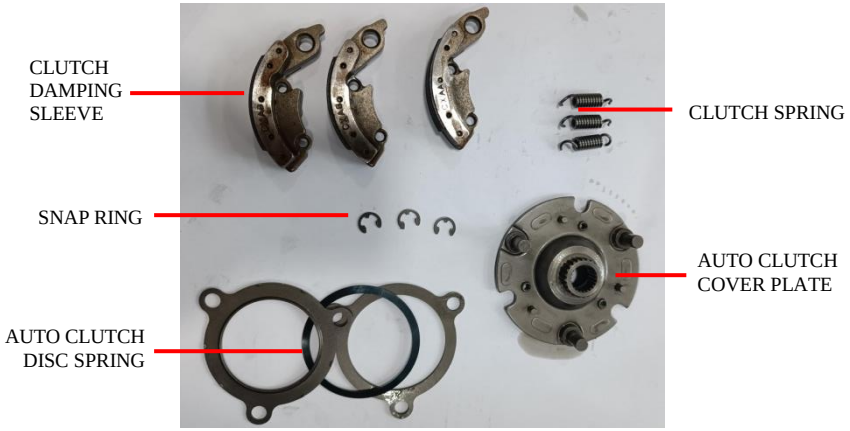
11) Remove the snap ring of auto clutch main body.



12) Remove the snap ring from the auto clutch drive plate assembly.



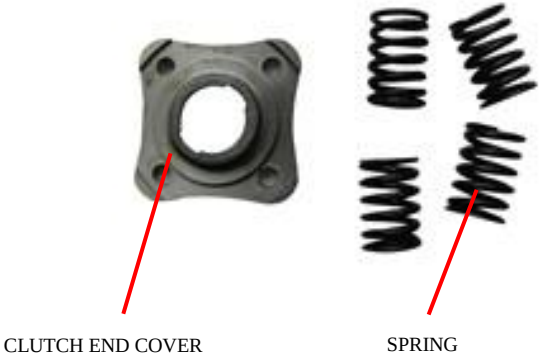
13) Check the snap ring, block, gasket, washer and main body of auto clutch for damage. Replace the block spring if it is out of elasticity.



14) Check the gear for damage or missing teeth, and replace it if necessary.

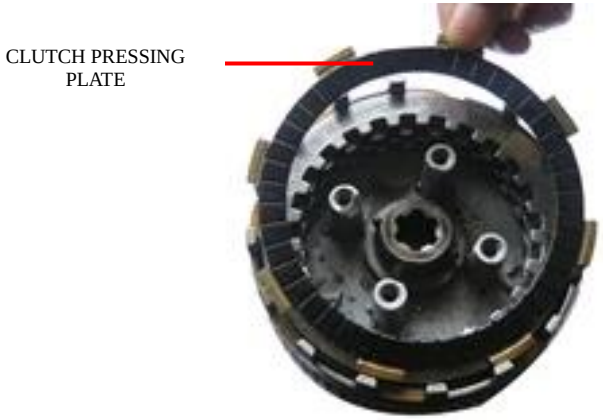
15) Unscrew the bolt (M6) from the clutch end cover. (Tightening torque: 8-12N·m)

16) Check the clutch end cover for damage, and replace it if necessary. And replace the spring if it is inelastic.



17) Remove and check the clutch pressing disc for damage, replace it if necessary.

18) Remove and check the clutch pressing plate for wear. Measure the deformation flatness with a feeler gauge, and replace the pressing plate if it exceeds the service limit 0.2mm.



19) Remove the clutch drive plate and driven plate (friction plate), and measure their thicknesses with a caliper. Replace the plates if they exceed the service limits (2.8mm & 1.4mm).

20) Check the primary driven gear for wear, and replace it if necessary.

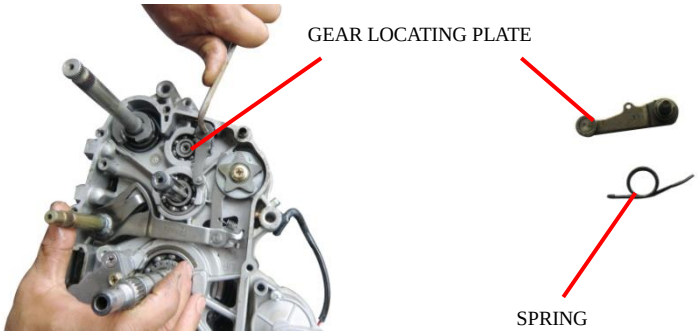
2.5.2 Troubleshooting to Clutch

Description	Cause	Fault	Remedy
Clutch drive disc	The drive disc grooves are worn into serrated shape.	Clutch is slipping, not disengaged thoroughly with a loud noise.	Trim the grooves with a saw or replace the drive disc.
Clutch drive plate & pressing plate	The contact face is excessively worn.	Clutch is slipping.	Replace
Clutch drive/driven plate	Excessively worn (thickness＜2.8/1.4mm)	Clutch is slipping, not disengaged thoroughly.	Replace the drive/driven plate as a set.
	Severely deformed	Clutch is slipping.	
Clutch spring	Inelastic or broken	Do.	Replace the spring.

Gearshift Mechanism

2.5.3 Removal, Maintenance and Maintenance

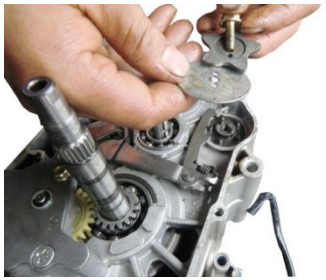
1) Unscrew the bolt (M6) to remove the gear locating plate, check the locating plate for damage, and replace it if necessary. Replace the spring if it is inelastic. (Tightening torque: 8-12N·m)



2) Remove and check the gearshift shaft for wear, and replace it if necessary.

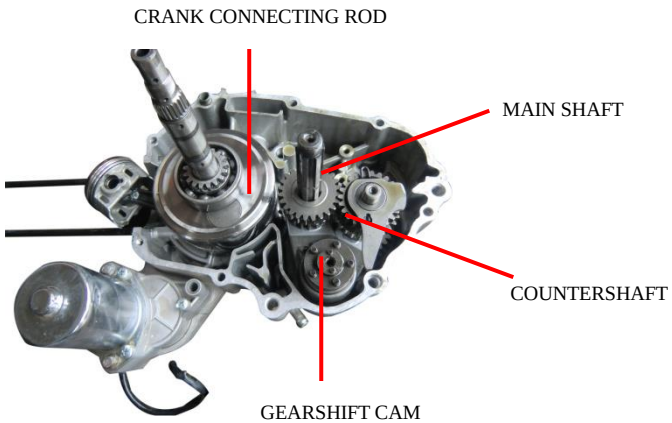
3) Unscrew the bolt (M6) of gear indicator from the gearshift cam assembly, and remove the gear indicator contact. (Tightening torque: 8-12N·m)

4) Check the gear indicator contact for wear, and replace it if necessary.

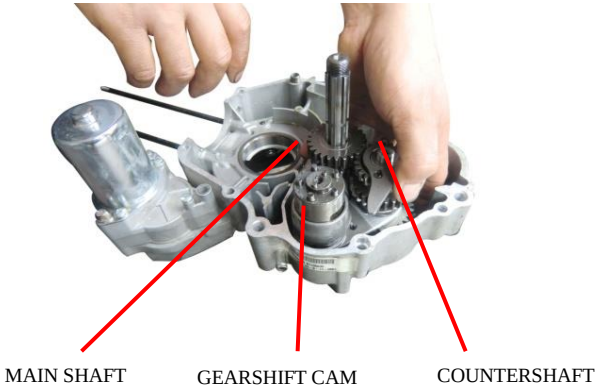


5) Unscrew the tightening bolt (M6) from the crankcase to remove the right crankcase assembly. Check the crankcase gasket for damage, replace it if necessary. (Tightening torque: 8-12N·m)

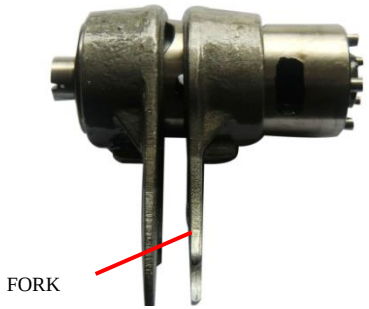
6) Remove the crank connecting rod comp.



7) Remove the gearshift cam assembly, main shaft and countershaft comp.

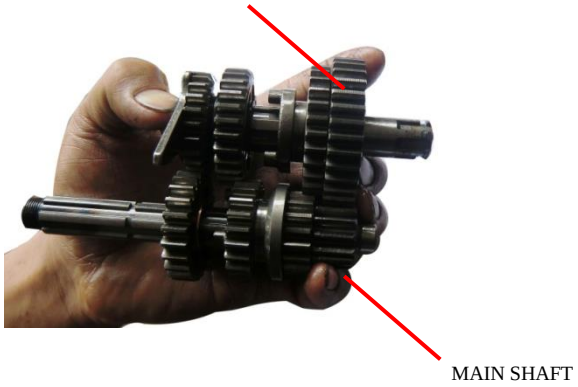


8) Remove the fork from the gearshift cam, check it for wear, and replace it if its claw thickness exceeds the service limit (3.8mm).

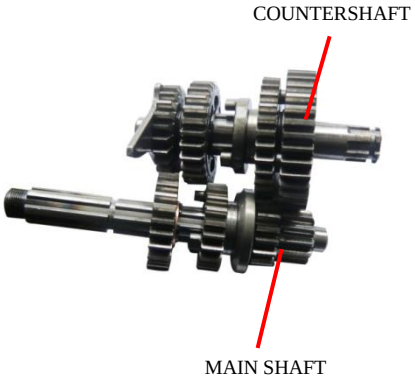


9) Check the drum and fork groove of gearshift cam for wear, replace the drum if it exceeds the service limit (Φ33.93mm).

10) Check the main shaft and countershaft, and replace them if their matching gap is excessively large.



11) Check the gears of main shaft and countershaft for wear, and replace them if deep pits or missing teeth occur.



12) Remove and check the 4th gear of countershaft for wear.

13) Remove and check the countershaft 3rd gear and its washer for wear. Replace them if the bore exceeds the service limit (Φ20.073mm).

14) Check the countershaft 2nd gear for wear, and replace it if necessary.

15) Check the countershaft 1st gear for wear, and replace the gear if the bore exceeds the service limit (Φ23.073mm).

16) Check all countershaft washers and snap rings for wear, and replace them if necessary.

17) Remove and check the main shaft 4th gear and spline washer for wear, and replace them if the bore exceeds the service limit (Φ17.075mm).

18) Remove and check the main shaft 3rd gear for wear, and replace it if necessary.

19) Remove and check the main shaft 2nd gear for wear, and replace it if the bore exceeds the service limit (Φ17.075mm).

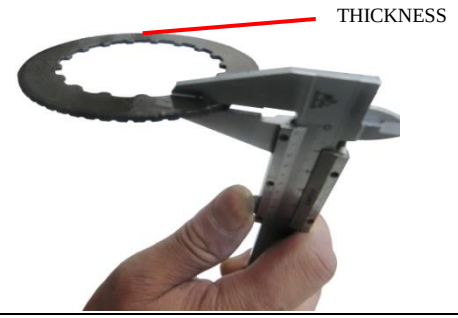
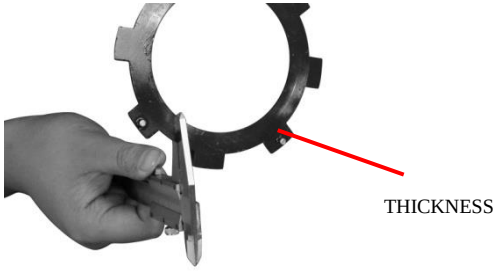
20) Check the main shaft and 1st gear for wear, and replace them if necessary.

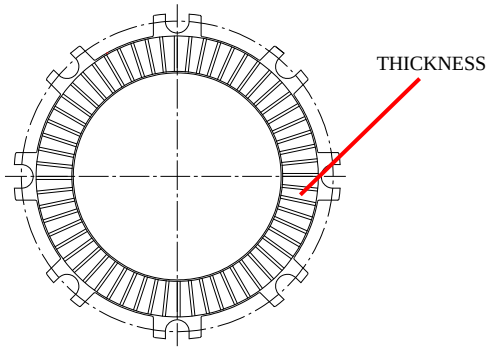
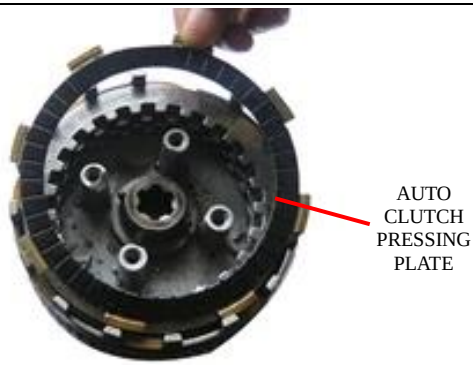
21) Check the inner spline washers and snap rings on the main shaft for deformation, and replace them if necessary.

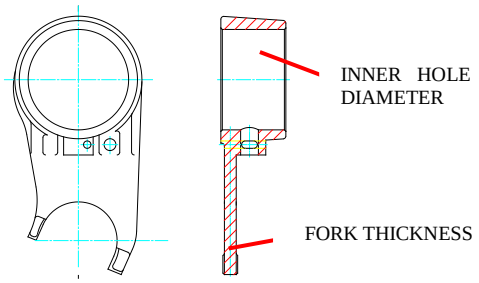
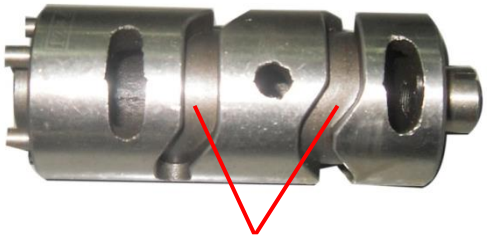
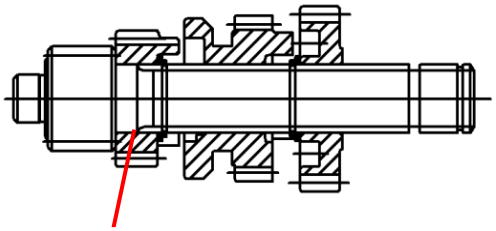
2.5.4 Troubleshooting to Gearshift Mechanism

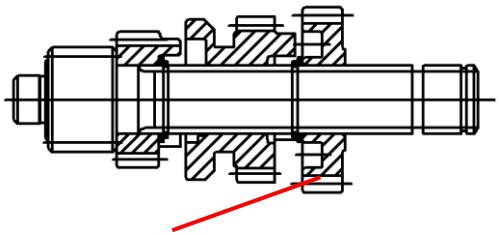
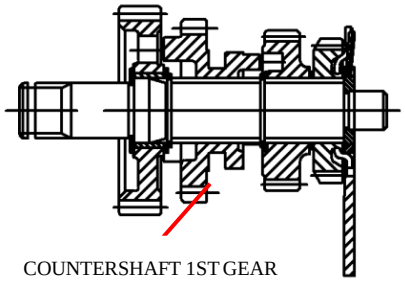
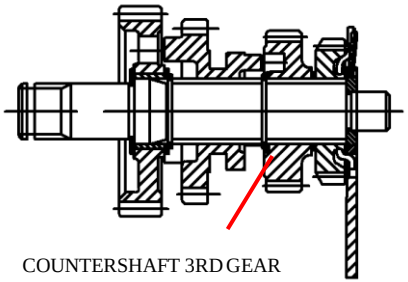
Description	Cause	Fault	Remedy
Gear	The teeth surfaces have pits, teeth are broken or gear inner hole is severely worn.	Abnormal noise occurs when the gearbox is working. It's difficult to gearshift.	Replace the gear.
	The meshing face of gear end is worn into an arc shape.	It's easy to disengage.	Do.
	Gear meshing hole is worn into trumpet shape.	Do.	Do.
	Fork groove is excessively worn.	Do.	Do.
Fork	Fork claw is excessively worn.	Do.	Replace the fork.
	Fork is deformed.	It's difficult to gearshift.	Do.
	Fork hole is excessively worn.	Do.	Do.
Gearshift cam	Gearshift groove is excessively worn.	Do.	Replace the gearshift cam.
Gear locating plate	Excessive wear or damage	Do.	Replace the gear locating plate.
	Spring is inelastic or broken.	It's easy to disengage.	Replace the torsion spring of locating plate.
Gearshift shaft	Spline is damaged.	It fails to gearshift.	Replace the gearshift shaft.
	Gearshift shaft is deformed.	It's difficult to gearshift.	Do.
	Gearshift shaft is worn or broken.	Do.	Do.
	Return spring is inelastic or broken.	It's difficult to gearshift, or pedal fails to return.	Replace the return spring.
Oil seal	Oil seal is severely worn, damaged or aged.	Oil leaks.	Replace the oil seal.

2.5.5 Reference List of Standard Value and Service Limit Value for Transmission Mechanism

Description	Test Item	Standard Value	Limit Value	Service	Picture
Auto clutch driven plate	Thickness	2.6-2.9	2.35	Replace if it exceeds the limit value.	
Auto clutch drive plate I	Thickness	1.6-1.75	1.35	Replace if it exceeds the limit value.	

Auto clutch drive plate II	Thickness	3.35-3.65	3.1	Replace if it exceeds the limit value.	
Auto clutch pressing plate	Thickness	1.45-1.55	1.2	Replace if it exceeds the limit value.	
	Flatness	0-0.1	0.2		
Auto clutch spring	Free height	17.7-18.3	14..2	Replace if it exceeds the limit value.	

Fork	Inner hole diameter	Φ34-Φ34.039	Φ34.06	Replace if it exceeds the limit value.	
	Fork thickness	4.85-4.95	4.8		
Gearshift cam	Groove width	6.05-6.15	6.18	Replace if it exceeds the limit value.	
Main shaft 2nd gear	Inner hole diameter	Φ17.016-Φ17.043	Φ17.075	Replace if it exceeds the limit value.	

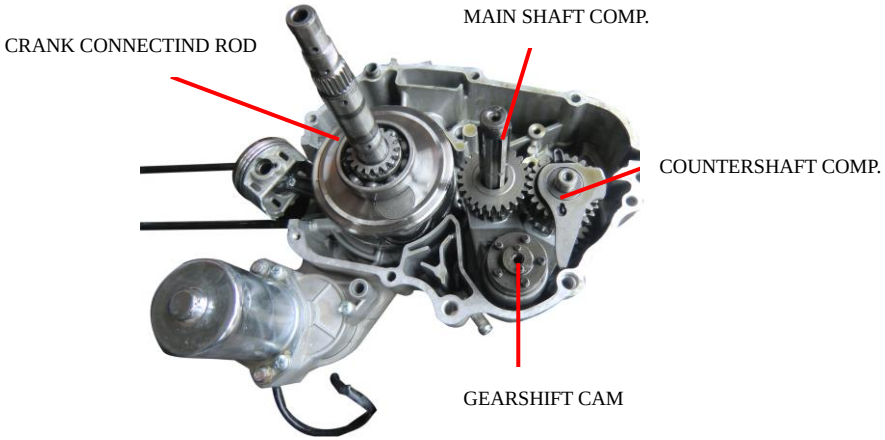
Main shaft 4th gear	Inner hole diameter	Φ17.016-Φ17.043	Φ17.075	Replace if it exceeds the limit value.	 MAIN SHAFT 4TH GEAR
Countershaft 1st gear	Inner hole diameter	Φ23.02-Φ23.041	Φ23.073	Replace if it exceeds the limit value.	 COUNTERSHAFT 1ST GEAR
Countershaft 3rd gear	Inner hole diameter	Φ20.02-Φ20.041	Φ20.073	Replace if it exceeds the limit value.	 COUNTERSHAFT 3RD GEAR

2.6 CRANK MECHANISM

2.6.1 Removal, Maintenance and Installation

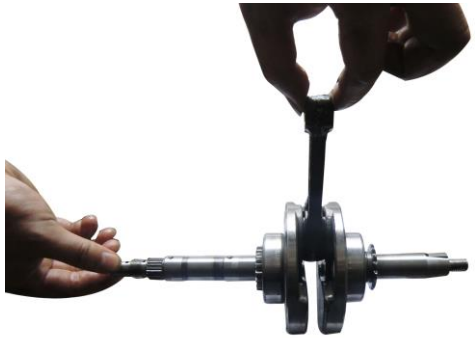
1) Check the main shaft bearing, countershaft bearing and crankshaft bearing. Replace them if they're severely worn.

2) The construction of crank connecting rod, main shaft comp., countershaft comp. and gearshift cam are shown as the following figure.



3) Remove the crank connecting rod and the construction is shown as the following figure.

4) Measure the gap of connecting rod big end with thickness gauge and micrometer gauge. Replace it with a new one , if it exceeds the service limit (axial: 0.48 mm, radial: 0.05 mm).



5) Check the timing drive sprocket of connecting rod and replace it if necessary. Make sure the tooth valleys between any two teeth are aligned with the center line of crankshaft key slot. And check the left and right bearings of crankshaft for wear. Replace them if necessary.

LEFT BEARING

RIGHT BEARING

6) Measure the O.D. of the piston pin with a micrometer. Replace it with a new one, if it exceeds the service limit (Φ12.78mm).

7) Clear away the carbon deposit on the piston top.

8) Remove the piston rings from the piston. Parallel push each piston ring into the cylinder block and check them for wear and elasticity. Measure the opening clearance of each ring with thickness gauge and replace all the piston rings as a set if they exceed the service limit (Piston ring I&II: 0.7mm, Oil ring: 1.9mm).

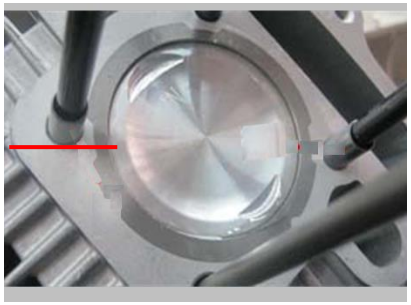
9) Measure the O.D. at the piston skirt 10mm from the piston bottom. Replace the piston if it exceeds the service limit (Φ53.15mm).

10) Measure the width of piston ring groove. Replace the piston, if it exceeds the service limit (Piston ring I&II: 0.89mm, Oil ring: 2.09mm).

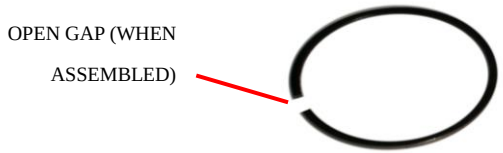
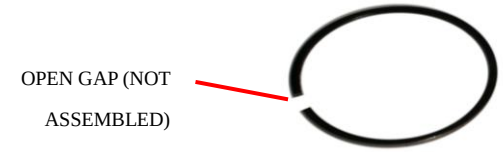
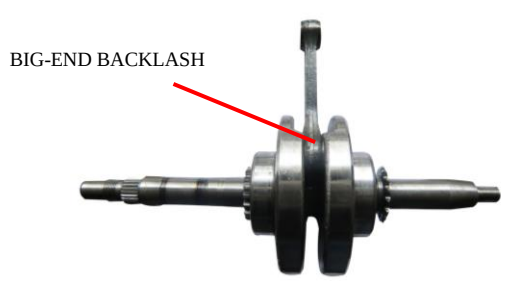
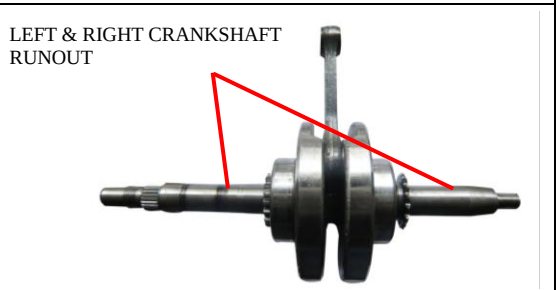
2.6.2 Troubleshooting to Crank Mechanism

Description	Cause	Fault	Remedy
Piston	Carbon deposit on the piston top	Engine overheats.	Clear away carbon deposit.
	Carbon deposit in the piston ring groove	Engine fails or is hard to start. Engine lacks power with thick blue smoke exhausting from the exhaust pipe.	Do.
	Scratches on the surface of piston skirt	Do.	Replace the piston.
	Piston is excessively worn.	Do.	Do.
	Piston ring groove is excessively worn .	Thick blue smoke exhausts from the exhaust pipe.	Do.
	Piston pin hole is excessively worn.	Knocking sound from piston pin and cylinder	Do.
Crankshaft Pin	Excessively worn	Knocking sound from big-end bearing	Replace the crank connecting rod.
Bearing	Needle bearing is excessively worn.	Do.	Do.
	Crankshaft bearing is excessively worn or damaged.	Abnormal noise from crankshaft	Replace the crankshaft bearing.
Piston Ring	Piston ring is broken	Engine fails or is hard to start. Engine lacks power with thick blue smoke exhausting from the exhaust pipe.	Replace the piston rings as a set.
	Piston ring is excessively worn.	Do.	Do.
	Piston ring is inelastic.	Engine lacks power with thick blue smoke exhausting from the exhaust pipe.	Do.
	Improper installation	Do.	Reassemble the piston rings.
Piston Pin	Excessively worn	Knocking sound from piston pin	Replace the piston pin.
Connecting Rod	Small-end hole is excessively worn.	Do.	Replace the connecting rod.
	Connecting rod is bent.	Knocking sound from cylinder	Do.
	Big-end hole is excessively worn.	Knocking sound from big-end bearing	Do.
Timing Drive Sprocket	Sprocket is excessively worn or damaged.	Incorrect timing/abnormal noise/engine lacks power.	Replace the timing drive sprocket.

2.6.3 Reference List of Standard Value and Service Limit value for Crank Mechanism

Description	Test Item	Standard Value	Limit Value	Service	Picture
Piston	Diameter of piston skirt	Φ53.475-Φ53.485	Φ53.440	Replace if it exceeds the service limit.	
	Cylinder matching gap	0.020-0.030	0.08	Replace if it exceeds the service limit.	CYLINDER MATCHING GAP 

	I.D. of pin hole	Φ13.002-Φ13.008		Φ13.05	Replace if it exceeds the service limit.	
Piston	Gap between piston ring and piston ring slot	Piston ring I& II	0.02-0.055	0.09	Replace if it exceeds the service limit.	
		Oil ring	0.035-0.150	0.2		
Piston pin	Diameter	Φ12.992-Φ12.998		Φ12.978	Replace if it exceeds the service limit.	

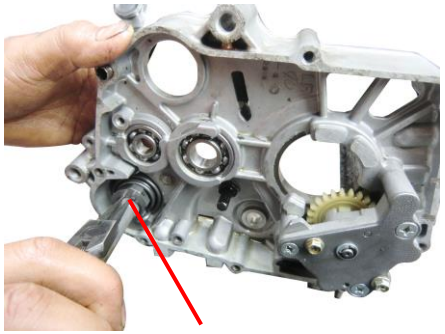
Piston ring set	Close gap	Piston ring I	0.10-0.25	0.5	Replace if it exceeds the service limit.	
		Piston ring II	0.25-0.35	0.5		
	Open gap	Piston ring I	Approx. 6.2	7.2	Replace if it exceeds the service limit.	
		Piston ring II	Approx.6.6	7.5		
Crank connecting rod	Backlash of connecting rod big-end	0.09-0.36		0.48	Replace if it exceeds the service limit.	
	Runout of left and right crankshaft	0-0.03		0.05	Replace if it exceeds the service limit.	

2.7 STARTERS

Kick-starter

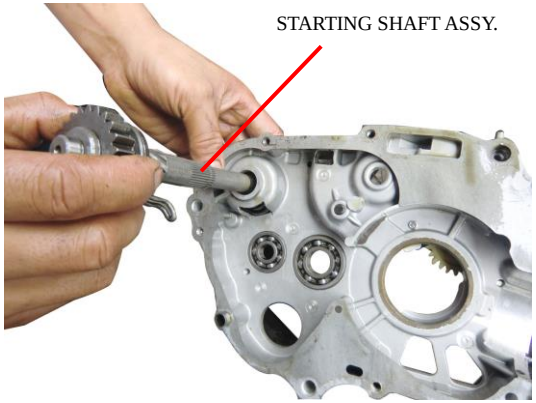
2.7.1 Removal, Maintenance and Installation

1) Remove and check the starting shaft spring and spring seat. Replace them if they are worn or deformed.



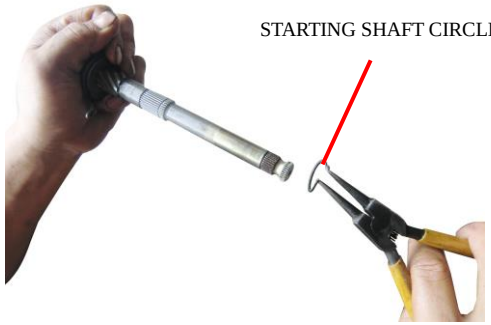
STARTING SHAFT SPRING

2) Check the starting return spring for elasticity. Replace it if it's inelastic.



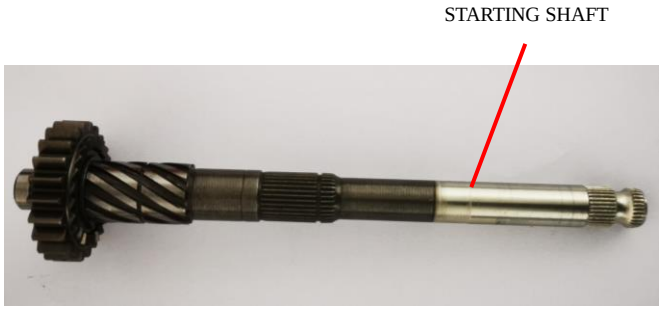
3) Remove the starting shaft assy.

4) Remove the starting shaft circlip and ratchet spring seat. Replace them if they are severely worn.

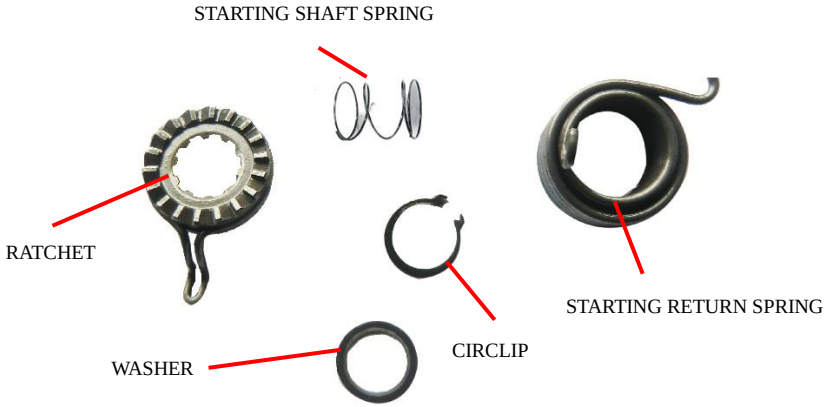


5) Remove the starting shaft spring and ratchet. Replace them if they are severely deformed or worn.

6) Check the starting shaft spline and replace it if it's severely deformed or worn.



7) Remove and check the starting shaft circlip, starting ratchet, starting return spring and washer. Replace them if they're deformed or worn.



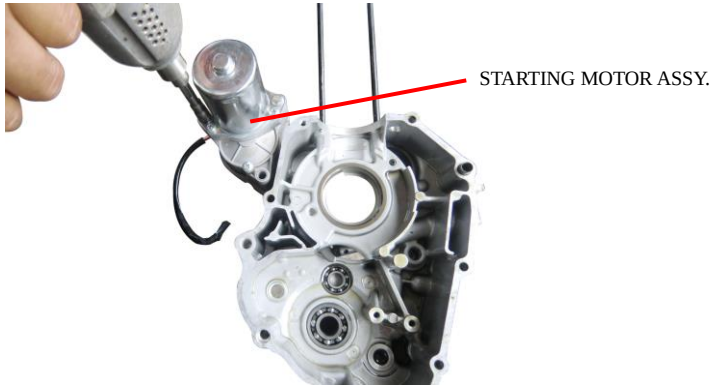
2.7.2 Troubleshooting to Kick-starter

Description	Cause	Fault	Remedy
Starting lever	The spline slips with the starting lever connected.	Slips in starting	Replace the starting lever.
Starting gear	Gear is worn.	Do.	Replace the gear.
	Gear is worn or damaged.	Difficult to start	
Ratchet	Ratchet is severely worn.	Slips in starting	Replace the ratchet.
	Friction spring of starting gear is broken.	Do.	Replace the spring.
Starting shaft	The spline connected with starting lever is damaged.	Do.	Replace the starting shaft.
	Return spring is broken.	Starting lever fails to return.	Replace the spring .

Electric starter

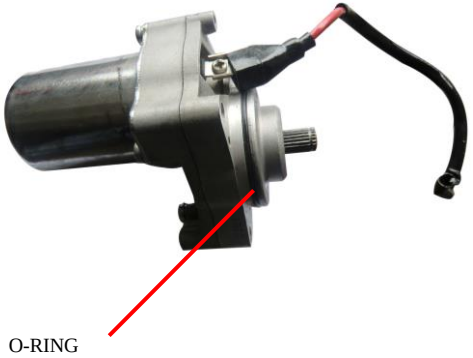
2.7.3 Removal, Maintenance and Installation

1) Unscrew tightening bolt (M6) of starting motor. (Tightening torque 8-12N ·m)



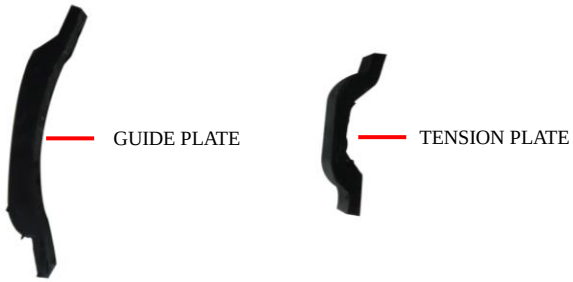
2) Knock the starting motor assy. with a plastic hammer and remove it.

3) Check the O-ring on starting motor and replace it if it's broken.



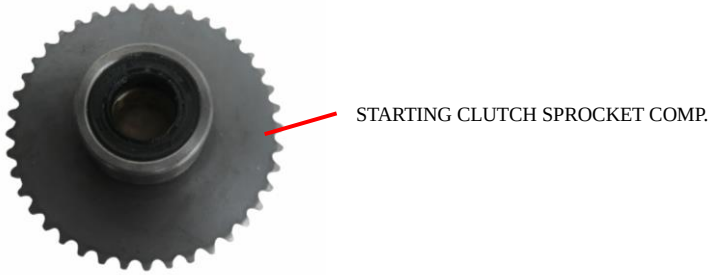
4) Check the starting chain for stretch and wear. Replace it if it's stretched for too long or severely worn.

5) Check the tension plate and the guide plate for wear. Replace them if they are severely worn.



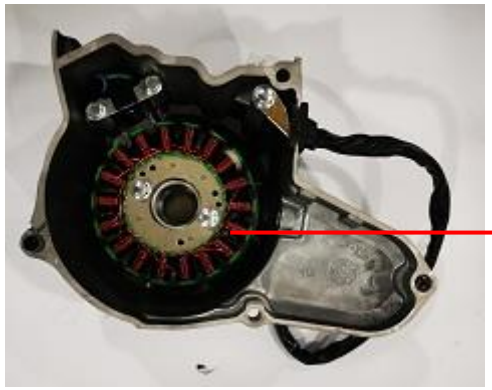
6) Check the gearshift indicator. Repair or replace it if necessary.

7) Check the starting clutch sprocket weldment for wear. Replace it if it's severely worn.



8) Check the body, roller and spring of the starting clutch for wear. Replace them if they're severely worn. The roller is required to be able to return freely and not to be stuck.

9) Remove the bolt (M6) of magneto stator coil from the left crankcase cover (Tightening torque: 8-12N·m). Check and replace it if it's damaged.



2.7.4 Troubleshooting to Electric Starter

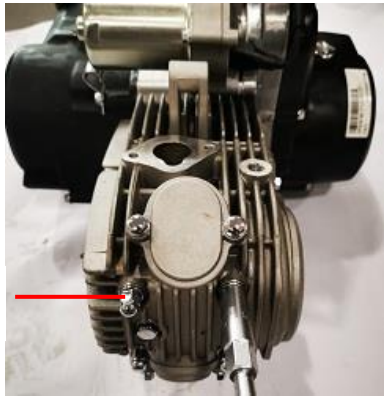
Description	Cause	Fault	Service
Starting motor	Carbon brush is excessively worn.	Starting motor lacks power or fails to work.	Replace the starting motor.
	The carbon brush spring is broken or inelastic.	Starting motor lacks power.	Do.
	The rotor commutator surface is fouled.	Do.	Do.
	The rotor commutator surface is burnt or damaged.	Do.	Do.
	The rotor commutator surface is excessively worn.	Starting motor lacks power or fails to work.	Do.
	Rotor coil is damaged by short circuit or broken circuit.	Starting motor fails to work.	Do.
Starting clutch	The contact face of starting clutch and roller is damaged or excessively worn.	Starting clutch slips or has abnormal noise.	Replace the starting clutch gear.
	The contact face of starting clutch and roller is damaged or worn into groove.	Do.	Replace the starting clutch.
	The roller is excessively worn or damaged.	Do.	Do.

2.8 LUBRICATION SYSTEM

2.8.1 Removal, Maintenance and Installation

1) Remove the cap nut from the engine. (Tightening torque 10-14N·m)

CAP NUT

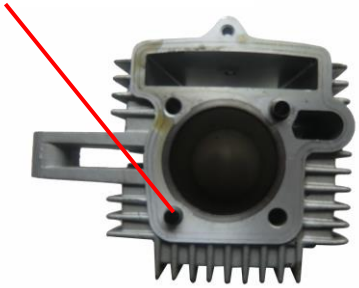


2) Step the starting lever and start the engine and check the copper washer for oil leaks. Clean the oil passage if necessary.

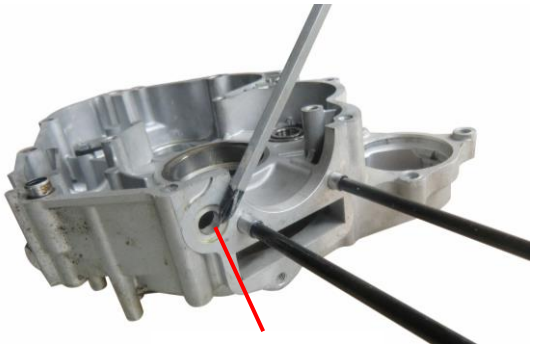
3) Check the oil passage in cylinder head for block.

4) Check the oil passage in cylinder block for block.

CYLINDER BLOCK OIL PASSAGE

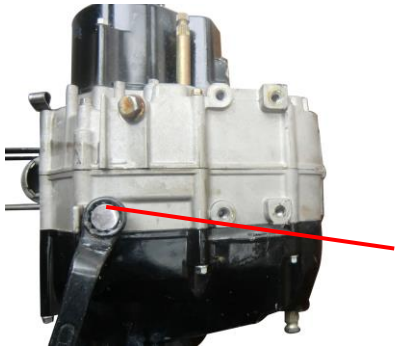


5) Check the crankcase oil passage and clean it.



OIL PASSAGE HOLE

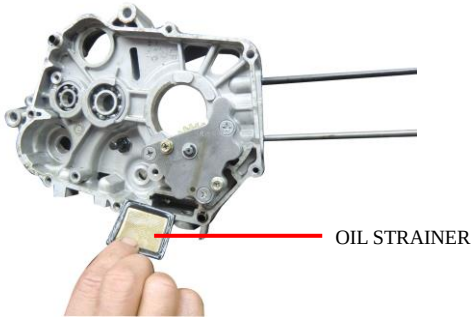
6) Unscrew the drain plug (Tightening torque: 20-30N·m) and empty the engine oil. Check the oil passage and clean it if necessary.



7) Unscrew the bolt (M6) on right crankcase cover, and remove the right crankcase cover. (Tightening torque: 8-12N·m)

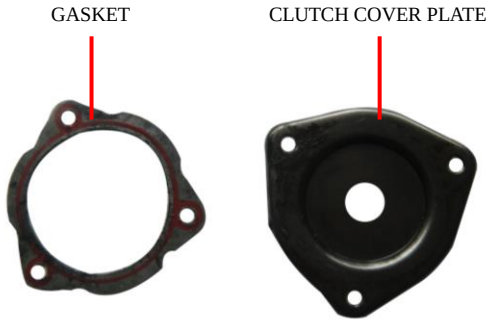
8) Check the sight glass for oil leaks and replace it if necessary. Check the oil passage in the right crankcase cover for foreign matter and clean it if necessary.

9) Remove the oil strainer on right crankcase assy. and clean it. Replace it if it's broken.

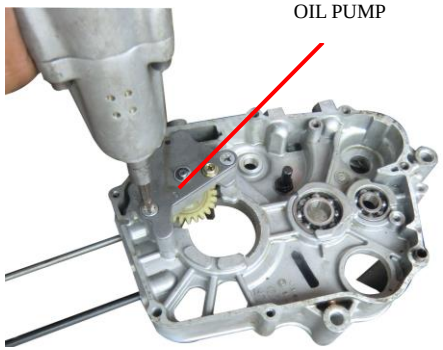


10) Check the auto clutch body. Replace and clean it if it's broken.

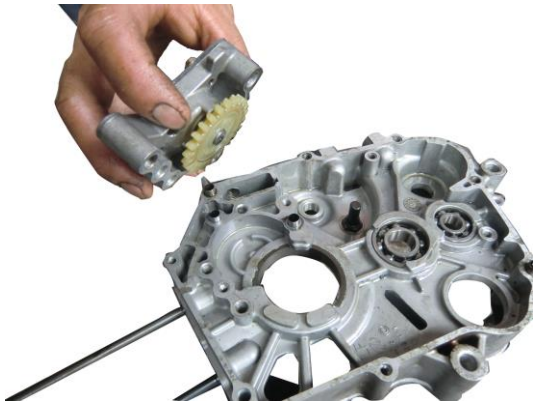
11) Check the auto clutch cover plate and its gasket. Replace them if they're broken.



12) Unscrew the tightening screw (M6) of oil pump. (Tightening torque: 8-12N ṁ)



13) Remove the oil pump.

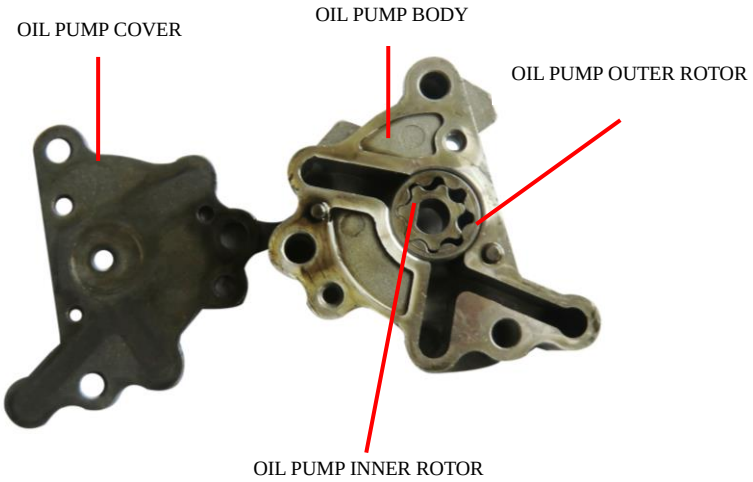


14) Remove the snap ring of the oil pump drive sprocket.

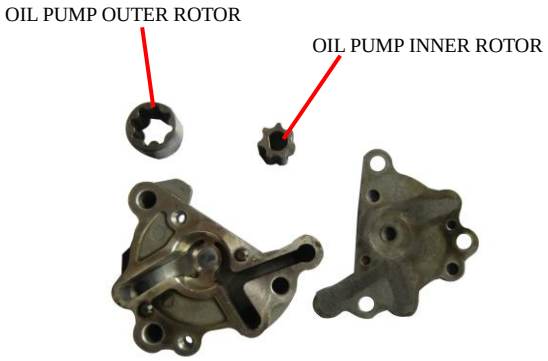
15) Check the drive sprocket, snap ring and washer of oil pump for wear. Replace them if they're severely worn.

16) Unscrew the fixing bolts of oil pump.

17) Remove the oil pump cover and clean it.



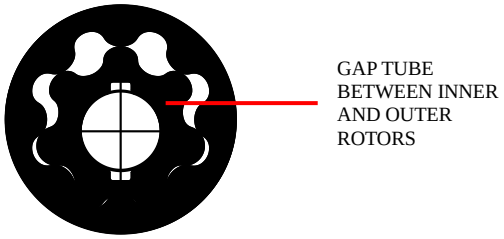
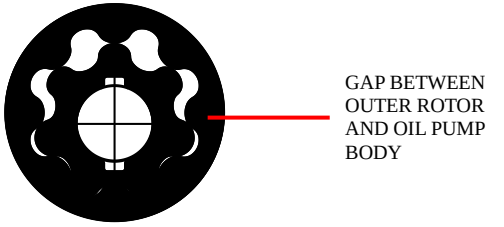
18) Check the top and bottom cover of oil pump. Replace the oil pump inner and outer rotors if they are broken or severely worn.



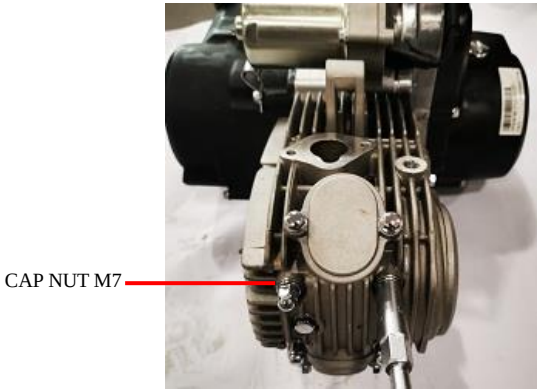
2.8.2 Troubleshooting to Lubrication System

Description	Cause	Fault	Service
Oil pump drive sprocket	Severely worn	Engine lacks power, overheats or is severely worn.	Replace the oil pump drive sprocket.
Lubrication system	Oil passages are blocked.	Low oil supply. Engine lacks power or overheats. Parts are severely damaged.	Clean the oil passages.

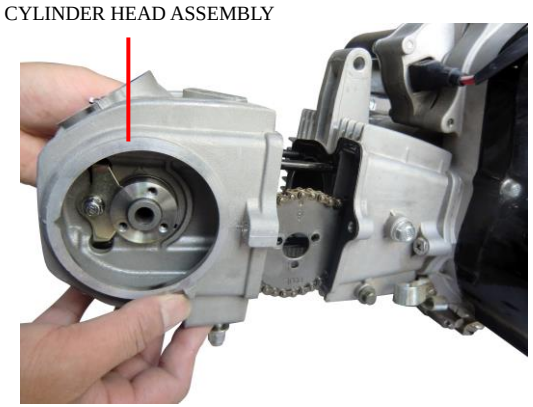
2.8.3 Reference List of Standard Value and Service Limit Value for Lubrication System

Description	Test Item	Standard Value	Limit Value	Service	Picture
Oil pump inner rotor	Gap between inner and outer rotors	0.05-0.08	0.25	Replace the oil pump if it exceeds the service limit.	
Oil pump outer rotor	Gap between outer rotor and oil pump body	0.10-0.15	0.30	Replace the oil pump if it exceeds the service limit.	

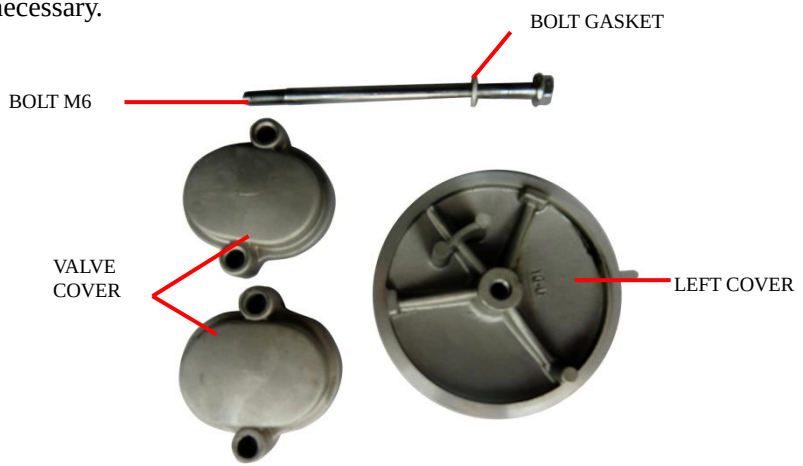
5) Unscrew the engine cap nut M7.
Tightening torque: 12~16N ·m



6) Remove the cylinder head assembly.



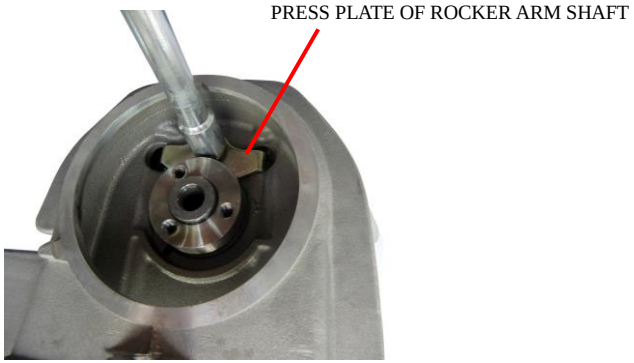
7) Check the cylinder head left cover, valve cover and bolt M6, replace them if necessary.



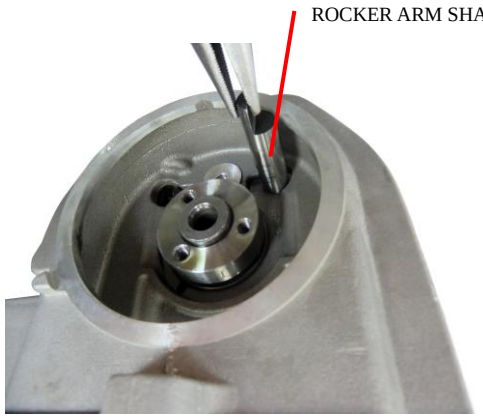
8) Check the gasket and valve cover seal ring, replace them if necessary.

9) Configuration of cylinder head assembly is shown as follows.

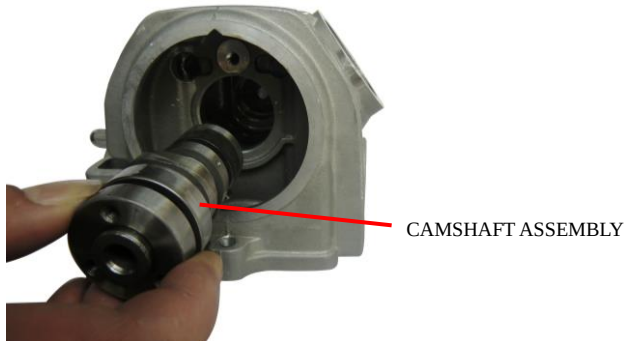
10) Unscrew and remove the press plate bolt M6 of rocker arm shaft. (Tightening torque: 8~12N ṁ)



11) Remove the rocker arm shaft and valve rocker arm.

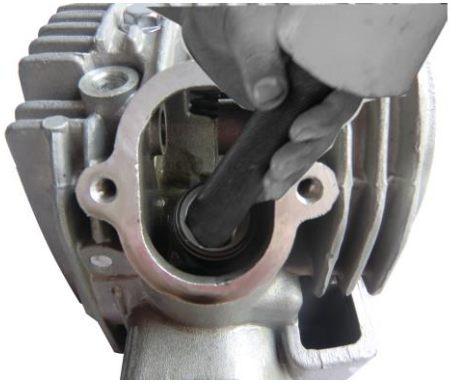


12) Remove the camshaft assembly and check it for wear, replace it if necessary.

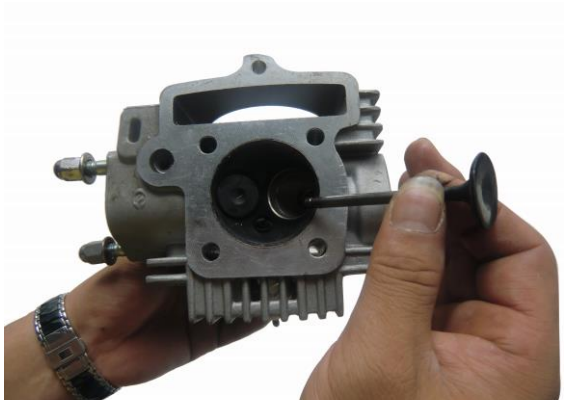


13) Check the intake and exhaust rocker arm and shaft for deformation and wear, replace it if shaft OD＜Φ9.94mm.

14) Remove the valve clip, valve spring and valve stem, check for wear and replace them if necessary.

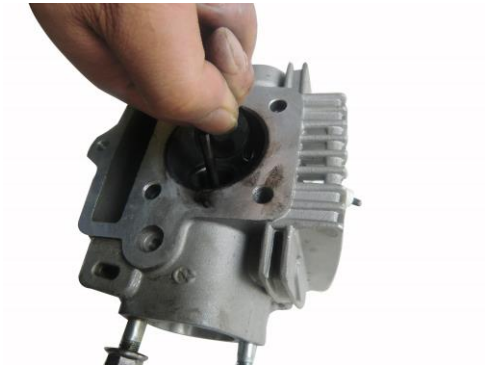


15) Measure the width of valve contact surface, replace the cylinder head and valve if it is beyond the limit (＞1.6mm).

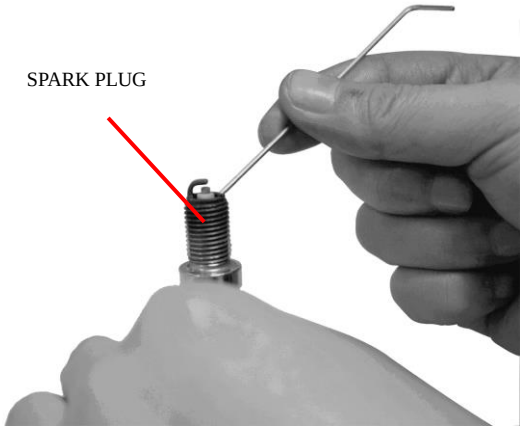


16) Ream the valve seats to specified values (Φ25±0.05mm, Φ20.5±0.05mm) and then grind them.

17) Measure the bore of valve guide, replace it if value exceeds the service limit (＞Φ5.03mm).



18) Unscrew the spark plug M10×1, clear carbon deposits on it. Tightening torque: 10~20N·m

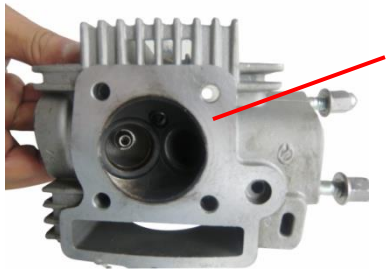
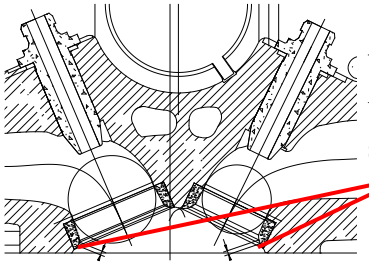
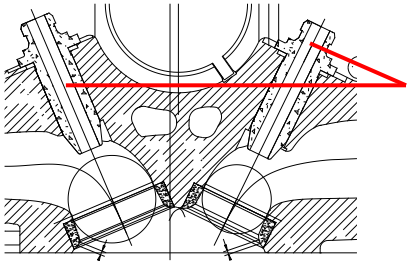


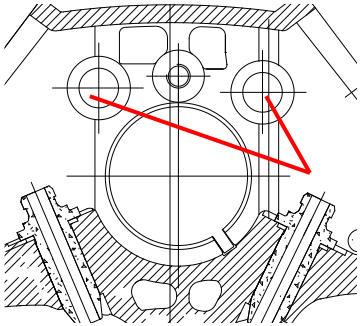
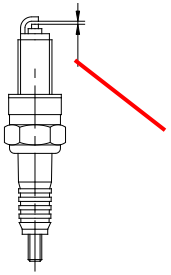
2.1.2 Troubleshooting to Cylinder Head

Description	Damage Form	Trouble	Service
Cylinder Head	Too much oil dirt and dusts on the radiating fins	Poor cooling or overheating engine	Clear away oil dirt and dusts
	Carbon deposits in the combustion chamber	Engine overheats	Clear away carbon deposits
	Damaged threaded hole of spark plug	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 (＞0.08mm) of cylinder head end surface	Engine fails or is hard to start. Engine lacks power, has unstable idle speed.	Grind end surface of cylinder head or replace the cylinder head
	Defects such as pits, erosion etc. are found on the contact area of valve seats	Engine fails or is hard to start. Engine lacks power, has unstable idle speed.	Grind valve seats and valves
	Valve guide bore is worn seriously (＞5.03mm)	Valve leaks due to eccentric grinding of valve seats, making the engine difficult to start and unstable at idle speed.	Replace valve guide or cylinder head
	Damaged cylinder head gasket	Engine fails or is hard to start. Engine lacks power, has unstable idle speed.	Replace cylinder head gasket
	Loose cylinder head locknut	Engine fails or is hard to start. Engine lacks power, has unstable idle speed.	Tighten up locknut

Spark Plug	Improper gap between two electrodes	Engine fails or is hard to start. Engine lacks power, has unstable idle speed.	Adjust by slightly bend the side electrode till the gap is 0.65-0.75 mm
	Electrodes link by carbon deposits	Engine fails to start.	Clear away carbon deposits
	Too much carbon deposits or oil dirt around the spark plug	Engine fails or is hard to start. Engine lacks power, has unstable idle speed.	Clear away carbon deposits or oil dirt
	Damaged spark plug insulator	Engine fails or is hard to start. Engine lacks power, has unstable idle speed.	Replace with a new spark plug in the same model
	Loose spark plug	Engine is hard to start, or has unstable idle speed.	Tighten up the spark plug

2.1.3 Reference List of Standard Value and List Value for Cylinder Head Maintenance

Description	Test Item	Standard Value	Limit Value	Service	Picture
Cylinder Head	Flatness of cylinder face	0～0.05	0.08	Replace when beyond the limit value	 Flatness
	Width of valve seat sealing face	0.9～1.1	1.4		 Width of valve seat sealing face
	Diameter of valve guide bore	Φ5～Φ5.012	Φ5.03		 Diameter of valve guide bore

Cylinder Head	Diameter of rocker arm shaft bore	Φ10～Φ10.022	Φ10.05	Replace when beyond the limit value	 Diameter of rocker arm shaft bore
Spark Plug	Spark plug gap	0.8～0.9	1	Adjust gap when beyond the limit value	 Spark plug gap
Rocker Arm Shaft	OD of rocker arm shaft	Φ9.972～Φ9.987	Φ9.94	Replace when beyond the limit value	 OD of rocker arm shaft

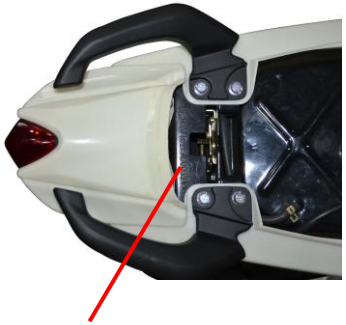
CHAPTER 3 CHASSIS

3.1 FRAME BODY

3.1.1 Motorcycle Identification

1) VIN

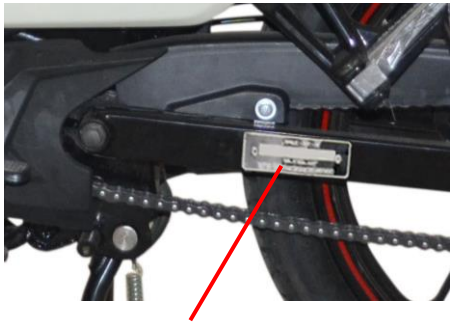
The vehicle identification number (VIN) is engraved on the upper face of handrail mounting bracket.



VIN

2) Frame Nameplate

The frame nameplate is fixed in the rear fork.



FRAME NAMEPLATE

3.1.2 Maintenance of Frame

Description	Damage Form	Trouble	Service
Frame	Deformed or broken	Off-tracking	Correct or replace the frame
Center (side) stand	Deformed or broken	Effect on parking	Replace the center (side) stand
	Damaged return spring	Center (side) stand fails to return. Effect on parking	Replace the return spring
Covering parts	Broken	Effect on appearance	Replace
Fender	Damaged	Effect on fending	Replace the fender
Seat cushion	Broken	Decrease comfort	Replace the seat cushion
Footrest	Deformed or broken	Deformed footrest or broken footrest rubber	Correct or replace the footrest rubber

3.1.3 Maintenance of Frame and Accessories

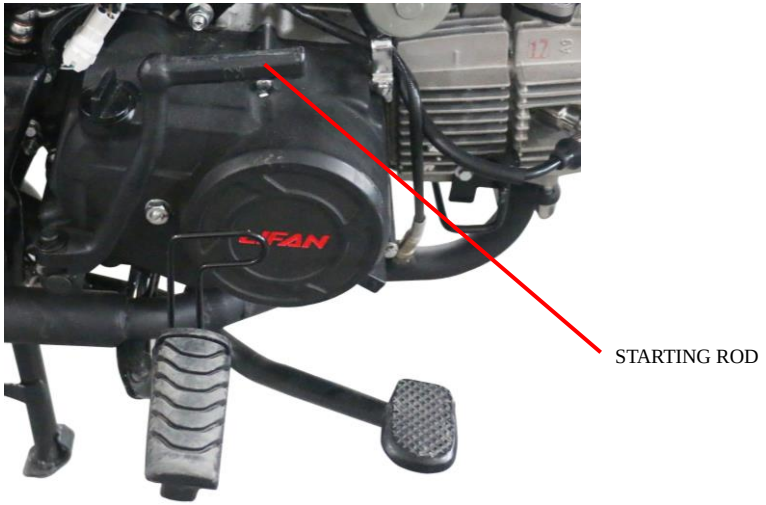
- Removal, Installation and Maintenance

1) Structure of frame is shown below. Check the welding parts and frame.

2) Check the rear-view mirror for looseness, tighten up the mirror and wipe the mirror surface.

3) Adjust the travel of rear brake pedal at the rear brake level if travel exceeds the service limit (20~30mm).

4) Check the starting rod for break, repair or replace it if necessary.

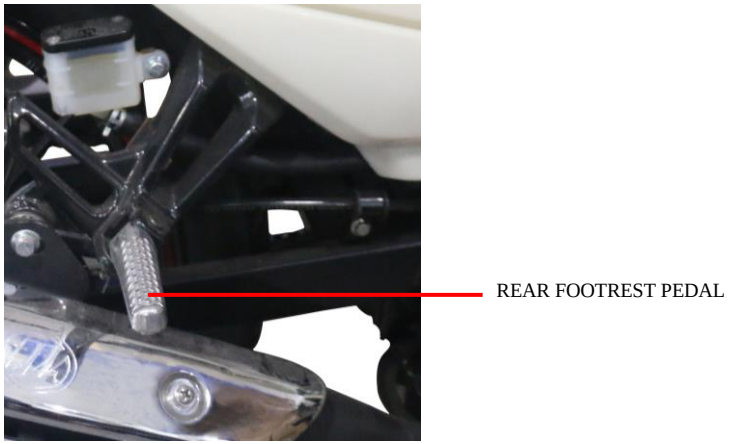


5) Check the front fender for break, replace it if necessary.

6) Check the rear fender for break, replace it if necessary.

7) Check the front footrest pedal for damage, replace it if necessary.

8) Check the rear footrest pedal for damage, replace it if necessary.



9) Check the center stand for deformation, replace it if necessary.

CENTER STAND

10) Check the side stand for deformation, replace it if necessary.

SIDE STAND

11) Check the handrail for break, replace it if necessary.

HANDRAIL

12) Check the seat cushion for break, replace it if necessary.

SEAT CUSHION

13) Check the windshield for break, replace it if necessary.

14) Check the rear panel for break, replace it if necessary.

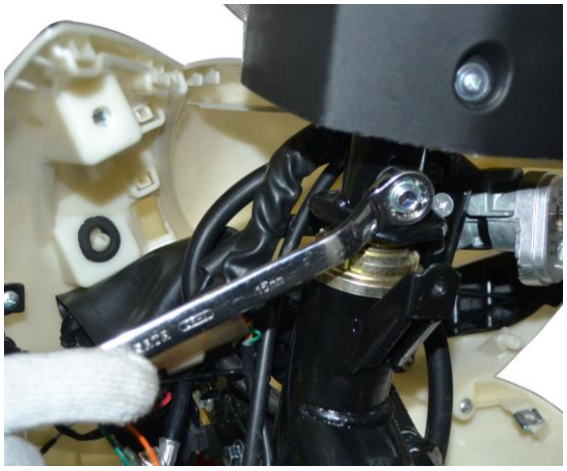
15) Check the rear-mid connecting plate for break, replace it if necessary.

3.2 SUSPENSION SYSTEM

3. 2.1 Removal, Installation and Maintenance of Steering Bar

1) Turn the steering bar and check it for proper functioning.

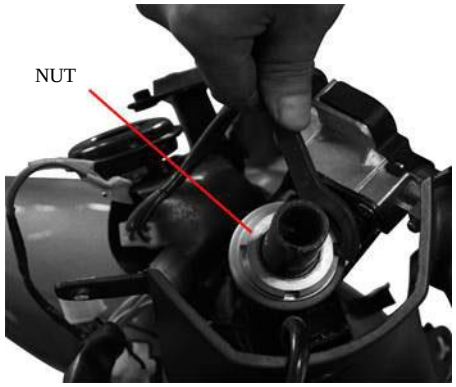
2) If necessary, disassemble the steering system to check.



3) Disassemble the steering bar pipe and check it for deformation, correct or replace it if necessary.

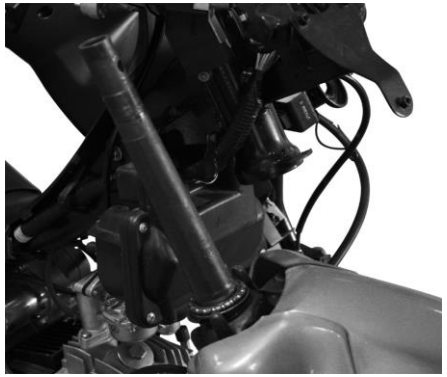
4) Unscrew the steering stem locknut.

5) Unscrew the adjusting nut of steering stem.



6) Check the top cover and bottom race of upper bearing of steering stem for wear, replace the bearing if necessary.

7) Extract the steering stem, check the top cover and bottom race of lower bearing of steering stem for wear, replace it if necessary.



8) Before installing the steering stem, apply a layer of grease to the top cover and bottom race of lower bearing.

9) Before installing the steering stem, apply a layer of grease to the top cover and bottom race of upper bearing.

10) Tighten up the steering stem locknut.

11) Tighten up the steering stem locknut.

3.2.2 Troubleshooting to Steering Stem

Description	Damage Form	Trouble	Service
Bearing bottom race	Adjusting nut of steering stem is over tightened	Operation of steering handle is stiff ; little gaps between bearing and upper cover, bearing and bottom race	Turn the adjusting nut by a wrench until the steering stem turns flexibly without radial play between steering stem and riser.
	The steel ball trail of bottom race is worn out, defects such as pits, dints, cracks are found.	Operation of steering handle is stiff with shaking and vibration.	Replace the bearing bottom race
Bearing	The steel ball is worn, deformed or damaged.	Operation of steering handle is stiff with shaking and vibration.	Replace the bearing as a set
Steering stem	Deformed	Operation of steering handle is stiff with shaking and vibration.	Replace the steering stem

3.3 FRONT SUSPENSION

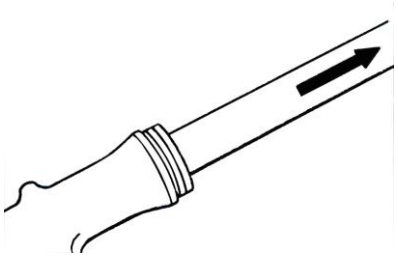
3.3.1 Removal, Installation and Maintenance of Front Suspension

1) Unscrew the fixing bolt of brake hose from the front fender.

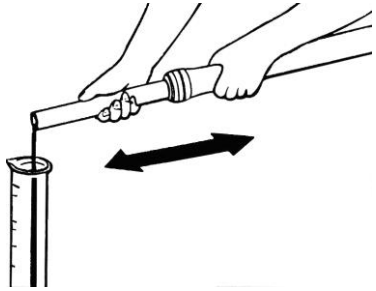
2) Unscrew the locknut of front axle and fixing bolt of brake caliper, pull out the front axle and remove the front wheel.

3) Remove the front fender and front shock absorber.

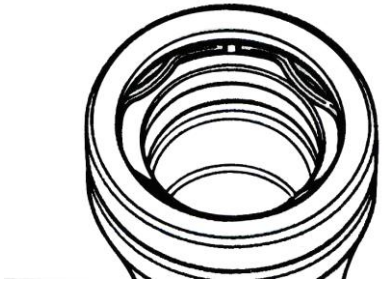
4) Unscrew the drain bolt from the front shock absorber and drain the damping oil. Check and replace the oil if necessary.



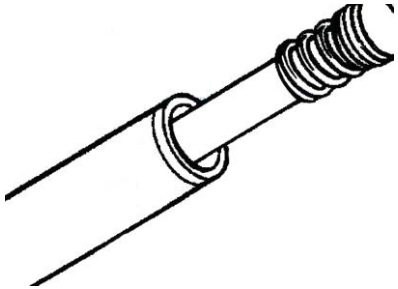
5) Remove the dust cover and clip, extract the bottom case.



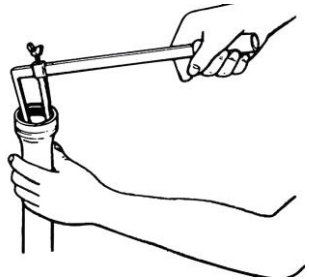
6) Remove and check the oil seal for wear, replace it if necessary.



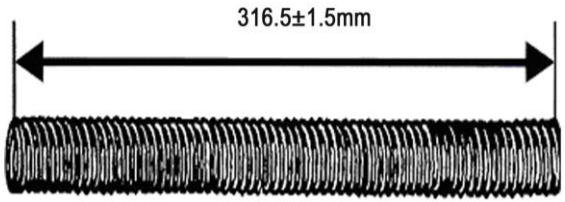
7) Extract and check the damping spring for wear, replace it if necessary.



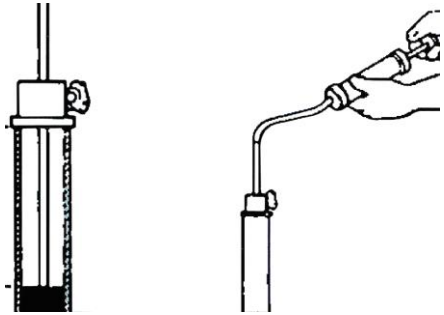
8) Measure the inner diameter of bottom case, replace it if it exceeds its service limit.



9) Measure the free length of shock absorber spring, replace it if it is out of the service limit 316.5±1.5 mm.



10) Pour about 60±1ml damping oil into the tube.



3.3.2 Troubleshooting to Front Shock Absorber

Description	Damage Form	Trouble	Service
Front shock absorber spring	Non-elastic or broken	The front shock absorber is too soft or abnormal sound comes out of the bottom case	Replace the spring
Front fork tube	Bent or deformed	Off-track in running	Correct or replace the front shock absorber
	Damaged or scratched working surface	Oil leaks from the oil seal	Replace the front fork tube
	The chromium-plated parts are worn with the substrate exposed.	Oil leaks from the oil seal	Replace the front fork tube
Bottom case	Broken, deformed or damaged	Oil leaks from the bottom case.	Replace the bottom case
Piston rod	Heavily worn or damaged	The front shock absorber is too soft.	Replace the piston rod
	Piston rings are heavily worn or damaged	The front shock absorber is too soft.	Replace the piston rod
Oil seal	Heavily worn, damaged or aged	Oil leaks from the front shock absorber	Replace the oil seal
Damping oil	Lack of oil	The front shock absorber is too soft.	Fill damping oil as per the specification (60±1ml)

3.4 REAR SUSPENSION

3.4.1 Removal, Installation and Maintenance of Rear Suspension

1) Check the rear wheel for swing, adjust or replace the rear fork sleeve if necessary.

2) Unscrew the locknut from the rear shock absorber, check the sleeve boot for wear, replace it if necessary.

3) Check the rear shock absorber spring; check the rear shock absorber for oil leakage, replace them if necessary.

4) Unscrew the locknut from the rear axle, check the rear fork sleeve for wear, replace the fork if necessary.

3.4.2 Troubleshooting to Rear Suspension

Description	Damage Form	Trouble	Service
Rear shock absorber	The spring is non-elastic or broken.	The rear shock absorber is too soft.	Replace the spring
	Oil leaks from the rear shock absorber.	The rear shock absorber is too soft.	Replace the rear shock absorber
	The piston rod is bent, deformed or broken.	The rear shock absorber is hard.	Replace the rear shock absorber
Rear fork	Deformed	Off-track in running	Correct or replace the rear fork
	Cracked	Unable driving	Weld or replace the rear fork

3.5 FRONT AND REAR WHEELS

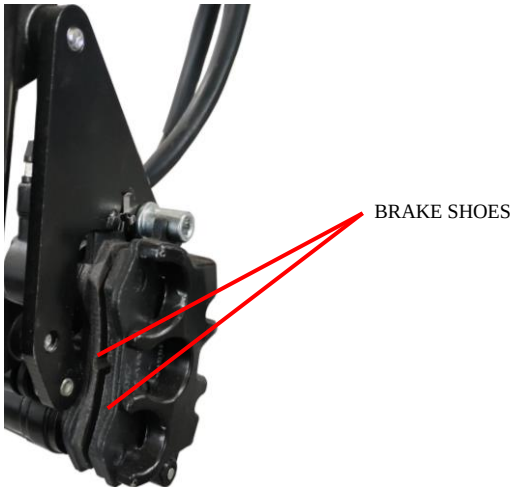
3.5.1 Maintenance of Wheels

1) Unscrew the front axle locknut to remove the front wheel.

2) Remove and check the front axle bush for wear, replace it if necessary.

3) Check the speedometer seal ring for wear, replace it if necessary.

4) Check the brake shoes for wear, replace the shoes as a set if necessary.



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

6) Check the front axle bearing for wear, replace it if necessary.

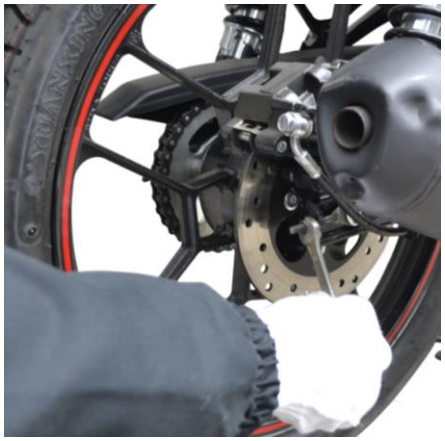
7) Remove the rubber dust cover of drain hose of front brake caliper, loosen the locknut; hold the front brake lever, and tighten the locknut until oil comes out from the drain hose (while not releasing the front brake lever).

8) Repeatedly hold and release the front brake lever to test if the front brake force reaches 200N.

9) Finally, repeatedly step and release the rear brake pedal until the operation force is suitable (less than 350N).

10) Unscrew the locknut from the rear axle.

11) Unscrew the adjusting nut from the chain adjuster and pull out the rear axle.



12) Remove the rear axle bush and oil seal, check the oil seal and replace it if necessary.

13) Unscrew the nut from the sprocket hub assembly, remove and check it for wear, replace it if necessary.

14) Check the tyre for wear, replace it if it exceeds 2mm of the service limit.

15) Check the bearing of rear axle for wear, replace it if necessary.

3.5.2 Troubleshooting to Front and Rear Wheels

Description	Damage Form	Trouble	Service
Front wheel	Front axle oil seal is worn.	Shortened service life of bearing, incorrect count of speedometer	Replace the front axle oil seal
	Brake shoes are worn.	Decreased braking effect	Replace the brake shoes
	Poor braking performance	Weak braking effect of front hydraulic brake	Discharge air in the front hydraulic brake as specified in 3.5.1
Rear wheel	Rear axle oil seal is worn.	Shortened service life of bearing	Replace the rear axle oil seal
	Surface of brake drum is worn.	Decreased braking force	Replace the rear wheel hub
Brake	Brake shoes are worn.	Decreased braking force	Replace the brake shoes

3.6 INTAKE SYSTEM AND EXHAUST SYSTEM

3.6.1 Removal, Installation and Maintenance of Intake System

1) Unscrew the mounting screw to remove the windshield, and disassemble the air cleaner.

2) Unscrew the screw to remove the air cleaner cover.

3) Remove and check the air cleaner filter strainer for damage, replace it if necessary.

4) Clear away dust on the air cleaner element, replace it if necessary.

5) Check the air cleaner housing, clear away dust on it and replace it if necessary.

3.6.2 Troubleshooting to Air Cleaner

Description	Damage Form	Trouble	Service	Remark
Air cleaner	Too much dust on the element	Engine is hard to start, engine lacks power, poor performance at idle speed; too much fuel consumption, thick smoke from the exhaust pipe	1. Remove the air cleaner element as 3.6.1; 2. Blow the dust on the element surface off, replace the element if necessary; 3. Reinstall the air cleaner element and cover in the reverse order of disassembly.	Do not clean it with water or oil
	Broken element	Loud noise from the engine intake system	Replace the element	

3.6.3 Removal, Installation and Maintenance of Exhaust System

1) Unscrew the fixing nut that connects the exhaust muffler with the engine.

2) Remove the exhaust muffler, check the mounting plate for break, repair or replace it if necessary.

3) Check the exhaust muffler gasket, replace it if necessary.

4) Shake the exhaust muffler and check the interior, replace it if necessary.

3.6.4 Troubleshooting to Exhaust Muffler

Description	Damage Form	Trouble	Service	Remark
Exhaust muffler gasket	Broken gasket	Loud noises from the exhaust system, air leaks from the pipe.	Replace the muffler gasket	Replace the gasket after each disassembly
Exhaust muffler	Broken muffler housing and mounting bracket	Loud noises from the exhaust system	Replace the exhaust muffler	
	Desoldering and loose internal components	Abnormal sound in the exhaust muffler	Replace the exhaust muffler	
	Carbon deposits in the exhaust pipe	Decreased engine performance raises the combustion gas discharge resistance	Clean off carbon deposits with genuine cleansing solvent	

CHAPTER 4 ELECTRICAL COMPONENTS AND METER

●Location Distribution of Electrical Components on The Vehicle

FUEL PUMP&FUEL SENSOR

BATTERY&FUSE BOX

DIMMER/TURN SIGNAL/EMERGENCY/HORN SW.

METER

STARTER BUTTON

FR. BRAKE SW.

TAILLIGHT&RR. REFLECTOR

RR. WINKER, LH/RH

IGNITION SW.

ECU

RECTIFIER

RR. BRAKE SW.

STARTING MOTOR

SPARK PLUG&SPARK PLUG CAP

HORN

HEADLIGHT

STARTING RELAY

FR. WINKER, LH/RH

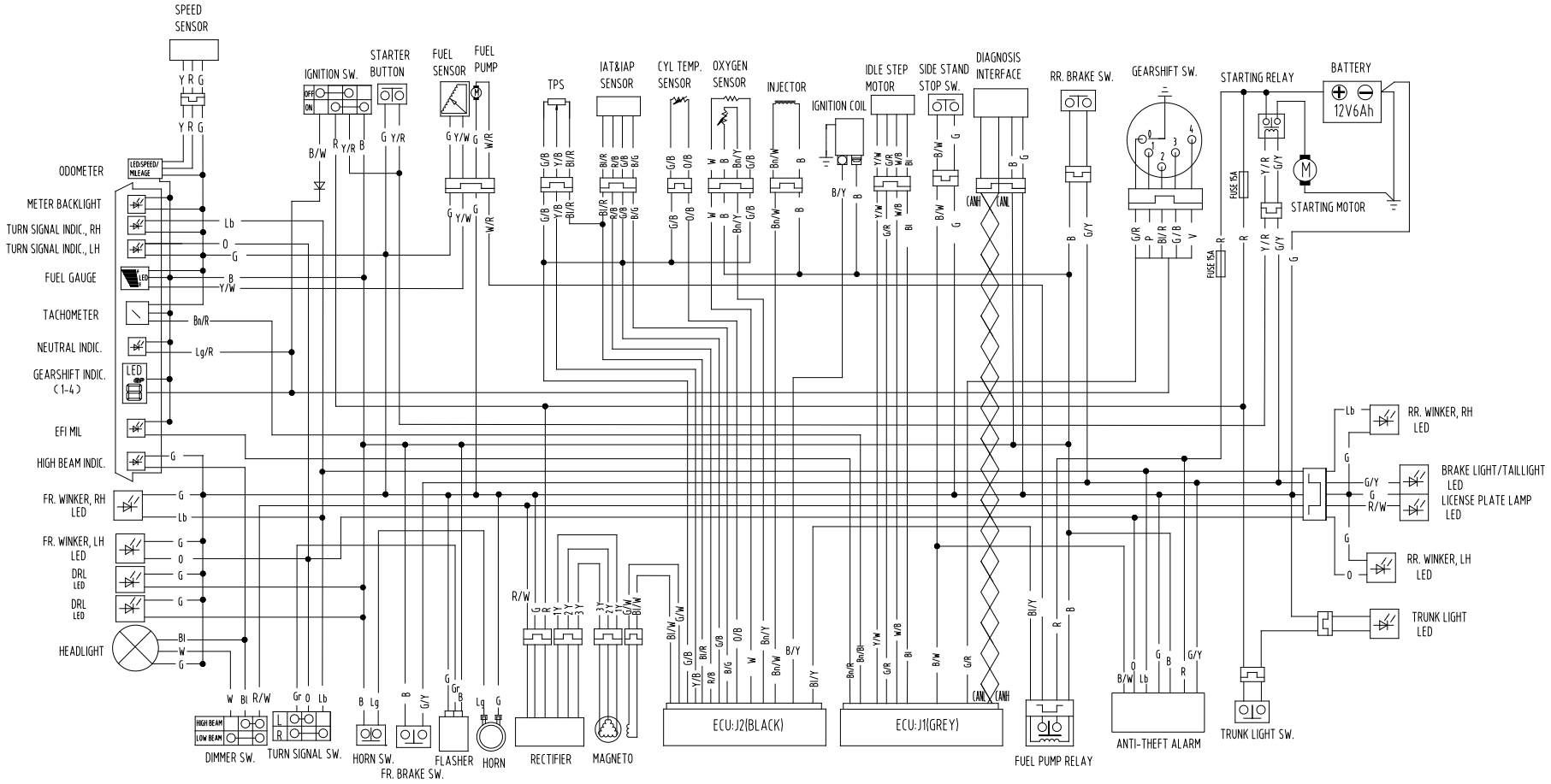
FLASHING RELAY

SPEED SENSOR

MAGNETO&GEARSHIFT SW.

IGNITION COIL

● Electric diagram



4.1 CHARGING SYSTEM

The vehicle is equipped with a battery 12V and a set of charging system as electric power.

● The charging system consists of:

1)Battery 12V6Ah

2)Magneto (permanent magnet alternator): rotor and stator (including charging/lighting coil and exciter coil)

3)Rectifier: 3-phase full wave

4)Fuse: cartridge fuse 15A with a spare one.

The battery is connected with the generator in parallel, supplying the electric equipment with power together.

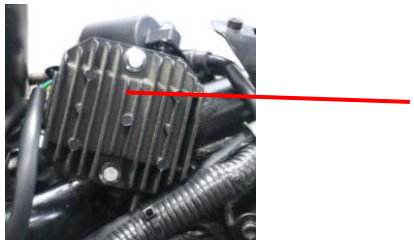
● The charging system is designed not only to supply the electrical devices with power when the generator generates sufficient electrical energy, but to charge the battery. Therefore, a portion of electrical energy is stored to ensure power supply to the electrical devices in case of insufficient power supply caused by low generator speed or high electrical load.

4.1.1 Removal, Installation and Maintenance of Charging System

Turn on the ignition switch.

IGNITION SW.

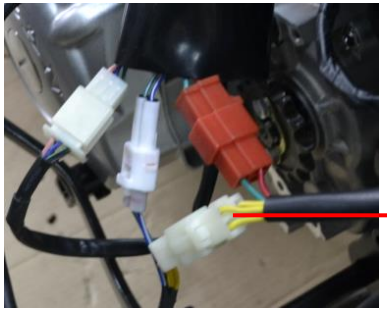
Disconnect coupler of the rectifier to main cable and check it for short circuit, broken circuit or poor connection. Repair or replace it if necessary.



RECTIFIER

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

Disconnect coupler of the magneto charging/lighting coil to main cable and check it for short circuit, broken circuit or poor connection. Repair or replace it if necessary.



COUPLER OF CHARGING/LIGHTING COIL LEAD WIRE (THE YELLOW WIRES ARE CHARGING/LIGHTING COIL.)

The resistance of charging/lighting coil (at 20℃) should be around 1Ω. Measure the resistance with multimeter, repair or replace the charging/lighting coil if the value differs considerably from 1Ω.

Check the charging/lighting coil for short circuit, broken circuit or poor connection. Repair or replace it if necessary.

Start the engine, measure the no-load voltage between yellow wires of charging/lighting coil with multimeter (A.C. 200V). The standard value should be as the following table:

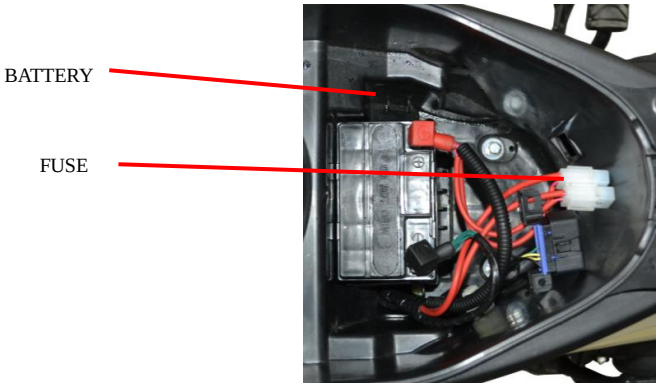
Engine speed (r/min)	2000	3000	4000	5000	6000	7000	8000
No-load voltage of charging/lighting coil (V)	35±1	55±1	70±1	85±1	105±1	120±1	140±1

Replace the magneto stator if the measured no-load voltage differs considerably from the above table.

CHARGING/LIGHTING COIL

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

MAGNETO ROTOR



Check the battery voltage. If it's below 12V, recharge the battery in time.

Check the fuse and replace it with same specification (15A) one if necessary. It's forbidden to take other materials, other ways instead or remove the fuse to connect with the vehicle circuit, which may cause the vehicle burning.

4.1.2 Troubleshooting to Charging System

Description	Damage Form	Trouble Symptom	Remedy
Magneto	A short circuit occurs to the charging/lighting coil.	Low voltage output or the battery is not fully charged.	Replace the charging/lighting coil
	A broken circuit occurs to the charging/lighting coil. (the resistance is ∞).	No voltage output, insufficient battery power or the electric appliances are out of work.	Do.
Rectifier	The rectifier is faulty.	Short/broken circuit occurs or the battery is not fully charged. Light is dim or out of work. The charging current is too high or the battery is deformed.	Replace the rectifier.
Battery	The battery is damaged.	No power output or the starting motor fails to run.	Replace the battery.
	Shortage of electrolyte due to long-term storage.	Low power/voltage output. The starting motor fails to run or runs slowly. The signal system is out of work.	Charge or replace the battery.

4.2 IGNITION SYSTEM

Ignition: EFI ignition, please refer to Chapter 5.

●The ignition system consists of battery (D.C. 12V), magneto, exciter coil, ECU, ignition coil, spark plug and so on. The function of the ignition system is to supply a sufficiently high voltage to the spark plug at a certain moment, generating a strong enough electric spark between the two electrodes of the spark plug to ignite the compressed mixture, thus enabling the engine to work.

Magneto and exciter coil: the magneto rotor flywheel is of single convex plate with outer trigger type. The standard value of exciter coil (at 20℃) should be in 110Ω-130Ω.

Ignition coil: 1) It is a basic component that converts low-voltage electricity output by the igniter into the required high-voltage electricity, which is actually a step-up autotransformer (withstand voltage≥35KV). 2) Working principle: When the primary current changes, due to electromagnetic induction, the secondary induction generates tens of thousands of volts of high-voltage electricity. 3) Composition: It consists of an iron core, a primary coil, a secondary coil, a skeleton, high and low voltage lead wires, a spark plug cap (including a damping resistor, without a metal shield), etc. The primary coil has a thick enameled copper wire with a smaller number of turns, while the secondary coil has a thin enameled copper wire with a larger number of turns. In order to prevent high-frequency ignition pulses from interfering with other radio equipment, a damping resistor of about 5kΩ is added to the spark plug cap of the ignition coil (to weaken or eliminate the high-frequency oscillations generated by the ignition spark).

Spark plug: 1) Function: introduces the high voltage generated by the ignition coil into the combustion chamber of the engine, forming an electric spark in the gap between the electrodes to ignite the mixed gas. 2) Structure: consists of a steel shell, ceramic insulator, electrodes, sealing gasket and sealing packing, without damping resistor; 3) For the model of the spark plug and the standard value of the spark plug gap, please refer to the instruction manual of this vehicle.

4.2.1 Removal, Installation and Maintenance of Ignition System

Turn on the ignition switch.

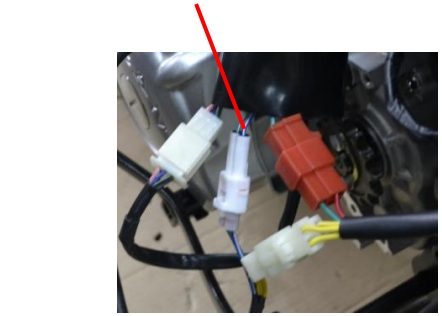
IGNITION SW.

ELECTRIC STARTER BUTTON

Remove the spark plug cap and replace it if necessary. Spark plug cap resistance: 5kΩ±0.5kΩ

Remove the spark plug cap on the high-voltage wire of the ignition coil, and clamp the high-voltage wire with an insulating clamp at a position of100mm to 150mm away from the end of the high-voltage wire at the spark plug cap. It is strictly prohibited to operate with water on your hands to avoid being shocked by high voltage. Place the end of the high-voltage wire at the spark plug cap close to the metal positive head of the spark plug, keeping the gap at 5mm to 7mm. Step on the starting pedal or press the electric starting button, and start the engine to conduct a high-voltage misfire test: If the ignition system is normal, a linear blue-white high-voltage spark will be generated at this gap. If the spark is red or dark red, it indicates that the ignition high voltage is not high enough (normally 10000V to 20000V high-voltage pulse). The engine cannot be ignited normally, and the ignition system is faulty. It is also possible to remove the spark plug and connect it to the ignition coil and high-voltage cap to check the strength of the spark between the electrodes of the spark plug.

For the standard value of spark plug gap, please refer to the instruction manual.



Check the coupler of magneto to main cable, replace it if necessary.

The Blue/White wire and Green wire in magneto lead wire is exciter coil. Measure the resistance of exciter coil, and the standard value should be in 110Ω-130Ω (at 20℃). Further inspection should be done if the measured value differs. The resistor can be damaged by short circuit, broken circuit, or connecting to the metal shell.

If the exciter coil or insulator is damaged, repair or replace it please.

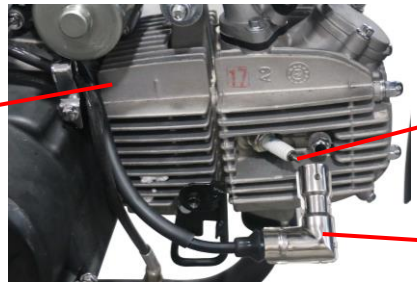
Disconnect the coupler of igniter to main cable and check it. Repair or replace it if necessary. Check if the black wire has a voltage of D.C. 12V and if the green wire is well connected with battery (The normal resistance of the wire should be below 0.1Ω).

COUPLER OF ECU TO MAIN CABLE

IGNITION COIL INSERT

IGNITION COIL

OUTPUT HIGH VOLTAGE CABLE



SPARK PLUG

SPARK PLUG CAP

Check the ignition coil: The resistance between ignition coil primary insert and iron core is around 0.3-0.8Ω. The resistance between secondary high voltage wire and iron core is about 4kΩ. The damping resistance of spark plug cap is around 4.5 kΩ-5.5 kΩ. Replace the ignition coil or spark plug cap if necessary.

NOTE: Do not plug or unplug ECU with power on.
It's strictly prohibited to disassemble ECU. Do not pry the pins in socket by hard objects.
Avoid knocking or colliding with hard objects against the ECU. Water/oil penetration into ECU or its connectors are strictly prohibited.

4.2.2 Troubleshooting to Ignition System

Description	Damage Form	Trouble Symptom	Remedy
Ignition power supply	Broken circuit or poor connection	No power supply, no/weak ignition spark.	Repair the circuit.
Exciter coil	Short circuit	No/weak ignition spark. Engine is hard to start with insufficient power or unstable idle speed.	Replace the exciter coil.
	Broken circuit (i.e.: the resistance is ∞)	No ignition spark and the engine fails to start.	Do.

Ignition switch/engine stop switch	Short circuit	The engine stop switch is out of work.	Replace the faulty switch.
	Broken circuit	No ignition spark and the engine fails to start.	Do.
ECU	Damaged	Do.	Replace the ECU.
Ignition coil	Short circuit	No/weak ignition spark. Engine is hard to start with insufficient power or unstable idle speed.	Replace the ignition coil
	Broken circuit (i.e.: the resistance is ∞)	No ignition spark and the engine fails to start.	Do.
	Insulator is aged.	Engine is hard to start with insufficient power, unstable idle speed or electricity leaks.	Do.
Spark plug	Carbon deposits, electricity leaks or the insulator is broken.	Engine is hard to start with insufficient power or unstable idle speed.	Clean off the carbon deposition, and replace the spark plug with the same model.
	Electrodes are worn.		Adjust the spark plug gap or replace spark plug with the same model.
	Electrodes are burnt.		Replace the spark plug with the same model.

4.3 SIGNAL SYSTEM AND METER

The signal system consists of turn signal switch, dimmer switch, horn button, horn, LED winker, various LED indicator lamps, flashing relay, front position light, taillight assy. (braking light, rear position light), front brake switch, rear brake switch, meter and so on.

4.3.1 Removal, Installation and Maintenance of Signal System

Turn on the ignition switch and check the signal system and meter.

IGNITION SW.

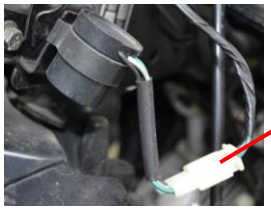
Check the battery voltage, fuse and charging system according to the method in charging system, and the voltage should be in normal range.

Disconnect the coupler of flashing relay to meter, and check for short circuit, broken circuit or poor connection. Repair or replace it if necessary.

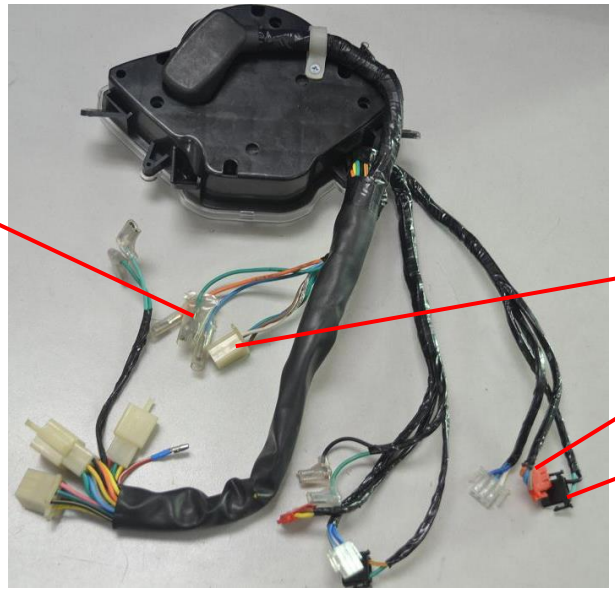
Check the LED winker for proper function if the flashing frequency or sound is abnormal. Replace the winker if necessary.

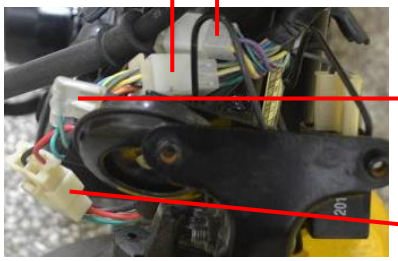
Check the relative couplers for short circuit, broken circuit or poor connection, and replace them if necessary.

Check the flashing relay and replace it if necessary.



If the rear position light, braking light, meter backlight & indicator lights, horn, front winker, etc., are out of work, please disassemble the meter case, headlight case and front cowl. Check the relative couplers for short circuit, broken circuit or poor connection, and replace them if necessary and replace the faulty parts if there exist.





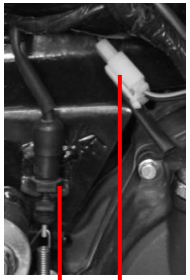
Open the seat and check the bulb of braking light and rear position light. Repair or replace the taillight assy. if necessary.

Check the front & rear brake switches and their couplers to main cable for short circuit, broken circuit or poor connection. Repair or replace them if necessary.

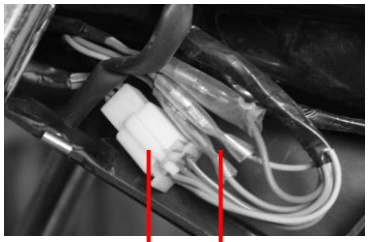
Check the couplers of winker and front position light to main cable for short circuit, broken circuit or poor connection. Repair or replace them if necessary. Check the relative light sockets for short circuit, broken circuit or poor connection. Repair or replace them if necessary. Check the relative parts and replace them if necessary.

FRONT WINKER

REAR WINKER



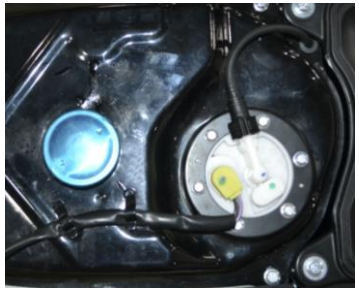
COUPLER OF RR. BRAKE SWITCH TO MAIN CABLE



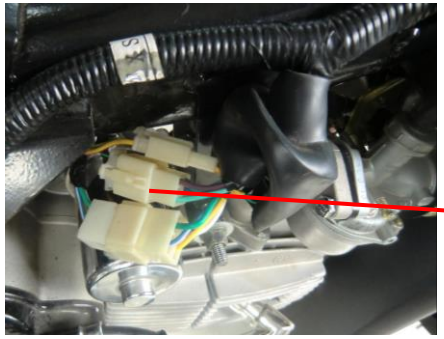
COUPLERS OF BRAKING LIGHT/REAR POSITION LIGHT AND REAR WINKER

FUEL PUMP & FUEL SENSOR

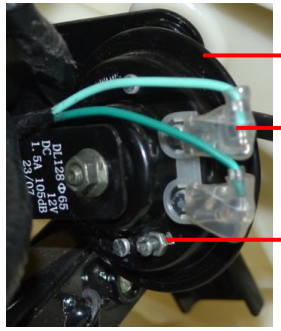
WIRE HARNESS OF FUEL PUMP & FUEL SENSOR



INSTALLATION PORT OF FUEL PUMP & FUEL SENSOR



COUPLER OF GEARSHIFT SWITCH TO MAIN CABLE



HORN

COUPLER OF HORN TO METER

ADJUSTING SCREW OF HORN SOUND

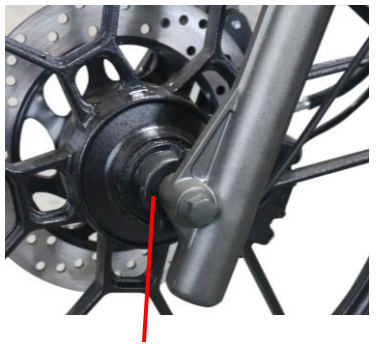
Check the couplers of horn and horn switch to meter for continuity. Repair or replace them if necessary. Turn the horn sound adjusting screw if there is no/weak horn sound. If the horn is damaged, please replace it with a new one with same specification.
Check such couplers of meter, gearshift switch, fuel sensor, etc. to main cable for continuity. Repair or replace them if necessary. Check the main cable, meter, gearshift switch, fuel sensor, etc. for proper function as follows: Disconnect the relative couples and check if the gearshift switch, meter indicators circuit, meter indicator lights, main cable, fuel sensor, etc. are in good condition by connecting them to a D.C. 12V battery with a multimeter. Repair or replace them if necessary. If the odometer is faulty, please check the speedometer, its cable and its coupler to meter, and repair or replace them if necessary. If the meter is faulty and the external circuit is in good condition, please check the internal circuit for short circuit, broken circuit or poor connection, and repair or replace them if necessary. Then check all the parts of meter, repair or replace the meter if necessary.

Disconnect the fuel sensor to main cable, measure the resistance between the two leads of fuel sensor with multimeter. When fuel level is at the highest, the standard resistance should be within 6Ω-10Ω. When fuel level is at the lowest, the standard resistance should be within 95Ω-101Ω. Please check the fuel sensor leads and resistance board if the measured values differ considerably from the standard values. And replace them if necessary.
When the gearshift switch is set into a certain gear, the gear line will be connected to the battery negative leads or engine housing. At this time the gearshift indicator should show the current gear number. When the turn signal switch is set to left/right, or the dimmer switch is set to high beam, the corresponding meter indicators should show left/right or the high beam indicator should light up. When pressing the horn button, the horn should sound normally. When the lighting switch is set to position light or headlight, the front and rear position light and headlight should light up at the same time. Check the relative parts and replace them if necessary.

METER

COUPLER OF SPEEDOMETER TO METER

COUPLER OF SPEED SENSOR TO METER



SPEEDOMETER

4.3.2 Troubleshooting to Signal System and Meter

Description	Damage Form	Trouble Symptom	Remedy
Winker	Internal damage	The winker are out of work.	Repair or replace the light.
Front position light	Do.	The front position light is out of work.	Do.
Lighting switch and dimmer switch	Poor connection, broken circuit or damage in internal circuit	The position light or high beam indicator is out of work.	Repair or replace the faulty switch.
Turn signal switch	Do.	The winker are out of work.	Do.
Flashing relay	Internal damage	Do.	Replace the flashing relay.
Front/rear brake switch	Poor connection or damage in the switch	The brake light keeps steady on or fails to light up.	Replace the brake switch.
Rear position light and brake light	Internal damage	The rear position light and brake light fail to light up.	Repair or replace the light.
Horn button	Poor connection, broken circuit or damage in internal circuit	No/abnormal horn sound.	Repair or replace the horn button.
Horn	Broken circuit or damage in the horn	Do.	Replace the horn.
Gearshift switch	Poor connection when shifting gears	The gear indicator fails to display the current gear number.	Replace the gearshift switch.
Fuel sensor	Internal damage	The fuel gauge fails to indicate correctly.	Replace the fuel sensor.
Meter	Internal parts are damaged.	The meter fails to indicate correctly.	Repair or replace.
	Do.	The indicators are out of work.	Do.
	Do.	The corresponding lights/meter are out of work.	Do.
	Odometer is damaged.	The odometer or tachometer fail to indicate correctly.	Do.
Meter cable	Cable is broken.	The meter backlight and signal system are out of work.	Replace meter cable.

4.4 LIGHTING SYSTEM

The lighting system includes dimmer switch, headlight, LED license light, etc.

4.4.1 Removal, Installation and Maintenance of Lighting System

Turn on the ignition switch, and check the lighting system.

IGNITION SW.

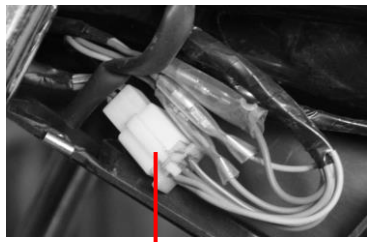
DIMMER SWITCH

COUPLER OF HEADLIGHT TO METER

Check the battery voltage, fuse and charging system according to the method in charging system, and the voltage should be in normal range.

COUPLER OF IGNITION SW. TO MAIN CABLE

BULB AND SOCKET OF HEADLIGHT



COUPLER OF LICENSE PLATE LIGHT TO MAIN CABLE

SOCKET AND COUPLER OF LICENSE PLATE LIGHT

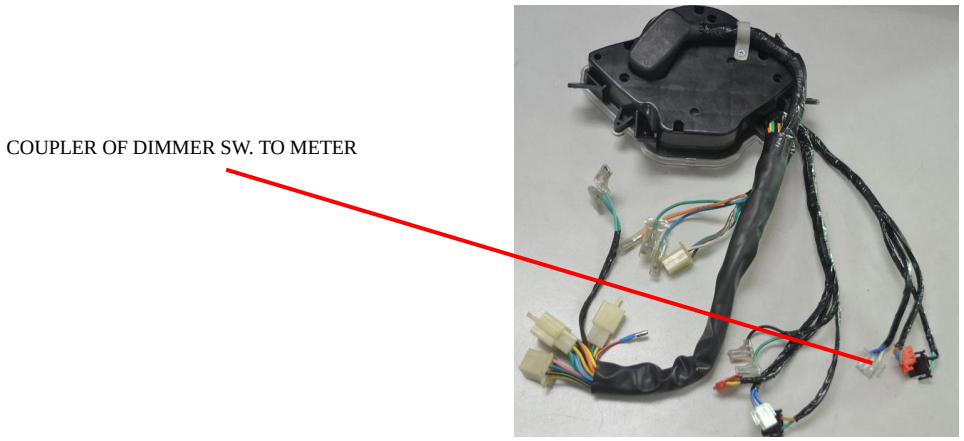
If the headlight fails to work, open the meter housing and headlight housing, check the relative couplers for continuity and check the relative parts for damage. Repair or replace them if necessary. Check ignition switch, coupler of license plate light to main cable, couplers of headlight, dimmer switch, etc. to meter for continuity. Repair or replace them if necessary. Disassemble the headlight and license plate lamp if necessary, check the circuit element and light socket, repair or replace them if

necessary. Check the main cable and the internal of ignition switch for continuity, and repair or replace them if necessary.

To test the fault: Please disconnect the relative coupler according to the electric diagram, and connect it to a D.C. 12V battery with a multimeter. Then judge if the part is faulty or not.

When the vehicle is started, the headlight will light up: If the dimmer switch is set to low beam at this time, the headlight will provide low beam lighting. If the dimmer switch is set to high beam at this time, the headlight will provide high beam lighting.

When the ignition switch is turned on, the license plate light will light up.



4.4.2 Troubleshooting to Lighting System

Description	Damage Form	Trouble Symptom	Remedy
Magneto charging/lighting coil	Short circuit	Low output voltage, low brightness, or insufficient battery charging	Replace the coil.
	Broken circuit	No output voltage, low brightness, or battery fails to charge.	Do.
Headlight	The headlight is improperly installed.	The lighting beam is improper.	Adjust the headlight.
	The filament is burnt.	The headlight fails to work.	Replace the bulb.
License plate light	Internal damage	The license plate light fails to work.	Repair or replace.
Dimmer switch	Poor connection, broken circuit or damage in internal circuit	The headlight or license light fails to work.	Repair or replace the switch.

4.5 ELECTRIC STARTING SYSTEM

Electric starting mode: brake starting.

The electric starting system includes starting motor, starting relay, ignition switch, electric starter button, grounded cable, front/rear brake switch, battery, fuse etc.

In order to start the engine, a DC 12V power supply and a reliable ignition system are necessary. The following is a special introduction to the removal, installation and maintenance of the electric starting system. For the removal, installation and maintenance of the charging system and ignition system, please refer to the previous chapters.

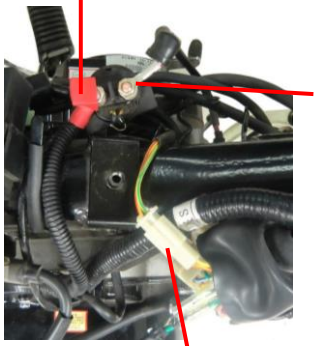
4.5.1 Removal, Installation and Maintenance of Electric Starting System

Turn on the ignition switch and check the electric starting system.

IGNITION SW.

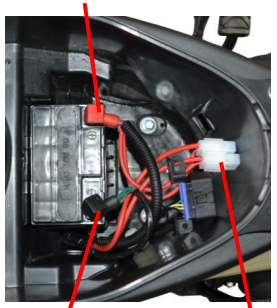
ELECTRIC STARER BUTTON

COUPLER OF STARTING RELAY TO MAIN CABLE



COUPLER OF STARTING MOTOR POSITIVE LEAD TO STARTING RELAY

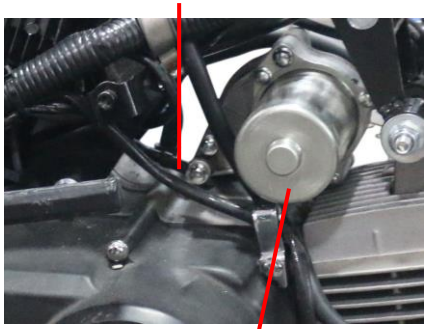
COUPLER OF BATTERT POSITIVE LEAD TO MAIN CABLE



COUPLER OF BATTERT NEGATIVE LEAD TO MAIN CABLE

FUSE

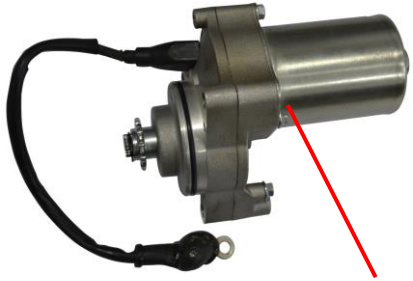
COUPLER OF GROUNDED WIRE OF MAIN CABLE TO ENGINE HOUSING



STARTING MOTOR

COUPLER OF STARTING MOTOR POSITIVE LEAD WIRE

COUPLER OF STARTING RELAY COIL TO MAIN CABLE

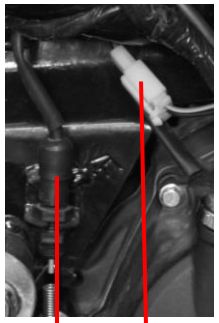


STARTING MOTOR POSITIVE LEAD WIRE

STARTING MOTOR

FR. BRAKE SW.

COUPLER OF ELECTRIC STARTER BUTTON TO METER



RR. BRAKE SW. AND ITS COUPLER TO MAIN CABLE

COUPLER OF IGNITION SW. TO MAIN CABLE

COUPLER OF MAIN CABLE TO METER

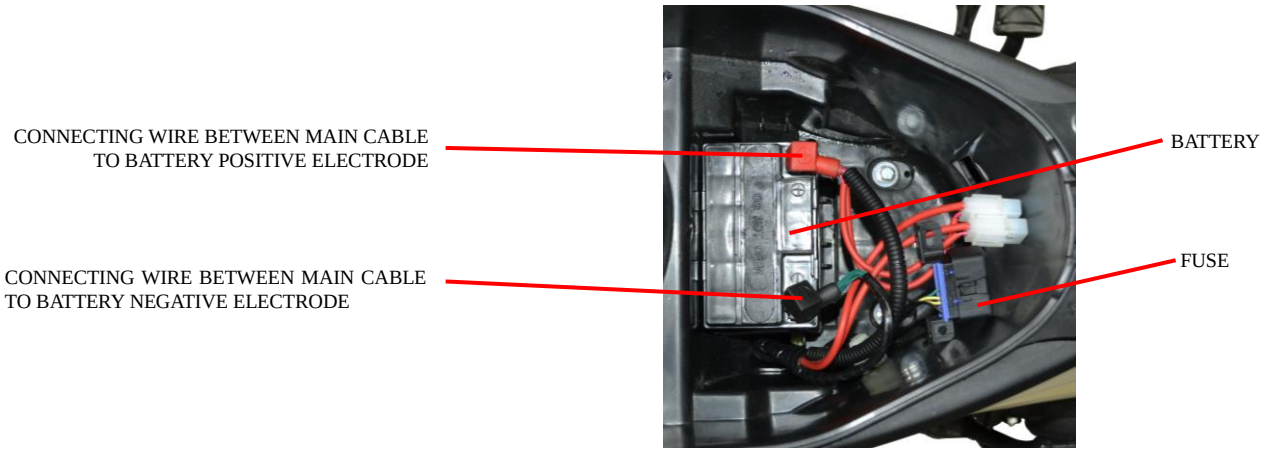
If the vehicle fails to electric starting, please check the couplers of electric starter button, front brake switch, etc. to meter, coupler of starting motor positive lead, coupler of meter to main cable and coupler of starting motor positive lead to starting relay, and check the couplers of ignition switch, rear brake switch, starting relay, battery, fuse, engine housing to main cable for continuity. Repair or replace them if necessary. Check the relative parts for internal damage, short circuit, broken circuit or poor connection, and repair or replace them if necessary.

4.5.2 Troubleshooting of Electric Starting System

Description	Damage Form	Trouble Symptom	Remedy
Starting relay	Short circuit or broken circuit in the coil.	The starting motor and vehicle fails to start.	Replace the relay.
	Internal damage	The starting motor runs abnormally and the vehicle fails to start.	Do.
All switches	Internal damage or poor connection	The starting motor and vehicle fails to start.	Replace the fault switches.

Fuse	Poor connection or the fuse is burnt.	The electric starting system has no power, and the vehicle fails to start.	Replace the fuse with the same specification one.
Battery	No voltage or voltage is too low	The starting motor fails to run or runs abnormally and the vehicle fails to start.	Repair or replace the battery.

4.6 BATTERY AND FUSE



Measure the battery voltage. If it's below 12V, charge the battery in time.

Fuse: 15A, with a spare one. Check the fuse and replace it with same specification (15A) one if necessary. It's forbidden to take other materials, other ways instead or remove the fuse to connect with the vehicle circuit, which may cause the vehicle burning.

4.6.1 Battery Maintenance

(1) Battery 12V6Ah (model:MTX7L-BS): is of maintenance-free type. The electrolyte is filled in the sealing shell by the manufacturer before leaving the factory, which fundamentally eliminates the acid leakage in common lead-acid batteries and the inconvenience of frequent filling of electrolyte or distilled water, so there’s no need to check or replenish the battery electrolyte. However it's important to note that the sealed electrolyte cap should never be removed. If the vehicle is not used for a long time, remove the battery, charge it, and store it in a cool, ventilated place.

Adding electrolyte: Electrolyte should be added to the unused battery first. After adding the electrolyte to battery, reinstall the battery plug in place to avoid electrolyte leakage. Warning: The main component of electrolyte is sulfuric acid which is corrosive, so reliable protective measures must be taken if it comes into contact with skin or eyes, which will cause severe burns.

Charging method: The battery can reach 75% of rated capacity after adding electrolyte and placing for 20 minutes and can be used without charging in this case. When conditions permit, it's better to use the battery after additional charge. Generally it takes 3 hours to charge with 1A current, but it is best to charge with 0.6A current for 6 to 8 hours.

If the vehicle is not used for a long time, the battery will discharge itself and cause insufficient capacity. Please remove the battery, charge it, store it in a cool, ventilated place, and charge the battery every 3 months. After 2 to 3 years of normal use, the battery capacity will also decrease, and it must be recharged to restore the voltage.

(2) Clean the battery terminals: Turn off the ignition switch, open the seat, and disconnect the negative and positive leads from battery. Clean the battery terminals with wire brush as shown in the figure. After cleaning, coat the terminals with a thin layer of grease, and connect the battery cables in reverse order of removal.

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

4.6.2 Replacement of Fuse

(1) Before checking and replacing the fuse, turn off the ignition switch so as to prevent an accidental short circuit.

(2) Open the seat, barrel cover and battery protective cover, and the fuse is located in the fuse box near the battery.

(3) Open the fuse box, and check if the fuse is burnt. If the fuse burns frequently, it usually indicates an overloaded circuit or a short circuit. The fault should be found out and eliminated before normal use.

(4) Replace the fuse as follows: Open the fuse box cover, lift the metal clips at both ends of fuse and the fuse, push the metal clip from the fuse end. Then install the new fuse into the clips and put on the cover.

(5) Replace the fuse with a new one with the same specification (15A).

WARNING：It's strictly forbidden to take other materials, other ways instead or remove the fuse to connect with the vehicle circuit, which may cause the vehicle burning.

(6) Reinstall the parts in the reverse order of removal and check if all wire clamps are securely installed.

4.7 LIGHTS AND HORN

4.7.1 Lights

For removal, installation and maintenance of lights, please refer to 4.3 Signal system and meter & 4.4 Lighting system.

1) Adjustment of brake light switch

Check the front and rear brake switch for proper function. Turn on the ignition switch, and hold the front brake handle or step on the rear brake pedal, the brake light will be on. Release the front brake handle or rear brake pedal, the brake light will be off. Adjust the rear brake switch as follows if necessary: Unscrew the locknut, and tighten the adjusting nut. Then tighten the locknut after adjustment.

2) Winker

Turn on the ignition switch, and operate the turn signal switch to check the front left/right or rear left/right winker for proper function.

3) Headlight, front position light, rear position light

Turn on the ignition switch, and operate the dimmer switch to check the headlight, front or rear position light for proper function.

4.7.2 Horn

1) Function

Turn on the ignition switch, and press the horn button to check if the horn works normally.

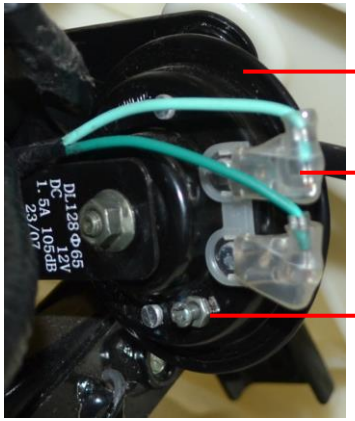
2) Fault

Please refer to 4.3 Signal system and meter for the inspection and maintenance of horn.

Check the horn button for short circuit, broken circuit and poor connection, and repair or replace it if necessary. If the horn fails to sound or sound weakly, turn the adjusting screw of horn sound.

If the horn is determined to be broken, replace it with a new one with same specification.

No horn sound is one of the common troubles, which can be divided into two types, one is the electric circuit fault, and the other is an internal fault.



(1) Check electric circuit fault

When the horn fails to sound, first check the fuse for proper function, then check the horn power supply line. If they're in good condition, it indicates that an internal fault occurs to the horn.

(2) Internal fault

Nowadays, as the technology of various production manufacturers is improving, the internal faults of the horns are becoming relatively less and less. For some of them, the frequency of use can even reach more than 100,000 times without faults. However, there still exists some common faults such as erosion appearing on the connectors, damage to coil, diaphragm broken and so on, among which, erosion appearing on connectors is the most common fault. There is often a process of

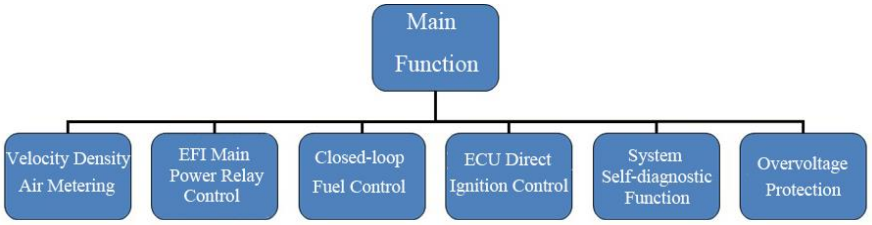
development for erosion appearing on connectors. For example, the horn sounds late after pushing the button, does not sound, the sound is not crisp, the sound is intermittent and the horn does not sound until the button is pressed again, all of them can be considered as the faults of horn connectors fault.

CHAPTER 5 STRUCTURE AND MAINTENANCE OF EFI SYSTEM

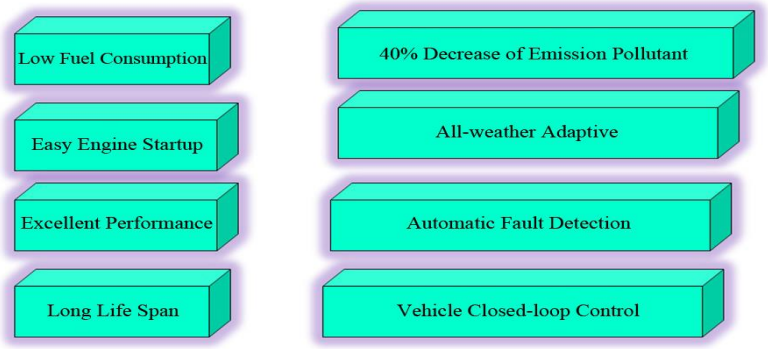
5.1 INTRODUCTION OF EFI SYSTEM

5.1.1 Definition

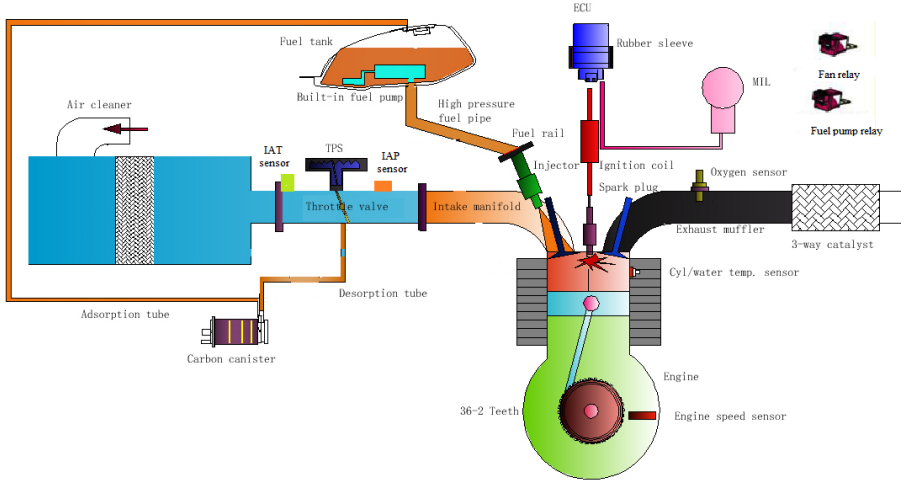
By various sensors, the EFI system converts the engine intake air volume, coolant temperature, engine speed, acceleration, deceleration and other operating conditions into electric signals, which are then input to the ECU. Comparing such information with the stored information, the ECU calculates and outputs the control signal. ECU can not only control the fuel supply accurately instead of a traditional carburetor, but also greatly improve the engine performance by controlling the ignition advance angle and idle speed air flow etc.



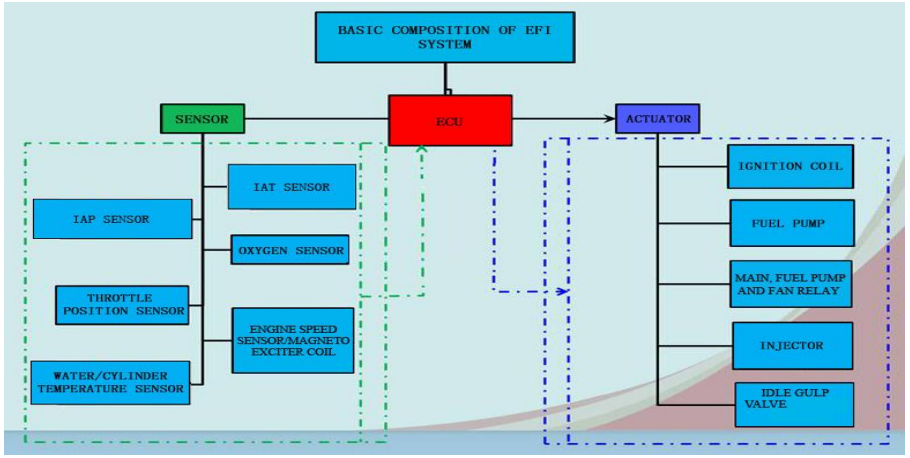
5.1.2 Advantages of EFI Motorcycle



5.1.3 Working Principle of EFI System



5.1.4 Composition of EFI System



5.2 CONFIGURATION AND LAYOUT OF EFI PARTS

5.2.1 EFI Parts

FUEL PUMP

THROTTLE VALVE BODY

INJECTOR

RELAY

ECU

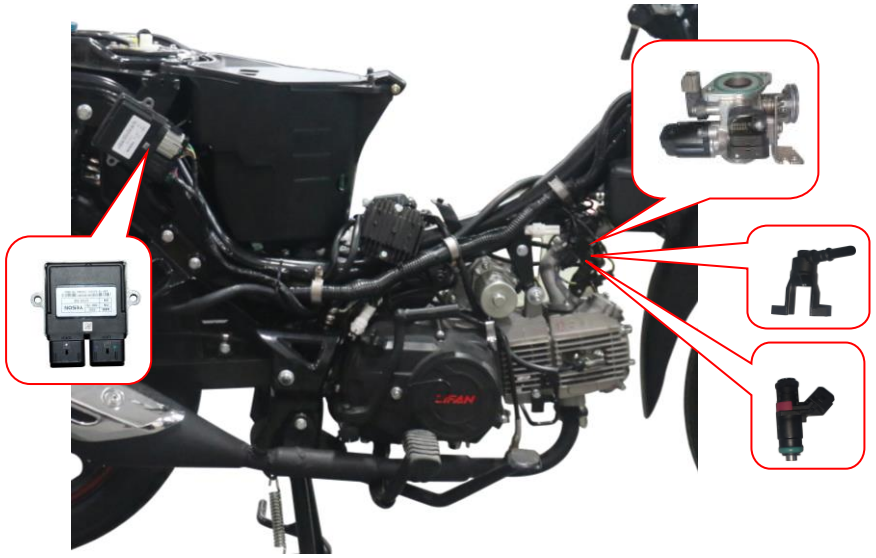
IAP&IAT SENSOR

OXYGEN SENSOR

CYLINDER TEMPERATURE SENSOR

OIL RAIL

5.2.2 Layout of EFI Parts



5.3 EFI PERFORMANCE AND MALFUNCTION

5.3.1 ECU

Function

ECU is a kind of electronic control integrated device. The optimal fuel injection timing of the engine under various working conditions is stored in the ECU memory. After receiving signals from various sensors, the fuel injection quantity satisfied the engine running state is determined, and the injection time is controlled according to the calculated results. ECU can process various information to realize ignition control, start control and idle speed control etc. In addition, ECU can connect with the instrument to provide RPM and temperature signal, with the diagnostic scanner for malfunction diagnosis, with the ECU anti-theft device to realize the anti-theft control.

Installation Location

ECU can be installed in any place, but it must be far away from the high pressure transformer to prevent interference.

ECU Parameters

Item	Value
Battery voltage range in normal (V)	9~15
Working temperature (℃)	-30~80
Storing temperature (℃)	-40~90

Malfunction Mode

Invalid connector, damaged elements, short-circuit due to water entering, loose and invalid elements due to vibration.

Definition of ECU Pin

J1-1	Stepper A+	怠速电机线圈 A+	J2-1	1-Ignition	1缸-点火线圈
J1-2	EVAP	碳罐电磁阀（选装）	J2-2	GND	蓄电池负极
J1-3	MIL	故障灯信号	J2-3	K-Line/Second-air	K线/二次补气
J1-4	OX2-Heat	2缸-氧传感器加热	J2-4	NE+	触发线圈（曲轴位置）"+"
J1-5	2-Oxygen Sensor +	2缸-氧传感器信号+	J2-5	1-INJ	1缸-喷油器控制端
J1-6	RPM OUT	发动机转速信号输出	J2-6	2-INJ	2缸-喷油器控制端
J1-7	CAN-L	CAN线低	J2-7	OX1-Heat	1缸-氧传感器加热
J1-8	CAN-H	CAN线高	J2-8	AIR TEMP	进气温度信号
J1-9	GND	蓄电池负极	J2-9	Pump	油泵控制端
J1-10	2-Ignition	2缸-点火线圈	J2-10	S-G1	传感器"-"端
J1-11	Stepper A-	怠速电机线圈 A-	J2-11	MAP	进气压力信号+
J1-12	Stepper B+	怠速电机线圈 B+	J2-12	TPS	节气门传感器信号端
J1-13	Stepper B-	怠速电机线圈 B-	J2-13	S-G2	触发线圈"-"端
J1-14	off-balance	倾倒传感器（选装）	J2-14	ENG TEMP	发动机温度传感器信号
J1-15	V-SPD	车速信号（选装）	J2-15	VBC-KEY	钥匙钥匙后电 12V+
J1-16	Side Stand	斜支撑熄火开关信号	J2-16	VREF	传感器供电端5V+
J1-17			J2-17	1-Oxygen Sensor +	1缸-氧传感器信号"+"
J1-18	Neutral Gear	空挡离合开关信号	J2-18	VBD	蓄电池常电12V+

NOTE: The pin number is marked according to the digital sequence on back of the ECU plug at the end of main cable.

5.3.2 Fuel Pump

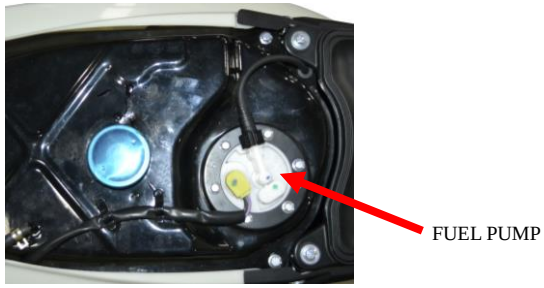
Function

Fuel pump is used to deliver fuels from fuel tank to engine at certain pressure and flow rate (as per the different vehicle and engine type).Working condition of fuel pump: when start the ignition switch, the fuel pump will run for 3s, if ECU fails to detect the effective speed signal, the fuel pump will stop; when the engine starts to work, the fuel pump will run unless the ECU detects at least 2 effective speed signals of missing teeth. Without speed signal, the fuel pump will stop.

NOTE: For long-term parking (more than 30 days), especially in summer, be sure to drain off fuel to avoid fuel deterioration and gel matter to damage the fuel pump.

Installation Location

Generally, the bottom installed built-in fuel pump is installed in the bottom of the fuel tank. However, the top installed type is installed in the top. It is necessary to ensure that the mounting surface is smooth without oil leakage.



Fuel Pump Parameters

Item	Reference Value
Working voltage (V)	8~15
Fuel system pressure (KPa)	300
Ambient temperature (℃)	-40~80
Allowable fuel working temperature (℃)	-30~70

Malfunction Mode

Blocked precise filter, fuel pump fails to rotate, invalid oil pressure regulator, invalid bracket vibration, invalid seal ring.

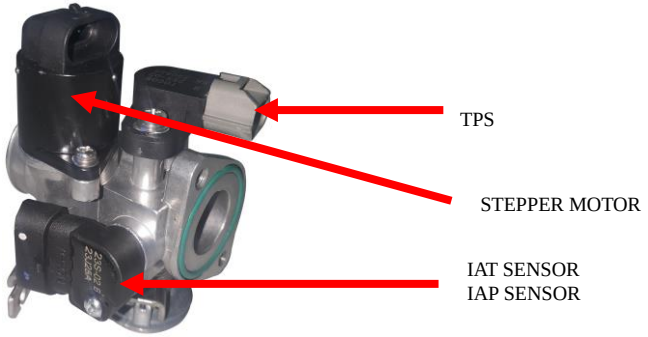
5.3.3 Throttle Valve Body Assembly

Function

It is installed in the EFI device to monitor opening angle of throttle valve, and output voltage signal to electronic controller as the load signal of engine and so as to judge the working condition of engine.

Installation Location

The throttle position sensor (TPS) is installed on the throttle valve body and fixed with a M5 screw after the initial value is adjusted. The throttle valve shaft can rotate flexibly and has a output voltage 0.58-4.8V after the sensor is power-on. Initial factory setting for output voltage is 0.58-0.65V.



Idle Speed Adjustment

(1) Target values of adjustment parameter

RPM: 1300±100r/min (1600±100 r/min for scooter)

Ignition advance angle: -0.2-(+6.0) °

Cylinder head temp.: 90±3℃

TEV opening：30°

Throttle valve position turning angle:0°

(2) Adjustment method

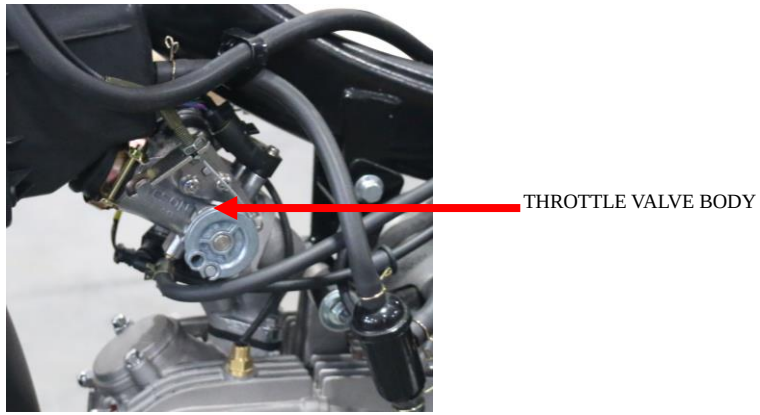
To increase the TEV opening, clockwise adjust the by-pass bolt; to decrease the TEV opening, counterclockwise adjust the by-pass bolt. It is recommended to turn 1/4 of one lap each time and wait 15s before next adjustment.

Malfunction Mode

Invalid sensor due to short-circuit, break-circuit, water entering or mechanical failure.

Installation Location

The throttle valve body is installed between the intake manifold and the air cleaner.



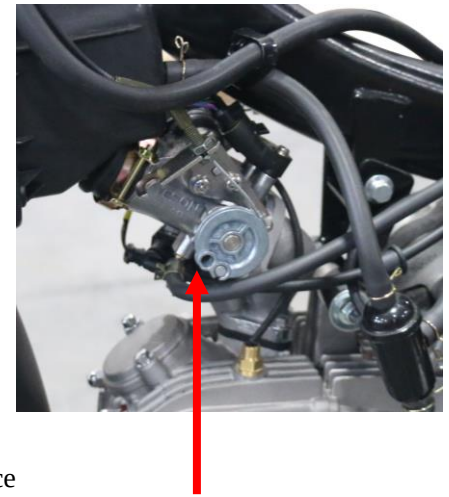
5.3.4 IAP Sensor

Function

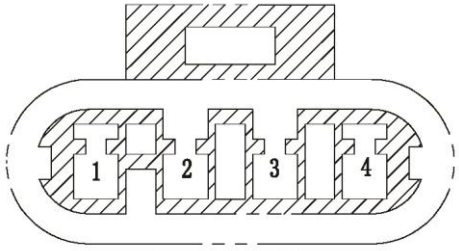
It is used to monitor the intake manifold absolute pressure and provide engine load information.

Installation Location

It is located on the intake manifold or connects with it through a rubber hose. The installation surface must be level and keep the vent port downward. If due to structural restrictions, the inclination angle of the mounting surface should be not greater than 20 °to avoid condensed water gathering.



Pin Definition



进气温压传感器

(Manifold Pressure & Temperature Sensor)

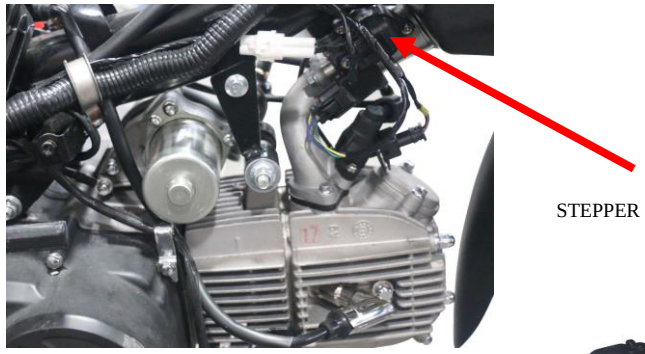
1. 温压传感器电源5V+（VREF）
2. 进气压力信号+（MAP）
3. 温压传感器电源地-（Sensor GND）
4. 进气温度信号（AIR TEMP）

Malfunction Mode

Connecting pipe is blocked, damagesl or falls off; invalid sensor due to short-circuit or break-circuit, water entering, mechanical failure.

5.3.5 Stepper Motor

The stepper motor receives directives from ECU to control the amount of air intake when the engine is idling. If the cylinder head temperature is not less than 90℃, and the engine speed is around 1500r/min (1600 r/min for scooter), the stepper motor steps range from 20-60 (depending on the vehicle model).



STEPPER MOTOR

5.3.6 IAT Sensor

Function

The IAS sensor is a negative temperature coefficient (NTC) thermistor, uses its temperature sensitive characteristics to convert the change of ambient temperature into the change of thermistor resistance, then converts this change into a voltage signal and outputs to ECU through a voltage divider circuit.

IAT SENSOR

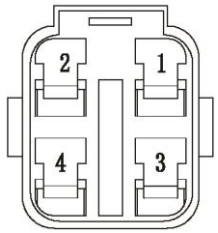
Malfunction Mode

Incorrect thermistor resistance, short-circuit or break-circuit sensor.

5.3.7 Oxygen Sensor

Function

The oxygen sensor is used in the feedback system of EFI device. It can realize the closed loop to improve the control accuracy of ECU to air/fuel ratio, and test the oxygen content in exhaust gas to determine whether the air and fuel were completely burned, so as to ensure that the three-way catalytic converter has the maximum conversion efficiency of HC, CO and NO_X in exhaust gas.



氧传感器（Oxygen Sensor）

1. 氧传感器加热控制地（Oxygen Heating）
2. 氧传感器加热电源12V+（Power 12V+）
3. 氧传感器信号-（Oxygen Sensor）
4. 氧传感器信号+（Oxygen Sensor +）

Installation Location

The oxygen sensor should be installed on the muffler or cylinder head, and can meet the specified temperature range. The installation location should be as close to the engine as possible and its angle to the horizontal plane should be ⩾ 20°.

NOTE: It is necessary to ensure that the installation seat is well sealed.

Parts	Reference Range	Trouble	Remark
Oxygen sensor	Large fluctuation between 0.01-0.99V after stabilizing the throttle for 40s	Unstable idle speed, not fluent fuel supply, high fuel consumption, engine speed decreases sharply at stable throttle	1. 0V (short- circuit of oxygen sensor) 2. 0.44V (open-circuit of oxygen sensor) 3. 0.42-0.44V (engine is not started)

Characteristic Parameters

Item	Value
Storing temperature (℃)	-40~100
Probe tube end working temp. (℃)	200~850
Connecting plug temp. (℃)	<120
Max. allowable working temp. of probe tube when heating (℃)	930
Rated voltage (V)	12
Continuous working voltage (V)	12~14
Test voltage (V)	13

Malfunction Mode

Failure of heating elements, failure of sensing elements, broken ceramic tube, short-circuit or break-circuit of heating/sensing circuit.

5.3.8 Cylinder/Water Temperature Sensor

Function

The cylinder/water temp. sensor is a negative temperature coefficient (NTC) thermistor, which uses its temperature sensitive characteristics to convert the change of engine temperature into the change of thermistor resistance, then converts this change into ECU through a voltage signal. The thermistor resistance value decreases as the engine temperature rises, but it is not a linear relationship. The NTC thermistor is installed in a copper heat conducting sleeve.

Installation Location

The sensor is mounted on the cylinder head, cylinder block or thermistor.

Thread of cylinder temp. sensor: M10×1.5

Taper thread of water temp. sensor: M10×1.25

Characteristic Parameters

Item	Value
Storing temperature (℃)	-40~130
Running temperature (℃)	-40~200
Rated resistance at 20℃	2.5 ±5%

Malfunction Mode

Incorrect resistance, short-circuit or break-circuit of sensor.

5.3.9 Injector & Oil Rail

1) Injector

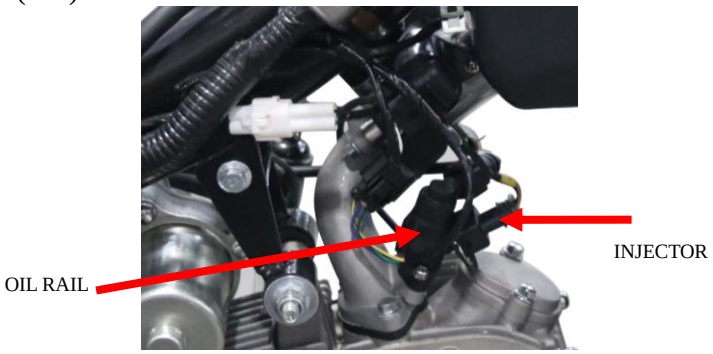
Function

The injector injects fuel in a specified time in accordance with the directive of ECU, thereby providing fuel to engine and atomizing it.

NOTE: Different types of fuel injector are used in various motorcycles, so they cannot be shared.

Installation Location

It is installed on the intake manifold and straight length from the intake valve is 70-120 (mm).



Characteristic Parameters

Item	Value
Working voltage (V)	8~16
Acceptable internal fuel pressure (kPa)	<1100
Continuous working temp. of injector (℃)	-40~110
Resistance range of injector at 20 ℃ (Ω)	12~16

Malfunction Mode

Blocked injector, break-circuit or short-circuit of magnetic coil, failure of injector due to vibration, oil leaks from seal ring.

2) Oil rail

Function

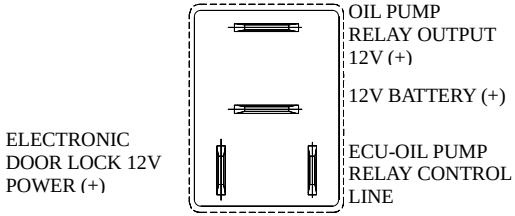
The oil rail is of simple structure, used to inject fuel from oil hose to injector, and has the function of storing oil and pressure, reducing fluctuation in oil pressure.

Installation Location

It is mounted on the intake manifold or throttle valve body with a bolt as shown above.

5.3.10 Relay

Pin Purpose



Installation Location

The relay is installed on the engine or frame.

Malfunction Mode

Break-circuit or short-circuit of relay, poor contact or failure of relay due to vibration.

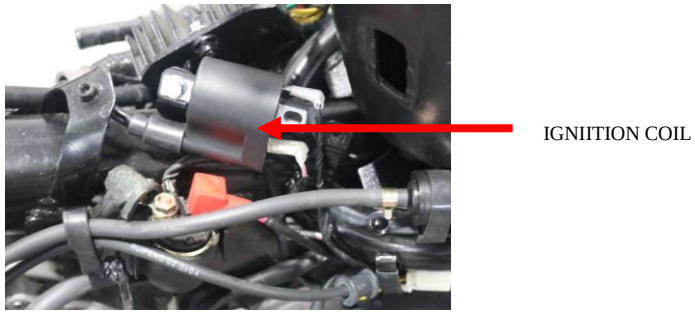
5.3.11 Ignition Coil

Function

It is used in the EFI device to receive ECU ignition signal and provide high pressure to ignite the spark plug, so as to ignite air/fuel mixture in the cylinder through high pressure connection wire and spark discharge from the spark plug.

Installation Location

The ignition coil is installed on the frame.



Characteristic Parameters

Working voltage (V)	Primary resistance (Ω)	Secondary resistance (KΩ)
6-16	4.5±10%	18.5±10%

Malfunction Mode

Break-circuit of primary windings, secondary windings are short-circuited by breakdown.

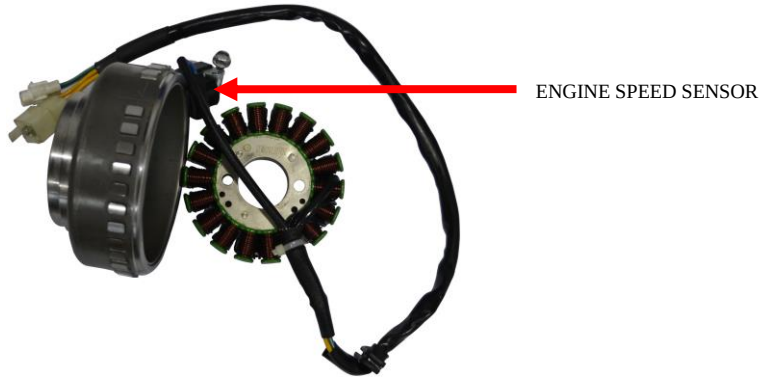
5.3.12 Engine Speed Sensor

Function

It is used in EFI device to monitor the engine crankshaft speed and output voltage-frequency signals to the electronic controller to make judgments on engine's operating conditions. At the same time, together with the missing teeth position of the sensor signal, it can detect the crankshaft position, so as to determine the TDC position which can be one of the parameters for calculating the ignition advance angle.

Installation Position

It is located in the position of the original carburetor.



36-2 TEETH MAGNETO ROTOR

Malfunction Mode

Large clearance between sensor and teeth plate, loose teeth plate, iron fillings on the sensor, damaged leading wire, short-circuit or break-circuit of sensor..

5.4 MALFUNCTION DIAGNOSIS

5.4.1 Self-diagnosis Function

(1) After the vehicle enters the working state, ECU controls the electronic system components to work and detects them in real time. Once malfunction occur to the components, the system will turn on the engine MIL to warn. When the system fails, ECU will start the backup function of “emergency control plan”.

(2) Malfunction can be classified into “steady-state malfunction” and “occasional malfunction” (such as temporary break-circuit or poor contact of couplers). Steady-state malfunction: a malfunction identified by the ECU exists for a longtime. Occasional malfunction: a malfunction exists by chance.

5.4.2 MIL Function

(1) The MIL is set in the vehicle instrument as shown in the picture. All sensors and actuators in the system can be detected. If a fault is detected, the MIL will flash in different frequency to remind the driver or maintenance personnel to read the fault code, and the fault can also be read by the fault diagnostic scanner.

(2) When the key switch is turned on but the engine is not started, the MIL will be on for 2~3s, if the current system has no fault, the MIL will be off. Otherwise, it will flash in regular code rule as the table below.

(3) Flashing rule: A fault code is composed of two digits which stand for the number of flashes. There is an interval between the light on and the next time. The decimal digits flash first and longer than the single digits, the two digital flashes have an interval of about 1.5s. When more than two faults are read, the interval time will be longer.

Clear Malfunction in ECU: Use the fault diagnostic scanner to call up the Clear Fault item and select it, and then click the OK button.

NOTE: After troubleshooting, the fault information stored in the ECU should be cleared.

Sensor	MIL Flash Code
IAT Sensor	31
	32
Intake Air Manifold Pressure	41
	42
Oxygen Sensor	51
	52
	53
Crankshaft Position Sensor	63
TPS	21
	22
Engine Temp. Sensor	11
	12

MIL

5.4.3 Diagnosis Reference Value

Item	Reference Range	Fault and Troubleshooting	Remark
Ignition advance angle	-0.2-(+6.0) °	1. When the angle is large, counterclockwise turn the idle speed bypass screw by 1/4 of a lap, accelerate the throttle 3 times and wait for 15s to check, repeat above operation until it returns to the standard value. 2. When the angle is small, clockwise turn the idle speed bypass screw by 1/4 of a lap, accelerate the throttle 3 times and wait for 15s to check, repeat above operation until it returns to the standard value.	It is normal to occasionally deviate from the normal range, and the idle speed can be stable at this time.
Injection time	2.5-3.5 ms	1. When the time is longer, problems maybe: blocked injector port, oxygen sensor continues to report dilute mixture, insufficient fuel pump pressure or battery voltage, air leaks from muffler gasket or mounting seat of oxygen sensor. 2. When the time is shorter, problems maybe: oxygen sensor continues to report thick mixture or faulty sensor oxygen, fuel pump pressure is higher than normal value.	Working condition: idling at warm engine
Oxygen sensor	Large fluctuation from 0.01 to 0.99V (after the engine works normally for 40s)	1. When the value keeps below 0.44V, the air-fuel mixture in combustion chamber is too lean. 2. When the value keeps above 0.6V, the air-fuel mixture in combustion chamber is too rich.	0V: short-circuit of oxygen sensor 0.44V: open-circuit of oxygen sensor
Water/cylinder temp. sensor	The temperature rises as the engine runtime increases, but peak temperature should not be more than 120℃.	1. A fault may occur when temperature of the water/cylinder temperature sensor changes little as the engine temperature rises greatly. 2. A fault may occur if the temperature continues to show a certain value or greatly exceeds the actual value. 3. The water/cylinder temperature sensor reads abnormal data, the fan keeps on rotating or fails to work.	Replace the sensor

IAT sensor	Vary as the air temperature	A fault may occur if the read differs significantly from the actual temperature.	Replace the sensor
TPS	0-80%	1. Unstable idle speed, slow response in acceleration; 2. Opening at idle speed condition shows 0 or 0.39%.	Mounting screw of the sensor cannot rotate freely.
IAP sensor	Idle speed: about 30Kpa	1. No idle speed, slow response in acceleration; 2. Faulty magneto speed sensor, air leaks from connecting hose or poor contact of circuit.	The atmospheric pressure needs to be calculated according to the altitude of the actual region.
Battery voltage	13.5-14.5V	1. Check the charging device and circuits at low voltage; 2. Check the rectifier at high voltage.	Check at stable idle speed

NOTE: When the altitude is higher than 1Km, the idle speed adjustment cannot refer to the TEV opening, but the target idle speed (1600±100) r/min, (1300±100) r/min and the ignition advance angle (-0.2~6) ℃. It is also possible to determine whether the bypass bolt adjustment is proper by accelerating or decelerating the throttle. When the cylinder head temperature reaches (90±3) ℃ and the throttle keeps at 4000r/min, loosen or rotate the throttle rapidly after 15s to determine whether the engine speed can return to the target idle speed by engine sound. If the fuel returns slowly, it indicates that air supply of the bypass bolt is too large. If there is an engine flameout at fuel return or fuel adding, air supply of the bypass bolt is too small. In both cases, the bypass bolt needs to be adjusted to ensure the vehicle in best condition.

Target idle speed for scooter: 1600±100 r/min

Target idle speed for other vehicles: 1300±100 r/min

5.5 TROUBLESHOOTING

TROUBLE			POSSIBLE CAUSES		SOLUTION
Engine fails or is hard to start, is easy to flameout	Fuel pump fails to work		No power in the system or at the fuel pump plug		1. Check the battery, fuse, system relay, wire harness and emergency switch for normal work. 2. If above components are in good condition, check the ECU.
			Fuel pump is electrified.	Damaged fuel pump	Replace the fuel pump
				Low voltage (＜8V)	Check the battery, system relay and couplers for normal work.
	Fuel pump can work	No fuel pressure or low fuel pressure	Lack of fuel		Add fuel and amount should not be less than 3L.
			Low battery voltage		Check if the battery, voltage regulator and magneto need to charge.
			Seriously blocked fuel passage		Check the fuel filter strainer for block
			Failure of fuel pressure regulator		Replace the fuel pump
			Leakage of fuel passage		Broken hose or loose hose clamp, replace them if necessary
			Fuel pump wires in reverse connection		Reconnect
		Normal fuel pressure	Sparks occur in ignition coil at high pressure	Fuel in spark plug is wet (fuel is not burned)	Remove and dry the spark plug, or replace it
				Creepage of spark plug insulator or abnormal jump-spark	Replace the spark plug or spark plug cap
				Improper spark plug gap	Adjust it to standard value
				Poor contact or creepage of spark plug cap	Adjust or replace
				Faulty ignition circuit or poor contact of couplers	Check the wires, TPS installation condition and various couplers.
				Damaged water/cylinder temp. sensor or IAT sensor	Replace
				Blocked injector	Clean or replace

			No spark or broken spark in ignition coil at high pressure	Poor contact of ignition circuits	Check and repair the circuits
				Large gap between speed sensor (exciter coil) and rotor convex plate	Adjust the gap
				Damaged ignition coil or spark plug	Replace
				Creepage of ignition coil output	Replace
				Faulty ECU or poor contact of couplers	Check or replace
Lack of power			Clogged air cleaner or too much dusty on it		Clean off
			Heavy carbon deposits in combustion chamber and exhaust muffler		Clear away
			Worn piston rings, piston and cylinder, large gaps		Replace
			Slipping clutch friction disc		Adjust or replace the clutch friction disc
			Clogged fuel passage, lower fuel pressure or poor quality fuel		Check the fuel pump, injector and fuel for good condition
			Faulty water/cylinder temp. sensor or faulty oxygen sensor		Check and replace
Large fuel consumption			Poor quality fuel		Use higher quality fuel
			Engine failure		Repair
			Faulty water/cylinder temp. sensor		Check and replace
			Faulty oxygen sensor		Check and replace
			Clogged air cleaner or too much dusty on it		Clean off

Unstable idle speed	Battery voltage＜ 12V	Check the battery and charging system
	Poor contact of ECU or injector couplers	Check and troubleshooting
	Air leaks from throttle valve body or connecting hose of inlet pipe	Check the paper gasket, O-ring, clamp or connecting hose for air leakage
	Dirties in throttle valve body or clogged air cleaner	Clean off
	Influent fuel passage	Check the fuel tank for enough fuel, check the fuel filer and fuel passage for clogging
	Expired fuel or poor quality fuel	Use unleaded gasoline with RQ92 or higher
	Loose spark plug	Tighten up
	Improper spark plug gap	Adjust to stand value
	Poor contact or creepage of spark plug cap	Adjust or replace
	Creepage or abnormal jump-spark of spark plug insulator	Replace the spark plug
	Small valve gap or engine failure	Adjust the valve gap or check the engine
	Air leaks from muffler gasket or oxygen sensor mounting seat	Check and troubleshooting
	Air leaks from connecting pipe of idle speed gulp valve or TEV opening isn’t suitable	Check or adjust
	Invalid oxygen sensor or little air supply of idle speed gulp screw	Check, adjust or replace

Failure of acceleration at mid/high speed or engine speed drops rapidly when holding the throttle for about 5s	Faulty water/cylinder temp. sensor	Check and replace
	Faulty oxygen sensor	Check and replace
	Insufficient fuel pressure of fuel pump	Check and replace
Low voltage of EFI system (＜12V)	Poor contact of circuit	Check
	Rectifier is unable to charge	Check and replace
	Insufficient power generated from magneto coil	Check and replace
	Aging battery can’t store power	Repair, maintain or replace
	Insufficient battery power due to heavy load	Avoid driving at low speed for a long time or connecting with high-power electrical appliances
The fan keeps rotating or fails to rotate	Faulty water temp. sensor	Check and replace
	Faulty fan relay	Check and replace
Engine is easy to stall when releasing the throttle	Large TEV opening or little idle gulp air	Adjust the adjusting screw of idle gulp valve
Too high idle speed	Damaged or leaking negative pressure switch cap of carbon canister	Check and replace
	Large intake air of idle gulp valve screw	Adjust
	Air leaks from inlet pipe or O-ring	Check and repair
	Broken or leaking desorption tube, idle gulp valve, negative pressure pipe, etc	Replace the abnormal rubber hose

Running with sudden rush	Poor contact of spark plug and cap, or water entering in	Check and repair
	Air leaks from oxygen sensor mounting seat	Check and repair
	Faulty oxygen sensor	Replace
	Improper TEV opening and abnormal idle gulp air	Adjust
	Air leaks from muffler gasket	Repair
Difficulties in gear-shifting	Clutch friction discs are burned and worn.	Replace
	Large gap of clutch cable, not disengaged clutch	Adjust
	Tight drive chain	Adjust
	Failure of engine gear-shifting device	Check the gearshift cam, gearshift shaft, main shaft & countershaft, gearshift drum and gearshift pedal
No spark of ignition coil	Faulty engine speed sensor (exciter coil)	Replace
	Large gap between engine speed sensor (exciter coil) and rotor convex plate	Adjust
	Poor contact of main cable with ignition coil coupler	Check and adjust
	Poor contact of ECU and main cable, or faulty ECU	Check and replace
	Poor contact of engine speed sensor and main cable coupler	Check and repair

Descriptions: When EFI vehicles have problems, please refer to the maintenance method of the carburetor vehicle and check it from the following aspects:

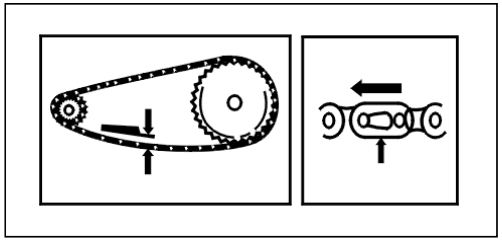
1. Check the vehicle for sufficient fuel (must be≥3L with good quality) and normal fuel supply.
2. Check the ignition system for normal work.
3. Check the engine cylinder or normal pressure.
4. Check the engine intake system for fluent flowing.

CHAPTER 6 SERVICE

6.1 ROUTINE MAINTENANCE AND ADJUSTMENT

6.1.1 Maintenance of Drive Chain

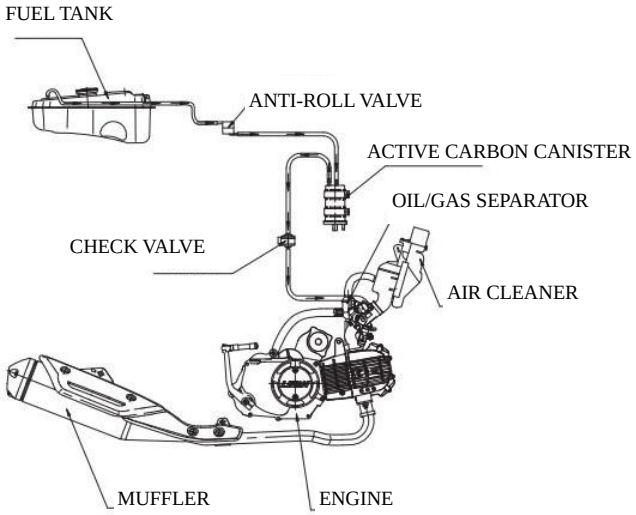
Check the drive chain for wear and slack. Lubricate the chain if it seems to be dry. Support the motorcycle with center stand, press the chain between two sprockets to check its slack. Adjust the slack to be 10~20mm.



6.1.2 Adjustment

Loosen the locknuts of rear axle and drive chain adjuster; turn the adjusting bolt until the left and right adjuster align with the same mark: finally, check and tighten up the rear axle locknut with tightening torque 60~80 N ṁ.

6.1.3 Fuel System



6.1.3.1 Removal, Installation and Maintenance

1) Turn off the ignition switch.

2) Unlock the seat with a key and turn over the seat cushion.

3) Remove the fuel tank cover, check the seal ring and replace it if it deforms or damages.

4) Remove the fuel pump and check the filter hose and strainer, clean them if necessary.

5) Remove the fuel tank, check the fuel tank interior and clean the tank if necessary.

6) Check all rubber hoses in fuel system for bend, breach and aging, adjust or replace them if necessary.

6.1.3.2 Troubleshooting to Fuel Tank

Description	Damage Form	Trouble	Service	Remark
Fuel Tank	Cracks on the fuel tank due to erosion	Fuel tank leaks.	Repair or replace	/
	Vent of fuel cock is clogged.	No fuel supply, engine fails to start.	Clean the vent of fuel cock	/

6.1.4 Principle of Secondary Air-Induction System and Crankcase EGR System

The crankcase EGR system has a gas channel between the crankcase and the air cleaner, and sets up an oil/gas separator. Exhaust gas in the crankcase passes through the oil/gas separator, then enters the air cleaner, throttle valve body assembly, and returns to the engine combustion chamber for combustion, avoiding direct discharge of exhaust gas into the atmosphere in the crankcase, thus reducing atmospheric pollution.
Precautions during use and maintenance: The oil/gas separator should be cleaned regularly, and it is recommended to do so every 3 months.

6.1.5 Check of Fasteners

Check all fasteners such as rear fork shaft, front/rear wheel with a torque spanner as pictures below.

REAR FORK SHAFT
TIGHTENING TORQUE:
45～65N.m

FRONT WHEEL
TIGHTENING TORQUE:
60～80N.m

REAR WHEEL
TIGHTENING TORQUE:
60～80N.m

MUFFLER
TIGHTENING TORQUE:
24～30N.m

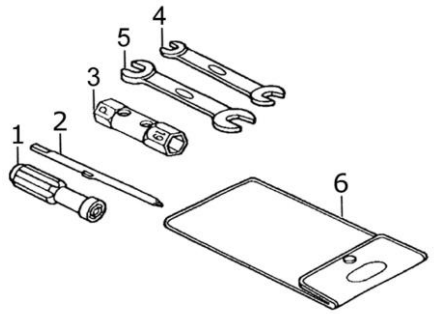
6.2 PRE-RIDE INSPECTION

Check the following before each ride:

1. Engine oil level——Add engine oil if necessary, check for leakage.
2. Fuel level——Refuel if necessary, check for leakage.
3. Front and rear brakes——Check for operation, adjust free play if necessary.
4. Tyres——Check condition and pressure.
5. Battery——Check its power.
6. Accelerator——Check for accelerator operation, cable connection and free play of handle, adjust or replace if necessary.
7. Lights and horn——Check that headlights, taillight, parking (position) light, winkers, indicators and horn function properly.
8. Drive chain——Check chain slack and engine oil condition, adjust, lubricate or replace if necessary.
9. All nut, bolts and fasteners——Check that the parts are mounted securely.
10. Steering system——Check for its flexibility and reliability.

6.3 GENERAL MAINTENANCE

6.3.1 Tool Kit



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

Manufacturer's Vehicle Repair and Maintenance Information

Web site addresses referred to

http://www.lifanmotos.net/product

Account: n.a.

Password: n.a.

6.3.2 Maintenance Schedule

FREQUENCY / SERVICE ITEM		Item	ODOMETER READING, km (Note ②)				
		Period	1,000km	4,000km	8,000km	12,000km	Note
•	Fuel line system			Ⅰ	Ⅰ	Ⅰ	
•	Fuel filter		C	C	C	C	
•	Throttle operation system		Ⅰ	Ⅰ	Ⅰ	Ⅰ	
	Air cleaner element	Note ①		C	C	C	
	Spark plug		Ⅰ	Ⅰ	Ⅰ	Ⅰ	
	Valve clearance		Ⅰ	Ⅰ	Ⅰ	Ⅰ	
	Engine oil	Yearly	R	Every 2,000Km after 500km & 1000km			
	Engine oil strainer	Yearly R			C		
•	Cam chain slackness		A	A	A	A	
	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	
•	Nut, bolt and fasteners		Ⅰ	Ⅰ	Ⅰ	Ⅰ	
••	Wheels/spokes		Ⅰ	Ⅰ	Ⅰ	Ⅰ	
••	Steering, handlebar 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.

6.4 STORAGE

1. Empty fuel inside the fuel tank, fuel hose and other passages.
2. Remove the spark plug and pour appropriate engine oil into its hole. Turn off the ignition switch, and crank several revolutions to scatter evenly the oil on the cylinder wall.
3. Remove the drive chain, clean and lubricate it.
4. Lubricate all of the controlling cables.
5. Support the motorcycle with the center stand, store it in the atmosphere and dry place.
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 wet or salty air.
8. Remove the battery and store it in a dry, cool and well-ventilated plate. Charge the battery once every 30-day.

6.5 UNPACKING

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