# AT110 model
# Maintenance Manual

# Compilation Illustration

This maintenance manual introduces the maintenance adjustment procedure, disassembly and assembly essentials, inspection and maintenance points, troubleshooting methods and maintenance technical data of AT110 model (ATV) (four-wheel all-terrain vehicle) in detail, with detailed graphic data attached to guide the operation.

Please carefully read this manual and conduct inspection and repair in accordance with the standard operating practices, which can effectively extend the service life of each part, improve the performance of the engine and the reliability of the whole vehicle.

# Content



**Note: Please understand that the contents in this maintenance manual which subject to change due to vehicle improvement, upgrading will not notify again. The actual condition of the vehicle shall prevail in the maintenance.**

**ZHE JIANG KAYO MOTOR CO., LTD**

## Unit Conversion Covered in the Manual

| Item | Unit Conversion |
|---|---|
| Pressure | 1kgf/cm2=98.0665kPa；1kPa=1000Pa |
| | 1PSI=0.0689kgf/cm2 |
| | 1mmHg=133.322Pa=0.133322kPa |
| Torque | 1kgf·m=9.80665N·m |
| Volume | 1mL=1cm3=1cc |
| | 1L=1000cm3 |
| moment of force | 1kgf=9.80665N |
| Length | 1in=25.4mm |

# Danger/warning/caution

Please read the following explanation carefully. It emphasizes the special meaning of the words "danger", "warning" and "attention". Special attention should be paid to the prominent meaning in the whole vehicle and engine maintenance.

**Danger:** Means to be alert to high danger

**Warning:** Indicates caution against moderate danger

**Caution:** Indicates concern for minor hazards

However, it is important to note that the "hazards" and "warnings" contained in this maintenance manual cannot cover all potential hazards in the process of engine use and maintenance.Therefore, in addition to the "danger" and "warning" regulations, maintenance personnel must also have basic mechanical safety knowledge. If the operator is not sure to complete the entire maintenance operation process, please consult more experienced senior technicians.

## Maintenance information



## 1.1 Notes for Operation

### Safety precautions

1. Work clothes (jumpsuits), hats, safety boots must be worn. When necessary, safety protective

equipment such as dustproof glasses, dustproof masks and gloves should be put on to protect yourself from injury.

2. Because the exhaust gas contains harmful components, it is prohibited to operate the engine in closed places and places with poor ventilation for a long time.

3. When the engine is shut down, the temperature of the engine and muffler is very high, so that it cannot be touched before cooling to avoid burns.

4. The battery solution (dilute sulfuric acid) is a corrosive agent, which may cause burns and blindness when it touches the skin and splashes into the eyes.In case of accidental contact with battery solution on clothes and skin, flush with plenty of water immediately;in case of accidental contact with battery solution on eyes, please;Flush with plenty of water immediately and go to the hospital in time for treatment.Batteries and battery solutions should be kept strictly and must be placed in a safe place out of reach of children.Battery charging is able to produce flammable and explosive hydrogen, once there is a fire or electric spark near, there is an explosion risk.Therefore, please charge in a well-ventilated place.

5. As gasoline is flammable and explosive, fireworks are strictly prohibited in the work site.Watch not only for open flames, but also for electric sparks.Vaporized gasoline is at risk of explosion. Please choose a well-ventilated site for operation.

6. Do not let the rear-wheel, clutch or other rotating parts and movable parts clamp hands and clothes at any time during maintenance.

7. When two or more people work together, they must continuously greet each other to ensure safety.

**Disassembly and assembly Note**

1. Components, lubricants and lipids must be made from genuine parts of Kayo brand or recommended parts designated by Kayo.

2. After the vehicle is disassembled, the parts of each system shall be sorted out and kept separately to ensure that the parts can be put back to their original position.

3. Please clean the dirt and dust of the vehicle before maintenance.

4. The gasket, o-ring, piston pin retainer, opening pin and other parts must be replaced after disassembly.Replace the lock nut according to damage situation after removal.

5. When the elastic baffle, spring, and steel wire baffle are disassembled, if the opening is too large, it will cause irreversible plastic deformation, resulting in the failure of parts, which will be easy to fall off after re-assembly.Please do not use already loose, lose the flexibility of this kind of article to replace new one in time.

6. After the parts are disassembled and checked, clean them before measurement and blow off the cleaning agent with compressed air.Oil or grease should be applied on the movement surface before assembly.

7. When disassembly, necessary parts shall be inspected, relevant data measured and even pictures taken.So that the assembly is able to revert to the previous state of disassembly.

8. Bolts, nuts and screw fasteners must first be threaded with 2~3 turns of thread, and then tightened on the diagonal in accordance with the principle of from big to

small and from inside out according to the prescribed tightening torque.
9. Rubber parts should be inspected for aging during disassembly and replaced in advance if necessary.Rubber parts are not resistant to gasoline and kerosene corrosion, try not to allow volatile oil, grease kind of touch.
10. The recommended grease should be applied or injected into the designated parts as required by the maintenance manual.
11. Correct special tools should be used for disassembly and assembly.
12. When deep groove ball bearing is disassembled, it adopts the disassembly method of internal ring force, so the removed bearing shall not be used again, and shall be replaced in time.
Deep groove ball bearings can be used finger rotation, if abnormal sound, stuck, bearing should be replaced.
Bearing axial.If the radial clearance is too large, it shall be replaced.
Bearing and the original on the body or diameter of the original pressure to fit, after the disassembly of the fit is not tight should be replaced.
13. The bearing should be coated with machine oil or grease before assembling.One - sided bearings need to pay attention to the direction of assembly.Open type, double-sided dust-proof cover bearing in the assembly of the manufacturer's logo, the size of the face outward installation.
14. When installing elastic baffle, one side with chamfer should be turned out.Do not use loose retainers.Rotate the elastic baffle after assembly and make sure the baffle is installed in the groove.
15. After assembly, please check whether the fasteners are tightened and working properly.
16. Brake fluid, gasoline and oil will corrode the coating surface, plastic parts, rubber parts, etc.Special care should be taken to prevent the above liquid from touching during disassembly and assembly.
17. The oil seal shall be installed outward with one side marked by the manufacturer. Check to make sure the spring coil inside the oil seal is intact.
Note lip crimping, broken, crack can not be used.
Smear grease on the oil seal surface to prevent burrs from scratching the oil seal lip.
18. When installing hose parts, the hose must be checked to the root of the joint.Tubing clips must be installed to the hollow of the pipe.Loose hose must be replaced during installation.
19. Pay attention to dust prevention during vehicle maintenance, and do not introduce dust and dirt into the engine, fuel tank and brake oil pressure system.
20. The gasket material attached to the joint surface of each box body of the engine can only be assembled after cleaning.To remove the contact mark on the surface, it must be polished evenly with oil stone.
21. The lasso should not be excessively twisted or bent.Deformation and damage to the cable will create a lag.
22. When assembling cap parts, the cap with groove must be installed into the groove.

**Engine Running-in**

The engine has many relative moving parts, such as piston, piston ring, cylinder body, crankshaft, crank, connecting rod, intermeshing transmission gear and so on.Therefore, in the early use of these parts, the specification of running-in is necessary.The run-in can make the relative moving parts adapt to each other, correct the working clearance, and form a good smooth friction surface that can withstand large loads.Only when the engine is well-run can it have excellent performance, more stable reliability and extend the service life of the engine.
The recommended running time of the engine is 20 hours, and the specifications are as follows:

**0~10 hours:** avoid continuous operation in the state of 1/2 throttle opening, and change speed at the same time, it is not recommended to operate in a fixed throttle position for a long time.After working for 1 hour, stop the engine to cool down for 5 to 10 minutes to avoid rapid acceleration.

**10~20 hours:** avoid long operation when the throttle is over 3/4 open. Use the accelerator freely, but not full throttle.

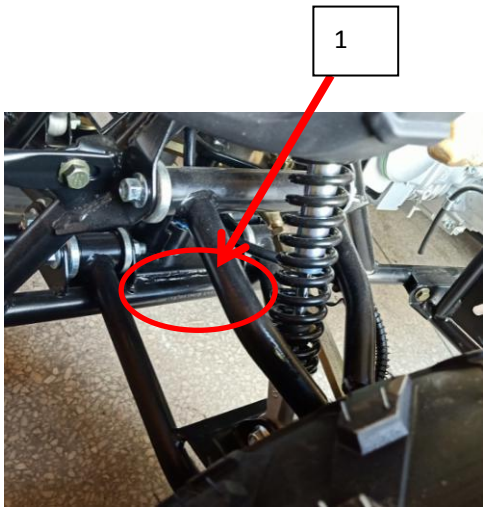
**Note:**
As per the daily maintenance provisions during wear and repair, troubleshooting in time;

After the end of the grinding, the engine for 20 hours of grinding before maintenance can enter the normal driving stage

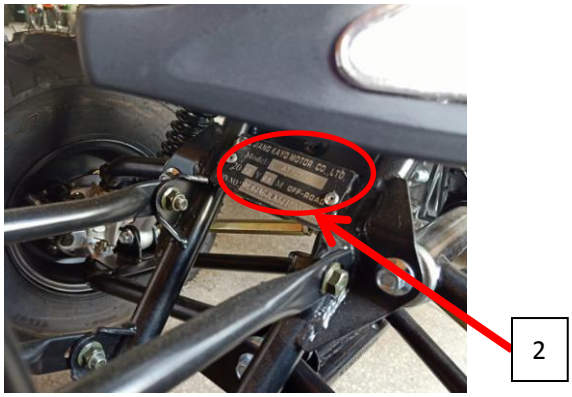
## 1.2 VIN

| | |
|---|---|
| **Vehicle Model** | **HY110AT（AT110）** |
| **VIN** | |
| **ENGINE NO.** | |

Inscription position See attached figure:
1) VIN on Chasis
2) Vehicle name plate
3) Engine No.








## 1.4 Main Parameters

| No. | Item | |
|---|---|---|
| 1 | TRADE MARK | KAYO |
| 2 | MODEL | HY110AT |
| 3 | NAME | ATV 110cc Sport ATV |
| 4 | COMPANY | Zhejiang Kayo Motor Co., Ltd |

## Main dimension parameters

| | | |
|---|---|---|
| 1 | Dimension(L*W*H) (mm) | 1380*880*930 |
| 2 | Height of Handle bar (mm) | 930 |
| 3 | Width of Handle bar (mm) | 730 |
| 4 | Height of Vehicle Tail (mm) | 700 |
| 5 | Seat Height (mm) | 635 |
| 6 | Ground Clearance(mm) | 90 |
| 7 | Wheel Base（mm） | 900 |
| 8 | Front wheel base | 700 |

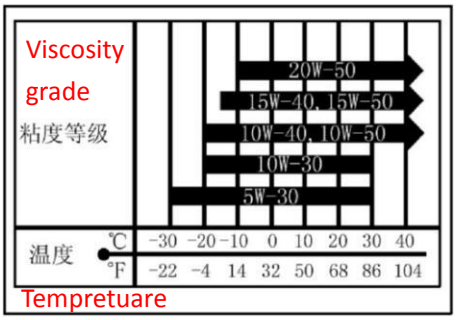
| | | |
|---|---|---|
| 9 | Rear wheel base | 640 |
| 10 | Turning radius | 1650 |
| 11 | Steering angle(Degree) | 38° ±2° |
| 12 | Dry Weight(kg) | 97.4±2 |
| 13 | Curb Weight(Battery + Fuel)（Kg） | 102 |
| 14 | Max. Speed Km/h | (Speed limitation) 40 |

## Engine parameters

| No. | Item | | | |
|---|---|---|---|---|
| 1 | Starting method | | Electric start | |
| 2 | Engine type | | Horizontal Single cylinder, four stroke, air cooling | |
| 3 | Air distribution | | SOHC/Chain drive | |
| 4 | Cylinder diameter × stroke（mm） | | 52.4*49.5 | |
| 5 | Compression ratio | | 9.0 :1 | |
| 6 | Lubrication method | | Pressure + splash lubrication | |
| 7 | Oil pump type | | Rotor type | |
| 8 | Lubricating oil filter type | | Full flow filter rotary,Paper filter core | |
| 9 | No. of Engine oil | | SAE15W-40 | |
| 10 | Cooling | | Air Cooling | |
| 11 | Coolant | | / | |
| 12 | Air filter | | Sponge filter cartridge | |
| 13 | Carburetor | | Flat suction plunger type （JINGKE PZ22/EPA） | |
| 14 | Fuel Tank Capacity | | 2L | |
| 15 | Clutch | | Dry automatic clutch | |
| 16 | Variable speed mode | | 1+1 Foot shifting, with shift protection. | |
| 17 | Shift Gear | | One forward gear, one reverse gear | |
| 18 | Shift mode / sequence | | R~N~D | |
| 19 | Deceleration ratio | | Forward Gear D | Reverse Gear R |
| | | Primary Deceleration ratio | Clutch hub gear / primary transmission tooth | |
| | | Single stage deceleration ratio | Forward gear ratio | Forward gear ratio |
| | | Total speed ratio | | |
| **Chasis** | | | | |
| 20 | Driving sprocket ratio | | 37/13 | |
| 21 | Output form | | Chain drive, rear wheel drive | |
| 22 | Brake | | Front and rear disc brake | |

| | | |
|---|---|---|
| 23 | Suspension | Double rocker independent type |
| 24 | Frame | Welded steel tube sheet |
| | | |

## Lubricating device

| Item | | Standard | limited |
|---|---|---|---|
| Engine oil capacity | Change oil | 800mL（No oil filter replaced） | — |
| | Change oil | 800mL（oil filter replaced） | |
| | Full capacity | 800mL | — |
| Recommended engine oil(See Original File)<br>  <br> | | Specilly used for 4-stroke motorcycle, if want to use other oil replace SAE-15W-40 Should used within following mentioned range<br>• API Classify: SG or higher engine oil.<br>• SAE Specification： Choose start from left side table according to outside temperature. | |
| Oil pump rotor | Internal and external rotor | 0.07 mm～0.15mm | 0.2mm |
| | Clearance between outer rotor | 0.03 mm～0.10mm | 0.12mm |
| | Oil pump rotor end clearance | 0.023 mm ～0.055 mm | 0.12 mm |
| | Oil pressure | 1500r/min，90℃时 200 kPa ~400kPa，Generally 240 kPa<br>6000r/min, 90℃ 600 kPa ~700kPa，Generally 600 kPa | |

**Intake system (see engine part)**

**Cooling device (no)**

## Wheel（front and rear are the same）

| Item | | Standard | limited |
|---|---|---|---|
| Rim pulsation | Vertical | 1.0mm | 2.0mm |
| | Horizontal | 1.0mm | 1.8mm |
| Tyre | Groove depth | ~ | 3.0mm |
| | Air Pressure | 4.0 PSI | ~ |

## Brake System

| Item | | Standard | limited |
|---|---|---|---|
| Front Brake (1 drag 2) | Brake disc thickness | 3.5mm | 3mm |
| | Brake handle stroke | 5~10mm | ~ |
| | Brake disc strength | 400N*m | ~ |
| Rear Brake | Brake disc thickness | 3.5mm | ~ |
| | Brake handle stroke | 10~20mm | ~ |

| | | | |
|---|---|---|---|
| | Brake disc strength | 500 N*m | ~ |

## Ignition device

| Item | | Standard |
|---|---|---|
| Ignition methord | | CDI Ignition |
| Sparking plug | Type | Resistive spark plug |
| | Standard | ATR7C/（torch） |
| | Spark plug gap | 0.6~0.7mm |
| | Spark characteristics | >8mm,1 atmospheres |
| **Ignition advance angle** | | |
| High voltage package resistance | Primary Resistance | 0.43~0.57Ω |
| | Second Resistance | 10.1~11KΩ |
| Peak voltage | Ignition coil Primary | >150V |
| | Pulse generator | 2V |

## Light/Instrument/Switch

| Item | | Standard |
|---|---|---|
| Relay Chip Fuse | | 15A |
| Light | Front Lelt & Right Light | 12V*3W*2 |
| | Rear light / brake light | LED |
| | Shift Gear Indication Light | LED |

**Valve + Cylinder head (See Engine Section)**

**Cylinder + Piston + Piston Ring + Crank Link(See Engine Section)**

## 1.5 Fastener tightening torque

**Note: When you install thread, you must manually bring 2~3 thread.**

Tightening torque at the designated part

The entire vehicle part

| No. | Item | Installation Position | Bolt specification | Grade | TorqueN*m |
|---|---|---|---|---|---|
| 1 | Engine | Rear power bolt | M8 | 10.9 Grade | 37~50 |
| 2 | | Upper power | M8 | 10.9 Grade | 37~50 |

| | | | | | |
|---|---|---|---|---|---|
| | | bolt | | | |
| 3 | | Lower power bolt | M8 | 8.8 Grade | 18~25 |
| 4 | Suspension | Front and rear Suspension bolts | M10*1.25 | 8.8 Grade | 35~45 |
| 5 | | Upper rocker shaft | M10*1.25 | 8.8 Grade | 35~45 |
| 6 | | Lower rocker bolt | M10*1.25 | 10.9 Grade | 58~71 |
| 7 | | Fork shaft | M12*1.25 | 8.8 Grade | 50~60 |
| 8 | Brake | Rear disc brake mounting | M8 | 8.8 Grade | 18~25（Blue thread adhesive ） |
| 9 | | Front Dics brake mounting | M6 | 10.9 Grade | 15~20 |
| 10 | | Disc brake pump Mounting | M8 | 10.9Grade | 29~35 |
| 11 | | Front Brake Tee Installation | M8 | 8.8 | 18~25 |
| 12 | Rear Axle | Rear Axle Mounting | M12*1.25 | 8.8 | 55~65 |
| 13 | | Big Nut | M27*1.5 | | 80~90 |
| 14 | | Chain bolt | M6 | 8.8 | 8~12 |
| 15 | Steering | Clip locking bolt(Inside hexagonal) corners) | M8 | 10.9 | 18~25 |
| 16 | | Steering column locking | M8 | 8.8 | 18~25 |
| 17 | | Lower Pressure block mounting bolt | M10*1.5 | 10.9 | 50~60 |
| 18 | Electrical devices | Battery Box Installation | M8 | 8.8 | 15~20 |
| 19 | | Muffler fastening | M8 | 8.8 | 15~20 |
| 20 | | Pressurizer high pressure | M6 | 8.8 | 7~11 |

| | | | | | |
|---|---|---|---|---|---|
| | | package | | | |
| 21 | Fuel tank, Vehicle Body, Plastic parts | Fuel Tank Installation | M6 | 8.8 | 7~11 |
| 22 | | Fuel Tank Switch | M6 | 8.8 | 7~11 |
| 23 | | Pedal Installation | M8 | 8.8 | 18~25 |
| 24 | | Steel Pedal | M6 | 8.8 | 8~12 |
| 25 | | Plastic Flat head | TM6 | | 7~11 |
| 26 | | Self tapping pins for connection headlight with Plastic Parts. | ST4.2 | | 3~5 |

**Tightening torque at the specified location - Engine section ( See Engine section )**
**Engine repair tool (See Engine section)**
**Engine-specific tools (See Engine section)**

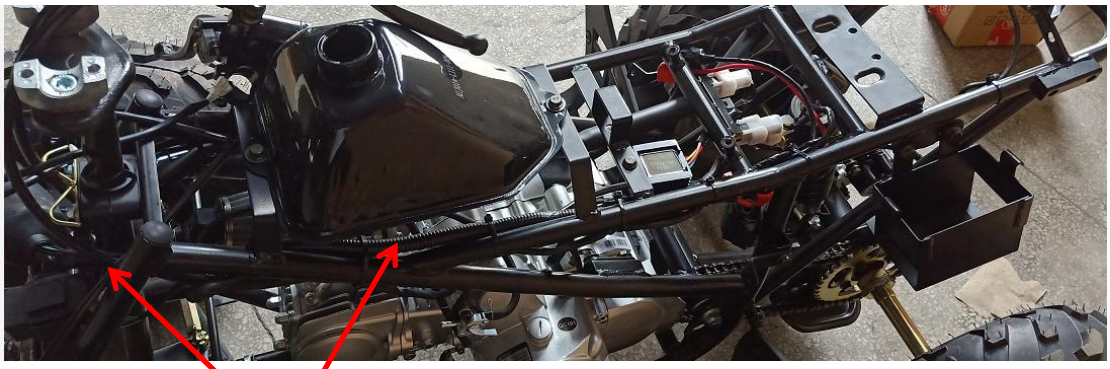
## 1.6 Lubricating grease, sealant

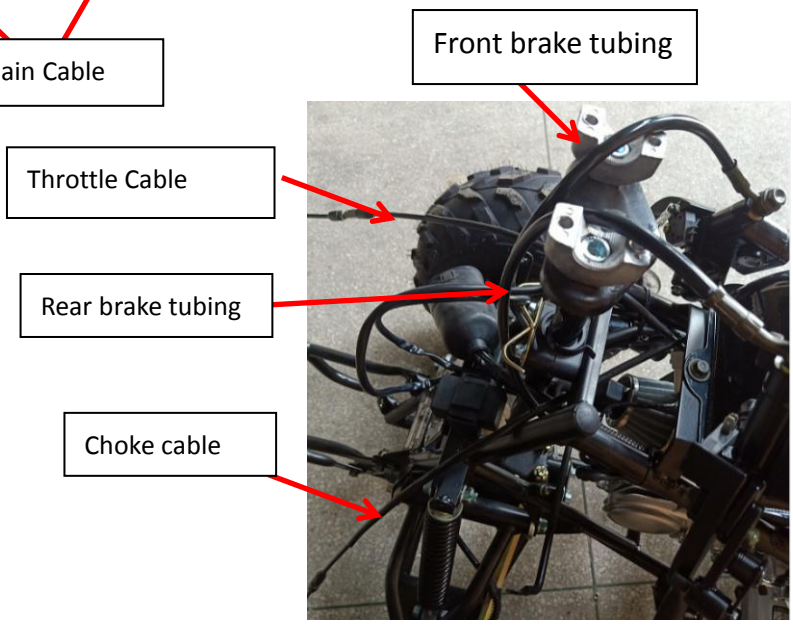
| No. | Smear Position | Function | Grease |
|---|---|---|---|
| 1 | Upper and lower rocker arm dust cover | Lubrication | XHP222 |
| 2 | Upper and lower rocker ball head seat | | |
| 3 | Steering column base | | |
| 4 | Left and right steering knuckle joint with wheel hub | | |
| 5 | Rear fork mounting shaft | | |
| 6 | Rear flat fork inner liner | | |
| 7 | Rear axle lining pipe | | |
| 8 | Rear axle bearing oil seal | | |
| 9 | Steering column clamp block | | |

## Note: The handle bar should to be glued first when install the grip

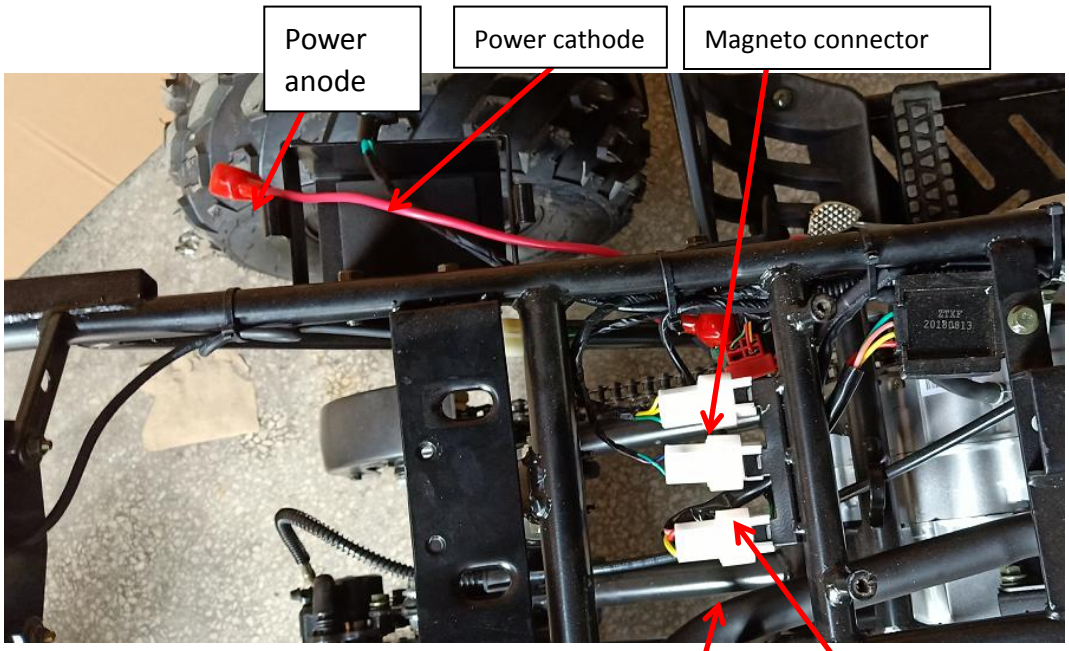
**Engine running material and installation accessories (see engine part). Engine operating materials include lubricant (Engine oil), grease (yellow oil), etc. Installation accessories include sealant, thread glue and so on.**

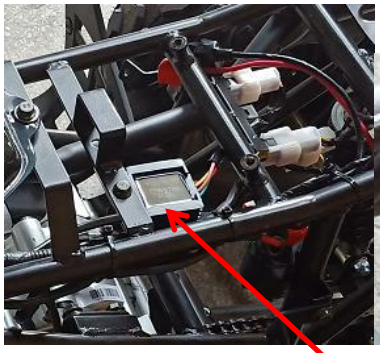
## 1.7 Cable Connection Layout




Main Cable
Front brake tubing
Throttle Cable
Rear brake tubing
Choke cable

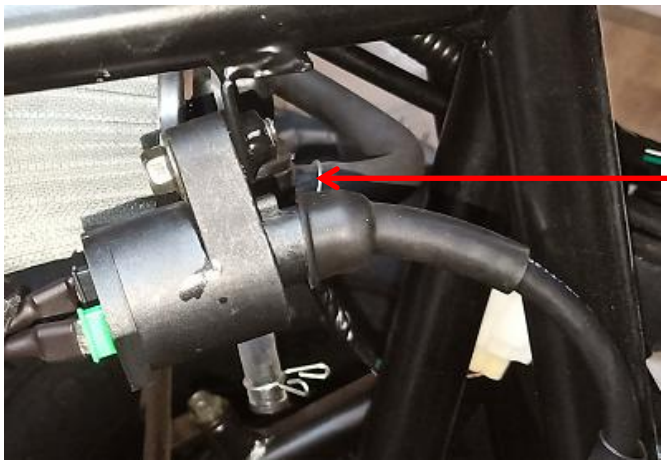

Brake cable connector
Emergency flameout switch connector
Neutral display connector
Reverse display connector
Switch lock connector
Functional switch connector
Headlight connector


Power anode
Power cathode
Magneto connector
Rectifier regulator connector
Gear display connector



Rectifier
Regulator

Rear
lamp



Ignition
Coil

CDI

## 2 Vehicle Covers

2.1 Maintenance information
2.2 Mounting torque
2.3 Disassembly and assembly of seat cushion, front and rear protectives, front and rear mud plate, head cover, rear body, left and right protective plate, front body, left and right plastic pedals and left and right pedals

**2.1 Maintenance information**

Work notes:

1. When replacing the overlays with the warning signs affixed and riveted on the vehicles, the corresponding marks should be correctly and completely completed according to the original ones.
2. This chapter describes the disassembly sequence of vehicle body panels, and refers to this chapter when it is necessary to disassemble the related panels when repairing the internal parts of the vehicle.
3. This chapter only describes the disassembly and assembly. If the problem of cable, tubing and cable alignment is involved in the process of disassembly and assembly, please refer to the cable layout chart.

**2.2 Mounting torque**

M8 bolt：18~25N*m

TM6 Large headed bolt ： 7~11 N*m

M6*bolt：8~12 N*m

**2.3 Dismantling and assembling of head cover, handle bar, seat cushion, whole vehicle plastic parts (front and rear fender, rear body, left and right footrest guard, front body), front guard assembly, left and right plastic parts of pedals, left and right pedals.**

**2.3.1Head cover**

### Disassemble

1. Remove the fixing bolts 1 and 2 (2 in symmetrical position).
2. Push the head cover in the direction shown in the figure. Remove the head cover after the buckle is loosened. (Note: the buckle on the head cover is easy to break and operate carefully.)

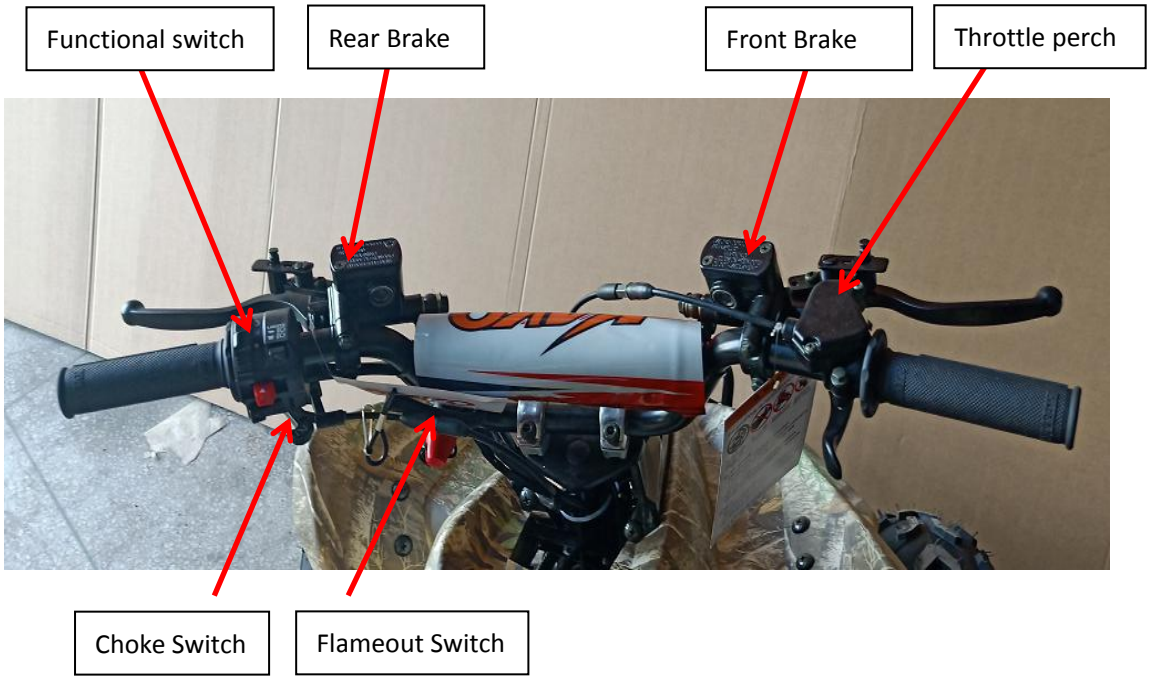
### Assemble

Follow the reverse sequence and reverse direction of the disassembly. After installation, pay attention to checking whether the cushion is installed in place and reliable.


## 2.3.2 Handle Bar

### Disassemble

1, when dismantling the direction, first disconnect the vehicle power supply.
2. Use scissors to cut the plastic tie, and pull out the main plug of the multi-functional switch, the plug of the flameout switch and the plug of the brake wire in turn.
3. Release the handle bolt of the disc brake with the tool and remove the brake handle.
4, the front brake dismantling the rear brake.
5,Pull out the air door line according to the graphic direction, then remove the choke cable.
6,Screw the accelerator cap bolts with tools and remove the throttle cable.
7,Remove the pressing bolts, remove the upper block and remove the handle bar.



## Assemble

Follow the reverse sequence of dismantling, and check to see if the installation is in place.
(Note: 1) After the installation of the handle bar, the flameout switch connector, multi-functional switch connector and brake connector must be checked to prevent misconnection and loosening.
2, Check the choke cable, throttle cable is installed in place.
3, The front brake and rear brake is suitable for installation angle, and the handle bar is referenced to the vehicle wiring diagram.

## 2.3.3 CUSHION ASSEMBLE

## DISASSEMBLE

1. Press the tail of the cushion and pull the seat hook at the same time.
2. Lift up the back of the cushion and pull the cushion back.


## ASSEMBLE

Follow the reverse sequence and reverse direction of the disassembly. After installation, pay attention to checking whether the cushion is installed in place and stable. (Note: The front hook of the seat cushion must be installed in the limit of the frame, and the limiting column of the seat cushion must be installed in the limit of the frame installation).

## 2.3.4 Front guard assmebly

**Disassembly**

1. Remove the installation bolts of the front guard assembly in turn.

2. Remove the front guard assembly.

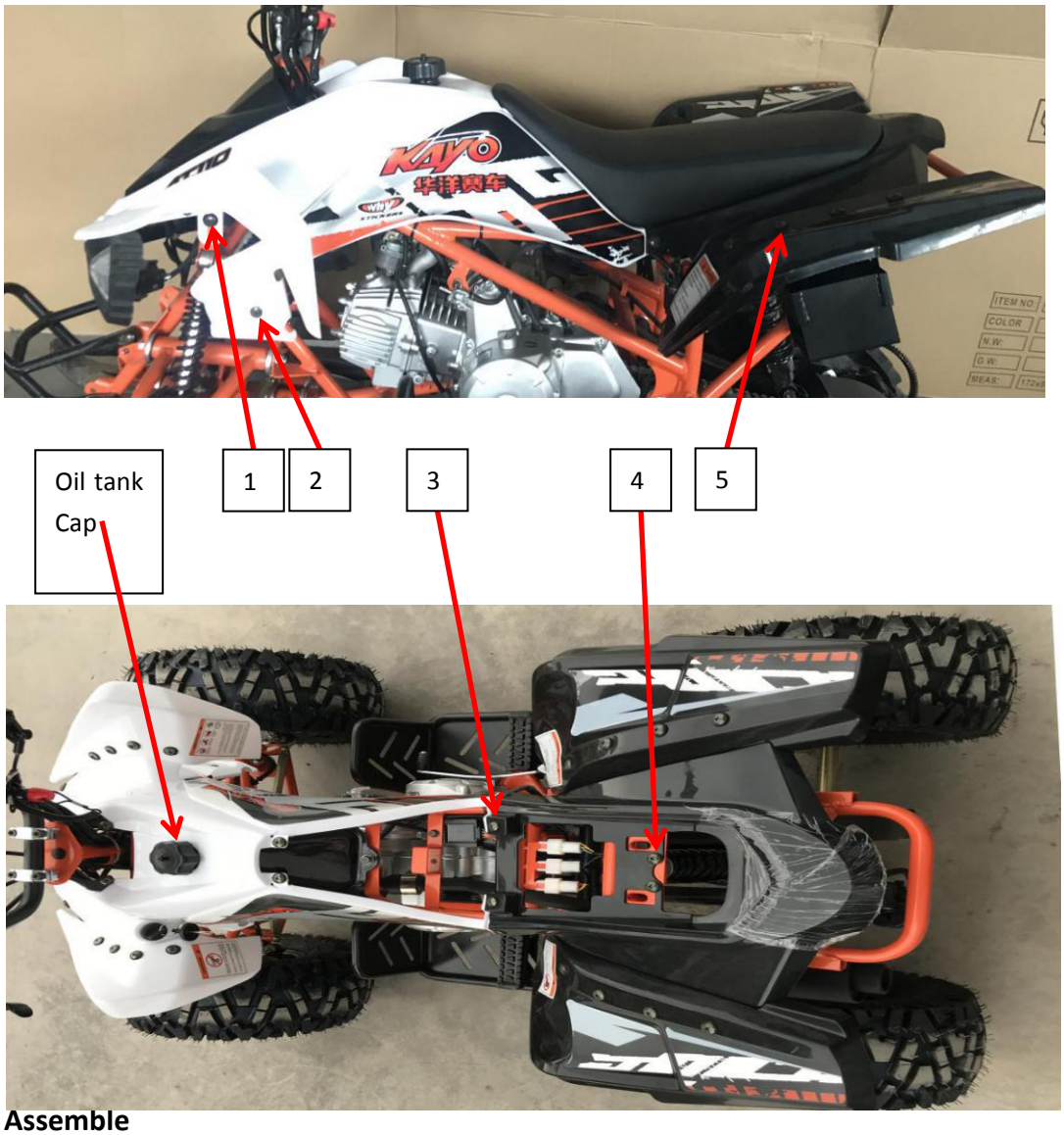

**Assembly**

Installation is done in reverse order.
(Note: If bolts and nuts are damaged, please replace new parts of the same specification in time.)

## 2.3.5 Vehicle plastic parts

### Disassemble

Disconnect the electric lock plug, the neutral indicator lamp plug, the reverse indicator lamp plug, the left and right headlight plug.
Remove the fixed bolts 1/2, 3/4, 5/6, 7/8, 9/10 in turn. Note (2/4/6/8/10 on the other side of the vehicle)
Unscrew the oil tank cover and remove the whole vehicle plastic parts. (Note: During the maintenance process, the handle bar must be removed first when dismantling the vehicle plastic parts.)




### Assemble

Installation is done in reverse order.
(Note: If bolts and nuts are damaged, please replace new parts of the same specification in time.
After installation, check the headlamp connector, the electric lock connector, the reverse indicator connector, the neutral indicator connector and so on to prevent loosening and misconnection.)

## 2.3.6 Front & Rear Fender

**Dismantling of Left & right front fender**

1. Remove the mounting bolts of the left fender in turn.
2. Remove the left front fenders.

**Assemble**

Installation is done in reverse order.
(Note: If bolts, nuts and rubber pads are damaged, please replace new parts of the same specification in time.)
Assemble & disassemble of the front right fender is same with front left fender.

**Dismantling of left & right rear fender**

1. Remove the mounting bolts of the left fender in turn.
2. Remove the left rear fenders.

**Install** Installation is done in reverse order.

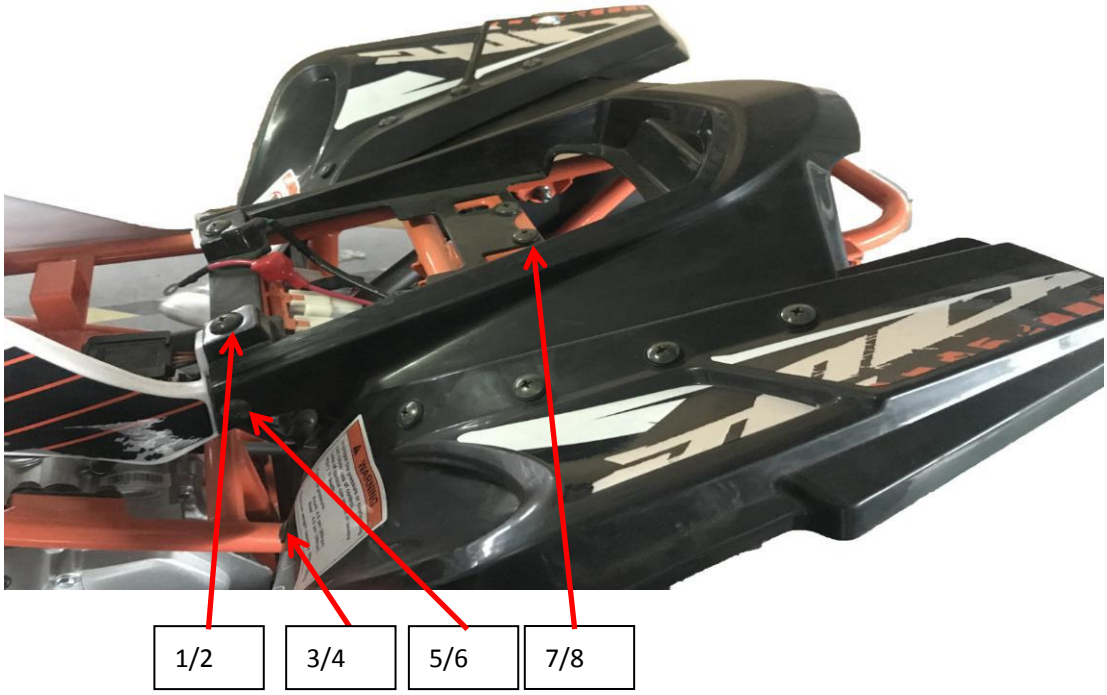
(Note: If bolts, nuts and rubber pads are damaged, please replace new parts of the same specification in time.)
Dismantling & Installation of the right rear fender are same with the left rear fender.

## 2.3.7 Rear Vehicle Body

### Disassemble

(Remove rear body, left & right rear fenders)

1. Remove the rear body mounting bolt 1/2,3/4,5/6,7/8, (the mounting bolts are symmetrical on the vehicle body).
2. Remove the vehicle body.




### Assemble

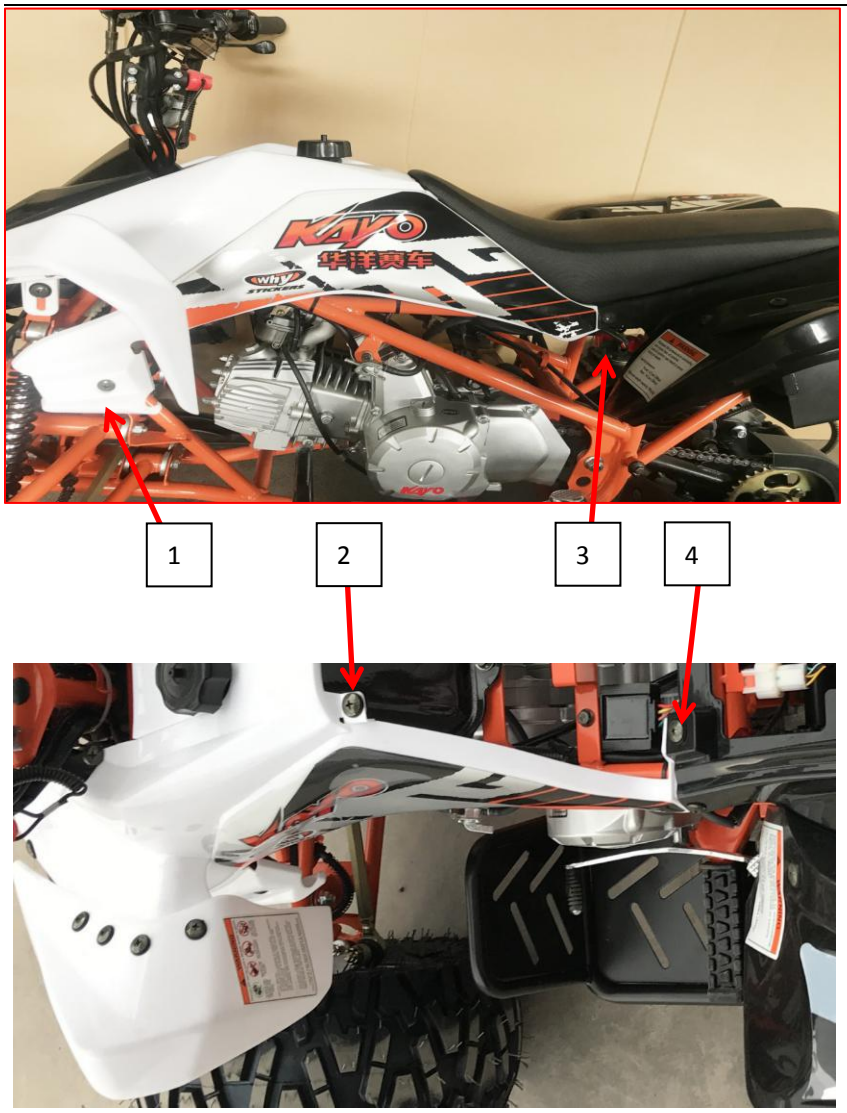
Installation is done in reverse order.
(Note: If bolts, nuts and rubber pads are damaged, please replace new parts of the same specification in time.)

## 2.3.8 Left & Right Guard Plate

**Disassemble of the left guard plate**

1. Remove the mounting bolts 1, 2, 3 and 4 of the left guard plate.

Push the left guard plate according to the direction showed on the picture, loosen the buckle on the plastic part, and remove the left guard plate.




## Assemble

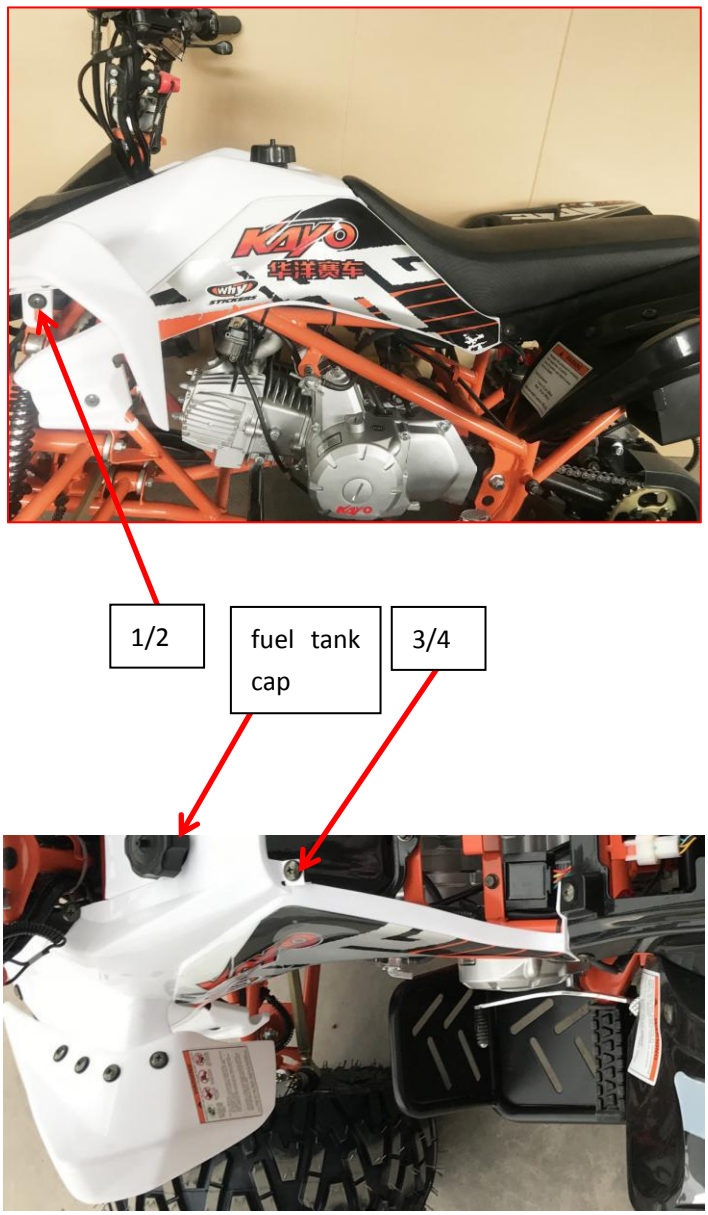
Installation is done in reverse order.
(Note: If bolts, nuts and rubber pads are damaged, please replace new parts of the same specification in time.)

Dismantling of the right guard plate are same with the left guard plate.

## 2.3.9 Front Vehicle Body

## Disassemble

(Note: Dismantling the handle bar when removing the vehicle body)
1. Remove the front body mounting bolts 1/2, 3/4 and unscrew the oil tank cap.
2. Release the electric lock plug, front and left headlight connector and take out the front vehicle body.




## Assemble

**According to the reverse order of disassembly.**

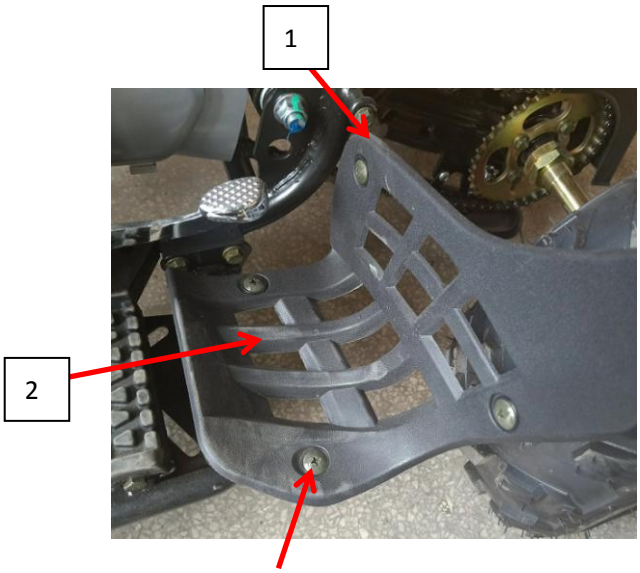
(Note: 1 If the bolts, nuts and rubber flat washer are damaged, please replace the new parts of the same specification in time.

2. Inspect headlamp connector, electric lock connector, reverse indicator connector and neutral indicator connector after installation to prevent loosening and misconnection.

## 2.3.10 Left & right footrest plastic parts

**Disassembly of left plastic parts**

1. Remove the plastic mounting bolts 1, 2 and 3.
2. Remove the left plastic parts




## Assemble

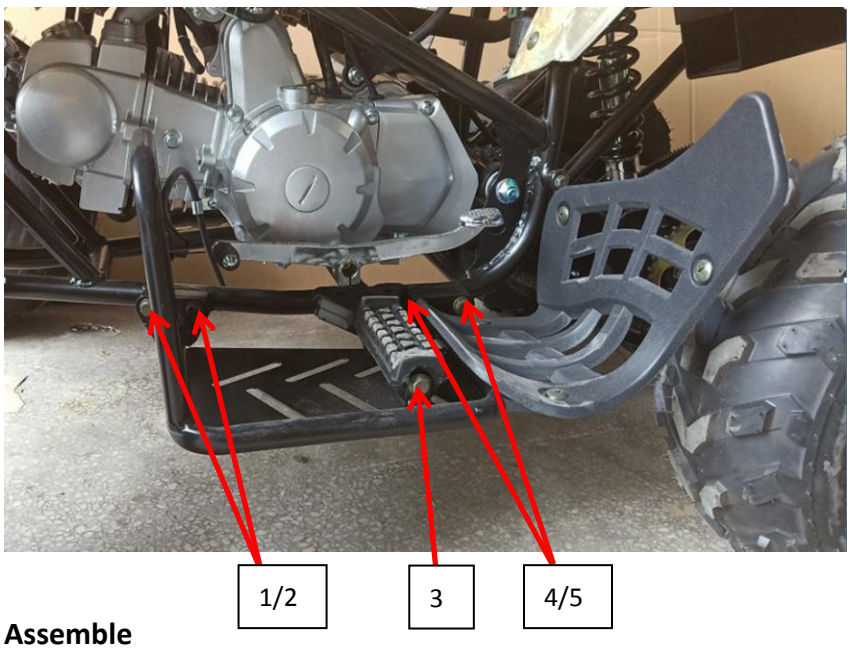
According to the reverse order of disassembly.
(Note: If bolts, nuts and rubber flat washer are damaged, please replace new parts of the same specification in time.)
The right plastic part is same with the left plastic part when dismantled .

## 2.3.11 Right & Left pedal

**Disassemble of left pedal**

1. Remove the mounting bolts 1, 2, 3, 4 and 5 of the pedal.

Go down the left foot pedal.




**Assemble**

According to the reverse order of disassembly.

(Note: when the bolts are damaged, please replace the new parts of the same specification in time.

## 3. Regular inspection and adjustment

3.1 Maintenance information

3.2 Set maintenance period

3.3 Inspection and maintenance method

3.4 Steering column and brake system

3.5 Wheel

3.6 Suspension system

3.7 Gear shift & fuel devices

3.8 Throttle checking

3.9 Vehicle Light device

3.10 Shock absorber slection

## 3.1 Maintenance Information

## Operation Notes

- As the exhaust gas contains toxic components such as carbon monoxide (CO), please do not run the engine for a long time in closed or poorly ventilated places.
- When the engine has just stopped, the temperature of the muffler and the engine is still very high, and when it touches the skin, it will cause burns. If the engine must be repaired when it has just stopped, long-sleeved overalls and gloves must be worn for operation.
- Gasoline is very easy to cause fire, and fireworks are strictly prohibited in the workplace. We should not only pay attention to open fires, but also pay special attention to electrical sparks. In addition, due to the risk of explosion of the vaporized gasoline, the operation should be carried out in a well ventilated area.
- Be careful not to allow drivers and other rotary parts to clip their hands and clothes.

**Be careful**

**Vehicles must be placed in a flat and stable place.**

**3.2 Set maintenance period**

Engine maintenance is a regular periodic work. It is very important to maintain the engine at a certain time interval. Normative maintenance can ensure excellent engine performance, reliable

operation and economic durability. Here is the maintenance periodic table of A125 engine.

**Note:** The following table is designed according to the normal working condition. Under bad conditions, the maintenance cycle of the engine should be shortened accordingly.

| A：Adjustment<br>C：Clean<br>I：Inspection<br>L：Lubrication R<br>：Replace | 10hours or 300km<br>20hours or 750km<br>Each 50 hours or 1500km<br>Each 100 hours or 3000km or 1 year<br>200 hours or 6000km or 2 year | | | | | Remarks |
|---|---|---|---|---|---|---|
| Engine | | | | | | |
| Lubricating oil filter | | R | | R | | |
| Valve adjustment | | I，A | | I，A | | |
| Engine tightness | I | | | I | | |
| Engine suspension | I | | | I | | |
| Air cleaner | | C | R | | | |
| Spark plug | | I | | I | R | |
| Fuel system | | | | | | |
| Carburetor | I | | | I，L | | |
| Driving wheel and driven wheel | | | | I，C | | |
| Clutch | | | | I | | |

| **Inspection and maintenance items** | | | **Period of maintenance** | | | **Judging Standard** |
|---|---|---|---|---|---|---|
| **Maintenance Parts** | | **Inspection Item** | **Daily** | **Half year** | **Year** | |
| Steering Device | Handle Bar | Operation Flexibility | o | | | |
| | Steering System | Damage | o | | | |
| | | Installation conditions | o | | | |
| | | Shaking of Ball pin | o | | | |
| Brake Device | Brake handlebar | Brake stroke | o | o | | |
| | | Brake effect | o | o | | |
| | Connecting rod and tubing | Loosening and damage | o | | o | |
| | Hydraulic brake and brake disc | Brake Fluid Volume | o | o | | Brake fluid should be at the lower limit. |
| | | Wear and damage of brake discs | o | o | | Working disc thickness of brake disc at present When the disc is less than 3mm, it should be replaced in time. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Brake disc | Wear and damage of brake pads | o | o | | The minimum brake pad (friction plate) thickness≥1.5mm; when less than 1.5mm, please replace it. |
| Running Device | Vehicle Wheels | Tire Pressure | o | o | | Front Tyre 45kPa（0.45kgf/ cm2） (4.0PSI) Rear Tyre： 45kPa（0.45kgf/cm 2） (4.0PSI) |
| | | Tyre cracking and damage | o | o | o | |
| | | Tire groove depth and abnormal wear | o | | o | If there is no appearance on the tire surface |
| | | Loosening of wheel nuts and wheel shafts | o | o | | |
| | | Sway of front wheelbearings | o | | o | |
| | | Sway of rear wheel bearings | o | | o | |
| Shock Device | suspension arm | Rocking of connecting part and damage of rocker arm | o | | o | |
| | shock absorber | Oil-leaking & damage | o | | o | |
| | | Function | | | o | |
| Transmission Device | chain | Transmission, lubrication and tightness | o | | o | Chain swinging up and down >20mm |
| | Flywheel,Rear sprocket | Transmission, lubrication and tightness of fastening bolts | o | | o | If the sprocket and chain are seriously worn, please replace the new parts in time. |
| Electrical Device | Ignition device | Spark plug condition | | o | | |
| | | Ignition period | | o | | |
| | Battery | Terminal connection status | | | o | |
| | Electric circuit | Loosening and damage at joints | | | o | |
| Fuel System | | Fuel leaking | | o | | |
| | | Throttle Condition | | | o | Throttle turn handle with clearance 3~5mm |
| Light & Indicators | | Function | o | o | | |
| Exhaust Pipe & Muffler | | loose or damage during Installation | | | o | |
| | | Perfomance of the Muffler | | | o | |
| Vehicle Frame | | loose or damage | | | o | |
| Others | | Grease status of various parts of frame | | | o | |
| Abnormal part that can be identified in operation | | Confirm whether the relevant part is abnormal. | o | | | |

## 3.4 Steering stem, brake system

Stop the vihicle in a horizontal position and shake it as the direction shown in the picture to check if there is any shaking.

If you feel the shaking, check if the steering stem is shaking or other components are shaking and then make the corresponding maintenance.
If the steering stem is shaking, increase the locking force of the lock nut of steering stem or disassemble it for repair.
Stop the car in a horizontal position and slowly turn the steering stem to the left and then right to confirm whether the rotation is flexible.

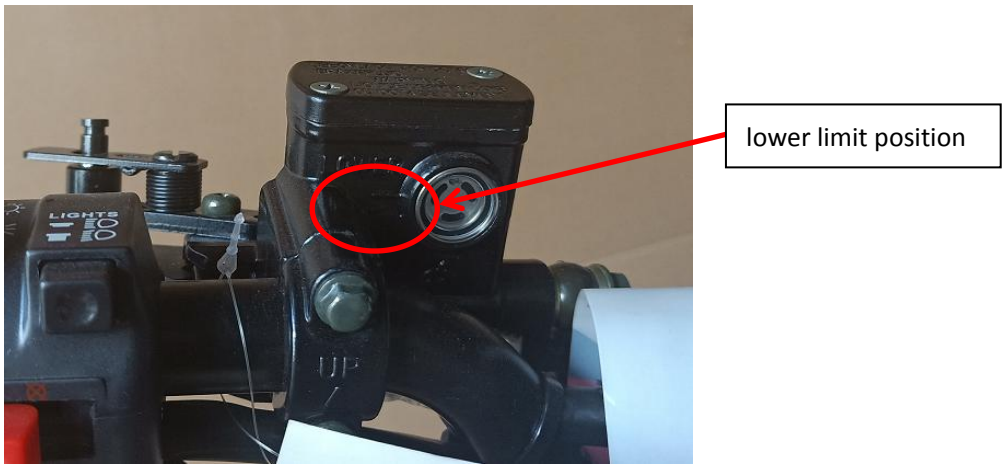
If there is any obstruction in some places, check the main cable, other cables, brake hose, etc.. If there isn't any problem, check if the powder metallurgy spacer which is at the end of the steering stem is stuck.

Note: It must be confirmed that the steering stem is flexible, otherwise the handle will cause an accident due to the inability to control the direction.

The clearance of the front and rear brake handles: Test the front and rear brake handles to check the braking effect. Clearance range of brake handle is 5-10mm.

**Brake pump combination**

Check the amount of brake fluid. When the volume of brake fluid reduced to the lower limit position(LOWER), the vehicle cannot be used. Check the brake pump, brake pipe and joints for leaking. If there is no abnormality, open the upper cover of the brake handle to fill the DOT4 brake fluid above the lower limit position.




Note:

Do not mix dust and water when fill the brake fluid;

To prevent chemical changes, use the brake fluid which is specified number;

Brake fluid will damage the surface of plastic and rubber parts. Please do not splash it on such parts.

Wear of brake discs and brake frection plates(hoof blocks)

It is normal for the brake frection plates (hoof blocks) and brake discs to wear during the use of vehicle.

Inspection and replacement of Brake disc

Check the surface of sliding friction of the brake disc for wear, smashing, bumping, scratching or straining. And replace it in time.

When the thickness of the brake disc is less than 3mm, please replace it in time.

Inspection and replacement of brake frection plates (hoof blocks)

Check the maximum thickness of the brake frection plates (hoof block). If the thickness is less than 1.5mm, please replace it in time.

Check the brake friction plate (hoof block) for damage or cracks. And replace it in time.

Note:

Friction plate (hoof blocks) must be replaced in set.

### 3.5 Wheel

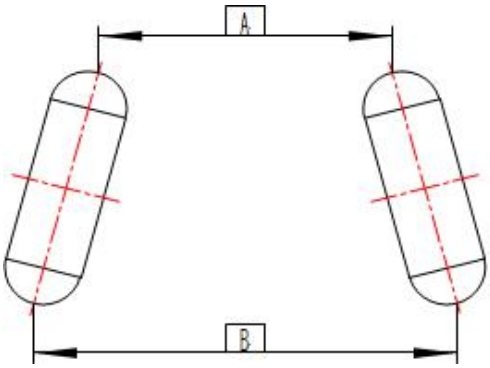
Lift the front wheel with the tool in the horizontal position, make sure that the bodyof vehicle has no force on the wheel, shake the front wheel from side to side, and check whether the connection of the front wheel is firm. Check if the front wheels shakes, if there is any shakes,please

Check the tightening bolts on the rocker arm, axle, and rim. If there is still shaking, check the rocker shaft bushing, the ball cap and replace them.

Front bundle of the wheel

Stop the vehicle in a horizontal position and measure the size of front bundle of the wheel.

The front of the wheel relative to the direction of driving of the vehicle is A, the rear of the wheel is B, and the size of front bundle is B-A=4~10mm



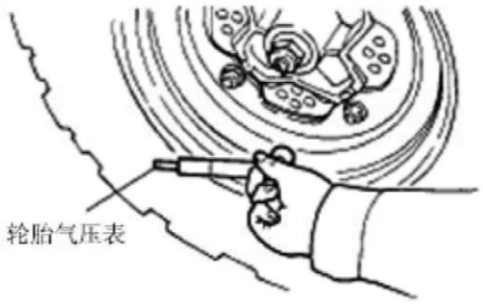

When the front bundle of vehicle is not in this range, adjust the steering stem and the front bundle to 4~10mm then lock.

Note: When the size of front bundle of the vehicle is adjusted, drive the vehicle slowly and make sure that the handlebar can correctly restrict the driving direction of the vehicle.

Pressure of wheel

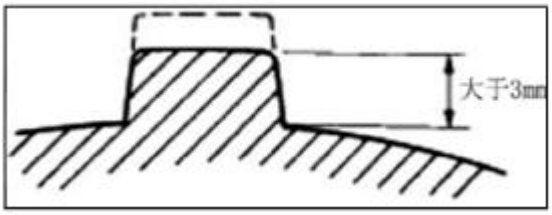
Use a gauge of tire pressure to check the air pressure. (The normal range of tire pressure is 4~6PSI)

Note: The check of tire pressure should be carried out under the condition which the tire is cooled. If the vehicle is driving in a state which the tire air pressure is not suitable, the operation and driving feel will be deteriorated, also will cause adverse effects such as eccentric wear of the tire.




Pattern of tire

Check the pattern of the tire. If the height is less than 3mm, please replace the new tire in time.




The inspection of rear wheel is the same as the front wheel.

**3.6 Suspension system**

Stop the vehicle in a horizontal position and press the vehicle several times according to position of the picture. If there is any shakes or abnormal noise, check the shock absorber for oil leakage, and whether the fastening parts are damaged or loose.

### 3.7 Gear shift &Fuel device

Change the gear position and check whether the gear shift is flexible and comfortable. If the gear shift is not comfortable, the angle of shift lever can be adjusted appropriately.


### Fuel device

When checking the fuel system, the plastic parts need to be removed from the vehicle.

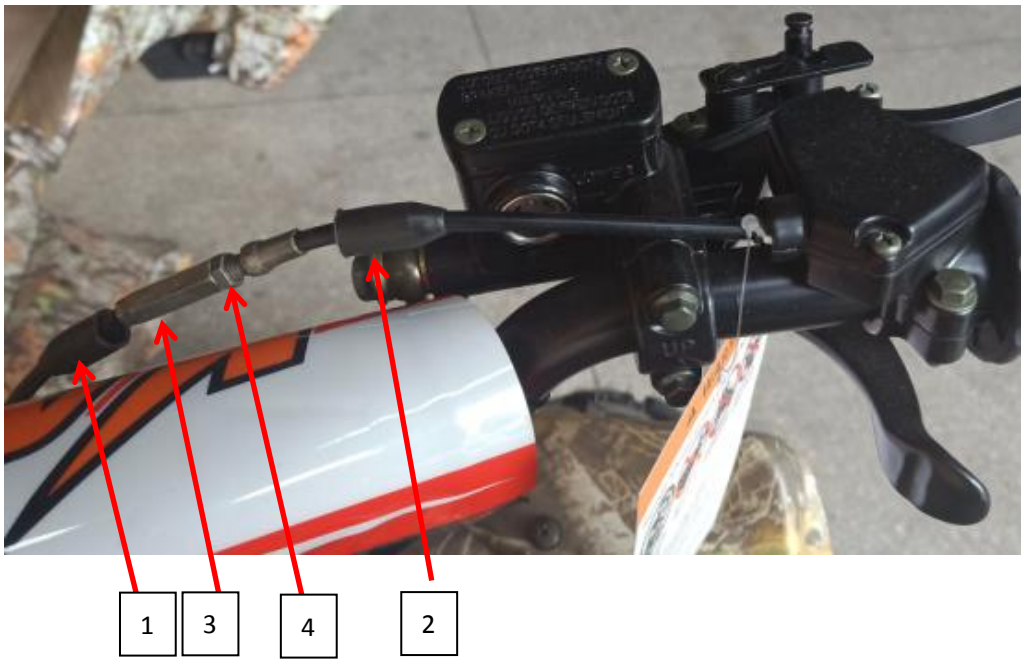
Check if the fuel pipe is aging or damaged. When the fuel pipe is aging or damaged, it should be replaced immediately. Check the vent pipe of fuel tank for cracks, bends, deformation, and replace it with new one if it is damaged.

### 3.8 Check of Throttle

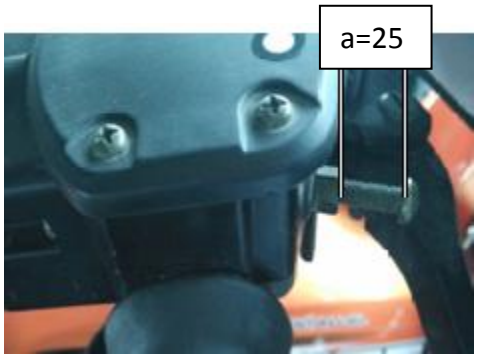
Check the normal flexible moving of throttle button. Press the throttle several times as the direction shown to check the flexible degree of the throttle. in normal circumstances, the throttle has no stuck phenomenon.

The throttle clearance is 3~5mm.

Adjustment the clearance when the throttle clearance is not within the specified range.



Remove the protective kit 1&2, turn the adjuster 3, and adjust the throttle to the normal flexible moving. Then adjust the rear tightening nut 4 and put on the protective kit 1&2.
If it does not reach the specified clearance or the operation is still not flexible after the adjustment , replace a new throttle line.
Adjustment of speed limit device (the model of EPA requires is unadjustable here)
The speed limit device is used to limit the opening angle of the throttle , to realize the speed limitation of the vehicle.
Check the limit length of the speed limit thread, the thread length a = 25mm.
Adjustment method: loosen the lock nut and adjust with a screwdriver.



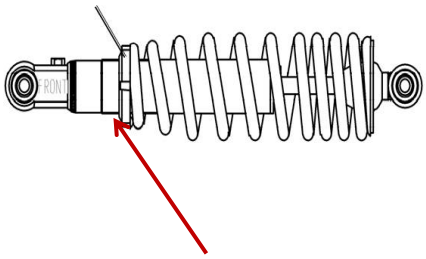

Note: For beginners, the speed limit device should be tightened. After the technology reaches a certain level, the speed limit device can be used to adjust the throttle opening angle. In addition, 25mm is the limit length of the speed limit thread. The EPA model must limit the adjust of throttle. After the factory adjusts it, the bolt is broken and changed to an unadjustable state.

**Option of front and rear shock absorbers**

The front shock absorber is unadjustable.
The rear shock absorber of the vehicle is in five-speed adjustable state, and the factory defaults to the third gear position when it leaves the factory. It can be adjusted according to the needs of customers.
Adjustment method:

1. Adjust with a wrench of shock absorber ( shape of crescent )
2. As shown in the picture below, adjust to left to make the shock absorber softer, and to right to make the shock absorber harder.

adjustment wrench of shock absorber



Place for adjusting the soft and hard of shock absorber

## 4 Engine periphery

4.1 Maintenance
4.2 Fuel System
4.5 Disassembly and installation of engine
4.3 Intake system
4.4 Exhaust system

4.1 Maintenance

Precautions

When repairing, please ensure that the vehicle is turned off and left for no less than 1 hour. Make sure the heating parts are cooled before the maintenance to avoid injury to the maintenance personnel.

• Be careful not to damage the frame, engine body, bolts, and cables during operation.

·When the engine is disassembled, the frame must be protected well with package.

·When the engine is removed, in order to protect the environment, using the corresponding container to fill with engine oil and fuel oil. When installing, the engine oil should be replenished as required.

• The following operations may not remove the engine from the vehicle:

-Oil pump

- Carburetor, air filter

-Cylinder head cover, starter motor, cylinder cover, cylinder body, camshaft

-Left-side cover, AC magneto

- Piston, piston ring, piston pin

• The following operations require the engine to be removed from the vehicle:

- crankshaft, box, main and auxiliary shaft

Tightening torque

See chapter1.5 Fastener tightening torque

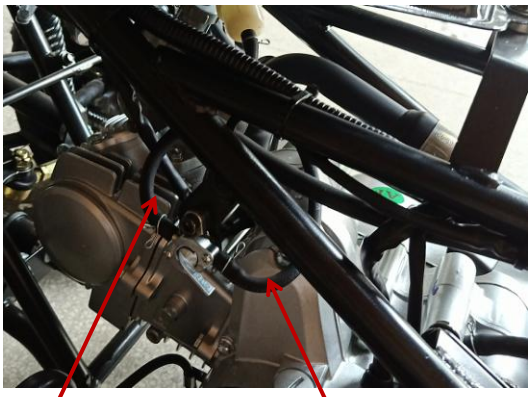
4.2 Fuel System

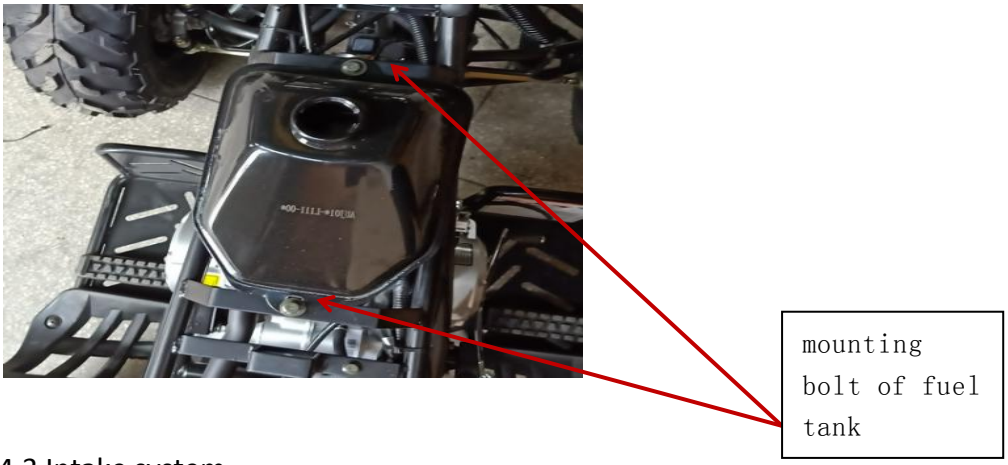
Note

Gasoline is very easy to catch fire, so fire and smoking are strictly prohibited in the workplace. Not only paying attention to the fire, but also high attention to electric sparks. In addition to the danger of explosion after the gasoline evaporates, so work should be carried out in a well ventilated area.

Disassembly

Remove the plastic parts of the vehicle, loosen the oil pipe 1 at the oil switch, remove the bolt 2 in the oil switch , remove the oil switch, remove the mounting bolt of fuel tank , and then remove the fuel tank.




4.3 Intake system

Disassembly

Loosen the air filter clamp, loosen the exhaust pipe, and remove the air filter.

air filter clamp

Installation

In reverse order of disassembly. The oil pipe needs to be inserted into the joint head, and the clamp must be installed in the groove of the tube joint.

Installation

In the reverse order of disassembly. The exhaust pipe needs to be inserted into the joint head, and the clamp must be installed in the groove of the tube joint.

4.4 Exhaust system

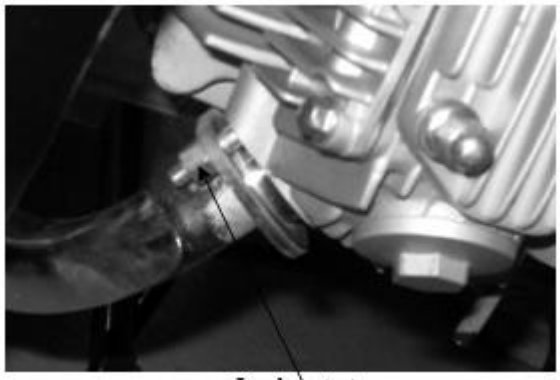
Disassembly

Loosen the connection clamp of the muffler and exhaust pipe, remove the mounting bolt of muffler, and then remove the muffler.

clamp

Mounting bolt

Remove the self-lock nut 3 which is connected to the exhaust pipe and the exhaust vent of the engine, and then remove the exhaust pipe.




Installation

In the reverse order of disassembly, pay attention to check the seal 4 of the exhaust pipe and the graphite sleeve 5 which is installed in the muffler during the operation, and replace with the new ones when they are broken. If the self-lock nut is damaged, replace it with a new one immediately.

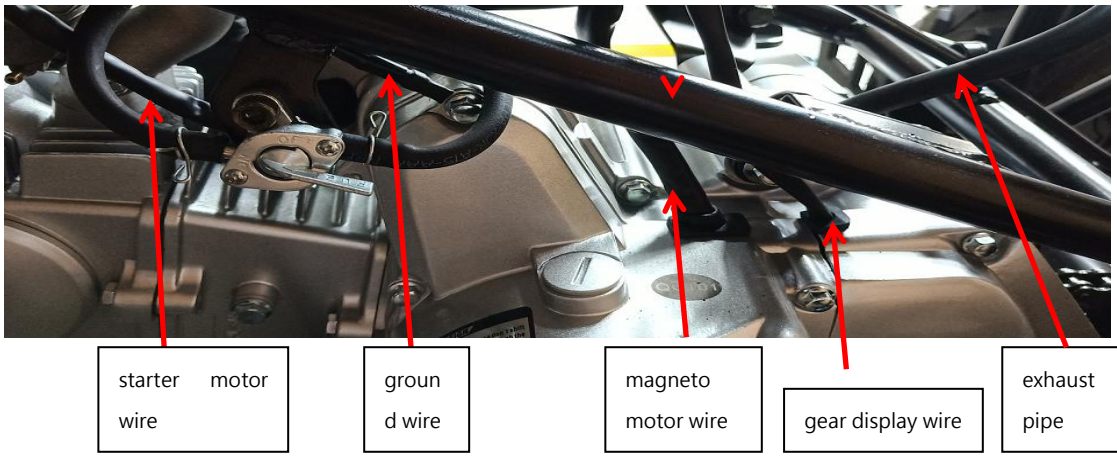
4.5 Disassembly and installation of engine

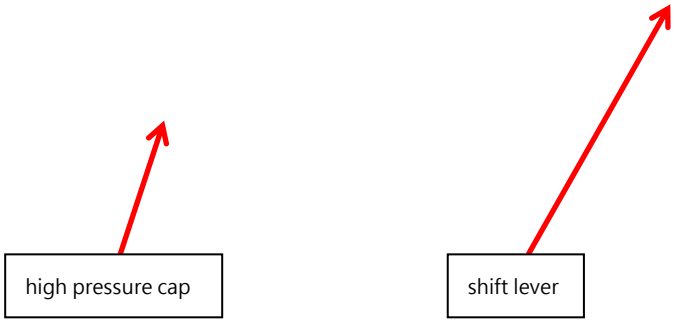
Disassembly

Note: The foot pedal must be removed first,then remove the engine from the frame.

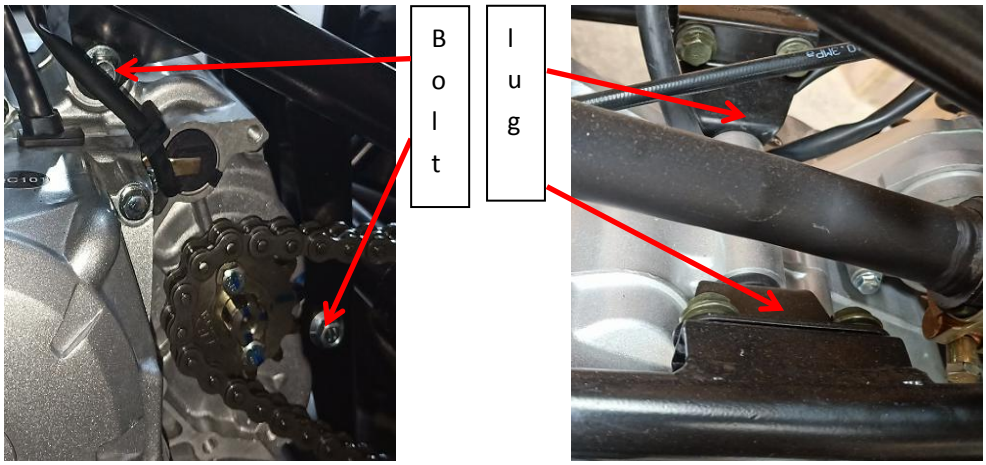
1. Remove the side-cover 1 of engine first, then remove the chain.

2.Remove the ground wire, gear display wire, magneto motor wire, starter motor wire, exhaust pipe ,high pressure cap, shift lever from the connection of engine.




3.Remove the bolt of upper power and then remove the lifting lug, bolt of rear power, bolt from bottom of the engine.




4.Remove the engine from the right side of the vehicle.

Installation

In reverse order of disassembly

## 5 Engine

### 5.1 Maintenance

Unit conversion table in this book

| item | Unit conversion |
|---|---|
| pressure | 1kgf/cm$^2$=98.0665kPa 1kPa=1000Pa<br>1mmHg=133.322Pa=0.133322kPa |
| torque | 1kgf·m=9.80665N·m |
| volume | 1mL=1cm$^3$=1cc<br>1L=1000cm$^3$ |

| | |
|---|---|
| torque | 1kgf=9.80665N |

## Warning

Please read the following explanation carefully, which emphasizes the specific meaning of the words “dangerous”, “warning” and “attention”, and pay special attention to the meaning of them when repair the engine.

Danger: Be wary of high risk
Warning: Be wary of middle risk
Note: Be wary of low risk

However, please note that the “Danger” and “Warning” which in this Service Manual are unlikely to cover all potential hazards during engine use and maintenance. Therefore, in addition to the relevant provisions of “Danger” and “Warning”, maintenance personnel must also have basic mechanical safety knowledge. If you are not sure of operating the entire maintenance process, please consult a more experienced senior technician.

General precautions

Warning: The correct maintenance process is very important for the safety of the maintenance personnel and the reliability and safety of the engine.

.When two or more people work together, they should pay attention to each other.

·When starting the engine indoors, make sure that the exhaust gas is discharged to the outside.

·when using poisonous or flammable materials in the work, must strictly follow the manufacturer's instructions and ensure that the workplace is well ventilated.

·Do not use gasoline as a cleaning liquid.

·To avoid burns, do not touch uncooled engine oil or exhaust system components

· If the systems of fuel oil, lubrication, and exhaust are repaired, they must be inspected for reticle and leakage.

·To protect the natural environment, do not dispose the unused parts.

• If you need to replace parts during maintenance, you must use genuine parts or recommended products provided by KAYO.

·Disassembled parts, which need to be reused, keep them in order, so that the assembly is not messy.

· Ensure the use of special tools as specified in the service manual

· Ensure that the components used in the assembly are clean, and the areas that require lubrication must be lubricated.

·Use the specified lubricants, adhesives and sealants

When tightening the bolts, screws, and nuts, first tighten the large size. Tightening from the inside to the outside according to the specified.

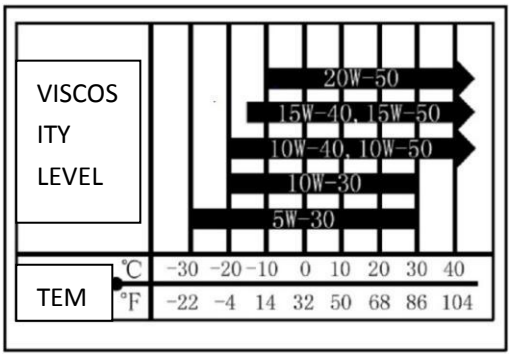
Torque fastening

Use a torque wrench to tighten the bolts according to the requirements, if there is grease and engine oil in the threads.

## 5.2 Introduce of fuel oil and engine oil

Fuel oil: use gasoline with 93# or above

Engine oil: SAE15W-40 engine oil for 4-stroke motorcycle, quality grade is SG grade or above according to API classification, if there is no SAE15W-40 engine oil, according to the ambient temperature of the engine, Select the right oil as shown on the right.




**Warning: Engine oil must not be mixed with other brands of engine oil**

## 5.3 Engine running-in

The engine has many components for relative movement, such as pistons, piston rings, cylinder blocks, transmission gears, etc. Therefore, in the initial stage of using, it is necessary to carry out standard running-in. The running-in can make the moving parts adapt to each other and correct the working gap,which forms a good smooth friction surface that can withstand large loads, and the engine after

making the running-in could have excellent performance and reliability.

The recommended running-in time is 20 hours and the specifications are as follows:
0 to 10 hours
Avoid continuous operation or continuously change the speed of the vehicle, or operate under a unfixed throttle position when the throttle state≥50%; after 1 hour of operation, let the engine cool for 5 to 10 minutes; avoid the sudden acceleration, the throttle change should be slowly.

10 to 20 hours
Avoid opeartion for longer periods when the throttle state is more than3/4, Do not use the full throttle state.

## Code place of engine


Displacement indicator of engine

## Maintain of engine

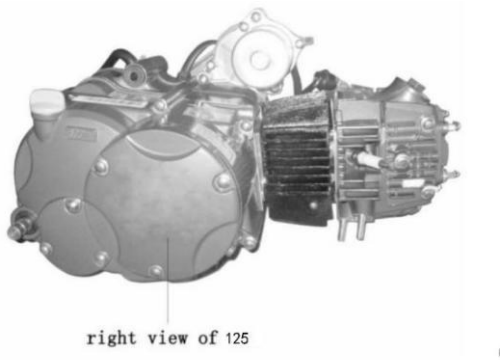
### Maintain

| maintain times | Odometer reading | | | |
|---|---|---|---|---|
| | 1000km | 4000km | 8000km | 12000km |
| Fuel system | Clean | Clean | Clean | Clean |
| Oil filter | Clean | Clean | Clean | Clean |
| Control | Adjust | Adjust, clean | Adjust, clean | Adjust, clean |
| Carburetor | Clean | Clean | Clean | Clean |
| Air cleaner | Clean | Clean | Clean | Clean |
| Spark plug gap | Adjust | Adjust, clean | Adjust, clean | Adjust, clean |
| Valve clearance | Adjust | Adjust | Adjust | Adjust |
| Engine lubrication | Replace | Replace once per 2000km | | |
| Filter media | Clean | Clean | Clean | Clean |
| Timing chain | Check | Adjust | Adjust | Adjust |
| Carburetor idle speed | Adjust | Adjust | Adjust | Adjust |
| Drive chain | Adjust and lubricate per 5000km | | | |
| Battery | Charge | Charge | Charge | Charge |
| Brake disc | Check | Adjust | Adjust | Replace |
| Brake system | Adjust | Adjust | Clean | Clean |
| Brake light switch | Adjust | Adjust | Adjust | Adjust |
| Illuminating system | Check | Check | Adjust | Adjust |
| Clutch | Adjust | Adjust | Adjust | Adjust |
| Shock absorber | Adjust | Adjust | Clean | Clean |
| Nuts/bolts | Tighten | Tighten | Tighten | Tighten |
| Front and rear wheel | Check | Check | Check | Replace |
| Turn handlebar bearing | Check | Adjust | Adjust | Replace |

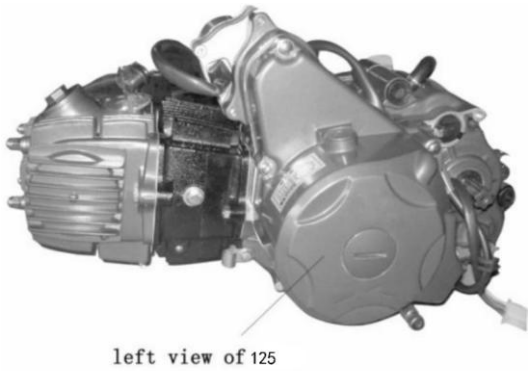
## 5.4 Maintenance of Engine Body

## 5.4.1 Disassemble, assemble and maintain cylinder head

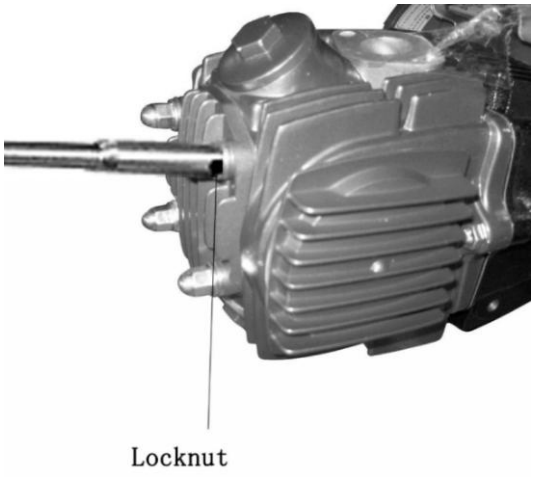
Right view of the 125 engine is shown in the figure.



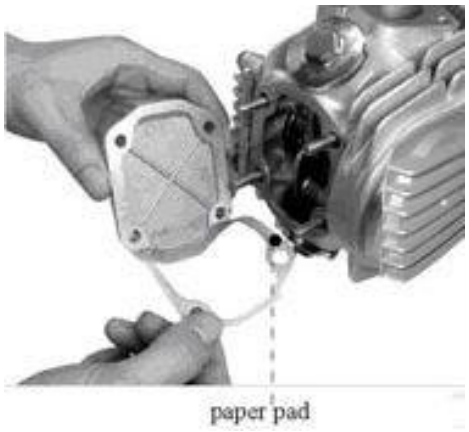

Left view of the 125 engine is shown in the figure



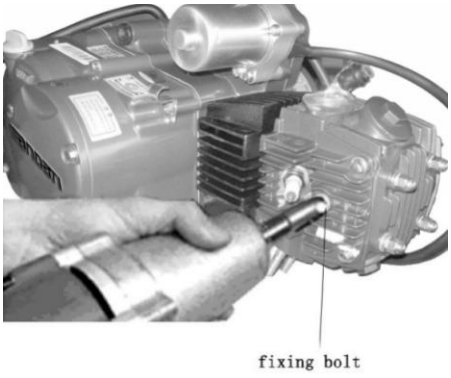

Remove the locknut of cylinder head from its holding place



Remove cylinder head. Check the state of paper pad. Replace if necessary.

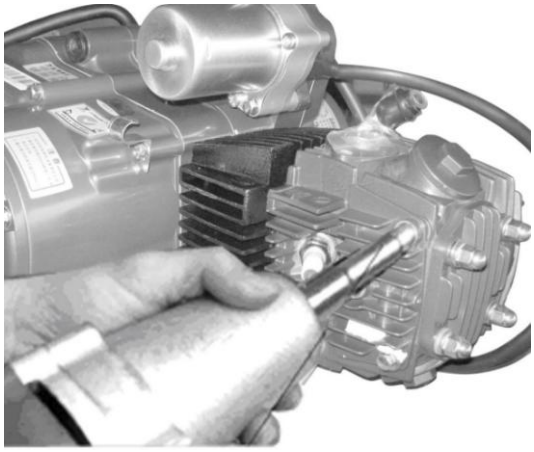



Dismantle the fixing bolt of left cover.

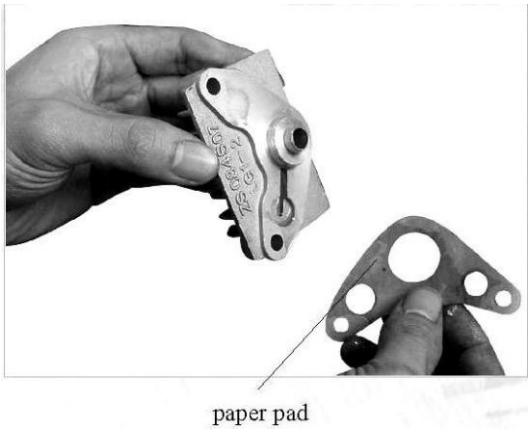



Remove left cover and inspect the paper pad for damage. Replace if necessary.

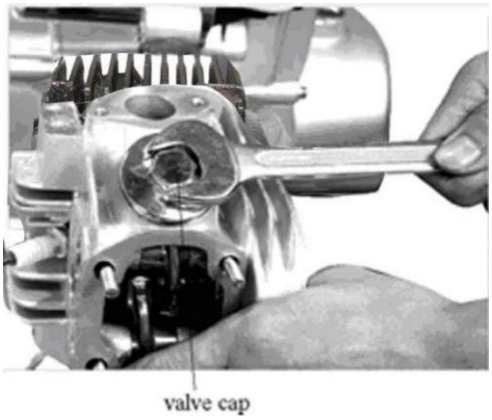
Dismantle the fixing bolt of right cover.



Remove the right cover of cylinder head.
Inspect the gasket for damage and replace if necessary.

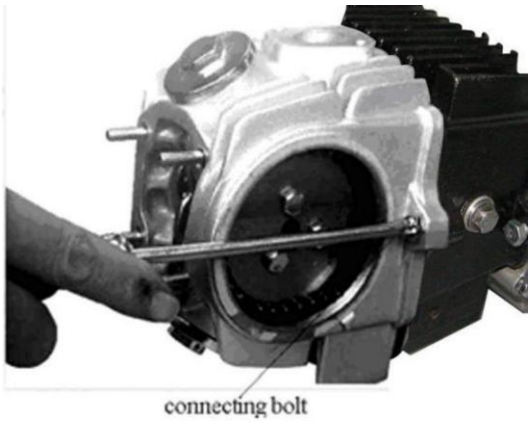



Remove inlet/exhaust valve cap .Check the state of seal ring of valve cap and replace if worn or if reuse is questionable.

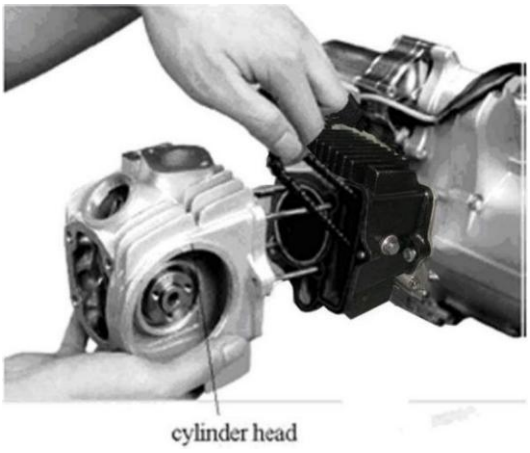


Remove the fixing bolt of timing driven sprocket.

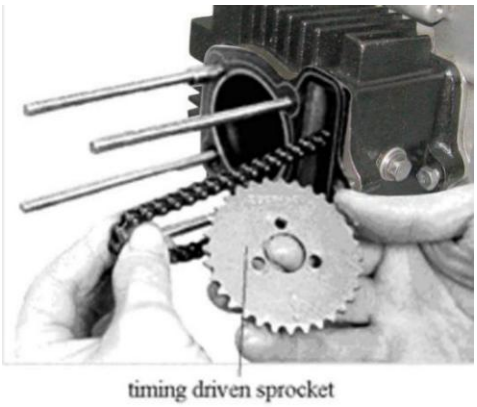

Remove the connecting bolt of cylinder head.




Remove cylinder head assembly.



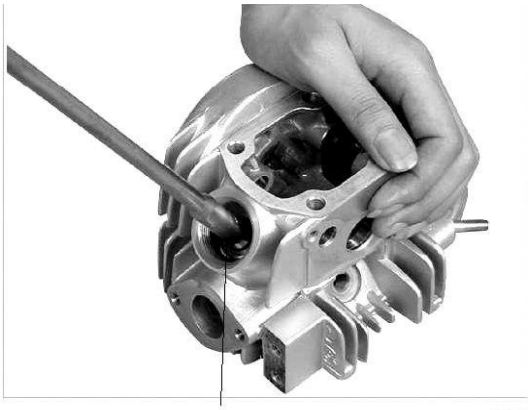
Remove timing driven sprocket. Inspect the timing driven sprocket for wear and damage. Replace if necessary.




Check whether there is excessive carbon deposit in combustion chamber. Clean and replace if necessary.


Remove the cylinder head. Pour gasoline into inlet/exhaust pipe to inspect the seal condition. Grind the valve and valve seat if there is gasoline leak into the combustion chamber.

Remove inlet/exhaust valve spring and check the state. Replace if necessary.




Inspect the oil seal of inlet/exhaust valve for damage. Replace if necessary.


Remove the spark plug to clean the carbon. Deposit and dust .Check the spark plug gap and set it to 0.6 to 0.7 if necessary.

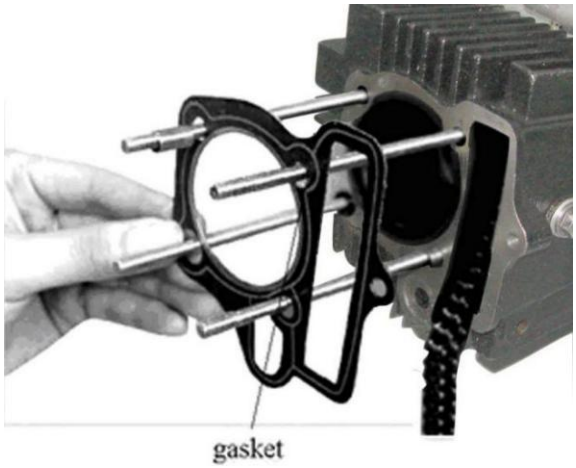
For the troubleshooting of cylinder head ,please refer to the following table

| Description | Damage Form | Problem | Cause | Correction |
|---|---|---|---|---|
| Cylinder head | Too much oil dirt or sand on the cooling fins. | Poor heat radiation of the fins on cylinder head. | The engine overheats. | Remove the oil dirt or sand |
| | Carbon deposit in the combustion chamber | Overheating head | The engine overheats | Remove the carbon deposit |
| | Failure of sparking plug threaded hole | Air leakage between the sparking plug and cylinder head | The engine starts hard or fails to start | Repair the threaded hole or replace the cylinder head |
| | Serious deformation c | Air leakage between the cylinder head and cylinder | The engine starts hard or fails to start. Insufficient engine output ;Engine speed changes during idle run | Grind the cylinder head end surface or replace the cylinder head |
| | There are pits, ablation or pock marks, damages on the working surface of valve seat. | Air leakage between the valve and valve seat due to improper tightness | The engine starts hard or fails to start. Insufficient engine output; engine speed changes during idle run | Repair the valve seat |
| | The inner hole of valve guide is over worn | The fitting clearance between the valve and the valve is too large | Thick blue and white fume form the exhaust muffler pipe | Replace the valve guide |
| | The cylinder gasket is broken | Air leakage between the cylinder head and cylinder | The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run | Replace the cylinder head gasket |

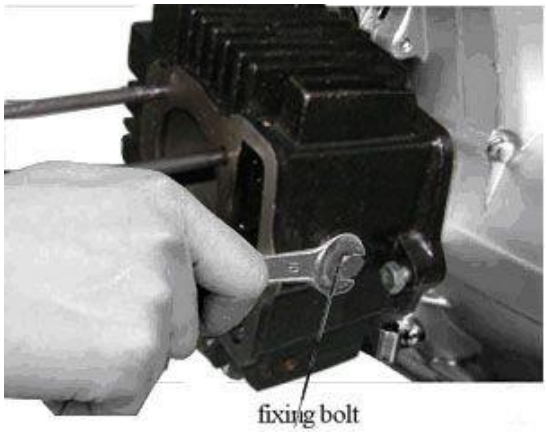
| | | | | |
|---|---|---|---|---|
| | The fixing nut is not properly tightened | Air leakage between the cylinder head and cylinder | The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run | Tighten the fixing nut |
| Spark plug | Improper clearance between electrodes | Weak or no sparking from the spark plug electrodes | Oil leakage between the cylinder and crankcase | Adjust electrode gap to 0.6~0.7mm |
| | The spark plug electrodes are jointed by carbon deposit | No sparking from the spark plug electrodes | The engine starts hard or fails to star | Remove the carbon deposit between the electrodes |
| | Excessive carbon deposit or oil dirt in the spark plug | Weak or no sparking from the spark plug electrodes | The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run | Remove the carbon deposit or oil dirt |
| | The spark plug insulator is damaged | Weak or no sparking from the spark plug electrodes | The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run | Replace with a new spark plug of the same type |
| | The spark plug is not properly tightened | Air leakage between the spark plug and cylinder head | The engine starts hard or fails to start. Engine speed changes during idle run | Tighten the spark plug |

## 5.4.2 Disassemble, assemble and maintain cylinder block

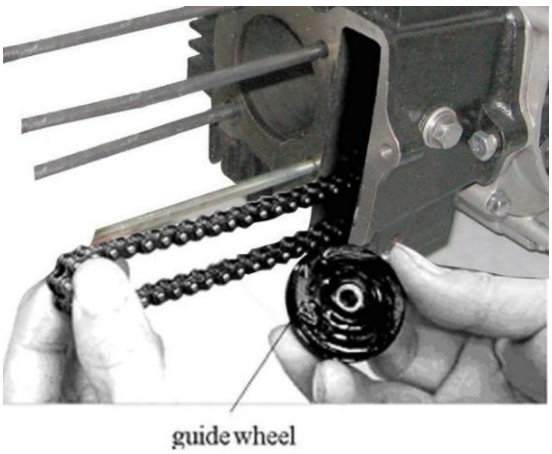
Remove cylinder gasket and dowel pin to check for wear and damage. Replace if necessary.



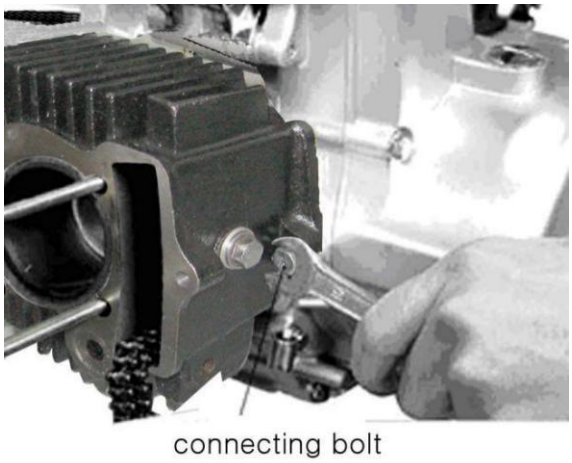

Dismantle the fixing bolt of timing chain of guide wheel.



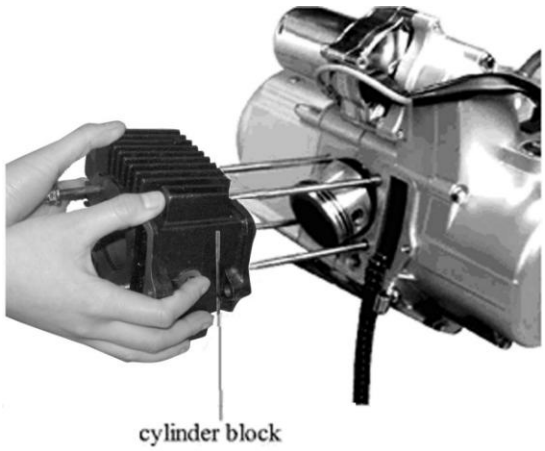

Remove the guide wheel of timing chain to inspect for wear and damage. Replace if necessary.



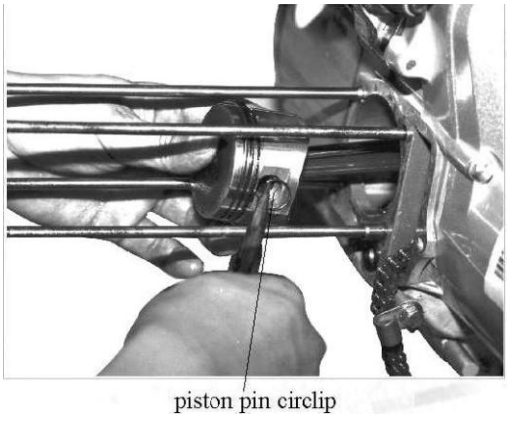

Dismantle connecting bolt of cylinder block.



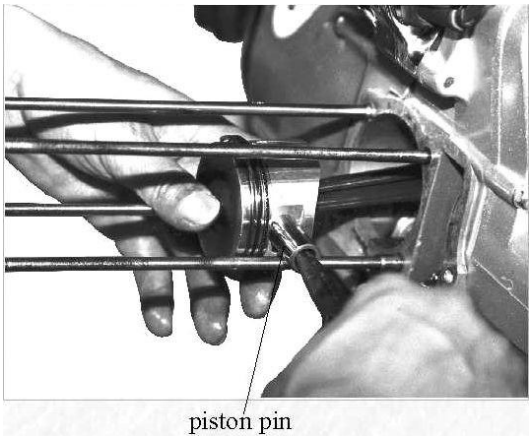

Remove the cylinder block.




Remove the circlip of piston pin.



Remove the piston of piston pin to check whether it is damaged. Replace if necessary.




Inspect the paper pad for worn or damage .Replace if necessary.


Check whether there is residual gasket on cylinder. Clean with gasoline if necessary.

Check the state of cylinder inner wall .Replace if worn or if reuse is questionable.


Check whether the internal diameter has exceed the limit value. Measure the diameter form upper, middle and lower position. The limit value is 50.05mm.Replace the cylinder block if it has beyond this value.

Troubleshooting of the cylinder body, please refer to the following table

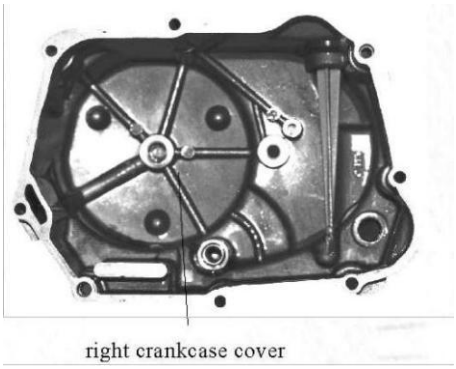
Maintenance of Cylinder Body

| Description | Damage form | Trouble | Cause | Correction |
|---|---|---|---|---|
| Cylinder body | Excessive oil dirt or sand on the radiating fins | Poor heat radiation of the fins on cylinder body | The engine overheats | Remove the oil dirt or sand |
| | Cylinder end surface badly distorted | Air leakage between the cylinder and cylinder head | The engine starts hard or fails to start .Insufficient engine output; poor idle speed and high fuel consumption | Grind the cylinder end surface or replace the cylinder body |
| | The cylinder is badly worn | The fitting clearance between the cylinder and position, position ring is too wide | The engine starts hard or fails to start .Insufficient engine output; Poor engine idle speed. Thick blue and white fume form the exhaust muffler pipe | Repair with boring machine or replace the cylinder body |
| | The cylinder | | Oil leakage between the cylinder and crankcase | Replace the cylinder gasket |

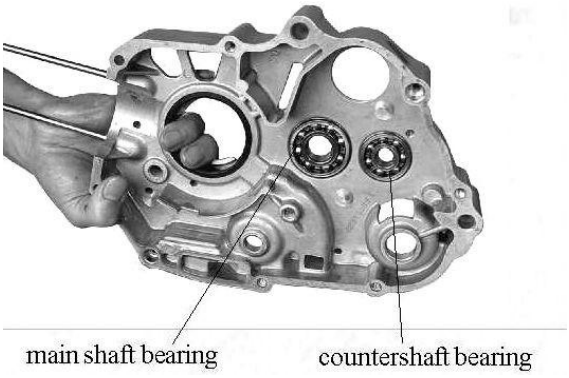
### 5.4.3 Disassemble, assemble and maintain crankcase

Remove the cover of right crankcase half. Check whether the oil seal of starting shaft and seal edge of gearshift lever are worn. Replace if necessary.

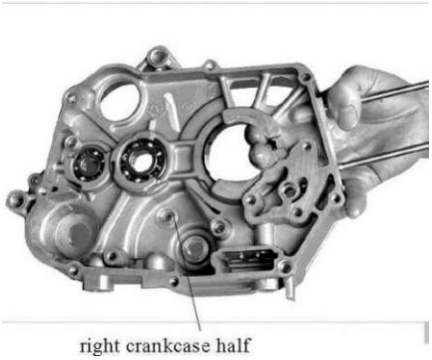

Check the state of right crankcase cover and replace if necessary.



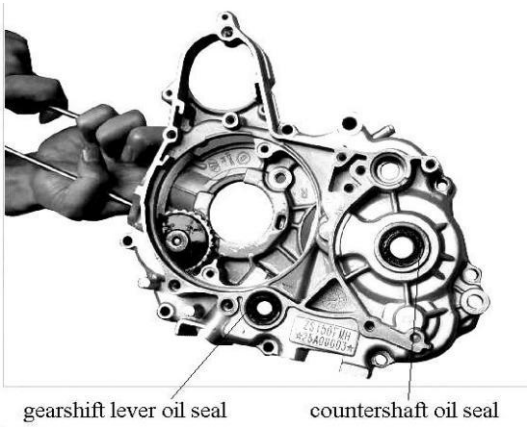

Left view of right crankcase half is shown in fig and check whether bearing of main shaft and countershaft are worn. Replace if necessary.



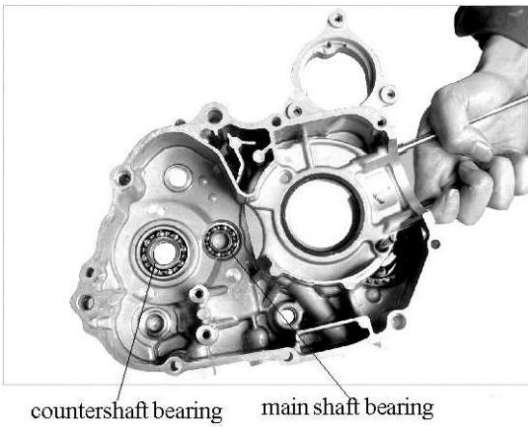
Right view of right crankcase half is shown in fig and check the state of right crankcase half. Replace if necessary.




Left view of left crankcase is shown below and check whether the oil seal of countershaft and oil seal edge of gearshift lever are worn .Replace if necessary.



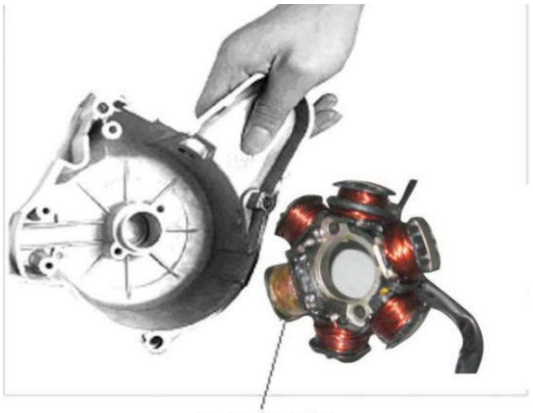

Right view of right crankcase half is shown in fig and check whether bearing of main shaft and countershaft are worn. Replace if necessary.



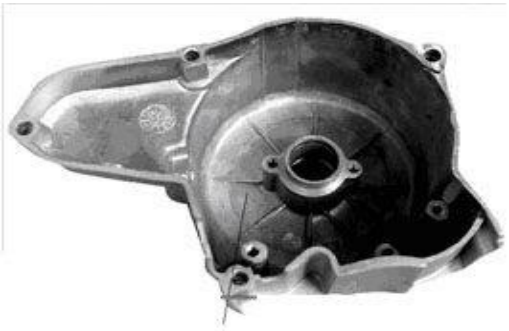

Dismantle fixing bolt of left crankcase cover.

Remove the neutral indicator and check the state. Replace if necessary.


Dismantle the fixing bolt of magneto stator and remove the stator.




Check the condition of left crankcase cover and replace if necessary.



left crankcase cover

**Troubleshooting of crankcase, please refer to the following table.**

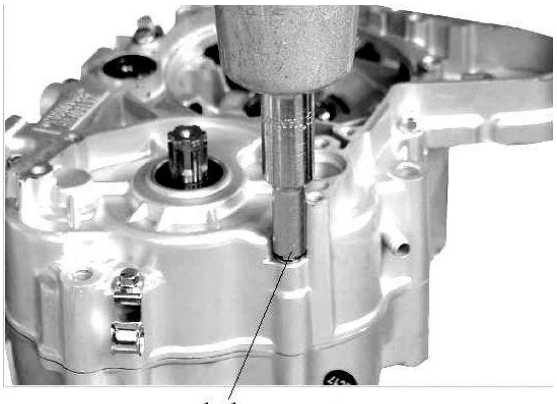
| Description | Problem | Trouble | Compucation | Correction |
|---|---|---|---|---|
| Crankcase | Crack in the crank case | | Oil leakage from the crankcase | Repair or replace the crankcase |
| | Oil leakage from the joint of left and right crankcase | | The crankcase gasket is worn out | Replace the gasket |
| | The threaded hole of oil drain plug screw is ineffective | | Oil leakage from the threaded hole of plug screw | Repair of replace the crankcase |
| | The threaded holes of cylinder bolt are ineffective | Cylinder head retaining nut is impossible to screw up firmly, resulting in air leakage between the cylinder head and cylinder | The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run | Repair the threaded or replace the crankcase |
| | The bolt of the cylinder is broken | The same as front | The same as front | Replace the cylinder bolt |

| | | | | |
|---|---|---|---|---|
| | The oil seal is damaged or the oil seal edge is damage/worn/aged | Oil leakage is ineffective | Oil leakage from the oil seal | Replace the oil seal |
| Right crankcase cover | The right crankcase cover is worn or cracked | | Oil leakage form the case cover | Repair or replace the case cover |
| | The gasket of right crankcase is broken | | Oil leakage between the case cover and the case | Replace the gasket |
| Left crankcase cover | The left crankcase cover is worn or cracked | | Oil leakage form the case cover | Repair or replace the case cover |
| | The gasket of left crankcase is broken | | Oil leakage between the case cover and the case | Replace the gasket |

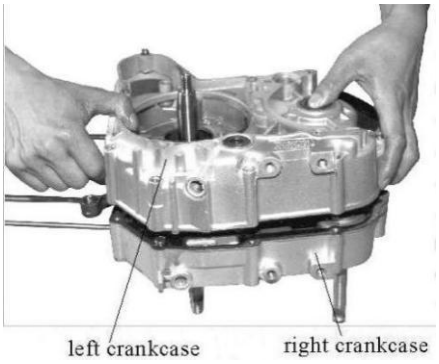
## 5.4.4 Maintenance of Crankshaft Connecting Rod

**Disassemble, assemble and maintain crankshaft connecting rod**

Remove the fixing bolt of crankcase from its holding place.



Remove left crankcase half. Take care not to forget the washer of mainshaft and countershaft when removing the left crankcase.



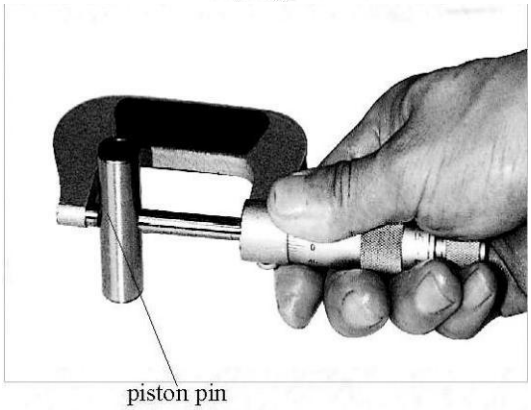

Remove the paper pad to inspect for wear and damage. Replace if necessary.


Remove the connecting rod assembly.

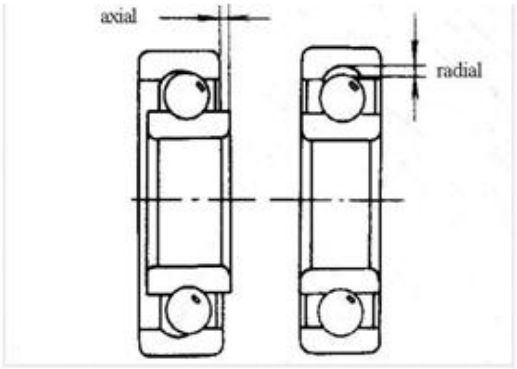

Inspect connecting rod bearing for wear and damage. Replace if necessary.

Check gap of big-end of connecting rod. Reset the gap if necessary.

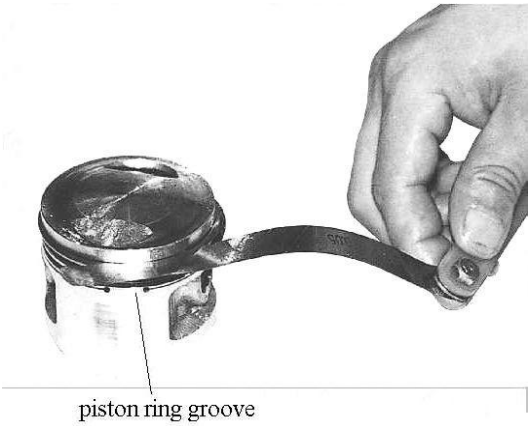

Check diameter of piston pin using a micrometer. Replace the piston pin if the value is over the maintenance limit value.



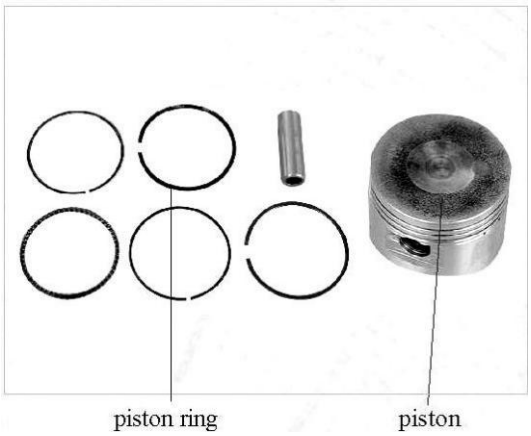

Check the axial and radial jumping of connecting rod bearing. Replace the conrod if the jumping is large.



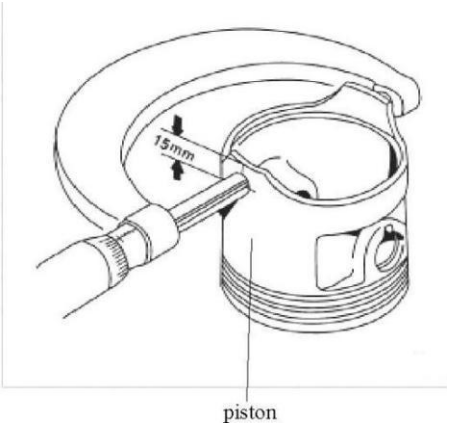

Check the side gap between piston ring and piston groove using a feeler gauge. Replace the piston if the gap is too wide.



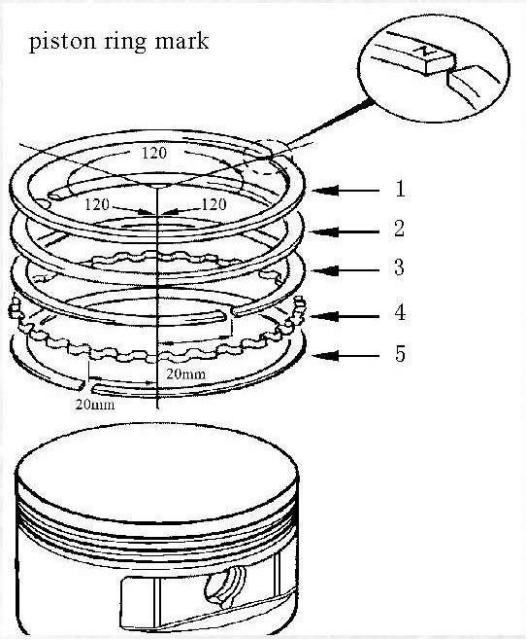
Check whether there is excessive carbon deposit on piston top and groove. Remove if necessary.




Check the state of piston and replace if worn or if reuse is questionable. Measure diameter of piston skirt. Replace it if the value is beyond the maintenance limit value.




Assemble the piston ring according to the fignne and check whether piston ring is damaged or the elasticity is weaken. Replace if necessary.



**For the troubleshooting of crankshaft connecting rod mechanism, please refer to the following table.**

Maintenance of Crankshaft Connecting Rod Mechanism

| Description | Damage from | Trouble | Cause | Correction |
|---|---|---|---|---|
| Piston | Carbon deposit on piston | | The engine over- heats | Remove the carbon deposit |
| | Carbon deposit in the ring groove | The piston ring is seized in ring groove | The engine starts hard or fails to start. Insufficient engine output; Thick blue and white fume form the exhaust muffler pipe | |
| | Scuffing or scratches on the surface of piston skirt | Scuffing or scratches on the surface of piston skirt | | |
| | The piston and ring groove are over worn | Excessive fitting clearance between the piston and the cylinder | The engine starts hard or fails to start. Insufficient engine output; Thick blue and white fume form the exhaust muffler pipe | Replace the piston |
| | The piston pin hole is over worn | Excessive fitting clearance between the piston ring and the hole. | Striking sound of the piston pin and of the cylinder | |
| Crank pin | The crank pin is over worn | Radial and axes gap of the connecting rod big end is too large | Striking sound of the big-end bearing; Striking sound of the cylinder | Replace the crankshaft connecting rod |
| Bearing | The big-end needle bearing is over worn | Radial and axes gap of the connecting rod big end is too large | Striking sound of the big-end bearing; and of the cylinder | Replace the crankshaft connecting rod |

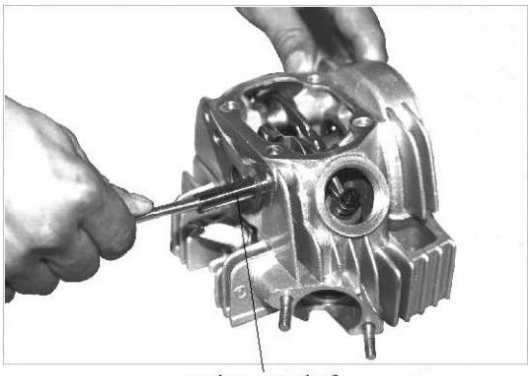
| | | | | |
|---|---|---|---|---|
| | The crankshaft bearing is over worn or damaged | | Abnormal sound during the crankshaft bearing transmission | Replace the crankshaft bearing |
| Piston ring set | The piston ring is fractured | The piston ring is fractured | The engine starts hard or fails to start. Insufficient engine output; Thick blue and white fume form the exhaust muffler pipe | Replace the piston ring set |
| | The piston ring is over worn | The piston ring opening gap or the side gap is too wide | | |
| | Insufficient elasticity of piston ring | It is impossible to tight the piston ring and the cylinder properly | | |
| | Improper fixing | The piston ring gap is not staggered | Thick blue and white fume form the exhaust muffler pipe | Refixing the piston ring set |
| Piston pin | The piston pin is over worn | The fitting clearance between the piston pin and the hole is too wide | Striking sound of the piston pin and of the cylinder | Replace the piston pin |
| Connecting rod | The connecting rod small-end hole is over worn | The fitting clearance between the piston pin and the small-end is too wide | Striking sound of the piston and of the cylinder | Replace the connecting rod |
| | The connecting rod is crooked or twisted | The connecting rod is crooked or twisted | Striking sound of the cylinder | Replace the connecting rod |
| | The big-end hole is over worn | Radial and axes gap of the connecting rod big end is too large | Striking sound of the big-end bearing and of the cylinder | Replace the connecting rod |

| | | | | |
|---|---|---|---|---|
| Timing sprocket | The gear is over worn of damage | ——————————— | Abnormal sound during sprocket driving | Replace the timing sprocket |

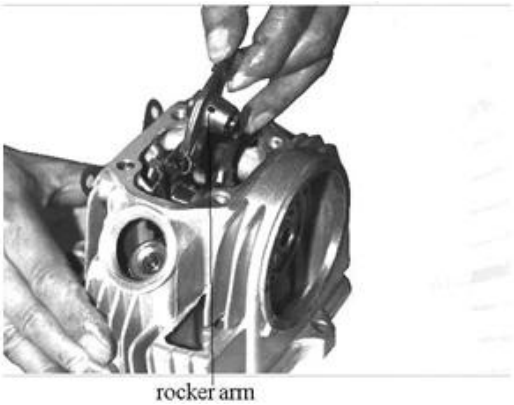
## 5.5 Maintenance of Mechanism

### 5.5.1 Disassemble, assemble and maintain valve mechanism

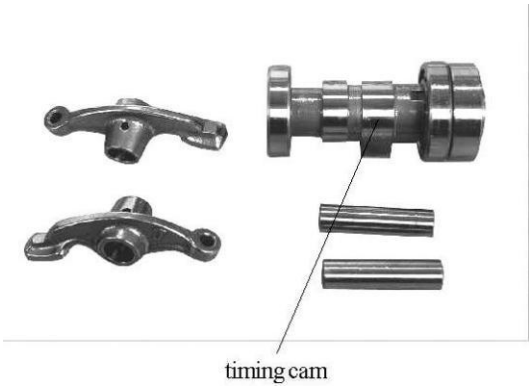
Remove rocker arm shaft



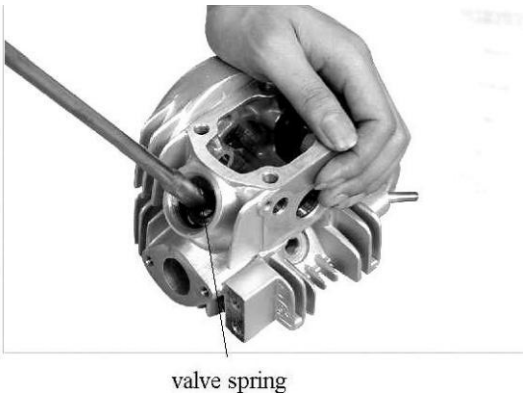

Remove the rocker arm of inlet/exhaust valve and check the state



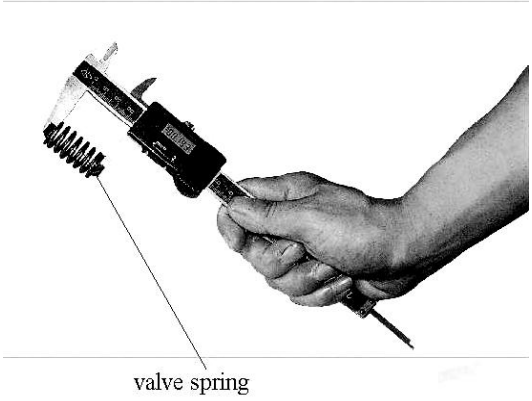
Remove the timing cam, rocker arm , rocker arm shaft to inspect for worn.Replace if necessary.



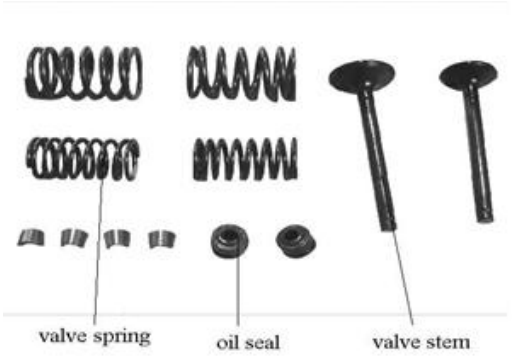

Remove the circlip of inlet and exhaust valve. Remove inlet vale stem and exhaust valve stem take care and don`t miss the valve clip.




Measure length of valve spring to check whether the spring is damaged or worn. Replace if necessary.



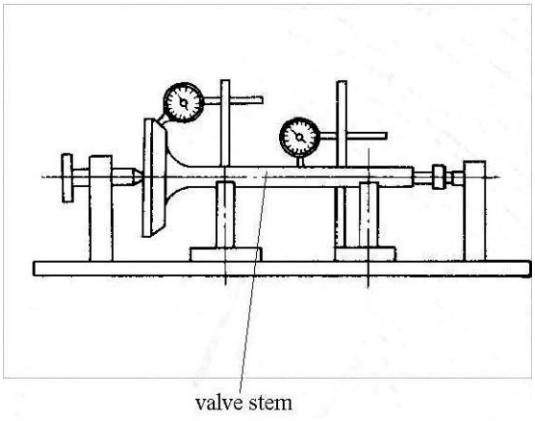

Remove the spring of inlet and exhaust valve to inspect for wear and damage.
Note: when assemble the valve spring , make sure its dense end downward.



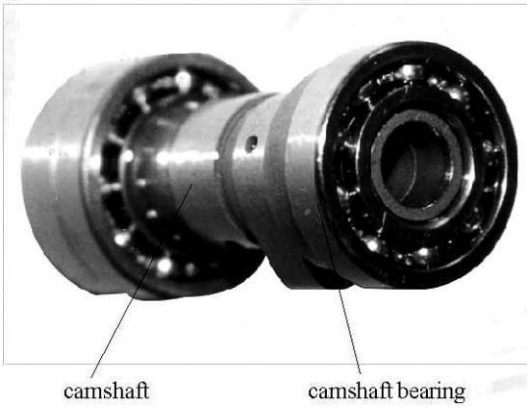
Check the external diameter of valve stem using a verier clipper. Replace the valve stem if the valve is beyond the maintenance limit valve.


Measure the width of valve contact surface to check whether the contact surface is rough or abnormal. Replace the valve stem if the valve is large than 1.5mm.

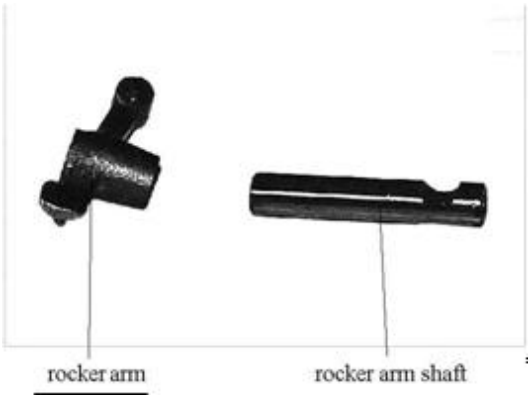

Check whether the valve stem is distored. Replace if necessary.



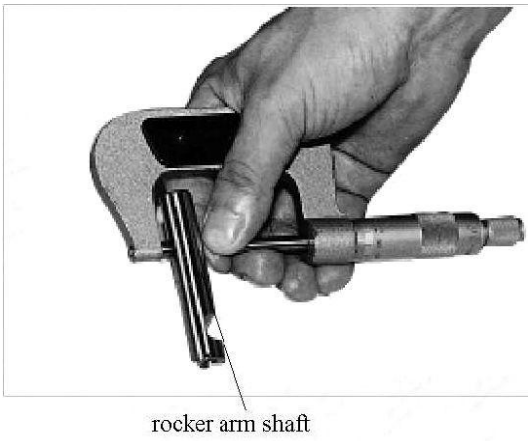
Inspect the timing camshaft bearing for wear and check the state of camshaft. Replace if necessary.



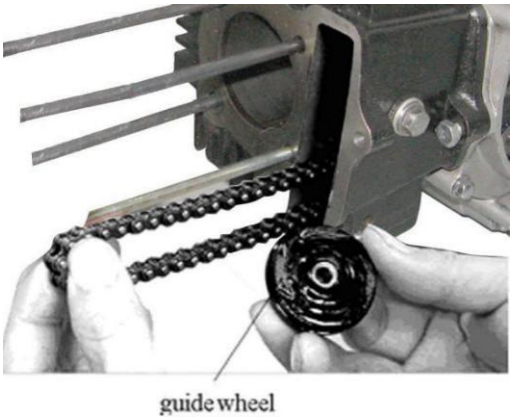

Check the gap of rocker arm shaft and rocker arm. Replace the rocker arm shaft and rocker arm if the gap is large.



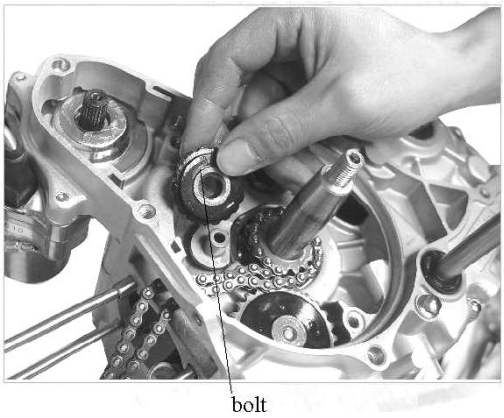

Check the external diameter of rocker arm using a micrometer. Replace the rocker arm shaft if the valve is beyond the maintenance limit valve.



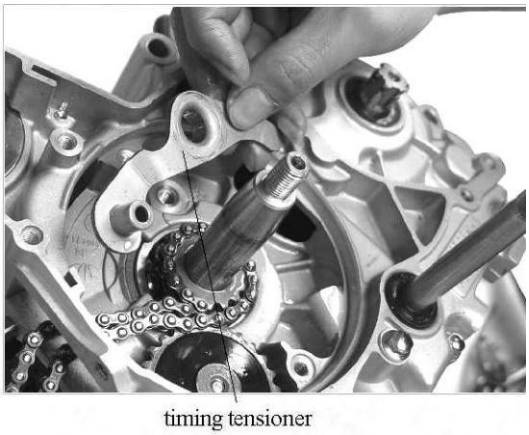

Remove the guide wheel of timing chain to inspect for wear and damage. Replace if necessary.



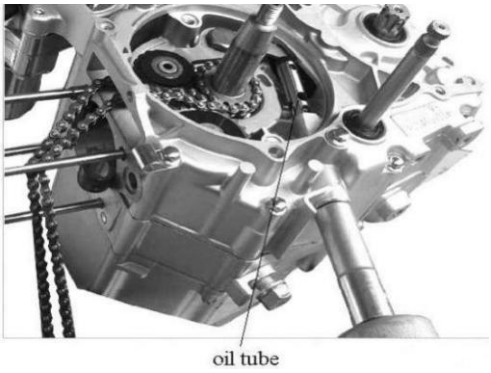
Remove the fixing bolt of timing tensioner and check the state. Replace if worn or if reuse is questionable.



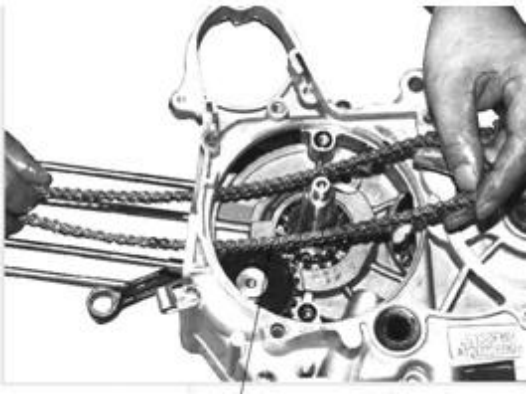

Remove the timing tensioner arm to inspect for wear and damage. Replace if necessary.



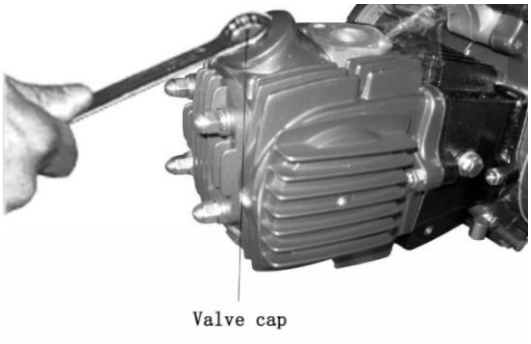

Remove the oil tube and spring and check the state. Replace if necessary.



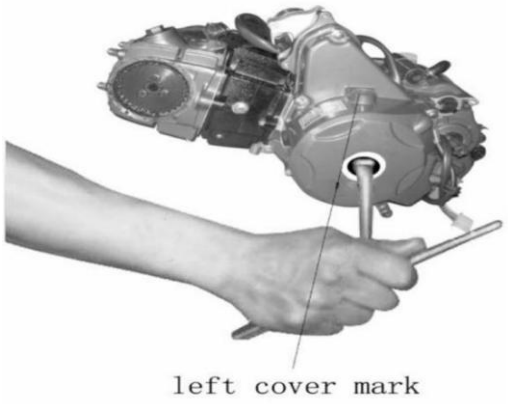

Remove the small timing chain and check the state. Replace if necessary.



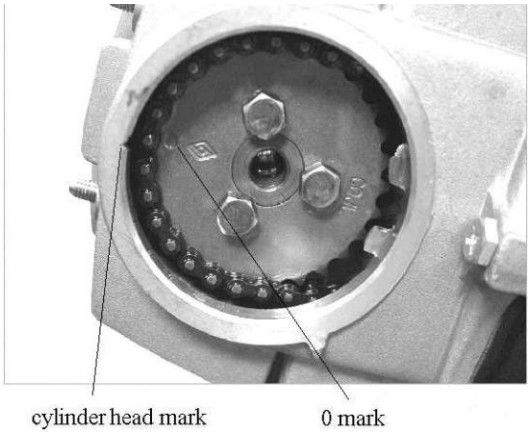
Adjust valve clearance as follows; Remove the valve cap and check the condition.



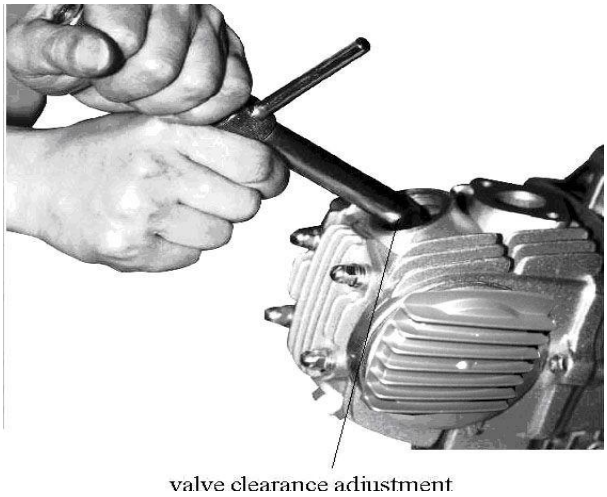

Adjust valve clearance of front cylinder. Turn magnetic rotor counterclockwise to make piston locate at top dead center and make T mark aimed to the mark of left crankcase cover.




Check whether the O-mark on cam sprocket is aimed to the gap of cylinder head. Readjust if necessary.




Set the valve clearance of rear cylinder to 0.05mm~0.06mm.



For the troubleshooting of engine distribution mechanism, please refer to the following table

Maintenance of Distribution Mechanism

| Descriptions | Damage form | Trouble | Cause | Correction |
|---|---|---|---|---|
| Valve oil seal | The edge of valve oil seal is worn, age or damage. | | Thick blue and white fume form the exhaust muffler pipe | Replace the complete set of valve oil seal |
| Camshaft | The cam is cover worn | | Insufficient engine output | Replace the camshaft |
| | The bearing of the camshaft is over worn or damaged | The axial or radial clearance of the bearing is too wide. Ineffective bearing swiveling or abnormal sound during | Abnormal sound heard during camshaft transmission. | Replace he camshaft |
| Rocker arm | The working surface is scratched or over worn | | Valve striking sound | Replace the rocker arm |
| | The rocker arm shaft hole is over worn | Big gap between the rocker arm and rocker arm shaft | Valve striking sound | Replace the rocker arm |
| | The rocker arm shaft is over worn | Big gap between the rocker arm and rocker arm shaft | Valve striking sound | Replace the rocker arm shaft |

| | | | | |
|---|---|---|---|---|
| Valve | The valve clearance is too small | The valve is impossible to close completely | The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run | Readjust the valve clearance to 0.05~0.06mm |
| | The valve clearance is too big | | Valve striking sound | Readjust the valve clearance to 0.05~0.06mm |
| | Carbon deposit on working surface | It is impossible to fit the valve and the valve seat tightly. | The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run | Remove the carbon deposit |
| | The working surface is over worn or has pits, pock marks, ablation or damage | It is impossible to fit the valve and the valve seat tightly. | The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run | Replace the valve |
| | The valve stem is over worn | The fitting clearance between the valve stem and the valve guide is too wide | Sound of valve leakage, Thick blue and white fume form the exhaust muffler pipe | Replace the valve |

| | | | | |
|---|---|---|---|---|
| | The valve stem is deformed | It is impossible to close the valve completely | The engine starts hard or fails to star | Replace the valve |
| Valve spring | The spring is ineffective or fractured | It is impossible to fit the valve and the valve seat tightly. | The engine starts hard or fails to star. Sound of the cylinder head | Replace the valve spring |

## 5.6 Disassemble, assemble and maintain carburetor

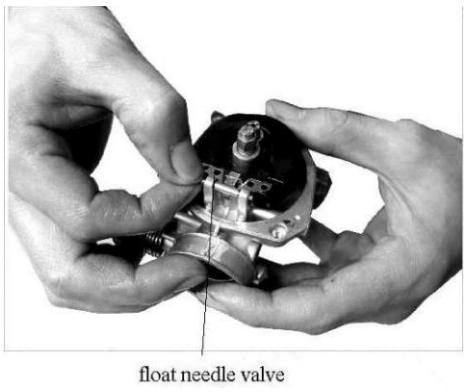
Dismantle the fixing bolt of carburetor and circlip of air cleaner. Remove the carburetor .Remove and clean throttle cap

Clean the carburetor as follows:

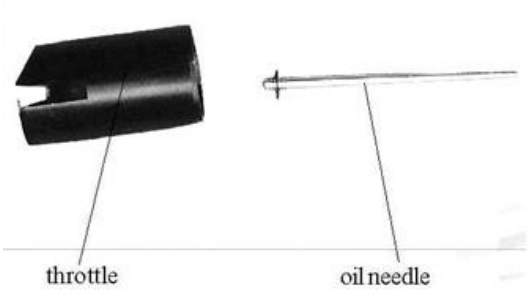
Remove the dirt and clean inner oil way.Dismantle the fixing bolt of float chamber cap.


Remove the float chamber cap. Remove the water and debris in the cap if necessary. Check the state of seal ring and replace if it is aging

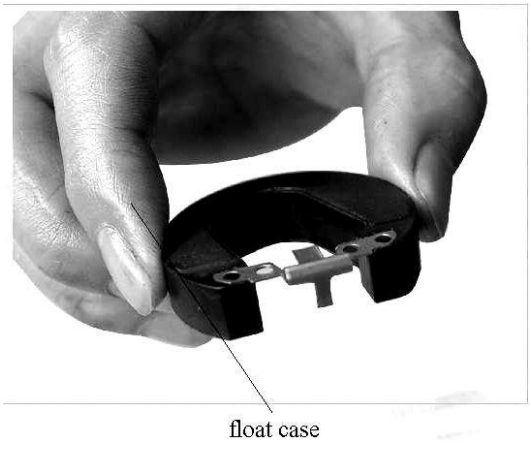

Remove the float needle valve to inspect for wear and damage. Replace if necessary.



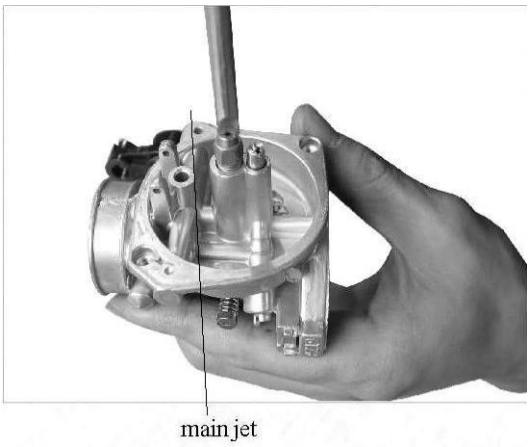
Remove the throttle and oil needle and check the condition replace if necessary.




Check the state of float case and replace as necessary. Adjust the height of float case by moving the float up or down.

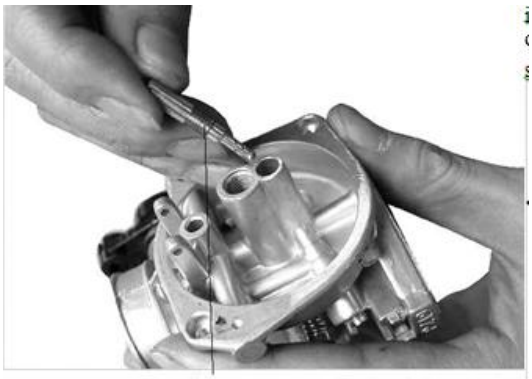



Take out the main jet to check whether the jet hole is clogged. Clean if necessary.



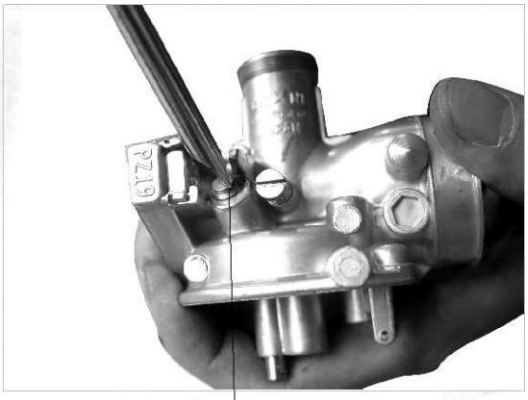

Remove the main nozzle to check whether small hole is clogged. Clean with compressed air if necessary.

Remove the idle jet and check for plugged. Clean the jet with compressed air if necessary



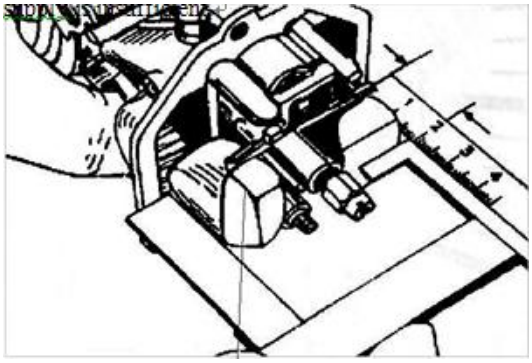
idle jet

Dismantle the mixture adjustment screw and inspect for worn. Replace if necessary.Adjust mixture screw of carburetor as the following. Standard: Tighten mixture screw, and turn it one And a half turns clockwise




mixture screw

Measure height of float case to check whether it is distorted or there is oil in the case If height is incorrect which indicates carburetor leaks or the oil supply is insufficient.



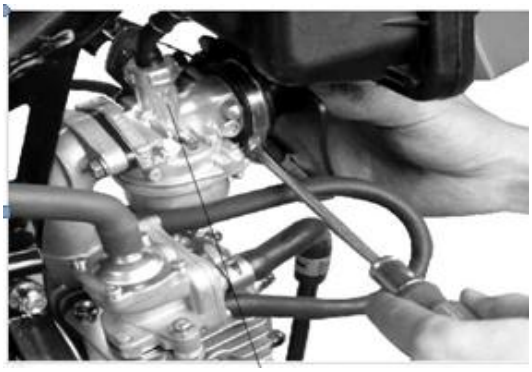
Adjust the oil needle to the third tier. If the clip rises, concentration of mixture becomes dilute and if falls it becomes thick.

## 5.7 Maintenance of Intake/Exhaust System

### 5.7.1 Disassemble, assemble and maintain intake system

Remove the air filter retaining ring

Remove the air filter



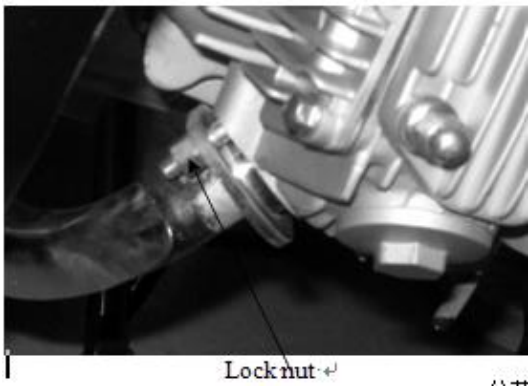
Remove the air filter to remove dust from the casing and remove the air filter to clean

For the troubleshooting of the air cleaner, please refer to the following table.

| Description | Damage form | Trouble | Cause | Correction |
|---|---|---|---|---|
| Air filter | Too much dust on the filter core | | The engine starts hard or fails to start. Insufficient engine output; poor performance of engine during idle run. Excessive fuel consumption. The exhaust muffler pipe | Clean the filter core |
| | The filter core is fractured or chapped. | | Engine air suction noise is too loud | Replace the filter core |

## 5.8 Disassemble, assemble and maintain exhaust system

Dismantle locknut of muffler




Dismantle suspension bolt of muffler to check whether the suspension support is damaged. Repair or or replace if necessary.

Remove the muffler to inspect for broken and damage. Replace or repair if necessary.

Remove the washer of muffler to inspect for damage. Replace if necessary.

## 5.9 Disassemble, assemble maintain the environmental protection Valve

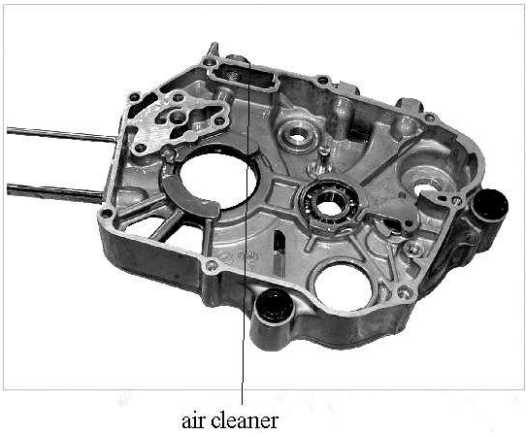
| Description | Damage form | Trouble | Cause | Correction |
|---|---|---|---|---|
| Exhaust pipe gasket | The gasket is broken | Exhaust pipe leakage | Engine exhaust noise is too loud. | Replace exhaust pipe gasket |
| Exhaust muffler | enclosure broken | The muffler enclosure is broken | Engine exhaust noise is too loud. | Replace exhaust muffler. |

Inspect the locknut for tightness and tighten as necessary. Inspect the connecting circlip of air pump for tightness. Tighten if necessary.

Dismantle the fixing bolt of air pump and check the state of air pump.

Replace the air pump if it is worn or if reuse is questionable.

Remove the secondary inlet air cleaner and inspect for wear and damage. Clean and replace if necessary.




For the troubleshooting of environment protection valve, please refer to the following table.

Maintenance of environment protection valve

| Parts | Damage form | Trouble | Cause | Correction |
|---|---|---|---|---|
| air pump | air pump broken or plugged | defective air pump | Emission fails to meet the standard | Replace |
| air cleaner | air cleaner damaged or plugged | defective air cleaner | Emission fails to meet the standard | Replace |

| | | | | |
|---|---|---|---|---|
| connecting hose | connecting hose get loose | noise is too big | Emission fails to meet the standard | Replace |
| Gasket | large noise from secondary inlet | air leaks form secondary inlet | Emission fails to meet the standard | Replace |
| muffler exhaust | too much carbon deposit on muffler exhaust | Poor combustion | Emission fails to meet the standard | Remove and clean |

## 5.10 Disassembly, assembly, maintenance and management of electric starters

Remove the fixing bolts on the cover of left crankcase


Remove the fixing bolts of file display.Then remove the file display And check for wear and damage. Replace them when necessary.

Remove the cover of left crankcase


Remove the gasket and check the condition. If it is worn,please replace it.

Remove the fixing bolt of magnetic stator and bolt of trigger.


Check the status of stator with a multimeter. If it is worn, please replace with the new one.


Disassemble the fixing nut of rotor

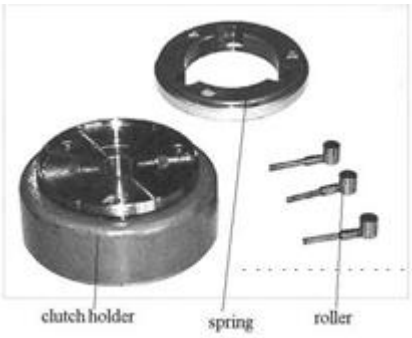

Remove the rotor with special tools


Remove the rotor and check if the rotor is demagnetized.

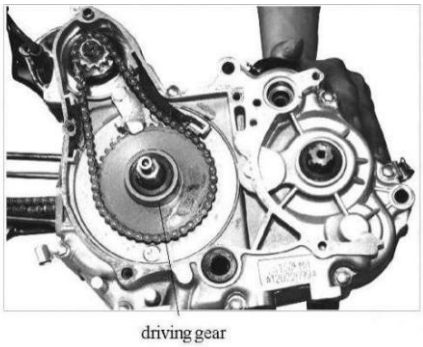
Replace it when necessary.

Remove the fixing bolt of overrunning clutch

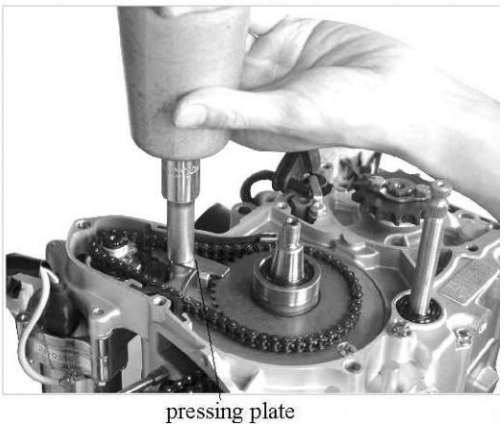

Remove the clutch. Check for wear and damage to the clutch seats, rollers and springs. Replace it when necessary.



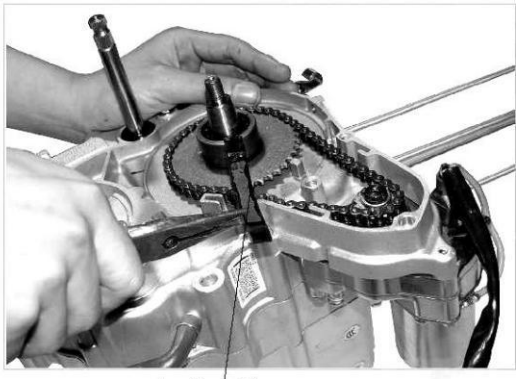

Check the wear and damage of the drive sprocket and drive gear. replace it when necessary.



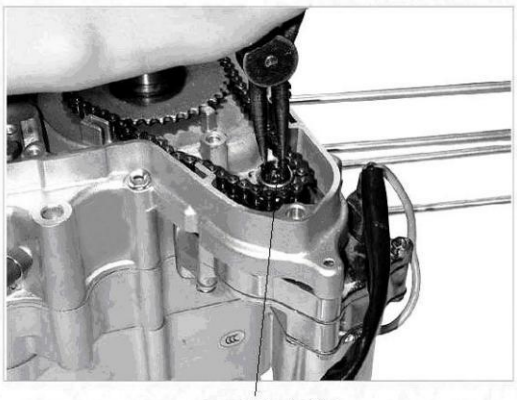

Disassemble the pressing plate of start sprocket



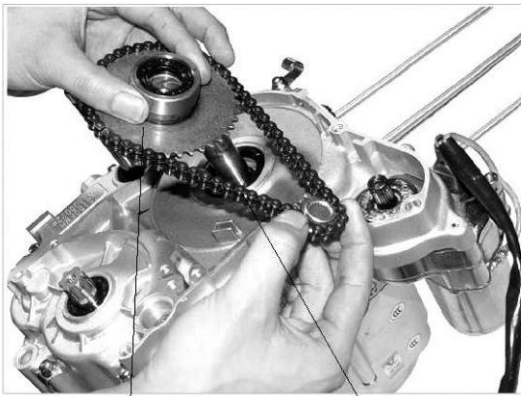
Remove the tension strip of the clutch and check its condition. If the tension strip is found to be worn or problems in use,replace it.



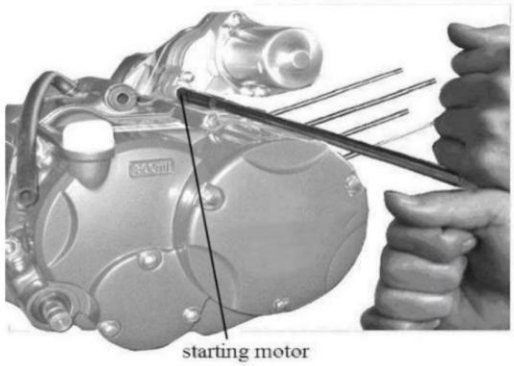

Remove the circlip of the sprocket of starter.



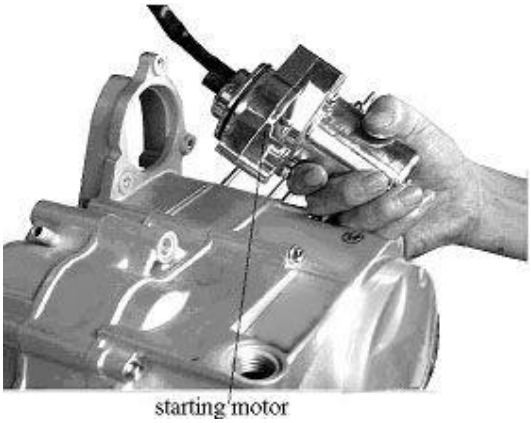

Remove the drive sprocket and chains




Remove the fixing bolt of electric starter

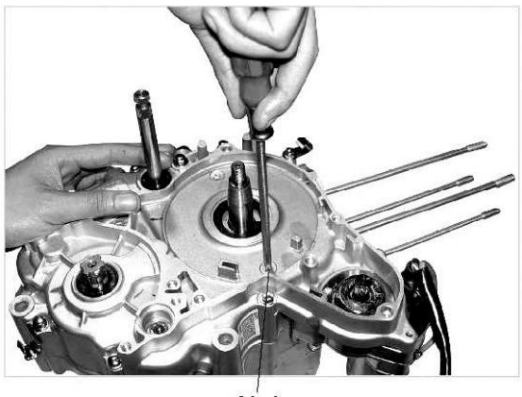



Remove the electric starter

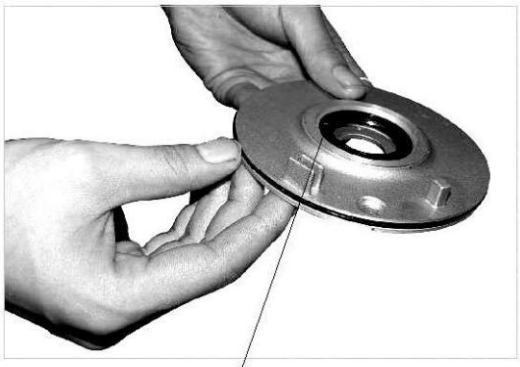



Check the electric starter for damage. Replace it when necessary.


Remove the disc of oil separation and check the condition. Replace it when necessary.

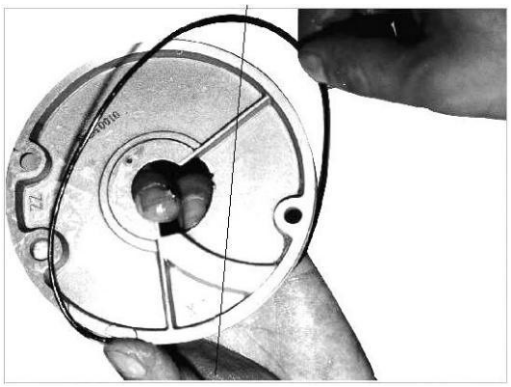



Check the edges of the oil seal for wear. Replace it when necessary.




status of oil seal ring and replace it when necessary.

Remove the seal ring. Check the



For the troubleshooting of engine electric starter, please refer to the following table.

Maintenance of Electric Starter

| Description | Damage form | Trouble | Cause | Correction |
|---|---|---|---|---|
| Starter motor | Carbon brush is over worn. The carbon brush spring is | | Starter motor has insufficient rotation force or it is out of work. | Replace carbon brush |
| | fractured or has insufficient elastic force. | | Starter motor has insufficient rotation force | Replace carbon brush spring |
| | Armature commentator surface is fouled. | | Starter motor has insufficient rotation force | Clean the commentator surface With gasoline or alcohol |

| | | | | |
|---|---|---|---|---|
| | Armature commentator surface is spotted, burnt or damaged. | | Starter motor has insufficient rotation force. | Polish the surface against the Commentator with fine abrasive Paper. Make the cut on the mica Plate between each commentator Piece with broken saw bit 0.5~0. 8mm deeper than the commentator surface. Remove the chip and Burr between each commentator. |
| | Armature commentator surface is ablation or over worn. | | Starter motor has insufficient rotation force or is out of work. | Replace starter motor |