# KAYO MOTO

## A150-D

# Maintenance Manual

**WWW.KAYO.COM.CN**

Version code：20241209
Version name：A150-D Maintenance Manual Chinese version.pdf

WWW.KAYO.COM.CN

ZHEJIANG KAYO MOTO CO,.Ltd
2024 12

# Description of the preparation

This service manual describes in detail the maintenance and adjustment procedures, disassembly and assembly points, inspection and repair points, troubleshooting methods and maintenance technical data of A150-D ATV, and is accompanied by detailed graphic information to guide the operation.

Please read this manual carefully and follow the standardized operation procedures for maintenance, which can effectively extend the service life of each component, improve the engine performance and the reliability of the whole vehicle.

The first chapter introduces the general operation matters, tools, basic techniques and maintenance parameters.

The second chapter introduces the assembly and disassembly operation of the whole vehicle cover parts.

Chapter 3 introduces the periodic inspection and adjustment of the whole vehicle

Chapter 4 introduces the disassembly of engine peripheral assembly parts.

Chapter 5 introduces the methods and precautions for disassembly, inspection, repair and assembly of various parts of the engine

Chapter 6 introduces the vehicle chassis related information

Chapter 7 introduces the inspection and maintenance information of the whole vehicle signal and lighting system

Chapter 8 introduces the EFI system

Appendix: Electrical schematic diagram

**The contents of this manual are subject to change without notice due to improvement of the vehicle. Maintenance should be carried out in the actual condition of the vehicle.**

ZHEJIANG KAYO MOTO CO,.Ltd
R&D center
2024 12

# CONTENTS


| | |
|---|---|
| Repair Information | 1 |
| Body Coverings | 2 |
| Periodic Inspection and Adjustment | 3 |
| Engine Periphery | 4 |
| Engine | 5 |
| Vehicle Chassis | 6 |
| Signal and Lighting Systems | 7 |
| EFI | 8 |
| Electrical Schematics | appendix |

## Table of unit conversions in this manual

| Project | unit conversion |
|---|---|
| Pressure | 1kgf/cm$^2$=98.0665kPa；1kPa=1000Pa |
| | 1mmHg=133.322Pa=0.133322kPa |
| Torque | 1kgf·m=9.80665N·m |
| Volume | 1mL=1cm$^3$=1cc |
| | 1L=1000cm$^3$ |
| Force | 1kgf=9.80665N |
| Length | 1in=25.4mm |

## Danger / Warning / Caution

Please read the following explanatory notes carefully, which emphasize the specific meanings of the words “DANGER”, “WARNING” and “CAUTION” and which should be given special attention when servicing the engine.

**DANGER: Indicates a high degree of alertness to danger.**
**WARNING: Indicates caution for moderate danger.**
**ATTENTION: Indicates concern for minor hazards.**

**However, please note that the “DANGERS” and “WARNINGS” contained in this service manual cannot cover all potential hazards in the use and maintenance of the engine. Therefore, in addition to the DANGERS and WARNINGS, the service technician must have a basic knowledge of mechanical safety. If you are unsure of how to complete the entire service procedure, please consult a more experienced technician.**

# 1 Maintenance Information

1.1 Precautions for operation……...1-1
1.2 vehicle identification number…….1-3
1.3 Main Parameter Table……1-5
1.4 Inspection Parameter List……...1-7
1.5 Tightening torque…….....1-10
1.6 Lubricants, sealants…….....1-11
1.7 Cable, hose and cable type wiring diagrams……...1-12

## 1.1 Precautions for operation

**Safety Precautions**

1. You must wear work clothes (coveralls, etc.), hats, safety boots that are appropriate for the job, and if necessary, dust-proof glasses and dust masks, gloves and other safety gear to protect your body.
2. Because the exhaust contains harmful components, it is prohibited to run the engine for a long time in closed places and poorly ventilated places.
3. When the engine is just shut down, the temperature of the engine and muffler is still very high, so do not touch it before cooling to avoid burns.
4. Battery solution (dilute sulfuric acid) is a strong corrosive agent, stained skin, eyes will have burns, blindness risk. If clothes, skin accidentally stained with battery solution, please immediately rinse with plenty of water and go to the hospital for treatment. The battery and battery solution should be strictly kept in a safe place out of the reach of children. When charging the battery, flammable and explosive hydrogen gas will be produced, once there is a source of fire or electric spark close to it, there is a danger of explosion. Therefore, please charge the battery in a well-ventilated place.
5. Since gasoline is flammable, fireworks are strictly prohibited in the workplace. Pay attention not only to open flames but also to electric sparks. In addition, evaporated gasoline may explode, so please choose a well-ventilated place to work.
6. Do not let the rear wheel, clutch and other rotary parts and movable parts clip your hands and clothes at any time during maintenance.
7. When two or more people are working, they must greet each other constantly to confirm safety.

**Disassembly and assembly precautions**

1.Parts, lubricants and grease must use the recommended products of KAYO brand.
2. The parts of each system should be organized and stored separately so that each part can be installed back to its original position.
3. Please clean the dirt and dust on the car before maintenance.
4. Gaskets, O-rings, piston pin retaining rings, cotter pins, etc. must be replaced with new products after disassembly.

5. Elastic retaining ring will be deformed if the opening is opened too wide during disassembly, and will be easily dislodged after reassembly. Do not use elastic retaining rings that have lost their elasticity.

6. After disassembling and checking the parts, clean them before measurement and blow away the cleaning agent with compressed air. Apply lubricant to the moving surface before assembly.

7.Disassembly should be necessary to check the place, determination of relevant data, so that in the assembly can be restored to the state before disassembly.

8. Bolts, nuts and screws should be pre-tightened first, and then tightened in accordance with the principle of from big to small, from inside to outside on the diagonal according to the specified tightening torque.

9. Rubber parts in the disassembly should be checked for aging, if necessary, replaced in advance. In addition, because the rubber parts are not resistant to gasoline, kerosene and other erosion, try not to let the volatile oil, grease attached to it.

10.Should be in accordance with the requirements of the maintenance manual, in the designated areas coated or injected with the recommended grease.

11.Should use the correct special tools for disassembly and assembly operations.

12.Ball bearings can be used to rotate the inner ring or outer ring with fingers, to confirm whether the rotation is flexible and round, if the dismantling in the dismantling of the dismantling method of applying force on the ball, the dismantled bearings should not be used again:

Bearing axial and radial clearance is too large to be replaced.

Bearings that rotate with a sense of stagnation should be cleaned, and those that still feel stagnation after cleaning should be replaced, and those that cannot be cleaned should be replaced directly.

And the body or shaft diameter on the original compression fit, disassembly and assembly of the fit is not tight when the bearing should be replaced.

13. Bearings should be coated with oil or grease before assembly. Single-sided dust-proof bearings should pay attention to the installation direction when assembling. Open type or double-sided dust-proof bearings should be assembled with the face engraved with the manufacturer's logo and size facing outward.

14.When installing rectangular retaining rings, the chamfered side should be oriented to the direction of force. Don't use the retaining ring which has been loosened and lost its elasticity. Rotate the rectangular retaining ring after assembly to make sure that it is firmly installed in the groove.

15. After assembling, check whether the fastening parts are tightened and work normally.

16. Brake fluid and coolant will damage painted surfaces, plastic parts, rubber parts, etc. Do not let it adhere to such parts, in case of attachment, immediately rinse with water.

17. The oil seal should be installed with the side with the manufacturer's logo facing outward (no oil direction):

When assembling, be careful not to curl the lip of the oil seal or allow burrs to scratch the lip of the oil seal.

Apply grease on the oil seal lip before assembling.

18.When installing hose parts, insert the hose to the root of the joint. If there is a hose clamp, install the hose clamp in the indentation mark of the hose. Installation of hoses without tightness to be replaced.
19. Don't get dust, mud, etc. into the inside of the engine and the inside of the oil pressure system of the brake.
20. The gasket material attached to the bonding surface of each case of the engine should be cleaned up before assembly. Bumps on the contact surface must be removed by evenly grinding with an oil stone.
21. Do not distort or bend the cable ties excessively. Deformation and damage to the cable will result in poor movement or breakage.
22. When assembling cap guard parts, be sure to insert the cap into the groove if there is a groove.

**Engine break-in**

Engine has many relative motion parts, such as piston, piston ring, cylinder block, meshing transmission gears, etc., therefore, in the early stage of its use, it is necessary to regulate the break-in, the break-in can make the moving parts to adapt to each other, correct the working clearance, the formation of a good smooth friction surface capable of withstanding large loads, regulate the break-in of the engine, only with excellent performance and reliability.

The recommended break-in time is 10 hours, and the specifications are as follows:

0 to 10 hours: avoid continuous operation under more than 1/2 throttle, change speed frequently, do not recommend long operation under a fixed throttle position; after every 1 hour of work, cool the engine for 5 to 10 minutes; avoid rapid acceleration, the throttle change should be slow, not sudden and sudden, do not drag the goods during the break-in period.

**CAUTION:**

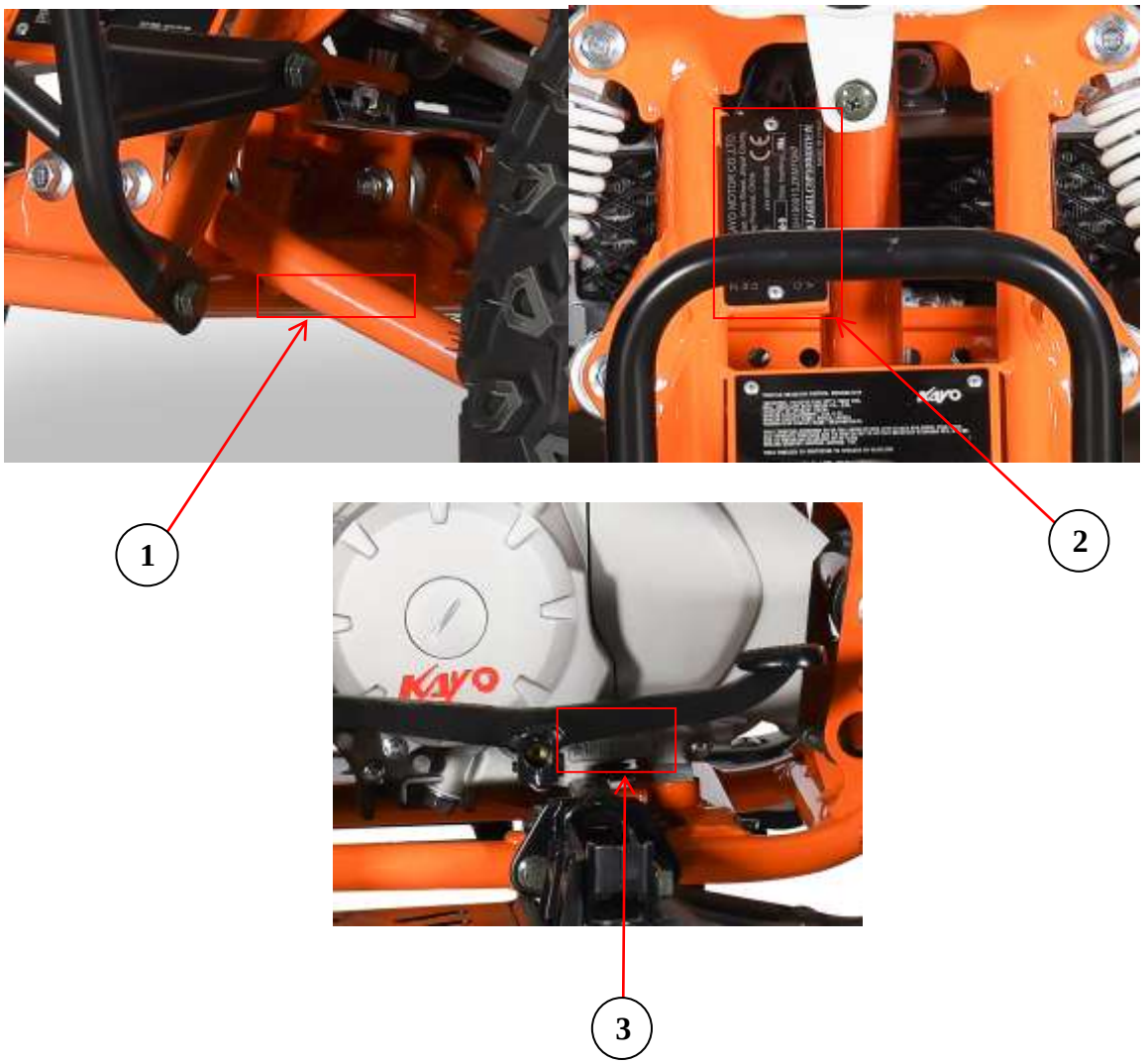
During the break-in period, carry out maintenance in accordance with the provisions of routine maintenance, and troubleshooting is found in time;

After the end of the break-in period, the whole machine will be maintained after the break-in period before entering the normal driving stage.

## 1.2 Vehicle identification number

①Frame number
②Vehicle nameplate
③Engine number

| | |
|---|---|
| Vehicle Type | A150-D |
| Frame Number | L6JAGKLA~ |
| Engine number | 156FMJ-2~ |



## 1.3 Main Parameter Table

| Item | | Parameters |
|---|---|---|
| Vehicle Model | | A150-D |
| Length (mm) | | 1540 |
| Width (mm) | | 965 |
| Height (mm) | | 980 |
| Wheelbase (mm) | | 985 |
| Engine Model | | YX150 |
| Total Displacement (cc) | | 140.4 |
| Fuel Type | | unleaded petrol |
| Vehicle mass (kg) | | 131.8 |
| Number of Passengers | | 1 person (driver) |
| Maximum loading mass (kg) | | 85 |
| Tire Specification | front wheel | Black 10*5.5AT-4/110 90 |
| | rear wheel | Black 9*8.0AT-4/110 90 |
| Turning circle diameter (minimum turning diameter at nearest point) | | 130mm |
| Engine | Starting method | Electric starter |
| | Engine type | Single-cylinder, four-stroke, oil-cooled |
| | Gas distribution method | Chain drive |
| | Bore × Stroke (mm) | 56×57 |
| | Compression ratio | 8.8:1 |
| | Lubrication method | Pressure + Splash |
| | Oil pump type | Rotor type |
| | Oil grade | 15W/40-SF and above |
| | Cooling method | Oil-cooled |

| Item | | Parameter | |
|---|---|---|---|
| Air filter type | | Sponge cartridge filter type | |
| Intake manifold | Mixing valve diameter | 19mm | |
| Fuel tank volume (L) | | 6.7 | |
| Transmission system | Clutch type | Automatic Clutch | |
| | Transmission Type | Three gears with reverse | |
| | Gearshift | Forward gear 1 2 3, reverse gear R | |
| | Gear Shift Type/Sequence | Foot operated / R N 123 | |
| | Output Type | Rear axle output | |
| | Direction of engine output rotation | In forward gear, the front is clockwise when viewed from the rear of the vehicle | |
| Right and left steering angles | | ＜45° | |
| Maximum Hill Climbing Performance | | ≥17° | |
| Brake Unit Type | | front | Disc Brake |
| | | rear | disc brake |
| Braking force (n) | | Front: ≥400 | |
| | | Rear: ≥400 | |
| Buffering method | Suspension | Independent front-wheel double-swing arm suspension, non-independent rear-wheel suspension | |
| Frame type | | Steel pipe and steel plate welding type | |

# 1.4 Inspection Parameter List

## Lubrication device

| Item | | Specification | Limit |
|---|---|---|---|
| Engine Oil capacity | Oil Change | 700ml (without oil filter change) | — |
| | Oil Change | 600ml (oil filter changed at the same | |
| | Full Capacity | 800ml | — |
| Recommended Engine Oils | | Use only 15W/40 SF oil, do not substitute or mix different grades of oil, as this can cause engine damage and accidents. | |
| Oil pump | Radial clearance between inner | 0.06~0.15mm | — |
| | Rotor combination and cover plate end face clearance | 0.04~0.1mm | — |

## Intake system (see 05-Engine section for details)

## Wheels (front and rear identical)

| Item | | Specification | Limit |
|---|---|---|---|
| Wheel Jump | Vertical | 0.8mm | 2.0mm |
| | Horizontal | 0.8mm | 2.0mm |
| Tire | Residual grooves | — | 3mm |
| | Pneumatic pressure | 35kPa（0.35kgf/cm$^2$） | — |

## Braking system

| Item | | Specification | Limit |
|---|---|---|---|
| Front Brake | Brake Disc Thickness | 3.5mm | 3mm |
| Rear brake | Brake handle travel | 3 ~ 5mm | — |
| | Brake Disc Thickness | 3.5mm | 3mm |

## Battery / Charger / Starter / Shift mechanism

| Item | | | Specification |
|---|---|---|---|
| Rectifier type | | | Full-wave DC |
| Battery | capacity | | 12V 7Ah |
| | Voltage between terminals | Fully charged | 14.4V |
| | | Undercharged | Less than 9.6V |

## Ignition device (diving)

| Item | | Specification |
|---|---|---|
| Ignition method | | ECU Controlled Ignition |
| Spark plugs | Resistive Spark Plugs | Resistive Spark Plugs |
| | A7RTC | A7RTC |
| | 0.6-0.7mm | 0.6-0.7mm |
| | Blue-White | Blue-White |

## Lights / Instruments / Switches

| Item | | Specification |
|---|---|---|
| Lights, bulbs | Front Left Lighting | 12V |
| | Front Right Light | 12V |
| | Tail/Brake Lights | 12V |

## Fuse

| Item | | Specification |
|---|---|---|
| Fuse | Main Fuse | 20A |
| | ECU Fuse | 15A |

## Gas Distribution + Cylinder Head (see 05-Engine section for details)

## Cylinder + Piston + Piston Ring + Crank Rod (see 05-Engine section)

## Clutch + Drive Train (see 05-Engine section for details)

## 1.5 Fastener tightening torque

**CAUTION：**

Before installing the threads, apply rust preventive grease to the threaded area and the bonding surface.

**Tightening torque for specified parts - Vehicle parts**

| No. | Item | Fastener Designator | Qty. | Tightening torque（N·m） |
|---|---|---|---|---|
| 1 | Rear shock lower mounting bolts | Zinc blue and white M10*50*1.25 half-threaded | 1 | 55-66 |
| 2 | Chainstay mounting bolts | Army green M8*12 | 4 | 25-30 |
| 3 | Oil Cooler Pipe Over Oil Bolt | Army green M10*25 | 2 | 25-30 |
| 4 | Elbow mounting bolts | White zinc M6*20*1.25 | 2 | 10-12 |
| 5 | Lower pressure block mounting bolts | White zinc M10*30*1.5 S14 | 2 | 49-59 |
| 6 | Rear Sprocket Mounting Bolts | Army Green M8*30 Full Thread | 4 | 25-30 |
| 7 | Rear Disc Brake Disc Mounting Bolts | Army green M8*16 | 4 | 25-30 |
| 8 | Front Disc Brake Disk Mounting Bolts | White zinc M6*16 10.9 grade | 4 | 10-12 |
| 9 | Rear Disc Brake Upper Pump Mounting Bolts | Army Green M6*20 | 2 | 10-12 |
| 10 | Front jersey side mounting plate mounting bolts | Army green M8*12 | 6 | 25-30 |
| 11 | Footrest mounting bolts | Army Green M8*16 | 8 | 25-30 |
| 12 | Lower Engine Mounting Bolts | Zinc blue and white M8*35 Half thread | 2 | 25-30 |
| 13 | Upper Engine Mounting Bolts | Zinc M8*105 | 1 | 55-66 |
| 14 | Rear engine mounting bolts | White zinc M8*110 | 1 | 55-66 |
| 15 | Rear Flat Fork Mounting Bolts | Zinc blue and white Φ 14*240*M14*1.5mm | 1 | 60-68 |
| 16 | Rear shock absorber upper fixing bolt | Zinc M10*45*1.25 half thread | 1 | 55-66 |
| 17 | Rear axle fixing bolts | White zinc M12*30*1.25 S15 | 4 | 60-68 |
| 18 | Rear axle thin nuts | Color zinc M33*1.5 | 2 | 86-103 |
| 19 | Steering column lower fixing (slotted nut) | Army green M10*1.25 | 1 | 15-20 |
| 20 | Oil cooler upper fixing bolt | Army green M6*25 | 2 | 10-12 |

| | | | | |
|---|---|---|---|---|
| 21 | Rear disc brake lower pump mounting bolts | Army green M8*25 full thread | 2 | 25-30 |
| 22 | Front reduction fixing bolt | White zinc M10*40*1.25 half-threaded | 4 | 55-66 |
| 23 | Upper and lower rocker arm ball head fixing (slotted nut) | Army green M10 | 2 | 55-66 |
| 24 | Front hub assembly fixing (slotted nut) | Army green M14*1.5*H18 | 2 | 49-59 |
| 25 | Upper pressure block fixing bolt | Green M8*30 | 4 | 25-30 |
| 26 | Front and rear wheel retaining nuts | White zinc M10*1.25 | 8 | 49-59 |
| 27 | Rear wheel hub fixing (slotted nut) | Green M18*1.5*H17.5 Slot depth 6 | 2 | 77-92 |

**Tightening torque for specified parts**

**Tightening torque of fasteners in unspecified areas**

| Kind | Torque N·m | Kind | Torque N·m |
|---|---|---|---|
| 5mm bolts and nuts | 4.5~6 | 5mm Screws | 3.5~5 |
| 6mm Bolt, Nut | 8~12 | 6mm Screws | 7~11 |
| 8mm bolt, nut | 18~25 | 6mm Convex Bolts | 10~14 |
| 10mm Bolt, Nut | 30~40 | 8mm Convex Bolt, Nut | 20~30 |
| 12mm bolt, nut | 35~50 | 10mm Convex Bolt, Nut | 30~40 |

**Engine service tools (see 05-Engine section for details)**

**Engine-specific tools (see 05-Engine section for details)**

## 1.6 Lubricating grease, sealants

| Coating position | Caution | Grease |
|---|---|---|
| Steering bearing | | Lightweight lithium soap-based grease |
| Throttle cable connection | | |
| Rocker arm movable part | | |
| Inside circumference of steering | | |
| Seat cushion lock movable part | | |

**Lubrication of operating cables, bearings, and rotating parts**

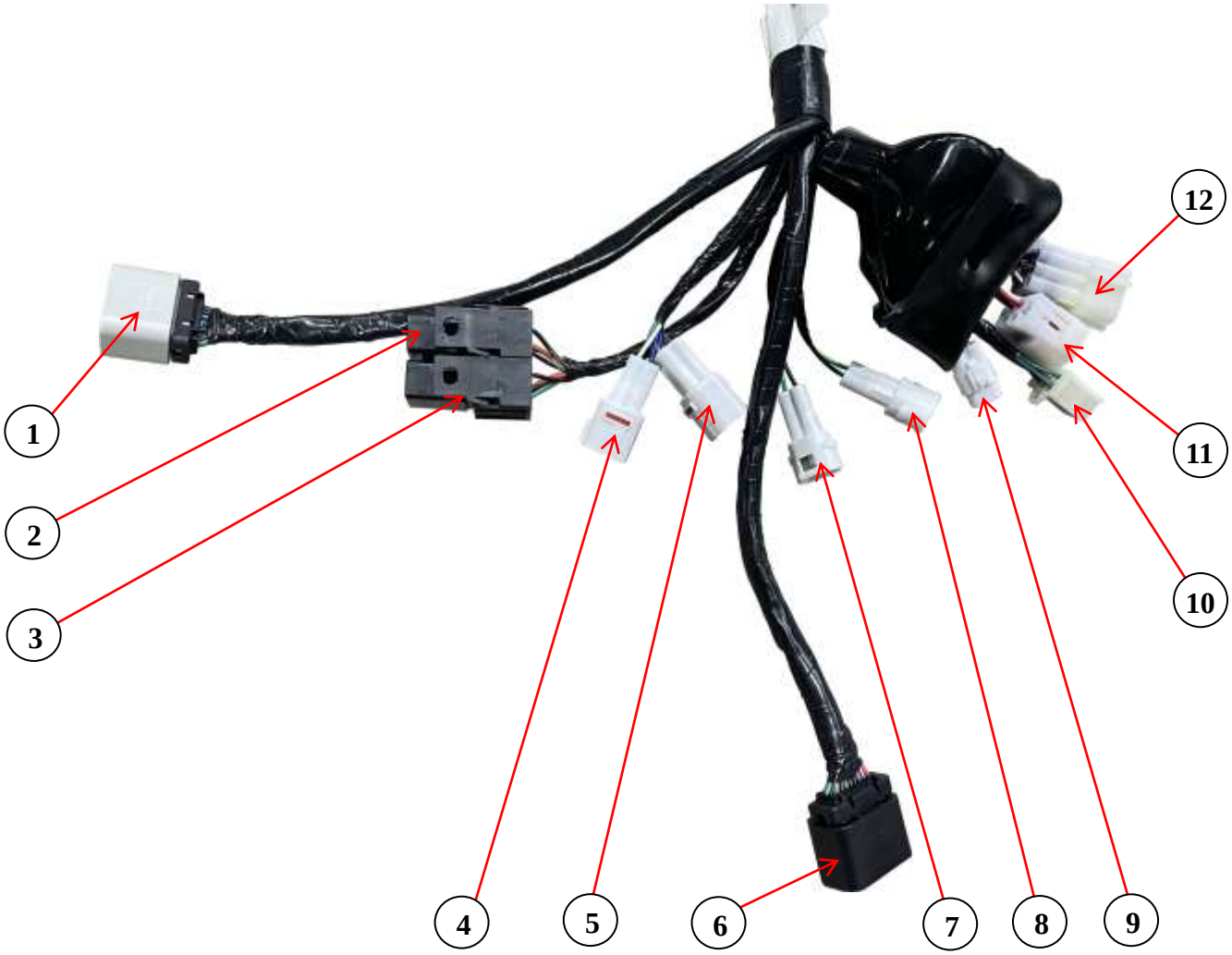
| Part | Contents | Grease |
|---|---|---|
| Steering shaft spherical bushing | Lubrication | Automobile general-purpose lithium grease |
| Rear axle support | | |
| Front and rear shock absorber joints | | |
| Throttle handle pivot and cable joint | | |

| | | |
|---|---|---|
| Left and right brake handle pivots | | |

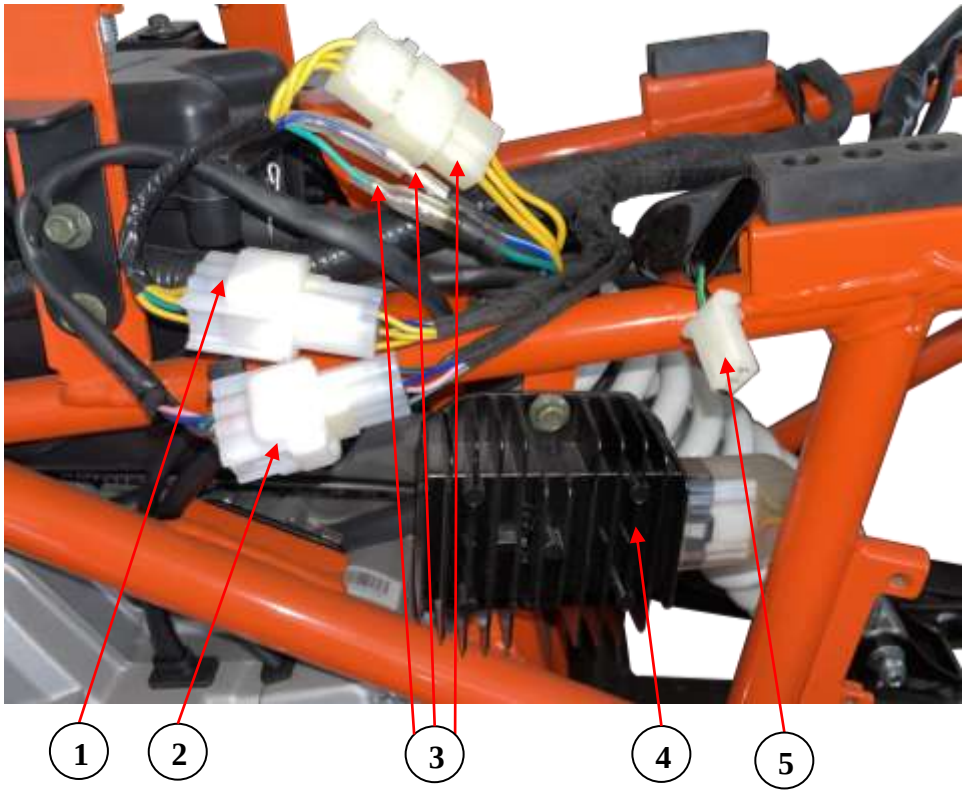
**Engine running materials and installation accessories (see 05-Engine section for details)**

Engine operating materials include lubricants (oil), grease (grease), etc.; installation accessories include flat sealants, thread locking adhesives, etc.

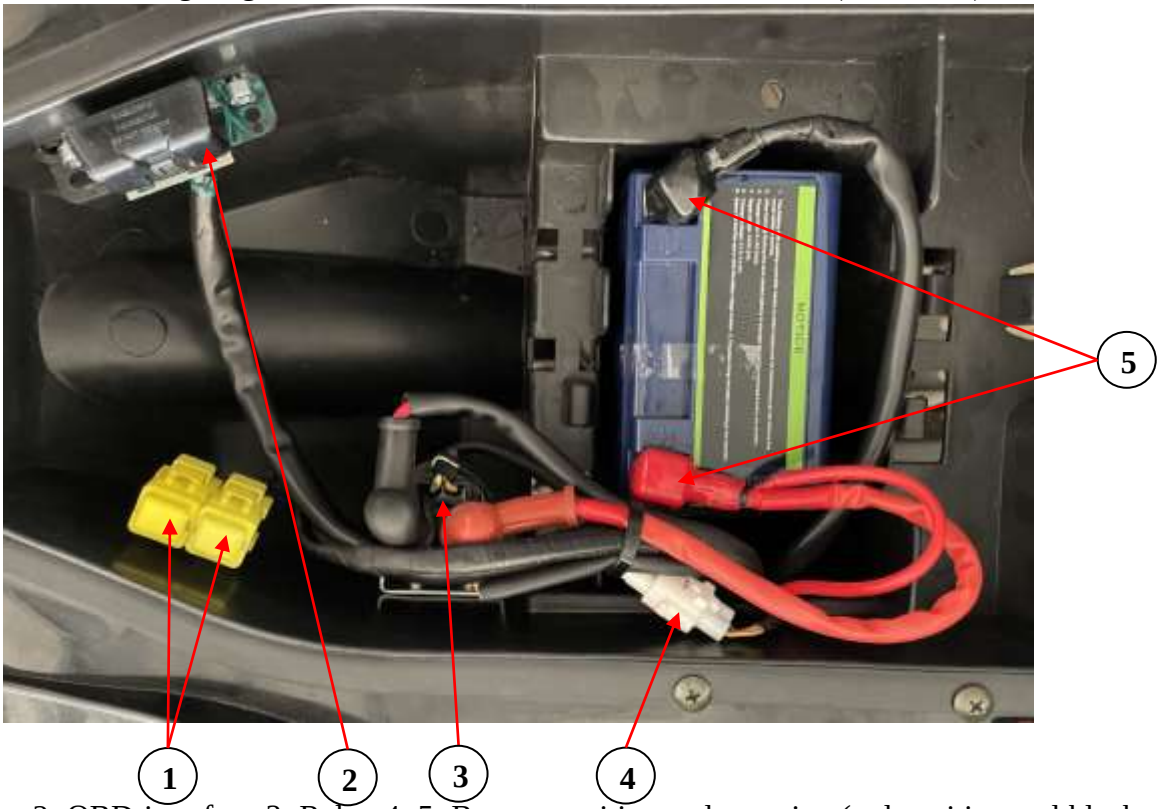
## 1.7 Cable, hose and cable type wiring diagrams



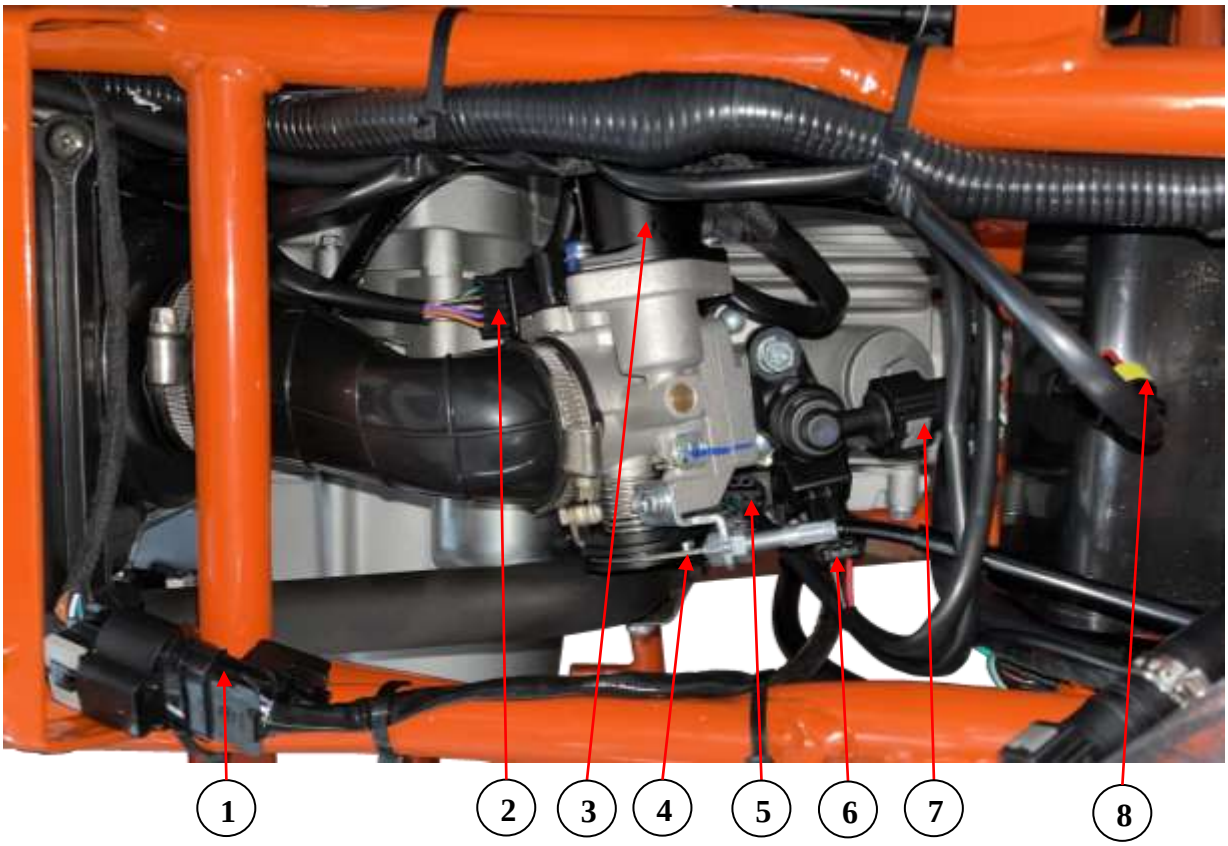

1、ECU connector 2、Fuel pump relay 3、ECU relay 4、Front headlight connector 5, headlight connector 6, ECU connector 7, front brake switch connector 8, rear brake switch connector 9、Fault light connector 10、Gear display connector 11、Electric door lock connector 12、Combination switch connector




1、Voltage regulator connector 2、Gear display connector 3、Magnetic motor connector connector 4、Voltage regulator connector 5、Brake switch connector (foot brake)



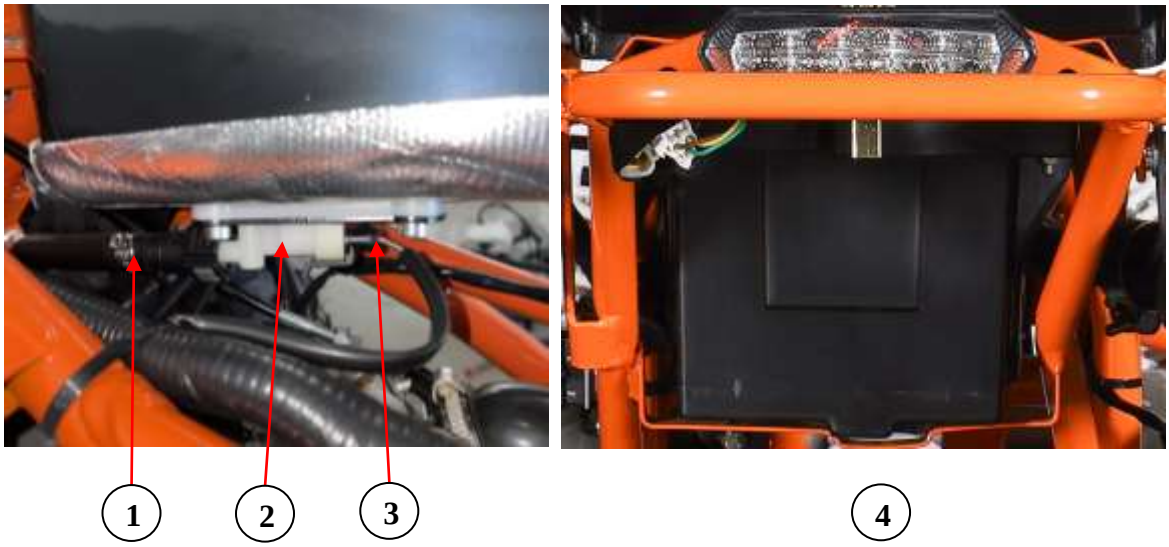

1, Fuse 2, OBD interface 3, Relay 4, 5, Battery positive and negative (red positive and black negative)



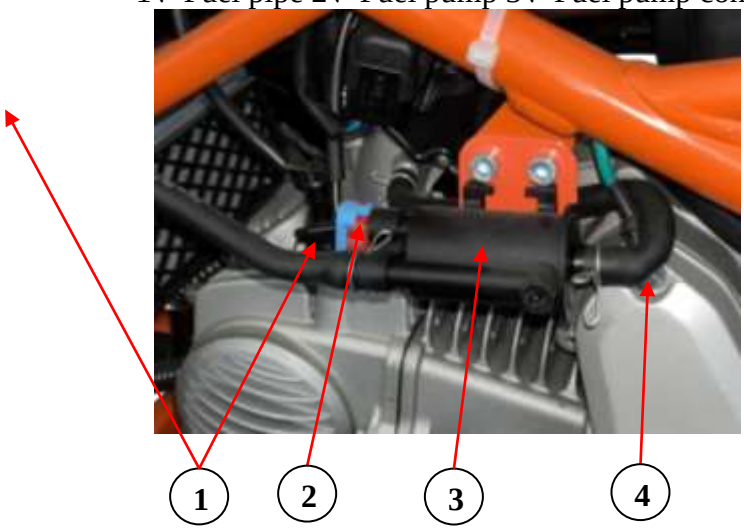

1、Cylinder temperature sensor connector 2、Three-in-one sensor connector 3、Step motor connector 4、Throttle cable 5、Cylinder temperature sensor connector 6、Injector connector 7、Fuel pipe 8、Fuel pump connector

1、Oxygen sensor connector 2、Spark plug cap 3、Oil cooler tube 4、Fuel fine filter 5 High pressure pack 6 High pressure pack ground wire

1、Parking handle 2、Front brake switch 3、Front brake hose 4、Throttle cable 5、Combination switch cable




1、Fuel pipe 2、Fuel pump 3、Fuel pump connector 4、Tail light/brake light connector




1、Cylinder temperature sensor connector 2、Carbon tank solenoid valve connector 3、Carbon tank solenoid valve 4、Engine hitch wire

**CAUTION: The molded parts assembly must be removed before the above parts can be inspected and serviced. See Chapter 2, Body Cladding, for specific disassembly.**

# 2 Body Cover

2.1 Inspection Information……..2-2
2.2 Mounting torque……2-2
2.3 Seat cushion removal ……2-3
2.4Hood Removal……....2-3
2.5 Removal and installation of gear display lampshade……2-3
2.6Removal and installation of plastic parts assembly and front and rear body assembly
2.6.1 Disassembly and assembly of plastic parts assembly……2-4
2.6.2 Front body assembly disassembly……..2-6
2.6.3 Rear body assembly removal……..2-7
2.7Removal and installation of chain cover……2-8
2.8 Left and right plastic footrests, left and right footrest guard brackets, left and right footrest guards, removal of left and right footrests
2.8.1 Left plastic footrest ……2-8
2.8.2 Left footrest guard bracket ……2-9
2.8.3 Left footrest guard ……..2-9
2.8.4 left pedal ……2-9
2.9 Removal and installation of the front guard …….....2-10

## 2.1 Inspection Information

Operating Precautions

When replacing the coverings on the vehicle that are affixed or riveted with regulatory warning labels, the corresponding labels must be correctly and completely made up in their original form.

This chapter describes the order of disassembly and installation of the body covering parts, and can be referred to when disassembling the relevant covering parts for overhauling the internal parts of the vehicle.

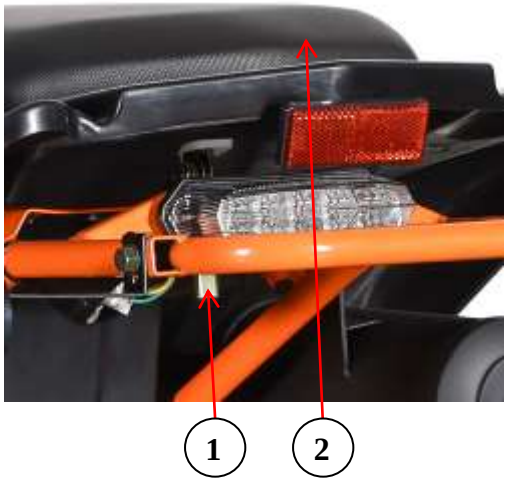
This chapter describes the disassembly operation of roof rack, seat cushion and exterior parts.

For tubes and cable pulls, please follow the cable, tube and cable pull wiring diagram to pass through from the correct position.

## 2.2 Mounting torque

| | | |
|---|---|---|
| M10 bolts | 45（4.5） | Torque N-m(kgf-m) |
| M8 bolt | 22（2.2） | Torque N-m(kgf-m) |
| M6 bolt | 10（1.0） | Torque N-m(kgf-m) |
| M5 bolts | 5（0.5） | Torque N-m(kgf-m) |
| Self-tapping screws | 4（0.4） | Torque N-m(kgf-m) |

## 2.3 Seat cushion removal




**Dismantle**

1.Toggle the seat cushion hook upwards 1

2.Lift up the back of the seat cushion and pull out the seat cushion backwards 2

**Mounting**

Installation is done in the reverse order of removal.

Check that the seat cushion is in place and secure after installation.

## 2.4 Hood Removal

**Dismantle**

1.Remove retaining bolt 1

2.Unplug the headlight insert

3.Remove cowl 2

**Mounting**

Installation in reverse order of removal

**CAUTION: 2 circle part of the snap position need to be pushed inward, and then slowly remove the cowl**

## 2.5 Removal and installation of the front gear display lampshade

**Dismantle**

1.Remove the cowl (→2.4)

2.Unplug the inserts for the malfunction lamp, ge1.1.1 gear display and 3.2.1 electric door locks.

3.Remove the fixing bolts 1

4.Remove the gear display lampshade 2

**Mounting**

**Installation is performed in reverse order of disassembly**

## 2.6 Removal and installation of plastic assemblies and front and rear bodies

### 2.6.1 Plastic Parts Assembly

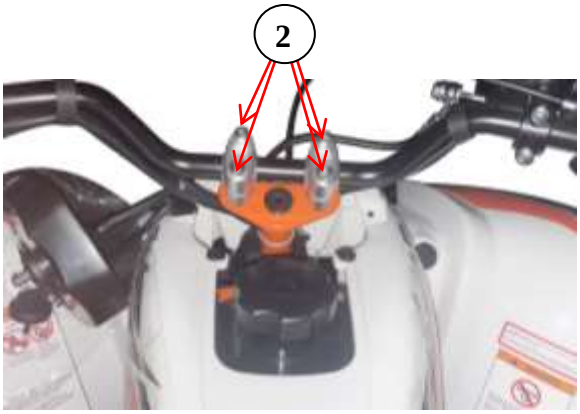
**Dismantle**

1.Remove the seat cushion, front gear show light cover, cowl and throttle cable
2.Unplug all inserts under the cowl

3.Remove disc brake upper pump 1

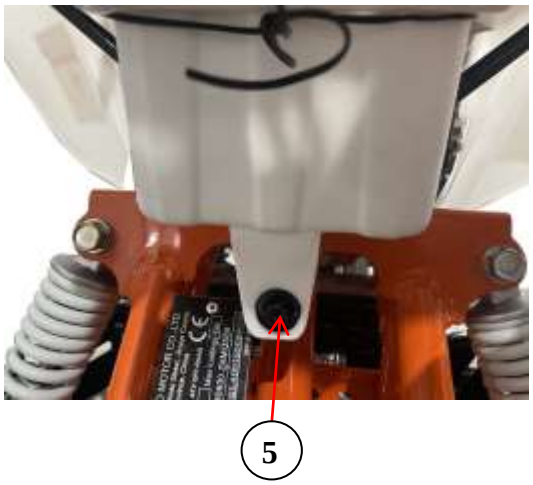
4.Remove the bolts holding the steering handle assembly 3

5.Remove the steering handle assembly

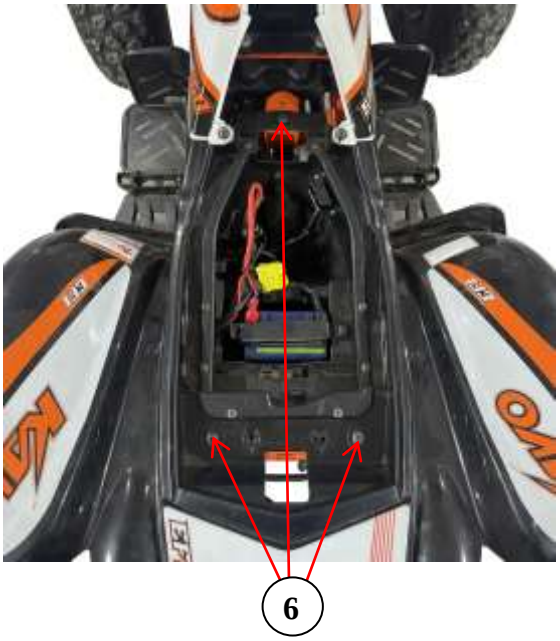



6.Remove the bolts securing the front body 4
(two on each side)

7.Remove the bolts securing the front body 5




8.Remove the bolts securing the rear body 6

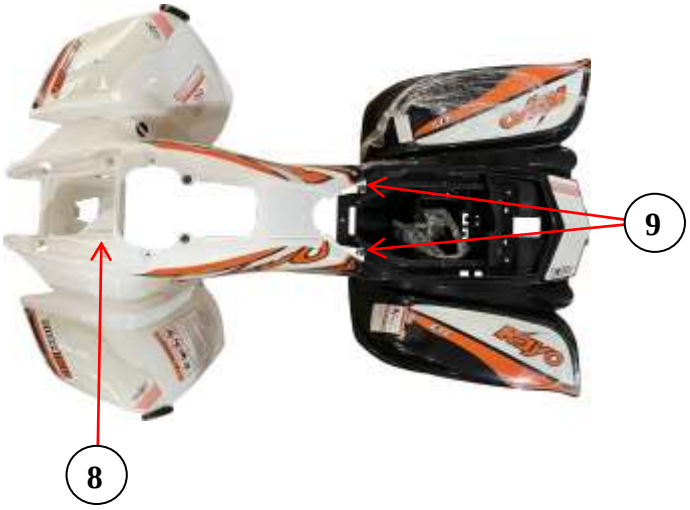



9.Remove the bolts securing the rear body 7
(One for each side)

10.To remove the plastic assembly 8

11.Remove fixing bolts 9

12.The front and rear bodies can be separated




**2.6.2 Front body assembly disassembly**

**Dismantle**

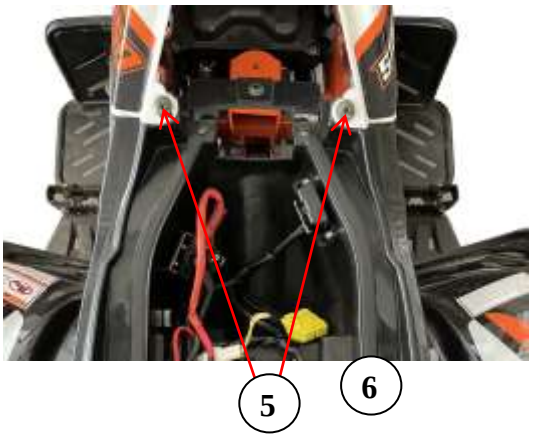
1.Remove the gearshift lampshade (→ 2.5)
2.Remove the cowl (→2.4)
3.Unplug all inserts and ECU
4.Remove the seat cushion (→2.3)
5.Remove the center shield fixing bolt 1
6.Remove the center shield 2

7.Remove the front body and frame fixing bolts 3
8.Remove the front body fixing bolts 4 (2 on each side)
9.Remove the front and rear body bolts 5.

10.You can remove the front body assembly 6

**Mounting**

Installation is performed in reverse order of disassembly




**CAUTION**

Unplug the cables, headlight inserts, combination switch inserts, and ECU inserts from the front body before disassembly, and check the cables and plugs, etc., after installation to prevent misconnections.

### 2.6.3 Rear body assembly removal

**Dismantle**

1.Remove the seat cushion
2.Remove battery, OBD port, relay and tail light inserts

3.Remove rear body fixing bolts 1 (1 each on left and right)

4.Remove rear body fixing bolts to the frame 2

5.Remove the front and rear body attachment bolts 3

6.Remove the battery holder fixing bolts 4

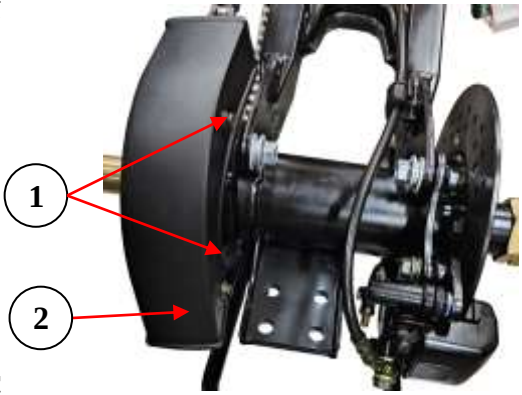
7.Remove the battery 5

8.Remove the rear body 6

**Installation**
Installation is performed in reverse order of disassembly

**Attention.**
Turn the ignition switch off, remove the positive battery terminal first, and install the negative battery terminal first. Check the removed electrical appliances, cables, etc. after installation.

## 2.7 Removal and installation of chain cover




**Dismantle**

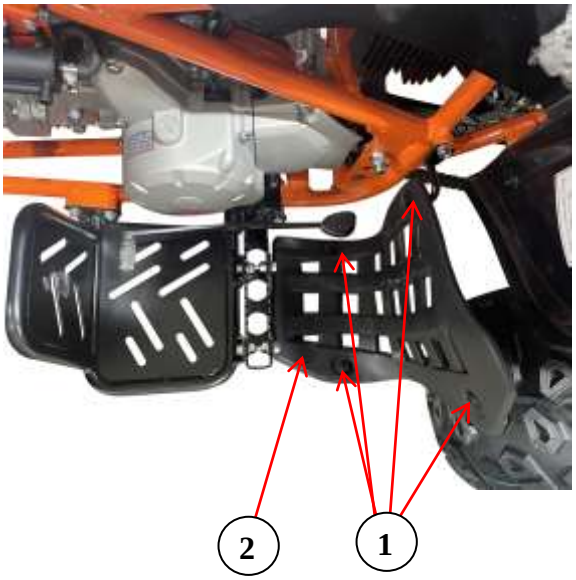
1.Remove fixing bolt 1

2.Remove the chain cover 2

**Mounting**

Installation in reverse order of removal

## 2.8 Left and right plastic footrests, left and right footrest guard brackets, left and right footrest guards, removal of left and right footrests




### 2.8.1 Left plastic footrest

**Dismantle**

1.Remove the four fixing bolts 1

2.Remove the left plastic footrest 2

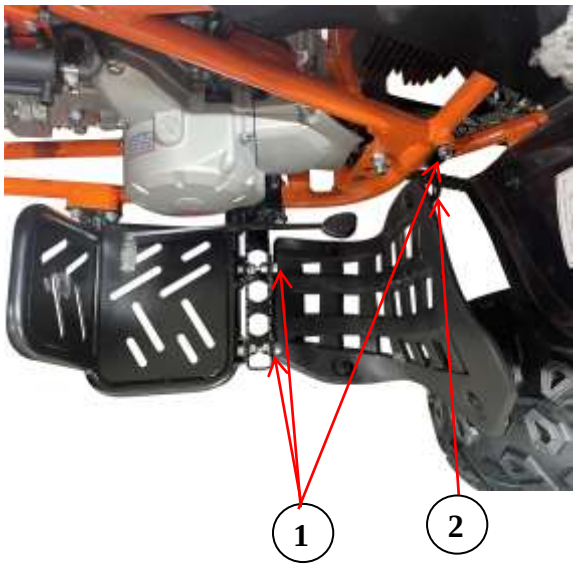
**Mounting**

Installation in reverse order of removal

**CAUTION**

Removal of the right plastic footrest is the same as the left plastic footrest except for the direction.

### 2.8.2 Left footrest guard bracket




**Dismantle**

1.Remove the left plastic footrest (→ 2.8.1)

2.Remove the guard bracket fixing bolt 1

3.Remove the left footrest guard bracket 2

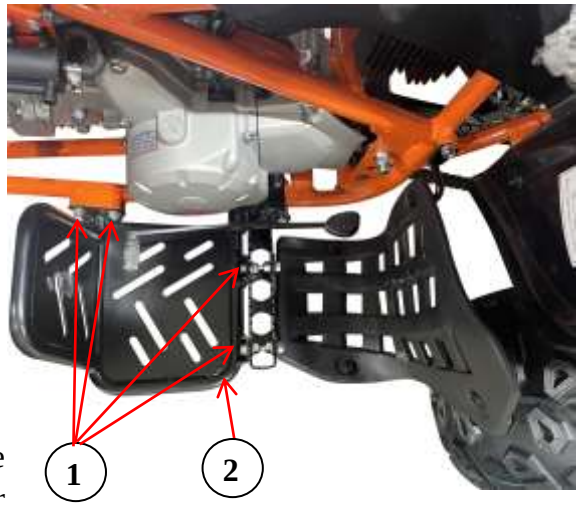
**Mounting**

Installation in reverse order of removal

**CAUTION**

Remove the right pedal guard bracket in the same direction as the left pedal guard bracket.

### 2.8.3 Left footrest guard




**Dismantle**

1.Remove the shield fixing bolt 1

2.Remove the left pedal guard 2

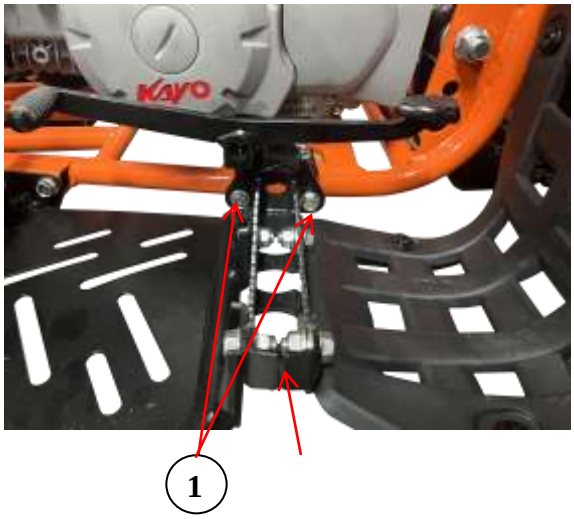
**Mounting**

Installation in reverse order of removal

**CAUTION**

Removal of the right pedal guard is the same as the left pedal guard except for the direction.

### 2.8.4 Left pedal




**Dismantle**

1.Remove the left plastic footrest assembly (→2.8.2)

2.Remove the left footrest guard (→ 2.8.3)

3.Remove the left footrest and frame fixing bolt 1

4.Remove the left footrest 2

**Mounting**

Installation in reverse order of removal

**CAUTION**

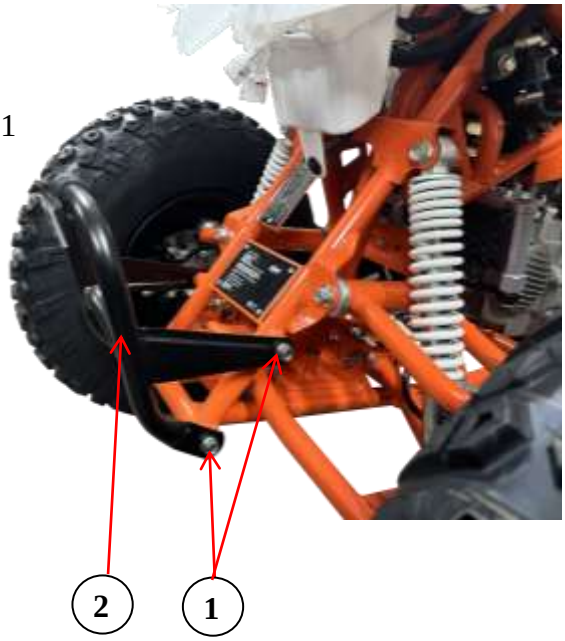
The right pedal is disassembled in the same way as the left pedal except for the direction.

## 2.9 Removal and installation of the front guard

### Dismantle

1.Remove the front guard fixing bolts 1 (2 each on the left and right)

2.Remove front guard 2




### Mounting

Installation in reverse order of removal

# 3 Periodic Inspection and Adjustment

Inspection Information……3-1
3.1 Determination of maintenance intervals……3-2
3.2 Inspection and maintenance methods……3-3
3.3 Steering column, brake system……..3-6
3.4 Wheel……..3-10
3.5 Suspension system……..3-13
3.6 Shift mechanism, fuel unit……..…3-14
3.7 Throttle check…….3-15
3.8 Air intake system check……..3-15
3.9 Lighting……..3-16
3.10 Gear meter and malfunction lamp ……3-14

## Inspection Information

**Precautions for operation**

**CAUTION**

As the exhaust contains carbon monoxide (CO ) and other toxic components, do not run the engine for a long time in a closed place or a poorly ventilated place.

When the engine is stopped, the temperature of the muffler and engine is still very high, and if it comes into contact with your skin, you may get burned. If you must perform maintenance when the engine has just stopped, you must wear long-sleeved coveralls and gloves.

Gasoline is very flammable, and fireworks are strictly prohibited in the workplace. Pay special attention not only to open flames but also to electrical sparks. In addition, work should be performed in a well-ventilated area because of the risk of explosion from evaporated gasoline.

**CAUTION**

Don't let rotary parts such as the drive system pinch your hands and clothes.

**CAUTION**

The vehicle must be placed on a flat, stable surface.

## 3.1 Determination of maintenance intervals

To keep the performance good, the motorcycle should be checked and maintained at certain interval. The meanings of capital in following table are:

I: Inspection, including check, clean, lubricate, refuel, repair or replacing if necessary. A: Inspection, adjusting if necessary

C: Cleaning R: Replacing L: Lubricate

| Maintenance period / Items | Odometer(km) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 750 | 3000 | 4000 | 6000 | 8000 | 9000 | Everyday check before riding |
| **Re-seating Valve | | I | | I | | I | |
| **Spark Plug | | I | | R | | I | |
| **Fuel System | | I | | I | | I | |
| *Engine Oil | R | R | | R | | R | |
| *Valve Gap | | I/A | | I/A | | I/A | |
| *Idle Speed | | A | | A | | A | |
| *Engine Bolt | I | I | | I | | I | |
| *Engine Oil Filter | C | C | | C | | C | |
| *Fuel Pump | | | I | | I | | |
| *Air Cleaner | | C | | R | | C | |
| *Fuel Filter | | R | | R | | R | |
| *Cooling System | | I | | I | | I | |
| Engine Mount | | I | | I | | I | |
| Fuel Line | | I | | I | | I | |
| Throttle Operation | | I | | I | | I | |
| Brake Shoes/Pad Wear | | I | | I | | I | |
| Brake System | | I | | I | | I | |
| Brake Liquid | | I | | I | | I | |
| Suspension | | I | | I | | I | |
| Nuts,Bolts,Fasteners | | I | | I | | I | |
| Wheel/Trye | | I | | I | | I | |
| Steering System | | I | | I | | I | |

## 3.2 Inspection Inspection Method

| Inspection and overhaul program | | | Overhaul period | | | Benchmark |
|---|---|---|---|---|---|---|
| Inspection area | | Inspection items | Daily | Semi-Annual | Annual | |
| turntable | steering wheels | Operational Flexibility | ○ | | | |
| | steering system | Damage | ○ | | | |
| | | Installation status of the steering system | ○ | | | |
| | | Ball pin wobble | ○ | | | |
| Detent | Brake Grip | Grip travel | ○ | ○ | | |
| | | Braking effect | ○ | ○ | | |
| | Connecting rods and tubes | Slack, looseness and damage | ○ | | ○ | |
| | Hydraulic brakes and discs | Front and rear brake fluid levels | ○ | ○ | | Brake fluid should be at or above the lower (LOWER) or higher |
| | | Brake disc wear and damage | ○ | ○ | | If the working disk thickness of the front brake disk is less than 3mm, the rear brake disk should be replaced in time.<br>If the working disk thickness of the front brake disk is less than 3mm and the working disk thickness of the rear brake disk is less than 3mm, it should be replaced in time. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | brake pad | Brake pad wear and damage | ○ | ○ | | Minimum brake pad (friction plate) thickness ≥ 1mm; replace if less than 1mm. |
| Walking device | wheel | tire pressure | ○ | ○ | | Front wheel: 28kPa (0.28kgf/ cm2) Rear wheel: 28kPa (0.28kgf/ cm2) |
| | | Cracked and damaged tires | ○ | | ○ | |
| | | Tire groove depth and abnormal wear | ○ | | ○ | If there is no indication of wear on the tire tread, the residual groove depth should be less than 3mm. If there are no wear indications on the tread, the residual grooves should have a depth dimension of not less than 3 mm. |
| | | Loose wheel nuts and wheel spindles | ○ | ○ | | |
| | | Front wheel bearing wobble | ○ | | ○ | |
| | | Rear wheel bearing wobble | ○ | | ○ | |
| Buffer | suspension arm | Wobbling of joints and damage to swingarms | ○ | | ○ | |
| | shock absorber | Oil leakage and damage | ○ | | ○ | |
| | | Function | | | ○ | |
| Transmission | Front axle | Transmission, lubrication | ○ | | ○ | |
| | rear axle | Transmission, lubrication | ○ | | ○ | |
| | transmission | Oil leakage and oil quantity | ○ | | ○ | Loosen the filler bolt port, |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | oil<br>To the orifice |

| Inspection and overhaul program | | | Overhaul period | | | |
|---|---|---|---|---|---|---|
| Inspection area | | Inspection items | Daily | Semi-Annual | Annual | benchmark |
| transmission | Output shaft (Drive shaft) | Loose connection | ○ | ○ | | |
| | | Spline wobble | | | ○ | |
| Electrical installations | Ignition | Spark plug condition | | ○ | | Spark plug gap: 0.6mm~0.7mm |
| | | Ignition period | | ○ | | |
| | Batteries | Condition of terminal connections | | | ○ | |
| | Electrical wiring | Loose or damaged connections | | | ○ | |
| fuel fabrication equipment | | Fuel leakage | | ○ | | |
| | | State of the throttle | | | ○ | Throttle knob clearance: 3 ~ 5mm |
| Lights & Turning Indicators | | action | ○ | ○ | | |
| Alarms & Locking Devices | | action | | | ○ | |
| Gauges | | action | | | ○ | |
| Exhaust pipes and mufflers | | Installation without looseness and damage | | | ○ | |
| | | Muffler function | | | ○ | |
| Frames | | Looseness and damage | | | ○ | |
| Others | | Lubrication and grease condition of all parts of the frame | | | ○ | |
| Parts that can be recognized as abnormal during operation | | Confirmation of any abnormalities in the relevant parts | ○ | | | |

Tighten all nuts, bolts and nuts. Care must be taken that all calibrated nuts, bolts and locknuts are tightened to the specified torque.

## 3.3 Steering column, brake system

Place the vehicle on a level surface and hold the steering handle firmly in the direction shown in the illustration to check for wobble.

If you feel wobbling, confirm whether it is the steering column wobbling or other wobbling, and carry out maintenance accordingly.

If it is a wobble of the steering column, increase the locking force of the steering column locking nut or disassemble the steering column for repair.

Place the car in a horizontal position and slowly turn the steering handle to the left and right to confirm that it turns smoothly and flexibly. If you feel an obstruction in some places, check if there is any interference in the main cable assembly and pull cable type, if not observe the position of the end of the steering tie rod to confirm if there is any interference and if the steering bearing is damaged.

**CAUTION: It is important to make sure that the steering is flexible, otherwise an accident may occur due to the inability to control the direction of the handlebar.**

**Front brake handle clearance：**

Operate the front brake handle and check the braking effect and handle action.

Check the play at the front brake handle.

**Front Brake Pump Combination (Liquid volume)**

1.Check the brake fluid level

2.Remove the 2 exhaust screws and check the fluid level, when the fluid level is less than 2/1, the vehicle will not be able to continue to use at this time, you need to check the brake pump, brake pipe and the leakage of each connection, if the check is normal, you need to check the wear of the brake disc and brake pads. If they are damaged or worn below the service limit, replace them.

3.It is also necessary to check these items before each use of the vehicle

4.Remove the 2 exhaust screws1.

5.Remove the oil cup cover2

6.Replenish the brake fluid with KAYO's recommended fluid up to the upper limit line.

**CAUTION**

When replenishing brake fluid, do not mix in dust and water

To prevent chemical changes, use the specified grade of brake fluid.

Do not splash brake fluid on plastic or rubber surfaces as it may damage these parts.

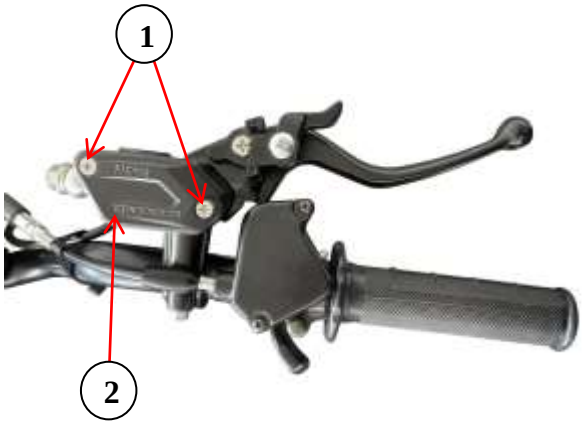
Turn the steering wheel slightly to the left or right, and remove the oil cup cover after the brake pump assembly is level.

**CAUTION: The rear brake pump combination is checked in the same way as the front brake pump combination.**

**CAUTION: Please check the brake fluid level from time to time, keep the fluid level in a safe position, check the oil circuit and connection points for damage, if any, please replace them in time, check the main pump/caliper for damage, if any, please replace them in time.**

**Check the oil circuit and connection points for damage, if any, please replace them in time, check the main pump/caliper for damage, if any, please replace them in time.**

**Note: Do not open the brake fluid cup for a long time.**



**Front brake discs, brake pads (wear of brake pads)**

Check brake pad wear

Replace brake pads if wear has reached wear limits

**CAUTION**

**Brake pads should be replaced as a set**

Inspection and Replacement of Brake Disc

Check the sliding surface of the brake disc 1 for wear and damage, and replace the brake disc if the current thickness of the brake disc is ⩽3.0mm

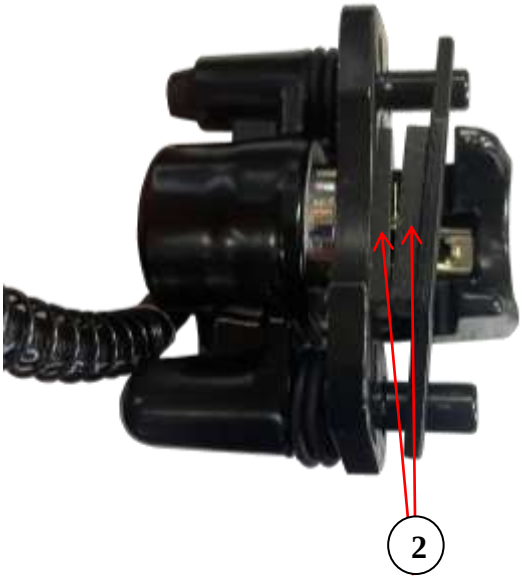
Thickness of front brake disk: 3.5mm

Check the minimum thickness of the brake friction disk 2

Minimum friction disk thickness ⩾ 1 mm

If it is less than the minimum thickness, replace the brake friction disc with a new one.

Check the brake friction discs for damage or cracks, if there are any, replace them with new ones.



**Rear brake disk, brake pads (brake pad wear)**

Check brake pad wear

Replace brake pads if wear has reached wear limits

**CAUTION**

**Brake pads should be replaced as a set**

Inspection and Replacement of Brake Disc

Check the sliding surface of the brake disc 1 for wear and damage, and replace the brake disc if the current thickness of the brake disc is ⩽3.0mm.

Thickness of the rear brake disk: 3.0mm

Check brake friction pads 2 for faults and wear.

Minimum friction disk thickness A ⩾ 1 mm

If less than the minimum friction disk thickness, replace the brake friction disk with a new one.

Check the brake friction pads for damage or cracks, if damaged or cracked, replace with new brake friction pads.

**Oil change (brake fluid change)**

Brake fluid changed annually

## 3.4 Wheel

Jack up the front wheel with a tool in a horizontal position, make sure that the car body does not have any force on the wheel, shake the front wheel from side to side, check whether the connection of the front wheel is firm, check whether there is any wobbling

If there is any wobble, check and tighten the rocker arm, axle, rim bolts and nuts.

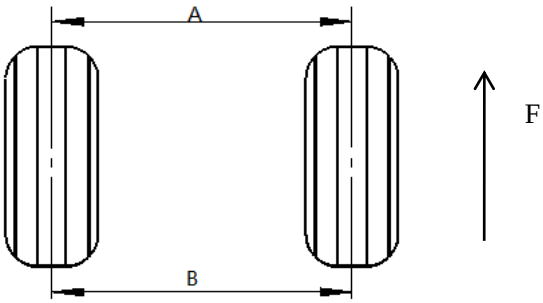
If there is still wobble, check and replace: bearings, rocker arm cushion bushings, ball pins.

Front Wheel Dimensions

Place the car body in horizontal position and measure the front beam size of the wheels; the front wheel in front of the wheel relative to the forward direction of the vehicle is: A, and the back of the wheel is: B.

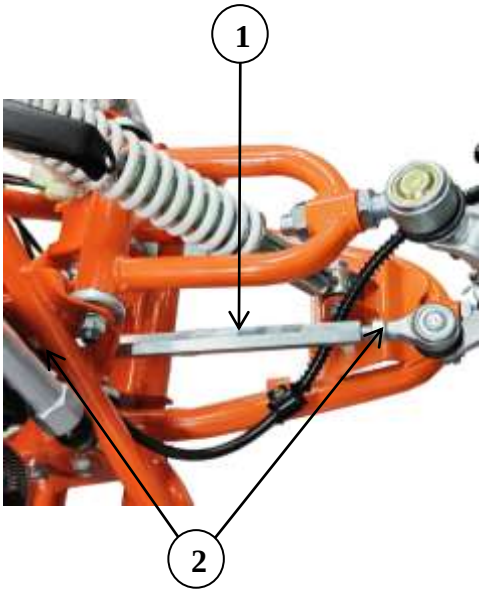
Front beam size: A-B=1.5 ~ 2.5mm

F is the forward direction



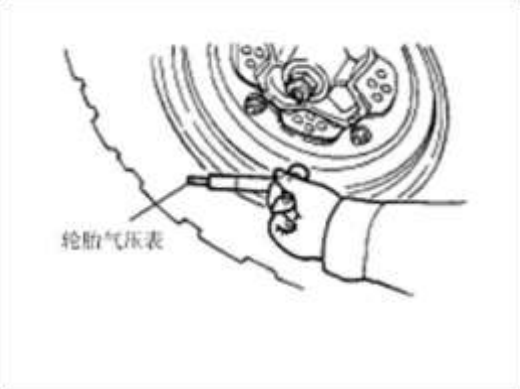

If not, adjust the lock nut 2 of the steering tie rods 1

**CAUTION：After the front beam size is adjusted, drive the whole car slowly to make sure that the handlebar can correctly constrain the direction of the car body**



**Tire pressure**

Use an air pressure gauge to check the air pressure in your tires.




**CAUTION**

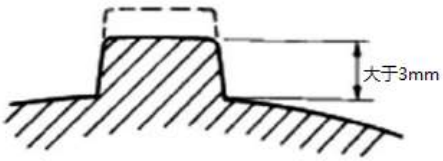
**Tire pressure should be checked in the tire cooling state. If the tire pressure is not appropriate state use, will make the operation and ride comfort deteriorate, resulting in tire bias wear and other adverse**
**effects.**

Specify air pressure/tire

| | front wheel | rear wheel |
|---|---|---|
| Air Pressure | 35kPa（0 .28kgf/cm²） | 35kPa（0.28kgf/cm²） |
| Tire Size | See chapter I | See chapter I |

**tread (on tires)**

Check the tire tread and replace the tire with a new one if the tread height is less than 3mm.




**CAUTION**

**Tire tread less than 3mm must be replaced immediately**

Wheel nuts and wheel axles

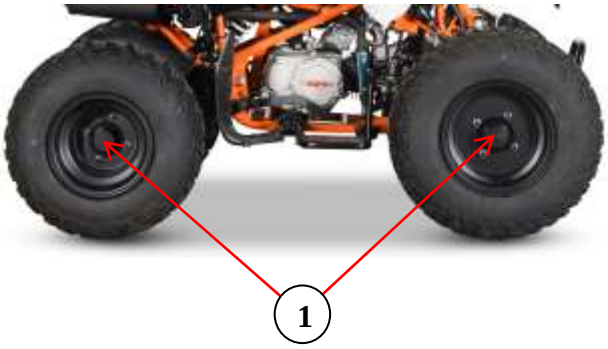
Check front axle, rear axle nut 1 and pin for looseness.

If loose, tighten to specified torque.

Torque:

Front axle nut: 49N-mm to 59N-mm (5.0kgf-mm to 6.0kgf-mm)

Rear axle nut: 55N-mm to 66N-mm (5.5kgf-mm to 6.6kgf-mm)




Wheel hub wobble

Set up the front wheel with a tool and check for wobble by rocking the wheel axially with no body force acting on the front wheel.

If there is wobble, remove the front wheel and check the wheel hub.

## 3.5 Suspension system

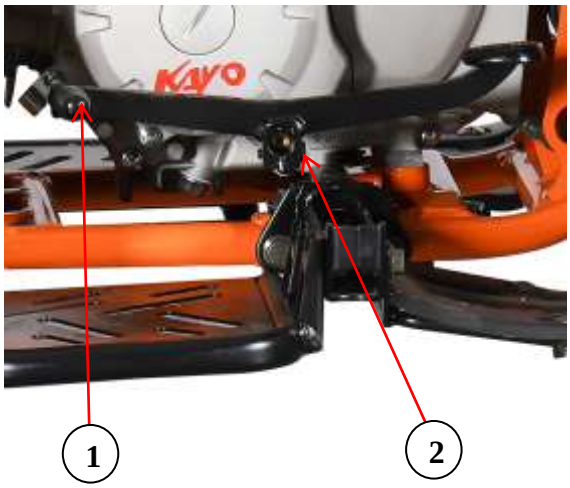
Put the car body on the horizontal position, according to the position shown in the figure up and down compression of the car body several times, if there is shaking or noise, check the shock absorber has no oil leakage, the fastening parts of the damage, loose and so on.

**Shock absorber adjustment**

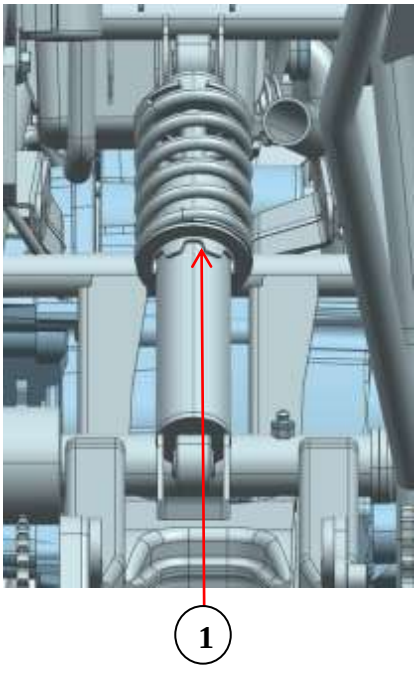
Adjustment of the shock absorber with a special tool according to the load 1
Clockwise rotation is from high to low, counterclockwise rotation is from low to high two-way adjustable, can be adjusted according to the comfort of riding according to the needs of customers.
(Note: the front shock absorber is not adjustable)

## 3.6 Shift mechanism, fuel unit

Shift mechanism
Change gears, check whether the gearshift mechanism 1 is flexible and whether the gears are in gear, if the gearshift is not flexible, adjust and tighten the gearshift tie rod bolts 2



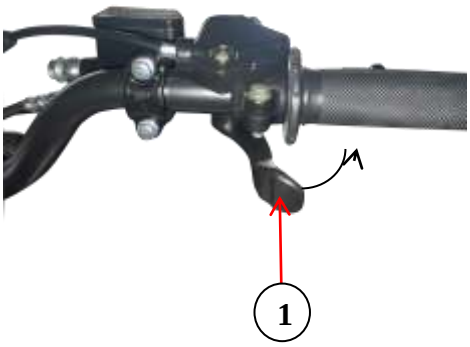

Fuel Installation
Status of the fuel system
Remove the seat cushion (→ 2.3.1).
Check the fuel pipe for deterioration and damage.
Check the gasoline fine filter for accumulation of impurities or damage, and replace it with a new product in time.
Replace the fuel pipe with a new product if there is aging or damage.
Check the fuel tank vent pipe or the adsorption pipe of the fuel evaporation system for cracks and bends, and replace with a new product if it is damaged.



## 3.7 Throttle check.

Check free travel of throttle pushbutton 1

**Clearance: 2 ~ 6 mm**




If the clearance is not within the specified range, adjust the clearance.

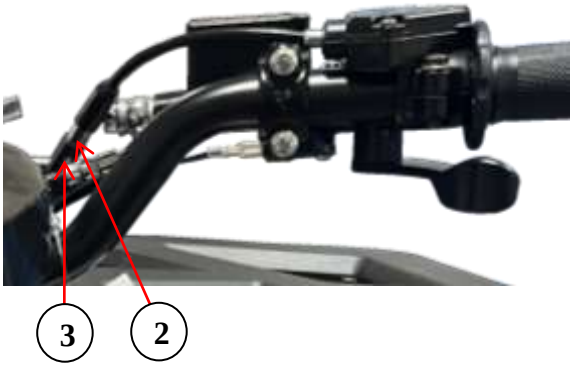
1.Remove the sleeve 3

2.Loosen the throttle cable lock nut 2

3.Adjust the free travel of the throttle button by turning the adjuster.

After adjustment, tighten the lock nut 2 and install the throttle cable sheath 3.

If the adjustment of the regulator still fails to achieve the required clearance or if the movement is still not flexible, replace the throttle cable with a new one.




## 3.8 Air intake system check

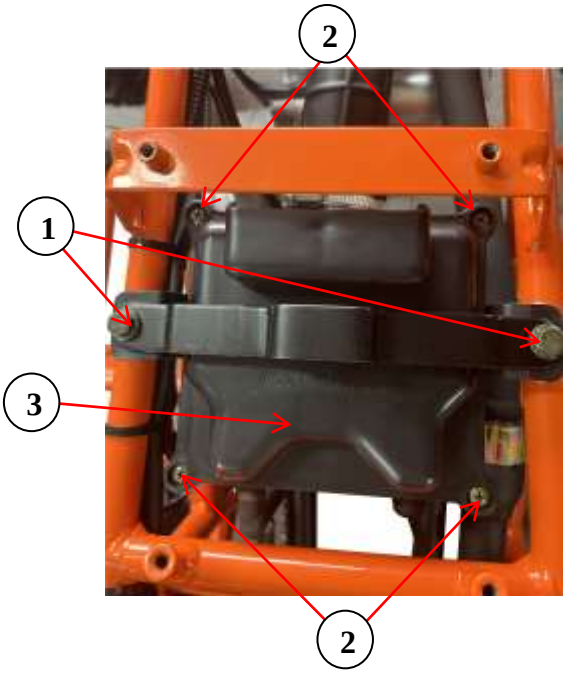
A dirty air filter element will affect air intake, reduce engine power, and should be serviced more frequently than the maintenance schedule if the operating area is dusty.

1.Remove the seat cushion and front body assembly

2.Remove the air filter retaining bolt 1

3.Remove the air filter upper cover fixing bolts 2

4.Remove the upper cover of the air filter 3




## Cleaning or replacing the cartridge

## 3.9 Lighting

**CAUTION：Before checking the light fittings, the entire vehicle system is required to be energized**

**Headlight Inspection**

Push the headlight switch 1 forward, observe whether the vehicle headlights are on, if not, please check the wiring is not connected to the wrong, if the wiring is correct, please replace the headlights in time

**Tail light inspection**

Squeeze the brake handle with your hand and observe the tail light, if the tail light does not light up, please check whether the wiring is connected incorrectly, if the wiring is correct, please replace the tail light in time.

## 3.10 Gear display meter and malfunction lamp

**Check Display Table**

**When the entire vehicle system is first energized (or after the first replacement of the gear display meter)**Turn on the power to start the engine, the driving process were hung up each gear, should pay attention to the display table were shown on the gear is correct, if not, should be timely maintenance

**Check fault light**

Normal mode:

Turn on the ignition switch, the ECU is initialized, the malfunction lamp is on, and the MIL lamp goes out immediately after the engine is started successfully. If the malfunction light goes from off to always on, it reminds the driver that there is a malfunction. When the engine is turned off, the current fault will be converted to historical faults stored in the EFI ECU. Read the fault code through the OBD interface to repair the fault in time.

# 4 Engine Periphery

Inspection Information……...4-1
4.1 Fuel system……..4-2
4.2 Air intake system……4-3
4.3 Exhaust system……4-4
4.4 Engine Removal and Installation…….....4-6

## Inspection Information

**Precautions for operation**

Please ensure that the vehicle is turned off and left to stand for not less than 1 hour to confirm that the hot parts are cooled down before carrying out repairs, so as not to cause injury to the maintenance personnel.

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

When removing the engine, the frame should be wrapped to protect the frame.

When the engine is dismantled, appropriate containers should be prepared to receive coolant, oil and fuel to protect the environment, and coolant and oil should be replenished according to the requirements when installing the engine.

| | | |
|---|---|---|
| Lower engine mounting bolts | Army Green M8×35 Half Thread | 25~30N·m |
| Engine upper lug fixing bolts | Army green M8×16 w/pads/flat pads | 25~30N·m |
| Engine mounting bolts | Zinc blue white M8×110 | 60~68N·m |
| Rear engine mounting bolts | Zinc blue white M8×105 | 60~68N·m |

## 4.1 Fuel system

**Dismantle**

1.Remove the seat cushion, fuel tank cover, steering handle assembly, and front body assembly (→Chapter 2, Body covering parts).

2.Remove the mounting bolts 1

3.Remove the oil pipe to the carbon tank solenoid valve 2

4.Remove the fuel pump connecting pipe and its insert 3

5.Remove the fuel tank 4

**CAUTION**

**Gasoline is very flammable, so fireworks are strictly prohibited in the workplace.**

**Pay close attention to not only open flames but also electric sparks.**

**In addition, since there is a risk of explosion when gasoline evaporates (vaporizes), work should be done in a well-ventilated area.**

**When dismantling the fuel tank, if there is still fuel in the tank, the fuel pipeline should be tightly tied to prevent fuel leakage before dismantling the tank.**

After the engine stops running for quite a long time, the fuel pressure in the fuel line also remains high. So do not easily dismantle the fuel pipe in the maintenance process, in the dismantling of the fuel pipe before the fuel system should be pressure relief.

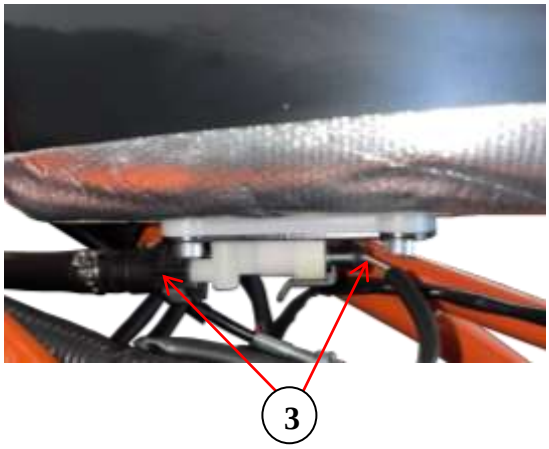
Pressure relief method: 1, the vehicle transmission is in “neutral” state; 2, disconnect the fuel pump assembly harness and vehicle wiring harness connection plug; 3, start the engine until the engine automatically shut off, and then continuously switch the ignition key 2-3 times, each time interval of 3 seconds, and then turn off the key switch;

After completing the above operations, the fuel line can be disassembled, and then reconnect the fuel pump assembly harness plug after the fuel line is reassembled.

## 4.2 Air intake system

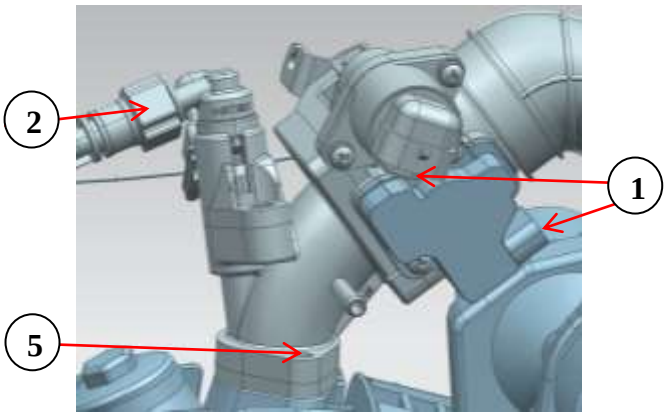
### Dismantle

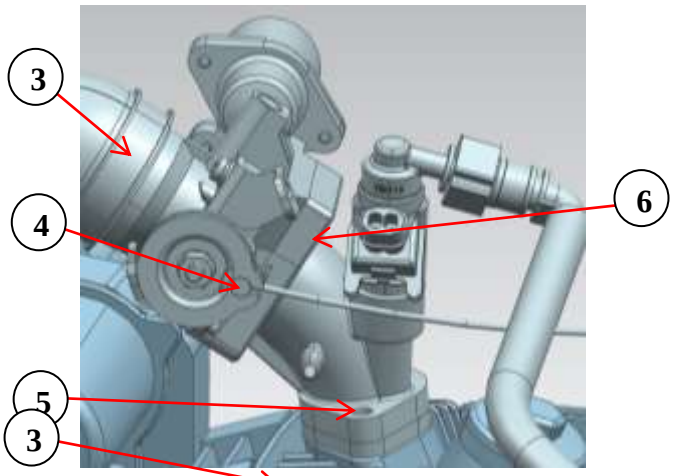
Remove the seat cushion, front and rear body assemblies ( → Chapter 2, Body covering parts), and fuel tank assembly.




### Throttle

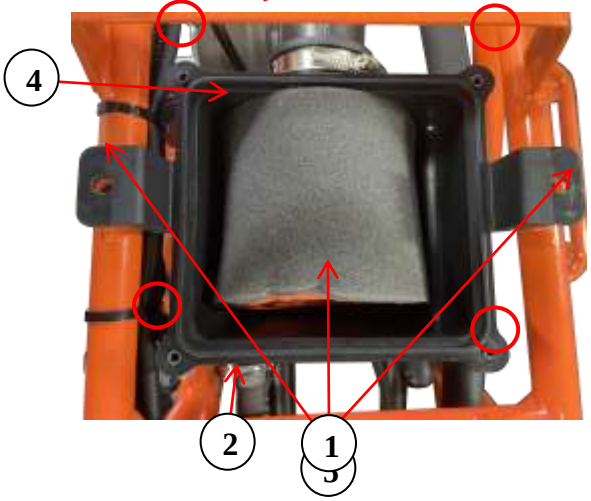
1.Remove the insert 1
2.Remove the fuel line to the carbon canister solenoid valve 2
3.Empty the air filter clamp 3
4.Remove the throttle cable 4
5.Remove the bolts securing it to the engine 5
6.Remove the throttle valve 6




### Air filter

1.Remove air filter retaining bolt 1
2.Pull out the air hose 2
3.Loosen the clamp 3
4.Remove the air filter 4

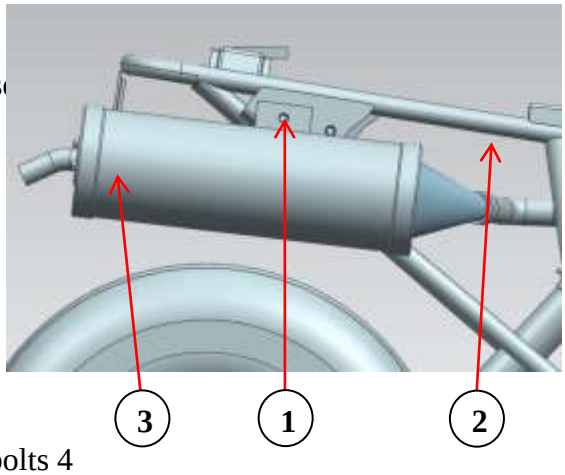


**CAUTION**
Remove the upper cover of the air filter
by removing the four bolts in the red circles to
replace and clean the filter element 5

**Mounting**
Installation in reverse order of removal

## 4.3 Exhaust system

**Dismantle**




1.Removing the seat cushion and rear body ass
(→Chapter 2 Body Cover)

2.Remove the muffler fixing bolt 1

3.Loosen the muffler clamp 2

4.Remove the muffler rear end 3

5.Remove the muffler and engine attachment bolts 4
(1 each on the left and right)

6.Remove the oxygen sensor insert 5

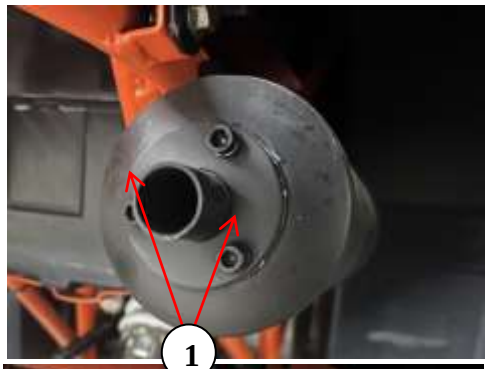
7.Remove the muffler front section 6

**Mounting**
Installation in reverse order of removal

## Spark arrester

### Dismantle

1.Remove the bolts securing the spark arrestor 1




2.Remove the spark arrestor 2

### Cleanse

1.Make sure the exhaust system is completely cool before cleaning.

2.Unscrew the screw securing the muffler end clamp to the flange of the spark arrester using a screwdriver.

3.Remove the exhaust end cap of the muffler and then carefully remove the spark arrester gasket from the muffler assembly.

4.Remove accumulated carbon on the spark arrester screen with soap and water and remove hard to remove carbon carefully

with a brass wire brush and then rinse and dry the spark arrester.

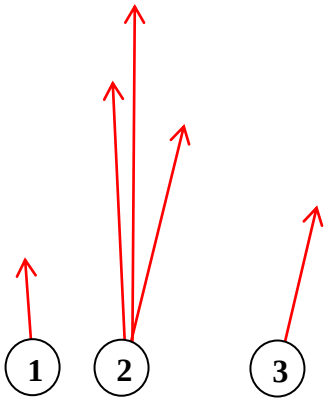
5.Clean and remove any carbon residue at the joint of the muffler flange and muffler.

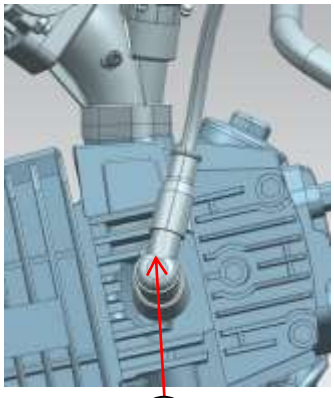
6.Insert the cleaned and dry spark arrester along with the gasket into the muffler assembly and replace the muffler end cap of the muffler assembly. And, then tighten the screw of the clamp securely. If the spark arrester clamp or gasket is torn or damaged, a new gasket can be ordered from our service department.

## 4.4 Engine Removal and Installation

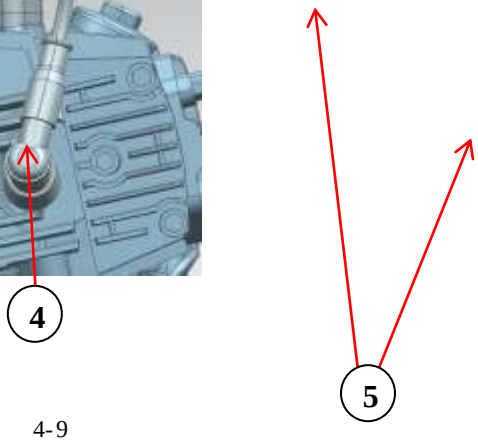
**Dismantle**

1.Remove the seat cushion, cowl, steering handle
2. assembly, front and rear body assemblies,
3. left and right footrests
4.(→Chapter 2 Body assembly, left and right footrests
5.Remove the intake and exhaust systems
6.Remove the engine cover1.
7.Unscrew the connectors of the voltage regulator, gear display, magneto, etc. 2.
8.Remove the chain3

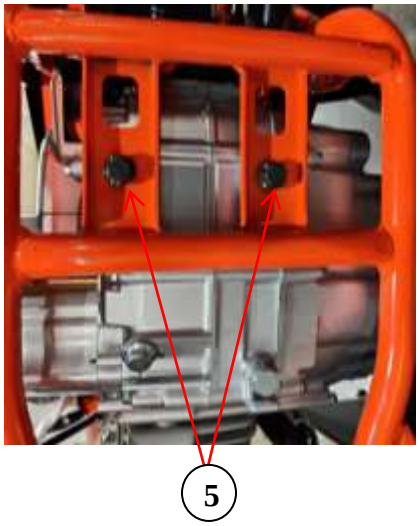


9.Remove the spark plug cap 4
10.Remove the engine mounting bolts 5



11.Remove engine mounting bolts 5




12.Remove engine left and right lug bolts 6

13.Remove the left and right engine lugs7

14.Remove the engine8

**Mounting**

Installation in reverse order of removal

# 5 Engine

5.1 Maintenance Information…….....5-2
5.2 Introduction to Fuel and Oil……5-3
5.3 Engine break-in…….…….....5-4
5.4 Engine Maintenance…….....…….……5-4
5.5 Maintenance of machinery…….....5-27
5.6 Carburetor removal and maintenance.....…….....……..5-36
5.7 Intake and exhaust system maintenance……..5-39
5.8 Gas system disassembly, assembly and maintenance…….....…….....5-40
5.9 Disassembly, assembly and maintenance of make-up air systems……..5-41
5.10Disassembly, assembly and maintenance of management electric starters……5-43

## 5.1 Maintenance Information

# Conversion tables for units in this book

| Item | unit conversion |
|---|---|
| stresses | 1kgf/cm$^2$=98.0665kPa　1kPa=1000Pa<br>1mmHg=133.322Pa=0.133322kPa |
| torsion | 1kgf·m=9.80665N·m |
| volumetric | 1ml=1cm$^3$=1cc<br>1L=1000cm$^3$ |
| torques | 1kgf=9.80665N |

维修注

# Danger / Warning / Caution

Please read the following explanatory notes carefully, which emphasize the specific meanings of the terms DANGER, WARNING, and CAUTION, and pay particular attention to their salient meanings when servicing the engine.

**Danger: Indicates a high degree of alertness to a high degree of danger**

**WARNING: Indicates caution for moderate danger.**

**CAUTION: Indicates concern for minor hazards.**

However, please note that it is not possible to cover all the potential hazards in the use and maintenance of the engine with the DANGERS and WARNINGS contained in this service manual, therefore, in addition to the DANGERS and WARNINGS, the service technician must also have a basic knowledge of mechanical safety. “Therefore, in addition to the DANGERS and WARNINGS, the service technician must also have a basic knowledge of machine safety. If you are unsure of how to perform the entire service procedure, please consult a more experienced technician.

### General precautions

**WARNING: The safety of the maintenance personnel and the reliability and safety of the engine are very important for proper maintenance.**

-When two or more people are working together, they should be safe with each other.

-When starting the engine indoors, make sure that the exhaust fumes are vented to the outside.

-When working with toxic or flammable substances, follow the manufacturer’s instructions and make sure that the workplace is well ventilated.

-Do not use gasoline as a cleaning fluid.

-To avoid burns, do not touch uncooled engine oil or exhaust system parts.

-If fuel, lubrication and exhaust systems have been serviced, they must be checked for scoring and leaks.

-To protect the natural environment, do not dispose of parts not used for oil changes.

## Warning：

-When replacing parts during maintenance, use genuine parts supplied by KAYO or recommended products.

-Keep the disassembled parts that need to be reused in order so that there is no confusion when assembling them.

-Ensure the use of specialized tools in accordance with the requirements specified in the maintenance manual.

-Ensure that the parts used for assembly are clean and lubricated where required.

-Use special lubricants, adhesives and sealants.

-When tightening bolts, screws, and nuts, tighten the larger ones first, and tighten them from the inside out to the specified torque.

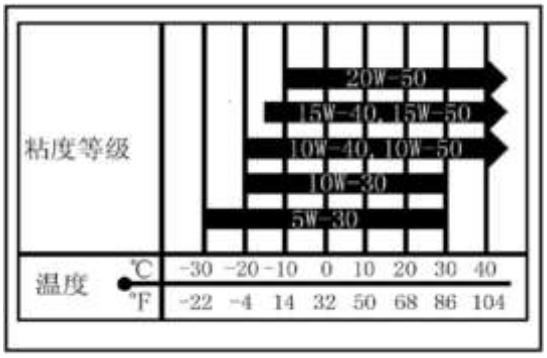
-Use a torque wrench to tighten bolts with torque requirements if there is grease and oil on the threads.

## 5.2 Introduction to Fuel and Oil

**WARNING: Engine oil should not be mixed with other brands of engine oil!**

**fuel oil：** Use of unleaded gasoline

**oil：** Use 15W/40-SF oil for 4-stroke motorcycles with a quality grade of API Classification SF or higher. If 15W/40-SF oil is not available, select the appropriate oil according to the ambient temperature of the engine being used as shown in the chart on the right.




## 5.3 Engine break-in

The engine has many parts in relative motion, such as piston, piston ring, cylinder block, intermeshing transmission gear, etc. Therefore, in the early stage of its use, it is necessary to carry out the standardized grinding, grinding can make the moving parts to adapt to each other, calibrate the working clearance, the formation of a good smooth friction surface capable of withstanding large loads, the standardized grinding of the engine, only with excellent performance and reliability.

The recommended break-in time is 20 hours with the following specifications:

**0～10 Hour**

Avoid continuous operation at ≥50% throttle, constantly changing speeds, and not operating at a fixed throttle position; cool the engine for 5 to 10 minutes after every hour of operation; avoid rapid acceleration, and change the throttle slowly, not abruptly.

**10～20 Hour**

Avoid running at greater than 3/4 throttle for extended periods of time, feel free to use but do not use full throttle.

## 5.4 Engine coding position

Engine coding position

Engine head displacement marking

Engine displacement marking

## 5.4Engine Maintenance

**Maintenance details**

| Frequency / Item | First maintenance | Maintenance cycle | |
|---|---|---|---|
| | After 300km or 1 month of use | After every 1000km or 6 months of use, whichever comes first. | After every 2000km or 1 year of use, whichever comes first. |
| Oil-Change | √ | | √ |
| Oil filter cleaning | √ | | √ |
| Air Filter Elements - Cleaning and Inspection | c | | |
| Idle-Check | √ | √ | |
| Valve lash - check | √ | | √ |
| Ventilation tubes and connections - check | | √ | |
| Spark Plugs - Cleaning and Gap Check | √ | | √ |

| | | | |
|---|---|---|---|
| Spark Plug Replacement | | | √ |
| Fuel lines and connections - check | | | √ |
| Valve Cleanliness - Check | √ | | √ |
| Spark Cap-Cleaning | | | √ |
| Clutch Clearance - Adjustment | | | √ |
| Reinstallation of valves - check | √ | √ | √ |
| Fuel system - check | √ | √ | √ |
| Engine Bolt-Inspection | √ | √ | √ |
| Fuel pump - check | | | √ |
| Fuel Filter - Replacement | | | √ |

## 5.5 Maintenance of Engine Body

### 5.4.1 Disassemble, assemble and maintain cylinder head

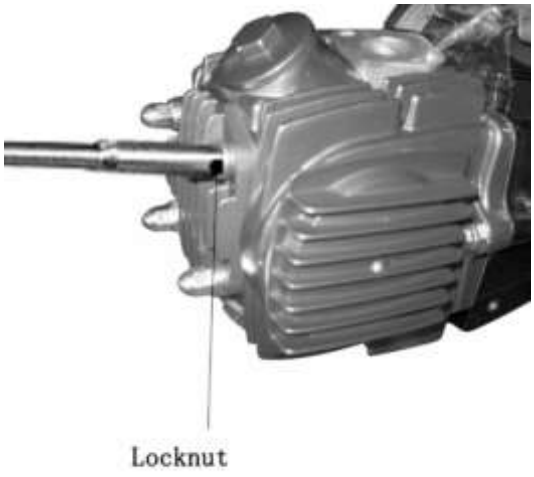
Right view of the engine is shown in the figure.

right view

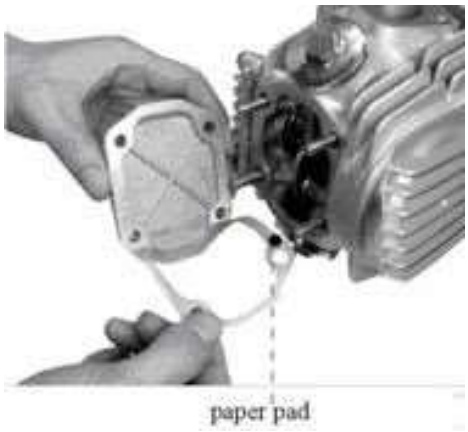
Left view of the engine is shown in the figure

left view

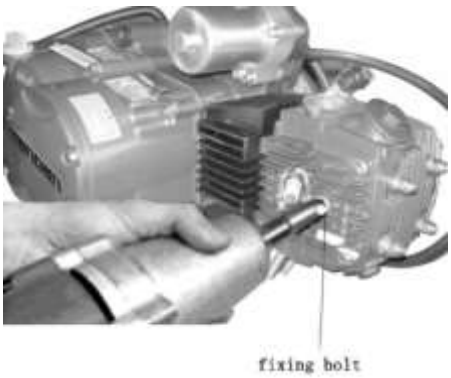
Remove the locknut of cylinder head from its holding place



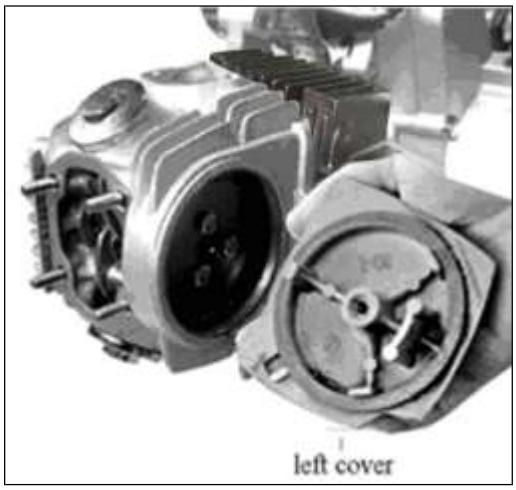

Remove cylinder head. Check the state of paper pad. Replace if necessary.



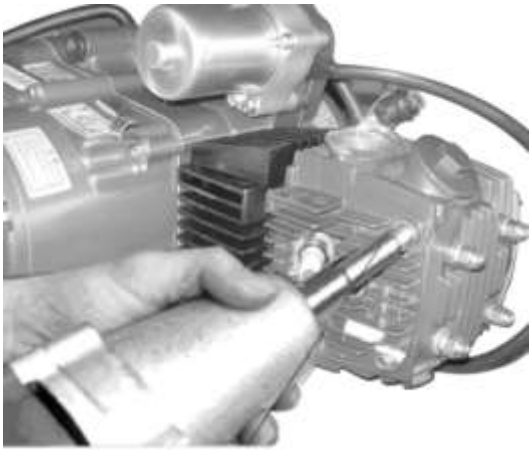

Dismantle the fixing bolt of left cover.




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




Dismantle the fixing bolt of right cover.

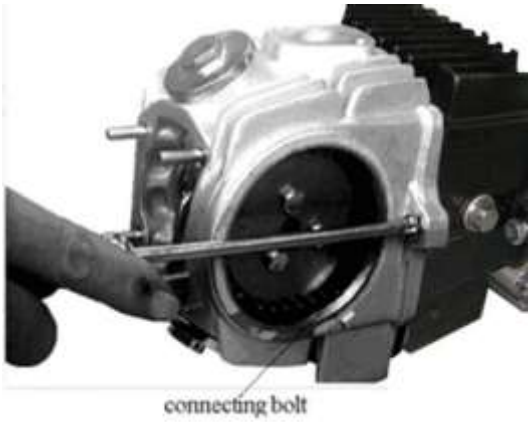


Remove the right cover of cylinder head. Inspect the gasket for damage and replace if necessary.Damage the gasket on the right cover and replace it if necessary.

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.

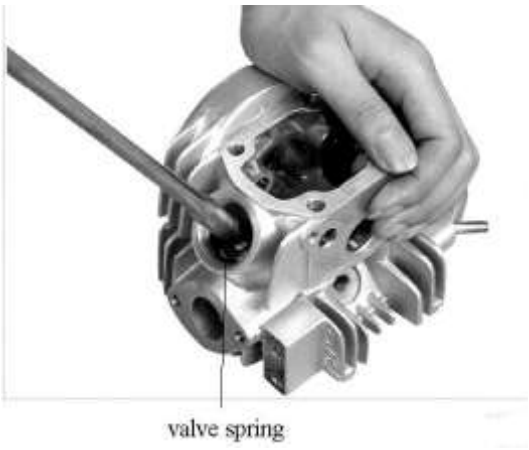
timing driven sprocket

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

combustion chamber

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

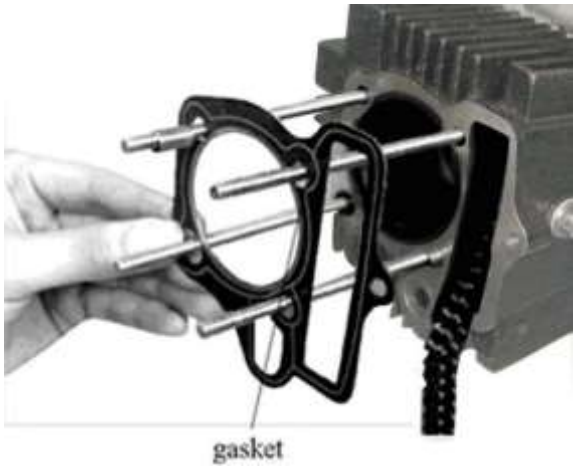
| Description | Damage Form | Problem | Cause | Correction |
|---|---|---|---|---|
| | Too much oil dirt or sand on the cooling fins. | Poor heat radiation of the fins on cylinder head. | The engine overheats. | Remove the oil dirt or sand |
| | Carbon deposit in the combustion chamber | Overheating head | The engine overheats | Remove the carbon deposit |

| | | | | |
|---|---|---|---|---|
| Cylinder head缸头 | 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 |
| | 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 |

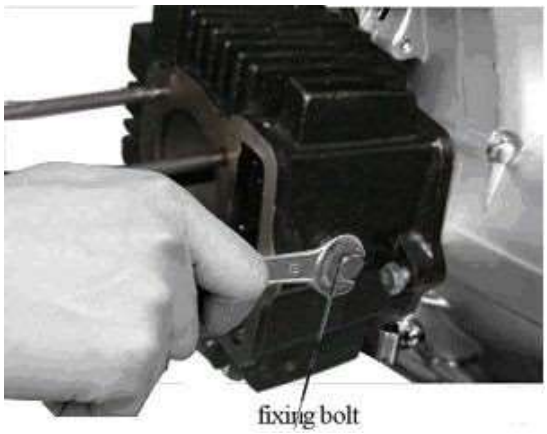
| | | | | |
|---|---|---|---|---|
| Spark plug火花塞 | The spark plug electrodes are jointed by carbon deposit | No sparking from the spark plug electrodes | The engine starts hard or fails to star | Remove the carbon deposit between the electrodes |
| | Excessive carbon deposit or oil dirt in the spark 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 |

## 5.4.2Disassemble, assemble and maintain cylinder block

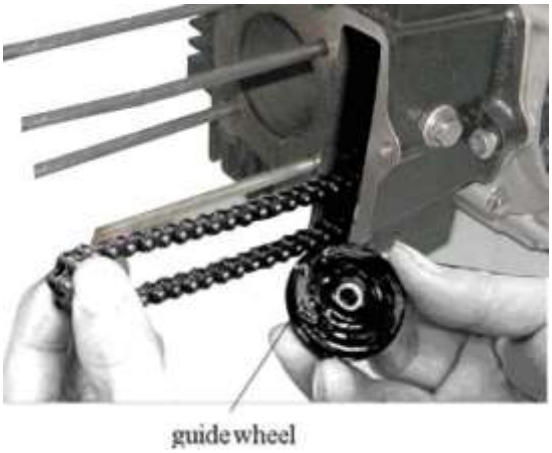
Remove cylinder gasket and dowel pin to check for wear and damage. Replace if necessary.



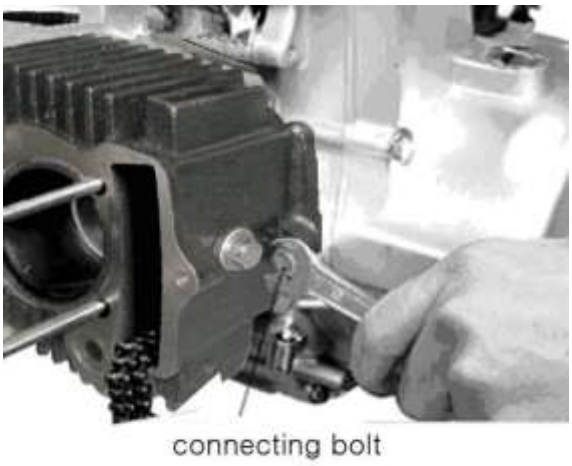

Dismantle the fixing bolt of timing chain of guide wheel.




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

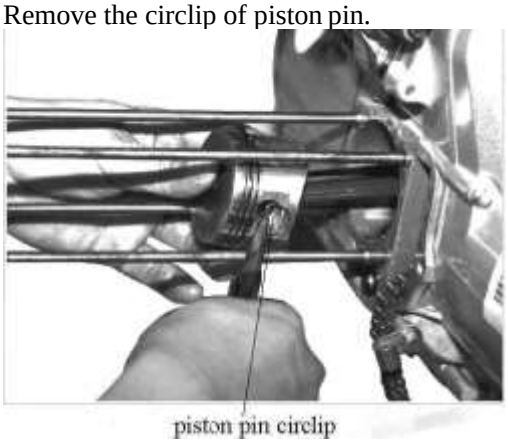



Dismantle connecting bolt of cylinder block.

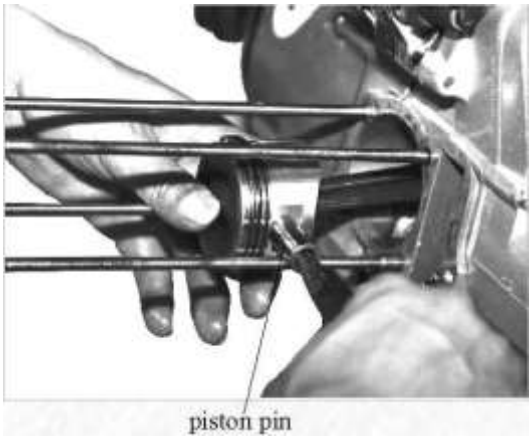



Remove the cylinder block.

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

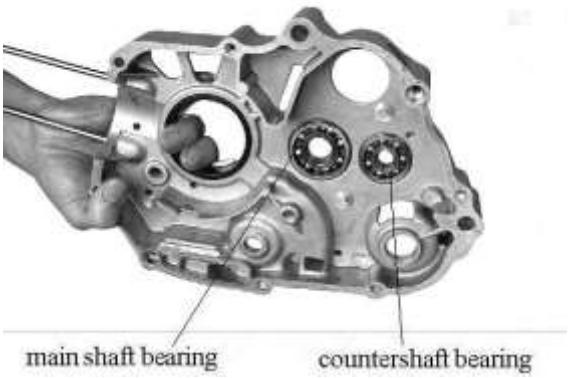
| Description | Damage form | Trouble | Cause | Correction |
|---|---|---|---|---|
| Cylinder body | Excessive oil dirt or sand on the radiating fins | Poor heat radiation of the fins on cylinder body | The engine overheats | Remove the oil dirt or sand |
| | Cylinder end surface badly distorted | Air 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 |

## 5.4.3Disassemble, assemble and maintain crankcase
## 5.4.3

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.

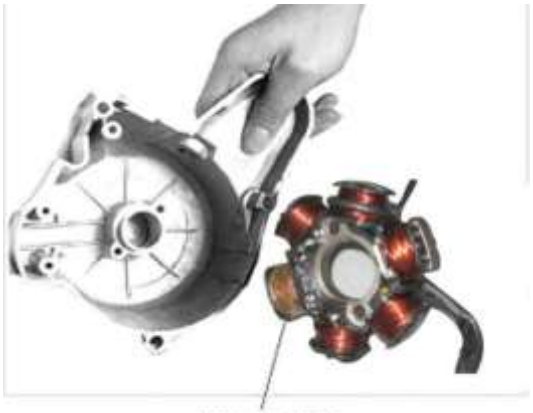
Left view of right crankcase half is shown in fig and check whether bearing of main shaft and countershaft are worn. Replace if necessary.



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 |

## 5.4.4Maintenance 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.

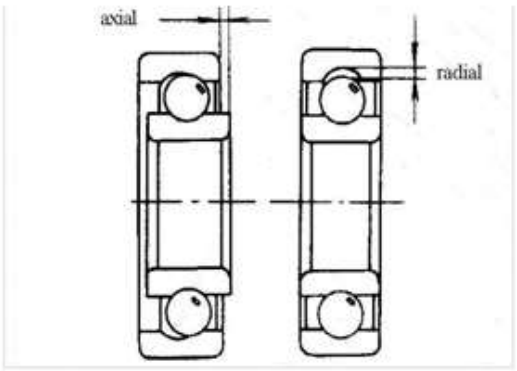
Remove the connecting rod assembly.

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.

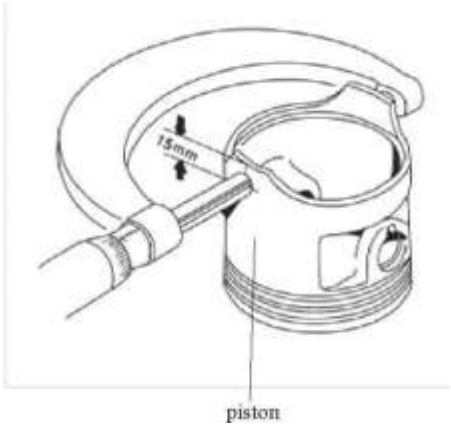
Check the axial and radial jumping of connecting rod bearing. Replace the conrod if the jumping is large.



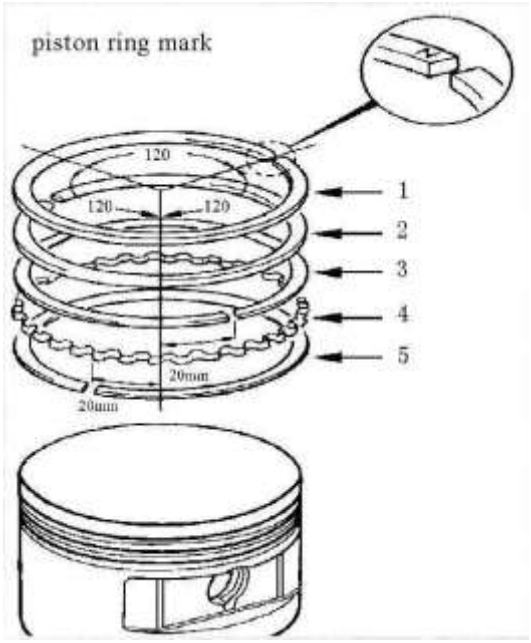

Check the side gap between piston ring and piston groove using a feeler gauge. Replace the piston if the gap is too wide.

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<br>发动机过热 | 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 | |

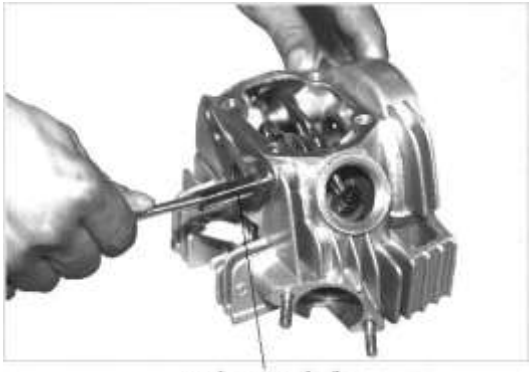
| | | | | |
|---|---|---|---|---|
| Crank pin | The crank pin is over worn | Radial and axes gap of the connecting rod big end is too large | Striking sound of the big-end bearing; Striking sound of the cylinder | Replace the crankshaft connecting rod |
| Bearing | The big-end needle bearing is over 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 轮 | The gear is over worn of damage | ——————— | Abnormal sound during sprocket driving | Replace the timing sprocket |

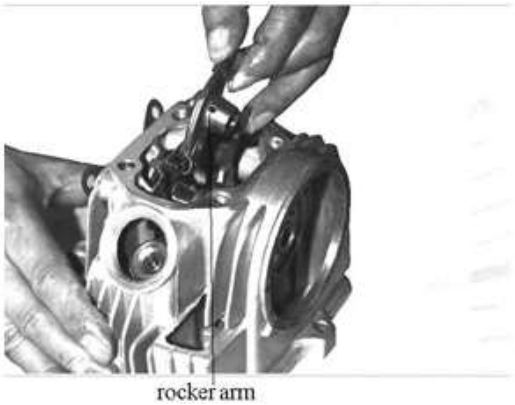
## 5.5 Maintenance of Mechanism

**Disassemble, assemble and maintain valve mechanism**

Remove rocker arm shaft




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



rocker arm

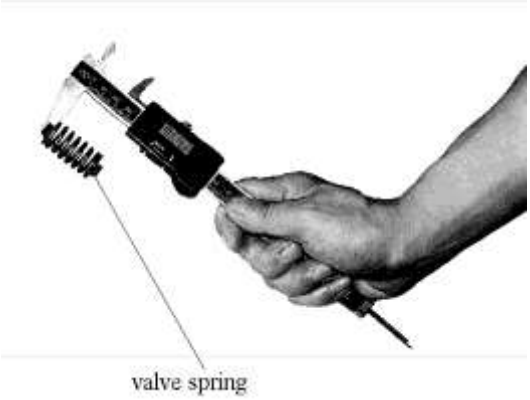
rocker arm shaft to inspect for worn.Replace if necessary.

timing cam

Remove the timing cam, rocker arm , 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.

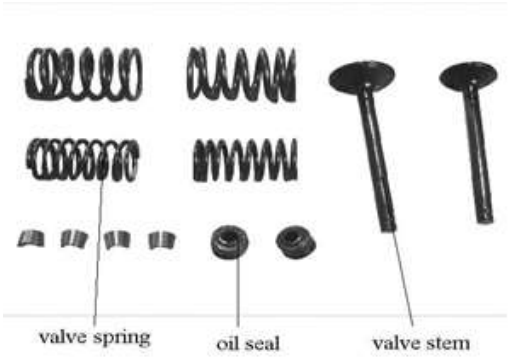
valve spring

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

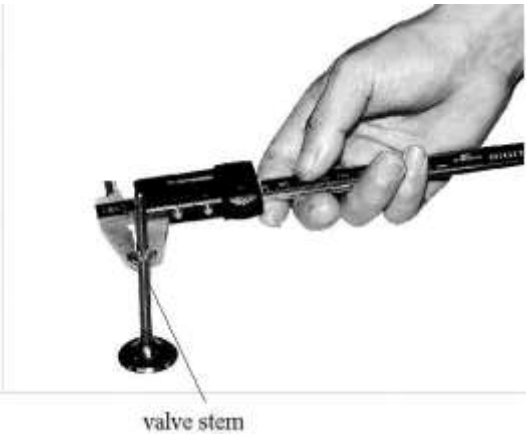



Remove the spring of inlet and exhaust valve to inspect for wear and damage.

Note: when assemble the valve spring , make sure its dense end downward.



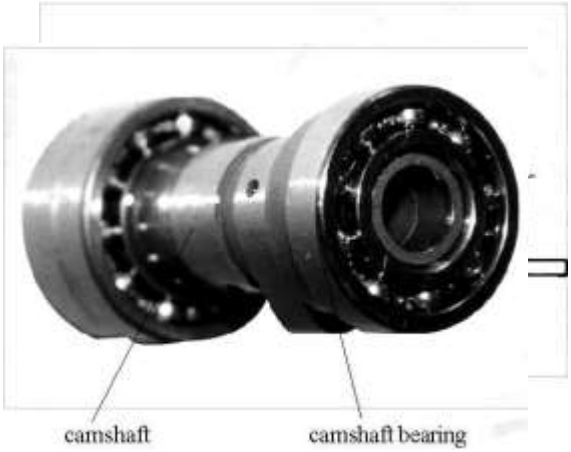

Check the external diameter of valve stem using a verier clipper. Replace the valve stem if the valve is beyond the maintenance limit valve.



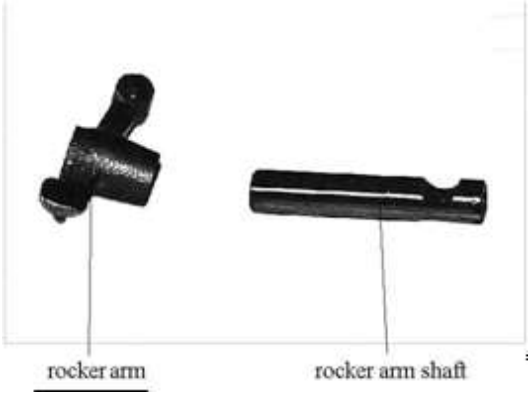

Measure the width of valve contact surface to check whether the contact surface is rough or abnormal. Replace the valve stem if the valve is large than 1.5mm.

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

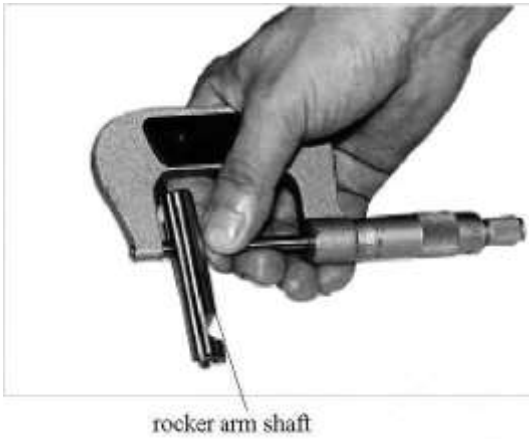
Inspect the timing camshaft bearing for wear and check the state of camshaft. Replace if necessary.



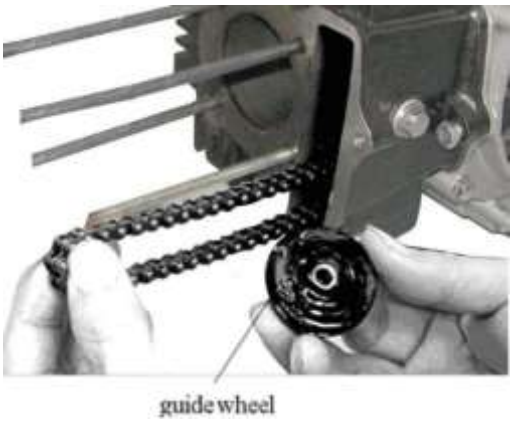
Check the gap of rocker arm shaft and rocker arm. Replace the rocker arm shaft and rocker arm if the gap is large.



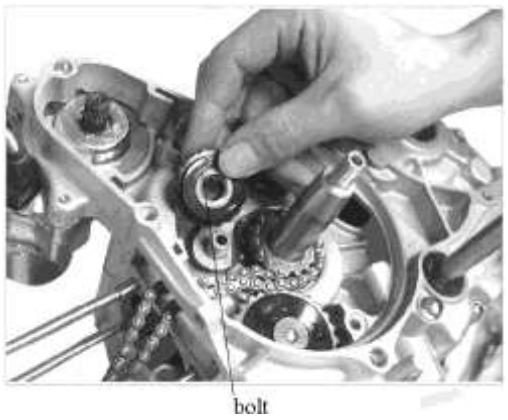

Check the external diameter of rocker arm using a micrometer. Replace the rocker arm shaft if the valve is beyond the maintenance limit valve.




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.



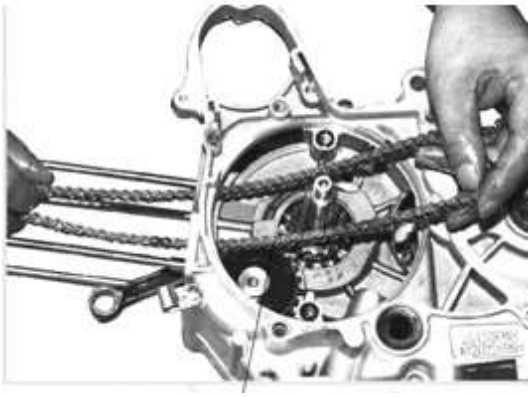

Remove the timing tensioner arm to inspect for wear and damage. Replace if necessary.

timing tensioner

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

oil tube

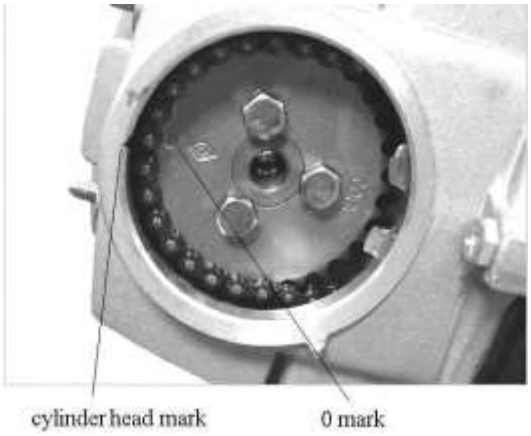
Remove the small timing chain and check the state. Replace if necessary.



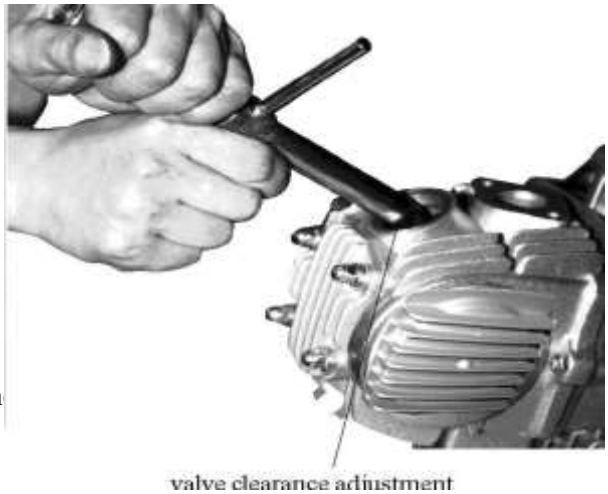
Adjust valve clearance as follows; Remove the valve cap and check the condition.

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 m

**For troubleshooting engine disassembly components, 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 |

**Disassemble, assemble and maintain carburetor**

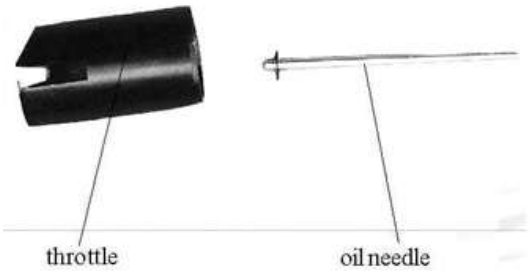
Dismantle the fixing bolt of carburetor and circlip of air cleaner. Remove the carburetor .Remove and clean throttle cap

Clean the carburetor as follows: 。Remove the dirt and clean inner oil way.Dismantle the fixing bolt of float chamber cap.

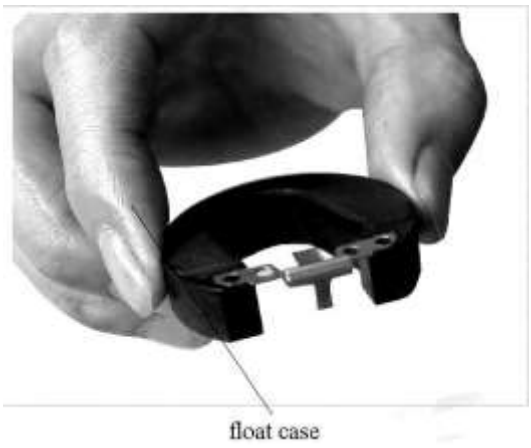
Remove the float chamber cap. Remove the water and debris in the cap if necessary. Check the state of seal ring and replace if it is aging

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

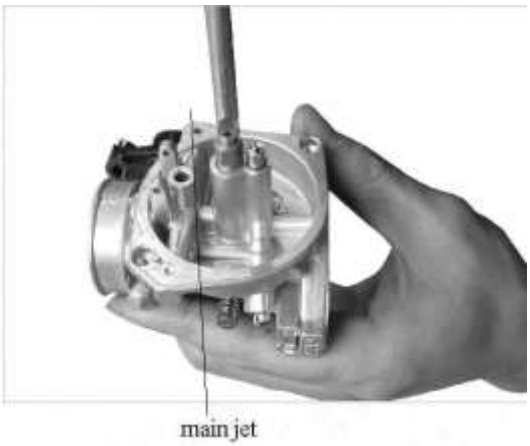
Remove the throttle and oil needle and check the condition replace if necessary.




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.

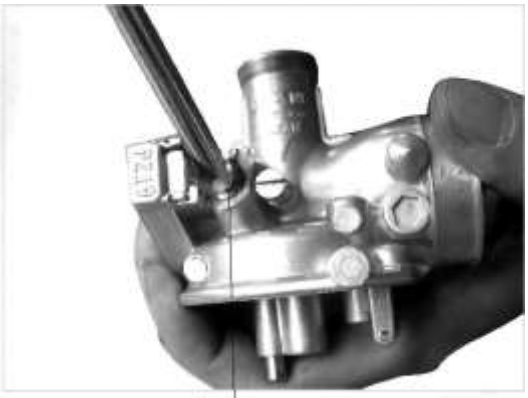



Remove the main nozzle to check whether small hole is clogged. Clean with compressed air if necessary.

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

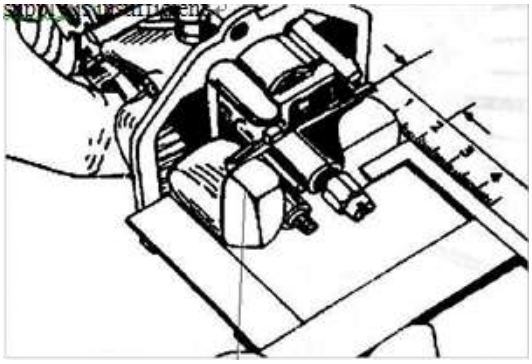
idle jet

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

1.Remove air filter retaining ring

2.Remove the air filter

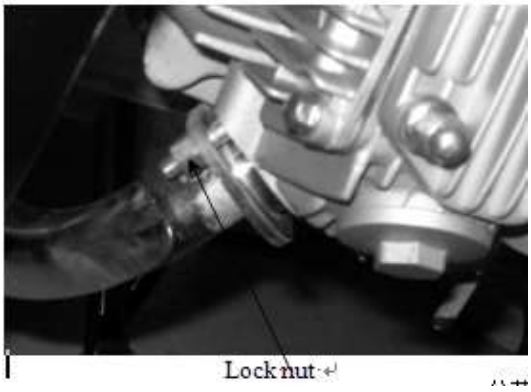
3.Remove the air filter to remove dust from the housing and disassemble the air filter for cleaning

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 | **Difficulty starting the engine or failure to start. Insufficient engine output; poor engine performance at** | 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.

For the troubleshooting or the exhaust muffler, please refer to the following table.

Maintenance of Exhaust Muffler

## 5.9 Disassemble, assemble maintain the environmental protection

| 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. |

## valve

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 and maintenance and management of electric starters

Remove the retaining bolt on the left crankcase cover

Remove the gear display retaining bolt. Remove the gear display and inspect for wear and damage. Replace if necessary.

Remove left crankcase cover

left crankcase cover

Remove gasket and check condition. If wear or reuse is a problem, replace.

gasket

Remove magnetic stator fixing bolts, trigger bolts

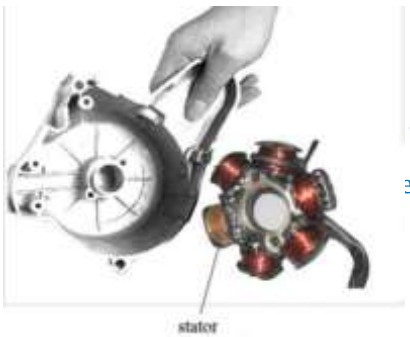
fixing bolt

fixing bolt

Check the condition of the stator with a multimeter. Replace with new parts if there is a problem with wear or repeated use

Remove rotor retaining nut

Remove the rotor with a special tool



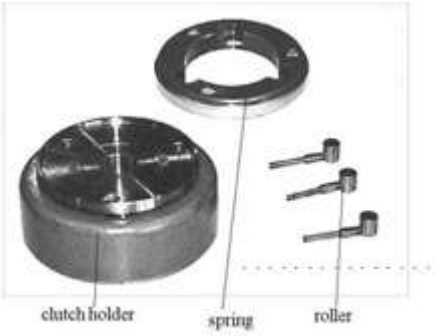

the

e if

necessary

Remove the overrunning clutch retaining bolt.

Disassemble the clutch. Inspect clutch seats, rollers and springs for wear and damage. Replace if necessary

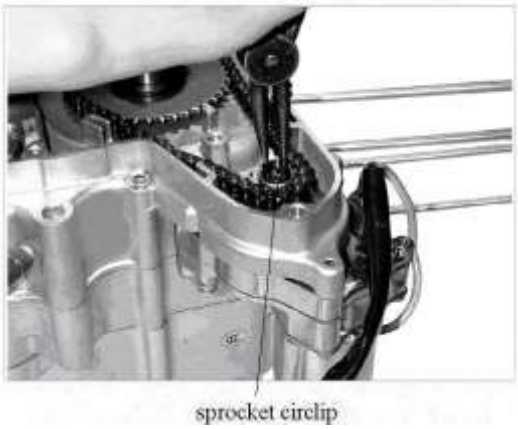



Check drive sprockets and drive gears for wear and damage and replace if necessary

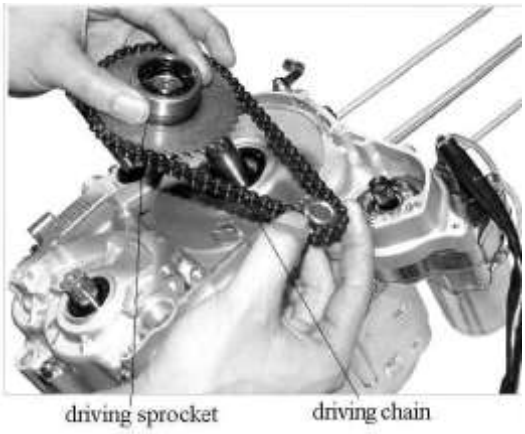
Removing the starter sprocket press plate

Remove the clutch tension band and check its condition. If the tension band is found to be worn or faulty and needs to be reused, it should be replaced.

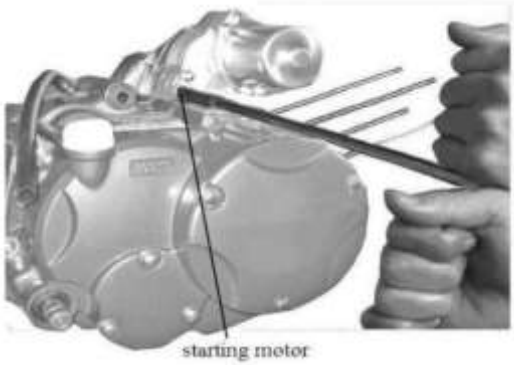
Remove the elastic retaining ring of the starter motor sprocket



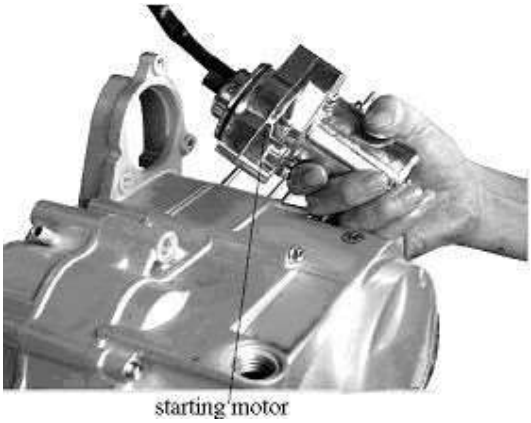

Removing the active sprocket and chain



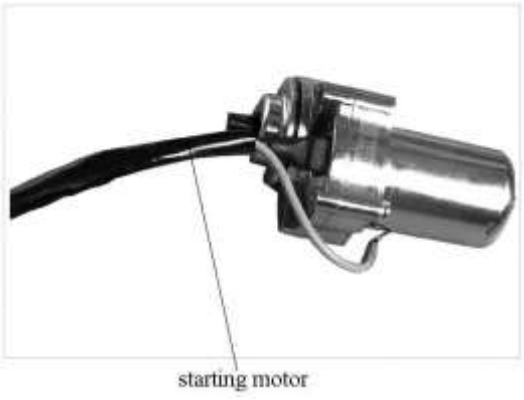

Remove starter motor retaining bolts



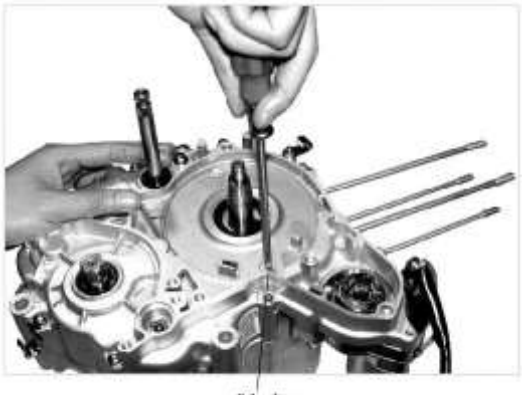

Remove starter motor




Check the starter motor windings for damage. Replace if necessary

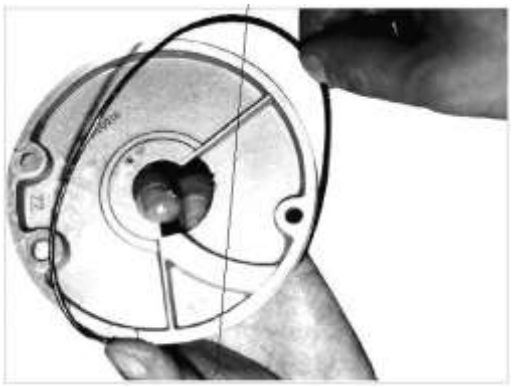



Remove oil separator disk and check condition. Replace if necessary




Check oil seal edges for wear. Replace if necessary

Remove the seal ring. Check the condition of the oil seal ring and replace it if worn out



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

## Maintenance of Electric Starter

| Description | Damage form | Trouble | Cause | Correction<br>修理方法 |
|---|---|---|---|---|
| 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 |

# 6 Vehicle chassis

Inspection Information…… 6-2
6.1 Fault diagnosis……6-3
6.2 Front wheel……..……6-4
6.3 Braking system……6-5
6.4 Front Suspension……..…6-7
6.5 Steering system……6-9
6.6 Rear Suspension……..6-11
6.7 Rear Drive Shaft Assembly……..…6-11

# Inspection Information

**CAUTION**

-When overhauling the front wheels and suspension system, the frame must be securely supported before work is performed

-Do not use excessive force on the wheels. Be careful not to damage the wheel.

-When removing a tire from the rim, use a special tire and rim protector to avoid damaging the rim.

Inspection benchmarks

| Item | | Specification | Limit |
|---|---|---|---|
| Rim | Axial runout | 0.8mm | 2.0mm |
| | Radial runout | 0.8mm | 2.0mm |
| Tires | Residual groove | — | 3mm |
| | Pneumatic pressure | 35kPa(0.35kgf/cm$^2$) | — |
| Front brake | Brake handle play | 0mm | — |

Tightening torque

| Item | Fastener Designator | Tightening torque（N·m） |
|---|---|---|
| Rear reduction mounting bolts | White zinc M10*40*1.25 half-threaded | 55-66 |
| Rear sprocket mounting bolts | Army green M8*16 | 25-30 |
| Rear Disc Brake Disc Mounting Bolts | Army green M8*16 | 25-30 |
| Front disc brake mounting bolts | White zinc M6*16 10.9 grade | 10-12 |
| Rocker arm ball joint assembly slotted nut | M10*1.25 | 49-59 |
| Rear Disc Brake Disc Mounting Nut | Color zinc M27*1.5*H10 | 86-103 |
| Front rim mounting nuts | GB6187-86 M8 | 49-59 |
| Rear disc brake lower pump bolts | Army Green M8*25 Full Thread | 25-30 |
| Front Hub Mounting Nuts | Army green M14*1.5*H18 | 49-59 |
| Rear Hub Mounting Nuts | Army green M16*1.5*H18 Slot depth 6 | 77-92 |

| | | |
|---|---|---|
| Front disc brake lower pump bolts | Army green M8*16 | 25-30 |

Tools

| | |
|---|---|
| Hexagon socket m6 | Assembly tool shafts |
| Open-end ratchet s8 | Pneumatic wrench s12 |
| Open-end wrenches s10-s12 | Pneumatic wrench s14 |
| Open-end ratchet s14 | Socket wrench m12 |
| Open-end wrenches s17-s19 | Socket wrench m14 |
| Open-end ratchet s22 | Socket wrench m20 |
| Open-end ratchet s24 | Socket wrench m24 |
| Phillips screwdrivers | Nose plier, pincers |

## 6.1 Fault resolution

**Steering weight**

1、The upper bolts of the steering column are too tightened

2、The steering knuckle and frame are too tightly locked.

3、Deformation of steering column

4、Low tire pressure

5、Tire wear

**Steering handle shaking**

1、Damage to steering bearing, poor fastening

2, Left and right shock absorber mismatch

3、Tires are skewed

4、Frame deformation

5、Tire wear, bias grinding

6、Wheel bearing shaking

**Front Wheel Bouncing**

1、Deformation of wheel rim

2、Bad wheel bearing

3、Bad tires

4, Improper wheel balance

5、Poor fastening around the wheel axle

**The wheel rotation is not flexible**

1、Bad wheel bearing

2, improper installation of the front wheel

3, brake fluid pipe, cable trip

**Rear suspension is too soft**

1, the rear shock absorber elasticity is weakened

2, tire pressure is too low

Rear suspension is too hard

1、Rear shock absorber damage

2、Tire pressure is too high

**Rear shock absorber noise**

1、Bad rear shock absorber

2、Shock absorber fastening parts loose

**Poor braking effect**

1、Brake adjustment is bad

2、Damaged brake disc surface

3、Worn brake pads

## 6.2 Front wheel

**Dismantle**

1.Set up the front wheel with a tool and make sure that no force is applied to the front wheel

2.Remove the retaining nut 1

3.Remove the front wheel 2

**Inspection of wheel rims**

Check wheel rim 3 for damage, deformation, or scars, and replace if abnormal. Turn the wheel slowly and measure the runout of the rim 3 with a micrometer

Limit of use: Axial: 2.0mm

Radial: 2.0mm

**Installation of rims**

Pressing the rim 4 into the tire on a special machine

**Front wheel mounting bracket removal**

1.Remove front wheel

2.Remove the front caliper body 5

3.Remove cotter pin

4.Remove the rim axle mounting nut 6

5.Remove the brake disk and mounting bracket together

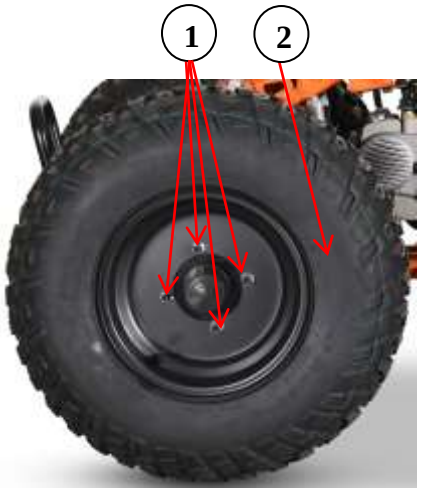
6.Remove the front wheel mounting bracket

**Mounting**

Installation is performed in the reverse order of disassembly.

Rim axle mounting nut torque: 49N-m to 59N-m

Note: Removal and installation of the rear wheel is similar to that of the front wheel, please refer to the front wheel.



Brake caliper fixing bolt 2 Torque: 10N-m to 12N-m (coated with thread fixer)

**Brake Pad Removal**

1.Loosen one of the fastening bolts
2.Lift up the shoe bracket 3
3.Remove the brake pads 4

**Check**

Measure the thickness of shoe 4. When the thickness of shoe 4 is less than or equal to 3 mm, replace both brake pads with new ones at the same time.

**Mounting**

Installation in reverse order of removal

**Front Brake Disc Removal**

1.Remove front wheel
2.Remove the brake caliper
3.Remove the slotted nut 5
4.Remove the brake disk 7 and the front wheel bracket 6 from the vehicle.
5.Remove the brake disk 7

**Check**

Thickness of front brake disc: less than 3mm, replace with new disc.

**Mounting**

Installation of brake disk
Brake disk fixing bolt torque: 10N-m～12N-m

## 6.3 Braking system

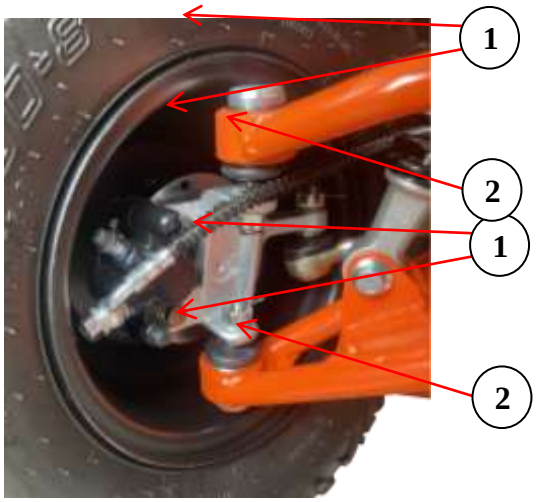
**Front caliper removal**

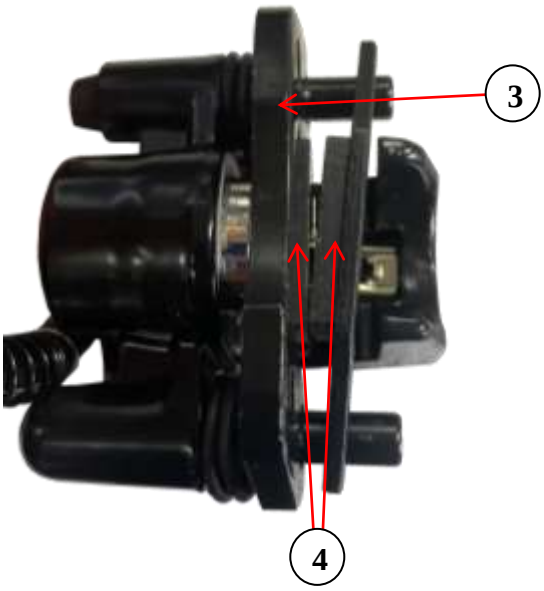
1.Remove the front wheel
2.Remove the 2 bolts mounted on the brake disk 1
3.Remove the brake caliper 2

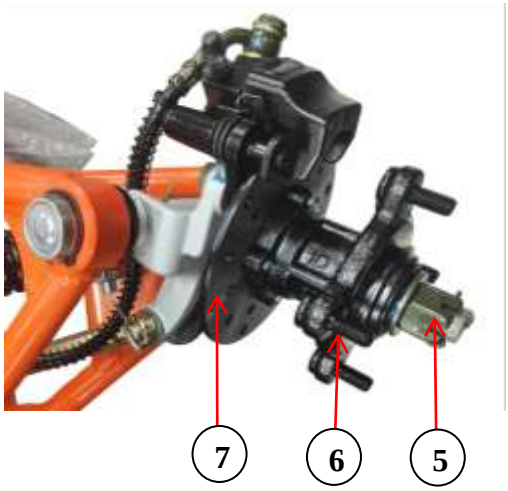
**Check**

Observe the brake caliper for cracks and oil leakage at each fastening, replace if available.

**Mounting**






**Front brake handbrake pump removal**

1.Unplug the brake switch insert 1

2.Remove the bolt 2

3.Separate the front brake handbrake pump 3 from the steering handle, it is not necessary to remove the front brake handbrake pump from the body of the vehicle when not replacing the brake pump assembly

**Mounting**

Installation in reverse order of removal

**CAUTION：**

Do not hang the brake pump by the brake fluid line!

For fear that tipping the front brake handbrake pump will cause air to enter the hydraulic system, keep it mounted on one side and secure it to the steering handle on the other.

The direction of the oil pipe on the car body, according to the first chapter of the cable, wire class alignment arrangement, must ensure that the brake oil circuit is free of obstruction

When the brake system assembly is installed, the braking force must be checked.

**Removal of the brake tee fitting**

1.Remove bolt 4

2.Separate brake tee fitting 5 from body

**Mounting**

Installation in reverse order of removal

**CAUTION：** Oil pipe in the body of the direction, according to the first chapter of the cable, wire class alignment diagram, must ensure that the braking oil circuit of the smooth braking system, the assembly is installed, you must check the braking power

**Rear Brake Caliper Body Removal**

1.Remove bolt 6

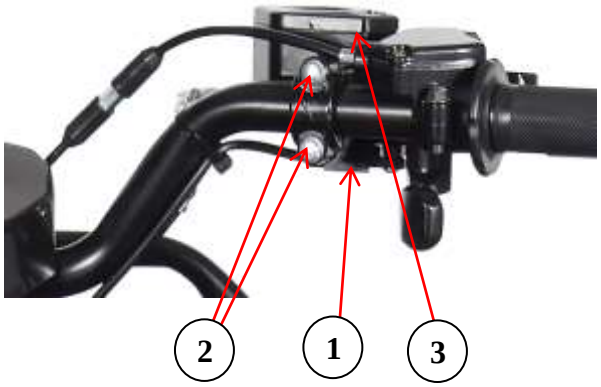
2.Remove the rear caliper body 7

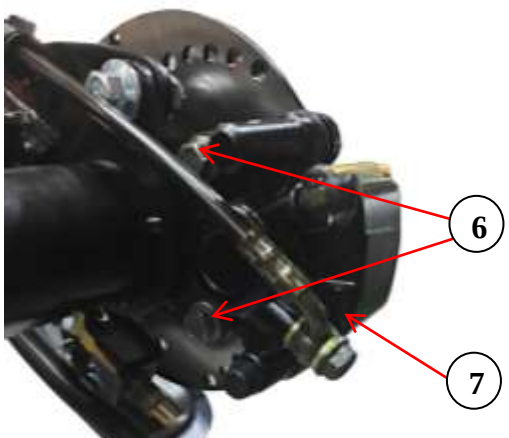
**Mounting**

Installation in reverse order of removal

**CAUTION：** The direction of the oil pipe on the car body, according to the first chapter of the cable, wire class alignment diagram, must ensure that the brake oil circuit is smooth brake system assembly is installed, must check the braking force, if the front and rear can not be linked to control the braking system, check the joints are

connected to check the amount of brake fluid in the brake oil cup is between the upper and lower limits of the scale line, if necessary, add the Huayang recommended braking fluid to the upper and lower limits of the scale line. Check whether the brake switch and brake light work normally.





## 6.4 Front Suspension

**Removal of the left front suspension combination**

**CAUTION:** When servicing the suspension, the left and right suspensions must not be removed at the same time, otherwise the vehicle will fall down without support.

1.Park the vehicle on a level surface and support the front of the vehicle with a jack to stabilize it.

2.Remove the front body

3.Remove the front wheels

4.Remove the brake caliper

5.Remove the front wheel hub bracket.

6.Remove the left front shock absorber mounting bolts from the vehicle body and the left front lower rocker arm 1.

7.Remove the front shock absorber 2

8.Remove the left front upper rocker arm frame mounting bolts and the nuts that fasten the bolts 3

9.Remove left front upper rocker arm ball pin mounted to left steering knuckle cotter pin and nut 4

10.Remove the left front upper rocker arm 5

Remove the cotter pin and lock nut from the steering tie rod ball pin 6

11.Remove left front lower rocker arm frame mounting bolts and nuts 7

12.Remove left front lower rocker arm ball pin locking bolt 8

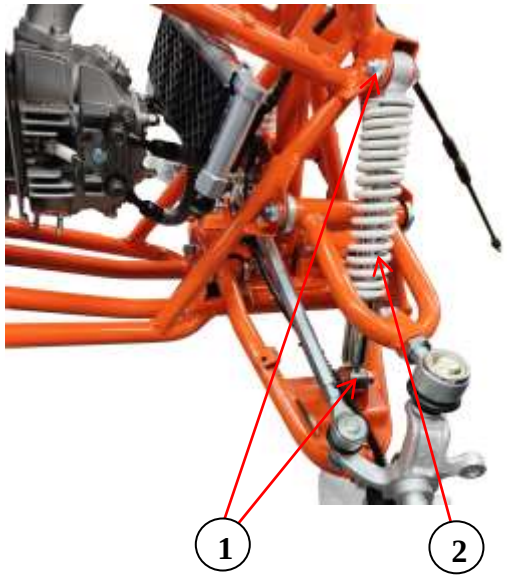
13.Remove the left front lower rocker arm 9

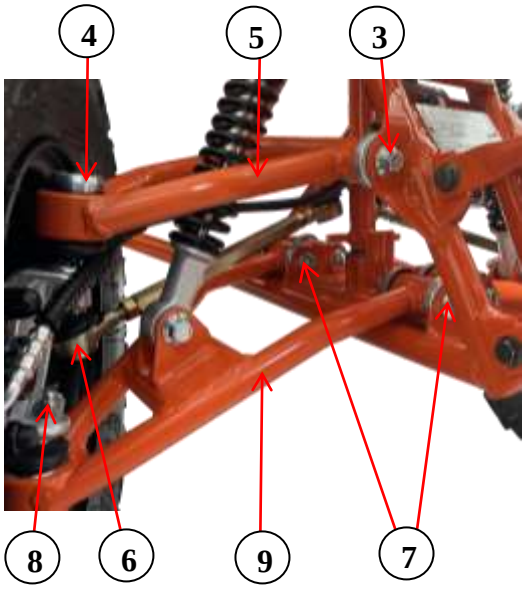
14.Pull the steering knuckle out of the drive shaft. The suspension system of this vehicle is available in various configurations to suit different customer groups. The above introduction for the basic configuration of the suspension system, other configurations of the suspension system maintenance method is similar, you can refer to the above method of maintenance

**Mounting**

Installation in reverse order of removal

Removal and installation of the right front suspension assembly is the same as that of the left front suspension assembly.



**Disassembly and assembly of rocker arm combinations**

1.Remove the left front shock absorber
2.Remove the left front upper rocker arm frame mounting bolts and nuts for the fastening bolts 3 (left front suspension assembly diagram)
3.Remove the left front lower rocker arm frame mounting bolts and the nuts for the fastening bolts 7 (left front suspension combination diagram)
4.Remove the wheel, caliper and rim bracket before removing the shock absorber
5.Remove the steering tie rod before removing each bolt
6.Pull the steering knuckle from the front isokinetic drive shaft before removing the left front rocker arm assembly.

7.Remove the left front rocker arm combination
8.Check the upper and lower rocker arms
9.Remove the left front upper rocker arm and weld in assembly 4 (left front suspension assembly diagram).
10.Remove the left front lower rocker arm and weld in assembly 8 (left front suspension assembly).
11.Check whether the grease inside the ball pin is deteriorated (grease model: No.2 lithium grease GB7324-87), whether the dust cover on the ball pin is cracked and aging, such as the above problems should be replaced with a new ball pin.
12.Remove the buffer sleeve combination in the left front upper and lower rocker arm welding combination to check whether the buffer sleeve combination is damaged and aging, and replace it with a new one if necessary.

**Mounting**

Press the ball pin into the rocker assembly with the special tool.

Installation in reverse order of removal

**CAUTION：** Upper and lower rocker arms should not be shaken after installation, if shaken then replace the new buffer sleeve combination

1.Checking the left steering knuckle
2.Remove the left steering knuckle
3.Remove the wheel hub bearing with a special tool.
4.Check the wheel bearing for damage, rotation and clearance, and replace it with a new one if it is defective.

**Mounting**

Installation in reverse order of removal

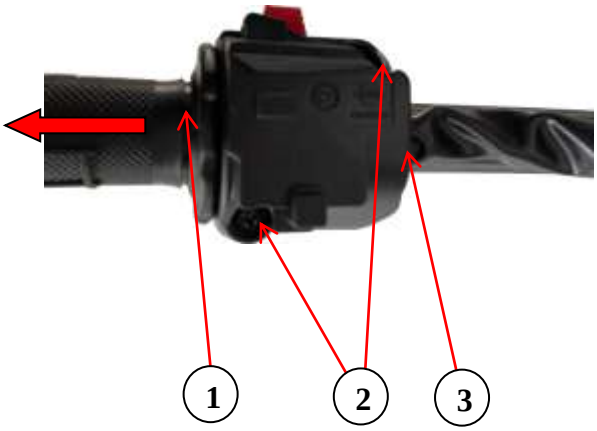
**Mounting**
Installation in reverse order of removal

## 6.6 Steering system

Remove the front gear show light cover

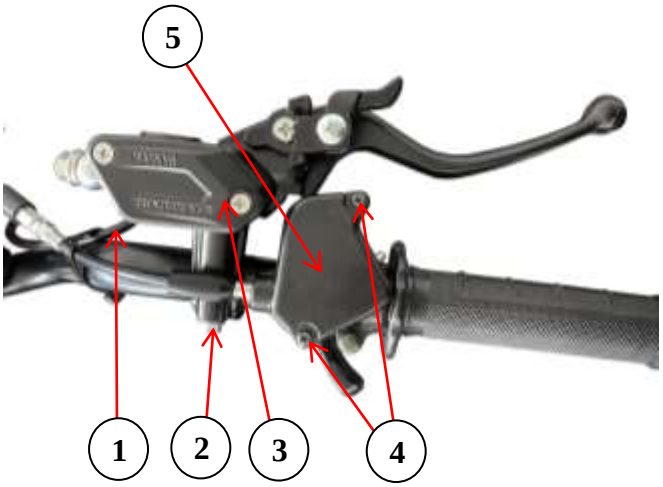
**Steering wheel**

**Left Handle Removal**

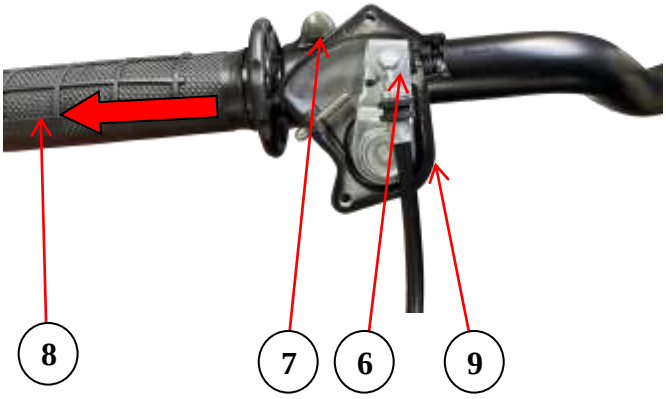



1.Release the combination switch insert
2.Pull out the left handle sleeve 1 in the direction of the arrow
3.Remove the combination switch fixing bolt 2
4.Remove the combination switch 3

**Mounting**
Installation in reverse order of removal

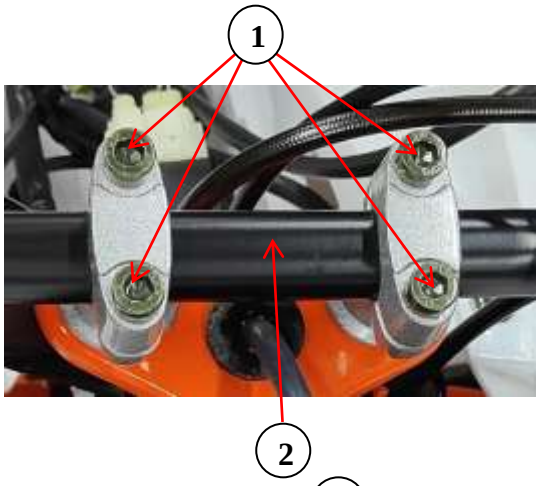



**Right Handlebar Removal**
1.Loosen the brake switch insert 1
2.Remove front brake set screw 2
3.Remove front brake upper pump 3
4.Remove the gas pedal top cover fixing screw 4
5.Remove the gas pedal upper cover5
6.Remove the throttle cable6
7.Remove the gas pedal fixing bolt7
8.Pull off the right handlebar cover in the direction of the arrow8.
9.Remove the accelerator9



**Steering Grip Tube Removal**

1.Remove left handlebar
2.Remove the rear handlebar
3.Remove the presser fixing bolt 1
4.Remove steering handle tube 2




**Mounting**

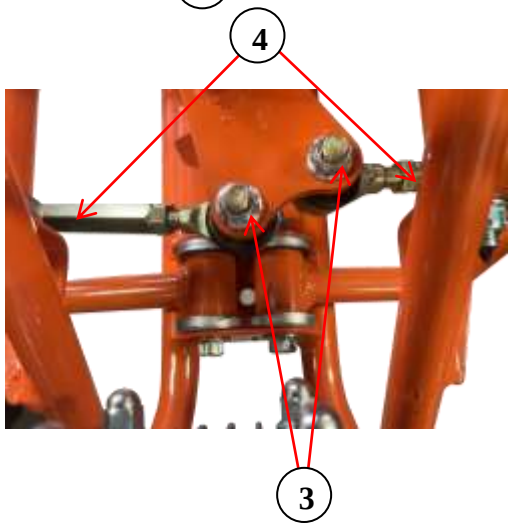
Installation in reverse order of removal

**Steering system disassembly**

Steering Shaft Assembly

**Dismantle**

1.Remove steering handle assembly
2.Remove front body
3.Remove the front wheel
4.Loosen the lock nut on the steering tie rod 3
5.Remove the steering tie rods 4

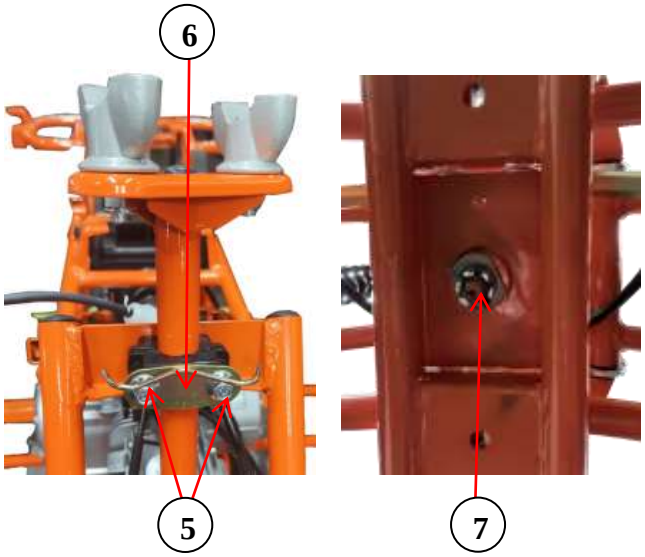



6.Remove the steering rocker arms (1 set each for left and right)
7.Remove the fixing bolts 5
8.Remove clamp plate and clamp block 6
9.Remove the cotter pin and locknut 7.
10.Remove the steering shaft assembly by lifting the steering shaft upward.

**Mounting**

Installation in reverse order of removal

**Caution: Replace the cotter pin with a new one when installing the cotter pin; after the installation is completed, check whether the steering flexibility and the left and right steering angles are the same; when assembling the steering rocker arm, be sure to place the steering rocker arm in the center before assembling the steering axle; when assembling the steering axle, be sure to assemble it patiently, and make sure that the left and right steering angles are the same before locking up the various parts.**



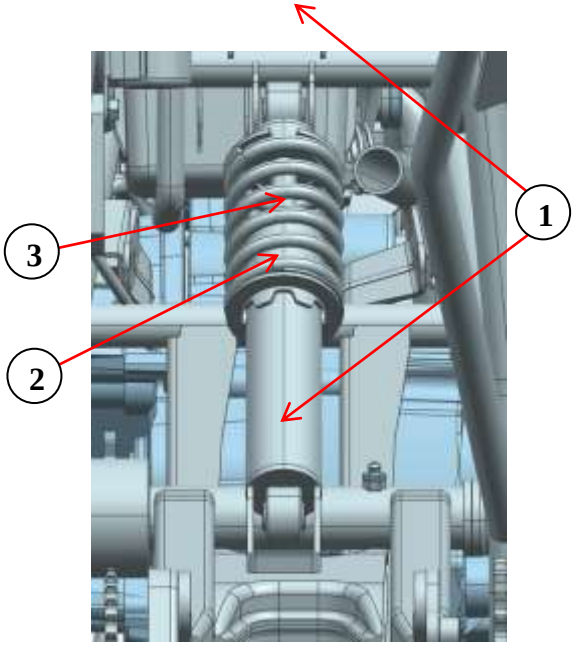
## 6.6Rear Suspension

**Rear shock absorber removal**
**Dismantle**
1.When servicing the suspension system, the vehicle body should be suspended before removing the rear suspension system, otherwise the vehicle body will fall down due to unsupported force.
2.Park the vehicle on a level surface and use a jack to stabilize the rear support.
3.Remove the rear body
4.Remove the rear wheels
5.Remove the rear shock absorber mounting screws from the body and the flat fork assembly 1.
6.Remove the rear shock absorber 2

**Inspection**
Inspect the removed shock absorber and set the adjustment cam 3 to the proper position

**Mounting**
Installation in reverse order of removal

8.Remove the chain 5
9.Remove the bolts and nuts connecting the flat fork assembly to the frame 6
10.Remove the rear drive shaft assembly 7

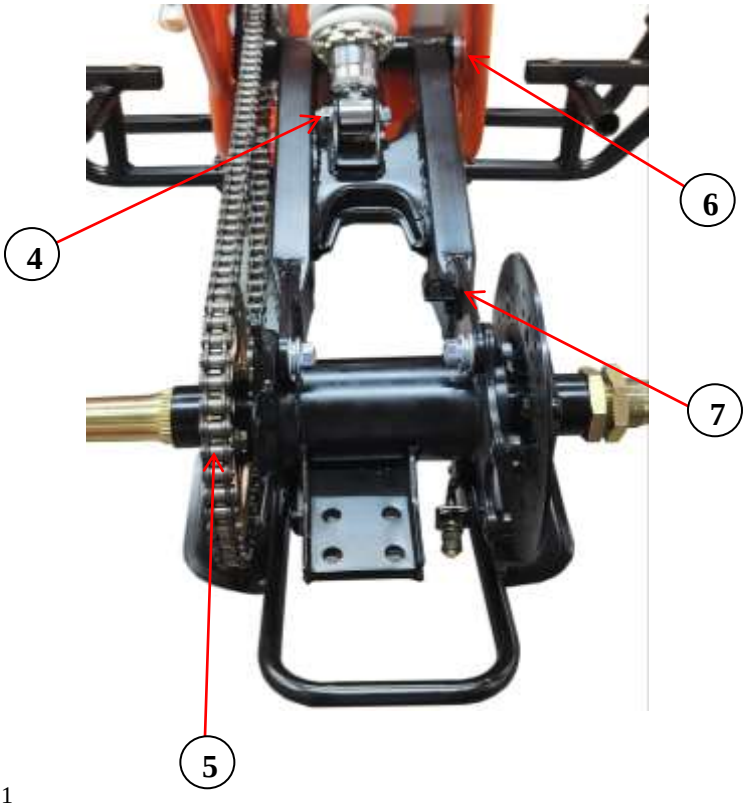



## 6.7 Rear Drive Shaft Assembly

**Rear Drive Shaft Assembly Removal**

1.Before removing the rear drive shaft, suspend the vehicle body, otherwise the vehicle body will fall down due to the unsupported rear of the vehicle.
2.Park the vehicle body on a level surface and use a jack to stabilize the rear support of the vehicle and start the operation.
3.Remove the rear body
4.Remove the rear wheels
5.Remove the chain cover
6.Remove the rear caliper

7.Remove the bolts securing the rear shock absorber to the rear flat forks. 4.



**Check**

An exploded view of the rear driveshaft assembly is shown below

| No. | Name | Qty. | No. | Name | Qty. |
|---|---|---|---|---|---|
| 1 | Rear axle | 1 | 10 | Rear disc brake disk | 1 |
| 2 | Rear Sprocket Block/Brake Disc Block | 2 | 11 | Oil seal TC62*42*8 | 2 |
| 3 | Steel rear sprocket 428/45 teeth | 1 | 12 | Bearing 6007-2RS | 2 |
| 4 | Hexagon socket head cap flange bolts Triple color M8*16 | 4 | 13 | Rear axle liner tube | 1 |
| 5 | Thin nuts | 2 | 14 | Rear axle cylinder | 1 |
| 6 | Color Zinc M33*1.5 | 2 | 15 | Flat cushion Φ12*24*2 | 2 |
| 7 | Rear hub assembly | 4 | 16 | Bouncing mat Φ12*20*3 | 3 |
| 8 | Hexagon socket head cap flange bolts Color zinc M12*30*1.25 | 1 | 17 | Rear axle assembly | 1 |
| 9 | Steel wire retaining ring | 4 | 18 | Hexagon socket head flange bolts | 4 |

Inspection of rear driveshaft after disassembly

· check if the rear hub is damaged, if it is damaged, then it should be replaced with a new part

· check the thickness of the disc brake disk, if the thickness of the disc brake is ≤3mm, then the disc brake disk should be replaced with a new one

· check whether the rear drive shaft is bent or damaged, if so, replace with a new drive shaft

· check the flat fork assembly, if there is damage, replace with new parts

· check the rear sprocket, if there is damage to the teeth, replace with a new sprocket

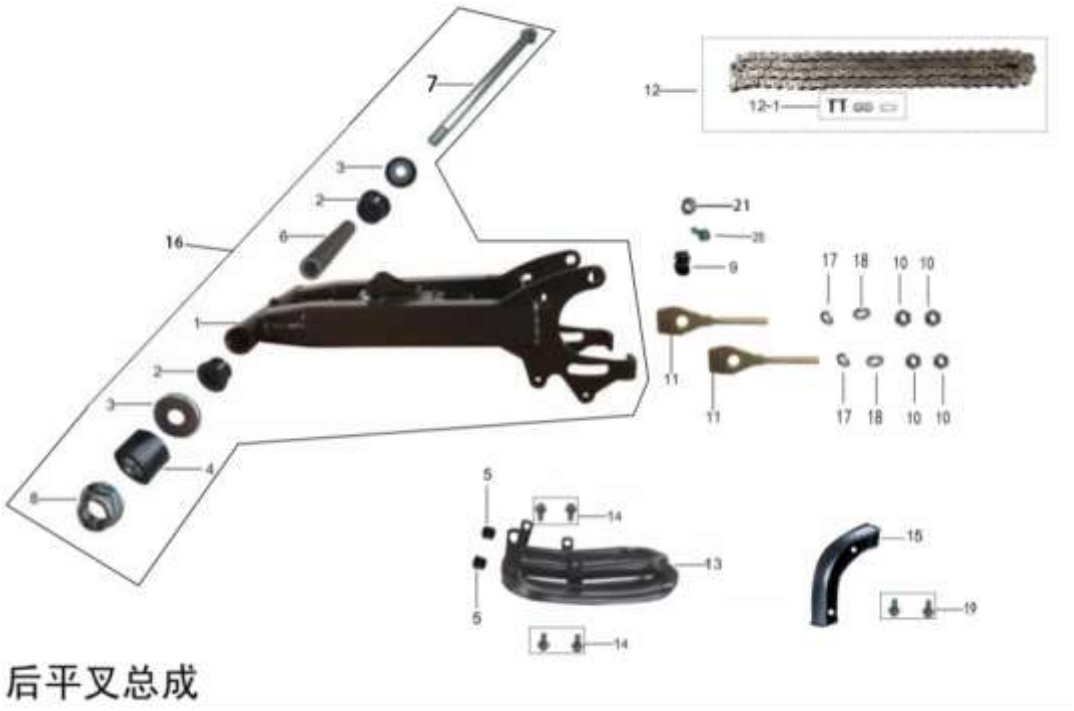
· check the rest of the parts are not damaged, if so, replace with new parts

**Mounting**

Proceed in reverse order of rear drive shaft disassembly

**Caution**: When installing the bushings, apply lithium grease containing molybdenum disulfide to both ends of the flat fork shaft.

An exploded view of the rear flat fork assembly is as follows




| No. | Name | Qty. | No. | Name | Qty. |
|---|---|---|---|---|---|
| 1 | Flat Fork Assembly Black | 1 | 12 | Chain connector gray 428H 108L | 1 |
| 2 | Flat Fork Derating Bushing | 2 | 12-1 | Chain connector gray 428H | 1 |
| 3 | Rear rocker arm dust cover Φ 31*40*8/center ϕ14 hole | 2 | 13 | Chain bracket assembly black | 1 |
| 4 | Flat Fork Chain Guide Black | 1 | 14 | Hexagon socket head cap flange bolts | 4 |
| 5 | Chainstay plug | 2 | 15 | Color M8*12 | 1 |
| 6 | Rear flat fork steel bushing | 1 | 16 | Chain cover black | 1 |
| 7 | Flange shaft zinc blue Φ 14*240*M14*1.5mm | 1 | 17 | Flat fork assembly | 2 |
| 8 | Hexagonal flange self-locking nut | 1 | 18 | Bouncing pad Φ8*13*2 | 2 |
| 9 | Color M14*1.5 | 1 | 19 | Flat pads three color Φ8*16*1.5 | 2 |
| 10 | Rear Disc Brake Hose Clamp Black | 4 | 20 | Hexagon socket head flange bolts three color M6*12 | 1 |
| 11 | Hexagonal flange nut color M8 | 2 | 21 | Hexagon small head flange bolts M6*16 | 1 |

# 7 Signal and Lighting Systems

Maintenance Instructions……7-1
7.1 Fault resolution…….....7-2
7.2 Inspection of headlights…….....7-2
7.3 Headlight and Rear Tail Light Removal and Installation…….....7-3
7.4 Ignition switch…….....7-4
7.5 Handlebar switch…….....7-4
7.6 Brake light switch…….....7-5
7.7 meter ……7-5

## Maintenance Instructions

When carrying out inspection work, the whole vehicle can be energized; when carrying out dismantling and installation work, the whole vehicle should be de-energized first, and ensure that your hands are dry.
Specification of each piece

| Name | Specification | Qty. | Note |
|---|---|---|---|
| Front headlight | 35W Waterproof Insert | 1 | Whole Replacement |
| Rear tail light | MZ-201 Waterproof | 1 | Whole Replacement |
| Gear display | Unit Digital Display R-N-1-2-3-4 | 1 | Whole Replacement |
| Malfunction Indicator Lamp | Waterproof Insert | 1 | Whole Replacement |

## 7.1 Fault resolution

First, the left headlight does not light

1、Damaged bulb

2、Connector contact is not good

3、Damaged handlebar switch

Second, the right headlight does not light

1、Damaged bulb

2、Connector contact is not good

3、Damaged handlebar switch

Third, the rear tail light does not light

1、Damaged bulb

2、Connector contact is not good

3、Damaged handlebar switch

Fourth, the meter does not light

1、Damaged screen

2、Connector contact is not good

## 7.2 Headlight Inspection

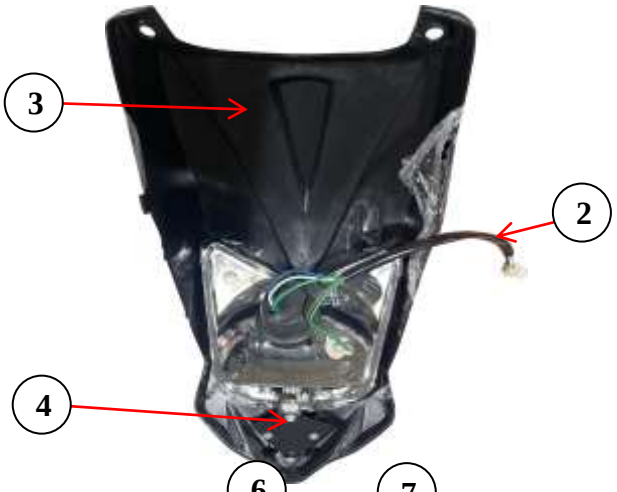
With the ignition switch set to ON, turn the light switch to the
Check if the headlight is on.
- Illuminated: Normal
- Not lit:
Main cable broken or short-circuited
Broken fuse
Damaged switch

If the headlight is damaged, the whole headlight should be replaced

## 7.3 Headlight and Rear Tail Light Removal and Installation

**Dismantle**

1.Remove the bolts securing the cowl 1
2.Remove the headlight insert 2
3.Remove the cowl 3
4.The headlamps can be replaced by removing the fixing bolts 4.




**Mounting**
Proceed in reverse order of disassembly

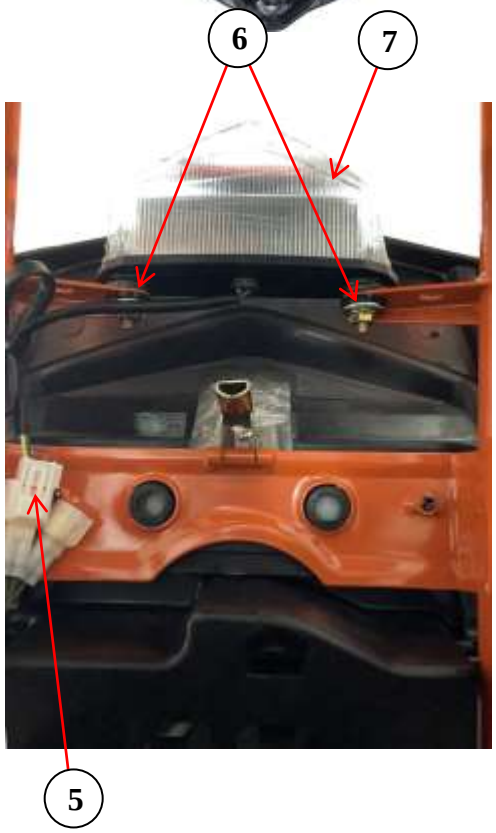
**Tail light**

**Dismantle**

1.Loosen the rear taillight insert 5

2.Remove the fixing screws 6

3.Remove the rear tail light 7




**Mounting**
Proceed in reverse order of disassembly

## 7.4 Ignition switch

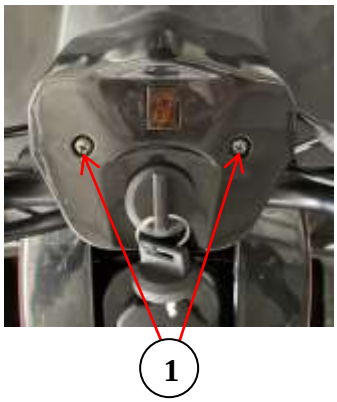
**Dismantle**

1.Remove fixing bolt 1

2.Remove the connection for the connection of the electric door lock plug 2

3.Remove the door lock 3

4.As shown by the arrow in the figure, the electric door lock can be removed by pressing on the protrusion

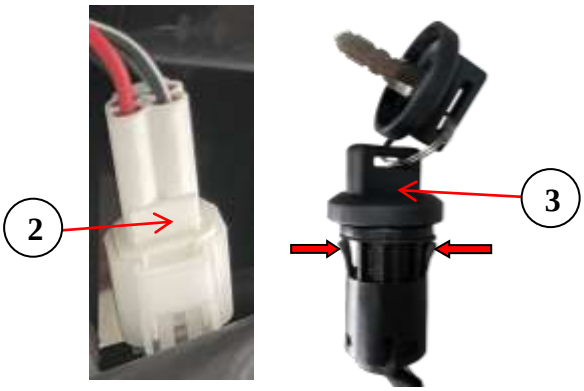



**Checking**

**Check for conduction between the terminals of each control switch connector according to the table below.**

**● - ● is normal.**

| | 绿 | 黑白 | 绿 |
|---|---|---|---|
| ⊗ | ○ | ○ | |
| ↺ | | | |
| ⊗ | | ○ | ○ |




**Mounting**

Proceed in reverse order of disassembly

## 7.5 Modular switch

**Dismantle**

1.Removing the headgear

2.Disconnecting the connections for the connection of the combination switch plug 3

**Checking**

**Check for conduction between the terminals of each control switch connector according to the table below.**

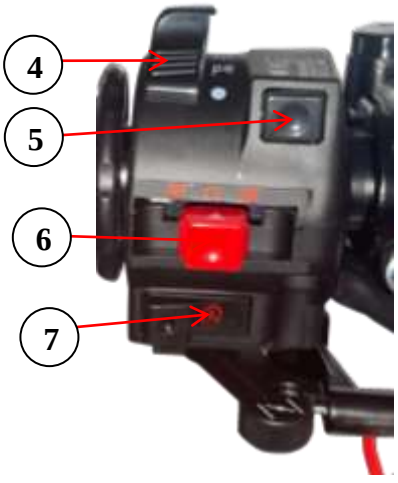
**● - ● is normal.**

**Lighting switch 4**

**High and low beam switch 5**

**Light switch6**

**Start switch 7**



## 7.6 Brake light switch

Check for continuity between terminals
Check that the brake light switch 1 is in place.
After confirming that the link is in place, when holding the brake lever
when holding the brake handle, but not when releasing the brake handle.
Normal.If there is any abnormality in the above check, replace the
Brake light switch

## 7.7 Fault indicator

**Dismantle**
1.Remove the gear display head cover
2.Unplug the malfunction light connector
3.Remove retaining nut 1
4.Remove the malfunction lamp 2
Check for conduction between terminals
When the malfunction indicator light is on, it indicates that your
vehicle's power system is malfunctioning.This could
result in reduced power, abnormal operation, or even complete
even a complete loss of power.Therefore, if the malfunction indicator light comes on
on, please contact your local dealer promptly to
check and solve any problems with the electrical system
to avoid unnecessary risks.Specific problems
can be checked in the fault code table.

## 7.8 Gear display table

**Dismantle**
1.Remove the gear indicator head cover
2.Unplug the gear indicator connector
3.Remove fixing bolt 4
4.Remove gear indicator 3
Check whether the terminals are conductive or not
Turn on the power to start the engine, and put it in each gear during driving.
When driving in each gear, you should pay attention to the display table shows the
If not, it should be repaired in time.

# 8 EFI

8.1 Throttle valve body……....8-2
8.1.1 Stepper motor……..8-3
8.1.2 Three-in-one sensors……...8-3
8.1.3 Manifolds and Injectors……..8-3
8.1.4 Throttle body……8-4
8.2 Fuel pump……8-4
8.3 ECU…….....8-5
8.4 Carbon canister……8-5
8.5 Fuel Fine Filter…….....8-6
8.6 Carbon tank solenoid valve……..…8-6
8.7 OBD……8-6
8.8 Use and Maintenance
8.8.1 Regular use……8-7
8.8.2 System self-inspection……8-7
8.8.3 Clean the throttle combination……8-8
8.8.4 Electric injection system maintenance instructions……8-9
8.8.5 Fuel Injection System Fault Diagnosis Tool Usage……8-11
8.8.6 Fault code（PCODE）list……8-14

## 8.1 Throttle valve body

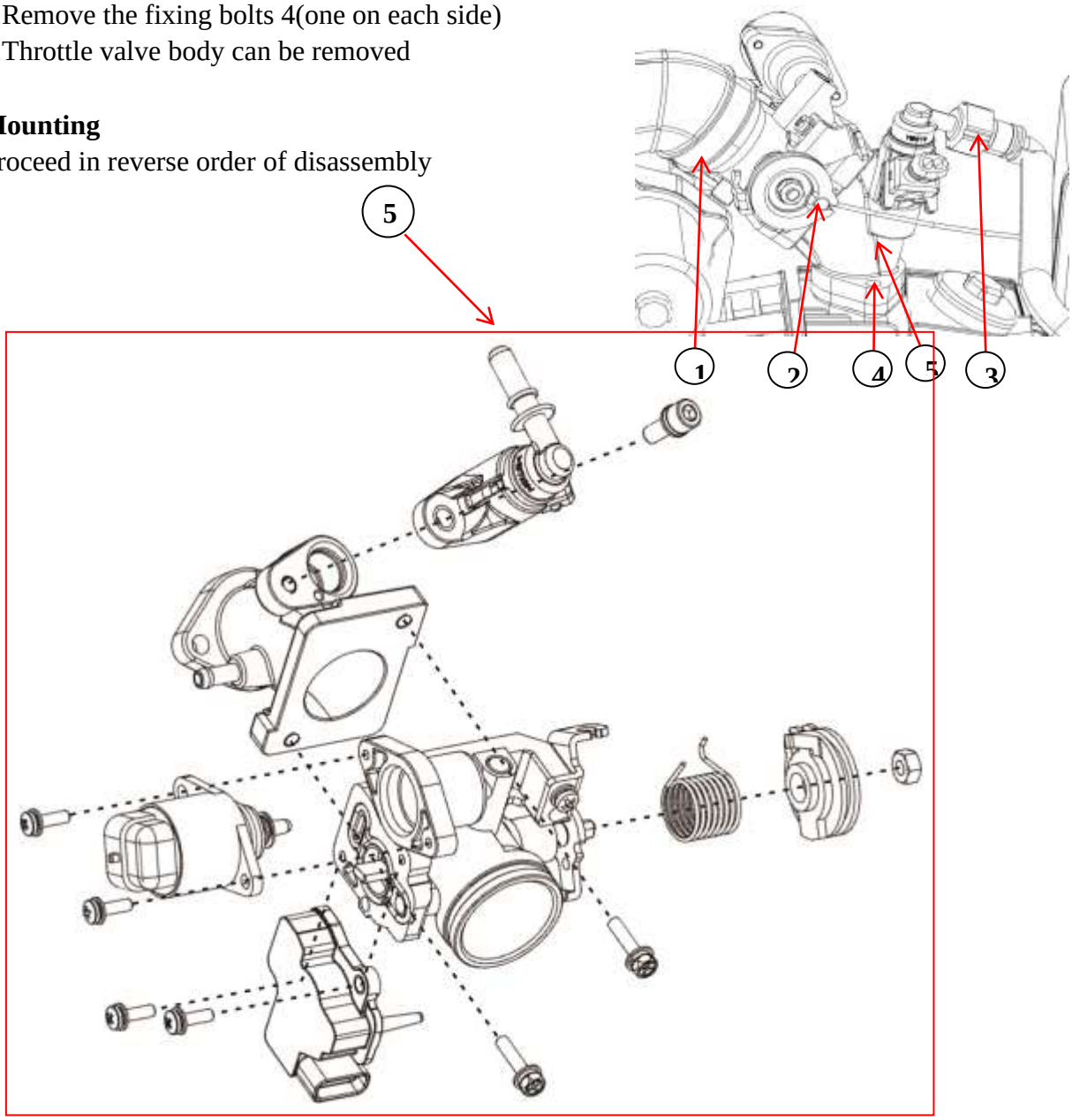
**Dismantle**

1.Unplug the stepper motor, triple sensor,Injector plug-in
2.Remove the hose connecting the valve body to the carbon solenoid valve.

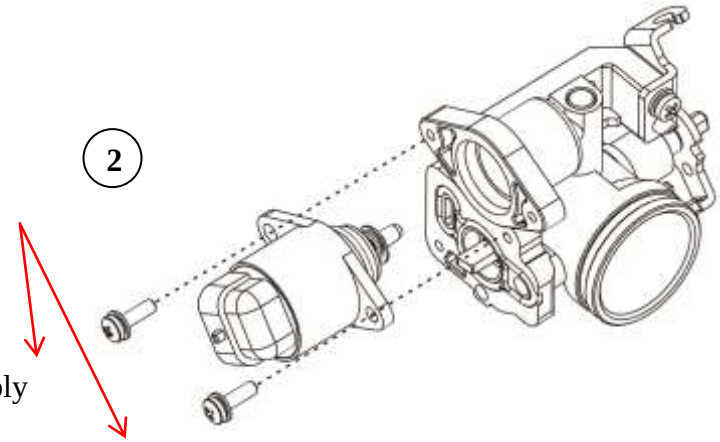
3.Remove the clamp that connects to the air filter 1
4.Remove the throttle cable 2
5.Remove the fuel injector hose that connects to the fuel fine filter 3
6.Remove the fixing bolts 4(one on each side)
7.Throttle valve body can be removed

**Mounting**

Proceed in reverse order of disassembly



## 8.1.1 Stepper motor



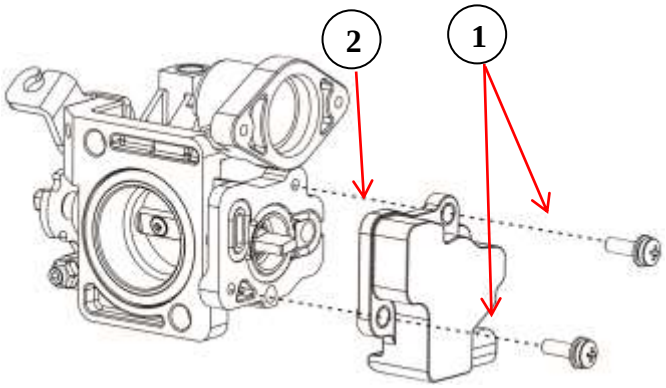

**Dismantle**

1.Remove fixing bolt 1
2.Remove stepper motor 2

**Mounting**

Proceed in reverse order of disassembly

## 8.1.2 Three-in-one sensors



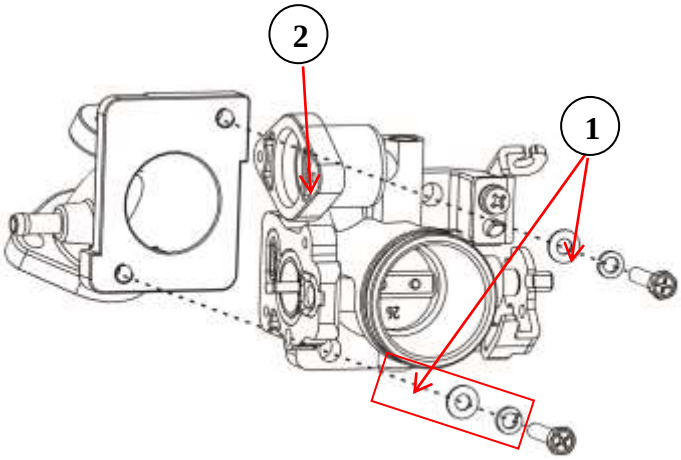

**Dismantle**

1.Lower fixing bolt 1
2.Remove the 3-in-1 sensor 2

**Mounting**

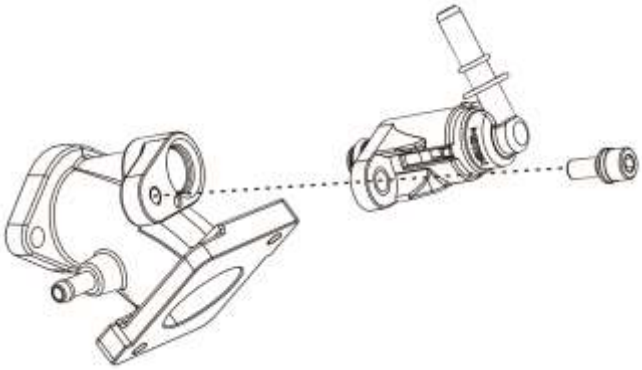
Proceed in reverse order of disassembly

## 8.1.3 Manifolds and Injectors




**Dismantle**

1.Remove fixing bolt and spacer 1
2.Remove manifold and injectors 2

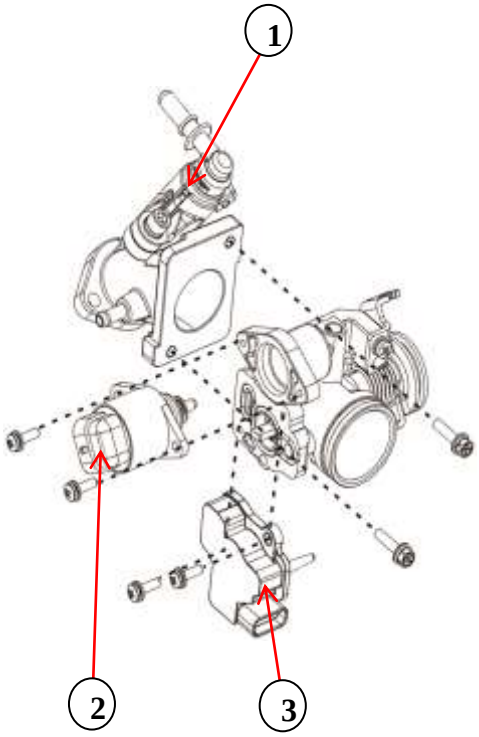


3.Remove fixing bolt 3
4.Remove manifold and injectors 4

**Mounting**

Proceed in reverse order of disassembly

## 8.1.4 Throttle body




**Dismantle**

1.Remove the injector and its fixing bolt 1

2.Remove the stepper motor and its fixing bolt 2

3.Remove the 3-in-1 sensor and its fixing bolt 3

4.The throttle body can be removed

**Mounting**

Proceed in reverse order of disassembly

## 8.2 Fuel pump

**Dismantle**

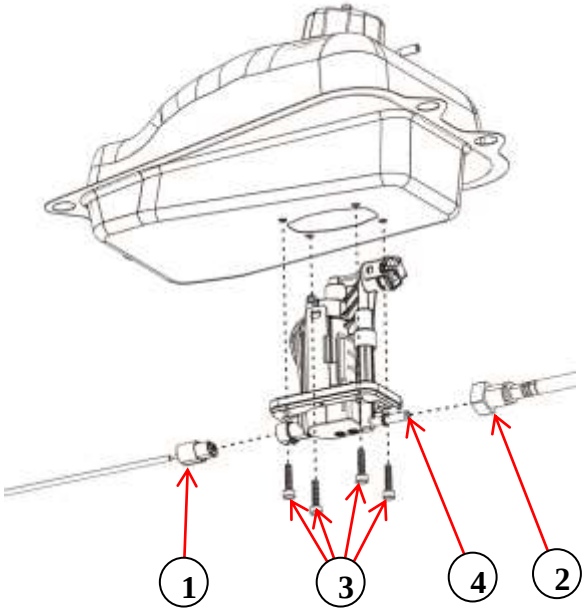
1.Remove the front body and the bolts holding the fuel tank in place

2.Unplug the insert on the left side of the fuel pump 1

3.Unplug the fuel hose on the right side of the fuel pump 2

4.Remove the fixing bolts 3(Four in total)

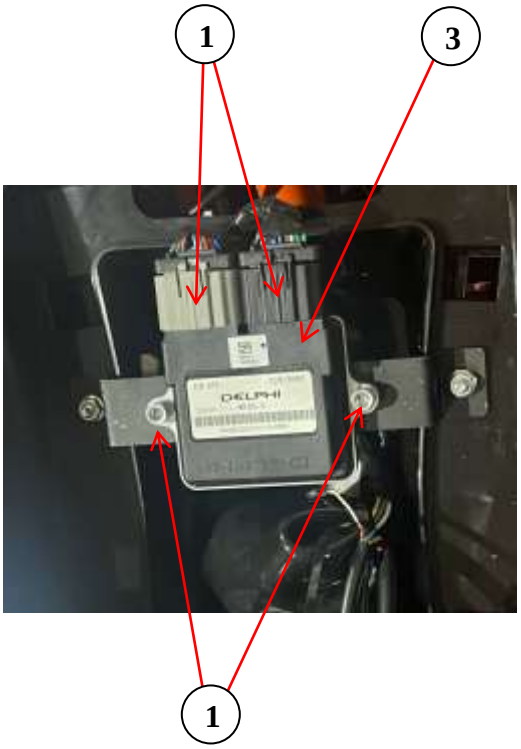
5.Remove the fuel pump 4




**Mounting**

Proceed in reverse order of disassembly

## 8.3 ECU




**Dismantle**

1.Remove the cowl
2.Unplug the two inserts under the ECU 1

3.Remove the bolts holding the ECU 2(Two in total)

4.Remove the ECU 3

**Mounting**
Proceed in reverse order of disassembly

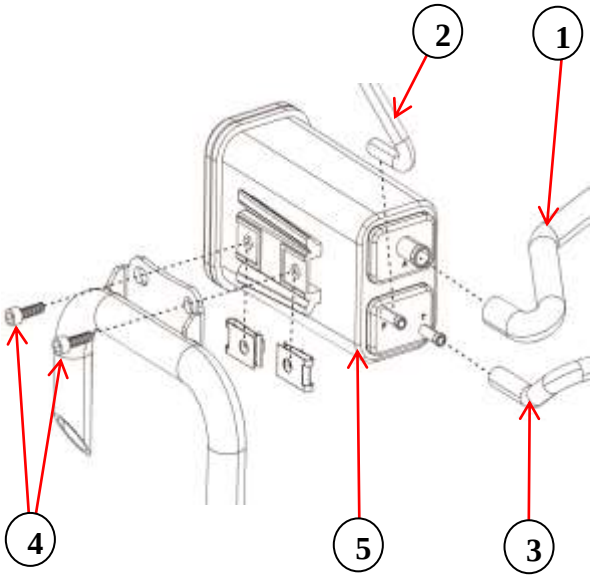
## 8.4 Carbon canister

**Dismantle**

1.Unplug the fuel hose from the carbon canister A port to the air filter 1

2.Unplug the oil pipe from the P port of the carbon canister to the oil tank 2

3.Unplug the carbon canister T port to connect the oil pipe of carbon canister solenoid valve 3
valve 3

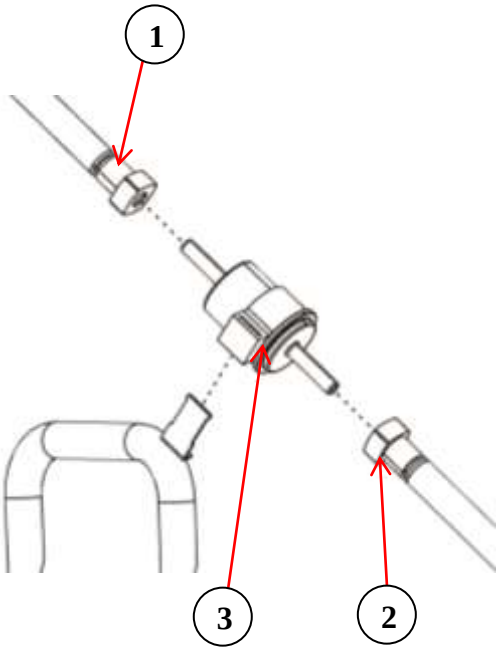



4.Remove the bolts securing the carbon canister 4 (including the two clamp nuts).

5.Remove the carbon canister 5

**Mounting**
Proceed in reverse order of disassembly

## 8.5 Fuel Fine Filter




**Dismantle**

1.Remove the upper fuel hose to the fuel pum

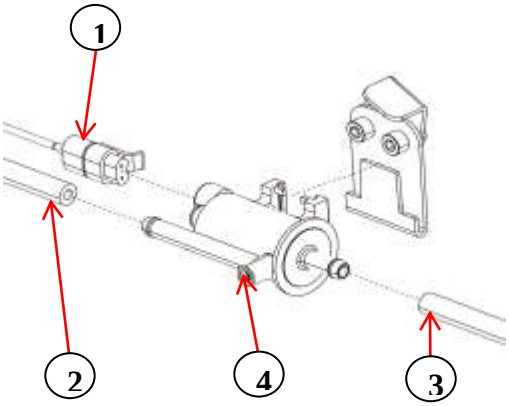
2.Remove the lower fuel line to the injector.

3.Pull out the fuel filter from the plug.

**Mounting**

Proceed in reverse order of disassembly

## 8.6 Carbon tube solenoid valve




**Dismantle**

1.Unplug the carbon canister solenoid valve insert

2.Remove the oil pipe connecting the carbon canister T-port

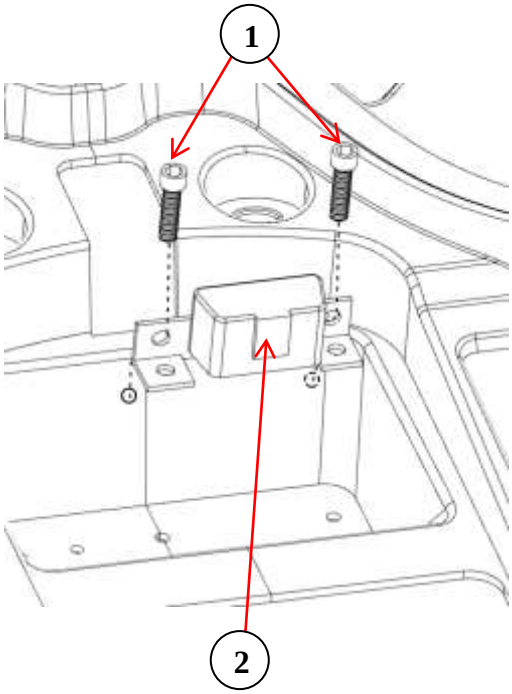
3.Remove the oil pipe connecting the throttle valve body

4.Remove the carbon canister solenoid valve

**Mounting**

Proceed in reverse order of disassembly

## 8.7 OBD




**Dismantle**

1.Remove the seat cushion

2.Remove the two fixing bolts 1

3.Unplug the insert

4.Remove the OBD connector 2

**Mounting**

Proceed in reverse order of disassembly

## 8.8 Use and Maintenance

### 8.8.1 Regular use

When the vehicle is used for the first time, it is recommended to continuously switch the key for three times before ignition. The interval between each time is recommended to be 15 seconds. The purpose is to eliminate the residual gas in the oil supply system and fully establish the oil pressure.

In the future normal use process, it is recommended to open the key until the end of the oil pump operation (or open the key) before the ignition, in order to fully establish the oil pressure to facilitate starting.

### 8.8.2 System self-inspection

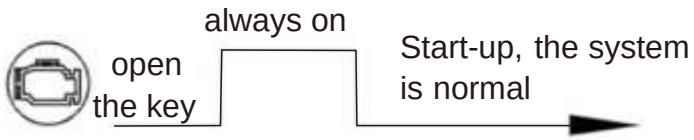
1）System self-test refers to the self-diagnosis and correction process of the system. In this process, the system will automatically solve the problems found. For the problems that cannot be solved automatically, the fault indicator will display the fault information, which will be solved manually.

2）System self-inspection is usually automatic, occurs at a certain point after the vehicle is running or stopped, and requires no manual operation. The fault indicator is located on the instrument panel. its function is to display the current status and fault information of the electric injection system, engine, etc.

3）After the vehicle turns on the ignition switch, the indicator light is "always on" and goes off after the vehicle starts, indicating that the system is normal.

4）After the engine starts, the fault indicator is always on, and the fault indicator is still on after the three diagnosis cycles, indicating that there is a current fault in the electric injection parts and should be checked.

5）After the ignition lock and ignition switch are on before the engine ignition, the fault indicator is always on， then after the engine starts, but the fault indicator is off after the three diagnosis, indicating that the electric injection system parts have no historical fault code removal, but the current electric injection parts are normal.




### 8.8.3 Clean the throttle combination

Throttle combination disassembly step：

1）Turn off the ignition lock；

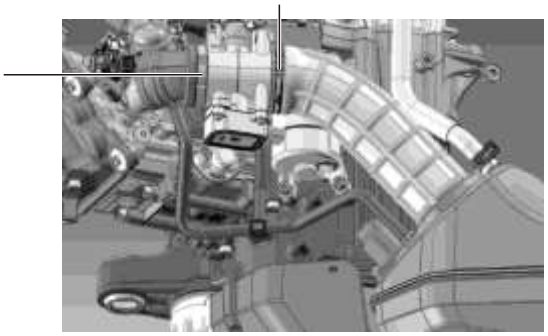
2）Open the cushion, remove the air support and the storage box；

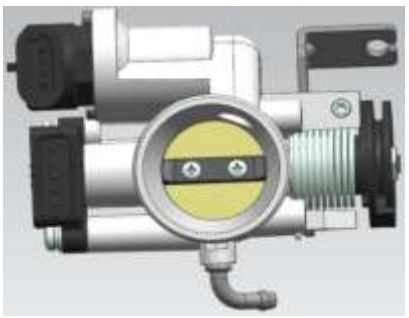
3）Remove the throttle cable；

4）Remove the 3-1 plug, the idle control valve connector and the vent tube (idle control valve)；

5）Release the clamp at both ends of the throttle combination，remove the throttle combination；

Note：The throttle body assembly needs to be cleaned every 6,000 km。





Release the inlet pipe end collar

**Cleaning step of the throttle body assembly：**

1）Clean the inner wall of throttle body assembly and throttle body air valve with special cleaning agent for throttle body assembly or gasoline ；

2）Turn the throttle body combination wheel to ensure smooth rotation, no lag or return phenomenon；

3）After the cleaning agent is fully evaporated, install the throttle body combination；

4）Install the throttle body assembly in the reverse order of removing the throttle body assembly。

## 8.8.4 electric injection system maintenance instructions

### General maintenance instructions

1) Only digital multi meters are allowed to be used to check the electric injection system;

2) Please use genuine parts for maintenance operations, otherwise the normal operation of the electric injection system cannot be guaranteed;

3) During maintenance, only unleaded gasoline can be used. Please follow the standard maintenance diagnostic process for maintenance operation;

4) It is forbidden to decompose and dismantle the parts of the electric injection system during the maintenance process;

5) During maintenance, when taking up the electronic components (electronic control units, sensors, etc.), need to be very careful and not to let them fall to the ground;

6) Establish the awareness of environmental protection, effectively treat the waste generated in the maintenance process;

### Notes for the maintenance process

1）Do not remove any parts or its connector of the electric injection system from its installation position at will, so as to avoid accidental damage or water, oil and other foreign bodies into the connector, and affect the normal work of the electric injection system。

2）When disconnecting and connecting the on connector, be sure to put the ignition switch in the closed position, otherwise the electrical components will damage。

3）Never make the temperature of the electronic control unit during the faulty thermal condition simulation and other maintenance operations that may increase the temperature exceed 80℃。

4）The oil supply pressure of the electric injection system is high (about 300 k pa), and all fuel lines are high pressure resistant fuel lines. Maintain

high fuel pressure in the circuit even if the engine is not running. Therefore, in the maintenance process, we should pay attention not to remove the oil pipe easily. If the fuel system is to be repaired, the fuel system should be unloaded with pressure before removing the oil pipe. The pressure discharge method is as follows: remove the fuel pump relay, start the engine to idle until the engine is itself out. Disassembly of tubing and replacement of fuel filters shall be performed in a well ventilated place by professional maintenance personnel.

5）Do not energize the oil pump when removing the electronic fuel pump support assembly from the fuel tank to avoid electric spark and fire.

6）The fuel pump is not allowed to operate in dry or water, otherwise it will be reduced. In addition, the positive and negative electrodes of the fuel pump must not be reversed.

7) When checking the ignition system, only conduct the jump spark detection when necessary, and the time should be as short as possible. The throttle should not be opened during the detection, otherwise it will lead to a large amount of unburned gasoline to enter the exhaust pipe and damage the three-way catalytic converter.

8）Since the adjustment of the idle speed is completely done by the electric injection system, no manual adjustment is required. The throttle limit screw of the throttle body has been adjusted at the factory, and the user is not allowed to change its initial position at will。

9）When connecting the battery, the positive and negative electrodes of the battery can not be connected to the wrong one, so as not to damage the electronic components. This system uses the negative electrode tie.

10）Remoof　battery cable is not allowed when the engine is running。

11) Before the welding operation on the vehicle, the battery positive, negative cable and electronic control unit must be removed.

12) Do not detect the electrical signals of the component by piercing the skin of the wire.

### 8.8.5 Fuel Injection System Fault Diagnosis Tool Usage

The fault diagnosis system, abbreviated as OBD (On-Board Diagnostic), is designed to detect faults in the fuel injection system. When a fault occurs, the malfunction indicator light (MIL) will turn on, and the OBD system will store the fault information in memory. Using standard diagnostic tools and interfaces, this information can be read in the form of fault codes. Based on the fault code, technicians can quickly and accurately determine the nature and location of the issue.

**Malfunction Indicator Light (MIL) Explanation**

1. Normal Mode, No Current Fault Code

When the ignition switch is turned on, the ECU initializes, and the MIL light will turn on. Once the engine starts successfully, the MIL light will immediately turn off.

2. When There Is a Current Fault Code

While the engine is running, if a fault occurs, the MIL will turn on, alerting the rider of a problem. Once the engine is turned off, the current fault will be saved as a historical fault in the fuel injection ECU.

## Reading Fault Codes Using the Diagnostic Tool

Diagnostic Tool Functions:

Read fault codes, clear fault codes, display data stream.

1. Connect the diagnostic tool to the diagnostic interface on the fuel injection harness.

2. Turn on the ignition.

3. Read the fault codes, refer to the service manual to identify the faulty components and types, and develop a repair plan based on the information and experience.

4. After resolving the fault, use the diagnostic tool to clear the historical fault codes.

5. Read the data stream to analyze fault causes that the ECU cannot report with fault codes.

## Fault Light Flashing Function Verification

### Fault Flashing Control Function Description

After switching the ignition on and off 3 times, the system enters the fault flashing code mode.

1. In the flashing code mode, the fault is identified by the number of flashes of the fault light. After turning off the key and restarting the ignition, the flashing code mode is exited.

2. The flashing code mode, apart from the LAMP function, operates the same as the engine's normal functions.

### Fault Flashing Light Working Mode

1. The flashing code follows a cyclic repetitive mode, with a 50% duty cycle (on for 0.5s, off for 0.5s). The first light-on time at the start of each cycle is 1 second.

2. Multiple fault flashing codes are separated and identified by a 3-second interval within each cycle.

3. Each cycle uses a 3-second interval to separate the identification of different faults.

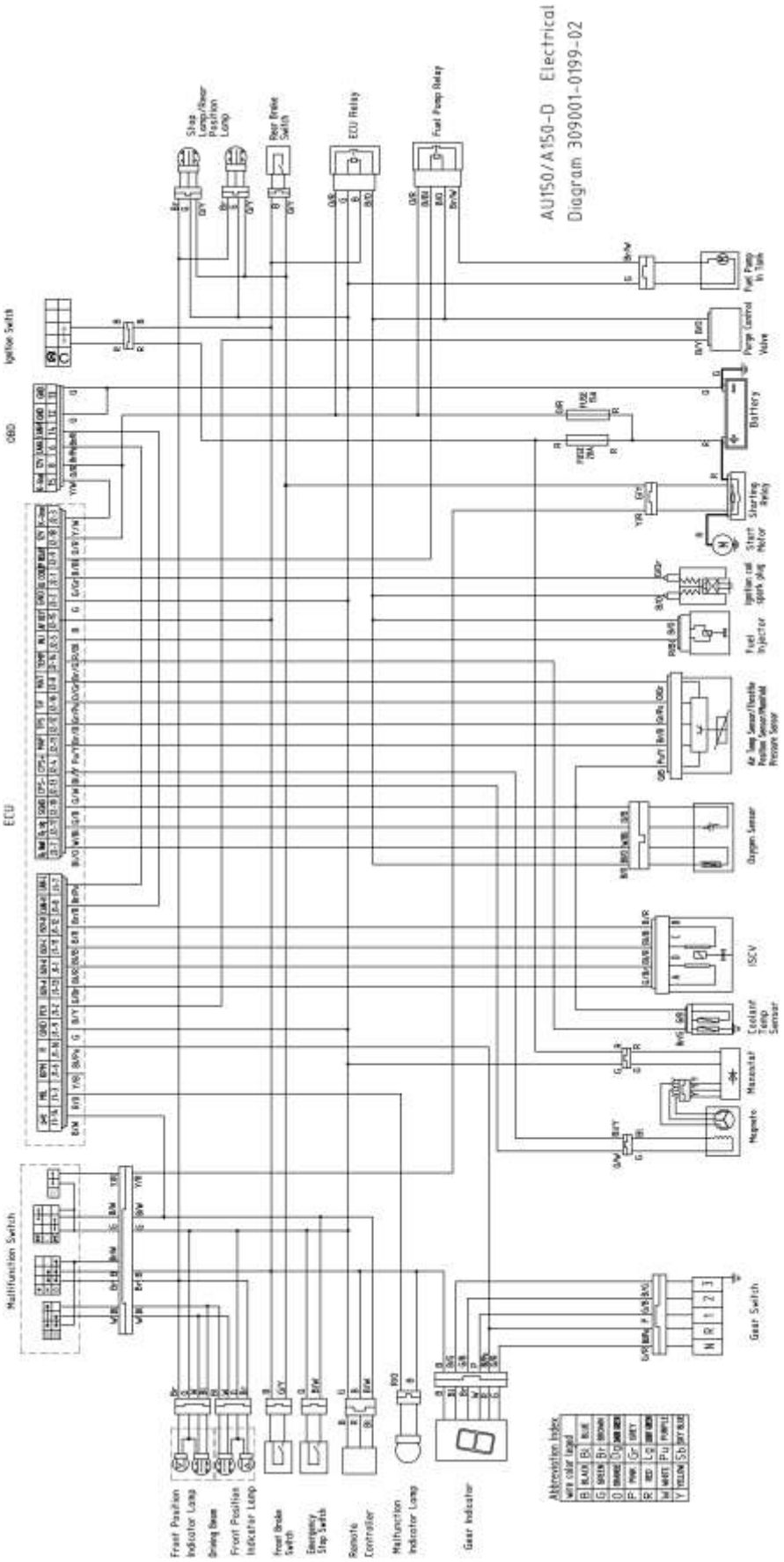
## 8.8.6 Fault code（PCODE）list

| Number of times the fault lamp blinks repeatedly | fault list | trouble code |
|---|---|---|
| 1 | P0118 | - Cylinder temperature sensor circuit high voltage/open circuit |
| 2 | P0117 | - Cylinder temperature sensor circuit low voltage |
| 3 | P0116 | - Cylinder temperature sensor signal performance fault |
| 4 | P1116 | - High cylinder temperature at startup (Performance/Out of Range) |
| 5 | P2301 | - Ignition coil "A" shorted to high voltage (Cylinder 1) |
| 6 | P2300 | - Ignition coil "A" shorted to low voltage/open circuit (Cylinder 1) |
| 7 | P0123 | - Throttle position sensor shorted to high voltage |
| 8 | P0122 | - Throttle position sensor shorted to low voltage/open circuit |
| 9 | P0459 | - Charcoal canister solenoid valve circuit shorted to high voltage |
| 10 | P0458 | - Charcoal canister solenoid valve circuit shorted to low voltage/open circuit |
| 11 | P00D1 | - Front oxygen sensor heater circuit current too low (Cylinder 1) (Heater performance fault) |
| 12 | P0232 | - Fuel pump relay shorted to high voltage |
| 13 | P0231 | - Fuel pump relay shorted to low voltage/open circuit |
| 14 | P014D | - Slow response from front oxygen sensor rich-to-lean (Cylinder 1) |

| | | |
|---|---|---|
| 15 | P014C | - Slow response from front oxygen sensor lean-to-rich (Cylinder 1) |
| 16 | P0601 | - ECM read-only memory checksum error |
| 17 | P0262 | - Cylinder 1 fuel injector shorted to high voltage |
| 18 | P0261 | - Cylinder 1 fuel injector shorted to low voltage/open circuit |
| 19 | P3106 | - Intake pressure too low at steady state |
| 20 | P0108 | - Intake pressure sensor circuit high voltage |
| 21 | P0107 | - Intake pressure sensor circuit low voltage/open circuit |
| 22 | P0105 | - Intake pressure sensor sticking |
| 23 | P0114 | - Intake temperature sensor signal fluctuating |
| 24 | P0113 | - Intake temperature sensor circuit high voltage/open circuit |
| 25 | P0112 | - Intake temperature sensor circuit low voltage |
| 26 | P0111 | - Intake temperature sensor model sticking |
| 27 | P0650 | - Engine fault indicator light malfunction |
| 28 | P2195 | - Front oxygen sensor PE too lean (Cylinder 1) |
| 29 | P0132 | - Front oxygen sensor shorted to high voltage/open circuit (Cylinder 1) |
| 30 | P0131 | - Front oxygen sensor shorted to ground (Cylinder 1) |
| 31 | P0300 | - Detected engine misfire |
| 32 | P0301 | - Cylinder 1 misfire |
| 33 | P0031 | - Front oxygen sensor heater shorted to low voltage/open circuit (Cylinder 1) |
| 34 | P0032 | - Front oxygen sensor heater shorted to high voltage (Cylinder 1) |
| 35 | P0563 | - System voltage high |

| | | |
|---|---|---|
| 36 | P0562 | - System voltage low |
| 37 | P0505 | - Idle control fault |

# Appendix


AU150/A150-D Electrical
Diagram 309001-0199-02
ECU
Ignition Switch
OBD
Multifunction Switch
Shift Lamp/Rear Position Lamp
Rear Brake Switch
ECU Relay
Fuel Pump Relay
Fuel Pump In Tank
Purge Control Valve
Battery
Fuse 30A
Fuse 15A
Starting Relay
Start Motor
Ignition coil spark plug
Fuel Injector
Air Temp Sensor/Throttle Position Sensor/Manifold Pressure Sensor
Oxygen Sensor
ISCV
Coolant Temp Sensor
Magneto
Gear Switch
Front Position Indicator Lamp
Dimming Beam
Front Position Indicator Lamp
Front Brake Switch
Emergency Stop Switch
Remote Controller
Malfunction Indicator Lamp
Gear Indicator
Abbreviation Index
wire color legend