KAYO

AU150

BULL 150

Maintenance Manual

WWW.KAYOMOTO.US

VERSION CODE：20190316
VERSION NAME：AU150 Maintenance Manual

ZHEJIANG KAYO MOTOR CO. LTD
March of 2019

Introduction

This manual contains detailed operation for AU150 (ATV), including maintenance and adjustment processes, dis-assembly and installation notes, inspection and maintenance points, troubleshooting methods and maintenance technical data, and graphics.
Please read the manual carefully and follow the instructions strictly during the inspection period, following these instructions can lengthen the service life of parts and enhance the performance of the ATV.
Chapter1: introduce the normal operation issue, tools used, basic technique and repair data.
Chapter2: introduce how to assemble and dis-assemble the plastics.
Chapter3: introduce the regular maintenance and adjustment.
Chapter4: introduce how to dis-assemble the parts in the places around engine.
Chapter5: introduce the method and notes for dis-assembly, checking, repair and assembly of engine parts
Chapter 6: introduce ATV chassis related information.
Chapter7: introduce the detection and repair of the signal and lighting system.
Appendix: Electrical schematic diagram
All contents in this manual are subject to improve and update without notice.
Maintenance is subject to actual condition.

Zhengjiang Kayo Motor., Ltd
RD Department
March of 2019

CONTENTS

Conversion table

Item	Unit conversion
pressure	1kgf/cm^2=98.0665kPa；1kPa=1000Pa
	1PSI=0.0689kgf/cm^2
	1mmHg=133.322Pa=0.133322kPa
Torque	1kgf·m=9.80665N·m
volume	1mL=1cm^3=1cc
	1L=1000cm^3
Moment	1kgf=9.80665N
Length	1in=25.4mm

Danger/warning/attention

Please take the safety precautions below seriously. During maintenance, and especially during engine service.

Danger: Be on high alert for danger.

Warn: to be alert to moderate danger.

Attention: to be alert to minor danger.

This manual may doesn't contain some potential risks in engine work and maintenance, so besides the above explanations, the service operator should also have basic mechanical knowledge, and if you are not sure whether can finish the repair, please learn from the experienced workers firstly.

1. Maintenance information

1.1 Operation notes

Safety notes

1. Wear work clothes (coveralls), hat and safety boots suitable for operation. In some conditions safety glasses, dust masks, gloves and other safety protective supplies are needed to protect you from injury。
2. Do not run engine in un-ventilated areas.
3. Do not touch the engine or exhaust before cooled down to avoid burns。
4. Battery solution (dilute sulfuric acid) is a strong corrosive agent, which might cause burns or blindness when get contact with skin or eyes. Once the battery solution is accidentally touched on clothes or skin, rinse immediately with plenty of water and go to hospital to get treatment in time when needed. Storage battery and battery solution should be kept strictly out of reach of children. Battery charging can produce flammable and explosive Hydrogen. There is an explosion risk if exposed to source of fire or spark. Please charge batteries in well-ventilated places.
5. As gasoline is flammable and explosive, Pay attention to sparks as well as open flames. Vaporized gasoline may explode or burst into flames, please choose well-ventilated areas when working with fuel systems.
6. Attention, the rear wheel, clutch or other rotating parts and movable parts may clip hands and clothes during maintenance. Please tie up any loose clothing or hair when performing maintenance in these areas
7. Two or more people must constantly greet each other when operating to ensure safety.

Disassembly and installation instructions

1. All the Parts, fluids and lubricants must be Kayo brand parts or Kayo recommends.
2. When disassembling, Please sort out the parts of each system and keep separate to ensure that all parts can be put back.
3. Clean the vehicle before inspection
4. Gaskets, O-rings, piston rings, circlips, snap-rings, cotter pins and other onetime use parts should be replaced after disassembling.

5. Snap rings can be deformed if opened or closed too much during disassembly. Please do not use snap rings that have been compromised.
6. After disassembly and inspections, clean the parts and blow the cleaning agent away with compressed air before measurements. Grease the moving surfaces before assembly.
7. During disassembly, check all the necessary parts for wear and measure. Before re-assembly make sure all parts are within specification.
8. Bolts, nuts, screws and other fasteners shall be pre-tightened by hand, then torqued to the specified torque value, In a diagonal sequence from large to small fasteners and from inside to out.
9. Inspect rubber parts before disassembling and replace if necessary. In addition, some rubber parts are not resistant to gasoline, kerosene and other corrosives. Please keep these rubber parts away from volatile oil and grease.
10. Smear or inject recommended grease in specific places as required in service manual.
11. Use the correct tools for disassembly and installation.

12. Bearings inner race or outer races can be checked by rotating with finger to confirm whether the rotation is smooth. If the bearings are a press fit, and the removed bearing is disfigured the bearing shall not be used again. If there are problems as bellow, please replace bearing.

- Bearing axial and radial clearance is loose
- The bearings if stuck or frozen, Please clean and lubricate. If the bearings still feel stuck after cleaning, replace it. If it can't be cleaned, replace it.
- If the bearing is originally compaction fit with vehicle or axle diameter, but it gets unsuitable after disassembly, replace it.

13. The bearings should be lubricated with oil or grease before assembly. Notice the direction of installation when assemble one-side dustproof bearing. When assemble open or double-sided dustproof bearing, make the manufacturer's logo and dimensions outwards.
14. Install snap rings with chamfered side towards force direction. Do not use the rings that have been deformed. After assembly, rotate the rectangular ring to confirm that it is firmly installed in the slot.
15. Please check whether all fastening parts are tightened and that function is normal after assembling.
16. Brake fluid and coolant can damage the coating surface, plastic parts, rubber parts, etc., do not let it adhere to these parts, in case of adhesion rinse with water immediately.
17. Make the side with manufacturer's mark outside when install oil seal：

- Pay attention not to make oil seal lips curl, do not let burrs scratch oil seal lip during assembly.
- Grease the oil seal lip before assembly.

18. When installing rubber hoses, insert the rubber hose onto the fitting. If there is a hose clamp, install the hose clamp in the hose indentation if there is one. Replace the rubber hoses that are loose, dried or cracking.
18. Keep the inner of engine and brake hydraulic system away from dust and clay.
20. Clean gasket materials on mating surfaces before installation. Any scratches or gouges on the

contact surface must be removed uniformly with a whetstone or resurfaced.
21. Do not bend the cables or hoses excessively. Deformed and damaged cables can cause poor range of motion, leaks or breaks.
22 When assembling the protective cap parts, if there is a groove insert the protective cap into the groove.

Grinding in of engine

There are many relative motion components in the engine, such as pistons, piston ring, valves chains, sprockets, mutually meshing gears, etc., it's very important to have a standard break-in at the beginning of using. Break-in can help the moving parts adapt to each other, correction work, form a smooth friction surface which can bear heavy load, by this way the engine will have excellent performance and reliability.

Recommended break-in time is 10 hours, as follows:

0~10 hours: To avoid continuous operation under the condition of 1⁄2 throttle, the speed should be changed frequently, and it is not recommended to operate for a long time with a fixed throttle position; Cool the engine for 5 to 10 minutes after each hour of operation. Avoid quick acceleration. The change of throttle should be slow, not sudden. Do not overload or drag/tow goods during the Break-in period.

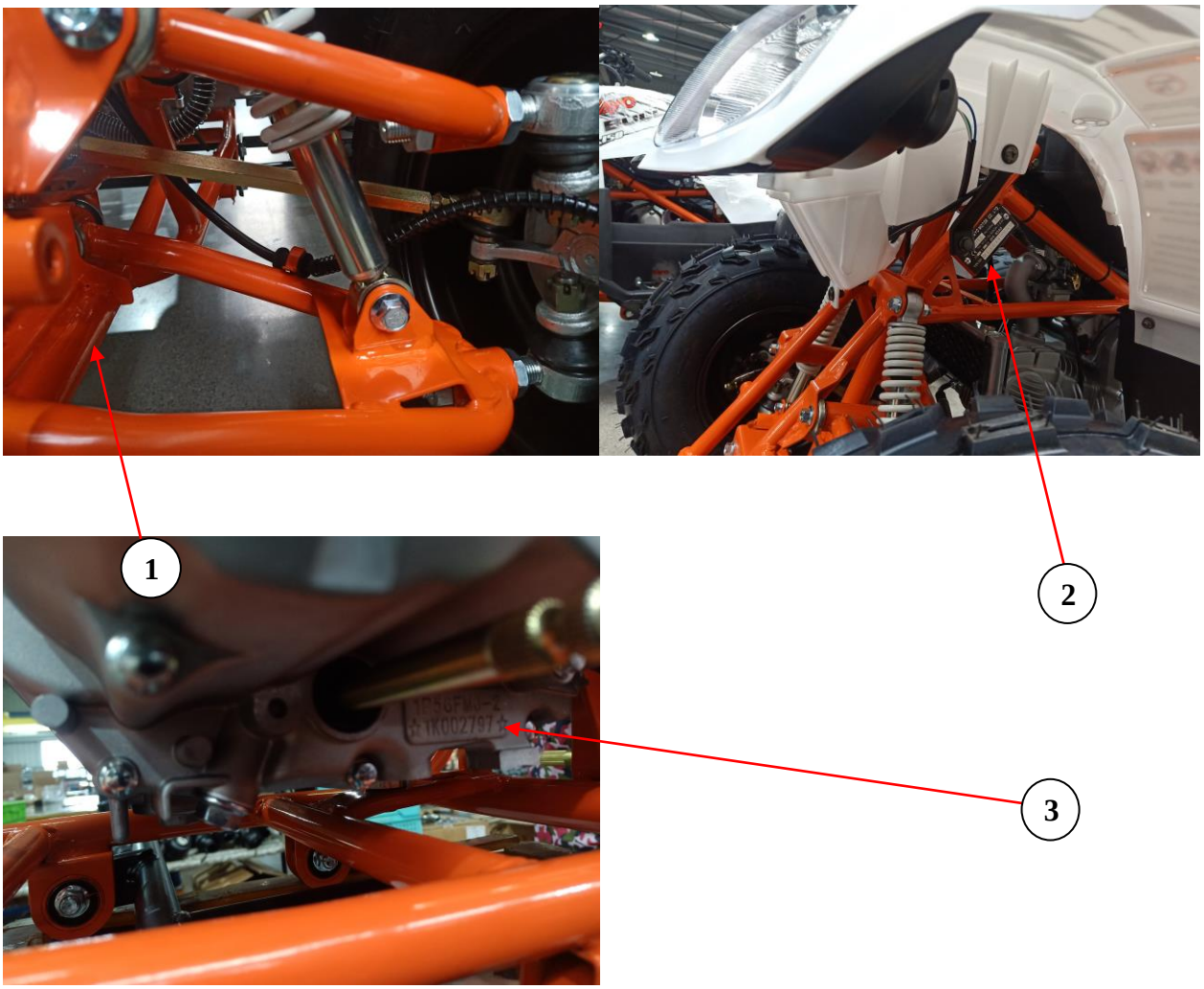
Note:

- During break-in period, perform everyday maintenance.to prevent future issues
- Once Break-in period is complete, schedule a service for the vehicle, then put into formal use.

1.2 VIN number

① VIN number
② Metal plate
③ Engine number

MODEL	AU150
VIN NUMBER	
ENGINE NUMBER	



1.3 Main Specifications

ITEM		Specification
Model		AU150
Length（mm）		1663
Width（mm）		965
Height（mm）		980
Wheelbase（mm）		1050
Engine model		156FMJ
Displacement（ml）		140
Fuel type		No. 91octane or above
Weight（kg）		141
Rider No.		1 person（Only the rider, no passenger）
Max loading quality		1 person ＋ 60kg = 120kg
Tire spec	Front tire	AT20×7-10
	Rear tire	AT19×10-9
Ground clearance		135mm
Turning radius（mm）		2350mm
Engine	Start	Electric
	Engine type	Single cylinder, 4-stroke, oil cooling.
	Transmission	CHOHO/Chain
	Bore stroke（mm）	57×57
	Compression ratio	8.8:1
	Lubrication mode	Splash and pressure
	Oil pump type	Rotor
	Lubricating oil filter type	All-flow rotating filter
	Oil	SAE15W-40/SF or above
	Cooling	Oil cooling

ITEM		Specification	
Air filter type		Paper filter core	
Throttle Body	Type	Plunger throttle	
	Mix valve diameter	30mm	
Fuel tank volume		7L	
Transmission	Clutch	Automatic	
	Speed changing way	3 gears+ reverse gear	
	Gears	Forward gears:1 2 3 Reverse gear:R	
	Gear changing order	By foot/ R N 1 2 3	
	Drive mode	Chain driven rear axle	
	Engine drive rotating direction	clockwise	
Steering equipment	Biggest steering angle	46°±1°	
Brake		Front	Hydraulic disc
		Rear	Hydraulic disc
buffered mode	Suspension mode	Front double A-arm independent, Rear single shock swingarm	
Frame type		MIG welded steel tube and plates	

1.4 Maintenance Specs list

Lubricating device

Item		Standard	Limits
Engine oil capacity	Change oil	600ml（No oil filter core replaced）	—
	Change oil	700ml（replace the oil filter core）	
	Full capacity	800ml	—
Recommended engine oil		Only use SAE 15W/40-SE oil. Don't use other brand of mixing use different brand as this will cause engine damaged and may cause accidents	
Oil pump rotor	Radial clearance of inner and outer rotors	—	0.12mm
	Radial clearance between outer rotor and pump body	—	0.12mm
	Axial clearance between rotor surface and pump body	0.05~0.1	0.2mm

Air intake system（see 05-engine section）

Wheel (front and rear wheels)

Item		Standard	Limits
Rim jump	Vertical	0.8mm	2.0mm
	Horizontal	0.8mm	2.0mm
Tire	Residual groove	—	3mm
	Air pressure	35kPa（0.35kgf/cm^2）	—

Brake system

Item		Standard	Limits
Front brake	Disc thickness	3.5mm	3.0mm
Rear brake	Brake bar stroke	10~20mm	—
	Disc thickness	4.0mm	3.5mm

Battery/charging device/Trigger coil

ITEM				STANDARD
Magneto	Type			Permanent-magnet alternator
	Output			Three-phase full wave
	Magneto trigger coil resistance			150
	Magneto No-load voltage（engine in cold condition）			N/A
	Magneto maximum output power			180w
	Regulated voltage			14.5 ± 0.5V
	trigger coil peak voltage			≥1V，200r/min；≥8.5V，2000r/min
Rectifier type				Full wave rectification
Battery	Capacity			12V 7Ah
	Voltage	Full charge		14.4V
		Not full		小于11.8V

Ignition device

ITEM		STANDARD
Ignition method		CDI electric ignition
Sparking plug	Type	Resistor type spark plug
	Standard	D8RTC
	Gap	0.6~0.7mm
	Spark character	Blue and white light
Ignition coil resistance	Primary	0.3 Ω
	Secondary	3.8 kΩ
Peak voltage	Primary ignition coil	300~450V
	Pulse	20kV~30kV
Start relay coil resistor		3.5 Ω

Light / Meter / Switch

ITEM		STANDARD
Fuse		10A
Light, bulb	Front light	12V—35W
	Tail light/brake light	12V—2.8W

Valve mechanism + cylinder cover（see 05-engine section）

Cylinder + piston + piston ring + crank connecting link（see 05-engine section）

Clutch + Transmission mechanism （see 05-engine section）

1.5 Tightening torque of fasteners

Note: When installing threads, please put antirust grease on the thread and connecting surface.

Tightening torque at specified position-whole vehicle

No	Install position	Bolt specification	Qty	Torque（N·m）
1	Suspension lower rocker arm bolt	GB5789 M10×1.25×70	4	45~59
2	Front shock bolt	GB5787 M10×1.25×40	4	45~59
3	Rear shock bolt	GB5787 M10×1.25×50	1	45~59
4	Rear shock bolt	GB5787 M10×1.25×45	1	45~59
5	Front hub mounting slotted nut	GB9457 M14×1.5×H18	2	126~218
6	Steering pulling rod ball pin slotted nut	GB9457 M10×1.25	4	33~45
7	Handle bar gland screw	GB70-85 M8×30	4	22~30
8	Front brake bolt	GB5789 M8×25	4	22~30
9	Front brake bolt	M8×1.25×20	8	22~30
10	Rear brake caliper bolt	GB5789 M8×25	2	22-30
11	Rear brake disc mounting screw	GB70-85 M8×16	4	22~30
12	Handle bar raisers mounting bolt	GB5783 M10×1.5×30	2	45~59
13	Oil cooler mounting bolt	GB5789 M6×25	4	9~12
14	Towing ball head fix plate mounting screw	GB70-85 M10×1.5×30	4	45~59
15	Rear hub mounting slotted nut	GB9457 M16×1.5	2	199~311
16	Steering column mounting slotted nut	GB9457 M10×1.25	1	110~130
17	Steering column clip plate mounting bolt	GB5787 M8×60	2	22~30
18	Oil tank front mounting bolt	GB5789 M6×25	2	9~12
19	Oil tank rear mounting bolt	GB5789 M6×30	2	9~12
20	Horn mounting bolt	GB5787 M6×16	1	9~12
21	Negative pressure switch bolt	GB5787 M6×16	1	9~12
22	Engine mounting bolt	GB5787 M10×1.25×160	1	45~59
23	Sprocket holder mounting screw	GB70-85 M8×20	4	38~51
24	Plastic bottom tray mounting screw	GB70-85 M6×45	4	13~16

25	Cross head tapping screw	GB845-85 ST4.2	—	—
26	Cross head machine screw	GB828-88 M5×16	2	—
27	Cross head big fat machine screw	TM6	—	—
28	Rim mounting nut	GB6187-86 M10×1.25	16	45~59

Tightening torque at specified position - engine（see 05-engine section）

Tightening torque for fastener in non-specified position

Spec	torque N·m	Spec	Torque N·m
5mm bolt, nut	4.5~6	5mm bolt	3.5~5
6mm bolt, nut	8~12	6mm bolt	7~11
8mm bolt, nut	18~25	6mm Convex bolt	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）

Engine special tools（see 05-engine section）

1.6 lubricating grease and sealant

Position	Note point	Grease
Steering bearing		Lightweight lithium soap-based grease
Throttle perch connecting place		
A-arm bushing		
Steering column inner surface		
Seat lock move part		
Gear shift mechanism move part		

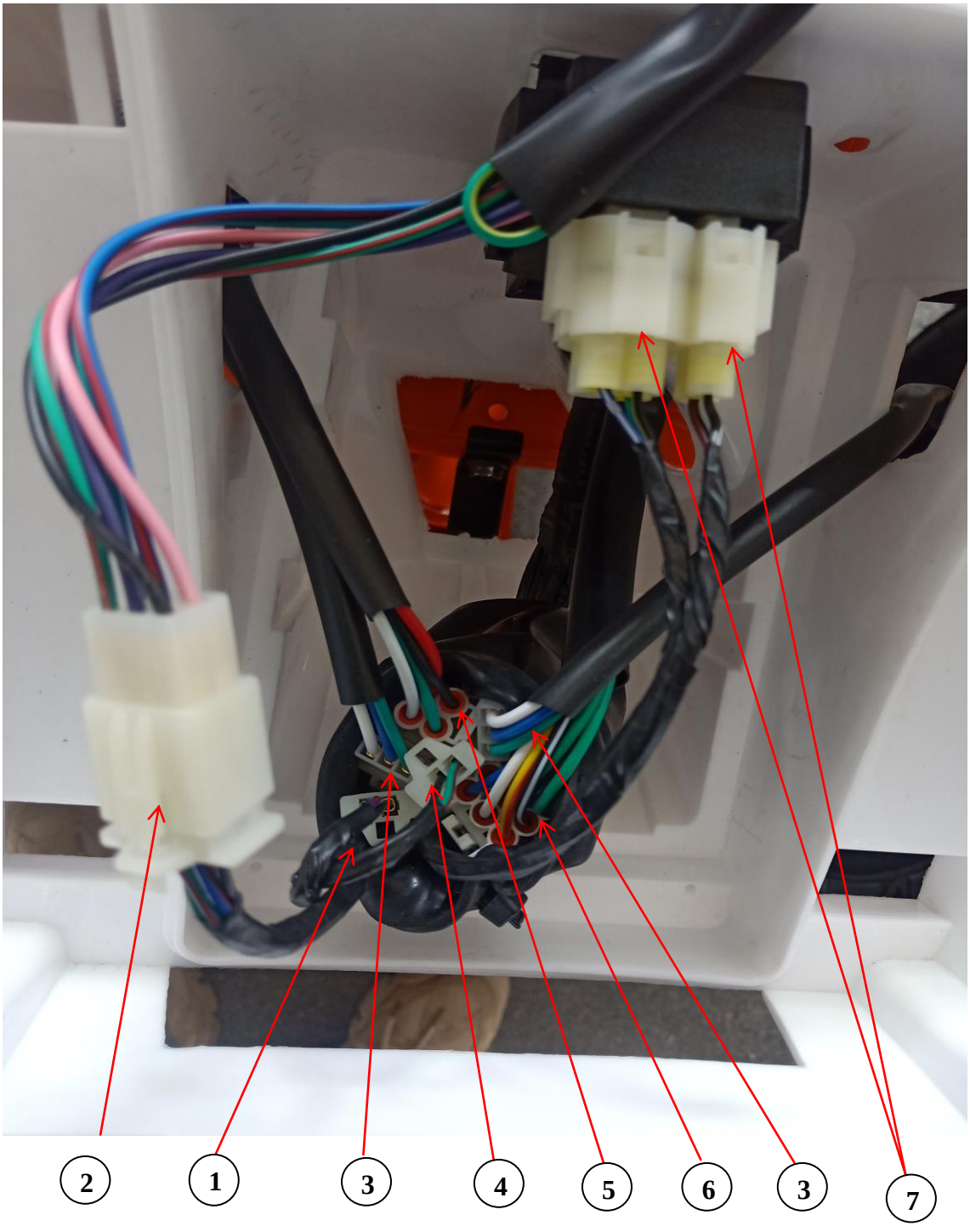
Lubricating grease for Handle cable, bearding and all rotating parts

Position	Contents	Grease
Steering axle spherical surface axle sleeve	Lubricating	Car use general Lithium grease GB/T5671
Rear wheel axle bracket		
Front and rear shock joint place		
Throttle, bar steering axle and pulling cable connector		
Left and right handle bar turning axle place		
Parking cable connect place		

Engine operating materials and installation accessories (see 05-engine section)

Engine operating materials includes lubricating oil (engine oil), Grease and cooling liquid. The installation accessories contain assembly grease or lube, screw thread sealant etc.

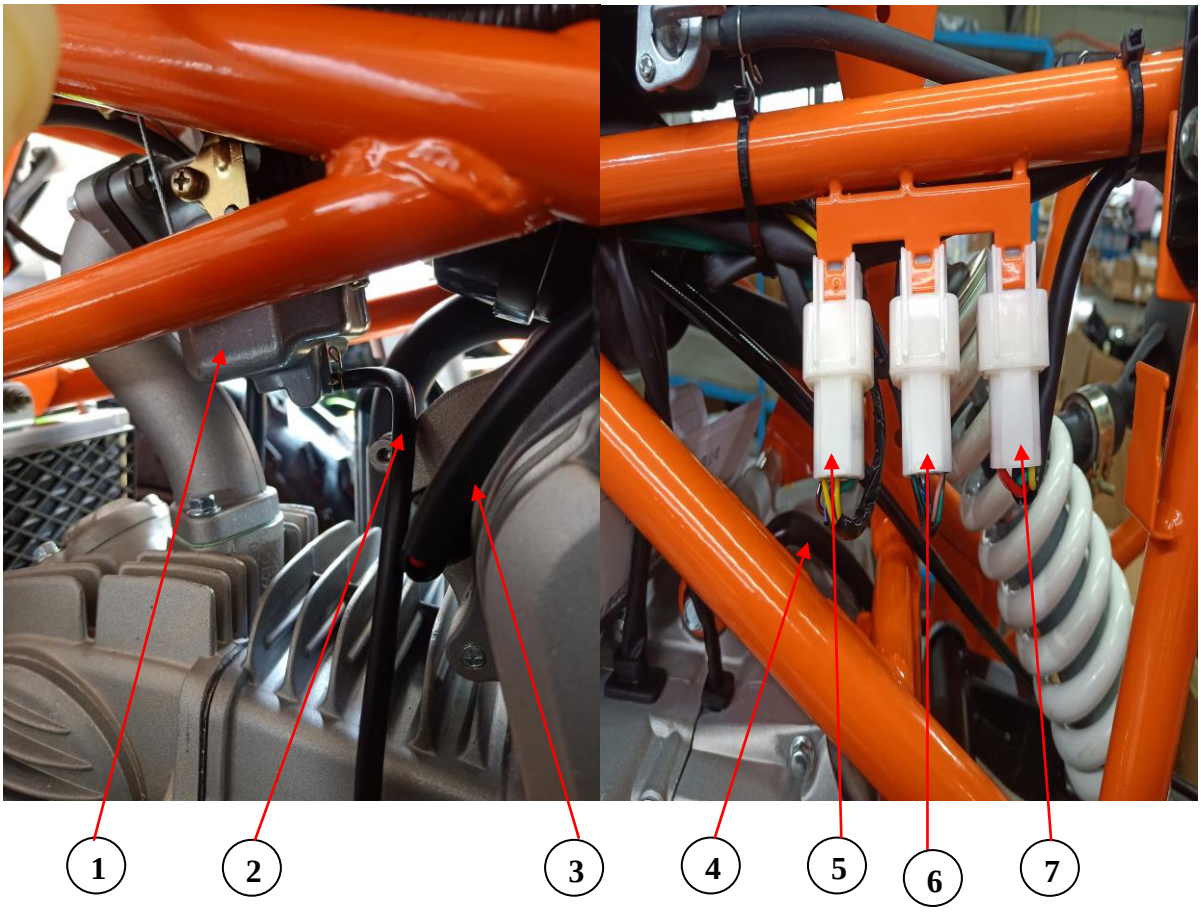
1.7 Wiring diagram of cable, hoses and cable



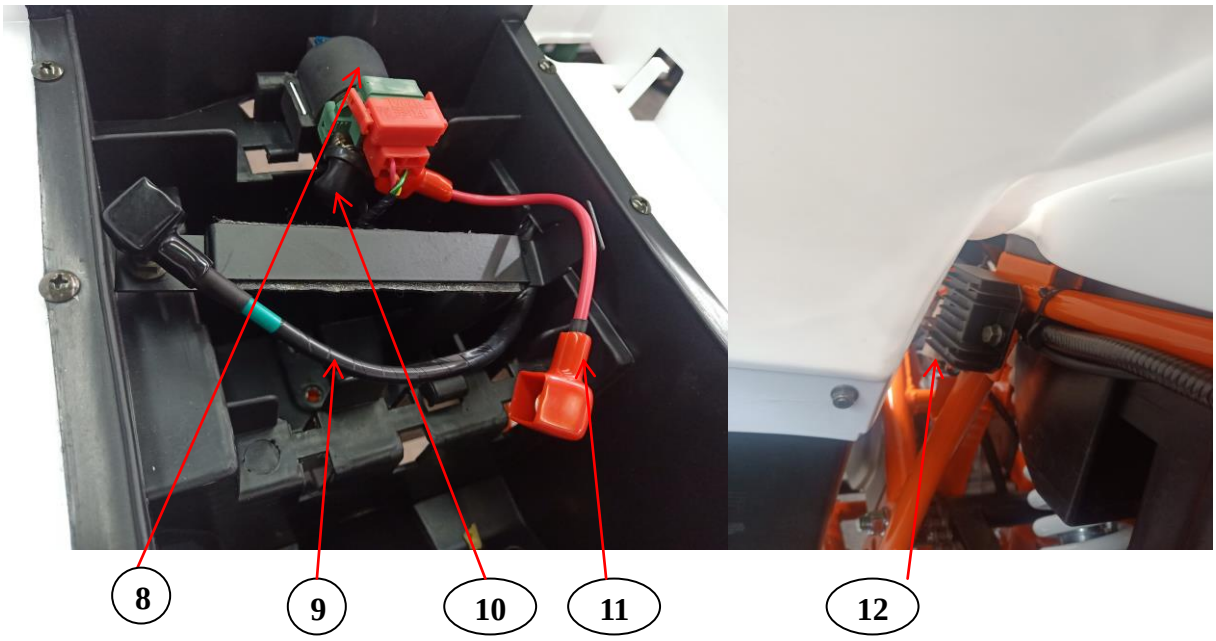
1. Reverse indicator connector(older models 2017⬇) **2.** Digital gear indicator connector **3.** Headlight connector **4.** Neutral indicator connector (older models 2017⬇)**5.** Key switch connector **6.**Multifunction switch Connector **7.** CDI connector

Note: To inspect the above parts, must remove the front rack and hood. Please refer to 02-Plastics.

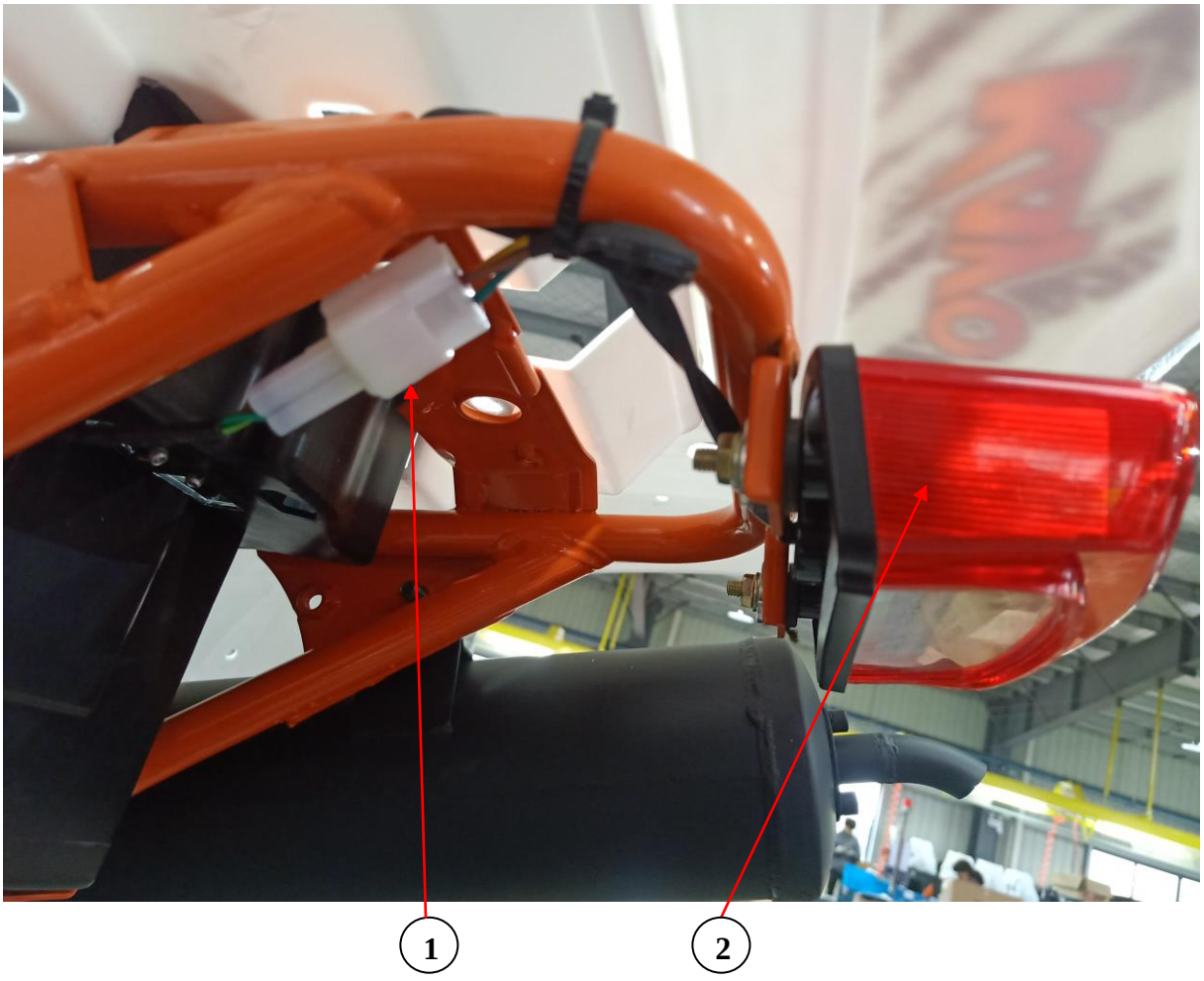
8. Brake switch (left and right) 9. Throttle cable 10. Front and Rear brake lines



1.Carburetor 2. carburetor overflow hose 3.Starter motor cable 4. Crankcase vent hose 5.Stator/ignition pickup connector 6. Gear indicator connector 7.Voltage regulator connector
Note: To inspect the above parts, must remove the shift lever, and left footrest. Please refer to 02-Plastics.



8. Starter Relay 9. Battery negative terminal 10. Starter cable 11. Battery positive terminal 12.Voltage regulator/rectifier



1. Tail light connector 2.Tail light

2 Plastics

2.1 Inspection information

Working notes.

- When replacing plastics with warning stickers, please reapply new stickers accordingly.
- Refer to this chapter when plastics need to be dis-assembled to inspect inner parts

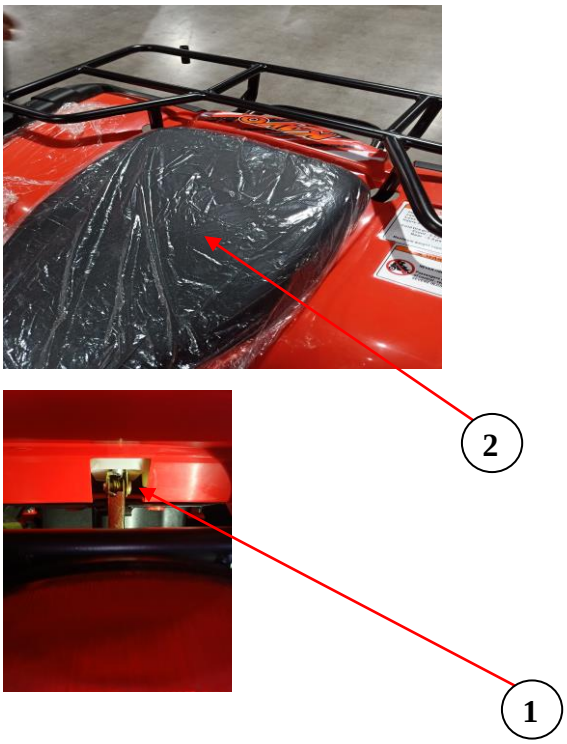
- This chapter describes the order of dis-assembly and assembly of plastics
- This chapter describes the dis-assembly and assembly of racks, seat, outer plastic parts.
- Hoses, cables, brake lines should be through the right positions as per the “Wiring diagram of cable, hosepipe and pulling cable”.

2.2 Mounting torque

M8 bolt	21（2.1）	torque N·m(kgf·m)
M6 bolt	10（1.0）	torque N·m(kgf·m)
M5 bolt	5（0.5）	torque N·m(kgf·m)
Self-tapping nail	4（0.4）	torque N·m(kgf·m)

2.3 Dis-assembly and assembly of seat and racks

2.3.1 Seat



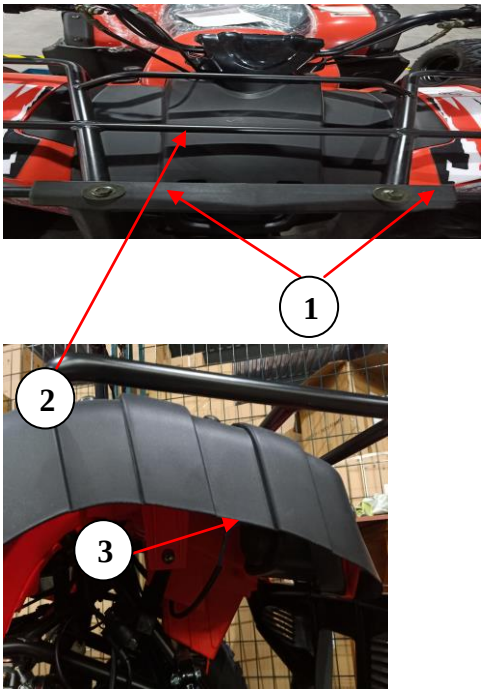
Dis-assembly

Lift the seat latch 1
Lift up the rear of seat, and then pull it backward. 2
Remove the seat.

Assembly

Install in reverse order from dis-assembly
Check if the seat is installed in place and firm

2.3.2 Front rack



Dis-assembly

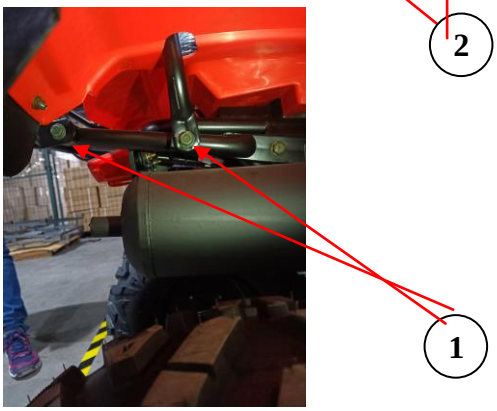
Dis-assemble the mounting bolts from rack 3(left and right each one）
Dis-assemble mounting bolts 1
Dis-assemble front rack 2

Assembly

Install in reverse order from disassembly

2.3.3 Rear rack

Dis-assembly
Dis-assemble mounting bolt from rear rack 1(left and right）
Dis-assemble rear rack 2

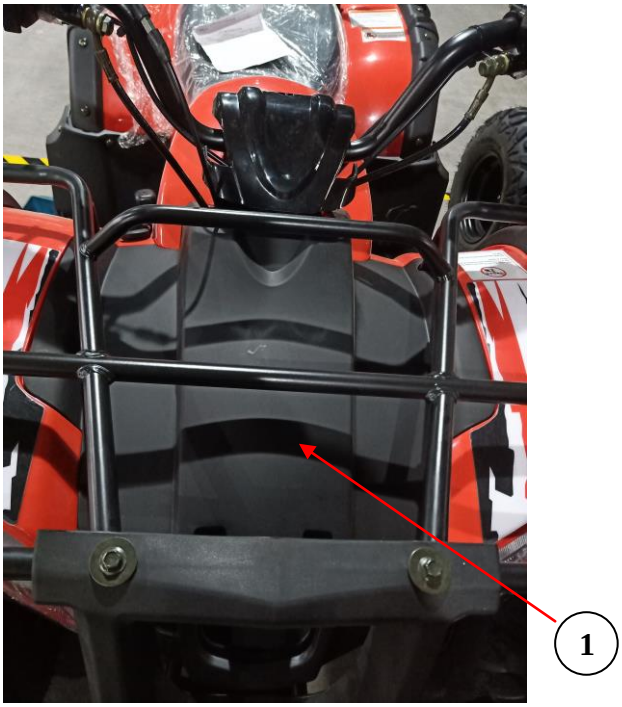


Assembly
Install in reverse order from dis-assembly

2.4 Front plate, gear display front cover, gear display, foot gear rod mounting combination

2.4.1 Hood

Dis-assemble front rack（→ 2.3.2）
Dis-assemble Hood 1

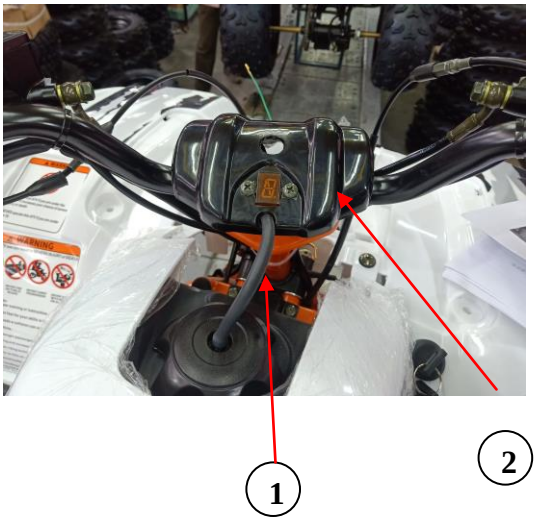


Assembly
Install in reverse order from dis-assembly

2.4.2 Gear display front cover

Dis-assembly
Pull out oil breather pipe 1
Dis-assemble front cover 2

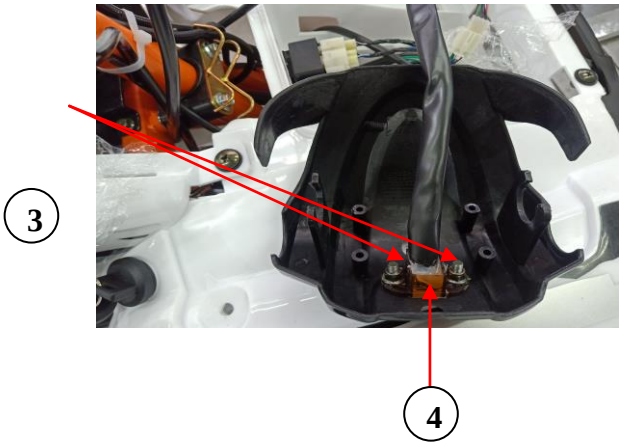
Assembly
Install in reverse order from dis-assembly



2.4.3 Gear display

Dis-assembly
Dis-assemble meter front cover（→ 2.4.2）
Back out 2 nuts 3
Dis-assemble gear display 4

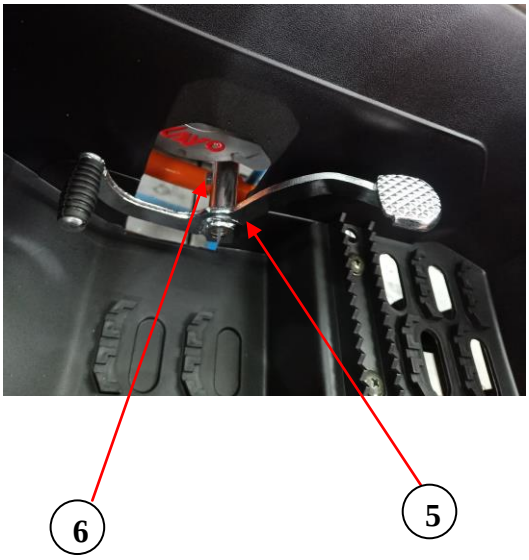
Assembly
Re assemble in reverse order from dis-assembly



2.4.4 Shift lever mounting combination

Dis-assembly
Dis-assemble Shift lever mounting bolt 6
Dis-assemble foot gear rod 5

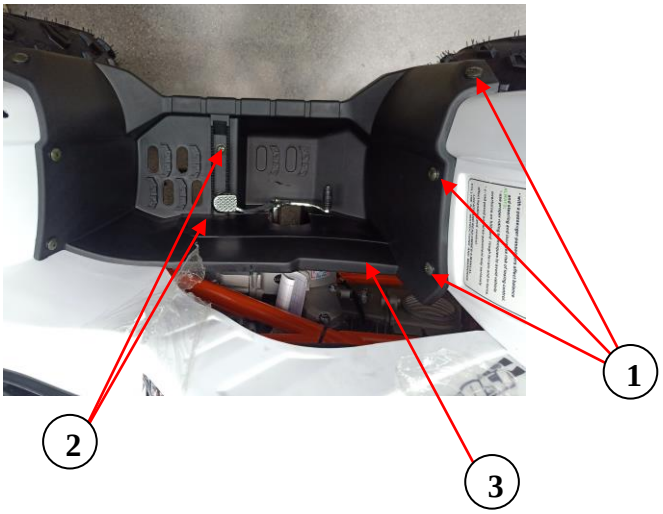
Assembly
Install in reverse order from dis-assembly



2.5.1 Left footrest plate

Dis-assembly
Dis-assemble foot gear rod（→ 2.4.4）
Dis-assemble fasten screw 1
Dis-assemble fasten screw 2
Dis-assemble left footpeg from lower to upper 3

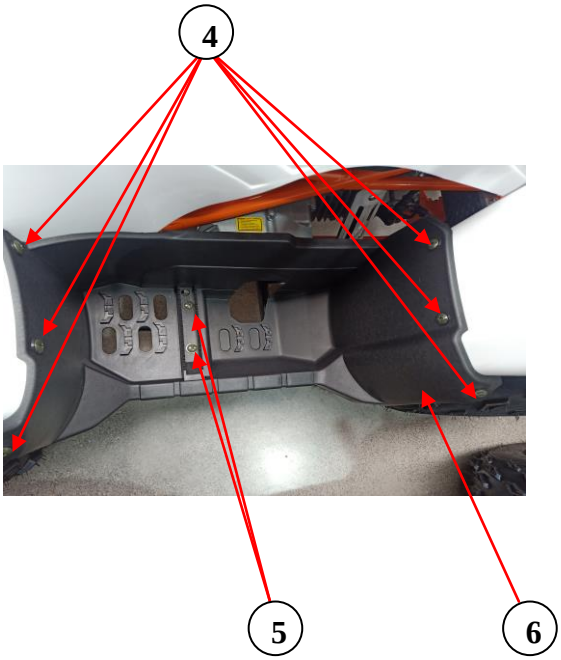
Assembly
Install in reverse order from dis-assembly



2.5.2 Right footrest plate

Dis-assembly
Dis-assemble fasten screw 4
Dis-assemble fasten screw 5
Dis-assemble right footrest from lower to upper 6

Assembly
Install in reverse order from dis-assembly

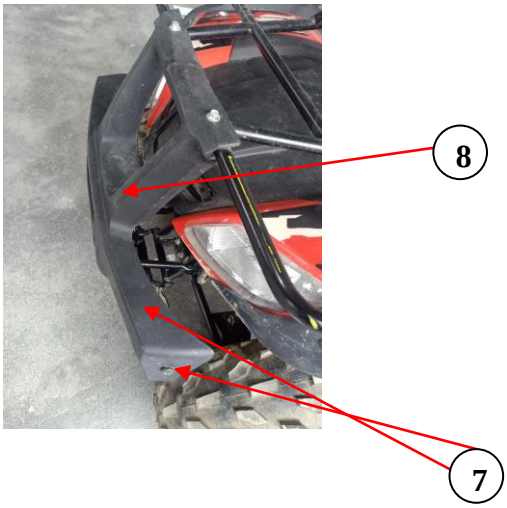


2.6 Dis-assembly of front ventilation plate and bumper

2.6.1 Front ventilation plate

Dis-assemble front rack（→2.3.2）
Dis-assemble mounting bolt 7（left and right each 2）
Dis-assemble front ventilation plate 8

Assembly
Install in reverse order from dis-assembly



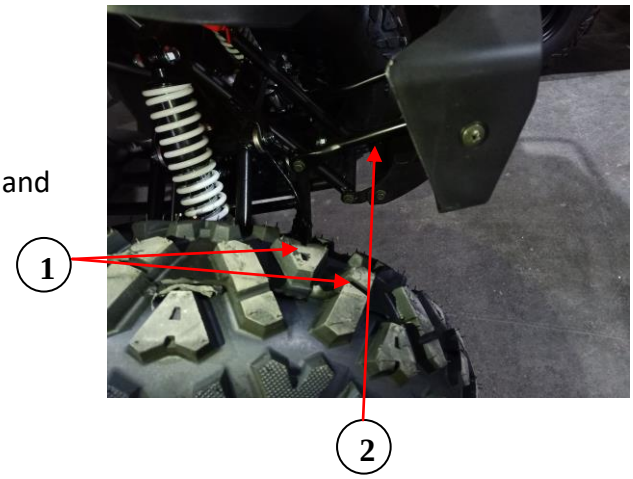
2.6.2 Bumper

Dis-assembly

Dis-assemble front rack（→ 2.3.2）

Dis-assemble mounting screw1（left and right each 2）

Dis-assemble bumper 2



Assembly

Take it back in reverse order from dis-assembly

2.7 Dis-assembly and Assembly of fuel tank cover plate, front and rear assy. plate

2.7.1 Front assy. Plate

Dis-assembly

Dis-assemble gear display front cover（→2.4.2）

Dis-assemble front rack（→2.3.2）

Dis-assemble front plate（→ 2.4.1）

Dis-assemble foot gear rod（→2.4.4）

Dis-assemble left footrest plate（→ 2.5.3）

Dis-assemble right footrest plate（→ 2.5.4）

Dis-assemble front Plate mounting screw 1

Dis-assemble screw 2（left and right 1）

Dis-assemble screw 3

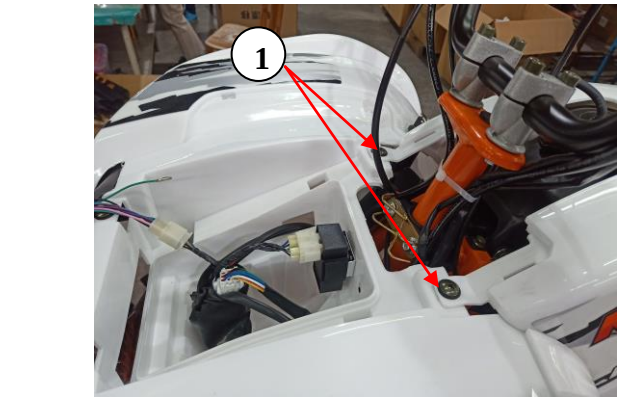
Dis-assemble front assy. Plate 4

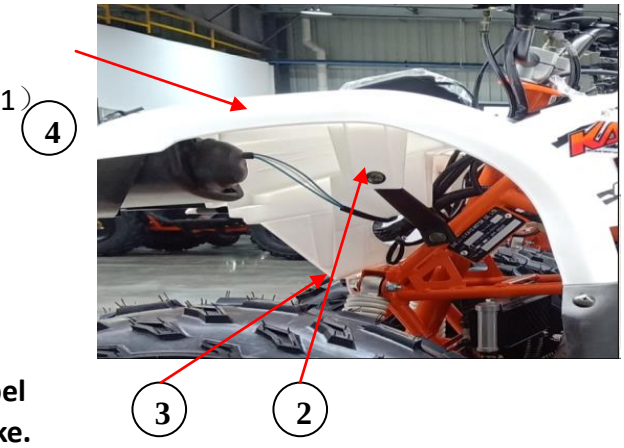
Assembly

Install in reverse order from dis-assembly

Note:

Before dis-assembly, remove and label wires and connectors to avoid mistake.

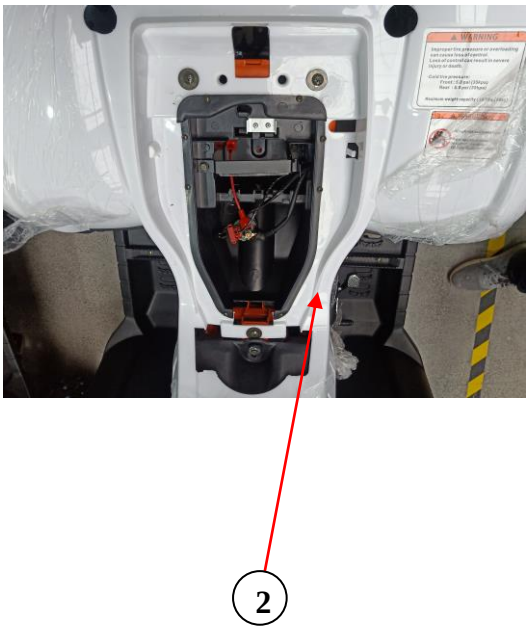




2.7.2 Rear assy. plate

Dis-assembly
Dis-assemble front plate（→ 2.4.1）
Dis-assemble front assy. Mounting screw（→2.7.1）
Dis-assemble foot gear rod（→ 2.4.4）
Dis-assemble left footpeg plate（→ 2.5.3）
Dis-assemble right footpeg plate（→ 2.5.4）
Dis-assemble mounting screw 2
Dis-assemble rear assy. plate3

Assembly
Re install in reverse order from dis-assembly
Note:
Disconnect battery and necessary wires before removal. Check cable, hose and wire routing once assembly is complete.



3 Regular maintenance and adjustment

Maintenance information

Operation cautions

Note:

- Do not run the engine in unventilated areas, exhaust contains carbon monoxide (CO) and other toxic components.
- Do not touch the engine or exhaust. Please wear long sleeves work clothes and gloves.
- As gasoline is flammable and explosive. Pay attention to sparks as well as open flames. Vaporized gasoline may explode, please choose well-ventilated sites when working with fuel systems.

Note:

Being careful of drive system and rotating parts, tie up loose hair and clothing if possible

Note:

Keep the vehicle on a flat and stable place

3.1 Maintenance Schedule

Engine maintenance is a regular periodic work, according to a certain time interval for engine maintenance is very important, standard maintenance is helpful for well engine performance, reliable work, economic and durable, the following is the AU150 engine maintenance period table.：

Note: the contents in the table is based on normal condition, if in bad condition, dirty or showing wear inspect or replace earlier.

Maintenance item	Item	Milometer(km)				
	Circle	1000km	4000km	8000km	12000km	Remarks
Fuel system access			I	I	I	
Fuel filter		C	C	C	C	
Carburetor chock						
Air filter	①	I	I/R	I	I/R	
Sparking plug		I	I	I	I	
Valve gap		I	I	I	I	
Lubricating oil	Each year	R	R	R	R	
Lubricating oil filter net	Each year R			C		
Clutch		I	I	I	I	
Carburetor idle		I	I	I	I	

The vehicle should be maintained regularly as per stipulated time, here is the meaning of each Abbreviation：

C：Clean

R：Replace

A：Adjust

L：Lubricate

I：Inspect

Remarks①: Clean more frequently when riding in the place of too much dust.

3.2 Way of maintenance

Maintenance item			Maintenance circle			Standard
Maintenance position		Maintenance item	Daily	Half year	One year	
Steering device	Steering wheel	Operating flexibility	o			
	Steering system	Damage	o			
		Installation status of steering	o			
		Ball pin shaking	o			
Braking device	Brake pedal	Pedal travel	o	o		
		Braking effect	o	o		
	Connecting rod and oil pipe	Slackness, looseness and damage	o		o	
	Hydraulic brake and brake disc	Brake fluid	o	o		Above the brake fluid lower limit
		Tear and damage of brake disc	o	o		Replace the disc in time, when front or rear brake working disc's thickness is less than 3mm.
	Brake pad	Tear and damage of brake pad	o	o		The minimum brake pad （ friction plate ） thickness≥1mm ； less than 1mm, replace it.
Driving device	Wheel	Tire pressure	o	o		Front wheel：35kPa（ 0.35kgf/ cm^2）(5PSI) Rear wheel： 35kPa（ 0.35kgf/ cm^2）(5PSI)
		Crack and damage of wheel	o		o	
		Tire tread depth and abnormal wear	o		o	If there's no wear indicator on the tire, the tread depth should greater than3mm
		Loose of wheel nut and axle	o	o		
		Front wheel bearing vibration	o		o	
		Rear wheel bearing vibration	o		o	
Buffer device	Suspension arm	Shaking of connection part and damage of rocker arm	o		o	
	Shock	Leakage and damage	o		o	
		Function			o	
Transmission device	Front axle	Transmission and lubrication	o		o	
	Rear axle	Transmission and lubrication	o		o	
	Gearbox	Fuel leakage and leakage qty	o		o	Loose Refueling port bolt,

						fuel should be reach the opening

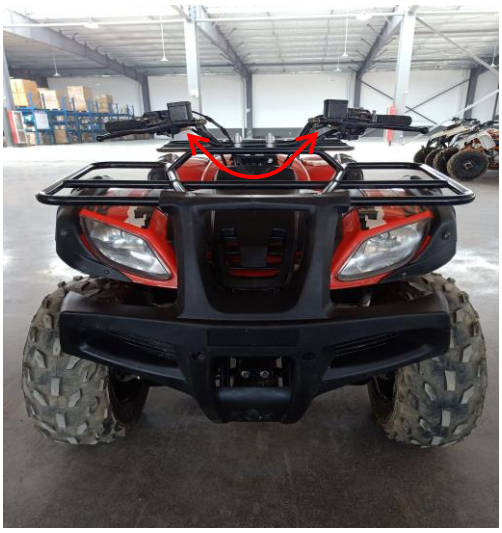
Maintenance item			Circle			Standard
Maintenance position		Maintenance item	Daily	Half year	One year	
Transmission device	Output shaft (transmission shaft）	Loose of connecting place	o	o		
		Shacking of Spline part			o	
Electrical device	Ignition device	State of spark plug		o		Spark plug gap：0.6mm~0.7mm
		Ignition period		o		
	Battery	Terminal connection status			o	
	Electric circuit	Looseness and damage of joints			o	
Fuel device		Fuel leak		o		
		Throttle condition			o	Throttle knob clearance：2 ~ 6mm
Light device and turning indicator		Function	o	o		
Alert and lock device		Function			o	
Meter		Function			o	
Exhaust pipe and muffler		Whether the installation is loose or damaged			o	
		Function of muffler			o	
Frame					o	
Other		state of grease in frame each part			o	
Exception can be identified in operation.		Make sure relevant parts are normal.	o			

3.3 Steering column and brake system

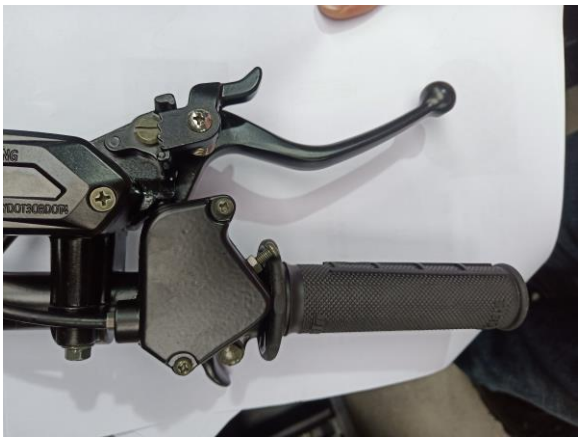
With the vehicle on a sturdy flat surface hold handlebar firmly and push up and down as it shown in the picture. Check for rattles, shaking or excessive play.

If there is, check steering column, bearings, and fastening parts.
Tighten any loose fasteners and replace worn bearings or bushings.

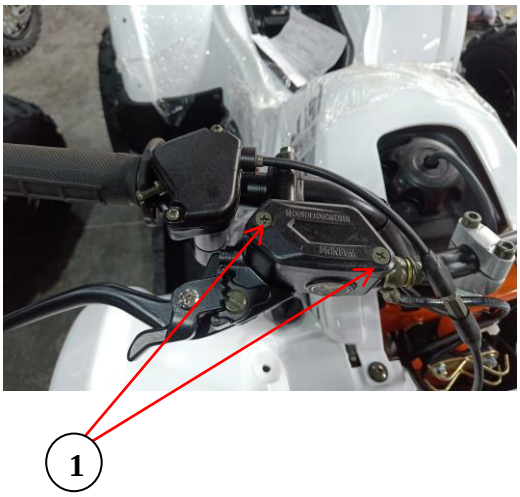
With the vehicle on a sturdy flat surface. Turn the handlebar slowly all the way left then all the way right to check if it turns smoothly.
If it is rough, hard to turn or loose, check the wire and cable routing, if there is no problem, check steering rod, ball joints for damage or wear.
Note: the steering handlebar must be smooth, accidents may occur due to lack of control.



Clearance for front and rear handlebars：
Operate the front handle bar to check the brake effectiveness and movement of handle bar
Check the clearance of handlebars

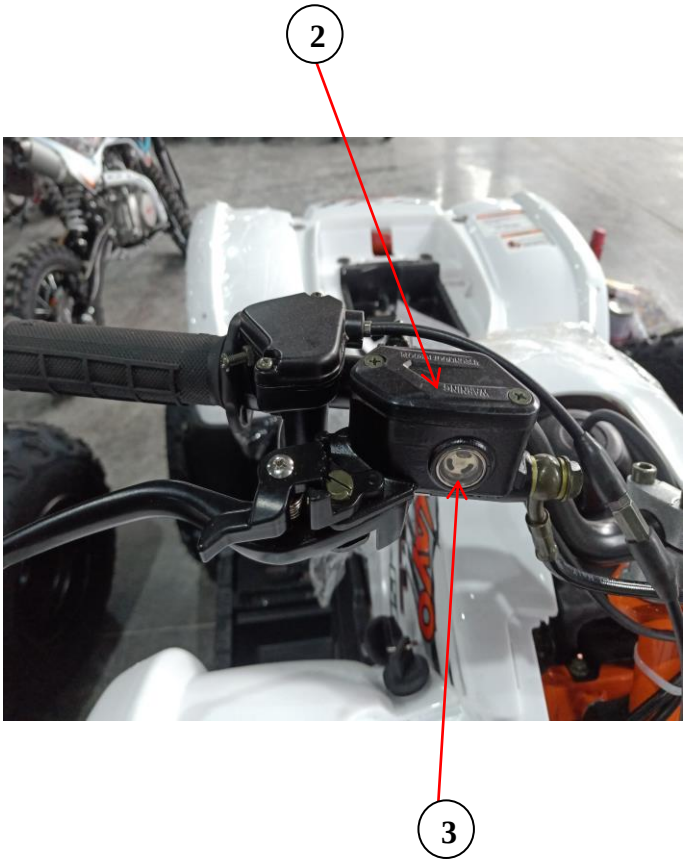


Front master cylinder



Check the fluid level.
Check the fluid level in the sight glass 3,
If the fluid level drops below the lower limit, stop using the vehicle. Check for leaks in master cylinder, brake line and all connections, if they are all normal, then check the brake caliper and pistons and replace if necessary. It should be a routine to check brakes condition and brake function before using the vehicle.

Remove screws 1
Remove master cylinder cover 2
Add brake liquid to the upper limit



Note:

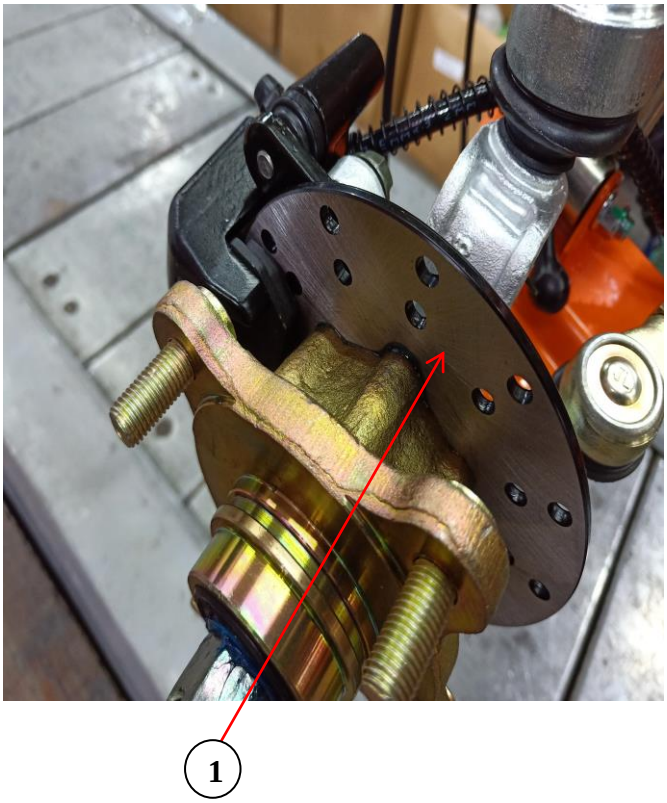
- When adding brake fluid, do not mix with dust, dirt or water.
- Use brake fluid from a new unopened container.
- Brake fluid can damage plastic, rubber and painted surfaces, Be careful not to spill. If brake fluid spills dilute with water and wipe clean immediately.

Turn the handle bar left and right, until the master cylinder is level, then remove cover to refill

Front brake disc and brake pads (break pad wear)

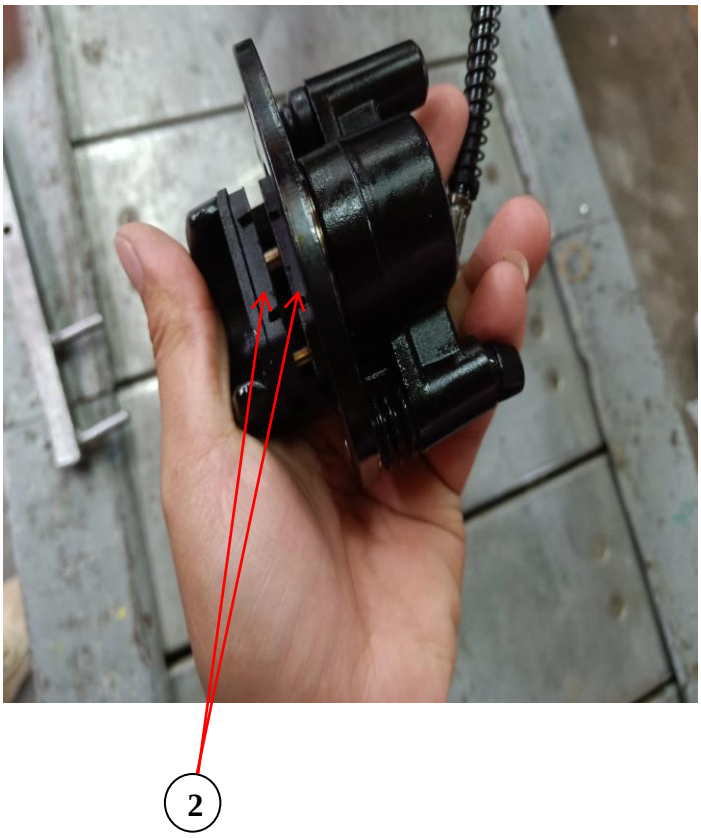
Note:
Brake pads should be changed as a set.

Checking brake rotors
Check the surface of brake disc blueing, discoloration or warping 1
If its thickness ≤3.0mm, replace.
Front brake disc thickness limits: no less than 3.0mm.



Check the brake pad thickness 2
The minimum thickness should be ≥1 mm at grooves, if less replace.
If the brake pads are damaged or showing cracks,or abnormal wear replace them.

Note:
Please check brake fluid levels frequently, Check brake line connecting points for leaks or damage replace if necessary. Check master cylinder and caliper for leaks or damage, replace if necessary.
Note: Do not leave the master cylinder cap off for prolonged periods of time.
Brake fluid should be flushed every two years.



Rear brake master cylinder

Check the fluid level.

Check the fluid level in the sight glass 3,

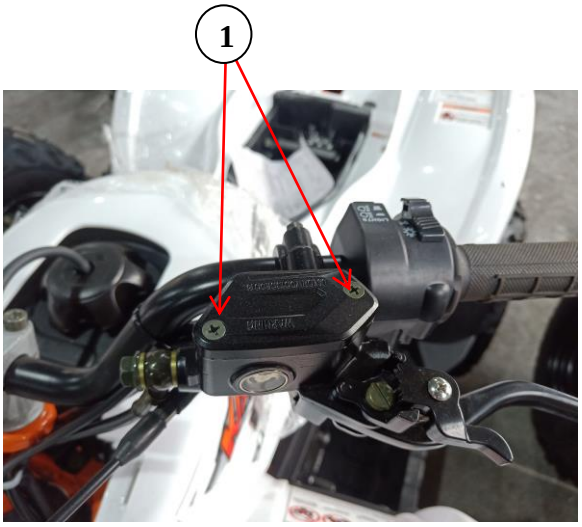
If the fluid level drops below the lower limit, stop using the vehicle. Check for leaks in master cylinder, brake line and all connections, if they are all normal, then check the brake caliper and pistons and replace if necessary. It should be a routine to check brakes condition and brake function before using the vehicle.

Dis-assembly

Remove screws 1

Remove master cylinder cover 2

Add brake liquid to the upper limit



Note:

- When adding brake fluid, do not mix with dust, dirt or water.
- Use brake fluid from a new unopened container.
- Brake fluid can damage plastic, rubber and painted surfaces, Be careful not to spill. If brake fluid spills dilute with water and wipe clean immediately.

Turn the handle bar left and right, until the master cylinder is level, then remove cover

Note:

Please check brake fluid levels frequently, Check brake line connecting points for leaks or damage replace if necessary. Check master cylinder and caliper for leaks or damage, replace if necessary.

Note: Do not leave the master cylinder cap off for prolonged periods of time.

Brake fluid should be flushed every two years.

Rear brake disc and brake block〈wear of brake block〉

Check the wear condition of brake block, if condition is bad, then replace it.

Note:

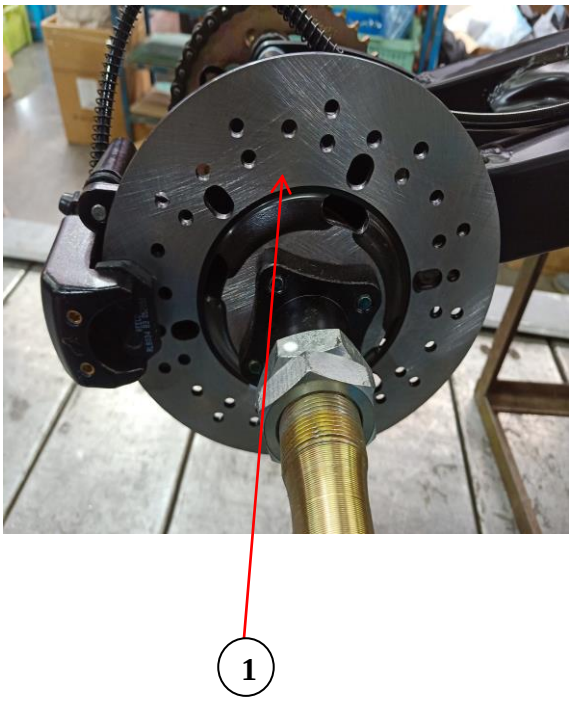
Brake pads should be changed as a set.

Checking brake rotors

Check the surface of brake disc blueing, discoloration or warping 1

If its thickness ≤3.0mm, replace.

Rear brake disc thickness limits: no less than 3.0mm.

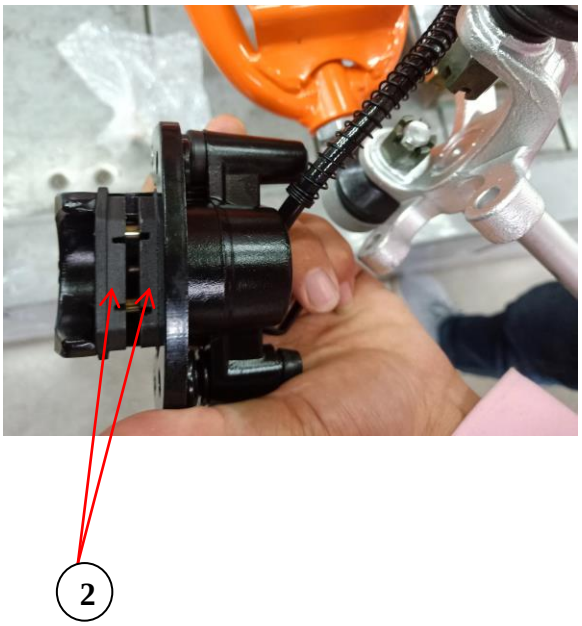


Check the brake pad thickness 2

The minimum thickness should be ≥1 mm, if not, then replace it.

If the brake pads are damaged or showing cracks, then replace it.

Brake fluid should be flushed every two years.



3.4 Wheels

Lift the front wheel with the tool in a horizontal position, and make sure there is no force on the wheel. Shake the front wheel left and right to check whether the connection of the front wheel is tight.

If there is movement, check and fasten the rocker arm, axle, rim bolt and nut.

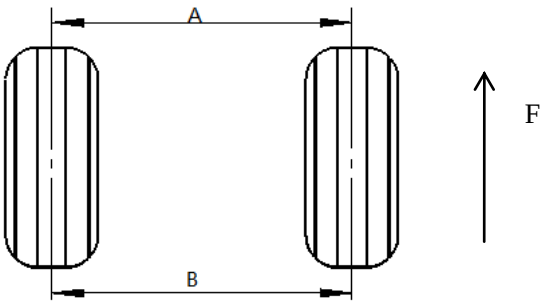
If there is still a movement, check and replace the bearing, ball joints, or A-arm bushings.

Front wheel size

Put the atv in a horizontal position and measure the size of the front wheel toe-in. The front wheel relative to the forward direction of the vehicle is: A in front and B behind the wheel

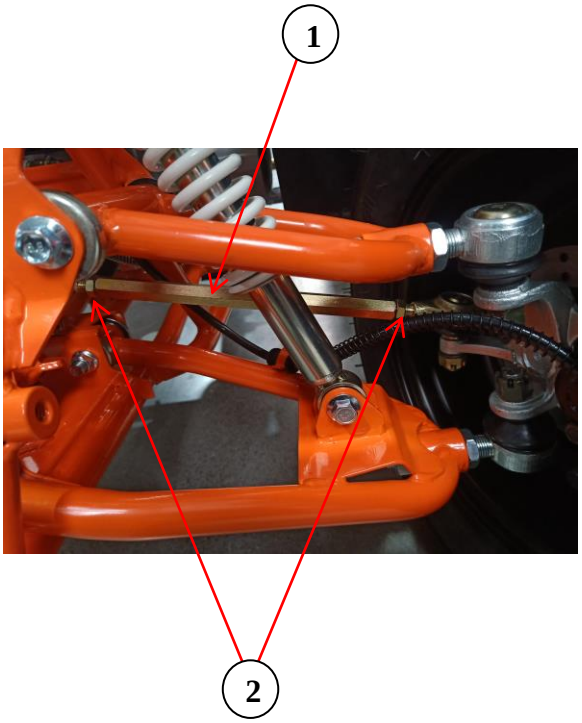
Toe-in size： A-B=1.5 ~ 2.5mm

F is the forward direction



If not within spec, adjust lock nut(2) of steering rod:1, adjust the wheel toe-in to 4~10mm, locking.

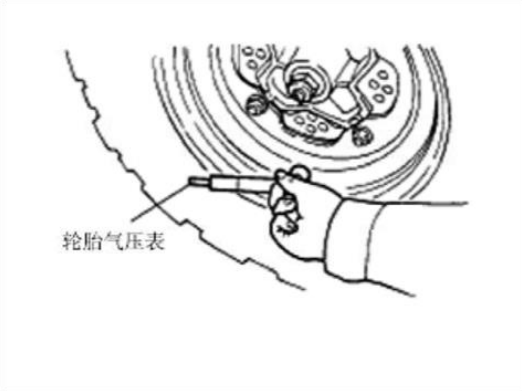
Note: after the adjustment of front toe-in size, drive the vehicle slowly then measure and adjust again.



Tire pressure

Check the tire pressure with a barometer.

Note: Check the tire pressures while the tire is cold for a more accurate reading



Appointed pressure/Tire

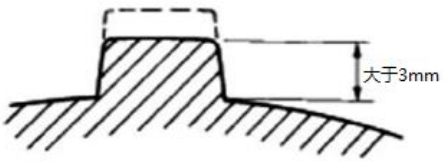
	Front tire	Rear tire
Pressure	35kPa（0 .35kgf/cm²）	35kPa（0.35kgf/cm²）
Tire size	See chapter 1	See chapter 1

Wheel pattern

Check tread depth if is less than 3mm, replace.

Note

When tread is less than 3mm, please replace immediately .



Wheel nut and wheel axle

Check the loose of front wheel axle, rear wheel axle nut: 1 and pin, if there is loose, fasten it as per the appointed torque.

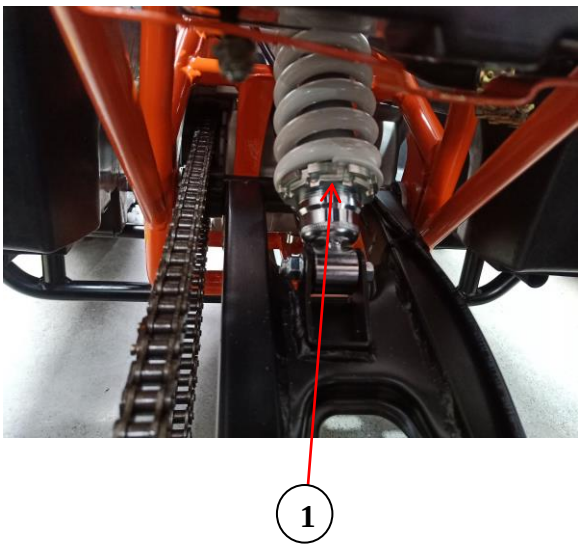
Torque:
Front wheel axle nut：126N·mm～218N·mm（12.6kgf·mm ～ 22kgf·mm）
Rear wheel axle nut：199N·mm～311N·mm（20kgf·mm ～ 31kgf·mm）

Shaking of Wheel hub
Use tools to hang up the front wheel, turn the wheels as per the axle direction when there is no other acting force on the vehicle, then check whether the vehicle will shake. If there is shack, then dis-assemble the front wheel and check the hub.

3.5 Suspension system

Keep vehicle in a horizontal position and compress up and down for several times according to the pictures. If there is shaking or abnormal sound, check for oil leaks in the shock absorber, and whether there is damage or loose fasteners.

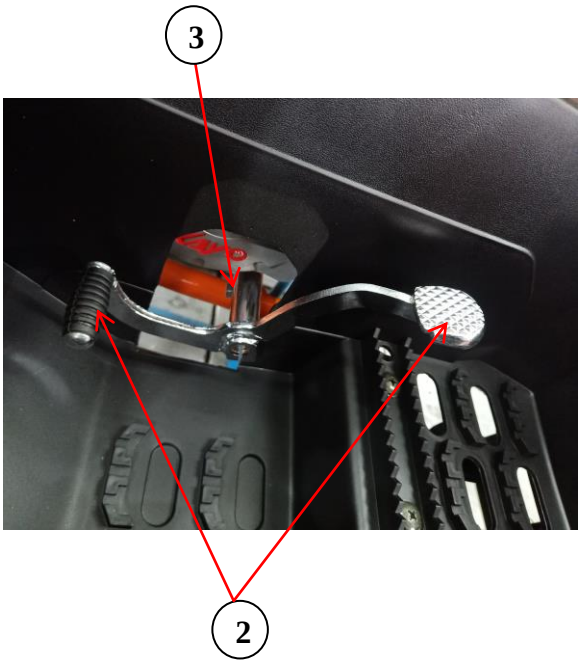
Rear shock pre-load adjustment
Use Shock spanner wrench to adjust the adjust cam of shock according to the load capacity: 1
Clockwise turning is from high to low.



3.6 Gear box and fuel system

Gear box

Shift lever Click through the forward gears with your heel operation should be smooth with firm clicks between each gear. Shift down with toe until you reach neutral come to a complete stop then shift down with toe to engage neutral. If shift lever is misadjusted remove #3 bolt and adjust accordingly.

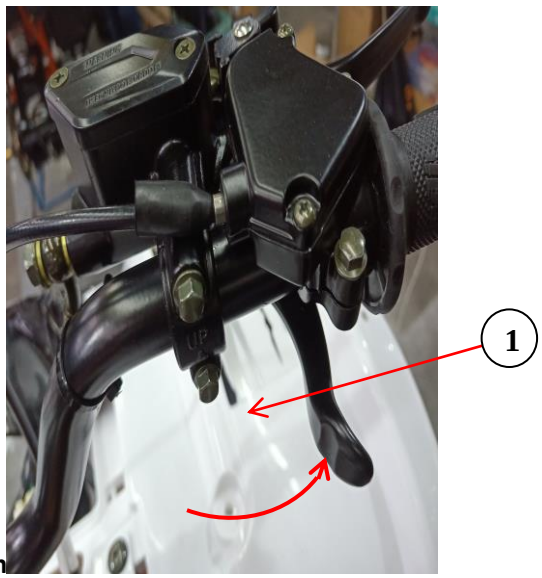


Fuel device
Condition of fuel system
Remove the seat (→ 2.3.1)
Check fuel and vacuum lines for aging, cracking, kinks or damage. If any damage is found replace the hose. Replace fuel lines every two years

3.7 Throttle check

Throttle Free-play : 1

Clearance： 2 ~ 6 mm



3-5mm

When the freeplay is not within the range, adjust throttle at the cable.

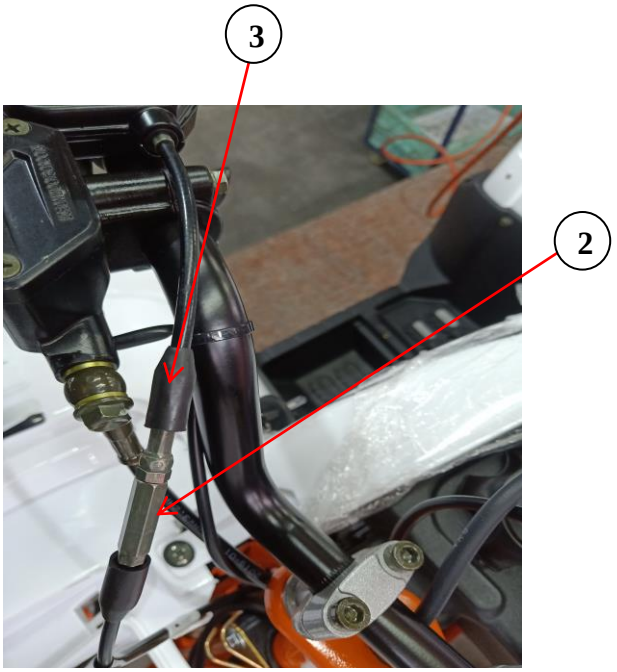
Remove sleeve: 3

Loose throttle cable nut: 2

Adjustment, adjust the freeplay of the throttle to within spec.

After adjustment, fasten lock nut: 2 and then assemble the sleeve: 3

*Replace throttle cable if cable adjustment is adjusted all the way out and throttle is still out of spec.



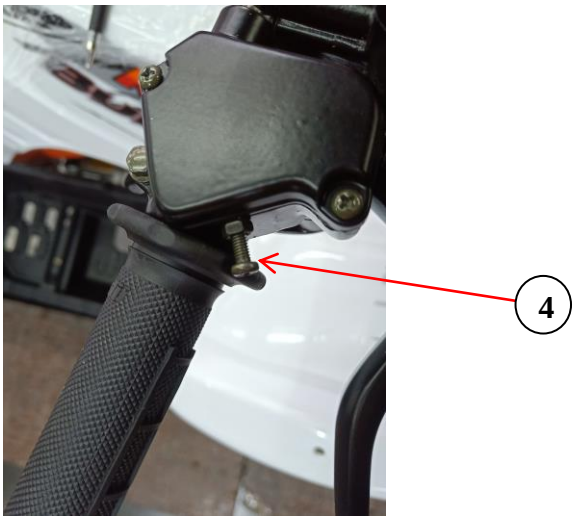
Throttle limiting device:

Throttle limiting device is used to restrict throttle opening. Inspect the thread length limit of the limiting screw. Factory set thread length should be 12mm:

To adjust Loosen the lock nut, then adjust with a phillips screwdriver. For beginners, Throttle limiter should be adjusted inward to limit throttle as much as possible for safety.

As the rider's skills progress the limiter screw can be adjusted outward.

*Throttle limiter is set from the factory at with a tamper proof screw. If necessary, the screw can be removed with pliers and replaced with a phillips head screw.



3.8 Gear display

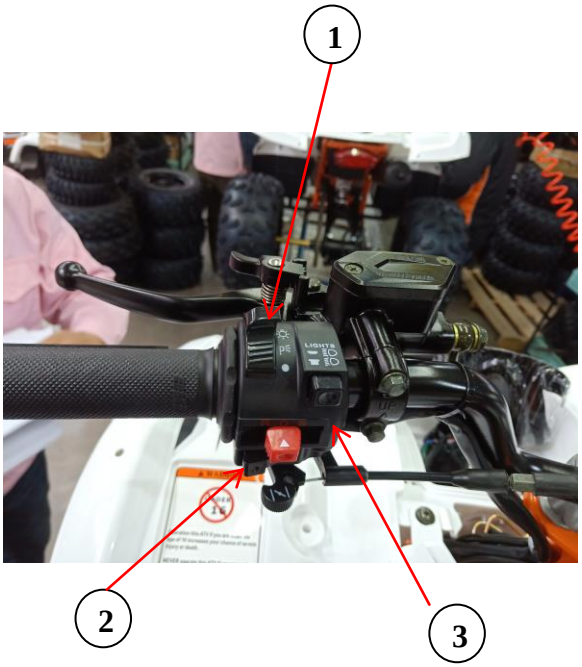
Checking the gear display
The Gear indicator should power up as soon as the key is turned on. Shift through the gears to make sure the gear indicator shows the correct gear. R-N-1-2-3
**When shifting into or out of reverse come to a complete stop before changing gears

3.9 Lighting system

Headlight Operation
Headlights will illuminate with the key on. On the combination switch slide the light switch (1) back to turn lights off, slide forward one position to illuminate fog lights, slide all the way forward to illuminate headlights. Push high beam (3) button in to turn high beams on. If any of the lights do not illuminate check connections, If connections are good check bulb filaments replace if necessary

Tail light operation/check.
Squeeze brake levers one at a time while checking for brake light illumination. Tail light should illuminate when the atv is started. If either is not working check connections at tail light connector and at brake switches. If connections are good check bulb filaments

Horn checking.



4 Engine components

Maintenance information

Precautions

- Before operation and maintenance, please ensure that the vehicle is shut down and cooled completely, to avoid injury.
- Do not damage the frame, engine body, bolts and cables during maintenance.
- In order to protect the engine frame, please wrap the engine before operating.
- When the engine is removed, the corresponding containers should be prepared to receive coolant, oil and fuel oil for environmental protection, and the coolant and oil should be supplemented as required during installation.

Tightening torque

Engine bracket mounting bolt: GB5787 M10×1.25×160 45~59N·m

4.1 Fuel system

Dis-assembly

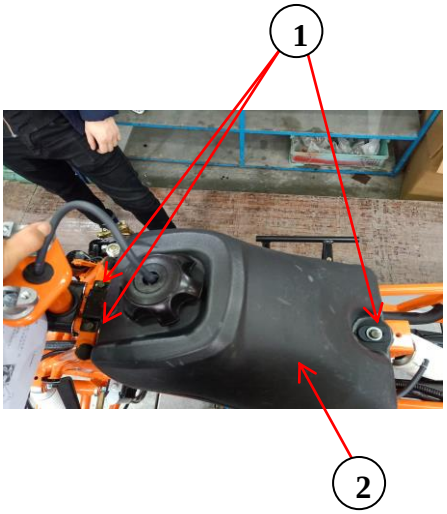
Dis-assemble foot gear, seat, gear display front cover, front assy. Plate(see 02: plastics)

Dis-assemble mounting bolt: 1

Turn the fuel switch 3: to OFF position

Dis-assemble fuel pipe: 4(connecting to carburetor position)

Remove fuel tank 2



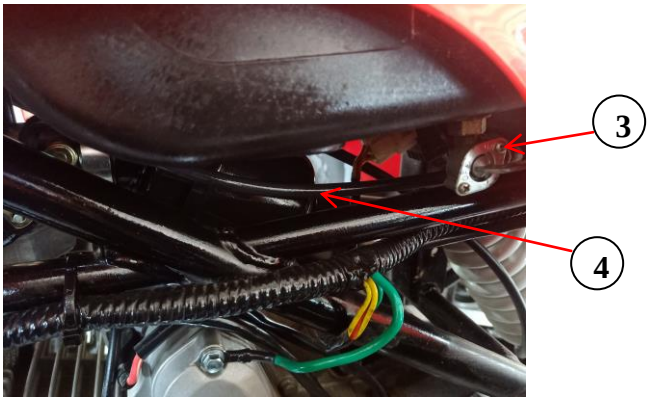
Note

Gasoline is flammable; fireworks are strictly prohibited in workplace. Not only open fire, but also electric spark shall be given high attention.

Besides, as there is a risk of explosion after the evaporation (vaporization) of gasoline, the operation should be carried out in a well-ventilated place.

When disassemble the plastic parts, loose the tube 1 of oil throttle, then dismount the oil switch bolt 2 and remove switch, remove tank mounting bolt last.

When dis-assemble fuel tank, if there is fuel in the tank, then turn the fuel switch 3 to OFF position to avoid fuel leaking, then dis-assemble the fuel tank.

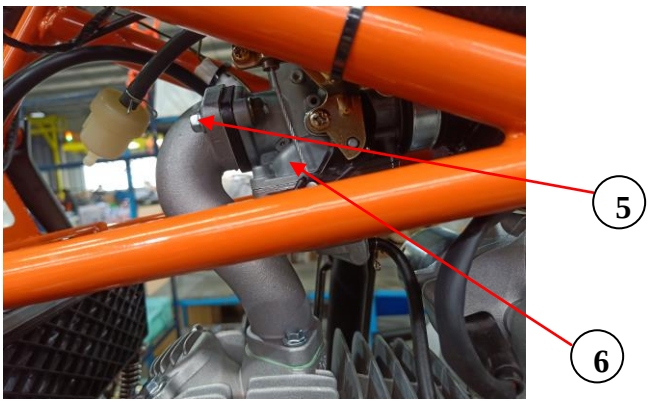


Assembly

Take it back in reverse order from dis-assembly

Plug should be inserted well, there should be a sound “Ta”.

Check the wellness of the fuel pipes during assembly.



4.2 Air intake system

Dis-assembly

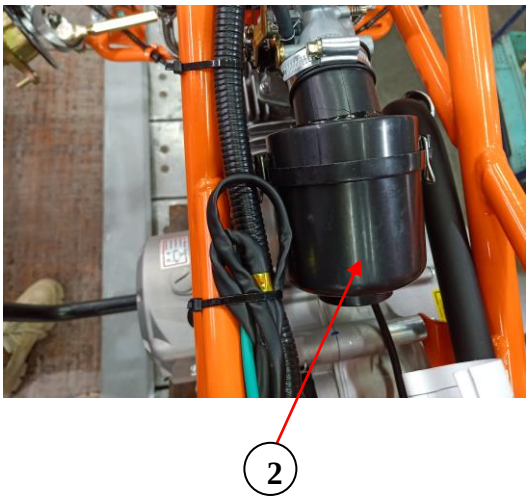
Dis-assemble seat, rear assy. Plate(see 02: plastics)

Dis-assemble mounting bolt: 5(left and right each 1)

Dis-assemble carburetor 6

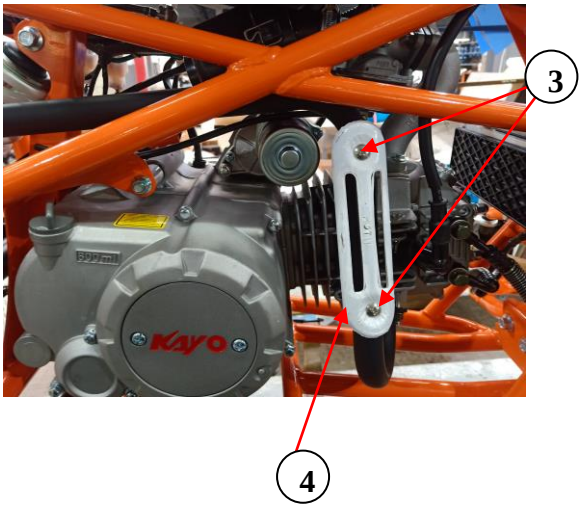
Dis-assemble fuel tank（→4.1 Dis-assembly and Assembly of fuel tank）
Loose hoop 1
Dis-assemble air filter 2

Assembly
In reverse order from dis-assembly
Re-install all components

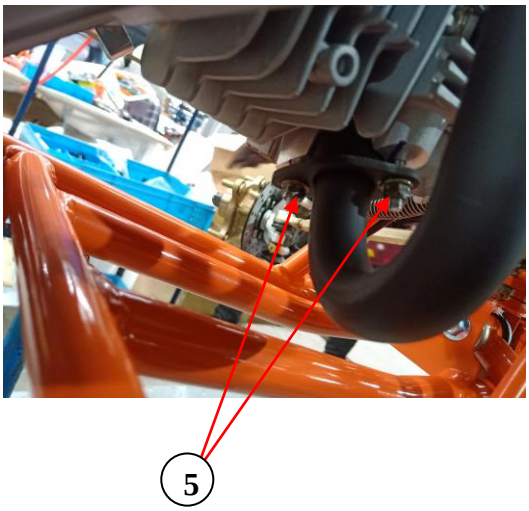


4.3 Exhaust system

Dis-assembly
Dis-assemble foot gear rod, seat, gear display front cover, front assy. Plate, rear assy. Plate(see 02: plastics)
Remove 2 bolts: 3
Remove heat shield parts: 4

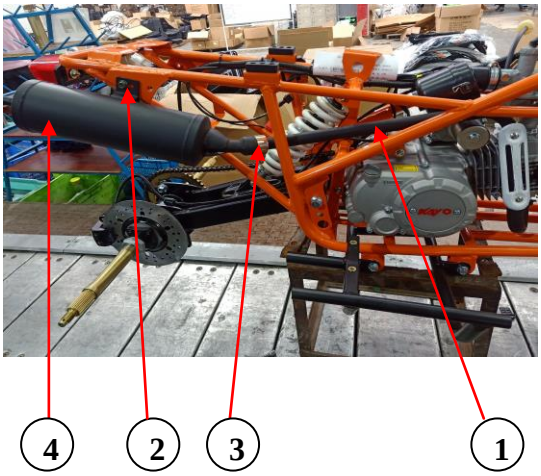


Remove mounting lock nuts: 5



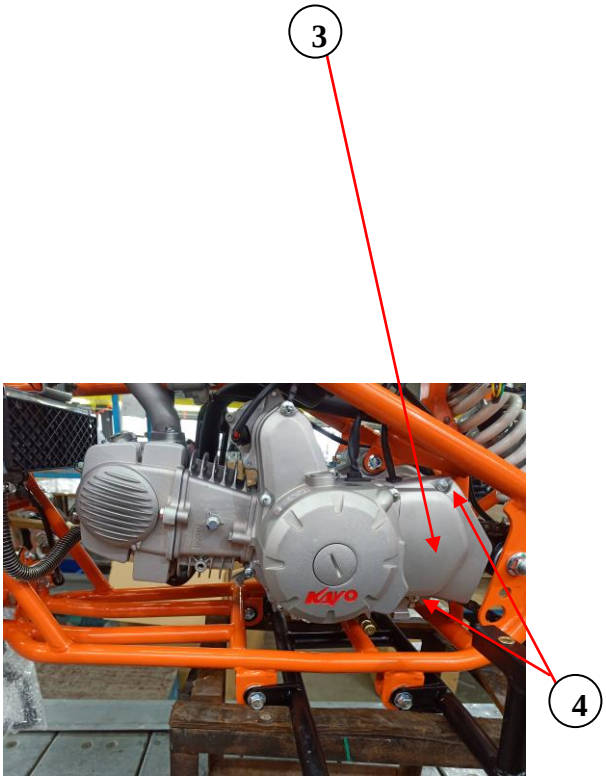
Remove muffler pipe clamp bolt: 3
Remove muffler pipe mounting bolt: 2
Remove muffler pipe 4
Remove exhaust head pipe 1

Assembly
Re-assemble in reverse order from dis-assembly



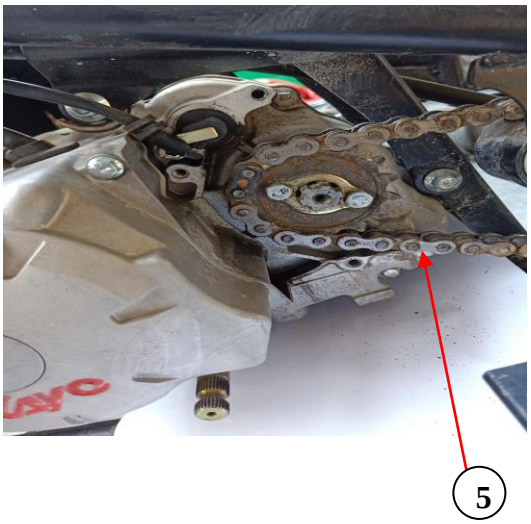
4.4 Dis-assembly and assembly of engine

Dis-assembly
Dis-assemble shift lever, seat, gear display front cover, left and right footpeg plate, rear assy. Plate(see 02: plastics)
Dis-assemble fuel tank (see 4.1)
Dis-assemble air filter, carburetor (see 4.2)
Dis-assemble muffler/exhaust assy.(see 4.3)

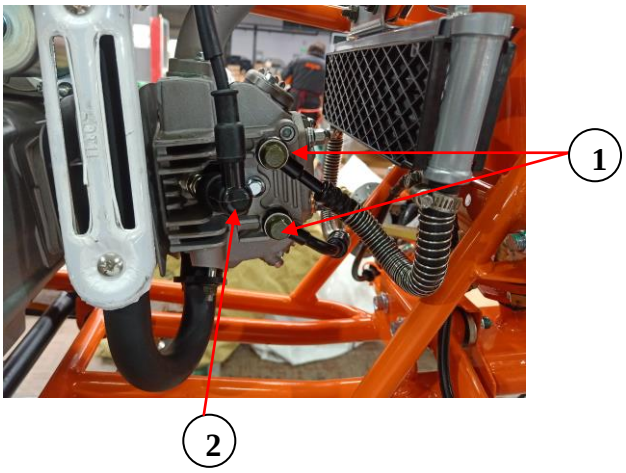


Remove 3 bolts: 4
Remove front sprocket cover: 3

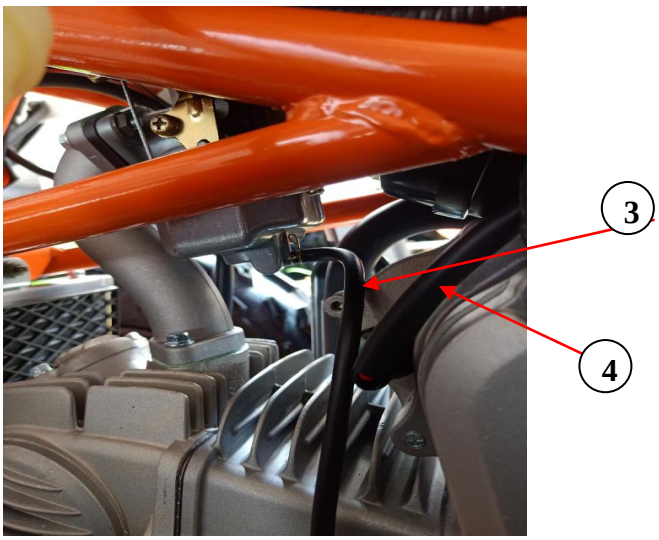
Remove chain: 5



Remove spark plug cap: 2
Disconnect oil cooler hoses banjo bolts: 1, reinsert bolts after lines are removed to prevent oil leaking.



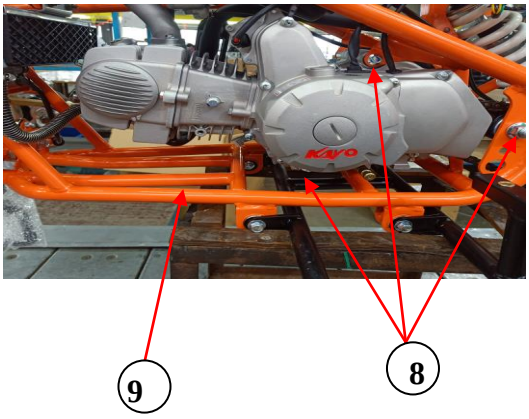
Disconnect gear display connect wire （→1.7）
Disconnect magneto trigger connect wires （→1.7）
Disconnect starter motor plug: 4
Disconnect carburetor hoses: 3



Remove engine mounting bolts: 8
remove engine from left side: 9

Assembly

Re-assemble reverse order from dis-assembly



5 Engine

5.1 Maintenance information

Conversion table refers

Item	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
Torque	1kgf=9.80665N

维

Danger/warning/attention

Take below definitions seriously, which are very important for maintenance

Danger: Be on high alert for danger.

Warn: to be alert to moderate danger.

Attention: to be alert to minor danger.

This manual may doesn't contain some potential risks in engine work and maintenance; the service operator should also have basic mechanical knowledge.

General precautions

Warning:

Proper maintenance is very important to engine reliability and personnel safety.

● When there is two or more people working together, more attention should be paid for safety.

● When starting the engine indoors, be sure to vent the exhaust outside.

● If toxic or flammable substances are used, handle in accordance with the manufacturer's instructions strictly and make sure workplace must be well ventilated.

● Don't use gasoline as a cleaning fluid

● To avoid burns, do not touch uncooled engine oil, exhaust system parts

● If the fuel, lubrication and exhaust systems are serviced, please check for leaks ·

● In order to protect the environment, oil replacement parts must be disposed of properly.

Warning:

－If parts need to be replaced during maintenance, please choose parts which recommended or provided by Kayo.

－Disassembled parts that need to be reused should be arranged in order, to aid in assembly.

－Use special tools as specified in the maintenance manual.

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

－Use special lubricants, binders and sealants.

－When fastening bolts, screws and nuts, tighten the large to small, and tighten from inside to outside in a cross pattern to the specified torque.

－Use a torque wrench to tighten the torque required bolts, before tightening clean all grease and oil from threads.

－Clean disassembled parts before inspection and measurement.

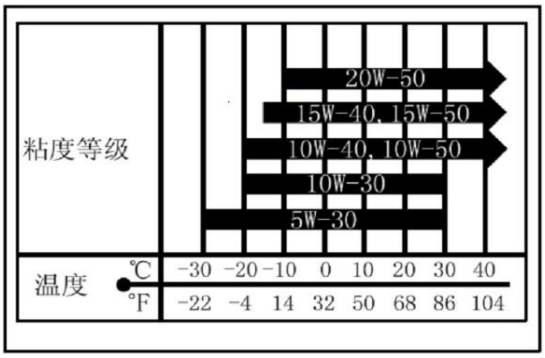
－After assembly, check fastening and running status of components

－Do reuse oil seals, O-rings, gaskets, self-locking nuts, lock washers, cotter pins, elastic baffle and other onetime use parts.

5.2 Engine oil and fuel

Fuel: Use octane 91# or higher unleaded gasoline

Engine oil： Use sae15w-40 oil for 4 stroke motorcycle, quality grade according to the classification of the API SG level or by the superior, if no SAE15W - 40 oil, according to the engine using the environment temperature, as the picture on the right is shown.



Warning: Do not mix oils from different brands or weights

5.3 Engine Break in

Engine has many relative motion components, such as piston, piston ring, cylinder block, mutually meshing transmission gear wheel, etc. therefore, a standard break-in is very important at the beginning of the its use, it can make the moving parts to adapt to each other, correction work, form good heavy load to bear a smooth friction surface. Through this process the engine will has excellent performance and reliability. Recommended break-in time: 20 hours, details as follows:

0～10 hours

Avoid continuous operation, constantly changing speed and not operating in a fixed throttle position when the throttle is more than 50%; Cool the engine for 5 to 10 minutes after each hour of operation. Avoid rapid acceleration, throttle change should be slow.

10～20 hours

Avoid operating longer than 3⁄4 throttle. Use freely but do not use full throttle.

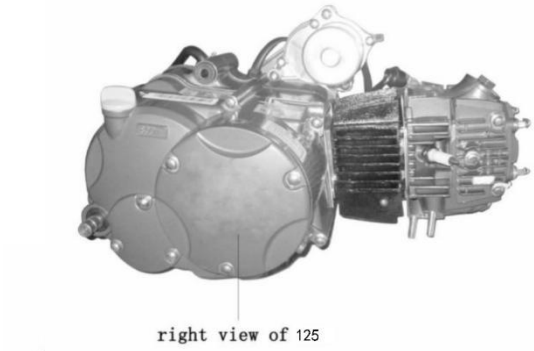
5.4 Maintenance of engine

Details

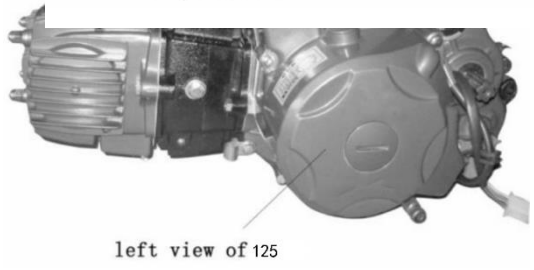
maintain times	Odometer reading			
Items	1000km	4000km	8000km	12000km
Fuel system	Clean	Clean	Clean	Clean
Oil filter	Clean	Clean	Clean	Clean
Control	Adjust	Adjust, clean	Adjust, clean	Adjust, clean
Carburetor	Clean	Clean	Clean	Clean
Air cleaner	Clean	Clean	Clean	Clean
Spark plug gap	Adjust	Adjust, clean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

5.4.1 Disassemble, assemble and maintenance cylinder head

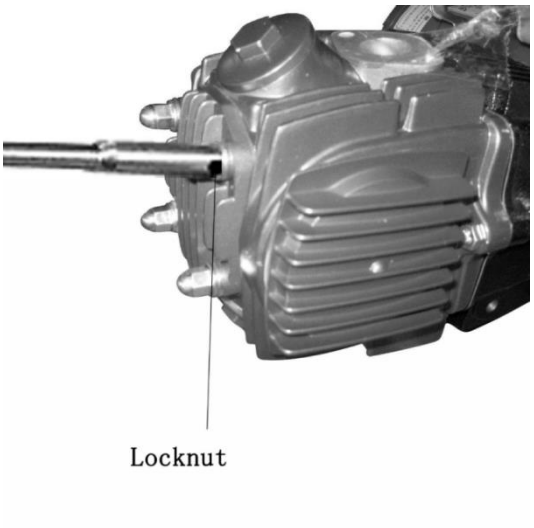
Right view of the 150 engine.



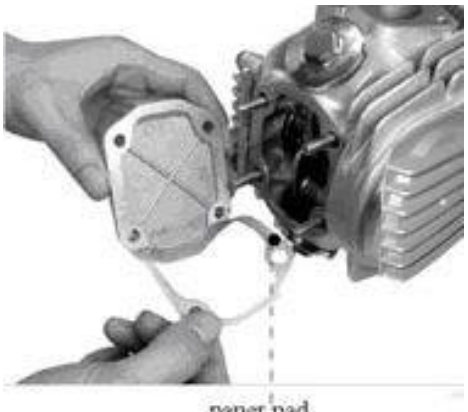
Left view of the 150 engine



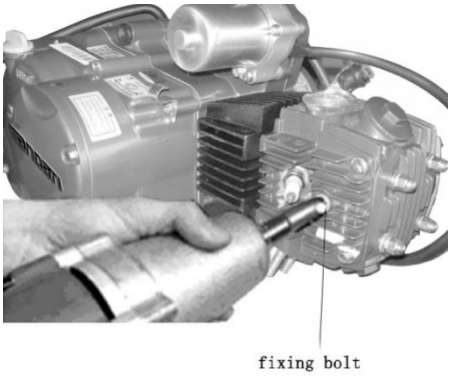
Remove the locknut of cylinder head from its holding place



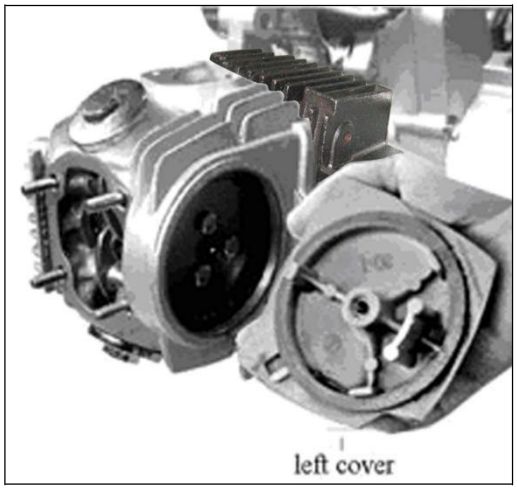
Remove cylinder head. Check the state of paper pad. Replace .



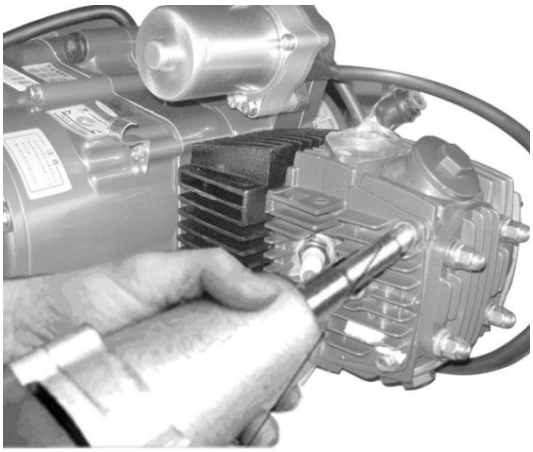
Dismantle the fixing bolt of left cover.



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



Dismantle the fixing bolt of right cover.

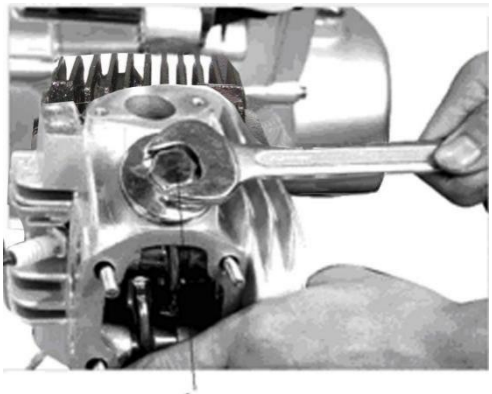


Remove the right cover of cylinder head.

Inspect the gasket for damage and replace.

paper pad

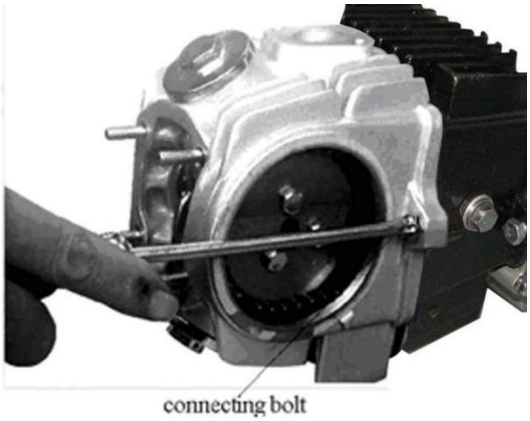
Remove inlet/exhaust valve cap .Check the state of seal ring of valve cap and replace if worn or if reuse is questionable.



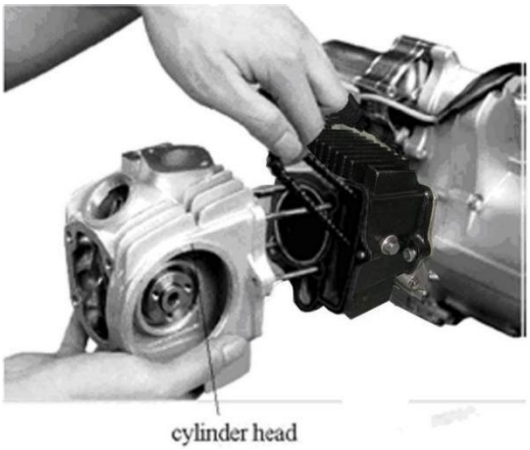
valve cap

Remove the fixing bolt of timing driven sprocket.

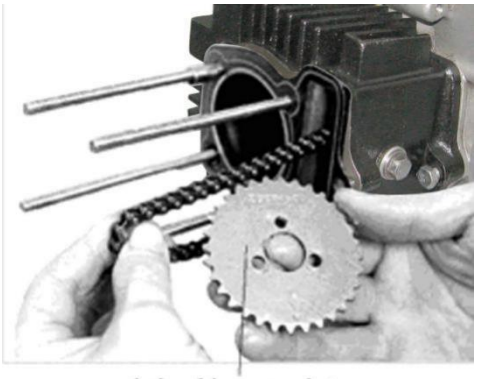
Remove the connecting bolt of cylinder head.



Remove cylinder head assembly.



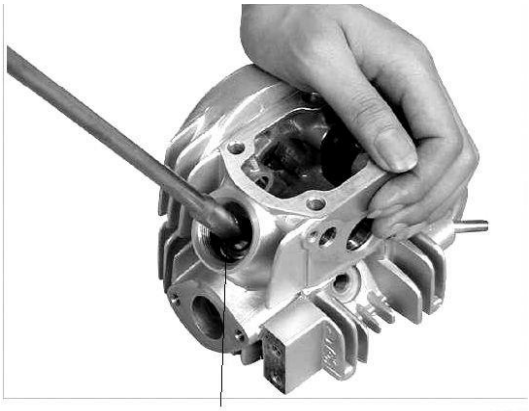
Remove timing driven sprocket. Inspect the timing driven sprocket for wear and damage. Replace if necessary.



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

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

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



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

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

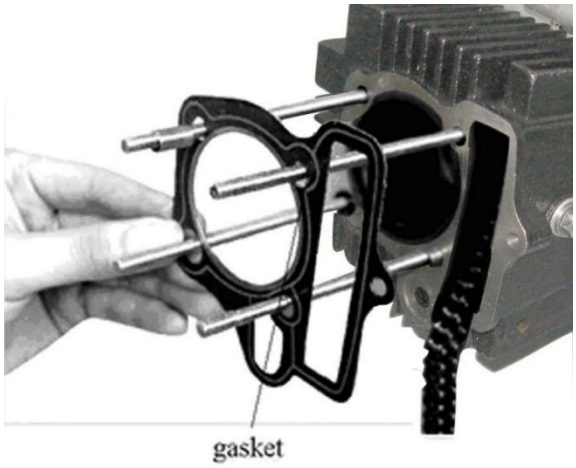
For the troubleshooting of cylinder head ,please refer to the following table

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

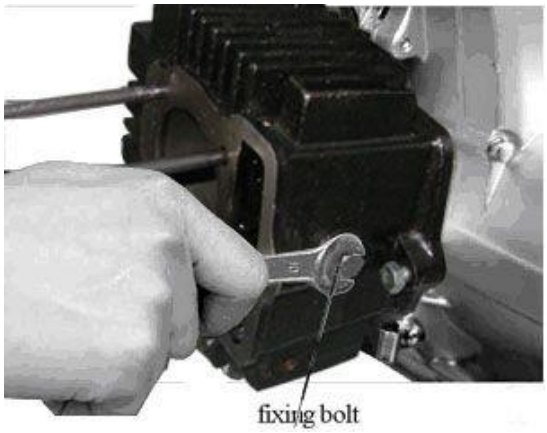
	The fixing nut is not properly tightened	Air leakage between the cylinder head and cylinder	The engine starts hard or fails to start. Insufficient engine output; Engine speed changes during idle run	Tighten the fixing nut
Spark plug	Improper clearance between electrodes	Weak or no sparking from the spark plug electrodes	Oil leakage between the cylinder and crankcase	Adjust electrode gap to 0.6~0.7mm
	The spark plug electrodes are joined 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

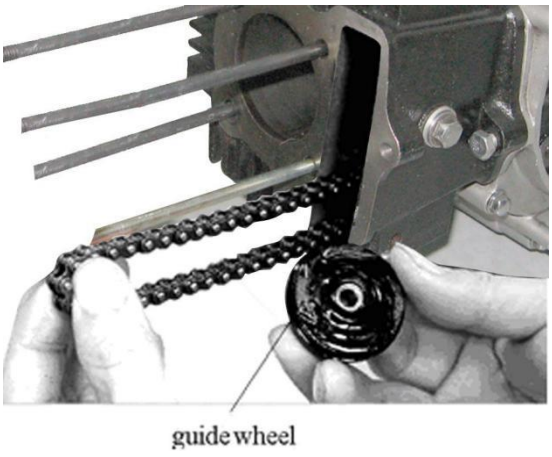
Remove cylinder gasket and dowel pin to check for wear and damage. Replace if necessary.



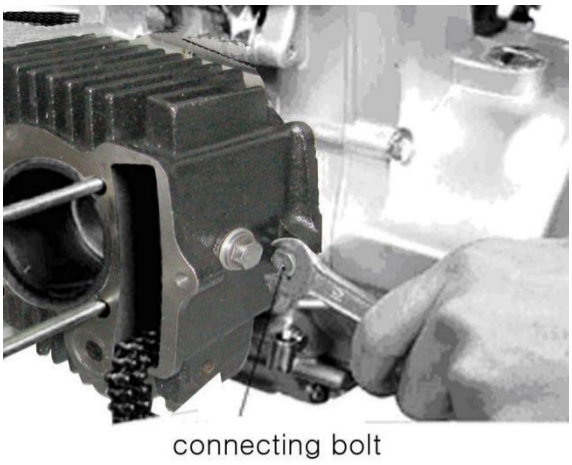
Dismantle the fixing bolt of timing chain of guide wheel.



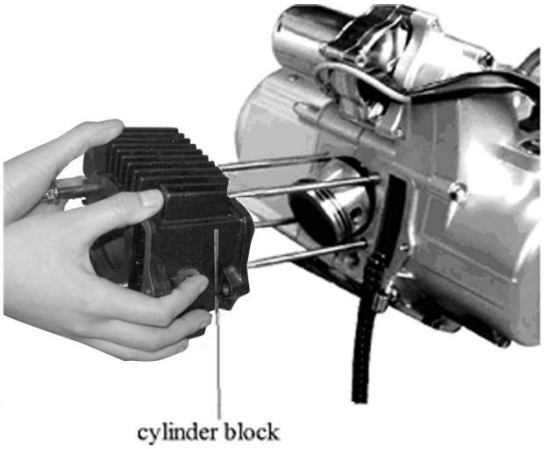
Remove the guide wheel of timing chain to inspect for wear and damage. Replace if necessary.



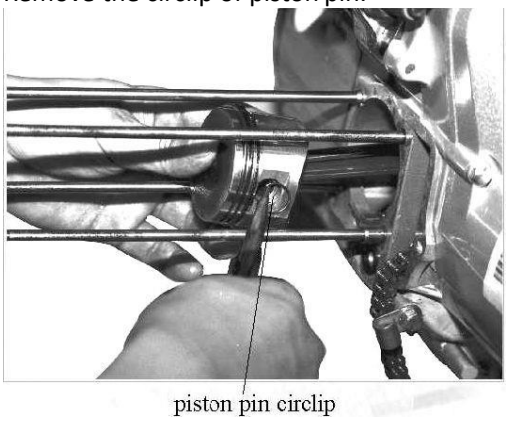
Dismantle connecting bolt of cylinder block.



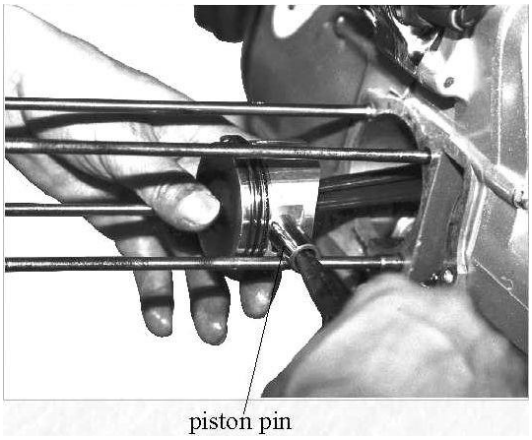
Remove the cylinder block.



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

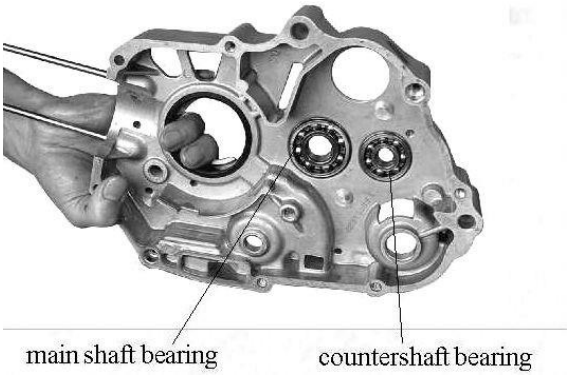
Description	Damage form	Trouble	Cause	Correction
Cylinder body	Excessive oil dirt or sand on the radiating fins	Poor heat radiation of the fins on cylinder body	The engine overheats	Remove the oil dirt or sand
	Cylinder end surface badly distorted	Air leakage between the cylinder and cylinder head	The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

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.

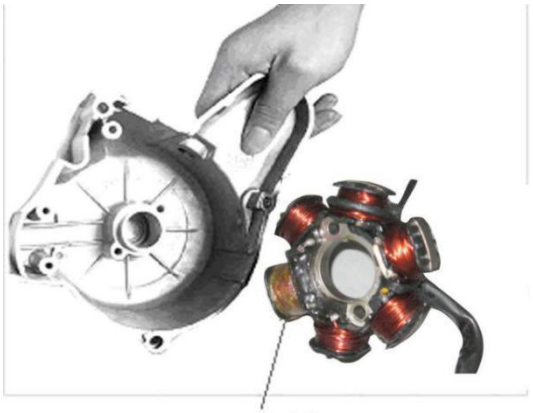
Left view of right crankcase half is shown in figure and check whether bearing of main shaft and countershaft are worn. Replace if necessary.



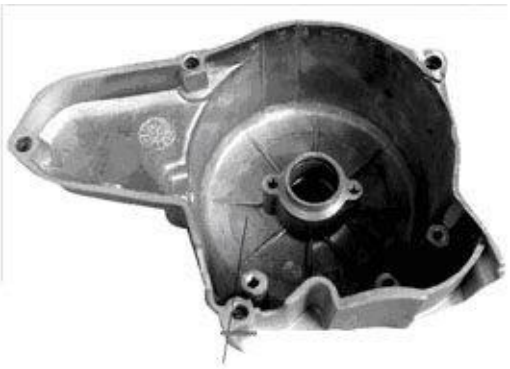
Dismantle fixing bolt of left crankcase cover.

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.

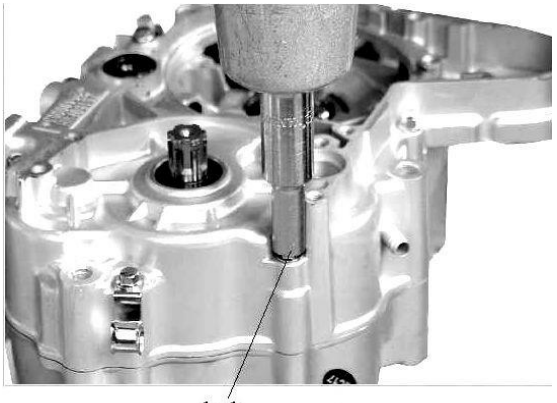
Description	Problem	Trouble	Consequences	Correction
Crankcase	Crack in the crank case		Oil leakage from the crankcase	Repair or replace the crankcase
	Oil leakage from the joint of left and right crankcase		The crankcase gasket is worn out	Replace the gasket
	The threaded hole of oil drain plug screw 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

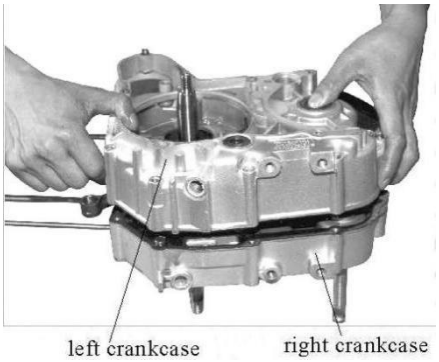
5.4.4Maintenance of Crankshaft Connecting Rod

Disassemble, assemble and maintain crankshaft connecting rod

Remove the fixing bolt of crankcase from its holding place.



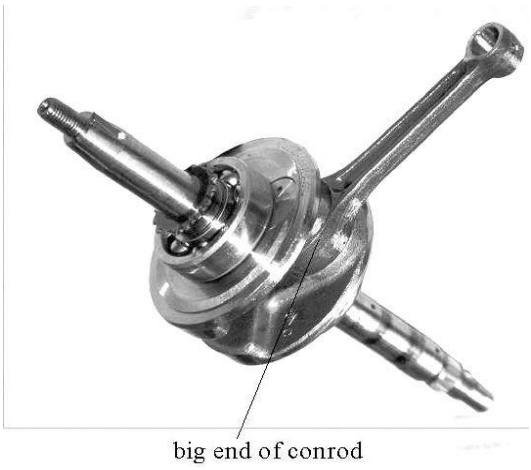
Remove left crankcase half. Take care not to forget the washer of main shaft and countershaft when removing the left crankcase.



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

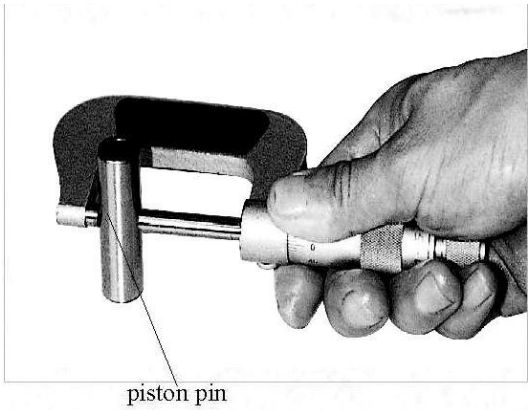
Remove the connecting rod assembly.

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

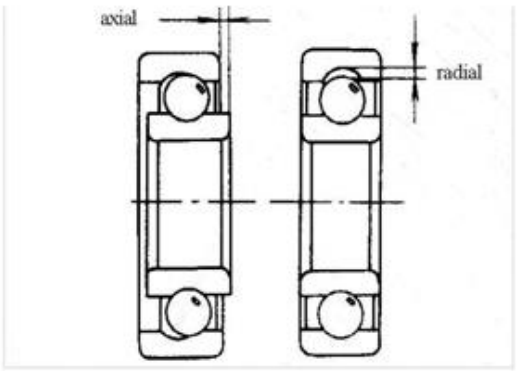


Check gap of big-end of connecting rod. Reset the gap if necessary.

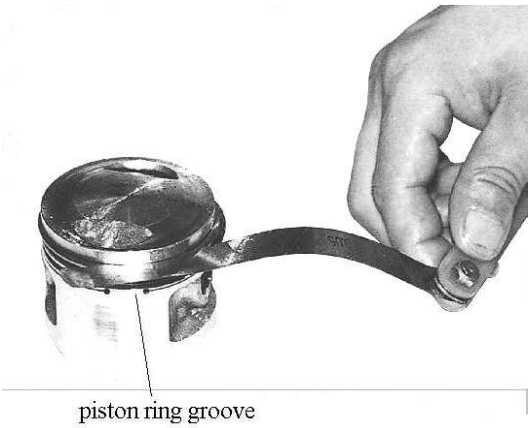
Check diameter of piston pin using a micrometer. Replace the piston pin if the value is over the maintenance limit value.



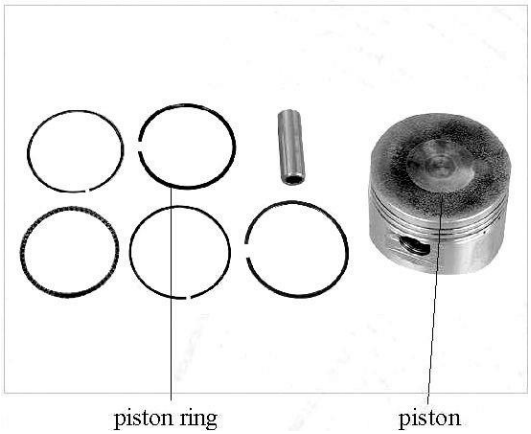
Check the axial and radial jumping of connecting rod bearing. Replace the conrod if the jumping is large.



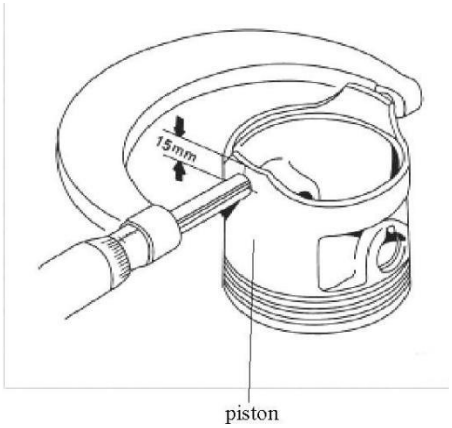
Check the side gap between piston ring and piston groove using a feeler gauge. Replace the piston if the gap is too wide.



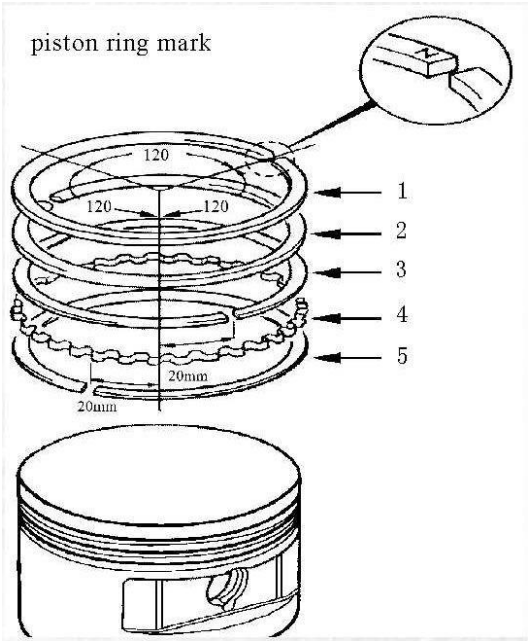
Check whether there is excessive carbon deposit on piston top and groove. Remove if necessary.



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 figure and check whether piston ring is damaged or the elasticity is weaken. Replace if necessary.



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

Maintenance of Crankshaft Connecting Rod Mechanism

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

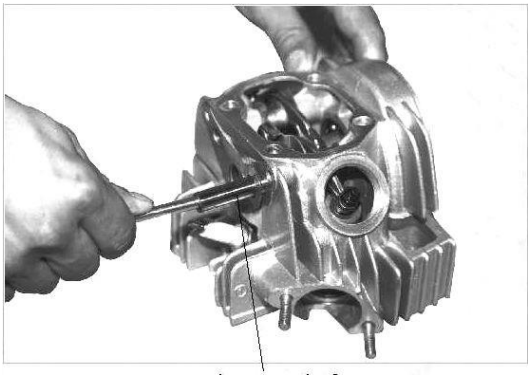
	The crankshaft bearing is over worn or damaged		Abnormal sound during the crankshaft bearing transmission	Replace the crankshaft bearing
Piston ring set	The piston ring is fractured	The piston ring is fractured	The engine starts hard or fails to start. Insufficient engine output; Thick blue and white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

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

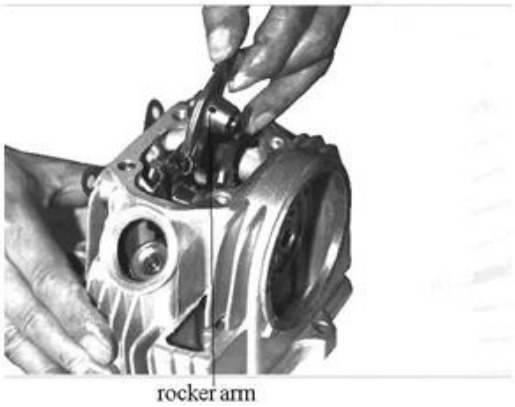
5.5 Maintenance of Mechanism

5.5.1Disassemble, assemble and maintain valve mechanism

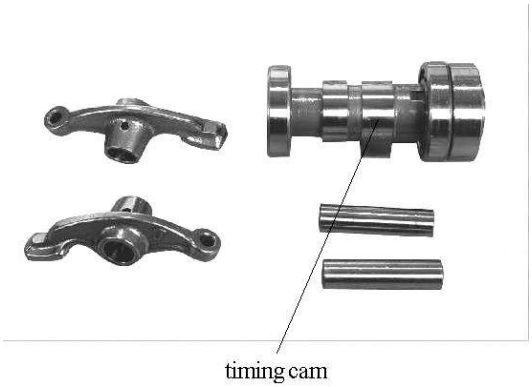
Remove rocker arm shaft



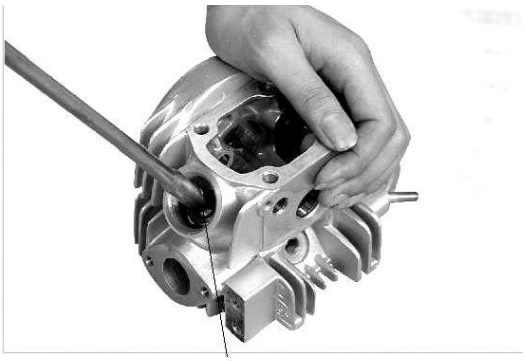
Remove the rocker arm of inlet/exhaust valve and check the state



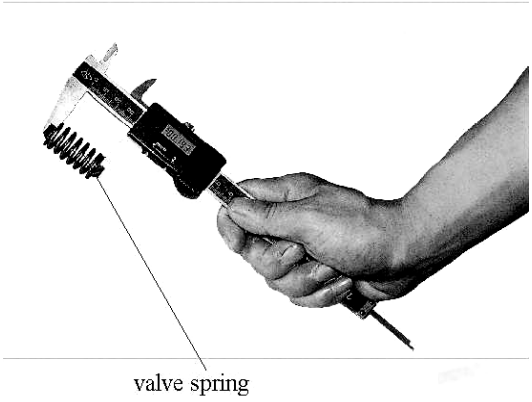
Remove the timing cam, rocker arm , rocker arm shaft to inspect for wear. Replace if necessary.



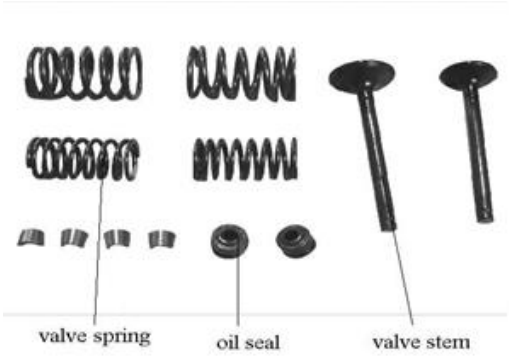
Remove the circlip of inlet and exhaust valve. Remove inlet vale stem and exhaust valve stem take care and don`t miss the valve clip.



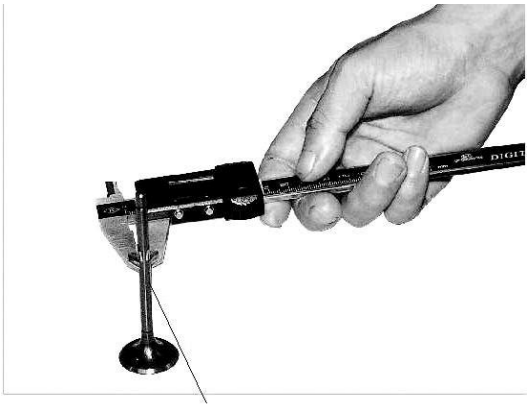
Measure length of valve spring to check whether the spring is damaged or worn. Replace if necessary.



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

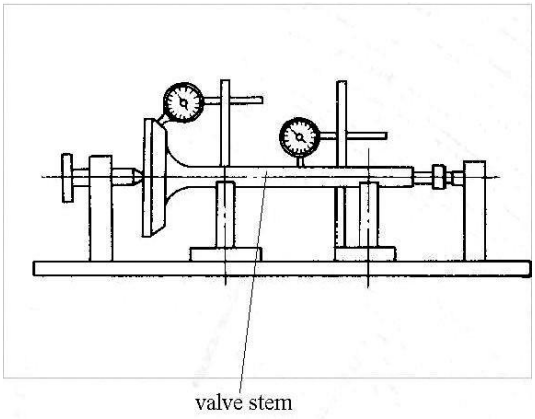


Check the external diameter of valve stem using a wedge. Replace the valve stem if the valve is beyond the maintenance limit valve.

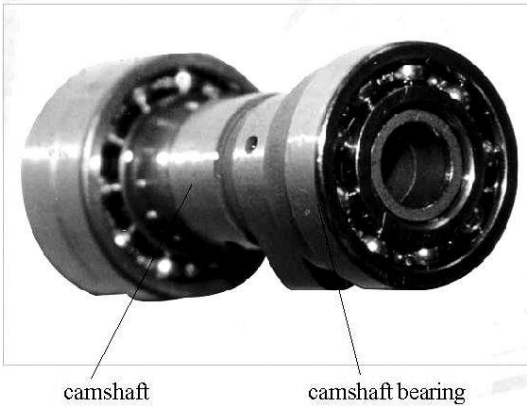


Measure the width of valve contact surface to check whether the contact surface is rough or abnormal. Replace the valve stem if the valve is large than 1.5mm.

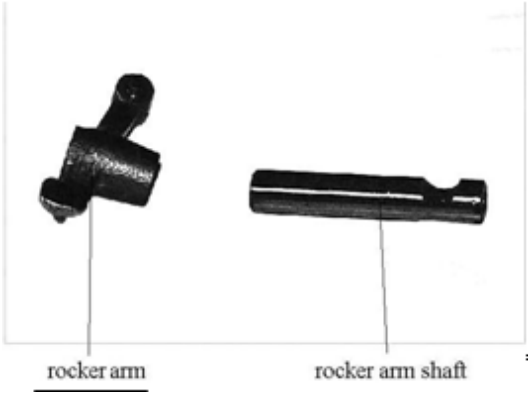
Check whether the valve stem is distorted. Replace if necessary.



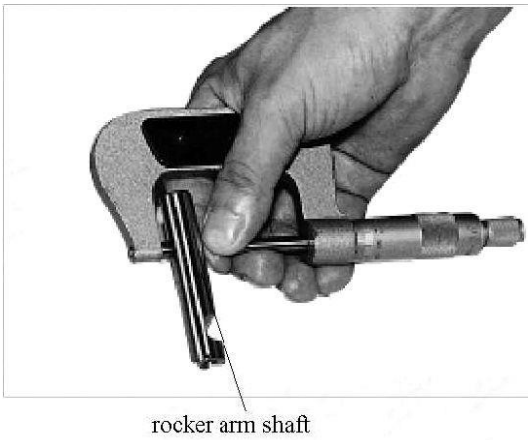
Inspect the timing camshaft bearing for wear and check the state of camshaft. Replace if necessary.



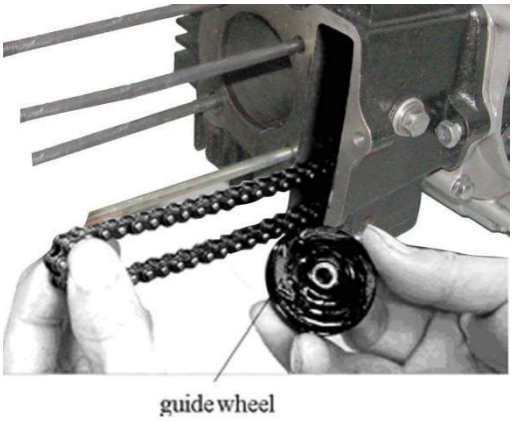
Check the gap of rocker arm shaft and rocker arm. Replace the rocker arm shaft and rocker arm if the gap is large.



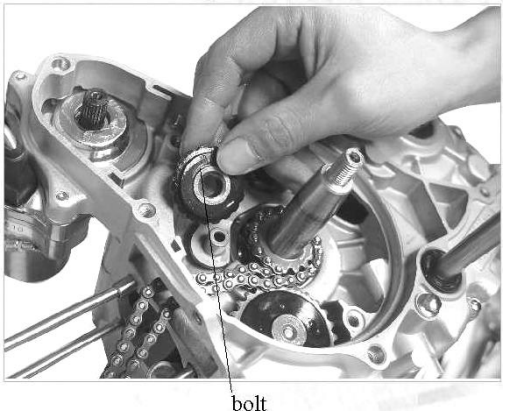
Check the external diameter of rocker arm using a micrometer. Replace the rocker arm shaft if the valve is beyond the maintenance limit valve.



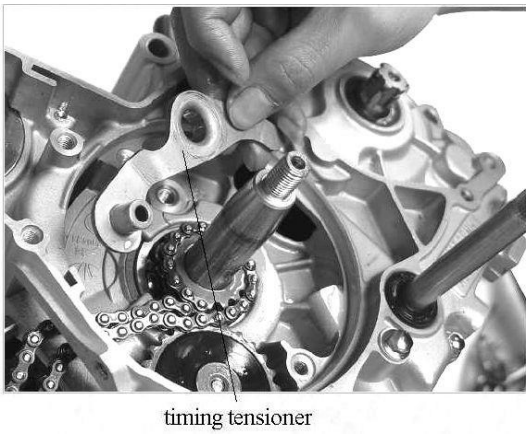
Remove the guide wheel of timing chain to inspect for wear and damage. Replace if necessary.



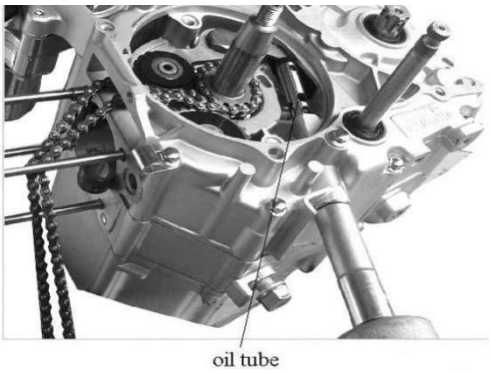
Remove the fixing bolt of timing tensioner and check the state. Replace if worn or if reuse is questionable.



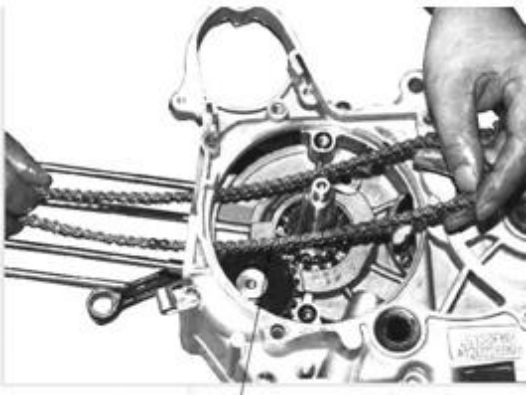
Remove the timing tensioner arm to inspect for wear and damage. Replace if necessary.



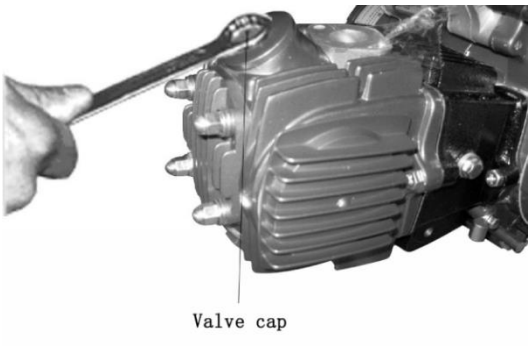
Remove the oil tube and spring and check the state. Replace if necessary.



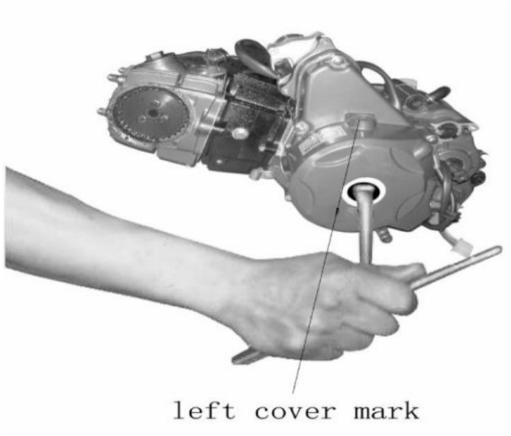
Remove the small timing chain and check the state. Replace if necessary.



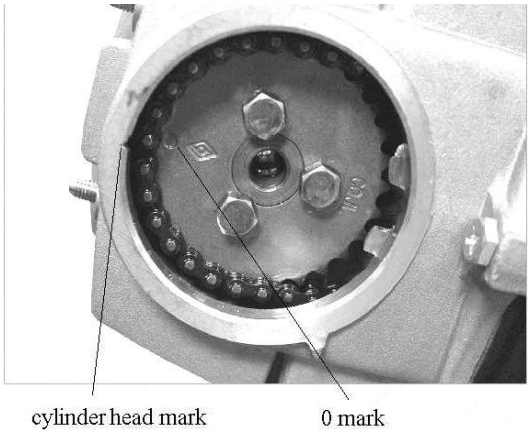
Adjust valve clearance as follows; Remove the valve cap and check the condition.



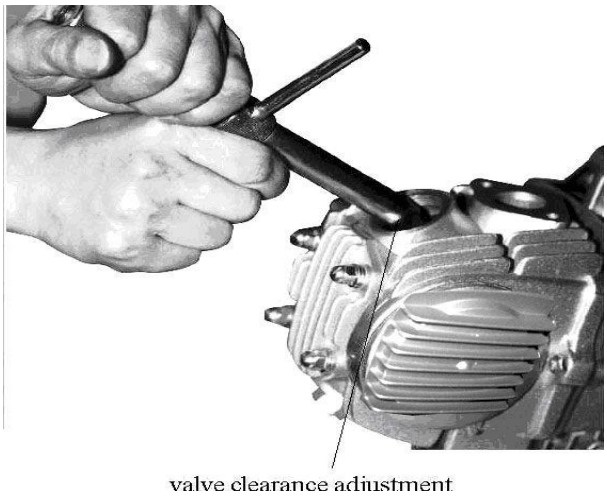
Adjust valve clearance of front cylinder. Turn magnetic rotor counterclockwise to make piston locate at top dead center and make T mark aimed to the mark of left crankcase cover.



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



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



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

Maintenance of Distribution Mechanism

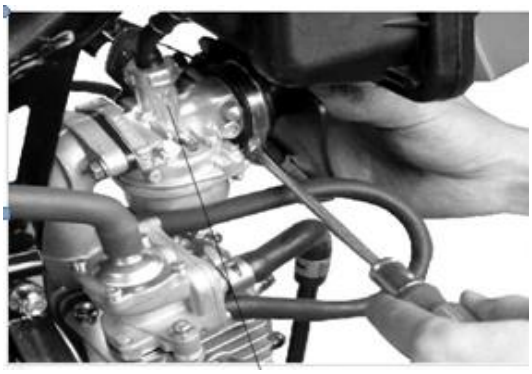
Descriptions	Damage form	Trouble	Cause	Correction
Valve oil seal	The edge of valve oil seal is worn, age or damage.		Thick blue and white fume form the exhaust muffler pipe	Replace the complete set of valve oil seal
Camshaft	The cam is cover worn		Insufficient engine output	Replace the camshaft
	The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

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

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

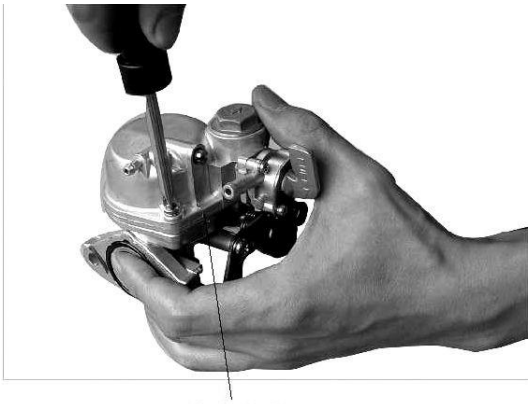
5.6 Disassemble, assemble and maintain carburetor

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



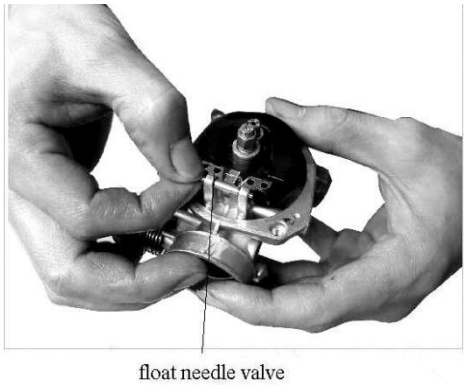
Clean the carburetor as follows: 。Remove the dirt and clean inner oil way.

Dismantle the fixing bolt of float chamber cap.

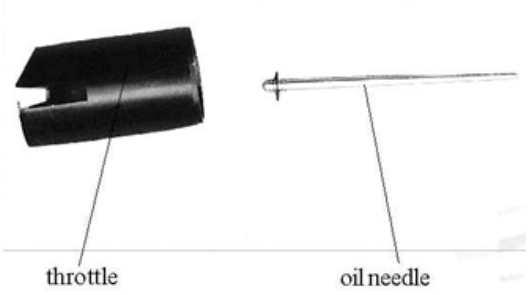


Remove the float chamber cap. Remove the water and debris in the cap if necessary. Check the state of seal ring and replace if it is aging

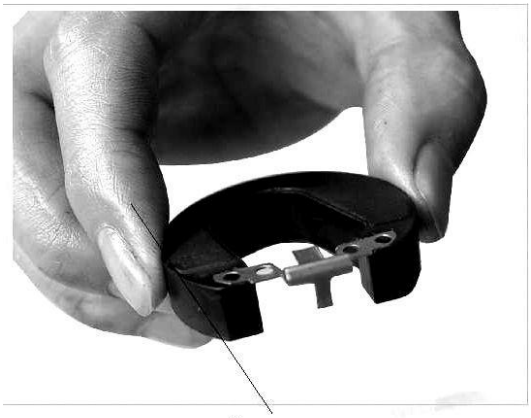
Remove the float needle valve to inspect for wear and damage. Replace if necessary.



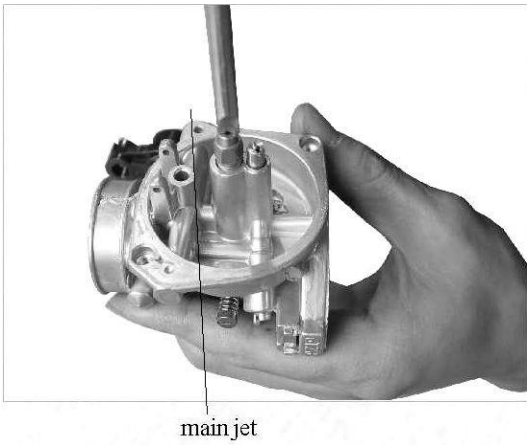
Remove the throttle and oil needle and check the condition replace if necessary.



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

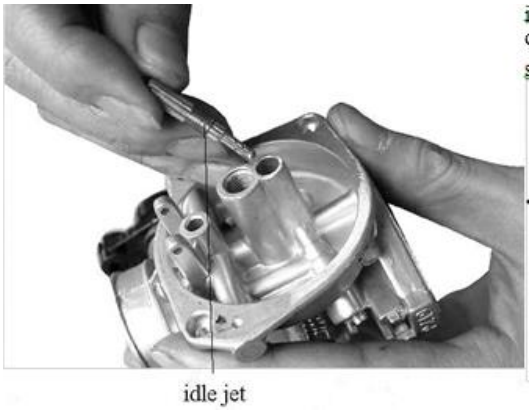


Take out the main jet to check whether the jet hole is clogged. Clean if necessary.

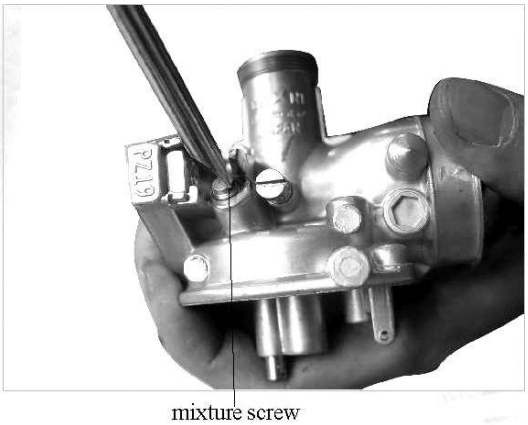


Remove the main nozzle to check whether small hole is clogged. Clean with compressed air if necessary.

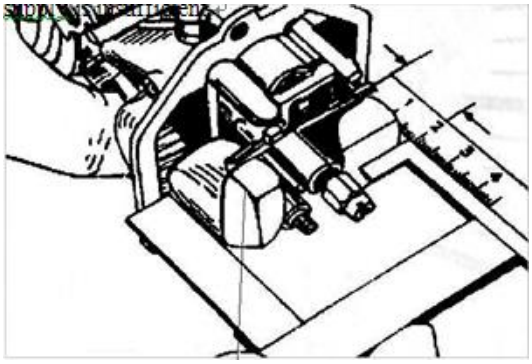
Remove the idle jet and check for plugged. Clean the jet with compressed air if necessary



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



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.



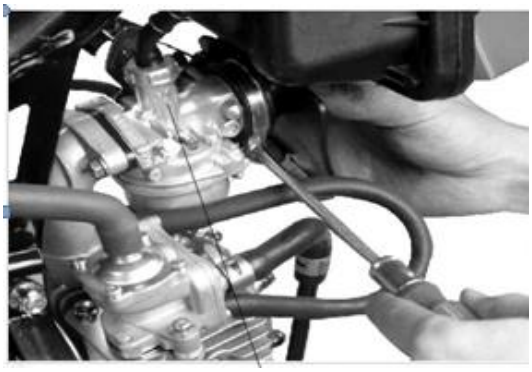
Adjust the oil needle to the third tier. If the clip rises, concentration of mixture becomes dilute and if falls it becomes thick.

5.7 Maintenance of Intake/Exhaust System

5.7.1 Disassemble, assemble and maintain intake system

Dis-assemble hoop of air filter

Dis-assemble air filter



Clean dust on the air filter surface and then dis-assemble the air filter and clean inside.

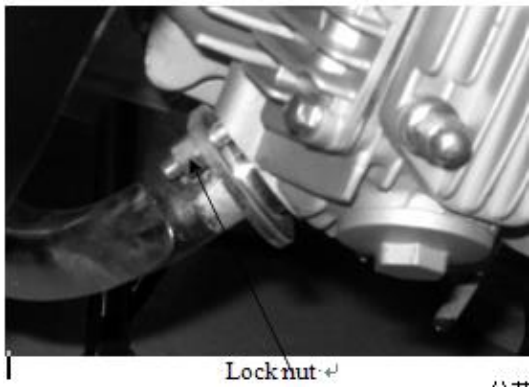
As the air filter core is made of paper, can't be cleaned. So replace the air filter core.

For the troubleshooting of the air cleaner, please refer to the followingtable.

Description	Damage form	Trouble	Cause	Correction
Air filter	Too much dust on the filter core	Engine hard to start, or fail start. Engine output power inadequate; performance not god at idle station. Fuel consumed too much; muffler smoke strong.	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 fumes strongly (black).	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

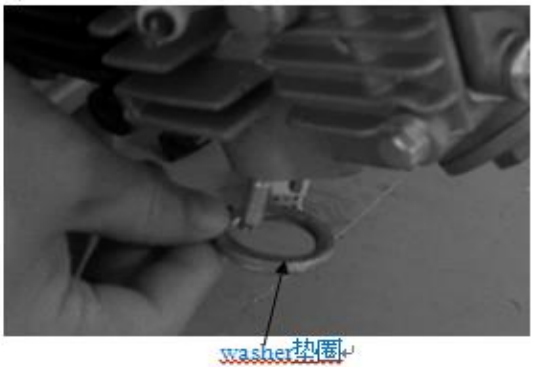
Dismantle locknut of muffler



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

Description	Damage form	Trouble	Cause	Correction 修理方法
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.

Maintenance of Exhaust Muffler

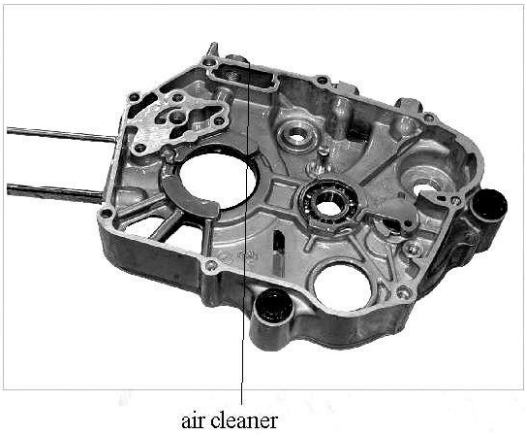
5.9 Disassemble, assemble maintain the environmental protection valve

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 broke 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

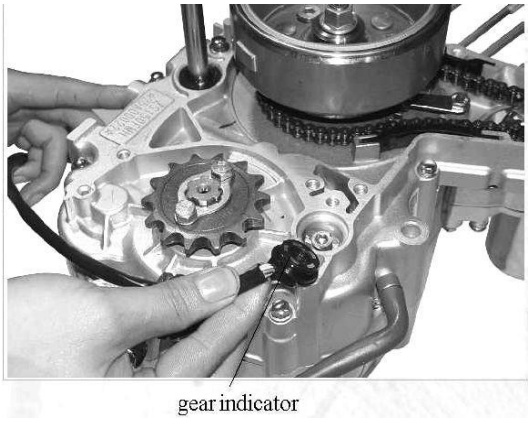
connecting hose	connecting hose get loose	noise is too big	Emission fails to meet the standard	Replace
Gasket	large noise from secondary inlet	air leaks form secondary inlet	Emission fails to meet the standard	Replace
muffler exhaust	too much carbon deposit on muffler exhaust	Poor combustion	Emission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

5.10 Dis-assembly, assembly, maintenance and management of electric start motor

Dis-assemble fixing bolt on left crankcase

Dis-assemble gear indicator fixing bolt

Dis-assemble gear indicator to check damage and wear. Change if necessary.

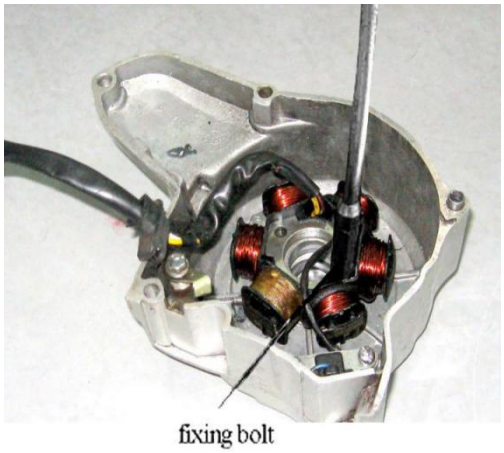


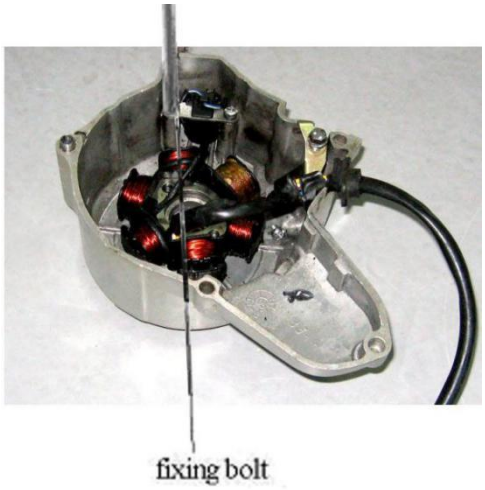
Dis-assemble left crankcase cover

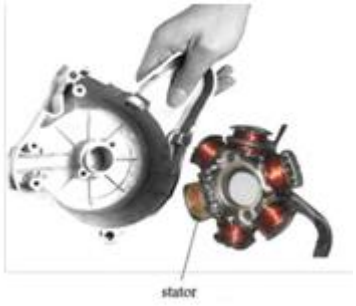
Dis-assemble gasket to check condition.

Change if damage or can't use.

Dis-assemble magneto stator fixing bolt trigger bolt.





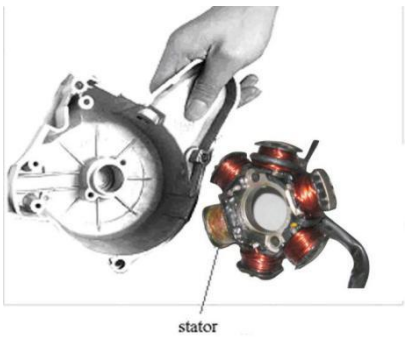


Check stator condition with a multiple-use meter. Replace if damage or can't use.

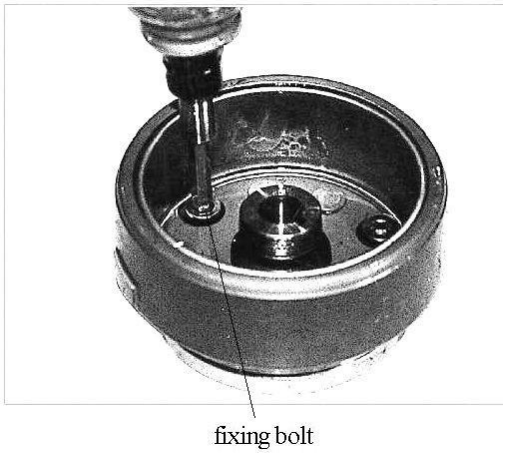
Dis-assemble rotor fixing bolt

Dis-assemble rotor with a dedicated tool.

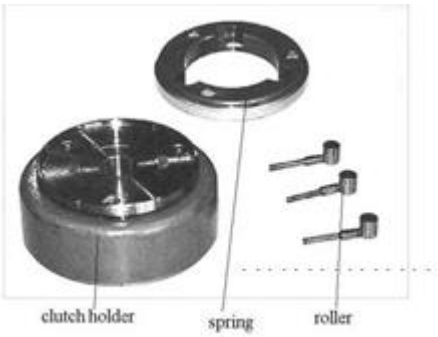
Check if rotor is with magneto. Change if necessary.



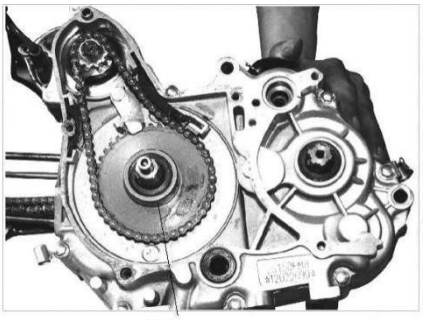
Dis-assemble over running clutch fixing bolt.



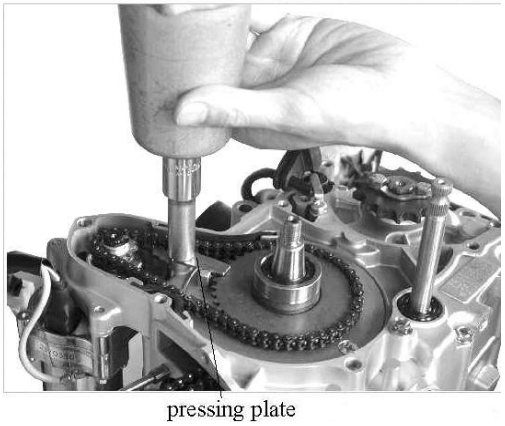
Dis-assemble clutch, check clutch holder, ball and spring for damage and ware. Change if necessary.



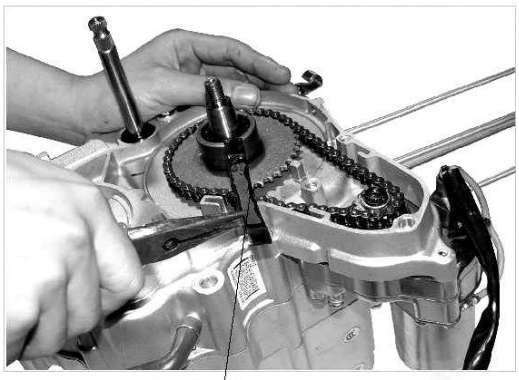
Check transmission sprocket and gear for damage and ware, change if necessary.



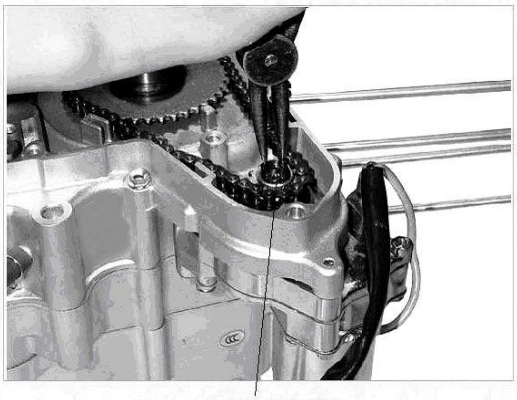
Dis-assemble start sprocket paper pressing paper.



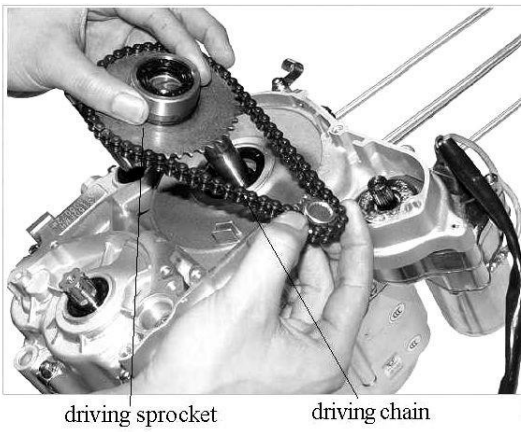
Dis-assemble tension band of clutch and check condition for damage and problem, change if necessary.



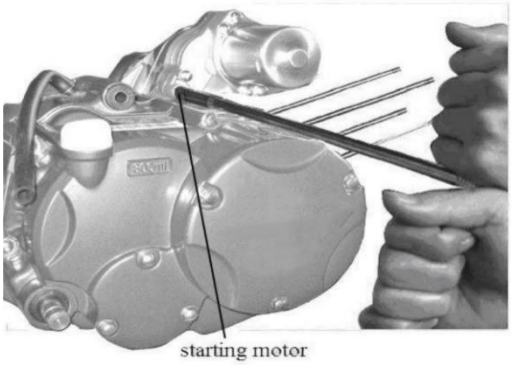
Dis-assemble retainer ring of start motor sprocket.



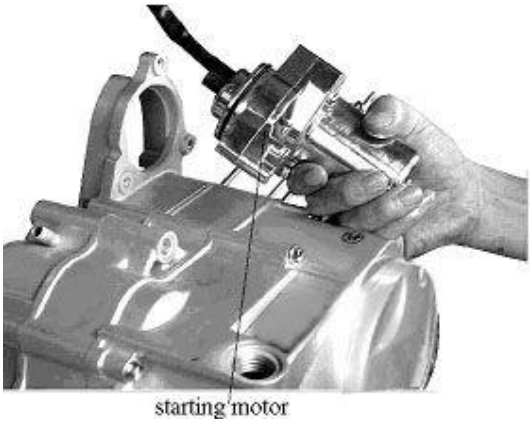
Dis-assemble driving sprocket and chain.



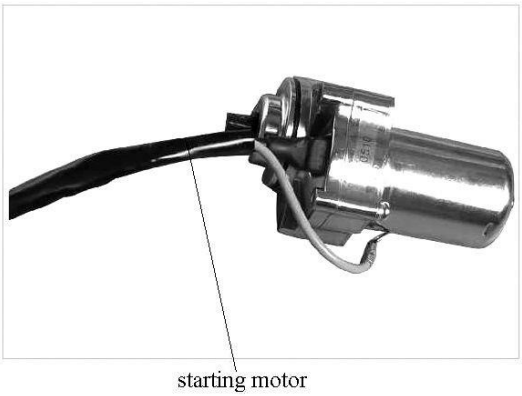
Dis-assemble start motor fixing bolt.



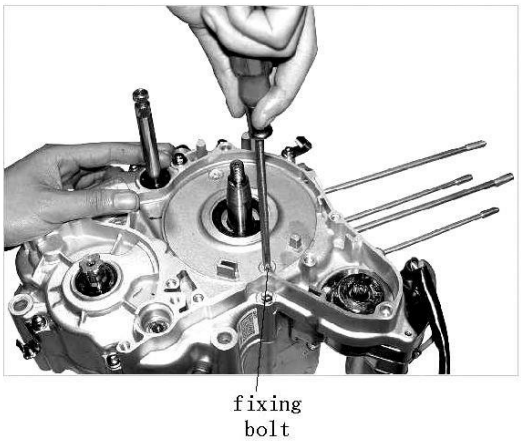
Dis-assemble start motor.



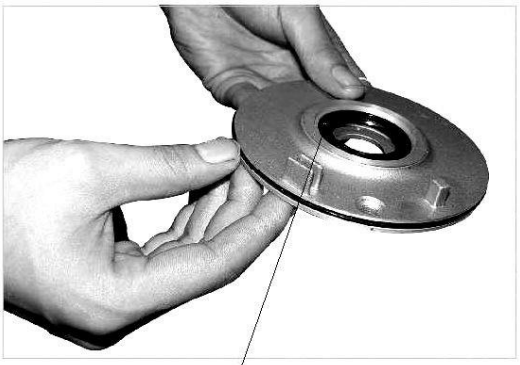
Check if the start motor winding is damaged, change if necessary.



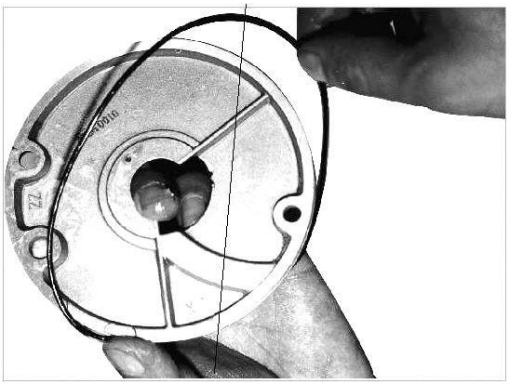
Dis-assemble oil separating plate and check condition, change if necessary.



Check the oil seal edge if damaged, change if necessary.



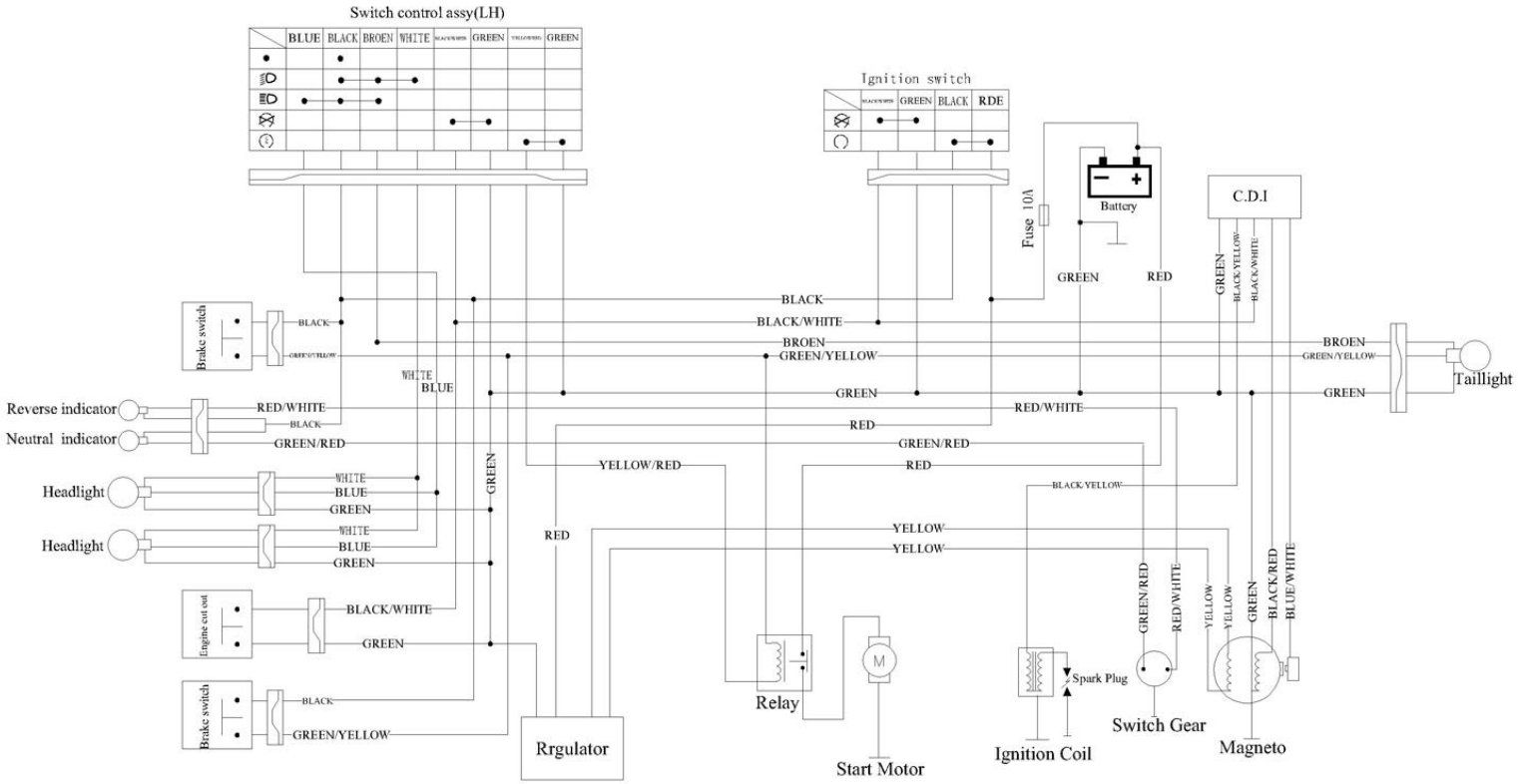
Dis-assemble seal ring and check condition, change if damaged.



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

Maintenance of Electric Starter

Description	Damage form	Trouble	Cause	Correction
Start 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



AU150 electrical circuit