

ZHEJIANG KAYO MOTOR CO., LTD.

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**Model A200**  
**JACKAL 200**  
**Service Manual**



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## **Introduction**

This manual contains detailed information for Kayo A200 (ATV), maintenance, adjustments, disassembly, installation, inspection points and specifications.

Please read the manual carefully and follow the instructions closely when performing inspections and repairs, this will increase the reliability, performance and overall lifespan of the vehicle .

**All contents in this manual are subject to improve and update without notice.**

# **Content**

**Chapter 1; Maintenance information**

**Chapter 2: Plastics and Body parts**

**Chapter 3: Regular Maintenance and adjustment**

**Chapter 4: Outer parts of engine**

**Chapter 5: Engine internals**

**Appendix: Electrical schematic diagram**

## Conversion table

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

## Danger/warning/attention

Take the the following warnings seriously, it's important for regular maintenance, especially important during engine maintenance.

**Danger**: Be on high alert for danger.

**Warning**: Be on alert for moderate danger.

**Attention**: Be on alert for minor danger.

This manual may contain some potential risks when performing engine work and maintenance, Please pay close attention to the above explanations, Service technician or mechanics should have basic mechanical knowledge before performing any service, maintenance, or inspection.

## Service Information

1.1 Warnings

1.5 Torque tightening

1.2 VIN Number

1.6 Lubricant, sealant

1.3 Main parameters list

1.7 Cable, hose and wiring diagram

1.4 Maintenance parameters list

## 1.1 Safety precautions

### Safety first

1. Wearing work clothes (coveralls), hat and safety boots suitable for the 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 the engine in unventilated places.
3. To prevent burns, do not touch the engine or exhaust until cooled.
4. Battery solution (dilute sulfuric acid) is a strong corrosive agent; contact with the skin, contact with eyes may cause blindness. If the battery solution accidentally touches clothes or skin, rinse immediately with clean cold water. If the battery solution is touches eyes, please flush immediately with plenty clean cold water and get medical treatment as soon as possible. Battery and battery solution should be kept out of reach of children. Battery charging will produce flammable and explosive gases, if exposed to a source of fire or spark there is a risk of explosion or fire. Please charge in well-ventilated places.
5. As gasoline is flammable and explosive. Pay attention to sparks as well as open flames. Vaporized gasoline may explode if exposed to open flame or sprks , please choose well-ventilated areas away from these hazards when refueling.
6. Attention, the rear wheel, clutch or sprockets and other rotating parts and movable parts as hands and clothes may be caught during maintenance.

### Disassembly and installation precautions

1. All Parts, lubricants oils and fluids must be Kayo brand parts or Kayo recommends.
2. During disassembly, Please sort and separate out the parts and fasteners of each system to ensure that everything is put back together properly.
3. Clean the vehicle or parts to be serviced before inspection.
4. Gaskets, o-rings, piston pin, piston ring, cotter pin and other one time use parts must be replaced after disassembling.
5. Snap rings can be deformed if opened too much during disassembly. DO NOT re-use deformed snap rings.

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6. After disassembly and inspection, clean parts and blow the cleaning agents away with compressed air before measuring. Grease the moving surfaces before assembly.
7. During disassembly, check all the necessary specifications and measure according to directions in this manual. Make sure measurements and conditions are within specification.
8. Bolts, nuts, screws and other fasteners shall be pre-tightened and then tightened in accordance with the specified torque in a diagonal sequence. From large to small, and from inside to outside.
9. Inspect all rubber parts during disassembly and replace if necessary. In addition, as some rubber pieces are not resistant to corrosive materials, please keep them from contacting volatile oils, grease, or liquids.
10. Pack or inject recommended grease in specific places as stated in service manual .
11. Use special tools when needed for disassembly and installation.
12. Ball bearings can be rotated with finger to confirm whether the rotation is flexible and smooth.
  - Bearing axial and radial clearance is oversized.
  - Clean and grease bearings with a tight spots when rotated. If the bearings still feel stuck after cleaning, replace. If the bearings can't be cleaned, replace.
  - If the bearing is a press fit, and becomes deformed after disassembling, replace it.
13. Bearings should be lubricated or packed with grease before assembly. Take note of the direction of installation when assembling. When installing open or double-sided dustproof bearing, make the manufacturer's logo and dimensions outwards.
14. Let the chamfered side towards force direction when install the Snap-ring. Do not use the rings without elasticity. After assembly, rotate the snap-ring to confirm that it is firmly installed in the slot.
15. It's important to check that all fastening parts are tightened and that functions are normal after assembling.
16. Brake fluid and coolant can damage surfaces, painted parts, plastic parts, rubber parts, etc., do not let brake fluid contact to these parts, If brake fluid contacts these

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parts rinse and dilute with water immediately.

17. When installing oil seals manufacturer's mark and sizes face outward.

- Check the oil seal before using.
- Grease the oil seal lip before assembly.

18. When installing rubber hose parts, insert the rubber pipe into the fitting . If there is a hose-clamp, install the hose-clamp in the hose indentation. Replace rubber hoses if dried, cracked, or deformed

19. Clean all gasket material from surfaces of before installing new parts or reassembling.

20. Do not bend cables excessively. Kinked or damaged cables may cause poor response and inner cables to fray and eventually break.

21. When assembling any protective caps, covers or boots make sure they are seated correctly in the respective grooves.

### **Break-in of engine**

Proper Engine break in is necessary on new engines and newly rebuilt engines to help ensure that longevity and reliability of the engine components.

Recommended break-in time is 20 hours, as follows:

0~10 hours: Operate at no more than ½ throttle, keep gear changes and speed variances to a minimum. Do not operate for extended amounts of time with a fixed throttle position. Let the engine cool for 5 to 10 minutes after each hour of operation. Avoid quick acceleration.

0~20 hours: Operate at no more than ¾ throttle, Do not operate for extended amounts of time with a fixed throttle position. Change gears and vary speeds as necessary. Let the engine cool for 5 to 10 minutes after each hour of operation. Avoid

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quick acceleration.

## Note:

- During break-in period, do everyday maintaining, and eliminate hidden trouble in time.
- Break-in period ended, make a maintenance for the vehicle, then putted into formal use.

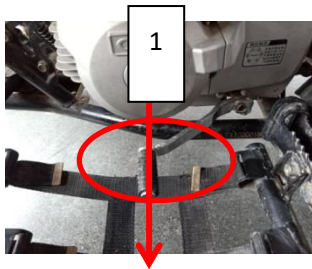
## 1.2 VIN Number

Model	<b>A200</b>
VIN number	
Engine number	

1VIN number

2Name plate

3Engine number



3





2

### 1.3 Specifications, Model information

No.	Item	
1	Brand	KAYO
2	Type	A200
3	Name	200cc Utility ATV
4	Company	ZHEJIANG KAYO MOTOR CO., LTD.

#### ● Dimensions, Vehicle Specifications

1	Dimension (L*W*H) (mm)	1700*1050*1080
2	Handlebar height (mm)	1080
3	Handlebar width (mm)	860
4	Rear height (mm)	1010
5	Ground clearance of seat (mm)	830
6	Min. terrain clearance (mm)	120
7	Wheelbase (mm)	1100
8	Front track (mm)	860
9	Rear track (mm)	790

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10	Turning radius (mm)	2500
11	Turning angle (degree)	38°±2°
12	Net weight (Kg)	155
13	Curb weight (battery+fuel) (Kg)	164.8
14	Max. Speed Km/h	70 (limited speed)

No.	Item	
1	Start type	Electric
2	Engine type	Single cylinder, four stroke, air cooling
3	Distribution	SOHC/by chain
4	Cylinder diameter × mileage	65X59mm
5	Compression ratio	9.2:1
6	Lubrication mode	Combination splash and pressure feed
7	Fuel pump	Rotor
8	Lubricating oil and filter	Complete filtrate, sponge filter
9	Oil brand	10W/40-SJ
10	Cooling type	Natural cooling
11	Cooling liquid	/
12	Air filter type	Sponge element
13	Carburetor	SG30·VM26· choke switch reinforce.
14	Tank volume	6L

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15	Clutch type		Manual	
16	Gear change		1+5 by foot	
17	Gear range		Step on rear direction to add gear and front to reduce.	
18	Shift type		R~N~1-2-3-4-5	
19	Reduction ratio		Forward gear 1-2-3-4-5	Reverse gear R
		Primary	Gear hub of clutch/primary gear	
		Single-stage	Gear ratio of forward gear	Gear ratio of forward gear
		Overall		
●Frame				
20	Drive sprocket ratio		45/14	
21	Output type		Chain drive, rear wheel drive	
22	Brake type		Front and rear disc	
23	Suspension type		Freestanding double rocker	
24	Frame type		Steel tube and steel plate welded type	

### ● Engine Specifications

#### ●Lubricating device

Item	Standard	Limitatio
Engine oil capacity	Change oil	800mL (No oil filter element replaced)
	Change oil	800mL (replace the oil filter element)
	Full capacity	800mL

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Recommended engine oil (see original )		<ul style="list-style-type: none"> <li>• four-strokes motorcycles SAE-15W-40</li> </ul> <p>For replacements, it must be within following scope:</p> <ul style="list-style-type: none"> <li>• API classification: SG or upper grade engine oil</li> <li>• SAE specification: refer to left table</li> </ul>	
Oil pump rotor	Radial clearance of inner and outer rotors	0.07 mm~0.15mm	0.2mm
	Radial clearance between outer rotor and pump body	0.03 mm~0.10mm	0.12mm
	Axial clearance between rotor surface and pump body	0.023 mm ~0.055 mm	0.12 mm
	Oil pressure	1500r/min , 90°C: 200 kPa ~400kPa, General 240 kPa 6000r/min , 90°C:600 kPa ~700kPa,	

### ● Air intake system (see engine section)

### ● Oil cooling device Mesh oil cooler

### ● Wheel (front and rear wheels)

Item		Standard	Limitation
Rim jump	Vertical	1.0mm	2.0mm
	Horizontal	1.0mm	1.8mm
Tire	Tread	~	3.0mm
	Air pressure	4.0 PSI	~

### ● Brake system

Item	Standard	Limitation

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Front brake (one with two)	disc thickness	3.5mm	3mm
	Brake handle stroke	5~10mm	~
	Braking force	400N*m	~
Rear brake	disc thickness	3.5mm	~
	Brake handle stroke	10~20mm	~
	Braking force	500 N*m	~

### ● Ignition device

Item		Standard
Ignition method		CDI electric ignition
Sparking plug	Type	Resistor type spark plug
	Standard	ATR7C/ (torch)
	Gap	0.6~0.7mm
	Spark character	>8mm, one bar
Spark advance angle		
Ignition coil resistance	Primary	0.43~0.57Ω
	Secondary	10.1~11KΩ
Peak voltage	Primary ignition coil	>150V
	Pulse	2V

### ● Light / Instrument / Switch

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Item		Standard
Relay insert fuse		15A
Light	Headlight	12V*55W*2
	Taillight/brake light	LED
	Gear indicator	LED

● Valve mechanism + cylinder cover ( see engine section )

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

### 1.4 Tightening moment of fastener

**Note:** When installing threads, please manually attach 2~3 turns of thread first.

#### Torque Specifications chart

No.	Item	install position	Bolt specification	Class	Moment N*m
1	Engine	Rear power bolt	M10	10.9 class	37~50
2		Up power bolt	M8	10.9 class	37~50
3		Down power bolt	M10	10.9 class	37~50
4	Suspension	Front bolt	M10*1.25	8.8 class	35~45
		Rear bolt	M12*1.25	10.9 class	37~50
5		Axle of upper	M10*1.25	10.9 class	37~50

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		<b>rocker arm</b>			
<b>6</b>		<b>Rear rocker arm bolt</b>	<b>M10*1.25</b>	<b>10.9 class</b>	<b>58~71</b>
<b>7</b>		<b>Fork axle</b>	<b>M16*1.25</b>	<b>10.9 class</b>	<b>50~60</b>
<b>8</b>	<b>Brake</b>	<b>Rear disc</b>	<b>M8</b>	<b>8.8 class</b>	<b>18~25 (with blue thread sealants)</b>
<b>9</b>		<b>Front disc</b>	<b>M8</b>	<b>10.9 class</b>	<b>15~20</b>
<b>10</b>		<b>Disc pump</b>	<b>M8</b>	<b>10.9 class</b>	<b>29~35</b>
<b>11</b>		<b>Front brake tee</b>	<b>M8</b>	<b>8.8</b>	<b>18~25</b>
<b>12</b>		<b>Rear axle</b>	<b>M12*1.25</b>	<b>8.8</b>	<b>55~65</b>
<b>13</b>	<b>Rear axle</b>	<b>Nut</b>	<b>M27*1.5</b>		<b>80~90</b>
<b>14</b>		<b>Chain bolt</b>	<b>M6</b>	<b>8.8</b>	<b>8~12</b>
<b>15</b>		<b>Clamp locking bolt (hexagon)</b>	<b>M8</b>	<b>10.9</b>	<b>18~25</b>
<b>16</b>	<b>Turning</b>	<b>Steering column locking</b>	<b>M10*1.25</b>	<b>8.8</b>	<b>18~25</b>
<b>17</b>		<b>Bolt of lower raiser</b>	<b>M10*1.5</b>	<b>10.9</b>	<b>50~60</b>
<b>18</b>	<b>Electrical elements</b>	<b>Battery box</b>	<b>M6</b>	<b>8.8</b>	<b>7~11</b>
<b>19</b>		<b>Muffler installation</b>	<b>M8</b>	<b>8.8</b>	<b>15~20</b>
<b>20</b>		<b>Voltage regulator ignition coil</b>	<b>M6</b>	<b>8.8</b>	<b>7~11</b>
<b>21</b>	<b>Oil tank,</b>	<b>Oil tank</b>	<b>M8</b>	<b>8.8</b>	<b>7~11</b>

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22	body parts, plastic	Oil tank switch	M8	8.8	18~25
23		Pedal	M8	8.8	8~12
24		Reinforced pedal	TM6		7~11
25		Plastic screw	ST4.2		3~5

● Tightening moment at specified position - engine (see engine section)

● Engine service tool (see engine section)

● Engine special tool (see engine section)

### 1.5 lubricating grease and sealant

No.	Position	Effect	Grease
1	Dust cap for rocker arms	lubrication	XHP222
2	Ball joint of rocker arms		
3	Steering column bottom		
4	Joints of knuckle and wheel hub		
5	Installation axle for rear fork		
6	Inner sleeves of rear fork		
7	Rear axle liner pipe		
8	Rear axle bearing and oil seal		
9	Steering column clamp		



**Note: please coat inside of handlebar grip with grip glue before installing.**

**Engine operating materials and installation accessories (see engine section)** Engine operating materials include lubricating oil (engine oil), Grease and may require thread sealant or thread lock.

## **1.6 Cable and hose routing**



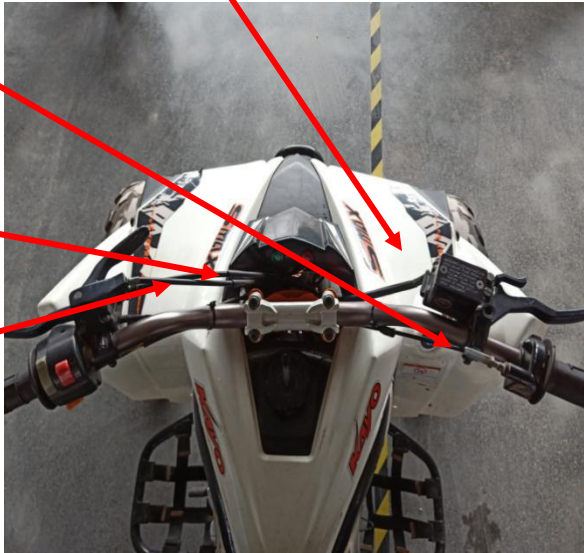
Main  
Harness

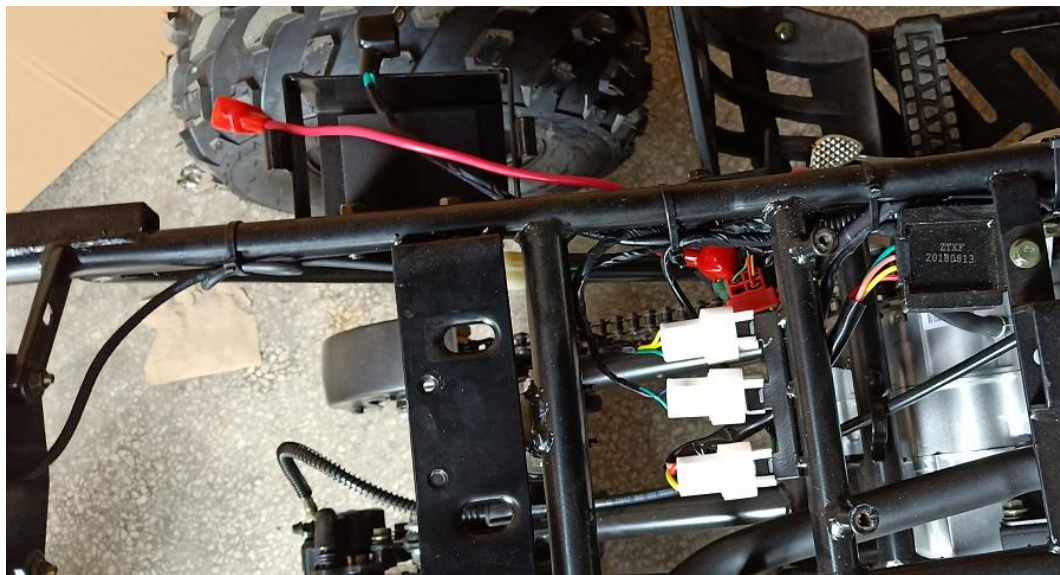
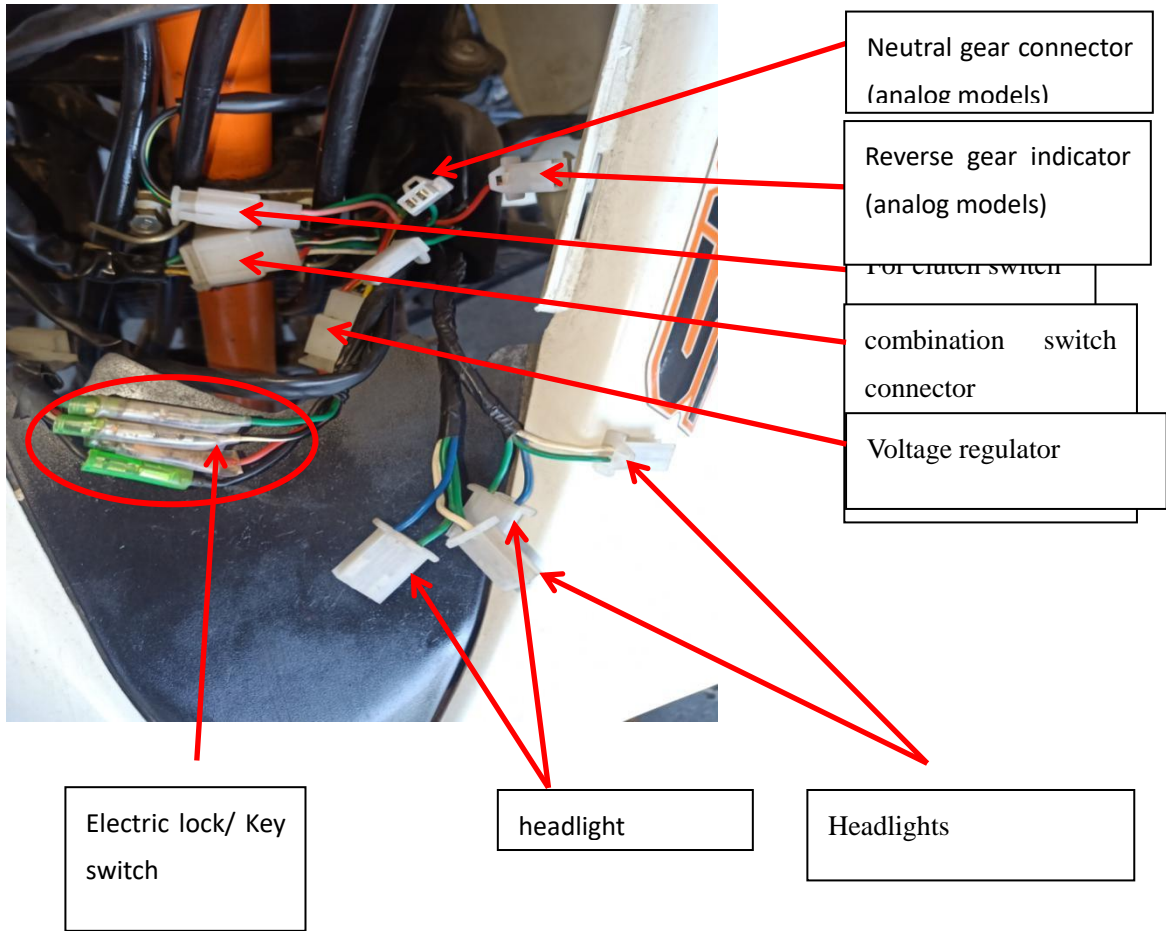
Brake pipe

Throttle cable

Clutch cable

Damper cable

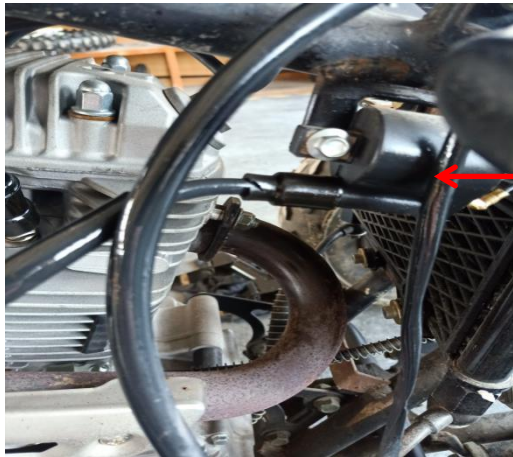






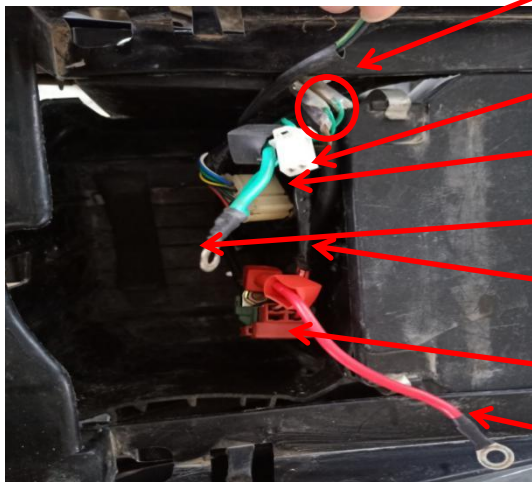
Regulator/rectifier

Tail light



Ignition coil

Brake light switch connector



Rear light connector

Ignition

Battery negative

Start motor cable

Relay connector

Battery positive

## **2 Plastic body**

### **2.1 Maintenance warnings**

### **2.2 Installation torques**

### **2.3 Seat, front guard, hood, rear body, left and right guard, plastics foot guards, dismounting left and right footpegs**

### **2.1 Maintenance cautions**

#### **Operation cautions**

1. When replacing plastics parts, please install new warning labels, stickers and riveted tags to the new plastics.
2. This chapter is about the dismounting the body plastics.

### **2.2 Installation torque**

M8 bolt: 18~25N\*m

TM6 bolt: 7~11 N\*m

M6\* bolt: 8~12 N\*m

### **2.3 Hood, handlebar, seat, plastic parts ( rear body, front body and middle guard), front guard, plastic pedals**

#### **2.3.1 Hood**

##### **Disassembly**

1. Remove the bolts 1 and 2.
2. Push down and gently pull the hood forward to remove. (Be careful as the tabs are easy to break)

**Installation:** In reverse order of disassembly. Locate tabs into slots and push to lock into place then install bolts 1 and 2 (note: replace hood plastic if any of the tabs broke during disassembly)



1/2

### 2.3.2 Handlebar

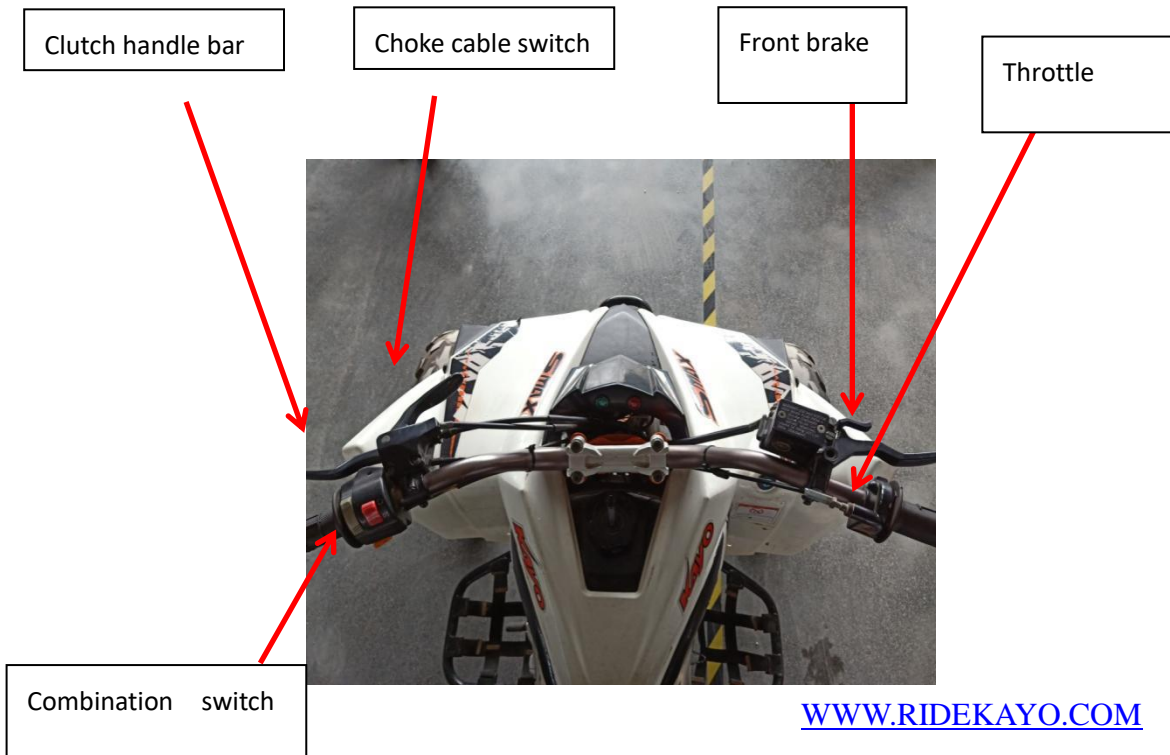
### 2.3.3 Disassembly

1. Cut off power first. (disconnect battery)
2. Cut plastic cable ties, then disconnect the combination switch, stop switch and remove right grip.

3. Remove the screws from the throttle cap to access and disconnect the throttle cable.

4. Remove combination switch screws and choke cable

5. Remove the 4 handlebar clamp bolts. Then remove the handlebars;



## Installation

In reverse order from disassembly, follow steps 5. Through 1.

\*after install, make sure to double check electrical connections, wire, cable and hose routing)

### 2.3.3 Seat

#### Disassembly

Locate the seat latch under the seat

Pull the latch to release, Then pull and lift to remove the sea



Seat latch

#### Installation

To install line the front hook up with the corresponding post.then simotaneously push down and forward until the latch locks into place.

### 2.3.4 Front Bumper

#### Disassembly

1. The mounting bolts in order.

Then remove the front bumper



Mounting  
bolts

### **Installation**

1. position the front bumper lining up mounting holes install the mounting bolts loosely. Then adjust bumper into position and tighten bolts.

### **2.3.5 Plastic Body**

#### **Disassembly**

1. Disconnect all necessary electrical connectors.
2. Disassemble plastic parts fixing bolts 1,2, 3,4, 5, 7, 9 in order on both sides
3. Remove the plastic body.

(note: remove the handlebar and hood before removing plastic body.)



- |     |     |   |     |     |
|-----|-----|---|-----|-----|
| 1/2 | 3/4 | 5 | 6/7 | 8/9 |
|-----|-----|---|-----|-----|



### Installation

Install the plastic body in reverse order from disassembly.

\*check all electrical connectors, cable, and hose routing after installation.

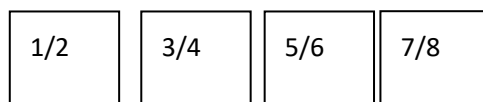
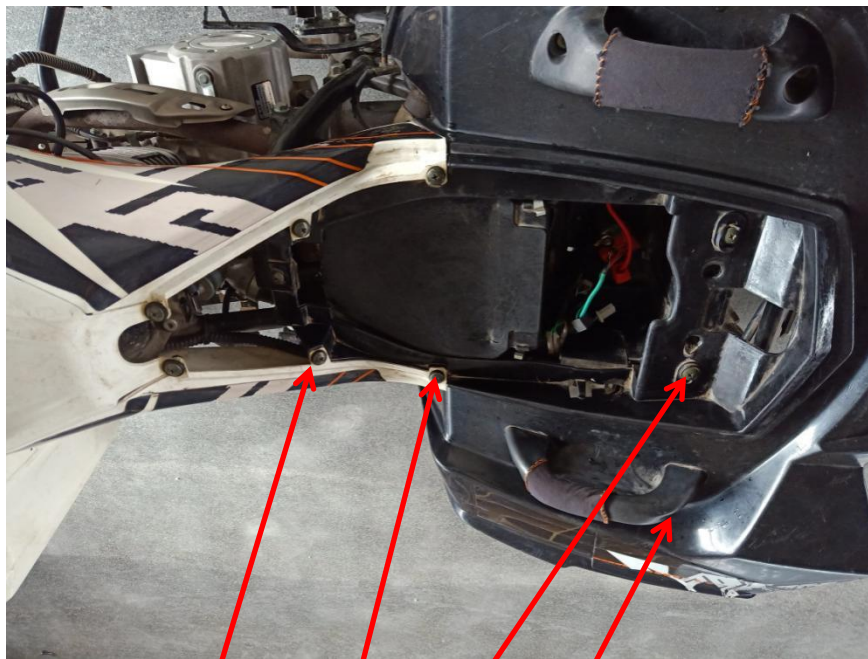


### **2.3.7 Rear body**

#### **Disassembly**

1. Remove the mounting bolts 1/2, 3/4, 5/6, 7/8 (and corresponding bolts on opposite side)

Take the rear body off.



#### **Installation**

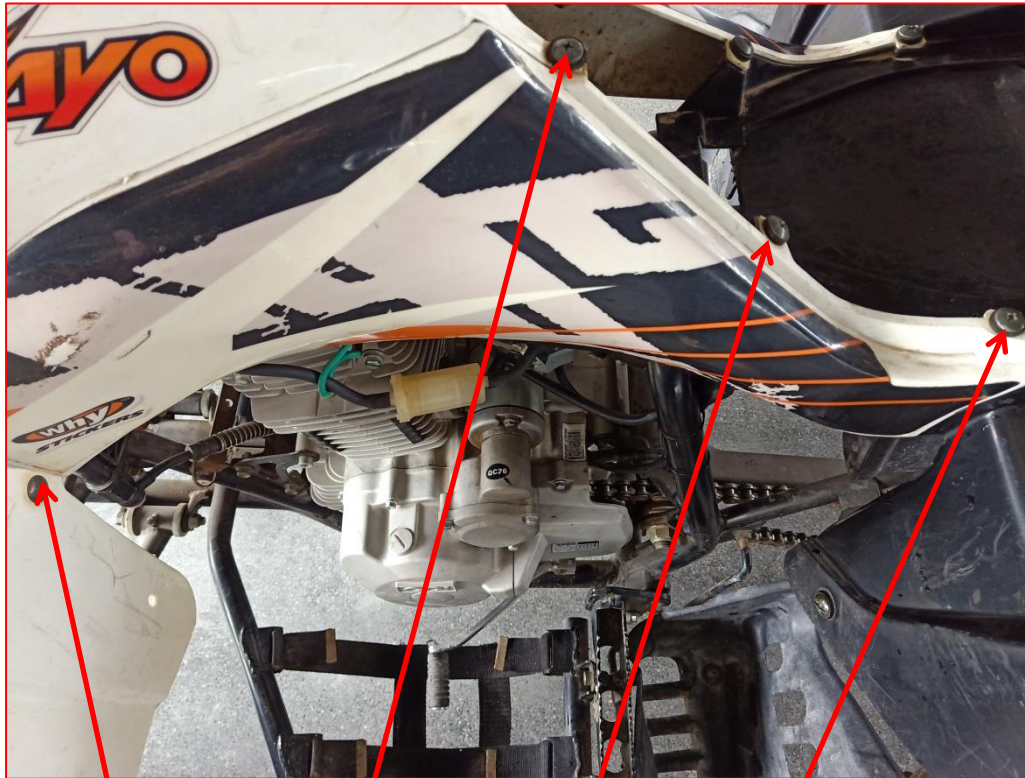
Install in reverse order from disassembly.

(Note: replace locking nuts and rubber washers as needed.)

### **2.3.7 Middle guard**

#### **Disassembly**

1. Remove the mounting bolt 1、2、3、4，
2. Remove the middle guard



1

2

3

4

#### **Installation**

Install in reverse order from disassembly

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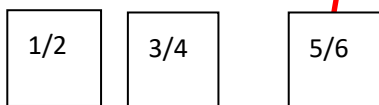
(Note: replace mounting bolts, nuts and rubber washers if damaged or worn)

### 2.3.8 Front body

#### Disassembly

(Note: remove the handlebar, hood, and middle guard)

1. Remove the front body mounting bolts 1/2, 3/4, 5.
2. Remove the key switch, headlight connector, then remove the front body



## Installation

1. Install in reverse order from disassembly.

replace mounting bolts, nuts and rubber washers as needed when worn.)

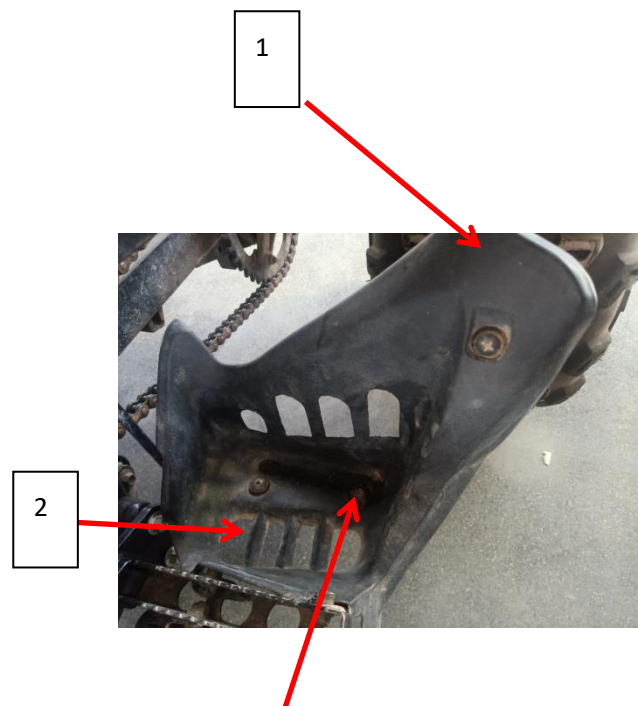
\*check all electrical connectors, cable, and hose routing after installation

## 2.3.9 Foot peg guards

### Disassembly

1. Remove mounting bolts 1、 2、 3、

2. Remove the foot guard.



### Installation

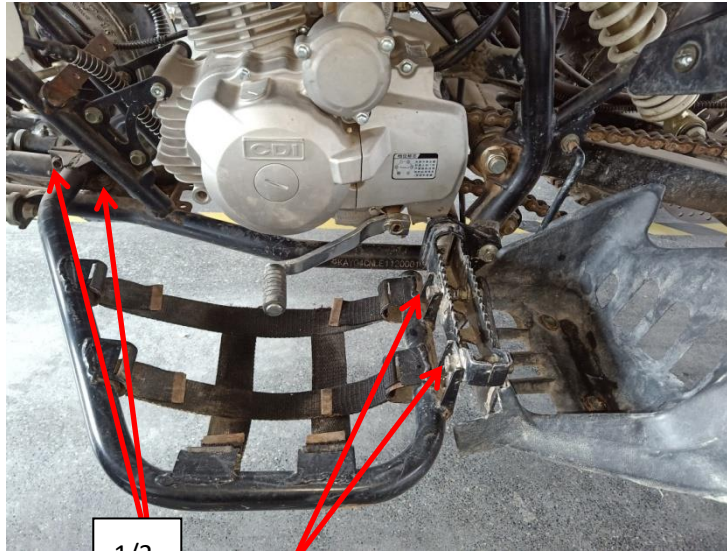
Intsall in reverse order of disassembly.

(Note: replace mounting bolts, nuts and rubber washers in time, once they worn.)

## 2.3.10 Pedal

**Disassembly floorboard/ foot peg**

1. Remove the mounting bolts 1, 2, 3, 4, 5.
2. Remove peg bracket and foot peg.

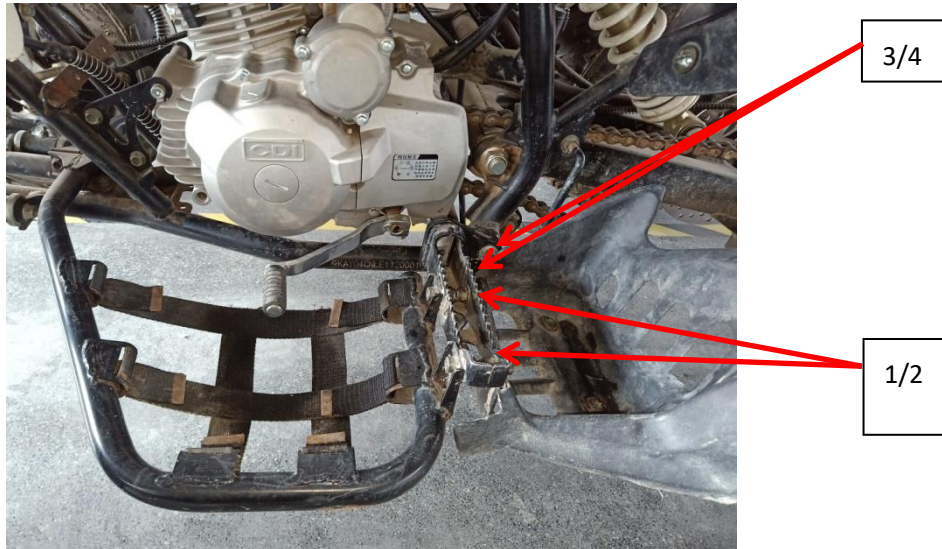


1/2

3/4

**Left foot peg front bracket**

1. Remove front bracket
2. Remove plastic
3. Remove screws 1, 2, 3, 4,
4. Remove foot peg



### **Left foot peg rear bracket**

1. Remove front bracket
2. Remove plastic
3. Remove the left foot peg.
4. Remove mounting nut 1,
5. Remove the rear bracket.



## Installation

Install in reverse order from disassembly.

(Note: replace mounting bolts, nuts and rubber washers in time, once they worn.)

## 3. Regular maintenance and adjustment

### 3.1 Maintenance information

### 3.6 Suspension system

### 3.2 Maintenance period

### 3.7 Gear box and fuel system

### 3.3 Inspection ways

### 3.8 Throttle check

### 3.4 Steering column and brake system

### 3.9 Light device

### 3.5 Wheel

### 3.10 Shock absorber selection

## 3.1 Maintenance information

### Warnings

#### Note:

- Do not run the engine in unventilated places, because the exhaust contains carbon monoxide (CO) and other toxic components.
- To prevent burns, don't touch the engine or exhaust until it has cooled down., please wear long sleeves work clothes and gloves.
- Gasoline is flammable and explosive. Pay attention to sparks as well as open flames. Vaporized gasoline may explode if exposed to open flame or sparks, please refuel in well-ventilated areas.
- Being careful of drive system and rotating parts, keep fingers, loose clothing and hair away from these parts

## 3.2 Maintenance period

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Engine maintenance is a regular periodic work, due at certain time intervals for engine maintenance, keeping up on standard maintenance will increase the lifespan and reliability of the components, the following is the A150 engine maintenance period table.

Note: the contents in the table is based on normal conditions, if bike is ridden in dusty muddy or wet areas maintenance should be performed more often and as needed.

A: adjustment	10 hours or 300km					
C: clean	20 hours or 750km					
I: inspection	per 50 hours or 1500km					
L: lubrication	per 100 hours or 3000km or one year					
	per 200 hours or 6000km					
	2 years					
	Remark					
Engine						
Lubricating oil and air filter		R		R		
Damper adjustment		I, A		I, A		
Engine leakdown	I			I		
Engine suspension	I			I		
Air filter		C	R			
Sparking plug		I		I	R	
Fuel system						
carburetor	I			I, L		
Driving wheel, driven wheel				I, C		
clutch				I		

Item		Period			Criterion
Parts	Item	Daily	Half year	One year	
Steering system	Steering wheel	Operating flexibility	<input type="radio"/>		
	Steering system	Damage	<input type="radio"/>		
		Steering linkages and	<input type="radio"/>		
		Ball joint shaking	<input type="radio"/>		
Braking system	Brake pedal, lever	Pedal, lever travel	<input type="radio"/>	<input type="radio"/>	
		Braking effect	<input type="radio"/>	<input type="radio"/>	
	Connecting rod and oil pipe	Slackness, looseness and damage	<input type="radio"/>		<input type="radio"/>



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	Hydraulic brake and brake disc	Brake fluid	<input type="radio"/>	<input type="radio"/>	Above the brake fluid lower limit	
		Tear and damage of brake disc	<input type="radio"/>	<input type="radio"/>	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	<input type="radio"/>	<input type="radio"/>	The minimum brake pad ( friction plate ) thickness $\geq 1.5\text{mm}$ ; less than 1.5mm, replace it.	
Driving system	Wheel	Tire pressure	<input type="radio"/>	<input type="radio"/>	Front wheel: 45kPa ( 0.45kgf/cm <sup>2</sup> ) (4.0PSI) rear wheel: 45kPa ( 0.45kgf/cm <sup>2</sup> ) (4.0PSI)	
		Crack and damage of wheel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
		Tire groove depth and abnormal wear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	If there's no tear indicator on the wheel, the residual groove
		Axle torque	<input type="radio"/>	<input type="radio"/>		
		Front wheel bearing vibration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
		Rear wheel bearing vibration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Suspension	Suspension	Shaking of connection part	<input type="radio"/>	<input type="radio"/>		
	Damper	Leakage and damage	<input type="radio"/>	<input type="radio"/>		
		Function		<input type="radio"/>		
Transmission	Chain	Transmission and lubrication, tightness	<input type="radio"/>	<input type="radio"/>	Chain deflection > 20mm	
	Flywheel, sprockets	Transmission and lubrication, tightness of fixing bolt	<input type="radio"/>	<input type="radio"/>	If chain wheel and chain wear severity, replace it.	
Electrical device	Ignition device	State of spark plug		<input type="radio"/>	Chain deflection > 20mm	
		timing		<input type="radio"/>		
	Battery	Terminal connections		<input type="radio"/>		
	Electric circuit	Corrosion or damage,		<input type="radio"/>		
Fuel device		Fuel leak		<input type="radio"/>		
		Throttle condition		<input type="radio"/>	Throttle knob clearance:	
Lighting device and indicators		function	<input type="radio"/>	<input type="radio"/>		
Exhaust pipe and muffler		Torque on all fasteners		<input type="radio"/>		

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	Function of muffler			<input type="radio"/>	
Frame	Joints and welds			<input type="radio"/>	
Other	state of grease in frame			<input type="radio"/>	
Exception can be identified in operation.	Make sure relevant parts are normal.	<input type="radio"/>			

### 3.4 Steering column and brake system

Keep vehicle in steady place and hold handlebar firmly as it shown in the picture to check if it' s shaking.



If there is a shaking, check it' s caused by steering column, linkages, ball joints, or fastening hardware then repair.

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If it's caused by steering column, tighten the bottom lock nut on steering column, or you can also disassemble the steering column to check bearing and clamps.

Keep vehicle in steady place and turn the handlebars slowly making sure movement is smooth.



If it is hard to turn, check cable, hose and wire routing, if there is no problem, check steering rods and connecting points for damage.

**Note: the steering must be smooth, and move freely between left locked position to right locked position .**

**Steering system free-play:** Check movement before operation. Free-play in steering should be 5-10mm.

### **Brake pump assembly**

Check the fluid level at the sight glass on the master cylinder. If brake is below the lower limit, stop using the vehicle immediately and inspect for leaks at master cylinder, hoses, fittings and connections. If fluid is low remove top of master cylinder and add DOT4 brake liquid to limit position.



Brake fluid sight glass

**Note:**

- When adding brake fluid, do not mix with dust or water, always add fluid from a new sealed container.
- Brake fluid can damage plastic, painted, and rubber surfaces. Wipe clean immediately if any is spilled

**Front brake disc and brake pads**

The brake pads, caliper and disc are normal wear and tear items

**Check or replace the brake disc**

- Check the surface of brake disc, if it is worn, damaged, bent, or grooved replace.
- If the disc thickness is less than 3.0mm, replace.

Check or replace brake pads

- Check thickness of pads, If it's less than 1.5mm, replace.
- Check for damage, cracks, and uneven wear. Replace pad set if out of specification

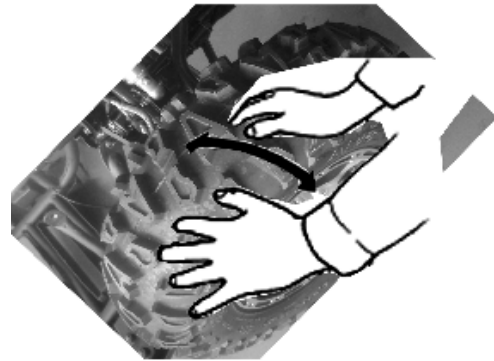
Note: Replace pads in sets.

### **3.5 Wheel**

With the atv on a jack or atv lift. Lift the front wheels off the ground. Push and pull the wheel in and out as shown in the diagram.

If there is movement, check torques on hub, steering shafts, spindles.

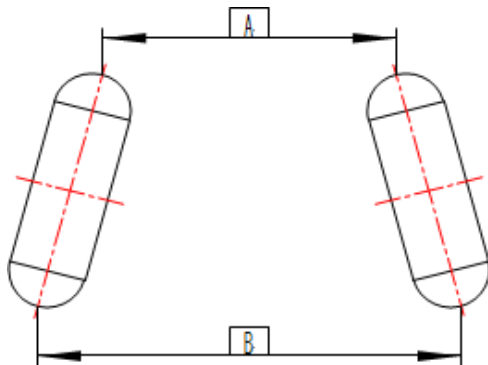
If there is still movement, check the bearings, ball joints, a-arm bushings. Replace if worn or damaged.



#### **Front wheel size**

On a level surface with handle bars straight check 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 specification:  $B-A=4 \sim 10\text{mm}$



If not in this range, adjust steering rods, adjust the wheel toe-in to within 4~10mm, and lock into place.

**Note: after the adjustment of front toe-in, drive the vehicle slowly and make sure vehicle tracks straight and true. After test ride check measurement again to make sure toe in is locked into place.**

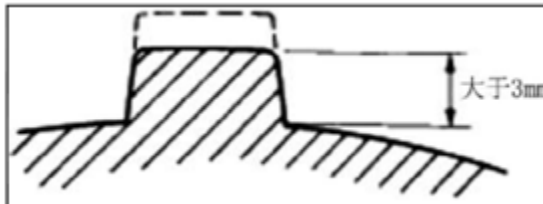
### **Tire pressure**

Check the tire pressure with a tire pressure gauge. (pressure range: 4~6PSI)

**Note: Check the tire pressures while the tire is cool . If tire pressure is out of specification please adjust to within range specified. Riding with tires out of specified range will affect vehicle handling and may cause premature wear and or damage to tire tread.**

### **Tire tread**

Check Tire tread, if tread is less than 3mm, replace it.



## **3.6 Suspension system**

Keep vehicle in a horizontal position and compress up and down several times according to the pictures. If there is shaking or abnormal sounds, check whether there is oil leakage in the shock absorber, or check for damage or loosening in the fastening parts.



### **3.7 Gear shifter and fuel system**

Changing gears, with the shift lever should be smooth and gear changes should have a positive firm feeling.



Gearshift lever

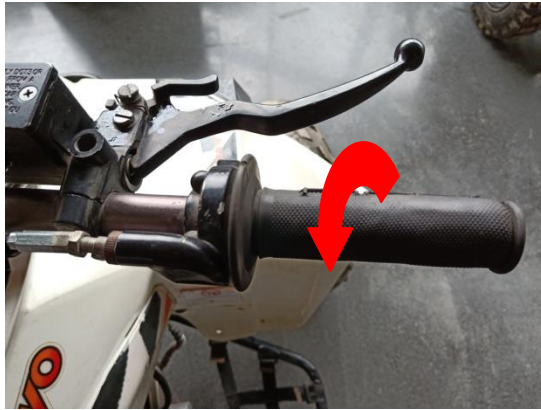
#### **Fuel device**

Remove the plastic parts first.

Check fuel vacuum and vent lines for aging, dry rot cracks and damage. Replace if any damages are found.

### **3.8 Throttle check**

Check the free stroke of the thumb throttle lever. Press the accelerator several times as shown in the diagram, check the free-play of the thumb throttle. Check for any sticking or slow return of the lever. Thumb throttle should be easy and smooth to push and should snap back quickly when released.



**Freeplay : 3~5mm**

Adjust throttle free play if out of specification.



1

2

3



Pull back rubber sleeves 1. Loosen lock nut 3 and barrell adjuster 2, then adjust throttle free-play to within specification.

### **Speed limiting device adjustment**

Speed limit device is used to restrict throttle opening.

Inspect the thread length limit of speed limit screw.

### **Suspension pre-load adjustment**

Front shock is non adjustable.

Rear shock can be adjusted from 1 to 5.

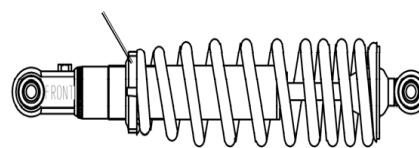
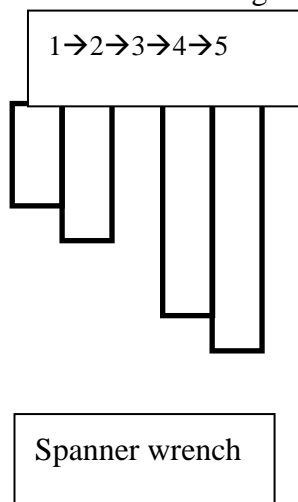
This is set in the middle at 3 from the factory.

Adjustment:

1. Using a shock absorber Spanner wrench.



Turn left to soften and right to stiffen



Spanner wrench

## **4 Engine systems**

4.1 Maintenance information

4.3 Air intake system

4.2 Fuel system

4.4 Exhaust system

4.5 Disassembly and installation of engine

### **4.1 Maintenance information**

#### **Precautions**

- Before performing maintenance, please make sure that the engine is not running, battery is disconnected and that the heated parts have cooled, to avoid injury.
- To protect finishes, please wrap the frame, plastics or any vulnerable finishes before removing engine parts or performing maintenance on engine.
- Please dispose of liquid such as oils and coolants properly. Use drain pans to prevent spills.
- The engine does not need to be removed for the following operations.
  - oil pump                      — carburetor, air filter
  - cylinder head cover, start motor, cylinder head, cylinder block, camshaft
  - left cover, AC magneto
  - piston, piston ring, piston pin
- Remove the engine in following operations.
  - Crankshaft, main and counter shaft    Tightening torque See 1.5

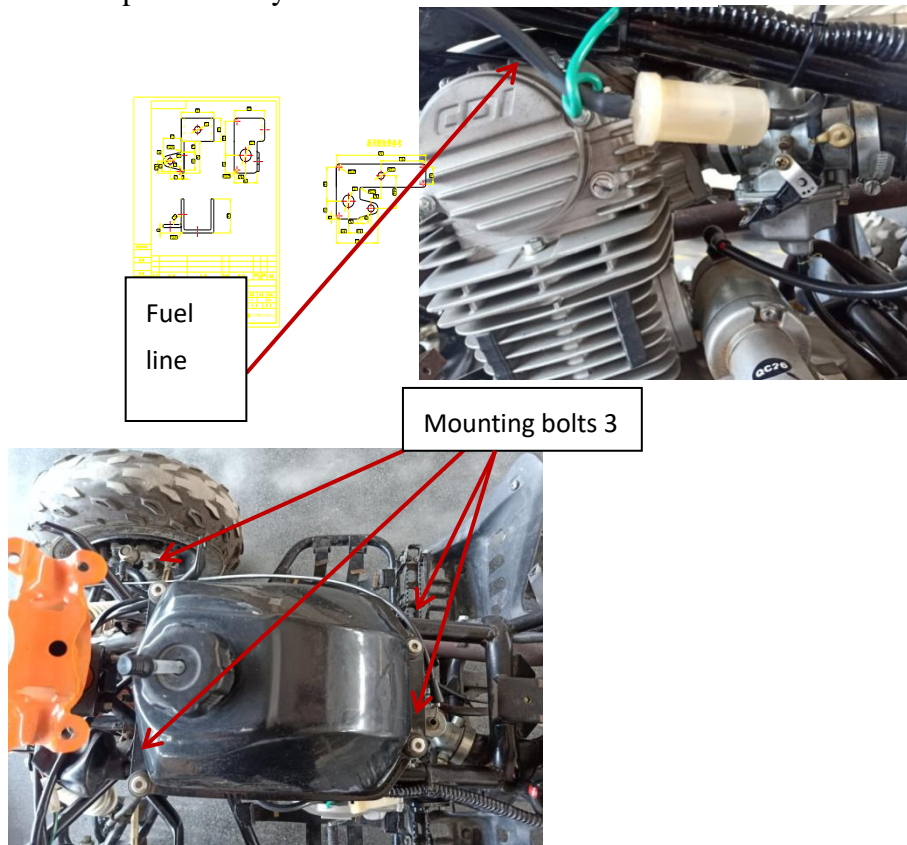
### **4.2 Fuel system**

Gasoline is flammable and explosive. Pay attention to sparks and open flame. Vaporized gasoline may explode if exposed to open flame or sparks, please choose well-ventilated areas away from these hazards when refueling or working on the fuel system and its related components.

## Fuel tank removal

Remove the plastic body parts, remove fuel lines from tank and fuel valve, then remove tank mounting bolts and tank.

\*Fuel tank pictures may differ from tanks on U.S. models



## 4.3 Air filter system

### Disassembly

Loose the air filter clamp to remove air filter.



clamp

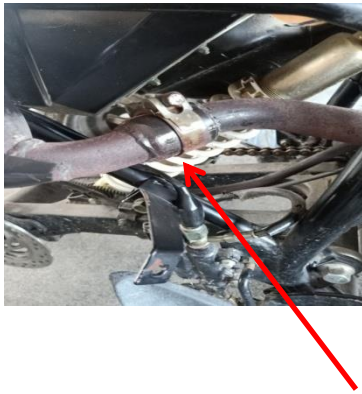
**Installation**

Installation shall be in the reverse order of removal. Make hose clamp is in the groove and any vacuum lines are hooked up correctly

**4.4 Exhaust system**

**Disassembly**

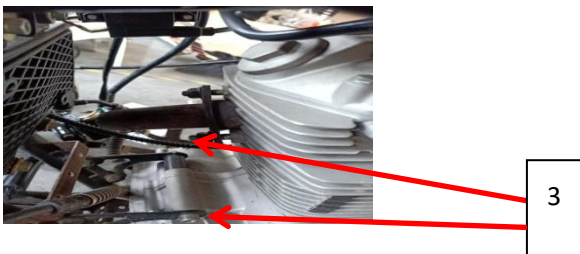
Disassemble the clamp between muffler and exhaust head pipe, then remove the muffler mounting bolt to remove muffler.



clamp

Mounting bolt

Remove exhaust flange nuts. then remove exhaust pipe.



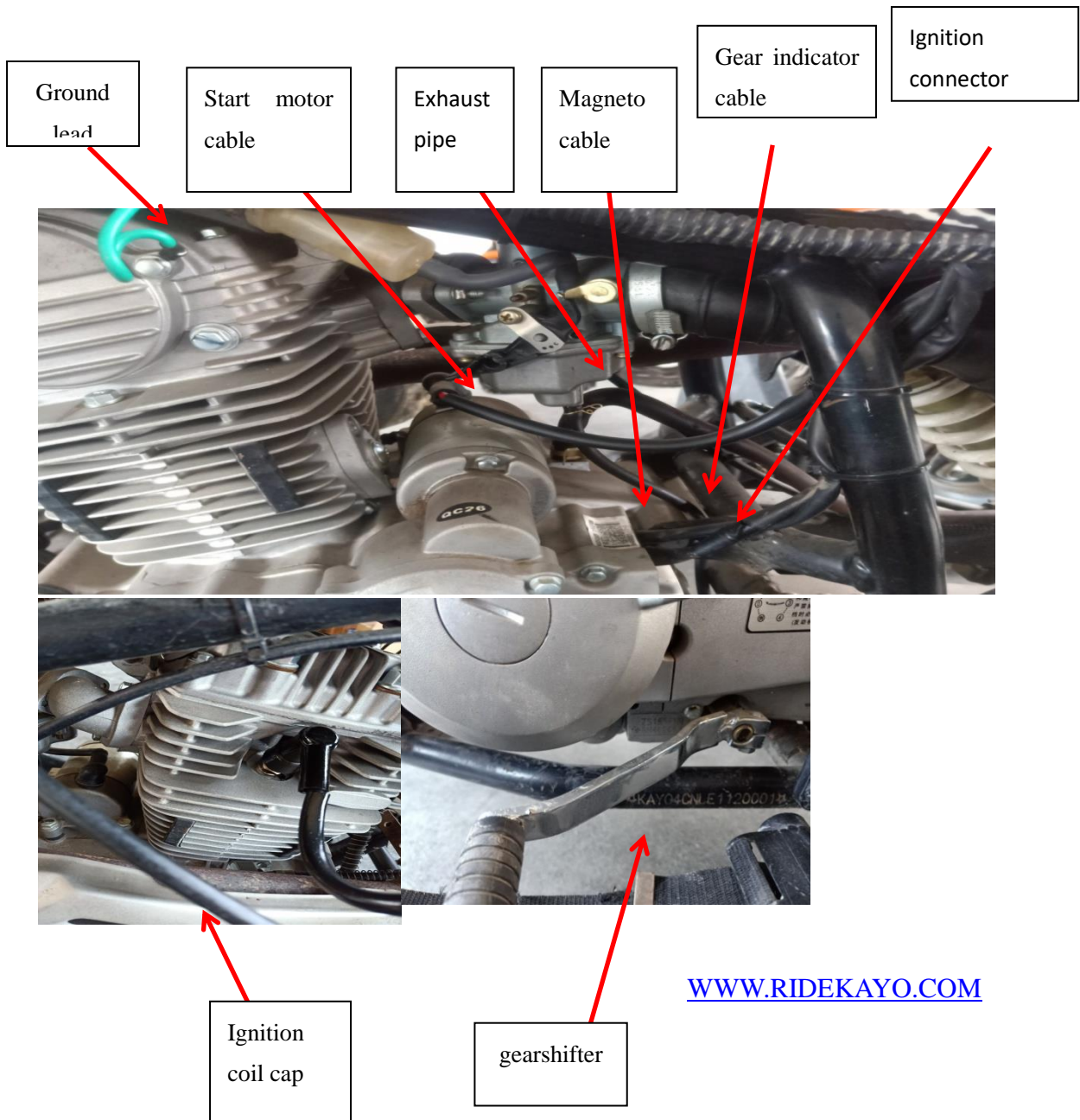
**Assembly**

Installation shall be in the reverse order of removal. \*do not reuse exhaust head pipe gasket always replace, replace muffler gasket and any hardware for exhaust if damaged or deformed.

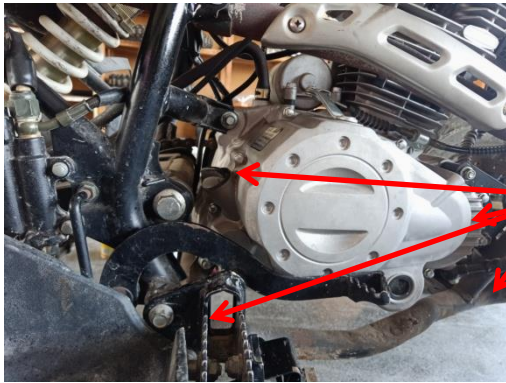
**4.5 Disassembly and installation of engine**

**Disassembly**

1. Remove the engine front sprocket side cover, then remove chain.
2. Remove the ground lead, and all electrical connectors, exhaust pipe, and gearshifter.



Remove the 3 engine mounting bolts.



Mounting  
bolts



Engine  
ear

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

### **Installation**

Installation shall be in the reverse order of removal

## **5. Engine**

### **5.1 Maintenance information**

#### **Cylinder and valve**

## ZHEJIANG KAYO MOTOR CO., LTD.

Precautions	Cylinder head check
troubleshooting	Measure the valve-face width
Disassemble	Assemble cylinder head
Swing arm check	Assemble cylinder head cap
Disassembly of cylinder head	Assemble cam shaft
Valve and spring check	Install cylinder head
	Install cylinder head cap

### Maintenance Precautions

#### General precautions

- Keep the oil routine on cylinder head clean and smooth.
- Pre-install locating pins before installing cylinder head.
- Make sure cam shaft in good condition and inject oil before installing.

#### Service parameters

Item	Standard mm	Limited mm
axial clearance between swing arm and cylinder head cap	0.05~0.3	0.5

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Radial clearance in swing arm and swing arm shaft	0.016~0.045	0.08
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Item			Standard mm	Limited mm
Valve	Valve bar diameter	Air intake	$\phi 4.972 \sim \phi 4.987$	$\phi 4.96$
		Air intake	$\phi 4.96 \sim \phi 4.975$	$\phi 4.94$
	Valve guide pipe inner diameter	Air intake	$\phi 5 \sim \phi 5.012$	$\phi 5.035$
		Air intake	$\phi 5 \sim \phi 5.012$	$\phi 5.035$
	Clearance between valve	Air intake	0.013~0.04	0.07

Free length of valve spring	48.35	47.5
Valve clearance	0.04~0.06	-----
Cam base circle bounce	0.02	0.04



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	bar and guide pipe	Air intake	0.25~0.052	0.08
	Valve seal width		1.5	----
Cylinder head	Flatness		0.04	0.05
	The working width of valve seat		0.8	----

### Troubleshooting

<p><b>Cylinder low pressure</b></p> <p>1、 valve</p> <p>-----wrong valve clearance</p> <p>-----bad valve seal</p> <p>-----wrong valve timing</p> <p>-----valve spring broken</p> <p>2、 Cylinder head</p> <p>-----disconnect of spark and cylinder</p> <p>-----damaged cylinder head gasket</p> <p>-----cylinder head with cranks or sand holes</p> <p>3、 Body, piston, piston ring</p> <p>-----piston ring clearance is too larger or broken</p> <p>-----piston with cranks or too damaged</p> <p>-----cylinder inner diameter is larger or with cranks</p>	<p><b>Black smoke</b></p> <p>1、 Valve guider pipe worn</p> <p>2、 Oil shield leaked or damaged</p> <p>3、 Cylinder head gasket leaked</p> <p>4、 Piston ring clearance is large</p> <p><b>Noise and abnormal sound</b></p> <p>1、 Wrong adjustment of valve</p> <p>2、 Valve get stuck or valve spring broken</p> <p>3、 Upper swing arm worn</p> <p>4、 Wrong valve timing</p> <p>5、 cam shaft worn out</p>
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**Disassemble cylinder head cap**

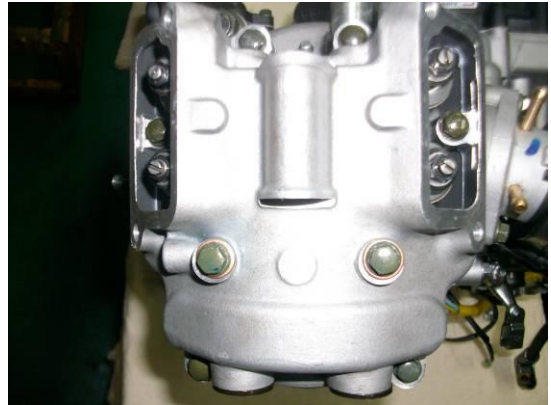
1. Remove four M6×20 fastening bolts from the cylinder head.

2. Remove air chamber covers of air intake.



3. Remove two M6×60 bolts, two M6×35 bolts, four M6×30 bolts and two A88 air intake pipe gasket, then install it on M6×60 bolt.

4. remove the cylinder head.



### Disassemble cylinder head

- 1 remove seal sleeves and cam shaft board
- 2.Remove (GB/T16674) "M6×16" bolt and (ZS500) 6.5×1.5×18 locating plate gasket.



3.remove 2 bolts from tensioner, then tensioner bolts, assembly and gaskets

4.remove timing chain

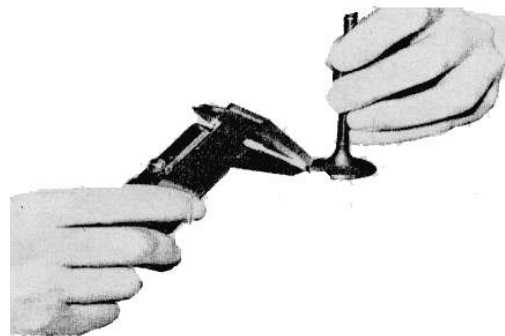
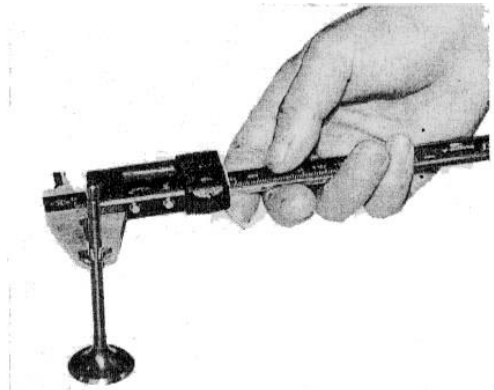
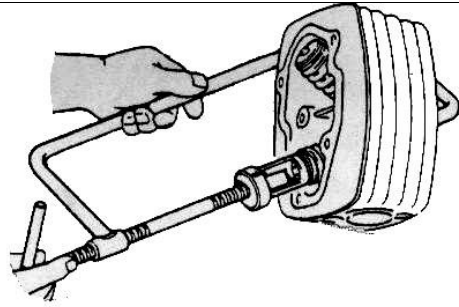
5.remove cam shaft assembly.



6.remove bolts which connect cylinder head and body



- 7.remove four nuts (ZS500A) and nuts (M10×1.25), then gaskets (10.5×2×20);
- 8.remove cylinder head



**Separate cylinder head cap**

1.Remove 2 bolts from cap and locating plate of swing shaft.

2.Remove air intake and exhaust swing arm shaft and swing arms.



### **Separate cylinder head**

Pressure the spring with valve tool to remove valve lock clap. Then release tool to remove spring, spring seat and valve.

**note**

**1.Do not pressure spring excessively, in case of deformed.**

**2.Mark all parts to make sure put back**

**properly.**

### **Valve and spring check**

Check if there is bend, burn or abnormal damage of valve. Measure diameter of valve bar.

Maintenance limited:

Intake:  $\phi 4.96\text{mm}$

exhaust:  $\phi 4.94\text{mm}$

Maintenance limited for contact width: 1.5mm

**note:**

**Replace valve if the valve face is not smooth for bad seal.**



Measure free length of valve spring:48.35mm

Service limited value (intake and exhaust)spring:47.5 mm

**Swing arm and shaft check**

Replace in following condition: swing arm worn, damaged or the axial clearance is large.

If the swing arm shaft is worn seriously, replace.

### **Cam shaft parts check**

1. If the cam shaft surface is worn, damage or the two end aren't smooth, replace the parts;
2. Check if the pressure reducing raiser has crank fractures, if the raiser and element shaft is loose, happens, replace it.

### **Cylinder head check**

1. if the cylinder with bad sealing, replace head or valve.
2. check if there is crank on spark hole and valve seat.
3. check if the head is deformed, and test the flatness with feeler gauge.

### **Valve seat check and adjusting**

Clean the chamber, and smear oil on valve seat, put the valve on seat and kick lightly, then pull out valve, if there is gap on trace, maintenance the seat.

First, clean seat, and smear lapping compound. attract the valve with rubber head.

### **Valve guide pipe check**

Measure all the pipe inner diameter and mark down.



Service limited value:

intake:  $\phi 5.035$  mm

exhaust:  $\phi 5.035$  mm

**note: Clean the pipe before measuring**

Adjust valve seat once replace guide pipe, and inject all valve in pipe to observe it's movement, measure the clearance between valve lever and guide pipe at last.

Service limited value:

intake: 0.07 mm

exhaust: 0.08mm

### **Guide pipe replacing**

Heat cylinder head to  $100\sim 150^{\circ}\text{C}$  in thermotank, take out head and put up, then take out pipe with dismantling device.

**Note: do not damage the cylinder head**

Install new guide pipe, and ream after cylinder head cooled.

**Note: smear oil on reamer when ream.**

Clean the cylinder head.

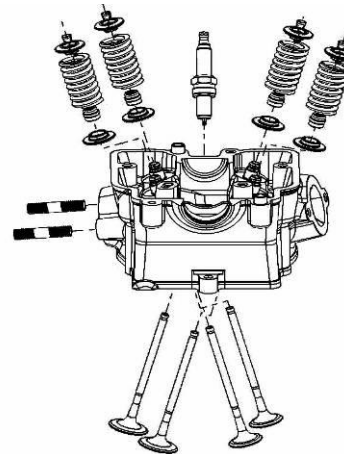
**Measure valve seat contact width**

Service limited value: 1.5 mm

If the valve seat is too wide or narrow, adjust it.

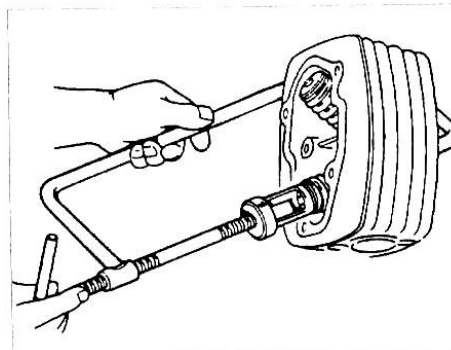
When adjust valve, use electric gun with rubber pipe, then add valve lever on rubber pipe, smear graphite on valve seal at the same time, then put on valve seal line, start electric gun and turn valve.

After adjust, check if you can see the seal line of valve and seat ring, if not, adjust again or replace valve or cylinder head.



**Cylinder head assembly**

1. Install the valve spring lower seat and oil shield to valve guide pipe.
2. First Smear oil on intake and exhaust pipe, second put them into valve guide pipe, then valve spring, spring upper seat, valve lock clip at last.
3. pressure valve spring with

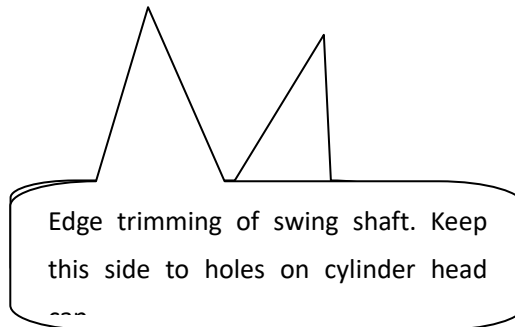


valve dismounting tool, then install valve lock clip in valve spring seat.

**Note:**

**Don't pressure spring too much in case it deformed.**

4. Check if the lock clip in right position.
5. Test sealing of cylinder head assembly.



**Cylinder head cap assembly**

Put two swing arms into cylinder head cap, and install shafts.  
Install fixing plate bolts of swing arm shaft to cylinder head cap at last.

**Note :**

- 1. Keep the swing arm shaft trimming to cylinder head**

cap holes.

**2. Finish install, turn swing arm to see if it smoothly.**

**3. Tighten-ting torque of swing arm fixing plate bolt: 16~20N·m.**



### **Cylinder head installing**

1. Replace new cylinder head gasket, then locating pin.

2. First Install cylinder head on A and B bolts, second “ZS500A” and (B bolt) nuts washers, third ZS500A and (B bolt) nuts.

#### **Note:**

**1. Keep the cylinder body clean.**

**2. nut tightening torque of A and B bolts.**

2. install “M6×25” bolt into connect hole of cylinder head and body and tighten.

**Tightening torque: 11~13N.m.**

3. Install cam shaft on cylinder head, then install timing chain on



Hole cover of left front cover.

cam shaft driven sprocket, check if the engine is timing position, if not adjust it.

**.engine timing adjust:**

**(1) Remove hole cover of left front cover and fixing plate bolts.**

**(2) Turn magneto locking nut with special tools, check if the scale line is in right position with timing mark of left front cover.**

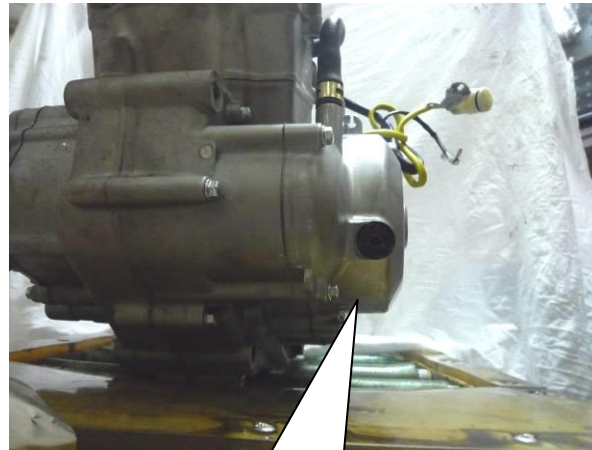
**(3) check if the timing mark on timing driven sprocket is in horizon with cover.**

4. Install hole cover and fixing plate of swing arm shaft on left front cover.

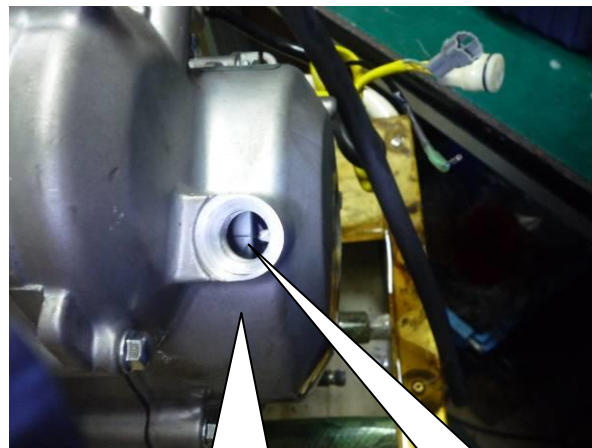
5. Install tensioner to specific holes, and fixed with two “GB/T16674-M6 × 20” bolts, then install tensioner spring, seal rings and bolts.

6. Install “ZS500” locating plate washer into “GB/T16674-M6 × 16” bolt, then put cam shaft plate into cylinder plate groove, put seal sets into groove last.

**Cylinder head installing**



.fixing plate bolt of swing arm shaft



Magneto timing mark

Left front cover timing mark

1. Smear plane sealant on contact surface of cylinder head cap.

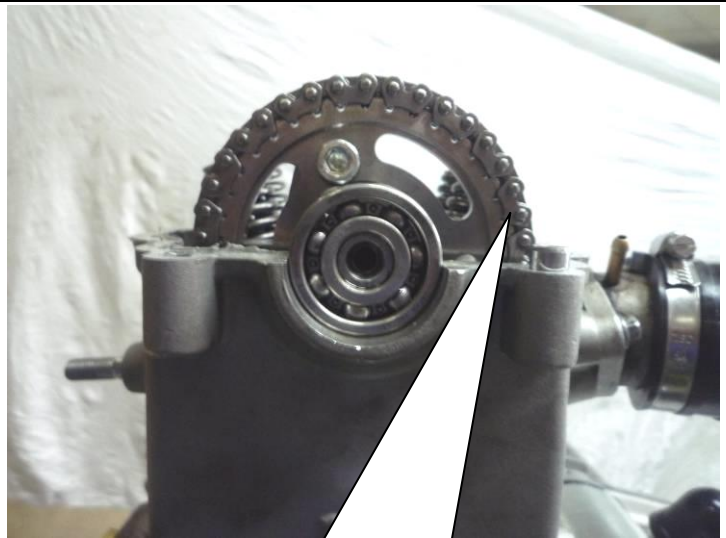
2. Install prepared cylinder head cap on cylinder head

3. put two "A8" intake pipe ring on "GB/T1667-M6×60" bolts, then set into oil pipe hole of cylinder head cap. Make 2 "GB/T16674-M6×35" and 4 "GB/T16674-M6×30" through cylinder head cap and tight. Tightening torque: 11~13N.m

5. adjust the clearance of intake and exhaust valve.

clearance: 0.04~0.06mm

6. Install valve chamber cap on cylinder head cap and tight with "GB/T16674" M6 × 20" bolt, tightening torque: 11~13N.m



Timing mark of timing driven sprocket



**Cylinder head and piston**

precautions	piston disassembly
troubleshooting	piston and piston ring check
Cylinder disassembly	piston ring assembly
Valve check	piston assembly
	Cylinder assembly

**Precautions**

- Before installing cylinder, make sure the engine left oil hole which next to AB bolts working.
- Keep the crankcase from dust.

**specification**

Item		Standard value mm	Service limited value mm
cylinder	Inner diameter	$\phi 77 \sim \phi 77.01$	$\phi 77.018$
	Out of roundness	0.05	0.01
	Flatness of cylinder surface	0.03	0.05
	Outer diameter	$\phi 76.96 \sim \phi 76.97$	$\phi 76.94$

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piston  Piston ring  Piston pin	Hole inner diameter of piston pin		$\phi 16.001 \sim \phi 16.006$	$\phi 16.015$
	Clearance between piston pin and the hole		$0.001 \sim 0.012$	0.025
	Piston ring closed interval	Top ring /second	$0.2 \sim 0.35$	0.5
		Oil ring	$0.2 \sim 0.7$	1.4
	Clearance between piston ring and piston ring groove	Top ring	$0.03 \sim 0.07$	0.08
		second	$0.02 \sim 0.06$	0.08
	clearance between cylinder and piston		$0.035 \sim 0.045$	0.07
	piston pin outer diameter		$\phi 15.994 \sim \phi 16$	$\phi 15.99$
connecting rod	Inner diameter		$\phi 16.015 \sim \phi 16.025$	$\phi 16.04$
	clearance between connecting rod and piston pin		$0.015 \sim 0.03$	0.05

### troubleshooting

#### Compression force low or instable

cylinder body or piston ring worn

#### Exhaust too much black smoke

Cylinder body, piston or piston ring worn

Incorrect installation of piston ring

Piston or cylinder wall scratched

#### overheat

carbon deposition

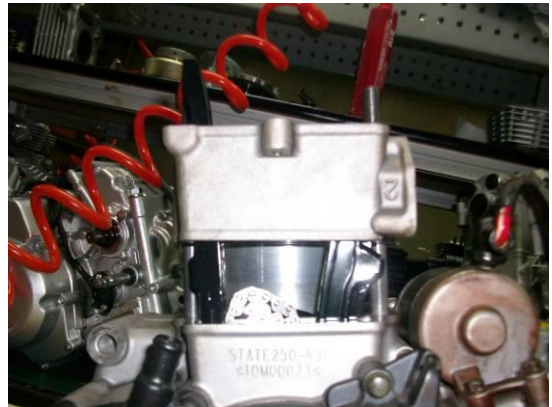
#### knock or or abnormal noise

piston or cylinder body worn

too much carbon deposition in piston

### **Cylinder disassembly**

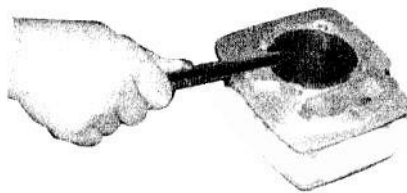
Remove chain guide plate to take the cylinder.



Clean up remained washer on cylinder

**Note :**

**It's easy to separate washers if put them into petrol. Take care of cylinder surface.**

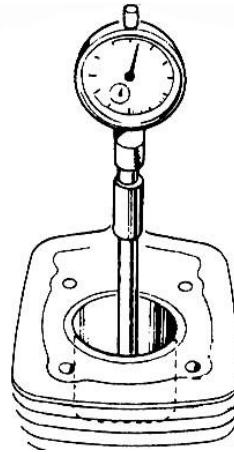


**Cylinder body check**

Check if the cylinder worn or damaged.

Measure cylinder inner diameter: top, middle and bottom position of piston stroke.

Service limited value:  $\phi 77.018\text{mm}$

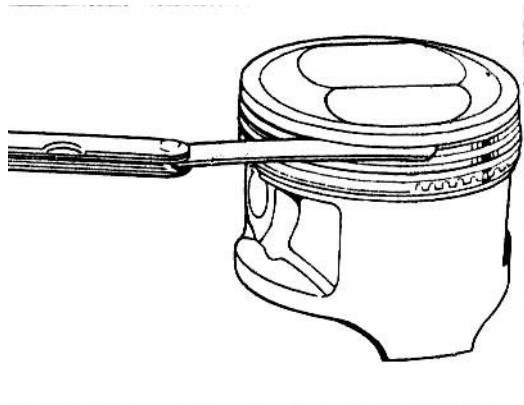


### **Piston disassembly**

Remove piston pin ring by pointed-noise pliers, then piston pin and piston.

**Note:**

**Take care don't drop piston pin ring into crankcase.**



### **Piston and piston ring check**

Remove piston ring

Note: keep piston ring well.

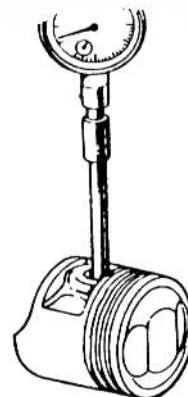
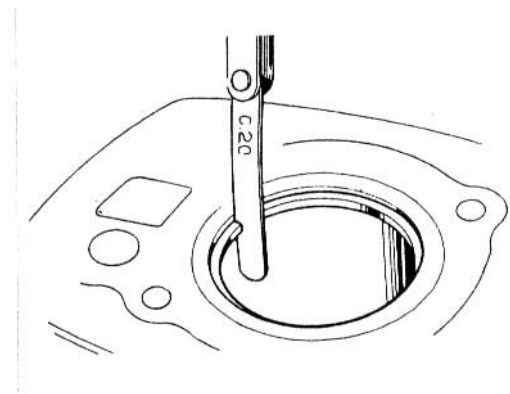
Measure clearance between piston ring and piston ring groove.

Service limited value:

First ring: 0.08mm

Second ring: 0.08 mm

Oil ring: 0.08 mm



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Check if piston ring worn or cranked, and groove worn.

Put piston ring into cylinder to measure end play.

Service limited value:

First ring: 0.5mm

Second ring: 0.5mm

Oil ring: 1.4 mm

Measure the inner diameter of piston pin hole.

Service limited value:  $\phi 16.015$  mm

Measure part diameter which is 7mm height from piston skirt.

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Service limited value:  $\phi 76.94$  mm

Compute the distance between cylinder and piston.

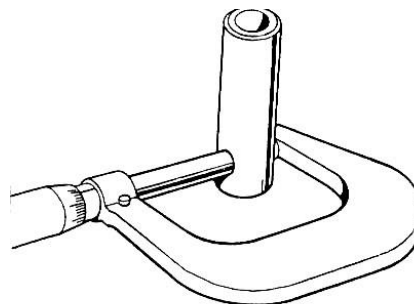
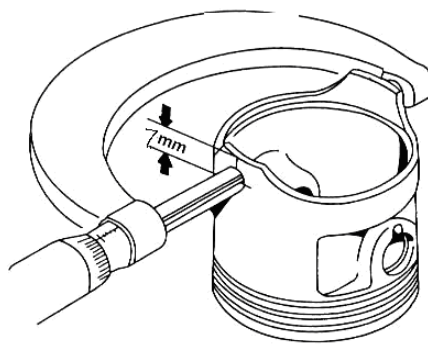
Service limited value: 0.1mm

Measure piston pin diameter.

Service limited value: 15.99 mm

Compute the distance between piston pin and piston.

Service limited value: 0.025 mm



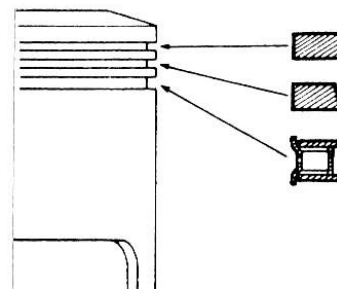
### **Piston ring assembly**

1. Clean piston ring groove completely.

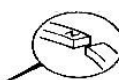
2. Install piston ring;

**note:**

- 1. Protect piston and piston ring among installation;**
- 2. Mention the installation sequence of first and second rings; the marked sides of rings face to piston neck.**
- 3. The piston ring works well after installation.**



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## Piston assembly

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Put piston, piston pin and new piston ring together.

### Note:

1. When install piston, the side marked with“ ◀ ”faces to engine exhaust pipe.
2. The piston ring end gap opening faces down.
3. If the piston ring severe deformed, replace.
4. Keep piston ring from crank case.



When install piston, the side marked with“ ◀ ”faces to engine exhaust pipe.

## Cylinder body assembly

1. Install cylinder locating pin and new gaskets.
2. Smear oil on cylinder body, piston and piston ring surfaces.
3. Stagger piston rings openings of 120°, then install cylinder body.

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**Clutch, driving gear, overrun clutch, oil pump and gearshift**

<b>Precautions</b>	<b>Water pump impeller check</b>
<b>Troubleshooting</b>	<b>Right crankcase check</b>
<b>Water pump cover disassembly</b>	<b>Clutch check</b>
<b>Right crankcase cover disassembly</b>	<b>Driving gear check</b>
<b>Clutch disassembly</b>	<b>Overshoot and start gear check</b>
<b>Driving gear disassembly</b>	<b>Right body oil pump check</b>
<b>Overshoot and start gear disassembly</b>	<b>Gearshift check</b>
<b>Right body oil pump disassembly check</b>	<b>Duplicate gear and starting motor</b>
<b>Gearshift disassembly</b>	
<b>Duplicate gear and starting motor disassembly</b>	

**Precautions**

**Note:**

After removing right crankcase, the disassembly of clutch, oil pump and gearshift can make with engine remain.

**specification**

item	Standard mm	Service limited value mm
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clutch	Spring free length	32.3~33.3	32.3
	driving disc free thickness	2.95~3.05	2.85
	Driven disc flatness	0.1	0.14
	Clearance of outer cover and friction disc	0.1~0.3	0.6
Oil pump	Radial clearance of outer and inner rotors	0.06~0.15	----
	End clearance of rotor and plate	0.04~0.1	----

### Troubleshooting

#### Clutch

If breakdown occurs, it can adjust by adjusting clutch bar free stroke.

#### Clutch slip when speed up

1. free stroke is not enough
2. disc worn

#### Bikes moves slowly when release clutch

1. oversize free stroke
2. clutch plate curved

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3. clutch plate curved

**Clutch trouble operating**

1. burr on clutch outer cover groove

**Handlebar over pressure**

1. clutch cables stick, damage or untidy

**Shifting difficulties**

2. lifting mechanism damaged.

1. stopper plate curved or worn

2. wrong clutch adjustment

**Oil pressure is too low**

**Trip stop of gearshift gear**

1. oil pump damaged

1. stopper arm spring broken or the

2. pump driven gear broken

elasticity is not enough

**Gearshift pedal can't spring back**

**Body with high temperature**

1. Spring broken

1. water pump impeller has trouble

2. Gearshift axle and crankcase cover

**Electric start troubled**

interfered each other.

1. starting motor has trouble

**Water pump impeller disassembly**

Remove drain bolts from pump cover, then drain the water, remove cover and impeller last.



**Right crankcase disassembly**

1. Drain oil first (remove oil screens from both sides and oil screen assembly from body, until the oil drain out completely)
2. Remove connected bolt from right cover, then right crankcase cover.



**Clutch disassembly**

1. Remove pressuring spring and bolts;
2. Pressure plate, pull rod and friction disc;
3. remove locking nuts and washers.
4. remove central bush, outer cover, axle cover and washers;
5. remove clutch push lever.



**Driving, overshoot and start gears disassembly**

1. Remove driving gear locking nuts and washers.
2. Remove overshoot and start gears.



**Note:**

**When remove start gear assembly, remove washer together and keep it safe.**

**Right body pump disassembly**

1. Remove oil pump intermediate gear and oil pump assembly rings;
2. Remove intermediate gear washer, intermediate gear and oil pump assembly;
3. Remove 3 "GB/T16674-M5×18" bolts from right oil pump cover, then remove oil pump plate assembly and outer and inner rotors of oil pump.

**Note:**

**There are 2 washers on oil pump intermediate gear, the removed ring, washers and pins should be kept safe.**



**deduplicated gear disassembly**

Remove ring "GB/T894.4-15" from gear groove first, then washer, deduplicated gear last.

**Starting motor disassembly**

Remove starting motor tighten bolts, then starting motor.

**Gearshift disassembly**

1. Remove five-star plate bolts (GB/T70.1 M6×35) and five-star plate.
2. Remove gearshift arm parts.
3. Remove tighten bolts, washers and locating plate assembly.

**Right crankcase cover check**

1. Check the oil seal condition of right

crankcase cover, if it worn, replace.

**Note:**

- 1. The oil seal end face has the "TCV" mark.**
- 2. The side with mark faces out.**

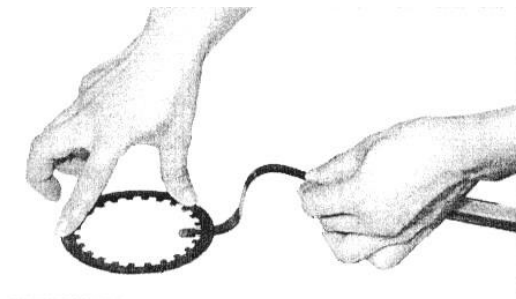
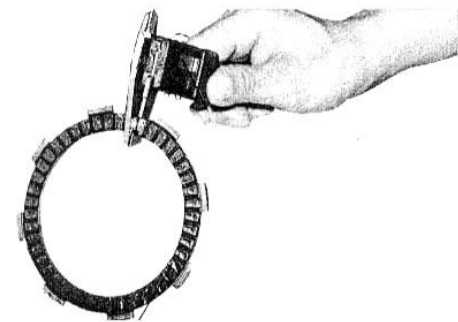
2. Check if the oil seal of starting shaft, if it worn, replace.

**Water pump shaft, impeller, water-sealed components and oil seal**

1. Check if the impeller has cranks, the inserts loosen, if so ,replace a new impeller.
2. Check water-sealed components, oil seal and pump shaft, if they're abnormal, replace.

**Note:**

- 1. Smear oil in pump shaft hole, use specific tool to install oil seal. Keep the marked side faces out;**
- 2. pressure pump water-sealed components to the 0.5mm height which lower than end face, marked side inside.**
- 3. smear lubricating grease to main water-seal opening. (lubricating grease: MYSTIK JT-6) ;**
- 4. pressure new water pump shaft to right position.;**
- 5. install ring (GB/T893.1-22) into**

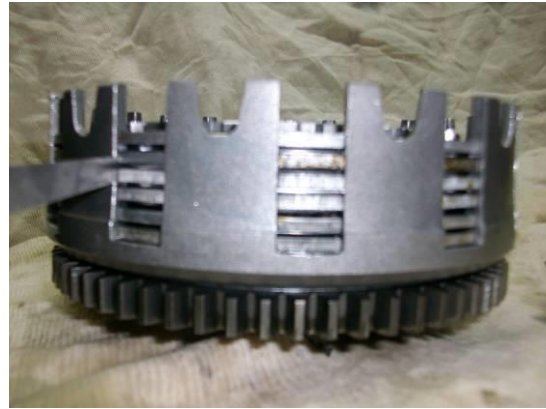




**pump shaft groove.**

**Starting shaft check**

check gears condition (if only electric start, ignore)



**Clutch spring check**

Measure free length of clutch spring

Service limited value: 32.3mm



**Clutch friction disc check**

If the friction disc got worn or faded, replace. measure the thickness for every disc.

lubricating grease: 2.85mm

Overshoot clutch  
outer cover

Overshoot  
clutch block

Check the driven disc surface with clearance gauge

Service limited value: 0.14 mm



Plate of right body oil



Outer and inner rotors

Check the clearance of clutch outer cover and friction disc.

Service limited value: 0.6 mm

**Clutch outer cover cheking**

Check if there is severe cranks on the outer cover groove, replace.

**Driving gear check**

Check if the driving gear worn or damaged severely, if so replace.

**Overshoot clutch check**

Remove the rand from clutch end face to check if the wedge block worn or damaged.

**Starting gear check**

Check the wear or damage condition of starting motor.

**Right body oil pump check**

1. Check if the outer and inner rotors worn or damage, if the condition is severely, replace the oil pump rotors assembly.
2. Check if the gap bridge gear and gear assembly broken, if so replace them.
3. Check the right body oil pump plate condition, if it worn or damaged, replace it.

**Starting motor and duplicate gear check**

Check the starting motor gear groove and duplicate gear to see if it get worn or damaged.

**Gearshift mechanism check**

Check if the wheel of locating plate worn and if it works smoothly.

**Starting shaft assembly**

Install starting shaft to shaft holes of right body. If only electric start, ignore this step.

**Duplicate gear assembly**

1. Install duplicate gear on duplicate gear shaft.
2. Put duplicate gear washer on end face of duplicate gear.
3. Install ring "GB/T894.1-15" on rand groove of duplicate gear shaft.

**Gearshift mechanism assembly**

1. Install fixed plate assembly on right body and tight it.
2. Install the five-star plate on transmission drum, note the gap faces to pin.
3. Install gear shift arm, check if it works well after installing.

**Right body oil pump assembly**

1. Put the oil pump pin into hole of oil pump shaft.
2. Install rotors assembly on right body hole, and fix the oil pump cover plate on oil pump rotors with 3 “GB/T16674-M5×18” bolts.

**Note:**

1. When install rotors, the outer and inner mark sides should in the same direction.
2. The tighten torque of oil pump cover plate is: 7~9 N.m;
3. Make sure the oil pump shaft works well.

3. Install oil pump gear assembly on oil pump, then install ring “GB/T894.1-10” on the rand groove.
4. install the bridge gear washer to bridge gear shaft, then install bridge gear on bridge gear shaft, install bridge gear washer to bridge gear, at last install ring “GB/T894.1-10” on the groove of oil pump bridge gear shaft.

**Overshoot clutch assembly**

Install the block on overshoot clutch cover.

**Starting gear and overshoot clutch installation**

1. Install the starting gear washer on right crank.
2. Install starting gear and overshoot clutch on right crank.

**Note:**

**Smear lubricating grease on inner hole of starting gear before installing.**

**Driving gear installation**

1. install driving gear on right crank.
2. put locking nut washer on driving gear.
3. smear 3-4 threads glue on locking nut, then install on right crank and tight.

**Note:**

**The tight torque of locking nut is:  
150~160N·m**

**Clutch installation**

1. Install cover washer, shaft sleeves, cover and central cover washer of clutch on main shaft.

**Note: smear lubricating grease to**

**the inner side of clutch shaft sleeve.**

2. First, install clutch central cover and locking nuts on main shaft, and smear 3-4 threads glue to tight it on main shaft.

**Note:**

**Locking nut tight torque: 80~  
90N·m**

3. First install friction disc into central cover and outer cover, then install the push lever into main shaft hole, install clutch pull lever assembly into central hole, last install push bearing and pull lever washer on push lever.

4. install clutch pressure platen, plate spring and plate bolts, then tight the bolts with torque wrench. tighten torque: 8~10N·m.

#### **starting motor installation**

smear oil on the groove and install the starting motor, tight with two "GB/T16674-M6×25" bolts, the tighten torque is: 11~13N·m.

#### **right crankcase installation**

1. remove the gasket from right crank case and install a new gasket, install the crankcase cover, then tight with ten "GB/T16674-M6×30" bolts, tighten



torque: 11~13N·m

2. install the water pump impeller on water pump shaft, tighten torque: 2~4N·m.

3. install upper cover gasket of water pump first, then install cover, tight with three "GB/T16674-M6×35" bolts and one "GB/T16674-M6×20".

**Magneto, balance driving gear and driven gear**

Precautions
Balance driving gear and driven gear disassembly and check
Left crankcase disassembly
Balance driving gear and driven gear assembly
Magneto stator and rotor disassembly
Magneto stator and rotor assembly
Magneto stator and rotor check
Left crankcase disassembly

**Precautions**

When disassembly magneto, balance driving gear and driven gear, just remove left crankcase cover is enough.

For the magneto check, please refer to the chapter of battery charge.

<p><b>left crankcase disassembly</b></p> <p>remove the fastening bolt from left crankcase, then remove left crankcase cover.;</p>	
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**magneto stator disassembly**

1. remove two "GB/T818-M5×10 (color-zinc) ML35-HIPER" fastening bolts.
2. remove two "GB/T70.1-M5×30" fastening bolts from stator coil, then remove stator assembly.



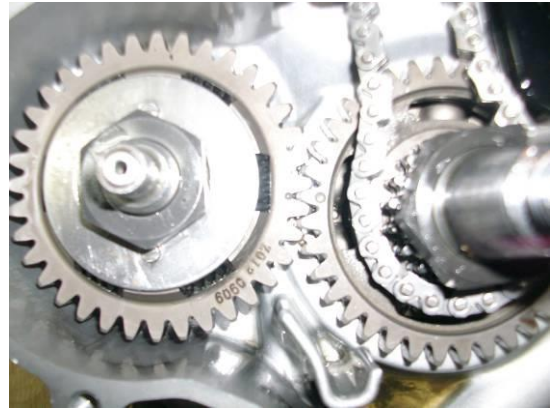
**magneto rotor disassembly**

remove rotor locking nut, then remove rotor with special tools.



**note:**

1. use special tool to remove magneto rotor, do not knock it.
2. if the rotor gets dropped or knocked, replace it.



**Balance driving gear and driven gear disassembly**

1. remove timing chain and chain tensing plate, then remove nuts and washer.
2. remove crankshaft timing chain and balance driving gear.
3. remove balance driven locking nut and "CB125" clutch washer.
4. remove driven gear, crankshaft sleeve and balance shaft flat key.



**left body oil pump disassembly**

1. remove three "GB/T16674-M5×1.0" bolts from cover;
2. remove oil pump cover and rotors assembly, keep pump pin safety.

**left crankcase cover check**

check the oil seal condition of left crankcase cover, if it damaged, replace.

**magneto stator and rotor check**

1. check if rotor magnetic tile worn or cranked, if so replace.
2. if the rotor worn or damaged, replace.

**balance driving gear and driven gear check**

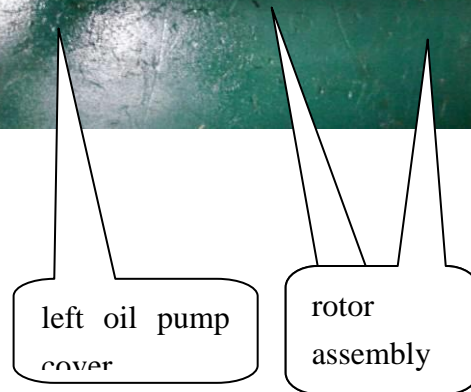
check if it worn or damage.

**left oil pump check**

1. check if the rotor assembly is worn or damaged.
2. check if the pump cover is worn or damaged. is worn or damaged.

**left oil pump installation**

1. install left oil pump into specific holes.
2. tight pump left cover with three"GB/T16674-M5×1 0" bolts.



note:

- 1.when install oil pump rotor, the marked sides should in same direction.
- 2.tighten torque of left body oil pump cover bolt: 7~9N·m;
- 3.check if the oil pump shaft is smoothly after installation.

**balance driving gear and driven gear installation**

1. install crankshaft sleeve on balance shaft, then install the flat key "4×4×13" into groove, install driven gear on balance shaft last.
2. install balance driving gear on left crank, then install timing chain on left crank.

**note:**

**make** sure driving gear and driven gear which with timing marks are mutual engagement.

3. install balance driving gear washer and "CB125" clutch washer on timing chain and driven gear. smear glue on locking nut "M24×1-M16×1", then install it on crankshaft and balance shaft.

note:

tighten torque: 80~90N·m。

**Magneto rotor installation**

install magneto rotor on left crank, then smear glue on “IB175-FC” magneto nut for 3-4 threads, install it on left crank.

Note:

locking nut tighten torque: 85-90N·m。

**magneto stator installation**

tight the stators on left crankcase with two “GB/T818 M5×10” and “GB/T70.1” -M5×30” bolts, tighten torque: 7~9N·m。

**left crankcase installation**

1. replace new gaskets.
2. install left crankcase, then tight with eight “GB/T16674-M6×35” bolts, tighten torque: 11~13 N·m

**crankcase, crankshaft, variable transmission and balance shaft**

<b>precautions disassembly</b>	<b>pedal starting device</b>
<b>Troubleshooting gear check</b>	<b>starter shaft transmission</b>
<b>crankcase disassembly crankshaft disassembly</b>	<b>starter shaft check starter shaft assembly</b>
<b>crankshaft check</b>	<b>install starter shaft</b>
<b>gearbox disassembly installation</b>	<b>variable speed and gear</b>
<b>gearshift fork, fork shaft and variable speed drum check.</b>	
<b>crankcase installation</b>	

**precautions**

Separate crankcase first.

**Work before separating crankcase**

Cylinder head disassembly

Cylinder and piston disassembly

Clutch, oil pump, gearshift mechanism, balance gear and magneto disassembly

**specification**

Item	Standard mm	Service limited
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## ZHEJIANG KAYO MOTOR CO., LTD.

			value mm
fork	right fork inner diameter / left fork inner diameter  (counter shaft)	$\phi 14.016 \sim \phi 14.043$	$\phi 14.045$
	fork inner diameter (main shaft)	$\phi 12.016 \sim \phi 12.043$	$\phi 12.045$
	claw thickness	4.8~4.9	4.8
fork shaft	fork shaft outer diameter (main shaft)	$\phi 11.973 \sim \phi 12$	$\phi 11.95$
	fork shaft outer diameter (counter shaft)	$\phi 13.973 \sim \phi 14$	$\phi 13.95$
	cylindricity	0.006	----
crankshaft	inner diameter of connecting rod small head	$\phi 16.015 \sim \phi 16.025$	$\phi 16.04$
	gap of connecting rod big end.	axial	0.15~0.4
		radial	0.008~0.016
balance shaft	Shaft diameter	$\phi 19.98 \sim \phi 19.993$	$\phi 19.96$

### Troubleshooting

#### difficulty shifting

- 1.fork bend
- 2.fork shaft bend

#### crankshaft noise

- 1.connecting rod big end bearing worn
- 2.connecting rod bend

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3. crankshaft bearing worn

**transmission skip**

1.gearshift gear claw worn

2.fork bend or worn

3.fork shaft bend

**gearshift gear noise**

1.gearshift gear worn

2.spline shaft worn

<p><b>crankcase disassembly</b></p> <p>1.put up left crankcase.</p> <p>2.remove eight “GB/T16674-M6 × 65” and five “GB/T16674-M6 × 45” tighten bolts, separate two crankcases, remove two locating pins.</p> <p><b>crankshaft/balance shaft/main shaft and counter shaft disassembly</b></p> <p>remove crankshafts assembly, balance shaft , fork shaft, fork, variable speed drum, main shaft and counter shaft</p>	
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assembly.

**note:**

**when** remove main shaft and counter shaft assembly **make** sure all the parts are removed.

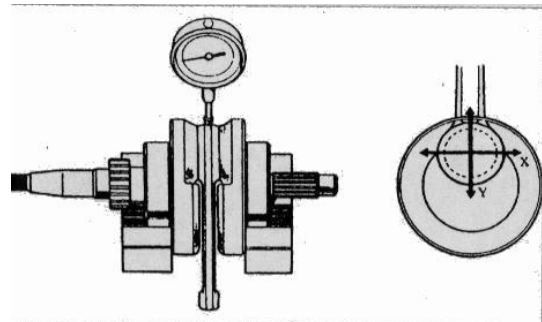
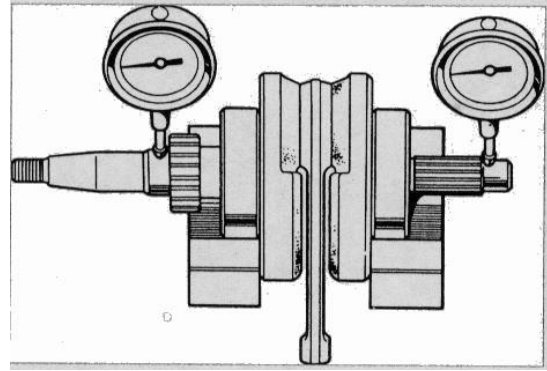
**crankshaft check**

put crankshaft on V type iron.

measure crankshaft radial clearance by dial indicator.

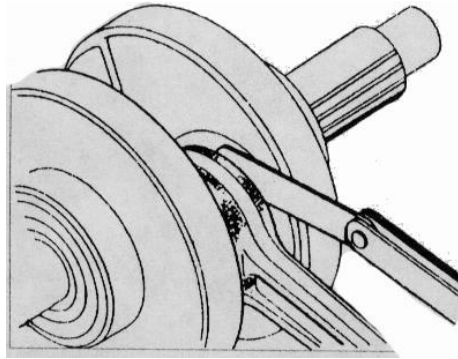
the radial clearance value should be half of TIR.

service limited value: 0.1 mm



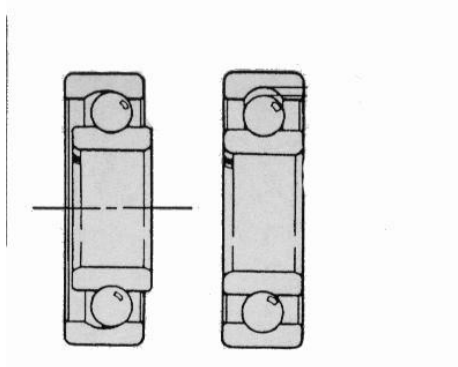
measure the radial clearance of X and Y on connecting rod big end.

service limited value: 0.02 mm



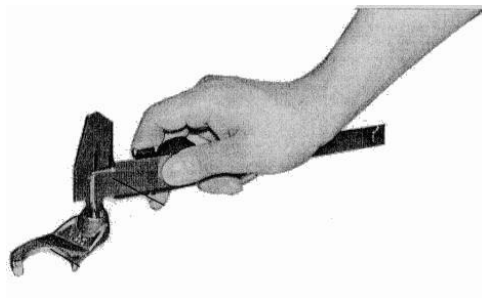
Measure the big end of the connecting rod with a thick gauge.

service limited value: 0.7 mm



**left and right crankcase bearings check**

1. if the bearing doesn't work smoothly, replace it.
2. Remove the crankshaft bearings of the left and right crankcase and check their trial and end jumps. If noise or jumps are found, replace new crankshaft bearings.



**gearshift fork/fork shaft/variable speed drum check**

check if the condition of fork, measure inner diameter.

main shaft service limited value:  $\phi$  12.45 mm

counter shaft service limited value:  $\phi$  14.45 mm

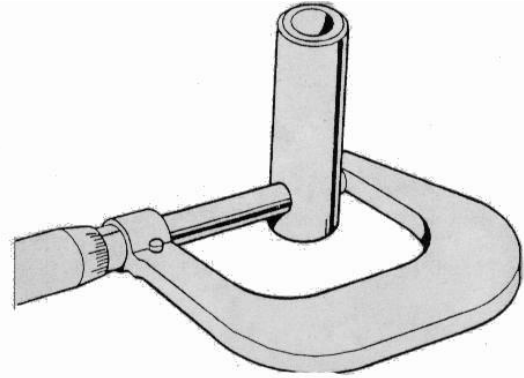
check the condition of main shaft and counter shaft fork, measure outer diameter.

main shaft fork service limited value:

$\phi$  11.95 mm

counter shaft fork service limited value:

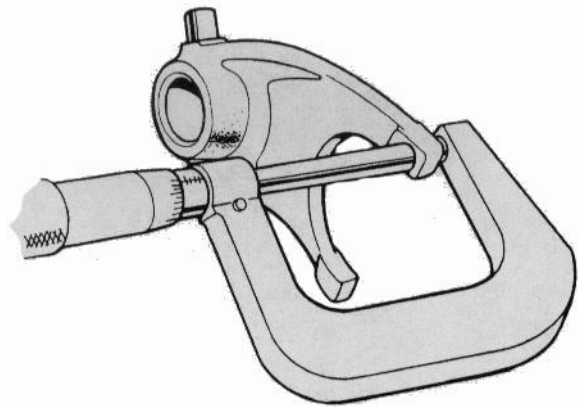
$\phi$  13.95 mm



Measure fork claw thickness

Service limited value: 4.7 mm

Check the transmission drum surface and groove to see it is damaged or worn.



Main vice shaft check

Check all gears and clamps condition, if there is damaged, deformed or fall off.



**oil filter components & oil filter screen check**

1. check the condition of oil filter and

## ZHEJIANG KAYO MOTOR CO., LTD.

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filter screen, if it not clean, wash with oil.

2. Check if any of two parts worn, if there is, replace it.



**Transmission / crankshaft / balance shaft assembly**

- 1.install crankshaft and balance shaft into the specific holes of left body.
- 2.install main shaft and counter shaft into specific left body holes, then install fork to right position.

**Note:**

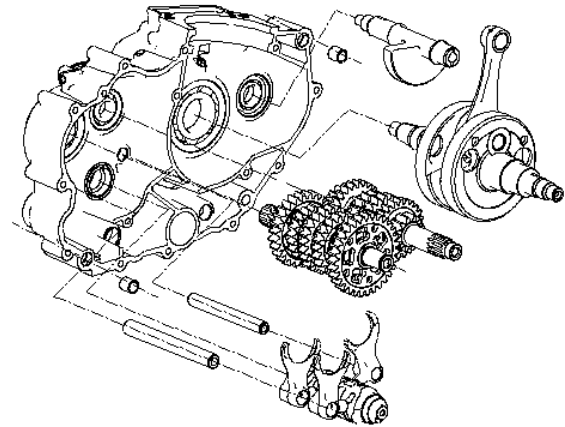
- 1.install the fork side marked"--R" on the counter shaft near right body.
- 2.the side marked"--L" on the counter shaft near left body.
- 3.the side marked"--C" on main shaft.

- 3.first install variable speed drum into the left body holes, second install the other side of fork into variable speed drum groove, last install fork shaft into fork.

**note:**

**the** longer shaft is for forks marked"--R" and "--L", the shorter shaft is for "--C" mark.

**moulding box and oil filter screen assembly**



Closed mouth of oil filter



1. Apply a layer of sealant evenly on the right crankcase, attach the locating pin to the corresponding hole in the left crankcase, and then join the right box to the left box. install five "GB/T16674-M6×45" and eight "GB/T16674-M6×65" into left crankcase holes and tight. tighten torque: 11~13 N·m.

2. install oil filter parts to the specific body holes.

Note::

Oil filter opening side faces to left body.

install the filter cap to two-head bolts, then tight with two "GB/T6177.1-M5" nuts, tighten torque: 7~9 N·m.

3. Install the oil filter screen assembly into the specific holes of left and right bodies, then tight with filter screen cap, tighten torque: 11~13 N·m.



Opening of oil filter, faces left tank

## Electrical schematic diagram

