

KAYO MOTO

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KMB60

SERVICE MANUAL 2021



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PREFACE

Thank you for choosing Kayo KMB pit motorcycle. We believe you and your child will enjoy your riding.

We recommend you read the owner's manual before riding and maintenance based on the process requirements. It's a good way to keep your motorcycle in good condition. Here we list maintenance schedule and instructions for both required servicing and specific tasks.

If you have any queries, please visit our website at www.kayomoto.com.

All contents in this manual are subject to improve and update without notice. Maintenance is based on actual condition.

Zhejiang Kayo Motor., Ltd
R&D Department
07/2021

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Symbols and Technical Terms

***** Requires professional operation. If you can't handle it on your own, please send motorcycle to maintenance shop or consult Kayo after-sales service.

→ Page reference (more information is provided on the specified page).

Danger /Warning / Caution

You will find safety messages preceded by three signal words, please read them carefully.

These signals words mean:

Danger Make sure you follow the instructions or you will be killed or seriously hurt.

Warning Make sure you follow the instructions or you can be killed or seriously hurt.

Caution Follow the instructions or you can be hurt.

We provide maintenance procedures and information on labels and in owner's manual, it alerts you some potential hazards, but it's not possible to list all associated hazards all. You should have your own judgment, if you can't finish it seek for professional help.

General Safety

This model is designed for younger riders. We suggest parents and youngsters read this manual carefully.

Wear a Helmet

Helmets can reduce the number and severity of head injuries significantly while riding. We urge you always wear property safety gear such as helmets, gloves, boots.

Single-seat Off-road motorcycle

This motorcycle is for off-road use only. It is designed for one person, there are no handholds, footrests or seat for a second person, so never carry a passenger. A passenger will lead to accident.

Accessories & Modifications

Modifying your motorcycle or using non-Kayo accessories may make your motorcycle unsafe. We recommend you use Kayo accessories, these parts were all designed and tested for your model. We also suggest you not to remove any original parts from the motorcycle also not to modify it.

We are not responsible for accidents which caused by above behaviors.

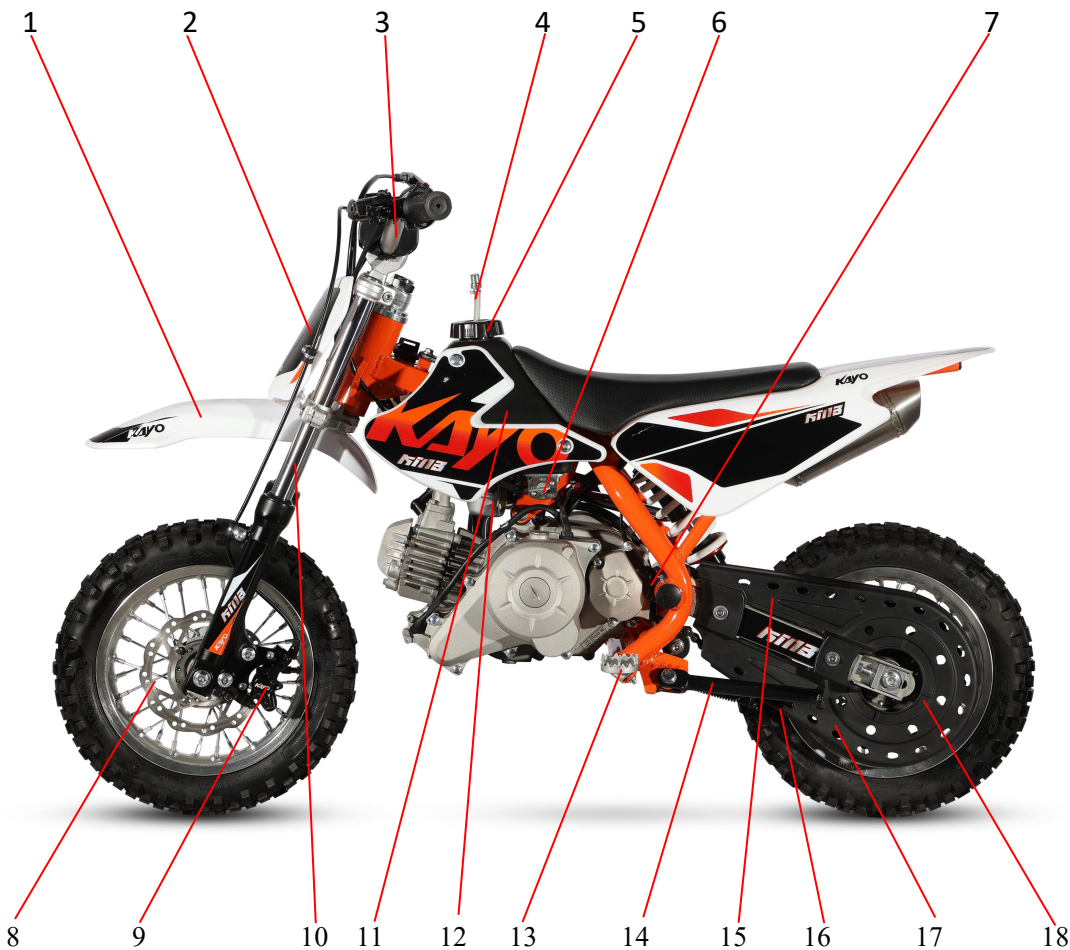
motorcycle in Good Condition

Inspect your motorcycle and perform maintenance before and after riding, it's important for your riding.

Caution hot

When you're riding, engine and exhaust pipe are in high temperature, don't touch it or you will be scalded. Do not wear shorts when riding.

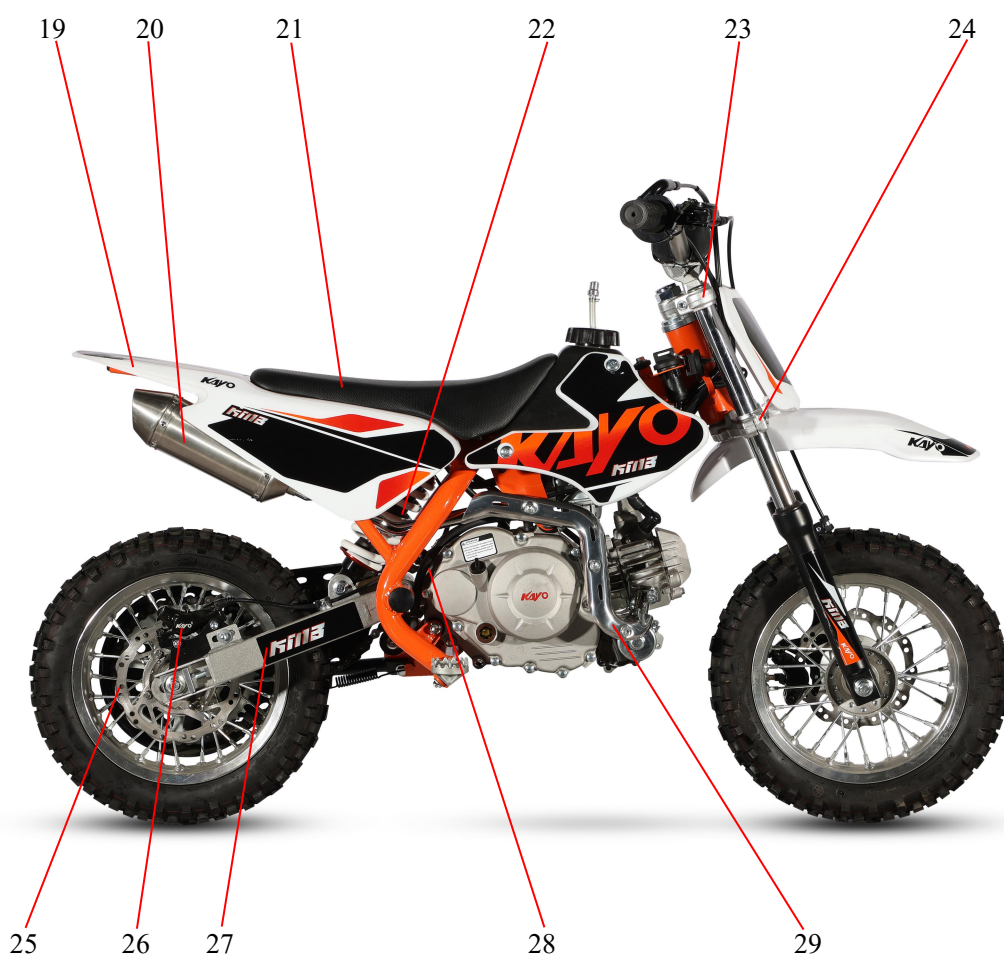
Component Locations



No.	Item	No.	Item
1	Front fender	10	Front shock
2	Front panel	11	Fuel tank
3	Handle bar	12	Carburetor
4	Breather pipe	13	Footrest

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5	Fuel tank cap	14	Side stand
6	Fuel tank tap	15	Chain cover
7	Chain slider	16	Chain
8	Front brake disc	17	Chain cover
9	Front brake caliper	18	Rear sprocket

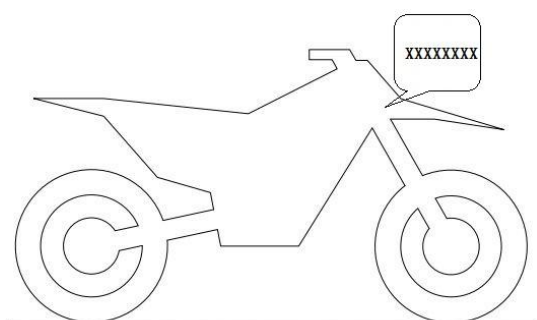


No.	Item	No.	Item
19	Rear fender	25	Rear brake disc
20	Muffler	26	Rear brake caliper
21	seat	27	Swing arm
22	Rear shock	28	Spark plug
23	Upper raiser	29	Exhaust pipe

24	Lower raiser		
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Serial Number

Chassis Number



Chassis number is engraved on the top of frame.

Engine number



Engine number is on the rear left of engine crankcase.

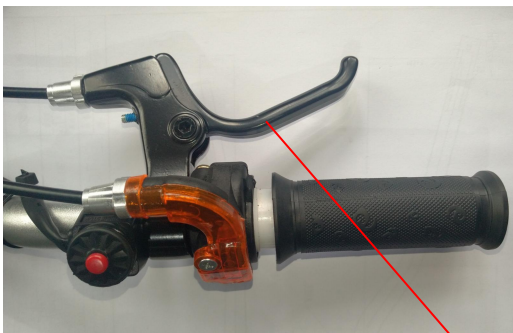
General Parameters

motorcycle	
L*W*H (mm)	1250×600×810
wheelbase (mm)	870
Dry weight (kg)	42
Tyre size	F 2.50-10; R 2.50-10
Seat height (mm)	550
Ground clearance (mm)	160
Fuel tank capacity (L)	2.5
Engine	
Type	Single-cylinder, 4-stroke, Air cooling, Full-auto
Displacement	56.8cc
Max. Power (kw/r/min)	1.6/7000
Max. Torque (N•m/r/min)	2.7/4000
Compression Ratio	8.5:1
Shift type	Constantly meshing two stage transmission stepless transmission
Starting	Electric
Ignition	CDI
Battery	12v/1.6Ah
Chain	#420H; 10T/45T

Frame/shock/Brake/Wheel	
Frame	Steel
Front shock	L=540mm, non-adjustable
Rear shock	L=245mm, non-adjustable
Swing arm	Steel
Handlebar	Alloy
Rim	F 1.40×10, R 1.40×10; Alloy
Front brake	Hydraulic, disc Φ160mm
Rear brake	Hydraulic, disc Φ160mm
Other part	
Air filter	Sponge

Operating Controls

Front brake



Front brake lever

The front brake lever is used to slow or stop the motorcycle. Pull the lever to operate.



Front brake caliper

Adopts caliper disk brake, fixed with 2 bolts.

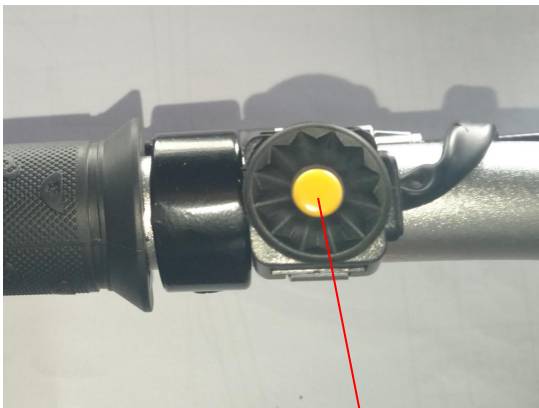
Throttle



Throttle

The throttle controls speed. To speed up, rotate the grip toward you. To slow down, rotate the grip away from you. The throttle will automatically return to the closed position when you remove your handle.

Ignition



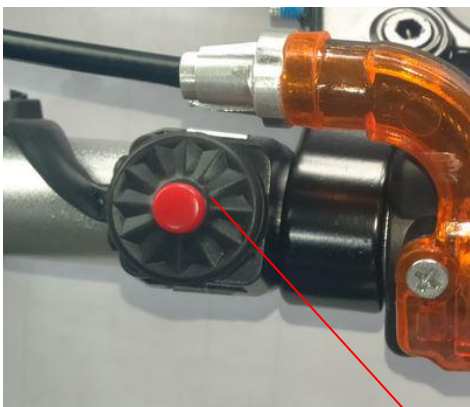
Ignition switch

Long press ignition switch (yellow) to start the motorcycle.

Note: Pull the brake lever while starting motorcycle to avoid engine start with gear.

Make sure there's fuel in tank. Turning fuel tap ON before starting the engine.

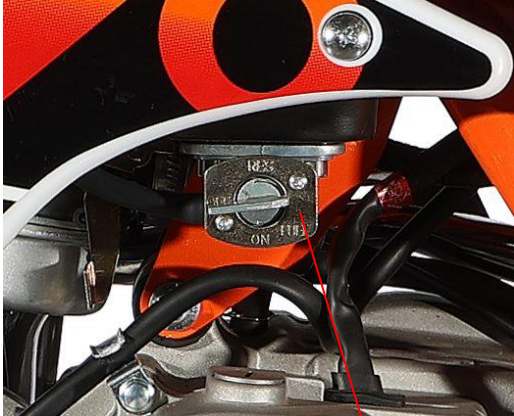
Stop



Long press stop switch (red) to turn the engine off and stop the motorcycle.

Stop switch

Fuel tap



Fuel tap

Fuel tap is under the left side of fuel tank.

The tap is used to control the flow of fuel from tank to carburetor.

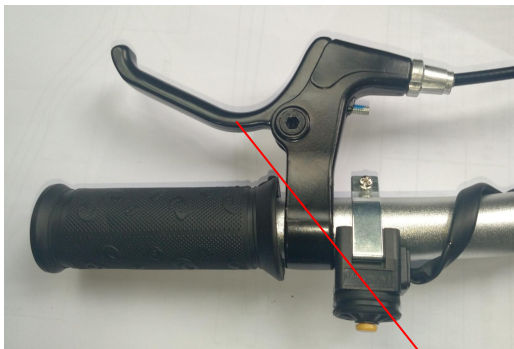
ON

Turning the fuel tap ON before starting engine allows the fuel to flow from tank to carburetor.

OFF

Turning the fuel tap OFF after stopping engine prevents the fuel flow from tank to carburetor.

Rear brake



Brake lever

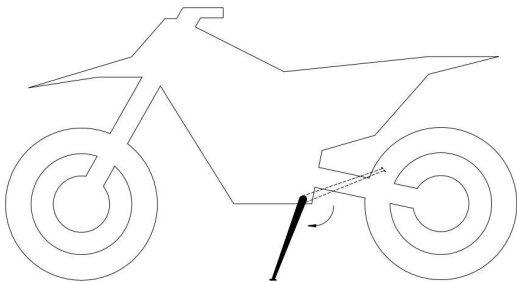
The rear brake is used to slow or stop your motorcycle. To operate, pull the brake lever.



Rear brake caliper

Adopts caliper disc brake, fixed by brake bracket.

Side stand



The side stand is used to support your motorcycle while parked. To operate, use your foot to lower the stand. Before riding, raise the stand.

Preparation before Riding

Advice to Beginners

1. Before ride, read this owner's manual especially "Operating Controls" and "Riding Instructions".
2. Running-in before riding.
3. If there's parts problems during riding, please see this manual or ask Kayo dealers for help.
4. Clean the motorcycle after each riding, then inspect your motorcycle for leaks or damage.
5. Avoid riding in bad weather such as during heavy snow and rains.
6. We are not responsible for motorcycles problems which cause by malicious act.

Running in

Running in is an important phrase of your preparation work before using motorcycle. Good running-in can ensure great engine performance.

Running-in phrase

Maximum engine performance	
0-2.5h	50%~75%, long time at one speed and rapidly accelerate is forbidden,
2.5-4h	50%~75%, full throttle is allowed but not exceed 5-10s. Let the engine cool out for 5-10min after each working hour.
4-5h	75%~100%
>5h	50~60km/h

Danger Reckless acceleration will damage engine and cause accident.

Riding Instructions

Pre-ride Inspection

1. Check the level and add fuel if needed, make sure the fuel fill cap is securely fastened.
2. Squeeze the front brake lever to check that the controls operate normally. Adjust freeplay, if necessary.
3. Squeeze the rear brake lever to check that the controls operate normally. Adjust freeplay, if necessary.
4. Check the front brake caliper disc.
5. Check the rear brake caliper disc.
6. Check the brake system.

7. Check the chain.
8. Check the rear sprocket, engine sprocket and drive chain.
9. Check the chain adjuster.
10. Check the tire surface.
11. Check tire pressure.
12. Check the battery power.
13. Check the front brake disc thickness.
14. Check the rear brake disc thickness.
15. Check the fasteners torque.
16. Check the engine gears.
17. Check the plastics.
18. Check the fuel tank tap.
19. Wear complete protective apparel.

Starting Procedure

- 1、 Turn the fuel tap to ON position.
- 2、 Pull the brake lever with right hand.
- 3、 Long press ignition switch (yellow).
- 4、 The engine starts to work.

Starting Cautions

- 1、 Before riding, check the motorcycle and wear complete protective apparel.
- 2、 When start the speed should not be too fast.
- 3、 When start use first gear.

Turning cautions

- 1、 Slow down your motorcycle before turning.
- 2、 When turning, lower your center of gravity to avoid rollover.
- 3、 No gears shifting while turning.

Acceleration Cautions

- 1、 Do not accelerate on curves.
- 2、 After accelerating, shift gears in time.

Braking Cautions

- 1、 Brake should be based on the foot brake, hand brake is auxiliary.
- 2、 check the brake fluid frequently.
- 3、 add proper brake fluid in time.

Parking Cautions

- 1、 Before stopping, slow down to avoid emergency braking.
- 2、 Lower the side stand to support your motorcycle.
- 3、 To stop motorcycle, shift into neutral before parking.

Maintenance Schedule

	Every 1 hour	Every 10 hours/After every race	Every 20 hours	Every 30 hours
Battery	•	•	•	•
Front brake pad	•	•	•	•
Rear brake pad	•	•	•	•

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Brake disc		●	●	●
Brake hose		●	●	●
Rear brake lever freeplay		●	●	●
Frame		●	●	●
Top of shock		●	●	●
shock connecting rod		●	●	●
Tire surface	○	●	●	●
Tire pressure	○	●	●	●
Hub bearing		●	●	●
Hub		●	●	●
Rim runout	○	●	●	●
Spoke tension	○	●	●	●
Chain, rear sprocket, drive sprocket, chain slider and chain cover		●	●	●
Chain tension	○	●	●	●
Lubricate all moving parts (chain, levers etc.), check if they work smoothly.		●	●	●
Check front brake lever freeplay		●	●	●
Check steering head bearing	○	●	●	●
Valve clearance	○			●
Replace gear oil	○	●	●	●
Check all hoses and casing pipes	○	●	●	●
Main cable		●	●	●
Sponge and housing of air filter		●	●	●
Check screws and nuts	○	●	●	●
Replace air filter				●
Check carburetor idle	○	●	●	●
Whole motorcycle inspection and test	○	●	●	●

○ One-time interval

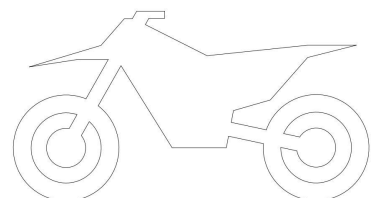
● Periodic interval

Attention This table is for reference only. Maintenance schedule should based on working environment.

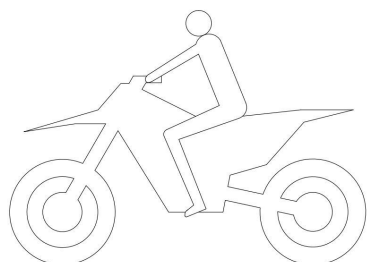
Warning As for engine parts service, we recommend you consult KAYO dealer.

Suspension System

Checking the basic chassis setting with the rider's weight.



For optimal motorcycle riding characteristics and to avoid damage to swing arm, shock, rocker arm and frame, the basic settings of the suspension system must match the rider's weight.

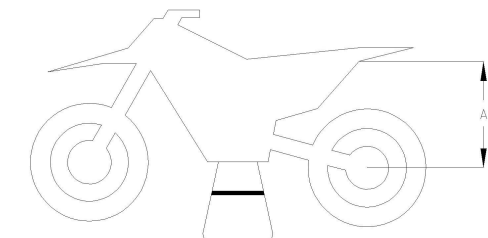


As delivered, KMB is adjusted for an average rider's weight.

Standard rider weight	15~30kg
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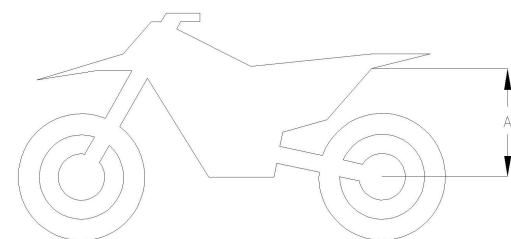
If the rider's weight is above or below this range, the basic setting of the suspension system must be adjusted according.

Measuring rear wheel sag suspended



1. Raise the motorcycle with a lift stand
2. Measure the vertical distance between rear axle and fixed point on rear mud plate. Record the value as "A1".
3. Remove motorcycle from the lift stand.

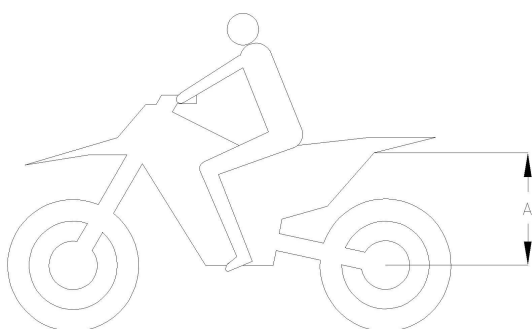
Measuring rear wheel sag unloaded



1. Hold the motorcycle upright, measure the distance between the rear axle and fixed point again, mark the value as "A2".
2. Note down the difference between "A1" and "A2" as "D1".

	D1
KMB difference	8~23mm

Measuring the riding sag



1. With another person holding the motorcycle vertical, the rider sits on the seat in a normal normal sitting position.
2. Measure the distance between rear axle and the fixed point, mark the value as “A3”.
3. Calculate the difference between “A1” and “A2” as “D2”.

	D2
KMB difference	30~56mm

If “D2” is differ from specific measurement, adjust the spring preload or change bigger spring.

Adjusting the spring preload of rear shock

Adjustable lock blade



Move the lock blade down, the spring preload increases, move the lock blade upwards, spring preload decreases.

Checking the front shock

procedure

1. Holding the motorcycle vertical on the ground.
2. Holing the handlebar in both hands and press down the front brake.
3. Checking the rebound damping.

Adjusting handlebar

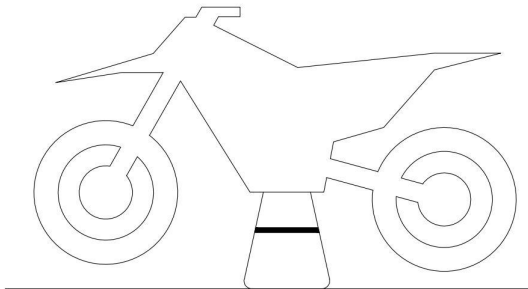


procedure

1. Remove the pad and cover.
2. Loosen the screws on clamp.
3. Adjust the handlebar to required position.
4. Tighten the screws.

Service Work

Raising your motorcycle



Raise your motorcycle firmly with a lift stand.

Front brake removal



Removal, Installation

1. Remove the brake bolt.
2. Remove the pipe clamp.
3. Remove the brake lever.
4. Remove the front panel clip.
5. Remove front brake.
6. Installation is in the reverse order of removal.

Front shock removal



Removal, Installation

1. Remove front brake.
2. Remove front wheel.
3. Remove the two bolts on front shock clamp.
4. Remove the front shock.
5. Installation is in the reverse order of removal.

Removing triple clamp



Removal, Installation

1. Remove the front shocks.
2. Remove the locking nuts from steering column.
3. Remove the upper triple clamps.
4. Remove the adjusting nuts from steering column.
5. Remove the lower triple clamps.
6. Take out the steering column.
7. Installation is in the reverse order of removal.

Checking condition of steering head

1. Raise the motorcycle with a lift stand.
2. Move the handlebar to and fro to check if it works smoothly.
3. If it's hard to move it, remove the triple clamps and check the steering head bearing.

Greasing the steering head bearing



Greasing the steering head bearing with lithium base grease before installation.

Dismounting and installing the front fender



1. Remove screws.
2. Remove the front fender.
3. Installation is in the reverse order of removal.

Removing and installing the rear shock



Check if there's any damage on rear shock before removing.

1. Remove the screws which connect the shock and frame.
2. Remove the screws of shock and swing arm.
3. Take the rear shock out.
4. Installation is in the reverse order of removal.

Removing the seat



1. Remove the rear screws on the seat.
2. Remove the screw between seat and fuel tank.
3. Remove screw connect the seat and plastic.
4. Installation is in the reverse order of removal.

Removing the air filter



1. Release the fixed hoop.
2. Take out the air filter.
3. Installation is in the reverse order of removal.

Cleaning and maintenance the air filter

Make inspection before maintenance. Contents as bellows:

1. Check if there is crack on the filter surface.
2. Check the sponge.
3. Check the flame screen.
4. Check if the air filter box stick well to sponge.

Replace worn parts. Maintenance as below:

1. Wash the filter hose and make it dry in open air.
2. Clean the dust from sponge and soak the surface with filter oil. If it hard to clean the sponge, replace it.
3. Clean the flame screen with fuel and make it dry in open air.
4. Wash the filter housing with water and make it dry in open air.

Removing the exhaust pipe



1. Remove muffler.
2. Remove bolts from exhaust pipe.
3. Remove the spring from exhaust pipe.
4. Remove nut between engine and exhaust pipe.
5. Remove exhaust pipe.
6. Installation is in the reverse order of removal.

Removing the muffler



If the exhaust pipe rusts or get broken, replace it.
High noisy or bad engine performance, replace it.
About muffler cleaning, please consult to KAYO dealers.

Removing procedures:

1. Removing mounting bolts of muffler.
2. Removing muffler fixing bolts.
3. Loose the buckle between muffler and exhaust pipe.
4. Pull out the muffler.
5. Replace muffler and and install fasteners parts.

Removing the fuel tank

1. Remove the seat.
2. Remove the rear fixing bolts from fuel tank.
3. Remove the front mounting bolts from fuel tank.
4. Remove fuel tank from frame.
5. Installation is in the reverse order of removal.

Checking and cleaning the chain



Checking chain:

1. Check if the chain in right position from the rear of the motorcycle.
2. Turn the rear wheel with hand and check if the chain works smoothly.
3. Check the chain for dirt accumulation.

Cleaning the chain:

Clean the chain with special cleaning agent and let it dry in open air, dispose anti-rust oil on chain surface.

Removing the chain



1. Remove spring washer from the chain.
2. Remove the active section.
3. Pull the chain out from the bottom of sprocket.
4. Installation is in the reverse order of removal.

Checking the chain tension

1. Raise the motorcycle with a lift stand, leave the rear wheel in air.
2. Measure the distance between the back of swing arm and chain, normal distance in 30-40mm region.
3. Loose the rear axle nut.
4. Find out the max tension position in normal distance.
5. Adjust chain tensioner nuts, make sure both swing arm ends are aligned.
6. Tighten tensioner nut.
7. Tighten rear axle nut.
8. Check the maximum Tension point, if necessary readjust it.

if the chain is tensioned too much or more than 2% , replace the chain, better to replace sprocket and chain guide together. Because of other wearing parts will reduce the working time of new chain.

if replace wearing parts, it is recommend to use KAYO original parts.

Lubricate chain regularly. Refer to lubrication section.

Note: Alternate dry and wet working conditions will greatly shorten the service life of the chain and related parts. Please choose appropriate lubricant for lubrication.

Note: if the chain needs tension frequently and there is no wear on sprockets and chain, contact KAYO dealer and make a inspection.

Checking the rear sprocket, engine sprocket and chain guide

Chain guide slider



Replace chain guide slider and cover, if they're in sever wear condition.



Chain guide roller

chain guide cover

Checking the frame

1. Check the painting layer of frame surface.
2. Check the if the frame has deformation.
3. Check the if the frame has cracks.

Checking the swingarm



1. Check if there is crack on swingarm.
2. Check if the swingarm has deformation.
3. Check the painting layer of swingarm.

Checking the throttle cable



1. Turn throttle grip then loose it. Check if the throttle grip can turn back easily.
2. Start the motorcycle and turn the motorcycle head, if the power changes, please adjust throttle cable.

Checking the handlebar

Ride on the motorcycle and put your hands on handlebar, check if it easy to operate.

Check and Maintain the Brake System

Checking the free play of brake lever



Put your right hand on grip, pull the lever with your index and middle fingers.

Push the lever then let go, check the resistance at same time. If the process feel loosen, it maybe caused by air in oil pump or oil pipe. Check the whole brake system and adjust it.

Checking the brake discs



disc

1. Check the discs surfaces, if it gets cracked or depressed, replace it.
2. Measure the disc thickness. If the disc thickness is less than the specified value. Change new disc.

Thickness limitation

	Front disc	Rear disc
KMB	3.0mm	3.0mm

Checking the play of brake lever



Pull the lever, if the distance to grip is less than 5mm, adjust the play.

Checking the front braking pad

Checking the thickness of braking pad. The minimum thickness



Front braking pad

is 1mm, if the thickness is less than 1mm, change new pad.

Note: brake pad should be replaced in completely set. Better to consult KAYO dealer.

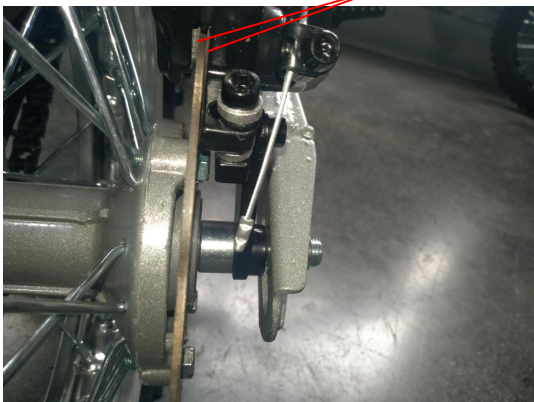
Checking the play of foot brake pad



Pull the lever, if the distance to grip is less than 5mm, adjust the play.

Checking the rear brake pad

Brake pad



Checking the thickness of braking pad. The minimum thickness is 1mm, if the thickness is less than 1mm, change new pad.

Note: if brake system severely worn out, change parts. Better to consult KAYO dealer.

Check and maintain the wheels

Removing the front wheel



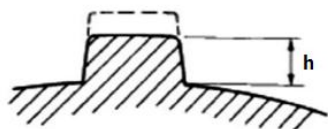
1. Raise the motorcycle with a lift stand.
2. Loose the locking nut from wheel spindle.
3. Holding the front wheel, withdraw the wheel spindle.
4. Remove the front wheel.
5. Installation is in the reverse order of removal.

Removing the rear wheel



1. Raise the motorcycle with a lift stand.
2. Remove the chain.
3. Loose the locking nut from wheel spindle.
4. Holding the rear wheel, withdraw the wheel spindle.
5. Remove the front wheel.
6. Installation is in the reverse order of removal.

Checking the tyre condition

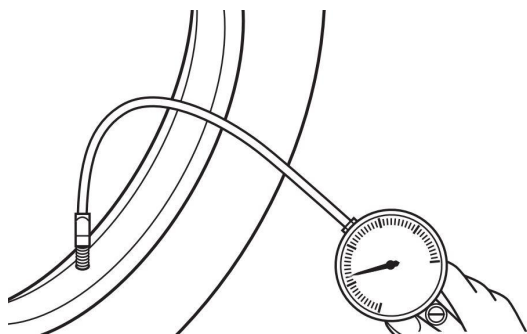


1. Check the tyre for cuts, run-in objects or other damages, if it has replace it.
2. The minimum tread depth is 3mm, if the depth less than 3mm, change the trye.

Checking tyre air pressure

Use pressure gauge to check air pressure.Recommend tyre air pressure:

	Front wheel	Rear wheel
--	-------------	------------



KMB	250kPa	250kPa
-----	--------	--------

Note: check tyre air pressure, when tyre is colk.

Checking rim spoke



Check spoke tension regularly, if the tension is too low correct spoke tension.

Installing Engine

1. Hang the engine in the motorcycle frame.
2. Install the carburetor on air inlet pipe, then fasten with bolts and nuts.
3. Install throttle cable and air filter, seal the connectors. Install clutch cable.
4. Install transmission chain.
5. Install the sprocket cover and fasten with bolts.
6. Install muffler. The torque to M8 nuts and muffler seal should be 25-30N*m.

Service and Adjust Work on Engine

Checking the bolts and nuts of cylinder head and cylinder

Check bolts and nuts for first 1000km and per 5000km. Tight the bolts and nuts with wrench at certain torque when engine is cooled.

Torque	M8	28~32N.m
	M6	10~15N.m

Checking the valve clearance

Check valve clearance for first 1000km and per 5000km. Excessive clearance will cause valve noise and too small clearance will reduce the engine power and damage valve. Check the valve clearance as request, adjust procedures as below:

1. Remove the valve cover.
2. Withdraw the plugs on front left cover, use a 14mm socket spanner to rotate the magneto rotor until the rotor mark line aligns with the timing hole of front left cover.
3. Insert the feeler gauge between valve rod end and rocker's bolt, the distance should be 0.03-0.5mm.
4. If the clearance is beyond the limits, adjust it with specified tools.
5. Reinstall valve cover and plugs.

Note: make sure the engine is cooled before checking.

Checking the compression pressure

Check for first 1000km and per 5000km.
Idle the engine and warm it up.

Screw off the spark plug.

Put the pressure gauge and connector into spark plug hole firmly.

Turn the grip to full throttle.

Use the motor to start engine for several times, mark the biggest pressure value.

standard	1200~1250Pa
limits	1100Pa

Low pressure causes:

1. Worn-out cylinder.
2. Piston or piston ring wear.
3. Piston ring is stuck in the ring slot. Bad connection between valve and valve seat.
4. Worn-out cylinder seal. If the pressure is lower than limits, check and reinstall the engine.

Note: fasten the cylinder head bolts and nuts on certain torque and adjust the valve clearance correctly before testing engine pressure.

Tuning the Engine

Adjusting the idle speed of carburetor



Good idle setting of carburetor is important to start engine. Adjusting procedures see below:

1. Turn the air adjusting screw clockwise until speed reach to the maximum value, then turn screw slowly counterclockwise by one and a quarter turn.
2. Adjust throttle screw to make sure the engine can work with a speed when the throttle is fully release.
3. Make the engine speed as low as possible by adjusting the throttle screw.
4. Make the engine speed as high as possible by adjusting the air adjusting screw.
5. Repeat above steps until you get can the best speed.
6. Check the throttle cable. Start engine then turn the handlebar. if the engine speed changes, check the throttle cable.

Danger: the minimum free play of throttle cable is 10mm,

Cleaning air filter



Oil drain bolt

Clean the carburetor after each ride.

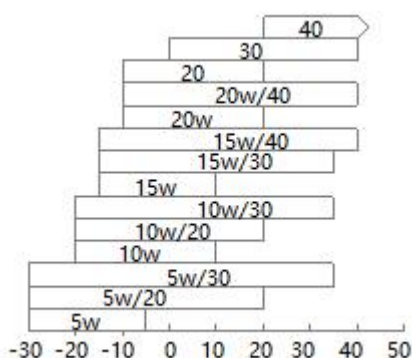
1. Put a container under the carburetor.
2. Close the fuel tank tap.
3. Remove the oil drain bolt and drain the fuel out completely.
4. Mount the screw.

Lubrication System of the Engine

Choose lubricating oil

Lubricating oil is important to engine performance and service life, use specified oil for lubricating.

The fuel in transmission case is 15W/40-SF as leaving our factory. Drain the old oil completely and use kerosene catharsis clean the carburetor before replace new lubricating oil. New lubricating oil grade should reach SG or above, viscosity is based on different regions and temperatures.



Checking the lubricating oil



Lubricating oil window

Stand the motorcycle upright on a horizontal surface.
The lubricating oil level should be between the minimum and maximum scales.

Changing lubricating oil

Changing the lubricating oil when the engine is warm.

Put an oil pan under the engine, remove the drain bolt and drain the lubricating oil. If the plug gasket is worn, replace it with a new one. Install the drain bolt and gasket; the torque is 15~20 N·m. Add new lubricating oil and check the oil level.

Lubrication system

Problem	Reason
Over-consumption of lubricating oil	Engine leakage
Dirty lubricating oil	Need to replace lubricating oil
	Unqualified lubricating oil

Overhauling the Engine

Cylinder head and valve mechanism I

Note:

1. Make sure valve clearance meet the standards after each disassembly work of rocker group.
2. Keep the oil passage on cylinder head cover is open.
3. Install the locating pin before mounting the cylinder head.

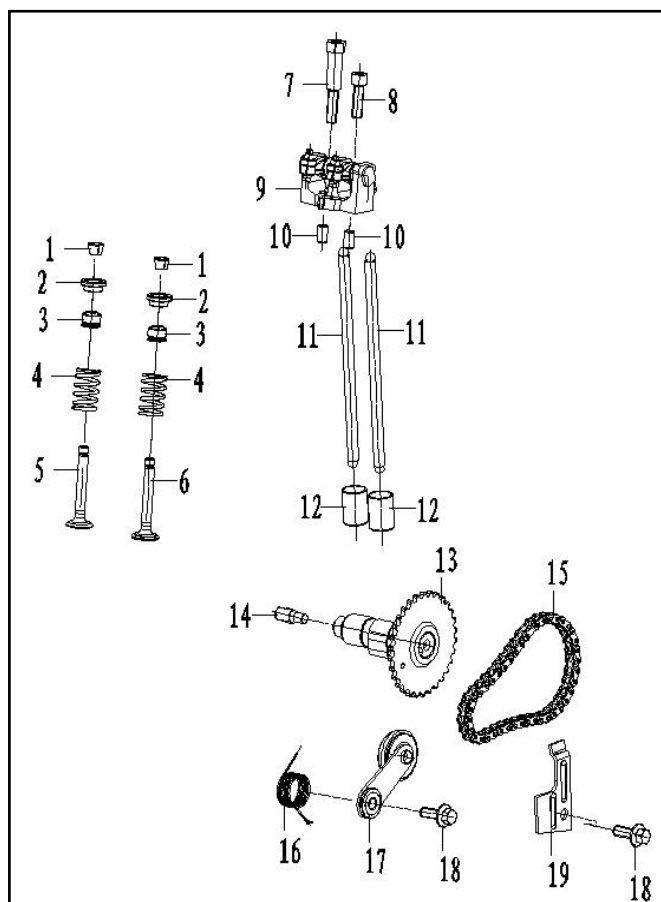
Main parameters and maintenance standards of cylinder head parts

Item			Standard value (mm)	Maintenance (mm)
Push rod length			135.85~136.15	135.80
Left and right backlash of rocker group			0.1~0.3	0.35
Free length of valve spring			22.7~24.7	22.5
Valve clearance			0.02~0.04	/
Valve Valve guide	Valve stem outer diameter	Air inlet	$\phi 5.45 \sim \phi 5.465$	$\phi 5.43$
		Air inlet	$\phi 5.43 \sim \phi 5.445$	$\phi 5.41$
	Valve stem inner diameter	Air inlet	$\phi 5.475 \sim \phi 5.487$	$\phi 5.53$
		Air inlet	$\phi 5.475 \sim \phi 5.487$	$\phi 5.53$
	Clearance between valve rod and valve guide	Air inlet	0.01~0.037	0.07
		Air inlet	0.03~0.057	0.09
	Valve line width	Air inlet	2.8	/
		Air inlet	1.4	/
Cylinder head	Flatness		0.03	0.1
	Valve seat width		0.71~0.99	1.2
spark plug	Clearance		0.6~0.7	/

Troubleshooting

No.	Faults	Possible causes	Remark
1	Low pressure in cylinder	Wrong valve clearance	
		Poorly sealed valve	
		Wrong valve timing	
		Valve spring broken	
		Leakage between the connector of spark plug and cylinder head.	
		Poorly cylinder head seal group	
		Cylinder head has crack or blister	
		Piston rings with big clearance or get broken	
		Piston has crack or worn out	
		Inner diameter of cylinder is big or a blister in cylinder	
2	muffler has black smoke when exhaust	Valve guide worn out	
		Oil shield damage or leakage	
		Piston rings with big clearance	
		Seal group of cylinder head leakage	
3	Excessive or abnormal noises	Wrong valve clearance	
		Valve stuck or valve spring broken	
		Camshaft or rocker worn out	
		Push rod worn or bent	
		Valve rocker worn out.	

Maintenance of valve mechanism I



Valve mechanism I:

- 1——CG125D valve collet (improved_RoHS)
- 2——ZL60 valve spring retainer (upper)
- 3——CG125D oil shield assembly
- 4——ZL60 valve spring
- 5——ZL60 intake valve
- 6——ZL60 exhaust valve
- 7——ZL60 rocker mounting bolt (I)
- 8——ZL60 rocker mounting bolt (II)
- 9——ZL60 valve rocker assembly (integral)
- 10——straight pin $\phi 6 \times 10$
- 11——ZL60 push rods assembly

Valve mechanism II:

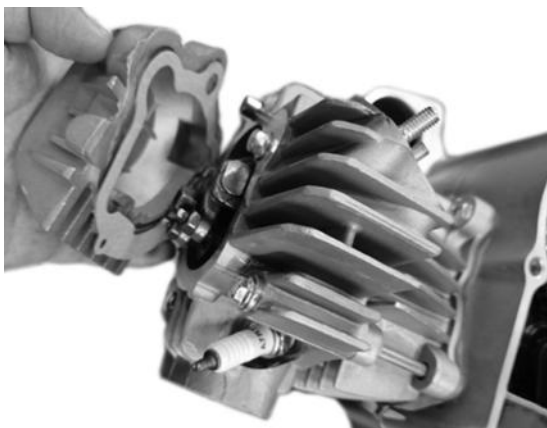
- 12——ZL60 push rod sleeve
- 13——ZL60 camshaft group (timing driven sprocket included)
- 14——ZL60 camshaft screw
- 15——ZL60 timing chain combination (42)
- 16——ZL60 chain tensioner spring
- 17——ZL60 chain tensioner assembly
- 18——GB16674 bolt M6 $\times$ 16(blue white zinc)
- 19——ZL60 timing driven sprocket pressuring plate

Dismounting the valve mechanism I

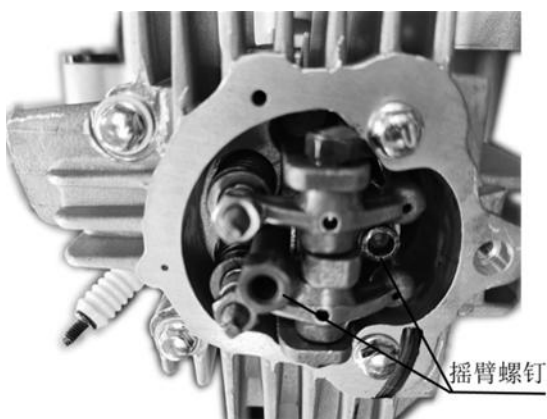


1. Remove the bolts on cylinder head cover.

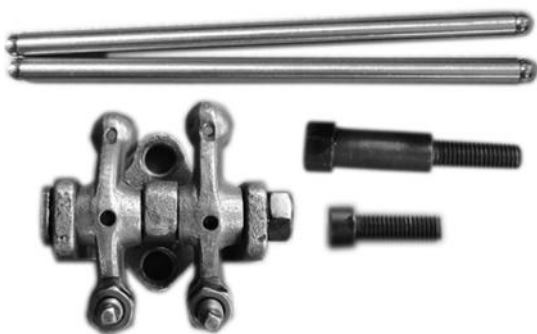
2. Remove the head cover, gaskets and locating pin.



3. Remove the fastening screws on rocker assembly.



4. Remove mounting bolts, rocker assembly and push rod.



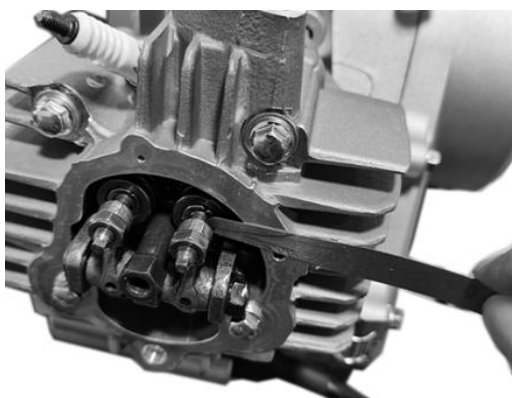
Overhauling the valve mechanism I



1. Check the valve clearance.

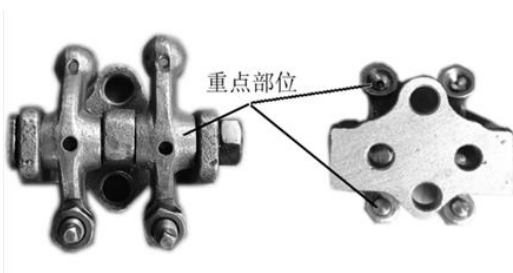


Remove the big and small access covers, use a socket spanner turn the magneto as is shown in picture, make the T line aligns with the left access cover gap.



Check the air inlet and exhaust valves clearance, adjust it to standard value.

Valve clearance standard (cooled engine):
0.02~0.04 mm



2. Inspect the rocker assembly and push rod
Check whether the rotating and friction parts of the rocker assembly are worn. If there is abnormal wear or stuck rotation, change new rocker assembly.



Check the push rod, if the rod head is incomplete or rod is bent, Replace new push rod.

Installing the valve mechanism I

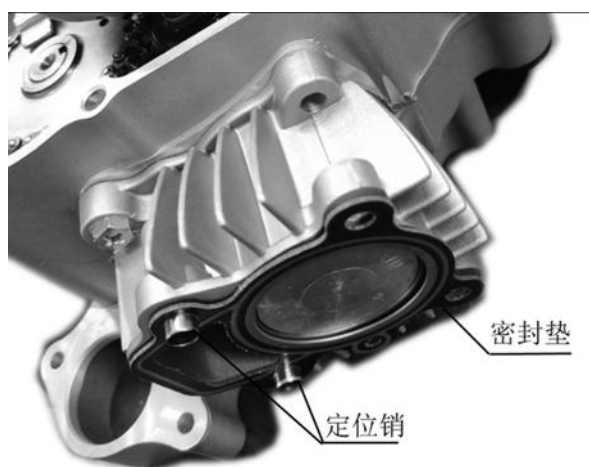
1. Installation is in the reverse order of removal.
2. Torque tightening table:

Item	Torque N.m
Cylinder head covet bolts M6	10
Rocket assembly fastening bolts	15
Cylinder head fastening bolts	15
Spark plug	15
Adjusting bolts for valve clearance	9

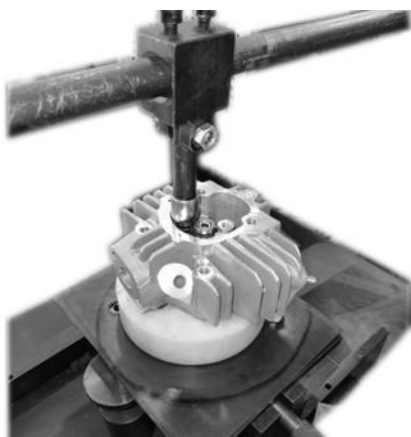
Dismounting the cylinder head assembly



1. Remove head cover, rocker assembly and push rod according to the dismount procedures of valve mechanism.
2. Remove the cylinder head fastening screws and cylinder assembly.



3. Remove locating pin and seals from cylinder head.



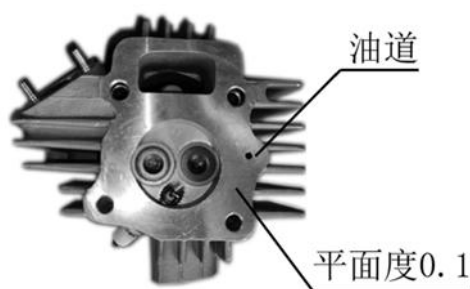
4. Put cylinder head on the fixture, press the inlet and exhaust valve springs, remove the inlet and exhaust valve collets at last.

Note: do not compress the springs too much to avoid permanent deformation.



5. Take out spring upper seat, spring, oil shield, air inlet valve, exhaust valve, locating pin and spark plug in sequence.

Overhauling cylinder head pars



1. Inspect the cylinder head appearance and flatness.
- Check the combustor, air path, door line and clean up the carbon deposit.
- make sure there is no crack on spark plug and valve seat.
- make sure cylinder head oil path is open
- Check if the cylinder head with deformation, use knife edge ruler and feeler gauge to check the flatness of the cylinder head.

Flatness limit: 0.1mm

2. Inspect the valve seat of cylinder head
- Smear a thin layer of stamp-pad ink evenly on the valve seat, then put a clean valve on the valve seat, at last gently knock on the valve, do not rotate, after that pull out the valve, if the contact traces on the valve working surface are interrupted, the valve seat should be grind.



Valve seat grinding

- clean up the carbon deposit on valve seat.
- Smear abrasive on the valve seat
- use a grinding tool with a rubber head to suck the valve up, then grind the valve.

Measure the contact face width of valve seat. if the seat is beyond standard or with dent, grind the valve seat or change a new cylinder head.

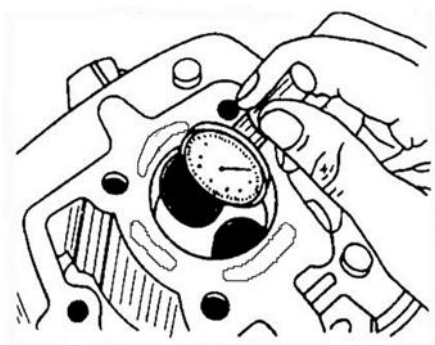
Limits: 1.0 mm



3. Inspect the valve guide of cylinder head

- clean up the valve guide
- measure valve guide inner diameter, if it less than the limits replace new guide.

limits: 5.53



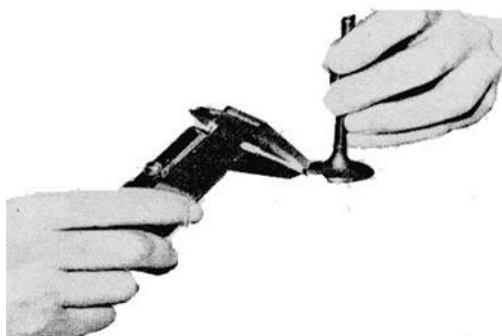
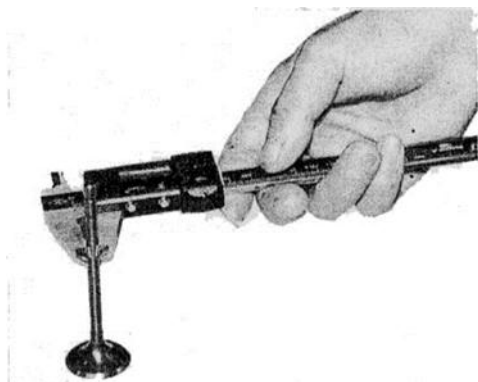
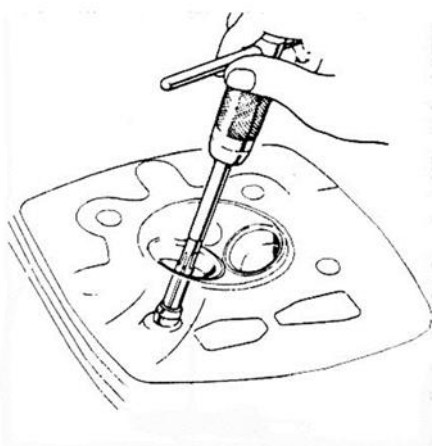
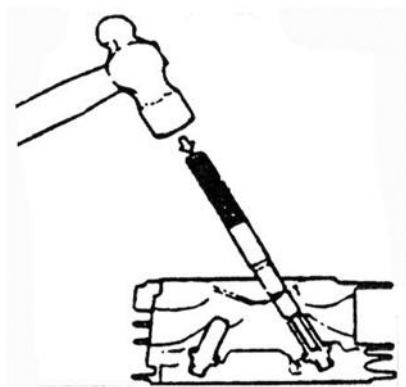
remove the valve guide.

- put the cylinder head into a thermostat until the temperature reach 100-150 °C
- remove and support the cylinder head, Use the valve removal tool to knock the valve guide out from the chamber side

Press fitting the new valve guide and O-ring, and reaming the newly installed valve guide after the cylinder head cools.

Note: When reaming, the reamer must be coated with cutting oil. When insert or withdraw the reamer, it should be rotated.

Grinding valve seat of cylinder head after changing



the valve guide.

4. Overhauling the valve

- clean the carbon deposit
- check if the valves bent, burn or worn out.
- measure stem diameter of valves.

Limits:

Air inlet valve 5.43 mm

Exhaust valve 5.41 mm

Check the contact surface of valve, if the surface is rough, rust or uneven, replace it. Measure the valve line width.

Length along the axis, limits:

Air inlet valve: 1.8 mm

Exhaust valve: 1.5 mm

5. Overhauling the valve spring

- check the valve appearance for deformation or abnormal wear.
- measure the free length of inner and outer springs.

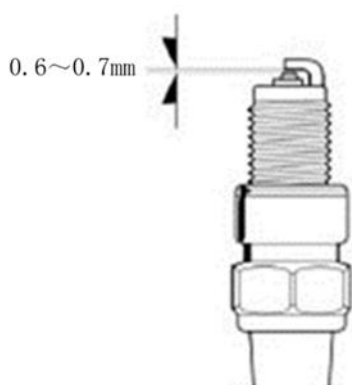
Limits: 22.5 mm

6. Overhauling the spark plug

- Check the spark plug electrode and the center electrode, if there is carbon deposit, clean it up.
- Check the corrosion of the spark plug electrode and the central electrode. If there is too much corrosion, replace the spark plug.



- Measure the gap between the spark plug electrode and the center electrode and ensure that the spark plug gap is 0.6 ~ 0.7mm



Install cylinder head assembly

1. Installation is in the reverse order of removal.

2. Torque table

Item	Torque N.m
Bolts for cylinder head cover M6	10
Fastening bolts for rocker assembly	15
Cylinder head fastening bolts	15
Spark plug	15
Adjusting bolts for valve clearance	9

3. Precautions for installing cylinder head assembly

Assemble the cylinder head

- install the oil shield on valve guide before installing valve.
- smear oil before installing oil shield, air inlet valve, exhaust valve and other parts.
- do not compress the spring too much to avoid permanent deformation.

Install the cylinder head assembly

- worn or defective seal is forbidden, replace new seal.
- make sure the oil path on cylinder head is open.
- make sure the locating pin in right place before installing cylinder head.

Cylinder and piston

Note :

1. No dust or other foreign bodies in the crankcase.
2. The surfaces of cylinder and piston are clean.
3. Smear oil for lubrication before installing cylinder and piston.

Main parameters and maintenance standards

Main parameters and maintenance standards						
No.	Item			Standard	Limits	Remark
1	Cylinder	Cinder diameter		$\Phi 44 \sim \phi 44.01$	$\Phi 44.08$	
		Cylindricity		0.005	0.01	
		Flatness of cylinder face		0.04	0.06	
2	Piston	Skirt diameter of piston, H=7		$\Phi 43.975 \sim \phi 43.985$	$\Phi 43.90$	
		Pin outer diameter		$\phi 12.994 \sim \phi 13.0$	$\phi 12.98$	
		Pin diameter		$\phi 13.002 \sim \phi 13.008$	$\phi 13.02$	
		Clearance between piston pin and piston pin hole		0.002~0.014	0.02	
3	Piston ring	Closed internal	First ring	0.1~0.25	0.35	
			Second ring	0.1~0.25	0.35	
			Oil ring	0.2~0.5	0.7	
		backlash	First ring	0.015~0.05	0.06	
			Second ring	0.015~0.05	0.06	
4	Clearance between cylinder and piston			0.005~0.035	/	
5	Inner diameter of small end of connecting rod			$\phi 13.015 \sim \phi 13.022$	$\Phi 13.044$	

Troubleshooting

No.	Faults	Possible causes	Remark
-----	--------	-----------------	--------

1	Low or unstable pressure in cylinder	Abnormal wear of cylinder block or piston ring	
2	Black smoke emission	Abnormal wear of cylinder block, piston or piston ring	
		Incorrectly installed piston ring	
		Scratches or scrapes on piston or cylinder walls	
3	Engine overheats	Too much carbon deposit in piston	
4	Knocking or abnormal noise	Piston or cylinder block is worn	
		Too much carbon deposit	

Dismounting the cylinder block, piston and piston ring



1. Remove cylinder head and sealing gaskets.
2. Remove fixing screws of cylinder block, then take the cylinder block out.
3. Remove sealing gaskets and locating pin.



4. Remove piston pin collar, then piston pin and piston.

Note: do not let the piston ring drop into crankcase. To avoid this happen, use a cloth cover the crankshaft connecting hole before removing.

1. Remove three piston rings in order.

Note:

1. To avoid engine leakage after assembly, when replace new gaskets for cylinder block, clean the cylinder and crankcase surface up first.
2. If the gasket is immersed in gasoline, it can be easily removed. Do not damage the contact surface of cylinder.



3. The removed parts should be properly placed to avoid damage and loss.

Overhauling of cylinder block, piston and piston ring



1. Inspect the cylinder block

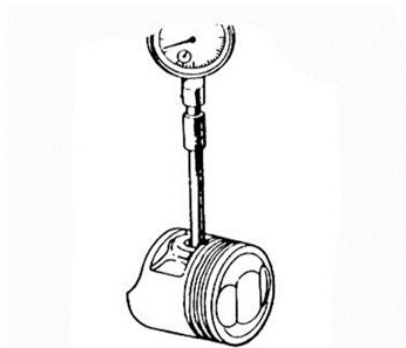
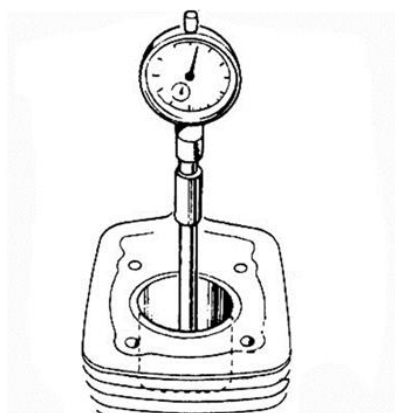
- Clean the residual gasket on the surface of cylinder block and the carbon deposit on the edge of cylinder hole.

Note: it is easy to clean the residual gasket if intrude into the gasoline. Do not damage the contact surface of cylinder block.

- if the bore has abnormal wear or damage, replace it.
- measure the inner diameter of bore.

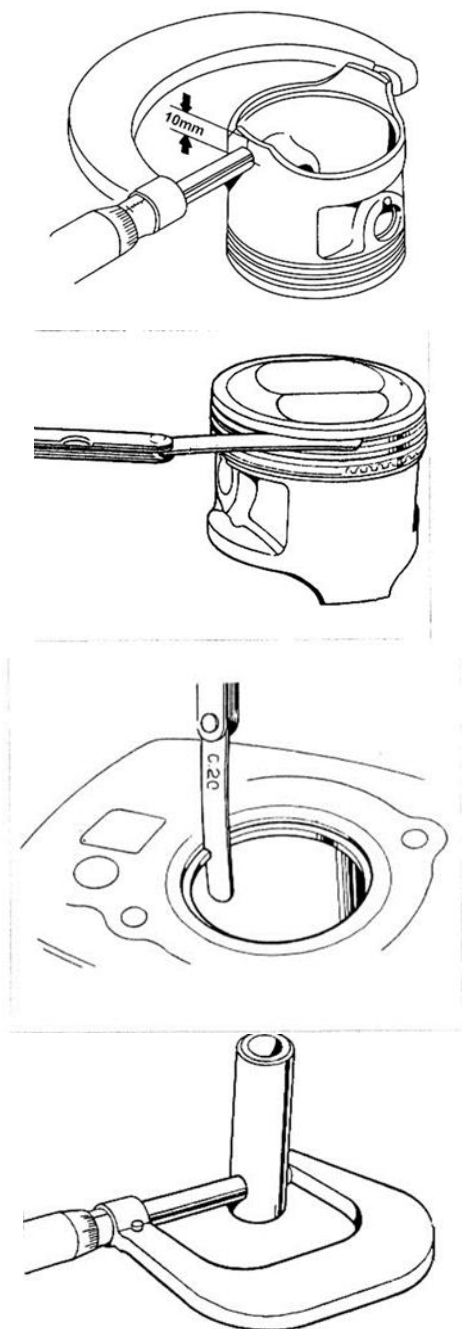
Bore size limits: $\phi 44.08$ mm

Cylinder diameter measurement, should take three positions, namely the top, the middle and the lower bottom part of piston stroke, and should be at right angles to each other in the two directions.



2. Inspect the piston

- clean the carbon deposit on the piston surface. If the surface has abnormal wear, replace new piston.
- inner diameter of piston pin
Limits: $\phi 13.02$ mm



- Check and measure piston skirt diameter
Limits: $\phi 43.90$ mm

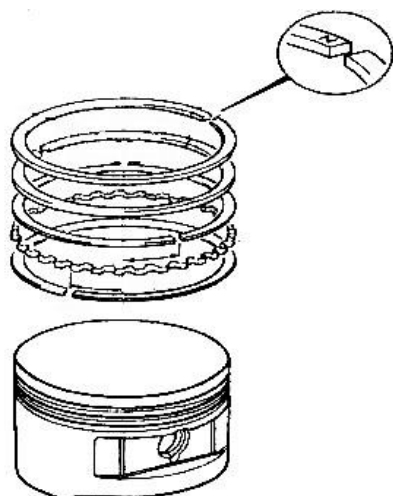
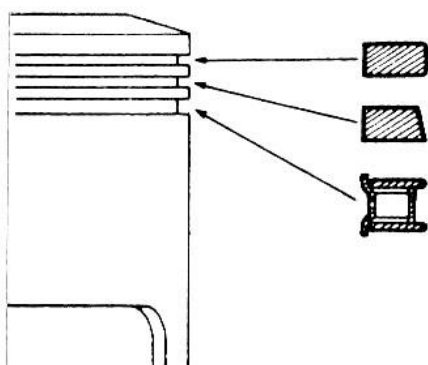
- Check and measure piston ring groove width
- According to piston ring groove width and piston ring thickness calculation fit clearance
Fit clearance limits:
First ring clearance: 0.06 mm
Second ring clearance: 0.06 mm

3. Inspect the piston ring
 - check the piston ring, if it has abnormal wear, replace new ring.
 - Insert the piston ring into the cylinder, check and measure the piston ring end gap.
Limits: 0.35mm

4. Inspect the piston pin
 - check the piston pin, if it with abnormal wear, change new piston pin.
 - check and measure the outer diameter of piston pin.
Limits: $\phi 12.98$ mm
 - calculate the clearance between piston and piston pin based on above measured dimensions.
Limits: 0.02 mm

Installing the cylinder block, piston and piston ring

1. Installation is in reverse order of removal.
2. Torque for cylinder block fixing bolts: 15 N.m
3. Installation precautions
 - install piston pin
Clean up the piston ring groove, install piston ring.
The piston ring end gap is separated by 120 degrees, do not align the gaps of each oil ring with each other.



The clearance between each ring in the oil ring should be matched with the clearance of the other ring. When installing the oil ring, install the spacer ring first, and then install the side guide rail.

Note:

- make sure piston and piston ring are in good condition.
- When install piston ring, make the sides with words of first and second ring toward the top of the piston, and the opening is staggered 180° , and the opening direction is towards the piston skirt; The openings of the two oil rings must be staggered $120^{\circ} \sim 180^{\circ}$, and cannot be aligned with the piston pin hole. The piston rings should rotate flexibly.
- Do not reverse the mounting position of the top and second rings.

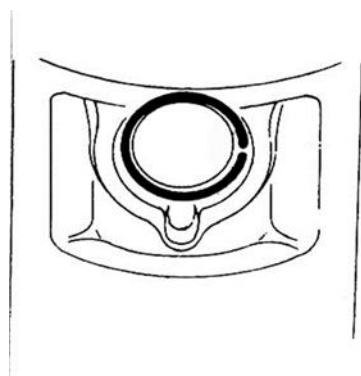
Install the piston

- Install piston with "IN" mark towards air inlet side.
- The end gap of the piston pin retainer ring should be staggered with the piston notch.
- use new piston pin retainer when reassemble piston.
- keep piston pin retainer away from dropping into crankcase.



Install cylinder block

- smear oil on cylinder, piston and piston ring before installation.
- do not use worn or damaged gaskets.



Clutch and valve mechanism II

Note:

When maintain clutch and driven gear parts, only need to remove right crankcase.

Cam shaft parts excluded.

Main parameters and maintenance standards

No.	Item		Standard	Limits	Remark
1	Clutch	Free height of active disc tension spring	21.2	22	
		Active disc keyway width	3.5~3.55	3.6	
		Bore diameter of outer clutch cover	Φ94~Φ94.15	Φ94.5	
		Fit	Outer diameter of clutch sleeve	Φ20.43~Φ20.45	Φ20.35
			Inner aperture of clutch housing	Φ20.5~Φ20.521	Φ20.55
		Clutch axle sleeve height	14.7~14.8	14.55	
2	Timing chain	Timing chain tension length (42 knot)	260.35~261.15	262.3	
		Backlash	0.15~0.4	0.45	

Troubleshooting

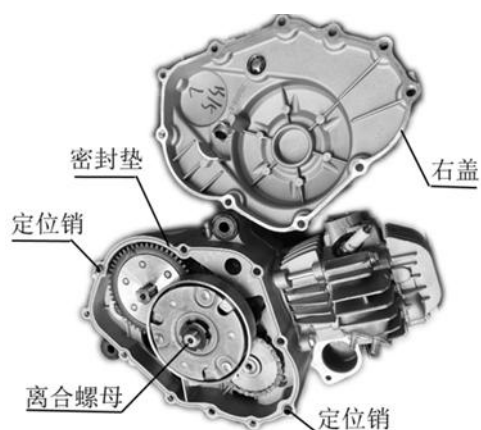
No.	Faults	Possible causes	Remark
1	The clutch slipped during acceleration	The friction plate of driving disk is worn out or damaged	
		clutch housing is badly worn	
2	At idle, the vehicle will move slowly	High idle speed	
		Driving disc spring of clutch is damaged	
		Clutch bushes are worn or damaged	

		Driving disc axle sleeves worn or damaged	
3	Abnormal driving speed or noise	Incorrect valve adjustment	
		Valve stuck or valve spring broken	
		Excessive wear of camshaft and rocker	
		Inaccurate valve timing	
		Timing chain wear	
		Tension arm wear	
		Push rod worn or bent	
		Push rod seat cover worn	

Dismounting the right crankcase and clutch

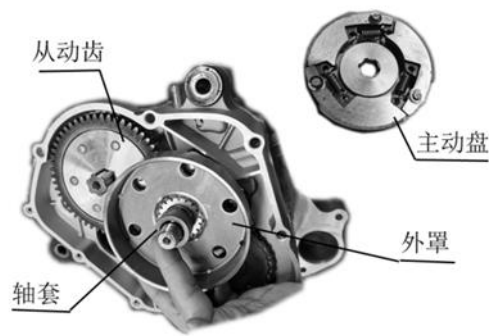


1. Drain the engine oil and remove fixing screws from right crankcase

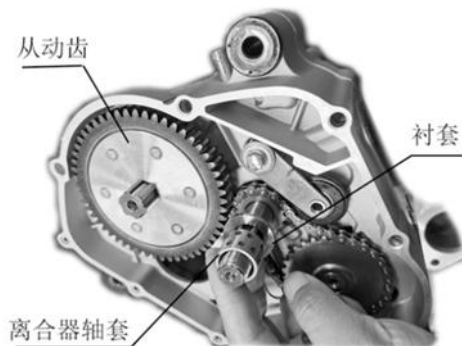


2. Remove right crankcase, sealing gasket and locating pin, then remove fastening nuts from clutch.

3. Remove nut washer, driving disc, axle sleeve of driving disc and housing.



4. Remove axle sleeve of clutch, bushes and driven gear.



Overhauling right crankcase and clutch



1. Inspect right crankcase
 - check if there is crack or defect.
 - check the right inspection window for leakage.



2. Inspect driving disc of clutch
 - check the driving disc of clutch, if it has abnormal wear, replace new parts.
 - check the friction plate of driving disc for wear.
 - check the free height of driving plate
 - Spring free height limits: 22mm
 - Check the spline hole of the clutch driving disk and measure the width of the slot.
 - Slot width limits: 3.6mm
3. Inspect axle sleeves and bushes of clutch
 - make sure axle sleeves of driving disc in good condition, if it damaged replace new one.
 - make sure bushes of clutch in good condition, if it



damaged replace new one.

4. Inspect axle sleeve of clutch

- make sure axle sleeve in good condition.
- measure the inner aperture of axle sleeve.
Limits: $\phi 20.55$ mm 4.3
- measure the outer aperture of axle sleeve.
Limits: $\phi 20.35$ mm。
- measure the axle sleeve height of clutch
Limits: 14.55 mm。



5. Inspect clutch housing

- check the clutch housing for wear or defect, if it has need to change new clutch housing.
- Measure the contact size of clutch housing and friction plate.
Limits: $\phi 90.5$ mm

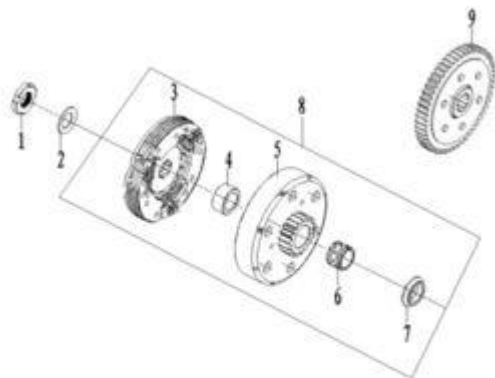


6. Inspect the driven disc of clutch

- check the driven gear for wear or defect, if it has need to change new clutch gear.
- Fixed the central part of the driven disc, rotating the outer end of the driven plate to ensure that the clutch driven plate stable, otherwise belongs to the driven plate damping wear, due to the replacement of the clutch driven plate.

7. Inspection after assembling the clutch

- Check the clutch drive disc is separated from the housing.
- Check that the difference between the height of the clutch sleeve is more than 0.05mm higher than the end face of the inner hole of the housing.



1-螺母, 2-垫圈, 3-主动盘, 4-主动盘轴套,
5-外罩, 6-离合器轴套, 7-衬套, 8-离合器总成,
9-从动齿组合

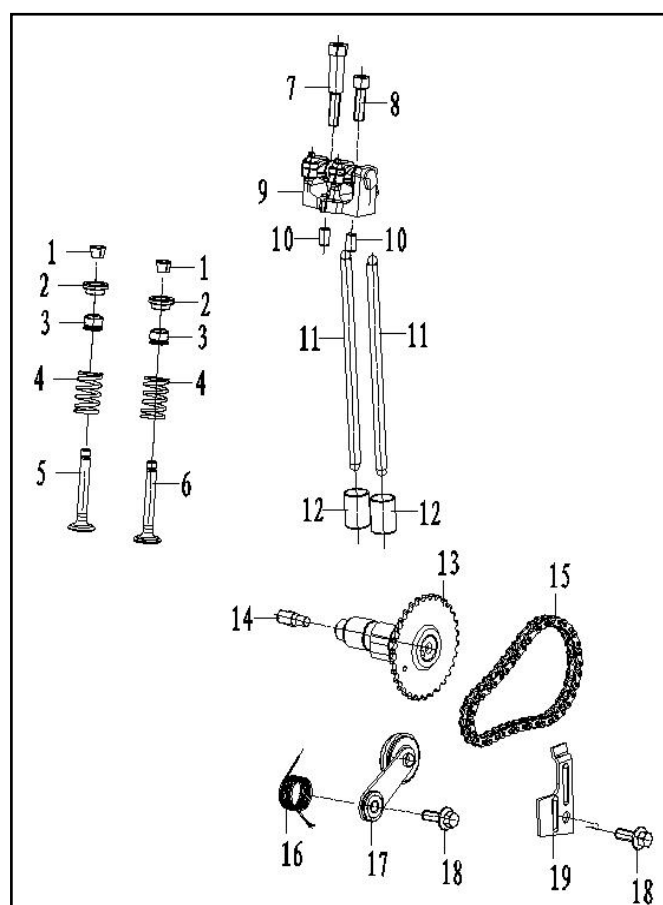
Installing the right crankcase and clutch

1. Installation is in reverse order of removal.
2. Torque table

Item	Torque N.m
Fastening bolts M6 of right crankcase	10
Clutch locking nuts	42

3. Installation precautions for right crankcase and clutch
- apply thread fastening glue when assemble the clutch locking nuts.

Maintain the valve mechanism



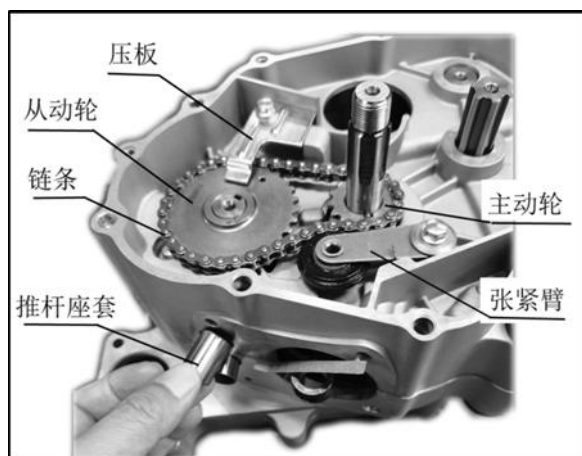
Valve mechanism I:

- 1——CG125D valve collet (improved_RoHS)
- 2——ZL60 valve-spring retainer (upper)
- 3——CG125D oil shield assembly
- 4——ZL60 valve spring
- 5——ZL60 air inlet valve
- 6——ZL60 exhaust valve
- 7——ZL60 rocker mounting bolts (I)
- 8——ZL60 rocker mounting bolts (II)
- 9——ZL60 valve rocker assembly (unitary)
- 10——round pin $\phi 6 \times 10$
- 11——ZL60 push rod assembly

Valve mechanism II:

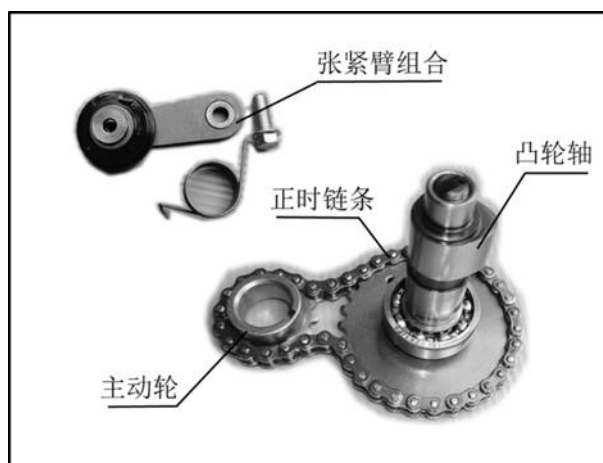
- 12——ZL60 push rod seat cover
- 13——ZL60 camshaft assembly (include timing driven sprocket)
- 14——ZL60 camshaft screw
- 15——ZL60 timing chain assembly (42)
- 16——ZL60 chain tension arm spring
- 17——ZL60 chain tension arm assembly
- 18——GB16674 panel bolt M6 $\times$ 16(blue white zinc)
- 19——ZL60 timing driven chain binder plate

Dismounting valve mechanism II



- 1. Dismount the cylinder block.
- 2. Remove clutch and driven gear.
- 3. Withdraw push rod seat cover by a suction rod.
- 4. Remove screws from binder plate and tension arm.

- 5. Remove tension arm assembly, spring, binder



plate, driven chain and driving wheel

Overhauling the valve mechanism



1. Inspect push rod seat cover
- if the cover has abnormal wear, replace it.



2. Inspect timing chain
- if timing chain with wear or defect, maintain or replace it.
- measure the chain length when in tension.
Limits: 262.3 mm
- measure the chain backlash.
Limits: 0.45 mm



3. Inspect camshaft
- make sure camshaft in good condition, any defect or wear replace it.

4. Inspect driving wheel
- make sure the parts in good condition, any defect or wear replace them.



5. Inspect tension arm assembly
- Observe that the tension arm can support the chain correctly, otherwise the tension spring should be replaced.
- Check the tension arm guide wheel, any abnormal wear, replace new parts.

Installing valve mechanism

1. Installation is in reverse order of removal.
2. Torque table

Item	Torque N.m
Plate bolt M6 of driven sprocket	10
Fixing bolt M6 of tension arm	10

3. Installation precautions

- The oil pump is driven by the screws at the small end of the camshaft. When installing, make sure the oil pump shaft is accurately assembled into the screw slot of the camshaft.
- if the camshaft is removed and the engine is reinstalled. Opening the cylinder head immediately when the engine is ignited for the first time, and check if the oil channel of the cylinder head has oil pumped, if yes the pump oil circuit is normal.

Magneto and electric start mechanism

Note:

When maintain these parts, only remove left crankcase is enough.

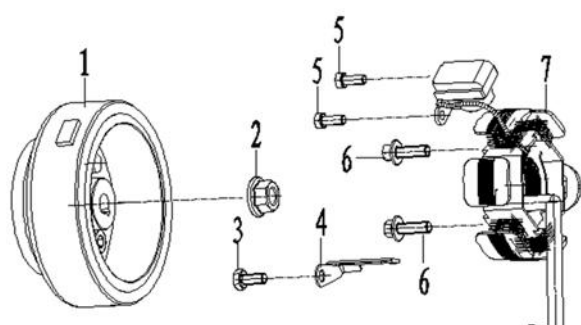
Parts specifications

Item		standards	Limits	Remark
Rotor - diameter of supersonic roller pin		$\phi 9.991 \sim \phi 10$	$\phi 9.98$	
Big starting gear	Bore diameter	$\phi 15.03 \sim \phi 15.05$	$\phi 15.08$	
	Over-separation fit diameter	$\phi 37.975 \sim \phi 38$	$\phi 37.95$	
Starting chain	Tension length of chain (69 knob)	438.15~438.95	440.95	
	Backlash	0.15~0.4	0.45	

Troubleshooting

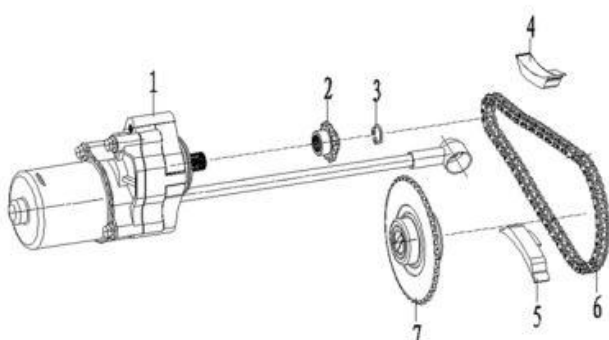
Item	Faults	Possible causes
1	Crankshaft does not rotate after electric start	Starting motor damage
		Starting chain damage
		Overrunning clutch damage
2	After electric start, crankshaft rotates but can't ignite	Spark plug damaged
		Interference between rotor and stator
		Stator coil short circuit
3	Oil leakage from left crankcase	stator disc oil seal wear
		Big sprocket seal wear

Magneto breakdown



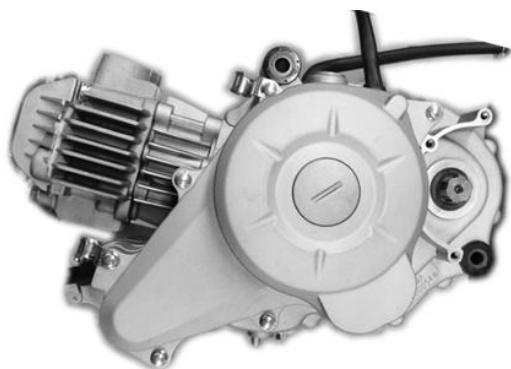
- 1——ZL60 Magneto rotor assembly (12V6 pole)
- 2——GB6177.1 nut M10×1.25(blue white zinc)
- 3——GB16674 bolt M6×12(blue white zinc)
- 4——BK70 Magneto wire clamp
- 5——GB5783 bolt M5×12(blue white zinc)
- 6——GB16674 bolt M6×18(blue white zinc)
- 7——ZL60 Magneto stator assembly

Electric start mechanism breakdown



- 1——ZL60 starting motor
- 2——small rocket of starting motor
- 3——GB894.1 ring
- 4——Chain guide plate assembly
- 5——Chain guard plate combination
- 6——Starting chain assembly (70 knob)
- 7——Starting large sprocket assembly (contain oil seal)

Dismounting magneto and electric start mechanism



1. Remove fixing bolt from left crankcase.



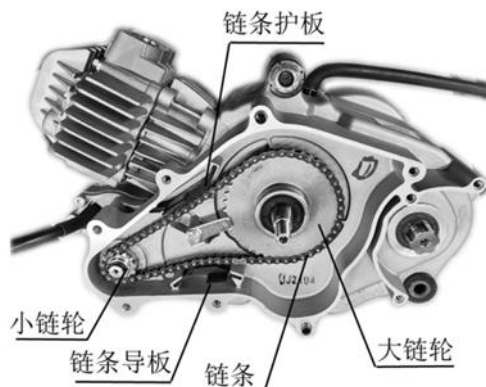
2. Remove left crankcase, sealing gasket, locating pin, then dismount the locking nuts of magneto and stator fixing screw.



3. Using a tooling remove magneto rotor, remove rotor and stator assembly.

Note:

1. Using special tools to remove magneto rotor. Do not knock the magneto rotor.
2. If the rotor and stator is hit or dropped, replace new parts.

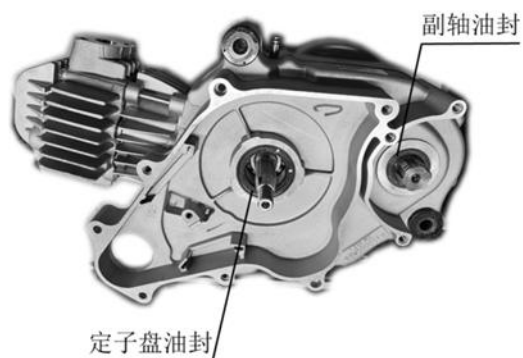


4. Remove the baffle of big sprocket, then remove chain cove, guide plate and chain in order.

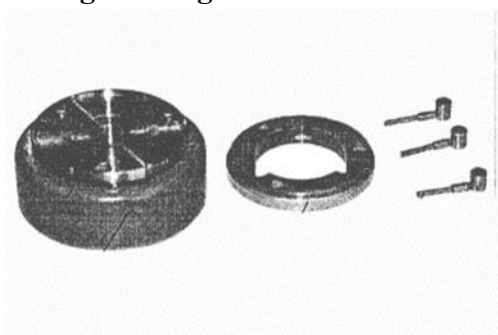


5. Remove the big sprocket and starting motor.

6. Remove oil seal of stator plate and counter shaft.



Overhauling the magneto and electric start mechanism



1. Overhaul the magneto

- Check the stator circumference of the magneto to see if there is any friction mark with the stator coil. If there is any friction mark, it is necessary to check whether the stator is loose, and open the box to check the crankshaft connecting rod condition.
- Check the overrunning clutch on the magneto stator, check whether the overrunning clutch roller is worn or damaged, and if the spring is broken or deformed.

2. Overhaul the electric start mechanism

- Make sure the chain guide plate and guard plate is in good condition, any damage replace it.
- overhaul starting chain

Any abnormal wear or defect, replace new chain.

Chain length when tensional (69 knobs): limits:
440.95 mm

Measure the backlash of starting chain

Limits: 0.45mm

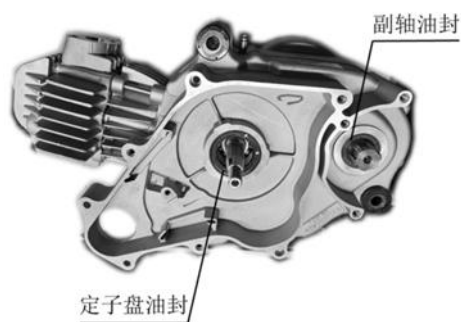
- check the small sprocket, if any abnormal defect, replace new parts.

- overhaul the big starting gear

If any abnormal wear for gear, replace it.

Make sure sprocket oil seal and lip in good condition.

Measure the diameter of sprocket inner hole, limits is $\phi 15.08$ m.



Make sure disc plate seal, counter shaft seal and lip are in good condition, any wear or defect replace new parts.

Installing the magneto and electric start mechanism

1. Installation is reverse of the removal.
2. Torque table

Item	Torque N.m
Fastening bolt M6 of left crankcase	10
Rotor locking nut M10×1.25 of magneto	35
Stator fastening bolt M6 of magneto	10
Magneto stator sensor fastening bolt M5	8
Large sprocket baffle bolt M6	10

3. Installation precautions

- After installing the electric starting mechanism, the starting small sprocket, chain and guide plate shall be coated with appropriate amount of grease.
- Before the installation of the magneto, it is necessary to clean the foreign bodies and oil stains in the cone holes of the magneto and crankshaft to ensure that the combined friction of the crankshaft and magneto meets the standard.
- The magneto rotor locking nut shall be smeared with proper thread fastening glue before installation.

Crankcase, crankshaft, oil pump and main and auxiliary shafts

Note

- Dismount the left and right crankcases before maintaining the crankcase, crankshaft, oil pump, main shaft and auxiliary shaft.
- Remove cylinder head, cylinder, piston, clutch, oil pump, gear shift mechanism, balance gear, magneto and adapter board before dismounting the crankcases.

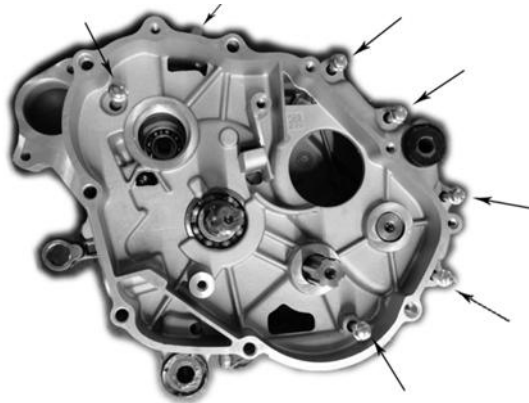
Main parameters and maintenance standards

No.	Item		Standard	Limits	Remark
1	Oil pump	Radial clearance between outer rotor and inner rotor	0.1~0.15	0.20	
		Radial clearance between pump body and outer rotor	0.15~0.21	0.25	
		End clearance between rotor and pump body	0.05~0.11	0.15	
2	Crankshaft	Small head diameter of connecting rod		13.010~13.025	13.044
		Big end side clearance of connecting rod	axial direction	0.1~0.3	0.45
			radial direction	0.004~0.012	0.05

Troubleshooting

No.	Faults	Possible causes	Remark
1	Crankshaft noise	The needle roller bearing of the big end of the connecting rod is worn	
		Connecting rod wear	
		crankshaft bearing is worn	
2	Gearshift gear noise	Gearshift gear is worn	
		Gear shaft is worn	
3	Low oil pressure or not pumping oil	Oil screen get blocked	
		Oil passage blocked	
		Oil pump parts are worn or damaged	

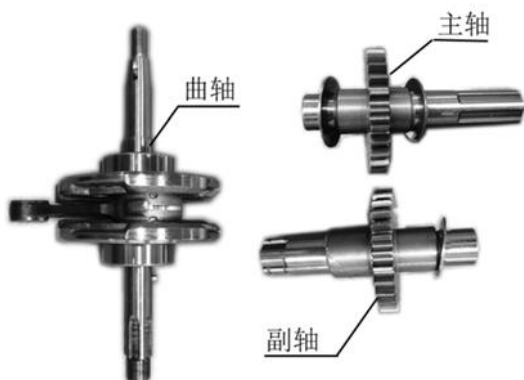
Dismounting crankcase, crankshaft, oil pump and main and auxiliary shafts



1. Remove cylinder block.
2. Remove camshaft refer to dismount valve mechanism II.
3. Remove magneto and electric start mechanism.
4. Remove the crankcase fastening screw, gently knock the crankshaft and auxiliary shaft with a rubber hammer, then remove the right crankcase.

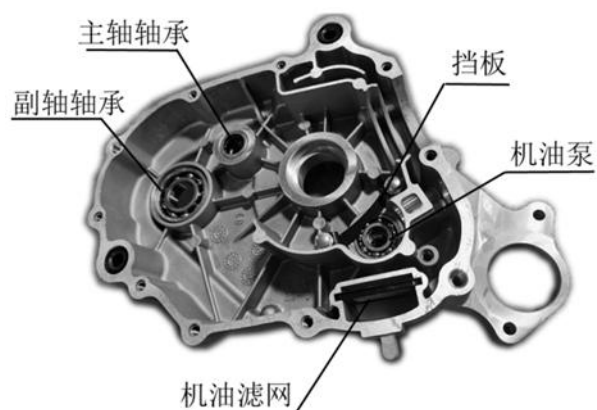


5. Remove sealing gasket, crankshaft, main and auxiliary shafts.

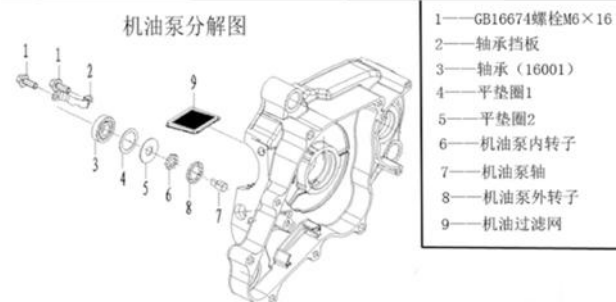
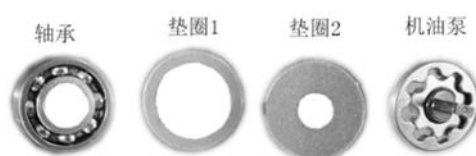


6. Remove crankshaft, main and auxiliary shafts.

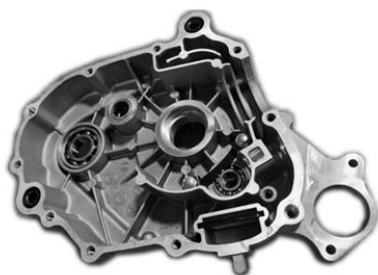
7. Remove oil screen and the oil pump baffle screw of left crankcase.



8. Remove the bearing, two gaskets, oil pump rotors and oil pump shaft.



Overhauling crankcase, crankshaft, oil pump and main and auxiliary shafts



1. Overhaul left crankcase

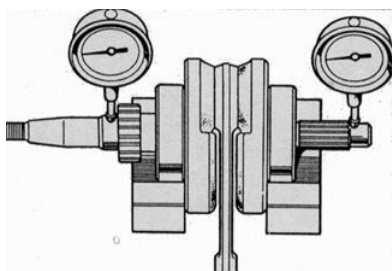
- make sure there is no crack or defect on left crankcase, if any replace new one.
- Check the left crankshaft bearing. The bearing should in good condition. Rotate the bearing by hand, and it should be flexible without stuck.



2. Overhaul right crankcase

- make sure there is no crack or defect on right crankcase, if any replace new one.
- Check the right crankshaft bearing. The bearing should in good condition. Rotate the bearing by hand, and it should be flexible without stuck.

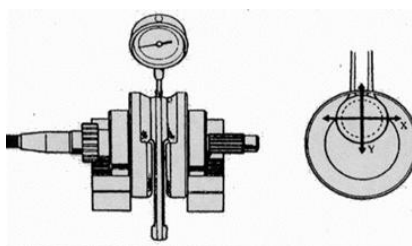
3. Overhaul the crankshaft connecting rod



- Check the crankshaft connecting rod condition, if there is any abnormal wear or defect, replace new parts.

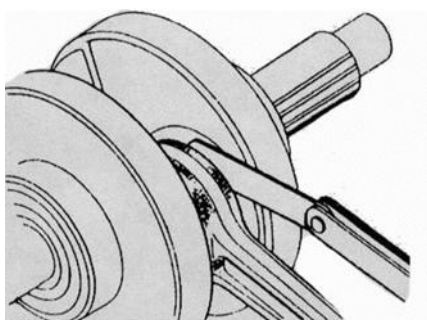
- Place the crankshaft on the V-iron and measure the radial run-out value of the crankshaft with a dial indicator.

Limits: 0.05mm



- Place the crankshaft on the V-iron and measure the radial clearance of the two points in the X and Y directions of the big connecting rod.

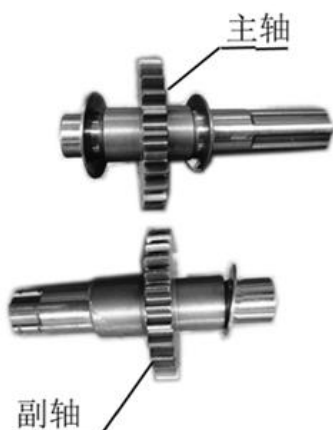
Limits: 0.05mm



- Measure the big head backlash of connecting rod with a feeler gauge,

Limits: 0.45mm

- Turn crankshaft bearing by hand, check its diameter jump and end jump, if with noise or big diameter jump and end jump, it should be replaced.



4. Overhaul the main and auxiliary shafts

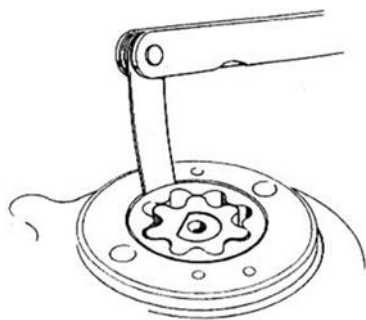
- Any damage or pit of shaft gears, replace new gears.

5. Overhaul oil pump

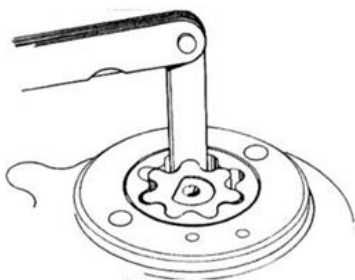
- Check the oil pump rotors, any abnormal wear or defect, replace new parts.

- Measure the clearance of pump body and outer rotor.

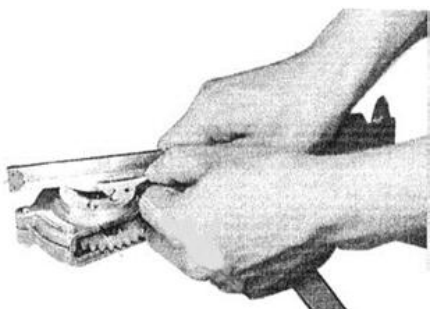
Limits: 0.25mm



- Measure the clearance of inner and outer rotor.
Limits: 0.20mm



- Clearance between oil pump rotors and end face of pump body
Limits: 0.15mm



Installing crankcase, crankshaft, oil pump and main and auxiliary shafts

1. Installation is reverse order of removal.
2. Torque table

Item	Torque N.m
Crankcase fastening bolt M6	10
Oil pump baffle fastening bolt M6	10

3. Installation precautions

- Clean up the crankcases, main and auxiliary shafts, crankshaft and oil pump before installing.
- Turn all the bearings by hand, make sure all parts turn smoothly.
- Oil pump gaskets should be installed in strict sequence, refer to oil pump breakdown for details.

Engine Troubleshooting

Below items are essential to support a engine work well.

1. Qualified fuel: There is a certain proportion of combustible mixture in the cylinder.
2. Spark: The spark plug emits a strong spark in limited time.
3. Compression: sufficient compression pressure in the cylinder.
4. Valve timing: correct opening time.

Faults	Inspection	Results	Possible causes
Engine does not start or difficult to start	Check if the fuel flow into carburetor	No	No fuel in tank
			Oil between tank and carburetor is blocked.
		Yes	Float components of carburetor stuck.
			Vent on tank cap blocked.
	Remove the spark plug then test	Weak or no spark	Spark plug fails
			Spark plug is dirty
			Electronic ignition faulty
			Magneto faulty
		Good spark	Poor or broken wiring
			high-voltage cable is disconnected or short-circuited
			Ignition coil break or short circuit
			Ignition switch faulty
	Test cylinder pressure	Low	Starting mechanism skidded
		Normal	Valve clearance is too small
			Valve opening blocked
			Cylinder or piston ring wear
			Cylinder head gasket broken
			Improper valve timing
	Restart engine	Engine turns but does	Choke opens too wide

		not start	Improper adjustment of carburetor adjusting screw
		No ignition	Air inlet pipe leakage
			Incorrect ignition timing
	Remove spark plug	Damp	Carburetor oil level is too high
			Carburetor choke is closed too tight
		Dry	Large throttle
Engine has poor performance at low speed or idle	Check valve timing and valve clearance	Faulty	Improper valve clearance adjustment or rocker adjustment screw quality is poor
		Correct	Improper adjustment of valve timing
	Check carburetor plunger trimming screw adjustment	Faulty	Improper adjustment
		Correct	/
	Check carburetor gaskets for leaks	Yes	Bad sealing gasket
		No	Carburetor loose
			Carburetor gasket damaged
	Remove the spark plug and conduct a spark test	Weak or intermittent spark	Spark plug is faulty or with carbon deposit
			Electronic igniter faulty
			Magneto faulty
		Good	The spark plug cap is faulty
			The power loop is faulty
Engine performs poorly at high speed	Check ignition timing and valve clearance	Improper	Ignition controller is faulty
			Improper valve clearance adjustment
			The magneto is faulty
		Valve clearance and ignition timing are correct	/
	Disconnect the carburetor fuel line and check if the oil	Fuel shortage	Tank has run out of fuel
			Fuel line blockage

	line is blocked	sufficient fuel flow	The gas tank cap vent is blocked
	Check filter and carburetor nozzles for blockage	Yes	Carburetor gauge hole is blocked
		No	Float stuck
			Filter blocked
	Check valve timing	Wrong	Adjust valve timing
		Correct	/
	Check valve spring pressure	Low pressure	Valve spring wear or fracture
Abnormal noise in the engine	Check valve for abnormal sound	Yes	Large valve clearance
			Worn valve
	Check whether there is abnormal sound in the cylinder	Yes	Piston and cylinder wear
			Small end holes of piston pin and connecting rod are worn
			Crank pin and connecting rod head worn
	Check whether the timing chain produces abnormal sound	Yes	Camshaft wear
			Timing driven sprocket wear
			The timing chain lengthens
			Timing chain automatic tensioner failure or guide wheel wear
	Check whether the driving gear and driven gear produce abnormal sound	Yes	Gear machining accuracy is not enough
			The teeth of the gear are worn
			The matching gap between the main and driven gears is too small or too large

Cleaning the motorcycle

Clean motorcycle regularly will be helpful to extend the service life.

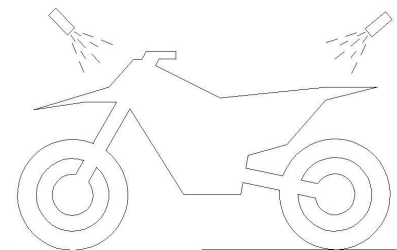
1. Seal the exhaust system to avoid water inflow.
2. Seal the electric lock and other plugs.
3. Clean motorcycle with a low pressure sprinkler.
4. Clean particularly dirty areas with specific motorcycle cleaner.

5. Rinse with low pressure water.
6. Let the motorcycle air dry.
7. Drive the motorcycle for a short time until the engine reaches operating temperature.
8. Lubricate the chain and all other parts that need lubrication.

Warning: Do not use high-pressure water to clean motorcycle. Avoid direct water contact with coils, plugs, carburetors or any electrical components.

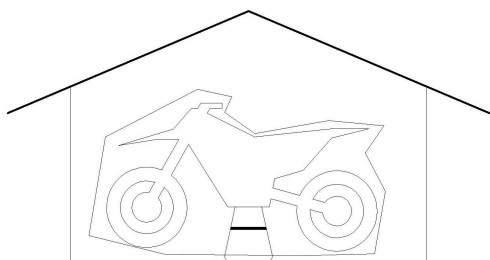
Storage

Preparation for long period storage

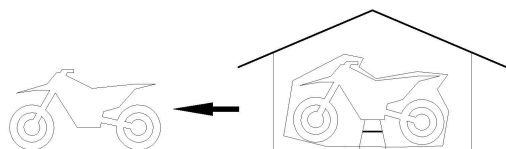


If you want to store your motorcycle for a long time, perform below steps.

1. Cover the muffler exhaust outlet.
2. Remove the battery.
3. Clean the motorcycle.
4. Empty the fuel tank.
5. Lubricating the chain.
6. All unpainted metal surfaces should be oiled to avoid rusting.
7. Raise the motorcycle with a lift stand, or put a cardboard pad under the motorcycle tire.
8. Cover the motorcycle.
9. Store the motorcycle in dry location.



Preparing for use after storage



1. Remove the cover on muffler exhaust outlet.
2. Tight the spark plug.
3. Fill up fuel to tank.
4. Install battery.
5. Check items that need to be checked before daily driving.
6. Make routinely lubrication.

Service Work

Faults	Possible cause	Solutions
Engine crank does not turn	Crank stuck	Consult to KAYO after sales service
	Cylinder, piston and connecting rod stuck	Consult to KAYO after sales service
	Gearbox stuck	Consult to KAYO after sales service
Press the power starter, engine does not work	fuse of the starting relay is blown	Remove seat and check fuse. If fuse is blown, replace fuse
	Low battery	Remove seat and check battery
Engine failure to start	The fuel deteriorated after long parking	Replace new fuel
	Dirt on spark plugs or wet spark plugs	Clean or dry the spark plugs and replace them if necessary
	Water get in the engine	Drain the fuel mixture from the engine and remove the crankcases, clean with a strong cleaning agent. Remove the spark plug and blow it dry with a fan (a machine that inflates the tires), then wipe out the air filter, and finally remove the engine exhaust pipe and blow dry it with a fan. When this is done, add new fuel. There is still a small amount of water in the new fuel because it is difficult for the crankcase to evaporate completely. Therefore, after water enters the engine and the car has travelled 100km, the

		fuel should be changed again, and then again within 500km. After three times, the water in the carburetor is basically gone. If water got in cylinder, in the case of flameout, repeatedly step on the starting rod. After a few such steps, the water in the cylinder will be drained from the exhaust pipe, and then the fan will blow on the mouth of the oil ruler for a few minutes. Warning: For safety, wrap the spark plug in dry cloth to prevent spark jumping.
	The air and fuel mix is incorrect	Clean tank vent and adjust air filter duct
	Vent valve open	Check and adjust
The engine can be started but will shut down immediately	Incorrect air supply	Close choke valve, clean tank ventilation pipe, adjust air filter duct
	The lack of fuel	fuel up
The engine is not running evenly	Any dirt, damage or incorrect adjustment on spark plugs	Remove spark plugs for cleaning, adjustment and replacement if necessary
	There is a problem with the spark plug cap	Check the condition of the spark plug cap, check whether the contact between the spark plug cap and the cable itself is good, check the cable, and replace the damaged parts
	Ignition rotor damage	Replacement of the rotor
	The fuel was mixed with water	Emptying the fuel, then injecting new fuel
Inadequate engine power or acceleration	There are problems with fuel supplies	Clean and inspect fuel system
	There is dirt in the air filter	Clean air filters and replace if necessary
	Exhaust system damage or leakage	Check whether the exhaust system is damaged and replace related accessories if necessary
	Dirt in carburetor nozzle	Remove carburetor and clean nozzle
	Crankshaft bearing damaged or worn	Consult to KAYO after sales service
Abnormal engine sound	Ignition problem	Consult to KAYO after sales service
	Overheating	See "Engine overheating" section

The exhaust pipe backfires	Carbon accumulates in the combustion chamber	Consult to KAYO after sales service
	Gasoline inferior	Replace gasoline
	Spark plugs in poor condition or wrong size	Replace the spark plug with a new one
	Exhaust system gasket aged	Check the exhaust system for damage, check the gasket is intact, and replace the gasket if it is aging
Exhaust white smoke	The fuel contains moisture	Change fuel
Exhaust black smoke	The air filter is blocked	Remove and clean the air filter
	The combustible mixture is too thick	Adjust carburetor valve
Gearbox gears don't mesh	Clutch anomaly	Consult to KAYO after sales service
	Fork bent or stuck	Check and adjust the fork
	Shift lever damage	Change gear lever
	Shift drum damaged	Replace the shift drum
	Ratchet device is damaged	Replace ratchet gear
	The spring at the speed selector position is loose or broken	Replace the speed selector position spring
gear run-out	Fork wear	Replace the fork
	Tooth space wear	Check gears and replace if necessary
	Gear damage	Replacement gear
	Shift drum groove is damaged	Replace the shift drum
	Fork shaft is worn	Check the fork shaft and replace it if necessary
	The speed selector position spring is damaged	Replace the speed selector position spring
Clutch slipping	Clutch plate wear	Replace clutch disc
	Clutch disc spring is too soft or damaged	Replace clutch spring
The motorcycle is difficult to turn	The cables made it difficult to turn	Move cables to reduce interference
	Steering shaft nut too tight	Adjust steering shaft nut
	Steering bearing worn or damaged	Check the steering bearings and replace them if necessary
	Steering shaft bending	Consult to KAYO after sales service

Hard damping	Front fork oil level is too high	Lower the front fork oil level to appropriate position
	Front fork oil is too viscous	Replace the front fork oil with the right viscosity
	Front fork bending	Consult to KAYO after sales service
	Excessive tire pressure	Check tire pressure and adjust to proper pressure
	The shock adjustment is wrong	Readjust the shock
Soft damping	Front fork oil level is insufficient	Add fork oil Note: the same oil is required
	Front fork oil viscosity is too low	Replace right viscosity
	Low tyre pressure	Check whether the tire leaks, if the tire is pumped to the appropriate pressure
	Incorrect shock adjustment	Readjust shock
Abnormal noise when motorcycle driving	Improper chain adjustment	Readjust the chain tension
	Chain wear	Replace the chain and front and rear sprockets
	Rear sprocket teeth worn	Replace rear sprocket
	Insufficient lubrication of chain	Lubricate the chain according to the manual
	Rear wheel is off-center	Check the spokes and centrally adjust the tension if necessary
	Front fork spring is soft or broken	Replace the front fork spring
	Brake disc is worn	Check the disc brake, if its thickness is less than the limit thickness, then replace
	Cylinder cover damaged	Consult to KAYO after sales service
	Improper fastening of support, nut and bolt	Check and adjust torque for corresponding fasteners
	The liner is incorrectly installed, worn or too smooth	Readjust the liner and replace as necessary
Front wheel vibration	Tyre wear	change a tyre
	Rim bias	Consult to KAYO after sales service
	Whether the front wheel bearing is worn	Check the bearings and replace it if necessary
	Motorcycle misalignment	Check the spokes and adjust the tension if necessary

	Excessive tolerance of steering shaft	Check the clearance of steering shaft pressure bearing
	Steering shaft nut loosened, handlebar unsecured	Check and re-tighten
motorcycle leans to one side	Chassis bend	Consult to KAYO after sales service
	Improper steering adjustment	Check and readjust.
	Steering shaft bending	Consult to KAYO after sales service
	Front fork is faulty	Consult to KAYO after sales service
	Motorcycle misalignment	Re-adjust the spokes tension, contact KAYO service center if necessary
Brake failure	Brake disc wear	Replace brake disc
	Insufficient brake fluid	Brake fluid supplement
	Brake fluid deterioration	Replace brake fluid
	Piston wear	Consult to KAYO after sales service
	Brake pad wear	Check the brake disc, if its thickness is less than the limits, then replace.

Tightening Torques

Note: Apply anti-rust grease on the thread and joint surface before installing the thread.

No.	Item	Specifications	Quantity	Torque (N•m)
1	Front brake caliper mounting bolt	M8×27 full thread	2	20~32
2	Steering column locking nut	Alloy silver	1	/
3	Raisers mounting screw	M8×25	4	20~32
4	Front brake disc mounting bolt	M6	4	7~11
5	Front axle mounting nut	M12×1.25	1	90~120
6	Engine mounting bolt	M8×90	2	20~32
7	Engine mounting nut	M8	2	40~70
8	Muffler mounting nut	M6	2	20~32
9	Chain slider mounting screw	M6×12	1	7~11
10	Swing arm axle mounting nut	M10×1.25	1	48~70

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11	Chain adjusting nut	M8	2	40~70
12	Connecting bolt of rear brake and frame	M10×40×1.25	2	40~70
13	Mounting bolt of rear brake disc	M6×16	4	7~11
14	Rear sprocket mounting screw	M8×20 10.9	6	27~35
15	Rear axle nut	M12×1.25	1	90~120
16	Rear brake disc cover mounting bolt	M6	4	7~11
17	Rear brake caliper mounting bolt	M6×20 full thread	1	7~11
18	Ignition coil mounting bolt	M6×16	2	7~11
19	Mounting bolt of stabilizer	M6×12	2	7~11
20	Front fender bolts	M6×16	2	7~11
21	Connecting screws between left and right plates and oil tank	M6×10 full thread	4	7~11
22	Mounting nuts of seat	M6	4	/
23	Spark plug	/	1	12~18