KOLPIN

THE COMPLETE POWERSPORTS COMPANY SINCE 1943

SERVICE MANUAL

SPORT MODEL

UTILITY MODEL

ATV 90CC FOUR STROKE

SECTION 1
CONTENTS

MAINTENANCE INFORMATION

Symbols and Marks

Symbols and marks are used in this manual to indicate what and where the special service are needed, in case supplemental information is procedures needed for these symbols and marks, explanations will be added to the text instead of using the symbols or marks.

Warning	Means that serious injury or even death may result if procedures are not followed.
Caution	Means that equipment damages may result if procedures are not followed.
Engine oil	Limits to use SAE 10W-30 API SG class oil. Warranty will not cover the damage that caused by not apply with the limited engine oil. (Recommended oil: KING MATE G-3 oil)
Grease	King Mate G-3 is recommended.
Gear oil	King Mate gear oil serials are recommended. (Bramax HYPOID GEAR OIL # 140)
Locking sealant	Apply sealant; medium strength sealant should be used unless otherwise specified.
Oil seal	Apply with lubricant.
Renew	Replace with a new part before installation.
Brake fluid	Use recommended brake fluid DOT3 or WELLRUN brake fluid.
Special tools	Special tools
Correct	Meaning correct installation.
Wrong	Meaning wrong installation.
Indication	Indication of components.
Directions	Indicates position and operation directions
	Components assembly directions each other.
	Indicates where the bolt installation direction, --- means that bolt cross through the component (invisibility)

General Safety

Carbon monoxide

If you must run your engine, ensure the place is well ventilated. Never run your engine in a closed area. Run your engine in an open area, if you have to run your engine in a closed area, be sure to use an extractor.

⚠ Caution

Exhaust contains toxic gas which may cause one to lose consciousness and even result in death.

Gasoline

Gasoline is a low ignition point and explosive material. Work in a well-ventilated place, no flame or spark should be allowed in the work place or where gasoline is being stored.

⚠ Caution

Gasoline is highly flammable, and may explode under some conditions, keep it away from children.

Used engine oil

⚠ Caution

Prolonged contact with used engine oil (or transmission oil) may cause skin cancer although it might not be verified.
We recommend that you wash your hands with soap and water right after contacting. Keep the used oil beyond reach of children.

Hot components

⚠ Caution

Components of the engine and exhaust system can become extremely hot after engine running. They remain very hot even after the engine has been stopped for some time. When performing service work on these parts, wear insulated gloves and wait until cooling off.

Battery

⚠ Caution

- Battery emits explosive gases; flame is strictly prohibited. Keeps the place well ventilated when charging the battery.
- Battery contains sulfuric acid (electrolyte) which can cause serious burns so be careful do not be spray on your eyes or skin. If you get battery acid on your skin, flush it off immediately with water. If you get battery acid in your eyes, flush it off immediately with water and then go to hospital to see an ophthalmologist.
- If you swallow it by mistake, drink a lot of water or milk, and take some laxative such as castor oil or vegetable oil and then go to see a doctor.
- Keep electrolyte beyond reach of children.

Brake shoe

Do not use an air hose or a dry brush to clean components of the brake system; use a vacuum cleaner or the equivalent to avoid dust flying.

⚠ Caution

Inhaling brake shoe or pad ash may cause disorders and cancer of the breathing system

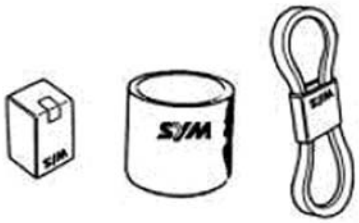
Brake fluid

⚠ Caution

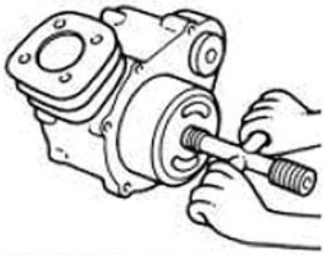
Spilling brake fluid on painted, plastic, or rubber parts may cause damage to the parts. Place a clean towel on the above-mentioned parts for protection when servicing the brake system.
Keep the brake fluid beyond reach of children.

Service Precautions

- Always use with KOLPIN genuine parts and recommended oils. Using non-designed parts for KOLPIN ATV may damage the ATV.



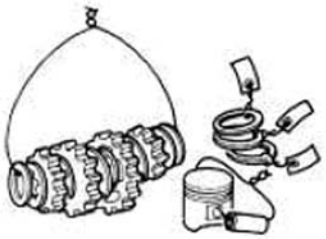
- Special tools are designed for remove and install of components without damaging the parts being worked on. Using wrong tools may result in parts damaged.



- When servicing this ATV, use only metric tools. Metric bolts, nuts, and screws are not interchangeable with the English system, using wrong tools and fasteners may damage this vehicle.
- Clean the outside of the parts or the cover before removing it from the ATV. Otherwise, dirt and deposit accumulated on the part's surface may fall into the engine, chassis, or brake system to cause damage.
- Wash and clean parts with high ignition point solvent, and blow dry with compressed air. Pay special attention to O-rings or oil seals because most cleaning agents have an adverse effect on them.

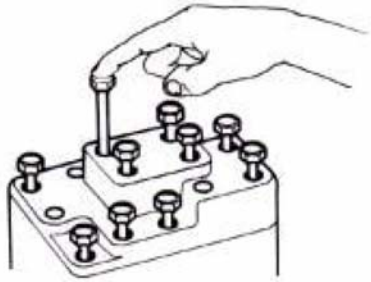
- Never bend or twist a control cable to prevent unsmooth control and premature worn out.

- Rubber parts may become deteriorated when old, and prone to be damaged by solvent and oil. Check these parts before installation to make sure that they are in good condition, replace if necessary.
- When loosening a component which has different sized fasteners, operate with a diagonal pattern and work from inside out. Loosen the small fasteners first. If the bigger ones are loosen first, small fasteners may receive too much stress.
- Store complex components such as transmission parts in the proper assemble order and tie them together with a wire for ease of installation later.

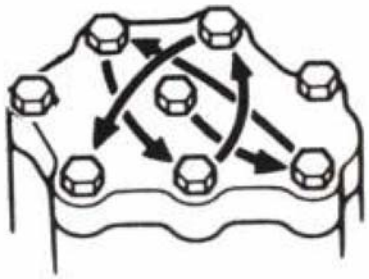


- Note the reassemble position of the important components before disassembling them to ensure they will be reassembled in correct dimensions (depth, distance or position).
- Components not to be reused should be replaced when disassembled including gaskets metal seal rings, O-rings, oil seals, snap rings, and split pins.

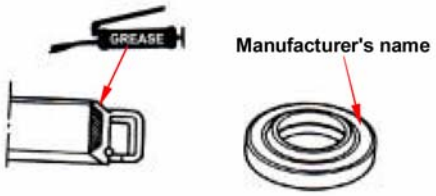
- The length of bolts and screws for assemblies, cover plates or boxes is different from one another, be sure they are correctly installed. In case of confusion, Insert the bolt into the hole to compare its length with other bolts, if its length out side the hole is the same with other bolts, it is a correct bolt. Bolts for the same assembly should have the same length.



- Tighten assemblies with different dimension fasteners as follows: Tighten all the fasteners with fingers, then tighten the big ones with special tool first diagonally from inside toward outside, important components should be tightened 2 to 3 times with appropriate increments to avoid warp unless otherwise indicated. Bolts and fasteners should be kept clean and dry. Do not apply oil to the threads.

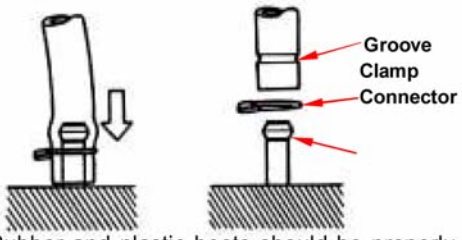


- When oil seal is installed, fill the groove with grease, install the oil seal with the name of the manufacturer facing outside, and check the shaft on which the oil seal is to be installed for smoothness and for burrs that may damage the oil seal.

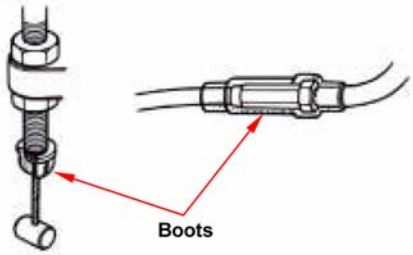


- Remove residues of the old gasket or sealant before reinstallation, grind with a grindstone if the contact surface has any damage.

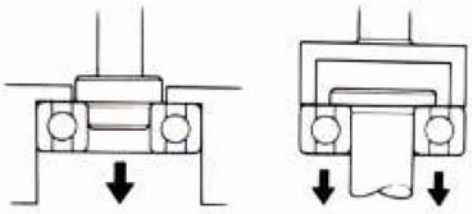
- The ends of rubber hoses (for fuel, vacuum, or coolant) should be pushed as far as they can go to their connections so that there is enough room below the enlarged ends for tightening the clamps.



- Rubber and plastic boots should be properly reinstalled to the original correct positions as designed.

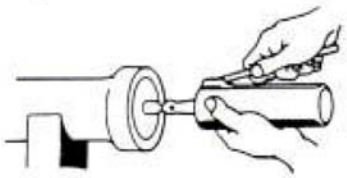


- The tool should be pressed against two (inner and outer) bearing races when removing a ball bearing. Damage may result if the tool is presse against only one race (either inner race or outer race). In this case, the bearing should be replaced. To avoid damaging the bearing, use equal force on both races.



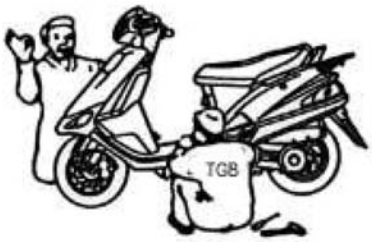
Both of these examples can result in bearing damage.

- Lubricate the rotation face with specified lubricant on the lubrication points before assembling.

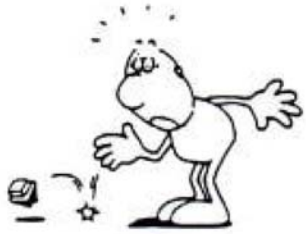


- Check if positions and operation for installed parts is in correct and properly.

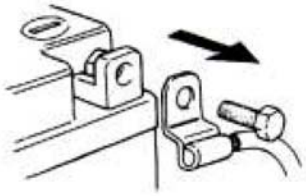
- Make sure service safety each other when conducting by two persons.



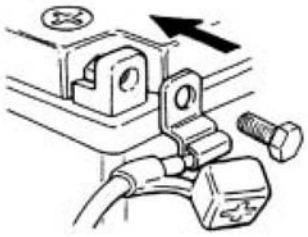
- Note that do not let parts fall down.



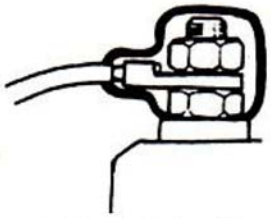
- Before battery removal operation, it has to remove the battery negative (-) cable firstly. Notre tools like open-end wrench do not contact with body to prevent from circuit short and create spark.



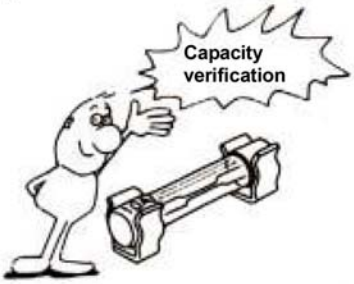
- After service completed, make sure all connection points is secured.
  Battery positive (+) cable should be connected firstly.
- And the two posts of battery have to be greased after connected the cables.



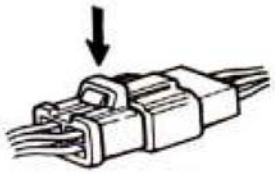
- Make sure that the battery post caps are located in properly after the battery posts had been serviced.



- If fuse burned, it has to find out the cause and solved it. And then replace with specified capacity fuse.

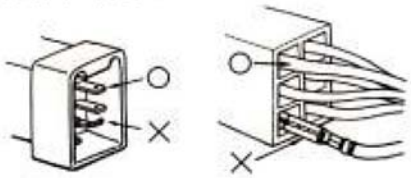


- When separating a connector, it locker has to be unlocked firstly. Then, conduct the service operation.

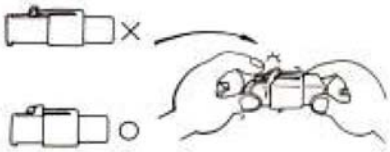


- Do not pull the wires as removing a connector or wires. Hold the connector body.

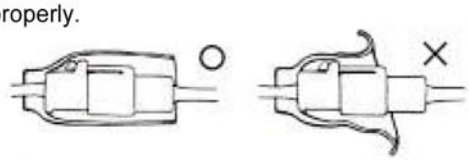
- Make sure if the connector pins are bent, extruded or loosen.



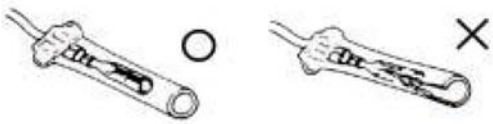
- Insert the connector completely.
  If there are two lockers on two connector sides, make sure the lockers are locked in properly.
  Check if any wire loose.



- Check if the connector is covered by the twin connector boot completely and secured properly.

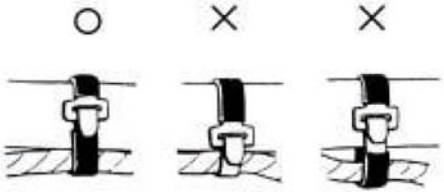


- Before terminal connection, check if the boot is crack or the terminal is loose.

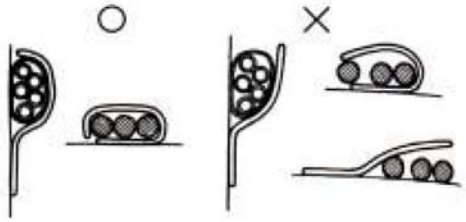


- Insert the terminal completely.
  Check if the terminal is covered by the boot.
  Do not let boot open facing up.

- Secure wires and wire harnesses to the frame with respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.

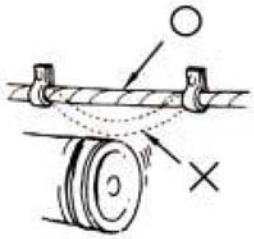


- Wire band and wire harness have to be clamped secured properly.

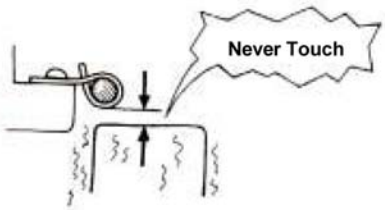


- Do not squeeze wires against the weld or its clamp.

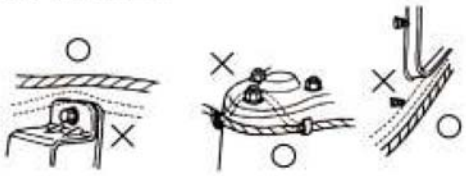
- Do not let the wire harness contact with rotating, moving or vibrating components as routing the harness.



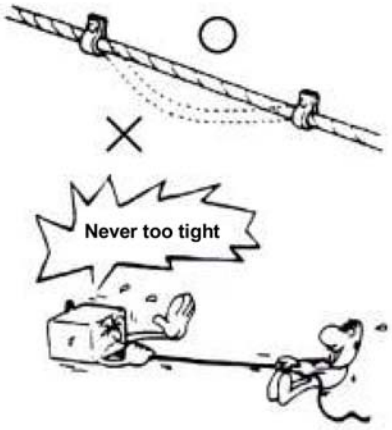
- Keep wire harnesses far away from the hot parts.



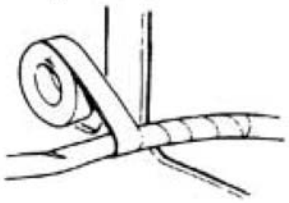
- Route wire harnesses to avoid sharp edges or corners and also avoid the projected ends of bolts and screws.



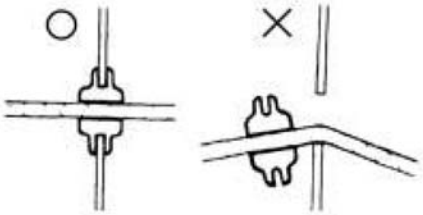
- Route harnesses so that they neither pull too tight nor have excessive slack.



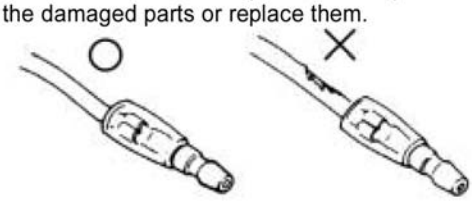
- Protect wires or wire harnesses with electrical tape or tube if they contact a sharp edge or corner. Thoroughly clean the surface where tape is to be applied.



- Secure the rubber boot firmly as applying it on wire harness.

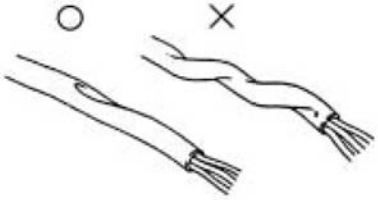


- Never use wires or harnesses which insulation has been broken. Wrap electrical tape around the damaged parts or replace them.

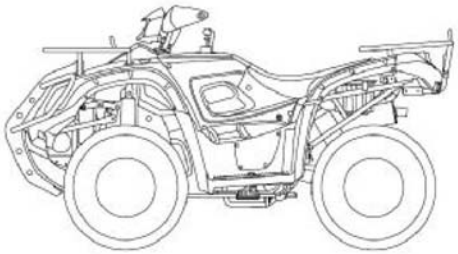


- Never clamp or squeeze the wire harness as installing other components.

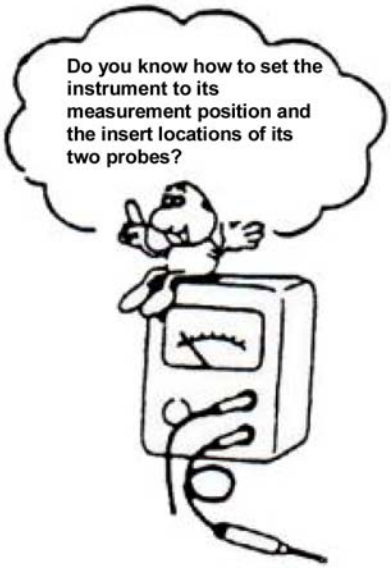
- Do not let the wire harness been twisted as installation.



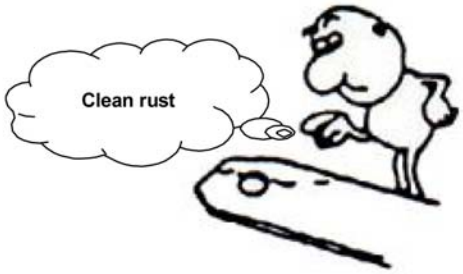
- Wire harnesses routed along the handlebar should not be pulled too tight or have excessive slack, be rubbed against or interfere with adjacent or surrounding parts in all steering positions.



- Before operating a test instrument, operator should read the operation manual of the instrument. And then, conduct test in accordance with the instruction.



- With sand paper to clean rust on connector pins/terminals if found. And then conduct connection operation later.



Specifications

item	specification
engine type	147FMF
pattern	single cylinder 4 stroke air cooling tilt 80° horizontal
bore* stoke	ф47×49.5
capacity	86ml
compression ratio	9.1：1
rating power& rating running speed	4.7kw[（7500~8500）r/min]
maximum torque	6.2N.m[（5500~6000）r/min]
minimum fuel consumption rate	367g/kwh
minimum idle stable running speed	1500±150r/min
lubricating oil brand of engine	SE-15W/40（GB 1121/1995）
lubricating oil pump pattern of engine	inner gear rotator type
lubrication type of engine	pressure splash type
air cleaner type	
carburetor type	stem plug type
gasoline brand	90# unleaded gasoline（GB17930-1999）
ignition type & ignition tilt	CDI electronic ignition 1500r/min 时 15° ±1° 4000r/min 35° ±1°
rotating direction of engine	rotating to left side (view the end of output shaft facing power)
spark plug type & gap	BPR8HS：0.6~0.7mm
valve gap	0.02-0.07mm
starting motor type	magneto direct current type
magneto type	without connecting point type of flywheel
clutch type	fixed shaft direction pressure and multilayer rubbing fuel washing pattern
gearshift type	cycle and non cycle pattern
speed ratio primary speed ratio	3.722
gearshift speed ratio	first gear 3.273 second gear 1.938 third gear 1.350 fourth gear 1.043
gearshift device	cycle and non cycle pattern
ending speed ratio	3.882
output type	chain drive
gearshift type	left foot operational pattern N-1-2-3-4
starting type	electric starting / recoil starting with pedal
outer size	461×370×360mm
net weight of engine	21.5kg

Torque values

Engine

item	quantity	screw thread dia.mm	torque value N.m
nut, cylinder head cover	4	6	8.0-12
intake pipe bolt	2	6	9.0-14
cam sprocket bolt	3	5	8.0-11
adjusting screw, valve	2	5	7.0-11
lock nut, clutch	1	14	38-45
flywheel fixed nut, magneto	1	10	30-38
drain plug, engine	1	12	20-25

other torque value for regular fasteners should refer to the following table, besides some torque valve for important parts are listed in the above table.

name & screw thread spec	torque value（N.m）
5mm bolt nut	4.5-6.0
6mm bolt nut	8-12
8mm bolt nut	18-25
10mm bolt nut	30-40
12mm bolt nut	35-50
5mm bolt nut	3.5-5
6mm bolt nut	7-11

Specialized tools

tool name	reference chapter
flywheel puller	
mounting holder,clutch	

special tools

Maintenance Schedule

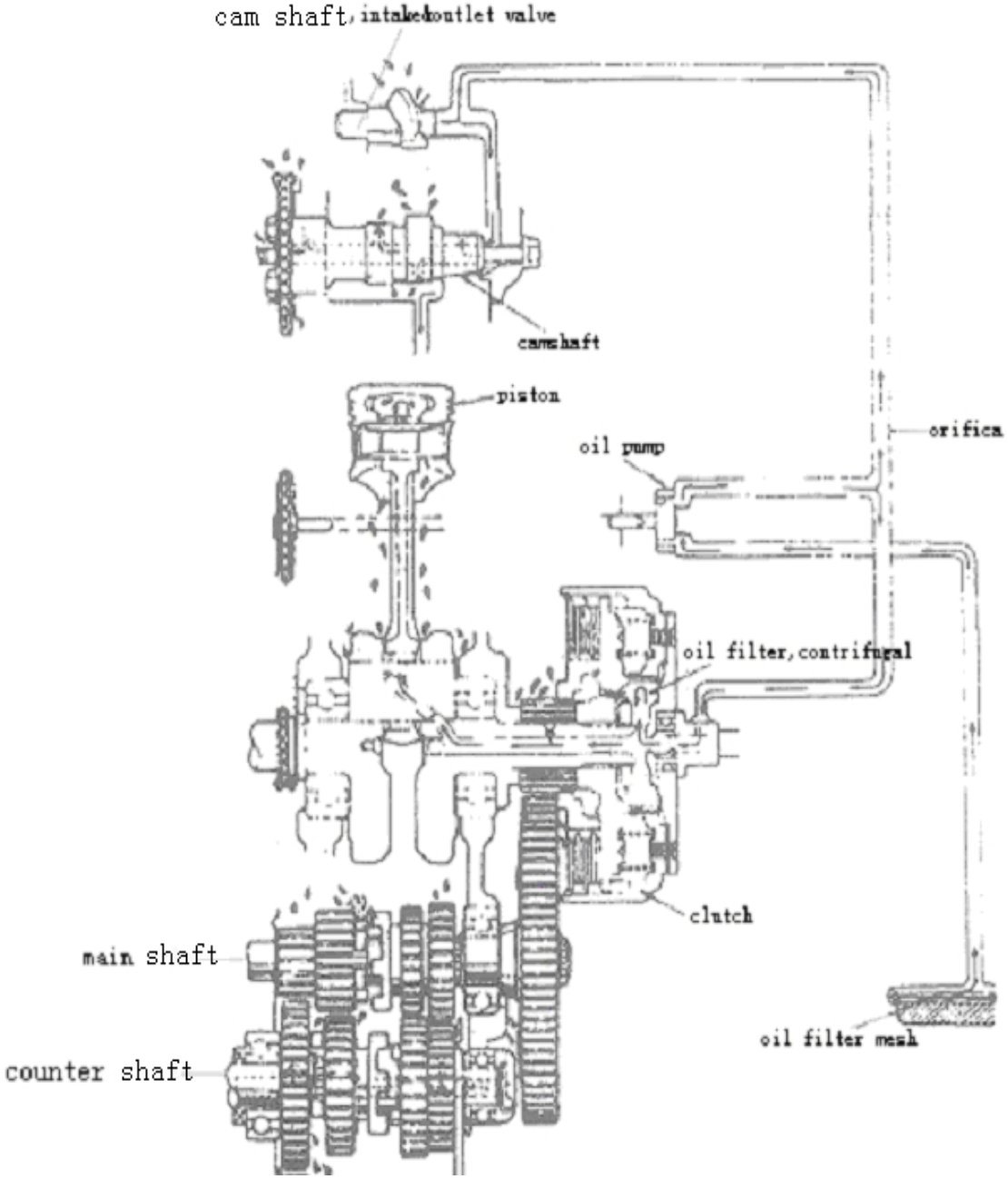
frequency / items		item period	mileage table km（note 2）				
			1000km	4000km	8000km	12000km	
*	fuel system		—	I	I	I	
	spark plug		—	I	I	I	
	lubricating oil, engine	yearly	R	R	every run 2000km		
replace *	filter mesh, lubricating	yearly		—	C	C	
	oil						
**	valvegap		—	I	I	I	
	air cleaner		—	C	C	C	
	idle speed system,carburetor		I	I	I	I	

The engine should be repaired within regular repairing time. Before repairing, the engine should be cleaned.
In the above table, the sense of each sign is followed.
I： Check-up, washing, adjusting, lubricating or replacement C：washing R：replacement A：adjusting
L：lubricating *： The item needs repairing by service station of KOLPIN. If the user has specialized tools, repairing parts or repairing ability, he can repair it by himself.
**： For the sake of safety, the item can only be repaired by service station of KOLPIN POWERSPORTS.

Note:

1. Wash the whole vehicle usually, when running in dusty conditions prior to servicing.
2. Perform service at mileage or time schedule, whichever comes first.

Lubrication system diagram



Section 2
Lubrication system

Service notice

General rules

The section mainly introduces washing, check-up and replacement of the lubrication system and each part in system for engine. When checking up and washing lubrication system, the engine may be dismantled step by step, but the lubricating oil in engine needs draining before checking up and washing.

Technology specification

		standard value	service limit
engine oil capacity		the capacity of replacing oil is about 0.8L, the capacity of mantling engine is 0.9L.	
Oil pump	radial clearance for inner & outer rotator	0.15-0.20mm	
Oil pump	radial clearance between pump body and outer rotator	0.02-0.07mm	
Oil pump	shaft-apt clearance	0.10-0.15mm	

Troubleshooting

Engine oil consumption excessive

1.engine oil leakage;
2. piston rings worn;
3. intake & output valve guides worn;

Lubrication work badly

1.oil level is too low;
2. oil strainer glogged or worn out;
3. oil pump worn out;

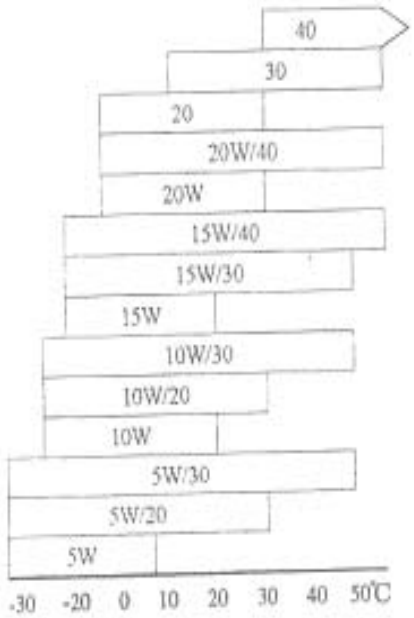
4. Transmission shaft oil seal assembled improperly or is damaged.

Engine oil is unclean.

1. Engine oil not changed according to service period table.
2.The screw thread of oil fill hole worn out.

Lubrication system of engine

Lubricating system of engine:



Lubricating oil of engine:

The lubricating oil is 15W/40QE grade gasoline oil and not common oil or other oil when this vehicle leaves our factory.

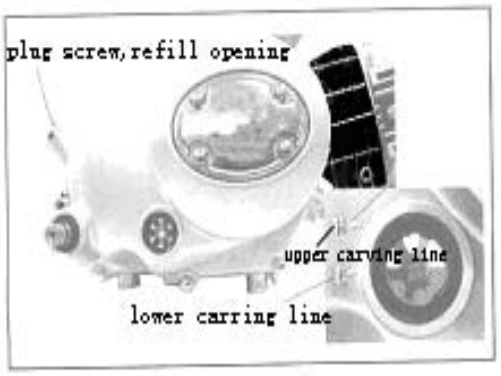
The viscosity of engine oil should be used separately according to different area and temperature change. The right picture shows the engine oil brand recommended under different temperatures. If there is no way to purchase 15W/40QE gasoline oil, use 10w-40 (5w-40 only used under -10℃) instead.

Engine oil capacity:

The capacity of engine disassembled and reassembled is 0.9L.

The capacity is 0.8L after draining oil and fill.

Fuel pump flow capacity is 2.2L/min (4000r/min)



Check-up of lubricating oil

Back up motor on the flat ground with main bracket, check up net oil capacity. If oil level is under the low carved line, the oil recommended should be made up, and make it above upper carved line.

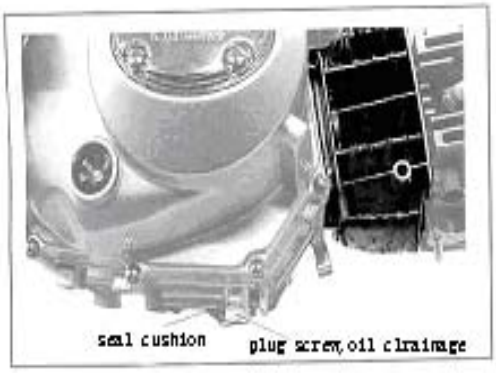
The replacement of lubricating oil

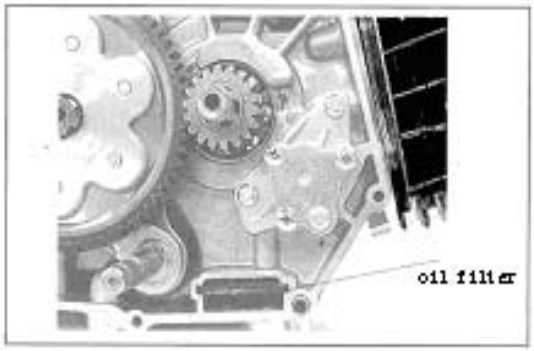
When replacing lubricating oil, the engine should be warmed up and not cool down. Doing such can promise removing the lubricating oil in crankcase. When replacing, place a plate under the engine to make oil drop into the plate, and then unload the drain plug. After finishing oil drain, we should check up the plug washer in proper, and then assemble the drain plug.

torque value of oil drain plug: 20-25N.m

Fill 0.8L new lubrication from the refueling spout.

Load the plug of refueling spout, and start the engine, and then stop the engine after running for 2-3 minutes at the idle speed. Back up the vehicle, and check the oil level normal (put the motor vertically), and finally check the leakage normal.





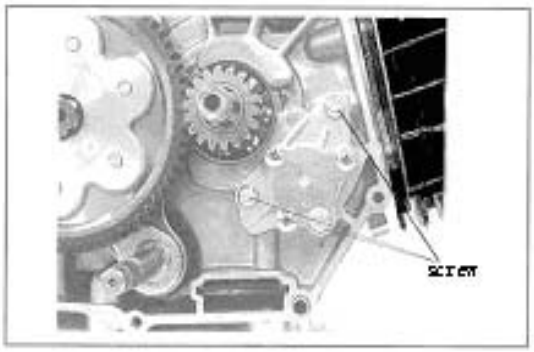
Disassemble oil mesh.

Clean away the mesh, and then put it into right crankcase body.

Load the following parts well:

Right crankcase cover, kick arm, exhaust muffler, clutch operation cable, footwell and clutch outer cover.

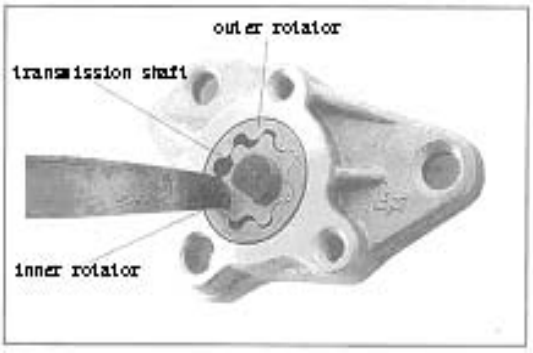
Fill recommended oil into crankcase, and start engine and make it run for 2-3 minutes at the idle speed, and then turn off engine, put the motor in porper, and check the capacity of lubrication. Never make leakage exist.



Oil pump

Screw off oil drain plug, and drain oil. Disassemble right crankcase cover.

Disassemble clutch assy and three screws of oil pump, and then unload the oil pump.

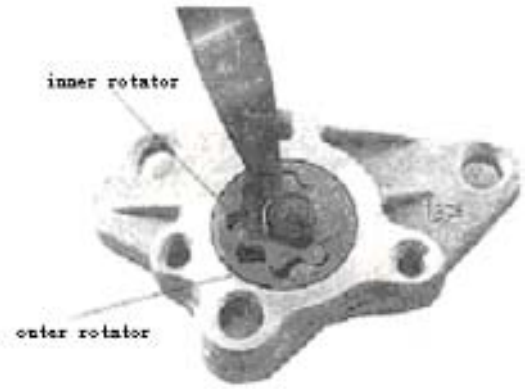


check-up of oil pump

Unload the oil pump cover.

Measure the radial clearance of inner/outer rotator according to diagram.

service limit：0.20mm



Measure the radial clearance between outer rotator and oil pump body according to diagram.

service limit：0.12mm

Measure the end surface clearance between rotator and oil pump.

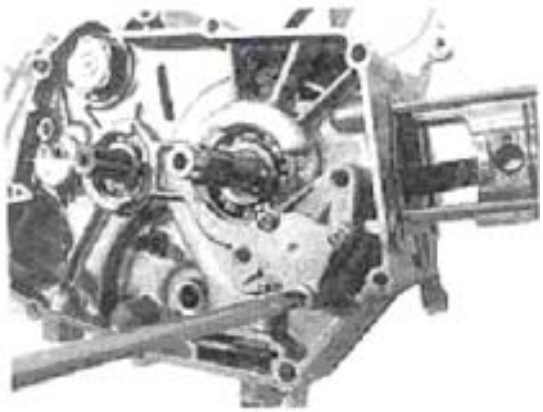
Service limit: 0.20mm

Assembly of oil pump

Assemble inner & outer rotator of oil pump. Insert oil pump shaft and make surface of oil pump alignment with surface of inner rotator.

Load seal cushion of oil pump and oil pump cap, and fasten them with screw.

Note: After assembly, oil pump can run normally.



Setting of oil pump

Assemble order: seal cushion of oil pump cover, oil pump cover, screw

Set the oil pump with seal cushion, make oil pump shaft alignment with the opening on oil pump sprocket shaft. Load the clutch, right crankcase and muffler.

Adjust clutch well.

Fill oil into crankcase.

Section 3
Check-up and adjustment

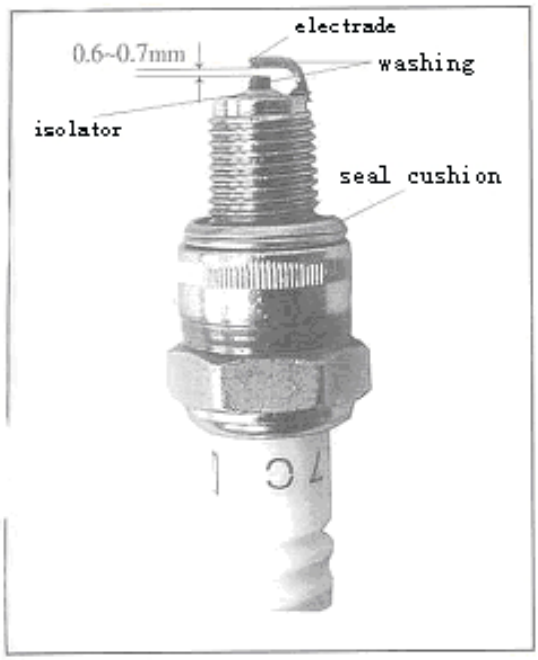
Service notice

General rule

This book introduces check-up and adjustment for all parts of CQ90FMH type engine. At the same time, it also introduces the technology requirement of adjustment and check-up. For check-up and washing of lubricating system, refer to second section.

Technology requirement

ignition timing：	ignition before piston reach the top point 27°/1500rpm
recommended spark plug：	China pattern BPR8HS
clearance for spark plug：	0.6-0.7mm
valve clearance：	0.02-0.07mm
idle speed：	1500±150rpa
cylinder compression power	1247kpa±196kpa



Spark plug

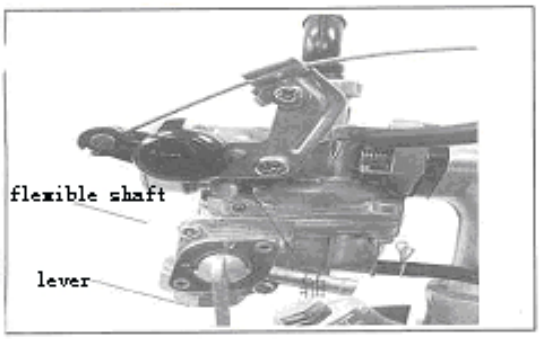
Take off spark plug cap.

Take off spark plug with barrel spanner. Wash the dust around spark plug. Central electrode should be square side, and side electrode should have a certain thickness, and check electrode ablated. If spark plug is damaged obviously or isolator is split, new spark plug should replaced.If seal cushion of spark plug has been worn, replace it.

Check up the electrode clearance with caliber gauge. The electrode clearance of spark plug is 0.6-0.7mm.

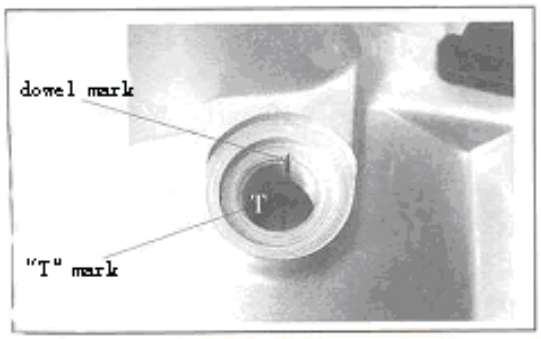
Carefully adjust the clearance, and then remove the deposited carbon or dust with spark plug washer or steel silk.

Load spark plug, by hand swirl spark plug into and screw it tightly, and then screw it tightly with barrel spanner. And then cover the spark plug cap.



Choke lever

Check choke lever for moving freely, and location standard. If obstacle occurs when moving, drop some drops of lubrication into flexible shaft. Polish shaft and shaft sheath on carburetor and wash them and then coat oil on them.



Valve clearance

Note: adjust valve clearance when engine is on cool condition.(temperature is lower than 35℃)

Disassemble decoration cover and upper sight hole cover.

Insert decoration cover hole with barrel spanner, and cover on nut of crankshaft.

Turn magneto flywheel counterclockwise, and make mark “T” on flywheel alignment with indicating mark on left front cover. At this moment, piston should be on the location of upper stop point of compression play.

Take off valve cover.

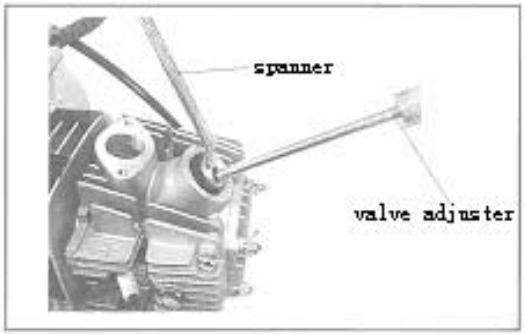
Insert plug gauge between adjusting screw and valve pole to check the clearance.

valve clearance： intake valve 0.03mm venting valve 0.05mm

When adjusting, loosen the nut and then rotate adjusting screw until caliber gauge feels light resistance. Then make adjusting screw stable with valve adjuster, and rotate lock nut tightly.

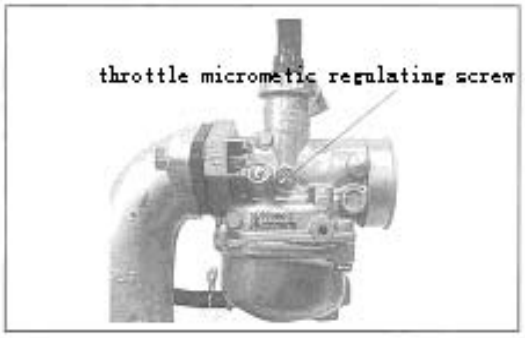
Then check up valve clearance.

Finally assemble valve cover, decoration cover and upper sight hole cover well.



Idle speed of carburetor

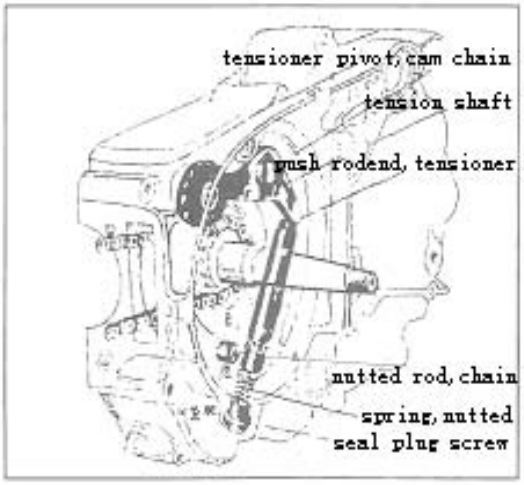
Note: after adjusting other item of engine into regulated range, check and adjust idle speed of carburetor.



Adjust when engine is warmed up and running. Back up the motor with main bracket, and adjust idle speed and screw of carburetor.

idle speed 1500r/min

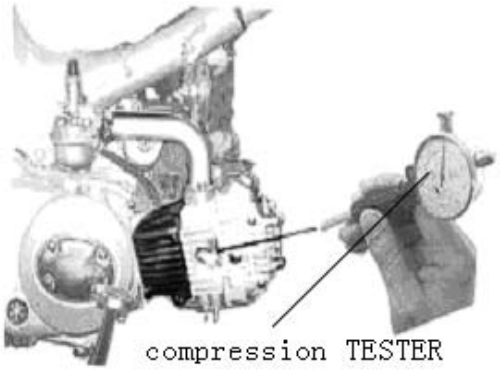
Tension for timing chain



Start engine and make it run at the idle speed, and check up tension for timing chain.

If chain is not tensioned, put motor on level stand, loosen seal plug, and check up spring of chain tensioner pole in proper, and check up whether oil enter inside chain tensioner comp. If the spring is not effective, and replace it. If no oil enter inside tensioner pole, loosen seal bolt, and fill some oil on it.

After finishing the above checking work, assemble each part well.



Cylinder pressure

Warm up the engine and make engine flameout, and disassemble spark plug. Load pressure table and close choke, and make throttle turning bar open completely. Run starter motor quickly.

Note: Cycle starter until the number on pressure table does not go up. The maximum degree usually reaches after 4-6 times starting.

cylinder compression power: 1274kpa±196kpa

pressure power is too low:

1. valve adjustment improper
2. cylinder head leaks air
3. seal cushion of compression tester leaks air
4. piston ring or cylinder worn

pressure power is too high:

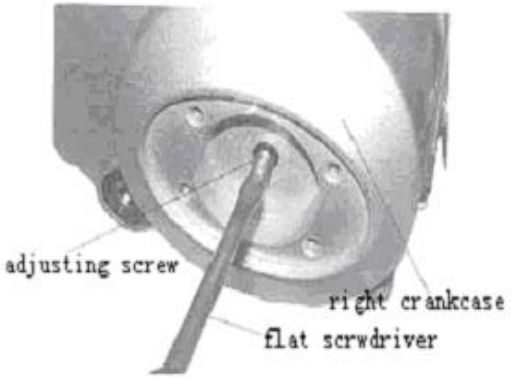
1.Deposited carbon exist in combustion chamber on piston.

Drive sprocket

。Check up whether drive sprocket gear and driven sprocket gear have excess wearing, if they are worn excessively, replace them.

Note: Never set new chain on a worn sprocket. Sprocket and chain must be replaced, as a set to reduce.

Adjustment of clutch



1. remove decoration cover of right cover of engine
2. loosen adjusting nut of clutch
3. screw adjusting screw of clutch tightly with screwdriver, until resistance is felt 1/4 turn.
4. screw adjusting nut of clutch, and torque to 18~25N.m.

Section 4
Carburetor

Service notice

General rule

1. Deal with gasoline carefully only in a well ventilated area, and far away from spark and flame.
2. Dismantling all parts of fuel system should pay attention to mounting position of "O"ring. When assembling again, replace new "O" ring.
3. There is fuel drain screw under float champer, loosen the screw and remove gasoline left in float bowl

Troubleshooting

Engine may ignite but not start

1.no fuel flow to engine
2.no fuel flow into carburetor
3.too much fuel enter cylinder
4.air cleaner clogged

Mixture air is too rich

1.choke is closed
2.fuel level in carburetor is too high
3. air jet spout of carburetor clogged
4.float is clipped or float needle is sticking open
5.air cleaner is not clean

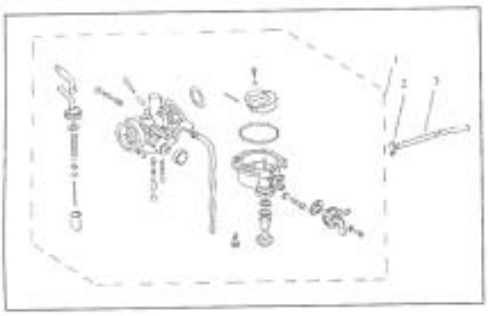
Mixture air is too lean

1. jet of carburetor clogged
2.breather hole of fuel bowl cover clogged
3. fuel filter clogged
4. fuel in fuel pipe flows badly
5.float needle has troubles
6.Fuel level in carburetor is too low

Idle speed of engine is not stable, speed losing or running badly

1.idle speed adjusts improperly
2. mixture air is too rich
3.mixture air is too lean

4.cylinder compression is too low
5. air filter clogged
6. impurity in fuel
7.Fuel is old



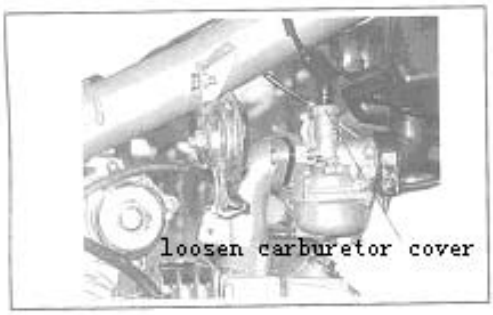
Carburetor disassembly

Close fuel cock, and disconnect fuel panel. And dismantle choke operation wire. Loosen oil drain screw of carburetor and drain fuel in carburetor bowl.

Take off connecting bolt between carburetor and intake pipe, and diamantle connecting spring clip washer between carburetor and air cleaner.

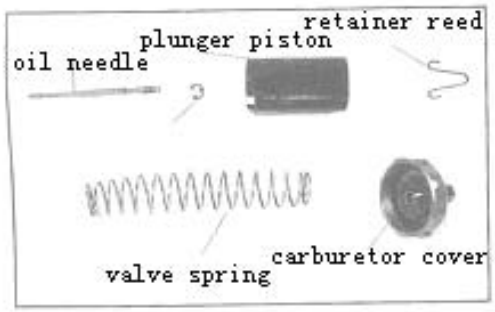
Then take off carburetor cover, and take out valve plunger piston. And disassemble carburetor.

Note: Keep away from spark and flame. Clean up any spills immediately.



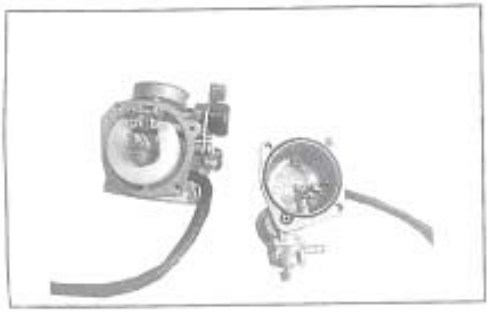
Carburetor slide

In lower socket of carburetor slide disconnect the end of throttle operation wire. Press down spring of slide when disassembling.



Disassemble dowel spring of fuel needle, and then disassemble fuel needle and fuel needle clip together from bleeding valve.

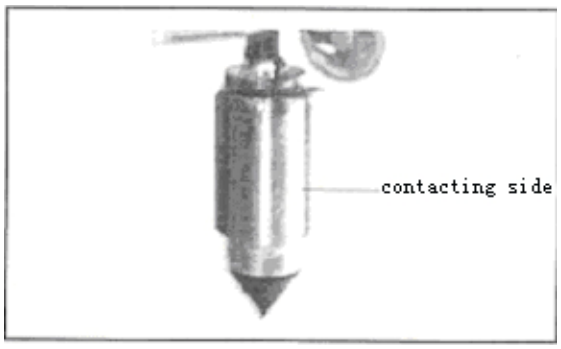
Check for bleeding valve and fuel needle surface clean, smooth, scratch or worn.



Float, float needle, jet

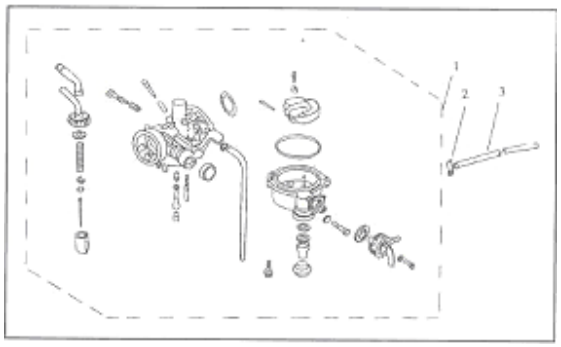
Disassemble connecting screw of float champer cover, and take off float champer cover. Then take out float arm pin.

Disassemble float and float needle. Check for float needle seat worn. If necessary, replace new float needle.



Dismantle main jet, jet spout of air bleeder, idle speed orifice, bleeding shutter and idle speed screw. And then dismantle air screw adjustment.

Note: Measure mounting position of adjustment screw before dismantling air screw adjustment. Record the cycle number of dismantling screw. Otherwise, mounting air screw adjustment will cause unnecessary troubles.

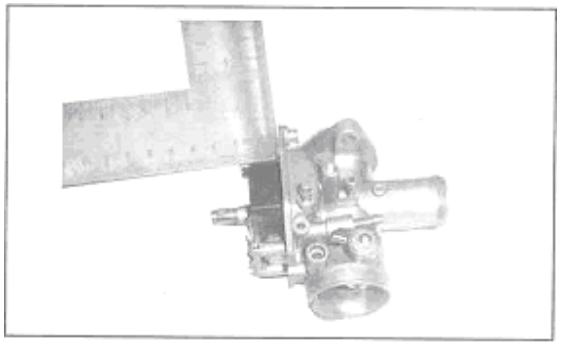


Then wash hole panel and surface of carburetor with cleaning solution. After washing, blow full hole panel with compression air, and clear away dirt.

Then, assemble idle speed orifice, jet spout of air bleeder,main jet and idle speed screw according to the reverse order of disassembly. Assembly air screw adjustment according to mounting positon before disassembly.

opening positon of air screw adjustment:

Screw in place and then return 1-3/4 cycle.

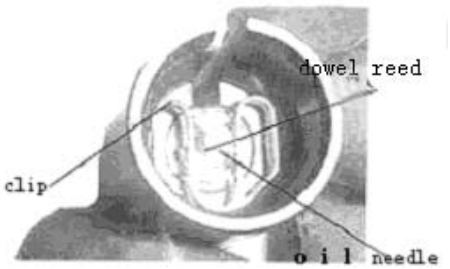


Mounting float,float needle, and then insert float arm pin.

Measurement of float height

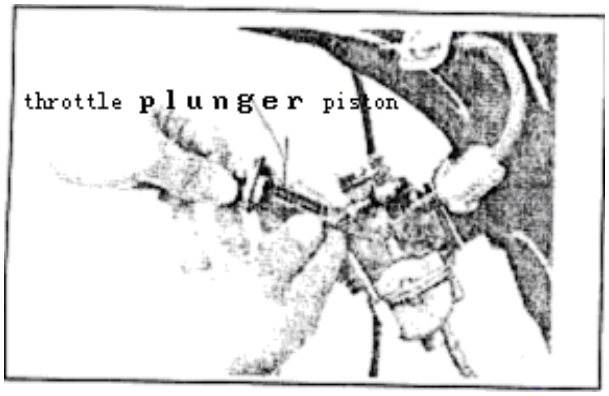
Measure height of float with height gauge.

20 .0mm If height of float is not correct, and adjust float height.



Carburetor slide mounting

Mounting clip inner ring groove of fuel needle. And insert fuel needle into carburetor slide, and then mounting dowel reed.

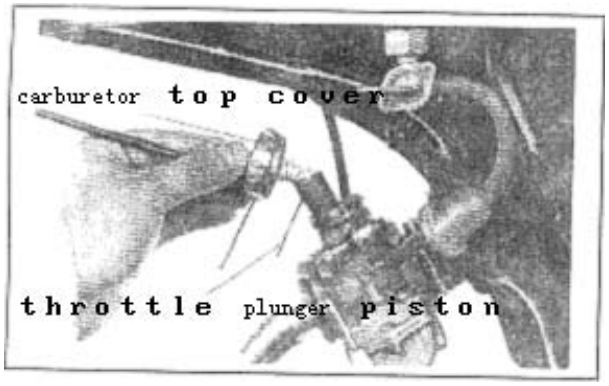


Then, mounting plunger piston spring inner throttle operation wire. And connect operation wire with slide plunger piston well.

Carburetor mounting

Mounting slide inner carburetor.

Note: make sure socket of slide aligns with adle speed adjust screw of carburetor.



Spin end cover of carburetor top tightly.

After mounting carburetor, adjust free play of throttle handlebar with adjuster on throttle operation wire.

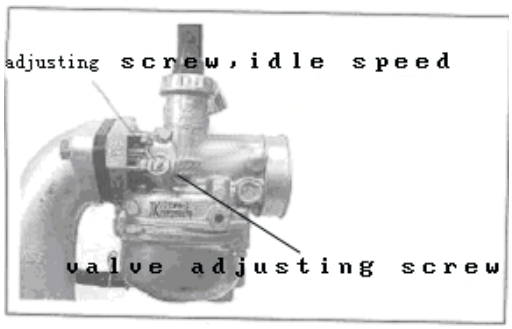
free play of throttle handlebar: 2—6m m

Adjustment of idle speed adjustment screw

Spin idle speed adjustment screw clockwise until it touches screw hole holder. And then spin counterclockwise to standard position.

standard position: 1-3/4cycle

Note: If idle speed adjustment screw and screw hole holder are screwed tightly, doing such will damage screw hole holder.



Start engine and make it warm up to work temperature. Adjust adjusting screw of bleeding shutter, and make idle speed reach 1500r / min.

Adjusting idle speed adjusting screw slightly, and make it reach running speed, for example, when over 1500r/min, and adjusting valve adjustment screw to make idle speed reach 1500r/min.

Section 5
Disassembly and assembly of engine

Service notice

General rule

When disassembly and assembly of engine, back up the motor with main stand, if disassembly and assembly on lift plat, fix front wheel and make maintenace for the following parts and comp after dismantling engine from the frame.

- cranklever and piston
- recoil starting unit
- transmission unit
- cam chain tensioner
- intake and oulet valve

Skill specification

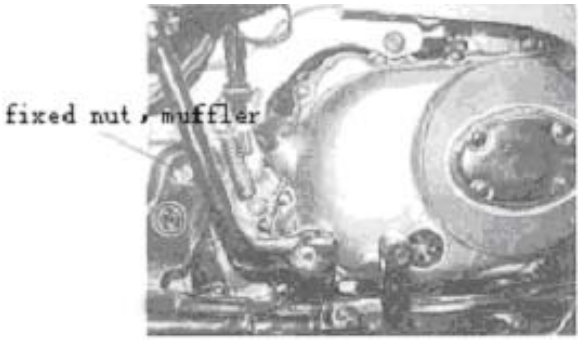
engine weight: 21kg

oil capacity: filling volume is0.8L after disassembly.

Rating torque:

hang bolt of engine:	39—49N .m
bolt of transmission sprocket:	39—45N. m
pedal bolt:	35 45N.m
exhaust pipe bolt:	8—12N.m

Disassembly of engine

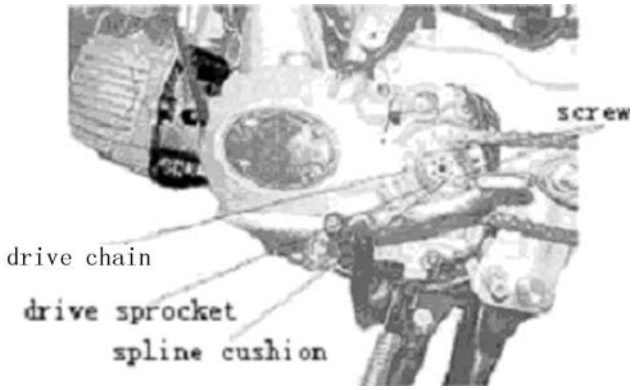


Drain off lubrication from engine.

Diamantle exhaust pipe fixed nut and muffler fixed nut, and take off exhaust muffler.

Take off spark plug cap, and move away high voltage wire from fixed clip of high voltage wire.

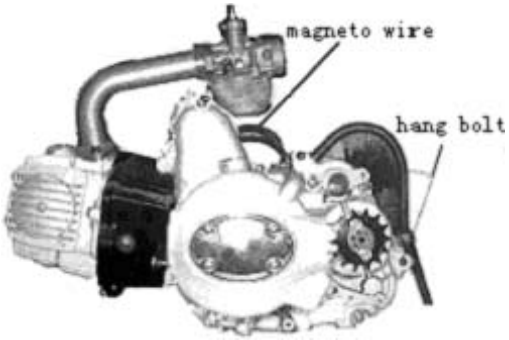
Dismantle clutch operation wire.



Disassemble and rear cover of left crankcase.

Loosen rear axle nut and transmission chain adjuster, and then dismantle spline cushion, drive sprocket and driven chain.

Place a jack or other backing equipment adjustable under engine.



Disconnect magneto and gear position switch and main cable and connecting wire. Disassemble starting motor wire.

Disassemble the two hang bolt of engine, and then disassemble engine.

Note: Remove engine slowly.

Assembly of engine

The assembly order of engine is basically the reverse order of disassembly process.

Note: Check correct connecting of all wires
Adjust free play of throttle cable well
Adjust the free play of clutch wire.
Adjust the sag of driven chain.
fill recommended oil into crankcase until oil reaches proper positon.

rating torque:
drive sprocket bolt: 39-45N .m
pedal fixed bolt: 39M5N.m
hang bolt of engine: 39~49N .m

Mounting of muffler

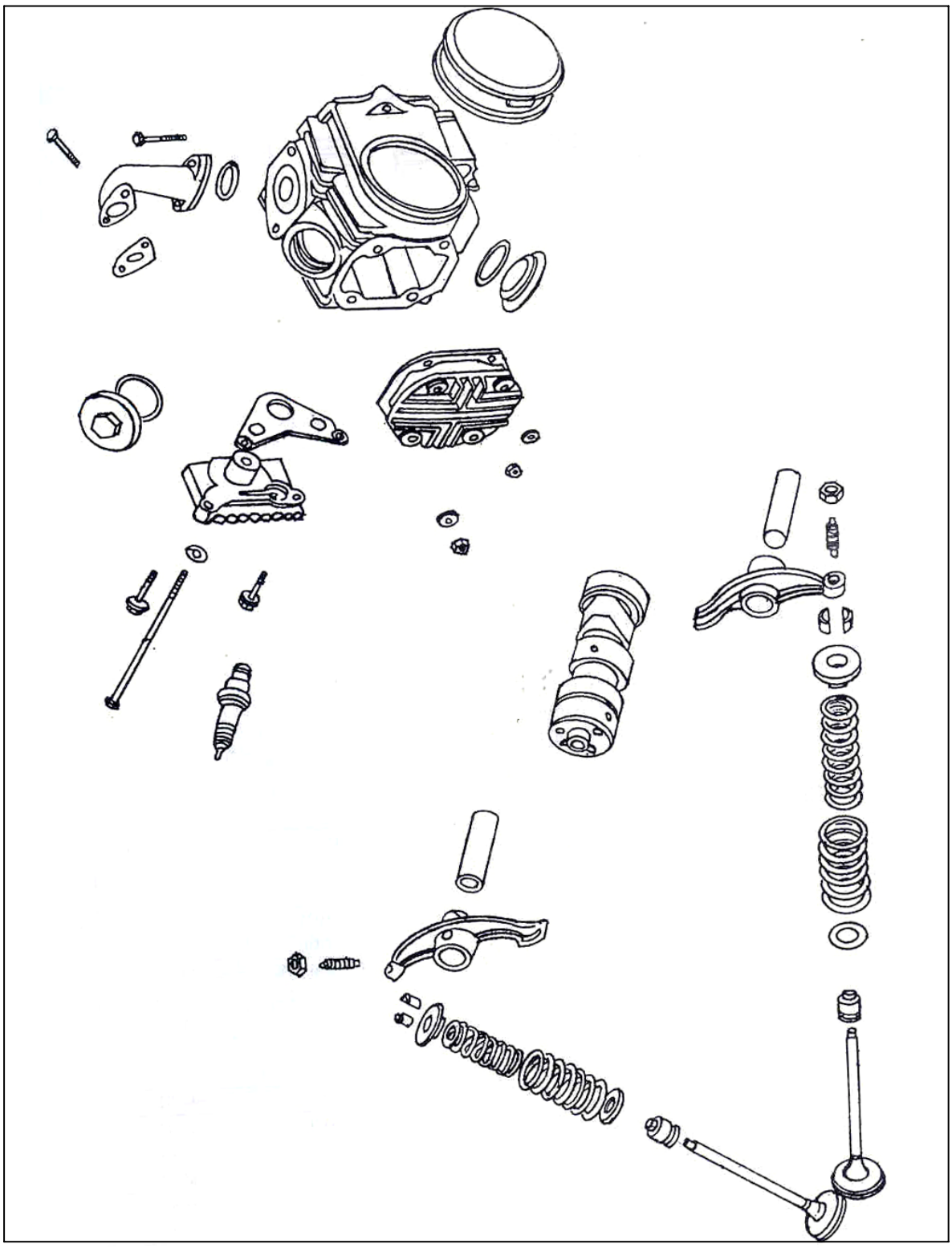
Firstly fasten the muffler on cylinder head and frame with two nuts and frame fixed nut of muffler, but not screw them tightly.

After feeling seal of cylinder head outlet mouth is good, screw two fixed nuts of exhaust pipe tightly, and then screw fixed nut between muffler and frame.

Note: After assembly, air leakage can not be allowed on exhaust spout.

rating torque:
fix nut of exhaust pipe: 8-12N.m
fix bolt of muffler: 39-49N.m

Cylinder head and valve



Chapter 6
Cylinder head and valve

Service notice

The section introduces the maintenance and check of the part: Cylinder head, Valve, Camshaft and rocker shaft. Above-mentioned section, it can be implemented but not tear down the engine.

Camshaft and rocker shaft lubrication oil passes from the oil groove, so it must be guaranteed the oil groove keep free.

When assembled, supramoly lubricant should be coated on bearing of the camshaft as basic lubricant.

When installed the Cylinder head, it should be installed the new coil form obturating ring and gasket seal.

Technology specification

Items			Reference value (mm)	service limits mm
Camshaft	Cam rise	Air-in	26.641	26.25
		air-out	26.408	26.02
	Oil clearing dist.		0.010-0.025	0.1
	lateral clearance dist.		0.004-0.036	0.1
Rocker hole	inner diameter		φ10.000-φ10.005	φ10.10
Rocker shaft	outer diameter		φ9.978-φ9.987	φ9.91
valve spring	unbraced length	outer layer	35.5	34.0
		internal layer	32.8	31.2
valve dist.	（air-in/air-out）		0.03-0.05	—
Valve	valve spindle outer diameter	air-in	φ4.970-φ4.985	φ4.92
		air-out	φ4.955-φ4.970	φ4.92
	valve tube inner diameter	air-in	φ5.000-φ5.012	φ5.03
		air-out	φ5.000-φ5.012	φ5.03
	Dist. Betw. Valve spindle and tube	air-in	0.015-0.042	0.08
		air-out	0.030-0.050	0.10
	Valve seating width		1.0	1.6
Cylinder head	flatness		—	0.05

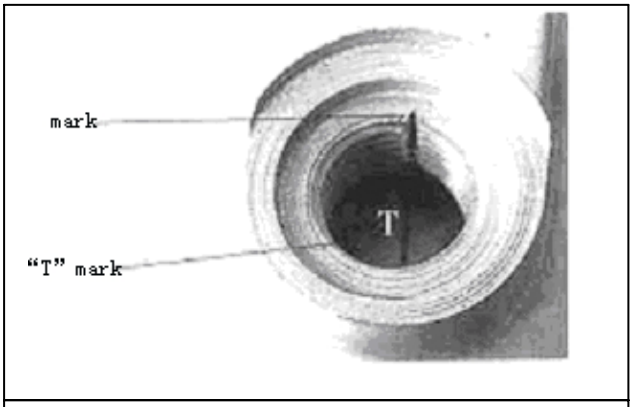
Troubleshooting

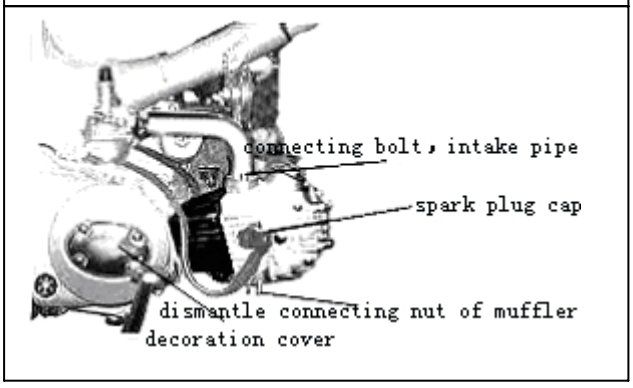
Black smoke in exhaust air

1. Valve seat worn out
2. cylinder head gasket is leaking
3. piston ring end gap is outside of specification

Overloud Noise

1. The adjustment of valve is not correct
2. Valve gets stuck or valve spring broken
3. Camshaft and rocker shaft gets wear and tear
4. Timing chain is too long
5. Timing not set to specification
6. Tensioner of timing chain gets wear and tear or damage
7. Timing chain wheel tooth gets wear and tear





Pressure in cylinder is below normal

1.Valve

--Adjustment of valve distance is not correct

--sealing of valve is not good

--Timing distribution is not correct

--Valve spring is cracking

2. Cylinder head

--The spark plug is not tight

-- Cylinder head gasket is leaking or damaged

-- Cylinder head has crack and pinhole porosity

3. Cylinder and piston

-- Piston ring end gap is relative oversize and cracking

--Piston has crack and is damaged

--Cylinder diameter is oversize or has pinhole porosity

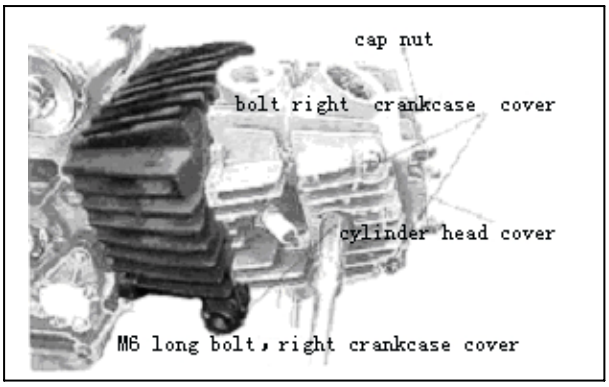
Cylinder head disassembling

Remove the inspection plate and ornamental lid. Then turn the fly wheel in an anticlockwise direction and make the mark 'T' align with that of on the left forward lid.

Remove the exhaust muffler;

Remove the spark plug cap

Remove the suction tube and connect the bolt



Loose the stay bolt on the right lid of the cylinder head. Beat the bolt and jack up the left lid. And remove the bolt and left lid.

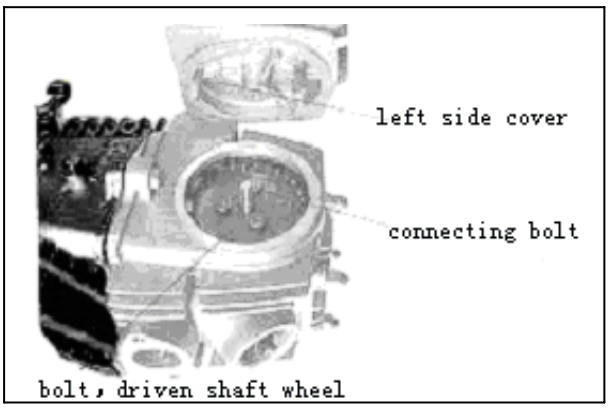
Remove two bolt s from the right lid of the cylinder head;

Remove the bolt and cylinder head lid;

Remove the driven sprocket bolt, and take off the driven sprocket bolt;

Take off the cylinder head;

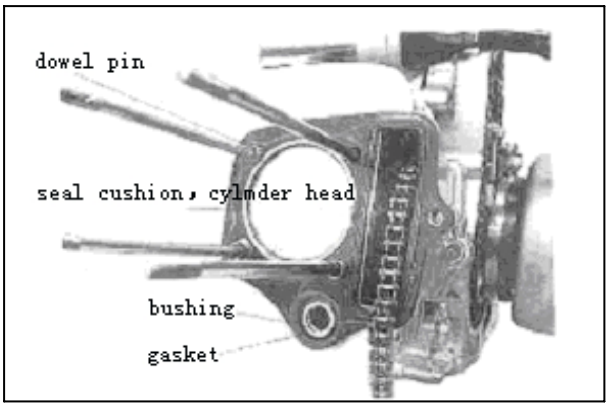
Clean the upper, lower, left, right part of the cylinder head and the junction surface of the carburetor;



Remove the obturating ring, interfacing, gland bush of the cylinder head, pin stop.

Clean the upper face of cylinder block.

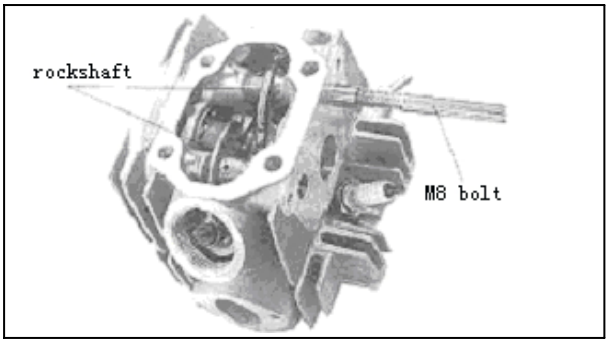
Cylinder head disassembly

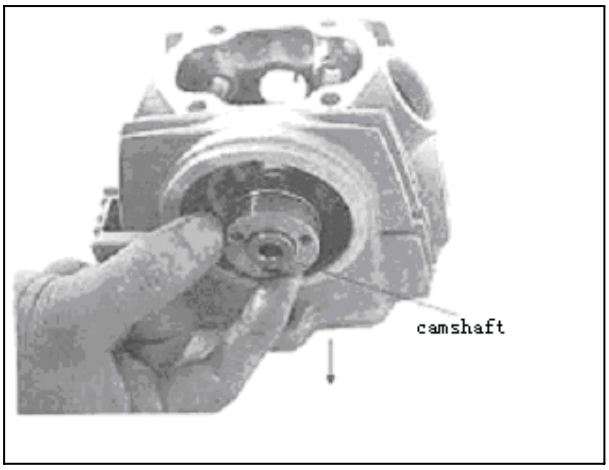


Remove the intake and exhaust valve-chamber cover and the O-ring closed-coil;

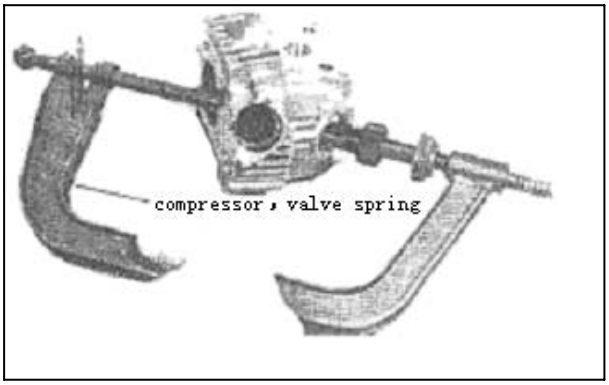
Screw in an 8mm bolt on the screwed end of the rocker shaft, then pull the rocker shaft from the right side of the cylinder head;

And remove the rocker shaft.



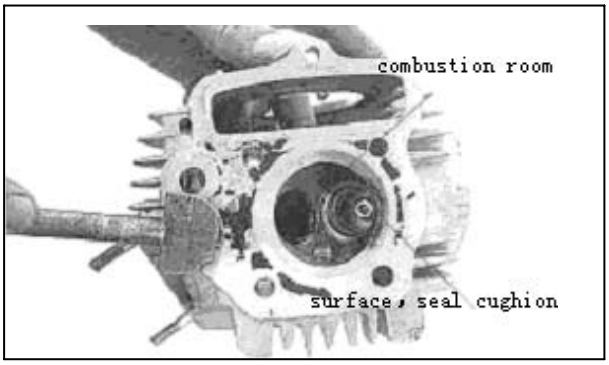


Make cam lobe align with cylinder head opening and remove camshaft from cylinder head.



Compress the valve spring wiht the valve spring compresser, then loose the valve spring compressor, and take off the valve spring seat, valve spring and valve.

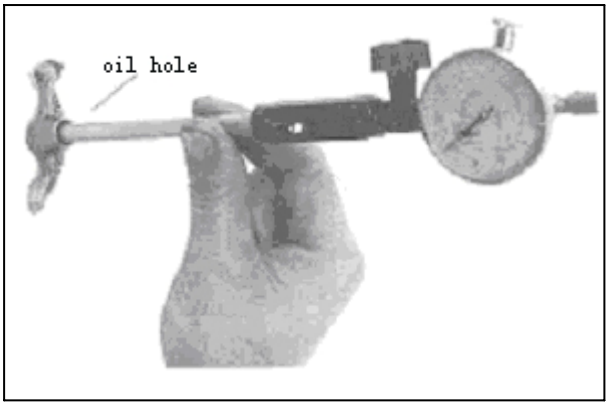
(ps In order to avoid tension set of the valve swing, do not compress the valve spring excessively when disassembled.)



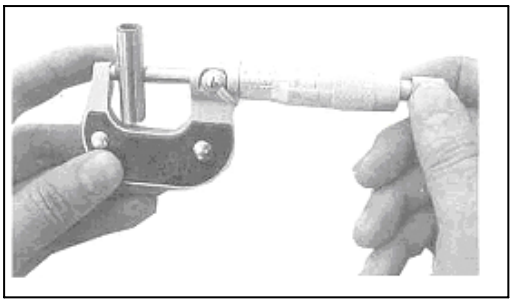
Clean the carbon in the cylinder head totally;
Clean the surface of the cylinder head;

(Ps. Do not damage the sealing face of the cylinder head.
If you immerse the valve guide in the solvent, it will be damaged.)

Check-up of rocker arm pivot

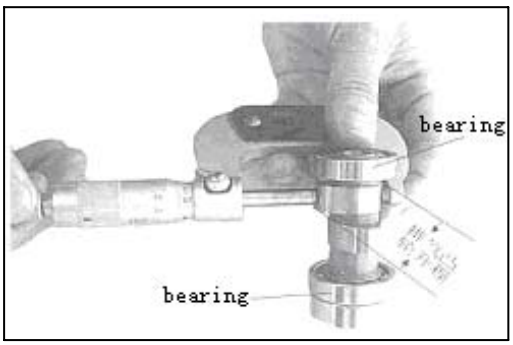


Check rocker arm for wear, damage or clogged oilhole.
Measure inner diameter of rocker arm.
service limit:
Service limit: Φ10.10mm



Check rocker shaft for wear or damage. Measure outer diameter with micrometer.

service limit: Φ9.9mm

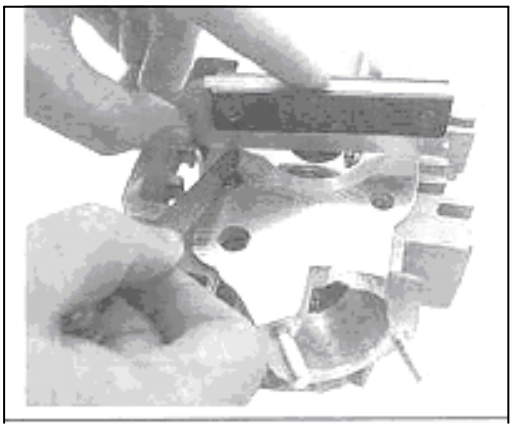


Check of the camshaft

Check each camshaft bearings whether the distance is over size or damaged. If the bearings have noise or oversize distance, it will be replaced.

Check the lift range of the intake and exhaust cam. Check whether it is damaged or worn away.

Service limits: air-in: 26.25mm ;air-out: 26.02mm

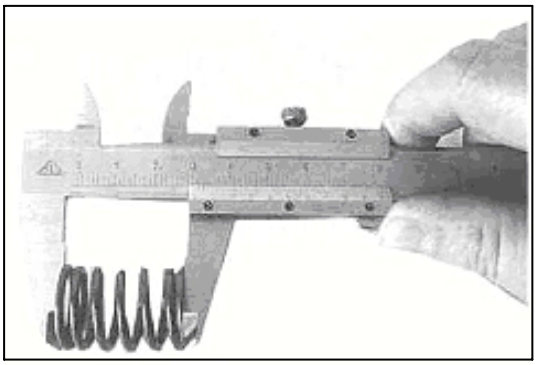


Check of the cylinder head

Check the spark plug and the valve seating whether there is a crack;

Check the cylinder head whether it becomes deformed, and check the flatness of the cylinder head by knife edge ruler or proof stick.

Service limits: 0.05mm



Check the valve spring

Measure the free length of the valve spring;

Service limits:

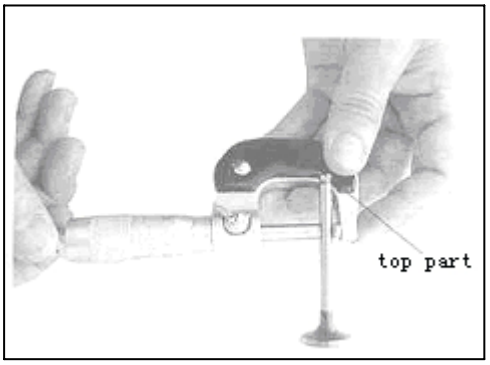
Intake valve: inner spring: 31.0mm

Outsider spring: 34.0mm

Exhaust valve inner spring: 31.2mm

Outsider spring: 34.0mm

Check the valve and valve guide



Check each valve whether there is a warp or burn or an abnormal abrasion on the top of the valve rod;

Check the movement situation of the valve in the valve guide;

Measure the outside diameter of each valve rod.

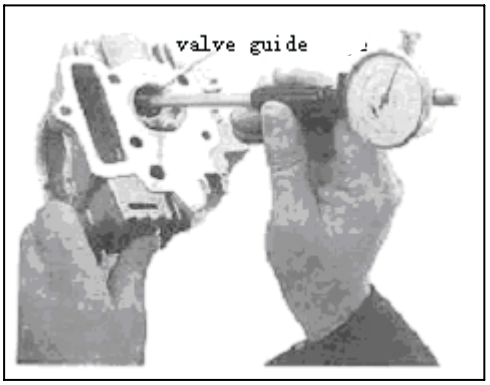
Service limits: intake/ exhaust: φ4.92mm

Measure the inside diameter of each valve tube by inside micrometer or special measure tools.

Service limits: φ5 .03mm

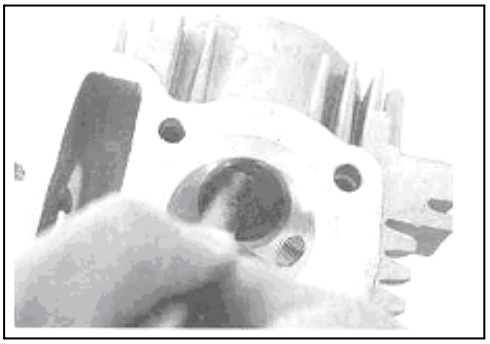
Finally count the distance between the valve rod and valve guide.

Service limits: 0.1mm



Note: Before measuring the inside diameter of valve guide, remove carbon residue.

If it needs to replace the valve guide, the surface of valve seat should be polished.

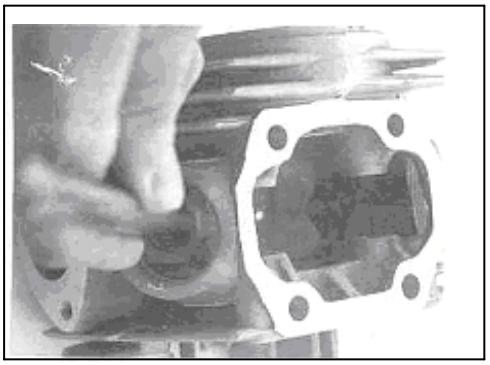


Change the valve guide

Fix the cylinder head, pull out the valve guide from valve hole by valve guide removal tools.

Note: Do not wear away the cylinder when removing the valve guide.

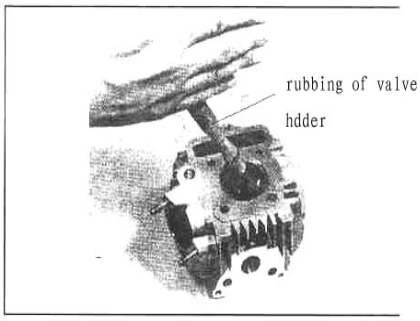
Install new valve guide and O-ring into the cylinder head. Then ream on the new installed valve guide.



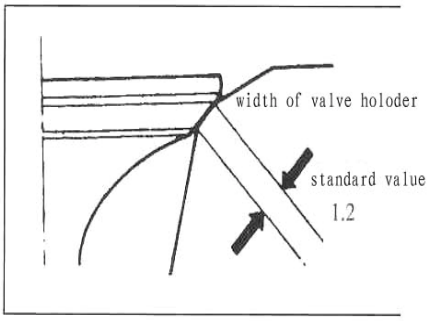
Note: When chambering, it should be coated cutting oil on the cutter knife. And it should be turned when installing and removing the cutting knife.

Finally clean the cylinder head by detergents. And clear out all the borings accumulating on cylinder head by compressed air.

Polished dressing of valve seat

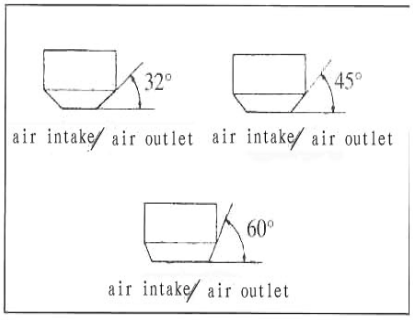


First clear out all the carbon in the intake and exhaust valve seat.
Apply polishing compound to valve and insert into head.
Turn with rubber coated head to clean valve seat.
Note: Do not let the detergent enter into the place between the valve rod and jumbo valve guide. After polished dressing, clear away the detergent completely. Then coat a layer of engine lubricant on the valve sealing face and valve seat.



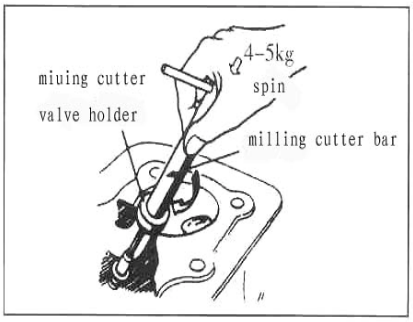
Take down valve and check the valve-face width.
Service limits: 1.6mm
Note: If the valve-face is crude or non-uniform corrosion or it can not contact the valve seat, the valve should be replaced.
Measure the valve seating face width.
Service limits: 1.6mm
If the valve seat is too wide or too narrow or has a dent, it should be maintain to achieve correct good seal.

Valve seating iron knife



Three iron knives with different angles.

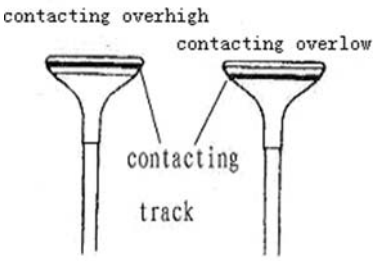
Use prescribed iron knife to scrape when polish the valve seat.
First, excise the crude or irregular place of the valve seat by the 45 iron knife.
Note: When changed the valve guide, it also needs to scrape the valve seat by the 45 iron cutter knife
Second, scrape one forth of the upper links of the valve face by the 32 reamer.
Third, scrape one forth of the bottom zones of the valve seat by 60 iron knife.
Finally, process the valve seat face proficiently to achieve real height.
The standard width of the face: 1.0mm



Check of the relative position between valve seat and valve

Coat a stamp-pad ink upon the valve seat.
And turn the valve. Then pull out the valve to observe

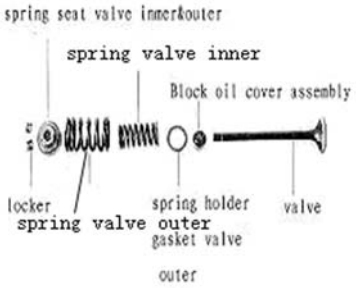
whether the contact face is correct and well.
Pay attention to the contact between valve and valve seating whether it is well or not.
It is a very important factor for the sealing performance of the engine.
If valve surface is too high, it can be lowered by the 32 iron sharpener.
If valve surface is too low, it can be lifted by the 60 iron sharpener.
Finally process the iron sharpener by the 45 cutting tools until the width of valve seating surface is achieve that of the regulations.

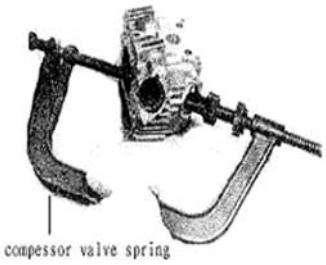


After processed the valve seating, coat a layer of abrasive upon it.
Then load it into the valve and grind it by rubber head grinding tools.
After doing it, clean all the residual abrasive on the cylinder head,
valve, valve seating, and valve tube.

Equipment of the cylinder head

First of all, cover oil shield on the valve guide and coat the supramoly
lubricant on each valve rod. Then insert valve into the valve tube.
Fit valve spring and spring seat.
Note: In order to avoid damage of the oil shied, turn the valve slowly when inserted.





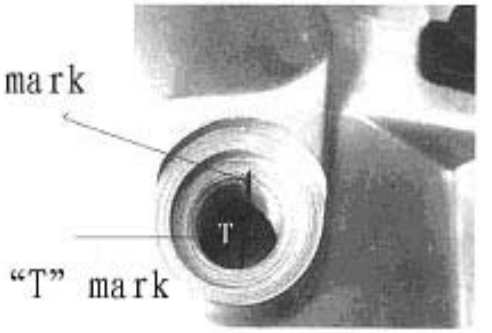
Second, depress valve spring by valve detacher. After that, insert valve cullet on the valve spring seat.
Note: In order to avoid the spring causing tension set, do not compact it excessively.

Insert camshaft and turn it to make the cam lift range downwards.
Coat a layer of thin engine lubricant on the rocker shaft.
Install rocker and rocker shaft. And turn one end with a thread out.
Change a new right lid cylinder head gland bush. And then install the right lid.

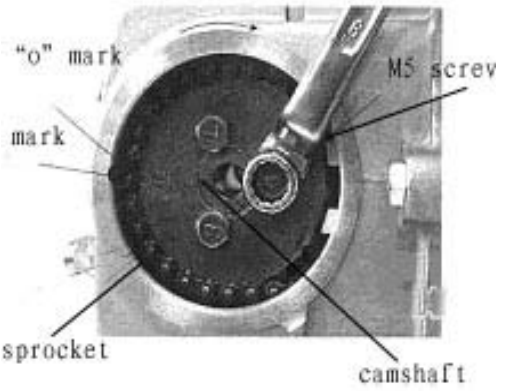
Cylinder head Installment

Turn the fly wheel to make the piston reach the dead center.
Install new cylinder head gland bush, seal packing ring, liner bushing, and positioning pin.
Note: Do not let dust and dreg fall into crankcase.

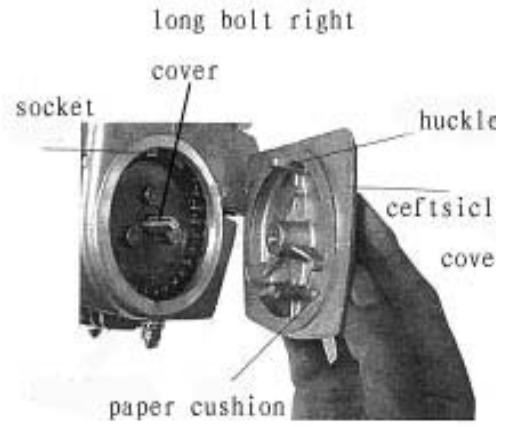
Install cylinder head.
Install cylinder head gland bush.
Tighten cylinder head and stabilize bolt.
Rated torque: 10-14N.m
The mark ‘arrow head’ of cylinder head should be align to the below of it When installed.
Tighten acorn nut and hexagon nut on the cylinder head by crossing angle direction.
It includes two or three steps.
Rated torque: 8-12N.m



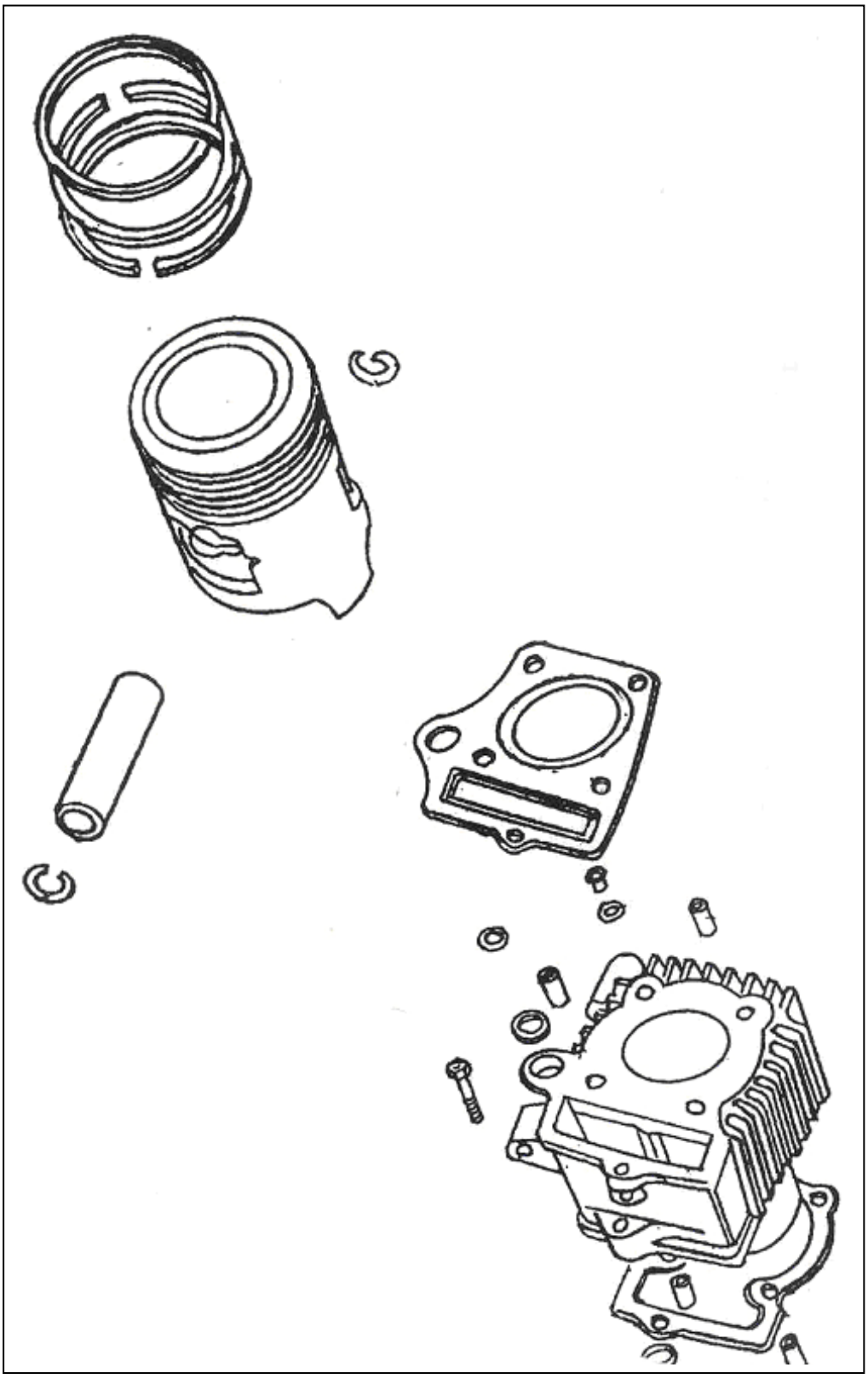
Turn the fly wheel in an anticlockwise direction to make the mark ‘T’ align with that on the left lid.
Install timing chain on the timing driven sprocket, and make the mark ‘O’ align with that of on the cylinder.
Install timing driven sprocket.
Stabilize fly wheel, and tighten the bolt.
Rated torque: 8-11N.m



Install cylinder head left lid. Make sure it’s raised place aligns with the socket of the cylinder.
Tighten stay bolt on the left lid of cylinder head.
Install the intake guide.
Install the exhaust muffler.
Install spark plug cap.
Adjust the valve gap.
Install valve lid and seal packing ring.



Cylinder & piston



Section 7
Cylinder & piston

service notice	cylinder inspectioin	piston ring mounting
troubleshooting	disassembly of piston	piston mounting
disassembly of cylinder	inspection of piston & piston ring	cylinder mounting

Service notice

General rule:

It is unnecessary to remove engine for maintaining and checking cylinder and piston.

Lubrication for camshaft and swing arm is the lubricating oil filled into fuel panel inner cylinder. So fuel panel can not been clogged.

Technology specification

item			standard value (mm)	Service limit (mm)
cylinder	cylinder inner diameter		Φ50.005—Φ50.015	Φ50.05
	taper		—	0.10
	roundness		—	0.10
	top flatness		—	0.10
piston, piston ring and piston pin	skirt section diameter of piston		Φ49.975—Φ49.995	Φ49.90
	inner diameter of piston pin hole		Φ13.002—Φ13.008	Φ13.05
	clearance between piston pin and piston pin hole		0.002—0.014	0.075
	cutter clearance of piston ring	top ring & second ring	0.10—0.30	0.5
		fuel ring	0.20—0.90	1.1
	clearance between piston ring and ring socket	top ring	0.015—0.050	0.12
		second ring	0.010—0.045	0.15
	clearance between cylinder piston		0.010—0.045	0.15

	outer diameter of piston pin	Φ12.994—Φ13.000	Φ12.980
small end of tie bar	inner diameter	Φ13.016—Φ13.034	Φ13.06
	clearance between tie rod and piston pin	0.016—0.040	0.08

Troubleshooting

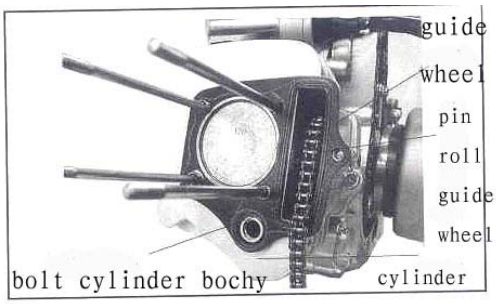
Overheat

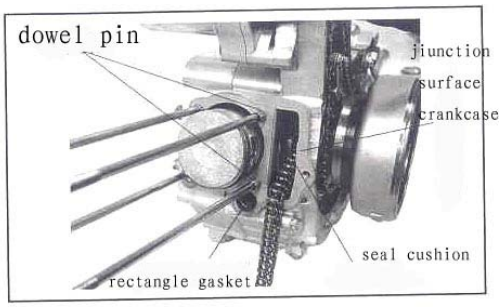
1. too much deposited carbon in piston or combustion chamber

Knocking or abnormal noise

1. piston or cylinder worn

2. too much deposited carbon in piston or combustion chamber



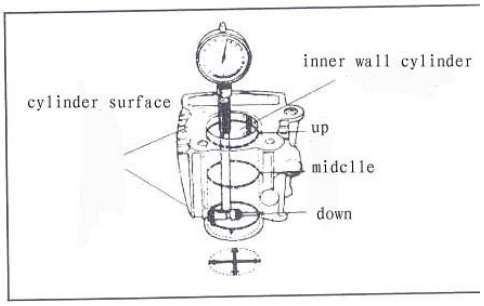


Disassembly of cylinder

Disassemble cylinder head (refer to sixth chapter)

Disassemble pin shaft of guide rolling wheel and guide rolling wheel.

Disassemble mounting bolt of cylinder



Note: Timing spocket chain never drop into crankcase when disassemble.

Disassemble rectangle seal washer, cylinder cushion and dowel pin.

Clean bottom face of cylinder body and jointing face between cylinder body and crankcase.

Cylinder inspection

Check inner wall of cylinder for wear or damaging.

Note: avoid damaging cylinder end face when doing this work.

Measure inner diameter of cylinder, three positions should be measured. They are top section, middle section and bottom section of piston play. And each position should be measured from two directioin with vertical angle.

service limit: Φ50.05mm

Measure flatness of cylinder top with ruler and thickness ruler.

service limit: 0.05mm

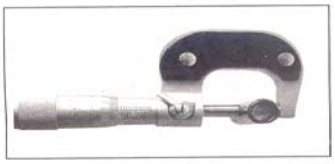
Disassembly of piston

Disassemble piston pin circlip with clamper.

Note: never drop circlip into crankcase

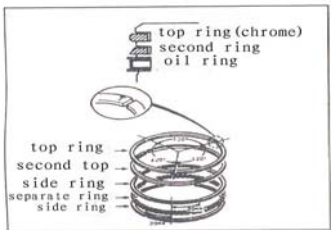
Press out piston pin from piston and disassemble piston.

Disassemble piston ring.



Note: never damage piston ring when disassembling.

Piston & piston ring inspection



Measure the clearance between piston ring socket with thickness ruler.

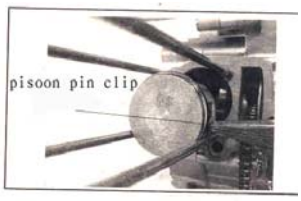
service limit: first ring/second ring 0.12mm

Check piston for damaging or cracking; piston ring socket worn.

Insert every piston ring into inner cylinder, then measure the shutting clearance.

service limit: first ring/second ring 0.15mm

oil ring 1.1mm



Measure outer diameter around 10mm position on skirt section bottom.

service limit: Φ46.90mm

Count the clearance between cylinder and piston.

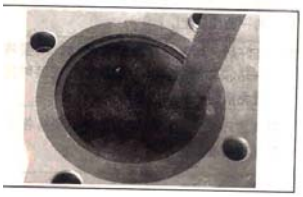
service limit: 0.15mm

Measure inner diameter of piston pin hole.

service limit: Φ13.05mm

Measure outer diameter of piston pin.

service limit: Φ12.98mm



Count the distance between piston pin hole and piston pin.

service limit: 0.075mm

Measure hole diameter of tie rod head.

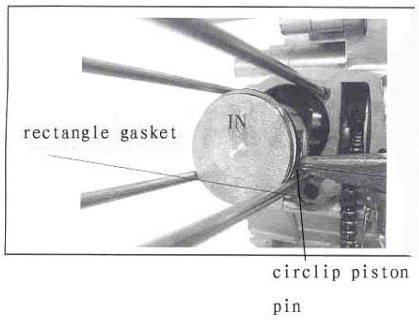
service limit: Φ13.06

Assembly of piston ring

Wash piston ring socket clean. Make the face with mark up when mounting piston ring.

Note: Piston ring should spin freely after disassembling. Never make first ring and second ring assembly reversely. Avoid damaging piston and piston ring when assembly.

Make clearance of piston ring staggered 120° ,never make the clearances of all fuel rings alignment with each other.



Assembly of piston

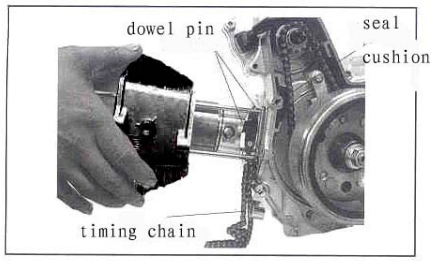
Spread supramoly lubrication in tie rod head hole.

Assembly piston,piston pin and new piston pin circlip.

Note: the side printed "IN" mark makes alignment with the side of intake

Make piston pin circlip opening and piston citting stagger.

When piston pin is disassembled each time, Replace new piston pin circlip when assembly.



Cylinder mounting

Note: never damaging end face of crankcase.

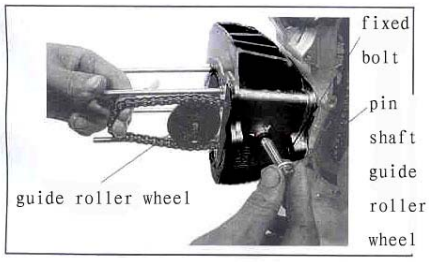
Never allow dropping any impurity into crankcase.

Load seal cushion,dowel pin and O-ring.

Spread a layer of thin oil on cylinder and piston ring.

Load upright piston on cylinder body.

When cylinder is located on half positon of piston mounting. chain through cylinder.



Assemble guide wheel, and screw pin shaft of guide rolling wheel.

rated torque: 9—14N.m

Load cylinder fixed bolt, but not screw tightly.

Load cylinder head(refer to sixth chapter)

Screw cylinder fixed bolt.

rated torque: 10—14N.m

Chapter 8

Clutch

Service notice

General rule

For maintenance of clutch and gearshift operation arm, it is unnecessary to discharge engine.

If gearshift fork, gearshift drum and transmission system need repairing and maintenace, dismantle engine and crankshaft.

Rating torque:

Right crankcase cover fasten bolt 8-12N.M; Clutch round nut 38-45N.M; Gearshift drum fasten bolt 14-20N.M

Technology specification

item		Standard value (mm)	Serivice limit (mm)
primary drive gear	inner diameter	Φ21.000—Φ21.021	Φ21.05
clutch	free lenth of spring	19.10	17.50
	friction piece thickness of clutch	3.45—3.55	3.00
	clutch board flat	—	0.2
shaft sheath	outer diameter	Φ21.930—Φ21.021	Φ21.05

Troubleshooting

clutch slipped

1.no free play

2.clutch friction piece worn

3. elastic force of clutch spring is not enough

clutch can not declutch

1. clutch piece bent

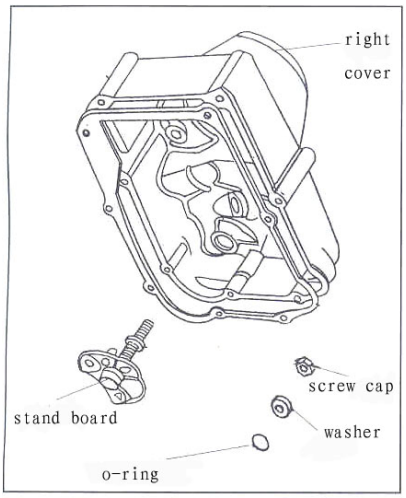
force pulling occurs when clutch declutch

1. outer cover groove of clutch has burr.
2. gearshift fork bent
3. gearshift rod bent
4. Dowel board of gearshift drum cracked

Disassembly of right crankcase cover

。Drain off engine oil.

Dismantle fasten bolt and cover of right crankcase cover.



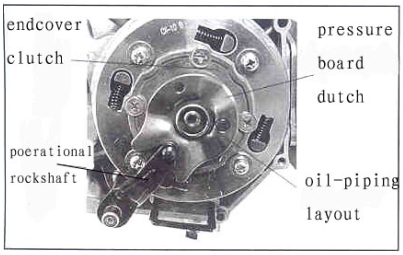
Clutch

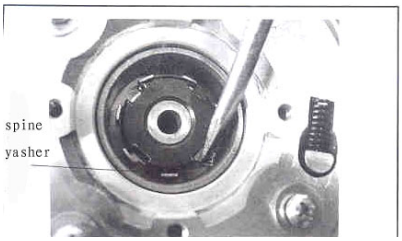
Diaassembly, check-up and assembly for clutch

Disassembly for dowel stand board.

Dismantle decoration cover.

Dismantle lock nut,washer,o-ring, and then dismantle dowe





Disassembly for clutch

Take off lift board, srping of fuel bushing, fuel bushing, operation arm.

Dismantle screw on clutch cover, and take off clutch end cover and seal cushion.

Dismantle stopper washer on round nut with opener.

Dismantle round nut, stopper washer and disc washer with lock nut spanner.

Take off clutch, drive gear wheel, shaft sheath and

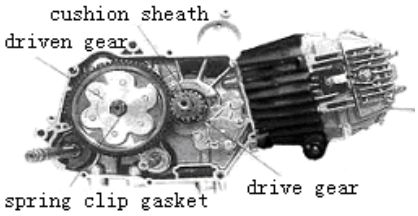
Seat washer.

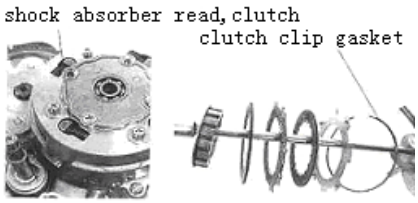
]Disassemble clutch

Take off shock absorber spring of clutch.

Take off elastic circlip.

Dismantle clutch piece/board, drive gear wheel outer.



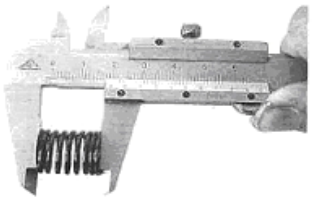


Inspection for clutch spring.

Measure free lenth of clutch spring.

standard value: 19.1mm

service limit: 17.5mm



Inspection for friction plate of clutch

If friction plate of clutch is scratched or defaded, it should been replaced.

Measure thickness of each friction plate.

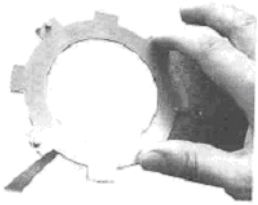
service limit: 3.0mm

Flatness of up & down board inspection

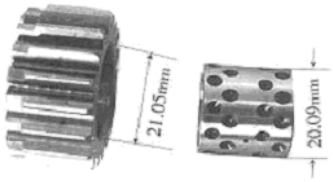
Check flatness of up & down board.

service limit:

up & down board 0.02mm



Inspection for drive gear wheel/shaft sheath

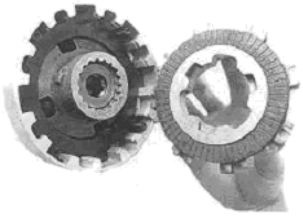


Check the above parts for worn or damaged.

Measure inner diameter of gear wheel and outer diameter of shaft sheath.

service limit: inner diameter of gear wheel Φ21.05mm

outer diameter of shaft sheath Φ20.90mm



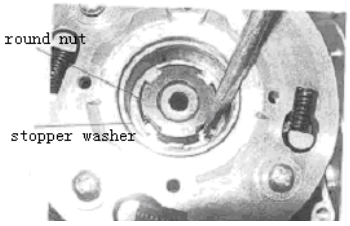
Assembly of clutch

Cover crankshaft with drive gear seat washer.

Cover crankshaft with drive gear.

Load drive gear bushing.

Spin drive gear, and make sure assembly of clutch is correct. Drive gear can spin freely towards counterclockwise, but not towards clockwise.



Assemble disc washer, stopper washer and round nut.

Note: when assembling disc washer, make "OUTSIDE" on washer towards outside.

Load clutch comp.

Load stopper wahser.

Load round nut and screw it tightly.

rating torque: 38—45N.m

Bend one side of stopper washer and screw round nut tightly.

Load seal cushion of clutch end cover, clutch end cover, fuel bushing, spring, fuel pipe one by one.

Assembly for right crankcase cover.

Assemble dowel pin and new seal cushion of right crankcase.

Assemble right crankcase cover according to the reverse order of disassembly. Fill proper 15/W40QE grade gasoline oil into crankcase.

Load exhaust muffler.

Adjust clutch well.(refer to third chapter)

Chapter 9
Magneto

service notice	disassembly of magneto
disassembly of left front cover	assembly of magneto

Service notice

General rule

This chapter introduces disassembly and assembly of engine, only dismantle left front cover, but unnecessary to dismantle left rear cover, so magneto disassembly is finished.

Rating torque

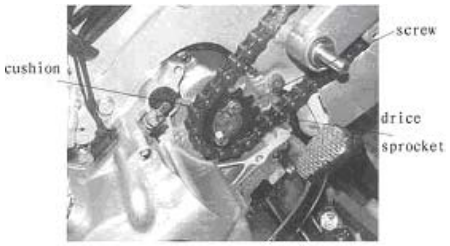
flywheel fasten nut 30—38N.m

Disassembly of left front cover

dismantle left rear cover

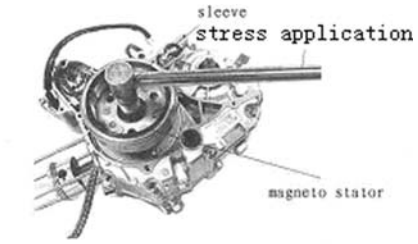
Disconnect the connecting end between magneto and main cable.

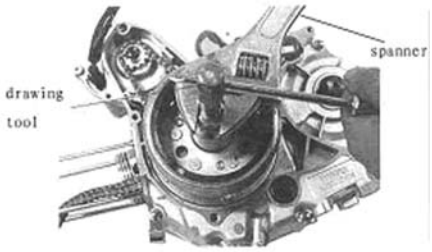
Dismantle left front cover.

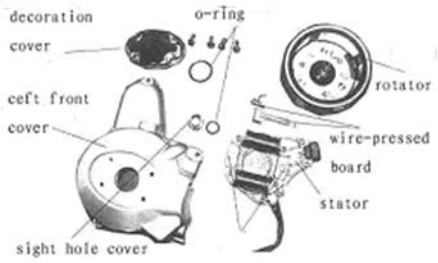


Disassembly of magneto

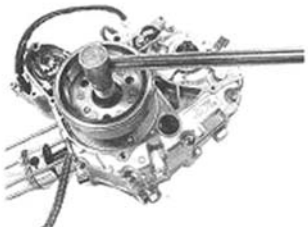
Fix flywheel rotator with fixed fork.
Dismantle flywheel fixed nut.
Fix flywheel rotator.
Pull out magneto flywheel with flywheel.







Dismantle two press wire inner left front cover and transducer.
Dismantle two fixed bolt of stator and
Take out stator comp.



Assembly of magneto

Assembly magneto stator comp inner left front cover.

The order of assembly magneto is the reaverse order of disassembly.

Note: make woodruff key on crankshaft alignment with magneto flywheel socket.

Screw flywheel fix nut tightly according to regulated torque.
Torque value: 30—38N.m

Assembly dowel pin and new seal cushion of left front cover on left crankcase. Assembly left front cover, and screw left front cover tightly, then dismantle transmission drive sprocket and left rear cover, and finally fasten bolt.

Connect the inserting end between magneto and main cable.

Chapter 10
Crankcase, crankshaft, transmission, starting device

Service notice

General rule

This section introduces disassembly of speedshift, crankshaft and starting structure. When doing the above work, firstly separate crankcase. For the disassembly of other parts of engine, it should be done before separating crankcase. The operation is followed before separating crankcase: disassembly of cylinder head, disassembly of cylinder/piston, disassembly of cluth, oil pump, disassembly of magneto.

Technology specification

item			Standard value（mm）	Service limit（mm）
crankshaft	inner diameter of tie rod head		Φ 13.016 — Φ 13.034	Φ 13.06
	clearance of tie rod big end	shaft direction	0.10—0.35	0.60
		diameter direction	0.00—0.012	0.05
transmission shaft	outer diameter of main axle		Φ 16.983 — Φ 16.994	Φ 16.94
	outer diameter of counter axle		Φ 19.959 — Φ 19.980	Φ 19.94

Troubleshooting

crankshaft noise

1. bearing of tie rod big end worn
2. tie rod deformed
3.crankshaft bearing worn
4.piston pin hole worn
5. piston pin worn
6. tie rod small head hole worn

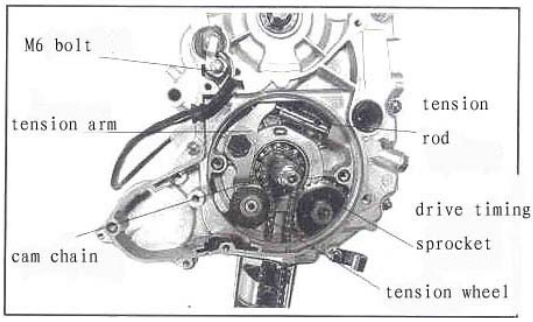
Disassembly of crankcase

Dismantle engine.(fifth chapter)

Dismantle cylinder head, cylinder and piston.(sixth and seventh chapter)

Dismantle right cover, clutch, transmission shaft and oil pump.(eighth chapter)

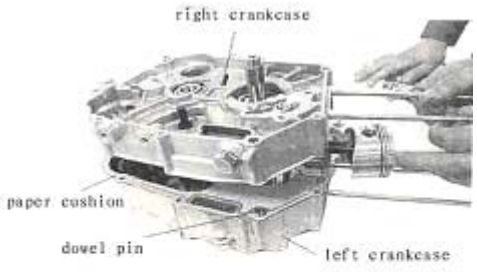
Dismantle left rear cover, left front cover, flywheel, transmission driven sprocket and cover board.(ninth and tenth chapter)



Dismantle tension wheel, timing sprocket, and dismantle fasten bolt of crankcase.

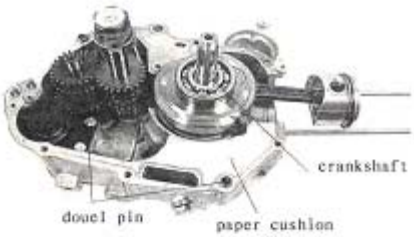
And put engine on work plat, right side of engine faces up.
And then dismantle fasten bolt of crankcase.

Separate left and right body of crankcase.



Dismantle dowel pin and crankcase seal cushion.

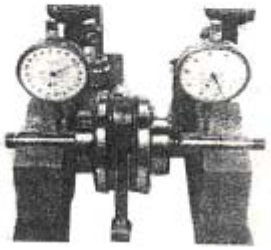
Wash left and right crankcase, and make inside and outside end face down.



Disassembly of crankshaft

Take out crankshaft comp from left crankcase

Dismantle main and coumter axle.



Crankshaft inspection

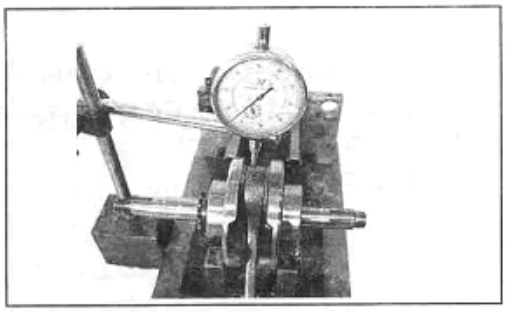
Put crankshaft on V pattern icon.

Measure diameter direction jumping of crankshaft with dial indicator. Actual jumping number of crankshaft is 1/2 of total read number.

service limit:0.10mm

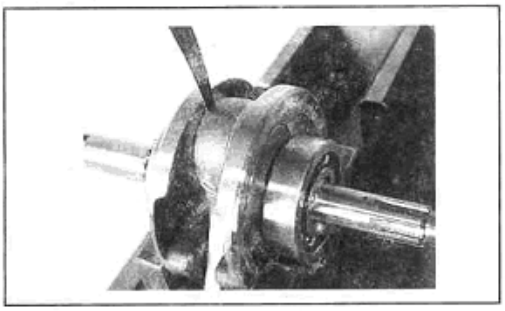
Measure diameter direction clearance of tie rod big head on two direction with vertical angle.

service limit: 0.05mm



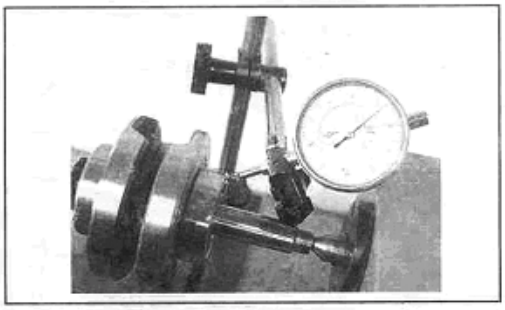
Measure shaft direction clearance of tie rod big head with thickness ruler.

service limit: 0.60mm



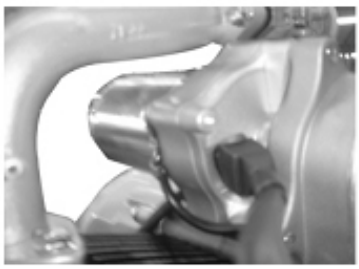
Spin bearing by hand, if noise appears when bearing running, or free play is too large, Measure free play of bearing with dial indicator.

service limit: shaft direction 0.10mm
diameter direction 0.05mm



Disassembly of starting montor

Get starting motor down once.disassembling mounting bolts.

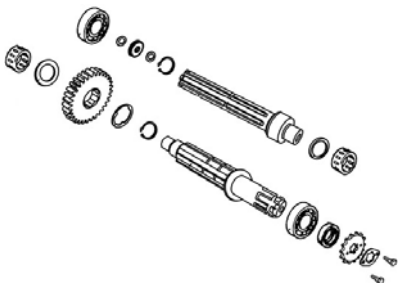


Check-up for starting motor

Check if gear face of starting motor is damaged much.

Transmission shaft

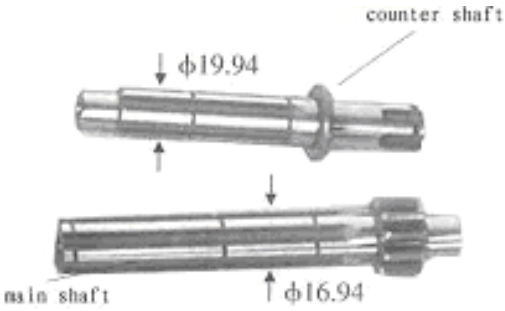
Dismantle mainshaft and countershaft drum together, then decompose gearshif



Transmission shaft inspection

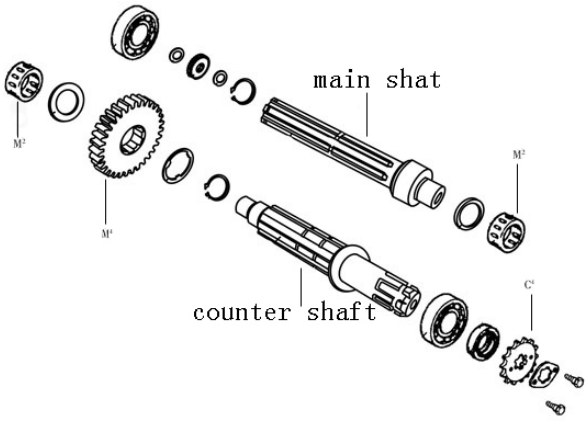
Check for each gear wheel worn or damaged, If necessary,replace it. Check for transmission paw of each gear wheel worn. Measure ourter diameter of transmission main axle and counter axle.

service limit: main axle Φ16.94mm
counter axle Φ19.94mm



Assembly of transmission shaft

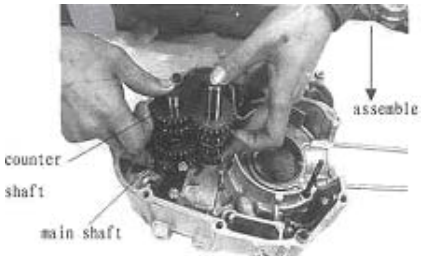
Note:Before assembly,
15W/40QE grade engine oil should be coated on each part.



First of all, assemble transmission axle and gear wheel, pay attention to the mouning position of spline washer and circlip.

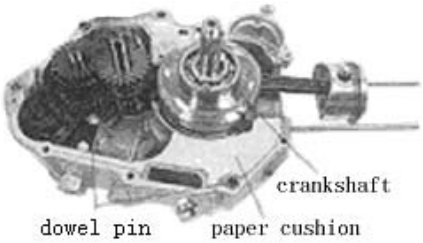
Note: The circlip must be mounted on the right position.

Make main & counter axle comp drum assemble the whole,
and then assemble it into left crankcase.

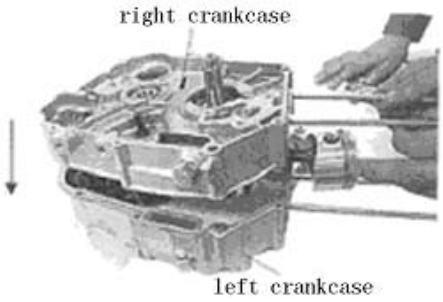


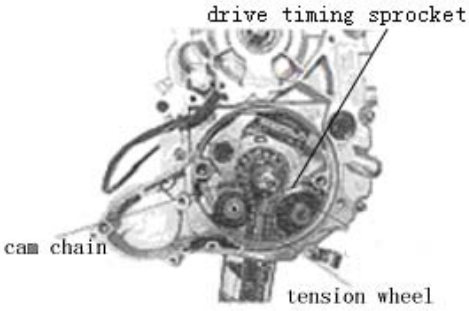
Assembly of crankcase

Remove impurity and remaining cushion on connecting side of crankcase. Check for connecting side of left & right crankcase worn.
Assemble new seal cushion and dowel pin.



Snapped down right crankcase. Turn over right crankcase.
Assemble crankcase screw and screw it tightly.
Note: When assembly, washer must be mounted on the right position.





Assemble and screw fasten bolt of crankcase. Assemble timing chain on timing drive sprocket, load tension wheel, gearshift drum dowel bolt and washer, and then assemble contact pressure board and bolt of gear position switch, connect the plug head of main cable wire and gear position wire.

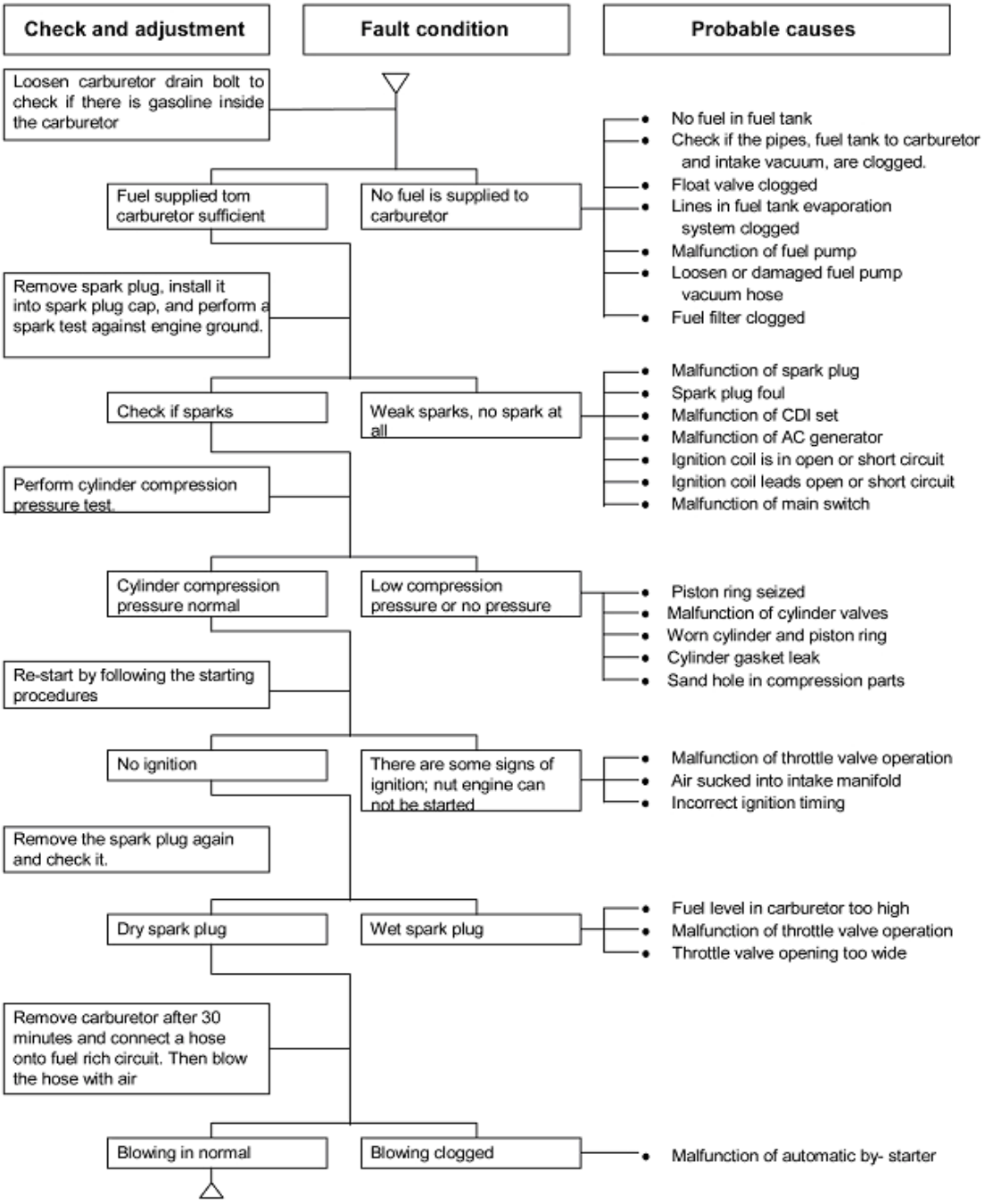
SECTION 11

Judge the trouble

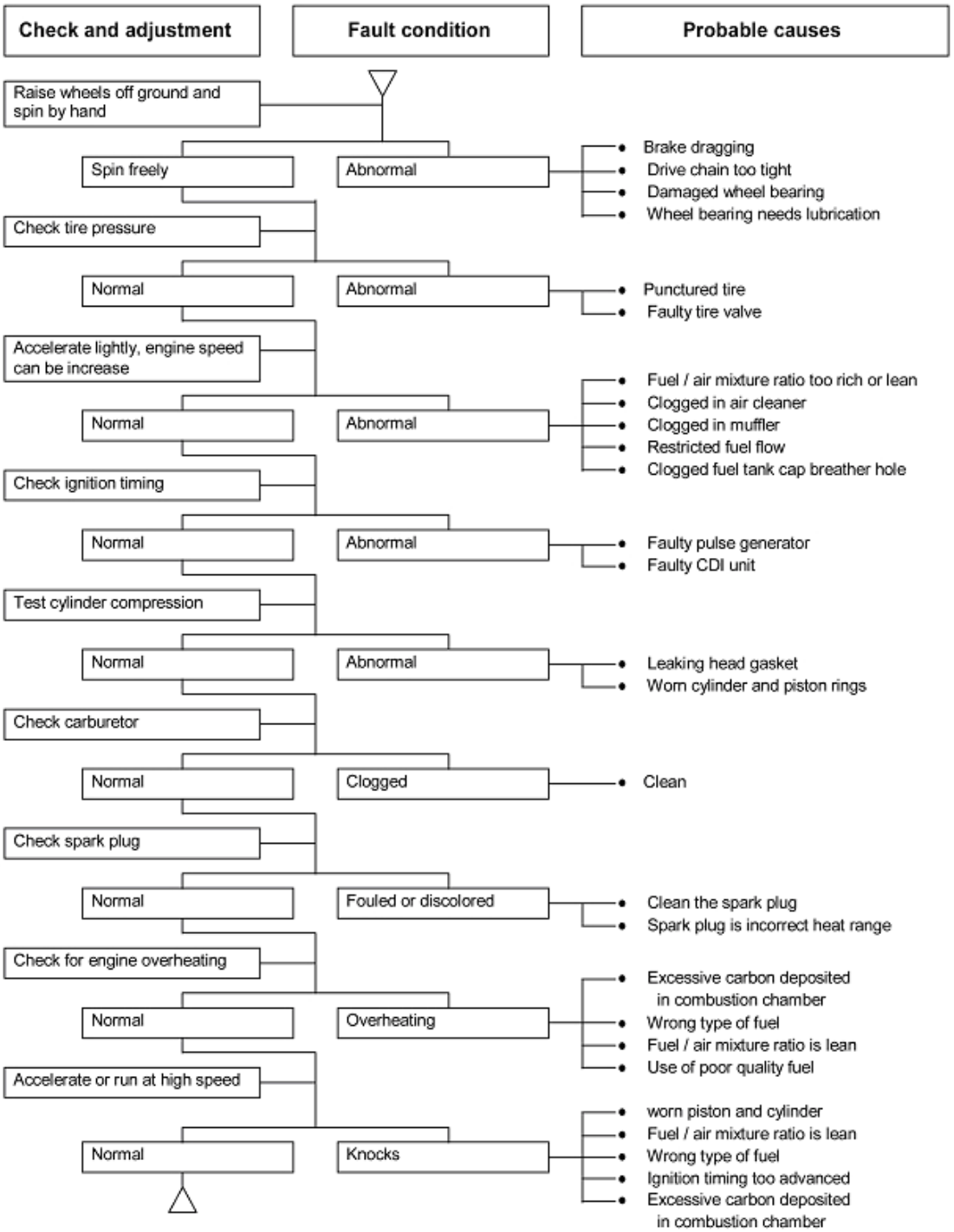
hard starting	engine runs sluggish (especially in low speed and idling)
Loss power	engine runs sluggish (high speed)

Troubles Diagnosis

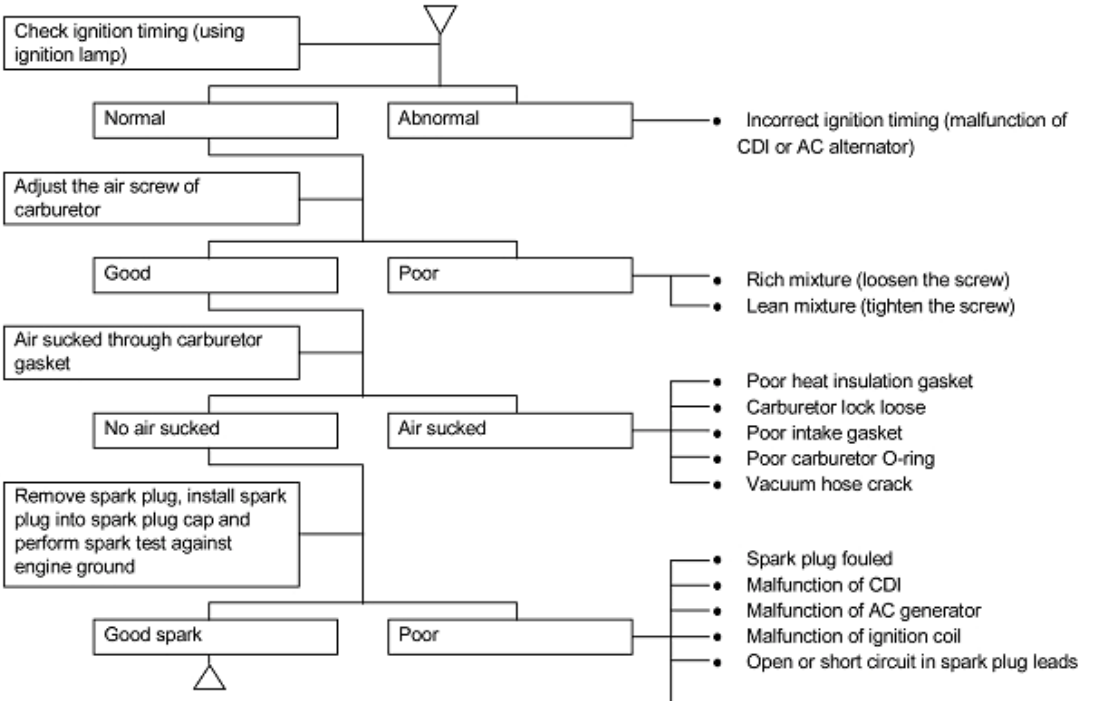
Engine hard to start or can not be started



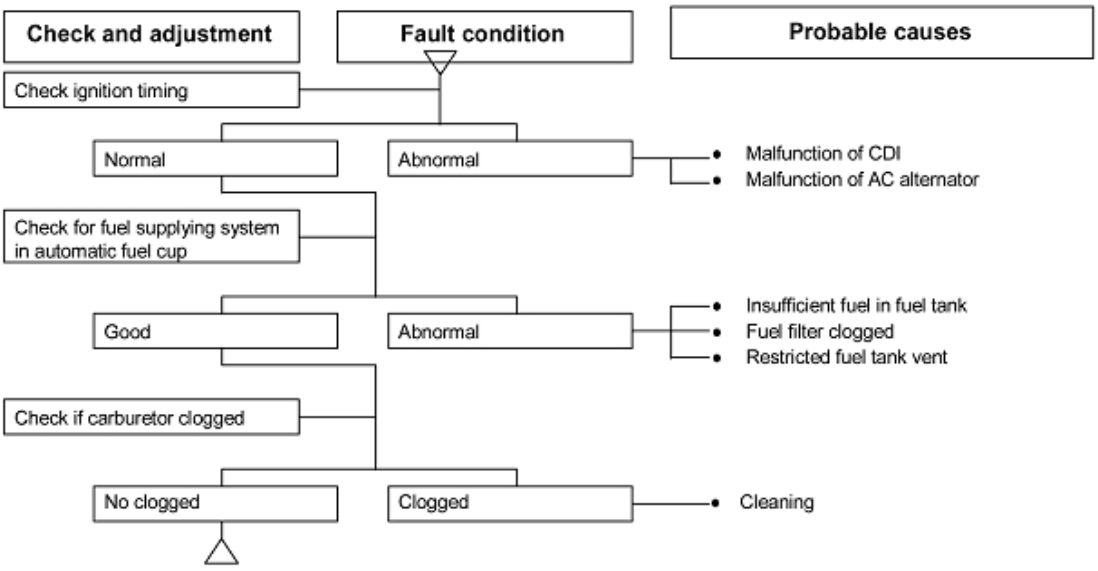
Loss power


Check and adjustment
Fault condition
Probable causes
Raise wheels off ground and spin by hand
Spin freely
Abnormal
Brake dragging
Drive chain too tight
Damaged wheel bearing
Wheel bearing needs lubrication
Check tire pressure
Normal
Abnormal
Punctured tire
Faulty tire valve
Accelerate lightly, engine speed can be increase
Normal
Abnormal
Fuel / air mixture ratio too rich or lean
Clogged in air cleaner
Clogged in muffler
Restricted fuel flow
Clogged fuel tank cap breather hole
Check ignition timing
Normal
Abnormal
Faulty pulse generator
Faulty CDI unit
Test cylinder compression
Normal
Abnormal
Leaking head gasket
Worn cylinder and piston rings
Check carburetor
Normal
Clogged
Clean
Check spark plug
Normal
Fouled or discolored
Clean the spark plug
Spark plug is incorrect heat range
Check for engine overheating
Normal
Overheating
Excessive carbon deposited in combustion chamber
Wrong type of fuel
Fuel / air mixture ratio is lean
Use of poor quality fuel
Accelerate or run at high speed
Normal
Knocks
worn piston and cylinder
Fuel / air mixture ratio is lean
Wrong type of fuel
Ignition timing too advanced
Excessive carbon deposited in combustion chamber

Engine runs sluggish (especially in low speed and idling)



Engine runs sluggish (High speed)



Ⅰ． TECHNICAL INFORMATION

ATV TYPE	70ATV	90ATV
ENGINE		
TYPE	Air-cooled、four-stroked	Air-cooled、four-stroked
Displacement	72ml	86ml
Bore and stroke	47×41.4mm	47×49.5mm
Compression	8.8:1	8.5:1
Carburetion	Plunger type	Plunger type
Ignition	C.D.I	C.D.I
Starting	Electric	Electric
Lubrication	Pressure splash	Pressure splash
Oil tank capacity	1.0L	1.0L
Transmission	Chain drive	Chain drive
CHASSIS		
Overall length	1350 mm	1350 mm
Overall width	680 mm	680 mm
Overall high	810 mm	810 mm
Wheel base	920mm	920 mm
Dry weight	70kg	90kg
Fuel tank capacity	4.0L	4.0L
SUSPENSION		
Front	Double wishbone	Double wishbone
Rear	Single damper	Single damper
BRAKES		
Front	Drum	Drum
Rear	Disk	Disk
TIRE		
Front	16×8-7	16×8-7
Rear	16×8-7	16×8-7
COLORING	Red/Green	Red/Green

Please record the frame and engine serial numbers for future reference. The frame serial Number(1) is stamped on the frame.

FRAME NO. _____

The engine serial number (2) is stamped on the left side of THE engine crankcase/

ENGINE NO. _____

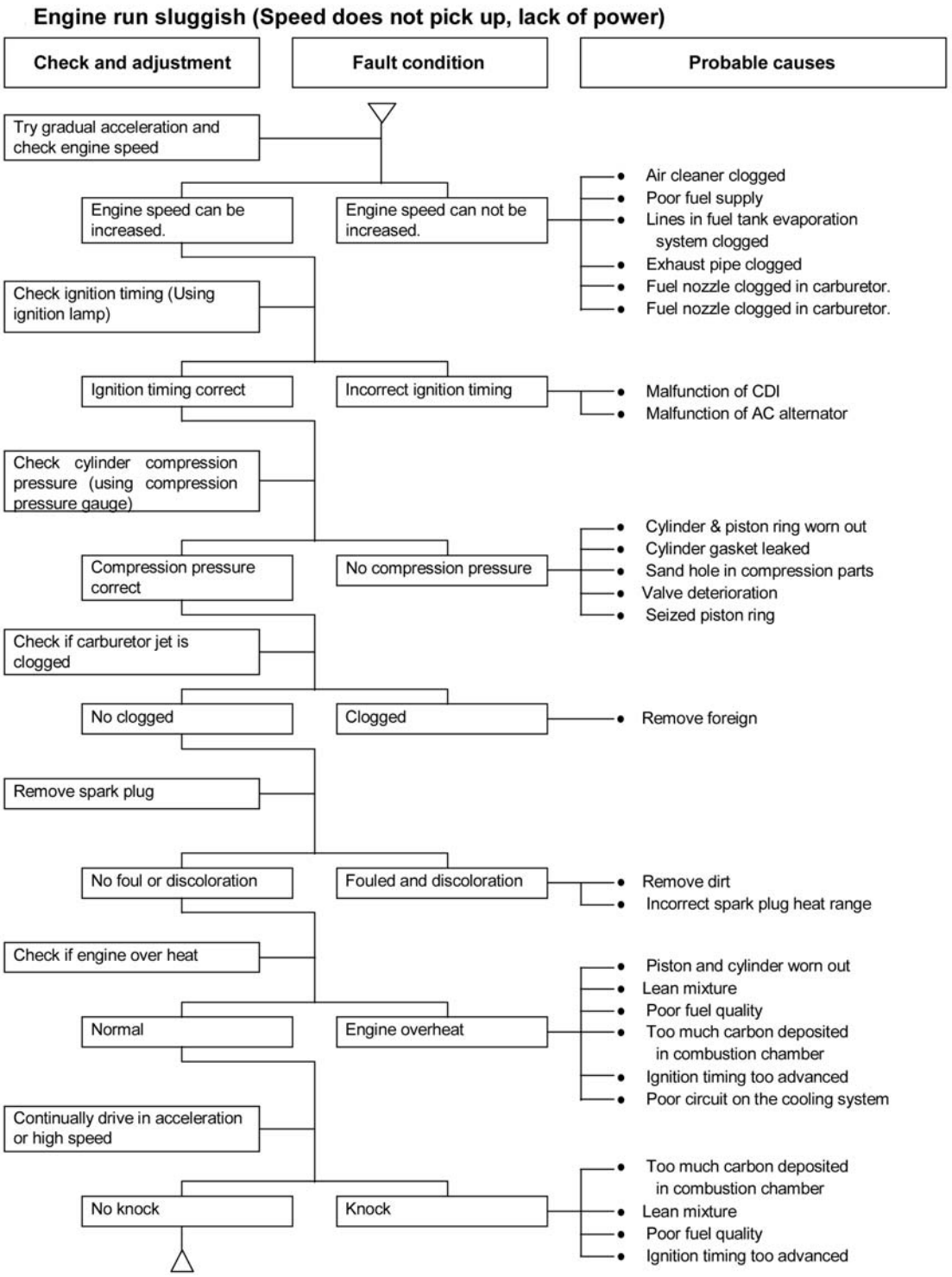
ENGINE

	70/90ATV
Cylinder head nut	1.3-1.5kg-m
Spark plug	1.5-2.0kg-m
Cylinder head bolt	1.4-2.0kg-m
Alternator bolt	3.5-4.0kg-m

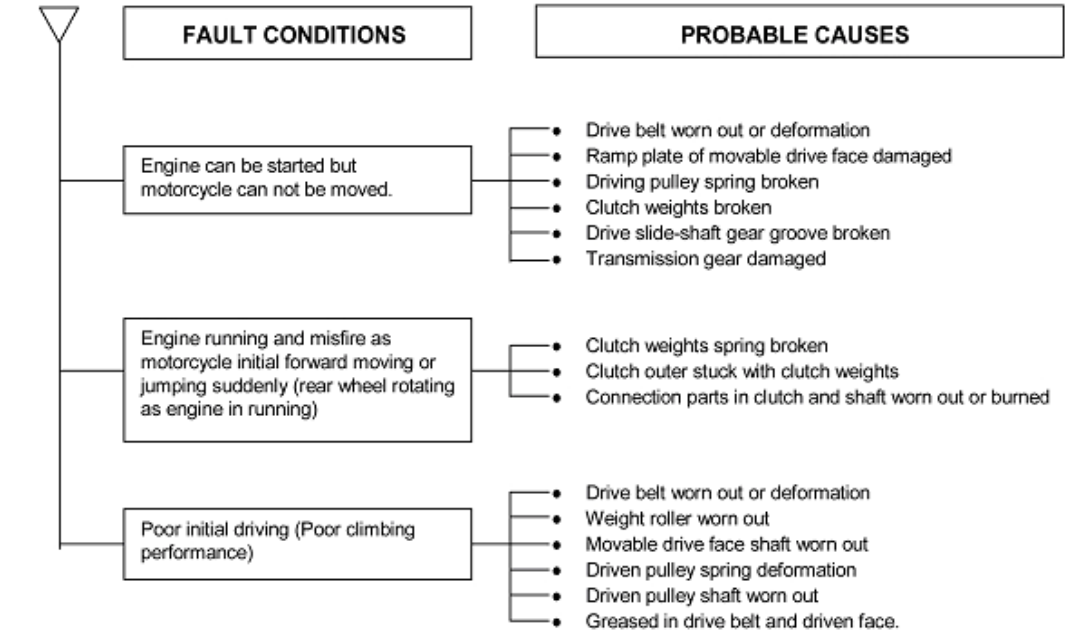
FRAME

	70/90ATV
Handlebar upper holder bolt	2.0-2.2 kgf-m
Steering shaft nut	4.5-5.0 kgf-m
Steering shaft bushing holder nut	2.0-2.2 kgf-m
Wheel rim bolt	3.5-4.0 kgf-m
Tie rod lock nut	3.0-3.5 kgf-m
Knuckle nut	3.5-4.0 kgf-m
Handlebar lower holder nut	4.5-5.0 kgf-m
Front wheel bolt	3.5-4.0 kgf-m
Front axle nut	4.0-4.5 kgf-m
Rear axle nut	4.5-5.0 kgf-m
Rear wheel bolt	3.5-4.0 kgf-m
Exhaust muffler mounting bolt	0.7-1.0 kgf-m
Engine hanger bolt	2.0-2.3 kgf-m
Drive sprocket 19T	4.5-5.0kgf-m

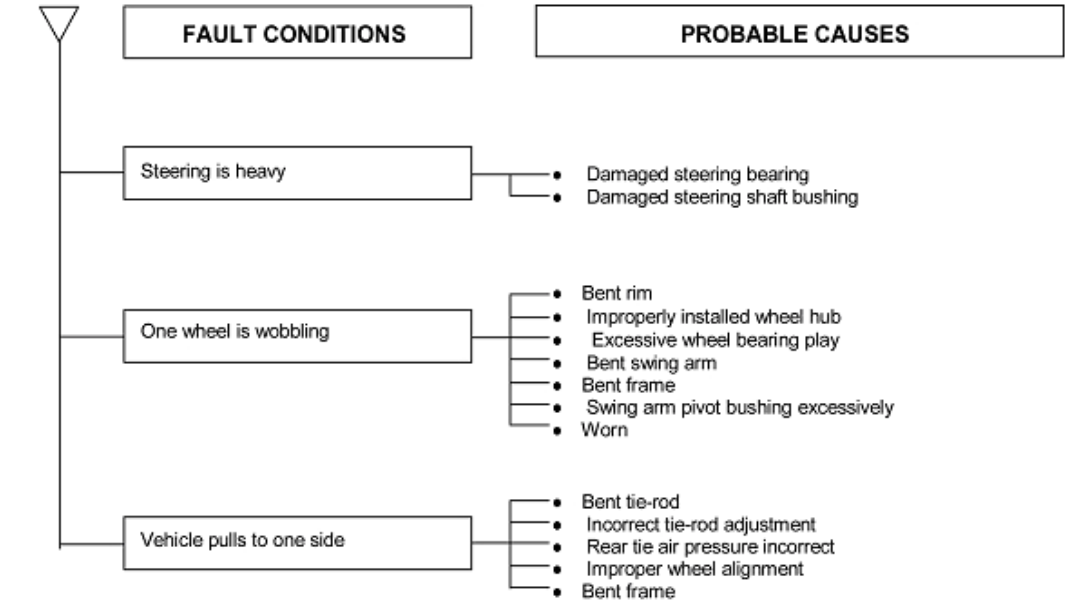
Ⅱ. TROUBLINESHOOTING



Clutch, driving and driving pulley



Poor handling



Ⅲ. MAINTENANCE

3.1 MAINTENANCE SCHEDULE

The maintenance intervals in the table below is based upon average riding and conditions. Riding in unusually dusty areas require more frequent servcing .

C: clean L: Lubricate R: Replace I: Inspect and Clean , Adjust, Lubricate or Replace, if necessary

	INITIAL SERVICE (First week)	REGULAR SERVICE(Every 30 operating days)	EVERYYEAR
FUEL LINE			I
THUOTTLE OPERATION	I	I	
AIR CLEANER		C	
SPARK PLUG		I	
CARBURETOR IDLE SPEED	I	I	
DRIVE CHAIN	L,I	L,I	
BRAKE SHOE WEAR			I
BRAKE SYSTEM	I	I	
NUT, BOLT,FASTENER	I	I	
WHEEL	I	I	
STEERING SYSTEM			I
SUSPENSION SYSTEM			I
C.V.T.AIR FILTER		C	
GEAR OIL			R

3.2 MAINTENANCE DATA

SPECIFICATION

	70 / 90 ATV
SPARK PLUG GAP	0.7-0.8mm
RECOMMENDED SPARK PLUGS	NGK BPR8HS
THROTTLE LEVER FREE PLAY	5-10mm
IDLE SPEED	1800V±100rpm
BRAKE LEVER FREE PLAY	15-20mm
DRIVE CHAIN SLACK	10-20mm
FRONT/REAR TIRE PRESSURE	2-10 psi (0.15-0.7bar)
TOE – IN	0-10 mm
ENGINE OIL	SAE10W – 40
GEAR LUBRICATION OIL	SEA 90
BATTERY	12V-5Ah

3.3 FUEL TUBE

Inspect the fuel lines for deterioration, damage or leakage and replace if necessary.

3.4 THROTTLE OPERATION

Inspect for smooth throttle lever full opening and automatic full closing in all steering positions.

Inspect if there is no deterioration, damage or kicking in the throttle cable, replace it if necessary.

Check the throttle lever, free play is 5-10mm at the tip.Of the throttle lever.

Disconnect the throttle cable at the upper end.

Lubricate the cable to prevent premature wear.

3.5 THROTTLE CABLE ADJUSTMENT

Slide the rubber cap of the adjuster off the throttle housing, loosen the lock nut and adjuster the free play of the throttle lever by turning the adjuster on the throttle housing. Inspect the free play of the throttle lever.

3.6 AIR CLEANER

Unscrew the air cleaner cover screws.

Pull out the air filter element from the air cleaner case.

Wash the element in non-flammable solvent, squeeze out the solvent thoroughly. Let it dry.

Soak the filer element in air filter oil and then squeeze out the excess oil.

Install the element into air cleaner carefully.

3.7 SPARK PLUG

The spark plug located at the front of the engine.

Disconnect the spark plug cap and unscrew the spark plug.

Check the spark plug electrodes for wear out.

Install a new spark plug if the electrodes and insulator tip appear unusually fouled or burned.

The spark plug gap must be 0.7-0.8mm

With the sealing washer attached, apply cupper grease,and thread the spark plug in by hand to prevent cross threading.

Tighten the spark plug with 1.5-2kg-m

3.8 IDLE SPEED

Connect a engine speed meter.

Warm up the engine, 10 minutes are enough.

Turn the idle-speed adjust screw on the carburetor to obtain the idle speed. “Turn in” (clockwise) will get higher speed. “Turn out” (counter clockwise) will result in lower speed.

3.9 DRIVE CHAIN

Inspect the chain slack. The standard is 10-25mm.

Adjust the chain slack. (in the rear fork)

Loose the lock bolts (4 PCS) then adjust the drive Chain slack by turning the adjustment nut.

Tighten the our lock bolts.

Apply chain lubricant to lubricate the drive chain.

When the drive chain is very dirty, it should be removed, cleaned and lubricated with chain specific grease.

Clean the drive chain with kerosene and wipe it dry, and apply the lubrican.

Inspect the drive chain for possible wear or damage.

Replace the chain, if it is worn excessively or damaged.

Inspect the drive sprocket (13T), if the teeth are worn or damaged, replace it.

Inspect the rubber sleeve.

If the rubber sleeve are worn or damaged, replace it.

3.10 BRAKE SYSTEM

Inspect the front brake lever and cable for excessive free play or damage. Replace or repair if necessary.

Measure the free of the brake cable at the end of the brake lever .the standard free play is 15~25mm.

Inspect the rear brake lever for excessive free play or damage.

Replace or repair if necessary.

3.11 WHEELS AND TIRES

Inspect the tire surfaces for cuts, nails or other sharp objects. Check the pressure at cold tire condition. The standard of tire pressure is. 70/90ATV: 3-6psi.

3.12 STEERING SYSTEM

Check the free play of the steering shaft with the front wheels, steering straight the tie-rod, knuckle bushing and ball joint.

3.13 TOE-IN

Park the vehicle on level ground and the front wheels facing straight ahead.

Mark the centers of the tires to indicate the axle center height.

Measure the distance between the marks.

Carefully move the vehicle back, let the wheels have turned 180°, so the marks on the tires are aligned with the axle center height.

Measure the distance between the marks.

Calceolate the difference in the front and rear measurements, Toe-in:0-10mm.

If the toe-in is out of seandard, adjust it by changing the length of the tie-rods equally by turning the rye-rod while holding the ball joint.

Tighten the lock nuts. Toque: 3.0-3.5kgf-m.

3.14 GEAR OIL

Gear oil needs to be changed every year.

There is gear oil release bolt at the rear of engine.

Unscrew this release bolt and can let the dirty oil flow out.

The re-add oil hole is on the engine case besides the gear box.

Ⅳ ENGINE SYSTEM

4.1 MAINTENANCE SCHEDULE

4.1.1 ENGINE SHALL BE REMOVED IN THE CONDITONS OF NECESSARY REPAIRMENT OR ADJUSTMENT TO THE TRANSMISSION AND COMBUSTION SYSTEM ONLY.

4.1.2 ENGINE REMOVAL

Remove the seat and all cover fender.

Remove the spark plug cap from the spark plug.

Disconnect the carburetor.

Take off the oil pump cable from the oil pump control plate.

The oil pump is on the right side of the engine.

Discontent the wire connectors.

There are three connectors:

Carburetor auto-choke

Starter motor

Generator

Remove the drive chain cover.

Remove the drive chain retaining clip and master link, and remove the dive chain.

Remove the three engine mounting nuts and bolts.

Remove the engine from the right side of frame.

4.1.3 ENIGNE INSTAKLLATION

Engine installation is essentially the reverse order of removal.

The torque of the engine mounting bolts is 4.5-5.0kg-m

Route the wires and cable in reverse order properly.

4.2 ENGINE FUEL SYSTEM

4.2.1 TROUBLESHOOTING

ENGINE DOES NOT START

NO FUEL IN TANK

NO FUEL TO CYLINDER

TOO MUCH FUEL GO IN TO CYLINDER

NO SPARK AT PLUG

AIR CLEANER CLOGGED

ENG AIDLESS UNSTEADY, STALLS OR RUNS POORLY

IN PROPER ADJUSTMENT OF THE LD LE SPEED SCREW

IGNITION MALFUNCTION

FUEL/AIR MIX TRUE RATIO INCORRECT

AIR FILTER OR LEAKS

FUEL TANK CAP BREATHING HOLE CLOGGED

FUEL JET OF CARBURETOR CLOGGED

LEAN MIXTURE

FUEL JET OF CARBURETOR CLOGGED

FUEL TANK CAP BREATHING HOLE CLOGGED

FUEL FILTER CLOGGED

FUEL FLOW IN THE TUBE UNSMOOTH

FLOAT LEVEL IN CARBURETOR TOO LOW

RICH MIXTURE

FLOAT NEEDLE VEAL VEIN CARBURETOR FAULTY

FLOAT LEVEL TOO HIGH

AIR DUCT IN CARBURETOR IS CLOGGED
AIR FILTER DIRTY

4.3.7 TROUBLESHOOTING

LACKING OIL SUPPLY TO ENGINE

THE OIL LEVEL IN OIL TANK IS TOO LOW
OIL TUBES WERE NOT FIXED WELL
OIL HAS LEAKED FROM TUBBE ENDS
OIL TUBES WERE BROKEN
OIL TUBES WERE CLOGGED
OIL PUMP DOES NOT FUNCTION

ALWAYS INSUFFICIENT OIL LEVEL IN OIL TANK

EXTERNAL OIL LEAKS
WORN CYLINDER HEAD GASKET
WORN PISTON RINGS

4.4 ENGINE COMBUSTION SYSTEM

4.4.1 TROUBLESHOOTING

LOW COMPRESSION

CYLINDER HEAD
HEAD GASKET LEANING OR DAMAGED WARPED OR CRACKED CYLINDER HEAD
CYLINDER OR PISTON RINGS WORN OUT

HIGH COMPRESSION

EXCESSIVE CARBON BUILD – UP ON PISTON HEAD ORIN COMBUSTION CHAMBER

EXCESSIVE NOISE

PISTON AND CYLINDER WORN OUT
EXCESSIVE CARBON BUILDOUP

EXCESS SMOKE

CYLINDER OR PISTON PINGS WORN OUT
IMPROPER INSTALLATION OF PISTON PINGS
PISTON OR CYLINDER WALL SCORED OR SCRATCHED

OVER HEATING

EXCESSIVE CARBON BUILD-UP NO THE PISTON OR COMBUSTION CHAMBER
FAULTY ENGINE COOLING SYSTEM (FAN,CYLINDER COVER….)
OIL SUPPLY IS OUT OF ORDER
WRONG IGNITION TIMING

Ⅴ CARBURETOR SYSTEM

Kolpin atv carburetion specifications

90cc jetting chart

	SEA LEVEL	ALTITUDE 4-7000	HIGH ALTITUDE 7000+
Pilot	32	32	35
Air screw	1to1 1/4 turns	1 to 2 turns	1 to 2 turns
Needle	#4	#3	#2 to # 1(full lean)
Main	70	70	65

Main jet: The round, slotted brass jet located in the center of the carburetor after removing the float bowl. It controls fuel from 1/2 to wide-open throttle.

Pilot jet: the very small slotted jet located in the cast tube next to the main jet. it controls idle up to 1/4 throttle opening.

Needle: located inside the throttle side and protrudes into the carburetor. it is held in one of five positions by a unclip .it controls mid-throttle fuel requirements. The top groove of the needle is the #1 position and is the leanest position. The bottom groove of the needle is the #5 position and full rich.

Pilot airscrew: controls the amount of air that mixes with the pilot jet. Turning the screw in makes the mixture richer; turning out makes the mixture leaner. It is located on the air intake side of the carburetor near where the air box boot is clamped. It is on the same side of the carburetor as the idle screw. This is a very important adjustment that greatly affects acceleration.

Idle screw: a protruding brass screw located in the middle of the carburetor facing the steering shaft. Turning the screw in raises the idle speed; turning it out lowers the idle speed.

5.1 CARBURETOR REMOVAL

Remove the air cleaner.

Disconnect the fuel line and auto-choke electric wire.

Unscrew the intake pipe mounting bolts at the carburetor then remove the carburetor.

NOTE: Turn fuel tap in off position

Loose the carburetor cap.

Remove the throttle valve from the carburetor.

Remove the throttle valve from the throttle cable.

THROTTLE VALVE DISASSEMBLY

Remove the retainer and take out the needle clip from the throttle valve.

INSPECTION

Check the throttle valve and the jet needle surface of dirt, scratches or wear.

5.2 STARTER PLUNGER INSPECTION

Check the starter plunger wire for continuity. STANDARD: UNDER 10

Remove the carburetor and let it cool down by nature for thirty minutes.Check the current of air routs as show.GOOD: CHECKLESS NG: CHECKED

Connect a full changed battery to starter plunger wore for five minutes.Check the current of route as show.GOOD: CHECKED NG: CHECKLESS

5.3 FLOAT CHEAMBER DISASSEMBLY

Remove the setting screws. Remove the chamber cap.

Remove the float setting bolt. Remove the float pin.

Remove the float. Remove the float valve.

Remove the main jet, slow jet, needle seat & air screw.

Clean all the jet & all the hole by using high pressure air.

5.4 FUEL HEIGHT INSPECTION

Measure the height by using a gauge. STANDARD:18.5mm.

5.5 CARBURETOR INSTALLATION

The installation sequence is essentially the reverse of remove.

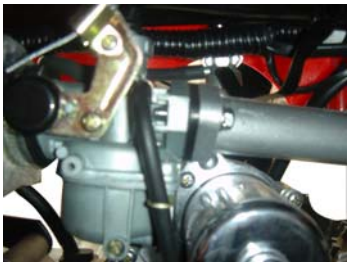
Adjust the clearance of the throttle valve cable.

Adjust the air screw.

STANDARD: $1\frac{1}{2} \pm \frac{1}{2}$ round

Adjust the idle speed.

STANDARD: 1800±100 rpm



Ⅵ. FRAME SYSTEM

6.1 FRONT WHEEL AND STEEDRING SYSTEM

6.1.1 DRAWING OF FRONT WHEELS AND STEERING SYSTEM PARTS

Check tightness

6.1.2 TROUBLESHOOTING

HARD STEERING ⟶

FAULTY TIRE
STEERING SHAFT HOLDER TOO TIGHT
INSUFFICIENT TIRE PRESSURE
FAULTY STEERING SHAFT
DAMAGED STEERING SHAFT BEARING

FRONT WHEEL WOBBLING →

FAULTY TIRE
WORN FRONT BRAKE DRUM BEARING
BENT RIM
AXLE NUT NOT TIGHTENED PROPERLY

BRAKE DRAG →

INCORRECT BRAKE ADJUSTMENT
STICEKING BRAKE CABLE

STEERS TO ONE SIDE →

BENT TIE RODS
WHEEL INSTALLED INCORRECTLY
UNEQUAL TIRE PRESSURE
BENT FRAME
WORN SEING ARM PIVOT BUSHINGS

POOR BRAKE PERFORMANCE →

BRAKE SHOES WORN
WORN BRAKE DRUM
BRAKE LINNGS OILY, GREASY OR DIRTY
IMPROPER BRAKE ADJUSTMENT

FRONT SUSPENSION NOISE →

LOOSE FRONT SUSPENSION FASTENERS
BINDING SUSPENSION LINK

HARD SUSPENSION →

FAULTY FRONT SWING ARM BUSHINGS
IMPROPERLY INSTALLED FRONT SWING ARMS
BENT FRONT SHOCK ABSORBER ROD

SOFT SUSPENSION →

WEAK FRONT SHOCK ABSORBER SPRINGS
WORN OR ADMAGED FRONT SWING
ARMBUSHINGS

6.1.3 HANDLE BAR REMOVE AND INSTALLATION

REMOVAL

Remove the handle cover.

Remove the throttle cable on the right level.

Remove the front brake cable. Please note that if you want to take the front brake cable apart, the gap of adjustable screw of brake needs to aim at the gap of right level.

Loose the screw of right level and remove the right level to the tank.
Remove the right grip.Take right level apart from handle bar.

Remove the rear brake cable and link switch electric wire of rear brake light.

Remove the left handle switch and link electric wire.

Loose the screw of left level and remove left level to fuel tank.Remove the left grip.

Remove the handle cover stay.Remove the L/R handle cover holder.

Remove the handle bar.

INSTALLATION

Install ation is the reverse order of remove.

Please pay attention to following items when you assemble L/R level：

A. There are one point of orientation separately located on the left and the right of handle bar.

B. When you assemble left level，the gap of left level must aim at orientation of handle bar （as drawing B）.

C. When you assemble right level， the gap of right level must aim at orientation of handle bar（as drawing C）.

6.1.4 FRONT WHEEL

REMOVAL

Raise the front wheels off the ground by placing a block under the frame.Remove the front wheel nuts， washers and wheels.

INSTALLATION

Install and tighten the four-wheel nuts. TORQUE：3.5-4.0kgf-m. Remember to put a cotter pin in the castle nut.

6.1.5 FRONT BRAKES

FRONT BRAKE INSPECTION

Remove the front wheel. Remove the brake drum.

Measure the brake lining thickness. The minimum limit：1.5mm.

If they are thinner than the minimum limit，replace the brake linings.

Measure the brake drum inner diameter.The maximum limit：86mm

Turn the inner ace of each bearing with the fingers.

The bearings should turn smoothly and quietly.

If the Race does not turn smoothly or quietly，remove and discard the bearings.

BRAKE PANEL REMOVEAL Disconnect the brake cable from the brake arm.

Remove the brake panel from the knuckle.

Remove brake arm and cam. Remove return spring. Remove felt seal.

INSTALL BRAKE PANEL

Apply grease to the brake cam and anchor pin and install the cam it the brake panel.

Soak the felt seal in the engine oil and install the seal on the brake cam.

Install the brake arm on the cam by aligning the punch mark and the grove on the cam.

Tighten the brake arm bolt and nut.TORQUE：4.7N.m

Install the brake panel on the knuckle. Connect the brake cable to the brake arm. Install the brake arm cover. Tighten the screws securely. Position the brake shoes in their original.

location and install the brake shoe spring. Install the brake drum and the front wheel. Install the castle nut and cotter pin.

6.1.6 STEERING SYSTEM

REMOVAL OF KUNCKLE AND TIE-ROD

Remove the front wheels and brakes panel.

Remove the four self lock nuts from the tie-rod ball joints and take off the two tie-rods.

Take the rubber cap off the knuckle and remove the cotter pin on the knuckle.

Unscrew the castle nut and remove the knuckle.

TIE-ROD INSPECTION

Inspect the tie-rod for damage or bending.

Inspect the ball joint rubbers for damage， wear or deterioration.

Turn the ball joints with fingers， the ball joints should turn smoothly and quietly.

KNUCHLE INSPECTION

Inspect the knuckle for damage or cracks.

Measure the knuckle outer diameter. Upper minimim limit： Φ15.4mm. Lower minimim limit： Φ16.9mm.

KNUCKLE BUSHING INSPECTION

There are two bushings in the sleeve of the front swing arm， the upper and lower bushing.

Check the knuckle bushings for wear or damage.

Measure the inner diameter of the bushings. Upper minimim limit： Φ15.6mm. Lower minimim limit： Φ17.1mm.

STEERING SHAFT REMOVAL

Remove the handle bar and handle bar cover. Remove the front side cover. Unscrew the

steering shaft fixing nut from the bottom of the shaft. Pull steering shaft carefully.

SLEEVE INSPECTION

Remove the steering shaft. Remove the sleeve from the shaft. Inspect the sleeve for damage or wear，replace if necessary. Measure the sleeve inner diameter.

STEERING SHAFT INSPECTION

Inspect the steering shaft for damage or cracks.

Measure the Steering shaft outer diameter in the location of the sleeve.

STEERING SHAFT BEARING INSPECTION

The bearing is on the front part of fame. Turn the shaft bearing by hand. The bearing should turn smoothly and quietly. Also check the bearing race figment in the holder. Replace the bearing if necessary.

INSTALLATION OF STEERING SHAFT

Install the steering shaft with the bushing. Apply grease to the bushing. Install thE bushing holder aNd tighten the nuts. TORQUE：2.0-2.2kgf-m.

Install the steering shaft nut and tighten it.

This nut is on the bottom side of the steering shaft. TORQUE：4.5-5.0kgf-m.

INSTALLATION OF TIE-ROD

Install the ball joint with “L” mark on the steering shaft side.

Install the tie-rod with the mark on the wheel side.

Set the distance between the ball joints at 278mm. This is temporary setting.

INSTALLATION OF KINGPIN

Use grease to the knuckle lower dust seal lips and install it.

Pump grease to the bushing and install the knuckle.

Tighten the knuckle nut，the setting torque is 3.0-4.0 kgf-m

Fix the waterproof rubber cap.

Set the temporary distance 278mm between the ball joints.

Install the tie-rod and tighten the nuts. The setting torque：3.5-4.0 kgf-m

Install the front brake. Install the front wheel.

Adjust the toe in by changing the distance between the ball joints on the tie rods.

6.3 FENDERS AND EXHAUST PIPE

6.3.1 DRAWING SIDE COVER ASSY

6.3.2 COVER REMOVAL

Remove the seat and battery disconnect the main switch and winker Assy electric wire.

Remove the side cover 3 and 4. Remove the foot well 1 and 2.

Remove the eight screws (two of the screws are inside the front cover connected with frame) which are fitted on front cover.

Remove the two screws which fitted on the rear cover.

Remove the rear cover.

If you only want to take the rear cover apart; Please do followings steps.

1. Remove the seat and battery.
2. Remove the eight screws which fitted on the front cover.
3. Remove the two screws which fitted on the rear cover.
4. Remove the four screws which fitted on the foot well 1.2 and rear cover.
5. Push the front cover forward and up, you still take the rear cover apart.

6.3.3 EXHAUST PIPE DRAWING

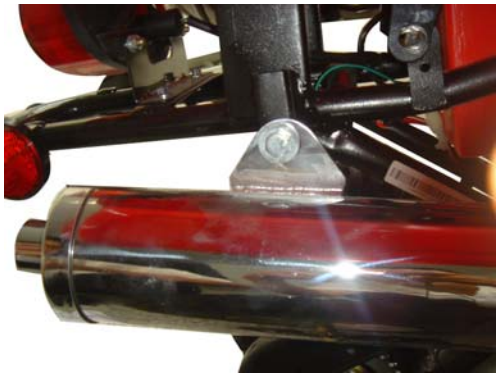
6.3.4 EXHAUST PIPE REMOVEAL

Do not service the exhaust pipe while it is hot.

Unscrew the bolts that fix the exhaust pipe with the engine.

Remove the exhaust pipe mounting bolts besides the muffler body.

Remove the exhaust pipe carefully.



6.3.5 EXHAUST PIPE INSTALLATION

Installation is the reverse order of removal.

TORQUE :Exhaust muffler bolts 2.5-3.0kgf-m After installation, make sure that there are no exhaust leaks.

Ⅶ. ELECTRICAL SYSTEM

7.1 TROUBLESHOOTING

ENGINE STARTS＆STALLS

IMPROPER IGNITION TIMING

FAULTY SPARK PLUG

NO SPARK

ENGEINE STOP SWITCH AT “OFF”

FAULTY IGNITION COIL

FAULTY GENERATOR

FAULTY CDI UNIT

POOR CONNECTOR CONTACET:

Between CDI and ignition coil

Between alternator and CDI unit

Between CDI and engine stop switch

Between ignition coil and spark plug

Between generator and CDI unit

ENGINE STARTS BUT RUNS POORLY

IGNITION PRIMARY CIRCUIT

Faulty generator

Faulty CDI unit

Faulty alternator exciter coil

Loosened contact terminals

Faulty ignition coil

IGNITION SECONDARY CIRCUIT

Faulty plug

Loosened contact spark plug cable

IMPROPER IGNITION TIMING

Faulty generator

Faulty CDI unit

CHARGING SYSTEM FAILURE

LOOSE, BROKEN OR SHORTED WIRE

FAULTY ALTERNATOR

FAULTY IGNITION SWITCH

ENGINE INTERMITTENT POWER

LOOSE BATTERY CONNECTION

LOOSE CHARGING SYSTEM CONNECTION

STARTER MOTOR WILL NOT TURN

DEAD BATTERY

FAULTY IGNITION SWITCH

OLLSE OR DISCONNECTED WIRE

STARTER MOTOR AND ENGINE TURN, BUT ENGINE DOES NOT START

FAULTY IGNITION SYSTEM

ENGINE PROBLEMS

FAULTY ENGINE STOP SWITCH

7-2 BATTERY REMOVAL/INSTALLATION

BATTERY INSPECTION

Check the voltage of the battery.

FULL CHARGE:13.0-13.2V

UNDER CHARGE:12.3V

BATTERY REMOVAL

Remove the battery holder bolt nuts.

Disconnect the negative cable and then the position cable and remove the battery.

BATTERY INSTALLATION

Install the battery in the reverse order of removal.

After installing the battery,coat the terminals with clean grease.

BATTERY CHARGING

Connect charge position (+) cable to the battery positive termini.

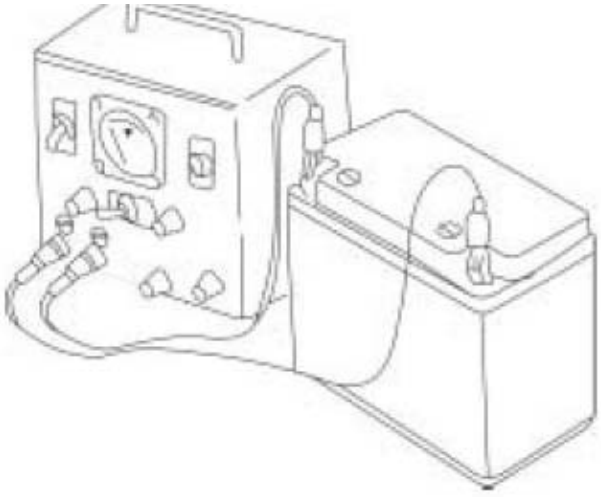
Connect the charge negative (-) cable to the battery negative (-) terminal.

CHARGING CURRENT: STANDARD: 0.4A SWIFTNESS: 4A

CHARGING TIME:

STANDARD: 5hrs

HIGH RATE: 30min



7-3 A.C.G. INSPECTION

EXCITER COIL INSPECTION

Disconnect the black/red wire of A.C.G.

Check the black/red and earth wire for continuity.

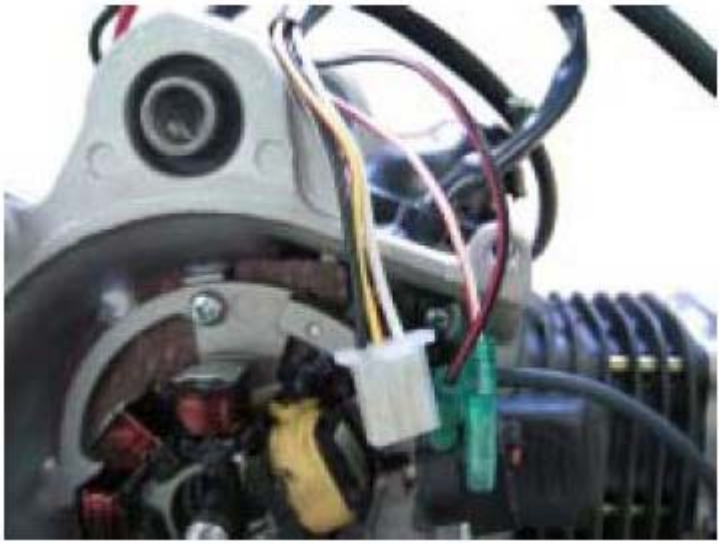
STANDARD:300Ω-1KΩ(20℃)

PLUSET COIL INSPECTION

Disconnect the blue/yellow wire of A.C.G.

Check the blue/yellow wire and green wire for continuity.

STANDARD:40Ω-300Ω(20℃)



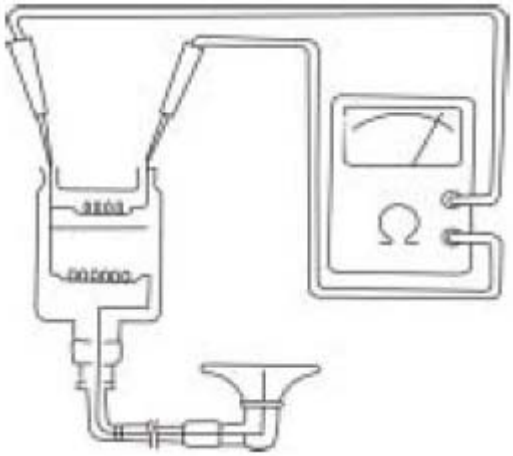
7-4 IGNITION COIL INSPECTION

Check the primary coil for continuity.

Mark connections with an ohmmeter as shown.

The coil is normal if there is continuity.

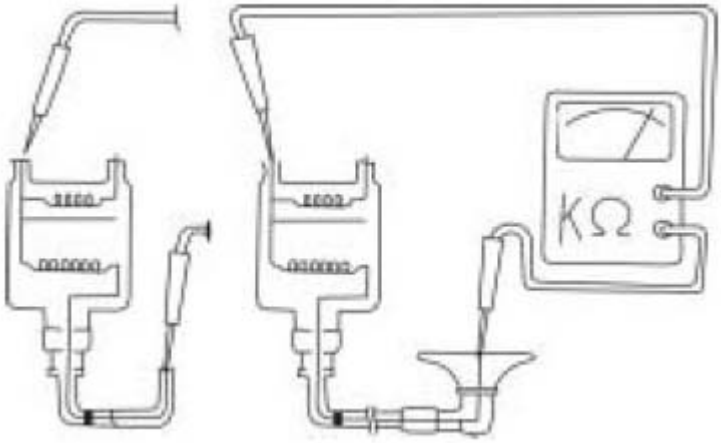
STANDARD:0.1Ω-1.0Ω(20℃)



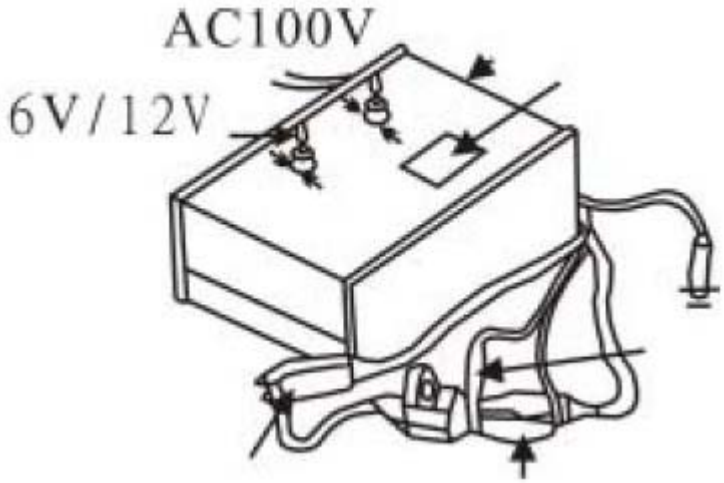
Check the secondary coil for continuity.

The ignite coil is correct if there is continuity.

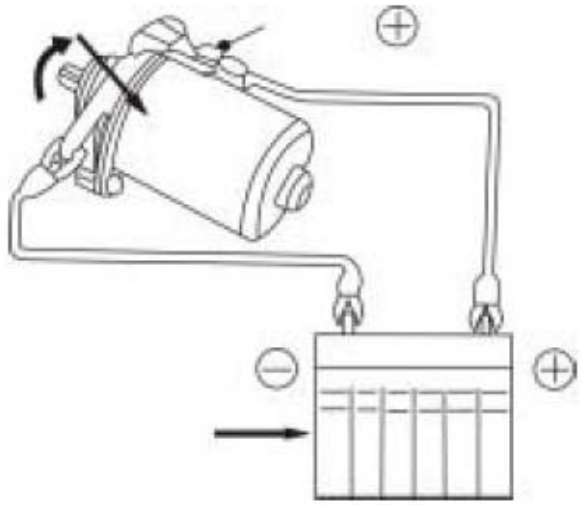
STANDARD: With plug cap:7Ω-12Ω No plug cap:3Ω-5Ω



Check the coil output on a ignition coil tester.
Set the tester to ignition test,dial out the electrodes and observe the spark gap.
GOOD:Continuous spark. NG:Discontinuous spark
NOTE:Follow the instructions supplied with the tester.



7-5 START MOROTR
START MOROTOR INSPECTION
Connect a battery (12V) to the motor.
Check the performance of the motor.
NOTE:Use a fully charged battery.



7-6 START RELLEY INSPECTION

Connect a battery (12V) between (D) and (C) as show.

Check the continuity the (A) pole (B) pole.

GOOD: continuityNG: discontinuity

7-7 PROJECTOR LIGHT

When project light is broken, please loose the bolt (1) and check the filament in the bulb (2) is damage or not. If yes, please replace new bulb; if no damage on filament, please loosen bolt (3) and replace the whole project light.