Preface

This manual covers the construction, function and servicing procedure of KIPOR IG2000/IG2000p/IG2000s/CG2000/CG2000s generators.

Careful observance of these instructions will result in better, safer service work.

CONTENTS

1. SPECIFICATIONS

1.1 SPECIFICATIONS

Dimensions and weights

Model	IG2000/IG2000p/CG2000	IG2000s/CG2000s
Overall Length	520mm	665mm
Overall Width	300mm	300mm
Overall Height	425mm	425mm
Net Weight	22Kg	24Kg

Engine

Model	KG158
Type	4-stroke,OVC, single cylinder, Gasoline engine
Displacement	105.6ml
Bore x stroke	58 x 40mm
Maximum horsepower(KVA)	2.2/4500
Compression ratio	8.5:1
Cooling system	Forced air-cooled
Ignition system	T.C.I
Ignition timing	27°B.T.D.C
Spark plug	A7RTC
Carburetor	Float type, Horizontal, butterfly valve type
Air cleaner	Semi-dry type
Governor	Electronic control type
Lubrication system	Forced splash
Oil capacity	0.4L
Starting system	Recoil starter
Stopping system	Primary circuit ground
Fuel used	Automotive unleaded gasoline

Generator

Model	KD20/KD20A/KM20/KM20A
Generator type	Multi pole rotation type
Generator structure	Self-ventilation drip-proof type
Excitation	Self-excitation (Magnet type)
Voltage regulation system	PWM(Plush width modulation)
Phase	Three phase
Rotating direction	Clockwise (Viewed from the generator)
Frequency regulation	AC-DC-AC conversion (Inverter type)

1.2 CHARACTERISTICS

Model	IG2000/IG2000s/IG2000p/CG2000/CG2000s		
Maximum output AC	2.0KVA		
Rated output AC	1.6KVA		
Rated output DC	100W		
Rated frequency	50Hz	60HZ	60HZ
Rated voltage AC	230V	120V	240V
Rated voltage DC	12V		
Rated current AC	7.0A	13.3A	6.7A
Rated current DC	8.3A		
Power factor	1.0cosφ		
Voltage variation rate Momentary Average Average time	10%max. 1.5%max. 3 sec. max.		
Voltage stability	±1%		
Frequency variation rate Momentary Average Average time	1%max. 1%max. 1 sec. max.		
Frequency stability	±0.1%		
Insulation resistance	10MΩmin.		
AC circuit protector	9.3A(230V)	17.9A(120V)	9.0A(240V)
DC circuit protector	10A		
Fuel tank capacity	3.5L		
Fuel consumption (at rated load)	500g/KW.h		
Operating hours (at rated load)	3.2h		
Noise level (Zero load to full load)	58-65dB(A)/7m		

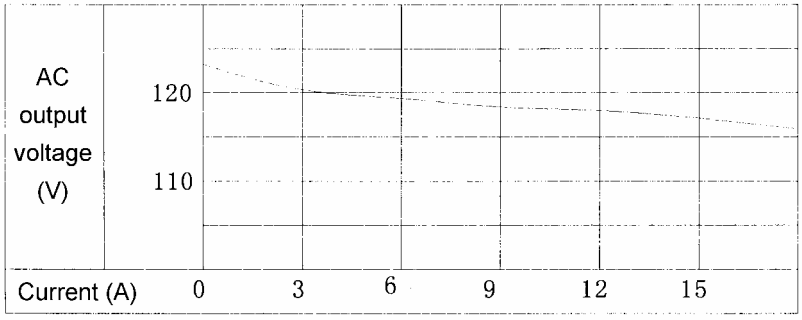
1.3 PERFORMANCE CURVES

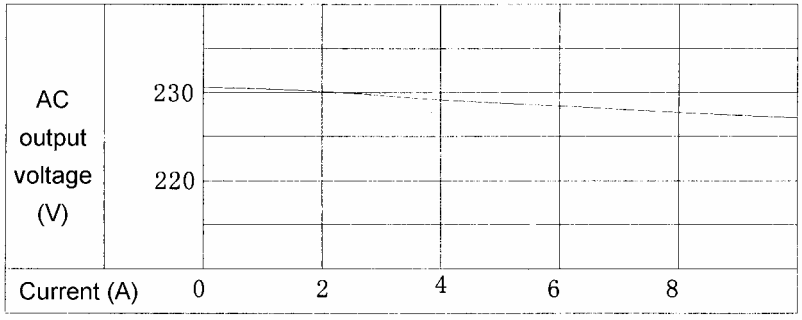
The curves show performance of the generator under average condition.

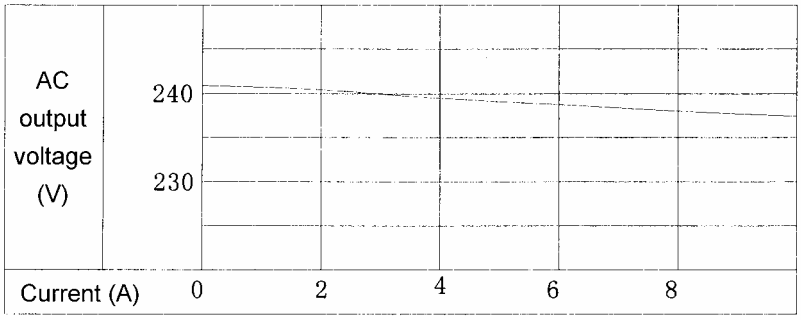
Performance may vary to some degree depending on ambient temperature and humidity.

The output voltage will be higher than usual when the generator is still cold, immediately after the engine starts.

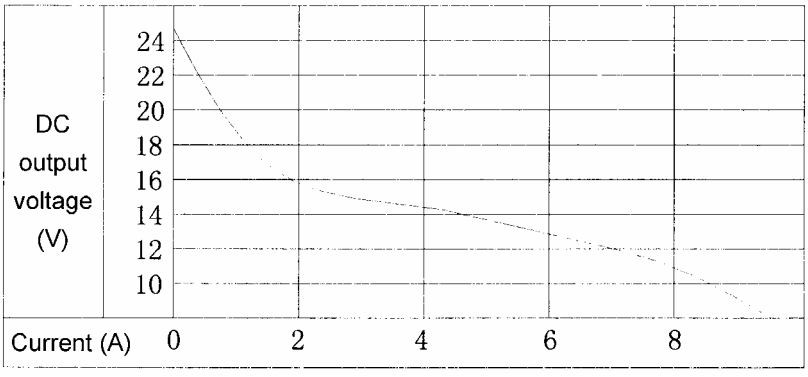
● **AC External characteristic curves**





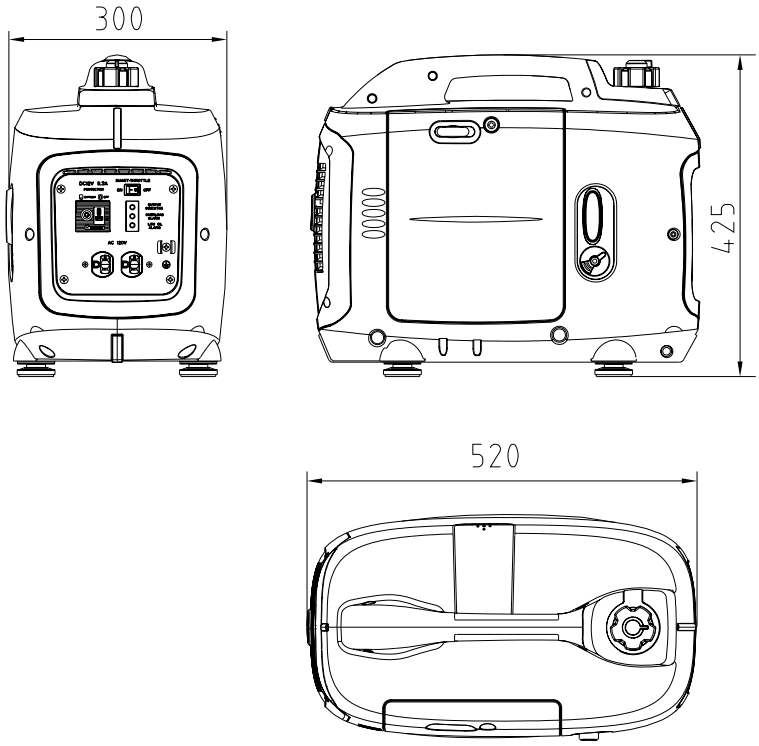


● **DC External characteristic curves**

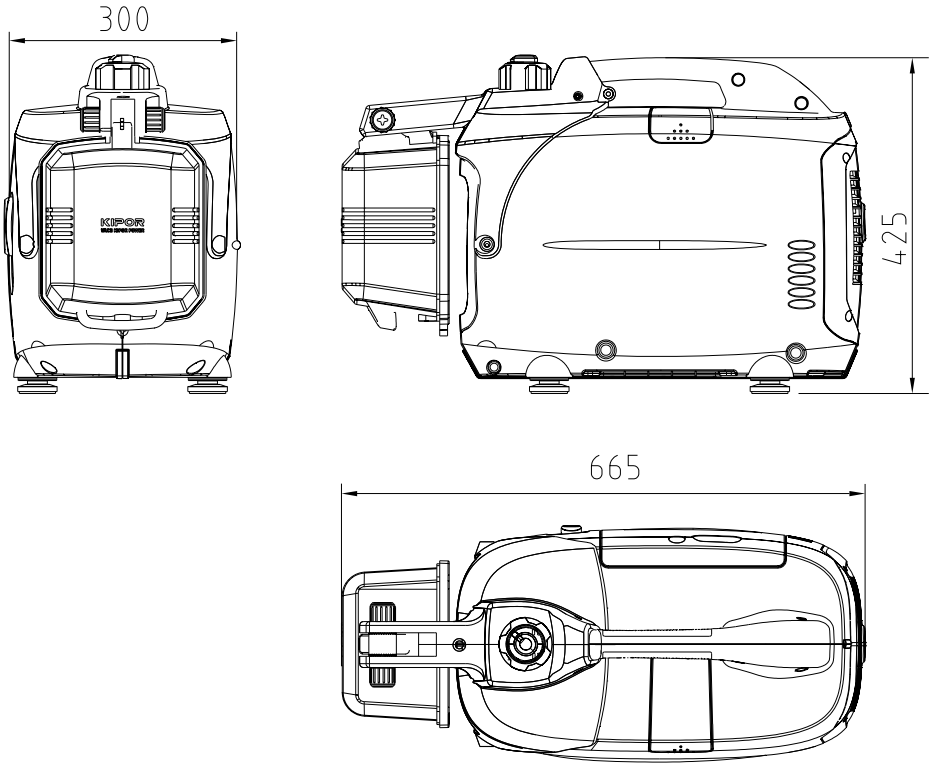


1.4 DIMENSIONAL DRAWING Unit: mm

a. IG2000\IG2000p/CG2000



b. IG2000s/CG2000s



1.5 WIRING DIAGRAM

a. IG2000/IG2000s

b: IG2000p

c. CG2000/CG2000s

2. Service information

2.1 The importance of proper servicing

■ Proper servicing is essential to the safety of the operator and the reliability of the engine. Any error or oversight made by the technician while servicing can easily result in faulty operation, damage to the engine or injury to the operator.

■ Improper servicing can cause an unsafe condition that can lead to serious injury or death.
Follow the procedures and precautions in this shop manual carefully.

■ Some of the most important precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing maintenance or repairs. Only you can decide whether you should perform a given task.

■ Failure to follow maintenance instructions and precautions can cause you to be seriously hurt or killed. Follow the procedures and precautions in this shop manual carefully.

2.2 Important safety precautions

Be sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and safety equipment. When performing maintenance or repairs, be especially careful of the following:

■ Read the instructions before you begin, and be sure you have the tools and skills required to perform the tasks safely.

■ Be sure that the engine is off before you begin any maintenance or repairs. This will reduce the possibility of several hazards:

Be careful for carbon monoxide poisoning from engine exhaust.
Be sure there is adequate ventilation whenever you run the engine.
Be careful for burns from hot parts.
Let the engine cool before you touch it.
Be careful for injury from moving parts.

■ Do not run the engine unless the instruction tells you to do so. Even then, keep your hands, fingers, and clothing away.

■ To reduce the possibility of a fire or explosion, be sure when working around gasoline, use only a nonflammable solvent, not gasoline, to clean parts. Keep all cigarettes, sparks, and flames away from all fuel-related parts.

2.3 Service rules

1. Use genuine KIPOR or KIPOR-recommended parts and lubricants or their equivalents. Parts that do not meet Kipor's design specifications may damage the engine.
2. Use the special tools designed for the product.
3. Install new gaskets, O-rings, etc. when reassembling.
4. When torque bolts or nuts, begin with larger-diameter or inner bolts first and tighten to the specified torque diagonally, unless a particular sequence is specified.
5. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.

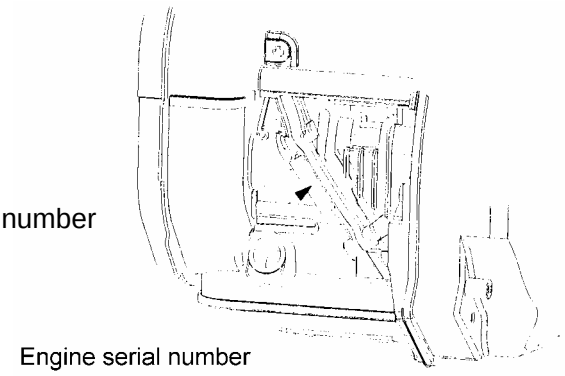
6. After reassembly, check all parts for proper installation and operation.
7. Many screws used in this machine are self-tapping. Be aware that cross-threading or over tightening these screws will strip the threads and ruin the hole.
8. Use only metric tools when servicing this engine. Metric bolts, nuts and screws are not interchangeable with no metric fasteners. The use of incorrect tools and fasteners will damage the engine.
9. Follow the instructions represented by these symbols when they are used.

■ Electric precautions

1. Hold the connector body to disconnect the connector. Do not disconnect by pulling the wire harness. To disconnect the locking connector, be sure to unlock first, and then disconnect.
2. Check the connector terminals for bend, excessive extrusion, missing terminal, or other abnormalities before connecting the connector.
3. To connect, insert the connector as full as it goes. If the connector is a locking type, be sure that it is locked securely.
4. Check the connector cover for breakage and check whether the connector female terminal is open excessively. Then, connect the connector securely. Check the connector terminal for rust. Remove the rust using an emery paper or equivalent material before connecting the connector.
5. Set the harness clips in the specified places of the frame securely, and clamp the wire harnesses.
6. Clamp the cables securely.
7. Clamp the wire harnesses securely so that they do not interfere with the rotating parts, moving parts and the hot parts.
8. Route and connect the wire harnesses properly. Be sure that the harnesses are not slack, twisted or pulled taut.
9. Route the wire harnesses properly so that they do not contact with the shape edges and corners, and the end of the bolts and screws on the body.
10. If a wire harness contacts the end of the bolts/screws or sharp edges and corners, protect the contact part of the harness with a tube or by winding with an electrician's insulating tape. If the wire harness has a grommet, set the grommet securely.
11. Take care not to pinch the wire harnesses during installation of a part. If a wire harness has the damaged insulation, repair by winding with the electrician's insulating tape.
12. Read the tester manufacture's operation instructions carefully before operation with tester. Follow the instructions of the Service Manual. Be sure that the battery built in a tester is fully charged and check the meter before inspection using the tester.

2.4 Serial number location

The engine serial number is stamped at the underside of engine side cover. Refer to these numbers when ordering or making technical inquiries.



2.5 Maintenance standards

Engine

Part	Item		Standard(mm)	Service limit
Engine	Maximum speed without load		4300±100rpm	—
	Compress force		0.45Mpa/800rpm	—
Cylinder	Sleeve I.D.		58.000-58.020	58.105
Piston	Skirt O.D		57.960-57.980	57.85
	Pin bore I.D.		13.002-13.008	13.05
Piston pin	O.D		12.994－13.000	12.95
Piston ring	1st ring	Height h	0.97-0.99	0.87
		Ring side clearance	0.02-0.06	0.15
		Ring end clearance	0.15-0.25	1.0
		Width t	1.95-2.15	1.75
	2nd ring	Height h	1.17-1.19	1.07
		Ring side clearance	0.02-0.06	0.15
		Ring end clearance	0.15-0.25	1.0
		Width t	2.4-2.6	2.2
	Oil ring	Height h	1.85-1.98	1.75
		Ring side clearance	0.03-0.18	0.24
		Ring end clearance	0.20-0.50	1.0
		Width t	2.3-2.7	2.2
Connecting rod	Small end I.D		13.006—13.017	13.08
	Big end I.D		24.020—24.033	24.09
Crankshaft	Crank pin O.D.		23.967-23.980	23.90
Valves	Valve clearance	IN	0.10±0.02	---
		EX	0.15±0.02	---
	Stem O.D.	IN	3.965－3.980	3.90
		EX	3.955－3.970	3.90
	Guide I.D.	IN/EX	4.000－4.030	4.06
	Seat width	IN/EX	0.7	1.8
Valve spring	Free length	IN/EX	26.4	24.9
Cam wheel	Cam height		29.026-29.086	28.5
Camshaft	O.D		8.966-8.975	8.92
	Camshaft bearing I.D.		9.000-9.015	9.035
Rocker arm	I.D(Rocker arm)		6.000-6.012	6.037
	O.D.(Rocker arm shaft)		5.972-5.980	5.965
	I.D.(Rocker arm shaft bearing)		6.000-6.012	6.037
Carburetor	Main jet		0.60	—
	Float height		12	—
	Pilot screw opening		2 turns out	—
Spark plug	Gap		0.6—0.7	—
Ignition coil	Resistance	Primary side	0.8—1.3Ω	—
		Second side	15 —21kΩ	—
Pulse coil (Trigger)	Air gap		0.5-0.75	—
	Resistance		80～130Ω	—

Motor

Part	Item	Type	Standard(Ω)			
			IG series		CG series	
			120V	230V/240V	120V	230V/240V
Ignition winding	Resistance	Green-Yellow/Green	0.40-0.55			
Outer charging winding	Resistance	Blue--Blue	0.12-0.15			
Sub winding	Resistance	White-White (IG) White-White (CG)	0.15-0.30			
Main winding	Resistance	Black—Black-Black (IG) Black-Yellow/Black-Green/Black-Red (CG)	1.35-1.75	5.0-5.5	0.18-0.21	0.65-0.90

2.6 Torque values

Item	Specification	Tightening torque	
		N·m	kgf·m
Connection rod bolt	M5X0.8X25	8-10	0.8-1.0
Spark plug	M10X1.0X13	12-15	1.2-1.5
Crankcase cover	M6X25	8-10	0.8-1.0
Flywheel nut	M12X1.25	70-80	7.0-8.0
Standard torque	M5 Bolt, nut	6-8	0.6-0.8
	M6 Blot, nut	8-10	0.8-1.0
	M8 Bolt, nut	20-23	2.0-2.3

Note: Use standard torque values for fasteners that are not listed in this table.

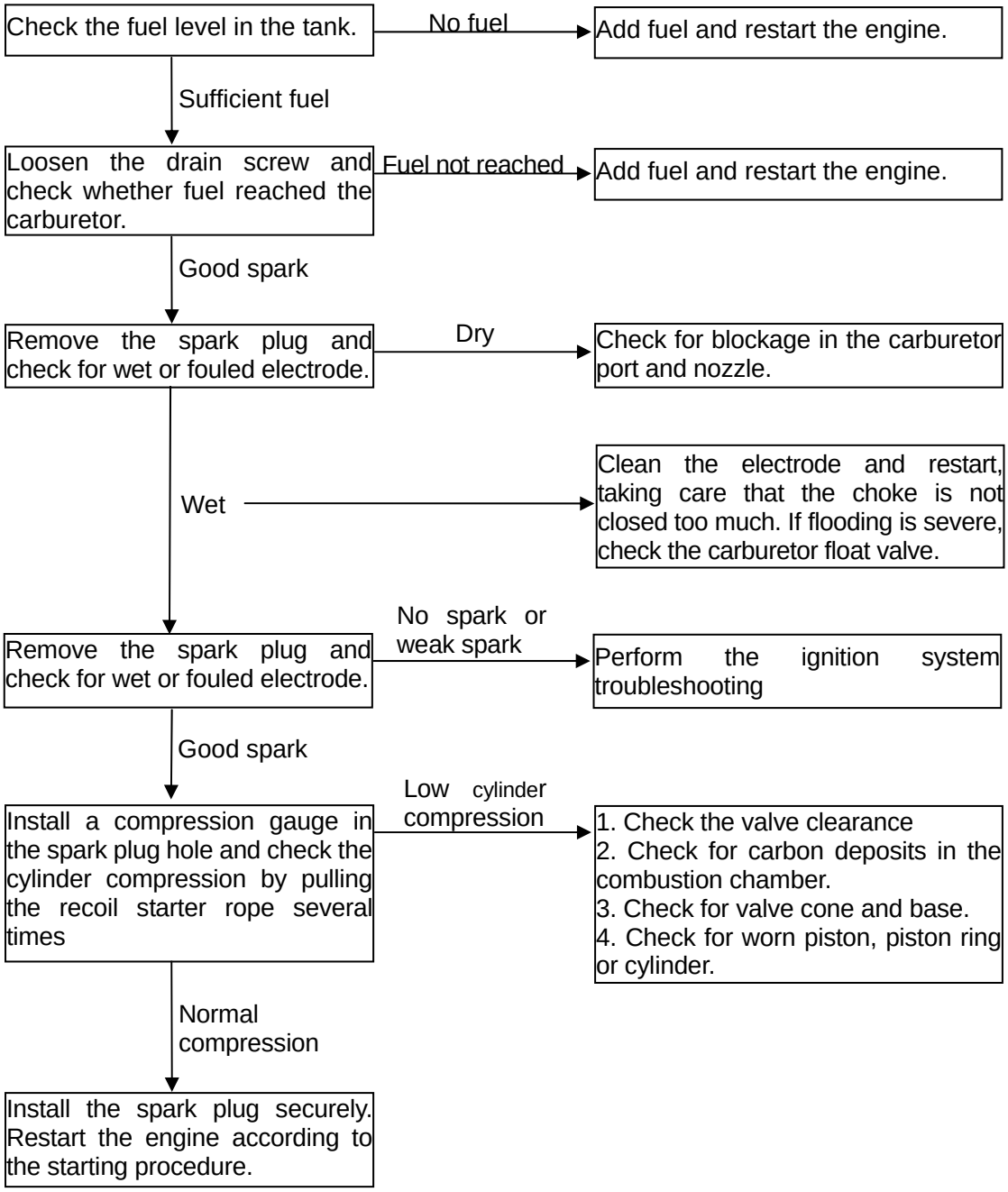
2.7 Troubleshooting

a. General symptoms and possible causes

Engine does not start or hard starting	Fuel filter clogged	Clean
	Fuel tank tube clogged	Clean
	Fuel switch clogged	Clean
	Carburetor faulty	Readjust and clean
	Ignition coil faulty	Inspect and replace
	Spark plug faulty	Inspect and replace
	Trigger faulty or trigger clearance faulty	Inspect and replace
	Spark plug cap looses	Fix it securely
	Low oil alarm faulty	Inspect and replace
	Ignitor faulty	Inspect and replace
	Ignition winding faulty	Inspect and replace

	Throttle opening fault	Set in fully close or half close position
Engine speed does not stabilize, too high or too low	Carburetor faulty	Adjust and/or disassemble and clean
	Throttle control motor (stepping motor) faulty	Inspect and replace
	Inverter unit faulty	Inspect and replace
	Valve clearance misadjusted	Readjust

b. Hard starting



■ **Cylinder compression check**

1. Remove the spark plug cap and spark plug.

2. Install a compression gauge in the spark plug hole, pull the recoil starter rope several times with force and measure the cylinder compression.

Cylinder compression	0.45Mpa/800rpm

C. Ignition system

■ Fill in oil to the demanded level.

■ Use the genuine spark plug A7RTC.

■ Spark plug inspection

1. Disassemble spark plug

2. Install spark plug onto spark plug cap.

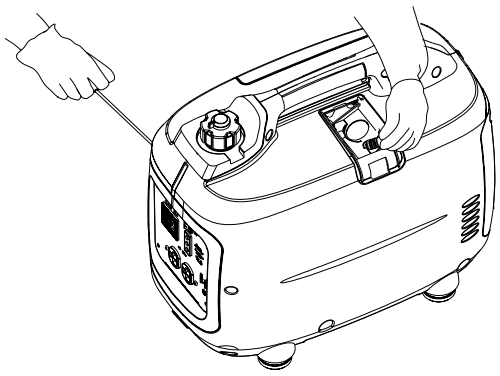
3. Set the oil switch to the “ON” position. Ground the negative (—) electrode (i.e. threaded part) of the spark plug against the shroud and pull the recoil starter rope to check the spark plug.

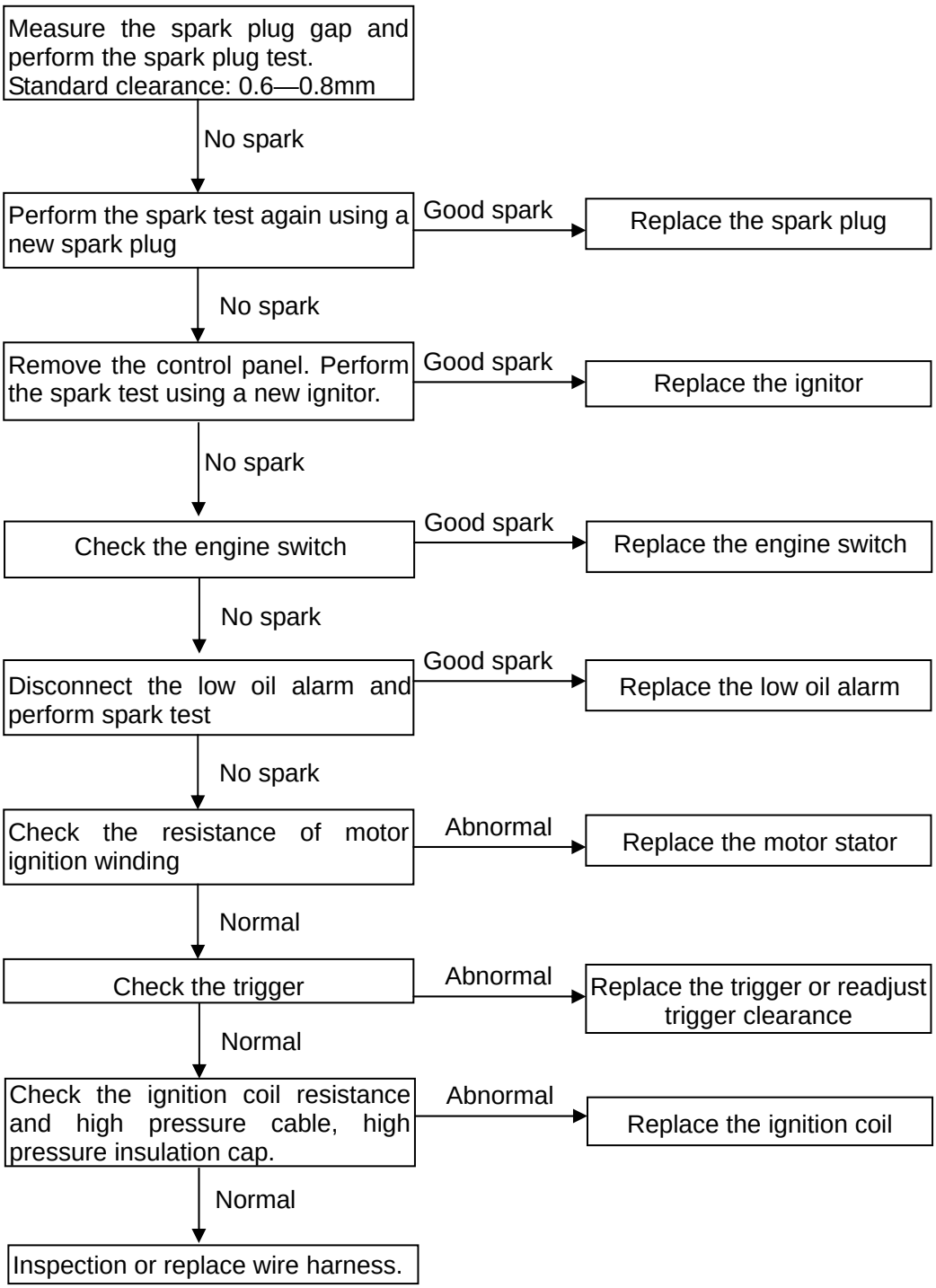
Warning

■ Don’t pull the recoil starter while touching the high tension wire with wet hands. High voltage generates, which is very dangerous.

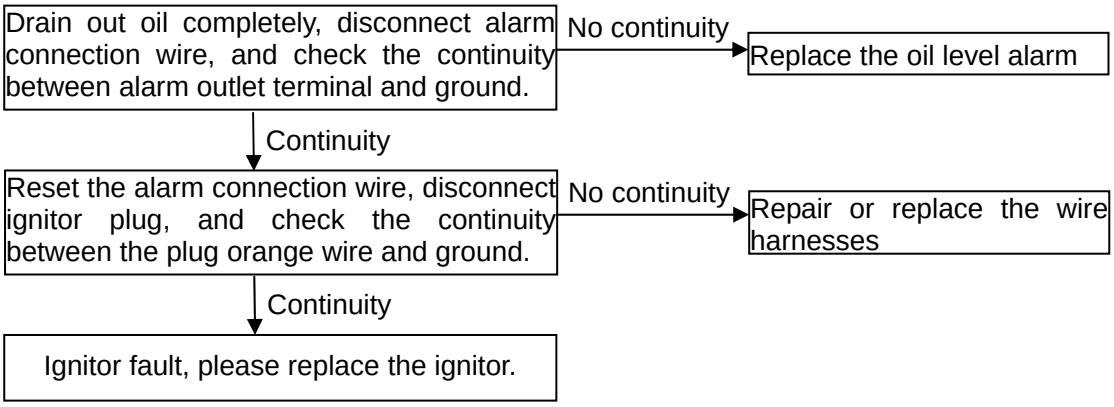
■ Drain the gasoline from the fuel tank and carburetor.

■ Pull the recoil starter several times to release the unborn gas in the cylinder with the engine switch OFF.

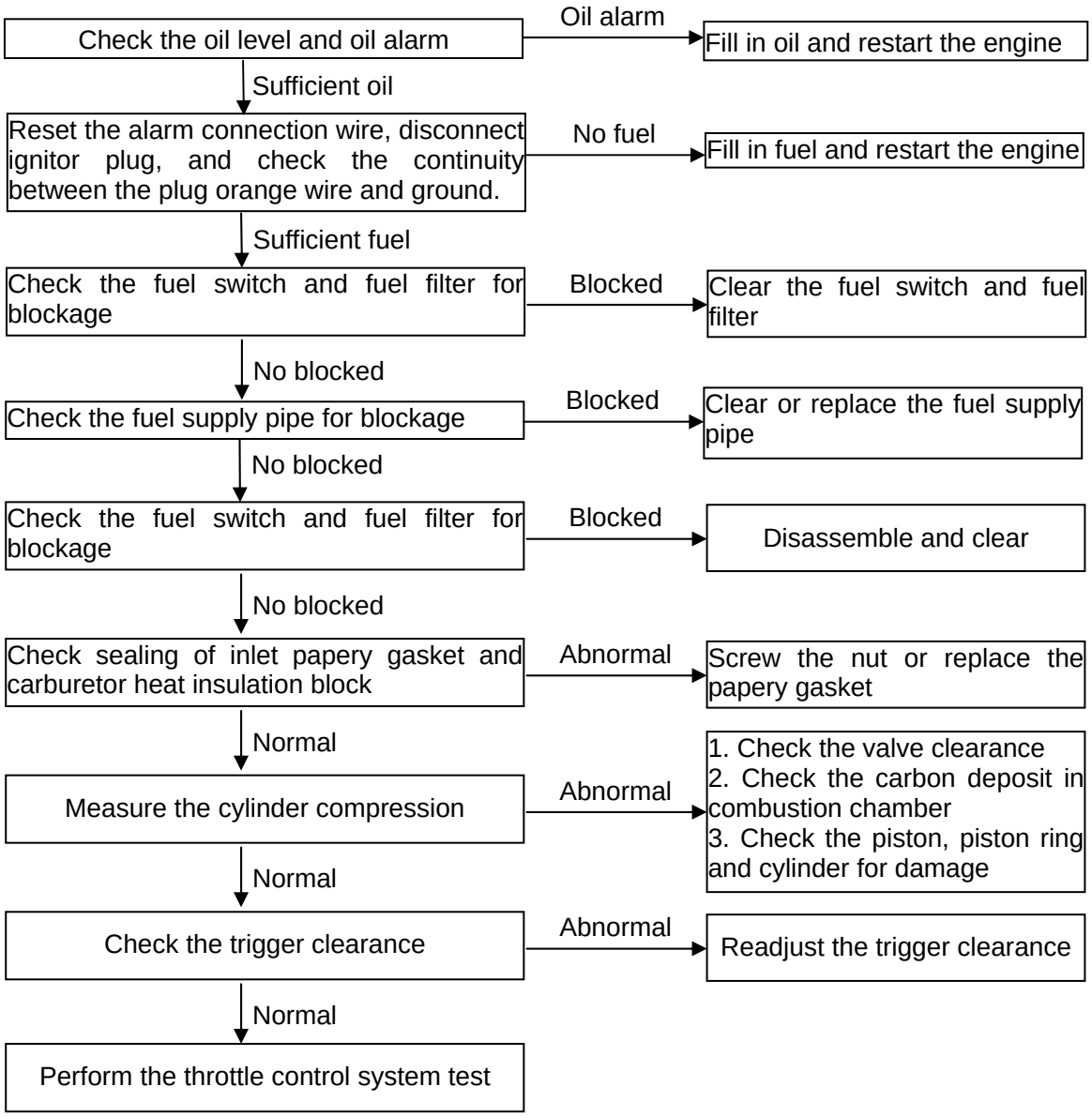




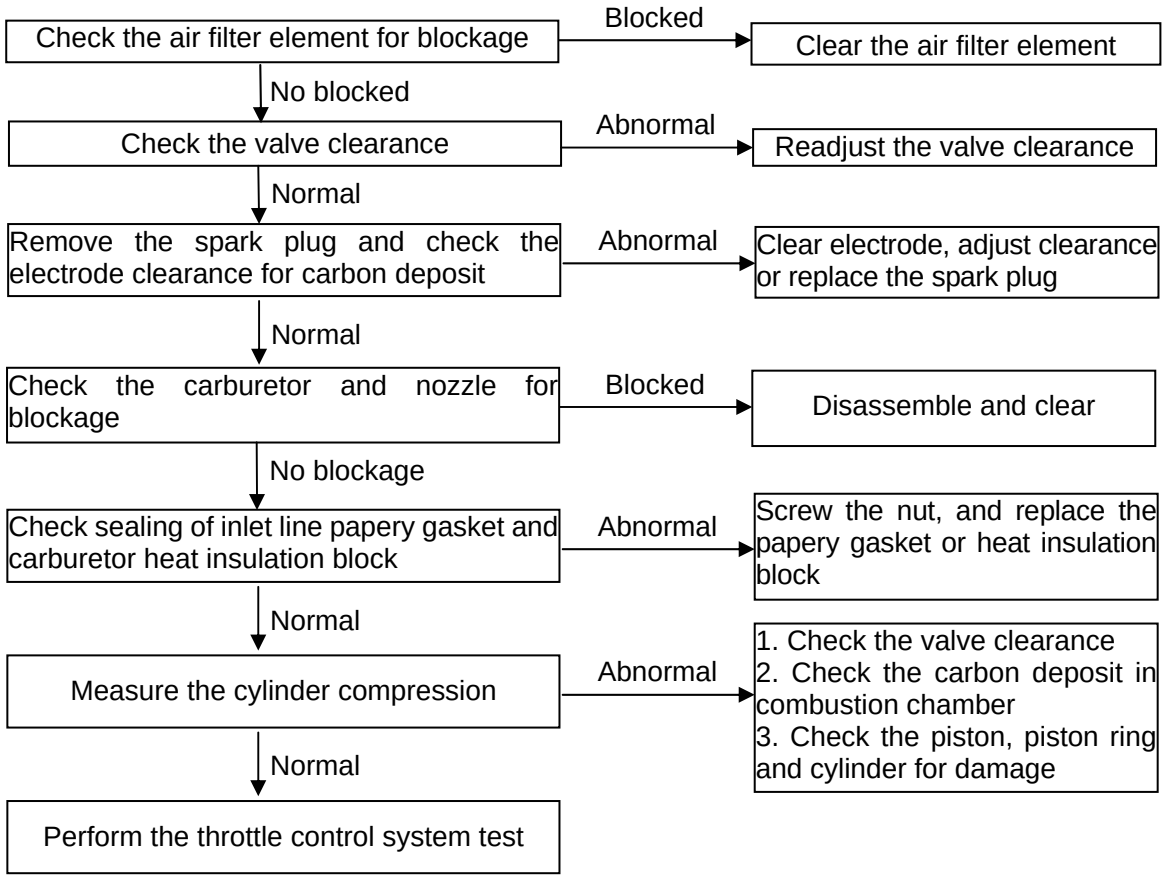
d. Engine oil level is low, but engine does not stop. (Poor oil alarm device)



e. Engine stops running (Throttle is at the correct position)

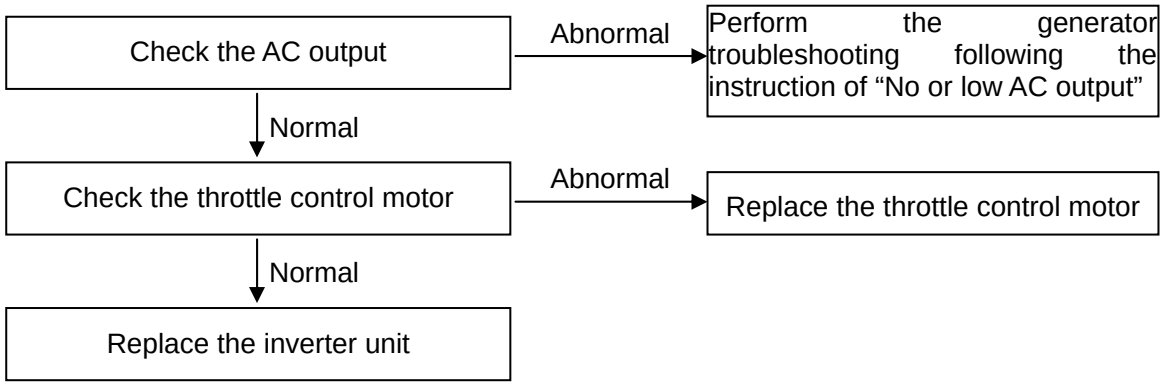


f. Engine speed can’t increase or instable (choke is at the correct position)

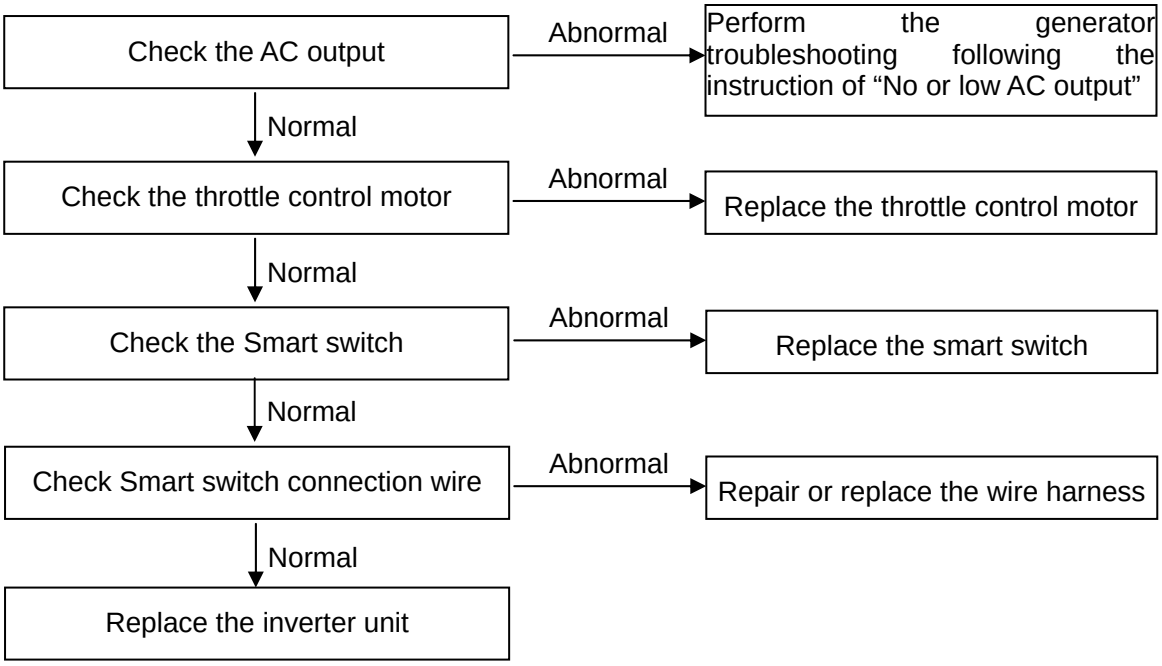


g. Throttle control system test

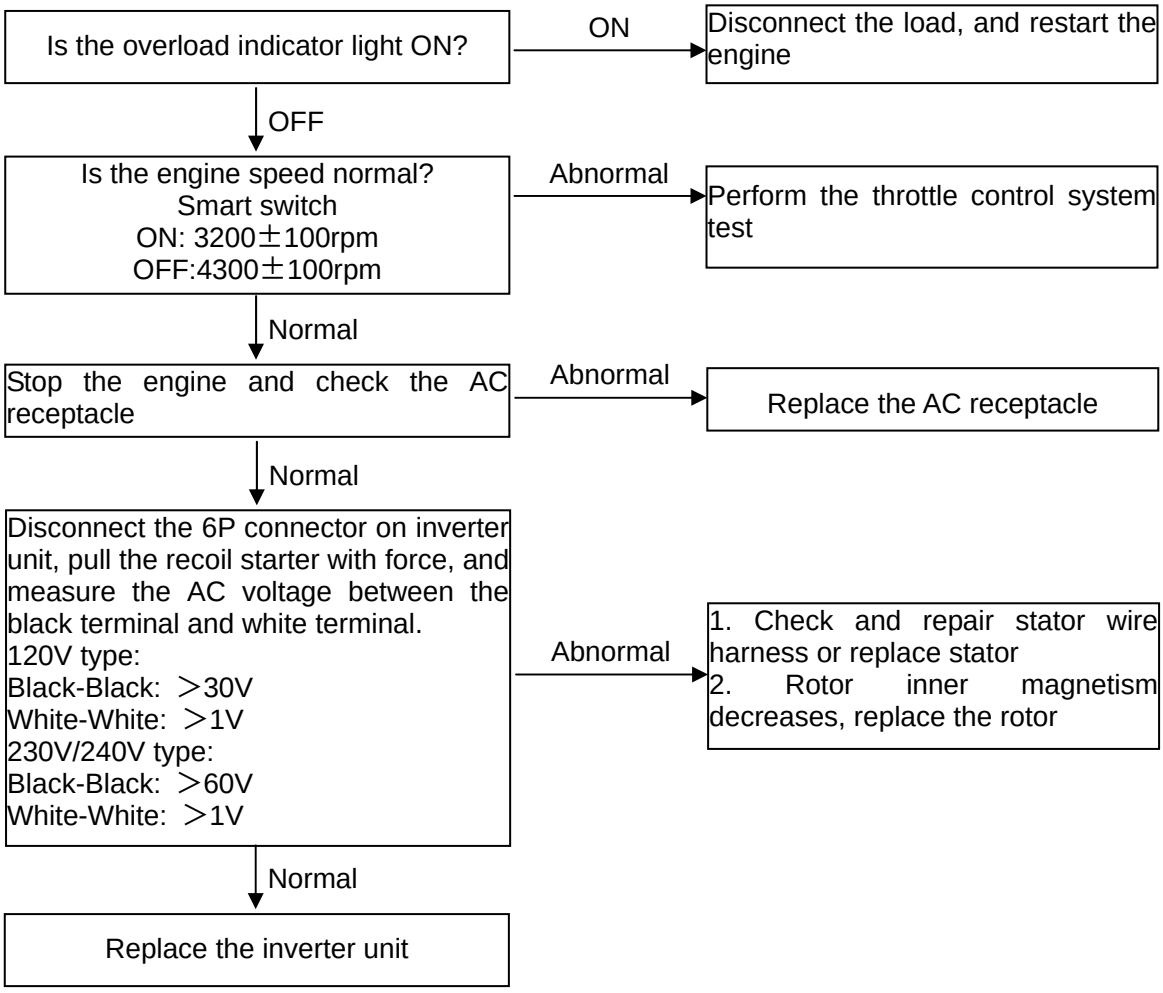
1. Engine speed too high or too low



2. Smart system doesn't work with zero load, engine speed doesn't increase with Smart system on and load connected.



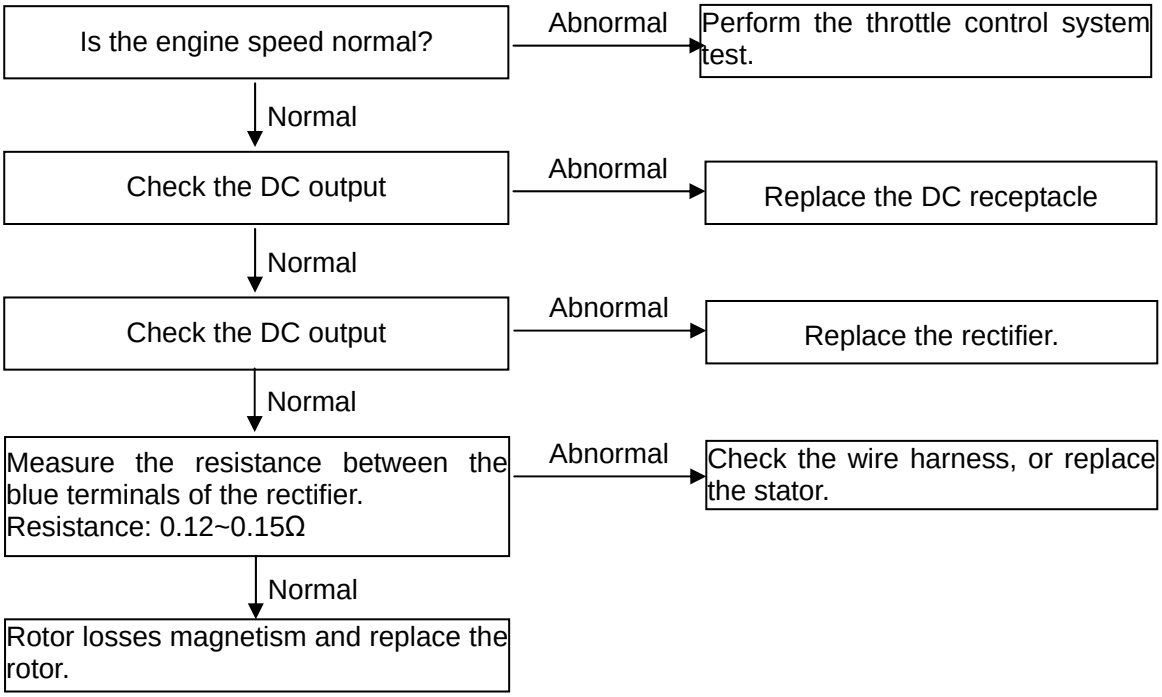
h. No or low AC output



Measure voltage

Model / Item	IG series		CG series	
	Phase wire color: Black-Black-Black Sub winding color: White-White		Phase wire color: Yellow-Green-Red Neutral wire color: Black Sub winding color: Black-Green	
	120V	230V\240V	120V	230V\240V
Voltage between phase wires	＞30V	＞60V	＞15V	＞30V
Sub winding voltage	＞1V			

i. No AC output (CG series)



j. No DC output

k. Parallel no output

■ Make sure that the two PARALLEL I/O are connected correctly by special communication wire.

■ Make sure that the PARALLEL, OUTPUT are inserted into the parallel cable and connected correctly.

■ If there is any disconnection, when you start the parallel generators, some one will be no output and

damaged.

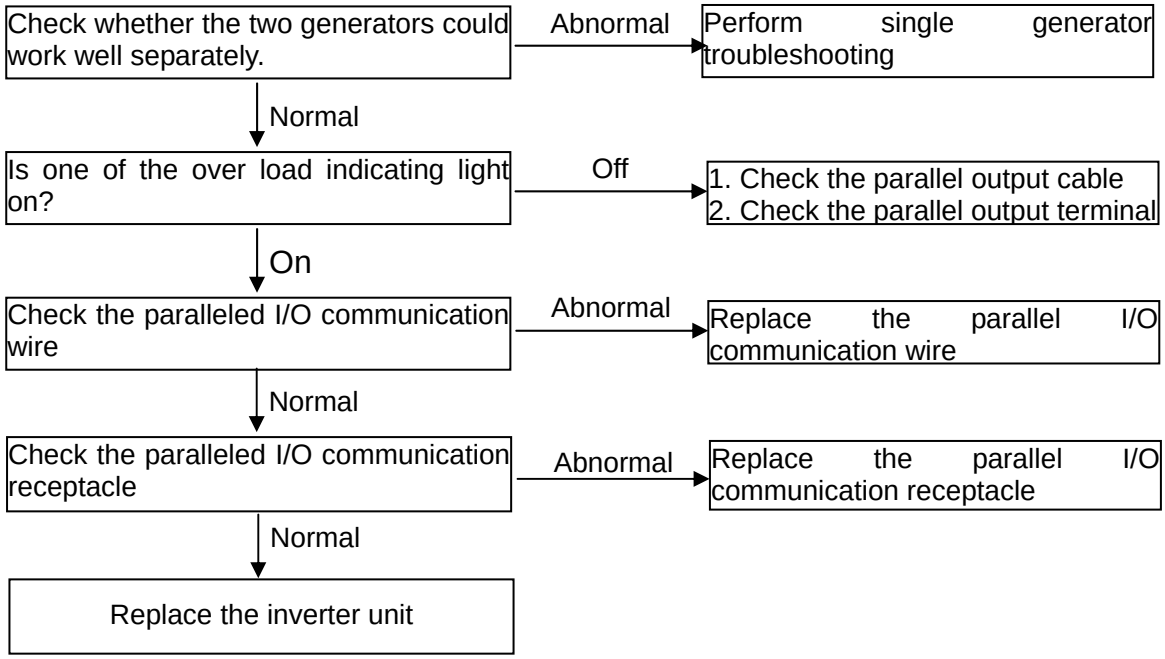
■ The parallel cable is only used for 2 generators with the same model. It can't be used for 3 or more than 3 generators.

■ Only KIPOR parallel output cable and communication wire is allowed to use, never try other cables. Use the receptacle output of parallel cable, don't use the receptacle of control panel.

■ Don't disconnect the PARALLEL I/O special communication wire and parallel output cable during parallel operation. Connect the PARALLEL I/O communication wire and parallel output cable before starting engine. Don't disconnect the PARALLEL I/O communication wire and parallel output cable until stop operation.

■ Don’t output current after stopping one generator when the parallel cable is still connected.

■ Do disconnect the parallel output cable and parallel communication wire if operate the generator separately.



3. Maintenance

3.1 Maintenance schedule

Regular service period(1) Item perform at every indicated month or operating hour interval, whichever comes first		Each use	First month or 20 Hrs.	Every 3 months or 50Hrs.	Every 6 months or 100 Hrs.	Every year or 300 Hrs.
Engine Oil	Check	●				
	Replace		●		●	
Air filter	Check	●				
	Clean			●②		
Spark plug	Clean-Adjust				●	
Spark catcher	Clean-Adjust				●	
Valve clearance	Check-Adjust					●③
Fuel tank and filter	Clean					●③
Fuel line	Check	Every 2 year (Replace if necessary)				

Note:

(1) For commercial use, operation hours are determined by proper maintenance.

(2) Service more frequently when operating in dusty areas, every 10 hrs or every day.

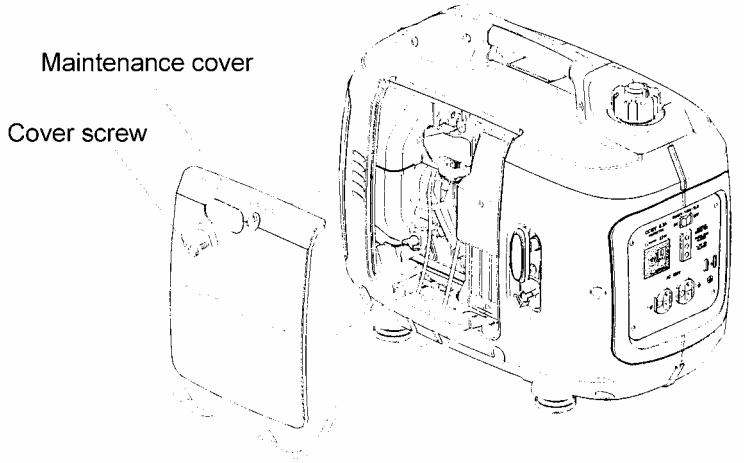
(3) Service by KIPOR authorized agency, unless correct tools or professional specialist is available. Do service according to the manual.

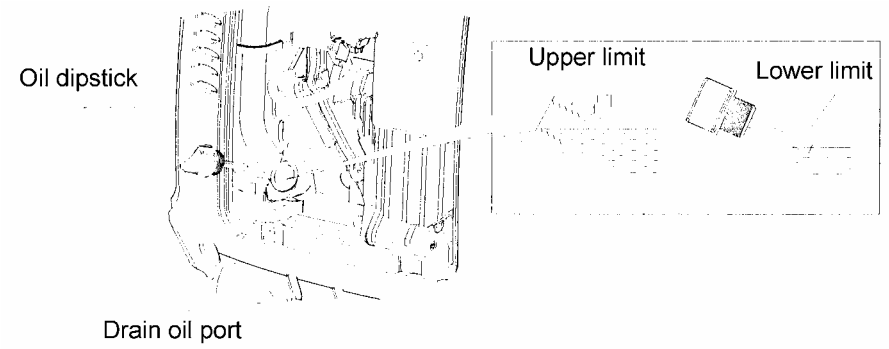
3.2 Engine oil

■ Checking for the oil level

Stop the engine and check the oil level, be sure to put the engine on a flat floor when checking.

1. Loosen the screws of the maintenance cover and remove the cover.
2. Remove the oil filler cap and check for the oil level.





3. If the oil level is low, add to the edge of the oil filler port.

■ **Replace the engine oil**

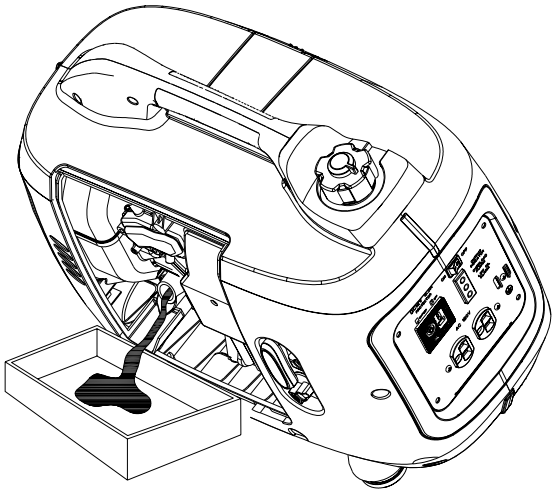
1. Disassemble the oil dipstick and oil drain bolt, drain out dirty oil.
2. Fix the oil drain bolt tightly.
3. Refill in clean oil. (oil capacity is 0.4L)

※ Recommended oil: SAE10W-30 or SAE30, API Service Classification SE, SF or SG.

4. Check the oil level; fill to the upper limitation level if necessary.
5. Tighten the oil dipstick.

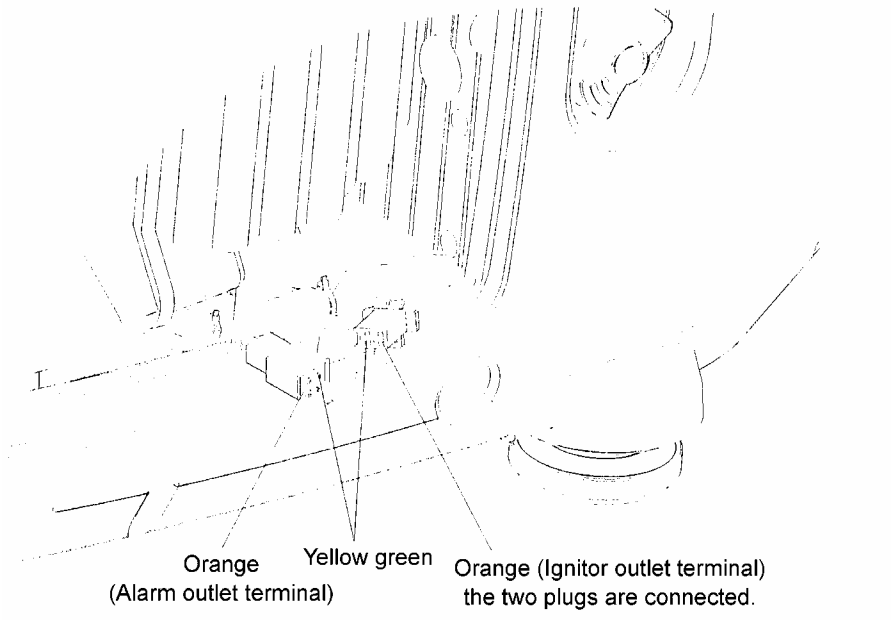
■ Please dispose of the used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash; pour it on the ground, or down a drain.

■ Drain the used oil while the engine is warm. Warm oil drains quickly and completely. Be attention that the temperature should not be too high to avoid scalding.

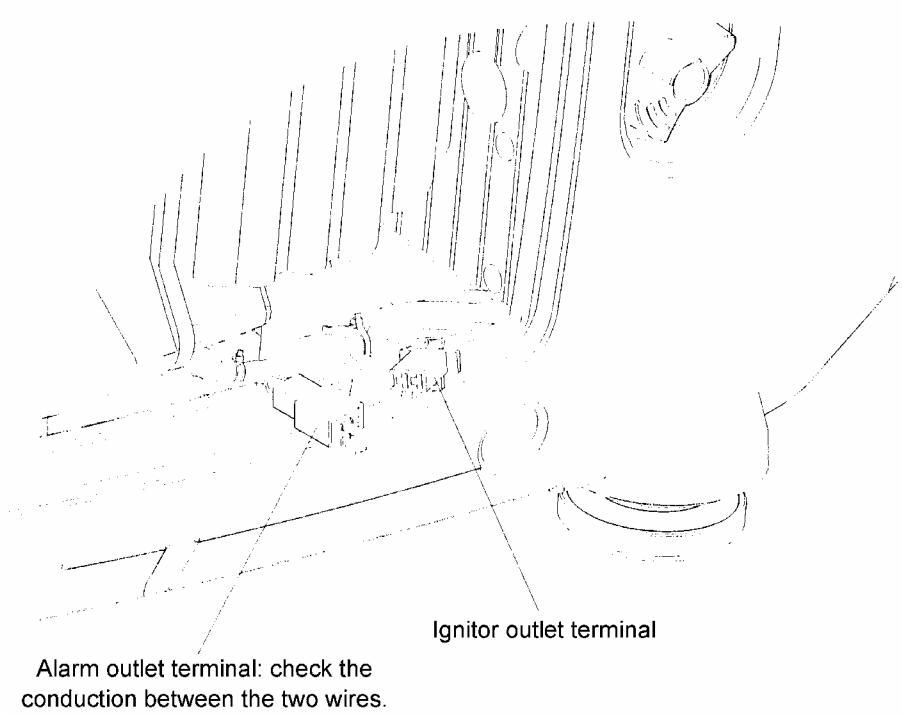


3.3 Checking for the low oil alarm

1. Disconnect oil alarm connector when the engine is still running, connect the two plugs, be sure that oil alarm lights and engine stops.



2. Stop engine, disconnect oil alarm connector, check the connector conduction, no conduct is normal.



3. Drain out the oil inside engine and check the conduction, conduct is normal.

3.4 Air cleaner

Inspection/Cleaning:

1) Loosen the cover screw and remove the maintenance cover.

2) Disengage the locking tab by pushing it, and remove the air cleaner cover.

3) Remove the element from the air cleaner case.

4) Clean the element in warm soapy water, rinse and allow to dry thoroughly, or clean with a high flash point solvent and allow to dry.

Dip the element in clean engine oil and squeeze out all the excess oil.

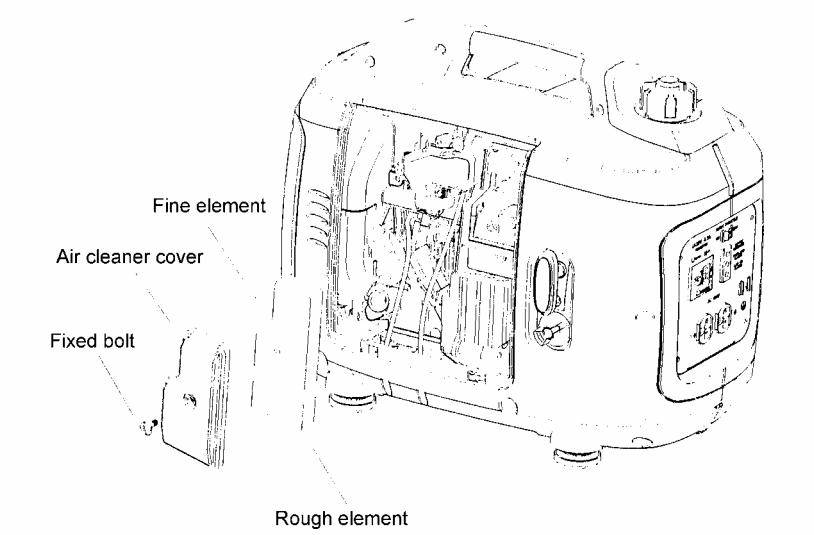
Excess oil will restrict air flow through the foam element and may smoke at the engine start.

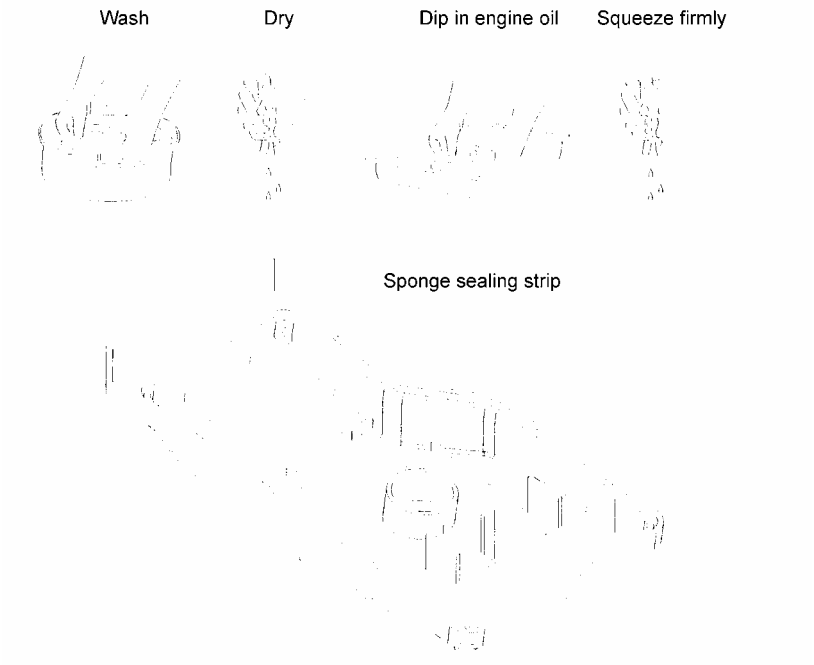
5) Install the air cleaner element in the air cleaner case.

Clean the air cleaner rubber and the air cleaner case if necessary. Be sure that the air cleaner cover seals are set securely.

6) Install the air cleaner cover. Be sure that the air cleaner cover seals are set securely.

7) Install the maintenance cover securely.





Caution

■ A dirty air cleaner will restrict air flow to the carburetor, reducing engine performance. If the engine is operated in dusty areas, clean the air cleaner more often than specified in the Maintenance Schedule.

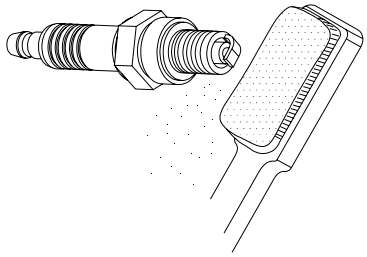
■ Never run the engine in case there is no element or the filter is damaged, as it will do great harm to the engine.

3.5 Spark plug

Inspection/Cleaning:

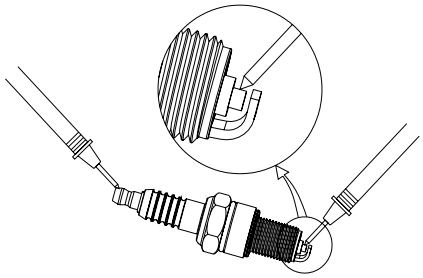
1) Remove the spark plug cap and remove the spark plug.

2) Remove carbon or other deposits with a plug cleaner or stiff ire brush. Check the sealing washer for damage.



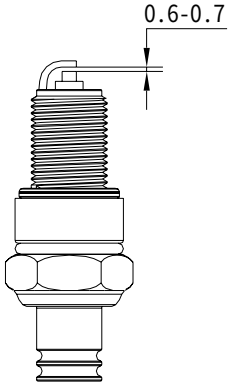
3) Measure the plug resistance; replace the spark plug if the measure is not accord with the asked valve.

Spark plug resistance	3~9KΩ



4) Measure the plug gap with a wire-type feeler gauge. Adjust by bending the side electrode if the measure is not accord with the asked valve.

Spark plug clearance	0.6~0.7mm
Standard spark plug	A7RTC



5). Install the plug finger tight to seat the washer, and then tighten with a plug wrench.

Torque valve is 12~15 N.m

3.6 Valve clearance

Caution

■ Valve clearance inspection and adjustment must be performed with the engine cold.

Inspection/Adjustment:

1) Remove the following parts:

—Front cover, control panel

—Rear cover

—Right/left side covers

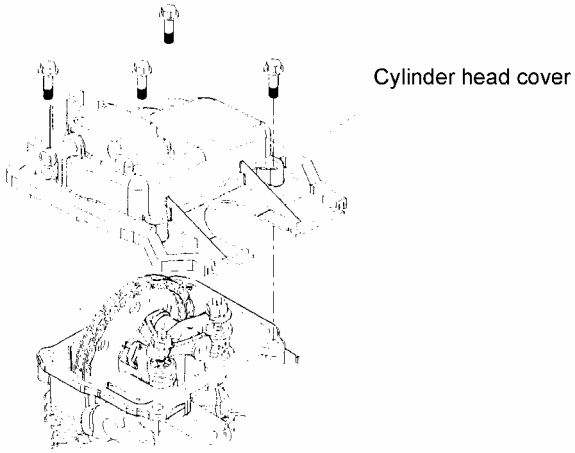
—Fuel tank

—Inverter unit, engine bed

—Recoil starter, fan cover

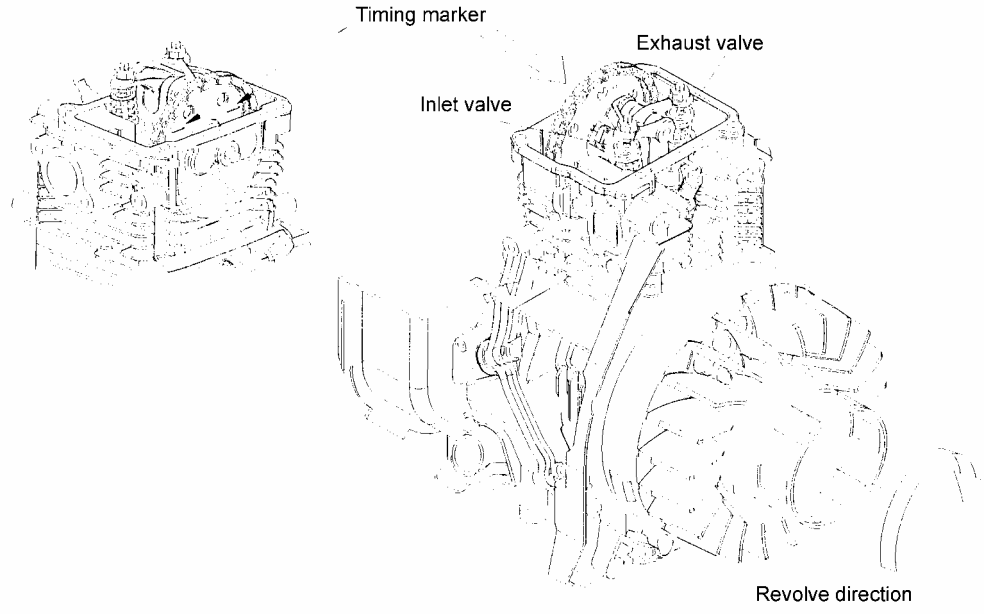
—Inlet/Exhaust side baffler

2) Remove the four tighten bolts and disassemble the cylinder cover. Don't remove the cylinder cover with excessive force. It can deform the cylinder cover. Replace the cylinder cover if it is deformed.



3) Turn the rotor to set the piston at top dead center of the compression stroke.

Timing line of camshaft driving chain should align with the cylinder head seal, check whether the inlet and exhaust valve are closed.



Caution

■ If the inlet valve is on, turn the rotor again to align the timing line with the cylinder head seal, and both the inlet and exhaust valve should be closed.

4) Insert a feeler gauge between the rocker arm and the valve and measure the valve clearance.

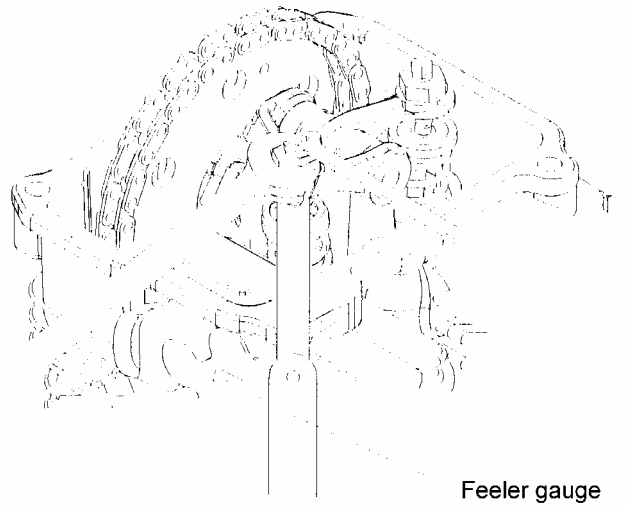
Valve clearance	IN	0.10±0.02mm
	EX	0.15±0.02mm

5) If adjustment is necessary, proceed as follows.

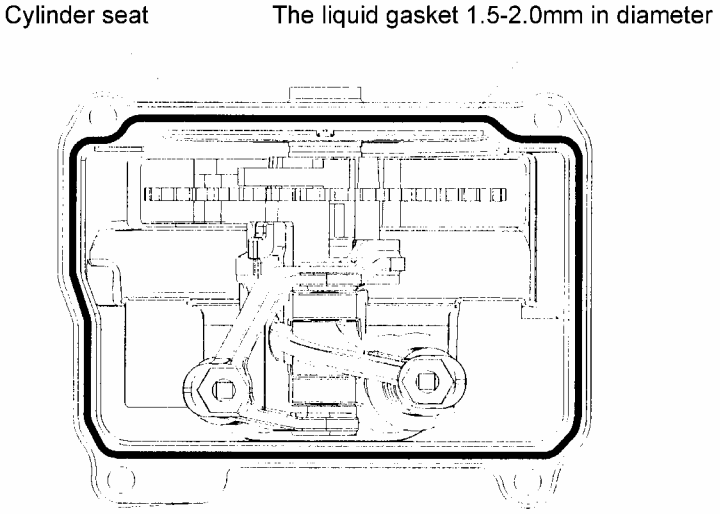
a. Loosen the adjusting screw lock nut and adjust the valve clearance by turning the adjusting screw in or out.

b. Secure the adjusting screw with a socket wrench and tighten the lock nut to the specified torque.

c. After tightening the lock nut, check the valve clearance again.



6) Clean the liquid gasket of the cylinder block and cylinder head cover. Apply the liquid gasket (Three Bond 1207B or equivalent) to the cylinder block installation surface as shown.



7) Install the removed parts in the reverse order of removal.

3.7 Fuel tank/Fuel filter

Caution

■ Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Wipe up spills immediately.

Cleaning:

1) Drain the fuel from the tank and carburetor, and then remove the following parts.

—Rear cover

—Front cover and control panel

—Right/Left side cover

2) Disconnect the fuel tube from the fuel tank, and remove the fuel filter.

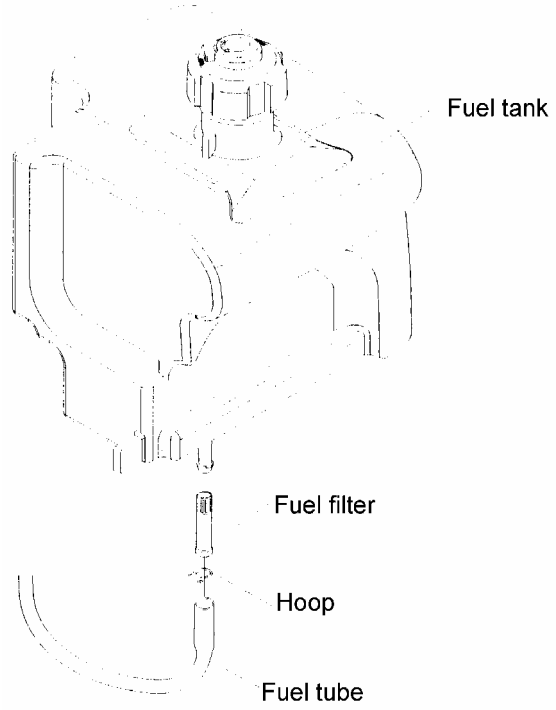
3) Remove the clogged foreign material from the fuel filter, and check the fuel filter for damage. Replace the fuel filter if necessary.

4) Remove the fuel tank and clean it with cleaning solvent and allow the fuel tank to dry thoroughly.

5) After cleaning, install the fuel tank and set the fuel filter in the tank. Connect the fuel tube.

6) Install the removed parts in the reverse order of removal.

7) Fill the fuel tank with gasoline and check the fuel tube for gasoline leakage.



3.8 Fuel tube/ Fuel pump

Caution

■ Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Wipe up spills immediately.

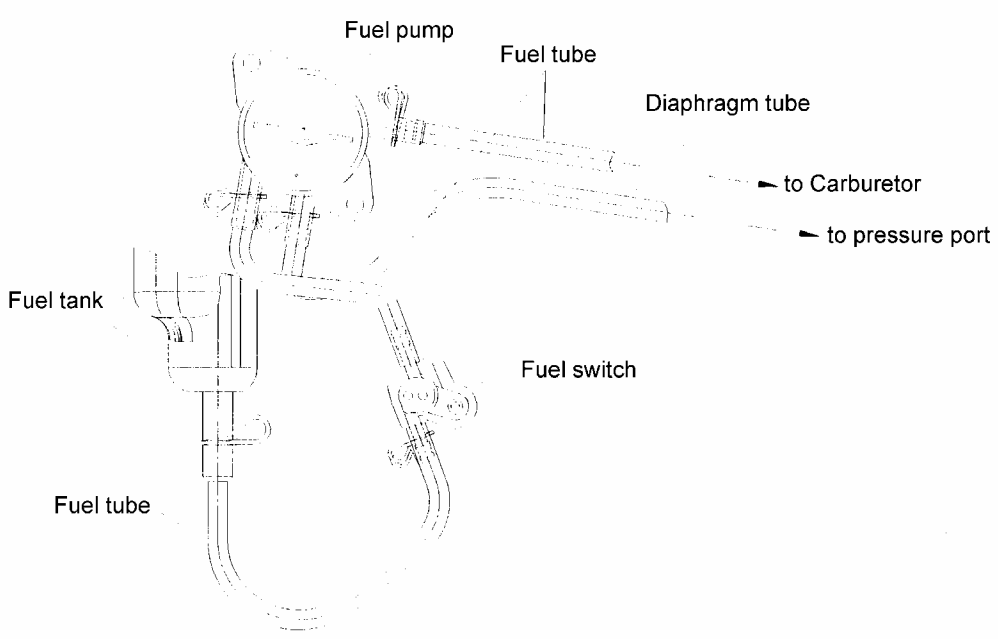
1) Drain the fuel from the tank and carburetor, and then remove the following parts.

—Rear cover

—Front cover and control panel

—Right/Left side cover

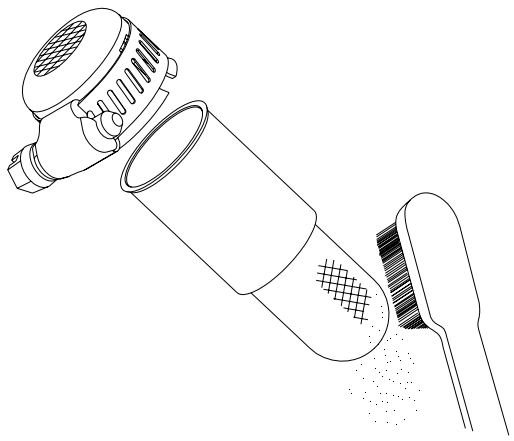
2) Check the fuel tube for deterioration, cracks and gasoline leakage. If there is any abnormality in the fuel tube, replace the tube.
3) Check the diaphragm tube for deterioration, crack and oil leakage. If there is any abnormality in the diaphragm tube, replace the tube.
4) Check to see whether water or foreign material has been accumulated in the fuel pump.
If there is water or foreign material accumulated in the pump, replace the fuel pump.
5) Check the fuel switch and fuel duct, blow away the foreign matter with high pressure gas with oil switch turned on.
6) After assembly, check for gasoline leakage from each part.



3.9 Spark catcher

Caution

■ Do the performance after engine cooled completely.
(1) Remove the rear cover
(2) Disassemble the spark catcher from muffler
(3) Remove the carbon from the spark catcher steel net, check for damage, and replace it if necessary.
(4) Install the removed parts in the reverse order of removal.

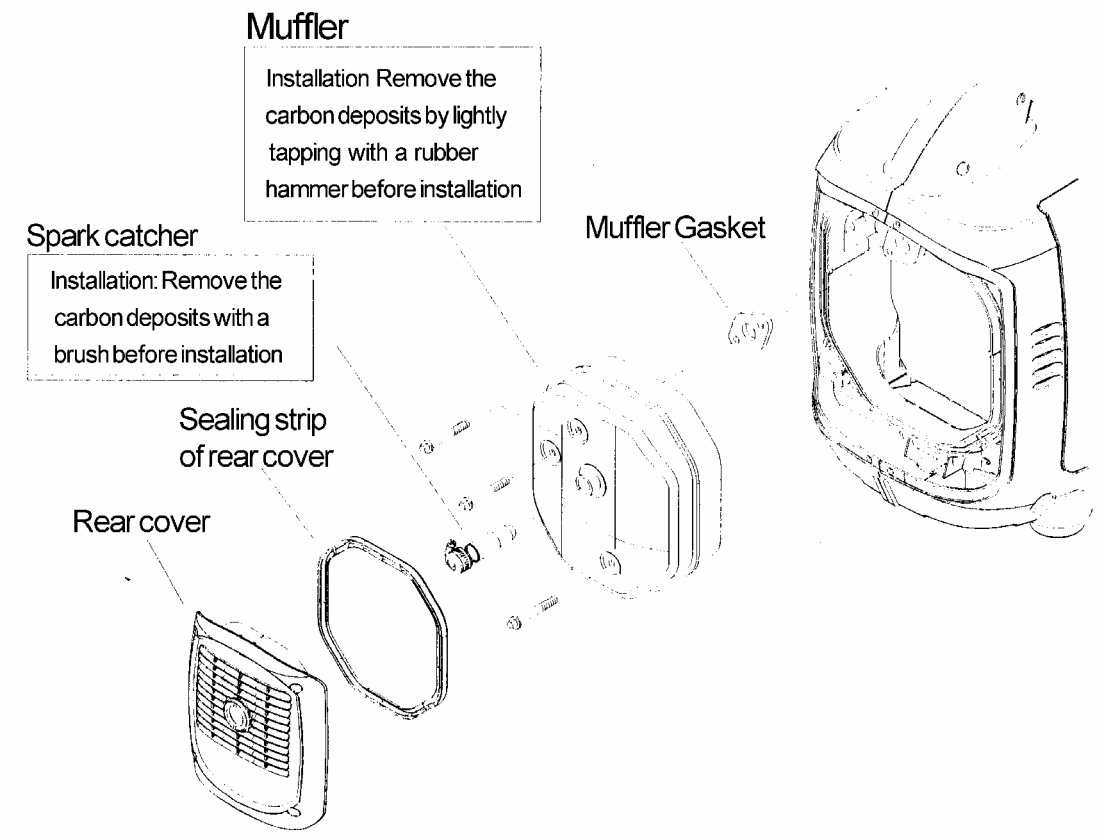


4. Muffler

Caution

■ Muffler removal/installation must be performed with the engine cold.

● **Disassembly/Reassembly**

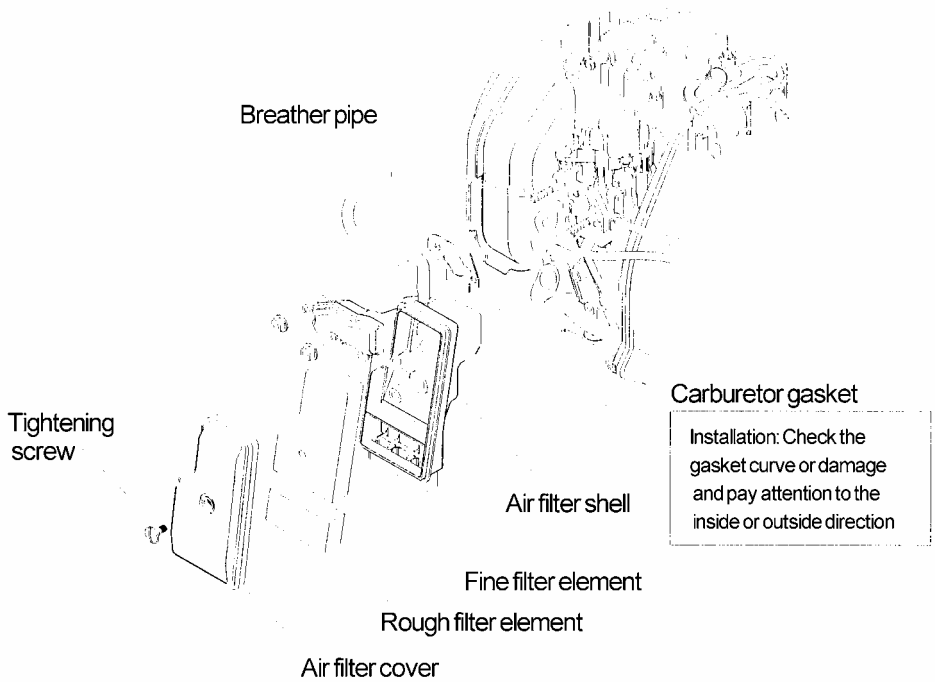


5. Air filter/Carburetor

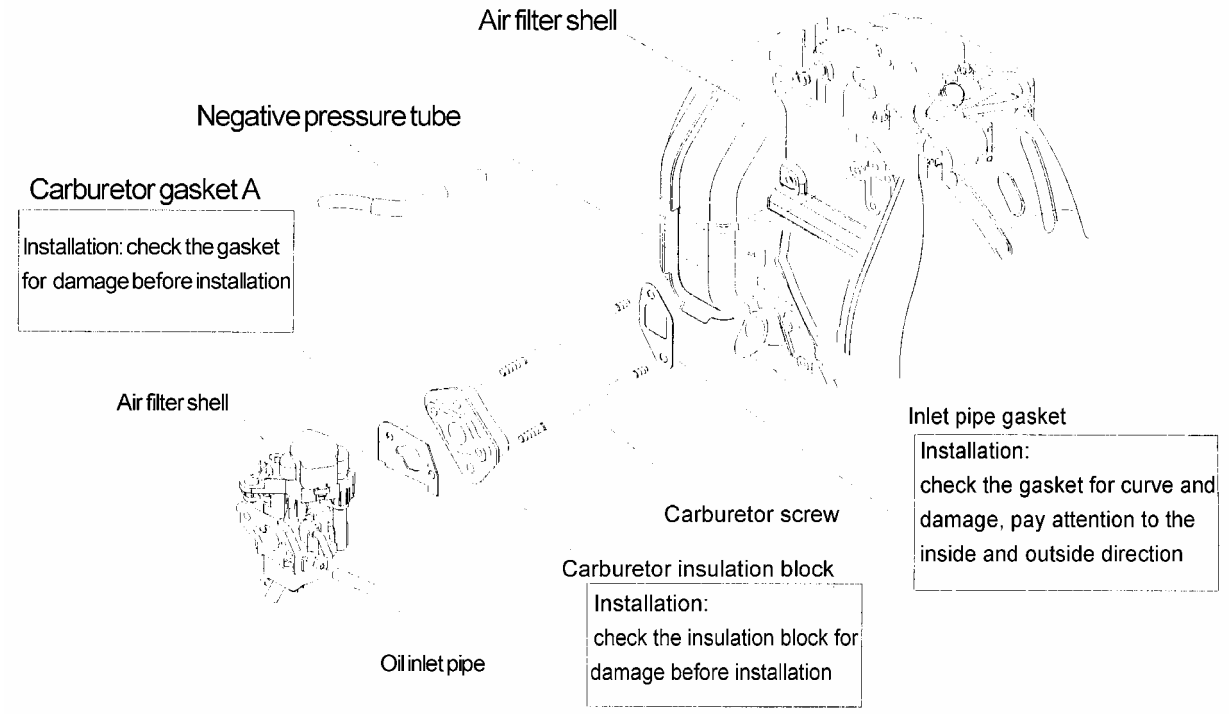
Caution

- Loosen the drain oil bolt and drain out fuel before disassembly.
- Keep heat, flame and sparks away.

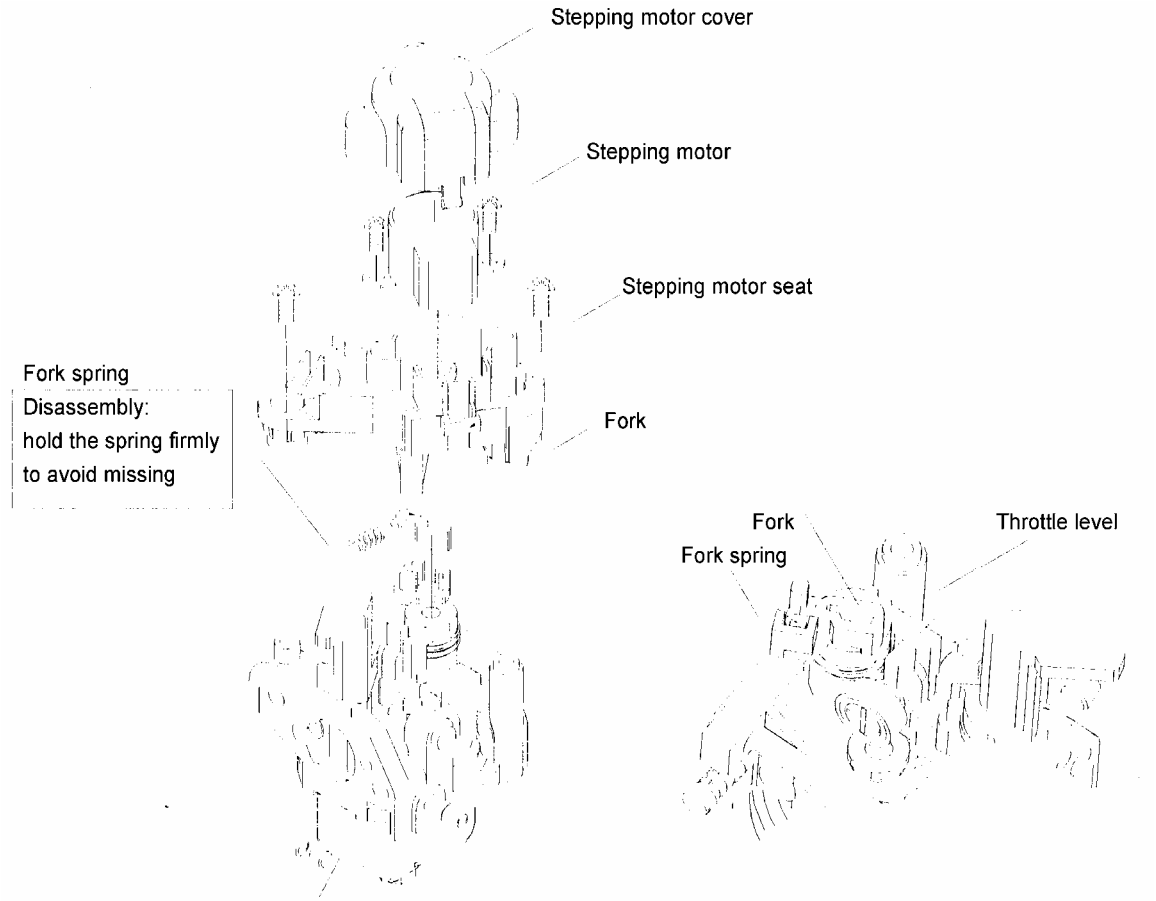
5.1 Disassemblv/Installation of Air filter



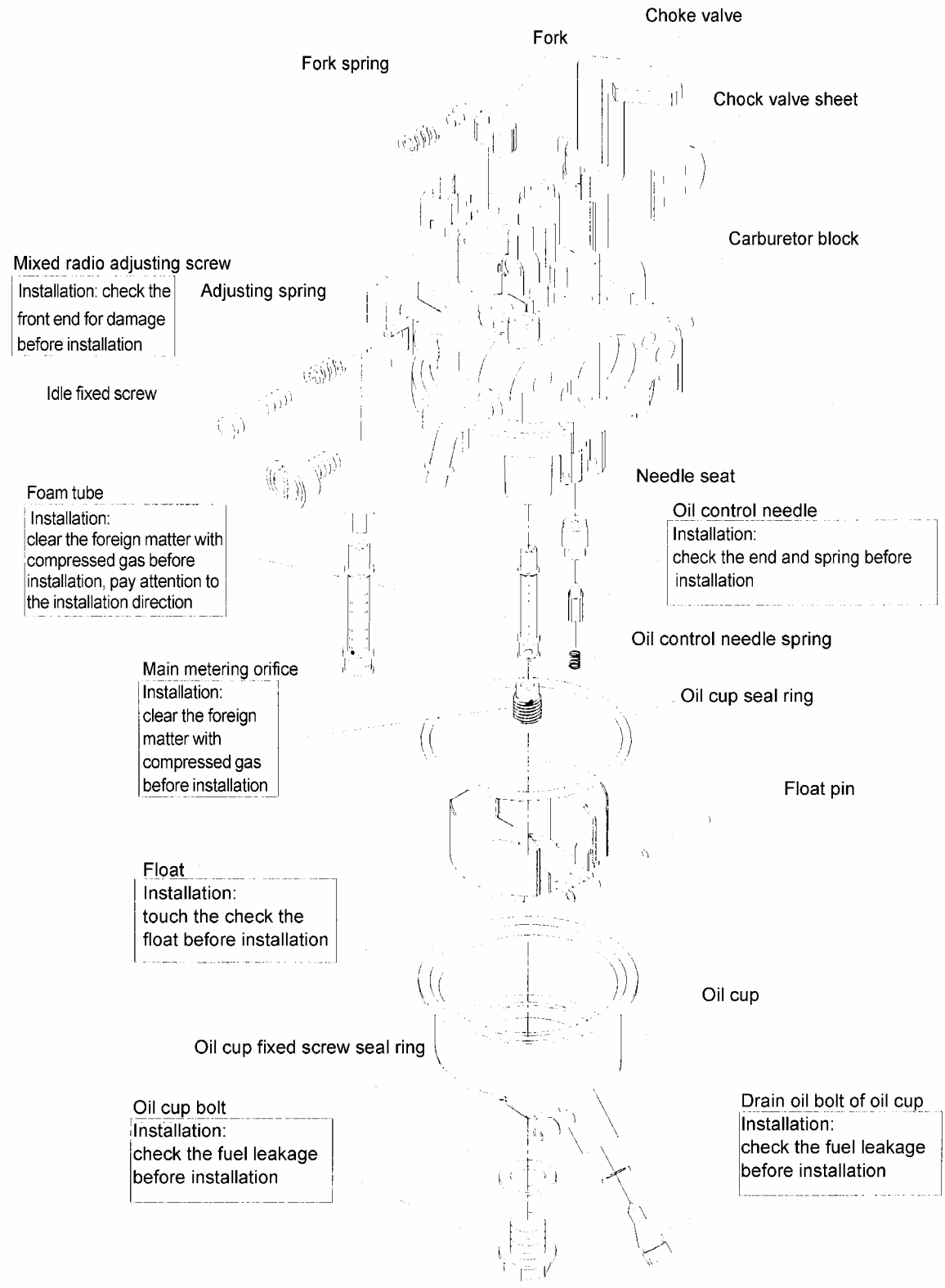
5.2 Disassembly/Installation of Carburetor



● Disassembly/Installation of Stepping motor



● Disassembly/Installation of Carburetor



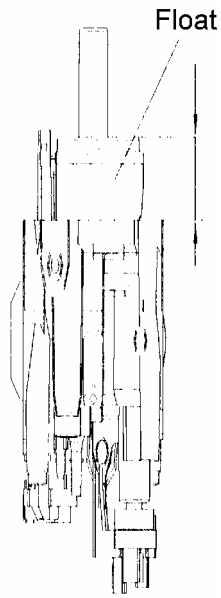
5.3 Inspection

● Float height

Place the carburetor as the picture shows, measure the float height between float and carburetor block.

Height	12mm

Replace the float if the float height is not the right size.

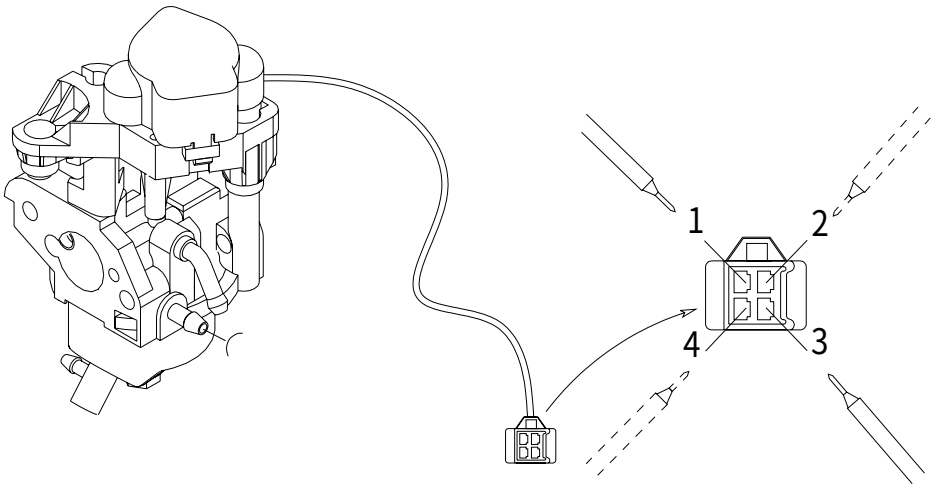


● Stepping motor

Measure the resistance of stepping motor lead-out wire.

Standard resistance	Between 1and 3：45~55Ω
	Between 2 and 4：45~55Ω

Replace the stepping motor if the resistance excesses the above range.



6. Control panel

6.1 Removal/Installation

IG2000/IG2000s

IG2000p

CG2000/CG2000s

6.2 Inspection

a. Control panel

● **AC receptacle**

Check the electrode contact disk inside receptacle, if it is burnt or the color changes, replace for it.

● **DC receptacle**

Connect both terminals of the receptacle with a jumper wire to short. There must be continuity between the lead wire terminals with the circuit protector ON. Replace the DC receptacle if there is no continuity.

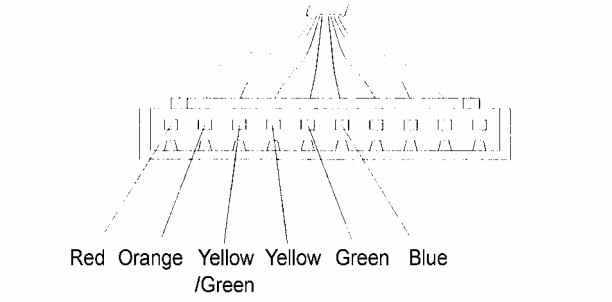
● **Smart switch/LOAD SELECT Switch (CG series)**

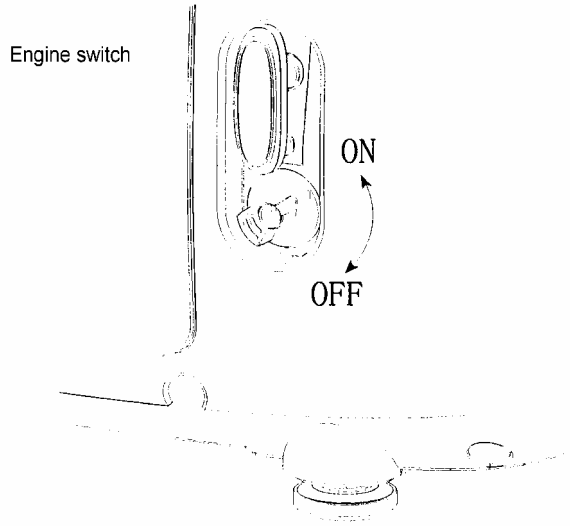
There should be continuity with the switch ON, and no continuity with the switch OFF.

● **Ignitor**

Pull off the 10P receptacle from ignitor, measure the resistance by connecting one testing pen with the metal outer case of engine, and the other testing pen with the 10P connector.

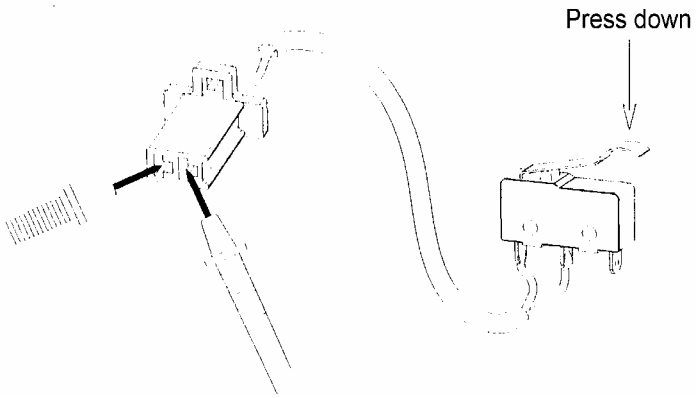
Color	Circuit unit	Standard resistance
Blue	Primary coil of the ignition coil	0.8-1.3Ω
Orange	Oil level alarm	There should be no continuity with correct oil level
Yellow	Trigger coil	80-130Ω
Yellow/Green	Ground wire	Continuity
Green	Ignitor unit power coil winding	0.26-0.28Ω
Red	Engine switch	There should be no continuity with the switch ON, continuity with the switch OFF





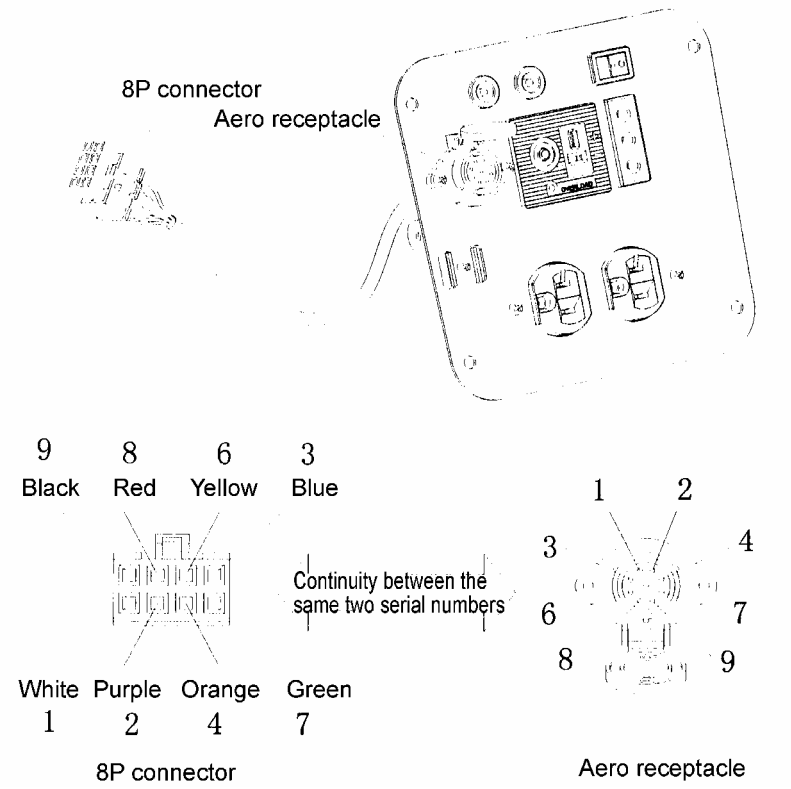
● **Engine switch**

Check the continuity of connector, there should be continuity if presses down the micro switch, otherwise, disconnect the switch.



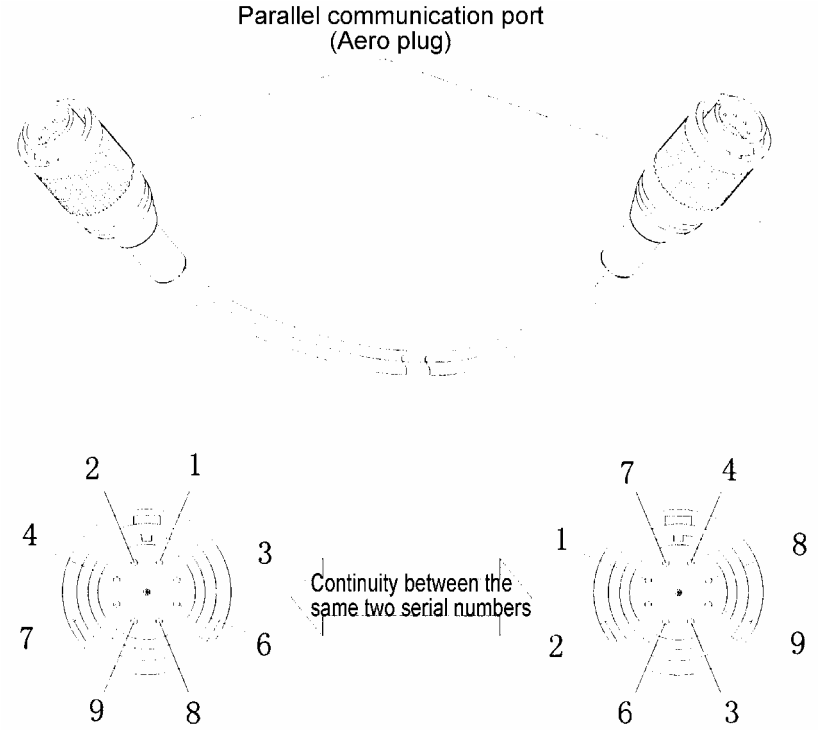
● **Aero receptacle (parallel I/O communication port)**

Check the continuity between connector and aero receptacle, there should be continuity between the two terminals with the same serial number.



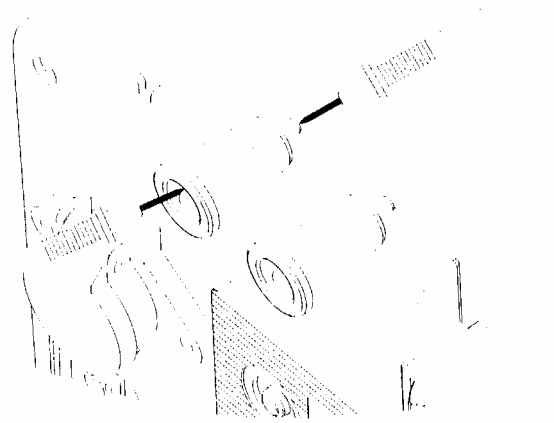
● **Aero plug (Parallel I/O communication data wire)**

Check the continuity of aero plugs, there should be continuity between two plugs with the same serial numbers.



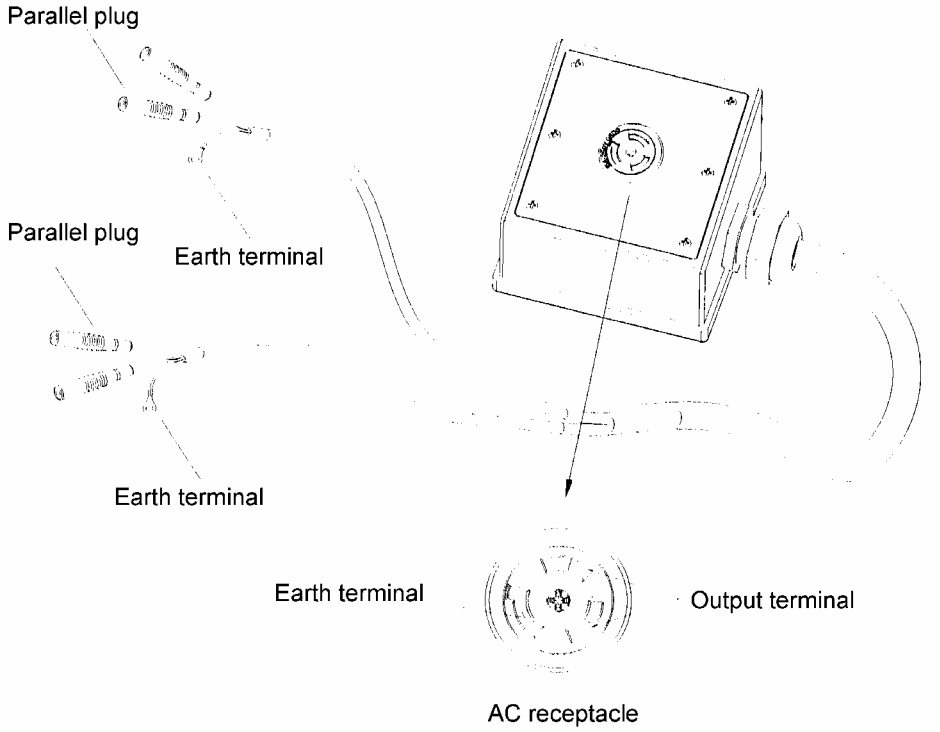
● **Parallel output receptacle**

Check the continuity between the two terminals of parallel output receptacle.



● **Parallel output cable**

1. Check the AC receptacle output terminal, there should be no continuity between two terminals.
2. Connect the AC receptacle output terminal with one lead, check the parallel plug; there should be continuity among the four plugs.
3. There should be continuity between the cable earth terminal and AC receptacle earth terminal.

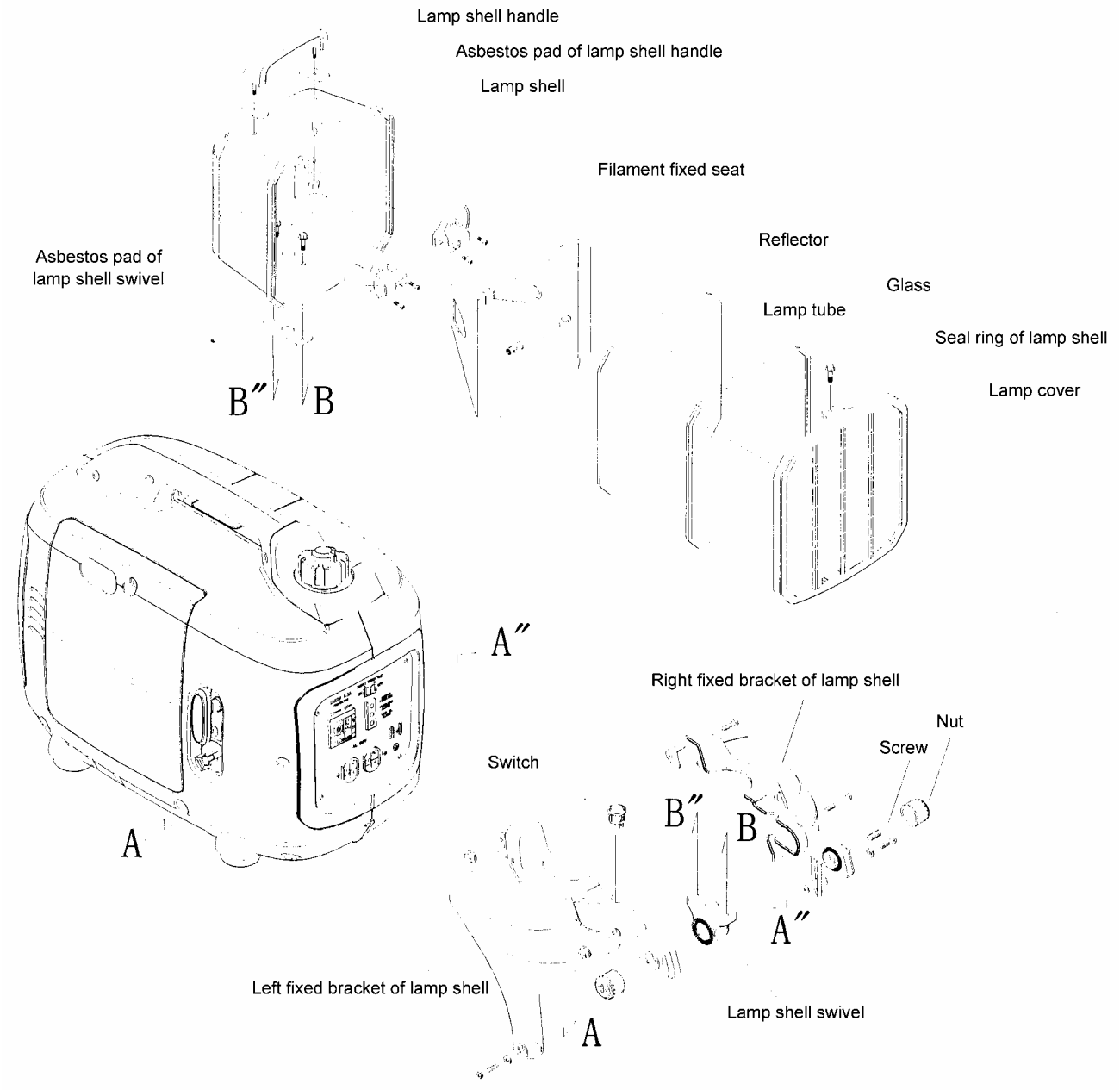


7. Lamp chimney/ Housing case/ Fuel tank/ Baffler/ Inverter unit

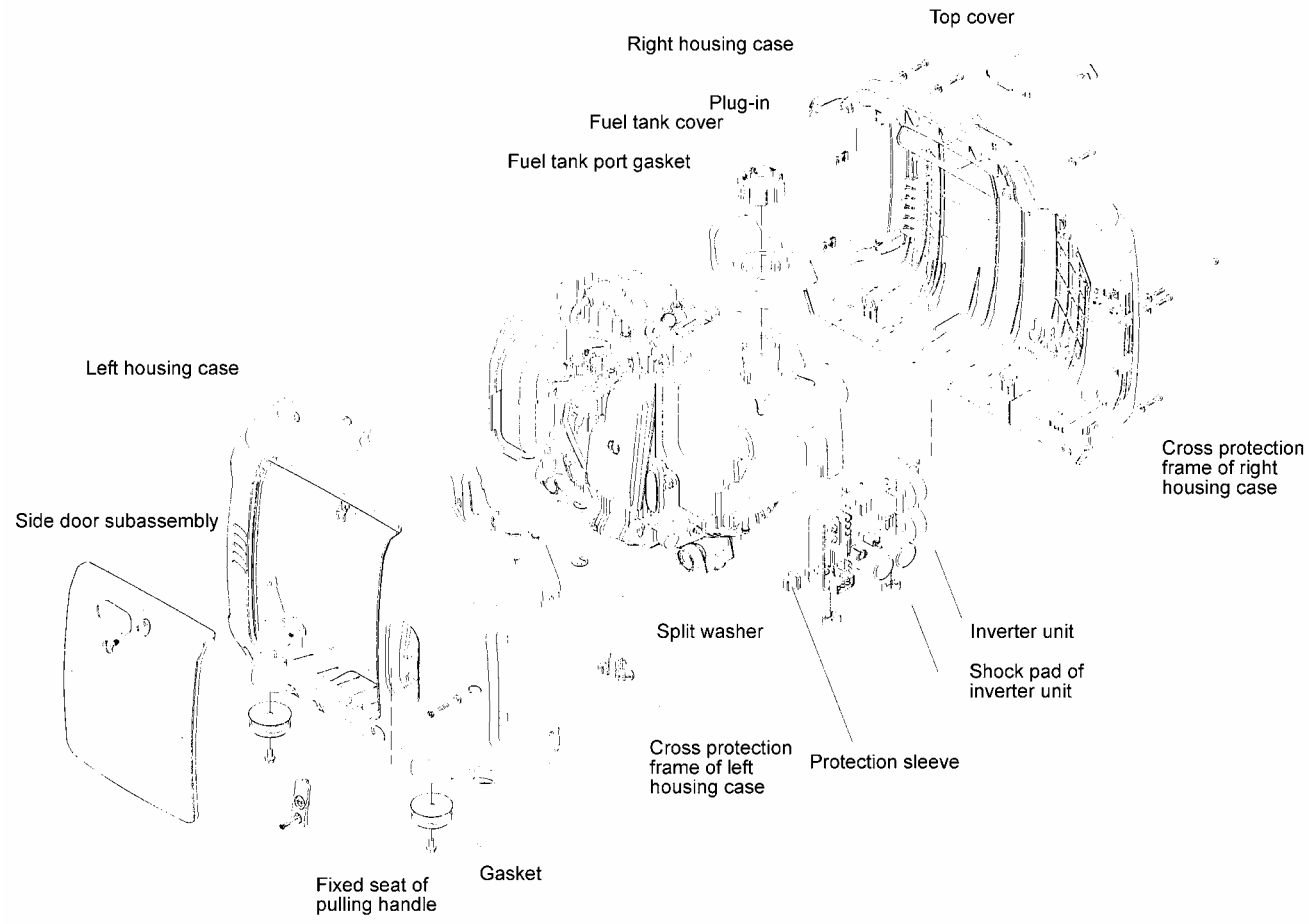
7.1 Disassembly and installation of lamp chimney

Caution

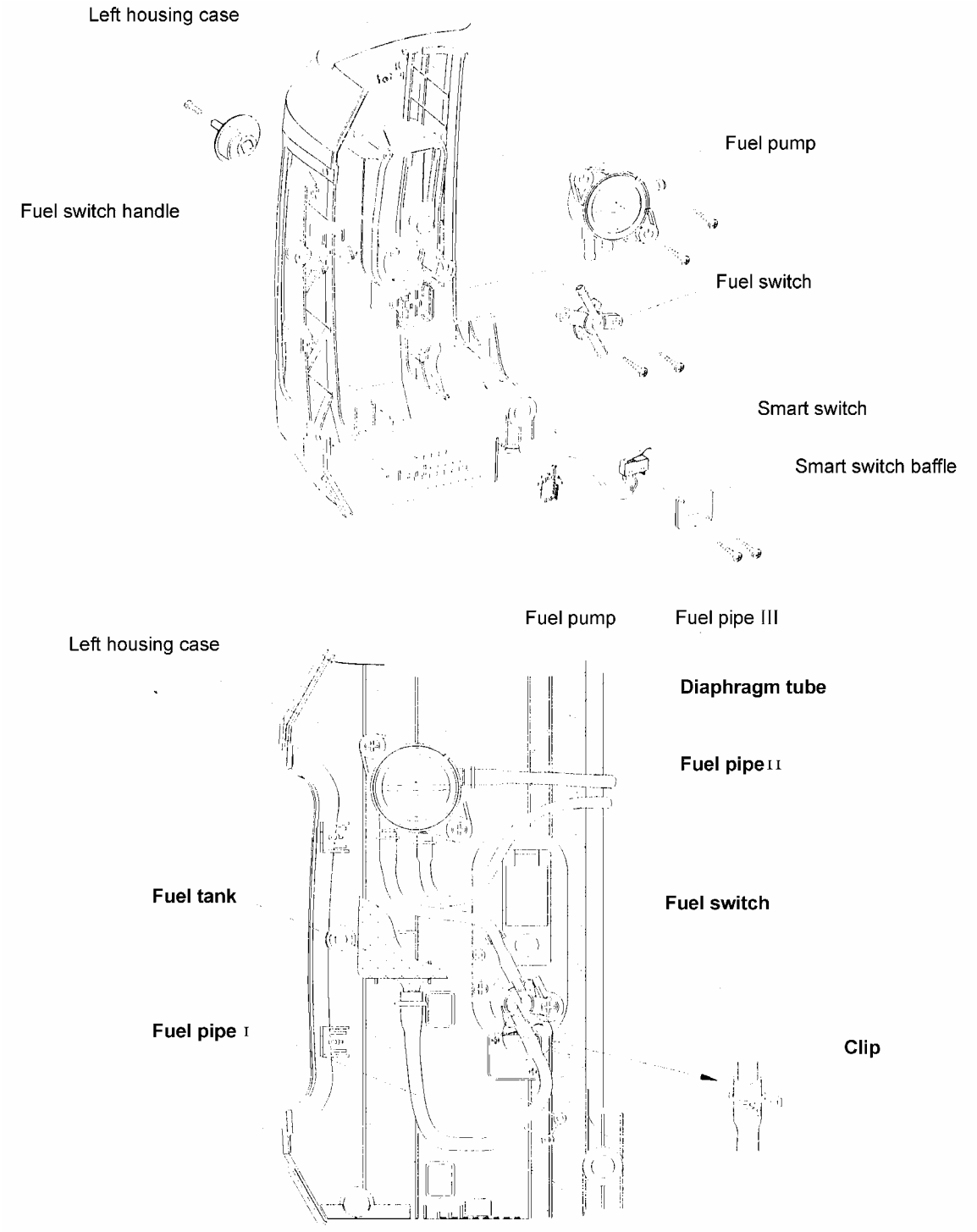
■ **Stop the engine and cool the lamp chimney completely before disassembly.**



7.2 Disassembly and installation of housing case



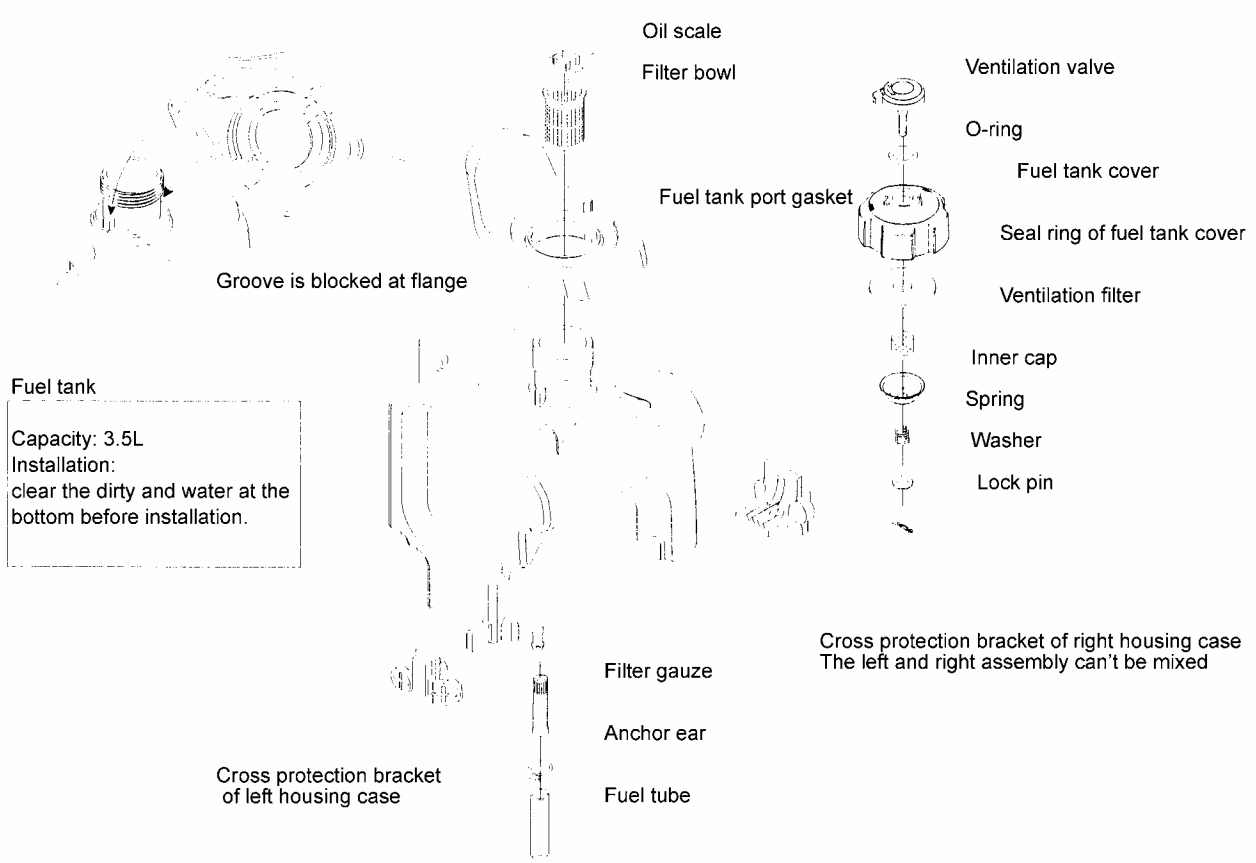
● Left housing case



7.3 Fuel tank

Caution

■ Gasoline is highly flammable and explosive. You can be burned or seriously injured when handing fuel. Keep heat, sparks, and flame away. Wipe up spills immediately. Loosen the drain screw to drain the carburetor thoroughly before removal.



7.4 Fan shield/Engine fixed plate

7.5 Guide Plate

7.6 Inspection

(1) Aluminum shell resistor (CG series)

Measure the resistance of aluminum shell resistor. Measuring error is ±5%.

Model	120V	230V\240V
Resistance \consumption power	5Ω\50W	10Ω\50W

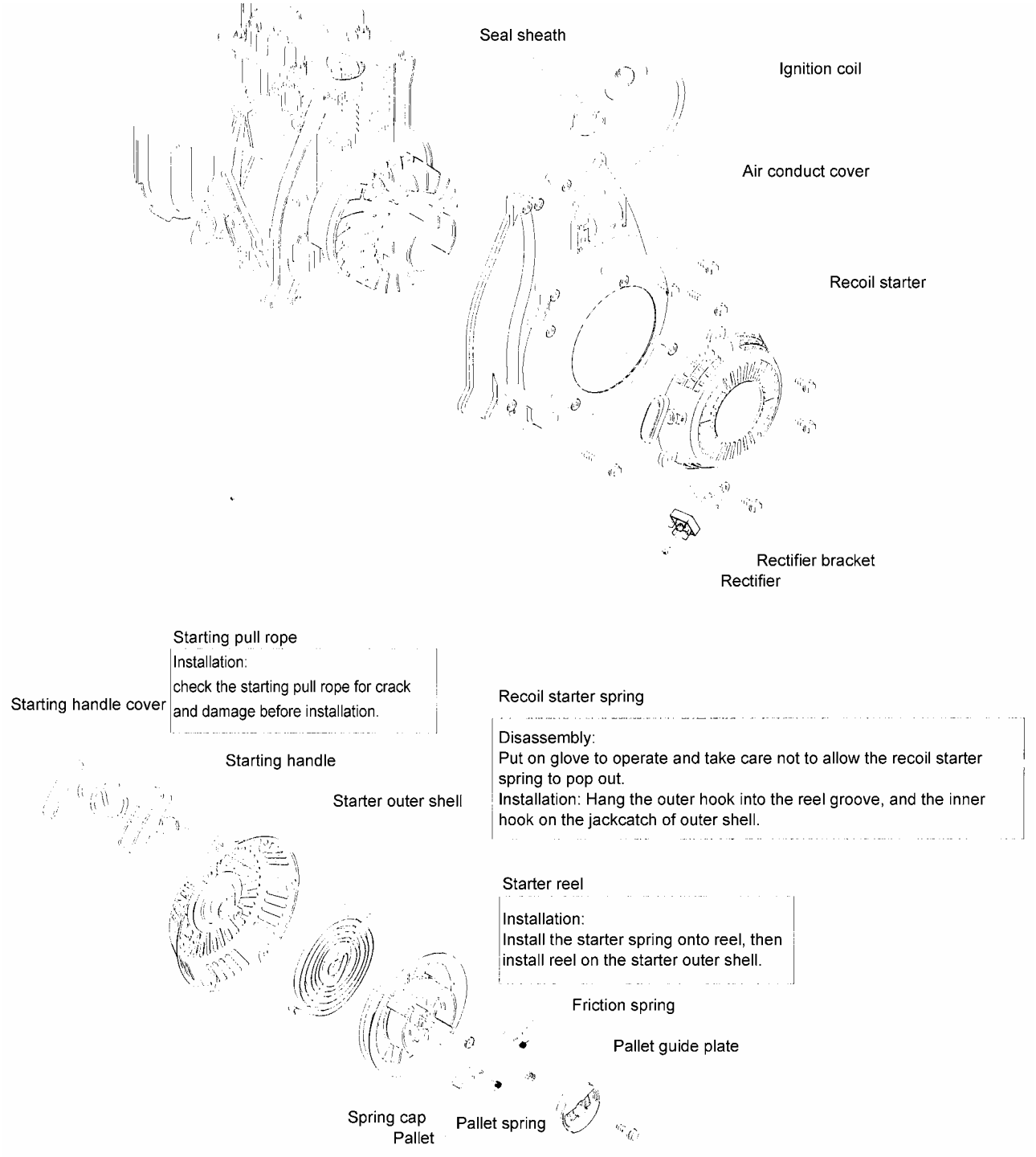
(2) Capacitor (CG series)

Measure the capacitance. Measuring error is ±5%.

Model	120V	230V\240V
Capacity /pressure	40uF\250V	20 uF\250V

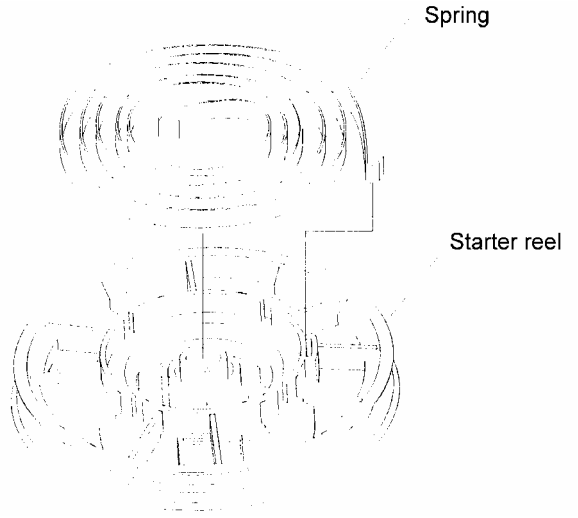
8. Recoil starter/ Air conduct cover/ Ignition coil

8.1 Disassembly/Reassembly

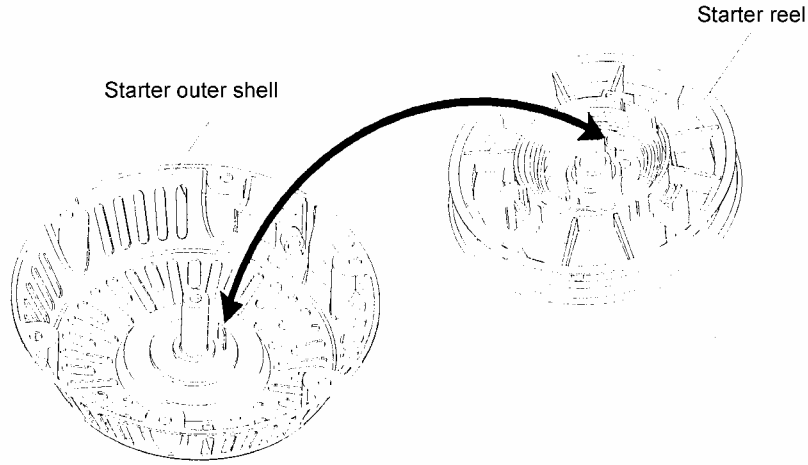


8.2 Installation of recoil starter

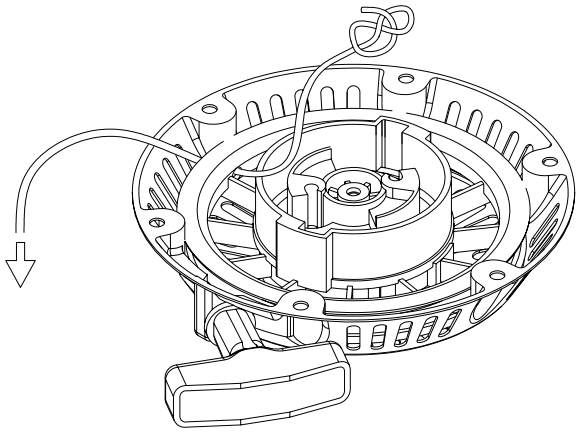
(1) Set the spring into the starter reel, and hang the spring outer hook inside the reel groove.



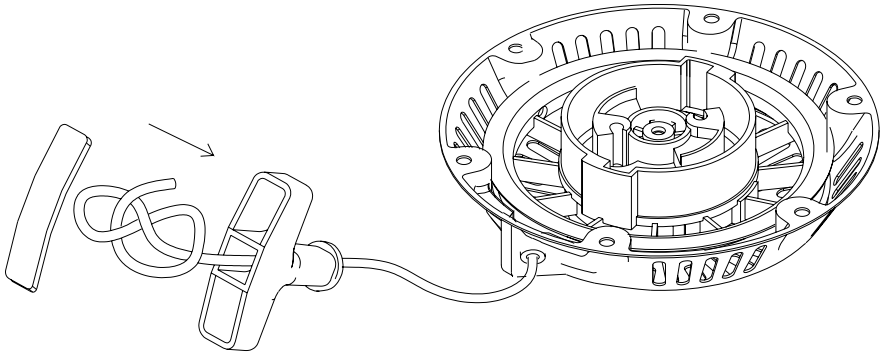
(2) Smear lubrication grease on the starter outer shell claw, install the starter reel. Revolve the reel anticlockwise to hang the spring inner hook on the starter outer shell claw.



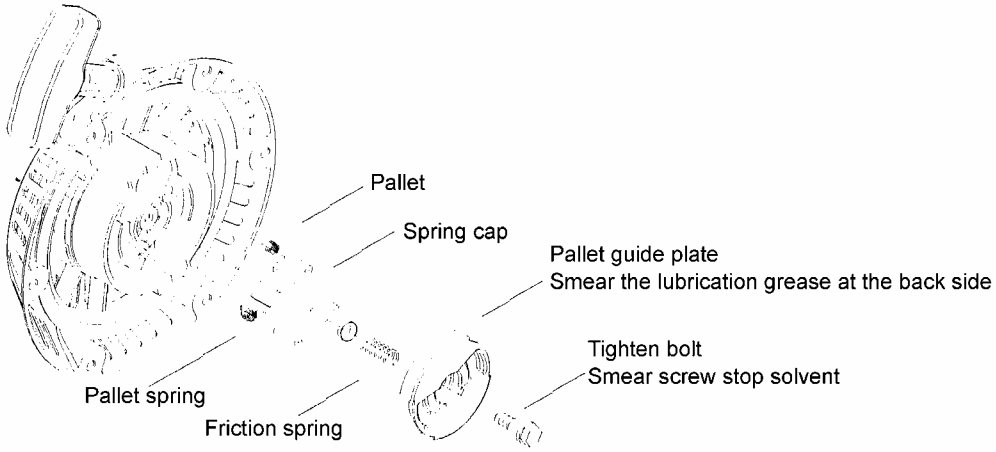
(3) Make a “8” knot at one end of the rope, pass the other end through the reel hole. Wind the reel anticlockwise 4 turns to fix the reel.



(4) Pull out rope thrum from starter outer shell hole completely, pass it through the handle and make a “8” knot, then turn off handle cover. Loosen the reel to rebound the spring, take care not to allow the reel pop out.



(5) Install the starter pallet and fix it with bolts.



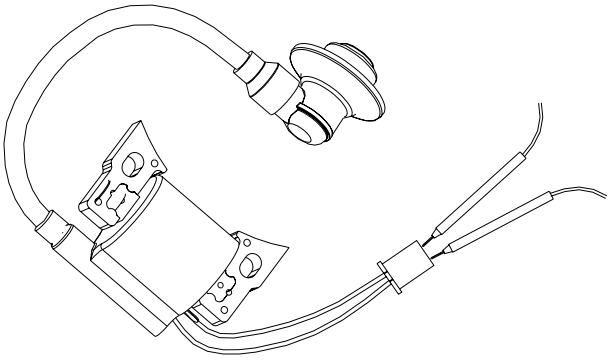
(6) Pull the starter for several times, and check the ratchet wheel returning.

8.3 Inspection

(1) Ignition coil

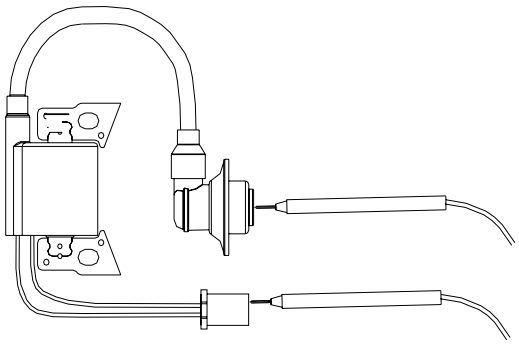
● Attach the two leads of tester to the primary coil plug of ignition coil, and measure the primary resistance of the ignition coil.

Primary resistance	0.8—1.3Ω



● Attach one lead of the tester to each terminal of primary coil plugs of ignition coil and the other lead to the spark plug cap，then measure the secondary resistance of the ignition coil.

Secondary resistance	15—21kΩ

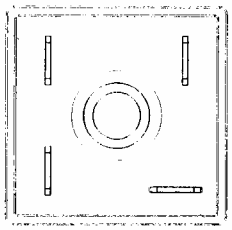


(2) Rectifier

Measure the on or off (positive pressure fall) of rectifier with control potentiometer, the measurement should accord with the standard as shown in the chart.

Positive / Negative	1	2	3	4
1		OFF	OFF	OFF
2	ON		OFF	OFF
3	ON	ON		ON
4	ON	OFF	OFF	

（1） Negative pin（－）　（2） AC pin　（～）

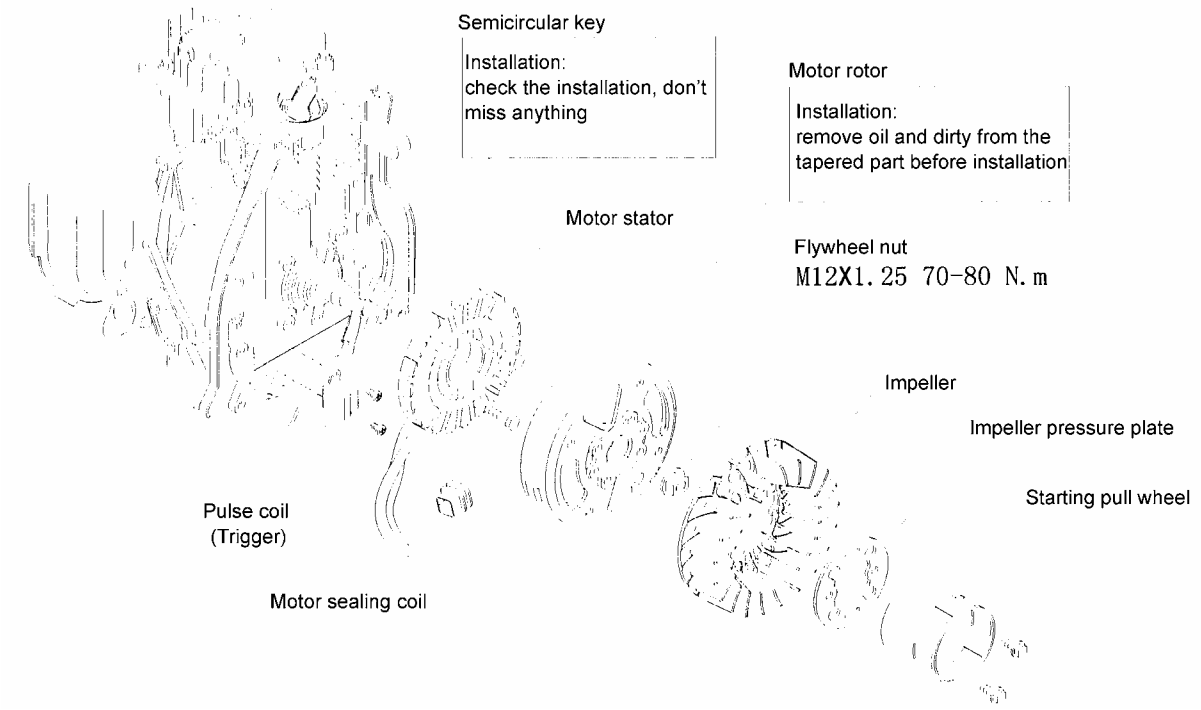


（4） AC pin　（～）　（3） Positive pin （＋）

9. Generator/ Trigger

9.1 Generator

Disassembly/Reassembly



9.2 Inspection

(1) Ignition winding

Measure the resistance between the green terminal and yellow/green terminal.

Resistance	0.40-0.55Ω

(2) Outer charging winding

Measure the resistance between the two blue terminals.

Resistance	0.12-0.15Ω

(3) Sub winding

Measure the resistance between the two sub winding terminals.

Resistance (Ω)	IG series	CG series
	White-White	Black-White
	0.15~0.30	

(4) Main winding

Measure the resistance among the main winding terminals.

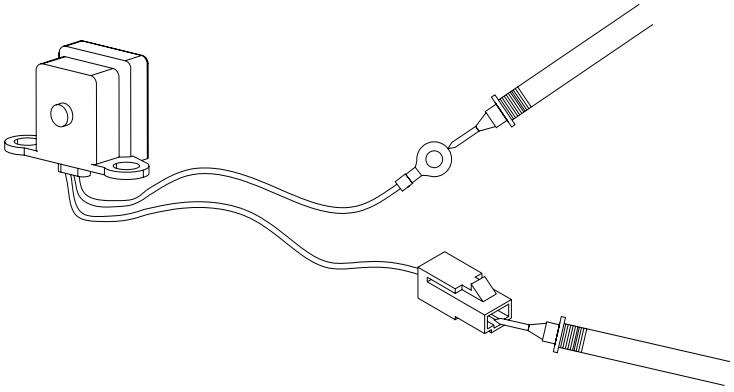
Resistance (Ω)	IG series		CG series	
	Black-Black-Black		Black-Yellow\Black-Green\Black-Red	
	120V	230/240V	120V	230/240V

	1.35~1.75	5.0~5.5	0.18~0.21	0.65~0.90

(5) Trigger

Attach the two testers in the trigger, and measure its resistance.

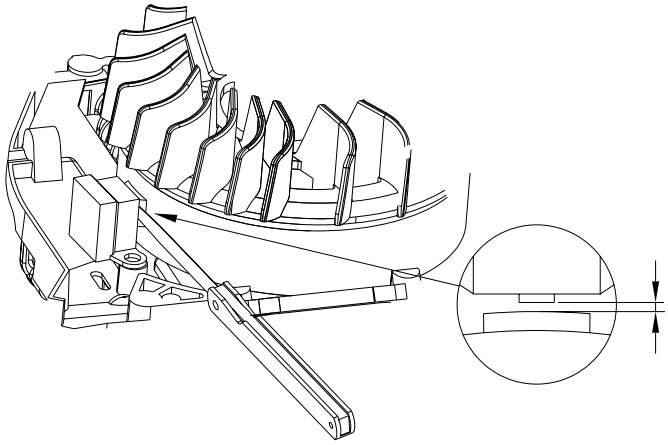
Trigger resistance	80-130Ω



9.3 Adjustment

Adjust the clearance between trigger and the projection part of rotor.

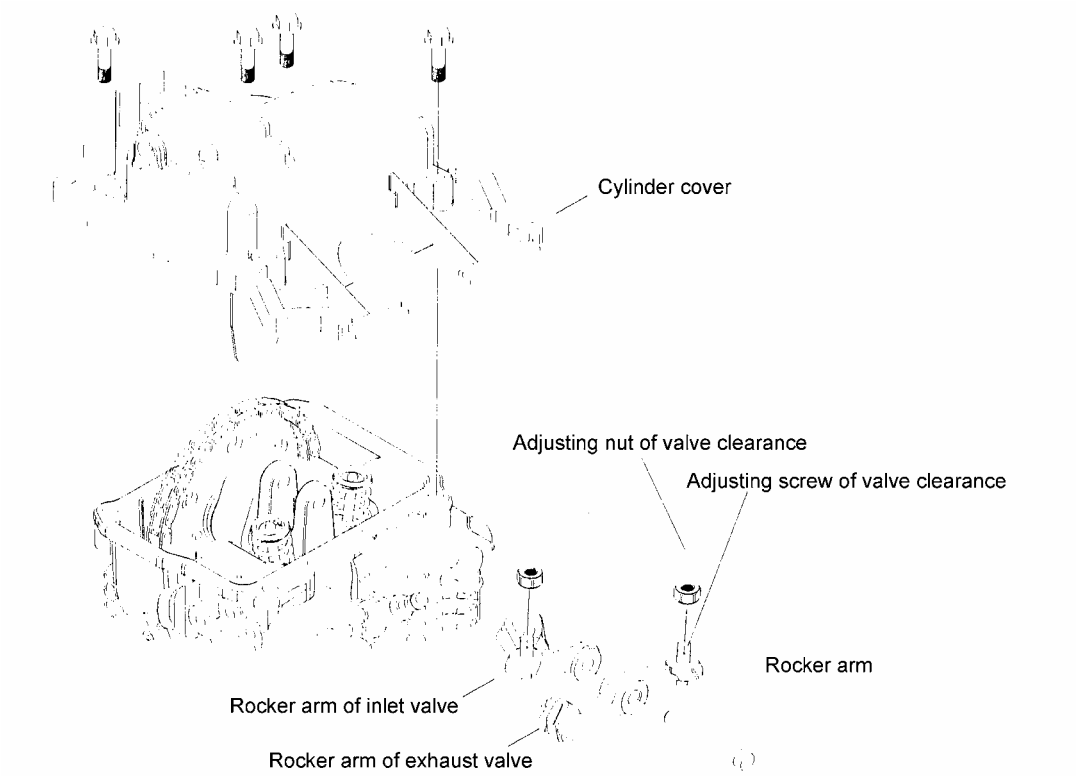
Trigger clearance	0.50-0.75mm

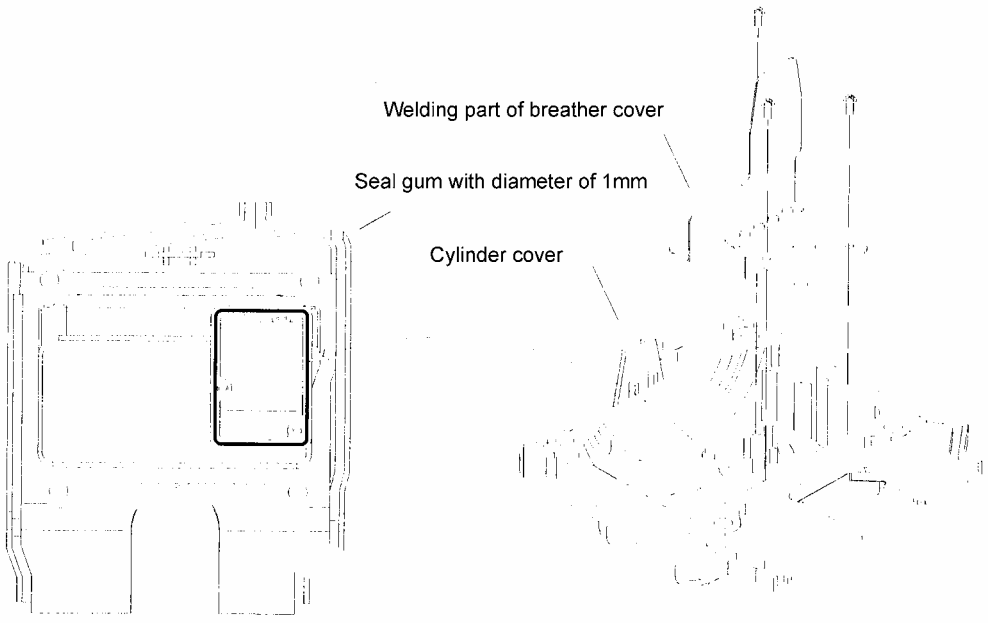


Insert a feeler gauge between the trigger and the projection part of the rotor; loosen the trigger fixed plate bolt to adjust the clearance slightly. Never move the plastic part of trigger, to avoid it separates from the fixed plate and damages the trigger.

10. Cylinder cover/ Rocker arm

10.1 Disassembly/ Reassembly

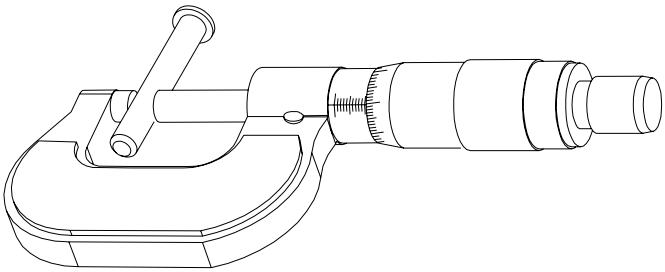




10.2 Inspection

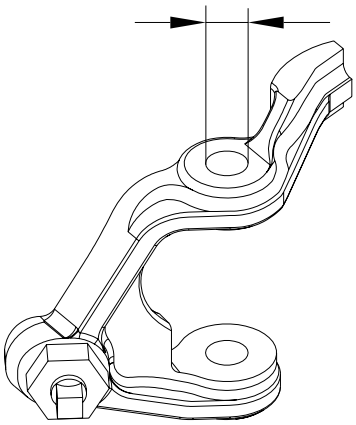
● **Rocker arm outer diameter**

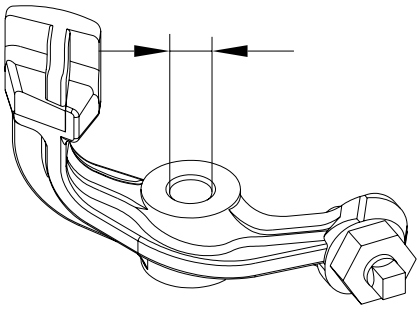
Standard(mm)	Service limit(mm)
5.972-5.980	5.965



● **Rocker arm inner diameter of inlet/exhaust valve**

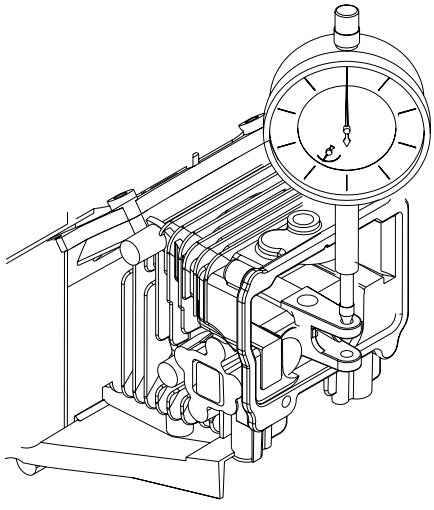
Standard(mm)	Service limit(mm)
6.000-6.012	6.037





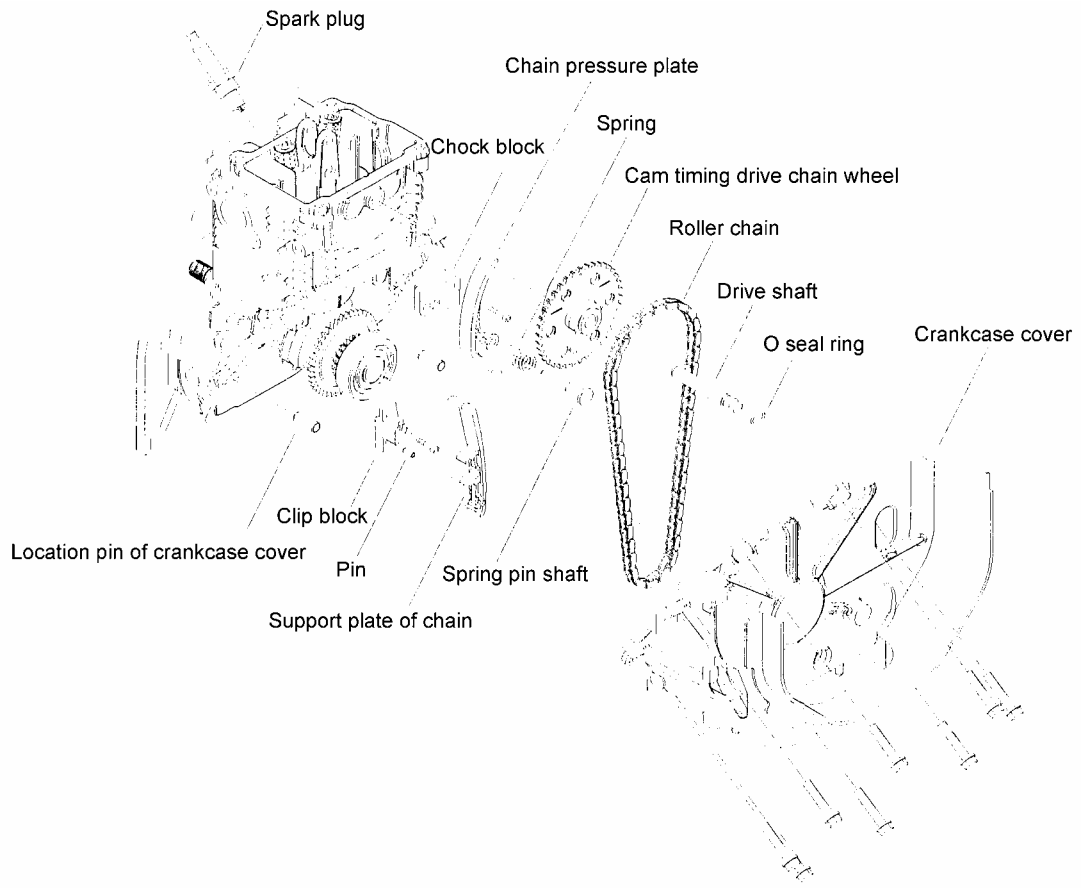
● **Inner diameter of rocker arm bearing**

Standard(mm)	Service limit(mm)
6.000-6.012	6.037

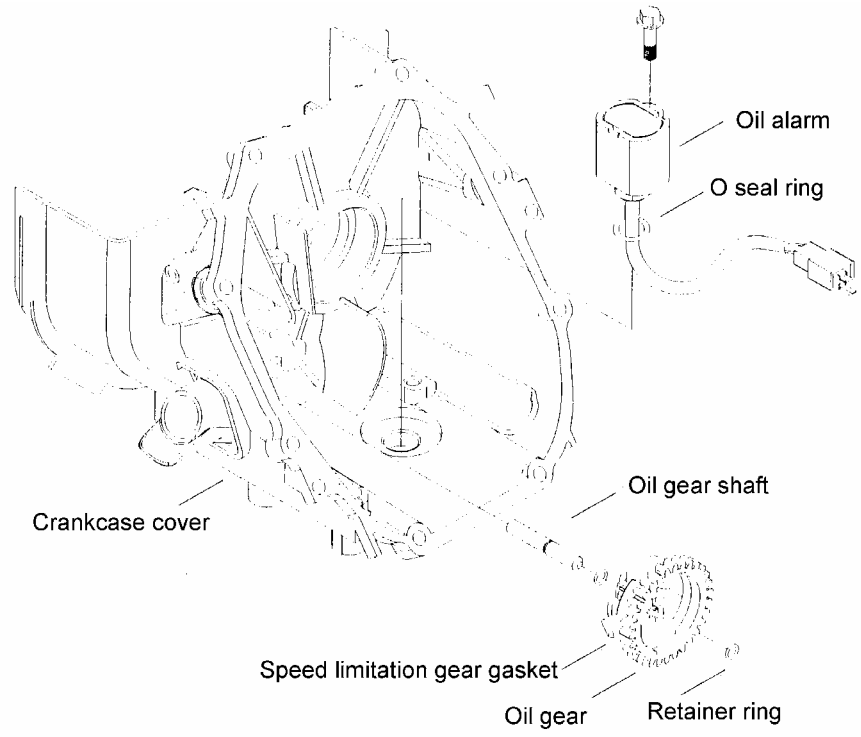


11. Crankcase cover/ Cam timing drive chain

11.1 Disassembly



11.2 Crankcase cover



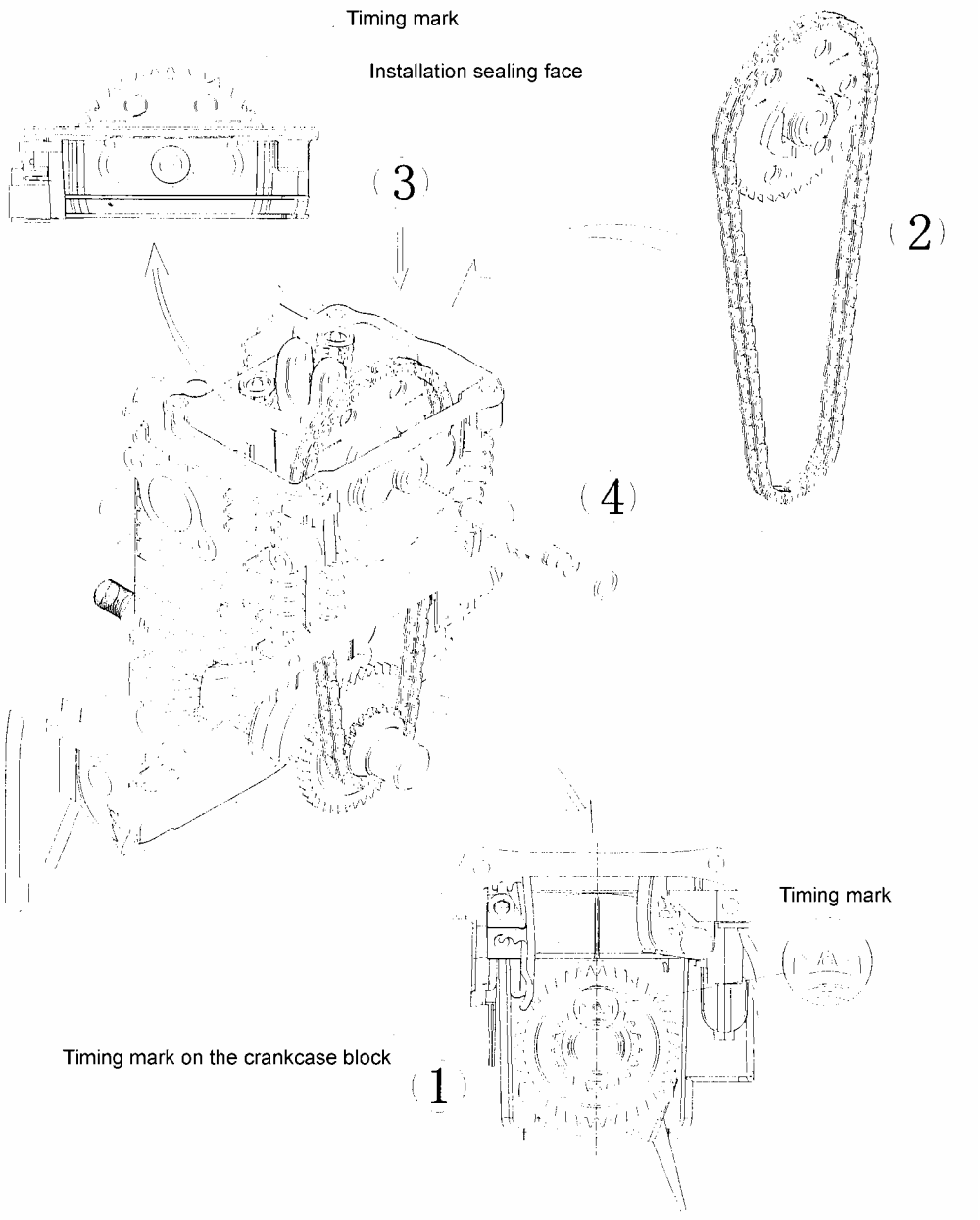
11.3 Reassembly of roller chain

1. Install the crankshaft, piston and connection rod assembly on the cylinder block.
2. Revolve the crankshaft; align the timing mark of crankshaft timing shaft with the timing mark of crankcase. (Step 1)
3. Install the roller chain on the cam timing drive chain, level the timing mark upward. (Step 2)
4. Put the roller chain into the crankcase, set the end of roller chain to the crankshaft timing gear. (Step 3) straighten the chain to align the timing mark of cam timing drive chain with cylinder head sealing face.

Caution

Don't remove the timing mark of crankshaft timing gear during installation. If the timing mark of cam timing drive chain is not parallel with cylinder head sealing face, adjust the meshing of chain and cam.

5. Install the O-seal ring into the drive shaft, and then assemble the drive shaft. (Step 4) Pay attention that the opening of drive shaft should upward.
6. Install chain pressure plate. (Step 5)



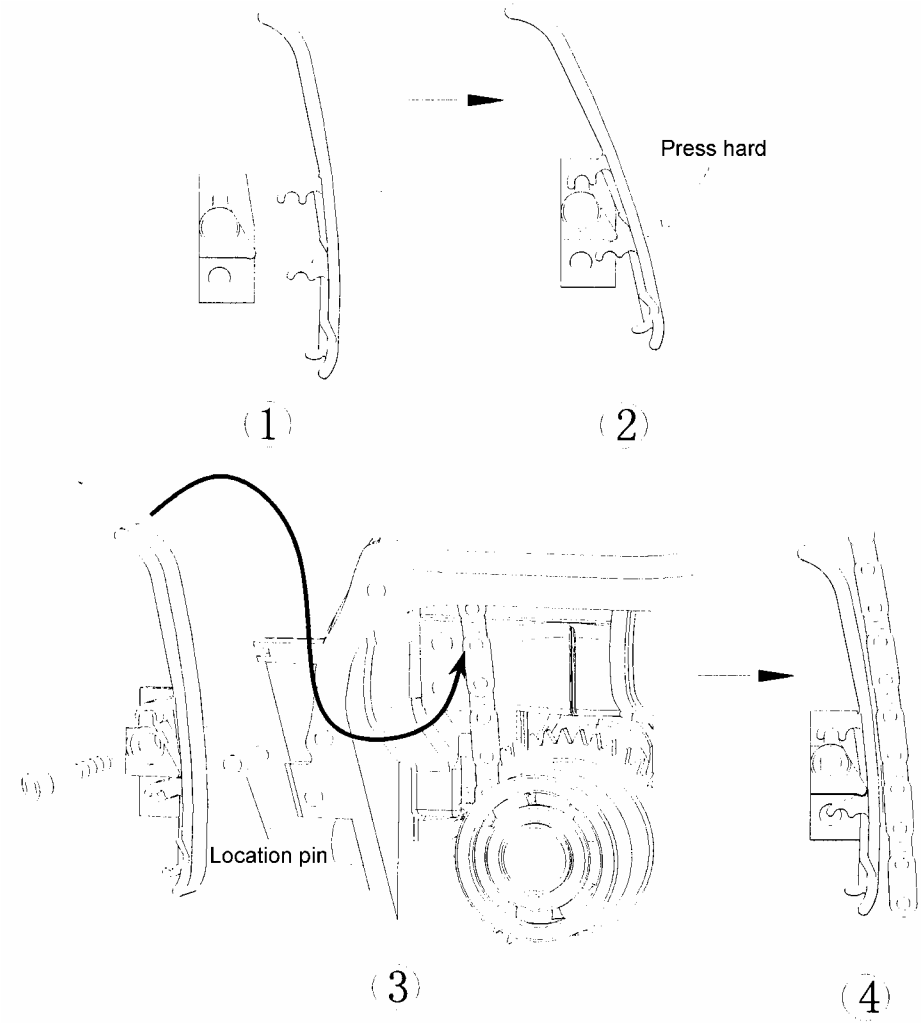
11.4 Assembly of chain support plate/ pressure plate

● **Chain support plate**

1. Put the upper groove of chain support plate into block; press the other end to seize the support plate fully.

2. Insert the location pin into cylinder block location hole and align them, set the support plate and clip block into cylinder block. Adjust the clip block location to align the clip bolt with cylinder block bolt.

3. Install inner hexagonal bolt and tighten hard.



● **Chain press plate**

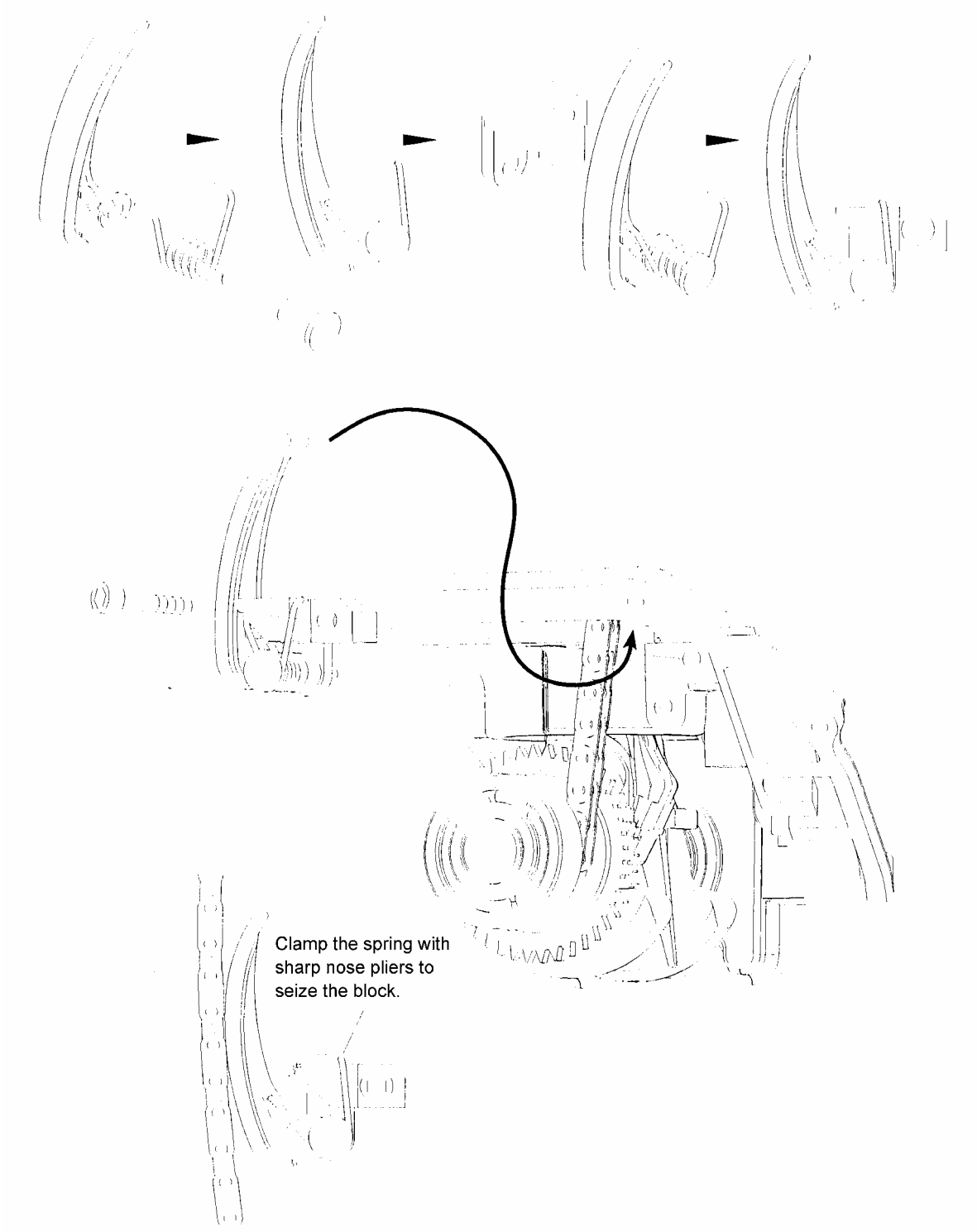
1. Install the spring pin shaft, spring and chain pressure plate as the picture shows.

2. Insert the spring into block location hole, set the chain pressure plate into cylinder block and spring into location hole. Pay attention that the spring pin should be inserted as far as location.

3. Adjust the block location to align the block bolt hole with cylinder block bolt hole.

4. Install the inner hexagonal bolt and tighten it.

5. Hold the spring free end to seize the block (as picture shows), knock the spring pin with copper hammer.



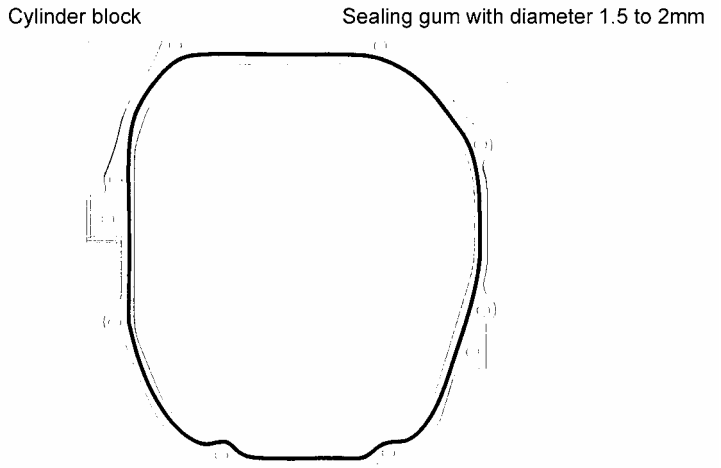
11.5 Assembly of crankcase cover

1. Clear the remaining seal gum on the cylinder block and crankcase cover with cloth.
2. Smear seal gum on the cylinder block sealing face, as picture shows.
3. Reassemble the crankcase cover in the opposite direction of disassembly.

Caution

Install the crankcase cover on the cylinder block 3 minutes after smearing. Revolve the crankshaft if necessary.

4. Tighten the crankcase cover bolt slowly, screw to the prescribed torque.
5. Wait for 20 minutes after installation, never refill in oil or start the engine during these 20 minutes.



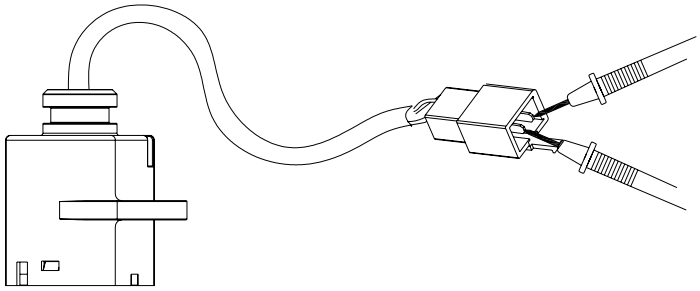
11.6 Inspection

● **Inspection of oil alarm**

(1) Stand the oil alarm, check the oil alarm output wire and copper earth wire, there should be no continuity.

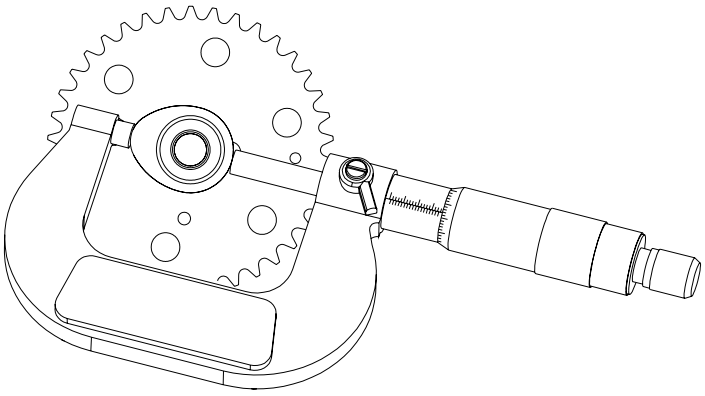
(2) Bottom up the oil alarm; check again, there should be continuity.

(3) Bottom up the oil alarm completely in the oil, check the float, there should be no continuity.



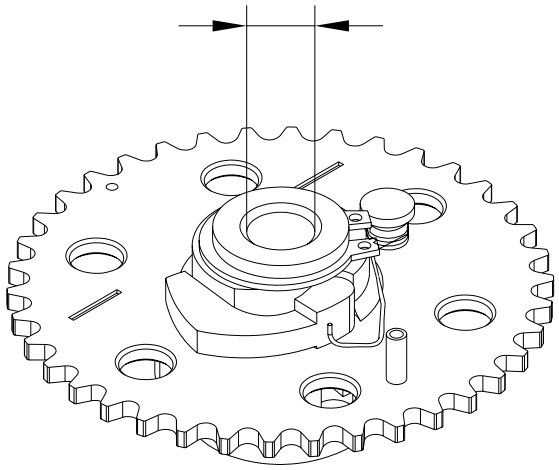
● **Cam height**

Standard(mm)	Service limit(mm)
29.026-29.086	28.15



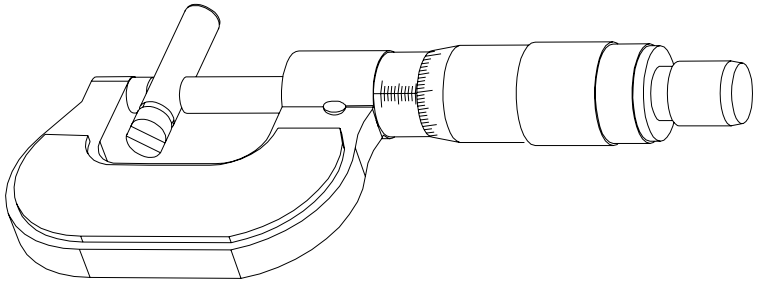
● **Cam inner diameter**

Standard(mm)	Service limit(mm)
9.000-9.015	9.035



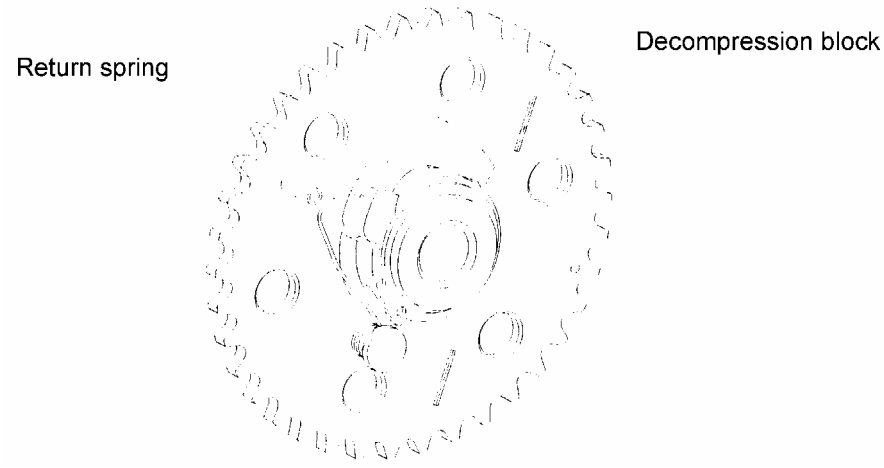
● **Camshaft outer diameter**

Standard(mm)	Service limit(mm)
8.966-8.975	8.920



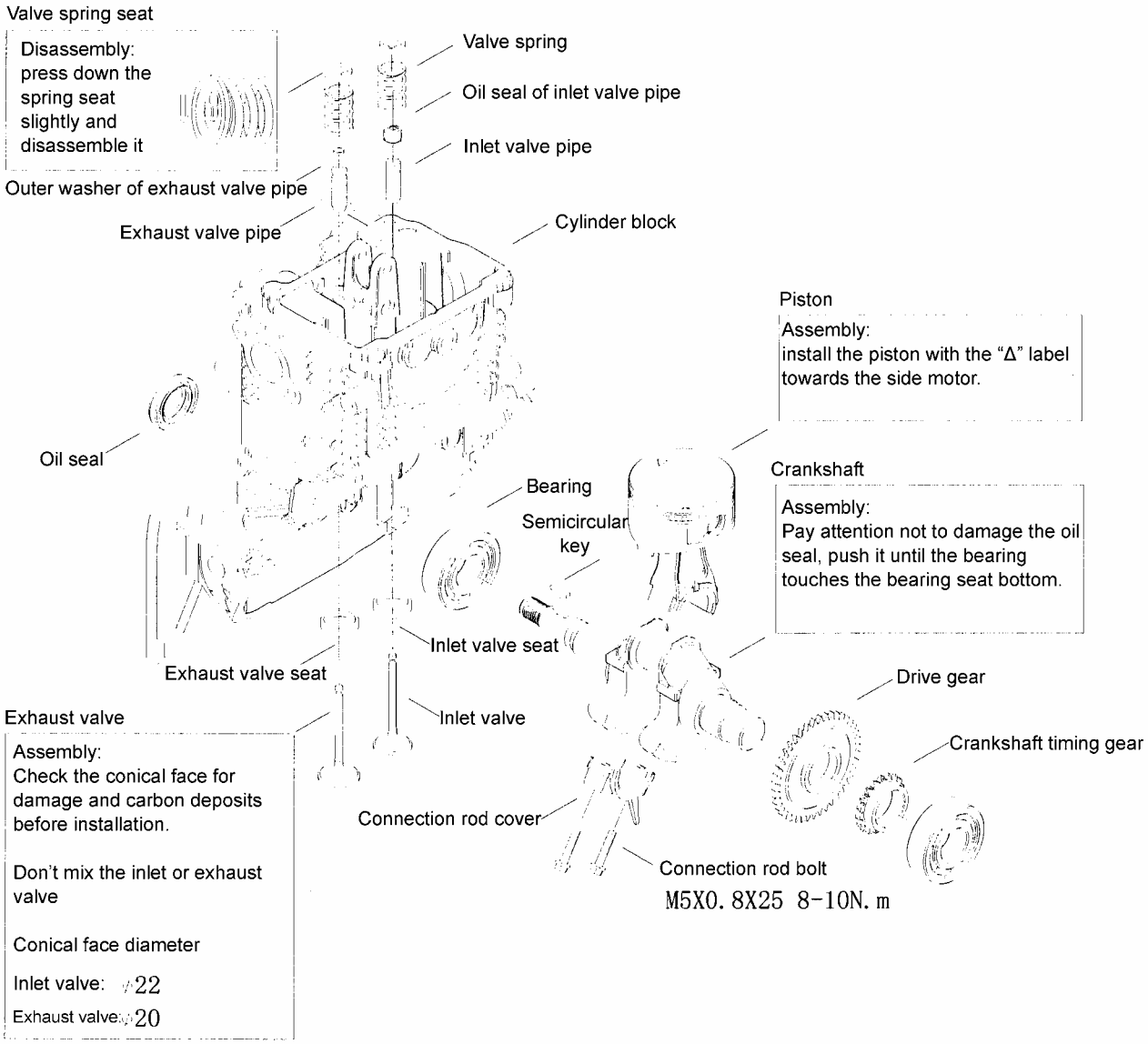
● **Decompression block**

Check the return spring for damage and weary, make sure the decompression block could perform well.

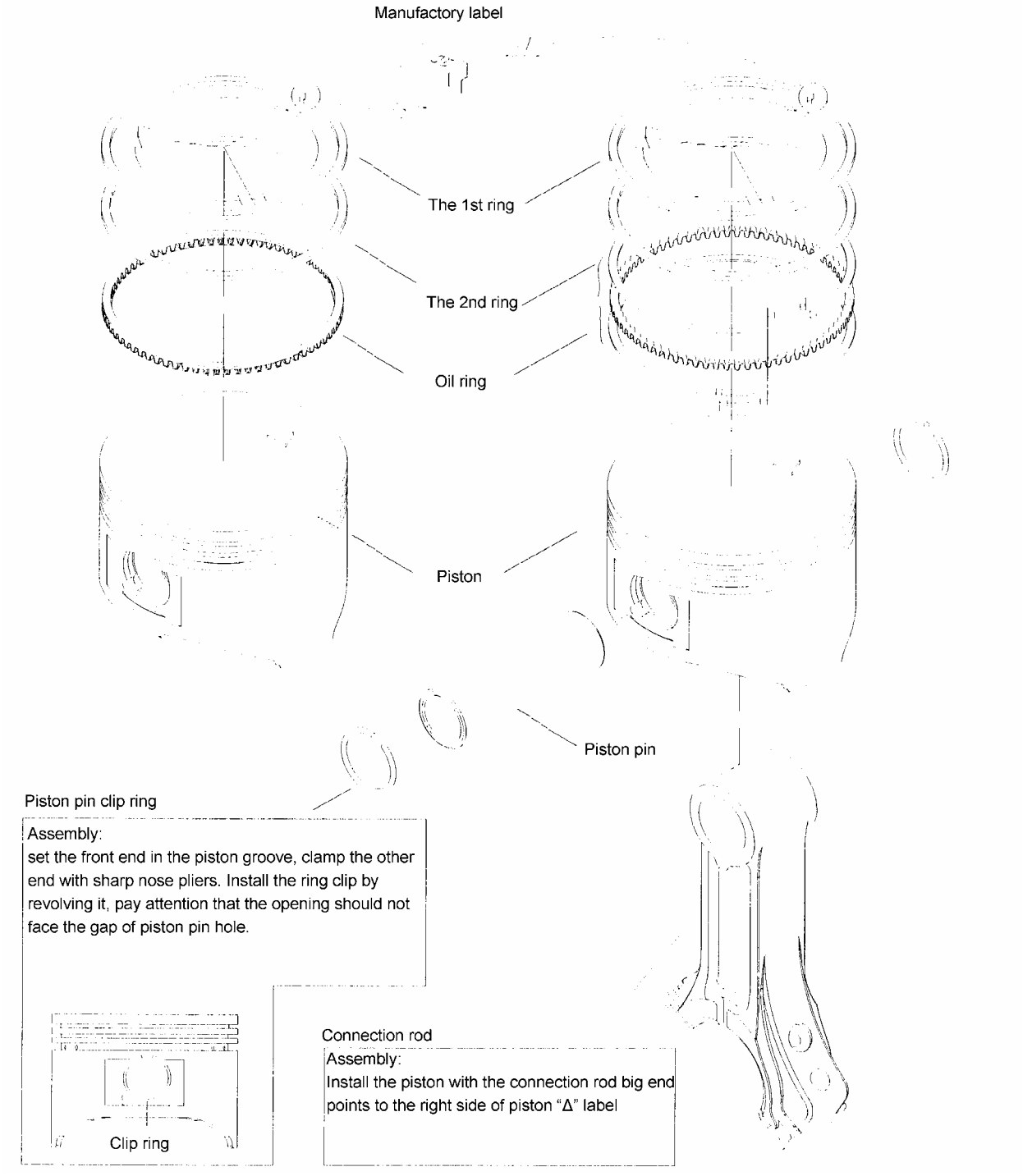


12. Crankshaft/ Piston

12.1 Disassembly/ Reassembly



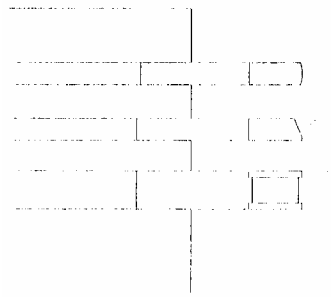
12.2 Piston



Assembly of piston ring

Caution

- Set the manufactory label upwards.
- Pay attention not to mix the location of the 1st ring and 2nd ring.
- Check the piston ring for flexibility after installation.
- Stagger each piston ring opening apart piston pin for 120 ° .

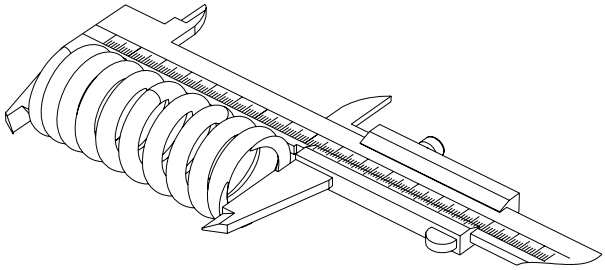


The 1st ring (with chrome)
The 2nd ring (Parkerizing on the surface)
Oil ring

12.3 Inspection

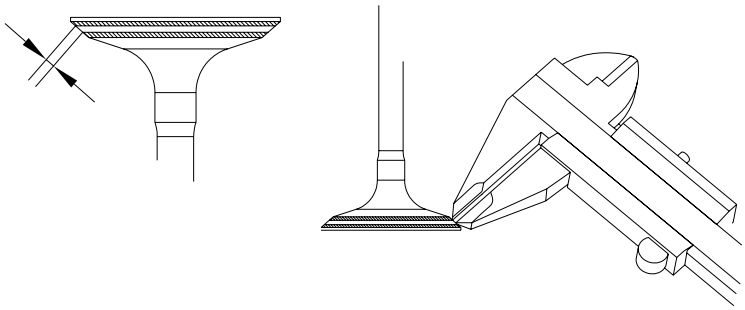
● **Free length of valve spring**

Standard(mm)	Service limit(mm)
26.4	24.9



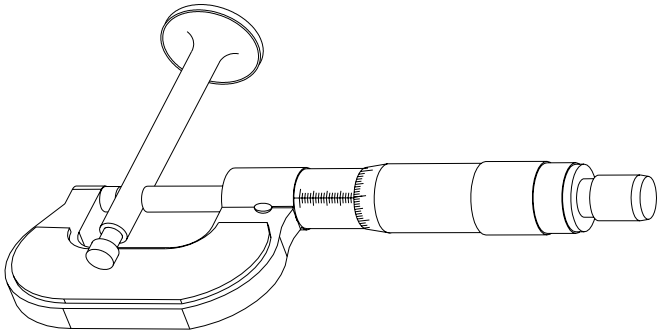
● **Valve seat width**

Standard(mm)	Service limit(mm)
0.7	1.8



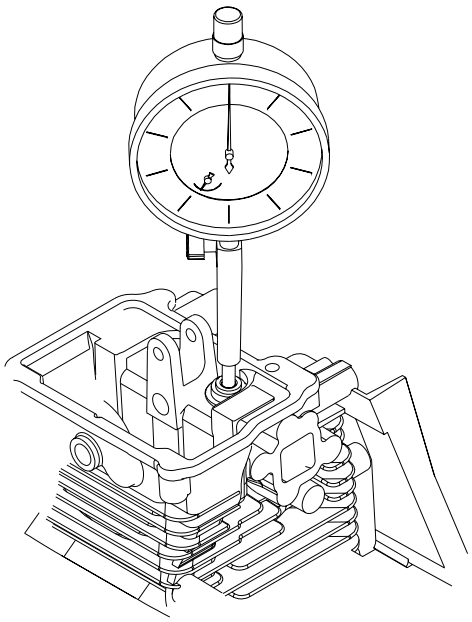
● **Valve rod outer diameter**

	Standard(mm)	Service limit(mm)
Inlet valve	3.965-3.980	3.90
Exhaust valve	3.955-3.970	3.90



● **Valve guide pipe inner diameter**

	Standard(mm)	Service limit(mm)
Inlet/Exhaust valve	4.000-4.030	4.060

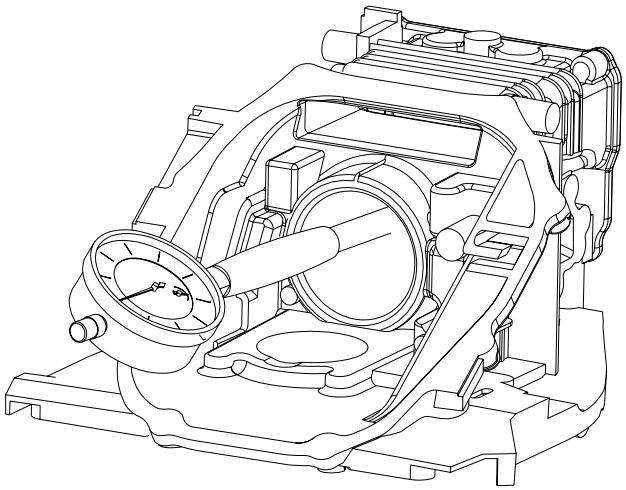


● **Clearance between valve rod and valve guide pipe**

	Standard(mm)	Service limit(mm)
Inlet valve	0.020-0.065	0.10
Exhaust valve	0.030-0.075	0.12

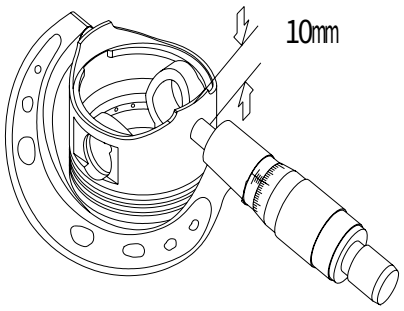
● **Cylinder inner diameter**

Standard(mm)	Service limit(mm)
58.000-58.020	58.105



● **Piston skirt outer diameter**

Standard(mm)	Service limit(mm)
57.960-57.980	57.850

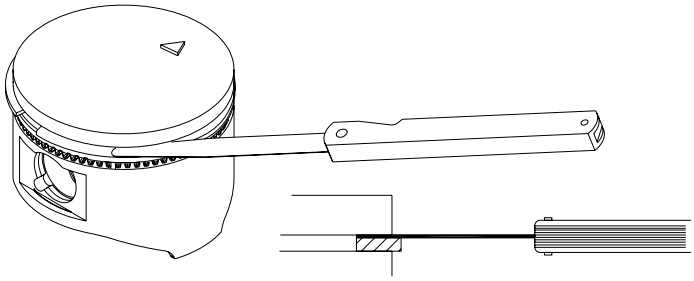


● **Clearance between piston and cylinder**

Standard(mm)	Service limit(mm)
0.020-0.042	0.120

● **Side clearance of piston ring**

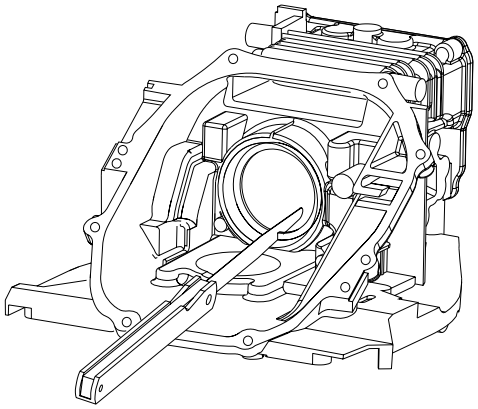
Standard(mm)	Service limit(mm)
0.02-0.06	0.15



● **Piston ring end clearance**

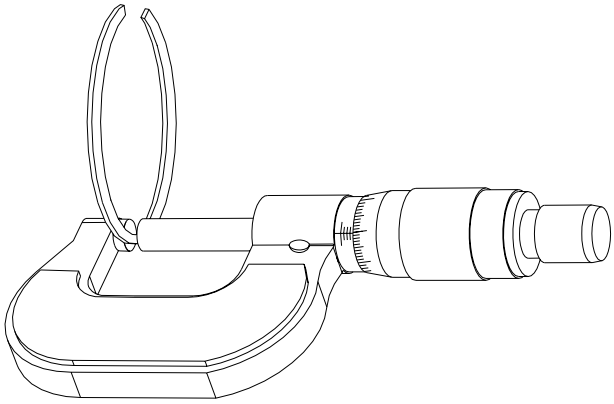
Locate the piston ring into cylinder with piston top, and measure the piston end clearance.

Standard(mm)	Service limit(mm)
0.15-0.25	1.0



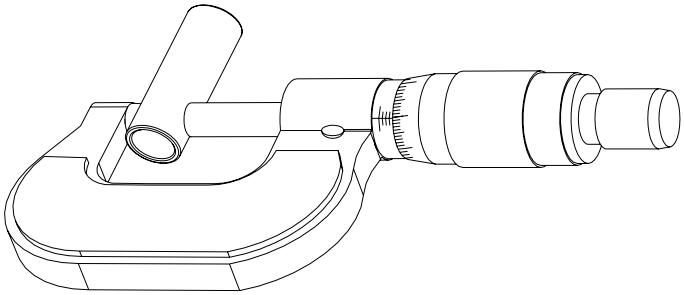
● **Piston ring height**

	Standard(mm)	Service limit(mm)
The 1st ring	0.97-0.99	0.87
The 2nd ring	1.17-1.19	1.107



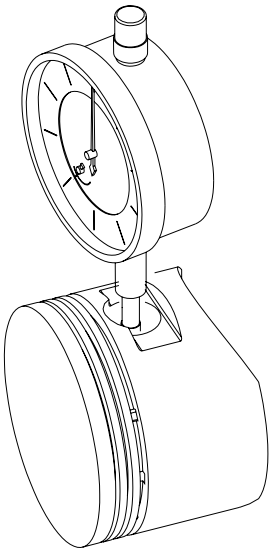
● **Piston pin outer diameter**

Standard(mm)	Service limit(mm)
12.994-13.000	12.950



● **Piston pin hole inner diameter**

Standard(mm)	Service limit(mm)
13.002-13.008	13.050

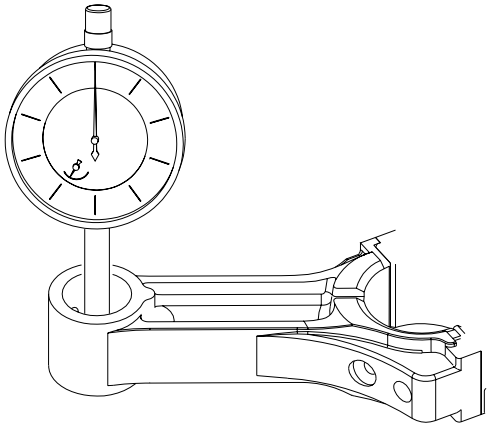


● **Clearance between piston pin and piston pin hole**

Standard(mm)	Service limit(mm)
0.002-0.014	0.080

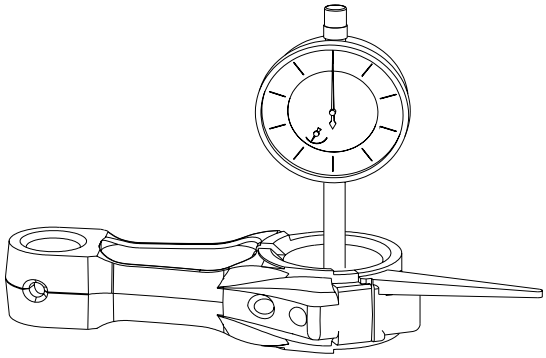
● **Connection rod small end inner diameter**

Standard(mm)	Service limit(mm)
13.006-13.017	13.080



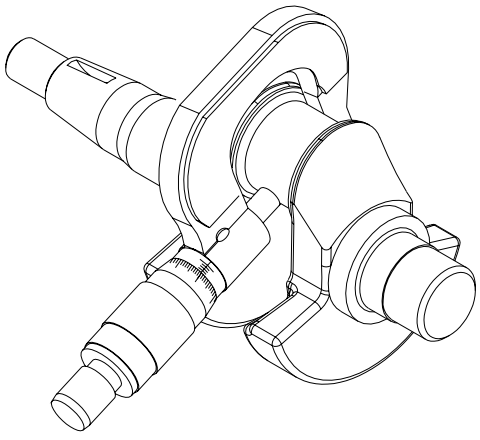
● **Connection rod big end inner diameter**

Standard(mm)	Service limit(mm)
24.020-24.033	24.090



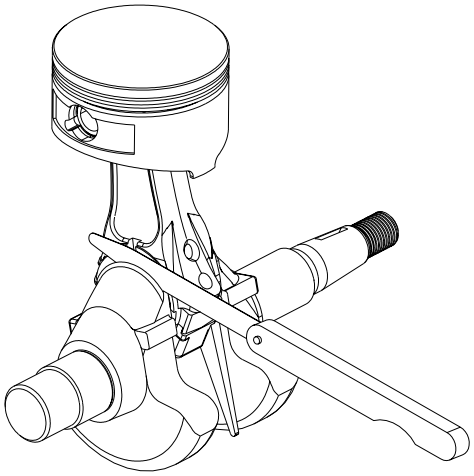
● **Crankshaft neck outer diameter**

Standard(mm)	Service limit(mm)
23.967-23.980	23.900



● **Connection rod big end side clearance**

Standard(mm)	Service limit(mm)
0.1-.0.4	0.8



● **Oil film clearance of connection rod big end**

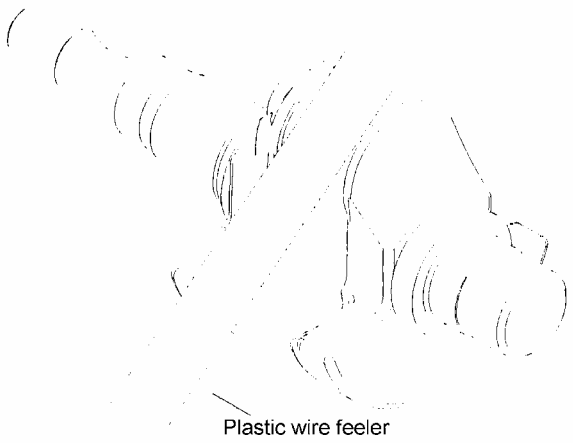
(1) Wipe off the oil on the surface of crankshaft neck.

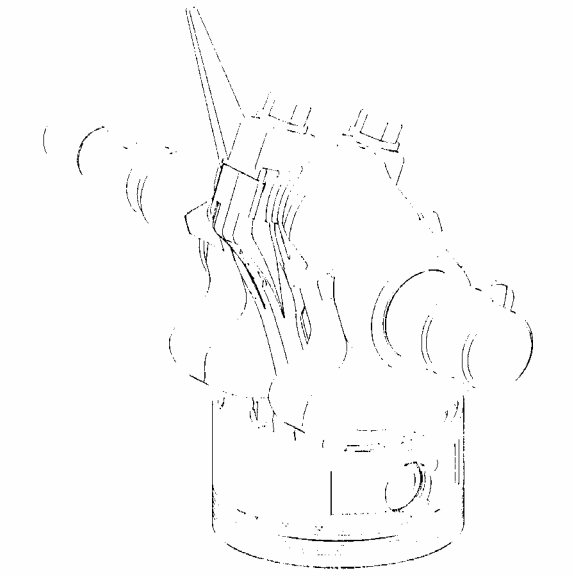
(2) Set the plastic wire feeler at the crankshaft neck and install the connection rod. Tighten the bolt to the prescribed torque, pay attention that don't revolve the crankshaft. The tighten torque is 8 to 10N.m.

(3) Disassemble the connection rod, measure the plastic wire feeler thickness.

(4) Replace the connection rod if the clearance exceeds the service limit and measure the clearance again. Grind the crankshaft neck if the new clearance still exceeds the service limit, and use the connection rod less than the standard valve.

Standard(mm)	Service limit(mm)
0.040-0.066	0.120





● **Bearing vibration**

Clear the bearing and dry it, check the clearance between crankshaft journal and connecting rod big end by revolving bearing by hands. Replace for a new bearing if there is abnormal noise or vibration.