KIPOR

KIPOR POWER

GENERATOR SHOP MANUAL

SINEMASTER

DIGITAL GENERATOR

KGE3000Ti

Preface

This manual covers the construction, function and servicing procedure of the KIPOR KGE3500Ti and Coast Distribution model KGE3000Ti generator engine. This manual is principally concerned with the engine specifications, function, overhaul and repair. There is a separate manual to cover generator function.

Careful observance of the instructions contained in this manual will result in safe and quality service work.

All information, illustrations, directions and specifications included in this publication are based on the latest product information available at the time of approval for printing.

Table of Contents

1. SPECIFICATIONS

Dimensions and weights

Model	KGE3000/3500Ti
Length in (cc)	27 in (686mm)
Width in (cc)	16.7 in (425mm)
Overall height	19.9 in (495mm)
Net weight	132 lbs (60 kg)

Engine

Model	KG205
Type	4-stroke,overhead valve, single cylinder
Displacement in (cc）	12.0 (196)
Bore x stroke in.(mm)	2.68 x 2.13 (68×54)
Horsepower	4.0 @ 3600 rpm
Compression ratio	8.5:1
Cooling system	Forced air
Ignition system	T.C.I
Ignition timing	25 B.T.D.C
Spark plug	F7RTC
Carburetor	Float type, horizontal butterfly valve
Air cleaner	Semi-dry
Governor	Electronic control
Lubrication system	Forced splash
Oil capacity	.63 qt (0.6L)
Fuel tank capacity	3.43 gal (13L)
Starting system	Recoil starter and Electrical starter
Stopping system	Primary circuit ground
Fuel used	Automotive unleaded gasoline 87 octane

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 generator. Any error or oversight made by the technician while servicing can easily result in faulty operation and/or damage to the equipment or injury to the operator.

Warning
■ 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 stated below.

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:

- Carbon monoxide poisoning from engine exhaust.
- Burns from hot parts.
- Injury from moving parts.

- Do not run the engine unless the instructions tell you to do so. Keep your hands and clothing away from rotating parts.

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

2.3 Service rules

- 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.

- Use the special tools designed for the product.

- Always install new gaskets, O-rings, etc. when reassembling components.

- Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly. After reassembly, check all parts for proper installation and operation.

- 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.

- Use only metric tools when servicing this engine. Metric bolts, nuts and screws are not interchangeable with non metric fasteners. The use of incorrect tools and fasteners will damage the engine.

2.4 Electrical precautions

- 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.

- Check the connector terminals for bend, excessive extrusion, missing terminals, or other abnormalities before connecting the connector.

- To connect, insert the connector as far as it goes. If the connector is a locking type, be sure that it is locked securely.

- Check the connector cover for breakage and check whether the connector female terminal is not opened excessively. Then, connect the connector securely. Check the connector terminal for rust. Remove the rust using emery paper or equivalent material before connecting the connector.

- Set the harness clips in the specified places of the frame securely, and secure the wire harnesses.

- Clamp the cables securely.

- Clamp the wire harnesses securely so that they do not interfere with the rotating parts, moving parts and hot parts.

- Route and connect the wire harnesses properly. Be sure that the harnesses are not slack, twisted or pulled overly taut.

- Route the wire harnesses properly so that they do not contact sharp edges and corners and the end of the bolts and screws on the body.

- If a wire harness must contact the end of the bolts or screws or sharp edges and corners, protect the contact part of the harness with a loom or by winding with electrical insulating tape. If the wire harness has a grommet, set the grommet securely.

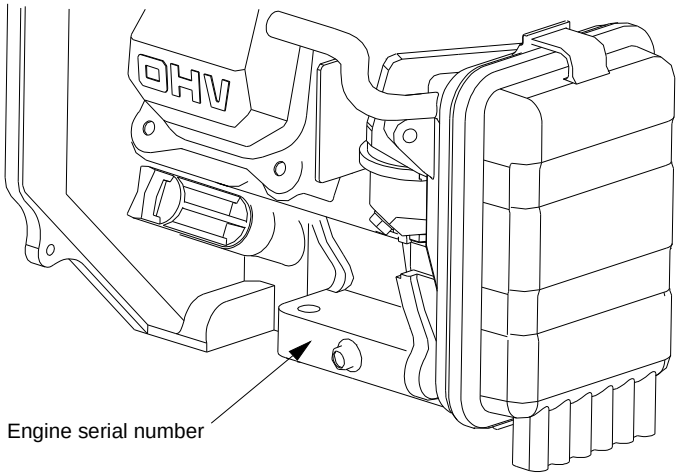
- Take care not to pinch the wire harnesses during installation of a part. If a wire harness has damaged insulation, repair by winding with electrical insulating tape.

- When using an electrical tester like a volt/ohm meter or clamp on meter, read the manufacturer's operating instructions carefully before operating the tester. Be sure that the tester battery is fully charged and the meter is functioning properly

2.5 Serial number location

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

Engine serial number



2.6 Maintenance standards

Engine

Part	Item	Standard in. mm)	Service limit
Cylinder	Sleeve I.D.	2.67~2.68 (68.02~68.04)	2.68 (68.17)
Piston	Skirt O.D	2.68~2.68 (67.97~67.99)	2.68 (67.62)
	Piston-to-cylinder clearance	.0016~.0023 (0.040~0.060)	.0047 (0.12)
	Pin bore I.D.	18.002~18.008	18.042
Piston pin	O.D	.708~.709 (17.990~18.000)	.709 (17.95)
	Pin-to-piston clearance	.0001~.0071 (0.002~0.018)	.0003 (0.080)
Piston ring	Ring width Top	1.420~1.440	1.32
	Second	1.420~1.440	1.32
	Ring side clearance Top/second	0.02~0.06	0.15
	Ring end clearance Top/second	0.150~0.350	1.0
Connecting rod	Small end I.D	.7089~.7093 (18.006~18.017)	0.711 (18.07)
	Big end I.D	1.182 (30.015~30.025)	1.184 (30.07)
	Big end oil clearance	.0018~.0024 (0.046~0.060)	0.12
	Big end side clearance	.0177~.0276 (0.45~0.70)	.0394 (1.0)
Crankshaft	Crank pin O.D.	29.960~29.975	29.90
Valve	Valve clearance Intake	.0039±.0008 (0.10±0.02)	
	Exhaust	.0059±.0008 (0.15±0.02)	
	Stem OD Intake	.215~.216 (5.46~5.48)	.211 (5.35)
	Exhaust	.215 (5.45~5.47)	.211 (5.35)
	Vessel I.D Intake/Exhaust	.216-.217 (5.500~5.518)	.219 (5.56)
	Clearance of valve and vessel	.0008~.0023 (0.020~0.058)	.0039 (0.1)
	Intake Exhaust	.00~.0027 (030~0.068)	.0047 (.12)
	Seat width Intake/Exhaust	.031~.047 (0.8~1.2)	.079 (2.0)
Valve spring	Free Length Intake/Exhaust	1.20 (30.5)	1.14 (29)
Cam wheel	Cam height Intake/Exhaust	1.09~1.10 (27.63~27.91)	1.08 (27.34)
	I.D (shaft bore)	1.09~1.10 (27.68~27.94)	1.08 (27.34)
Camshaft	O.D	.550~.551 (13.966~13.984)	.553 (13.92)
Valve lifter	I.D (shaft bore)	.313~.314 (7.96~7.98)	.310 (7.87)
Crankcase cover	Camshaft Bearing I.D.	>550~.552 (14.000~14.027)	.553 (14.05)
Cylinder block	Valve lifter I.D.	.315~.316 (8.000－8.015)	.317 (8.06)
	Camshaft Bearing I.D.	.550~.552 (14.000－14.02)7	.553 (14.05)
Spark plug	Clearance	.024~.031 (0.6—0.8)	—
Ignition coil	Resistance Primary side	0.8—1.3Ω	—
	Second side	15—21kΩ	—
Pulse coil (Trigger)	Air gap	.020~.030 (0.5～0.75)	—
	Resistance	80～130Ω	—
Starting relay	Resistance	3.8～4.1Ω	—

2.7 Torque values

Item	Thread dia. X pitch	Tightening torque	
		Ft/lbf	N.m
Connecting rod bolt	M7	10.3~11.8	14~16
Cylinder head bolt	M8×60	20.7~23.6	28~32
Spark plug	M14×1.25×19	18.4~22.2	25~30
Crankcase cover	M8×30	14.75~17.0	20~23
Flywheel nut	M14×1.5	59.0~66.42	80~90
Tightening bolt of rocker arm base	M6×0.75×33	14.75~17.0	20~23
Adjusting nut of rocker axis	M6×0.75	7.4~8.8	10~12
Standard torque	M5 bolt、nut	4.4~5.9	6~8
	M6 bolt、nut	5.9~7.4	8~10
	M8 bolt、nut	14.8~17.0	20~23
	M10 bolt、nut	40.6~44.3	55~60

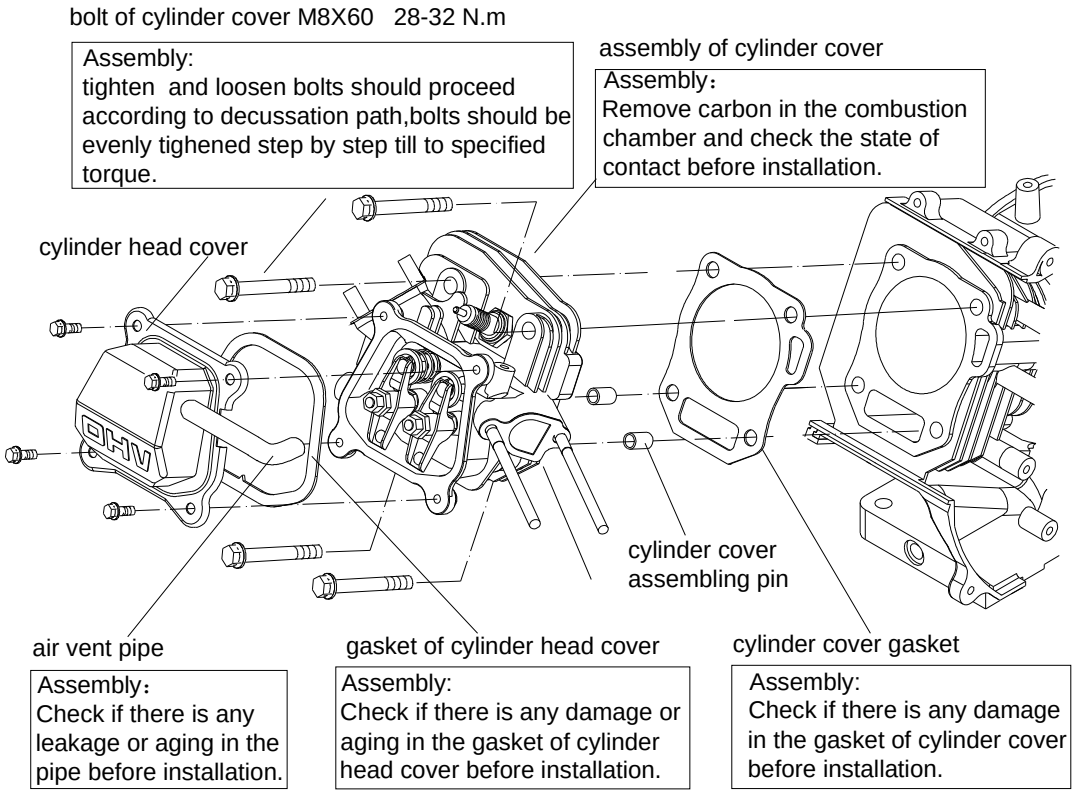
Note：

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

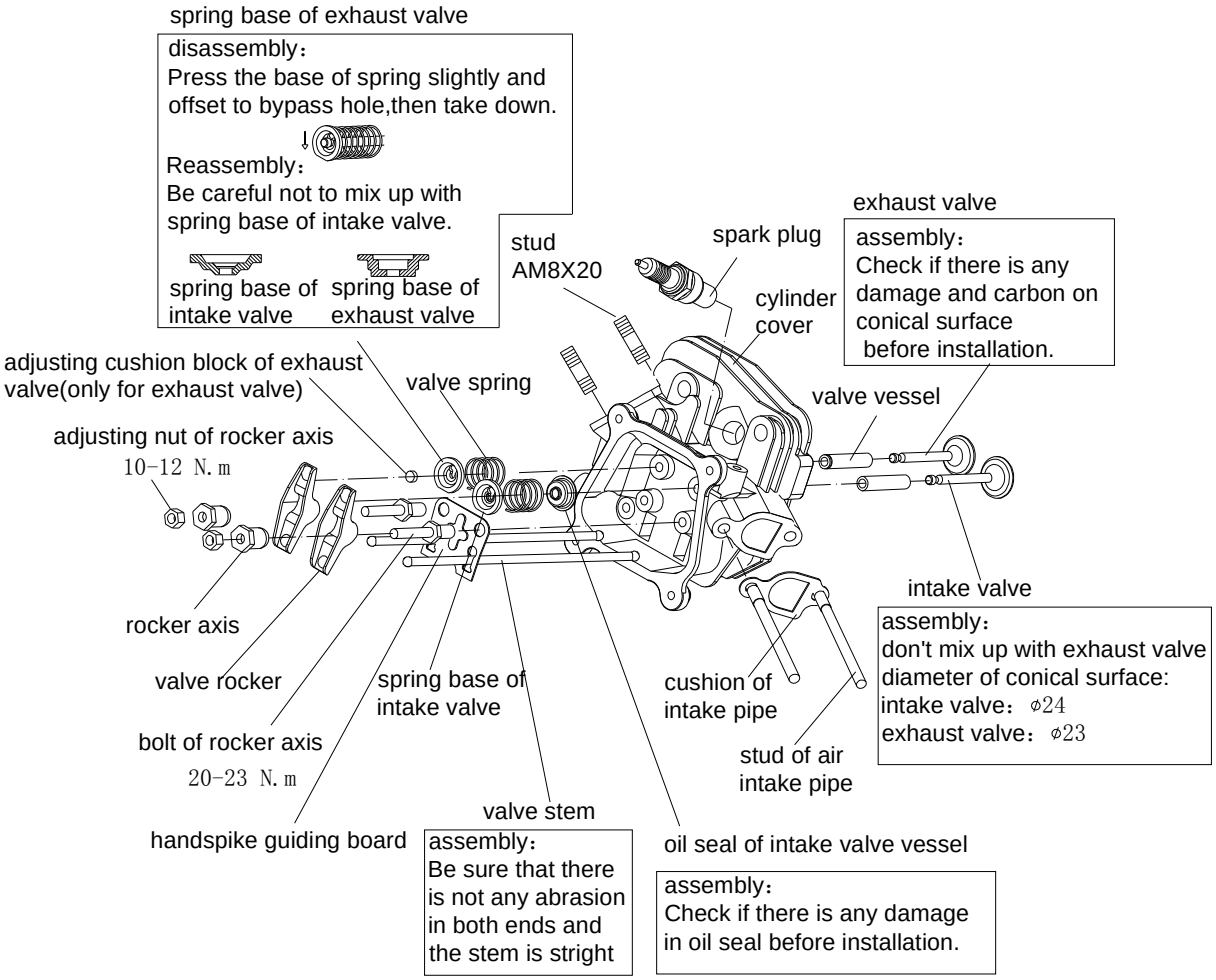
3. Cylinder cover/valves

3.1 Disassembly and reassembly

a. Cylinder Head



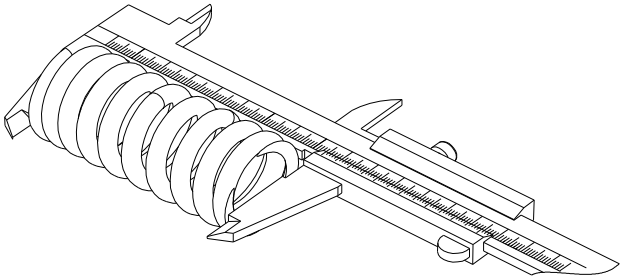
b. Valves



3.2 Inspection

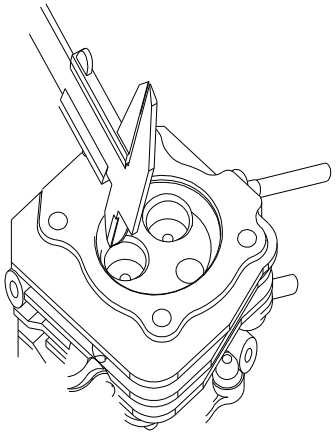
●Free length of valve spring

Standard value in (mm)	Service limit in (mm)
1.20 (30.5)	1.14 (29)



●Width of valve base

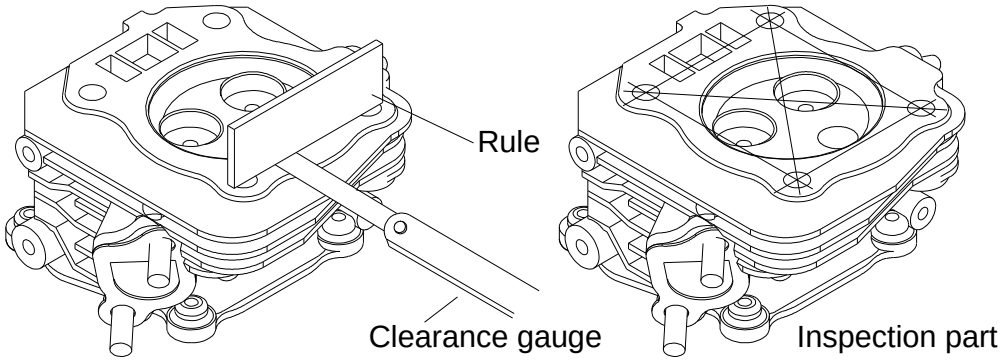
Standard value in (mm）	Service limit in (mm)
0.03~0.047 (0.8~1.2)	0.079 (2.0)



●Cylinder Head

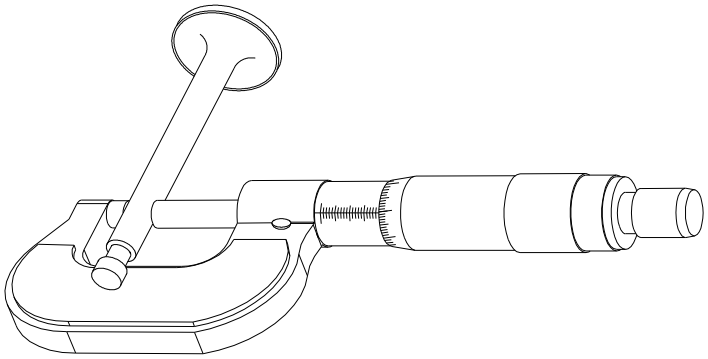
Clear the gathered carbon in the combustion chamber and hangover on the cylinder head gasket.
Check for cracks on the spark plug bore, valve base and valve conduit.
Check if the cylinder head distorted

Service limit	Replace over 0.004 in (0.1mm)



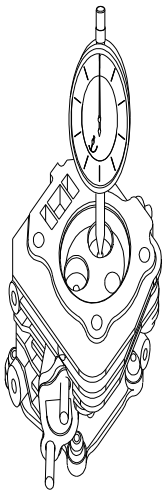
●Valve lifter O.D

	Standard (mm)	Service limit in (mm)
Inlet valve	.2148~.2158 (5.46~5.48)	0.211 (5.35)
Exhaust valve	.2146~.2157(5.45~5.47)	0.211 (5.35)



● **Valve conduit I.D**

	Standard in（mm）	Service limit in (mm)
Intake & Exhaust valve	0.2165~0.217 (5.500~5.518)	0.2189(5.56)



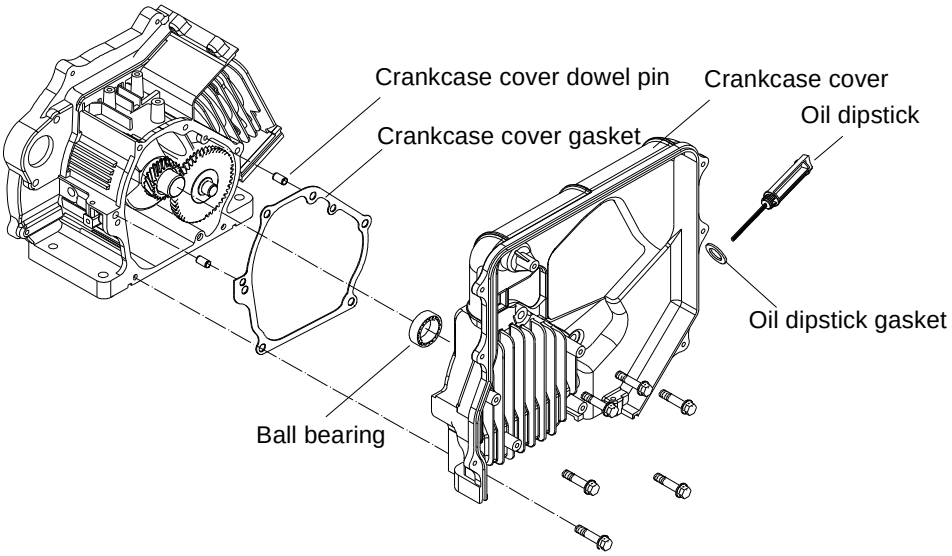
●**Clearance between valve lifter and valve conduit**

	Standard in (mm)	Service limit in (mm)
Inlet valve	.0008~.0022 (0.020~0.058)	.004 (0.10)
Exhaust valve	.0011~.0027 (0.030~0.068)	.0047 (0.12)

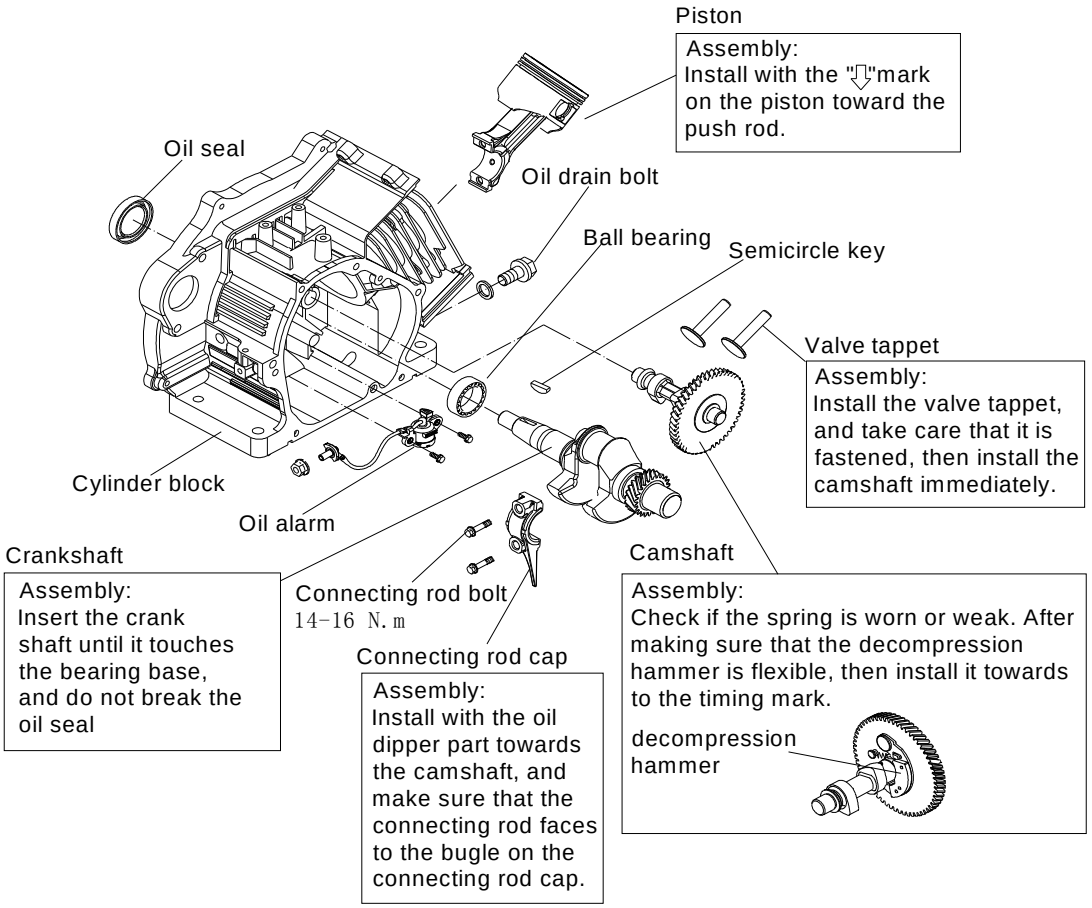
4. Crankcase Cover, Crankshaft, Camshaft and Piston

4.1 Disassembly & Assembly

A. Crankcase cover

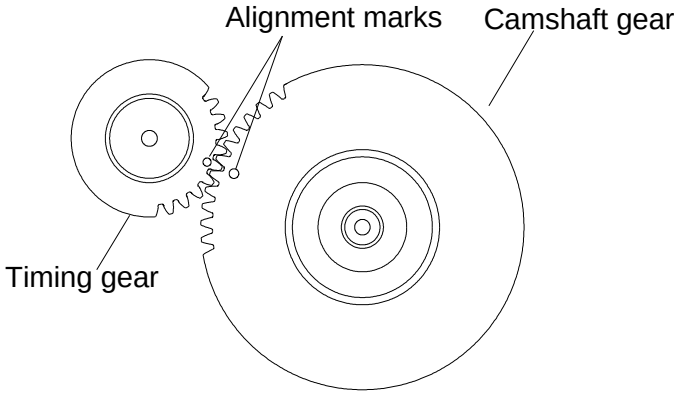


B. Crankshaft and camshaft

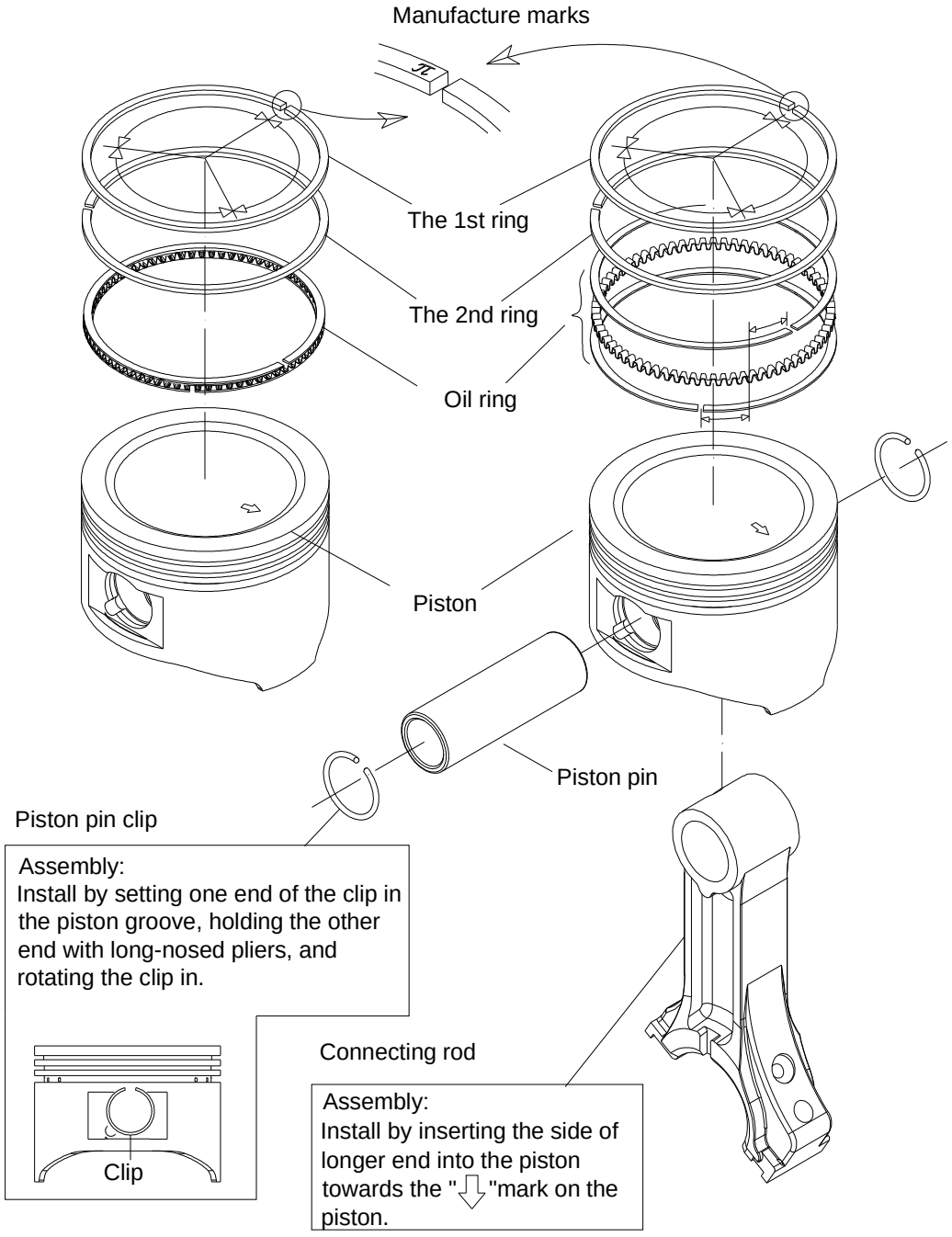


●Aligning the alignment marks

Install by aligning the camshaft (the small gear on the camshaft) to the alignment mark on the timing gear.

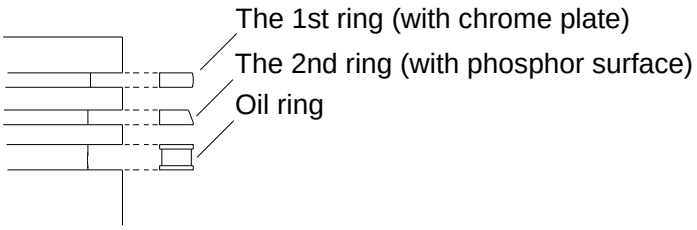


C. Piston


Manufacture marks
The 1st ring
The 2nd ring
Oil ring
Piston
Piston pin
Piston pin clip
Assembly:
Install by setting one end of the clip in the piston groove, holding the other end with long-nosed pliers, and rotating the clip in.
Clip
Connecting rod
Assembly:
Install by inserting the side of longer end into the piston towards the "⇩"mark on the piston.

Assembly of piston rings

Attention
•The manufacture mark should face upward. •Do not interchange the top ring and the second ring. •Check for smooth movement of the piston ring after assembly. •The hatch of every piston ring should not align the with the piston pin, and stagger the piston ring end gaps 120° apart.



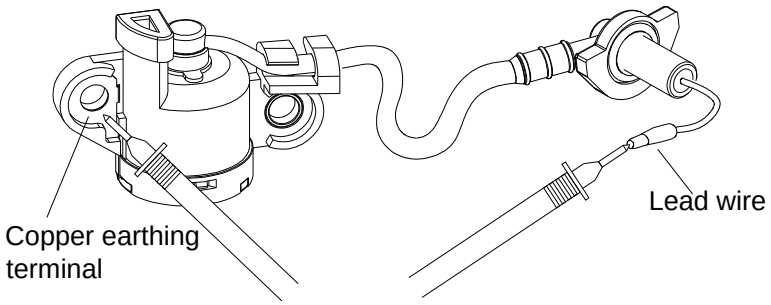
2.2 Inspection

A. **Inspection of oil switch**

（1）Put the oil switch in the upward position, and check for continuity between the oil switch lead wire and the ground terminal.

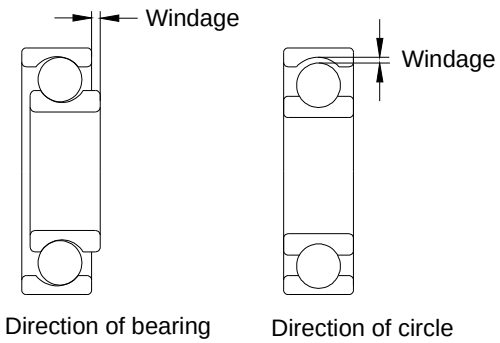
（2）Turn the switch upside down , check for the discontinuity.

（3）Check the float by dipping it in an oil container. There should not be any continuity



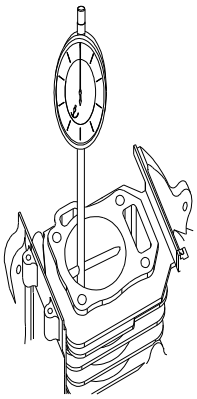
B. Bearing clearance

Clean and dry the bearing, and check the bearing visually by rotating the bearing manually. If there is abnormal noise or loose movement, the bearing should be replaced.



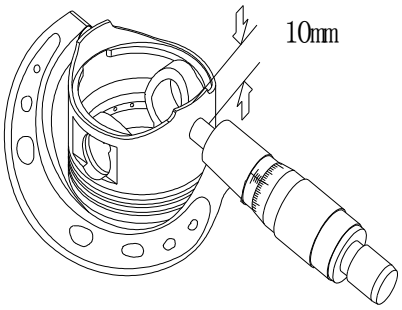
C. Cylinder ID

Standard in. (mm)	Service limit in. (mm)
2.678 (68.02~68.04)	2.684 (68.17)



D. Piston sleeve OD

Standard in. (mm)	Service limit in. (mm)
2.676~2.677 (67.97~67.99)	2.662 (67.62)

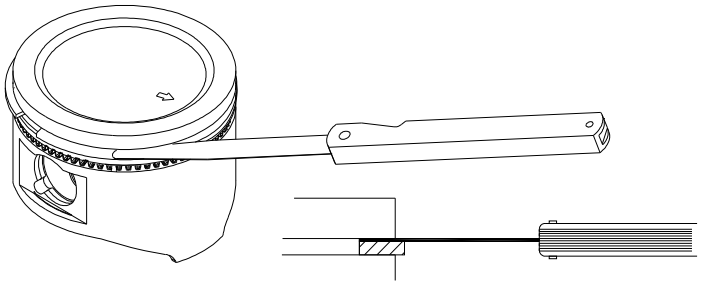


E. Clearance between piston and valve

Standard in (mm)	Service limit in. (mm)
.0016~.0024 (0.040~0.060)	.0047 (0.120)

F. Piston ring side clearance

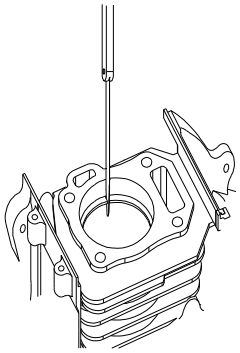
Standard（mm）	Service limit (mm)
.0008~.0024 (0.020~0.060)	.0059 (0.150)



G. Piston ring end cap

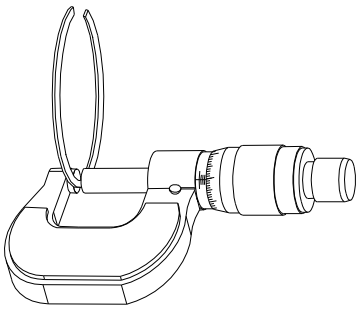
Use the top of piston to locate the piston ring in the cylinder, measure the piston ring end cap.

Standard in. (mm)	Service limit in. (mm)
.0059~.0138 (0.150~0.350)	.0393 (1.0)



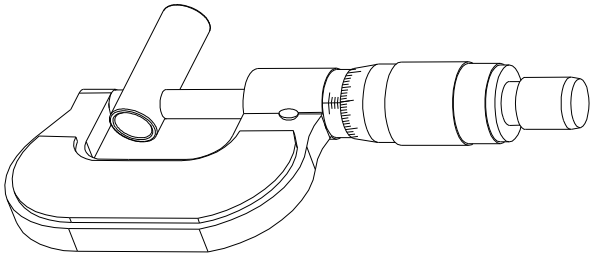
H. Piston ring width

	Standard in. (mm)	Service limit in. (mm)
The 1st ring	.0450 (1.420~1.440)	.0520 (1.320)
The 2nd ring	.0450 (1.420~1.440)	.0520 (1.320)



I. Piston pin OD

Standard in. (mm)	Service limit in. (mm)
.7083~.7087 (17.990~18.000)	.7067 (17.950)



J. Piston pin bore ID

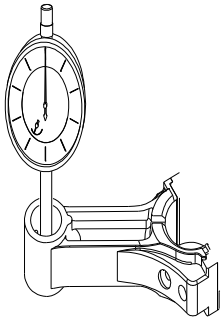
Standard in. (mm)	Service limit in. (mm)
.7087~.7090 (18.002~18.008)	.7103 (18.042)

K. Clearance between piston pin and piston pin bore

Standard in. (mm)	Service limit in. (mm)
.00007~.0007 (.002~0.018)	.0031 (0.080)

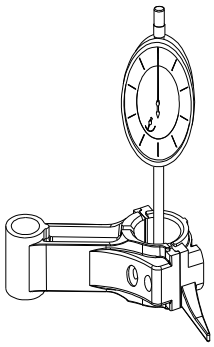
L. Connecting rod small end ID

Standard in. (mm)	Service limit in. (mm)
.7089~.7093 (18.006~18.017)	.7114 (18.070)



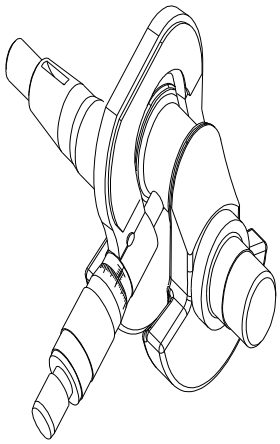
M. Connecting rod big end ID

Standard in. (mm）	Service limit in. (mm)
1.181~1.182 (30.015~30.025)	1.184 (30.070)



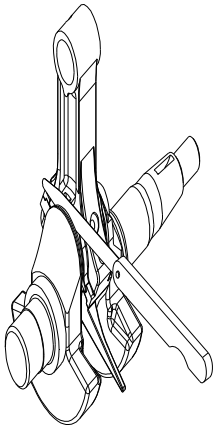
N. Crank pin OD

Standard in. (mm）	Service limit in. (mm)
1.179~1.180 (29.960~29.975)	1.177 (29.900)



O. Connecting rod big end side clearance

Standard in. mm）	Service limit in. (mm)
.0177~.0276 (0.45~0.70)	.0394 (1.0)



P. Connecting rod big end oil clearance

（1）Clean the crank pin and the connecting rod big end.

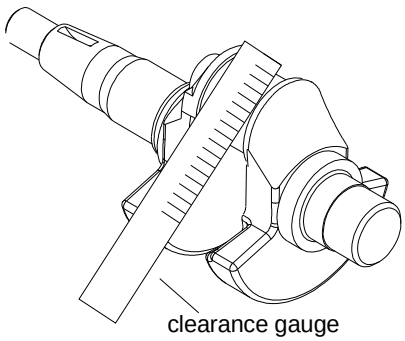
（2）Set a plastic gauge on the crank pin. Install the connecting rod cap and tighten the connecting rod bolt to the specified torque.

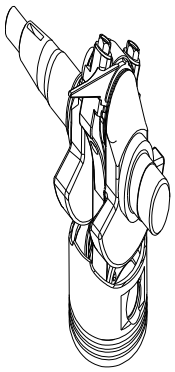
Torque: 10.3~11.8 ft lbs (14~16 N.m)

（3）Remove the connecting rod cap and measure the plastic gauge with the plastic gauge scale.

（4）If the measurement exceeds the service limit, replace the connecting rod and recheck the learance. If the clearance, measured by using a new connecting rod, exceeds the service limit, replace the crankshaft.

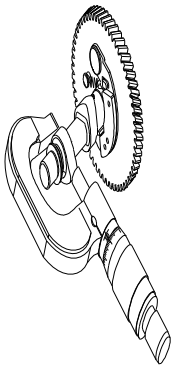
Standard in. (mm)	Service limit in. (mm)
.0018~.0024 (0.046~0.060)	.0047 (0.120)





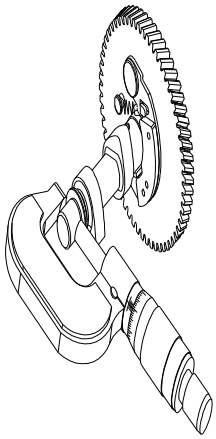
Q. Camshaft height

	Standard in. (mm）	Service limit in. (mm)
Inlet	1.088~1.099 (27.63~27.91)	1.076 (27.34)
Exhaust	1.090~1.100 (27.68~27.94)	1.076 (27.34)



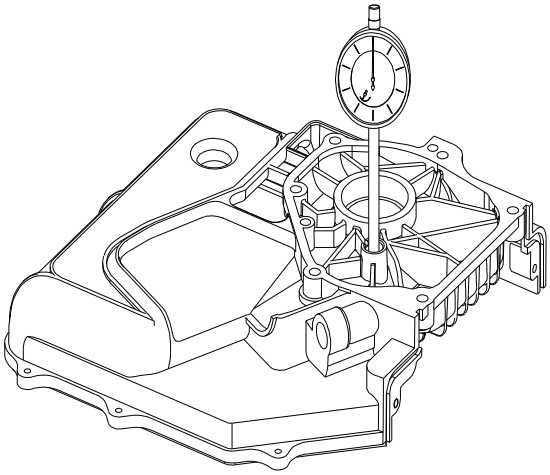
R. Camshaft OD

Standard in. (mm)	Service limit in. (mm)
.5496~.5506 (13.966~13.984)	.5480 (13.920)



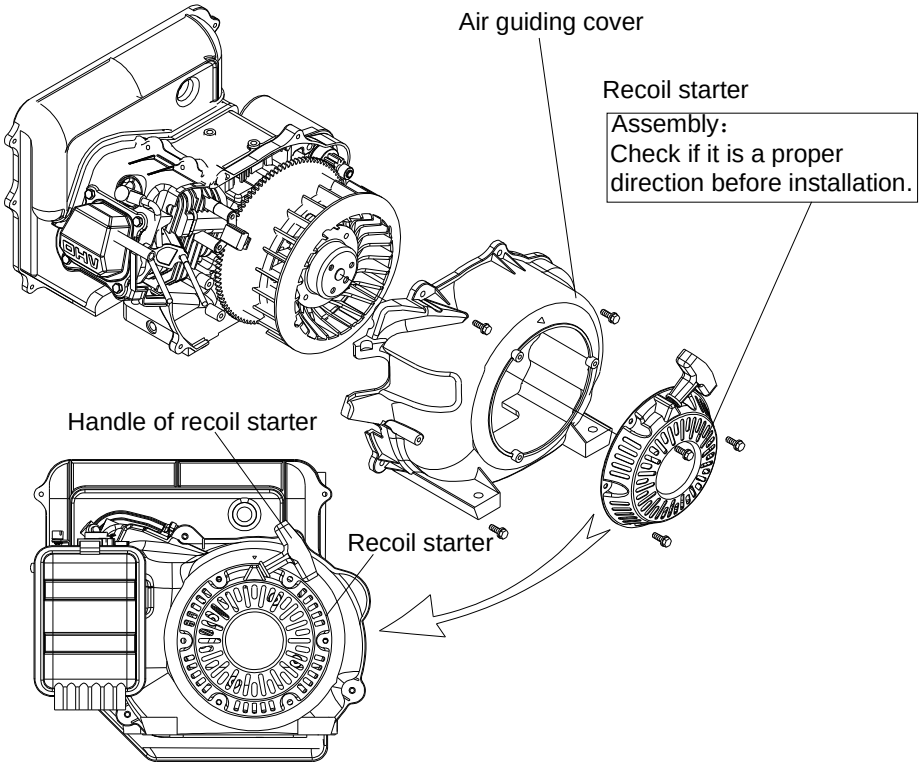
S. Camshaft bearing ID

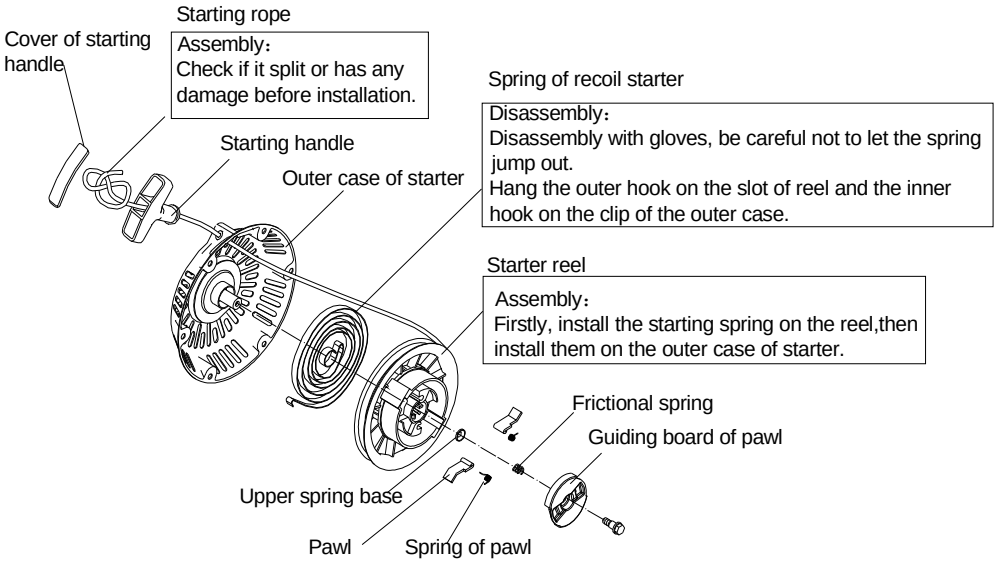
Standard in. (mm)	Service limit in. (mm)
.5512~.5522 (14.000~14.027)	.5532 (14.050)



5. Recoil starter\ Air guiding cover

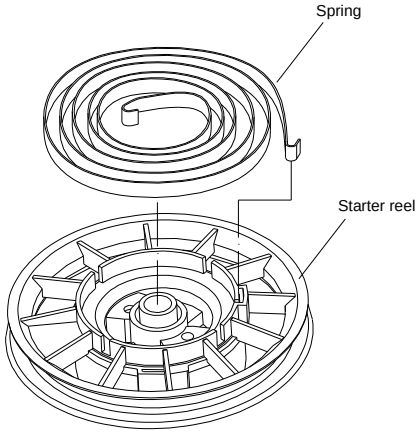
5.1 Disassembly and Reassembly



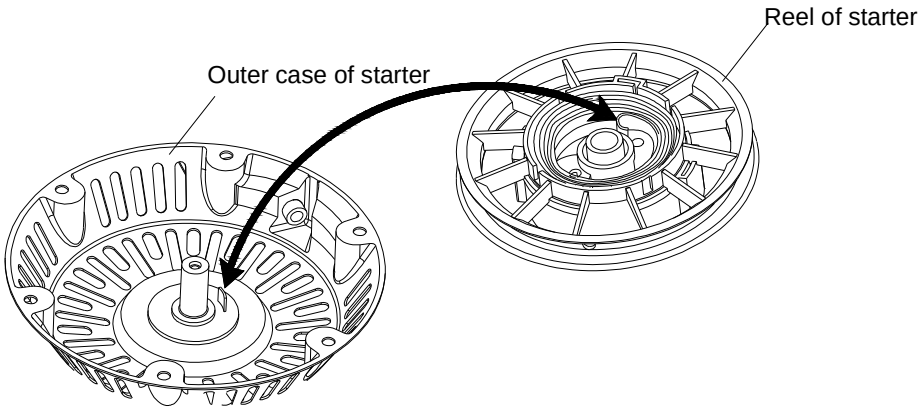


5.2 Assembly of recoil starter

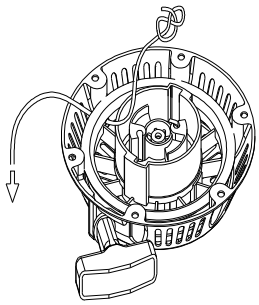
①. Install the spring in the starter reel, and then put the outer hook of the spring in the block of reel.



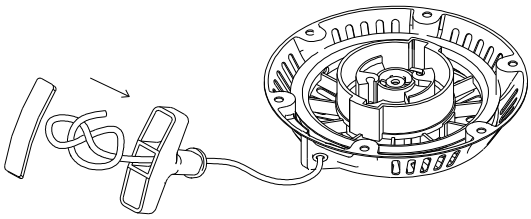
②. Spread lubricating grease on the ratchet of outer case, and then install the reel with spring, rotate the reel anticlockwise to make the inner hook of spring hitch to the block of the outer case.



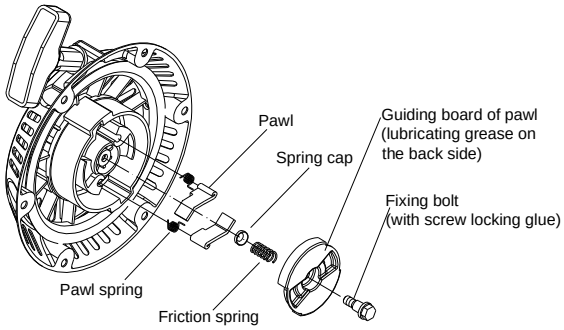
③ Make a knot at the ends of the starter rope which is like figure ‘8’ as shown in the following, thread another end through the hole on the reel and pull out it. And then install the reel, rotate it for 4 loops anticlockwise, and then hold the reel so it does not turn back.



④ Pull the other end thought the hole of the outer case , and then thread through handle. Make a knot at the end and install the handle cover. Release the reel to let the spring draw the rope back. Be careful not to let the reel jump out of the case.



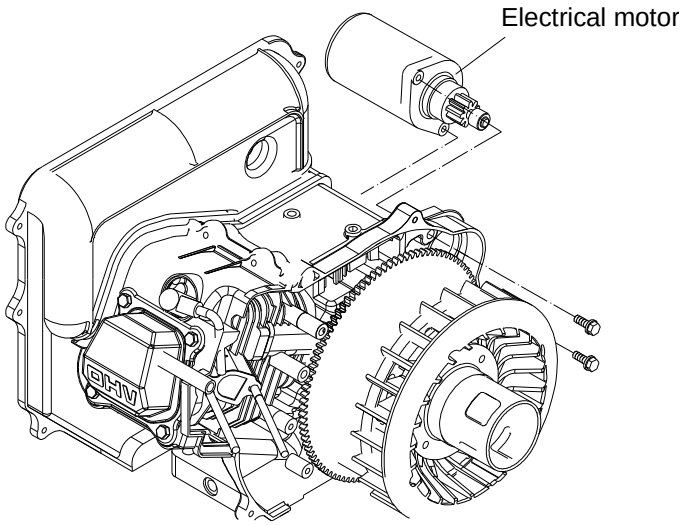
⑤ Install pawl of starter and other parts, and then fix them with bolts.



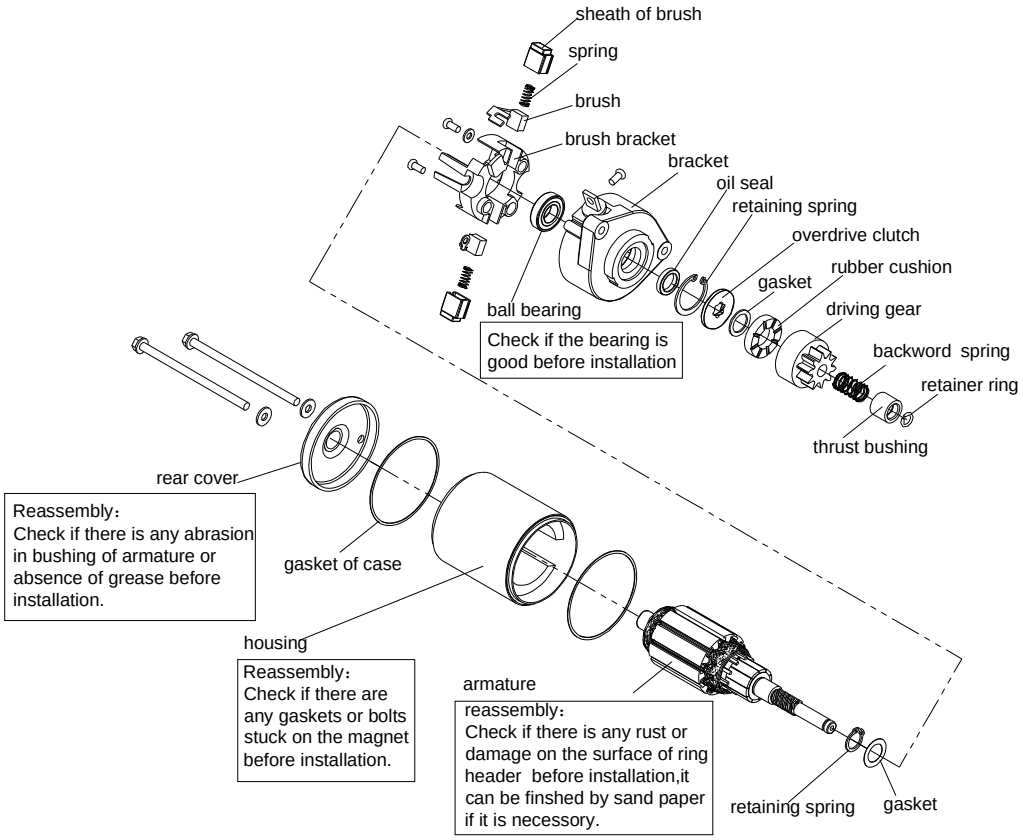
⑥ Pull the rope several times to check if it is engaging

6. Starter Motor

6.1 Removal and reinstallation



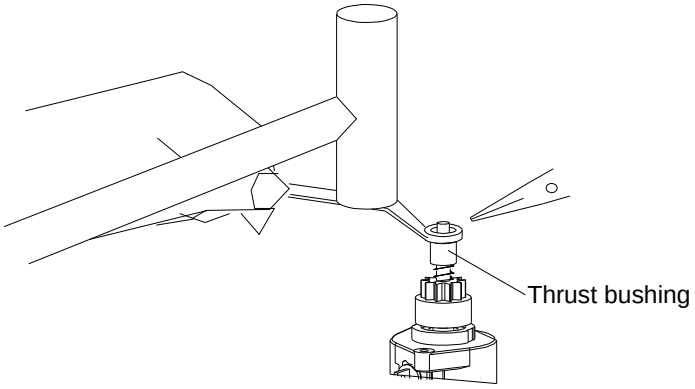
6.2 Disassembly and reassembly



A. Disassembly of driving gear

Stand the starter in an upright position, push down on the bushing, and remove the retainer ring with

long nose pliers. Remove the driving gear.



6.3 Inspection

(1) Starting relay

Insert two instrument pens into two connection-pegs of starting relay to measure primary resistance of ignition coil.

Resistance of ignition coil	3.8~4.1Ω

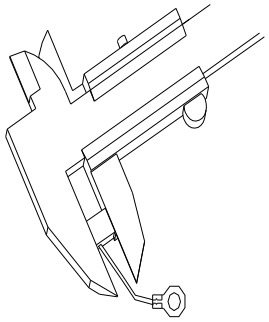
Electrify two lead wires of starting relay with voltage of 12v, relay should have motion and make noise, keep electricity on and test if lead bolts of two main contact points are connected. If it is connected, it means normal.

（2）Electrical motor

- Brush length

Measure the length of brush, if abrasion is larger than service limit it should be changed with another one.

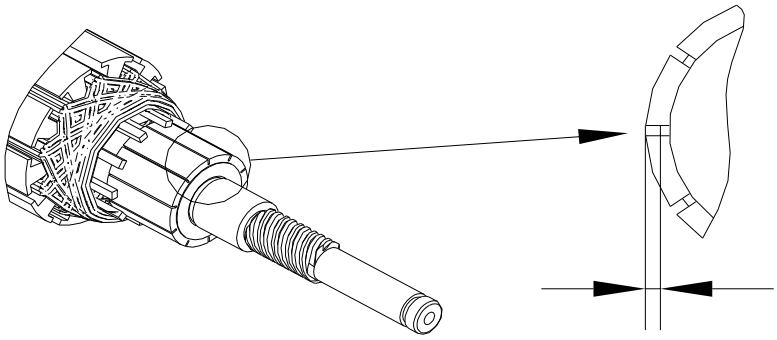
Standard value in. (mm)	Service Limit in. (mm)
.197~.394 (5.0~10.0)	.197 (5.0)



- Depth of isinglass

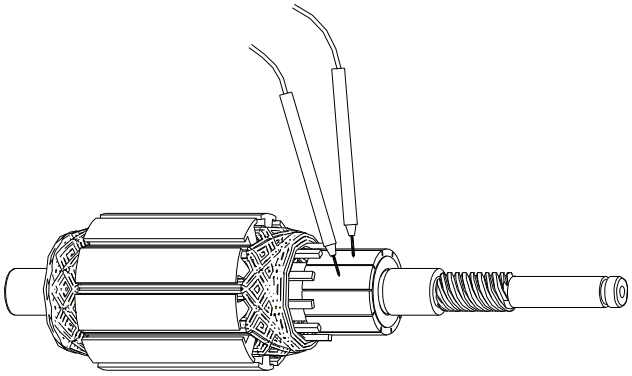
If isinglass is blocked or lower than the minimum limit, it should be sheared with edge.

Standard value in. (mm)	Service limit in. (mm)
.0394 (1.0)	.008 (0.2)



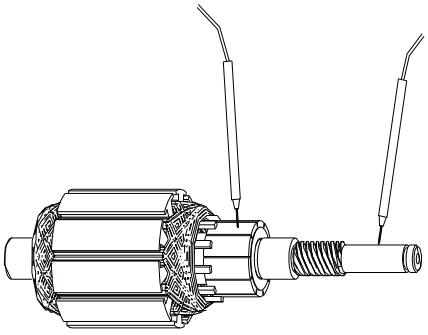
- Turnon of sector body

Check turnon of sector body, if there is any disconnection, armature should be replaced.



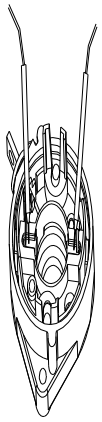
- Insulation between ring header and axis

Check turnon between ring header and axis, if there is any disconnection armature should be replaced.



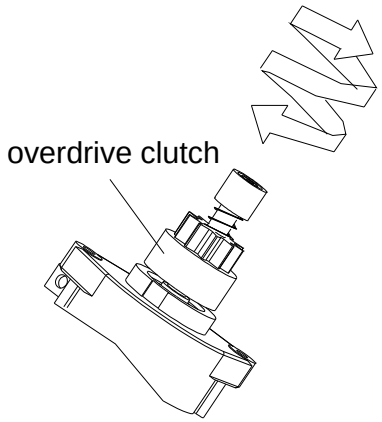
- Insulation between brushes

Demount armature to check turnon of brushes. It is normal if it disconnected



- **Overdrive clutch**

①Rotate the overdrive clutch to check if it turns smoothly. Then revolve the over- drive clutch to the thrust bushing and release it, under the force of spring it can restore, but if it doesn't work properly even with lubricating oil, it should be replaced with another one.



② Check the tooth surface of small gear, if there is any damage or abrasion it should be replaced.