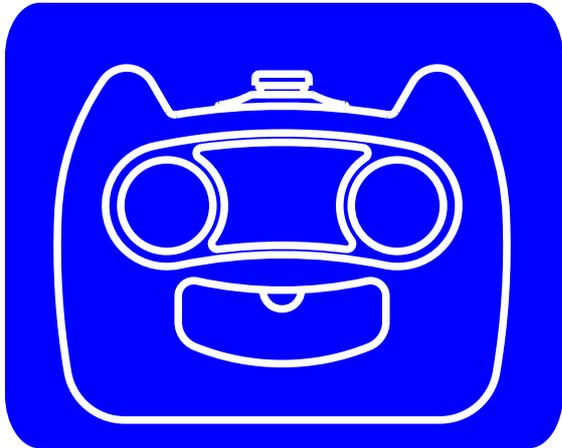


BOLIY

BOLIY POWER GENERATOR SHOP MANUAL



DIGITAL GENERATOR

Pro3600Si

Pro3600SiE (electric start)

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Preface

This manual covers the construction, function and servicing procedure of the BOLIY Pro3600Si/E model generators. This manual is principally concerned with the generator specifications, function, troubleshooting and repair. There is a separate manual to cover engine overhaul which includes the starting systems.

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.

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1.1 SPECIFICATIONS

DIMENSIONS & WEIGHT

OVERALL LENGTH (mm / in)	585 / 23
OVERALL WIDTH (mm / in)	420 / 16.5
OVERALL HEIGHT (mm / in)	470 /18.5
DRY WEIGHT (kg / lb.)	31/ 68
GROSS WEIGHT (kg / lb.)	35.5 / 78
FUEL TANK CAPACITY (L / US gal.)	7.4 / 1.9
FUEL CONSUMPTION AT RATED OUTPUT	0.55 L/kwh
NOISE LEVEL (at 7m)	53-58 dB

ENGINE

TYPE	166F, OHV, AIR-COOLED, 4 * STROKE
STARTING SYSTEM	RECOIL START
CYLINDER ARRANGEMENT	INCLINED,SINGLE CYLINDER
BORE * STROKE (mm/in)	66(2.6) * 50(1.97)
IGNITION SYSTEM	CDI
SPARK PLUG TYPE	BPR4ES(NGK)/F7RTC
GAP (mm/in)	0.7-0.8(0.028-0.031)
DISPLACEMENT (cc)	171CC
RATED OUTPUT KW(HP)r/min	3.6(4.9)/3,600
FUEL	UNLEADED GASOLINE
ENGINE OIL QUANTITY(L / US qt.)	0.6(0.63)

GENERATOR

TYPE	AC OUTPUT, Multistage permanent-magnet generator
RATED OUTPUT (WATTS)	3,000
MAX OUTPUT (WATTS)	3,300
FULL TANK OUTPUT (WATTS)	13,500
RUN TIME AT 1/2 RATED LOAD	8.3 hours
RUN TIME AT RATED LOAD	4.5 hours
POWER CONVERSION RATE	85%*92%
RATED VOLTAGE (V)	120 & 230
RATED CURRENT (A)	25 & 13
DC OUTPUT(12V / 8 A)	YES

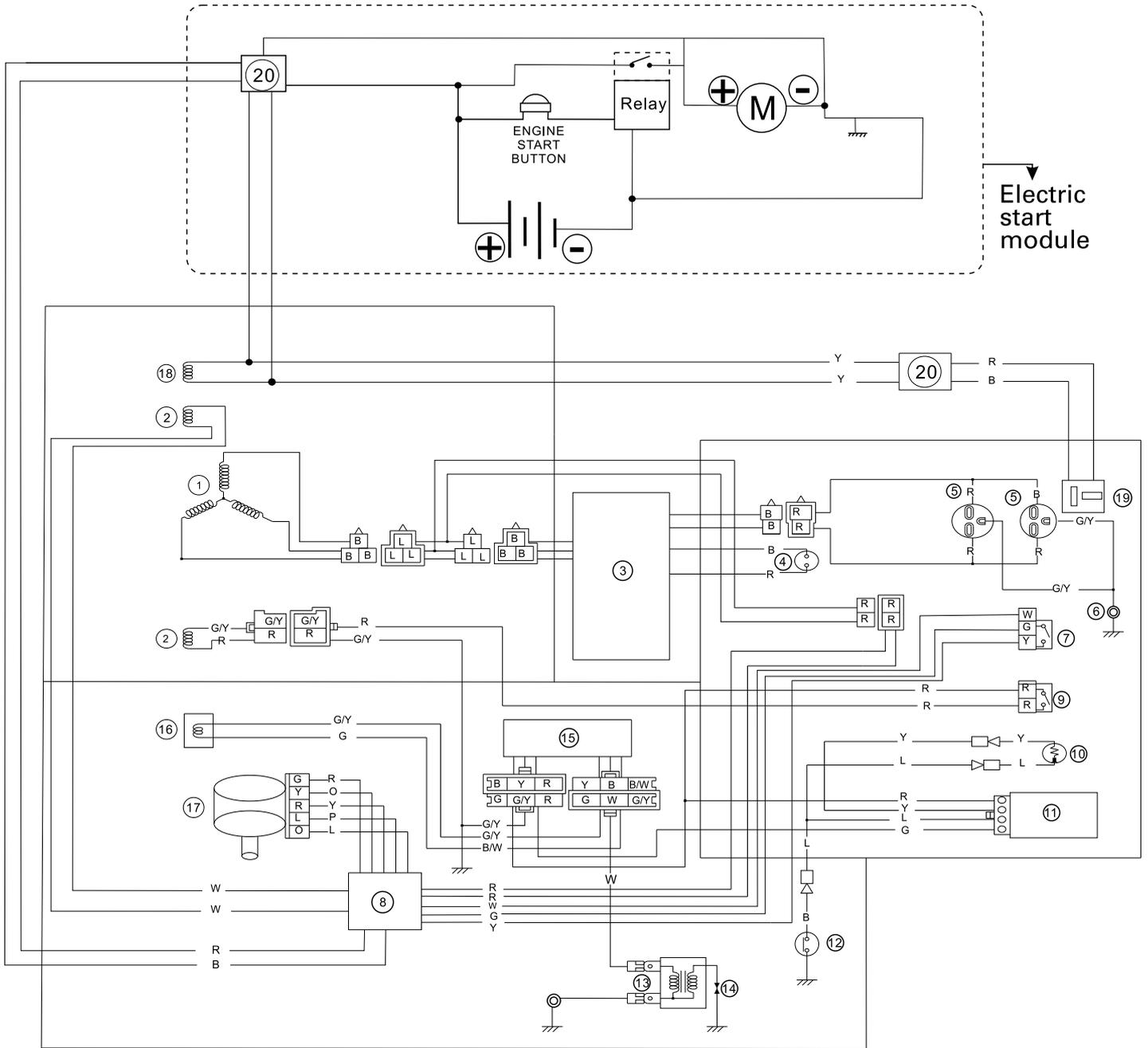
CHARACTERISTIC

AUTOMATIC RELEASE PRESSURE	YES
ELECTRO-BREAKER	YES
FUEL LEVEL GAUGE	YES
ENGINE Oil WARNING LIGHT	YES
OVERLOAD INDICATOR LIGHT	NO
AC INDICATOR LIGHT	YES
ENERGY CONSERVATION CURRENT IDLING	YES
INSULATION CLASS	E

THE FLUCTUATION OF VOLTAGE & FREQUENCY

INSTANTANEOUS	25%
STABLE STATE	?2%
STABLE TIME (second)	3 sec. max.
FREQUENCY stability	? .01%

BOLIY Pro 3600Si & 3600Si/E DSP INVERTER GENERATOR WIRING DIAGRAM



Color code

B - Black
 G - Green
 L - Blue
 O - Orange
 R - Red
 W - White
 Y - Yellow
 P - Pink
 B/W - Black/White
 G/Y - Green/Yellow
 W/L - White/Blue

- | | |
|---|---------------------|
| 1 - Main coil | 13 - Ignition coil |
| 2 - Sub coil | 14 - Spark plug |
| 3 - Control unit | 15 - AC-CDI unit |
| 4 - AC indicator light/
Overload indicator light | 16 - Pulsar coil |
| 5 - AC receptacle | 17 - Stepping motor |
| 6 - Ground (Earth) terminal | 18 - Charge coil |
| 7 - Economy Control Switch | 19 - DC receptacle |
| 8 - Step Motor controller | 20 - Ballast |
| 9 - Engine switch | |
| 10 - Oil warning light | |
| 11 - Oil warning unit | |
| 12 - Oil level gauge | |

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 BOLIY or BOLIY-recommended parts and lubricants or their equivalents. Parts that do not meet BOLIY 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 an 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

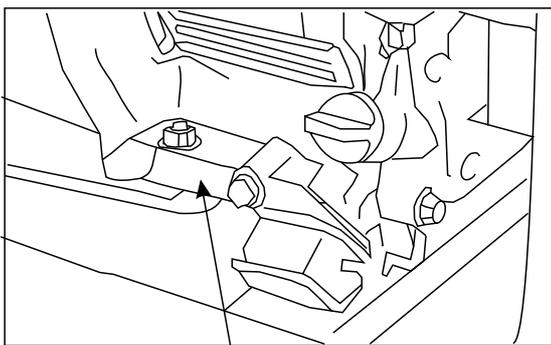
2.5 Serial number location

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

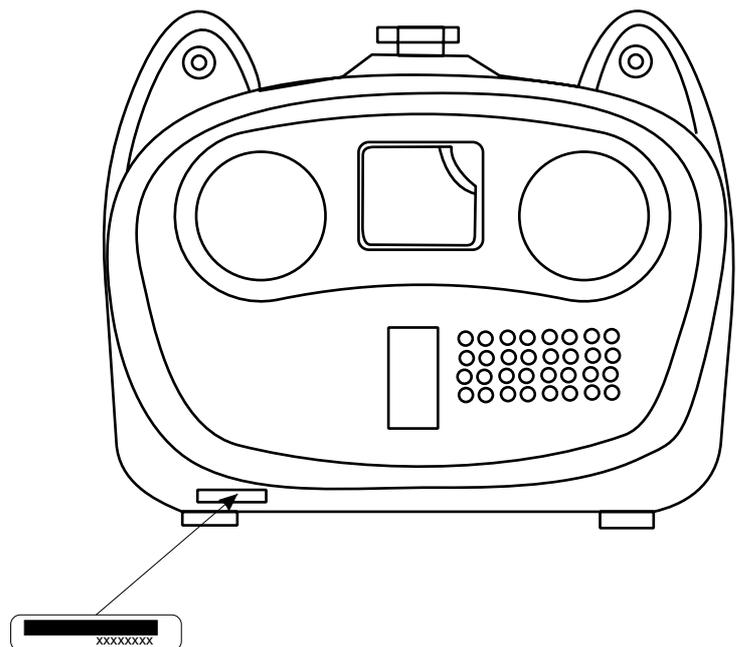
One engine serial number-one machine bar serial number

Engine serial number

Machine bar serial number



Engine serial number



Machine bar serial number

2.6 Maintenance standards

Engine

Part	Item	Standard(mm)	Service limit
Cylinder	Sleeve I.D.	66.02~66.04	66.15
Piston	Skirt O.D	67.97~67.99	66.67
	Piston-to-cylinder clearance	0.040~0.060	0.12
Piston pin	O.D	15.990~16.000	.15.95
	Pin-to-piston clearance	0.002~0.018	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
Connecting rod	Small end I.D	6.006~18.017	16.07
	Big end I.D	28.015~28.025	28.07
	Big end oil clearance	0.046~0.060	0.12
Crankshaft	Crank pin O.D.	27.960~27.975	27.90
Valve	Valve clearance Intake	0.1?2	
	Exhaust	0.15?2	
	Stem OD Intake	5.46~5.48	5.35
	Exhaust	5.45~5.47	5.35
	Vessel I.D Intake/Exhaust	5.500~5.518	5.56
	Clearance of valve and vessel Intake	0.020~0.058	0.1
Valve spring	Free Length Intake/Exhaust	26.8	25.5
Camshaft	O.D	14.966~14.984	14.92
Crankcase cover	Camshaft Bearing I.D.	15.000~15.027	15.05
Cylinder block	Valve lifter I.D.	8.000-8.015	8.06
	Camshaft Bearing I.D.	15.000*15.02	15.05
Spark plug	Clearance	0.6~0.8	
Ignition coil	Resistance Primary side	0.6~1.1ohm	
	Second side	15~19ohm	
Starting relay	Resistance	0.25~0.5	

Generator

Part	Item	Type	Standard	Service
			120V	Limit
Ignitioncoil	Resistance	Yellow/Green-Red	0.7~0.85	~
Outerchargingwindingcoil	Resistance	Yellow-Yellow	0.35~0.45	~
ECONfeedback windingcoil	Resistance	White-White	0.2~0.3	~
Controlfeedback	Resistance	Yellow-Yellow	0.4~0.45	~
Mainwindingcoil	Resistance	Blue-Blue	0.8~1.0	~

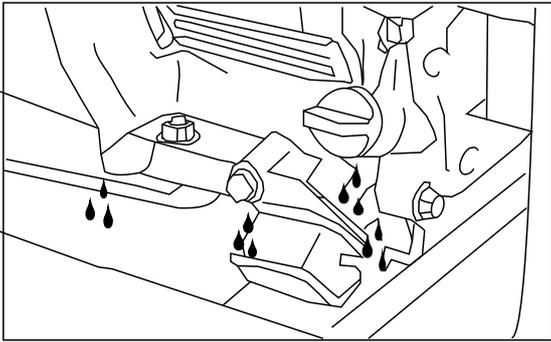
3 MAINTENANCE

3.1 Maintenance schedule

Item	Attention	Each use	First month or 20 Hrs.	Every 3 months or 50Hrs.	Every 6 months or 100 Hrs.	Every year or 300 Hrs.
Spark plug	Clean-Adjust			*		
Valve clearance	Check-Adjust					*
Crankshaft System	Check					*
Idle Speed	Check-Ajust					*
Exhaust System	Check Replace	*				
Engine oil	Check Replace	*	*		*	
Air cleaner	Check-Replace			*		
Fuel cleaner	Check				*	
Fuel pipe	Check Replace	*				
Chock	Check	*				
Cooling System	Check					*
Start system	Check	*				
Clean engine carbon	Clean					*
Generator	Check light	*				
Assembly Part	Check				*	

3.2 Engine Oil

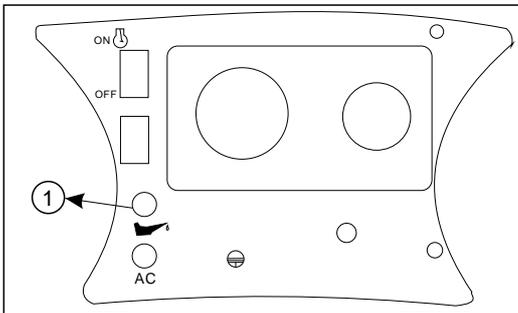
Check Engine Oil leak



Check the engine whether or not have leak oil.
If leak replace gasket, or oil seal or O ring.

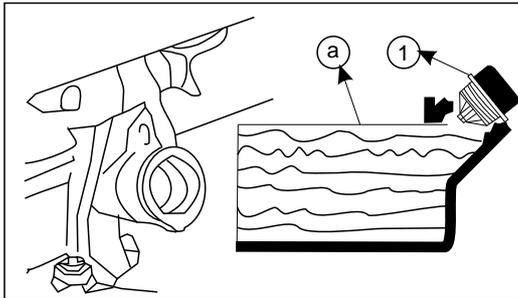
A. Checking Oil Level

Engine should be shut off and generator be on level ground when checking the oil level.



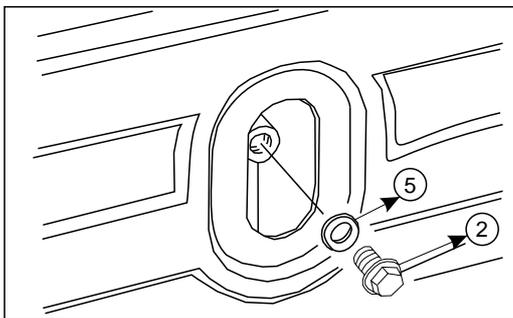
1. Check engine oil level and oil warning light
When start whether or not the light ray.

Light ray- add oil
No light ray- ok



2. Remove the oil dipstick, Add the proper viscosity engine oil to the upper limit if oil level is low. Be careful to over fill.

B. Changing engine oil



- (1) Remove the bottom oil screw and unscrew oil drain plug to drain used oil.
- (2) Replace the drain plug and secure tightly.
- (3) Add the proper viscosity oil to the upper oil limit level.
- (4) Reinstall the dipstick and screw it tightly

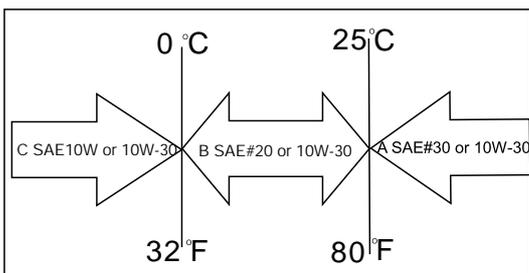


17Nm(1.7 m.kg , 12 ft.lb)

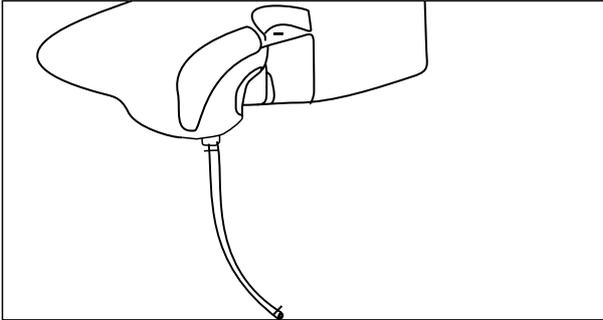


Engine
A SAE#30 or 10W-30
B SAE#20 or 10W-30
C SAE10W or 10W-30

0.6L (0.53imp qt 0.63 US qt)



3.3 Fuel leak

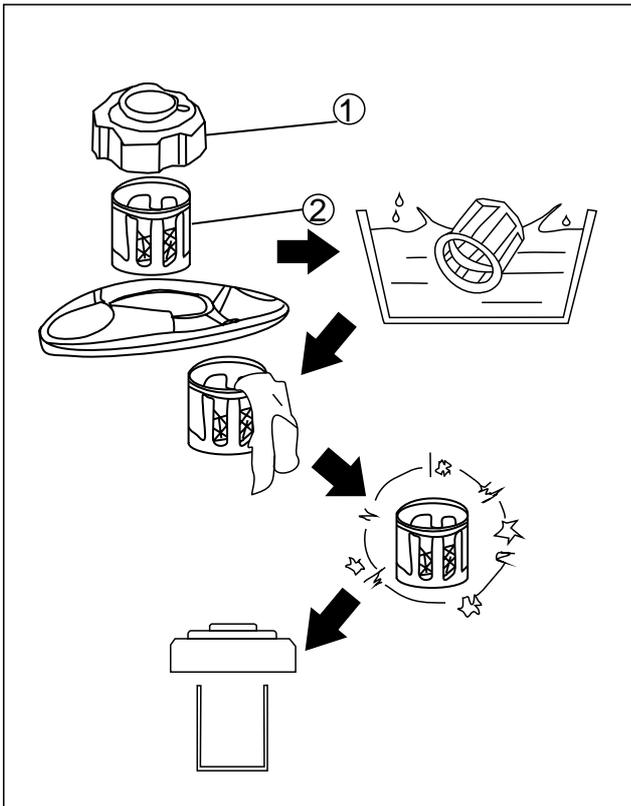


1 Check

Check fuel tank, fuel switch, fuel pipe and carburetor.

Caution:

Every 2 years replace the fuel pipe and fuel filter.



Caution:

No fire when you clean it.

1. Take off hat.
2. get the strainer

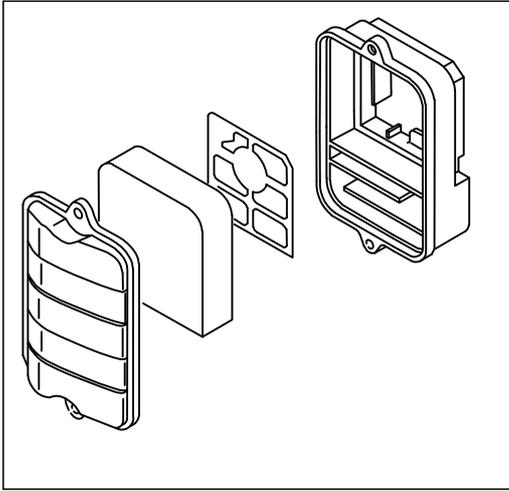
Check strainer

Damage-replace

If ok-Clean it.

Remark: You'd better use impregnant clean it then for dry.

3.4 Air Filter Maintenance

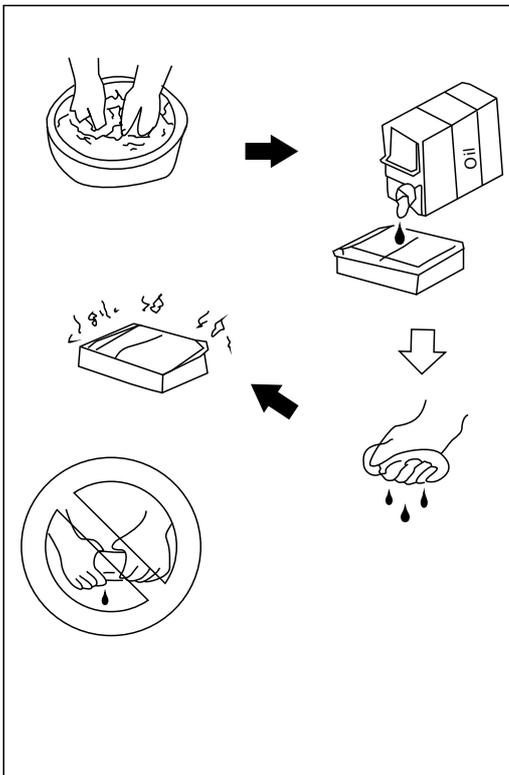


(1) Open the service door.

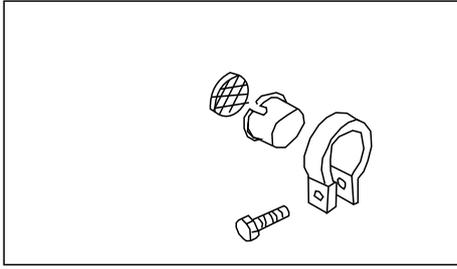
(2) Open the cover of air filter and take out the filter element.

(3) Blow the inner side of filter element using compressed air or lightly knock it to remove dirt. If any dirt remains, change the element. Be sure to use a genuine Kipor element to maintain a proper seal and avoid engine damage.

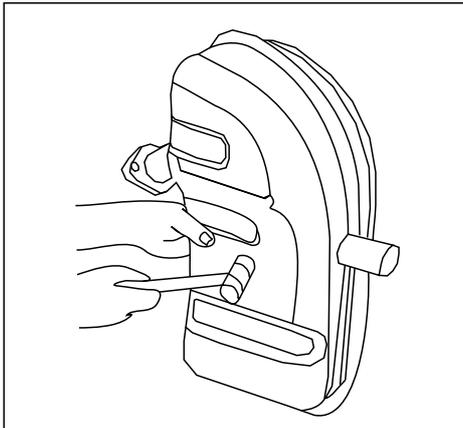
(4) Reinstall the filter element and close the service door.



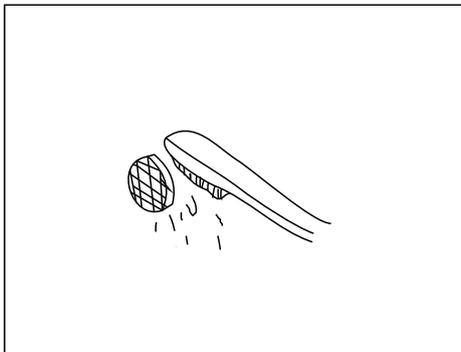
3.5 Exhaust



1. Take off
Wire netting, collar clamp, and bolt etc.



2. remove carbon dust.
The exhaust as picture method to knock.



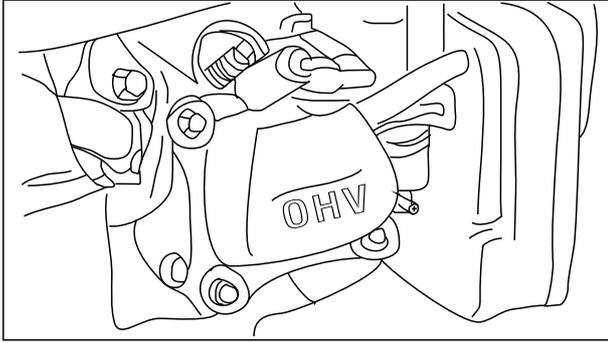
3. Clean the wire netting.

Waring: Don't use metal silk for clean. That will damage the material.

3.6 Adjusting valve clearance

Attention

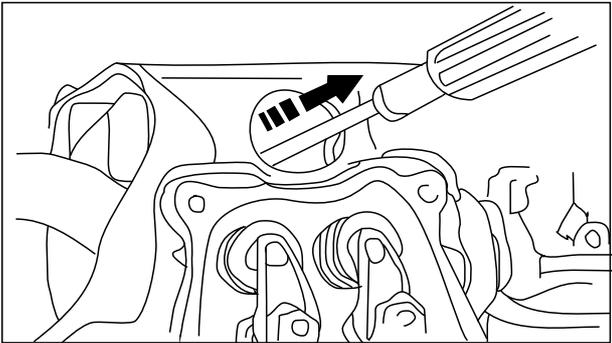
Valve adjustment should only be performed on a cool engine.



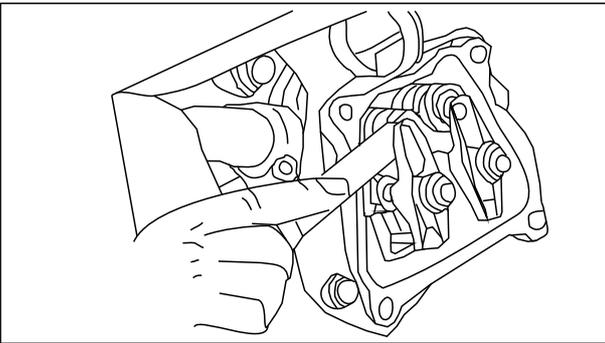
(1) Remove back case, then take off valve cover.

(2) Pull the starter rope gently and set the piston in top dead center (Use a stick in the spark plug hole measure the depth).

(3) Insert a feeler gauge into the gap between rocker and valve to measure the valve clearance.



Valve Clearance	
Intake:	0.1mm(0.004 in)
Exhaust:.	0.1mm (0.004in)



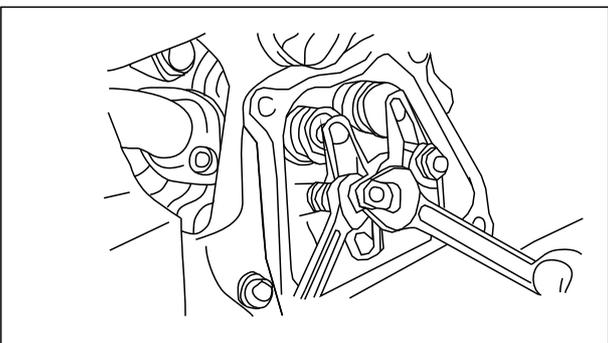
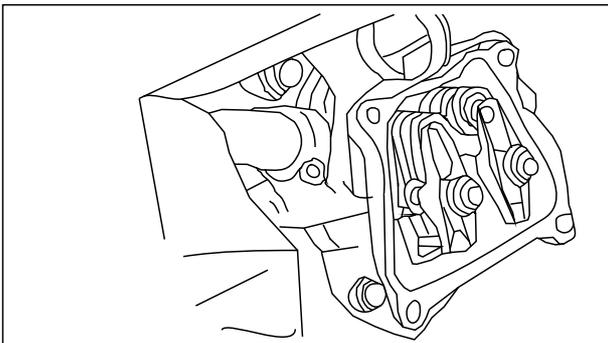
(4) If adjustment is necessary, proceed as follows:

a. Hold rocker axis using the wrench and loosen the lock nut.

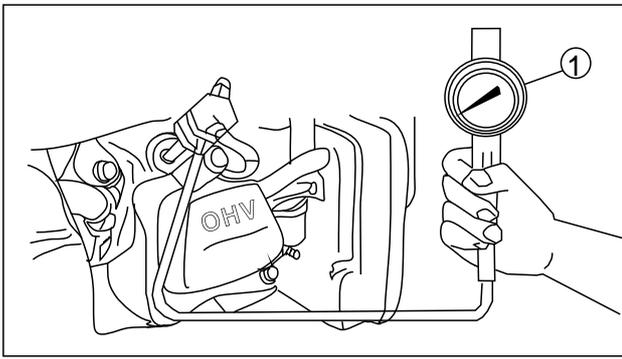
b. Loosen the lock nut of rocker axis to gain the specified intake and exhaust valve clearance.

c. Hold rocker axis using a wrench and tighten the lock nut.

d. Check the clearance of valve after adjustment.



3.7 compress pressure



Remark:

When finish adjust Valve Clearance, then measure the compress pressure.

1. For running few mins.
2. Remove spark plug.
3. Use manometer and adapter for measure.

Manometer

Adapter

Measure:

Measure pressure you need pull the starter when the pressure finger stop, read the NO..

The standard: 400-600kpa (4-6kg/cm³, 57-85 psi)

Waring:

When start engine, spark plug need connect for ground, that no spark.

Measure step (At lowest level):

dripping little engine oil for cylinder, then mesure the compress pressure.

Reading	Estimate
Low than no oil	Cylinder, piston or piston rings are wear and tear.
The same with no oil	Piston, piston rings, valve, Cylinder gasket fail. Or need adjust valve clearance.

Measure step (At high level):

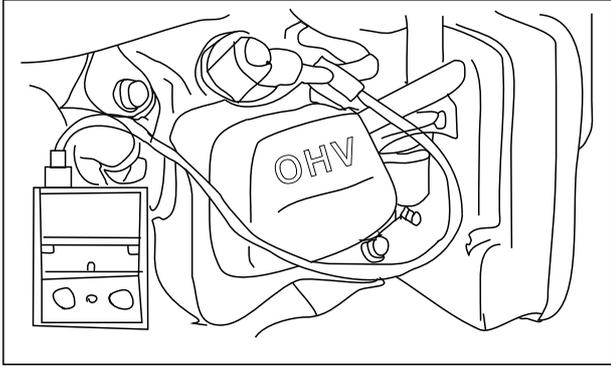
Check cylinder, valve and piston whether or not have carbon dirty.

Build in the spark plug:



18Nm (18M.kg, 13ft.lb)

3.8 Rating speed



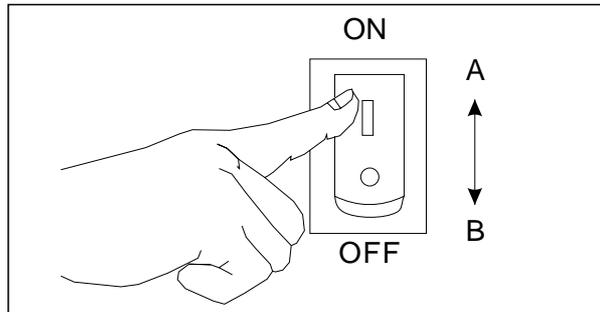
Frist connect the speed meter

Accord with standard speed = right

If not right please check chapter3. for repair.

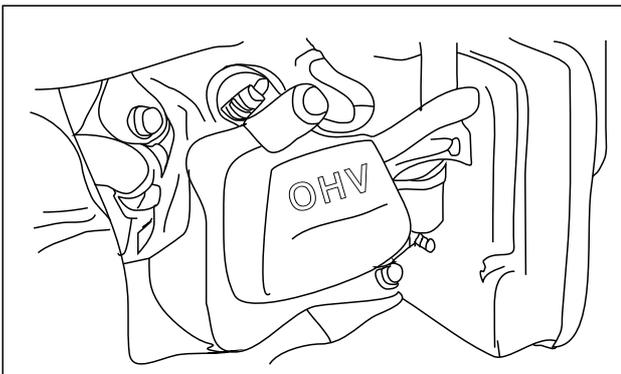
Check step:

- 1) Start engine (0% load)
- 2) Turn to off ECON switch.
- 3) Measure the speed.



3800-3950r/min

3.9 Hose



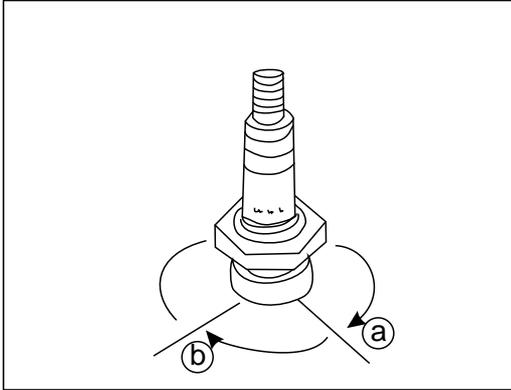
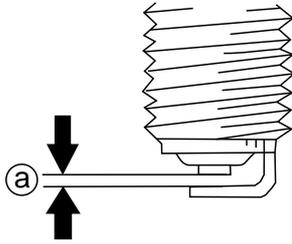
1.Check:

Hose

Crack/- Replace.

No good connect- Adjust

4.0 Spark plug



Attention

Check the cylinder position should only be performed on a cool engine.

When you take off the spark plug must keep no durity into engine.

1. Take off the spark plug and spark cap.

take off the spark plug.

2. Check electrode

Bad-replace

dielectric- color

3. Measure

Spark plug clearance

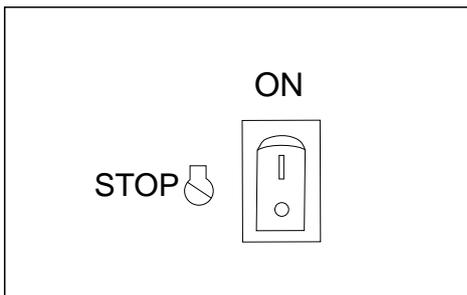
Ues thickness tool.

No standard- Adjust

Spark plug clearance 0.7-0.8mm

If need for clean, please use cleaner for clean

Standard spark plug BPR4ES(NSK or F7RTC)

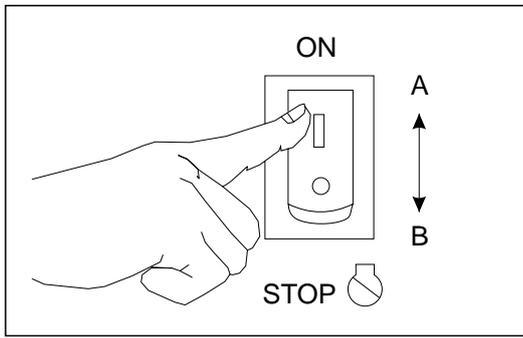


4.1 Check engine switch.

Turn to witch for "ON" If start that's ok.

Turn "off" , the engine stop -ok.

4.2 ECON switch



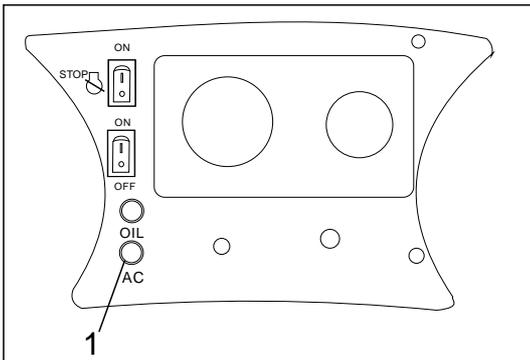
Check step:

When switch "ON"

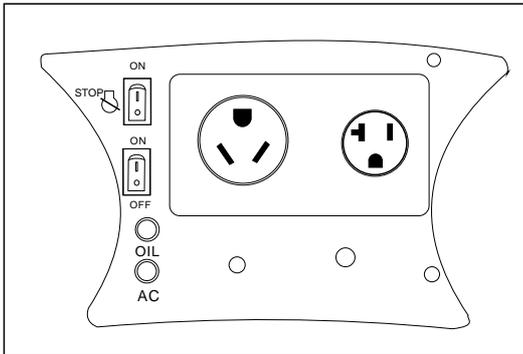
Start engine

When turn to "OFF" Check the engine speed.

4.3 Check electric components



Start the engine pilot lamp(1) for illume.



AC plug.

If bad-replace

4.4 Troubleshooting

Section 1- Fuel related problems

1. Fuel leak
2. Fuel flow
3. Stepping motor

Section 2- Generator won't start

1. No Start, Cranks, has spark & fuel.
2. Choke pin

Section 3- No Start, no spark.

1. No Start, Cranks, has no spark.
2. Low oil switch
3. Ignition winding
4. Ignition coil

Section4- No AC Output (Inverter series)

1. No AC
2. No DC

Section5- ECON Switch failurel.

- 1.High Speed, Ingition be disconnected,ECON switch failurel.

Section6-The controler box failurel.

- 1.The engine can not chang speed. The the step motor no control.

Section 1-

1- Fuel Leak

For the Pro3600Si/Pro3600SiE, it could be the valve or it could be the tank leaking between the plastic tank. Both are replaceable. Determine which is leaking and either part is replaceable.

For all generators, check all fuellines, valve, and carburetor.

2- Fuel Flow. Open the drain screw on the bottom of the carburetor, do you get a steady flow of fuel? If so, there is no blockage. If no fuel flow, blockage may be the case. It is possible that you have a partial blockage which allows fuel to flow to the carb, giving the appearance of a steady supply, when in fact it is there but is not enough to meet the demand of the engine. Check for kinks in the fuel line.

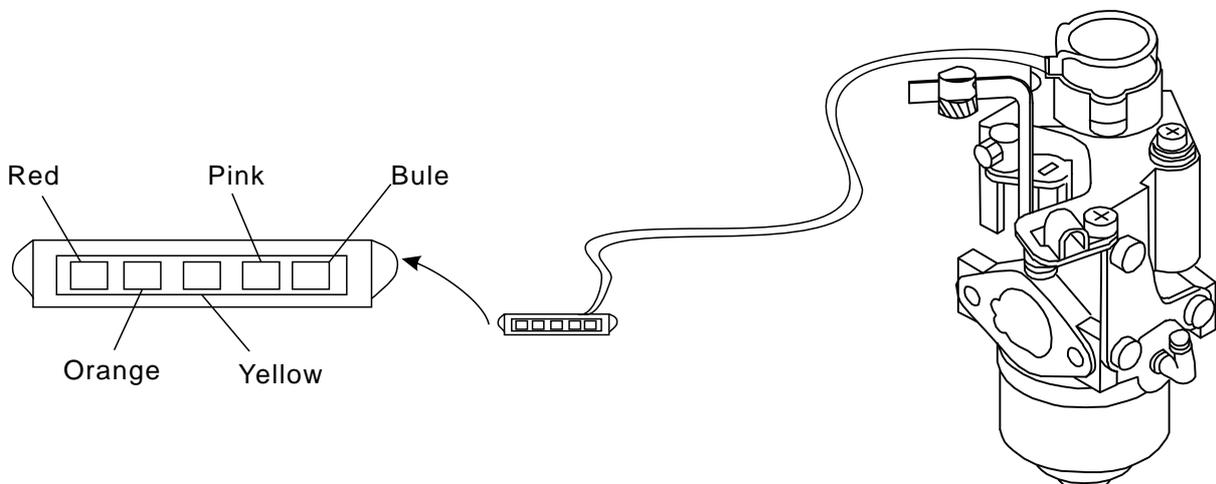
It is also possible that there is a blockage in the carb. Try removing the bowl on the bottom of the carb and then removing the float and turning on the fuel. This will allow fuel to flow freely thru the carb. This is a very simple process. However, it may be easier to remove the carburetor first. Be careful to not damage the gasket. Clean the parts and replace them and try again to see if the unit will run properly. It could also be a plugged fuel filter. For the generator you have to take the fuel valve off and it should come out attached to the valve.

3- Stepping Motor (Electric Throttle Actuator) Does the stepping motor respond when the inverter module is trying to change the engine speed when more load is applied? Does the stepping motor try to adjust the carb and is unable to or does the carb respond properly to the stepping motor but it still makes no difference? Depending on your answer, it could be the stepping motor or the carb. It manually might free connect up.

Measuring the resistance of stepping motor leading wires

Specified resistance:	Red and Orange	200
	Red and Yellow	200
	Red and Pink	200
	Red and blue	200

Replace the stepping motor if the resistance value exceeds the specified range.



Section 2-

1-No Start, Cranks, has spark & fuel.

2- Choke pin. It's possible that the choke pin that fell out. Look under the choke plate for a pin operating the choke mechanism. If not, change the choke plate and the choke cable.

Section 3-

1- No Start, Cranks, has no spark.

Do you hear a click when you turn the engine switch to on?

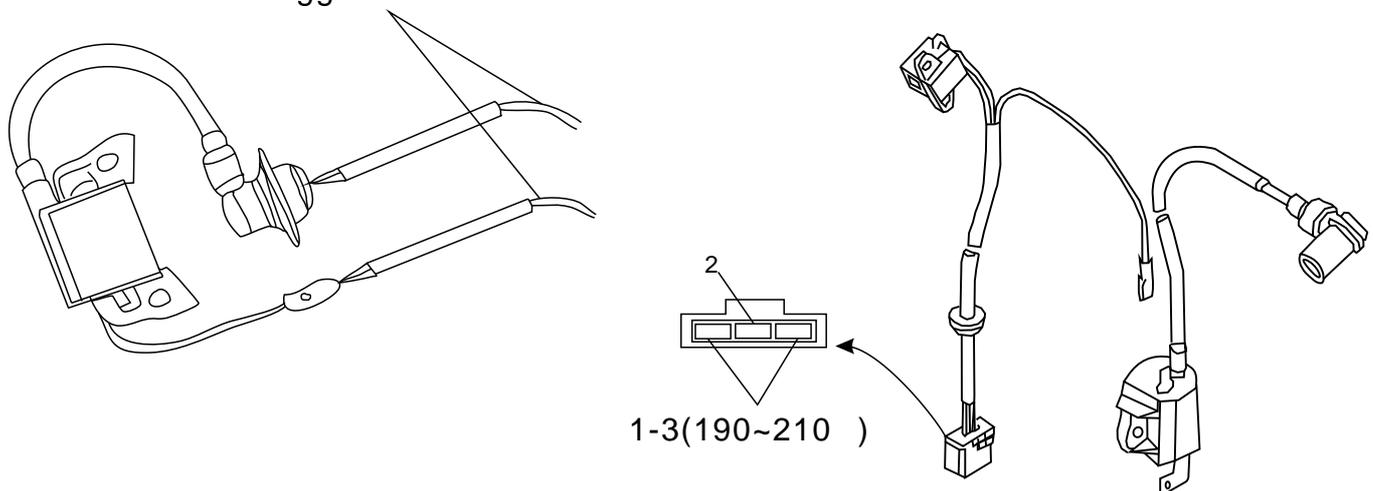
If no, the micro switch is not operating properly. It could be a wire stopping it from moving or could be dirty. Clean with a non flammable pressurized cleaner like electrical contact cleaner. If it still doesn't operate, change the micro switch.

2- Low Oil Switch. It could be the low oil switch if the low oil light is coming on and the unit will not start. The oil switch might be stuck. 1- Check the oil level. 2- Unplug the oil switch and run the engine for 2 minutes. 3- Reconnect the oil switch with the engine running. 4- Check for a damaged wire (shorting to ground).

3- Ignition Windings. It could be the ignition system. Remove the control panel you will see 4 pin connector. Yellow/Green-Red 0.7~0,85 .

5- Ignition Coil. To check the primary side of the ignition coil, check continuity between ground and blue wire. To check the secondary side of the ignition coil, unplug the spark plug wire and check continuity between the blue wire and spark plug wire. There should be a reading between 12.0 and 20.0 k-ohms. If either or both of these are faulty, there could be a loose wire or bad ignition coil. (2 should to background)

Resistance of trigger 15~20



Section 4-

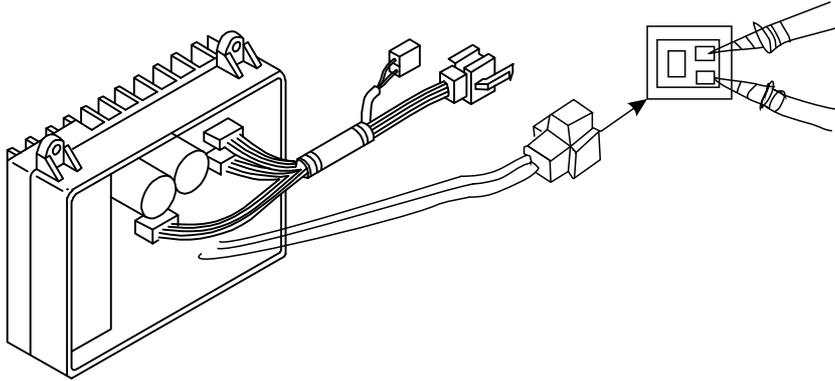
1- No AC Output (Inverter series)

This could be a loose wire from the inverter to the receptacles. Check to see if the red and black wires are securely plugged in and the wires are securely attached to the receptacles.

Check 3pin blue connector. the reading should be 0.8~1ohm. The voltage should be 160~220V.

2- No DC out put

Check the Protector switch, Keep the "ON", If ok, please check the DC wire connector.



Section5-

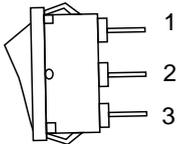
1.High Speed, Ignition be disconnected, ECON switch failure.

Open the control panel. Check ECON switch connector whether or not ok.

1-White wire

2-Green wire

3-Yellow wire

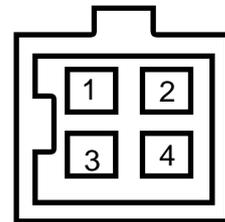


In the control panel. Check 2 pin connector (Red wire) .The reading should be 0.8~1.0 ohm. the rated voltage 170V~230V.

Check feedback signal 4 pin connector (From generator fan-out).

1-2 White wire 0.2~0.3 ohm rated voltage 12~16V(AC)

3~4 Yellow wire 0.4~0.45 ohm rated voltage 85~145V(AC)



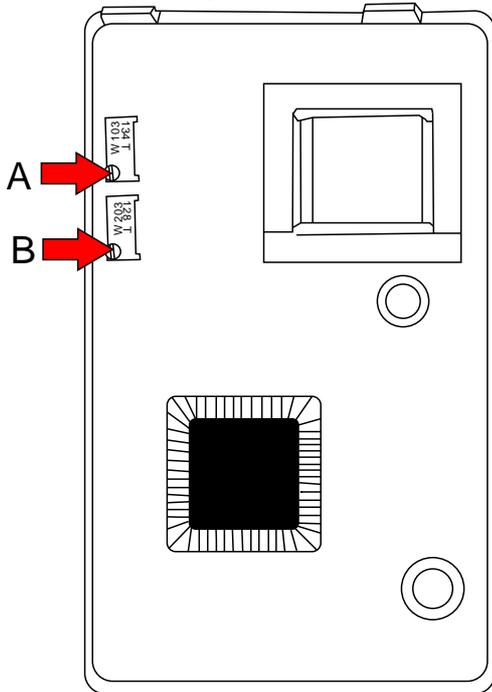
If the reading accord with above data. Please replace the controller.

Section6-The controller box failure.

1.The engine can not change speed. The step motor no control.

Method:

Adjust controller (120V / 60Hz)



A is ECON=OFF adjust knob, when ECON=OFF, the three -phase voltage reading is AC 210V± 5V, in clockwise to increase the voltage, in counter-clockwise to reduce the voltage.

B is ECON=ON adjust knob, when engine at low speed idle the three-phase voltage reading AC 170V±5V, in clockwise to increase the voltage, in counter-clockwise to reduce the voltage.

Why need adjust the controller box?

The machine can normally for running, but the noise is not smooth or output voltage is not steady, under this circumstance, the machine need to adjust the control box.

1. When need to adjust **A** knob?

When the machine is with 100% load, and then shift the ECON switch from ECON=ON to ECON=OFF, if you feel that the engine speed and the three -phase voltage reading figure have big difference , need to adjust the **A** knob.

Adjusting method:

When the generator is with 100% load, please take the ECON=ON as the base normal three -phase voltage 150V-155V, and then swift to ECON=OFF, if the three-phase voltage is not in the range of 150V-155V, please turn the **A** knob in clockwise to increase the voltage, or turn the A knob in counter-clockwise to reduce the voltage.

In one word, in the normal condition do not need adjust the **A** knob.

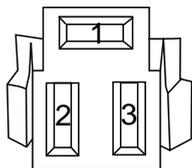
2. How to adjust **B** knob? (Mainly for adjust B knob)

1)Runing the machine.

2)Measure blue wire connector:

The three -phase voltage reading need 170V(0% load ECON=ON). When ECON=OFF The the three -phase voltage reading will about 200V.

The three -phase voltage reading need 150~155V (100% load ECON=ON, ECON=OFF are the same reading) .



1-2, 1-3, 2-3 the voltage reading about 5V error.

The three -phase voltage so low or error large can cause the output voltage low.

3) Adjust method:

In the Step motor control module have **B** knob, That can change the three -phase voltage. Clockwise is to low & counter-clockwise is to high.

Three -phase voltage, please according as follow:

1) When on: 0% load the voltage about 170V. (ECON=ON)

2) When on: 100% load the voltage about 150~155 V. (ECON=ON, ECON=OFF)

Ilf adjust have no effect Please change a new one.