Owner's Manual

Air-cooled Standby Generators

⚠ CAUTION!

⚠ NOT INTENDED FOR USE IN CRITICAL LIFE SUPPORT APPLICATIONS.

⚠ ONLY QUALIFIED ELECTRICIANS OR CONTRACTORS SHOULD ATTEMPT INSTALLATION!

⚠ DEADLY EXHAUST FUMES! OUTDOOR INSTALLATION ONLY!

☐ **BNL10SE**

Procedure before starting

1. Add oil 1.5L on the oil gauge and the lower scale and check before starting;
2. Gas pressure 1.7-3.5KPA, pipe diameter > 16mm(when the fuel is NG, the fuel conversion valve is in the NG position, when the fuel is LPG, the fuel switch is in the LPG position);
3. Connect the battery to the positive terminal (+) with a red line and the battery to the positive terminal with a black line The line is negative (-);
4. Connect the AC output load line U/N(U/V/W/N). The black pile head N is the neutral line.
5. Ground the generator.
6. Open the emergency stop switch, power switch, disconnect the circuit breaker;
7. Manual start: Press the red reset button on the panel and press again
Manual button on panel (MAN) Green start button on panel;
8. The unit will start again after 1 minute of no-load operation, the circuit breaker is in ON position for use;
9. Stop: disconnect the no-load operation of the circuit breaker;
Press the red reset (STOP) key to stop and turn off the power switch

ATS connection method

1.Connect ATS box, mains and power generation and load pile head;
2. Insert the ATS plug into the generator ATS socket;
3.Put the break protector as open position;
4. Press the panel auto button to enter the automatic mod

Table of Contents

INTRODUCTION

Thank you for purchasing our products. The generator set is approved for use in stationary applications in locations served by a reliable utility power source.

Read this manual and carefully follow all procedures and safety precautions to ensure proper equipment operation and to avoid bodily injury. Read and follow the Safety Precautions and Instructions section at the beginning of this manual.
If any portion of this manual is not understood, contact the nearest Dealer for starting, operating and servicing procedures.

For professional advice on generator set power requirements and conscientious service, please contact your nearest distributor or dealer.

SPEC OF GENERATOR SET

1.1 Technical feature of the generator set

This gas generator is multi-fuel drive uses an optimized dedicated multi-fuel engine. According to our standards, we have designed this unit in a simple and environmentally safe, and user friendly means:

Speed Regulating System: The gas uses an internally designed electronic speed control system, allowing for quick and easy adjustments to the engine speed that can be stabilized to specific speed ranges. This control system allows the engine to run more smoothly and respond quickly to sudden increases or decreases in required engine speeds.

Silent Air In-take System: Extra large air intake cross-sections in the housing enclosure ensure ample air flow and engine in-take. This unique housing enclosure structure leads to a significant reduction operating noise.

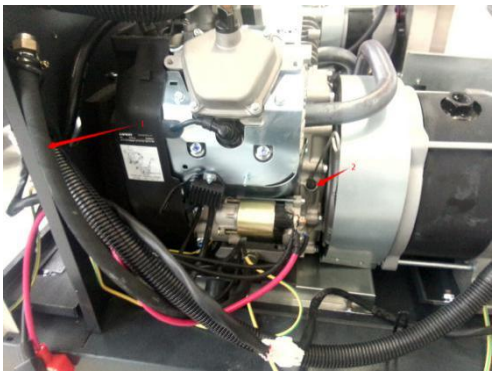
Automatic Transfer Switch Function: These units are Automatic Transfer Switch compatible which will automatically, without personal involvement, start the generator, and produce the required power needed up .

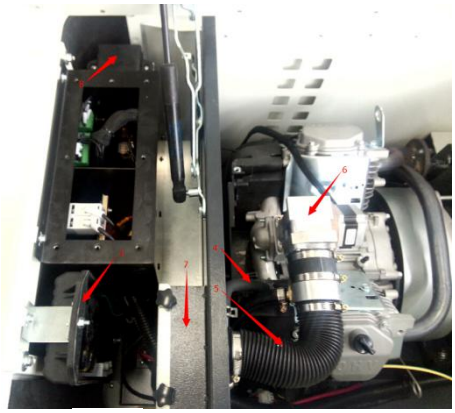
Intelligent Hazard Control System: the use of our Intelligent Hazard Control System function warns of hazardous engine or generator conditions. This system continually checks and monitors the units operating conditions and will automatically shut the unit down to help avoid hazardous and costly damage can happen. The system uses and visual control panel that can preset according to the user's needs.

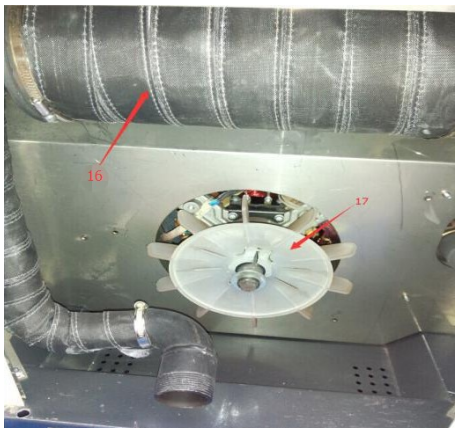
1.2 Main spec

Please review the below detailed spec chart of generator.

1.3 Main Components



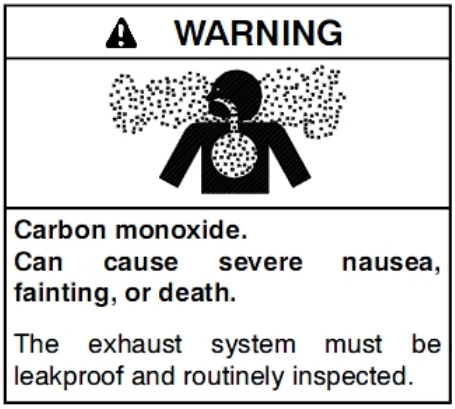




1. Oil drain
2. Dipstick
3. AVR
4. Exhaust pipe
5. Air filter pipe
6. Actuator components
7. Air filter box
8. Fuse
9. Control panel
10. Switch
11. Circuit breaker
12. Socket
13. Emergency stop
14. ATS terminal
15. Load outlet
16. Muffler
17. Fan

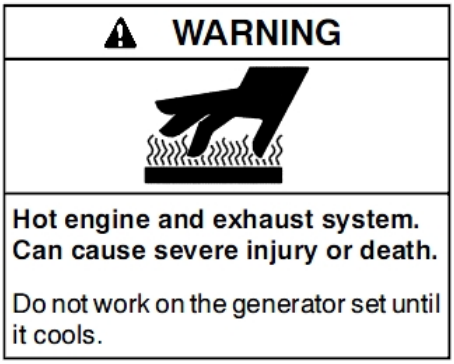
Safty Rules

2.1 Precautions



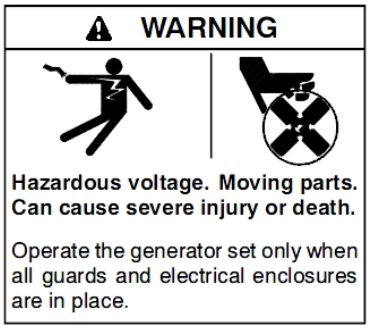
Generator set operation. Carbon monoxide can cause severe nausea, fainting, or death. Carbon monoxide is an odorless, colorless, tasteless, nonirritating gas that can cause death if inhaled for even a short time. Avoid breathing exhaust fumes when working on or near the generator set. Never operate the generator set inside a building. Never operate the generator set where exhaust gas could seep inside or be drawn into a potentially occupied building through windows, air intake vents, or other openings.

The fuel system. Explosive fuel vapors can cause severe injury or death. Vaporized fuels are highly explosive. Use extreme care when handling and storing fuels. Store fuels in a well-ventilated area away from spark-producing equipment and out of the reach of children. Never add fuel to the tank while the engine is running because spilled fuel may ignite on contact with hot parts or from sparks. Do not smoke or permit flames or sparks to occur near sources of spilled fuel or fuel vapors. Keep the fuel lines and connections tight and in good condition.

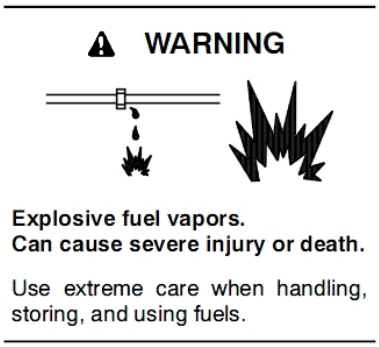


Servicing the exhaust system. Hot parts can cause severe injury or death. Do not touch hot engine parts. The engine and exhaust system components become extremely hot during operation.

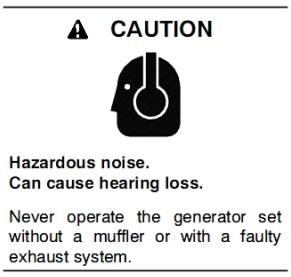
Servicing the engine heater. Hot parts can cause minor personal injury or property damage. Install the heater before connecting it to power. Operating the heater before installation can cause burns and component damage. Disconnect power to the heater and allow it to cool before servicing the heater or nearby parts.



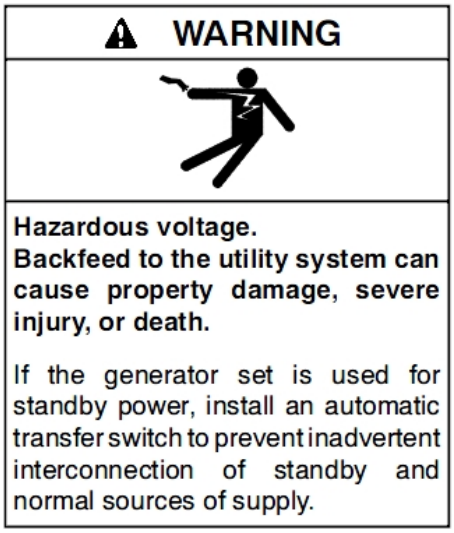
Grounding electrical equipment Hazardous voltage can cause severe injury or death. Electrocution is possible whenever electricity is present. Ensure you comply with all applicable codes and standards. Electrically ground the generator set, transfer switch, and related equipment and electrical circuits. Turn off the main circuit breakers of all power sources before servicing the equipment. Never contact electrical leads or appliances when standing in water or on wet ground because these conditions increase the risk of electrocution.



Gas fuel leaks. Explosive fuel vapors can cause severe injury or death. Fuel leakage can cause an explosion.



Engine noise. Hazardous noise cancause hearing loss. Generator sets not equipped with sound enclosures can produce noise levels greater than 105 dBA. Prolonged exposure to noise levels greater than 85 dBA can cause permanent hearing loss. Wear hearing protection when near an operating generator set



Short circuits. Hazardous voltage/current can cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment. Electrical backfeed to the utility. Hazardous backfeed voltage can cause severe injury or death. Install a transfer switch in standby power installations to prevent the connection of standby and other sources of power. Electrical backfeed into a utility electrical system can cause severe injury or death to utility personnel working on power lines.

2.2 Operating system

Panel System

1.Panel
2.Power switch
3.Gas switch
4.Stop button
5.Manual button
6.Start button
7.Data checking
8.Data checking

Emergency stop

When an emergency occurs, immediately press the Emergency Stop Switch. The unit will immediately stop running. Once the switch has been depressed and the emergency has passed, to re-start the generator unit,

rotate clockwise 90 ° to pop up into the normal operational position.

Use： When starting manually, always start the generator before placing the circuit breaker in the ON position. Likewise, when operating manually, place the circuit breaker in the OFF position before shutting the generator down.

2.3 Prestart preparation

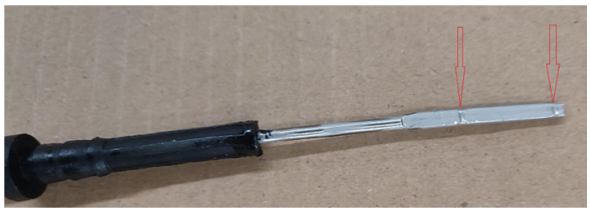
All necessary installation and maintenance shall be conducted by authorized personnel.
Check all items in the following before running it for the first time.

Engine Oil.

Fill, if necessary, with the recommended viscosity and grade of oil. Or it cause damage on engine. Use the following recommended or similar engine oil

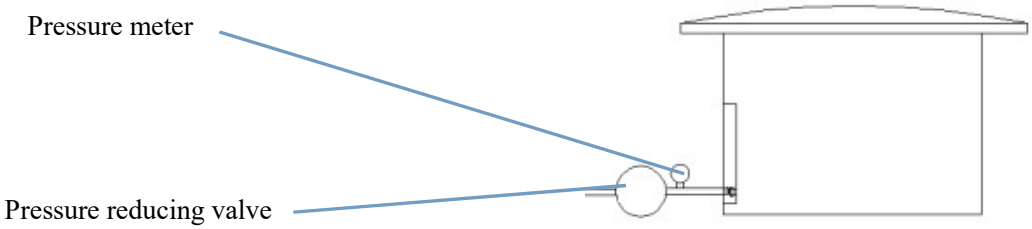
Ambient temperature	**Oil grade（optional）**
-30℃～0℃	5W/30　10W/30
0℃～30℃	10W/30　15W/40
30℃ above	15W/40

- Put the funnel at engine oil inlet, keep not leans
- When first time operation a new unit, 1.4 0il should be added.
- Check the oil gauge, the oil level should keep at top center of two lines



Liquid propane (LP Vapor)

In engines set up to run on Liquid propane, please check the fuel supply pressure, lower or higher pressure range will result in equipment failure. Inlet pressure 1.7kPa to 3.5kPa, and the gas pipe shall be not longer than 5m, the inner diameter shall not be less than 16mm.



It’s strictly prohibit to remove the high pressure pipe when in maintenance. You must make sure there’s no leakage before use. If there is no special equipment, you can use soap bubble to test the gas pipe joints. The observation time is not less than 1 minute.

According to the different gas source of users’, there may be different gas pressure arrange. Make sure of the pressure first. And provide spare parts of pressure reducing valve according to users’ different needs. You need to use the pressure reducing valve if the pressure is excessively large. The tools such as pressure gauge are by the users to provide.

Natural Gas

In engines set up to run on natural gas, please check the fuel pressure and flow, or purchase a pressure reducing valve if your fuel supply is with higher pressure.

CAUTION. After installation, users are not allowed to change the gas type. If users want to change the gas type (NG or LPG), please contact the retailer.

Electrical Connections

If the generator set is used for standby power, install an automatic transfer switch (ATS) which is provided by us to prevent inadvertent interconnection of standby and normal sources of supply. Shut down the generator set before servicing the equipment. Never contact electrical leads or appliances when standing in water or on wet ground because these conditions increase the risk of electrocution.

Battery

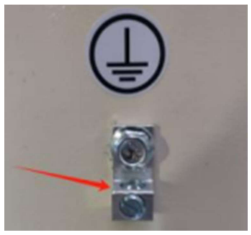
Connect battery positive (+) and negative (-) to wire positive and negative side, connect negative（-）lead last when connecting the battery. The generator set will not start and circuit board damage may occur if the battery is connected in reverse.

Before use the maintenances free batter, tested voltage ≥12.6V can be use directly; After the first time use or ＜12.6V should be re-charge then use.

For the first use, you should operate according to the steps bellow:

- Take off the red cap of battery positive.
- Use the multi-meter to check whether the voltage of battery is over 12.6V, charge the battery if the voltage is lower than this.
- Loose the positive battery clip. Put it onto the positive terminal fully and adjust the direction.
- Fasten the nut on the battery clip.
- Cover it with the red battery clip rubber.

Grounding terminal connect the generator to the ground first before using the set, do not remove the battery when generator is working.



2.4 Startup

1. Turn on the emergency stop switch
2. Turn on the power switch 2
3. Turn on the fuel switch 3
4. After 10s turn on the fuel switch; press the manual 5 on control panel
5. Press 6, unit enter into start
6. Press 7 or 8, observe the frequency, voltage, speed and the 12V working voltage as well as the operation time.
7. After the unit started then can be automatically generation (match with ATS enter into “auto” mode)

2.5 Inspection generator set when operating.

Inspect the following parts when operating.

1. Radiator (Coolant)

Let the engine cools down, and remove the radiator cap.
runs into the rubber hose after running with high temperature, please shut the generator down to resolve the problem.
Checklist：

- check for coolant leaks
- Inspect the inside and outside of the radiator to ensure no excessive dirty or dust.
- Check the cleanliness of the radiator and ensure no dust, dirty or foreign substance.
- Check the hose to ensure it is not blocked.

Exhaust color

As long as the generator engine is running within the rated output range,
The exhaust will be colorless.
If the exhaust is dark grey or black when after running for 60 seconds or more, this is an indication of a problem. Shut the engine down until the problem is corrected.

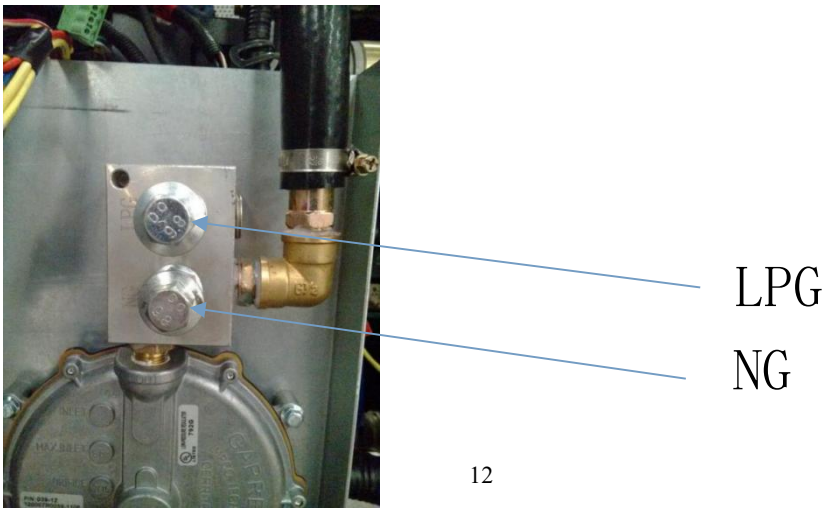
2.6 Shut the generator set down

Should a need occur to shut down the generator, shut down the electrical output first by turning the circuit breaker to the "OFF" position and depress the reset key. This will automatically shut the engine and generator down.
The generator don't need any close switch if connected with ATS system.

2.7 Fuel Conversion

Two fuel connections on the fuel block allow field conversion between natural gas and LP vapor. The fuel metering valves are factory-set and sealed to provide the best possible hot and cold starting.
Use the following procedure to convert fuel
Natural Gas and Liquid Propane (LP vapor)Conversion

- Use a pressure reducing valve to reduce LP vapor supply pressure.
- Moving the hose fitting to the natural gas or LP vapor port per the fuel which you want to use.
- Slide the hose onto the hose fitting and secure it with the clamp
- Check for leaks using a gas leak detector.



Main components

3.1 GENERATOR SPECIFICATIONS

Rated output(LPG)	KW	10	10
Rated output(NG)	KW	8	8
frequency	HZ	50	50
speed	RPM	3000	3000
Rated voltage	V	220	220/380
Rated Amper(LPG)	A	45.4	18.9
Rated Amper(NG)	A	36.3	15.1
phase		SINGLE	THREE
Power factor		1.0	0.8
Protect level		IP23	IP23
Insulation level		F	F

3.2 ENGINE SPECIFICATIONS

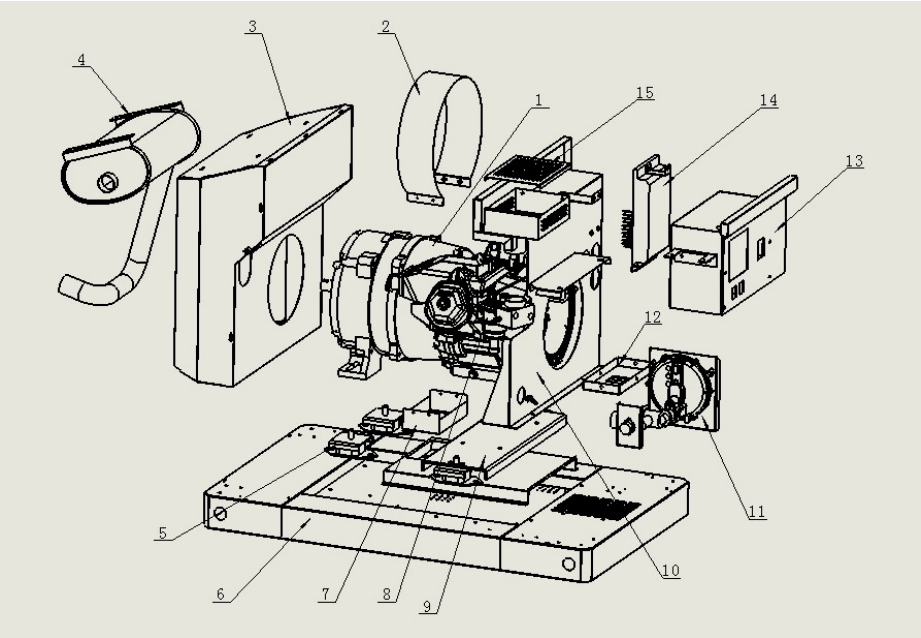
Engine	2V78
Engine type	688
Number of Cylinders	2
Horse power @ rated speed	14KW/3600r/min
Displacement	688CC
cylinder block	Aluminum w/Cast Iron Sleeve
air valve	OHV
ignition system	Ignition Module
Recommended Spark Plug	F6RTC
spark plug gap	0.70-0.80
compression ratio	8.5:1
Starter	DC12V
Oil capacity	1.4L
speed	3600
Engine power is subject to and limited by such factors as fuel Btu/joules content, ambient temperature and altitude. Engine power decreases about 3.5 percent for each 1,000 feet (304.8 meters) above sea level, and also will decrease about 1 percent for each 6° C (10° F) above 15° C (60° F) ambient temperatur	

Do not transit generator on roughness road, improper transit can cause equipment damage. Do not place generators set in slope area. Carefully unpack the generator set. Inspect closely
for any damage that might have occurred during shipment.

Unbalanced weight, improper lifting can cause severe injury or death and equipment damage.
Do not use lifting eyes.
Lift the generator set using lifting bars inserted through the lifting holes on the skid

- Install the generator on high ground where water levels will not rise and endanger it.
- Install the unit where rain gutter down spouts, roof run-off, landscape irrigation, water sprinklers or sump pump discharge does not flood the unit or spray the enclosure, including any air inlet or outlet openings.
- Where strong prevailing winds blow from one direction, face the generator air inlet openings to the prevailing winds.。
- Install the unit where services will not be affected or obstructed, including concealed, underground or covered services such as electrical, fuel, phone, air conditioning or irrigation
- The genset must be installed on a level surface. The base frame must be level within two (2) inches all around.
- Install the generator as close as possible to the fuel supply, to reduce the length of piping.

3.4 components inside

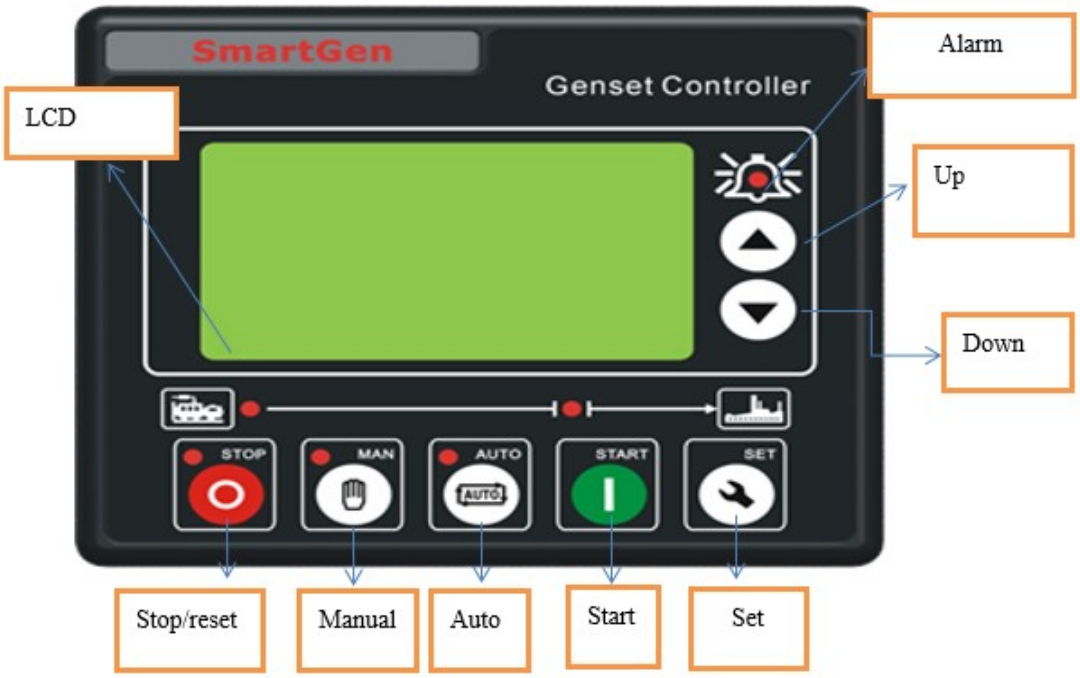


Items	Parts number	Name	Qty	Remark
1		Engine generator assembly	1	
2		Front support air inlet	1	
3		Muffler plate	1	1、2、3、4 plate

4		Muffle	1	
5		Vibration mounting	4	
6		Base assembly	1	
7		air inlet connecting plate	1	
8		Mixer assembly	1	
9		Engine support	1	
10		Engine plate	1	
11		Fuel system	1	
12		Battery box	1	
13		Control system	1	
14		AVR	1	
15		Air filter	1	

Items	**Unit**	**Name**	**Conversion**
Power	kW	kilowatt	1 kilowatt =1.36horsepower（1kW=1.36Ps）
Torsion	N • m	Newton • meter	1 kilogram • meter=9.81 Newton • meter (1kgf • m=9.81N • m)
Speed	r/min	rotate/minute	
Oil, fuel consumption	g/kW • h	gram/ killowatt • hour	1gram/horsepower • hour=1.36gram/killowatt • hour(1g/Ps • h)=1.36g/kW • h)
Capacity(L)	l	liter	1 litre =1000milliliter(1L=1000ml)
Acreage	cm2	square centimeter	1square meter=10000 square centimeter (1m2=10000cm2)
Pressure	KPa MPa	kilopascal mega-pascal	1kilogram force/square centimeter =98.1 kilopascal =0.0981 mega-pascal (1kgf/cm2=98.1kPa=0.0981Mpa)
Power	N	Newton	1 kilogram force =9.8Newton(1kgf=9.8N)
Length	m	meter	1 meter =1000millimeter(1m=1000mm)
Time	min(s)	minute（second）	1minute=60second(1min=60s)
Temperature	K（℃）	Kelvin degree（centigrade）	273K=0℃
Voltage	V	volt	
Current	A	ampere	
Crankshaft Angle	° CA	angle, crankshaft angle	
Quality	g	gram	1 kilogram =1000g(1kgf.m=9.81N.m)

Panel



	Stop/ Reset	Stop running generator in Auto/Manual mode; Lamp test (press at least 3 seconds); Reset alarm if alarm occurs; During stopping process, press this button again to stop generator immediately
	Start	Start genset in Manual/Test mode.
	Manual Mode	Pressing this key will set the module into Manual mode. Press this key and “Up/Increase” key (or Down/Decrease) key can adjust LCD contrast.
	Auto Mode	Pressing this key will set the module into AUTO mode.
	Set/Confirm	Pressing this key will view set menu; In setting parameter status, press this key will shift cursor or confirm setting value.
	Up/Increase	1) Screen scroll; 2) Up cursor and increase value in setting menu.
	Down/Decrease	1) Screen scroll; 2) Down cursor and decrease value in setting menu.