

INSTRUCTION MANUAL

Modified Sine Wave Inverter

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1.Safety Guidelines (Please read through this manual before assembling the power inverter)

- Risk of electrical shock and energy hazard. All failures should be examined by the qualified technician. Please do not remove the case of the inverter by yourself.
- please do not install the inverter in places with high moisture or near water.
- please do not install the inverter in places with high ambient temperature, under direct sunlight or near flame source.
- please only connect batteries with the same brand and model number in one battery bank. Using batteries from different manufacturers or different capacity is strictly prohibited.
- Never allow a spark or flame in the vicinity of the batteries because it may generate explosive gases during normal operation.
- Make sure the air flow from the fan is not obstructed at both sides (front and back) of the inverter. Please allow at least 15cm of space.
- Please do not stact any object on the inverter.



WARNING: Batteries will have a aging problem after years of operation. It is suggested to execute regular battery maintenance(e.g. every year). Once aged, the batteries should be changed by professional technician, or the failed batteries may cause fire or other hazards.



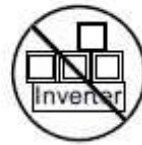
Don't disassemble



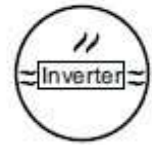
Away from moisture



Away from fire or high temperature



Don't stack on the inverter



Keep good ventilation

2. Modified sine wave inverter

2. 1 Product Introduction

- An inverter is connected to a battery or battery bank and converts the direct current (DC) from the battery to alternating current (AC).
- With modified sine wave output. It could run for a long term under 0% -100% load condition.
- its peak power reaches more than twice. It is applicable to resistive load, inductive load, capacitive load, etc.
- General applications include PC, ITE, yachts,vehicles, home appliances, motors, power tools, industrial control equipments, AV systemsand etc....

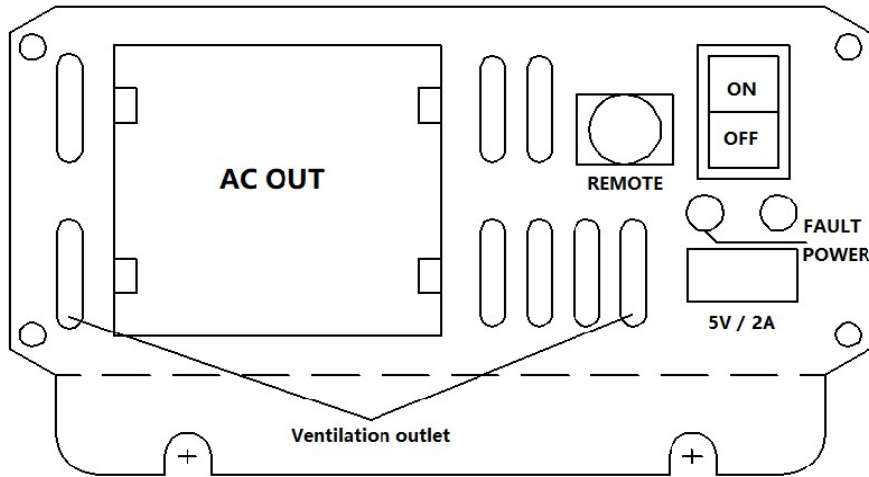
2.1 Features

- Modified sine wave output
- High efficiency up to 89%
- Complete LED indication for operation status
- Can be used for most electronic products with AC input.
- Battery low alarm and indicator
- Full digital controlled
- Compliance to CE / FCC / LVD / RoHS
- 1 year global warranty

2.2 Main Specification

| | | | | | | | | |
|-------------------------|---|------------|------------|---|-----------|-----------|-----------|-----------|
| Output Waveform | Modified Sine Wave | | | | | | | |
| Model | YX-300-M | YX-500-M | YX-600-M | YX-1000-M | YX-1500-M | YX-2000-M | YX-2500-M | YX-3000-M |
| Continuous Power | 300W | 500W | 600W | 1000W | 1500W | 2000W | 2500W | 3000W |
| Peak Power | 600W | 1000W | 1200W | 2000W | 3000W | 4000W | 5000W | 6000W |
| No Load Current Draws | < 0.5A | < 0.5A | < 0.5A | < 0.7A | < 0.7A | < 1.0A | < 1.0A | < 1.2A |
| Dimensions(L*W*H)cm | 18x12x5.2 | 21x12x5.2 | 21x12x5.2 | 26.5x15x7 | 34x15x7 | 31x22x8 | 32x22x8 | 43x22x8 |
| Weight (kgs) | 0.86 ± 0.2 | 0.93 ± 0.2 | 0.93 ± 0.2 | 1.9 ± 0.2 | 2.8 ± 0.2 | 4.3 ± 0.2 | 4.5 ± 0.2 | 6.2 ± 0.5 |
| Efficiency | up to 89% | | | | | | | |
| Input Voltage | DC12V | DC24V | DC48V | | | | | |
| | 10-15.5V | 20-31V | 40-61V | | | | | |
| Low voltage protection | 10±0.5V | 20±1V | 40±1V | | | | | |
| Over voltage protection | 15.5±0.5V | 31±1V | 61±1V | | | | | |
| Output Voltage | 100V/110V/115V/120V/220V/230V/240V | | | | | | | |
| Frequency | 50Hz/60Hz | | | | | | | |
| Cooling fan | Temperature and load controlled | | | | | | | |
| Protection Function | Low voltage alarm protection | | | | | | | |
| | Low voltage shut down protection | | | | | | | |
| | Over input voltage protection | | | | | | | |
| | Over temperature protection | | | | | | | |
| | Over load protection | | | | | | | |
| | Short circuit protection | | | | | | | |
| | Reverse polarity protection (fuse) | | | | | | | |
| Fuse | Internal or external | | | | | | | |
| Battery type | Open & Sealed Lead Acid | | | | | | | |
| USB Port | 5V, 2A or 5V, 1A | | | | | | | |
| Grounding | Ground Chasis: Properly grounds the inverter to vehicle grounding system or to earth ground | | | | | | | |
| Remote control | Control the inverter as a distance with remote control switch | | | | | | | |
| Application | Automobiles, RVs, boats, tractors, turcks, laptops, TV sets, video games, CD players, DVD players, power tool, office equipment, major household appliances, etc. | | | | | | | |
| Environment | Operating temperature | | | 0°C--+40°C @ 100% load; ≥ +60°C @ 50% load | | | | |
| | Operating relative humidity | | | 20%--90% RH non-condensing | | | | |
| | Storage temperature | | | -30°C--+70°C | | | | |
| | Cooling Fan automatically run | | | inner temperature is risig up ≥ 45°C, or load power is rising up ≥30% | | | | |

2.3 Front Panel of 300W-600W inverter



a. ON/OFF switch: This switch controls ON/OFF operation of the unit.

b. AC output outlet: For application demands of different geographic areas all over the world, there are many different kinds of optional AC outlets to choose from.

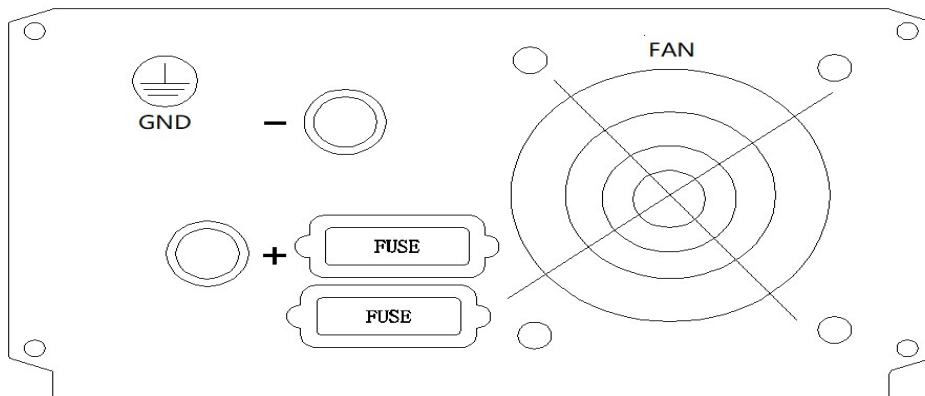
c. Ventilation holes: The inverter requires suitable ventilation to work properly. Please make sure there is good ventilation and the lifespan of the inverter can be preserved.

d. LED indicator light: Power Fault

Power: this light will turn green when the switch is ON status.

Fault: turns red shows fault.

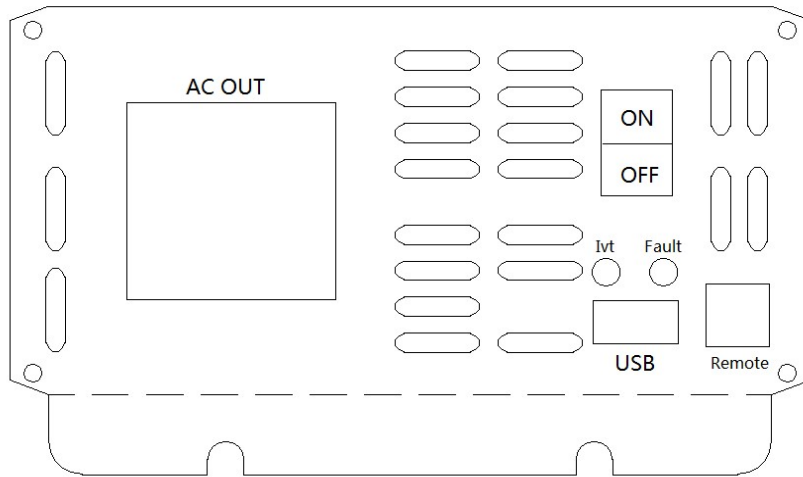
2.4 Real Panel of 300W-600W inverter



a. DC battery terminals: connect the inverter to batteries or other power sources. Negative (-) and positive (+) DC terminals should be kept insulated to protect from accidental short circuits.

b. Cooling fan: temperature and load controlled.

2.5 Front Panel of 1000W-1500W inverter



a. ON/OFF switch: This switch controls ON/OFF operation of the unit.

b. AC output outlet: For application demands of different geographic areas all over the world, there are many different kinds of optional AC outlets to choose from.

c. Ventilation holes: The inverter requires suitable ventilation to work properly. Please make sure there is good ventilation and the lifespan of the inverter can be preserved.

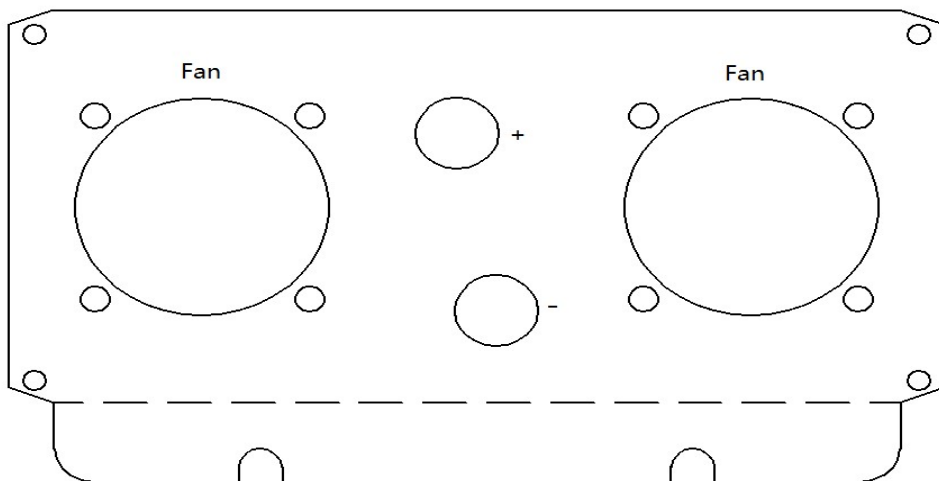
d. LED indicator light: Power Fault

Power: this light will turn green when the switch is ON status.

Fault: turns red shows fault.

e. Remote port: control your inverter at a distance with remote control switch.

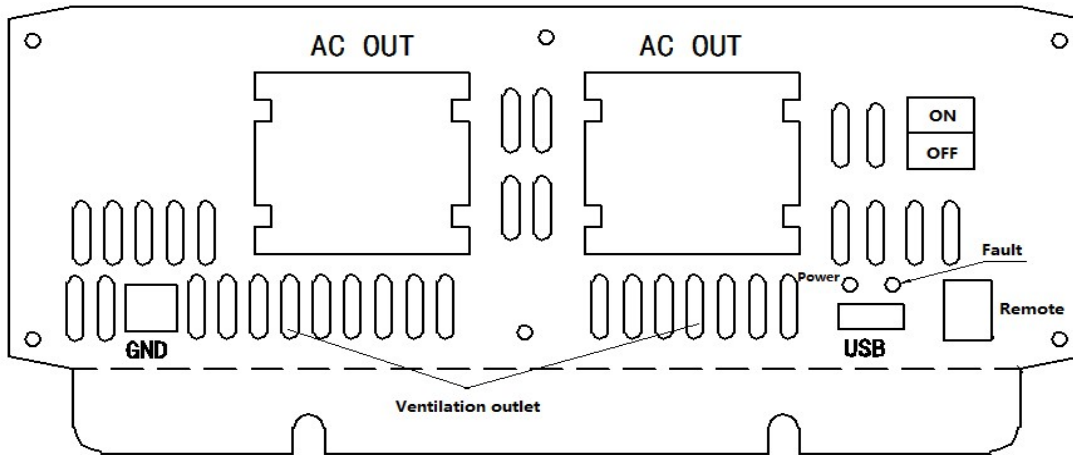
2.6 Rear Panel of 1000W-1500W inverter



a. DC battery terminals: connect the inverter to batteries or other power sources. Negative (-) and positive (+) DC terminals should be kept insulated to protect from accidental short circuits.

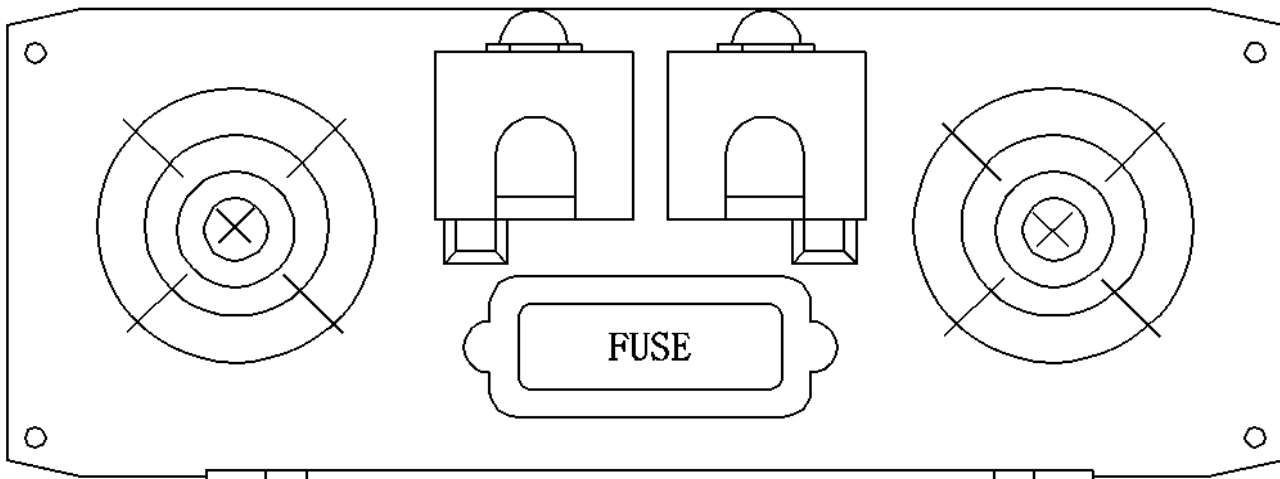
b. Cooling fan: temperature and load controlled.

2.7 Front Panel of 2000W-3000W inverter



- ON/OFF switch: This switch controls ON/OFF operation of the unit.
- AC output outlet: For application demands of different geographic areas all over the world, there are many different kinds of optional AC outlets to choose from.
- Ventilation holes: The inverter requires suitable ventilation to work properly. Please make sure there is good ventilation and the lifespan of the inverter can be preserved.
- LED indicator light: Power Fault
Power: this light will turn green when the switch is ON status
Fault: turns red shows fault
- Remote port: control your inverter at a distance with remote control switch.

2.8 Rear Panel of 2000W-3000W inverter



- DC battery terminals: connect the inverter to batteries or other power sources. Negative (-) and positive (+)
- Cooling fan: temperature and load controlled.
- Fuse: external fuse is a very good design as you can very easy to change the fuse outside the inverter if your inverter fuse was blown.

3. Protection

3.1 Input Protection

(1) **Battery Reversed Polarity Protection:** If the battery input is connected in reverse polarity, the internal (or external) fuse of the inverter would blow and the inverter should be send back FACTORY for repair. (For the inverter with external fuse, there is the spare fuse in the box. Please disclose the fuse case of the front panel and replace it when the fuse was blew.)

(2)**Battery Low Voltage Protection:** When the battery voltage is lower than the preset value, the inverter will automatically shut down and the buzzer alarm will sound continuously. Fault light turns red at the same time.

(3) **Battery Over Voltage Protection:** When the battery voltage is higher than the preset value, the inverter will automatically shut down and fault light turns red at the same time.



WARNING: Please choose suitable batteries that is compatible with the rated input DC voltage of inverter (refer to the SPEC). If the input DC voltage is too low (ex. Using 12VDC battery bank for 24VDC input models), the inverter can not be started up properly. If the input voltage is too high (ex.using 48VDC battery bank for 24VDC input models), the inverter will be damaged!

3.2 Output Protection

The display panel will show failure status when inverter is faced with abnormal operating conditions (Refer to Table 4.3). This lets the user know what could be the problem.

(1) **Over Temperature Protection (OTP) :**When the inverter's internal temperature is higher than the limit value (65 degrees), the "Over Temperature Protection" will be activated. The buzzer alarm will be sounded continuously, then the fault light turns red. When the internal temperature drops to 65 degrees, the inverter will automatically return to normal status.

(2) **AC Output Abnormal Protection:** When the AC output voltage of the inverter is too high or too low , the unit will turn off and should be restarted again.

(3) **AC Output Short Circuit Protection:** When a short circuit situation occurs at the output side of the inverter or the loads increase greatly in a short period of time, the unit will turn off and should be restarted again.

(4) **Battery Voltage Abnormal Protection:** When the battery voltage is too high or too low, this protection will be activated. The inverter will auto recover after the battery voltage go back to a safe level and users do not need to restart it.

(5) **Output Overload Protection (OLP) :** When output is overloaded 120%, the inverter will stop operation automatically , and it will automatically restart and check itself after 1S' waiting. (continuous loop) .

3.3 Fault Messages Guidelines

| Symptom | Fault Messages |
|-------------------------|--|
| Low voltage | The inverter operates normally, but the buzzer alarm is sounded continuously. It is the battery low voltage protection. |
| Under voltage | The inverter turns off automatically and the buzzer alarm sounds continuously, fault light turns red at the same time. It is the battery under voltage protection. |
| Over voltage | Fault light turns red and the inverter turns off automatically. It is the battery over voltage protection. |
| Over temperature | Fault lights turns red, then the buzzer alarm sounds continuously. It is the over temperature protection. |
| Over load | the unit stops operation automatically , and it automatically restart and check itself after 1S' waiting. (continuous loop). It is the over load protection. |

4. Installation & Wiring

4.1 Wiring for Batteries: Wire connections should be as short as possible and less than 1.5 meter is highly recommended. Make sure that suitable wires are chosen based on the rating of current. Too small of a cross-section will result in overheating that could induce certain danger. Please refer to Table 4-1.

Note: Please consult our local distributors if you have any questions.

Table 4-1 Suggestion for Wire Selection

| Rated Current of Equipment (amp) | Cross-section of Lead (mm ²) | AWG | Suggested Wiring |
|----------------------------------|--|-----|---------------------|
| 16A-25A | 2.5 | 12 | Safety Wiring Range |
| 25A-32A | 4 | 10 | |
| 32A-40A | 6 | 8 | |
| 40A-60A | 10 | 6 | |
| 63A-80A | 16 | 4 | |
| 80A-100A | 25 | 2 | |
| 100A-125A | 35 | 1 | |
| ≥ 125A | 50 | 0 | |

4.2 Suggested Battery Bank Capacity

In accordance with the minimum safety starting, full load discharge time and minimum configuration capacity, the users could choose battery bank of larger capacity (to meet the discharge time) to meet the

·**Simple calculation of battery discharge time:** Battery capacity / discharge current = discharge time

eg: 12V/220V/50Hz/300W full load of inverter 100% Efficiency 89%

Discharge time is required to be 1 hour. What is the optional battery capacity?

·**Select the configuration capacity according to the following formula:**

(1) $300W \div 0.89 = 337W$ Output power/efficiency = input power

(2) $337W \div 10.5V = 32A$ Input power / battery voltage (low voltage node) = Input Current

(3) $32A \times 1\text{hour} = 32AH$ Input current \times discharge time = battery capacity

(4) 40Ah battery could meet the discharge time of 85 minutes.

Note: (Actual discharge time error may exist according to the lifespan and maintenance of the battery.)

4.3 Requirement of Installation

The unit should be mounted on a flat surface or holding rack with suitable strength. In order to ensure the lifespan of the unit, please refrain from operating in environment of high dust, high temperature or high moisture. This is a power supply with built-in DC fan. Please make sure that ventilation is not blocked.

(Note: There should be no barriers within 15cm of the ventila

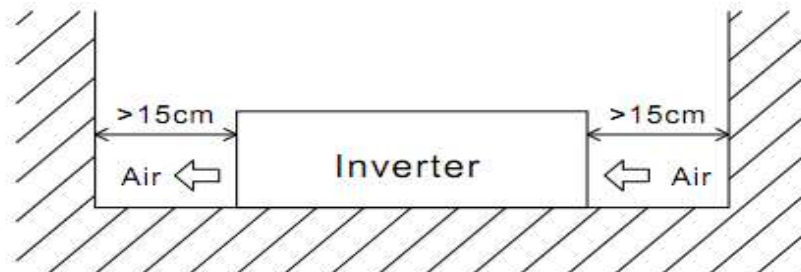


Figure 4.3: Example of Installation

4.4 Mounting Suggestion:

There are 4 semi-circular cutout on the side flanges of the inverter. It can be used for fixing inverter onto the system enclosure. We highly recommend mounting in the horizontal position. Please make sure ventilation openings are free from obstruction.

4.5 Derating

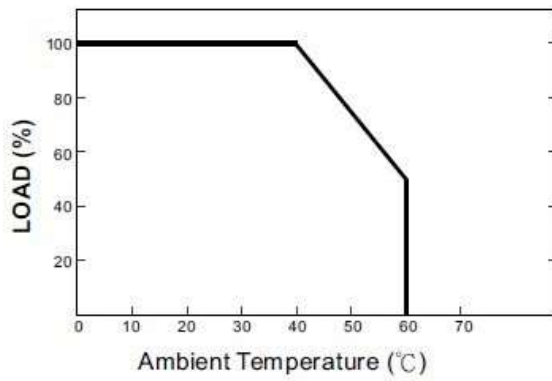


Figure 4.5.1 Output Derating Curve

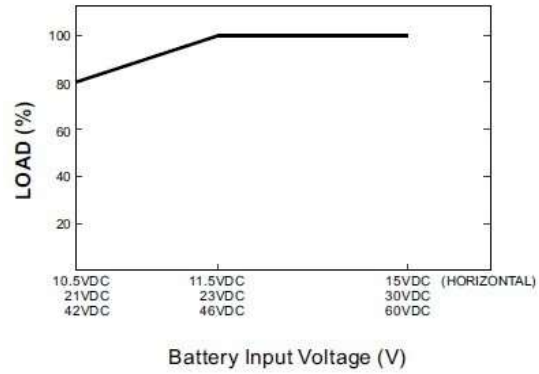


Figure 4.5.2 Input Derating Curve



Notes on output load:

The inverter can power most of equipments that need an AC source which can provide inverter continuously. But for certain load type, the unit may not work properly.

(1) Since inductive loads or motor based equipments need a large start up current (6~10 times of its rated current), the inverter may not start up successfully with these kinds of load.

(2) When the output are capacitive or rectified equipments (such as switching power supply), it is suggested to operate these equipment at no load or light load. To ensure proper operation, you should increase the load only after the inverter has started up.

5. Failure Correct Notes

The inverter should be serviced by a professional technician. Any importer usage or modification may damage the unit or result in shock hazard. If you are not able to clear the failure condition, please contact FACTORY or any our distributors for repair service.

| Status | Possible Reasons | Ways to Eliminate |
|---|-------------------------------|---|
| No AC output voltage | Abnormal input | Check the AC or DC input sources. Make sure the voltage is within the required range. |
| | Over temperature protection | Make sure that the ventilation is not blocked or whether the ambient temperature is too high. Please derating the output usage or reduce the ambient temperature. |
| | Overload protection | Make sure the output load does not exceed the rated value or the instantaneous start up current is not too high. (for inductive or capacitive loads) |
| | Short circuit protection | Make sure the output is not overloaded or shout circuited. |
| Discharging period of batteries is too short. | Batteries are aged or broken | Replace the batteries |
| | Battery capacity is too small | Reconfirm the specification and enlarge the battery capacity as suggested |
| Fan does not spin | Clog with foreign bodies | Remove the foreign objects |
| | Malfunction of the fan | Repaire required. Please send it back to us or any of our distributors. |

6.Installation diagram (Dimension figure)

As the models size is different, the factory will attach installation diagram with every unit (within the package box)

7.Warranty

One year of global warranty is provided for inverter under normal operating conditions. Please do not change components or modify the unit by yourself or FACTORY may reserve the right not to provide the complete warranty.