

3. Important Safety Warning (SAVE THESE INSTRUCTIONS)

Before using the inverter, please read all instructions and cautionary markings on the unit, this manual and the batteries.

General Precaution-

Conventions used:

WARNING! Warnings identify conditions or practices that could result in personal injury;

CAUTION! Caution identify conditions or practices that could result in damaged to the unit or other equipment connected.

CAUTION! The unit is designed for indoor use. Do not expose this unit to rain, snow or liquids of any type.

CAUTION! To reduce risk of injury, only use qualified batteries from qualified distributors or manufacturers. Any unqualified batteries may cause damage and injury. Do NOT use old or overdue batteries. Please check the battery type and date code before installation to avoid damage and injury.

WARNING! It's very important for system safety and efficient operation to use appropriate external battery cable. To reduce risk of injury, external battery cables should be UL certified and rated for 75°C or higher. And do not use copper cables less than 10AWG. Below is the external battery cable reference according to system requirements.

Table 1 Minimum Recommended Battery Cable Size versus Length

Model	Typical Amp.	1 meter (one-way)	Dia-mm
1K/2K	59 A	AWG 8	5.9

CAUTION! Do not disassemble the inverter. Contact with the qualified service center when service or repair is required.

WARNING! Provide ventilation to outdoors from the battery compartment. The battery enclosure should be designed to prevent accumulation and concentration of hydrogen gas at the top of the compartment.

CAUTION! Use insulated tools to reduce the chance of short-circuit when installing or working with the inverter, the batteries, or other equipments attached to this unit.

CAUTION! For battery installation and maintenance, read the battery manufacturer's installation and maintenance instructions prior to operating.

Personnel Precaution -

CAUTION! Careful to reduce the risk or dropping a metal tool on the batteries. It could spark or short circuit the batteries and could cause an explosion.

CAUTION! Remove personal metal items such as rings, bracelets, necklaces, and watches when working with batteries. Batteries can produce a short circuit current high enough to make metal melt, and could cause severe burns.

CAUTION! Avoid touching eyes while working near batteries.

CAUTION! Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

CAUTION! NEVER smoke or allow a spark or flame in vicinity of a battery.

CAUTION! If a remote or automatic generator start system is used, disable the automatic starting circuit or disconnect the generator to prevent accident during servicing.

4. Specifications

MODEL	1K	2K
CAPACITY	1000VA/600 W	2000VA/1200 W
INPUT		
Voltage	110/120 VAC or 220/230 VAC	
Voltage Range	75-150 VAC or 140-300 VAC	
OUTPUT		
Voltage Regulation (Batt. Mode)	+/-10%	
Transfer Time	Typical 4-8 ms, 13ms max. (For PC) 40 ms max. (For Home Appliances)	
Waveform	Pure Sine Wave	
BATTERY		
Battery Voltage	12 VDC	24 VDC
Floating Charge Voltage	13.5 VDC ± 0.5 VDC	27 VDC ± 1 VDC
Maximum AC Charge Current	10 A or 20 A (selectable)	
SOLAR CHARGER (option)		
Charging Current	50 A max.	
Maximum PV Array Open Circuit Voltage	40 VDC	60 VDC
PHYSICAL		
Dimension (DxWxH) mm	395 x 145 x 220	
Net Weight (kgs)	10.1	14.8

5. Installation

NOTE: Before installation, please inspect the unit. Be sure that nothing inside the package is damaged.

Connect to Utility and Charge

Plug in the AC input cord to the wall outlet. The unit will automatically charge the connected external battery even though the unit is off.

Connect External Battery

Step 1 - Install a DC Breaker in a positive battery line. The rating of the DC Breaker must be according to the inverter's battery current (50 Amp). Keep the DC breaker off. **(see Fig. 1)**

Step 2- Connect battery cables to the terminals of battery.

WARNING! Please use the appropriate battery cable. Please refer to **Important Safety Warnings Section** for the details.

1) Single battery connection (Refer to Fig. 1): When using a single battery, its voltage must be equal to the Nominal DC Voltage of the unit **(see below Table 1)**.

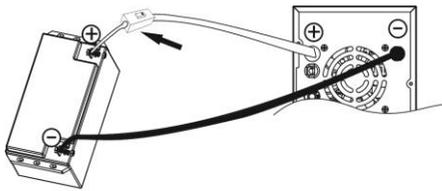


Fig. 1

Model	Nominal Battery DC Voltage
1K	12 VDC
2K	24 VDC

Table 1

2) Multiple batteries in series connection (Refer to Fig. 2): All batteries must be equal in voltage and amp hour capacity. The sum of their voltages must be equal to the nominal DC Voltage of the unit.

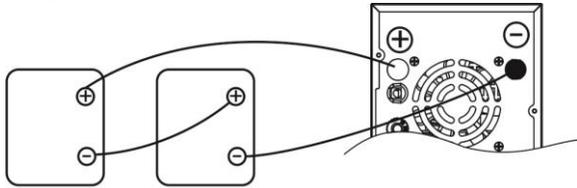


Fig 2

3) Multiple batteries in parallel connection (Refer to Fig. 3): Each battery's voltage must be equal to the Nominal DC Voltage of the unit.

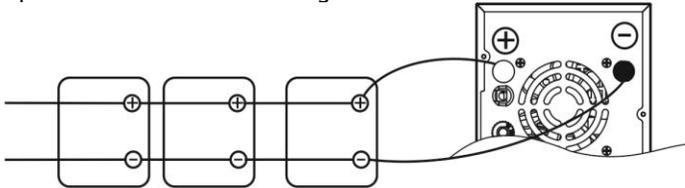


Fig 3

Step 3- Make sure to connect the polarity of battery side and the unit correctly.

Positive pole (Red) of battery to the positive terminal (+) of the unit.

Negative pole (Black) of battery to the negative terminal (-) of the unit.

Step 4- Put the covers back to the external battery terminals.

Step 5- Take the DC breaker on.

Connect to Utility and Charge

Plug in the AC input cord to the wall outlet. The unit will automatically charge the connected external battery even though the unit is off.

Connect to Device

Simply plug devices to battery supplied sockets. During power failure, it will provide continuous power to connected devices.

Connect to Solar Panel (only for the model is equipped with solar charger)

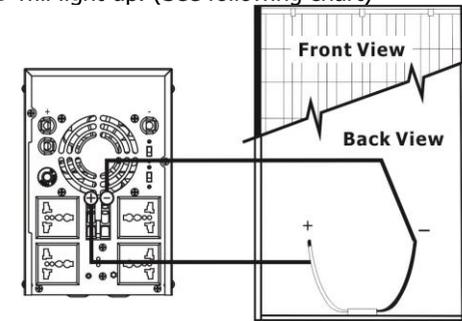
To prevent any damage to the solar charger, please DO select the solar panel and battery capacity according to recommended specifications below.

Solar Panel	Recommended Spec				
Maximum Output Voltage (Vm)	40 VDC for 1K, 60 VDC for 2K *1K: Maximum open-circuit voltage (Voc) < 40V 2K: Maximum open-circuit voltage (Voc) < 60V				
Maximum output current (Im)	50Amp	40Amp	30Amp	20Amp	10Amp
Suggested battery capacity	≥250Ah	≥200Ah	≥165Ah	≥135Ah	≥100Ah

Step 1- Connect one cable to the positive(+) pole of solar panel and solar charger positive (+) terminal.

Step 2- Connect the other cable to the negative (-) pole of solar panel and solar charger negative (-) terminal.

Step 3- Check the solar charging indicator. If the green LED flashes, it means that batteries are charged by solar power. When the batteries are fully charged, the green LED will be lighting. If there is no solar power available, the green LED will be off. If any fault occurs on charger, the red LED will light up. (See following chart)



6. Operation

Power On/Off

Once the inverter has been properly installed, press the power switch to turn on the unit. The unit will work automatically in line mode or inverter mode according to input utility power's status. When press the power switch again, the unit will be turned off.

Operation Mode Selector

a). UPS: Setting for precious electronic devices

If you select this mode, the transfer time will become 10ms for precious electronic devices during battery mode. You can connect the computer systems or other precision home equipment when you select this operation mode.

b). Inverter: setting for home appliances

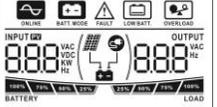
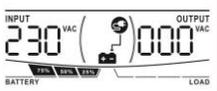
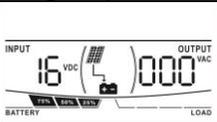
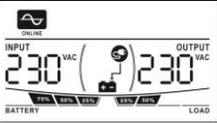
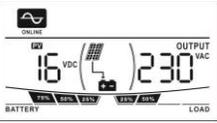
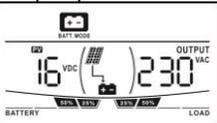
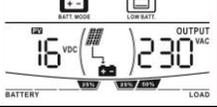
If you select this mode, the transfer time will become 20ms during battery mode. You can connect the home equipments, such as light bulb, fluorescent tube, fan, or TV on this mode.

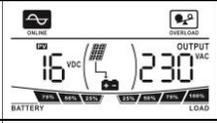
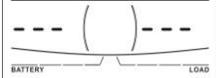
Charging Current Selector

a) 20A: setting battery charging current at 20A

b) 10A: setting battery charging current at 10A

LCD Display & Audible Alarms (PV icon is shown only in the model with solar charger)

Status	LCD	Alarm
Power on: when the unit is powered on, it will enter this mode for 3 seconds.		Off
Standby Mode: charger is turned on.	 Charged by AC	Off
Standby Mode: PV charger is turned on.	 Charged by PV	Off
Line Mode	 Charged by AC	Off
	 Charged by PV	
	 icon flashes when AVR is working.	
Battery Mode	 Output power from battery	Off
	 Output power from PV	
	 and  icons will flash.	
Low battery warning	  and  icons will flash.	Sounding every second

Overload: when connected load is over 110%	Line Mode		Sounding every 0.5 second
	Battery Mode		
	 and     icons will flash.		
Fault Mode			Continuously sounding

7. Trouble Shooting

Use the table below to solve minor problems.

Problem	Possible Cause	Solutions
Utility power is normal but the unit is in battery mode.	AC input power cord is not connected well.	Check AC input power connection.
	Input breaker is activated.	Reset the input breaker.
When power fails, the backup time is shorten.	The unit is overload.	Remove some non-critical loads.
	Battery voltage is too low.	Charge the unit at least 8 hours.
	Battery capacity is not full even after charge the unit for at least 8 hours.	Check the date code of the battery. If the batteries are too old, replace the batteries.
No LED display on the front panel when the utility power is normal.	The unit is not turned on.	Press power switch to turn on the unit.
	Battery is not connected well.	Check the external battery cable and terminal. Make sure all the battery connections to the unit are all correct.
	Battery defect.	Replace the batteries.
	Battery voltage is too low.	Charge the unit at least 8 hours.
The unit is in fault and restart circularly.	The unit is overload.	Verify that the load matches the capability specified in the specification.
	Output is short circuited.	Check the loads and remove loads which cause short circuit.

If there is any abnormal situations occur, which doesn't list above, please call the service people immediately for professional examine.