

USER MANUAL

Simulated Sinewave Inverter/Charger



Table of Contents

1. Introduction.....	1
2. Important Safety Warning (SAVE THESE INSTRUCTIONS).....	1
3. Product Overview	2
4. Installation.....	2
5. Operation.....	3
6. Trouble Shooting	8
7. Specifications	8

1. Introduction

Thank you for purchasing this power inverter. This simple power inverter is designed to power your home appliances or precious 3C electronics. It also can handle motor-type loads with high surge power such as vacuums, small freezers, or drills. With built-in AC charger, it can convert utility power to battery power and provide continuous power to connected equipment during power failure.

2. 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.

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.

General Precaution-

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 105°C or higher. And do not use copper cables less than 6AWG or 10AWG*2.

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.

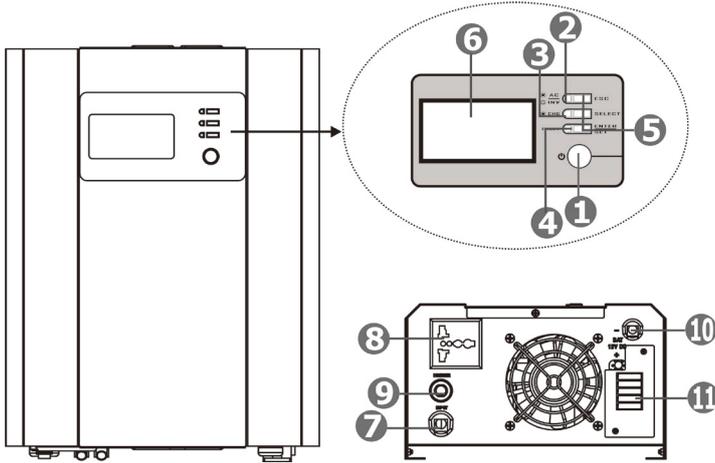
CAUTION! Avoid touching eyes while working near batteries.

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.

3. Product Overview



1. Power switch
2. Status indicator
3. Charging indicator
4. Fault indicator
5. Function buttons
(Please see the Operation section for the details)
6. LCD display
7. AC input
8. AC output socket
9. Input circuit breaker
10. External battery connectors
11. DC fuse

4. Installation

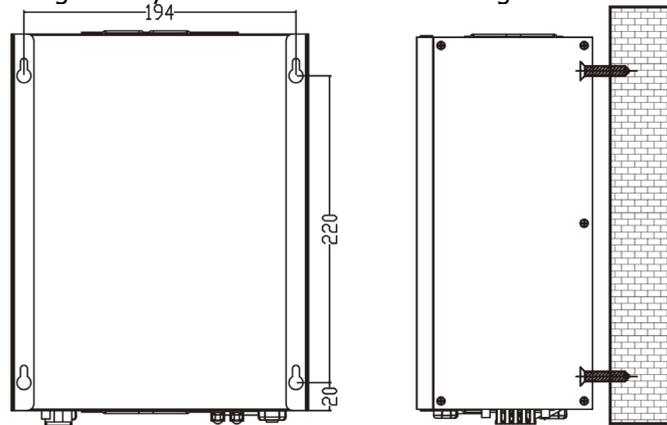
NOTE: Before installation, please inspect the unit. Be sure that nothing inside the package is damaged.

Mounting the unit

The unit **ONLY** can be mounted vertically to a wall surface.

Please follow below steps:

1. Turn off the unit before mounting.
2. Select an appropriate mounting location. Mark four mounted ends as shown in chart.
3. Drill four marks by screws.
4. Mount the unit by positioning the key-hole slots over the mounting screws.



Connect External Battery

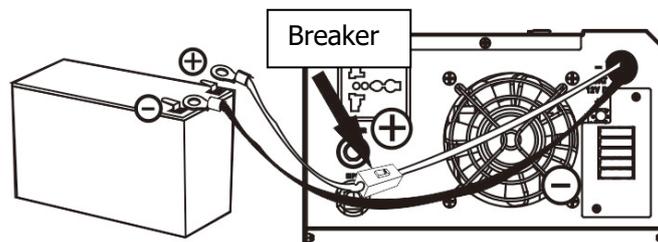
Step 1- Install a DC Breaker in a positive battery line. The rating of the DC Breaker must be according to the inverter's battery current (100 Amp). Keep the DC breaker off.

Step 2 - Remove insulation sleeve 18 mm for positive and negative conductors.

Step 3- Connect battery cables to the external batteries.

Note: For the user operation safety, we strongly recommend that you should use tapes to isolate the battery terminals before you start to operate the unit.

1) Single battery connection: When using a single battery, its voltage must be equal to the Nominal DC Voltage of the unit



2) Multiple batteries in series connection(Refer to Fig. 3): 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.

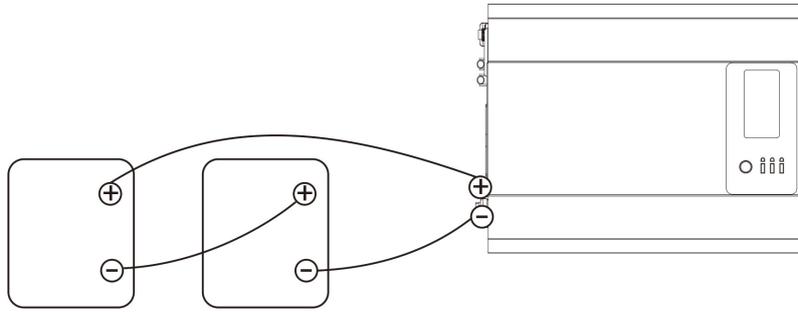


Fig 3

3) Multiple batteries in parallel connection(Refer to Fig. 4): Each battery's voltage must be equal to the Nominal DC Voltage of the unit.

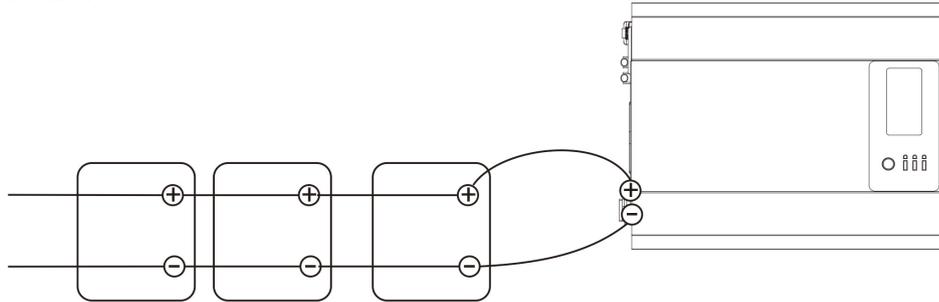


Fig 4

Step 4- 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 5- Take the DC breaker on.

5. 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.

LED Indicators, Function Keys & Audible Alarms

There are three indicators in the front panel of the unit.

LED Indicator		Messages	
☀ AC / ☀ INV	Green	Solid On	Output is available in bypass mode
		Flashing	Output is powered by battery in inverter mode
☀ CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging but not full.
⚠ FAULT	Red	Solid On	Fault mode
		Flashing	battery low or overload warning

Function Keys

Function Key		Description
↻	ESC	To exit setting mode
⬆	SCROLL	To go to next selection
↵	ENTER	To confirm the selection in setting mode or enter setting mode

Audible Alarms

Buzzer Audible Alarm	Messages
Inverter Mode (Low-battery Voltage)	Buzzing every 1 seconds
110% overload warning	Buzzing every 0.5 second
Overcharge	Buzzing continuously
Fault mode	Buzzing continuously

LCD Display

Display	Function															
Input source information																
	Indicates the AC input															
	Indicates input voltage, input frequency, PV voltage, charging current, battery voltage,															
Configuration Program and Fault Information																
	Indicates the setting programs.															
	Indicates the warning and fault codes. Warning:  Flashing with warning code Fault:  Lighting with fault code															
Output Information																
	Indicates the output voltage, load percentage, load in Watt and main board firmware version.															
Battery Information																
	Indicates the battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode, charging status in line mode.															
In AC mode, it will present battery charging status.																
<table border="1"> <thead> <tr> <th>Status</th> <th>Battery voltage</th> <th>LCD Display</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Constant Current mode / Constant Voltage mode</td> <td>< 11Vdc/pcs</td> <td>4 bars will flash in turns.</td> </tr> <tr> <td>11Vdc ~ 11.5Vdc/pcs</td> <td>Bottom bar will be on and the other three bars will flash in turns.</td> </tr> <tr> <td>11.5Vdc ~ 12.5Vdc/pcs</td> <td>Bottom two bars will be on and the other two bars will flash in turns.</td> </tr> <tr> <td>> 12.5Vdc/pcs</td> <td>Bottom three bars will be on and the top bar will flash.</td> </tr> <tr> <td colspan="2">Floating mode. Batteries are fully charged.</td> <td>4 bars will be on.</td> </tr> </tbody> </table>	Status	Battery voltage	LCD Display	Constant Current mode / Constant Voltage mode	< 11Vdc/pcs	4 bars will flash in turns.	11Vdc ~ 11.5Vdc/pcs	Bottom bar will be on and the other three bars will flash in turns.	11.5Vdc ~ 12.5Vdc/pcs	Bottom two bars will be on and the other two bars will flash in turns.	> 12.5Vdc/pcs	Bottom three bars will be on and the top bar will flash.	Floating mode. Batteries are fully charged.		4 bars will be on.	
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Mode operation information	
	Indicates unit connects to the mains.
	Indicates load is supplied by utility power.
	Indicates the utility charger circuit is working.
	Indicates the DC/AC inverter circuit is working.

LCD Setting

After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press "SCROLL" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit.

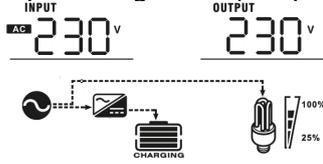
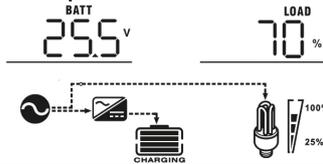
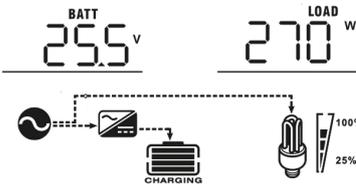
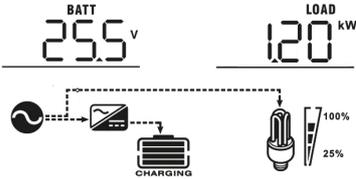
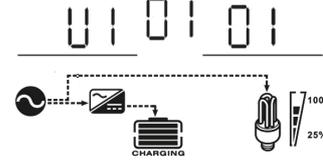
Setting Programs

Program	Description	Selectable option
00	Exit setting mode	Escape 00 ESC
01	AC input voltage range	Wide (default) 01 uDE If selected, acceptable AC input voltage range will be within 90-280VAC.
		Narrow 01 ntu If selected, acceptable AC input voltage range will be within 170-280VAC.
02	Battery type	AGM(Default) 02 AGn Flooded 02 FLd User-defined 02 USE
03	Max AC charging current	20A(default) uE1 03 20A
		10A uE1 03 10A
04	Bulk charging (C.V voltage)voltage	12V model default setting: 14.1V u 04 14.1 ^{BATT} v
		24V model default setting: 28.2V u 04 28.2 ^{BATT} v
		If self-defined is selected in program 02, this program can be set up. Setting range is from 13.0V to 14.6V for 12Vdc model and increment of each click is 0.1V. Setting range is from 26.0V to 29.2V for 24Vdc model and increment of each click is 0.2V.
05	Floating charging voltage	12V model default setting: 13.5V FLu 05 13.5 ^{BATT} v
		24V model default setting: 27.0V FLu 05 27.0 ^{BATT} v

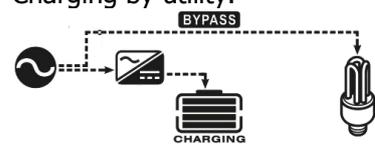
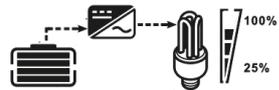
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06	Low DC cut-off voltage	1.2K default setting: 9.9V 
		2.4K default setting: 19.8V 
		Setting range is from 9.9V to 12.0V for 1.2K model and increment of each click is 0.1V Setting range is from 19.8V to 24.0V for 2.4K model and increment of each click is 0.2V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.

Display Setting

The LCD display information will be switched in turns by pressing "SCROLL" key. The selectable information is switched as below order: input voltage, input frequency, PV voltage, charging current, battery voltage, output voltage, output frequency, load percentage, load in Watt, load in VA, load in Watt, DC discharging current, main CPU Version and second CPU Version.

Selectable information	LCD display	
Input voltage/Output voltage (Default Display Screen)	Input Voltage=230V, output voltage=230V 	
Battery voltage / Load percentage	Battery voltage=25.5V Load percent=70% 	
Battery voltage/ Load in watt	When load is lower than 1kW, load in W will present xxxW like below chart. 	When load is larger than 1kW ($\geq 1KW$), load in W will present x.xkW like below chart. 
Main CPU version checking	Main CPU version 00001.01 	

Operating Mode Description

Operation mode	Description	LCD display
Standby mode Note: *Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery with AC bypass output.	Utility input bypass to output, charger is available and LCD backlight is off	Charging by utility. 
Line Mode	The unit will provide output power from the mains. It will also charge the battery at line mode.	Charging by utility. 
Battery Mode	The unit will provide output power from battery.	Power from battery only. 

Fault Reference Code

Fault Code	Fault Event	Icon on	Fault Code	Fault Event	Icon on
00	Output short circuit		05	Fan locked	
01	Over load time out		06	Over temperature	
03	Output voltage too high		08	Over charge	

Warning Indicator

Warning Code	Warning Event	Icon flashing
01	Over load	
02	Battery low	

6. Trouble Shooting

Use the table below to solve minor problems.

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
When power fails, the backup time is shorten.	Battery low alarm issue quickly.	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.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power. (Shore or Generator)	1. Check if AC wires are too thin and/or too long. 2. Check if generator (if applied) is working well or if input voltage range setting is correct. (Narrow → Wide)
No LED display on the front panel when the utility power is normal.	No LED display.	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.
Buzzer beeps continuously and red LED is on.	Fault code 00	Output short circuited.	Check if wiring is connected well and remove abnormal load.
	Fault code 01	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 03	Output voltage too high	Return to repair center.
	Fault code 05	Fan fault	Replace the fan.

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

7. Specifications

MODEL	1.2K	2.4K
INPUT		
Voltage	230 VAC	
Voltage Range	90-280 VAC	
OUTPUT		
Voltage Regulation (Batt. Mode)	+/-10%	
Transfer Time	20 ms typical	
Waveform	Simulated Sine Wave	
BATTERY		
Battery Voltage	12 VDC	24 VDC
Floating Charge Voltage	13.7 VDC ±0.5 VDC	27.4 VDC ±1 VDC
PHYSICAL		
Dimension (DxWxH) mm	272 x 212 x 127	
Net Weight (kgs)	4.5	4.8