SUNRISE

OFF Grid PV Inverter

user manual

5.5k

Table Of Contents

1. ABOUT THIS MANUAL

1.1.Purpose

This manual describes the assembly installation, operation and troubleshooting of this unit. Please ead this manual carefully before installations and operations.Keep this manual for future reference.Keep this manual for future reference.

1.2.Security Note

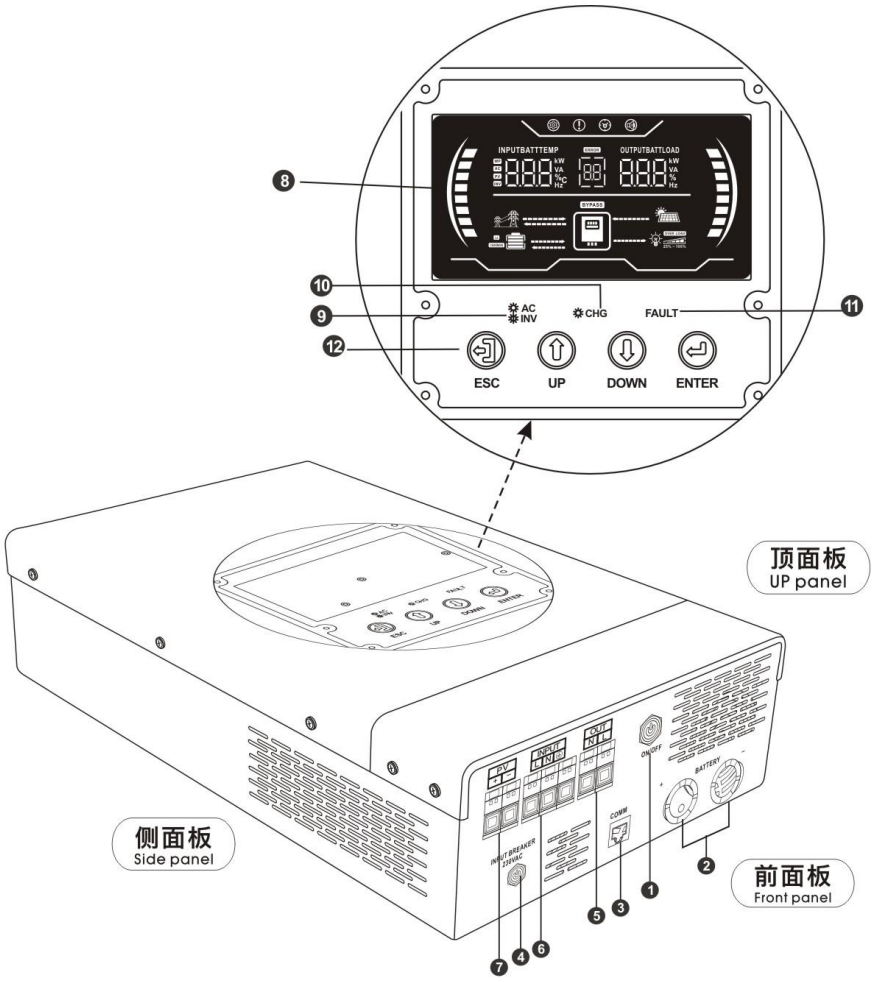
WARNING: This manual contains important safety and operating instructions. Please read and save this manual for future reference.

1.Before using the unit,read allinstructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.
2.Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
3.To reduce rsk of eectric shock, disconnect al wirngs before attemptng any maintenance or cleaning.Turning off the unit will not reduce this risk.
4.CAUTION- Only qualified personnel can install this device with battery.
5.NEVER charge a frozen battery.
6.For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size.It's very mportant to correctly operate this inverte/charger.
8.Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion,
9.Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
10.GROUNDING INSTRUCTIONS -This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to installthis inverter.
11.NEVER cause AC output and DC nput short circuited. Do NOT connect to the mains when DC input short circuits.
12.When installing or removing the unit, be sure to disconnect all power sources, such as utility, photovoltaic, and battery power.
13.Warning!!Only qualified service persons are able to service this device. If errors still persist after folowing trouble shooting table, please send this inverter/charger back tolocal dealer or service center for maintenance.

2. INTRODUCTION

This is a multi-function wall-mounted home energy storage inverter/charger, combining functions of inverter MPPT solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive large LCD display offers user-configurable and easy-accessible touch button operation such as battery charging current, AC/solar charger priorty and acceptable input voltage based on different applications. Can power a wide range of equipment in a home or office environment, including devices such as downlights, fan lamp, refrigerators and air conditioners.

2.1.Panel Function Display



❶ 电源开关 POWER SWITCH	❷ 电池输入 BATTERY INPUT	❸ RS485/RS232 (长距离通讯不行) 通信端口	❹ 断路器 CIRCUIT BREAKER
❺ 交流输出 AC OUTPUT	❻ 交流输入 AC INPUT	❼ PV输入 PV INPUT	❽ 液晶显示器 LIQUID CRYSTAL DISPLAY
❾ 状态指示器 STATUS INDICATOR	❿ 充电指示灯 CHARGING INDICATOR LIGHT	⓫ 故障指示灯 FAULT INDICATOR LIGHT	⓬ 功能触摸按钮 FUNCTION TOUCH BUTTONS

2.2.Features

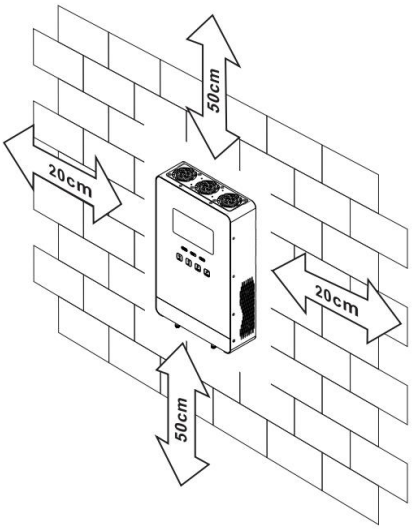
1. Pure sine wave solar inverter.
2. Unique glass top cover design with 6.25inch LCD display and touchable buttons.
3. Built-in 150A MPPT(Max PV)solar charger.
4. High PV input range from 120V-450Vdc.
5. Smart battery charger design for optimized battery performance.
6. Configurable AC/Battery input priority via LCD setting
7. Auto restart while PV is recovering.
8. Over-load,over temperature and output short circuit protection. Cold restart function
9. Restore default Settings with one click.

3. INSTALLATION

3.1.Mounting the Unit

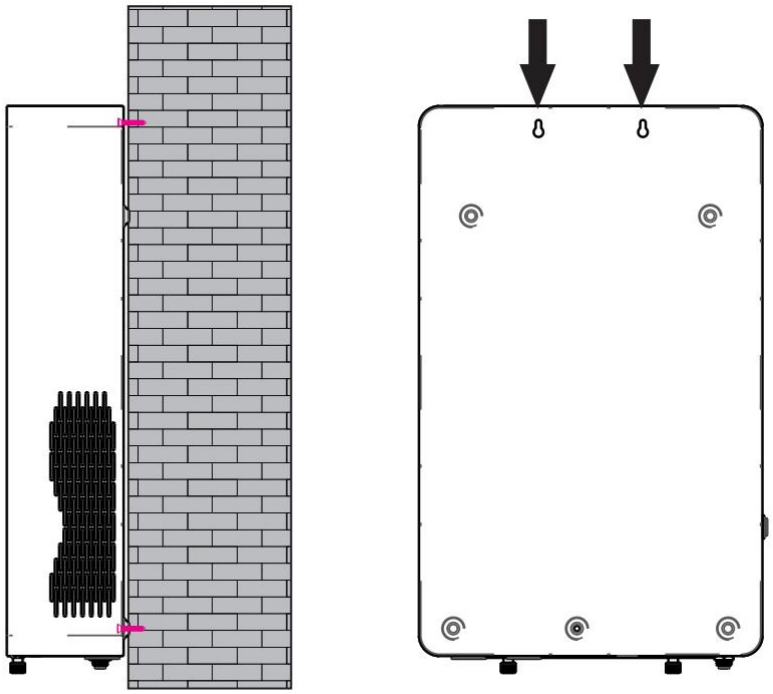
Consider the following points before selecting where to install:

1. Do not mount the inverter on flammable constructon materials.
2. Mount on a solid surface.
3. Installthis nverter at eye level in order to allow the LCD display to be read at all times.
4. he ecommended installation position is to be adhered to the wall vertically.
5. Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipaton and to have enough space for removing wires.



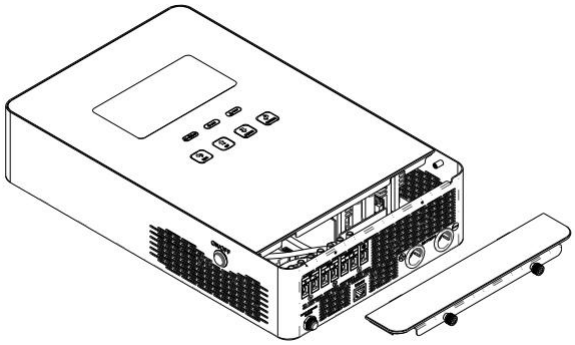
SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.

Install the unit by screwing two screws.



3.2.Preparation

Before connecting all wirings, please take off bottom cover by removing two screws as shown below.



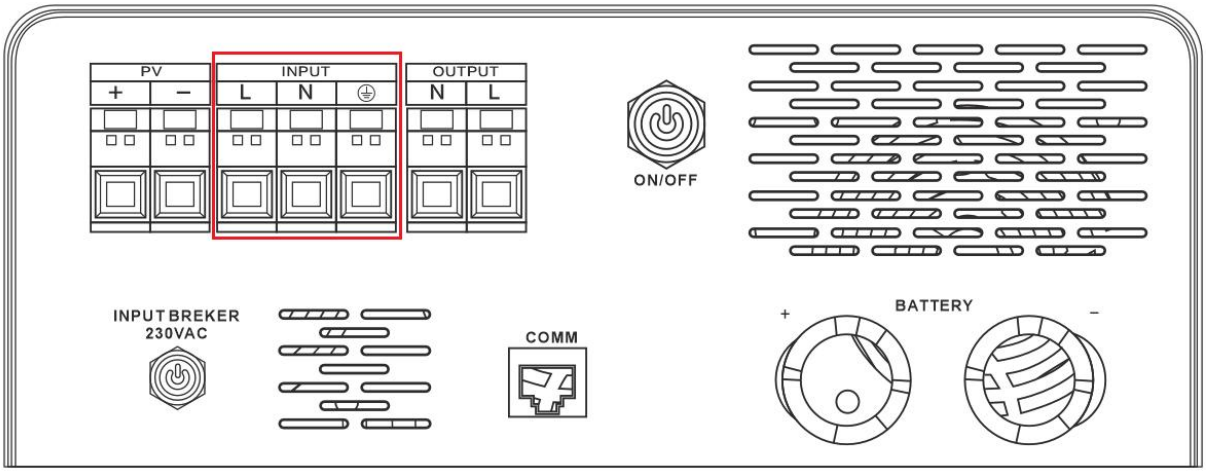
3.3.AC Connection

CAUTION!! Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended size of the AC circuit breaker is 50A for 5.5KW.

3.3.1.AC Input Connection

Please follow below steps to implement AC input connection:

1. Be sure to disconnect the device before connecting the AC input.
2. Be sure to insert the AC input wires according to the polarity indicated on the terminal block and tighten the terminal screws.
3. The AC input wire is inserted into the center of the "INPUT" terminal block as shown in the figure.
4. Make sure the wires are securely connected.

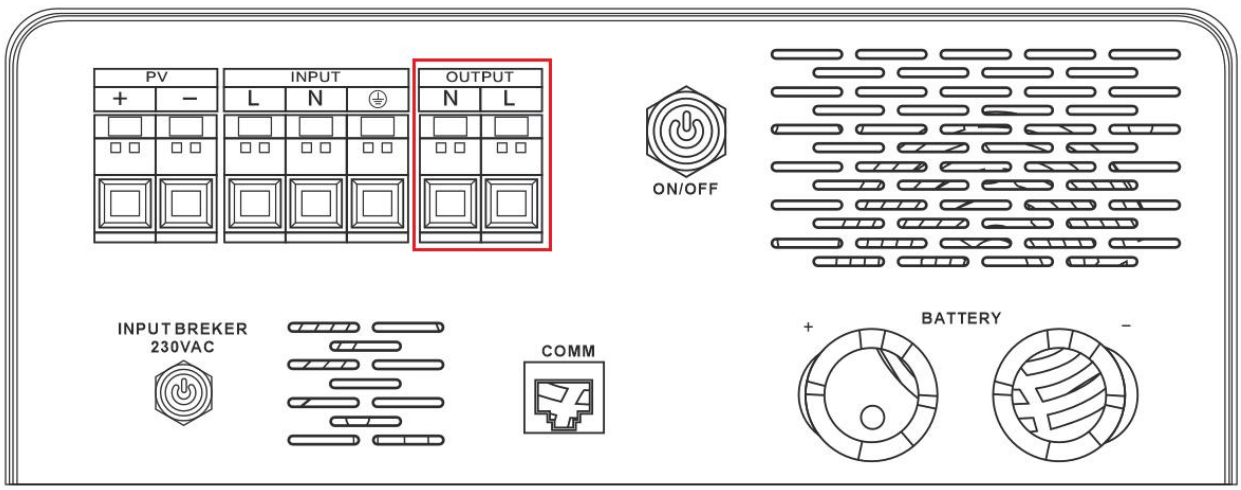


Besure to connect PE protective conductor ⏚ first.

3.3.2.AC Output Connection

Please follow below steps to implement AC output connection:

1. Be sure to disconnect the device before connecting the AC output.
2. Be sure to insert the AC output wires according to the polarity indicated on the terminal block and tighten the terminal screws.
3. The AC output wire is inserted into the center of the "OUTPUT" terminal block as shown in the figure.。
4. Make sure the wires are securely connected.

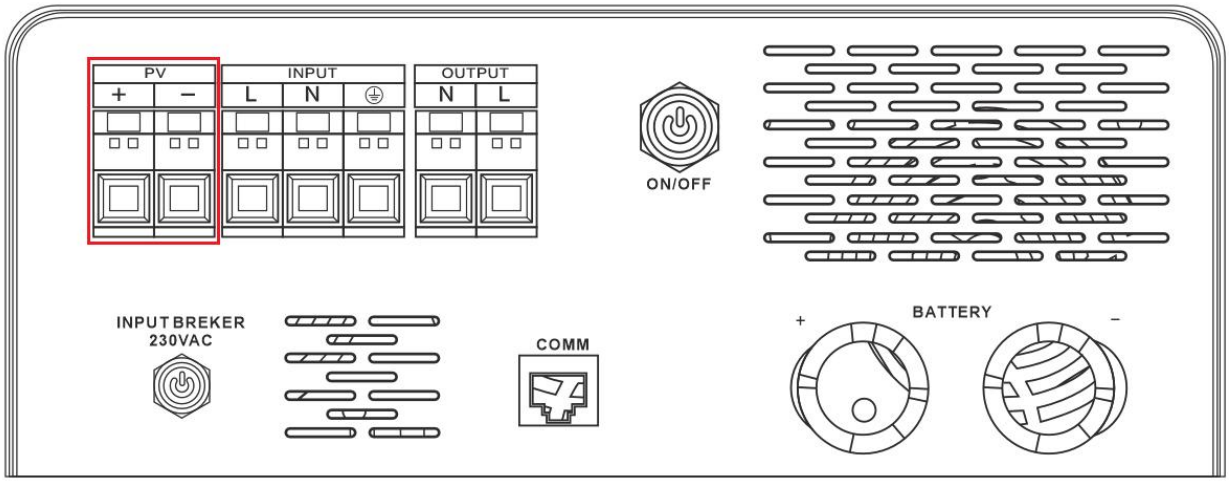


3.4.PV Connection

CAUTION: Before connecting to PV modeles, please install separately a DC circuit breaker between inverter and PV modules.

Please follow the steps below to connect the PV modules:

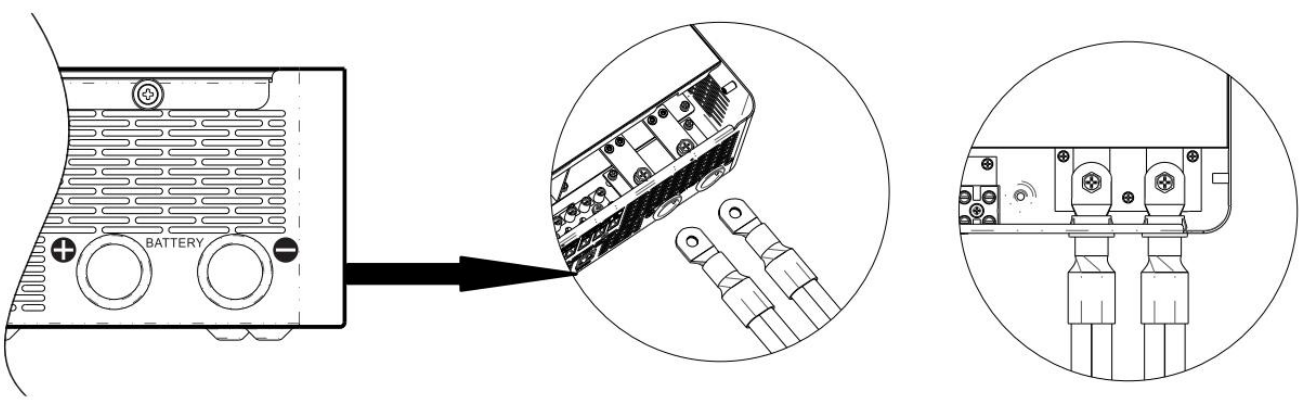
1. Be sure to disconnect the power supply before connecting the PV module.
2. Insert the PV input wires according to the polarity indicated on the terminal block and tighten the terminal screws.
3. The PV input wire is inserted at the leftmost "PV" of the terminal block as shown in the figure.
4. Make sure the wires are securely connected.



3.5.Battery Connection

Please folow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 2-3 Nm.
3. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.



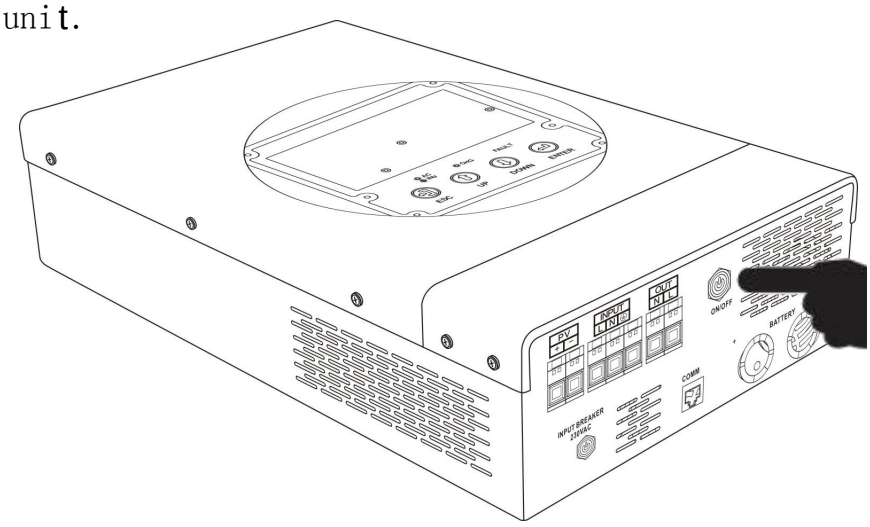
3.6.Final Assembly

1. After installing the connecting cable, be sure to check that the polarity connection is correct to avoid irreparable damage to the unit.
2. After making sure there are no errors, replace the lower cover and tighten the screws.

4. OPERATION

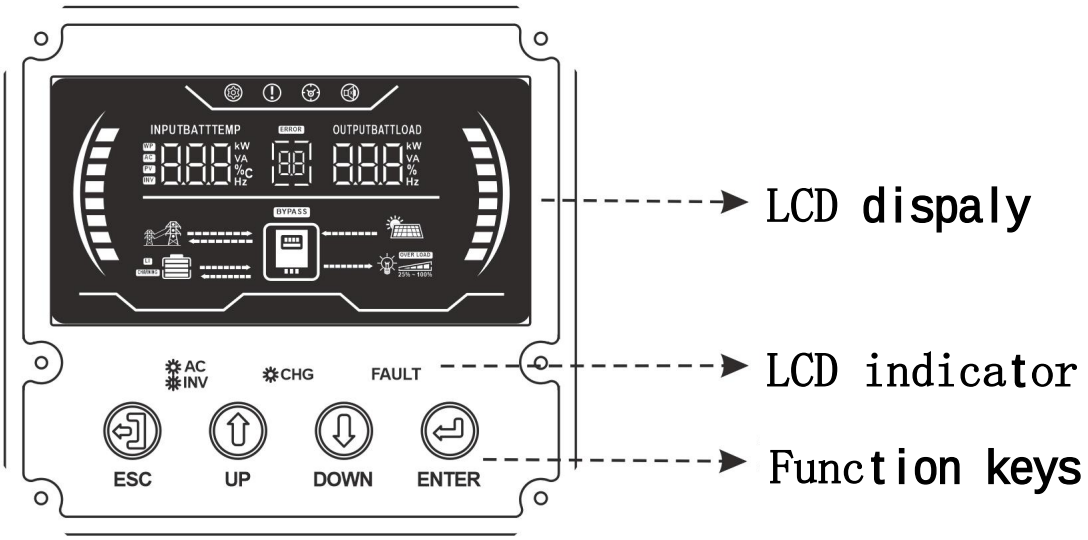
4.1.Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press On/Of switch (located on the button of the case) to turn on the unit.



4.2.Display Panel

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includesthree indicators, four function keys and a LCD display, indicating the operating status and input/output power information.



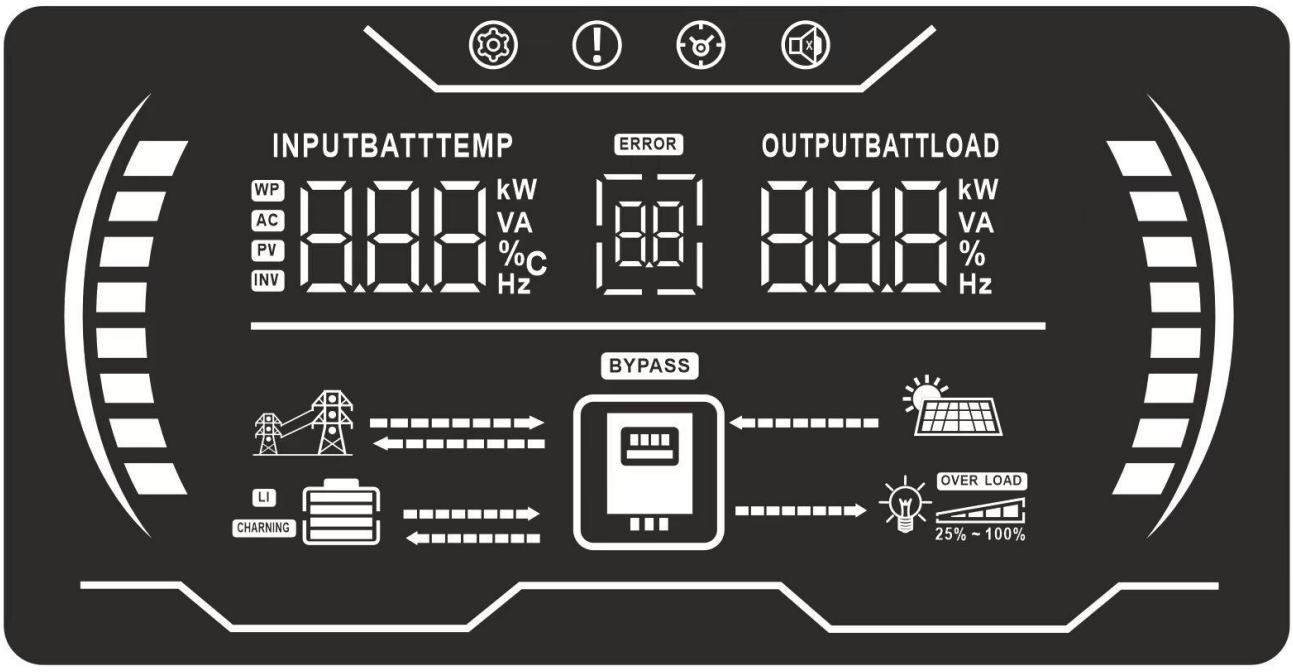
4.2.1.LCD Indicator

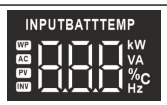
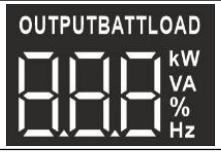
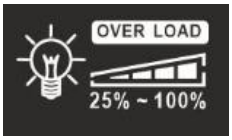
LED Indicator			Messages
AC INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or Pv in battery mode.
CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

4.2.2.Function Keys

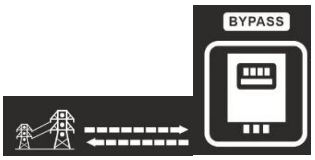
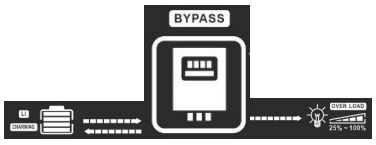
Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

4.2.3.LCD Display Icons



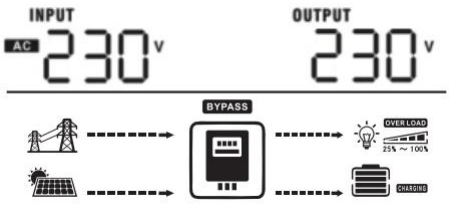
Icon	Function description
Input Source Information	
	Indicates the AC input.
	Indicates the PV input
	Indicate input voltage, input frequency, PV voltage, battery voltage and charger current.
Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes.
	Warning:  flashing with warning code.
	Fault:  lighting with fault code
Output Information	
	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
Battery Information	
	Left side flashing bar and battery icon Indicates battery level by 0-20%, 20-40%, 40-60% and 80-100% in battery mode and charging status in line mode.
Load Information	
	Indicates overload.
	Right side flashing bar and load icon Indicates the load leve by0-24%, 25-50%, 50-75%and 75-100%.

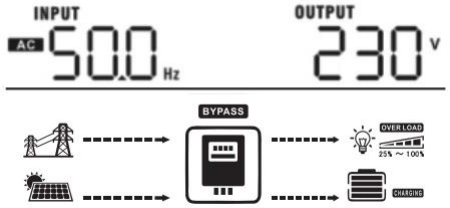
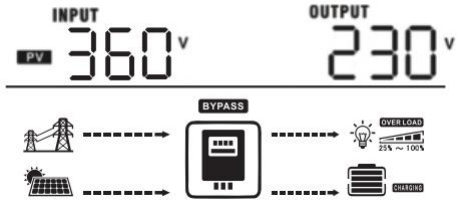
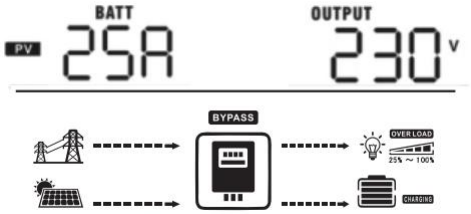
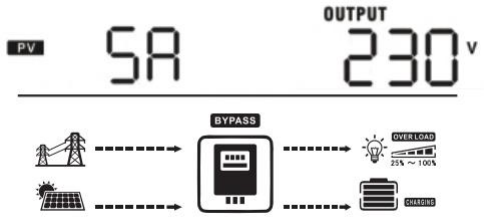
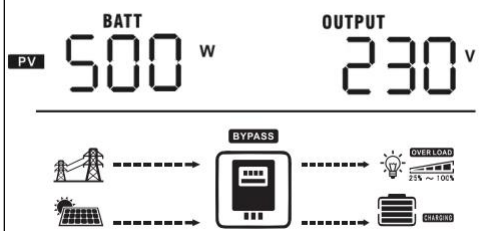
0%~25%	25%~50%	50%~75%	75%～100%
			

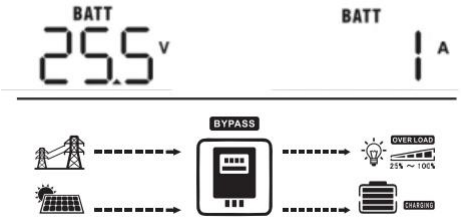
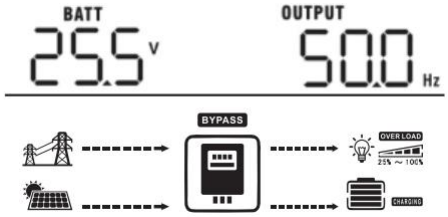
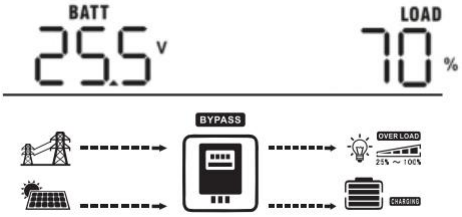
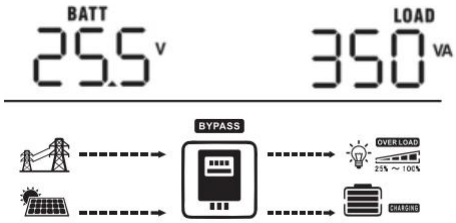
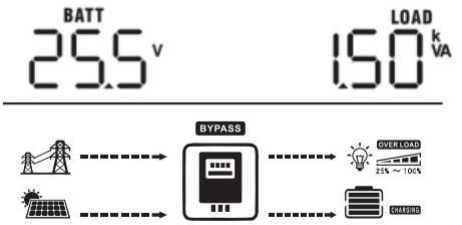
Icon	Function description
Mode operation information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
	Indicates load is supplied by utility power
	Indicates the utility charger circuit is working,
	Indicates the DC/AC inverter crcuit s working
MuteOperation	
	Indicates unit alarm is disabled.

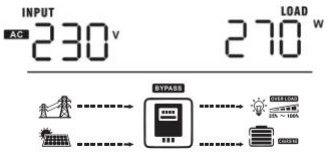
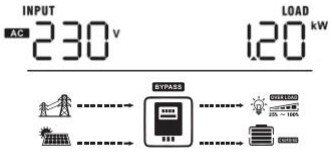
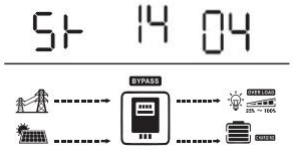
Display Setting

The LCD display information will be swtched in turns by pressing “UP” or ″ DOWN” key. The selectable informaton is switched as below order: input voltage, nput requency, PV voltage, MPPT charging current,MPPT charging power, battery voltage, output voltage, output frequency load percentage, load in VA load n Watt, DC discharging current main CPU Version.

Selectable information	LCD display
Input voltage/Output voltage (Default Display Screen)	Input Voltage=230V,output voltage=230V 

Selectable information	LCD display
Input frequency	Input frequency=50Hz 
PV voltage	PV voltage=360V 
MPPT Charging current	Current ≧10A  Current < 10A 
MPPT Charging power	MPPT Charging power=500W 

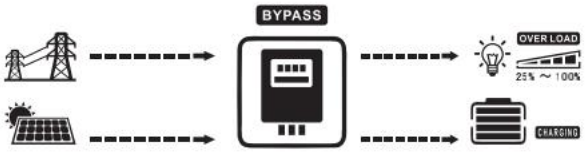
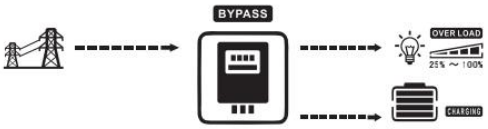
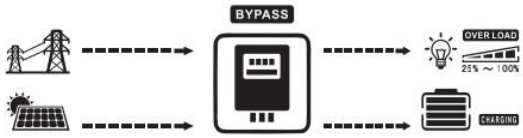
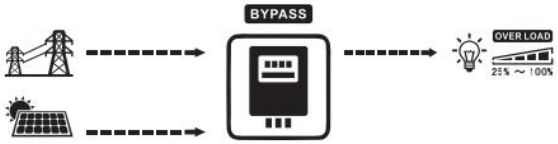
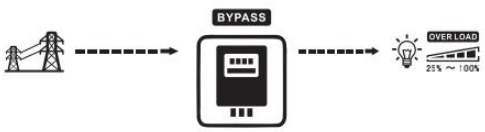
Selectable information	LCD display
Battery voltage /DC discharging current	Battery voltage=25.5V, discharging current=1A 
Output frequency	Output frequency=50Hz 
Load percentage	Loadpercent=70% 
Load in VA	When connected load is lower than 1kVA, load in VA will present xxxVA like below chart.  When oad is larger than 1kVA, load in VA will present x.xkVA like below chart. 

Selectable information	LCD display
Load in Watt	When load is lower than 1kW, load n W will present xxxw like below chart.  When load is larger than 1kw, load in W will present x.xkW like below chart. 
Main CPU version checking	Main CPU version 00014.04 

4.3.Operating Mode Description

Operation mode	Description	LCD display
Standby mode /Power saving mode *Standby mode: The inverteris not turned on yet but at this time, the inverter can charge battery without Ac cutput. *Power saving mode: If enabled, the outtput of inverter will be off when connected load is pretty low or not detected.	No output is supplied by the unit but it still can charge batteries.	Charging by utility and pv energy. 
		Charging by utility. 
		Charging by pv energy. 
		No charging. 

Operation mode	Description	LCD display
Fault mode *Fault mode: Errors are caused by inside circuit erroror external reasons such as over temperature, output short circuited and so on.	PV energy and utility can charge	Charging by utility and PV energy. 
		Charging by utility. 
		Charging by Py energy. 
		No charging. 

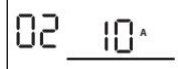
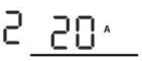
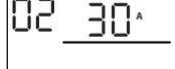
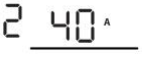
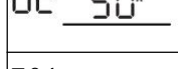
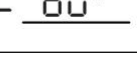
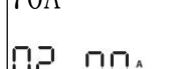
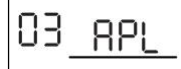
Operation mode	Description	LCD display
Line Mode	The unit will provide output power from the mains. It will also charge the battery at line mode.	Charging by utility and Pv energy. 
		Charging by utility. 
		If "SUB"is selected as output source priority and solar energy is not sufficient to provide the load, solar energy and the utility will provide the loads and charge the battery at the same time. 
		If "SUB"is selected as output source priority and battery is not connected, solar energy and the utility will provide the loads. 
		Power from utility. 

Operation mode	Description	LCD display
Battery Mode	The unit will provide output power from battery and PV power.	Power from battery and PV energy. 
		PV energy will supply power to the loads and charge battery at the same time. 
		Power from battery only. 

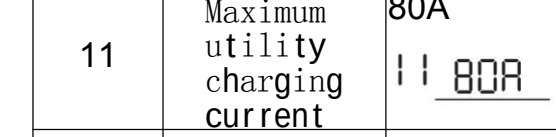
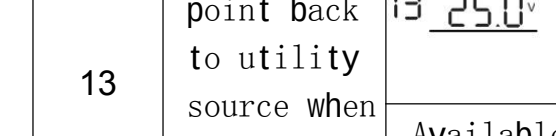
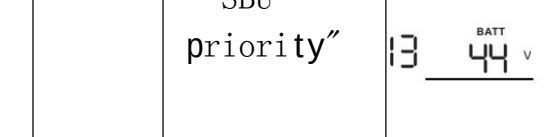
4.4.Setting Programs:

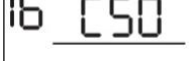
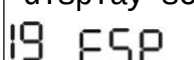
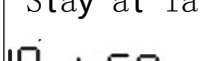
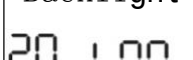
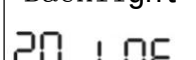
After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESc button to exit.

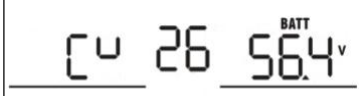
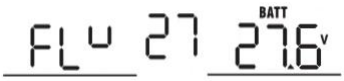
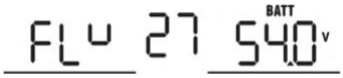
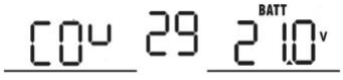
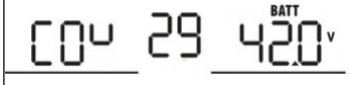
Program	Description	Selectable option	
00	Exit setting mode	00 ESC	
01	Output source priority:To configure load power source priority	01 SUb	Solar energy provides power to the loads as frist priority. If solar energy is out sufficient to power all connected loads,utility energy will supply power to the loads at the same time.
		01 SbU	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.

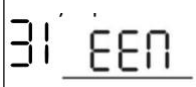
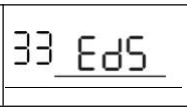
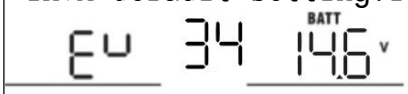
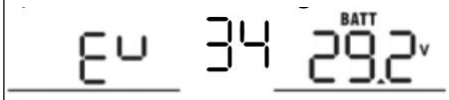
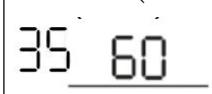
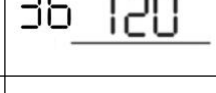
Program	Description	Selectable option	
02	Maximum charging current To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	10A 	20A 
		30A 	40A 
			60A 
		70A 	80A 
		90A 	100A 
		110A 	150A 
03	AC input voltage range	Appliances 	If selected, acceptable AC input voltage range will be within 90-265VAC.
		UPS(default) 	If selected, acceptable AC input voltage range will be within 190-255VAC.
04	Power saving mode enable/ disable	Saving mode disable (default) 	If disabled, no matter connected load is low or high, the on/off status of inverter output will not be effected.
		Saving mode enable 	If enabled, the output of inverter will be off when connected load is pretty low or not detected.

Program	Description	Selectable option	
05	Battery type	AGM (default) 05 AGn	Flooded 05 FLd
		User-Defined 05 USE	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 2627 and 29.
06	Auto restart when overload occurs	Restart disable(default) 06 LrD	Restart disable 06 LrE
07	Auto restart when over temperature occurs	Restart disable 07 LrD	Restart enable (default) 07 LrE
08	Output voltage	220V 08 220	230V (default) 08 230
		240V 08 240	
09	Output frequency	50Hz (default) 09 50	60Hz 09 60
11	Maximum utility charging current	150A 11 150A	10A 11 10A
		20A 11 20A	30A 11 30A
		40A 11 40A	50A 11 50A
		60A 11 60A	70A 11 70A

Program	Description	Selectable option	
11	Maximum utility charging current	80A 	
13	Setting voltage point back to utility source when selecting “SBU priority”	Available options in 24V models:	
		22.0V 	22.5V
		23.0V(默认) 	23.5V
		24.0V 	24.5V
		25.0V 	25.5V
		Available options in 48V models:	
		44V 	45V
		46V(default) 	47V
		48V 	49V
		50V 	51V

Program	Description	Selectable option	
16	Charger source priority:To configure charger source priorty	If this inverter/charger is workng in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility 	Solar energy and utility will charge
		Only Solar 	Solar energy willbe the only charger source no matter utilty is available or not.
		If this inverter/charger is working in Battery mode or Power saving mode, only solar energy can charge battey Solar energy will charge battery if its available and sufficient.	
18	Alarm control	Alarm on (default) 	Alarm off 
19	Auto return to default display screen	Return to default display screen (default) 	If selected,no matter how users switch display screen,it will automatically return to default display screen (Input voltage / output voltage)after no button is pressed for 1 minute.
		Stay at latest screen 	If selected,the display screen will stay at latest screen user finally switches.
20	Backlight control	Backlight on(default) 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on 	Alarm off(default) 
25	Record Fault code	Record enable(default) 	Record disable 

Program	Description	Selectable option
26	Bulk charging voltage (C.V voltage)	24V model default setting: 28.2V 
		48V model default setting: 56.4V 
		If self-defined s selected in program 5, this program can be set up.Setting range is from 24.0V to 29.2V for 24V model and 48.0V to 58.4V for 48V model. Increment of each click is 0.1V.24V model default to 27.0V
27	Floating charging voltage	24V model default to 27.0V 
		48V model default setting: 54.0V 
		If self-defined is selected in program 5, this program can be set up.Setting ange is from 24.0V to 29.2V for 24V model,48.0V to 58.4V for 48V model. Increment of each click is 0.1V.24V model default setting: 21.0V
29	Low DC cut-off voltage	24V model default setting: 21.0V 
		48V model default setting: 42.0V 
		If self-defined is selected in program 5, this program can be set up.Setting ange is from 20.0V to 24.0V for 24V model,40.0V to 48.0V for 48V model.Increment of each click is 0.1V.Low DC cut-off voltage willbe fixed to setting value no matter what percentage of load is connected.
30	Restore default settings	Restore default settings 
		If this option is selected, the Inverter will restore the default settings

Program	Description	Selectable option	
31	Battery equalization	Battery equalization 	Battery equalization disabe (defaut) 
		If"Flooded" or "User-Defined"is selected in program 05, this program can be set up.	
33	Battery equalization		
		If"Flooded" or "User-Defined"is selected in program 05, this program can be set up.	
34	Battery equalization voltage	1KVA default setting:14.6V 	
		Setting range is from12.5V to 15 V. Increment of each cick is 0.1V.	
		4K5 default setting: 29.2V 	
		Setting range s from 25.0V to 29.5V. Increment of each cick is 0.1V.	
		6K5 default setting: 58.4V 	
		Setting range is from 50 to 59 V. Increment of each click is 0.1V.	
35	Battery equalized time	60min (default) 	Setting range is from 5min to 900min. Increment of each cick is 5min
36	Battery equalized timeout	120min (default) 	Setting range is from 5min to 900 min. Increment of each click is 5 min
37	Equalization interval	30days (default) 	Setting range is from 0 to 90 days. Increment of each click is 1 day

Program	Description	Selectable option	
39	Equalization activated immediately	Enable 39 AEn	Disable(default) 39 AdS
		If equalization function is enabled in program 30, this program can be set up. If "Enable" is selected in this program, it's to activate battery equalization immediately and LCD main page will shows „Eq„ . If "Dsable"is seleted, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, „Eq„ will not be shown in LCD main page.	

5. SPECIFICATIONS

5.1. Line Mode Specifications

	INVERTER MODEL	Specification
Line Mode Specifications	Input Voltage Waveform	Sinusoidal(utility or generator)
	Nominal Input Voltage	230Vac
	Input Voltage Range	190Vac-255Vac
	Standard input frequency	50Hz / 60Hz(Automatic detection)
	Charging voltage	56.4Vdc
	Under-voltage protection	42Vdc
	Over-voltage protection	59.2Vdc
	Floating charge voltage	54Vdc
	Trickle charge voltage	56Vdc
	Input Current	60A(default)
	Total input current (PV and utility)	80A(default)
	peak efficiency	90%

5.2.Inverter Mode Specifications

	INVERTER MODEL	Specification
Inverter Mode Specifications	Rated output power	5.5KW
	Output voltage waveform	Pure sine wave
	Output voltage	230Vac
	Output current limit	24A
	Output frequency	50Hz / 60Hz
	Peak efficiency	92%
	Overload protection	5s@≥150% load; 10s@110~150% load
	No-load power consumption	＜50W

5.3.Charge Mode Specifications

	INVERTER MODEL	Specification
Load pv solar charging mode	Charging power	5.5KW
	PV array MPPT voltage range	120-450Vdc
	Peak efficiency	98% Max
	Total input current (PV and utility)	80A(default)
	undervoltage protection	100Vdc
	over voltage protection	500Vdc
	Standby power consumption	<10W

6. Fault Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off.	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited or over temperature is detected	
06	Output voltage is too high.	
07	Overload time out	
08	Bus voltage is too high	
09	Bus soft start failed	
11	Main relay failed	
51	Over current or surge	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
56	Battery connection is open	

Fault Code	Fault Event	Icon on
57	Current sensor failed	
58	Output voltage is too low	

7. TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
The machine shuts down automatically during startup.	The LCD/LED and buzzer will activate for 3 seconds and then turn off completely.	Battery voltage too low(<1.91V/Cell)	1. Recharge the battery 2. Replace the battery
No response after power up.	No indication.	1.Battery voltage too low (<1.4V/Cell) 2.Battery polarity connections are reversed.	1. Check if the battery and wiring are well connected. 2. Recharge the battery. 3. Replace the battery
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is fashing.	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.(UPS->Appliance)
	Green LED is flashing	Set "Solar First" as the priority of output source.	Change output source priority to Utility frst.

Problem	LCD/LED/Buzzer	Explanation/ Possible cause	What to do
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LEDs are flashing	Battery is disconnected,	Check if battery wires are connected well.lo
Buzzer beeps continuously and red LED is on.	Fault code07	Overload eror, The inverter is overad 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code05	Output short circuited	Check if wiring is connected well and remove abnormal load.
		temperature of internal converter component is over 120℃.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code02	Internal temperature of inverter component is over 100°C.	
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is toc high.	Check if spec and quantity of batteries are meet requirements.
	Fault code01	Fan fault	Replace the fan.
	Fault code 06/58	Output abnormal (inverter voltage below than 190Vac or is higher than 260Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components failed	Retum to repair center.
	Fault code 51	Over currert or surge.	Restart the unit, if the error happens again, pleese return to repair center.
	Fault code 52	Bus voltage is too low.	
	Fault code 55	Output voltage is unbalanced.	
	Fault code 56	Battery is not connected well or fuse is burnt	If the battery is connected well, please return to repair center.

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