

# **USER MANUAL**

**3.5KW/5.5KW**  
**SOLARE INVERTER/CHARGER**

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## ABOUT THIS MANUAL

### Purpose

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

### Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

**The following cases are not within the scope of warranty.**

1. Out of warranty.
2. Series number was changed or lost.
3. Battery capacity was declined or external damaged.
4. Inverter was damaged caused by transport shift, remissness, etc external factor
5. Inverter was damaged caused by irresistible natural disasters.
6. Not in accordance with the electrical power supply conditions or operate environment caused damage.

## SAFETY INSTRUCTIONS



**WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.**

1. Before using the unit, read all instructions and cautionary markings on the unit the batteries and all appropriate sections of this manual.
2. **CAUTION** --To reduce risk of injury charge only deep-cycle lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
3. 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.
4. To reduce risk of electric shock, disconnect all wires before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. **CAUTION** --Only qualified personnel can install this device with battery.
6. NEVER charge a frozen battery.
7. For optimum operation of this inverter/charger; please follow required spec to select appropriate cable size. It is very important to correctly operate this inverter/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. Fuses (1 piece of 150A, 63VDC for 3kW~ 5kW) are provided as over-current protection for the battery supply.
11. **GROUNDING INSTRUCTIONS**- This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
12. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
13. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following trouble shooting table, please send this inverter/charger back to local dealer or service center for maintenance.

## INTRODUCTION

This is a multi-function inverter/charger; combining functions of inverter; solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

## Features

- Pure sine wave inverter
- Configurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload/ Over temperature/ short circuit protection
- Smart battery charger design for optimized battery performance
- Cold start function

## Basic System Architecture

The following illustration shows basic application for this inverter/charger. It also include following devices to have a complete running system:

- Generator or Utility
- PV modules (option)

Consult with your system integrator for other possible system architectures depending on your requirements.

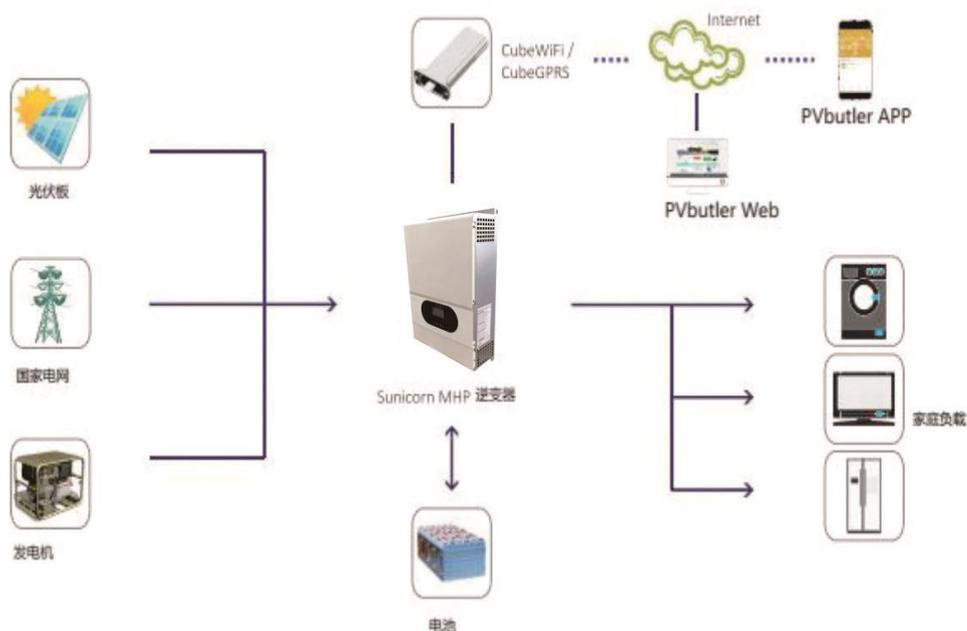
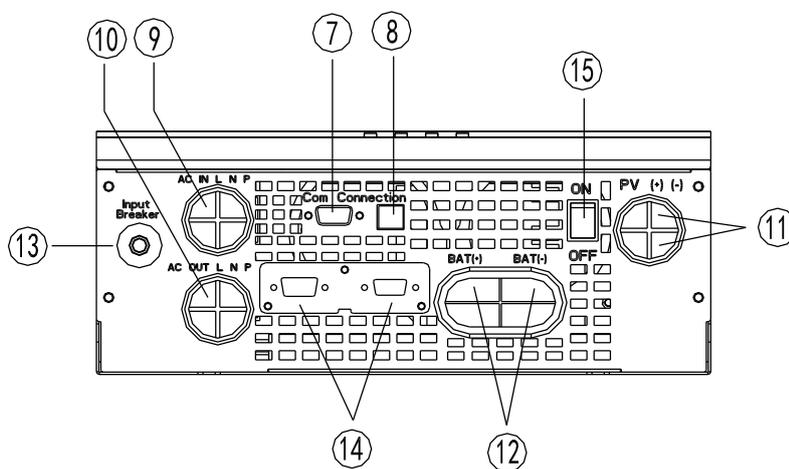
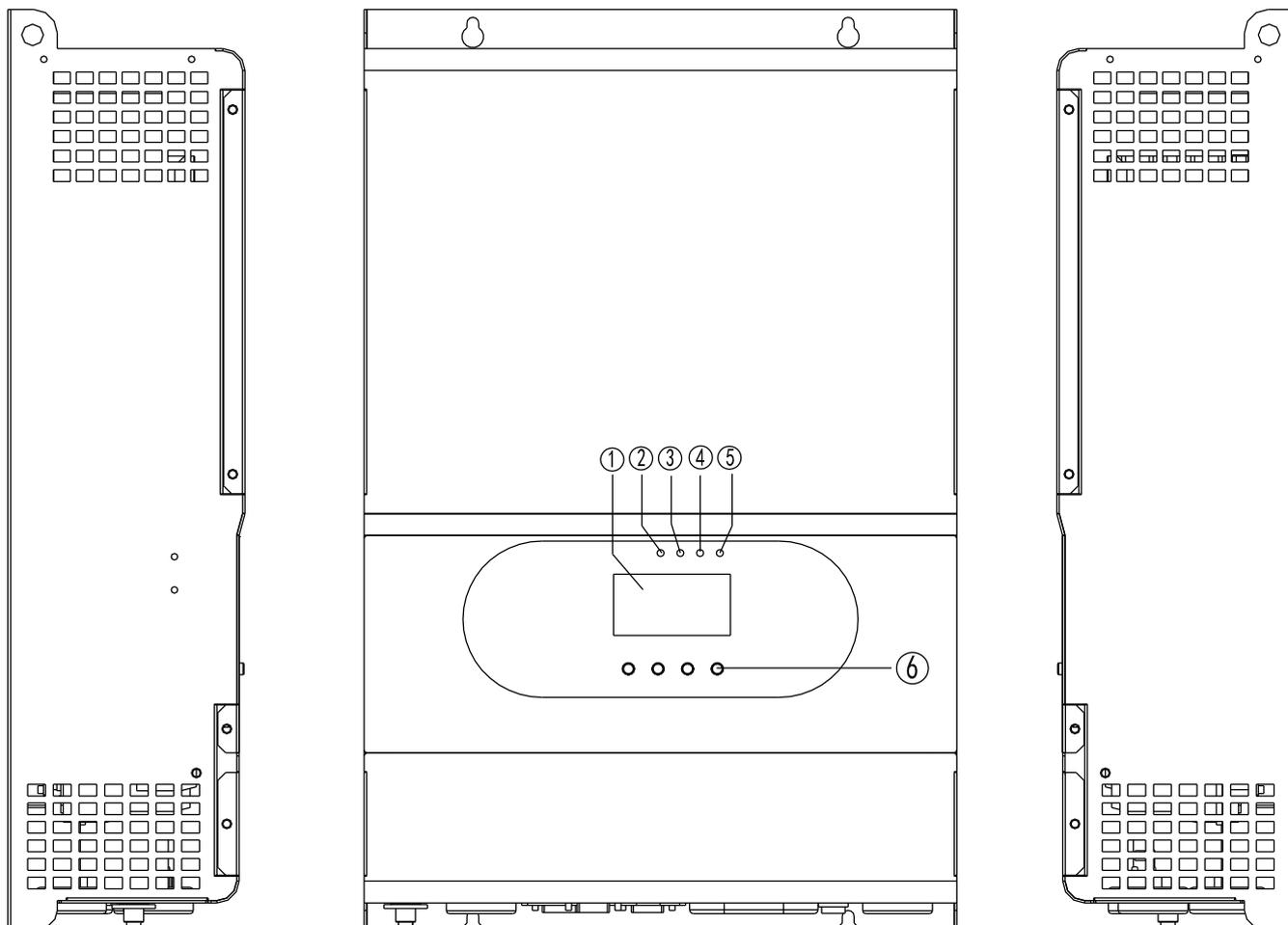


Figure 1 Hybrid Power System

# Product Overview



- |                                   |  |                  |                      |
|-----------------------------------|--|------------------|----------------------|
| 1. LCD display                    | 2. Line indicator  | 3. INV indicator | 4. Battery indicator |
| 5. Fault indicator                | 6. Function button   | 7. RS232 port    | 8. USB port          |
| 9. AC input                       | 10. AC output  | 11. PV input     | 12. Battery input    |
| 13. Input over current protection | 14. Parallel communication port (only for models with parallel function) |                  |                      |
| 15. Power on/off switch           | 16. Installation kit   |                  |                      |

# INSTALLATION

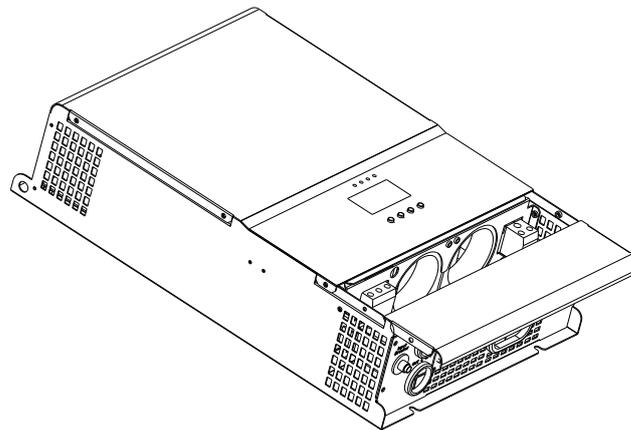
## Unpacking and Inspection

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

- The unit x 1
- User manual x 1

## Preparation

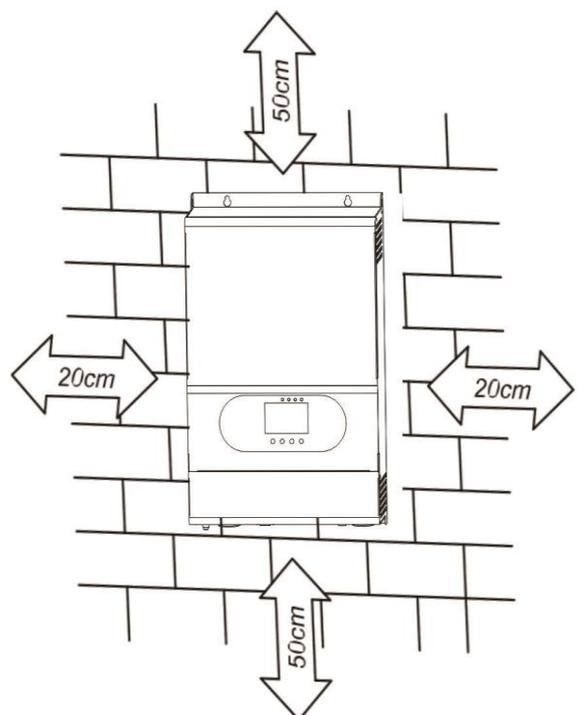
Before connecting all wires, please  
Remove two screws as shown below.



## Mounting the Unit

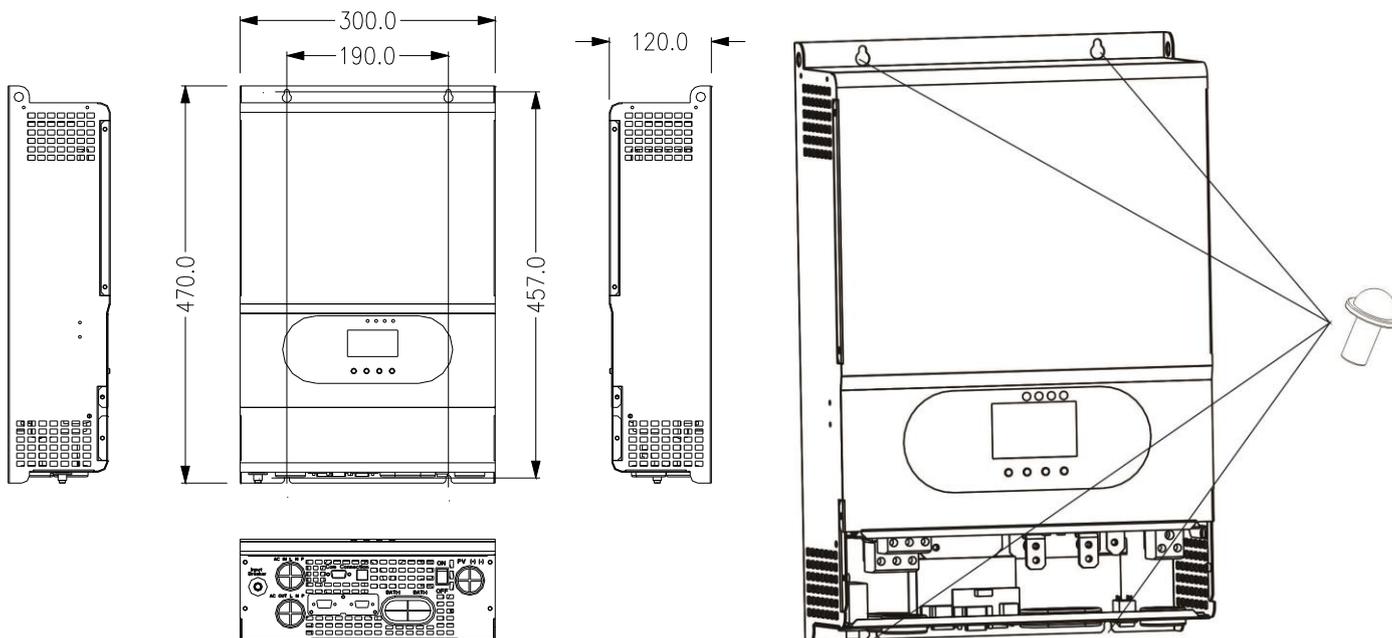
Consider the following points before selecting where to install:

1. Do not mount the inverter on flammable construction materials.
2. Mount on a solid surface.
3. Install this inverter at eye level in order to allow the LCD display to be read at all times.
4. For proper air circulation to dissipate heat, allow a clearance of approx. 200 mm to the side and approx. 300 mm above and below the unit.
5. The ambient temperature should be between 0c and 55°C to ensure optimal operation.
6. The recommended installation position is to be adhered to the wall vertically.
7. Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.



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

Install the unit by screwing four screws.



### Battery Connection

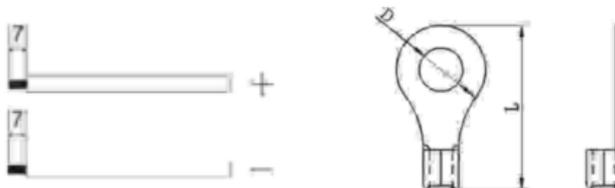
**CAUTION:** For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it is still requested to have over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

**WARNING!** All wiring must be performed by a qualified personnel.

**WARNING!** It's very important for system safety and efficient operation to use appropriate cable for battery connection.

To reduce risk of injury, please use the proper recommended cable and terminal size as below.

**Ring terminal:**

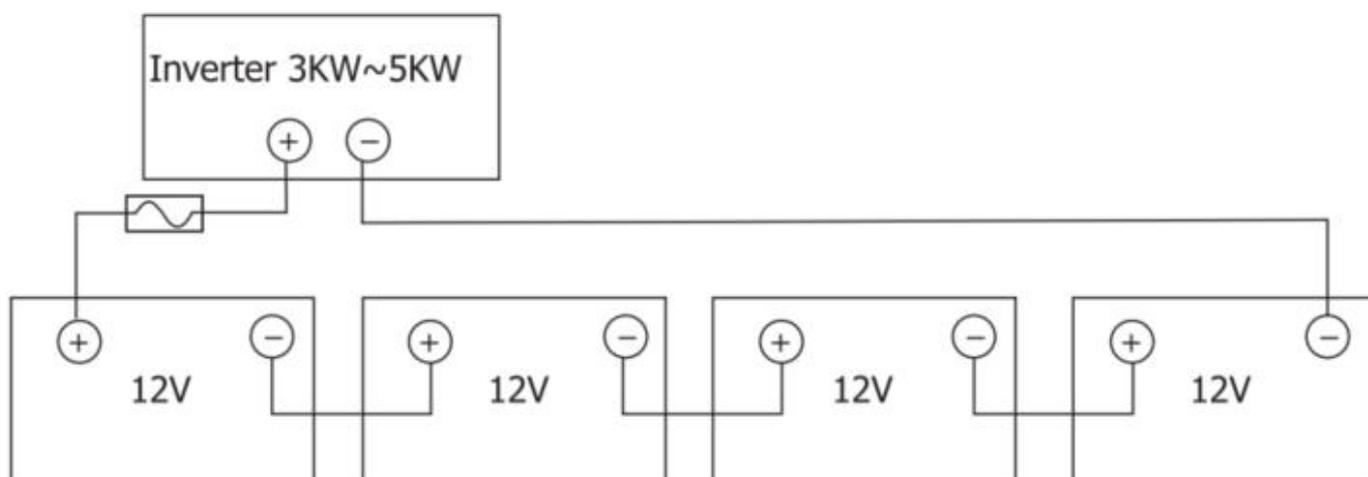
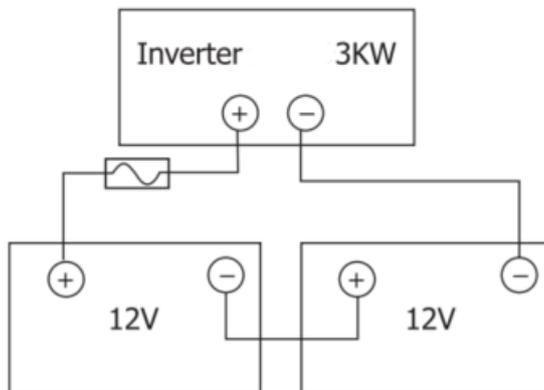


**Recommended battery cable and terminal size:**

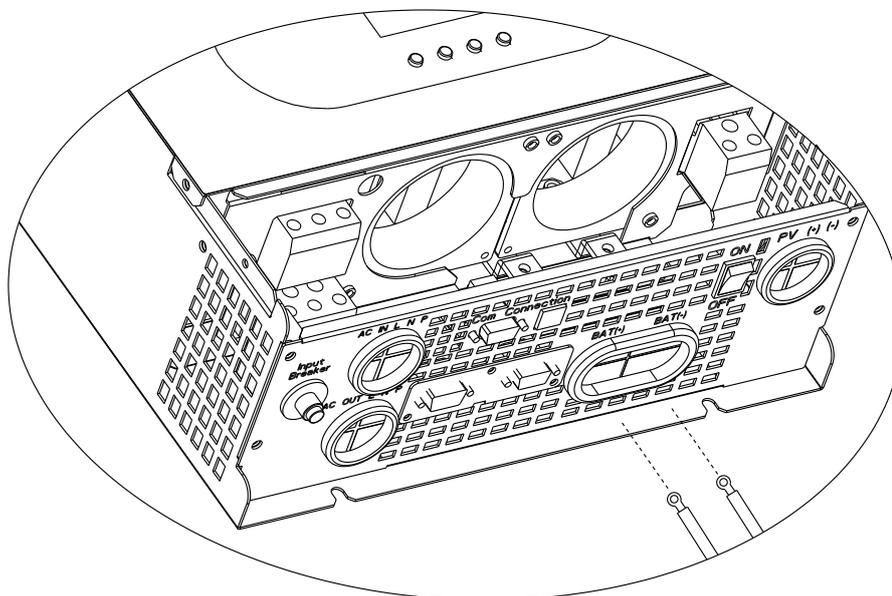
Model	Typical Amperage	Wire Size	Cable mm <sup>2</sup>	Ring Terminal		Torque Value
				Dimensions		
				D (mm)	L (mm)	
3kW DC24V	118A	1*2AWG	38	8.4	39.2	5Nm
3kW DC48V	71A	1*6AWG	14	8.4	39.2	
5kW DC48V	118A	1*2AWG	38	8.4	39.2	

Please follow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. Connect all battery packs as units requires. It's suggested to connect at least 200Ah capacity battery for 3kW~5kW model.



3. 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. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.



**WARNING: Shock Hazard**

Installation must be performed with care due to high battery voltage in series.



**CAUTION!!** Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur.

**CAUTION!!** Do not apply anti-oxidant substance on the terminals before terminals are connected tightly.

**CAUTION!!** Before making the final DC connection or closing DC breaker/dis-connector; be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

## AC Input/Output 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 spec of AC breaker is 32A for 3kW and 50A for 5kW.

**CAUTION!!** There are two terminal blocks with "IN" and "OUT" markings. Please do not invert input and output connectors.

**WARNING! All wiring must be performed by a qualified personnel.**

**WARNING!** It's very important for system safety and efficient operation to use appropriate cable for AC input connection, to reduce risk of injury, please use the proper recommended cable size as below.

### Suggested cable requirement for AC wires

Model	Gauge	Torque Value
3KW DC24V	12 AWG	1.2~ 1.6Nm
3KW DC48V	12 AWG	1.4~ 1.6Nm
5KW DC48V	10 AWG	1.4~ 1.6Nm

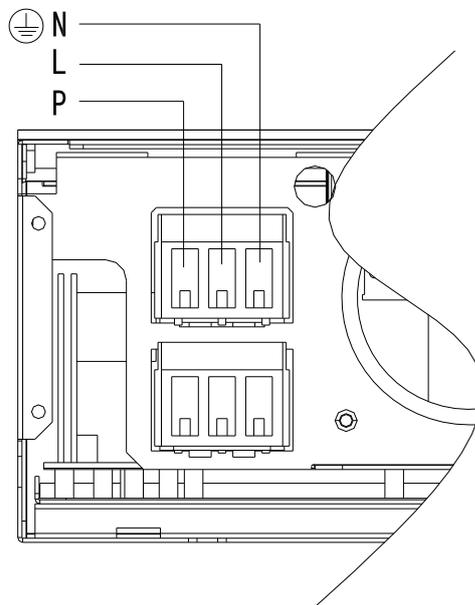
Please follow below steps to implement AC input/output connection:

1. Before making AC input/output connection, be sure to open DC protector or dis-connector first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor @ ) first.

4. PE→Ground (Yellow -Green)

5. L→Line (brown or black)

6. N→Neutral (blue)

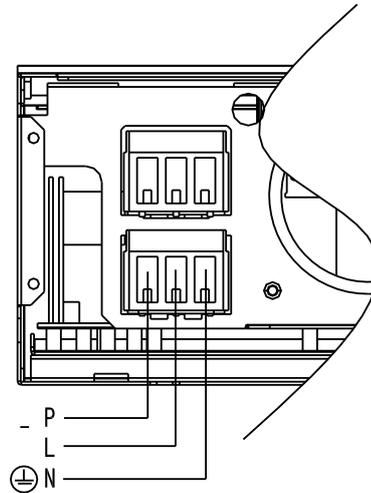


**WARNING:**

Be sure to that AC power source is disconnected before attempting to hard-wire it to the unit.

4. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor @ )first.

- ⊕ PE→Ground (Yellow -Green)
- L→Line (brown or black)
- N→Neutral (blue)



5. Make sure the wires are securely connected.

**CAUTION: Important**

Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

**CAUTION:** Appliances such as air conditioner are required at least 2~3 minutes to restart because it is required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. **To prevent this kind of damage, please check manufacturer of air conditioner if it is equipped with time-delay function before installation. Otherwise, this inverter/charger will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.**

**PV Connection**

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

**WARNING!** All wiring must be performed by a qualified personnel.

**WARNING!** It's very important for system safety and efficient operation to use appropriate cable for PV module connection.

To reduce risk of injury; please use the proper recommended cable size as below.

Model	Typical Amperage	Cable Size	Torque
3kW	60A	8AWG	2.0-2.4 Nm
5kW	80A	8AWG	2.0-2.4 Nm

**PV Module Selection:**

When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.
3. Max. Power Voltage (Vmpp) of PV modules should be close to best Vmp of inverter or within Vmp range to get best performance. If one PV module can not meet this requirement, it's necessary to have several PV modules in series

connection. Refer to below table.

Note:\* Vmp: panel max power point voltage.

The PV charging efficiency is maximized while PV system voltage is close to Best Vmp.

Maximum PV module numbers in Series: Vmpp of PV module\*X pcs = Best Vmp of Inverter or Vmp range

PV module numbers in Parallel: Max. charging current of inverter/Impp

Total PV module numbers=maximum PV module numbers in series\*PV module numbers in parallel.

<b>Solar Charging Mode</b>			
<b>INVERTER MODEL</b>	<b>3KW DC24V</b>	<b>3KW DC48V</b>	<b>5KW DC48V</b>
<b>Rated Power</b>	3000W	3000W	5000W
<b>MPPT charger</b>			
solar charging current	60A	80A	80A
Max.PV Array Power	1500W	5500W	
Max. PV Array Open Circuit Voltage	145Vdc	450Vdc	
PV Array MPPT Voltage Range	30~115Vdc	120~430Vdc	
Min. battery voltage for PV charge	30Vdc	120Vdc	
<b>AC INPUT charger</b>			
AC charging current	60A	80A	80A
Operating Voltage Range	90~280Vac		

**PV module configuration**

Recommended module specification

Maximum Power (Pmaxl)	250W
Max. Power Voltage Vmpp(V)	30.9V
Max. Power Current Impp(A)	8.42A
Open Circuit Voltage Voc(V)	37.7V
Short Circuit Current Isc(A)	8.89A

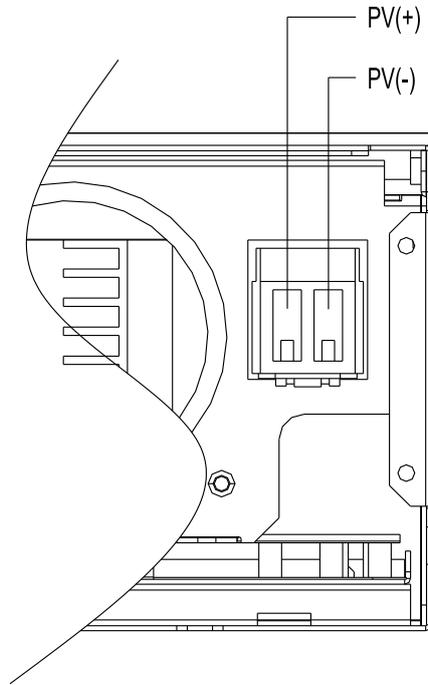
Recommended PV module configuration

Model	Solar Input	Qty of Panels	Total Input Power
3000W DC24V	3 pcs in series and 2 set in parallel	6 pcs	1500W
3000W DC48V 5000W DC48V	6 pcs in series	6 pcs	1500W
	8 pcs in series	8 pcs	2000W
	12 pcs in series	12 pcs	3000W
	13 pcs in series	13 pcs	3250W
	8 pcs in series and 2 set in parallel	16 pcs	4000W
	10 pcs in series and 2 set in parallel	20 pcs	5000W

Please follow below steps to implement PV module connection:

1. Remove insulation sleeve 10 mm for positive and negative conductors
2. Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+)of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.

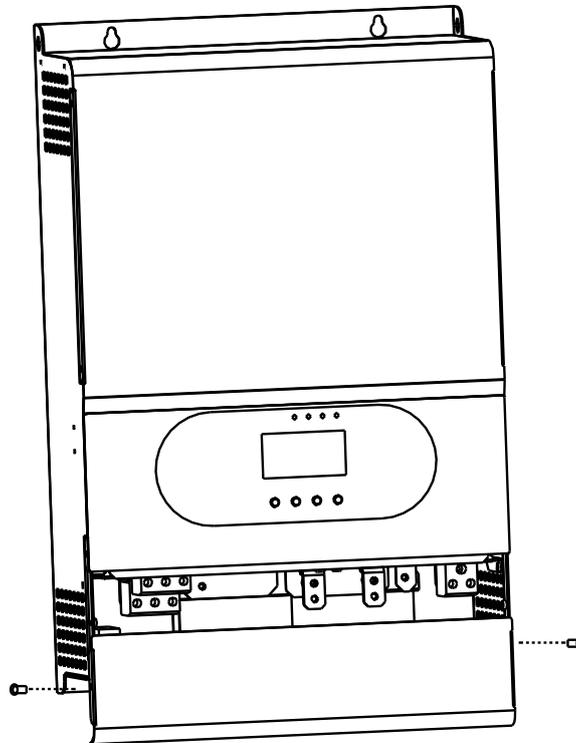




3. Make sure the wires are securely connected.

## Final Assembly

After connecting all wires, please put bottom cover back by screwing two screws as shown below.



## Communication Connection

Please use supplied communication cable to connect to inverter and PC. Insert bundled CD into a computer and follow on-screen instruction to install the monitoring software. For the detailed software operation, please check user manual of

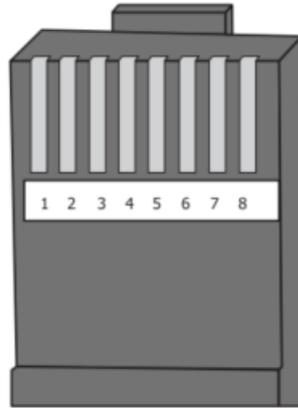
software inside of CD.

**WARNING:** It is forbidden to use network cable as the communication cable to directly communicate with the PC port.  
**Otherwise, the internal components of the controller will be damaged.**

**WARNING:** RJ45 interface is only suitable for the use of the company's supporting products or professional operation.

Below chart show RS45 pins definition.

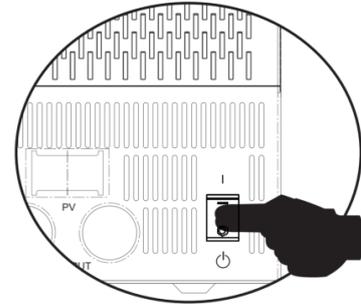
Pin	Definition
1	RS-485-B
2	RS-485-A
3	GND
4	
5	CANL
6	CANH
7	
8	



## OPERATION

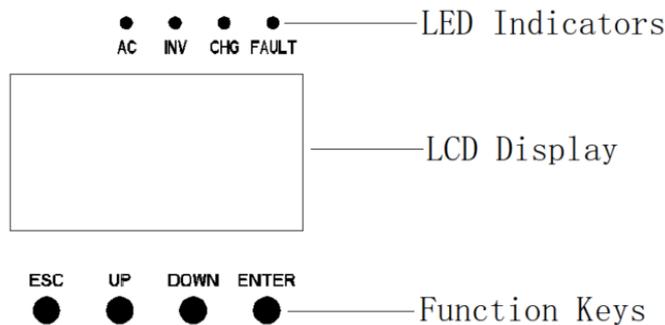
### Power ON/OFF

When the inverter works in AC mode, output is powered on or off by the button.  
 If powering the inverter to battery mode, must first switch on the button.



### Operation and Display Panel

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



LED Indicator

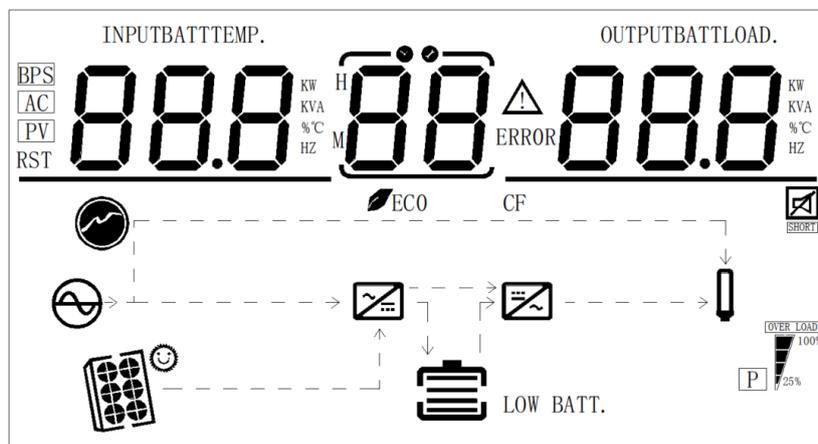
LED Indicator		Messages	
AC	Green	On	AC input is normal and working in AC Mode
		Flash	AC input is normal, but not working in AC Mode
		Off	AC input is abnormal.
INV	Yellow	On	Working in Battery Mode
		Off	Not working in Battery Mode

BAT	Yellow	On	Battery is in float charge.
		Flash	Battery is in constant voltage charge.
		Off	Not in charge
FAULT	Red	On	Fault occurs.
		Flash	Warning occurs.
		Off	No fault or alarm

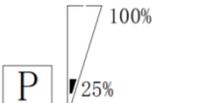
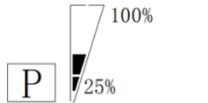
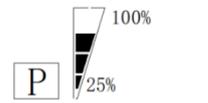
### Function keys

Function Keys	Description
ESC	Return to previous level.
UP	Increase the setting value.
DOWN	Decrease the setting value.
ENTER	Enter setting mode and confirm the selection in setting mode go to next

### LCD Display ICONS



Icon	Function Description
<b>Input Source Information and Output Information</b>	
	Indicates the AC information
	Indicates the DC information
	Indicate input voltage, input frequency, PV voltage, battery voltage and charger current. Indicate output voltage, output frequency, load in VA, load in Watt and discharging current.
<b>Configuration Program and Fault Information</b>	
	Indicates the setting programs
	Indicates the warning and fault codes. Warning:  flashing with warning code. Fault:  lighting with fault code.
<b>Battery Information</b>	

	Indicate battery level by 0-24%, 25%-49%, 50-74% and 75-100% in battery mode and charging status in line mode		
<b>In AC mode, it will present battery charging status</b>			
Status	Battery voltage	LCD Display	
Constant Current mode/Constant Voltage mode	<2V/cell	4 bars will flash in turns	
	2V/cell~2.083V/cell	Bottom bar will be on and the other three bars will flash in turns.	
	2.083v/cell~2.167v/cell	Bottom two bars will be on and the other two bars will flash in turns.	
	>2.167V/cell	Bottom three bars will be on and the top bar will flash.	
Batteries are fully charged.		4 bars will be on.	
<b>In battery mode, it will present battery capacity</b>			
Load Percentage	Battery Voltage	LCD Display	
Load >50%	<1.717V/cell		
	1.717V/cell~1.8V/cell		
	1.8V/cell~1.883V/cell		
	>1.883 V/cell		
50% > Load > 20%	<1.817V/cell		
	1.817V/cell~1.9V/cell		
	1.9 V/cell ~1.983V/cell		
	>1.983 V/cell		
Load < 20%	<1.867V/cell		
	1.867V/cell~i.95V/cell		
	1.95V/cell~2.033V/cell		
	>2.033 V/cell		
<b>Load Information</b>			
	Indicates overload.		
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.		
	0%~24% 	25%~49% 	50%~74% 
<b>Mode Operation Information</b>			

	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
	Indicates load is supplied by utility power.
	Indicates the solar charger circuit is working.
	Indicates the DC/AC inverter circuit is working.
<b>Mute Operation</b>	
	Indicates unit alarm is disabled.

## LCD Setting

After pressing and holding "ENTER" button for 2 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" or "ESC" button to confirm the selection and exit.

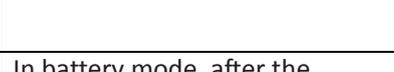
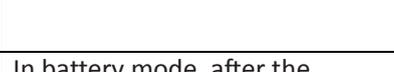
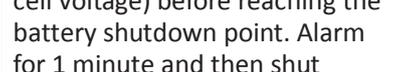
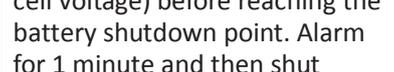
### Setting Programs:

Program	Description	Select-able option
01	Output voltage  NOTE: When the output voltage is set to 208V, the output needs to be derated to 90%.	208V OPU 01 208 <sub>v</sub>
		220V OPU 01 220 <sub>v</sub>
		230V (default) OPU 01 230 <sub>v</sub>
		240V OPU 01 240 <sub>v</sub>
02	Output frequency	50Hz (default) OPF 02 50 <sub>Hz</sub>
		60Hz OPF 02 60 <sub>Hz</sub>
03	Output source priority : To configure load power source priority	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available. OPP 03 Ut-d
		Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time. OPP 03 PV
		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. OPP 03 Pbc

			Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 15.
04	AC input voltage range	nDd 04 APP	If selected, acceptable AC input voltage range will be within 90-280VAC.
		nDd 04 UPS	If selected, acceptable AC input voltage range will be within 170-280VAC.
05	Charger source priority :To configure charger source priority	CHP 05 PNC	Solar energy and utility will charge battery at the same time.
		CHP 05 OPV	Solar energy will be the only charger source no matter utility is available or not
		CHP 05 Ut-d	Utility will charge battery as first priority. Solar energy charge battery only when utility is not available.
		CHP 05 PV	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
06	Maximum utility charging current 3/5KVA:1-60A	ACC 06 60	Note: If setting value in program 07 is smaller than that in program in 06, the inverter will apply charging current from program 07 for utility charger.
07	Maximum charging current: To configure total charging current for solar and utility chargers	nCC 07 120	Max. charging current =utility charging current + solar charging current. 3KW 24VDC: 2/10/20/30/40/50/60/70/ 80/90/100/110/120A can set. 3KW 48VDC/ 5KW 48VDC:2/10/ 20/30/40/50/60/70/80A can set.
08	Auto return to default display screen	ON (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.	OFF : If selected, the display screen will stay at latest screen user finally switches.
		nDf 08 ON	nDf 08 OFF
09	Auto restart when overload occurs	Restart disable (default) LTS 09 OFF	Restart enable LTS 09 ON

10	Auto restart when over temperature occurs	Restart disable (default) E75 10 OFF	Restart enable E75 10 ON
11	Beeps while primary source is interrupted	Alarm on (default) n1P 11 ON	Alarm off n1P 11 OFF
12	Low power power saving	Power Saving OFF (default) P45 12 OFF	Power Saving ON P45 12 ON
13	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) OLC 13 OFF	Bypass enable OLC 13 ON
14	Buzzer mute setting	Buzzer on (default) nUt 14 OFF	Buzzer off nUt 14 ON
15	Low DC cut-off voltage: • If battery power is only power source available, inverter will shut down. • If PV energy and battery power are available, inverter will charge battery without AC output. If PV energy, battery power and utility are all available, inverter will transfer to line mode and provide output power to loads.	<b>When the battery definition mode is CUS (customer set type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 23.0V Set Range : 22-26V bEtG 15 230 <sup>v</sup>	3KW 48VDC/5KW 48VDC Default setting : 46.0V Set Range : 44-52V bEtG 15 460 <sup>v</sup>
		<b>When the battery definition mode is AGM (lead-acid battery type), FLD (water injection battery type) mode:the setting point in program 17.</b>	
		3KW 24VDC default setting : 23.0V Set Range: 22-26V bEtG 15 230 <sup>v</sup>	3KW 48VDC/5KW 48VDC Default setting : 46.0V Set Range : 44-52V bEtG 15 460 <sup>v</sup>
		<b>When the battery definition mode is UB (lithium battery type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 23.8V Set Range : 20-25V bEtG 15 238 <sup>v</sup>	3KW 48VDC/5KW 48VDC Default setting : 47.6V Set Range : 40-50V bEtG 15 476 <sup>v</sup>
16	Setting voltage point back to battery mode when selecting "OPP" (OPP " priority) in program 03.	<b>When the battery definition mode is CUS (customer set type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 26.0V Set Range : 24-29V bEtG 16 260 <sup>v</sup>	3KW 48VDC/5KW 48VDC Default setting : 54.0V Set Range : 48-58V bEtG 16 540 <sup>v</sup>

		<b>When the battery definition mode is AGM (lead-acid battery type), FLD (water injection battery type) mode:the setting point in program 17.</b>	
		3KW 24VDC Default setting : 26.0V Set Range : 24-29V 	3KW 48VDC/5KW 48VDC Default setting : 52.0V Set Range : 48-58V 
		<b>When the battery definition mode is LIB (lithium battery type) mode: the setting point in program 17.</b>	
		3KW 24VDC default setting : 27.2V Set Range : 23-29V 	3KW 48VDC/5KW 48VDC Default setting : 54.4V Set Range : 46-58V 
17	Battery Type	Lead-acid batteries (default): "AGM" 	Water-filled battery : "FLD" 
		Lithium battery: "LIB" 	Customer Setup Type : "CUS" 
18	Battery low voltage alarm point	<b>When the battery definition mode is CUS (customer set type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 22.0V Set Range : 21-27V 	3KW48VDC/5KW48VDC Default setting : 44.0V Set Range : 42-54V 
		<b>When the battery definition mode is LIB (lithium battery type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 23.8V Set Range : 20.6-25V 	3KW48VDC/5KW48VDC Default setting : 47.6V Set Range : 41.2-50V 
19	Battery low voltage shutdown point	<b>When the battery definition mode is CUS (customer set type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 21.0V Set Range : 20-24V 	3KW 48VDC/5KW 48VDC Default setting : 42.0V Set Range : 40-48V 
		<b>When the battery definition mode is LIB (lithium battery type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 23.0V Set Range : 20-24V 	3KW 48VDC/5KW 48VDC Default setting : 46.0V Set Range : 40-48V 

20	Battery Constant Voltage	<b>When the battery definition mode is CUS (customer set type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 28.2V Set Range : 28-29V 	3KW48VDC/5KW48VDC Default setting : 56.4V Set Range : 48-60V 
		<b>When the battery definition mode is LIB (lithium battery type) mode: the setting point in program 17.</b>	
		3KW 24VDC Default setting : 28.2V Set Range : 25-29V 	3KW48VDC/5KW48VDC Default setting : 56.4V Set Range : 48-56V 
21	Floating Charging Voltage	<b>When the battery definition mode is CUS (customer set type) mode: the setting point in program 17.</b>	
		3KW24VDC Default setting : 27.6V Set Range : 26.6-27.8V 	3KW48VDC/5KW48VDC Default setting : 54.0V Set Range : 48-60V 
		<b>When the battery definition mode is LIB (lithium battery type) mode: the setting point in program 17.</b>	
		2KW24VDC/3KW24VDC Default setting : 27.6V Set Range : 24-28V 	3KW48VDC/5KW48VDC Default setting : 55.2V Set Range : 50-58V 
22	Line Low Voltage	The setting point in program 04 APP mode default setting : 154V Set Range : 90-154V 	The setting point in program 04 UPS mode default setting : 185V Set Range : 170-200V 
		The setting point in program 04 APP mode default setting : 264V Set Range : 264-280V 	The setting point in program 04 UPS mode default setting : 264V <b>Fixed value, cannot be changed.</b> 
23	Line High Voltage	The setting point in program 04 APP mode default setting : 264V Set Range : 264-280V 	The setting point in program 04 UPS mode default setting : 264V <b>Fixed value, cannot be changed.</b> 
		Set Range : 1-8 Hours When the battery voltage exceeds 13.2V (single cell voltage) for more than 30s, this discharge time will be reset. 	In battery mode, after the continuous discharge time exceeds this set value, the battery voltage shutdown point will be modified to 11V (single cell voltage) before reaching the battery shutdown point. Alarm for 1 minute and then shut down. 
24	Low Watt Discharge	Set Range : 1-8 Hours When the battery voltage exceeds 13.2V (single cell voltage) for more than 30s, this discharge time will be reset. 	In battery mode, after the continuous discharge time exceeds this set value, the battery voltage shutdown point will be modified to 11V (single cell voltage) before reaching the battery shutdown point. Alarm for 1 minute and then shut down. 
		OFF(default) When set to OFF, the output switch will not be closed until the inverter voltage rises to the rated output. 	ON When set to ON, the inverter output gradually increases from 0 to the target voltage value. 
25	Soft Relay Enable	OFF(default) When set to OFF, the output switch will not be closed until the inverter voltage rises to the rated output. 	ON When set to ON, the inverter output gradually increases from 0 to the target voltage value. 
		Before setting, this interface is displayed as OFF, when it is set to ON, the system will restore the default settings. After the setting is completed, this	
26	Set Default (Reset all settings to default)	Before setting, this interface is displayed as OFF, when it is set to ON, the system will restore the default settings. After the setting is completed, this	

	values)	interface will display OFF again. <b>Setting conditions: It can be set in mains mode and standby (standby: no output but bright screen state). It cannot be set in battery mode.</b> 
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## Fault Reference Code

Fault: The inverter enters the fault mode, the LED red light is always on, and the LCD displays the fault code.

The alarm code ALA flashes and the buzzer beeps for 1s and stops for 1 minute. The fault indicator code is always on, the buzzer stops after 10s long beeping, the fault is eliminated after the stop, try to restart the machine, if it fails to restart three times, it will continue in the fault state. A complete power off (screen off) is required before the machine can be restarted.

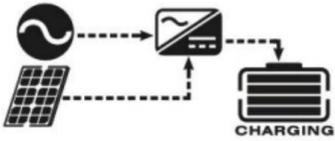
Fault Code	Fault Cause	LCD Indication
1	Bus soft start failed	ALA 1
2	Bus high	ALA 2
3	Bus low	ALA 3
5	Inverter transformer over temperature	ALA 5
6	Battery voltage is too high	ALA 6
7	Bus soft failed	ALA 7
8	Bus short Fault	ALA 8
9	INV short Fault	ALA 9
10	INV over voltage	ALA 10
11	INV under voltage	ALA 11
12	INV short	ALA 12
13	Negative power	ALA 13
14	Over load fault	ALA 14
15	Model fault	ALA 15
16	No boot loader	ALA 16

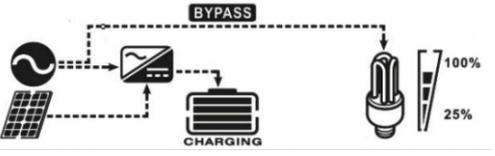
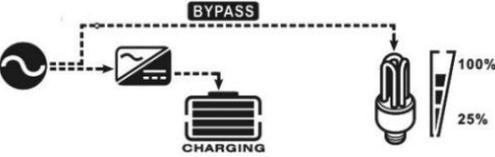
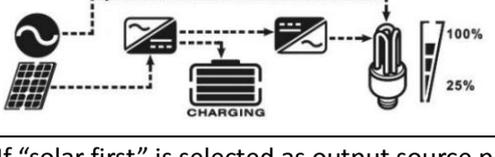
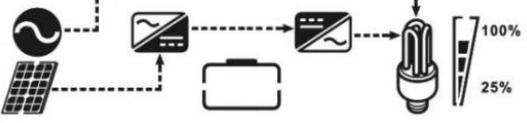
## Warning Indicator

(Warning ) Alarm: The inverter does not enter the fault mode, the red LED flashes, and the LCD displays the alarm code.

Warning Code	Warning Event	Icon Flashing
50	Battery terminal	ALA 50
51	Battery under	ALA 51
52	Battery low	ALA 52
53	Battery charge short	ALA 53
55	Battery over charge	ALA 55
57	Over temperature	ALA 57
58	Fan fault	ALA 58
59	EEPROM Fault	ALA 59
60	Over load warning	ALA 60
62	PV energy weak	ALA 62

## Operating Mode Description

Operating Mode	Description	LCD display
Standby mode/ Power saving mode <b>Note:</b> Standby mode: The inverter is not turned on, but at this time, the inverter can charge battery without AC output. Power saving mode: If enabled, the output 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.	Charged by utility and PV energy. 
		Charged by utility. 
		Charged by PV energy. 
Fault mode <b>Note:</b>	PV energy and grid can charge batteries.	Charged by utility and PV energy.

<p>Fault mode: Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.</p>		
		<p>Charged by utility.</p> 
		<p>Charged by PV energy.</p> 
<p>Line Mode</p>	<p>The unit will provide output power from the mains. It will also charge the battery at line mode.</p>	<p>Charged by utility and PV energy.</p> 
		<p>Charged by utility.</p> 
		<p>If “solar first” 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.</p>
		
		<p>If “solar first” is selected as output source priority and batteries are not connected, solar energy and the utility will provide the loads.</p> 
		<p>Power from utility.</p>

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.
		Power from PV energy only.

## Display Setting

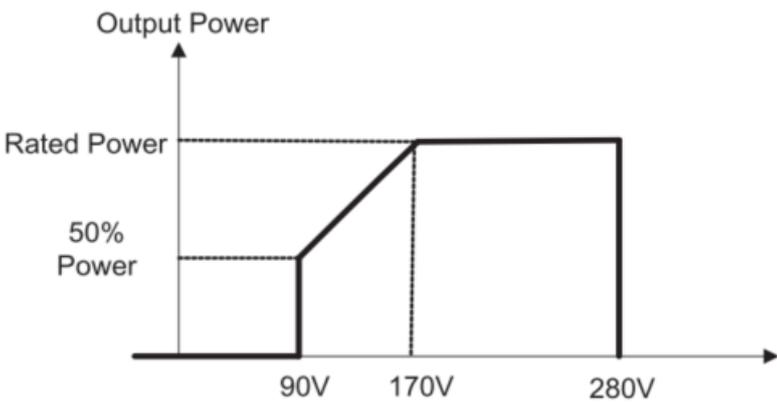
The LCD display information will be switched in turns by pressing "UP" or "DOWN" key. The selectable information is switched as below order: battery voltage, battery current, inverter voltage, inverter current, grid voltage, grid current, load in Watt, load in VA, grid frequency, inverter frequency; PV voltage, PV charging power; PV charging output voltage, PV charging current.

Selectable information	LCD display
Battery voltage/DC discharging current	
Inverter output voltage/Inverter output current	
Grid voltage/Grid current	
Load in Watt	
Grid frequency/Inverter frequency	

PV voltage and power	$PV$ 120 <sup>V</sup>	200 <sup>KW</sup>
PV charger output voltage and PV charging current	$PV$ 510 <sup>V</sup>	OUTPUT 400 <sup>A</sup>

## SPECIFICATIONS

**Table 1 Line Mode Specifications**

INVERTER MODEL	3kW/5kW
Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Loss Voltage	90Vac $\pm$ 7V(APP); 170Vac $\pm$ 7V(UPS)
Low Loss Return Voltage	100Vac $\pm$ 7V(APP); 180Vac $\pm$ 7V(UPS)
High Loss Voltage	280Vac $\pm$ 7V(UPS,APP)
High Loss Return Voltage	270Vac $\pm$ 7V(UPS,APP)
Max AC Input Voltage	300Vac
Nominal Input Frequency	50Hz/60Hz(Auto detection)
Low Loss Frequency	40Hz $\pm$ 1Hz(UPS/APP),50Hz; 50Hz $\pm$ 1 Hz(UPS,APP),60Hz;
Low Loss Return Frequency	43.5Hz $\pm$ 1Hz(UPS),40.5Hz $\pm$ 1Hz(APP),50Hz; 53.5Hz $\pm$ 1Hz(UPS, 50.5Hz $\pm$ 1 Hz(APP),60Hz;
High Loss Frequency	60Hz $\pm$ 1Hz(UPS),70Hz $\pm$ 1Hz(APP),50Hz; 70Hz $\pm$ 1Hz(UPS),70Hz $\pm$ 1Hz(APP),60Hz;
High Loss Return Frequency	56.5Hz $\pm$ 1Hz(UPS),69.5Hz $\pm$ 1Hz(APP),50Hz; 66.5Hz $\pm$ 1Hz(UPS),69.5Hz $\pm$ 1Hz(APP),60Hz;
Output Short Circuit Protection	Line mode: Circuit Breaker Battery mode: Electronic Circuits
Transfer Time	10ms typical (UPS,APP)
Output power derating: When AC input voltage drops to 95V or 170V depending on models, the output power will be derated.	230Vac model: 

**Table 2 Inverter Mode Specifications**

INVERTER MODEL	3KW DC24V	3KW DC48V	5KW DC48V
Rated Output Power	3000W	3000W	5000W
Output Voltage Waveform	Pure Sine Wave		
Output Voltage Regulation	230Vac±5%		
Output Frequency	60Hz or 50Hz		
Peak Efficiency	>93%		
Overload Protection	60S@102%~110% load; 10S@110%~130% load; 3s@130%~150 load; 200ms@>150% load;		
Surge Capacity	2 x rated power for 5 seconds		
Nominal DC Input Voltage	24Vdc	48Vdc	48Vdc
Cold Start Voltage	23.0Vdc	46.0Vdc	46.0Vdc
Low DC Warning Voltage	22.0Vdc	44.0Vdc	44.0Vdc
Low DC Cut-off Voltage	21.0Vdc	42.0Vdc	42.0Vdc
High DC Recovery Voltage	27Vdc	58Vdc	58Vdc
High DC Cut-off Voltage	32Vdc	61Vdc	61Vdc

**Table 3 Charge Mode Specifications**

Charge Mode Specifications				
INVERTER MODEL		3KW DC24V	3KW DC48V	5KW DC48V
Charging Current @ Nominal Input Voltage		1~120A	1~80A	1~80A
Absorption Voltage	AGM / FLD/LIB/CUS Battery	25Vdc	50Vdc	50Vdc
	Flooded battery	25Vdc	50Vdc	50Vdc
Floating charging voltage	AGM / FLD/LIB/CUS Battery	27.4Vdc	54.8Vdc	54.8Vdc
	Flooded battery	27.4Vdc	54.8Vdc	54.8Vdc
Bulk charging voltage (C.V voltage)	AGM / FLD/LIB/CUS Battery	28.8Vdc	57.6Vdc	57.6Vdc
	AGM / FLD/LIB/CUS Battery	28.4Vdc	56.8Vdc	56.8Vdc
Charging Algorithm		17-Step(Battery Type , AGM/FLD/UB/CUS Battery)		
<b>Solar Charging Mode</b>				
INVERTER MODEL		3KW DC24V	3KW DC48V	5KW DC48V
Rated Power		3000W	3000W	5000W
<b>MPPT charger</b>				
solar charging current		60A	80A	80A
Max.PV Array Open Circuit Voltage		145Vdc max	450Vdc max	450Vdc max
PV Array MPPT Voltage Range		30~115Vdc	120~430Vdc	120~430Vdc
Min battery voltage for PV charge		30Vdc	120Vdc	120Vdc
Standby Power Consumption		2W		
<b>Line mode charger</b>				
charging current		60A	60A	60A
Line Voltage Range		90~280VAC(APP mode); 170~280VAC(UPS mode)		
Battery Voltage Accuracy		+/-0.3%		
Voltage Accuracy		+/-2V		

Charging Algorithm	17-Step(Battery Type , AGM/FLD/UB/CUS Battery)		
Charging algorithm for lead acid battery			
Charging algorithm for lithium battery			
<b>Joints Utility and Solar Charging</b>			
INVERTER MODEL	3KW DC24V	3KW DC48V	5KW DC48V
Solar charging mode	MPPT		
Maximum charging current	60A	80A	80A
Default charging current	60A	80A	80A

**Table 4 General Specifications**

INVERTER MODEL	3KW DC24V	3KW DC48V	5KW DC48V
Safety Certification	CE		
Operating Temperature Range	-10°C to 50°C		
Storage temperature	-15°C~ 60°C		
Dimension (D*W*H) mm	155x335x507		
Net Weight (kg)	7.0	8.5	9.0

## Trouble shooting

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (< 1.91V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after powering on.	No indication	1. The battery voltage is far too low (<1.4V/Cell) 2. Battery polarity is connected reversed. Input protector is tripped	1. Check if batteries the wiring are connected and well. 2. Re-charge battery. 3. Replace battery.
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. (Applia nee=> wide)
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.
Buzzer beeps continuously and red LED is on.	Fault code 14	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 12	Output short circuited.	Check if wiring is connected well and remove abnormal load.
	Fault code 5	Internal temperature of inverter component is over 90 °C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 6	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.
	Fault code 10/11	Output abnormal (Inverter voltage below than 202Vac or is higher than 253Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 1/7/8/9/15/16	Internal components filed.	Return to repair center
	Fault code 51	Over current or surge	Restart the unit, if the error happens again, please return to repair center.
	Fault code 2/3	Bus voltage is too high/too low	
Fault code 15	Model fault		
Buzzer beeps and red LED is flashing.	Fault code 58	Fan fault	Fan fault
	Fault code 50/51/52	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.

## Appendix: Approximate Back-up Time Table

Model	Load(W)	Backup Time@24Vdc 100Ah(min)	Backup Time@24Vdc 200Ah(min)
3KW	300	449	1100
	600	222	525
	900	124	303
	1200	95	227
	1500	68	164
	1800	56	126
	2100	48	108
	2400	35	94
	2700	31	74
	3000	28	67

Model	Load(W)	Backup Time@48Vdc 100Ah(min)	Backup Time@48Vdc 200Ah(min)
3KW	300	1054	2107
	600	491	1054
	900	291	668
	1200	196	497
	1500	159	402
	1800	123	301
	2100	105	253
	2400	91	219
	2700	71	174
	3000	63	155
5KW	500	613	1288
	1000	268	613
	1500	158	402
	2000	111	271
	2500	90	215
	3000	76	182
	3500	65	141
	4000	50	112
	4500	44	100
	5000	40	90

**Note:** Backup time depends on the quality of the battery; age of battery and type of battery. Specifications of batteries may vary depending on different manufacturers.

**Product are subject to change without notice.**