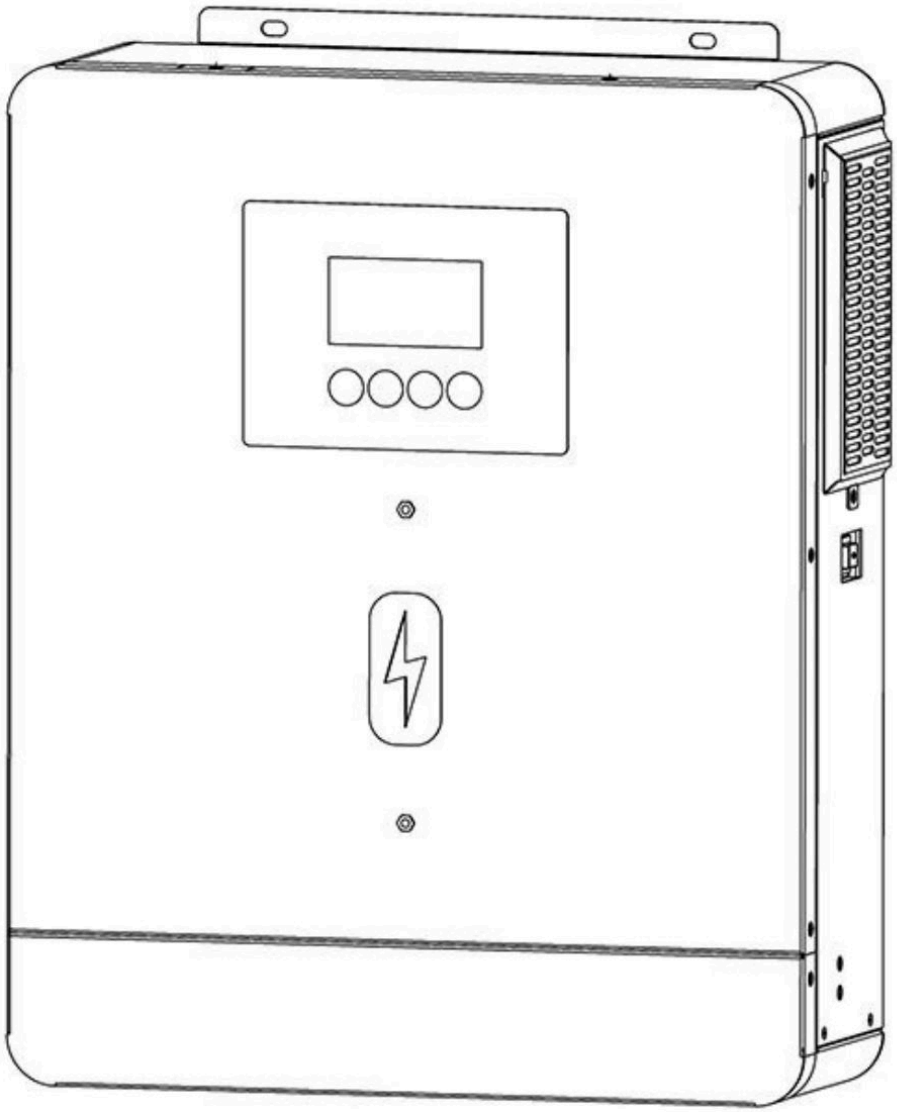
Product Model

POW-HVM4.5K-24V-E

POW-HVM6.5K-48V-E



PowMr

HYBRID INVERTER

User Manual

Table Of Contents

1. ABOUT THIS MANUAL 2

1.1 PURPOSE 2

1.2 SCOPE 2

2. SAFETY INSTRUCTIONS 2

3. INTRODUCTION 3

3.1 FEATURES 3

3.2 BASIC SYSTEM ARCHITECTURE 3

3.3 PRODUCT OVERVIEW 4

4. INSTALLATION 5

4.1 UNPACKING AND INSPECTION 5

4.2 PREPARATION 5

4.3 MOUNTING THE UNIT 5

4.4 BATTERY CONNECTION 5

4.5 AC INPUT/OUTPUT CONNECTION 7

4.6 PV CONNECTION 8

4.7 FINAL ASSEMBLY 9

4.8 COMMUNICATION CONNECTION 9

5. OPERATION 15

5.1 POWER ON/OFF 15

5.2 OPERATION AND DISPLAY PANEL 15

5.3 LCD DISPLAY ICONS 16

5.4 LCD SETTING 18

5.5 DISPLAY SETTING 28

5.6 OPERATING MODE DESCRIPTION 29

5.7 BATTERY EQUALIZATION DESCRIPTION 31

5.8 MAINS AND LITHIUM BATTERY ACTIVATION FUNCTION 32

5.9 FAULT REFERENCE CODE 33

5.10 WARNING INDICATOR 33

6. CLEARANCE AND MAINTENANCE FOR ANTI-DUST KIT 34

6.1 OVERVIEW 34

6.2 CLEARANCE AND MAINTENANCE 34

7. SPECIFICATIONS 35

TABLE 1 LINE MODE SPECIFICATIONS 35

TABLE 2 INVERTER MODE SPECIFICATIONS 36

TABLE 3 TWO LOAD OUTPUT POWER 36

TABLE 4 CHARGE MODE SPECIFICATIONS 37

TABLE 5 GENERAL SPECIFICATIONS 37

8. TROUBLE SHOOTING 38

9. APPENDIX: APPROXIMATE BACK-UP TIME TABLE 39

1 ABOUT THIS MANUAL

1.1 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.

1.2 Scope

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

2 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. 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 risk of electric shock, disconnect all wirings before attempting 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 important to correctly operate this inverter/charger.
7. 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.
8. 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.
9. One piece of 150A fuse is provided as over-current protection for the battery supply.
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 install this inverter.
11. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
12. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.

3 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.

3.1 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
- RS485 is used to communicate with BMS and adjust the charging current of inverter according to battery demand
- It can work with or without batteries
- Intelligent fan speed adjustment, which adjusts the fan speed according to temperature, load and charging current
- Built-in MPPT, operating voltage range 60~450V, open circuit voltage 500Voc
- RGB lamp, which displays different colors according to inverter status
- WIFI remote monitoring (optional)
- Offline upgrade function, firmware can be upgraded through COM port
- Grid-connected
- Built-in anti-dust kit for harsh environment
- In battery-free mode, PV systems deliver a better user experience when powering loads
- Equipped with lithium battery activation function

3.2 Basic System Architecture

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

- Generator or Utility.
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements. This inverter can power all kinds of appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.

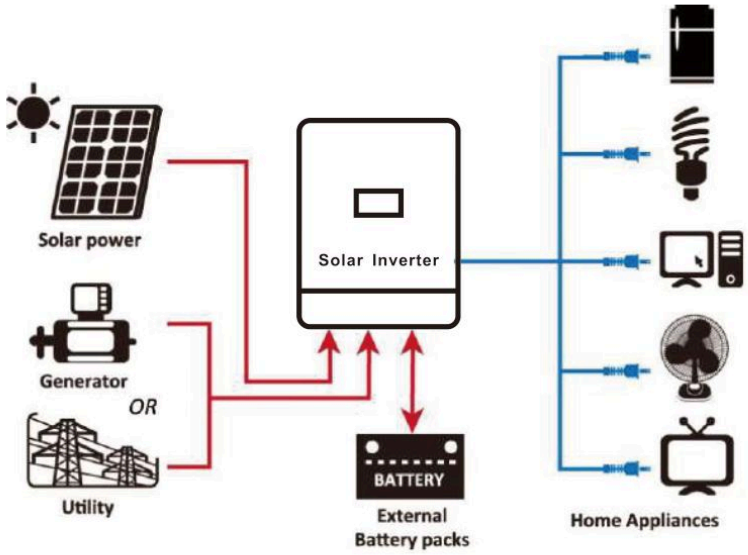
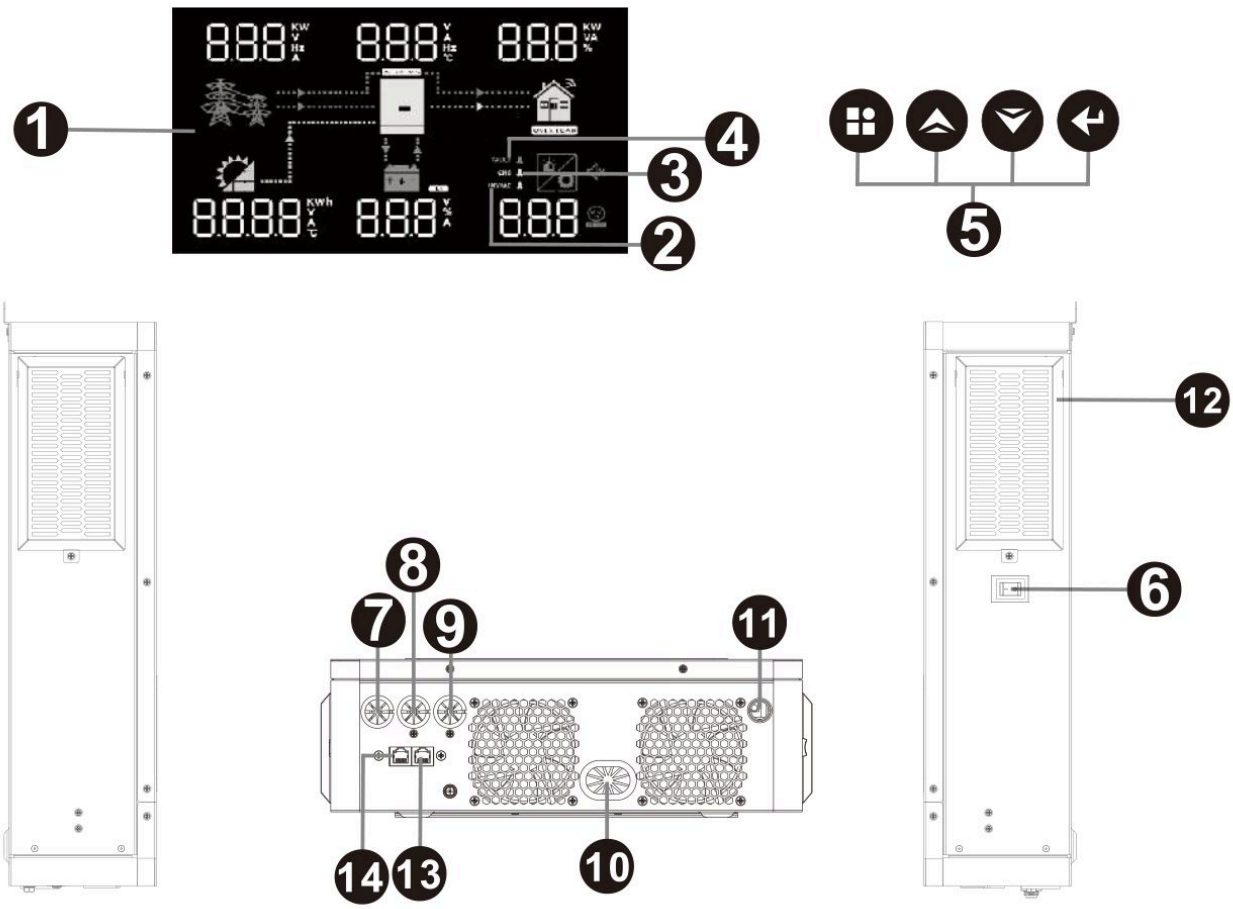


Figure 1 Hybrid Power System

3.3 Product Overview



1. LCD display
2. Status indicator
3. Charging indicator
4. Fault indicator
5. Function buttons
6. Power on/off switch
7. AC input
8. Main output
9. Second output
10. Battery input
11. PV input
12. Anti dust kit
13. Battery communication/RS-485 port
14. WIFI communication/RS-232 port

4 INSTALLATION

4.1 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

4.2 Preparation

Before connecting all lines, remove the screws under the machine and remove the bottom cover plate.

4.3 Mounting the Unit

Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- For proper air circulation to dissipate heat, allow a clearance of approx. 20 cm to the side and approx. 50 cm above and below the unit.
- The ambient temperature should be between 0°C and 55°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Make sure that other objects and surfaces are left with enough space from the machine to ensure adequate heat dissipation and that there is enough room to remove the wires.



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

Install the unit by screwing two screws. It's recommended to use M6 screws.

4.4 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's 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.

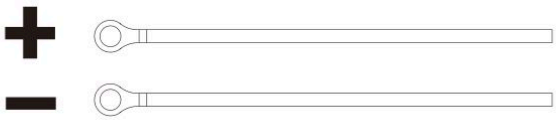
WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable as below.

Recommended battery cable size:

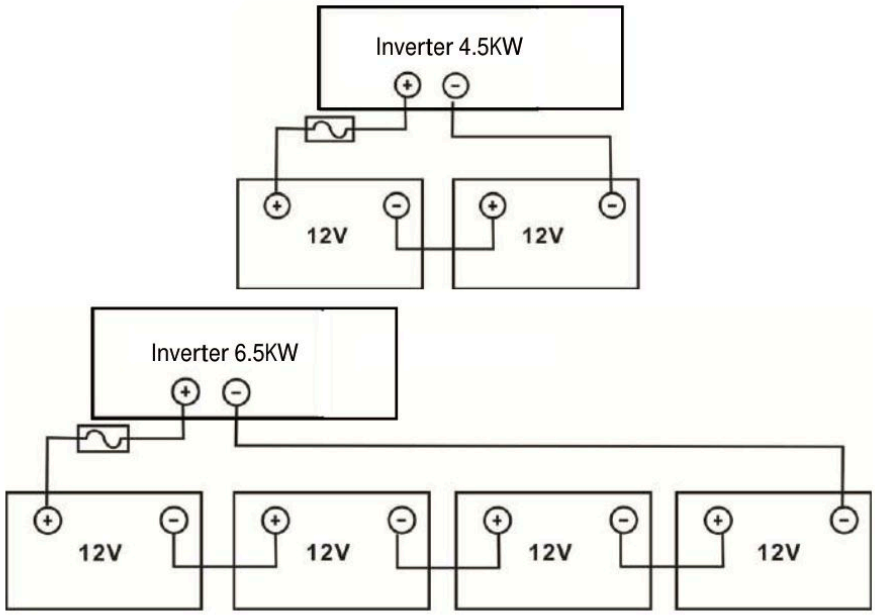
Model	Wire Size	Cable (mm^2)	Torque value（max）
4.5KW/6.5KW	1 x 2AWG	35	2 Nm

Please follow below steps to implement battery connection:

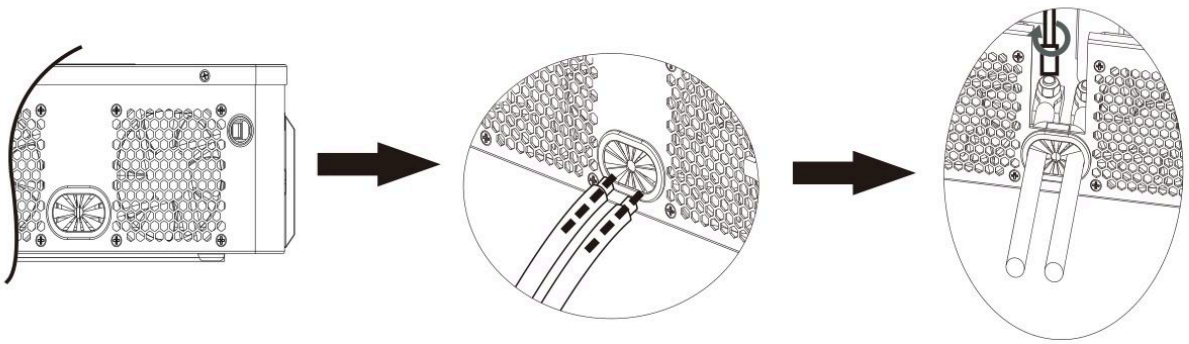
1. Remove insulation sleeve 18 mm for positive and negative conductors.
2. Suggest to put bootlace ferrules on the end of positive and negative wires with a proper crimping tool.



3. Connect all battery packs as below chart.



4. Insert the battery wires flatly into battery connectors of inverter and make sure the bolts are tightened with torque of 2 Nm in clockwise direction. Make sure polarity at both the battery and the inverter/charge is correctly connected and conductors are tightly screwed into the battery terminals.
   Recommended tool: #2 Pozi Screwdriver



⚠	**WARNING: Shock Hazard** Installation must be performed with care due to high battery voltage in series.

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

4.5 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 4.5KW and 50A for 6.5KW

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT mis-connect 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.

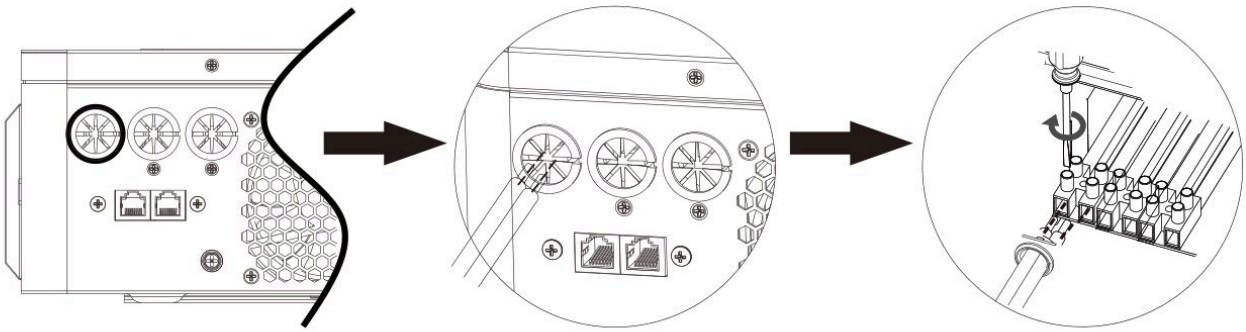
Suggested cable requirement for AC wires

Model	Gauge	Cable (mm^2)	Torque Value
4.5KW	12 AWG	4	1.2 Nm
6.5KW	10 AWG	6	1.2 Nm

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

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

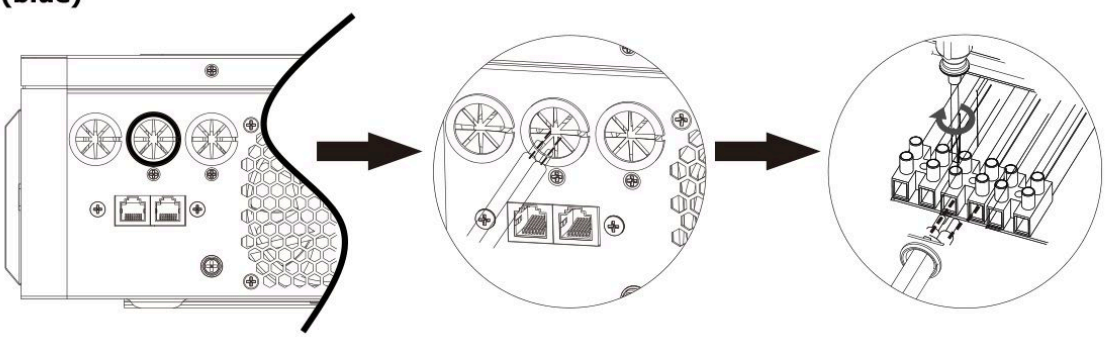
   L→LINE (brown or black)
   N→Neutral (blue)



⚠	**WARNING:** Be sure that AC power source is disconnected before attempting to hardwire it to the unit.

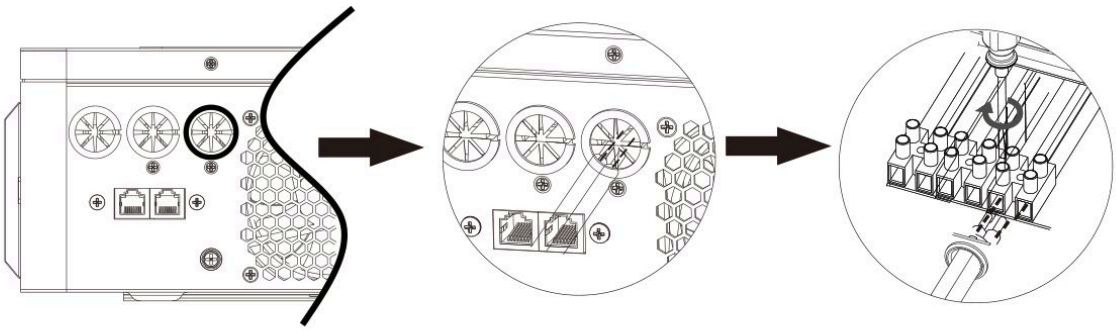
4. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws.

   L→LINE (brown or black)
   N→Neutral (blue)



5. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws.

   L→LINE (**brown or black**)
   N→Neutral (**blue**)



6. Make sure the wires are securely connected.

CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's 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's 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.

4.6 PV Connection

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

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	Wire Size	Cable (mm^2)	Torque value（max）
4.5KW/6.5KW	1 x 12AWG	4	1.2 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.

INVERTER MODEL	4.5KW	6.5KW
Max. PV Array Open Circuit Voltage	500Vdc	
PV Array MPPT Voltage Range	60Vdc-450Vdc	
IMax.PV	27A	

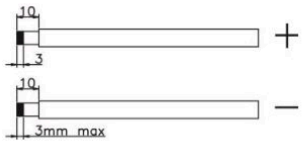
Take 250Wp PV module as an example. After considering above two parameters, the recommended module configurations are listed as below table.

Solar Panel Spec. (reference) - 250Wp - Vmp: 30.1Vdc - Imp: 8.3A - Voc: 37.7Vdc - Isc: 8.4A - Cells: 60	SOLAR INPUT (Min in serial: 6 pcs, max. in serial: 13 pcs)	Q'ty of panels	Total input power
	6 pcs in serial	6 pcs	1500W
	8 pcs in serial	8 pcs	2000W
	12 pcs in serial	12 pcs	3000W
	13 pcs in serial	13 pcs	3250W
	8 pieces in serial and 2 sets in parallel	16 pcs	4000W
	10 pieces in serial and 2 sets in parallel	20 pcs	5000W
	10 pieces in serial and 2 sets in parallel	20 pcs	6200W
	12 pieces in serial and 2 sets in parallel	24 pcs	6500W
	10 pieces in serial and 3 sets in parallel	30 pcs	7500W

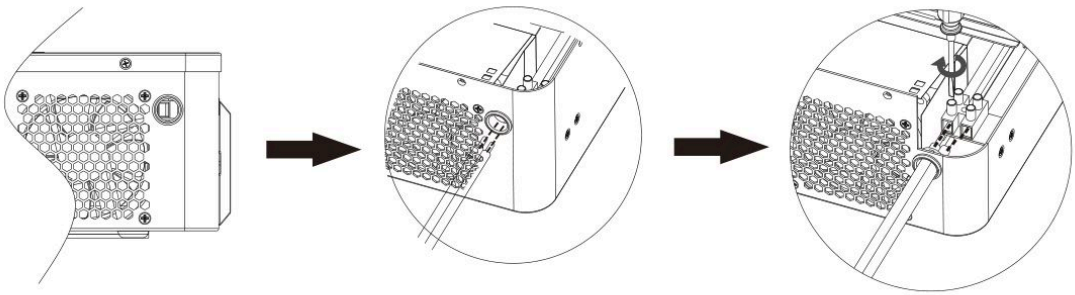
PV Module Wire Connection

Please follow below steps to implement PV module connection:

1. Remove insulation sleeve 10 mm for positive and negative conductors.
2. Suggest to put bootlace ferrules on the end of positive and negative wires with a proper crimping tool.



3. Check correct polarity of wire connection from PV modules and PV input connectors. Then, connect positive pole (+) of connection wire to positive pole (+) of PV input connector. Connect negative pole (-) of connection wire to negative pole (-) of PV input connector.
   Recommended tool: 4mm blade screwdriver



4.7 Final Assembly

After connecting all wirings, please put bottom cover back by screwing two screws.

4.8 Communication Connection

1. Wi-Fi cloud communication (option):

Please use supplied communication cable to connect to inverter and Wi-Fi module. Download APP and installed from APP store, and Refer to "Wi-Fi Plug Quick Installation Guideline" to set up network and registering. The inverter status would be shown by mobile phone APP or webpage of computer.

2. GPRS cloud communication (option):

Please use supplied communication cable to connect to inverter and GPRS module, and then applied external power to GPRS module. Download APP and installed from APP store, and Refer to "GPRS RTU Quick Installation Guideline" to set up network and registering. The inverter status would be shown by mobile phone APP or webpage of computer.

3. Battery communication

The communication between the battery and the inverter can be realized through the battery commun-ication interface, so that the inverter and the lithium battery can exchange information(Baud rate:9600).

4. Lithium battery and inverter connection:

If choosing lithium battery for the inverter, only lithium batteries that have been matched with BMS communication protocol are allowed.

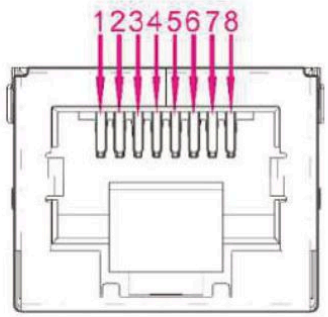
1. Connect the battery according to the recommended battery cable specifications.
2. Insert the ring terminal of the battery cable into the battery connector of the inverter flatly, and ensure that the bolts are tightened with a torque of 2-3 Nm.Make sure that the polarities of the battery and inverter are connected correctly,and that the ring terminal is tightened with the battery terminal.
3. Connect one side of RJ45 cable to the BMS communication port of inverter.
4. Insert the other side of RJ45 cable into RS485 communication port on lithium battery.

NOTE: If you choose a lithium battery.please make sure to connect the battery and inverter with BMS communication cable, and select the battery type as " LIB-485" mode.

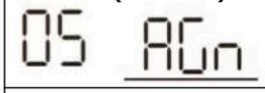
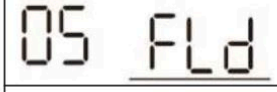
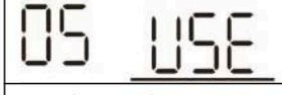
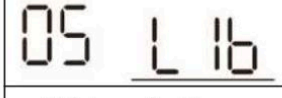
Communication And Setting Of Lithium Battery

1. Connect the RJ45 communication cable between inverter and battery. Please confirm that the lithium battery BMS port's PIN is correspond with the inverter BMS communication port. The inverter BMS port'PIN definition as below:

Pin number	Port definitions
1	RS485B
2	RS485A
3	NG
4	NG
5	NG
6	NG
7	RS485A
8	RS485B



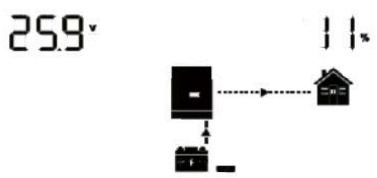
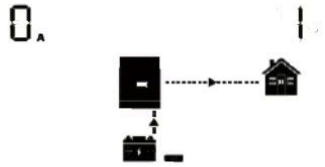
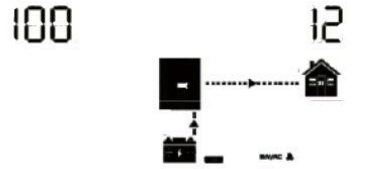
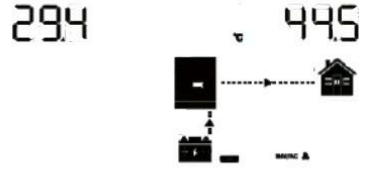
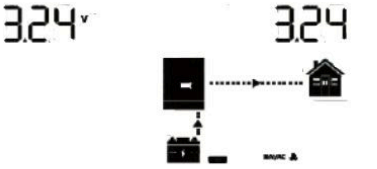
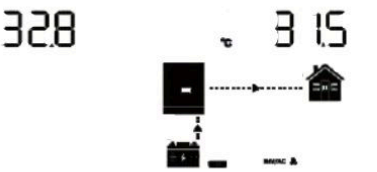
In order to communicate with the lithium battery BMS,you should press the “ENTER” button for a long time,and set the battery type as “LIB-485” in program 05. Then selectthe matching battery protocol in Program 43.

05	Battery type	AGM (default) 
		Flooded 
		User Defined 
		Lithium battery mode 
		Lithium battery communication mode 
43	Lithium battery protocol	PYLON 
		PACE 

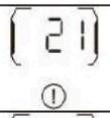
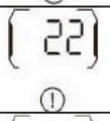
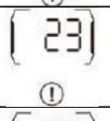
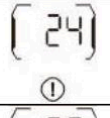
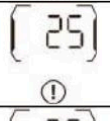
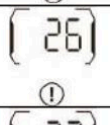
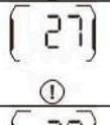
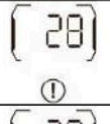
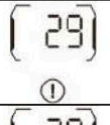
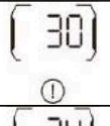
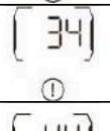
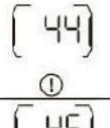
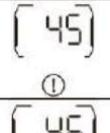
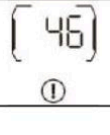
CAUTION: When the battery type is set to “LIB-485”,the setting items 12,13 and 29 are displayed in percentage.

In“LIB-485” mode,press and hold the “ESC” button to view the information of thelithium battery, and the inverter display screen will enter the following screen
(the intial interface shows the total battery voltage and remaining battery capacity).

Press the “DOWN” button to display the following data in turn.

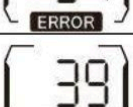
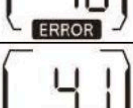
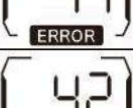
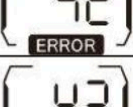
Selectable information		LCD display
The data is displayed in the upper left corner of the LCD	The data is displayed in the upper right corner of the LCD	LCD display interface
Total battery voltage = 25.9V	Remaining battery capacity =11%	
Battery charging current = 0A	Battery discharge current =1A	
Rated battery capacity =100AH	Battery charge cycles =12	
Minimum MOS temperature of battery =29.4℃	Maximum MOS temperature of battery =44.5℃	
The maximum voltage of a single battery cell =3.24V	Minimum voltage of a single battery cell =3.24V	
Maximum temperature of battery cell =32.8℃	Minimum temperature of battery cell =31.5℃	

Battery Alarm Code

Alarm code	Alarm event	Icon flashing
21	Battery Cell Over Voltage	
22	Battery Cell Under Voltage	
23	Battery Pack Over Voltage	
24	Battery Pack Under Voltage	
25	Charging Over Current	
26	DischargingOver Current	
27	Charging Cell Over Temperature	
28	DischargingCell Over Temperature	
29	Charging Cell Under Temperature	
30	Discharging Cell Under Temperature	
34	Battery capacity is too low	
44	Battery Cell Voltage Imbalance	
45	Battery Cell Temperature Imbalance	
46	Internal CommunicationAlarm	

Battery fault code

Fault code	Fault event	The icon is long and bright
21	Battery Cell Over Voltage	
22	Battery Cell Under Voltage	
23	Battery Pack Over Voltage	

24	Battery Pack Under Voltage	
25	Charging Over Current	
26	Discharging Over Current	
27	Charging Cell Over Temperature	
28	Discharging Cell Over Temperature	
29	Charging Cell Under Temperature	
30	Discharging Cell Under Temperature	
31	Ambient Over Temperature	
32	Ambient Under Temperature	
33	MOS Over Temperature	
35	Battery Short Circuit	
36	Charge Overvoltage	
37	System Failure	
39	Charging MOS Fault	
40	Discharge MOS Fault	
41	Temperature Sensor Fault	
42	Battery Cell Fault	
43	Sampling Communication Failure	
61	Communication Failure	

5 OPERATION

5.1 Power ON/OFF

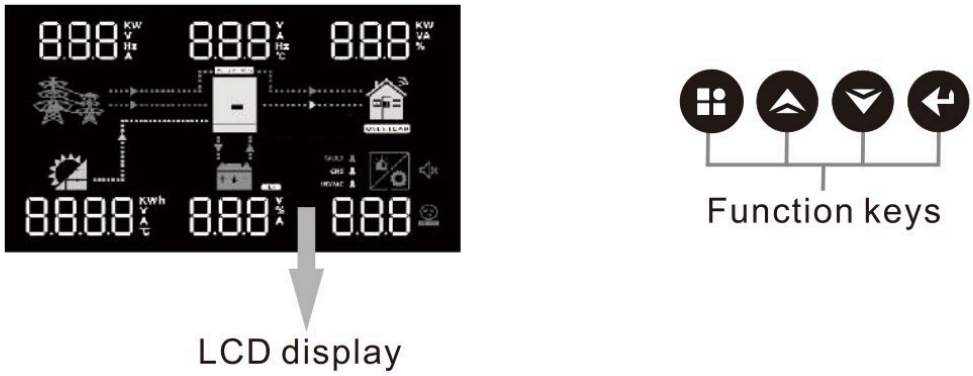
Side view of unit



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

5.2 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.



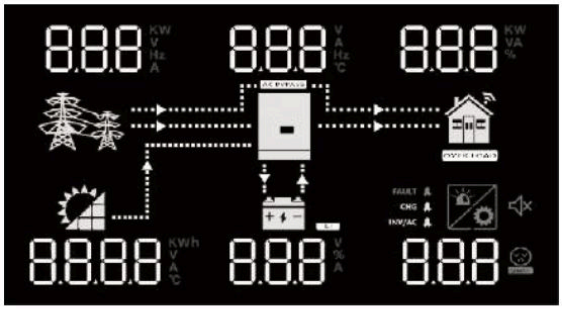
LED Indicator

LED Indicator			Messages
INV/AC	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.

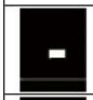
Function Keys

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

5.3 LCD Display Icons



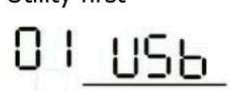
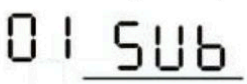
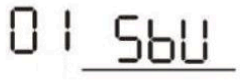
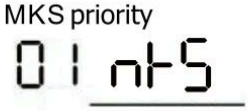
Icon	Function description
Input Source Information	
	Indicates the AC input.
	Indicates the PV input
KW V Hz A	Indicate input voltage, input frequency, PV voltage, charger current charger power, battery voltage.
Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes. Warning: flashing with warning code. Fault: lighting with fault code
Output Information	
KW VA %	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
Battery Information	
Load Information	
OVER LOAD	Indicates overload.

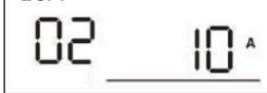
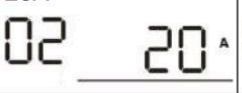
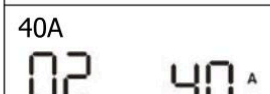
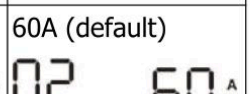
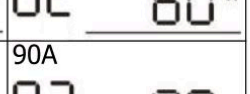
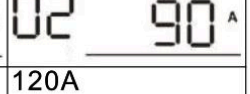
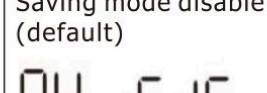
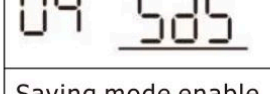
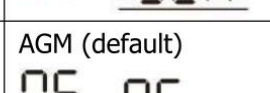
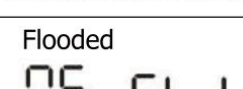
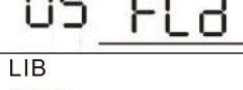
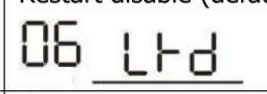
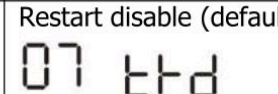
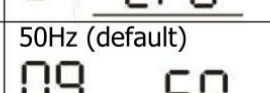
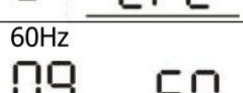
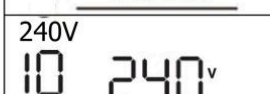
Mode Operation Information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
AC BYPASS	Indicates load is supplied by utility power.
	Indicates the utility charger circuit is working.
	Indicates the DC/AC inverter circuit is working.
Mute Operation	
	Indicates unit alarm is disabled.

5.4 LCD Setting

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.

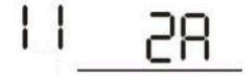
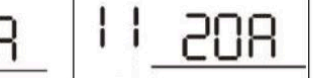
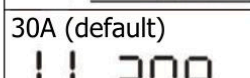
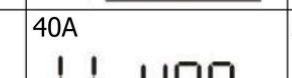
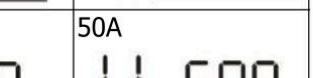
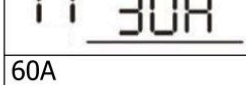
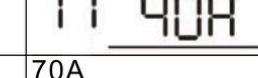
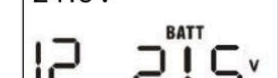
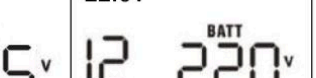
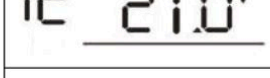
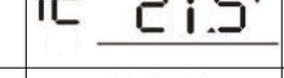
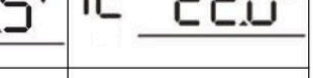
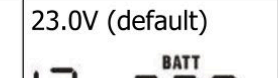
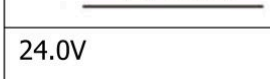
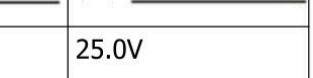
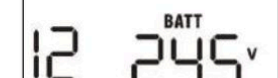
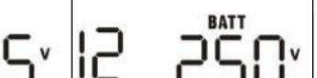
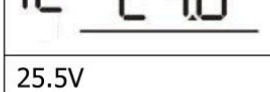
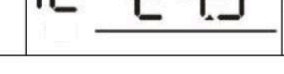
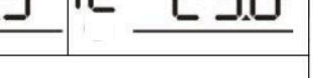
Setting Programs:

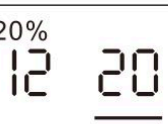
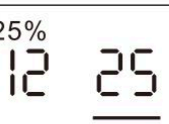
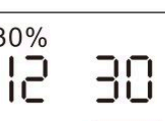
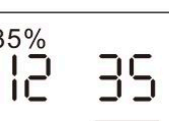
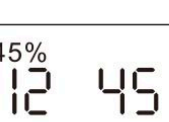
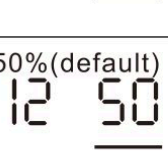
Program	Description	Selectable option	
00	Exit setting mode	Escape (default) 	One-button restore setting options
			
01	Output source priority: To configure load power source priority	Utility first 	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.
		Solar first (default) 	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, utility will supply power to the loads at the same time. Battery provides power to the loads only when any one condition happens: - Solar energy and utility is not available. - Solar energy is not sufficient and utility is not available.
		SBU priority 	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.
		MKS priority 	Solar energy provides power to the loads as frist priority，if solar energy is not sufficient to power all connected loads，utility energy will supply power to the loads at the same time. The battery only supplies energy to the load as a backup power.

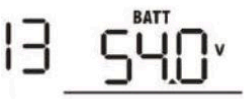
02	Maximum charging current: To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	10A 	20A 	30A 
		40A 	50A 	60A (default) 
		70A 	80A 	90A 
		100A 	110A 	120A 
03	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within 90-280VAC.	
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.	
04	Power saving mode enable/disable	Saving mode disable (default) 	If disabled,no matter connected load is low or high,the on/off statur 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.	
05	Battery type	AGM (default) 	Flooded 	
		User-Defined 	LIB 	When using lithium battery and not connected to BMS communication
		LIB-485 	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.	
06	Auto restart when overload occurs	Restart disable (default) 	Restart enable 	
07	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 	
09	Output frequency	50Hz (default) 	60Hz 	
10	Output voltage	220V 	230V (default) 	
		240V 		

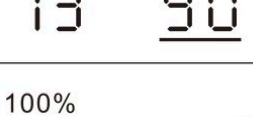
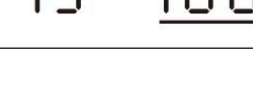
<table>
<tr><td rowspan="4">11</td><td rowspan="4">Maximum utility charging current

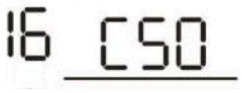
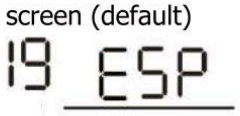
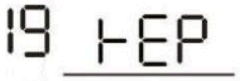
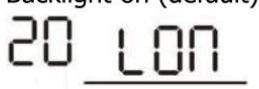
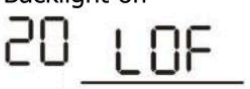
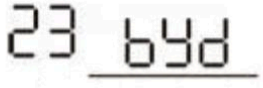
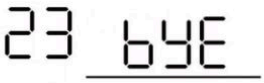
Note: If setting value in program 02 is smaller than that in program in 11, the inverter will apply charging

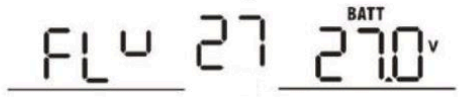
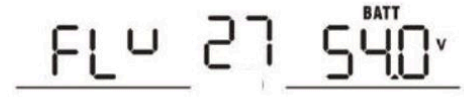
current from program 02 for utility charger.</td><td>2A
</td><td>10A
</td><td>20A
</td></tr>
<tr><td>30A (default)
</td><td>40A
</td><td>50A
</td></tr>
<tr><td>60A
</td><td>70A
</td><td>80A
</td></tr>
<tr><td>90A
</td><td colspan="2">100A
</td></tr>
<tr><td rowspan="9">12</td><td rowspan="9">Setting voltage point back to utility source when selecting “SBU priority” or “Solar first” in program 01.</td><td colspan="3">Available options in 4.5KW model:</td></tr>
<tr><td>21.0V
</td><td>21.5V
</td><td>22.0V
</td></tr>
<tr><td>22.5V
</td><td>23.0V (default)
</td><td>23.5V
</td></tr>
<tr><td>24.0V
</td><td>24.5V
</td><td>25.0V
</td></tr>
<tr><td colspan="3">25.5V
</td></tr>
<tr><td colspan="3">Available options in 6.5KW model:</td></tr>
<tr><td>42V
</td><td>43V
</td><td>44V
</td></tr>
<tr><td>45V
</td><td>46V (default)
</td><td>47V
</td></tr>
<tr><td>48V
</td><td>49V
</td><td>50V
</td></tr>
<tr><td colspan="3">51V
</td></tr>
</table>

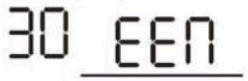
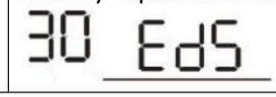
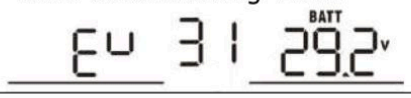
<table>
<tr><td rowspan="6"></td><td rowspan="6">When "SBU" is selected in program 01 and “LIB-485" is selected in program 05, the power point is set back to the common power supply.</td><td colspan="3">Available options in 4.5KW/6.5KW model:</td></tr>
<tr><td>10%
</td><td>15%
</td><td rowspan="5">When the power is lower than the set value, it will auto matically switch back to the public power output (if the public power access has a delay, it will be switched to the public power after the delay time after the power is lower than the set value.)</td></tr>
<tr><td>20%
</td><td>25%
</td></tr>
<tr><td>30%
</td><td>35%
</td></tr>
<tr><td>40%
</td><td>45%
</td></tr>
<tr><td>50%(default)
</td><td></td></tr>
</table>

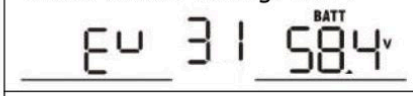
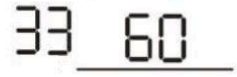
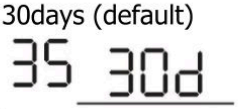
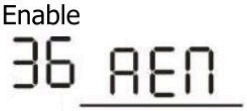
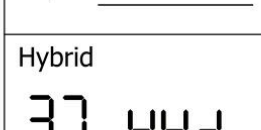
<table>
<tr><td rowspan="10">13</td><td rowspan="10">Setting voltage point back to battery mode when selecting “SBU priority” or “Solar first” in program 01.</td><td colspan="2">Available options in 4.5KW model:</td></tr>
<tr><td>Battery fully charged
</td><td>24V
</td></tr>
<tr><td>24.5V
</td><td>25V
</td></tr>
<tr><td>25.5V
</td><td>26V
</td></tr>
<tr><td>26.5V
</td><td>27V (default)
</td></tr>
<tr><td>27.5V
</td><td>28V
</td></tr>
<tr><td>28.5V
</td><td>29V
</td></tr>
<tr><td colspan="2">Available options in 6.5KW model:</td></tr>
<tr><td>Battery fully charged
</td><td>48V
</td></tr>
<tr><td>49V
</td><td>50V
</td></tr>
<tr><td>51V
</td><td>52V
</td></tr>
<tr><td>53V
</td><td>54V (default)
</td></tr>
</table>

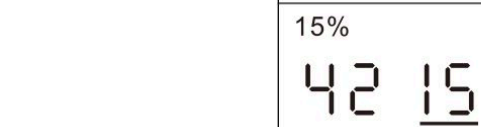
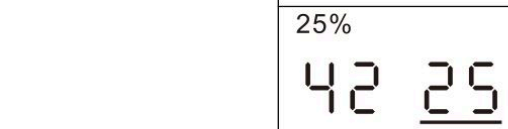
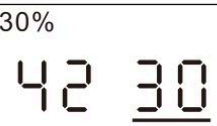
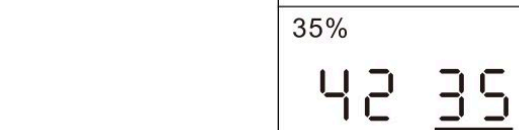
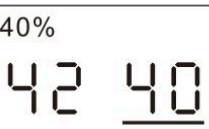
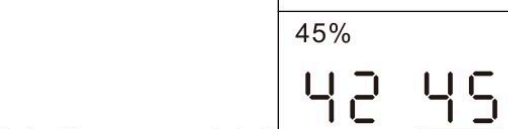
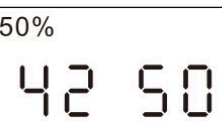
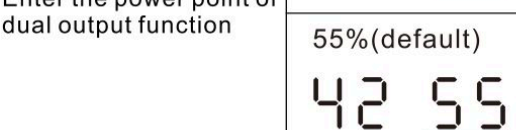
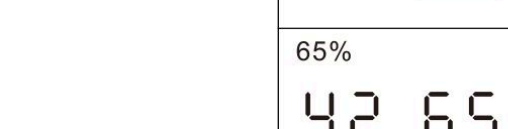
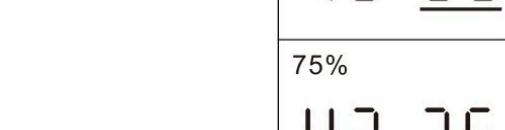
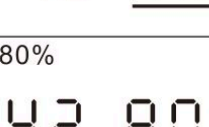
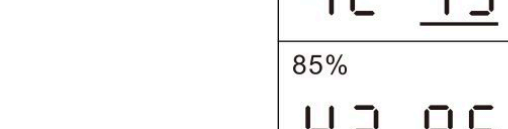
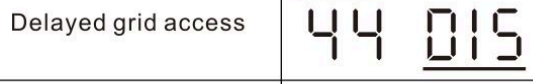
<table>
<tr><td rowspan="10"></td><td rowspan="2"></td><td>55V
</td><td colspan="2">56V
</td></tr>
<tr><td>57V
</td><td colspan="2">58V
</td></tr>
<tr><td rowspan="8">When "SBU" is selected in program 01 and "LIB-485" is selected in program 05, the power point is set back to battery mode.</td><td colspan="3">Available options in 4.5KW/6.5KW model:</td></tr>
<tr><td>30%
</td><td>35%
</td><td rowspan="8">When the battery power is higher than the set value, it will automatically switch back to the battery mode output (when the set value is 100, it will automatically switch when the battery power is 100%.)</td></tr>
<tr><td>40%
</td><td>45%
</td></tr>
<tr><td>50%
</td><td>55%
</td></tr>
<tr><td>60%
</td><td>65%
</td></tr>
<tr><td>70%
</td><td>75%
</td></tr>
<tr><td>80%
</td><td>85%
</td></tr>
<tr><td>90%
</td><td>95%(default)
</td></tr>
<tr><td>100%
</td><td></td></tr>
</table>

<table>
<tr><td rowspan="5">16</td><td rowspan="5">Charger source priority:
To configure charger source priority</td><td colspan="2">If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:</td></tr>
<tr><td>Solar first
</td><td>Solar energy will charge battery as first priority.
Utility will charge battery only when solar energy is not available.</td></tr>
<tr><td>Solar and Utility (default)
</td><td>Solar energy and utility will charge battery at the same time.</td></tr>
<tr><td>Only Solar
</td><td>Solar energy will be the only charger source no matter utility is available or not.</td></tr>
<tr><td colspan="2">If this inverter/charger is working in Battery mode or Power saving mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.</td></tr>
<tr><td>18</td><td>Alarm control</td><td>Alarm on (default)
</td><td>Alarm off
</td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">Auto return to default display screen</td><td>Return to default display screen (default)
</td><td>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.</td></tr>
<tr><td>Stay at latest screen
</td><td>If selected, the display screen will stay at latest screen user finally switches.</td></tr>
<tr><td>20</td><td>Backlight control</td><td>Backlight on (default)
</td><td>Backlight off
</td></tr>
<tr><td>22</td><td>Beeps while primary source is interrupted</td><td>Alarm on (default)
</td><td>Alarm off
</td></tr>
<tr><td>23</td><td>Overload bypass:
When enabled, the unit will transfer to line mode if overload occurs in battery mode.</td><td>Bypass disable (default)
</td><td>Bypass enable
</td></tr>
<tr><td>25</td><td>Record Fault code</td><td>Record enable (default)
</td><td>Record disable
</td></tr>
</table>

<table>
<tr><td rowspan="3">26</td><td rowspan="3">Bulk charging voltage
(C.V voltage)</td><td>4.5KW default setting: 28.2V
</td></tr>
<tr><td>6.5KW default setting: 56.4V
</td></tr>
<tr><td>If self-defined is selected in program 5, this program can be set up. Setting range is from 25.0V to 30.0V for 4.5KW model and 48.0V to 60.0V for 6.5KW model. Increment of each click is 0.1V.</td></tr>
<tr><td rowspan="3">27</td><td rowspan="3">Floating charging voltage</td><td>4.5KW default setting: 27.0V
</td></tr>
<tr><td>6.5KW default setting: 54.0V
</td></tr>
<tr><td>If self-defined is selected in program 5, this program can be set up. Setting range is from 25.0V to 30.0V for 4.5KW model and 48.0V to 60.0V for 6.5KW model. Increment of each click is 0.1V.</td></tr>
<tr><td rowspan="4">29</td><td rowspan="4">Low DC cut-off voltage</td><td>4.5KW default setting: 20.0V
</td></tr>
<tr><td>6.5KW default setting: 40.0V
</td></tr>
<tr><td>If self-defined is selected in program 5, this program can be set up. Setting range is from 20.0V to 25.0V for 4.5KW model and 40.0V to 50.0V for 6.5KW model. Increment of each click is 0.1V.
Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.</td></tr>
<tr><td>If "LIB-485" is selected in item 05. you can set the battery low SOC shutdown point.

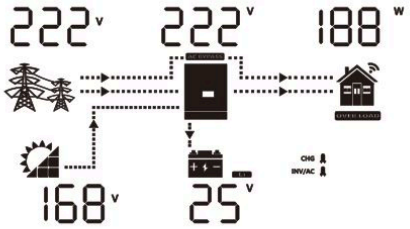
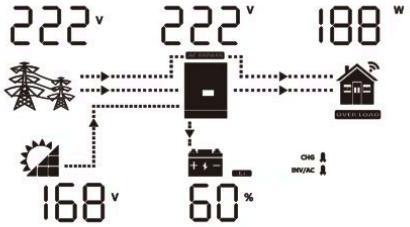
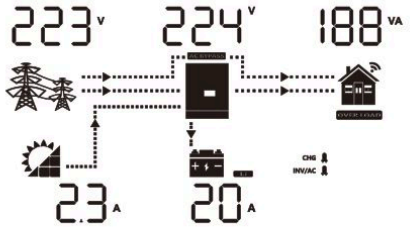
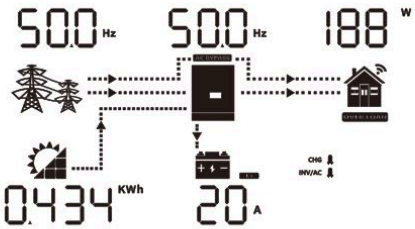
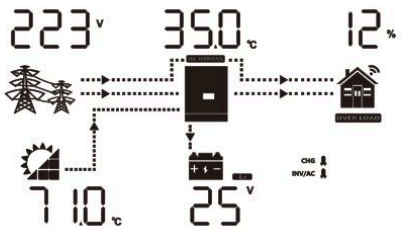
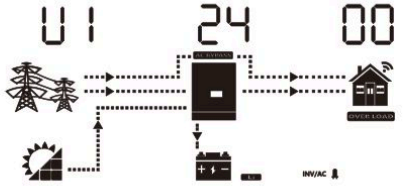
The default value is 5%, and 5% ~ 30% can be set.</td></tr>
<tr><td rowspan="2">30</td><td rowspan="2">Battery equalization</td><td>Battery equalization
</td><td>Battery equalization disable (default)
</td></tr>
<tr><td colspan="2">If "Flooded" or "User-Defined" is selected in program 05, this program can be set up.</td></tr>
<tr><td>31</td><td>Battery equalization voltage</td><td colspan="2">4.5KW default setting: 29.2V
</td></tr>
</table>

		6.5KW default setting: 58.4V 	
		Setting range is from 25.0V to 31.5V for 4.5KW model and 48.0V to 61.0V for 6.5KW model. Increment of each click is 0.1V.	
33	Battery equalized time	60min (default) 	Setting range is from 5min to 900min. Increment of each click is 5min.
34	Battery equalized timeout	120min (default) 	Setting range is from 5min to 900 min. Increment of each click is 5 min.
35	Equalization interval	30days (default) 	Setting range is from 0 to 90 days. Increment of each click is 1 day
36	Equalization activated immediately	Enable 	Disable (default) 
		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 "E9". If "Disable" is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, "E9" will not be shown in LCD main page.	
37	GRID-tie operation	Off grid (default) 	Inverter operates only in off-grid mode. Solar energy provides power to the loads as first priority and charging second
		Hybrid 	Inverter operates hybrid mode. Solar energy provides power to the loads as first priority and charging second Excess energy feed to grid.
38	GRID-tie current	10A 	Increment of each click is 2A.
39	Led pattern light	Led pattern off 	Led pattern on(default) 
41	Dual output	disable (default) 	use 
42	Enter the dual output functional voltage point	4.5KW default setting: 22.0V 	
		6.5KW default setting: 44.0V 	
		Setting range is from 20.0V to 26.0V for 24VDC model and 40.0V to 52.0V for 48VDC model. Increment of each click is 0.1V.	

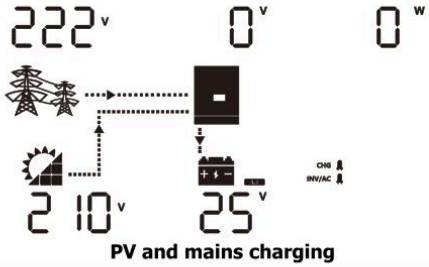
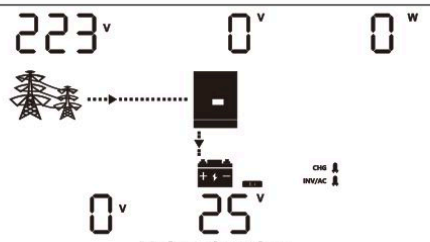
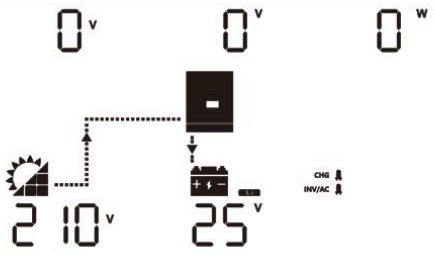
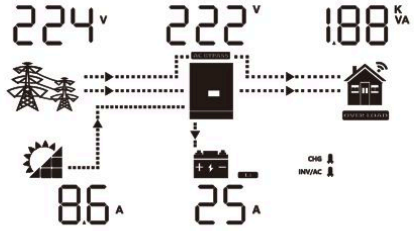
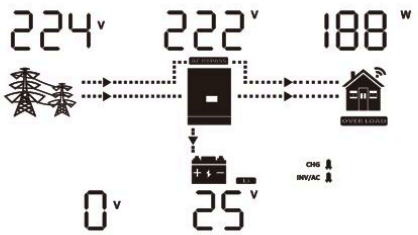
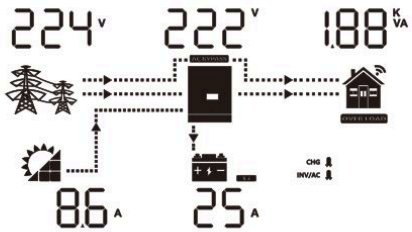
<table>
<tr><td rowspan="10"></td><td rowspan="10">Enter the power point of dual output function</td><td colspan="3">Available options in 4.5KW/6.5KW model:</td></tr>
<tr><td>5%
</td><td>10%
</td><td rowspan="9">When the power is lower than the set value or battery low voltage alarm, the main output of the inverter is disconnected, and the main output no longer supplies power to the external.</td></tr>
<tr><td>15%
</td><td>20%
</td></tr>
<tr><td>25%
</td><td>30%
</td></tr>
<tr><td>35%
</td><td>40%
</td></tr>
<tr><td>45%
</td><td>50%
</td></tr>
<tr><td>55%(default)
</td><td>60%
</td></tr>
<tr><td>65%
</td><td>70%
</td></tr>
<tr><td>75%
</td><td>80%
</td></tr>
<tr><td>85%
</td><td></td></tr>
<tr><td>43</td><td>Lithium battery protocol</td><td>PYLON (default)
</td><td colspan="2">PACE
</td></tr>
<tr><td>44</td><td>Delayed grid access</td><td>disable
</td><td colspan="2">enable(default)
</td></tr>
<tr><td>45</td><td>Maximum Second Load</td><td>33%(default)
20%~70%</td><td colspan="2">If the inverter enter the dual output function, the output power of the second channel, can be change to 20%~70% of the rated power.</td></tr>
</table>

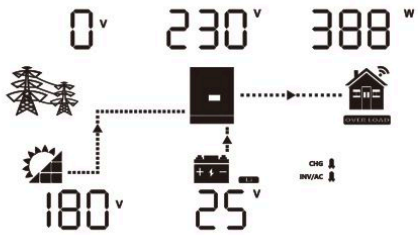
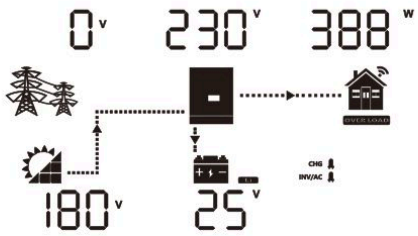
5.5 Display Setting

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

Selectable information	LCD display
Charged state, and the power is less than 1kw	
Input voltage=222V, PV voltage=168V, Battery voltage=25V, Output voltage=222V, Load in Watt=188W, Chg(Flashing), Inv/ac(bright)	
Input voltage=222V, PV voltage=168V, Remaining battery capacity =60%, Output voltage=222V, Load in Watt=188W, Chg(Flashing), Inv/ac(bright), (When the battery type is set to "LIB-485")	
Input voltage=223V, PV current=2.3A, Battery current=20A, Output voltage=224V, Load in VA=188VA, Chg(Flashing), Inv/ac(bright)	
Input frequency=50.0Hz, PV power=0.434KWh, Battery current=20A, Output frequency=50.0Hz, Load in watt=188W, Chg(Flashing), Inv/ac(bright)	
Input voltage=223V , Bat ntc temperture=71.0℃, Battery voltage= 25V, Inv ntc temperture=35.0℃, Load percentage=12%, Chg(Flashing), Inv/ac(bright)	
Main CPU version checking	Main CPU version 24 00 

5.6 Operating Mode Description

<table>
<tr><th>Operation mode</th><th>Selectable information</th><th>LCD display</th></tr>
<tr><td rowspan="3">Stand bymode
*standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.</td><td rowspan="3">No output is supplied by the unit but it still can charge batteries.</td><td>
PV and mains charging</td></tr>
<tr><td>
Mains charging</td></tr>
<tr><td>
PV charging</td></tr>
<tr><td rowspan="2">Line Mode</td><td rowspan="2">The unit will provide output powerfrom the mains.It will also charge the battery at line mode.</td><td>
Grid-connected mode</td></tr>
<tr><td>
Mains charging</td></tr>
<tr><td>Grid-Tie operation</td><td>When working in Grid -Tie mode, the will be flash 3S/times.</td><td>
Grid-connected mode</td></tr>
</table>

Operation mode	Selectable information	LCD display
Battery Mode	The unit will provide output power from battery and power.	 **Battery and Solar supply power to loads at the same time**
		 **Solar supply power to loads**

RGB Light (option)

① **Inverter state:green light** ② **Utility state:blue light**

③ **Failure state:red light**

5.7 Battery Equalization Description

Equalization function is added into charge controller. It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalization also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically.

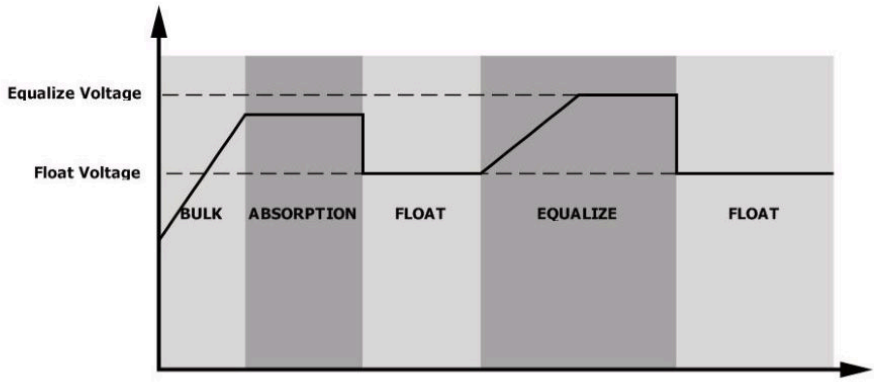
⌘ **How to Apply Equalization Function**

You must enable battery equalization function in monitoring LCD setting program 30 first. Then, you may apply this function in device by either one of following methods:

1. Setting equalization interval in program 35.
2. Active equalization immediately in program 36.

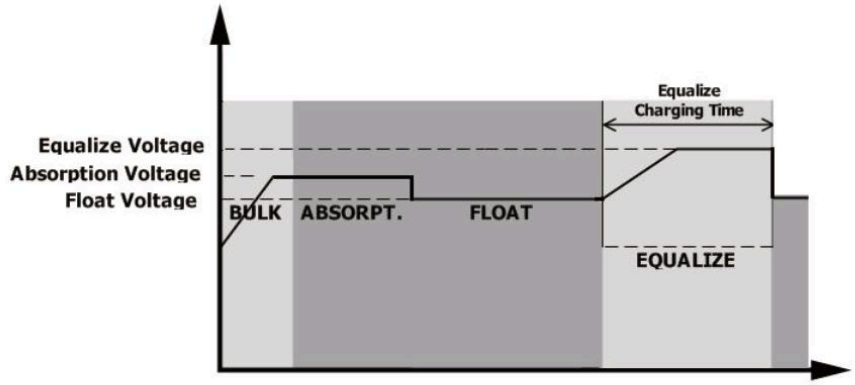
⌘ **When to Equalize**

In float stage, when the setting equalization interval (battery equalization cycle) is arrived, or equalization is active immediately, the controller will start to enter Equalize stage.

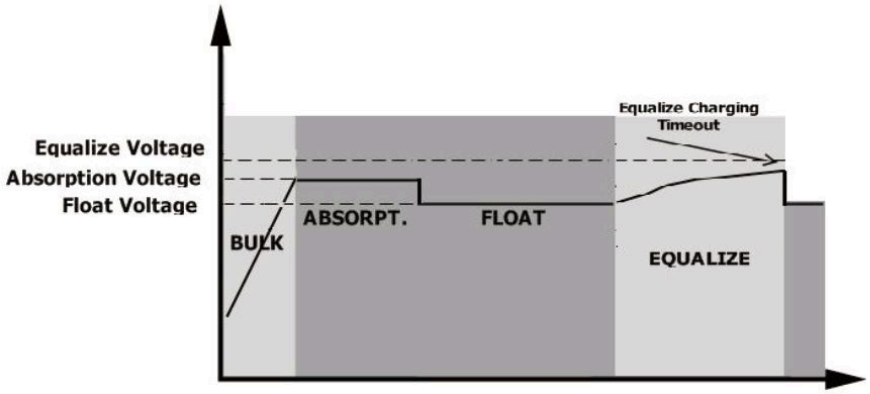


⌘ **Equalize charging time and timeout**

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized timeout setting is over, the charge controller will stop equalization and return to float stage.



5.8 Mains and lithium battery activation function

1.After 90s of mains power connection to the inverter, the machine is connected to the mains and starts to work.

2.The inverter is in lithium battery mode (item 05 is LIb or LIb-485). After the mains is connected, the battery is not connected, and the mains activation function is automatically enabled.

5.9 Fault Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off.	01 ERROR
02	Over temperature	02 ERROR
03	Battery voltage is too high	03 ERROR
04	Battery voltage is too low	04 ERROR
05	Output short circuited or over temperature is detected by internal converter components.	05 ERROR
06	Output voltage is too high.	06 ERROR
07	Overload time out	07 ERROR
08	Bus voltage is too high	08 ERROR
09	Bus soft start failed	09 ERROR
51	Over current or surge	51 ERROR
52	Bus voltage is too low	52 ERROR
53	Inverter soft start failed	53 ERROR
55	Over DC voltage in AC output	55 ERROR
57	Current sensor failed	57 ERROR
58	Output voltage is too low	58 ERROR
59	PV voltage is over limitation	59 ERROR

5.10 Warning Indicator

Warning Code	Warning Event	Audible Alarm	Icon flashing
01	Fan is locked when inverter is on.	Beep three times every second	01
03	Battery is over-charged	Beep once every second	03
04	Low battery	Beep once every second	04
07	Overload	Beep once every 0.5 second	07
10	Output power derating	Beep twice every 3 seconds	10
15	PV energy is low.	Beep twice every 3 seconds	15
16	AC voltage is over limitation	Beep twice every 3 seconds	16
E9	Battery equalization	None	E9
bP	Battery is not connected	None	bP

6 CLEARANCE AND MAINTENANCE FOR ANTI-DUST KIT

6.1 Overview

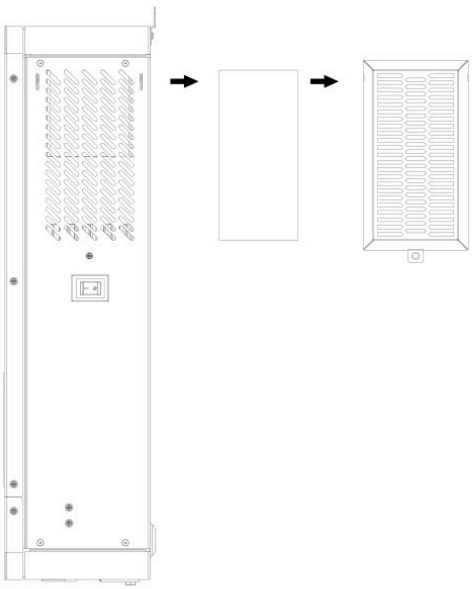
Every inverter is already installed with anti-dusk kit from factory. Inverter will automatically detect this kit and activate internal thermal sensor to adjust internal temperature. This kit also keeps dusk from your inverter and increases product reliability in harsh environment.

6.2 Clearance and Maintenance

Step 1: Please loosen the screw in counterclockwise direction on the top of the inverter.



Step 2: Then, dustproof case can be removed and take out air filter foam as shown in below chart.



Step 3: Clean air filter foam and dustproof case. After clearance, re-assemble the dust-kit back to the inverter.

NOTICE: The anti-dust kit should be cleaned from dust every one month.

7 SPECIFICATIONS

Table 1 Line Mode Specifications

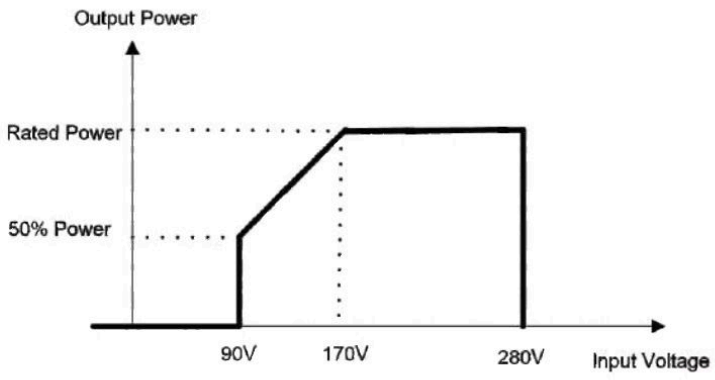
INVERTER MODEL	4.5KW	6.5KW
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	230Vac	
Low Loss Voltage	170Vac±7V (UPS); 90Vac±7V (Appliances)	
Low Loss Return Voltage	180Vac±7V (UPS); 100Vac±7V (Appliances)	
High Loss Voltage	280Vac±7V	
High Loss Return Voltage	270Vac±7V	
Max AC Input Voltage	300Vac	
Nominal Input Frequency	50Hz / 60Hz (Auto detection)	
Low Loss Frequency	40±1Hz	
Low Loss Return Frequency	42±1Hz	
High Loss Frequency	65±1Hz	
High Loss Return Frequency	63±1Hz	
Output Short Circuit Protection	Circuit Breaker	
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)	
Transfer Time	10ms typical (UPS); 20ms typical (Appliances)	
Output power derating: When AC input voltage drops to 170V, the output power will be derated.		

Table 2 Inverter Mode Specifications

INVERTER MODEL	4.5KW	6.5KW
Rated Output Power	4500VA/4200W	6500VA/6200W
Output Voltage Waveform	Pure Sine Wave	
Output Voltage Regulation	230Vac±5%	
Output Frequency	50Hz	
Peak Efficiency	93%	
Overload Protection	3s@≥150% load; 30s@101%~150% load	
Surge Capacity	2* rated power for 3 seconds	
Nominal DC Input Voltage	24Vdc	48Vdc
Cold Start Voltage	23.0Vdc	46.0Vdc
Low DC Warning Voltage @ load < 50% @ load ≥ 50%	 22.0Vdc 21.0Vdc	 44.0Vdc 42.0Vdc
Low DC Warning Return Voltage @ load < 50% @ load ≥ 50%	 22.5Vdc 22.0Vdc	 45.0Vdc 44.0Vdc
Low DC Cut-off Voltage @ load < 50% @ load ≥ 50%	 20.5Vdc 20.0Vdc	 41.0Vdc 40.0Vdc
High DC Recovery Voltage	32Vdc	62Vdc
High DC Cut-off Voltage	33Vdc	63Vdc
No Load Power Consumption	25W	50W
Saving Mode Power Consumption	< 10W	< 15W

Table 3 Two Load Output Power

INVERTER MODEL	4.5KW	6.5KW
Full Load	4200W	6200W
Maximum Main Load	4200W	6200W
Second Load Range	840W~2940W	1240W~4340W
Main Load Cut Off Voltage	22VDC	44VDC
Main Load Return Voltage	26VDC	52VDC

Table 4 Charge Mode Specifications

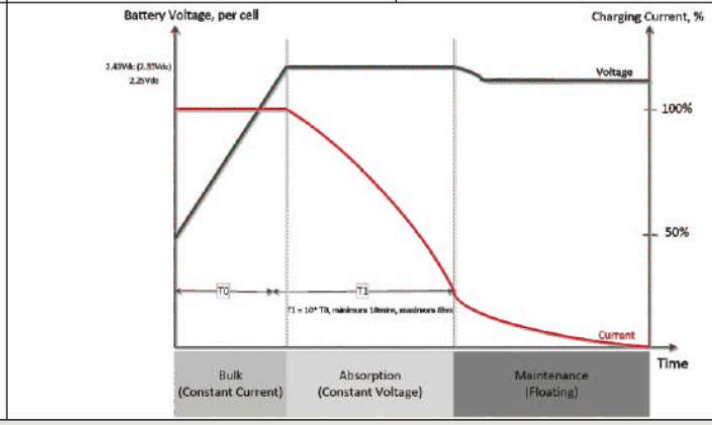
Utility Charging Mode			
INVERTER MODEL		4.5KW	6.5KW
Charging Algorithm		3-Step	
AC Charging Current (Max)		100Amp (@$V_{I/P}$=230Vac)	
Bulk Charging Voltage	**Flooded Battery**	29.2	58.4
	AGM / Gel Battery	28.2	56.4
Floating Charging Voltage		27Vdc	54Vdc
Charging Curve			
MPPT Solar Charging Mode			
INVERTER MODEL		4.5KW	6.5KW
Max. PV Array Power		6200W	8000W
Nominal PV Voltage		240Vdc	360Vdc
PV Array MPPT Voltage Range		60Vdc~450Vdc	
Max. PV Array Open Circuit Voltage		500Vdc	
Max Charging Current (AC charger plus solar charger)		120Amp	

Table 5 General Specifications

INVERTER MODEL	4.5KW	6.5KW
Safety Certification	CE	
Operating Temperature Range	-10°C to 50°C	
Storage temperature	-15°C~ 60°C	
Humidity	5% to 95% Relative Humidity (Non-condensing)	
Dimension (D*W*H), mm	423×344×112	
Net Weight, kg	7.2	8.2

8 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 power on.	No indication.	1. The battery voltage is far too low. (<1.4V/Cell) 2. Internal fuse tripped.	1. Contact repair center for replacing the fuse. 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. (UPS↱Appliance)
	Green LED is flashing.	Set "Solar First" as the priority of output source.	Change output source priority to Utility first.
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 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
		Temperature of internal converter component is over 120°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 02	Internal temperature of inverter component is over 100°C.	
	Fault code 03	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 01	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.	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 52	Bus voltage is too low.	
	Fault code 55	Output voltage is unbalanced.	

9 Appendix: Approximate Back-up Time Table

Model	Load (W)	Backup Time @ 24Vdc 100Ah (min)	Backup Time @ 24Vdc 200Ah (min)
4.5KW	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
	3200	28	67
	3600	25	60
	4200	22	53

Model	Load (W)	Backup Time @ 48Vdc 100Ah (min)	Backup Time @ 48Vdc 200Ah (min)
6.5KW	500	613	1288
	1000	268	613
	1500	158	402
	2000	111	271
	2500	90	215
	3200	76	182
	3500	65	141
	4000	50	112
	4500	44	100
	5000	40	90
	6200	36	80

Note:1.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.
2.The final interpretation right of this product belongs to the company.



SHENZHEN HEHEJIN INDUSTRIAL CO.,LTD

Tel/Fax: +86 755-28219903

Email: support@powmr.com

Web: www.powmr.com

Add: Henggang Street, Longgang District, Shenzhen, Guangdong, China