Product Model

POW-HVM11KP



PowMr

HYBRID SOLAR INVERTER

User Manual

Table of Contents

1 About This Manual 1
1.1 Purpose 1
1.2 Scope 1
2 Safety Instructions 1
3 Introduction 3
3.1 Features 3
3.2 Basic System Architecture 4
3.3 Product Overview 5
4 Installation 7
4.1 Unpacking and Inspection 7
4.2 Preparation 7
4.3 Mounting the Unit 7
4.4 Battery Connection 9
4.5 AC Input/Output Connection 11
4.6 PV Connection 14
4.7 Final Assembly 17
5 Operation 18
5.1 Power ON/OFF 18
5.2 Operation and Display Panel 19
5.3 LCD Display Icons 20
5.4 LCD Setting 22
5.5 LCD Display 35
5.6 Operating Mode Description 39
5.7 Communication 42
5.8 Dry Contact Signal 42
5.9 Battery Equalization Description 43
5.10 Fault and Alarm Description 45
6 Technical Datasheet 48
7 Trouble Shooting 50

8 Appendix I: Parallel Function 52
8.1 Mounting the Unit 52
8.2 Wiring Connection 52
8.3 PV Connection 63
8.4 LCD Setting and Display 64
8.5 Commissioning 66

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 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. **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 wirings 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's 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. Two 150A fuses are provided as over-current protection for the battery supply.
11. GROUNDING INSTRUCTIONS -This inverter/charger should be connected to a permanent grounder 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 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
- The maximum number of parallel units is 9

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 environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.

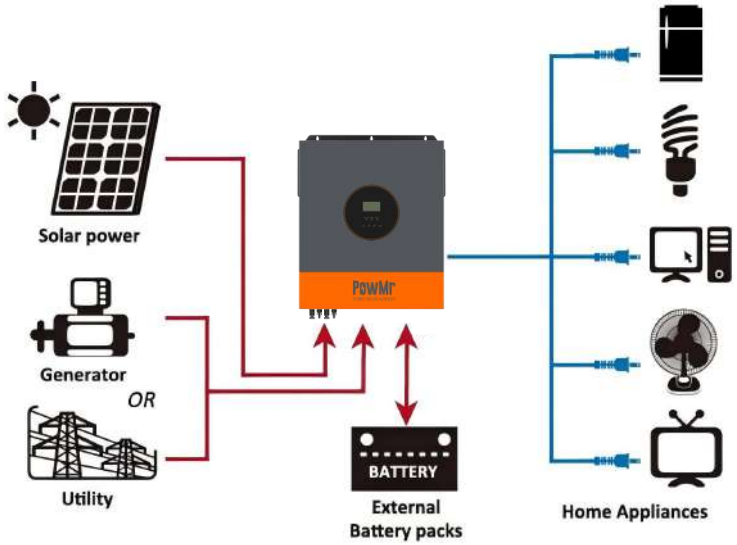
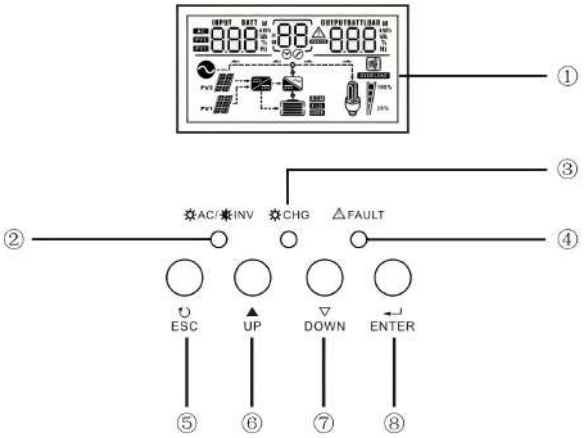


Figure 1 Hybrid Power System

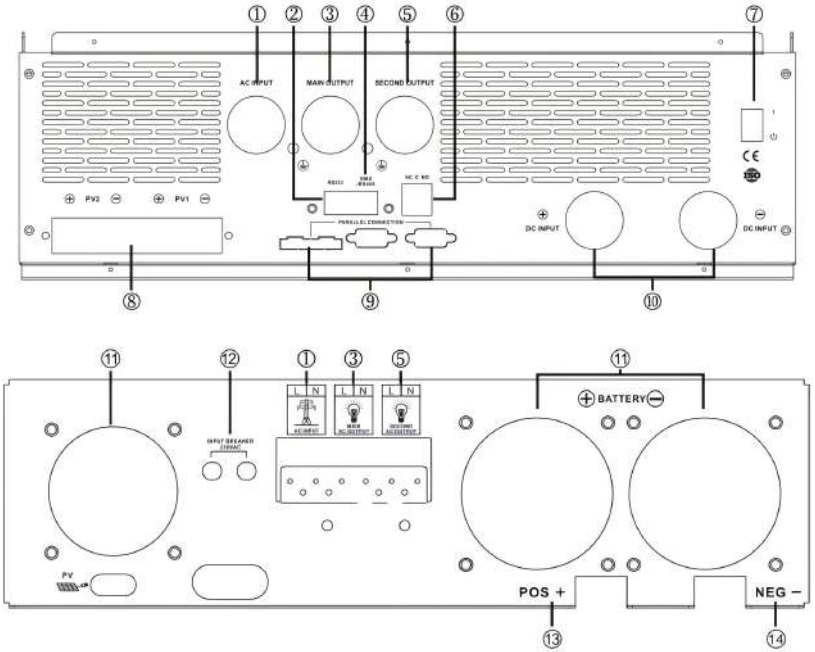
3.3 Product Overview

3.3.1 LCD Screen



1	LCD display	5	ESC
2	Status indicator	6	UP
3	Charging indicator	7	DOWN
4	Fault indicator	8	ENTER

3.3.2 Back Panel



1	AC Input	8	PV Input
2	RS232 Communication Port	9	Parallel Connection
3	Main Output	10	Battery Port
4	BMS/RS485 Communication Port	11	Fan
5	Second Output	12	Input Breaker
6	Dry Contact	13	Battery Terminal Positive (+)
7	Power ON/OFF Switch	14	Battery Terminal Negative (-)

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
- Parallel communication cable x 1
- Share current wires x 1
- Expansion screw (M6*80mm) x 3
- Battery fuse x 2
- Male MC4 connector & Female MC4 connector x 2

4.2 Preparation

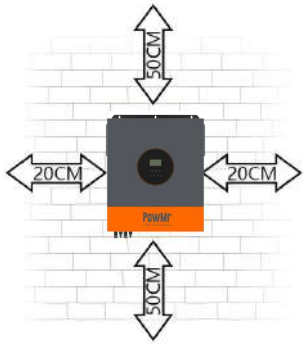
Before connecting all please take off bottom cover by removing five screws.



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 -10℃ and 50℃ to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- 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.

- Use M6*80mm expansion bolts for suspending and securing the equipment from above.
- Use M4 or M5 screws in the 3 holes to secure the equipment, as shown in the figure.

NOTICE

- To avoid potential damage to the terminal base and internal electronic components, it is recommended not to install screws in the mounting hole located at the lower left corner.



4.4 Battery Connection

Recommended battery cable and terminal size:

Rated Capacity	Typical Amperage	Battery Capacity	Wire Size	Ring Terminal			Torque Value
				Cable(mm^2)	Dimensions		
					D(mm)	L(mm)	
11KW	228A	250Ah	1*3/0AWG	85	8.4	54	5 Nm

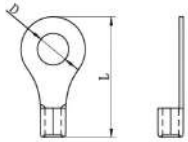
CAUTION

- 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 will may not be requested to have a disconnect device in some applications, however, it's still requested to over-current protection installed. Please refer to typical amperage in the above table as required fuse or breaker size.

WARNING

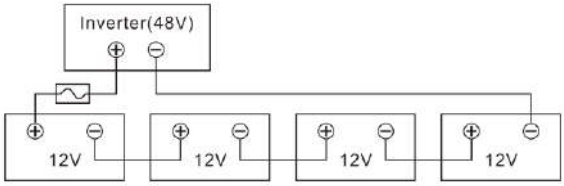
- All wiring must be performed by be qualified personnel.
- It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size.

Ring terminal:



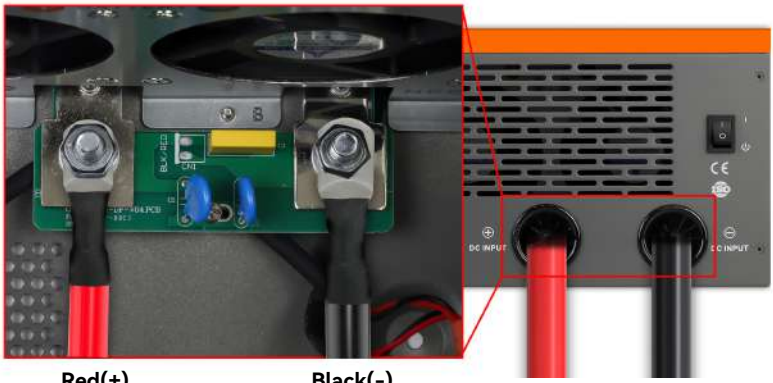
Please follow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. The 11KW model supports 48VDC battery systems. Connect all battery banks as shown in the diagram below.



3. 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.



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

Suggested cable requirement for AC wires

Rated Capacity	Gauge	Torque Value
11KW	8 AWG	1.4~1.6 Nm

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 disconnected during maintenance and fully protected from over current of AC input. The recommended spec of breaker is 63A for 48V system.
- There are two terminal blocks with " IN " and " OUT " markings. Please do NOT mis-connect input and output connectors.

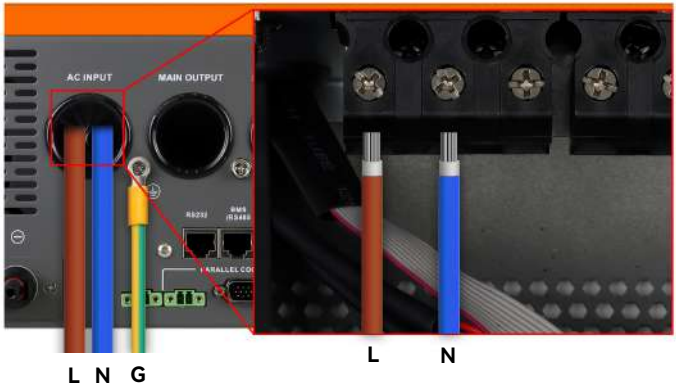
WARNING

- All wiring must be performed by qualified personnel.
- 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.

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 N 3 mm.
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.

⏚→Ground(yellow-green); L→LINE(brown or black); N→Neutral (blue)

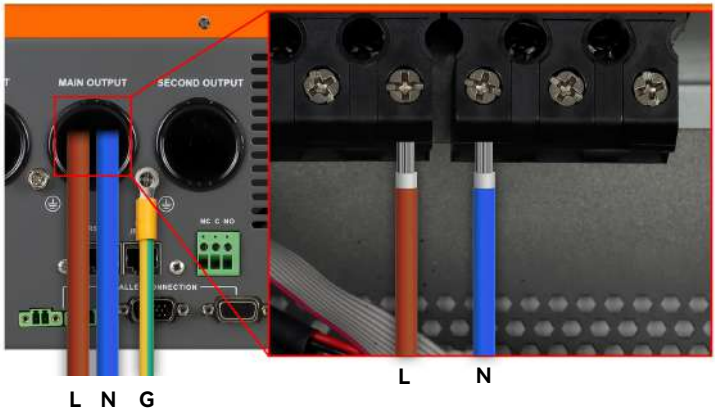


WARNING

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

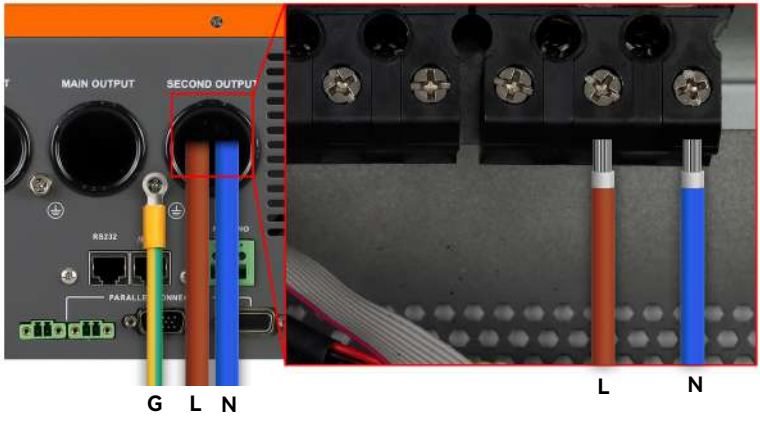
4. Then, insert AC main output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⏚) first.

⏚→Ground(yellow-green); L→LINE(brown or black); N→Neutral (blue)



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

⏚→Ground(yellow-green); 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

Rated Capacity	Typical Amperage	Gauge	Torque Value
11KW	30A	12 AWG	1.4~1.6 Nm

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.
- 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.

PV module selection:

When choosing the right PV module, be sure to first consider the following requirements:

1. The open circuit voltage (Voc) of the PV modules does not exceed the maximum PV array open circuit voltage of the inverter.
2. The maximum supply voltage of the PV modules should be close to the optimal PV access voltage range of the inverter for best performance. If one PV module cannot meet this requirement, it is necessary to connect multiple PV modules in series.

Model	POW-HVM11KP
PV Charging Mode	Dual MPPT
MAX.PV Input Power	2*7500W
MPPT Tracking Range	90~500Vdc
Operating voltage	360~430V
MAX.PV Input Voltage	500Vdc
PV max input current	27A/27A
MAX.PV Charging Current	150A
MAX.AC Charging Current	150A
MAX. Charging Current	150A

PV Module Wire Connection

Please follow below steps to implement PV module connection:

Step 1. Check the input voltage of PV array modules. This system is applied with two strings of PV array. Please make sure that the maximum current load of each PV input connector is 27A/27A.

Step 2. Disconnect the circuit breaker and switch off the DC switch.

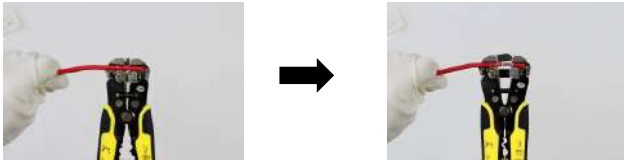
Step 3. Assemble provided PV connectors with PV modules by the following steps.

Components for PV connectors and Tools:

Female connector housing	
Female terminal	
Male connector housing	
Male terminal	
Wire stripper, crimping tool and spanner	

Prepare the cable and follow the connector assembly process:

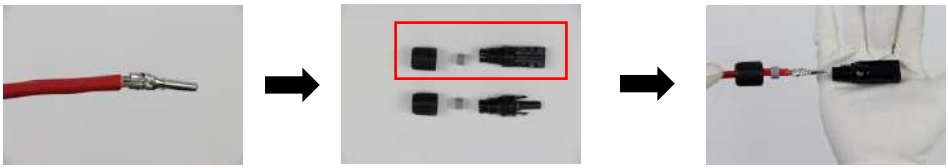
Strip one cable 10 mm on both end sides and be careful NOT to nick conductors.



Insert striped cable into male terminal and crimp male terminal as shown below.



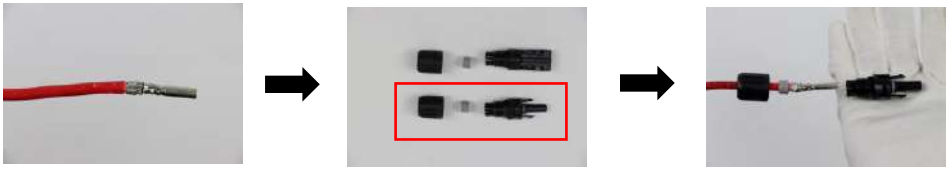
Insert the assembled cable into the female connector housing and push the sealing ring into place, as shown in the figure below.



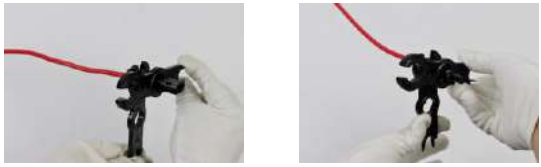
Insert striped cable into female terminal and crimp female terminal as shown below.



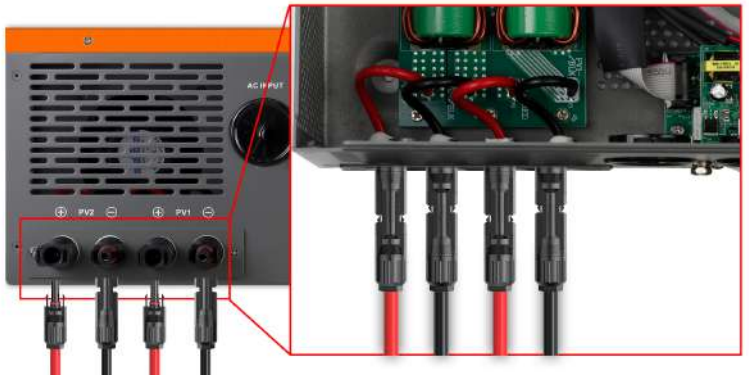
Insert the assembled cable into the male connector housing and push the sealing ring into place, as shown in the figure below.



Then, use two spanners to tightly screw the pressure dome onto the female and male connectors to ensure a secure and waterproof connection.



Step 4. Check correct polarity of wire 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.



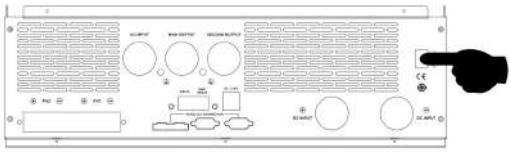
4.7 Final Assembly

After connecting all wirings, please install bottom cover back by screwing five screws.



5 Operation

5.1 Power ON/OFF



Once the unit has been properly installed and the batteries are connected, follow the power-on sequence below to start the inverter safely:

1. Close the battery circuit breaker.
2. Press the On/Off switch (located on the bottom of the case) to turn on the unit. Wait until the inverter starts up and enters normal operation (inverting).
3. Close the PV and AC input circuit breakers.
4. Finally, close the AC output circuit breaker.

To shut down the system, turn off the circuit breakers in the reverse order.

5.1.1 Steps to Start Up

Connect the battery that meets the requirements (battery voltage needs to beyond 46V) or AC (AC needs to confirm the suitable input range depend on the output mode), then you can start up the inverter.

➢ **Mains power on**

Connect to normal AC power, press the switch, the system will automatically turn on. If you set AC output power priority, after waiting for a period of time, the panel will display AC mode that represents turn on the machine successfully, then will enter the AC mode.

➢ **Battery boot**

Connect to battery, press the power-on button to establish a working power source.

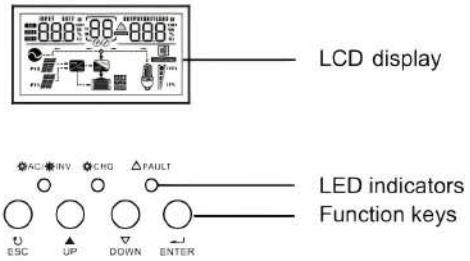
The system will automatically turn on, after waiting for a period of time, the panel will display battery mode that represents turn on the machine successfully, then will enter the battery mode.

5.1.2 Shutdown Steps

When the system is in battery mode or AC mode output, press the switch again, then the system will be turned off.

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.



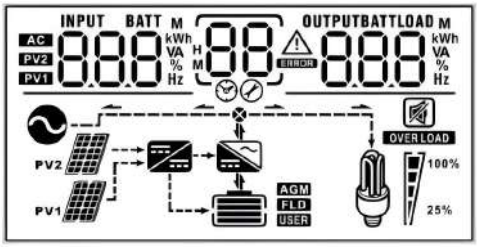
➢ **Function Keys**

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

➢ **LED Indicator**

LED Indicator			Messages
AC / INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Yellow	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.

5.3 LCD Display Icons



Icon	Function
Input source information	
AC	Indicates the AC input
PV1	Indicates the 1st PV panel input
PV2	Indicates the 2st PV panel input
Left digital display information	
	Indicate input voltage, input frequency, battery voltage, PV1 voltage, PV2 voltage, charger current.
Middle digital display information	
	Indicates the setting programs.
	Indicates the warning and fault codes. Warning: Flashing  with warning code Fault: display  with fault code
Right digital display information	
	Indicate the output voltage, output frequency, load percent, load VA, load W, PV1 charger power, PV2 charger power, DC discharging current.
Battery information	
	Indicates battery level by 0-24%, 25-49%, 50-74%, 75-100% and charging status.

AGM FLD USER	Indicates the battery type: AGM, Flooded or User-defined battery.
Load information	
OVER LOAD	Indicates overload.
100% 25%	Indicates the load level by 0-24%, 25-50%, 50-74% and 75%-100%.

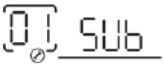
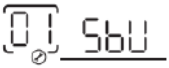
0~25%	25%~50%	50%~75%	75%~100%
			

Mode operation information	
	Indicates unit connects to the mains.
	Indicates unit connects to the 1st PV panel.
	Indicates the solar charger is working.
	Indicates the DC/AC inverter circuit is working.
Mute operation	
	Indicates unit alarm is disabled.

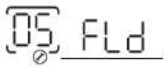
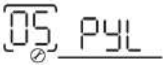
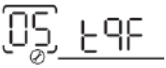
5.4 LCD Setting

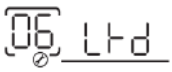
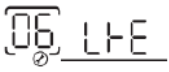
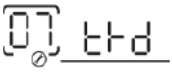
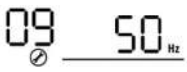
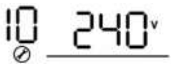
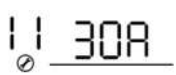
After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or "ESC" button exit.

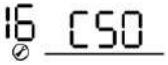
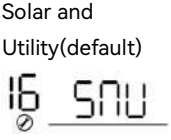
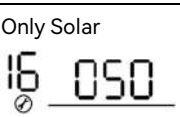
Setting Programs:

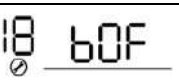
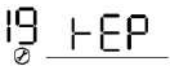
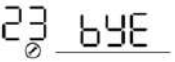
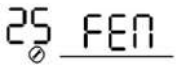
NO.	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority selection	SUB priority(default) 	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time.
		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 or solar and battery is not sufficient.
02	Maximum charging current: To configure total charging current for solar and utility chargers.	60A(default) 	Setting range is from 10A to maximum charging current. Increment of each click is 10A.

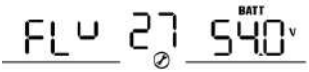
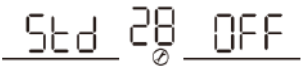
	(Max. charging current = utility charging current + solar charging current)		
03	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.
04	AC output mode *This setting is only available when the inverter is in standby mode (Switch off)	Single (default) 	When the units are used in parallel with single phase, please select "PAL" in program 04. It is required to have at least 3 inverters or maximum 9 inverters to support three-phase equipment. It's required to have at least one inverter in each phase or it's up to four inverters in one phase please-2 for detailed information. Please select "3P1 " in program 04 for the inverters connected to phase, "3P2" in program 04 for the inverters connected to L2 phase and "3P3" in program 04 for the inverters connected to L3 phase. Be sure to connect share current cable to units which are on the same phase. Do NOT
		Parallel 	
		L1 phase 	
		L2 phase 	
		L3 phase 	

			connect share current cable between units on different phases. Besides, power saving function will be automatically disabled.
05	Battery type	AGM(default) 	Flooded 
		User-Defined 	If "User-Defined" is selected, battery charge voltage, low DC cut-off voltage and dual cut-off voltage can be set up in program 24, 26, 27, 29 and 61.
		LIA-protocol compatible battery 	If selected, program of 24, 26, 27 and 29 will be automatically set up. No need for further setting.
		Pylontech battery 	
		Techfine battery 	
		Growatt battery 	
		Felicity battery 	
		LIB-protocol compatible battery 	Select“LIB” if using Lithium battery compatible to Lib protocol.

			If selected, programs of 26,27 and 29 will be automatically set up. NO need for further setting.
		3 rd party lithium battery 	If selected, programs of 26,27 and 29 will be automatically set up. NO need for further setting. Please contact the battery supplier for installation procedure.
06	Auto restart when overload occurs	Restart disable(default) 	Restart enable 
07	Auto restart when over temperature occurs	Restart disable 	Restart enable (default) 
08	ECO function: System will temporarily stop when the load is low in battery mode.	Disable(default) 	
		Enable 	
09	Output frequency	50Hz(default) 	60Hz 
10	Output voltage	220V 	230V(default) 
		240V 	
11	Maximum utility charging current	30A(default) 	Setting range is 2A, then from 10A to max.AC charging

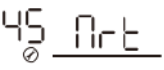
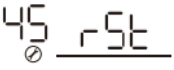
<table>
<tr><td></td><td>Note: If setting value in program 02 is smaller than that in program in 11, the inverter will apply charging current from program 02 for utility charger.</td><td></td><td>current. Increment of each click is 10A.</td></tr>
<tr><td>12</td><td>Setting voltage point back to utility source when selecting "SBU priority" in program 01</td><td>46V(default)
</td><td>Setting range is from 44V to 51 V. Increment of each click is 1V.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">Setting voltage point back to battery mode when selecting "SBU priority" in program 01.</td><td>Battery fully charged
</td><td>54V(default)
</td></tr>
<tr><td colspan="2">Setting range is from 48V to 58V. Increment of each click is 1V.</td></tr>
<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, 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>
</table>

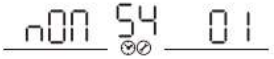
			
19	Auto return to default display screen	Return to default display screen (default) 	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage / output voltage) after no button is pressed for 1 minute.
		Stay at latest screen 	If selected, the display screen will stay at latest screen user finally switches.
20	Backlight control	Backlight on (default) 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 	Bypass enable 
24	Battery low voltage ● If battery power is only power source available inverter will alarm	Battery low voltage 44.0V 	
		Setting range is from 40.0V~54.0V for 48V system	
25	Record Fault code	Record enable 	Record disable (default) 

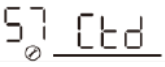
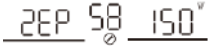
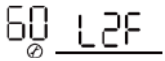
<table>
<tr><td rowspan="2">26</td><td rowspan="2">Bulk charging voltage (C.V voltage)</td><td>48V system default setting:56.4V
</td></tr>
<tr><td>If self-defined is selected in program 5, this program can be set up. Setting range is from 48.0V to 60.0V for 48V system model. Increment of each click is 0.1V.</td></tr>
<tr><td>27</td><td>Floating charging voltage</td><td>48V system default setting:54.0V
</td></tr>
<tr><td rowspan="2">28</td><td rowspan="2">Reset factory setting</td><td>Turn off(default)
</td></tr>
<tr><td>Turn on
</td></tr>
<tr><td rowspan="2">29</td><td rowspan="2">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.</td><td>48V system default setting:42.0V
</td></tr>
<tr><td>If self-defined is selected in program 5, this program can be set up. Setting range is from 40.0V to 52.0V for 48V system 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 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>
</table>

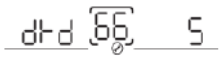
31	Battery equalization voltage	48V system default setting:58.4V  	
		Setting range is from 48.0V to 60.0 V for 48V system model. Increment of each click is 0.1V.	
33	Battery equalized time	60min (default) 	Setting range is from 5min to 900min. Increment of each click is 5min.
34	Battery equalized timeout	120min (default) 	Setting range is from 5min to 900min. Increment of each click is 5min.
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 "", If "Disable" is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, "" will not be shown in LCD main page.	
37	BMS Function Switch	Off(default) 	Whether to enable the BMS communication function
		On 	
38	Bat Soc Under Lock	10%(default)  	If any type of lithium battery is selected in program 5.

			BMS low voltage SOC value, if the BMS SOC value is lower than the set value, the inverter will shut down to protect the battery.
39	Bat Soc Turn to AC	20%(default) 	If any type of lithium battery is selected in program 05. When the working mode of the inverter is set to the battery priority mode, the inverter will be forced to enter the mains charging when the SOC of the BMS is lower than the set value.
40	Bat Soc Turn to DC	95%(default) 	If any type of lithium battery is selected in program 05. When the working mode of the inverter is set to the battery priority mode, the inverter resumes the DC working mode when the SOC of the BMS is higher than the set value.
41	Bat Restart Soc	50%(default) 	If any type of lithium battery is selected in program 05. When the inverter is turned on, the SOC must be higher than the set value to work normally.
43	Solar supply priority	Default 	When solar energy is available, it will prioritize charging the battery. Excess solar power will then be used to power the loads.
			When solar energy is available, it will prioritize powering the loads. Excess solar power will then be used to charge the battery.

44	Solar energy feed to grid configuration	Disable(default) 	Solar energy feed to grid disable.
		Enable 	Solar energy feed to grid enable (Compliance with local regulations is required for grid connection.)
45	Reset PV energy storage	Not reset(default) 	Reset 
46	Start charging time for AC charger	00:00(default)  The setting range for the AC charger start time is from 00:00 to 23:00, increment of each click is 1 hour.	
47	Stop charging time for AC charger	00: 00(default)  The setting range for the AC charger stop time is from 00: 00 to 23:00, increment of each click is 1 hour.	
48	Scheduled time for AC output on	00: 00(default)  The setting range of scheduled time for AC output on is from 00: 00 to 23:00, increment of each click is 1 hour.	
49	Scheduled time for AC output off	00: 00(default)  The setting range of scheduled time for AC output off is from 00: 00 to 23:00, increment of each click is 1 hour.	
50	Set country customized regulations	Mode 1 	If selected, acceptable feed-in grid voltage range will be 195.5~253VAC. Acceptable

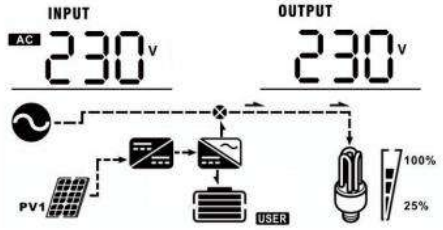
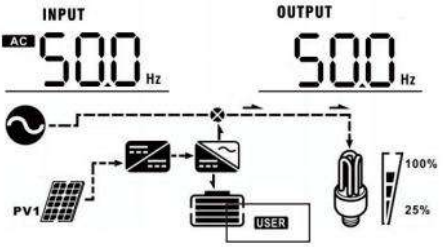
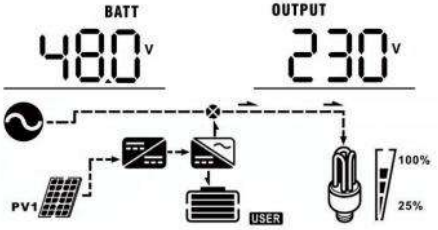
			feed-in grid frequency range will be 49~51 Hz.
		Mode 2 	If selected, acceptable feed-in grid voltage range will be 184~264.5VAC. Acceptable feed-in grid frequency range will be 47.5~51.5Hz.
		Mode 3 	If selected, acceptable feed-in grid voltage range will be 184~264.5VAC. Acceptable feed-in grid frequency range will be 57~62Hz.
		Mode 4 (default) 	If selected, acceptable feed-in grid voltage range will be 170~264.5VAC. Acceptable feed-in grid frequency range will be 47.5~53.5Hz.
		Mode 5 	If selected, acceptable feed-in grid voltage range will be 100~280VAC. Acceptable feed-in grid frequency range will be 47.5~53.5Hz.
51	Time setting-Minute	 For minute setting, the range is from 00 to 59.	
52	Time setting-Hour	 For hour setting, the range is from 00 to 23.	
53	Time setting-Day	 For day setting, the range is from 00 to 31.	
54	Time setting-Month	 For month setting, the range is from 1 to 12.	

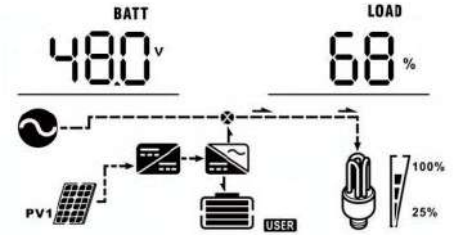
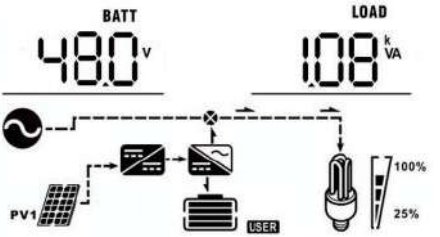
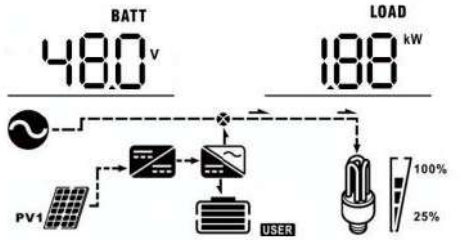
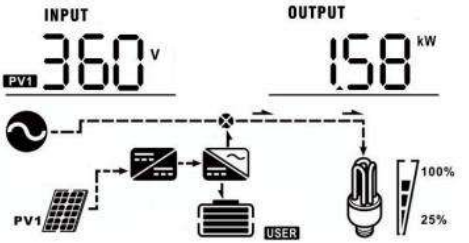
55	Time setting-Year	 For year setting, the range is from 16 to 99.	
56	GRID-tie current	20A 	Increment of each click is 1A.
57	External CT Function	Default  	This model does not support this setting for now.
58	Set the input power of mains power	150W(default) 	This model does not support this setting for now.
60	Dual output	Disable 	Use (default) 
61	Enter the dual output functional voltage point	Default setting: 44.0V 	
		If battery voltage lower than inverter setting, second output will be cutted off, Increment of each click is 0.1V.	
62	Enter the dual output functional SOC point	20% (default) 	If any type of lithium battery is selected in program 05. If BMS capacity lower than SOC setting, second output will be cutted off.
63	Battery voltage recovery threshold for dual output	52.0V (default) 	Default 52V, if the battery voltage is higher than the inverter setting, the dual will be restored.

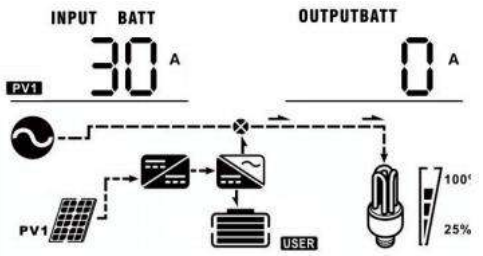
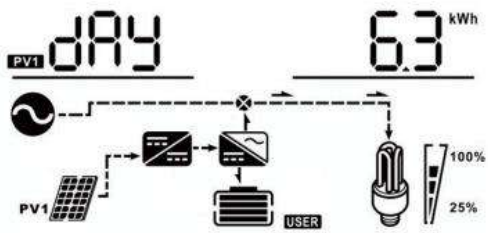
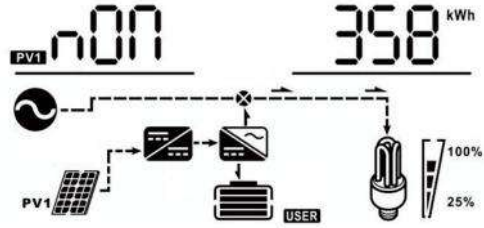
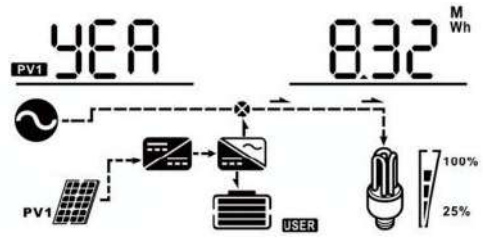
64	SOC recovery threshold for dual output	50% (default) 	If any type of lithium battery is selected in program 05. Default 50%, if the BMS capacity is higher than the SOC setting, the second output will be restored.
65	Setting discharge time on the second output	Disable(default) 	Setting range is disable and then from 0 min to 990 min. Increment of each click is 5 min. *If the battery discharge duration reaches the time set in Program 65, and the dual output function in Program 60 is disabled, and the battery voltage falls below the threshold set in Program 61, the output will be shut down.
66	Dual Recover Delay Time	5min (default)  Disable 	The value ranges from 0-60min.
67	Output Open Time		The value ranges from 0 to 23.
68	Output Stop Time		The value ranges from 0 to 23.
70	Set the Rated power		Increment of each click is 100W.

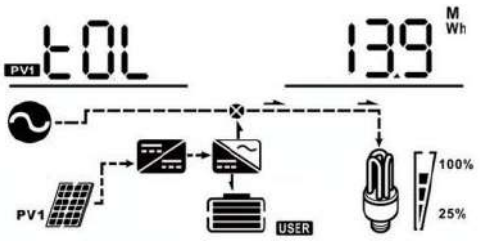
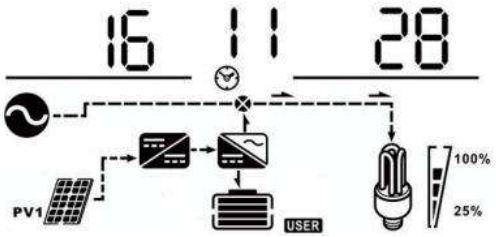
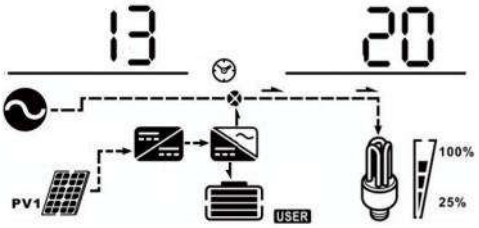
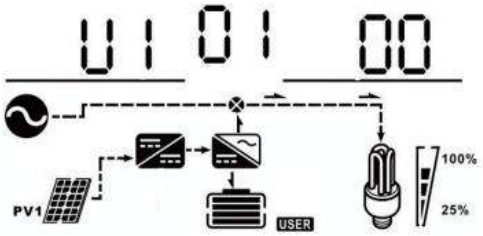
5.5 LCD Display

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, battery voltage, output voltage, output frequency, load percentage, load in Watt, load in VA, load in Watt, DC discharging current, main board firmware version and SCC firmware version.

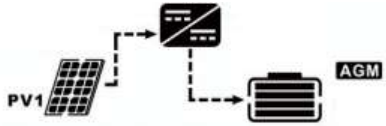
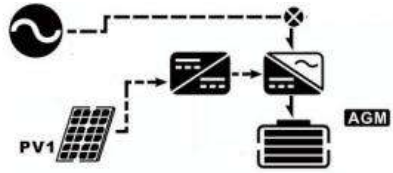
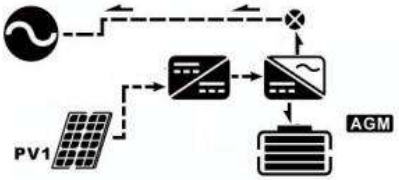
Select item	LCD display
Input voltage and output voltage (Default Display Screen)	Input voltage=230V, Output voltage=230V 
Input frequency and output frequency	Input frequency=50.0Hz, output frequency=50.0Hz 
Battery voltage and output voltage	Battery voltage=48.0V, output voltage=230V 

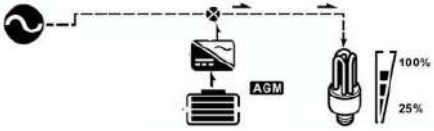
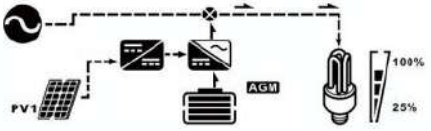
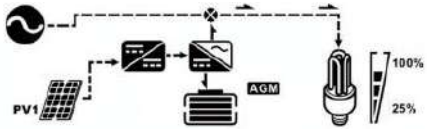
Battery voltage and load percentage	Battery voltage=48.0V, load percentage=68% 
Battery voltage and load in VA	Battery Voltage=48.0V, load in VA=1.08kVA 
Battery voltage and load in Watt	Battery Voltage=48.0V, load in Watt=1.88kW 
PV1 voltage and PV1 charger power	PV1 voltage=360V, charger power=1.58kW 

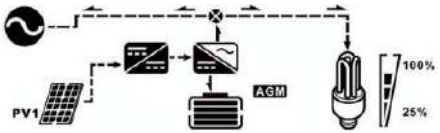
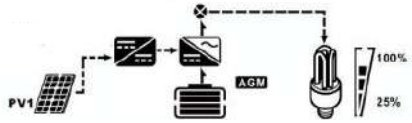
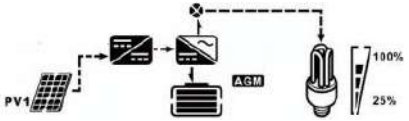
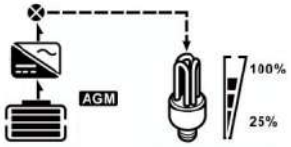
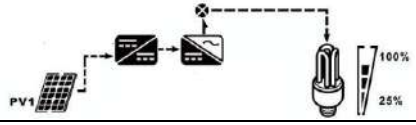
Charger current and DC discharging current	Charging current=30A, discharging current=0A 
PV energy generated today	Today energy=6.3kWh 
PV energy generated this month	This month energy=358kWh 
PV energy generated this year	This year energy=8.32MWh 

PV energy generated totally	Total energy=13.9MWh 
Real date	Real date Nov 28, 2016 
Real time	Real time 13:20 
Main board firmware version	Version 00001.00 

5.6 Operating Mode Description

Operating mode	Description	LCD display
Standby mode Note: *Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery 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 power, solar or utility charger available	Battery is charged by utility. 
		Battery is charged by PV energy. 
		Battery is charged by utility and PV energy. 
		Battery is charged by PV energy and feed PV energy grid. 
		No charging 

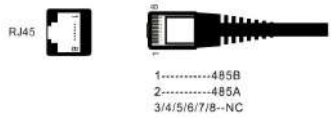
Line mode	Output power from utility. Charger available	Utility charges battery and provides power to load. 
		Utility and battery power provide power to load. 
		PV energy, battery power and utility provide power to load. 
		PV energy and utility charge battery, and utility provides power to load. 
		PV energy charges battery, utility and PV energy provide power to the load. 

		PV energy charges battery, PV energy provides power to the load and feeds remaining energy to the grid. 
Battery mode	Output power from battery or PV	PV energy and battery energy supply power to the load. 
		PV energy charges battery, PV energy supply power to the load. 
		Battery provides power to the load. 
Only PV mode	Output power from PV	PV provides power to the load. 

5.7 Communication

5.7.1 BMS/RS485 communication

When the BMS/RS485 communication interface is externally connected, as shown in the following figure:



RJ45(Control board signal interface):

NO	SYMBOL	DESCRIPTION
1/7/8	NC	No Connected
2	+12V	+Power
3	RS232_TXD	RS232 Transmit Data
4/5	GND	Ground
6	RS232_RXD	RS232 Receive Data

5.8 Dry Contact Signal

There is one dry contact(3A/250VAC) available on the rear panel. It could be used to deliver signal to external device when battery voltage reaches warning level.

Unit Status	Condition			Dry contact port:	
				NC & C	NO & C
Power Off	Unit is off and no output is powered.			Close	Open
Power On	Output is powered from battery or solar	Normal mode	Battery voltage< Low DC warning voltage	Open	Close
			Battery voltage>Float charging voltage	Close	Open
		Solar first mode	Battery voltage< Solar to AC voltage	Open	Close
			Battery voltage> AC to DC voltage	Close	Open

5.9 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.

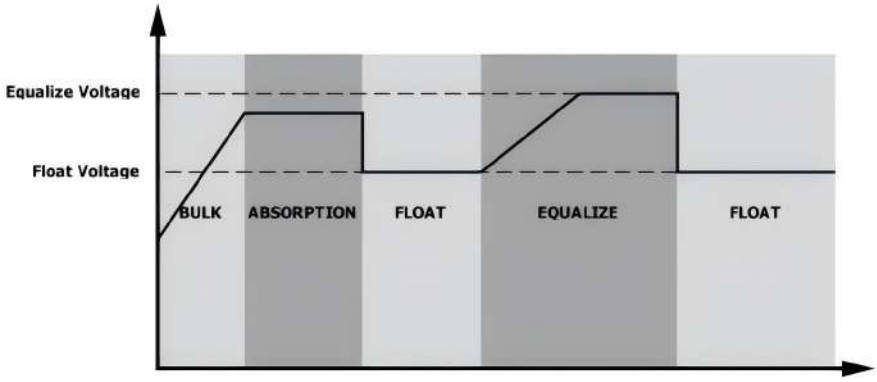
- **How to Apply Equalization Function**

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.

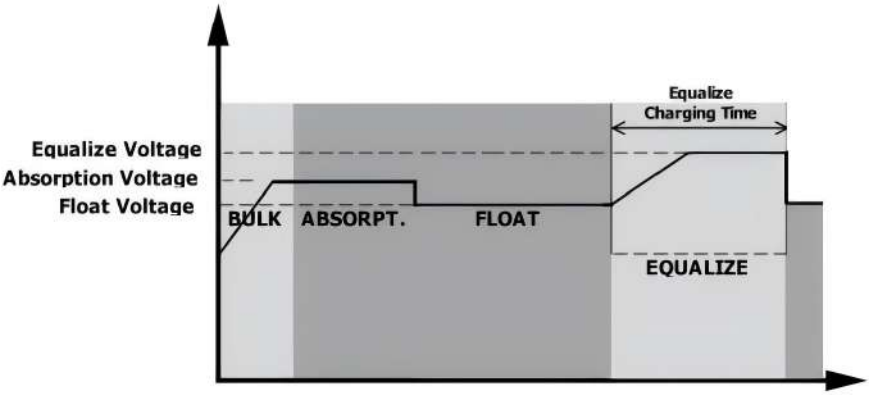
- **When to Equalize**

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

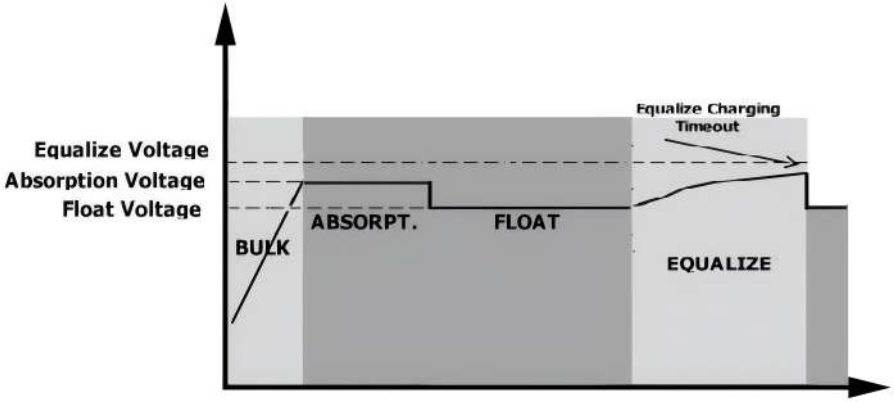


- **Equalize charging time and timeout**

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.



5.10 Fault and Alarm Description

5.10.1 Faults Descriptions

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

Fault Reference Code

Fault Code	Fault Event	Icon
01	Fan is locked when inverter is off.	
02	Over temperature or NTC is not connected well.	
03	Battery voltage is too high.	
04	Battery voltage is too low.	
05	Output short circuited or over temperature is detected by internal converter components.	
06	Output voltage is too high.	
07	Overload time out.	
08	Bus voltage is too high	
09	Bus soft start failed	
51	Over currents or surge	
52	Bus voltage is too low	

53	Inverter soft start failed	
55	Over DC voltage in AC output	
57	Current sensor failed	
58	Output voltage is too low	
59	PV voltage is over limitation	

5.10.2 Warning Descriptions

- **Alarm:** The red LED flashes, and the LCD displays an alarm code, the inverter does not enter the failure mode

Warning Indicator

Warning Code	Warning Event	Audible Alarm	Icon flashing
01	Fan is locked when inverter is on.	Beep three times every second	
02	Over temperature	None	
03	Battery is over-charged	Beep once every second	
04	Low battery	Beep once every second	
07	Overload	Beep once every 0.5 second	
10	Output power derating	Beep twice every 3 seconds	
15	PV energy is low.	Beep twice every 3 seconds	

16	High AC input (>280VAC) during BUS soft start	None	
E9	Battery equalization	None	
bP	Battery is not connected	None	

5.10.3 Code Reference

Related information code will be displayed on LCD screen. Please check inverter LCD screen for the operation.

Code	Description
60 ⚠	If battery status is not allowed to charge and discharge after the communication between the inverter and battery is successful, it will show code 60 to stop charging and discharging battery.
61 ⚠	Communication lost ● After battery is connected, communication signal is not detected for 1 minutes, buzzer will beep. ● Communication lost occurs after the inverter and battery is connected successfully, buzzer beeps immediately.
69 ⚠	If battery status is not allowed to charge after the communication between the inverter and battery is successful, it will show code 69 to stop charging battery.
70 ⚠	If battery status must to charge after the communication between the inverter and battery is successful, it will show code 70 to charge battery.
71 ⚠	If battery status is not allowed to discharge after the communication between the inverter and battery is successful, it will show code 71 to stop discharge battery.

6 Technical Datasheet

Model		POW-HVM11KP
AC Input		
Input Sources		L+N+PE
Rated Input Voltage		220/230/240VAC
Voltage Range		90-280VAC±3V(APL Mode) ; 170-280VAC±3V(UPS Mode)
Frequency		50Hz/60Hz(Auto Adaptive)
Inverter Output		
Rated power	**The Battery Inverter**	11000W
	Photovoltaic Inverter	12000W
Output Voltage		220/230/240VAC±5%
Output Frequency		50Hz/60Hz±0.1%
Waveform		Pure Sine Wave
Transfer Time (Adjustable)		Computers(UPS Mode)10ms, Appliance(APL Mode)20ms
Peak Power		22000VA
Overload Capacity		Battery mode: 11s@105%~150%Load; 2s@150%~200%Load; 400ms@>200%Load
Grid-Connected Operation		
Output Voltage		220/230/240VAC±5%
Feed Into the Grid Voltage Range		100-280VAC
Feed Into the Grid Frequency Range		47-53±1Hz/57-62±1Hz
Nominal Output Current		47.8A
Power Factor Range		>0.99
Maximum Conversion Efficiency (DC/AC)		98%
Battery		
Battery Voltage		48Vdc

Constant Charging Voltage (Adjustable)	56.4Vdc
Float Charging Voltage (Adjustable)	54Vdc
PV Input	
PV Charging Mode	Dual MPPT
MAX. PV Input Power	7500W/7500W
MPPT Tracking Range	90~500Vdc
Operating Voltage	360~430V
MAX. PV Input Voltage	500Vdc
PV Max Input Current	27A/27A
MAX. PV Charging Current	150A
MAX. AC Charging Current	150A
MAX. Charging Current	150A
Display	
LCD Interface	CAN display running mode/load/input/output, etc.
Interface	
RS232	Baud Rate 2400
Extend the Socket Communication Interface	Lithium Battery BMS Communication Card, WiFi Card, Dry Contact
Parallel Machine Interface	Parallel Machine(network) function
General Specifications	
Operating Temperature	-10℃~50℃
Humidity	20%~95% (Non-condensing)
Storage Temperature	-15℃~60℃
Altitude	Altitude Not Over 1000m, Derating over 1000m, Max 4000m, Refer to IEC62040
Noise	≤50db
Standards and certification	EN-IEC 60335-1, EN IEC 60335-2-29, IEC 62109-1
Dimension (D*W*H)	560x490x155mm
Net Weight	19.75kg

7 Trouble Shooting

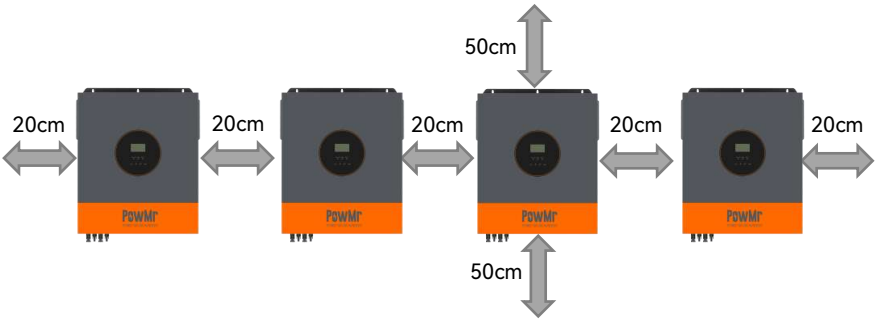
Problem	LCD/LED/Buzzer	Explanation/Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91 V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after power on.	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 105% and time is up.	Reduce the connected load by switching off some equipment.

		If PV input voltage is higher than specification, the output power will be derated. At this time, if connected loads is higher than derated output power, it will cause overload.	Reduce the number of PV modules in series or the connected load.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
		Temperature internal converter component is over 120℃.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 02	Internal temperature of inverter component is over 100℃	
	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.	
	Fault code 59	PV input voltage is beyond these specification.	Reduce the number of PV modules in series.

8 Appendix I: Parallel Function

8.1 Mounting the Unit

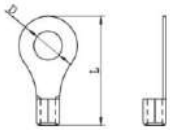
When installing multiple units, please follow below chart.



NOTE: 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, Be sure to install each unit in the same level.

8.2 Wiring Connection

Ring terminal:



NOTICE: It's requested to connect to battery for parallel operation.

The cable size of each inverter is shown as below:

Recommended battery cable and terminal:

Rated Capacity	Wire Size	Ring Terminal			Torque Value
		Cable (mm^2)	Dimensions		
			D(mm)	L(mm)	
11KW	1*3/0AWG	85	8.4	54	5Nm

WARNING

- Be sure the length of all battery cables is the same. Otherwise, there will be voltage difference between inverter and battery to cause parallel inverters not working.

Recommended AC input and output cable size for each inverter:

Rated Capacity	AWG no.	Torque
11KW	8AWG	1.4~1.6Nm

You need to connect the cables of each inverter together. Take the battery cables for example: You need to use a connector or bus-bar as a joint to connect the battery cables together, and then connect to the battery terminal. The cable size used from joint to battery should be X times cable size in the tables above. "X" indicates the number of inverters connected in parallel.

Regarding AC input and output, please also follow the same principle.

WARNING

- Make sure all output N wires of each inverter must be connected all the time. Otherwise, it will cause inverter fault in error code #72.

CAUTION

- Please install the breaker at the battery and AC input side. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of battery or AC input.

Recommended breaker specification of battery for each inverter:

Rated Capacity	1 unit*
11KW	300A/70VDC

*If you want to use only one breaker at the battery side for the whole system, the rating of the breaker should be X times current of 1 unit. "X" indicates the number of inverters connected in parallel.

Recommended breaker specification of AC input with single phase:

Rated Capacity	2 units	3 units	4 units	5 units	6 units	7 units	8 units	9 units
11KW	120A/ 230VAC	180A/ 230VAC	240A/ 230VAC	300A/ 230VAC	360A/ 230VAC	420A/ 230VAC	480A/ 230VAC	540A/ 230VAC

Note 1: Also, a circuit breaker should be installed at the AC input of each inverter, and the selection of the circuit breaker should refer to the AC input current of the machine nameplate.

Note2: Regarding three-phase system, you can use 4-pole breaker directly and the rating of the breaker should be compatible with the phase current limitation from the phase with maximum units.

Recommended battery capacity

Inverter parallel numbers	2	3	4	5	6	7	8	9
Battery Capacity for 11KW	500AH	750AH	1000AH	1250AH	1500AH	1750AH	2000AH	2250AH

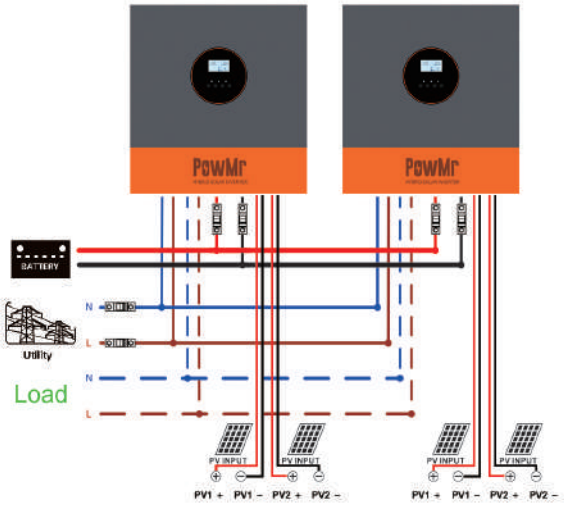
WARNING

- Be sure that all inverters will share the same battery bank. Otherwise, the inverters will transfer to fault mode.

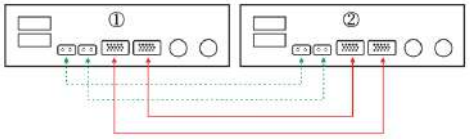
8.2.1 Parallel Operation in Single Phase

Two inverters in parallel:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

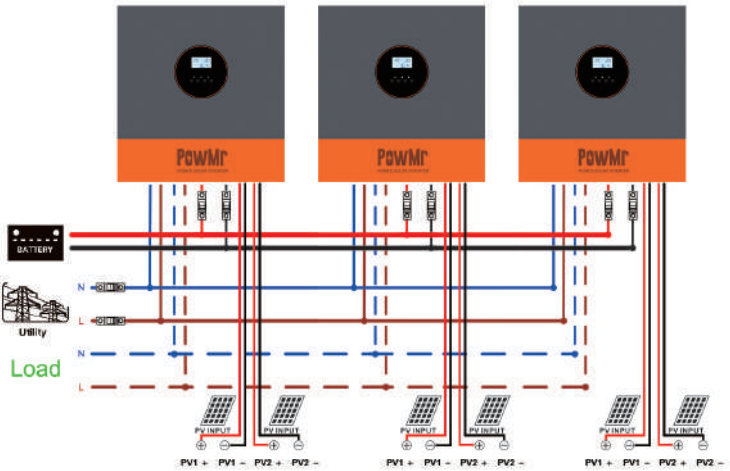


Communication Connection

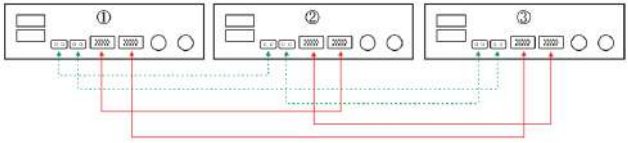


Three inverters in parallel:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

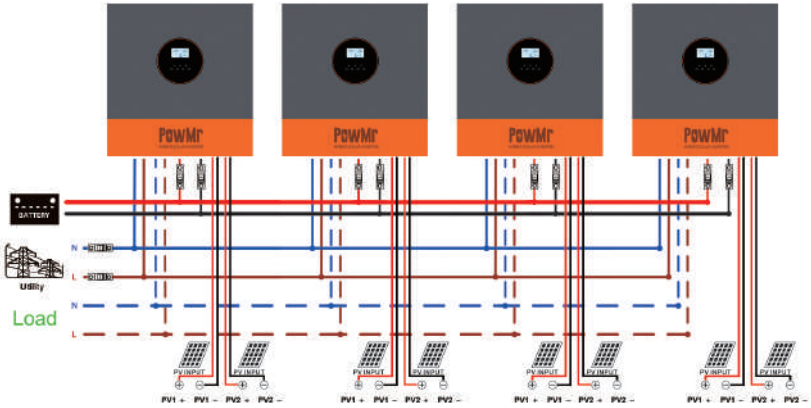


Communication Connection

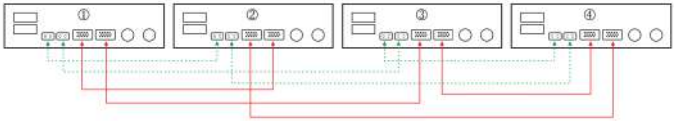


Four inverters in parallel:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

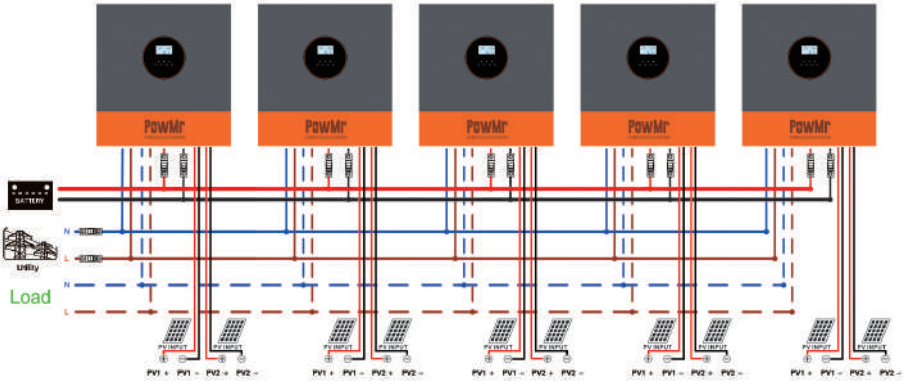


Communication Connection

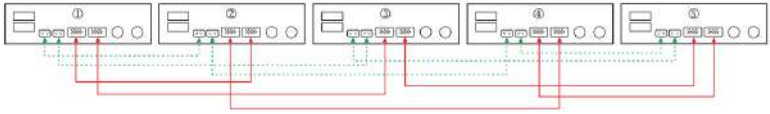


Five inverters in parallel:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

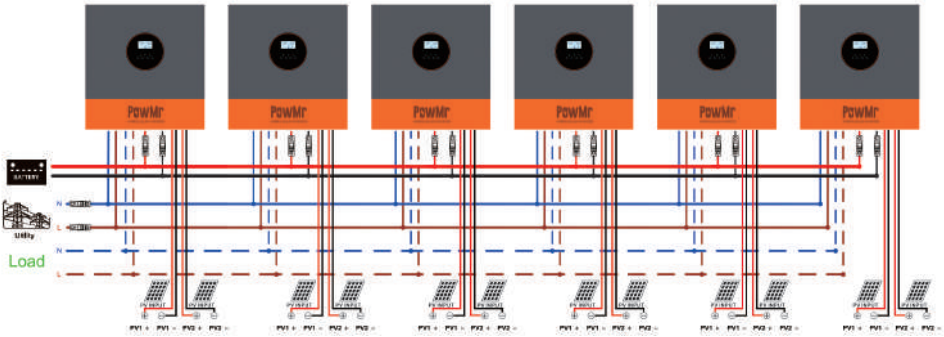


Communication Connection

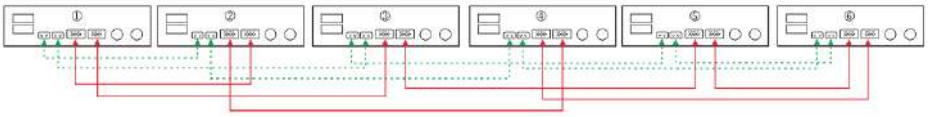


Six inverters in parallel:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

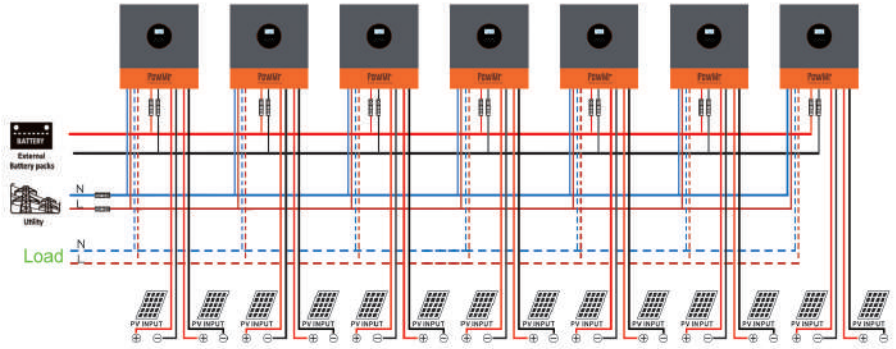


Communication Connection



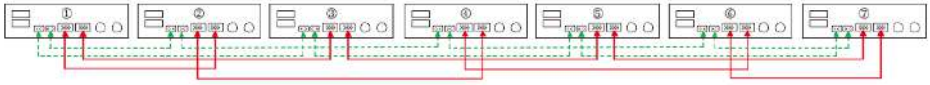
Seven inverters in parallel:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

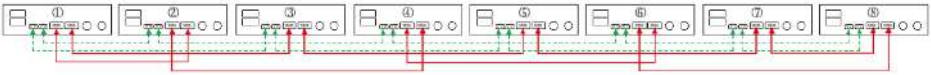


Communication Connection

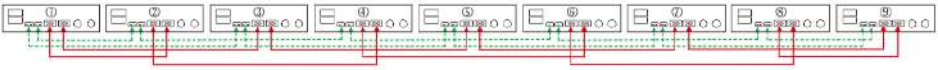
- Seven inverters in parallel



- Eight inverters in parallel



- Night inverters in parallel

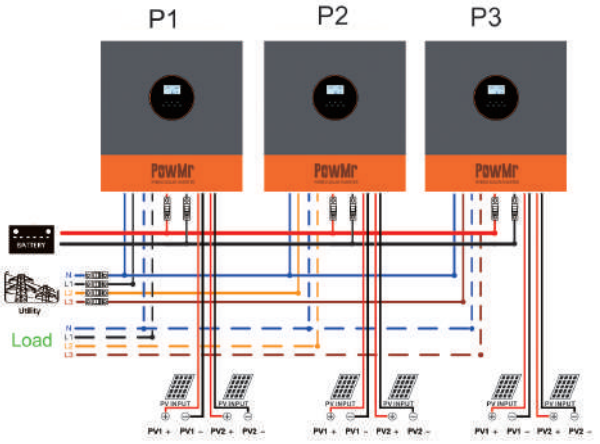


8.2.2 Support Three-phase Equipment

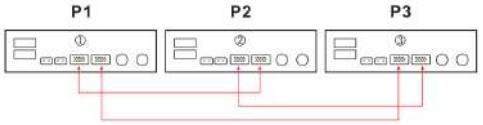
WARNING: Do not connect the current sharing cable between the inverters which are in different phases. Otherwise, it may damage the inverters.

One inverter in each phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

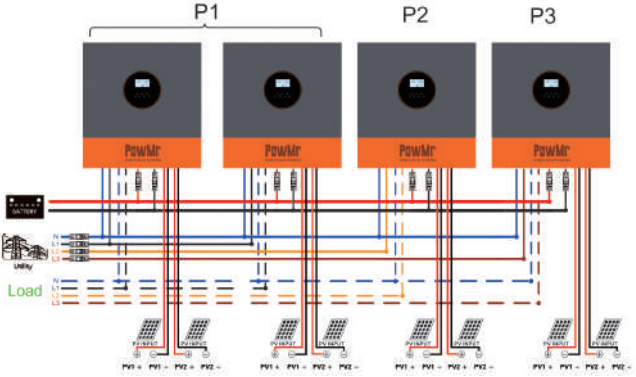


Communication Connection

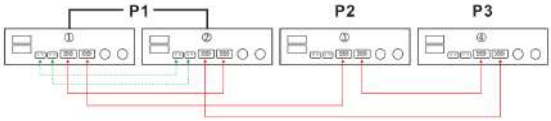


Two inverters in one phase and only one inverter for the remaining phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

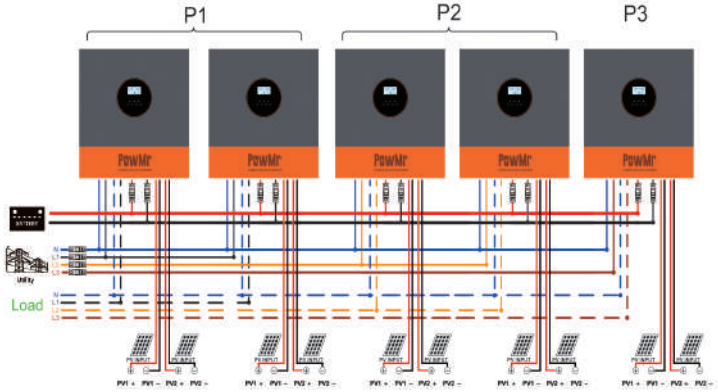


Communication Connection

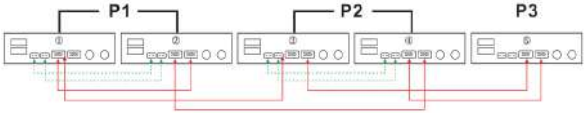


Two inverters in two phase and only one inverter for the remaining phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

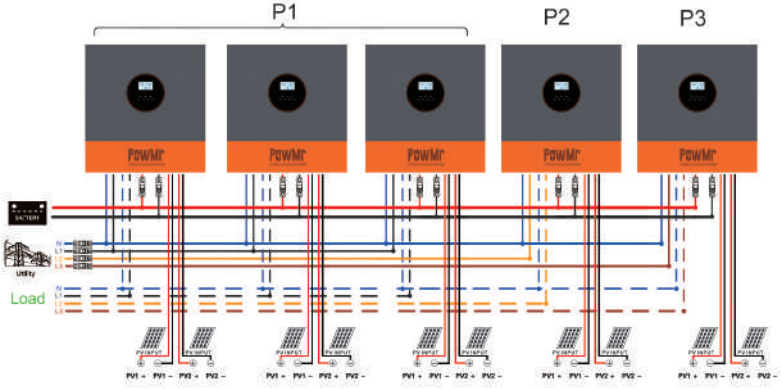


Communication Connection

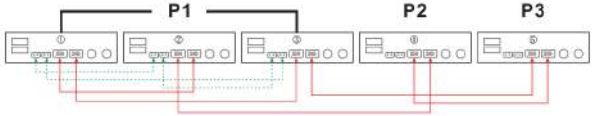


Three inverters in one phase and only one inverter for the remaining two phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

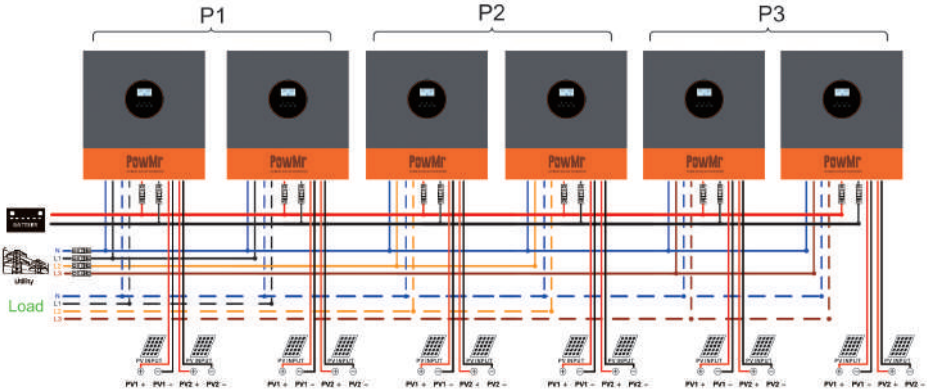


Communication Connection

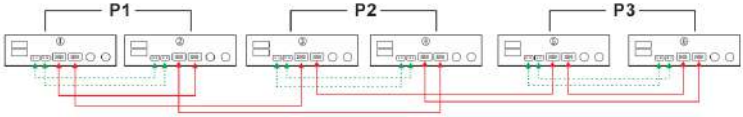


Two inverters in each phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

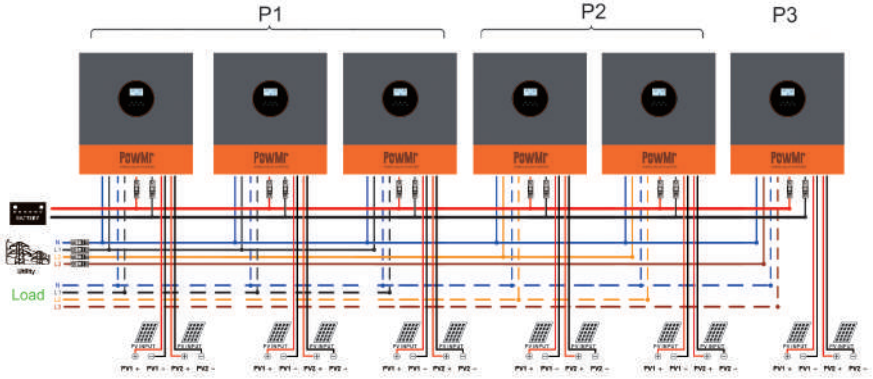


Communication Connection

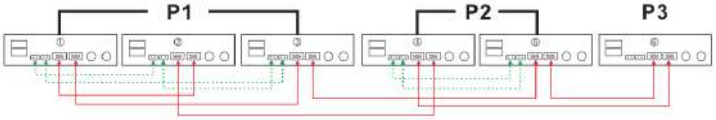


Three inverters in one phase, two inverters in second phase and one inverters for the third phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

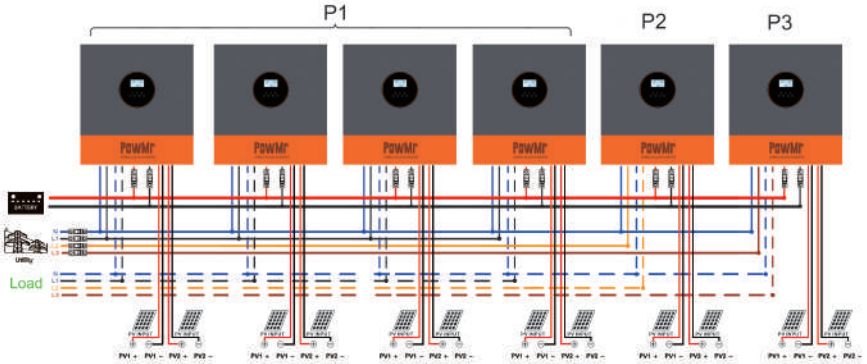


Communication Connection

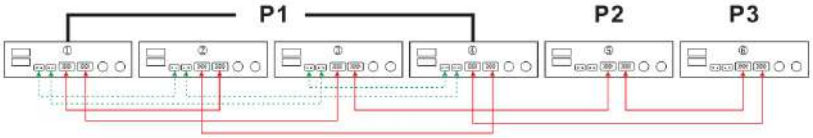


Four inverters in one phase and one inverter for the other two phases:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

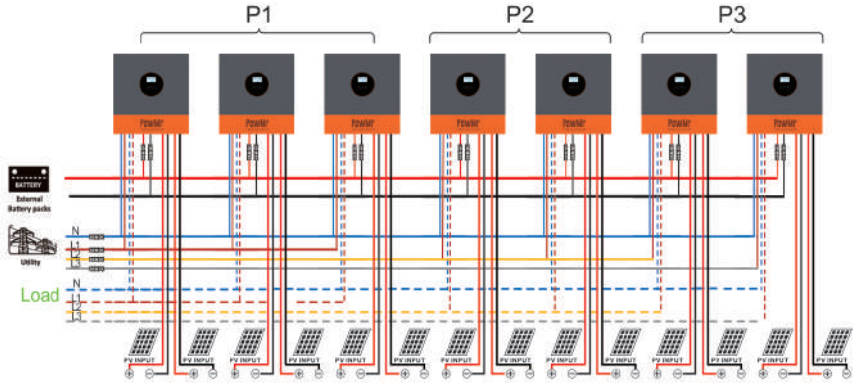


Communication Connection

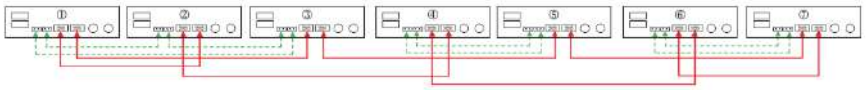


Three inverters in one phase, two inverters in second phase and two inverters for the third phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

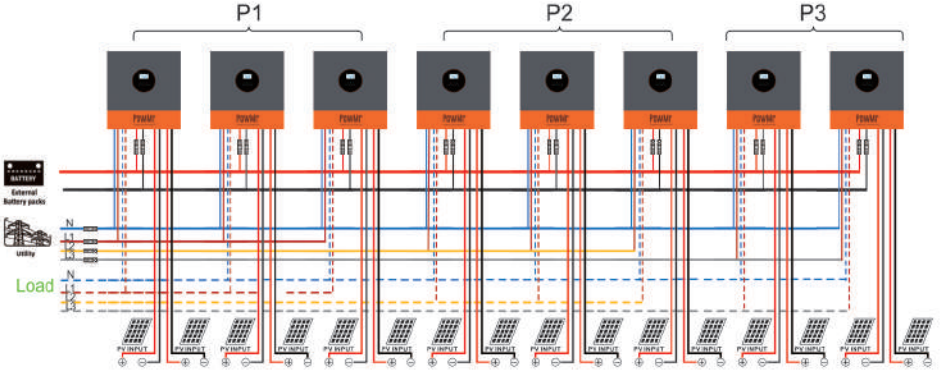


Communication Connection

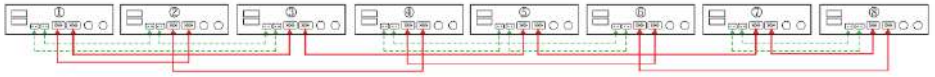


Three inverters in one phase, three inverters in second phase and two inverters for the third phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)

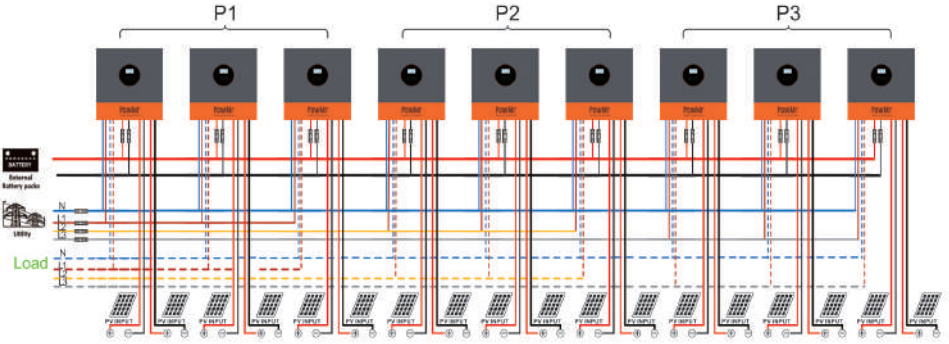


Communication Connection

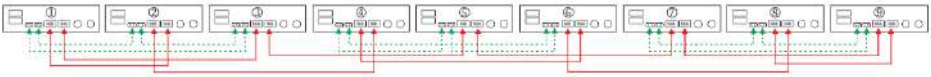


Three inverters in each phase:

Power Connection (Each photovoltaic panel needs to be connected to an independent system)



Communication Connection

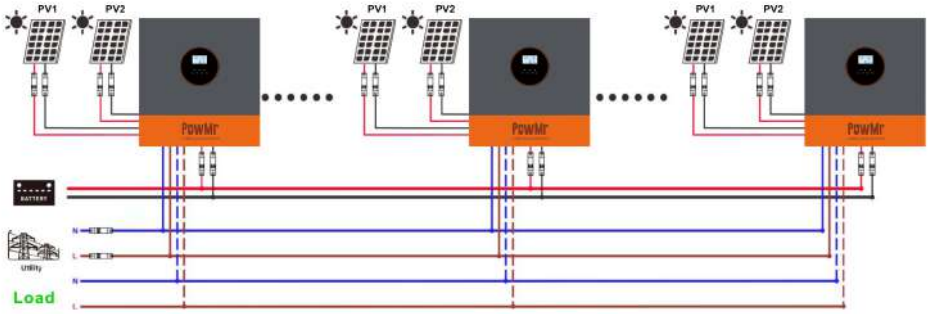


8.3 PV Connection

NOTE

- Each inverter should be connected to an independent photovoltaic array. Multiple inverters must not share the same photovoltaic array, as this may cause irreversible damage to the inverters.
- Each inverter needs to be connected to two photovoltaic input terminals, with each terminal connected to a separate photovoltaic array.

Please refer to the schematic diagram below and combine it with the photovoltaic wiring guidelines in the wiring section to complete the connection of the photovoltaic array in parallel operation mode.



8.4 LCD Setting and Display

Setting Program:

Program	Description	Selectable option	
04	AC output mode *This setting is only available when the inverter is in standby mode (Switch off)	Single: 	When the units are used in parallel with single phase, please select "PAL" in program 4. It is required to have at least 3 inverters or maximum **9** inverters to support three-phase equipment. It's required to have at least one inverter in each phase or it's up to four inverters in one phase please-2 for detailed information. Please select "3P1 " in program 4 for the inverters connected to L1 phase, "3P2" in program 4 for the inverters connected to L2 phase and "3P3" in program 4 for the inverters connected to L3 phase. Be sure to connect share current cable to units which are on the same phase. Do NOT connect share current cable between units on different phases. Besides, power saving function will be automatically disabled.
		Parallel: 	
		L1 phase: 	
		L2 phase: 	
		L3 phase: 	

Fault code display

Fault Code	Fault Event	Icon on
60	Power feedback protection	
71	Firmware version inconsistent	
72	Current sharing fault	
80	CAN fault	
81	Host loss	
82	Synchronization loss	
83	Battery voltage detected different	
84	AC input voltage and frequency detected different	
85	AC output current unbalance	
86	AC output mode setting is different	

8.5 Commissioning

Parallel in single phase

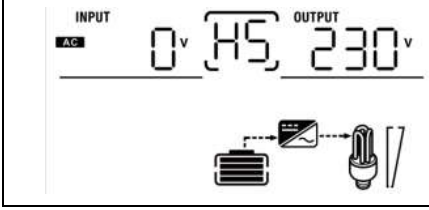
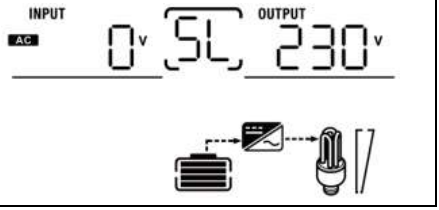
Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open each Neutral wires of each unit are connected together.

Step 2: Turn on each unit and set "PAL" in LCD setting program 4 of each unit. And then shut down all units.

NOTE: It's necessary to turn off switch when setting LCD program. Otherwise, the setting can not be programmed.

Step 3: Turn on each unit.

LCD display in Master unit	LCD display in Slave unit
	

NOTE: Master and slave units are randomly defined.

PowMr

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