Product Model

POW-SunSmart 6.5KP

PowMr

SOLAR STORAGE INVERTER

User Manual

Important Safety Instructions

Please keep the user manual properly for future reference!

Warning: It is essential to read, understand, and adhere to all safety instructions provided in this document. Failure to comply with safety regulations may result in property damage or personal injury.

- **Basic Guidelines**

1. Before using the equipment, carefully review all relevant sections of the device, battery, and instruction manual for all guidance and warning signs.
2. Caution: o reduce the risk of injury, if you choose to use lead-acid batteries, please charge only deep cycle lead-acid batteries. Other types of lead-acid batteries may rupture, causing personal injury.
3. This product does not contain user-serviceable parts. Do not disassemble the equipment. When maintenance or cleaning is required, take it to a qualified service center. Improper reassembly may pose risks of short-circuiting and fire. If any panel displays a malfunction, do not remove the front panel or operate the product. All operating procedures must be performed by trained professionals.
4. To reduce the risk of electric shock, disconnect all wiring before performing any maintenance and cleaning. Only turn off the main unit; this alone does not reduce the risk of electric shock.
5. Caution: Only qualified personnel should assemble the equipment with the battery.
6. Charging frozen batteries is prohibited.
7. Exercise extreme caution when using metal tools or placing them around the battery. Dropping tools can generate sparks or cause unpredictable risks such as short-circuiting the battery or other electronic components, potentially leading to explosions.
8. When disconnecting AC or DC terminals, strictly follow the installation steps as outlined in the instruction manual's installation section.
9. Before using this product, read the provided instructions to familiarize yourself with safety features and operating instructions. This product is designed and tested according to international standards. The equipment must be used exclusively for its intended purpose.

- **Installation**

1. Do not use this product in areas where there is a risk of gas or dust explosions. Prior to use,

consult with the battery manufacturer's relevant literature to ascertain the compatibility of this product with the battery. Always adhere to the safety instructions provided by the battery manufacturer.

2. This is a safety-class product equipped with a protective grounding terminal. Continuous protective grounding must be provided by the AC input/output terminals.
3. Grounding Instructions: The inverter/charger should be connected to a permanent grounding wire system to ensure full compliance with local requirements and regulations for installing the inverter. When grounding protection may have been compromised, the product must be shut down to prevent accidental electric shock.
4. To ensure optimal operation of the inverter/charger, adhere to the required specifications and select appropriate cable sizes, which are crucial for the correct operation of the inverter/charger.
5. Before connecting to the mains power, ensure that the available power supply meets the parameters specified in the product manual.
6. Do not short-circuit the AC output and DC input. Do not connect the mains power when the DC output is short-circuited.
7. Ensure that the equipment is used in conditions compliant with standards. Do not operate the product in moist or dusty environments. Ensure there is sufficient clearance space around the product and check that ventilation holes are not blocked.
8. Ensure that the required system voltage does not exceed the capacity of the product.

➢ **Transportation and Storage**

1. Ensure that the power and battery cables are disconnected before storing or transporting the product.
2. If the equipment is not in its original packaging during transportation, any transport damage is not the responsibility of the manufacturer.
3. Store the product in a dry environment, with storage temperature between -10℃ to 55℃.
4. Refer to the battery manufacturer's manual for information on battery transportation, storage, charging, recharging, and disposal.

Please follow these instructions diligently to ensure safe installation, operation, transportation, and storage of the product.

Table of Contents

1 Overview

1.1 Scope

This user manual provides information, operation, and maintenance guidance for the POW-SunSmart series inverter-charger integrated machines. The POW-SunSmart series products are all-in-one solar inverters developed by PowMr for solar energy storage systems, suitable for various residential or commercial applications.

1.2 Target Audience

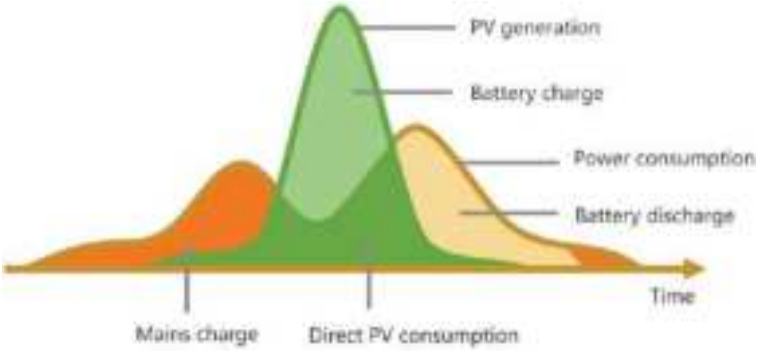
This manual is intended for professional technical personnel involved in the installation, operation, and maintenance of lithium batteries, as well as end-users seeking technical information.

1.3 Manual Usage

1. Before using the product, carefully review this user manual and keep it stored in an easily accessible location.
2. All information in the user manual, including images and symbols, is the property of PowMr. Unauthorized use of any portion or all of the content is prohibited for individuals outside the company.
3. Considering the possibility of updates and revisions to the manual content, users are advised to use the accompanying manual as a reference. For the latest user manual, users can visit the official website or contact customer service.

2 Product Overview

POW-SunSmart 6.5KP is a new type of solar storage inverter that integrates PV storage, mains charge, and energy storage and outputs sinusoidal AC. Equipped with DSP control and advanced control algorithm, it has high response speed and good reliability, and applies to industrial scenarios.



2.1 Features

- Support the connection of various types of energy storage batteries such as lead-acid battery and lithium-ion battery
- Have the dual activation function during lithium-ion battery sleep, that is, access to mains/PV power can activate the lithium-ion battery
- Support split-phase/single-phase pure sine wave output
- Support adjusting the voltage of each phase within the range of 100 Vac, 105 Vac, 110 Vac, 120 Vac and 127Vac
- Support two-channel PV input and have the function of simultaneous two-channel maximum power point tracking (MPPT) for charging/carrying capacity
- Support two-channel MPPT, with an efficiency of up to 99.9% and a maximum single-channel current of 18 A, perfectly fitting high-power modules
- Provide four charge modes: only PV, mains first, PV first, and mains + PV
- Have the timed charge and discharge function, that is, users can set the charge and discharge time according to the time-of-use price to save electricity costs

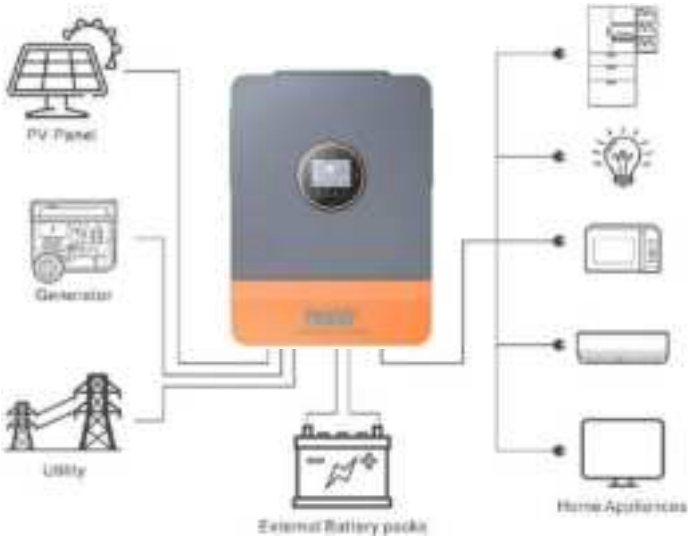
- Have the energy-saving mode, reducing no-load energy losses
- Provide two output modes: mains bypass output and inverter output, achieving uninterrupted power supply
- Support LCD display of dynamic flowchart, updating system data and operating status at any time
- Provide 360 ° protection, including short circuit protection, overcurrent protection, overvoltage and undervoltage protection, and overload protection
- Support CAN, USB, RS485 communication

2.2 System Basic Architecture

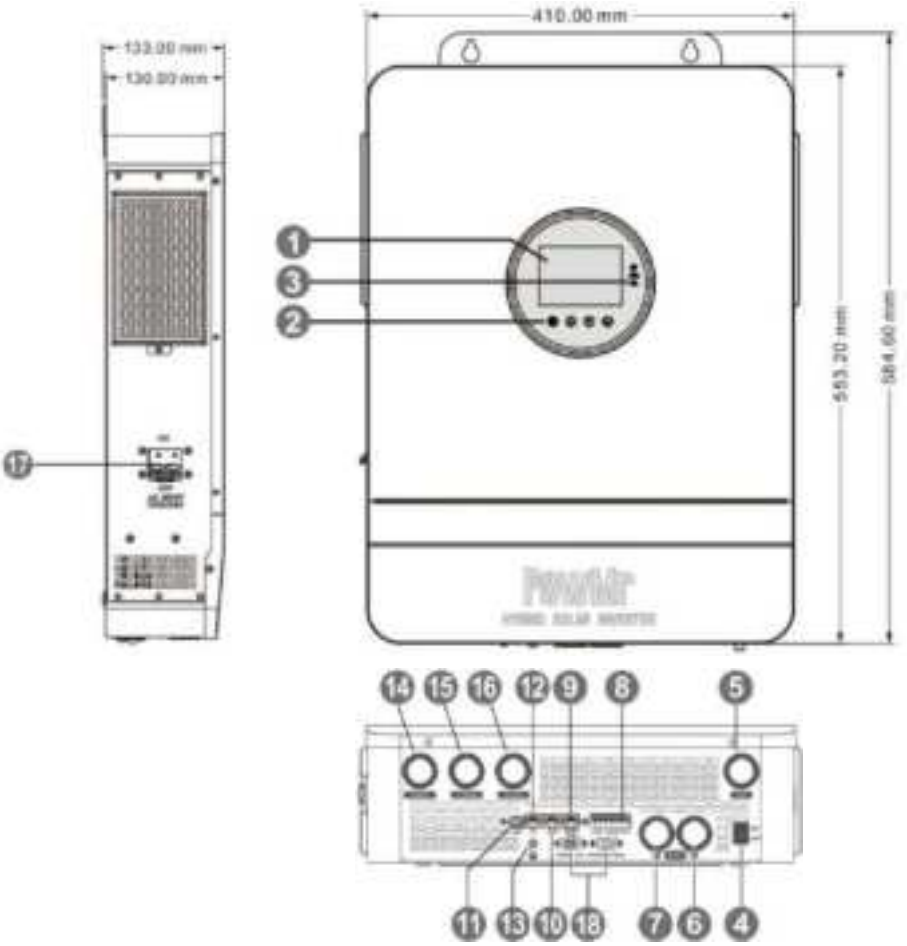
The following illustration depicts the basic application of the inverter/charger. A complete system consists of the following parts:

1. **PV module:** It converts solar energy into DC to charge batteries or into AC to supply power to loads.
2. **Mains or generator:** Connected to AC input, it can charge batteries while supplying power to loads. When the battery and PV module supply power to the load, the system can generally operate without mains or generator.
3. **Battery:** The function of a battery is to ensure normal power supply for the system load when there is insufficient PV power and no mains.
4. **Household load:** It can connect various household and office loads, including refrigerators, lighting fixtures, TVs, fans, air conditioners, and other AC loads.
5. **Inverter:** It is the energy conversion device of the entire system.

Additional system architectures can be consulted with system integrators based on your requirements. This inverter can provide power to various electrical appliances in residential or office environments, including lamps, fans, refrigerators, air conditioners, and other motor-type appliances.



2.3 Product Appearance



1	LCD screen	7	Battery negative port	13	Grounding screw
2	Physical button	8	Dry contact	14	AC output (L1+L2+N)
3	LED indicator	9	RS485/CAN port	15	AC input (L1+L2+N)
4	ON/OFF rocker switch	10	WIFI port	16	Generator port (L1+L2+N)
5	PV input	11	USB-B port	17	AC input circuit breaker
6	Battery positive port	12	CT	18	Parallel communication port

3 Installation

3.1 Unboxing and Inspection

Before assembly, please inspect the unit to ensure that the items in the packaging are undamaged.

Inside the package, you will find the following items:

- Inverter device
- Instruction manual
- Explosion screws
- Battery fuses

3.2 Installation Tools

Before installation, please prepare the following tools.

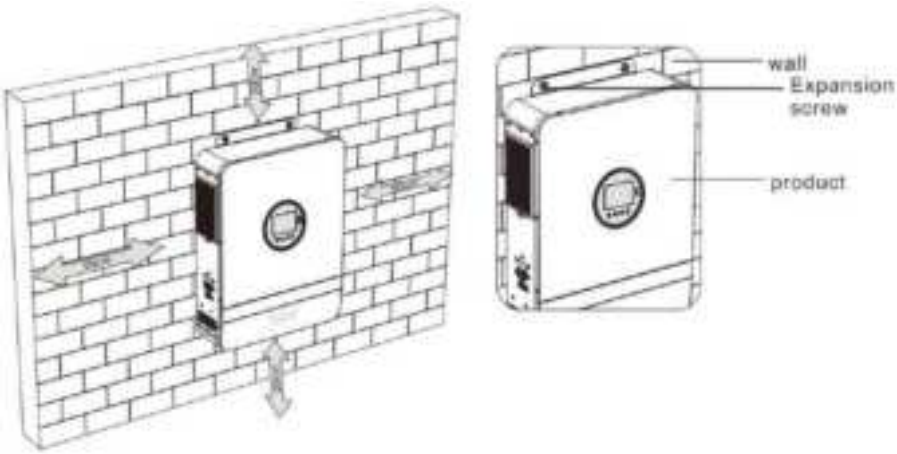
Category	Tools		
General Tools	Multimeter 	Protective gloves 	Insulated safety shoes 
	Protective clothing 	Safety goggles 	Antistatic wrist strap 
Installation Tools	Electric screwdriver 	Socket wrench 	Wire stripper 
	Phillips screwdriver 	Electric drill 	Hammer 

3.3 Installation Location

Before selecting an installation location, consider the following points:

- Install on a solid surface.
- Position the inverter at eye level for easy viewing of the LCD display.
- Maintain approximately 20cm spacing on each side and approximately 50cm spacing above and below the device for proper air circulation and heat dissipation.
- Ensure ambient temperature remains between -10°C to 55°C for optimal operation.
- It is recommended to install the device vertically against the wall.
- Ensure other objects, as shown in the diagram, maintain sufficient distance from the inverter surface to ensure adequate heat dissipation and provide enough space for wiring removal.

⚠ **Suitable for installation on concrete or other non-combustible walls.**



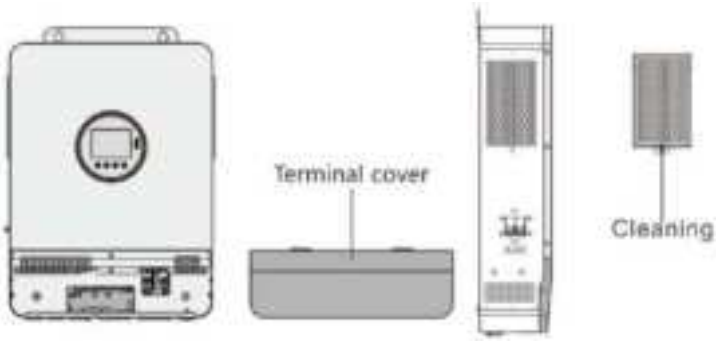
DANGER

- Do not install the inverter near highly flammable materials
- Do not install the inverter in potentially explosive areas
- Do not install the inverter and lead-acid battery in enclosed spaces
- Do not install the inverter on combustible building materials.

CAUTION

- Do not install the inverter in direct sunlight
- Do not install or use the inverter in damp environments

3.4 Removal of terminal cover and insect-proof net

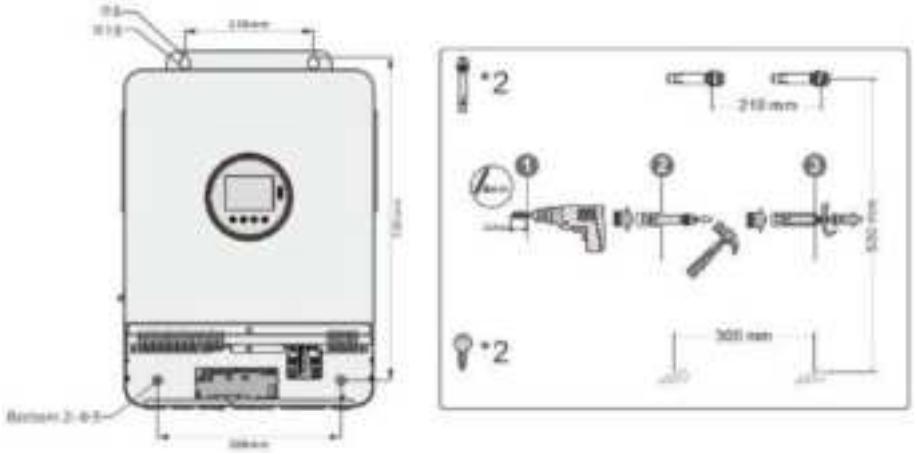


NOTICE

- When using the inverter in areas with poor air quality, the dustproof net is easily blocked by air particles. Please regularly remove and clean it to avoid affecting the air flow rate inside the inverter; otherwise it may cause inverter overheating (19/20 fault), and affect power supply and the service life of the inverter.

3.5 Inverter Installation

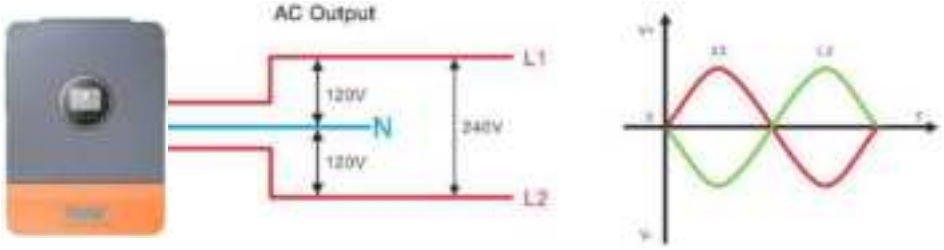
Drill 4 installation holes of the specified sizes on the wall with an electric drill, insert 2 expansion screws above, and fix the inverter with 2 M5 screws below.



4 Wiring

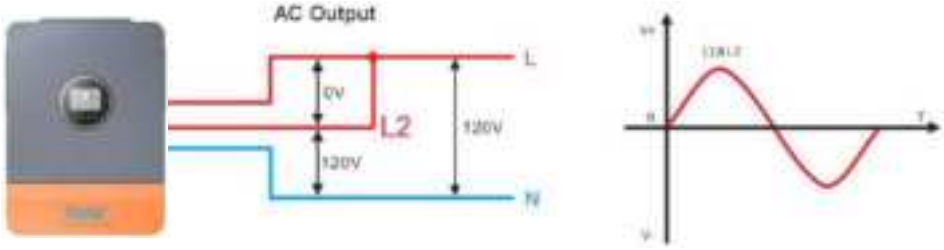
4.1 Wiring mode (depends on the output mode)

4.1.1 Split-phase mode (default)



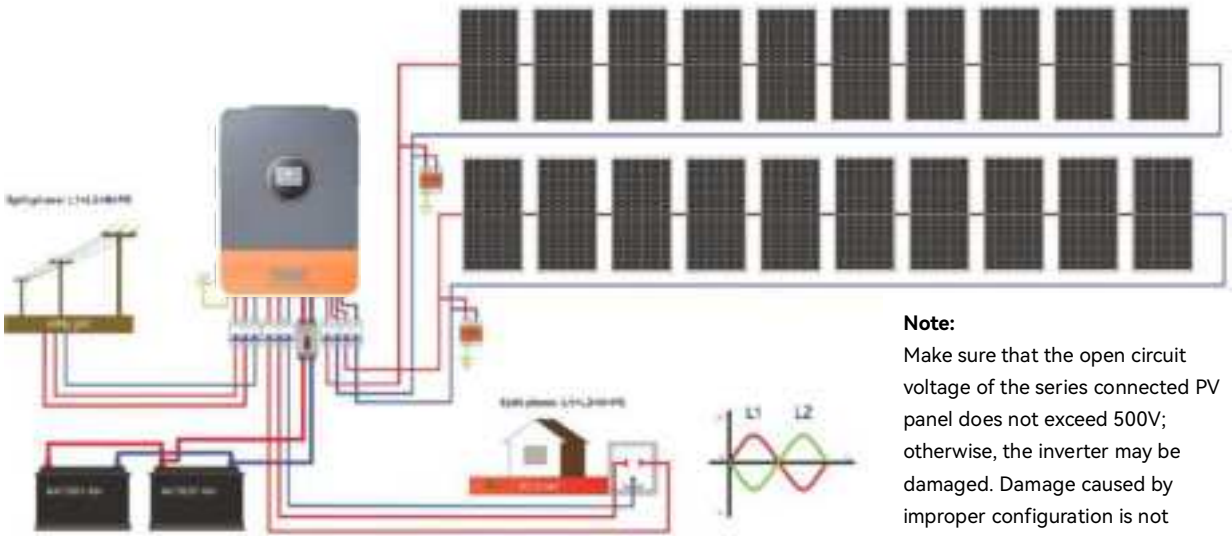
Item	Description
Applicable model	POW-SunSmart 6.5KP
AC output phase voltage (L-N)	100 VAC–120 VAC, 120 VAC (default)
AC output line voltage (L-L)	200 VAC–240 VAC, 240 VAC (default)

4.1.2 Single-phase mode



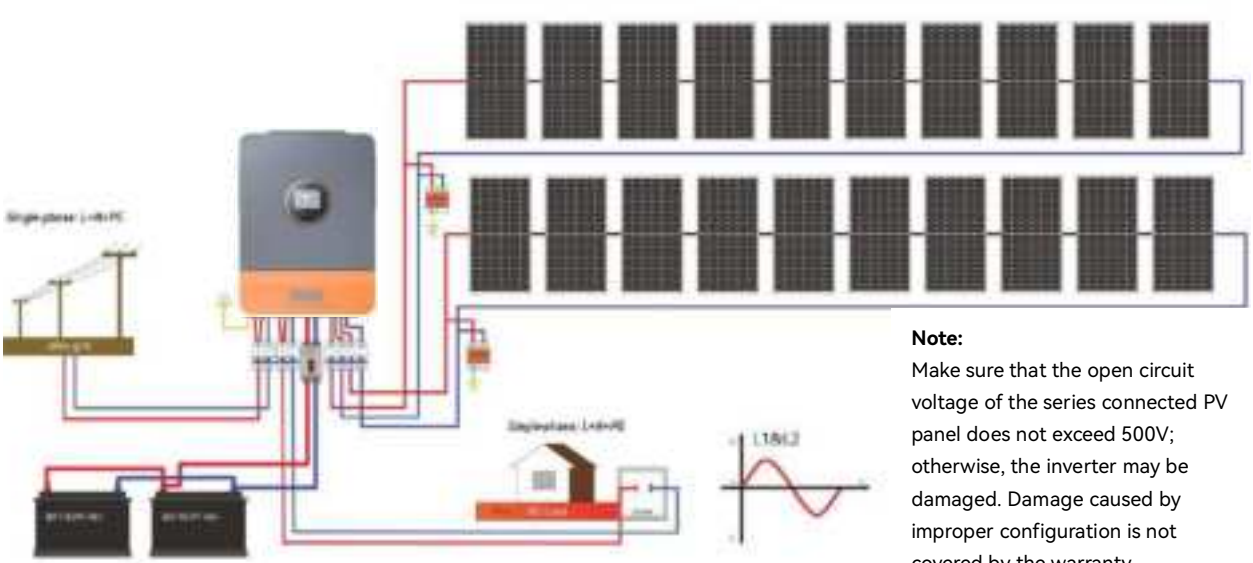
Item	Description
Applicable model	POW-SunSmart 6.5KP
AC output phase voltage (L-N)	100 VAC–120 VAC, 120 VAC (default)

Split-phase Mode



Note:
Make sure that the open circuit voltage of the series connected PV panel does not exceed 500V; otherwise, the inverter may be damaged. Damage caused by improper configuration is not covered by the warranty.

Single-phase Mode



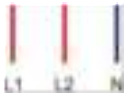
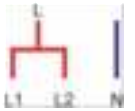
Note:
Make sure that the open circuit voltage of the series connected PV panel does not exceed 500V; otherwise, the inverter may be damaged. Damage caused by improper configuration is not covered by the warranty.

4.2 Cable and circuit breaker model

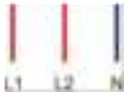
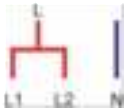
4.2.1 PV INPUT

Inverter Model	Cable Size	Max. Input Current	Circuit Breaker Model
POW-SunSmart 6.5KP	4mm²/12AWG	18A/18A	2P-25A

4.2.2 Grid input

Inverter Model	Output Mode	Diagram	Max. Current	Cable Size	Circuit Breaker Model
POW-SunSmart 6.5KP	Split-phase mode		40A (L1/L2/N)	10mm²/ 8AWG (L1\L2\N)	3P-40A
	Single-phase mode		40A(L1/L2) 80A(N)	10mm²/8AWG(L1/L2) 20mm²/4AWG(N)	2P-80A

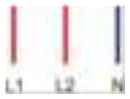
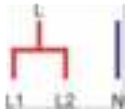
4.2.3 Generator input

Inverter Model	Output Mode	Diagram	Max. Current	Cable Size	Circuit Breaker Model
POW-SunSmart 6.5KP	Split-phase mode		40A (L1/L2/N)	10mm²/ 8AWG (L1\L2\N)	3P-40A
	Single-phase mode		40A(L1/L2) 80A(N)	10mm²/8AWG(L1/L2) 16mm²/4AWG(N)	2P-80A

4.2.4 Battery

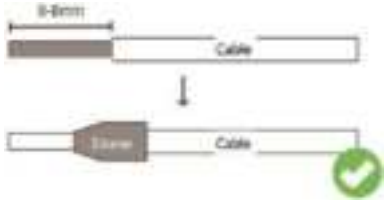
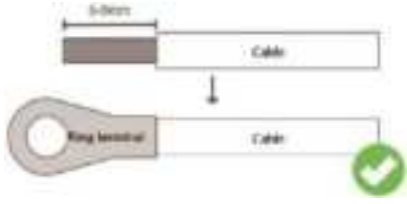
Inverter Model	Cable Size	Max. Current	Circuit Breaker Model
POW-SunSmart 6.5KP	35mm²/2AWG	150A	2P-160A

4.2.5 AC output

Inverter Model	Output Mode	Diagram	Max. Current	Cable Size	Circuit Breaker Model
POW-SunSmart 6.5KP	Split-phase mode		40A (L1/L2/N)	10mm²/ 8AWG (L1\L2\N)	3P-40A
	Single-phase mode		40A(L1/L2) 80A(N)	10mm²/8AWG(L1/L2) 16mm²/6AWG(N)	2P-80A

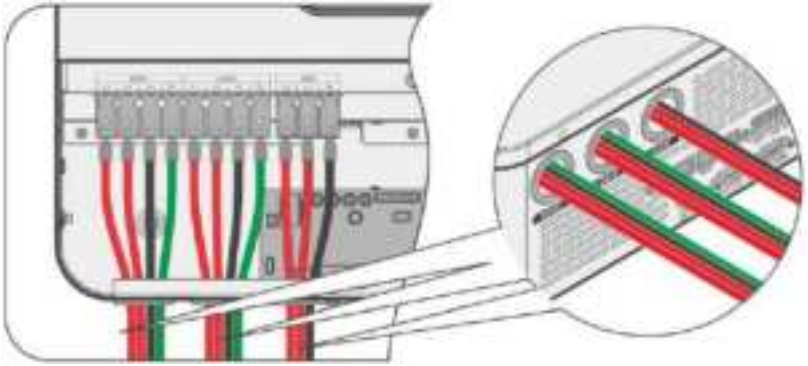
NOTICE

The cable size is for reference only. If the distance between the PV array and the inverter or between the inverter and the battery is long, using thicker cables will reduce voltage drop and improve system performance.

PV input, AC input, and AC output terminals 1. Use a wire stripper to strip off 6 mm–8 mm long insulation layer of the cable. 2. Fix a sleeve at the end of the cable. (the sleeve is to be prepared by the user)	
Battery terminal 1. Use a wire stripper to strip off 6 mm–8 mm long insulation layer of the cable. 2. Fix a ring terminal (attached) at the end of the cable.	

4.3 GRID, LOAD and Gen wiring

Connect the live wire, neutral wire, and ground wire according to the cable position and sequence shown in the following figure.

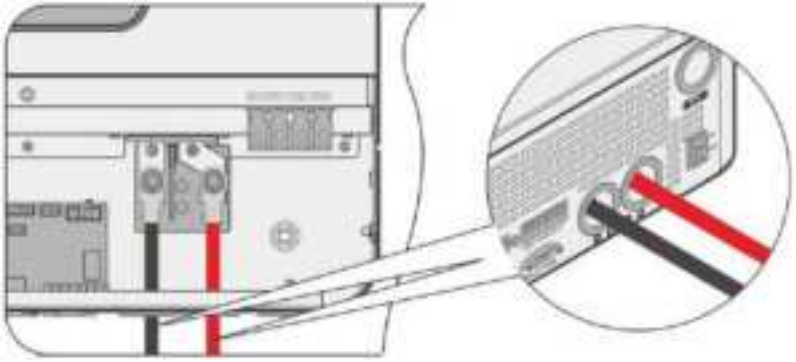


DANGER

- Before connecting AC input and output, be sure to disconnect the circuit breaker to avoid the risk of electric shock. Do not conduct live operation.
- Please check whether the cables used are sufficient to meet the requirements. Cables that are too thin or of poor quality may pose serious safety hazards.

4.4 Battery wiring

Connect the positive and negative cables of the battery according to the cable position and sequence shown in the following figure

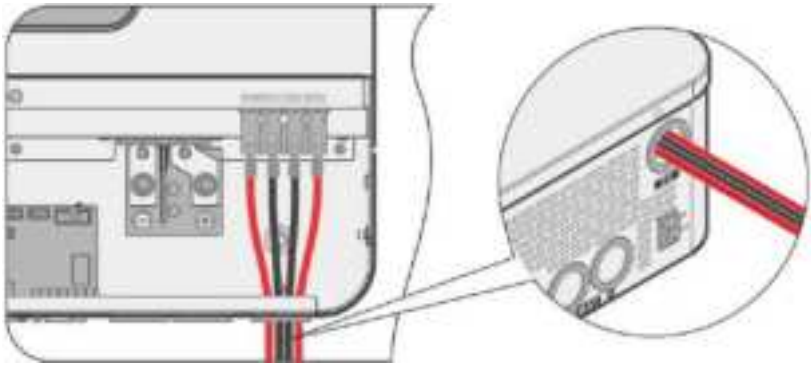


DANGER

- Before connecting the battery, be sure to disconnect the circuit breaker to avoid the risk of electric shock. Do not conduct live operation.
- Please check the positive and negative terminals of the battery for correct connection and no reverse connection; otherwise it may damage the inverter.
- Please check whether the cables used are sufficient to meet the requirements. Cables that are too thin or of poor quality may pose serious safety hazards.

4.5 PV wiring

Connect the positive and negative terminals of the two-channel PV modules according to the cable position and sequence shown in the following figure.

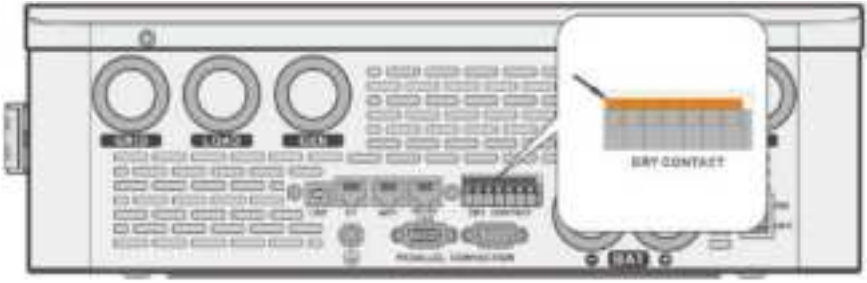


DANGER

- Before connecting PV modules, be sure to disconnect the circuit breaker to avoid the risk of electric shock. Do not conduct live operation.
- Please make sure that the open circuit voltage of the series connected PV modules does not exceed the maximum open circuit voltage of the inverter (in ASP series, this value is 550 V); otherwise, the inverter may be damaged.

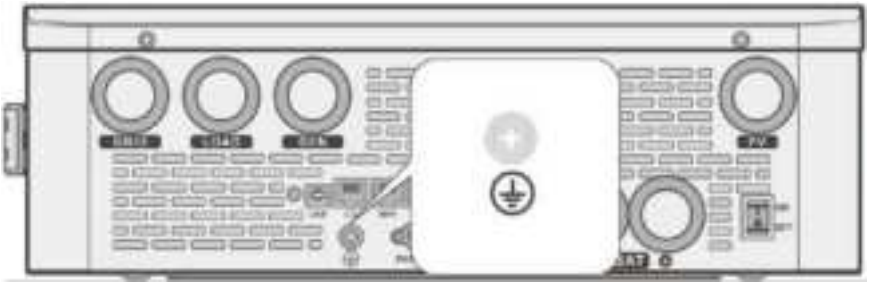
4.6 Dry contact wiring

Use a small-sized screwdriver to push back in the direction indicated by the arrow, and then insert the communication cable into the dry contact port. (Communication cable section: 0.2mm²–1.5mm²)



4.7 Grounding

Please ensure that the grounding terminal is reliably connected to the grounding busbar.



NOTICE

- The grounding cable size shall not be less than 4 mm² and shall be as close as possible to the grounding point.

5 Operation

5.1 Starting the Inverter

After confirming reliable wiring and correct wiring sequence, restore the terminal cover to its original position.

Step 1. Close the circuit breaker of the battery.

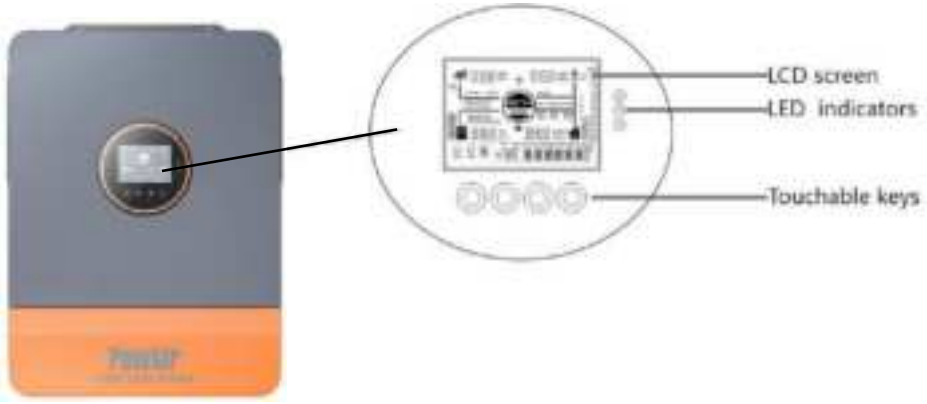
Step 2. Press the rocker switch at the bottom of the inverter, and the screen and indicator will light up, indicating that the inverter is enabled.

Step 3. Close the circuit breakers for PV input, AC input, and AC output in sequence.

Step 4. Start loads one by one in order of power from small to large.

5.2 Operation and display panel

The operation and display panel of the inverter includes one LCD screen, three indicators, and four physical buttons.



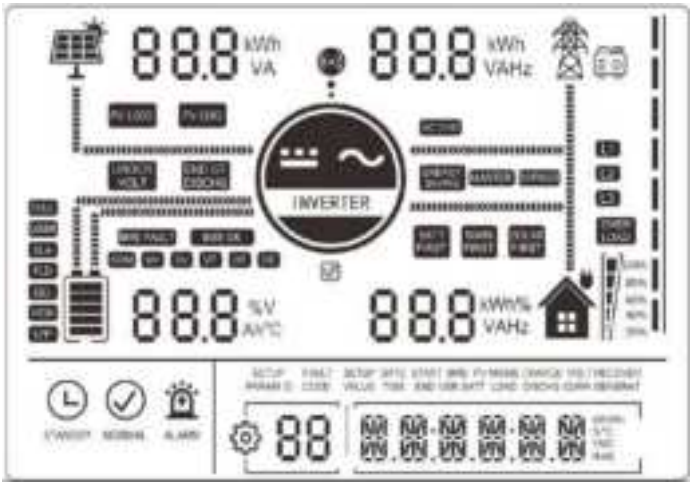
➢ **Physical button**

Physical button	Description
	Enter/Exit the setup menu.
	Go to the next option.
	Go to the previous option.
	Confirm/Enter the option in setup menu.

➢ LED Indicators

Indicators	Color	Description
AC/INV	Yellow	Steady on: utility grid bypass output.
		Flash: inverter output.
CHARGE	Green	Steady on: charging complete.
		Flash: charging.
FAULT	Red	Steady on: level-1 fault. Flash: level-2 fault. Off: level-3 fault or level-4 fault.

➢ Display panel



Icon	Description	Icon	Description
	PV panel		Main
	Battery		Generator
	The inverter is working		Load

	The inverter is communicating with the data collector		The buzzer is in mute mode
	Power flow direction		
	The inverter is in standby mode		The inverter is working normally
	There is a fault		Settings
	Load power: 80%–100%		SOC: 80%–100%
	Load power: 60%–79%		SOC: 60%–79%
	Load power: 40%–59%		SOC: 40%–59%
	Load power: 20%–39%		SOC: 20%–39%
	Load power: 5%–19%		SOC: 5%–19%
UNDER VOLT	Battery under-voltage	END OF DISCHG	Battery over-discharge
OVER LOAD	Overload	BMS FAULT	BMS fault
COM	System communication error	UV	System under-voltage
OV	System overvoltage	UT	Too low system temperature
OT	Too high system temperature	OC	System overcurrent
FULL	Battery full power	USER	User-defined battery
SLD	Sealed lead-acid battery	FLD	Flooded lead-acid battery
GEL	Gel lead-acid battery	NCM	Ternary Li-ion battery

LFP	LFP Li-ion battery	**ECO**	Energy-saving mode
PV LOAD	PV power is loading	**PV CHG**	PV power is charging the battery
AC CHG	AC input power is charging the battery	**MAIN FIRST**	The output mode of the inverter is mains first
BYPASS	The output mode of the inverter is mains bypass	**SOLAR FIRST**	The output mode of the inverter is PV first
BATT FIRST	The output mode of the inverter is battery first		

➢ Real-time parameters view

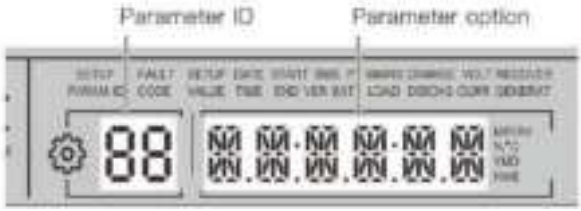
On the screen, press the UP/DOWN button to view real-time data of the inverter in operation.

NOTICE

Page	PV	Battery	AC input	Load	General
1	PV input voltage	Battery voltage	Ac input voltage	Single-phase voltage	Current time
2	PV input current	Battery current	AC input current	Single-phase current	Current date
3	PV input power	Battery voltage	AC total input power	Single-phase active power	PV gross generation
4	PV generation for the day	Battery current	AC charging capacity for the day	Single-phase apparent power	Total load consumption
5	PV heat sink temperature	Heat sink temperature	Mains frequency	Inverter output frequency	RS485 address
6	Rated open circuit voltage	Rated battery voltage	Bus voltage	Rated output frequency	Software version
7	Max. PV charge current	Max. battery charge current	Max. mains charge current	Total output active power	/
8			/	Total output apparent frequency	/

5.3 LCD Screen Settings

NOTICE



No.	Item	Option	Description
00	Exit	ESC	Exit the setup menu.
01	AC output mode	UTI (default)	Photovoltaic energy priority with the load, photovoltaic is not enough, the grid power and photovoltaic mixed load, photovoltaic energy is enough with the load, the excess energy to charge the battery, the grid power only starts charging when the battery is too discharged (06 Settings as “OSO(only PV)”, the grid power will not charge), the battery is only discharged when off the grid.
		SBU	Inverter first. The PV mode is to be applied first for loading, and only when the battery voltage is lower than the set value in the item 4, it will switch to the mains mode for loading. When the battery voltage is higher than the set value in

			the item 5, it will switch back to the PV mode from the mains mode.
		SOL	The PV mode is to be applied first and when the PV power is unavailable or the battery voltage is lower than the set value in the item 4, it will switch to the mains mode.
		SUB	Solar energy priority charging, insufficient solar energy, grid energy and solar energy hybrid charging (if 06 Settings as “OSO(only PV)”,the grid energy will not charge) and grid with load, when solar energy is enough to charge, excess energy not enough to load, excess solar energy and grid will hybrid load, the battery is discharged only when off the grid
02	AC input frequency	50.0	In bypass mode, the AC output frequency will adapt to the mains frequency, and in other cases, the output will follow the preset value.
		60.0 (default)	
03	AC input voltage range	UPS (default)	When the output voltage is 120/110 V, the input voltage range is 90 V–140 V.
		APL	When the output voltage is 100/105 V, the input voltage range is 85 V–140 V.
04	Battery to mains voltage threshold	43.6 (default)	When the parameter item 01 is SBU or SOL and the battery voltage is lower than the threshold, the output switches from inverter to mains. Setting range: 40 V–52 V.
05	Mains to battery voltage threshold	57.6 (default)	When the parameter item 01 is SBU or SOL and the battery voltage is higher than the threshold, the output switches from mains to inverter. Setting range: 48 V–60 V.
06	Battery charge mode	SNU (default)	When both PV power and mains are used to charge the battery at one time, the PV charge first and when the PV power is insufficient, the mains tags in. Only in bypass mode can both PV power and mains be used to charge the battery at one time, and only the PV charge mode can

			be enabled during inverter operation.
		OSO	Do not enable the mains charge mode when in only PV charge mode.
07	Battery charge current	60A	POW-SunSmart 6.5KP setting range:0-140A.
08	Battery type	USER	User-defined, and in this type, you can set all battery parameters.
		SLD	Sealed lead-acid battery.
		FLD	Flooded lead-acid battery.
		GEL (default)	Gel lead-acid battery.
		L14/L15/L16	LFP battery L14/L15/L16, corresponding to 14, 15, and 16 series of LFP batteries.
		N13/N14	Ternary Li-ion battery N13/N14, corresponding to 13 and 14 series of ternary Li-ion batteries.
		NOb	No battery.
09	Battery boost charge voltage	56.8	Setting range: 48 V–58.4 V, with a step of 0.4V, available for user-defined and lithium-ion battery types.
10	Boost charge duration	120	The continuous charging time when the voltage reaches the set voltage during constant voltage charging, with a setting range of 5 min–900 min and a step of 5 min.
11	Battery floating charge voltage	55.2	Setting range: 48 V–58.4 V, with a step of 0.4 V. This parameter cannot be set after successful BMS communication.
12	Battery over-discharge voltage (delayed shutdown)	42	When the battery voltage is lower than the voltage and triggers the set value in the item 13, it will turn off the inverter output. Setting range: 40 V–51.2 V, with a step of 0.4 V.
13	Battery over-discharge delay time	5	When the battery voltage is lower than the set value in the item 12 and triggers the delay time set in this parameter item, it will turn off the inverter output. Setting range: 5s–50s, with a step of 5s.
14	Battery under-	44	When the battery voltage is lower than the threshold, it will give an under-voltage alarm

	voltage alarm threshold		and the output will not shut down. Setting range: 40 V–52 V, with a step of 0.4 V.
15	Battery discharge limit voltage	40	When the battery voltage is lower than the value, the output immediately shuts down. Setting range: 40 V–50 V, with a step of 0.4 V, available for user-defined and Li-ion batteries
16	Battery equalizing charging	DIS(default)	Disable equalizing charge.
		ENA	Enable equalizing charge, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones.
17	Equalizing charge voltage	58	Setting range: 48 V–59.2 V, with a step of 0.4 V, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones.
18	Equalizing charge duration	120	Setting range: 5 min – 900 min, with a step of 5 min, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones.
19	Equalizing charge delay time	240	Setting range: 5 min – 900 min, with a step of 5 min, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones.
20	Equalizing charge interval	30	Setting range: 0 day – 30 days, with a step of 1 day, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones.
21	Equalizing charge Enable/Disable	DIS (default)	Stop equalizing charge immediately.
		ENA	Start equalizing charge immediately.
22	Energy-saving mode	DIS (default)	Disable energy-saving mode.
		ENA	Enable energy-saving mode, and when the load power is below 50 W, it will turn off the inverter output after a 5-minute delay. When it exceeds 50 W, the inverter will automatically restart.
23	Overload auto	DIS	Disable overload auto restart and when overload occurs, it will turn off the output and

	restart		the inverter will no longer resume startup.
		ENA (default)	Enable overload auto restart, and If overload occurs, the output will be turned off, and after a delay of 3 min, the output will restart. After 5 cumulative attempts, the inverter will no longer resume startup.
25	Buzzer alarm	DIS	Disable buzzer alarm.
		ENA (default)	Enable buzzer alarm.
26	Mode switch prompt	DIS	Disable prompt when the status of the main input source changes.
		ENA (default)	Enable prompt when the status of the main input source changes.
27	Inverter to bypass switch	DIS	Disable auto switch to mains for loading in case of inverter overload.
		ENA (default)	Enable auto switch to mains for loading in case of inverter overload.
28	Grid charge current	60A	POW-SunSmart 6.5KP setting range:0-80A.
30	RS485 communication address	ID: 1	Setting range: 1-254.
31	Parallel mode	SIG (default)	Single inverter operation
		PAL	Parallel operation
		2P0/2P1/2P2	Two-phase parallel operation
		Set to "2P0" for the machine screens connected to P1 Assuming that the output voltage of the setting item [38] is set to 120 VAC 1) When all the inverters connected to P2 are set to "2P1" on the screen, the voltage phase difference between P1 and P2 is 120°, the voltage between the live wire L1 of phase-P1 and the live wire L2 of phase-P2 is 120*1.732=208 VAC, and the voltage of L1-N and L2-N is 120 VAC. 2) When all the inverters connected to P2 are set to "2P2" on the screen, the voltage phase difference between P1 and P2 is	

		180°, the voltage between the live wire L1 of phase-P1 and the live wire L2 of phase-P2 is120*2=240 VAC, and the voltage of L1-N and L2-N is120 VAC.	
		3P1/3P2/3P3	Three-phase parallel operation
		Set to "3P1" on the screen for all the inverters connected to P1; set to "3P2" on the screen for all the inverters connected to P2; and set to "3P3" on the screen for those connected to P3. 1) Assuming that the output voltage of the setting item [38] is set to 120 VAC: then the voltage phase difference of P1-P2, P1-P3, and P2-P3 is 120°, the voltage between the live wire L1 of phase-P1 and the live wire L2 of phase-P2 is 120*1.732=208 VAC, and similarly the voltage of L1-L3 and L2-L3 is 208 VAC; the voltage of L1-N, L2-N, and L3-N is 120 VAC.	
32	RS485 communication function	DIS (default)	Enable PC and Remote Monitoring Protocol.
		485	Enable the BMS communication function based on RS485 communication.
		CAN	Enable the BMS communication function based on CAN communication.
33	BMS communication	Select the corresponding communication protocol in item 33 when you set it to 485 or CAN in item 32.	
		PAC = PACE, RDA = Ruida, AOG = Aoguan, OLT = Oliter, HWD = Sunwoda, DAQ = Daqin, WOW = SRNE, PYL = Pylontech, UOL = Vilion.	
35	Battery under-voltage recovery threshold	52	When the battery is under voltage, the battery voltage needs to be greater than the threshold to restore the AC output of the battery inverter. Setting range: 44 V–54.4 V.
37	Recharge voltage threshold for fully charged battery	52	After the battery is fully charged, the inverter stops charging, and recovers charging when the battery voltage is lower than the threshold. Setting range: 44 V–54 V.
38	AC output voltage	120	Setting range: 100/105/110/120 /127VAC.
39	Charge current limit (when BMS works)	LCSET	The maximum battery charge current is not greater than the set value of [item 07].
		LCBMS (default)	The maximum battery charge current is not greater than the maximum value of BMS.

		LCINV	The maximum battery charge current is not greater than the logical judgment value of inverter.
40	Period-1 battery charge start time	00:00:00	Setting range: 00:00:00–23:59:00.
41	Period-1 battery charge end time	00:00:00	Setting range: 00:00:00–23:59:00.
42	Period-2 battery charge start time	00:00:00	Setting range: 00:00:00–23:59:00.
43	Period-2 battery charge end time	00:00:00	Setting range: 00:00:00–23:59:00.
44	Period-3 battery charge start time	00:00:00	Setting range: 00:00:00–23:59:00.
45	Period-3 battery charge end time	00:00:00	Setting range: 00:00:00–23:59:00.
46	Timed battery charge function	DIS (default)	Disable the function.
		ENA	After the timed mains charge/loading function is enabled, the power supply mode will turn into SBU, where mains is available for power supply in the set period or after battery over-discharge. If the timed discharge function is enabled at the same time, the power supply mode of the system will be changed into UTI, where mains is only available for power supply in the set charge period, and the system only switches to the power supply of battery inverter during the set discharge period or mains failure.
47	Period-1 battery discharge start time	00:00:00	Setting range: 00:00:00–23:59:00.
48	Period-1 battery discharge end time	00:00:00	Setting range: 00:00:00–23:59:00.
49	Period-2 battery	00:00:00	Setting range: 00:00:00–23:59:00.

	discharge start time		
50	Period-2 battery discharge end time	00:00:00	Setting range: 00:00:00–23:59:00.
51	Period-3 battery discharge start time	00:00:00	Setting range: 00:00:00–23:59:00.
52	Period-3 battery discharge end time	00:00:00	Setting range: 00:00:00–23:59:00.
53	Timed battery discharge function	DIS (default)	Disable the function.
		ENA	After the timed battery discharge function is enabled, the power supply mode will be changed into UTI, where the system only switches to the power supply of battery inverter during the set discharge period or mains failure.
54	Current date	00:00:00	Year/Month/Day Setting range: 00:01:01–99:12:31.
55	Current time	00:00:00	Setting range: 00:00:00–23:59:59.
56	Leakage current protection enable	DIS(default)	Disable leakage current protection.
		ENA	Enable leakage current protection.
57	Charge stop current	3	The charge stops when the charge current is less than the set value. (unit: A)
58	SOC setting for discharge alarming	15	When the capacity is less than the set value, the SOC alarms. (unit: %, only available during normal BMS communication)
59	SOC setting for discharge cutoff	5	When the capacity is less than the set value, the discharge stops. (unit: %, only available during normal BMS communication)
60	SOC setting for charge cutoff	100	When the capacity is greater than the set value, the charge stops. (unit: %, only valid during normal BMS communication)
61	SOC setting for switching to mains	10	When the capacity is less than the set value, it switches to mains. (unit: %, only available during normal BMS communication)
62	SOC setting for	100	When the capacity is greater than the set value, it switches to the inverter output mode.

	switching to inverter output		(unit: %, only available during normal BMS communication)
63	Auto N-PE connection switch function	DIS (default)	Disable auto N-PE connection switch.
		ENA	Enable auto N-PE connection switch.
67	Power sales setting	0 (default)	Setting range: 0–rated power.
68	AC output phase mode	0	0 represents the single-phase mode. Assuming that the AC output voltage of item 38 is 120 V, the phase difference of L1-L2 is 0°, and L1/L2 can be connected in parallel, the phase voltage of L1-N/L2-N is 120 V.
		180 (default)	180 represents the split-phase mode. Assuming that the AC output voltage of item 38 is 120 V, the phase difference of L1-L2 is 180°, the phase voltage of L1-N/L2-N is 120 V, and the voltage of L1-L2 is 240 V.
73	Max charging current by generator	40A	POW-SunSmart 6.5KP setting range:0-80A.
74	Generator input power	6KW	setting range:0-10KW.

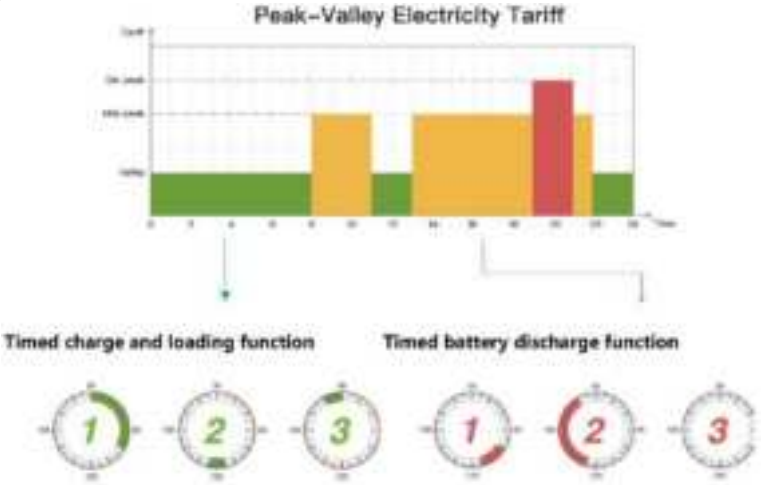
5.4 Timed charge/discharge function

POW-SunSmart 6.5KP has the timed power charge/discharge function. Users can set different charge and discharge periods according to the local time-of-use price, thus reasonably using mains and PV power. When mains is expensive, the battery inverter is used to supply power to the load; when mains is cheap, it can be used to supply power to and charge the load, thus helping users reduce electricity expenses to the full extent. Users can turn on/off the timed charge/discharge function in items 46 and 53 in the setup menu, and set charge and discharge periods in parameters 40–45 and 47–52.

The following is an example to help users understand the function.

Before using the function for the first time, please set the local time and date in parameters 54 and 55, and then you can set corresponding periods based on the local time-of-use price.

NOTICE



With 3 definable periods, users can freely set the mains charge/loading period in the range of 00:00–23:59. During the period set by the user, in case of PV energy output, it will be used first; in case of no PV energy output or lack of PV energy, mains will be used as a supplement.

With 3 definable periods, users can freely set the battery discharge period in the range of 00:00–23:59. During the period set by the user, the inverter will first use the battery inverter to load; if the battery power is insufficient, the inverter will automatically switch to mains to ensure stable operation of the load.

5.5 Battery parameters

➢ Lead-acid battery

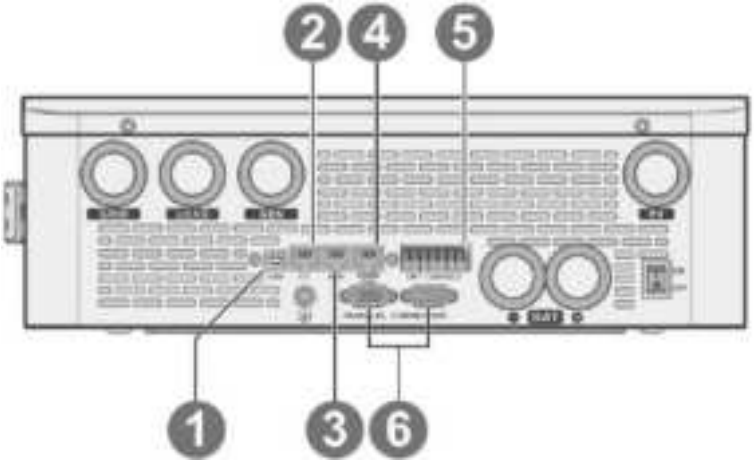
Battery type / Parameters	Sealed lead acid battery (SLD)	Gel lead acid battery (GEL)	Flooded lead acid battery (FLD)	User-defined (USE)	Adjustable
Overvoltage disconnection voltage	60V	60V	60V	60V	
Battery fully charged recovery point	52V	52V	52V	52V	√
Boost charge voltage	57.6V	56.8V	57.6V	40~58.4V	√
Undervoltage alarm voltage([01] fault)	44V	44V	44V	40~52V	√
Undervoltage alarm voltage recovery point([01] fault)	Undervoltage alarm voltage+0.8V				
Low voltage disconnection voltage([04] fault)	42V	42V	42V	40~51.2V	√
Low voltage disconnection voltage recovery point ([04] fault) (setup item [35])	52V	52V	52V	52V	√
Discharge limit voltage	-	-	-	40~50V	√
Over-discharge delay time	5s	5s	5s	5 ~ 50s	√
Boost charge duration	-	-	-	5 ~ 900 minutes	√

➢ **Li-ion battery**

Battery type / Parameters	Ternary (N13)	Ternary (N14)	LFP (L16)	LFP (L15)	LFP (L14)	Adjustable
Overvoltage disconnection voltage	60V	60V	60V	60V	60V	
Battery fully charged recovery point	50.4V	54.8V	53.6V	50.4V	47.6V	√
Boost charge voltage	53.2V	57.6V	56.8V	53.2V	49.2V	√
Undervoltage alarm voltage([01] fault)	43.6V	46.8V	49.6V	46.4V	43.2V	√
Undervoltage alarm voltage recovery point([01] fault)	Undervoltage alarm voltage+0.8V					
Low voltage disconnection voltage([04] fault)	38.8V	42V	48.8V	45.6V	42V	√
Low voltage disconnection voltage recovery point ([04] fault) (setup item [35])	46V	49.6V	52.8V	49.6V	46V	√
Discharge limit voltage	36.4V	39.2V	46.4V	43.6V	40.8V	√
Over-discharge delay time	30s	30s	30s	30s	30s	√
Boost charge duration	120 minutes	120 minutes	120 minutes	120 minutes	120 minutes	√

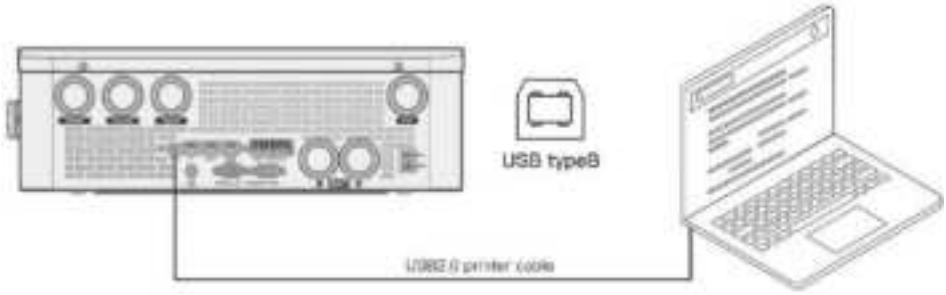
6 Communication

6.1 Overview



1	USB-B port	2	CT port	3	WIFI port
4	RS485/CAN port	5	Dry contact port	6	Parallel port

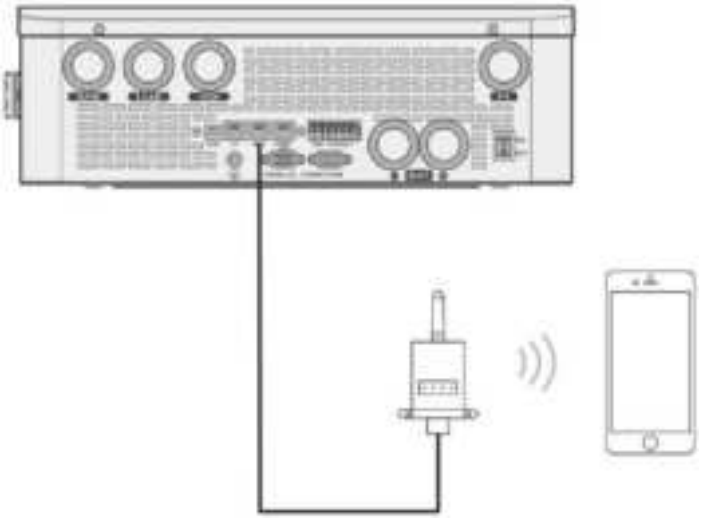
6.2 USB-B port



Users can use the upper computer software through the port to read and modify device parameters. If needing the installation package for the upper computer software, you can download it from the official website of SRNE, or contact us to get it.

6.3 WIFI port

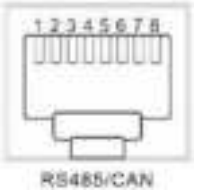
The WIFI port is used to connect to the Wi-Fi/GPRS data acquisition module, and then users can view the operation status and parameters of the inverter via the mobile APP.



RJ45	Definition
Pin 1	5 V
Pin 2	GND
Pin 3	/
Pin 4	/
Pin 5	/
Pin 6	/
Pin 7	RS485-A
Pin 8	RS485-B

6.4 RS485/CAN port

The RS485/CAN port is used to connect to the BMS of the Li-ion battery.

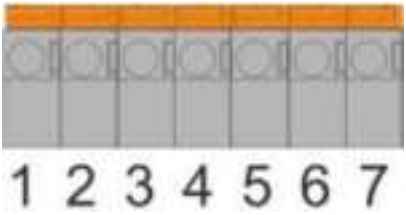


RJ45	Definition
Pin 1	5 V
Pin 2	GND
Pin 3	/
Pin 4	/
Pin 5	/
Pin 6	/
Pin 7	RS485-A
Pin 8	RS485-B

6.5 Dry contact port

The dry contact port has 4 functions:

1. RSD power supply
2. Remote ON/OFF
3. Battery temperature sampling
4. Remote generator start/stop



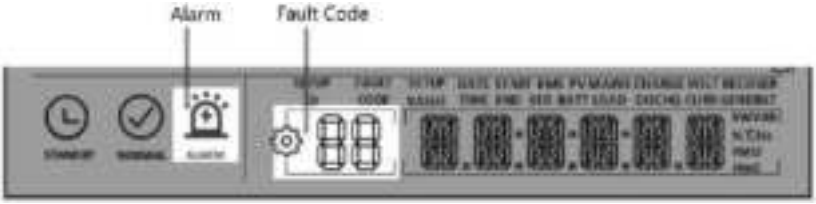
Function	Description
RSD power supply	PIN 1 is GND，PIN 2 is RSD 12V+
Remote ON/OFF	When pin 1 is connected to pin 3, the inverter will turn off the AC output. When disconnected, the inverter is in normal output.
Temperature sampling (reserved)	Pins 1 and 4 can be used for battery temperature sampling compensation.
Remote generator start/stop	When the battery voltage reaches the under-voltage alarm voltage (parameter 14) or the voltage threshold for mains to switch to the battery (parameter 04), pins 6 to 5 are normally open, and pins 7 to 5 are normally closed. When the battery voltage reaches the voltage threshold for the battery to switch to mains (parameter 05), or the battery is fully charged, pins 6 to 5 are normally closed, and pins 7 to 5 are normally open. (5/6/7 pin output: 125 VAC/1 A, 230 VAC/1 A, and 30 VDC/1 A)

NOTICE

- If you need to use the remote start/stop function of the generator with dry contact, please ensure that the generator has an ATS and supports remote start/stop.

7 Fault Codes and Response Measures

7.1 Fault codes



Fault Code	Meaning	Affect Output or Not	Description
01	BatVoltLow	Yes	Battery under-voltage alarm.
02	BatOverCurrSw	Yes	Overcurrent software protection for average battery discharge current.
03	BatOpen	Yes	Disconnected battery alarm.
04	BatLowEod	Yes	Under-voltage battery discharge stop alarm.
05	BatOverCurrHw	Yes	Battery overcurrent hardware protection.
06	BatOverVolt	Yes	Charge overvoltage protection.
07	BusOverVoltHw	Yes	Bus overvoltage hardware protection.
08	BusOverVoltSw	Yes	Bus overvoltage software protection.
09	PvVoltHigh	Yes	PV overvoltage protection.
10	PvBoostOCSw	No	Boost overcurrent software protection.
11	PvBoostOCHw	No	Boost overcurrent hardware protection.
12	SpiCommErr	Yes	SPI communication fault of master and slave chips.
13	OverloadBypass	Yes	Bypass overload protection.
14	OverloadInverter	Yes	Inverter overload protection.
15	AcOverCurrHw	Yes	Inverter overcurrent hardware protection.
16	AuxDSpReqOffPWM	Yes	Slave chip OFF request fault.
17	InvShort	Yes	Inverter short-circuit protection.
18	Bussoftfailed	Yes	Bus soft-start failure.
19	OverTemperMppt	No	PV heat sink over-temperature protection.
20	OverTemperInv	Yes	Inverter heat sink over-temperature.

21	FanFail	Yes	Fan fault.
22	EEPROM	Yes	Memory fault.
23	ModelNumErr	Yes	Model setting error.
24	Busdiff	Yes	Positive and negative bus voltage imbalance.
25	BusShort	Yes	Bus short-circuit.
26	Rlyshort	Yes	Inverter AC output backward to bypass AC output.
28	LinePhaseErr	Yes	Mains input phase error.
29	BusVoltLow	Yes	Bus low-voltage protection.
30	BatCapacityLow1	Yes	Alarm of battery capacity rate below 10% (taking effect after BMS communication is successful).
31	BatCapacityLow2	No	Alarm of battery capacity rate below 5% (taking effect after BMS communication is successful)
32	BatCapacityLowStop	Yes	Battery low-capacity OFF (taking effect after BMS communication is successful).
34	CanCommFault	Yes	Parallel can communication fault.
35	ParaAddrErr	Yes	Parallel ID (communication address) setting error.
37	ParaShareCurrErr	Yes	Parallel current sharing fault.
38	ParaBattVoltDiff	Yes	Large battery voltage difference in parallel mode.
39	ParaAcSrcDiff	Yes	Inconsistent mains input source in parallel mode.
40	ParaHwSynErr	Yes	Hardware synchronization signal error in parallel mode.
41	InvDcVoltErr	Yes	Inverter DC voltage error.
42	SysFwVersionDiff	Yes	Inconsistent system firmware version in parallel mode.

43	ParaLineContErr	Yes	Parallel connection fault.
44	Serialnumbererror	Yes	Failure to set the serial number before leaving factory.
45	Errorsettingofsplit-phasemode	Yes	Setting error of setting items in parallel mode.
56	Lowinsulation	No	Abnormally low earth impedance of PV1+, PV2+, and PV-.
57	Leakagecurrent overloadfault	Yes	System current leakage out of the standard.
58	BMSComErr	No	BMS communication fault.
60	BMSUnderTem	No	BMS under-temperature alarm (taking effect after BMS communication is successful).
61	BMSOverTem	No	BMS over-temperature alarm (taking effect after BMS communication is successful).
62	BMSOverCur	No	BMS overcurrent alarm (taking effect after BMS communication is successful).
63	BMSUnderVolt	No	BMS under-voltage alarm (taking effect after BMS communication is successful).
64	BMSOverVolt	No	BMS overvoltage alarm (taking effect after BMS communication is successful).

7.2 Troubleshooting

Fault Code	Meaning	Cause	Solution
/	No screen display	There is no power input, or the device switch at its bottom is not turned on	Check if the battery air-switch or PV air-switch has been closed; check if the switch is in "ON"; press any button on the screen to exit the screen sleep mode.
01	Battery under-voltage	The battery voltage is lower than the value set in parameter [14]	Charge the battery until the battery voltage exceeds the value set in parameter [14].
03	Disconnected battery	The battery is not connected, or the BMS of the lithium-ion battery is in the discharge protection state	The battery is not connected, or the BMS of the lithium-ion battery is in the discharge protection state
04	Battery over-discharge	The battery voltage is lower than the value set in parameter 12	Manual reset: Turn off the power, and restart Automatic reset: Charge the battery until the battery voltage is higher than the value set in parameter [35]
06	Rechargeable battery overvoltage protection	The battery is in the overvoltage state	Manually turn off the power, and restart. Check if the battery voltage exceeds the limit. If the limit is exceeded, discharge the battery until the voltage is below the overvoltage recovery threshold of the battery.
13	Bypass overload (software detection)	The output power or current of the bypass is overloaded within a certain period	Reduce the load power, and restart the device. For more details, please refer to item 11 in Protection Function.
14	Inverter overload (software	The output power or current of the inverter	

	detection)	is overloaded within a certain period	
19	Over-high temperature of the heat sink for PV input (software detection)	The temperature of the heat sink for PV input exceeds 90°C for 3s	Wait until the temperature of the heat sink is below the over-temperature recovery temperature, when charge and discharge return to normal
20	Over-high temperature of the heat sink for inverter output (software detection)	The temperature of the heat sink for inverter output exceeds 90°C for 3s	
21	Fan fault	Software detection founds the fan has a fault	Shut down, manually flick the fan, and check if any foreign objects are blocking it
26	AC input relay short-circuit	Stuck relay for AC output	Manually shut down, and restart. If the fault occurs again after restarting, contact the after-sales service personnel to repair the machine
28	Mains input phase fault	The phase of AC input is inconsistent with that of AC output	Ensure that the phase of AC input is the same as that of AC output. For example, if the output is in the split-phase mode, the input shall also be in the split-phase mode.

NOTICE

- If you encounter product faults that cannot be solved by the methods listed in the above table, please contact our after-sales service department for technical support, and do not disassemble the device by yourself.

8 Protection Function and Product Maintenance

8.1 Protection function

No.	Protection Function	Description
1	PV current-limiting protection	When the charge current or power of the configured PV array exceeds the rated current and power of the inverter, it will charge at the rated current and power.
2	PV overvoltage protection	If the PV voltage exceeds the maximum allowable value of hardware, the machine will report the fault, and stop the step-up of PV to output sine AC waves.
3	Reverse charge protection at night	At night, as the battery voltage is greater than that of the PV module, it will prevent the battery from discharging to the PV module.
4	Mains input overvoltage protection	When the mains voltage of each phase exceeds 140 VAC, it will stop mains from charging, and switch it to inverter output.
5	Mains input under-voltage protection	When the mains voltage of each phase is lower than 90 VAC, it will stop mains from charge, and switch it to inverter output.
6	Battery overvoltage protection	When the battery voltage reaches the overvoltage disconnect voltage threshold, it will automatically stop PV and mains from charging the battery, thus preventing damage to the battery due to overcharge.
7	Battery under-voltage protection	When the battery voltage reaches the low-voltage disconnect voltage threshold, it will automatically stop discharging the battery, thus preventing damage to the battery due to over-discharge.
8	Battery overcurrent protection	When the battery current exceeds the allowable range of hardware, the machine will turn off the output, and stop discharging the battery.

9	AC output short-circuit protection	When a short-circuit fault occurs at the load output terminal, it will immediately turn off the output of AC voltage. Only after manually powering on the device, normal output restores.
10	Heat sink over-temperature protection	When the internal temperature of the inverter is too high, the inverter will stop charging and discharging; when the temperature returns to normal, the inverter will charge and discharge again.
11	Overload protection	After overload protection is triggered, the inverter output will be restored after 3 min, and after 5 times of overload, the output will be off until the frequency changer is restarted. (102%< load <110%): An error will be reported, and the output will be turned off after 5 min. (110%< load <125%): An error will be reported, and the output will be turned off after 10s. Load >125%: An error will be reported, and the output will be turned off after 5s.
12	AC backward protection	Prevent the mains of battery inverter backward to bypass AC input
13	Bypass overcurrent protection	Built-in circuit breaker for AC input overcurrent protection.
14	Bypass wiring error protection	When the phase of the two bypass inputs is different from that of the inverter split-phase, the machine will prohibit connecting to the bypass, thus preventing the power failure or short circuit of load when connecting to the bypass.

8.2 Maintenance

In order to maintain the best long-term performance, it is recommended to conduct following checks twice a year.

1. Make sure that the airflow around the inverter is smooth, and remove any dirt or debris from the heat sink.
2. Check whether the insulation of all exposed wires is damaged by exposure to sunlight, friction with other objects around them, dryness, bite by insects or rodents, etc. Repair or replace wires if necessary.
3. Verify the consistency of the indication and display with the device operation. Please pay attention to any faults or errors, and take corrective actions if necessary.
4. Check all wiring terminals for corrosion, insulation damage, and signs of high temperature or burning/discoloration, and tighten the terminal screws.
5. Check for dirt, nesting insects, and corrosion, clean up as required, and clean the Insect proof net regularly.
6. If the arrester fails, replace it in time against lightning damage to the inverter or even other devices of the user.

DANGER

- Before conducting any inspection or operation, please ensure that the inverter is disconnected from all power sources and that the capacitor is fully discharged to avoid the risk of electric shock.

Our company will not be held responsible for damage due to the following reasons:

1. Damage caused by improper use or use in the wrong location.
2. The open circuit voltage of the PV module exceeds the maximum allowable voltage.
3. The operating temperature exceeds the limited operating temperature range.
4. Unauthorized personnel dismantle, and repair the inverter.
5. Force majeure: damage during transportation or handling of the inverter

9 Data sheet

Inverter Model	POW-SunSmart 6.5KP	Settable
Inverter output		
Rated output power	6500W	
Max. peak power	13,000 VA	
Rated output voltage	120/240 VAC (single-phase/split-phase)	Y
Rated frequency	50/60 Hz	Y
Output wave	Pure sine wave	
Switching time	10 ms (typical value)	
Parallel number	6	
Battery		
Battery type	Lithium-ion battery/lead-acid battery/user-defined battery	Y
Rated battery voltage	48 Vdc	
Voltage range	40 Vdc–60 Vdc	Y
Max. mains/generator charge current	80 A	Y
Max. mix charge current	140 A	Y
PV input		
MPPT channel number	2	
Max. input power	5000W/5000W	
Max. Input Current	18/18 A	
Max. open circuit voltage	550 Vdc+550Vdc	
MPPT operating voltage range	150 Vdc–450 Vdc	
Mains/generator input		
Input voltage range	65 VAC–140 VAC	
Input frequency range	50/60 Hz	
Bypass overload current	40A	
Efficiency		
MPPT tracking efficiency	99.9%	
Max. efficiency of battery	93%	

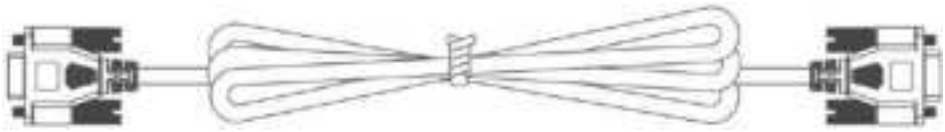
inverter		
General		
Dimension	584.6mm*410 mm*133 mm	
Weight	18.9 kg	
Protection level	IP20, for indoor use only	
Ambient temperature	−10℃–55℃, >45℃ derating	
Noise	<60 dB	
Cooling mode	Intelligent fan	
Communication		
Built-in interface	RS485/CAN/USB/dry contact	Y
External module (optional)	Wi-Fi/GPRS	Y
Certification		
Safety	IEC62109-1, IEC62109-2, and UL1741	
EMC	EN61000-6-1, EN61000-6-3, and FCC 15 class B	
RoHS	Yes	

10 Parallel Wiring

10.1 Parallel operation

1. The parallel operation supports up to six solar storage inverters.
2. When using the parallel function, it is necessary to connect the parallel communication cable in a correct and reliable manner. See the figure blow for the communication cable (packaging accessory):

Parallel communication cable*1



10.2 Cautions for parallel connection

Warning:

1. PV wiring:

In parallel connection, the PV array of each inverter must be independent, and the PV array of PV1 and PV2 for one inverter must also be independent.

2. Battery wiring:

In single-phase or three-phase parallel connection, all solar storage inverters must be connected to the same battery, with BAT+ connected to BAT+ and BAT- to BAT-, and before power on and start-up, it is necessary to check and ensure correct connection, wiring length, and cable size, so as to avoid the abnormal operation of parallel system output caused by wrong connection.

3. LOAD wiring:

In single-phase parallel connection, all solar storage inverters must be connected in the manner of L-to-L, N-to-N, and PE-to-PE, and before power on and start-up, it is necessary to check and ensure correct connection, wiring length, and cable size, so as to avoid the abnormal operation of parallel system output caused by wrong connection. In three-phase parallel connection, all solar storage inverters must be connected in the manner of N-to-N and PE-to-PE. The L lines of all inverters in the same phase shall be connected together, but the AC output L lines of different phases shall not be connected together. Other cautions are the same as those for single-phase

parallel connection.

4. GRID and GEN wiring:

In single-phase parallel connection, all solar storage inverters must be connected in the manner of L-to-L, N-to-N, and PE-to-PE, and before power on and start-up, it is necessary to check and ensure correct connection, wiring length, and cable size, so as to avoid the abnormal operation of parallel system output caused by wrong connection. Meanwhile, it is not allowed to have multiple different AC source inputs to avoid damage to the external equipment of the inverter. The AC source input shall be consistent and unique.

In three-phase parallel connection, all solar storage inverters must be connected in the manner of N-to-N and PE-to-PE. The L lines of all inverters in the same phase shall be connected together, but the AC output L lines of different phases shall not be connected together. Other cautions are the same as those for single-phase.

5. Communication wiring:

Our company's communication cable for parallel operation is a DB15 standard computer cable with shielding function, and it is used for single-phase or three-phase parallel connection. Each inverter shall be connected with one out and one in, that is, the male connector (out) of the inverter is to be connected to the female connector (in) of the parallel inverter, not the one of the inverter. In addition, DB15 terminal screws will be used to tighten the communication cable of each parallel inverter to avoid falling off or poor contact of the communication cable, followed by abnormal operation or damage of the system output.

6. Before and after connecting the system, please carefully refer to the following system wiring diagrams to ensure that all wiring is correct and reliable before power on.

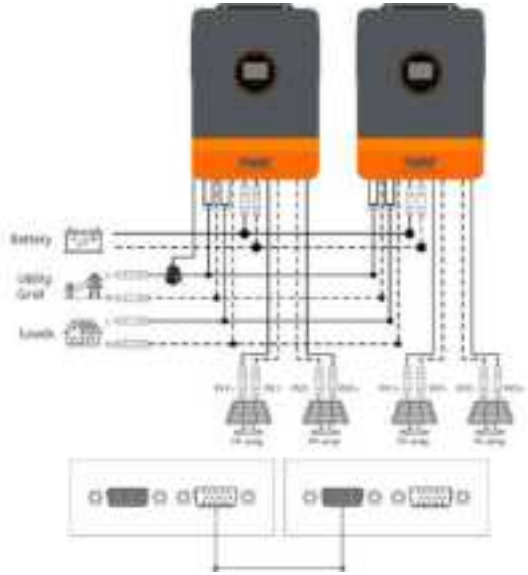
10.3 Wiring diagram for single-phase parallel connection (phase difference between L1 and L2: 0°)

The communication cable of parallel solar storage inverter is to be locked with screws after connecting. See the diagram below:

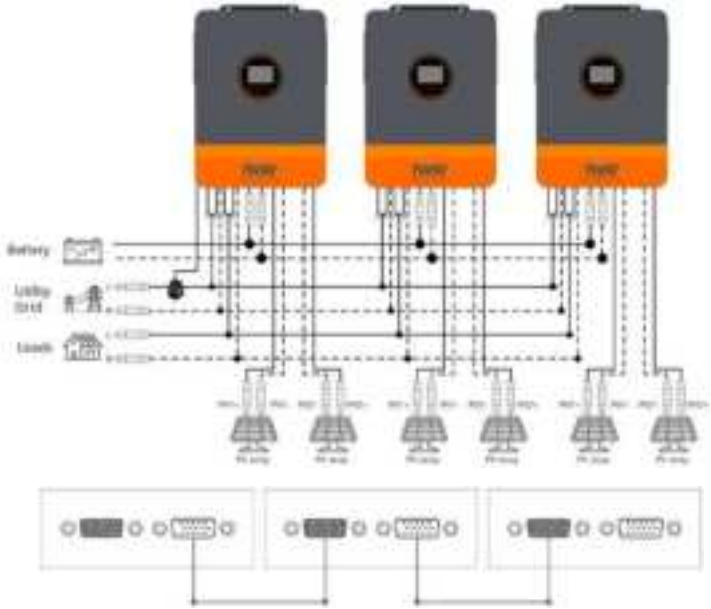
➢ **See the diagram below for parallel connection**

Set the item [31] to "PAL" and the item [68] to "0°." When setting the item [38] to "120 V," the output L-N voltage is 120 V

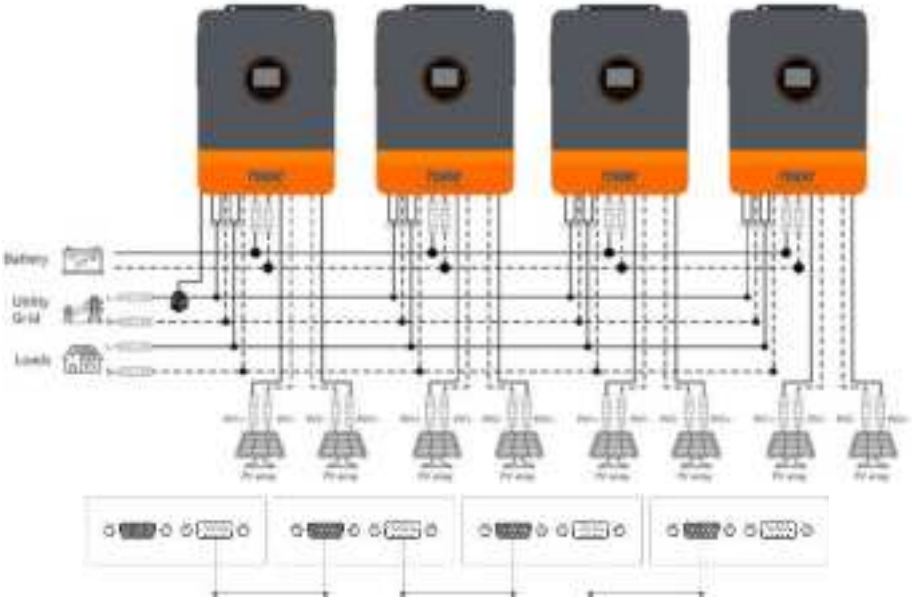
1. Two parallel-connected solar storage inverters:



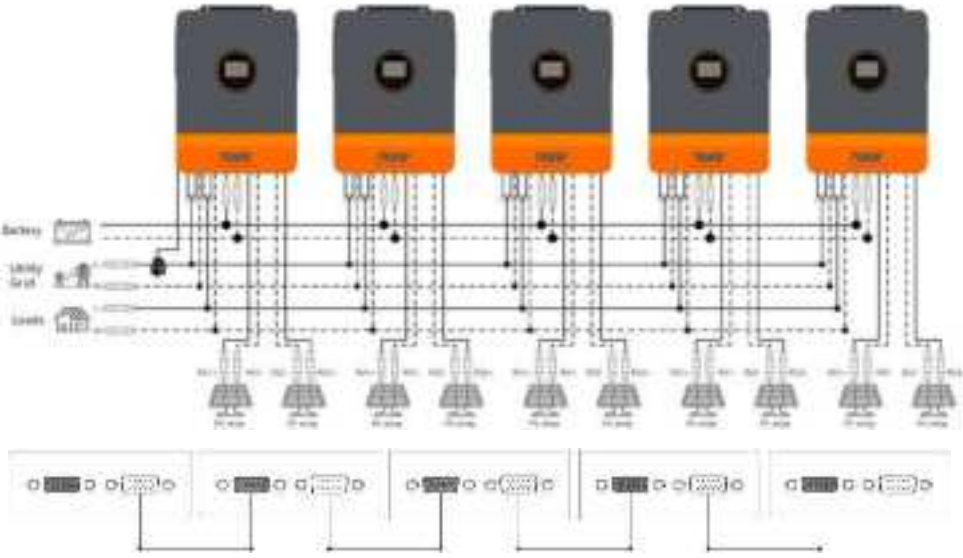
2. **Three parallel-connected solar storage inverters:**



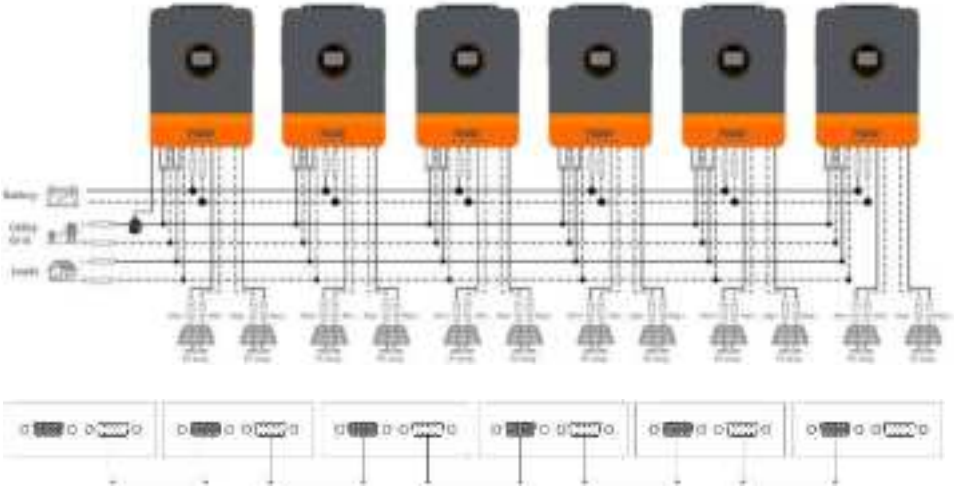
3. **Four parallel-connected solar storage inverters:**



4. Five parallel-connected solar storage inverters:



5. Six parallel-connected solar storage inverters:



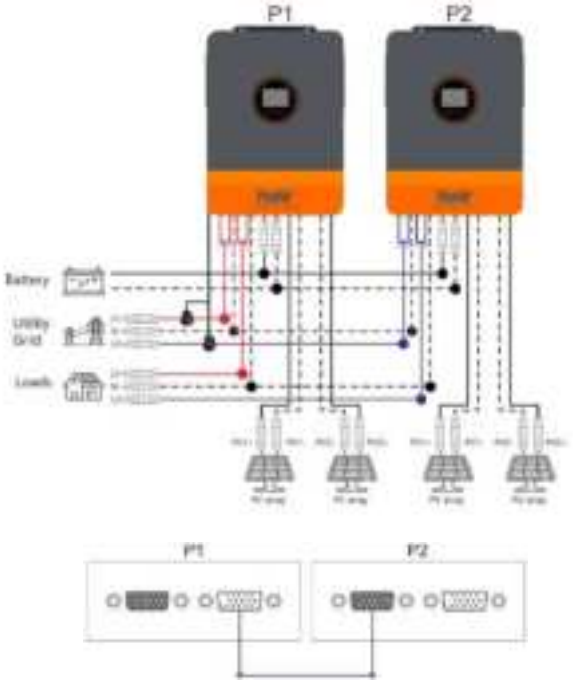
10.4 Wiring diagram for two-phase parallel connection (phase difference between L1 and L2: 0°)

(1) P1: Set the item [31] to "2P0;" P2: Set the item [31] to "2P1," all of the P1/P2 inverter item [68] can not be set, it is default “0°”and the phase difference between P1 and P2 is 120°. When setting the item [38] to "120 V," the voltage between the live wire L1 of P1 phase and the live wire L2 of P2 phase is 208 V, and the L1-N voltage is 120 V.

(2) P1: Set the item [31] to "2P0;" P2: Set the item [31] to "2P2," all of the P1/P2 inverter item [68] can not be set, it is default “0°”and the phase difference between P1 and P2 is 180°. When setting the item [38] to "120 V," the voltage between the live wire L1 of P1 phase and the live wire L2 of P2 phase is 240 V, and the L1-N voltage is 120 V, L2-N voltage is 120V.

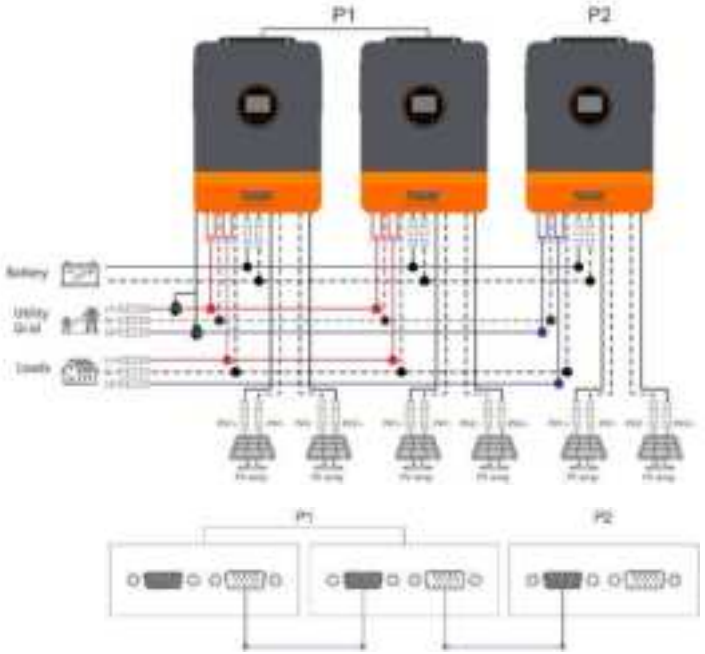
a. Split-phase system (two inverters)

1+1 system:



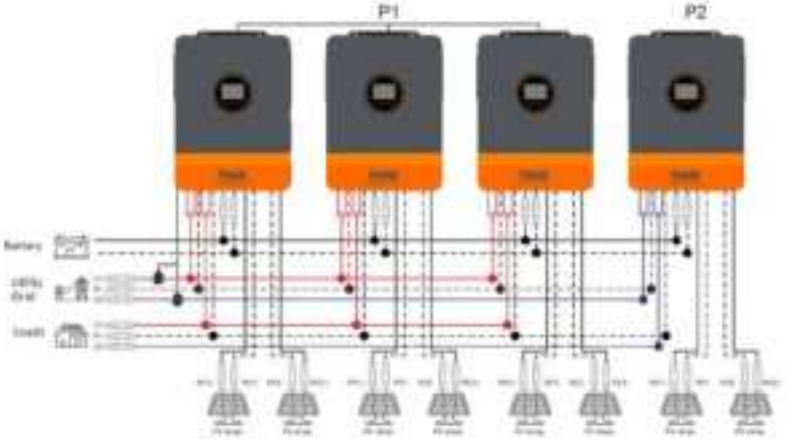
b. Split-phase system (three inverters)

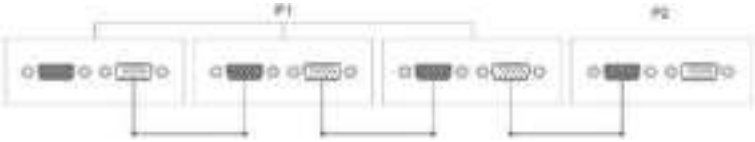
2+1 system



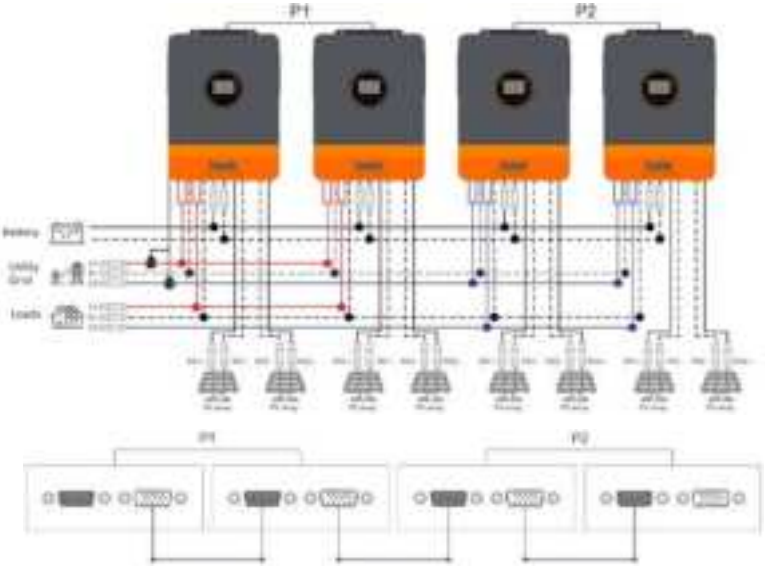
c. Split-phase system (four inverters)

3+1 system:



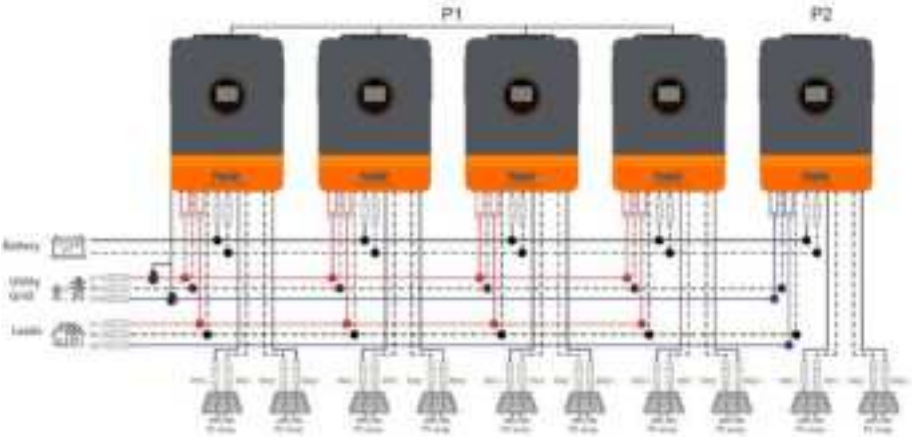


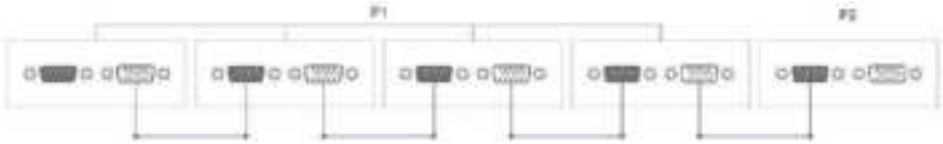
2+2 system:



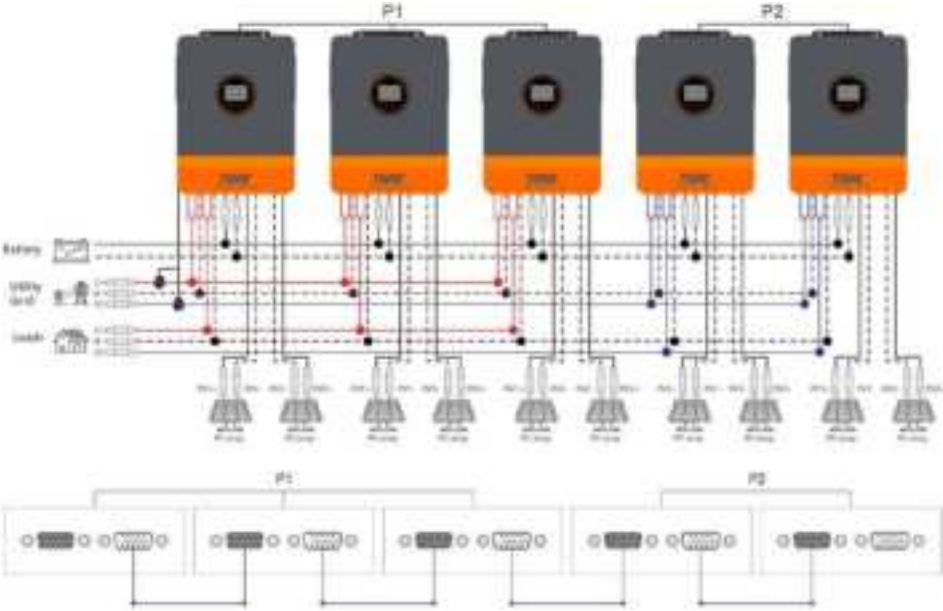
d. Split-phase system (five inverters)

4+1 system:



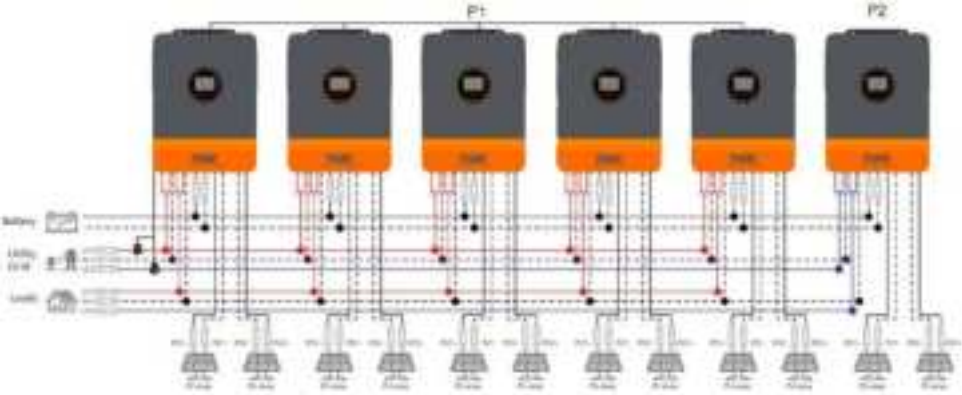


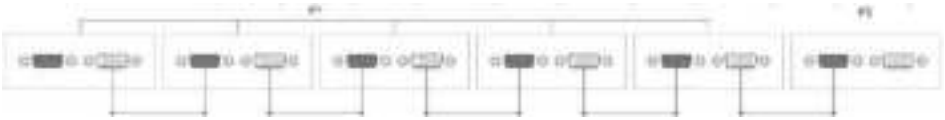
3+2 system:



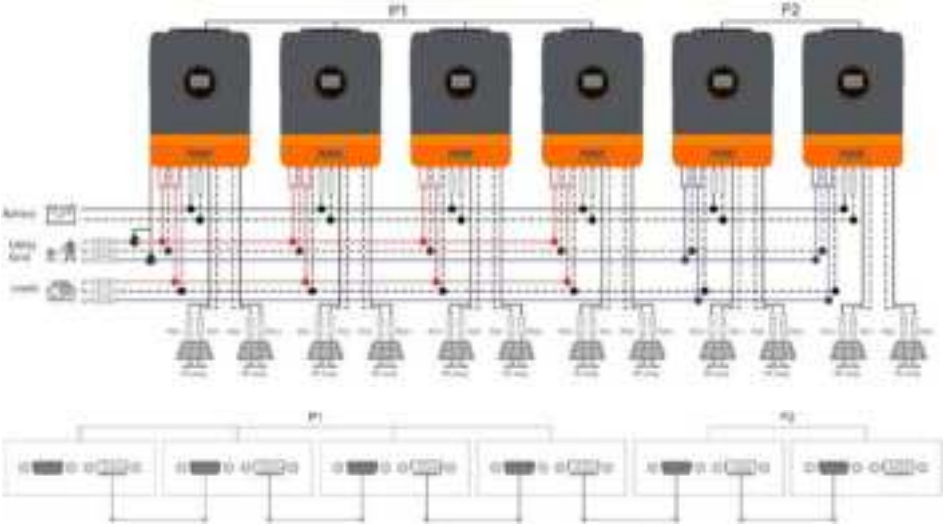
e. Split-phase system (six inverters)

5+1 system:

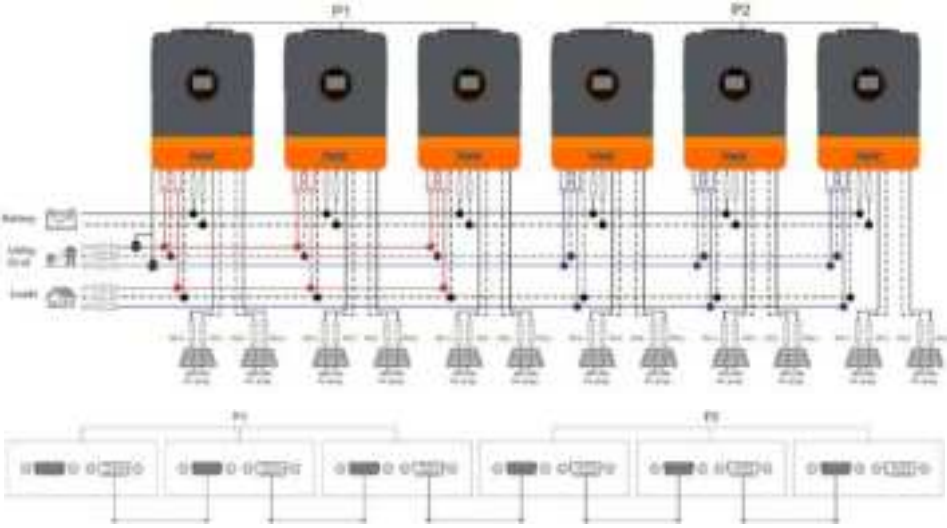




4+2 system:



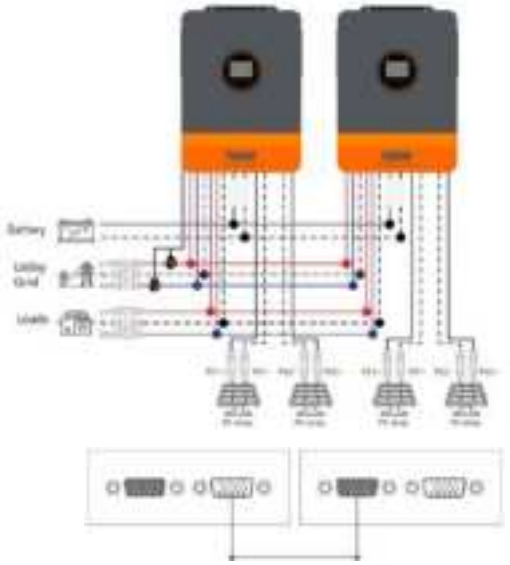
3+3 system:



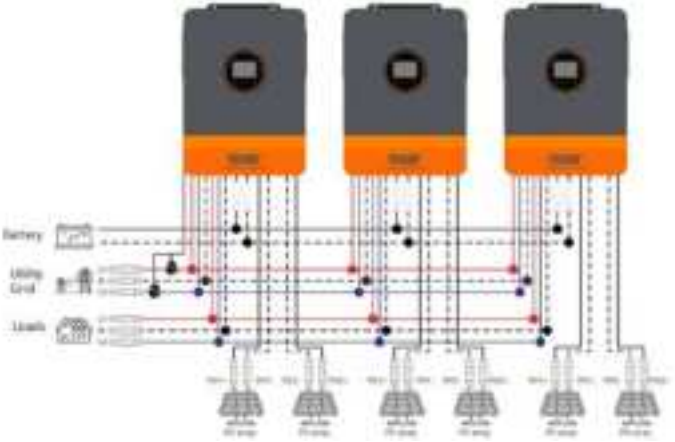
10.5 Wiring diagram for split-phase parallel connection (phase difference between L1 and L2: 180°)

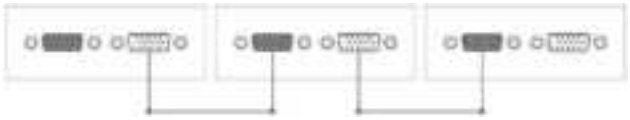
Set the item [31] to PAL, and set the item [68] to 180°. When setting the item [38] to "120 V," the L1-L2 voltage is 240 V, and the L1-N voltage is 120 V, L2-N voltage is 120V.

a. Two parallel-connected solar storage inverters:

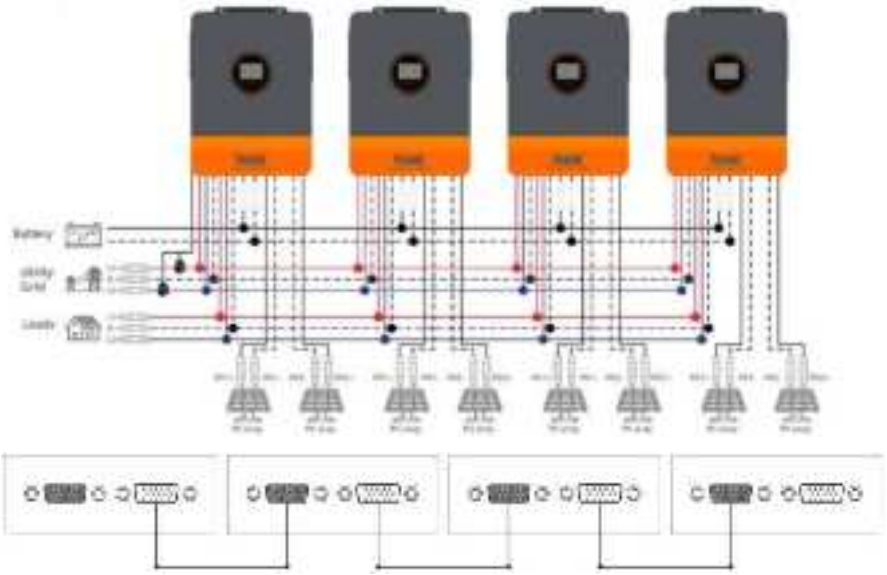


b. Three parallel-connected solar storage inverters:

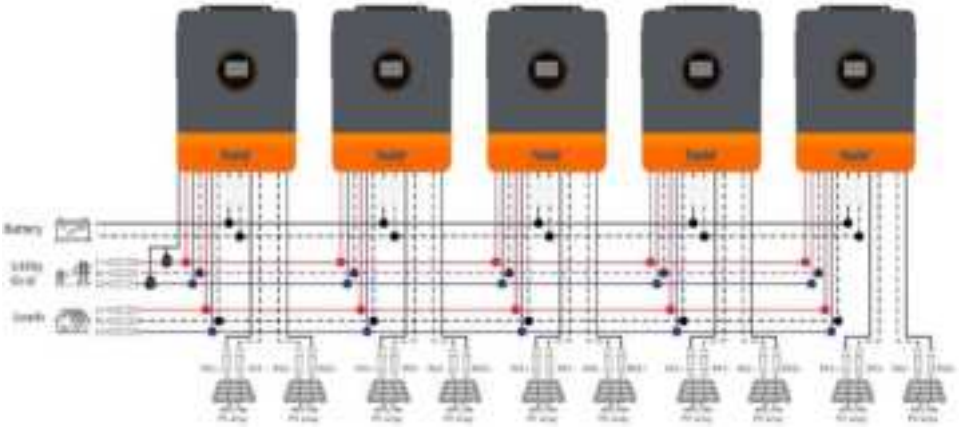


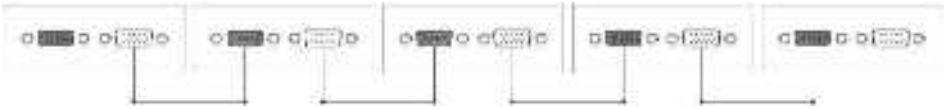


c. **Four parallel-connected solar storage inverters:**

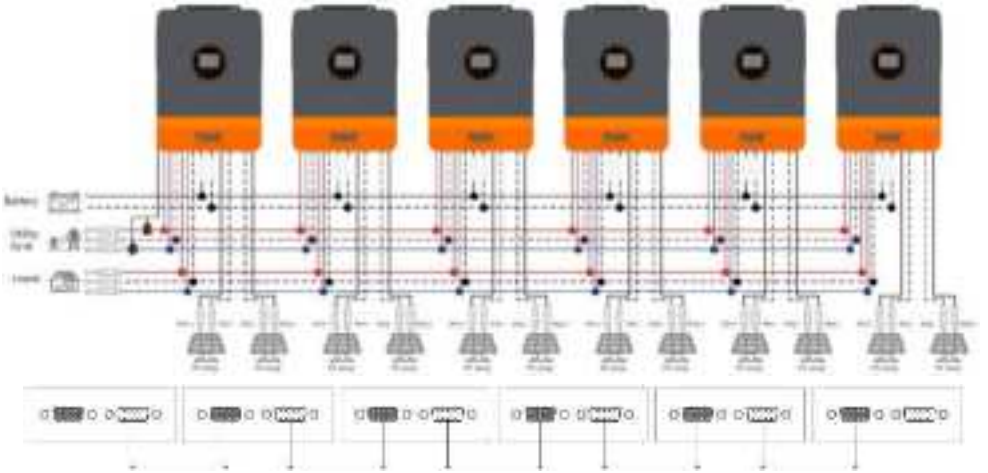


d. **Five parallel-connected solar storage inverters:**





e. Six parallel-connected solar storage inverters:



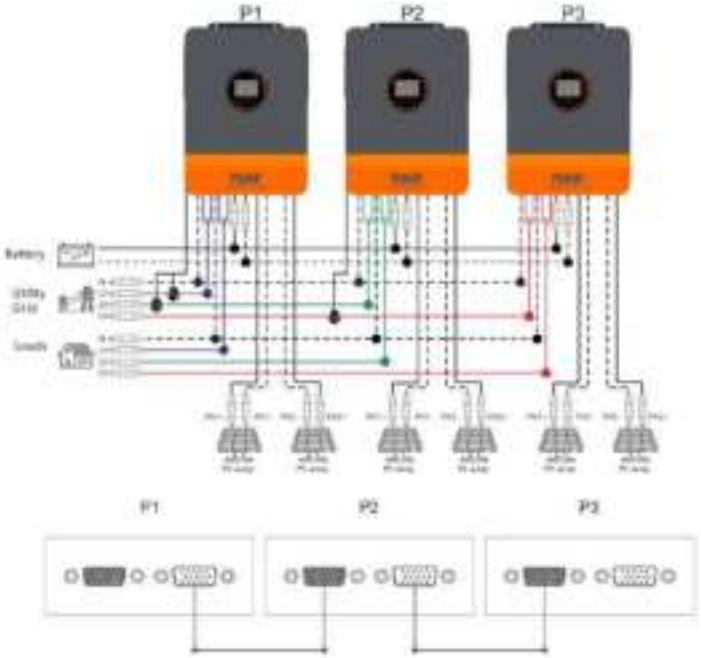
10.6 Wiring diagram for three-phase parallel connection

P1: Set the item [31] to "3P1;" P2: Set the item [31] to "3P2;" P3: Set the same to "3P3", all of P1/P2/P3 inverters item [68] can not be set, it is default “0°”

At this point, the P1-P2, P1-P3, and P2-P3 phase difference is 120°. When setting the item [38] to "120 VAC," the voltage between the live wire L1 of P1 phase and the live wire L2 of P2 phase is 120*1.732=208 VAC. Similarly, the L1-L3 and L2-L3 voltage is 208 VAC:

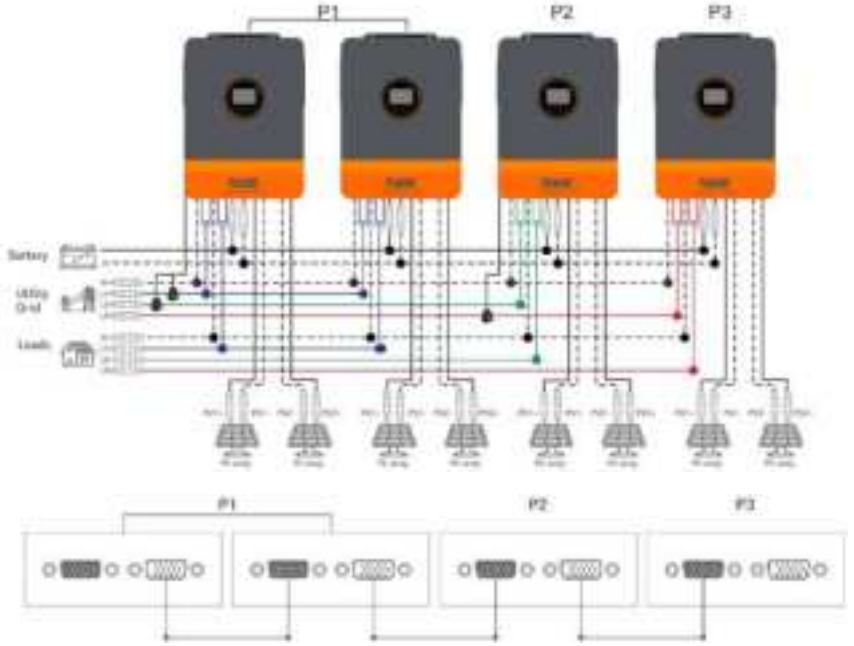
a. Three-phase system (three inverters)

1+1+1 system:



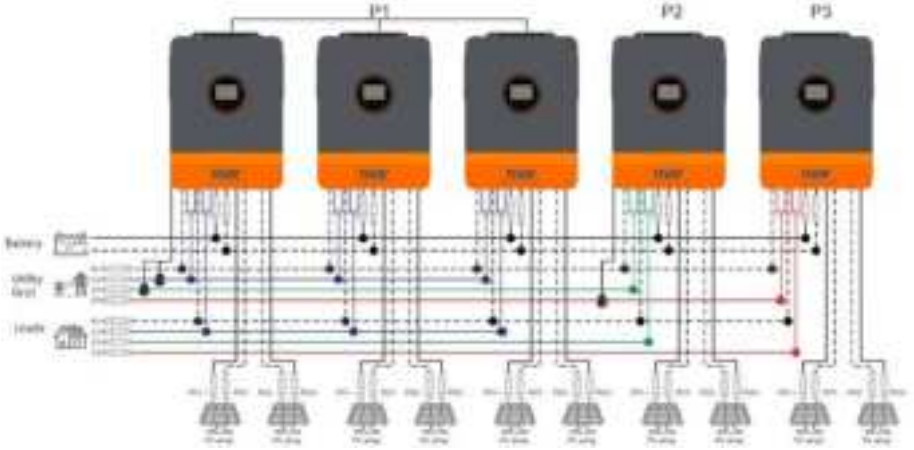
b. Three-phase system (four inverters)

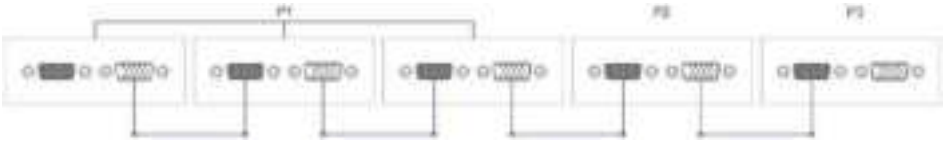
2+1+1 system:



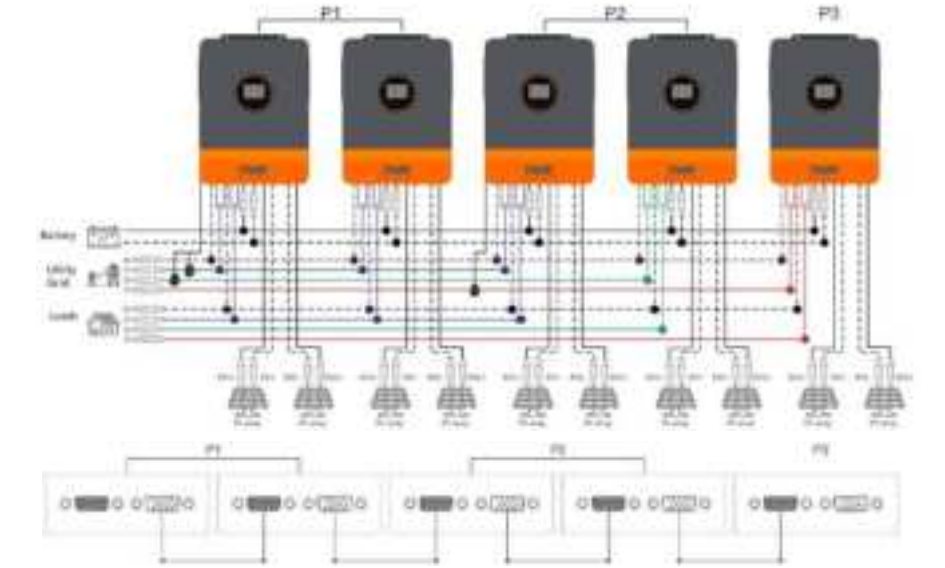
c. Three-phase system (five inverters)

3+1+1 system:



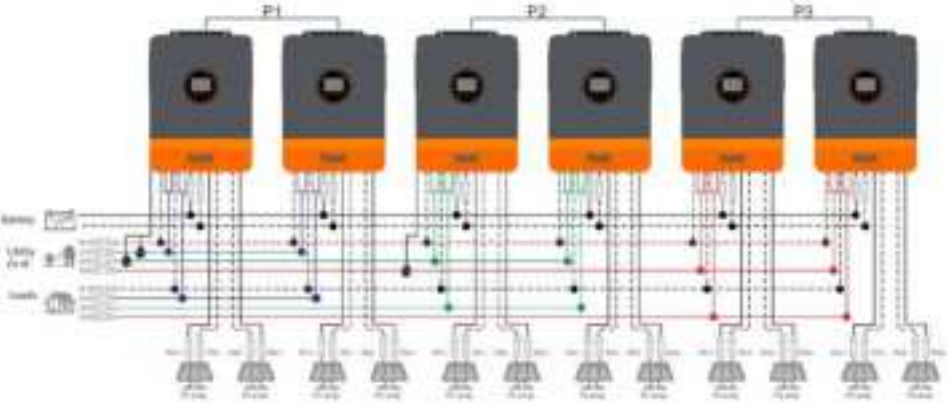


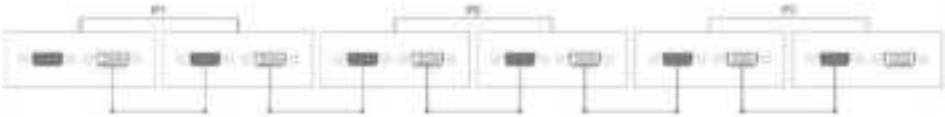
2+2+1 system:



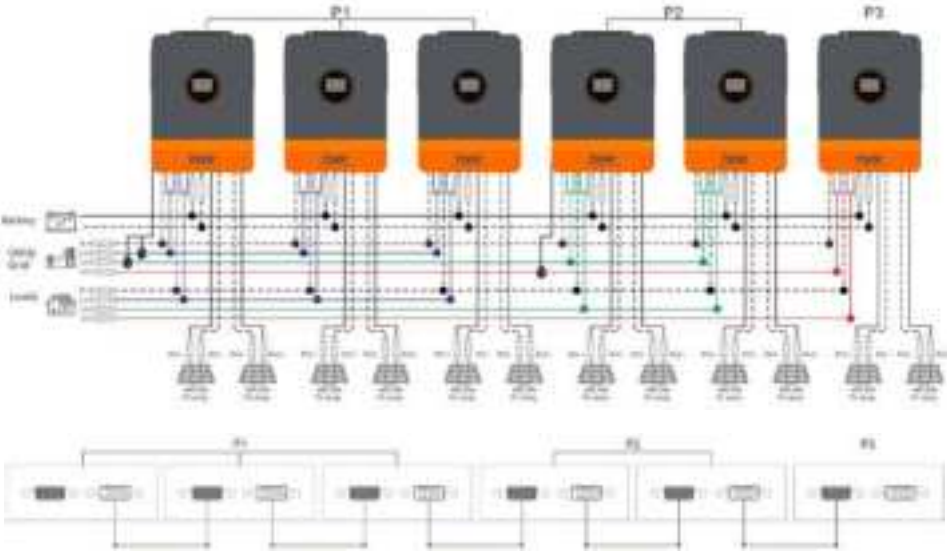
d. Three-phase system (six inverters)

2+2+2 system:





3+2+1 system:



Note:

1) Before powering on and lighting up the screen, check for correct wiring according to the above wiring diagrams to avoid system problems.
2) Check all connections for firm fixing to avoid detachment and abnormal system operation.
3) When connecting the AC output to the load, complete wiring according to the requirements of the electrical load to avoid damage to the load.
4) Set the item [38] to the same parameter, or only set it in the host inverter. During parallel operation, the voltage set in the host shall prevail, so the host inverter will forcibly set the item to the value for slave inverters. Only in standby mode can the item be set.
5) The inverter defaults to single mode at the factory. If using the parallel or three-phase function, set the item [31] on the screen as follows:

   Power on one inverter each time, turn off the other inverters, and then set the item [31] according to the on-site system operation mode. After setting the inverter, turn off the inverter,

and set the other inverters one by one. After all are set, power on all inverters at one time to enter the working state.

In single-phase parallel operation:

Set the item [31] to "PAL" and the item [68] to "0°." When setting the item [38] to "120 V," the output L-N voltage is 120 V.

In two-phase parallel operation:

a) P1: Set the item [31] to "2P0;" P2: Set the item [31] to "2P1," all of P1/P2 inverters item [68] can not be set, it is default “0°”and the phase difference between P1 and P2 is 120°. When setting the item [38] to "120 V," the voltage between the live wire L1 of P1 phase and the live wire L2 of P2 phase is 208 V, and the L1-N voltage is 120 V.

b) P1: Set the item [31] to "2P0;" P2: Set the item [31] to "2P2," all of P1/P2 inverters item [68] can not be set, it is default “0°”and the phase difference between P1 and P2 is 180°. When setting the item [38] to "120 V," the voltage between the live wire L1 of P1 phase and the live wire L2 of P2 phase is 240 V, and the L1-N voltage is 120 V.

In split-phase parallel operation:

Set the item [31] to PAL, and set the item [68] to 180°. When setting the item [38] to "120 V," the L1-L2 voltage is 240 V, and the L1-N voltage is 120 V.

In three-phase parallel operation:

P1: Set the item [31] to "3P1;" P2: Set the item [31] to "3P2;" P3: Set the same to "3P3" all of P1/P2/P3 inverters item [68] can not be set, it is default “0°”.

At this point, the P1-P2, P1-P3, and P2-P3 phase difference is 120°. When setting the item [38] to "120 VAC," the voltage between the live wire L1 of P1 phase and the live wire L2 of P2 phase is 120*1.732=208 VAC. Similarly, the L1-L3 and L2-L3 voltage is 208 VAC:

6) After the system runs, measure the correct output voltage before connecting to loads.

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