GST48 Series Single-phase Hybrid Inverter
User Manual

Important safety Instructions

Please keep this manual for future use

Waring: Before using the unit, read all instructions and cautionary marking on the unit, the batteries and all appropriate sections of this manual. The company has the right not to quality assurance, if not according to the instructions of this manual for installation and cause equipment damage.

- Select the lithium battery system or lead-acid battery system on the display screen as required. If you select the wrong battery system, the energy storage system cannot work properly.
- Do not place the hybrid inverter where it is accessible for children.
- Do not install the hybrid inverter in harsh environments such as moist, oily,flammable or explosive, or heavily dusty areas.
- The mains input and AC output are high voltage, so please do not touch the wiring terminals.
- To avoid personal injury, users shall not disassemble the hybrid inverter themselves. Contact our professional maintenance personnel if there is a need for repair.
- The shell of the is hot when hybrid inverter is working. Do not touch or open it.
- It is recommended to attach proper fuse or circuit breaker to the outside of the hybrid inverter.
- When install PV modules in the daytime, installer should cover the PV modules by opaque materials, otherwise it will be dangerous as high terminal voltage of modules in the sunshine.
- Always disconnect the fuse or circuit breaker near the terminals of PV array, mains and battery before installing and adjusting the wiring of the hybrid inverter.
- After installation, check that all wire connections are tight to avoid heat accumulation due to poor connection, which is dangerous.
- The hybrid inverter is off-grid. It is necessary to confirm that it is the only input device for load, and it is forbidden to use it in parallel with other input AC power to avoid damage.

Catalogue

1. General Information

1.1 Basic system introduction

The figure below shows the system application scenario of this product. A complete system consists of the following parts:

1. **Photovoltaic modules:** Convert light energy into DC power, and charge the battery through the hybrid inverter, or directly invert into AC power to drive the load.

2. **Mains or generator:** Connected at the AC input, to power the load while charging the battery. If the mains or generator is not connected, the system can also operate normally, and the load is powered by the battery and PV module.

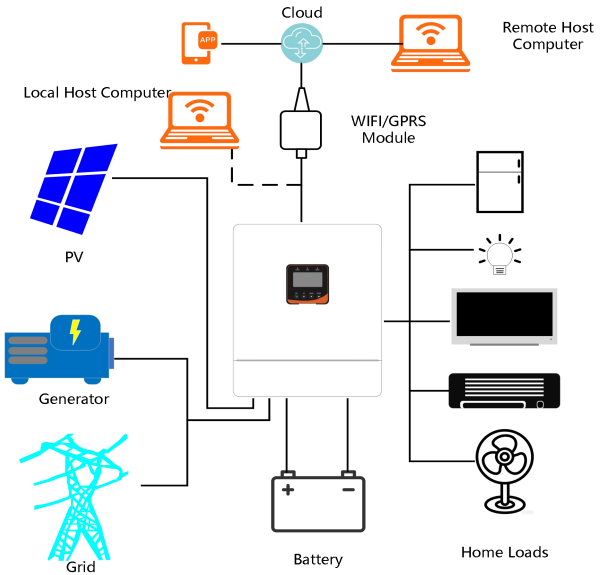
3.**Battery:** Provided to ensure normal power supply to the system loads when solar energy is insufficient and the Mains is not connected.

4.**Household load:** Allow connection of various household and office loads, including refrigerators, lamps, TVs, fans and air conditioners.

5.**Communication interface:** It can connect to the local host computer or WIFI/GPRS cloud communication module.

6.**Hybrid inverter:** The energy conversion unit of the whole system.

Specific system wiring method depends on the actual application scenario.



GST48 series is a new hybrid solar charge inverter, which integrates solar energy storage & means charging energy storage and AC sine wave output. It adopts DSP control and advanced control algorithm, it has high response speed, high reliability and high industrial standard. Four charging modes are optional, i.e. Only Solar, Mains Priority, Solar Priority and Mains & Solar hybrid charging; and two output modes are available, i.e. Inverter and Mains, to meet different application requirements.

The solar charging module applies the latest optimized MPPT technology to quickly track the maximum power point of the PV array in any environment and obtain the maximum energy of the solar panel in real time.

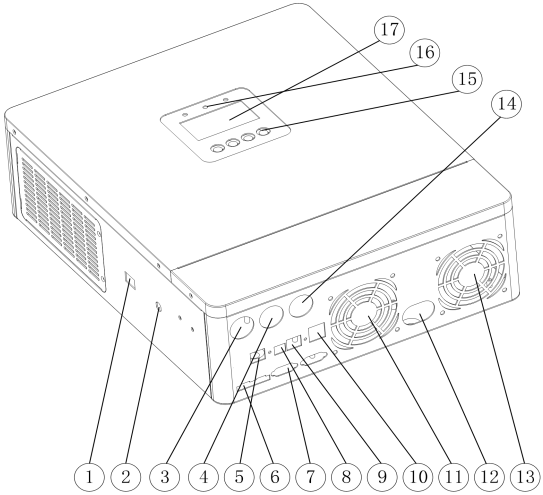
Through a state of the art control algorithm, the AC-DC charging module realizes fully digital voltage and current double closed loop control, with high control precision in a small volume. Wide AC voltage input range and complete input/output protections are designed for stable and reliable battery charging and protection.

Based on full-digital intelligent design, the DC-AC inverter module employs advanced SPWM technology and outputs pure sine wave to convert DC into AC. It is ideal for AC loads such as household appliances, power tools, industrial equipment, and electronic audio and video equipment. The product comes with a segment LCD design which allows real-time display of the operating data and status of the system. Comprehensive electronic protections keep the entire system safer and more stable.

Features:

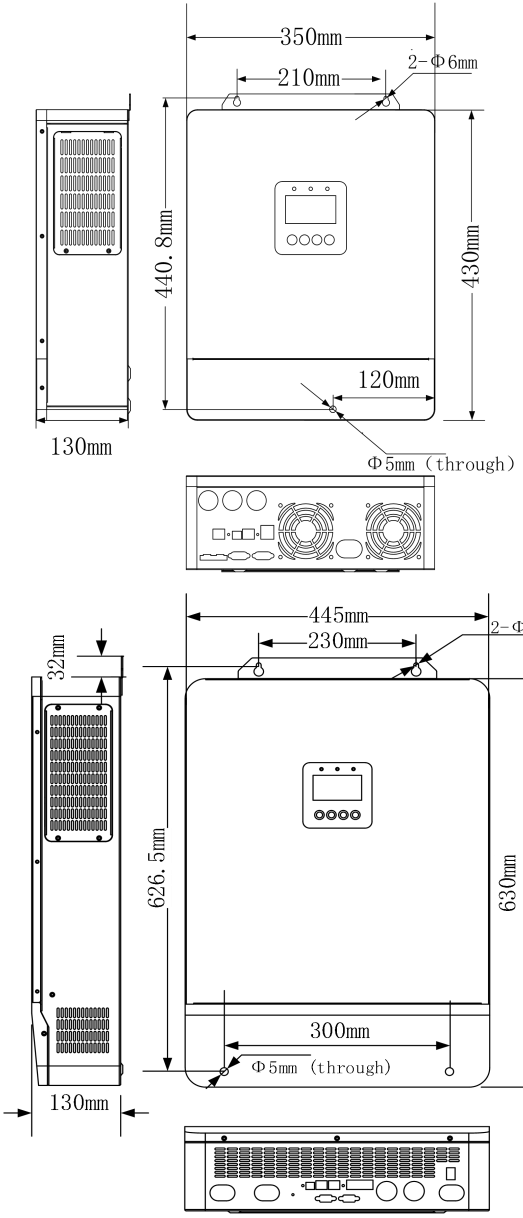
1. Anti-backflow grid connection function, support for inverter and mains power hybrid output, support for use without battery, can be set up for on-grid power generation.
2. Two output modes: mains bypass and inverter output and UPS function.
3. 4 charging modes: Only Solar, Mains Priority, Solar Priority and Mains & Solar hybrid charging.
4. Advanced MPPT technology with an efficiency of 99.9%.
5. Power saving mode available to reduce no-load loss.
6. Intelligent variable speed fan efficiently dissipate heat and extend system life.
7. Lithium battery activation by PV solar or mains, allowing access of lead-acid battery and lithium battery.
8. Complete protections, including short circuit protection, over voltage and under voltage protection, overload protection, etc.
9. Parallel machine number is up to 9.
10. Support for WIFI/GPRS remote monitoring.

1.2 Appearance



①	Overload protector	⑩	Dry contact port
②	ON / OFF, rocker switch	⑪	Cooling fan
③	PV port	⑫	Battery port
④	AC input port	⑬	Cooling fan
⑤	RS485-2 communication port (Host computer or WiFi/GPRS communication module)	⑭	AC output port
⑥	Current sharing port (parallel module only)	⑮	Function key
⑦	Parallel communication port (parallel module only)	⑯	Indicator light
⑧	USB communication port	⑰	LCD screen
⑨	RS485-1 communication port (BMS)		

1.3 Dimension drawing



2. Installation instructions

2.1 Installation precautions

Please read this manual carefully prior to installation to familiarize yourself with the installation steps.

- Do not place metal objects near the battery to prevent short-circuit of the battery.
- Only the battery that meets the requirements of the inverter can be charged.
- Poorly connected connections and corroded wires may cause great heat which will melt the wire insulation, burn the surrounding materials, and even cause fires. So, make sure the connectors have been tightened, and the wires are secured with ties to avoid looseness of connections caused by shaking of wires during mobile application.
- The system connection wires are selected according to a current density of not more than 5 A/mm^2.
- Avoid direct sunlight and rainwater infiltration for outdoor installation.
- Even after the power is turned off, there is still high voltage inside the unit. Do not open or touch the internal components, and avoid related operations until the capacitor completely discharges.
- Polarity at the battery input end of this product shall not be reversed, otherwise it may damage the device or cause unpredictable danger.

2.2 Installation and connection

2.2.1 Inspection before installation

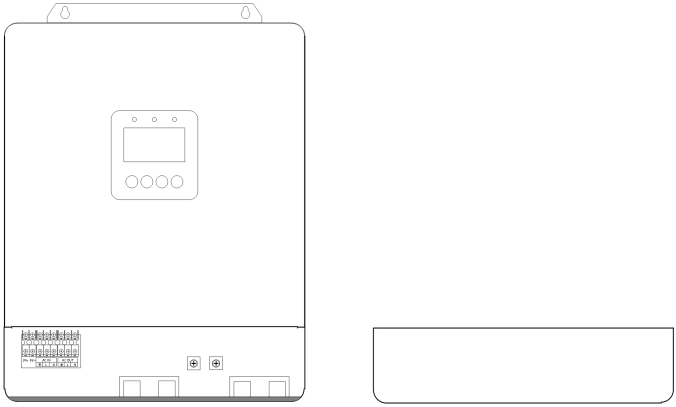
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items in the package:

The unit x 1

User manual x 1

2.2.2 Installation steps:

Step 1: Remove the terminal cover



Step2: Consider the following points before selecting where to install:

1.Do not mount the inverter on flammable construction materials.

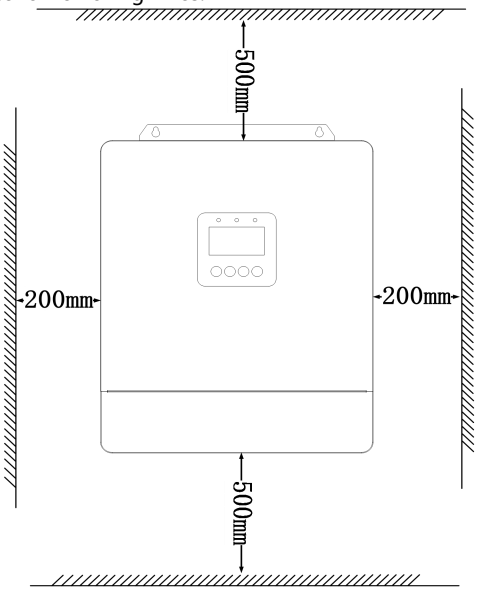
2.Mount on a solid surface.

3. Install this inverter at eye level in order to allow the LCD display to be read at all times.

4.The ambient temperature should be between -10°C and 55°C to ensure optimal operation.

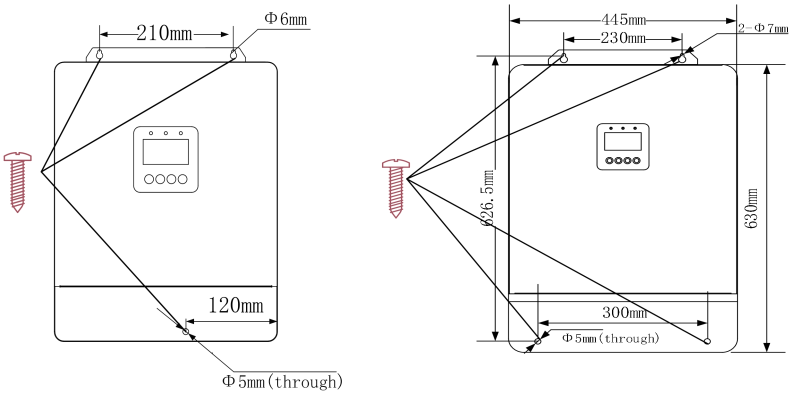
5.The recommended installation position is to be adhered to the wall vertically.

6.Ensure to retain other objects and surfaces as shown in the figure below, and leave at least 200mm space on the left and right air vents of the hybrid inverter to ensure sufficient heat dissipation and space for removing wires.

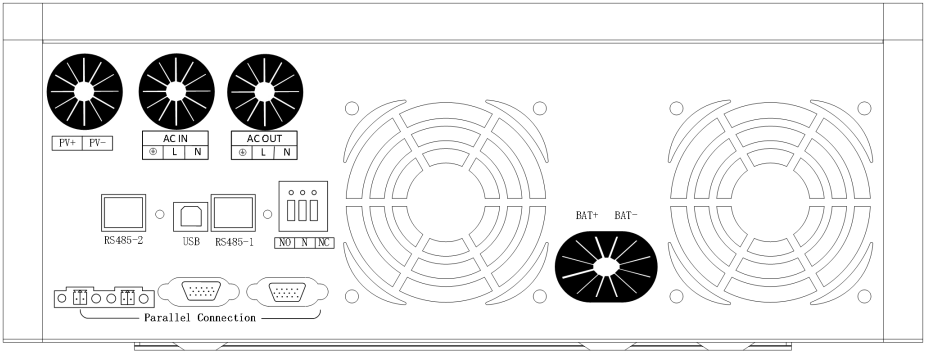


Warning: Danger of explosion! Never install the hybrid inverter and lead-acid battery in the same confined space! Also do not install in a confined place where battery gas may collect.

7.Mounting screws, it is recommended to use 3 or 4 M4 and M5 screws.



Step 3: Wiring



Wiring and installation must comply with national and local electrical codes.

BAT wiring method:

a)Lead-acid battery wiring:

1.Select a lead-acid battery that meets the rated voltage,prior to wiring, disconnect the external circuit breaker and confirm that the wire used is thick enough.

Recommended battery input wire diameter and switch selection

Model	Recommended battery wiring diameter	Rated battery discharge current	Maximum charge current	Recommended circuit breaker type
GST48-3500 VII	25mm^2/3AWG	80A	80A	2P— 100A
GST48-5500 VII	30mm^2/2AWG	110A	100A	2P— 160A
GST48-10K VII	42mm^2/1AWG	220A	200A	2P— 250A

Note: The wiring line diameter and circuit breaker are for reference only, please select the appropriate wiring line diameter and circuit breaker according to the actual situation. If the distance between the photovoltaic array and the all-in-one or the all-in-one and the battery is far, it is thicker can reduce the pressure drop to improve the system performance.

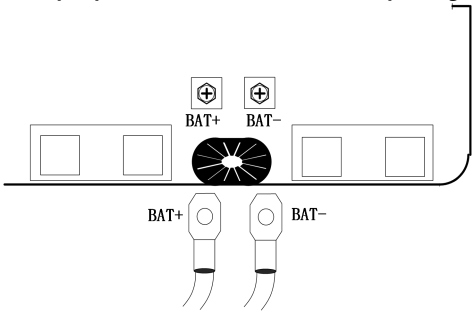
2.Please follow below steps to implement battery connection:

1)Assemble battery ring terminal based on recommended battery cable and terminal size.

2)Connect all battery packs as units requires. It' s suggested to connect at least 200Ah capacity battery.

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

BAT +: BAT input positive electrode BAT-: BAT input negative electrode



WARNING: Shock Hazard

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

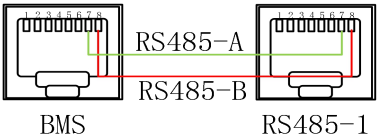
b)Lithium battery wiring:

1.Please use the lithium battery only which we have configure.There are two connectors on the lithium battery, RJ45 port of BMS and power cable.
2.Please follow below steps to implement battery connection:
1)Assemble battery ring terminal based on recommended battery cable and terminal size (same as Lead acid, see section Lead-acid Battery connection for details).

2) Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 2-3Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.
3) Connect the end of RJ45 of battery to BMS communication port

c) BMS communication and setting

In order to communicate with the battery BMS, the battery type should be set to lithium in parameter 14. Then switch the LCD to parameter 38, that is, set the protocol type. There are two protocols in the inverter, the default protocol is the "WOW" protocol.
Connect the RJ45 end of the battery to the BMS communication port of the inverter. The connection between the pin of the inverter RS485-1 port and the pin of the battery BMS port is shown in the following figure.



NO	Parameter name	Set options	LCD display	Description
14	Battery type	0:USER	bAtt USE 014	User-defined, all battery parameters can be set.
		1:SLd	bAtt SLd 014	Sealed lead-acid battery with constant charge voltage of 57.6V and floating charge voltage of 55.2V
		2:FLd	bAtt FLd 014	Flooded lead-acid battery with constant charge voltage of 58.4V and floating charge voltage of 55.2V

NO	Parameter name	Set options	LCD display	Description
		3: GEL Default		GEL lead-acid battery with constant charge voltage of 56.8V and floating charge voltage of 55.2V
		4:LFP14 5:LFP15 6:LFP16		LFP14/LFP15/LFP16 are corresponding to Battery Series of 14, 15 and 16, and their default constant charge voltages are 49.6V, 53.2V and 56.8V respectively, which can be adjusted
38	BMS Protocol	WOW		Select the corresponding lithium battery manufacturer brand for communication
		PAL		

AC input / output wiring method:

Warning: All wiring must be performed by a qualified personnel.

1. Prior to AC input/output wiring, opening the external circuit breaker and confirm that the wire used is thick enough.

Recommended AC input wiring specifications and circuit breaker selection

Model	Recommended AC input wiring diameter	Maximum bypass input current	Recommended circuit breaker type
GST48-3500 VII	10mm^2/7AWG	30A	2P—32A
GST48-5500 VII	10mm^2/7AWG	40A	2P—40A
GST48-10K VII	16mm^2/5AWG	63A	2P—63A

Recommended AC output wiring specifications and circuit breaker selection

Model	Recommended AC output wiring diameter	Rated inverter AC output current	Maximum bypass Output current	Recommended circuit breaker type
GST48-3500 VII	10mm²/7AWG	16A	30A	2P—32A
GST48-5500 VII	10mm²/7AWG	25A	40A	2P—40A
GST48-10K VII	16mm²/5AWG	45A	63A	2P—63A

Note: there is a corresponding circuit breaker at the mains input connection point, and the circuit breaker may not be added.

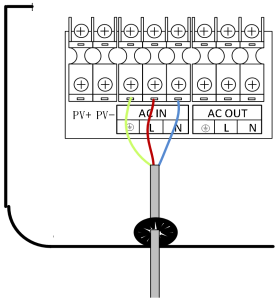
2. Please follow below steps to implement battery connection:

1) Before making AC input/output connection, be sure to shut all circuit breakers first.

2) Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm, then press in tubular terminal.

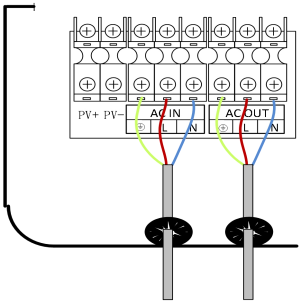
3) Then, insert AC input wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor.

⏚: Ground L: Live N: Neutral



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

⏚: Ground L: Live N: Neutral



5) Make sure the wires are securely connected.

Note: The grounding wire shall be as thick as possible (cross-sectional area is not less than 4mm^2). The grounding point shall be as close as possible to the hybrid inverter. The shorter the grounding wire, the better.

PV input wiring method:

Warning: All wiring must be performed by a qualified personnel.

1. Prior to wiring, disconnect the external circuit breaker and confirm that the wire used is thick enough.

Recommended PV array wiring specifications and circuit breaker selection: Since the output current of the PV array is affected by the type, connection method and illumination angle of the PV module, the minimum wire diameter of the PV array is calculated according to its short-circuit current; refer to the short-circuit current value in the PV module specification (the short-circuit current is constant when the PV modules are connected in series; the short-circuit current is the sum of the short-circuit currents of all PV modules connected in parallel); the short-circuit current of the PV array shall not exceed the maximum input current.

Refer to the table below for PV input wire diameter and switch:

Model	Recommended PV wiring diameter	Maximum PV input current	Recommended circuit breaker type
GST48-3500 VII	3.5mm^2/12AWG	13A	2P—25A
GST48-5500 VII	6mm^2/10AWG	22A	2P—25A
GST48-10K VII	6mm^2/10AWG	22A+22A	2P—25A

Note: The voltage shall not exceed the maximum PV input open circuit voltage in series.

2.Please follow below steps to implement battery connection:

1)Before making PV connection, be sure to shut all circuit breakers first.

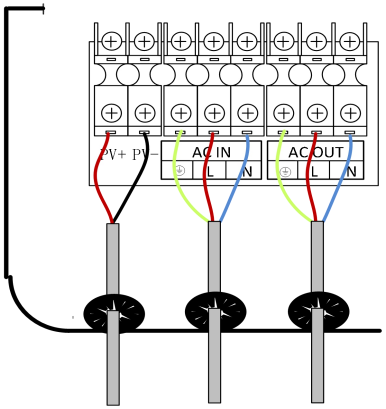
2)Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral

conductor N 3mm， then press in tubular terminal.

3)Then, insert PV wires according to polarities indicated on terminal block and tighten terminal screws.

4)When used in parallel connection,different machines need to be connected to different PV arrays or PV sources.

PV +: PV input positive pole　　PV-: PV input negative pole



Warning:

1.Mains input, AC output and PV array will generate high voltage. So, before wiring, be sure to opening the circuit breaker or fuse;

2.Be very careful during wiring; do not close the circuit breaker or fuse during wiring, and ensure that the "+" and "-" pole leads of each component are connected properly; a circuit breaker must be installed at the battery terminal.

3. Before wiring, be sure to disconnect the circuit breaker to prevent strong electric sparks and avoid battery short circuit; if the hybrid inverter is used in an area with frequent lightning, it is recommended to install an external lightening arrester at the PV input terminal.

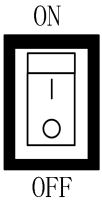
4.Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur.

5. Do not apply anti-oxidant substance on the terminals before terminals are connected tightly.

Step 4: Check if the wiring is correct and firm. In particular, check if the battery polarity is reversed, if the PV input polarity is reversed and if the AC input is properly connected.

Step 5: Install the terminal cover.

2.3 Turn on the hybrid inverter



First, close the circuit breaker at the battery terminal, and then turn the rocker switch on the left side of the machine to the "ON" state. The "AC/INV" indicator flashing indicates that the inverter is working normally. Close the circuit breakers of the PV array and the Mains. Finally turn on AC loads one by one as the AC output is normal to avoid a protection action caused by a large momentary shock due to simultaneous turning on the loads simultaneously. Now, the machine goes into a normal operation according to the set mode.

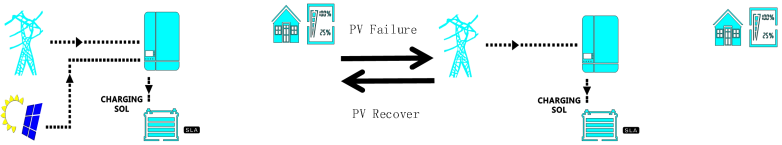
Note: If power is supplied to different AC loads, it is recommended to first turn on the load with a large surge current. After the load is stable, turn on the load with a small surge current.

Note: If the hybrid inverter does not work properly or the LCD or indicator is abnormal, refer to Chapter7 to handle the exceptions.

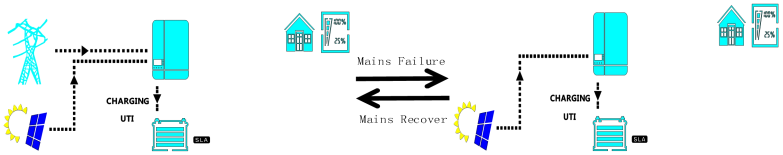
3.Operating modes

3.1 Charging mode

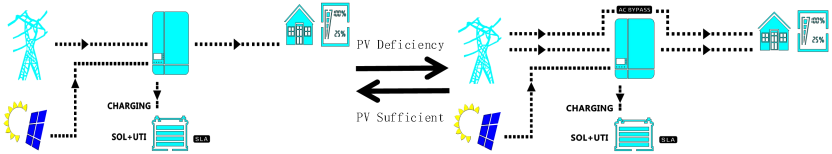
1) **Photovoltaic priority:** Photovoltaic charging is preferred, and mains charging is only started when photovoltaic fails. Make full use of solar power during the day,At night, the battery can keep the battery power, which is used in areas where the grid is relatively stable and the electricity price is more expensive.



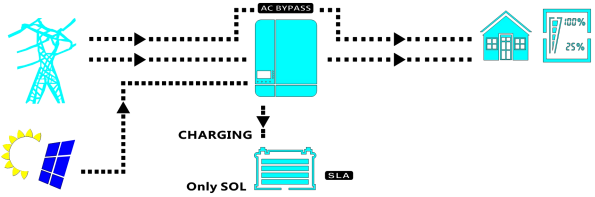
2) **Mains first:** priority shall be given to charging by Mains Power, and charging with PV power will be started only when the Mains has failed.



3) **Hybrid Charging:** hybrid charging of PV and Mains Power, give priority to PV MPPT charging, and supplement Mains Power when PV energy is insufficient. When the PV energy is sufficient, the Mains Power will stop charging. This is the mode of fast charging and suitable for unstable areas of power grid, and can provide sufficient backup power at any time.

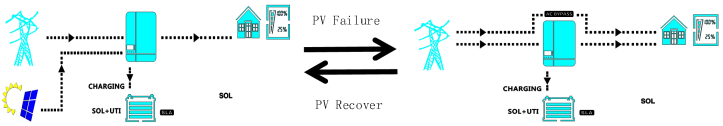


4) **Only Solar:** Only PV charging, no mains charging is initiated. This is the most energy-efficient mode and the battery power comes from solar energy, which is usually used in regions with good daylighting conditions.



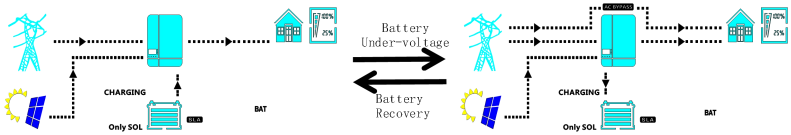
3.2 Output mode

1)Solar First: PV and battery will power the load, with diversified charging modes available and output mode optional, when the Solar First Mode is selected, the use of green solar energy can be maximized for energy efficiency and emission reduction. Switch to Mains Power when PV has failed. This mode can maximize the use of solar energy while maintaining the battery power, which is suitable for regions with relatively stable power grid.



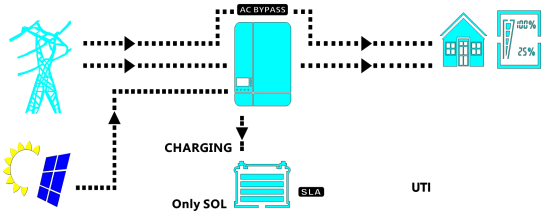
2)Mains First:switch to inverter power supply only when Mains Power has failed, which is equivalent to backup UPS and is used in regions with unstable power grid.

3) Inverter First: switch to Mains Power supply only when the battery is under-voltage. This mode uses DC energy to the maximum extent and is used in regions with stable power grid.



3.3 On-grid function

When the output mode is set to mains priority output mode and the bypass is opened: if the grid connected power generation function is enabled, the surplus photovoltaic energy is directly fed to the local load and the power grid; If the grid connected anti backflow function is enabled, the load power is provided by both the PV and the mains.



4.LCD screen operation instructions

4.1 Display the control area panel description

1. Display and control panel

The display and control panel is divided by functions as shown in the figure, mainly divided into three functional areas:LCD screen, LED display area, Key area.

2.The LED indication

The three light-emitting diodes (LEDs) in the LED display area in the figure serve as the indicator light for operating status and failure.

Name	Description
AC / INV lamp (green)	Normally On: The inverter works in the Mains power output mode Flicker: The inverter works in the battery inverter output mode Off: Other states
CHG lamp (yellow)	Normally On: The battery is floating or the battery is fully charged Flicker: The battery is in the constant current or constant voltage charging Off: Other states
FLUAT lamp (red)	Normally On: The inverter fault Off: The inverter is normal

3. Function key area

The function key area includes 4 buttons:

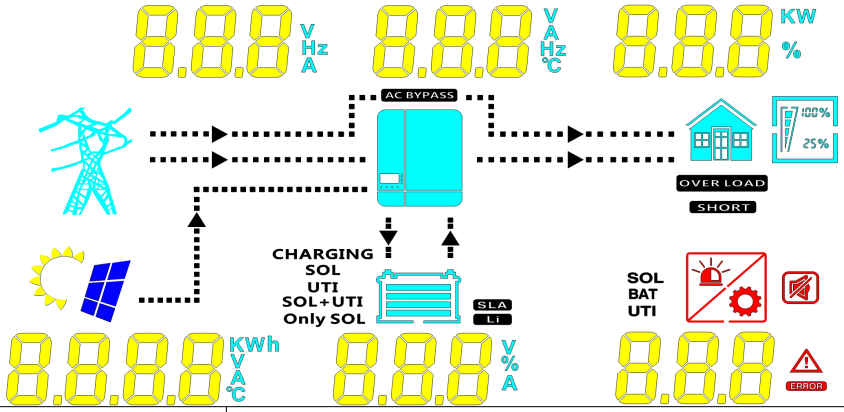
(ESC): It is the exit key when the parameter is set;

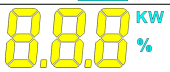
(UP): Add the key to the value in the parameter setting interface, which can be used as the page turning key in the main interface;

(DOWM): It is the value reduction key in the parameter setting interface, which can be used as a page turning key in the main interface;

(ENTER):It is the confirm key in the parameter setting menu,and the enter key in the main interface.

4.2 Description of the LCD Display



Icon	Description
Communicate input information	
	AC input
	Indicates AC input power, AC input voltage, AC input frequency, and AC input current
	Indicates AC bypass ON
Photovoltaic input information	
	PV input sign
	PV power generation quantity, PV voltage, PV current, PV charging radiator temperature
outgoing message	
	Inverter logo
	Indicates the output voltage, the output current, the output frequency, and the inverter radiator temperature
Load information	
	Load logo
	Indicates the load power, and the load percentage
	Indicates overload

Icon	Description
SHORT	Indicates short circuit
Battery information	
	When charging in battery mode and bypass mode, it means that the battery power is 0-24%, 25-49%, 50% -74%, and 75 -100%.
	It represents the battery voltage, battery power percentage, and battery current
SLA	Indicates lead-acid batteries
Li	Indicates lithium battery
CHARGING SOL UTI SOL+UTI Onl SOL	Priority for charging sources: solar first, solar and mains power, or solar only
Other information	
SOL BAT UTI	Represents the priority of output : photovoltaic priority, battery priority, mains power priority
	Displays a warning code or an error code
	Indicates a warning or an error is occurring
	Indicates that the machine is currently in the parameter setting state
	Indicates that the buzzer is closed

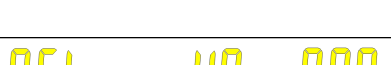
4.3 LCD menu settings

After pressing the Enter button, the unit will enter the parameter setting mode. Press the Up or Down button to select the Setup Procedure. Then press the Enter the button to confirm the selection or ESC button to exit.

NO	Parameter name	Set options	LCD display	Description
1	Supply Priority Mode	AC1ST Default		Mains Power First Mode, switch to the Inverter only when the Mains Power is failed
		BT1ST		Inverter First Mode: switch to Mains Power only when the battery is under-voltage or lower

NO	Parameter name	Set options	LCD display	Description
				than Parameter [12] Set Value
		PV 1ST		Solar First Mode: switch to Mains Power when PV has failed or battery is lower than Parameter [04] Set Value
2	Output frequency	50		Bypass self-adaptation; when the mains is connected, it automatically adapts to the mains frequency; when the mains is disconnected, the output frequency can be set through this menu. The default output frequency of the 230V machine is 50HZ, and the 120V machine is 60Hz
		60		
3	AC output voltage setting	The 230 Vac default The 120 Vac defaults		Set up: 200 / 208 / 220 / 230 / 240 Vac Can be set: 100/105/110/120Vac
4	PV grid-connected power generation function	0: DIS Default		Disable this Function
		Togrid		In the utility bypass state, when no battery is connected, the surplus PV energy is fed back to the grid
		Toload		In the utility bypass state, when no battery is connected, the load power is supplied by the hybrid of PV and the utility

NO	Parameter name	Set options	LCD display	Description
5	AC Input Voltage	UPS Default		The input mains voltage range of 230V machine is 170~280V Mains input voltage range of 120V machine: 90~140V
		APL		The input mains voltage range of 230V machine is 90~280V Mains input voltage range of 120V machine: 90~140
6	Charging mode	Hybrid Default		Hybrid charging by PV and under utility grid give priority to PV, and use utility grid for supplementary if PV energy is insufficient. When the PV energy is sufficient, the utility grid will stop charging. Note: PV and utility grid are available for charging at the same time only when the bypass output is loaded, and only PV charging can be activated when the inverter is working
		AC1ST Default		The Mains Power is charged first, and PV charging is started only when the Mains Power has failed
		PV 1ST		Priority shall be given to charging by PV and mains charging will be initiated only when the PV has failed

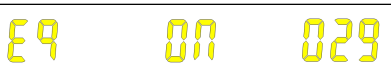
NO	Parameter name	Set options	LCD display	Description
		ONLYPV		Only PV charging, no mains charging is enabled
7	Maximum charging current	100A defaults		Max hybrid charging current. Setting range: 0~100A
8	Max PV Charging Current	80A Default		Max PV charger current. Setting range: 0~100A
9	Current of charging under grid electricity	60A Default		AC output 230Vac, with the Set Range of 0~60A
		40A Default		AC output 120Vac, with the Set Range of 0~40A
10	Stop Charging Current	2A Default		Charging stops when the default charging current is less than this setting and the battery voltage is> = P15-0.2V
11	Charge current limiting method (when BMS is enabled)	LC SET		Max. battery charging current not greater than the value of setting【07】
		LC BMS Default		Max. battery charging current not greater than the limit value of BMS
		LC INV		Max. battery charging current not greater than the logic judgements value of the inverter
12	Battery to Mains	The default value is determined by the battery type		When the Parameter [01] = BT1ST/PV1ST, the battery voltage is lower than the set value, and the output is switched from inverter to Mains Power, and the set range is 40V~52V.,available

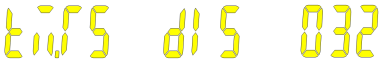
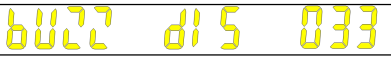
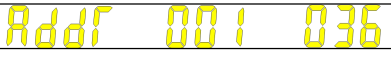
NO	Parameter name	Set options	LCD display	Description
				when the battery type is user-defined and lithium battery
13	Mains to Battery	The default value is determined by the battery type		When the Parameter [01] = BT1ST/PV1ST, the battery voltage is higher than the set value or the battery is fully charged, and the output is switched from mains to inverter, and the set range is 48V~60V,available when the battery type is user-defined and lithium battery
14	Battery type	0:USER		User-defined, all battery parameters can be set.
		SLd		Sealed lead-acid battery with constant charge voltage of 57.6V and floating charge voltage of 55.2V
		FLd		Flooded lead-acid battery with constant charge voltage of 58.4V and floating charge voltage of 55.2V
		GEL Default		GEL lead-acid battery with constant charge voltage of 56.8V and floating charge voltage of 55.2V
		LFP14 LFP15 LFP16		LFP14/LFP15/LFP16 are corresponding to Battery Series of 14, 15 and 16, and their default constant charge voltages are 49.6V, 53.2V and 56.8V

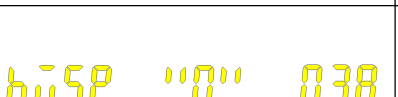
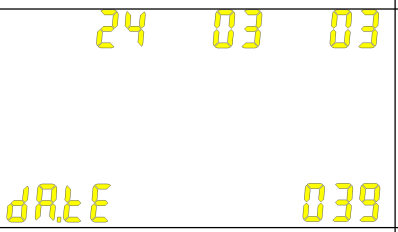
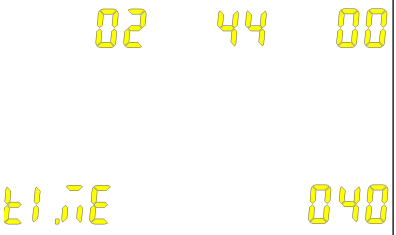
NO	Parameter name	Set options	LCD display	Description
				respectively, which can be adjusted
15	Boost Voltage	The default value is determined by the battery type		Setting of Boost Voltage: Set Range of 48V~58.4V, Step 0.4V, available when the battery type is user-defined and lithium battery
16	Maximum Boost Duration	120 Default		Setting of Maximum Boost Duration, which is the maximum charging time when the voltage reaches the Parameter [15] when charging at constant voltage, with the Set Range of 5min~900min, and Step of 5min,available when the battery type is user-defined and lithium battery
17	Float charge voltage	The default value is determined by the battery type		Floating Charge Voltage, with the Set Range of 48V~58.4 V, Step of 0.4 V,available when the battery type is user-defined and lithium battery
18	Over Discharge Voltage	The default value is determined by the battery type		Over-discharge Voltage: the battery voltage is lower than such criterion, and the Inverter output is turned off after the time delay parameter is set to [19], with the Set Range of 40V~48V and Step of

NO	Parameter name	Set options	LCD display	Description
				0.4V,available when the battery type is user-defined and lithium battery
19	Over Discharge Delay Time	5S default		Over-discharge Delay Time: when the battery voltage is lower than the Parameter [18], the inverter output is turned off upon delay of time set by this Parameter, with the Set Range of 5S~50S, Step of 5S,available when the battery type is user-defined and lithium battery
20	Battery Under Voltage Alarm point	The default value is determined by the battery type		Battery under-voltage alarm point: when the battery voltage is lower than such criterion, under-voltage alarm will be given, the output will not be shut down, with the Set Range of 40V~52V, Step of 0.4V
21	Battery Discharge Limit Voltage	The default value is determined by the battery type		Battery discharge limit voltage, the battery voltage is below the point, the output is immediately closed. The setting range is 40V~52V, the step is 0.4V, it can be set ,available when the battery type is user-defined.Automatically set by the program.when they are other battery types

NO	Parameter name	Set options	LCD display	Description
22	Battery over Discharge Recovery Point	The default value is determined by the battery type		When the battery is under voltage, the battery voltage needs to be greater than this setting value to restore the battery inverter AC output, the setting range: 44V~54.4V
23	Fully Charged Battery Recharge Point	The default value is determined by the battery type		After the battery is charged, the inverter stops charging. When the battery voltage is lower than this voltage value, the charging will be resumed, with the setting range: 44V~54V
24	Equalization Charge	DIS		No equalization charging
		ENA Default		Enable equalization charging, only Flooded lead-acid batteries, sealed lead-acid batteries and user-defined are effective
25	Equalization Voltage	The default value is determined by the battery type		Equalization Charging Voltage, with the Set Range of 48V~58V, Step of 0.4V, available for Flooded lead-acid battery, sealed lead-acid battery and user-defined
26	Equalization Charging Time	120 Default		Equalization Charging Time, with the Set Range of 0min~900min, Step of 5min, available for Flooded lead- acid battery, sealed lead-acid battery and user-defined

NO	Parameter name	Set options	LCD display	Description
27	Equalized Charging Delay	120 Default		Equalization Charging Delay, with the Set Range of 0min~900min, Step of 5min, available for Flooded lead- acid battery, sealed lead-acid battery and user-defined
28	Equalization Charge Interval Time	30 Default		Equalization Charge Interval Time, 0~30d, Step of 1d,available for Flooded lead-acid battery, sealed lead-acid battery and user-defined
29	Equalization Charging Start-Stop	ENA		Start equalization charging immediately
		DIS Default		Stop equalization charging immediately
30	ECO mode	DIS Default		NO ECO mode
		ENA		When the ECO mode is enabled, if the load is below 50W, the inverter output is delayed for 5 minutes and then the output is turned off. When the hull switch is pressed to the "OFF" State, and then pressed to the "ON" State, the inverter will resume the output
31	Overload Automatic Restart	DIS		Overload automatic restart is disabled. If overload occurs, the output will be shut down, and the machine will not be restarted

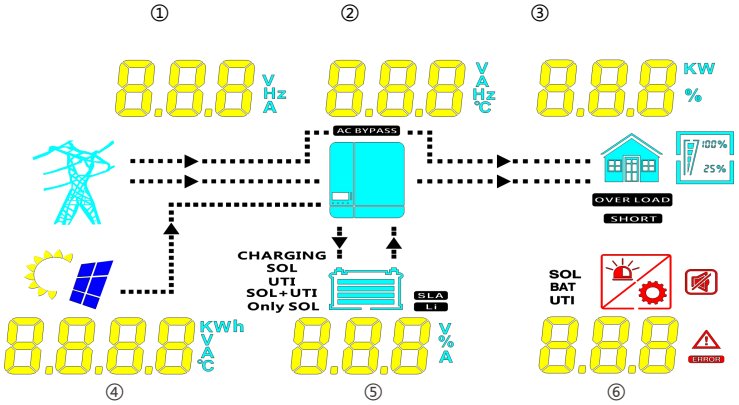
NO	Parameter name	Set options	LCD display	Description
		ENA Default		Enable overload auto restart. If overload occurs, shut down output, delay the machine for 3 min and then restart the output. After 5 times in total, no startup will be resumed
32	Auto restart upon over-temperature	DIS		Over-temperature automatic restart is disabled. If over-temperature occurs, the output will be shut down, and the machine will not be restarted for output.
		ENA Default		Enable automatic restart upon over-temperature. If over-temperature occurs, shut down output, and restart output after the temperature has dropped
33	Buzzer Alarm	DIS		No alarm
		ENA Default		Enable alarm
34	Mode Change Reminder	DIS		Alarm is disabled when the status of the main input source has change
		ENA Default		Alarm is disabled when the status of the main input source has change
35	Inverse Overload to Bypass	DIS		Automatic switch to Mains Power is disabled when the Inverter is overloaded
		ENA Default		Automatic switch to Mains Power when the inverter is overloaded
36	RS485	1		RS485 Communication

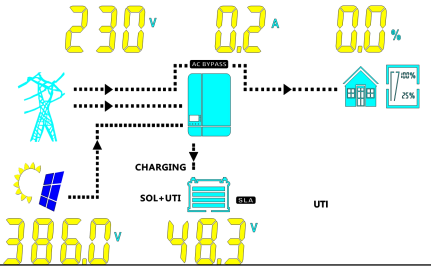
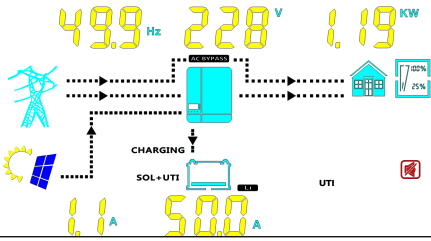
NO	Parameter name	Set options	LCD display	Description
	Address Setting	Default		address single machine setting range: 1~254, parallel machine setting range: 1~9
37	AC Output Mode (Can only be set in standby mode)	SIG Default		Single machine setting
		PAL		Single-phase parallel connection setting
		3P1/3P2 /3P3		Three-phase parallel connection setting
38	BMS Protocol	WOW		Select the corresponding lithium battery manufacturer brand for communication
		PYL		
39	Current Date Settings	00:00:00 Default		Setting range: 00:01:01-99:12:31
40	Current Time Setting	00:00:00 Default		Setting range: 00:00:00-23:59:59
41	Alarm SOC Setting	15% Default		When the capacity is less than this setting value, the SOC +10% is recovery point. Setting range: 0~50 (valid when BMS communication is normal)
42	Stop Discharge SOC	5% Default		When the capacity is less than the setting value, stop the discharge and

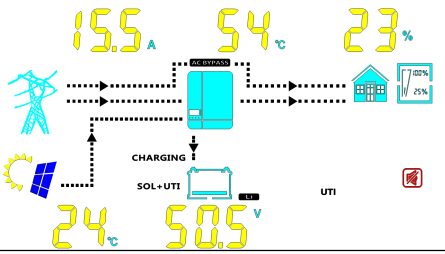
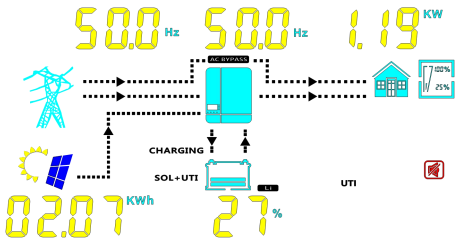
NO	Parameter name	Set options	LCD display	Description
	Setting			the SOC+10% is recovery point. Setting range: 0~30 (valid when BMS communication is normal)
43	Charging Stop SOC Setting	100% Default		When the capacity is greater than this set value, stop charging and restore by 3%. Setting range: 60~100, greater than or equal to P45 (valid when BMS communication is normal)
44	Battery to Main SOC settings	10% by Default		When the capacity is less than the set value, switch to the mains. Set range: 0~40, at least 5 larger than P42 (valid when BMS communication is normal)
45	Mains to Battery SOC settings	20% by Default		When the capacity is greater than the set value, switch to the inverter output mode. Set range: 20~100, at least 15 larger than P42 (valid when BMS communication is normal)

4.4 The LCD displays the information

Press the "Up" or "Down" key to switch the LCD information in turn. Each switch information is provided in the following order:



Set information	LCD DISPLAY
① AC input voltage ② Output current ③ Load percentage ④ PV input voltage ⑤ Battery voltage ⑥ Warnings and faults	
① AC input frequency ② Output frequency ③ Load power percentage ④ PV input current ⑤ Battery capacity and charging current ⑥ Warnings and faults	

Set information	LCD DISPLAY
① AC input current ② The inverter radiator temperature ③ Load power percentage ④ PV charging radiator temperature ⑤ Battery voltage ⑥ Warnings and faults	
① AC input frequency ② Output frequency ③ Load power ④ PV generation amount ⑤ Battery capacity percentage ⑥ Warnings and faults	

4.5 Warning and failure

P1, P2... indicates the menu parameter setting code

code	Fault name	Description
1	Battery low voltage alarm	Report alarm 0.2s after the battery voltage is less than P20; the alarm is restored 0.2s after the battery voltage is greater than P20+ 0.8V
2	Battery average discharge current over current software protection	Report fault 2s after battery discharge current is too large ; the fault is recovered after 1min
3	The Battery Open Alarm	Report fault 2s after the battery voltage is less than P21-2V or immediately when the battery voltage is less than<2V ; the fault is restored 5s after the battery voltage is greater than P21-0.8V
4	Battery over-discharge alarm	BMS communication is normal : When SOC is less than P42 , after the time that P19 setting ,it reports the fault ,and when the battery voltage is less than P21,it immediately reports the fault.The fault recovers after SOC is greater than P45 for 4s. BMS communication is abnormal: When the battery voltage is less than P18 ,after the time that P19 setting ,it reports the fault,and when the battery voltage is less than P21,it immediately reports

code	Fault name	Description
		the fault .The fault recovers when the battery voltage is greater than P22 for 2s
6	Charge over voltage protection	Report fault 2s after the charging voltage is greater than 60V,or greater than 62V or received the hardware over voltage signal,when the charging voltage is less than 59.2V ,the fault recovers automatically after 1min
7	Battery boost circuit over voltage hardware protection	Report fault when received hardware over voltage signal ; the fault recovers automatically after 1min
8	Battery boost circuit over voltage software protection	Report fault when slow start is abnormal or inverter bus voltage is greater than 485V and maintain 0.5S; the fault is recovered automatically after 1min
9	PV over voltage	Report fault when PV input voltage is greater than 490V; the fault is recovered automatically after 1min
10	PV input over current software protection	Report fault 2s after photovoltaic input current is greater than 24A;after the current is less than 22A for 1min,the fault is recovered
12	Bypass output overload	Report fault 2s after the bypass output current is greater than specified value of technical parameters ;the fault is recovered after 1 min ;When this fault repeats five times, can not be recovered automatically
13	Inverter output overload	Report fault when load is 102% -125% for 5min; 125% -150% for 10S;> 150% for 5s ; recovers automatically in 1 min
17	Inverter output short circuit	The output voltage is low after soft start 500ms, the fault is reported; and recovers automatically in 1min
19	PV charging radiator over temperature protection	The PV charging radiator temperature is greater than 90 degrees for 2s ,fault is reported; and recovers after temperature is less than 80 degrees
20	Inverter radiator over temperature protection	The inverter radiator temperature is greater than 90 degrees for 2s ,the fault is reported;and it recovers after temperature is less than 80 degrees
21	Fan failure	After the fan hardware signal stops for 2s, the fault is reported; and recovers in 1min automatically
22	The EEPROM R / W fault	Read and write error occurs for 20 times, it reports fault; and recovers in 1min automatically
29	Battery boost circuit fault	Reporting fault after 2s the battery boost circuit is less than 250V; and recovers in 1min automatically
30	BatCapacityLow1	The alarm is reported when SOC is not greater than P41, and restored when SOC is greater than P41 alarm SOC + 5%

code	Fault name	Description
31	BatCapacityLow2	The alarm is reported when SOC is not greater than P44,and restored when SOC is greater than or equal to P45
32	Battery low capacity shutdown	The alarm is reported when SOC is not greater than P42 ,and restored when SOC is greater than or equal to P45
34	Parallel CAN communication fault	The fault is reported after CAN communication is abnormal for 5S, and restored after the communication recovers for 5S
35	Parallel ID setting error	Address conflict, or address =0,> 9 reported fault; restore after normal
37	Parallel current sharing fault	Load current>5A, and the difference with the average current>half of the load current for 1min, the fault reported and recovers automatically in 1 min
38	Parallel battery voltage difference	Battery voltage is different from the host and the slaves; alarm is restored after recovered
39	Inconsistent AC input source in parallel mode	Check whether the parallel AC inputs are from the same input interface
40	Hardware synchronization signal failure	Hardware synchronization signal failure with the host ; Recovery after normal operation
42	Inconsistent system firmware version in parallel mode	Check whether the software version of each inverter is consistent
43	Parallel connection fault	Check whether the parallel line is not connected well, such as loose or wrong connection
45	Parallel Phase setting failure	Parallel Phase setting not set according to the manual,recovered after correct setting
58	BMS communication error	Alarm is reported after communication is abnormal for 15s ;and it is restored after the communication recovered for 10s
60	Lithium-battery low-temperature alarm	Transferred over by the BMS
61	Lithium battery high temperature alarm	
62	Lithium battery overcurrent alarm	
63	Lithium-battery low-voltage alarm	
64	Lithium battery high-voltage alarm	

4.6 Battery type parameters

For Lead-acid Battery :

Battery type / Parameters	Sealed lead acid battery (SLD)	Colloidal lead acid battery (GEL)	Vented lead acid battery (FLD)	User-defined (User)
Overvoltage disconnection voltage	60V	60V	60V	36 ~60V (Adjustable)
Battery fully charged recovery point(setup item 23)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)
Equalizing charge voltage	58V	/	58V	36 ~60V (Adjustable)
Boost charge voltage	57.6V	56.8V	58.4V	36 ~60V (Adjustable)
Floating charge voltage	55.2V	55.2V	55.2V	36 ~60V (Adjustable)
Undervoltage alarm voltage(01 fault)	44V	44V	44V	36 ~60V (Adjustable)
Undervoltage alarm voltage recovery point(01 fault)	Undervoltage alarm voltage+0.8V			
Low voltage disconnection voltage(04 fault)	42V	42V	42V	36 ~60V (Adjustable)
Low voltage disconnection voltage recovery point (04 fault)(setup item 22)	52V (Adjustable)	52V (Adjustable))	52V (Adjustable)	52V (Adjustable)
Discharge limit voltage	40V	40V	40V	36 ~60V (Adjustable)
Over-discharge delay time	5s	5s	5s	1 ~30s (Adjustable)
Equalizing charge duration	120 minutes	/	120 minutes	0 ~600 minutes (Adjustable)
Equalizing charge interval	30 days	/	30 days	0 ~250 days (Adjustable)
Boost charge duration	120 minutes	120 minutes	120 minutes	10 ~600 minutes (Adjustable)

Lithium battery:

Parameters \ Battery type	(NCM13)	(NCM14)	(LFP16)	(LFP15)	(LFP14)
Overvoltage disconnection voltage	60V	60V	60V	60V	60V
Battery fully charged recovery point(setup item 23)	50.4V (Adjustable)	54.8V (Adjustable)	53.6V (Adjustable)	50.4V (Adjustable)	47.6V (Adjustable)
Boost charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)
Floating charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2 (Adjustable)
Undervoltage alarm voltage(01 fault)	43.6V (Adjustable)	46.8V (Adjustable)	49.6V (Adjustable)	46.4V (Adjustable)	43.2V (Adjustable)
Undervoltage alarm voltage recovery point(01 fault)	Undervoltage alarm voltage+0.8V				
Low voltage disconnection voltage(04 fault)	38.8V (Adjustable)	42V (Adjustable)	48.8V (Adjustable)	45.6V (Adjustable)	42V (Adjustable)
Low voltage disconnection voltage recovery point (04 fault)(setup item 22)	46V (Adjustable)	49.6V (Adjustable)	52.8V (Adjustable)	49.6V (Adjustable)	46V (Adjustable)
Discharge limit voltage	36.4V	39.2V	46.4V	43.6V	40.8V
Over-discharge delay time	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)
Boost charge duration	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)

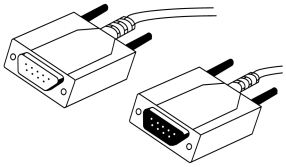
5. Parallel Function

5.1 Introduction

1. Up to nine units connected in parallel.

2. When using the parallel operation function, the following connecting lines (package accessories) shall be firmly and reliably connected:

DB15 Parallel communication line*1:



average flow detection line * 1:

5.2 Precaution for connecting the parallel connecting lines

Warning:

1. PV connection:

When used in parallel connection, different machines need to be connected to different PV arrays or PV sources.

2.Battery wiring:

Parallel connection in single or split phase: Ensure that all hybrid r inverters are connected to the same battery, with BAT+ connected to BAT+ , BAT- connected to BAT-, and that the connection is correct with the same wiring length and line diameter before power on and start-up, so as to avoid the abnormal operation of parallel system output caused by wrong connection.

3. AC OUT wiring:

Parallel connection in single phase: Ensure L-to-L, N-to-N and PE-to-PE connection for all hybrid inverters, and that the connection is correct with the same wiring length and line diameter before power on and start-up, so as to avoid the abnormal operation of parallel system output caused by wrong connection. For specific wiring, please refer to 5.3 Wiring Diagram.

4.AC IN wiring:

Parallel connection in single phase: Ensure L-to-L, N-to-N and PE-to-PE connection for hybrid inverters, and that the connection is correct with the same wiring length and line diameter before power on and start-up, 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 consistency and uniqueness of AC source input shall be ensured. For specific wiring, please refer to 5.4 Wiring Diagram.

5. Wiring of parallel communication line:

Parallel connection in single or split phase: Our company's parallel communication line is a DB15 standard computer cable with shielding function. Ensure the "one-in-one-out" rule when connecting each inverter, that is, connect the male connector (out) of this inverter with the female connector (in) of the inverter to be paralleled. Do not connect the male connector of the inverter to its female connector. In addition, make sure to tighten the parallel communication line of each inverter with self-contained end screws of DB15 to avoid the abnormal operation or damage of the system output caused by the falling off or poor contact of the parallel communication line.

6. Wiring of current sharing detection line:

Parallel connection in single phase: Our company's current sharing detection line is a twisted connection line. Ensure the "one-in-one-out" rule when connecting each inverter, that is, connect the current sharing line of the inverter with the current sharing green port of the inverter to be paralleled (choose one port from the two, and there is no mandatory sequence requirement). The current sharing ports of the inverter cannot be connected to each other. In addition, make sure that the red and black current sharing connection lines of each inverter are not manually exchanged, and make sure to tighten the lines with self-contained screws to avoid the abnormal operation or damage of the system output caused by abnormal parallel current sharing detection. For specific wiring, please refer to 5.3 Wiring Diagram.Parallel connection in split phase: The current sharing detection lines of all inverters connected to the same phase need to be connected together. But the current sharing detection lines of different phases cannot be joined together. Other connection precautions are the same as parallel connection in single phase. For specific wiring, please refer to 5.4 Wiring Diagram.

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

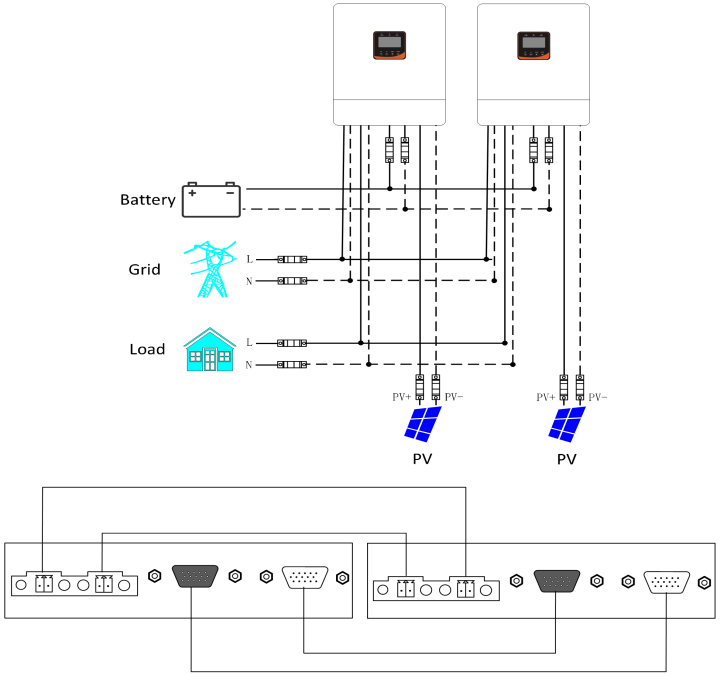
8. After the system is wired, powered on and in normal operation, if a new inverter needs to be connected, make sure to disconnect the battery input, PV input, AC input

and AC output, and that all all-in-one solar charger inverters are powered off before reconnecting into the system.

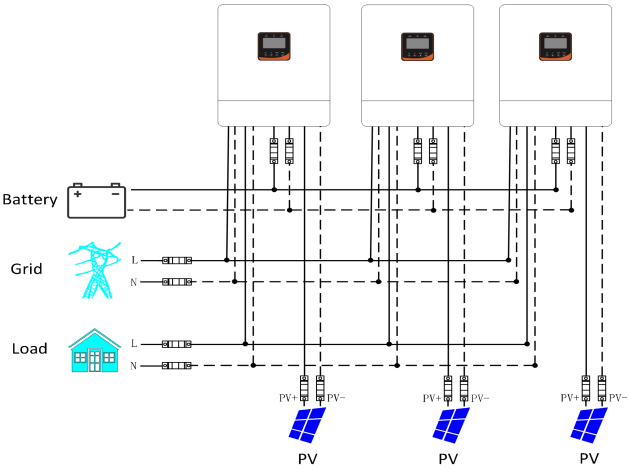
5.3 Schematic diagram of parallel connection in single phase

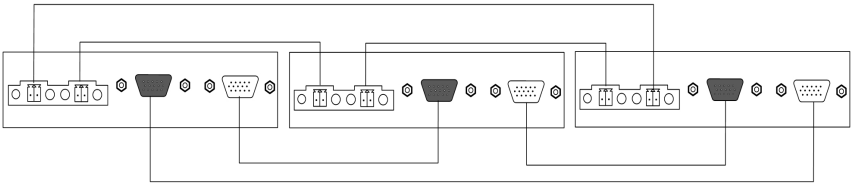
1. The parallel communication line and current sharing detection line of the hybrid inverter need to be locked with screws after connecting.
2. In case of parallel operation with multiple inverters, the schematic diagram of parallel connection is as follows:

a) Two hybrid inverters of the system connected in parallel:

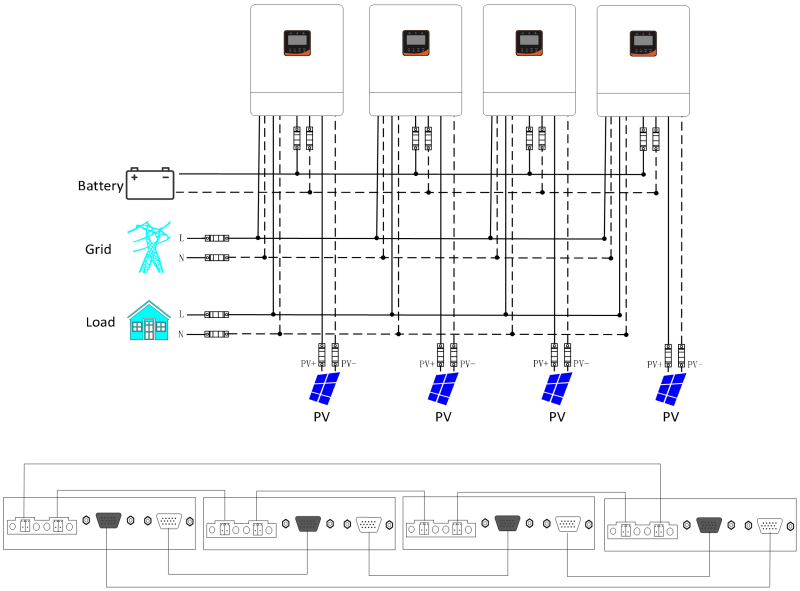


b) Three hybrid inverters of the system connected in parallel:

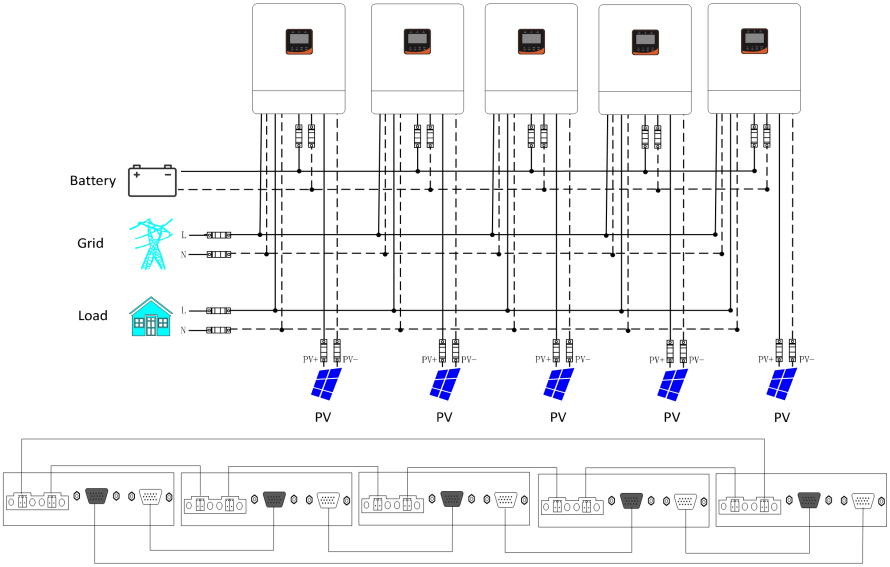




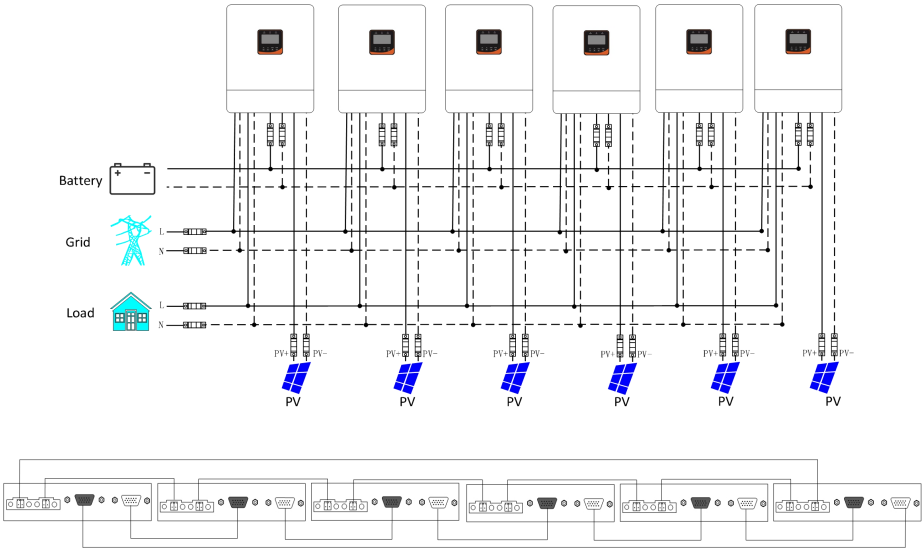
c) Four hybrid inverters of the system connected in parallel:



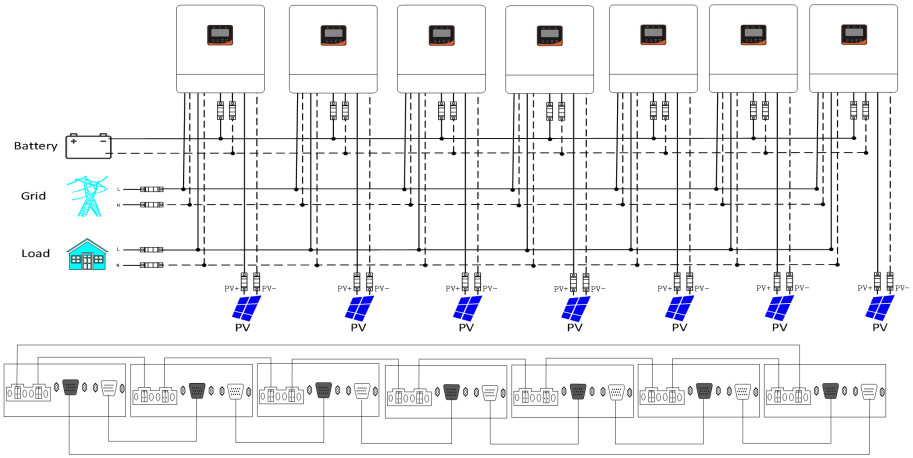
d) Five hybrid inverters of the system connected in parallel:



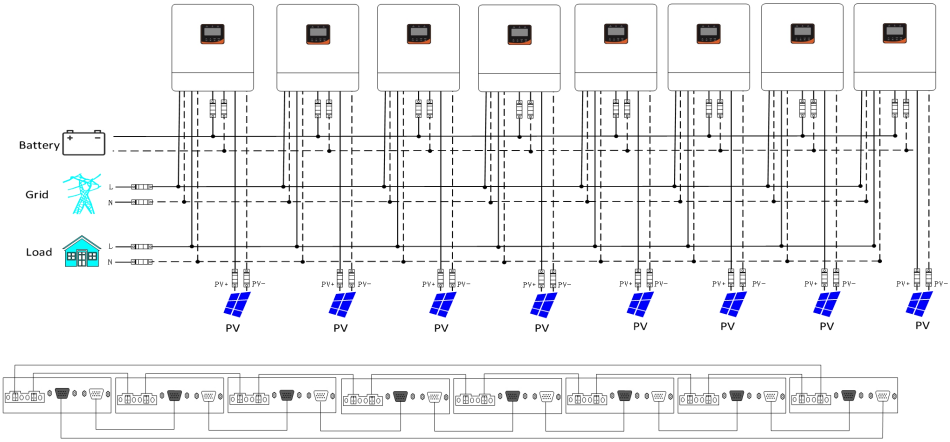
e) Six hybrid inverters of the system connected in parallel:



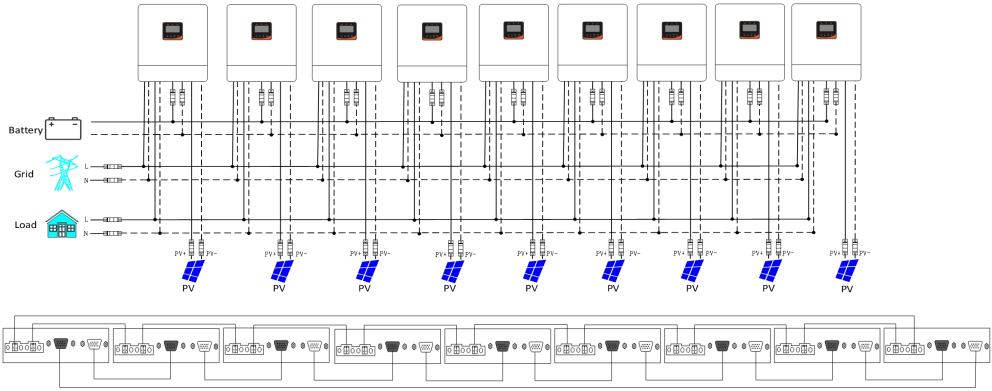
f) Seven hybrid inverters of the system connected in parallel:



g) Eight hybrid inverters of the system connected in parallel:



h) Nine hybrid inverters of the system connected in parallel:



5.4 Schematic diagram of parallel connection in split phase

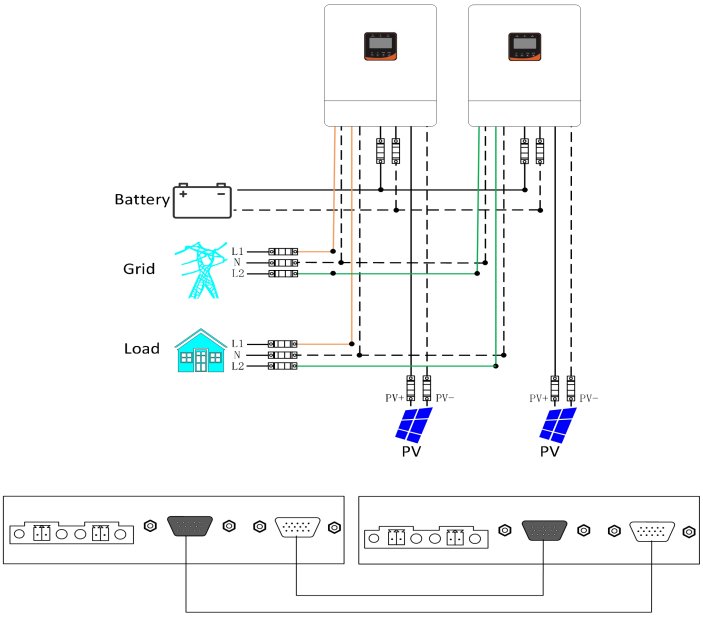
1. The reverse control integrated communication line and the flow detection line should be locked by the screw.

2.In case of parallel operation with multiple inverters, the schematic diagram of parallel connection is as follows:

Parallel Operation in two phase

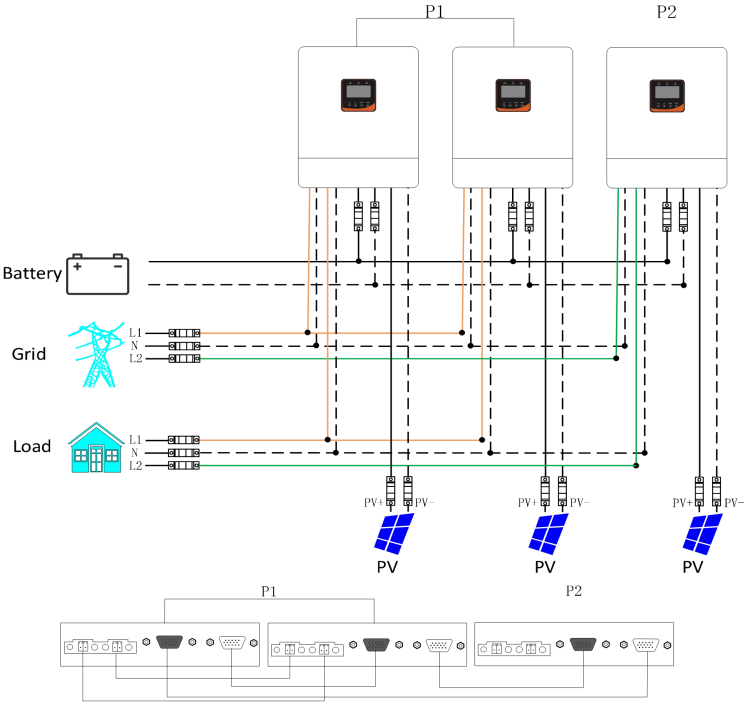
a)Two hybrid inverters of the system connected in two phase:

1+1 system:



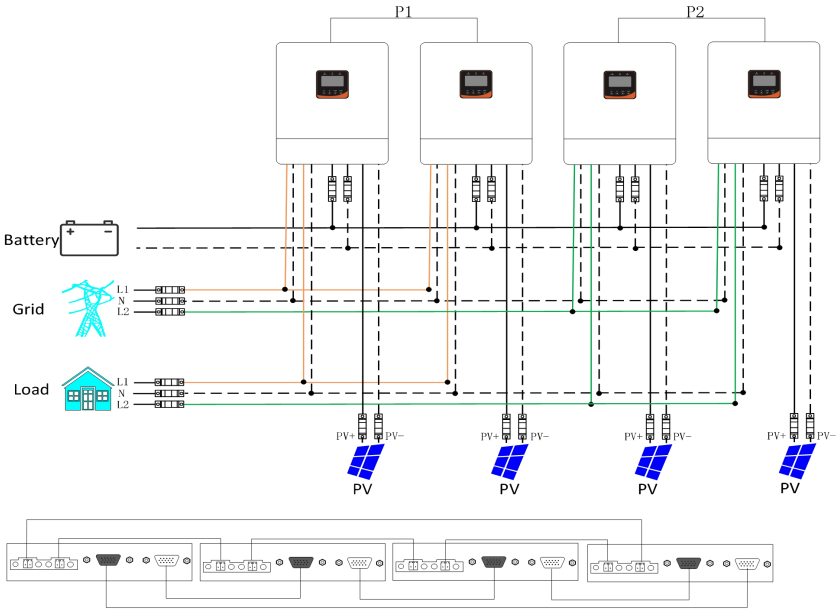
b) Three hybrid inverters of the system connected in two phase:

2+1 system:

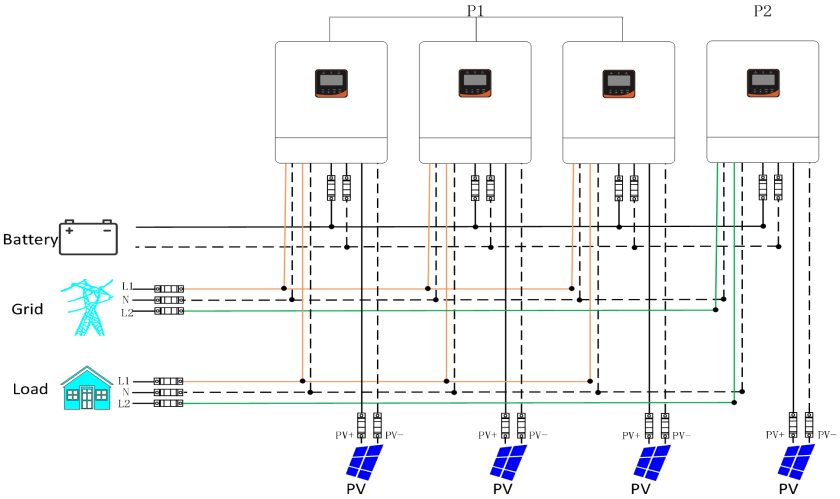


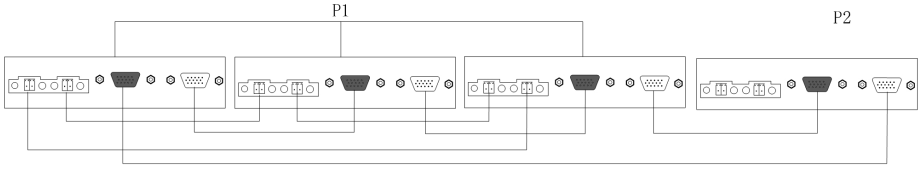
c) Four hybrid inverters of the system connected in two phase:

2+2 system:



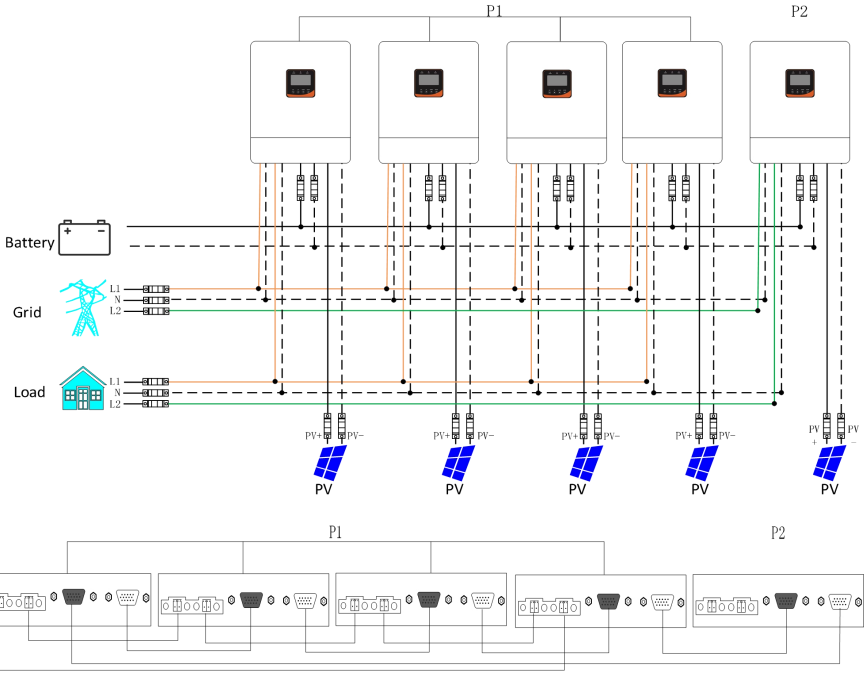
3 + 1 system:



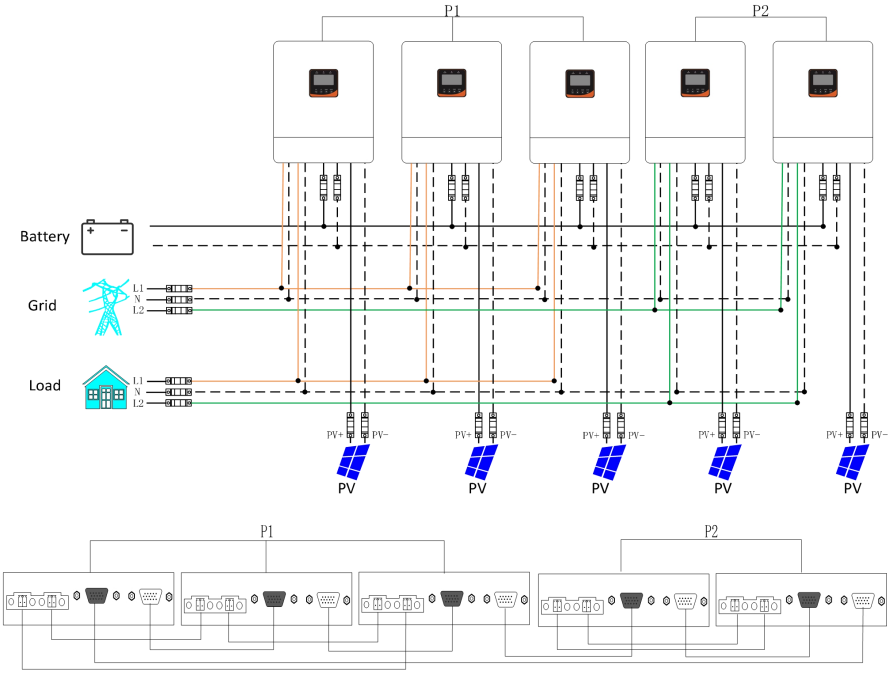


d) Five hybrid inverters of the system connected in two phase:

4+1 system:

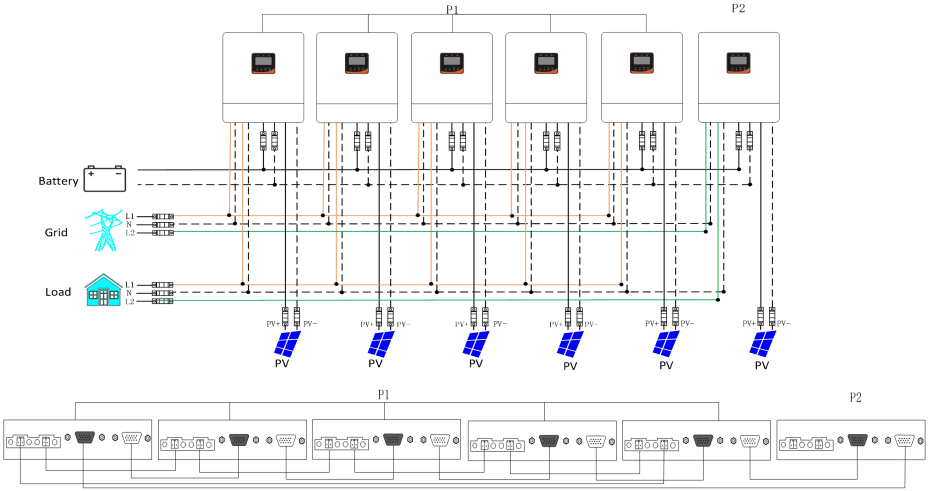


3+2 system:

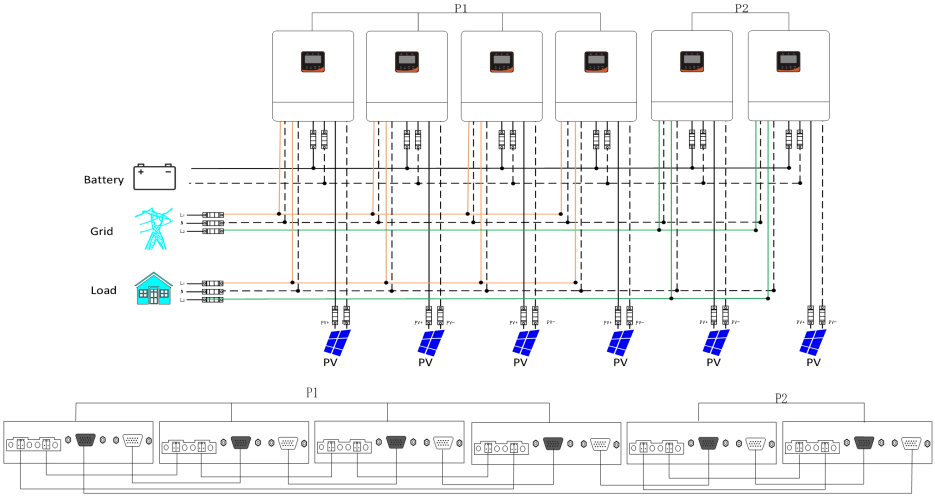


e) Six hybrid inverters of the system connected in two phase:

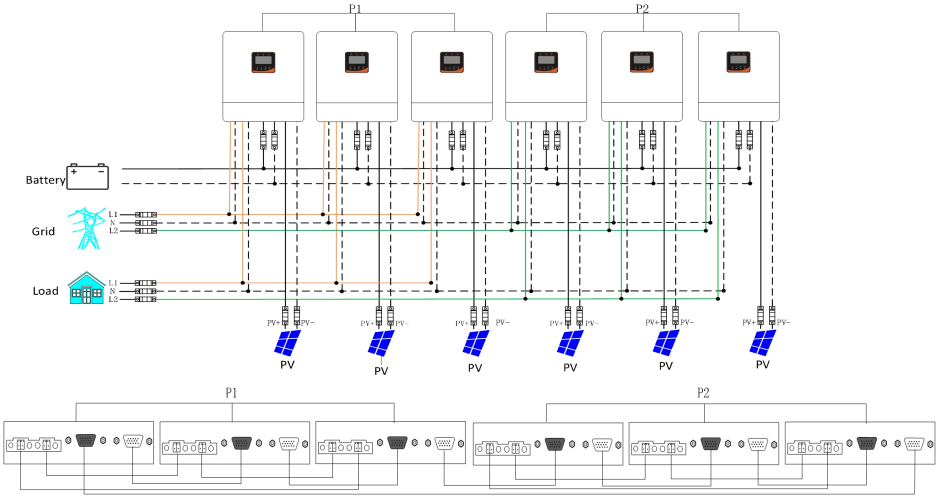
5 + 1 system:



4 + 2 system:

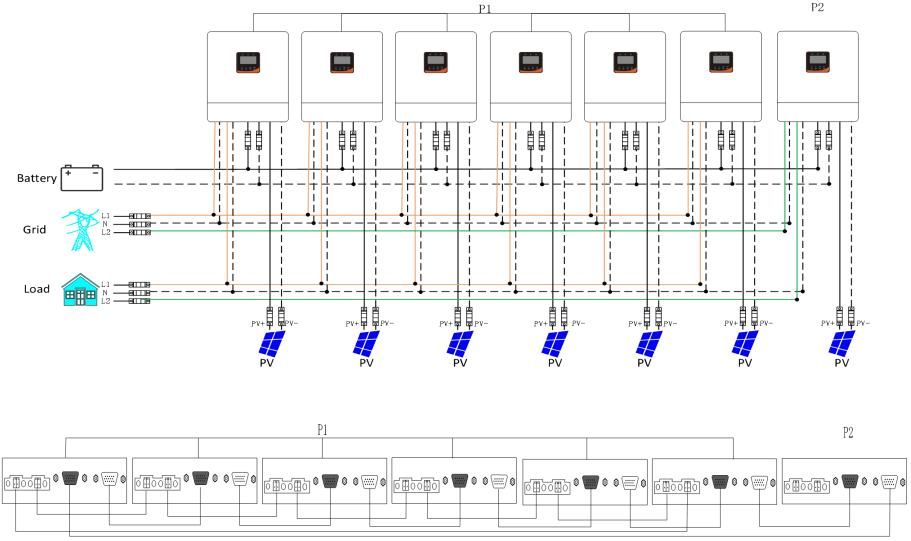


3 + 3 system:

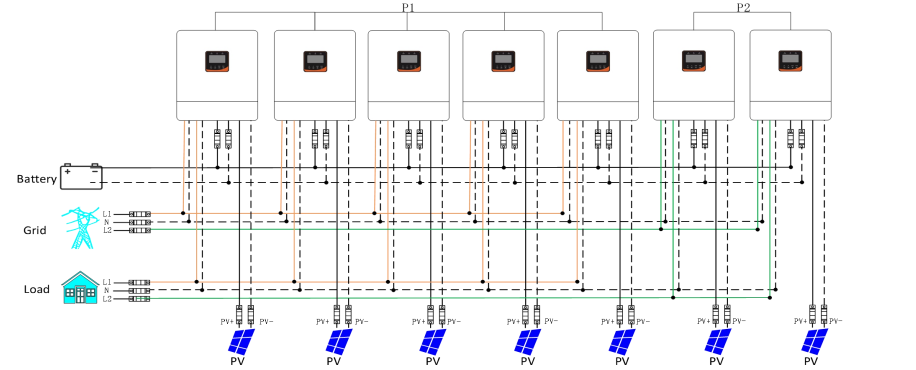


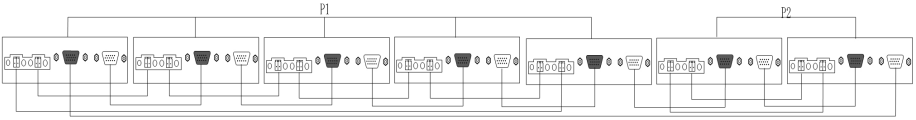
f) Seven hybrid inverters of the system connected in two phase:

6 + 1 system:

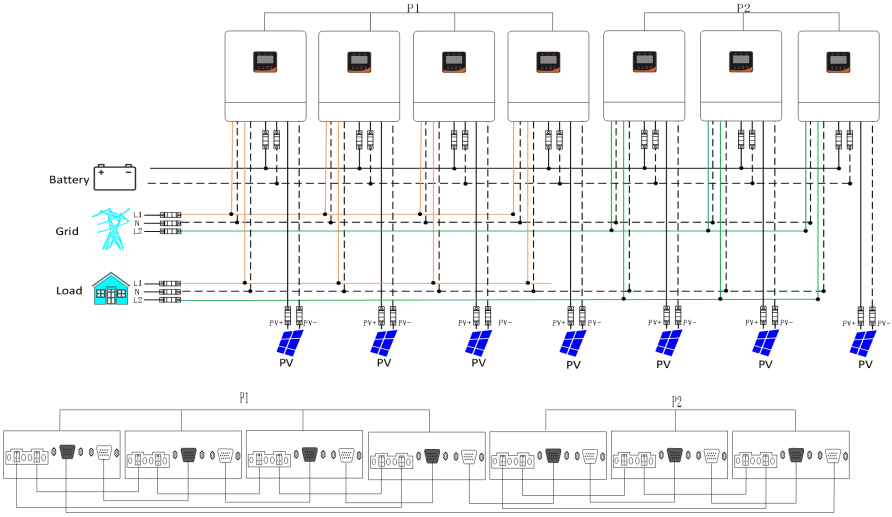


5 + 2 system:



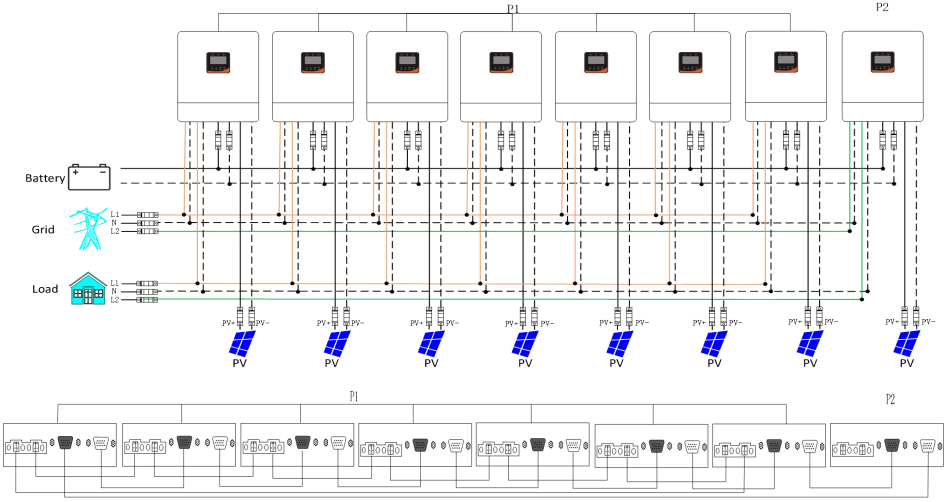


4 + 3 system:

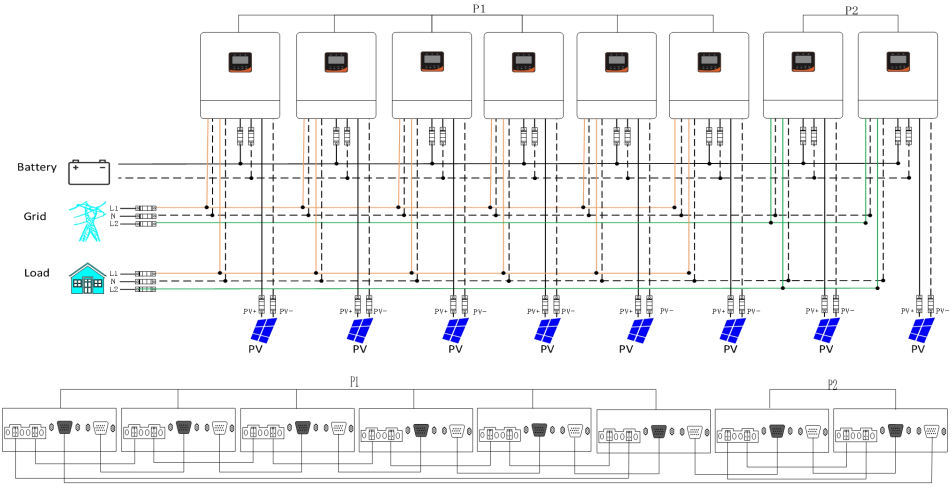


g) eight hybrid inverters of the system connected in two phase:

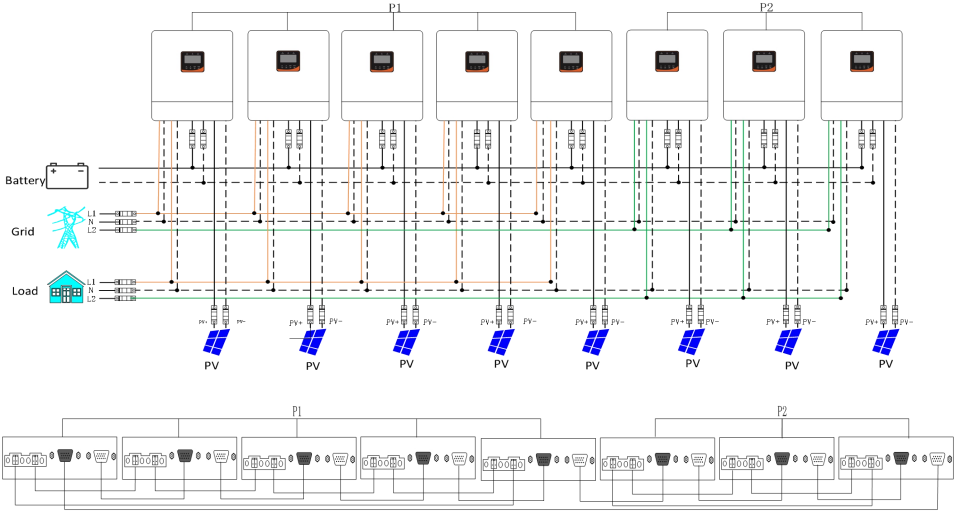
7 + 1 system:



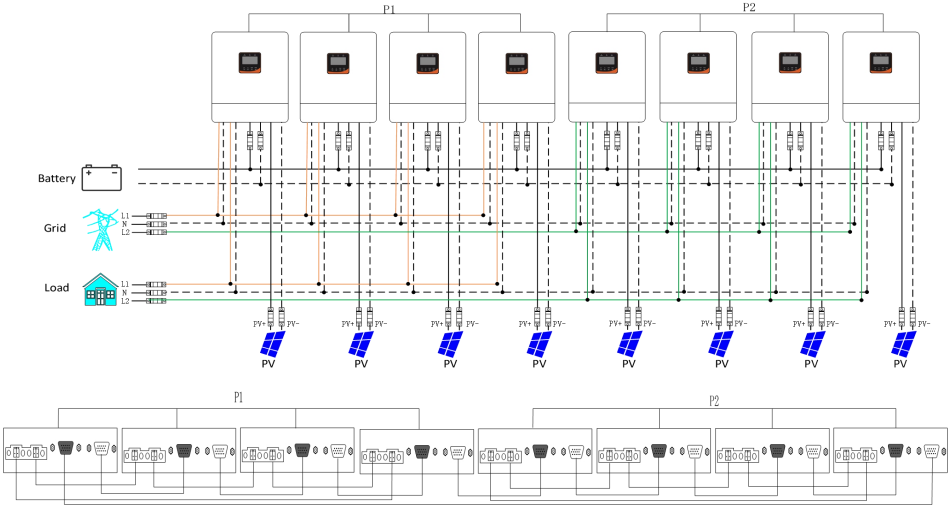
6 + 2 System:



5 + 3 System:

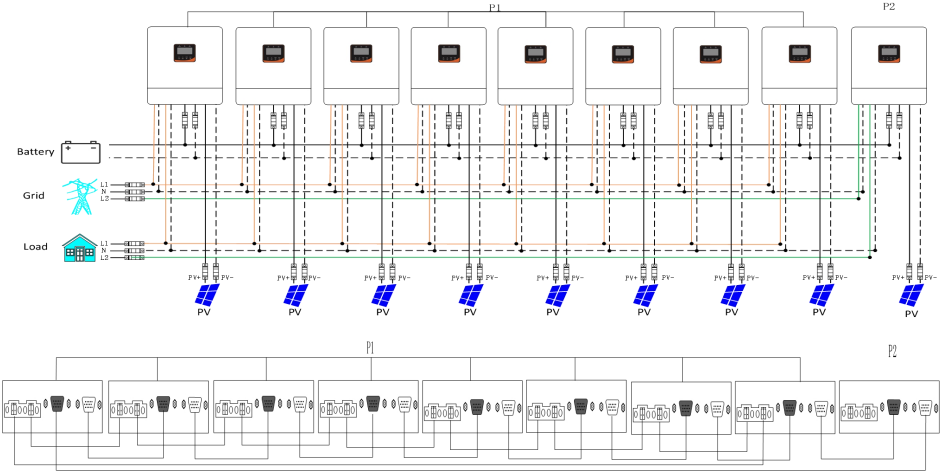


4 + 4 System:

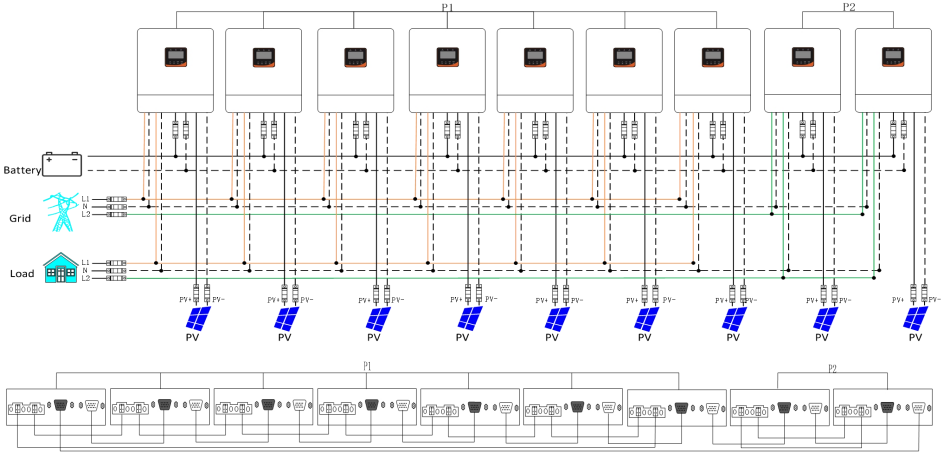


h) eight hybrid inverters of the system connected in two phase:

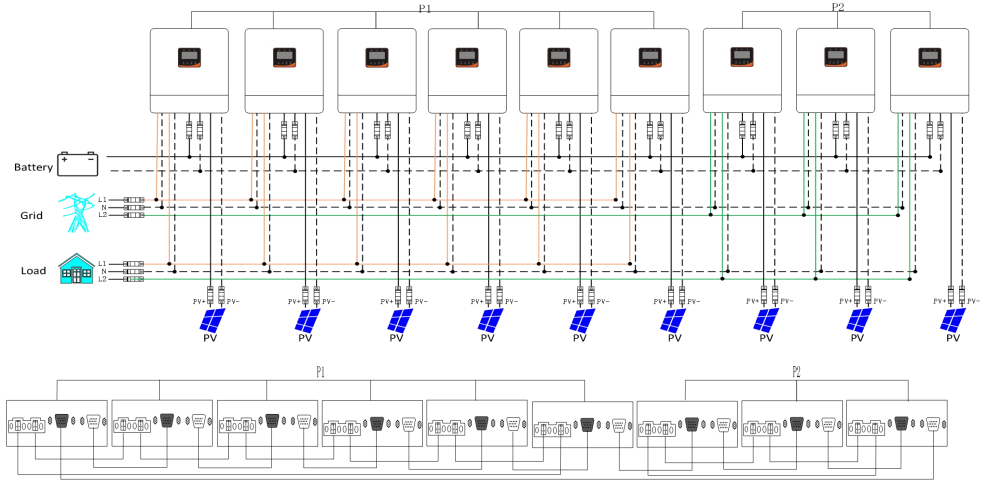
8 + 1 System:



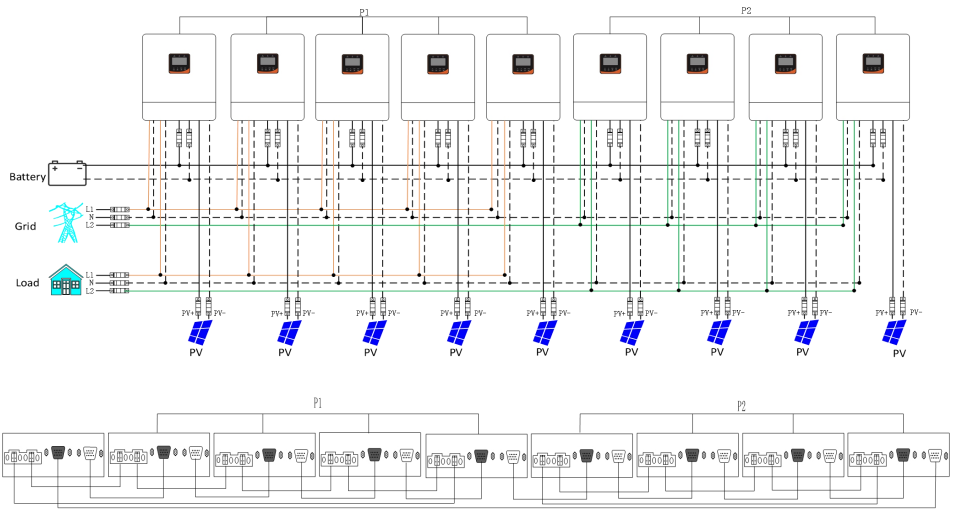
7 + 2 System:



6 + 3 System:



5 + 4 System:



5.5 Schematic diagram of parallel connection in three phase

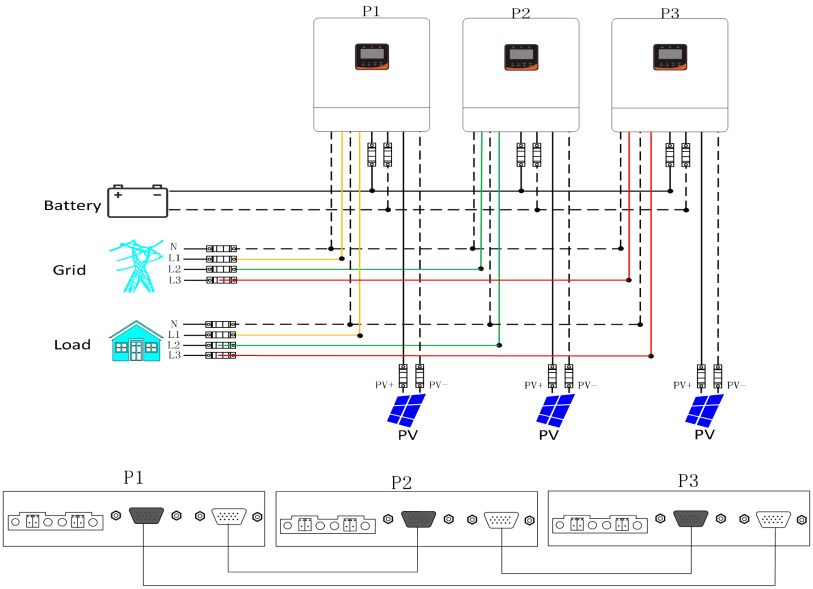
1. The parallel communication line and current sharing detection line of the all-in-one solar charger inverter need to be locked with screws after connecting.

2. In case of parallel operation with multiple inverters, the schematic diagram of parallel connection is as follows:

Parallel Operation in three phase :

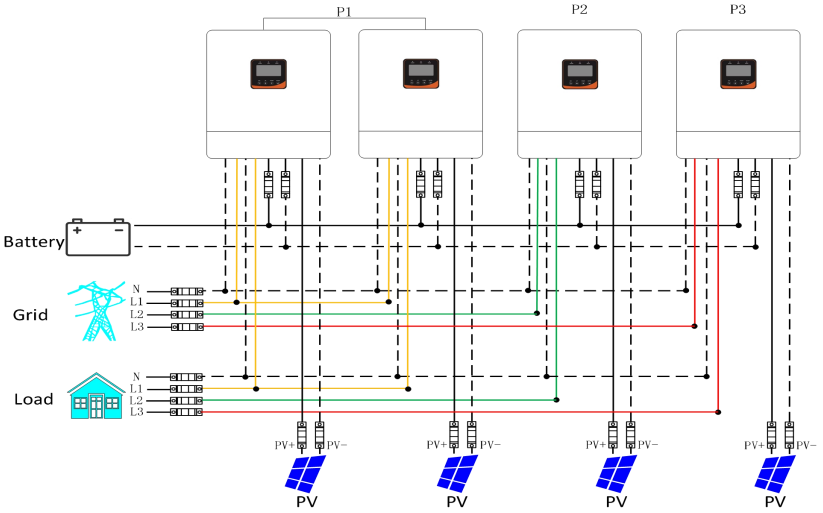
a) Three hybrid inverters of the system connected in three phase:

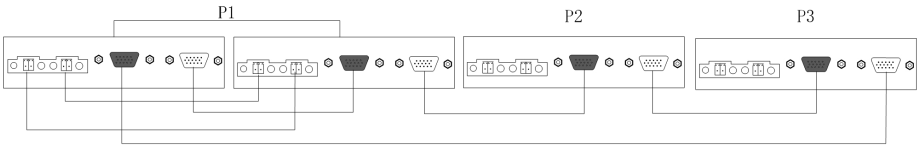
1 + 1 + 1 system:



b) Four hybrid inverters of the system connected in three phase:

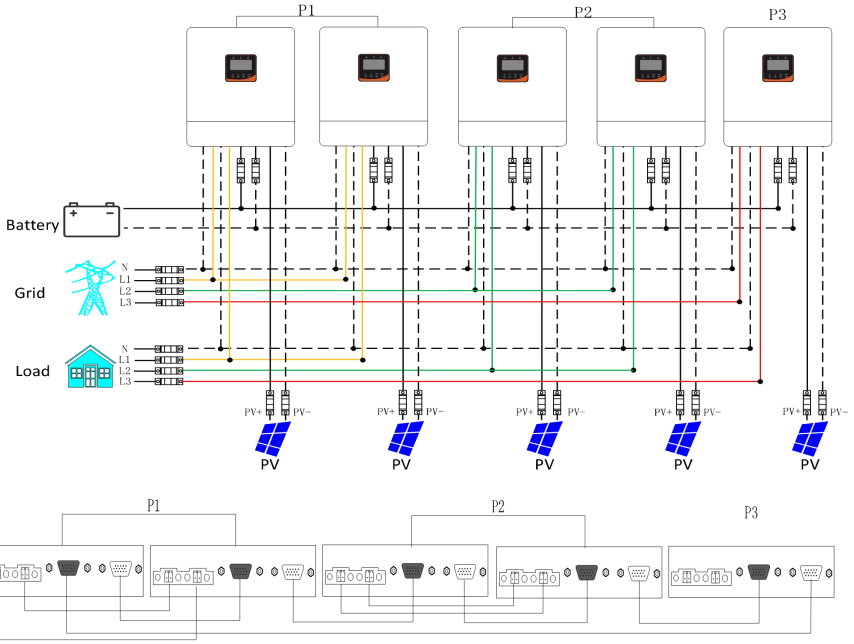
2 + 1 + 1 system:



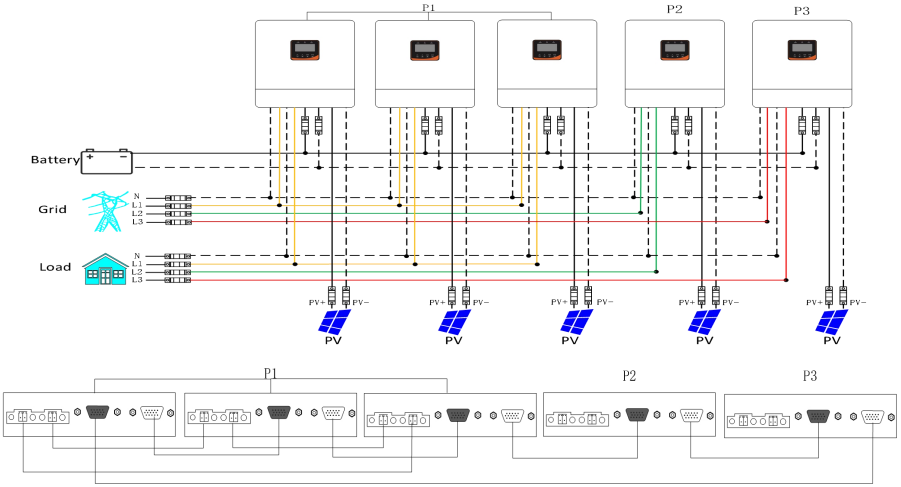


c) Five hybrid inverters of the system connected in three phase:

2 + 2 + 1 system:

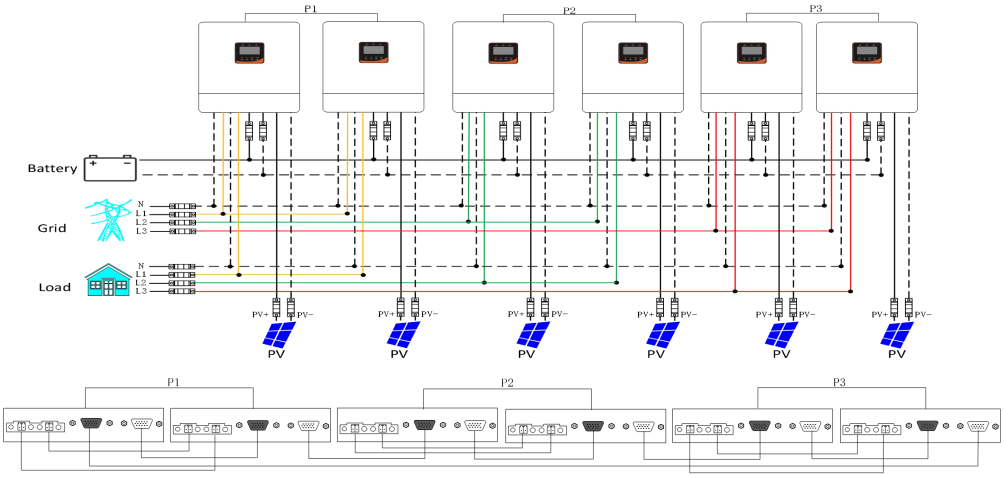


3 + 1 + 1 system:

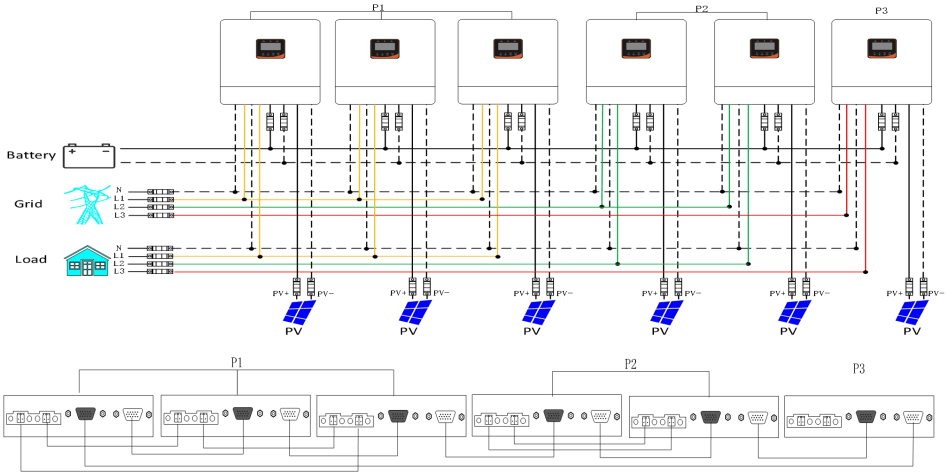


d) Six hybrid inverters of the system connected in three phase:

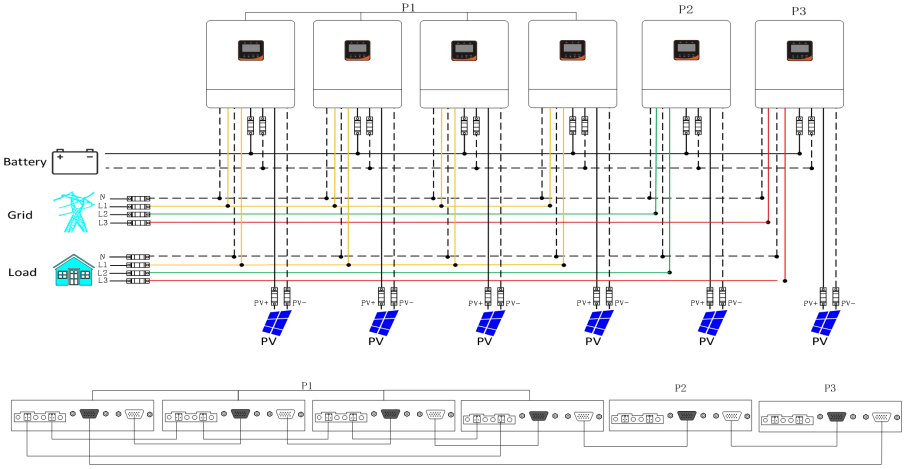
2 + 2 + 2 system:



3 + 2 + 1 system:



4 + 1 + 1 system:

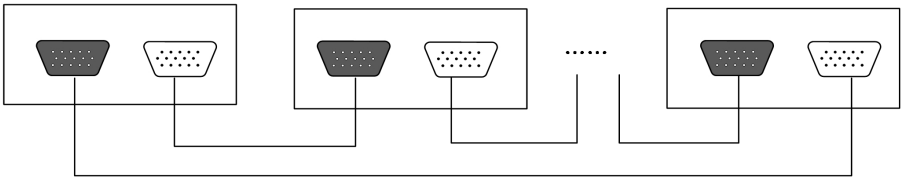


e) seven hybrid inverters of the system connected in three phase

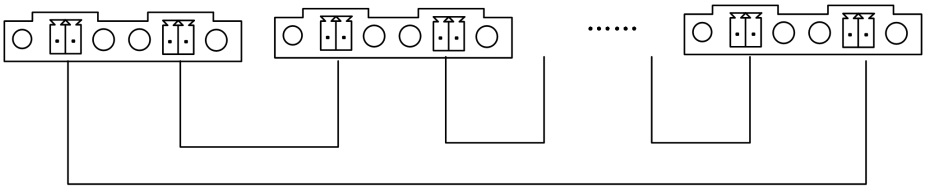
f) Eight hybrid inverters of the system connected in three phase

g) Nine hybrid inverters of the system connected in three phase

All parallel wires shall press as following.



The parallel current sharing line of each phase is wired according to the figure below.



Note:

1) Before starting up and running, please check whether the connection was correct to avoid any abnormalities in the system.
2) All wiring must be fixed and reliable to avoid wire drop during use.
3) When the AC output is wired to the load, it shall be properly wired according to the requirements of the electrical load equipment to avoid damage to the load equipment.
4) The AC output voltage frequency needs to be set consistently.
5) Machine factory default for single machine mode, if you use parallel, split-phase or three-phase function, you need to set the【37】item parameters through the screen. The setting method is: power on one machine at a time, the rest of the machine off, and then set the【37】item parameters according to the site system operation mode. After this machine is set successfully, turn off the machine switch and wait for the machine to be powered down,then set the rest of the machines in turn until all machines are set, and then all machines are powered up again at the same time and enter the working state.

The【37】setting item:

When in single phase parallel connection: setting【37】should be set as 【PAL】
When in three phase parallel connection, setting【37】 should be set as follows:

All machines in phase 1 must be set as "3P1", all machines in phase 2 must be set as "3P2" all machines in phase 3 must be set as "3P3", at present, the voltage phase difference between P1-P2, P1-P3 and P2-P3 is 120 degrees.

When the output voltage set in the setting【3】is 120 Vac (U model), the line voltage between L1 in phase 1 and L2 in phase 2 is 120*1.732 = 208 Vac, similarly the line voltage between L1-L3, L2-L3 is 208 Vac; the single phase voltage between L1-N, L2-N, L3-N is 120 Vac.

When the output voltage set in the setting【3】is 230Vac (S model), the line voltage between the live wire L1 in phase 1 and the live wire L2 in phase 2 is 230*1.732 =398Vac, and similarly the line voltage between L1-L3, L2-L3 is 398Vac; the single phase voltage between L1-N, L2-N, L3-N is 230Vac.

In split phase parallel connection(U) ,All connected P1-phase inverters are set to "2P0":

If all connected P2-phase inverters are set to "2P1", AC output line voltage difference is 120 degrees (L1-L2), line voltage is 120*1.732= 208Vac; Phase voltage is 120Vac (L1-N; L2-N).

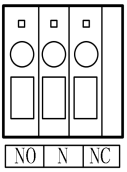
If all connected P2-phase inverters are set to "2P2", AC output line voltage difference is 180 degrees (L1-L2), line voltage is 120*2= 240Vac; Phase voltage is 120Vac (L1-N; L2-N).

6) After the system runs, the output voltage is measured correctly, and then the load setting is connected.

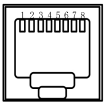
6. Other functions

6.1 Dry contact

Working principle: This dry contact can control the ON/OFF of the diesel generator to charge the battery. ① Normally, the terminals are that the NC-N point is closed and the NO-N point is open; ② When the battery voltage reaches the low voltage disconnection point, the relay coil is energized, and the terminals turn to that the NO-N point is closed while NC-N point is open. At this point, NO-N point can drive resistive loads: 125VAC/1A, 230VAC/1A, 30VDC/1A.



6.2 RS485 communication function



This port is a RS485 communication port. There are two RS485 ports, the RS485-1 and the RS485-2 RS485 communication port, with 2 functions: 1.RS485-2 allows direct communication with the optional host computer developed by our company through this port, and enables monitoring of the equipment running status and setting of some parameters on the computer.It also allows direct connection with the optional RS485 to WiFi/GPRS communication module developed by our company through this port. After the module is selected, you can connect the hybrid inverter through the mobile phone APP, on which you can view the operating parameters and status of the device.

2.RS485-1 can allows direct communication with BMS.

As shown in the figure:

RS485-1: Pin 1 is 5V power supply, Pin 2 is GND, Pin 7 is RS485-A1, and Pin 8 is RS485-A1;

RS485-2: Pin 1 is 5V power supply, Pin 2 is GND, Pin 7 is RS485-A2, and Pin 8 is RS485-B2;

6.3 Parallel communication function (parallel operation only)

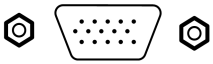
a) This port is used for parallel communication, through which the parallel modules can communicate with each other.

b) Each inverter has two DB15 ports, one for the male connector and the other for the female connector.

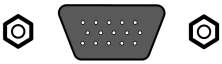
c) When connecting, make sure to connect the male connector of the inverter with the female connector of the inverter to be paralleled, or connect the female connector of the inverter to the male connector of the inverter to be paralleled.

d) Do not connect the male connector of the inverter to its female connector.

Male connector



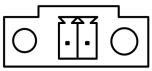
Female connector



6.4 Current sharing detection function (parallel operation only)

a) This port is used for current sharing detection, through which the current sharing of the parallel modules can be detected (parallel operation only).

b) Each inverter has two current sharing detection ports, which are connected in parallel. When it is connected to other models to be paralleled, either port can be connected for convenience. There is no special mandatory wiring requirements.



7. Troubleshooting

In order to maintain the optimal long-term work performance, it is recommended to check the following items twice a year.

1. Make sure that the airflow around the unit is not blocked and remove any dirt or debris from the heat sink.

2. Check that all exposed wires are damaged by exposure to sunlight, friction with other objects around them, dryness, bite by insects or rodents, etc., and the wires shall be repaired or replaced if necessary.

3. Verify for the consistency of indication and display with the operation of the device. Please pay attention to the display of any faults or errors, and take corrective actions if necessary.

4.Check all wiring terminals for corrosion, insulation damage, signs of high temperature or burning/discoloration, and tighten the screws.

5. Check for dirt, nesting insects and corrosion, and clean up as required.

6. If the arrester has failed, replace in time to prevent lightning damage to the unit or even other equipment of the user.

Warning: Danger of electric shock! When doing the above operations, make sure that all power supplies of the all-in-one machine have been disconnected, and all capacitors have been discharged, and then check or operate accordingly!

The company does not assume any liability for damage caused by:

1. Improper use or use in improper site.
2. Open circuit voltage of the PV module exceeds the maximum allowable voltage rated.
3.Temperature in the operating environment exceeds the limited operating temperature range.
4.Disassemble and repair the hybrid inverter without permission.
5.Force majeure: Damage that occurs in transportation or handling of the hybrid inverter.

8. Technical parameters

MODEL	GST48-3500 VII	GST48-5500 VII	GST48-10K VII
Rated output power (W)	3500	5500	10000
Rated output power (VA)	3500	5500	10000
Maximum Peak Power (W)	6000	10000	15000
Rated AC Output	230 Vac (200 / 208 / 220 / 240 Vac), 50 / 60Hz		
Output Voltage Waveform	Pure Sine Wave		
Inverter and Bypass Switching Time	10ms (typical)		
Parallel Capacity	9		
Maximum Battery Inverter Efficiency	93%		
Overload Protection	102%-110% 5 minutes; 110%-125% 10 seconds; >125% 2 seconds.		
BATTERY			
Battery Type	Lithium / Lead-acid / User Defined		
Rated Battery Voltage	48Vdc		
Battery Voltage Range	40-60Vdc		
Max.MPPT Charging Current	60A	100A	200A
Max.Mains Charging Current	60A	60A	120A
Max.Hybrid Charging Current	80A	100A	200A
Charging current error	±3Adc		
Charging Short Circuit protection	Blown Fuse		
PV CHARGING			
MPPT Quantity	1		2
Max. PV array power	4000W	5500W	5500W+5500W
Max. PV input current	13A	22A	22A+22A
Max. Open Circuit Voltage	500Vdc		500Vdc+500Vdc
MPPT Voltage Range	120-450Vdc		
MPPT Tracking Efficiency	99.9%		
MAINS INPUT			
Input Voltage Range	90-280Vac/170-280Vac		

Frequency Range	50/60Hz±0.3Hz		
Output Short Circuit Protection	Circuit breaker		
Bypass Overload Current	30A	40A	63A
SPECIFICATIONS			
Dimensions (W*D*H-mm)	350*130*455		445*130*630
Weight (kg)	11	12	27
Classification of waterproof	IP20		
Operating Temperature Range	-10°C~55°C		
Storage Temperature Range	-25°C~60°C		
Noise	<60dB		
Heat Dissipation	Forced air cooling (variable speed of fan)		
COMMUNICATION			
Embedded interface	RS485/CAN/USB/Dry contact		
External module	WIFI/GPRS		
CERTIFICATION			
Safety	CE(IEC62109-1)		
EMC	EN61000		