

# **Solar off grid hybrid inverter**

## **User Manual**



### **Product models:**

CEP4850-EU-80-H

# Important Safety Instruction

## **Please maintain the manual for reference in the future**

The manual comprises all safety, installation and operation instruction for CE48-H Solar Energy Storage and Solar off grid hybrid inverter.

Before installation and use, please carefully read all instructions and notices in the manual.

- There is unsafe voltage inside the solar off grid hybrid inverter. In order to avoid personal injury, the user shall not dismantle the machine by himself. To repair the machine, it is required to contact the company's professional maintenance personnel.
- Non-safety voltage exists inside the off-grid Hybrid Inverter. To avoid personal injury, users shall not disassemble the off-grid Hybrid Inverter themselves. Contact our professional maintenance personnel if there is a need for repair.
- Do not place the off-grid Hybrid Inverter within the reach of children.
- Do not install the off-grid 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.
- The housing of the off-grid Hybrid Inverter is hot when it is working. Do not touch it.
- Do not open the terminal protective cover when the off-grid Hybrid Inverter is working.
- It is recommended to attach proper fuse or circuit breaker to the outside of the off-grid Hybrid Inverter.
- Always disconnect the fuse or circuit breaker near the terminals of PV array, mains and battery before installing and adjusting the wiring of the off-grid Hybrid Inverter.
- After installation, check that all wire connections are tight to avoid heat accumulation due to poor connection, which is dangerous.
- The solar off grid hybrid inverter is the off-grid type. It is required to confirm that the all-in-one machine is the unique power supply input device for the load device. It is forbidden to use the machine in parallel with other input AC power to avoid damage.

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# 1. General information

## 1.1 Product overview and characteristics

CEP series is a new type of mixed solar energy storage inverting & control all-in-one machine integrating solar energy storage & municipal power charge storage and AC sine wave output. It adopts DSP control and advanced control algorithm to achieve characteristics of high response speed, high reliability and high industrial standard. There are four charge modes namely only solar power, mains power priority, solar power priority, mains power & solar power; and two optional output modes, namely inverting and mains power to meet different application needs.

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 an advanced 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.

### **Characteristics:**

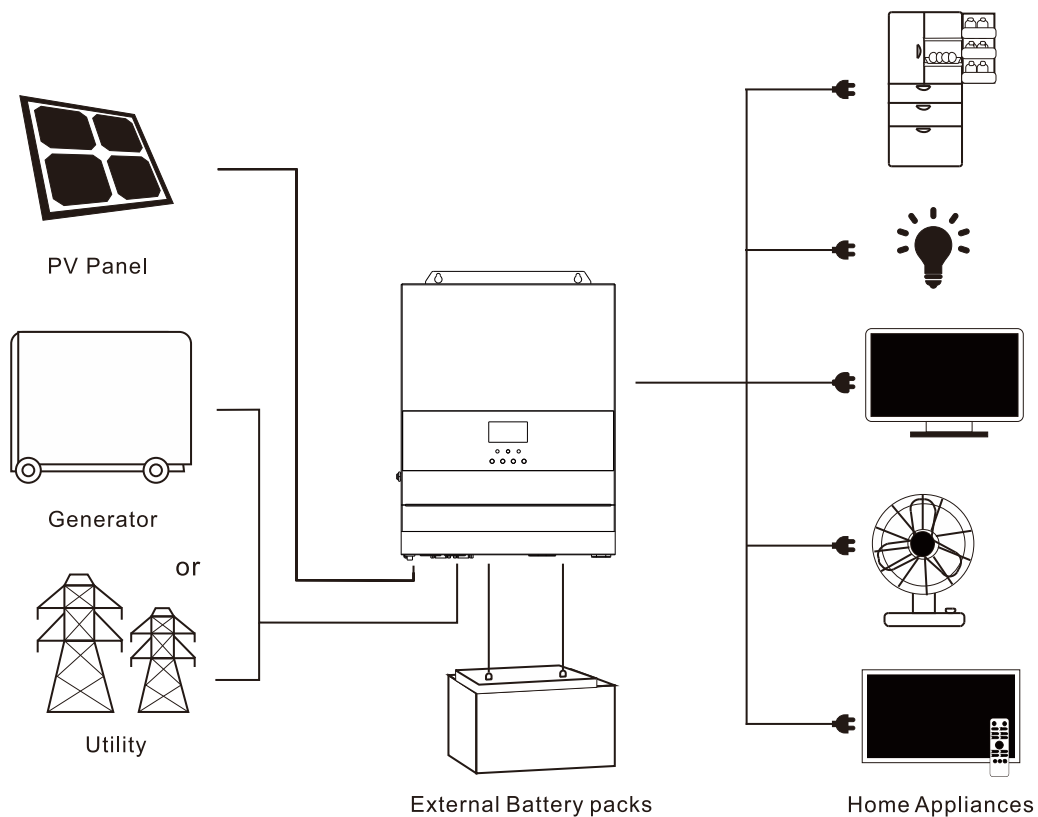
1. Full digital voltage and current double closed loop control, advanced SPWM technology, output of pure sine wave.
2. Two output modes: mains bypass and inverter output; uninterrupted power supply.
3. Available in 4 charging modes: Only Solar, Mains Priority, Solar Priority and Mains & Solar hybrid charging.
4. Advanced MPPT technology with an efficiency of 99.9%.
5. Designed with a LCD screen and 3 LED indicators for dynamic display of system data and operating status.
6. ON/OFF rocker switch for AC output control.
7. Power saving mode available to reduce no-load loss.
8. Intelligent variable speed fan efficiently dissipate heat and extend system life.
9. Lithium battery activation by PV solar or mains, allowing access of lead-acid battery and lithium battery.
10. 360 ° all-around protection with a number of protection functions.

11. Complete protections, including short circuit protection, over voltage and under voltage protection, overload protection, reverse protection, etc.

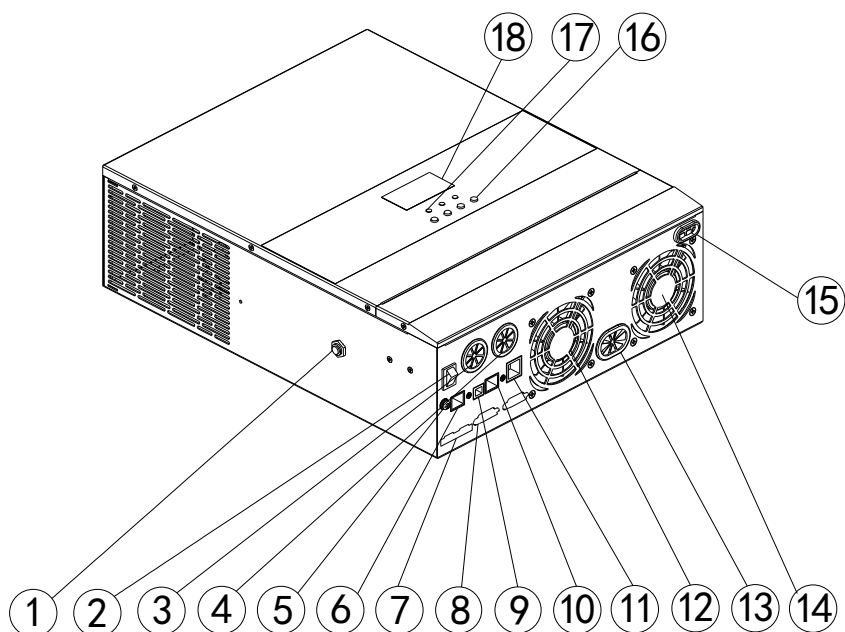
## 1.2 Basic system introduction

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

1. PV module: Convert light energy into DC power, and charge the battery through the off-grid 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. Off-grid Hybrid Inverter: The energy conversion unit of the whole system.
- Specific system wiring method depends on the actual application scenario.

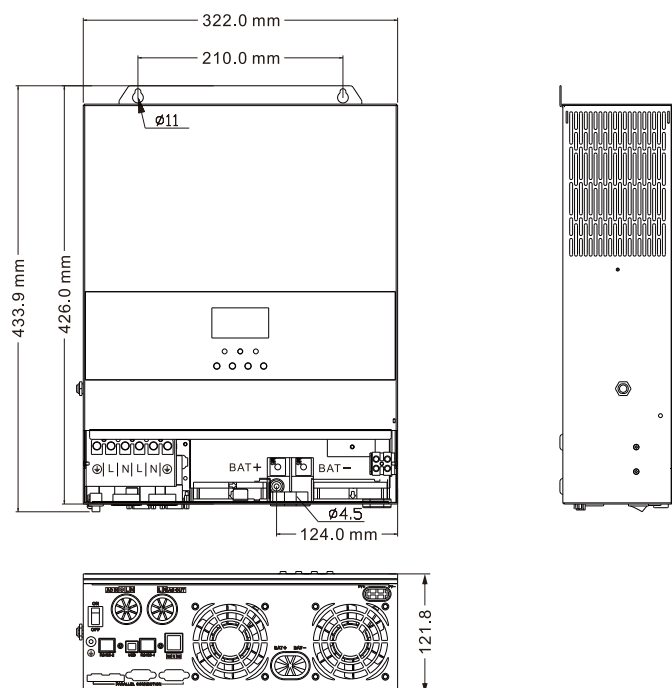


### 1.3 Appearance



①	Overload protector	⑩	RS485-1 communication port
②	ON/OFF rocker switch	⑪	Dry contact port
③	AC input port	⑫	Cooling fan
④	AC output port	⑬	Battery port
⑤	Grounding screw hold	⑭	Cooling fan
⑥	RS485-2 communication port	⑮	PV port
⑦	Current sharing port (parallel module only)	⑯	Function key
⑧	Parallel communication port (parallel module only)	⑰	Indicator light
⑨	USB communication port	⑱	LCD screen

## 1.4 Dimension drawing



## 2. Installation Instruction

### 2.1 Installation precautions

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

- Be very careful when installing the battery. Wear safety goggles when installing a lead-acid liquid battery. Once coming into contact with the battery acid, rinse with clean water timely.
- Do not place metal objects near the battery to prevent short-circuit of the battery.
- Acid gas may be generated when the battery is charged. So, please ensure good ventilation.
- When installing the cabinet, be sure to leave enough space around the off-grid Hybrid Inverter for heat dissipation. Do not install the off-grid Hybrid Inverter and lead-acid battery in the same cabinet to avoid corrosion by acid gas generated during battery operation.
- Only the battery that meets the requirements of the all-in-one unit 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<sup>2</sup>.
- 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.
- Do not install the off-grid Hybrid Inverter in harsh environments such as moist, oily, flammable or explosive, or heavily dusty areas.
- Polarity at the battery input end of this product shall not be reversed, otherwise it may damage the device or cause unpredictable danger.
- The mains input and AC output are high voltage, so please do not touch the wiring terminals.
- When the fan is working, do not touch it to prevent injury.
- Load equipment input power needs to confirm that this off-grid Hybrid Inverter is the only input device, and it is forbidden to use in parallel with other input AC power to avoid damage. It is necessary to confirm that the solar charge inverter is the only input device for load equipment, and it is forbidden to use it in parallel with other input AC power to avoid damage

## 2.2 Wiring specifications and circuit breaker selection

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

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.

- **Maximum wire diameter that can be connected to the terminal**

Terminal location	Maximum accessible wire diameter
AC input	7AWG/10mm <sup>2</sup>
AC output	7AWG/10mm <sup>2</sup>
Battery terminal	2AWG/35mm <sup>2</sup>
PV input	8AWG/8mm <sup>2</sup>

- **Please refer to the table below for PV input wire diameter and switch:**

Type	Recommended wire diameter	Maximum PV input current	Recommended types of air switch or breaker
CEP4850-EU-80-H	6mm <sup>2</sup> /10AWG	22A	2P—25A

Note: the voltage in parallel shall not exceed maximum PV input open-circuit voltage.

- **Please refer to the table below for recommended AC input wire diameter and switch:**

Type	Recommended wire diameter	Maximum bypass input current	Recommended types of air switch or breaker
CEP4850-EU-80-H	10mm <sup>2</sup> /7AWG	40A	2P—40A

Note: There is already an appropriate circuit breaker at the Mains input wiring terminal, so it is not necessary to add one more.

- **Recommended battery input wire diameter and switch selection**

Type	Recommended wire diameter	Rated battery discharge current	Maximum charge current	Recommended types of air switch or breaker
CEP4850-EU-80-H	30mm <sup>2</sup> /2AWG	125A	80A	2P—160A

- **Recommended AC output wiring specifications and circuit breaker selection**

Type	Recommended wire diameter	Rated inverter AC output current	Maximum bypass output current	Recommended types of air switch or breaker
CEP4850-EU-80-H	10mm <sup>2</sup> /7AWG	22A	2P—40A	CEP4850-EU-80-H

Note: The wiring diameter is for reference only. If the distance between the PV array and the off-grid Hybrid Inverter or the distance between the off-grid Hybrid Inverter and the battery is relatively long, using a thicker wire can reduce the voltage drop to improve system performance.

Note: The above are only recommended wiring diameter and circuit breaker. Please select the appropriate wiring diameter and circuit breaker according to actual situations.

## 2.3 Installation and Wiring

**Please check whether the accessories are complete before installation**

List of accessories:

model	Serial No	name	quantity	Specifications
CEP4850-EU-80-H	1	Manual	1	Neutral, English
	2	Certificate	1	Neutral, English
	3	Test report	1	Neutral, Chinese/English
	4	Warranty Card	1	Neutral, English
	5	Cross screw	2	M6*10mm
	6	Flange screws	2	M6*10mm
	7	Wring terminal	2	SC35-6
	8	Communication cable	1	DB15

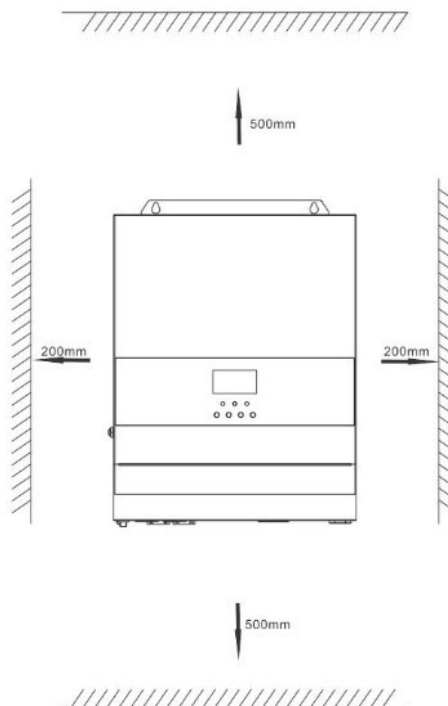
	9	Current sharing cable	1	2P
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### Installation step:

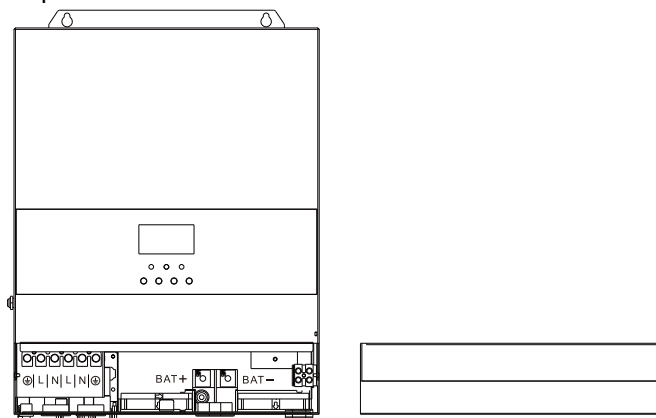
**Step 1:** Determine the installation position and the space for heat dissipation. Determine the installation position of the off-grid Hybrid Inverter, such as wall surface; when installing the off-grid Hybrid Inverter, ensure that there is enough air flowing through the heat sink, and space of at least 200mm to the left and right air outlets of the inverter shall be left to ensure natural convection heat dissipation. Refer to the installation diagram of the whole machine as above.



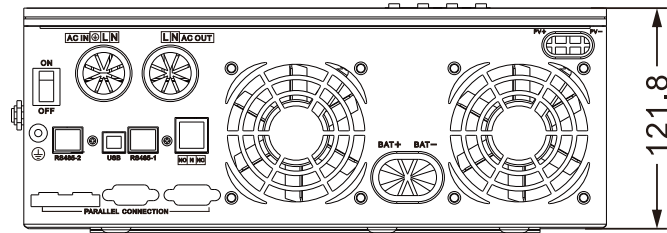
**Warning:** Danger of explosion! Never install the off-grid Hybrid Inverter and lead-acid battery in the same confined space! Also do not install in a confined place where battery gas may collect.



**Step 2:** Remove the terminal protection cover




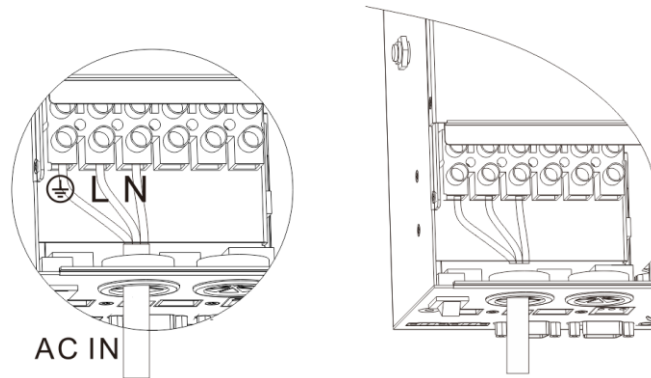
**Step 3:** wiring



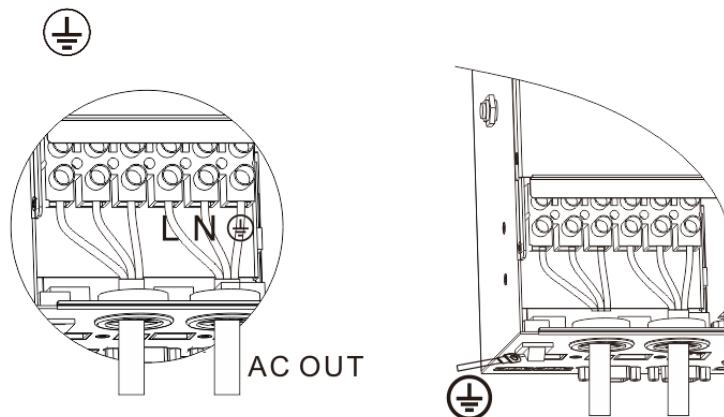
AC input/output wiring method:

- ① Before AC input/output wiring, disconnect the external breaker at first and then confirm whether the cable used is thick enough. Please refer to chapter “ 2.2 Wiring Specification and Breaker type ” ;
- ② Correctly connect AC input wire in accordance with cable sequence and terminal position shown in the figure below. Please connect ground lead at first, and then live wire and null wire;

 : **Ground**   **L: Live**   **N: Neutral**



- ④ Correctly connect AC output wire in accordance with cable sequence and terminal position shown in the figure below. Please connect the ground wire at first, and then live wire and null wire. The ground wire is connected to the ground screw hold through O shaped terminal.



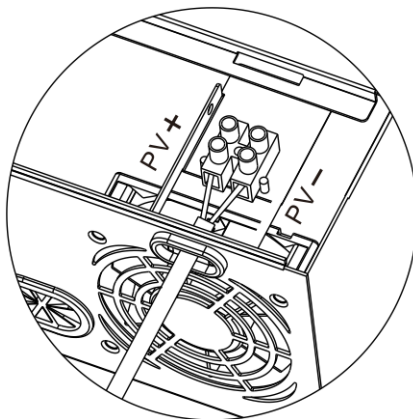
: **Ground**   **L: Live**   **N: Neutral**

Note: use thick ground cable as far as possible (with cable section not less than 4mm<sup>2</sup>), place the ground point to be close to the all-in-one machine as far as possible and choose shorter ground wire to the greatest extent

Wiring method of PV input:

- ① Before wiring, disconnect external breaker at first, and confirm whether the used cable is thick enough. Please refer to chapter "2.2 Wiring Specification and Breaker Type" ;
- ② Correctly connect PV input wire in accordance with cable sequence and terminal position shown in the figure below.

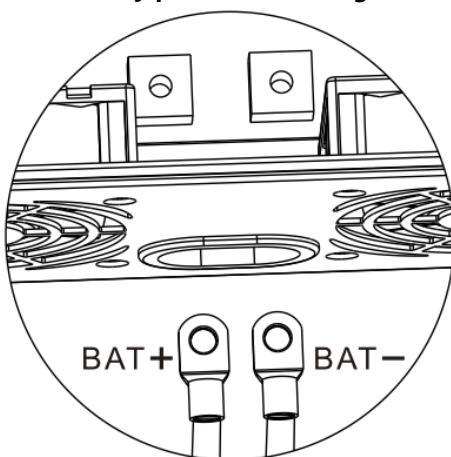
**PV+ positive input pole      PV1- negative input pole**



#### **BAT wiring method:**

- ① Before wiring, disconnect external breaker at first, and then confirm whether the used cable is thick enough. Please refer to chapter " 2.2 Wiring Specification and Breaker Type " . BAT wire shall be connected with the machine via O-shaped terminal. It is recommended to use the O-shaped terminal with 5mm inside diameter. The O-shaped terminal must compress BAT wire firmly to prevent excessive heating caused by great contact resistance;
- ② Correctly connect BAT wire in accordance with cable sequence and terminal position shown in the figure below.

**BAT+: positive battery pole      BAT-: negative battery pole**



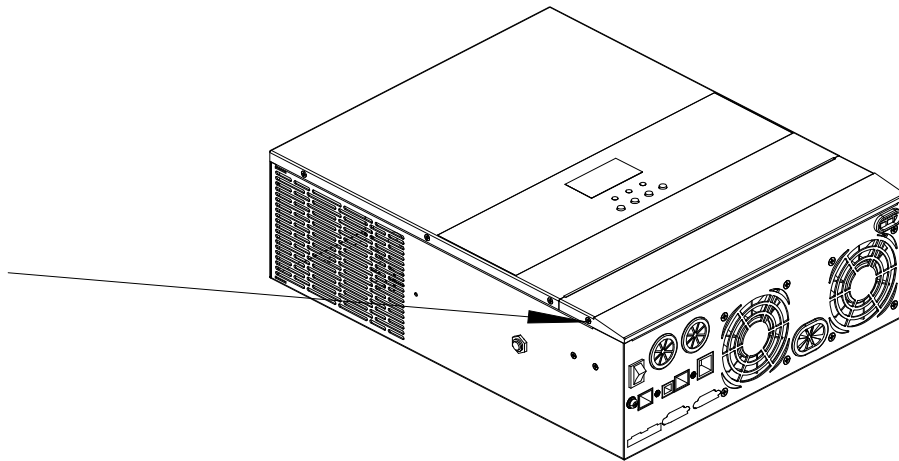
#### **Warning notice:**

- ① Input from mains supply, AC output and photovoltaic array may generate high voltage. Before wiring, make sure to break the breaker or fuse;
- ② During wiring process, make sure to pay attention to the safety; during the wiring process, please don' t close the breaker or fuse. At the same time, guarantee that "+" and "-" poles of different parts are

correctly connected with wires; a breaker must be installed at the battery end and selected based on chapter "2.2 Wiring Specification and Breaker Type" . Before wiring, make sure to break the breaker to prevent strong electric spark generated during wiring. At the same time, avoid battery short circuit during the wiring process; if the all-in-one machine is in the area with frequent thunder, it is suggested to install an external arrester at PV input terminal.

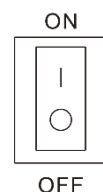
**Step 4:** inspect whether the wires are correctly and firmly connected, especially whether the positive and negative input poles of the battery are correct, whether the positive and negative input poles of PV are correct, whether AC input is inaccurately connected to AC output terminal.

**Step 5:** install protective cap of terminal



**Step 6:** Start the off-grid Hybrid Inverter

At first close the breaker at the battery end, and then press the rocker switch at the lower left side of the machine to " ON " state, " AC/INV " indicator light flashes, indicating normal operation of inverter. Afterwards, close breakers of photovoltaic array and mains supply. In the end, after AC output is normal, turn on AC load one by one to avoid protection action generated by great instant impact owing to simultaneous turn on of loads. The all-in-one machine operates normally in accordance with set mode.



Note: if power is supplied to different AC loads, it is suggested to turn on the loads with great impact current, and then turn on the load with little impact current after the load operates stably.

Note: in case of abnormal operation of all-in-one machine or abnormal display of LCD or indicator light, refer to Chapter 6 for troubleshooting.

## 2.4 Parallel machine wire connection

### 2.4.1 Introduction

1. Up to six 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:**



**Current sharing detection line\*1:**



## 2.4.2 Precautions for connecting the parallel connecting lines



**Warning:**

### 1. **Battery wiring:**

**Parallel connection in single three phase:** Ensure that all all-in-one solar charger 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.

### 2. **AC OUT wiring:**

**Parallel connection in single phase:** Ensure L-to-L, N-to-N and PE-to-PE connection for all all-in-one solar charger 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 2.4.3 Wiring Diagram

**Parallel connection in three phase:** Ensure N-to-N and PE-to-PE connection for all all-in-one solar charger inverters. The **L** lines of all inverters connected to the same phase need to be connected together. But **L** 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 2.4.4 Wiring Diagram

### 3. **AC IN wiring:**

**Parallel connection in single phase:** Ensure L-to-L, N-to-N and PE-to-PE connection for all all-in-one solar charger 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 2.4.3 Wiring Diagram.

**Parallel connection in three phase:** Ensure N-to-N and PE-to-PE connection for all all-in-one solar charger inverters. The **L** lines of all inverters connected to the same phase need to be connected together. But **L** 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 2.4.4 Wiring Diagram

Diagram.

**4. PV wiring:**

When the inverters are connected in parallel output, the solar panels should be connected to each inverter separately. The maximum open circuit voltage and input current limits for each device must be followed when connecting the PV modules. Otherwise damage to the device may result.

**5. Wiring of parallel communication line:**

**Parallel connection in single or three 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 2.4.3 Wiring Diagram.

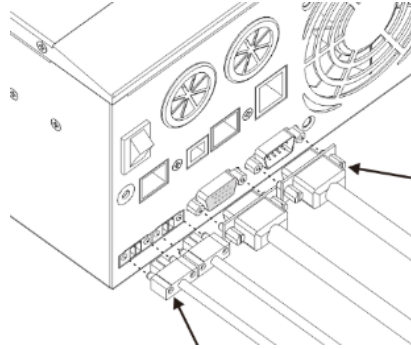
**Parallel connection in three phase:** The current sharing detection lines of all inverters connected to the same phase need to be connected together. But the current sharing detection lines of different phases cannot be joined together. Other connection precautions are the same as parallel connection in single phase. For specific wiring, please refer to 2.4.4 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.

### **2.4.3 Schematic diagram of parallel connection in single phase**

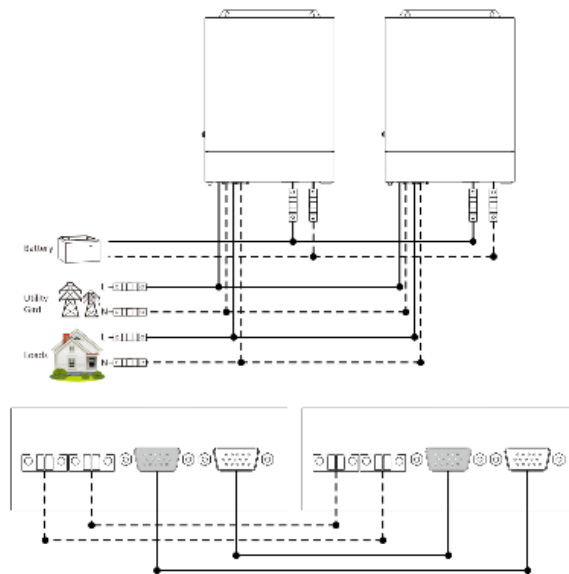
1. The parallel communication line and current sharing detection line of the all-in-one solar charger inverter need to be locked with screws after connecting. The schematic diagram is as follows:



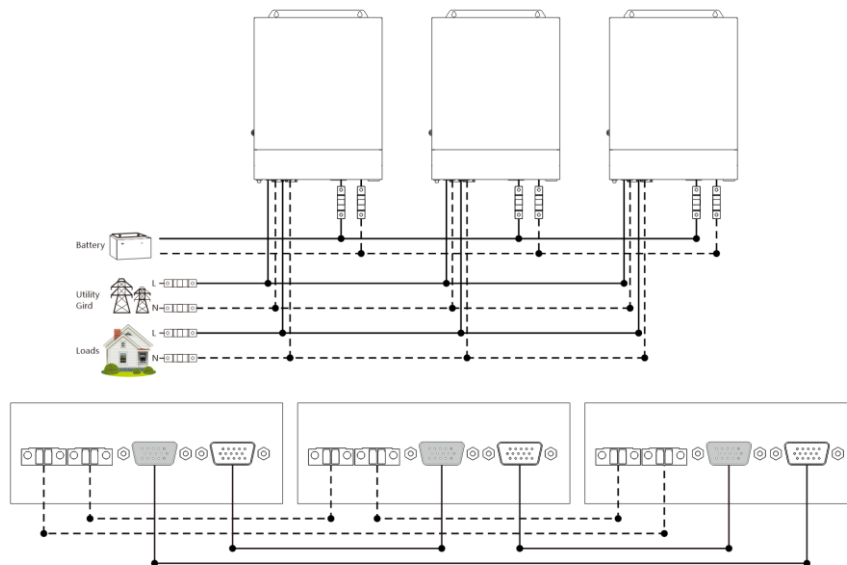


2. In case of parallel operation with multiple inverters, the schematic diagram of parallel connection is as follows:

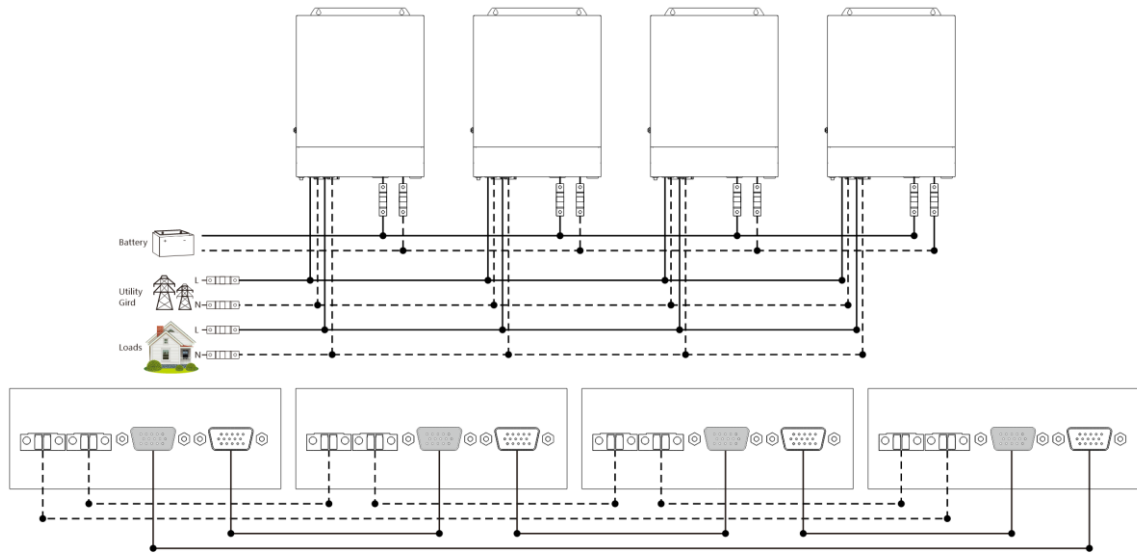
a) **Two all-in-one solar charger inverters of the system connected in parallel:**



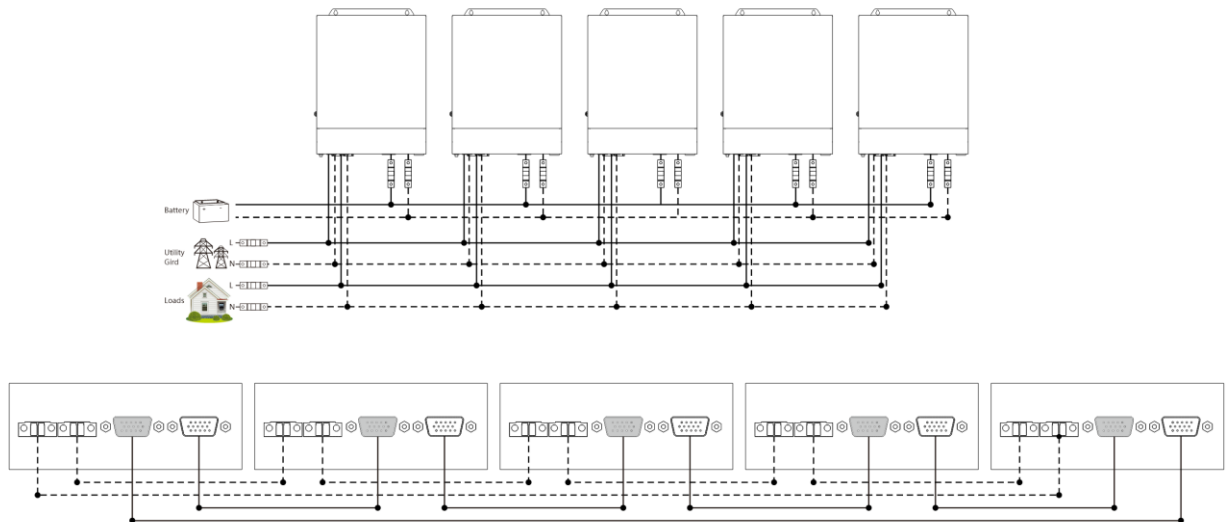
b) **Three all-in-one solar charger inverters of the system connected in parallel:**



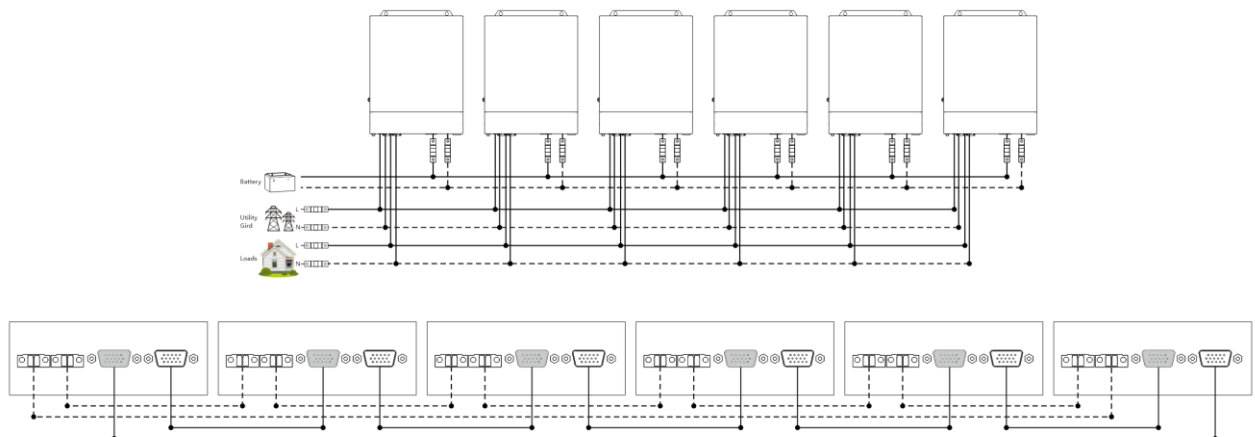
c) Four all-in-one solar charger inverters of the system connected in parallel:



d) Five all-in-one solar charger inverters of the system connected in parallel:

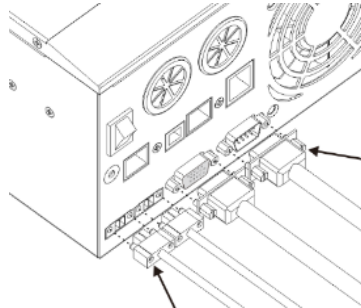


e) Six all-in-one solar charger inverters of the system connected in parallel:



## 2.4.4 Schematic diagram of parallel connection in split 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. The schematic diagram is as follows:

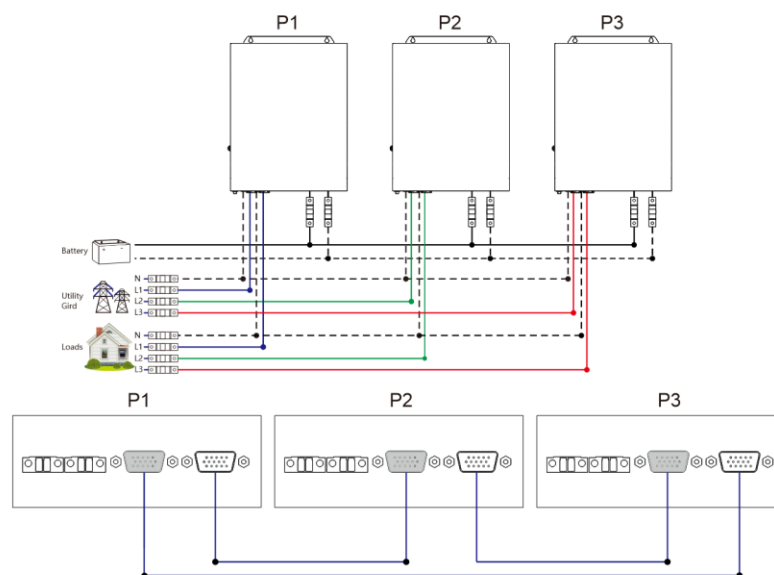


2. In case of parallel operation with multiple inverters, the schematic diagram of parallel connection is as follows:

### Parallel Operation in three phase :

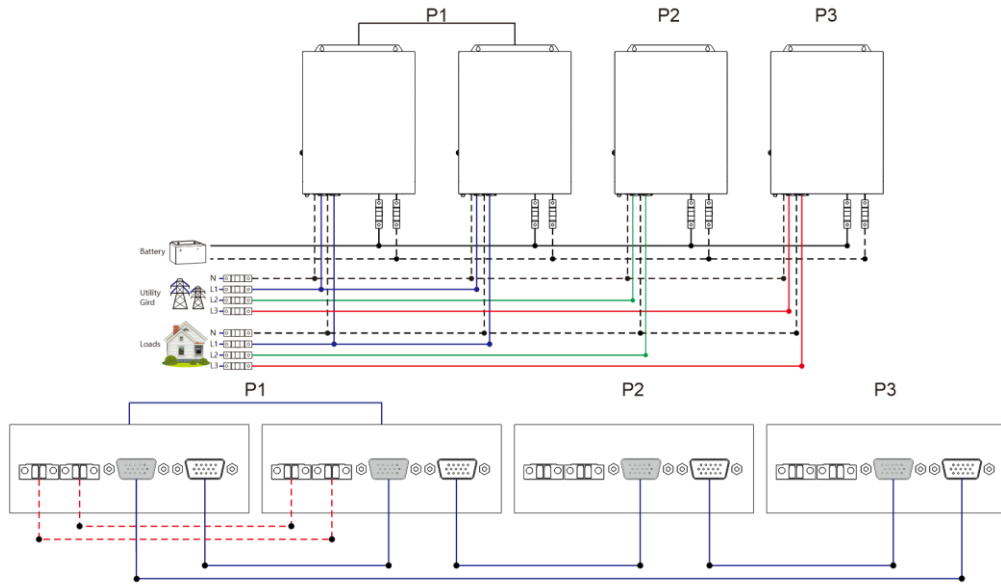
- a) Three all-in-one solar charger inverters of the system connected in three phase:

#### 1+1+1 system:



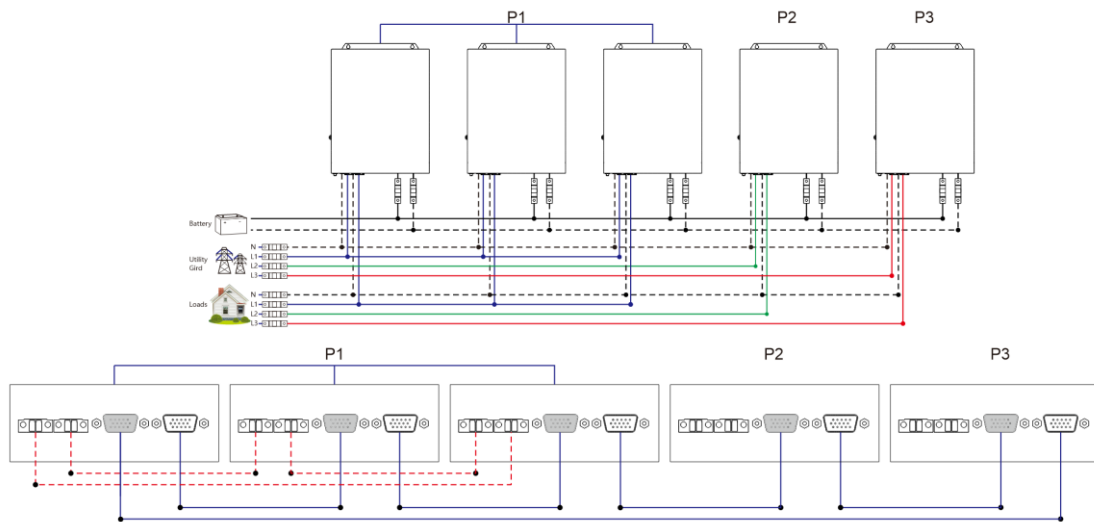
- b) Four all-in-one solar charger inverters of the system connected in three phase:

#### 2+1+1 system:

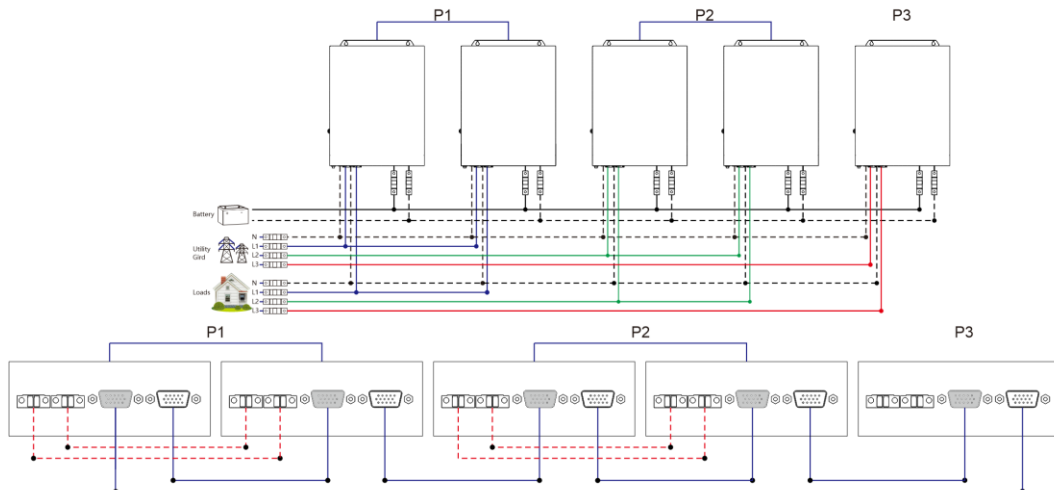


c) Five all-in-one solar charger inverters of the system connected in three phase:

**3+1+1 system:**

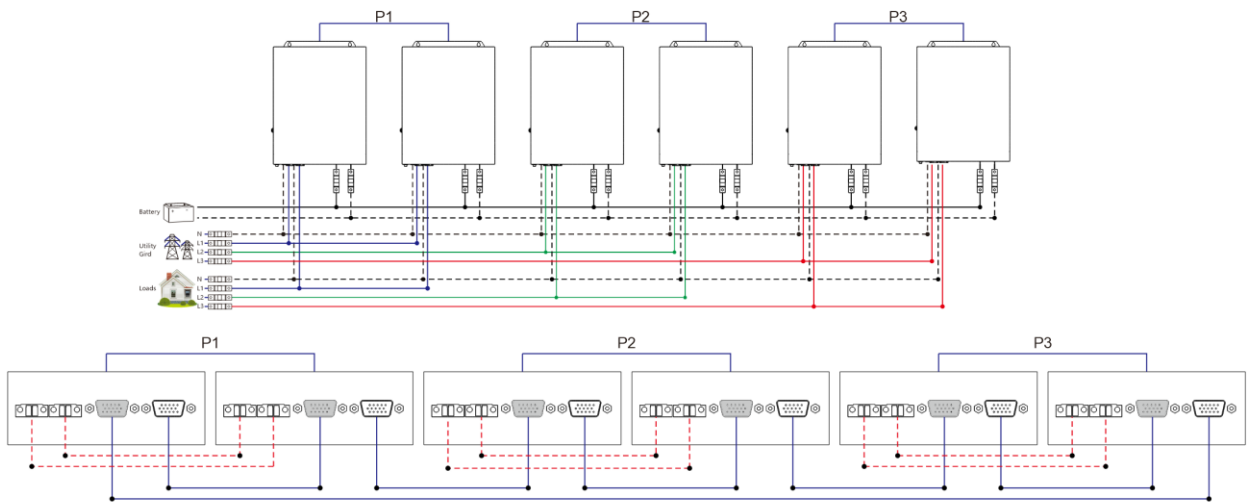


**2+2+1 system:**

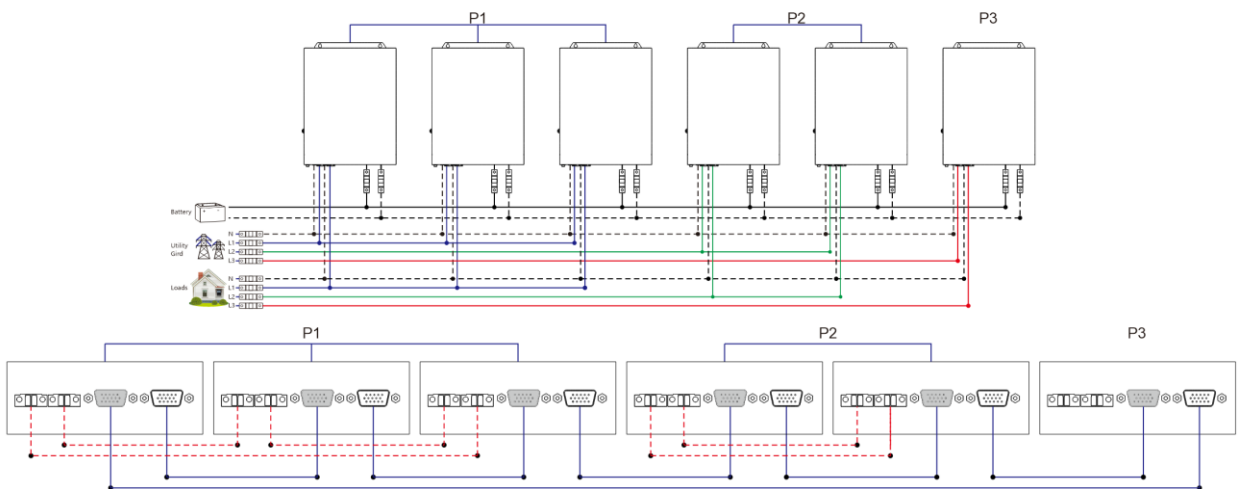


d) Six all-in-one solar charger inverters of the system connected in three phase:

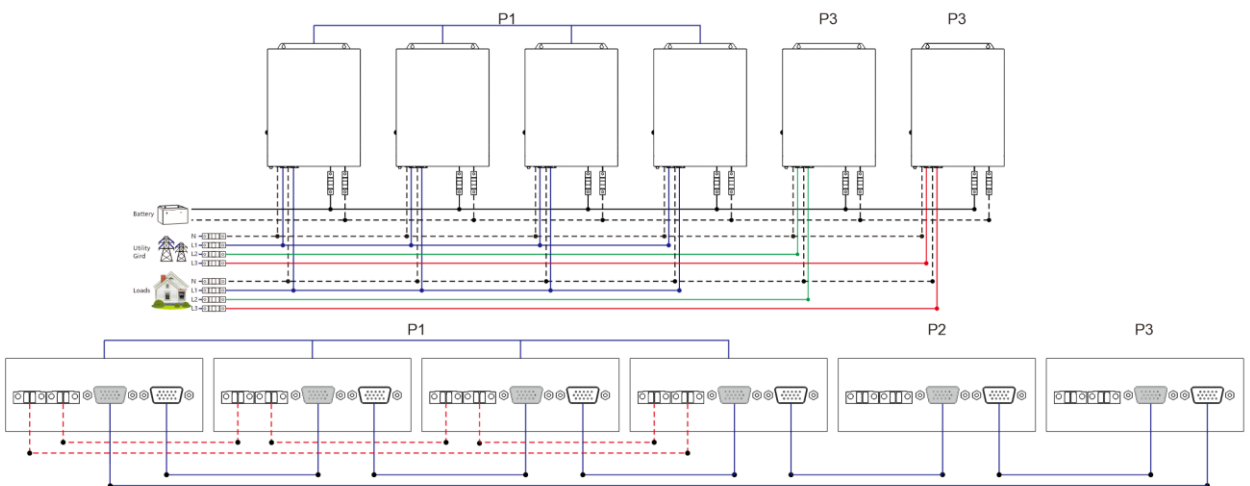
**2+2+2 system:**



**3+2+1 system:**



**4+1+1 system:**



**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) Settings [38] need to be set consistently or only for the host. When the machine is running, the voltage set by the host shall prevail, and the master will force the rewrite of the other slave machines to keep the same set. Only can be set in the standby mode.
- 5) When using parallel or three phase separation function, the [31] setting items need to be set accordingly.

**Parallel Operation in three phase:**

The [31] setting item:

All connected P1-phase inverters are set to "3P1";

All connected P2-phase inverters are set to "3P2";

All connected P3-phase inverters are set to "3P3";

When the parameter [38] setting item=230 for S series model. Phase difference between each live wire is 120 degrees, each line-to-line voltage (L1-L2/L1-L3/L2-L3) is

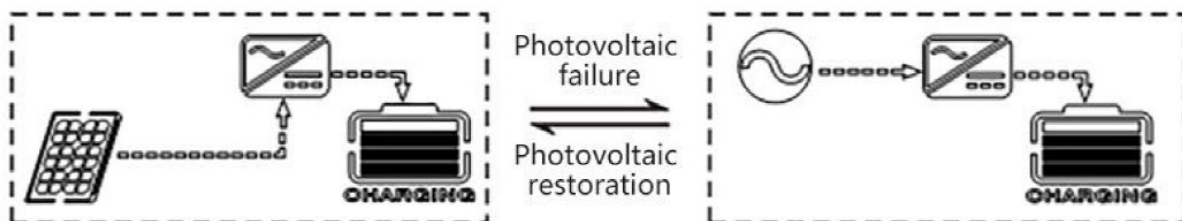
$230 \times 1.732 = 398\text{Vac}$ ; Each phase voltage is 230Vac (L1-N; L2-N; L3-N).

- 6) When the phase sequence is set [31] on the screen, the setting one is turned on to set, and the other machines are turned off. One by one set. Finally, power off and start up again.
- 7) After the system runs, the output voltage is measured correctly, and then the load setting is connected.

## 3. Operating Mode

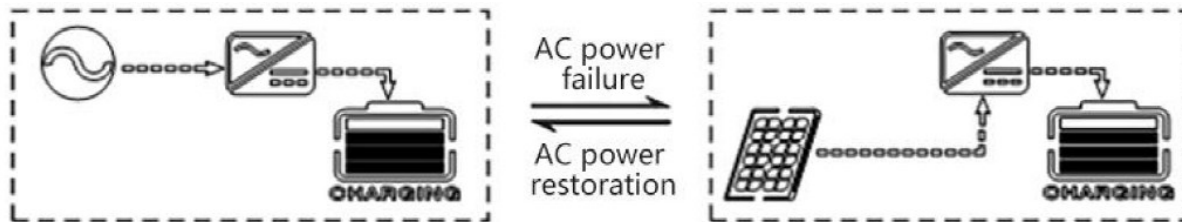
### 3.1 Charge mode

**1. PV priority:** PV module will charge the battery preferentially, and the battery is charged by the Mains only when the PV system fails. During the day, solar energy is fully used to charge, while at night, it converts to the Mains. This can maintain battery level, and is ideal for areas where the grid is relatively stable and electricity price is relatively high.

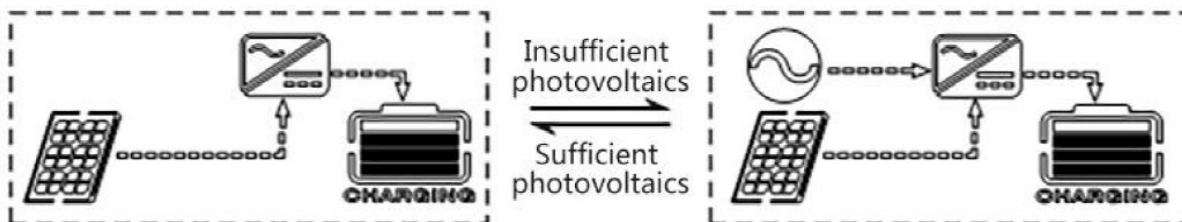


**2. Mains priority:** The Mains supply is preferentially used to charge the battery. Only when the Mains fails, the

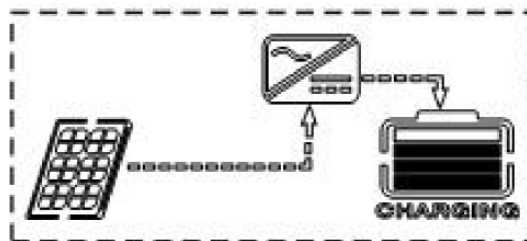
PV charging can be activated.



**3. Mixed charge:** PV and mains hybrid charging. PV MPPT charging is a priority, and when PV energy is insufficient, the mains supply supplements. When the PV energy is sufficient again, the mains stops charging. This is the fastest charging mode, suitable for the areas where power grid is unstable, providing sufficient backup power supply at any time.



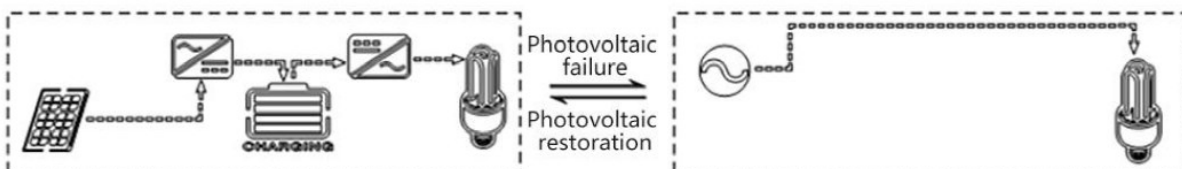
**4.Only solar:** Only PV charging, without Mains charging. This is the most energy-efficient way in which battery is charged only by solar panels, and is usually used in areas with good lighting conditions.



### 3.2 Output mode

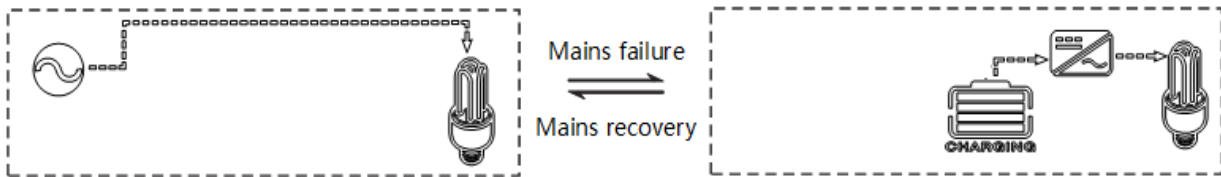
#### ➤ PV priority mode:

Switch to mains supply when the PV charging fails. This mode maximizes the use of solar energy while maintaining battery power, suitable for use in the areas with relatively stable grid. Power supply priority: Solar—> Utility—>Battery.



#### ➤ Mains supply priority mode:

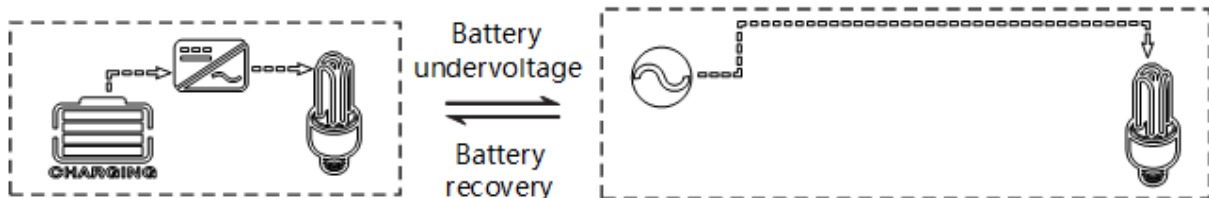
Switch to inverter only when the mains fail (when there was mains power, switch to mains power for



charging and power supply). Then, the unit is equivalent to a backup UPS, suitable for areas with unstable grid. Switching does not affect PV charging. Power supply priority: Utility -> Solar -> Battery.

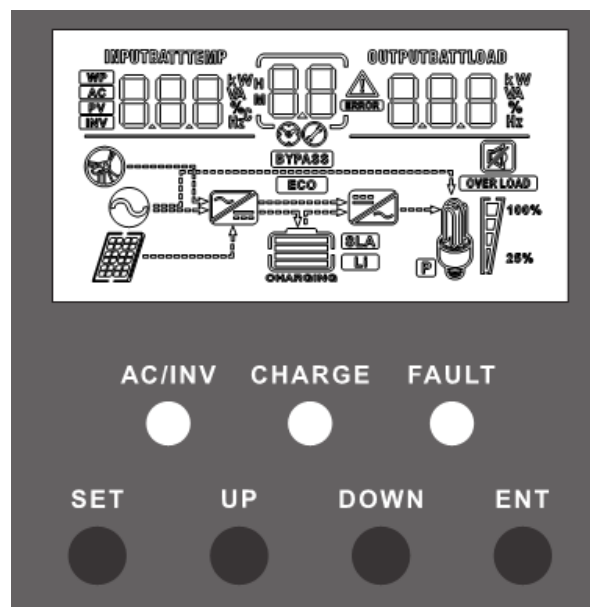
#### ➤ **Battery priority mode:**

Switch to mains supply only when the battery discharge undervoltage is lower than the set point (item 04). When the charging battery is higher than the set point of (05 setting item), switch to the battery discharge mode. This can cycle the battery charge and discharge. This mode maximizes the use of DC power and is used in the area with stable grid. Switching does not affect PV charging. Power supply priority: Solar -> Battery -> Utility.



## 4. Operation Instruction for LCD Screen

### 4.1 Operation and display panel





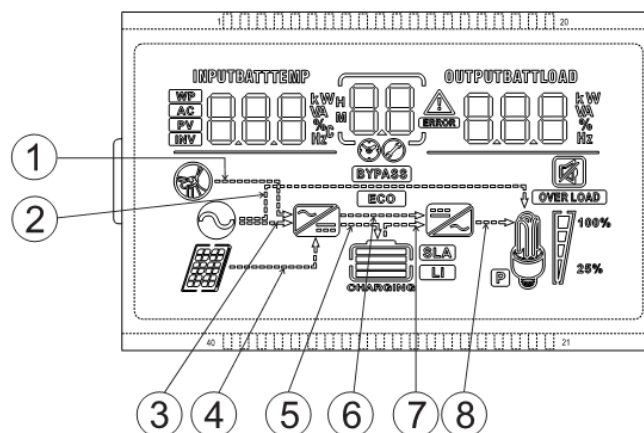
## 4.2 Introduction to operation keys

Function Key	Description
SET	Enter/Exit Settings menu
UP	Previous choice
DOWN	Next choice
ENT	Confirm/Enter Options under the settings menu,




























## 4.3 Introduction to indicator light


Indicator light	Color	Description
AC/INV	Yellow	Steady on: Mains output
		Flash: Inverter output
CHARGE	Green	Flash: Fast charging
		Steady on: Floating charge
FCBLT	Red	Flash : Fault state

## 4.4 Introduction to LCD screen



Icon	Function	Icon	Function
	Indicating that AC input end has been connected to power grid		Indicating that inverter circuit is in working.
	Indicates that the AC input mode in APL mode (wide		Indicating that the machine is in mains supply bypass work mode

	voltage range)		
	Indicating that PV input end has been connected to solar battery panel		Indicating that AC output is in overload state
	Indicating that machine has been connected to battery,  indicating 0%~24% battery remaining capacity  indicating 25%~49% battery remaining capacity  indicating 50%~74% battery remaining capacity  indicating 75%~100% battery remaining capacity		Indicating percentage of AC output load,  indicating 0%~24% load percentage,  indicating 25%~49% load percentage,  indicating 50%~74% load percentage,  indicating ≥75% load percentage
	Indicating that present battery type of the machine is lithium battery		Indicating that buzzer is not enabled
	Indicating that current battery type of machine is lead-acid battery		Indicating alarm of machine
	Indicating that the battery is in charge state.		Indicating that the machine is in fault state.
	Indicating that AC/PV charge circuit is in working		Indicating that the machine is in setting mode.
	Indicating that AC output end has AC voltage output		Middle parameter display of screen, 1. In non-setting mode, displaying alarm or fault code; 2. In setting mode, displaying code of parameter item under current setting.
	In parallel operation, this icon indicates that this inverter is the host, which is only valid in parallel mode.		
Parameter display at left side of screen: input parameter			
	Indicating AC input		
	Indicating PV input		
	Indicating inverter circuit		
	The icon is not displayed		
	Displaying battery voltage, total charge current of battery, charge power of mains supply, AC input voltage, AC input frequency, PV input voltage, temperature of internal radiator, software version		

Parameter display at right side of screen: output parameter			
		Indicating output voltage, output current, output active power, output apparent power, battery discharge current, software version; under setting mode, displaying the setting parameter under the parameter item code set currently	
Arrow display			
①	The arrow is not displayed	⑤	Indicating charge from charge circuit to battery end
②	Indicating power grid power supply to load	⑥	The arrow is not displayed
③	Indicating power grid power supply to charge circuit	⑦	Indicating power supply from battery end to inverter circuit
④	Indicating PV power supply to charge circuit	⑧	Indicating power supply from inverter circuit to load

### Real-time data view method

In LCD main screen, press keys “UP” and “DOWN” to turn page and view different real time data of the machine.

Page	Left Parameter of Screen	Middle Parameter of Screen	Right Parameter of Screen
1	INPUT BATT V (Battery input voltage)	Fault code	OUTPUT LOAD V (Output load voltage)
2	PV TEMP °C (PV charger heatsink temperature)		PV OUTPUT KW (PV output power)
3	PV INPUT V (PV input voltage)		PV OUTPUT A (PV output current)
4	INPUT BATT A (Input battery current)		OUTPUT BATT A (Battery output current)
5	INPUT BATT KW (Battery input power)		OUTPUT BATT KW (Battery output power)
6	AC INPUT Hz (AC input frequency)		AC OUTPUT LOAD Hz (AC output frequency)
7	AC INPUT V (AC input voltage)		AC OUTPUT LOAD A (AC output load current)
8	INPUT V (For maintain)		OUTPUT LOAD KVA (Load apparent power)
9	INV TEMP °C (AC charge or battery discharge heatsink temperature)		INV OUTPUT LOAD KW (Load active power)
10	APP software version		Bootloader software version

11	Model Battery Voltage Rating		Model Output Power Rating
12	Model PV Voltage Rating		Model PV Current Rating
13	RS485 Address Number		Phase Sequence Number

## 4.5 Setting parameter

Buttons operation instructions: Press the "SET" button to enter the setup menu and exit the setup menu. After entering the setup menu, the parameter number [00] will flash. At this point, press the "UP" and "DOWN" buttons to select the code of parameter item to be set. Then, press the "ENT" button to enter the parameter editing mode, and the value of the parameter is flashing. Adjust the value of the parameter with the "UP" and "DOWN" buttons. Finally, press the "ENT" button to complete the parameter editing and return to the parameter selection state.

**Note:** in parallel mode, all machines will synchronize the setting parameters of the host (the machine with "P" is displayed on the display screen) before startup. After startup, the setting parameters of any machine will be synchronized to other machines in the system

Parameter no.	Parameter name	Settings	Description
00	Exit setting menu	[00] ESC	Exit the setup menu
01	Output source priority	[01] SOL	PV priority mode, switching to the Mains when the PV fails or the battery is lower than the set value of parameter [04].
		[01] UTI <b>default</b>	Mains priority mode, switching to inverter only when the mains fails.
		[01] SBU	Battery priority mode. Switch to mains power only when the battery is under voltage or lower than the setting value of parameter [04]; Switch to battery discharge only when the battery is fully charged or higher than the setting value of parameter [05].
Parameter no.	Parameter name	Settings	Description
02	Output Frequency	[02] 50.0	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 60HZ.
		[02] 60.0	

<b>03</b>	AC Input Voltage Range	[03] APL	Wide mains input voltage range of 230V machine: 90~280V
		[03] UPS <b>default</b>	Narrow mains input voltage range of 230V machine: 170~280V
<b>04</b>	Battery Power to Utility Setpoint	[04] 43.6V <b>default</b>	When the parameter <b>[01]</b> =SBU, the battery voltage is lower than the set value, and the output is switched from the inverter to the mains. Setting range: 40V~52V.
<b>05</b>	Utility to Battery Power Setpoint	[05]56.0V <b>default</b>	When the parameter [01] =SBU, the battery voltage is higher than the set value, and the output is switched from the mains to the inverter. Setting range: 48V~60V.
<b>06</b>	Charger source priority	[06] CSO	PV priority charging; only when the PV charging fails, the mains charging is started.
		[06] CUB	Mains priority charging; only when the mains charging fails, the PV charging is started.
		[06] SNU <b>default</b>	PV and Mains hybrid charging; PV charging is a priority, and when the PV energy is insufficient, the Mains charging supplements. When the PV energy is sufficient, the Mains charging stops. Note: Only when the Mains bypass output is loaded, the PV charging and the mains charging can work at the same time. When the inverter works, only the PV charging can be started.
		[06] OSO	Only PV charging, with the Mains charging not activated.
<b>07</b>	Max charger current	[07] 80A <b>default</b>	Max charger current (AC charger +PV charger). S series model: setting range 0~80A;
<b>08</b>	Battery Type Battery Power to Utility Setpoint Utility to Battery Power Setpoint	[08] USE	User-defined; all battery parameters can be set.
		[08] SLd	Sealed lead-acid battery; constant-voltage charge voltage: 57.6V, floating charge voltage: 55.2V.
		[08] FLd	Vented lead-acid battery; constant-voltage charge voltage: 58.4V, floating charge voltage: 55.2V.
		[08] GEL <b>default</b>	Colloidal lead-acid battery; constant-voltage charge voltage: 56.8V, floating charge voltage: 55.2V.
		[08] L14/L15/L16	LFP battery L14/L15/L16, corresponding to 14strings ,15 strings and 16 strings of LFP battery; for 16 strings, default constant-voltage

			charge voltage is 56.8V; for 15 strings, default constant-voltage charge voltage is 53.2V; for 14 strings, default constant-voltage charge voltage is 49.2V; allow adjustable.
		[08] N13/N14	Ternary lithium battery; which is adjustable.
<b>09</b>	Battery boost charge voltage	[09] 57.6V <b>default</b>	Boost charge voltage setting; the setting range is 48V~58.4V, with step of 0.4V; it is valid for user-defined battery and lithium battery.
<b>10</b>	Battery boost charge time	[10] 120 <b>default</b>	Boost charge maximum time setting, which means the maximum charging time to reach the set voltage of parameter [09] during constant-voltage charging. The setting range is 5min~900min, with a step of 5 minutes. It is valid for user-defined battery and lithium battery.
<b>11</b>	Battery floating charge voltage	[11] 55.2V <b>default</b>	Floating charge voltage, setting range: 48V~58.4V, step: 0.4V, valid when battery type is user-defined.
<b>12</b>	Battery over discharge voltage (delay off)	[12] 42V <b>default</b>	Over-discharge voltage; when the battery voltage is lower than this judgment point, delay the time set by parameter [13] and turn off inverter output. Setting range is 40V~48V, with a step of 0.4V. It is valid for user-defined battery and lithium battery.
<b>13</b>	Battery over discharge delay time	[13] 5S <b>default</b>	Over-discharge delay time; when the battery voltage is lower than the parameter [12], the inverter output will be turned off after the time set by this parameter is delayed. The setting range is 5S~55S, with a step of 5S. It is valid for user-defined battery and lithium battery.
<b>14</b>	Battery under voltage alarm	[14] 44V <b>default</b>	Battery undervoltage alarm point; when the battery voltage is lower than the point, an undervoltage alarm is given, and the output is not turned off; the setting range is 40V~52V, with a step of 0.4V. It is valid for user-defined battery and lithium battery.
<b>15</b>	Battery discharge limit voltage	[15] 40V <b>default</b>	Battery discharge limit voltage; when the battery voltage is lower than the point, the output is turned off immediately; the setting range is 40V~52V, with a step of 0.4V. It is valid for user-defined battery and lithium battery.
<b>16</b>	Battery equalization enable	[16] DIS	Equalizing charge is disabled
		[16] ENA <b>default</b>	Equalizing charge is enabled, only valid for vented lead-acid battery and sealed lead-acid

			battery
17	Battery equalization voltage	[17] 58.4V <b>default</b>	Equalizing charge voltage; setting range: 48V~58.4V, with a step of 0.4V; valid for vented lead-acid battery and sealed lead-acid battery
18	Battery equalized time	[18] 120 <b>default</b>	Equalizing charge time; setting range: 5min~900min, with a step of 5 minutes; valid for vented lead-acid battery and sealed lead-acid battery
19	Battery equalized time out	[19] 120 <b>default</b>	Equalizing charge delay; setting range: 5min~900min, with a step of 5 minutes; valid for vented lead-acid battery and sealed lead-acid battery
20	Battery equalization interval	[20] 30 <b>default</b>	Equalizing charge derating time, 0~30days, with a step of 1 day; valid for vented lead-acid battery and sealed lead-acid battery
21	Battery equalization immediately	[21] DIS <b>default</b>	Stop equalizing charge immediately.
		[21] ENA	Start equalizing charge immediately.
22	Power saving mode	[22] DIS <b>default</b>	Power saving mode disabled.
		[22] ENA	After the power saving mode is enabled, if the load is null or less than 50W, the inverter output is turned off after a delay for a certain period of time. When the load is more than 50W, the inverter automatic restart.
23	Restart when over load	[23] DIS	Automatic restart when overload is disabled. If an overload occurs and the output is turned off, the machine will not restart.
		[23] ENA <b>default</b>	Automatic restart when overload is enabled. If an overload occurs and the output is turned off, the machine will restart after a delay of 3 minutes. After it reaches 5 cumulative times, the machine will not restart.
24	automatic restart after over temperature	[24] DIS	When automatic restart after overtemperature is disabled, if the output machine is turned off upon overtemperature, no output is turned on.
		[24] ENA <b>default</b>	When automatic restart after overtemperature is enabled, if the output is turned off upon overtemperature, the output can be turned on after the machine cools down.
25	Alarm enable	[25] DIS	Alarm is disabled
		[25] ENA <b>default</b>	Alarm is enabled

26	Beeps while primary source is interrupted	[26] DIS	Alarm beep is disabled when the status of the main input source changes
		[26] ENA <b>default</b>	Alarm beep is enabled when the status of the main input source changes
27	Bypass output when over load	[27] DIS	It is disabled to automatically switch to the Mains when the inverter is overloaded.
		[27] ENA <b>default</b>	It is enabled to automatically switch to the Mains when the inverter is overloaded.
28	Max AC charger current	[28] <b>default</b>	S series model: Max AC charger current. Setting range: 0~60A; 60A <b>default</b> .
29	Split Phase	[29] DIS <b>default</b>	Supply for industrial frequency transformer (disabled)
		[29] ENA	Supply for industrial frequency transformer (enabled)
30	Model ID setting	[30] 1 <b>default</b>	RS485 address number. Parallel mode needs to be set in the range of 1-6. When the power is first turned on, it will be automatically distributed
31	AC output mode ( <b>can be set in the standby mode only</b> )	[31] SIG	When single inverter is used, the default is SIG mode.
		[31] PAL <b>default</b>	In parallel operation with single phase. Please refer to 2.4 Wiring Diagram.
		[31] 3P1/3P2/3P3	In split phase operation with three phase. At least one inverter is required for each phase. Please refer to 2.4 Wiring Diagram.
		<b>When the parameter [38] setting item=230 .</b> All connected P1-phase inverters are set to " <b>3P1</b> "; All connected P2-phase inverters are set to " <b>3P2</b> "; All connected P3-phase inverters are set to " <b>3P3</b> "; AC output line voltage difference is 120 degrees (L1-L2/L1-L3/L2-L3), each line voltage is $230 \times 1.732 = 398\text{Vac}$ ; Each phase voltage is 230Vac (L1-N; L2-N; L3-N).	
32	RS485-1 communication	[32] SLA <b>default</b>	RS485-2 port for PC or telecommunication control.
		[32] BMS	RS485-2 port for BMS communication.



33	Battery BMS communication	When the parameter [32] setting item = <b>BMS</b> , you can choose to match the battery manufacturer's BMS protocol to communicate with BMS for the lithium battery protection.	
		PAC=PACE, RDA=Ritar, AOG=ALLGRAND BATTERY, OLT=OLITER, HWD=SUNWODA, DAQ=DAKING, WOW=SRNE, PYL=PYLONTECH, UOL=WEILAN	
35	Battery Low voltage recovery	[35] 52V default	Setting range 44V~58.4V
37	Battery fully charged recovery point	[37] 52V default	After the battery is fully charged, it needs to be lower than this set voltage before it can be recharged
38	AC output voltage setting	[38] 230Vac default	Settable: (200/208/220/240Vac)
		[38] 120Vac default	Settable: (100/105/110Vac)

## 4.6 Battery type parameters

**For Lead-acid Battery :**

<b>Battery type</b> <b>Parameters</b>	<b>Sealed lead acid battery (SLD)</b>	<b>Colloidal lead acid battery (GEL)</b>	<b>Vented lead acid battery (FLD)</b>	<b>User-defined (USE)</b>
Overvoltage disconnection voltage	60V	60V	60V	60V
Equalizing charge voltage	58.4V	56.8V	59.2V	40 ~ 60V (Adjustable)
Boost charge voltage	57.6V	56.8V	58.4V	40 ~ 60V (Adjustable)
Floating charge voltage	55.2V	55.2V	55.2V	40 ~ 60V (Adjustable)
Undervoltage alarm voltage	44V	44V	44V	40 ~ 60V (Adjustable)
Low voltage disconnection voltage	42V	42V	42V	40 ~ 60V (Adjustable)
Discharge limit voltage	40V	40V	40V	40 ~ 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)

**For Lithium Battery :**

<b>Battery type</b> <b>Parameters</b>	<b>Ternary lithium battery (N13)</b>	<b>Ternary lithium battery (N14)</b>	<b>Lithium iron phosphate battery (L16)</b>	<b>Lithium iron phosphate battery (L15)</b>	<b>Lithium iron phosphate battery (L14)</b>	<b>User-defined (USE)</b>
Overvoltage disconnection voltage	60V	60V	60V	60V	60V	60V
Equalizing charge voltage	-	-	-	-	-	40 ~ 60V (Adjustable)
Boost charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)	40 ~ 60V (Adjustable)
Floating charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)	40 ~ 60V (Adjustable)
Undervoltage alarm voltage	43.6V (Adjustable)	46.8V (Adjustable)	49.6V (Adjustable)	46.4V (Adjustable)	43.2V (Adjustable)	40 ~ 60V (Adjustable)
Low voltage disconnection voltage	38.8V (Adjustable)	42V (Adjustable)	48.8V (Adjustable)	45.6V (Adjustable)	42V (Adjustable)	40 ~ 60V (Adjustable)
Discharge limit voltage	36.4V	39.2V	46.4V	43.6V	40.8V	40 ~ 60V (Adjustable)
Over-discharge delay time	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	1 ~ 30s (Adjustable)
Equalizing charge duration	-	-	-	-	-	0 ~ 600 minutes (Adjustable)
Equalizing charge interval	-	-	-	-	-	0 ~ 250 days (Adjustable)
Boost charge duration	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	10 ~ 600 minutes (Adjustable)

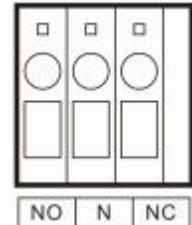
## 5. Other Function

### 5.1 Dry node function

Working principle: this dry node can control the switch of diesel generator to charge the battery.

① Under normal conditions, in this terminal, NC-N point is closed and NO-N point is opened;

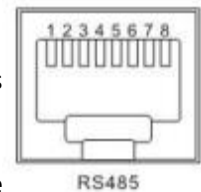
② when the battery voltage reaches the low-voltage disconnection voltage point, the coil of the relay is energized and NO-N point is closed and NC-N point opened. At this time, NO-N point can drive resistive loads 125VAC/1A, 230VAC/1A and 30VDC/1A.



### 5.2 RS485 communication function

**This port is an RS485 communication port which comes with two functions:**

- ① RS485 communication with lithium battery BMS can be conducted directly through this port RS485-2 (need to be customized);
- ③ RS485-1 is connected to the selected RS485 to WIFI /GPRS communication module independently developed by our company After the selected module is equipped, the reverse control all-in-one machine of our company can be connected through mobile APP, and the operating parameters and status of the reverse control all-in-one machine can be checked through the mobile APP.
- ④ Such as shown in the figure: pin 1 is 5V power supply; pin 2 is GND, pin 7 is RS485-A and pin 8 is RS485-B.



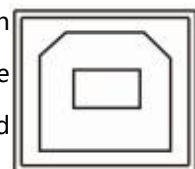
**As shown in the figure:**

RS485-1: Pin 1 is 5V power supply, Pin 2 is GND, Pin 7 is RS485-A1, and Pin 8 is RS485-B1;

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

### 5.3 USB communication function

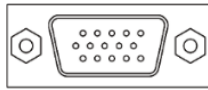
This port is a USB communication port, which can be used for USB communication with the selected upper computer software of our company (Need to apply for). To use this port, the corresponding “USB to serial port chip CH340T driver” should be installed in the computer.



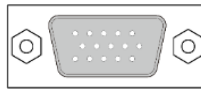
## 5.4 Parallel communication function (parallel operation only)

- 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.

**Female connector**

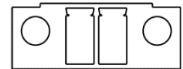


**Male connector**



## 5.5 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.



## 6. Protection

### 6.1 Protection function

No.	Protection Function	Note
1	PV current/power limiting protection	When charging current or power of the PV array configured exceeds the PV rated, it will charge at the rated.
2	PV night reverse-current protection	At night, the battery is prevented from discharging through the PV module because the battery voltage is greater than the voltage of PV module.
3	Mains input over voltage protection	When the mains voltage exceeds 280V, the mains charging will be stopped and switched to the inverter mode.
4	Mains input under voltage protection	When the mains voltage is lower than 170V (230V model /UPS mode), the mains charging will be stopped and switched to the inverter mode.
5	Battery over voltage protection	When the battery voltage reaches the overvoltage disconnection point, the PV and the mains will be automatically stopped to charge the battery to prevent the battery from being overcharged and damaged.
6	Battery low voltage protection	When the battery voltage reaches the low voltage disconnection point, the battery discharging will be automatically stopped to prevent the battery from being over-discharged and damaged.
7	Load output short circuit protection	When a short-circuit fault occurs at the load output terminal, the AC output is immediately turned off and turned on again after 1 second.
8	Heat sink over temperature protection	When the internal temperature is too high, the all-in-one machine will stop charging and discharging; when the temperature returns to normal, charging and discharging will resume.
9	Overload protection	Output again 3 minutes after an overload protection, and turn the output off after 5 consecutive times of overload protection until the machine is re-powered. For the specific overload level and duration, refer to the technical parameters table in the manual.
10	PV reverse polarity protection	When the PV polarity is reversed, the machine will not be damaged.
11	AC reverse protection	Prevent battery inverter AC current from being reversely input to Bypass.
12	Bypass over current protection	Built-in AC input overcurrent protection circuit breaker.
13	Battery input over current	When the discharge output current of the battery is greater than the

	protection	maximum value and lasts for 1 minute, the AC input would switched to load.
14	Battery input protection	When the battery is reversely connected or the inverter is short-circuited, the battery input fuse in the inverter will blow out to prevent the battery from being damaged or causing a fire.
15	Charge short protection	When the external battery port is short-circuited in the PV or AC charging state, the inverter will protect and stop the output current.
16	CAN communication loss protection	In parallel operation, an alarm will be given when CAN communication is lost.
17	Parallel connection error protection	In parallel operation, the equipment will be protected when the parallel line is lost.
18	Parallel battery voltage difference protection	In parallel operation, the equipment will be protected when the battery connection is inconsistent and the battery voltage is greatly different from that detected by the host.
19	Parallel AC voltage difference protection	In parallel operation, the equipment will be protected when the AC IN input connection is inconsistent.
20	Parallel current sharing fault protection	In parallel operation, the running equipment will be protected when the load difference of each inverter is large due to improper connection of current sharing line or device damage.
21	Synchronization signal fault protection	The equipment will be protected when there is a fault in the guidance signal between parallel buses, causing inconsistent behavior of each inverter.

## 6.2 Meaning of fault code

Fault Code	Fault Name	Affecting output or not	Note
<b>【01】</b>	BatVoltLow	NO	Battery undervoltage alarm
<b>【02】</b>	BatOverCurrSw	Yes	Battery discharge average current overcurrent software protection
<b>【03】</b>	BatOpen	Yes	Battery not-connected alarm
<b>【04】</b>	BatLowEod	Yes	Battery undervoltage stop discharge alarm
<b>【05】</b>	BatOverCurrHw	Yes	Battery overcurrent hardware protection
<b>【06】</b>	BatOverVolt	Yes	Charging overvoltage protection
<b>【07】</b>	BusOverVoltHw	Yes	Bus overvoltage hardware protection
<b>【08】</b>	BusOverVoltSw	Yes	Bus overvoltage software protection
<b>【09】</b>	PvVoltHigh	No	PV overvoltage protection
<b>【10】</b>	PvBoostOCSw	No	Boost overcurrent software protection
<b>【11】</b>	PvBoostOCHw	No	Boost overcurrent hardware protection
<b>【12】</b>	bLineLoss	No	Mains power down

<b>【13】</b>	OverloadBypass	Yes	Bypass overload protection
<b>【14】</b>	OverloadInverter	Yes	Inverter overload protection
<b>【15】</b>	AcOverCurrHw	Yes	Inverter overcurrent hardware protection
<b>【17】</b>	InvShort	Yes	Inverter short circuit protection
<b>【19】</b>	OverTemperMppt	No	Buck heat sink over temperature protection
<b>【20】</b>	OverTemperInv	Yes	Inverter heat sink over temperature protection
<b>【21】</b>	FanFail	Yes	Fan failure
<b>【22】</b>	EEPROM	Yes	Memory failure
<b>【23】</b>	ModelNumErr	Yes	Model setting error
<b>【26】</b>	RlyShort	Yes	Inverted AC Output Backfills to Bypass AC Input
<b>【29】</b>	BusVoltLow	Yes	Internal battery boost circuit failure
<b>【30】</b>	BatCapacityLow1	No	Alarm given when battery capacity rate is lower than 10% (setting BMS to enable validity)
<b>【31】</b>	BatCapacityLow2	No	Alarm given when battery capacity rate is lower than 5% (setting BMS to enable validity)
<b>【32】</b>	BatCapacityLowStop	Yes	Inverter stops when battery capacity is low (setting BMS to enable validity)
<b>【34】</b>	CanCommFault	Yes	CAN communication fault in parallel operation
<b>【35】</b>	ParaAddrErr	Yes	Parallel ID setting error
<b>【36】</b>	-	-	-
<b>【37】</b>	ParaShareCurrErr	Yes	Parallel current sharing fault
<b>【38】</b>	ParaBattVoltDiff	Yes	Large battery voltage difference in parallel mode
<b>【39】</b>	ParaAcSrcDiff	Yes	Inconsistent AC input source in parallel mode
<b>【40】</b>	ParaHwSynErr	Yes	Hardware synchronization signal error in parallel mode
<b>【41】</b>	InvDcVoltErr	Yes	Inverter DC voltage error
<b>【42】</b>	SysFwVersionDiff	Yes	Inconsistent system firmware version in parallel mode
<b>【43】</b>	ParaLineContErr	Yes	Parallel line connection error in parallel mode
<b>【44】</b>	Serial number error	YES	If the serial number is not set by omission in production, please contact the manufacturer to set it
<b>【45】</b>	Error setting of splitphase mode	YES	<b>【31】</b> Settings item setting error
<b>【58】</b>	BMS communication error	NO	Check whether the communication line is connected correctly and whether <b>【33】</b> is set to the corresponding lithium battery



			communication protocol
<b>【59】</b>	BMS alarm	NO	Check the BMS fault type and troubleshoot battery problems
<b>【60】</b>	BMS battery low temperature alarm	NO	BMS alarm battery low temperature
<b>【61】</b>	BMS battery over temperature alarm	NO	BMS alarm battery over temperature
<b>【62】</b>	BMS battery over current alarm	NO	BMS alarm battery over current
<b>【63】</b>	BMS low battery talarm	NO	BMS alarm low battery
<b>【64】</b>	BMS battery over voltage alarm	NO	BMS alarm battery over voltage

### 6.3 Some fault troubleshooting

Fault code	Faults	Remedy
<b>Display</b>	No display on the screen	Check if the battery the PV air switch has been closed; if the switch is in the "ON" state; press any button on the screen to exit the screen sleep mode.
<b>【06】</b>	Battery overvoltage protection	Measure if the battery voltage exceeds rated, and turn off the PV array air switch and Mains air switch.
<b>【01】 【04】</b>	Battery undervoltage protection	Charge the battery until it returns to the low voltage disconnection recovery voltage.
<b>【21】</b>	Fan failure	Check if the fan is not turning or blocked by foreign object.
<b>【19】 【20】</b>	Heat sink over temperature protection	When the temperature of the device is cooled below the recovery temperature, normal charge and discharge control is resumed.
<b>【13】 【14】</b>	Bypass overload protection, inverter overload protection	① Reduce the use of power equipment; ③ ② Restart the unit to resume load output.
<b>【17】</b>	Inverter short circuit protection	① Check the load connection carefully and clear the short-circuit fault points; ① ② Re-power up to resume load output.
<b>【09】</b>	PV overvoltage	Use a multimeter to check if the PV input voltage exceeds the maximum allowable input voltage rated.
<b>【03】</b>	Battery disconnected alarm	Check if the battery is not connected or if the battery circuit breaker is not closed.
<b>【40】 【43】</b>	Parallel connection fault	Check whether the parallel line is not connected well, such as loose or wrong connection.
<b>【35】</b>	Parallel ID setting error	Check whether the setting of parallel ID number is repeated.
<b>【37】</b>	Parallel current sharing fault	Check whether the parallel current sharing line is not connected well, such as loose or wrong connection.

<b>【39】</b>	Inconsistent AC input source in parallel mode	Check whether the parallel AC inputs are from the same input interface.
<b>【42】</b>	Inconsistent system firmware version in parallel mode	Check whether the software version of each inverter is consistent.

## 7. Troubleshooting

- **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 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 off-grid Hybrid Inverter without permission.

Force majeure: Damage that occurs in transportation or handling of the off-grid Hybrid Inverter.

## 8. Technical Parameter

Models	CEP4850-EU-80-H
<b>Parallel mode</b>	
Permitted parallel number	1~6
<b>AC mode</b>	
Rated input voltage	220/230Vac
Input voltage range	(170Vac~280Vac) $\pm 2\%$ (90Vac-280Vac) $\pm 2\%$
Frequency	50Hz/ 60Hz (Auto detection)
Frequency Range	47 $\pm 0.3$ Hz ~ 55 $\pm 0.3$ Hz (50Hz); 57 $\pm 0.3$ Hz ~ 65 $\pm 0.3$ Hz (60Hz);
Overload/short circuit protection	Circuit breaker
Efficiency	>95%
Conversion time (bypass and inverter)	10ms (typical)
AC reverse protection	Available
Maximum bypass overload current	40A
<b>Inverter mode</b>	
Output voltage waveform	Pure sine wave
Rated output power (VA)	5000
Rated output power (W)	5000
Power factor	1
Rated output voltage (Vac)	230Vac
Output voltage error	$\pm 5\%$
Output frequency range (Hz)	50Hz $\pm 0.3$ Hz 60Hz $\pm 0.3$ Hz
Maximum Efficiency	>92%
Overload protection	(102% < load < 125%) $\pm 10\%$ : report error and turn off the output after 5 minutes; (125% < load < 150%) $\pm 10\%$ : report error and turn off the output after 10 seconds; Load > 150% $\pm 10\%$ : report error and turn off the output after 5 seconds
Peak power	10000VA
Loaded motor capability	4HP
Rated battery input voltage	48V (Minimum starting voltage 44V)
Battery voltage range	Undervoltage alarm/shutdown voltage/overvoltage alarm /overvoltage recovery... settable on LCD screen)

Power saving mode self-consumption	Load≤50W
<b>AC charging</b>	
Battery type	Lead acid or lithium battery
Maximum charge current (can be set)	0-60A
Charge current error	± 3Adc
Charge voltage range	40 –58Vdc
Short circuit protection	Circuit breaker and blown fuse
Circuit breaker specifications	40A
Overcharge protection	Alarm and turn off charging after 1 minute
<b>PV charging</b>	
Maximum PV open circuit voltage	500Vdc
PV operating voltage range	120-500Vdc
MPPT voltage range	120-450Vdc
Battery voltage range	40-60Vdc
Maximum PV input power	5500W
Maximum PV input current	22A
PV charging current range (can be set)	0-80A
Charging short circuit protection	Blown fuse
Wiring protection	Reverse polarity protection
<b>Hybrid charging Max charger current specifications (AC charger+ PV charger)</b>	
Max charger current (can be set)	0-80A
<b>Certified specifications</b>	
Certification	CE(IEC62109-1)/CETL (UL 1741 C22.2 NO.107.1)
EMC certification level	EN61000, C2
Operating temperature range	-10°C to 55°C
Storage temperature range	-25°C ~ 60°C
Humidity range	5% to 95% (Conformal coating protection)
Noise	≤60dB
Heat dissipation	Forced air cooling, variable speed of fan
Communication interface	USB/RS485(WIFI/GPRS)/Dry contact control
Dimension (L*W*D)	426mm*322mm*124mm
Weight	10.8kg



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