ECO-WORTHY
ENERGY FOR INDEPENDENCE

Version: A-1-V1.02

USER MANUAL

# ECO-WORTHY 10KW AIO INVERTER USER MANUAL




**SUPPORT**

If you are experiencing technical problems and cannot find a solution in this manual, please contact ECO-WORTHY for further assistance.

·Call:+1 713-906-2097 (US)
+49 6175-6514-999 (DE)
+44 755-3406-988(UK)

·Web: www.eco-worthy.com

·E-mail: essvipsupport@eco-worthy.com.cn

Catalogue


1. Safety ..... 1
1.1 About this Manual ..... 1
1.2 Symbols and description ..... 1
1.3 Safety matters ..... 1
2. About the Product ..... 2
2.1 Description ..... 2
2.2 Features ..... 2
2.3 System connection diagram ..... 3
2.4 Product overview ..... 4
3. Installation ..... 5
3.1 Installation location ..... 5
3.2 Inverter installation ..... 6
3.3 Removal of terminal cover and insect-proof net ..... 6
4. Wiring ..... 7
4.1 Wiring mode (depends on the output mode) ..... 7
4.2 Cable and circuit breaker model ..... 10
4.3 AC input and output wiring ..... 12
4.4 Battery wiring ..... 12
4.5 PV wiring ..... 13
4.6 Dry contact wiring ..... 13
4.7 Grounding ..... 14
4.8 Inverter start ..... 14
4.9 Parallel wiring ..... 14
5. Operation ..... 32
5.1 Operation and display panel ..... 32
5.2 Setting ..... 37
5.3 AC output mode ..... 44
5.4 Battery charge mode ..... 46
5.5 Timed charge/discharge function ..... 47
5.6 Battery parameters ..... 48
6. Communication ..... 50
6.1 Overview ..... 50
6.2 USB-B port ..... 50
6.3 WIFI port ..... 51
6.4 RS485/CAN port ..... 51
6.5 Dry contact port ..... 52
7. Fault Codes and Response Measures ..... 53
7.1 Fault codes ..... 53
7.2 Troubleshooting ..... 56
8. Protection Function and Product Maintenance ..... 57
8.1 Protection function ..... 57

8.2 Maintenance ..... 59
9. Parameter Table ..... 60

# 1. Safety

## 1.1 About this Manual

- This Manual contains important information, guiding principles, operation, and maintenance of the product, and applies to the model: ECO10000W(SR)
- Users must follow the instructions in this Manual during installation, use, and maintenance

## 1.2 Symbols and description

| Symbol | Description |
|---|---|
| ⚠ DANGER | Dangerous situations that will lead to death or serious injury when ignored |
| ⚠ WARING | Dangerous situations that may lead to death or serious injury when ignored |
| ⚠ CAUTION | Dangerous situations that may lead to mild or moderate injury when ignored |
| ⓘ NOTICE | Operation tips |

## 1.3 Safety matters

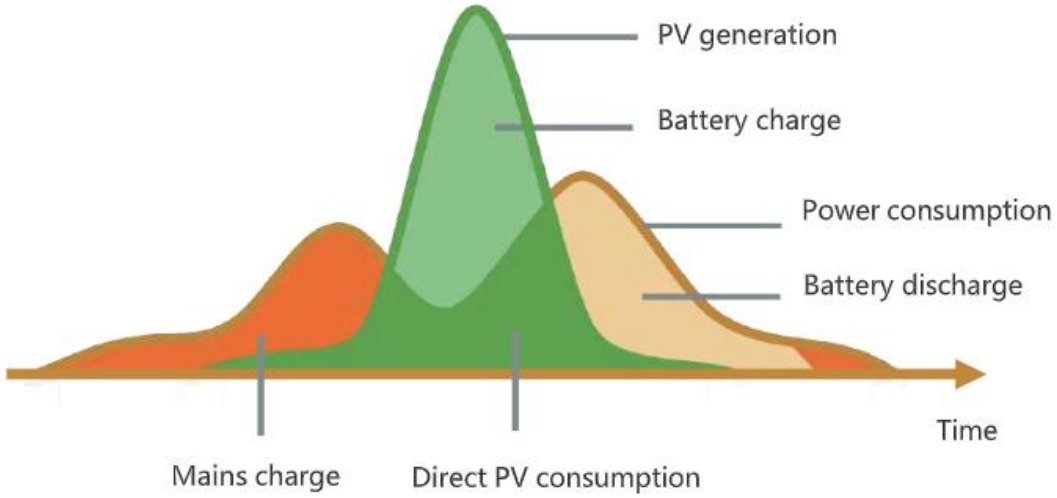
⚠ DANGER

- This chapter contains important safety matters. Please read and keep this Manual for future reference.
- Please make sure to comply with local requirements and regulations when installing the inverter.
- Be careful of high voltage. Before and during installation, please turn off the switch of each power supply to avoid electric shock.
- In order to achieve optimal operation of the inverter, please select the appropriate cable size and necessary protective devices according to regulations.
- Do not connect or disconnect any connections when the inverter is working.
- Do not open the terminal cover when the inverter is working.

# 2.About the Product

## 2.1 Description

ECO10000W(SR) is a new type of solar storage inverter that integrates PV storage, mains charge, and energy storage and outputs sinusoidal AC. Equipped with DSP control and advanced control algorithm, it has high response speed and good reliability, and applies to industrial scenarios.




## 2.2 Features

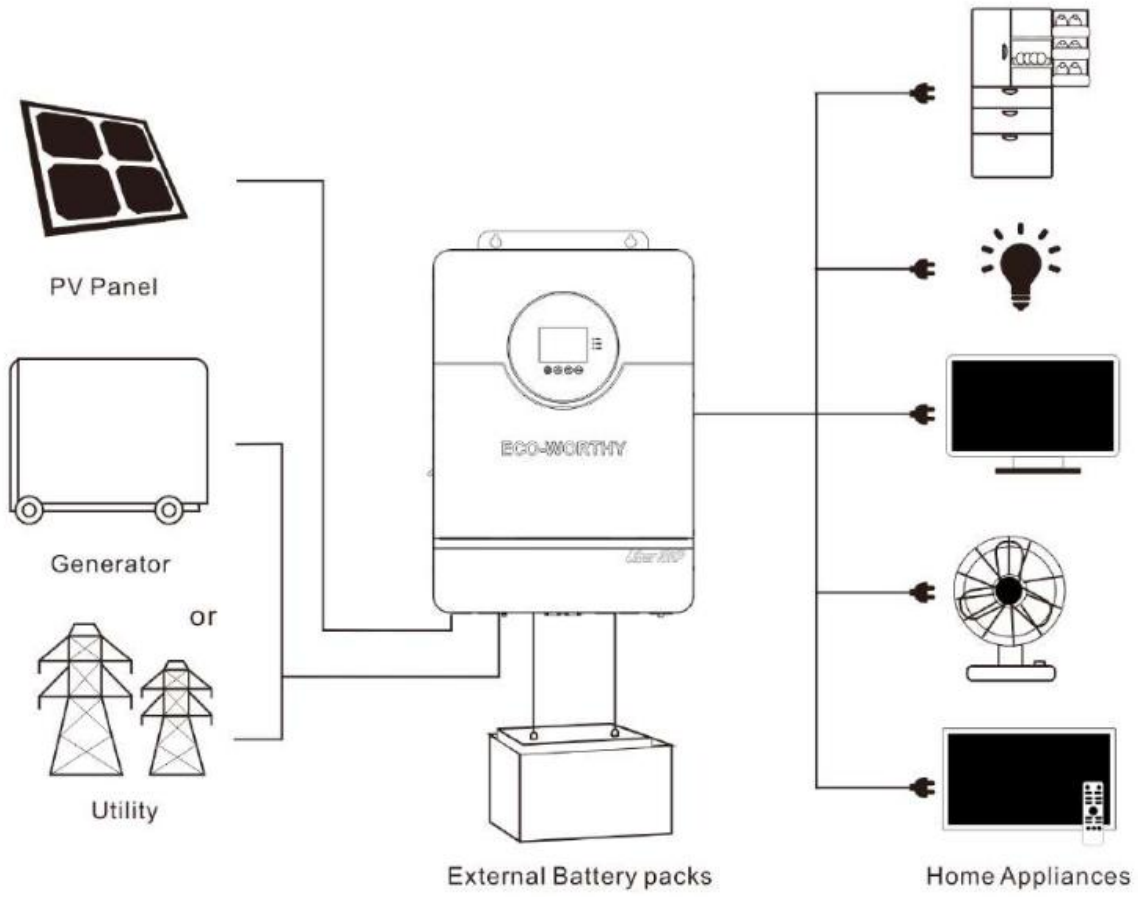
- Support the connection of various types of energy storage batteries such as lead-acid battery and lithium-ion battery
- Have the dual activation function during lithium-ion battery sleep, that is, access to mains/PV power can activate the lithium-ion battery
- Support split-phase/single-phase pure sine wave output
- Support adjusting the voltage of each phase within the range of 100 VAC, 105 VAC, 110 VAC, and 120 VAC
- Support two-channel PV input and have the function of simultaneous two-channel maximum power point tracking (MPPT) for charging/carrying capacity
- Support two-channel MPPT, with an efficiency of up to 99.9% and a maximum single-channel current of 22 A, perfectly fitting high-power modules
- Provide four charge modes: only PV, mains first, PV first, and mains + PV
- Have the timed charge and discharge function, that is, users can set the charge and discharge time according to the time-of-use price to save electricity costs
- Have the energy-saving mode, reducing no-load energy losses
- Provide two output modes: mains bypass output and inverter output, achieving uninterrupted power supply
- Support LCD display of dynamic flowchart, updating system data and operating status at any time
- Provide 360 ° protection, including short circuit protection, over-current protection, over-voltage and under-voltage protection, and overload protection
- Support CAN, USB, RS485 communication

## 2.3 System connection diagram

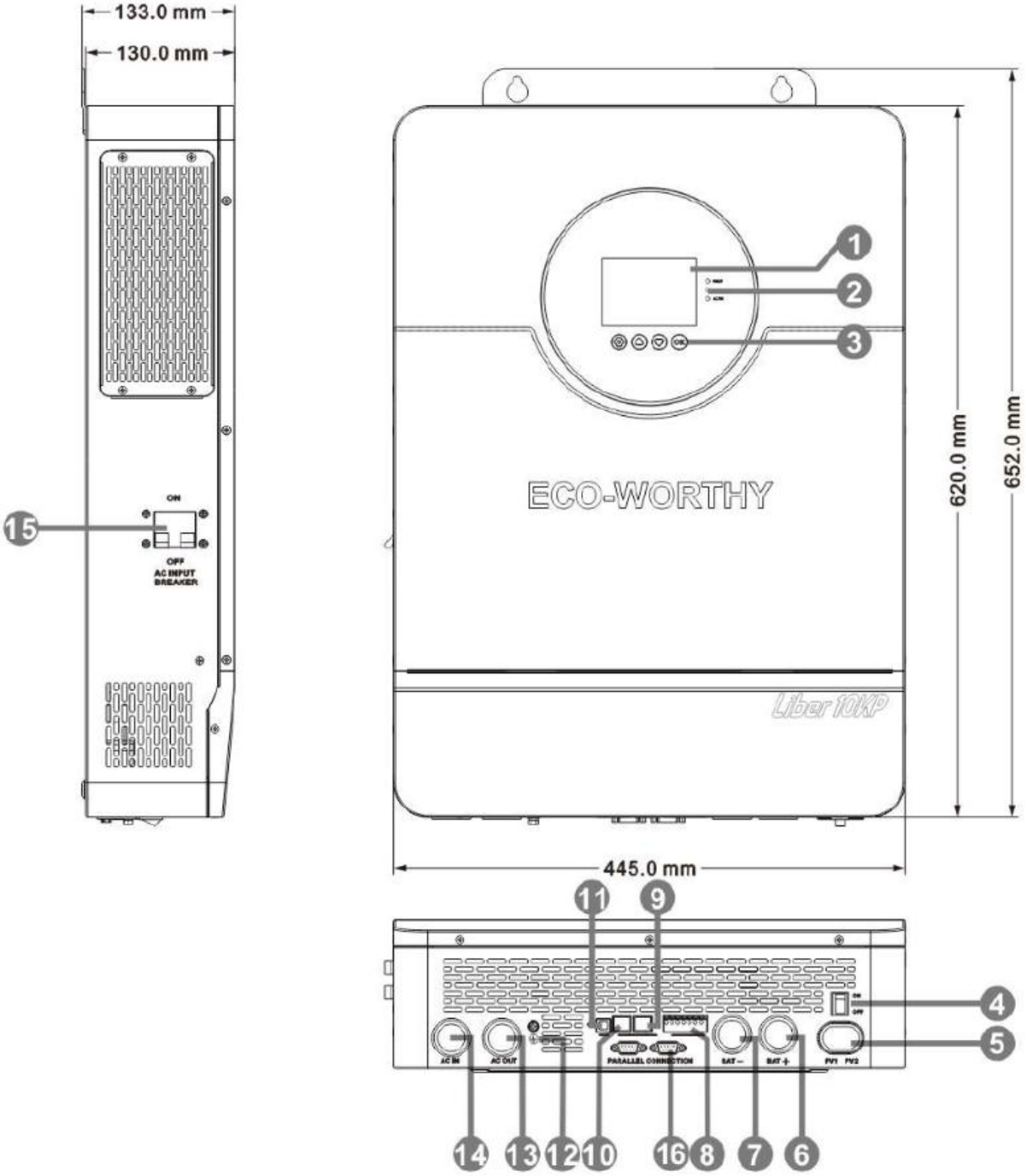
The following figure shows the system application scenario of the product. A complete system consists of the following parts:

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

- **The actual application scenario determines the specific system wiring mode**



## 2.4 Product overview



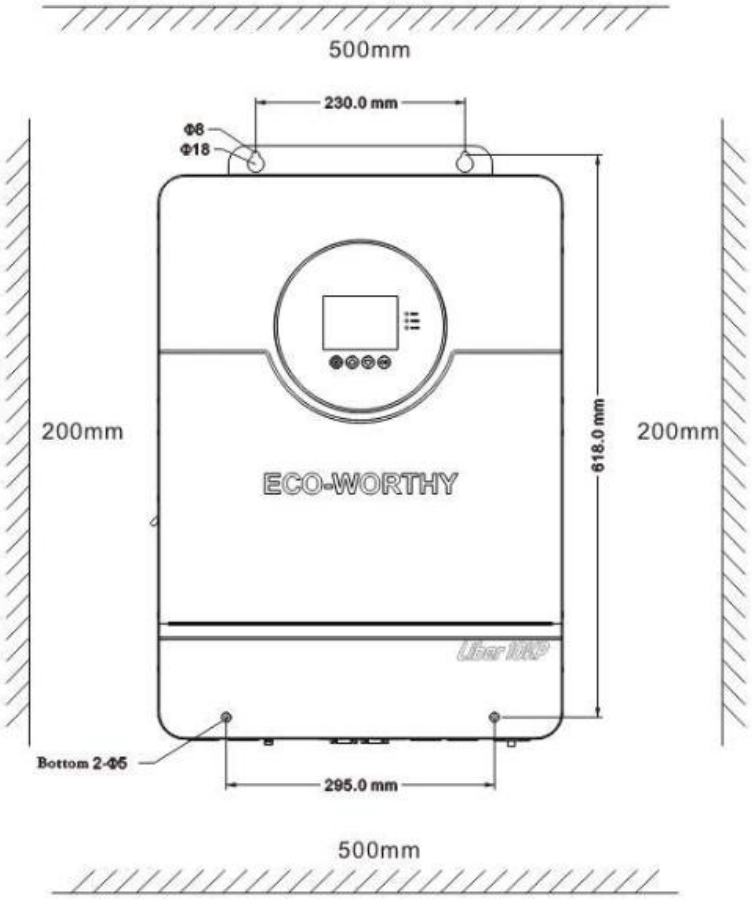

| | | | | | |
|---|---|---|---|---|---|
| 1 | LCD screen | 2 | LED indicator | 3 | Physical button |
| 4 | ON/OFF rocker switch | 5 | PV input (1/1) | 6 | Battery (positive electrode) |
| 7 | Battery (negative electrode) | 8 | Dry contact | 9 | RS485/CAN port |
| 10 | WIFI port | 11 | USB-B port | 12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

# 3. Installation

## 3.1 Installation location

ECO10000W(SR) is only for indoor use **(protection level: IP20)**. Before selecting the installation location, users should consider the following factors:

- A solid wall
- Installation height: flush with the line of sight
- Sufficient heat dissipation space
- Ambient temperature: -10°C–55°C (14°F–131°F), to ensure optimal operation




**⚠ DANGER**

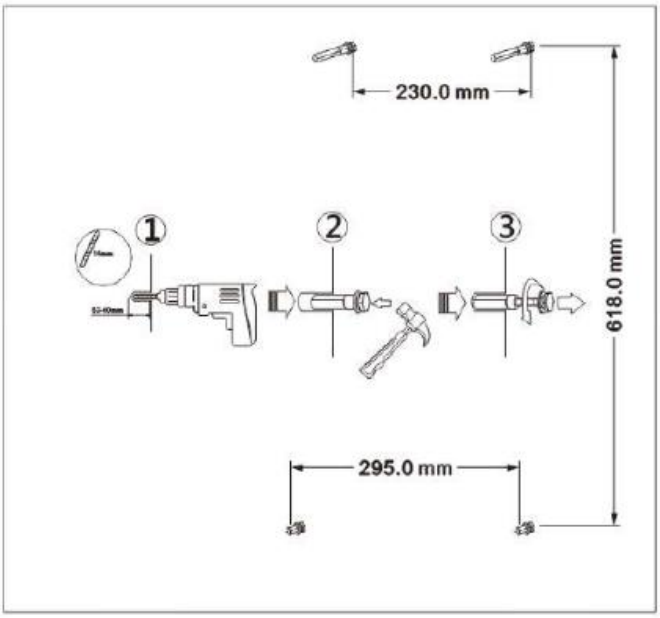
- Do not install the inverter near highly flammable materials
- Do not install the inverter in potentially explosive areas
- Do not install the inverter and lead-acid battery in enclosed spaces

**⚠ CAUTION**

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

## 3.2 Inverter installation

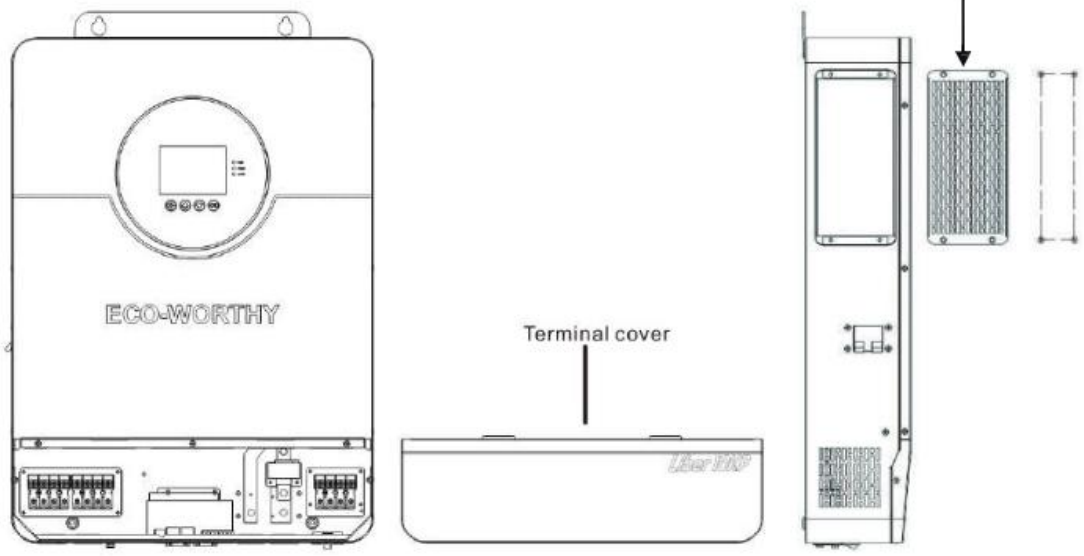
Drill 4 installation holes of the specified sizes on the wall with an electric drill, insert 2 expansion screws above, and fix the inverter with 2 M5 screws below.




## 3.3 Removal of terminal cover and insect-proof net

Remove the terminal cover and insect-proof net with a screwdriver

Remove the insect-proof net when cleaning




**NOTICE**

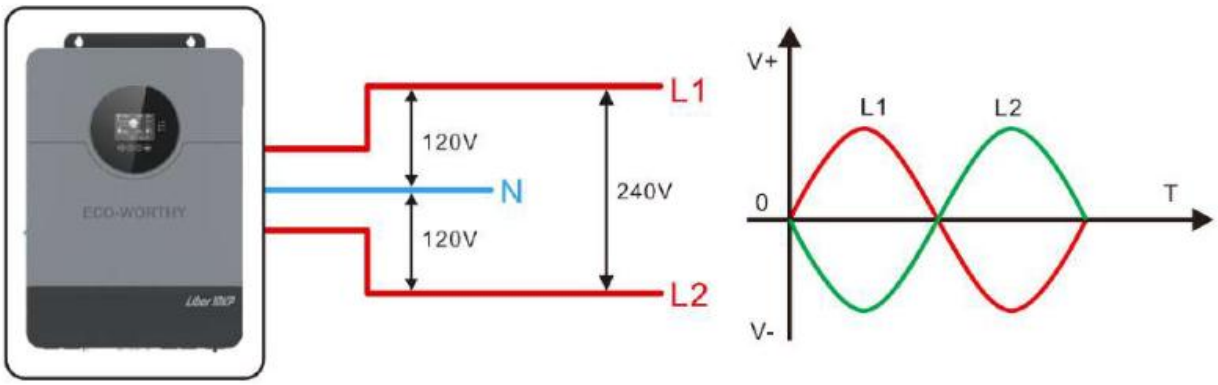
- When using the inverter in areas with poor air quality, the dustproof net is easily blocked by air particles. Please regularly remove and clean it to avoid affecting the air flow rate inside the inverter; otherwise it may cause inverter overheating (19/20 fault), and affect power supply and the service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

# 4. Wiring

## 4.1 Wiring mode (depends on the output mode)

- **Split-phase mode (default)**

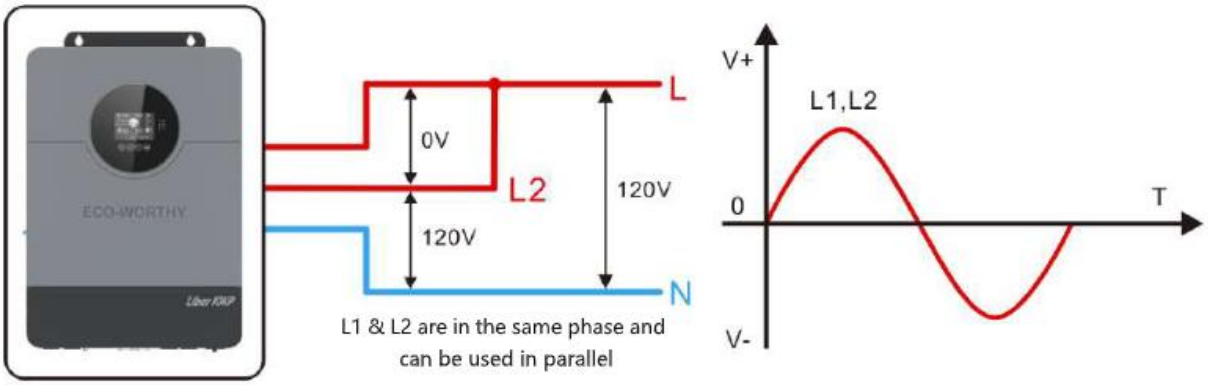
**AC output**




| Item | Description |
|---|---|
| Applicable model | ECO10000W(SR) model |
| AC output phase voltage (L-N) | 100 VAC–120 VAC, 120 VAC (default) |
| AC output line voltage (L-L) | 200 VAC–240 VAC, 240 VAC (default) |

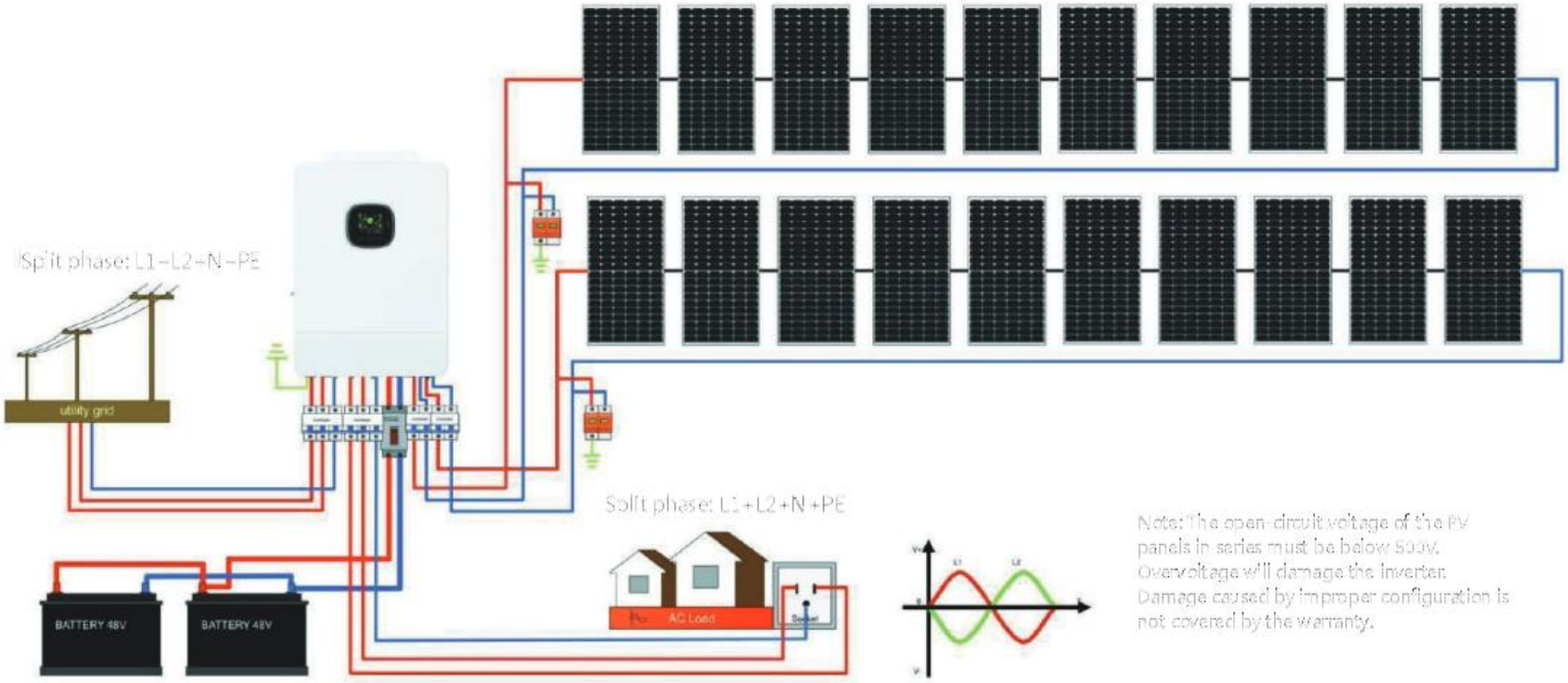
- **Single-phase mode**

**AC output**



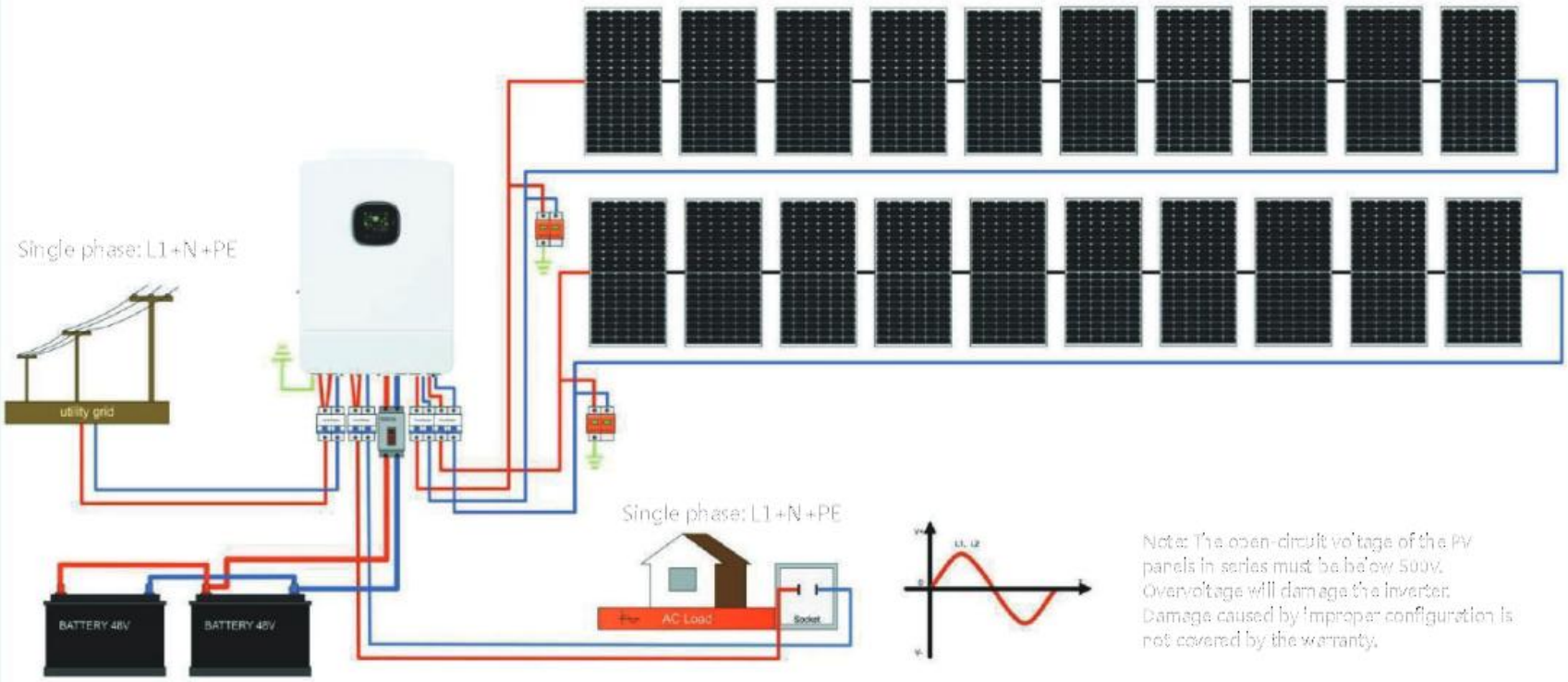

| Item | Description |
|---|---|
| Applicable model | ECO10000W(SR) model |
| AC output phase voltage (L-N) | 100 VAC–120 VAC, 120 VAC (default) |

# Split-phase Mode




Note: The open-circuit voltage of the PV panels in series must be below 500V. Overvoltage will damage the inverter. Damage caused by improper configuration is not covered by the warranty.

# Single-phase Mode



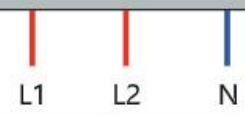
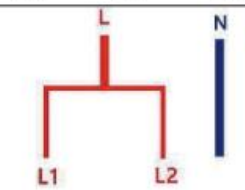

Note: The open-circuit voltage of the PV panels in series must be below 500V. Overvoltage will damage the inverter. Damage caused by improper configuration is not covered by the warranty.

## 4.2 Cable and circuit breaker model

- **PV INPUT**

| Inverter Model | Cable Size | Maximum Input Current | Circuit Breaker Model |
|---|---|---|---|
| ECO10000W(SR) | 5 mm² /10 AWG | 22 A | 2P-25A |

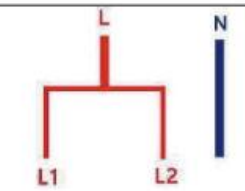
- **AC INPUT**

| Inverter Model | Output Mode | Diagram | Maximum Current | Cable Size | Circuit Breaker Model |
|---|---|---|---|---|---|
| ECO10000W(SR) | Split-phase mode |  | 63A (L1/L2/N) | 13mm²/6 AWG (L1\L2\N) | 3P-63A |
| | Single-phase mode |  L1 and L2 in same phase | 63A (L1/L2) 126 A (N) | 13mm²/6 AWG (L1\L2) 26mm²/3 AWG (N) | 2P-125A |

- **Battery**

| Inverter Model | Cable Size | Maximum Current | Circuit Breaker Model |
|---|---|---|---|
| ECO10000W(SR) | 42 mm²/1 AWG | 220 A | 2P-250A |

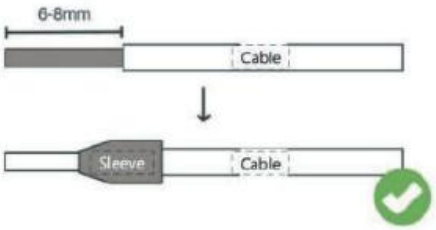
- **AC OUTPUT**

| Inverter Model | Output Mode | Diagram | Maximum Current | Cable Size | Circuit Breaker Model |
|---|---|---|---|---|---|
| ECO10000W(SR) | Split-phase mode |  | 63A (L1/L2/N) | 13mm²/6 AWG (L1\L2\N) | 3P-63A |
| | Single-phase mode |  L1 and L2 in same phase | 63A (L1/L2) 126 A (N) | 13mm²/6 AWG (L1\L2) 26mm²/3 AWG (N) | 2P-125A |

ⓘ NOTICE

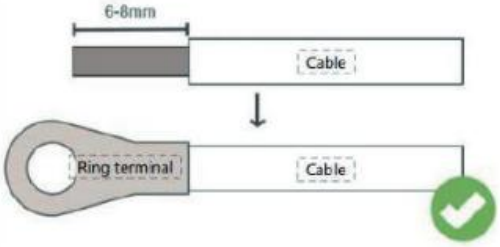
- **PV input, AC input, and AC output terminals**

1. Use a wire stripper to strip off 6 mm–8 mm long insulation layer of the cable.
2. Fix a sleeve at the end of the cable (the sleeve is to be prepared by the user)




- **Battery terminal**

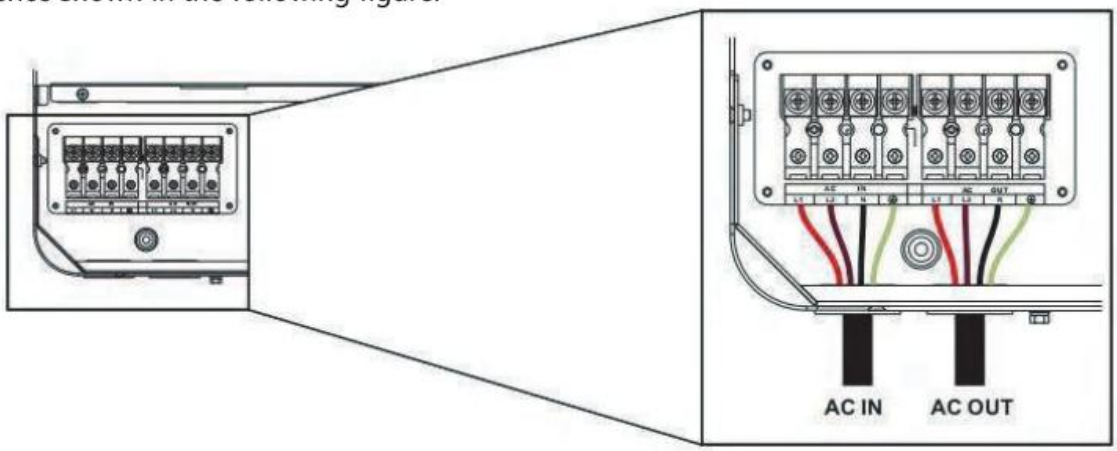
1. Use a wire stripper to strip off 6 mm–8 mm long insulation layer of the cable.
2. Fix a ring terminal (attached) at the end of the cable




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

## 4.3 AC input and output wiring

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

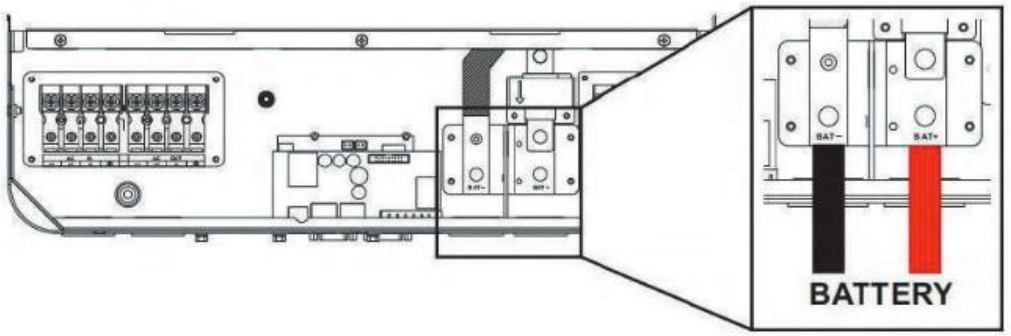



**⚠ DANGER**

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

## 4.4 Battery wiring

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

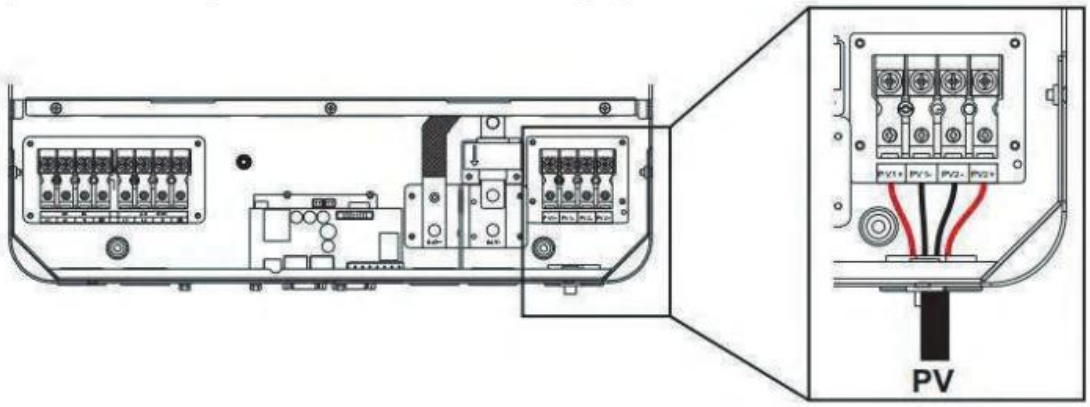



**⚠ DANGER**

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

## 4.5 PV wiring

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

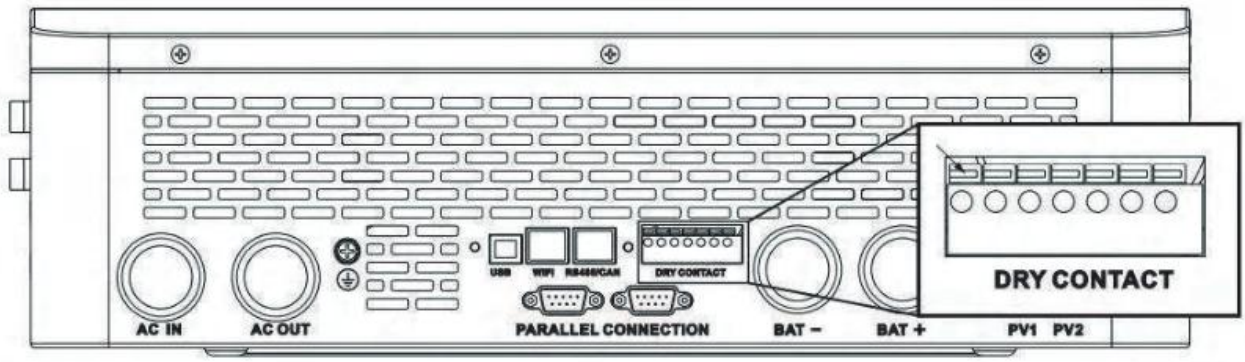



**⚠ DANGER**

- Before connecting PV modules, be sure to disconnect the circuit breaker to avoid the risk of electric shock. Do not conduct live operation.
- Please make sure that the open circuit voltage of the series connected PV modules does not exceed the maximum open circuit voltage of the inverter (in SPI series, this value is 500 V); otherwise the inverter may be damaged.

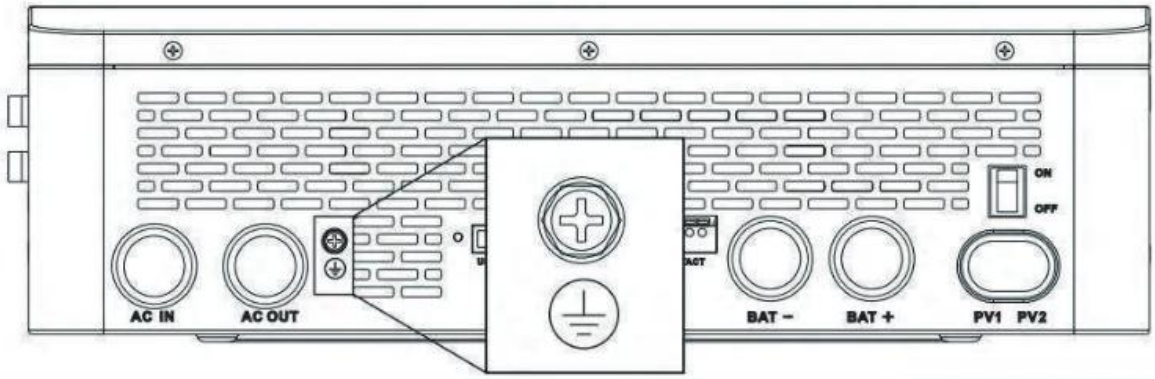
## 4.6 Dry contact wiring

Use a small-sized screwdriver to push back in the direction indicated by the arrow, and then insert the communication cable into the dry contact port. (Communication cable section: 0.2 $mm^2$–1.5 $mm^2$)



## 4.7 Grounding

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




**NOTICE**

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

## 4.8 Inverter start

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

- Step 1: Close the circuit breaker of the battery
- Step 2: Press the rocker switch at the bottom of the inverter, and the screen and indicator will light up, indicating that the inverter is enabled
- Step 3: Close the circuit breakers for PV input, AC input, and AC output in sequence
- Step 4: Start loads one by one in order of power from small to large

## 4.9 Parallel wiring

### 4.9.1 Parallel operation

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

**Parallel communication cable*1**



## 4.9.2 Cautions for parallel connection

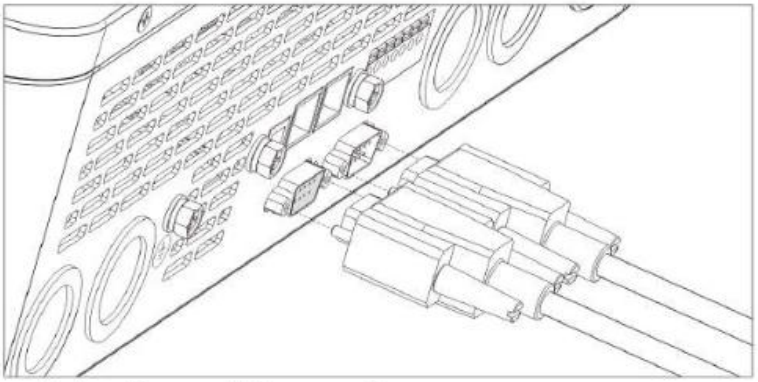
**Warning:**

1. **PV wiring:**
   In parallel connection, the PV array of each inverter must be independent, and the PV array of PV1 and PV2 for one inverter must also be independent.
2. **Battery wiring**
   In single-phase or three-phase parallel connection, all solar storage inverters must be connected to the same battery, with BAT+ connected to BAT+ and BAT- to BAT-, and before power on and start-up, it is necessary to check and ensure correct connection, wiring length, and cable size, so as to avoid the abnormal operation of parallel system output caused by wrong connection.
3. **AC OUT wiring:**
   In single-phase parallel connection, all solar storage inverters must be connected in the manner of L-to-L, N-to-N, and PE-to-PE, and before power on and start-up, it is necessary to check and ensure correct connection, wiring length, and cable size, so as to avoid the abnormal operation of parallel system output caused by wrong connection.
   In three-phase parallel connection, all solar storage inverters must be connected in the manner of N-to-N and PE-to-PE. The L lines of all inverters in the same phase shall be connected together, but the AC output L lines of different phases shall not be connected together. Other cautions are the same as those for single-phase parallel connection.
4. **AC IN wiring:**
   In single-phase parallel connection, all solar storage inverters must be connected in the manner of L-to-L, N-to-N, and PE-to-PE, and before power on and start-up, it is necessary to check and ensure correct connection, wiring length, and cable size, so as to avoid the abnormal operation of parallel system output caused by wrong connection. Meanwhile, it is not allowed to have multiple different AC source inputs to avoid damage to the external equipment of the inverter. The AC source input shall be consistent and unique.
   In three-phase parallel connection, all solar storage inverters must be connected in the manner of N-to-N and PE-to-PE. The L lines of all inverters in the same phase shall be connected together, but the AC output L lines of different phases shall not be connected together. Other cautions are the same as those for single-phase parallel connection.
5. **Communication wiring:**
   Our company's communication cable for parallel operation is a DB15 standard computer cable with shielding function, and it is used for single-phase or three-phase parallel connection. Each inverter shall be connected with one out and one in, that is, the male connector (out) of the inverter is to be connected to the female connector (in) of the parallel inverter, not the one of the inverter. In addition, DB15 terminal screws will be used to tighten the communication cable of each parallel inverter to avoid falling off or poor contact of the communication cable, followed by abnormal operation or damage of the system output.
6. Before and after connecting the system, please carefully refer to the following system wiring diagrams to ensure that all wiring is correct and reliable before power on.

7. After the system is correctly 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 solar storage inverters are powered off before reconnecting into the system.

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

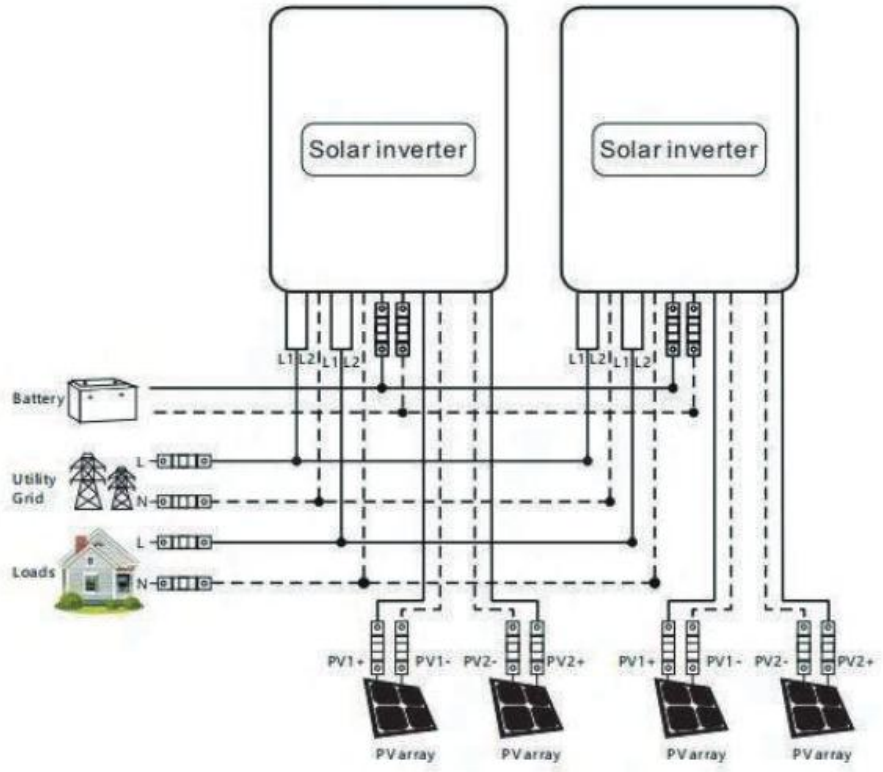
- The communication cable of parallel solar storage inverter is to be locked with screws after connecting. See the diagram below:

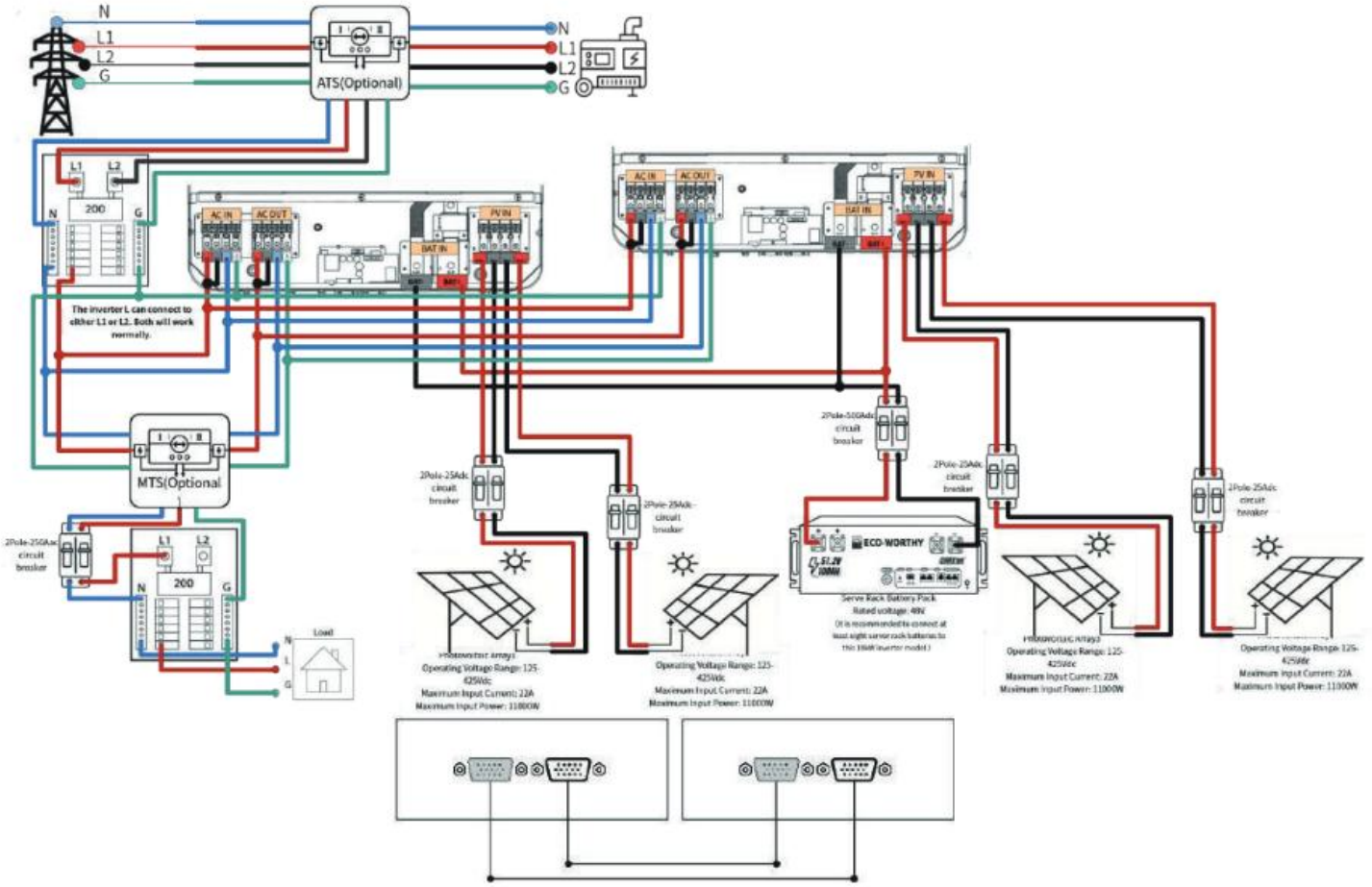


- See the diagram below for parallel connection

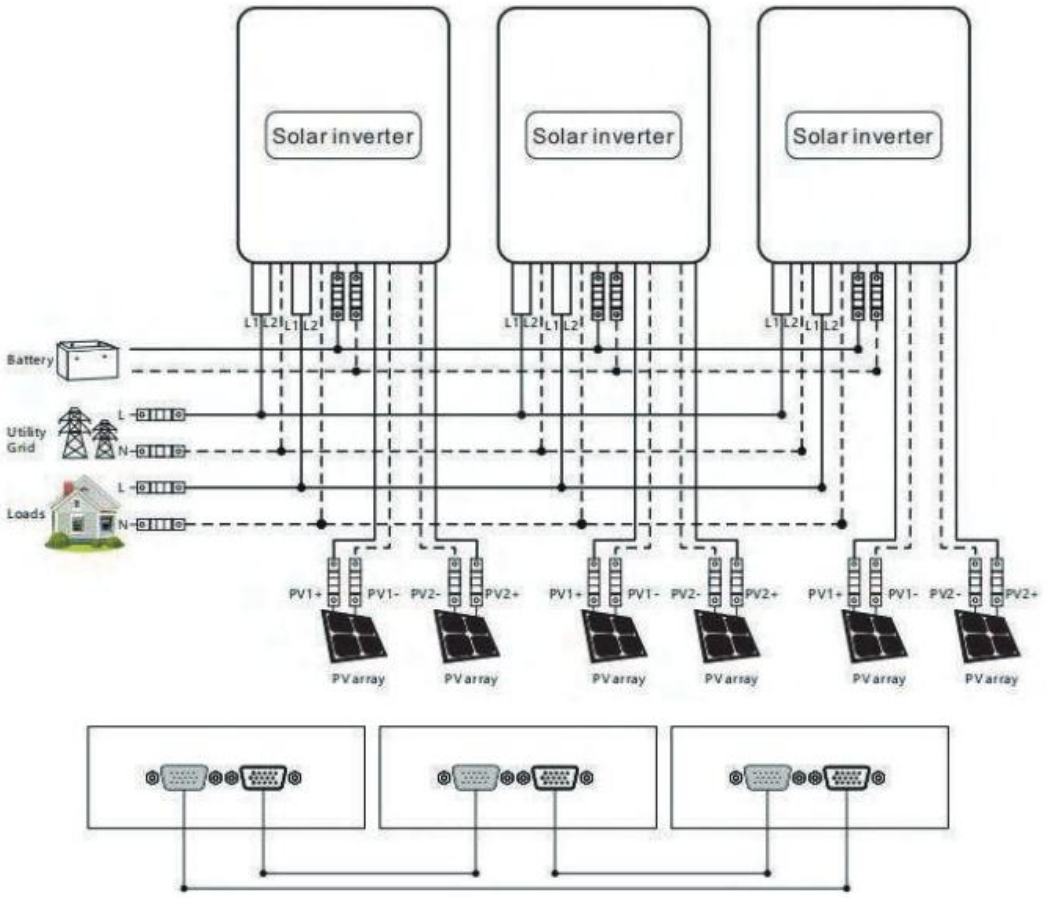
  Set the item [31] to "PAL" and the item [68] to "0°." When setting the item [38] to "120 V," the output L-N voltage is 120 V

1. **Two parallel-connected solar storage inverters:**

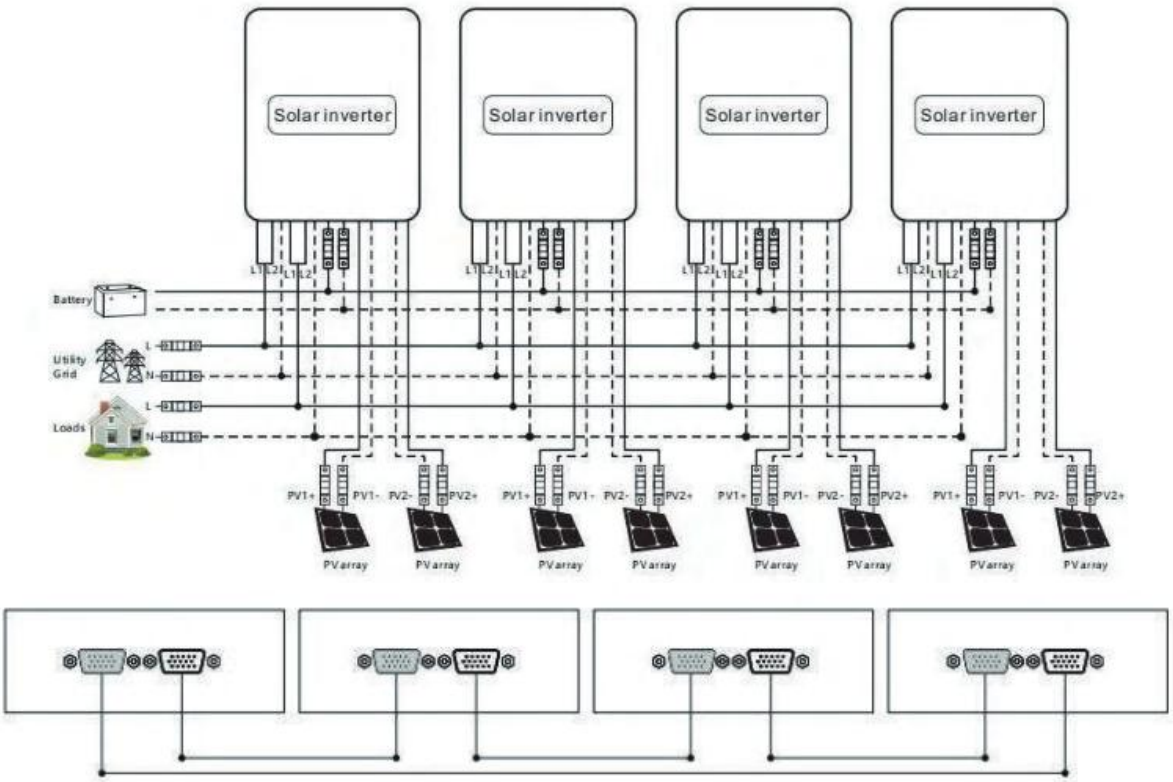




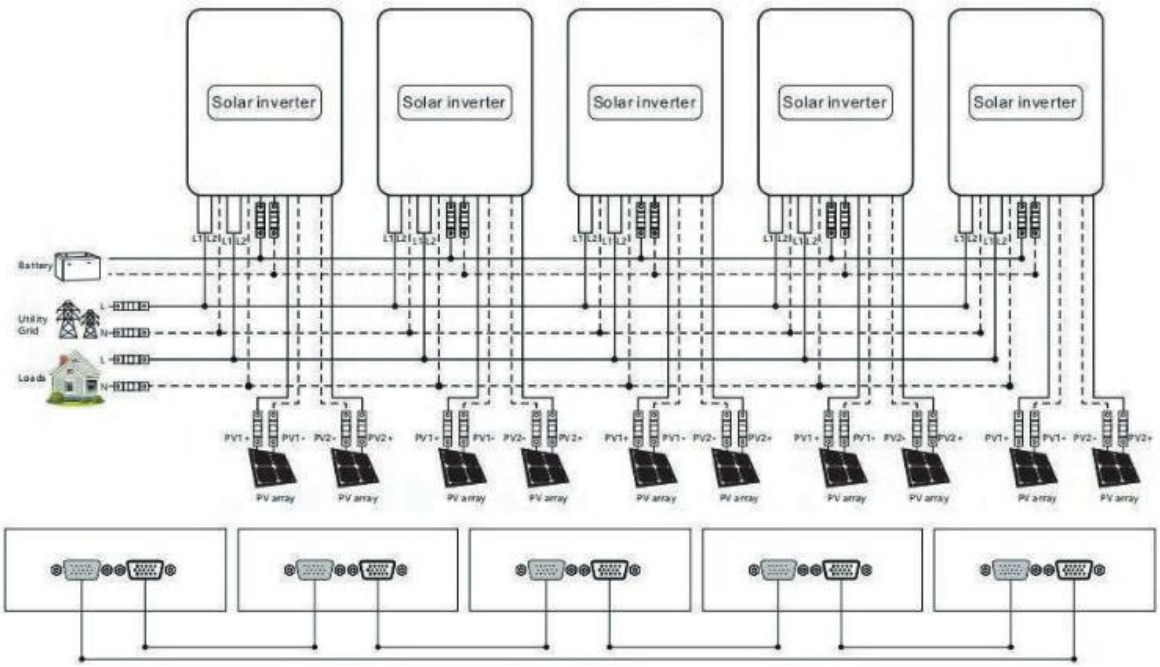

2. **Three parallel-connected solar storage inverters:**



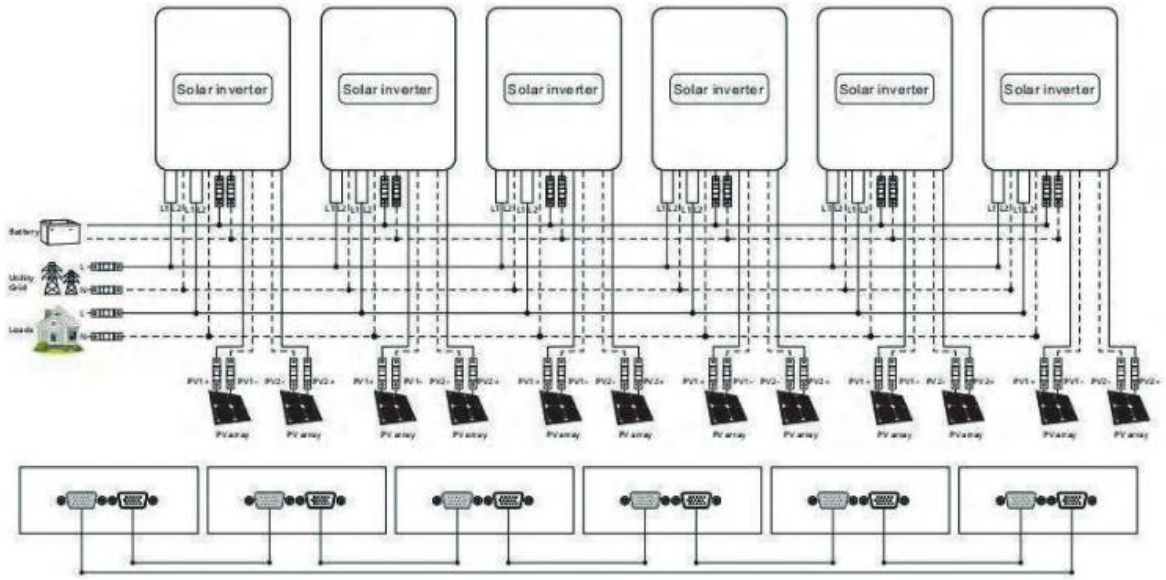
3. **Four parallel-connected solar storage inverters:**




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



5. **Six parallel-connected solar storage inverters:**



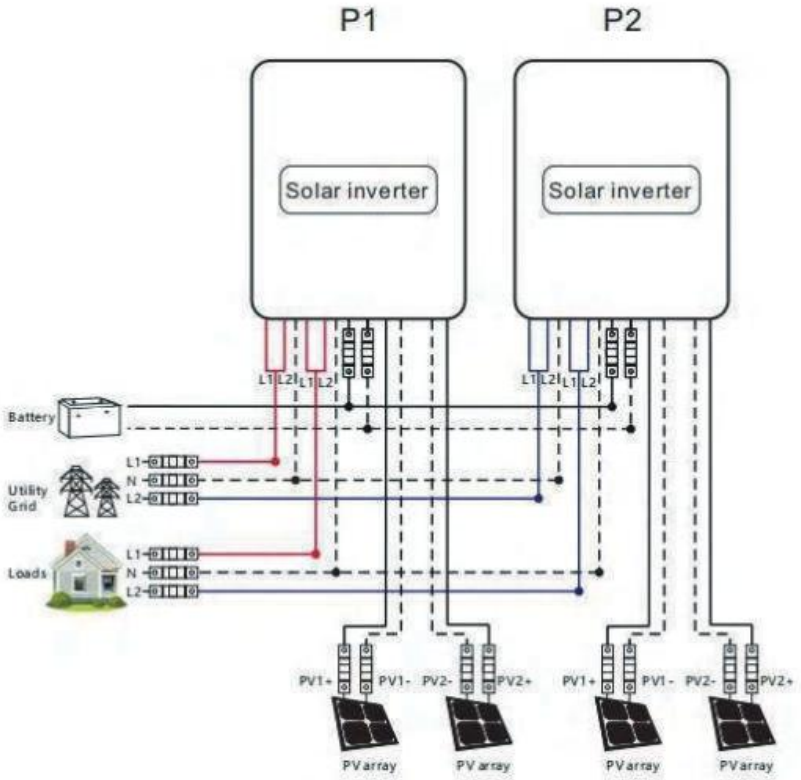

## 4.9.4 Wiring diagram for two-phase parallel connection (phase difference between L1 and L2: 0°)

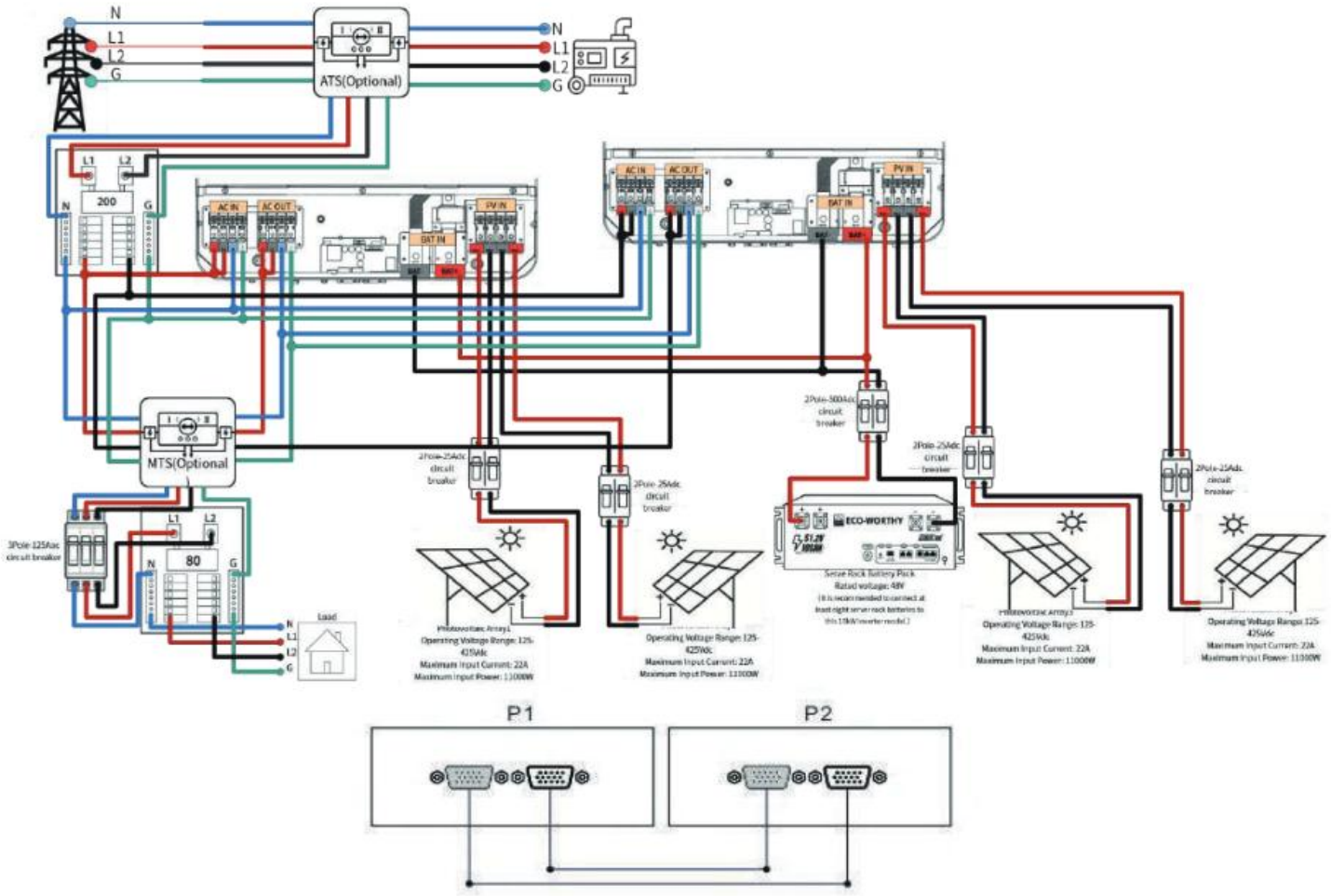
**(1)** P1: Set the item [31] to "2P0;" P2: Set the item [31] to "2P1," all of the P1/P2 inverter item [68] can not be set, it is default "0°" and the phase difference between P1 and P2 is 120°. When setting the item [38] to "120 V," the voltage between the live wire L1 of P1 phase and the live wire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

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

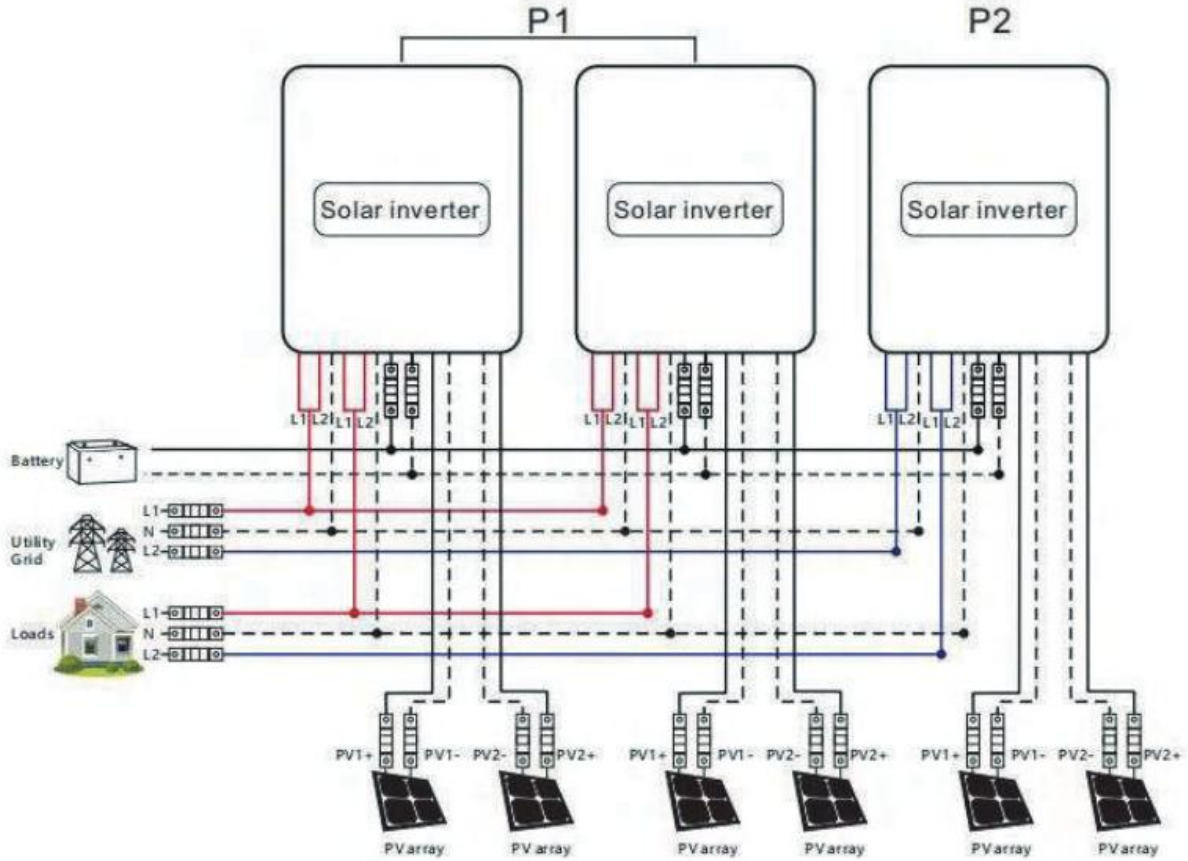
**a. Split-phase system (two inverters)**

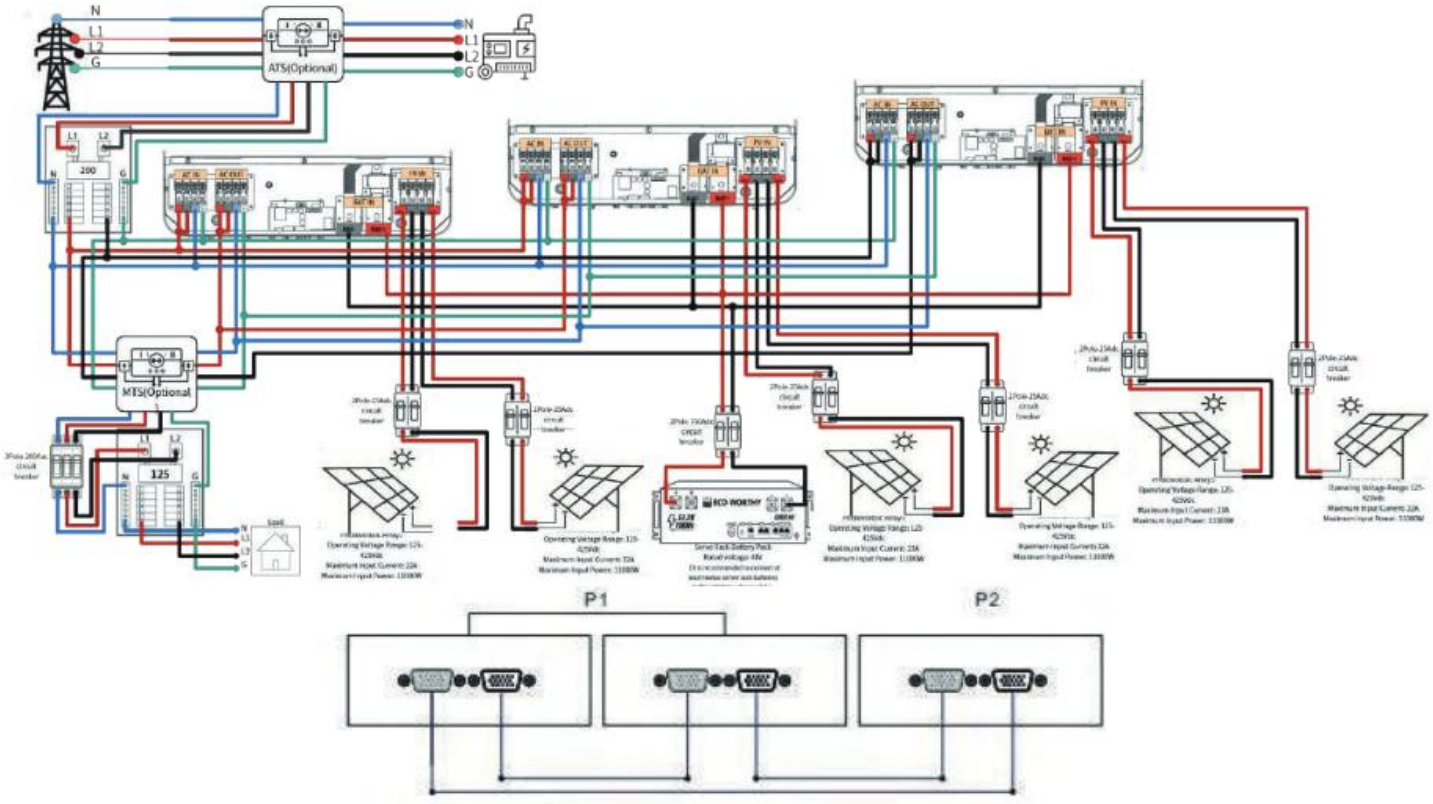
**1+1 system:**





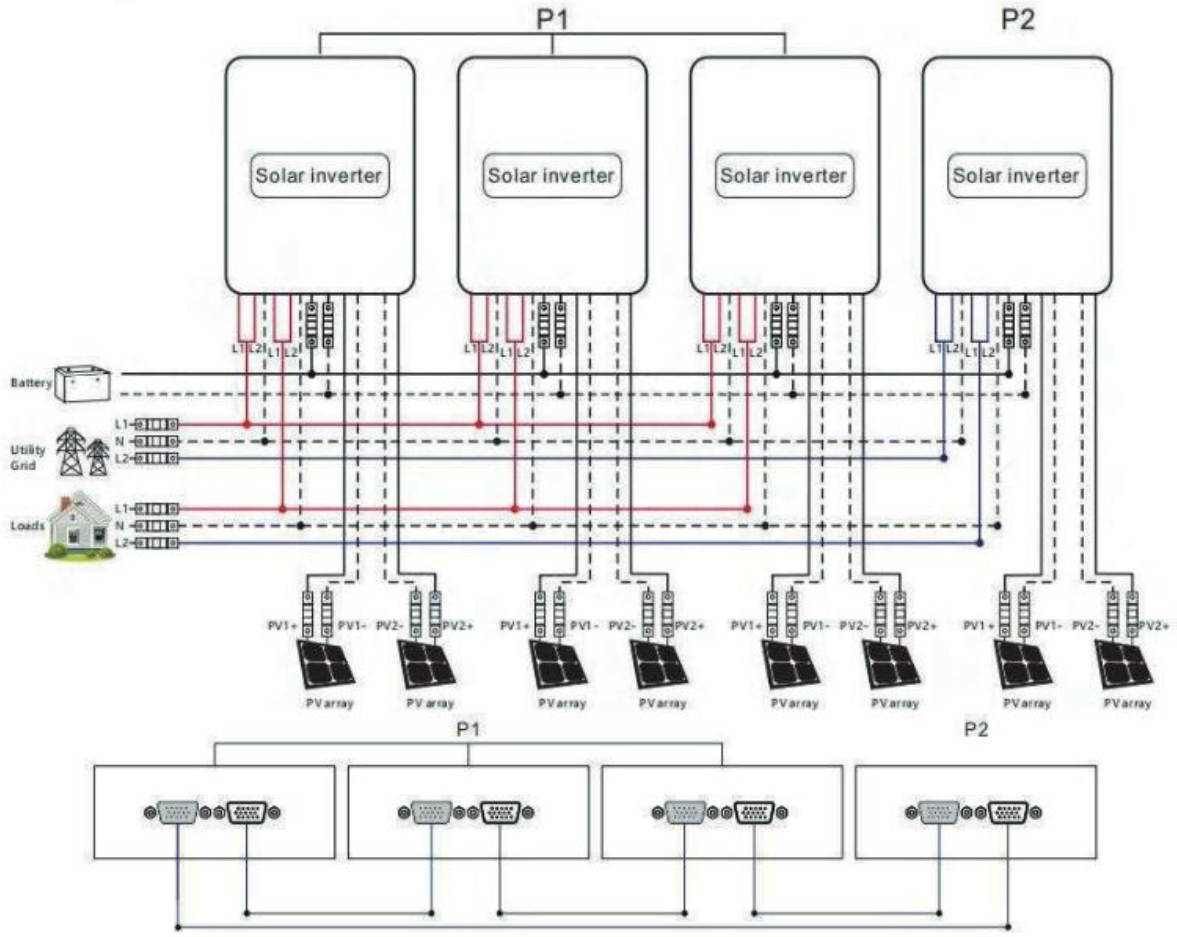

**Split-phase system (three inverters) 2+1 system**



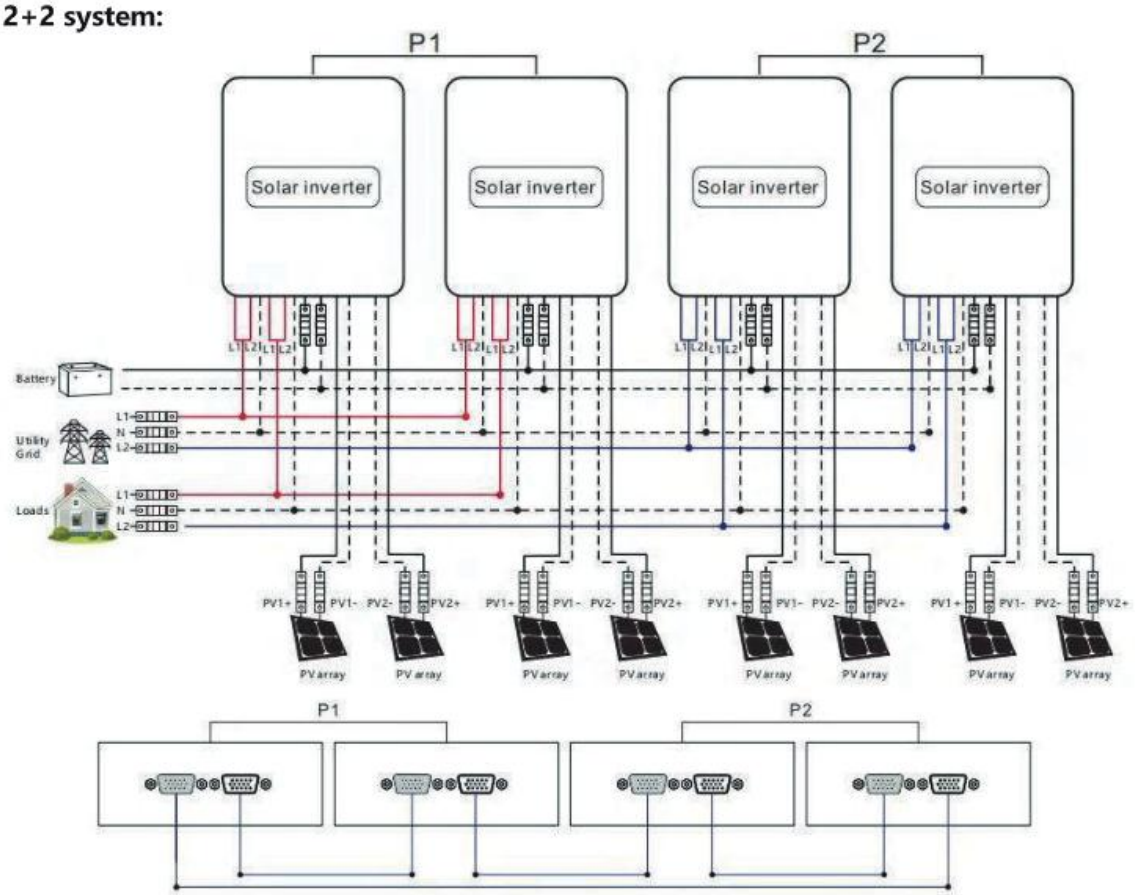



**b. Split-phase system (four inverters)**

**3+1 system:**

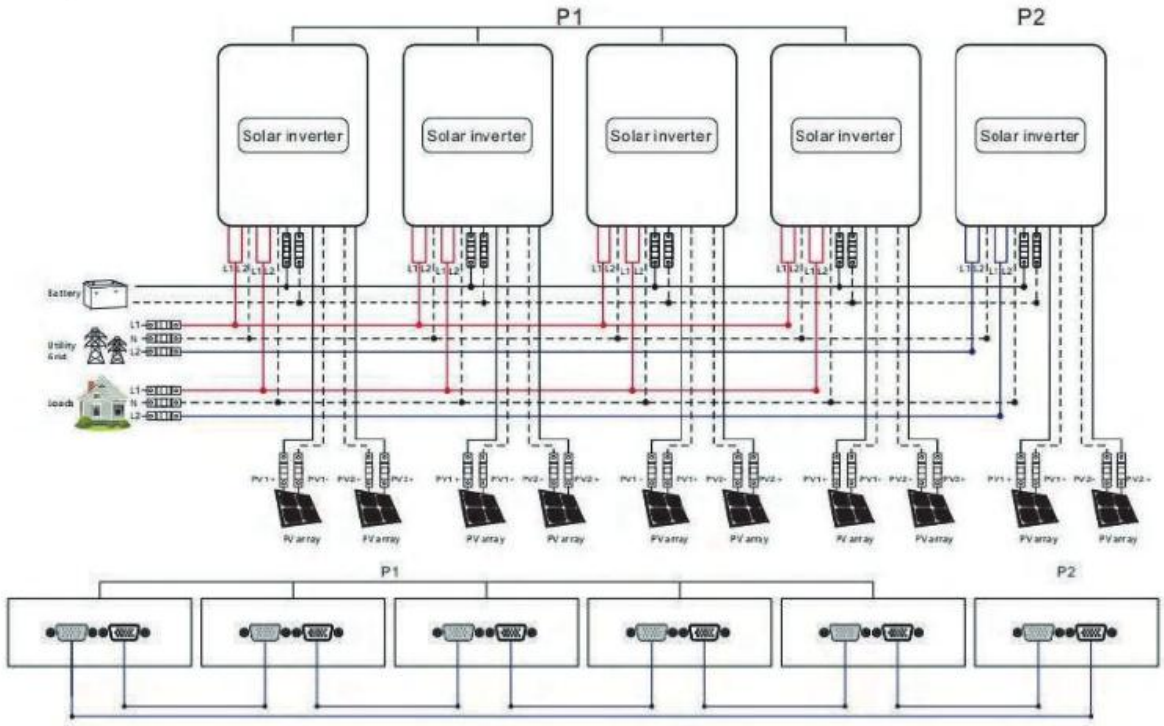


**2+2 system:**

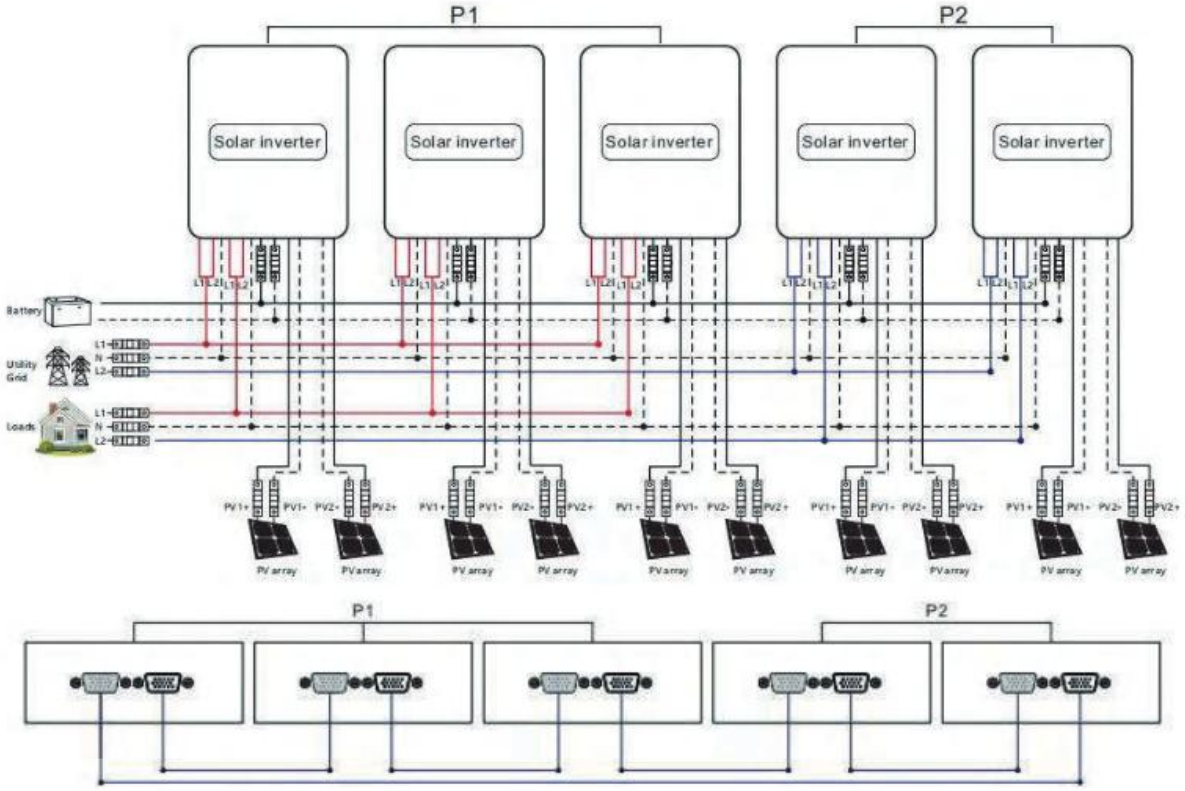



c. **Split-phase system (five inverters)**

**4+1 system:**

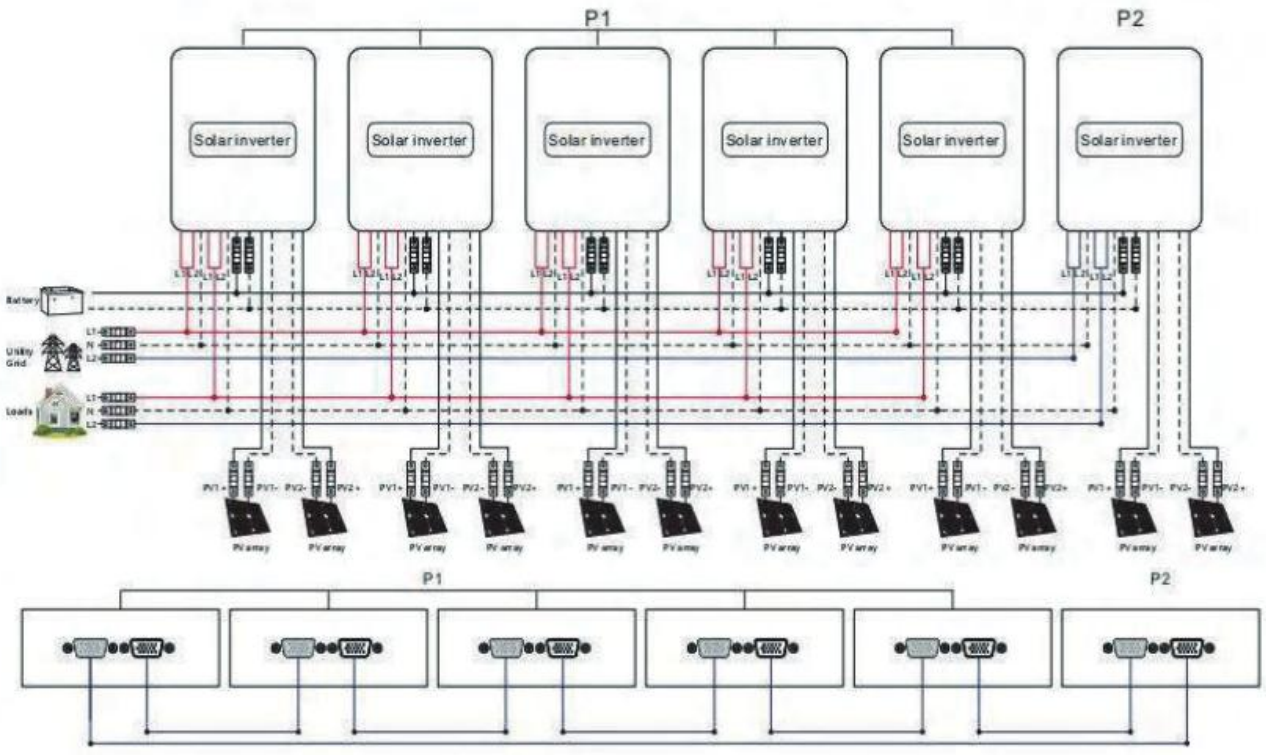


**3+2 system:**

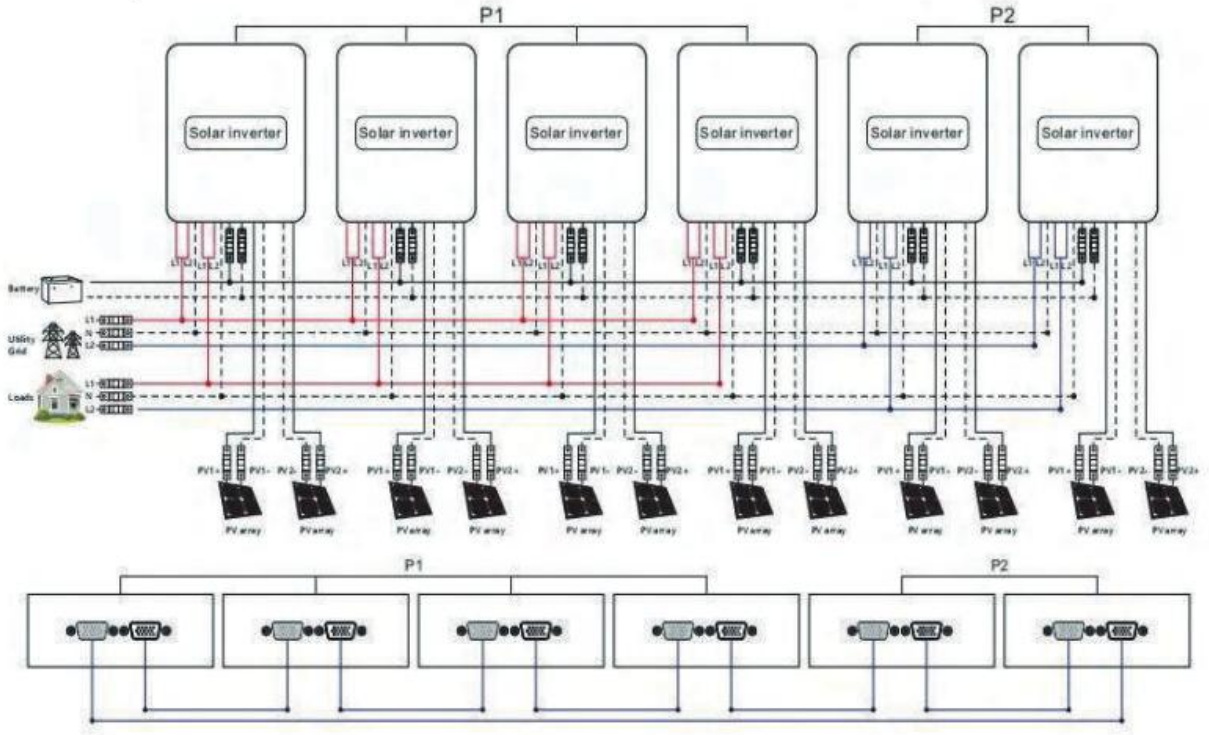



**d. Split-phase system (six inverters)**

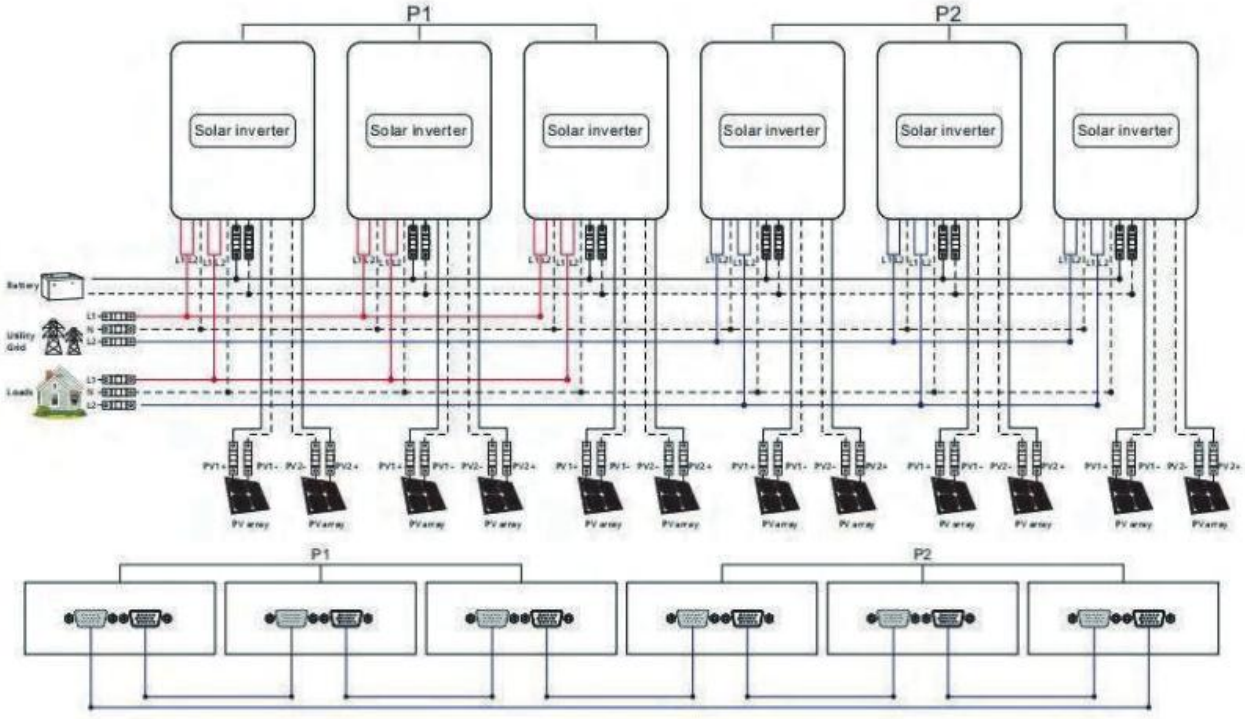
**5+1 system:**



**4+2 system:**



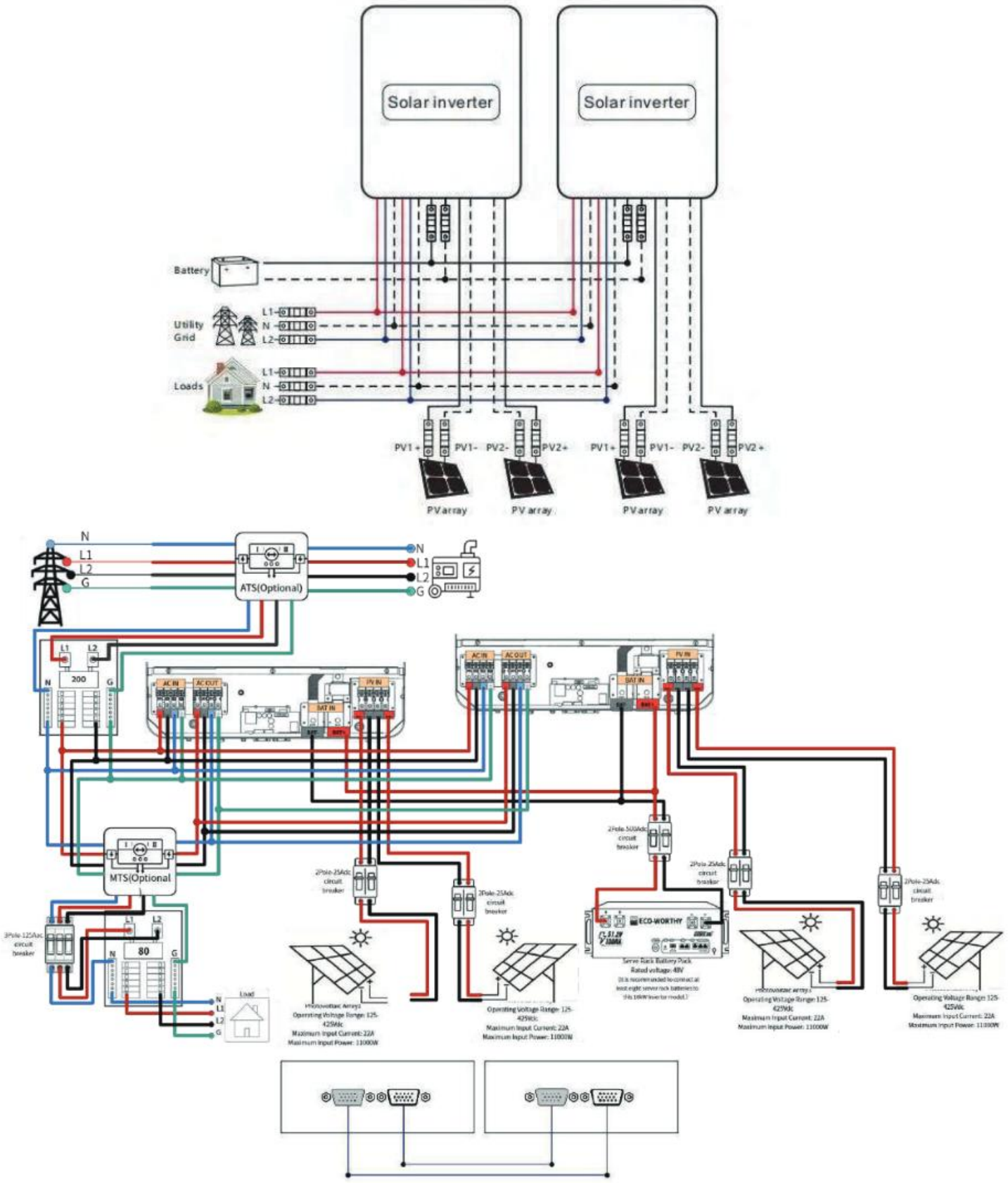

**3+3 system:**



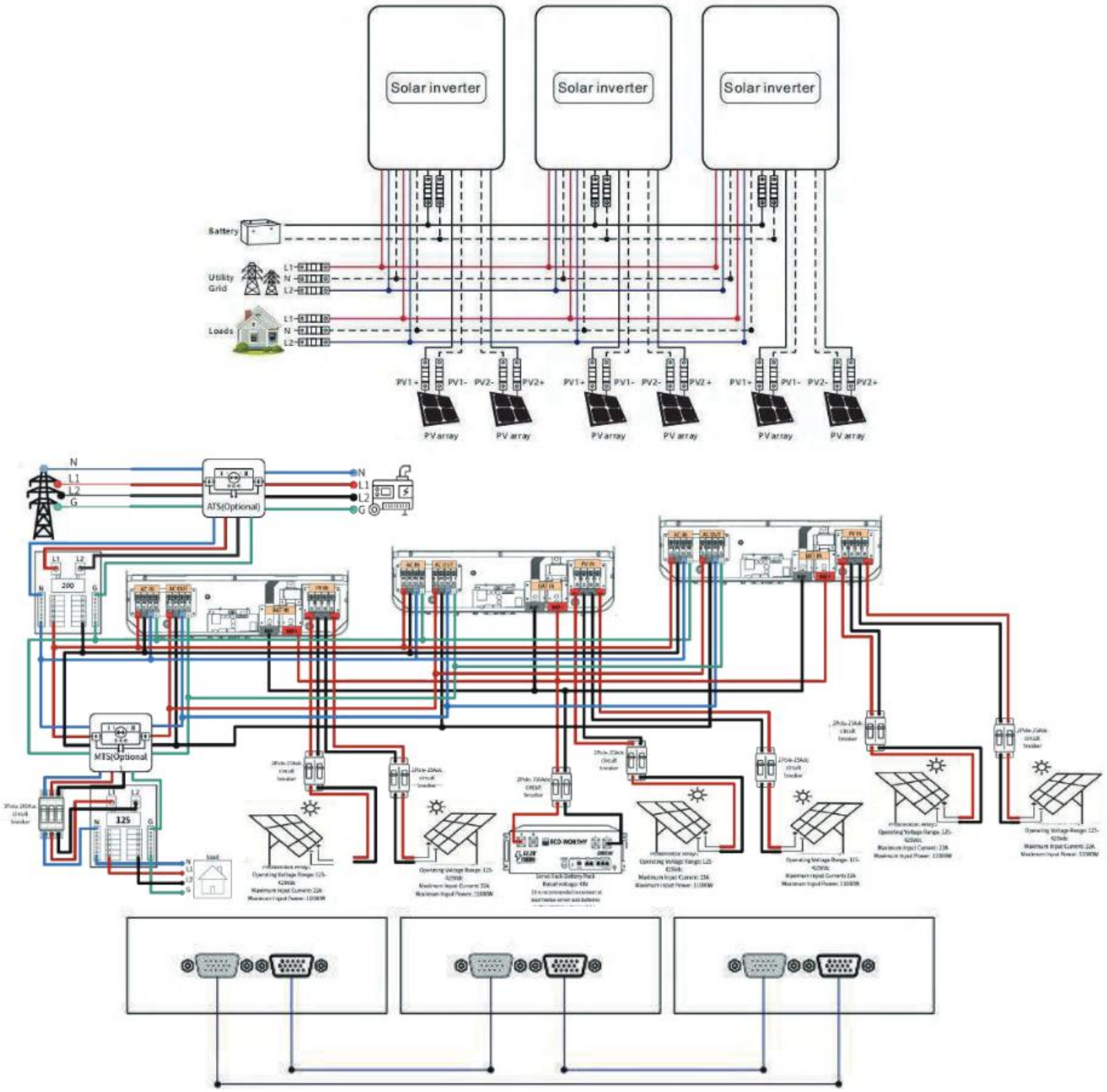
## 4.9.5 Wiring diagram for split-phase parallel connection (phase difference between L1 and L2: 180˚)

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

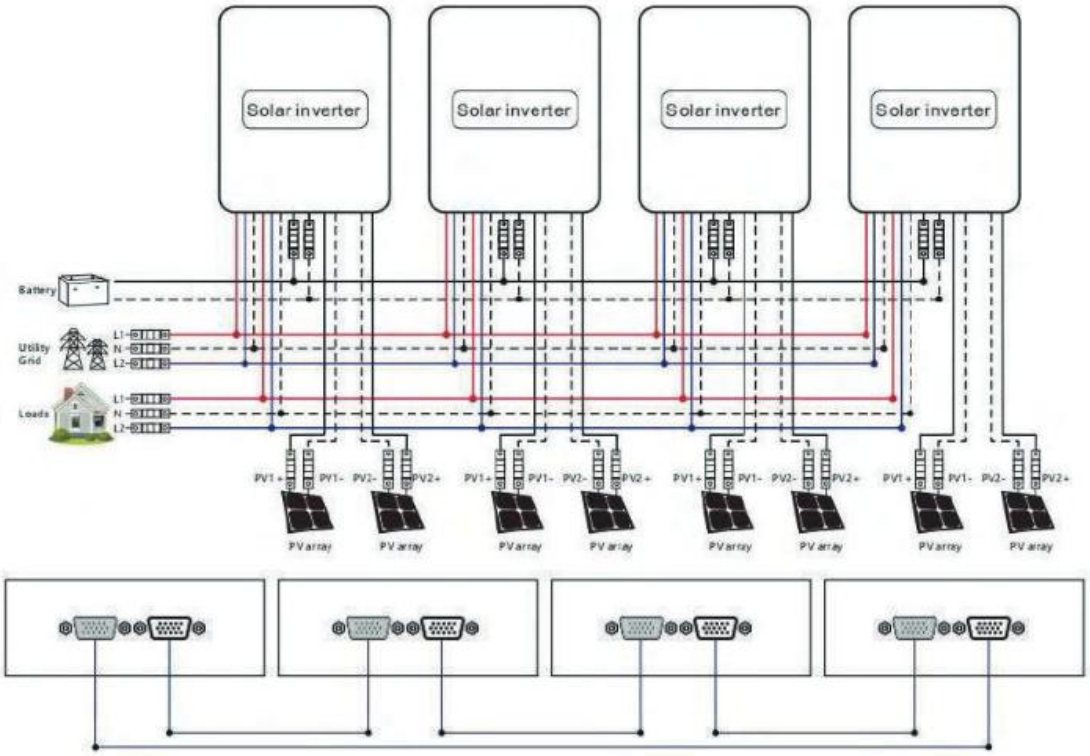
**a. Two parallel-connected solar storage inverters:**



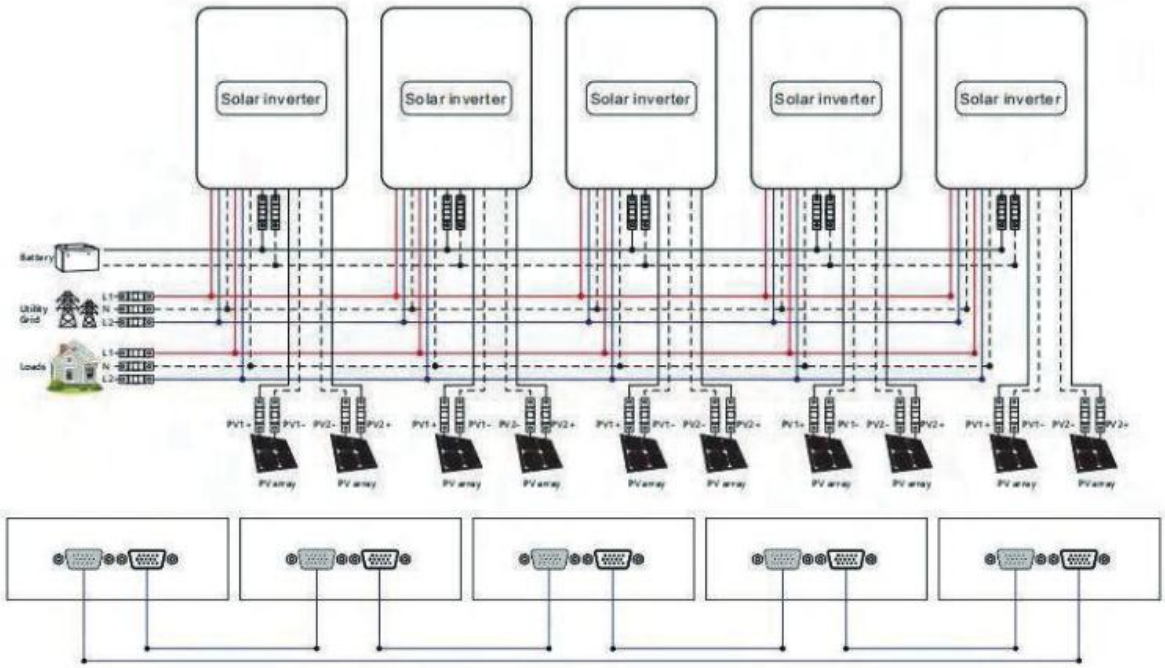
**b. Three parallel-connected solar storage inverters:**



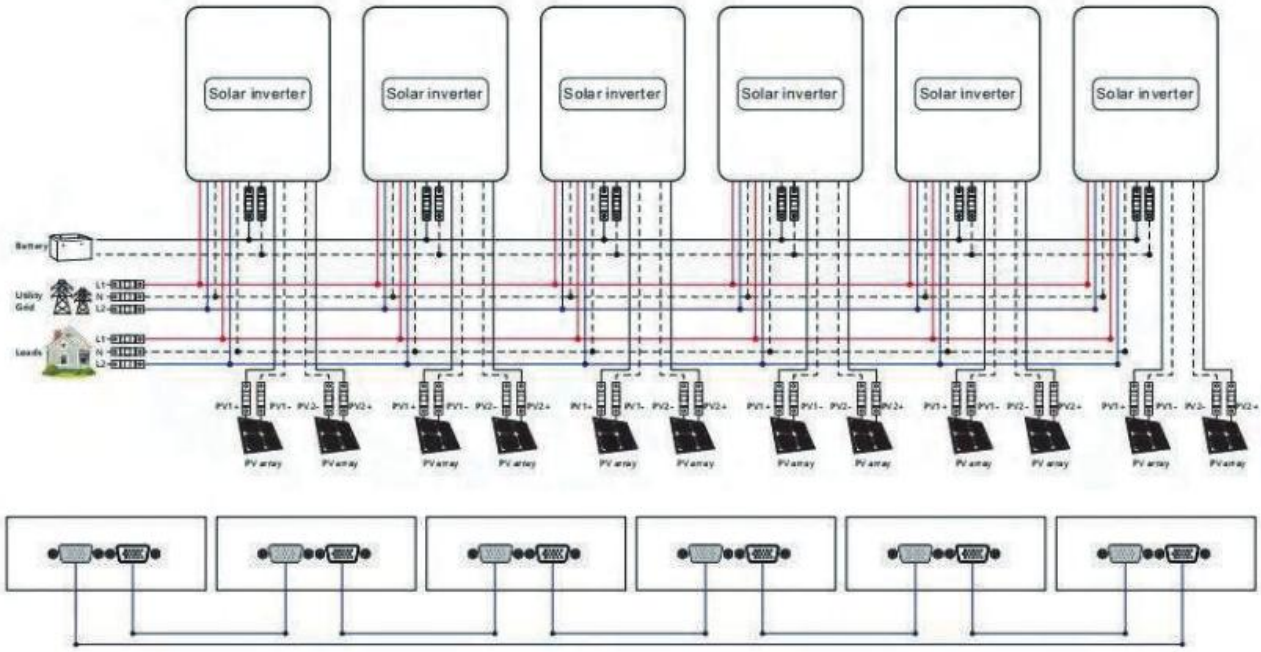
c. **Four parallel-connected solar storage inverters:**




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



**e. Six parallel-connected solar storage inverters:**



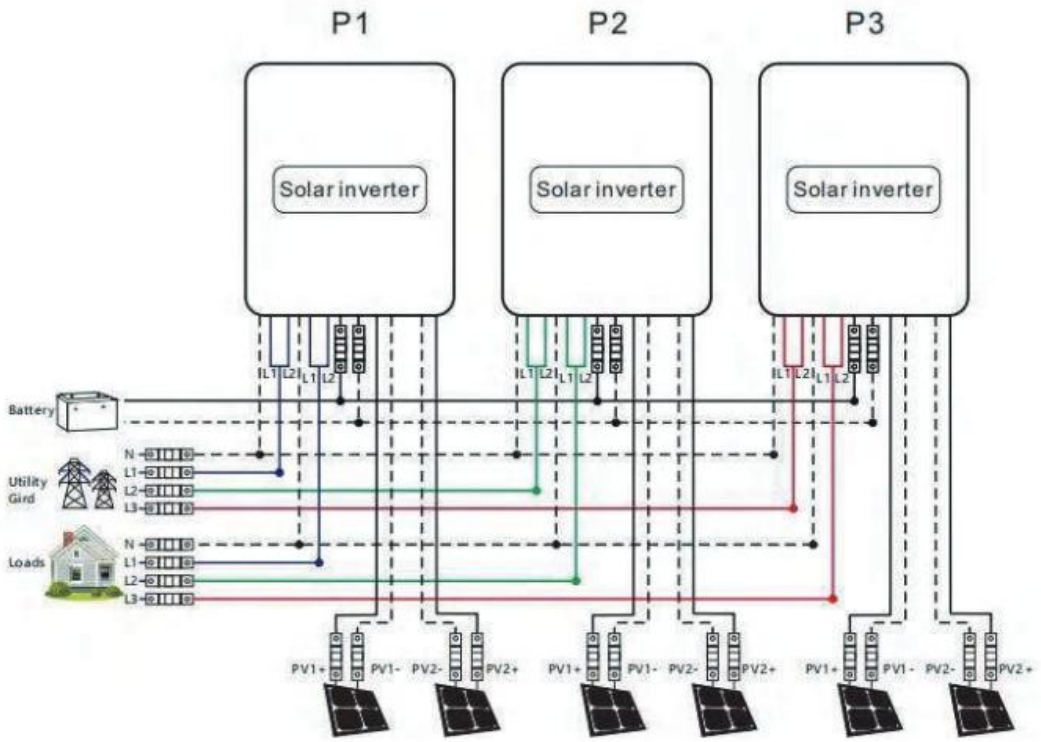

## 4.9.6 Wiring diagram for three-phase parallel connection

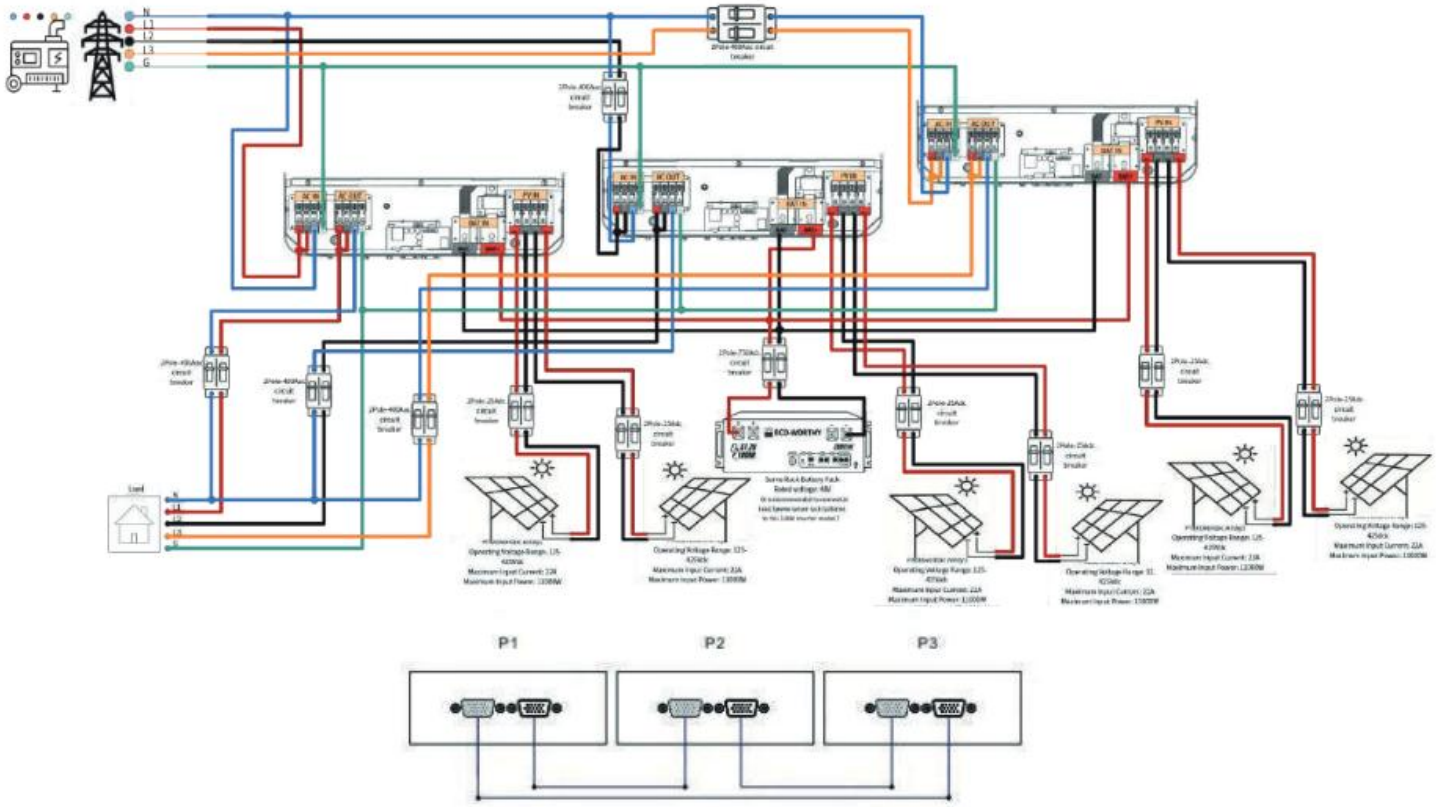
P1: Set the item [31] to "3P1;" P2: Set the item [31] to "3P2;" P3: Set the same to "3P3" , all of P1/P2/P3 inverters item [68] can not be set, it is default "0°"

At this point, the P1-P2, P1-P3, and P2-P3 phase difference is 120°. When setting the item [38] to "120 VAC," the voltage between the live wire L1 of P1 phase and the live wire L2 of P2 phase is 230*1.732=208 VAC. Similarly, the L1-L3 and L2-L3 voltage is 208 VAC:

**a. Three-phase system (three inverters)**

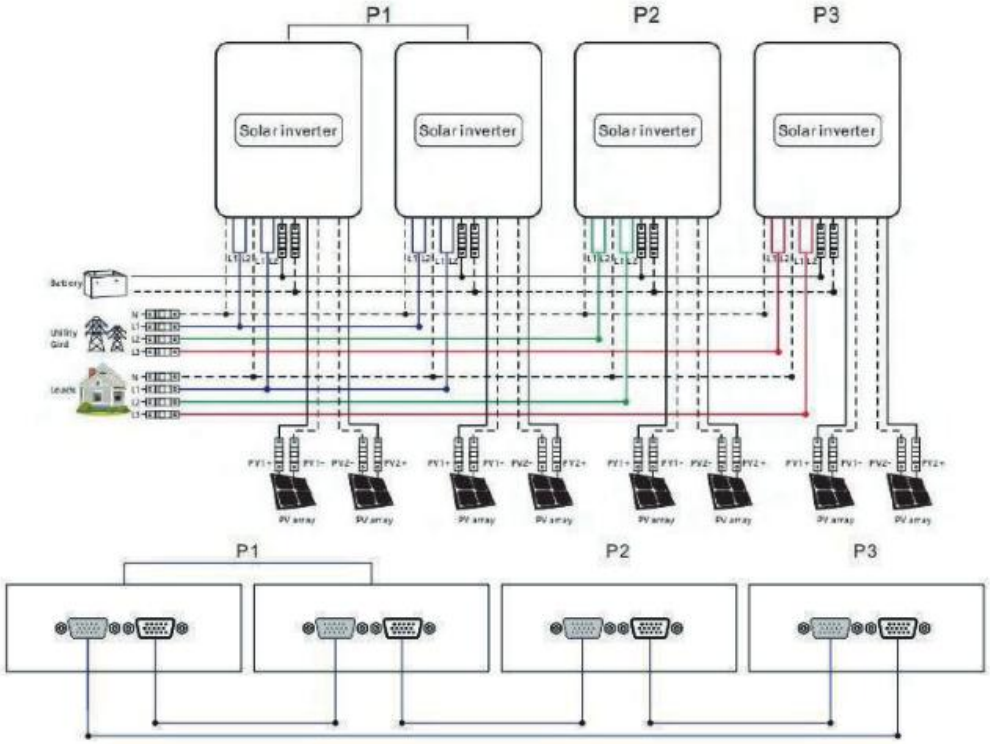
**1+1+1 system:**





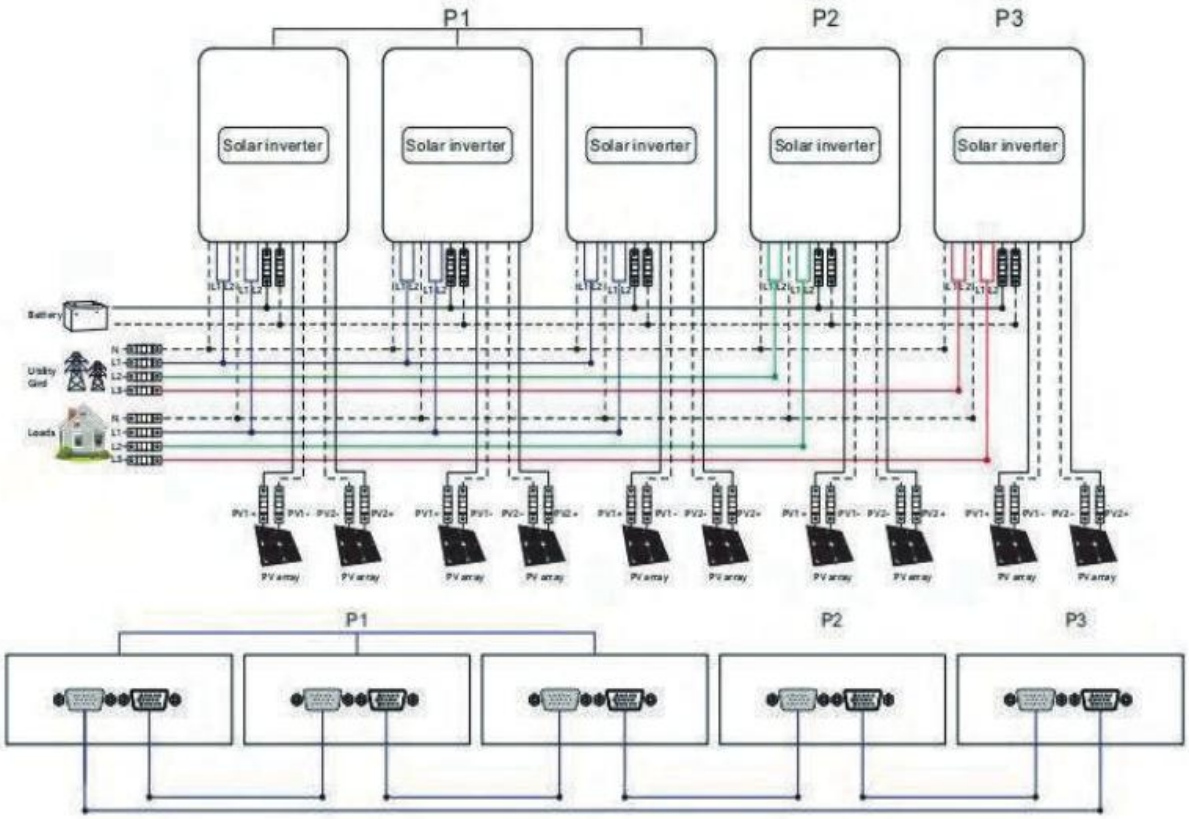

**b. Three-phase system (four inverters)**

**2+1+1 system:**

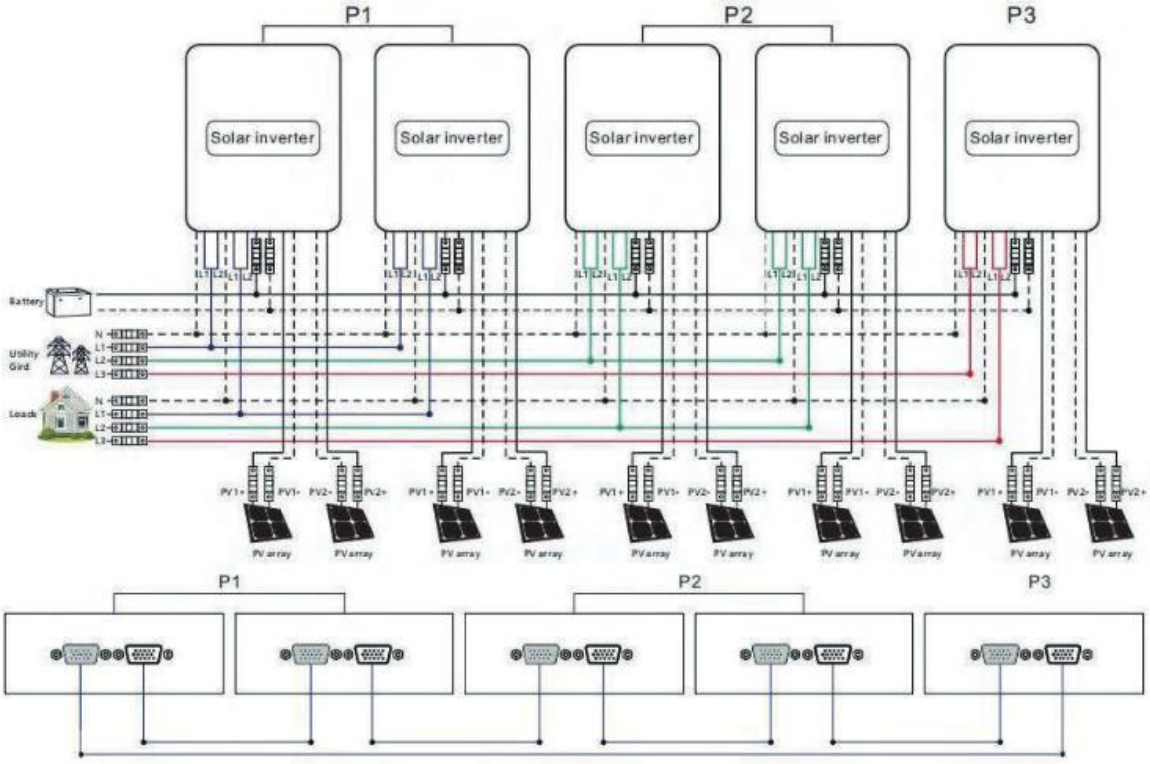


c. **Three-phase system (five inverters)**

**3+1+1 system:**

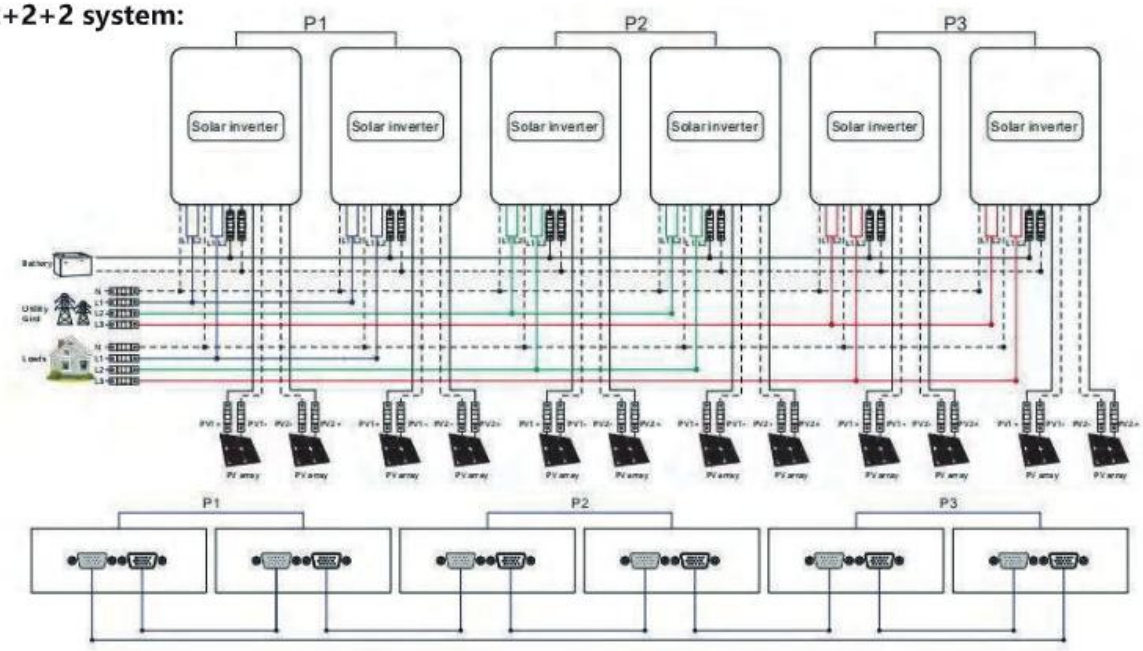



**2+2+1 system:**

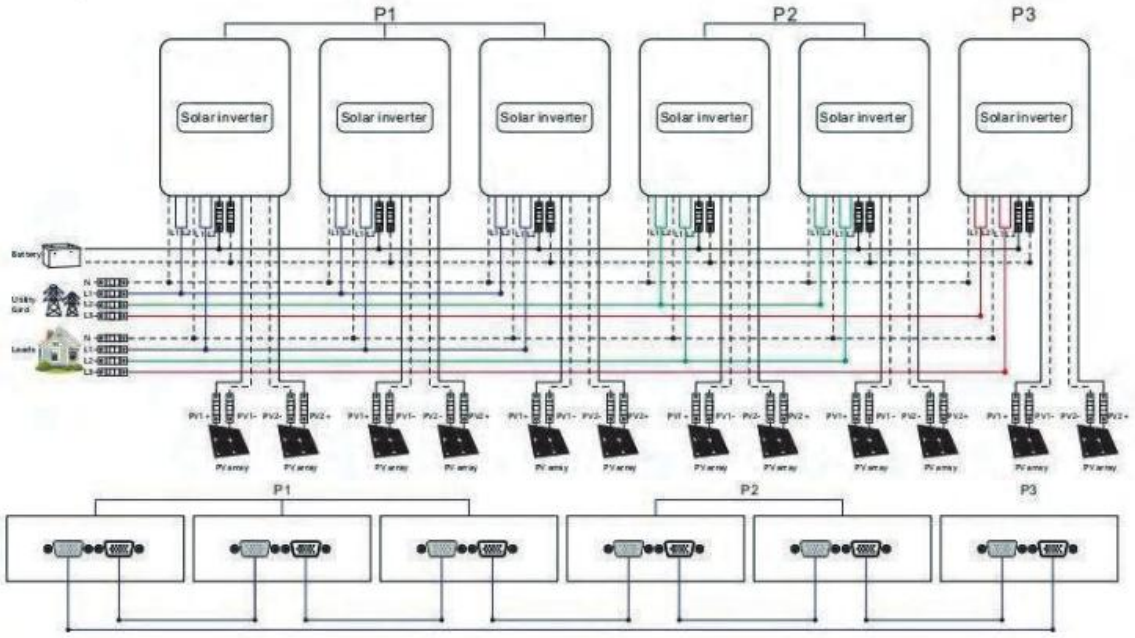


d. **Three-phase system (six inverters)**

**2+2+2 system:**




**3+2+1 system:**




**Note:**

1) Before powering on and lighting up the screen, check for correct wiring according to the above wiring diagrams to avoid system problems.

2) Check all connections for firm fixing to avoid detachment and abnormal system operation.

3) When connecting the AC output to the load, complete wiring according to the requirements of the electrical load to avoid damage to the load.

4) Set the item [38] to the same parameter, or only set it in the host inverter. During parallel operation, the voltage set in the host shall prevail, so the host inverter will forcibly set the item to the value for slave inverters. Only in standby mode can the item be set.

5) The inverter defaults to single mode at the factory. If using the parallel or three-phase function, set the item [31] on the screen as follows:

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

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

**In single-phase parallel operation:**

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

**In two-phase parallel operation:**

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

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

**In split-phase parallel operation:**

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

**In three-phase parallel operation:**

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

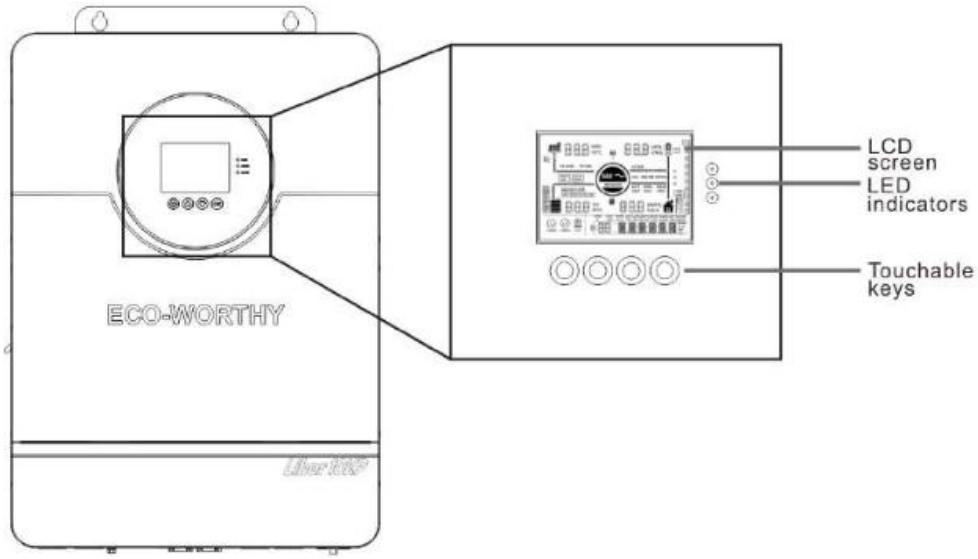
At this point, the P1-P2, P1-P3, and P2-P3 phase difference is 120°. When setting the item [38] to "120 VAC," the voltage between the live wire L1 of P1 phase and the live wire L2 of P2 phase is 230*1.732=208 VAC. Similarly, the L1-L3 and L2-L3 voltage is 208 VAC:

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

# 5. Operation

## 5.1 Operation and display panel

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



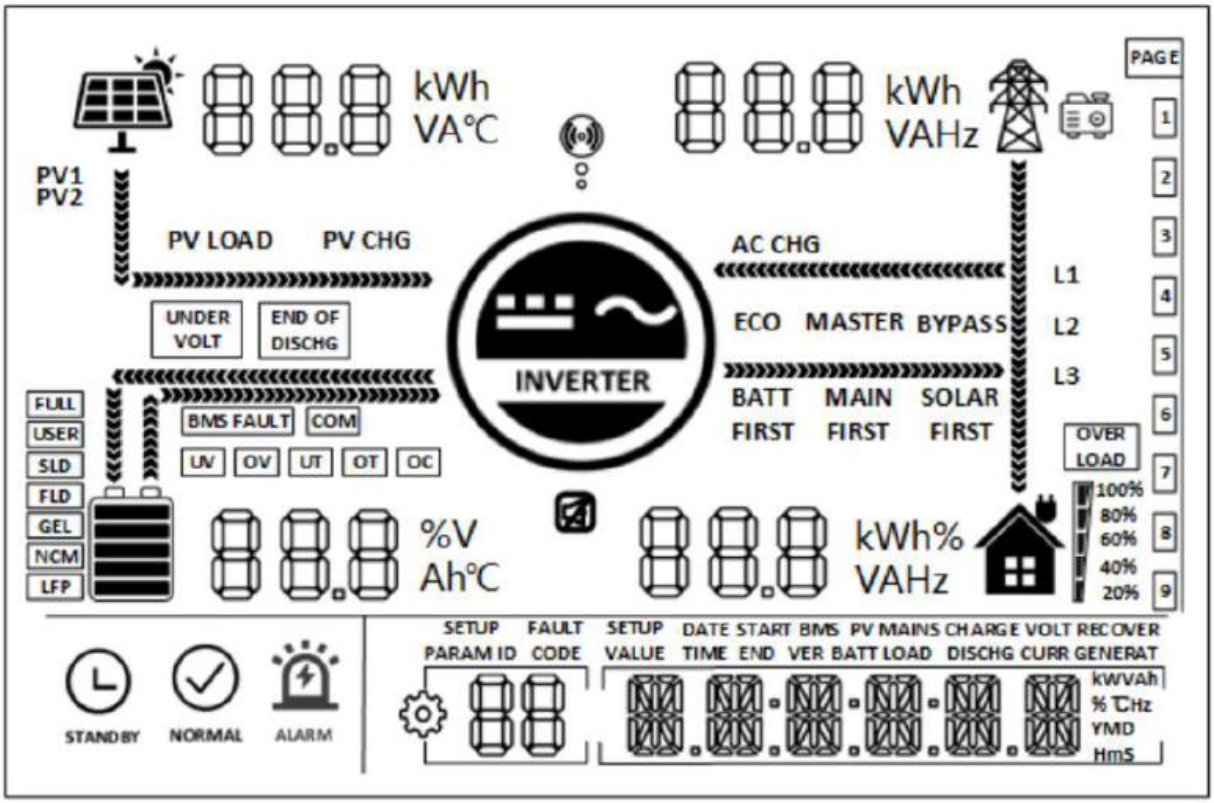
- **Physical button**

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

- **LED indicator**

| Indicator | Color | Description |
|---|---|---|
| AC/INV | Yellow | Normally ON: mains bypass output |
| | | Flash: inverter output |
| CHARGE | Green | Normally ON: charging completed |
| | | Flash: charging |
| FAULT | Red | Normally ON: level-1 fault<br>Flash: level-2 fault<br>OFF: level-3 or level-4 fault |

- **Display screen**

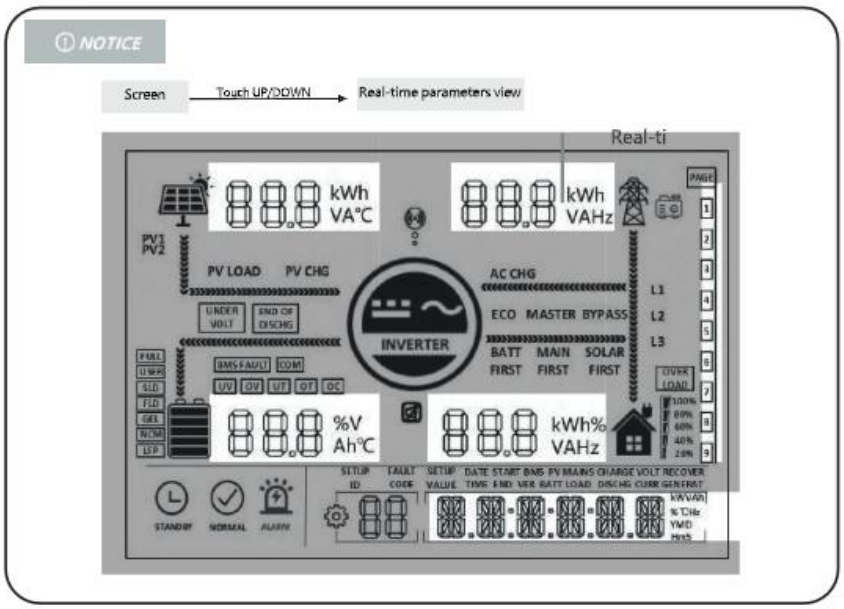


| Icon | Description | Icon | Description |
|---|---|---|---|
|  | PV panel |  | Mains |
|  | Battery |  | Generator |
|  | The inverter is working |  | Load |
|  | The inverter is communicating with the data collector |  | The buzzer is in mute mode |
|  | Power flow direction | | |
|   | The inverter is in standby mode |   | The inverter is working normally |
|   | There is a fault |  | Settings |
|  | Load power: 80%–100% |  | SOC: 80%–100% |
|  | Load power: 60%–79% |  | SOC: 60%–79% |
|  | Load power: 40%–59% |  | SOC: 40%–59% |
|  | Load power: 20%–39% |  | SOC: 20%–39% |

| Icon | Description | Icon | Description |
|---|---|---|---|
|  | Load power: 5%–19% |  | SOC: 5%–19% |
| UNDER VOLT | Battery under-voltage | END OF DISCHG | Battery over-discharge |
| OVER LOAD | Overload | BMS FAULT | BMS fault |
| COM | System communication error | UV | System under-voltage |
| OV | System overvoltage | UT | Too low system temperature |
| OT | Too high system temperature | OC | System overcurrent |
| FULL | Battery full power | USER | User-defined battery |
| SLD | Sealed lead-acid battery | FLD | Flooded lead-acid battery |
| GEL | Gel lead-acid battery | NCM | Ternary Li-ion battery |
| LFP | LFP Li-ion battery | ECO | Energy-saving mode |
| PVLOAD | PV power is loading | PVCHG | PV power is charging the battery |
| ACCHG | AC input power is charging the battery | MAINS FIRST | The output mode of the inverter is mains first |
| BYPASS | The output mode of the inverter is mains bypass | SOLAR FIRST | The output mode of the inverter is PV first |
| BATT FIRST | The output mode of the inverter is battery first | | |

- **Real-time parameters view**

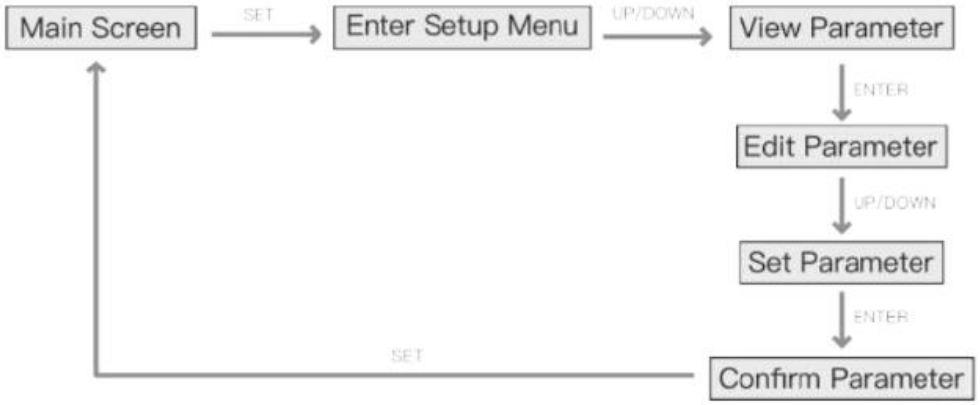
On the screen, press the UP/DOWN button to view real-time data of the inverter in operation

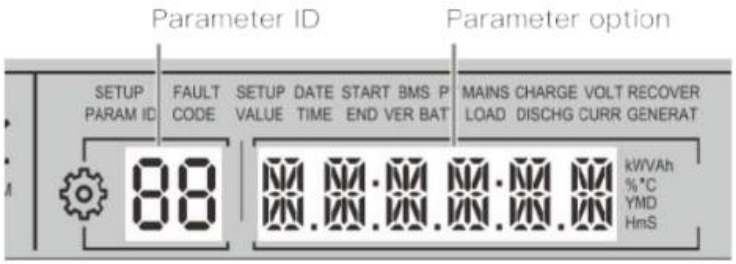



| Page | PV | Battery | AC input | Load | General |
|---|---|---|---|---|---|
| 1 | PV input voltage | Battery voltage | Mains input voltage | Single-phase voltage | Current time |
| 2 | PV input current | Battery current | Mains input current | Single-phase current | Current date |
| 3 | PV input power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

## 5.2 Setting

**NOTICE**




| ID | Parameter | Option | Description |
|---|---|---|---|
| The voltage setting logic: 【15】< 【12】< 【04】< 【14】< 【35】< 【37】< 【05】< 【09/11】<br>(When the battery communicate with inverter, the voltage setting is useless ) | | | |
| **00** | Exit | ESC | Exit the setup menu |
| **01** | AC output mode | UTI | Photovoltaic energy priority with the load, photovoltaic is not enough, the grid power and photovoltaic mixed load, photovoltaic energy is enough with the load, the excess energy to charge the battery, In the UTI mode, if 06 is set as SNU, charging will only occur during over-discharge. If it is set as OSO, charging will not take place when there is grid power. the grid power will not charge), the battery is only discharged when off the grid. |
| | | SBU | Inverter first. The PV mode is to be applied first for loading, and only when the battery voltage is lower than the set value in the item 4, it will switch to the mains mode for loading. When the battery voltage is higher than the set value in the item 5, it will switch back to the PV mode from the mains mode. |
| | | SOL | The PV mode is to be applied first and when the PV power is unavailable or the battery voltage is lower than the set value in the item 4, it will switch to the mains mode |

| ID | Parameter | Option | Description |
|---|---|---|---|
| | | SUB (default) | Solar energy priority charging, insufficient solar energy, grid energy and solar energy hybrid charging (if 06 Settings as" OSO(only PV ) " ,the grid energy will not charge) and grid with load, when solar energy is enough to charge,excess energy not enough to load, excess solar energy and grid will hybrid load, the battery is discharged only when off the grid. |
| 02 | AC input frequency | 50.0 | In bypass mode, the AC output frequency will adapt to the mains frequency, and in other cases, the output will follow the preset value. |
| | | 60.0 (default) | |
| 03 | AC input voltage range | UPS (default) | When the output voltage is 120/110 V, the input voltage range is 90 V–140 V |
| | | APL | When the output voltage is 100/105 V, the input voltage range is 85 V–140 V |
| 04 | Battery to mains voltage threshold | 43.6 (default) | When the parameter item 01 is SBU or SOL and the battery voltage is lower than the threshold, the output switches from inverter to mains. Setting range: 40 V–52 V |
| 05 | Mains to battery voltage threshold | 57.6 (default) | When the parameter item 01 is SBU or SOL and the battery voltage is higher than the threshold, the output switches from mains to inverter. Setting range: 48 V–60 V |
| 06 | Battery charge mode | SNU (default) | When both PV power and mains are used to charge the battery at one time, the PV charge first and when the PV power is insufficient, the mains tags in. Only in bypass mode can both PV power and mains be used to charge the battery at one time, and only the PV charge mode can be enabled during inverter operation. |
| | | OSO | Do not enable the mains charge mode when in only PV charge mode. |
| 07 | Battery charge current | 100 | Setting range: 0 A–200 A<br>This setting should be greater than 28 items.<br>Item 07 is the maximum charging current for battery charging with "PV and GRID" or "PV and Generator";<br>If the 28 item setup are greater than the 07 item setup , they do not have an effect. |
| 08 | Battery type | USER | User-defined, and in this type, you can set all battery parameters |
| | | SLD | Sealed lead-acid battery |
| | | FLD | Flooded lead-acid battery |
| | | GEL (default) | Gel lead-acid battery |
| | | L14/L15/L16 | LFP battery L14/L15/L16, corresponding to 14, 15, and 16 series of LFP batteries |
| | | N13/N14 | Ternary Li-ion battery N13/N14, corresponding to 13 and 14 series of ternary Li-ion batteries |
| | | NOb | No battery |

| ID | Parameter | Option | Description |
|---|---|---|---|
| 09 | Battery boost charge voltage | 56.8 | Setting range: 48 V–58.4 V, with a step of 0.4 V, available for user-defined and lithium-ion battery types |
| 10 | Boost charge duration | 120 | The continuous charging time when the voltage reaches the set voltage during constant voltage charging, with a setting range of 5 min–900 min and a step of 5 min |
| 11 | Battery floating charge voltage | 55.2 | Setting range: 48 V–58.4 V, with a step of 0.4 V. This parameter cannot be set after successful BMS communication |
| 12 | Battery over-discharge voltage (delayed shutdown) | 42 | When the battery voltage is lower than the voltage and triggers the set value in the item 13, it will turn off the inverter output. Setting range: 40 V–48 V, with a step of 0.4 V |
| 13 | Battery over-discharge delay time | 5 | When the battery voltage is lower than the set value in the item 12 and triggers the delay time set in this parameter item, it will turn off the inverter output. Setting range: 5s–50s, with a step of 5s |
| 14 | Battery under-voltage alarm threshold | 44 | When the battery voltage is lower than the threshold, it will give an under-voltage alarm and the output will not shut down. Setting range: 40 V–52 V, with a step of 0.4 V |
| 15 | Battery discharge limit voltage | 40 | When the battery voltage is lower than the value, the output immediately shuts down. Setting range: 40 V–52 V, with a step of 0.4 V, available for user-defined and Li-ion batteries |
| 16 | Battery equalizing charge | DIS **(default)** | Disable equalizing charge |
| | | ENA | Enable equalizing charge, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones |
| 17 | Equalizing charge voltage | 58 | Setting range: 48 V–58 V, with a step of 0.4 V, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones |
| 18 | Equalizing charge duration | 120 | Setting range: 5 min–900 min, with a step of 5 min, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones |
| 19 | Equalizing charge delay time | 120 | Setting range: 5 min–900 min, with a step of 5 min, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones |
| 20 | Equalizing charge interval | 30 | Setting range: 0 day–30 days, with a step of 1 day, but only available for flooded lead-acid batteries, sealed lead-acid batteries, and user-defined ones |
| 21 | Equalizing charge Enable/Disable | DIS **(default)** | Stop equalizing charge immediately |
| | | ENA | Start equalizing charge immediately |

| ID | Parameter | Option | Description |
|---|---|---|---|
| 22 | Energy-saving mode | DIS (default) | Disable energy-saving mode |
| | | ENA | Enable energy-saving mode, and when the load power is below 50 W, it will turn off the inverter output after a 5-minute delay. When it exceeds 50 W, the inverter will automatically restart. |
| 23 | Overload auto estart | DIS | Disable overload auto restart and when overload occurs, it will turn off the output and the inverter will no longer resume startup |
| | | ENA (default) | Enable overload auto restart, and If overload occurs, the output will be turned off, and after a delay of 3 min, the output will restart. After 5 cumulative attempts, the inverter will no longer resume startup. |
| 24 | Over-temperature auto restart | DIS | Disable over-temperature auto restart and when over-temperature occurs, it will turn off the output and the inverter will no longer turn on the output |
| | | ENA (default) | Enable over-temperature auto restart and when over-temperature occurs, it will turn off the output and the output will restart when the temperature drops |
| 25 | Buzzer alarm | DIS | Disable buzzer alarm |
| | | ENA (default) | Enable buzzer alarm |
| 26 | Mode switch prompt | DIS | Disable prompt when the status of the main input source changes |
| | | ENA (default) | Enable prompt when the status of the main input source changes |
| 27 | Inverter to bypass switch | DIS | Disable auto switch to mains for loading in case of inverter overload |
| | | ENA (default) | Enable auto switch to mains for loading in case of inverter overload |
| 28 | Mains charge current | 60 (default) | Setting range: 0 A-120 A |
| 30 | RS485 communication address | ID: 1 | Setting range: 1-254 |
| 31 | Parallel mode (turn off the rocker switch can be set) | SIG (default) | Single inverter operation |
| | | PAL | Parallel operation |
| | | 2P0/2P1/2P2 | Two-phase parallel operation(Item 68 needs to be set to 0) |
| | | Set to "2P0" for the machine screens connected to P1<br>Assuming that the output voltage of the setting item [38] is set to 120 VAC<br>1) When all the inverters connected to P2 are set to "2P1" on the screen, the voltage phase difference between P1 and P2 is 120°, the voltage between the live wire L1 of phase-P1 and the live wire L2 of phase-P2 is 120*1.732=208 VAC, and the voltage of L1-N and L2-N is 120 VAC.<br>2) When all the inverters connected to P2 are set to "2P2" on the screen, the voltage phase difference between P1 and P2 is 180°, the voltage between the live wire L1 of phase-P1 and the live wire L2 of phase-P2 is120*2=240 VAC, and the voltage of L1-N and L2-N is120 VAC. | |

| ID | Parameter | Option | Description |
|---|---|---|---|
| | | 3P1/3P2/3P3 | Three-phase parallel operation（Item 68 needs to be set to 0.） |
| | | Set to "3P1" on the screen for all the inverters connected to P1; set to "3P2" on the screen for all the inverters connected to P2; and set to "3P3" on the screen for those connected to P3. 1) Assuming that the output voltage of the setting item [38] is set to 120 VAC: then the voltage phase difference of P1-P2, P1-P3, and P2-P3 is 120°, the voltage between the live wire L1 of phase-P1 and the live wire L2 of phase-P2 is 120*1.732=208 VAC, and similarly the voltage of L1-L3 and L2-L3 is 208 VAC; the voltage of L1-N, L2-N, and L3-N is 120 VAC. | |
| 32 | RS485 communication function | SLA **(default)** | Enable PC and Remote Monitoring Protocol |
| | | 485 | Enable the BMS communication function based on RS485 communication |
| | | CAN | Enable the BMS communication function based on CAN communication |
| 33 | BMS communication | Select the corresponding communication protocol in item 33 when you set it to 485 or CAN in item 32 | |
| | | 485 | WOW=SNPOWER，PYL=PYLONTECH，SHO=FOXESS，XXI=XINXIDIGI，POW= HHJ，GUX=GOTION HIGH-TECH，SGP=SUNGOLDPOWER，GSL=GSLENERGY，PYT=PYLONTECH 2，PUTXT=DEBISEN，LUX=LUXPOWER，DYE=DEYE，PAC=PACTECH，RDA=RITAR，AOG=AOGUAN，OLT=OLITER，CEF=CHANGFENG，XWD=SUNWODA，DAQ=DYNESS |
| | | CAN | UZE=UZE，SGP=SGP，GSL=GSLENERGY，PYT=PYLONTECH 2，PUTXT=DEBISEN，LUX=LUXPOWER，DYE=DEYE |
| 35 | Battery under-voltage recovery threshold | 52 | When the battery is under voltage, the battery voltage needs to be greater than the threshold to restore the AC output of the battery inverter. Setting range: 44 V–54.4 V |
| 37 | Recharge voltage threshold for fully charged battery | 52 | After the battery is fully charged, the inverter stops charging, and recovers charging when the battery voltage is lower than the threshold. Setting range: 44 V–54 V |
| 38 | AC output voltage （turn off the rocker switch can be set） | 120 | Setting range: 100/105/110/115/120/127 VAC<br>The rated output power will be reduced=<br>(Power Rate)*(Vset/120) |
| 39 | Charge current limit (when BMS works) | LCSET | The maximum battery charge current is not greater than the set value of [item 07] |
| | | LCBMS **(default)** | The maximum battery charge current is not greater than the maximum value of BMS |
| | | LCINV | The maximum battery charge current is not greater than the logical judgment value of inverter |
| 40 | Period-1 battery charge start time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 41 | Period-1 battery charge end time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 42 | Period-2 battery charge start time | 00:00:00 | Setting range: 00:00:00–23:59:00 |

| ID | Parameter | Option | Description |
|---|---|---|---|
| 43 | Period-2 battery charge end time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 44 | Period-3 battery charge start time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 45 | Period-3 battery charge end time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 46 | Timed battery charge function | DIS **(default)** | Disable the function |
| | | ENA | Enable the function |
| 47 | Period-1 battery discharge start time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 48 | Period-1 battery discharge end time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 49 | Period-2 battery discharge start time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 50 | Period-2 battery discharge end time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 51 | Period-3 battery discharge start time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 52 | Period-3 battery discharge end time | 00:00:00 | Setting range: 00:00:00–23:59:00 |
| 53 | Timed battery discharge function | DIS **(default)** | Disable the function |
| | | ENA | When the battery timed discharge function is enabled and the machine enters the timed discharge period, if Item 01 is set to UTI or SUB and grid power is available, the battery discharge and grid power will jointly power the load. |
| 54 | Current date | 00:00:00 | Year/Month/Day<br>Setting range: 00:01:01–99:12:31 |
| 55 | Current time | 00:00:00 | Setting range: 00:00:00–23:59:59 |
| 57 | Charge stop current | 3 | The charge stops when the charge current is less than the set value (unit: A) |
| 58 | SOC setting for discharge alarming | 15 | When the capacity is less than the set value, the SOC alarms (unit: %, only available during normal BMS communication) |
| 59 | SOC setting for discharge cutoff | 5 | When the capacity is less than the set value, the discharge stops (unit: %, only available during normal BMS communication) |
| 60 | SOC setting for charge cutoff | 100 | When the capacity is greater than the set value, the charge stops (unit: %, only valid during normal BMS communication) |
| 61 | SOC setting for switching to mains | 10 | When the capacity is less than the set value, it switches to mains (unit: %, only available during normal BMS communication) |
| 63 | Auto N-PE connection switch function | DIS **(default)** | Disable auto N-PE connection switch |
| | | ENA | Enable auto N-PE connection switch |

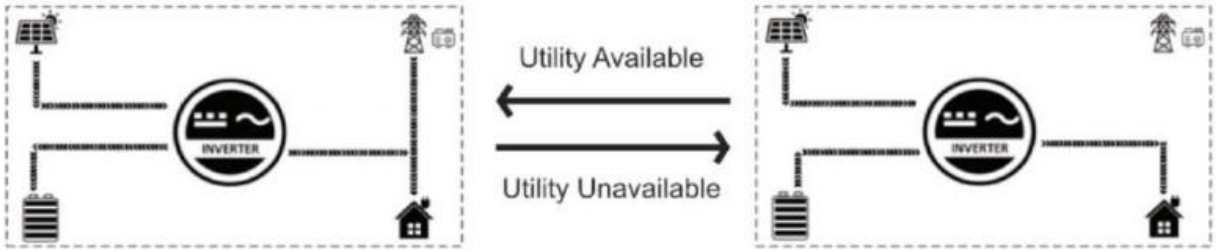
| ID | Parameter | Option | Description |
|---|---|---|---|
| 68 | AC output phase mode (turn off the rocker switch can be set) | 0 | 0 represents the single-phase mode<br>Assuming that the AC output voltage of item 38 is 120 V, the phase difference of L1-L2 is 0°, and L1/L2 can be connected in parallel, the phase voltage of L1-N/L2-N is 120 V |
| | | 180 **(default)** | 180 represents the split-phase mode<br>Assuming that the AC output voltage of item 38 is 120 V, the phase difference of L1-L2 is 180°, the phase voltage of L1-N/L2-N is 120 V, and the voltage of L1-L2 is 240 V |
| | | NO N | Without N-wire(When you set"No N",the phase difference is 180° default) |
| 75 | Battery temperature compensation | DIS **(default)** | Turn off battery temperature compensation function |
| | | ENA | Enable battery temperature compensation function (only effective for lead-acid batteries). |

## 5.3 AC Output Mode

The AC output mode corresponds to parameter setting item 01 which allows the user to set the AC output power source manually.

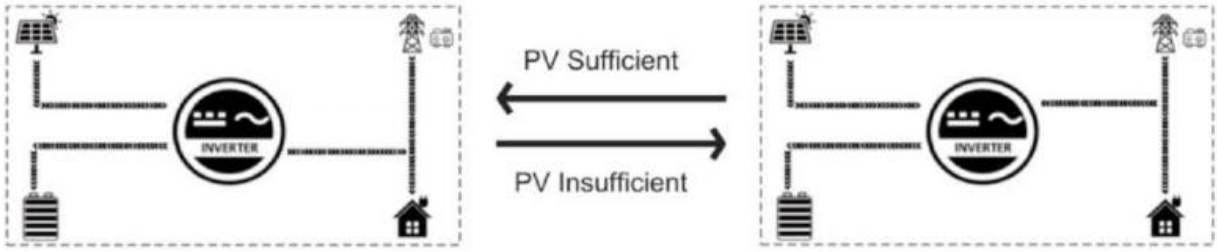
- **Utility Priority, PV Loading Priority 01 UTI**

PV energy priority with the load, When PV power is insufficient, the grid and PV jointly supply the load. When PV power exceeds the load demand, the surplus charges the battery.Grid charging is activated only when the battery is over-discharged. (parameter item [06] Settings as" OSO(only PV)" , the grid power will not charge), and the battery is only discharged when off the grid.




- **Utility Priority, PV Charging Priority 01 SUB (default)**

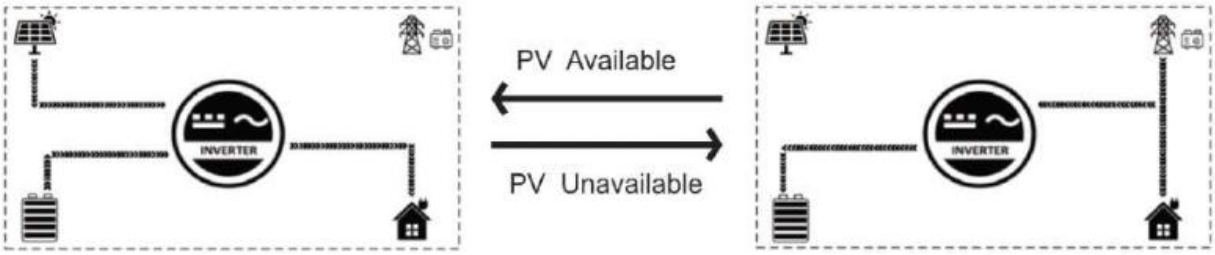
PV priority charging; When PV power is insufficient, utility power and PV will perform hybrid charging (when item 06 is set to "PV-only charging", utility power will not be used for charging), and utility power will supply the load. When PV power meets the charging demand but cannot meet the load demand, PV and utility power will perform hybrid loading, and the battery will only discharge in off-grid mode.




- **PV Priority Output 01 SOL**

PV prioritizes power supply to the load. When PV meets the load demand, the excess power will charge the battery. When PV energy is insufficient, the battery will supplement energy to power the load. When PV is invalid, it will switch to utility power supply, and finally use battery power supply. When PV energy is insufficient, and when the battery level is lower than the parameter (Battery to utility ) or the SOC setting value for switching to utility, it will switch to utility power supply for the load and charging. PV charges when there is no load. This mode can maximize the use of PV power generation while maintaining battery capacity, and is suitable for areas with stable power grids.

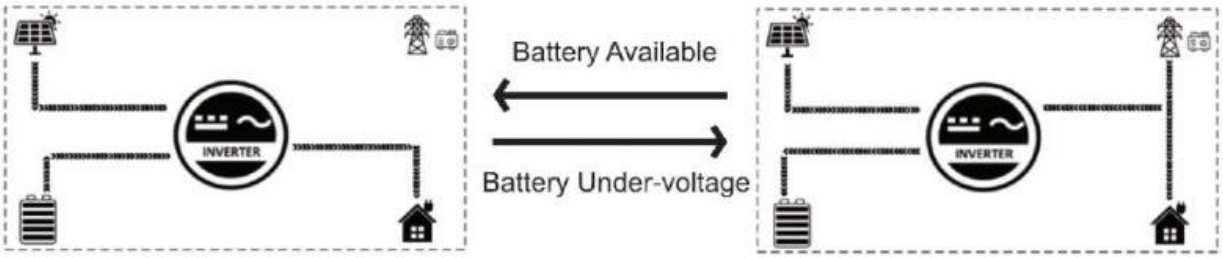
**(Priority: PV > Utility > Battery)**




- **Inverter Priority Output 01 SBU**

The PV will supply power to the loads on a priority basis. If the PV is insufficient or unavailable, the battery will be used as a supplement to supply power to the load. When the battery voltage touches the value of parameter [04] (Voltage point of battery switch to utility), it will switch to utility power supply to the load (without BMS connected) / When the BMS is connected and the Li-ion battery SOC touches the value of parameter [61] (Switching to utility SOC setting), it will switch to utility power supply to the load. This mode maximises the use of DC energy, and it is suitable for the areas where the utility power is stable.

**(Priority: PV > Battery > Utility)**



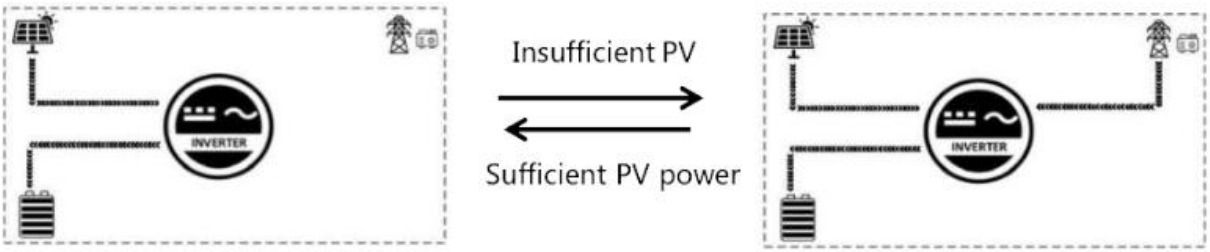
## 5.4 Battery charge mode

The charge mode corresponds to the parameter setting item 06, allowing users' manual setting.

- **Mix charge SNU (default)**

Both PV and mains charge the battery, with PV used first, and mains as a supplement during insufficient PV power. This is the fastest charge method, suitable to provide users with sufficient backup power in areas where the power supply is insufficient.

**(Priority: PV > Mains)**




- **Only-PV charge OSO**

Only PV power is used to charge the battery, with mains not used for charge. This is the most energy-saving method, by which the battery power comes from solar energy, usually used in areas with good radiation conditions.



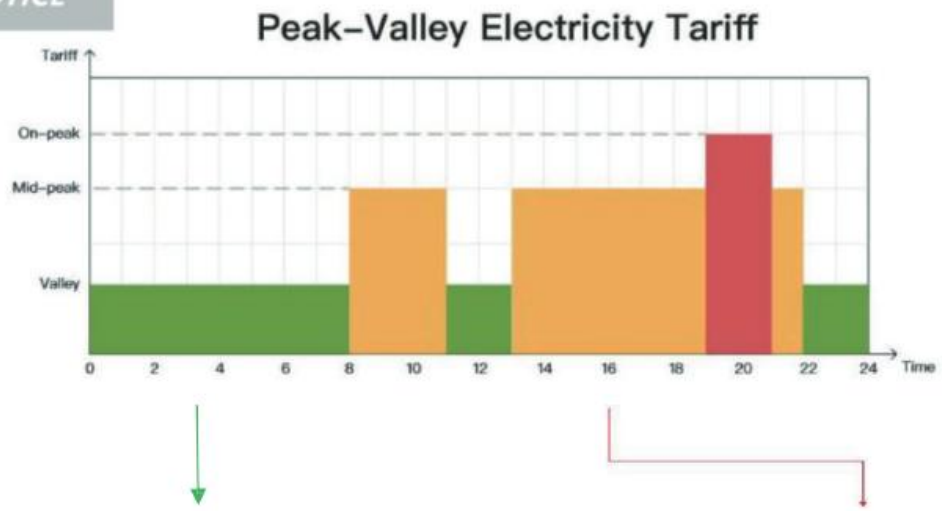
## 5.5 Timed charge/discharge function

ECO10000W(SR) has the timed power charge/discharge function. Users can set different charge and discharge periods according to the local time-of-use price, thus reasonably using mains and PV power. When mains is expensive, the battery inverter is used to supply power to the load; when mains is cheap, it can be used to supply power to and charge the load, thus helping users reduce electricity expenses to the full extent. Users can turn on/off the timed charge/discharge function in items 46 and 53 in the setup menu, and set charge and discharge periods in parameters 40–45 and 47–52.

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

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

ⓘ NOTICE




**Timed charge and loading function**




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

**Timed battery discharge function**

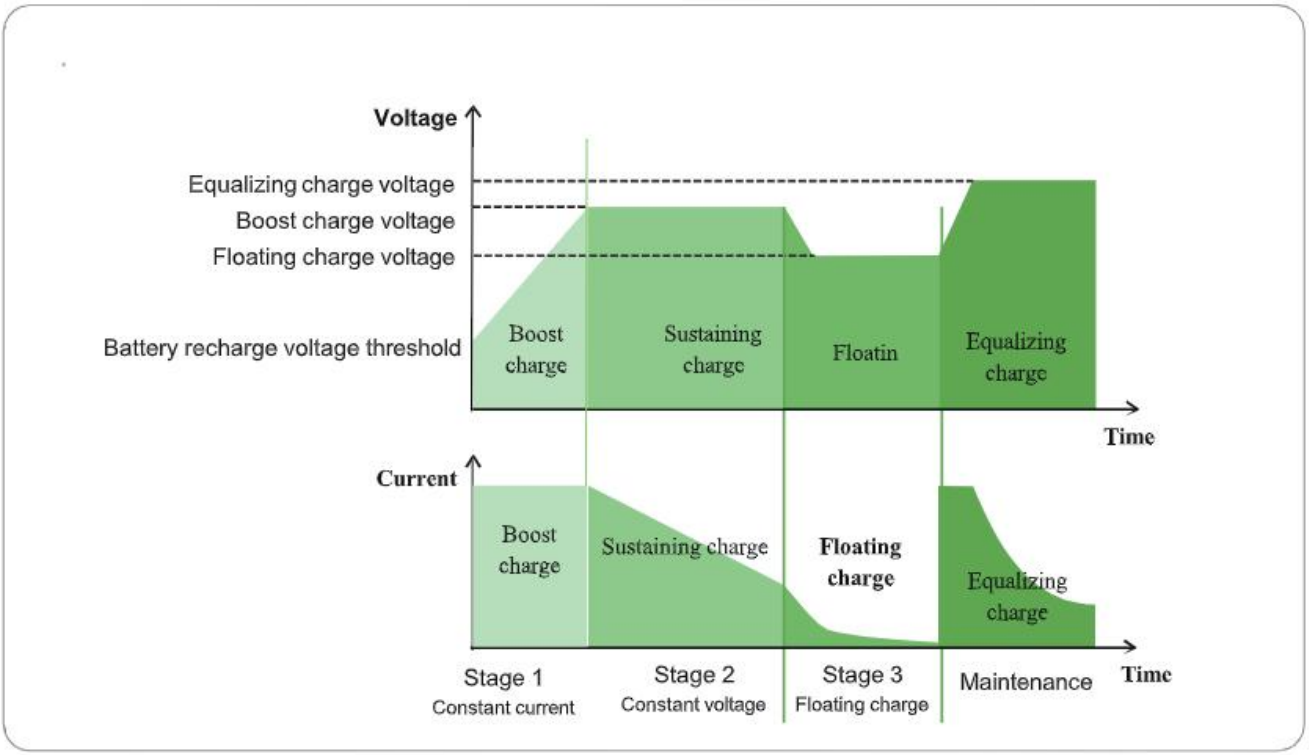



With 3 definable periods, users can freely set the battery discharge period in the range of 00:00–23:59. During the period set by the user, the inverter will first use the battery inverter to load; if the battery power is insufficient, the inverter will automatically switch to mains to ensure stable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

## 5.6 Battery parameters

- **Lead-acid battery**

| Parameter/Battery Type | Sealed Lead-acid Battery | Gel lead-acid battery | Flooded Lead-acid Battery | User-defined Battery |
|---|---|---|---|---|
| | SLD | GEL | FLD | USE |
| Over-voltage disconnect voltage | 60 V | 60 V | 60 V | 60 V |
| Equalizing charge voltage | 58 V | 56.8 V | 58 V | 40 V–60 V (settable) |
| Boost charge voltage | 57.6 V | 56.8 V | 57.6 V | 40 V–60 V (settable) |
| Floating charge voltage | 55.2 V | 55.2 V | 55.2 V | 40 V–60 V (settable) |
| Under-voltage alarm voltage | 44 V | 44 V | 44 V | 40 V–60 V (settable) |
| Under-voltage disconnect voltage | 42 V | 42 V | 42 V | 40 V–60 V (settable) |
| Discharge limit voltage | 40 V | 40 V | 40 V | 40 V–60 V (settable) |
| Over-discharge delay time | 5s | 5s | 5s | 1s–30s (settable) |
| Equalizing charge duration | 120 min | - | 120 min | 0 min–600 min (settable) |
| Equalizing charge cycle | 30 d | - | 30 d | 0 d–250 d (settable) |
| Boost charge cycle | 120 min | 120 min | 120 min | 10 min–600 min (settable) |

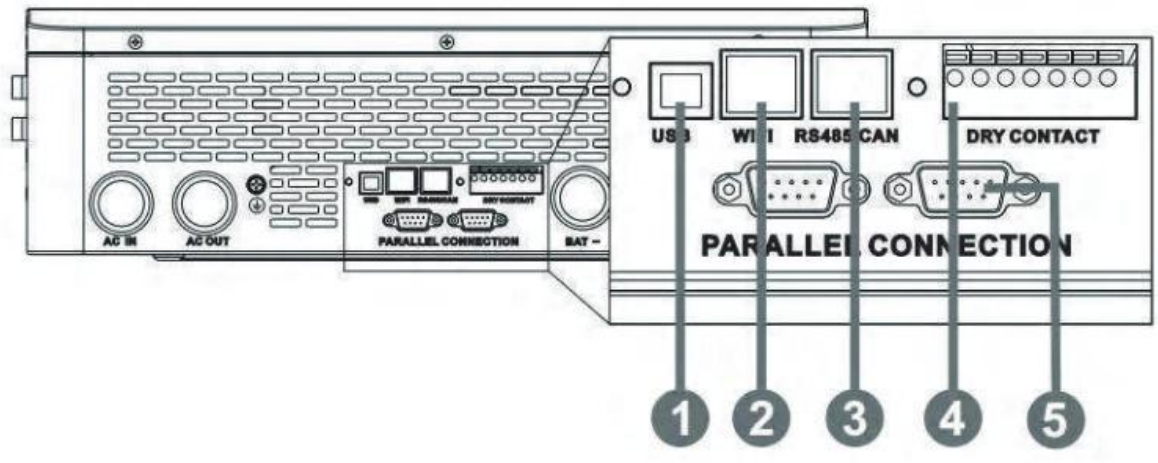


- **Li-ion battery**

| Parameter/Battery Type | Ternary Li-ion Battery | | LFP Battery | | | User-defined Battery |
|---|---|---|---|---|---|---|
| | N13 | N14 | L16 | L15 | L14 | USE |
| Over-voltage disconnect voltage | 60 V | 60 V | 60 V | 60 V | 60 V | 60 V |
| Equalizing charge voltage | - | - | - | - | - | 40 V–60 V (settable) |
| Boost charge voltage | 53.2 V | 57.6 V | 56.8 V | 53.2 V | 49.2 V | 40 V–60 V (settable) |
| Floating charge voltage | 53.2 V | 57.6 V | 56.8 V | 53.2 V | 49.2 V | 40 V–60 V (settable) |
| Under-voltage alarm voltage | 43.6 V | 46.8 V | 49.6 V | 46.4 V | 43.2 V | 40 V–60 V (settable) |
| Under-voltage disconnect voltage | 38.8 V | 42 V | 48.8 V | 45.6 V | 42 V | 40 V–60 V (settable) |
| Discharge limit voltage | 36.4 V | 39.2 V | 46.4 V | 43.6 V | 40.8 V | 40 V–60 V (settable) |
| Over-discharge delay time | 30s | 30s | 30s | 30s | 30s | 1s–30s (settable) |
| Equalizing charge duration | - | - | - | - | - | 0 min–600 min (settable) |
| Equalizing charge cycle | - | - | - | - | - | 0 d–250 d (settable) |
| Boost charge cycle | 120 min (settable) | 120 min (settable) | 120 min (settable) | 120 min (settable) | 120 min (settable) | 10 min–600 min (settable) |

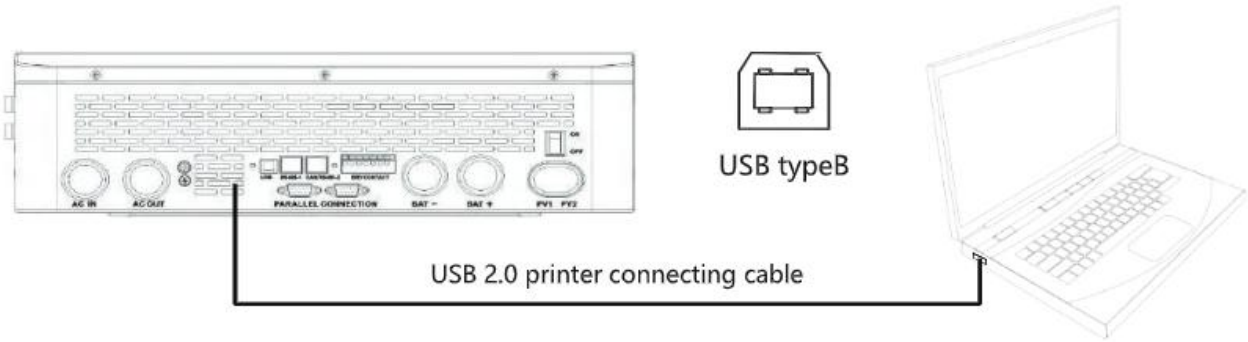
# 6. Communication

## 6.1 Overview



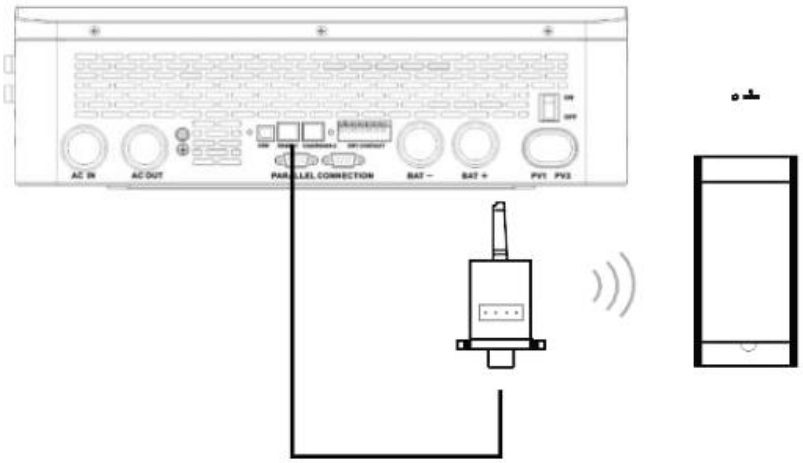

| | | | | | |
|---|---|---|---|---|---|
| 1 | USB-B port | 2 | WIFI port | 3 | RS485/CAN port |
| 4 | Dry contact port | 5 | Parallel port | | |

## 6.2 USB-B port



## 6.3 WIFI port

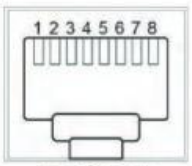
The WIFI port is used to connect to the Wi-Fi/GPRS data acquisition module, and then users can view the operation status and parameters of the inverter via the mobile APP.



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

## 6.4 RS485/CAN port

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




RS485/CAN

**NOTICE**

If you need the communication between the inverter and the BMS of the Li-ion battery, please contact us to understand the communication protocol, or upgrade the inverter to the corresponding software program.

| RJ45 | Definition |
|---|---|
| Pin 1 | RS485-B |
| Pin 2 | RS485-A |
| Pin 3 | / |
| Pin 4 | CANH |
| Pin 5 | CANL |
| Pin 6 | / |
| Pin 7 | RS485-A |
| Pin 8 | RS485-B |

## 6.5 Dry contact port

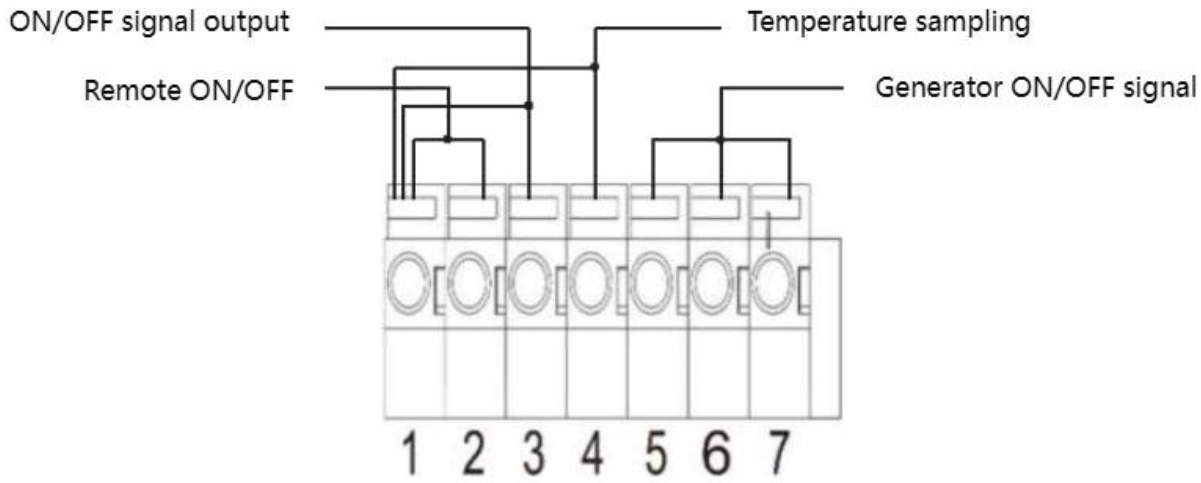
**The dry contact port has 4 functions:**

1.Remote ON/OFF

2.ON/OFF signal output

3.Battery temperature sampling

4.Remote generator start/stop



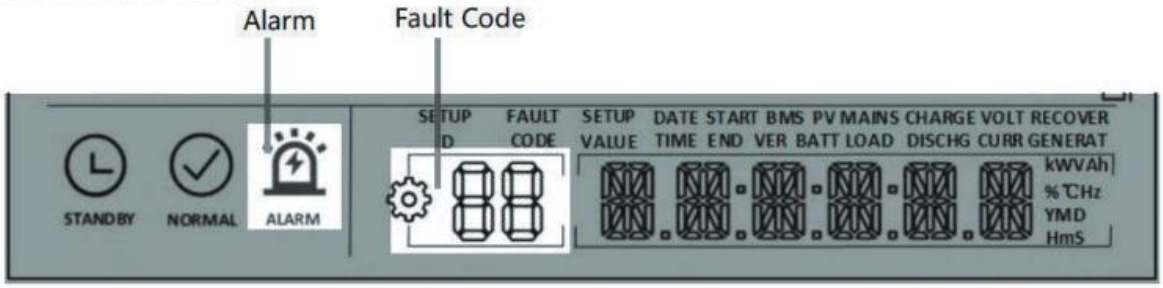

| Function | Description |
|---|---|
| Remote Switch: | When pin 1 is connected to pin 2, the inverter will turn off the AC output. When pin 1 is disconnected from pin 2, the inverter will resume normal output; |
| Switch Signal Output | **Without BMS:** When the battery voltage drops below the discharge limit voltage (Item 15), the voltage from pin 3 to pin 1 is 0V. When the battery is fully charged, or its voltage recovers to the grid-to-inverter voltage point (Item 05) and the machine switches to inverter mode, the voltage from pin 3 to pin 1 becomes 5V;<br>**With BMS:** When the battery SOC drops below the discharge cutoff SOC point (Item 59), the voltage from pin 3 to pin 1 is 0V. When the battery is fully charged, or its SOC recovers to the grid-to-inverter SOC point (Item 62) and the machine switches to inverter mode, the voltage from pin 3 to pin 1 becomes 5V; |
| Temperature Sampling | Temperature Sampling: Pin 1 and pin 4 are used for battery temperature sampling and compensation . |
| Generator Remote Start/Stop | **Without BMS communication:** When the battery voltage drops below the inverter-to-grid voltage point (Item 04) or the battery low voltage alarm point (Item 14), pin 6 to pin 5 is Normally Open (NO), and pin 7 to pin 5 is Normally Closed (NC). When the battery voltage recovers to the grid-to-inverter voltage point (Item 05), or after the battery is fully charged and returns to the inverter state, pin 6 to pin 5 becomes Normally Closed (NC), and pin 7 to pin 5 becomes Normally Open (NO);<br>**With BMS communication:** When the battery capacity drops below the inverter-to-grid SOC (Item 61), pin 6 to pin 5 is Normally Open (NO), and pin 7 to pin 5 is Normally Closed (NC). When the battery SOC recovers to the grid-to-inverter SOC point (Item 62), or after the battery is fully charged and returns to the inverter state, pin 6 to pin 5 becomes Normally Closed (NC), and pin 7 to pin 5 becomes Normally Open (NO).<br>(5/6/7 pin output: 125 VAC/1 A, 230 VAC/1 A, and 30 VDC/1 A) |

**NOTICE**

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

# 7. Fault Codes and Response Measures

## 7.1 Fault codes




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

| | | | |
|---|---|---|---|
| **20** | OverTemperInv | Yes | Inverter heat sink over-temperature protection |
| **21** | FanFail | Yes | Fan fault |
| **22** | EEPROM | Yes | Memory fault |
| **23** | ModelNumErr | Yes | Model setting error |
| **24** | Busdiff | Yes | Positive and negative bus voltage imbalance |
| **25** | BusShort | Yes | Bus short-circuit |
| **26** | Rlyshort | Yes | Inverter AC output backward to bypass AC output |
| **28** | LinePhaseErr | Yes | Mains input phase error |
| **29** | BusVoltLow | Yes | Bus low-voltage protection |
| **30** | BatCapacityLow1 | Yes | Alarm of battery capacity rate below 10% (taking effect after BMS communication is successful) |
| **31** | BatCapacityLow2 | No | Alarm of battery capacity rate below 5% (taking effect after BMS communication is successful) |
| **32** | BatCapacityLowStop | Yes | Battery low-capacity OFF (taking effect after BMS communication is successful) |
| **34** | CanCommFault | Yes | Parallel can communication fault |
| **35** | ParaAddrErr | Yes | Parallel ID (communication address) setting error |
| **37** | ParaShareCurrErr | Yes | Parallel current sharing fault |
| **38** | ParaBattVoltDiff | Yes | Large battery voltage difference in parallel mode |
| **39** | ParaAcSrcDiff | Yes | Inconsistent mains input source in parallel mode |
| **40** | ParaHwSynErr | Yes | Hardware synchronization signal error in parallel mode |
| **41** | InvDcVoltErr | Yes | Inverter DC voltage error |
| **42** | SysFwVersionDiff | Yes | Inconsistent system firmware version in parallel mode |
| **43** | ParaLineContErr | Yes | Parallel connection fault |
| **44** | Serialnumbererror | Yes | Failure to set the serial number before leaving factory |
| **45** | Errorsettingofsplit-phasemode | Yes | Setting error of setting items in parallel mode |
| **56** | Lowinsulation | No | Abnormally low earth impedance of PV1+, |

| | | | |
|---|---|---|---|
| | resistancefault | | PV2+, and PV- |
| **57** | Leakagecurrent overloadfault | Yes | System current leakage out of the standard |
| **58** | BMSComErr | No | BMS communication fault |
| **60** | BMSUnderTem | No | BMS under-temperature alarm (taking effect after BMS communication is successful) |
| **61** | BMSOverTem | No | BMS over-temperature alarm (taking effect after BMS communication is successful) |
| **62** | BMSOverCur | No | BMS overcurrent alarm (taking effect after BMS communication is successful) |
| **63** | BMSUnderVolt | No | BMS under-voltage alarm (taking effect after BMS communication is successful) |
| **64** | BMSOverVolt | No | BMS overvoltage alarm (taking effect after BMS communication is successful) |

## 7.2 Troubleshooting

| Fault Code | Meaning | Cause | Solution |
|---|---|---|---|
| / | No screen display | There is no power input, or the device switch at its bottom is not turned on | Check if the battery air-switch or PV air-switch has been closed; check if the switch is in "ON"; press any button on the screen to exit the screen sleep mode. |
| **01** | Battery under-voltage | The battery voltage is lower than the value set in parameter [14] | Charge the battery until the battery voltage exceeds the value set in parameter [14]. |
| **03** | Disconnected battery | The battery is not connected, or the BMS of the lithium-ion battery is in the discharge protection state | Check if the battery is reliably connected; check if the circuit breaker of the battery is off; ensure that the BMS of the lithium-ion battery can communicate normally. |
| **04** | Battery over-discharge | The battery voltage is lower than the value set in parameter 12 | Manual reset: Turn off the power, and restart<br>Automatic reset: Charge the battery until the battery voltage is higher than the value set in parameter [35] |
| **06** | Rechargeable battery over-voltage protection | The battery is in the over-voltage state | Manually turn off the power, and restart<br>Check if the battery voltage exceeds the limit. If the limit is exceeded, discharge the battery until the voltage is below the over-voltage recovery threshold of the battery |
| **13** | Bypass overload (software detection) | The output power or current of the bypass is overloaded within a certain period | Reduce the load power, and restart the device. For more details, please refer to item 11 in Protection Function |
| **14** | Inverter overload (software detection) | The output power or current of the inverter is overloaded within a certain period | |
| **19** | Over-high temperature of the heat sink for PV input (software detection) | The temperature of the heat sink for PV input exceeds 90°C for 3s | Wait until the temperature of the heat sink is below the over-temperature recovery temperature, when charge and discharge return to normal |
| **20** | Over-high | The temperature of the | |

| | | | |
|---|---|---|---|
| | temperature of the heat sink for inverter output (software detection) | heat sink for inverter output exceeds 90°C for 3s | |
| **21** | Fan fault | Software detection founds the fan has a fault | Shut down, manually flick the fan, and check if any foreign objects are blocking it |
| **26** | AC input relay short-circuit | Stuck relay for AC output | Manually shut down, and restart. If the fault occurs again after restarting, contact the after-sales service personnel to repair the machine |
| **28** | Mains input phase fault | The phase of AC input is inconsistent with that of AC output | Ensure that the phase of AC input is the same as that of AC output. For example, if the output is in the split-phase mode, the input shall also be in the split-phase mode. |

*NOTICE*

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

# 8. Protection Function and Product Maintenance

## 8.1 Protection function

| No | Protection Function | Description |
|---|---|---|
| **1** | PV current-limiting protection | When the charge current or power of the configured PV array exceeds the rated current and power of the inverter, it will charge at the rated current and power |
| **2** | PV over-voltage protection | If the PV voltage exceeds the maximum allowable value of hardware, the machine will report the fault, and stop the step-up of PV to output sine AC waves |
| **3** | Reverse charge protection at night | At night, as the battery voltage is greater than that of the PV module, it will prevent the battery from discharging to the PV module |
| **4** | mains input over-voltage protection | When the mains voltage of each phase exceeds 140 VAC, it will stop mains from charging, and switch it to inverter output |

| | | |
|---|---|---|
| **5** | Mains input under-voltage protection | When the mains voltage of each phase is lower than 90 VAC, it will stop mains from charge, and switch it to inverter output |
| **6** | Battery over-voltage protection | When the battery voltage reaches the overvoltage disconnect voltage threshold, it will automatically stop PV and mains from charging the battery, thus preventing damage to the battery due to overcharge |
| **7** | Battery under-voltage protection | When the battery voltage reaches the low-voltage disconnect voltage threshold, it will automatically stop discharging the battery, thus preventing damage to the battery due to overdischarge |
| **8** | Battery over-current protection | When the battery current exceeds the allowable range of hardware, the machine will turn off the output, and stop discharging the battery |
| **9** | AC output short-circuit protection | When a short-circuit fault occurs at the load output terminal, it will immediately turn off the output of AC voltage. Only after manually powering on the device, normal output restores |
| **10** | Heat sink over-temperature protection | When the internal temperature of the inverter is too high, the inverter will stop charging and discharging; when the temperature returns to normal, the inverter will charge and discharge again |
| **11** | Overload protection | After overload protection is triggered, the inverter output will be restored after 3 min, and after 5 times of overload, the output will be off until the frequency changer is restarted.<br>(102%< load <110%): An error will be reported, and the output will be turned off after 5 min.<br>(110%< load <125%): An error will be reported, and the output will be turned off after 10s.<br>Load >125%: An error will be reported, and the output will be turned off after 5s. |
| **12** | AC backward protection | Prevent the mains of battery inverter backward to bypass AC input |
| **13** | Bypass over-current protection | Built-in circuit breaker for AC input over-current protection |
| **14** | Bypass wiring error protection | When the phase of the two bypass inputs is different from that of the inverter split-phase, the machine will prohibit connecting to the bypass, thus preventing the power failure or short circuit of load when connecting to the bypass |

## 8.2 Maintenance

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

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

**⚠ DANGER**

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

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

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

# 9. Parameter Table

| Inverter Model | ECO10000W(SR) | Settable |
|---|---|---|
| **Inverter output** | | |
| Rated output power | 10,000 W | |
| Maximum peak power | 20,000 W | |
| Rated output voltage | 120/240 VAC (single-phase/split-phase) | Y |
| Loading motor capacity | 6 HP | |
| Rated frequency | 50/60 Hz | Y |
| Output wave | Pure sine wave | |
| Switching time | 10 ms (typical value) | |
| Parallel number | 6 | |
| Overload protection | After overload protection is enabled, the inverter output will be restored after 3 min, and after 5 times of overload, the output will be off until the inverter is restarted.<br>(102%< load <110%): An error will be reported, and the output will be turned off after 5 min.<br>(110%< load <125%): An error will be reported, and the output will be turned off after 10s.<br>Load >125%: An error will be reported, and the output will be turned off after 5s. | |
| **Battery** | | |
| Battery type | Lithium-ion battery/lead-acid battery/user-defined battery | Y |
| Rated battery voltage | 48 Vdc | |
| Voltage range | 40 Vdc–60 Vdc | Y |
| Maximum PV charge current | 200 A | Y |
| Maximum mains/generator charge current | 120 A | Y |
| Maximum mix charge current | 200 A | Y |
| **PV input** | | |
| MPPT channel number | 2 | |

| | | |
|---|---|---|
| Maximum input power | 11,000 W | |
| Maximum Input Current | 22/22 A | |
| Maximum open circuit voltage | 500 Vdc | |
| MPPT operating voltage range | 125 Vdc–425 Vdc | |
| **Mains/generator input** | | |
| Input voltage range | 90 VAC–140 VAC | |
| Input frequency range | 50/60 Hz | |
| Bypass overload current | 63 A | |
| **Efficiency** | | |
| MPPT tracking efficiency | 99.9% | |
| Maximum efficiency of battery inverter | 92% | |
| **General** | | |
| Dimension | 620 mm*445 mm*130 mm | |
| Weight | 27 kg | |
| Protection level | IP20, for indoor use only | |
| Ambient temperature | –10°C–55°C, >45°C derating | |
| Noise | <60 dB | |
| Cooling mode | Intelligent fan | |
| **Communication** | | |
| Built-in interface | RS485/CAN/USB/dry contact | Y |
| External module (optional) | Wi-Fi/GPRS | Y |
| **Certification** | | |
| Safety | IEC62109-1, IEC62109-2, and UL1741 | |
| EMC | EN61000-6-1, EN61000-6-3, and FCC 15 class B | |
| RoHS | Yes | |