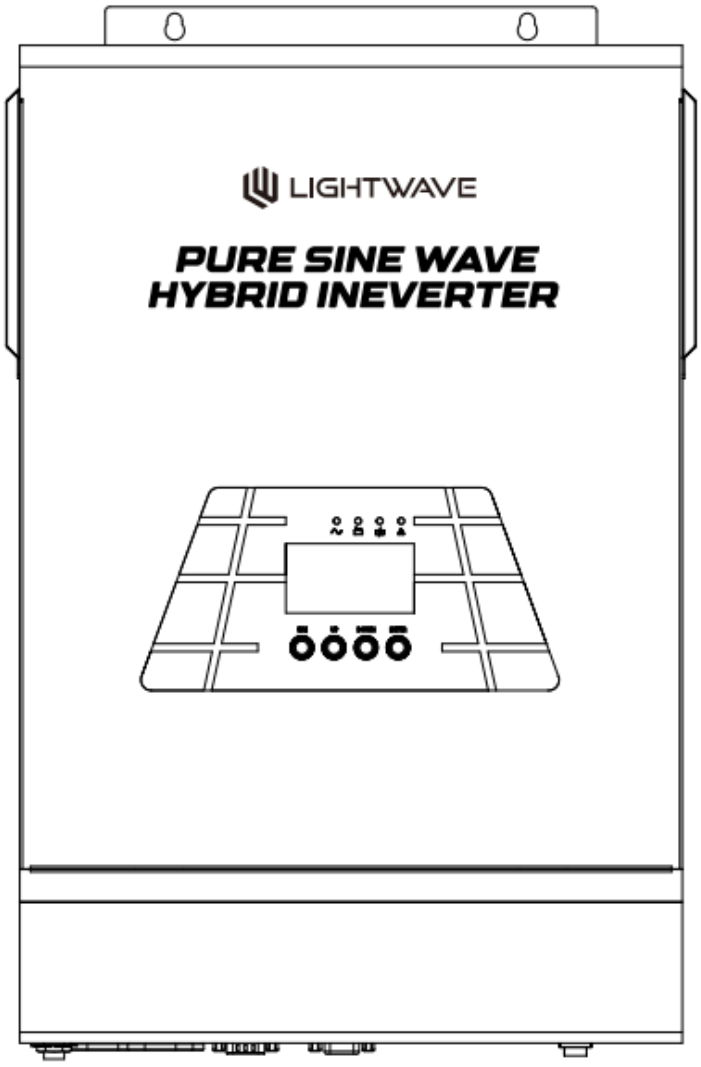
LIGHTWAVE

PURE SINE WAVE HYBRID INVERTER

USER'S MANUAL



LW-INY-HY-6KW

Read the manual carefully before operation and keep it for reference. This manual is only for reference, please comply with actual appliance you selected. Manufacturer hold the authority to redesign or modify its products without notice.

www.lightwaveglobal.com

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About This Manual

1.1. Purpose

This manual describes the assembly, installation, operation and trouble-shooting of this unit. Please read this manual carefully before installations and operations and keep it for future reference.

1.2. Scope

This manual provides safety and installation guidelines as well as information on tools and wiring. It includes five different kinds of machines with secondary power-off function and those without. This manual is compatible with machines with central control board and machines with RS232 communication board as well.

2. Safety Instructions

WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1 Before using the unit read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.

2 **CAUTION**−Do not squeeze, impact, or move the battery while it is charging. Do not use private modification battery, set inverter charging battery cannot exceed the rated charging current of the battery; When connecting the battery for the first time or replacing the battery, please check the rated battery voltage and current. Otherwise, the battery may burst due to problems and mismatching, causing personal injury or damage.

3 Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.

4 To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.

5 **CAUTION:** Only qualified personnel can install this device with battery.

6 **NEVER** charge a frozen battery.

7 For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter.

8 Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.

9 Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to installation section of this manual for the details.

10 One piece of fuse is provided as over-current protection for the battery supply.

11 GROUNDING INSTRUCTIONS -This inverter/ charger should be connected to a permanent grounder wiring system. Be sure to comply with local requirements and regulation to install this inverter.

12 NEVER cause AC output and DC input short circuited. DO NOT connect to the mains when DC input short circuits.

13 **Warning!!** If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.

3. Introduction

This is a multi-function Inverter/charger, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation. You can change parameters such as battery charging current, AC/solar

charger priority, and acceptable input voltage based on different applications.

3.1. Features

- Pure sine wave inverter
- Configurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload/Over temperature/Short circuit protection
- Smart battery charger design for optimized battery performance
- Cold start function

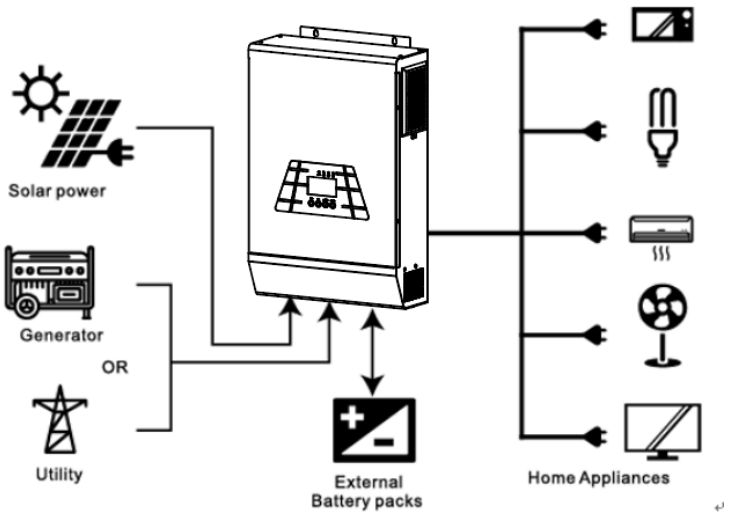
3.2. Basic System Architecture

The following illustration shows basic application for this inverter/charger. It also includes following devices to have a complete running system:

- Generator or Utility
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements.

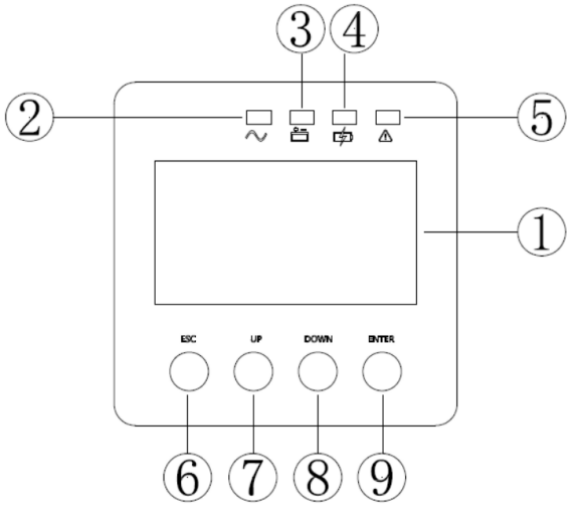
This inverter can power numerous kinds of appliances in home or environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.



One detection device needs to be connected between the PV+ and PV- & the ground to ensure leakage current between PV+ and PV- & the ground is less than 30mA.

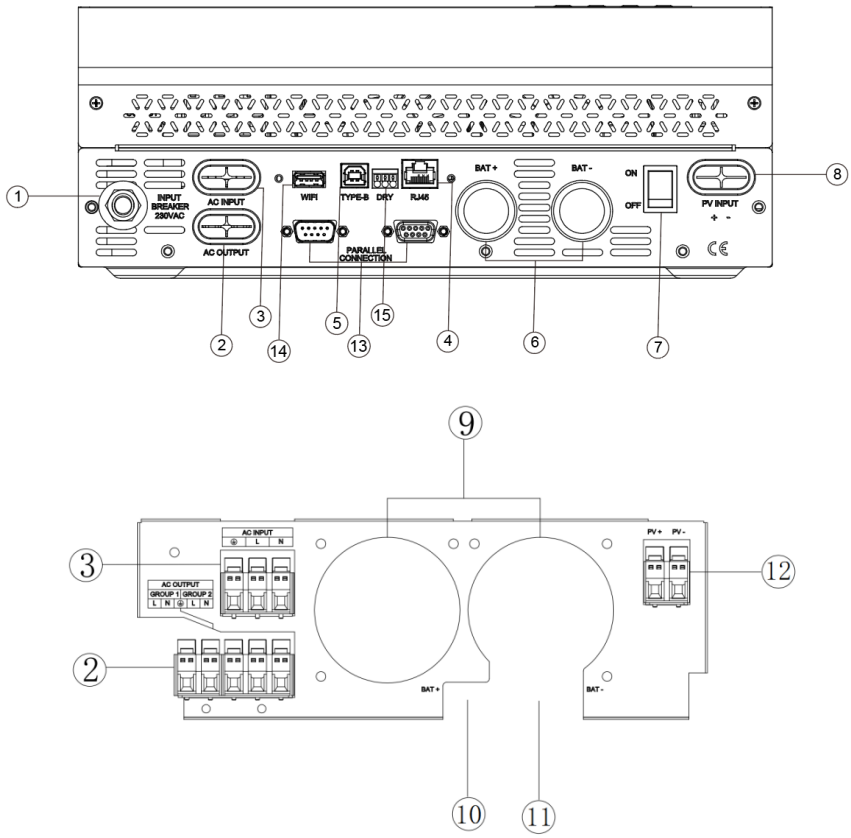
3.3. Product Overview

3.3.1. LCD Screen



① LCD Display	⑥ ESC
② AC Model Indicator	⑦ UP
③ Invert Mode Indicator	⑧ DOWN
④ Charging Indicator	⑨ ENTER
⑤ Alarming Indicator	

3.3.2. Back Panel



6kVA/6kW back panel view

① Input Break	⑨ FAN
② AC Output	⑩ Battery Terminal Positive
③ AC Input	⑪ Battery Terminal Negative
④ RS232(DB9)/RS485(CAN) Communication Port	⑫ Solar Panel Input
⑤ USB Communication Port	⑬ Parallel interface
⑥ Battery Input	⑭ Wi-Fi Communication Port
⑦ Power ON/OFF Switch	⑮ Dry contact interface
⑧ PV Input	

Note:
1. The “AC Output Group2” is only applicable to inverters equipped with dual output function.
2. The WiFi communication port, dry contact interface and RS485(CAN) communication port are only applicable to inverters equipped with the central control board.
3. The machine without central control board is equipped with RS232 communication board instead. There is a USB type-B interface and a RS232 communication port which is available for WiFi communication.

4. Installation

4.1. Unpacking and Inspection

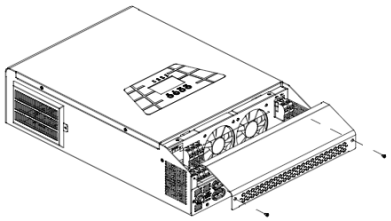
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

- The unit x 1

- User manual x 1

4.2. Preparation

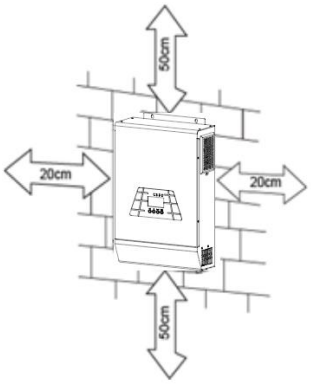
Before connecting all, please take off bottom cover by removing several screws as shown below.



6kVA/6kW

4.3. Mounting the Unit

Consider the following points before selecting where to install:



※ Do not mount the inverter on flammable construction materials

※ Mount on a solid surface

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

※ For proper air circulation to dissipate heat, please allow a clearance of approximately 20cm and 50cm respectively on the left-right and upper-down with the unit

※ The ambient temperature should be between 0~40℃ and to ensure optimal operation

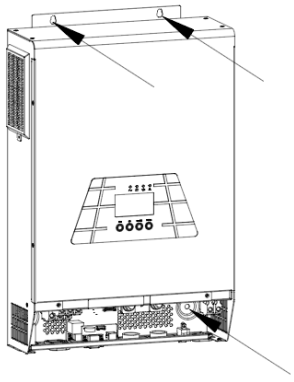
※ The recommended installation position is to be adhered to the wall vertically

※ Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for removing wires

FIRE HAZARD. SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.

Install the unit by screwing two screws.

- 1, 2 Use the M6*80mm expansion bolts.
- 3 Use M4 or M5.



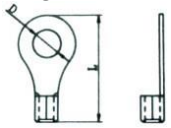
6kVA/6kW

4.4. Battery Connection

CAUTION: For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it's still requested to over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

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

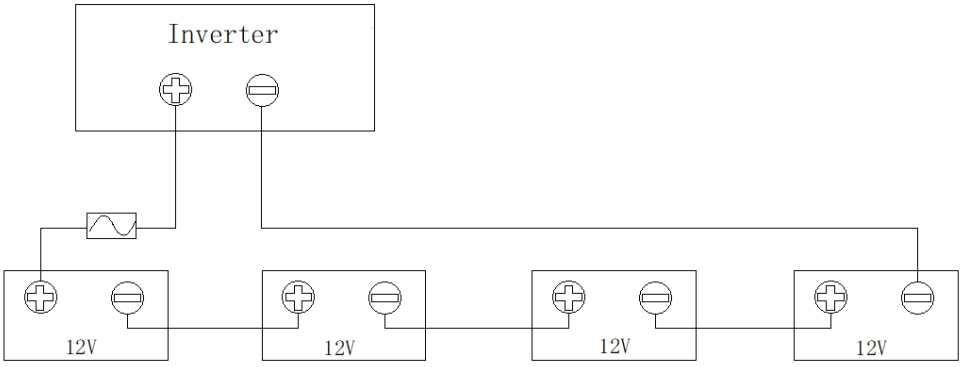
Ring terminal:



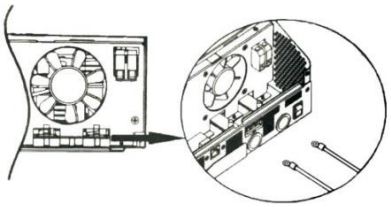
Recommended battery cable and terminal size:

Model	Typical Amperage	Battery capacity	Wire Size	Ring Terminal			Torque value
				Cable(mm²)	Dimensions		
					D(mm)	L(mm)	
6kVA	128A	200AH	1*2AWG	38	6.4	39.2	2-3 Nm
			2*6AWG	28	6.4	33.2	

Please follow below steps to implement battery connection:
1. Assemble battery ring terminal based on recommended battery cable and terminal size.



2. Insert the battery wires flatly into battery connectors of inverter and make sure the bolts are tightened with torque of 2 Nm in clockwise direction. Make sure polarity at both the battery and the inverter/charge is correctly connected and conductors are tightly screwed into the battery terminals Recommended tool: # 2 Pozi Screwdriver.



6kVA/6kW

WARNING: Shock Hazard
Installation must be performed with care due to high battery voltage in series.

CAUTION!! Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

4.5. AC Input Output Connection

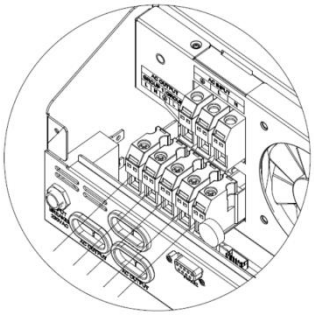
CAUTION!! Before connecting to AC input power source, please Install a separate AC breaker between inverter and AC input power source. This will ensure the Inverter can be disconnected during maintenance and fully protected from over current of AC input. For the 3kVA model, the recommended spec of breaker is 32A while for the 6kVA model is 50A.
CAUTION!! There are two terminal blocks with" IN" and" OUT" markings. Please do NOT mis-connect input and output connectors.
WARNING! All wiring must be performed by qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

Suggested cable requirement for AC wires

Model	Gauge	Torque value
6kVA	8AWG	1.4~1.6Nm

Please follow below steps to implement AC input/output connection
1. Before making AC input/output connection be sure to open DC protector or disconnector first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚) first.

⏚ **→Ground**
L → LINE
N→ Neutral



6kVA/6kW

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

4. Make sure the wires are securely connected

CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/charger will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

4.6. PV Connection

CAUTION: Before connecting to PV modules, please install separately a DC circuit breaker between inverter and PV modules.

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

PV module selection:
When choosing the right PV module, be sure to consider the following requirements first:
The open circuit voltage (Voc) of the PV modules does not exceed the maximum PV array open circuit voltage of the inverter. The maximum supply voltage of the PV modules should be close to the optimal PV access voltage range of the inverter for best performance. If one PV module cannot meet this requirement, it is necessary to connect multiple PV modules in series.

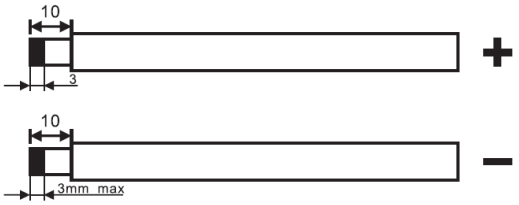
Model	**6000VA /6000W**
PV Charging Mode	MPPT
MAX PV Input Power	6000W
MAX PV Input Current	18A
MPPT Tracking Range	120~450 Vdc
MAX PV Input Voltage	500Vdc
Best open circuit voltage range	370~430V
Best voltage	300~340V
MAX PV Charging Current	100A
MAX AC Charging Current	80A
MAX Charging Current	100A

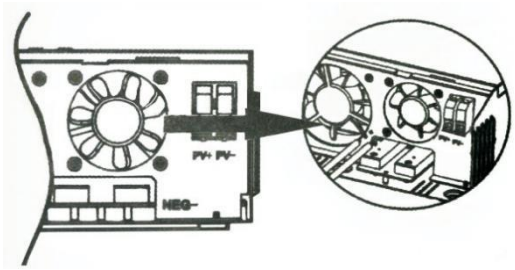
PV Module Wire Connection

Please follow below steps to implement PV module connection:

1. Remove insulation sleeve 10 mm for positive and negative conductors.

2. Suggest to put bootlace ferrules on the end of positive and negative wires with a proper crimping tool.
3. Fix wire cover to the inverter with supplied screws as shown in below chart.

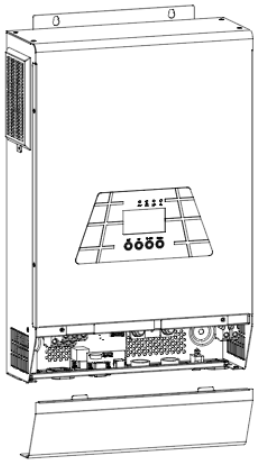




4. Check correct polarity of wire from PV modules and PV input connectors. Then, connect positive pole (+) of connection wire to positive pole (+) of PV input connector. Connect negative pole (-) of connection wire to negative pole (-) of PV input connector. Screw two wires tightly in clockwise direction. Recommended tool: 4mm blade screwdriver.

4.7. Final Assembly

After connecting all wirings, please put bottom cover back by screwing two screws as shown below.



6kVA/6kW

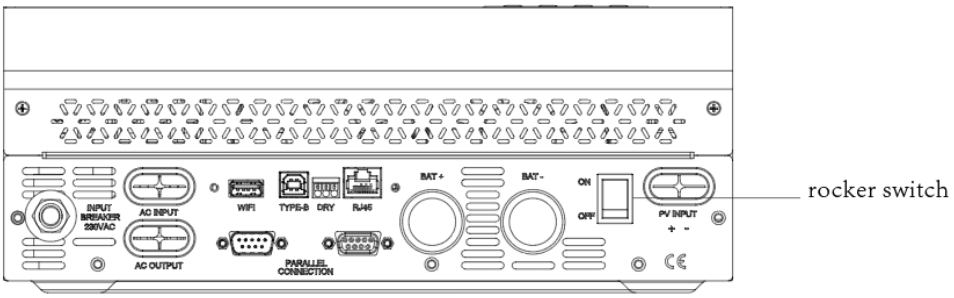
4.8. Communication Connection

1. Please use supplied communication cable to connect to inverter and PC.
2. Wi-Fi cloud communication(option):

Please use supplied communication cable to connect to inverter and Wi-Fi module. Download APP and installed from APP store, and refer to "Wi-Fi Plug Quick Installation Guideline" to set up network and registering. The inverter status would be shown by mobile phone APP or webpage of computer.

5. Operation

5.1. Power ON/OFF



6kVA/6kW

Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) to turn on the unit.

5.1.1. Steps to Start Up

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

- Mains power on

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

When the normal mains power is connected and press the power-on button then the system will automatically power on. If it is set as AC output priority, after a period of time, the panel will display the AC mode to indicate that the power-on is complete and enter the AC mode.

- Battery boot

Connect to battery, press the power-on button to establish a working power source. The system will automatically turn on, after waiting for a period of time, the panel will display battery mode that represents turn on the machine successfully, then will enter the battery mode.

5.1.2. Shutdown Steps

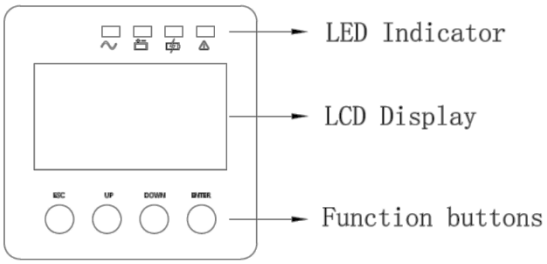
When the system is in battery mode, pressing the POWER ON/OFF switch again will turn off the system and turn off the LCD.
When the system is in bypass mode, press the POWER ON/OFF switch again, then the system will be turned to standby mode. Disconnect the mains power input and the LCD screen will turn off.

CAUTION: Please disconnect AC input and turn off battery switch if the product would keep for no using in long time in order to reduce the system's self-consuming power.

Warning: When repairing the machine, please disconnect all input and output cables after shutting down the machine. Wait for 10 minutes before disassembling the machine casing, otherwise there is a risk of electric shock.

5.2. Operation and Display Panel

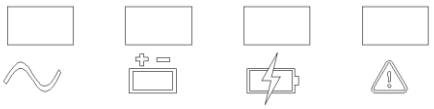
The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes four indicators, four function buttons and a LCD display, indicating the operating status and input/output power information.



5.2.1. Buttons Function

Buttons	Descriptions
Function settings/ENTER	Function settings: Press the ENTER button on the display page for more than 2 seconds to enter the function setting page. After entering, press the ENTER button to turn the page and select the interface to be set.
Page turning/inquiry button UP	Page turning: Press UP on any page to turn the pages.
Page turning/inquiry button DOWN	Page turning: Press DOWN on any page to turn the pages.
ESC	After setting up a single item, press ESC and then press UP or DOWN to select other settings. Confirm and save settings: On the function settings page, press ESC for 2 seconds, and then go back to the main interface and set to save.

5.2.2. LED Indicator Function



Indicator Lights	Name	Descriptions
LED-G	AC Input (Green)	On: The mains is normal and the mains is working Flashing: The utility power is normal, but the utility power is not working Off: Mains is abnormal

LED-Y	Inverter (Yellow)	On: Machine working in battery mode output Off: Other states
LED-Y	Battery (Yellow)	On: The battery is float charging Flash: Battery charging off at constant voltage Off: other states
LED-R	Warning (Red)	On: Inverter fault Flash: Inverter has alarm Off: The inverter is normal

5.2.3. LCD Function Display

LCD display can be divided into: icon display, numerical display and function setting area, working mode display area.

Icon display

- The load and battery graphics represent the load and battery capacity, each square represents 25% of the capacity, the load icon will flash when the inverter is overloaded, and the battery icon will flash when the battery capacity is too low or the battery is not connected.
- The buzzer icon shows whether the buzzer is muted or not. Under normal circumstances, this icon is not displayed; in any mode, the background software sets MUTE ON, the inverter enters the mute state, and the buzzer prohibition icon will be displayed.
- When entering the setting menu, the setting icon will light up, otherwise the icon will not be displayed.
- The fault icon is only displayed in the fault mode, otherwise the icon is not displayed.

Numerical display and function setting area

- In non-function setting mode, this area displays inverter related information. Display output information in normal mode, operate the up and down query keys to display input voltage and output voltage, input frequency and output frequency, battery voltage and current, PV voltage and PV current, PV voltage and power, output power and output voltage, output apparent power and output voltage, load percentage and output voltage, software version and other related information. The fault mode displays the fault code.
- On the function setting page, you can set the output voltage (OPU), battery low voltage shutdown point (EOD), etc. by operating the function setting key and the up and down query keys.

Working mode display area

- After 4 seconds of power on, this display area mainly displays the working mode of the inverter. Such as: standby mode, mains mode, battery mode, fault mode.

5.2.4. Inverter Working Status Table Corresponding to Buzzer

Warning buzzer	Descriptions
Long beeping, continuous for 10 seconds then stop	Failure Mode
Stop after beeping for 3 seconds	Loss or recovery of PV/input voltage
	The main switch is on or off
Beep per second, continuous for 1 min then stop	All other alarms (battery low voltage alarm will only beep in battery mode.)

5.2.5. Checking Parameter Operation

Under normal circumstances, there are ten pages in the display. Press the query button UP or DOWN to draw a page for the display, and display information such as input-output voltage, input-output frequency, battery, PV

voltage and power, component versions, etc. If there is an alarm, a page of alarm information will be displayed, and if the inverter fails, a page of fault code will be displayed. By default, the main panel displays the fault information. When the transformer has no fault, the main page displays the voltage and rate information by default.

Display page 1 (main display page): Display the inverter input and output voltage, as shown in Figure 1-1.

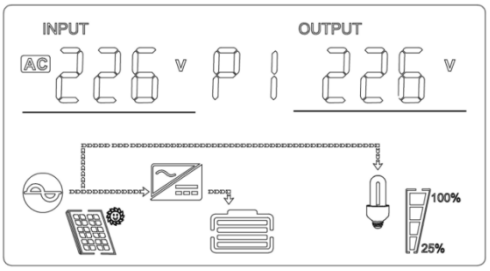


Figure 1-1 display page 1

Display page 2: Display the input and output frequency of the inverter, as shown in Figure 1-2.

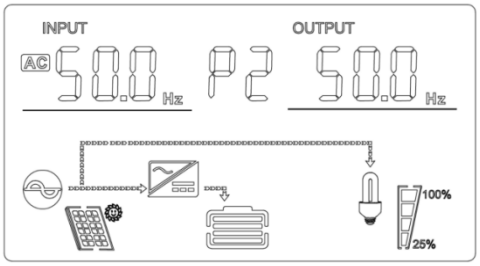


Figure 1-2 display page 2

Display page 3: Battery information, showing battery voltage and charging current, as shown in Figure 1-3.

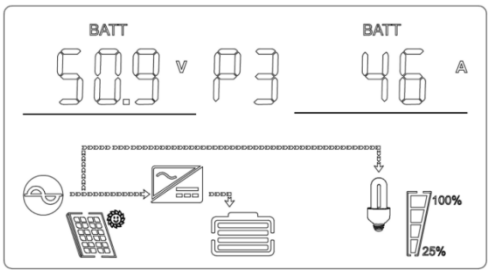


Figure 1-3 display page 3

Display page 4: PV info, display PV voltage and PV charging amps, as shown in Figure1-4.

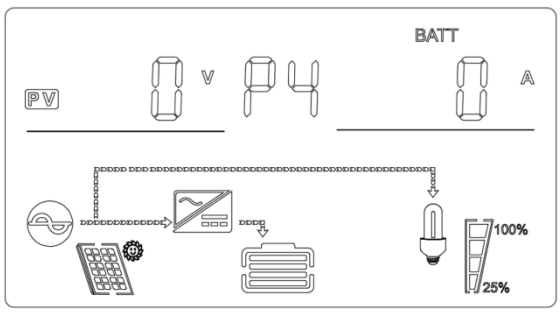


Figure 1-4 display page 4

Display page 5: PV info, display PV voltage and PV charging wattage, show as 1-5.

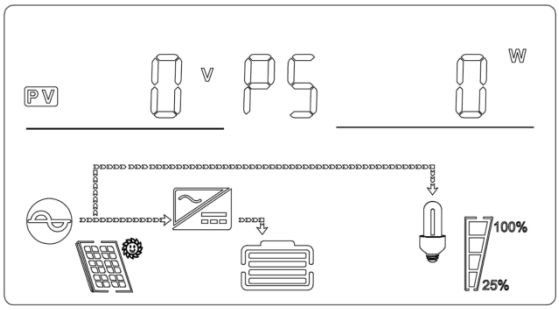


Figure 1-5 display page 5

Display page 6: Output Information shows the output voltage and output power, as shown in Figure 1-6.

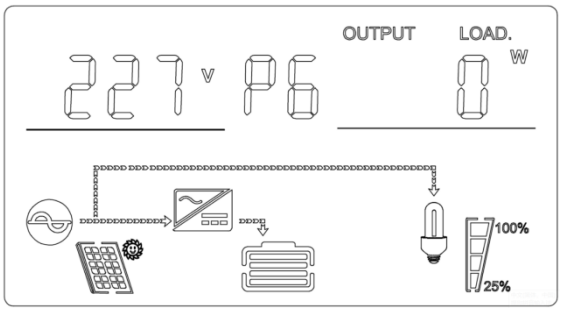


Figure 1-6 display page 6

Display page 7: Output Information shows the output voltage and output power, as shown in Figure 1-7.

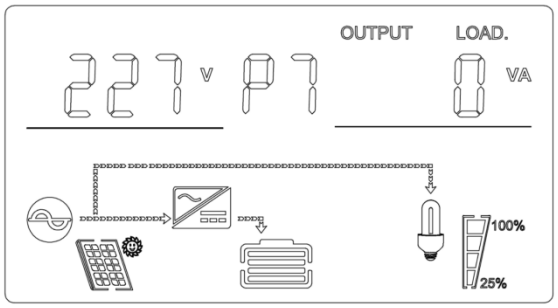


Figure 1-7 display page 7

Display page 8: Output Information displays output voltage and load percentage, as shown in Figure 1-8.

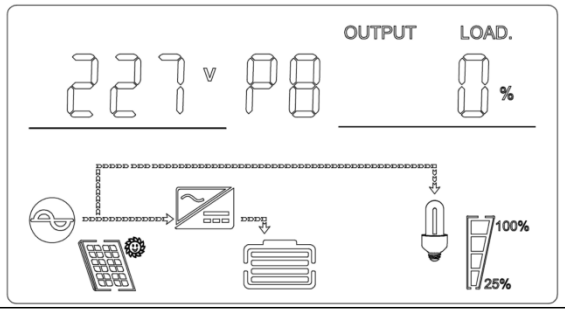


Figure 1-8 display page 8

Display page 9: Software version displays the inverter system software version, as shown in Figure 1-9 (Software Version VER 01).

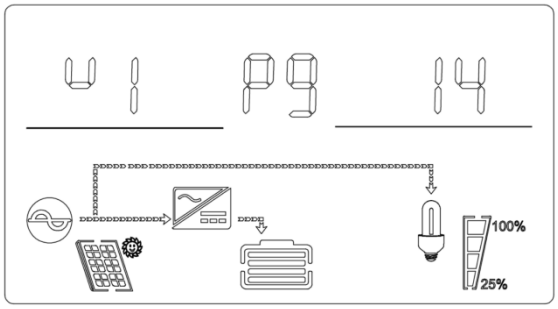


Figure 1-9 display page 9

Display page 10: Software version.

6KVMH displays photovoltaic power generation, as shown in Figure 1-11.

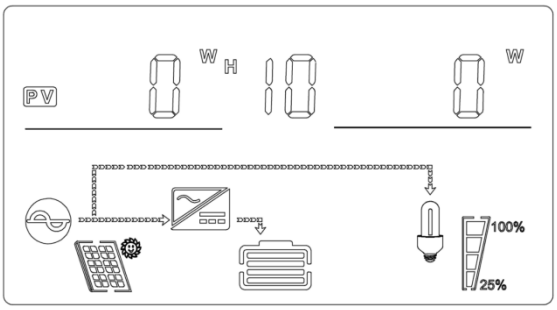


Figure 1-11 display page10

Display page 11: Parallel operation status.

This page is only available for 6Kva/6kW.

Display the parallel operation status, as shown in Figure 1-12

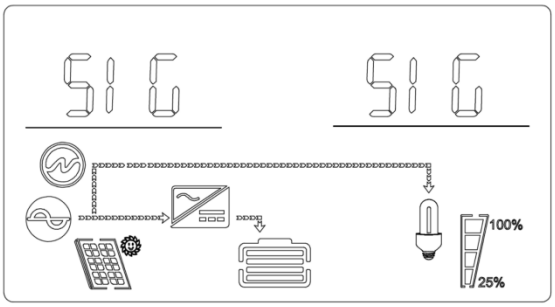


Figure 1-12 display page11

Display page 12: Lithium battery networking status.

When SIG constant is displayed on the upper right, the battery pack operates in a single group;

When PAR constant is displayed, the battery pack operates in series and parallel;

When PAR flashes, the battery pack is establishing multiple groups of series and parallel connection, as shown

in Figure 1-13.

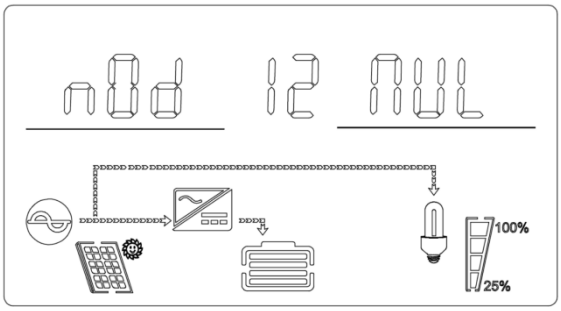


Figure 1-13 display page12

Display page 13: Voltage and current information of lithium battery.

The upper left displays the BMS battery voltage information; The upper right displays the BMS battery current information. In case of BMS communication failure, the upper left and upper right are displayed as flashing ERR, as shown in Figure 1-14.

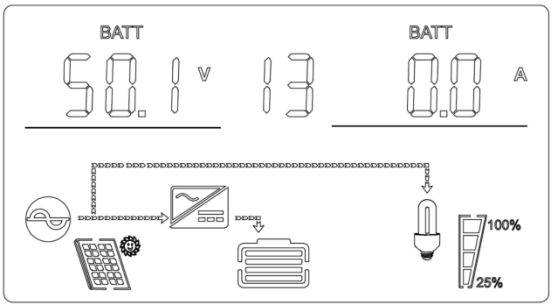


Figure 1-14 display page13

Display page 14: Lithium battery capacity.

The upper left shows the rated capacity; The upper right displays the current capacity. In case of BMS communication failure, the upper left and upper right are displayed as flashing ERR, as shown in Figure 1-15.

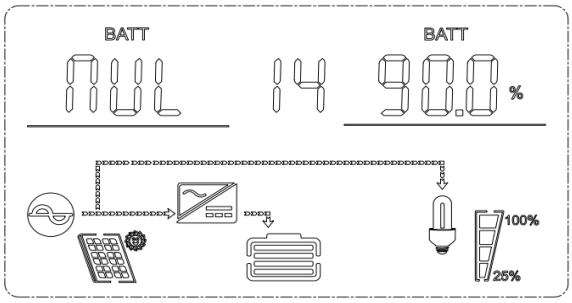


Figure 1-15 display page15

Display page 15: Constant voltage point of lithium battery.

Fixed letters CV are displayed on the upper left. The top right displays the BMS constant voltage charging point. When BMS communication fails, the upper right displays a flashing ERR, as shown in Figure 1-16.

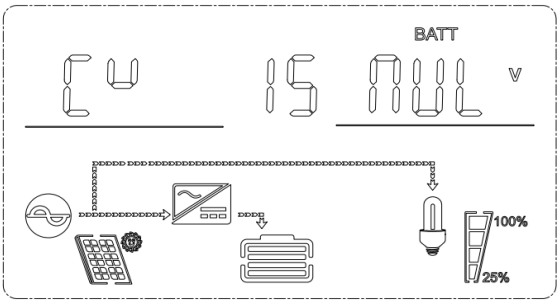


Figure 1-16 display page16

Display page 16: Lithium battery fault alarm information.

The upper left displays BMS alarm information; BMS fault information is displayed on the upper right.

In case of BMS communication failure, the upper left and upper right are displayed as flashing ERR, as shown in Figure 1-17.

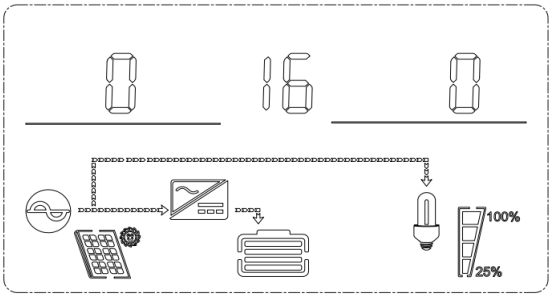


Figure 1-17 display page17

5.3. Function Setting Operation

➢ Function setting operation

The specific operations for entering and exiting the function setting page and function setting are as follows:

- Press the function setting key ENTER for more than 2 seconds to enter the function setting page, press the query key UP/DOWN for 0.1 to 2 seconds to select the function, and after turning the page to the desired function setting page, the corresponding function words will flash.
- Press the ENTER key for 0.1 to 2 seconds to enter the setting page of the selected function. At this time, the word of the selected function will light up, and the value will flash on the left of the word of the selected function. Press the query key UP/DOWN for 0.1 to 2 seconds to select the value of the desired function parameter.
- After turning the page to the function parameter to be selected, press the enter key for 0.1 to 2 seconds, the function setting is completed, and the value of the function parameter is long on and no longer flashing.

Press the ESC key for more than 0.1 to 2 seconds, the function will be successfully set, and at the same time exit the function setting page and return to the main display page (you can also do no operation, and automatically jump back to the main display page after waiting for up to 30S).

5.3.1. Output Voltage (OPU)

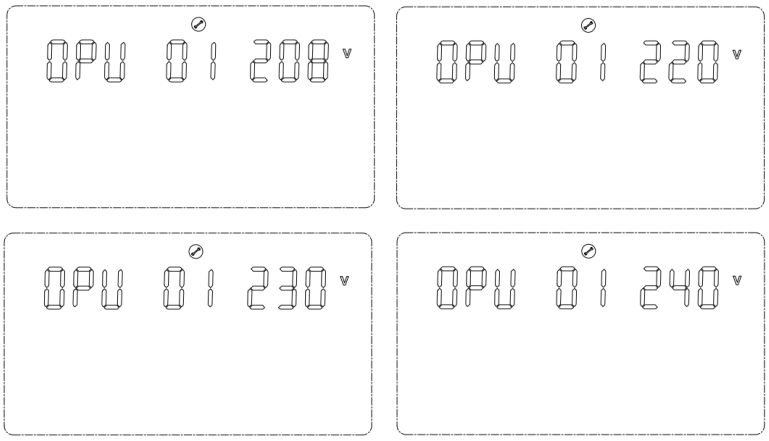


Figure 1-18 Output Voltage Setting

- The default output voltage is 230V, 208V, 220V, 230V, 240V can be set, all working conditions can be set, and it will take effect immediately when the inverter is restarted.
- Press the function setting key "ENTER" key for more than 2 seconds to enter the function setting page, press the query key "UP" "DOWN" key for 0.1 to 2 seconds to select the function, after turning the page to the output voltage OPU setting page, the word OPU flashes.
- Press the "ENTER" key for 0.1 to 2 seconds to enter the setting page of the output voltage OPU. At this time, the word OPU is long on, and the value flashes to the right of the word OPU. Press the query key "UP" or "DOWN" key for 0.1 to 2 seconds to select different output voltage values, the available voltage values are 208V, 220V, 230V, 240V. By default, the output voltage is 230V, and the settings are saved in real time.
- After turning the page to the desired output voltage value, press the "ENTER" key for 0.1~2 seconds, the output voltage OPU setting is completed, and the value on the right side of the OPU will be long on and no longer flashing.
- Press the "ESC" key for more than 0.1 to 2 seconds, the function will be set successfully, exit the function setting page, and return to the main display page (or do not operate, and automatically jump back to the main display page after waiting for up to 30S).

Note:

When the output voltage is set to 208V, the output needs to be derated to 90%.

5.3.2. Output Frequency（OPF）

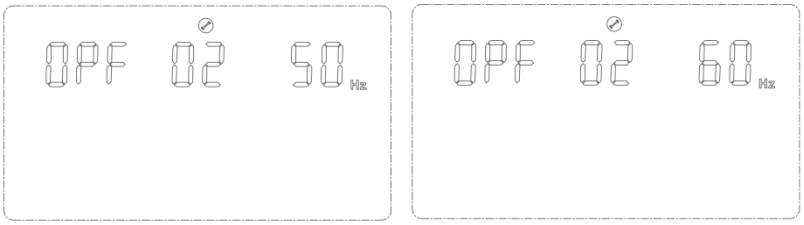


Figure 1-19 Output Frequency Setting Page

Function description: 50Hz or 60Hz can be adjusted, default value is 50Hz.

Setting conditions: All states can be set. In battery mode, the setting will take effect when the Inverter is restarted next time; in mains mode, it will take effect immediately. After the setting is completed. after switching back to battery mode, the frequency will change at a slower rate.

5.3.3. Output Priority Settings（OPP）

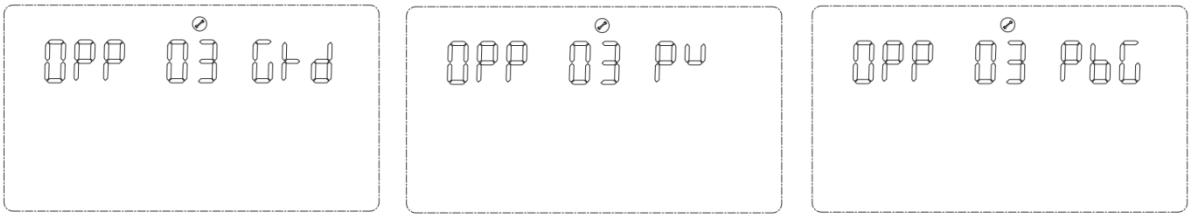


Figure 1-21 Output priority settings page

Function description: Set the inverter output priority.

Setting conditions: All states can be set, and they will take effect immediately after setting.

Note:

There are three options for output priority, the default is GRD: mains output priority; the second is PU(PV): photovoltaic output priority; the third is PBG: PV first, battery second, mains third output.

5.3.4. Charging Priority Settings (CHP)

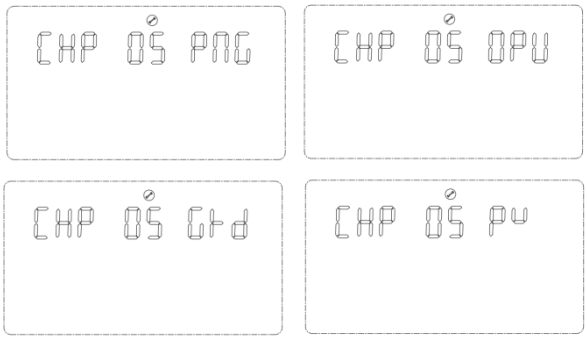


Figure 1-23 Charging priority setting page

Function description: Set the inverter charging priority.

Setting conditions: All states can be set and take effect immediately.

Explanation:

There are four options for charging priority, the default is PNG (PV and Grid): PV and Grid are charged at the same time; the second is OPV (Only PV): only photovoltaic charging; the third is GRD(Grid): mains charging priority; The fourth is PV: PV priority charging.

5.3.5. Mains Charging Current (RCC)

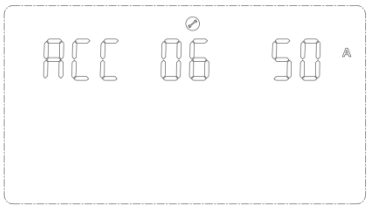


Figure 1-24 Mains maximum charging setting page

Function description: Set the maximum charging current of the inverter mains.

Setting conditions: All states can be set.

Explanation:
RCC: Grid Charge Current, the default maximum charging current of mains
6kVA/6kW: The default value is 30A. The setting range is [2, 80A].

5.3.6. Maximum Charging Current (MCC)

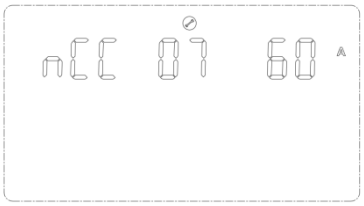


Figure 1-25 Maximum charging current setting page

Function description: Set the maximum charging current value of the inverter.

Setting conditions: All states can be set.

Explanation:

MCC: Maximum Charge Current, the maximum charging current refers to the maximum value of the PV and mains charging current.

6kVA/6kW Version is 2/10/20/30/40/50/60/70/80/90/100A optional.

5.3.7. Menu Front (MDF)

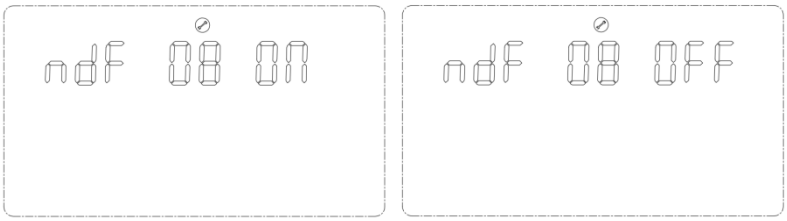


Figure 1-26 Return to the home page setting page

Function description: Return to the main interface settings.

Setting conditions: All states can be set.

Explanation:

The default setting is ON. In the function setting operation, when it is set to ON, if the page is not in the first interface (P1) at this time, it will return to the first interface after 1 minute; if it is set to OFF, if the page is not in the first interface (P1) at this time, the LCD will always stay on this interface.

5.3.8. Overload Restart Setting (LrS)

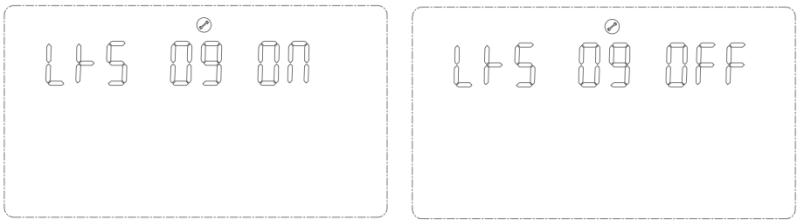


Figure 1-27 Overload restart setting page

Function description: Overload restart setting.

Setting conditions: All states can be set.

Explanation:

Overload restart is set to ON by default.

5.3.9. Over Temperature Restart Setting (TrS)

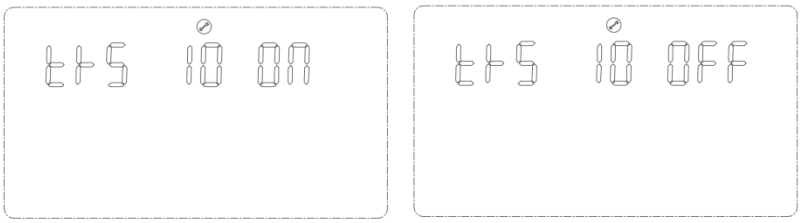


Figure 1-28 Over temperature restart selling page

Function description: Over-temperature restart settings.

Setting conditions: All states can be set.

Explanation:

The default setting for over-temperature restart is ON.

5.3.10. Main Input Power Failure Alarm Setting (MIP)

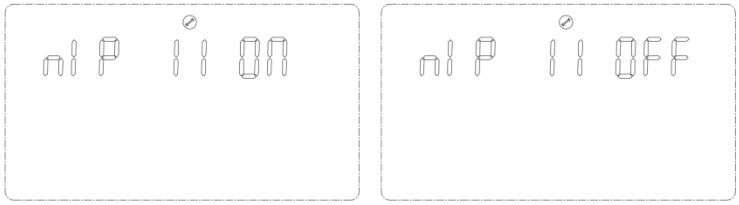


Figure 1-29 Main input power failure alarm setting page

Function description: Mains or PV loss alarm long beep setting.

Setting conditions: All states can be set, the default is ON, and the mains or PV loss alarm will beep for a while. Can be set to OFF. (All modes can be set)

Explanation:

MIP: Main input cut warning.

The default setting is ON, after the main input detection is lost, the buzzer will sound for 3s; when it is set to OFF, after the main input is lost, the buzzer will not sound constantly.

5.3.11. Power Saving Mode (PWS)

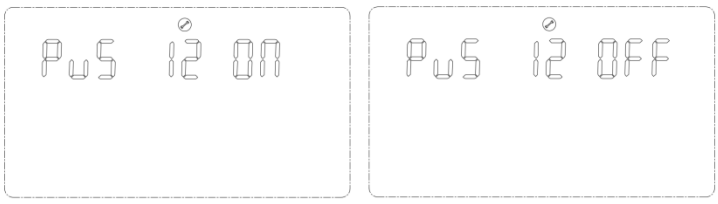


Figure 1-30 Power Saving Mode Setting Page

Function description: Set whether the inverter enables low power consumption mode (energy saving mode).

Setting conditions: All states can be set.

Explanation:

PWS: Power Saving.

The default setting is OFF, the function is not turned on; when it is set to ON, in battery mode, if the load is lower than 25W, the system will temporarily stop the output, and then continue to output. If the load is higher than 35W, the system will resume continuous normal output.

5.3.12. Overload Convert to Bypass Setting (OLG)

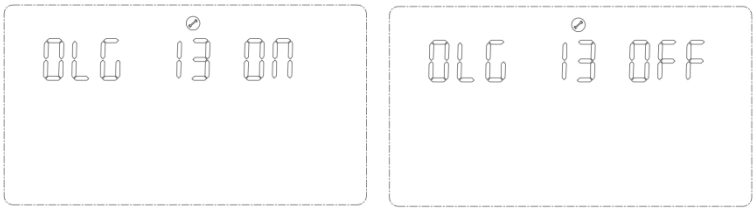


Figure 1-31 Overload convert to bypass setting page

Function description: When overload in the battery mode, set whether to switch to the mains mode (bypass mode) immediately.

Setting conditions: All states can be set.

Explanation:

OLG: Over load to Bypass.

The default setting is OFF, the function is not enabled; when it is set to ON, under the condition of PV priority output with load, if overloaded, the system will immediately transfer to bypass. (mains output, namely bypass mode)

5.3.13. Silent Mode Setting

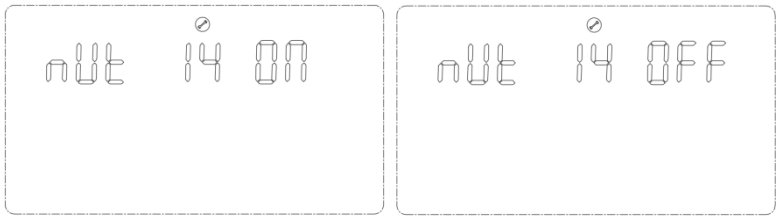


Figure 1-32 Silent mode setting page

Function description: Set whether the buzzer beeps or not.

Setting conditions: All states can be set.

Explanation:

MUE Mute.

The default setting is OFF, the function is not turned on; when it is set to ON, the buzzer does not sound under any circumstances, such as alarms, faults, etc. All modes can be set and function normally, pictures cannot be displayed.

5.3.14. Battery Mode to Mains Mode Voltage Point

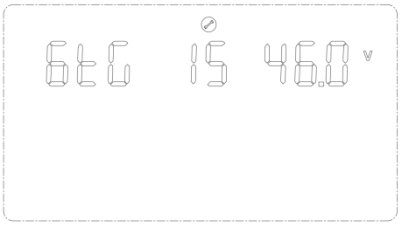


Figure 1-33 Battery mode to mains mode voltage point setting page

Function description: When the battery and mains exist at the same time, the battery will be transferred to the mains when it is discharged to a certain voltage to ensure that the battery will not be empty.

Setting conditions: All states can be set the output priority should be set in PV or PBG modes.

Explanation:

BTG: Back To Grid

- **6kVA/6kW** initial default setting is 46V.

When the battery definition mode is CUS (customer set type) mode:

- **6kVA/6kW** can set the range to [44, 52].

When the battery definition mode is AGM (lead-acid battery type), FLD (water injection battery type) mode:

- The default setting of **6kVA/6kW** is 46V, the settable range is [44, 52].

When the battery definition mode is LIB (lithium battery type) mode:

- The default setting of **6kVA/6kW** is 47.6V, the settable range is [40, 50].

When the battery definition mode is FEL (LiFePO4 battery type without communication) mode:

- The default setting of **6kVA/6kW** is 49.6V, the settable range is [40, 50].

5.3.15. Switch Back to Battery Mode Voltage Point (BTB)

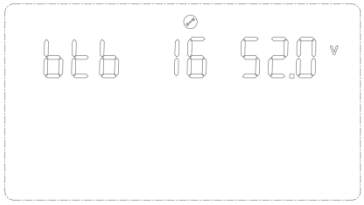


Figure 1-34 Setting of battery voltage point when mains switch back to battery mode

Function description: After the battery is turned off at low voltage, it needs to reach a certain battery voltage value before it can be restarted in battery mode.

Setting conditions: All states can be set.

Explanation:

BTB: Back To Battery.

- **6kVA/6kW** initial default setting is 52V.

When set to FUL, the battery will charge until fully charged before restarting on battery mode.
When the battery definition mode is CUS (customer set type) mode:
6kVA/6kW can set the range to [48, 58] (when the set value Vbtb>TCFV-1V, switch back to battery mode and keep the voltage point as TCFV-1V), and set the PV priority output or when the photovoltaic battery mains (PBG) is output, if it is not in battery mode at this time, if the battery voltage is higher than TCFV-1V, the system will switch back to battery mode.

When the battery definition mode is AGM (lead-acid battery type), FLD (water injection battery type) mode:

- **6kVA/6kW**, the default setting is 52V, and the settable range is [48, 58] (the logic is the same as above).

When the battery definition mode is LIB (lithium battery type) mode:

- **6kVA/6kW,** the default setting is 54.4V, and the settable range is [46, 58] (the logic is the same as above).

When the battery definition mode is FEL (LiFePO4 battery type without communication) mode:

- **6kVA/6kW,** the default setting is 53.2V, and the settable range is [46, 58] (the logic is the same as above).

5.3.16. Battery Mode Setting

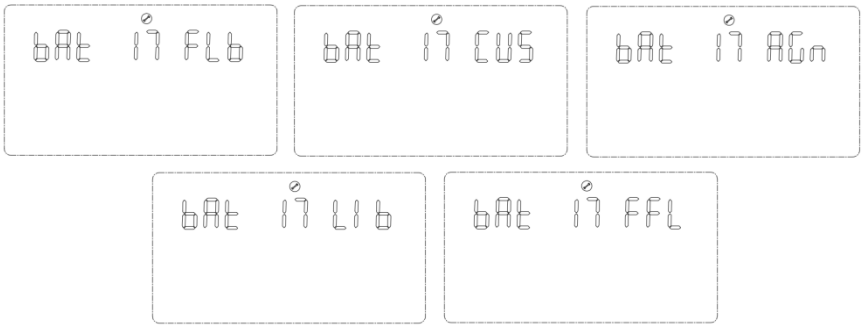


Figure 1-35 Battery mode setting page

Function description: Battery type setting function.

Setting conditions: All states can be set.

Explanation:

BAT: Battery Type.

Four battery type settings: the default setting is AGM (lead-acid battery); the second is FLO (water injection battery); the third is LIB (lithium battery); the fourth is CUS (customer setting type)； the fifth is FEL(LiFePO4 battery type, Only VML3K is allowed to use this type of battery).

5.3.17. Battery Low Voltage Point

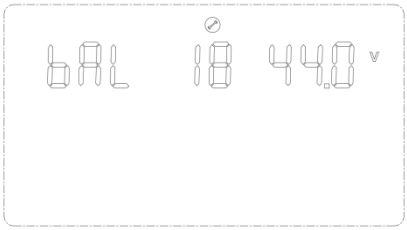


Figure 1-36 Battery low voltage point setting

Function description: Low voltage alarm point setting.

Setting conditions: All states can be set.

Explanation:

BAL: battery Low.

It cannot be set when the battery definition mode is AGM (lead-acid battery type) or FLD (water-filled battery type).

- **6kVA/6kW** initial default setting is 44V.

The battery low voltage point can be modified when the battery type is set to CUS (customer set type).

- **6kVA/6kW**, the settable range is [42, 54].

When the battery type is set to LIB (lithium battery type), the battery low voltage point can be modified.

- The default setting of **6kVA/6kW** is 47.6V, and the settable range is [41.2, 50.0].

When the battery type is set to FEL (FeLiPO4 battery type), the battery low voltage point can be modified.

- The default setting of **6kVA/6kW** is 48.0V, the settable range is [41.2, 50.0].

5.3.18. Battery Low Voltage Cut Off Point

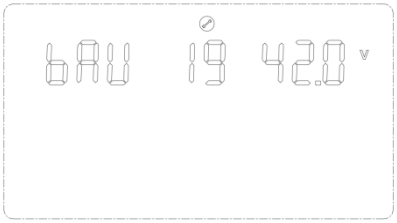


Figure 1-37 Battery low voltage cut off point setting page

Function description: Battery low voltage shutdown point setting function.

Setting conditions: All states can be set.

Explanation:

BAU: battery Under.

It cannot be set when the battery definition mode is AGM (lead-acid battery type) or FLD (water-filled battery type).

- **6kVA/6kW** initial default setting is 42V

The battery shutdown point can be modified when the battery type is set to CUS (customer set type).

- **6kVA/6kW** can set the range to [40, 48].

The battery shutdown point can be modified when the battery type is set to LIB (lithium battery type).

- **6kVA/6kW** is set to 46V by default, and the settable range is [40, 48].

The battery shutdown point can be modified when the battery type is set to FEL (FeLiPO4 battery type without communication).

- **6kVA/6kW** is set to 46.4V by default, and the settable range is [40, 48].

5.3.19. Constant Voltage Mode Voltage Point Setting (bCV)

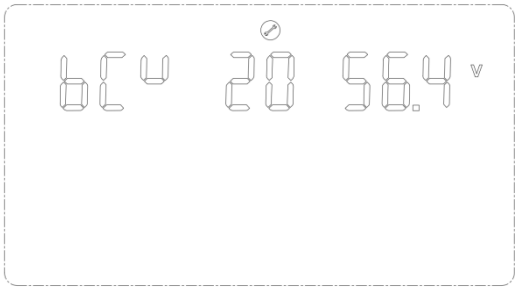


Figure 1-38 Constant voltage mode voltage point setting page

Function description: Constant voltage point setting function.

Setting conditions: All states can be set.

Explanation:

bCV: battery Constant Voltage.

It cannot be set when the battery definition mode is AGM (lead-acid battery type) or FLD (water-filled battery type).

- **6kVA/6kW** initial default setting is 56.4V(AGM), 58V(FLD).

The constant voltage charging point can be modified when the battery type is set to CUS (customer set type).

- **6kVA/6kW** can be set in the range of [48, 60]. The constant voltage point voltage needs to be greater than the floating point voltage.

The constant voltage charging point can be modified when the battery type is set to LIB (lithium battery

type).

- The default setting of **6kVA/6kW** is 56.4V, and the settable range is [48, 60]. The constant voltage point voltage needs to be greater than the floating point voltage.

The constant voltage charging point can be modified when the battery type is set to FEL (FeLiPO4 battery type without communication).

- The default setting of **6kVA/6kW** is 55.2V, and the settable range is [48, 60]. The constant voltage point voltage needs to be greater than the floating point voltage.

5.3.20. Floating Charge Mode Voltage Point Setting (bFL)

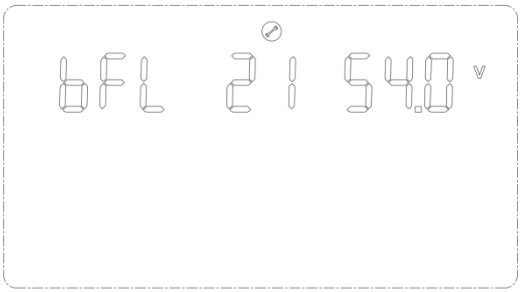


Figure 1-39 Floating charge mode voltage point setting page

Function description: Float voltage point setting function.

Setting conditions: All states can be set.

Explanation:
bFL: battery Float.
It cannot be set when the battery definition mode is AGM (lead-acid battery type) or FLD (water-filled battery type) mode.

- **6kVA/6kW** initial default setting is 54V.

Set the battery type to CUS (customer set type) to modify the battery float point.

- **6kVA/6kW** can be set in the range of [48, 60]. The constant voltage point voltage needs to be greater than the floating point voltage.

The constant voltage charging point can be modified when the battery type is set to LIB (lithium battery type).

- The default setting of **6kVA/6kW** is 55.2V, and the settable range is [50, 58]. The constant voltage point voltage needs to be greater than the floating point voltage.

The constant voltage charging point can be modified when the battery type is set to FEL(FeLiPO4 battery type without communication).

- The default setting of **6kVA/6kW** is 55.2V, and the settable range is [50, 58]. The constant voltage point voltage needs to be greater than the floating point voltage.

5.3.21. Mains Low Voltage Point Setting (LLV)

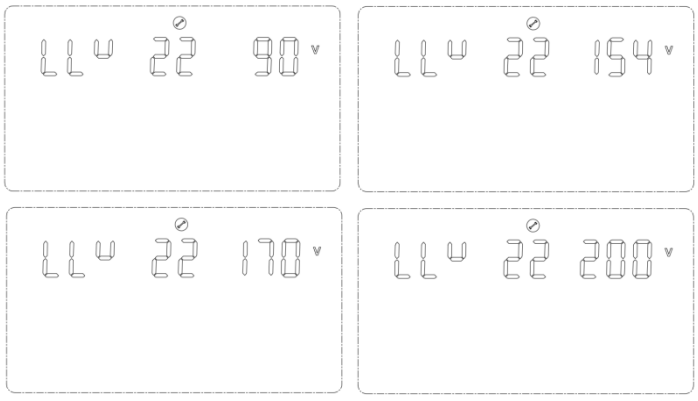


Figure 1-40 Mains low voltage point setting page in APP mode

Function description: Set the mains low voltage protection point.

Setting conditions: The inverter is in APP and UPS mode, all states can be set.

Explanation:

LLV: Line Low Voltage.

In inverter mode (output mode: MOD needs to be set to APP), the low-voltage point of mains is set, the default setting is 154V, and the setting range is [90, 154]. (Output mode: MOD needs to be set to UPS), the low-voltage point setting of mains, the default setting is 185V, and the setting range is [170, 200].

5.3.22. Mains High Voltage Protecting Point Setting (LHV)

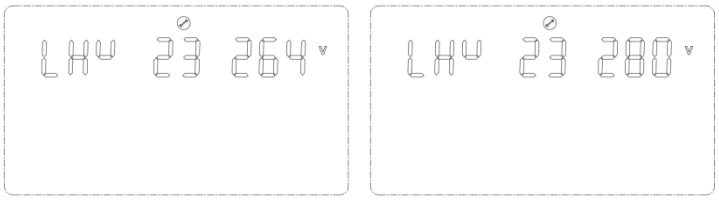


Figure 1-41 Mains high voltage protecting point setting page in APP mode

Function description: Set the mains high voltage protection point.

Setting conditions: The inverter is in APP mode, and all states can be set.

Explanation:

LHV: Line High Voltage.

In inverter mode (output mode: MOD needs to be set to APP), the mains high voltage point setting, the default setting is 264V, and the setting range is [264,280].

5.3.23. Low Power Discharging Time Setting (LWD)

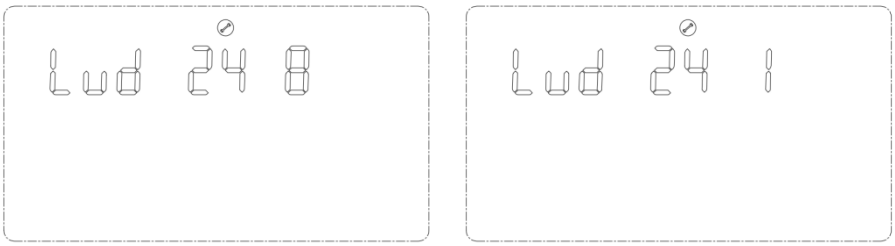


Figure 1-42 Low power discharging time setting page

Function description: Low power discharge protection function, when in battery mode, under a low load, the discharge of unlimited time will make the battery empty and affect the battery life. When the inverter is in the low power discharge setting time, the low voltage shutdown point of the **6kVA/6kW** model battery low voltage shutdown point will be raised to 44V.

Setting conditions: All states of the inverter can be set in APP mode.

Explanation:

LWD: Low Watt Discharge.

In inverter mode, the low power discharge time setting, the default is 8 (8 hours), the setting range is [1, 8].

In battery mode, after the continuous discharge time exceeds 8 hours and the battery shutdown point has not been reached, the battery voltage shutdown point will be modified to ***11V * number*** of battery cells, and the system will alarm for 1 minute when the battery continues to discharge to ***11V * numbe***r of battery cells. Then shut down again.

When the battery voltage exceeds ***13.2V* the number*** of battery cells exceeds 30s, the battery discharge time

will be reset.

5.3.24. Inverter Soft Start Setting (SRE)

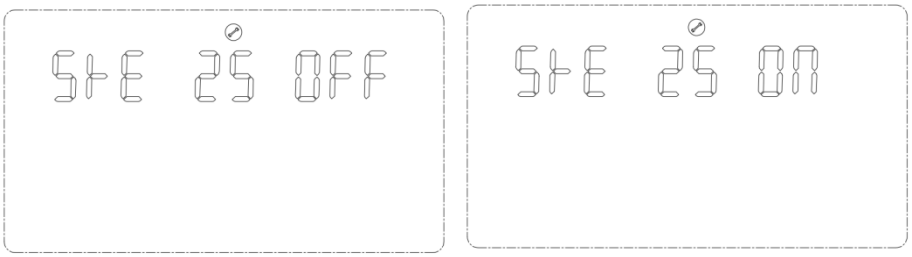


Figure 1-43 Inverter soft start setting page

Function description: When the setting is ON, the inverter output gradually increases from 0 to the target voltage point. This function is very suitable for the motor and the loads with motor. When the setting is OFF, the inverter output is directly increased from 0 to the target voltage point.

Setting conditions: All states can be set.

Explanation:

SRE: Soft Relay Enable.

The default setting is OFF, and the output switch will not be closed until the inverter voltage rises to the rated output. If set to ON, the output switch will be closed before the inverter starts boosting.

5.3.25. Reset Factory Settings (SED)

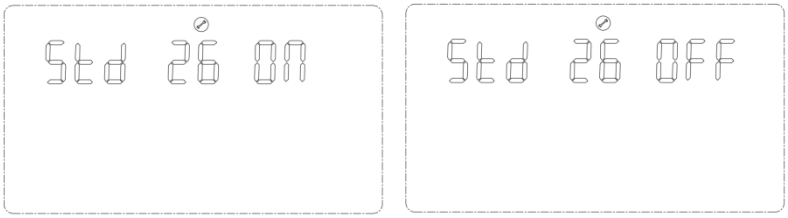


Figure 1-44 Default Value settings page

Function description: Restore all setting to factory settings.

Setting conditions: It can be set in mains mode and standby (no output but screen on state). It cannot be set when the battery mode.

Explanation:

SED: Set Default.

Before the setting, this interface is displayed as OFF. When it is set to ON, the system will restore to factory settings. After the setting is completed, this interface will display OFF again.

Mains and standby modes can be set and take effect immediately, but cannot be set in battery mode, and pictures cannot be displayed.

5.3.26. Missing Battery Alarm (SBA)

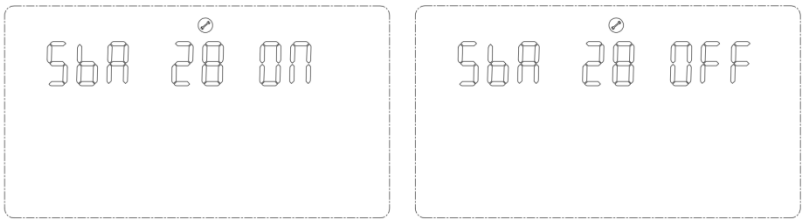


Figure 1-46 Missing battery alarm page

Function description: Set turn on no battery alarm.
Setting conditions: Can be set in all states.
Explanation:
SBA: Set battery alarm.
Default is OFF.
If it is set to OFF, when the battery is not connected, there will be no battery-missing, low-battery, and under-battery alarms.

5.3.27. Equalization Mode (EQM)

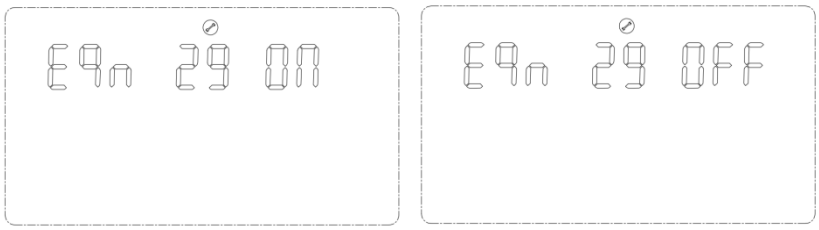


Figure 1-47 Equalization Mode Settings Page

Function description: Setting whether the inverter turn on equalization mode.

Setting conditions: Can be set in all states.

Explanation:

EQM: Equalization Mode.

The default setting is OFF, the function is not turned on; if it is set to ON, the controller will start to enter the equalization phase when the set equalization interval (battery equalization period) is reached during the float charging stage, or the equalization is activated immediately.

5.3.28. Equalization Voltage Point Setting (EQV)

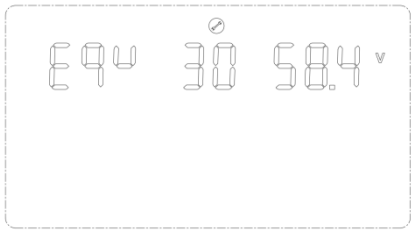


Figure 1-48 Equalization voltage point setting page

Function description: Equilibrium voltage point setting function.

Setting conditions: Can be set in all states.

Explanation:

bCV: Equalization Voltage.
6kVA/6kW (Except for FEL mode)**,** the default setting is 58.4V, and the settable range is [48, 60].

6kVA/6kW (FEL mode**),** the default setting is 56V, and the settable range is [48, 60].

5.3.29. Equalization Charging Time Setting (EQT)

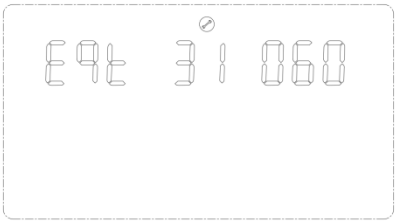


Figure 1-49 Equalization charging time setting page

Function description: Equalization charging time setting.
Setting conditions: Can be set in all states.
Explanation:
EQT: Equalization Time.
During the equalization phase, the controller will charge the cells as much as possible until the cell voltage rises to the cell equalization voltage. Then use constant voltage regulation to maintain the battery voltage to maintain the battery balance voltage. The cells will remain in the equalization phase until the set cell equalization time is reached. The default setting is 60 minutes, the settable range is [5,900], and the increment is 5 minutes each time.

5.3.30. Equalization Delay Time Settings (EQO)

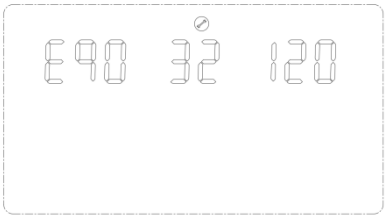


Figure 1-50 Equalization Delay Time Settings Page

Function description: Equalization delay time settings.
Setting conditions: Can be set in all states.
Explanation:
EQT: Equalization Timeout.
In the equalization stage, when the cell equalization time expires and the cell voltage does not rise to the cell equalization voltage point, the charge controller will extend the cell equalization time until the cell voltage reaches the cell equalization voltage. When the battery balancing delay setting ends, the battery voltage is still lower than the battery balancing voltage, the charge controller will stop balancing and return to the floating charge stage. The default setting is 120 minutes, the settable range is [5,900], and the increment is 5 minutes each time.

5.3.31. Equalization Interval Setting (EQI)

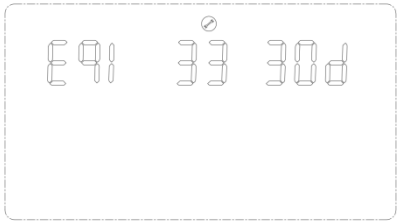


Figure 1-51 Equalization interval setting

Function description: Equalization interval setting.
Setting conditions: Can be set in all states.

Explanation：
EQI: Equalization Interval.
When the battery connection is detected during the float phase with the equalization mode turned on, the

controller will start to enter the equalization phase when the set equalization interval (cell equalization period) is reached. The default setting is 30 days, the settable range is [1, 90], and the increment of each setting is 1 day.

5.3.32. Turn on Equalization Settings Immediately（EQN）

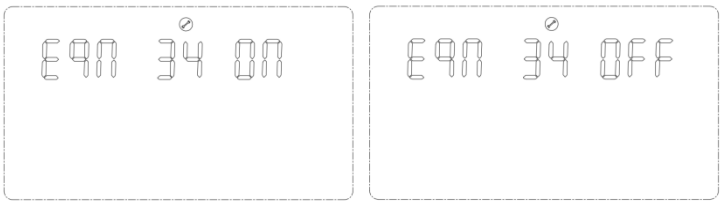


Figure 1-52 Turn on equalization settings immediately

Function description: Turn on equalization settings immediately.
Setting conditions: Can be set in all states.
Explanation
EQN: Equalization Now.
The default setting is OFF, the function is not turned on; when it is set to ON, in the float charging stage when the balance mode is turned on and the battery connection is detected, the balance charging is activated immediately, and the controller will start to enter the balance stage.

5.3.33. Battery Dual Output Low Voltage Shutdown Point (DBV)

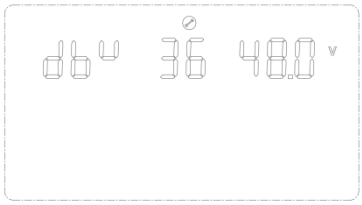


Figure 1-54 Battery Dual Output Low Voltage Shutdown Point Page

Function description: When it is turned on, the inverter secondary output is turned on by default. After entering the battery mode, when the battery voltage is lower than the set point, turn off the secondary output. When the battery voltage is higher than the set value+1V/knot again, the secondary circuit output is turned on.
Setting conditions: All statuses can be set.
Explanation
DBV: Dual output battery mode cut-off voltage.
The default setting of **6kVA/6kW** is 48V, and the setting range is [44, 60].
When the set point is higher than the constant voltage charging (CV) point - 1V/knot, the constant voltage charging point is taken as the recovery voltage.
*This function needs to be used together with the dual output auxiliary board.
Caution: The output port with “GROUP 1” printed nearby corresponds to the main output while the output port with “GROUP 2” printed nearby corresponds to the secondary output. Please connect important loads to the main output port to avoid affecting your daily use.

5.3.34. Battery Dual Output Duration (DBT)

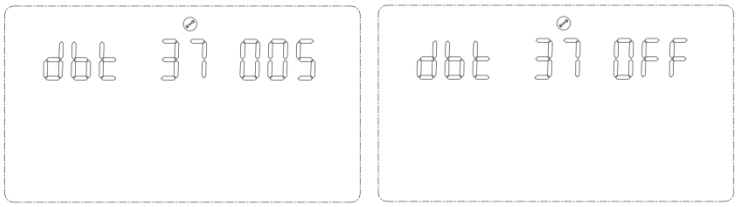


Figure 1-55 Battery Dual Output Low Voltage Shutdown Point Page

Function description: When it is turned on, the inverter secondary output is turned on by default. After entering the battery mode, when the battery discharge time reaches the set point, turn off the secondary circuit output.

Setting conditions: All statuses can be set.

Explanation

DBT: Dual output battery mode cut-off time.

The default setting is OFF. The function is not enabled. The setting range is [5,890]. The unit is minute.

When it is set to FUL, the secondary output is not limited to the output time.

*This function needs to be used together with the dual output auxiliary board.

Caution: The output port with “GROUP 1” printed nearby corresponds to the main output while the output port with “GROUP 2” printed nearby corresponds to the secondary output. Please connect important loads to the main output port to avoid affecting your daily use.

5.3.35. Low SOC Shutdown Function (BSU)

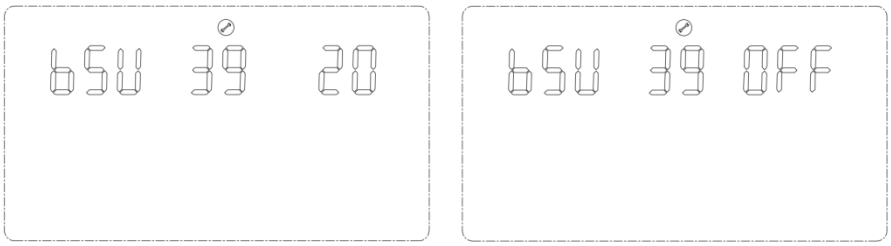


Figure 1-57 Low SOC Shutdown Function Setting Page

Function description: Set the inverter to shut down when the SOC is low.

Setting conditions: All statuses can be set.

Explanation

BSU: Battery SOC under lock.

The default setting is 20, and the setting range is [5, 50]. In the battery mode, when the lithium battery SOC reaches the set value, it will shut down, and alarm 68 will be given at the same time. When it returns to the set value+5%, alarm 68 will be cleared. In standby mode, the battery mode can only be switched to when the set value+10% is reached, and an alarm of 69 will be given when the set value+10% is not reached. After the function is enabled, alarm 69 will occur when the lithium battery SOC reaches the set value+5%, and alarm 69 will be cleared when it returns to the set value+10%. It can be set to OFF. At this time, the inverter will not shut down, start up or alarm according to the SOC condition. After the function is turned on, if the communication is abnormal, the inverter will no longer determine the operation logic according to the SOC information, and the related alarm will be cleared.

*This function needs to be used together with the central control board.

*When the central control board is not connected, this option page is shielded.

5.3.36. Low SOC to Mains Function (STB)

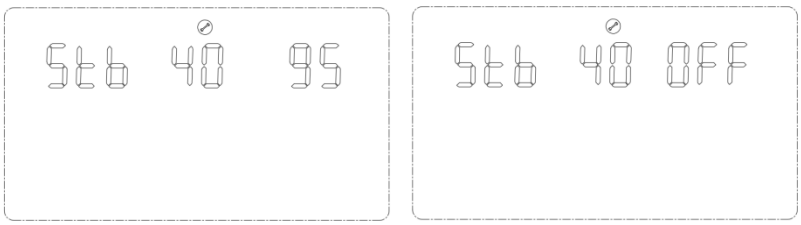


Figure 1-58 Low SOC to mains function setting page

Function description: Set the SOC value of inverter to battery mode.

Setting conditions: All statuses can be set.

Explanation
STB: Battery SOC turn to battery mode.
The default setting is 90, and the setting range is [10,100]. PBG priority: switch to battery mode when the lithium battery SOC reaches the set value under normal mains power mode. When it is turned on, the inverter will switch to battery mode only when the SOC is higher than the set point and the battery voltage is higher than the voltage point of switching back to battery mode. It can be set to OFF. At this time, the inverter will not switch from mains mode to battery mode according to the SOC condition. After the function is turned on, if the communication is abnormal, the inverter will no longer determine the operation logic according to the SOC information, and the related alarm will be cleared.
*This function needs to be used together with the central control board.
*When the central control board is not connected, this option page is shielded.

5.3.37. Low SOC to Mains Function (STG)

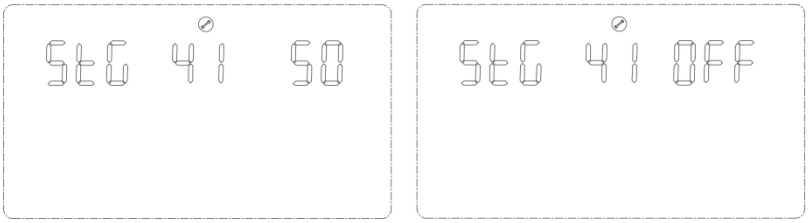


Figure 1-59 Low SOC to mains function setting page

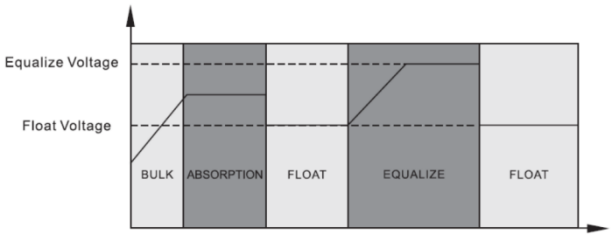
Function description: Set the SOC value of inverter to mains mode.
Setting conditions: All statuses can be set.
Explanation
STG: Battery SOC turn to grid mode.
The default setting is 50, and the setting range is [10, 90]. PBG priority: switch to mains power mode when the lithium battery SOC reaches the set value under mains power normal battery mode. When it is turned on, when the SOC is lower than the set point or the battery voltage is lower than the point of switching back to the mains voltage, the inverter will switch to the mains mode. It can be set to OFF, and the inverter will no longer switch from battery mode to mains mode according to the SOC condition. After the function is turned on, if the communication is abnormal, the inverter will no longer determine the operation logic according to the SOC information, and the related alarm will be cleared. When this setting is higher than the STB point, STB and STG will not take effect after taking effect next time.
*This function needs to be used together with the central control board.
*When the central control board is not connected, this option page is shielded.

5.4. Battery Equalization Description

Equalization function is added into charge controller, it reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalization also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically.

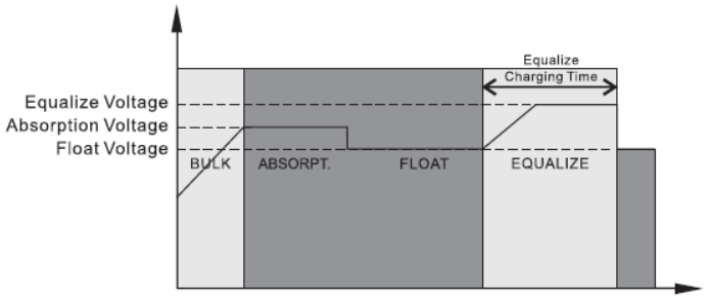
※ **How to Apply Equalization Function**
You must enable battery equalization function in monitoring LCD setting program 30 first. Then, you may apply this function in device by either one of following methods:
1. Setting equalization interval in program 35.
2. Active equalization immediately in program 36.

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

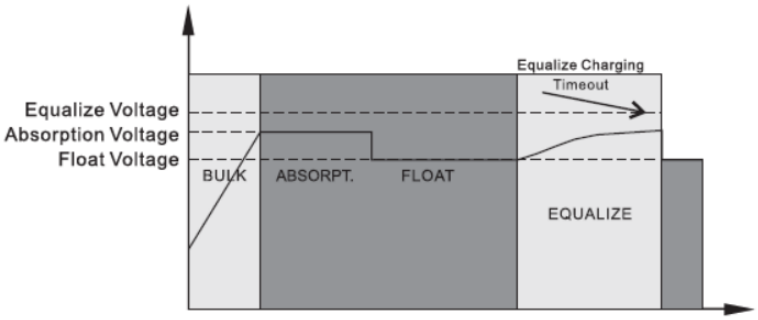


※ **Equalize charging time and timeout**

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized timeout setting is over, the charge controller will stop equalization and return to float stage.



5.5. Fault and Alarm Description

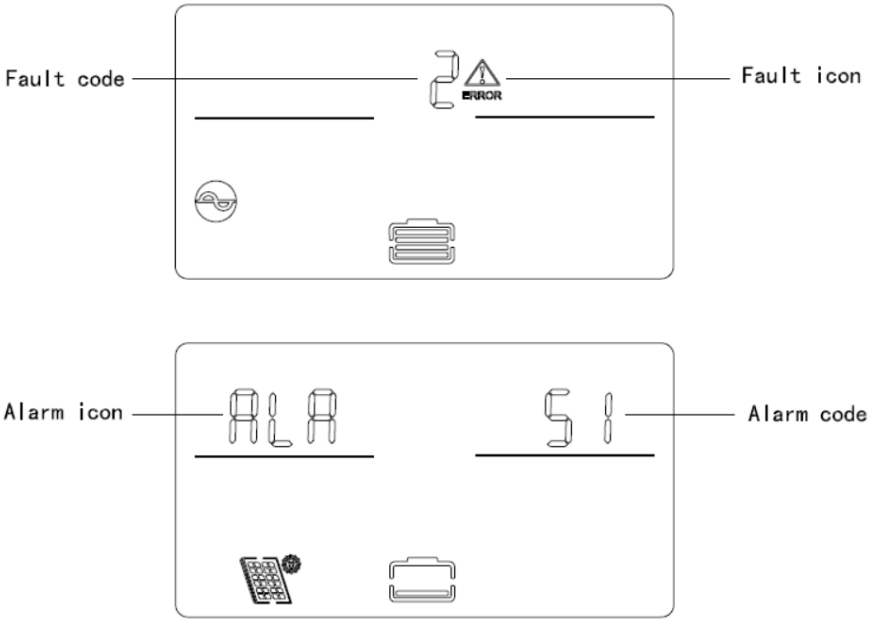


Figure 1-60 Fault and warning icons

Function description: The alarm code ALA flashes and the buzzer sounds every 1 second, and stops for 1 minute. The fault indicator code is always on, and the buzzer stops after 10 seconds of long beeping. After the stop, the fault is eliminated. Try to restart the machine. If it fails to restart six times, it will continue in the fault state. It needs to be completely powered off (screen off) or wait 30 minutes before restarting the machine. The fault and alarm LCD display is as shown in the figure above. The fault icon in the fault mode is always on, and the alarm icon in the alarm state is flashing. Contact the manufacturer to eliminate the abnormal situation according to the fault information.

5.5.1. Faults Descriptions

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

Fault code descriptions

Fault code	meaning	Related Actions	Triggering conditions	recovery conditions	fault alarm
1	Bus soft start fail	switch to failure mode	When the bus is soft-started, the set voltage cannot be reached	irrecoverable	fault
2	Bus high	switch to failure mode	The bus is higher than the set value	irrecoverable	fault
3	Bus low	switch to failure mode	Bus below set value	irrecoverable	fault
4	Battery Over Current	switch to failure mode	The instantaneous value of the battery current exceeds 580A, immediately protect	irrecoverable	fault
5	Over temperature	switch to failure mode	Temperature sensor for PFC or INV above over temperature set point	After the restart is enabled, the fault cannot be recovered after six failed restarts	fault

6	Battery high	switch to failure mode	The battery voltage is higher than the set value	recoverable	fault
7	Bus soft Fault	switch to failure mode	The DC soft-start voltage for busbar does not reach the set value	irrecoverable	fault
8	Bus short Fault	switch to failure mode	During normal operation, the busbar is momentarily lower than the set value	irrecoverable	fault
9	INV soft Fault	switch to failure mode	After the inverter is soft-started for a period of time, it still cannot reach the rated output voltage	irrecoverable	fault
10	INV over voltage	switch to failure mode	In battery mode, the inverter voltage is higher than the set value	irrecoverable	fault
11	INV under voltage	switch to failure mode	In battery mode, the inverter voltage is lower than the set value	irrecoverable	fault
12	INV short	switch to failure mode	The inverter voltage is less than the set value momentarily, and the current is momentarily greater than the set value	After six failed restarts, no recovery is possible	fault
13	Negative power	switch to failure mode	The inverter power is less than the set value for a period of time	irrecoverable	fault
14	overload fault	switch to failure mode	Load out of specification	After the restart is enabled, the fault cannot be recovered after six failed restarts	fault
15	Model Fault	switch to failure mode	The software identification machine model does not match the hardware detection	irrecoverable	fault
16	No boot loader	switch to failure mode	no bootloader	irrecoverable	fault
17	Panel Flash Fault	switch to failure mode	3kVA model is burning PV control program	Recovery after burning	fault
Fault code	**meaning**	**Related Actions**	**Triggering conditions**	**recovery conditions**	**fault alarm**
19	Same Serial	switch to failure mode	In parallel mode, it is detected that there are multiple machines with the same serial number	irrecoverable	fault
20	CAN Fault	switch to failure mode	In parallel mode, CAN bus communication is abnormal	irrecoverable	fault
21	BAT Volt Different	switch to failure mode	In parallel mode, the battery voltage difference of different machines is too large	irrecoverable	fault
22	Line Volt Different	switch to failure mode	In parallel mode, the input pressure difference of different machines is too large	irrecoverable	fault
23	Line Freq Different	switch to failure mode	In parallel mode, the input voltage frequency difference of different machines is too large	irrecoverable	fault
24	Output Config Different	switch to failure mode	In the three-phase parallel mode, there is a phase loss in different machine parallel mode settings, or simultaneous three- phase and single-phase parallel operation or there is a single machine mode	Set to single machine operation and disconnect parallel communication, or meet the setting condition for three-phase operation, or restore when the single-phase parallel setting conditions are met	fault

25	Output Syn Loss	switch to failure mode	In parallel mode, the output voltage detection loses synchronization	irrecoverable	fault
26	BMS Fault	Switch to failure mode	Battery BMS fault message	Turn off BMS communication function, or BMS fault elimination and recovery	fault

5.5.2. Warning Descriptions

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

Alarm code descriptions

Alarm code	meaning	Related Actions	Triggering conditions	recovery conditions	fault alarm
50	Battery open	Alarm, battery not charging	Battery voltage lower than 8V/cell	Recoverable (10V/cell)	Alarm
51	Battery Under	Alarm, low battery shutdown or no power on	The battery voltage is lower than 10.5V/cell (default)	Recoverable (10V/cell + 0.2* N (number of battery cells))	Alarm
52	Battery low	Alarm	Depends on bAL setting	Recoverable (action point +0.2V/section)	Alarm
53	Battery charge short	Alarm, battery not charging	The battery voltage is less than 5V and the charging current is greater than 4A	irrecoverable	Alarm
54	Low watt discharge	Alarm	Battery discharge exceeds the set low power discharge time	Recoverable (battery voltage higher than 13.2V/knot)	Alarm
55	Over charge	Alarm, battery not charging	The battery voltage is higher than the set value	recoverable	Alarm
56	BMS Loss	After BMS communication function is enabled, communication fails	After BMS communication function is enabled, communication fails	recoverable	Alarm
Alarm code	**meaning**	**Related Actions**	**Triggering conditions**	**recovery conditions**	**fault alarm**
57	Over Temperature	Alarm, battery not charging	The temperature sensor of PFC or INV is higher than the set value	Temperature sensor of PFC or INV below set value	Alarm
58	fan lock	Alarm, if one of the fans fails, the other fan runs at full speed	No fan speed signal detected	recoverable	Alarm
59	EEPROM fail	Alarm	EEPROM read and write failed	irrecoverable	Alarm
60	overload warning	Alarm, battery not charging	Load>102%	Recoverable (load <97%)	Alarm
61	Abnormal generator waveform	Alarm, keep working in battery mode	Generator waveform detection abnormality	recoverable	Alarm
62	PV Energy Weak	Turn off PV output and charge	When the battery is not connected, the bus voltage is lower than the set value	Recovery after 10mins	Alarm

63	Synchronization signal fail	Alarm, switch to failure mode	Parallel board disconnection fault	Switch to stand-alone mode recovery Disconnection Troubleshooting Recovery	Alarm
64	Parallel configuration incompatible	Alarm, go to standby mode	When three-phase parallel, there is a phase loss setting	Restores when the three-phase setting is correct	Alarm
65	Parallel version incompatible	Alarm, go to standby mode	The parallel system has an incompatible version number	Restore when all machine versions in the parallel system are compatible with each other	Alarm
66	Parallel Communication Fault	Alarm, go to standby mode	Slave cannot be detected in parallel system	In the parallel system, it is detected that the slave is connected to the recovery, and the recovery is set to single-machine mode.	Alarm
67	Parallel Line Differ	Alarm	The mains voltage or frequency error of each machine in parallel is too large	Recover when the mains voltage and frequency errors of each machine are detected to be reasonable	Alarm
68	SOC Under	Alarm, switch to standby	Lithium battery SOC is lower than the set value	Turn off the low SOC shutdown function, or turn off the BMS communication function, or restore the SOC to the set value+5%	Alarm
69	SOC Low	Alarm, if it is in standby mode, it will remain in standby mode without power on	Lithium battery SOC lower than the set value+5% (mains mode or battery mode), lower than the set value+10% (standby mode)	Turn off the low SOC shutdown function, or turn off the BMS communication function, or restore the SOC to the set value+10%	Alarm
Alarm code	**meaning**	**Related Actions**	**Triggering conditions**	**recovery conditions**	**fault alarm**
70	Battery Terminal Source Fail	Alarm, switch to standby mode	When the battery is not connected, the voltage measured in the battery terminal of the inverter is lower than the set value	Recover when the battery connection is detected or voltage measured in the battery terminal of the inverter is higher than the set value for 1minute	Alarm

6. Trouble Shooting

Problem	LCD/LED/Buzzer	Explanation Possible cause	What to do

Unit shuts down automatically during startup process	LCD/LEDs and buzzer will be active for 3 seconds and then complete off	The battery voltage is too low (<191v/Cell)	1 Recharge battery 2. Replace battery
No response after power on	No indication	1. The battery voltage is far too low (<1.4V/Cell) 2. Internal fuse tripped	1. Contact repair center for replacing the fuse 2. Recharge battery 3. Replace battery
Mains exist but the unit works in battery mode	Input voltage is displayed as on the LCD and green LED is flashing	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well
	Green LED is flashing	Insufficient quality of AC power (Shore or Generator)	1. Check if AC wires are too thin and/or too long 2. Check if generator (if applied) is working well or if input voltage range setting is correct (UPS Appliance)
	Green LED is flashing	Set" SBU "as the priority of output source	Change output source priority to Utility first
Problem	**LCD/LED/Buzzer**	**Explanation Possible cause**	**What to do**
When the unit is turned on, internal relay is switched on and off repeatedly	LCD display and LEDs are flashing	Battery is disconnected	Check if battery wires are connected well

7. Technical Datasheet

Model		**6000VA/ 6000W**
Input	Input Sources	L+N+PE
	Rated Input Voltage	208/220/230/240Vac
	Voltage Range	90~280Vac ± 3V(APP Mode),170~264Vac ± 3V(UPS Mode)
	Frequency	50Hz/60Hz (Auto Adaptive)
Output	Rated Capacity	6000W
	Output Voltage	208/220/230/240Vac ± 5%
	Output Frequency	Line Mode: 50Hz:(43.5～56.5)Hz(UPS Mode),(40～70)Hz(APP Mode) 60Hz:(53.5～66.5)Hz(UPS Mode),(40～70)Hz(APP Mode) Battery Mode: 50/60Hz ± 0.1%
	Waveform	Pure Sine Wave

	Transfer Time (Adjustable)	Computers (UPS Mode)10ms, Appliance (APP Mode)10ms	Computers (UPS Mode)10ms, Appliance (APP Mode)10ms
	Peak Power		11200VA
Output	Overload Ability	Battery Mode: 1min@102%～110% Load 10s@110%～130% Load 3s@130%～150% Load 200ms@>150% Load	
	Peak Efficiency (Battery Mode)	>94.0%	
Battery	Battery Voltage	48.0Vdc	
	Constant Charging Voltage (Adjustable)	51.75Vdc (3.45*15)	
Chargers	PV Charging Mode	MPPT	
	MAX PV Input Power	6000W	
	MAX PV Input Current	18A	
	MPPT Tracking Range	120~450Vdc	
	MAX PV Input Voltage	500Vdc	
	Best Open Circuit Voltage Range	370~430Vdc	
	Best Voltage	300~340Vdc	
	MAX PV Charging Current	100A	
	MAX AC Charging Current	80A	
	MAX Charging Current	100A	
Model		**6000VA/ 6000W**	
Display	LCD Display	Display Running Mode / Loads / Input / Output etc.	
Interface	RS232	5PIN/Pitch2.0mm, Baud Rate2400	
	Communication Port	WiFi/USB/CAN(RS485)	
	Parallel Connect Interface	With Parallel	
Environments	Operating Temperature	0~40℃	
	Humidity	20%~95% (No Condensing)	
	Storage Temperature	-15~60℃	

	Altitude	No derating below 1000m, derating for 1% every 100m from 1000m to 4000m, refer to IEC62040
	Noises	≤55dB

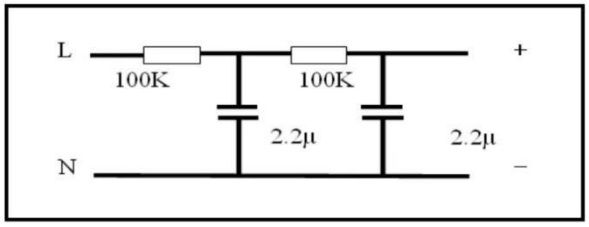
The information in this document is subject to change without notice.

8. Appendix: Parallel Operation Guide (6KW dedicated)

8.1. Single-phase Parallel Operation

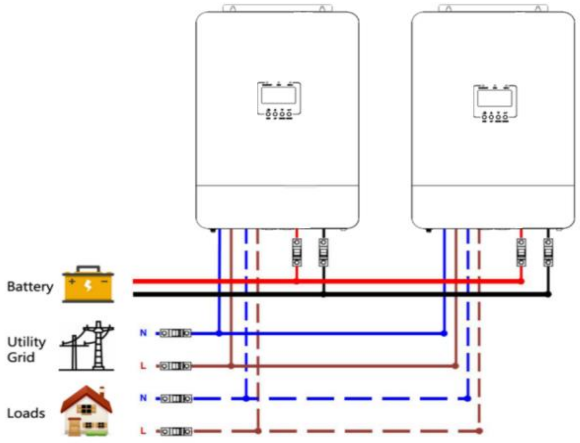
Note:

- Before paralleling, each machine needs to calibration the inverter output voltage, DC component, and battery voltage. In theory, the more accurate the calibration, the better, but at least meet the inverter output voltage and battery voltage calibration deviation within ±1V, DC component calibration within 50mV. Normal calibration can be carried out according to the “Inverter Calibration SOP”.
- DC component calibration requires a fixture according to the following parameters. This fixture is connected to the output, with its positive and negative poles connected to the positive and negative poles of the multimeter, the DC component of the output is measured using the mV range.

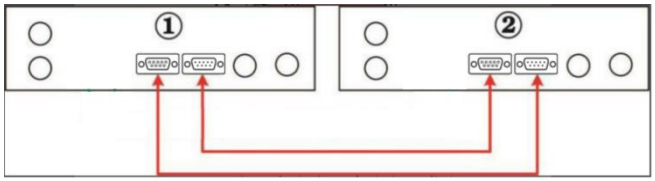


8.1.1. Two Inverters in Parallel

System connection:

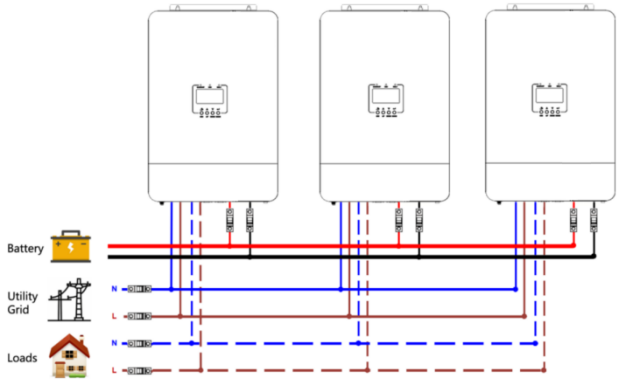


Communication connection:

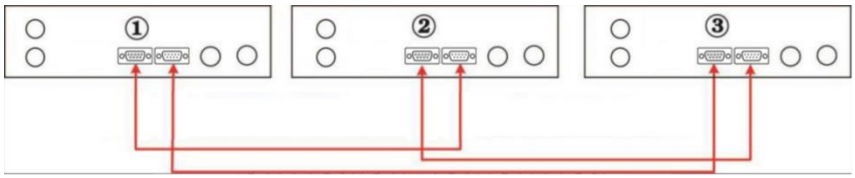


Three Inverters in Parallel

System connection:



Communication connection:

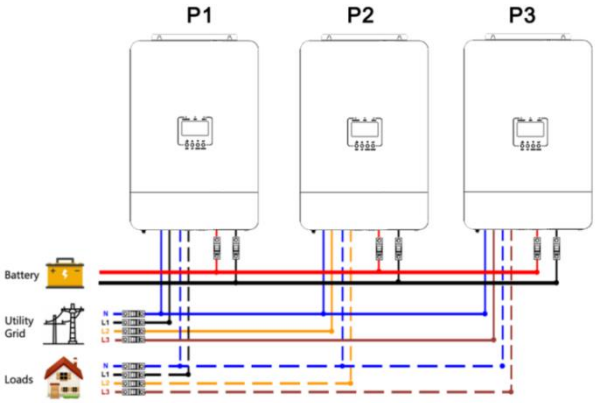


Multiple single-phase parallel systems can follow the extended wiring method of two single-phase parallels to three single-phase parallels.

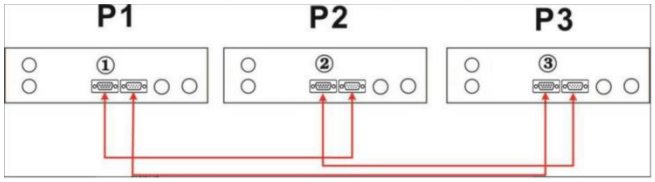
8.2. Three-phase Parallel Operation

8.2.1. One Inverter Per Phase

System connection:

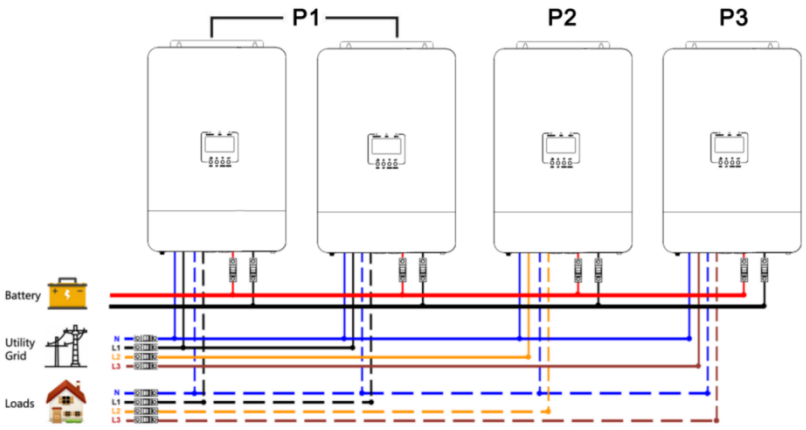


Communication connection:

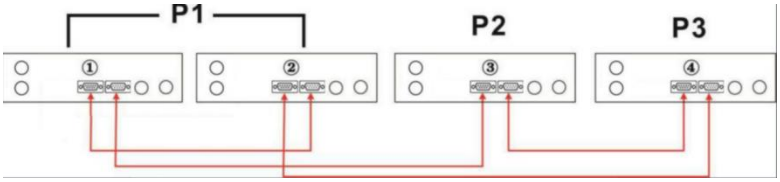


8.2.2. Two Inverters for The First Phase, Only One Inverter for The Remaining Phases

System connection:

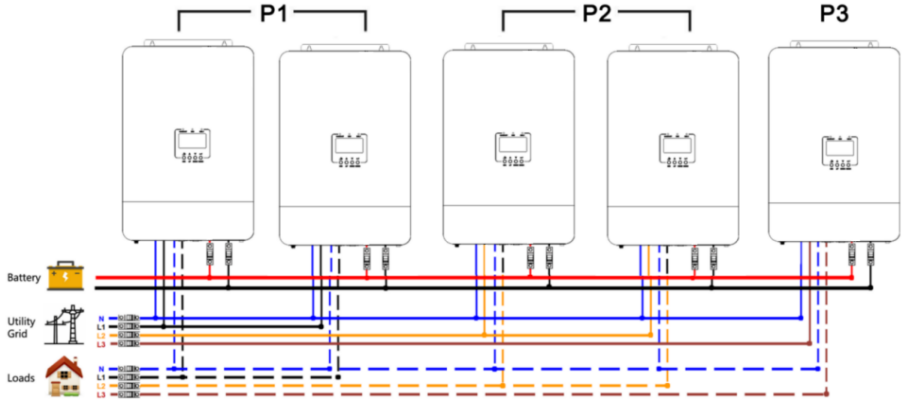


Communication connection:

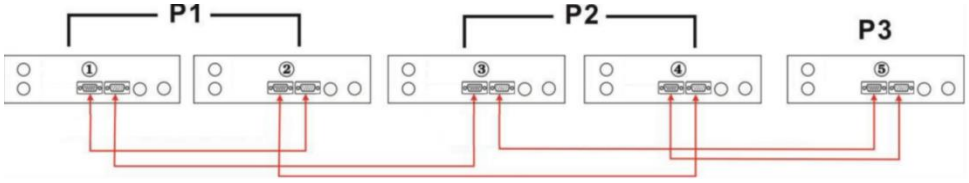


8.2.3. Two Inverters for The First and Second Phases, and One Inverter for The Third Phase

System connection:

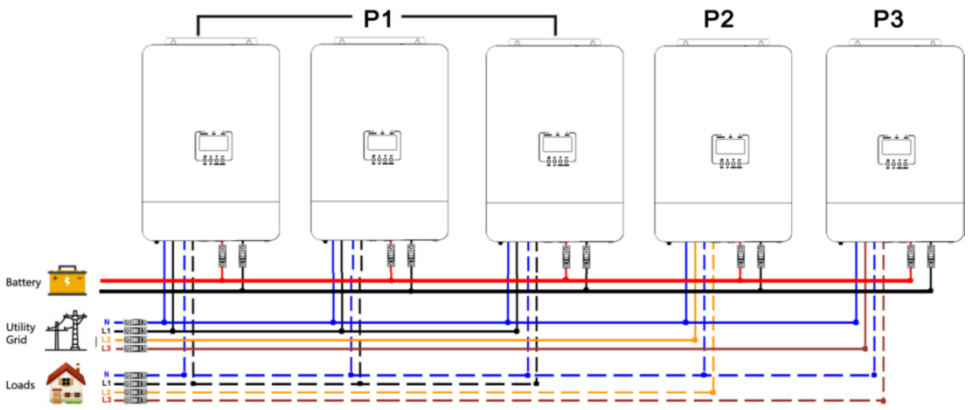


Communication connection:

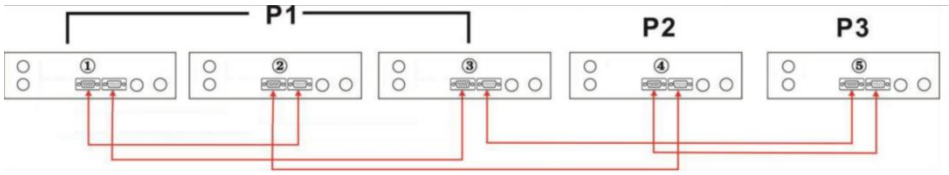


8.2.4. Three Inverters for The First Phase, Only One Inverter for The Other Two Phases

System connection:

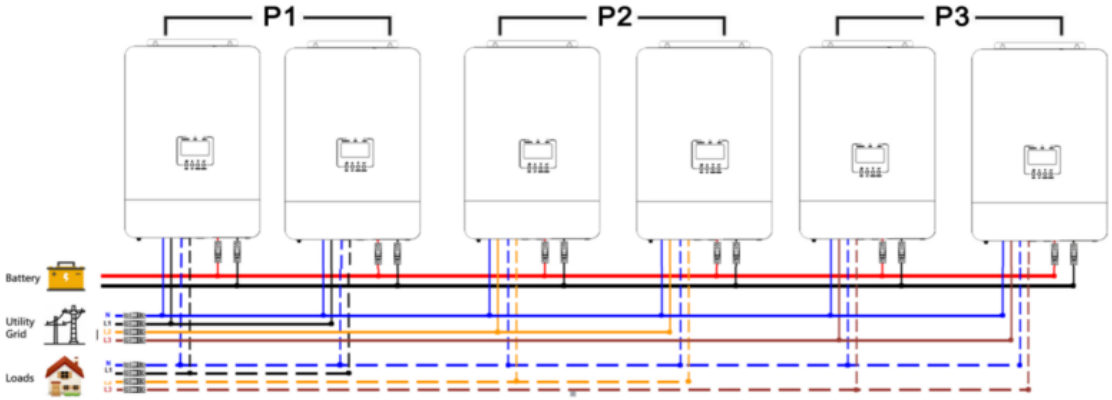


Communication connection:

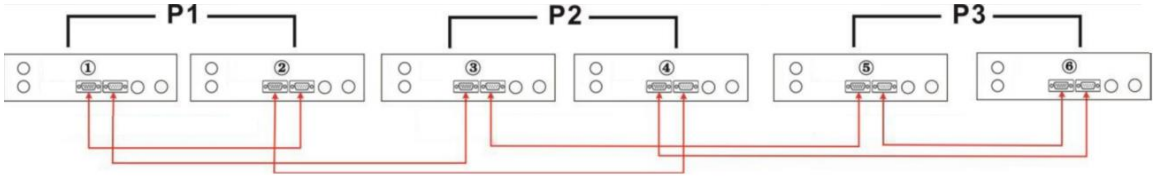


8.2.5. Two Inverter Per Phase

System connection:

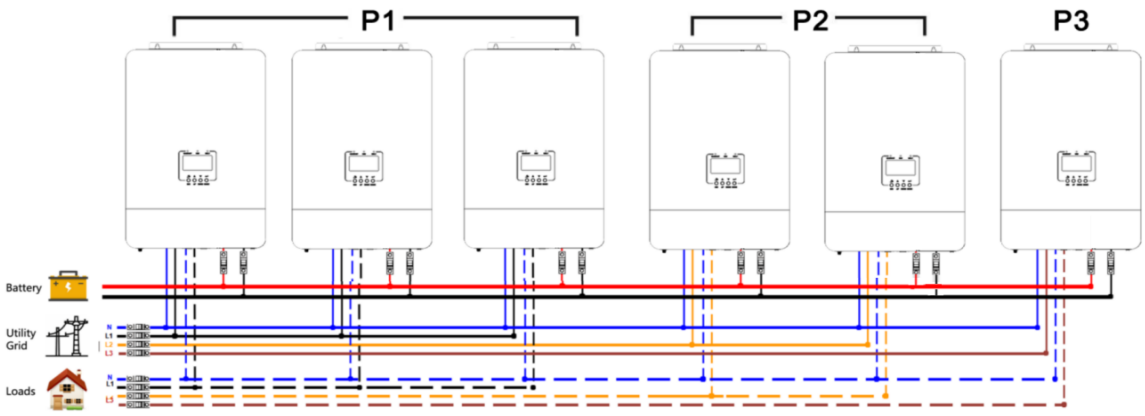


Communication connection:

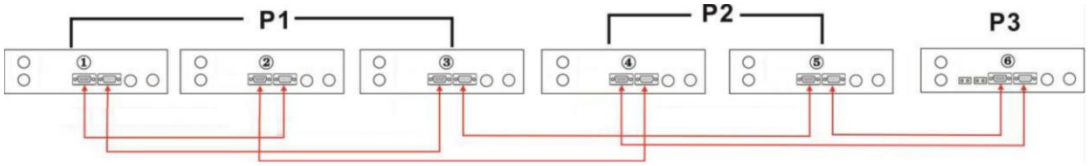


8.2.6. Three Inverters for The First Phase, Two Inverter for The Second Phase, and One Inverter for The Third Phase

System connection:

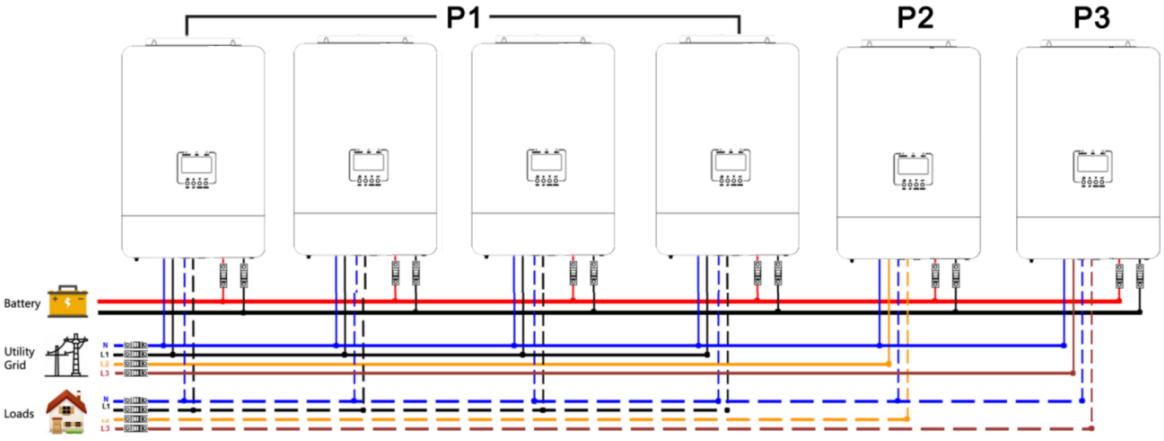


Communication connection:

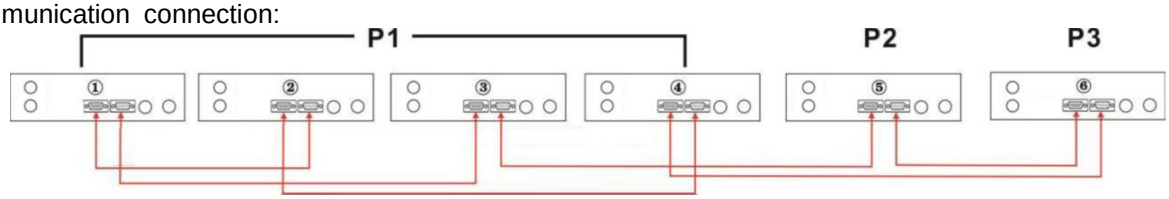


8.2.7. Four Inverters for The First Phase and One Inverter for The Other Two Phases

System connection:



Communication connection:



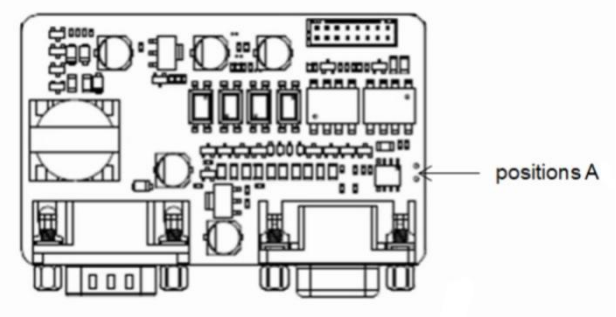
8.3. Connection Precautions

8.3.1. PV Connection

Note:
Each inverter is connected to the PV separately, and the PVs of each inverter cannot be wired in parallel.

8.3.2. Parallel Board Connection

Note:
In each set of parallel systems, select the two sets of machines with the farthest distance and short-circuit the positions A of the parallel board with jumper caps.



8.4. LCD Setup and Display

Refer to setting item 27.

8.4.1. Single-phase Parallel

Step 1:

Before debugging, please check the following requirements: Is the wiring correct?

Make sure all circuit breakers in the load side line are open. And each neutral line (N line) of the inverter is connected together.

Step 2:

Go into Inverter setting mode and set “PAR” in program 27 on the LCD. Then turn off all inverters.

Note:

When setting on the LCD, the power-on switch must be turn off. Otherwise, settings cannot be made.

Setting interface single-phase Parallel display

Note:

Automatic identification of primary and secondary inverters in the system.

Step 3:

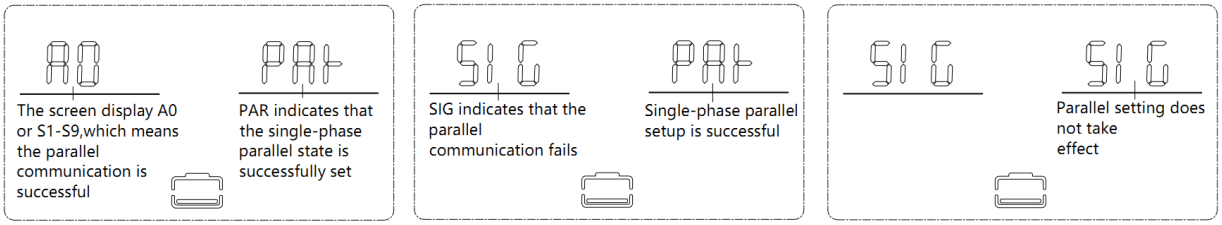
Close the AC circuit breakers of all lines in the AC input. Keep the rocker switch not closed and wake up the parallel system. There are instructions on the next page of P9 on the LCD display interface.as shown in Figure 4.1.1. It is best to have all inverters connected to mains at the same time. If not, it will show fault 23 or 22.

Step 4:

If there are no more fault alarms and the indicating interface is normal, the parallel system is fully installed.

Step 5:

Close the circuit breaker on the load side. Turn on the system and start supplying power to the load.



The parallel setting is successful, the communication is successful interface.

The parallel setting is successful, but the communication is failure interface.

Parallel setting failure interface.

Figure 4.1.1

8.4.2. Three-phase Parallel System

Step 1:

Before debugging, please check the following requirements: Is the wiring correct?

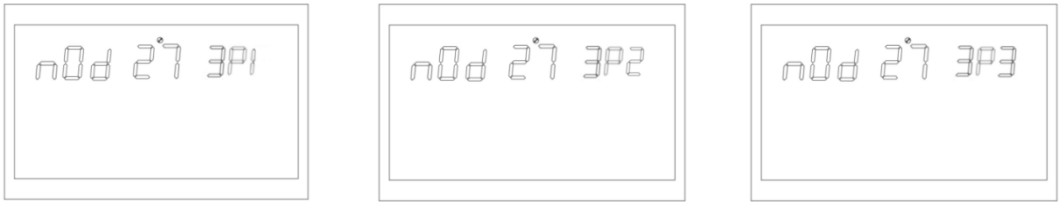
Make sure that all circuit breakers on the load side are disconnected, the neutral wires of each inverter are connected together. Confirm that the output inverter voltage of each machine, the DC component and the battery voltage are all successfully calibrated.

Step 2:

Turn on the Inverter, then use program 27 on the LCD to configure each inverter as 3P1, 3P2, 3P3 in turn. Finally, shut down all machines.

Note:

When using the LCD for program setting, the power-on switch must be turned off. Otherwise, setting cannot be made.



The first phase LCD display

The second phase LCD display

The third phase LCD display

Step 3:

Turn on the AC circuit breakers for all lines in the AC input. If an AC connection is detected

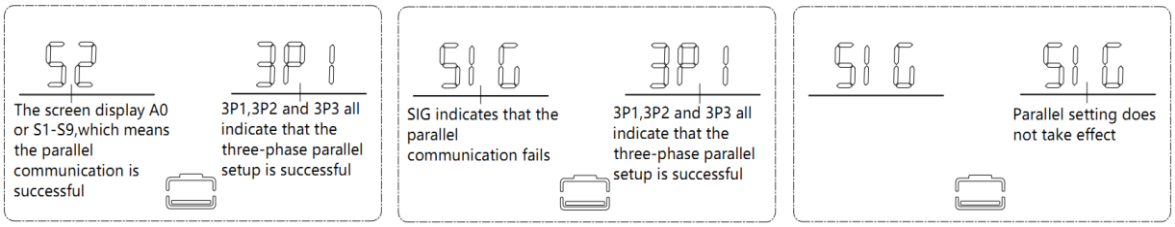
And matches the device settings. The system is working properly. Otherwise, the system will display an alarm or fault, and will not operate in mains mode.

Step 4:

Close the AC circuit breakers of all lines in the AC input, keep the rocker switch not closed, and wake up the parallel system. There are instructions on the next page of P9 on the LCD display interface, as shown in Figure4.1.2, Which means three-phase power supply system installation is complete.

Step 5:

Please close the circuit breakers of all power lines on the load side, close the rocker switch, and the system will start supplying power to the load.



The parallel setting is successful, the communication is successful interface.

The parallel setting is successful, but the communication is failure interface.

Parallel setting failure interface.

Figure 4.1.2

Note 1:
To avoid overloading, it is best to let the whole system operate normally before closing the circuit breaker on the load side.
Note 2:
There is a switching time for this power supply system. Power outages may occur for critical equipment with high power requirements.

8.5. Serial Port Instruction Settings

8.5.1. Single Phase Parallel Operation Command

Connect the communication board to the computer using DB9 or USB first, open the corresponding serial port assistant:

(1) Sending the command "PAR1" and replying to "ACK" indicates that the single-phase parallel operation of the machine has been successfully set up. After all machines that need to be parallel have been successfully set up, the parallel operation can proceed. After powering on, refer to Figure 4.1.1 on the LCD screen to determine if OK is set.
(2) Sending a "PAR0" reply with "ACK" can disable the parallel function. The machine defaults to "PAR0" (single machine mode)

8.5.2. Three-phase Parallel Operation Command

(1) Sending a "PAR2" reply with "ACK" indicates that the first phase in the three phases has been successfully set. After powering on, refer to Figure 4.1.2 on the LCD screen to determine if OK is set.
(2) Sending a "PAR3" reply with "ACK" indicates that the second phase in the three phases has been successfully set.
(3) Sending a "PAR4" reply with "ACK" indicates that the third phase of the three phases has been successfully set.

If the above settings are unsuccessful or if there are both three-phase and single-phase parallel machines, the machine will report a "24" fault.