All-In-One Off-Grid
Energy Storage System

User manual

Contents

1. Information

1.1 System Introduction

AOLES-3KW / AOLES-5KW can be used in DC coupled systems (newly installed) and off-grid system (transformation, photovoltaic capacity increase), the scheme is as follows:

Solution	Configuration	
	Inverter	Battery
AOLES-3KW	3KW	2.5KWh
AOLES-5KW	5KW	5KWh

1.2 Application

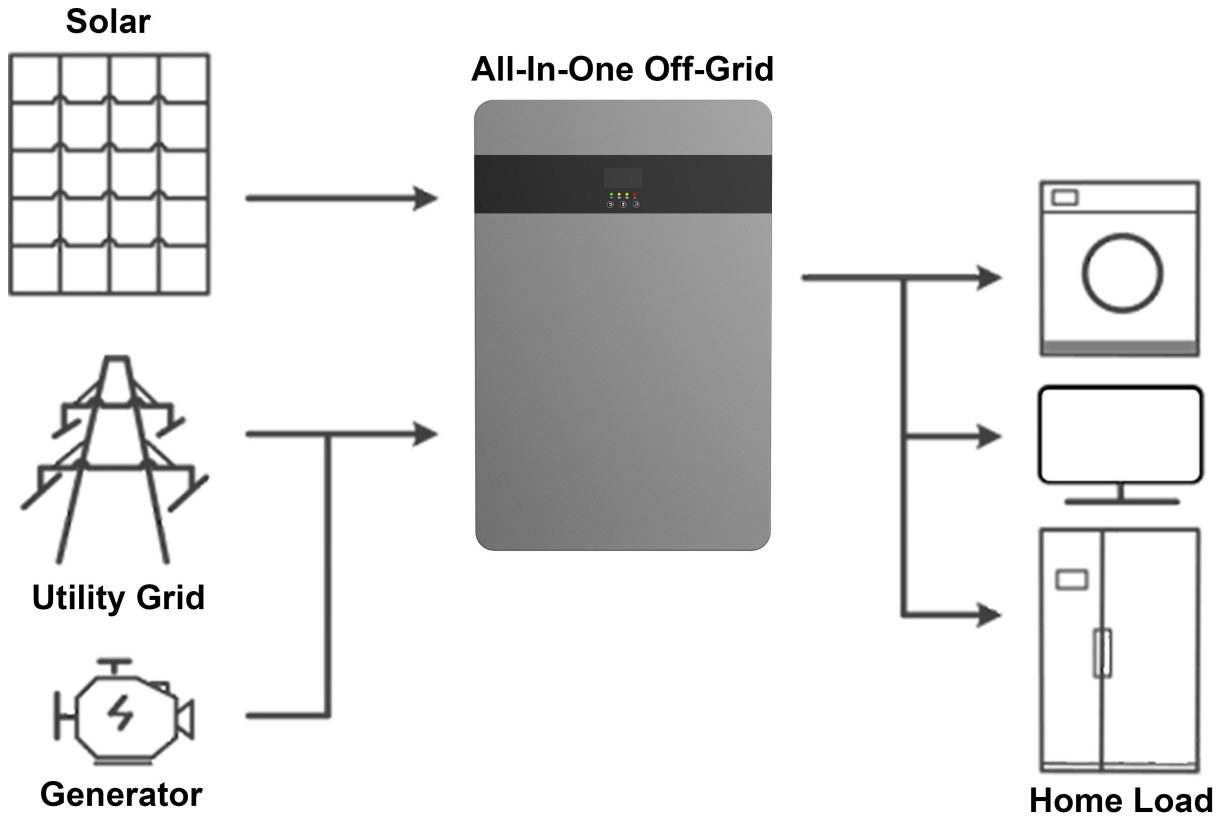


Figure1.2-1 Working diagram

1.3 Safety Instructions

Warning signs and stickers

	Warning generic hazard		Do not mix with domestic
	Warning High Voltage - Electrical shock hazard		Please recycle
	No flame		User manual
	No stepping on		Multiple handling
	Warning Single handling		This side up

1.3.1.Setting of Warning Sign for Safety

During instruction, maintenance and repair, follow the instructions below to prevent non-specialist personnel from causing misuse or accident:

♦ Obvious signs should be placed at front switch and rear-level switch to prevent accidents caused by false switching.

♦ Warning signs or tapes should be set near operating areas.

♦ The system must be reinstalled after maintenance or operation.

1.3.2 Measuring Equipment

To ensure the electrical parameters to match requirements, related measuring equipment are required when the system is being connected or tested.

Ensure that the connection and use matched specification to prevent electric arcs or shocks.

1.3.3 Moisture Protection

It is very likely that moisture may cause damages to the system. Repair or maintaining activities in wet weather should be avoided or limited.

1.3.4 Operation After Power Failure

The battery system is part of the energy storage system which stores life-threatening high voltage even when the DC side is switched off. Touching the battery outlets is strictly prohibited. The inverter can keep a life-threatening voltage even after disconnecting it from the DC and / or AC side. Therefore, for safety reasons, it must be tested with a properly calibrated voltage tester before an installer works on the equipment.

1.4 Battery Safety Datasheet

1.4.1 Hazard Information

Classification of the hazardous chemical:

This product is a Lithium Iron Phosphate Battery with certified compliance under the UN Recommendations on Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, subsection 38.3. For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage. However, if the product is exposed to a fire, added mechanical shocks, decomposed,added electric stress by misuse, the gas release vent will be operated. The battery cell case will be breached at the extreme. Hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid or harmful fume may be emitted.

1.4.2 Safety Datasheet

For detailed information please refer to the provided battery safety datasheet.

1.5 General Precautions

DANGER

Danger to life due to high voltages of the PV array, battery and electric shock. When exposed to sunlight, the PV array generates dangerous DC voltage which will be present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the system under load, an electric arc may occur leading to electric shock and burns.

♦ Do not touch uninsulated cable ends.

♦ Do not touch the DC conductors.

♦ Do not open the inverter and battery.

♦ Do not wipe the system with damp cloth.

♦ Have the system installed and commissioned by qualified people with the appropriate skills only.

♦ Prior to performing any work on the inverter or the battery pack, disconnect the inverter from all voltage sources as described in this document.

WARNING

Risk of chemical burns from electrolyte or toxic gases. During standard operation, no electrolyte shall leak from the battery pack and no toxic gases shall form. Despite careful construction, if the Battery Pack is damaged or a fault occurs, it is possible that electrolyte may be leaked or toxic gases formed.

♦ Do not install the system in any environment of temperature below -20°C or over 50°C and in which humidity is over 90%.

♦ Do not touch the system with wet hands.

♦ Do not put any heavy objects on top of the system. Do not damage the system with sharp objects.

♦ Do not install or operate the system in potentially explosive atmospheres or areas of high humidity.

♦ Do not mount the inverter and the battery pack in areas containing highly flammable materials or gases.

♦ If moisture has penetrated the system (e.g. due to a damaged enclosure), do not install or operate the system.

♦ Do not move the system when it is already connected with battery modules.Secure the system to prevent tipping with restraining straps in your vehicle.

♦ The transportation of product must be made by the manufacturer or an instructed personal. These instructions shall be recorded and repeated.

♦ A certified ABC fire extinguisher with minimum capacity of 2kg must be carried along when transporting.

♦ It is totally prohibited to smoke in the vehicle as well as close to the vehicle when loading and unloading.

♦ For the exchange of a battery module, please request for new hazardous goods packaging if needed, pack it and let it be picked up by the suppliers.

♦ In case of contact with electrolyte, rinse the affected areas immediately with water and consult a doctor without delay.

CAUTION

Risk of injury through lifting or dropping the system. The inverter and battery are heavy. There is risk of injury if the inverter or battery is lifted incorrectly or dropped during transport or when attaching to or removing from the wall.

♦ Lifting and transporting the product must be carried out by more than 2 people.

1.6 Parts List

Check the following parts list to ensure it is complete

 Product*1	 Wall Mounting Bracket*1	Mounting Locating Plate*1
 User Manual	 Expansion Screw M8*80mm *4	 OT6-6 terminal*4
 Male Connector*1 Female Connector*1	 D4 Disassembly Tool*1	

1.7 Specifications

Item	Model	AOLES-3KW	AOLES-5KW
Rated Power		3kW	5kW
Battery Type		$LiFePO_4$	
Battery Parameters	Rated Voltage	25.6V	51.2V
	Rated Capacity	2.56kWh	5.12kWh
Input	Utility Input Voltage	170~260VAC	
	Utility Frequency Range	50~60Hz (Automatic recognition)	
Solar Charger & AC Charger	Max. PV Array Power	4000W	6000W
	PV Array Open Circuit Voltage	120V~430V	
	Max. Solar Input Current	15A	
	Max. Solar Charge Current	80A	
	Max. AC Charge Current	32A	
	Max. Charge Current (PV+AC)	80A	
Output	AC Output Voltage	208VAC / 220VAC / 230VAC / 240VAC	
	Frequency	50Hz / 60Hz	
Other	Overload Alarm	Alarm at 110% load, one minute shutdown at 120% load, 3 seconds shutdown at 150% load. Automatic shutdown when load falls below 8%	
	Protection Features	Charging over voltage protection, Discharging under voltage protection, Over current protection, Over temperature protection, Low temperature protection, Short circuit protection, etc.	
	Four Working Modes	Utility priority mode, Battery priority mode, Energy-saving mode, RV priority mode	
	Fan Control	Intelligent speed control	
	Switching Time	<5ms	
	Operating Condition	Indoor	
	Installation	Wall mounting	
	Material/Colour	Metal/Gun grey (Customizable)	
	Operating Temperature	Charge: 0~55℃ / Discharge: -20~55℃	
	Storage Temperature	-10°C~35°C	
	Communication	Bluetooth (Battery)	
	Protection Level	IP20	
	Relative Humidity	10% ~ 95%RH	
	Dimension (W*D*H)	460*140*700mm	
	Weight	37Kg	55Kg
	Certification	UN 38.3	

1.8 Liability Limitation

Any product damage or property loss caused by the following conditions, factory does not assume any direct or indirect liability.

Product modified, design changed or parts replaced without factory authorization.

Changes, repair attempts and erasing of series number or seals by non factory technician; System design and installation are not in compliance with standards and regulations.

Fail to comply with the local safety regulations (VDE for DE, SAA for AU).

Transport damage (including painting scratch caused by rubbing inside packaging during shipping).

A claim should be made directly to shipping or insurance company in this case as soon as the container/packaging is unloaded and such damage is identified.

Fail to follow any/all of the user manual, the installation guide and the maintenance regulations; Improper use or misuse of the device.

Insufficient ventilation of the device.

The maintenance procedures relating to the product have not been followed to an acceptable standard.

Force majeure (violent or stormy weather, lightning, overvoltage, fire etc.).

Damages caused by any external factors.

1.9 Installation

The manual introduces the basic steps to install and set up product

	**NOTE:** **Please be cautious unpacking the battery, otherwise components could be damaged**

1.10 Installation Site and Environment

General

This energy storage system is indoor version and can be installed in an indoor location.

When product systems are installed in a room, product must not be hampered by the structure of the building, the furnishings and equipment of the room.

The following locations are not allowed for installation: habitable rooms; ceiling cavities or wall cavities. on roofs that are not specifically considered suitable; access/exit areas or under stairs/access walkways. where the freezing point can be reached, such as garages, carports or other places as well as wet rooms (environmental category 2).

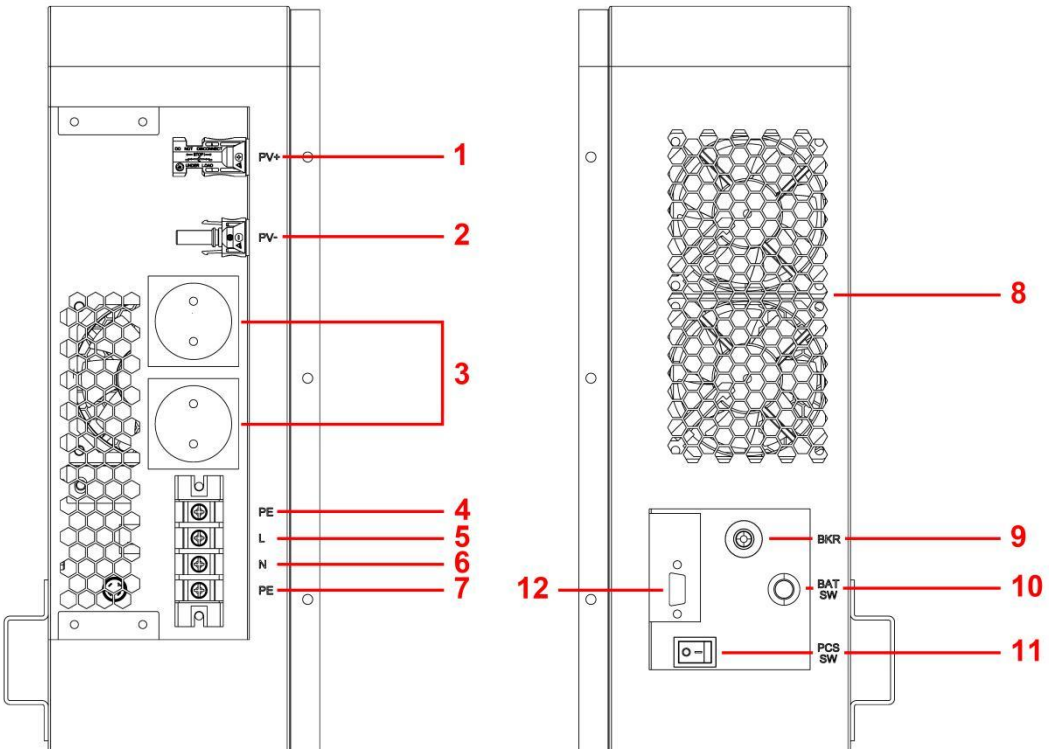
Locations with humidity and condensation over 90%; places where salty and humid air can penetrate.

Seismic areas-additional security measures are required; sites with altitude above 2000m.

Places with an explosive atmosphere.

Locations with direct sunlight or a large change in the ambient temperature; places with flammable materials or gases or an explosive atmosphere.

2. Product Introduction



No	Name	Description	Remark
1	PV+	PV input +	/
2	PV-	PV input -	/
3	/	Socket	/
4	PE	Grid input is PE	/
5	L	Grid input is L	/
6	N	Grid input is N	/
7	PE	Product ground	/
8	/	Fan	/
9	BKR	Breaker	Reset
10	BAT SW	Battery switch	/
11	PCS SW	PCS switch	/
12	/	/	/

2.1 Installation

Step 1

Take out the positioning plate to keep the mounting plate in a horizontal position and position the holes in the wall according to the positioning plate.

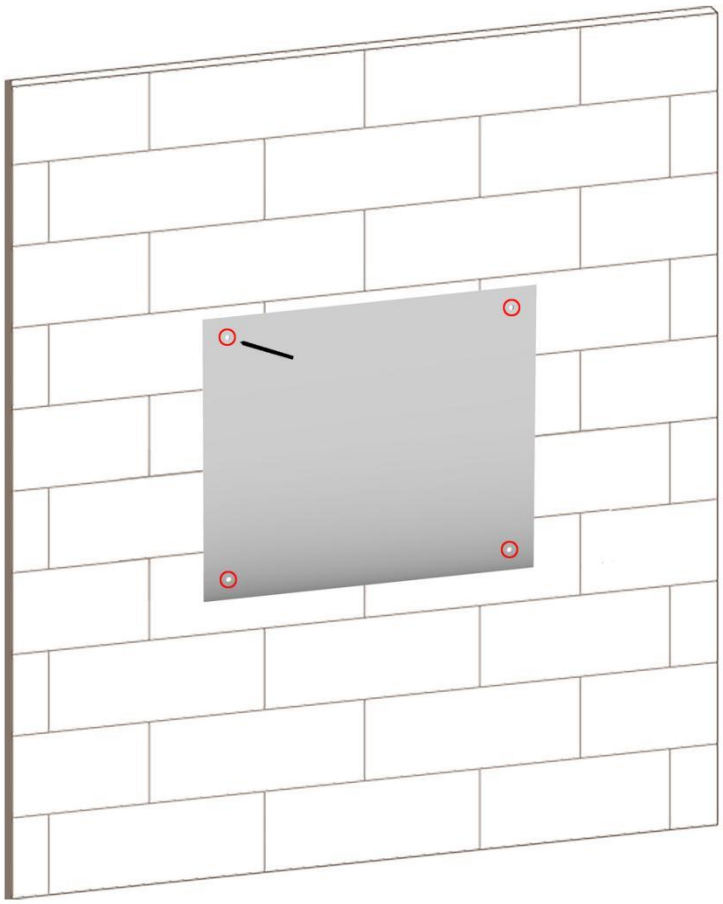


Figure 2.1-1 Positioning plate digram

Step 2

Drill 4 holes on the wall with drill Φ12, insert 4 expansion plugs into the drill holes, as shown in Figure 2.1-2.

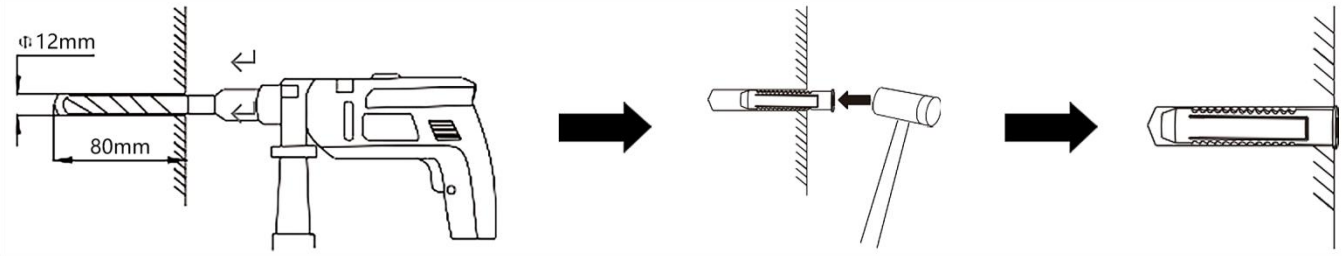


Figure 2.1-2 Insert the expansion plugs

Step 3

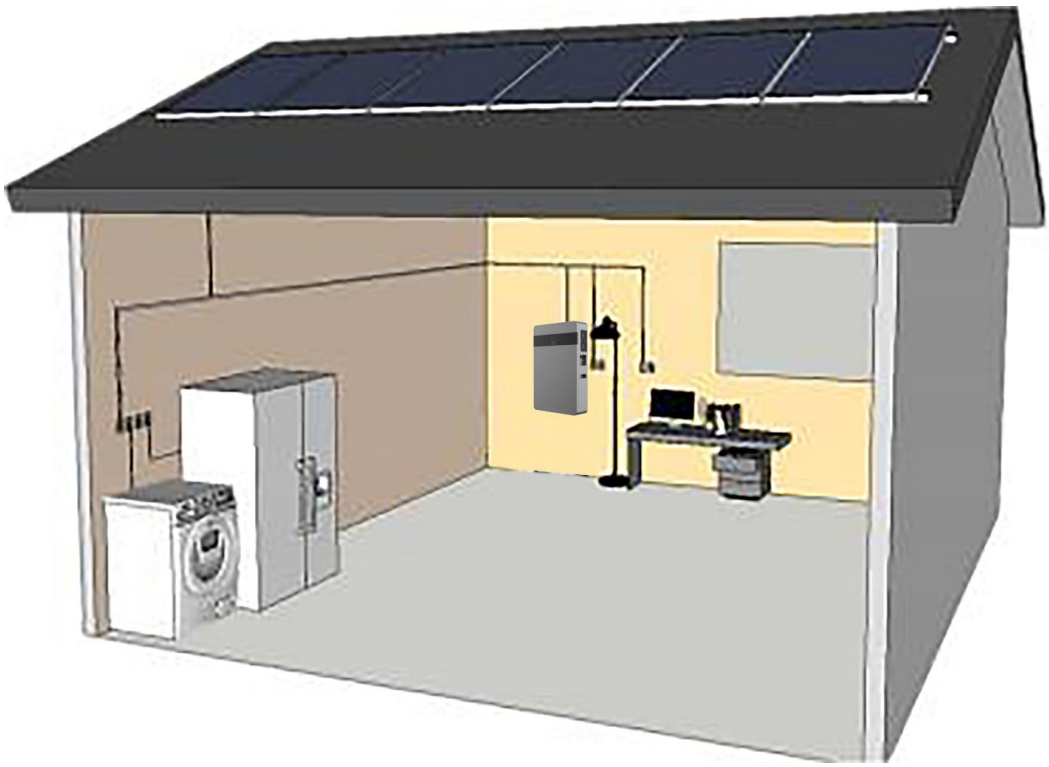
Attach the mounting bracket to the wall.

Figure 2.1-3 Install the wall bracket

Step 4

Hang the battery on the mounting bracket.

Figure 2.1-4 Secure the battery



Residential all-in-one off-grid application

⚠	**NOTE: First turn on the battery switch, then turn on the inverter switch**

⚠	**NOTE: Recommended AC circuit breaker rating is 32A**

3. System Operation

3.1 Switch On

When turning on the system, it is very important to follow the steps below to prevent damage to the system .
WARNING: Please check the installation again before turning on the system .

Step 1: Press the battery switch button, then press the PCS switch button, and the display will light up.
Step 2: Turn on the external PV switch. (If there is a PV external switch)
Step 3: Turn on the external grid switch. (If there is a external grid switch)

3.2 Switch Off

Step 1: Press the battery switch button, then press the PCS switch button until the display is off.
Step 2: Turn off the external grid switch.
Step 3: Turn off the external PV switch on the cable box.

3.3 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 securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 32A for AOLES-5KW.

WARNING: All wiring must be performed by a 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
AOLES-5KW	8AWG	1.2-1.6 Nm

Please follow below steps to implement AC input/output connection:

Before making AC input/output connection, be sure to open DC protector or disconnector first.

Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.

Insert AC input/output wires according to polarities indicated on terminal and tighten the terminal screws.

Connect the corresponding cable to the port according to the identifier , Make sure the wires are securely connected.

WARNING:

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

CAUTION: Important

Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

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 with manufacturer of air conditioner that if it's equipped with time-delay function before installation. Otherwise, this off grid solar inverter will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

3.4 PV Connecion

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 a qualified personnel.

WARNING: It'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.

Model	Gauge	Torque Value
AOLES-5KW	15AWG	1.2-1.6 Nm

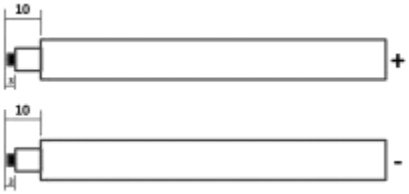
PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. PV input voltage.

Please follow below steps to implement PV module connection:

Remove insulation sleeve 10 mm for positive and negative conductors.



Step 1 : Check the input voltage of PV array modules. This system is applied with One strings of PV array. Please make sure that the maximum current load of each PV input connector is 18A .

CAUTION: Exceeding the maximum input voltage can destroy the unit!! Check the system before wire connection

Step 2: Disconnect the circuit breaker and switch off the DC switch.

Step 3: Insert PV+/PV- according to the polarity indicated on the terminal, and tighten the terminal screw.

3.5 Emergency Procedure

When the energy storage system appears to be running abnormally, you can turn off the grid-connected main switch that directly feeding the BESS , and turn off all load switches within the BESS ,turn off the battery switch at the same time. To prevent a potentially fatal personal injury, if you want to repair or open the machine after the power is switched off,please measure the voltage at the input terminals with a suitably calibrated voltage tester.Before working on this equipment, please confirm that there is no grid electric supply to the BESS! The upper cover plate cannot be opened until the DC-link capacitance inside the battery modules discharges completely about 15 minutes later.

3.5.1 Emergency Handling Plan

1. Disconnect the AC breaker.

2.Check the control power supply. If it is OK, return the power supply to find out the reason.

3. Please record every detail related to the fault, so Factory can analyse and solve the fault. Any operation of equipment during a fault is strictly forbidden, please contact Factory as soon as possible.

4.As battery cells contain a little Oxygen inside and all cells have got explosion-proof valves,explosion hardly happens.

5.When the indicator light on the battery shows a red fault, check the fault type through the communication protocol, and contact our after-sales service personnel for advice.

3.5.2 Hazards

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions

described below:

Inhalation: Evacuate the contaminated area, and seek medical attention.

Eye contact: Rinse eyes with running water for 5 minutes, and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.
Ingestion: Induce vomiting and seek medical attention.

3.5.3 Fire

If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:

Fire extinguishing media

During normal operation, no respirator is required. Burning batteries can not be extinguished with a

regular fire extinguisher, this requires special fire extinguishers such as the Novec 1230, the FM-200 or a dioxin extinguisher. If the fire is not from a battery, normal ABC fire extinguishers can be used for

extinguishing.

Fire -Fghting Instructions

1.If fire occurs when charging batteries, if it is safe to do so, disconnect the battery pack circuit breaker to shut off the power to charge.

2.If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.

3. If the battery pack is on fire, do not try to extinguish but evacuate people immediately.

Effective Ways to Deal With Accidents

Battery in dry environment: Place damaged battery into a segregated place and call local fire department or service engineer.

Battery in wet environment: Stay out of the water and don ’t touch anything if any part of the battery, inverter, or wiring is submerged.

Do not use a submerged battery again and contact the service engineer.

4. EMS Introduction and Set Up

4.1 Panel Description

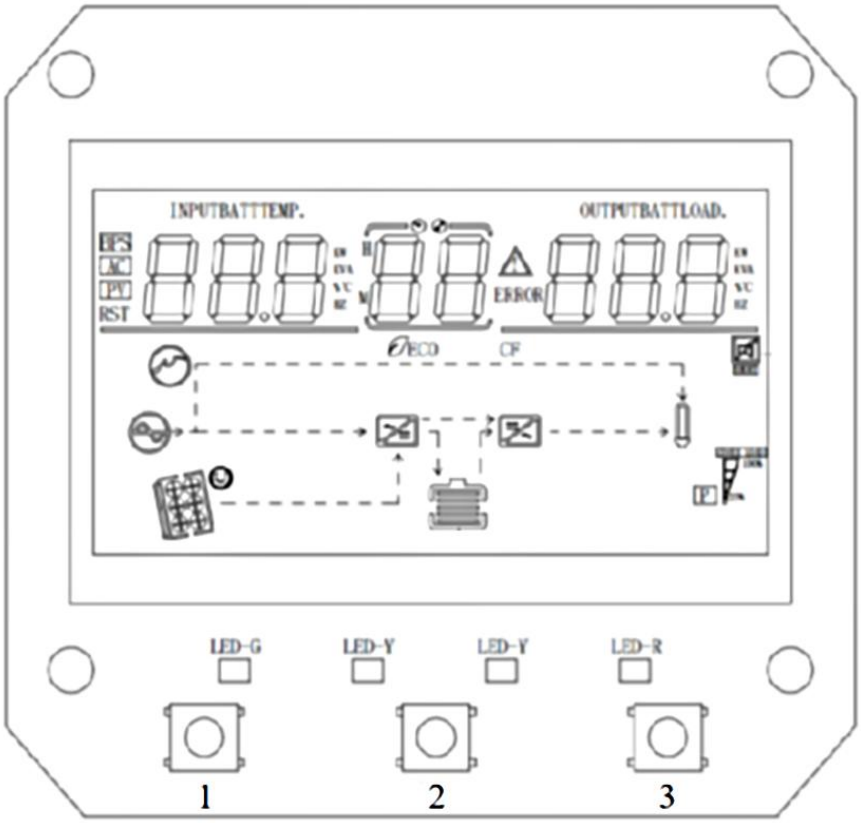


Figure 4.1-1 Screen interface

Three button function

Button	Function Description
Function Settings Enter Button	Function setting: Press the No. 3 key on the display page for more than 2 seconds to enter the function setting page. After entering the setting interface, press the No. 2 key to turn the page and select the interface to be set. Ok: On the function Settings page, press key 1 for 0.1 to 2 seconds to determine the options set.
Page Turning Button Inquire Button	Page turning: Press No. 2 key on any page for more than 0.1 seconds to perform page turning. Polling mode: On the display page, press No. 2 key for more than 1 second to enter polling mode, cycle to display each page content, each page content display time is 2 seconds, press No. 2 key again for more than 1 second to exit polling mode.

4.2 LED Indicator Function

Indicator	Name	Description
LED-G	Input lamp (Green)	On: The mains is normal and starts working Blinking: The mains is normal but does not work Off: The mains is abnormal
LED-Y	Inverter lamp (Yellow)	On: Machine working in battery mode output Off: Other states
LED-Y	Battery light (Yellow)	On: The battery is floating and charging Blinking: The battery is being charged at constant voltage Off: Other states
LED-R	Warning light (Red)	On: The inverter is faulty Blinking: An alarm is generated on the inverter Off: The inverter is running properly

4.3 LCD Function Display

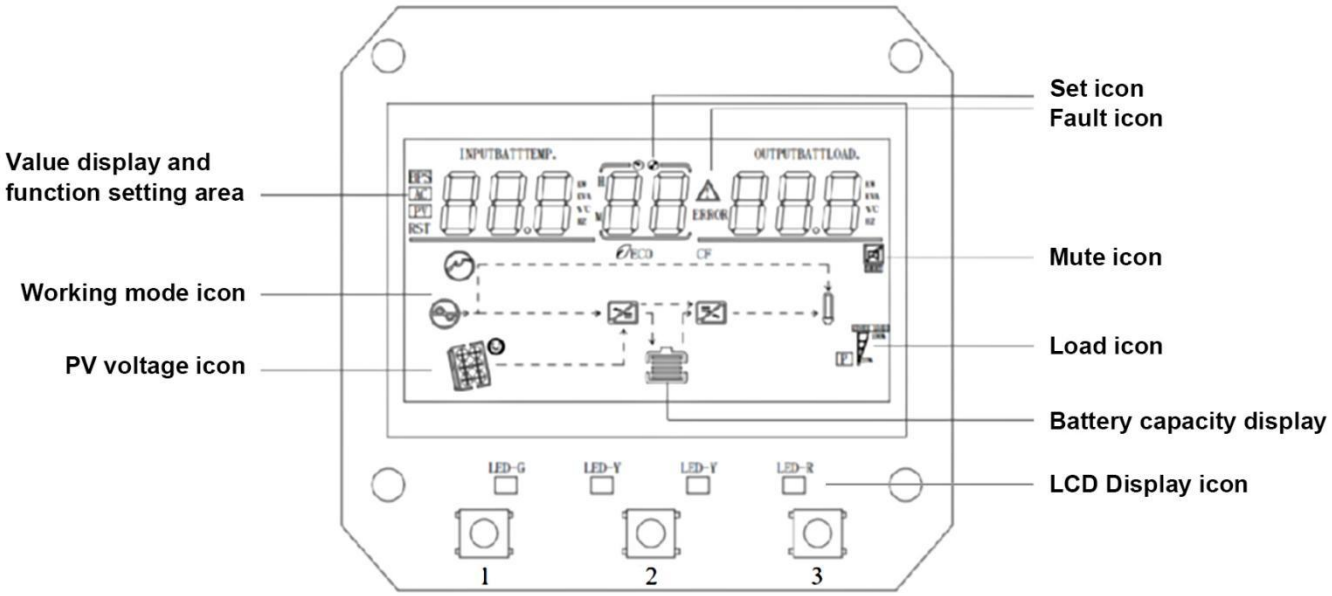


Figure 4.3-1 Interface display description

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

The Icon Shows:

The load and battery graph shows the load and battery capacity. Each square represents 25% of the capacity. The load icon will blink when the inverter is overloaded, and the battery icon will blink when the battery capacity is too low or the battery is not connected.

Buzzer icon Displays whether the buzzer is silent. In normal cases, the buzzer icon is not displayed. In any mode, the background software sets MUTE ON, the inverter enters the mute state, and the buzzer disable icon is displayed.

When you enter the Settings menu, the Settings icon will be displayed. Otherwise, the icon will not be displayed.

The fault icon is displayed only in fault mode. Otherwise, the icon is not displayed.

Value Display and Function Setting Area:

In non-functional setting mode, inverters are displayed in this area. Normal mode display output information, operation up and down search key (2 or 3 key)(three press the key: No. 2) can 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. Fault mode Displays the fault code.

On the function setting page, you can set the output voltage (OPU) and battery Low voltage shutdown point (EOd) by using the function setting keys and the up and down query keys.

Working Mode Display Area:

After 4s is started, this display area mainly displays the working mode of the inverter. For example: standby mode, mains mode, battery mode, fault mode.

Inverter operating status table corresponding to the buzzer

A long song. It lasts ten seconds and then stops	Failure mode
The song stops after three seconds	The PV voltage/input voltage is lost or restored
	Turn on or off the power switch
It starts every second, lasts a minute and stops	All other alarms (Battery low voltage alarms will sound only in battery mode)

4.4 Daily On and Off

Please refer to this manual for on-off operation

4.4.1 Boot Procedure

You can start the power supply when the required batteries (the battery voltage must be greater than 11.5V) or the mains (the mains input range must be determined based on the output mode) are connected.

The Mains is Powered On

When the normal mains is connected, press the switch and switch to ON, the system will start. If the mains output priority is set, wait for a period of time for the panel to display the mains mode, indicating that the mains is successfully started and enters the mains mode.

Battery On

Connect the normal battery, press the switch, and the inverter establishes the working power supply.

The system will start automatically. Wait for a period of time for the battery mode to be displayed on the panel, indicating that the startup is complete and the system enters battery mode.

4.4.2 Shutdown Procedure

When the system outputs in battery mode or mains mode, press the switch again and switch to the OFF state, and the system will shut down.

4.4.3 Mute Operations

When the inverter is in any mode, you can MUTE/unmute the inverter by setting MUTE ON or OFF.

4.4.4 Performing Operations in Alarm State

When the inverter has an alarm tone and the LED fault indicator blinks, it indicates that the inverter works in the alarm state. You can locate the cause of the alarm or contact the supplier based on the alarm information.

4.4.5 Operations in Fault Mode

When the inverter buzzer is long sounding and the LED fault light is long on, it indicates that the inverter is working in fault mode. You can contact suppliers or maintenance personnel to provide fault alarm information for troubleshooting.

4.5 Parameter Query Operation

Under normal circumstances, the display page has ten pages, press the query key No.2 key 0.2 to 1 second to turn the display page, display input and output voltage, input and output frequency, battery, PV voltage and current, load, software version, and other information. If an alarm is generated, an alarm information page is displayed. If the inverter is faulty, the fault code page is displayed by default. By default, fault or alarm information is displayed on the home page. If there is no fault or alarm, the output voltage and frequency are displayed on the home page.

If you hold down key 2 for more than 1 second, the LCD enters polling mode. The display page automatically turns every 2 seconds. If you hold down key 2 again, the polling mode will exit.

Display page 1 (Main Display): Display of Inverter Input and Output Voltages.

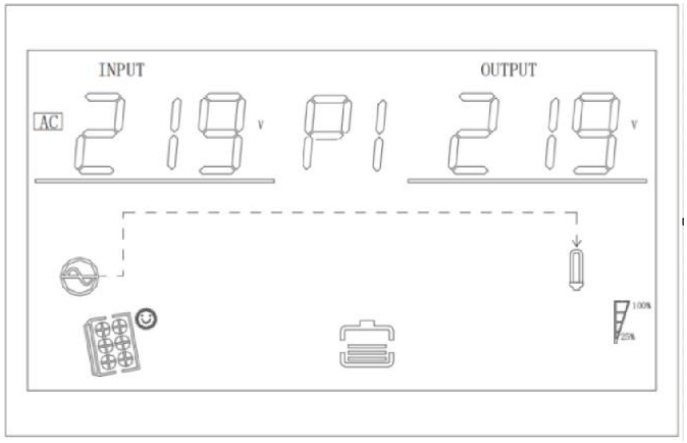


Figure 4.5-1 Display page 1

Display page 2: Display of Inverter Input and Output Frequency.

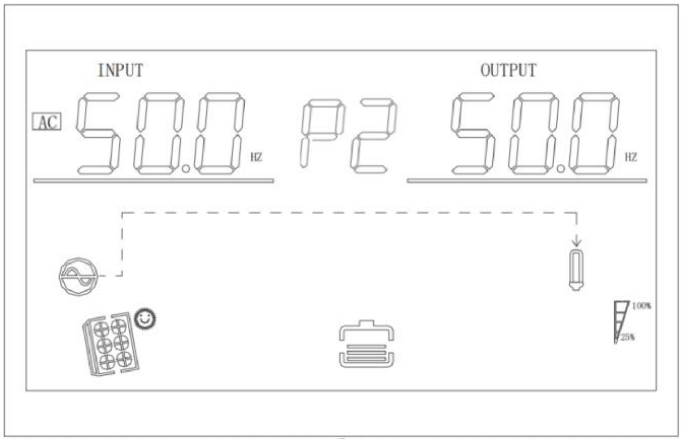


Figure 4.5-2 Display page 2

Display page 3: Battery information, showing battery voltage and charging current.

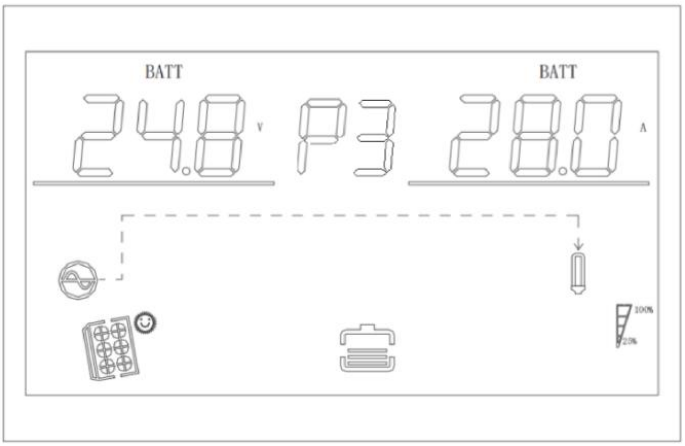


Figure 4.5-3 Display page 3

Display page 4: PV information, displaying PV voltage and PV charging current.

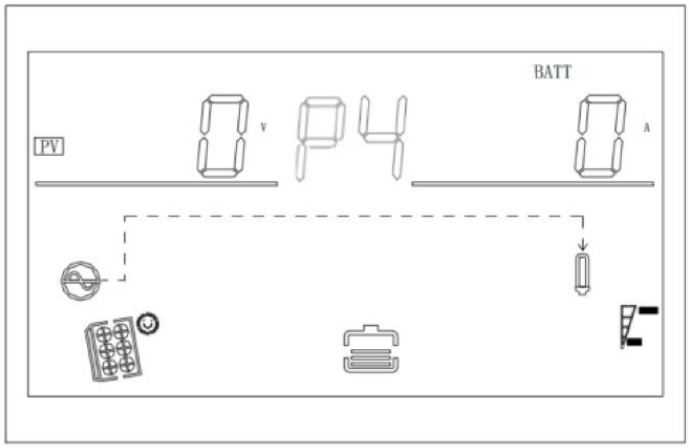


Figure 4.5-4 Display page 4

Display page 5: PV information, display PV voltage and PV power.

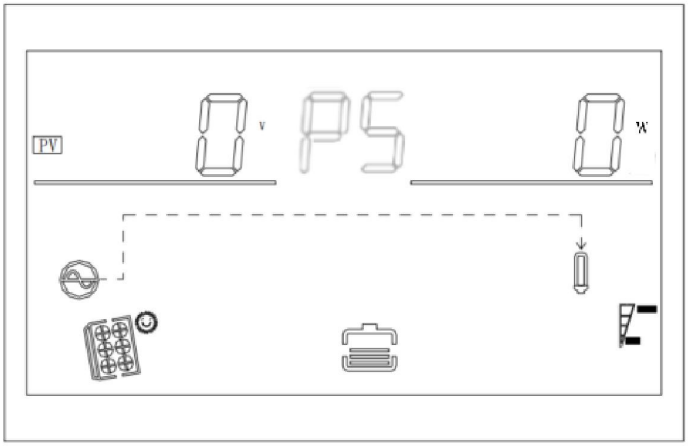


Figure 4.5-5 Display page 5

Display page 6: Output information, display output voltage and output active power.

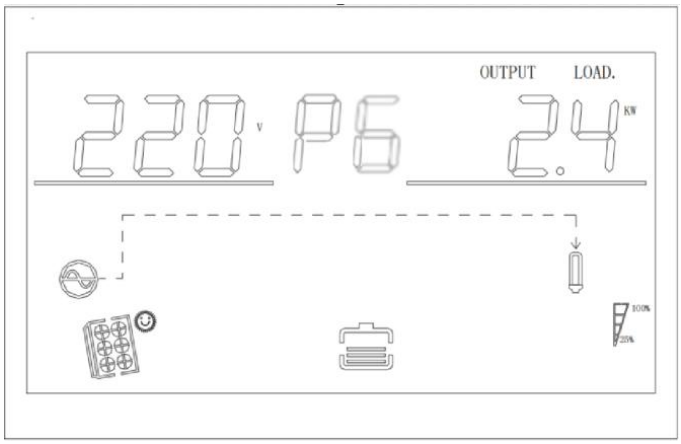


Figure 4.5-6 Display page 6

Display page 7: Output information, display output voltage and output compound power.

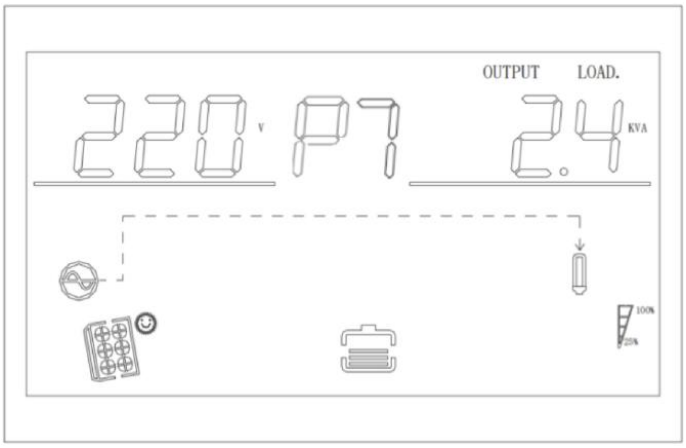


Figure 4.5-7 Display page 7

Display Page 8: Output Information, Display Output Display Voltage and Load Percentage.

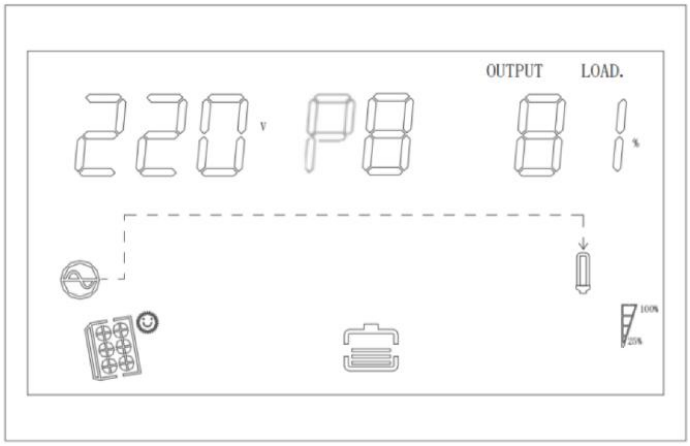


Figure 4.5-8 Display page 8

Display page 9: Software version, displaying the inverter system software version.

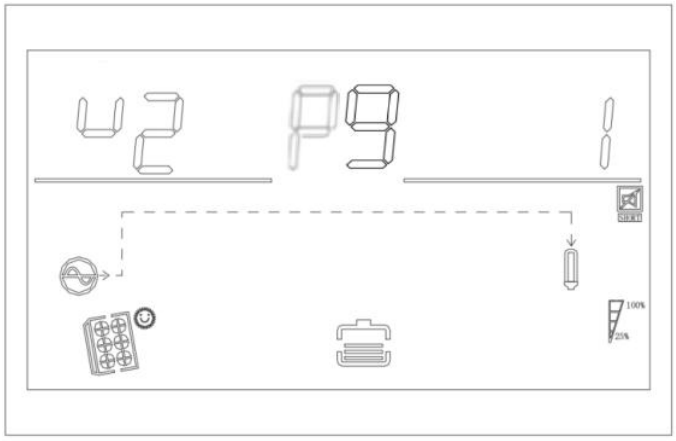


Figure 4.5-9 Display page 9

Display page 10: Software version. 3KVML/3KVP displays the MPPT system software version; 5KVMH displays the PV power generation.

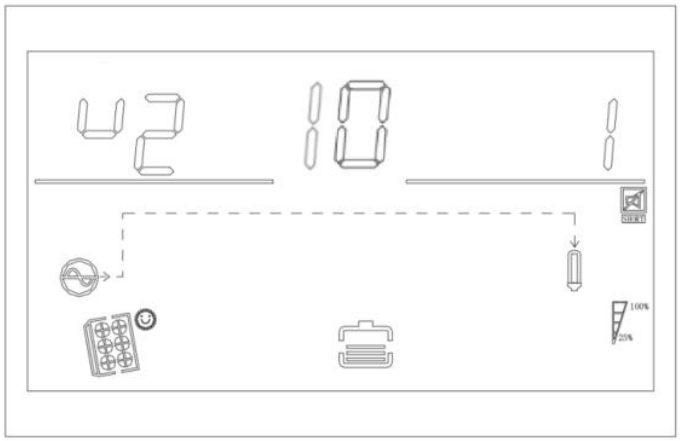


Figure 4.5-10 Display page 10 (Software version)

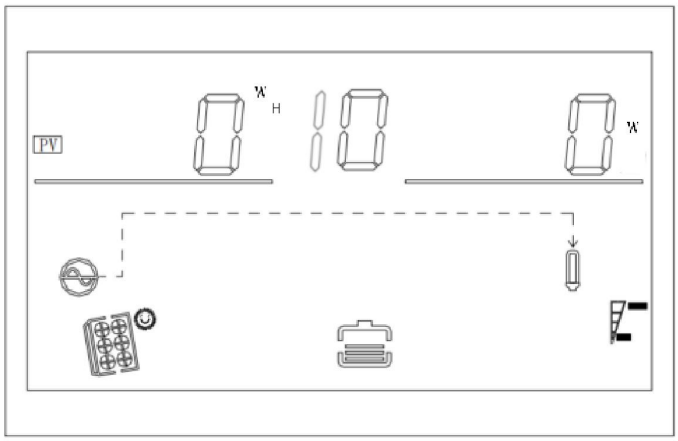


Figure 4.5-10 Display page 10 (PV power)

Display Page 11: Parallel Status. 3KVML/3KVP does not have this page; 5KVMH displays parallel status.

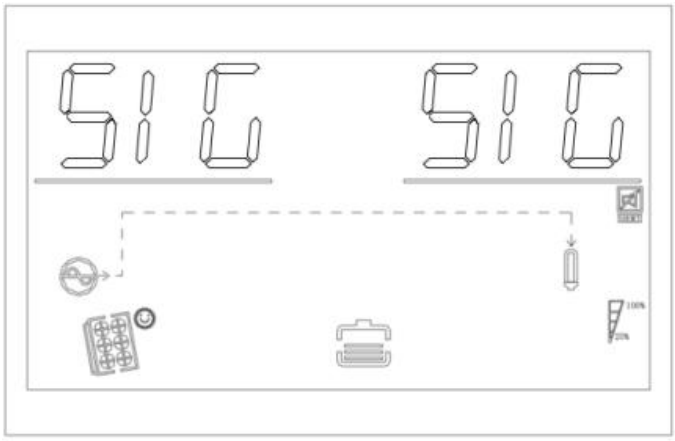


Figure 4.5-11 Display page 11 (Parallel state)

Display page 12: Lithium battery grouping status; when the upper right display is SIG constant, the battery pack is single group operation; when the display is PAR constant, the battery pack is multi-group series-parallel operation; when the display is PAR blinking, the battery pack is establishing multi-group series-parallel connection status.

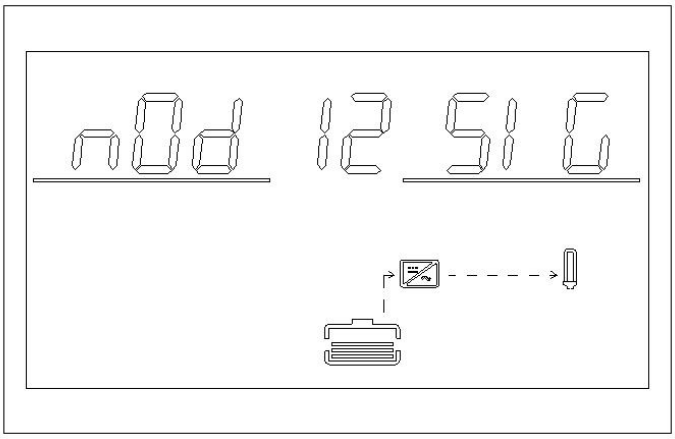


Figure 4.5-12 Display page 12 (Lithium battery networking status)

Display page 13: Li-ion battery voltage and current information; the upper left display shows BMS battery voltage information; the upper right display shows BMS battery current information. when the BMS communication fails, the upper left and right are displayed as flashing ERR.

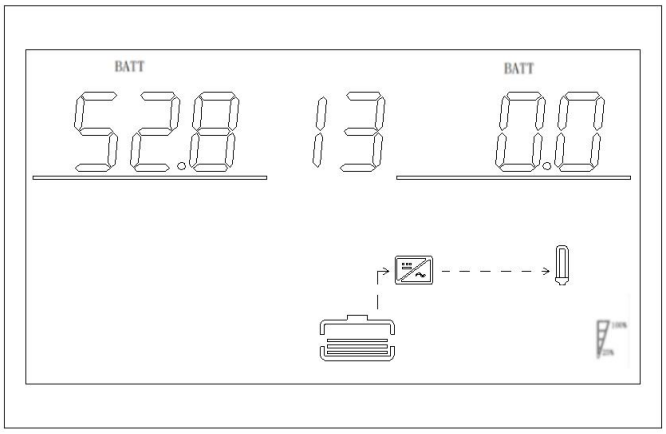


Figure 4.5-13 Display page 13 (Lithium battery voltage and current information)

Display page 14: Li-ion battery cell temperature, SOC; the upper left display shows BMS temperature information; the upper right display shows BMS SOC information. when the BMS communication fails, the upper left and right are displayed as flashing ERR.

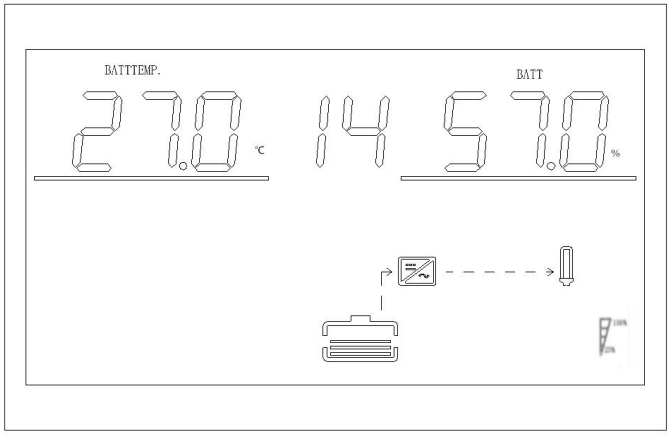


Figure 4.5-14 Display page 14 (Li-ion battery cell temperature, SOC information)

Display page 15: Li-ion battery cell capacity; upper left shows rated capacity; upper right shows current capacity. when BMS communication fails, both upper left and upper right show flashing ERR.

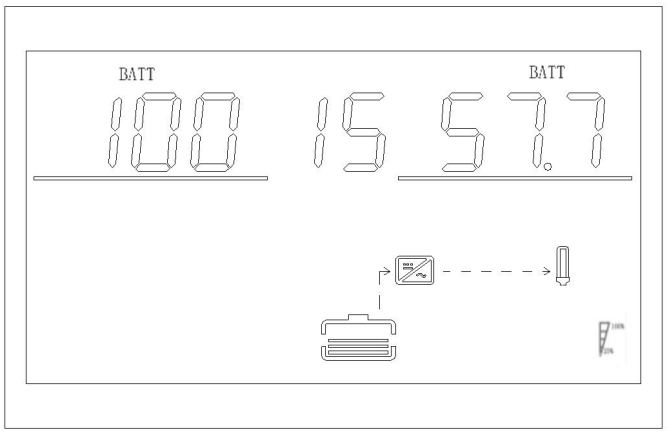


Figure 4.5-15 Display page 15 (Lithium battery cell capacity information)

Display page 16: Li-ion battery cell constant voltage point; the upper left display is fixed letter CV; the upper right display is BMS constant voltage charging point. when the BMS communication fails, the upper right are displayed as flashing ERR.

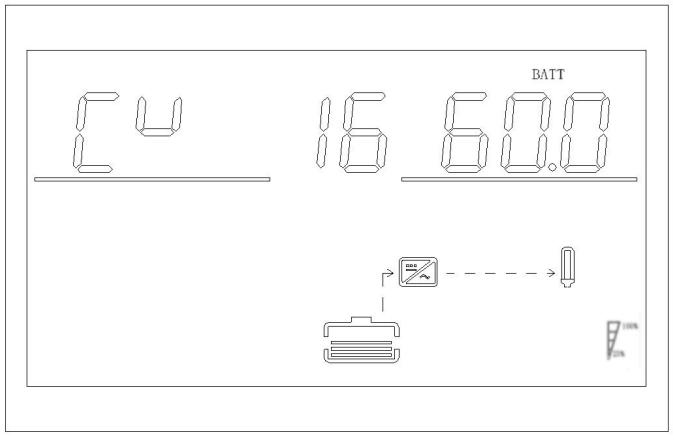


Figure 4.5-16 Display page 16 (Lithium battery cell constant voltage information)

Display page 17: lithium battery failure alarm information; the upper left display is BMS alarm information; the upper right display is BMS failure information. when the BMS communication fails, the upper left and right are displayed as blinking ERR.

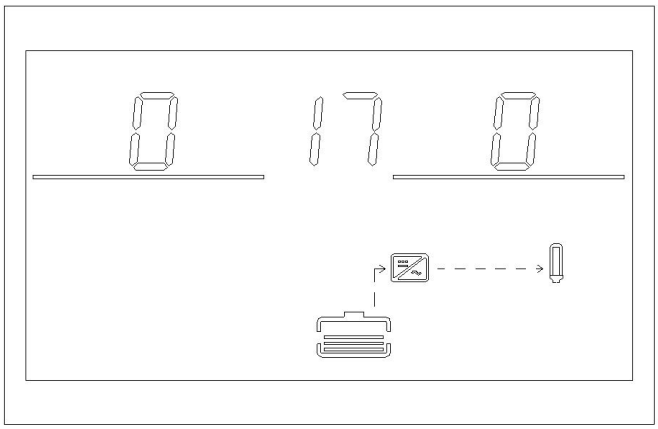


Figure 4.5-17 Display page 17 (Lithium battery failure alarm message)

4.6 Function Setting Operation

Inverter function setting operation

Enter the exit function setting page and function setting specific operations as follows:

♦ Press function setting key No. 3 for more than 2 seconds to enter the function setting page, press query key No. 2 for 0.1 to 2 seconds to select the function, and after turning the page to the desired function setting page, the corresponding function word flashes.

♦ Press the confirmation key No. 3 for 0.1 to 2 seconds to enter the setting page of the selected function, at this time, the words of the selected function are long lit and the value appears flashing on the left side of the words of the selected function. Press the inquiry key No. 2 for 0.1 to 2 seconds to select the value of the desired function parameter.

♦ After turning the page to the desired function parameter, press the confirmation key No. 3 for 0.1 to 2 seconds, the function setting is completed, at this time, the function parameter value is long lit and no longer blinking.

Press key 1 for more than 0.1 to 2 seconds, the function will be set successfully, and at the same time, it will exit the function setting page and return to the main display page (or it can be left unoperated and wait for up to 30S before jumping back to the main display page automatically).

4.6.1 Output Voltage (OPU)

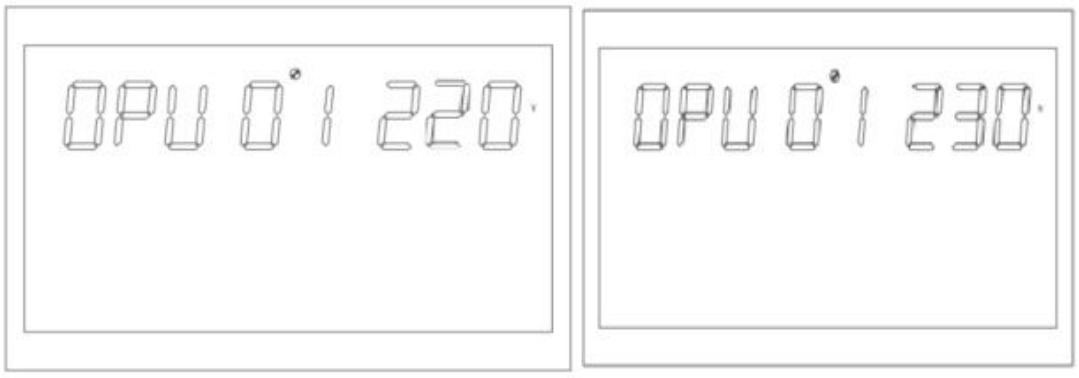


Figure 4.6-1 Output voltage setting page

♦ The default value of output voltage is 230V/208V/220V/230V/240V can be set, all working conditions can be set, and immediately effective.

♦ Press function setting key No. 3 for more than 2 seconds to enter the function setting page, press query key No. 2 for 0.1 to 2 seconds to select the function, and after turning the page to the output voltage OPU setting page, the word OPU blinks.

♦ Press the confirmation key No.3 for 0.1 to 2 seconds to enter the setting page of output voltage OPU, at this time, the word OPU is long lighted, and the value appears flashing on the right side of the word OPU. Press the query key No.2 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 made are saved in real time.

♦ After turning the page to the desired output voltage value, press the confirmation key No. 4 for 0.1 to 2 seconds, the output voltage OPU setting is completed, at this time, the value on the right side of the OPU is long lit and no longer blinking.

♦ Press key 1 for more than 0.1 to 2 seconds, the function will be set successfully, exit the function setting page, and go back to the main display page (or not operate, wait for up to 30S and then automatically jump back to the main display page).

Caution:

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

4.6.2 Other Function Settings

4.6.2.1 Output Frequency (OPF)

Output frequency setting, default 50Hz.

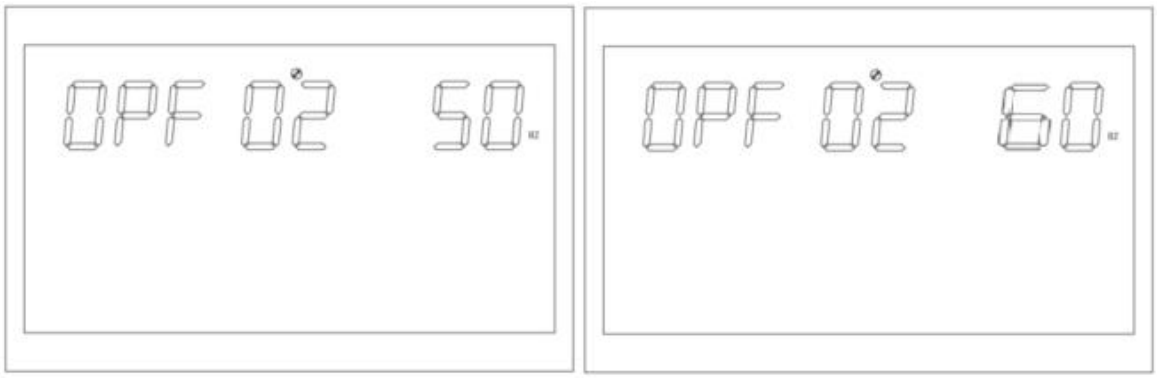


Figure 4.6-2 Output frequency setting screen

Function description: Set the inverter output frequency, 50Hz and 60Hz can be set, default 50Hz.

Setting conditions: all states can be set, battery mode will take effect the next time the machine reboots the setting; utility mode takes effect immediately, after the setting is completed, the frequency will change at a slower rate after turning back to battery mode.

4.6.2.2 Output Priority Setting (OPP)

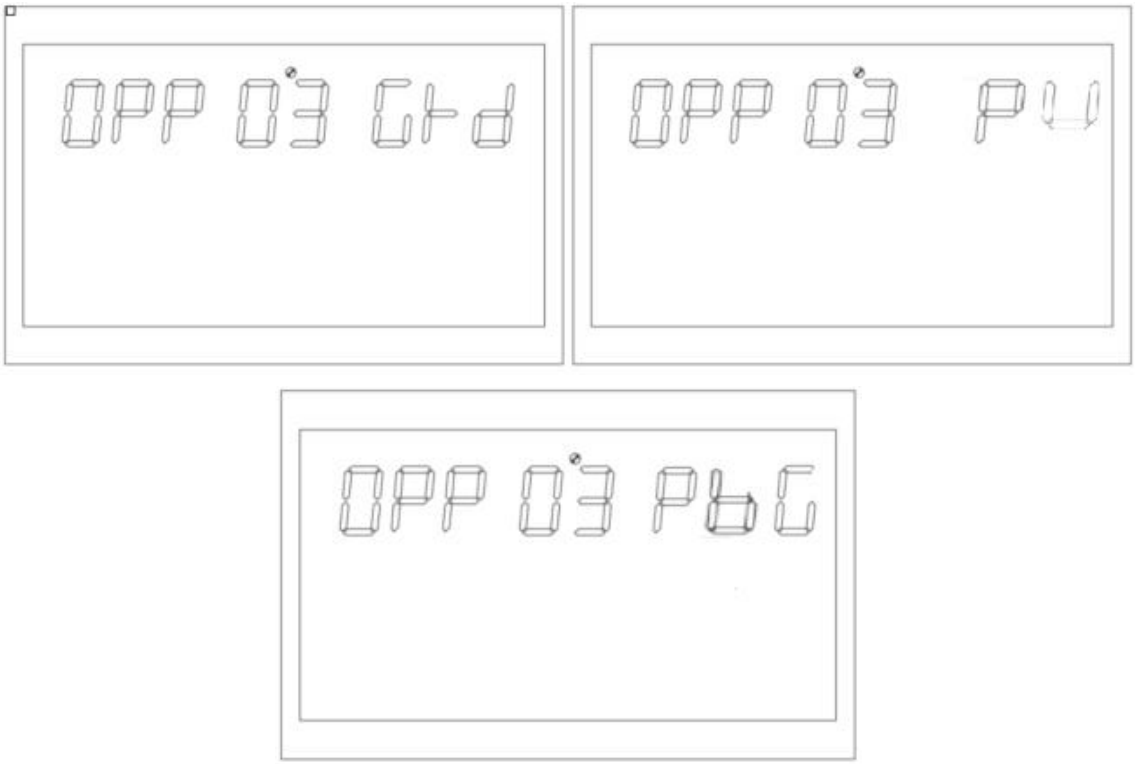


Figure 4.6-3 Output priority setting screen

Function setting: Set inverter output priority.

Setting condition: All states can be set, and it takes effect immediately after setting.

Attention:

There are three choices for output priority. The default is GRD: utility output priority; the second is PU(PV): photovoltaic output priority; the third is PBG: photovoltaic battery utility output.

4.6.2.3 Output Mode (MOD)

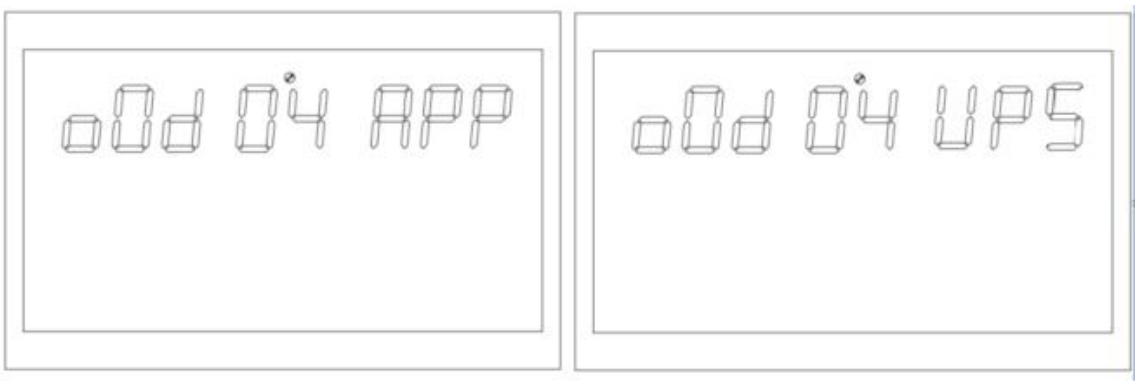


Figure 4.6-4 Output mode setting page

Function setting: Set inverter output mode.

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

Description:

There are two choices for AC output mode. The default is APP: Appliance for home appliances; the second is UPS mode for computers and other devices. The typical value of switching time is 10ms.

4.6.2.4 Charging Priority (CHP)

Figure 4.6-5 Charging priority setting screen

Function setting: Set inverter charging priority.

Setting condition: all states can be set, effective immediately.

Description:

There are four choices for charging priority. The default is PNG (PV and Grid): PV and Grid charging at the same time; the second one is OPV (Only PV): only PV charging; the third one is GRD (Grid): utility charging is prioritized; the fourth one is PV: PV charging is prioritized.

4.6.2.5 Utility Charge Current (RCC)

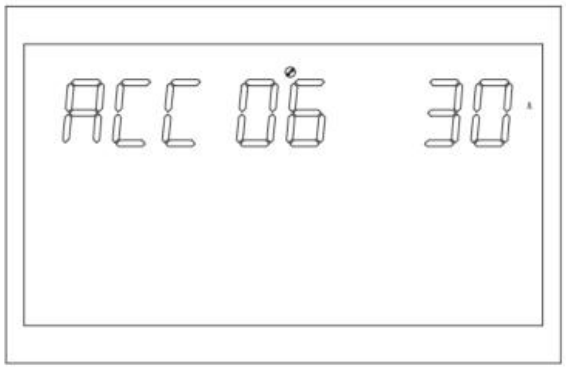


Figure 4.6-6 Utility maximum charge setting page

Function setting: Set the maximum value of inverter mains rechargeable current.

Setting condition: All states can be set.

Description:

RCC: Grid Charge Current. The utility maximum charging current is set by default to 40A(3K VML-24V)/40A(3K VP-24V)/30A(5K VMH-48V), The setting range is[2,60A](3K VML-24V)/[2,50A](3K VP-24V)/[2,80A](5K VMH-48V)

4.6.2.6 Maximum Charging Current (MCC)

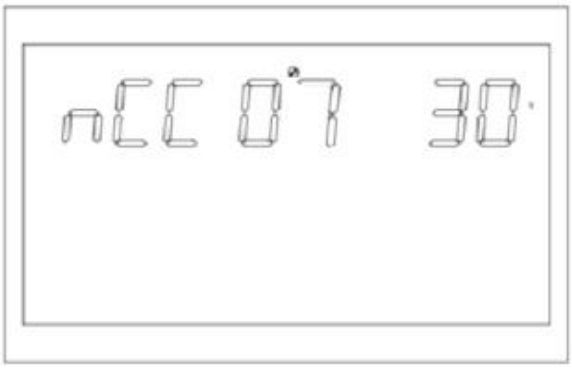


Figure 4.6-7 Maximum charging current setting screen

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

Setting condition: All states can be set.

Description:

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

3K-VML-24V the version is 2/10/20/30/40/50/60/70/80/90/100/110/120A (optional).

3K-VP-24V the version is 2/10/20/30/40/50/60/70/80/90/100A (optional).

5K-VMH-48V the version is 2/10/20/30/40/50/60/70/80A (optional).

4.6.2.7 Menu Default (MDF)

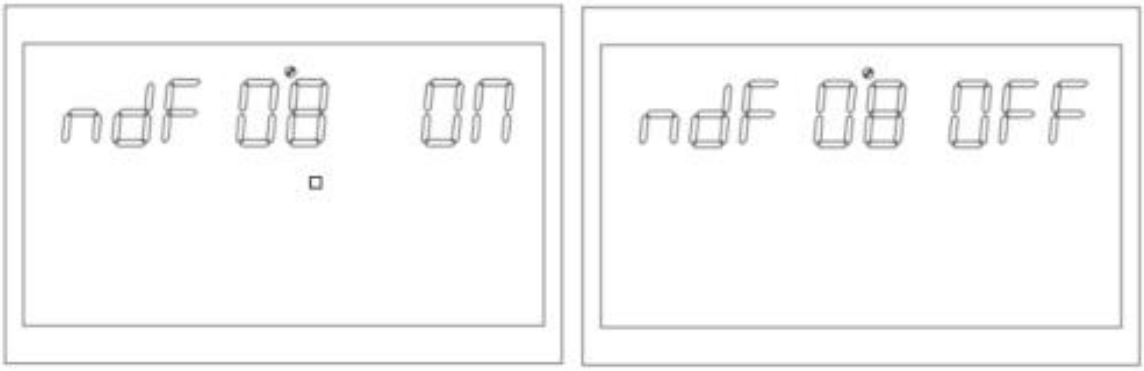


Figure 4.6-8 Return to the main page setup page

Function description: Return to the main interface for setting.

Setting condition: All states can be set.

Description:

The default setting is ON; if ON is set during the function setting operation, the page is not in the first interface (P1) at this time, and it will return to the first interface after 1min; if OFF is set, the LCD will remain in this interface if the page is not in the first interface (P1) at this time.

4.6.2.8 Overload Restart (LrS)

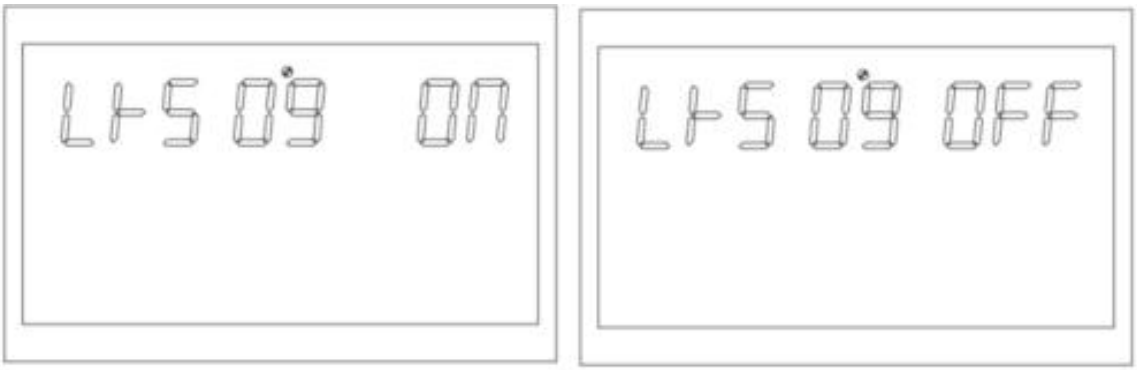


Figure 4.6-9 Overload restart setting page

Function: Overload restart setting.

Setting condition: All states can be set.

Description:

The default setting of overload restart is ON.

4.6.2.9 Thermal Restart (TrS)

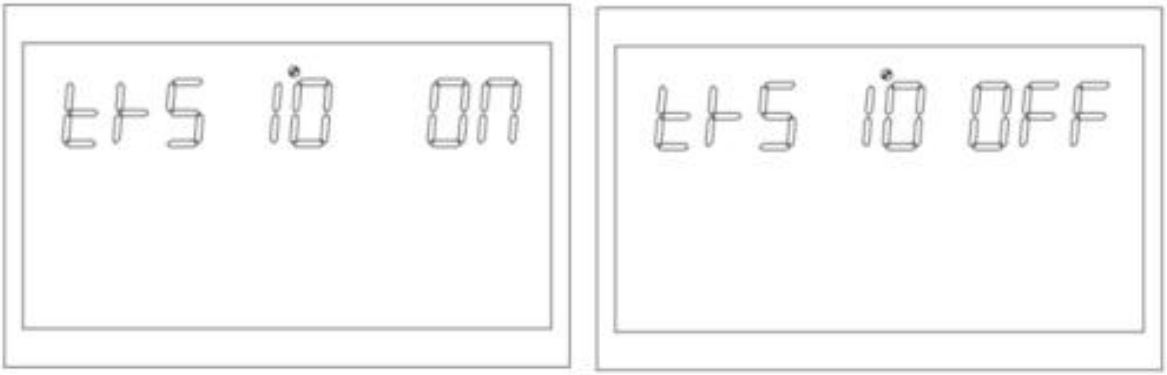


Figure 4.6-10 Thermal restart setting page

Function description: Over-temperature restart setting.

Setting condition: All states can be set.

Description:

The default setting of over-temperature restart is ON.

4.6.2.10 Main Input Power-down Alarm (MIP)

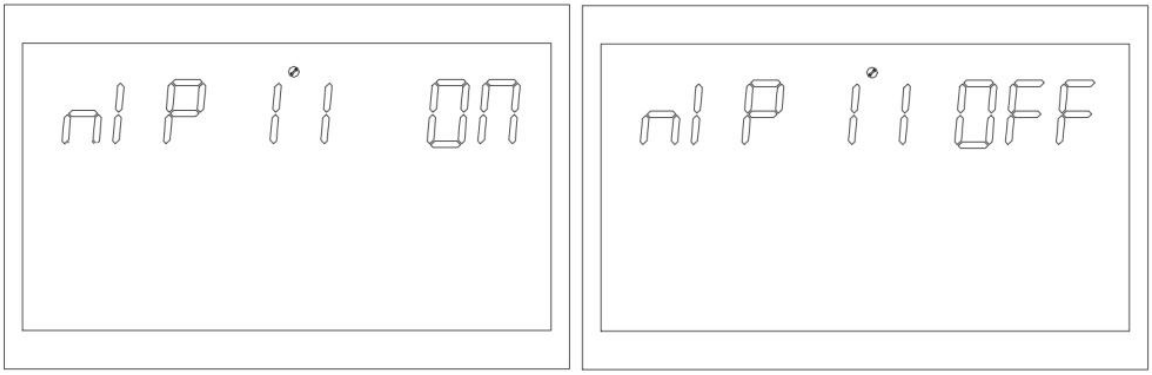


Figure 4.6-11 Main input power-down alarm setting page

Function setting: Setting of long alarm for utility power or PV loss.

Setting condition: All states can be set, default is ON, utility or PV loss alarm will sound for a long time. It can be set to OFF.

(All modes can be set)

Description:

MIP: Main Input cut warning

Default setting is ON, the buzzer will be beeping for 3s after the loss of main input is detected; setting OFF, the buzzer will not be beeping after the loss of main input.

4.6.2.11 Power Saving Mode (PWS)

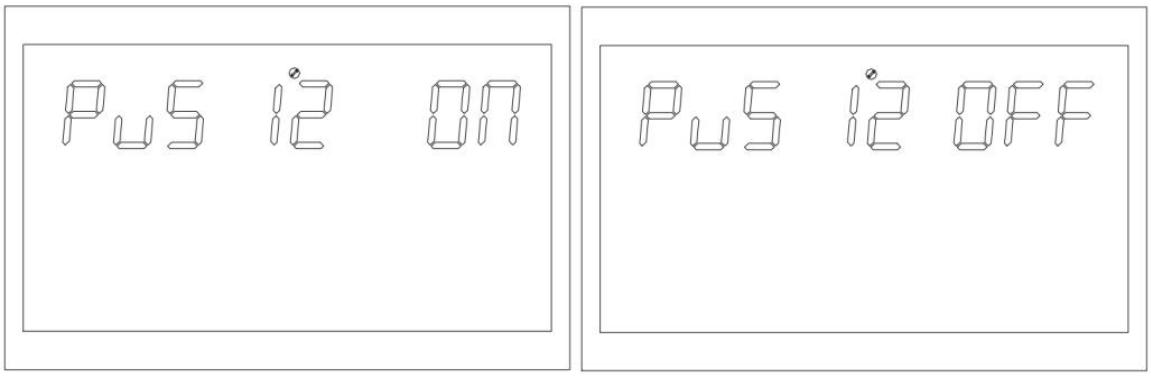


Figure 4.6-12 Power saving mode setting screen

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

Setting condition: Can be set in stand-alone operation mode (see 1.4.2.26).

Description:

PWS: Power saving

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

4.6.2.12 Overload to Bypass (OLG)

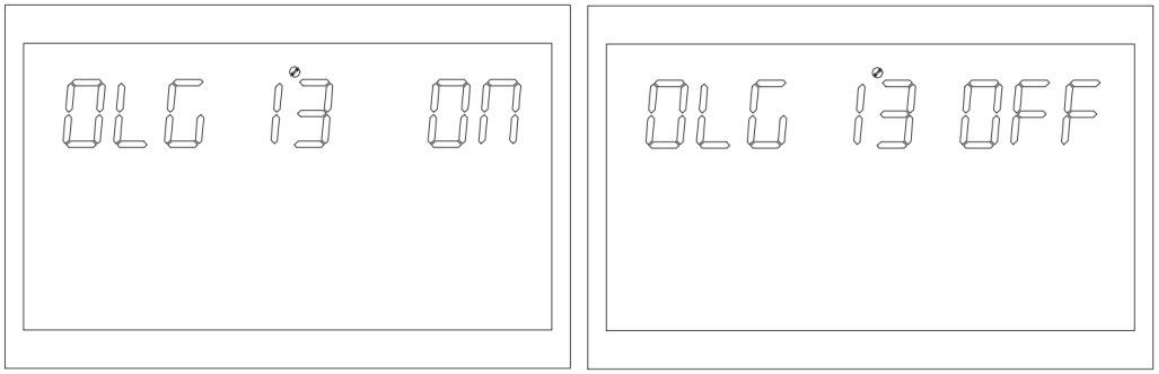


Figure 4.6-13 Overload to bypass setting page

Function description: When the battery mode is overloaded, set whether to immediately transfer to the mains mode (also known as bypass mode).

Setting condition: All states can be set.

Description:

OLG: Overload to bypass

Default setting is OFF, the function is not turned on; when set to ON, in case of PV priority output with load, if it is overloaded, the system will turn to bypass (utility output, also known as bypass mode) immediately.

4.6.2.13 Mute Setup (MUE)

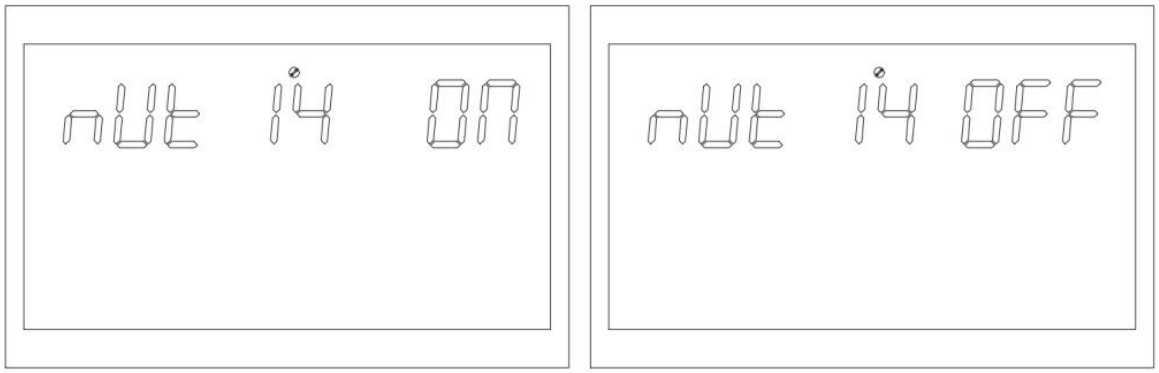


Figure 4.6-14 Mute setting screen

Function setting: Set whether the buzzer sounds or not.

Setting condition: All states can be set.

Description:

MUE: Mute

Default setting is OFF, the function is not turned on; when it is set to ON, the buzzer does not sound in any situation, alarm, fault and other states.

All modes can be set and the function is normal, the picture can not be shown.

4.6.2.14 Battery to Mains Voltage Point (BTG)

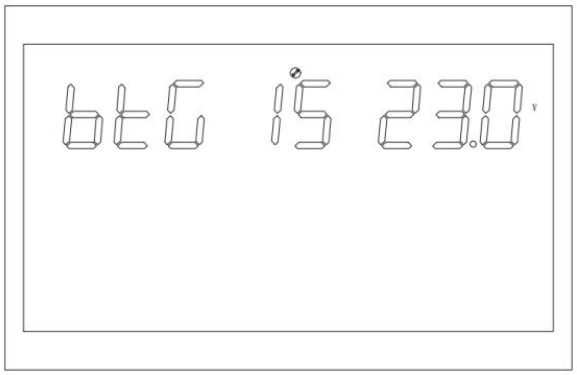


Figure 4.6-15 Battery to mains voltage point setting page

Function description: When the battery utility exists at the same time, the battery will be discharged to the utility at a certain voltage to ensure that the battery will not be discharged.

Setting condition: All states can be set, the output priority should be set in PV and PBG mode.

Description:

BTG: Back to grid

3K-VML-24V/3K-VP-24V initial default setting is 23V

5K-VMH-48V initial default setting is 46V

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

3K-VML-24V/3K-VP-24V possible range [22,26]

5K-VMH-48V possible range [44,52]

When the battery definition mode is LIB (lithium battery type) mode:
3K-VML-24V/3K-VP-24V initial default setting is 23.8V, possible range [20,25]
5K-VMH-48V initial default setting is 47.6V, possible range [40,50]

4.6.2.15 Transfer Back to Battery Mode Voltage Points (BTB)

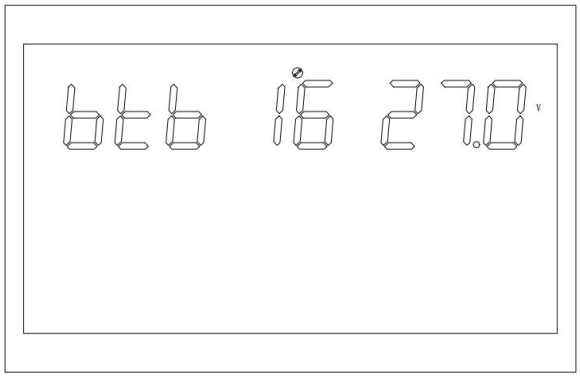


Figure 4.6-16 Utility to battery voltage point setup page

Function description: After the battery is turned off with low voltage, it needs to reach a certain battery voltage value to turn on the battery mode again.

Setting condition: All states can be set.

Description:

BTB:Back to battery

3k-VML-24V/3K-VP-24V initial default setting is 26V

5k-VMH-48V initial default setting is 52V

When set to FUL, the battery will charge until it is fully charged before it can be turned back on in battery mode.

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

3k-VML-24V/3K-VP-24V possible range [24,29] (When the set value Vbtb > TCFV-1V, the point of switching back to battery mode voltage remains TCFV-1V), in case the output priority is set to photovoltaic (PV) priority output or photovoltaic battery mains (PBG) output, if it is not at this time in battery mode, if the battery voltage is higher than TCFV-1V, the system will switch back to battery mode.

5k-VMH-48V possible range [48,58] (same logic as above)

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

3k-VML-24V/3K-VP-24V default setting 27.2V, possible range [23,29] (same logic as above)

5k-VMH-48V default setting 54.4V, possible range [46,58] (same logic as above)

4.6.2.16 Battery Type (BAT)

Figure 4.6-17 Battery type setting page

Function: Battery type setting function.
Setting conditions: All states can be set.

4.6.2.17 Battery Low Voltage Point (bAL)

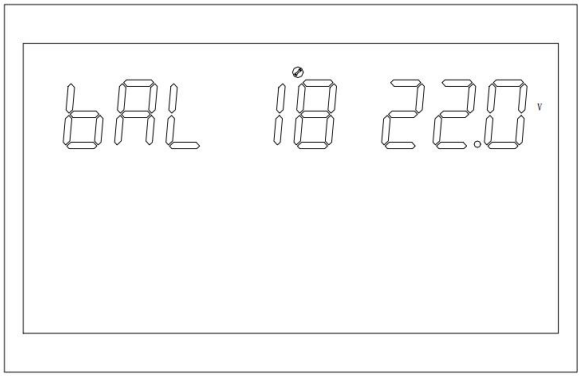


Figure 4.6-18 Battery low voltage point setting page

Function setting: Low voltage alarm point setting.
Setting condition: All states can be set.
Description:
bAL: Battery low
3k-VML-24V/3K-VP-24V initial default setting is 21.6V
5k-VMH-48V initial default setting is 44V

The battery low voltage point can be modified when the battery type is set to CUS (customer setting type).
3k-VML-24V/3K-VP-24V, possible range [21,27]
5k-VMH-48V, possible range [42,54]

The battery low voltage point can be modified when the battery type is set to LIB (lithium battery type).
3K-VML-24V/3K-VP-24V default setting 23.8V, possible range [20.6,25.0]
5K-VMH-48V default setting 47.6V, possible range [41.2,50.0]

4.6.2.18 Battery shutdown point (bAU)

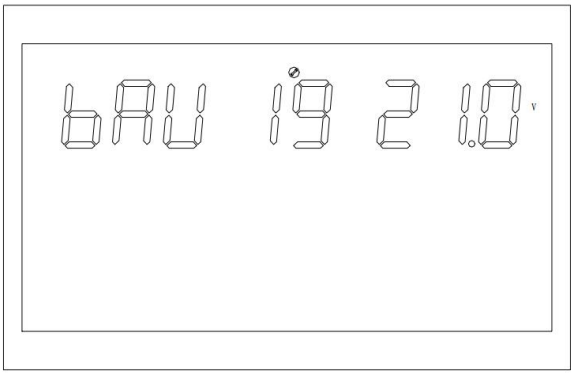


Figure 4.6-19 Battery shutdown point setting page

Function: Battery low voltage shutdown point setting function.
Setting condition: All states can be set.
Description:
bAU: Battery under
3k-VML-24V/3K-VP-24V initial default setting is 21V
5k-VMH-48V initial default setting is 42V

The battery shutdown point can be modified when the battery type is set to CUS (customer setting type).
3k-VML-24V/3K-VP-24V possible range [20,24]
5k-VMH-48V possible range [40,48]

The battery shutdown point can be modified when the battery type is set to LIB (lithium battery type).
3k-VML-24V/3K-VP-24V default setting 23V, possible range [20,24]
5k-VMH-48V default setting 46V, possible range [40,48]

4.6.2.19 Constant Voltage Mode Voltage Point Setting (bCV)

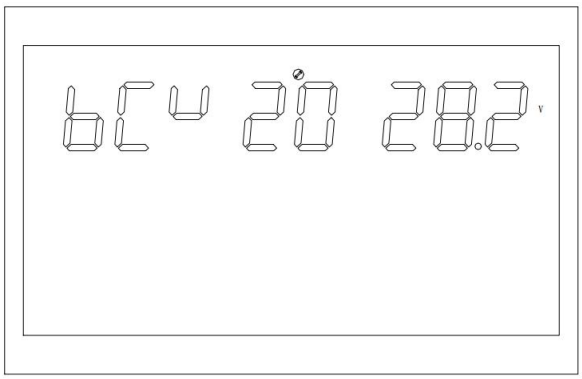


Figure 4.6-20 Constant voltage mode voltage point setting page

Function description: Constant voltage point setting function.

Setting condition: All states can be set .

Description:

bCV: Battery constant voltage

3k-VML-24V/3K-VP-24V initial default setting is 28.2V (AGM), 29V (FLD)

5k-VMH-48V initial default setting is 56.4V (AGM), 58V (FLD)

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

3k-VML-24V/3K-VP-24V possible range [24,29]. The constant voltage point voltage needs to be greater than the float point voltage.

5k-VMH-48V possible range [48,60]. The constant voltage point voltage needs to be greater than the float point voltage.

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

3k-VML-24V/3K-VP-24V default setting 28.2, possible range [25,29]. The constant voltage point voltage needs to be greater than the float point voltage.

5k-VMH-48V default setting 56.4, possible range [48,60]. The constant voltage point voltage needs to be greater than the float point voltage.

4.6.2.20 Float Charge Mode Voltage Point Setting (bFL)

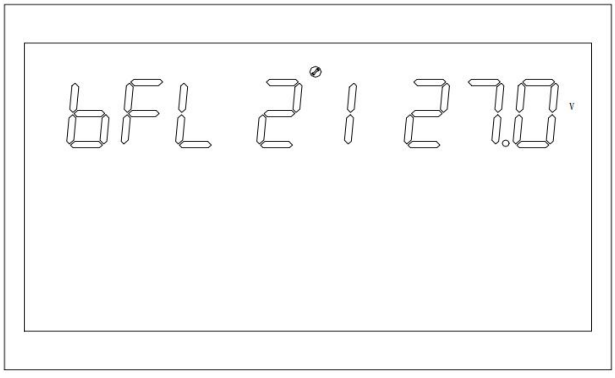


Figure 4.6-21 Float charge mode voltage point setting page

Function: Float charge voltage point setting function.

Setting condition: All states can be set.

Description:

bFL: Battery float

3K-VML-24V/3K-VP-24V initial default setting is 27V

5k-VMH-48V initial default setting is 54V

Battery type set to CUS (customer setup type) modifies the battery float point.

3K-VML-24V/3K-VP-24V possible range [26.6,27.8]. The constant voltage point voltage needs to be greater than the float point voltage.

5k-VMH-48V possible range [48,60]. The constant voltage point voltage needs to be greater than the float point voltage.

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

3K-VML-24V/3K-VP-24V default setting 27.6V， possible range [24,28]. The constant voltage point voltage needs to be greater than the float point voltage.

5k-VMH-48V default setting 55.2V， possible range [50,58]. The constant voltage point voltage needs to be greater than the float point voltage.

4.6.2.21 Utility Low Voltage Point Setting (LLV)

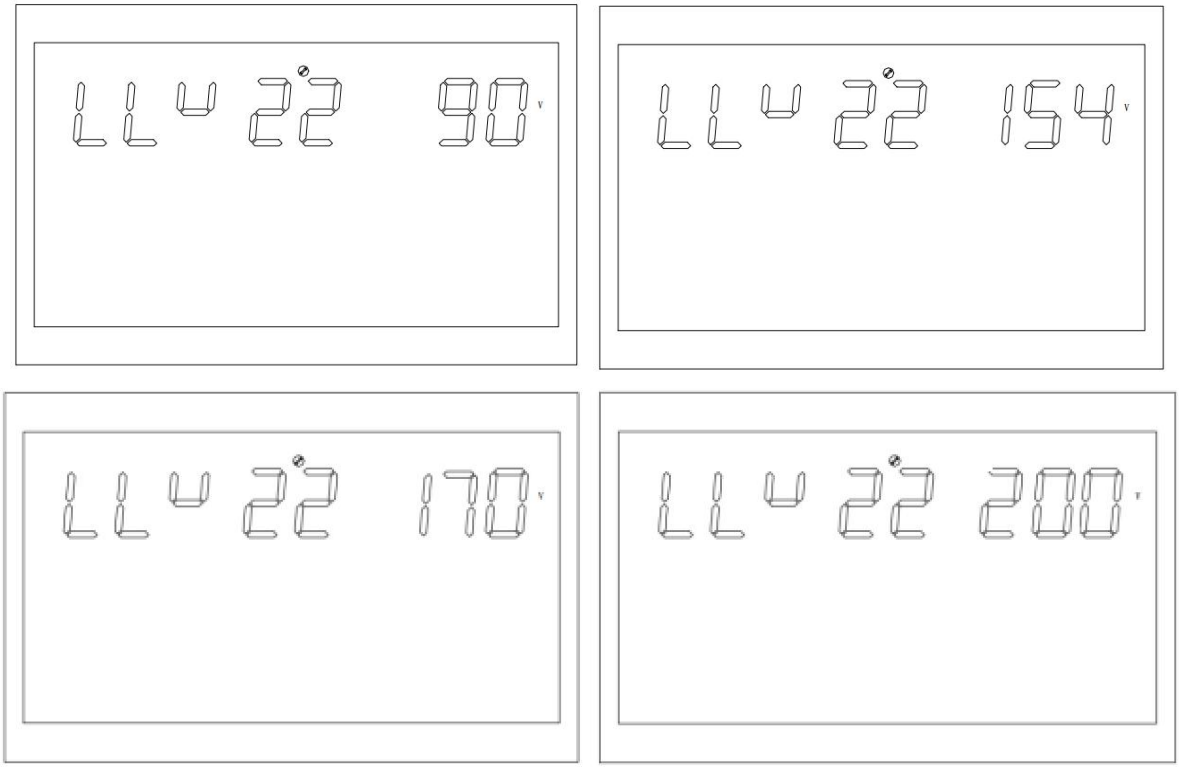


Figure 4.6-22 Inverter mode utility low voltage point setting page

Function description: Set the low voltage protection point of utility power.

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

Description:

LLV: Line low voltage

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

4.6.2.22 Utility High Voltage Point Setting (LHV)

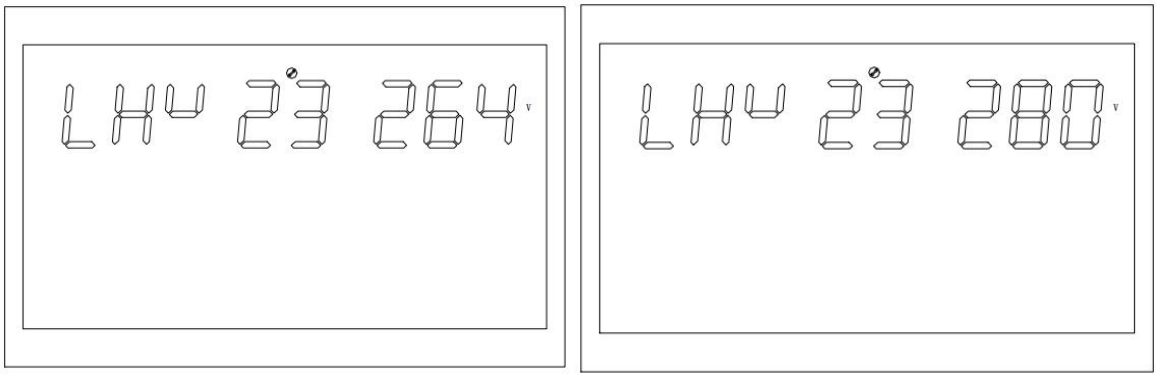


Figure 4.6-23 Inverter mode utility high voltage point setting page

Function Description: Set the utility high voltage protection point.

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

Description:

LHV: Line high voltage

Inverter mode (output mode: MOD needs to be set to APP), utility high voltage point setting, default setting 264V, possible range [264,280].

4.6.2.23 Low Power Discharge Time Setting (LWD)

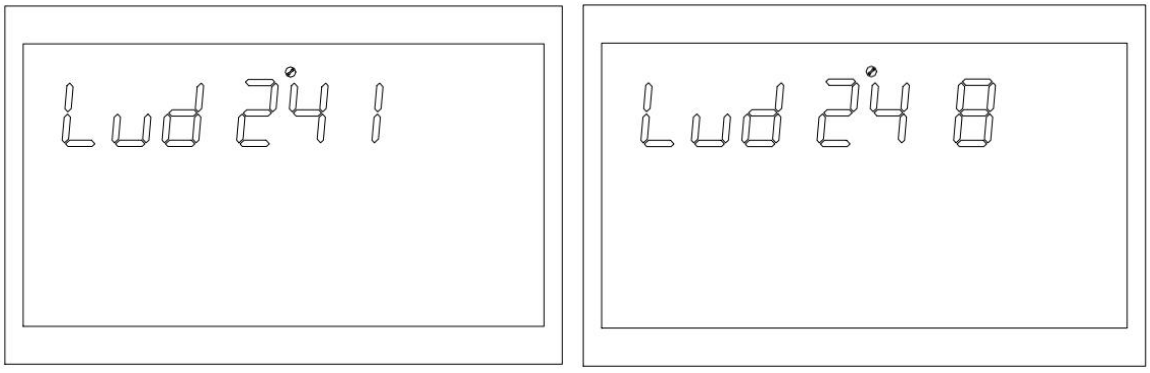


Figure 14.6-24 Low power discharge time setting screen

Function description: Low power discharge protection function, when the battery mode is in a lower load, unlimited time discharge will make the battery to be very empty, affecting the battery life. When the inverter is in low power discharge setting time, the low voltage shutdown point of 3k-VML-24V battery will be raised to 22V. 5k-VMH-48V battery will be raised to 44V.

Setting conditions: Inverter settings are set for all states in APP mode.

Description:

LWD: Low watt discharge

LWD: Low watt discharge time setting in inverter mode, default setting 8 (8 hours), possible range [1, 8].

In battery mode, after the continuous discharge time exceeds 8 hours, before the battery shutdown point is reached, it will modify the battery voltage shutdown point to 11V* number of battery sections, and the battery will then be discharged to reach the 11V* number of battery sections voltage, the system will alarm for 1 minute and then shutdown again.

When the battery voltage exceeds 13.2V* number of cells for more than 30s, the battery discharge time will be reset.

4.6.2.24 Inverter Soft-Rise Setting (SRE)

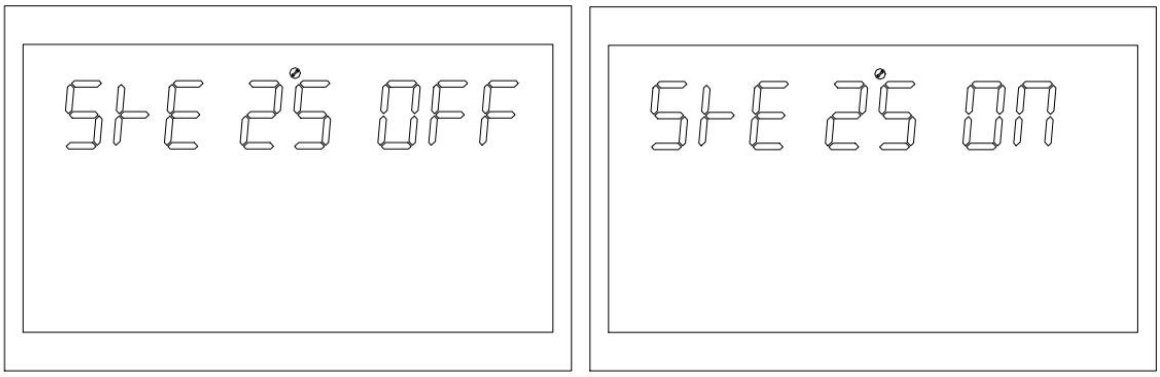


Figure 4.6-25 Inverter soft-rise setting page

Function description: When this interface is ON, the inverter output gradually increases from 0 to the target voltage value. When this interface is OFF, the inverter output is directly increased from 0 to the target voltage value.

Setting condition: It can be set in stand-alone operation mode (see 1.4.2.26).

Description:

SRE: Soft relay enable

The default setting is OFF, the inverter voltage will not close the output switch until after it has risen to the rated output. If set to ON, the output switch will be closed before the inverter starts to ramp up.

4.6.2.25 Default Value Setting (STD)

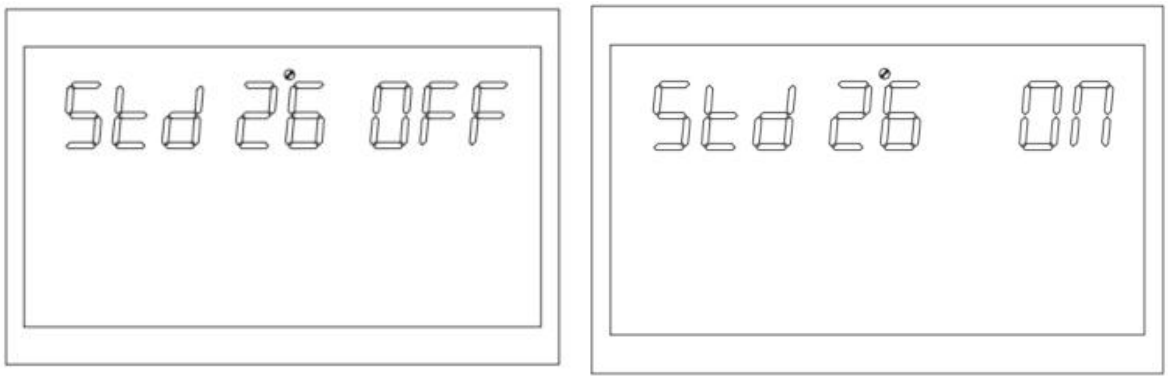


Figure 4.6-26 Default value setting screen

Function description: Restore all setting values, to the default values.

Setting conditions: Can be set in mains mode and standby (StandBy: no output but bright screen state). And cannot be set in Battery mode.

Description:

STD: Set default

This interface shows OFF before setting, when setting ON, the system will restore the default setting. When the setting is completed, this interface will show OFF again.

The mains and standby modes can be set and take effect immediately, while the battery mode cannot be set and cannot be displayed in the picture.

4.6.2.26 Battery Not Answered Alarm (SBA)

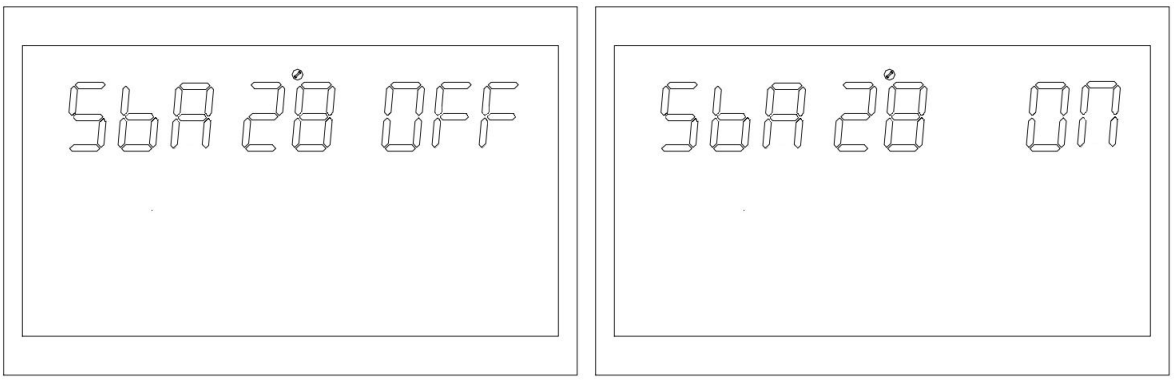


Figure 4.6-27 Default value setting screen

Function setting: Set to turn on the battery not connected alarm.

Setting condition: All states can be set.

Description:

SBA: Set battery alarm.

The default setting is OFF.

Set to OFF, when the battery is not connected, there will be no battery not connected, battery low voltage, battery under voltage alarm.

5K-VMH-48V can be set in stand-alone operation mode, other models cannot be set.

4.6.2.27 Equalization Mode (EQM)

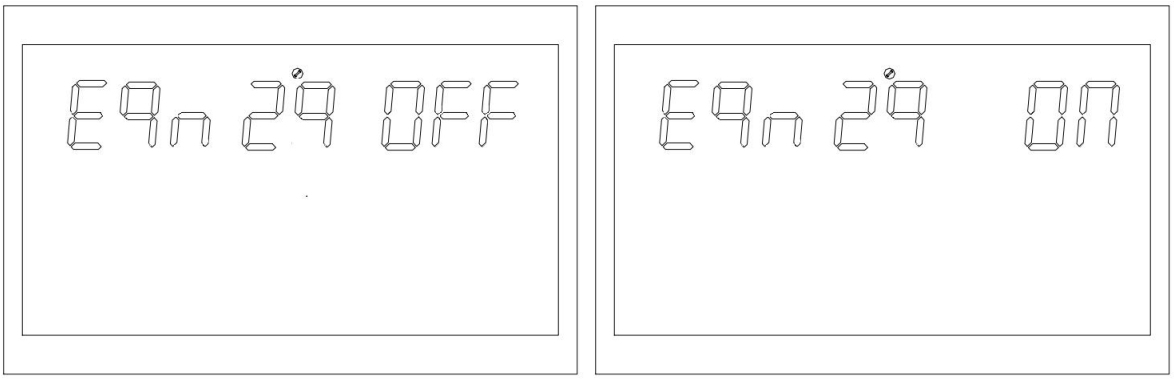


Figure 4.6-28 Equalization mode setting page

Function setting: Set whether the inverter enables equalization mode.

Setting condition: All states can be set.

Description:

EQM: Equalization mode

The default setting is OFF, the function is not enabled; set to ON, the controller will start to enter the equalization phase when the float charging phase reaches the set equalization interval (battery equalization cycle), or the equalization is activated immediately.

4.6.2.28 Equalizing Voltage Point Setting (EQV)

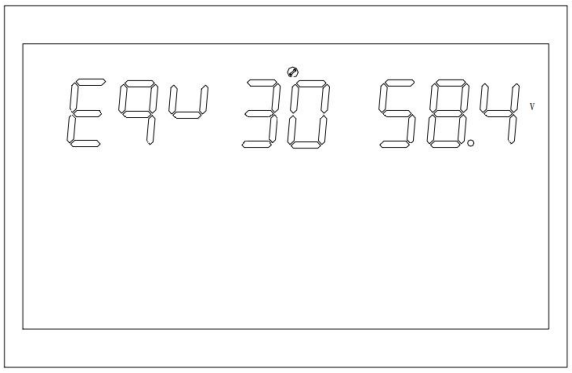


Figure 4.6-29 Equalizing voltage point setting screen

Function: Equalize voltage point setting function.

Setting condition: All states can be set.

Description:

bCV: Equalization voltage

All modes can be set.

3k-VML-24V/3k-VP-24V Default setting is 29.2, settable range is [25,31.5].

5k-VMH-48V The default setting is 58.4, and the settable range is [48,60].

4.6.2.29 Equalize Charging Time Setting (EQT)

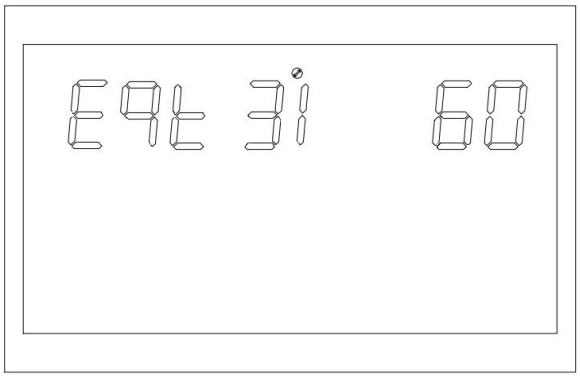


Figure 4.6-30 Equalizing charging time setting page

Function description: Equalize charging time setting.

Setting condition: All states can be set.

Description:

EQT: Equalization time

During the equalization phase, the controller will charge the battery as much as possible until the battery voltage rises to the battery equalization voltage. Then constant voltage regulation is used to keep the battery voltage at the equalization voltage. The battery will remain in the equalization phase until the set battery equalization time is reached.

The default setting is 60 minutes and can be set in the range of [5,900] in increments of 5 minutes per setting.

4.6.2.30 Equalizing Delay Time Setting (EQO)

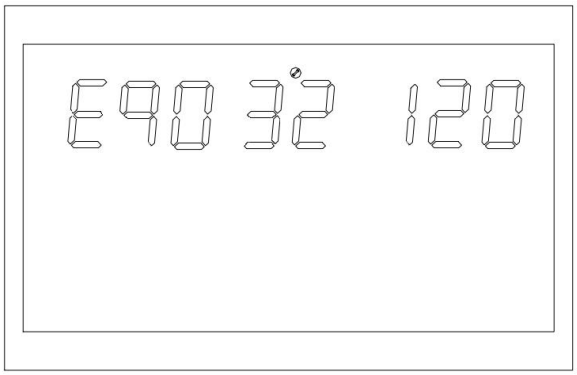


Figure 4.6-31 Equalization delay time setting screen

Function description: Equalization delay charging time setting.

Setting condition: All states can be set.

Description:

EQT: Equalization timeout

During the equalization phase, when the battery equalization time expires and the battery voltage does not rise to the battery equalization voltage point, the charge controller will extend the battery equalization time until the battery voltage reaches the battery equalization voltage. When the battery equalization timeout is set to expire and the battery voltage is still lower than the battery equalization voltage, the charge controller will stop equalization and return to float charging stage.

The default setting is 120 minutes, and the settable range is [5,900], each setting increment is 5 minutes.

4.6.2.31 Equalization Interval Setting (EQI)

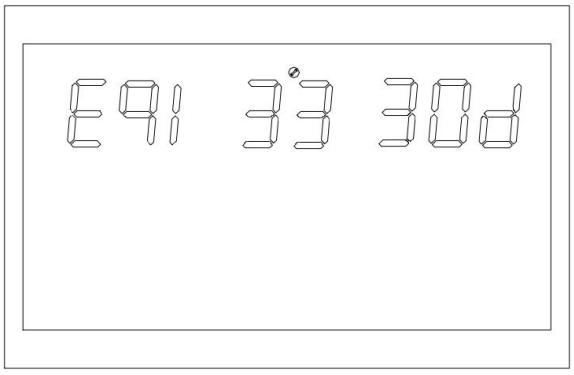


Figure 4.6-32 Equalization interval setting screen

Function description: Equalize charging interval setting.

Setting condition: All states can be set.

Description:

EQI: Equalization interval

When battery access is detected during the float charging phase with equalization mode on, the controller will start to enter the equalization phase when the set equalization interval (battery equalization cycle) is reached.

The default setting is 30 days, and the settable range is [1,90] with an increment of 1 day per setting.

4.6.2.32 Grid-tie Inverter Function (GTI)

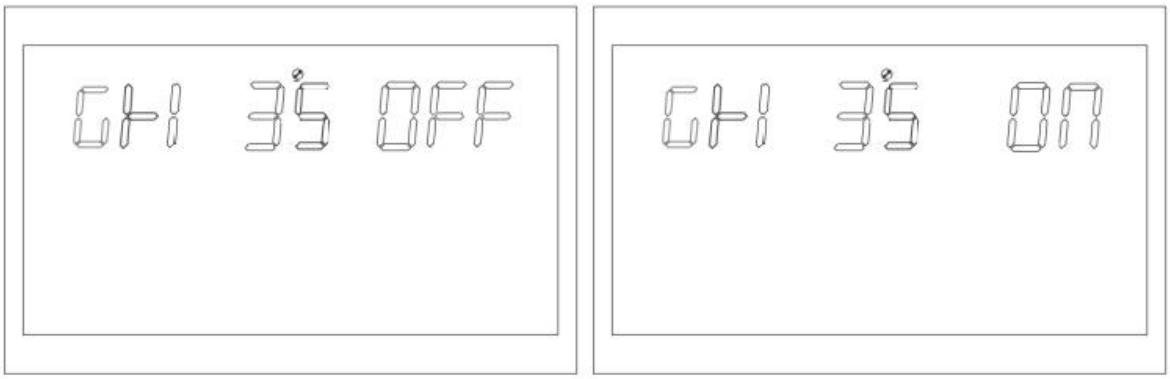


Figure 4.6-33 Grid-tie inverter function setting page

Function description: Set whether the inverter is grid-connected feeder in PV priority utility mode or PBG utility mode.

Setting condition: All states can be set.

Description:

GTI: Grid tie invert

The default setting is OFF, the function is not on; when set to ON, the inverter feeds excess energy into the utility by performing maximum power point tracking.

4.6.2.33 BMS Communication Function (BMS)

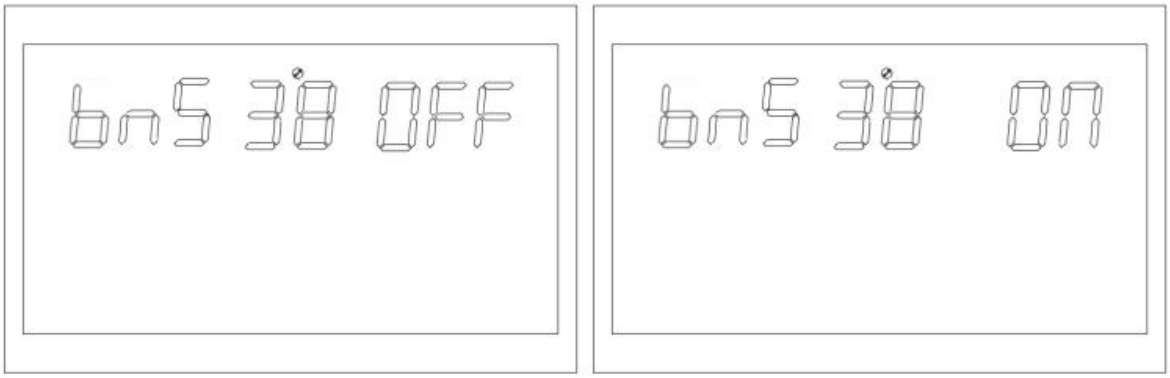


Figure 4.6-34 BMS management function setup screen

Function setting: Set whether the inverter communicates with lithium battery BMS.

Setting condition: All states can be set.

Description:

BMS: Battery manage system

Default setting is OFF, the function is not turned on; when it is set to ON, the inverter communicates with Li-ion battery BMS through the centralized centralized control board and obtains battery information.

When the function is ON, if communication abnormality occurs, alarm 56 will be generated and the inverter will no longer decide the operation logic based on the BMS information.

4.6.2.34 Low SOC Shutdown Function (SBU)

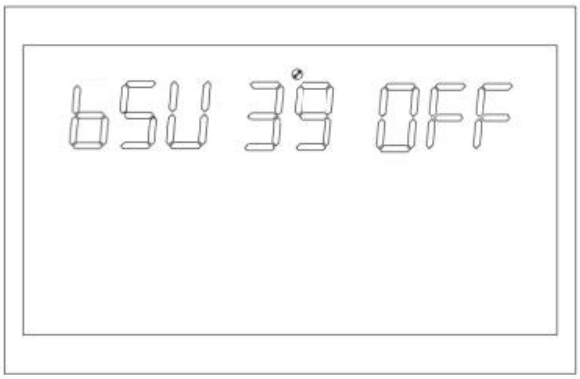


Figure 4.6-35 Low SOC shutdown function setting page

Function setting: Set the inverter to shut down at low SOC.

Setting condition: All states can be set.

Description:

BSU: Battery SOC under lock

Default setting is 20, settable range is [5,50]. Battery mode Li-ion battery SOC under lock is shut down when it reaches the set value, at the same time alarm 68, clear alarm 68 when it returns to the set value + 5%. standby, it reaches the set value + 10% to transfer to battery mode, alarm 69 when it is not yet reached. when the function is ON, Li-ion battery SOC under lock is alarm 69 when it reaches the set value + 5%, clear alarm 69 when it returns to the set value + 10%.

It can be set to OFF, at this time, the inverter no longer performs shutdown, startup and alarm operation according to the SOC situation.

After the function is turned on, if communication abnormality occurs, the inverter no longer decides the operation logic according to the SOC information and clears the related alarms.

4.6.2.35 High SOC to Battery Function (STB)

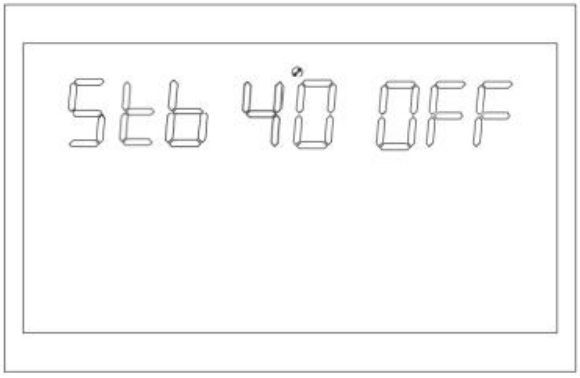


Figure 4.6-36 High SOC to battery function setup page

Function setting: Set inverter to battery mode SOC value.

Setting condition: All states can be set.

Description:

STG: Battery SOC turn to battery mode.

Default setting is 90, settable range is [10,100].PBG Priority Utility Normal Utility mode Li-ion battery SOC switch to battery mode when SOC reaches the set value. When it is ON, the inverter will switch to battery mode when SOC is higher than the set point and battery voltage is higher than the voltage point of switching back to battery mode (see 1.4.2.15).

It can be set to OFF, at which time the inverter will no longer cut the battery mode in mains mode according to the SOC.

After the function is turned ON, if communication abnormality occurs, the inverter no longer decides the operation logic according to the SOC information and clears the related alarms.

4.6.2.36 Low SOC to Utility Function (STG)

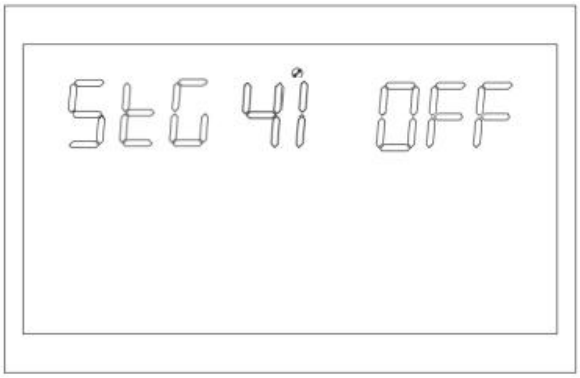


Figure 4.6-37 Low SOC to utility function setup page

Function setting: Set the inverter to mains mode SOC value.

Setting condition: All states can be set.

Description:

STG: Battery SOC turn to grid mode.

Default setting is 50, settable range is [10,90].PBG Priority Utility Normal Battery mode Li-ion battery SOC switch to utility mode when SOC reaches the set value. When it is ON, the inverter will switch to utility mode when SOC is lower than the set point or when the battery voltage is lower than the point of switching back to utility voltage (see 1.4.2.14).

It can be set to OFF, at this time, the inverter will no longer switch from battery mode to mains mode according to the SOC condition.

After the function is turned on, if communication abnormality occurs, the inverter no longer decides the operation logic according to the SOC information and clears the related alarms.

When this setting is higher than the STB point, STB and STG are no longer effective after the next effective time.

4.7 Description of Faults and Alarms

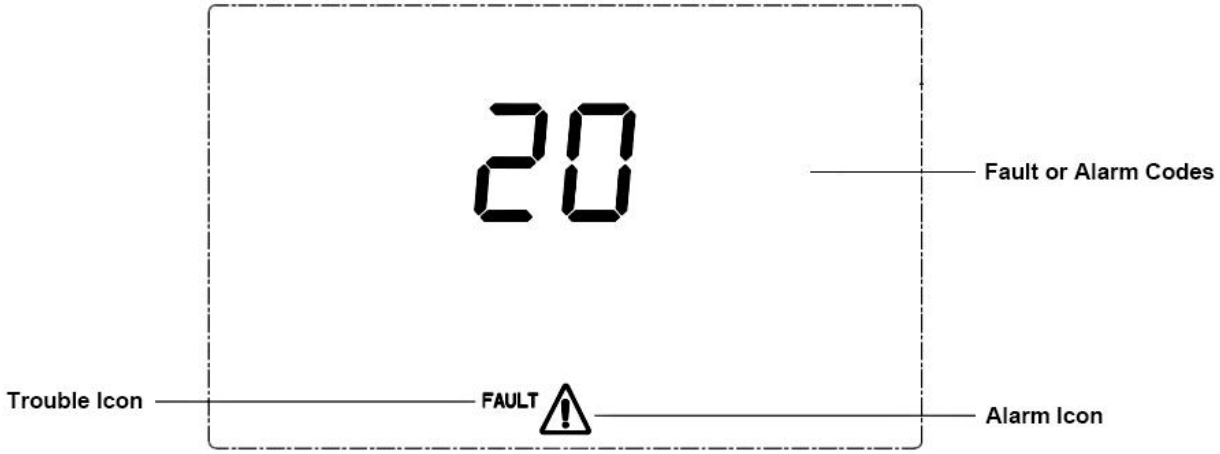


Figure 4.7-1 Fault and alarm icons

Function description: Alarm code ALA flashing and buzzer 1s a sound, continued for 1 minute to stop. Fault indicator code is always on, the buzzer stops after 10S long beeping, the fault is eliminated after stopping, try to restart the machine, six restart failures, it continues to be in the fault state. Need to completely power off (rest screen) or wait 30 minutes, before you can restart the machine.

Fault and alarm LCD display as shown in the above figure, fault mode fault icon long light, alarm state alarm icon flashing, according to the fault information to contact the manufacturer to troubleshoot abnormal conditions.

4.7.1 Fault Description

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

Fault code table

Alarm Codes	Connotation	Related Actions	Trigger Condition	Recovery Condition	Fault Alarms
1	Bus Soft Start Fail	Failover mode	Set voltage cannot be reached during busbar soft start	Unrecoverable	Fault
2	Bus High	Failover mode	Busbar higher than set value	Unrecoverable	Fault
3	Bus Low	Failover mode	Busbar higher than set value	Unrecoverable	Fault
4	Battery Over Current	Failover mode	Immediate protection if battery current transient exceeds 580A	Unrecoverable	Fault
5	Over Temperature	Failover mode	Temperature sensor of the PFC or INV is above the over-temperature setpoint	Not recoverable after six failed failures of faulty reboot after reboot enablement	Fault
6	Battery High	Failover mode	Battery voltage higher than set value	Recoverable	Fault
7	Bus Soft Fault	Failover mode	DC soft start voltage for busbar not at set value	Unrecoverable	Fault

8	Bus Short Fault	Failover mode	Busbar momentarily below set value during normal operation	Unrecoverable	Fault
9	INV Soft Fault	Failover mode	Inverter still can't reach rated output voltage after a period of time of soft starting	Unrecoverable	Fault
10	INV Over Voltage	Failover mode	In battery mode, the inverter voltage is higher than the set value	Unrecoverable	Fault
11	INV Under Voltage	Failover mode	In battery mode, the inverter voltage is lower than the set value	Unrecoverable	Fault
12	INV Short	Failover mode	Inverter voltage is instantly lower than the set value, current is instantly higher than the set value	Unrecoverable after six failed fault reboots	Fault
13	Negative Power	Failover mode	Inverter power is less than the set value for a period of time	Unrecoverable	Fault
14	Overload Fault	Failover mode	Load is out of specification	Not recoverable after six failed failures of faulty reboot after reboot enablement	Fault
15	Model Fault	Failover mode	Software recognition of machine model does not match hardware detection	Unrecoverable	Fault
16	No Boot Loader	Failover mode	No boot program	Unrecoverable	Fault
17	Panel Flash Fault	Failover mode	VML model is burning PV control program	Recovery after burn-in	Fault
19	Same Serial	Failover mode	In parallel mode, multiple machines with the same serial number are detected	Unrecoverable	Fault
20	CAN Fault	Failover mode	In parallel mode, CAN bus communication is abnormal	Unrecoverable	Fault
21	BAT Volt Different	Failover mode	In parallel mode, the battery pressure difference between different machines is too large	Unrecoverable	Fault
22	Line Volt Different	Failover mode	Excessive input voltage difference between different machines in parallel mode	Unrecoverable	Fault
23	Line Freq Different	Failover mode	In parallel mode, the frequency difference of input voltage of different machines is too large	Unrecoverable	Fault
24	Output Config Different	Failover mode	In three-phase parallel mode, the parallel mode settings of different machines are out of phase,	Set to single-phase operation and disconnect parallel	Fault

			or there are both three-phase and single-phase parallel machines, or there is a single machine mode	communication, or resume when the three-phase operation setting condition is satisfied, or when the single-phase parallel setting condition is satisfied	
25	Output Syn Loss	Failover mode	Output voltage detection is out of synchronization in parallel mode	Unrecoverable	Fault
26	BMS Fault	Failover mode	Battery BMS has a fault message	Turn off BMS communication function, or BMS fault elimination recovery	Fault

4.7.2 Alarm Description

Alarm: The inverter does not enter the fault mode, the LED blinks red, and the LCD displays the alarm code.

Alarm code table

Alarm Codes	Connotation	Related Actions	Trigger Condition	Recovery Condition	Fault Alarms
50	Battery Open	Alarm, battery not charging	Battery voltage below 8V/cell	Recoverable (10V/cell)	Fault
51	Battery Under	Alarm, battery low voltage shutdown or no hair power on	Battery voltage below 10.5V/cell (default)	Recoverable (10V/cel+0.2* N (number of cells))	Fault
52	Battery Low	Alarm	Depends on bAL settings	Recoverable (action point +0.2V/section)	Fault
53	Battery Charge Short	Alarm, battery not charging	Battery voltage less than 5V and charging current more than 4A	Unrecoverable	Fault
54	Low Watt Discharge	Alarm	Battery discharge exceeds set low power discharge time	(Action point +0.2V/section)	Fault
55	Over Charge	Alarm, battery not charging	Battery voltage is higher than the set value	Recoverable	Fault
56	BMS Loss	Alarm, lockout Standby Mode	Communication failure after BMS communication function is turned on	Recoverable	Fault
57	Over Temperature	Alarm, battery not charging	Temperature sensor of PFC or INV is higher than set value	Temperature sensor of PFC or INV is below the set value	Fault
58	Fan Lock	Alarm, if one of the fans fails, the other fan spins at full speed	Fan speed signal is not detected	Recoverable	Fault
59	EEPROM Fail	Alarm	EEPROM read/write failure	Unrecoverable	Fault

60	Overload Warning	Alarm, battery not charging	Load >102%	Recoverable (load<97%)	Fault
61	Abnormal Generator Waveform	Alarm, continuous operation in battery mode	Abnormal generator waveform detection	Recoverable	Fault
62	PV Energy Weak	Turns off PV output and charging	Bus voltage lower than set value when battery not connected	Recover in 10mins	Fault
63	Synchronization Signal Fail	Alarm, switch to standby mode	Paralleling board disconnection fault	Switching to Standalone Mode Recovery Disconnected Troubleshooting Recovery	Fault
64	Parallel Configuration Incompatible	Alarm, switch to standby mode	When three-phase parallel operation, there is a missing phase setting	Recovery when three-phase setting is correct	Fault
65	Parallel Version Incompatible	Alarm, switch to standby mode	Incompatible version number in parallel system	Recovery when all machine versions in the parallel system are compatible with each other	Fault
66	Parallel Communication Fault	Alarm, switch to standby mode	Slave not detected in parallel system	Recovery after detecting a slave machine in a parallel system, or recovery in stand-alone mode	Fault
67	Parallel Line Differ	Alarm	Parallel machine each machine mains voltage or frequency error is too large	Resumes when the mains voltage and frequency error of each machine are detected to be reasonable	Fault
68	SOC Under	Alarm, switch to standby mode	Li-ion battery SOC below set value	Recover when the low SOC shutdown function is turned off, the BMS communication function is turned off, or the SOC recovers to +5% of the set value	Fault

69	SOC Low	Alarm, if in standby mode, maintains standby mode without powering up	Li-ion battery SOC below set value + 5% (mains mode or battery mode), below set value + 10% (standby mode)	Recover when the low SOC shutdown function is turned off, the BMS communication function is turned off, or the SOC recovers to +10% of the set value	Fault

The pictures or diagrams in this manual are for reference only, please refer to the actual product, and the content is subject to change without notice.

5. Routine Maintenance

5.1 Maintenance Plan

♦ Check if wire connections are loose.
♦ Check if cables are aged/damaged.
♦ Check if cable insulating ribbon drops.
♦ Check if cable terminal is loose, any overheat sign.
♦ Check if ground connection is good.

5.1.1 Operating Environment

(Every six months)

Carefully observe whether the battery system equipment is ineffective or damaged; When the system is running, listen to any part of the system for abnormal noise;

Check whether the voltage, temperature and other parameters of the battery and other equipment parameters are normal during system operation;

5.1.2 Equipment Cleaning

(Every six months to one year, depending on the site environment and dust content, etc.)Ensure that the ground is clean and tidy, keep the maintenance access route unblocked,and ensure that the warning and guiding signs are clear and intact.

Monitor the temperature of the battery module and clean the battery module if necessary.

5.1.3 Cable, Terminal and Equipment Inspection

(Every six months to one year)

♦ Check if the cable connections are loose.
♦ Check whether the cables are aged / damaged.
♦ Check whether the cable tie of the cable has fallen off.
♦ Check if the cable terminal screws are loose and the terminal position has any signs ofoverheating.
♦ Check whether the management system of the system equipment, monitoring system and other related equipment are invalid or damaged.
♦ Check that the grounding of the equipment is good and the grounding resistance is less than 10 ohms.

5.2 Notes

After the equipment is out of operation, please pay attention to following notes while maintaining :

♦ Related safety standards and specifications should be followed in operation and maintenance.

♦ Disconnect all the electrical connections so that the equipment would not be powered on.

♦ Wait at least 5 minutes after disconnection, so that the residual voltage of the capacitors drops to a safe voltage. Use a multimeter to make sure that the equipment is completely discharged.

♦ The equipment should be repaired by professional staff only and it is strictly forbidden for maintenance staff to open equipment modules on their own.

♦ Appropriate protective measures should be taken while maintaining, such as insulated gloves, shoes, and anti -noise ear plugs.

♦ Life is priceless. Make sure no one would get hurt first.

♦ In case of a deep discharge, the battery must be charged to a SOC rate of 30% to 50% if the entire system is static (ie the battery has not been charged for two weeks or more).

Please contact us in time if there are any conditions that could not be explained in the manual.

6. Quality Assurance

When product faults occur during the warranty period, factory or his partner will provide free service or replace the product with a new one.

Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, factory has the right to refuse to honor the quality guarantee.

Conditions

♦ After replacement, unqualifified products shall be processed by factory.

♦ The customer shall give manufacturer or his partner a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, manufacturer has the right to refuse to honor the quality guarantee:

♦ The free warranty period for the whole machine/components has expired.

♦ The device is damaged during transport.

♦ The device is incorrectly installed, refifitted, or used.

♦ The device operates in harsh environment, as described in this manual.

♦ The fault or damage is caused by installation, repairs, modifification, or disassembly performed by a service provider or personnel not from manufacturer or his authorized partner .

♦ The fault or damage is caused by the use of non-standard or non-manufacturer.

components or Software.

♦ The installation and use range are beyond stipulations of relevant international standards.

♦ The damage is caused by unexpected natural factors.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of manufacturer