

User Manual Of All-in-one Stackable Energy Storage

Model: ESSD-OH5-BAT5-X



(Ver.1.0.1)

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Chapter 1. Notes On This Manual

1.1 Clarification

This manual applies to the assembly, installation, commissioning and maintenance of the All-in-One Stacked Off-Grid Energy Storage Unit. It does not cover any details of peripheral equipment and accessories (e.g. photovoltaic modules) connected to this product. For information on other associated connected devices, please refer to their manuals.

Target People:

	This manual applies to a person who has received electrical training and is qualified with knowledge of the skills to build and operate this equipment. This person is competent to deal with the dangers and hazards involved in the installation of electrical equipment.
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1.2 Additional Information

Visit our official website for more product information.

1.3 Storage of instructions

Please keep this user manual in a safe place for future use. The manufacturer is not responsible for any damage or harm caused by failure to operate in the manner instructed in the manual.

1.4 Symbol Description

The icons in the following tables will appear in subsequent text and are annotated below.

	MANUAL: Please read this manual carefully before use.
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 DANGER	DANGER: This symbol indicates a dangerous situation that, if not avoided, could result in death or serious injury.
 WARNING	WARNING: This symbol indicates a dangerous situation that, if not avoided, could result in death or serious injury.
 CAUTION	CAUTION: This symbol indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.
 NOTE	NOTE: Failure to follow this warning could result in damage to the equipment.

1.5 Warning symbols

Symbols	Descriptions
	Hazardous voltage warning! This product operates at high voltages. All work on this product must be carried out as described in its documentation and by qualified tradespeople.
	Beware of the heat! This product becomes hot during operation. Do not touch this product during operation.
	Observe the operating instructions! Read this product manual before using the product. Follow all safety precautions and instructions described in the document.
	Connection points for earth protection
	Direct Current (DC)

	<p>Alternating current (AC)</p>
	<p>Danger signals! There is a risk of electric shock! Installation operations should only be carried out after the inverter has been switched off and disconnected for 5 minutes.</p>

Chapter 2. Safety and conformity

2.1 Safety instructions

Lethal high pressure, life-threatening!
High voltage is present in this equipment and on the power cord. Therefore, only authorised electricians should install and operate this equipment. Even if the equipment is disconnected, there may still be a risk of electric shock from high voltage!



DANGER

Danger of burns on housing parts!

The four sides of the housing cover and the radiator may become hot during operation. Only touch the front hood case during operation.



NOTE

PV Module & Equipment Grounding

The grounding of the photovoltaic module and this product shall be in accordance with the requirements of the ground where the equipment is to be used. And ensure that the connection to the ground is made in the correct manner for optimum protection of the system and personnel.



NOTE

Capacitor discharge current

Photovoltaic modules with higher capacity relative to ground, such as thin-film photovoltaic modules on metal substrates, can only be used if their coupling capacity does not exceed 470 nF. During the charging and discharging operation, a leakage current flows to the ground. The magnitude of the leakage current depends on the mounting method of the PV module (e.g. aluminium foil on a metal roof) and the weather (rain, snow). Generally, the leakage current will not exceed 30mA, beyond which the inverter will trigger protection and automatically disconnect from the grid.



NOTE

No one may open the device during operation!

2.2 DC and AC circuit breakers

Use DC and AC circuit breakers to safely disconnect equipment from the grid and PV inputs.

DC and AC circuit breakers shall be capable of disconnecting all conductors after ungrounded installation.

2.3 PV module grounding

This unit has a built-in transformerless isolated inverter. It is strictly forbidden to ground the PV module directly. Only the mounting frame must be earthed. Otherwise, you will receive the error message "PV ISO Low".

2.4 Qualification of skilled technicians

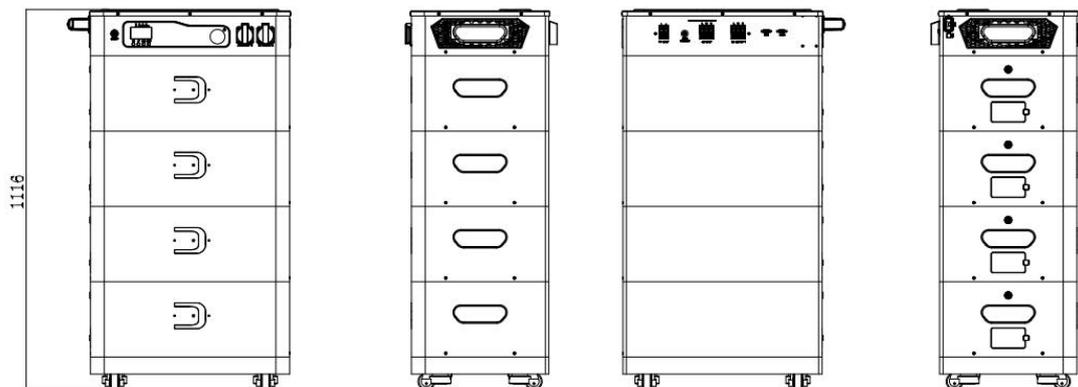
- Understand how this product works and how to operate it.
- Know how to deal with the hazards and risks associated with the installation and use of electrical equipment and devices.
- Attended training in the installation and commissioning of electrical equipment and devices.
- Familiarize yourself with all applicable standards and guidelines
- Know and follow this manual and all safety instructions.

Chapter 3. Product description

3.1 Overview of the Unit

(Model: ESSD-OH5-BAT5-X)

Product appearance (Figure 1)

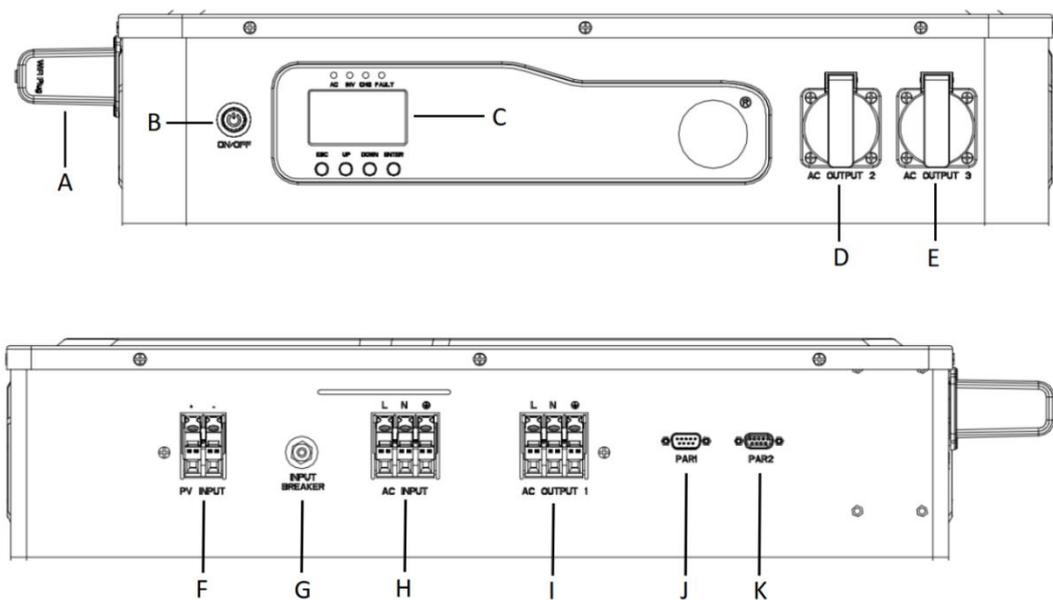


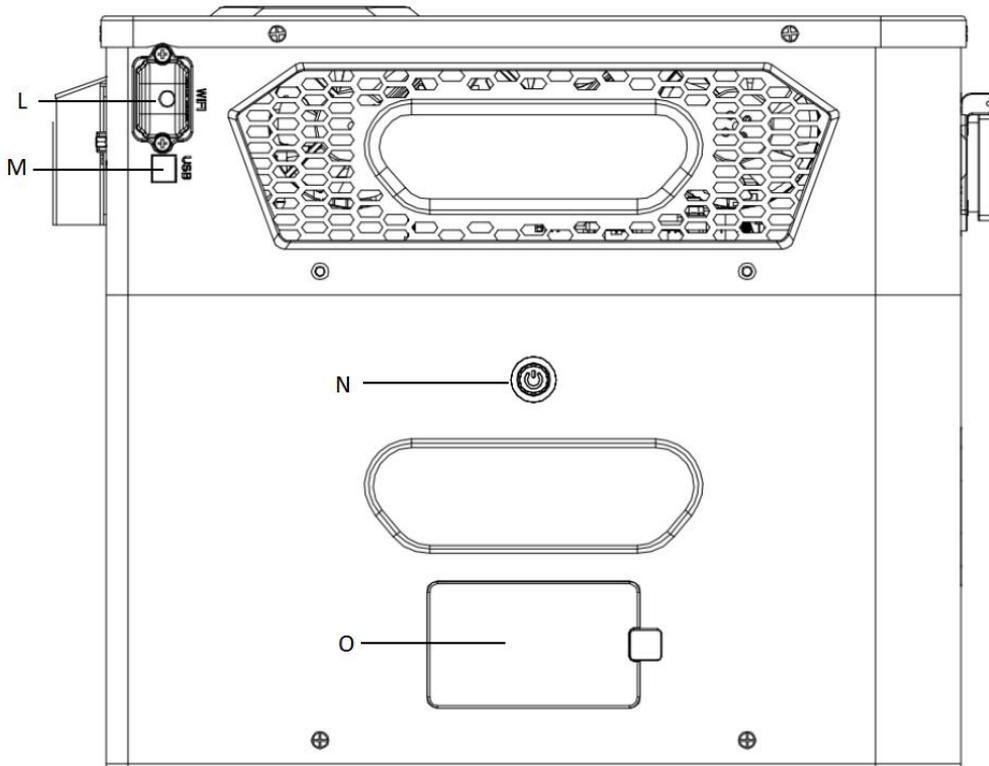
3.2 Equipment information

This is a multi-functional all-in-one off-grid energy storage unit; integrating an MPPT solar charge controller, a high frequency pure sine wave inverter, stackable battery modules and UPS functionality modules, making it ideally suited for off-grid standby power and self-consumption applications. This inverter can operate with or without batteries.

The entire system requires other equipment for complete operation, such as PV modules, generators or the utility grid. Depending on your needs, please consult your system integrator for other possible system architectures. The WiFi / GPRS module is a plug and play monitoring device to be installed on the inverter. The WiFi / GPRS module is a plug-and-play monitoring device to be installed on the inverter, allowing the user to monitor the status of the PV system anytime, anywhere via mobile phone or website.

Product Interface Description (Figure 2)





(Figure 2)

A	WiFi Dongle
B	Inverter Power Switch
C	LCD
D	AC Output 2
E	AC Output 3
F	PV Input
G	AC Input Circuit Breaker
H	AC input
I	AC Output 1
J	Parallel communication port 1
K	Parallel communication port 2
L	Wi-Fi communication port
M	USB communication port
N	Battery switch
O	Battery communication port

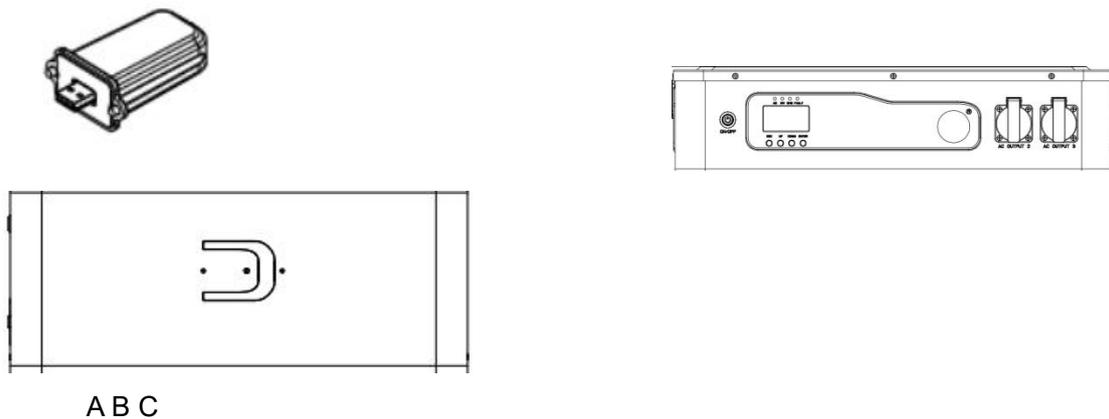
3.3 Product storage conditions

- Equipment must be stored in its original box
- The ambient storage temperature should be between -25°C and +55°C.
- The relative humidity of the storage environment should be maintained between 0 and 95 per cent at all times.
- Bulk equipment storage, original cartons can be stacked up to 5 levels

3.4 Unpacking Inspection

Upon receipt of the product, please check the packaging first, if you find any damage to the packaging, or if you find damage to the unit after unpacking, please save the original packaging and contact your dealer immediately. If you need to transport the unit, the original packaging is recommended!

Product standard accessories (Figure 3)



serial number	brand name	Quantity (PCS)
A	inverter	1
B	WIFI Dongle	1
C	Stacked Battery Modules	Quantity optional

3.5 Installation and electrical connections

  DANGER Fire and explosion hazard! Do not install the product near flammable or explosive materials!
  DANGER The case & radiator are hot and there is a risk of burns! The inverter should be mounted in an inaccessible location



DANGER

- All electrical installations should be made in accordance with IEE wiring rules, do not disassemble the enclosure. This product is not supplied with user-serviceable parts; refer servicing to qualified service personnel.
- All alignments and electrical installations should only be carried out by a qualified electrician.
- Please remove the unit carefully and inspect it carefully for damage. If you find any problems, please contact your supplier.
- All AC & DC inputs and outputs need to be disconnected before servicing.
- This unit is designed to supply power to the public grid only. Do not connect this unit to a generator or other external power generator as this could result in serious damage to the unit.
- Due to the presence of a DC capacitor within this product, high voltages may remain within the product even after the unit is disconnected from the grid and the PV panel.
- Although the product is designed to meet all safety requirements, some parts and surfaces of the product can generate high levels of heat during operation. To reduce the risk of injury, do not touch the side and rear enclosures of the unit while it is in operation.

Basic Installation Requirements

This part of the guide is for the installer to select a suitable mounting position to avoid damage to the machine or injury to the operator.

- This product must not be installed in direct contact with water.
- In order to avoid over-temperature which may reduce the output power of the product, please do not expose the device to direct sunlight.
- This product should be installed at least 91.4cm (3ft) above the floor
- Ambient humidity around the equipment should be 0 - 95 per cent, non-condensing
- Installation location must be convenient for future maintenance
- Do not install the product in buildings constructed of flammable or non-heat-resistant materials.
- Keep out of reach of children
- Do not cover this product, do not put anything on the device
- Do not install the product near strong magnetic signals such as TV aerials or other antennas or cables.

The equipment requires adequate cooling space. Provide the unit with

optimum ventilation to ensure adequate heat dissipation. The ambient temperature should be below 40°C for optimal operation.

- Although the electrical part of this product is IP65 rated, it is recommended that it be installed in such a way as to avoid prolonged operation under sun, rain and snow pressure.

3.6 Equipment installation status check

- Be sure to select a suitable mounting surface to ensure that the unit is stable and free of wobbles.
-

Electrical connection

High pressure hazard!

The conductive parts of the device are subject to high voltages that can cause electric shocks. Disconnect the AC side, the PV side and the battery side of the inverter before performing any operations on the device. Reverse battery positive and negative connections are prohibited! Failure to do so will damage the inverter and void the warranty!



WARNING

There is a risk of damage to electronic components from electrostatic discharge and appropriate anti-static measures should be taken when replacing and installing equipment.

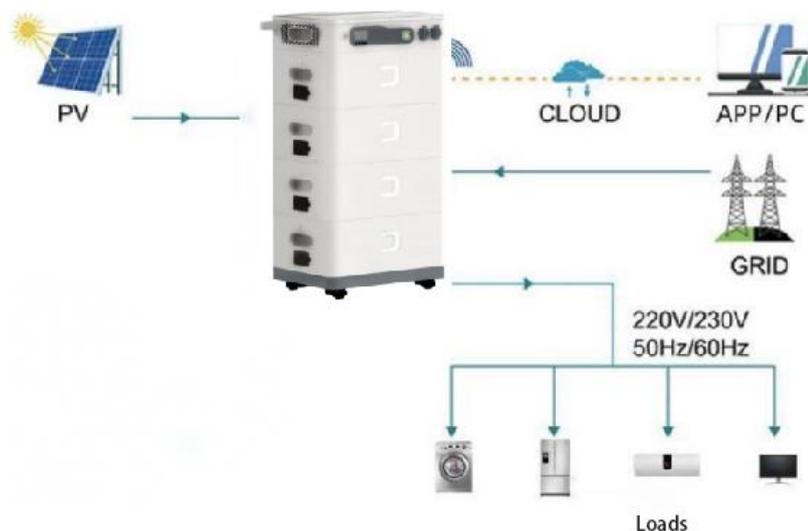


DANGER

Grounding: The AC power supply must be grounded before connecting the DC power cord.

3.7 Diagram of the system

See details (figure 4)



(Figure 4)

3.7.1 AC input/output connections

Caution!! Please install a separate AC circuit breaker between the inverter and AC input power before connecting to AC input power. This will ensure that the inverter is safely disconnected during maintenance and fully protected from AC input overcurrent. The recommended AC circuit breaker specification of ESSD-OH5-BAT5-X is 40A.

Caution!! The AC output has three output ports and the total power does not exceed 5000W.

Caution!! There are two terminal blocks labeled "IN" and "OUT". Please do not connect the input and output connectors incorrectly.

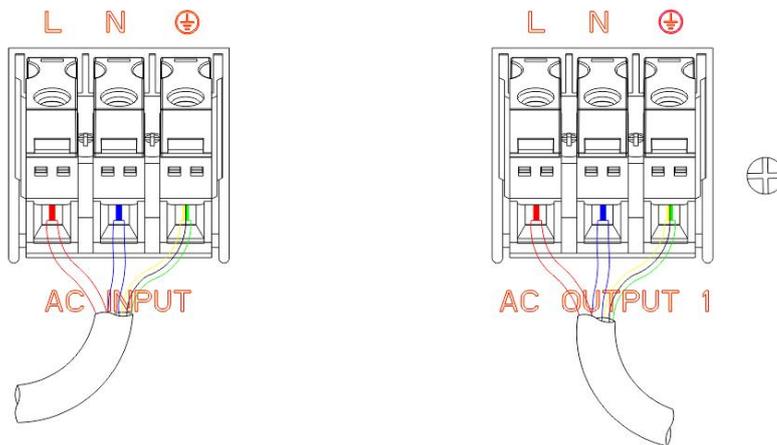
Caution!! All wiring must be done by qualified person.

Caution!! Using appropriate cables for AC input connections is very important for safe and efficient operation of the system. To reduce the risk of injury, use the appropriate cable sizes recommended below.

Recommended cable requirements for AC wires:

Item NO#	Wire Spec	Cable(mm ²)	Torque value
----------	-----------	-------------------------	--------------

ESSD-OH5-BAT5	8AWG	8	1.2-1.6 Nm
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WARNING: Make sure AC power is disconnected before attempting to hardwire AC power to the unit.

Note: Important! ! !

Make sure to connect the AC cord with the correct polarity. If the L line and N line are connected in reverse, it may cause a short circuit in the power supply when these inverters are operated in parallel.

Note: Appliances such as air conditioners need at least 2 to 3 minutes to restart because it needs enough time to balance the refrigerant gas in the circuit. If a power shortage occurs and is restored within a short time, damage will be caused to connected equipment. To prevent this type of damage, check with the air conditioner manufacturer to see if it is equipped with a time delay function before installation. Otherwise, this off-grid solar inverter will trigger an overload fault and cut off the output to protect your equipment, but sometimes it will still cause internal damage to the air conditioner.

3.7.3 PV panel connections (Figures 6 and 7)

NOTE: Before connecting to the PV module, install a DC circuit breaker between the inverter and the PV module respectively.

Warning! All wiring must be done by qualified personnel.

Warning! Connecting the PV module using the appropriate cables is important for safe and efficient system operation. To reduce the risk of injury, use the appropriate connection. To reduce the risk of injury, use the appropriate cable size recommended below.

Item No#	Wire Spec	Cable (mm) ²	Torque value (max)
ESSD-OH5-BAT5-X	1 X12AWG	6	1.2-1.6 Nm

3.7.2 PV panel connection (Figure 6 and Figure 7)

Note: Please install a DC circuit breaker between the inverter and the PV modules before connecting to the PV modules.

Warning! All wiring must be done by qualified person.

Warning! The use of appropriate cables to connect PV modules is very important for safe and efficient operation of the system. To reduce the risk of injury, use proper connection methods. To reduce the risk of injury, use the appropriate cable sizes recommended below.

Item No#	Wire	Cable(mm ²)	Torque value (max)
ESSD-OH5-BAT5-X	1 X10AWG	6	1.2-1.6 Nm

PV module selection:

When choosing the right PV modules, be sure to consider the following parameters:

1. The open circuit voltage (Voc) of the PV module does not exceed the maximum open circuit voltage of the inverter's PV array.
2. The open circuit voltage (Voc) of the PV module should be higher than the minimum battery voltage.

Item No:	ESSD-OH5-BAT5-X
Max. open circuit voltage of PV array	450Vdc
Start-up voltage:	150Vdc
PV array MPPT operating voltage range:	120Vdc~430Vdc

Please follow the steps below to connect the PV modules:

1. Insert the PV panel positive and negative cables and strip them, then connect the positive pole (+) of the connecting cable to the positive pole (+) of the PV input connector, and connect the negative pole (-) of the connecting

Function Setting/Identification Keys	Function Setting: Press Enter on the display page for more than 2 seconds to enter the function setting page. After entering the setting page, press UP or DOWN key to open the up and down page, and select the interface to be set. OK: On the "Function Setting" page, press the ESC key for 0.1 to 2 seconds to confirm the setting options.
Page/Query Key	Page Turn: Press and hold the UP or DOWN key for more than 0.1 second on any page to change the page to the left or right.

4.1.1 Four-key function

4.1.2 LED indicator function

LED Indicator			Remarks
AC	Green	Always on	Utility power is normal and enters utility operation
		Flashing	Utility power is normal, but not in utility operation
		Not on	Utility anomaly
INV	Yellow	Always on	Machine operates in battery mode
		Not on	Other statuses
CHG	Yellow	Always on	Battery on float charge
		Flashing	Battery charging at constant voltage
		Not on	Other statuses
FAULT	Red	Always on	Inverter failure
		Flashing	Inverter has alarms
		Not on	Inverter normal

4.1.3 LCD function display

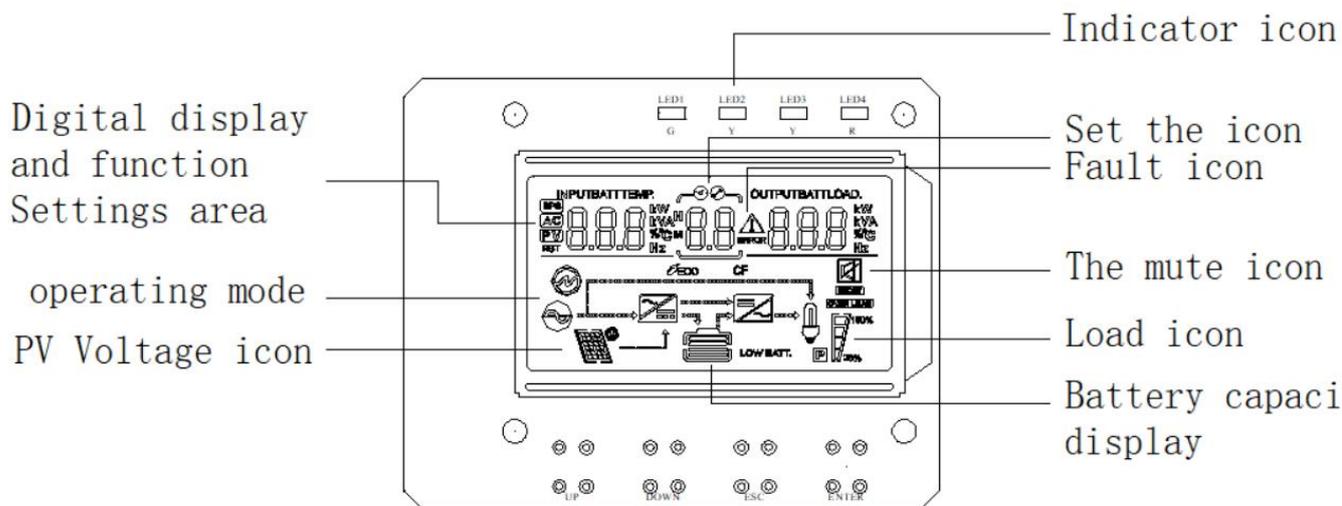


Table 1-2 4-Button LCD Screen

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

Icon Display:

-Load and Battery Chart represents load and battery capacity. Each square represents 25% of the capacity. The load icon flashes when the inverter is overloaded and the battery icon flashes when the battery capacity is too low or the battery is not connected.

-Buzzer icon indicates whether the buzzer is muted. Normally, this icon will not be displayed. In any mode where the background software is set to MUTE ON, the inverter enters the MUTE state and will display the buzzer disabled icon.

-When entering the Settings menu, the Settings icon will be turned on. Otherwise, the icon is not displayed.

-The fault icon is displayed only in fault mode. In other cases, the fault icon is not displayed.

Numerical display and function setting area:

-In non-functional mode, inverter information is displayed in this area. Output information is displayed in normal mode. Operation of the query keys (UP or DOWN keys) displays information related to input and output voltages, input and output frequencies, 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 so on. Fault mode displays fault codes.

-On the "Function Setting" page, you can set the output voltage by using the operation function setting keys and the up and down keys.

(OPU) and the battery low voltage shutdown point (EOd).

Operating mode display area

After 4 seconds after start-up, this display mainly shows the operating modes of the inverter. For example, standby mode, mains mode, battery mode and fault mode.

4.1.4 Buzzer operating status table for inverter

Buzzer alarm status	Descriptions
A long beep that lasts ten seconds and then stops	Failure mode
A long beep that lasts three seconds and then stops	PV/input voltage has been lost or restored
	Power on main switch closed or disconnected
Beeps for one second at a time for one minute, then stops	All other alarms (low battery voltage alarm only wails in battery mode)

4.2 Daily power switching

To switch the machine on and off, refer to this manual.

4.2.1 Start-up procedures

The unit can be activated when a qualified battery or mains power supply is connected (the input range of the mains power supply must match the

output mode).

>Mains power on

Connect to the mains and press the switch to ON, the system will start. If the mains priority output is selected, wait for a period of time until the mains mode is displayed on the operating panel.

>Battery switch on

Connect to the normal battery, press the switch, the inverter starts to work and supply power. After the inverter is switched on, if the operation panel shows battery mode, the inverter is working in battery mode.

4.2.2 Shutdown procedures

When the system is in battery mode or mains mode, press the switch button again to switch it off and the system will shut down.

4.2.3 Mute operation

When the inverter is in any mode, set MUTE ON or OFF for the inverter buzzer sound to turn on or off.

4.2.4 Actions performed in an alarm state

If the inverter has an alarm sound and the LED fault indicator flashes, the inverter is in alarm. You can find the cause of the alarm or contact the supplier based on the alarm information.

4.2.5 Operation in Fault Mode

When the inverter buzzer always sounds and the LED fault indicator is always on, the inverter is operating in fault mode. Contact your supplier or maintenance personnel to provide information about the fault alarm and to help troubleshoot the problem.

4.3 Parameter Inquiry Operation

Under normal conditions, the display page consists of seventeen pages.

Pressing the query key UP or DOWN for 0.2~1 second switches the display page to show the information of input and output voltages, input and output frequencies, battery, PV voltages and currents, loads, and software versions. If an alarm is generated, an alarm information page will be added. If the inverter has a fault, the fault code page is displayed by default. By default, fault or alarm information is displayed on the home page. When the inverter has no faults or alarms, output voltage and frequency information is displayed by default.

Display page 1 (main display page): displays the input and output voltages of the inverter, as shown in Figure 1-3

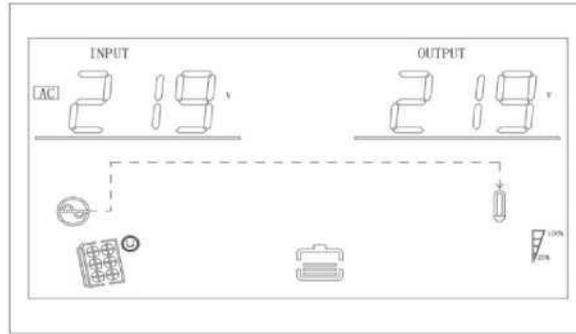


Figure 1-3 Display Page 1

Display Page 2: Displays the input and output frequencies of the inverter, as shown in Figure 1-4

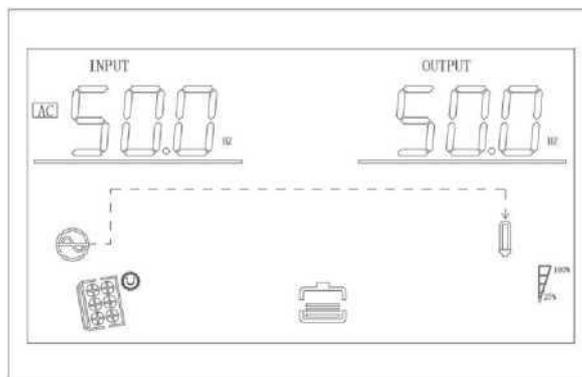


Figure 1-4 Display Page 2

Display Page 3: Displays battery information, showing battery voltage and charging current, as shown in Figure 1-5

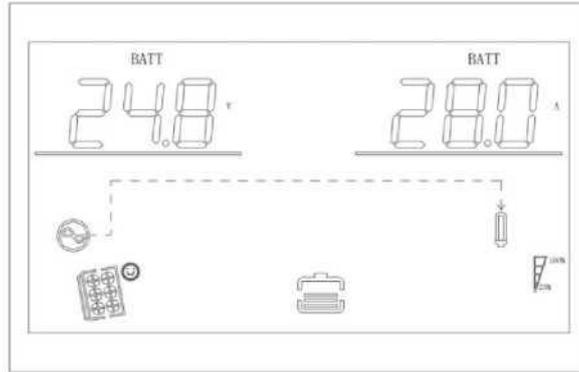


Figure 1-5 Display Page 3

Display Page 4: Displays PV information, showing PV voltage and PV charging current, as shown in Figure 1-6

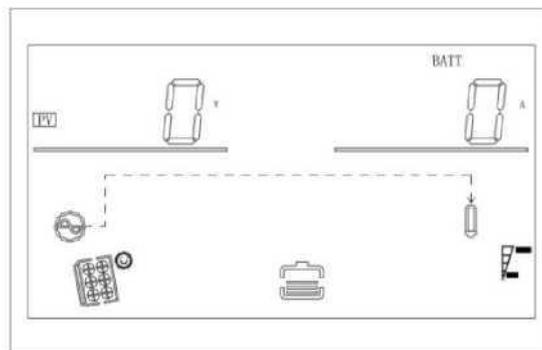


Figure 1-6 Display Page 4

Display Page 5: Displays PV information, showing PV voltage and PV charging power, as shown in Figure 1-7

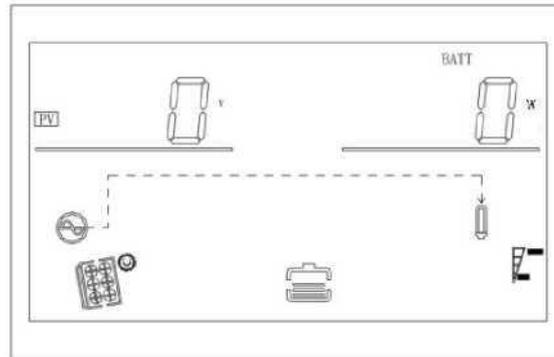


Figure 1-7 Display Page 5

Display Page 6: Displays output information, showing output voltage and active power, as shown in Figure 1-8

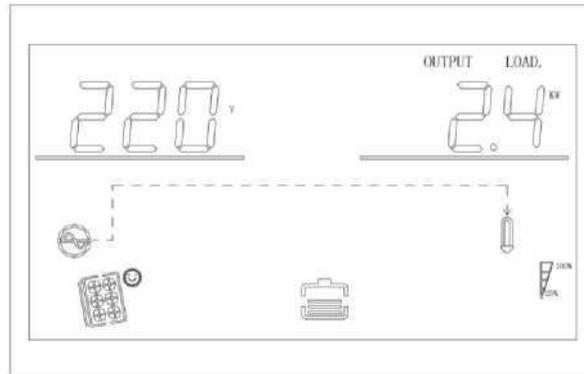


Figure 1-8 Display Page 6

Display Page 7: Output Information displays the output voltage and output compound power, as shown in Figure 1-9

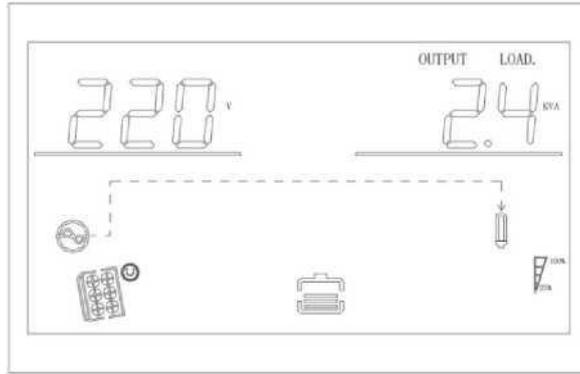


Figure 1-9 Display Page 7

Display Page 8: Output Information displays the output voltage and load percentage, as shown in Figure 1-10

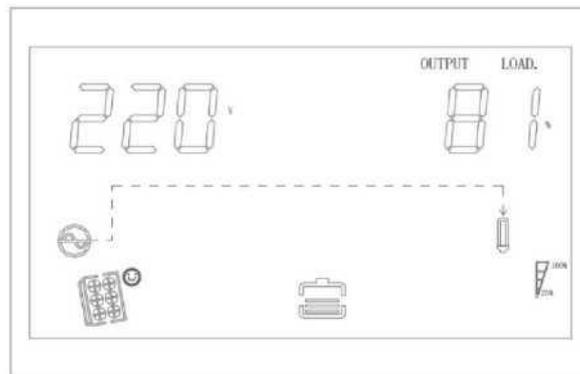


Figure 1-10 Display Page 8

Display Page 9: The software version of the inverter is displayed, as shown in Figure 1-11

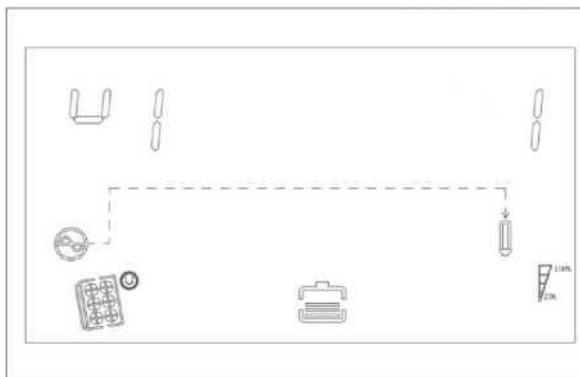


Figure 1-11 Display Page 9

Displaying Page 10: The software version of the inverter is displayed, as shown in Figure 1-12

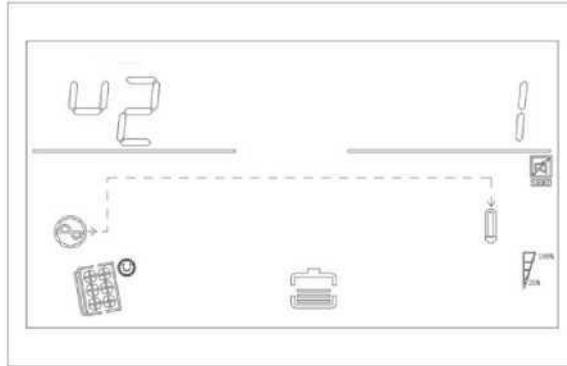


Figure 1-12 Display Page 10

Displaying page 11: PV power generation is shown, as shown in Figure 1-13

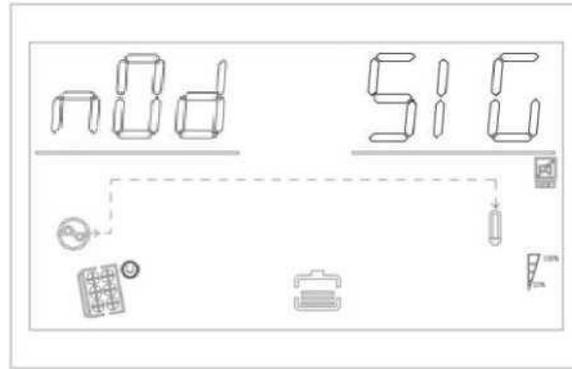


Figure 1-13 Display Page 11 (Parallel Connection Status)

Displays page 12: lithium battery networking status; SIG constant, battery pack single pack operation; PAR constant, battery pack parallel operation. When PAR is blinking, the battery packs run in parallel, as shown in Figure 1-14

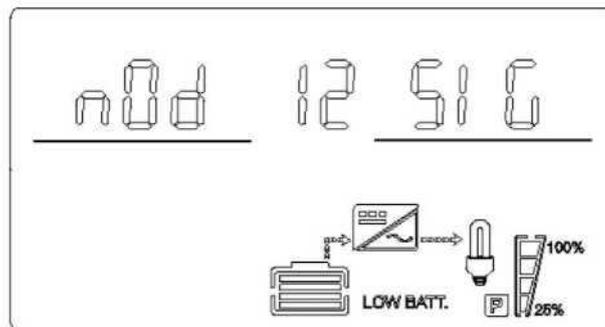


Figure 1-14 Display Page 12 (Lithium Battery Networking Status)

Displays Page 13: Li-ion battery voltage and current information; upper left corner displays BMS battery voltage information ; upper right corner displays BMS battery current information. When BMS communication fails, flashing **ERR** is displayed in the upper left corner.

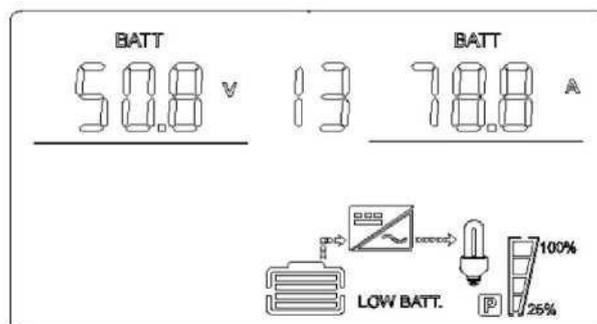


Figure 1-15 Display Page 13 (Lithium Battery Voltage and Current Information)

Displays Page 14: Li-ion battery temperature, SOC information. The BMS temperature is displayed in the upper left corner, and the S O C is displayed in the upper right corner. When the BMS communication fails, both the upper left and right corners are displayed as flashing ERR.



Figure 1-16 Display Page (Li-ion Battery Temperature, SOC Information)

Display Page 15: Li-ion Battery Capacity; rated capacity in upper left corner, current capacity in upper right corner
When the BMS communication fails, a flashing **ERR** is displayed in both the upper left and right corners.

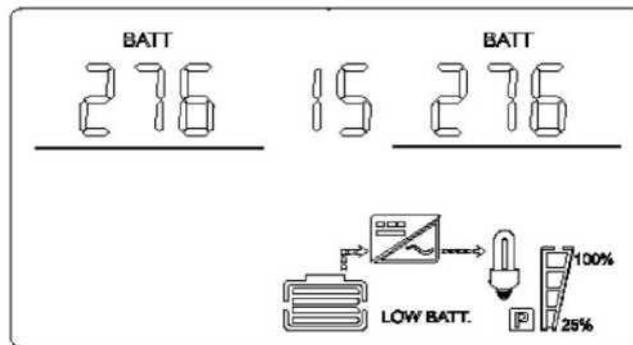


Figure 1-17 Display Page 15 (Lithium Battery Capacity Information)

Displays Page 16: Li-ion Battery Constant Voltage Points; fixed letters **CV** in the upper left corner and **BMS** Constant Voltage Charge Points in the upper right corner. When the **BMS** communication fails, the flashing **ERR** is displayed in the upper left and right corners.

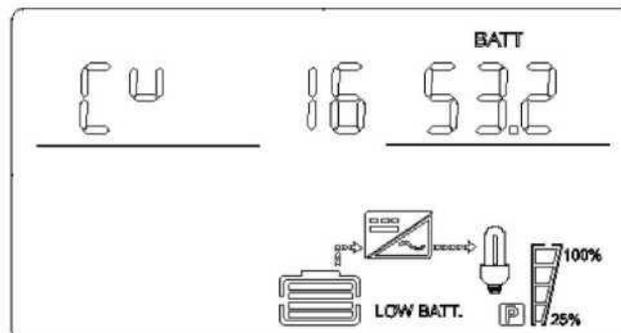


Figure 1-18 Display Page 16 (Lithium Battery Constant Voltage Information)

Display Page 17: Li-ion Battery Failure Alarm Message; BMS Alarm Message on the upper left; BMS Failure Message on the upper right. When BMS communication fails, both upper left and right corners flash ERR.

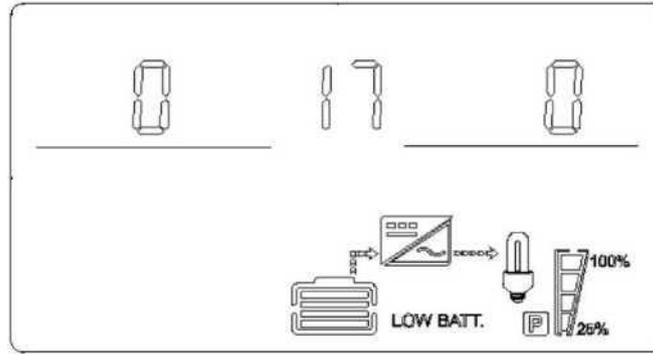


Figure 1-19 Display Page 17 (Lithium Battery

Fault Alarm Message)

4.4 Function Setting Operation

> Inverter function setting operation:

Go to the Exit Function Setting page and proceed as follows.

- Press the function setting key ENTER for more than 2 seconds to enter the function setting page. Press the enquiry key UP or DOWN for 0.1 to 2 seconds to select the function. After turning the page to the desired function setting page, the corresponding function word will flash.

- Press the confirmation key ENTER for 0.1 to 2 seconds to enter the setting page for the selected function. At this point, the word for the selected function will become normally lit and the value will flash to the left of the word for the selected function. Press the enquiry key UP or DOWN for 0.1 to 2 seconds and then select the value of the desired function parameter.

- After turning the page to the desired function parameter, press the confirmation key ENTER for 0.1 to 2 seconds and the function setting is completed. At this point, the value of the function parameter will become normally lit and will no longer flash.

Press the ESC key for 0.1 to 2 seconds to successfully set the function. At the same time, exit the function setting page and return to the main display page (you can also do nothing and wait for up to 30 seconds before automatically jumping back to the main display page).

4.4.1 Output voltage (OPU)

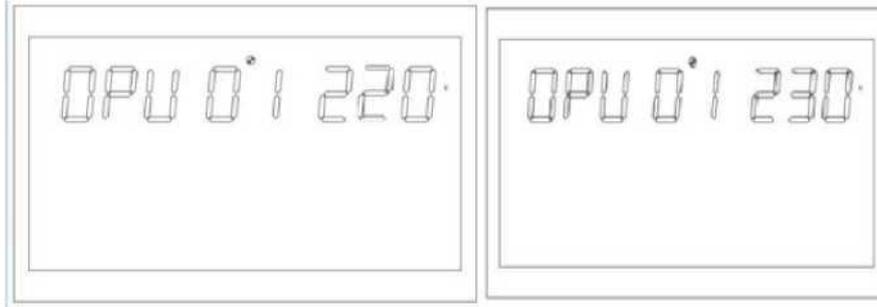


Figure 1-12 Setting the Output Voltage

- The default output voltage is 230V. 208V, 220V, 230V, 240V can be set as the output voltage under all operating conditions with immediate effect.

- Press the function setting key ENTER for more than 2 seconds to enter the function setting page. Press the query key UP or DOWN for 0.1 to 2 seconds to select the function. The word OPU blinks when the page is turned to the output voltage OPU setting page.
- Press the confirmation key ENTER for 0.1 to 2 seconds to enter the setting page for the output voltage OPU. At this time, the word OPU will be normally lit and the value of OPU will be flashing on the right side of the word OPU. Press the query key UP or DOWN for 0.1 to 2 seconds and then select different output voltage values. The available voltage values are 208 V, 220 V, 230 V, 240 V. By default, the output voltage is 230 V. The settings will be saved in real time.

-After turning the page to the desired output voltage value, press the confirmation key ENTER for 0.1 to 2 seconds. The output voltage OPU setting is complete. At this point, the value to the right of the OPU will be permanently lit and will no longer flash.

- Press the **ESC** key for 0.1~2 seconds, the function is set successfully, exit the function setting page, and return to the main display page (you can also wait for up to 30 seconds to jump back to the main display page automatically without operation).

Attention:

-If the output voltage is set to 208V, the output voltage must be derated to 90%.

4.4.2 Setting up other functions

4.4.2.1 Output frequency (OPF)

The output frequency has been set and the default value is 50Hz.

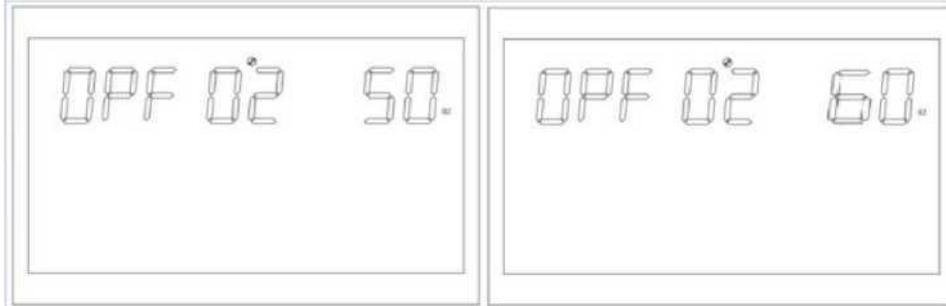


Figure 1-13 Setting the Output

Frequency

Function Description: Set the output frequency of the inverter. 50Hz and 60Hz can be set. the default value is 50Hz.

Setting conditions: Settings are available in all states. In battery mode, the setting will take effect at the next restart. Mains mode Effective immediately. The frequency changes slowly after switching to battery mode.

4.4.2.2 Setting the output priority (OPP)

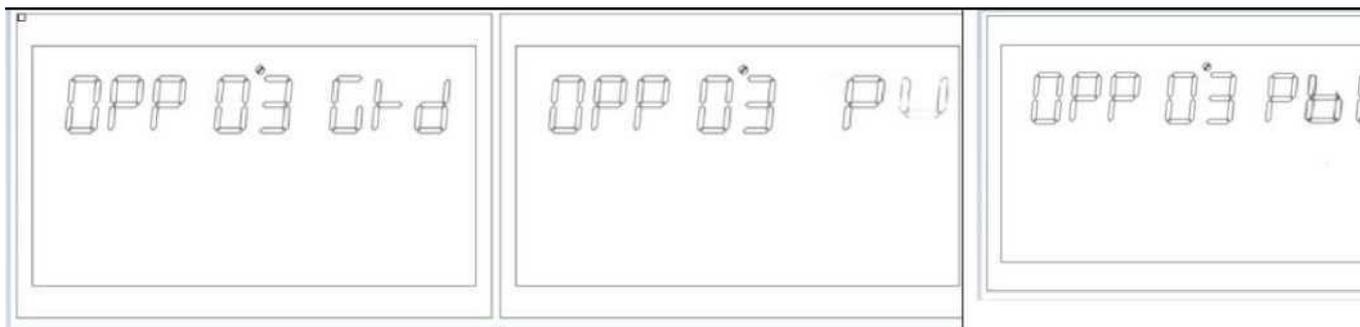


Figure 1-14 Set Output Priority Page Function:
Setting Inverter Output Priority

Setting conditions: Can be set in all states, and the setting will take effect immediately.

Note: There are three choices for output priority, the default is GRD: utility output priority; the second is PU(PV): photovoltaic output priority; and the third is PBG :PV\ battery\ utility output in order;

4.4.2.3 Output modes (MOD)

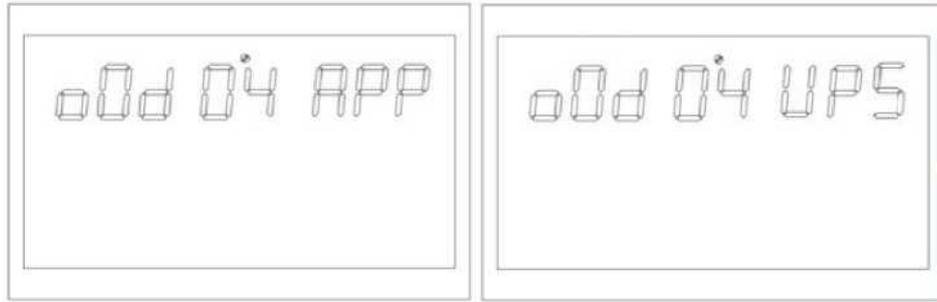


Figure 1-15 Setting the Output

Mode

Function: Setting the inverter output mode.

Setting conditions: Can be set in all states, and the setting will take effect immediately.

Description:

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

4.4.2.4 Charging Priority Level (CHP)



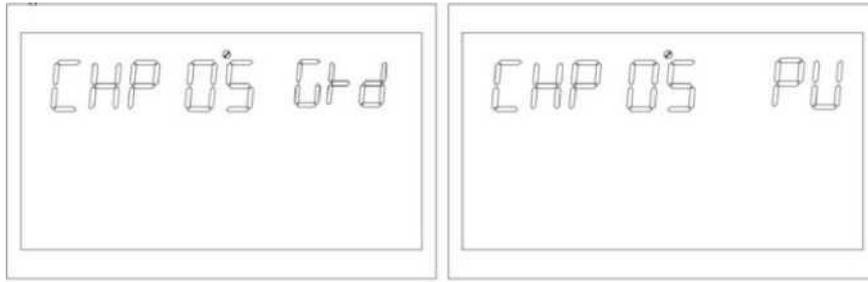


Figure 1-16 Setting the Charging

Priority Page

Function: Setting the charging priority of the inverter

Setting conditions: Can be set in all states, and the setting will take effect immediately.

Description:

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

4.4.2.5 Utility charging current (RCC)

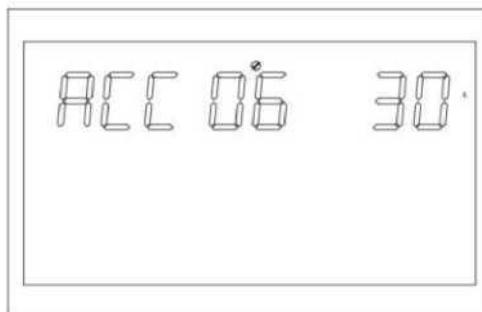


Figure 1-17 Utility Maximum Charge

Current Setting

Function: Setting the maximum value of inverter mains rechargeable current.

Setting conditions: Can be set in all states.

Description:

RCC: The default setting of the maximum mains charging current is 30A, and the setting range is [1,80A].

4.4.2.6 Maximum charging current (MCC)

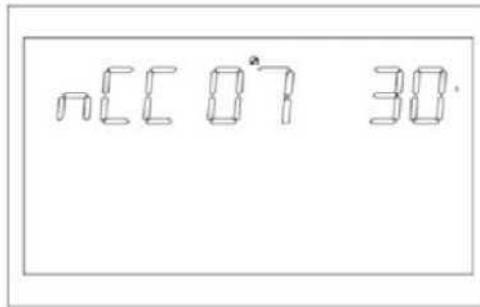


Figure 1-18 Setting the maximum

charging current

Function: Setting the maximum charging current of the inverter
Setting conditions: All states can be set

Description:

MCC:Maximum Charge Current is the maximum value of the PV and mains charge current.

Selectable maximum charging current: 2/10/20/30/40/50/60/70/80 A

4.4.2.7 Menu Defaults (MDF)

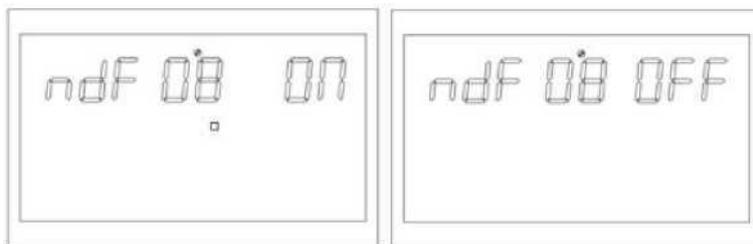


Figure 1-19 Return to Settings Page

Function Description: Return to Home Screen

Setting conditions: All states can be set.

Description:

The default setting is ON, if it is ON, the page is not in the first interface

(P1), it will return to the first interface after 1 minute; if it is OFF, if the page is not in the first interface (P1), the LCD will keep in this interface.

4.4.2.8 Overload restart (LrS)

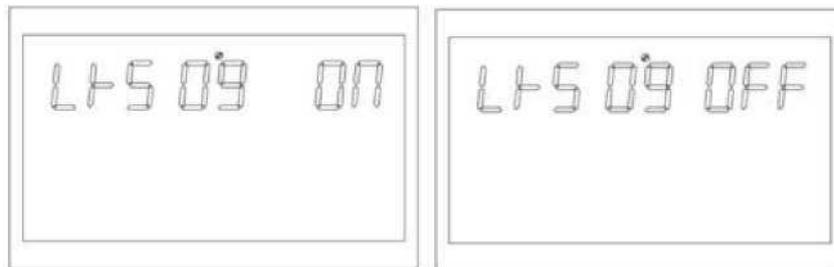


Figure 1-20 Setting Overload Restart

Function description: Setting overload restart

Setting conditions: all states can be set

Description:

Overload restart is set to ON by default.

4.4.2.9 Over-temperature restart (TrS)

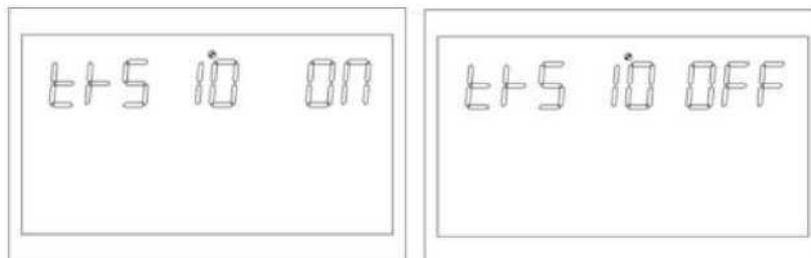


Figure 1-21 Setting up

over-temperature restart

Function: Over-temperature restart setting

Setting conditions: all states can be set

Description:

Over temperature restart is set to **ON** by default.

4.4.2.10 Main input power-down alarm (MIP)

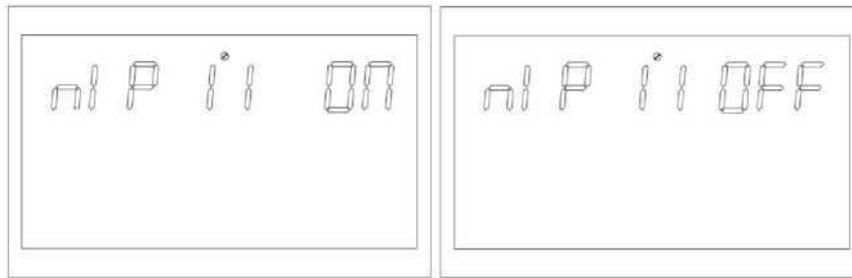


Figure 1-22 Setting the Main Input Power

Failure Alarm

Function Description: Utility or PV power down alarm long beep setting.

Setting conditions: all states can be set, the default is ON, utility or PV power down will alarm for a long time, can also be set to OFF.

Description:

MIP: Main input cut-off warning

If the default setting is ON, the buzzer will sound for 3 seconds after the main input detects a power failure; if the setting is OFF, the buzzer will not sound for long after the main input is powered down.

4.4.2.11 Power saving mode (PWS)

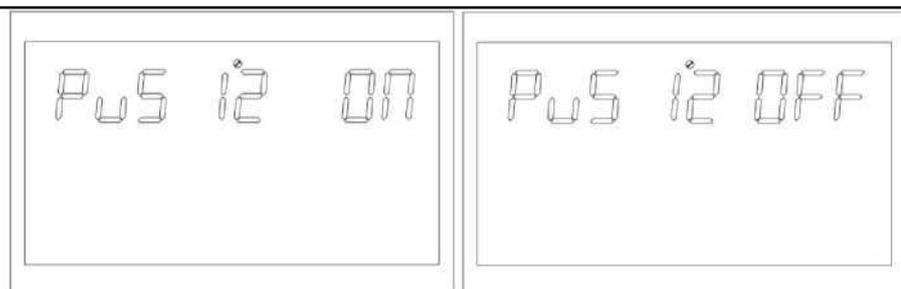


Figure 1-23 Setting the Energy Saving Mode

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

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

Description:

PWS: Energy saving

The default setting is OFF, 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 for a short time and then continue to output. If the load is higher than 35W, the system will resume normal output.

4.4.2.12 Overload to bypass (OLG)

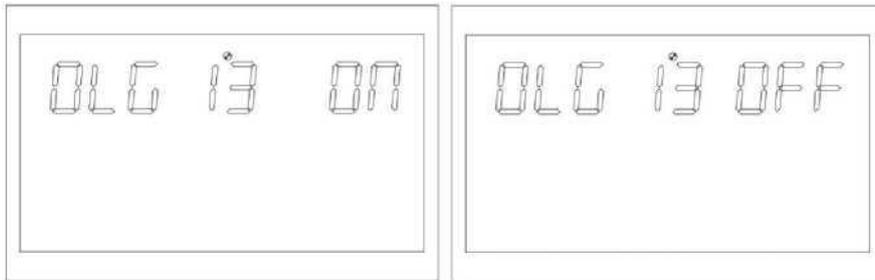


Figure 1-24 Overload to Bypass Setting

Page

Function description: Set whether to immediately switch to mains mode (also known as bypass mode) when battery mode is overloaded

Setting conditions: Can be set in all states.

Description:

OLG: Overload switching to bypass

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

4.4.2.13 Mute the setting (MUE)

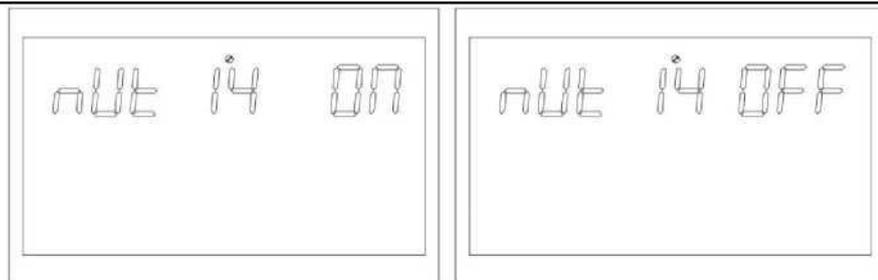


Figure 1-25 Mute Settings Page

Function Description: Set whether the buzzer beeps or not

Setting conditions: Can be set in all states.

Description:

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, alarm, fault and other states.

All modes can be set and function properly, images cannot be displayed.

4.4.2.14 Battery transfer back to mains voltage point (BTG)

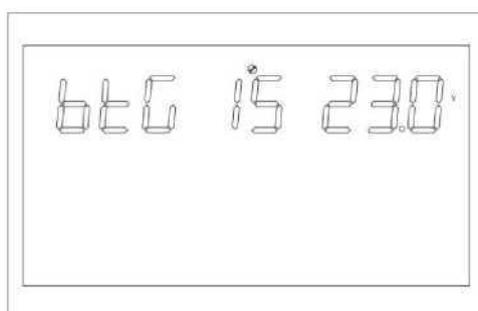


Figure 1-26 Battery transfer back to mains voltage point setup page

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

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

Description:

BTG: Battery discharge voltage for return to mains default value is 46V

When the battery definition mode is CUS (Customer Setting Type) mode:
The battery discharge voltage setting interval for returning to the mains is [44,52].

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

The default value of the battery discharge voltage for returning to the

mains is 46V, and the discharge voltage setting interval is [44,52].

When the battery definition mode is L old (lithium battery type) mode:

The default value of the battery discharge voltage for return to mains is 47.6V, and the discharge voltage setting interval is [40,50].

4.4.2.15 Switch back to battery mode voltage point (BTB)

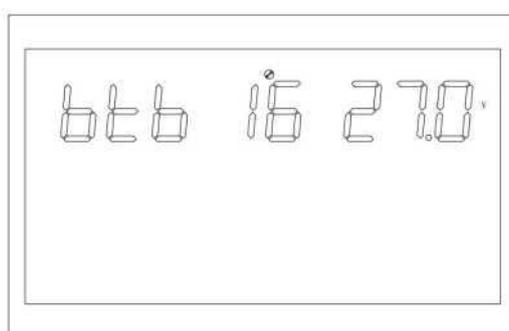


Figure 1-27 Utility to Back to Battery Mode Battery Voltage Point Setting Page

Function Description: After the battery is switched off with low voltage, a certain battery voltage value needs to be reached before it can be switched on again in battery mode.

Setting conditions: Can be set in all states.

Description:

BTB: Mains to Battery

Default battery voltage for mains to battery transfer is 52V

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

When the battery definition mode is CUS (Customer Setting Type) mode:

The battery settable voltage range for transferring the mains power back to the battery is [48,58].

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

The default battery voltage of the mains-to-battery is 52V, and the battery voltage range of the mains-to-battery can be set to [48,58].

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

The default battery voltage of the mains-to-battery is 54.4V, and the battery voltage range of the mains-to-battery can be set to [46,58].

4.4.2.16 Battery type (BAT)



Figure 1-28 Battery Type Setting Page

Function Description: Battery type setting.

Setting conditions: Can be set in all states.

Description:

BAT:Battery Type

Four battery type settings: the default setting is AGM (lead-acid batteries); the second is FLD (water-filled batteries); the third is LIB (lithium batteries); and the fourth is CUS (customer-set type)

4.4.2.17 Battery low pressure point (bAL)

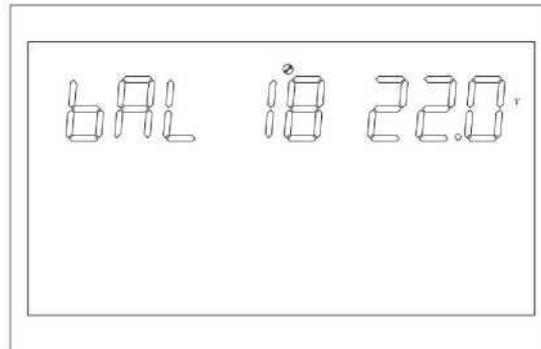


Figure 1-29 Setting the Battery Low

Voltage Point

Function Description: Low voltage alarm point setting.

Setting conditions: Can be set in all states.

Description:

bAL: Battery Low Voltage

Not settable when the battery definition mode is AGM (lead-acid battery type), FLD (water-filled battery type) mode. Battery low voltage point initial default is 44V.

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

The battery low voltage point setting interval is [42,54].

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

The initial default battery LV point is 47.6V, and the battery LV point setting interval is [41.2,50.0].

4.4.2.18 Battery shutdown point (bAU)

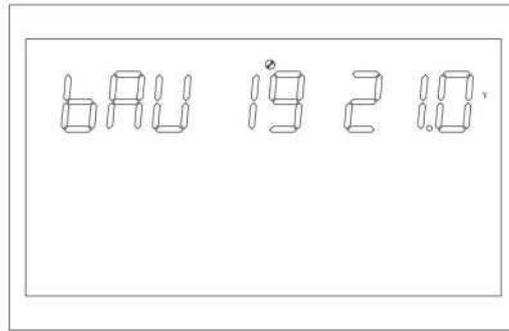


Figure 1-29 Setting the Battery Shutdown Point

Function Description: Battery low voltage shutdown point setting

Setting conditions: All states can be set.

Description:

bAU: Battery low voltage shutdown

Not settable when the battery definition mode is AGM (lead-acid battery type), FLD (water-filled battery type) mode. The initial default setting for the battery low voltage shutdown point is 42V.

The battery shutdown point can be modified when the battery type is set to CUS (customer setting type). The settable voltage range for the battery low voltage shutdown point is [40,48].

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

The initial default setting of the battery low voltage shutdown point is 46V, and the voltage range of the battery low voltage shutdown point can be set to [40,48].

4.4.2.19 Constant voltage mode voltage point setting (bCV)

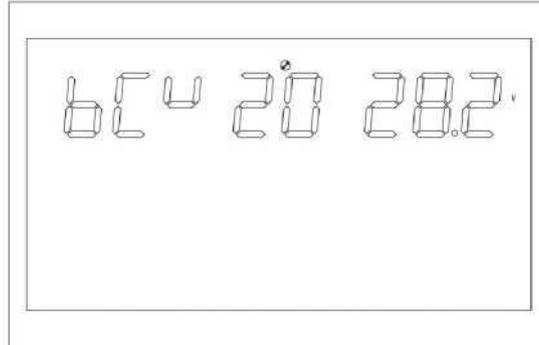


Figure 1-30 Constant Voltage Mode

Voltage Point Setting Page

Function Description: Constant voltage point setting.

Setting conditions: Can be set in all states.

Description:

bCV: Battery constant voltage point

Not settable when the battery definition mode is AGM (lead-acid battery type), FLD (water-filled battery type) mode.

Battery constant voltage point initial default setting: 56.4V (AGM), 58V (FLD)

The constant voltage point can be modified when the battery type is set to CUS (Customer Setting Type).

The battery constant voltage charging point can be set in the range of [48,60], and the constant voltage point needs to be greater than the float voltage point.

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

The initial default setting of the battery constant voltage point is 56.4V, and the setting range is [48,60]. The constant voltage point needs to be greater than the float voltage point.

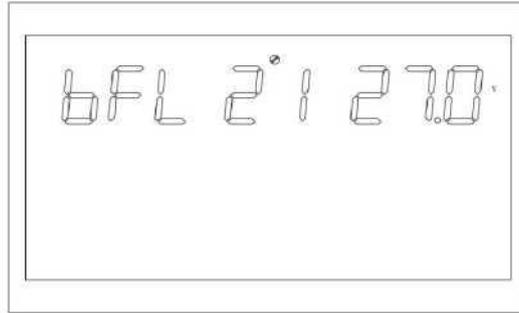


FIGURE 4-21 Battery Float Charge Voltage Point Setting

4.4.2.20 Float mode voltage point setting (bFL)

Function Description: Float Charge Voltage Point Setting

Setting conditions: all states can be set

Description:

bFL: Battery Float Charge

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

The initial default value of the battery float voltage point is 54V.

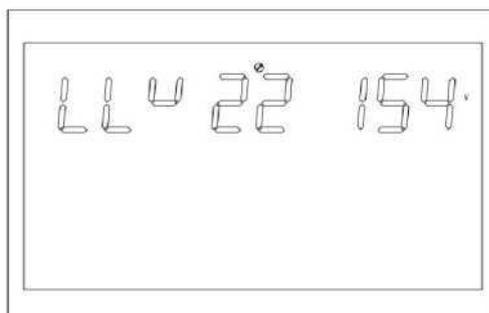
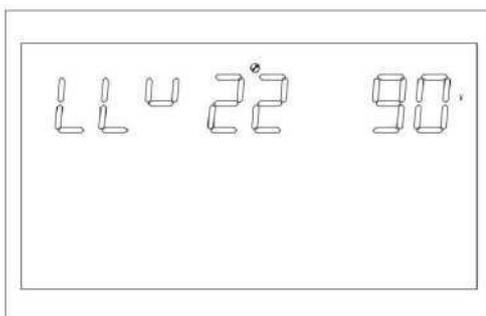
Battery type set to CUS (Customer Setup Type) modifies the battery float voltage point.

Battery float voltage point can be set in the range of [48,60], the constant voltage point voltage needs to be greater than the float voltage.

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

The initial default value of battery float voltage point is 55.2V, and the setting range is [50,58]. The constant voltage point needs to be greater than the float voltage point.

4.4.2.21 Utility low voltage point setting (LLV)



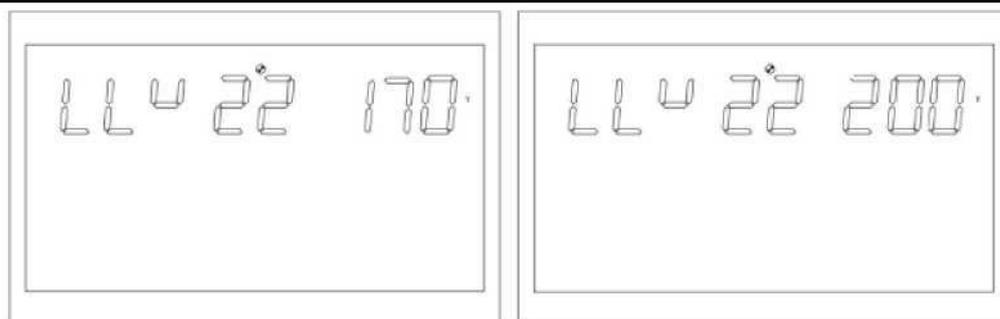


Figure 1-32 Inverter Mode Utility Low Voltage Point Setting Page

Function description: Setting of low voltage protection points for mains power supply

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

Description:

LLV: Low-voltage protection point for utilities

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

4.4.2.22 Utility high voltage point setting (LHV)

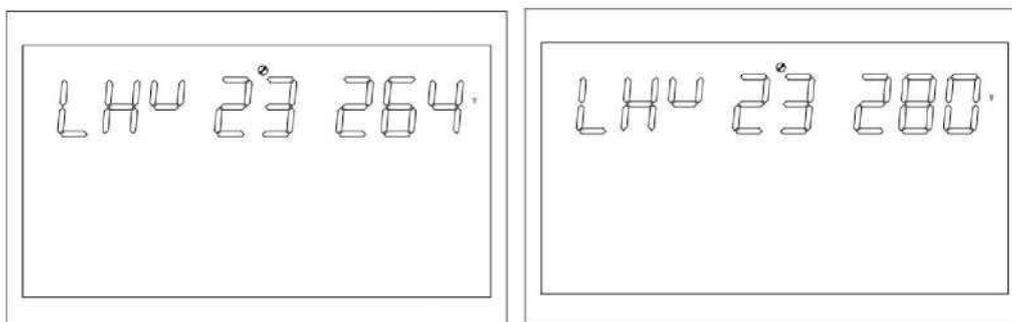


Figure 1-33 Inverter Mode Utility High Voltage Point Setting Page

Function description: Setting of the utility high voltage protection point

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

Description:

LHV: Mains High Voltage Protection Point

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

4.4.2.23 Low power discharge time setting (LWD)

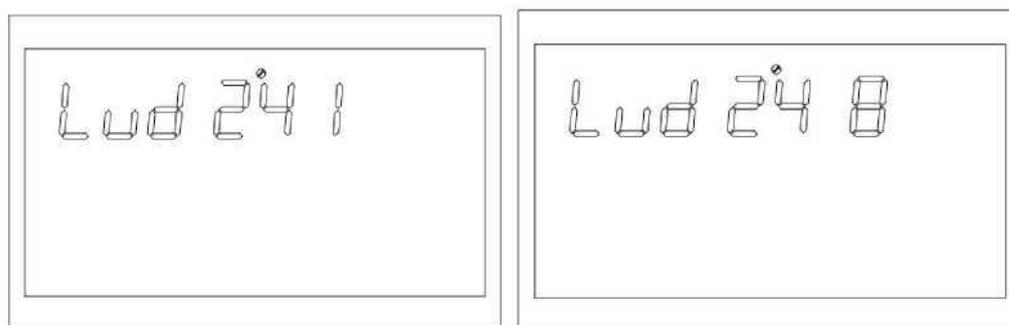


Figure 1 -34 Low Power Discharge Time Setup Page

Function description: Low power discharge protection, in battery mode, at a low load, unlimited time discharge will put the battery to very empty, affecting the battery life. When the inverter is in the low power discharge setting time, the battery low voltage shutdown point will be raised to 44 V.

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

Description:

LWD: Low Power Discharge

The default setting for the low power discharge time in inverter mode is 8 (8 hours) and can be set in the range [1, 8].

In battery mode, after more than 8 hours of continuous discharge time, before the battery shutdown point is reached, the battery voltage shutdown point will be modified to $11V \times \text{number of battery sections}$, the battery will then be discharged to reach $11V \times \text{number of battery sections}$ voltage, the system will be alarmed for 1 minute and then shutdown.

The battery discharge time is reset when the battery voltage exceeds $13.2V \times \text{number of battery cells}$ and exceeds 30s.

4.4.2.24 Inverter soft start setting (SRE)

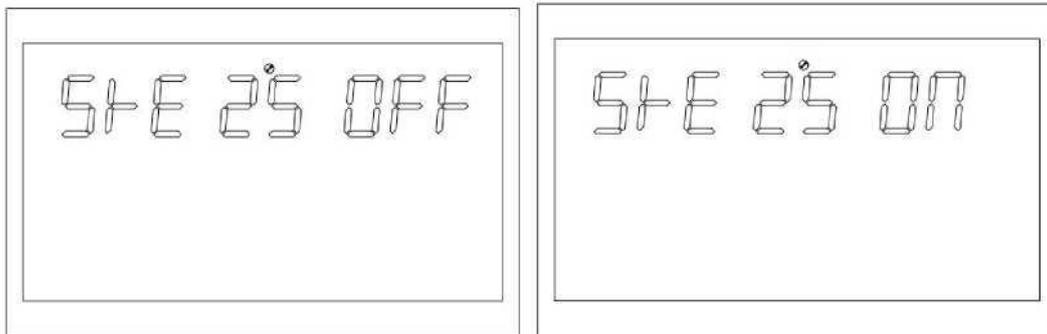


Figure 1-35 Inverter Soft Start Setting Page

Function Description: When this interface is ON state, 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 conditions: Can be set in all states.

Description:

SRE: Soft Relay Enable

The default setting is OFF, the output switch will be turned on after the inverter voltage has risen to the rated output. If it is set to ON, the output switch will be turned on before the inverter starts boosting.

4.4.2.25 Setting of default values (STD)

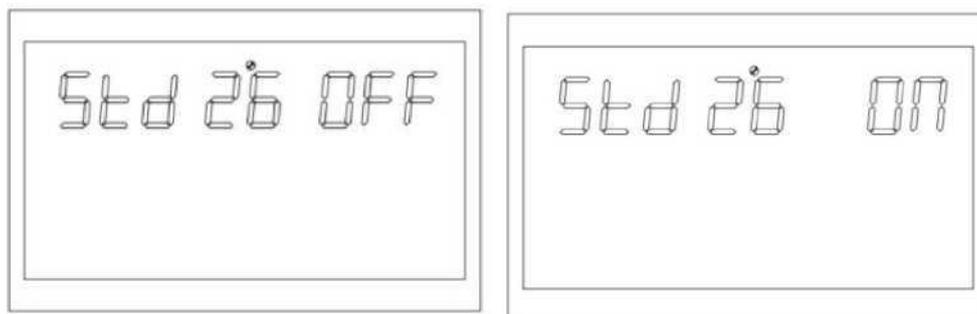


Figure 1-36 Default Value Settings

Function: Restore all setting values to the default values.

Setting conditions: Setting is possible in mains mode and standby (StandBy : no output but screen on status). It cannot be set in battery mode.

Description:

STD: Default value setting

Before setting, this interface shows OFF, when setting ON, the system will restore the default setting. When the setting is finished, this interface will show OFF again, it can be set in mains and standby mode and take effect immediately, but it can't be set in battery mode and can't be shown in the picture.

4.4.2.26 Parallel mode setting (PAM)

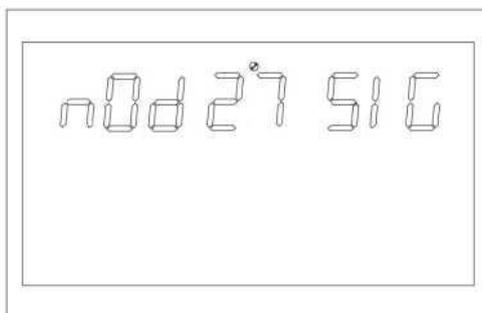


Figure 1-36 Default Value Setting Screen

Function Set the parallel operation mode.

Setting conditions: Settings can be made in mains mode and standby (StandBy: no output but the screen is lit), but not in battery mode.

Description:

PAM: Parallel Operating Mode

The default setting is SIG (single mode), which can be set to PAR (parallel mode), 3P1 (R-phase mode), 3P2 (S-phase mode), 3P3 (T-phase mode).

When using the parallel machine function, first connect the parallel system in the correct way, and then set the parallel mode of each machine correctly. If there is a machine set to SIG in the parallel system, the machine reports fault 24. If there is a machine set to 3P1, 3P2, 3P3 in the parallel system, all machines must be set to one of these three modes and at least one machine exists in each mode, otherwise all machines set to these three modes report fault 24.

4.4.2.27 Battery Not Answered Alarm (SBA)

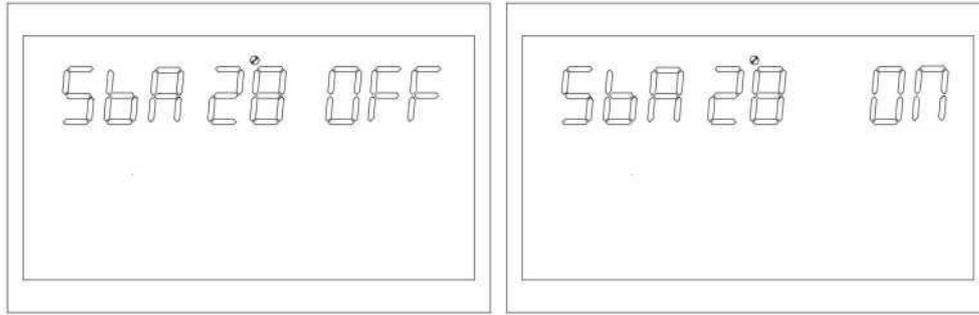


Figure 1-36 Default Value

Function: Setting to enable the battery not connected alarm

Setting conditions: all states can be set

Description.

SBA: Battery alarm setting.

The default setting is OFF.

When set to OFF and the battery is not connected, there will be no battery not connected, battery low voltage, or battery undervoltage alarms.

4.4.2.28 Equalisation model (EQM)

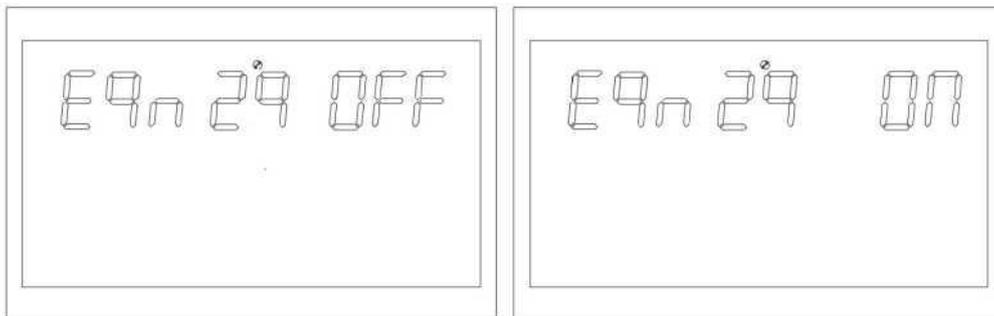


Figure 1-37 Equalisation

Function: Set Mode Settings whether the inverter enables equalisation mode or not.

Setting conditions: all states can be set

Description:

EQM: Equalisation Mode

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

4.4.2.29 Equalisation voltage point setting (EQV)

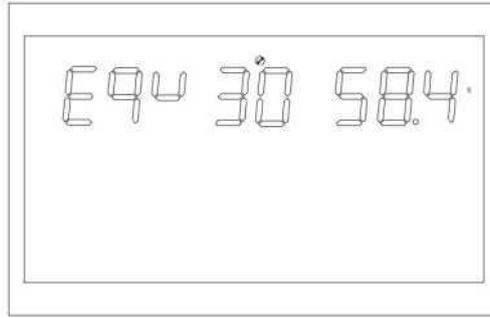


Figure 1-38 Equalisation

Function Description: Equalisation Voltage Point Setting

Setting conditions: all states can be set

Description:

EQV: Equalisation Voltage

All modes can be set.

The initial default value of the equalisation voltage is 58.4V, and the settable range is [48,60].

4.4.2.30 Equalisation charging time setting (EQT)

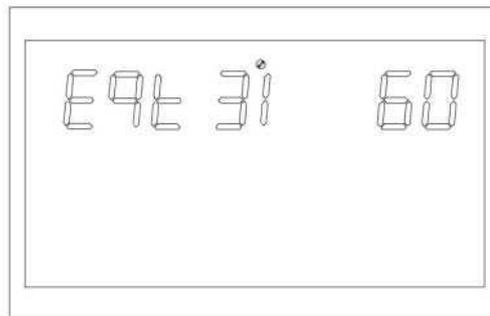


Figure 1-39 Equalisation Charge

Function description: Equalisation charging time setting

Setting conditions: all states can be set

Description:

EQT: Equalisation Time

During the equalisation phase, the controller will charge the battery as much as possible until the battery voltage rises to the battery equalisation voltage. Constant voltage regulation is then used to maintain the battery equalisation voltage. The battery will remain in the equalisation phase until the set battery equalisation time is reached.

The default setting is 60 minutes, and the range can be set to [5,900], with an increment of 5 minutes per setting.

4.4.2.31 Equalisation delay time setting (EQO)

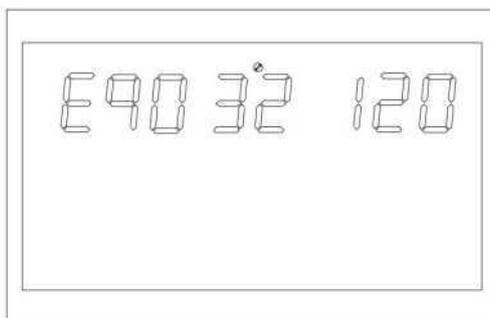


Figure 1-40 Equalisation Delay Time Setting

Page

Function description: Equalisation delay charging time setting

Setting conditions: all states can be set

Description:

EQT: Equalisation Timeout

In the equalisation stage, when the battery equalisation time expires and the battery voltage does not rise to the battery equalisation voltage point, the charge controller will extend the battery equalisation time until the battery voltage reaches the battery equalisation voltage. When the battery equilibrium delay time is finished, the battery voltage is still lower than the battery equilibrium voltage, the charge controller will stop the equilibrium and go back to float charging stage.

The default setting is 120 minutes, and the range can be set to [5,900], with an increment of 5 minutes per setting.

4.4.2.32 Equalisation interval setting (EQI)

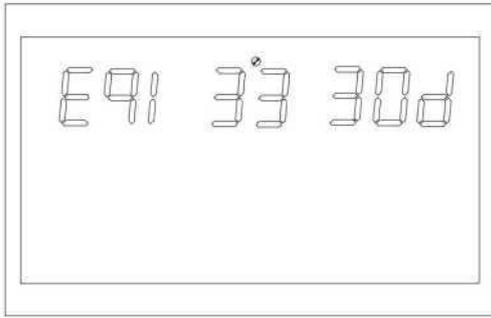


Figure 1-41 Equalisation Interval Setting

Function description: Equalisation charging interval setting
Setting conditions: all states can be set

Description:

EQI: Equalisation Interval

When battery access is detected during the float phase with the equalisation mode on, the controller will begin the equalisation phase when the set equalisation interval (battery equalisation cycle) is reached.

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

4.4.2.33 Enabling equalisation settings immediately (EQN)

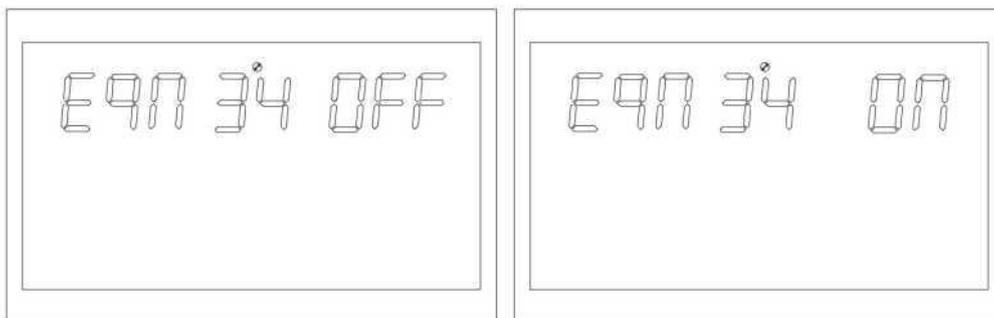


Figure 1-42 Enable Equalisation Settings Page Now

Function: Set whether the inverter immediately turns on the equalisation mode or not

Setting conditions: All states can be set.

Description:

EQN: Enable equalisation mode immediately

The default setting is OFF, the function is not turned on; when it is set to ON, during the float charging phase when the equalisation mode is on and

battery connection is detected, equalisation charging will be activated immediately, and the controller will start to enter the equalisation phase.

4.4.2.34 Grid-tie inverter function (GTI)

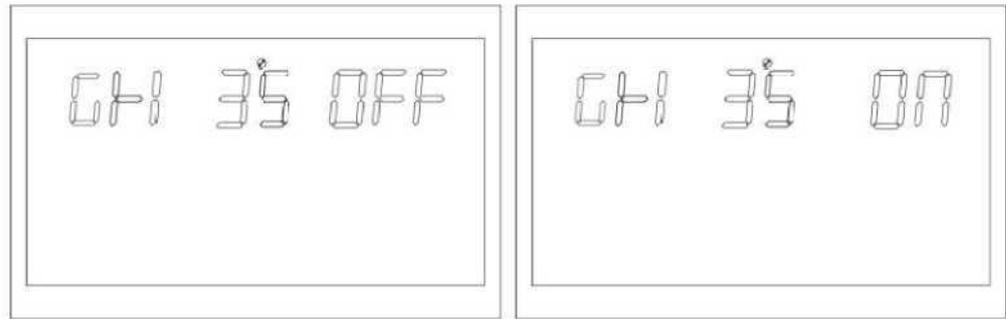


Figure 1-43 Grid-connected inverter function setting

Function Description: Sets whether the inverter is grid-connected to feed power in PV priority utility mode or P B G utility mode.

Setting conditions: Can be set in all states.

Description:

GTI: Inverter to Grid

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

After the function is turned on, if communication abnormality occurs, alarm 56 will be generated, and the inverter will no longer decide the operation logic according to the BMS information.

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

4.4.2.35 Battery dual output low voltage shutdown point (DBV)

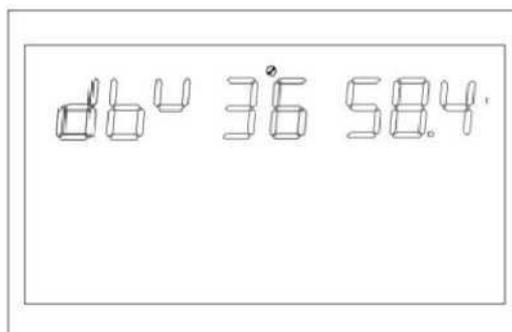


Figure 1-44 Battery Dual Output Low Voltage Shutdown Point Page

Function Description: When 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, the secondary output is turned off. When the battery voltage is again above the setpoint + 1 V/cell, the secondary output turns on.
Setting conditions: Can be set in all states.

Description.

DBV: Dual output cut-off voltage in battery mode

The initial default value of the dual output cut-off voltage in battery mode is 48V, and the settable range is [44,60]. When the set point is higher than the constant voltage charging (CV) point -1V/section, the constant voltage charging point is used as the recovery voltage.

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

4.4.2.36 Battery dual output duration (DBT)

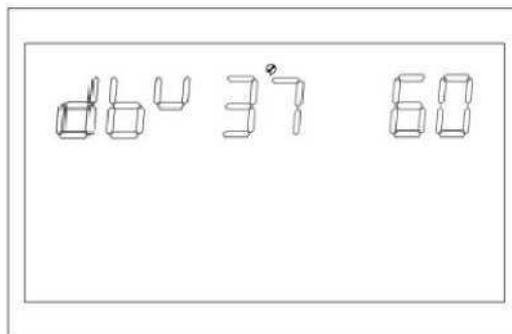


Figure 1-45 Battery Dual Output Low Voltage

Shutdown Point Page

Function Description: When 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, the secondary output is switched off.

Setting conditions: All states can be set.

Description:

DBT: Dual output cut-off voltage shutdown time in battery mode

The default setting is OFF, the function is not turned on, the settable range is [5,890], the unit is minutes. When set to FUL, the secondary output is not limited to the output time.

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

4.4.2.37 BMS communication function (BMS)

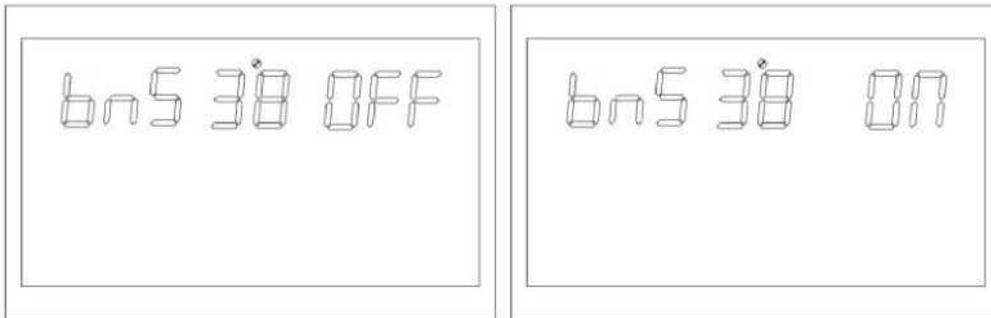


Figure 1-46 BMS Management Function Setting Page

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

Setting conditions: All states can be set.

Description.

BMS: Battery Management System

The default setting is OFF, the function is not turned on; when the setting is ON, the inverter communicates with the lithium battery BMS through the central centralised control board and obtains the battery information.

After the function is turned on, if communication abnormality occurs, alarm 56 will be generated, and the inverter will no longer decide the operation logic according to the BMS information.

*This function needs to be used in conjunction with the centralised control panel.

*This option page is blocked when the centralised hub is not connected.

4.4.2.38 Low SOC shutdown function (BSU)

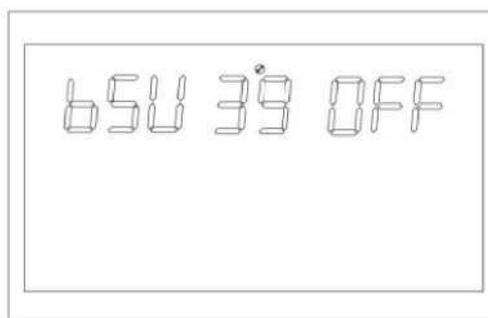


Figure 1-47 Low SOC Shutdown Function Setting Page

Function Description: Set inverter low SO C shutdown

Setting conditions: all states can be set

Description:

BSU :Battery SOC Lock

The default setting is 20, and the setting range is [5,50]. In battery mode, when Li-ion battery SOC reaches the set value, switch off the power, at the same time, alarm 68, clear the alarm 68 when return to the set value + 5%. in standby mode, reach the set value + 10% to turn to battery mode, alarm 69 if not reached. after the function is turned on, when the Li-ion battery SOC reaches the set value + 5%, alarm 69, clear the alarm 69 when return to the set value + 10%.

It can be set to OFF, at this time, the inverter no longer performs shutdown, start-up 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.

*This function needs to be used in conjunction with the centralised control panel.

*This option page is blocked when the centralised hub is not connected.

4.4.2.39 Setting the SOC to Battery Mode (STB)

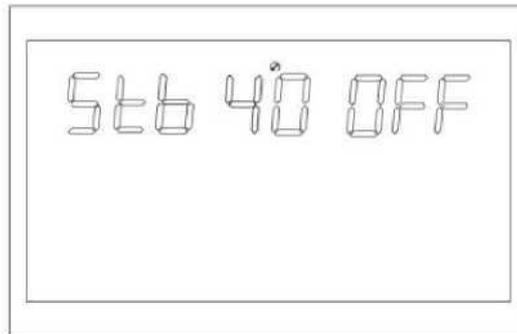


Figure 1-48 Setting the S O C to Battery Mode

Page

Function Description: Setting the inverter to battery mode SO C value

Setting conditions: All states can be set.

Description:

STB:Setting mains to battery mode

The default setting is 90, and the settable range is [10,100]. If PBG priority is set, the mains power is normal and the lithium battery SOC reaches the set value when switching to battery mode.

The inverter can be set to OFF, at which time the inverter no longer cuts the battery mode from the mains mode according to the SOC condition.

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

*This function needs to be used in conjunction with the centralised control panel.

*This option page is blocked when the centralised hub is not connected.

4.4.2.40 Low SOC to mains function (STG)



Figure 1-49 Low SO C to mains function

setting page

Function Description: Sets the inverter to mains mode SOC value.

Setting conditions: Can be set in all states.

Description:

STG:Battery low SOC to mains mode

The default setting is 50, and the settable range is [10,90]. Set PBG priority, normal utility power, switch to utility mode when Li-ion battery SOC reaches set value in battery mode.

The function can be set to OFF, at this time, the inverter will no longer switch from battery mode to mains mode 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.

*This function needs to be used in conjunction with the centralised control panel.

*This option page is blocked when the centralised hub is not connected.

4.5 Description of faults and alarms

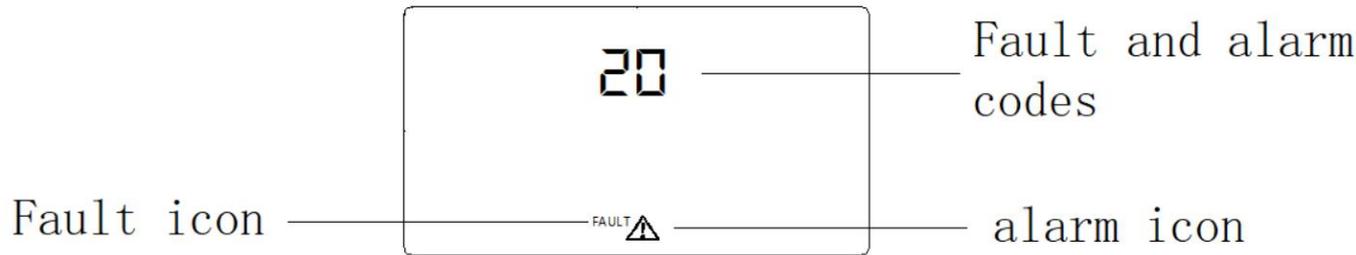


Figure 1-50 Fault and Alarm Icons

Function Description: Alarm code ALA flashes and buzzer beeps for 1 second and stops for 1 minute. Fault indicator code is always on and the buzzer sounds for 10 minutes.

Stopped after seconds, fault removed after stopping, attempted to restart the machine, failed to restart six times, it persisted in a faulty state. Need to completely power off (rest screen) or wait 30 minutes before restarting the machine.

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

4.5.1 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

Fault Code	Malfunctions	Related actions	Trigger condition	Recovery conditions	Fault Alerts
1	Bus Boost Soft Start Failure	rotation fault paradigm	Set voltage cannot be reached during busbar soft start	unrecoverable	malfunctions
2	Busbar overpressure	failover mode	Busbar higher than set value	unrecoverable	malfunctions
3	Busbar undervoltage	failover mode	Busbar below set value	unrecoverable	malfunctions
4	Battery overcurrent	failover mode	Battery current transients above 580A, immediate protection	unrecoverable	malfunctions
5	Overheating	failover mode	Temperature sensor of PFC or INV is higher than the over-temperature setpoint.	Failed to restart six times after restarting the function.	malfunctions

				unrecoverable	
6	Battery overvoltage	failover mode	Battery voltage higher than set value	recoverable	malfunctions
7	busbar flexible malfunction	failover mode	DC soft start voltage for busbar not reaching set value	unrecoverable	malfunctions
8	Busbar short circuit	failover mode	During normal operation, the busbar momentarily falls below the set value.	unrecoverable	malfunctions
9	Inverter soft start failure	failover mode	Inverter soft start for a period of time, but still can not reach the rated output voltage	unrecoverable	malfunctions
10	Inverter output overvoltage	failover mode	Battery mode, inverter voltage higher than set value	unrecoverable	malfunctions
11	Inverter output undervoltage	failover mode	Battery mode, inverter voltage below set value	unrecoverable	malfunctions
12	inverter short circuit	failover mode	Inverter voltage momentarily less than set value, current momentarily greater than set value	Failure to reboot six times Failure to reboot, not recoverable	malfunctions
13	negative power protection	failover mode	The inverter power is less than the set value for a certain period of time.	unrecoverable	malfunctions
14	overloaded fault	failover mode	Loads out of specification	After restarting the function, the fault restarts six times lost irreversible	malfunctions

15	Malfunction of the machine type	failover mode	Mismatch between machine model recognised by software and hardware detection	unrecoverable	malfunctions
16	No bootloader	failover mode	No bootloader	unrecoverable	malfunctions
17	PV programme Sequence Burning	failover mode	Burning PV control programme.	Recover after burning	malfunctions
19	Same serial number	failover mode	In parallel mode, multiple machines with the same serial number are detected.	unrecoverable	malfunctions
20	CAN communication incorrect	failover mode	In parallel mode, the CAN Bus communication abnormality	unrecoverable	malfunctions
21	Battery differential pressure too high	failover mode	Excessive battery pressure difference between different machines in parallel mode	unrecoverable	malfunctions
22	Input voltage Differential voltage too large	failover mode	Excessive pressure difference between the inputs of different machines in parallel mode	unrecoverable	malfunctions
23	Input voltage Frequency difference	failover mode	Excessive difference in input voltage and frequency between different machines in parallel mode	unrecoverable	malfunctions
24	Asynchronous Setting of Output Parameters	failover mode	In three-phase parallel mode, there is a phase loss in the parallel mode setting of different machines.	Resumes when the setting is set to single-phase operation or when the three-phase operation setting conditions are met.	malfunctions

25	Output out of step	failover mode	Output voltage detection out of sync in parallel mode	unrecoverable	malfunctions
26	BMS failure	failover mode	Battery BMS presence fault message	Turn off BMS communication Function or BMS Fault Elimination Recovery	malfunctions

4.5.1 Description of alarms

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

Alarm Code List

Alarm Code	Chinese Meaning	Related actions	trigger condition	Recovery conditions	Fault Alerts
50	Battery not connected	Alarm, battery not charging	Battery voltage below 8V/section	recoverable (10V/section)	warning
51	Battery low voltage shutdown	Alarm, battery low voltage shutdown or unable to power on	Battery voltage below 10.5V/section (default)	Recoverable (10V/section + 0.2* N) (Number of battery cells)	warning
52	Battery Low Voltage	warning	Depending on the bAL setting	Recoverable (Action Points + 0.2V/section)	warning
53	Charger short circuit	Alarm, Battery Not Charging	Battery voltage less than 5V and charging current Greater than 4A	unrecoverable	warning
54	Low Power Discharge	warning	Battery discharged beyond set low power discharge time	Recoverable (battery voltage above 13.2V/section)	warning

55	Battery overcharge	Alarm, battery not charging	Battery voltage higher than set value	recoverable	warning
56	BMS lost	Alarm, Lockout standby mode	BMS Communication Function Failed to communicate when turned on.	recoverable	warning
57	overheating	Alarms. Battery not charging	PFC or INV temperature Degree sensor higher than set value	Temperature sensor for PFC or INV below set value	warning
58	fan failure	Alarm, if one fan fails, the other fan spins at full speed	Fan speed signal not detected	recoverable	warning
59	EEPROM failure	warning	EEPROM read/write fail (e.g.	unrecoverable	warning
60	overloaded	Alarm, battery not charging	Load >102 per cent	recoverable (Load <97 per cent)	warning
61	generator wave metaphysical anomaly (geology)	Alarm, Continuous Operating in Battery Mode	Generator waveforms Detecting anomalies	recoverable	warning
62	Weak PV energy	Turns off PV output and charging	Bus voltage below set value when battery is not connected	Recover in 10 minutes	warning
63	loss of synchronisation	Alarm, Failure Mode	Parallel board disconnection fault	Switch to stand-alone mode or disconnect troubleshooting	warning

64	Incompatible parallel settings	Alarm, Go to Failure Mode	Three-phase parallel with out-of-phase setting	Restore when three-phase setting is correct	warning

65	parallel version incompatible	Alarm, Failure Mode	Incompatible version numbers exist for the parallel system	Resume when all machine versions in the parallel system are compatible.	warning
66	Parallel communication failure	Alarm, Go to Failure Mode	Slave not detected in parallel system	Recover after detecting slave access under parallel system, set to stand-alone mode and recover.	warning
67	Parallel Utility Difference	warning	Excessive error in the mains voltage or frequency of parallel machines.	Resumes when reasonable errors in mains voltage and frequency are detected for each machine.	warning
68	Low SOC shutdown	Alarm, Failure Mode	Li-ion battery SOC below set value	Turn down the SOC shutdown setting or turn off the BMS communication function or SOC. Restore to Settings	warning
69	low SOC	Alarm, if in standby mode, maintain standby mode without power on	Lithium Battery SOC Below setpoint + 5%	disable SOC shutdown function or turn off BMS	warning
			(mains mode or battery mode), +10% below set value (standby mode)	communication function, or SOC restored to set Restored at +10 per cent of constant value	

Chapter 5 Introduction and Installation of the system

5.1 Safety Precautions

- If the battery is stored for a long period of time, it needs to be recharged every three to six months and the SOC should be no less than 80%.
- If the battery is fully discharged, it needs to be recharged within 12 hours.
- Do not connect the battery to the photovoltaic solar energy directly with.
- It is prohibited to insert any foreign object into any part of the battery.
- Always disconnect power from the grid and make sure the battery is in the off mode before installation.
- The embedded BMS in the battery is designed for 48VDC, please do not connect the batteries in series.
- Prohibit connection of batteries to different types of batteries
- Before connecting more than two batteries in parallel, make sure that the battery SOC and voltage should be at the same level.
- If it is necessary to move or repair the battery system, the power must first be disconnected and the battery completely shut down.
- In the event of a fire, only dry powder fire extinguishers may be used, and the use of liquid fire extinguishers is prohibited.
- Do not open, repair or disassemble the battery. We do not accept any responsibility or liability for the consequences of any violation of safe operation or of design, production and equipment safety standards.

5.2 Connections

Batteries are combined by stacking



5.3 Parallel use of batteries

After the batteries are combined by stacking, press the power-on keyswitch in sequence, the sequence first presses the slave power-on switch, and finally opens the power-on switch connected to the system host battery, and the system is powered on and auto-encoded.

Press and hold the main unit for more than 15 seconds to reassign the address.

Note: The last battery that pressed the switch button is the main unit battery.

Chapter 6 Technical parameters

Table 1 Line pattern specifications

Item no#	ESSD-OH5-BAT5-X
Input Voltage Waveform	Sinusoidal (electric or generator)
Rated Input Voltage	230Vac
AC Low Voltage	185Vac (UPS); 90Vac (domestic loads)
AC Low Voltage	185ac+10V (UPS);90+10V (domestic loads)
AC High Voltage	264Vac (UPS); 280Vac (domestic loads)
AC High Voltage	264ac-10V (UPS);280-10V (domestic loads)
Rated Input Frequency	50Hz / 60Hz (automatic monitoring)
AC Frequency Low	40±1 Hz
AC frequency low	42±1 Hz
AC Frequency High	70±1 Hz
AC frequency high	65±1 Hz
Input short circuit	interrupter
Efficiency (line mode)	>95% (rated R load, fully charged battery)
conversion time	10 ms typical, 20 ms max @ individual <30 ms @ parallel
Output power derating: when the AC input voltage drops to 170V, the output power is derated.	<p>The graph illustrates the output power derating characteristics. The x-axis represents Input Voltage (V) with key points at 90V, 170V, and 280V. The y-axis represents Output Power. The power is zero for input voltages below 90V. At 90V, the power begins to rise linearly, reaching the Rated Power level at 170V. From 170V to 280V, the output power remains constant at the Rated Power level. Beyond 280V, the output power drops to zero.</p>

Table 2 Inverter mode specification table

Inverter Model	OH5000TL
Rated output power	5KVA/5KW
Output Voltage Waveform	pure sine wave
Output Voltage Adjustment Rate	230Vac±3%
output frequency	50Hz/60Hz
Rated output current	21.7A
peak efficiency	>93 per cent
overload protection	5s@>150% load; 10s@110%~150% load
peak power	2x rated power for 5 seconds
Rated Battery Input Voltage	48Vdc
Cold Start Voltage (Lead Acid Mode)	48Vdc
	Default 30%, Low DC cut-off SOC +5%
Battery low voltage warning point (lead acid mode)	44.0Vdc
Battery low voltage recovery point (lead-acid mode)	46.0Vdc
Battery low voltage shutdown point (lead acid mode)	42.0Vdc
Battery SOC low alarm (lithium mode)	+5% above shutdown point SOC
Battery power SOC low recovery (lithium)	+10% above shutdown point SOC
Battery charge SOC low shutdown	Default 20% of shutdown point, 5%~50% can
Battery High Voltage Recovery Point	58Vdc (C.V. charging voltage)
Battery voltage shut-off point	64Vdc
No-load power consumption	<60W

Table 3 Charging mode specification table

Mains charging mode

Inverter Model		OH5000TL
Charging Algorithm		3-Step
Maximum AC charging current		80Amp (@VI/P=230Vac)
Constant voltage charging	water-filled battery	58Vdc
	lead-acid battery	56.4Vdc
Float Charge Voltage		54Vdc
Charging curve		
MPPT solar charging mode		
PV Input Maximum Power		5500W
PV Input Maximum Current		18A
starting voltage		150Vdc±10Vdc
MPPT operating voltage		120Vdc~430Vdc
PV Maximum Open Circuit Voltage		500Vdc
PV Maximum charging current		80A
Maximum charging current (combined AC & PV charging)		80A

Table 4 General specifications

Inverter Model	OH5000TL
operating temperature	0°C ~40 °C
Storage temperature	-15°C~ 60 °C
humidity level	5% to 95% relative humidity (no frost)
altitude	<2000m
Dimensions (H x W x D) mm	485 x 300 x 120
Net weight kg	9.5

Chapter 7 Operation Guide of User Account Registration and WiFi Dongle Network Configuration

7.1 Web registration

7.1.1 Register an account

(1) Enter the neutral website <https://mini-ems.com> into the browser to enter the web login interface.

(2) Click the "Register" button on the main interface to start registering a user account .

(Figure 1)



(Figure 1)

(3) Fill in the corresponding information as prompted and click the "Register" button. Please contact the dealer to obtain the verification code required in the prompt. (As shown in Figure 2)

Register

* User Name :

* Login Account :

* Verification Code :

* Login Password :

* Password Again :

E-mail :

Cell Number :

* Country :

Complete Address :

(Figure 2)

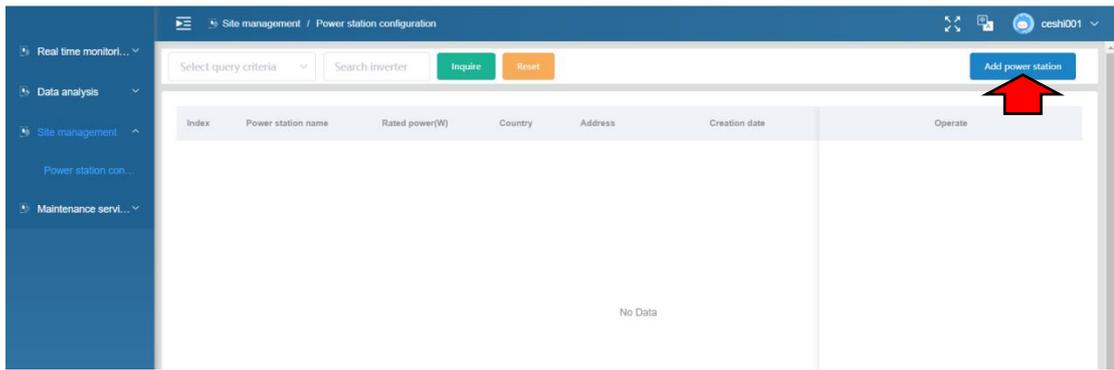
7.1.2 Add power station

(1) Fill in the registered account number and password and log in to the website. (As shown in Figure 3)



(Figure 3)

(2) Select the power station configuration and click the "Add Power Station" button. (As shown in Figure 4)



(Figure 4)

(3) Fill in the actual information as prompted and click the "Add" button. (As shown in Figure 5)

Basic Information

* Power station name : Jack 5000

* Latitude & longitude : 106.965365,35.905122

* Rated power(W) : 5000

* Country : Asia / East Asia / China

* Power Price : 1.5 Choose currency

Complete Address : ua Road, Guangming District, Shenzhen City, Guangdong Province, China

Add **Close**

(Figure 5)

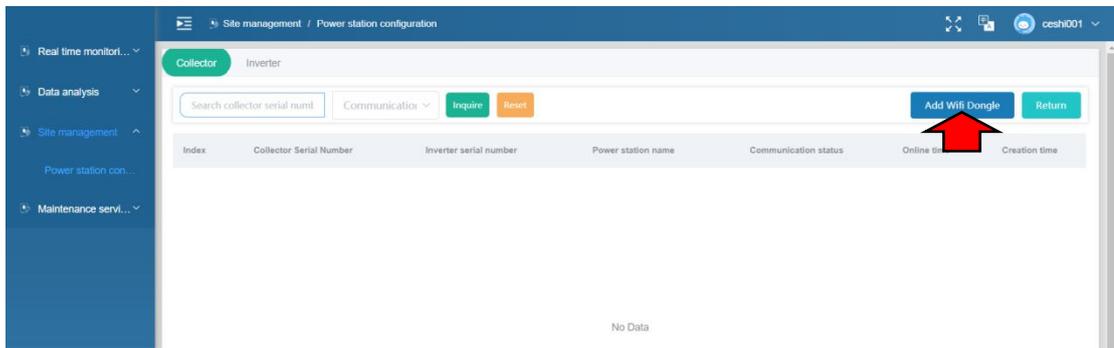
7.1.3 Add Collector

(1) In the power station configuration, find the newly built power station and click the "Set Collector" button. (As shown in Figure 6)



(Figure 6)

(2) Click the "Add Collector" button. (As shown in Figure 7)



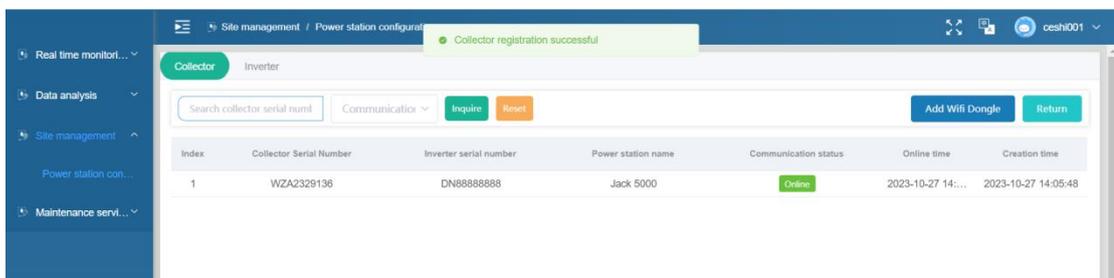
(Figure 7)

(3) Fill in the serial number and verification code on the back of the WIFI Dongle , and then click the "Add" button to complete the collector entry. (As shown in Figure 8)



(Figure 8)

(4) The website interface displays the collector information and the entry is completed. (As shown in Figure 9)



(Figure 9)

7.2 APP registration

7.2.1 APP download

(1) In the Google App Market, you can download the Neutral MiniEMS App.

7.2.2 Account registration

(1) Open the APP (Picture 10), click Register on the homepage (Picture 11), and enter the registration interface.

(2) Fill in the corresponding information as prompted and click register (Figure 12)



(Figure 10)



(Figure 11)



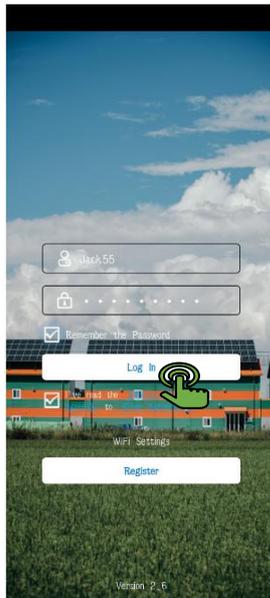
(Figure 12)

7.2.3 Add power station to APP

(1) Log in to the newly registered account on the APP homepage (Figure 13)

(2) Click to add a power station in the power station list (Figure 14), and fill in the corresponding information as prompted (Figure 15)

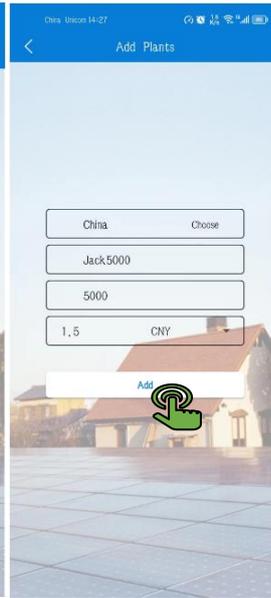
(3) Addition completed (Figure 16)



(Figure 13)



(Figure 14)



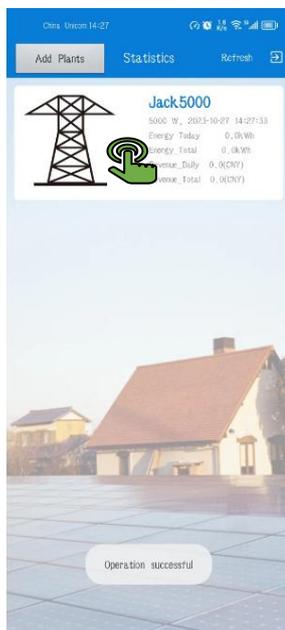
(Figure 15)



(Figure 16)

7.2.4 Add Collector (WIFI Dongle)

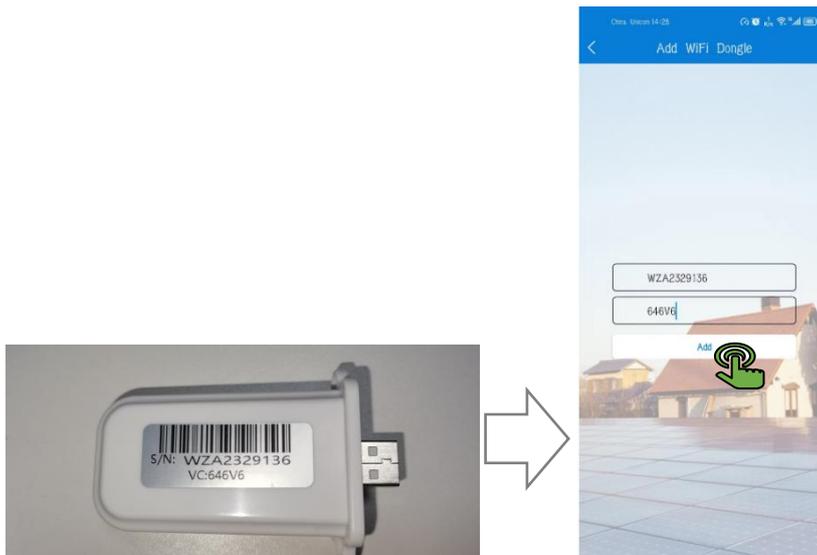
- (1) In the power station list, click on the corresponding power station to enter the power station overview.
- (2) Click on the collector and fill in the WIFI serial number and verification code as prompted.
- (3) Click OK to complete the addition



(Figure 17)



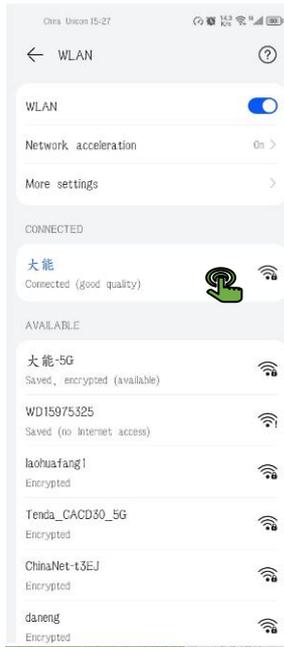
(Figure 18)



(Figure 19)

7.2.5 Router configuration

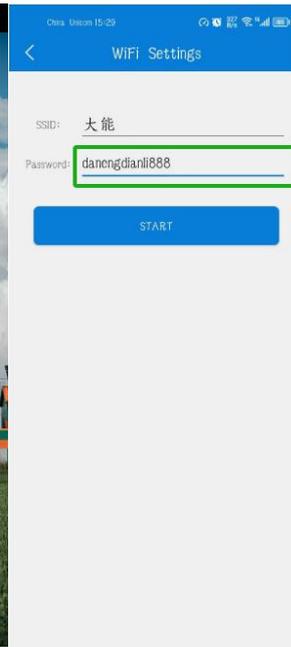
- (1) Power on the inverter and ensure that the inverter is within the wireless signal coverage of the router.
- (2) Enable the WPS function in the router settings.
- (3) If it is a WiFi where 2.4G and 5G are integrated into one, please turn off the integration function. Let 2.4G and 5G frequency WiFi be displayed separately.
- (4) The mobile phone is connected to 2.4G WiFi and the inverter is within the coverage of this WiFi (Figure 20).
- (5) Open the Neutral App, click the "WiFi Settings" option (Figure 11), agree to authorize the App's positioning permission (Figure 21), and enter the WiFi password (Figure 22) .
- (6) Insert the data collector into the USB interface below the inverter (Figure 23) .
- (7) While waiting for the blue and green lights of the data collector to flash slowly (**old devices need to short press the WIFI Dongle reset button in this step**) , click "Start" on the app and try to connect (as shown in Figure 24/25); when the App interface displays Content: The network distribution is successful, indicating that the network distribution is completed (Figure 26) . After the network configuration is completed, wait until the blue and green lights of the data collector are on and the data collector is successfully connected to the network (Figure 27) .



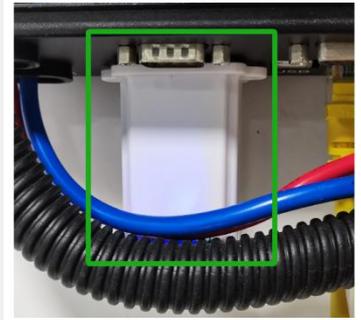
(Figure 20)



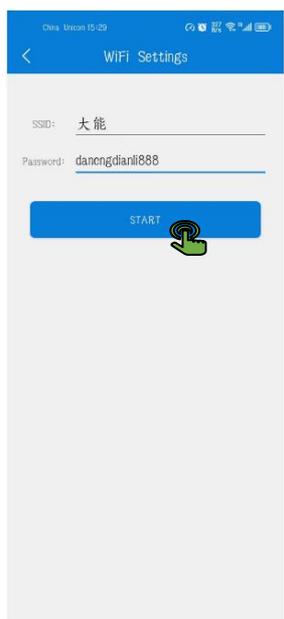
(Figure 21)



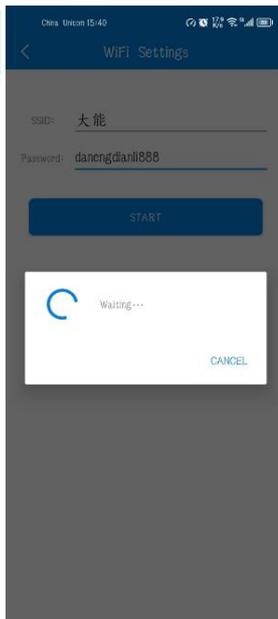
(Figure 22)



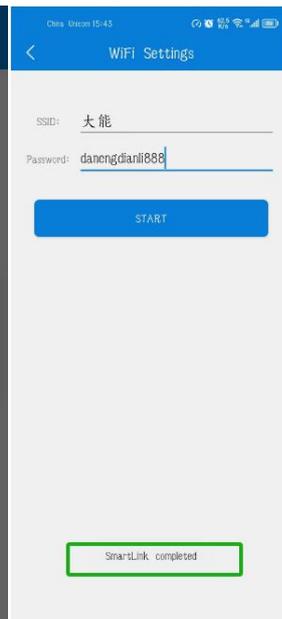
(Figure 23)



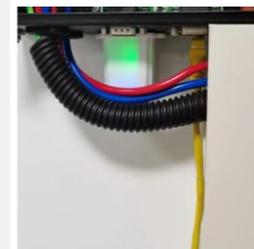
(Figure 24)



(Figure 25)



(Figure 26)



(Figure 27)

Note: The prompt information on the IOS APP will be slightly different from the Android APP.

7.3 LED Status Description on WIFI Dongle

Indicator color	Status description	
	Blue	Green
USB not recognized	Not bright	Not bright
USB recognized	Slow flash	Not bright
Configuration phase	Slow flash	Not bright
Networking successful	Slow flash	Always on
Allow APP to configure network	Slow flash	Slow flash
Connect to server	Always on	Always on

7.4 FAQ of WIFI Configuration

7.1 The WIFI Dongle cannot connect to the network ?

- (1) Move the wireless router closer to the inverter, or use a wireless signal amplifier.
- (2) The WIFI Dongle only supports connection to the 2.4GHz frequency network.
- (3) The wireless name of the router should be composed of English and numbers. Chinese names and special characters are not supported.
- (4) The router is prohibited from using the dual-band function.
- (5) If you use the WPS direct connection function, check whether the router supports the WPS function.
- (6) When using the APP to configure the network, the network configuration must be allowed when the two indicators flash slowly.
- (7) Press and hold the reset button for more than 10 seconds to reset the WIFI Dongle and then power on again to configure the network.

7.2 When using the APP to configure the network for the WIFI Dongle, cannot the network currently connected to the phone be retrieved?

- (1) Exit the APP first, and then re-enter the WIFI setting interface.
- (2) Check whether the network currently connected to the mobile phone is 2.4Ghz frequency.

7.3 Can't find the "XXXXXXXXXX" serial number (please check the label on the back of the WIFI Dongle for the serial number)?

- (1) Please confirm that the inverter is powered on and the WIFI Dongle is plugged in.
- (2) If the WIFI Dongle has been reset, it will be named LPT-230 and will be automatically renamed "XXXXXXXXXX" later.
- (3) Press and hold the reset button for more than 5 seconds to reset the WIFI Dongle and then power on again to configure the network.

7.4 After the configuration is completed, the blue and green lights are always on, but the status is still displayed as offline on the monitoring website?

- (1) Wait five minutes before checking the website data.
- (2) Recheck whether the registered WIFI serial number is consistent with the current WIFI Dongle serial number.
- (3) Restart the WIFI Dongle.