Off-Grid Inverter

User Manual

HE200-2500-O

■ Please read this Manual carefully and understand the content, so as to correctly install and use the converter.

■ Please give this Manual to the end user and properly keep it.

■ The technical specifications of the converter is subject to change without prior notice.

2HE20251204-1.0 Version A

English

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Note

Inverter models of HE200-2500-O:
Where: O: Use with 12V battery;
MPPT: Max power point tracking;
UPS: Uninterruptible power supply;
BMS: Battery management system;
AGM: Absorbent glass mat;
FLD: Fluoride ion battery;
LIB: Lithium-ion battery;
CUS: Customer set type;
APP: Application;
GEN: Generator;
PV: Photovoltaic;
SOC: State of charge;
EEPROM: Erasable programmable read-only memory.

1. Manual Information

1.1 Validity

This manual is applicable to the following equipment:
HE200-2500-O Inverter

1.2 Scope of Application

This manual describes the assembly, installation, operation, and troubleshooting of the equipment. Please read this manual carefully before installation and operation.

1.3 Target Population

This document is intended for qualified personnel and terminal users. Qualified personnel must possess the following skills:

- Understand the working principle and operation of the inverter;
- Know the dangers and risks involved in the installation and operation of electrical equipment and units;
- Pass the training on the installation and commissioning of electrical equipment;
- Be familiar with relevant standards and directives;
- Be aware of all safety information in this manual.

1.4 Label Instructions

To ensure the safety of users when operating this product, the inverter and manual include relevant label information and appropriate symbols to remind users. Users should carefully read the symbols used in this manual.

Inverter labels

	Caution Do not disconnect under load!
	Danger: High voltage! Danger: Risk of electric shock!
	Maintenance on the inverter should only be performed after disconnecting all external power sources for at least 5 min.
	Read the instructions carefully before performing any operation on the inverter.
	Grounding: For the operator's safety, the system must be properly grounded.

Document labels

 Warning!	High risk: Failure to avoid may result in death or serious injury.
 Caution!	Medium/low risk: Failure to avoid may result in moderate or minor injury. In certain severe conditions, this may result in death or serious injury.

1.5 Safety Instructions



Warning!

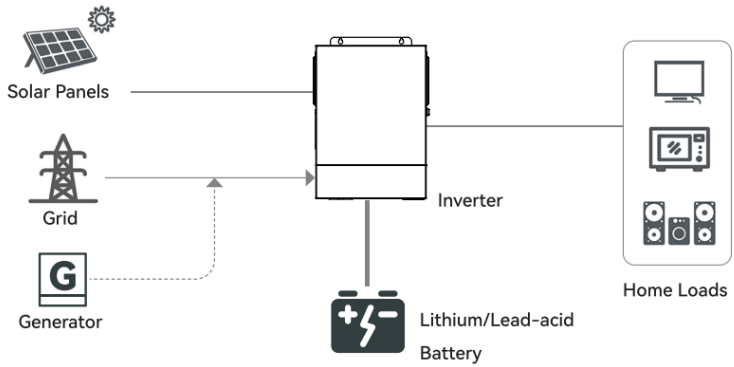
This chapter contains important safety and operational instructions. Read and keep this manual for future reference.

01. Please clearly identify the battery system you are using - whether it is a lithium battery system or an AGM system. If you set up the wrong system, the energy storage system will not operate correctly.
02. Before using the equipment, please read all instructions and warning labels on the equipment and battery, as well as all related sections of this manual. If the equipment is installed incorrectly and this leads to damage, the company reserves the right to void the warranty.
03. All operations and connections should be carried out by a qualified electrical engineer.
04. All electrical installations must comply with local electrical safety standards.
05. When installing PV modules during the day, installers should cover the modules with opaque materials. Otherwise, the terminal voltage of the modules will become dangerously high under sunlight.
06. Note: To minimize the risk of injury, only charge AGMs and lithium batteries. Other types of batteries may explode, causing personal injury and damage.
07. Do not disassemble the equipment. If maintenance is required, send it to a qualified service center. Incorrect reassembly may lead to the risk of electric shock or fire.
08. To reduce the risk of electric shock, ensure that all wiring is disconnected before performing any maintenance or cleaning. Simply turning off the equipment does not eliminate the risk of electric shock.
09. Never charge frozen batteries.

10. To ensure optimal performance of this inverter, select the appropriate cable size according to electrical specifications.
11. Be very cautious when working with metal tools on or around the battery. Dropping tools could create sparks, cause the battery or other electrical components to short-circuit, and potentially lead to an explosion.
12. When disconnecting AC or DC terminals, strictly follow the installation procedure. For detailed instructions, please refer to the “Installation” section of this manual.
13. Grounding instructions: This inverter should be connected to a permanent grounding system. Ensure compliance with local requirements and regulations when installing this inverter.
14. Never cause a short circuit between the AC output and DC input. Short circuits can cause equipment damage and jeopardize personal safety.
15. Make sure the inverter is completely assembly, before the operation.

2. Introduction

This is a multifunctional solar inverter, integrated with a MPPT solar controller, a high frequency pure sine wave inverter and a UPS function module in one machine, which is perfect for off grid backup power and self-consumption applications.



Solar Storage System

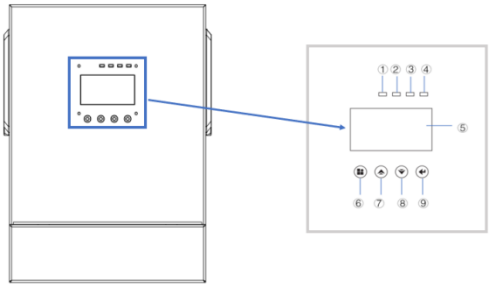
The whole system also need other devices to achieve complete running such as PV modules, generator, or utility grid. Please consult with your system integrator for other possible system architectures depending on your requirements.

2.1 Features

- PV, Grid, and batteries can simultaneously supply power to the load.
- MPPT range: 17-115V DC.
- High-frequency inversion, compact size, and light weight.
- Pure sine wave AC output.
- Battery must be connected.

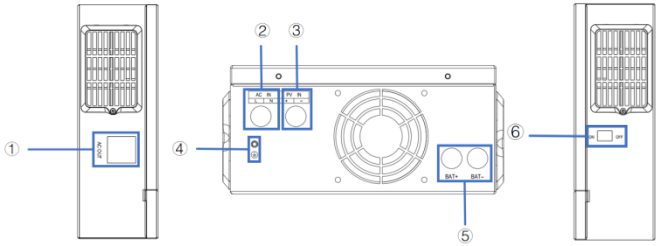
2.2 Product Overview

2.2.1 LCD Screen Introduction



① AC indicator light	④Fault indicator light	⑦ Up button
② Inverter indicator light	⑤ LCD screen	⑧ Down button
③ Charging indicator light	⑥Exit button	⑨ Enter/OK button

2.2.2 Port Introduction



① AC Output	④ Grounding
② AC Input	⑤ Battery Input
③ PV Input	⑥ ON/OFF

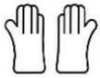
3. Installation

3.1 Unpacking and Inspection

3.1.1 Unpacking and Inspection

The product has undergone strict testing before leaving the factory. Please inspect the product upon receipt. If the product is damaged, contact the local distributor immediately.

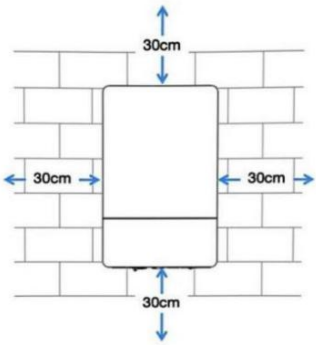
3.1.2 Installation Tools

Installation Tools	Multimeter 	Protective gloves 	Insulated anti-crushing shoes 
	Safety glasses 	Anti-static wrist strap 	Hammer drill 
	Electric screwdriver 	Cross screwdriver 	Rubber hammer 
	Level 	Wire cutters/strippers 	Terminal crimping tool 

3.1.3 Packing List

S/N	Item	Quantity	Description	Note
1	Inverter	1		
2	Accessories for installation	1		
3	User Manual	1		

3.2 Installation



Before selecting the installation location, please consider the following points:

- Do not install the inverter on flammable building materials.
- Install the inverter on a solid surface.
- For optimal performance, the ambient temperature should be between -10°C and 60°C.
- It is recommended to install the inverter vertically on the wall.
- Ensure adequate clearance around the inverter for proper heat dissipation and to allow space for wire removal.
- Install the inverter in a location where rainwater will not enter.

Warning!

The inverter is only suitable for installation on non-combustible surfaces, such as concrete.

Inverter Installation Steps:

1) Back-mounted installation

1. Remove the relevant accessories from the accessory box. Use M5 screws to attach the spring hooks and plastic tubes to the back of the inverter housing.



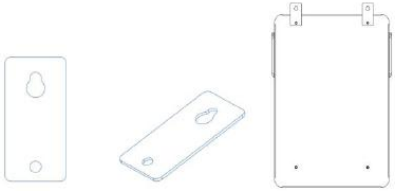
2. Use expansion screws and anchors to secure the mounting bracket to the wall. Hang the inverter on the bracket and secure the spring hooks with a screwdriver from the top.





2) Hanging installation

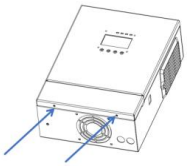
1. Use M5 screws to secure the circular hole at the end of the hanging bracket to the upper part of the inverter housing, and tighten it.



2. Once the hanging bracket is installed, secure the inverter to the installation location.

3.3 Inverter Connection

Before connecting any wires, remove the two screws on the bottom cover and open the top cover, as shown below:



Caution!

Before connecting to the AC input power, install a separate AC circuit breaker between the inverter and the AC input power. This ensures that the inverter can be safely disconnected during maintenance and fully prevents overcurrent in the AC input. For the HE200-2500-O Inverter, the recommended AC circuit breaker specification is 16A.

Caution!

Ensure that the live (L) and neutral (N) lines for the AC input are connected correctly. If the live (L) and neutral (N) wires are reversed, it may cause a short circuit when the inverter is running in parallel.

Caution!

Before connecting the PV modules, install a separate DC circuit breaker between the inverter and the PV modules.

Caution!

To ensure safe operation and regulatory compliance, a separate DC overcurrent protection device or disconnecting units should be installed between the battery and the inverter. In some applications, disconnecting units may not be required, but overcurrent protection devices should still be installed. Recommended sizes for protection or disconnect unit: For HE200-2500-O, use 150A.

Warning!

Do not ground the positive or negative terminals of the PV modules. Doing so may severely damage the inverter.

Warning!

Direct sunlight generates lethal high voltage in the PV strings, so strictly follow the safety precautions listed in the PV string and related documentation.



Warning!

Ensure that the PV input cables are connected to the corresponding terminals on the inverter. Reversed polarity may damage the inverter.



Warning! Risk of Electric Shock

Due to the high voltage in series-connected batteries, installation must be carried out with caution.



Warning!

All wiring must be performed by qualified personnel.



Danger!

Ensure that the grounding wire is securely connected to prevent the risk of electric shock.



Warning!

- The external grounding protection point provides reliable grounding. Do not use inappropriate grounding conductors, as this may lead to product damage or personal injury.
- If unsure about the grounding connection, consult a professional for proper guidance.



Warning!

Use the appropriate cables to connect the inverter. To minimize system safety risks, please use the recommended cable sizes below.

Recommended Cable Sizes for Connection

Cable category	Cable type	HE200-2500-O Inverter cable specifications
AC input cable	US standard specifications	16AWG
	National standard specifications	2mm²
AC output cable	US standard specifications	16AWG
	National standard specifications	2mm²
PV input cable	US standard specifications	14AWG
	National standard specifications	4mm²

Battery input cable	US standard specifications	2AWG
	National standard specifications	25mm²

Caution!

Before making the final DC connections or closing the DC circuit breaker/disconnect switch, ensure that the positive (+) terminal is connected to the positive (+), and the negative (-) terminal is connected to the negative (-).

Warning!

Do not close any AC/DC circuit breakers before completing the electrical connections.
All operations during the electrical connection process and the specifications of the cables and components used must comply with local laws and regulations.

3.4 Photovoltaic module configuration

When configuring photovoltaic modules, please make sure to meet the following inverter parameters:
1. HE200-2500-O inverter allows the input voltage range of photovoltaic modules to be 17-115Vdc;
2. HE200-2500-O inverter allows a maximum input current of 16A for photovoltaic modules;

When configuring photovoltaic modules, follow the following steps:
1. Check the technical parameters of the photovoltaic modules used, such as open circuit voltage and short-circuit current.
2. When configuring photovoltaic modules, it is recommended to use them in series to improve the input voltage of photovoltaic modules. The total voltage after series connection shall be within the range of 17-115Vdc, and some allowance shall be reserved to prevent voltage fluctuation from being overpressure. It is recommended that the maximum calculated value is 110V.
For example, if the open circuit voltage of a photovoltaic module is 40V, it is recommended to connect up to 2 photovoltaic modules in series.
3. Check that the short-circuit current of the photovoltaic module does not exceed the input current allowed by the inverter.

Example: Configuring photovoltaic modules with HE200-2500-O inverter
Photovoltaic module parameters: maximum power: 450W; maximum voltage: 41.76Vdc; Maximum current: 10.78A; open circuit voltage: 50.12Vdc; Short circuit current: 11.67A.

Suggest connecting up to 2 photovoltaic panels in series! Cannot be connected in parallel!

3.5 Battery connection

For the HE200-2500-O Inverter: Users can choose an appropriate capacity AGM with a rated voltage of 12V.

Additionally, you should select the battery type as either “AGM” or “FLD”.

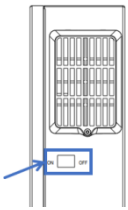
Note: For AGMs, the recommended charging current is 0.3C (C > battery capacity).

Connect all battery packs according to the equipment requirements. It is recommended to connect batteries with a min capacity of 200Ah.

4. Operation

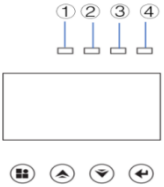
4.1 Power ON/OFF

After the equipment is correctly installed, press the ON/OFF switch (located on the casing button) to power on the equipment.



4.2 Operation of Display Panel

The display panel is shown in the image below and includes four indicator lights, four function buttons, and an LCD screen that displays operational status and input/output power information.



LED indicator light			Meaning
①AC	Status indicator light (Green)	Constant	Normal Grid, entering Grid operation.
		Flashing	Normal Grid, but not yet in Grid operation.
		Off	Abnormal Grid.
② Inverting	Inverter indicator light (Yellow)	Constant	Battery mode, output powered by battery or PV.
		Off	Other status.
③ Charging	Charging indicator light (Yellow)	Constant	Battery in float charge status.
		Flashing	Battery in constant voltage charging status.
		Off	Other status.

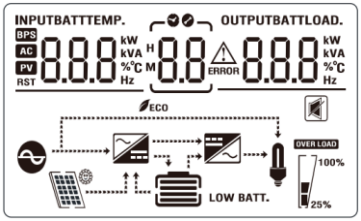
④Fault	Fault indicator light (Red)	Constant	Inverter fault.
		Flashing	Inverter warning.
		Off	Inverter operating normally.

Function button



Button	Description
ESC	Exits the current setup mode
UP	Moves to the previous selection
DOWN	Moves to the next selection
ENTER	Confirms the selection in the setup mode or enters setup mode

4.2.1 LCD Display Icon

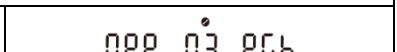


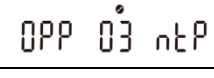
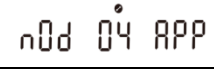
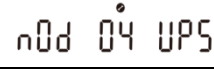
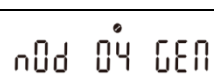
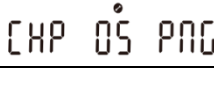
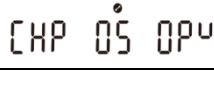
Icon	Description
AC input information	
	AC input icon
	Indicates AC input power, AC input voltage, AC input frequency, and AC input current.
PV input information	
	PV input icon.
	Indicates PV power, PV voltage, PV current, etc.
Output information	
	Inverter icon.
	Indicates output voltage, output current, output frequency, and inverter temperature.
Load information	
	Load icon.

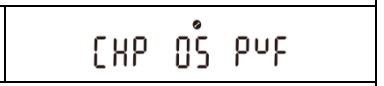
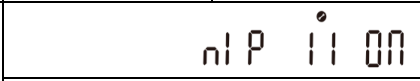
	Indicates load power and load power percentage.
	Indicates overload occurrence.
Battery information	
	Battery mode: battery charge is indicated in 0-24%, 25-49%, 50-74%, and 75-100%. Line mode: charging status is displayed.
	Displays battery voltage, battery percentage, and battery current.
Other information	
	Indicates alarm code or fault code.
	Indicates a fault is occurring.
	Indicates the alarm is disabled.
	Indicates energy-saving mode.

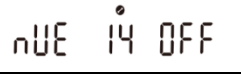
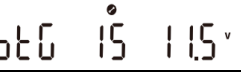
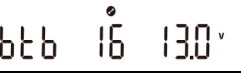
4.2.2 LCD Setting

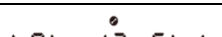
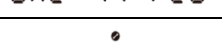
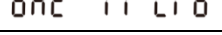
Press and hold the “ENTER” button for 2 s to enter setup mode. Press the “UP” or “DOWN” buttons to select the setup program. Then, press the “ENTER” button to confirm the selection or press “ESC” to exit.

Program	Description	Setting option	
01	Output voltage		
		230V (Default) Adjustable/Settable value: 208V, 220V, 230V, 240V	
02	Output frequency		
		50Hz (Default) Adjustable/Settable frequency: 50Hz, 60Hz	
03	Output priority setting	Solar priority	
		Same as GPB (Grid first)	
		Grid first	

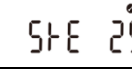
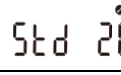
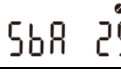
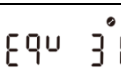
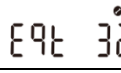
		Grid is given priority to power the load. If the grid power exit, battery will power the load. Solar only charge the battery in all conditions. If grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
		PBG priority (Default)	
		Battery is given priority to Power the load. If the energy of battery is insufficient, the grid will power the load. Solar only charge the battery in all conditions. If grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
		MKP priority	
		Comprehensive priority When PV exists, the battery takes priority, and when PV does not exist, the grid takes priority.	
04	Output mode	APP: Equipment (Default)	
		Used for home appliances	
		UPS	
		Applied to computer and other devices. Typical switching time is 10 ms.	
		GEN	
		Applied to connect generator by using grid input port.	
05	Grid priority	PNG: PV and Grid (Default)	
		PV and Grid are charging at the same time.	
		OPV: Only PV	

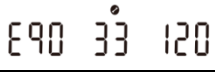
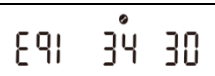
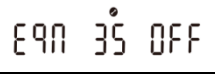
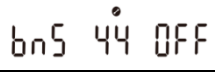
		The second is OPV (Only PV). Only PV charge.	
		PV: PV priority	
		When both PV and Grid power exist, only PV charging occurs. When only PV exists, PV charging occurs. When only grid power exists, grid charging occurs.	
06	Grid charging current		
		For the HE200-2500-O Inverter: 30A (Default) Setting range: 2/10/20/30/40/50A	
07	Max charging current		
		Setting the total charging current for solar and Grid chargers. The default value is 40A. HE200-2500-O Inverter available option: 2/10/20/30/40/50/60/70/80/90/100A	
08	Menu default		
		Settings: Set to ON: If the current page is not the first page and there is no operation within 1 min, the system will return to display the first page. Set to OFF: If the current page is not the first page and there is no operation within 1 min, the system will stay on the current page.	
09	Overload restart	Default is ON.	
10	Overtemperature restart	Default is ON.	
11	Primary input power loss warning		
		Enable/disable the main power or PV power loss alarm. Default setting is ON. If the main input detected lost, the buzzer will sound for 3 s. When set to OFF, the buzzer will not sound when the Grid input is lost.	

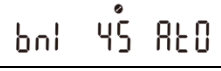
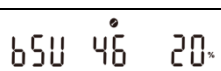
12	Energy-saving mode	
		The default setting is OFF. When set to ON, In battery mode, if the load is below 25W, the system will stop output for a period and then resume. If the load remains below 25W, the system will repeatedly stop and resume. If the load exceeds 35W, the system will resume continuous normal output.
13	Overload bypass	
		The default setting is OFF. When set to ON, in PBG mode, if an overload occurs, the system will immediately switch to bypass mode (Grid output, also known as bypass mode).
14	Mute settings	
		Enable/disable the buzzer sound. The default setting is OFF. When set to ON, the buzzer will not sound under any circumstances (e.g., alarms or faults). This setting applies to all modes.
15	Battery return to Grid voltage point	
		When the battery is set to CUS mode: The default setting is 11.7V, and it can be adjusted within a range of [10, 12.5V].
		When the battery is set to AGM or FLD mode, the default setting is 11.5V, and it can be adjusted within a range of [11,13V].
		When the battery is set to LIB mode or FEL mode, the default setting is 11.9V, and it can be adjusted within a range of [10,12.5V].
16	Return to battery mode voltage point	
		When the battery is set to AGM or FLD mode, the default setting is 13V. It can be adjusted within a range of [12,14.5V].
		When the battery is set to LIB mode, FEL mode or CUS, the default setting is 13.6V, and it can be adjusted within a range of [11.5,14.5].

17	Battery type	AGM (Default)	
		Flooded	
		Lithium (Ternary Lithium Battery)	
		User-Defined	
		Lithium Iron	
18	Battery low voltage point		
		Battery low voltage alarm setting. It cannot be set when battery type is AGM or FLD. The default setting is 11V.	
		When the battery type is set to LIB, FEL, the default setting is 11V. The adjustable range for the voltage is [10.3 12.5V].	
		When the battery type is set to CUS, the default setting is 11V. The adjustable range for the voltage is [10.5, 13.5V].	
19	Battery shutdown voltage point		
		The battery low voltage shutdown point setting function cannot be adjusted when the battery is defined as AGM or FLD mode. The default setting is 10.5V.	
		When the battery type is set to LIB, FEL or CUS, the battery shutdown point can be modified. The default setting is 10.5V, and the adjustable range is [10,12V].	
20	Constant voltage mode voltage point setting		
		The battery low voltage shutdown point setting function cannot be adjusted when the battery is defined as AGM or FLD mode. The default setting for AGM is 14.1V, for FLD is 14.5V.	

		When the battery type is set to LIB, FEL or CUS, the default setting is 14.1V, and it can be adjusted within the range of [12,15V]. It is important to ensure that the constant voltage set point voltage is higher than the float charge set point voltage.
21	Float charge mode voltage point setting	 When the battery is defined as AGM or FLD mode, the voltage set point cannot be configured. The default setting is 13.5V. When the battery type is LIB or FEL, the default setting is 13.8V. It can be set within the range of [12.5, 14.5V]. When the battery type is CUS, the default setting is 13.8V. It can be set within the range of [12,15V]. It is important to note that the constant voltage point voltage should always be set higher than the floating charge point voltage.
22	Grid low voltage point setting	 If output mode is APP/GEN, Grid low voltage point can be set within a range of 90V to 154V. The default setting is 154V. If output mode is UPS, Grid low voltage point can be set within a range of 170V to 200V. The default setting is 185V.
23	Grid high voltage point setting	 If output mode is APP/GEN, Grid high voltage point can be set within a range of 264V to 280V. The default setting is 264V. If output mode is UPS, the default setting is 264V and cannot be changed.
24	Automatic screen shutdown setting	 The default value is OFF. After turn on the function, the backlight will shutdown after 10 minutes of no button operation.

25	Inverter soft start setting	 The default setting is OFF. If set to ON, the inverter output will gradually increase from 0 to the target voltage value. If OFF, the inverter output directly increase from 0 to the target voltage value. Setting conditions: It can be set in single-machine operation mode.
26	Reset factory setting	 Restore all settings to the factory default values. Before setting, this interface is displayed as OFF. When set to ON, the system will restore to default settings. After the setting is completed, the interface will display OFF again. The setting can be applied immediately in mains and standby modes, but cannot be set in battery mode.
29	Battery Disconnection Alarm	 Enable/Disable battery disconnection alarm. The default setting is OFF. When set to OFF, there will be no battery disconnection, low battery voltage, or battery under voltage alarms when the battery is disconnected.
31	Equalization voltage point setting	 The default setting is 14.6V, with a configurable range of [12,15V].
32	Equalization charging time setting	 During the equalization stage, the controller will charge the battery as much as possible until the battery voltage rises to the battery the equalization voltage. Then, it will adopt constant voltage regulation to maintain the battery voltage. The battery will remain in the equalization stage until the set battery equalization time is reached. The default setting is off, with a configurable range of [off, 5~900], and an increment of 5 minutes for each setting.

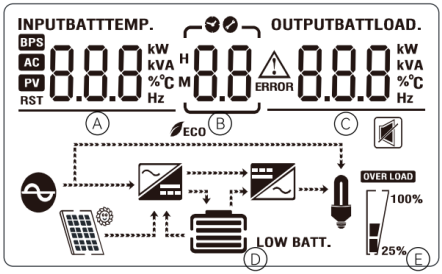
33	Equalization delay time setting	 During the equalization stage, if the battery equalization time expires and the battery voltage has not risen to the battery equalization voltage point, the charging controller will extend the battery equalization time until the battery voltage reaches the battery equalization voltage. When the battery equalization delay setting is completed and the battery voltage is still below the battery equalization voltage, the charging controller will stop equalizing and return to the floating stage. The default setting is 120 minutes, with a configurable range of [5, 900], and an increment of 5minutes for each setting.
34	Equalization interval time setting	 When the battery connection is detected during the float phase with the equalization mode turned on, the controller will start to enter the equalization phase when the set equalization interval (cell equalization period) is reached. The default setting is 30 days, the settable range is [1,90], and the increment of each setting is 1 day.
35	Enable Equalization Immediately	 The default setting is OFF; the function is not turned on. When it is set to ON, in the float charging stage when the equalization mode is turned on and the battery connection is detected. The equalization charging is activated immediately, and the controller will start to enter the equalization stage.
44	BMS communication function	 Enable/disable lithium battery communicates with inverter. The default setting is OFF. Choose the corresponding option based on the battery pack type. If a communication abnormality occurs, alarm 56 is generated. Supported protocols: CVT 485 protocol, PYL 485 protocol, GRO 485 protocol, VOL 485 protocol, PAC 485 protocol.

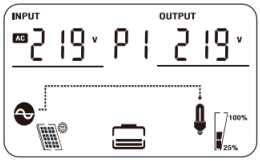
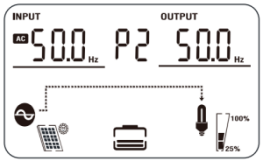
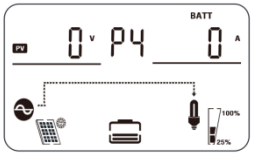
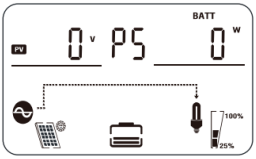
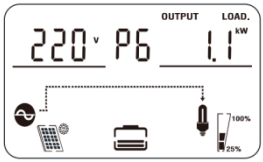
45	BMS ID setting	 Setting BMS ID number to communicate with. The default setting is auto (AtO). The setting range is [0,15]. When the item is set to auto (AtO), system will automatically poll the BMS ID from small to large. When system polls for the first ID with a correct response, it locks the ID and only asks the BMS with that ID.
46	Low SOC shutdown	 Set the inverter to shut down when the State of Charge (SOC) of the battery is low. Default setting is 20%, With a configurable range of [5, 50]. When the lithium battery SOC reaches the set value in battery mode, the inverter shuts down and generates alarm 68. The alarm 68 is cleared when the SOC returns to the set value +5%. In standby mode, the inverter can switch to battery mode only when the SOC reaches the set value +10%. If it does not reach this threshold, alarm 69 is generated. Once the function is enabled, alarm 69 is triggered when the lithium battery SOC reaches the set value +5%, and it is cleared when it returns to the set value +10%. It can be set to OFF; in which case the inverter no longer performs shutdown, startup, or alarm operations based on the SOC condition. Once the function is enabled, if a communication abnormality occurs. The inverter no longer operates based on the SOC information and clears the related alarms.
47	High SOC to battery	 Set the SOC value for the inverter to switch to battery mode. Default setting is 90%, with a configurable range of [10, 100]. In PBG priority mode, when the lithium battery SOC reaches the set value in normal grid mode, the inverter switches to battery mode. Once enabled, the inverter will only switch to battery mode when the SOC is above the set point and the battery voltage is higher than the voltage point to switch back to battery mode. It can be set to OFF, in which case the inverter no longer switches from grid mode to battery mode based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.

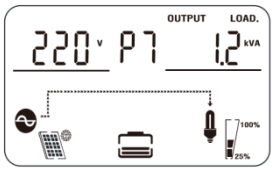
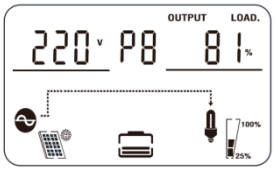
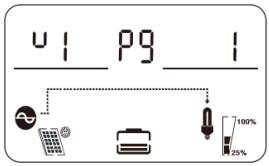
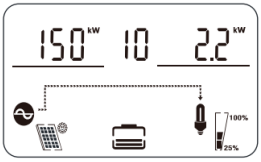
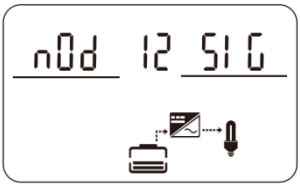
48	Low SOC to Grid	StG 48 50% Set the SOC value for the inverter to switch to grid mode. The default setting is 50%, with a configurable range of [10, 90]. In PBG priority mode, when the lithium battery SOC reaches the set value in battery mode, the inverter switches to grid mode. Once enable, the inverter will switch to grid mode when the SOC is below the set point or the battery voltage is lower than the voltage point to switch back to grid mode. It can be set to OFF; in which case the inverter no longer switches from battery mode to grid mode based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms. When this setting is higher than the STB point, STB and STG will no longer take effect after the next activation.
61	Max. discharge current	ndC 61 OFF The default value is OFF; Available options: Off, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110. When the battery current exceeds the set value in battery mode, an overload alarm 60 is triggered, and after 5 seconds, an overload fault 14 is reported. If the overload to bypass function is enabled in PBG mode, battery overcurrent will also trigger the overload to bypass logic. It can be set to OFF, and the inverter will no longer trigger overload faults or alarms based on battery current.

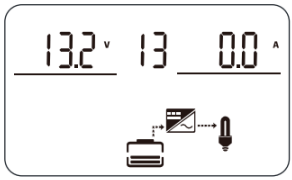
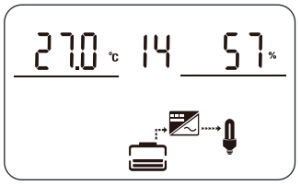
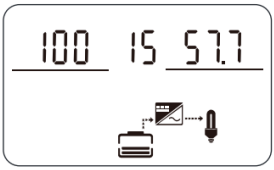
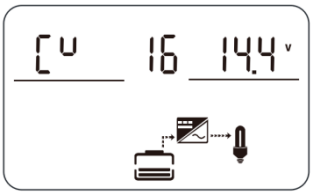
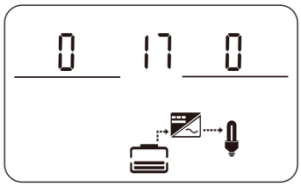
4.3 Display Information

By pressing the “UP” or “DOWN” key, you can cycle through the LCD display information. The available display sequence is: Voltage, Frequency, Current, Power, Firmware Version.



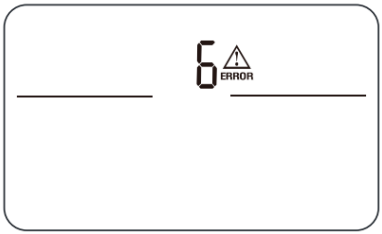
Information	LCD display
Ⓐ AC input voltage Ⓑ Display page number Ⓒ Output voltage Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ AC input frequency Ⓑ Display page number Ⓒ Output frequency Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Battery voltage Ⓑ Display page number Ⓒ Charge current Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ PV voltage Ⓑ Display page number Ⓒ PV charging current Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ PV voltage Ⓑ Display page number Ⓒ PV power Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Output voltage Ⓑ Display page number Ⓒ Active power output Ⓓ Battery capacity Ⓔ Load percentage	

Ⓐ Output voltage Ⓑ Display page number Ⓒ Apparent power output Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Output voltage Ⓑ Display page number Ⓒ Load percentage Ⓓ Battery capacity Ⓔ Load percentage	
Display software version	
Ⓐ Total power generation Ⓑ Display page number Ⓒ Daily power generation Ⓓ Battery capacity Ⓔ Load percentage	
Parallel operation status	
After enabling BMS, the following pages can be displayed:	
Network status of lithium battery. When the upper right display shows SIG constant, the battery pack is operating as a single group; When it shows PAR constant, the battery pack is operating in multiple groups in series and parallel; When it flashes PAR, the battery pack is establishing a state of multiple groups in series and parallel.	

Lithium battery voltage and current information: The upper left displays BMS battery voltage information; The upper right displays BMS battery current information. When BMS communication fails, both the upper left and upper right displays will flash ERR.	
Lithium battery temperature and SOC; The upper left displays BMS temperature information; The upper right displays BMS SOC information. When BMS communication fails, both the upper left and upper right displays will flash ERR.	
Lithium battery capacity; The upper left displays rated capacity, The upper right displays the current capacity. When BMS communication fails, both the upper left and upper right displays will flash ERR.	
Lithium battery constant voltage point: The upper left displays the fixed letter CV; The upper right displays the BMS constant voltage charging point. When BMS communication fails, the upper right display will flash ERR.	
Lithium battery fault alarm information: The upper left displays BMS alarm information; The upper right displays BMS fault information. When BMS communication fails, both the upper left and upper right displays will flash ERR.	

5. Fault Reference Code

Fault display:



Function Description: If alarm occurs, Fault indicator flashes and buzzer sound every one second for 1 minute, then stop. If fault occurs, the fault indicator is always on, the buzzer sounds 10 seconds then stops, System will try restart automatically. IF the machine does not work after six times restart, the machine and LCD display will always be in the fault status. You need to completely power off (off the screen) or wait for 30 minutes to restart the machine. The fault LCD display is shown in the figure above. In fault mode fault icon is bright, in alarm state alarm icon is flashing, and contact the manufacturer to troubleshoot the abnormal situation according to the fault information.

Fault: The inverter enters fault mode, with a constant red LED light and LCD displaying a fault code. The following recoverable faults can be restarted 6 times within 15 minutes. After exceeding 6 times, a fault lock will be triggered, and the fault lock will be released after 15 minutes.

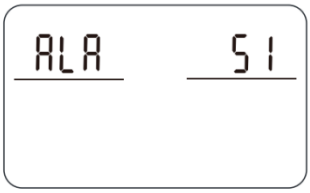
Fault Code Table

Fault code	Meaning	Related actions	Trigger conditions	Resume conditions
1	Bus soft boost start failed	Turn fault mode	Bus voltage does not reach set value.	Can restore.
2	Bus voltage high	Turn fault mode	The bus voltage is higher than protection point.	Can restore.
3	Bus voltage low	Turn fault mode	Bus voltage is below the undervoltage protection point.	Can restore.
4	Battery overcurrent	Turn fault mode	TZ interrupt triggered more than 2 times with 2ms.	Cannot restore.
5	Over temperature	Turn fault mode	The temperature exceeds the protection threshold or fan stuck.	Can restore.
6	Battery high voltage	Turn fault mode	Battery voltage is higher than set value.	Can restore.
7	Bus soft start fault	Turn fault mode	The soft start process has exceeded but the bus voltage has not reached set value.	Can restore.

Fault code	Meaning	Related actions	Trigger conditions	Resume conditions
8	Bus short circuit	Turn fault mode	Inverter on or PFC on, bus voltage below threshold.	Can restore.
9	Inverter soft start fault	Turn fault mode	After a period of soft start, the inverter still cannot reach the rated output voltage.	Can restore.
10	INV over voltage	Turn fault mode	The inverter voltage is higher than the set value.	Can restore.
11	INV under voltage	Turn fault mode	In battery mode, the inverter voltage is lower than the set value.	Can restore.
12	INV short circuit	Turn fault mode	In battery mode or Standby mode, if the inverter voltage is lower, current is greater than set value.	Can restore.
13	Negative power protection	Turn fault mode	In battery mode, the load power is lower than set value (negative power, such as-1200W)	Can restore.
14	Over load	Turn fault mode	Overload exceeds limit (list in specification).	Can restore.
26	BMS fault	Turn fault mode	Error code in BMS message.	Turn off BMS communication function or BMS fault recovery.
27	MCU fault	Turn fault mode	MCU error.	Cannot restore.
29	INV TZ fault	Turn fault mode	In four consecutive half waves, with each half wave triggering more than 10 rapid overcurrent events.	Can restore.

6. Alarm Reference Code

Alarm: The inverter has not entered fault mode, LED red light flashes, and the LCD displays the alarm code.



Alarm Code Table

Alarm code	Meaning	Related actions	Trigger conditions	Recovery conditions
50	Battery open	Alarm, battery does not charge.	Battery voltage is below 8V.	Recovery after battery voltage >10V.
51	Battery low voltage shutdown	Alarm, battery low voltage shut down or cannot power on.	Battery voltage is below set point.	Restore after battery voltage recover.
52	Battery low voltage	Alarm	Battery voltage is below set point.	Restore after battery voltage recover.
53	Charger short circuit	Warning battery does not charge.	The battery voltage is less than 5V and the charging current is greater than 4A.	Cannot restore.
55	Battery over charge	Alarm, battery does not charge.	Battery voltage is higher than the set value.	Restore after battery voltage is < the set value -0.5V.
56	BMS disconnect	Alarm, lock standby mode.	No correct BMS communication response.	Recovery after communication recover.
58	Fan error	Alarm, if one fan fails and the other fan is running at full speed.	Fan speed is less than the set value.	Restore after fan recover.
60	Overload	Alarm, battery does not charge.	When not in Grid mode or the PV is normal and the output priority is not Grid priority, the load exceeds 102%.	Restore after load back to normal.
68	SOC Under	Alarm, turn standby mode.	Lithium battery SOC is lower than the set value.	Recovery after turning off the low SOC shutdown function, or turning off the BMS communication function, or when

				the SOC returns to the set value +5%.
69	SOC Low	Alarm, if it is in standby mode, it will remain in standby mode and not power on.	Lithium battery SOC is lower than the set value +5% (Grid mode or battery mode), lower than the set value +10% (standby mode).	Restore after turning off the low SOC shutdown function, or turning off the BMS communication function, or when the SOC returns to the set value +10%.
71	Battery short circuit	Alarm	Battery short circuit is detected.	Cannot restore.
72	Battery start up lock	Alarm	Battery voltage do not reach 11.5V/ piece (cell).	Can restore.

7. Battery Equalization

An equalization function is added to the inverter. It can reverse the accumulation of negative chemical effects such as stratification, where the acid concentration at the bottom of the battery is higher than at the top. Equalization also helps remove sulfate crystals that may accumulate on the plates. If left uncontrolled, this condition, known as sulfation, reduces the battery's total capacity. Therefore, regular battery equalization is recommended.

Note: *Don't active this mode when using lithium batteries.

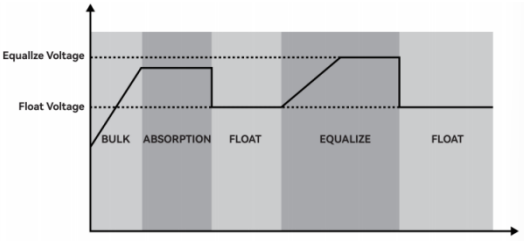
- How to apply the equalization function

You must enable battery equalization function by set charging time from 'off' to another setting first. Then, you may apply this function in device by either one of following methods:

1. Set equalization voltage point on Program 31.
2. Set equalization delay time on program 33.
3. Set equalization interval time on Program 34.
4. Set immediate equalization mode activation on Program 35.

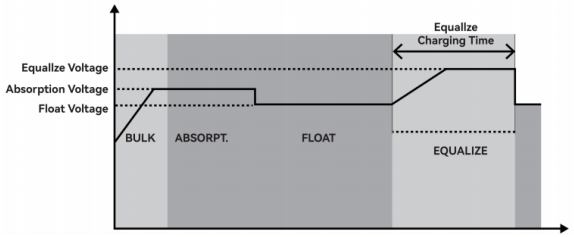
- Equalization time

During the float charging stage, when the set equalization interval time (battery equalization cycle) is reached or when equalization is triggered immediately, the inverter enters the equalization stage.

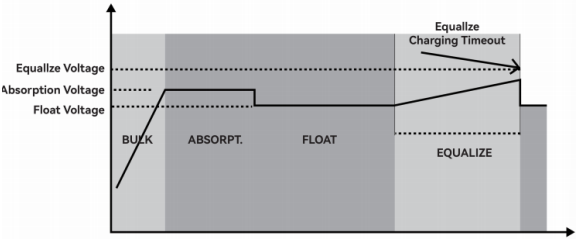


- Equalization charging time and timeout

In the equalization stage, the inverter will charge the battery as much as possible until the battery voltage rises to the battery equalization voltage. It then maintains the battery voltage at the equalization voltage using constant voltage regulation until the set equalization time is reached, keeping the battery in the equalization stage.



However, if the battery voltage does not reach the equalization voltage point by the end of the set equalization time, the inverter will extend the equalization time until the battery voltage reaches the equalization voltage. If the battery voltage still does not reach the equalization voltage by the equalization timeout setting, the inverter will stop equalization and return to the float charging stage.



8. Product Parameters

8.1 Mains Parameters

Features	Modes	HE200-2500-O specifications	Note
Input voltage	Main input	L+N+PE	
	Input voltage	230VAC	Settable: 208/220/230/240Vac
	Input voltage range	90~280Vac	Settable
	Input low cut-off:	154Vac (Default) Settable: 90-154	APP/GEN mode
		185Vac (Default) Settable: 170-200	UPS mode
	Input low recovery	Low cut-off voltage +9V	
	Input high cut-off:	264Vac (Default) Settable: 264-280	APP/GEN mode
		264Vac	UPS mode
	Input high recovery:	High cut-off voltage -9V	

Input frequency	Rated frequency	50/60Hz	
	Frequency low cut-off/recovery :	40/43.5Hz @50Hz (UPS mode) 40/40.5HZ@50Hz (APP/GEN mode)	
		50/53.5Hz @60Hz (UPS mode) 50/50.5HZ@60Hz (APP/GEN mode)	
	Frequency high cut-off/recovery :	60/56.5Hz@50Hz (UPS mode) 70/69.5Hz@50Hz (APP/GEN mode)	
		70/66.5Hz@60Hz (UPS mode) 70/69.5Hz@60Hz (APP/GEN mode)	
	Max current (RMS)	10A	>10A,60s; >12A,10s; >14A,3s; >16A,200ms;

Note: If the external circuit breaker rating is greater than 16A, the max input current is 16A. If the external circuit breaker rating is less than 16A, the max input current depends on the external circuit breaker rating.

8.2 Battery Parameters

Features	Modes	HE200-2500-O specifications	Note
Battery information	Number of batteries:	1	12V/ block
	Auto-restart function:	Yes	
	Battery test function:	No	
	Battery type	AGM/FLD/LIB/FEL/CUS	
	Rated battery voltage	N*12V	@25℃
	Battery management	Yes	
Battery protection	Battery overvoltage	15V	
	Battery undervoltage	10.5V*N	Settable: 10*N~11*N
	Low battery alarm	10.8V*N	Settable: 10.3*N~11.3*N
	Overcurrent protection	Fuse	Fast-acting

N = number of batteries

8.3 Charging Parameters

Features	Modes	HE200-2500-O specifications	Note
Charging (Grid mode)	Charging voltage	FV mode: 13.5V Settable : 12~14.9V CV mode: 14.1V Settable :12~15V	
	Temperature compensation	No	
	Charging current	2~50A	Settable
	Default charging current	30A	
	Charging mode	Two types/automatic setting	Three-stage: CC/CV/Float Two-stage: CC/Float
	Charging voltage accuracy	±5%	Calibrated via RS232
Charging (PV mode)	PV charging mode	MPPT	
	PV max input power	800W	
	Efficiency	99.5% max	
	MPPT	17~115Vdc	
	Min PV voltage	17Vdc	
	Max PV voltage	115Vdc	
	Max PV charging current	100A	
Max charging current	/	100A (max allowable value) Default: 40A	Settable

8.4 Output Parameters

Features	Modes	HE200-2500-O specifications	Note
Output rated power	Output	L+N+PE	
	Output max power	1200W	When setting the Output voltage to 208V, the Output Power rating will be reduced to 90%.

Output voltage	Rated voltage	230Vac	Settable: 208/220/230/240Vac, manually set via RS232 or LCD
	Waveform	Sine wave	
	Voltage regulation	±5%	
	DC offset	±200mV Battery mode	Empty-load and linear load mode
Output frequency	Rated frequency	50/60Hz	50/60Hz automatic selection (enabled by default)
	Grid mode	50Hz: (43.5-56.5)Hz(UPS mode) (40-70)Hz(APP/GEN mode) 60Hz: (53.5-66.5)Hz(UPS mode) (40-70)Hz (APP/GEN mode)	
	Battery mode	50/60Hz	
	Frequency regulation	±0.1Hz	
Overload capability (battery mode)	10min @102%~120%Load		
	1min @120%~150%Load		
	10s @150%~200%Load		
	5s @>200% Load		
Output short circuit protection	Battery mode	Current limitation	
	Grid mode	Breaker (16A)	

8.5 Switching Time Specifications

Features	Modes	Value	Note
Switching time	Grid mode to battery mode	10 ms (typical)	UPS mode
		10 ms (typical)	APP mode
		10 ms (typical)	GEN mode

8.6 Efficiency Specifications

Features	Modes	HE200-2500-O specifications	Note
Efficiency	Grid mode	>99%@1.2KVA	Full R load: Without battery connect.
	Battery mode	>90@% 1.2KVA	Full R load.
	Standby power	<30W	Empty load mode, battery disconnected.

9. Trouble Shooting

Problem	Fault event	Trigger conditions	What to do
LED screen display fault code 5	Over-temperature	Fan lock exceeds 10 seconds.	Please check if fan is not connected or if there are loose wiring issues. If the fan is not connected for more than 10 seconds, the machine will report fault code 5.
LED screen display fault code 12	Inverter short circuit	In battery mode or standby mode, if the inverter voltage is lower than 80V and the inverter current is greater than 5A, it should respond within 80-100ms.	1. Check if there is a short circuit at the output terminals (such as a screw piercing through the locking terminal causing a LN short circuit). 2. Verify if the inverter voltage and inverter current meet the triggering conditions.
LED screen display fault code 15	Model malfunction	The model number detection does not match any model number.	Check if the control board is assembled incorrectly or if the program is burned incorrectly.
LED screen display fault code 16	No boot program	The third digit of the communication is not 1.	Send command TIDA1911000000000000

LED screen display fault code 58	Fan malfunction	Any fan rotating less than 10 times within 5 seconds.	1. Check if the fan is not connected properly or if there are any loose connections. 2. If the fan is properly connected: a) Check if there is any issue with the fan detection circuit, usually caused by excessive soldering underneath the control board socket. b) Check if the fan itself is damaged.
Unable to start	Battery	Due to the need for a voltage of ⩾ 11.5V/N to start the machine in battery mode, common reasons for failure to start include improper calibration or insufficient battery voltage.	1. Check if the battery voltage sampling is functioning properly and if the battery voltage has been calibrated. 2. Use a multimeter to measure the voltage at the battery terminals (using a DC power supply or real battery) to see if it reaches the minimum voltage of 11.5V per cell for startup. Note: It is crucial to configure the battery voltage according to the machine model. 3. Check whether BSU configuration in page 46 is accessible. Connecting the wrong battery voltage can cause capacitor explosion.
	Utility power	/	1. Check for any short circuits at the Grid terminals (such as a screw piercing through and causing a short circuit between the live and neutral terminals). 2. Check if there are any wiring errors, such as mistakenly connecting the Grid input to the output terminals.
	PV		Check if the PV input voltage is too close to the critical threshold.

PV not charging			Connecting the wrong battery voltage can result in damage to the auxiliary power supply on the PV side, causing a loss of power and inability to communicate with the main control.

PRODUCT NAME: _____

PRODUCT MODEL: _____

DATE OF PRODUCTION: _____

Warranty Notice

I. This warranty only applies to our company's products.

II. This product comes with a three-year warranty from the date of shipment.

III. If the damage to the product is caused by the following reasons, our company will not be obligated to provide free repair services.

1. Unexpected factors or intentional damage caused by human factors, mechanical destruction, violent throwing, etc;

2. Damage caused by using in an abnormal working environment or not following the instructions;

3. Users who dismantle, modify or have not undergone after-sales maintenance by our company without authorization.

IV. Our company reserves the right to make the final interpretation decision.