
Hybrid Inverter

User Manual

HE300-7200-FPS-I5

HE300-12000-FPS-I5

- 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.

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English

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Table of contents

Note	1
1. Manual Information	1
1.1 Validity	1
1.2 Scope of Application	1
1.3 Target Population	1
1.4 Label Instructions	2
1.5 Safety Instructions	2
2. Introduction	3
2.1 Features	4
2.2 Product Overview	4
2.2.1 HE300-7200-FPS-I5	4
2.2.2 HE300-12000-FPS-I5	5
3. Installation	6
3.1 Unpacking and Inspection	6
3.1.1 Unpacking and Inspection	6
3.1.2 Installation Tools	6
3.1.3 Bill of Materials	6
3.2 Installation	7
3.3 Inverter Connection	8
3.4 PV module configuration	11
3.5 WIFI Communication Module Connection (Optional Component)	11
4.Operation	12
4.1 Power ON/OFF	12
4.2 Operation of Display Panel	12
4.3 Touchscreen display of flowchart	13
4.4 Touchscreen Operation Instructions	14
4.4.1 The content of the main interface page of the touch screen	14
4.4.2 System Settings Menu	16
5.Battery Equalization Description	23
6. Fault and alarm description	24
6.1 Faults Descriptions	24
6.2 Alarm Descriptions	25
6.3 Code Reference	26
7. Trouble removal	26
8. Technical datasheet	28
9. Parallel operation	30
9.1 Installation precautions	30
9.2 Parallel operation in single phase	30
9.3 Support 3-phase equipment	33
9.4 Display of the parallel machine fault code	37
9.5 Commissioning	37

Note

HE300-7200-FPS-I5、HE300-12000-FPS-I5 inverter models:

F: Use 48V battery; P: Parallel operation; S: Touch screen; I5: Protection level IP54.

MPPT: Max power point tracking;

UPS: Uninterruptible power supply

WiFi: Wireless fidelity;

BMS: Battery management system;

AGM: Absorbent glass mat;

FLD: Fluoride ion battery;

LIB: Lithium-ion battery;

GRO: Growatt battery

LIA: Protocol compatible battery

PYL: Pylontech battery

TQF: Techfine battery

LIC: 3rd party lithium battery

USE: User-Defined

APP: Application;

PV: PV;

SOC: State of charge;

1. Manual Information

1.1 Validity

This manual is applicable to the following equipment:

HE300-7200-FPS-I5、HE300-12000-FPS-I5 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 severe conditions, this may result in death or serious injury.

1.5 Safety Instructions



Warning!

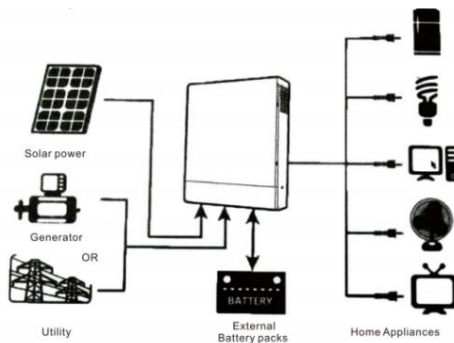
This chapter contains important safety and operational instructions.
Read and keep this manual for future reference.

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.

2. Introduction

This is a multi-function Inverter/charger, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.



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

- Generator or Utility
- PV modules

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

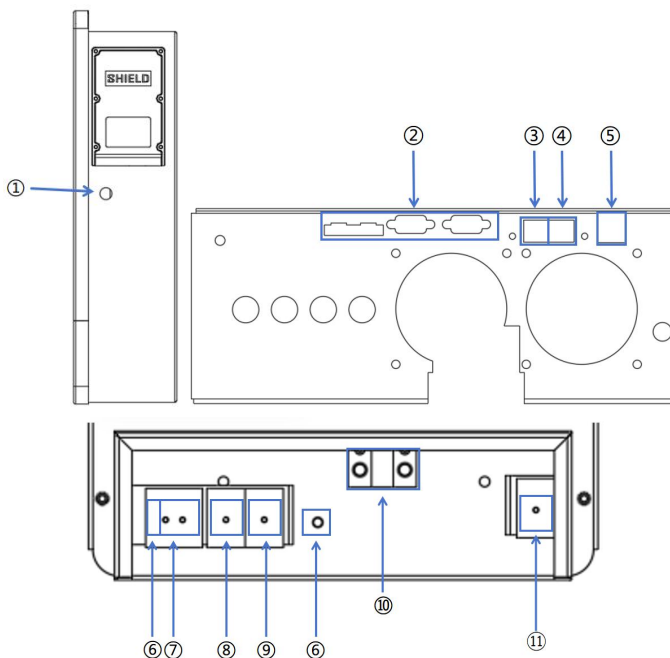
This inverter can power all kinds of appliances in home or environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.

2.1 Features

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

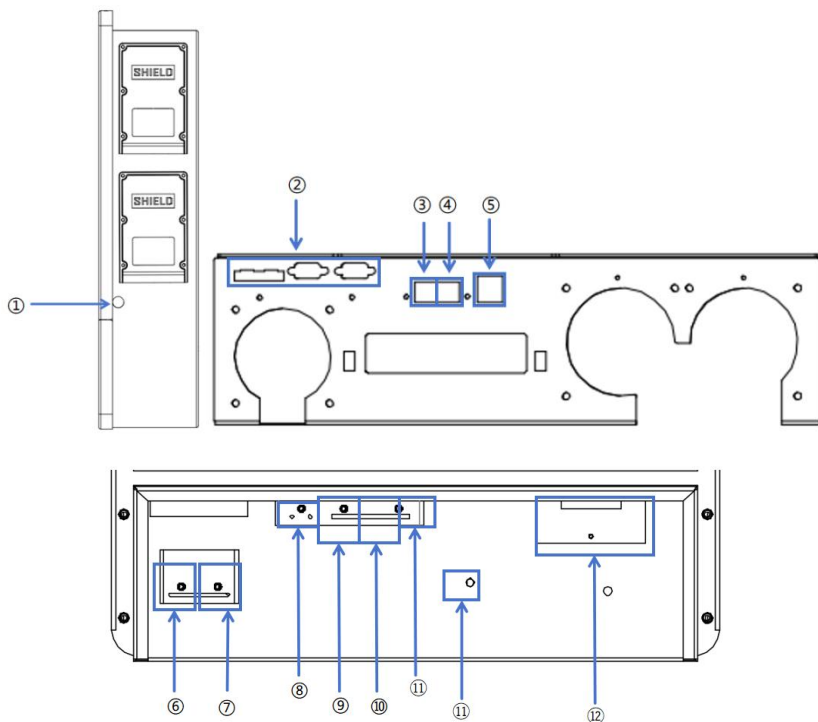
2.2 Product Overview

2.2.1 HE300-7200-FPS-I5



- | | | |
|-------------------------------|---------------------|-----------------|
| ① ON/OFF | ⑤ Dry contact | ⑨ Second output |
| ② Parallel communication port | ⑥ Ground connection | ⑩ Battery input |
| ③ RS232 communication port | ⑦ AC power input | ⑪ PV input |
| ④ BMS/RS485 | ⑧ Main output | |
- communication port

2.2.2 HE300-12000-FPS-I5



- | | | |
|-------------------------------|--------------------------------|---------------------|
| ① ON/OFF | ⑤ Dry contact | ⑨ Main output |
| ② Parallel communication port | ⑥ Second photovoltaic input | ⑩ Second output |
| ③ RS232 communication port | ⑦ The first photovoltaic input | ⑪ Ground connection |
| ④ BMS/RS485 | ⑧ AC power input | ⑫ Battery input |
- communication port

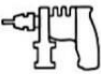
3. Installation

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.

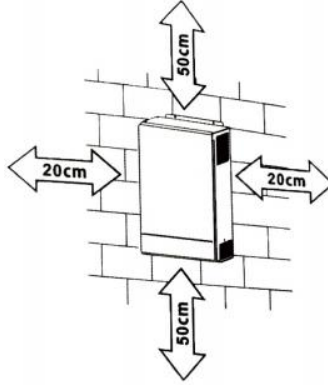
3.1.2 Installation Tools

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

3.1.3 Bill of Materials

S/N	Item	Quantity	Description	Note
1	Inverter	1		
2	Accessories for installation	1		
3	User Manual	1		
4	Parallel line	1		HE300-7200-FPS-I5 and HE300-12000-FPS-I5 Parallel operation accessories

3.2 Installation



Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- For proper air circulation to dissipate heat, allow a clearance of approx. 20 cm to the side and approx. 50 cm above and below the unit.
- The ambient temperature should be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.



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.

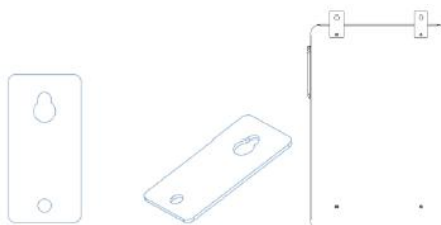


2. Use expansion screws and anchors to secure the mounting bracket to the wall. Hang the inverter on the bracket and secure the spring hooks with a screwdriver from the top.



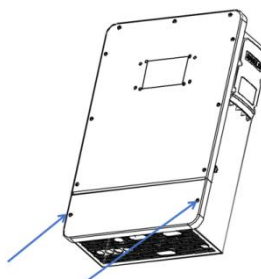
2) Hanging installation

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 all the lines, please first remove the screws on the bottom cover and open the top cover, as shown in the picture on the right:



Caution!



Before connecting to the AC input power supply, install a separate AC circuit breaker between the inverter and the AC input power supply. This will ensure that the inverter can be safely disconnected during maintenance and completely prevent overcurrent in the AC input. It is recommended to configure the circuit breaker specification as 63A.

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. The recommended size of the protector or disconnecting device for HE300-7200-FPS-I5 inverter is 150A, and the recommended size of the protector or disconnecting device for HE300-12000-FPS-I5 inverter is 300A.

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!



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.



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	HE300-7200-FPS-I5 inverter cable specification	HE300-12000-FPS-I5 inverter cable specification
AC input cable	US standard specifications	10AWG	8AWG
	National standard specifications	6mm ²	10mm ²
AC output cable	US standard specifications	10AWG	8AWG
	National standard specifications	6mm ²	10mm ²
PV input cable	US standard specifications	12AWG	12AWG
	National standard specifications	4mm ²	4mm ²
Battery input cable	US standard specifications	2AWG	3/0AWG
	National standard specifications	38mm ²	85mm ²



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 PV module configuration

When configuring the photovoltaic modules, please ensure the following inverter parameters are met:

1. HE300-7200-FPS-I5: The inverter allows the input voltage of the photovoltaic modules to range from 60 to 500 Vdc;

HE300-12000-FPS-I5: The inverter allows the input voltage of the photovoltaic modules to range from 90 to 500 Vdc;

2. HE300-7200-FPS-I5: The inverter allows the maximum input current of the photovoltaic modules to be 27 A.

HE300-12000-FPS-I5: The inverter inputs two photovoltaic modules, and the inverter allows the maximum input current of each photovoltaic module to be 27 A.

When configuring the photovoltaic modules, follow these steps:

1. Review the technical parameters of the used photovoltaic modules, such as open-circuit voltage and short-circuit current.

2. When configuring the photovoltaic modules, it is recommended to use them in series to increase the input voltage of the photovoltaic modules. For the HE300-7200-FPS-I5 inverter, the total voltage after series connection should be within the range of 60-500Vdc. For the HE300-12000-FPS-I5 inverter, the total voltage after series connection should be within the range of 90-500Vdc. Some margin should also be reserved to prevent voltage fluctuations from exceeding the pressure limit. It is recommended to use the maximum calculated value of 450Vdc.

For example: If the open-circuit voltage of the photovoltaic module is 40V, it is recommended to connect a maximum of 11 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 HE300-12000-FPS-I5 inverter

Photovoltaic module parameters: maximum power: 670W; maximum voltage: 40.6Vdc; Maximum current: 17.49A; open circuit voltage: 41.7Vdc; Short circuit current: 18.57A.

Suggest connecting up to 11 photovoltaic panels in series on each channel! Cannot be connected in parallel!

3.5 WIFI Communication Module Connection (Optional Component)

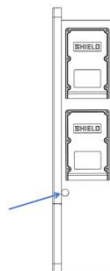
The WiFi communication module is used to connect to the cloud platform for remote monitoring of inverter parameters.

Please insert the WiFi communication module into the COM port. Scan the QR code on the WiFi package with your mobile phone to download the app, open the app, register an account, then scan the QR code on the WiFi communication module to add the device and perform Bluetooth network pairing.

4.Operation

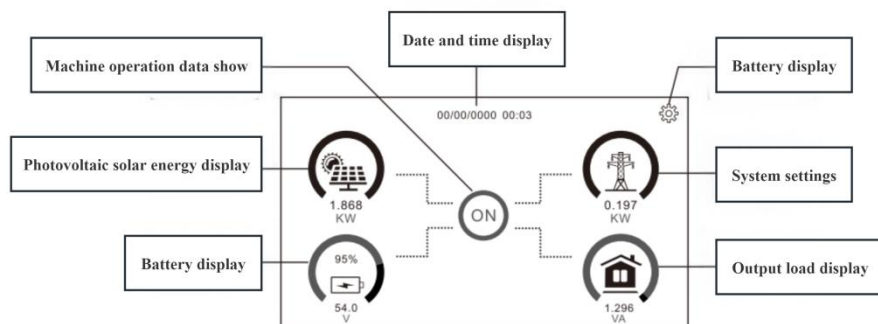
4.1 Power ON/OFF

After the equipment is correctly installed, press the ON/OFF switch (located on the outer shell button) and the equipment will power on and start operating.

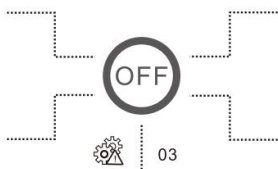


4.2 Operation of Display Panel

The display panel shown in the figure is located on the front panel of the inverter and it is a touch screen with color display.



1. A blank space in the center of the main screen indicates that the system is operating normally. If a gray icon and characters are displayed in the center of the main screen, it means that the inverter has issued a warning, and the warning information will be shown in characters below this icon (detailed error information can be found in the alarm menu of the manual). If a red icon and characters are displayed in the center of the main screen, it means that the inverter has malfunctioned, and the fault information will be shown in characters below this icon (detailed error information can be found in the alarm menu of the manual).



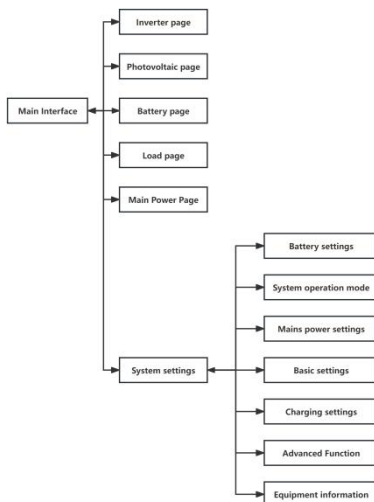
Overcharging of the battery



Photovoltaic voltage exceeds the limit

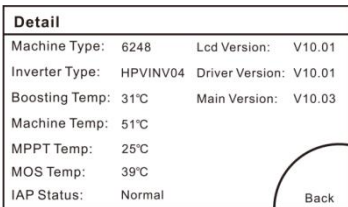
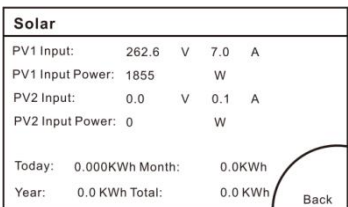
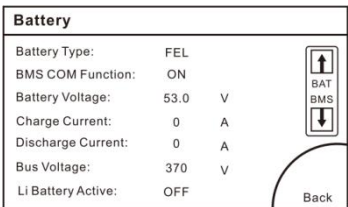
- 2.The time is displayed on the top of the screen.
- 3.The system settings icon. Click this "Settings" button to enter the system settings screen, which includes battery settings, system operation mode, grid settings, basic settings, advanced settings, and device information.
- 4.The information displayed on the main screen includes solar power, mains power, load and battery. It also shows the direction of energy flow with arrows. When the power approaches the limit value, the color on the panel will change from green to red, making the system information vividly displayed on the main screen.
- 5.The photovoltaic power and the load power remain positive at all times.
- 6.The mains power is connected in reverse mode for grid connection and is also being obtained in the forward mode.
- 7.The negative terminal of the battery indicates charging, while the positive terminal indicates discharging.

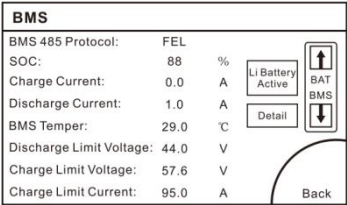
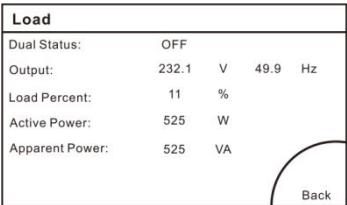
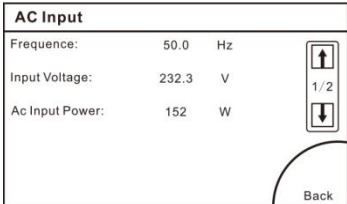
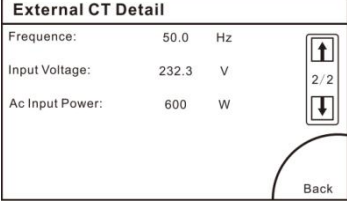
4.3 Touchscreen display of flowchart



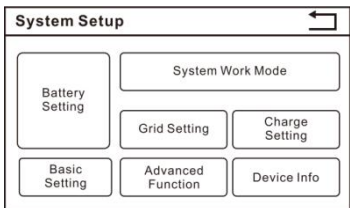
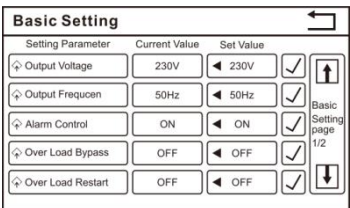
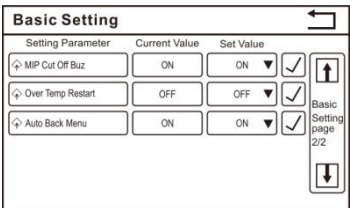
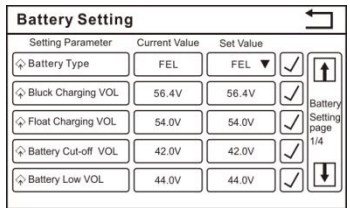
4.4 Touchscreen Operation Instructions

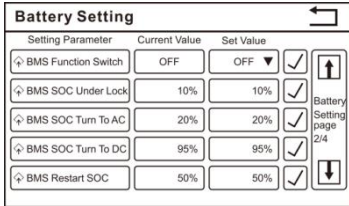
4.4.1 The content of the main interface page of the touch screen

Inverter page	Inverter Data Detailed Page
 Detail Machine Type: 6248 Lcd Version: V10.01 Inverter Type: HPVINV04 Driver Version: V10.01 Boosting Temp: 31°C Main Version: V10.03 Machine Temp: 51°C MPPT Temp: 25°C MOS Temp: 39°C IAP Status: Normal Back	This page provides a detailed display of the machine model of the inverter, the protocol type, the temperature of the boost tube, the internal temperature, the MPPT temperature, the inverter temperature, whether the underlying program is normal, the color screen version number, the central control version number, and the machine motherboard version number.
Photovoltaic page	Detailed page of photovoltaic data
 Solar PV1 Input: 262.6 V 7.0 A PV1 Input Power: 1855 W PV2 Input: 0.0 V 0.1 A PV2 Input Power: 0 W Today: 0.000KWh Month: 0.0KWh Year: 0.0 KWh Total: 0.0 KWh Back	This page provides a detailed display of the input voltage, current and power of the photovoltaic solar panels. It also records the current day's photovoltaic power generation, the total photovoltaic power generation for this month, the total photovoltaic power generation for this year, and the total photovoltaic power generation over all years.
Battery page	Battery Details Page
 Battery Battery Type: FEL BMS COM Function: ON Battery Voltage: 53.0 V Charge Current: 0 A Discharge Current: 0 A Bus Voltage: 370 V Li Battery Active: OFF BAT BMS Back	This page provides a detailed display of the battery type, the current communication status of the BMS, the battery voltage, the charging current of the BAT, the discharging current of the BAT, the voltage of the BUS bus line, and the activation status of the lithium battery.

BMS page	BMS Detailed Page
 BMS BMS 485 Protocol: FEL SOC: 88 % Charge Current: 0.0 A Discharge Current: 1.0 A BMS Temper: 29.0 °C Discharge Limit Voltage: 44.0 V Charge Limit Voltage: 57.6 V Charge Limit Current: 95.0 A Li Battery Active BAT BMS Detail Back	This page provides a detailed display of the current usage protocol of BMS, the current SOC value of BMS, the charging current of BMS, the discharging current of BMS, the temperature of BMS, the discharge limit voltage of BMS, the charging limit voltage of BMS, and the charging limit current of BMS. Li Battery Active: This single unit can activate the lithium battery once. Details: Click to display the information of the battery cell.
Load page	Load Details Page
 Load Dual Status: OFF Output: 232.1 V 49.9 Hz Load Percent: 11 % Active Power: 525 W Apparent Power: 525 VA Back	This page provides a detailed display of the output mode, output voltage, output frequency, active power, and reactive power.
Main Power Page	Detailed page of mains power supply
 AC Input Frequency: 50.0 Hz Input Voltage: 232.3 V Ac Input Power: 152 W 1 / 2 Back	This page displays the frequency of the power grid, the input voltage, and the power of the power grid.
CT Page	CT Detailed Information Page
 External CT Detail Frequency: 50.0 Hz Input Voltage: 232.3 V Ac Input Power: 600 W 2 / 2 Back	This page displays the frequency, input voltage and grid power at the CT detection point.

4.4.2 System Settings Menu

System Settings Menu	System Settings Menu Page
	This is the system settings page, which includes battery settings, system operation mode, battery settings, mains power settings, charging settings, basic settings, advanced functions, and device information.
Basic Settings Menu	Basic Settings Menu Page
	This page allows for settings as follows: Inverter voltage: 220/230/240V (default 230V) Inverter frequency: 50/60Hz (default 50Hz) Alarm indication: ON/OFF Bypass switch: ON/OFF Overload restart: ON/OFF
	This page allows for the following settings: Input source indication function: ON/OFF Over-temperature restart function: ON/OFF Automatic return to the first page function: ON/OFF
Battery Settings Menu	Battery Settings Menu Page
	This page allows for settings Battery type: AGM/FLD/USE/PYL/LIA/LIB/LIC/GRQ/TQF/FEL High charging voltage: If the battery type is set to custom, this setting can be made. Settings for 48V system models range from 48.0V to 60.0V.

	Floating voltage: 54V Low voltage cut-off: If the battery power is the only available power source, the converter will shut down. If PV energy and battery power are available, the inverter will charge the battery without an AC output. If the battery type is set to custom, this setting can be made. Settings for 48V system models range from 40.0V to 52.0V. Regardless of the proportion of the connected load, the low direct current cut-off voltage will be fixed at the set value. Low voltage: Settings for 48V system models range from 40.0V to 54.0V.																								
 <table border="1"> <thead> <tr> <th>Setting Parameter</th><th>Current Value</th><th>Set Value</th><th></th></tr> </thead> <tbody> <tr> <td>BMS Function Switch</td><td>OFF</td><td>OFF ▼</td><td>✓</td></tr> <tr> <td>BMS SOC Under Lock</td><td>10%</td><td>10%</td><td>✓</td></tr> <tr> <td>BMS SOC Turn To AC</td><td>20%</td><td>20%</td><td>✓</td></tr> <tr> <td>BMS SOC Turn To DC</td><td>95%</td><td>95%</td><td>✓</td></tr> <tr> <td>BMS Restart SOC</td><td>50%</td><td>50%</td><td>✓</td></tr> </tbody> </table>	Setting Parameter	Current Value	Set Value		BMS Function Switch	OFF	OFF ▼	✓	BMS SOC Under Lock	10%	10%	✓	BMS SOC Turn To AC	20%	20%	✓	BMS SOC Turn To DC	95%	95%	✓	BMS Restart SOC	50%	50%	✓	This page allows for settings BMS function switch: Whether to enable BMS communication function BMS SOC lock: If the BMS's SOC value is lower than the set value, the inverter will shut down to protect the battery. BMS SOC switching to AC: When the inverter's working mode is set to battery priority mode, when the BMS's SOC is lower than the set value, the inverter will be forced to enter power charging mode. BMS SOC switching to DC: When the inverter's working mode is set to battery priority mode, but the BMS's SOC is higher than the set value, the inverter will return to the DC working mode. Battery SOC restart: When the inverter is turned on, the SOC must be higher than the set value for normal operation.
Setting Parameter	Current Value	Set Value																							
BMS Function Switch	OFF	OFF ▼	✓																						
BMS SOC Under Lock	10%	10%	✓																						
BMS SOC Turn To AC	20%	20%	✓																						
BMS SOC Turn To DC	95%	95%	✓																						
BMS Restart SOC	50%	50%	✓																						

Battery Setting			
Setting Parameter	Current Value	Set Value	
Battery Equalization	OFF	OFF ▼	✓
BAT EQ Voltage	58.4V	58.4V ▼	✓
BAT EQ Time	60 Min	60Min	✓
BAT EQ Out Time	120 Min	120Min	✓
BAT EQ Interval	30 Day	30Day	✓

Battery Setting page 3/4

This page allows for settings:

Battery equalization: If the battery type is selected as "Liquid Battery" or "User Defined", this function can be enabled.

Battery equalization voltage: For 48V system models, the default is 58.4V.

Battery equalization time: The setting range is from 5 minutes to 900 minutes.

Battery equalization timeout: The setting range is from 5 minutes to 900 minutes.

Equalization interval: The setting range is from 0 to 90 days.

Battery Setting			
Setting Parameter	Current Value	Set Value	
DC TO AC Voltage	46.0V	46.0V ▼	✓
AC TO DC Voltage	54.0V	54.0V ▼	✓

Battery Setting page 4/4

This page allows for settings for:

DC to AC voltage:44V-51V

AC to DC voltage: 48V-58V

System operation mode setting menu

System operation mode setting menu page

System Work Mode			
Setting Parameter	Current Value	Set Value	
ECO	OFF	OFF	✓
Output Priority	SUB	SUB	✓
Output TYPE	PAL	PAL	✓
Clear Generation	OFF	OFF	✓
Reset Factory Setting	OFF	OFF	✓

Work Mode page 1/2

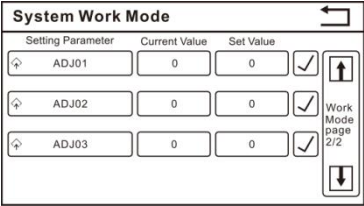
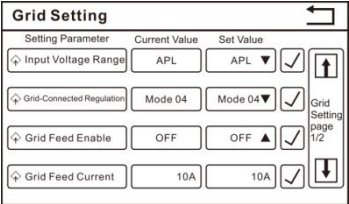
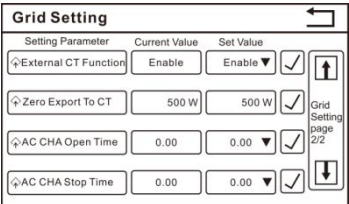
This page allows for settings

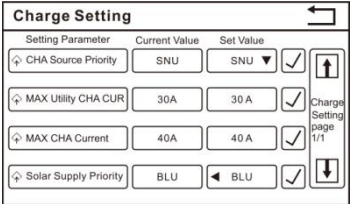
ECO function: When the load is low in battery mode, the system will temporarily stop.

Output priority: Options for output source priority

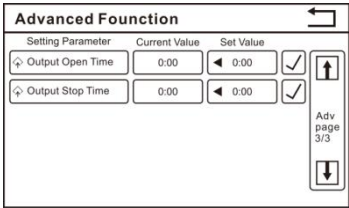
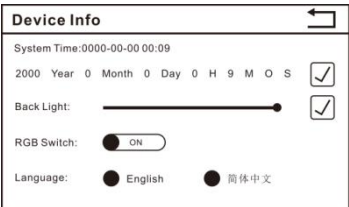
1. SUB: Solar energy is the first priority for the load. If solar energy is insufficient to power all connected loads, the grid energy will also supply power to the loads simultaneously. Solar energy is the first priority for the load output source priority to provide power.

2. SBU: If solar energy is insufficient to power all connected loads, the battery energy will supply

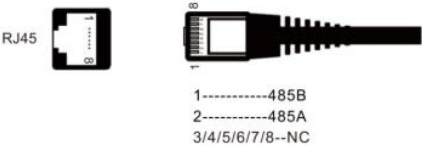
	power to the loads simultaneously. The grid power will only supply power to the loads when the battery voltage drops to the low-level warning voltage or when solar and battery energy are insufficient. Output type: SIG\PAL\3P1\3P2\3P3 Clear power generation: Off/On Restore factory settings: To restore default values, check the checkbox and click the "YES" button.
System operation mode setting menu	System operation mode setting menu page
	This page is a reserved page for functions.
AC power grid settings menu	The page of the mains power grid setting menu
	This page allows for settings Input voltage range: APL\UPS Photovoltaic energy type: Mode01\Mode02\Mode03\Mode04\Mode05 Grid connection mode: Disabled\Enabled Grid-connected current during mains power: Default 20A
	This page allows for settings External CT function: Configure the external CT function Default value: disable Zero output to CT: Set the main input power range from 10W to 500W Default value: 150W

	Power supply charging start time: Adjustable range from 0 to 23 Power supply charging end time: Adjustable range from 0 to 23
Charging Settings Menu	Charging Settings Menu Page
	This page allows for settings Charging priority: Configure charging priority 1.CSO:Solar energy will prioritize charging the battery. Only when solar energy is unavailable will AC power charge the battery. 2.SNU:Solar energy and AC power will simultaneously charge the battery. 3. OSO: Regardless of whether there is AC power or not, solar energy will be the sole source of charging. Note: If the inverter/charger is operating in battery mode, only solar energy can charge the battery. If there is sufficient solar energy, solar energy will charge the battery. Maximum AC current Note: If the set value in the maximum charging current is less than the set value in the maximum AC current, the inverter will use the charging current in the maximum charging current to charge the AC charger. Maximum charging current: Configure the total charging current for solar energy and AC charger Energy feeding priority: BLU solar energy prioritizes charging the battery/LBU solar energy prioritizes charging the load

Advanced Settings Menu	Advanced Settings Menu Page																								
Advanced Function <table><thead><tr><th>Setting Parameter</th><th>Current Value</th><th>Set Value</th><th></th></tr></thead><tbody><tr><td>Dual Mode</td><td>ON</td><td>ON</td><td>✓</td></tr><tr><td>Dual BAT VOL Under</td><td>44.0V</td><td>44.0V</td><td>✓</td></tr><tr><td>Dual BAT SOC Under</td><td>20%</td><td>20%</td><td>✓</td></tr><tr><td>Dual BAT VOL Receiver</td><td>52.0V</td><td>52.0V</td><td>✓</td></tr><tr><td>Dual BAT SOC Receiver</td><td>50%</td><td>50%</td><td>✓</td></tr></tbody></table>	Setting Parameter	Current Value	Set Value		Dual Mode	ON	ON	✓	Dual BAT VOL Under	44.0V	44.0V	✓	Dual BAT SOC Under	20%	20%	✓	Dual BAT VOL Receiver	52.0V	52.0V	✓	Dual BAT SOC Receiver	50%	50%	✓	This page allows you to set the second output battery voltage: ON/OFF Disable the second output battery voltage: 44V. If the battery voltage is lower than the inverter setting, the second output will be cut off. Disable the second output battery capacity: The default is 20%. If the battery capacity is lower than the SOC setting, the second output will be cut off. Restore the second output battery voltage: The default is 52V. If the battery voltage is higher than the battery voltage setting, the second output will be restored. Restore the second output battery capacity: The default is 50%. If the battery capacity is higher than the SOC setting, the second output will be restored.
Setting Parameter	Current Value	Set Value																							
Dual Mode	ON	ON	✓																						
Dual BAT VOL Under	44.0V	44.0V	✓																						
Dual BAT SOC Under	20%	20%	✓																						
Dual BAT VOL Receiver	52.0V	52.0V	✓																						
Dual BAT SOC Receiver	50%	50%	✓																						
Advanced Settings Menu	Advanced Settings Menu Page																								
Advanced Function <table><thead><tr><th>Setting Parameter</th><th>Current Value</th><th>Set Value</th><th></th></tr></thead><tbody><tr><td>Dual Discharge Time</td><td>Disable</td><td>0Min</td><td>✓</td></tr><tr><td>Dual recover Delay Time</td><td>5Min</td><td>5Min</td><td>✓</td></tr><tr><td>Dual Output On Time</td><td>0:00</td><td>0:00</td><td>✓</td></tr><tr><td>Dual Output Off Time</td><td>0:00</td><td>0:00</td><td>✓</td></tr></tbody></table>	Setting Parameter	Current Value	Set Value		Dual Discharge Time	Disable	0Min	✓	Dual recover Delay Time	5Min	5Min	✓	Dual Output On Time	0:00	0:00	✓	Dual Output Off Time	0:00	0:00	✓	This page allows settings. Second output discharge time: 0 - 990 minutes Set the discharge time to turn off the second output, and wait for a period of time when the inverter returns to line mode or the battery is charging to turn on the second output. Second output recovery delay time: Configure the recovery delay time for the second output. Even if the conditions for restoring the second output battery voltage and restoring the second output battery capacity are met, the second output will only be restored after the recovery delay				
Setting Parameter	Current Value	Set Value																							
Dual Discharge Time	Disable	0Min	✓																						
Dual recover Delay Time	5Min	5Min	✓																						
Dual Output On Time	0:00	0:00	✓																						
Dual Output Off Time	0:00	0:00	✓																						

	period has elapsed. The value range is 0-66 minutes. Second output activation time: Value range 0-23. Second output deactivation time: Value range 0-23.
Advanced Settings Menu	Advanced Settings Menu Page
	This page allows for settings. Output start time: The value range is from 2 to 23. Output stop time: The value range is from 0 to 23.
Device Information Settings Menu	Device Information Settings Menu Page
	This page allows you to set the system time: Year/Month/Day/Hours/Minutes/Seconds. Screen brightness: from dark to bright. RGB switch: on/off Language selection

When the BMS/485 communication interface is externally connected, as shown in the following figure:



Communication Connection

Please use supplied communication cable to connect to inverter and PC. Please install a monitoring software on the computer.

Dry Contact Signal

There is one dry contact (3A/250VAC) available on the rear panel. It could be used to deliver signal to external device when battery voltage reaches warning level.

Unit Status	Condition			 Dry contact port:	
				NC&C	NO&C
Power Off	Unit is off and no output is powered.			Close	Open
Power on	Output is powered from battery or solar.	Normal mode	Battery voltage<Low DC warning voltage	Open	Close
			Battery voltage>Float charging voltage	Close	Open
		Solar first mode	Battery voltage<Solar to AC voltage	Open	Close
			Battery voltage>AC to DC voltage	Close	Open

5.Battery Equalization Description

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

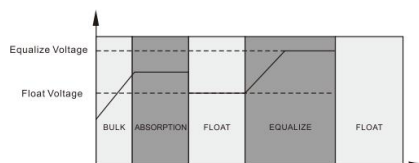
How to Apply Equalization Function

You must enable battery equalization function in monitoring LCD setting program 30 first. Then, you may apply this function in device by either one of following methods:

1. Setting equalization interval in program 35.
2. Active equalization immediately in program 36.

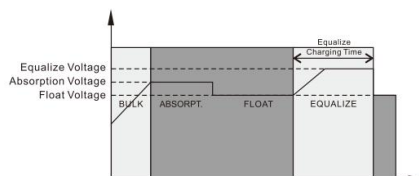
When to Equalize

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

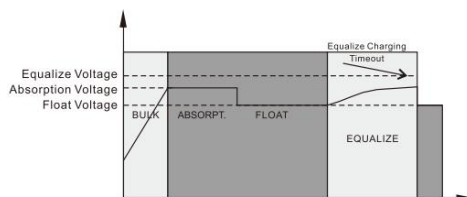


Equalize charging time and timeout

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



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



6. Fault and alarm description

6.1 Faults Descriptions

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

Fault Reference Code

Fault Code	Fault Event
01	Fan is locked when inverter is off.
02	Over temperature or NTC is not connected well.
03	Battery voltage is too high.
04	Battery voltage is too low.

05	Output short circuited or over temperature is detected by internal converter components.
06	Output voltage is too high.
07	Over load time out.
08	Bus voltage is too high.
09	Bus soft start failed.
51	Over currents or surge.
52	Bus voltage is too low.
53	Inverter soft start failed.
55	Over DC voltage in AC output.
57	Current sensor failed.
58	Output voltage is too low.
59	PV voltage is over limitation.

6.2 Alarm Descriptions

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

Alarm Indicator

Alarm Code	Alarm Event	Audible Alarm
01	Fan is locked when inverter is on.	Beep three times every second
02	Over temperature.	None
03	Battery is over-charged.	Beep once every second
04	Low battery	Beep once every second
07	Overload	Beep once every 0.5 second
10	Output power derating	Beep twice every 3 seconds
15	PV energy is low.	Beep twice every 3 seconds
16	High AC input (>280Vac) During BUS soft start	None
E9	Battery equalization	None
6P	Battery is not connected.	None

6.3 Code Reference

Related information code will be displayed on LCD screen. Please check inverter LCD screen for the operation.

Code	Description
60	If battery status is not allowed to charge and discharge after the communication between the inverter and battery is successful, it will show code 60 to stop charging and discharging battery.
61	Communication lost - After battery is connected, communication signal is not detected for 1 minutes, buzzer will beep. - Communication lost occurs after the inverter and battery is connected successfully, buzzer beep immediately.
69	If battery status is not allowed to charge after the communication between the inverter and battery is successful, it will show code 69 to stop charging battery.
70	If battery status must to charge after the communication between the inverter and battery is successful, it will show code 70 to charge battery.
71	If battery status is not allowed to discharge after the communication between the inverter and battery is successful, it will show code 71 to stop discharge battery.

7. Trouble removal

Problem	LCD/LED/Buzzer	Explanation/Possible cause	What to do
Unit shuts down automatically during startup process.	LCD and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication	1. The battery voltage is far too low. (<1.4V/Cell) 2. Internal fuse tripped.	1. Contact repair center for replacing the fuse. 2. Re-charge battery. 3. Replace battery. Check if AC breaker is tripped and AC wiring is connected well.

Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD	Input protector is tripped	
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD screen flickering	Battery is disconnected.	Check if battery wires are connected well.
Buzzer beeps continuously and red LED is on.	Fault code 07	Overload error. The inverter is overload 105% and time is up.	Reduce the connected load by switching off some equipment.
		If PV input voltage is higher than specification, the output power will be derated. At this time, if connected loads is higher than derated output power, it will cause overload.	Reduce the number of PV modules in series or the connected load.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
		Temperature internal converter component is over 120°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 02	Internal temperature of inverter component is over 100°C.	
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirement.
	Fault code 01	Fan fault	Replace the fan.

	Fault code 06/58	Output abnormal (Inverter voltage below than 190V _{ac} or is higher than 260V _{ac})	1. Reduce the connected load. 2. Return to repair center.
	Fault code 08/09/53/57	Internal components failed.	Return to repair center.
	Fault code 51	Over current or surge.	Restart the unit, if the error happens again, please return to repair center.
	Fault code 52	Bus voltage is too low.	
	Fault code 55	Output voltage is unbalanced.	Reduce the number of PV modules in series.
	Fault code 59	PV input voltage is beyond the specification.	

8. Technical datasheet

Model			HE300-7200-FPS-I5	HE300-12000-FPS-I5
Input	Input Sources		L+N+PE	
	Rated Input Voltage		220/230/240VAC	
	Voltage Range		90-280VAC±3V(APL Mode) 170-280VAC±3V(UPS Mode)	
	Frequency		50Hz/60Hz (Auto Adaptive)	
Output	Rated Capacity	Battery inverter	6200W	11000W
		PV inverter	6500W	12000W
	Output Voltage		220/230/240VAC±5%	
	Output Frequency		50Hz/60Hz±0.1%	
	Waveform		Pure Sine Wave	
	Transfer Time (adjustable)		Computers (UPS Mode) 10ms, Appliance (APL Mode) 20ms.	
	Peak Power		12400VA	22000VA
	Overload capacity		Battery mode 11s@105%-150% load; 2s@150%-200% Load; 400ms@>200% Load	
	Peak Efficiency (battery Mode)		>98%	
Grid-connected operation	Output Voltage		220/230/240VAC±5%	
	Feed into the grid frequency range		100-280VAC	
	Feed into the grid frequency range		47-53Hz±1Hz/57-62Hz±1Hz	
	Nominal output current		26.9A	47.8A
	Power Factor Range		>0.99	

	Maximum conversion efficiency (DC/AC)	98%	
Battery	Battery Voltage	48Vdc	
	Constant Charging Voltage (Adjustable)	56.4Vdc	
	Floate Charging Voltage (Adjustable)	54Vdc	
Charging	PV Charging Mode	MPPT	MPPT Dual MPPT
	Max. PV input Power	8500W	2*5500W
	MPPT Tracking Range	60-500Vdc	90-500Vdc
	Best voltage	360-430V	300-400V
	Max. PV Input Voltage	500Vdc	
	Max. PV Input Current	27A	18A
	Max. PV Charging Current	120A	150A
	Max. AC Charging Current	100A	150A
	Max. Charging Current	120A	150A
Display	LCD Display	Display Running Mode/Loads/Input/Output etc	
Interface	RS232	Baud Rte 2400	
	Communication port	Lithium Battery BMS communication Card , Wifi Card, Dry Contact	
	Parallel Connect Interface	Parallel Machine (network) function	
Environment	Operating Temperature	-10-50°C	
	Humidity	20%-95% (Non-condensing)	
	Storage Temperature	-15-60°C	
	Altitude	Altitude Not Over 1000m, Derating over 1000m, Max 4000m, Refer to IEC62040	
	Noise	≤ 50db	

9. Parallel operation

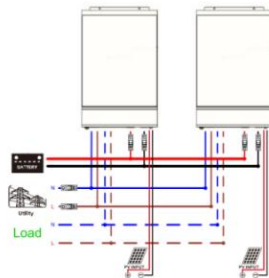
9.1 Installation precautions

1. **NOTE!** For proper air circulation to dissipate heat, allow a clearance of approx. 20cm to the side and approx. 50cm above and below the unit, Be sure to install each unit in the same level.
2. **NOTE!** It's requested to connected to battery for parallel operation.
3. **WARNING!** Be sure the length of all battery cables is the same. Otherwise, there will be voltage difference between inverter and battery to cause parallel inverters not working.
4. **WARNING!** Make sure all output N wires of each inverter must be connected all the time. Otherwise, it will cause inverter fault in error code#72.
5. **CAUTION!** Please install the breaker at the battery and AC input side. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of battery or AC input.
6. **NOTE!** Also, a circuit breaker should be installed at the AC input of each inverter, and the selection of the circuit breaker should refer to the AC input current of the machine nameplate.
7. **NOTE!** Regarding three-phase system, you can use 4-pole breaker directly and the rating of the breaker should be compatible with the phase current limitation from the phase with maximum units.
8. **WARNING!** Be sure that all inverters will share the battery bus. Otherwise, the inverters will transfer to fault mode.

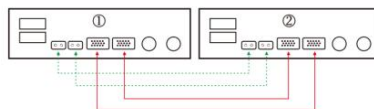
9.2 Parallel operation in single phase

NOTE! Each photovoltaic panel needs to needs to be connected to an independent system.

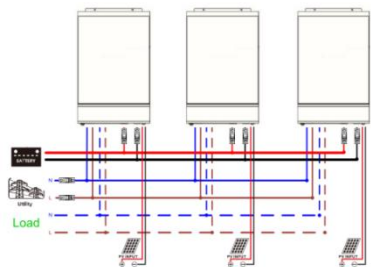
Two inverters in parallel:



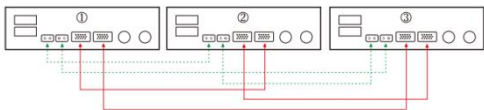
Communication connection



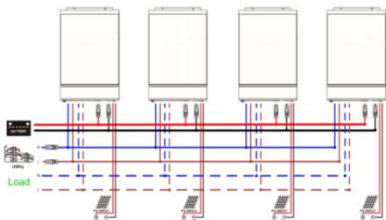
Three inverters in parallel:



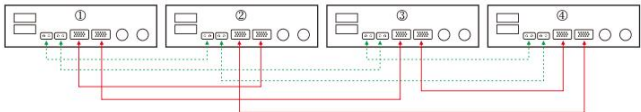
Communication connection



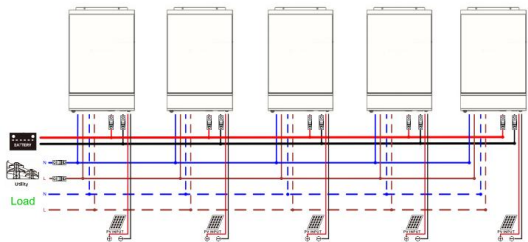
Four inverters in parallel:



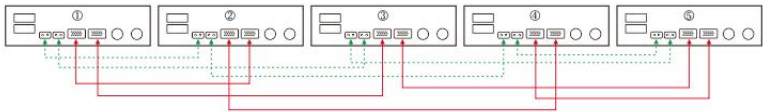
Communication connection



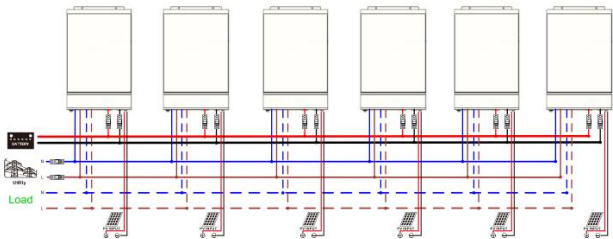
Five inverters in parallel:



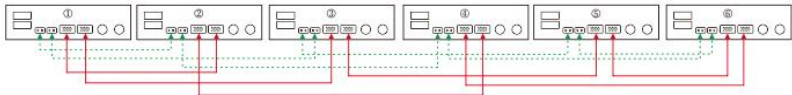
Communication connection



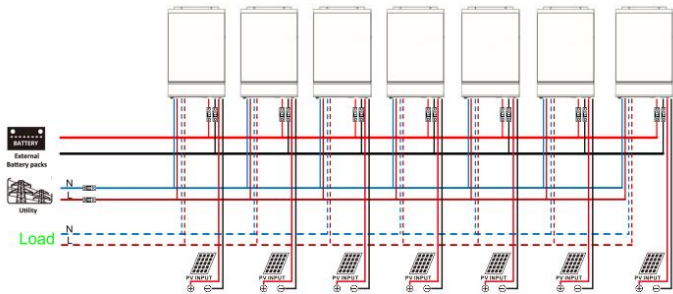
Six inverters in parallel:



Communication connection



Seven to nine inverters in parallel:

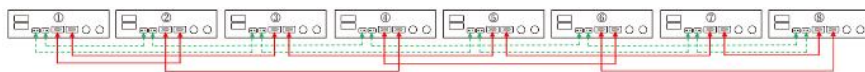


Communication connection

Seven inverters in parallel



Eight inverters in parallel



Nine inverters in parallel

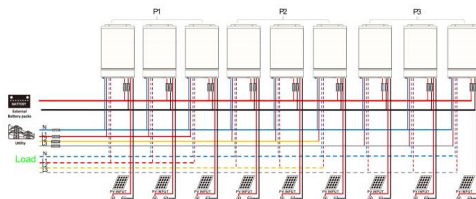


9.3 Support 3-phase equipment

NOTE! Each photovoltaic panel needs to be connected to an independent system.

WARNING: Do not connect the current sharing cable between the inverters which are in different phases. Otherwise, it may damage the inverters.

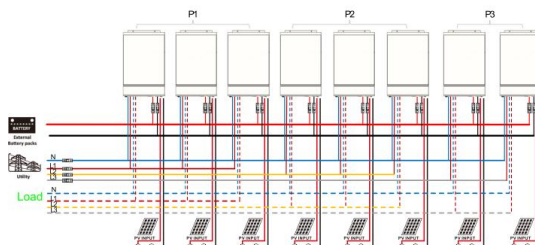
Three inverters in each phase:



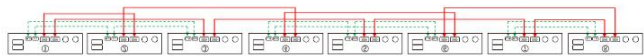
Communication connection



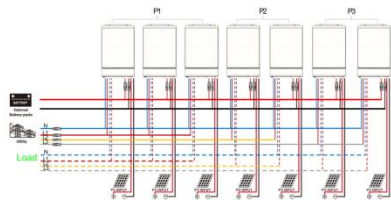
Three inverters in one phase, three inverters in second phase and two inverters for the third phase:



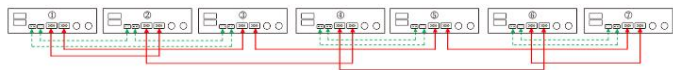
Communication connection



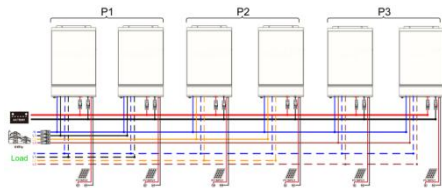
Three inverters in one phase, two inverters in second phase and two inverters for the third phase:



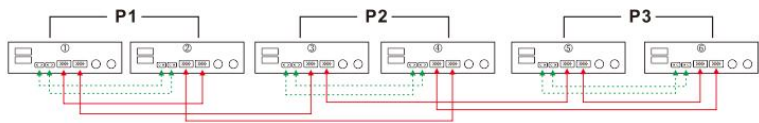
Communication connection



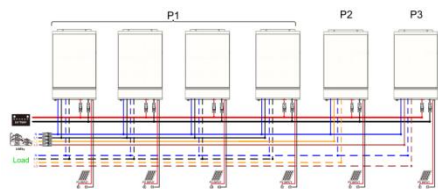
Two inverters in each phase:



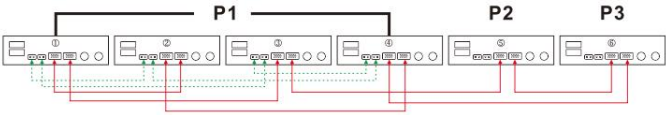
Communication connection



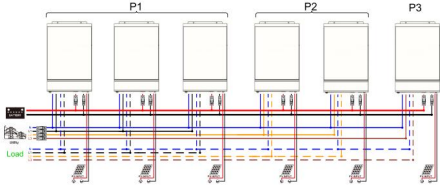
Four inverters in one phase and one inverter for the other two phases:



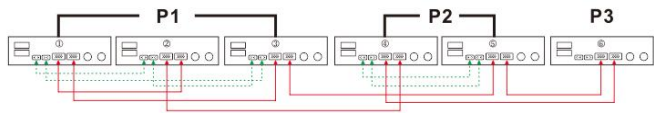
Communication connection



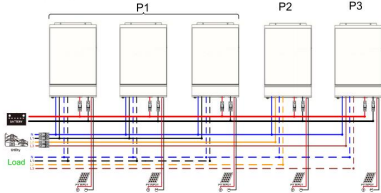
Three inverters in one phase, two inverters in second phase and one inverter for the phase:



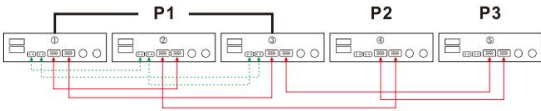
Communication connection



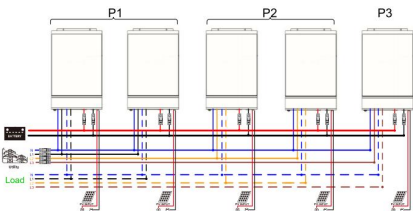
Three inverters in one phase and only inverter for the remaining two phases:



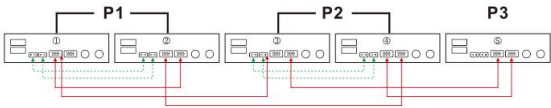
Communication connection



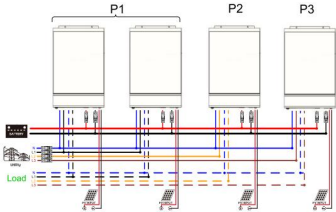
Two inverters in two phase and only one inverter for the remaining phase:



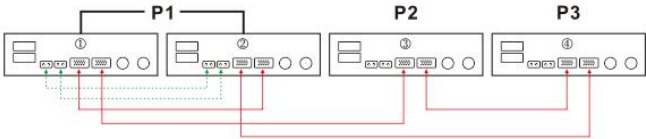
Communication connection



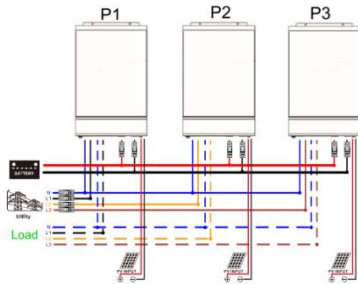
Two inverters in one phase and only one inverter for the remaining phase:



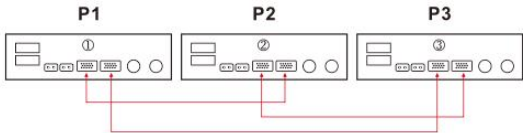
Communication connection



One inverter in each phase:



Communication connection



9.4 Display of the parallel machine fault code

Fault code display

Fault Code	Fault Event
60	Power feedback protection
71	Firmware version inconsistent
72	Current sharing fault
73	Inconsistent output voltage settings in parallel-connected systems
80	CAN fault
81	Host loss
82	Synchronization loss
83	Battery voltage detected different
84	AC input voltage and frequency detected different
85	AC output current unbalance
86	AC output mode setting is different

9.5 Commissioning

Parallel in single phase

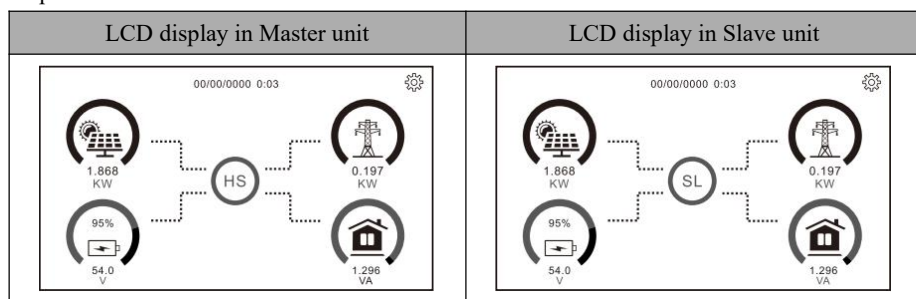
Step 1: Check the following requirements before commissioning:

- ◆ Correct wire connection
- ◆ Ensure all breakers in Line wires of load sides are open and each Neutral wires of each unit are connected together.

Step 2: Turn on each unit and set “PAL” in LCD setting program 4 of each unit. And then shut down all units.

NOTE! It's necessary to turn off switch when setting LCD program. Otherwise, the setting can not be programmed.

Step 3: Turn on each unit.



NOTE: Master and slave unit are randomly defined.

Three parallel operations follow the above steps.

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.