USER MANUAL

HYBRID SOLAR INVERTER

500W-1200W

FOR SOLAR OFF-GRID SYSTEM

M-HSI-PLUS-EN-A01

Table of Contents

Chapter 1 Safety Precautions

Operational Safety

1. Please read “Safety Precautions” carefully before using this product to ensure correct and safe use. Please keep this manual in a safe place.
2. When operating, please pay attention to all warning signs and operate as required.
3. Do not use the device in direct sunlight, rain or moisture environment.
4. This equipment cannot be installed near heat source areas, or near electric heaters, furnaces, etc.
5. When placing the inverter, keep a safe distance around it , ensure ventilation and heat dissipation and product maintenance. Please refer to this manual when installing.
6. When cleaning, use a dry, non-conductive item to wipe.
7. In the event of a fire, please use a dry power fire extinguisher for fire fighting. Do not use liquid fire extinguishers.
8. Please consider the position-to-machine and battery pack load-bearing capacity before installation.
9. Before using the device, please ensure that the load power matches the rated power of the inverter and the battery specifications.

Prohibited Matter

1. There is high voltage inside the power supply equipment, not the company or a technician who is not authorized by the company,Do not open the lid without authorization, otherwise there is a danger of electric shock and loss of warranty.
2. Before applying to the following load equipment, please discuss with the dealer in advance; its application, setup, management and maintenance must have special considerations and design:
   A. Precision industrial, scientific and medical instruments and equipment;
   B. Elevators and other equipment that may endanger personal safety;
   C. Starting a load device with a large current and generating negative work;
3. Do not place the battery in a fire to avoid explosion.

Electrical Safety

1. Before powering up, please confirm that it is properly grounded and check the correctness of the distribution line and battery polarity.
2. The battery protection device must be equipped with an overcurrent protection circuit breaker of the rated specification.
3. When the inverter needs to be moved or re-wired, it must be ensured that the inverter is completely shut down and the input breaker and battery switch are disconnected, otherwise the output may still be charged and there is a danger of electric shock.
4. Before connecting the inverter, the client must install a four-pole overcurrent protection device with rated value in the power distribution system to disconnect all input lines to prevent electric shock.

Battery Safety

1. The life of the battery is shortened as the ambient temperature increases. Regular battery replacement ensures that the inverter is working properly and that sufficient backup time is guaranteed.
2. Battery replacement and maintenance should only be carried out by authorized personnel with battery expertise. The same type and model of battery must be used and must be the same quantity.
3. There is a danger of electric shock and short current in the battery. To avoid electric shock and injury, please observe the following warnings when replacing the battery:
   A. Do not wear watches, rings or similar metal objects;
   B. Use insulated tools;
   C. Wear rubber shoes and gloves;
   D. Do not place metal tools or similar metal parts on the battery;
   E. Disconnect the load connected to the battery before removing the battery connection terminal.
4. It is strictly forbidden to expose the battery to fire to avoid explosion and endanger personal safety.
5. Non-professionals should not open or damage the battery, because the electrolyte in the battery contains dangerous substances such as strong acid, which can cause damage to the skin and eyes. If you accidentally come into contact with the electrolyte, immediately wash it with plenty of water and go to the hospital for examination.
6. Do not short-circuit the positive and negative terminals of the battery. Over-current protection must be installed in the battery box to prevent fire or electric shock.

Use And Maintenance

1. The use environment and storage methods have an impact on the service life and reliability of this product. Therefore, please be careful not to use it in the following working environments:
   A. High, low temperature and humidity places that exceed the technical specifications (temperature 0-55 °C, relative humidity 0-95%,No condensation);
   B. Locations that are subject to vibration and are subject to collision;
   C. Locations with metallic dust, corrosive substances, salt and flammable gases.
2. If not used for a long time, the inverter (without battery) must be stored in a dry environment with a storage temperature range of 0-55 °C. Before the inverter is turned on, the ambient temperature must be warmed to above 0 °C for more than 2 hours.
3. Please keep the inlet and exhaust holes open. Poor ventilation of the inlet and exhaust holes can cause the temperature inside the inverter to rise, shortening the life of components in the machine, which will affect the life of the machine.
4. When the battery is not used for a long time, the battery needs to be charged once if it has not been charged for three consecutive months.

Chapter 2 Installation

Unpacking Inspection

1. Open the Package ,it should be include:
1）One unit Inverter
2）Communication Wire(optional)
3）External display (optional)
4）User manual

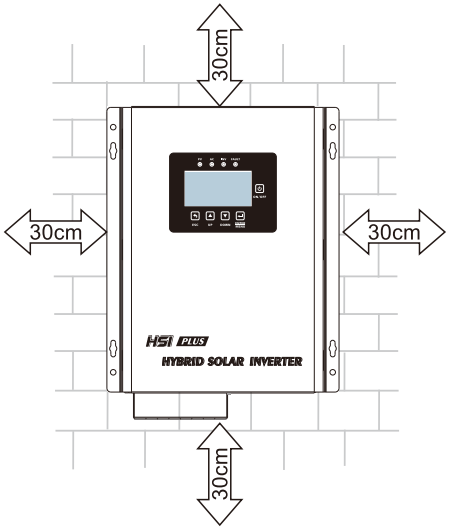
2. Before opening the inverter package, please check if the inverter is damaged during transportation. If it is found damaged or missing parts, do not turn it on. Contact the carrier or dealer immediately.

Recycling: The packaging material is reusable, please keep the packaging material for future use.

Installation Requirements

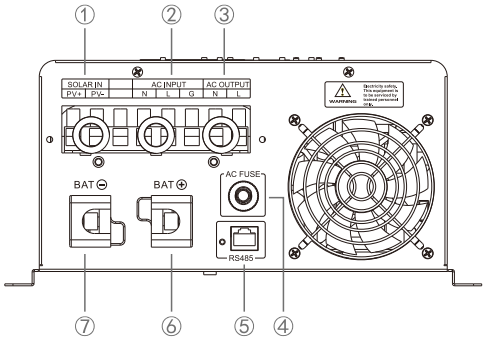
1.Installation of the inverter must be performed by personnel with electrical safety knowledge.

- The wall on which the inverter is mounted must be sturdy and can withstand the weight of the inverter for a long time. (Please refer to the instruction manual for the weight of the inverter).
- The installation location must match the size of the inverter.
- Do not install the inverter on a building constructed of flammable or heat-resistant materials.
- Install the inverter in a head-up orientation for easy inspection of the LCD display and maintenance work.
- It is not recommended to expose the inverter directly to strong sunlight.
- The humidity of the installation environment should be between 0 and 95% (non-condensing).
- The ambient temperature around the inverter should be between 0 °C and 55 °C.
- The inverter can be mounted on a plane that is tilted vertically or backwards as shown:



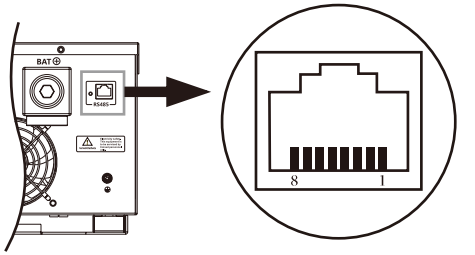
It is only suitable for installation on the ground or other non-combustible surfaces.

Product Overview



① SOLAR IN ② AC INPUT ③ AC OUTPUT
④ AC FUSE ⑤ RS485 ⑥ BATTERY ⊕
⑦ BATTERY ⊖

Device Side - Female Connector



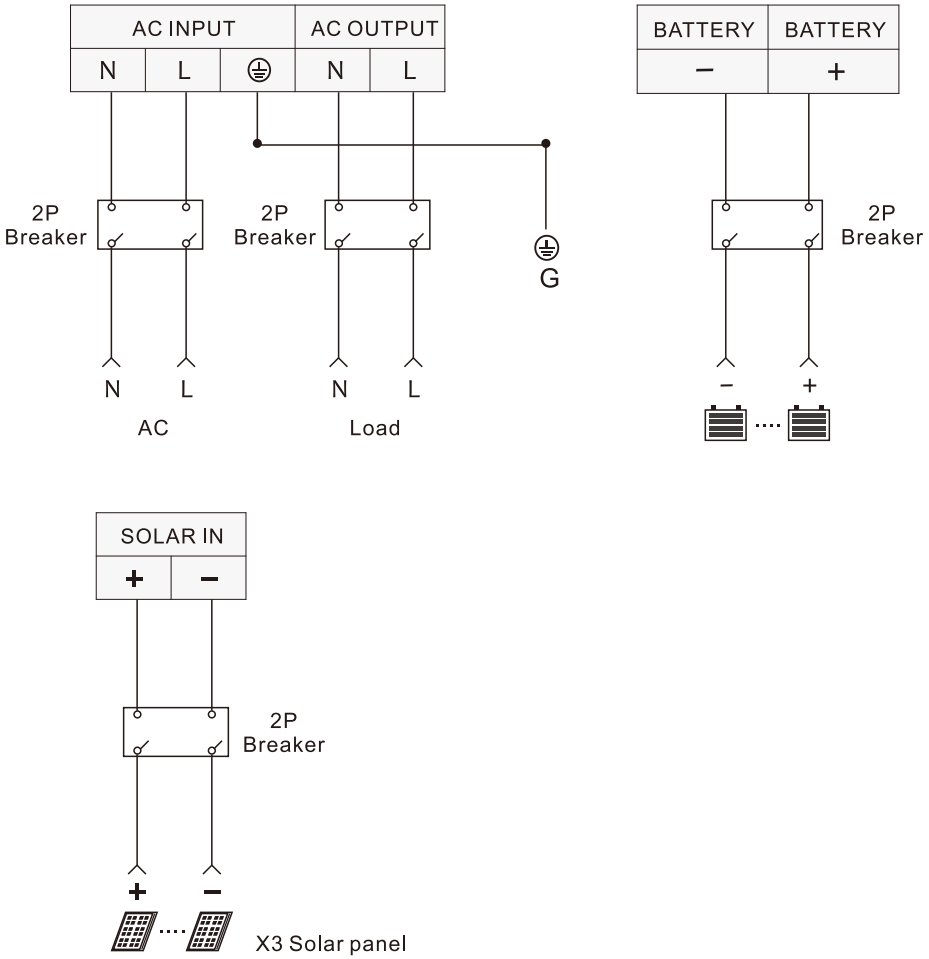
Pin on Rj45	Name	Description
1	A	Generator terminal 0
2	B	Generator terminal 1
8	GND	Signal and optional Power Supply common

Inverter Circuit Diagram

The machine with relatively high power is connected to the mains input and load output through the terminal block. The load output is output in addition to the terminal block mode.

Caveat! ! Please do not connect the output line to the "AC" terminal, and do not connect the AC to the "load" terminal.

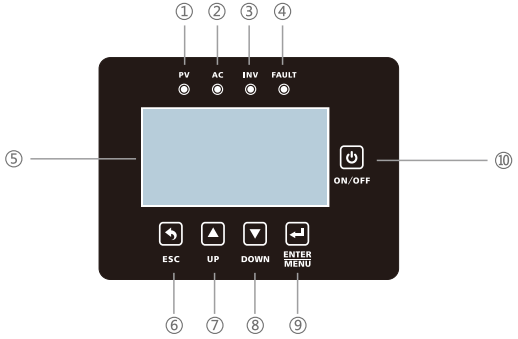
1.AC input and output load connection



Chapter 3 Operating

Screen Control Function

LCD screen is an interface used for man-machine interaction, which can be used for visual operation through LCD screen, which provides a friendly interface for functions such as turn on, turn off, state display, fault alarm, parameter setting, and so on. After installation, the user can complete all operations through the LCD screen. The LCD screen includes three parts: status indicator, LCD display screen, and navigation key. The following table describes the status indicator and the navigation button respectively.



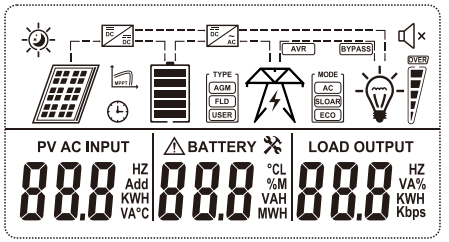
- **Indicator Status**

Identification	Indicator light name	Status
①	PV	PV Normal
②	AC	AC Normal
③	Inverter	Battery inverter power supply
④	Fault/Warning	Warning/work abnormal

- LCD Display——⑤：Detailed display information
- Navigation keys: selection, opening, obtaining information, modifying system parameters, etc.

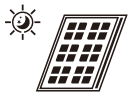
Identification	Navigation keys	Function
⑥	Return	Return to the previous interface menu or exit the settings interface (do not save the settings)
⑦	UP	Page turning; switching options; adding settings value
⑧	Down	Page turning; switching options; minus setting values
⑨	Confirm	Press and hold for 5 seconds to enter the setting interface; short press to confirm save or set to enter the setting submenu
⑩	Turn On/Off	Turn on or turn off the inverter

LCD Monitor Icon



Icon	Function Description
Input Source Information	
AC INPUT	Indicates the AC information
PV INPUT	Indicates the SOLAR information
PV AC INPUT 88.8 HZ Add KWH VA°C	Indicates input voltage, input voltage, solar voltage
Output Information	
LOAD OUTPUT 88.8 HZ VA% KWH Kbps	Indicates output voltage, output frequency, load percentage, VA in load, load watts and discharge current
Battery Information	
BATTERY 88.8 °CL %M VAH MWH	Indicates battery voltage and charging current
	The battery capacity status is 0-10%, 10-30%, 30-50%, 50-70%, 70-90% and 90~ 100%

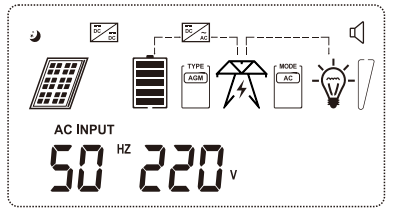
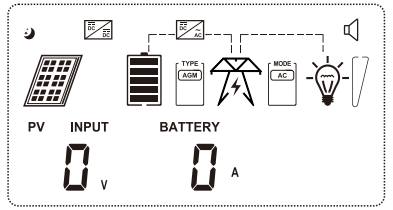
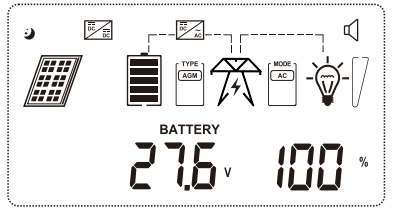
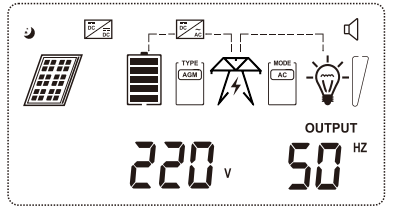
0%~10%	10%~30%	30%~50%	50%~70%	70%~90%	90%~100%
					

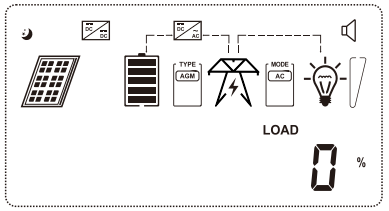
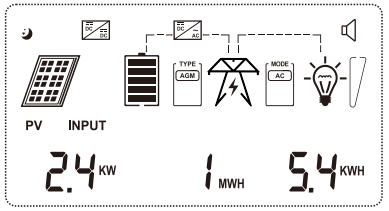
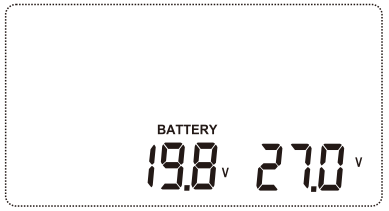
Load Information					
OVER	Indicates overload				
	Indicates load				
	0%~25%	25%~45%	45%~65%	65%~85%	85%~100%
					
Mode Operation Information					
	Indicates unit connects to PV				
	Indicates unit connects to AC				
	Indicates MPPT				
	Indicates time				
	Indicates the DC/DC inverter circuit is working				
	Indicates the DC/AC inverter circuit is working				
BYPASS	Indicates load is supplied by utility power				

	Indicates types include AGM, FLD and USER
	Indicates modes include AC priority mode, battery priority, ECO mode and unattended mode
Buzzer Information	
	Indicates buzzer on
	Indicates buzzer off

Display Settings

By pressing the "UP" or "DOWN", the LCD display information will be switched in turn.

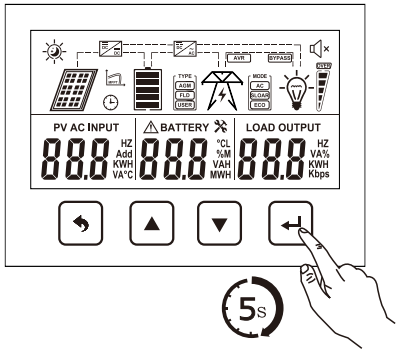
Icon	Parameter Interface	LCD Display
①	AC Input	
②	Solar Input Voltage/ Charging Current	
③	Battery Voltage Percentage	
④	Output Voltage Frequency	

Icon	Parameter Interface	LCD Display
⑤	Load Percentage	
⑥	Solar Charging Power/ total Power Total power=1MWHx1000+5.4KWH Prompt: Restore the factory settings to reset the power generation;the power generation cannot be accumulated when shutting down;restart will lose some power generation.	
⑦	Restore Factory Setting （Long press the return key and the down key to restore the factory settings)	
⑧	Accident Details （Refer to Chapter 6 Fault Reference Code)	
⑨	Standby Mode （The current battery voltage is 19.8V; the battery voltage is 27.0V when exiting the standby state)	

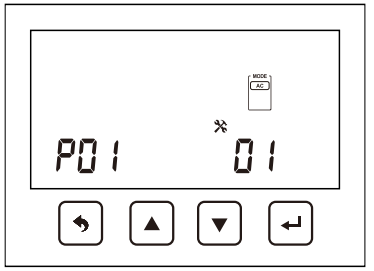
Mode Introduction

On the main interface, long press the "ENTER" for 5 seconds to enter the mode introduction interface, and then press the "UP" or "DOWN" to switch between different setting interfaces.

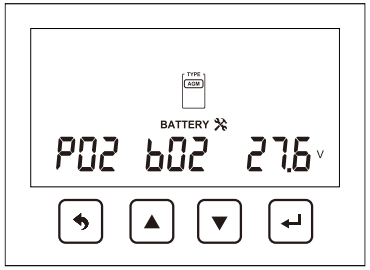
1) Long press the "ENTER" for 5s on the main interface



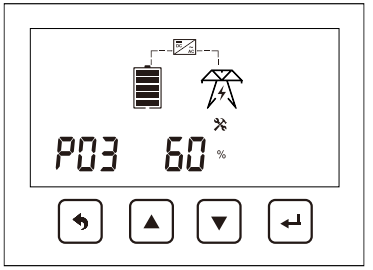
2) Enter P01 mode setting



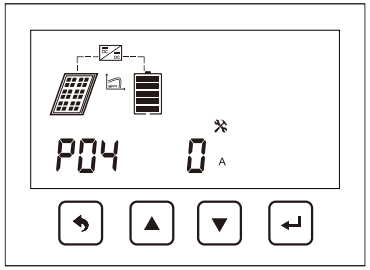
3) Press "DOWN" to enter P02 battery type and settings interface



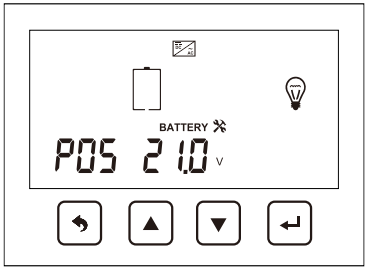
4) Press the "DOWN" to enter the P04 mains charging current interface



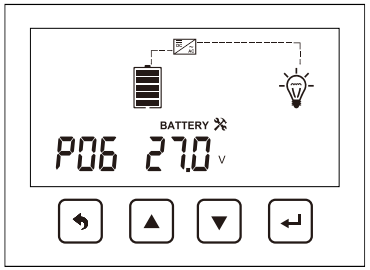
5) Press the "DOWN" to enter the P04 solar charging current interface



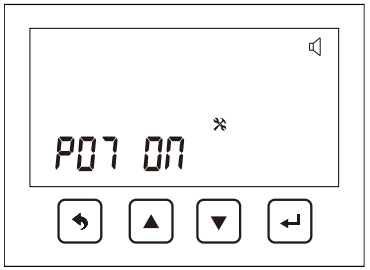
6) Press the "DOWN" to enter the P05 battery low voltage protection setting interface



7) Press the "DOWN" to enter the P06 battery low voltage recovery setting interface



8) Press "DOWN" to enter the P07 buzzer switch interface



P01-Mode Setting

On the main interface, press and hold the "ENTER" for 5s to enter the P01 interface. On this interface, press the "ENTER" again to enter the editing state, then press the "UP" or "DOWN to switch between different setting parameters, and then press the "ENTER" to select the selected parameter, and stop after confirming the parameter Flashes and returns to the setting selection page.

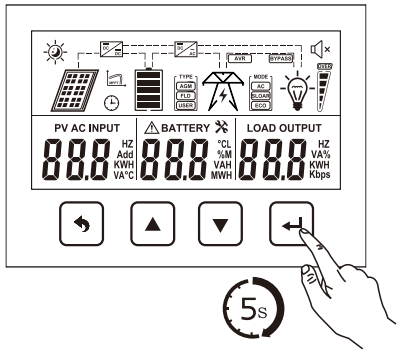
01--AC priority mode: charging and load power supply when there is mains power, battery power supply to the load when there is no mains;

02--Battery priority mode: when the battery is charged, it will be powered by the battery. When the battery is empty or the battery voltage is low, it will be switched to the mains supply (the battery low-voltage protection value can be set on the P05 interface), and it will be used when an external charger or solar rechargeable battery is connected. Switch to battery power supply (you can set the battery low voltage recovery value on the P06 interface).

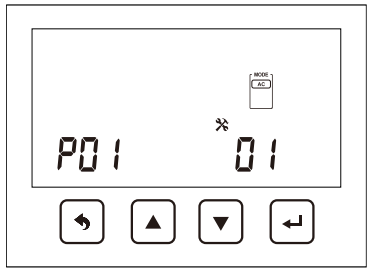
03--ECO mode: when there is city power, charge and load power supply, when there is no city power, the battery supplies power to the load, but the load must be higher than 5% of the machine's capacity, otherwise the machine will not work normally;

04--Unattended mode: When the battery is charged, it is powered by the battery. (The battery low-voltage protection value can be set on the P05 interface; the battery low-voltage recovery value can be set on the P06 interface). When the battery is lower than the set value, the output will be turned off, and the output will open auto when the battery voltage restores to the set value.

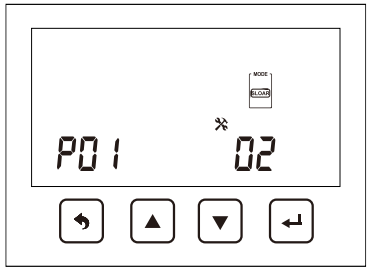
1) Long press the "ENTER" for 5s on the main interface



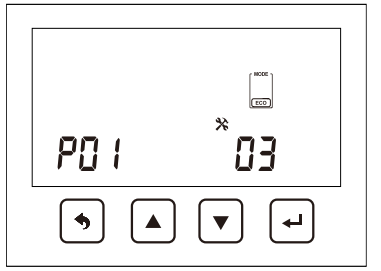
2) Enter the P01 interface and press the "ENTER" to enter the editing state, then press the "UP" and "DOWN" to select 01, and then press the "ENTER" to confirm the parameter



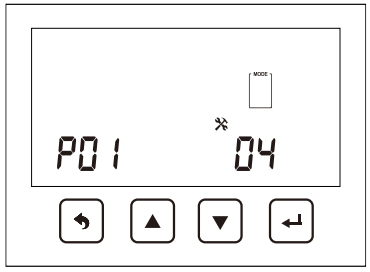
3) Press the "ENTER" to enter the editing state, then press the "UP" and "DOWN" to select 02, and then press the "ENTER" to confirm the parameter



4) Press the "ENTER" to enter the editing state, then press the "UP" and "DOWN" to select 03, and then press the "ENTER" to confirm the parameter



5) Press the "ENTER" to enter the editing state, then press the "UP" and "DOWN" to select 04, and then press the "ENTER" to confirm the parameter

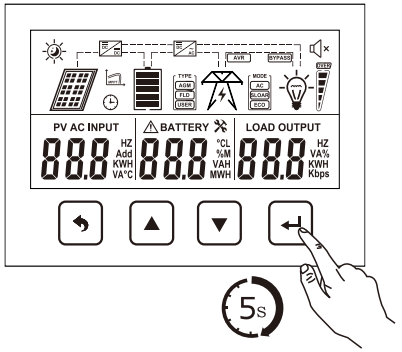


P02-Battery Type And Settings

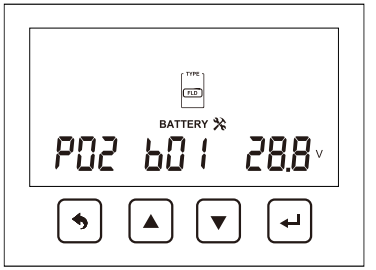
On the main interface, press and hold the "ENTER" for 5s to enter the P02 interface. On this interface, press the "ENTER" again to enter the editing state, then press the "UP" or "DOWN to switch between different setting parameters, and then press the "ENTER" to select the selected parameter, and stop after confirming the parameter Flashes and returns to the setting selection page.

Icon	Parameter Interface	LCD Display
b01	28. 8V	SLA
b02	27. 6V	AGM
b03	Custom set charging voltage	—

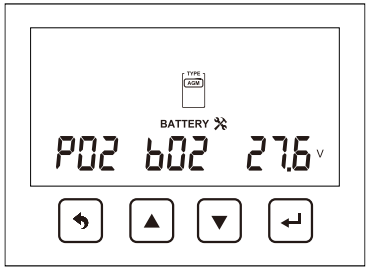
1) Long press the "ENTER" for 5s on the main interface



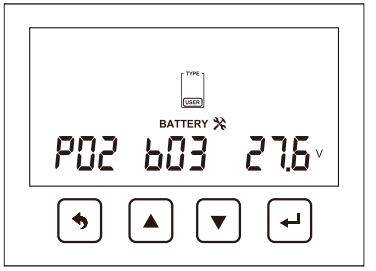
2) Enter the P02 interface and press the "ENTER" to enter the editing state, then press the "UP" and "DOWN" to select b01, and then press the "ENTER" to confirm the parameter



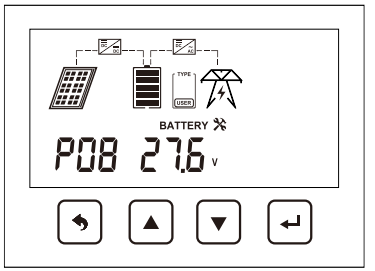
3) Press the "ENTER" to enter the editing state, then press the "UP" and "DOWN" to select b02, and then press"ENTER" to confirm parameters



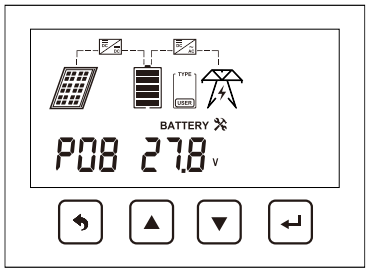
4) Press the "ENTER" to enter the editing state, then press the "UP" and "DOWN" to select b03, and then press"ENTER" to confirm parameters



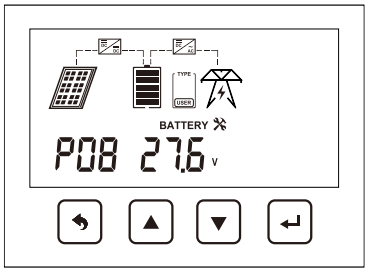
5) Press "ENTER" to enter the setting interface



6) Press the "UP" to increase the setting parameter



7) Press the "DOWN" to reduce the setting parameters

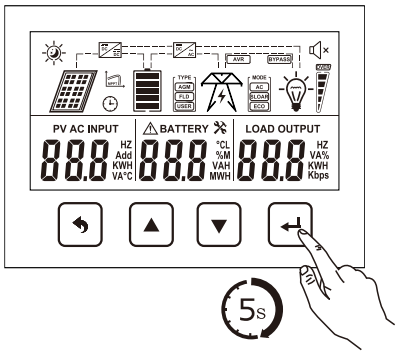


P03-AC Charging Current Setting

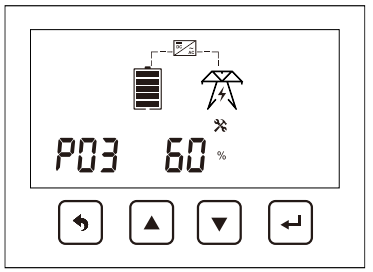
On the main interface, press and hold the "ENTER" for 5s to enter the P03 interface. On this interface, press the "ENTER" again to enter the editing state, then press the "UP" or "DOWN to switch between different setting parameters, and then press the "ENTER" to select the selected parameter, and stop after confirming the parameter Flashes and returns to the setting selection page.

Can be set from 0%-100% (in 10% increments)

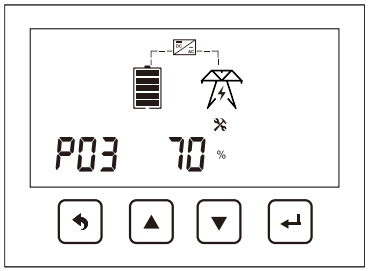
1) Long press the "ENTER" for 5s on the main interface



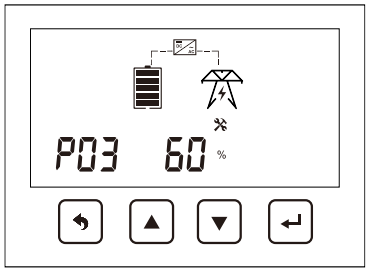
2) Enter the P03 interface and press the "ENTER" to enter the editing state



3) Press the "UP" to increase the setting parameter



4) Press the "DOWN" to reduce the setting parameters

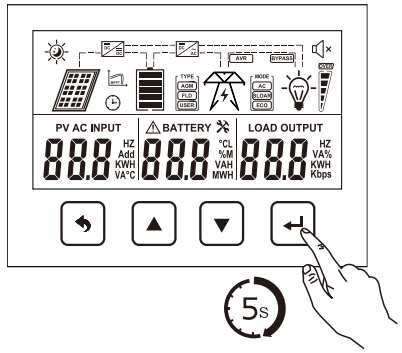


P04-PV Charging Current

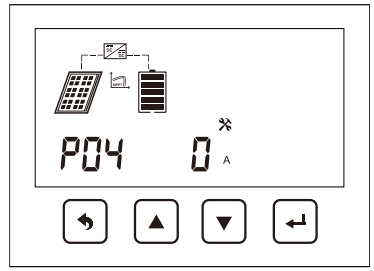
On the main interface, press and hold the "ENTER" for 5s to enter the P04 interface. On this interface, press the "ENTER" again to enter the editing state, then press the "UP" or "DOWN to switch between different setting parameters, and then press the "ENTER" to select the selected parameter, and stop after confirming the parameter Flashes and returns to the setting selection page.

Can be set to 0-rated charging current.

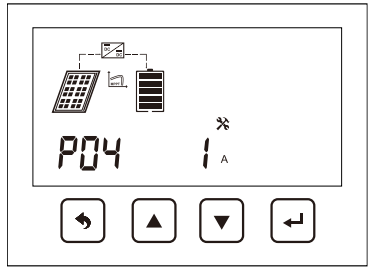
1) Long press the "ENTER" for 5s on the main interface



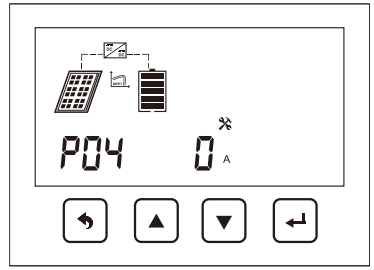
2) Enter the P04 interface and press the "ENTER" to enter the editing state



3) Press the "UP" to increase the setting parameter



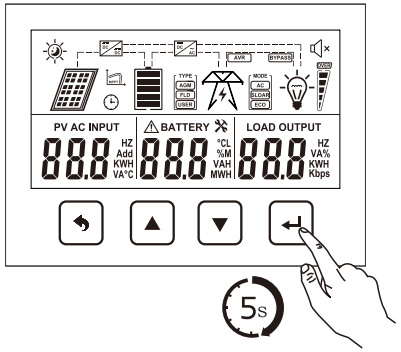
4) Press the "DOWN" to reduce the setting parameters



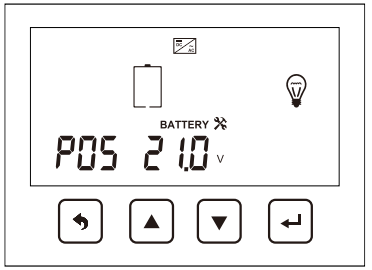
P05-Battery Low Voltage Protection Setting

On the main interface, press and hold the "ENTER" for 5s to enter the P05 interface. On this interface, press the "ENTER" again to enter the editing state, then press the "UP" or "DOWN to switch between different setting parameters, and then press the "ENTER" to select the selected parameter, and stop after confirming the parameter Flashes and returns to the setting selection page.

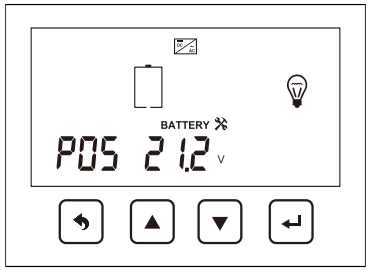
1) Long press the "ENTER" for 5s on the main interface



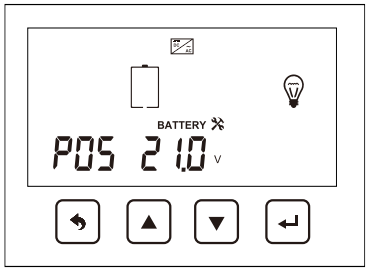
2) Enter the P05 interface and press the "ENTER" to enter the editing state



3) Press the "UP" to increase the setting parameter



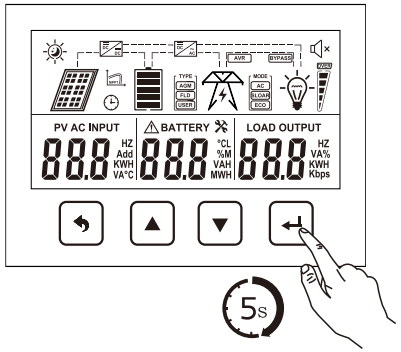
4) Press the "DOWN" to reduce the setting parameters



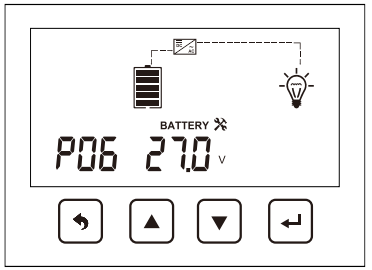
P06-Low Battery Recovery Setting

On the main interface, press and hold the "ENTER" for 5s to enter the P06 interface. On this interface, press the "ENTER" again to enter the editing state, then press the "UP" or "DOWN to switch between different setting parameters, and then press the "ENTER" to select the selected parameter, and stop after confirming the parameter Flashes and returns to the setting selection page.

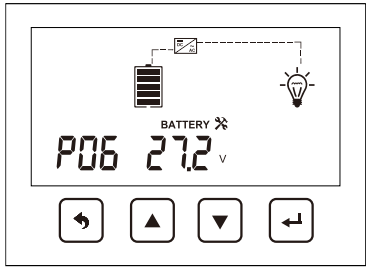
1) Long press the "ENTER" for 5s on the main interface



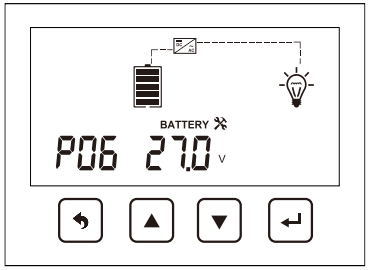
2) Enter the P07 interface and press the "ENTER" to enter the editing state



3) Press the "UP" to increase the setting parameter



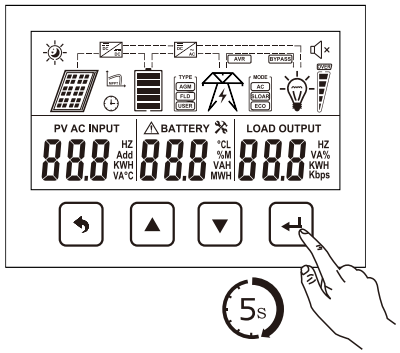
4) Press the "DOWN" to reduce the setting parameters



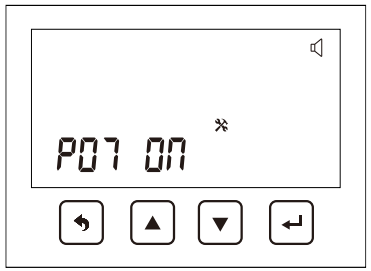
P07-Buzzer Switch

On the main interface, press and hold the "ENTER" for 5s to enter the P07 interface. On this interface, press the "ENTER" again to enter the editing state, then press the "UP" or "DOWN to switch between different setting parameters, and then press the "ENTER" to select the selected parameter, and stop after confirming the parameter Flashes and returns to the setting selection page.

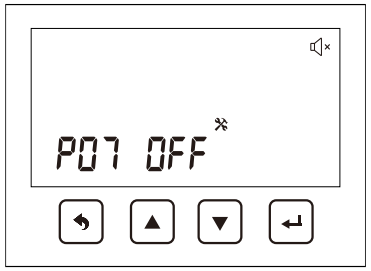
1) Long press the "ENTER" for 5s on the main interface



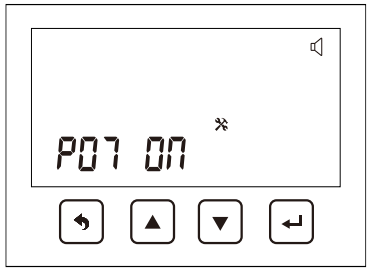
2) Enter the P07 interface and press the "ENTER" to enter the editing state



3) Press "UP" to turn off the buzzer



4) Press the "DOWN" to turn on the buzzer



Chapter 4 Trouble Shooting

Fault Reference Code

The following faults may be encountered during the use of the inverter. Please refer to the following methods for simple fault analysis.

Fault Code	Failure Event	Solution
E01 OC	Inverter overcurrent	Check whether there is a surge or large impact load on the output, reduce the load; if the load is disconnected and restarted, it still displays E01 OC. Please contact the supplier.
E02 OSt	Output short circuit	Check whether there is a surge or large impact load on the output, reduce the load; if the load is disconnected and restarted, it still displays E02 OSt . Please contact the
E03 OL	Inverter overload	Reduce the load. If you cannot solve it, please contact the supplier.
E04 tH	Inverter over temperature	Check whether the fan is normal, whether the ventilation holes are blocked, and keep the internal dust away from the high temperature environment. If you cannot solve it, please contact the supplier.
E05 bH	Battery high voltage	Lower the battery voltage and check whether the high voltage protection setting value is too low. If you cannot solve it, please contact the supplier.
E06 bL	Battery low voltage	Check whether the battery low-voltage protection value is too low. If you cannot solve it, please contact the supplier.
E07 PHA	Abnormal phase sequence	Check whether the wiring is wrong. If you cannot solve it, please contact the supplier.
E08 OVL	Output low voltage	The output voltage is too low and the load is too large. If you cannot solve it, please contact the supplier.
E09 ECO	ECO mode work	The energy-saving function is activated, the output is turned off, and the load is automatically restored. If you cannot solve it, please contact the supplier.

Chapter 5 Protection And Cleaning

Check The Heat Dissipation

Check the environment around the inverter to eliminate the clogging of the vents. Cleaning the device will improve the heat dissipation of the inverter.

Cleaning The Inverter

Turn off the AC circuit breaker, DC switch, and wait until the inverter is turned off. You can wipe the inverter with non-conductive items. Do not use water or any cleaning agent (such as solvent or abrasive).

Check Connection

Regularly check the cable and switch for damage or abnormal heat; if there is any damage to the cable and DC switch, please contact a professional staff for inspection.

Chapter 6 Disassembly

Disassemble The Inverter

- Let the inverter be powered off.
- Remove all cables connected to the inverter.
- Unscrew all cable connectors.
- Carefully remove the inverter.

Inverter Packaging

Whenever possible, replace the inverter with the original box and fasten it with the bag. If you can't find the original box, you can also use a box of the same size to ensure that it is the right size and can withstand the weight of the inverter.

Inverter Processing

Do not dispose of the obsolete inverter or its accessories as domestic waste. The disposal methods of discarded electrical and electronic products refer to the regulations on the management of waste electrical and electronic recycling.

Chapter 7 Technical Data Sheet

Model		500W	700W	1000W	1200W
Capacity	Rated Power	500W	700W	1000W	1200W
	Peak Power	1500W	2100W	3000W	3600W
Input	Battery Voltage	12V / 24V			
	DC Input Voltage	12V:10.5-15VDC / 24V:21-30VDC			
	AC Input Voltage	165-275VAC			
	AC Input Frequency	50Hz / 60Hz±5Hz			
Protection	Battery High Voltage Warning	12V:＞15VDC / 24V:＞30VDC			
	Battery High Voltage Protection	12V:＞17VDC / 24V:＞34VDC			
	Battery Low Voltage Warning	12V:＜10.5VDC / 24V:＜21VDC			
	Low Voltage Battery Shutdown	12V:＜10VDC / 24V:＜20VDC			
	Overload, High Temperature,Short Circuit Protection	Automatic Shut-down			
Output	Effectiveness	⩾90%			
	Output Voltage	(Inverter Mode) 220VAC±3%			
	Output Frequency	(Inverter Mode) 50Hz / 60Hz±0. 5Hz			
	Output Waveform	Pure Sine Wave			
	Avr Output Regulator	Output220VAC±10%			
	Avr Output Frequency	Tracking The Mains			
Other	Swithtime	⩽5ms			
	Display	LED+LCD			
	Cooling System	Forced air cooling, intelligent speed regulation			
	Operating Mode	AC Input Priority/Battery Priority/ECO Mode /Unattended mode			
	Communication	RS-485			
AC Charging	Type Of Battery	SLA Battery/AGM Battery/Lithium Battery			
	AC Charging Current	15A			
Working Environment	Temperature	0~55℃			
	Humidity	0~95%(No Condensation)			
Exterior	Product Size(mm)	396x294x145			
	N. W. (Kg)	8	9	10	11

• Product specifications are subject to change without notice.

MPPT Specifications

Charging Mode		Constant Current / Floating Charge / MPPT	
Overall Unit Efficiency	12V/24V	⩾96.5%	
Photovoltaic Module Utilization	12V/24V	⩽99%	
Solar Input Open Circuit Voltage		⩽135V	
Solar Input Operating Voltage		⩽100V	
Maximum Charging Current		30A	40A
Maximum Charging Power	12V	414W	552W
	24V	828W	1104W

Solar Panel Configuration Requirements

Open Circuit Voltage 43V:

Rated Voltage (V)	Rated Current (A)	PV Module Load Voltage (Recommended Value)	Open Circuit Voltage 43V				
			Max. Input voltage(V)	Optimal Number Of Series	Max. Number Of Series	Minimum Number Of Series	Number Of Parallel Groups
12V	30A	18V~100V	100V	2	2	1	Configured According To Power Consumption
12V	40A	18V~100V	100V	2	2	1	
24V	30A	36V~100V	100V	2	2	1	
24V	40A	36V~100V	100V	2	2	1	

Open Circuit Voltage 36V:

Rated Voltage (V)	Rated Current (A)	PV Module Load Voltage (Recommended Value)	Open Circuit Voltage 36V				
			Max. Input voltage(V)	Optimal Number Of Series	Max. Number Of Series	Minimum Number Of Series	Number Of Parallel Groups
12V	30A	18V~100V	100V	2	3	1	Configured According To Power Consumption
12V	40A	18V~100V	100V	2	3	1	
24V	30A	36V~100V	100V	2	3	1	
24V	40A	36V~100V	100V	2	3	1	