USER MANUAL

HYBRID SOLAR INVERTER

500W-1200W

FOR SOLAR OFF-GRID SYSTEM

M-HTS-EN-A01

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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

2.1 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

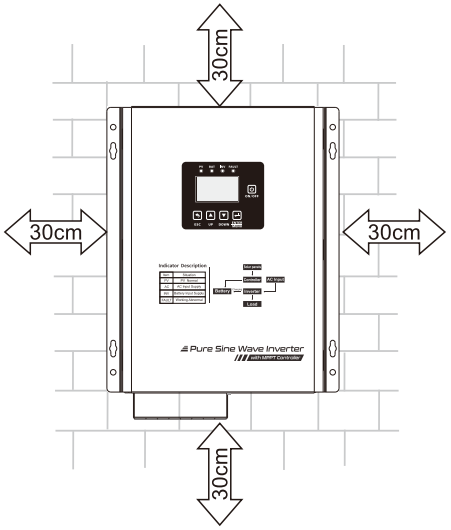
2. Before opening the inverter package, please check if the inverter is damaged during transportation. If it is found damaged or missing parts, do not turn it on. Contact the carrier or dealer immediately.

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

2.2 Installation Requirements

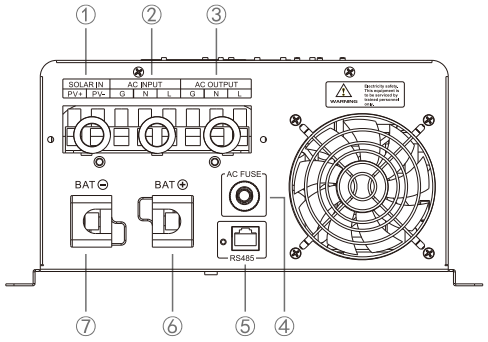
1.Installation of the inverter must be performed by personnel with electrical safety knowledge.

- 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:



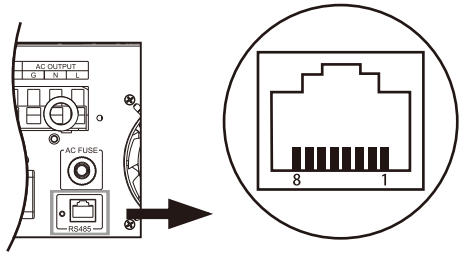
⚠ It is only suitable for installation on the ground or other non-combustible surfaces.

2.3 Product Overview



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

2.4 Device Side - Female Connector



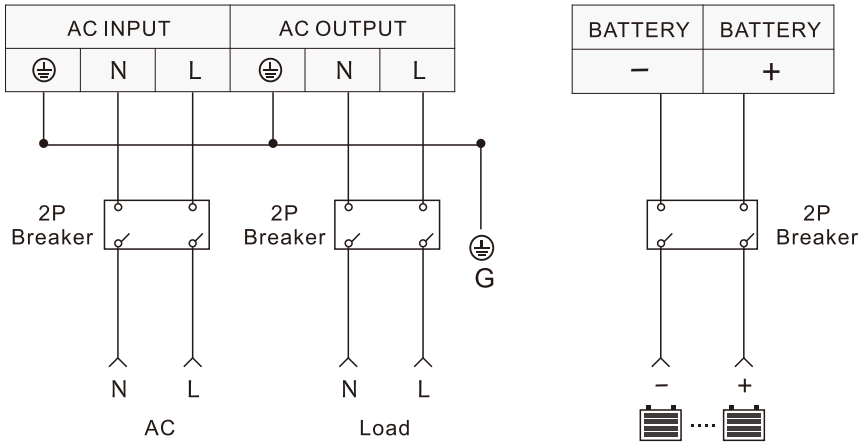
Pin on Rj45	Name	Description
1	A	Generator terminal 0
2	B	Generator terminal 1
8	GND	Signal and optional Power Supply common

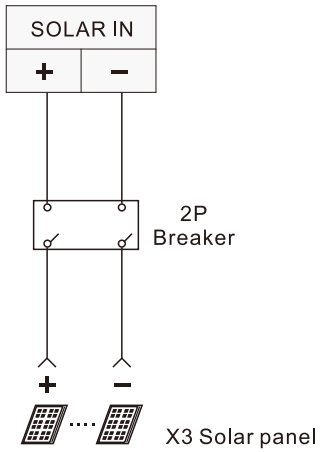
2.5 Inverter Circuit Diagram

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.

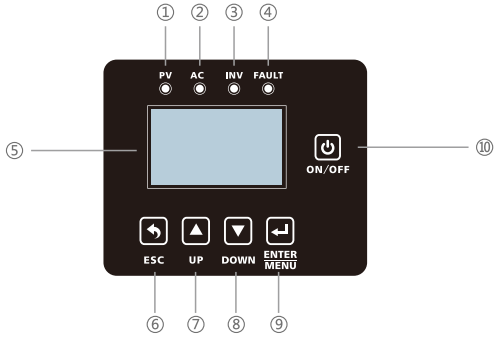
1.AC input and output load connection





Chapter 3 Operating

3.1 Inverter Screen Function



- **Indicator status**

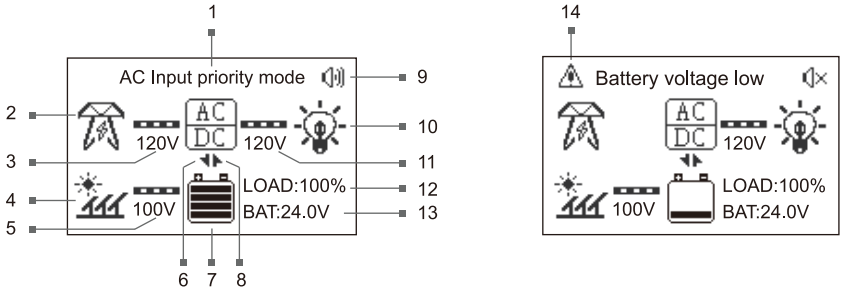
Identification	Indicator light name	Status
①	PV	PV Normal
②	AC	AC Normal
③	Inverter	Battery inverter power supply
④	Fault/Warning	Warning/work abnormal

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

Identification	Navigation keys	Function
⑥	ESC	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	Enter	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

3.2 LCD Display Icons

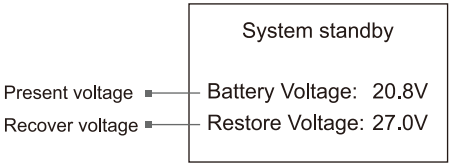
The main interface description is as shown.The following shown is 24V as an example.



NO.	Description	NO.	Description
1	System Mode	8	Battery Inverter
2	AC	9	Alarm Status
3	AC Input Voltage	10	Load
4	PV	11	Output Voltage
5	PV Input Voltage	12	Load Capacity
6	AC Charging	13	Battery Voltage
7	Battery	14	Fault Info

3.3 System Standby

In the unattended mode, the battery voltage will be too low to enter the system standby.



3.4 Display Data

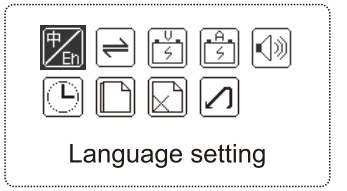
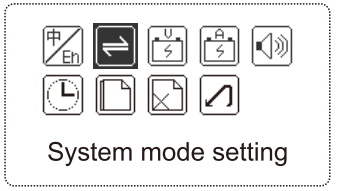
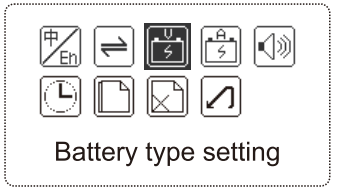
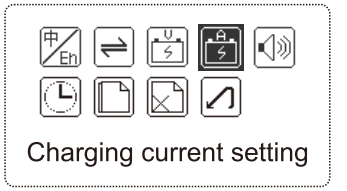
In the default main interface, press the "UP" or "DOWN" button to scroll through the pages. Under the main page, long press the back and down keys to restore the factory settings.

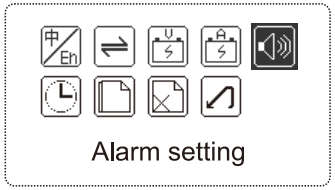
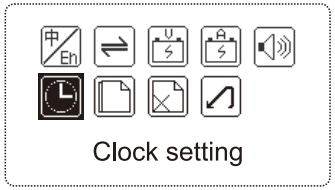
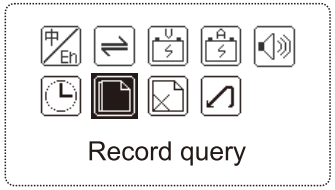
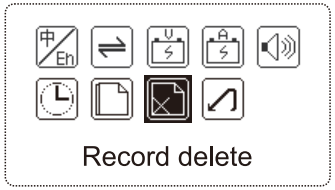
Icon	Parameter Interface	LCD display
①	AC Input Parameter	AC Input parameter Voltage: 120V Freq: 60Hz Status: AC input normal
②	PV Parameter	PV Parameter PV Voltage: 80V PV Current: 80A PV Status: PV loss
③	Engergy Parameter	Engergy Parameter Daily Engergy: 744Wh Total Engergy: 4.859KWh
④	Daily Engergy MAX:00.00Wh(Recorded the highest power generation value for a day)	Daily Engergy MAX: 53 WH 1200 800 400 0 6 12 18

Icon	Parameter Interface	LCD display
⑤	Battery Parameter	Battery parameter Battery Voltage: 27.3V Battery Capacity 100% Charging Voltage : 27.4V
⑥	Output Parameter	Output Parameter Voltage: 120V Freq: 60Hz Status: Output off
⑦	System Information	System Information 2021-06-19 08:57:00 Hardware Version: 1.00 Software Version: 1.00

3.5 LCD Setting

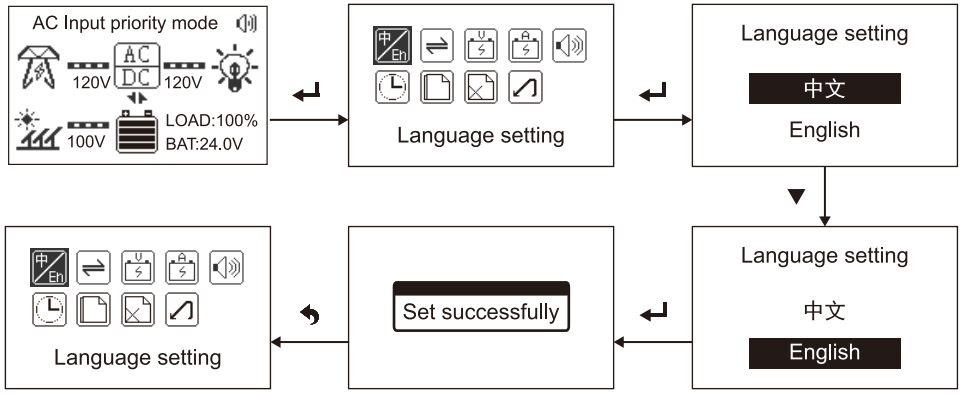
In the default main interface, long press the "ENTER" for 5 seconds to enter the setup menu, press "DOWN" to scroll through the submenus. Set to battery priority mode, the default charge is off, you need to charge to the current settings page.

Icon	Parameter Interface	LCD display
①	Language setting	
②	System mode setting	
③	Battery type setting	
④	Charging current setting	

Icon	Parameter Interface	LCD display
⑤	Alarm setting	
⑥	Clock setting	
⑦	Record query	
⑧	Record delete	
⑨	Factory recover setting	

3.6 Language Setting

In the default main interface, long press the "ENTER" for 5 seconds to enter the setup menu, press "DOWN" to select the language setting and press the "ENTER" to confirm, press the "ESC" to return to the menu or wait after the pop-up is successful. 2 seconds automatically returns to the menu.



3.7 System Mode Setting

In the default main interface, long press the "ENTER" for 5 seconds to enter the setup menu, press the "DOWN" to select the system mode setting and press the "ENTER" to confirm, enter the mode selection press "DOWN" to select the option, pop-up settings After success, press the "ESC" to return to the menu or wait for 2 seconds to automatically return to the menu.

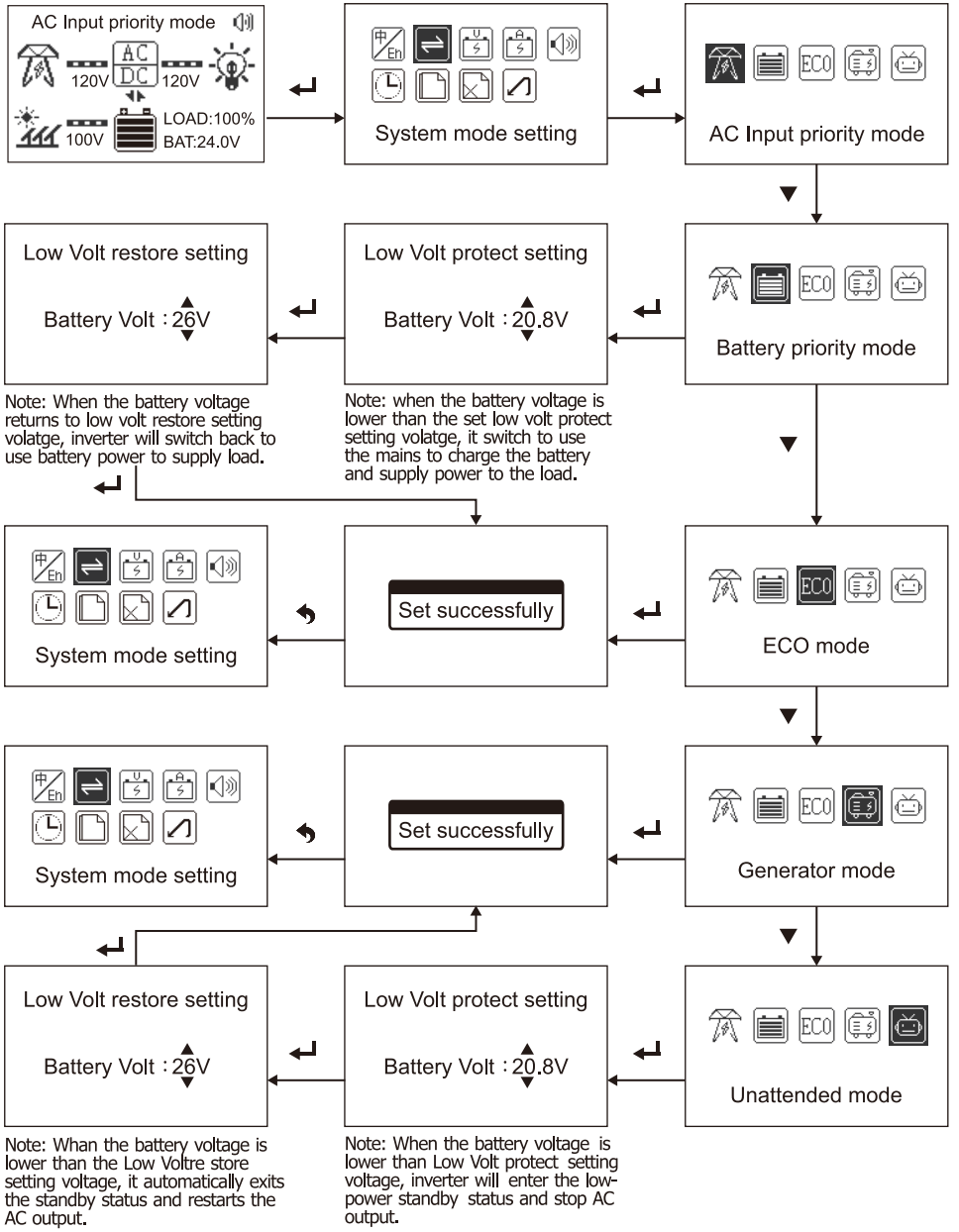
AC Priority Mode - The AC input(utility power/city grid) will supply power to AC output (applianes/load) first, and auto charge battery at the same time. Inverter will auto stop charging when battery been fully charged. When there is no AC input, inverter will auto switch to battery power supply.

Battery Priority Mode - The battery power will supply power to AC output (applianes /load).When battery voltage reach low voltage limit, if AC input is on, inverter will auto switch to AC input supply; If AC input is off,inverter will auto shut down.When battery fully charged,inverter will auto switch back to battery supply.

ECO Mode - Similar to AC priority mode. When AC input(utility power/city grid) is off, the inverter will auto enter standby status when appliances capacity under 5% inverter capacity.Inverter will keep auto switch between on and standby status in order to detact if AC output (applianes/load) capacity over 5% of the inverter capacity.If the AC output capacity over this above mentioned limit,inverter will auto switch from standby status to inverting status.

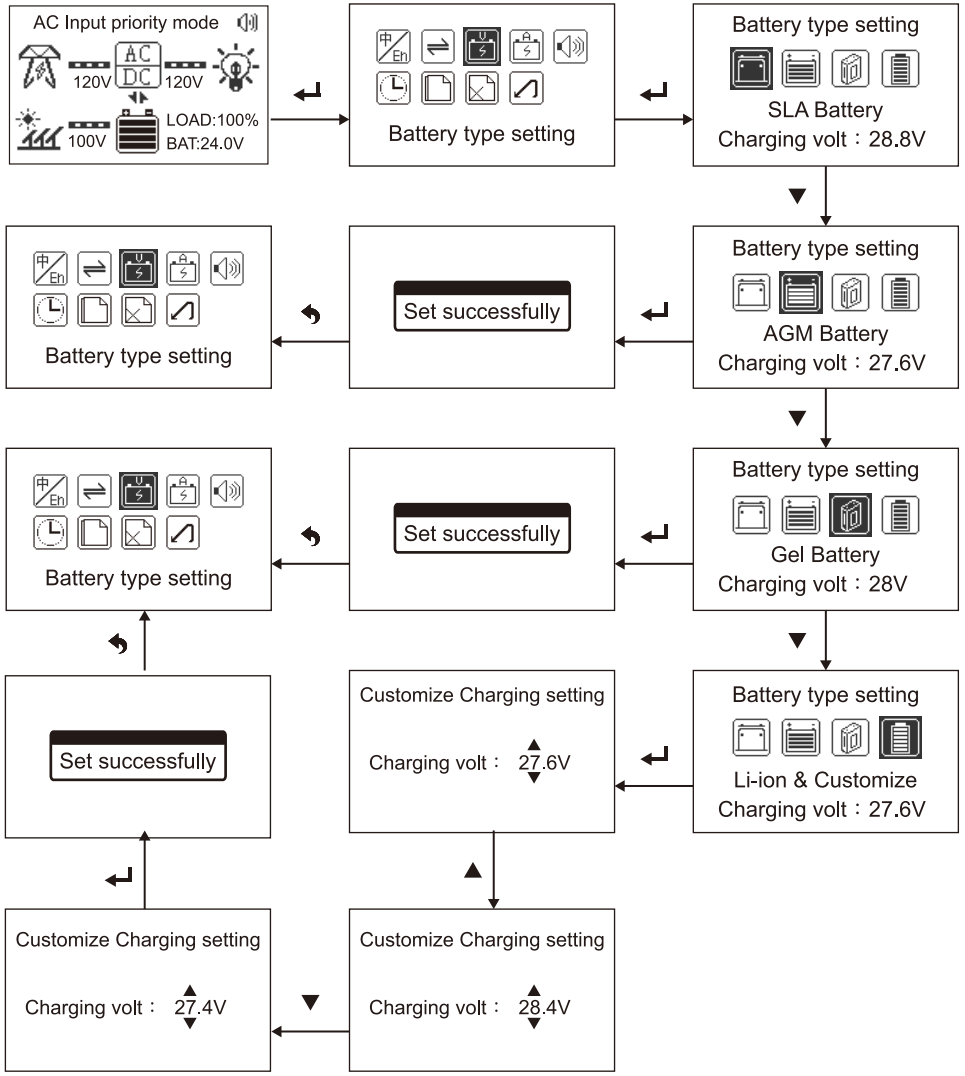
Generator mode - use unstable generator to generate power, access the inverter AC input. through the inverter AVR regulator, automatic matching 50HZ/60HZ municipal frequency, output voltage regulator in the normal operating range.

Unattended Mode - Similar AC priority mode. When AC input (utility power/city grid) is off, battery voltage is too low, the inverter will auto shut down AC output and enter STANDBY status. Once battery been charged it back to the restore voltage point, the inverter will restart the AC output.On the other hand,when AC input back on, inverter will auto restart AC output as well.



3.8 Battery Type Setting

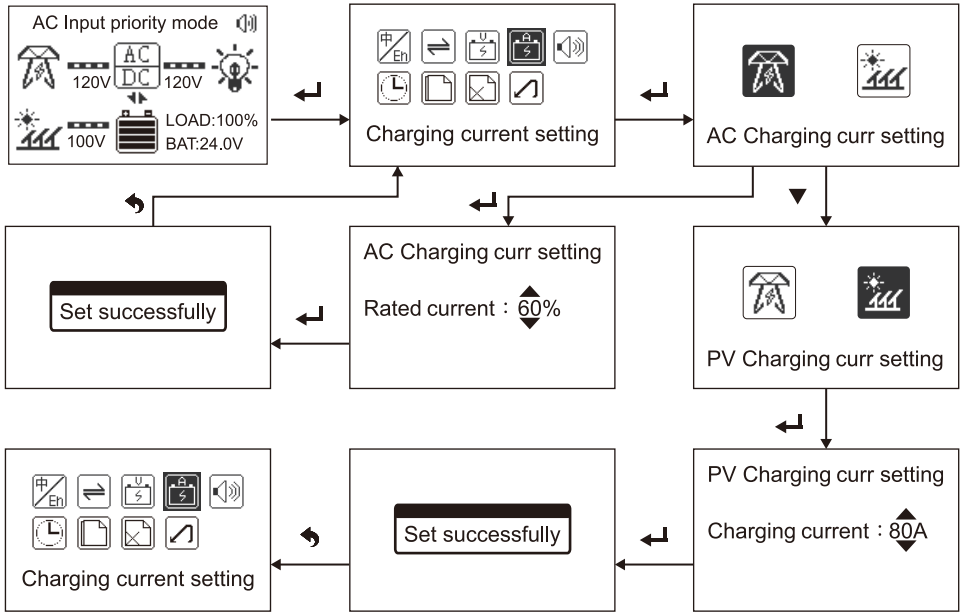
In the default main interface, the long press "ENTER" 5 seconds into the settings menu, press "DOWN" to select battery type settings and then press "ENTER" confirmation, enter mode select press "DOWN" selection option, Press "ESC" to return to menu or wait for 2 seconds to automatically return to menu.



3.9 System Mode Setting

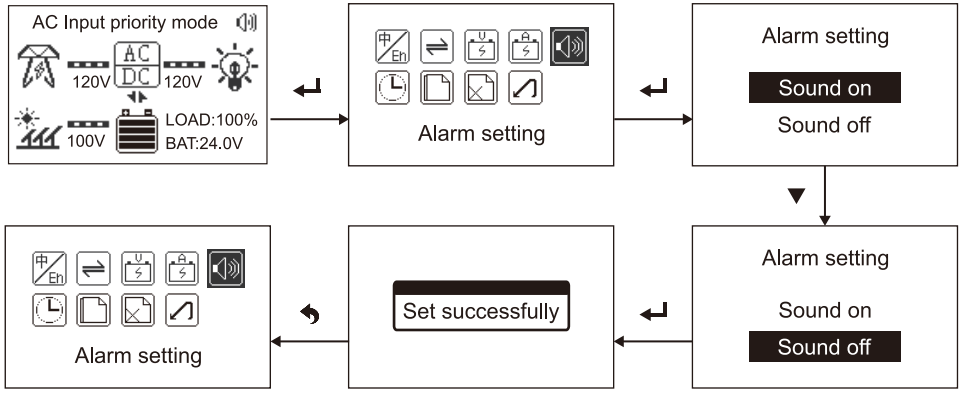
In the default main interface, long press the "ENTER" for five seconds to enter the setup menu, press the "DOWN" to select the charging current setting and press the "ENTER" to confirm, press the "DOWN" to modify the value, confirm the value and press to "ENTER", press the "ESC" to return to the menu after the pop-up setting is successful or wait for 2 seconds to automatically return to the menu.

Note: Setting the value to 0% will turn off the charging function.



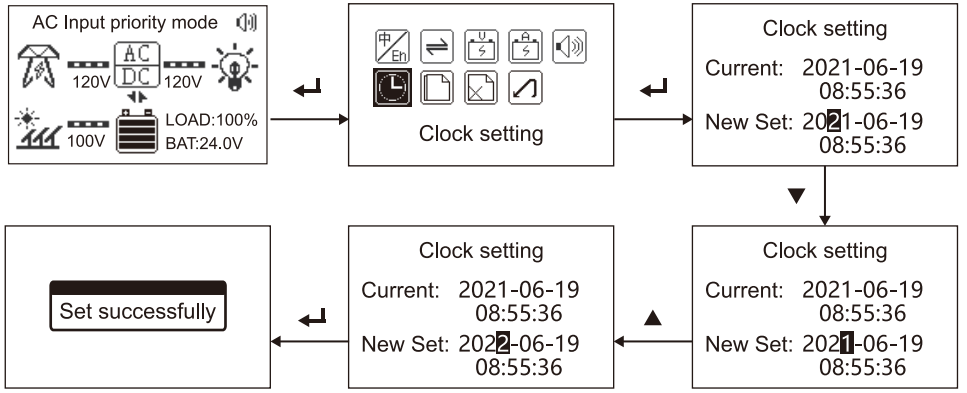
3.10 Alarm Setting

In the default main interface, long press the "ENTER" for five seconds to enter the setup menu, press the "DOWN" to select the alarm tone setting and press the "ENTER" to confirm, press the "ESC" to return to the menu or Wait 2 seconds to automatically return to the menu.



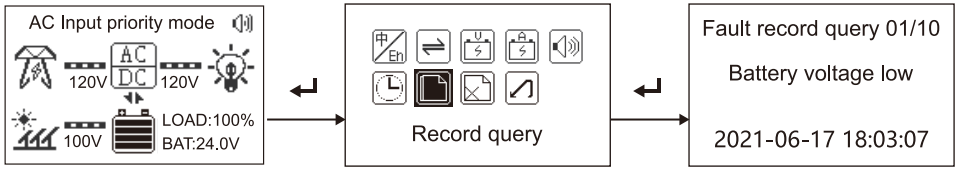
3.11 Clock Setting

In the default main interface, long press the "ENTER" for five seconds to enter the setup menu, press the "DOWN" to select the clock setting and press the "ENTER" to confirm, press the "ESC" to return to the menu or Wait 2 seconds to automatically return to the menu.



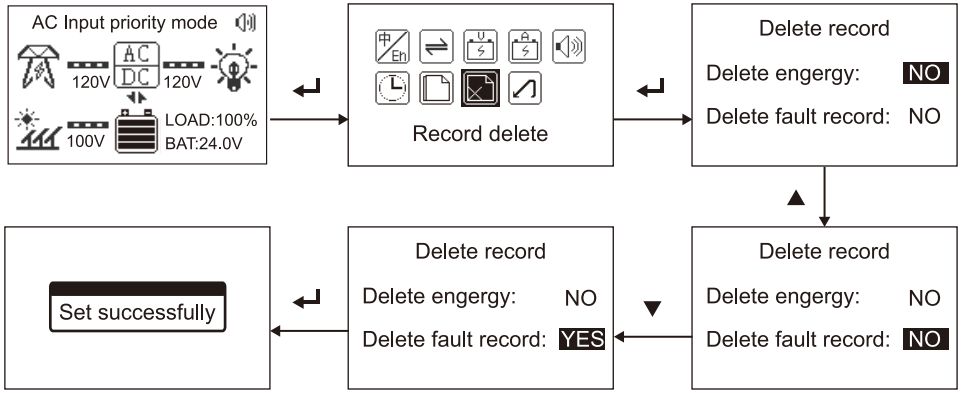
3.12 Record Query

In the default main interface, the long press "ENTER" 5 seconds into the settings menu, press "DOWN" to select record query and then press "ENTER" confirmation, Press "ESC" to return to menu or wait for 2 seconds to automatically return to menu.



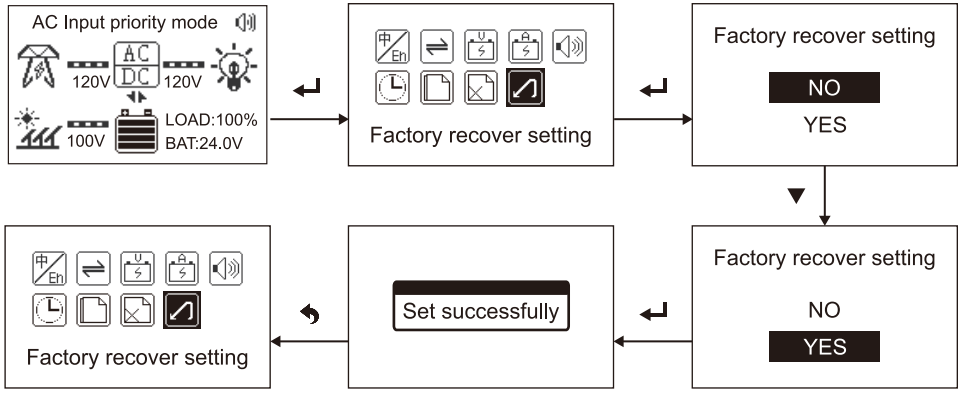
3.13 Record Delete

In the default main interface, the long press "ENTER" 5 seconds into the settings menu, press "DOWN" to select record query and then press "ENTER" confirmation, Press "ESC" to return to menu or wait for 2 seconds to automatically return to menu.



3.14 Factory Recover Setting

In the default main interface, long press the "ENTER" for five seconds to enter the setup menu, press the "DOWN" to select the factory recover setting and press the "ENTER" to confirm, press the "ESC" to return to the menu or Wait 2 seconds to automatically return to the menu.



Chapter 4 Trouble Shooting

When the inverter is not working properly, we recommend the following solutions to eliminate common faults. The table below helps the technician understand the problem and take action.

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically	No indication or buzzer beeps continuously and red LED is on	The battery voltage is too low	1. Re-charge battery. 2. Replace battery.
Fan stop or slow running	No indication	Fan intelligent speed regulation or fan fault	1. A rise in temperature or load capacity will increase the running speed. 2. Replace the fan.
Output turns on for 1 second and then stops, repeating	ECO mode	This mode shuts off output when the load is less than 5%	1.The load > 5% will run continuously. 2.Change mode settings.
No response after power on	No indication	1. The battery voltage is far too low. 2. Battery polarity is connected reversed.	1. Check if batteries and the wiring are connected well. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode	Input voltage is displayed as 0 on the LCD	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Input voltage is displayed in the normal range on the LCD	Insufficient quality of AC power. (Shore or Generator)	1. Check if AC wires are too thin and/or too long. 2. Check if generator (if applied) is working well or The input frequency is unstable or out of range.
	Green LED is lighten	Set “Battery priority mode” as the system mode	System mode is not set to “Battery priority mode”.
Buzzer beeps continuously and red LED is on	Over current	Over current or surge	Reduce the connected load ,Restart the unit, if the error happens again, please return to repair center.
	Output short	Output Short or surge	

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Buzzer beeps continuously and red LED is on	Over load	Over load error. The inverter is over load 110% and time is up	Reduce the connected load by switching off some equipment.
	Over temperature	Internal temperature of inverter component is over 80°C	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Batterry volt. high	Battery is over-charged.The battery voltage is too high	1. Check the setting of charger. 2. Check if spec and battery quantity of requirements.
	Battery voltage low	The battery voltage is too low	1. Re-charge battery. 2. Replace battery. 3. Check if spec and battery.
	Output voltage low	Output abnormal	1. Reduce the connected load. 2. Return to repair center.

Chapter 5 Protection And Cleaning

Check The Heat Dissipation

Please check environment temperature around the inverter. Make sure there is no clogging of the vents.

Cleaning the inverter will improve the heat dissipation of the inverter.

Cleaning The Inverter

Please turn off AC input first, shut down inverter ,then turn off the DC switch. Make sure all of them is completely off.

You could wipe the inverter with dry and insulated rag. Please don't use water and any liquid such as solvent or abrasive liquid.

Check Connection

Please check all cables or breakers regularly to see if there is abnormal heat. If there any demage of the cable and breaker, pls shut down all of component and contact a professional electrician for inspection.

Chapter 6 Removal

How To Remove The Inverter

- Shut down AC input.
- Shut down inverter.
- Shut down DC breaker.
- Remove all cables off the inverter.
- Carefully remove the inverter.

Inverter Packaging

Please keep the inverter original packaging in case of delivery. If you can't find the original packaging ,please use strong box with correct size to contain this inverter.

Inverter Processing

Please do not throw this in the garbage. In case of dispose this inverter, please follow local regulations about electronic component 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	85-135VAC@110V / 93-147VAC@120V			
	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)110VAC/120VAC±3%			
	Output Frequency	(Inverter Mode) 50Hz / 60Hz±0. 5Hz			
	Output Waveform	Pure Sine Wave			
	Avr Output Regulator	Output120VAC±10%			
	Avr Output Frequency	Tracking The Mains			
Other	Swithtime	⩽5ms			
	Display	LCD			
	Cooling System	Forced air cooling, intelligent speed regulation			
	Operating Mode	AC Input Priority Mode / Battery Priority Mode / ECO Mode / Generator Mode / Unattended Mode			
	Communication	RS-485			
AC Charging	Type Of Battery	SLA Battery/AGM Battery/GEL 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	