Horizontal Type All-in-one Solar Charger Inverter

User Manual

Product models:

HT4830S80-145 | HT4840S80-145 | HT4850S80-145

Important safety instructions

Please keep this manual for future reference

The user manual contains all safety, installation, and operation instructions for the HT series all-in-one solar energy storage inverter controller.

Please read all instructions and precautions in the manual carefully before installation and use.

- There is unsafe voltage inside the all-in-one machine, so in order to avoid personal injury, users shall not disassemble themselves, and should contact the company's professional maintenance personnel for repair.
- Do not place the all-in-one machine in a place where children can reach it.
- The protection grade of the all-in-one machine is IP20. It is an indoor application product. It is strictly prohibited to use outdoors.
- Do not install the all-in-one machine in harsh environments such as wet, greasy, flammable, explosive or dusty.
- The mains input and AC output are high voltage, so do not touch the wire connections.
- When the all-in-one machine is operating, the temperature of its enclosure is very high, so do not touch it.
- Do not open the terminal protection cover while the all-in-one machine is operating.
- It is recommended to install a suitable fuse or circuit breaker on the exterior of the all-in-one machine.
- Always disconnect the fuse or circuit breaker near the PV array, mains and battery terminals before installing and adjusting the wiring of the all-in-one machine.
- After installation, check that all wiring connections are tight to avoid the risk of heat build-up due to false connections.
- The all-in-one machine is off-grid type, it is necessary to confirm that it is the only input device for loads as needed and it is prohibited to use it in parallel with other input AC power to avoid damage.

Table of Contents

1. Basic Information

1.1 Product overview and features

HT series is a new hybrid PV energy storage inverter controller integrating PV energy storage, mains charging and storage and AC sine wave output. Using DSP control through advanced control algorithms, it comes with high response speed, high reliability, high industrialization standard and other characteristics. Four charging modes are available: only PV, mains priority, PV priority, and hybrid charging by mains&PV; two output modes: inverter and mains are available to meet different application needs.

The PV charging module employs the latest optimized MPPT technology to quickly track the maximum power point of the PV array in any environment and obtain the maximum energy of the PV panel in real time.

AC-DC charging module adopts advanced control algorithm to realize full digital voltage and current double closed-loop control with high control precision and small size. Wide AC voltage input range and complete input/output protections enable stable and reliable battery charging and protection.

The DC-AC inverter module based on a full digital intelligent design uses advanced SPWM technology to output pure sine waves and convert DC to AC, suitable for AC loads such as household appliances, power tools, industrial equipment, electronic audio and video equipment. With segmented LCD display design, the product can display the system running data and status in real time. All-round electronic protections ensure that the entire system is safer and more stable.

Features:

1. It adopts full digital voltage and current double closed loop control, combined with advanced SPWM technology to output pure sine wave.
2. Two output modes: mains bypass and inverter output enable uninterrupted power supply.
3. 4 charging modes are available for choice: only PV, mains priority, PV priority, and hybrid charging.
4. Advanced MPPT technology with efficiency up to 99.9%.
5. LCD screen design, with 3 LED indicators, for dynamic display of system data and run status.

6. ON/OFF rocker switch controls AC output.

7. Power saving mode reduces no-load loss.

8. Intelligent variable speed fan ensures efficient heat dissipation, and thereby extends system life.

9. It comes with double lithium battery activation modes: mains and PV, and supports lead-acid battery and lithium battery access.

10. Multiple protections provide 360 ° all-round protection for the system.

11. Complete protections include multi-electrical appliance air switch short circuit protection, overvoltage and undervoltage protection, overload protection, back-flow protection, etc.

12. Horizontal installation facilitates cabinet combination installation.

13. Lithium battery can be activated by both mains and PV panel.

1.2 Basic system introduction

The figure below shows the system application scenario for this product, and a complete system consists of the following parts:

1. PV module: converts light energy into DC energy to charge the battery through an all-in-one machine, or directly changes to alternating current to power the load.

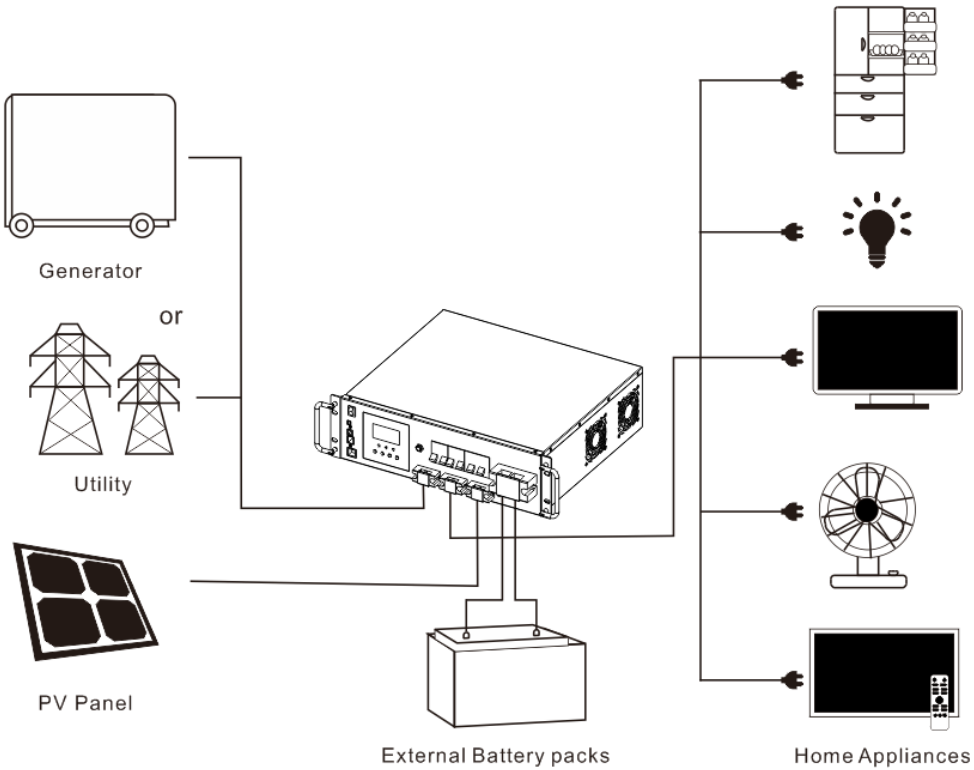
2. Mains or generator: connected at the AC input, to supply power to the load and charge the battery. If not connected to the mains or a generator, the system can also operate normally, and at this time, the load is powered by the battery and PV module.

3. Battery: The role of the battery is to ensure the normal use of the system loads when the solar energy is insufficient and mains is not available..

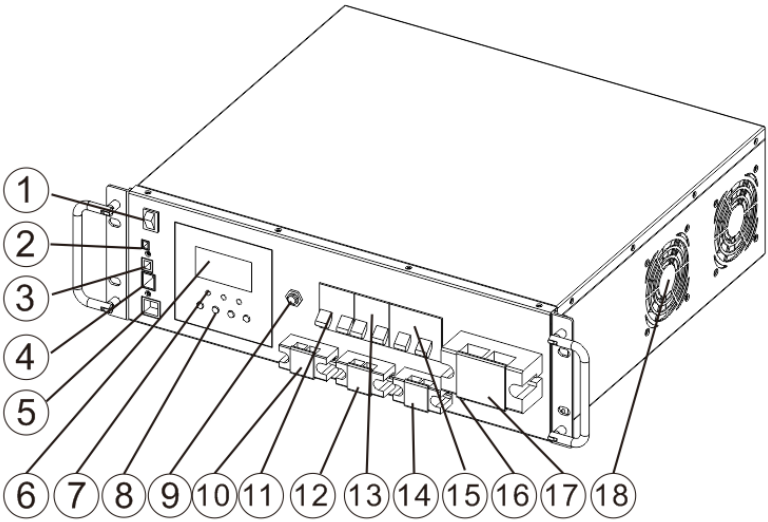
4. Household load: It can be connected to various household and office loads, including refrigerators, lamps, TVs, fans, air conditioners and other AC loads.

5. All-in-one inverter controller: energy conversion unit of the whole system.

The specific system wiring method is determined by the actual application scenario.


Generator
or
Utility
PV Panel
External Battery packs
Home Appliances

1.3 Product characteristics



①	ON/OFF rocker switch	⑩	AC input port
②	CAN communication port	⑪	AC input air switch
③	USB communication port	⑫	AC output port
④	RS485 communication port	⑬	AC output air switch
⑤	Dry node port	⑭	PV port
⑥	LCD screen	⑮	Battery air switch
⑦	Indicator	⑯	Grounding screw hole
⑧	Touch button	⑰	Battery port
⑨	Overload protector	⑱	Cooling fan

2. Installation Instructions

2.1 Installation considerations

Read this manual carefully and familiarize yourself with the installation procedures before installing.

- Be very careful when installing the battery, and wear protective goggles when installing lead-acid liquid battery. Once in contact with the battery acid, rinse the contact part with water in time.
- Avoid placing metal objects near the battery to prevent a short circuit.
- Acidic gases may be generated when the battery is charged, so make sure the environment is well ventilated.
- When installing the cabinet, be sure to leave enough space around the machine for heat dissipation; do not install the machine and the lead-acid liquid battery in the same cabinet, so as to avoid the acid gas generated when the battery works that may corrode the machine.
- Only charge the battery that meets the requirements of this all-in-one machine.
- The false connection points and corroded wires may generate great heat that may melt the wire insulation, burn the surrounding material, or even cause fire, so make sure that the connectors are tightened, and the wires should be fixed with ties to avoid shaking when moving the machine, causing the connectors to be loose.
- The system connection wires should be selected according to the current density of not more than 5A/mm2.
- When installing outdoors, avoid direct sunlight and rainwater infiltration.
- When the power is turned off, there is still a high voltage inside the machine, so do not open or touch the internal components and wait for the capacitor runs out of power.
- Do not install the all-in-one machine in harsh environments such as wet, greasy, flammable, explosive or dusty.
- Do not reverse the polarity of the battery input end of this product, otherwise the equipment may be easily damaged or unpredictable danger may occur.
- The mains input and AC output are high voltage, so do not touch the wire

connections.

- When the fan is working, do not touch to prevent injury.
- It is necessary to confirm that it is the only input device for loads as needed and it is prohibited to use it in parallel with other input AC power to avoid damage.

2.2 Wiring specifications and circuit breaker selection

Wiring and installation methods must comply with national and local electrical code requirements.

Recommended PV array wiring specifications and circuit breaker selection: The output current of PV array is affected by the type of PV modules, connection method and lighting angle, so the minimum line diameter of the PV array is calculated according to the short-circuit current of the PV array; please refer to the PV module specifications for the short-circuit current value (short-circuit current does not change when is unchanged when the PV modules are in series; when they are connected in parallel, the short-circuit current is the sum of the short-circuit current of all parallel modules); the short-circuit current of the PV array shall not exceed the PV maximum input current.

- **Refer to the table below for PV input wire diameter and switch:**

Model	Recommended battery wire diameter	Maximum PV input current	Recommended air switch or circuit breaker specification
HT4830S80-145	10mm^2/7AWG	50A	2P—63A
HT4840S80-145	10mm^2/7AWG	50A	2P—63A
HT4850S80-145	10mm^2/7AWG	50A	2P—63A

Note: The voltage must not exceed the maximum PV input open circuit voltage of 145V when connected in series.

- **Refer to the table below for recommended AC input wire diameter and switch:**

Model	Recommended battery wire diameter	Maximum bypass input current	Recommended air switch or circuit breaker specification
HT4830S80-145	10mm^2/7AWG	40A	2P—40A
HT4840S80-145	10mm^2/7AWG	40A	2P—40A
HT4850S80-145	10mm^2/7AWG	40A	2P—40A

Note: The corresponding circuit breaker is available at the mains input connection and may not be added.

- **Recommended battery input wire diameter and switch selection**

Model	Recommended battery wire diameter	Rated battery discharge current	Maximum charge current	Recommended air switch or circuit breaker specification
HT4830S80-145	30mm^2/2AWG	85A	140A	2P—160A
HT4840S80-145	30mm^2/2AWG	110A	140A	2P—160A
HT4850S80-145	30mm^2/2AWG	125A	140A	2P—160A

- **Recommended AC output wire specifications and circuit breaker selection**

Model	Recommended battery wire diameter	Rated inverter AC output current	Maximum bypass output current	Recommended air switch or circuit breaker specification
HT4830S80-145	10mm^2/7AWG	13A	40A	2P—40A
HT4840S80-145	10mm^2/7AWG	17.5A	40A	2P—40A
HT4850S80-145	10mm^2/7AWG	22A	40A	2P—40A

Note: The wiring diameter is for reference only. If the distance between the PV array and the all-in-one machine or between the all-in-one machine and the battery is long, using a thicker wire will reduce the voltage drop and improve system performance.

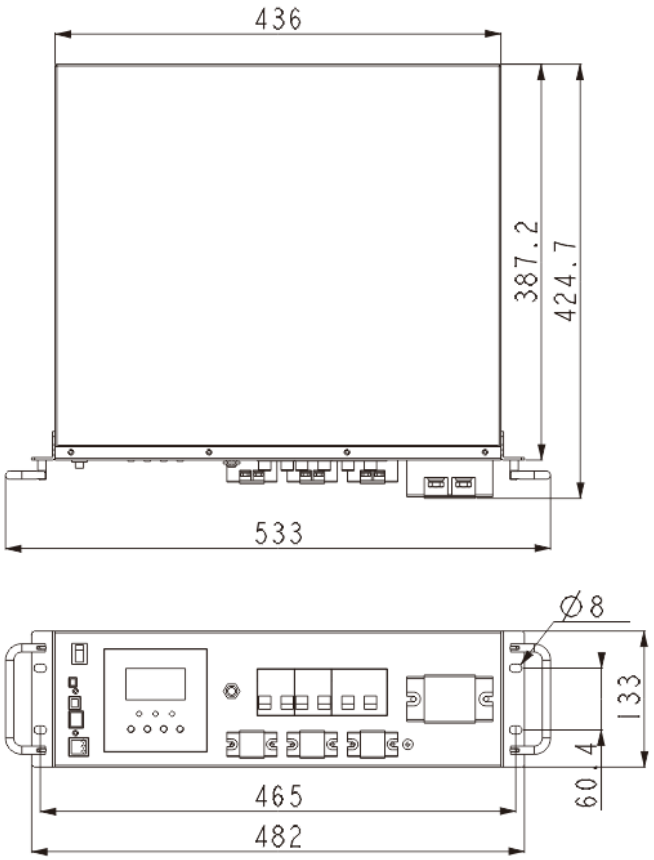
Note: The above wiring diameters and circuit breakers are only for recommendation. Please select the appropriate wiring diameters and circuit breakers according to the actual situation.

2.3 Installation and wiring

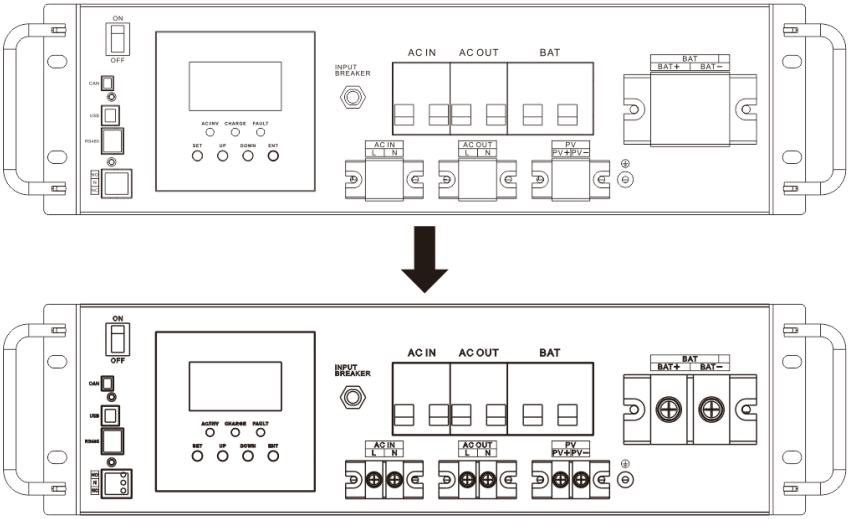
Installation steps:

Step 1: Determine the installation location and heat dissipation space: determine the installation location of the all-in-one machine, such as the wall; when installing the all-in-one machine, ensure that there is sufficient air flow through the all-in-one machine's heat sink, leaving at least 200mm space between the left and right air outlets of the all-in-one machine to ensure natural convection heat dissipation. Refer to the complete machine installation diagram below.

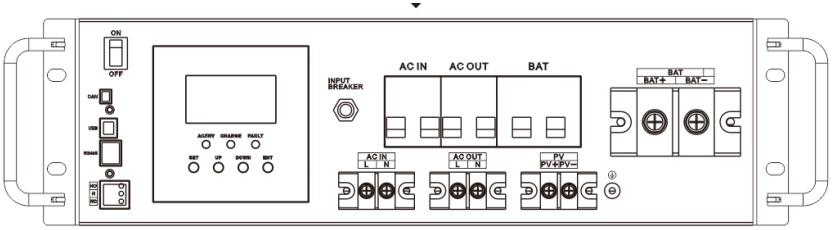
 Warning: danger of explosion! Never install the all-in-one machine and a lead-acid liquid battery in the same airtight space! Also don't install it in a confined area where battery gas may collect.



Step 2: Remove the terminal protection cover



Step 3: Wiring

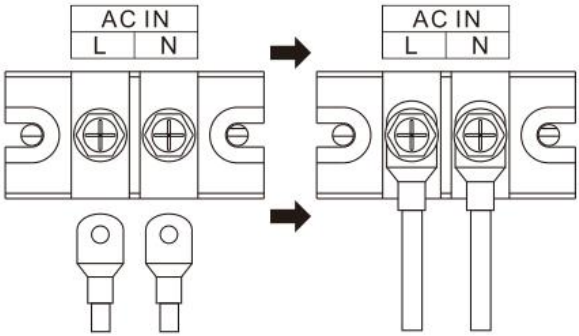


AC input/output wiring method:

① Before AC input/output wiring, disconnect the circuit breaker first, and confirm whether the wires used are thick enough. Please refer to Section 2.2 “Wiring Specifications and Circuit Breaker Selection".

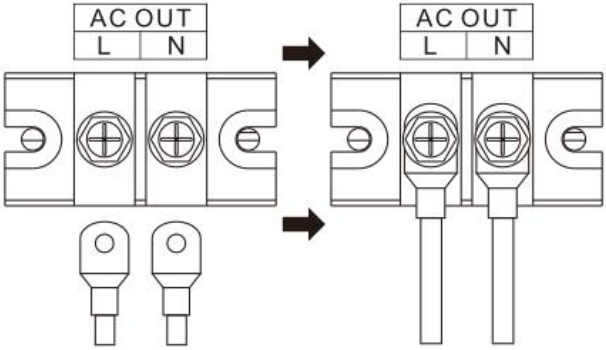
② Correctly connect the AC input live and neutral wires according to the wire sequence and terminal locations shown below.

L: Live wire N: Neutral wire



③ Correctly connect the AC output live and neutral wires according to the wire sequence and terminal locations shown below, and connect the earth wire to the grounding screw hole through the O-type terminal.

L: Live wire N: Neutral wire



Note: Try to use a thick earth wire (wire cross-sectional area is not less than 4mm2), the grounding point should be as close as possible to the machine, and the shorter the grounding wire the better.

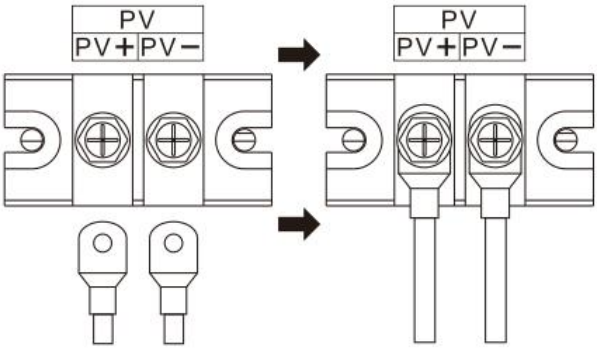
PV input wiring method:

① Before wiring, disconnect the circuit breaker first, and confirm whether the wires used are thick enough. Please refer to Section 2.2 “Wiring Specifications and Circuit Breaker Selection".

② Correctly connect the PV input wires according to the wire sequence and terminal

locations shown below. The PV ports on the machine are preferred for wiring.

PV+:PV input positive **PV-:PV input negative**

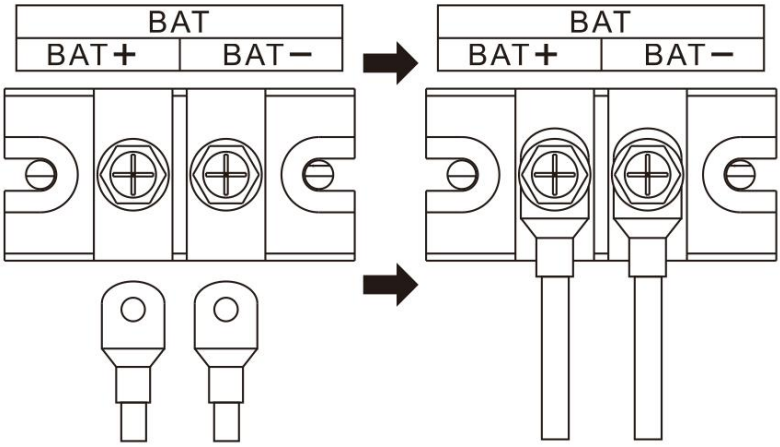


BAT wiring method:

① Before wiring, disconnect the circuit breaker first, and confirm whether the wires used are thick enough. Please refer to Section 2.2 “Wiring Specifications and Circuit Breaker Selection”. The BAT wires need to be connected to the machine through O-type terminals. It is recommended to use the O-type terminals with an inner diameter of 6 mm, and the O-type terminals must be firmly pressed against the BAT wires to prevent overheating due to excessive contact resistance.

② Correctly connect the BAT wires according to the wire sequence and terminal locations shown below.

BAT+: Battery positive **BAT-: Battery negative**



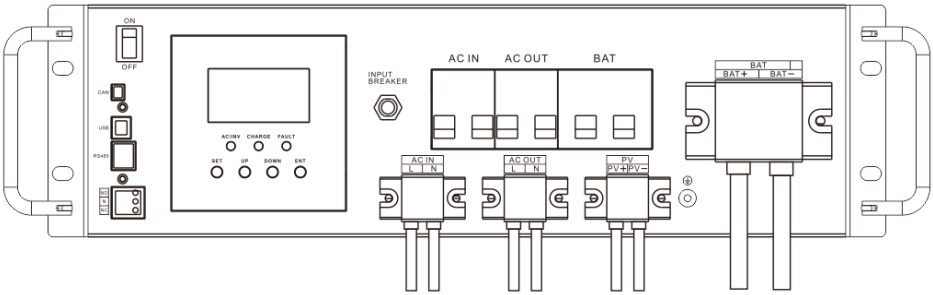
Warnings:

① The mains input, AC output and PV array will generate high voltages, so be sure to disconnect the circuit breaker or fuse before wiring;

② During wiring, be sure to be careful; during wiring, do not close the circuit breaker or fuse, and ensure that the "+" and "-" pole lead connections of each component are correct; battery end must be installed with a circuit breaker. For the selection of circuit break, please refer to Section 2.2 "Wiring Specifications and Circuit Breaker Selection". Before wiring, be sure to disconnect the circuit breaker, to prevent strong electric sparks when wiring, and at the same time, avoid battery short circuit during wiring; if the machine is applied in lightning frequent areas, it is recommended to install external lightning arrester at the PV input.

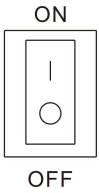
Step 4: Check the wiring for correct and firm connection, especially check the battery input for reverse polarity, the PV input for reverse polarity, and the AC input for being wrongly connected to the AC output.

Step 5: Install the terminal protection cover



Step 6: Start the all-in-one machine

First of all, close the circuit breaker at the battery end; secondly, turn the rocker switch on the left side of the machine to the "ON" state, and "AC/INV" indicator flashing means that the inverter is working normally; then, close the circuit breaker of the PV array and mains power; finally, turn on the AC loads one by one after the AC output is normal, so as to avoid protection action due to large instantaneous impact generated by turning on the loads at the same time. At this point, the machine can work normally according to the set mode.



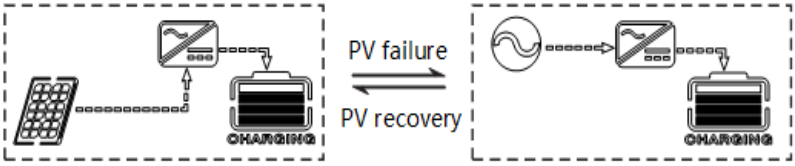
Note: To power different AC loads, it is recommended to turn on the loads with large surge current first, and turn on the load with small surge current after the loads are operating stably.

Note: If the machine does not work properly or if the **LCD** or indicator displays abnormally, refer to Section **6** for troubleshooting.

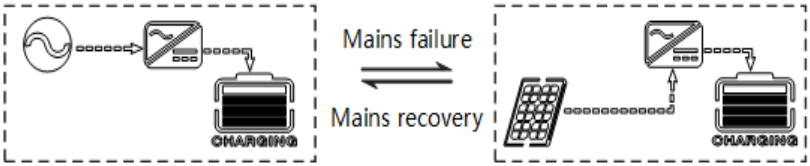
3. Operating Mode

3.1 Charging mode

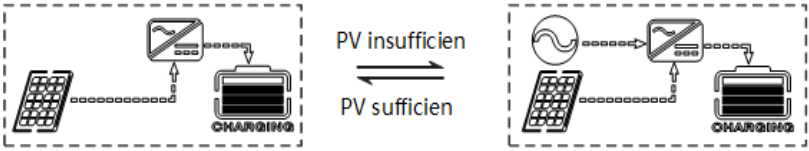
1. PV priority: PV system is prioritized for battery charging, only when the PV fails, mains charging is activated. Making full use of solar energy to generate power during the day and switching to mains charging at night keep the batteries charged. This mode is applicable to the areas where the grid is relatively stable and electricity is more expensive.



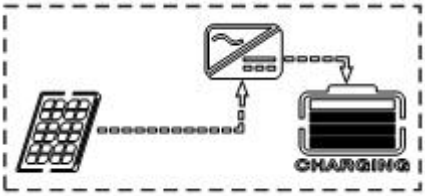
2. Mains priority: Mains power is prioritized for battery charging, only when the mains power is not available, PV charging is activated.



3. Hybrid charging: PV and mains hybrid charging. PV MPPT charging gets the priority. When PV energy is insufficient, mains starts to charge. When the PV energy is sufficient again, the mains stops charging. This is the fastest way to charge, suitable for areas where the grid is unstable, and provides an adequate back-up power supply at all times.

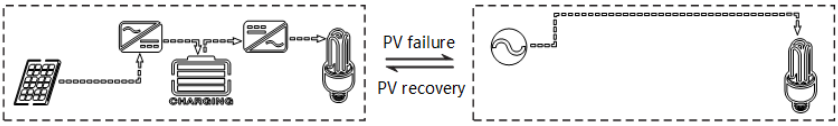


4. Only Solar: battery is only charged by PV system and mains charging is not activated. This is the most energy-efficient mode, with all battery power coming from solar energy, usually used in areas with good light conditions.

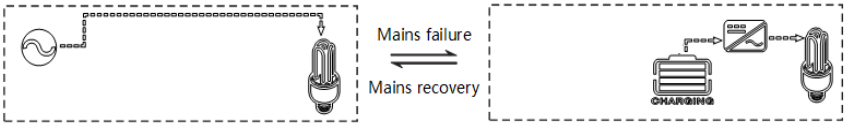


3.2 Output mode

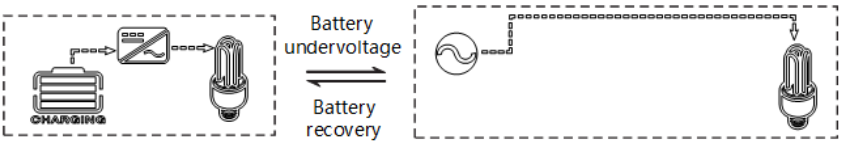
- **PV priority mode:** both PV and battery power the loads. Diversified charging modes and output modes are available for selection. When the PV priority mode is selected, it can maximize the use of green solar energy and achieve energy saving and emission reduction. When the PV fails, it will switch to the mains. This mode maximizes the use of solar energy while maintaining battery power and is suitable for areas where the grid is relatively stable.



- **Mains priority mode:** Switch to inverter only when the mains fails. This mode is equivalent to a backup UPS and is suitable for areas where the grid is unstable.



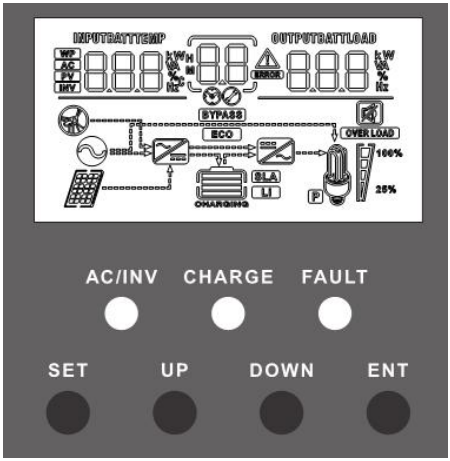
- **Inverter priority mode:** Switch to mains only when the battery is under voltage. This mode maximizes the use of DC power and is suitable for areas where the grid is stable.



4. LCD Screen Operating Instructions

4.1 Operation and display panel

The operation and display panel is shown below and consists of 1 LCD screen, 3 indicators and 4 operation buttons.



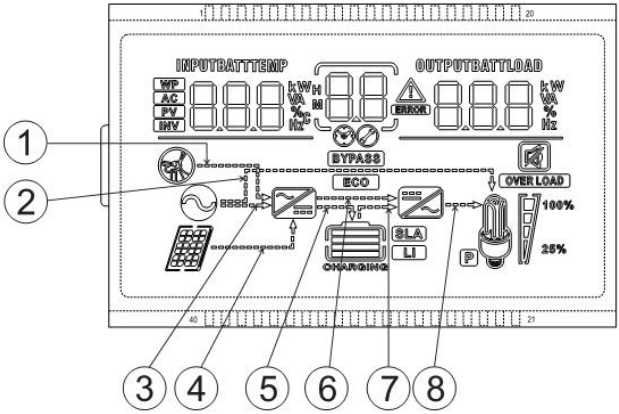
Operation buttons introduction

Functional buttons	Description
SET	Enter/exit setup menu
UP	Previous option
DOWN	Next option
ENT	Under the Setup menu, the OK/Enter option

Indicators introduction

Indicators	Color	Description
AC/INV	Yellow	Steady on: Mains output
		Flashing: Inverter output
CHARGE	Green	Flashing: Battery is in charging state
		Steady on: Charging complete
FAULT	Red	Steady on: Fault state

LCD screen introduction



Icons	Function	Icons	Function
	Indicates that the AC input end has been connected to the grid		Indicates that the inverter circuit is working
	Indicates that the AC input mode in APL mode (wide voltage range)	BYPASS	Indicates that the machine is working in Bypass mode
	Indicates that the PV input end has been connected to the solar panel	OVER LOAD	Indicates that the AC output is in an overload state
	Indicates that the machine has been connected to a battery Indicates that the remaining battery power is 0%~24% Indicates that the remaining battery power is 25%~49% Indicates that the remaining battery power is 50%~74% Indicates that the remaining battery power is 75%~100%		Indicates AC output load percentage Indicates that the load percentage is 0%~24% Indicates that the load percentage is 25%~49% Indicates that the load percentage is 50%~74% Indicates that the load percentage is ≥75%
LI	Indicates that the current battery type of the machine is a lithium battery		Indicates that the buzzer is not enabled

SLA	Indicates that the current battery type of the machine is a lead-acid battery		Indicates that the machine has an alarm
CHARGING	Indicates that the battery is in charging state	ERROR	Indicates that the machine is in a faulty state
	Indicates that the AC/PV charging circuit is working		Indicates that the machine is in setup mode
	Indicates that the AC output end has AC voltage output		Display of parameters in the middle of the screen: 1. In non-setup mode, display the alarm or fault code; 2. In setup mode, display the code of currently set parameter item
Display of parameters on the left side of the screen: input parameters			
AC	Indicates AC input		
PV	Indicates PV input		
INV	Indicates inverter circuit		
WP	This icon is not displayed		
INPUTBATTEMP	Display battery voltage, total battery charge current, mains charge power, AC input voltage, AC input frequency, PV input voltage, internal heat sink temperature, software version		
Display of parameters on the right side of the screen: output parameters			
OUTPUTBATTLOAD	Display output voltage, output current, output active power, output apparent power, battery discharge current, software version; in setup mode, display the parameters under the code of the currently set parameter item		
Arrows display			
①	The arrow is not displayed	⑤	Indicates that the charging circuit is charging the battery end
②	Indicates power supply of grid to load	⑥	The arrow is not displayed
③	Indicates power supply of grid to charging circuit	⑦	Indicates power supply of battery to inverter circuit
④	Indicates power supply of PV panel to charging circuit	⑧	Indicates power supply of inverter circuit to load

Real-time data viewing method

On the LCD main screen, press the "UP" and "DOWN" buttons to scroll through the real-time data of the machine.

Page	Parameters on the left side of the screen	Parameters in the middle of the screen	Parameters on the right side of the screen
1	INPUT BATT V (Battery input voltage)	Fault code	OUTPUT LOAD V (Output load voltage)
2	PV TEMP ℃ (PV charger heatsink temperature)		PV OUTPUT KW (PV output power)
3	PV INPUT V (PV input voltage)		PV OUTPUT A (PV output current)
4	INPUT BATT A (Input battery current)		OUTPUT BATT A (Battery output current)
5	INPUT BATT KW (Battery input power)		OUTPUT BATT KW (Battery output power)
6	AC INPUT Hz (AC input frequency)		AC OUTPUT LOAD Hz (AC output frequency)
7	AC INPUT V (AC input voltage)		AC OUTPUT LOAD A (AC output load current)
8	INPUT V (For maintain)		OUTPUT LOAD KVA (Load apparent power)
9	INV TEMP ℃ (AC charge or battery discharge heatsink temperature)		INV OUTPUT LOAD KW (Load active power)
10	APP software version		Bootloader software version
11	Model Battery Voltage Rating		Model Output Power Rating
12	Model PV Voltage Rating		Model PV Current Rating

4.2 Setup parameters description

Buttons operation instructions: Press the "SET" button to enter the setup menu and exit the setup menu. After entering the setup menu, the parameter number [00] will flash. At this point, press the "UP" and "DOWN" buttons to select the code of parameter item to be set. Then, press the

"ENT" button to enter the parameter editing mode, and the value of the parameter is flashing. Adjust the value of the parameter with the "UP" and "DOWN" buttons. Finally, press the "ENT" button to complete the parameter editing and return to the parameter selection state.

Parameter no.	Parameter name	Settings	Description
00	Exit setting menu	[00] ESC	Exit the setup menu
01	Output source priority	[01] SOL	PV priority mode, switching to the Mains when the PV fails or the battery is lower than the set value of parameter [04].
		[01] UTI **default**	Mains priority mode, switching to inverter only when the mains fails.
		[01] SBU	Inverter priority mode, switching to the mains only when the battery is under voltage or lower than the set value of parameter [04].
02	Output Frequency	[02] 50.0	Bypass self-adaptation; when the mains is connected, it automatically adapts to the mains frequency; when the mains is disconnected, the output frequency can be set through this menu. The default output frequency of the 230V machine is 50HZ。
		[02] 60.0	
03	AC Input Voltage Range	[03] APL	Wide mains input voltage range of 230V machine: 90~280V
		[03] UPS **default**	Narrow mains input voltage range of 230V machine: 170~280V
04	Battery Power to Utility Setpoint	[04] 46.0 **default**	When the parameter [01] =SOL/SBU, the battery voltage is lower than the set value, and the output is switched from the inverter to the mains. Setting range: 44V~52V.
05	Utility to Battery Power Setpoint	[05]56.0V **default**	When the parameter [01] =SOL/SBU, the battery voltage is higher than the set value, and the output is switched from the mains to the inverter. Setting range: 48V~60V.

Parameter no.	Parameter name	Settings	Description
06	Charger source priority	[06] CSO	PV priority charging; only when the PV charging fails, the mains charging is started.
		[06] CUB	Mains priority charging; only when the mains charging fails, the PV charging is started.
		[06] SNU **default**	PV and Mains hybrid charging; PV charging is a priority, and when the PV energy is insufficient, the Mains charging supplements. When the PV energy is sufficient, the Mains charging stops. Note: Only when the Mains bypass output is loaded, the PV charging and the mains charging can work at the same time. When the inverter works, only the PV charging can be started.
		[06] OSO	Only PV charging, with the Mains charging not activated.
07	Max charger current	[07] 80A **default**	Max charger current (AC charger+PV charger). Setting range: 0~140A ;
08	Battery Type	[08] USE	User-defined; all battery parameters can be set.
		[08] SLd	Sealed lead-acid battery; constant-voltage charge voltage: 57.6V, floating charge voltage: 55.2V.
		[08] FLd	Vented lead-acid battery; constant-voltage charge voltage: 58.4V, floating charge voltage: 55.2V.
		[08] GEL **default**	Colloidal lead-acid battery; constant-voltage charge voltage: 56.8V, floating charge voltage: 55.2V.
		[08] L14/L15/L16	Lithium iron phosphate battery L14/L15/L16, corresponding to 14strings ,15 strings and 16 strings of lithium iron phosphate battery; for 16 strings, default constant-voltage charge voltage is 56.8V; for 15 strings, default constant-voltage charge voltage is 53.2V; for 14 strings, default constant-voltage charge voltage is 49.2V; allow adjustable.

Parameter no.	Parameter name	Settings	Description
		[08] N13/N14	Ternary lithium battery; which is adjustable.
09	Battery boost charge voltage	[09] 57.6V **default**	Boost charge voltage setting; the setting range is 48V~58.4V, with step of 0.4V; it is valid for user-defined battery and lithium battery.
10	Battery boost charge time	[10] 120 **default**	Boost charge maximum time setting, which means the maximum charging time to reach the set voltage of parameter [09] during constant-voltage charging. The setting range is 5min~900min, with a step of 5 minutes. It is valid for user-defined battery and lithium battery.
11	Battery floating charge voltage	[11] 55.2V **default**	Floating charge voltage, setting range: 48V~58.4V, step: 0.4V, valid when battery type is user-defined.
12	Battery over discharge voltage (delay off)	[12] 42V **default**	Over-discharge voltage; when the battery voltage is lower than this judgment point, delay the time set by parameter [13] and turn off inverter output. Setting range is 40V~48V, with a step of 0.4V. It is valid for user-defined battery and lithium battery.
13	Battery over discharge delay time	[13] 5S **default**	Over-discharge delay time; when the battery voltage is lower than the parameter [12], the inverter output will be turned off after the time set by this parameter is delayed. The setting range is 5S~55S, with a step of 5S. It is valid for user-defined battery and lithium battery.
14	Battery under voltage alarm	[14] 44V **default**	Battery undervoltage alarm point; when the battery voltage is lower than the point, an undervoltage alarm is given, and the output is not turned off; the setting range is 40V~52V, with a step of 0.4V. It is valid for user-defined battery and lithium battery.

Parameter no.	Parameter name	Settings	Description
15	Battery discharge limit voltage	[15] 40V **default**	Battery discharge limit voltage; when the battery voltage is lower than the point, the output is turned off immediately; the setting range is 40V~52V, with a step of 0.4V. It is valid for user-defined battery and lithium battery.
16	Battery equalization enable	[16] DIS	Equalizing charge is disabled
		[16] ENA **default**	Equalizing charge is enabled, only valid for vented lead-acid battery and sealed lead-acid battery
17	Battery equalization voltage	[17] 58.4V **default**	Equalizing charge voltage; setting range: 48V~58.4V, with a step of 0.4V; valid for vented lead-acid battery and sealed lead-acid battery
18	Battery equalized time	[18] 120 **default**	Equalizing charge time; setting range: 5min~900min, with a step of 5 minutes; valid for vented lead-acid battery and sealed lead-acid battery
19	Battery equalized time out	[19] 120 **default**	Equalizing charge delay; setting range: 5min~900min, with a step of 5 minutes; valid for vented lead-acid battery and sealed lead-acid battery
20	Battery equalization interval	[20] 30 **default**	Equalizing charge derating time, 0~30days, with a step of 1 day; valid for vented lead-acid battery and sealed lead-acid battery
21	Battery equalization immediately	[21] DIS **default**	Stop equalizing charge immediately.
		[21] ENA	Start equalizing charge immediately.
22	Power saving mode	[22] DIS **default**	Power saving mode disabled.
		[22] ENA	After the power saving mode is enabled, if the load is null or less than 50W, the inverter output is turned off after a delay for a certain period of time. When the load is more than 50W, the inverter automatic restart.
23	Restart when over load	[23] DIS	Automatic restart when overload is disabled. If an overload occurs and the output is turned off, the machine will not restart.

Parameter no.	Parameter name	Settings	Description
		[23] ENA **default**	Automatic restart when overload is enabled. If an overload occurs and the output is turned off, the machine will restart after a delay of 3 minutes. After it reaches 5 cumulative times, the machine will not restart.
24	Restart when over temperature	[24] DIS	Automatic restart when over temperature is disabled. If an over-temperature shutdown occurs, machine will not restart to turn the output on.
		[24] ENA **default**	Automatic restart when over temperature is enabled. If an over-temperature shutdown occurs, the machine will restart when the temperature drops.
25	Alarm enable	[25] DIS	Alarm is disabled
		[25] ENA **default**	Alarm is enabled
26	Beeps while primary source is interrupted	[26] DIS	Alarm beep is disabled when the status of the main input source changes
		[26] ENA **default**	Alarm beep is enabled when the status of the main input source changes
27	Bypass output when over load	[27] DIS	It is disabled to automatically switch to the Mains when the inverter is overloaded.
		[27] ENA **default**	It is enabled to automatically switch to the Mains when the inverter is overloaded.
28	Max AC charger current	[28] 80A **default**	Max AC charger current. Setting range: 0~80A ;
29	Split Phase	[29] DIS **default**	Supply for industrial frequency transformer (disabled)
		[29] ENA	Supply for industrial frequency transformer (enabled)
30	RS485 address setting	[30] 1 **default**	RS485 communication address setting range 1 ~ 254

Parameter no.	Parameter name	Settings	Description
32	Type of communication connection	[32] SLA **default**	Communication Connect to our remote monitoring module (WiFi, GPRS...)
		[32] BNS	Communication connection battery BMS
33	BMS protocol type	[33] PAC **default**	Pace BMS Protocol (valid when parameter [32] is set to BNS)
		[33] RDA	Ratar BMS Protocol (valid when parameter [32] is set to BNS)
		[33] AOG	Allgrand BMS Protocol (valid when parameter [32] is set to BNS)
		[33] XWD	Sunwoda BMS Protocol (valid when parameter [32] is set to BNS)
		[33] DAQ	Dyness BMS Protocol (valid whenparameter [32] is set to BNS)
		[33] WOW	-
		[33] PYL	Pylontech BMS Protocol (valid when parameter [32] is set to BNS)
35	Battery lowvoltage recover	[35] 50.4V **default**	When the battery voltage is under voltage, the battery voltage needs to recover more than this set value before the inverter starts the output
36	MaxPVcharger current	[36] 80A **default**	Max PV charger current. Setting range: 0~80A
37	Battery fully charged recovery point	[37] 52V **default**	After the battery is fully charged, it needs to be lower than this set voltage before it can be recharged
38	AC output voltage setting	[38] 230Vac **default**	Settable : (200/208/220/240Vac)

4.3 Battery type parameters

For Lead-acid Battery :

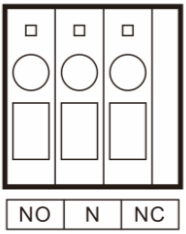
Battery type / Parameters	Sealed lead acid battery (SLD)	Colloidal lead acid battery (GEL)	Vented lead acid battery (FLD)	User-defined (User)
Overvoltage disconnection voltage	60V	60V	60V	60V
Equalizing charge voltage	58.4V	56.8V	59.2V	36 ~ 60V (Adjustable)
Boost charge voltage	57.6V	56.8V	58.4V	36 ~ 60V (Adjustable)
Floating charge voltage	55.2V	55.2V	55.2V	36 ~ 60V (Adjustable)
Undervoltage alarm voltage	44V	44V	44V	36 ~ 60V (Adjustable)
Low voltage disconnection voltage	42V	42V	42V	36 ~ 60V (Adjustable)
Discharge limit voltage	40V	40V	40V	36 ~ 60V (Adjustable)
Over-discharge delay time	5s	5s	5s	1 ~ 30s (Adjustable)
Equalizing charge duration	120 minutes	-	120 minutes	0 ~ 600 minutes (Adjustable)
Equalizing charge interval	30 days	-	30 days	0 ~ 250 days (Adjustable)
Boost charge duration	120 minutes	120 minutes	120 minutes	10 ~ 600 minutes (Adjustable)

For Lithium Battery :

Battery type / Parameters	Ternary lithium battery (N13)	Ternary lithium battery (N14)	Lithium iron phosphate battery (L16)	Lithium iron phosphate battery (L15)	Lithium iron phosphate battery (L14)	User-defined (User)
Overvoltage disconnection voltage	60V	60V	60V	60V	60V	60V
Equalizing charge voltage	-	-	-	-	-	36～60V (Adjustable)
Boost charge voltage	53.2V (Adjustable)	57.2V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)	36～60V (Adjustable)
Floating charge voltage	53.2V (Adjustable)	57.2V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2 (Adjustable)	36～60V (Adjustable)
Undervoltage alarm voltage	43.6V (Adjustable)	46.8V (Adjustable)	49.6V (Adjustable)	46.4V (Adjustable)	43.2V (Adjustable)	36～60V (Adjustable)
Low voltage disconnection voltage	38.8V (Adjustable)	42V (Adjustable)	48.8V (Adjustable)	45.6V (Adjustable)	42V (Adjustable)	36～60V (Adjustable)
Discharge limit voltage	36.4V	39.2V	44.8V	42.8V	40.8V	36～60V (Adjustable)
Over-discharge delay time	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	1～30s (Adjustable)
Equalizing charge duration	-	-	-	-	-	0～600 minutes (Adjustable)
Equalizing charge interval	-	-	-	-	-	0～250 days (Adjustable)
Boost charge duration	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	10～600 minutes (Adjustable)

5. Other functions

5.1 Dry node



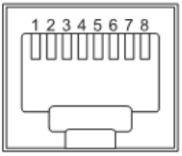
Working principle: This dry node can control the ON/OFF of the diesel generator to charge the battery. ① Normally, the terminals are that the NC-N point is closed and the NO-N point is open; ② When the battery voltage reaches the low voltage disconnection point, the relay coil is energized, and the terminals turn to that the NO-N point is closed while NC-N point is open. At this point, NO-N point can drive resistive loads: 125VAC/1A, 230VAC/1A, 30VDC/1A.

5.2 RS485/CAN communication port

This port is an RS485 communication port ;

This port is an CAN communication port is an optional function, which is not available in the standard machine.

This port is an RS485 communication port which comes with two functions(either-or):



RS485

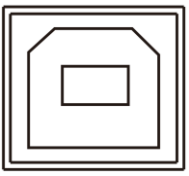
① RS485 communication with lithium battery BMS can be conducted directly through this port RS485 (need to be customized);

② RS485 is connected to the selected RS485 to WiFi /GPRS communication module independently developed by our company After the selected module is equipped, the reverse control all-in-one machine of our parameters and status of the reverse control all-in-one machine can be checked through the mobile APP.

As shown in the figure:

Pin 1 is 5V power supply, Pin 2 is GND, Pin 7 is RS485-A, and Pin 8 is RS485-B ;

5.3 USB communication port



This port is a USB communication port, which can be used for USB communication with the selected upper computer software of our company (Need to apply for). To use this port, the corresponding "USB to serial port chip CH340T driver" should be installed in the computer.

6. Protection

6.1 Protections provided

No.	Protections	Description
1	PV current/power limiting protection	When charging current or power of the PV array configured exceeds the PV rated, it will charge at the rated.
2	PV night reverse-current protection	At night, the battery is prevented from discharging through the PV module because the battery voltage is greater than the voltage of PV module.
3	Mains input over voltage protection	When the mains voltage exceeds 280V (230V model) or 140V (120V model), the mains charging will be stopped and switched to the inverter mode.
4	Mains input under voltage protection	When the mains voltage is lower than 170V (230V model /UPS mode) or 90V (120V model or APL mode), the mains charging will be stopped and switched to the inverter mode.
5	Battery over voltage protection	When the battery voltage reaches the overvoltage disconnection point, the PV and the mains will be automatically stopped to charge the battery to prevent the battery from being overcharged and damaged.
6	Battery low voltage protection	When the battery voltage reaches the low voltage disconnection point, the battery discharging will be automatically stopped to prevent the battery from being over-discharged and damaged.
7	Load output short circuit protection	When a short-circuit fault occurs at the load output terminal, the AC output is immediately turned off and turned on again after 1 second.
8	Heat sink over temperature protection	When the internal temperature is too high, the all-in-one machine will stop charging and discharging; when the temperature returns to normal, charging and discharging will resume.
9	Overload protection	Output again 3 minutes after an overload protection, and turn the output off after 5 consecutive times of overload protection until the machine is re-powered. For the specific overload level and duration, refer to the technical parameters table in the manual.

10	PV reverse polarity protection	When the PV polarity is reversed, the machine will not be damaged.
11	AC reverse protection	Prevent battery inverter AC current from being reversely input to Bypass.
12	Bypass over current protection	Built-in AC input overcurrent protection circuit breaker.
13	Battery input over current protection	When the discharge output current of the battery is greater than the maximum value and lasts for 1 minute, the AC input would switched to load.
14	Battery input protection	When the battery is reversely connected or the inverter is short-circuited, the battery input fuse in the inverter will blow out to prevent the battery from being damaged or causing a fire.
15	Charge short protection	When the external battery port is short-circuited in the PV or AC charging state, the inverter will protect and stop the output current.

6.2 Fault code meaning

Fault code	Fault name	Whether it affects the output or not	Description
【01】	BatVoltLow	Yes	Battery undervoltage alarm
【02】	BatOverCurrSw	Yes	Battery discharge average current overcurrent software protection
【03】	BatOpen	Yes	Battery not-connected alarm
【04】	BatLowEod	Yes	Battery undervoltage stop discharge alarm
【05】	BatOverCurrHw	Yes	Battery overcurrent hardware protection
【06】	BatOverVolt	Yes	Charging overvoltage protection
【07】	BusOverVoltHw	Yes	Bus overvoltage hardware protection
【08】	BusOverVoltSw	Yes	Bus overvoltage software protection
【09】	PvVoltHigh	No	PV overvoltage protection
【10】	PvBuckOCSw	No	Buck overcurrent software protection
【11】	PvBuckOCHw	No	Buck overcurrent hardware protection
【12】	bLineLoss	No	Mains power down
【13】	OverloadBypass	Yes	Bypass overload protection
【14】	OverloadInverter	Yes	Inverter overload protection
【15】	AcOverCurrHw	Yes	Inverter overcurrent hardware protection
【17】	InvShort	Yes	Inverter short circuit protection
【19】	OverTemperMppt	No	Buck heat sink over temperature protection
【20】	OverTemperInv	Yes	Inverter heat sink over temperature protection
【21】	FanFail	Yes	Fan failure
【22】	EEPROM	Yes	Memory failure
【23】	ModelNumErr	Yes	Model setting error
【26】	RlyShort	Yes	Inverted AC Output Backfills to Bypass AC Input
【29】	BusVoltLow	Yes	Internal battery boost circuit failure

6.3 Handling measures for part of faults

Faults	Handling measures
No display on the screen	Check if the battery air switch or the PV air switch has been closed; if the switch is in the "ON" state; press any button on the screen to exit the screen sleep mode.
Battery overvoltage protection	Measure if the battery voltage exceeds rated, and turn off the PV array air switch and Mains air switch.
Battery undervoltage protection	Charge the battery until it returns to the low voltage disconnection recovery voltage.
Fan failure	Check if the fan is not turning or blocked by foreign object.
Heat sink over temperature protection	When the temperature of the device is cooled below the recovery temperature, normal charge and discharge control is resumed.
Bypass overload protection, inverter overload protection	① Reduce the use of power equipment; ② Restart the unit to resume load output.
Inverter short circuit protection	① Check the load connection carefully and clear the short-circuit fault points; ② Re-power up to resume load output.
PV overvoltage	Use a multimeter to check if the PV input voltage exceeds the maximum allowable input voltage rated.
Battery missed alarm	Check if the battery is not connected or if the battery circuit breaker is not closed.

7. System Maintenance

- In order to maintain optimal long-lasting performance, it is recommended that the following items be checked twice a year.

1. Confirm that the airflow around the all-in-one machine will not be blocked and remove any dirt or debris from the head sink.

2. Check all exposed wires for damage of insulation caused by sunlight, friction with other objects around, dry rot, insect or rodent biting, etc., and repair or replace the wires if necessary.

3. Verify if the indications and displays are consistent with the operation of the equipment, be aware of any faults or incorrect displays, and take corrective actions if necessary.

4. Check all terminals for signs of corrosion, insulation damage, high temperature or burning/ discoloration and tighten terminal screws.

5. Check for dirt, nesting insects and corrosion and clean up as required.

6. If the lightning arrester has failed, replace it in time to prevent lightning damage to the all-in-one machine or even other equipment of the user.

Warning: risk of electric shock! Make sure all power supplies are disconnected from the all-in-one machine and the capacitor is completely discharged before performing any checks or operations!

- The Company shall not be liable for any damage caused by:

① Improper use or use in an unsuitable place.

② Open circuit voltage of the PV module exceeding the maximum allowable voltage of 145V.

③ Operating ambient temperature exceeding the restricted operating temperature range.

④ Dismantling and repairing the all-in-one machine without permission.

⑤ Force majeure: Damage occurring during transportation or loading or unloading of the all-in-one machine.

8. Technical parameters

Model	HT4830S80-145	HT4840S80-145	HT4850S80-145
Mains mode			
Rated input voltage	220/230Vac		
Input voltage range	(170Vac~280Vac) ±2% (90Vac-280Vac)±2%		
Frequency	50Hz/ 60Hz (automatic detection)		
Frequency range	47±0.3Hz ~ 55±0.3Hz (50Hz); 57±0.3Hz ~ 65±0.3Hz (60Hz);		
Overload/short circuit protection	Circuit breaker		
Efficiency	>95%		
Conversion time (bypass and inverter)	10ms (typical)		
AC backflow protection	Yes		
Maximum bypass overload current	40A		
Inverter mode			
Output voltage waveform	Pure sine wave		
Rated output power (VA)	3000(2600/2700/3000)	4000(3480/3600/3800/4000)	5000(4350/4500/4800/5000)
Rated output power (W)	3000(2600/2700/3000)	4000(3480/3600/3800/4000)	5000(4350/4500/4800/5000)
Power factor	1		
Rated output voltage (Vac)	230Vac(200/208/220/240Vac Settable)		
Output voltage error	±5%		
Output frequency range (Hz)	50Hz ± 0.3Hz 60Hz ± 0.3Hz		
Efficiency	>92%		
Overload protection	(102%<load<125%) ±10%: Report error and turn off output after 5 minutes; (125%<load<150%) ±10%: Report error and turn off output after 10 seconds; Load>150% ±10%: Report error and turn off output after 5 seconds;		

Peak power	6000VA	8000VA	10000VA
Loaded motor capacity	2HP	3HP	4HP
Output short circuit protection	Circuit breaker		
Bypass circuit breaker specification	63A		
Rated battery input voltage	48V (minimum starting voltage 44V)		
Battery voltage range	40.0Vdc~60Vdc ± 0.6Vdc (undervoltage alarm / shutdown voltage / overvoltage alarm / overvoltage recovery...LCD screen can be set)		
Eco mode	Load ≤50W		
AC charging			
Battery type	Lead acid or lithium battery		
Maximum charge current	0-60A		
Charge current error	± 5Adc		
Charge voltage range	40 –58Vdc		
Short circuit protection	Circuit breaker		
Circuit breaker specification	(AC IN) 63A/(BAT) 125A		
Overcharge protection	Alarm and turn off charging in 1 minute.		
PV charge			
Maximum PV open circuit voltage	145Vdc		
PV operating voltage range	60-145Vdc		
MPPT voltage range	60-115Vdc		
Battery voltage range	40-60Vdc		
Maximum	4200W		

output power	
PV charge current range (settable)	0-80A
Charge short circuit protection	BAT circuit breaker and fuse
Wiring protection	Reverse polarity protection
Hybrid charging Max charger current specifications (AC charger+PV charger)	
Max charger current(can be set)	0-140A
Certified specification	
Specification certification	CE(IEC 62109-1)
EMC certification level	EN61000, C2
Operating temperature range	-15°C to 55°C
Storage temperature range	-25°C ~ 60°C
RH range	5% to 95% (conformal coating protection)
Noise	≤60dB
Heat dissipation	Forced air cooling, adjustable air speed
Communication interface	USB/RS485 (WiFi/GPRS)/Dry Node Control
Dimensions (L*W*D)	482*425*133mm
Weight (kg)	13.3