

Product User Manual

**Energy Storage Controller
Inverter Integrated
Machine**

Preface

First of all, thank you for purchasing our Energy Storage Controller Inverter Integrated Machine!

This manual introduces the functional characteristics and usage of Energy Storage Controller Inverter Integrated Machine, including product parameters, installation and commissioning, fault maintenance check, etc. Please be sure to read this manual carefully before use.

Attention

- Please read the corresponding warning signs and the corresponding battery type specifications carefully before installing and using the equipment.
- Do not disassemble the equipment, if you need equipment repair and maintenance, please go to the designated maintenance center, if improper operation may lead to electric shock or even fire.
- To reduce the risk of electric shock, disconnect all circuits before performing repairs and maintenance.
- Warning: The battery must be installed by a professional technician.
- For maximum product functionality and efficiency, please configure the cable type as specified in the product.
- Please be careful to use metal tools for loading and unloading work to avoid short circuit and explosion caused by metal conductors.
- Equipment grounding requirements: Please select a permanently fixed place for product wiring!
- Do not short-circuit the AC output and DC input. Do not connect the power supply when the DC input is short-circuited.
- Warning! Only qualified service personnel should service this equipment. If the error persists after the troubleshooting sheet, return this unit to your local dealer or service center for maintenance.

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Chapter 1 Safety Information and Precautions

Safety Definition: In this manual, safety precautions are divided into the following two categories:

-  **Danger:** A situation in which serious injury, or even death, may result from a hazard caused by failure to operate as required;
-  **Caution:** Hazards caused by failure to operate as required, which may result in moderate injuries or minor injuries, and equipment damage;

Please read this chapter carefully when installing, commissioning and maintaining this system, and be sure to follow the safety precautions required by the contents of this chapter. Any injury or loss caused by irregular operation is not the responsibility of our company.

Usage Stage	Security Level	Item
Before installation	 Danger	➤ Do not install the equipment if you find water, missing parts or damaged parts when you open the box! ➤ If the packing list does not match the actual name, please do not install it!
	 Attention	➤ Handling should be done gently, otherwise there is a risk of damage to the equipment! ➤ Please do not use equipment with damage or missing parts. There is a risk of injury! ➤ Do not touch the components in the equipment with your hands, otherwise there is a risk of electrostatic damage!
At installation	 Danger	➤ Please install on metal and other flame retardant objects; keep away from combustible materials. Otherwise it may cause fire! ➤ Do not unscrew the fixing bolts of the equipment components at will.
	 Attention	➤ You can't just open the device case! ➤ Please install the equipment in a place with little vibration and avoid direct sunlight.
Wiring time	 Danger	➤ The instructions in this manual must be followed and the work performed by professional electrical engineers, otherwise unexpected dangers can occur!
	 Attention	➤ Pay attention to the markings of the terminals, do not connect the wrong line! Otherwise cause equipment damage! ➤ Please refer to the recommendations in the manual for the wire diameter of the wire used. Otherwise accidents may occur!
Before power on	 Danger	➤ Please confirm whether the voltage level of the input power supply is the same as the rated voltage level of this equipment; whether the wiring of the terminals is correct; and check whether there is a short circuit in the peripheral circuit connected with this equipment and whether the connected lines are tight, otherwise it will cause damage to the equipment! ➤ Any part of the equipment does not need to be tested for voltage resistance, the product has been tested at the factory. Otherwise it will cause an accident!
	 Attention	➤ The wiring of all peripheral accessories must comply with the instructions in this manual and be wired correctly according to the circuit connection method provided in this manual. Otherwise cause an accident!

Usage Stage	Security Level	Item
After power on	 Danger	➤ Do not open the cover after the power is applied. Otherwise there is a risk of electric shock! ➤ Do not touch the equipment and surrounding circuits with wet hands. Otherwise there is a risk of electric shock! ➤ Do not touch any input and output terminals of the device. Otherwise there is a risk of electric shock!
	 Attention	➤ Please do not change the manufacturer's parameters of the equipment at will. Otherwise, damage to the equipment may result!
In operation	 Danger	➤ Non-technical professionals should not test the signal while the equipment is in operation. Otherwise it may cause personal injury or equipment damage!
	 Attention	➤ When the equipment is running, avoid having something fall into the equipment. Otherwise cause damage to the equipment! ➤ Do not start and stop the equipment frequently, otherwise it will cause damage to the equipment!
Maintenance time	 Danger	➤ Do not perform maintenance and repair on the equipment without professional training. Otherwise, personal injury or equipment damage will result! ➤ Please do not carry out maintenance and repair of the equipment with electricity. Otherwise there is a risk of electric shock! ➤ Make sure that the input power of the equipment is disconnected for 10 minutes before implementing maintenance and repair of the equipment, and pay attention to the residual charge on the capacitor when maintenance will cause harm! ➤ All pluggable plug-ins must be plugged in the case of power failure!

2.1 Introduction

The Energy Storage Controller Inverter Integrated Machine combines the functions of inverter, MPPT solar controller and utility charging to provide stable power supply for power-using equipment in areas with no power, lack of power and unstable power. The product is based on a fully digital intelligent design with advanced SPWM technology, outputting pure sine wave, converting DC power into AC power, suitable for AC loads such as household appliances, power tools, industrial equipment, electronic video and audio. LCD screen display design, real-time display of system operation data and operating status. Comprehensive electronic protection function ensures the whole system is safer and more stable.

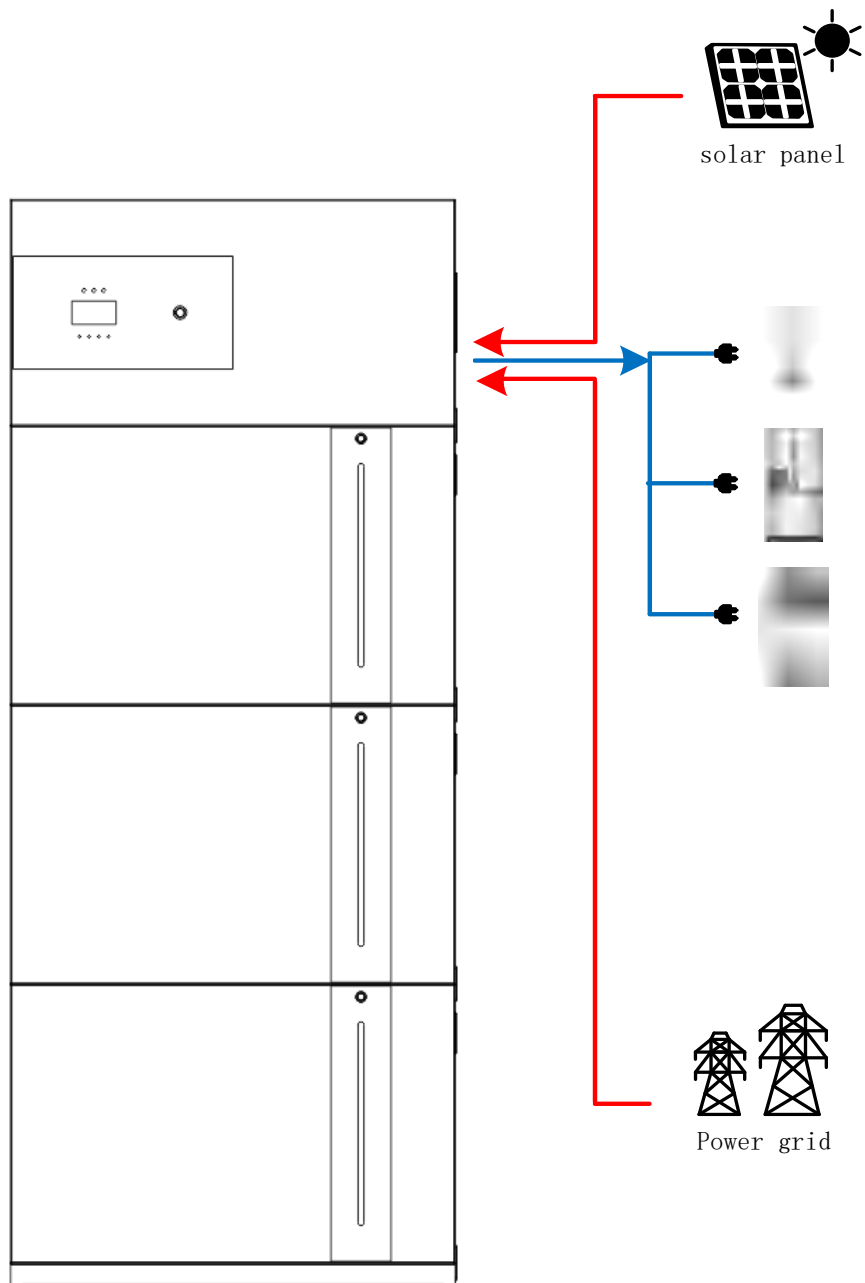
2.2 Functional Features

- Pure sine wave inverters;
- Integrated MPPT controller/charger;
- Settable priority of utility and PV power supply;
- Wide PV input voltage;
- Settable battery type, supporting lead-acid and lithium batteries;
- Functions and parameters can be set via the LCD;
- With battery equalization function to optimize battery performance and extend battery life.

2.3 System schematic

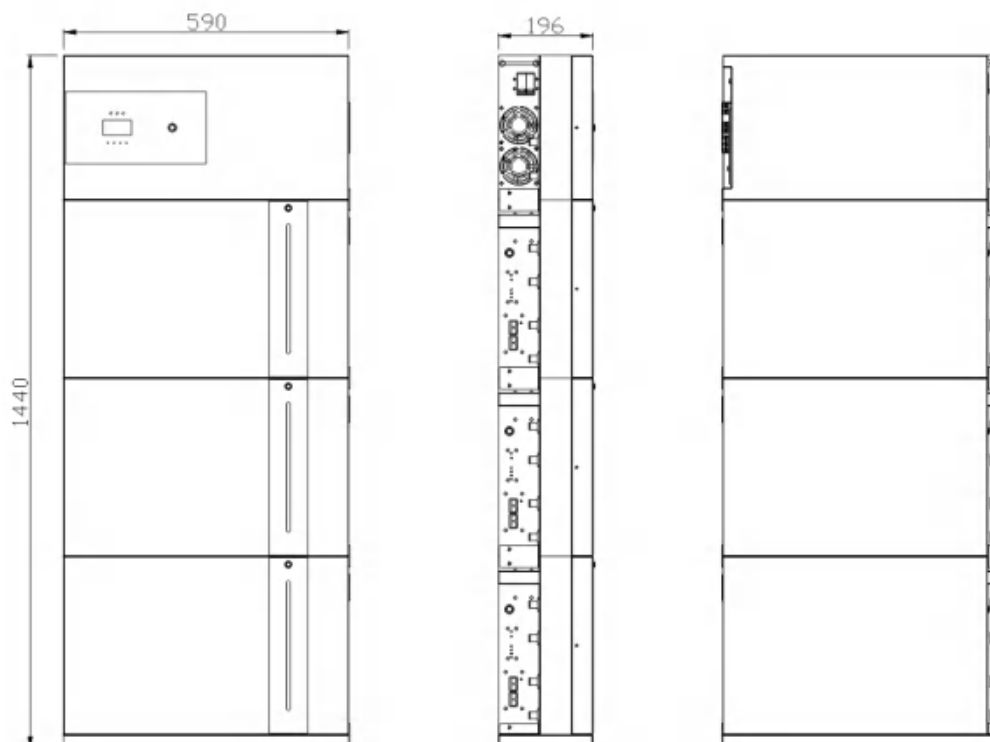
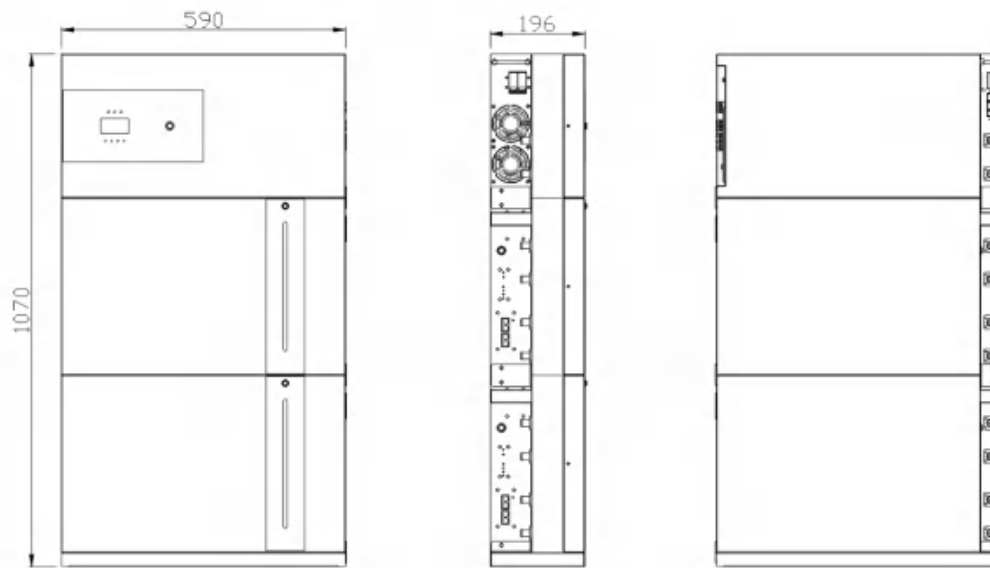
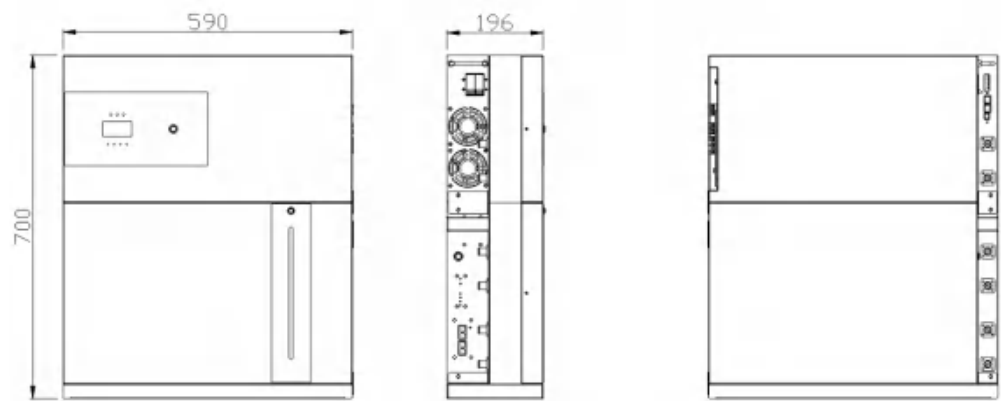
The following figure shows the system application scenario of this product. A complete system includes the following parts:

- 1. Photovoltaic module:** Convert light energy into DC electric energy, charge the battery through energy storage inverter, or directly reverse it into AC to power the load.
- 2. Utility or generator:** Connected at the AC input, it can supply power to the load and charge the battery at the same time. If no utility or generator is connected, the system can also operate normally, when the load power is provided by the battery and PV module.
- 3. Battery:** The role of the battery is to ensure the normal use of power for the system load when the solar energy is insufficient and there is no utility power.
- 4. Household load:** It can access various household and office loads, including refrigerators, lamps, TV sets, fans, air conditioners and other AC loads.
- 5. Energy Storage Controller Inverter Integrated Machine:** The energy conversion device of the whole system.



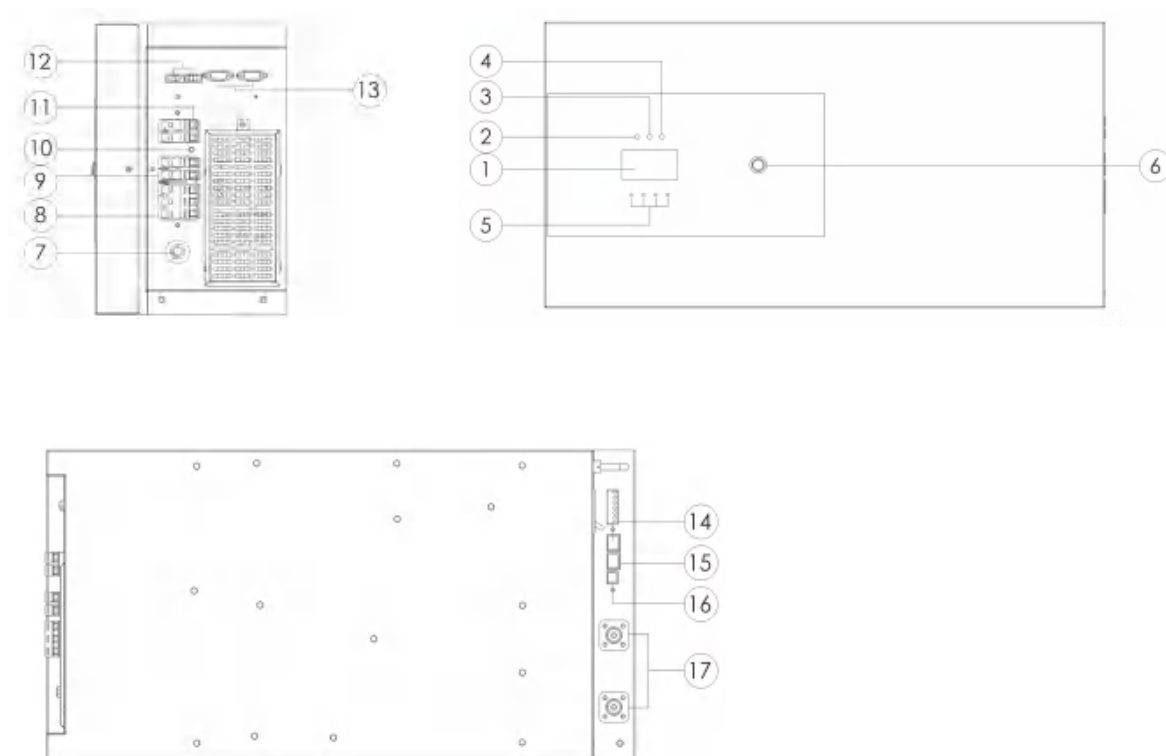
System schematic

2.4 Product Size (Unit: mm)



Chapter 3 Energy Storage Inverter Product Introduction

3.1 Interface Description

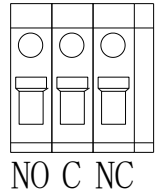


- | | |
|-------------------------|---|
| 1、LCD display | 10、Ground connection |
| 2、Status indicator | 11、PV input interface |
| 3、Charging indicator | 12、Parallel average current port |
| 4、Fault indicator | 13、Parallel communication port |
| 5、Function button | 14、Dry contact |
| 6、Switch button | 15、Inverter BMS communication interface |
| 7、Overload protector | 16、USB |
| 8、Mains input interface | 17、Battery interface |
| 9、load output interface | |

Dry Contact Signal

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

Unit Status	Condition			Dry contact port:	
				NC & C	NO & C
Power Off	Unit is off and no output is powered.			Close	Open
Power On	Output is powered from Battery power or Solar energy.	Program 01 set as USB (utility first) or SUB (solar first)	Battery voltage < Low DC warning voltage	Open	Close
			Battery voltage > Setting value in Program 13 or battery charging reaches floating stage	Close	Open
		Program 01 is set as SBU (SBU priority)	Battery voltage < Setting value in Program 12	Open	Close
			Battery voltage > Setting value in Program 13 or battery charging reaches floating stage	Close	Open



3.2 Installation Instructions

3.2.1 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: Since the output current of PV array is affected by the type of PV module, connection method and light angle, the minimum wire diameter of PV array is calculated according to the short-circuit current of PV array; please refer to the short-circuit current value in the PV module specification (the short-circuit current remains the same when PV modules are connected in series; the short-circuit current is the sum of the short-circuit currents of all parallel-connected modules when they are connected in parallel) The short-circuit current of the array must not exceed the maximum PV input current.

➤ Refer to the following table for PV input wire size and switches:

Model	Recommended wire diameter	Maximum PV input current	Maximum PV input current
5.5kW 48V	6mm ² /10AWG	18A	2P/25A

Note: The PV panel series time volt input voltage must not exceed the maximum open circuit voltage corresponding to the model.

➤ Refer to the following table for recommended AC input wire sizes and switches:

Model	Recommended wire diameter	Maximum bypass input current	Maximum PV input current
5.5kW 48V	10mm ² /7AWG	40A	2P/40A

Note: There is a corresponding circuit breaker at the utility input wiring, without adding a circuit breaker.

➤ Recommended AC output wiring specifications and circuit breaker selection

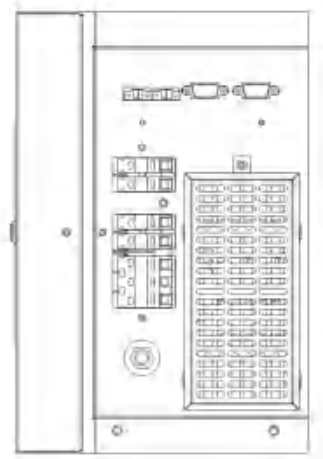
Model	Recommended wire diameter	Rated output current	Bypass maximum current	Recommended air switch or circuit breaker models
5.5kW 48V	10mm ² /7AWG	22.7A	40A	2P/40A

Note: The wire diameter is for reference only. If the distance between the PV array and the storage inverter or between the battery and the storage inverter is long, using a thicker wire can reduce the voltage drop to improve the system performance.

Note: The above wiring diameters and circuit breakers are only recommended, please select the appropriate wiring diameters and circuit breakers according to the actual situation.

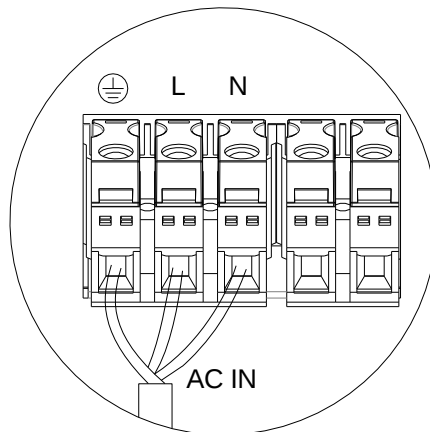
3.2.2 connection

Step 1: Wiring



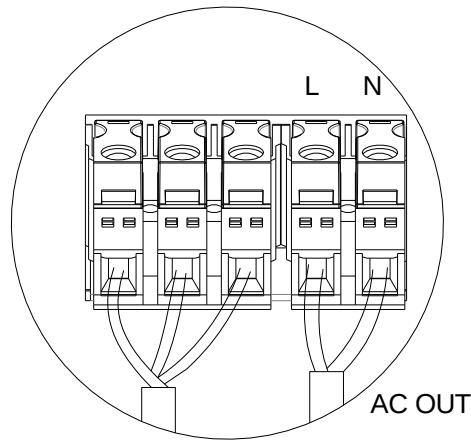
AC AC input/output wiring method:

- ① Disconnect the external circuit breaker before wiring the AC input/output, and verify that the cable used is thick enough;
- ② Correctly connect the AC input line according to the cable sequence and terminal locations shown in the figure below; please ground the ground wire first, then connect the fire and zero wires;



$\perp$: Ground Line L: Firewire N: zero line

- ③ According to the cable order and terminal position shown below, correctly connect the AC output line, please ground the wire first, then connect the fire wire and zero wire, the ground wire is connected to the chassis ground screw hole through the O-type terminal.

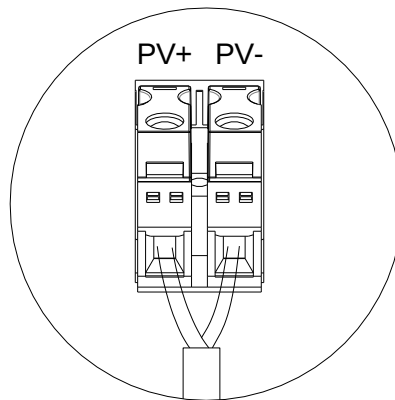


$\perp$: Ground Line L: Firewire N: zero line

Note: The grounding cable should be as thick as possible (wire cross-sectional area not less than 4mm^2), the grounding point should be as close as possible to the energy storage inverter, and the shorter the grounding wire, the better.

PV input wiring method:

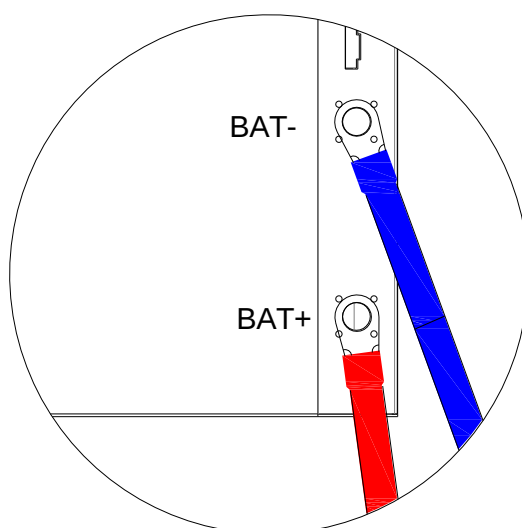
- ① Disconnect the external circuit breaker before wiring and verify that the cable used is thick enough;
- ② Connect the PV input wires correctly according to the cable sequence and terminal locations shown in the figure below.



PV+: Input positive pole
PV-: Input negative

BAT Wiring Method:

- ① Before wiring, disconnect the external circuit breaker and confirm that the cable used is thick enough, the BAT line needs to be connected to the machine through O-terminals, it is recommended to use O-terminals with an inner diameter of 5MM, the O-terminals must be firmly pressed against the BAT line to prevent excessive heating caused by excessive contact impedance;
- ② Connect the BAT wires correctly according to the cable sequence and terminal positions shown in the figure below.



 Warning:

- ① Utility input, AC output and PV arrays can generate very high voltages; be sure to disconnect the circuit breaker or fuse before wiring;
- ② During the wiring process, be sure to pay attention to safety; during the wiring process, please do not close the circuit breaker or fuse, and make sure that the "+" and "-" pole leads of each component are connected correctly; If the energy storage inverter is used in the area with frequent lightning, it is recommended to install an external lightning arrester at the PV input.

Step 2: Check whether the wiring is connected correctly and firmly, especially check whether the battery input is reversed, the PV input is reversed, and whether the AC input is incorrectly connected to the AC output.

Step 3: Start the energy storage inverter

Firstly, close the circuit breaker of the battery, secondly, press the circular switch on the front of the machine, the "AC/INV" indicator light will flash, which means the inverter is working normally, then close the circuit breaker of PV array and utility, finally, after the AC output is normal, then open the AC load one by one, so as to avoid the large instantaneous shock caused by turning on the load at the same time. The energy storage inverter will work normally according to the set mode.

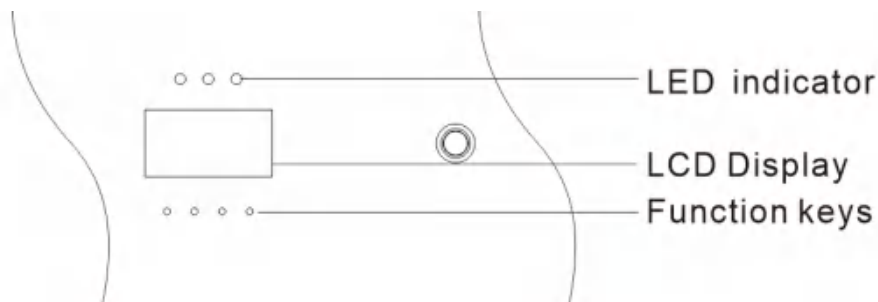
Note: If supplying power to different AC loads, it is recommended to turn on the load with high inrush current first, and then turn on the load with low inrush current after the load has been working stably.

Note: If the energy storage inverter does not work properly or if the LCD or indicator shows abnormal, Refer to Troubleshooting.

3.3 Equipment Operation

3.3.1 Running the display panel

The operation display board, as shown in the figure, is located on the front panel of the inverter. It contains 3 indicators, 4 function keys and 1 LCD display for displaying device operation status indication, input and output power information, etc.



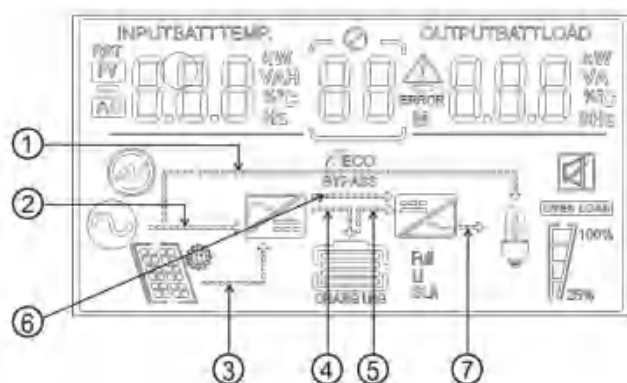
LED indicator

LED indicator		Instruction Information
AC OUT	Green	Steady on: Mains output
		Flash: Inverter output
CHARGE	Yellow	Flash: Fast charging
		Steady on: Floating charge
FAULT	Red	Flash : Fault state

Function button

Function Buttons	Description
ESC	To exit setting mode
UP	Previous choice
DOWN	Next choice
ENTER	To confirm the selection in setting mode or enter setting mode

3.3.2 LCD screen introduction



Icons	Functions	Icons	Functions
	Indicates that the AC input terminal 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 in the Mains Bypass mode
	Indicates that the PV input terminal 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 the battery: indicates that the remaining battery is 0%~24%; indicates that the remaining battery is 25%~49%; indicates that the remaining battery is 50%~74%; indicates that the remaining battery is 75%~100%.		Indicates the percentage of AC output loads: 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%
	Indicates that the battery		Indicates that the buzzer

	type of the machine is a lithium battery		is not enabled
	Indicates that the current battery type of the machine is a lead-acid battery		Indicates that the machine has an alarm
	Indicates that the battery is in charging state		Indicates that the machine is in a fault condition
	Indicates that the AC/PV charging circuit is working		Indicates that the machine is in setup mode
	Indicates that the AC output terminal has an AC voltage output		The parameters displayed in the middle of the screen: 1. In the non-setup mode, the alarm or fault code is displayed. 2. In the setup mode, the currently set parameter item code is displayed.
	In parallel operation, this icon indicates that this inverter is the host, which is only valid in parallel mode.		
Parameters display on the left side of the screen: input parameters			
	Indicates AC input		
	Indicates PV input		
	This icon is not displayed		
	Display battery voltage, battery charge total current, mains charge power, AC input voltage, AC input frequency, PV input voltage, internal heat sink temperature, software version		
Parameters display on the right side of the screen: Output parameters			
	Indicates output voltage, output current, output active power, output apparent power, battery discharge current, software version; in setup mode, displays the set parameters under the currently set parameter item code		
Arrow display			
	Indicates the grid supplying power to the load		Indicates the charging circuit charging the battery terminal
	Indicates grid supplying power to the charging circuit		Indicates the battery terminal supplying power to the inverter circuit
	Indicates PV module supplying power to the charging circuit		The arrow is not displayed
	Indicates the inverter circuit supplying power to the 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	Battery voltage	Fault code	Output voltage
2	Battery voltage collected by BMS (It will be displayed only after BMS communication is normal)		Battery capacity rate obtained by BMS (It will be displayed only after BMS communication is normal)
3	Battery current		Battery output power
4	AC output load current		Load active power
5	AC output frequency		Load apparent power
6	AC input current		AC input voltage
7	AC input frequency		AC input apparent power
8	PV input voltage		PV input power
9	PV charger heatsink temperature		PV input current
10	AC charge or battery discharge heatsink temperature		Bus voltage
11	software version 1		software version 2
12	Model Battery Voltage Rating		Model Output voltage Rating
13	Model PV Voltage Rating		Model PV Current Rating
14	RS485 Address Number		Inverter parallel mode

3.4 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.

Note: in parallel mode, all machines will synchronize the setting parameters of the host (the machine with "M" is displayed on the display screen) before startup. After startup, the setting parameters of any machine will be synchronized to other machines in the system

Parameter no.	Parameter name	Settings	Description
00	Exit setting menu	[00] ESC	Exit the setup menu
01	Output source priority	[01] GID default	Mains priority mode, switching to inverter only when the mains fails.
		[01] BAT	Battery priority mode. Switch to mains power only when the battery is under voltage or lower than the setting value of parameter [16] ; Switch to battery discharge only when the battery is fully charged or higher than the setting value of parameter [17] .
		[01] PV	PV priority mode, switching to the Mains when the PV fails or the battery is lower than the set value of parameter [16] .
		[01] HBR	Hybrid mode, you can set this mode through the [33] setting item.
02	AC output voltage setting	[02] 230V	Allow to set to 200Vac/208Vac/220Vac/230Vac/240 Vac, default 230V. The rated output power will be reduced= (Power Rate)*(Vset/230)
03	Output Frequency	[03] 50.0HZ	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 to 50Hz of the 230V.
		[03] 60.0HZ	

Parameter no.	Parameter name	Settings	Description
04	AC Input Voltage Range	[04] APL	Wide mains input voltage range of 230Vac machine: 90~280Vac; Frequency range: 47~ 55Hz (50Hz); 57Hz ~ 65Hz (60Hz);
		[04] UPS default	Narrow mains input voltage range of 230Vac machine: 170~280Vac; Frequency range: 47~ 55Hz (50Hz);57Hz ~ 65Hz (60Hz);
		[04] GEN	Diesel generators input, need to set this mode, at this time: Narrow Ac input voltage range of 230Vac machine: 90~280Vac Frequency range: 40~ 70Hz
05	Power saving mode	[05] DIS default	Power saving mode disabled.
		[05] ENA	After the power saving mode is enabled, if the load is null or less than 25W, 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.
06	Charger source priority	[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] OVO	Mains priority charging; only when the mains charging fails, the PV charging is started.
		[06] OSO	PV priority charging; only when the PV charging fails, the mains charging is started.
		[06] NUC	Only PV charging, with the Mains charging not activated.
07	Max total charging current	[07] 80A default	Maximum total charging current setting. setting range:0~100A.

Parameter no.	Parameter name	Settings	Description
08	Max PV charger current	[08] 80A default	Max PV charger current. Setting range: 0~100A;
09	Max AC charger current	[09] 60A default	setting range: 0~60A; 60A default .
10	Battery fully charging current setting	[10] 3A default	When the battery type is lead-acid, when the battery voltage is greater than or equal to the floating charge value, and the charging current is less than the setting value, the battery is considered to be fully charged and the charging is stopped; If the battery type is lithium battery, when the battery voltage is greater than or equal to the constant voltage charging value and the charging current is less than the set value, the battery is considered to be fully charged and the charging is stopped.
11	Battery Type	[11] USE	User-defined; all battery parameters can be set.
		[11] SLd	Sealed lead-acid battery; constant-voltage charge voltage: 57.6V, floating charge voltage: 55.2V.
		[11] FLd	Vented lead-acid battery; constant-voltage charge voltage: 58.4V, floating charge voltage: 55.2V.
		[11] GEL default	Colloidal lead-acid battery; constant-voltage charge voltage: 56.8V, floating charge voltage: 55.2V.
		[11] LF14/LF15/LF16	Lithium iron phosphate battery LF14/LF15/LF16, 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
		[11] N13/N14	Ternary lithium battery; which is adjustable. The default constant voltage charging voltage of N13 is 53.2V, and the default constant voltage charging voltage of N14 series is 57.6V.
12	Battery boost charge voltage	[12] 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.
13	Battery floating charge voltage	[13] 55.2V default	Floating charge voltage, setting range: 48V~58.4V, step: 0.4V.
14	Battery boost charge time	[14] 120 default	Boost charge maximum time setting, which means the maximum charging time to reach the set voltage of parameter [12] 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.
15	Battery recharge recovery point	[15] 52V default	After the battery is fully charged, the inverter stops charging, and restarts charging when the battery voltage is lower than the voltage value.
16	Battery Power to Utility Setpoint	[16] 46V default	When the parameter [01] = Bat, the battery voltage is lower than the set value, and the output is switched from the inverter to the mains. Setting range: 44V~52V.
17	Utility to Battery Power Setpoint	[17] 57.6V default	When the parameter [01] = Bat, the battery voltage is higher than the set value, and the output is switched from the mains to the inverter. Setting range: 48V~60V.
18	Battery under voltage alarm	[18] 44V default	Battery undervoltage alarm point; when the battery voltage is lower than the point, an undervoltage alarm is given (01 fault), and the output is not turned off; the setting range is 40V~52V, with a step of 0.4V.
19	Battery over discharge	[19] 42V default	Over-discharge voltage; when the battery voltage is lower than this

Parameter no.	Parameter name	Settings	Description
	voltage (delay off)		judgment point, delay the time set by parameter [22] and turn off inverter output. Setting range is 40V~48V, with a step of 0.4V.
20	Battery over discharge voltage (immediately)	[20] 42V default	Battery discharge limit voltage; when the battery voltage is lower than the point, the output is turned off immediately (02 fault); the setting range is 40V~52V, with a step of 0.4V. It is valid for user-defined battery and lithium battery.
21	Battery voltage recovery point after over discharge protection (02 fault)	[21] 52V default	When the battery over discharge protection disconnects the inverter output, the battery voltage must be greater than this value to restore the inverter AC output.
22	Battery over discharge delay time	[22] 5S default	Over-discharge delay time; when the battery voltage is lower than the parameter [19] , 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.
23	RS485-2 /CAN communication	[23] DIS default	RS485-2 Disable the BMS communication. However, our PC and remote monitoring protocol can continue to be used.
		[23] RS485	RS485-2 port for BMS communication.
24	BMS protocol Settings	When the setting Program [23] is RS485, the corresponding lithium battery manufacturer brand needs to be selected for communication PLN=PYLONTECH, PCE=PACE, GXU=GOTION, DAQ, AOG=ALLGRAND, OLT=OLITER, XWD=SUNWODA, CFE, MIT=FOXESS, VOL=WEELAND	
25	SOC discharge alarm (Optional when BMS is enabled)	[25] 15% default	After the BMS of the setting item [23] is enabled, the machine will alarm 07 if the battery capacity rate is lower than this value, and the alarm will be cleared if the battery capacity rate is higher than 5% of this value.

Parameter no.	Parameter name	Settings	Description
26	SOC switching mains (optional when BMS is enabled)	[26] 10% default	After the BMS of the setting item [23] is enabled, the machine will switch to the mains when the battery capacity rate is lower than this value and the mains power is available.
27	SOC switching inverter (optional when BMS is enabled)	[27] 100% default	After the BMS of the setting item [23] is enabled, it takes effect in battery priority mode. If the battery capacity rate is higher than this value, the machine will switch from the mains to the inverter mode.
28	SOC discharge cut off (optional when BMS is enabled)	[28] 5% default	After the BMS of the setting item [23] is enabled, if the battery capacity rate is lower than this value, the machine will report 08 fault and cut off the power supply or output.
29	SOC charging cut off (optional when BMS is enabled)	[29] 100% default	After the BMS of the setting item [23] is enabled, when the battery capacity rate is higher than this value, the inverter considers the battery to be full. If the battery priority mode is adopted at this time, the machine will switch the battery back from the mains.
30	Buzzer alarm	[30] DIS default	Alarm beep is enabled when the status of the main input source changes or the inverter fails.
		[30] ENA	Buzzer is silent
31	AC output mode (can be set in the standby mode only)	[31] SIG default	When single inverter is used, the default is SIG mode.
		[31] PAL	In parallel operation with single phase. Please refer to 8.3 Wiring Diagram.
		[31] 3P1/3P2/3P3	In split phase operation with three phase. Please refer to 8.4 Wiring Diagram.
		All connected P1-phase inverters are set to " 3P1 "; All connected P2-phase inverters are set to " 3P2 "; All connected P3-phase inverters are set to " 3P3 "; When the parameter [02] setting item=230: AC output line voltage difference is 120 degrees (P1-P2/P1-P3/P2-P3), each line voltage is $230 \times 1.732 = 398\text{Vac}$; Each phase voltage is 230Vac	

Parameter no.	Parameter name	Settings	Description
		(L1-N; L2-N; L3-N).	
32	RS485 ID setting	[32] 1 default	Parallel mode needs to be set in the range of 1-6, the ID cannot be repeated. When the power is first turned on, it will be automatically distributed. Single mode setting range 1-254.
33	Mixed mode (available for some models, Hybrid mode available)	[33] GID	It is allowed to connect to the grid, and the surplus electricity is generated by the grid.
		[33] LOD	Anti-countercurrent, self-use according to the load power, do not input current to the mains.
34	N-PE connection switchover is enabled	[34] DIS default	Do not automatically connect the N wire to the PE wire under any working conditions.
		[34] ENA	When there is no mains input off the grid, the neutral line automatically connects to the PE. When the bypass has mains input, the neutral line is automatically disconnected from the PE.
35	Automatic battery activation	[35] DIS	When the battery is dormant or not connected, the PV or mains does not automatically activate the battery to turn on the battery output.
		[35] ENA default	When the battery is dormant or not connected, the PV or mains automatically activates the battery to turn on the battery output.

Chapter 4. Operating Mode Description

4.1 Charging mode

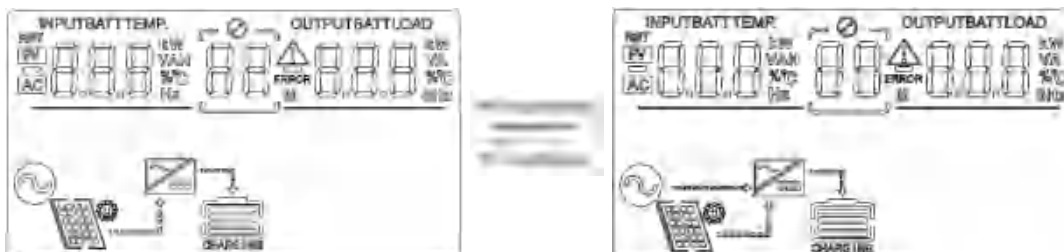
1) PV priority: PV module will charge the battery preferentially, and the battery is charged by the Mains only when the PV system fails. During the day, solar energy is fully used to charge, while at night, it converts to the Mains. This can maintain battery level, and is ideal for areas where the grid is relatively stable and electricity price is relatively high.



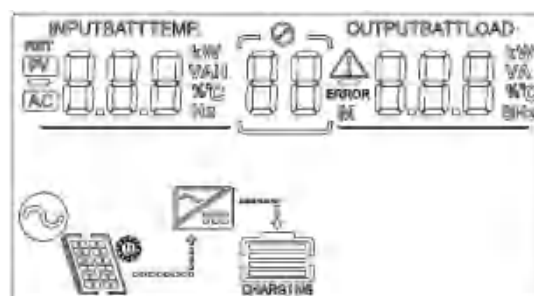
2) Mains priority: The Mains supply is preferentially used to charge the battery. Only when the Mains fails, the PV charging can be activated.



3) Hybrid charging: PV and mains hybrid charging. PV MPPT charging is a priority, and when PV energy is insufficient, the mains supply supplements. When the PV energy is sufficient again, the mains stops charging. This is the fastest charging mode, suitable for the areas where power grid is unstable, providing sufficient backup power supply at any time.



4) Only Solar Only Solar): Only PV charging, without Mains charging. This is the most energy-efficient way in which battery is charged only by solar panels, and is usually used in areas with good lighting conditions.



4.2 Output mode

➤ PV priority mode:

Switch to mains supply when the PV charging fails. This mode maximizes the use of solar energy while maintaining battery power, suitable for use in the areas with relatively stable grid.

Power supply priority: Solar—» Utility—» Battery.



➤ Mains priority mode:

Switch to inverter only when the mains fails (when there was mains power, switch to mains power for charging and power supply). Then, the unit is equivalent to a backup UPS, suitable for areas with unstable grid. Switching does not affect PV charging.

Power supply priority: Utility—» Solar—» Battery.



➤ Battery priority mode:

Switch to mains supply only when the battery discharge undervoltage is lower than the set point (item 16). When the charging battery is higher than the set point of (17 setting item), switch to the battery discharge mode. This can cycle the battery charge and discharge. This mode maximizes the use of DC power and is used in the area with stable grid. Switching does not affect PV charging.

Power supply priority: Solar—» Battery—» Utility.



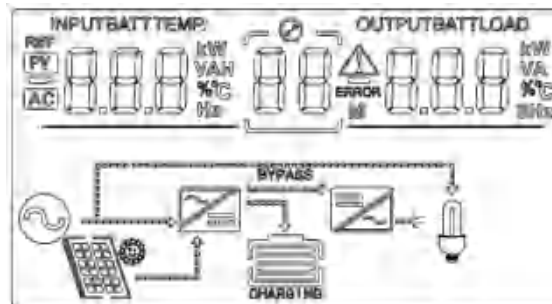
➤ **Hybird model:**

LOD: Inverter power generation energy only to the load (generation power < Load power).

Note: mixed load, mains and photovoltaic are loaded together, photovoltaic is not enough to supplement the mains

GID: Inverter power generation energy directly connected to the grid (generation power may be greater than the load power).

Note: photovoltaic power generation is sufficient load power, excess grid-connected power generation



Chapter 5. Battery Type Parameters

5.1 For Lead-acid Battery

Battery Type parameter	Sealed lead acid battery (SLD)	Colloidal lead acid battery (GEL)	Vented lead acid battery (FLD)	User-defined (User)
Overvoltage disconnection voltage	60V	60V	60V	36 ~ 60V (Adjustable)
Battery fully charged recovery point(setup item 15)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)	52V (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(01 fault)	44V	44V	44V	36 ~ 60V (adjustable)
Undervoltage alarm voltage recovery point(01 fault)	Undervoltage alarm voltage+0.8V			
Low voltage disconnection voltage(02 fault)	42V	42V	42V	36 ~ 60V (Adjustable)
Low voltage disconnection voltage recovery point (02 fault)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)
Discharge limit voltage	40V	40V	40V	36 ~ 60V (Adjustable)
Over-discharge delay time	5s	5s	5s	1 ~ 30s (Adjustable)
Boost charge duration	120 minutes	120 minutes	120 minutes	10 ~ 600 minutes (Adjustable)

5.2 For Lithium Battery

Battery type Parameters	Ternary lithium battery (N13)	Ternary lithium battery (N14)	Lithium iron phosphate battery (LF16)	Lithium iron phosphate battery (LF15)	Lithium iron phosphate battery (LF14)
Overvoltage disconnection voltage	60V	60V	60V	60V	60V
Battery fully charged recovery point(setup item 15)	50.4V (Adjustable)	54.8V (Adjustable)	53.6V (Adjustable)	50.4V (Adjustable)	47.6V (Adjustable)
Boost charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)
Floating charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2 (Adjustable)
Undervoltage alarm voltage(01 fault)	43.6V (Adjustable)	46.8V (Adjustable)	49.6V (Adjustable)	46.4V (Adjustable)	43.2V (Adjustable)
Undervoltage alarm voltage recovery point(01 fault)	Undervoltage alarm voltage+0.8V				
Low voltage disconnection voltage(04 fault)	38.8V (Adjustable)	42V (Adjustable)	48.8V (Adjustable)	45.6V (Adjustable)	42V (Adjustable)
Low voltage disconnection voltage recovery point (04 fault)(setup item 35)	46V (Adjustable)	49.6V (Adjustable)	52.8V (Adjustable)	49.6V (Adjustable)	46V (Adjustable)
Discharge limit voltage	36.4V	39.2V	46.4V	43.6V	40.8V
Over-discharge delay time	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)
Boost charge duration	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)

Chapter 6. Technical Specifications

Rated power		5.6KW	
Battery voltage		48VDC	
Permittedparallel number		1-6	
PV	Maximum Input Power	5.6KW	
	Rated voltage/maximum input voltage	360VDC/450VDC	
	MPPT Voltage range	120VDC～450VDC	
Off grid operation parameters			
AC Output	rated output voltage	Single phase 220VAC /230VAC /240VAC can be set	
	Rated output current	21.7A	23.9A
AC Input	Ac input voltage	230VAC	
	Input voltage range	90～280VAC（household appliances）/170～280VAC（PC）	
	Frequency range	50Hz/60Hz（adjustable）	
	Maximum input current/charging current	40A/60A	
Battery Mode Output	Rated output voltage	Single phase 220VAC /230VAC /240VAC can be set	
	Maximum efficiency (DC/AC)	93%	
	Output waveform	Pure sine wave	
Other Data			
Basic parameters	Communication port	RS485/CAN/ dry contact	
Working Environment	Operating temperature	-20℃～+50℃	
	Storage temperature	-30℃～+70℃	
	Humidity	5%-95% Relative humidity（no condensation）	
	Protection level	IP20	

Chapter 7. Trouble shooting

Fault code	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.
【06】	Rechargeable battery overvoltage protection	Measure if the battery voltage exceeds rated. If it exceeds, the battery needs to be discharged until the voltage is below the overvoltage recovery point of the battery.
【01】【02】	Battery under voltage protection	Charge the battery until it returns to the low voltage disconnection recovery voltage.
【27】	Fan failure	Check if the fan is not turning or blocked by foreign object.
【22】【23】	Heat sink over temperature protection	When the temperature of the device is cooled below the recovery temperature, normal charge and discharge control is resumed.
【09】【10】	Bypass overload protection, inverter overload protection	1.Reduce the use of power equipment; 2.Restart the unit to resume load output.
【11】	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.
【18】	PV overvoltage	Use a multimeter to check if the PV input voltage exceeds the maximum allowable input voltage rated.
【05】	Battery missed alarm	Check if the battery is not connected or if the battery circuit breaker is not closed.

【40】【42】	Parallel connection fault	Check whether the parallel line is not connected well, such as loose or wrong connection.
【37】	Parallel ID setting error	Check whether the setting of parallel ID number is repeated.
【36】	Parallel current sharing fault	Check whether the parallel current sharing line is not connected well, such as loose or wrong connection.
【39】	Inconsistent AC input source in parallel mode	Check whether the parallel AC inputs are from the same input interface.
【41】	Inconsistent system firmware version in parallel mode	Check whether the software version of each inverter is consistent.

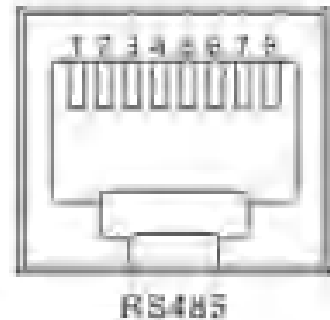
Note: If you encounter a product fault that cannot be solved by the methods in the above table, please contact our after-sales service department for technical support, and do not disassemble the equipment yourself.

Chapter 8. Installation

8.1 Lithium battery communication and setting

Connect the end of RJ45 of battery to BMS communication port of inverter. Make sure the lithium battery BMS port connects to the inverter is Pin to Pin, the inverter BMS (RS485-2/ CAN) port pin and RS485-1 port pin assignment shown as below:

No.	BMS port (RS485-2/CAN)	RS485-1 port (Reserve)
1	RS485-A	RS485-A
2	RS485-B	RS485-B
3	--	--
4	CAN-H	--
5	CAN-L	--
6	--	--
7	5V	5V
8	GND	GND

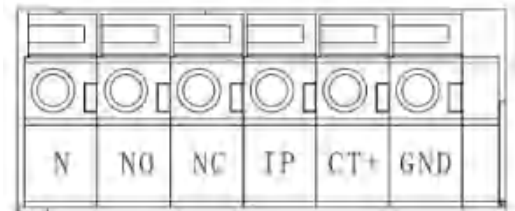


8.2 Dry contact Port

N-NO-NC function:

Working principle: This dry node can control the ON/OFF of the diesel generator.

- 1) Normally, NC-N point is connected and the NO-N point is disconnected;
- 2) When the battery voltage reaches the low voltage disconnection point, the relay coil is energized, the NO-N point is connected while NC-N point is disconnected. At this point, NO-N point can drive resistive loads specifications: 125VAC/1A, 230VAC/1A or 30VDC/1A.



IP-GND function:

Optional function, not standard function;

Working principle: This dry node can control the AC output power ON/OFF of the inverter.

- 1) IP-GND is disconnected---AC output ON;
- 2) IP-GND is connected---AC output OFF;

(CT+)-GND function:

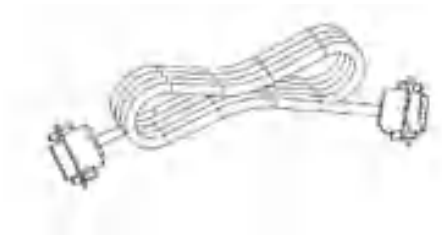
Optional function, not standard function;

Working principle: By sampling the input line current, self-use function is realized. But need to use our configuration of CT sensors;

8.3 Parallel installation

- 1、 Maximum six inverters can be used for parallel operation.
- 2、 When using the parallel operation function, the following connecting lines (package accessories) shall be firmly and reliably connected:

Parallel communication line*1:



Current sharing detection line*1:



Chapter 9 Faultcode

Fault code	Fault name	Whether it affects the output or not	Description
【01】	Battery under voltage warning	No	If the battery voltage is lower than 【18】 , the battery is in the undervoltage state.
【02】	Battery under voltage protection	Yes	When the battery voltage is low, turn off the output to stop the battery discharge protection.
【03】	Average battery discharge current over current protection	Yes	If the average battery discharge current exceeds the maximum input battery current for 1 minute, turn off the output to stop the battery discharge protection.
【04】	Instantaneous battery discharge over current protection	Yes	If the instantaneous value of the battery discharge current is greater than the maximum instantaneous value of the device, turn off the output to stop the battery discharge protection.
【05】	Battery not connected	Yes	Battery not connected warning.
【06】	Battery over voltage	Yes	When the selected battery type or set battery voltage is exceeded, turn off the output to stop the battery charging protection.

【07】	BMS low battery talarm	No	BMS alarm low battery (Set BMS enablement to work)
【08】	BMS low battery protection	Yes	The BMS battery capacity rate is low. Disable the output to stop the battery discharge protection. (Set BMS enablement to work)
【09】	Bypass overload protection	Yes	If the mains is overloaded, turn off the AC output and stop the mains charging.
【10】	Battery output overload protection	Yes	If the battery discharge inverter is overloaded, turn off AC output and stop battery discharge protection.
【11】	Battery inverter output short circuit	Yes	If the AC output of the battery inverter discharge is short circuiting, turn off the AC output and stop the battery discharge protection.
【12】	The AC output of the battery inverter over circuit	Yes	If the AC output of the battery inverter discharge is over circuit, turn off the AC output and stop the battery discharge protection.
【13】	The DC component of the battery inverter voltage is abnormal	Yes	If the DC component of the battery inverter voltage is abnormal, turn off the AC output and stop the battery discharge protection.
【14】	Bus over voltage software sampling protection	Yes	Internal battery boost, boost bus voltage overvoltage software

			protection, turn off AC output and charge.
【15】	Bus over voltage hardware sampling protection	Yes	Internal battery boost, boost bus voltage overvoltage hardware protection, turn off AC output output and charge.
【16】	Bus under voltage protection	Yes	Internal battery boost, boost bus voltage undervoltage protection, turn off AC output output and charge.
【17】	Bus short circuit protection	Yes	Internal battery boost, boost bus voltage short-circuit protection, turn off AC output output and charge.
【18】	The PV input voltage is over voltage	Yes	The solar input voltage exceeds the maximum allowable input voltage protection.
【19】	-	-	-
【20】	PV over current protection	No	Solar charging overcurrent hardware protection, turn off solar charging.
【21】	-	-	-
【22】	The PV heat sink is overheated. Procedure	No	If the temperature of the solar charging radiator is too high, turn off the solar charging.
【23】	The AC heat sink is overheated. Procedure	Yes	If the temperature of the heat sink is too high, turn off the AC charging or battery inverter discharge.
【24】	The temperature of the main transformer is	Yes	If the internal main transformer temperature is too high, turn off the AC

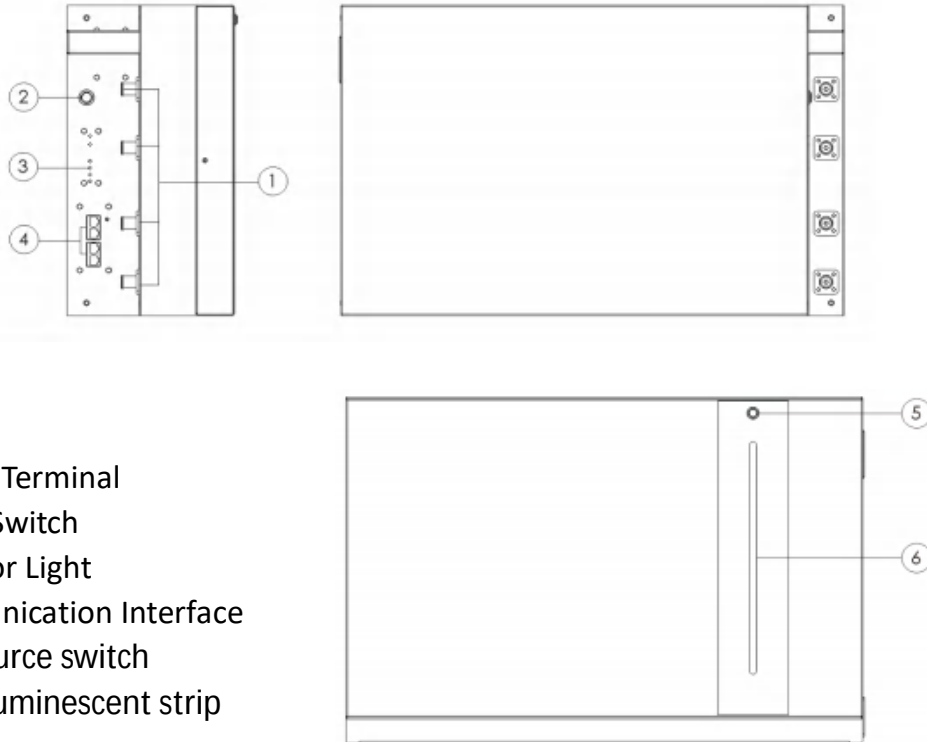
	overheated		charging or battery inverter discharge.
【25】	Ac input relay short circuit	Yes	Ac input relay short-circuit protection prevents the inverter AC output from being pumped back into the bypass AC input.
【26】	-	-	-
【27】	Fan failure	Yes	If the fan is blocked or fails, disable the inverter output and charging functions.
【28】	-	-	-
【29】	-	-	-
【30】	Type detection error	Yes	The model is not set before delivery, and the model identification is wrong.
【31】	-	-	-
【32】	-	-	-
【33】	Parallel control can communication is faulty	Yes	In parallel mode, CAN communication is lost, AC output and charging are turned off.
【34】	Parallel control can communication is faulty	Yes	In parallel mode, CAN communication is lost, AC output and charging are turned off.
【35】	Parallel mode is faulty	Yes	In parallel mode, the system has inconsistent machine parallel mode 【31】 Settings.
【36】	Parallel current sharing fault	Yes	In parallel mode, the AC output of the battery inverter differs greatly from the non-uniform current output of each machine. Turn off the AC

			output and charge.
【37】	Parallel ID setting error	Yes	In parallel mode, the RS485 addresses repeatedly conflict. The fault stops the AC output and charge. After the host automatically reallocates the address, the fault is cleared and the host enters the parallel.
【38】	Inconsistent Battery in parallel mode	Yes	In parallel mode, the battery voltage input of each machine varies greatly.
【39】	Inconsistent AC input source in parallel mode	Yes	Inconsistent AC input source in parallel mode
【40】	The parallel mode synchronization fails	Yes	Parallel mode, hardware synchronization signal reception failure, stop parallel and AC output.
【41】	Inconsistent system firmware version in parallel mode	Yes	If the program version is inconsistent in the parallel system, stop the parallel and AC output.
【42】	The parallel communication cable is faulty	Yes	The parallel communication line is faulty. Stop the parallel and AC output.
【43】	Serial number error	Yes	The serial number is not set before the factory, or the factory serial number is set repeatedly in the system.
【49】	BMS communication error	No	Check whether the communication line is connected correctly and

			whether [11] is set to the corresponding lithium battery communication protocol
【50】	BMS other alarm	No	Check the BMS fault type and troubleshoot lithium battery problems
【51】	BMS battery over temperature alarm	No	BMS alarm lithium battery over temperature
【52】	BMS battery over current alarm	No	BMS alarm lithium battery over current
【53】	BMS battery over voltage alarm	No	BMS alarm lithium battery over voltage
【54】	BMS battery low voltage alarm	No	BMS alarm lithium battery low voltage
【55】	BMS battery low temperature alarm	No	BMS alarm lithium battery low temperature

Chapter 10. Storage Battery Introduction

10.1 Appearance is introduced



Electroluminescent strip:

The SOC 81-100% light source board is shown in green
The SOC 41-80% light source board is shown yellow
The SOC 21-40% light source board is shown in orange
The SOC 5-20% light plate is shown in red
The SOC 0-5% light plate shows a red slow flash

Note: The battery power light bar has 2~3 superimposed independent batteries, and the color is not synchronized when switching during charging and discharging.

For example, when discharging, the power of two batteries is 81% (green light) / 79% (yellow light) of the other battery, and the yellow light is switched when the SOC81% is reduced by 80%.

10.2 Technical Specifications

Rated capacity	5.12 KWH
Nominal voltage	51.2V
Discharge voltage range	43.2-57.6V
Charging current	1C@25℃
Max.charging current	1C@25℃
Max.discharge current	1C@25℃
Max.power output	5120w
Depth of discharge DOD	0.9
Communication Interface	RS485/RS232/CAN
Cycles	5000 cycles 80%DOD.@25℃
Working Temp.Range	Charge: 0℃ ~50℃ Discharge: -10℃ ~60℃
Storage temperature(℃)	-20℃ ~-60℃

Recommendation: Charge and discharge the battery every 3 months.

10.3 LED indicator description

LED operating status indication

State	Normal/Alarm/ Protection	RUN	ALM	Battery level indicator LED				Illustrate
								
Shutdown	Dormancy	no	no	no	no	no	no	Completely extinguished
Standby	Normal	Twinkle 1	no	According to the indication of the power level				Standby state
	Alarm	Twinkle 1	no					Module low voltage
Charge	Normal	Continuous	no	According to the battery level indication (battery level indication up to LED flashing 2)				The maximum battery LED flashes (flashes 2), and the ALM does not flash when the overcharge alarm occurs
	Alarm	Continuous	no					
	Overcharge protection	Continuous	no	Continuous	Continuous	Continuous	Continuous	If there is no mains power, it will be turned into standby
	Temperature, overcurrent, fail-safe	no	Continuous	no	no	no	no	Stop charging
Discharge	Normal	Continuous	no	According to the indication of the power level				
	Alarm	Continuous	no					
	Undervoltage protection	Continuous	no	no	no	no	no	Stop discharging
	Temperature, overcurrent, short circuit, reverse polarity, fail-safe	no	Continuous	no	no	no	no	Stop discharging
Lapse		no	Continuous	no	no	no	no	Stop charging and discharging

Capacity indication

State		Charge			
Capacity indicator		L4	L3	L2	L1
					
Electricity	0~25%	no	no	no	Twinkle 2
	25~50%	no	no	Twinkle 2	Continuous
	50~75%	no	Twinkle 2	Continuous	Continuous
	75~100%	Twinkle 2	Continuous	Continuous	Continuous
Running indicator 		Continuous			

State		Discharge			
Capacity indicator		L4	L3	L2	L1
					
Electricity	0~25%	no	no	no	Continuous
	25~50%	no	no	Continuous	Continuous
	50~75%	no	Continuous	Continuous	Continuous
	75~100%	Continuous	Continuous	Continuous	Continuous
Running indicator 		Twinkle 3			

LED Twinkle Status

Status	On	Off
Twinkle 1	0.25s	3.75s
Twinkle 2	0.5s	0.5s
Twinkle 3	0.5s	1.5s

10.4 Protection and Maintenance 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 140V, 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 or 85V , 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 for more than 200 milliseconds, the AC output is immediately turned off.
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.
16	CAN communication loss protection	In parallel operation, an alarm will be given when CAN communication is lost.
17	Parallel connection error protection	In parallel operation, the equipment will be protected when the parallel line is lost.
18	Parallel battery voltage difference protection	In parallel operation, the equipment will be protected when the battery connection is inconsistent and the battery voltage is greatly different from that detected by the host.
19	Parallel AC voltage difference protection	In parallel operation, the equipment will be protected when the AC IN input connection is inconsistent.
20	Parallel current sharing fault protection	In parallel operation, the running equipment will be protected when the load difference of each inverter is large due to improper connection of current sharing line or device damage.
21	Synchronization signal fault protection	The equipment will be protected when there is a fault in the guidance signal between parallel buses, causing inconsistent behavior of each inverter.

Maintenance

In order to maintain the best long-term performance, it is recommended to conduct following checks twice a year.

1. Make sure that the airflow around the unit is not blocked and remove any dirt or debris from the heat sink.
2. Check that all exposed wires are damaged by exposure to sunlight, friction with other objects around them, dryness, bite by insects or rodents, etc., and the wires shall be repaired or replaced if necessary.
3. Verify for the consistency of indication and display with the operation of the device. Please pay attention to the display of any faults or errors, and take corrective actions if necessary.
4. Check all wiring terminals for corrosion, insulation damage, signs of high temperature or burning/discoloration, and tighten the screws.
5. Check for dirt, nesting insects and corrosion, and clean up as required.
6. If the arrester has failed, replace in time to prevent lightning damage to the unit or even other equipment of the user.

The company does not assume any liability for damage caused by:



- a) Improper use or use in improper site.
- b) Open circuit voltage of the PV module exceeds the maximum allowable voltage rated.
- c) Temperature in the operating environment exceeds the limited operating temperature range.
- d) Disassemble and repair the all-in-one solar charge inverter without permission.
- e) Force majeure: Damage that occurs in transportation or handling of the all-in-one solar charge inverter.



Danger of electric shock! When doing the above operations, make sure that all power supplies of the all-in-one machine have been disconnected, and all capacitors have been discharged, and then check or operate accordingly!