

Sodium Battery Pack

USER MANUAL



48V230Ah-11KWH

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1.0 About This Manual

Save the following instructions: This manual contains important instructions to follow about this series during installation and maintenance. Please read and save this manual for future reference.

This manual describes how to install the battery pack, read this manual before you attempt to install the product and follow the instructions throughout the installation process. If you are uncertain about any of the requirements, recommendations, or safety procedures described in this manual, contact us for advice and clarification.

The information included in this manual is accurate at the time of publication. However, with regards to the product design and technical specification updates, our company reserves the right to make changes at any time without prior notice. In addition, the illustrations in this manual are meant to help explain system configuration concepts and installation instructions. The illustrated items may differ from the actual items at the installation location.

2.0 Important Safety Information

For safety reasons, installers are responsible for familiarizing themselves with the contents of this manual and all warnings before performing installation.

WARNING: The installation of this unit may only be undertaken by qualified personnel with appropriate training. High voltages in and around the unit can cause serious injury or death. This unit must be installed in accordance with rules and regulations at the site of installation.

CAUTION: A battery can present a risk of electrical shock, burn from high short-circuit current, fire or explosion from vented gasses. Observe proper precautions.

General Safety Precautions

Failure to observe the precautions described in this section can cause serious injury to persons or damage to property. Please observe the following precautions.

Handling

Do not expose the battery to fire.

Do not immerse in water.

Do not expose the battery to direct sunlight.

Do not allow the battery connectors to touch conductive objects such as wires.

Do not place the battery in a charger or equipment with wrong terminals connected.

Avoid shorting circuiting the battery.

Avoid excessive physical shock or vibration.

Do not disassemble or deform the battery.

Do not mix the battery with other different makes, type, or model batteries.

Keep out of the reach of children.

DC voltages over 52V can stop the human adult heart! Please be careful and wear insulated gloves.

Charge and Discharge

The battery must be charged with a appropriate charger/inverter only.

Never use a modified or damaged charger.

Never connect the battery modules units in series! This is unsafe and will void the warranty.

Storage

The battery should be stored indoors in a dry, clean, shaded, and well-ventilated area at a temperature between 15° and 30°C, the monthly average relative humidity does not exceed 90%, and no corrosive, flammable or explosive gases in the surrounding air; no strong machinery Vibration, shock, strong electromagnetic fields and direct sunlight. Keep the capacity at 50% to 60% before storage and charge it every 3 months. Do not store battery for longer than 6 months. If storage exceeds 6 months, cycle the battery at least once. Over-discharge will damage the battery and void the warranty. The battery must be charged within a maximum of 10 days after the over-discharge stage has been reached.

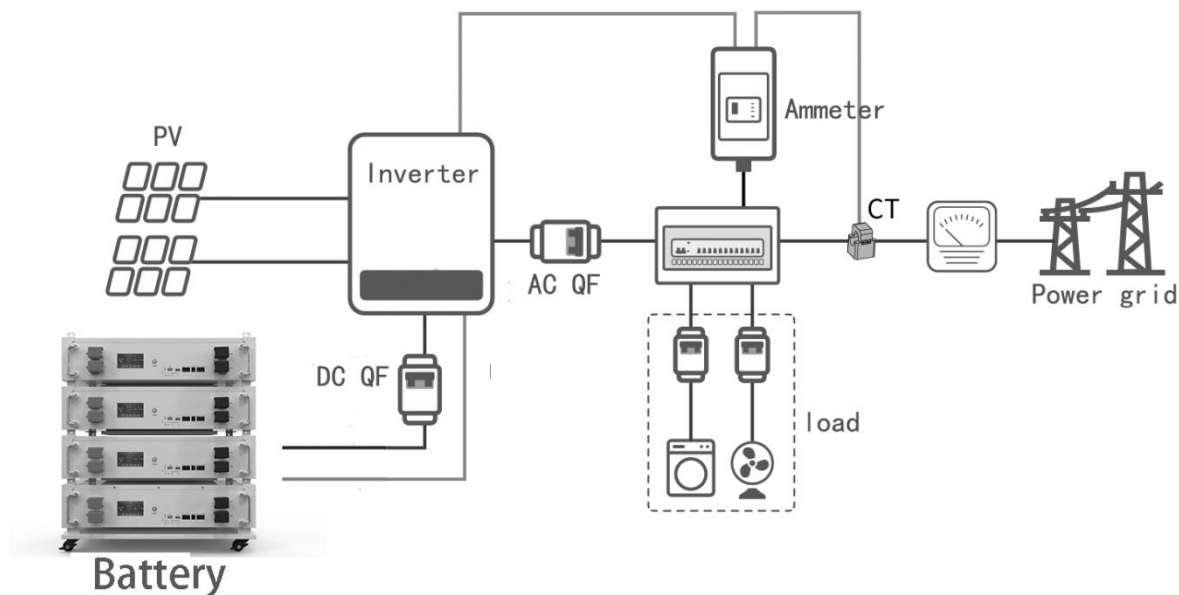
The battery must not be dropped, prohibit face down placed, or subjected to any severe impact.

Transportation

According to the regulations of this product, it can be used for general transportation, but it should be avoided from throwing, rainfall, strong radiation and corrosion. During transportation, please prevent collisions and strong vibrations.

3.0 About Battery Application

This battery is mainly combined with inverter, photovoltaic (PV) and related accessories to build residential energy storage systems. This system is used to store the electricity generated by photovoltaic power generation into the connected battery, and convert the direct current (DC) generated by photovoltaic power generation into alternating current (AC) by connecting the battery to the home grid.



(Note: actual residential ESS may also include electrical equipment such as distribution box and meter.)

This battery pack is a lithium-ion battery that stores electrical energy and outputs DC current. The battery pack only remains electrically connected to the inverter. The electricity generated by photovoltaic is converted into direct current by the inverter and stored in the connected battery pack. When power is needed, the electric energy generated by the battery pack is converted from direct current to alternating current through the inverter and transmitted to the home grid to power household appliances.

The main function of the home energy storage system relies on the inverter, and the lithium battery pack is a device that stores electrical energy.

4.0 Features and Functions

*Produce and Sell Electricity Independently

Use solar and lithium battery pack to reduce dependence on the grid and the difficulty of storing electricity
Store electricity during the day and use it at night.

*Emergency Power Supply

When the power grid is out of power, it can seamlessly switch to the lithium battery pack for power supply.

*Off-grid Power Supply

The off-grid power supply system can be connected to a diesel generator to ensure uninterrupted power.
Provide power supply in areas without city electricity, such as islands and remote mountainous areas.

(Note: the system electric energy dispatching management depends on the inverter, and the lithium battery pack is compatible with various inverters. The inverter you use may not include all the above functions.)

*Excellent human-computer interaction

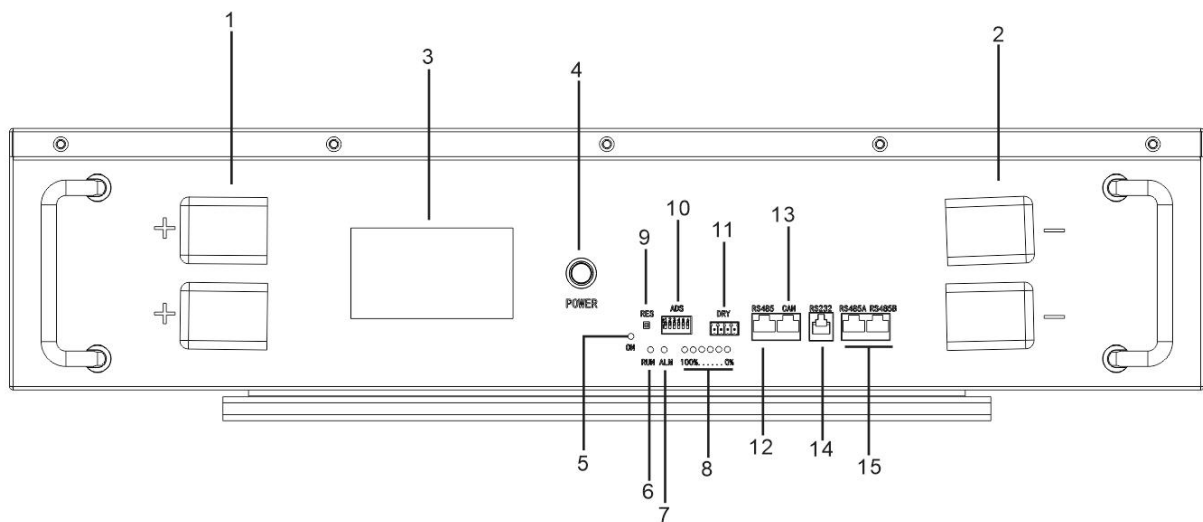
The battery pack system adopted the user-friendly colored touchscreen.
The battery cycle information will be counted and shown on the homepage.
The battery pack is compatible with the mainstream inverter, instead of inverter setup with a laptop computer, you only need to select the compatible inverter protocol through the RS485 or CANBus menu on the screen.
It supports parallel automatic addressing function, which can abandon cumbersome dial settings.

5.0 Specifications

Model	48V230Ah-11KWH
Battery Type	Sodium-ion Battery/SIB
Configuration	16S1P
Rated Energy	11kWh
Nominal Voltage	48V
Working Voltage	32V to 62.4V
Capacity	230Ah
Recommended Charge Current	≤50A
Max. Charge	100A
Max. Discharge	150 A
Cycle Life (@ 25 °C)	> 5 000Cycles @ 80% DoD
Extensibility	Up to 15 batteries in parallel
Working Temperature (Charge)	-10 to +65 °C
Working Temperature (Discharge)	-20°C to +65 °C
Storage Temperature	-20°C to +30 °C

Max. Altitude	≤4000m
Humidity	5% to 95%
Communication	CAN/RS485/RS232
Dimensions (L*W*H)	700*535*171mm
Weight	61kg
Mounting	Wall mounted/Rack/Stacked installation
Ingress Protection	IP20

6.0 Profile and Interface



Item	Name	Function
1	Battery pack positive	Battery pack positive terminal interface
2	Negative battery terminal	Battery negative terminal interface
3	Display screen	View real-time information about the battery pack
4	Switch	Control BMS power on and off
5	ON	Battery pack power-on indicator light
6	Run	Battery pack operation indicator light
7	ALM	Battery pack alarm, fault indicator light
8	SOC	Battery pack remaining capacity indicator light
9	Reset	Reset BMS status
10	ADD	Set the battery pack communication address when operating in parallel.
11	DRY	Passive switch, controls the switching of external equipment such as alarm systems, generators
12	RS485	Communication interface between BMS and computer or inverter
13	CAN	Communication interface between BMS and inverter
14	RS232	Expanded RS232 communication interface
15	Parallel communication	Communication interface between BMS and BMS when battery packs are used in parallel

6.1 Display Control

*Main Page

The main page primarily displays parallel system statistics, such as average SOC, highest and lowest single-cell voltage, highest and lowest single-body temperature, average battery voltage and total system current, average system remaining capacity, operating power, charge/discharge MOS status, and language switching functionality.



*Slave

After entering the slave unit page, the top displays the slave selection, the middle section visually presents the battery level and SOH data, the center shows the battery voltage and current, charge/discharge status and fault display status, while the bottom displays the slave unit's battery cell and temperature data, as well as ambient temperature and MOS temperature data.

Explanation of slave address background colors: blue indicates the currently selected slave controller, green represents the currently detected online slave, and white denotes offline slave controllers.



*Parameter Settings page

This page requires after-sales technical personnel to log in and operate. Unauthorized login and modification are prohibited.



*CAN protocol Settings

Support pylon、growatt、goodwe、sofarsolar、victron、voltronic、lxp、deye、ginlong、sma.

*RS485 protocol selection

Support pylon、growatt、Voltronic、lxp、deye、invent、srna.



*System Settings



Pack status

Item	Definition
OVP	Over Voltage Protection(single cell)
UVP	Under Voltage Protection(single cell)
POVP	Pack Over Voltage Protection
PUVP	Pack Under Voltage Protection
COTP	Charge Over Temperature Protection
CUTP	Charge Under Temperature Protection
DOTP	Discharge Over Temperature Protection
DUDP	Discharge Under Temperature Protection
COCP	Charge Over Current Protection
DOCP	Discharge Over Current Protection
SCP	Short Circuit Protection
LOCK	Soft Lock

6.2 Reset Switch

When BMS is dormant, press the button (3~6S) and release, the battery pack is activated and the LED indicator is from "RUN" Start lighting up for 0.5 seconds.

When BMS is active, release the button (3~6S), the battery pack is dormant and the LED indicator is from the minimum. The light starts to turn for 0.5 seconds.

When the BMS is active, press the button (6~10S) and release, the battery pack is reset, and all the LED lights are lit at the same time 1.5 Seconds.

Battery pack dormancy and wake-up:

Dormancy

When any of the following conditions is met, the system enters low-power mode:

- 1) The monomer or overall over release protection is not removed within 30 seconds.
- 2) Press the key (3~6S) and release the button.
- 3) The lowest monomer voltage is lower than the dormant voltage, and the duration reaches the dormancy delay time (while satisfying the no communication, No protection, no equilibrium, no current).
- 4) Standby time exceeds 24 hours (no communication, no charge and discharge, no city power).
- 5) Force the shutdown through the upper computer software.

Before entering the sleep mode, make sure that the input terminal is not connected to the external voltage, otherwise it will be unable to enter the low power consumption mode.

After the BMS is reset, it still retains the parameters and functions set by the upper computer. If it needs to restore to the initial parameters, it can be achieved through the "restore default value" of the upper computer, but the relevant operation records and stored data remain unchanged (such as electricity, cycle times, protection records, etc.).

Waken

When the system is in the low power consumption mode and any of the following conditions are met, the system will exit the low power consumption mode and enter the normal operation mode:

- 1) When connected to the charger, the output voltage of the charger shall be greater than 48V.
- 2) Press the key (3-6S) and release it.
- 3) Activated via RS485 port.

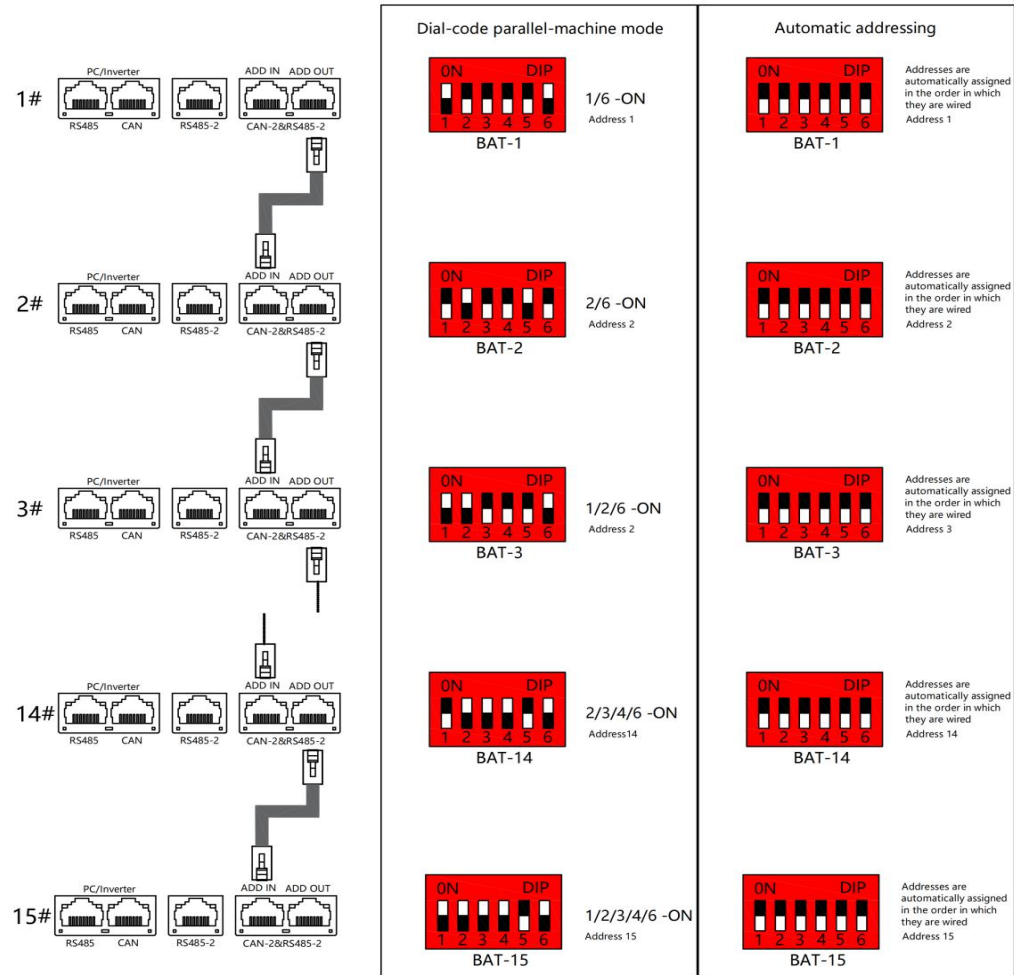
Note:

After the single or overall over discharge protection, it enters the low power consumption mode, wakes up regularly every 4 hours, and starts the charging and discharging MOS. If it can be charged, it will exit the sleep state and enter into normal charging; If automatic wake-up fails to charge for 10 consecutive times, it will not automatically wake up again.

When the system defines that the recovery voltage is not reached after 2 days of standby (set value of standby time) after the end of charging, the charging is forced to resume until the end of recharging.

6.3 DIP Switch

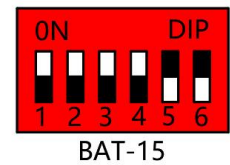
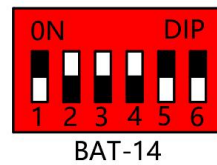
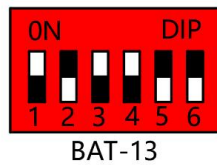
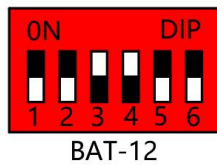
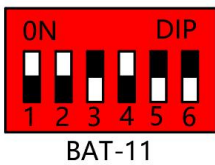
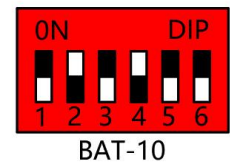
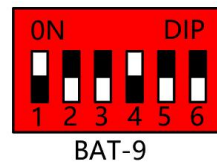
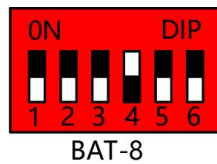
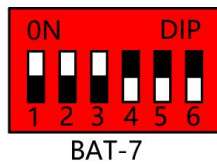
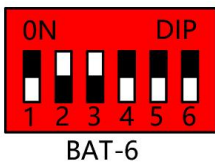
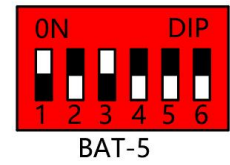
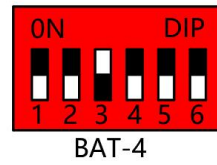
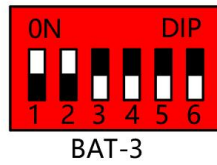
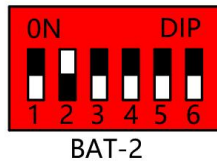
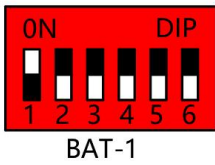
When packs are connected in parallel, use the DIP address function when DIP 6 is connected to ON. Otherwise, use the default automatic addressing function. Use the DIP switch on the BMS to set the address to distinguish different packs.



Calculation example

Address	DIP Switch Position					
	#1	#2	#3	#4	#5	#6
1	ON	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF

8	OFF	OFF	OFF	ON	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	ON	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF



6.4 Dry Contact



1 2 3 4

BMS can provide one way of dry contact signals, which are all passive switches, regardless of polarity.

Switches to control the external equipment, such as generators, etc.

6.5 LED Indicator

One running indicator (Green)

One warning indicator (Red)

Six capacity indicators (Green)

							
RUN	ALARM	SOC					

LED Working Status Indication

Status	Normal/Alarm/Protection	ON/ OFF	RUN	ALM	SOC						Remark
											
OFF	Dormancy	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
STANDBY	Running	Bright	Flash 1	OFF	Indicating based on the remaining capacity						Standby
	Alarm	Bright	Flash 1	Flash 3							Low Voltage
Charge	Normal/Alarm/Protection	Bright	Bright	OFF	Indicating based on the remaining capacity (the maximum power indicator LED flashes 2)						The maximum power indicator LED flashes (flash 2), and the ALM does not flash during overcharge alarm.
	Alarm	Bright	Bright	Flash 3							
	Overcharge Protection	Bright	Bright	OFF	Bright	Bright	Bright	Bright	Bright	Bright	If there is no mains power, the indicator light turns to standby mode.
	Temperature, Over-Current, Failure Protection	Bright	OFF	Bright	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Discharge	Normal	Bright	Flash 3	OFF	Indicating based on the remaining capacity						
	Alarm	Bright	Flash 3	Flash 3							
	Under-Voltage Protection	Bright	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging
	Temperature, Over-Current, Short Circuit, Reverse Connection and Failure Protection	Bright	OFF	Bright	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging
Fault		OFF	OFF	Bright	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging and discharging

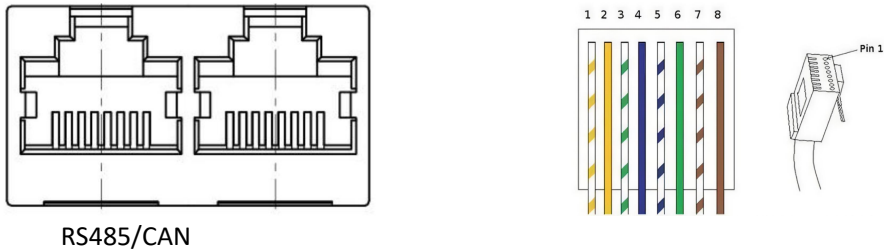
6.6 Communication

RS485 communication

With dual RS485 interfaces, you can view the battery pack information. The default baud rate is 9600bps. If it is necessary to communicate with the monitoring equipment through RS485, the monitoring equipment, as the host, polls data according to the address, and the address setting range is 2~15.

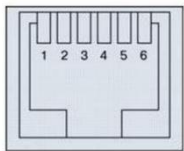
CAN communication

CAN communication, baud rate 250K.



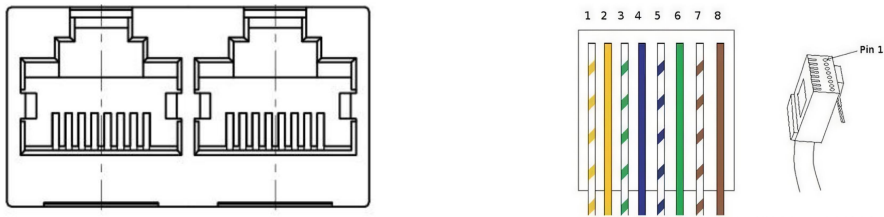
RS485-8P8C Vertical RJ45 Socket		CAN-8P8C Vertical RJ45 Socket	
RJ45-Pin	Definition	RJ45-Pin	Definition
1、 8	RS485-B1	1、 2、 3、 6、 8	NC
2、 7	RS485-A1	4	CANL
3、 6	GND	5	CANH
4、 5	NC	7	GND

RS485 and CAN Port



RS232 通讯接口

RS232	6P6C	RJ11
RJ11		
2		NC
3		TX
4		RX
5		GND



Parallel RS485-2/CAN2

RS485-8P8C Vertical RJ45 Socket		CAN-8P8C Vertical RJ45 Socket	
RJ45-Pin	Definition	RJ45-Pin	Definition
1、 8	RS485-B	1、 8	RS485-B
2、 7	RS485-A	2、 7	RS485-A
4	CAN-H	4	CAN-H
5	CAN-L	5	CAN-L
6	GND	6	GND
3	IN	3	OUT

Parallel RS485 Port

7.0 Packing Listing

No.	Item	Picture	Quantity
1	Battery Pack		1pcs
2	Power Wires (6AWG, 1m, Black*1pcs & Red*1pcs)		2pcs
3	Communication cable 1.2m		1pcs
4	User Manual		1pcs
5	Wall Mounted Bracket		1pcs
7	Expansion Bolts M10*100mm		4pcs

8.0 Installation

8.1 Installation Tools

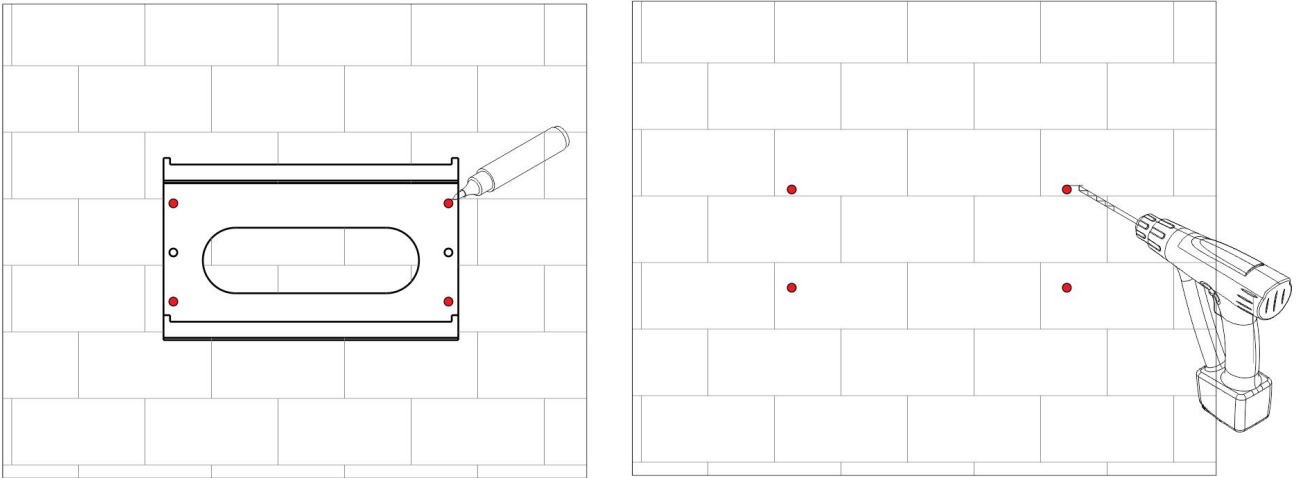
Tools			
Installation	Knife 	Measuring tape 	Socket wrench (10/16mm) 
	Rubber mallet 	Cross Screwdriver 	Hammer drill (12mm) 
Protection	ESD gloves 	Safety goggles 	Anti-dust respirator 
	Safety shoes 		

The installation, operation and maintenance of the lithium battery energy storage system must be carried out by trained and qualified professionals. Before installation and use, please read the safety precautions and relevant operating carefully. Strictly follow the following safety rules and local safety rules, otherwise it may cause personal injury or damage to the product!

- *Ensure that the load equipment connected to the battery system is in good condition with no defects;
- *Ensure that the power system is off and the battery system is also off before installation;
- *All cables must have the corresponding insulation level, please ensure that the cables are not exposed;
- *Ensure that the battery and power system grounding is reliable;
- *The temperature and humidity of the installation site conform to the working scope of the product, and the environment is free of metal dust or corrosive gas.

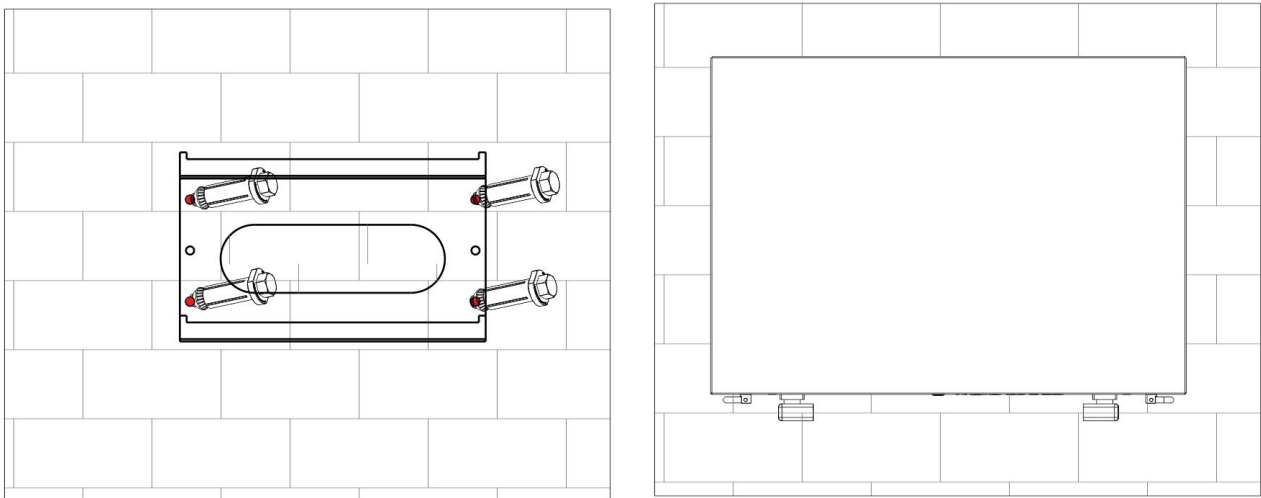
8.2 Wall-Mounted

Step 1: Use horizontal instruments and tape measures to mark the position of the holes on the installed wall, as shown in the figure;



Step 2: Use the impact rotation in the marked position of the aperture of 10mm deep 100mm hole, put the explosion bolt in the accessories and tighten the fixation, and then fix the brackets on the explosion bolts;

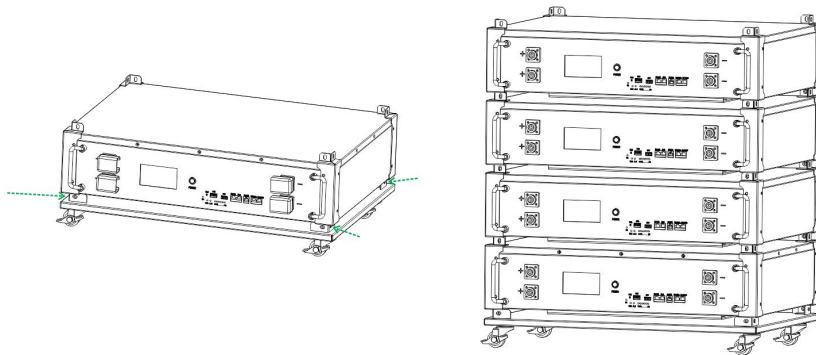
Step 3: One to two people will lift the battery pack, and put the battery on the bracket according to the position of the brackets, (to ensure reliability and firmness), as shown in the figure;



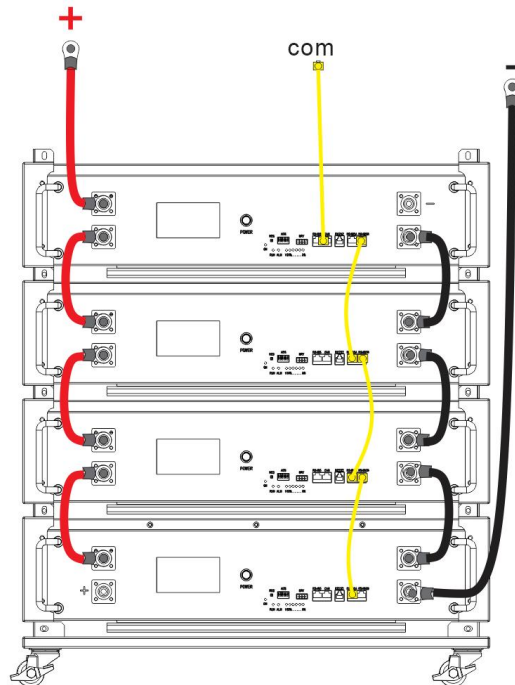
8.3 Stacked installation

Step 1: Remove the base tray and stacking bracket from the accessory box, install the stacking bracket onto the battery box, and then secure it to the base tray;

Step 2: Secure the screws between the bracket and the base tray, then install the second battery pack on top of the first one and fasten the fixing bolts, and so on.



Step 3: In the case of no junction box, press the matching harness in parallel connection as shown in the figure.



Power cord connection steps:

1) Confirm that the inverter power wires is disconnected and the photovoltaic circuit is disconnected. Make sure the battery is turned off.

- 2) The ring terminal of the wiring cable is connected to the positive and negative poles of the inverter DC terminal.
- 3) The negative ring terminal at the other end is quickly connected to the negative port of the battery.
- 4) The positive ring terminal at the other end is quickly connected to the positive port of the battery.
- 5) Communication connection, please refer to 6.2 DIP switch setting.

Warning: The battery and inverter must be turned off before installing the power wires.

Power cord disconnect step:

Procedure for disconnecting the power wires:

- 1) Make sure the mains line is disconnected, and the PV line is disconnected.
- 2) Turn off the inverter.
- 3) Turn off the battery pack.
- 4) Disconnect the ring terminal of the each wire.

Warning: Please follow these steps carefully. And make sure the interface is in good contact.

9.0 BMS Monitoring

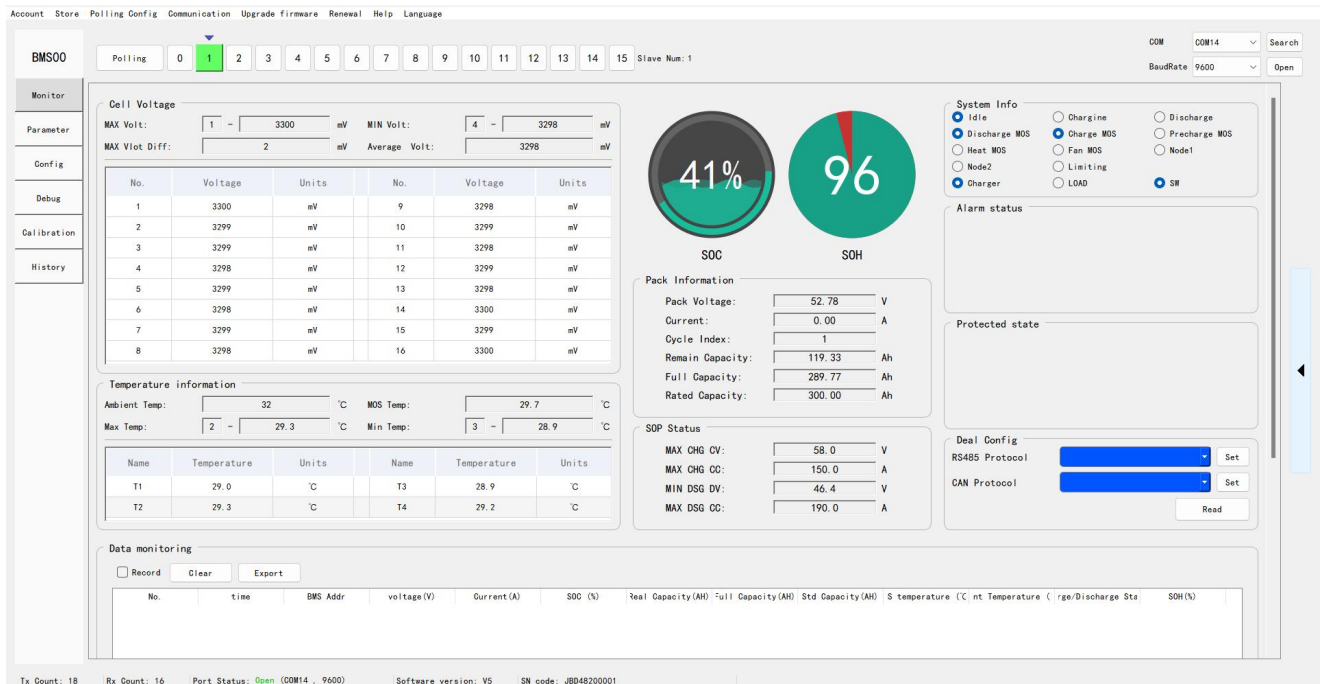
With this application, you can monitor system operations from your PC device, including the following:

Real-time current, voltage, and capacity usage.

Obtain energy consumption data and alarm status records of lithium battery pack.

The connection method: After installing the special driver for our communication box on the computer, insert the USB end of the communication box into the USB port of the computer, and connect the other end to the corresponding interface of the protection board that has been connected to the battery. Open the upper computer, click the communication port settings, select the COM port corresponding to the communication box, and do not change other options. After confirming, click Start to read the data from the BMS.

If you need to change the parameters of the BMS, you must click on the parameter page to read the parameters before changing the parameters.



Note: the parameter modification authority of BMS must be obtained with the company or the local distributor, and arrange relevant personnel to provide technical guidance. Any unauthorized modification of parameters that results in instability or damage to product performance, which will invalidate the warranty claim.

10.0 Troubleshooting

No	Fault	Analysis	Solution
1	No DC output	Low voltage protection	Charge before use
2	No enough discharging time	No enough capacity or not charged to full	Confirm maintenance or replace battery
3	ALM always bright, can not charge or discharge	Battery or BMS fault	Connect to Inverter/ PC monitoring or check the data on LCD Screen and find the reason

Caution: If the battery cannot operate normally, please do not disassemble the battery without technical instructions.

11.0 Maintenance

- 1) The battery system operates with hazardous voltages. Repairs may be carried out only by qualified maintenance personnel.
- 2) Even after the unit is disconnected from the mains, components inside are still connected to the battery cells which are potentially dangerous.
- 3) Before carrying out any kind of service and/or maintenance, disconnect the batteries and verify that no current is present and no hazardous voltage exists in the terminals.
- 4) Only persons are adequately familiar with batteries and with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.
- 5) Verify that no voltage between the battery terminals and the ground is present before maintenance or repair. In this product, the battery circuit is not isolated from the input voltage.
- 6) Hazardous voltages may occur between the battery terminals and the ground.
- 7) Batteries may cause electric shock and have a high short-circuit current. Please remove all wristwatches, rings and other metal personal objects before maintenance or repair, and only use tools with insulated grips and handles for maintaining or repairing.
- 8) When replace the batteries, install the same number and same type of batteries.
- 9) When replace the parallel batteries, make sure the new battery is full charged.
- 10) Do not open or destroy batteries. Escaping electrolyte can cause injury to the skin and eyes. It may be toxic.
- 11) Please replace the fuse only with the same type and amperage in order to avoid fire hazards.
- 12) Do not disassemble the battery system.

12.0 Product Responsibilities and Consulting

- 1) We will not be liable for the accidents resulting from operation breaking this specification and user manual.
- 2) We will not send separate notice, provided that the contents of this specification are changed due to improvement of product quality or technological upgrading; provided that you want to understand the latest information of this product, please contact us.
- 3) In case of any questions, please contact us.

Equipment warranty card

Dear users: Thank you for purchasing the products. In order to better serve you, please read, fill in and keep this warranty card carefully after purchasing the products.

Product name		Specifications Models	
Warranty date		Order number	
User name		Contacts	
Contact number		Purchase Date	
User address			
Maintenance record	date	Fault cause and handling situation	

- Warranty instructions

If the product has quality problems and needs to be repaired, please send the warranty card and the purchased product properly back to our company to provide the after-sales maintenance department.

For quality problems not caused by the quality of the company's products, such as improper use, improper storage, unauthorized dismantling, the company will charge the maintenance cost.