

ChangSha Enook Technology Co., Ltd



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1. Safety Operation Instructions

Please carefully read this operation and maintenance manual before performing any operations on the equipment. The safety precautions mentioned in the manual do not represent all the safety matters that should be observed, but only serve as a supplement to the safety precautions. When installing, operating, and maintaining the equipment, local safety regulations and specifications should be complied with. Only trained professional personnel are allowed to install, operate, and maintain the equipment. Our company shall not be liable for any losses caused by violation of general safety operation requirements or safety standards for the design, production, and use of the equipment. Installation and maintenance personnel must have the technical ability to operate high-voltage and AC power supplies. When installing, operating, and maintaining the equipment, do not wear any conductive objects, such as watches, bracelets, and rings, and prevent moisture from entering the equipment.



High Voltage Danger:

The high-voltage power supply provides power for the operation of the equipment. Direct contact or indirect contact with the high-voltage power supply through wet objects can be fatal danger.



Use Special Tools:

When working with high voltage and AC power supply, specialized tools must be used instead of personal tools.



anti-static

The static electricity generated by the human body can damage the static-sensitive components on the single board. Before touching the plug-ins, circuit boards, or chips, ensure correct anti-static measures.



Disconnect the Power during Operation:

When operating the power supply, the power must be cut off first. Live operation is prohibited.



Short-Circuit Danger:

The power system provides a DC regulated power supply. A DC short-circuit can damage the equipment and cause a fatal danger.

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2. Product introduction

This lithium iron phosphate battery is composed of 16 series of battery cells and is suitable for household applications. We can design customized products according to customer requirements to meet the needs of various application scenarios. It can provide stable power support for users' various devices, and has the advantages of long service life, high energy density, strong temperature adaptability, modular design, environmental protection and energy saving, as well as small installation space.

3. Product features

- a. The BMS (Battery Management System) configured in the battery pack has protection functions such as over - charge, over - discharge, over - current, temperature, and short - circuit protection.
- b. It has a voltage equalization function during the charging process.
- c. High safety performance, long service life, stable and reliable.
- d. It has an RS485 communication interface and supports parallel expansion of the battery pack.
- e. It has a wide operating temperature range (-10~60°C) and good high - temperature discharge performance.
- f. Small in size, light in weight, supports customized design, and is easy to install and maintain.

4. Product technical parameters

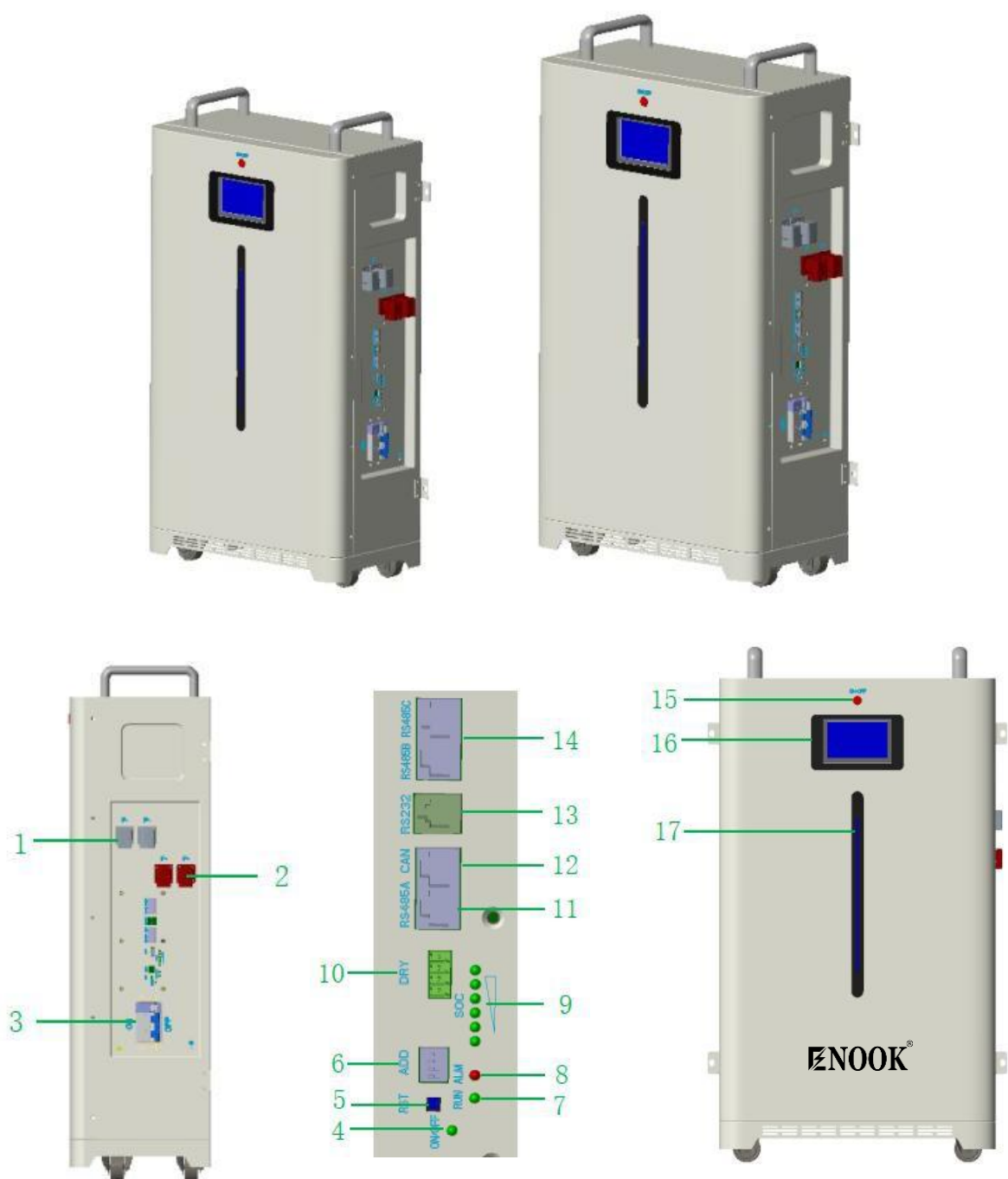
4.1 Basic parameters

Project	Basic parameters
Product model	52.2V314AH
Rated voltage (V)	51.2V
Operating voltage range (V)	43.2~57.6
Rated capacity (Ah)	314AH
Rated energy (WH)	16076
Combination method	1P16S
Charge cut - off voltage (V)	58.4V
Discharge cut - off voltage (V)	43.2V
Operating temperature range (°C)	-10~60°C
Recommended charging current (A)	100

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Maximum continuous charging current (A)	200
Maximum continuous discharging current (A)	200
Product dimensions (mm)	850*500*255mm
Net weight of the product (KG)	125KG

4.2 Interface definition



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Serial Number	Name	Definition
1	Negative Socket	The negative pole of the DC output of the battery can be connected to the negative pole of the inverter through a cable.
2	Positive Socket	The positive pole of the DC output of the battery can be connected to the positive pole of the inverter through a cable.
3	Circuit Breaker	Protect the battery from overload or short - circuit.
4	Power Indicator	Lights up when turned on and goes off when turned off.
5	Reset Button	Manual reset switch button.
6	ADD DIP Switch	Set the battery parallel communication and inverter communication.
7	Running Light	Indicates the normal operating state of the battery.
8	Alarm Light	Indicates the abnormal state of the battery. An alarm sound will occur in case of under - voltage or over - voltage.
9	SCO	Six power lights to indicate the remaining power status.
10	Dry Contact	Users can connect external alarm devices by themselves.
11	RS485A	Communication interface with the inverter and the host computer.
12	CAN	Communication interface with the inverter and the host computer.
13	RS232	Reserved interface.
14	RS485 B/C	Parallel communication interface between battery packs.
15	Button Switch	Used to turn on or off the battery pack switch.
16	Display Screen	Displays the battery voltage, SOC, temperature, etc.
17	Light Strip	Power display indicator.

4. 3 Battery Management System (BMS)

4. 3. 1 Over - voltage Protection

When the battery is being charged, if the voltage of a single battery cell or the total voltage exceeds the preset single-cell voltage threshold or total voltage threshold, and this state persists for the duration of the overcharge protection delay, the system will enter the overcharge protection mode, turn off the charging MOSFET, and stop charging the battery. The overcharge protection will be released when the voltage drops below the overcharge recovery threshold, or it can also be released through discharging.

4. 3. 2 Over - discharge Protection

When the battery is discharging, if the voltage of a single battery cell or the total voltage falls below the preset single-cell voltage threshold or total voltage threshold, and this state lasts for the duration of the over-discharge protection delay, the system will enter the over-discharge protection mode, turn off the discharging MOSFET, and stop discharging the battery.

After the battery pack activates over-discharge protection, the protection can be released by charging the battery pack.

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4. 3. 3 Over - current protection

When the battery is being charged or discharged, if the current exceeds the preset overcurrent protection threshold and this state persists for the duration of the overcurrent protection delay, the system will enter overcurrent protection mode, turn off the charging and discharging MOSFETs, and disable both battery charging and discharging. Once the battery pack activates over-discharge protection, the protection can be released by charging the battery pack.

4. 3. 4 High - temperature protection for charging and discharging

When the battery is being charged or discharged, if the NTC detects that the surface temperature of the battery cell is higher than the set high - temperature protection temperature, the battery system enters the high - temperature protection state. The charging and discharging MOS are turned off, and the battery cannot be charged or discharged in this state.

4. 3. 5 Low - temperature protection for charging and discharging

When the battery is being charged or discharged, if the NTC detects that the surface temperature of the battery cell is lower than the set low - temperature protection temperature, the battery system enters the low - temperature protection state. The charging and discharging MOS are turned off, and the battery cannot be charged or discharged in this state.

5. Installation and configuration

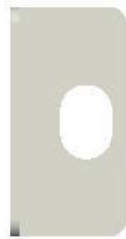
5. 1 Pre - installation inspection

(1) After receiving the battery, the user should open the packaging box to check if there are any damages, cracks or other defects on the battery surface. If so, do not install the battery. The user should contact the supplier and wait for the supplier's response before proceeding to the next step.

(2) Ensure that the package contains the following accessories:



Battery pack



Fixed hanging ears



Expansion screws * 4PCS



Power cable connected to the inverter



Screws M8 * 12mm * 4PCS



Parallel communication cable



Communication cable connected to the inverter



Host computer cable

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5. 2 Configuration of Installation Tool List

Before installing the battery pack, the user needs to prepare the following tool list, which is shown in the following table.

Tools/Materials	Name	Function
	Spirit Level	Ensure the horizontal installation position
	Impact Drill	Drill holes in the wall
	Electric Wrench	Tighten the expansion screws
	Electric Screwdriver	Tighten the screws
	Hammer	Knocking tool
	Crimping Pliers	Crimp the RJ45 terminals
	Wire Strippers	Function for stripping wires
	Adjustable Wrench	Function for tightening and loosening screws

5. 3 Precautions for Wall-mounted Installation

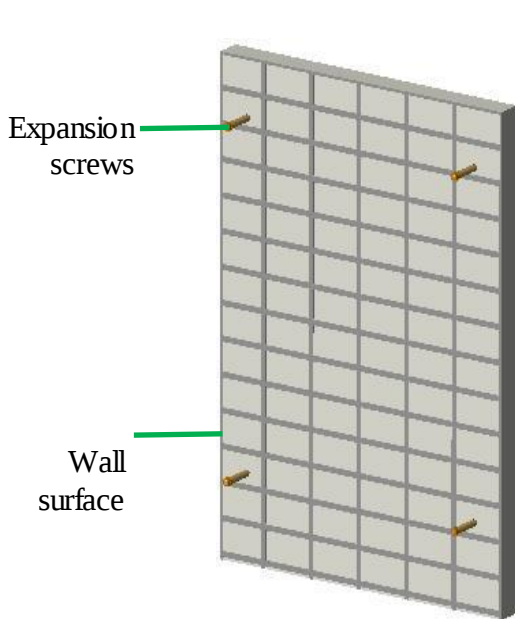
1. The wall for battery installation should be a solid brick or concrete wall with strong load-bearing capacity, and the wall thickness should be no less than 100mm.
2. If installed indoors, a certain amount of space should be reserved during installation to facilitate the installation operation, and attention should be paid to ventilation. Do not place flammable materials around the battery.
3. If installed outdoors, protection should be made around the battery, and attention should be paid to rain protection.

5. 4 Installation Steps

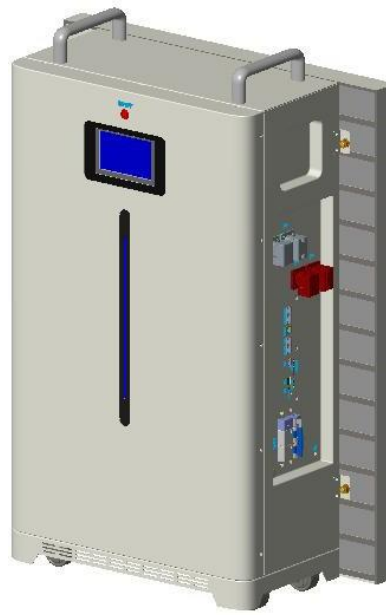
1. Mark the drilling positions on the bracket, measure them with a spirit level to ensure horizontal installation.

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2. Drill holes with an impact drill, with a hole diameter of about 12mm and a drilling depth of about 60mm.
3. Place the bracket firmly against the wall, align it with the holes, and fix it with M8 expansion screws.
4. Tighten the M8 expansion screws with an electric wrench with a tightening force of 20N.m.



(Installation Schematic Diagram 1)



(Installation Schematic Diagram 2)

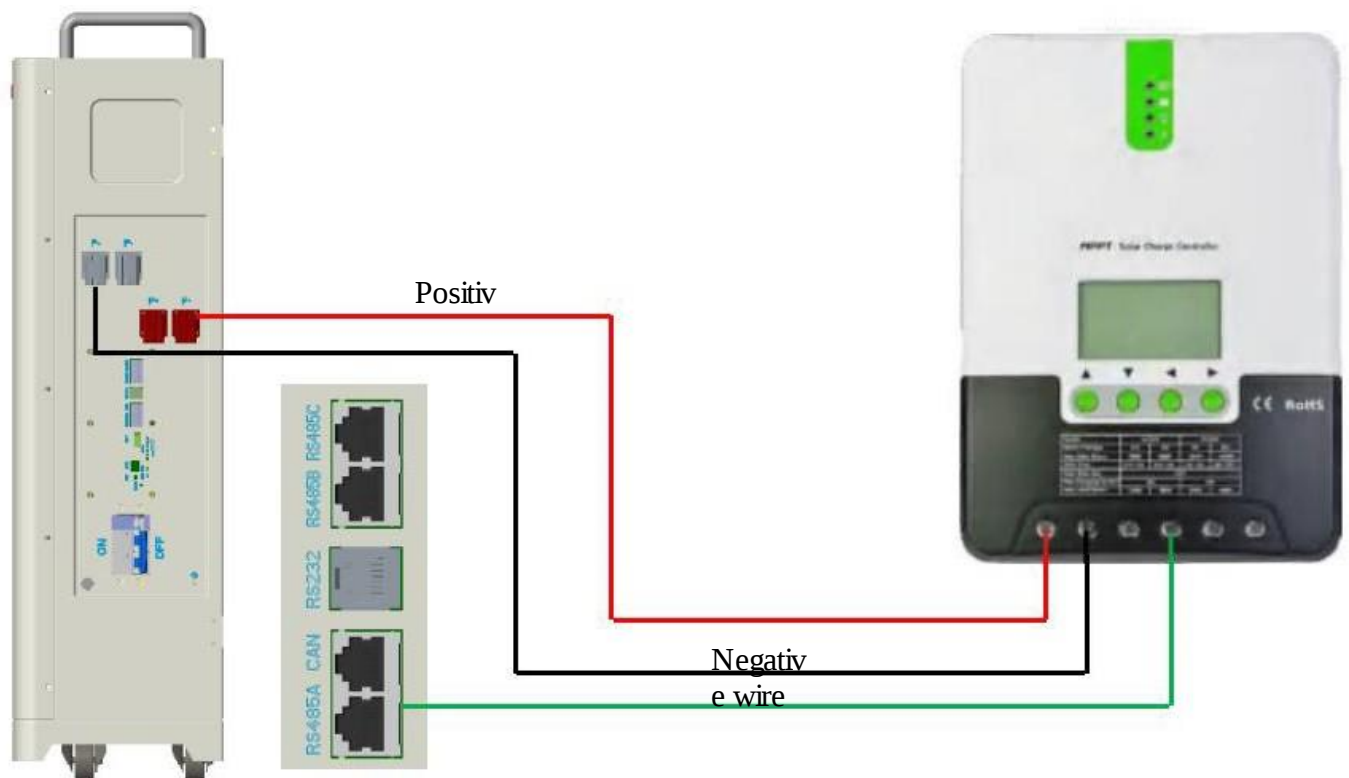
6. Steps for connecting the battery to the inverter

6.1 Precautions before connecting the battery to the inverter

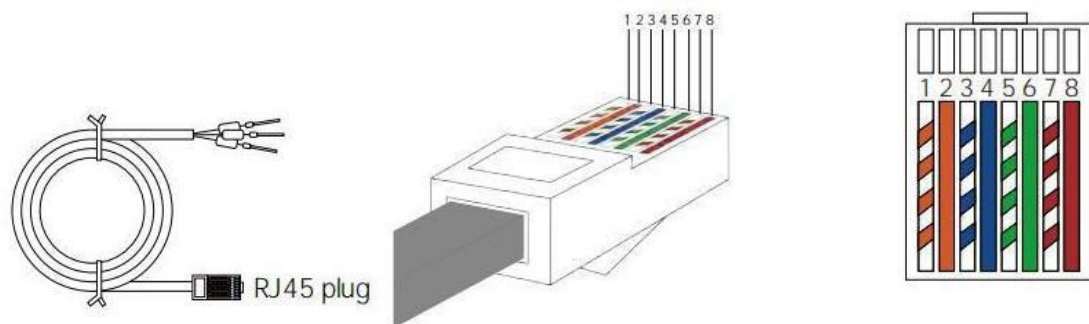
- a. Use a multimeter to measure whether the positive and negative cable lines are conductive, and check whether there is any loose connection at the positive and negative terminals.
- b. Before wiring, the battery should be in the shutdown state to ensure that the battery has no DC output.
- c. Lock the positive and negative poles of the battery end first, and then connect the positive and negative poles of the inverter.
- d. Connect the communication cable to the RS485/CAN port of the battery end, and then connect it to the BMS (RS485/CAN) port of the inverter end. The definition of the BMS port of the inverter varies according to different inverter brands. Please refer to the inverter manual.

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Inverter



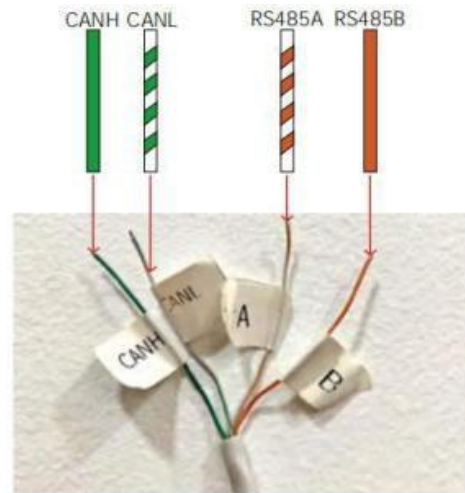
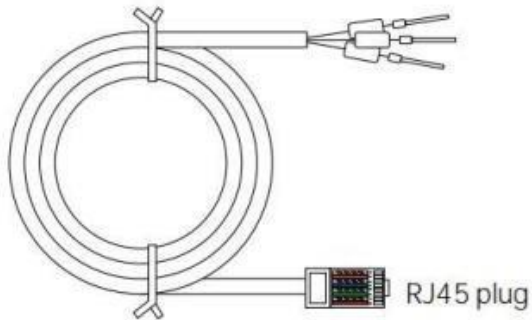
The definition order of the communication wire connection pins is as follows.



RS485A interface	Pin	1	2	3	4	5	6	7	8
	Definition	RS485-B	RS485-A	GND	NC	NC	GND	RS485-A	RS485-B
CAN interface	Pin	1	2	3	4	5	6	7	8
	Definition	NC	NC	NC	CAN-H	CAN-L	NC	GND	NC

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Diagram of RJ45 connection to the inverter port:

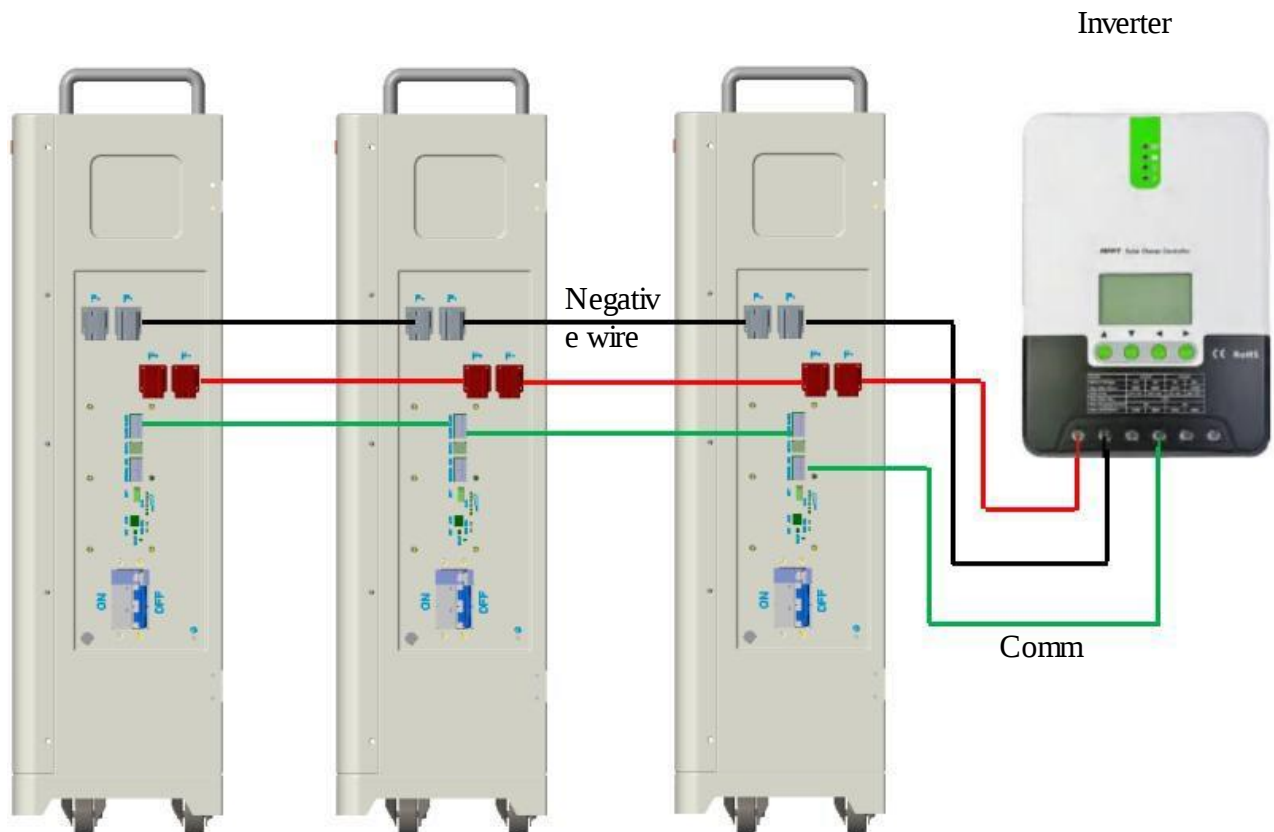


RJ45 Connector Diagrams	Communication
 Brand: DEYE, Growatt, Goodwe, Solis	CANH->pin4 CANL->pin5
 Brand: Victron	CANH->pin7 CANL->pin8
 Brand: Pylon, Growatt	RS485B->pin1 RS485A->pin2
 Brand: Voltronic	RS485B->pin3 RS485A->pin5
Please set up the RJ45 connector according to the pin definition of the inverter	

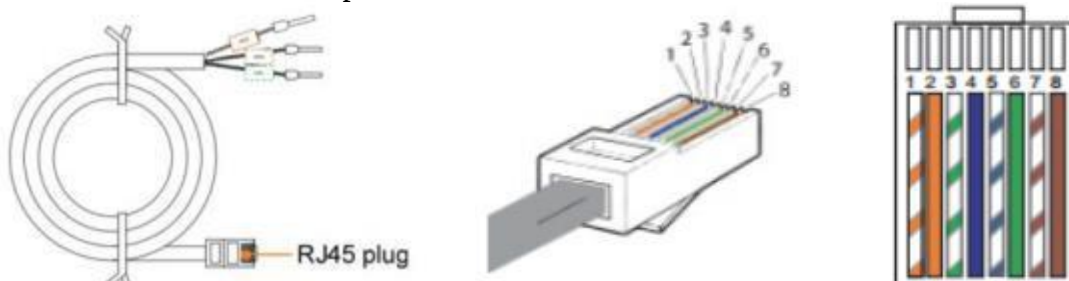
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6.2 Precautions before connecting parallel batteries to the inverter

- Use a multimeter to measure whether the positive and negative cable lines are conductive, and check whether there is any looseness at the connection of the positive and negative terminals.
- The battery should be in the shutdown state before wiring to ensure that the battery has no DC output.
- Lock the parallel cable to the positive pole of the battery terminal first, and then lock the negative pole of the battery.
- Connect the parallel communication line to the RS485 port of the battery.
- Lock the positive and negative cable lines of the inverter to the positive and negative terminals of the battery first, and then connect them to the positive and negative poles of the inverter.
- Connect the communication line to the RS485/CAN port of the battery terminal, and then connect it to the BMS (RS485/CAN) port of the inverter terminal. The definition of the BMS port of the inverter varies according to different inverter brands. Please refer to the inverter manual.



The definition order of the pins of the communication line connection is as follows.

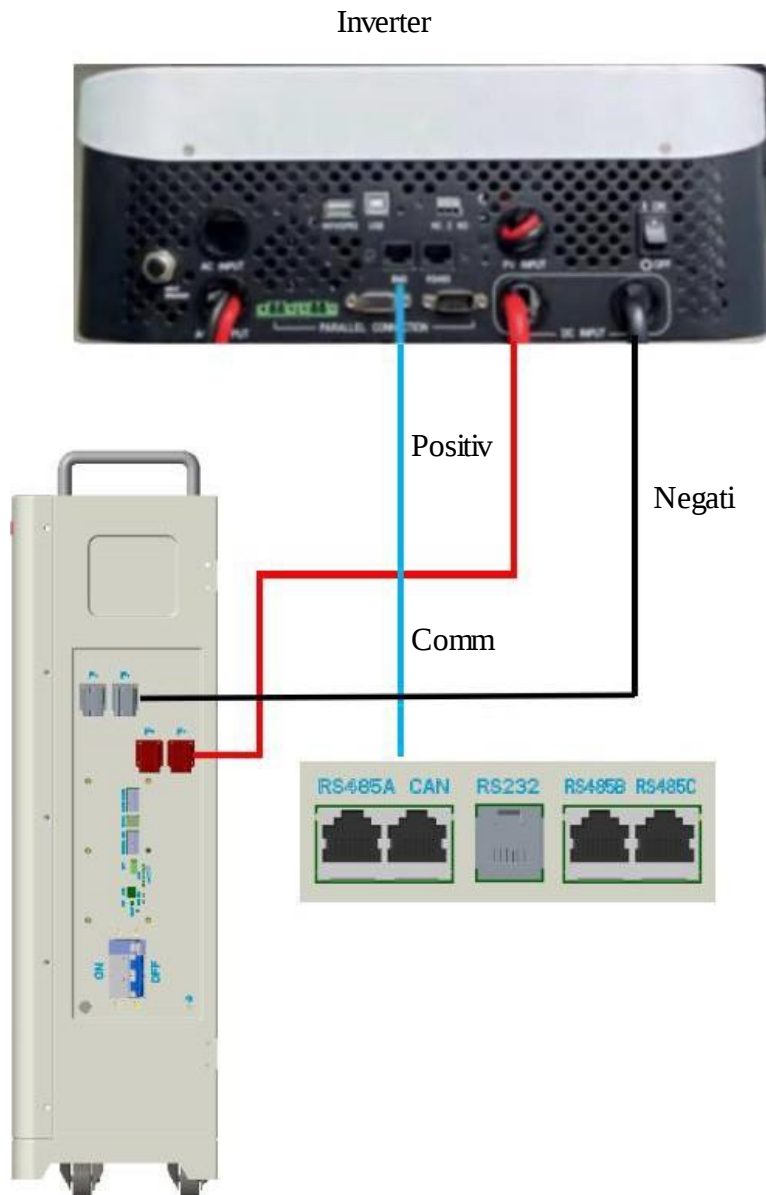


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RS485 Parallel Communication Interface Definition	Pin	1	2	3	4	5	6	7	8
	Definition	RS485-B	RS485-A	GND	NC	NC	GND	RS485-A	RS485-B

6.3 Schematic Diagram of Battery and Inverter Connection

Connect the positive and negative wires of the battery to the positive and negative terminals of the DC input of the inverter. Insert the RJ45 crystal head at one end of the supplied inverter communication cable into the battery's RS485 port. At the other end, the user should crimp an RJ45 crystal head according to the defined wiring, and then connect it to the BMS terminal of the inverter. This completes the connection between the battery and the inverter.



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6.4 Definition and Setting of DIP Switches

In multi - unit communication when battery packs are connected in parallel, DIP switches can be used to distinguish different Pack addresses. The addresses can be set through the DIP switches on the board. The ADD switch is a 4 - bit DIP switch. When multiple battery packs are connected in parallel, the DIP switch settings of the ADD switch can refer to the following figure.

4-BIT					
Address	Dip Switch Position				Illustration
	#1	#2	#3	#4	
0	OFF	OFF	OFF	OFF	
1	ON	OFF	OFF	OFF	
2	OFF	ON	OFF	OFF	
3	ON	ON	OFF	OFF	
4	OFF	OFF	ON	OFF	
5	ON	OFF	ON	OFF	
6	OFF	ON	ON	OFF	
7	ON	ON	ON	OFF	
8	OFF	OFF	OFF	ON	
9	ON	OFF	OFF	ON	
10	OFF	ON	OFF	ON	
11	ON	ON	OFF	ON	
12	OFF	OFF	ON	ON	
13	ON	OFF	ON	ON	
14	OFF	ON	ON	ON	
15	ON	ON	ON	ON	

7. Operation

7.1 Pre - startup Inspection

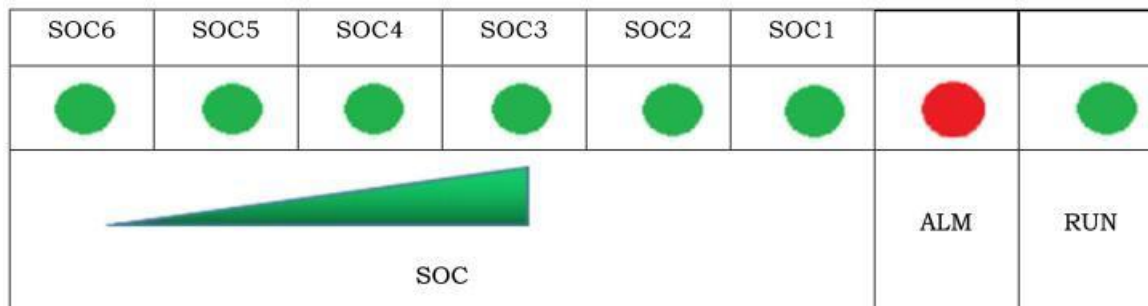
- Check whether all positive and negative cable lines and communication lines are correctly and safely connected, etc.
- Check whether the batteries are firmly installed for easy operation and maintenance, and whether the ventilation is good.
- Whether unused ports are properly insulated.

7.2 Power On

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- Turn on the button switch on the battery.
- Check if the status of the LED indicator is normal.
- If the electrical connections are correct but the battery system still fails to start, please contact our after-sales service within 48 hours.

7.3 LED light description: 6 green capacity indicators, 1 red alarm indicator, and 1 green operation indicator



Capacity indication description

状态	充电						放电					
容量指示灯	SOC6 ●	SOC5 ●	SOC4 ●	SOC3 ●	SOC2 ●	SOC1 ●	SOC6 ●	SOC5 ●	SOC4 ●	SOC3 ●	SOC2 ●	SOC1 ●
0~16%	闪烁 2	灭	灭	灭	灭	灭	灭	灭	灭	灭	灭	灭
16~32%	常亮	闪烁 2	灭	灭	灭	灭	常亮	灭	灭	灭	灭	灭
32~48%	常亮	常亮	闪烁 2	灭	灭	灭	常亮	常亮	灭	灭	灭	灭
48~60%	常亮	常亮	常亮	闪烁 2	灭	灭	常亮	常亮	常亮	灭	灭	灭
60~76%	常亮	常亮	常亮	常亮	闪烁 2	灭	常亮	常亮	常亮	常亮	灭	灭
76~100%	常亮	常亮	常亮	常亮	常亮	闪烁 2	常亮	常亮	常亮	常亮	常亮	灭
运行指示灯 ●	常亮						闪烁 3					

Status indication description

系统状态	异常事件	电量 LED						ALM	RUN	备注
										
关机	关机/休眠								全灭	
待机	正常	依据电量指示						灭	闪 1	待机时只有正常和告警，保护和故障按充放电状态上报;告警包含以下几类，压差大告警,容量低告警,单体电压高、低，总体电压高、低，所有的温度告警(电芯温度高、低，环境温度高、低、MOS 温度高。（单体&总压过压告警时 ALM 不闪）
	告警							闪 2	闪 1	
充电	正常	依据电量指示						灭	常亮	
	告警	(最高指示 LED 闪烁 2)						闪 2	常亮	告警包含以下几类，压差大告警，容量低告警，单体电压高、低，总体电压高、低，所有的温度告警(电芯温度高、低环境温度高、低，MOS 温度高;过流告警。（单体&总压过压告警时 ALM 不闪）
	单体/整体过压保护/满充保护	依据电量指示						灭	闪 2	
	过流保护	依据电量指示						灭	常亮	充过流保护后进入限流充电且有充电电流按正常状态显示;充过流保护后进入限流充电且无充电电流按故障状态显示，ALM 常亮其它都灭。
	(进入限流充)	(有充电电流时闪 2)								
	温度保护	灭						常亮	灭	电芯、MOS、环境。

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放电	正常	依据电量指示	灭	闪 3	
	告警		闪 2	闪 3	告警包含以下几类，压差大告警，容量低告警，单体电压高、低，总体电压高、低，所有的温度告警(电芯温度高、低，环境温度高、低 MOS 温度高;过流告警。
	单体/整体欠压保护		闪 2	灭	
	过流、短路保护	灭	常亮	灭	
	温度保护	灭	常亮	灭	电芯，MOS，环境
故障	NTC 故障、MOS 故障、反接、压差保护、超低压保护	灭	常亮	灭	

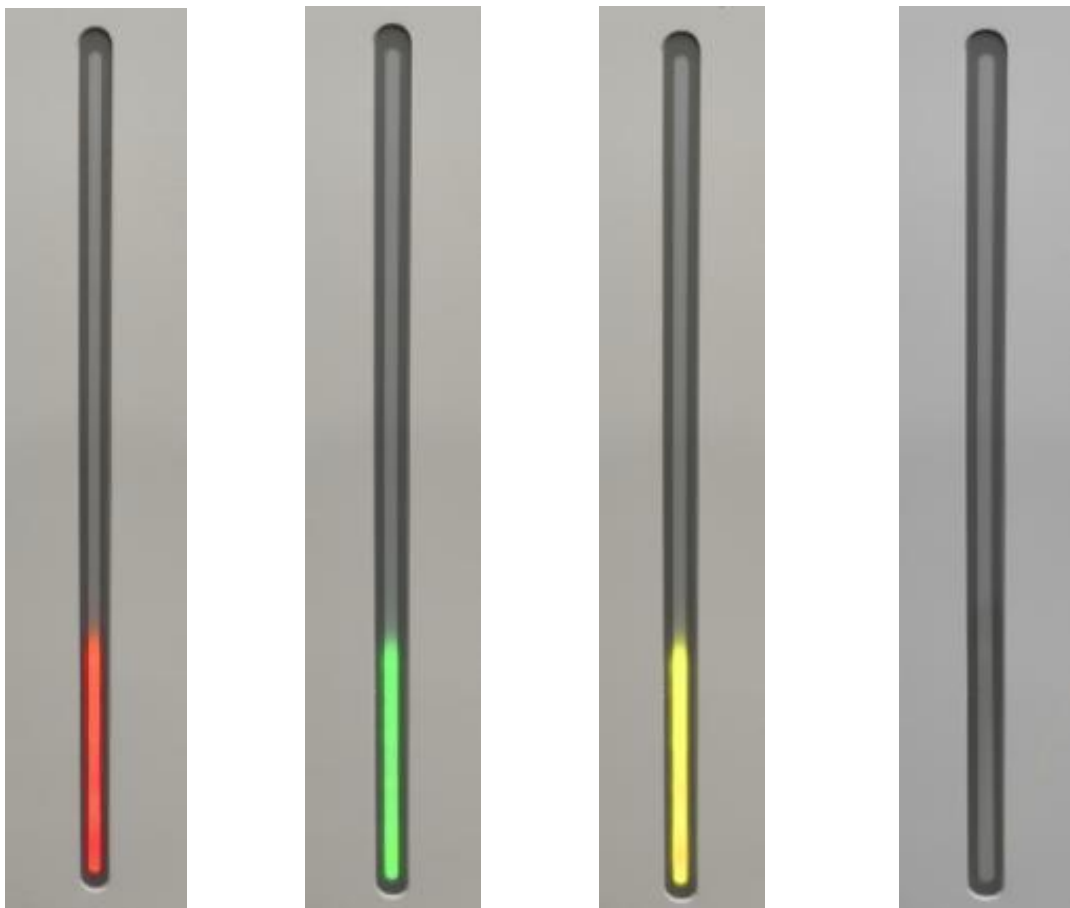
7.4 LED Strip Instructions

a. Power Indication: 0 - 100% SOC

b. Indicator Light Definitions:

(1): Battery Alarm - Flashing Red Light; (2): Battery Protection or Fault - Flashing Yellow and Red Lights;
(3): Power On or Working - Flashing Green Light;

(4): Charging - Flashing Green Light;(5)Light Board Communication Error - Flashing Yellow Light;
(6): Battery Low Voltage Protection -Light Off;



Red Light

Green Light

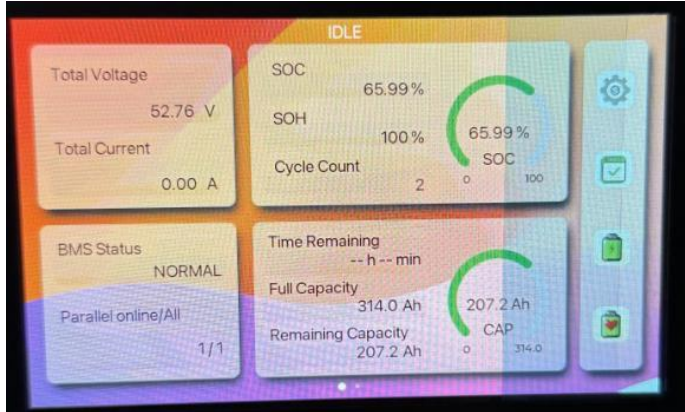
Yellow Light

Light Off

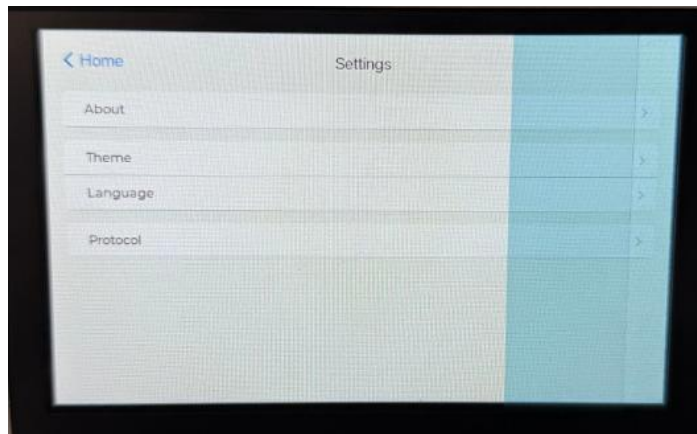
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8. Instruction Manual for Color Toch Screen

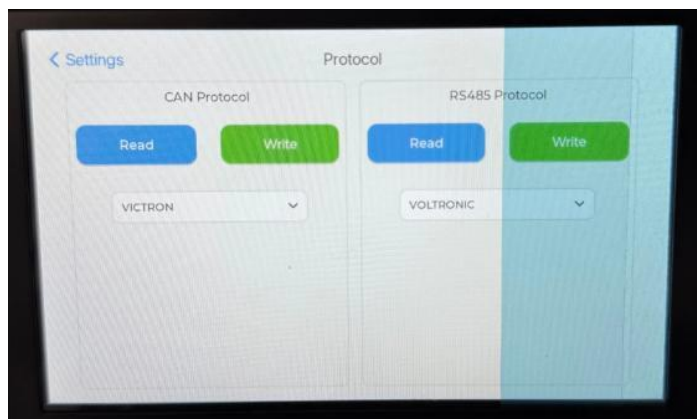
- Color display: touch screen, easy to operate.
- Multiple languages: Chinese, English, German, Spanish, Italian, French, Polish, Romanian, Danish, Dutch, Ukrainian, Bulgarian.
- Turn on the battery, and the screen will light up and display data.



- Click “⚙️”, enter the settings page and click on the protocol to switch the communication protocol.



- There are CAN/RS485 options. Click “Read” to view the current protocol (default communication protocol: Pylon).



9. Bluetooth Operation Instructions

The 48V battery is configured with Bluetooth function, which supports detecting the information in the battery through the mobile APP, such as the battery charging status, voltage, current, temperature and other operation information. These parameters can be modified via Bluetooth, etc.

9.1 Bluetooth Connection Instructions

1. First, turn on the Bluetooth function, then open the Bluetooth APP, search for Bluetooth devices, select the device to be connected for Bluetooth connection, as shown in the following figure.



Bluetooth Search and Connection Interface

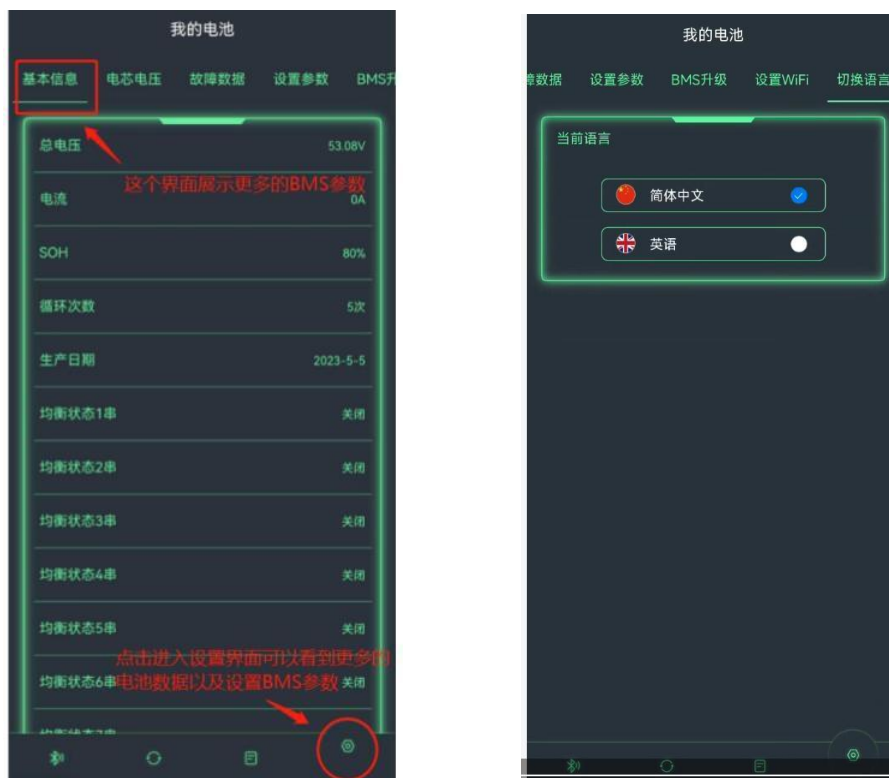
2. After the Bluetooth device is successfully connected, it will automatically jump to the home page, where you can see the home page data of the battery, as shown in the following figure.

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Battery homepage data interface

3. Enter the settings interface to view more BMS parameters, such as basic information, cell voltage, fault data, setting parameters, BMS upgrade, setting Wi-Fi, and switching languages, as shown in the following figure.



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10. Operation Instructions for the Host Computer

Open the host computer software. Connect one end of the host computer cable to the computer and the other end to the RS485 port of the battery. Select the correct baud rate of 9600 and the DIP switch address of 0. Then click "Open Serial Port" to communicate with the BMS normally and obtain basic parameters, as shown in the following figure.

串口

打开串口

开始监控

串口

COM3

波特率

9600

间隔时间

1s

地址

0

发送个数

256

解析成功

6

地址

0



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11. Storage

- a. The external terminals of the battery pack are in an insulated and protected state.
- b. If the battery pack is not used for a long time, it is recommended to store it with a charge of 30% - 60%. It is prohibited to store it completely without charge.
- c. Batteries that have been stored for more than 3 months should be recharged. Charge them at 0.2C - 0.3C for 2 - 3 hours.
- d. Batteries should be stored in a dry, clean, well - ventilated environment without corrosive gases. Keep them away from fire sources and avoid direct sunlight.
- e. Do not store or place the battery at a high temperature above 60 °C for a long time, otherwise it will cause functional decline and reduced lifespan.

12. Warnings and Precautions for Battery Use

To prevent the battery from possible leakage, overheating, and explosion, please pay attention to the following preventive measures. WARNING!

- ① It is strictly prohibited to immerse the battery in seawater or water. When not in use, store it in a cool and dry environment.
- ② It is strictly prohibited to use the battery with the positive and negative electrodes reversed.
- ③ It is prohibited to directly connect the positive and negative electrodes of the battery with metal to cause a short - circuit.
- ④ It is prohibited to transport or store the battery together with metals such as hairpins and necklaces.
- ⑤ It is prohibited to strike, throw, or step on the battery.
- ⑥ It is prohibited to directly weld the battery or pierce the battery with nails or other sharp objects. ATTENTION!
- ① It is prohibited to use or place the battery at high temperatures (in direct sunlight or in a very hot car). Otherwise, it may cause the battery to overheat, catch fire, malfunction, or have a reduced lifespan. The recommended optimal temperature for long - term battery storage is 10 - 45 °C.
- ② It is prohibited to throw the battery into fire or a heater to prevent fire, explosion, and environmental pollution. Scrapped batteries should be returned to the supplier or a battery recycling point for disposal.
- ③ It is prohibited to use the battery in places with strong static electricity and strong magnetic fields, otherwise it is easy to damage the battery's safety protection device and pose an unsafe hazard.
- ④ If the battery leaks and the electrolyte gets into your eyes, do not rub your eyes. Immediately rinse your eyes with clean water and go to the hospital for treatment, otherwise it will damage your eyes. If the battery emits an odor, overheats, changes color, deforms, or shows any abnormalities during use, storage, or charging, immediately remove the battery from the device or charger and stop using it.
- ⑤ It is prohibited to directly insert the positive and negative electrodes of the battery into a power socket. A special charger for lithium - ion batteries must be selected.
- ⑥ Before installation, check the battery voltage and connectors. Use the battery only after everything is normal.
- ⑦ Store the battery with a half - charge. If the battery has not been used for three months, recharge it once.
- ⑧ If the electrodes are dirty, wipe them clean with a dry cloth before use, otherwise it may cause poor contact and malfunction.

ChangSha Enook Technology Co., Ltd

The brands of BMS communicable inverters are shown in the following table.

逆变器品牌		协议名称	通信接口	真机调试	匹配型号	协议在逆变器代码
德业 Deye		低压储能CAN通信协议 Low-voltage hybrid inverter CAN communication protocol	CANBUS-500K	是	SUN-5K-SG03LP1-EU	1. Battery Setup Menu->Lithium 2. Advanced Function->BMS_Err_Stop
派能 PYLON		派能CAN总线协议V1.2 PYLON CANBUS Protocol V1.2	CANBUS-500K	否		
		派能低压RS485通信协议 PYLON low voltage RS485 Protocol				
古瑞瓦特 Growatt		古瑞瓦特低压CAN总线协议REV_05 Growatt BMS CAN-Bus-protocol -low-voltage_Rev_05	CANBUS-500K	是	SPF 3000TL HVM-48	1. 在05中设LI 2. 在36中设置为1，则为CAN通信
		储能机与电池PACK之间RS485通讯协议V2.01 Growatt xxSxxP ESS Protocol V2.01	RS485-9600	是	SPF 3000TL HVM-48	1. 在05中设LI 2. 在36中设置为51，则为RS485通信
维克多 Victron		维克多CAN总线协议201707 CAB-BUS_BMS_Protocol_201707	CANBUS-500K	是	Cerbo GX	
英威腾 Invent		英威腾户用储能逆变器低压版BMS通信协议(V1.02) INVT EMS CAN Bus protocol V1.02	CANBUS-500K	是	ED5KTL-RL1	
固德威 GoodWe		固德威低压CAN总线协议V1.7(ES/EM/S-BP/BP系列) GoodWe LV EMS Protocol (CAN) V1.7(For ES/EM/S-BP/BP Series)	CANBUS-500K	是	GW5000-ES-20	电池类型中选择GoodWe->SECU-A5.4L*1
SMA		SMA电池与逆变器通信协议 FSS-ConnectingBat-TI-en-10 Version 1.0	CANBUS-500K	否		
日月元 Voltronic		日月元逆变器与BMS RS485通信协议 Voltronic Power Inverter and EMS 485 communication protocol	RS485-9600	否		1. 长按SET键进入设置页面; 2. 将05项设置成LIB;
硕日 SRNE		硕日Modbus通信协议 PACE BMS Modbus Protocol for RS485	RS485-9600	是	HF2430S60-100	1. 将39设置成BMS 2. 将32设置成BMS 3. 将33设置成VQW
美世乐 MUST						
首航 SOFAR						



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