16kWh Battery Pack User Manual

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1. Safety Operation Instructions

Before performing any equipment operation, please carefully read this operation and maintenance manual. The safety precautions mentioned in the manual are supplementary to safety guidelines and do not represent all required safety measures. When installing, operating, or maintaining the equipment, you must comply with local safety regulations and standards. Only trained professionals are authorized to perform these tasks. Our company shall not be held liable for any losses resulting from violations of general safety operation requirements or breaches of equipment safety standards during design, production, or use. Installation and maintenance personnel must possess technical proficiency in handling high-voltage and AC power sources. During equipment operation, installation, or maintenance, avoid wearing conductive objects such as watches, bracelets, or rings, and prevent moisture from entering the equipment.

**High risk:**

High-voltage power supplies provide electricity for equipment operation. Direct contact with high-voltage power or indirect contact through wet objects can be fatal.

**Use dedicated tools:**

When working with high voltage and alternating current power sources, always use specialized tools instead of personal tools.

**electrostatic prevention：**

The static electricity generated by the human body can damage the electrostatic-sensitive components on the board. Before touching the plug, circuit board, or chip, ensure proper anti-static measures are in place.

**Unplug the power during operation:**

When operating the power supply, always disconnect it first. Do not work on it while powered on.

**DC short circuit hazard:**

The power system provides a DC regulated power supply, and the DC short circuit will damage the equipment and cause fatal danger.

2. Product Presentation

This product features a lithium iron phosphate battery with 16 cell strings, designed for home use. It offers customizable solutions to meet diverse application needs, providing stable power support for various devices. The battery boasts a long service life, high energy density, excellent temperature adaptability, modular design, and energy-saving advantages, while also requiring minimal installation space.

3. Product Features

A. The battery pack's BMS (Battery Management System) provides protection against overcharging, overdischarging, overcurrent, temperature, and short circuits.

B. There is voltage balancing function in the charging process.

C. It has high safety performance, long service life, stable and reliable.

D. It features an RS485 communication interface and supports parallel expansion of battery packs.

E. The discharge performance is good at high temperature.

F. Compact, lightweight, and customizable, it is easy to install and maintain.

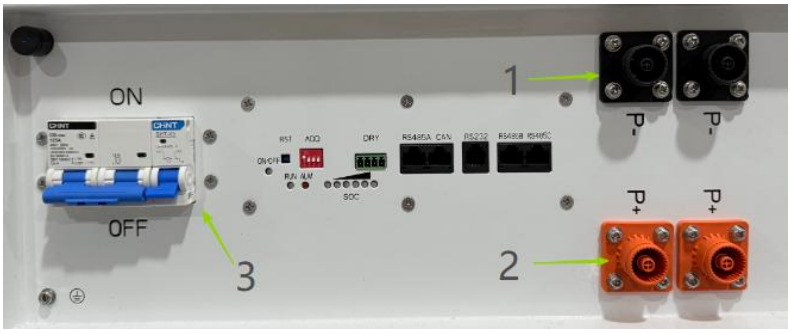
4. Product Technical Specifications

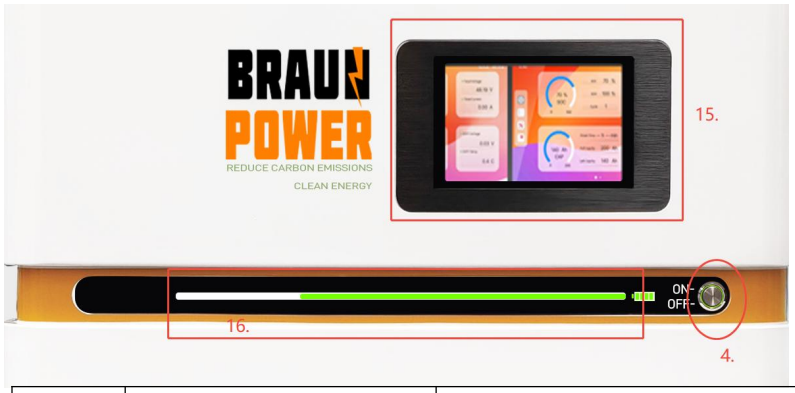
4.1 Essential Parameter

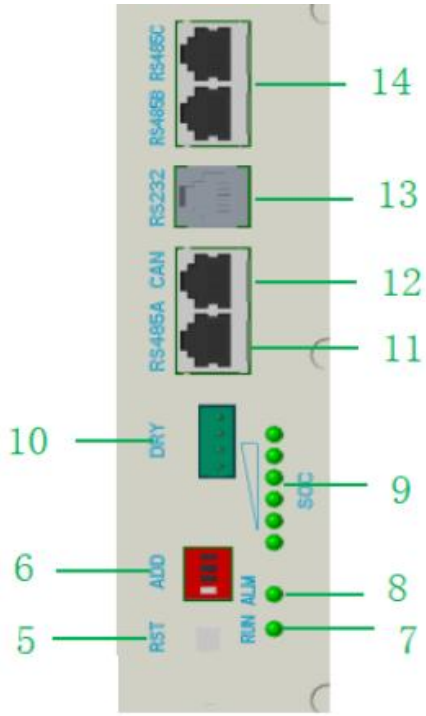
product model	51.2V314AH	51.2V314AH
rated voltage （V）	51.2	51.2
Operating voltage range (V)	43.2-57.6	43.2-57.6
rated capacity （Ah）	314AH	314AH
rated energy （WH）	16076	16076
compound mode	1P16S	1P16S
Charging cutoff voltage (V)	58.4V	58.4V
Discharge cutoff voltage (V)	43.2V	43.2V
Operating temperature range (°C)	-20 ~ 60℃	-20 ~ 60℃
Recommended charging current (A)	50	50
Maximum continuous charging current (A)	200	200
Maximum continuous discharge current (A)	200	200

4.2 Interface Definition









Item	Name	Definition
1	anode socket	The negative terminal of the battery's DC output can be connected to the inverter's negative terminal via a cable.
2	Positive socket	The positive terminal of the battery's DC output can be connected to the inverter's positive terminal via a cable.
3	circuit breaker	Protect the battery from overload or short circuit
4	button switch	Use to turn the battery pack switch on or off
5	reset key	Manual reset switch button
6	ADD dial-up	Set up battery parallel communication and inverter communication

7	running light	Indicates the normal operating status of the battery.
8	guard lamp	Indicates abnormal battery conditions, such as under-voltage or over-voltage, triggering an alarm sound.
9	SCO	6 battery indicator lights to show remaining battery level
10	dry contact	Users can connect external alarm devices
11	RS485A	Communication Interface Between Inverter and PC
12	CAN	Communication Interface Between Inverter and PC
13	RS232	Reserved interface
14	RS485 B/C	Battery pack and battery pack parallel communication interface
15	display screen	Display battery voltage, SOC, and temperature
16	tape lights	Indicates SOC status from 0% to 100%

4.3 Battery Management System (BMS)

4.3.1 Over voltage Crowbar

During battery charging, if a cell's voltage or total voltage exceeds the preset threshold for either individual or total voltage, and this condition persists beyond the overcharge protection delay period, the system activates overcharge protection. The charging MOS is then disabled, preventing further charging. Once the voltage drops below the recovery threshold, the protection is lifted, and the battery can be discharged.

4.3.2 Over Discharge Protection

During battery discharge, if a cell's voltage or total voltage drops below preset thresholds for either individual or collective parameters, and the duration exceeds the over-discharge protection delay, the system activates protection mode. The discharge MOS switches are then disabled, halting further discharge. The protection is lifted upon recharging the battery pack.

4.3.3 Over Current Protection

When the current exceeds the preset protection threshold during battery charging or discharging, and the duration reaches the overcurrent protection delay, the system activates overcurrent protection. The charging and discharging MOS devices are then disabled, preventing battery operation. Once the protection period ends, the system reverts to normal operation, allowing battery charging and discharging to resume.

4.3.4 High-temperature Protection During Charging and Discharging

When the battery is charging or discharging, if the NTC detects that the cell's surface temperature exceeds the preset high-temperature protection threshold, the battery system activates high-temperature protection mode. During this state, the charging and discharging MOS switches are disabled, preventing any battery operation.

4.3.5 Charge and Discharge Low Temperature Protection

When the battery is charging or discharging, if the NTC detects that the cell's surface temperature drops below the preset low-temperature protection threshold, the battery system activates low-temperature protection mode. During this mode, the charging and discharging MOS switches are disabled, preventing any battery operation.

5. Install and configure

5.1 Pre-installation Check

⑴ Upon receiving the battery, the user should inspect the packaging box to check for surface damage, cracks, or other defects. If any issues are found, do not install it. Instead, contact the supplier and await their response before proceeding.

⑵ Ensure the packaging contains the following accessories:



Battery pack



expansion screws *2PC



connected to the inverter power line



Inverter communication line



Parallel communication lines



upper computer line

5.2 Install the tool list configuration

Before installing the battery pack, users must prepare the following tool list, as shown in the table below.

Tools/Materials	name	act on
	levelling instrument	Ensure the horizontal installation position
	churn drill	Drill holes in the wall
	electric wrench	Locking expansion screw
	hammer	Hammer

	wire clamp	RJ45 terminal crimping
	connection cover cutting pliers	stripping action
	monkey wrench	The function of loosening and tightening screws

5.3 Installation Instructions

1. The wall for battery installation must be a solid brick or cement wall with a load-bearing capacity, and the wall thickness should be no less than 100mm.

2. If installed indoors, leave sufficient space during installation for easy operation, ensure proper ventilation, and avoid placing flammable materials around the battery.

If installed outdoors, the battery should be protected and kept dry.

5.4 Installation Steps

1. Mark the position of the support for drilling.
2. The borehole is drilled with an impact drill, with a diameter of about 12mm and a depth of about 60mm.
3. Secure the bracket firmly against the wall, align it with the hole, and fasten it with M8 expansion screws.

Use an electric wrench to tighten the M8 expansion screw with a tightening force of 20N.m.



6. Steps for connecting the battery to the inverter

6.1 Precautions for connecting batteries to inverters

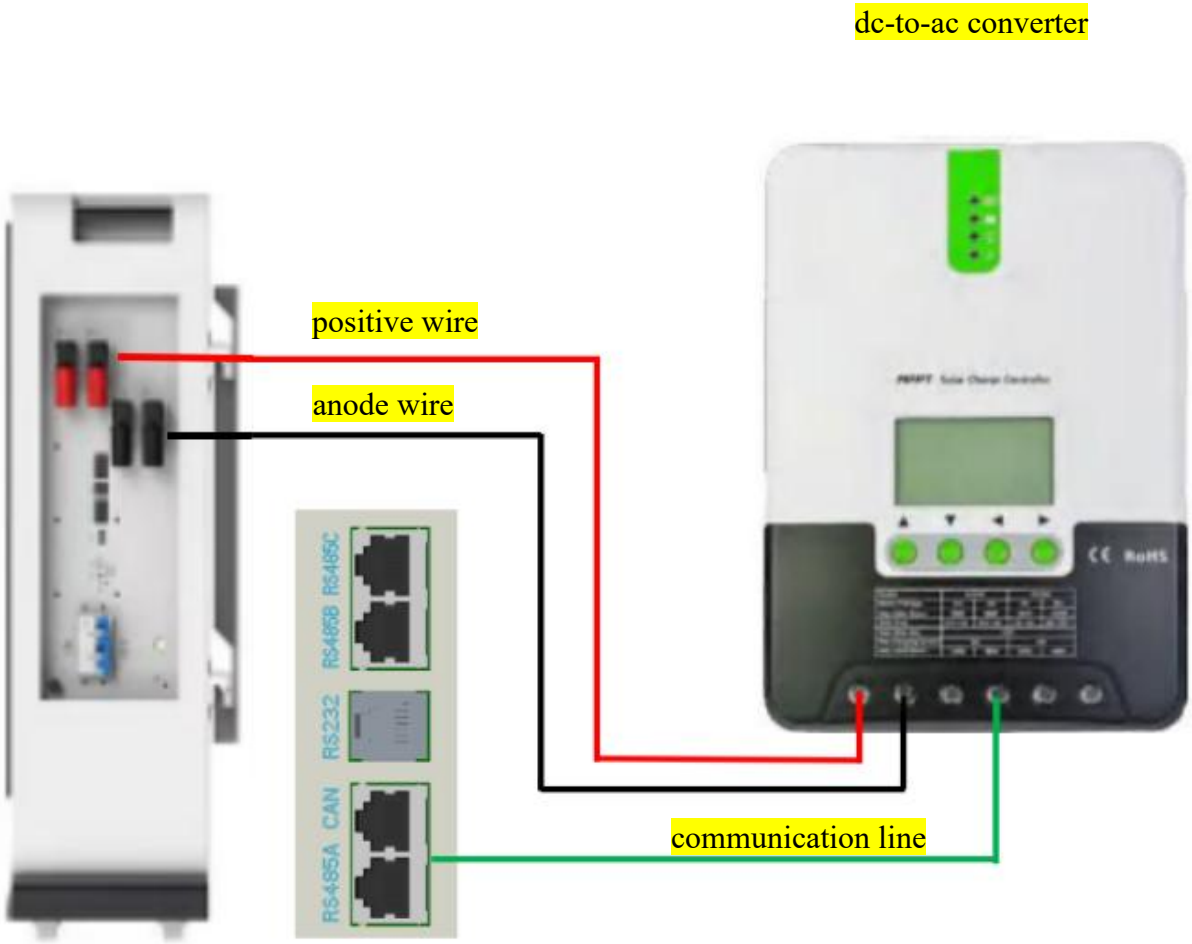
a. Use a multimeter to test the cable's positive and negative terminals for continuity, and check for any loose connections at the terminals.

b. Before wiring, the battery must be powered off to ensure no DC output.

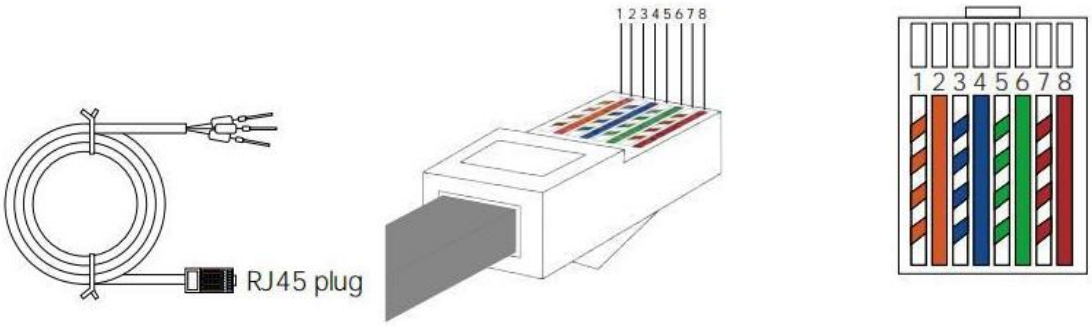
c. Secure the battery's positive and negative terminals first, then connect them to the inverter's terminals.

d. The communication cable connects to the battery's RS485/CAN port, then to the inverter's BMS (RS485/CAN)

port. Note that BMS port specifications vary by inverter brand; refer to the inverter manual for details.

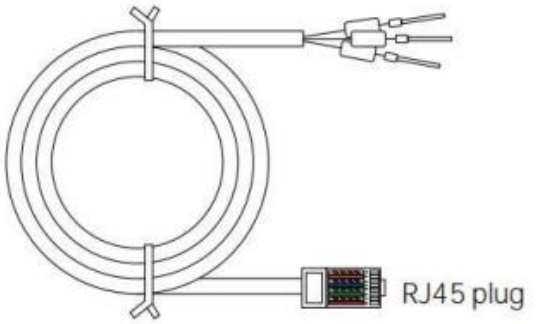


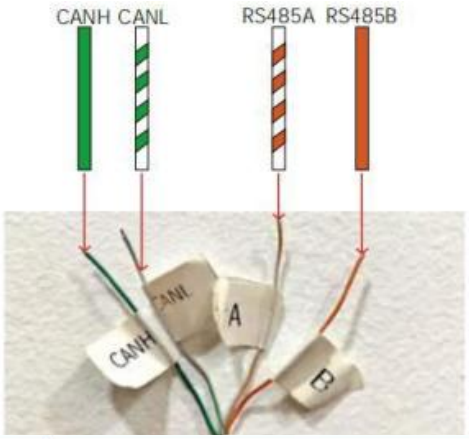
The order of pins for the communication line is as follows.



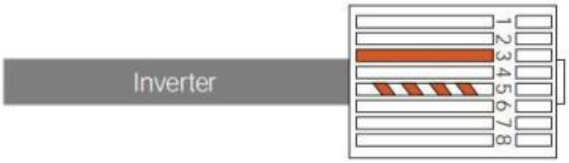
RS485A interface	stitch	1	2	3	4	5	6	7	8
	definition	RS485-B	RS485-A	GND	NC	NC	GND	RS485-A	RS485-B
CAN joggle	stitch	1	2	3	4	5	6	7	8
	definition	NC	NC	NC	CAN-H	CAN-L	NC	GND	NC

Diagram of RJ45 port configuration for inverter:





6.2

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	

Precautions for connecting parallel batteries to the inverter

a. Use a multimeter to test the cable's positive and negative terminals for continuity, and check for any loose connections at the terminals.

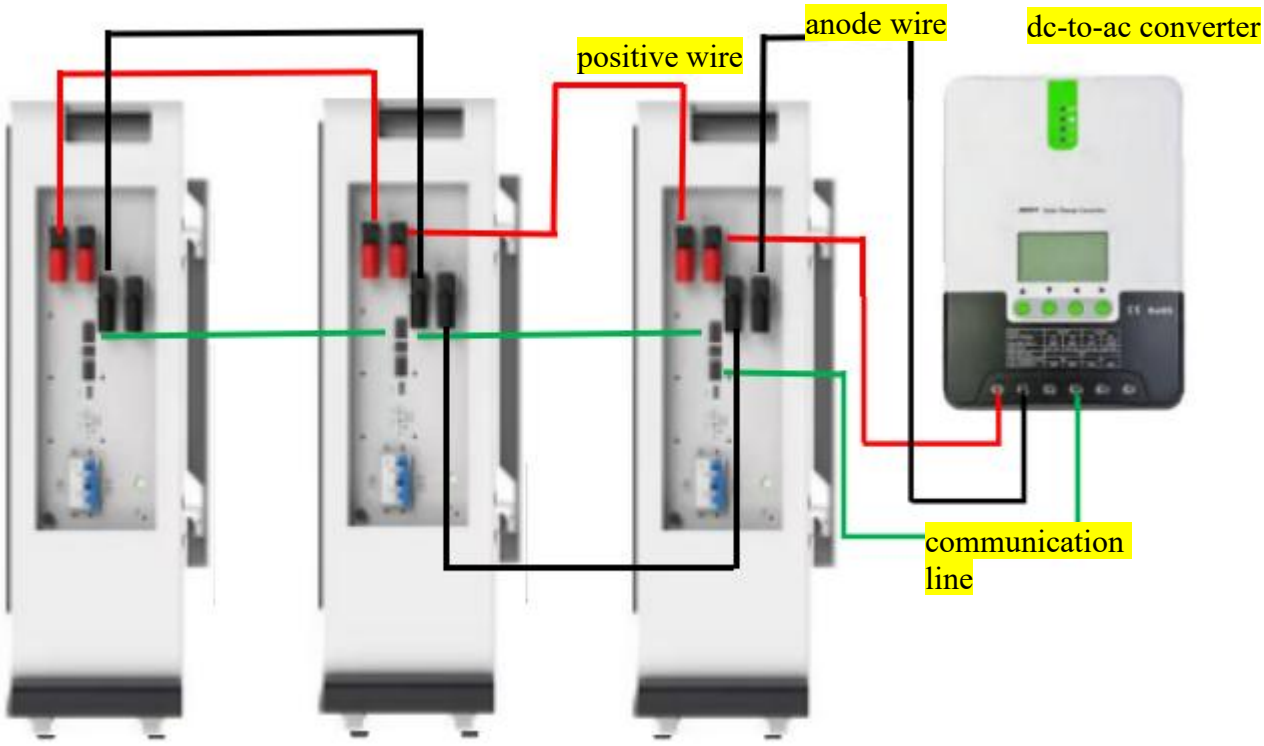
b. Before wiring, the battery must be powered off to ensure no DC output.

c. Secure the parallel cable first to the battery's positive terminal, then to the negative terminal.

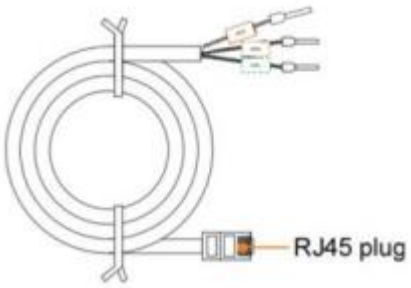
d. The parallel communication line connects to the battery's RS485 port.

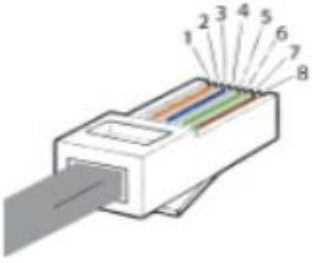
e. First, connect the cables to the battery terminals, then connect them to the inverter's positive and negative terminals.

f. The communication cable connects to the battery's RS485/CAN port, then to the inverter's BMS (RS485/CAN) port. Note that BMS port specifications vary by inverter brand; refer to the inverter manual for details.



The order of pins for the communication line is as follows.



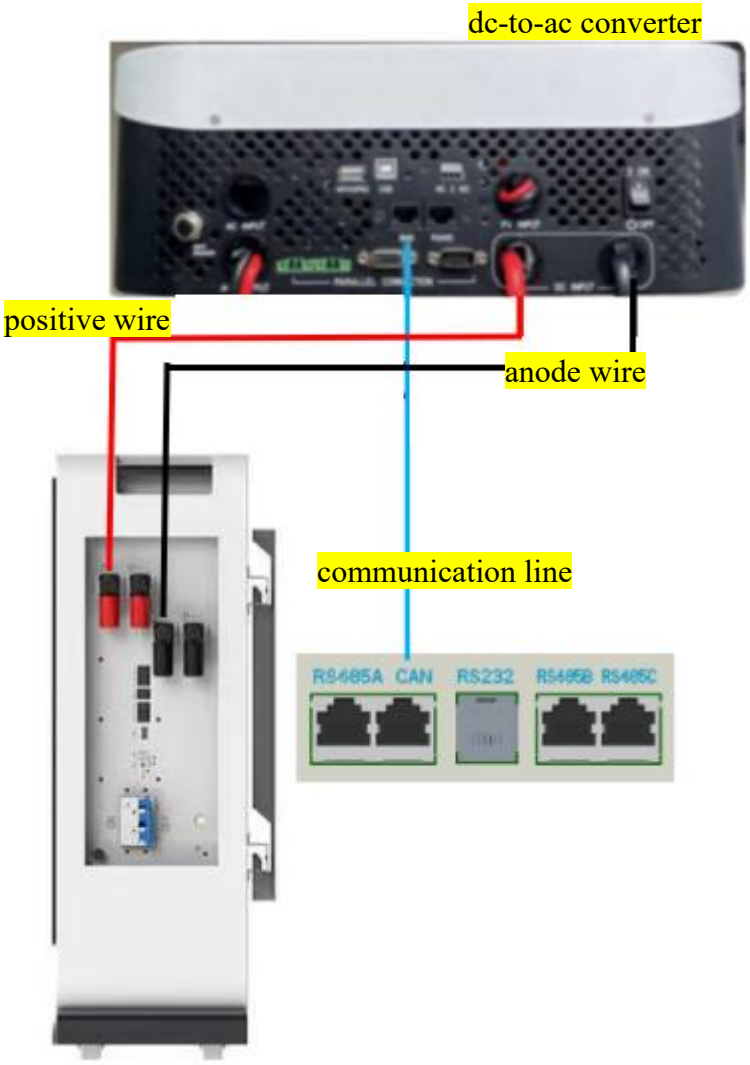




Definition of RS485 Parallel Communication Interface	stitch	1	2	3	4	5	6	7	8
	definition	RS485-B	RS485-A	GND	NC	NC	GND	RS485-A	RS485-B

6.3 Schematic diagram of battery and inverter connection

Connect the battery's positive and negative terminals to the inverter's DC input terminals. Insert the RJ45 connector of the inverter's communication cable into the battery's RS485 port. The other end should be connected to the inverter's BMS terminal using the preconfigured RJ45 connector. This completes the battery-inverter connection.



6.4 Definition and Settings of Code Switch

For multi-unit communication in parallel battery packs, a DIP switch is used to distinguish different Pack addresses, which can be configured via the board's DIP switch. The ADD switch is a 4-bit DIP switch. When multiple battery packs are connected in parallel, refer to the diagram below for the ADD switch settings.

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. Run

7.1 Pre-start-up Checks

a. Check all positive and negative cables, as well as communication lines, to ensure proper wiring and safety.

b. Check if the battery is securely installed for easy operation and maintenance, and verify proper ventilation.

c. Are the unused ports properly insulated?

7.2 Power On

a. Turn on the button switch on the battery.

b. Check whether the LED indicator is functioning properly.

c. If the electrical connection is correct but the battery system still won't start, please contact our after-sales service within 48 hours.

LED Power Indicator

状态(status)		充电(charging)					放电(discharge)				
容量指示灯(capacity indicator light)		L5	L4	L3	L2	L1	L5	L4	L3	L2	L1
电量(Electric quantity)%	0~20%	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON
	20~40%	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	ON
	40~60%	OFF	OFF	ON	ON	ON	OFF	OFF	ON	ON	ON
	60~80%	OFF	ON	ON	ON	ON	OFF	ON	ON	ON	ON
	80~100%	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
备注：ON代表LED状态为亮，OFF代表LED状态为熄灭 Note: ON indicates that the LED is on, OFF indicates that the LED is off											

LED Description

状态（status）	正常/告警/保护(Normal, alarm, or Protection)	ON/OFF指示	RUN	ALM	L1	L2	L3	L4	L5	L6	说明(Instructions)
关机(Power Off)	正常(normal)	OFF									
Balance	正常(normal)	ON	闪烁(flicker)	OFF	依据电量显示(Battery based display)					OFF	
充电(charging)	正常(normal)	ON	闪烁(flicker)	OFF	依据电量显示(Battery based display)					OFF	
	过流\过温\过压\充电失败(Over current, over temperature, over voltage, charging failure)	ON	闪烁(flicker)	闪烁(flicker)	依据电量显示(Battery based display)					OFF	

放电 (discharge)	正常(normal)	ON	闪烁 (flicker)	OFF	依据电量显示(Battery based display)	OFF	
	过流\过温\欠压\放电失败(Over current, over temperature, under voltage, discharge failure)	ON	闪烁 (flicker)	闪烁 (flicker)	依据电量显示(Battery based display)	OFF	
其他告警 (Other alarm)	密码未修改\短路\温度异常 (Password not changed \ short circuit \ temperature	ON	闪烁 (flicker)	闪烁 (flicker)	依据电量显示(Battery based display)	OFF	

备注：当设备地址设置为0时做主机，最后一颗LED灯 L6闪烁。当设为其他值时做从机熄灭，从机和主机通信成功后闪烁 Note: When the device address is set to 0, the last LED indicator L6 blinks. If the value is set to other values, the slave is off and blinks after the communication between the slave and the host is successful.
备注：ON代表LED状态为亮，OFF代表LED状态为熄灭。 Note: ON indicates that the LED is on,OFF indicates that the LED is off.

8. Bluetooth Operation Instructions

The 48V battery features Bluetooth and WiFi connectivity, allowing users to monitor battery data via a mobile app—including charging status, voltage, current, temperature, and other operational metrics. These parameters can be adjusted after establishing a lithium battery WiFi connection.

8.1 Instructions for Bluetooth Connection/WiFi Settings

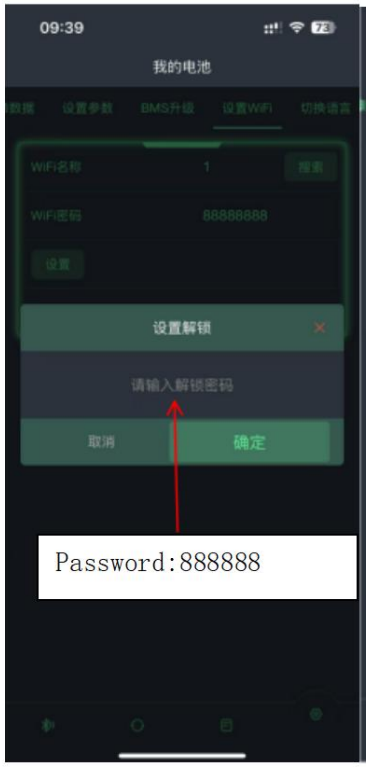
First, open the Lithium Battery WiFi app. Tap the Bluetooth icon in the top-right corner to enable Bluetooth, then select 'Search' and locate the target device (e.g., 'BL-25F-170-104') under 'Available Devices'. Tap the '+' icon next to the device to connect. Expand the settings menu at the bottom-right, swipe right to access WiFi settings, and set a password (e.g., 888888). Enter the customer's WiFi name in the' WiFi Name 'field, search for it, enter the password, and click' Settings '. The system will display' WiFi setup completed' upon successful configuration, as shown in the image below.



app linkage



Enter the interface and expand the options



WiFi settings

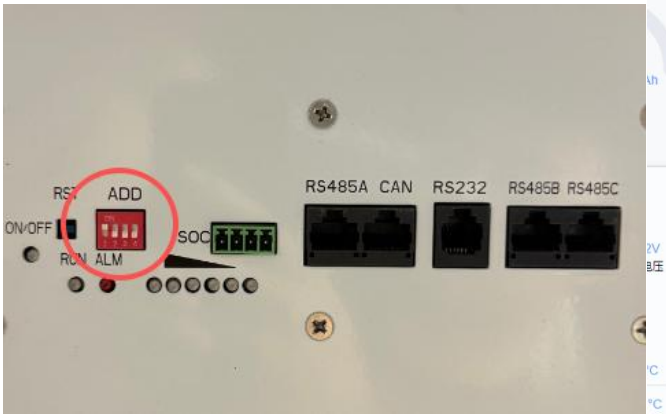


WiFi settings

9. Instructions for operating the upper computer

Open the host computer software. Connect one end of the host computer cable to the computer and the other end to the battery's RS485 port. Set the device address to 1 (and the dial switch to 1) and the corresponding serial port number. Click' Connect' to establish the connection and access the real-time status interface, as shown in the figure below.









a. Real-time status page displaying battery voltage, charging current, abnormal alarms, battery status, and protection status.

b. On the parameter settings page, no parameters can be modified by default. To make changes, navigate to 'Basic Parameters 1' under 'Parameters'. The default password for the protection board is '666666'.



10. BMS

The brands of communicable inverters are shown in the following table

Inverter Communication Protocol Matching 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	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	PYLONTECH	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	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	victron energy	维克多CAN总线协议201707 CAB-BUS_BMS_Protocol_201707	CANBUS-500K	是	Cerbo GX	
英威腾 Invent	invt 英威腾	英威腾户用储能逆变器低压版BMS通信协议(V1.02) INVT BMS CAN Bus protocol V1.02	CANBUS-500K	是	BD5KTL-RL1	
固德威 GoodWe	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 BMS 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	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	Voltronic Power	日月元逆变器与BMS RS485通信协议 Voltronic Power Inverter and BMS 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	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WOW
美世乐 MUST	MUST美世乐					
首航	SOFAR 首航新能源					

10.1 Inverter settings

a. Deye inverter parameter setting

Inverter setup steps:

1. Go to the setup page, as shown below.



2. Click Battery Setting and select Lithium as shown in the image below.



3. In the Advanced Function section, configure BMS Err.Stop as shown in the figure below.



b. Growatt parameter settings

1. Press and hold the Enter key to enter the settings mode

2. Set item 05 to LI as shown in the figure below;



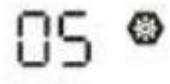
3. After successful setup, you will be redirected to 36 items.

4. For RS485 communication, set item 36 to L01 (see Figure 2); for CAN communication, set item 36 to L51 (see Figure 2).



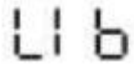


c. Voltronic parameter settings



1. Long press the SET key to open the

2. Set 05 to LIB as shown in the figure on



d. SRNE parameter settings

1. Long press the SET key to open the settings page;

2. Configure 32 items as BMS, as shown in the figure below.



3. Set 33 items to WOW as shown in the figure below.



4. Configure 39 items as BMS, as shown in Figure 3 below.



11.Storing

a. The external terminals of the battery pack are in an insulated and protected state.

b. For long-term storage, the battery pack should be kept at 30%-60% charge; storing it completely uncharged is strictly prohibited.

c. Batteries stored for more than 3 months should be recharged for 2-3 hours with 0.2C~0.3C.

d. The battery should be stored in a dry, clean, and well-ventilated area free from corrosive gases, away from fire sources, and protected from direct sunlight.

e. Do not store or keep for long periods at temperatures above 60 degrees Celsius, as this may cause functional decline

and reduced lifespan.

12. Battery Usage Warnings and Precautions

To prevent battery leakage, overheating, or explosion, follow these precautions

warn！

① Do not immerse batteries in seawater or water. When not in use, store them in a cool, dry place.

② It is strictly prohibited to reverse the polarity of batteries;

③ It is forbidden to use metal to directly connect the positive and negative terminals of the battery to short circuit;

④ Do not transport or store batteries with metal objects such as hair clips or necklaces.

⑤ It is forbidden to strike, throw, or step on the battery;

⑥ Direct welding of batteries and piercing them with nails or other sharp objects are prohibited.

Pay attention to！

① Avoid using or storing batteries in high temperatures (e.g. under direct sunlight or in a hot car), as this may cause overheating, fire, or reduced lifespan. For long-term storage, the recommended temperature range is 10-45°C.

② Do not throw batteries into fire or heater to prevent fire, explosion and pollution of environment.

③ It is forbidden to use in the place of strong static electricity and strong magnetic field, otherwise it is easy to damage the battery safety protection device and bring hidden danger.

④ If the battery leaks and the electrolyte enters your eyes, do not rub it. Immediately rinse the eyes with clean water and seek medical attention to prevent eye damage. If the battery emits an unusual odor, overheats, changes color, deforms, or shows any abnormalities during use, storage, or charging, remove it from the device or charger and stop using it immediately.

⑤ Direct insertion of battery terminals into power sockets is prohibited; a lithium-ion battery-specific charger must be used.

⑥ Before installation, check the battery voltage and connectors. Only use after confirming all components are functioning properly.

⑦ Battery half-charge storage: If the battery has not been used for three months, it should be recharged once.

⑧ If the electrode is dirty, wipe it with a dry cloth before use, otherwise it may cause poor contact and failure of function.