RACK MOUNTED BATTERY ENERGY STORAGE

TB8000X&TB8500X

User Manual

Contents

1. Introduction

1.1. Introduction

The TB8000X and TB8500X lithium iron phosphate battery systems are standard battery system units. The two products have the same external dimensions, and the box body hanging ears are designed to be detachable, meeting the application requirements of different scenarios. Users can select a certain number of batteries as needed and connect them in parallel to form a battery pack with a larger capacity to meet their long-term power supply demands. This product is particularly suitable for applications with high working temperatures, limited installation space, and a long service life.
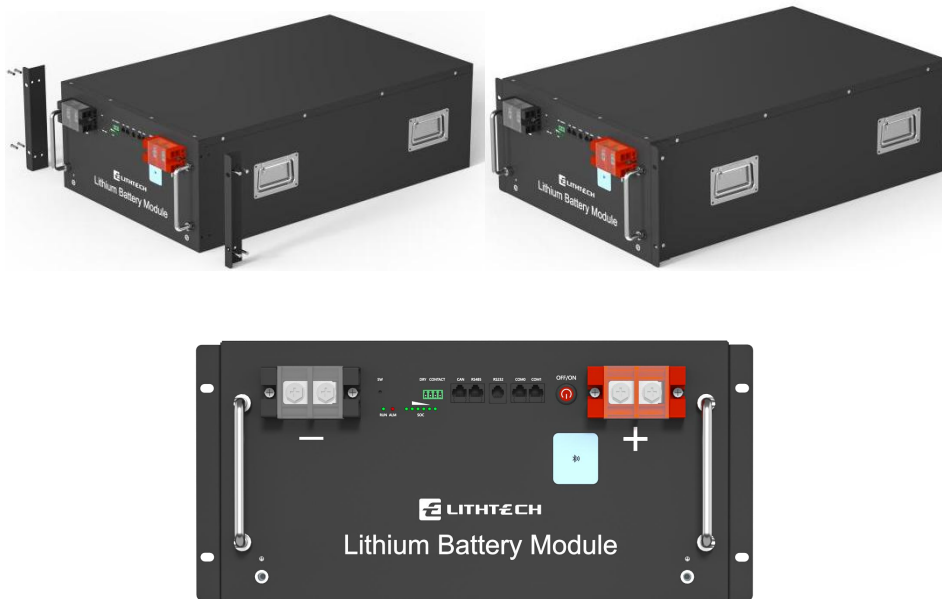
Note:
1. The battery is relatively heavy and there is no support at the bottom of the box. It is strictly prohibited to install the battery vertically.

1.2. Product Features

TB8000X&TB8500X Battery system uses lithium iron phosphate as the battery anode material and is equipped with a high-performance BMS to effectively manage the battery cells. The system has the following characteristics:
- Meet European RoHS regulations, pass SGS certification, use the best non-toxic and pollution-free battery;
- The battery anode is made of lithium iron phosphate (LiFePO4) material, which has good safety performance and long cycle life;
- Adopt high-performance BMS battery management mode, with over-discharge, over-charge over-current,temperature and other protection functions;
- With charge and discharge automatic management and single cell balance

function;

- Fully intelligent design, equipped with a centralized monitoring module, with three remote(telemetry, remote signaling and remote control) functions;
- Flexible configuration, multiple system units connected in parallel can extend the power supply time of the system;
- Self-cooling method, the whole system has extremely low noise
- The battery has less self-discharge, and it can be recharged for up to 10 months during storage;no memory effect, shallow charging and discharging;
- Wide temperature working range，-20 C ~+ 60 C, good cycle life and discharge performance at normal temperature;
- Small battery size and light weight.

1.3. Product Identification Definition

⚡	Voltage of battery is higher than safety voltage, it's dangerous to touch.	📖	Read manual before operation.	♻	Please recycle the battery after serving.
⚠	Operate carefully.	🗑	Default battery can't be thrown to trash can.	CE	CE standards are met.

2. Specifications

2.1. Model number

Items	TB8000X	TB8500X
Rated Voltage (V)	51.2	51.2
Nominal capacity (Ah)	280	314
Energy (kWh)	14.336	16.076
Weight（Kg）	118±1	121±1
Size（mm） W*H*T	442*710*223mm（±2.5mm）	442*710*223mm（±2.5mm）

2.2. Performance parameter

Performance parameter table

NO.	Items	Sub-Items	TB8000X	TB8500X	Remark
1	Charging	Single cell charging over-voltage protection	3.65V		Release below 3.34V
		Battery pack of charging over-voltage protection	58.4V		

2	Voltage	Single cell discharge low voltage protection	2.75V		Release above 3.0V
3	Discharging	Battery pack of discharge low voltage protection	44.8		
`4		Alarm value	205A	157A	
5	Charging	Over-current Protection	205A	162A	Delay 1s protection
6		Over-current Protection 1	210A	167A	1s delay
7		Over-current Protection 2	250A	/	160ms delay
8		Short circuit protection	Yes		350ms delay
9	Current	Charge and discharge temperature range	Discharge temperature range:-20~60°C		
11	Ambient	Charging temperature range	Charging temperature range: 0~55°C		
12	PCB	Operating temperature range	Below 85°C		

2.3. Interface Definition

Introduction to the Panel Interface Configuration and Functions of TB8000X&TB8500X.
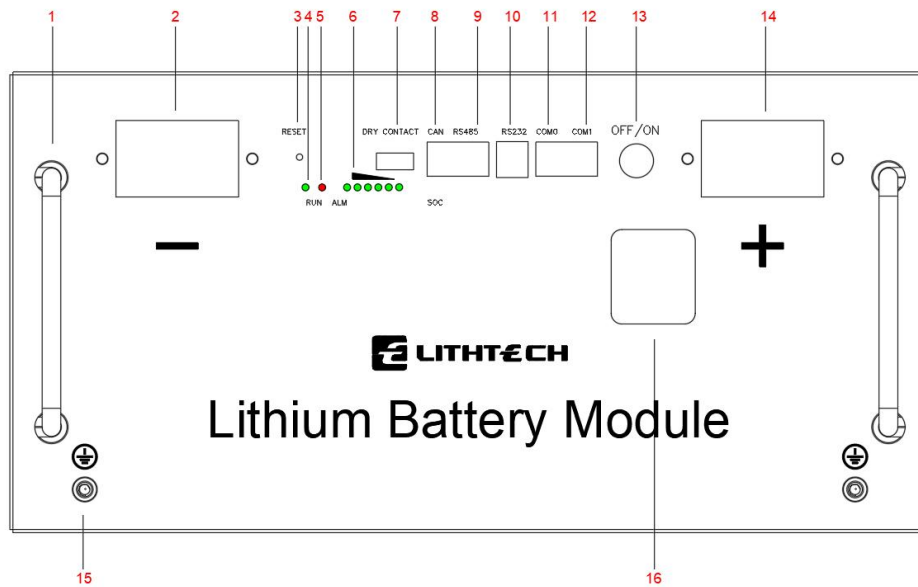
Schematic diagram of control panel (reference figure)

Definition comparison table

No.	Name	Definition
1	Handle	Install the battery pack
2	Negative terminal	Battery output negative or parallel negative cable
3	RESET（Wake on battery Sleep switch）	When the "OFF / ON" key is ON, press and hold this key for 3 seconds.Put the battery into the power-on or hibernation state./当
4	RUN Indicator	Green light, flashing during standby, flashing during charging, and always on when discharging
5	ALM Indicator	Red light, flashing when alarm. Protection is always on. Conditions that trigger protection Normally recover automatically after lifting
6	SOC Indicator	The number of green lights shows the remaining battery power, as shown in 2.3.2.
7	Dry contact	Dry contact
8	CAN	Host external communication port, support CAN communication
9	RS485	Host external communication port, support 485 communication
10	RS232 COM	Debug
11	COM0	Slave internal parallel communication port, support RS485 communication_input
12	COM1	Slave internal parallel communication port, support RS485 communication_output
13	ON/OFF Switch	OFF/ON，Must be "ON" when used
14	Positive terminal	Battery output positive or parallel positive cable
15	grounding	⏚
16	WiFi/Bluetooth	WiFi/Bluetooth

2.3.1. Easy &Fast Guideline for Installation Steps

Schematic diagram of battery and inverter connection:
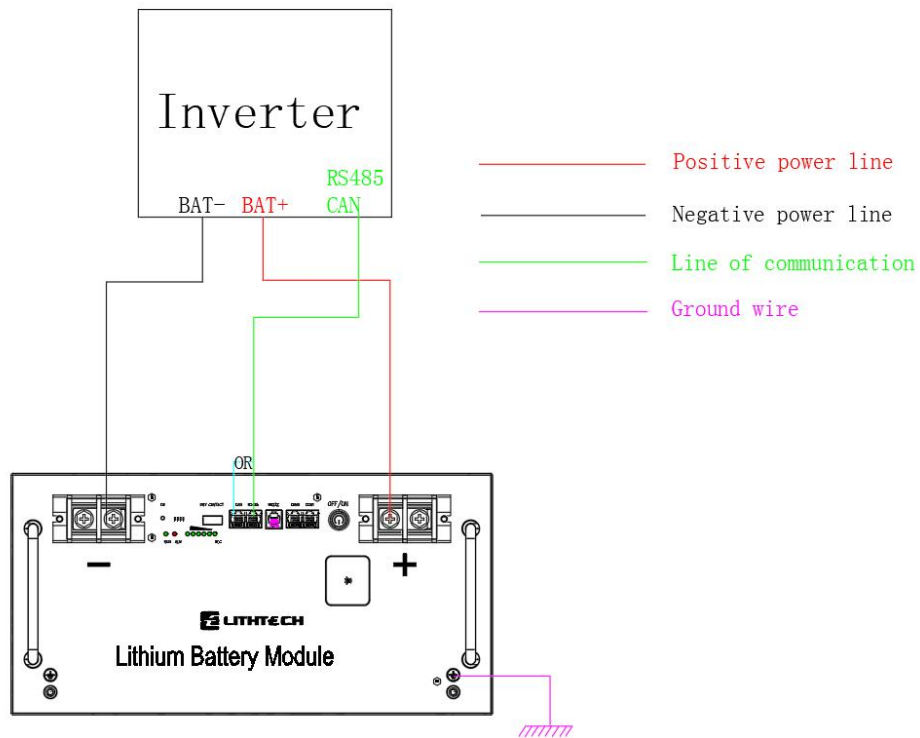
Single group connection diagram
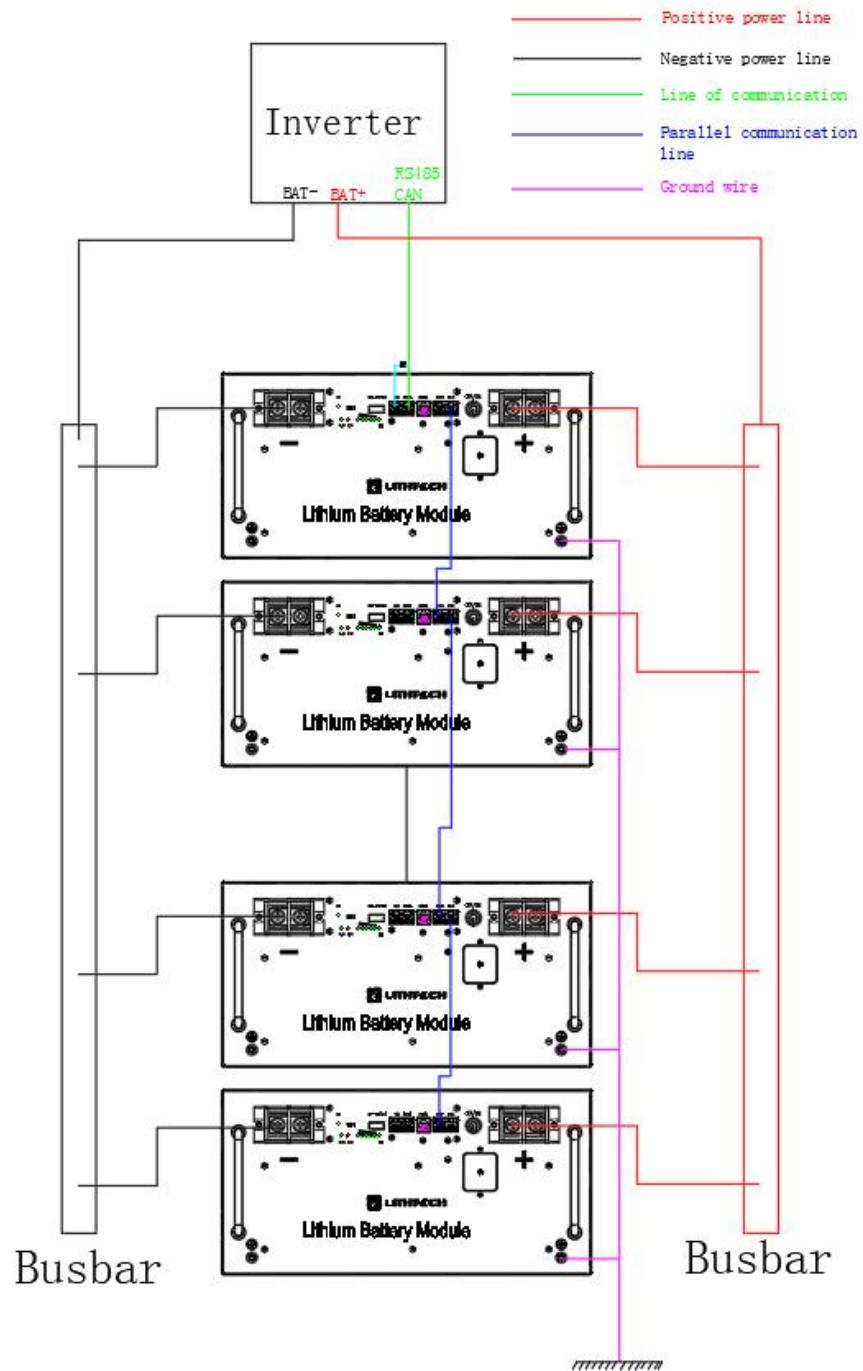
Wiring diagrams for multiple groups (more than 2 groups)
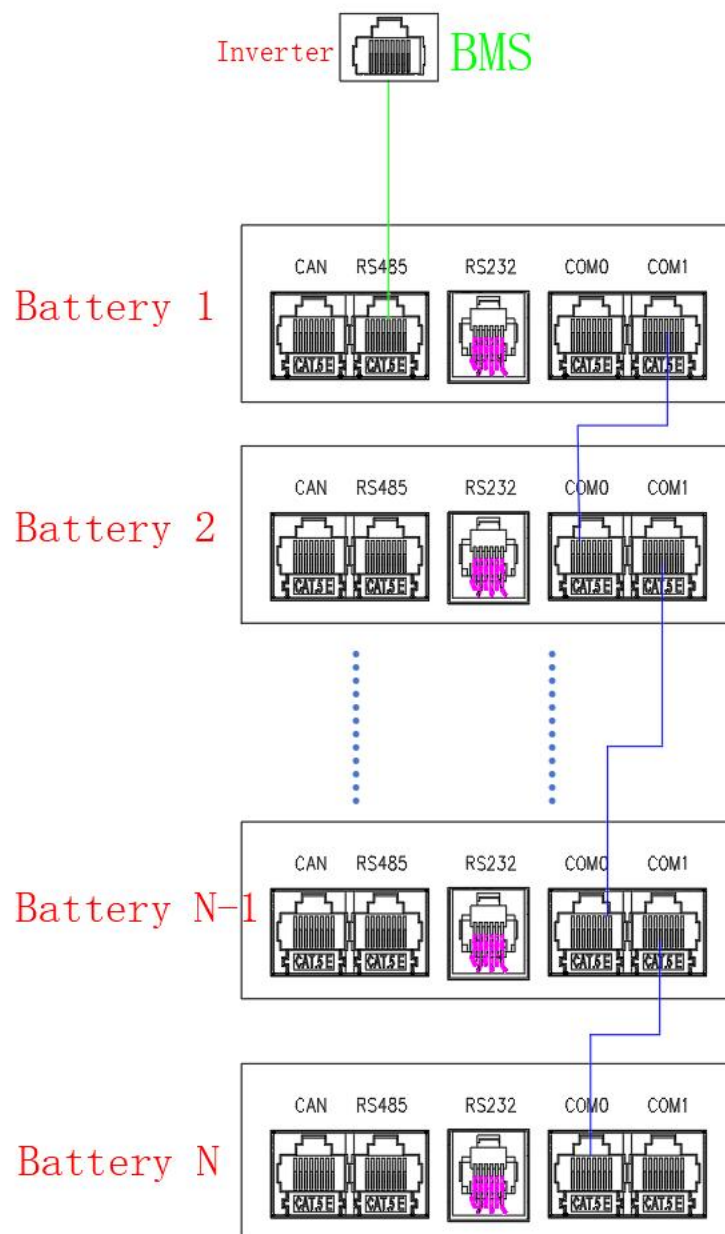
Schematic diagram of multiple parallel communication lines

Note1:

1. Battery box parallel communication line connection mode；

2. If the power of the inverter is greater than 10kW, please select parallel busbars and parallel batteries, and the lengths of the power lines from the positive and negative terminals of the batteries to the parallel busbars must be consistent.

Note2:

● Communication interfaces must be one-to-one. For the definition of battery 485 and CAN communication interfaces, see 2.3.7.

● For details about the inverter 485 and CAN communication ports, see the inverter operation

manual. If the communication interfaces are inconsistent, the communication fails.

- Photovoltaic and AC input, load output wiring should comply with local safety regulations;
- BMS batteries support multiple mainstream inverter protocols, and BMS supports automatic inverter recognition. If the inverter communication protocol cannot be automatically recognized, it can be set through the Bluetooth connection of the APP. Set the password Aa123456.

2.3.2. Indicator definition and description

LED working status indication

status	Normal alarm/protection	RUN	ALM	power indicator light						explain
				L6	L5	L4	L3	L2	L1	
		*	*	•	•	•	•	•	•	
power off		off	off	off	off	off	off	off	off	All off
charging	0%-15%	*							*	
	16%-31%	*						*	•	
	32%-47%	*					*	•	•	
	48%-63%	*				*	•	•	•	
	64%-79%	*			*	•	•	•	•	
	80%-100%	*		*	•	•	•	•	•	
	100%	*		•	•	•	•	•	•	
Discharge	80%-100%	*		•	•	•	•	•	•	Alarm-* Low Battery The default value is 10%
	64%-79%	*			•	•	•	•	•	
	48%-63%	*				•	•	•	•	
	32%-47%	*					•	•	•	
	16%-31%	*						•	•	
	1%-15%	*							•	
	0%	*	*						*	
Parallel standby state	80%-100%	*		•	•	•	•	•	•	
	64%-79%	*			•	•	•	•	•	
	48%-63%	*				•	•	•	•	
	32%-47%	*					•	•	•	
	16%-31%	*						•	•	
	1%-15%	*							•	
	Low battery alarm	*	*	/	/	/	/	/	/	
	Under voltage alarm	*		/	/	/	/	/	/	
	Over voltage alarm	*	*	/	/	/	/	/	/	
	Charging over current alarm	*	*	/	/	/	/	/	/	

alarm	Discharge over current alarm	*	*	/	/	/	/	/	/
	Charge low temperature alarm	*	*	/	/	/	/	/	/
	Charging high temperature alarm	*	*	/	/	/	/	/	/
	Discharge low temperature alarm	*	*	/	/	/	/	/	/
	Discharge high temperature alarm	*	*	/	/	/	/	/	/
	MOS tube high temperature alarm	*	*	/	/	/	/	/	/
	Fan fault alarm	*	*	/	/	/	/	/	/
	Voltage dif is too large	*	*	/	/	/	/	/	/
Protection	Under voltage protection	*	●				●	/	/
	Over voltage protection	*		/	/	/	/	/	/
	Charge over current protection	*	*			●		/	/
	Discharge over current protection	*	*		●			/	/
	Charge low temperature protection	*	*			●	●	/	/
	Charge high temperature protection	*	*		●		●	/	/
	Discharge low temperature protection	*	*	●			●	/	/
	Discharge high temperature protection	*	*		●	●		/	/
	MOS tube high temperature protection	*	*	●		●		/	/
	Discharge short circuit protection	*	*	●		●	●	/	/
Fault alarm	充电 MOS 管失效故障 Charge MOS failed		*					/	/
	放电 MOS 管失效故障 Discharge MOS failed		*			●		/	/
	Voltage front sampling failure		*		●			/	/
	voltage front end is disconnected		*	●				/	/

	temperature front-end sampling is faulty	✳			●	●	/	/	
	temperature front end is disconnected	✳		●		●	/	/	
	The current front-end sampling is faulty	✳	●			●	/	/	
	The voltage difference is too large	✳		●	●		/	/	
	Parameter configuration is incorrect. Procedure	✳	●		●		/	/	
	Parallel battery fault	✳	●	●			/	/	
	Pre-charge fault	✳		●	●	●	/	/	
	Communication failure	✳	●		●	●	/	/	
	Charger failure	✳	●	●		●	/	/	
	Fault superposition	✳	●	●	●	●	/	/	Two or more faults occur at the same time

Remark：

● Standing light   ✳ flashing

2.3.3. Buzzer action description

When a fault occurs, the sound is sounded every 1 second. When protecting, sound every 2S. When the alarm, every 3S once ringing 0; The buzzer function can be turned on or off by the host computer, and is off by factory default.

2.3.4. RESET Button description

When the BMS is in hibernation state, press the RESET button (3-6s) and release it to activate the protection board, and the LED indicator will turn on for 0.5 seconds from "RUN". When the BMS is active, press the RESET button (3-6s) and release it, and the protection board will turn on for 0.5 seconds from the lowest battery. When the BMS is activated, press the button (6-10s) and release, the protection board is reset, and the LED light is on for 1.5 seconds at the same time.

After the BMS is reset, the parameters and functions set by the host computer are still retained. If the original parameters need to be restored, they can be implemented by the"Restore default values" of the host computer, but the related operation records and stored data remain unchanged (such as power, cycle times, Protect records, etc.).

2.3.5. Sleep and wake

2.3.5.1. Sleep

When any of the following conditions are met, the system enters the low-power

mode：

    (1) Single or overall over-discharge protection has not been released within 60 seconds

    (2) Press the RESET button(3~6S), and release the button.

    (3) The minimum cell voltage is lower than the sleep voltage, and the duration reaches the sleep delay time (at the same time, no communication, no protection, no balance, no current).

    (4) Standby time exceeds 24 hours (no communication, no charge and discharge, no mains).

    (5) Force shutdown by PC software.

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

2.3.5.2. Wake

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

    (1) Connect the charger, The output voltage of the charger must be greater than 51.2V.

    (2) Press the RESET button (3~6S), and release the button.

   (3) External devices communicate with the BMS to wake up the BMS.

Note:

After single or overall, over- discharge protection, it enters low power consumption mode and wakes up at regular intervals every 4 hours to turn on charge and discharge mode. Can be charged, it will exit hibernation and enter normal charging; if it cannot be charged after 10consecutive automatic wake up, it will no longer to wake up.

When the system is defined as the end of charging, the recovery voltage is not reached after 2days of standby (standby time set value), and the charging is forcibly resumed until the end of recharging.

2.3.6. RS232 interface definition

The BMS can communicate with the host computer through the RS232 interface, so that it can monitor various battery information, including battery voltage, current, temperature, status, and battery production information, The default baud rate is 9600bps.
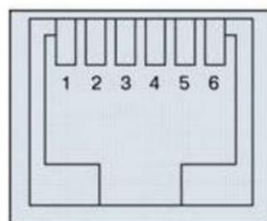

RS232- with 6P6C vertical RJ11 socket

RJ11 PIN	Definition specification
1、2、6	NC
3	TX
4	RX
5	GND

2.3.7. RS485 And CAN Interface Definition

485 Communication: The default baud rate is 9600bps. This interface is used to communicate with the inverter. When the battery is the master, it can summarize the slave data and communicate with the inverter.

The default baud rate of the CAN communication interface is 500K. Function This interface is used to communicate with inverters. When the battery is the main, the slave data can be summarized to communicate with the inverter.
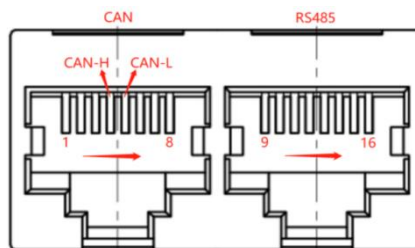
CAN-- Using 8P8C vertical RJ45 socket		RS485- 8P8C vertical RJ45 socket	
Pin	Definition specification	RJ45-Pin	Definition specification
4、12	CAN-H	1、8 、9、16、	RS485-B1
5、13	CAN-L	2、7、10、15	RS485-A1
11、14	GND	3、6	GND

2.3.8. Definition of two RS485 parallel communication ports

You can view the PACK information. The default baud rate is 9600bps. If the monitoring device functions as a host and needs to communicate with the monitoring device over the RS485 port, set the address range to 2 to 15 based on the address polling data.
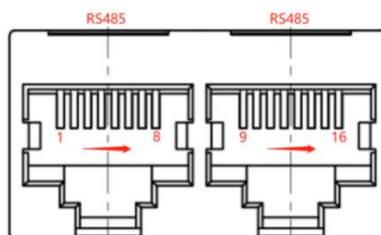
COM0- 8P8C vertical RJ45 socket		RS485- 8P8C vertical RJ45 socket	
Pin	Definition specification	RJ45-Pin	Definition specification
1、8	RS485-B	9、16、	RS485-B

2、7	RS485-A	10、15	RS485-A
3、6	GND	11、14	GND
4	ADR-OUT	12	ADR_IN
5、13	ISO_5V+		

2.3.9. DRY Interface Definition

Pin number	Pin definition	Remarks
1	NO	The MOSFET tube is closed and the dry contact is disconnected
2	NO	
3	NO	The MOSFET tube is disconnected, and the dry contact is closed
4	NO	

2.4. Battery Management System (BMS)

2.4.1. Low Voltage Protection

Discharge low voltage protection:

When discharging, the voltage of any single cell is lower than the protection value, the over discharge protection will be started, the battery buzzer alarm, When the voltage of all cells is recovered to the range of released value, the protection is removed.

Charging Over Voltage Protection:

During charging, when the total voltage of battery pack or the voltage of any single cell reaches the protection value, the system stops charging. When the total voltage and the single voltage return to the released value range, the protection will be released.

2.4.2. Current Protection

Charging Over Current Protection:

When the charging current is more than the protection value, the battery buzzer will alarm and the system will stop charging. The protection will release after the system delays the rated time.

Discharging Over Current Protection:

When the discharge current is more than the protection value, the battery buzzer will alarm and the system will stop discharging. The protection will release after the

system delays the rated time.

Note: The buzzer alarm setting can be manually closed on the computer, and it is off by default.

2.4.3. Temperature Protection

Charge low/high temperature protection:

During charging, when the battery temperature exceeds the range of 0°C~+55°C,the system starts the charging temperature protection, stops charging, recovering to the rated return value and then the protection is released.

Discharge low/high temperature protection:

During discharge, when the battery temperature exceeds the range of -20°C~+60°C, the system starts the discharge temperature protection, stops discharge, recovering to the rated return value and then the protection is released.

2.4.4. Other Protection

Short circuit protection:

When the battery BMS system detects that the external current is too large and exceeds the maximum working current allowed by the BMS, it will trigger the BMS short-circuit protection.

Release of Short Circuit Protection

When any of below conditions achieved, the protection will be released:

(1)   When the charging current is greater than 1A.

(2)   Wait for about 30 seconds, and the BMS will automatically release the short-circuit protection.

Note: The max, discharge current of battery should be bigger than max, working current required for load.

3. Installation and configuration

3.1. Installation & Preparation

Safety Regulation

Only the personnel who have received the electrical system training and fully mastered the electrical knowledge can install this system, Always follow the safety regulations listed below and local safety regulations during installation.

- All circuits with external voltage less than 48V connected to the power system must meet SELV requirements defined in lEC60950.
- If operating inside the cabinet, make sure that the power system is not active, The battery shall also be shut down.
- The cables shall be arranged reasonably and protected to avoid touching these

cables when operating the power equipment.

● It is recommended to wear the following safety gear when dealing with the battery pack

Insulated glove   Safety shoes   Safety goggles

3.1.1. Environment Requirement

Working Temperature:-20°C~+60°C.
Storage Temperature:-10°C~+35°C.
Relative Humidity:5%~85%RH.
Altitude:<4000m.
Working environment: there is no conductive dust and corrosive gas, and the following conditions are met:

● The installation site shall be far away from the sea to avoid salt water and high humidity environment.
● Choose a sheltered place to install the battery to prevent it from getting wet.
● The ground is flat and level.
● There are no in flammables and explosives in the accessories of the installation point.
● The ideal ambient temperature is 15°C~30°C .
● Keep away from dust and dirty areas.

3.1.2. Tools

The tools and meters that may be used：
Tools

Name (Left Column)	Name (Right Column)
Screwdriver/Slotted screwdriver/Phillips screwdriver	Multimeter
Torque wrench	Clamp meter
Diagonal pliers	Insulation tape
Needle-nose pliers	Thermometer
Wire cutter	Anti-static bracelet
Wire stripping pliers	Lifting belt
Electric drill	Tape measure
Forklift	

3.1.3. Technical preparations

- Electrical interface check：

   Devices connected directly to the battery can be user equipment, power supplies, or other power devices.

- Confirming whether the user's photovoltaic power generation equipment, power supply or other power supply equipment has a direct current output interface, and measuring whether the output voltage of the direct current interface meets the voltage range requirements in 2,2 performance parameter table.

- Confirming that the maximum discharge current capacity of the DC interface of the user's photovoltaic power generation equipment, power supply or other power equipment should be greater than the maximum charging current of the product used in the performance parameter table, For the maximum charging current of the product used, the DC interface of the user's photovoltaic power generation equipment should have a current limiting function to ensure the normal operation of the user equipment first.

- Make sure that the maximum operating current of the battery-powered user equipment (inverter DC input) should be less than 2,2 The maximum discharge current of the product used in the performance parameter table.

3.1.4. Security check

   It is strictly prohibited to place flammable, explosive and other dangerous items beside batteries. There should be fire-fighting equipment near the equipment, such as portable dry powder fire extinguishers, fire-fighting sand and other fire-fighting equipment suitable for extinguishing electrical equipment. If necessary, an automatic fire-fighting system should be set up.

3.1.5. Unpacking inspection

- When the equipment arrives at the installation site, it must be loaded and unloaded in accordance with regulations to prevent sunlight and rain, Before unpacking, check the total number of pieces according to the shipping list attached to each packing box, and check whether the appearance of the packing box is intact.

- Handle with care during unpacking to protect the surface coating of objects.

- When opening the packaging box, the installer should first read the technical documents and check the list, and check whether the items are complete and intact according to the configuration table and packing list, If the internal packaging is damaged, it must be checked and recorded. The packing list is as follows:

Accessories list

NO.	Part No.	Product Name	SPEC.	QTY.	Remarks

1		EXT-COMM Cable	Crimp RJ45 connectors at one end _ Leave one end blank _ Cable length 1500mm_ Deliver RJ45 connectors	1	The battery communicates with the inverter
2		Parallel communication line	2*RJ45_CAT5E_L=1000mm_BLACK	1	Parallel/optional
3		Positive Cable	EV50_Press SC50-8 terminals at both ends_L1000mm_Orange	1	assortative mating
4		Negative Cable	EV50_Press SC50-8 terminals at both ends_L1000mm_Black	1	assortative mating
5		screw	GB9074.13_M5* 14mm_Stainless steel 304_8.8 grade _ Outer hexagon cross combination screws	2	Ground screw
6		Hanging ears	Battery box fixed mounting ear _L221.5mm*W40mm*H21mm*T2.0mm	2	
7		warranty card	TB6000X_300g_coated paper	1	
8		specification	TB6000X_157g_coated paper	1	
9		Certificate	English Version_L40*W40mm	1	

3.1.6. Engineering coordination

Note the following before construction:
- **Power cord specifications**

Power cord specifications should meet the maximum discharge current requirements of each product.

- Installation space and load

Ensure that the batteries have sufficient installation space and the ground is flat enough to support the placement of multiple battery boxes.

- Wiring layout.

Ensure that the wiring reasonable, orderly; and consider the moisture-proof, corrosion prevention .

- The whole installation process should wear anti-static wristband.
- The installation site should be at least two or more peoples to operate.
- Equipment and tools ready for installation.
- When stacking batteries, make sure the placement brackets are sufficient to bear the weight of the batteries. Please use a forklift to assist with the installation. Be careful that the battery may fall and hurt people.

⚠ **CAUTONS:** Please ensure the installation site safe before installation.
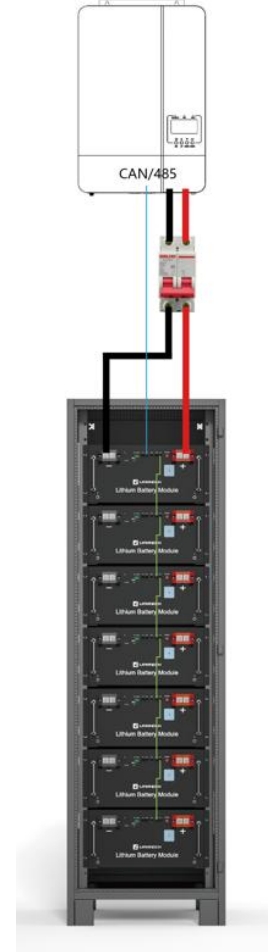
3.1.7. Installation Steps

- Set the ON/OFF switch of the installed battery system to ON, turn on the battery system, and ensure that the battery works properly and the alarm light does not flash.
- Set the "ON/OFF" switch of the installed battery system to OFF and turn off the battery system.
- Install the battery (including battery lug installation and battery placement installation).
- Install the power lines of the battery system.
- Install the communication lines between battery systems (when multiple groups are paralleled).
- Install the ground wire of the battery system.
- Install the power line of the electrical assembly system to the inverter.
- Install the communication line from the battery pack system to the inverter.
- Check that the connection positions of the positive and negative poles of the system, bolt locking, communication line connections, etc. meet the requirements of the electrical system.
- Set the "ON/OFF" switch of the installed battery system to ON to turn on the battery system
- Electrical debugging (BMS communication protocol setting and inverter parameter debugging) to ensure normal communication between the BMS system and the inverter.
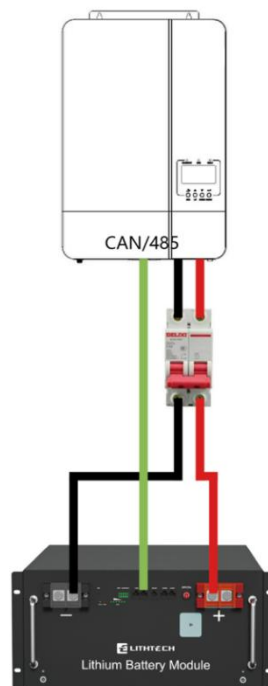
Single-group battery connection method
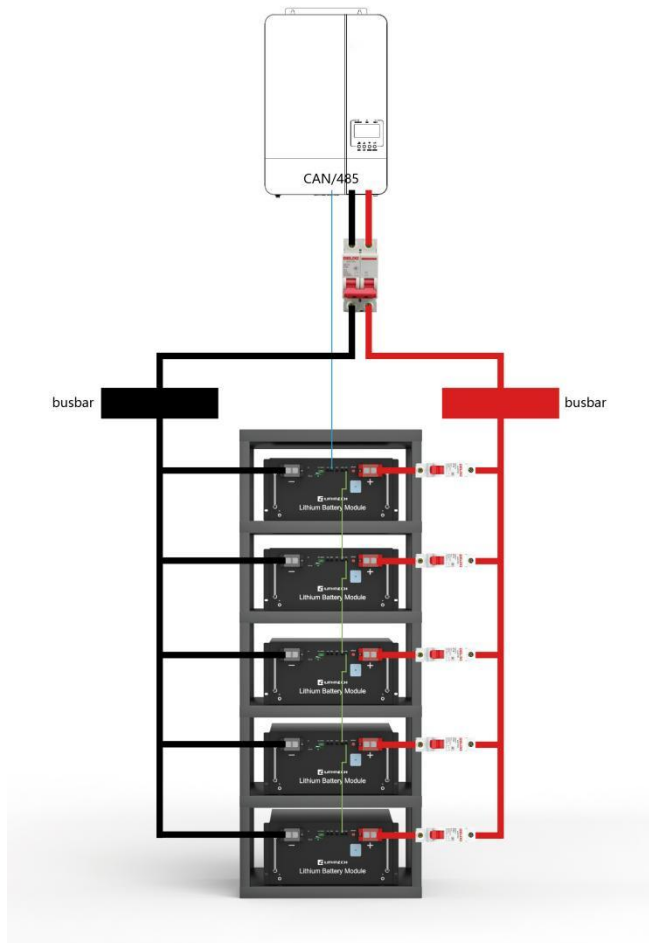
| | Multi-group parallel wiring method | Cabinet-type multi-group connection |

Step No.	Name	Definition
1	Turn off power supply	The system should be powered off, to ensure that there is no electric in installation process
2	Mechanical installation	1. Install the lugs or brackets 2. Battery fixed installation
3	Electrical installation	1. Grounding cable 2. Power cable installation 3. Connecting equipment installation 4. Communication cable installation
4	Electrical commissioning	Power system commissioning

Step 1.Turn off power supply

Before installation, please ensure the battery is powered off, at the same time, shutdown the equipment which need to connect to the battery.

Step 2. Machinery Installation

Install the battery box hanging lugs or the battery bracket, place the battery system on the bracket, and lock and fix it.

Step 3. Electrical installation

Grounding cable:

The grounding cable end with screw press-fit fixation in the chassis rear grounding hole, the other end is connected to the frame (or cabinet) grounding copper bar. To ensure the stable connection.

Power cord installation:

If a single battery is used, the battery terminal is directly connected to the terminal of the device or the switching power supply.

If multiple batteries are connected in parallel, use a bus bar to connect the battery power cables in parallel. The length of the power cables from the parallel battery power cables to the bus bars must be the same.

Parallel communication line connection:

For details, see 2.3.1 Cable Connection.

Step 4.Electrical commissioning

After these steps are completed, turn on the switches in sequence to start the battery, and then start the entire power system to complete the installation. And start debugging the inverter parameters to ensure that the communication between the BMS and the inverter is normal.

※Communication inspection and fault handling between BMS and inverter:

➢ **Inspection method for communication between BMS and inverter**

After the inverter is debugged, disconnect the communication line between the BMS and the inverter. Wait for about 1 minute and then determine whether the inverter reports a "BMS communication fault". If it reports a fault, after connecting the communication line, the inverter communication fault disappears, indicating that the communication between the BMS and the inverter is normal.

If the communication line between the BMS and the inverter is disconnected and the inverter does not alarm, it indicates that the BMS and the inverter cannot communicate normally. Check the parameter Settings of the inverter.

➢ **The handling method for the inverter reporting "BMS communication error"**

If the inverter keeps reporting a BMS communication failure, check whether the inverter's communication interface definition matches the interface definition of the BMS communication line and whether the BMS communication protocol Settings match the inverter

Treatment method:

1.Refabricate the communication lines that match the inverter and BMS interface

definitions.

2. Set the communication protocol using the BMS APP.

⚠ **CAUT/ONS:** If you have any question about the installation, please stop and contact Lithtech technical support immediately. If the battery does not start or control panel ALM lights, please disconnect the power line inspection and reinstall the start, if still cannot solve, please contact Lithtech, avoid damage to equipment or cause accidents.

4. Using、maintenance and troubleshooting

4.1. battery system use and operation instructions

After completing the electrical installation, turn on the battery system as follows:

1. make preparations before starting the battery pack and then turn the ON/OFF switch to "ON", run light and SOC light will be on after self inspection.

⚠ **Pay attention**

After turn the switch "ON". If it is found that the battery status indicator on the front panel is on red continuously; please check'4.2 alarm description, If the fault cannot be eliminated, please contact the dealer in time.

1. Use a voltmeter to measure whether the two voltages at the battery access end of the circuit breaker are over 45V, and check whether the voltage polarity is consistent with the inverter input polarity,; if the voltage output at the battery access end of the circuit breaker is over 45V, then the battery has started to work normally;

2. After confirming that the output voltage and polarity of the battery are correct, turn on the inverter;turn off the Circuit breaker switch.

3. Check the status of the indicator light (communication indicator light and battery access status indicator light) between the inverter and the battery, if it is normal, the connection between the battery and the inverter is completed, If the indicator light is different Often, please refer to the inverter manual to find out the reason or contact the dealer.

4.2. Alarm Description and Solution

When a protection action or fault occurs in the system, an alarm signal will be sent through the working status indicator light on the front panel, and the specific alarm category can be queried through the network management system. If there are any abnormal faults that affect the output, such as over-voltage, over-current during charging, under-voltage protection, temperature protection, etc., please handle them according to the corresponding faults listed in the table.

Battery protection Fault handling table

State	Alarm category	Alarm indication	Solution
Charging state	Cell over voltage	ALM Red light is always on/	Stop charging
	Charge over current	ALM Red light is always on	Stop charging and find out the cause of the fault/
	Charging temperature alarm	ALM Red light is always on	Stop charging
Discharging state	Discharge over current alarm	ALM Red light is always on	Stop discharging and find out the cause of the fault
	Discharging temperature alarm	ALM Red light is always on	Stop discharging
	Total voltage under voltage alarm	ALM Red light is always on	Charge
	Cell Voltage Under-voltage alarm	ALM Red light is always on	Charge

4.3. Analysis and solution of common faults

Comparison table of Common Fault handling methods

Common faults and solutions

No.	Fault	Causal analysis	Solutions
1	When the ON/OFF switch is set to ON, the indicator light does not respond	1. Power switch is broken 2. Over-discharge of the battery 3. The BMS hardware is damaged	1. Replace the power switch 2. Charge 3. Replace the BMS
2	When the "ON/OFF" switch is set to ON, there is no DC output and the ALM light flashes	Battery data status is abnormal	Connect the mobile phone APP to the BMS Bluetooth or WIFI, read the fault and battery information, and select the corresponding solution through the BMS fault
3	DC power supply time is too short	1. Battery capacity attenuation 2. The consistency of the charge capacity carried by individual battery cells varies too much.	Replace a battery

4	Battery cannot be fully charged.	Charging voltage is too low	Adjust charging voltage to 57.6V
5	The moment the battery is connected to an external device and starts up, the ALM light of the battery flashes.	1. Short circuit in power supply wiring. 2. The starting current of the external device is too large.	1. Turn off the battery, check the cause of the short circuit and solve it. 2. Disconnect the device connection, start the battery alone, and confirm the battery status. If the battery status is normal, the external device is damaged.

In case of special technical difficulties or questions, please contact the seller in time.

APP User Manual

5. Download and install

According to the mobile phone system, scan the QR code for APP download of the corresponding system through the browser to download the APP.

Scan the QR code with a browser to download the APP.

Android   iOS

Note：

If the iOS system is unable to scan the QR code, you can search for "NewE BMS" in the APP store and download the app.

6. Registration and login

Registration：

Create the new account by means of email account, password and verification code.

Login：

Log in with the registered account number and password.

Forget your password

You can reset your password through your email number.
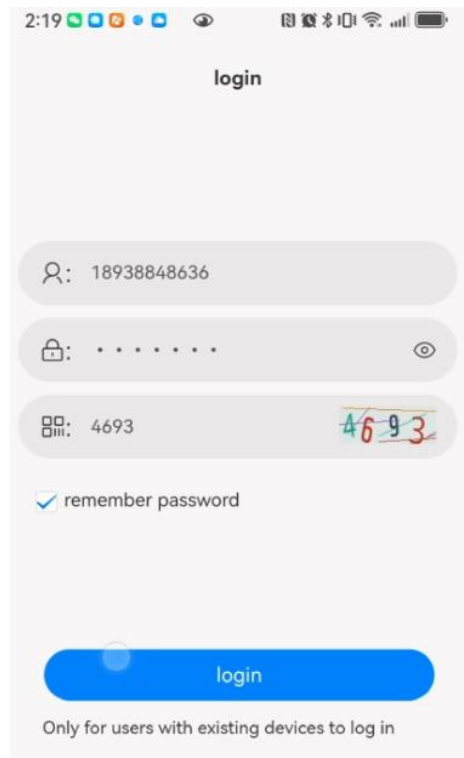
Note:

Please select the real country and region according to the actual situation, This is very important. Once selected and created successfully,the devices added through the account distribution network will automatically connect to the server node with the same account .

7. Control method

Local control: BLE Bluetooth communication, directly search for the nearby Bluetooth signal, a pair of continuous connection, control devices,no account login, do not do binding records.

Remote control: WiFi communication to achieve the purpose of controlling devices instead of being in the same geographical location. Account registration and login are required. Record the binding of the account to the device. Network distribution operations are also needed.
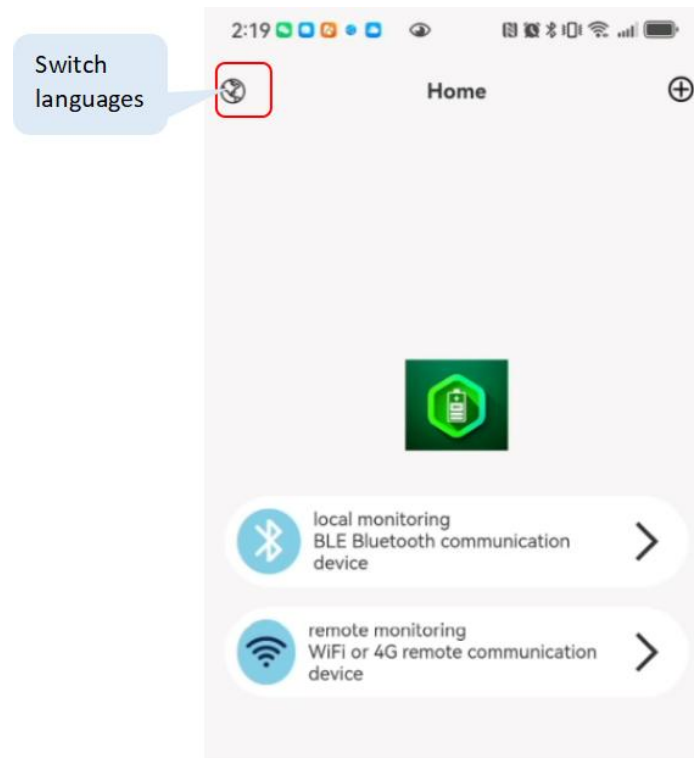
7.1. APP dynamic permission

Install the APP, click the start button and start smoothly. For the first start, you will request the user to confirm and authorize the following authority:

● Allow the NewE BMS to access the device location permission；
● Allow NewE BMS to find and connect to the permissions of nearby devices;
● Camera permission:；
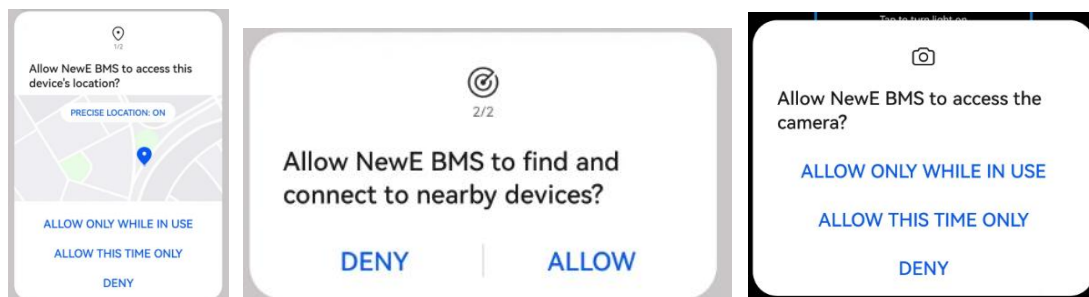
7.1.1. Local Control(BLE)

When the device is in the distribution network state, click the Local control button, search for the device on the local control page, click Search for the device, and click Connect to enter the BMS data page, view the BMS information and modify parameters.
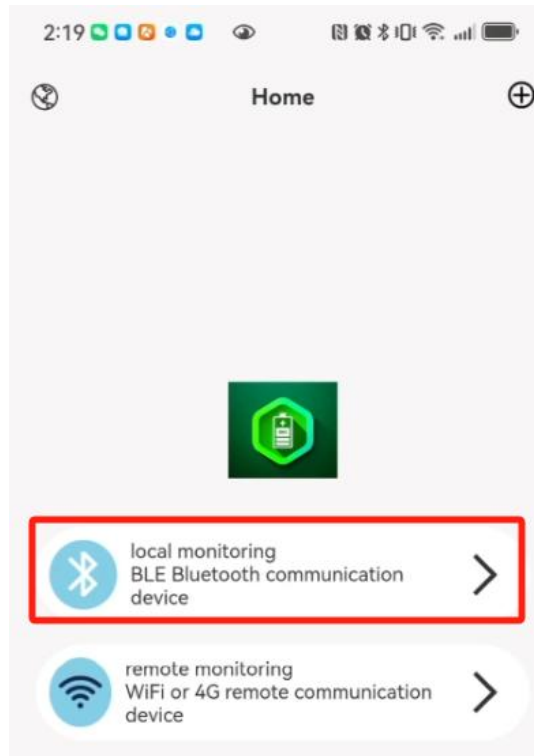
Select the Bluetooth signal that has been searched
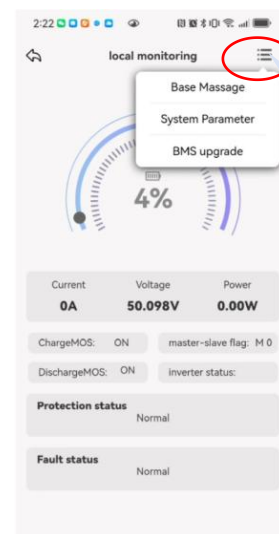
Parameter modification menu

7.1.1.1.   Base Massage

By sliding the display screen up and down, you can view information such as the PACK current, total voltage, capacity, cycle times, SOC, SOH, detailed voltage of individual cells, temperature, and software version.

7.1.1.2. System Parameter

The relevant parameters of BMS can be set

7.1.1.3. BMS program upgrade

Through this interface, the BMS program upgrade can be achieved.

1. Click "Select file" to add the program file
2. Click "upgrade" to upgrade
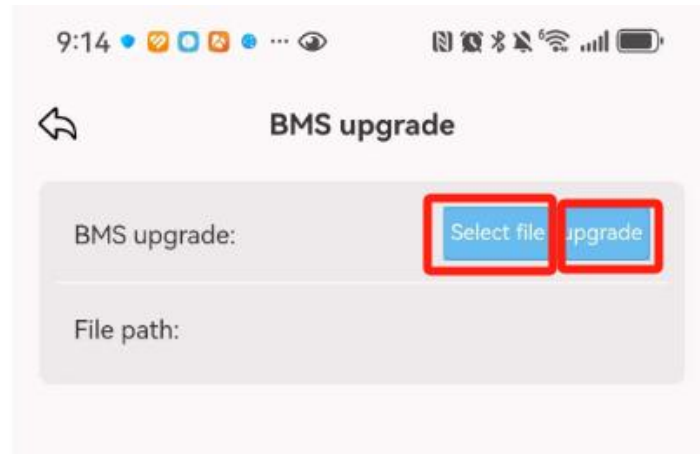
Note:
 1. Upgrading the BMS program is prohibited without the BMS program file.

8. Remote monitoring

8.1. WIFI signal search

 Click "Remote Monitoring", enter the signal search interface, click "Device Add", search for the WIFI signal, click to search for the signal, and enter the distribution network.
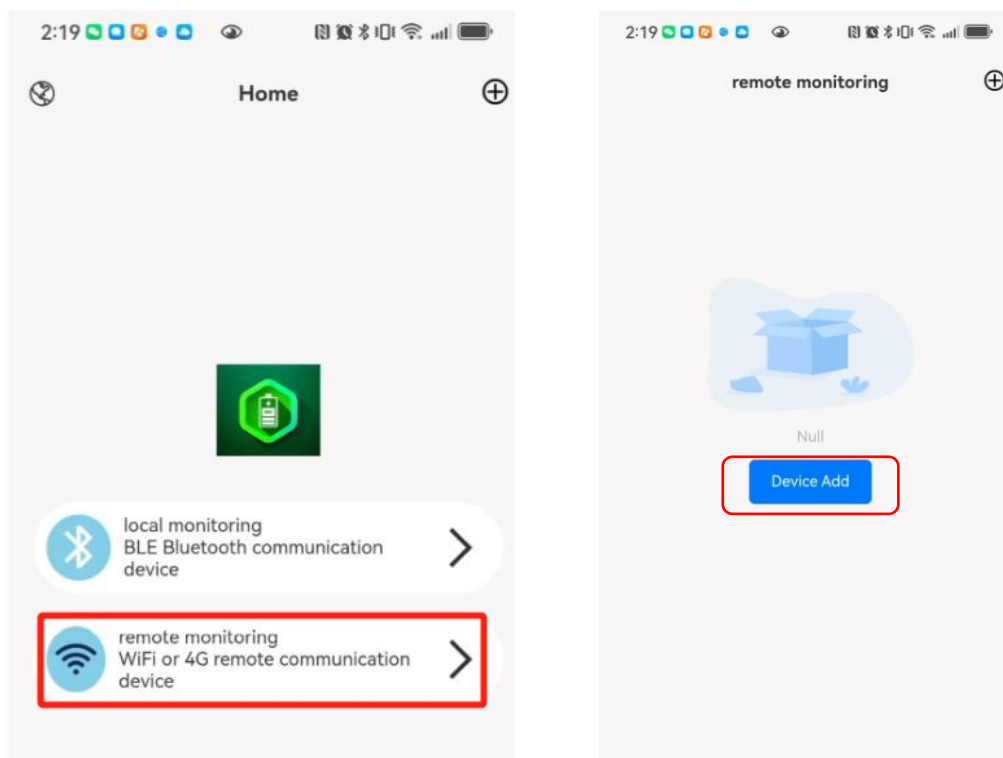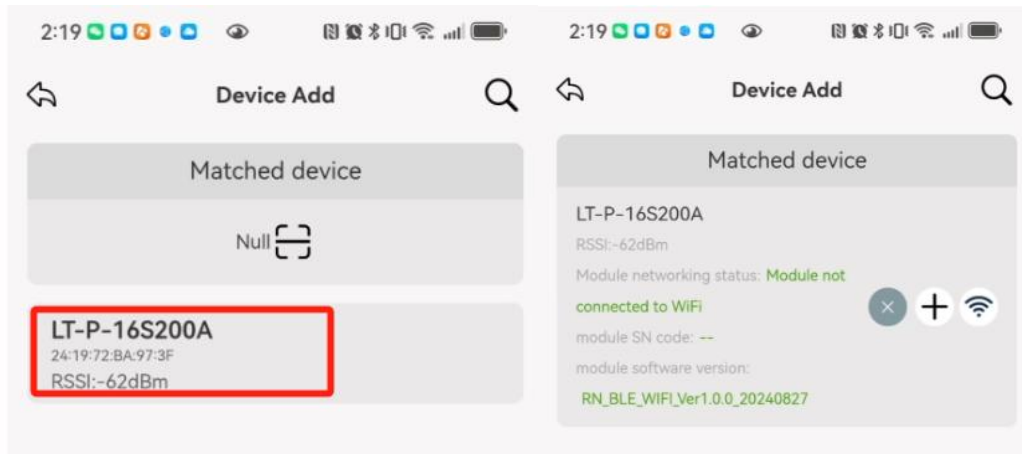
8.2. Remote distribution network

8.2.1. WIFI network configuration

Click "1 WIFI Icon", click "Magnifying Glass Icon", search for "WIFI Signal", enter "WIFI Password", and click "3 Submit".

8.2.2. Setting of power station name and address

Click the "+", enter the device name and device address, and click "Submit".
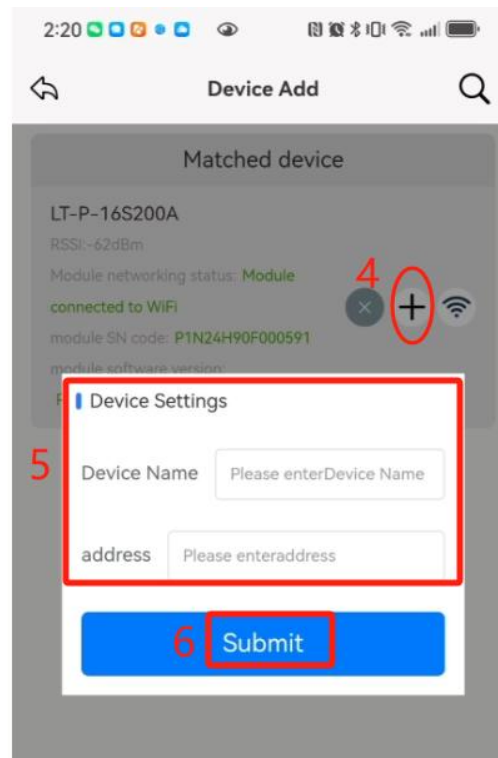
Note:

When distributing the network, the name and address of the power station, as well as the name and password of the WIFI, all need to be set; otherwise, the distribution will not be successful.

8.2.3. The distribution network was successful.
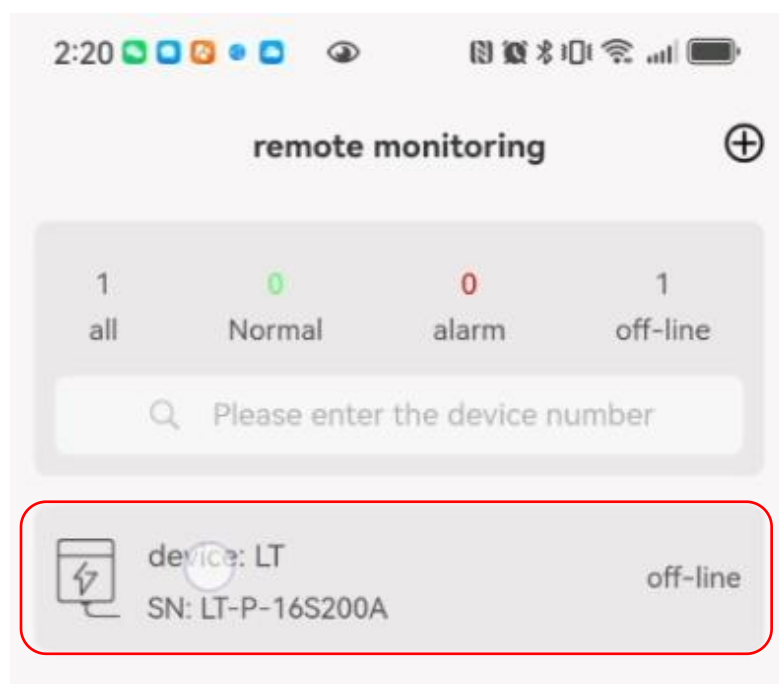
Note:

1. This step requires the phone to open the "Bluetooth", "Positioning and "WiFi" functions, otherwise the search and subsequent distribution network operation cannot be completed.

8.2.4. Enter the Settings interface

On this interface, you can view the voltage, current, SOC, MOSFET status, protection status and alarm status of the battery pack.
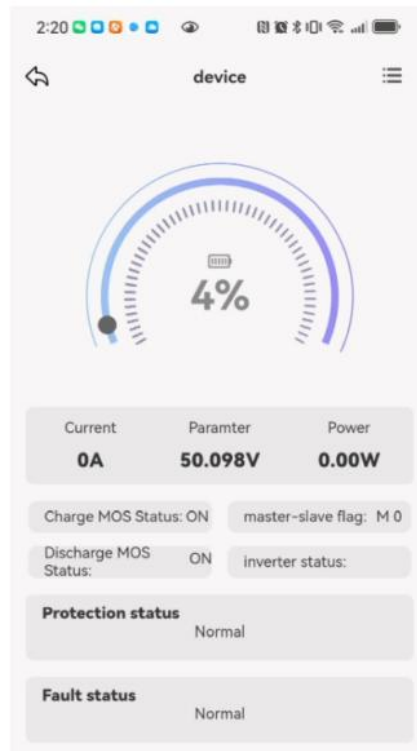
8.2.5. Parameter setting

Click the icon in the upper right corner to enter different parameter items, query battery information, system parameters, historical information, etc.
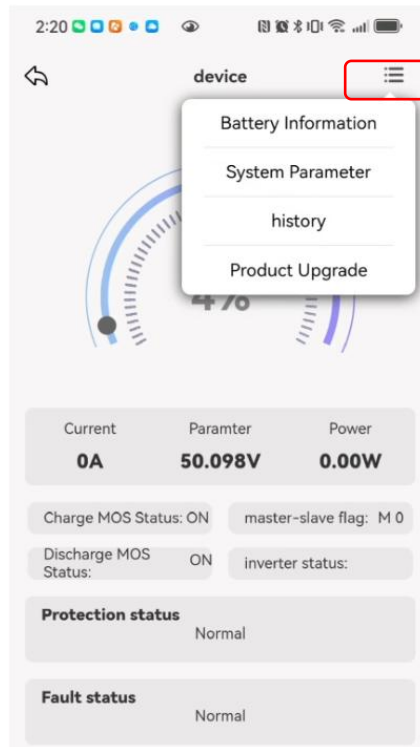
8.2.5.1. Battery information

Through this interface, you CAN view the current CAN communication protocol, RS485 communication protocol, battery cycle times, voltage, current, capacity, SOC, SOH, detailed individual cell voltage, temperature, BMS version number, program version number and other information of the BMS.

8.2.5.2. System parameters

Through this interface, the alarm parameters and protection parameters of the BMS can be modified.

Note：

The BMS-related parameters of the battery have been set before leaving the factory. If you need to modify the parameters, please communicate and confirm with LITHTECH.
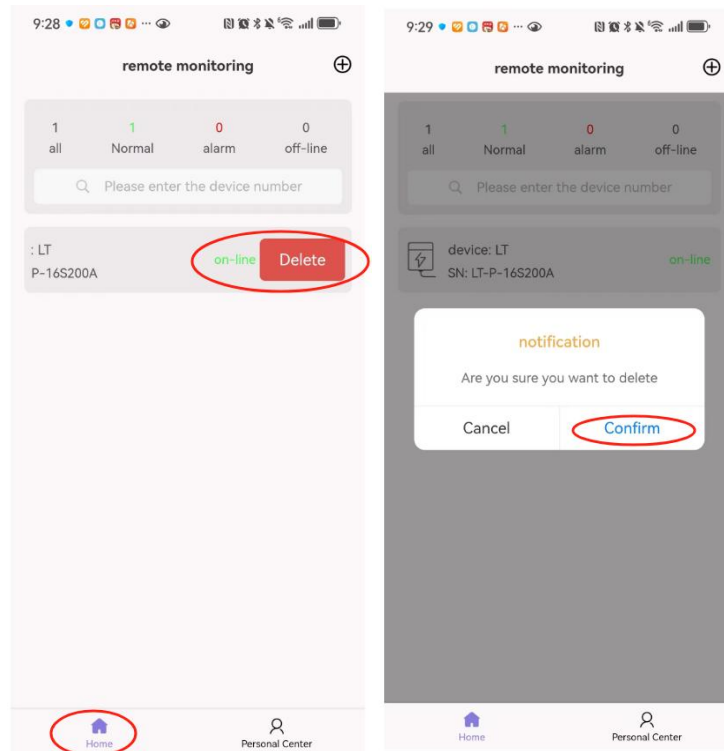
8.2.5.3. History

Through this interface, you can query the historical alarm information of BMS, which can be downloaded and saved to your mobile phone for battery fault analysis.
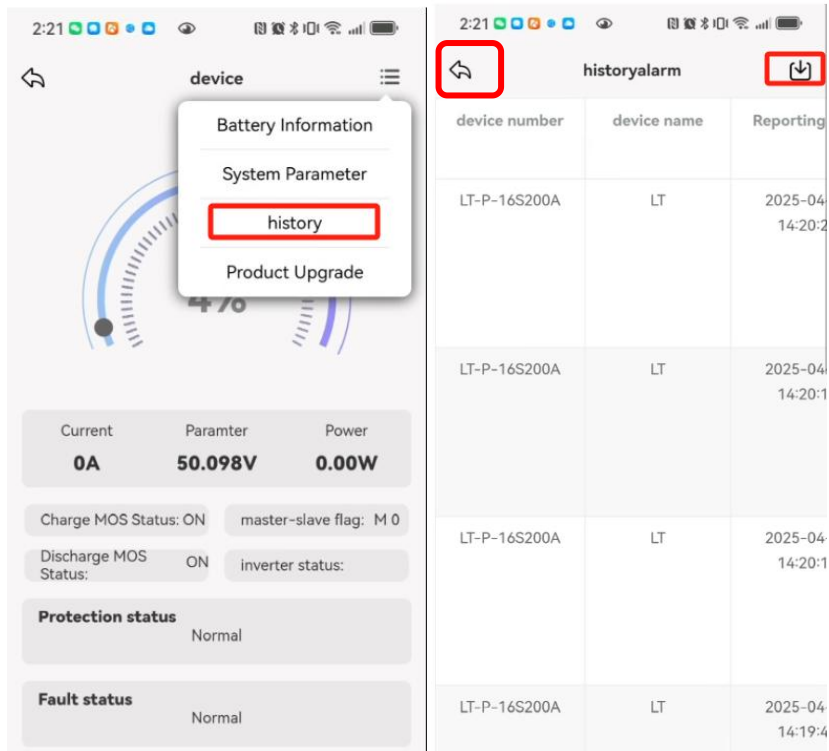
8.2.5.4.　Distribution network disconnection

　　Return to the WIFI main interface, find the power station you need to Delete, follow the screen, swipe left, click "Delete", and then click "Confirm".

Note：
1. The WIFI of BMS can only be bound to one account. If you need to bind another

account, please delete the binding of the previous account first.

2. If BMSAPP fails to search for BMS's WIFI signal, the possible reason might be that an account is bound to WIFI. Please contact LETHTECH for unbinding.

8.3. Account exit and logout

Account logout: After exiting, you can switch to logging in with another account or modify the account login password through this interface.