

USER MANUAL

POWER BANK LIFEPO4 BATTERY

LP48320

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Chapter 1 Safety Precautions

⚠ Warning

1. Please do not put the battery into water or fire, in case of explosion or any other situation that might endanger your life.
2. Please connect wires properly while installation, do not reverse connect. To avoid short circuit, please do not connect positive and negative poles with conductor (Wires for instance).
3. Please do not stab, hit, trample or strike the battery in any other way.
4. Please shut off the power completely when removing the device or reconnecting wires during the daily use or it could cause the danger of electric shock.
5. Please use dry powder extinguisher to put out the flame when encountering a fire hazard, liquid extinguisher could result in the risk of secondary disaster.
6. For your safety, please do not arbitrarily dismantle any component in any circumstances unless a specialist or an authorized one from our company, device breakdown due to improper operation will not be covered under warranty.

⚠ Caution

1. We have strict inspection to ensure the quality when products are shipped out, however, please contact us if case bulging or another abnormal phenomenon.
2. For your safety, device shall be ground connected properly before normal use.
3. To assure the proper use please make sure parameters among the relevant device are compatible.
4. Please do not mixed-use batteries from different manufacturers, different types and models as well as old and new together.
5. Ambient and storage method could impact the life span and product reliability, please consider the operation environment abundantly to make sure device works in proper condition.
6. For long-term storage, the interval between two times cell charges is more than 2 months, the standard charging mode should be used first before the fast charging mode.
7. When the cell voltage is lower than 2.1V, the cell may be caused permanent damage. In this situation the product quality assurance liability becomes invalid. When the actual discharge cut-off voltage is lower than the standard discharge cut-off voltage, the internal energy consumption of system is down to minimum and the sleep time is extended before recharging. Customers need to train the user to recharge the cell in the shortest time to prevent the cell from entering the over-discharge state.
8. Formula of theoretical standby time: $T=C/I$ (T is standby time, C is battery capacity, I is total current of all loads).

Chapter 2 Installation and Configuration

2.1 Ready for installation

Safety Requirement

This system can only be installed by personnel who have been trained in the power supply system and have sufficient knowledge of the power system.

The safety regulations and local safety regulations listed below should always be followed during the installation.

- If operating within the power system cabinet, make sure the power system is not charged. Battery devices should also be switched off.
- Distribution cable wiring should be reasonable and has the protective measures to avoid touching these cables while operating power equipment.
- When installing the battery system, must wear the protective items below:



The isolation gloves



Safety goggles



Safety shoes

2.1.1 Environmental requirements

Working temperature: $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$

Charging temperature range is $0^{\circ}\text{C} \sim +55^{\circ}\text{C}$

Discharging temperature range is $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$

Storage temperature: $-10^{\circ}\text{C} \sim +35^{\circ}\text{C}$

Relative humidity: $5\% \sim 85\% \text{RH}$

Elevation: no more than 4000m

Operating environment: Indoor installation, sites avoid the sun and no wind, no conductive dust and corrosive gas.

And the following conditions are met:

- Installation location should be away from the sea to avoid brine and high humidity environment.
- The ground is flat and level.
- There is no flammable explosive near to the installation places.
- The optimal ambient temperature is $15^{\circ}\text{C} \sim 30^{\circ}\text{C}$.
- Keep away from dust and messy zones.

2.1.2 Unpacking inspection

- When the equipment arrives at the installation site, loading and unloading should be carried out according to the rules and regulations, to prevent from being exposed to sun and rain.
- Before unpacking, the total number of packages shall be indicated according to the shipping list attached to each package, and the case shall be checked for good condition.
- In the process of unpacking, handle with care and protect the surface coating of the object.
- Open the package, ensure objects are complete and intact, if the internal packing is damaged, should be examined and recorded in detail.

2.1.3 Engineering coordination

- Attention should be paid to the following items before construction:
- Power line specification.
The power line specification shall meet the requirements of maximum discharge current for each product.
 - Mounting space and bearing capacity.
Make sure that the battery has enough room to install, and that the battery rack and bracket have enough load capacity.
 - Wiring.
Make sure the power line and ground wire are reasonable. Not easy to short-circuit, water and corrosion.

The security check

- Firefighting equipment should be provided near the equipment, such as portable dry powder fire extinguisher.
- Automatic fire fighting system shall be provided for the case where necessary.
- No flammable, explosive and other dangerous articles are placed beside the battery.

Chapter 3 Product Specification

3.1 Size and Weight

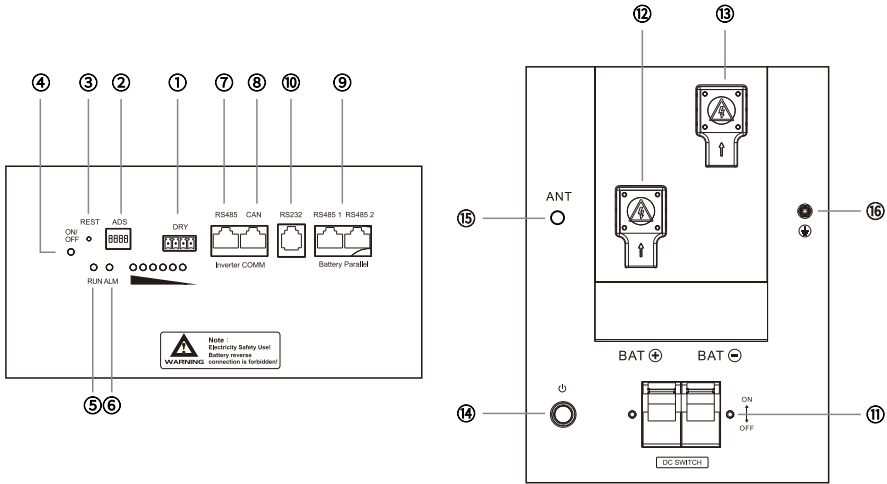
Product	Dimension	Weight
LP48320	830x490x250mm	125kg

3.2 Performance Parameter

Item	Parameter value
Rate capacity	320AH
Energy power	16.4KWH
Rate Voltage	51.2VDC
High Voltage Protection	56VDC
Low voltage protection	44.8VDC
Charge Voltage	55.2VDC
Max Charge current	200A
Max discharge Current	200A

3.3 Interface Definition

This section elaborates on interface functions of the front interface of the device.



Item	Name	Item	Name
①	DRY port	②	ADS port
③	REST port	④	ON/OFF indicator
⑤	RUN indicator	⑥	ALM indicator
⑦	RS485 communication port	⑧	CAN communication port
⑨	RS485 communication port	⑩	RS232 communication port
⑪	DC SWITCH	⑫	BAT+
⑬	BAT-	⑭	ON/OFF
⑮	ANT	⑯	GND

3.4 Communication Description

3.4.1 RS232 communication

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

3.4.2 CAN communication

CAN communication, baud rate 500K.

3.4.3 Parallel RS485 communication

You can view the information of PACK, and the default baud rate is 9600bps. If communication with monitoring equipment is required through RS485, the monitoring equipment serves as the host and is based on the addressPolling data, with address settings ranging from 2 to 15.

3.4.4 Independent RS485 communication

The default baud rate is 9600bps. This interface is used for communication with the inverter. When the battery is the host, it can aggregate data from the slave and communicate with the inverter.

3.4.5 DIP switch settings

When the PACK is used in parallel, the address can be set by the DIP switch on the BMS to distinguish different PACKS, and the address needs to be avoided to be set to the same, and the definition of the BMS DIP switch is referred to the following table.



ADD	DIP switch position			
	#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

3.4.6 Bluetooth communication and WiFi communication manual(option)

1) Bluetooth and WIFI communication description

①BMS can communicate with the Bluetooth APP, through the Bluetooth APP to monitor various information of the battery, including the battery voltage 、 current、 temperature、 status、 SOC、 SOH and battery production information, the default baud rate is 9600bps.

②Press and hold the reset button for 10-13 seconds. After all the flow lights are on, it will turn into a state where one light is on. Release it (except for ON/OFF lights) and wait for 8 seconds to add it to the APPI see a new device at the equipment location.

2) Bluetooth and WIFI communication manual

(1) Download and install

According to the mobile system, select the download method:

Android entrance: GMS supported phones can download the **"BMS-TOOL"** App through the Google Play Store, Android phones that do not support GMS can directly contact business personnel.

IOS entrance: Search for **"BMS-TOOL"** download in the App Store.

(2) APP dynamic permission

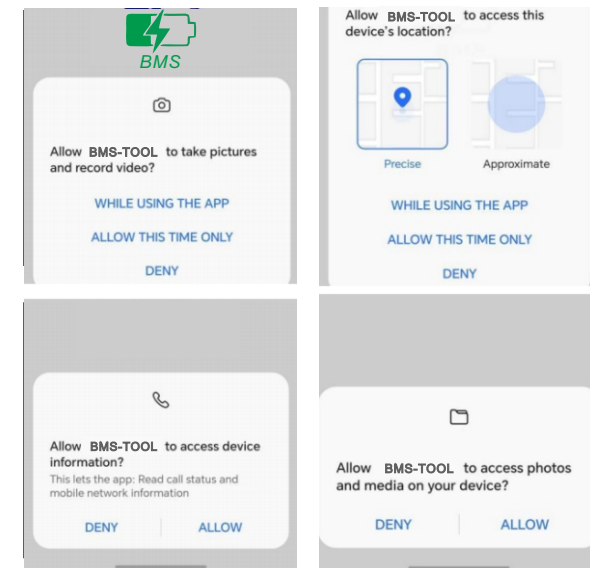
Install the APP, click the start button and start smoothly. For the first start, you will request the user to confirm and authorize the following

authority: Camera permission: Add wifi devices in remote control Location

permission: search for nearby Bluetooth devices in local control and identify current network information in remote control Equipment status

information: to detect the operation status of the equipment Photos and

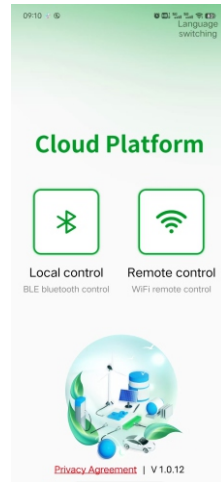
audio: The code scanning interface in the remote control system can directly identify the local photo album.



(3) Control method

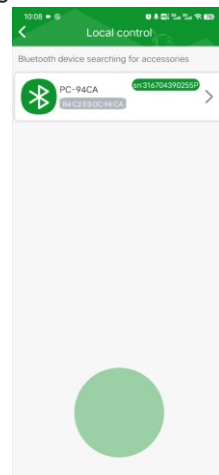
Local control: BLE Bluetooth communication, directly search for the nearby Bluetooth signal, a pair of continuous connection, control devices, no account login, do not do binding records, that is, ready to use Remote

control: WiFi communication, which realizes the purpose of controlling the device rather than in the same geographical location. It requires account registration and login, records the binding between the account and the device, and requires distribution network operation.



(4) Local Control (BLE)

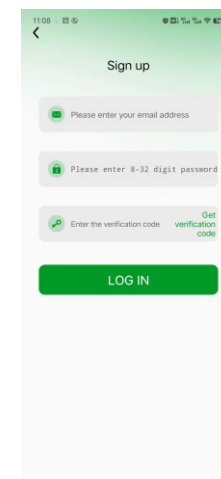
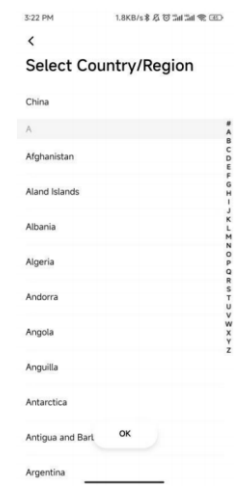
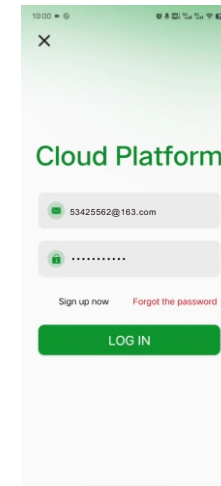
When the device is in the distribution network state, click the local control button to search the device on the local control page, and click the device to enter the device control page.



(5) telecontrol

① Account registration and login

Registration: Create the new account by means of email account, password and verification code. 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 Login: Log in with the registered account number and password Forget your password: You can reset your password through your email number.

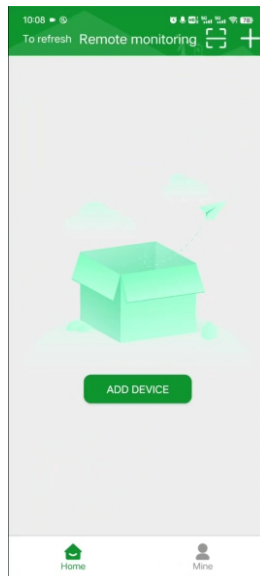


②List of equipment

③Equipment added

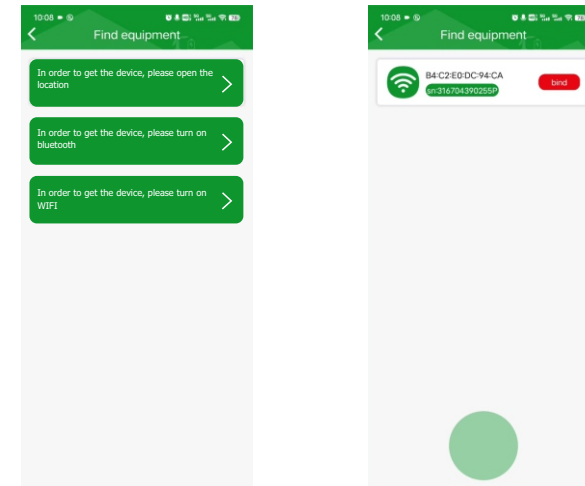
1.The wifi module is put back in the factory

The wifi module restores the factory so that the device is in a discoverable state
:Long press the reset button 10-13s, the specific operation of the LED
lamp is shown as : long press the button to make the water lamp run one.



2. Click "Add" and "+" to enter the search page and search for the device

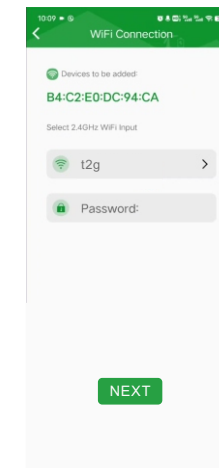
Note: This step requires the phone to open the "Bluetooth", "Positioning" and "WiFi" functions, otherwise the search and subsequent distribution network operation cannot be completed



3. Fill in the distribution network information

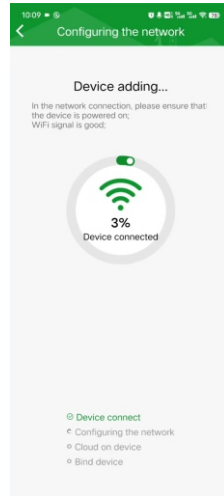
Click the device found in 2, jump to the distribution network information page, fill in the WiFi account and password of the device to be connected, or change the WiFi. After confirming that the password is correct, click "Next" to enter the distribution network waiting page

Note: The mobile phone should be connected to the WiFi first, and the module only supports 2.4G WiFi, please identify it by yourself



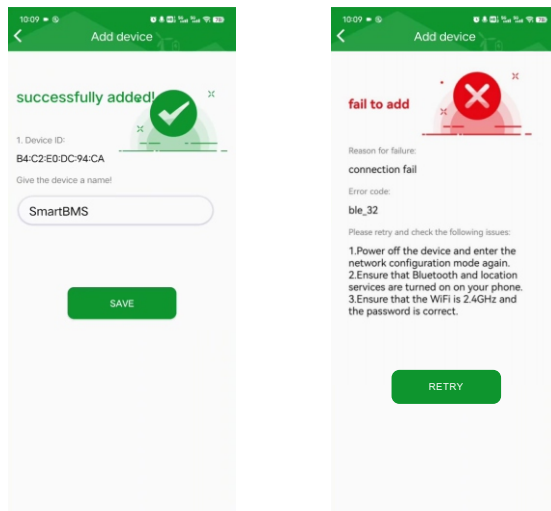
4. Execute distribution network operation

APP and device will automatically perform "Connect device", "Configure network", "device cloud" and "bind device" operations. Please wait patiently.



④ Distribution network results

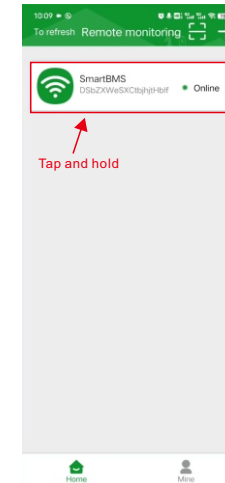
When the distribution network is over, it will jump to the page, click Save to successfully add and automatically jump back to the device list page; If the network fails, please follow the prompts of the APP, and start from step ① after inspection. If the network still fails for many times, please save the error page and contact the after-sales personnel!



(6) Device editor

Long press the device item, and the edit menu will pop up at the bottom

Rename: Modify device nickname to use Delete: unbinding with the device, the next use need to scan the code or add the network



(7) Device sharing

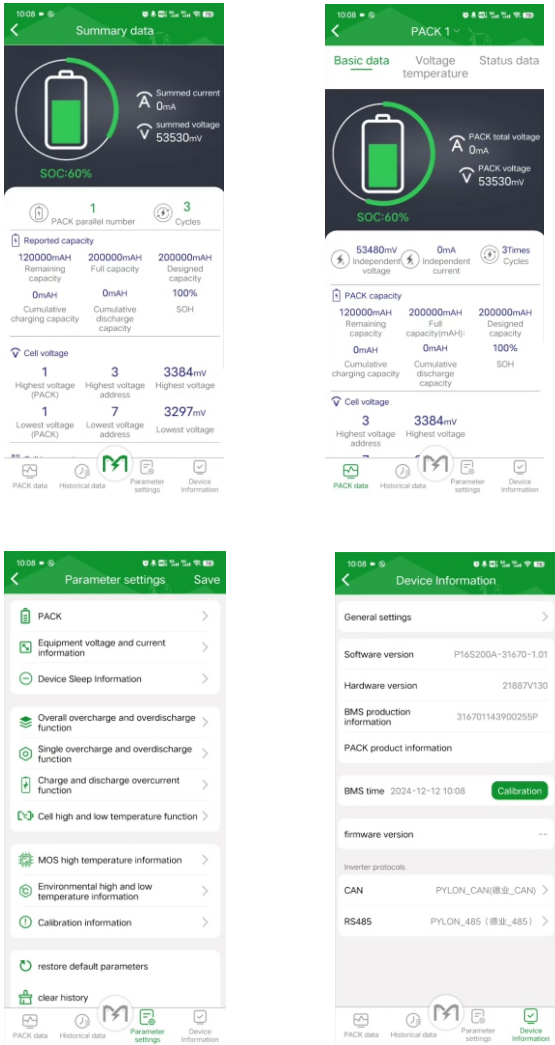
Long press the device item, when you are the device administrator (the first account bound to the first distribution network), the device can generate a QR code for other users to scan the code to add.

Note: Non-administrators cannot share twice. The QR code generated each time can only be scanned once, and the time of scanning the code is limited (30 minutes).



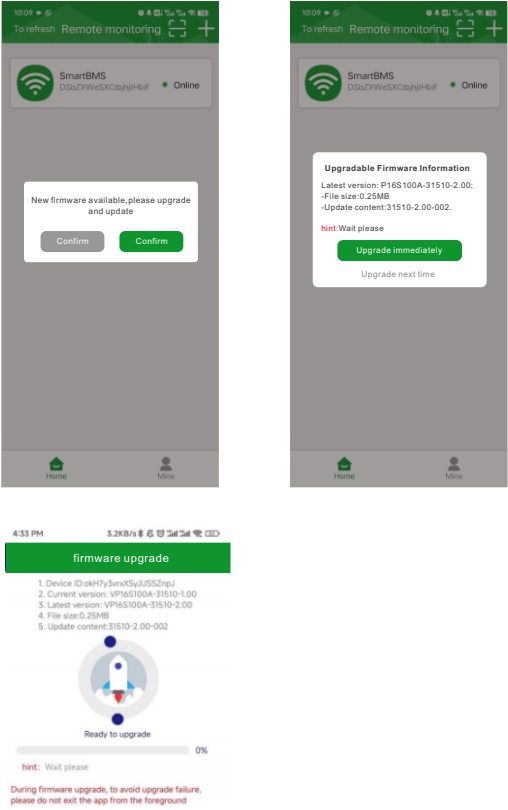
(8) Device control

According to the functions supported by serial port protocol 0.0.9, except for the protocol itself, the summary interface, basic data, voltage and temperature, state data, historical data, parameter setting, equipment information, general setting, etc.



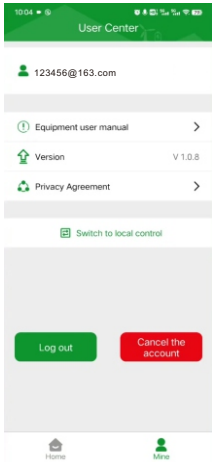
(9) OTA upgrade

When there is an updated version of firmware in the background, the APP clicks on a device to pop up the upgrade popup, click upgrade immediately, and the firmware will be upgraded. Click the next time to enter the device parameters display, Settings and other pages.

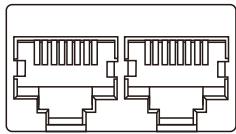


(10) Account exit and logout

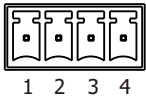
Account exit: after exit, you can switch to other accounts for login
Account cancellation: Once cancelled, all the information and binding relationship of the account will be cleared, and you need to be re-registered next time.



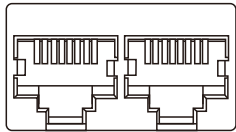
3.5 Interface Definition



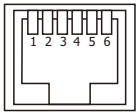
CAN and RS485 port



DRY port



Parallel communication ports



RS232 COMMUNICATION PORT

RS232--Using 6P6C vertical RJ11 socket	
RJ11 pin	Definition description
2	NC
3	TX (single board)
4	RX (single board)
5	GND

CAN--Using 8P8C vertical RJ45 socket		RS485--Using 8P8C vertical RJ45 socket	
RJ45 pin	Definition description	RJ45 pin	Definition description
1、 2、 3、 6、 8	NC	9、 16	RS485-B1
5	CANL	10、 15	RS485-A1
4	CANH	11、 14	GND
7	GND	12、 13	NC

CAN and RS485 port

RS485--Using 8P8C vertical RJ45 socket		RS485--Using 8P8C vertical RJ45 socket	
RJ45 pin	Definition description	RJ45 pin	Definition description
1、 8	RS485-B	9、 16	RS485-B
2、 7	RS485-A	10、 15	RS485-A
3、 6	GND	11、 14	GND
4、 5	NC	12、 13	NC

Parallel communication ports

3.6 LED Indications

LED Working Status Indication

State	Normal/alarm /protection	ON/ OFF	RUN	ALM	Power Indicator LED						Explain
		●	●	○	●	●	●	●	●	●	
Shut down	Dormancy	off	off	off	off	off	off	off	off	off	All off
Standby	Normal	Lighting	Flash 1	off	According to the electricityinstruction						Stand by
	Alarm	Lighting	Flash 1	Flash 3							Module low voltage
Charge	Normal	Lighting	Lighting	off	According to the electricityinstruction (Power level indicatesmaximum LED flash 2)						Alarm when overvoltage light off
	Alarm	Lighting	Lighting	Flash 3							
	Overcharge protection	Lighting	Lighting	off	Lighting	Lighting	Lighting	Lighting	Lighting	Lighting	If there is no charging the indicator light is instandby state
	Temperature overcurrent protection	Lighting	off	Lighting	off	off	off	off	off	off	Stop charging
Discharge	Normal	Lighting	Flash 3	off	According to the electricity instruction						The max. battery LED flashes(flash 2) and the ALM does not flash in case of an overcharge alarm.
	Alarm	Lighting	Flash 3	Flash 3							
	Undervoltage protection	Lighting	off	off	off	off	off	off	off	off	Stop discharge
	Temperature over current, short-circuit, Reverse connection and failure protection	Lighting	off	Lighting	off	off	off	off	off	off	Stop discharge
Fail		off	off	Lighting	off	off	off	off	off	off	Stop charging and discharging

● Green ○ Red

Capacity Indication Instructions

State		Charge						Discharge					
Capacity indicator light		L6	L5	L4	L3	L2	L1	L6	L5	L4	L3	L2	L1
		●	●	●	●	●	●	●	●	●	●	●	●
Battery Power (%)	0 ~ 16.6%	off	off	off	off	off	Flash2	off	off	off	off	off	Lighting
	16.6 ~ 33.2%	off	off	off	off	Flash2	Lighting	off	off	off	off	Lighting	Lighting
	33.2 ~ 49.8%	off	off	off	Flash2	Lighting	Lighting	off	off	off	Lighting	Lighting	Lighting
	49.8 ~ 66.4%	off	off	Flash2	Lighting	Lighting	Lighting	off	off	Lighting	Lighting	Lighting	Lighting
	66.4 ~ 83.0%	off	Flash2	Lighting	Lighting	Lighting	Lighting	off	Lighting	Lighting	Lighting	Lighting	Lighting
	83.0 ~ 100%	Flash2	Lighting	Lighting	Lighting	Lighting	Lighting	Lighting	Lighting	Lighting	Lighting	Lighting	Lighting
Operation Indicator ●		Lighting						Flashing(Flash3)					

LED Flashing Instructions

Flash Mode	Bright	Off
Flash,1	0.25S	3.75S
Flash,2	0.5S	0.5S
Flash,3	0.5S	1.5S

Note: The alarm of LED indicator can be enabled or disabled by the software, and the factory default is enabled.

3.7 Description of Buzzer Action

In case of fault, beep for 0.25 S every 1s;

During protection, beep 0.25 S every 2S (except over voltage protection);

In case of alarm, beep 0.25 S every 3S (except over voltage alarm);

The buzzer function can be enabled or disabled by the software, and it is disabled by factory default.

3.8 Key Description

When the BMS is in sleep mode, press the key (3 ~ 6S) and release it, the BMS will be activated, and the LED indicator lights will be on for 0.5 seconds from "RUN".

When the BMS is activated, press the key (3 ~ 6S) and then release it, the BMS is put to sleep, and the LED indicator lights are on for 0.5 seconds from the lowest power lamp.

When the BMS is activated, press the key (6 ~ 10S) and release it, the BMS reset, and all LEDs are on for 1.5s.

After the BMS is reset, it still retains the parameters and functions set by the software. If it is necessary to restore the initial parameters, it can be realized by "restoring the default value" of the software, but the relevant operation records and storage data remain unchanged (such as electric quantity, cycle times, protection records,etc.).

3.9 Battery Management System(BMS)

3.9.1 Voltage Protection

Discharging Low Voltage Protection :

When any battery cell voltage is lower than the protection value during discharging, The over-discharging protection starts, and the battery buzzer makes an alarm sound. Then battery system stops supplying power to the outside. When the voltage of each cell recovers to rated return range, the protection is over.

Charging Over Voltage Protection:

When total voltage or any battery cell voltage reaches the protection value during charging, battery stops charging. When total voltage or a cell recovers to rated return range, the protection is over.

3.9.2 Current Protection

Over Current Protection in Charging:

When the charging current is greater than the protection value, the battery buzzer alarms and the system stops charging. Protection is removed after rated time delaying.

Over Current Protection in Discharging:

When the discharge current is greater than the protection value, the battery buzzer alarms and the system stops discharging. Protection is released after rated time delaying.

Note:

The buzzer function can be enabled or disabled by the software, and it is disabled by factory default.

3.9.3 Temperature Protection

Less/Over temperature protection in charging:

When battery's temperature is beyond range of 0°C ~+65°C during charging, temperature protection starts, device stops charging. The protection is over when it recovers to rated return range.

Less/Over temperature protection in discharging:

When battery's temperature is beyond range of -20°C ~+65°C during discharging, temperature protection starts, device stops supplying power to the outside.