Shenzhen Cylaid Technology Co.,Ltd		

Lifepo4 battery pack user manual

Model	48V300AH
Nominal Voltage	51.2V
Nominal Voltage	300Ah
Cell Type	Lifepo4 battery
Date	

CONTENT

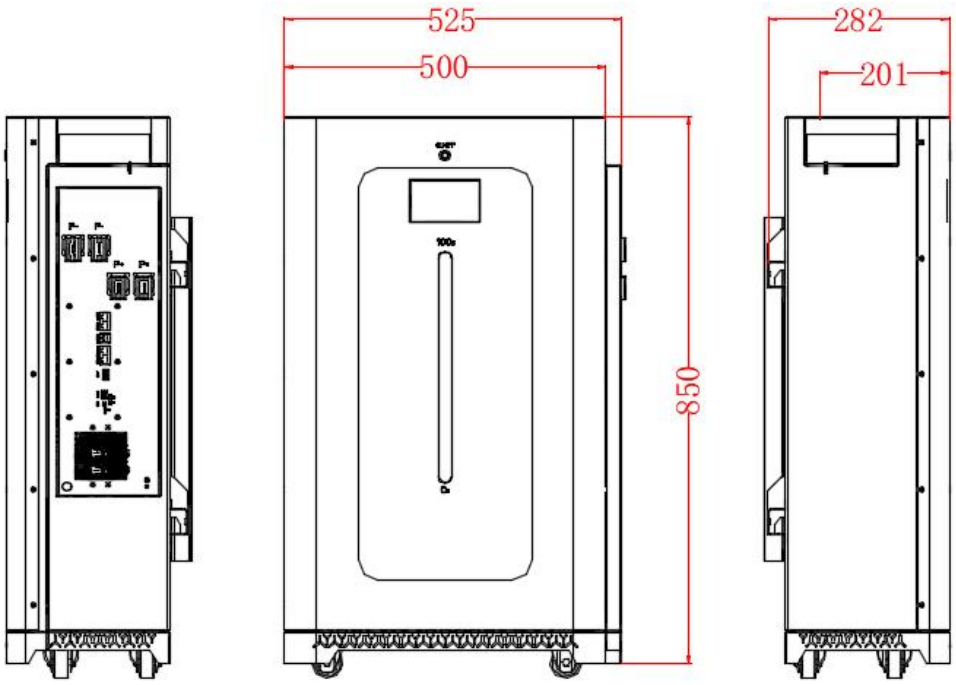
1.Production Introduction

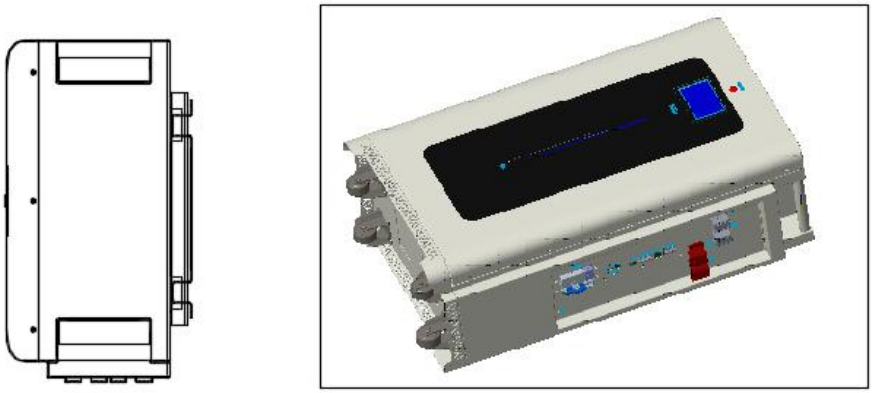
The 51.2V 300Ah battery system is applicable to home energy storage, small or medium sized shopping mall energy storage, which uses 16 pieces of 3.2V 300Ah battery cells in 16s1p configuration.

2. Production Introduction

This product model is a 48V300Ah battery pack composed of 16S1P cells, with a maximum continuous charging and discharging current of 200A, a 20A charging current limiting function, communication function (dual RS485), and storage function. The color is white.

2.1 Product Structure Diagram





2.2 Technical Parameter

Project		Specification	Marking
Production model		48V300Ah	48V/300AH
Nominal Capacity		300AH	16S1P(16S1P)
Nominal Voltage		51.2V	3.2*16
Nominal Power（Wh）±5%		15360	
Display Screen		5cun touch screen	
Charging method		CC-CV (constant current constant voltage)	
Discharge method		Constant current discharge	
Charge and discharge ports (common or separate)		Common	
Communication Port		RS485/CAN	
Cooling method		Natural cooling	
Charging working temperature range		0℃~55℃	
Discharge working temperature range		-20℃~60℃	
Storage temperature		-20℃~60℃	
Storage humidity		25%~70%	
Protection grade		IP55	
Size (L*W*Hmm)		850*525*282mm	
Weight±2kg		125KG	
Charging	Maximum continuous current	200A	CC&CV 200A
	Cutoff voltage	58.4V	
	Standard mode	Charge at a constant voltage of 58.4V and a constant current of 100A at an ambient temperature of (25 ± 2) ℃;	

Discharge	Maximum continuous current	200A	
	Overcurrent protection	215A	
	Cutoff voltage	40V	
	Standard mode	Under the condition of an ambient temperature of (25 ± 2) ℃, discharge the battery at a constant current of 100A until the single cell voltage reaches 2.5V (or the total voltage reaches 40V) and stop.	
Compatible with Inverter		CAN：派能、德业、固德威，古瑞瓦特、锦浪、Victron、首航、SMA等	
		RS485: 日月元、硕日、Pylon 等	

3. BMS

3.1 Overview of BMS System Functions

3.1.1 Cell and battery voltage detection.

3.1.2 Battery charging and discharging current detection.

3.1.3 Cell, environment, and power temperature detection.

3.1.4 Battery capacity calculation and cycle count function.

3.1.5 Charging and discharging MOSFET switch function.

3.1.6 Battery charging balance function.

3.1.7 Button switch function.

3.1.8 RS485 and CAN communication functions.

3.1.9 Upper computer control function.

3.1.10 Historical data storage function.

3.1.11 Charging current limiting function.

3.1.12 Secondary protection function.

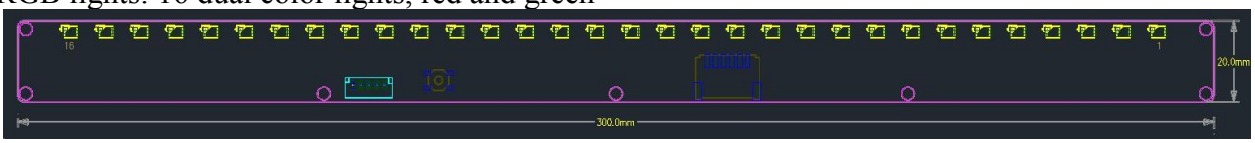
3.1.13 Heating function (optional).

3.2 BMS Parameter Settings

project name	Indicator project	Standard value
Standard value	Overcharge protection value	3.65±0.05V
	Overcharge Alarm value	3.6±0.05V
	Overcharge recovery value	3.38±0.05V
Cell over discharge protection	Overcharge protection value	2.5±0.05V
	Overcharge Alarm value	2.7±0.05V
	Overcharge recovery value	3.0±0.05V
Battery pack overcharge protection	Overcharge protection value	58.4±0.05V
	Overcharge Alarm value	57±0.05V
	Overcharge recovery value	54.4±0.05V
Battery pack over discharge protection	Overcharge protection value	40±0.05V
	Overcharge Alarm value	44±0.05V
	Overcharge recovery value	48±0.05V
Charging overcurrent protection	Charging overcurrent protection 1	215A
	Charging overcurrent 1 delay	3000mS
	Charging overcurrent protection 2	250A
	Charging overcurrent 2 delay	500mS
Discharge overcurrent protection	Charging overcurrent protection 1	215A
	Charging overcurrent 1 delay	3000mS
	Charging overcurrent protection 2	250A
	Charging overcurrent 2 delay	500mS
Short circuit protection	Short circuit protection current	380A
	Short circuit protection delay	300uS
	Short circuit protection released	When charging, the short-circuit protection is released
		After the load is removed, it will be automatically released
Temperature protection	Charging high temperature protection	60±2 ℃
	Charging high temperature recovery	50±2 ℃
	Low temperature protection for charging	-5±2 ℃
	Low temperature charging protection recovery	0±2 ℃
	Discharge high temperature protection	65±2 ℃
	Discharge high temperature recovery	50±2 ℃
	Low temperature protection for discharge	-10±2 ℃
	Low temperature discharge protection recovery	0±2 ℃
Balance function	Balanced turn-on voltage	3.5V
	Balanced opening voltage difference	65mA

3.3 LED Indicator Introduction

RGB lights: 16 dual color lights, red and green



3.3.1 Indication instructions (definition of running lights and signal lights)

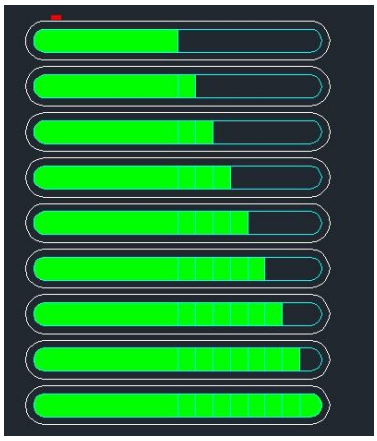
① Power on self-test: Green runs from low to high, from light 1 to light 16, with a frequency of 300mS. After the self-test is completed, it enters the normal display state

State.

② Communication interruption between BMS and light board for 30 seconds, flashing yellow light, on for 1 second, off for 1 second<

③ The red light stays on during faults and protections, flashes for 0.5 seconds during alarms, and goes out completely during undervoltage protection. It also turns red during overvoltage alarms or protections Do not flash or keep the light on constantly

④ When charging, the green light flashes in a loop (for example, when the SOC is 50%, lights 1 and 8 are always on, and starting from light 6, run for 300mS)



⑤ During discharge, decrease according to SOC

⑥ Overdischarge protection, the system enters sleep mode and is completely extinguished

⑦ When the battery is in standby mode (not charging or discharging), display the corresponding length based on the actual SOC (as shown in the figure below when it is 50%)

3.4 Reset button instructions

When the BMS is in sleep mode, press the button for 1 second and release it to activate the protection board. The LED indicator lights will light up sequentially from "L4" for 0.5 seconds.

When the BMS is in the active state, press the button for 3 seconds and release it, the protection board will enter sleep mode, and the LED indicator lights will light up sequentially from "RUN" for 0.5 seconds.

3.5 Sleep and wake-up function

3.5.1 Sleep

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

① Individual undervoltage protection or overall undervoltage protection has not been released within 30 minutes.

② Press the button for 3 seconds and then release it.

③ The minimum cell voltage is lower than the sleep set voltage (default value 3350mV), and the duration reaches the sleep delay time (default value 1440)

Minutes) (simultaneously meeting the requirements of no communication and no charging/discharging current).

④ Force shutdown through the upper computer software.

Before entering sleep mode, it is necessary to ensure that the P-terminal is not connected to external voltage, otherwise it will not be able to enter low-power mode.

⑤ The minimum cell voltage is lower than the undervoltage protection value of -500mV, and after a delay of 10 minutes, it is forced to enter deep sleep mode

3.5.2 Wake-up

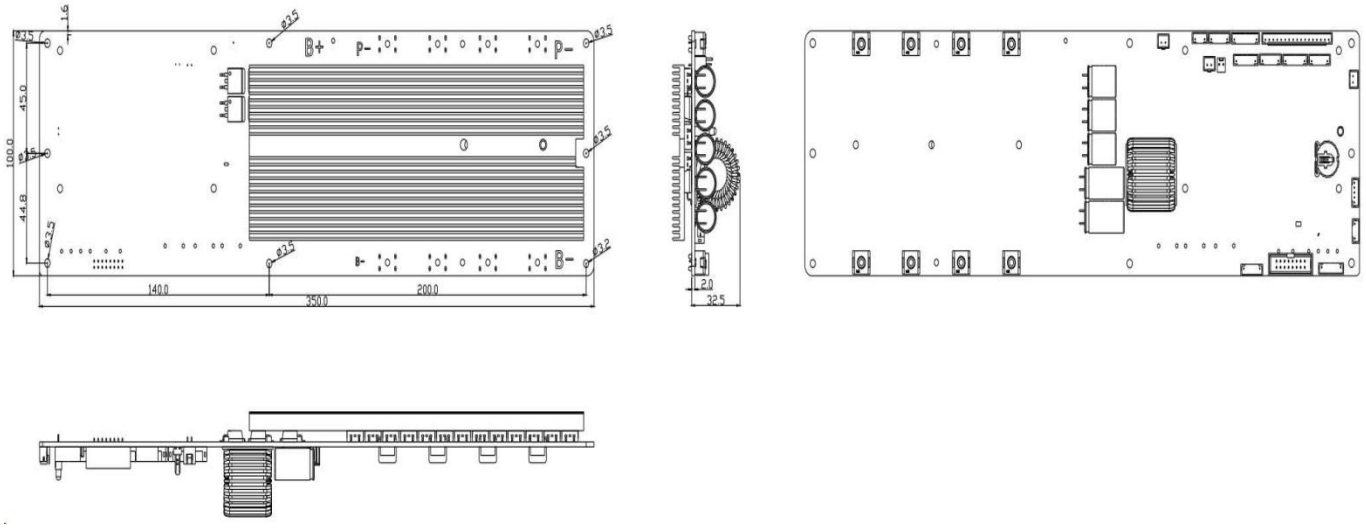
When the system is in low-power mode and meets any of the following conditions, the system will exit low-power mode and enter normal operation mode:

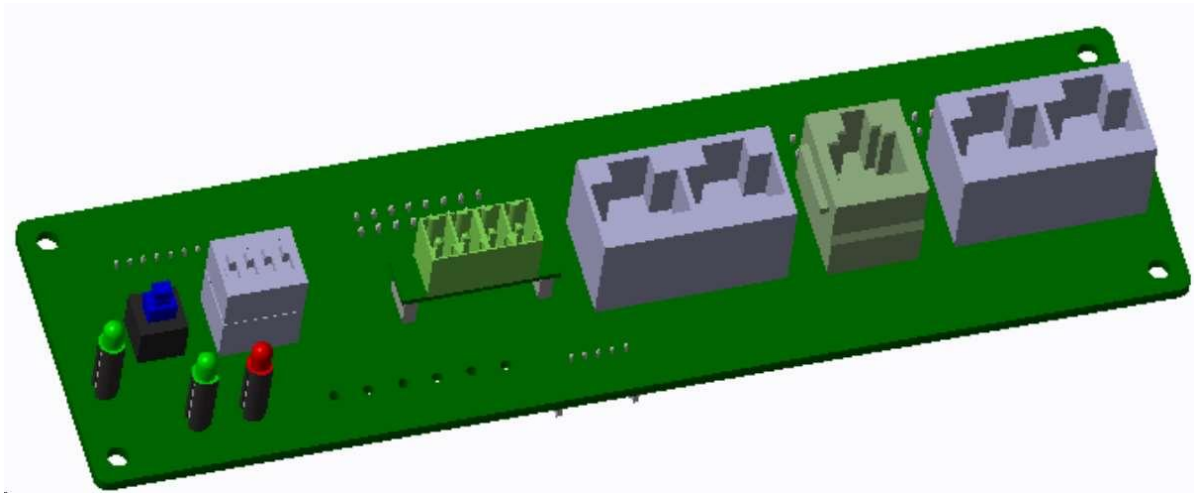
① Connect the charger, and the output voltage of the charger should be greater than or equal to 48V.

② Press the button for 1 second, then release the button.

③ Connect the RS485 communication line and activate the upper computer software.

3.6 BMS size and picture

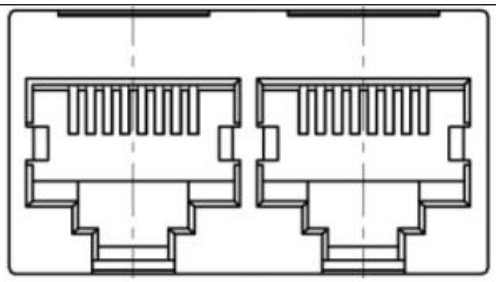




4.Communication

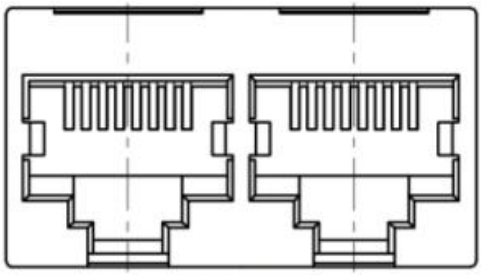
BMS can communicate with the upper computer through RS485 communication interface, and can communicate with multiple computers in parallel through RS485 interface; Equipped with RS485 and CAN interfaces for communication with inverters or terminals

4.1 Definition of Communication Interface



CAN 和 RS485 接口

RS485-1 接口（与上位机或逆变器通讯） 支持硕日、日月元、Pylon 协议--通过上位机切换协议		CAN-1 通信接口（逆变器通讯） 支持 Victron、Pylon、古瑞瓦特协议——通过上位机切换协议	
RS485—采用 8P8C 立式 RJ45 插座		CAN—采用 8P8C 立式 RJ45 插座	
RJ45 引脚	定义说明	RJ45 引脚	定义说明
1、8	RS485A-B1	4	CAN1-H
2、7	RS485A-A1	5	CAN1-L
6	GND	6	GND

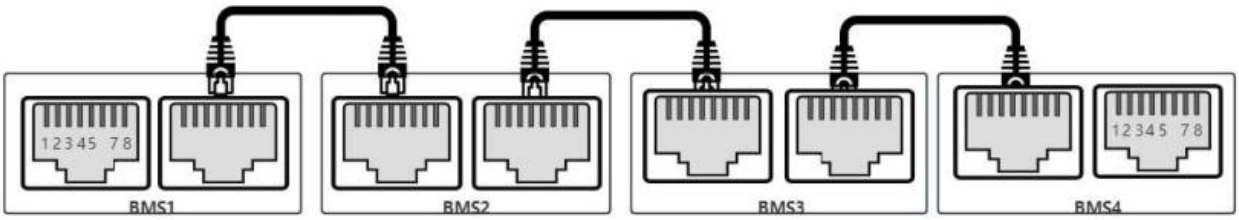


并联通讯端口

并机通讯端口（只用来并机）			
RS485-2—采用立式 RJ45 插座		RS485-2—采用 8P8C 立式 RJ45 插座	
RJ45 引脚	定义说明	RJ45 引脚	定义说明
1、8	RS485-B2	1、8	RS485-B2
2、7	RS485-A2	2、7	RS485-A2
6	GND	6	GND

4.2 Parallel interface

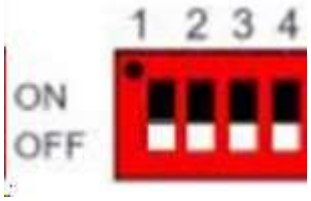
The BMS battery compartment communicates in parallel through RS485 bus and can also communicate with devices with RS485 bus, while the CAN interface enables communication with PC or other devices It has intelligent terminal communication and human-computer interaction for any battery pack information connected in parallel to the RS485 bus. The multi machine parallel bus interface is shown in the following figure.



4.3 Address DIP Switch

4.3.1 Dialing Settings

When using packs in parallel, different PACK addresses are distinguished by hardware dialing addresses, and each PACK address in the entire battery pack is unique. The following is the hardware address set through the dialing switch, as shown in the table below.



地址	拨码开关位置			
	#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

5.Display Screen

6.Test conditions

Except for special circumstances, all testing conditions shall be based on standard testing conditions:

Environmental temperature: 25 ± 5 ℃; Environmental humidity 40% -80% RH

Standard charging "refers to charging with a constant current of 0.2C to 58.4V at an ambient temperature of 25 ° C ± 5 ° C, and then charging with a constant voltage of 58.4V

The electric current is less than 0.02C.

Standard discharge "refers to discharging at a constant current of 0.2C to 40V under the condition of an ambient temperature of 25 ° C ± 5 ° C.

7.Performance and Security testing

7.1 Performance testing

Test project	Testing standards	Tchnical requirement
25 ° C room temperature discharge capacity	The battery pack is fully charged at a current of 0.2C under standard testing conditions, and then discharged at a current of 0.2C, and the discharge capacity of the battery pack is recorded.	≥ 100% nominal capacity
-10 ° C low-temperature discharge capacity	The battery pack is fully charged under standard testing conditions at a current of 0.2C, and then stored at a low temperature of -10 ° C for 10H. It is discharged at a current of 0.2C until the termination voltage, and the discharge capacity of the battery pack is recorded.	≥ 75% nominal capacity
55 ° C high temperature discharge capacity	The battery pack is fully charged under standard testing conditions at a current of 0.2C, and then stored at a high temperature of 55 ° C for 5H. It is discharged at a current of 0.2C until the termination voltage, and the discharge capacity of the battery pack is recorded.	≥ 95% nominal capacity
Charge retention capability and capacity recovery capability	The battery pack is first charged and discharged at a current of 0.2C under standard testing conditions, and the initial capacity is recorded. It is fully charged under standard testing conditions and left to stand at an ambient temperature of 25 ° ± 5C for 30 days. It is discharged at a current of 0.2C until the termination voltage is tested to maintain capacity. It is charged at 0.2C and then discharged at 0.2C for 3 cycles, with the third cycle being the recovery capacity	Charge retention rate ≥ 95%; Capacity recovery rate ≥ 95%
25 ° C ambient temperature cycle life	The battery pack is fully charged at a current of 0.2C under standard testing conditions, and then discharged at a current of 0.2C. The charging and discharging tests are conducted continuously at an ambient temperature of 25 ° C ± 5 ° C. The cycle life test is terminated when the discharge capacity is ≤ 80% of the initial capacity	≥ 3000 times
55 ° C high temperature cycle life	The battery pack is fully charged at a current of 0.2C under standard testing conditions, and then discharged at a current of 0.2C. The charging and discharging tests are conducted continuously at an ambient temperature of 55 ° C ± 5 ° C. The cycle life test is terminated when the discharge capacity is ≤ 80% of the initial capacity	≥ 1500 times

7.2 Security testing

Test project	Testing standards	Tchnical requirement
External short circuit test	The battery pack is charged under standard testing conditions. The fully charged battery pack is placed in an explosion-proof box and a wire with an internal resistance of less than 100m Ω is short circuited to the positive and negative poles outside the battery pack. The surface temperature of the battery is recorded during the test, and the short circuit lasts for 10 minutes to complete the test.	No fire, no explosion
Overcharge test	After charging the battery pack under standard testing conditions, a single section of the battery pack is charged at 0.2C using a constant current and constant voltage source. The constant current is charged to 5V and then switched to constant voltage charging until the cut-off current reaches 0A, ending the test.	No fire, no explosion
Over discharge test	After charging the battery pack under standard testing conditions, the load device is used to discharge the battery pack continuously at 0.5C until the voltage of a single battery cell reaches 0-0.5V, ending the test.	No fire, no explosion

8.Packing

8.1 The appearance of the battery box is good, without any defects such as paint peeling, scratches, deformation, or damage.

8.2 Before packaging, the battery should be in a shutdown sleep state.

8.3 The appearance of the battery must be inspected and qualified before it can be packed.

8.4 The outer packaging adopts wooden crate packaging, and the information on the wooden crate should be clear. The wooden crate should be nailed around to increase its strength and hardness, ensuring safety during transportation.

8.5 Protective packaging materials should be added inside the wooden box to ensure that the battery box is not scratched during transportation.

8.6 A packing list is attached inside the wooden box.

9.Product storage and transportation

9.1 Product storage

When the product is stored for a long time without use, it should be stored in a dry, clean, and well ventilated warehouse at 10 ℃ to 35 ℃, avoiding flammable and explosive materials; Regularly charge and maintain the battery pack every three months to ensure optimal performance.

9.2 Transportation

The battery pack should be packaged externally before transportation, and should be protected from severe shaking, impact, or compression during transportation, as well as exposure to sunlight and rain.

10.Safety precaution

To prevent battery leakage, heating, and explosion, please pay attention to the following preventive measures

Warning!

① It is strictly prohibited to immerse batteries in seawater or water. When not in use, they should be stored in a cool and dry environment

② It is strictly prohibited to use batteries by reversing the positive and negative poles;

③ It is prohibited to directly connect the positive and negative terminals of the battery with metal for short circuit;

④ Do not transport or store batteries together with metals such as hair clips, necklaces, etc;

⑤ Do not strike, throw, or step on batteries, etc;

⑥ It is prohibited to directly weld batteries and pierce batteries with nails or other sharp objects;

Attention!

① Do not use or place batteries in high temperatures (such as hot sunlight or in very hot cars), as this may cause the battery to overheat, catch fire, malfunction, or shorten its lifespan; The recommended optimal temperature for long-term storage of batteries is 10-45 ℃.

② Do not throw batteries into fire or heaters to prevent fire, explosion, and environmental pollution; Scrapped batteries should be returned to the supplier or battery recycling point for disposal.

③ Do not use in places with strong static electricity and strong magnetic fields, otherwise it may damage the battery safety protection device and bring unsafe hazards.

④ If the battery leaks and electrolyte enters the eyes, do not rub them. Immediately rinse the eyes with clean water and seek medical treatment, otherwise it may harm the eyes. If the battery emits an odor, heats up, discolors, deforms, or experiences any abnormalities during use, storage, or charging, the battery should be immediately removed from the device or charger and stopped.

⑤ It is prohibited to directly insert the positive and negative poles of the battery into the power socket, and a dedicated charger for lithium-ion batteries must be selected.

⑥ Before installation, it is necessary to check the battery voltage and connections, and only use them if everything is normal.

⑦ Half battery storage, if the battery has not been used for three months, it needs to be recharged once.

⑧ If the electrode is dirty, it should be wiped clean with a dry cloth before use, otherwise it may cause poor contact and functional failure.