Shenzhen Braun Power Energy Storage Co., Ltd.

48V300AH Battery Pack Product Specification

Preparation:	Audit:	Approval:
Date:	Date:	Date:

Shenzhen Braun Power Energy Storage Co., Ltd.

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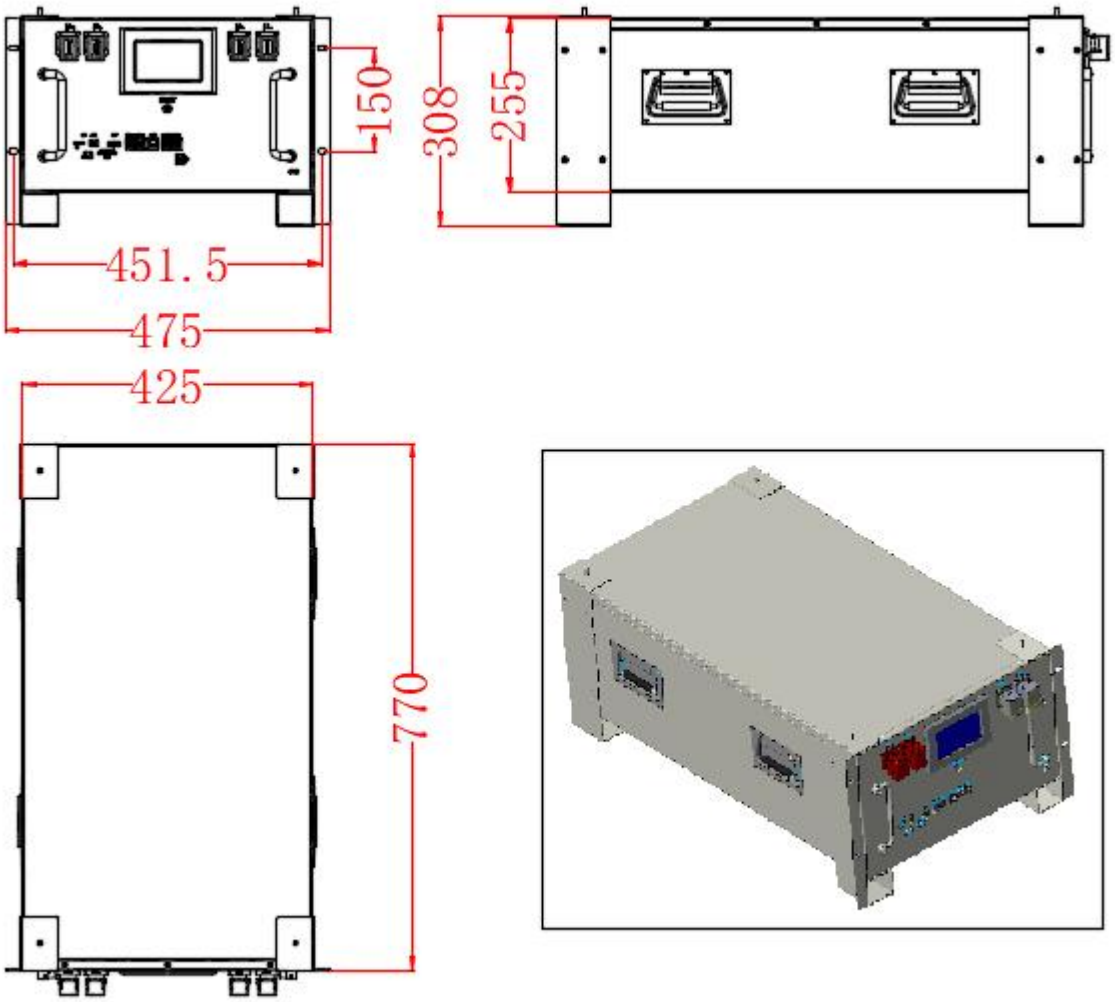
1. Product Overview

This product consists of a lithium iron phosphate battery pack with 16 strings of cells (including BMS), and this product is suitable for load equipment with an operating current within the range of 200A.

2. Product specifications

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

2.1 Battery Pack Product Structure Diagram



2.2 Battery system technical parameters

	serial number	Project name	Basic parameters	Note
battery pack	1	Product Model	48V300Ah	
	2	Rated voltage	51.2V	
	3	Rated capacity	300Ah	
	4	Energy rating	15360Wh	
	5	Cooling method	Natural cooling	
	6	combinatorial approach	16 series 1 parallel	
	7	Charge and Discharge Ports (Common or Split)	common-language (e.g. mouth)	
	8	Communication port RS232/RS485/CAN	RS485/CAN	
	9	Monitor	with display	
	10	Heating function	None by default	Mismatch
	11	Battery pack charging cut-off voltage	57.6V	Charge protection voltage
	12	Battery pack discharge cut-off ltage	43.2V	Discharge protection voltage
	13	Monoblock charging cut-off voltage	3.65	
	14	Single Discharge Cutoff Voltage	2.7	
	15	Charging operating temperature range	-0～55℃	
	16	Discharge operating temperature range	-20～60℃	
	17	Standard charge	0.2C current continuous charge to 57.6V cutoff	
	18	Standard discharge	1C current continuous discharge to 43.2V cutoff	
	19	Maximum allowable continuous charging current	200A	
	20	Maximum allowable continuous discharge current	200A	
	21	Discharge protection current	220A	

	22	Battery box size (L*W*Hmm)	475x770x308mm	Dimensional tolerance ±2mm
	23	Battery box weight tolerance (KG)	127	Weight tolerance ±3KG

3.Battery Management System (BMS)

3.1 BMS System Functional Overview

3.1.1 Provide overcharge, overdischarge, short circuit, overcurrent, high and low temperature alarm and protection functions for single and total voltage.

3.1.2 With 20A charging current limit function.

3.1.3 Provides intelligent equalization management function, and the charging equalization strategy can be set flexibly, which can effectively improve the usage time and cycle life of the battery.

3.1.4 Two-way RS485 communication, in line with YD/T1363.3 communication specifications, support for the upper computer docking, support for multi-group parallel communication.

3.1.5 Provide multi-function keys for reset, power down, wake up, etc.

3.1.6 With standby hibernation function to keep the system in non-operating mode with low power consumption.

3.1.7 The BMS system can be set up to enable the system to perform real-time storage of operational data. It is used for monitoring, analyzing and maintenance of the system.

3.1.8 Self-contained pre-charging anti-short-circuit function.

3.1.9 Heating function (optional)

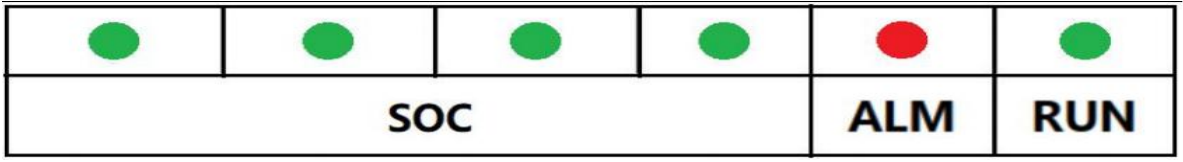
3.2 BMS System Parameter Setting

Project name	Indicator project	standard value
Monoblock overcharge protection	Overcharge protection value	3.65±0.05V
	Overcharge alarm value	3.55±0.05V
	overcharge recovery value	3.5±0.05V
monomer overdischarge protection	overdischarge protection value	2.7±0.05V
	overdischarge alarm value	2.8±0.05V
	bleed-off recovery value	2.9±0.05V
Battery pack overcharge protection	Overcharge protection value	57.6±0.05V
	Overcharge alarm value	57±0.05V
	overcharge recovery value	56±0.05V

Battery pack over-discharge protection	overdischarge protection value	43.2±0.05V
	overdischarge alarm value	46±0.05V
	bleed-off recovery value	48±0.05V
Charge overcurrent protection	Charge overcurrent1 protection	205A
	Charge overcurrent 1 delay	4000mS
	Charge overcurrent 2 protection	220A
	Charge overcurrent 2 delay	500mS
Discharge overcurrent protection	Discharge overcurrent 1 protection	205A
	Discharge overcurrent 1 delay	5000mS
	Discharge overcurrent 2 protection	220A
	Discharge overcurrent 2 delay	500mS
short circuit protection	Short-circuit protection current	300A
	Short circuit protection delay	300uS
	Short-circuit protection release	When there is charging, the short-circuit protection is released
		When the load is removed, it will automatically disengage the
temperature protection	Charging High Temperature Protection	60±2 ℃
	Charge High Temperature Recovery	50±2 ℃
	Charging Low Temperature Protection	-5±2 ℃
	Charge cryoprotection recovery	0±2 ℃
	Discharge heat protection	65±2 ℃
	Discharge High Temperature Recovery	50±2 ℃
	Discharge cryoprotection	-10±2 ℃
	Discharge cryoprotection recovery	0±2 ℃
equalization function	Equalized turn-on voltage	3.5V
	Equalize opening differential pressure	20mA

3.3 LED Indicator Description

LEDs: 4 green capacity indicators, one red warning indicator, one green run indicator



3.4 Description of Capacity Indication

状态	充电						放电					
容量指示灯	L1●	L2●	L3●	L4●	L5●	L6●	L1●	L2●	L3●	L4●	L5●	L6●
0~16.6%	常亮	灭	灭	灭	灭	灭	常亮	灭	灭	灭	灭	灭
16.6~33.2%	常亮	常亮	灭	灭	灭	灭	常亮	常亮	灭	灭	灭	灭
33.2~49.8%	常亮	常亮	常亮	灭	灭	灭	常亮	常亮	常亮	灭	灭	灭
49.8~66.4%	常亮	常亮	常亮	常亮	灭	灭	常亮	常亮	常亮	常亮	灭	灭
66.4~83.0%	常亮	常亮	常亮	常亮	常亮	灭	常亮	常亮	常亮	常亮	常亮	灭
83.0~100%	常亮	常亮	常亮	常亮	常亮	常亮	常亮	常亮	常亮	常亮	常亮	常亮

3.5 Description of Status Indications

系统状态	正常/告警/保护	RUN	ALM	电量 LED	说明
		●	●	● ● ● ● ● ●	
关机	休眠	灭	灭	全灭	
待机	正常	闪烁1	灭	依据电量指示	待机状态
	告警	闪烁1	灭		温度告警 ALM 闪3
充电	正常	闪烁2	灭		
	告警（不含温度）	闪烁2	灭		温度告警 ALM 闪3
	过充保护	闪烁1	灭		过充保护 ALM 灭
	过温、欠温、过流保护	闪烁1	闪烁2		
	限流充电	常亮	灭		
放电	正常	常亮	灭		
	告警	常亮	闪烁3		放电过流告警 ALM 灭
	过放保护	闪烁1	灭		过放保护 ALM 灭
	过温、欠温、过流、短路、反接保护	闪烁1	闪烁2		
失效	故障	灭	常亮	全灭	故障指 BMS 电压采样器件、充电 MOS 损坏，温度传感器断线等硬件故障

3.6 LED blinking instructions

闪动方式	亮	灭
闪1	0.25 S	3.75 S
闪2	0.5 S	0.5 S
闪3	0.5 S	1.5 S

3.7 Reset button key description

When the BMS is in sleep state, press the button for 1S and release it, the protection board is activated and the LEDs light up sequentially for 0.5 seconds starting from "L4".

When the BMS is active, press the button for 3S and then release it, the protection board will be put to sleep and the LEDs will light up in sequence from "RUN" for 0.5 seconds.

3.8 Sleep and Wake Functions

3.8.1 hibernation

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

① The single unit undervoltage protection or overall undervoltage protection has not been released within 30 minutes.

②Press the button for 3 seconds and release it.

③The lowest single unit voltage is lower than the hibernation set voltage (default 3300mV) and the duration reaches the hibernation delay time (default 1440minutes) (while satisfying no communication and no charge/discharge current).

④Forced shutdown via the upper computer software.

Before entering hibernation, make sure that no external voltage is connected to the P-terminal, otherwise you will not be able to enter the low power mode.

3.8.2 Wake up

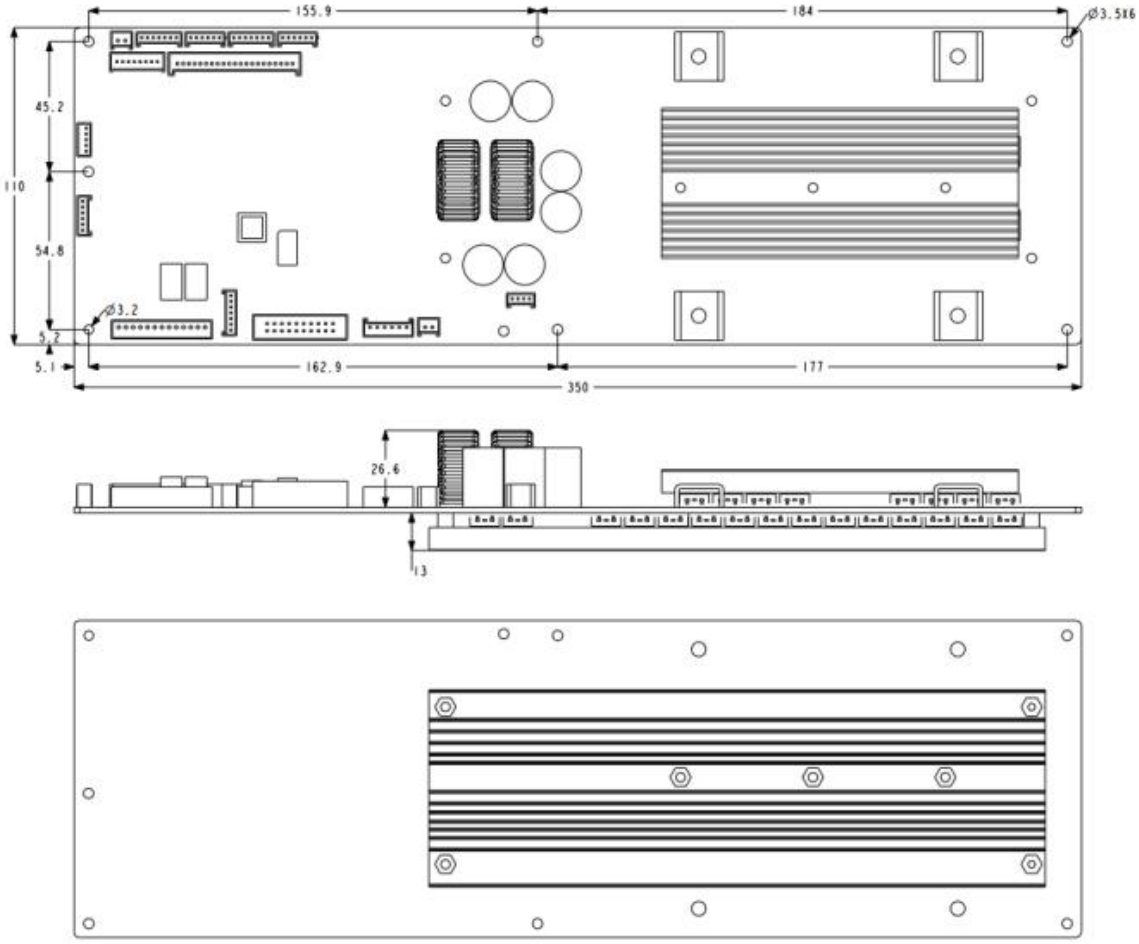
当When the system is in low-power mode and any of the following conditions are met, the system will exit low-power mode and enter normal operation mode:

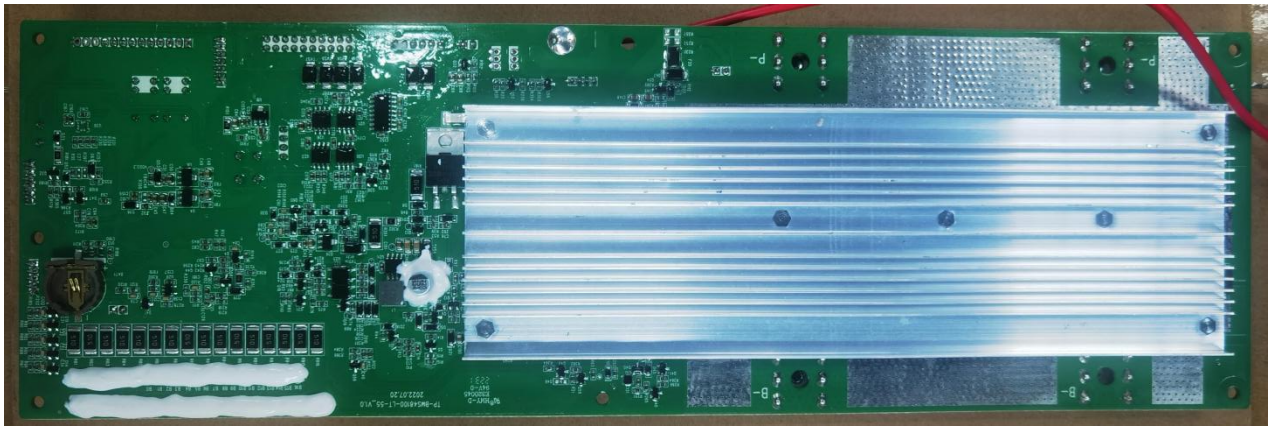
①Connect to a charger with an output voltage greater than or equal to 48V.

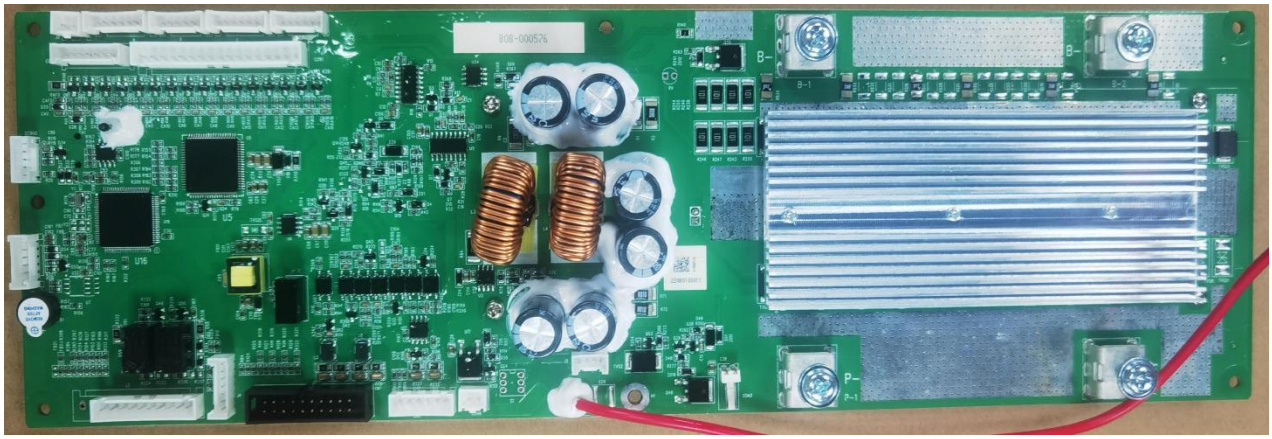
②Press the button for 1S and release the button.

③Connect the RS485 communication cable and open the upper computer software.

3.9 Protective plate size in kind


155.9
184
Ø3.5X6
45.2
110
54.8
Ø3.2
5.2
5.1
162.9
177
350
41.6
26.6
13





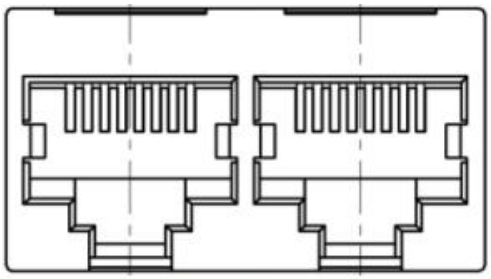




4. Newsletter

With RS232 interface for communication with the upper computer; with RS485 interface for parallel communication within the BMS group, which can be used for parallel communication of multiple machines; with RS485 and CAN interfaces for communication with inverters or terminals.

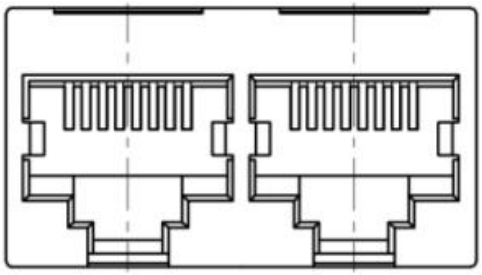
4.1 Communication Interface Definition



CAN 和 RS485 接口

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	RS485-B1	9、10、11、14、16	NC
2、7	RS485-A1	12	CANL
3、6	GND	13	CANH
4、5	NC	15	GND

CAN 和 RS485 接口



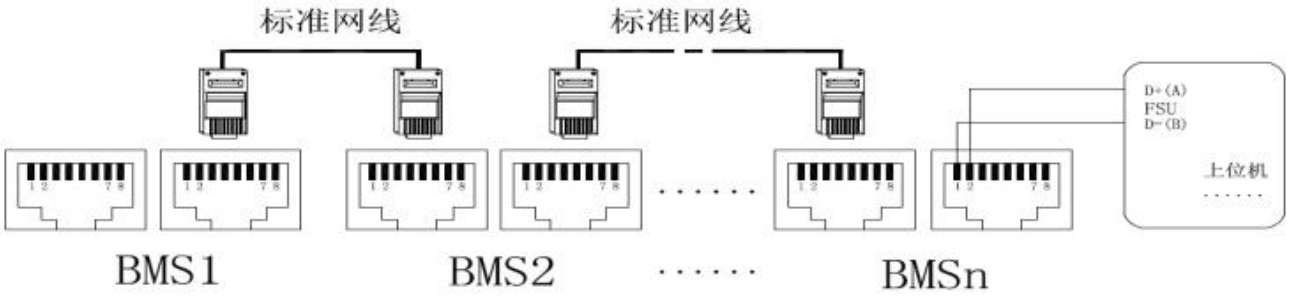
并联通讯端口

RS485--采用 8P8C 立式 RJ45 插座		RS485--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-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

并联通讯端口

4.2 Parallel interface

The BMS battery pack communicates in parallel via the RS485 bus, and can also communicate with devices with the RS485 bus, while the CAN interface enables communication with a PC or its It communicates with intelligent terminals, human-computer interaction RS485 bus is connected in parallel for any battery pack information, and the multi-machine parallel bus interface is shown in the figure below.



4.3 Address dip switches

4.3.1 Dialing code setting

（1）For parallel communication operation of multiple machines, it is necessary to configure the dialing code address of each PACK first. The dialing code adopts BCD code format, and the address of 0 is defined as 

（The black dot is the 0 FF state, the blank is the ON state, the same as the following）Address 0, Address 1 

Address 2 

, binary, and so on for other addresses.

（2）(2) The master needs to be dialed to 0 and the slave to 1-15.

1	ON	OFF	OFF	OFF	Pack1
2	OFF	ON	OFF	OFF	Pack2
3	ON	ON	OFF	OFF	Pack3
4	OFF	OFF	ON	OFF	Pack4
5	ON	OFF	ON	OFF	Pack5
6	OFF	ON	ON	OFF	Pack6
7	ON	ON	ON	OFF	Pack7
8	OFF	OFF	OFF	ON	Pack8
9	ON	OFF	OFF	ON	Pack9
10	OFF	ON	OFF	ON	Pack10
11	ON	ON	OFF	ON	Pack11
12	OFF	OFF	ON	ON	Pack12
13	ON	OFF	ON	ON	Pack13
14	OFF	ON	ON	ON	Pack14
15	ON	ON	ON	ON	Pack15

5. Test condition

Except for special cases, all test conditions are based on standard test conditions:

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

"Standard charging" means charging at a constant current of 0.2C to 57.6V at an ambient temperature of 25° C±5° C, and then charging at a constant voltage of 57.6V to a current of less than 0.02C.

The "standard discharge" is a discharge to 43.2V at a constant current of 0.2C at an ambient temperature of 25° C±5° C. The discharge is performed at an ambient temperature of 25° C±5° C and a constant current of 0.2C.

6. Electrical performance, safety performance testing

6.1 Electrical Performance Testing

Test items	Test standard	Technical requirement

25°C room temperature discharge capacity	The battery pack is first fully charged at 0.2C current under standard test conditions and then discharged at 0.2C current to record the discharge capacity of the battery pack.	≥100% of nominal capacity
-10° C low temperature discharge capacity	The battery pack is first fully charged with 0.2C current under standard test conditions, then stored for 10H at a low ambient temperature of -10° C, and discharged to the termination voltage with 0.2C current to record the discharging capacity of the battery pack.	≥75% of nominal capacity
55° C high temperature discharge capacity	The battery pack is first fully charged at 0.2C current under standard test conditions, then stored at 55° C high ambient temperature for 5H, and discharged to the termination voltage at 0.2C current to record the discharging capacity of the battery pack.	≥95% of nominal capacity
Charge retention and capacity restoration	Battery packs are first charged and discharged at 0.2C under standard test conditions, initial capacity is recorded, fully charged under standard test conditions, set aside for 30d at 25° ±5C ambient temperature, discharged at 0.2C to the termination voltage to test the retention of capacity, charged at 0.2C, discharged at 0.2C, cycling for 3 times, and the third time for the recovery of capacity.	Charge retention rate ≥95%; Capacity recovery rate ≥95%
Cycle life at 25°C	Battery packs are fully charged at 0.2C current and then discharged at 0.2C current under standard test conditions, with continuous charging and discharging test at 25° C±5° C ambient temperature, and the cycle life test is terminated when the discharged capacity is ≤80% of the initial capacity.	≥3000 times
55° C high temperature cycle life	Battery packs are fully charged at 0.2C current and then discharged at 0.2C current under standard test conditions, with continuous charging and discharging at 55° C±5° C ambient temperature, and the cycle life test is terminated when the discharged capacity is ≤80% of the initial capacity.	≥1500 times

6.2 Safety Performance Testing

Test items	测试标准	技术要求
External Short Circuit Test	Battery pack in the standard test conditions for charging, will be fully charged battery pack placed in the explosion-proof box, with internal resistance of less than 100mΩ wire short-circuit in the battery pack outside the positive and negative electrodes, the test process to record the surface temperature of the battery, short-circuit duration of 10min, that is, to complete the test.	No fire, no explosion

Overcharge test	After the battery pack is charged under standard test conditions, a single cell of the battery pack is charged at 0.2C with a constant current and constant voltage source, and the constant current is charged to 5V and then switched to constant voltage charging until the cutoff current reaches 0A, ending the test.	No fire, no explosion
Over-discharge test	After the battery pack is charged under standard test conditions, the battery pack is continuously discharged at 0.5C with load equipment until the voltage of a single cell reaches 0~0.5V, then the test is ended.	No fire, no explosion

7. Product Packaging Requirements

7.1 The battery box is in good appearance, there can not be paint loss, scratches, deformation, broken and other bad phenomena.

7.2 Before packing, the battery should be in the shutdown and hibernation state.

7.3 The appearance of the battery should be inspected and passed before packing.

7.4 The outer packaging is packed in wooden crates, the information on the crates should be clear, and the wooden crates are treated with nails around the crates to increase the strength and hardness of the crates to ensure safety in transportation.

7.5 Protective wrapping material should be added to the inside of the wooden box to ensure that the battery box is not scratched during transportation.

7.6 A packing list is attached to the inside of the wooden crate.

8. Product Storage and Transportation

8.1 Product Storage

When the product is not used for long-term storage, it should be stored in a dry, clean and well-ventilated warehouse at 10℃~35℃, avoiding flammable and explosive substances;Regular charging and maintenance of the battery pack every three months ensures that the battery is at its optimum performance.

8.2 Product Transportation

Battery packs should be externally packaged for transportation, and should be protected from violent shocks, impacts or extrusion during transportation, and from sun and rain.

9. Warnings and Precautions for Battery Use

To prevent possible battery leakage, heat generation, and explosion, please observe the following precautions

Warning!

① It is strictly prohibited to immerse the battery in seawater or water, and it should be placed in a cool and dry environment when not in use.

② It is strictly prohibited to use the battery with the positive and negative poles reversed;

③ It is prohibited to short-circuit the positive and negative terminals of the battery by connecting them directly with metal;

④ Batteries should not be transported or stored with metal, such as hairpins or necklaces;

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

⑥ Direct soldering of batteries and piercing of batteries with nails or other sharp objects are prohibited;

Attention!

① It is prohibited to use or place the battery under high temperature (under hot sunlight or in a very hot car), otherwise it may cause the battery to overheat, catch fire, or fail to function and shorten its life; the recommended optimal temperature for long-term storage of the battery is 10-45℃.

② It is prohibited to dispose of the batteries in fire or heater to prevent fire, explosion and pollution of the environment; end-of-life batteries should be returned to the supplier or battery recycling point for disposal.

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

④ If the battery leaks and the electrolyte gets into your eyes, do not rub it, flush your eyes immediately with water and take it to hospital immediately for treatment, otherwise it will hurt your eyes. If the battery emits a strange odor, becomes hot, discolored, deformed, or if any abnormality occurs during use, storage, or charging, the battery should be immediately removed from the device or charger and taken out of service.

⑤ It is prohibited to insert the positive and negative terminals of the battery directly into the power outlet, and a special charger for lithium-ion batteries must be used.

⑥ Battery voltage and connectors should be checked before installation, and everything should be normal before use.

⑦ Battery half power storage, if the battery has not been used for three months, need to carry out the replenishment of electricity once.

⑧ If the electrodes are dirty, they should be wiped clean with a dry cloth before use, otherwise poor contact and malfunction may result.