



深圳市光讯能源科技有限公司

Shenzhen Bullcube Energy Technology Co., LTD

产品规格书

Product specification

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产品名称 (Name) : 立式可移动锂离子电池包
产品型号 (Model) : HT-C0152
产品规格 (Specifications) : 51.2V/300Ah
拟制 (Fiction) : _____
审核 (Auditing) : _____
批准 (Approve) : _____
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1. 适用范围 (Application)

本规格书描述电池之标称参数、电气特性、安全性能、环境适应性及其实验和判定、使用说明和安全规程、质量评定及包装、标志、贮存、运输等。

This specification describes the battery's nominal parameters, electrical characteristics, safety performance, environmental suitability, experiments and judgments, instructions for use and safety regulations, quality assessment, packaging, marking, storage, transportation and so on.

2. 引用标准 (Standard)

中华人民共和国国家标准GB31241-2014《便携式电子产品用锂离子电池和电池组安全要求》

National Standard of the People's Republic of China GB 31241-2014" Safety Requirements for Lithium-Ion Battery and Battery Pack for Portable Electronics.

3. 产品形态及规格 (Product form and specifications)

3.1 产品形态 (Product form)



3.2 产品规格 (Product Specification)

电池类型 (Battery type)	锂离子电池 (lithium ion battery)	
组合方式 (Combination method)	16S1P	
额定电压 (Rated voltage)	51.2V	
额定容量 (Rated capacity)	304Ah	
能量密度 (Energy density)	15564.8Wh	
均衡方式 (Equalization method)	被动均衡 (passive equilibrium)	
接口类型 (Interface type)	充放电同口 (Charge and discharge are both at the same port)	
常温循环寿命 Cycle Life@25°C	≥ 5500 Cycles	25±2°C 带夹具初始夹紧力 300±20Kgf, 阶梯充电 (参考 4.2.8) /1C 放电, 容量衰减至 161Ah (单体) . 25±2°C, step-charge (refer to 4.2.8) /1C DC under 300±20Kgf preload. Capacity fading to 161Ah (Cell) .
电池组出货状态 (Pack before shipping)	电池组在出厂时已充入 40~60%左右的电量, 电池电压在 51.2V~54V。(Charged with about 40~60% power and the voltage is 51.2V~54V being) 。	
运行功耗 (Consumption of running)	≤25mA	
休眠模式功耗 (Consumption of sleep Mode)	≤150uA	
储运模式功耗 (Consumption of power down Mode)	≤20uA	
储运温度 (Storage temperature)	-30°C~60°C	
储运湿度 (Storage humidity)	存储环境湿度 ≤ 90%ROH, 无凝露 (Storage ambient humidity ≤ 90% ROH, no condensation)	
退出储运模式条件 (condition of exit power down Mode)	连接充电器或者闭合自锁开关(Connect the charger or Key press)	
电池包外形尺寸(Pack size)		
电池包重量 (Pack Weight)		
其它 (Others)		

4. 电气特性 (Electrical Characteristics)

项目 (Item)		参数 (Parameter)	备注 (Remark)
充电特性 (Charging characteristics)	标准充电倍率 (Standard charge rate)	0.33C (100A)	条件: 电池工作温度 (Prerequisite: Battery operating temperature) : 25±2°C
	最大充电电流 (Max. charging current)	200A	条件: BMS工作温度 (Prerequisite : BMS operating

充电特性 (Charging characteristics)	充电截止电压 (Charge cut-off voltage)	58.4V	temperature) : -20°C ~75°C	
	标准充电模式 (Standard charge method)	0.33C 恒流充电至 58.4V 然后恒压充电至截至电流 0.05C; 0.33C CC to 3.65V CV to 0.05C		
	充电过流 (Over current Charge)	过流保护 1 (overcurrent protection1)	215A (保护延时 1000mS)	
		过流保护 2 (overcurrent protection2)	220A (保护延时 2000mS)	
		过流保护 3 (overcurrent protection3)	225A (保护延时 4000mS)	
	过流恢复释放条件 (Over current Charge release conditions)	1、10min 尝试自动恢复 (Automatic recover after a delay of 10 minutes) 2、放电恢复(Discharging)		
	充电保护温度 (Charging Temperature)	$\geq 65\pm 3^{\circ}\text{C}/\leq -10\pm 3^{\circ}\text{C}$	电池组内部温度约 $\geq 65\pm 3^{\circ}\text{C}/\leq -10\pm 3^{\circ}\text{C}$ 时会关断充电回路 (When the internal temperature of the battery reaches $\geq 65\pm 3^{\circ}\text{C}/\leq -10\pm 3^{\circ}\text{C}$, will shut off the charging loop)	
充电环境温度 (Temperature of charging place)	+10°C ~+35°C	最佳充电温度 (Best charge temperature)		
放电特性 (Discharging characteristics)	持续放电电流 (Continuous discharge current)	200A	在0°C~45°C环境中 (In the environment of 0°C~45°C)	
	最大放电电流 (MAX. discharging current)	200A		
	过放保护电压 (Over discharge protection voltage)	40V \pm 0.02V	条件: 电池工作温度 (Prerequisite: Battery operating temperature) : 25°C	
	放电过流 (Over current Discharge)	过流保护1 (overcurrent protection1)	215A (保护延时1000mS)	
		过流保护 2 (overcurrent protection2)	220A (保护延时 2000mS)	
		过流保护 3 (overcurrent protection3)	225A (保护延时 4000mS)	
过流恢复释放条件 (Over current Charge release conditions)	延时 1min 后自动恢复或充电恢复 (Automatic recover after a delay of 1 minutes or charging)			
短路保护电流 (Short circuit protection current value)	500A	短路保护延时 :400uS (Short circuit protection delay time:400uS)		

放电特性 (Discharging characteristics)	Discharging Temperature 放电保护温度	$\geq 75^{\circ}\text{C} \pm 3 / \leq -20^{\circ}\text{C} \pm 3$	When the internal temperature of the battery reaches $\geq 75^{\circ}\text{C} / \leq -20^{\circ}\text{C}$, will shut off the discharging loop 电池组内部温度约 $\geq 75^{\circ}\text{C} / \leq -20^{\circ}\text{C}$ 时会关断放电回路
	放电环境温度 (Temperature of discharging place)	$0^{\circ}\text{C} \sim +45^{\circ}\text{C}$	Best discharge temperature 最佳放电温度

5. 可靠性测试 (Pack reliability test)

5.1 电性能、机械性能测试 (Electrical and Mechanical Performance Tests)

测试项目 Test item	测试方法 Test method	技术要求 Technical requirement
放电容量 Discharge capacity	在标准测试条件下, 对电池组进行标准充电, 以0.1C电流放电, 记录放电容量。 Under the standard test condition, the pack is charged to the standard, and discharged at 0.1C, and recorded the capacity.	$\geq 100\%$ 标称容量 $\geq 100\%$ standard capacity
-20°C 低温放电容量 Discharge capacity at -20°C	电池组标准充电后, 在 $-20 \pm 2^{\circ}\text{C}$ 低温环境中储存8H后, 以0.1C电流放电至终止电压, 记录放电容量。 After standard charging of the battery pack, storage for 8H at $-20 \pm 2^{\circ}\text{C}$, discharge at 0.1C to the end voltage, and record the discharge capacity.	$\geq 65\%$ 标称容量 (不带BMS) $\geq 65\%$ standard capacity (Without BMS)
55°C 高温放电容量 Discharge capacity at 55°C	电池组标准充电后, 在 $55 \pm 2^{\circ}\text{C}$ 高温环境中储存4H后, 以0.1C电流放电至终止电压, 记录放电容量。 After standard charging of the battery pack, storage for 4H at $55 \pm 2^{\circ}\text{C}$, discharge at 0.1C to the end voltage, and record the discharge capacity.	$\geq 97\%$ 标称容量 $\geq 97\%$ standard capacity
荷电保持能力 (残余容量和容量恢复能力) Charge retention capability (residual capacity and capacity recovery)	电池组标准充放电后, 记录初始容量; 电池标准充电后, 在 $15 \sim 35^{\circ}\text{C}$ 的条件下搁置28d, 然后放电记录残余容量; 在将电池进行标准充放电, 记录恢复容量。 After standard charging and discharging of the battery pack, record the initial capacity, then storage for 28 days at $15 \sim 35^{\circ}\text{C}$, then discharge and record the residual capacity; then record recovery capacity after standard charge and discharge.	残余容量(荷电保持率) $\geq 95\%$ 恢复容量 $\geq 97\%$ Residual capacity (charge retention rate) $\geq 95\%$; Recovery capacity $\geq 97\%$
循环寿命 Cycle life	将电池组标准充电后, 以0.5C放电, 当放电容量小于起始容量的80%时终止循环寿命测试。 Discharge the battery pack at 0.5C after standard charge, terminate the cycle life test when the discharge capacity is less than 80% of initial capacity.	≥ 5500 次 ≥ 5500 Cycles

<p>55°C 7天储存 Storage at 55°C for 7 days</p>	<p>电池组标准充放电后，记录初始容量；电池标准充电后，在55±2°C高温环境中储存7天，然后放电记录残余容量；在将电池进行标准充放电，记录恢复容量。 After standard charging and discharging of the battery pack, record the initial capacity; after standard charging of the battery pack, storage for 7 days at 55±2°C, then discharge and record the residual capacity; then record recovery capacity after standard charge and discharge;</p>	<p>残余容量 ≥92% Residual capacity ≥92% 恢复容量 ≥95% Recovery capacity ≥95%</p>
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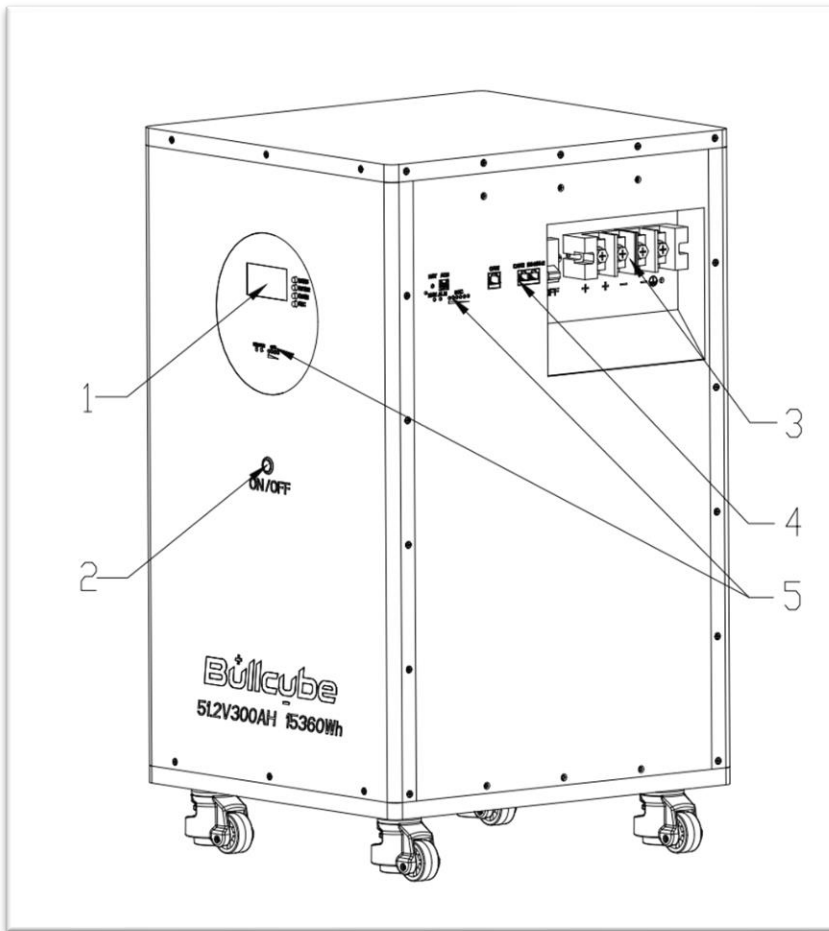
5.2 安全性能测试 (Safety Performance Test)

<p>测试项目 Test item</p>	<p>测试方法 Test method</p>	<p>技术要求 Technical requirement</p>
<p>短路 Short circuit</p>	<p>将电池组标准充电后，放置在防爆箱中，用内阻小于100mΩ的导线短路于电池组外部的正负极，试验过程中记录电池表面温度，短路持续时间10min,即完成测试。 或以单体电芯进行短路安全评估测试。 After standard charging, placed in the explosion-proof box, with an internal resistance of less than 100mΩ wire short circuit in the battery pack external positive and negative terminals. The battery pack is placed in an explosion-proof box after standard charging, and then short-circuited with a wire with internal resistance less than 100mΩ to the positive and negative terminals outside the battery pack, the surface temperature of the battery is recorded during the test, and the short-circuit duration is 10min, which is the completion of the test. Or use a single battery cell to conduct short-circuit safety assessment test. The test is completed when the surface temperature of the battery is recorded during the test. Translated with www.DeepL.com/Translator (free version)</p>	<p>不起火，不爆炸(不带保护线路及壳体试验) No fire, no explosion (without protective circuit and shell test)</p>
<p>过充电 Over-charge</p>	<p>将电池组标准充电后，用恒流恒压源对电池组某一单节进行0.2C充电，恒流充电至5V后转为恒压充电，直到截止电流到0A或表面温度小于环境温度+10°C以下时，结束试验。 After standard charging of the battery pack, use a constant current and constant voltage source to charge a single cell of the battery pack with 0.2C, and then switch to constant voltage charging after constant current charging to 5V. Charge until the cut-off current reaches 0A or the surface temperature is less than the ambient temperature. When the surface temperature is less than the ambient temperature +10°C or below, test end</p>	<p>不起火，不爆炸(不带保护线路及壳体试验) No fire, no explosion (without protective circuit and shell test)</p>

<p>过放电 Over-discharge</p>	<p>将电池组标准充电后，用负载仪对电池组进行0.5C 持续放电，直至某一单节电池电压到达0~0.5V时结束试验。</p> <p>After standard charging of the battery pack, use the load meter to discharge the battery pack continuously at 0.5C until the voltage of a single cell reaches 0~0.5V, then end the test.</p>	<p>不起火，不爆炸(不带保护线路及壳体试验)</p> <p>No fire, no explosion (without protective circuit and shell test)</p>
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6. 产品结构及相关功能介绍 (Product structure and related functions)

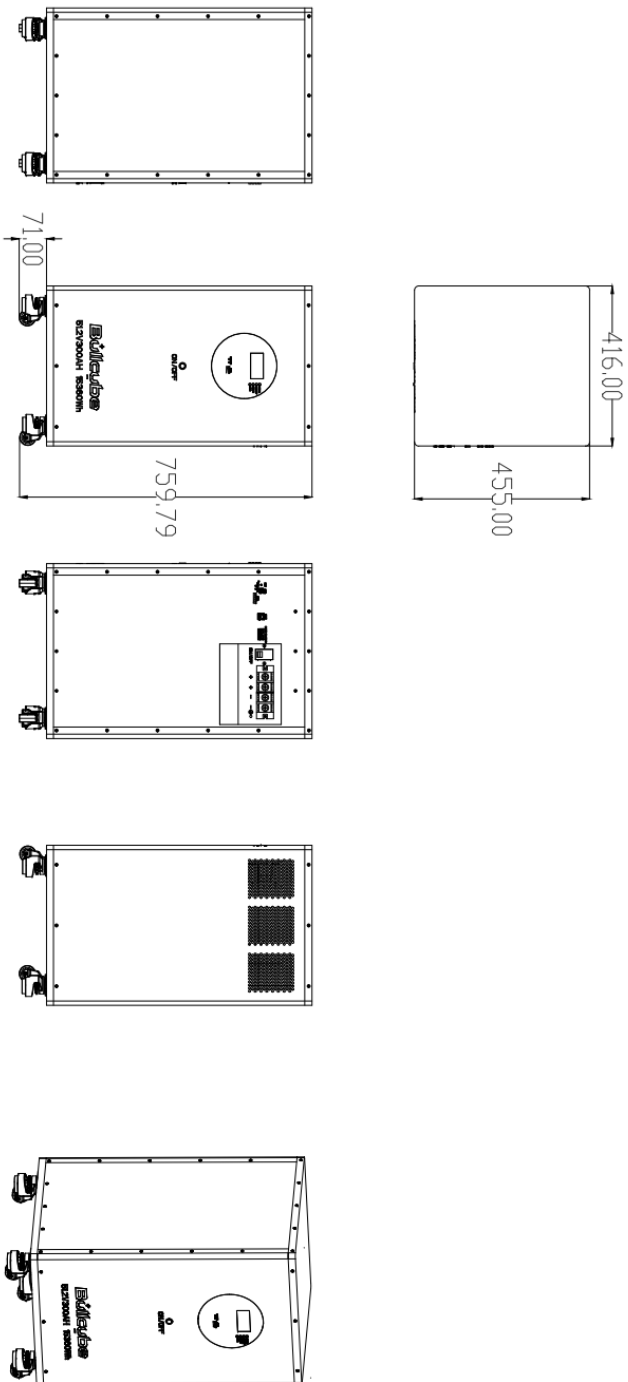
6.1外部配置介绍 (Exterior Configuration Introduction)



序号	配置名称	序号	配置名称
1	显示屏及控制按键(Display and control buttons)	4	外部通讯接口 (external communication interface)
2	开/关机按键 (On/Off button)	5	SOC 电量显示 (SOC power display)
3	充/放电接口 (Charge and Discharge Interface)		

6.2 外观尺寸 (Appearance Size)

HT-C0152立式可移动锂离子电池包外观尺寸图(单位: MM)



规格: 51.2V/300Ah

公差等级	0.5~3	>3~6	>6~30	>30~120
f	±0.05	±0.05	±0.1	±0.15
n	±0.1	±0.1	±0.2	±0.3

零件名称		HT-C0152立式可移动锂离子电池包	
零件图号		零件编号	
表面处理		比例	1:1
日期	2024/4/2	材厚/厚度	
制图		数量	
审核		版本	A1
第 张	共 张	第三视角	

6.3 功能介绍 (Functions)

6.3.1.过充保护和恢复(Overcharge protection and recovery)

单体过充保护及恢复(Cell overcharge protection and recovery)

当任意一节电芯电压高于单体过充电压设定值，并且持续时间达到单体过充延时，系统进入过充保护状态，关闭充电 MOS，不能对电池充电。单体过充保护后，当所有单体电压降到单体过充恢复值以下时，解除过充保护状态。也可放电解除。

When the voltage of any cell is higher than the set value of the cell overcharge voltage, and the duration reaches the cell overcharge delay, the system enters the overcharge protection state, the charging MOS will turn off, and the battery cannot be charged. After the cell overcharge protection, when the voltage of all cells drops below the cell overcharge recovery value, the overcharge protection state is released. It can also be released by discharge.

总体过充保护及恢复(Entire overcharge protection and recovery)

当总体电压高于总体过压设定值，并且持续时间达到总体过充延时，系统进入过充保护状态，关闭充电 MOS，不能对电池充电。当总体电压降到总电压过压保护恢复值以下时，解除过充保护状态，也可放电解除。

When the entire voltage is higher than the entire Over-voltage set value, and the duration reaches the entire overcharge delay, the system enters the overcharge protection state, turns off the charging MOS, and cannot charge the battery. When the entire voltage drops below the recovery value of the entire voltage Over-voltage protection, the overcharge protection state is released, and it can also be released by discharge.

6.3.2.过放保护和恢复(Over-discharge protection and recovery)

单体过放保护及恢复(Cell over-discharge protection and recovery)

当最低节电压低于单体过放电压设定值，并且持续时间达到单体过放延时，系统进入过放保护状态，关闭放电 MOS，不能对电池放电。发生单体过放保护后，对电池组充电可以解除过放保护状态。

When the minimum cell voltage is lower than the set value of the over-discharge voltage of the cell, and the duration reaches the over-discharge delay of the cell, the system enters the over-discharge protection state, turns off the discharge MOS, and cannot discharge the battery. After the cell over-discharge protection occurs, charging the battery pack can release the over-discharge protection state.

总体过放保护及恢复(Entire over-discharge protection and recovery)

当总体电压低于总体过放电压设定值，并且持续时间达到总体过放延时，系统进入过放保护状态，关闭放电 MOS，不能对电池放电。发生总体过放保护后，对电池组充电可以解除过放保护状态。

When the entire voltage is lower than the entire over-discharge voltage set value, and the duration reaches the entire over-discharge delay, the system enters the over-discharge protection state, turns off the discharge MOS, and cannot discharge the battery. After the entire over-discharge protection occurs, charging the battery pack can release the over-discharge protection state.

6.3.3.充电过流保护和恢复(Over-current protection and recovery in charging)

当充电电流超过充电过流保护电流且持续的时间达到过流检测延迟时间，系统进入到充电过流保护状态，不能对电池进行充电。发生充电过流保护后延时自动恢复，如需不要自动恢复可将对应的释放时间设长；放电也可以解除充电过流状态。

When the charging current exceeds the charging protection current and the duration reaches the Over-current detection delay time, the system enters the charging Over-current protection state and cannot charge the battery. After the charging Over-current protection occurs, it will automatically recover after a delay. If you want to automatically recover or not, you can set the corresponding release time to be longer; the charging Over-current state can also be released by discharging.

6.3.4.放电过流保护和恢复(Over-current protection and recovery in discharging)

当放电电流超过放电过流保护电流且持续的时间达到过流检测延迟时间，系统进入到放电过流保护状态，关闭放电 MOS。发生放电过流后延时自动恢复，如需不要自动恢复可将对应的释放时间设长。充电也可以解除放电过流状态。放电有两级过流保护功能，对不同的电流值具有不同的响应速度，更加可靠地保护电池。

When the discharge current exceeds the discharge Over-current protection current and the duration reaches the Over-current detection delay time, the system enters the discharge Over-current protection state and turns off the discharge MOS. Delayed automatic recovery after discharge Over-current occurs, and the corresponding release time can be set longer if automatic recovery is required. Charging can also release the discharge Over-current protect condition. Discharge has two-level Over-current protection function, which has different response speeds for different current values, and protects the battery more reliably.

6.3.5.温度保护和恢复(Temperature Protection and Recovery)

6.3.5.1.充放电高温保护及恢复(High temperature protection and recovery in charging and discharging)

当充放电时 NTC 检测电芯表面的温度高于设定的高温保护温度时，管理系统进入高温保护状态，充电或放电 MOSFET 关闭，在该状态不能对电池包充电或放电。当电芯表面的温度下降到高温恢复设定值时，管理系统从高温状态恢复，重新导通充放电 MOS。

When the NTC detects that the temperature of the battery cell surface is higher than the setting of high temperature protection value during charging and discharging, the management system enters the high temperature protection state, the charging or discharging MOSFET is turned off, and the battery pack cannot be charged or discharged in this state. When the temperature of the surface of the cell drops to the high temperature recovery set value, the management system recovers from the high temperature state and turns on the charge and discharge MOS again.

6.3.5.2.充放电低温保护和恢复(Low temperature protection and recovery in charging and discharging)

当充放电时 NTC 检测电芯表面的温度低于设定的低温保护温度时，管理系统进入低温保护状态，充电或放电 MOSFET 关闭，在该状态不能对电池包充电或放电。当电芯表面的温度上升到低温恢复设定值时，管理系统从低温状态恢复，重新导通充放电 MOS。

When the NTC detects that the temperature of the cell surface is lower than the setting of low temperature protection value during charging and discharging, the management system enters the low temperature protection state, the charging or discharging MOSFET is turned off, and the battery pack cannot be charged or discharged in this state. When the temperature of the cell surface rises to the low temperature recovery set value, the management system recovers from the low temperature state and turns on the charge and discharge MOS again.

6.3.6.均衡功能(Balance function)

管理系统采用电阻旁路的方式进行电芯均衡,充电过程中电池组最高节单体电芯电压达到设定的均衡启动电压值，且电池组单体电芯最低电压与最高电压压差大于设定值时，达到条件的电芯均衡功能开启，相邻的两路均衡不能同时开启。当电芯压差小于设定值或者电芯电压小于均衡开启电压时均衡停止。

The management system uses the resistance bypass method to balance the cells. During the charging process, the voltage of the highest single cell of the battery pack reaches the set equilibrium starting voltage value, and the voltage difference between the minimum voltage and the maximum voltage of the single cell of the battery pack is greater than the set value. When the value is set, the equalization function of the cells that meet the conditions is enabled, and the two adjacent equalizers cannot be enabled at the same time. The equalization stops when the cell voltage difference is less than the set value or the cell voltage is less than the equalization turn-on voltage.

6.3.7.容量计算(Capacity calculation)

可以通过对电流、时间积分的方式精准地进行电池组的 SOC 计算。电池组满容量、及循环容量可以通过上位机进行设置，具有充放电循环次数计算功能，当电池组累积放电容量达到设定循环容量时，循环次数增加一次。

The SOC calculation of the battery pack can be accurately performed by integrating current and time. The full capacity and cycle capacity of the battery pack can be set through the host computer, It has the function of calculating the number of charge and discharge cycles. When the cumulative discharge capacity of the battery pack reaches the set cycle capacity, the number of cycles increases once.

注：新装电池请根据电池容量设定标称容量和循环容量，并进行一次容量学习，否则可能出现容量不准问题。容量学习操作：先充满电至过压保护，然后放空电至欠压保护，再充一次电即可。

Note: For newly installed batteries, please set the nominal capacity and cycle capacity according to the battery capacity, and conduct a capacity study, otherwise the capacity inaccuracy may occur. Capacity learning operation: first fully charge to Over-voltage protection, then discharge to under-voltage protection, and then charge it again.

6.3.8.休眠功能(Sleep function)

当系统满足一下任一条件，系统进入低功耗模式或掉电模式，此时充放电 MOS 管关闭；

1)系统最低单节电压低于欠压保护-100mV 电压且持续 60S，保护板进入掉电模式，功耗 uA 级别。充电或按键可退出休眠模式。

2)用户按键按下 3~6S 后，指示灯全部电量，然后依次熄灭后，按键松开后，系统进入休眠模式。充电、通信、按键可激活系统

3)断开自锁开关 1S~3S 后，系统进入掉电状态。

1) When the system meets any of the following conditions, the system enters the low power mode or power off mode, and the charge and discharge MOS tube shuts down.

2) After the user presses the key for 3 to 6S, all the indicators are charged, and then turn off successively. After the key is released, the system enters the sleep mode. Charging, communication, and pressing buttons activate the system.

3) After the self-locking switch is turned off for 1S to 3S, the system enters the power-off state.

6.4 通讯功能(Communication)

6.4.1 RS485 通讯 & UART 通讯(RS485 communication & UART communication)



UART通讯盒

UART Communication Box



RS485通讯盒

RS485 communication box

注：上述工具都需要另行购买。

Note: The above tools need to be purchased separately.

连接方式：在电脑端安装我司通讯盒专用驱动程序后，将通讯盒的 USB 端插在电脑的 USB 端口，另一头接在已经接好电池的保护板对应接口。打开上位机，点通讯口设置，选择通讯盒对应 COM 口，其他选项不用动，确认后点击开始，即可读取保护板的数据。如需更改保护板参数，一定要先在参数页面点击读取参数后，再来更改参数。

The connection method: After installing the special driver for our communication box on the computer, insert the USB end of the communication box into the USB port of the computer, and connect the other end to the corresponding interface of the protection board that has been connected to the battery. Open the upper computer, click the communication port settings, select the COM port corresponding to the communication box, and do not change other options. After confirming, click Start to read the data from the BMS. If you need to change the parameters of the BMS, you must click on the parameter page to read the parameters before changing the parameters.

通讯设置(Communication setting)

RS485_1/LCD_UART/蓝牙 UART/WIFI UART 通讯设置： .波特率：9600； .校验位：无； .数据位长度：8 位； .停止位长度：1 位；	.RS485_1/LCD_UART/BLUE_UART/WIFI UART communication setting .Baud rate:9600; .Parity Bit:NONE; .Data Bit:8 bits; .Stop Bit:1 bit;
RS485_2 通讯设置： .波特率：19200； .校验位：无； .数据位长度：8 位； .停止位长度：1 位；	.RS485_2 communication Setting .Baud rate:19200; .Parity Bit:NONE; .Data Bit:8 bits; .Stop Bit:1 bit;

6.4.2 CAN 总线通讯

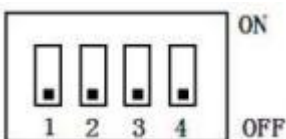
环境配置：将 USBCAN Driver 安装至电脑中，首先需要核对电脑操作系统，32 位操作系统与 64 位操作系统匹配不同的驱动文件。(32 位操作系统匹配文件后缀"x86",64 位操作系统匹配文件后缀"x64")。最后可在电脑的设备管理器中查看端口以检查是否成功安装。

连接方式：将通讯盒的 USB 线插入电脑的 USB 端口，另一端连接在电池的保护板对应接口。通讯格式：CAN 设备根据通讯盒类型选择，波特率默认为 500K。

Environment configuration: To install the USBCAN Driver to the computer, first check the computer operating system. The 32-bit operating system and the 64-bit operating system match different driver files. (For 32-bit operating systems, the file suffix is x86; for 64-bit operating systems, the file suffix is x64.) Finally, you can check the successful installation by viewing the port in your computer's Device Manager.

Connection method: Insert the USB cable of the communication box into the USB port of the computer, and connect the other end to the corresponding interface of the battery protection board. Communication format: CAN device based on the type of communication box, the default baud rate is 500K.

6.5 拨码开关 (Dip switch)

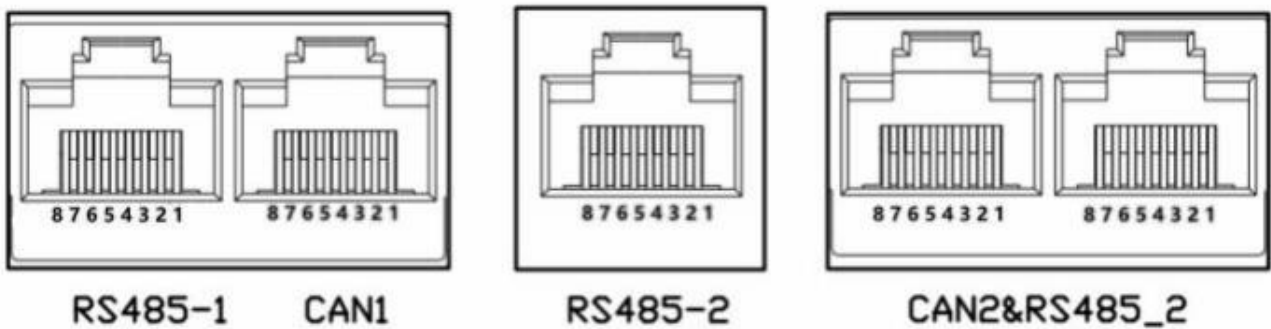


当 PACK 作并联使用时，拨码到任一地址时使用拨码地址功能，否则使用默认自动寻址功能，通过 BMS 上的拨码开关设置地址区分不同的 PACK，需避免地址设为相同，BMS 拨码开关的定义参照下表,系统最大支持 15 个并机。

When packs are connected in parallel, use the DIP address function when DIP 6 is connected to ON. Otherwise, use the default automatic addressing function. Use the DIP switch on the BMS to set the address to distinguish different packs.

地址位(二进制) Address bit (binary)	说 明 (Explain)				
	4	3	2	1	
0001(1)	OFF	OFF	OFF	ON	设置 PACK1 主机/单机使用 (Set PACK1 to be used by a host or single machine)
0010(2)	OFF	OFF	ON	OFF	设置 PACK2 (Set PACK2)
0011(3)	OFF	OFF	ON	ON	设置 PACK3 (Set PACK3)
0100(4)	OFF	ON	OFF	OFF	设置 PACK4 (Set PACK4)
0101(5)	OFF	ON	OFF	ON	设置 PACK5 (Set PACK5)
0110(6)	OFF	ON	ON	OFF	设置 PACK6 (Set PACK6)
0111(7)	OFF	ON	ON	ON	设置 PACK7 (Set PACK7)
1000(8)	ON	OFF	OFF	OFF	设置 PACK8 (Set PACK8)
1001(9)	ON	OFF	OFF	ON	设置 PACK9 (Set PACK9)
1010(10)	ON	OFF	ON	OFF	设置 PACK10 (Set PACK10)
1011(11)	ON	OFF	ON	ON	设置 PACK11 (Set PACK11)
1100(12)	ON	ON	OFF	OFF	设置 PACK12 (Set PACK12)
1101(13)	ON	ON	OFF	ON	设置 PACK13 (Set PACK13)
1110(14)	ON	ON	ON	OFF	设置 PACK14 (Set PACK14)
1111(15)	ON	ON	ON	ON	设置 PACK15 (Set PACK15)

接口图示：



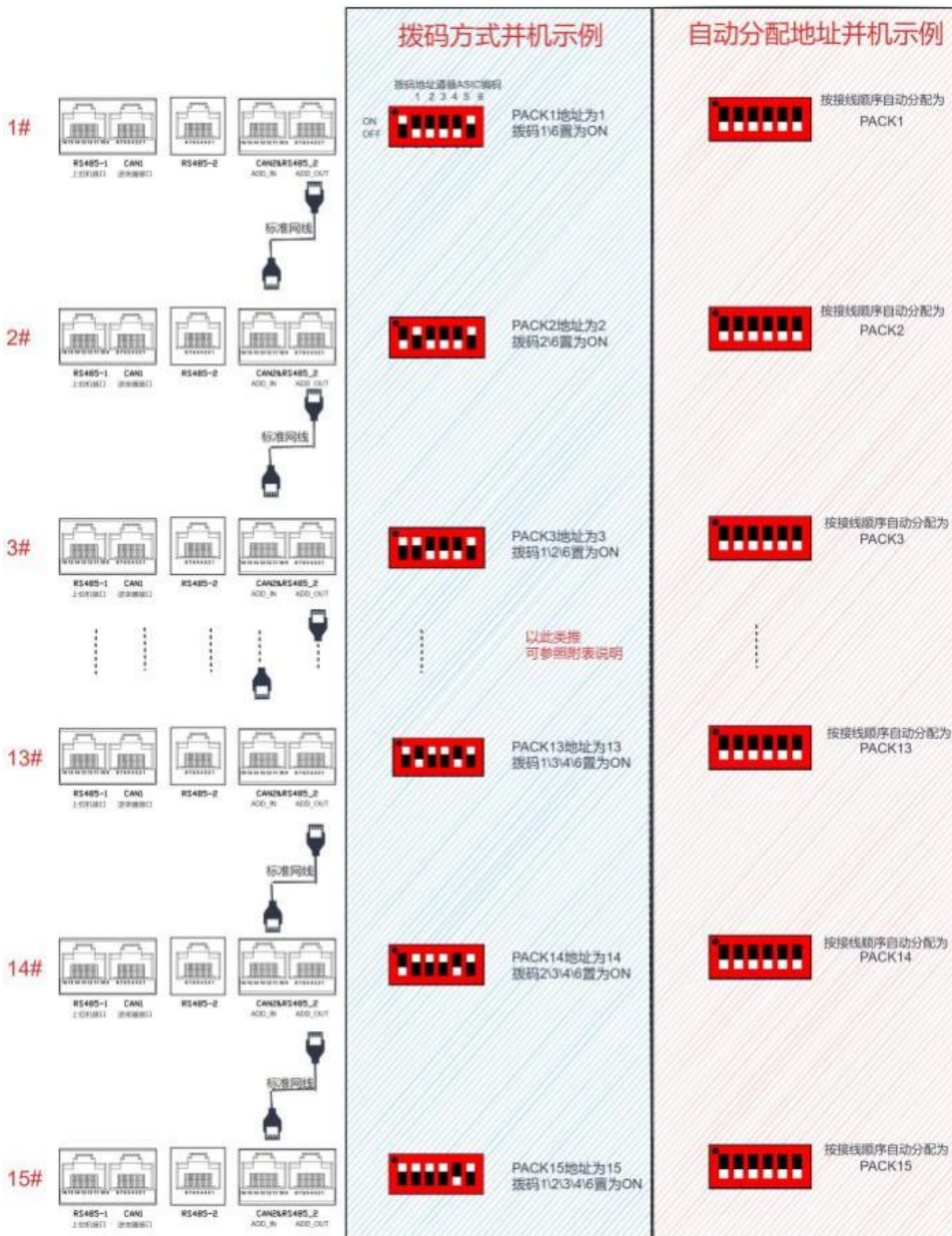
接口定义:

功能用途	RS485-1 接口 (与上位机或逆变器通信)		CAN1 通信接口 (逆变器通信接口)	
插座类型	8P8C 立式 RJ45 插座		8P8C 立式 RJ45 插座	
引脚定义	RJ45 引脚	定义说明	RJ45 引脚	定义说明
	1、8	RS485-B1	1、8	NC
	2、7	RS485-A1	2、7	NC
	4	NC	4	CANH1
	5	NC	5	CANL1
	3、6	GND	3、6	GND

功能用途	RS232 接口 (上位机通讯接口)	
插座类型	8P8C 立式 RJ11 插座	
引脚定义	RJ45 引脚	定义说明
	1、2、6	NC
	3	TX
	4	RX
	5	GND

功能用途	RS485-2 接口 (并机通信接口)			
插座类型	8P8C 立式 RJ45 插座		8P8C 立式 RJ45 插座	
引脚定义	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
	3	ADDR_IN	3	ADDR_OUT
	4、5	NC	4、5	NC
	6	GND	6	GND

并机接线说明



6.6 显示功能 (Display function)

表 4- 11- 1 LED 显示说明 (Table 4- 11- 1 LED display description)

系统状态 State of system	事件 Event	ON/OFF (LED9)	Run (LED8)	Alarm (LED7)	SOC(LED6~1)						说 明						
		LED6	LED5	LED4	LED3	LED2	LED1										
		●	●	●	●	●	●										
关机(Power off)	休眠(Sleep)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	全灭(All LEDs turn off)					
待机 static state	正常(Normal)	ON	Flash1	OFF	参考表 4-11-2 Refer to table(4-11-2)						/						
	告警(Alarm)	ON	Flash1	Flash3							/						
	正常(Normal)	ON	ON	OFF							/						
充电 Charging	告警(Alarm)	ON	ON	Flash3	参考表 4-11-2 Refer to table(4-11-2)						过充告警 ALM 不闪烁 The over-voltage alarm does not flash						
	过压保护 (OV protect)	ON	ON	OFF							ON	ON	ON	ON	ON	ON	/
	温度、过流、失效保护 (Temperature, Over-current, fail-safe)	ON	OFF	ON							OFF	OFF	OFF	OFF	OFF	OFF	OFF
放电 Discharging	正常(Normal)	ON	Flash 3	OFF	参考表 4-11-2 Refer to table(4-11-2)						/						
	告警(Alarm)	ON	Flash 3	Flash 3							/						
	欠压保护 (UV protect)	OFF	Flash2	OFF							OFF	OFF	OFF	OFF	OFF	OFF	OFF
	过流、短路、温度、失效保护 (Over-current, short circuit, temperature, fail-safe)	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	/					

表 4- 11- 2 电池 SOC 显示指示说明 (Table 4- 11- 2 SOC display description)

状态(State)	充电(Charging)						放电(Discharging)						
LED	LED6	LED5	LED4	LED3	LED2	LED1	LED6	LED5	LED4	LED3	LED2	LED1	
	●	●	●	●	●	●	●	●	●	●	●	●	
SOC(%)	0~16.6%	OFF	OFF	OFF	OFF	OFF	Flash2	OFF	OFF	OFF	OFF	OFF	ON
	16.6~33.2%	OFF	OFF	OFF	OFF	Flash2	ON	OFF	OFF	OFF	OFF	ON	ON
	33.2~49.8%	OFF	OFF	OFF	Flash2	ON	ON	OFF	OFF	OFF	ON	ON	ON
	49.8~66.4%	OFF	OFF	Flash2	ON	ON	ON	OFF	OFF	ON	ON	ON	ON
	66.4~83.0%	OFF	Flash2	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON
	83.0~100%	Flash2	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
RUN LED●	ON						Flash 3						

表4- 11-3 LED Flash (Table 4- 11-3 LED flash description)

闪烁模式(Flash Mode)	亮(ON)	灭(OFF)
Flash1	0.25S	3.75S
Flash2	0.5S	0.5S
Flash3	0.5S	1.5S

6.7 蜂鸣器动作说明 (Buzzer action description)

故障时, 每 1S 鸣叫 0.25S;

保护时, 每 2S 鸣叫 0.25S (过欠压保护除外);

告警时, 每 3S 鸣叫 0.25S (过欠压告警除外);

When a fault occurs, 0.25S is emitted every 1S;

When protecting, chirp 0.25S every 2S (except over and under voltage protection);

When an alarm is generated, the alarm is generated every 3S for 0.25S (except for an over-voltage or under-voltage alarm);

6.8 复位按键开关说明 (Reset key switch description)

BMS 处于休眠状态时, 按下按键(1S)后松开, 保护板被激活, LED 指示灯从"LED1"开始依次点亮 0.5 秒。
BMS 处于激活状态时, 按下按键(3~6S)后,LED 指示灯从最低电量灯开始依次点亮 0.5 秒,松开后,系统进入休眠。

BMS 处于激活状态时, 按下按键(6~10S)后松开, 保护板被复位, LED 指示灯依据当前电量显示。

When the BMS is in hibernation state, press the key (1S) and release it, the protection board is activated, and the LED indicator lights up successively from "LED1" for 0.5 seconds.

When the BMS is active, press the button (3 to 6S), and the LED indicator will turn on for 0.5 seconds from the lowest power indicator. When released, the system will go to sleep.

When the BMS is in the active state, press the button (6-10s) and release it, the protection board is reset, and the LED indicator is displayed according to the current power.

6.9 自锁开关说明 (Description of the self-locking switch)

BMS 处于休眠状态时, 闭合自锁后, 保护板上电, LED 指示灯从"LED1"开始依次点亮 0.5 秒。

BMS 处于激活状态时, 断开自锁开关 1S~3S 后, 系统进入掉电状态。

When the BMS is in hibernation state, after closing the self-lock, the protection board is powered on, and the LED indicator lights up successively from "LED1" for 0.5 seconds.

When the BMS is active, turn off the self-locking switch and wait for 1S~3S before the system enters the power-off state

7 注意事项 (Notes)

7.1 使用电池前, 请仔细阅读本规格书和注意电池表面标识。

Before using the battery, please read this specification carefully and pay attention to the battery surface identification.

7.2 长期不用时, 每一个月对电池进行一次标准充放电维护, 电池在 10%~50%荷电状态下贮存。

If battery is not in state of usage for a long time, maintain the battery once a month with standard charge and discharge, and store the battery in the state of 10%~50% SOC.

7.3 充电电流和充电电压不得超过本规格书中规定的允许最大充电电流和最大充电电压。使用高于推荐值电流充电将可能引起电池的充放电性能、机械性能和安全性能的问题，并可能会导致发热或漏液。

The charging current and voltage should not exceed the maximum charging current and voltage in this specification. Charging the battery with current above the recommended value may cause problems with the battery's charge and discharge performance, mechanical and safety performance, and may lead to heat or leakage.

7.4 放电电流不得超过本规格书规定的最大放电电流，大电流放电会导致电池容量快速衰减并可能导致过热，甚至会出现电池冒烟并喷出黑色物质等极端情况。

The discharging current should not exceed the maximum discharge current in this specification. Larger discharge current will lead to rapid battery capacity loss and may lead to overheating, and even emit smoke and other black material in some extreme cases.

7.5 正确连接电池的正负极，严禁反向充电。若电池正负极接反，将导致电池报废并产生安全隐患。

Connect the positive and negative poles correctly. Reverse charging is strictly prohibited. If the positive and negative poles of the battery are connected to each other, safety risks will be generated.

7.6 电池正常使用过程中，应安装电池管理系统防止电池过放电的发生，若电池过放电，将导致电池报废并产生安全隐患。

During the normal use of the battery, the battery management system should be installed to prevent overdischarge of the battery. If the battery is over-discharged, it may cause safety hazards.

7.7 电池箱应有足够的机械强度以保证其内部电池免受机械撞击。

The battery box should be of sufficient mechanical strength to protect the internal batteries from mechanical impact.

7.8 电池箱的设计应充分考虑单体电池的散热问题，由于电池箱散热设计问题导致的电芯或电池过热损坏，兰钧不承担质量保证责任。

The design of the battery box should fully consider the heat dissipation of cell battery. BTL will not undertake the responsibility of quality assurance if the battery cell or battery overheat is damaged due to the failure of battery box.

7.9 电池箱设计中应充分考虑电池的防水、防尘问题，电池箱必须满足国家有关标准规定的防水、防尘等级。由于防水、防尘问题而导致的电芯或电池的损坏（如腐蚀、生锈等），我公司不承担质量保证责任。

Battery box design should give full consideration to the battery waterproof, dustproof problem, the battery box must meet the relevant national standards for waterproof, Dustproof grade. Our company will not bear the quality guarantee responsibility for the damage of the battery cells or batteries (such as corrosion, rust, etc.) caused by the waterproof and dustproof problems.

7.10 测试时，如使用螺栓形式连接铝连接片和充放电设备的动力线，应确保连接阻值小于 $0.05\text{m}\Omega$ ，正负极导线间的总阻值相比正负极铝连接片间的阻值增加小于 $0.1\text{m}\Omega$ 。

During the test, if bolts are used to connect the busbar and the power line of the charging & discharging device, ensure that the connection resistance is less than $0.05\text{m}\Omega$, the total resistance between the positive and negative wires increases should be less than $0.1\text{m}\Omega$ compared to the resistance between the positive and negative busbar.

7.11 此样品仍处于开发阶段，暂未完成设计冻结，其中 4.2 充电模式、4.3 放电模式在量产阶段可能会重新定义，并提供正式的规格书。

The cell is still in the development stage; the design freeze has not been completed yet. The "4.2 Charging model" and "4.3 Discharge model" for the mass production phase need to be redefined to provide formal product specifications.

8 安全须知 (Safety instruction)

8.1 在使用过程中，应远离热源、火源，切勿摔打电池，禁止坠落、冲击电池。

During use, keep away from heat source and fire source. Do not beat the battery. Do not fall or impact the battery.

8.2 禁止直接焊接电池和用钉子或其它利器刺穿电池。

Direct welding of the battery and puncture of the battery with nails or other sharp objects are prohibited.

8.3 禁止将电池倒置，并避免敲击、抛掷、踩踏和弯折电池等。

It is forbidden to turn the battery upside down, and avoid hitting, throwing, trampling and bending the battery.

8.4 禁止短路电池，以免发生危险，电池严重损坏。

Do not short-circuit the battery to avoid danger and serious damage to the battery.

8.5 废弃电池请安全妥当处理，不要投入火中或水中。

Dispose of discarded batteries safely and properly. Do not throw them into fire or water.

8.6 本电池只能使用锂离子电池专用充电器充电。

This battery can only be charged by special charger for lithium ion battery

9 紧急情况处理 (Emergency situation)

8.1 如果电池发生泄露，电解液进入眼睛，请不要揉擦，应用清水冲洗眼睛，并立即送医治疗，否则会伤害眼睛。

If battery leak and electrolyte enter into eyes, do not rub. Rinse with clean water, and seek medical assistance immediately.

8.2 如果电池使用以及贮存过程中发出异味、发热、变色、变形等异常，应立即切断电源，若电池表面温度较高，待电池冷却后，将电池从装置或充电器中移离。

Stop use battery and relocate the battery to a safe place if battery gives off peculiar smell, temperature increase, deform, color change or any other abnormal phenomena.

8.3 电池在极端条件下不会发生爆炸，但可能会有冒烟现象发生，遇到该情况可采取将电池隔绝空气的措施，如掩盖沙土，或使用二氧化碳灭火器、干粉灭火器，切忌用水，待烟雾散去后再进行处理。

If battery catch fire, use dry powder, foam fire extinguisher or sand to extinguish flames and remove it from the operating environment.

10 其它事项 (Others)

任何本规格书中未提及的事项，请咨询本公司。当本规格书版本更新时，本公司不做另行通知。

If there are any items not mentioned in this specification, please contact BTL. When the version of the specification is updated, the BTL will not issue a separate notice