

# 电池规格书

## SPECIFICATION OF BATTERY

客户名称 Customer Name: L437  
产品名称 Product Name: 锂离子动力电池  
产品型号 Product Model: SH651003-AN6AY1  
(9070000003578)  
电芯型号 Cell Model: LG INR18650 MJ1

|                             | 姓名 Name | 职位 Position | 日期 Date    | 签名 Visa |
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| 客户确认 Customer Approval                                                              |                     |
|-------------------------------------------------------------------------------------|---------------------|
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|  | November 21st, 2022 |
| AMPERUM GmbH                                                                        |                     |

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## 1. 修订履历 Revision History

### 产品修订履历表

## Product Revision History

[illegible]

## 2. 适用范围 Application Scope

本规格书描述或规定锂离子电池产品、产品特征、基本性能、相关测试条件和方法、安全使用注意事项等。本规格书只适用于广东博力威科技股份有限公司（简称广东博力威）所设计和生产的电池。

This product specification is made to describe the product, product characteristics and performance, relevant measurement conditions and methods, and safety Instructions of the Lithium ion battery PACK as specified in following details. The specification only applies to Guangdong Greenway Technology Co., Ltd.

## 3. 产品规格 Product Specification

### 相关定义 Relevant definitions

- 1) 标准温度：除非特殊说明，本文件测试所用标准温度为  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$  。

Standard temperature: Unless otherwise specified, the standard temperature stipulated in the Document is  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ .

- 2) 标准充电: 标准温度下以 0.5C 电流恒流 (但不高于产品设计的最大允许充电电流) 充电至最高单颗电芯电压达到充电截止电压，维持该充电电压，恒压充电至充电电流小于或等于 0.05C 为止。

Standard charging: Under standard temperature ,Charge with constant current of 0.5C (but not higher than the maximum allowable charging current designed for the product) until the maximum single-cell voltage reaches the charging cut-off voltage, and then charge the battery at the constant voltage until the charging current is lower than or equal to 0.05C.

- 3) 满电状态：电池执行完标准充电后的状态。

Fully charged status: Status of the battery after standard charging.

- 4) 标准放电：标准温度下以 0.2C 电流恒流放电至最低单颗电芯电压达到放电截止保护电压为止。

Standard discharging: Under the standard temperature, discharge at a constant current of 0.2C until the minimum unit cell voltage reaches the discharging cut-off protection voltage.

## 3.1 电芯主要特性 Cell Main Characteristics

| 电芯制造商<br>Cell manufacturer | 电芯型号<br>Cell Model | 标称电压<br>Nominal Voltage | 标称容量<br>Nominal Capacity | 最小容量<br>Rated Capacity |
|----------------------------|--------------------|-------------------------|--------------------------|------------------------|
| LG                         | INR18650 MJ1       | 3.63V                   | 3500mAh                  | 3400mAh                |

## 3.2 电池包特性 Pack Electrical Characteristics

| NO.    | 项目<br>Items                                   | 规格<br>Specifications                  |            | 备注<br>Remark                                              |
|--------|-----------------------------------------------|---------------------------------------|------------|-----------------------------------------------------------|
| 3.2.1  | 容量<br>Capacity                                | 电池包标称容量<br>Pack Nominal Capacity Typ. | 10.5 Ah    | 按标准充放电条件测试<br>Standard discharge after<br>Standard charge |
|        |                                               | 电池包最小容量<br>Pack Rated Capacity Min.   | 9.975 Ah   |                                                           |
| 3.2.2  | 标称电压<br>Nominal Voltage                       | 36.3V                                 |            |                                                           |
| 3.2.3  | 最高充电电压<br>Max. Charge voltage                 | 42V                                   |            |                                                           |
|        | 标准充电电流<br>Standard Charge Current             | 3A                                    |            |                                                           |
|        | 最大充电电流<br>Max. Charge current                 | 4A                                    |            |                                                           |
| 3.2.4  | 标准放电电流<br>Standard Discharge Current          | 7A                                    |            |                                                           |
|        | 最大持续放电电流<br>Max. Continuous Discharge Current | 15A                                   |            | 30min                                                     |
|        | 放电截止保护电压<br>Discharge cutoff voltage          | 25V                                   |            |                                                           |
| 3.2.5  | 工作电压范围<br>Operating voltage Range             | 30V~42V                               |            | Recommended usable Voltage<br>推荐的可用电压范围                   |
| 3.2.6  | 使用环境温度<br>Operating environments temperature  | 充电温度范围<br>Charging temp.range         | 0~45°C     | Recommended                                               |
|        |                                               | 放电温度范围<br>Discharging temp. range     | -20~60°C   |                                                           |
| 3.2.7  | 初始内阻<br>Initial Internal Impedance            | ≤165mΩ                                |            | AC impedance 1KHz at 3.6V/Cell                            |
| 3.2.8  | 重量 Weight                                     | Approx.1.975 Kg                       |            |                                                           |
| 3.2.9  | 防水等级<br>Waterproof level                      | IPX5                                  |            |                                                           |
| 3.2.10 | 出货带电量<br>Capacity in shipment                 | 根据海运、空运或者客户要求定义                       |            |                                                           |
| 3.2.11 | 储存温度<br>Storage Temperature                   | ≤1 month:                             | -20°C~60°C |                                                           |
|        |                                               | ≤3 months:                            | -20°C~45°C |                                                           |
|        |                                               | ≤1 year:                              | -20°C~20°C |                                                           |
| 3.2.12 | 储存湿度<br>Storage Humidity                      | ≤80% RH                               |            |                                                           |

## 3.3 BMS 参数 BMS Electrical parameters (保护板型号 BMS Model:AY)

| 电压保护参数<br>Voltage protection parameters                                                  |            |                |                |                |
|------------------------------------------------------------------------------------------|------------|----------------|----------------|----------------|
| 项目<br>Item                                                                               | 单位<br>Unit | 最小值<br>Minimum | 标称值<br>Nominal | 最大值<br>Maximum |
| 过充保护电压/Cell (一级)<br>Overcharging protection voltage/Cell                                 | mV         | 4235           | 4250           | 4265           |
| 过充保护延时时间 (一级)<br>Overcharging protection delay time                                      | s          | 1.6            | 2              | 2.75           |
| 过充保护恢复电压/Cell (一级)<br>Overcharging protection recovery voltage/ Cell                     | mV         | 4135           | 4150           | 4165           |
| 过充保护恢复延迟 (一级)<br>Overcharging protection recovery delay time                             | s          | 1.6            | 2              | 2.75           |
| 初级过放保护电压/ Cell<br>Primary Overdischarging protection voltage/ Cell                       | mV         | 3085           | 3100           | 3115           |
| 初级过放保护延时时间<br>Primary Overdischarging protection delay time                              | min        | 59             | 60             | 61             |
| 初级过放保护恢复电压/ Cell<br>Primary Overdischarging protection recovery voltage / Cell           | mV         | 3285           | 3300           | 3315           |
| 过放保护电压/ Cell<br>Overdischarging protection voltage / Cell                                | mV         | 2485           | 2500           | 2515           |
| 过放保护延时时间<br>Overdischarging protection delay time                                        | s          | 3.5            | 4              | 5              |
| 过放保护恢复电压/ Cell<br>Overdischarging protection recovery voltage / Cell                     | mV         | 2985           | 3000           | 3015           |
| 过放保护恢复延迟<br>Overdischarging protection recovery delay time                               | s          | 3.5            | 4              | 5              |
| 电流保护参数<br>Current protection parameters                                                  |            |                |                |                |
| 项目<br>Item                                                                               | 单位<br>Unit | 最小值<br>Minimum | 标称值<br>Nominal | 最大值<br>Maximum |
| 充电过流保护电流<br>Charge overcurrent protection                                                | A          | 4.5            | 5              | 5.5            |
| 充电过流保护延时时间<br>Charge overcurrent protection delay time                                   | s          | 4              | 5              | 6              |
| 充电过流保护恢复时间<br>Charge overcurrent protection recovery time                                | s          | 58             | 60             | 62             |
| 放电过流保护电流 (一级)<br>Discharging overcurrent protection/ Primary protection                  | A          | 25             | 26             | 27             |
| 放电过流保护延时时间 (一级)<br>Discharging overcurrent protection delay time / Primary protection    | s          | 9              | 10             | 11             |
| 放电过流保护恢复时间 (一级)<br>Discharge overcurrent protection recovery time / Primary protection   | s          | 28             | 30             | 32             |
| 放电过流保护电流 (二级)<br>Discharging overcurrent protection/ Secondary protection                | A          | 40             | 44.5           | 49             |
| 放电过流保护延时时间 (二级)<br>Discharging overcurrent protection delay time / Secondary protection  | ms         | 250            | 320            | 390            |
| 放电过流保护恢复时间 (二级)<br>Discharge overcurrent protection recovery time / Secondary protection | s          | 48             | 50             | 52             |

|                                                                                                 |            |                                                                    |                |                |
|-------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------|----------------|----------------|
| 短路保护电流<br>Short circuit protection current                                                      | A          | 90                                                                 | 100            | 110            |
| 短路保护延时<br>Short circuit protection delay time                                                   | us         | 280                                                                | 400            | 520            |
| 短路保护恢复延时<br>Short circuit protection recovery time                                              | s          | 58                                                                 | 60             | 62             |
| 短路保护恢复方式<br>Short circuit protection recovery method                                            | -          | 达到规定延时时间后自动恢复<br>The protection would recover after a certain time |                |                |
| 温度保护参数<br>Temperature protection parameters                                                     |            |                                                                    |                |                |
| 项目<br>Item                                                                                      | 单位<br>Unit | 最小值<br>Minimum                                                     | 标称值<br>Nominal | 最大值<br>Maximum |
| 充电高温保护温度（一级）<br>Charging high temperature protection/ Primary protection                        | ℃          | 57                                                                 | 60             | 63             |
| 充电高温保护恢复温度（一级）<br>Charging high temperature protection recovery temperature/ Primary protection | ℃          | 53                                                                 | 56             | 59             |
| 充电高温保护延迟时间（一级）<br>Charging over-temperature protection delay time/ Primary protection           | s          | 9                                                                  | 10             | 11             |
| 充电低温保护温度（一级）<br>Charging low temperature protection/ Primary protection                         | ℃          | -3                                                                 | 0              | 3              |
| 充电低温保护恢复温度（一级）<br>Charging low temperature protection recovery temperature/ Primary protection  | ℃          | 1                                                                  | 4              | 7              |
| 充电低温保护延迟时间（一级）<br>Charging under-temperature protection delay time/ Primary protection          | s          | 9                                                                  | 10             | 11             |
| 放电高温保护温度<br>Discharging high temperature protection                                             | ℃          | 67                                                                 | 70             | 73             |
| 放电高温保护恢复温度<br>Discharging high temperature protection recovery temperature                      | ℃          | 63                                                                 | 66             | 69             |
| 放电高温保护延迟时间<br>Discharging over-temperature protection delay time                                | s          | 9                                                                  | 10             | 11             |
| 放电低温保护温度<br>Discharging low temperature protection                                              | ℃          | -23                                                                | -20            | -17            |
| 放电低温保护恢复温度<br>Discharging low temperature protection recovery temperature                       | ℃          | -17                                                                | -14            | -11            |
| 放电低温保护延迟时间<br>Discharging under-temperature protection delay time                               | s          | 9                                                                  | 10             | 11             |
| 功耗参数<br>Power consumption parameters                                                            |            |                                                                    |                |                |
| 项目<br>Item                                                                                      | 单位<br>Unit | 最小值<br>Minimum                                                     | 标称值<br>Nominal | 最大值<br>Maximum |
| 正常模式功耗<br>Normal mode power consumption                                                         | mA         | -                                                                  | -              | 10             |
| 休眠模式功耗<br>Sleep mode power consumption                                                          | uA         | -                                                                  | -              | 400            |
| 关机模式功耗<br>Shutdown consumption                                                                  | uA         | -                                                                  | -              | 20             |

| 其他参数<br>Other parameters |            |                |                |                |
|--------------------------|------------|----------------|----------------|----------------|
| 项目<br>Item               | 单位<br>Unit | 最小值<br>Minimum | 标称值<br>Nominal | 最大值<br>Maximum |
| 容性负载 Capacitive load     | uF         | -              | -              | 2000           |

### 3.4. 功能说明 Function Declaration

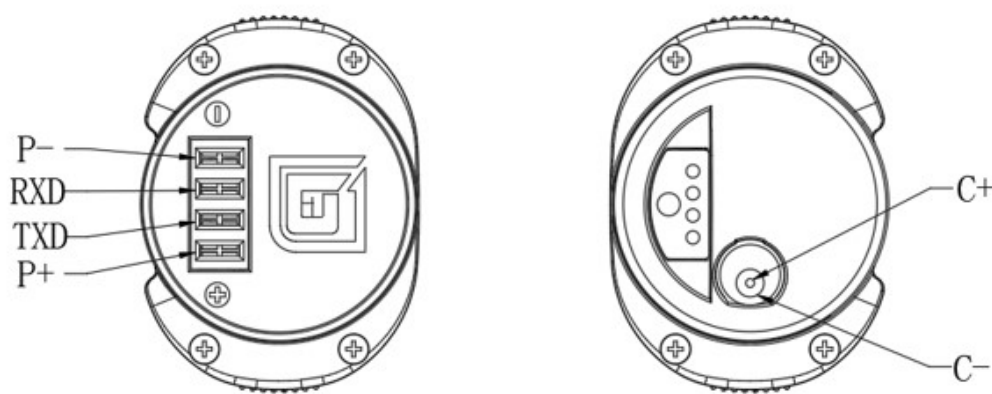
|                                                                                                                                                                                                                                    |                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 通讯模式<br>Communication mode                                                                                                                                                                                                         | 采用 UART 通讯 波特率为 9600<br>The communication interface is UART, baud rate is 9600.                                                                                                                              |
| <p>电源逻辑 Power Logic</p> <pre>graph TD; WM([工作模式<br/>work mode]); SM([休眠模式<br/>sleep mode]); SHM([关机模式<br/>shutdown mode]); WM -- C --&gt; SM; SM -- D --&gt; WM; WM -- A --&gt; SHM; SHM -- B --&gt; WM; SM -- E --&gt; SHM;</pre> |                                                                                                                                                                                                              |
| 工作模式<br>Work mode                                                                                                                                                                                                                  | 充放电 MOS 管开启，放电口有输出<br>Charge and Discharge MOSFET are on, the discharge port has output.                                                                                                                     |
| 休眠模式<br>Sleep mode                                                                                                                                                                                                                 | 充放电 MOS 管开启，放电口有输出。详情请参考“功耗参数”。<br>Charge and Discharge MOSFET are on, the discharge port has output. For details, see "Power consumption parameters".                                                       |
| 关机模式<br>Shut down mode                                                                                                                                                                                                             | 充放电 MOS 管关闭，放电口无输出<br>Charge and Discharge MOSFET are off, the discharge port has no output.                                                                                                                 |
| 转换<br>Transition                                                                                                                                                                                                                   | 条件<br>Condition                                                                                                                                                                                              |
| A                                                                                                                                                                                                                                  | 长按按键 3s 或者达到初级过放保护<br>Long press button for 3s or trigger the primary over-discharge protection                                                                                                              |
| B                                                                                                                                                                                                                                  | 短按按键或者插入充电器<br>Short press button or insert the charger                                                                                                                                                      |
| C                                                                                                                                                                                                                                  | 电池放电电流小于 1A，充电电流小于 200mA 且无通讯，持续 30min<br>The battery discharge current below 1A, the charge current below 200mA and without communication for 30min.                                                        |
| D                                                                                                                                                                                                                                  | 充放电电流唤醒或者按键唤醒或者通讯唤醒<br>Charge or Discharge current or press the button or communication                                                                                                                      |
| E                                                                                                                                                                                                                                  | 达到初级过放保护或者电池放电电流小于 1A，充电电流小于 200mA 且无通讯，持续 48H<br>trigger the primary over-discharge protection or the battery discharge current below 1A, the charge current below 200mA and without communication for 48H. |



## 3.5. 端口定义 Terminal defined

| Name 定义 | Description 描述 |
|---------|----------------|
| C+/C-   | 充电端口正极/负极      |
| P+      | 放电端口正极         |
| P-      | 放电端口负极         |
| RXD     | UART 通讯端口 RXD  |
| TXD     | UART 通讯端口 TXD  |

Battery pack output terminal diagram/电池组输出端口图:



## 3.6. 显示说明 Display

Battery capacity indicator 电量显示:

电或静置状态下按按键, LED 显示如下 (LED 的灰度根据 SOC 进行调整):

When the battery is in the state of discharging or Idle, if the user push the button, the display pattern of the LED would be shown as below (The gray level of the led would be adjusted according to the SOC) .

★: FLASH, ☆: BREATH, ●: ON, ◎:OFF (★: 闪烁, ☆: 呼吸, ●: 亮, ◎: 灭)

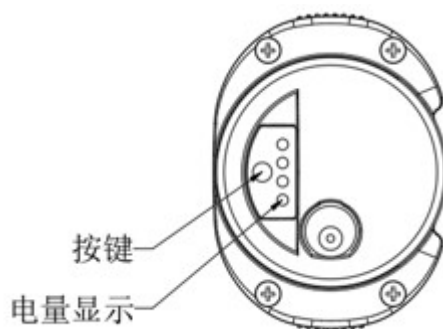
|  | SOC      | LED1 (Red) | LED2 (Green) | LED3 (Green) | LED4 (Green) |
|--|----------|------------|--------------|--------------|--------------|
|  | 0%~10%   | ★          | ◎            | ◎            | ◎            |
|  | 11%~25%  | ●          | ◎            | ◎            | ◎            |
|  | 26%~50%  | ●          | ●            | ◎            | ◎            |
|  | 51%~75%  | ●          | ●            | ●            | ◎            |
|  | 76%~100% | ●          | ●            | ●            | ●            |

当电池处于充电状态时, LED 的显示模式如下所示:

When the battery is in the state of charging, the display pattern of the LED would be shown as below.

★: FLASH, ☆: BREATH, ●: ON, ◎:OFF (★: 闪烁, ☆: 呼吸, ●: 亮, ◎: 灭)

|  | SOC      | LED1 (Green) | LED2 (Green) | LED3 (Green) | LED4 (Green) |
|--|----------|--------------|--------------|--------------|--------------|
|  | 0%~25%   | ☆            | ◎            | ◎            | ◎            |
|  | 26%~50%  | ●            | ☆            | ◎            | ◎            |
|  | 51%~75%  | ●            | ●            | ☆            | ◎            |
|  | 76%~100% | ●            | ●            | ●            | ☆            |



#### 4.测试协定 Test Protocol

##### 4.1 常规测试 General Test

除非另有规定，否则本产品规范中规定的所有试验均在以下条件下进行：

温度：23±2℃；湿度：60±15%

Unless otherwise specified, all tests stated in this Product Specification are conducted under below condition:

Temperature : 23±2℃, Humidity: 60±15%

| No.   | 项目<br>Item                                               | 测试方法和条件<br>Test Methods and Condition                                                                                                                                                                                                                                                                                                                                        | 标准<br>Criteria                                                                                                                                                                            |
|-------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1.1 | 额定容量<br>Rated Capacity                                   | 以 0.5 C 充电(但不高于产品设计的最大允许充电电流)到满(截止电流为 0.02C),静置 30 分钟,然后以 0.2 C 放电到完成。<br>Charge at 0.5C but not higher than the maximum allowable charging current of the product design to(cut-off current is 0.02C), rest for 30 min. , constant current 0.2C discharge to empty.                                                                                                         | Capacity≥95%                                                                                                                                                                              |
| 4.1.2 | 循环寿命<br>Cycle Life                                       | 按售后协议执行。<br>According to after-sales protocol.                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                           |
| 4.1.3 | 初始内阻<br>Initial Impedance                                | 使用 AC 1KHz 检测方法,准确度不低于 0.5 级的仪表,测量电池接口处正负极之间的内阻值,若检测仪表在检测过程中使用附加的电池固定夹具和引线,可以视情况减去固定引线的电阻值,且记录最大与最小之差值。<br>Using a AC 1KHZ meter whose precision must be less than 0.5%, detect the resistance between the battery's positive and negative terminals. The result value can not include any external conductor's resistance. The maximum and the minimum need to be recorded. | 参考 3.2.7<br>(Refer to 3.2.7)                                                                                                                                                              |
| 4.1.4 | 成品电池外观及尺寸<br>Appearance and size of the finished battery | 目测电池外观;<br>使用尺寸测量仪器设备测量尺寸。<br>Visual appearance of the battery;<br>Use size measurement equipment measurements.                                                                                                                                                                                                                                                              | 电池外表应清洁,无机械损伤,触点无锈蚀;有必要的产品标志;尺寸应符合规格要求。<br>Battery appearance should be clean ,no mechanical damage ,contact no rust necessary product logo; dimensions shall comply with specifications. |

## 4.2 保护性能 Protection Performance

| No.   | Item 项目                        | Test Methods and Condition 测试方法和条件                                                                                                                                                                                                                                                                                                                                                                 | Criteria 标准                                                                                    |
|-------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 4.2.1 | 过充测试<br>Overcharge testing     | 以设计之正常充电电压的 1.2 倍给电池包施加电压, 并以允许最大充电电流对电池组充电, 直至电池管理系统起作用(并观察 2 小时), 或起火、爆炸条件时停止试验。<br>Apply voltage to the battery pack at 1.2 times of the designed normal charging voltage, and charge the battery pack at the maximum allowable charging current, until the battery management system comes into operation (and observe for 2 hours), or stop the test in case of fire or explosion conditions. | 充电保护动作, 且不起火, 不爆炸<br>The charging protection is acting, and No fire, no explosion,             |
| 4.2.2 | 过放测试<br>Over-discharge testing | 以最大允许放电电流, 并以低于放电截止保护电压设置放电过程, 直至放电终止, 电池管理系统起作用(并观察 2 小时), 或起火、爆炸条件时停止试验。<br>Set the discharge process with the maximum allowable discharge current and the protective voltage below the discharge cutoff until the discharge is terminated, the battery management system is in operation (and observe for 2 hours), or the test is stopped under fire or explosion conditions.                  | 放电保护动作, 且不起火, 不爆炸, 无泄液<br>Discharging protection is acting, No fire, no explosion, no leakage. |
| 4.2.3 | 外部短路<br>External short circuit | 完全充电后, 用小于 0.08Ω 电阻连接正负极, 持续 1h<br>After fully charged, connect the anode and cathode with a 0.08Ω resistance element and keep it for one hour.                                                                                                                                                                                                                                                    | 短路保护动作、不起火、不爆炸<br>Short circuit protection is acting, No fire, no explosion                    |

## 4.3 机械性能 Mechanical property

| No.   | 项目 Item         | 测试方法和条件 Test Methods and Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 标准 Criteria                                      |
|-------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 4.3.1 | 振动<br>Vibration | <p>在 20±5°C 充电环境下, 将电池组充电至上限截止电压。充好电的电池按照以下测试条件进行测试: 振幅保持在 0.76mm, 频率范围保持在 10~55HZ, 从 X、Y、Z 三个方向以扫频速率 1HZ/min, 循环扫频, 测试时间为 90±5 min。电池振动后静置 1H 后目视检查外观。</p> <p>At 20±5°C Charge temperature condition, the battery pack charging to upper limited charging voltage. The battery pack shall be tested under the following vibration conditions: An amplitude of 0.76mm, Frequency range between 10 Hz and 55 Hz, Sweeping velocity of 1 Hz per minute, Three mutually perpendicular directions of vibration (X, Y and Z axes), Tested time of 90±5 minutes. The battery pack shall be left for one hour after the test and a visual inspection shall be conducted.</p> | 不起火、不爆炸, 无泄液<br>No fire, no explosion no leakage |
|       |                 | 备注: 本试验不适用于无壳电池组。<br>Remark: The test is not suitable for battery pack with no housing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |

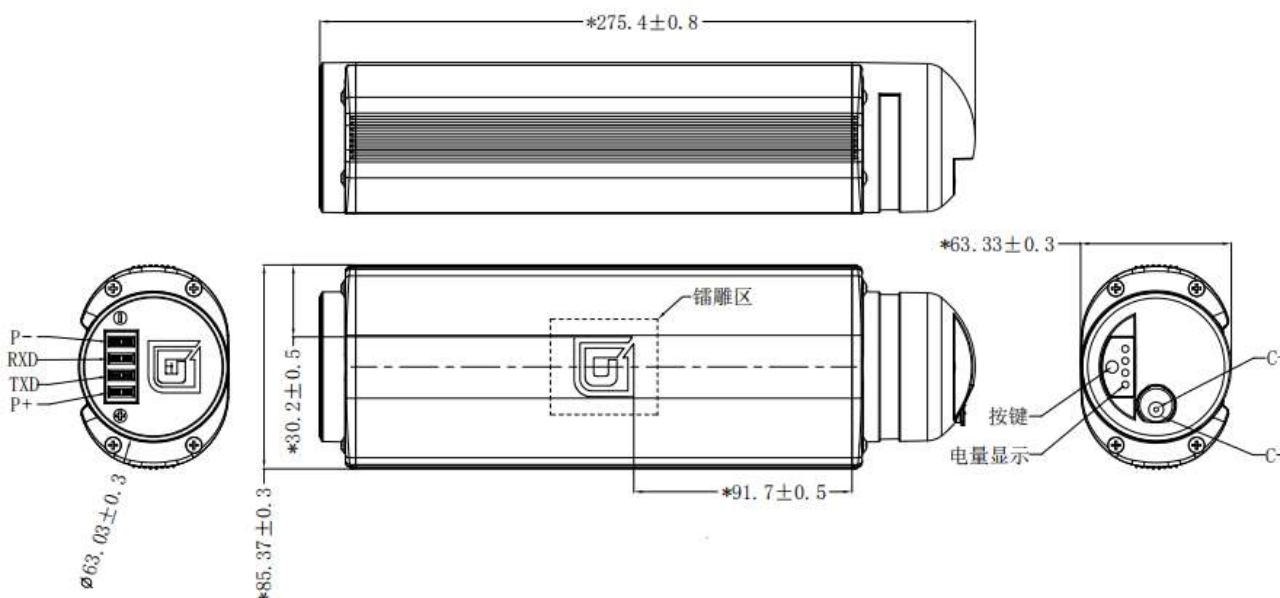
|       |                   |                                                                                                                                                                                                                                                                                                                   |                                      |
|-------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 4.3.2 | 自由跌落<br>Free fall | 在 20±5℃ 充电环境下, 将电池组充电至上限截止电压。将电池组从离地面 1m 的高度, 以任意方向跌落到混凝土地板上, 总共进行三次试验。<br>At 20±5℃ Charge temperature condition ,the battery pack charging to upper limited charging voltage. The battery pack shall be dropped three times from a level of 1 meter onto a concrete floor in a random direction for three times. | 不起火、不爆炸,<br>No fire,<br>no explosion |
|       |                   | 备注: 本试验不适用于无壳电池组。<br>Remark: The test is not suitable for battery pack with no housing.                                                                                                                                                                                                                           |                                      |

## 5. 安规 Safety regulations

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## 6. 机械特性描述 Description Of Mechanical Characteristics

### 6.1 电池成品尺寸 Battery Final Dimension



注意: 尺寸测量工具用精度为 0.02mm 的游标卡尺或更高级别的测量仪器。

### 6.2 标签图 (移印图) Label Figure



### 6.3 包装图纸与尺寸 Packaging Diagram And Size

## 7. 运输、贮存与保质期 Transportation Storage And Warranty

### 7.1 运输 Transportation

电池应包装成箱进行运输, 在运输过程中应防止剧烈振动、冲击或挤压, 防止日晒雨淋, 严禁与易燃、易爆、易腐蚀的物品同车装运, 可使用汽车、火车、轮船、飞机等交通工具进行运输。

The product must be packaged by ship, and should be prevented by vibration, shocking or crushing, even more can't be stored under the sun and rain; Shipped with the stuff of flammable, combustible and easy corrosion is inhibited. This product can be shipped by cars, trains, air and sea.

### 7.2 贮存 Storage

产品贮存应保持原有包装, 贮存产品的环境温度及湿度符合 3.2 规定的条件, 并置于清洁、干燥、通风并设有防潮、防尘、防震、防腐蚀措施的室内。避免与腐蚀性物质接触, 应远离火源及热源。

The products shall be stored in the original packaging, the ambient temperature and humidity of the stored products shall meet the conditions specified in 3.2, and be placed in a clean, dry, ventilated room with moisture-proof, dust-proof, shock-proof and anticorrosive measures. Avoid contact with corrosive substances and keep away from fire and heat sources.

## 8. 安全规定与注意事项 Safety and Caution

### 8.1 危险 Danger

- ◇ 禁止在超出外壳防水等级环境下使用, 电池内部防水可能在环境条件变化和使用条件变化下失效。

It is forbidden to use in an environment beyond the waterproof grade of the shell. The waterproof inside the battery may fail under the change of environmental conditions and service conditions.

- ◇ 禁止将电池浸入如水、饮料或其它液体中。(除为此使用场景设计之特殊产品)

Do not immerse the battery in liquid such as water, beverages, or other fluids.( Except for special products designed for this use scenario)

- ◇ 禁止在靠近火、加热器或高温(>60℃)环境中使用或搁置电池。

Do not use or place the battery near an fire, heater or high temperature environment (above 60℃).

- ◇ 禁止使用未经授权的充电器。

Do not use unauthorized chargers.

- ◇ 禁止将电池极性反转连接。

Do not attach or insert battery with polarity reversed.

- ◇ 禁止将电池连接到 AC 插座或 DC 的汽车充电插座。

Do not connect the battery to an AC outlet or DC automotive plug.

- ◇ 禁止将电池使用在其它装置或设备中。

Do not use the battery in equipment for which it was not intended.

- ◇ 禁止焚烧电池或对其进行加热。

Do not incineration the battery in fire or heat it.

- ◇ 禁止使用导线等金属物体直接连接电池正负极短路电池。

Do not short-circuit the battery by directly connecting the positive and negative terminal with metal object such as wire.

- ◇ 禁止对电池的过度机械冲击, 如撞击、抛掷、践踏等。

Do not excessive impact to the battery such as striking, throwing, trampling, etc.

- ◇ 禁止使用钉子或其它尖锐物体刺穿电池。

Do not penetrate the battery with a nail or other sharp object.

- ◇ 禁止拆解电池。

Do not disassemble the battery.

## 8.2 警告 Warnings

- ◇ 将电池放在小孩够不到的地方。如果电池或者电池任意部件被小孩吞食，必需立刻就医  
Keep the battery away from small children. If the battery or any of its component parts is swallowed, seek medical attention immediately.
- ◇ 禁止将电池放在靠近微波设备或其它烹饪装置附近，如果电池被加热或受到强电磁辐射，可能发生漏液、发热、冒烟、着火等。  
Do not place the battery in or near a microwave or other cooking appliances. If subjected to heat or strong electromagnetic radiation, the battery may leak, generate heat, smoke, catch fire, or explode.
- ◇ 禁止与其它电池混用。因与其它电池有不同的容量、化学成分、制造工艺等，相互混用可能会发热、冒烟、着火等。  
Do not mix with other batteries. The battery should not be used with other batteries having a different capacity, chemistry, or manufacturer. Doing so could cause the battery to generate heat, smoke, catch fire, or explode.
- ◇ 如果电池在使用或贮存中有明显异常，如发出异味、发热、变色、变形，或者是在充电过程中出现任何异常现象，立即将电池从使用装置或充电器中移开，并停止使用。电池可能有缺陷，继续使用可能导致发热、冒烟、着火等。  
Immediately remove it from the device or charger, and stop using it, if there are noticeable abnormalities, such as smell, heat, discoloration, or deformity. The battery may be defective and could generate heat, smoke, catch fire, or explode with continued use.
- ◇ 如果充电不能在规定的时间内完成，停止充电。  
Stop charging if the charge process cannot be finished within the specified time.
- ◇ 禁止将电池靠近火源。  
Do not use a battery near open flame.
- ◇ 电池进水后禁止使用。  
Do not use the battery after water.
- ◇ 禁止触摸漏液电池。如果电解液不小心进入眼睛，请不要揉擦，应马上用清水冲洗眼睛，并立即送医院治疗，否则会伤害眼睛。  
Do not touch a leaking battery. If liquid leaking from the battery gets into your eyes, immediately flush your eyes with clean water and seek medical attention. If left untreated, it will cause significant eye damage.
- ◇ 防止在运输和存放过程中短路或损坏电池，必需将电池安全包装在盒子或纸箱中。不要与金属物体如项链、发夹等一起运输和存储。  
To prevent short-circuit or damage during transport or store, securely pack the battery in a case or carton. Do not transport and store the battery together with metal objects such as necklaces, hairpins, etc.
- ◇ 不可长期置放充电器上如果超过正常充电时间很长时间充电器仍在充电应停止充电，不正常的充电有可能会使电池发热、冒烟变形或燃烧。  
Do not insert the battery onto the charger for a long time. If charging beyond the normal time, the battery is still in the charger, please stop charging. The abnormal charging will cause battery over-heated, distort, smoke or burning.

## 8.3 注意 Caution

- ◇ 电池使用前注意阅读此规格书，并保存以便后续查阅。  
Read the specification before use. Keep for future reference.
- ◇ 禁止在高温下(>60℃，如直射的阳光下或很热的汽车中)使用或搁置电池，否则可能会引起电池过热、起火或功能失效，或者导致电池寿命减短或损坏电池。  
Do not use or leave the battery at very high temperature (>60℃, for example, at strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
- ◇ 禁止在发电超过 1000V 的静电环境使用电池，否则可能破坏电池保护电路，导致不安全的隐患发生。Do not use the battery where static electricity in excess of 1000V is generated as it may damage the protection circuit, and cause hidden trouble of safety.
- ◇ 在充电前仔细阅读充电器使用说明，使用正确的充电方法。  
Read the charger's manual before use for proper charge method.

- ◇ 在首次使用前, 如果电池发出明显的异味、发热或锈蚀迹象, 请联系电池供应商。  
Please contact the supplier if the battery gives off an unusual odor, generates heat, or shows signs of rust prior to its initial use.
- ◇ 给小孩使用前大人必须讲解清楚如何使用设备和电池, 并定期跟踪确认, 以确保小孩正确使用。  
Parents must explain how to use the system and the battery. Please check back periodically to ensure children are using the system and the battery correctly.
- ◇ 请不要靠近易燃材料充放电电池, 否则可能产生起火隐患。  
Do not charge or discharge near flammable materials. Doing so could result in fire.
- ◇ 如果电解液从电池漏出并接触到皮肤或衣服, 立即用水冲洗, 否则导致刺激皮肤。  
If electrolyte leaks from the battery and comes into contact with skin or clothing, immediately flush with water. Otherwise, it may cause skin irritation.
- ◇ 如果电池组有一个由剥离导线或暴露的接触板组成的系统接口, 应谨慎操作。可暂时用聚丙烯胶带或聚氯乙烯胶带隔离暴露接触导体与绝缘体。不这样做可能会导致触电, 短路造成电池发热、冒烟、着火, 或其它材料的燃烧。  
If the battery pack have a system interface consisting of stripped lead wires or exposed contact plates, handle with due care. Temporarily insulate exposed contacts and conductors with an insulator such as polypropylene tape or polyvinylchloride tape. Failure to do so could result in an electrical shock, a short circuit causing the battery to generate heat, smoke, catch fire, or the combustion of other materials.
- ◇ 处理电池时, 注意带电的电池可能会造成火灾, 应该用胶带将电路端子隔离。根据当地法规回收。When disposing of the battery, be aware discharged battery may cause fire, tape the terminals to insulate them. Recycle it according to local rules and regulations.
- ◇ 如果电池电路端子弄脏, 使用前应用干布抹净, 否则可能会因接触不良而影响性能失效。  
In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.
- ◇ 电池应当在室温下存放, 应充电到 30%~60% 的电量。为防止电池过放, 建议每 3 个月按标准充电方式进行补电。如储存时间超过一年, 建议每年按标准充放电方式进行一次充、放电循环以激活电池。  
The batteries should be stored at room temperature, charged to about 30% to 60% of capacity. In case of over-discharge, batteries should be charged to suitable range with standard charge method for one time every 3 months while storing and batteries should be charge-discharged with standard method for one time after being stored more than one year in order to activate it and restore energy.

#### 8.4 质量评定程序 Quality assessment procedures

- ◇ 质量检验分为鉴定检验和质量一致性检验。  
Quality inspection is divided into appraisal inspection and quality consistency check.
- ◇ 鉴定检验一般在设计定型、更改设计和生产定型时进行。抽样方案、检验项目、顺序以及判定规则等事宜由供需双方协商确定。原则上应包括以上各项性能试验。  
Identification test in general design type, change the design and production, finalize the design. Sampling plan, inspection items, order and decision rule matters such as supply and demand determine by both parties through consultation. In principle should include the above performance test.
- ◇ 质量一致性检验分为逐批检查和周期检查, 用以判定产品生产过程中能否合格保证产品质量的持续稳定。可以参照 GB/T2828.1-2003, GB2829-2002 标准执行。具体抽样方案、检验项目、顺序以及判定规则等事宜由供需双方协商确定。原则上, 逐批检查的检验项目应包括外观、内阻、额定容量等。  
Quality conformance inspection into batch inspection and periodic inspection to determine whether the qualified production process to ensure product quality remained stable. Can refer GB/T2828.1-2003, GB2829-2002 standard. Specific sampling plan, test items, order, and matters such decision rules negotiated by both parties. In principle, batch inspection of the test items should include appearance, resistance, rated capacity and so on.

#### 9. 其它事项 Others

- (1) 客户若需要将电池应用于本文件规定以外的使用条件下, 应事先联系广东博力威, 因为需要进行特定的实验测试以验证电池在该使用条件下的性能及安全性。  
The customer is requested to contact Guangdong Greenway in advance, if the customer needs other applications or operating conditions out of those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

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- (2) 对于在超出文件规定以外的条件下使用电池而造成的任何意外事故，广东博力威概不负责。  
Guangdong Greenway will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.
- (3) 如有必要，广东博力威会以书面形式告之客户有关正确操作使用电池的改进措施。  
Guangdong Greenway will inform the customer in a written form regarding proper use and handing of the cell, if it is necessary.
- (4) 本文件内容未经本公司许可，严禁以其它目的的转载或复制等。  
Use of the information described herein for other purposes and/or reproduction or copying without the express permission of Guangdong Greenway is strictly prohibited.
- (5) 任何本说明书中未提及的事项，须经双方协商确定。  
Any matters that this specification does not cover should be conferred between the customer and Guangdong Greenway.
- (6) 产品符合广东博力威科技股份有限公司 GW-WI-E-QDS-0044 《博力威有害物质限制管理规范》  
Product comply with GW-WI-E-QDS-0044《 Greenway hazardous substances control standards》 of Guangdong Greenway Technology Co., Ltd .