

SIB-46145-18Ah 产品规格书

Product Specification of SIB-46145-18Ah

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|--------|--------|--------|
| 产品设计准备 | 产品设计审批 | 产品经理审批 |
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| 客<br>户<br>确<br>认 | 签 名   | 日 期 |
|                  |       |     |
|                  | 客户代码： |     |
|                  | 公司印章： |     |

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## 1. 适用范围 Scope of application

本技术协议详细描述了深圳市种花家科技有限公司生产的 3.0V 18Ah 钠离子电池的产品性能指标 以及产品使用条件及风险警示。

The purpose of this document is to specify the specifications of 3.0V 18Ah sodium ion cells supplied by Shenzhen Zhonghuajia Technology Co., Ltd.

## 2 .产品电性能指标Electrical specification

### 2.1 概要 General

| No.     | 参数<br>Parameter                     | 产品规格<br>Specification  | 条件<br>Condition   |
|---------|-------------------------------------|--|---|
| 2. 1.1  | 标准容量<br>Typical capacity            | 18Ah   | 新电池状态<br>Fresh cell<br>参考 2.2 与 2.3 标准充放电模式测试<br>Refer to 2.2&2.3 standard charge and discharge procedure   |
| 2. 1.2  | 标准能量<br>Typical Energy              | 54Wh   | 新电池状态<br>Fresh cell<br>参考 2.2 与 2.3 标准充放电模式测试<br>Refer to 2.2&2.3 standard charge and discharge procedure   |
| 2. 1.3  | 工作电压<br>Operating voltage           | 1.5~3.9V<br>1.5~3.9V   | 电芯温度 $T>0^{\circ}\text{C}$<br>Cell temperature $T>0^{\circ}\text{C}$<br>电芯温度 $T\leq 0^{\circ}\text{C}$<br>Cell temperature $T\leq 0^{\circ}\text{C}$            |
| 2. 1.4  | 电池内阻<br>Impedance (1KHz)            | $\leq 1\text{m}\Omega$   | 新电池状态 (50%SOC)<br>Fresh cell (50%SOC)   |
| 2. 1.5  | 出货电量<br>Shipping SOC                | ~50%   | /   |
| 2. 1.6  | 月自放电<br>Residual capacity loss      | $\leq 3.0\%$ /月<br>Per month $\leq 3.0\%$  | 出货三个月以后的电芯, 标准充电到 50%SOC , $25\pm 2^{\circ}\text{C}$ 储存<br>Fresh cell after 3month, 50%SOC, $25\pm 2^{\circ}\text{C}$ storage                                   |
| 2. 1.7  | 工作温度(充电)<br>Charging temperature    | $0\sim 35^{\circ}\text{C}$   | 参考第 2.2 节<br>Reference to paragraph 2.2   |
| 2. 1.8  | 工作温度(放电)<br>Discharging temperature | $-40\sim 60^{\circ}\text{C}$   | 参考第 2.3 节<br>Reference to paragraph 2.3   |
| 2. 1.9  | 电池重量<br>Cell Weight                 | 约 480g   | N.A.  |
| 2. 1.10 | 存储温度<br>Storage Temp.               | $-30\sim 30^{\circ}\text{C}$   | 存储环境湿度 $\leq 85\%\text{ROH}$ , 无凝露<br>Storage ambient humidity $< 85\%\text{ROH}$ , no condensation   |
| 2. 1.11 | 电池尺寸<br>Typical dimension (D*H)     | 直径(Diameterh):<br>$47.0\pm 0.5\text{mm}$<br>高度(Height):<br>$150.0\pm 0.5\text{mm}$ | $300\pm 20\text{Kgf}$ 压力下, 新鲜电池<br>(详见本技术协议第 8 条)<br>Thickness with compression force ( $300\pm 20\text{Kgf}$ ), Height with Terminal, BOL(Reference to item 8) |
| 2. 1.12 | 静置 SOC<br>Rest SOC                  | $\geq 8\%$   | 无负载或充电时的 SOC 区间<br>SOC interval without load or charging  |

|        |                             |              |  |
|--------|-----------------------------|--------------|--|
| 2.1.13 | 应用海拔<br>Altitude            | <5000m       | N.A.   |
| 2.1.14 | 可充放电次数<br>Cycle performance | ≥3000 Cycles | 循环过程中电芯温度 25±2℃，初始夹紧力 300 ±20Kgf，标准充放电测试，循环至标称容量的 70%<br>The temperature is maintained at 25±2℃, cycle test by the standard charge and discharge method under 300±20Kgf preload, Fading to 70% of standard capacity. |

## 2.2 充电模式/参数 Charging/Parameter

| No.   | 参数<br>Parameter  | 产品规格<br>Specification   | 条件<br>Condition   |
|-------|--|---|---|
| 2.2.1 | 标准充电功率<br>Standard charge Power                                      | 0.5P  | 25±2℃   |
| 2.2.2 | 最大可持续充电功率<br>Maximum sustainable charging power                      | 0.5P  | 25±2℃   |
| 2.2.3 | 标准充电电压<br>Standard charge voltage                                    | 单体电池最大 3.9V<br>Cell max voltage 3.9V  | N.A.  |
| 2.2.4 | 标准充电模式<br>Standard charge method                                     | 电池温度 25±2℃, 0.5P 恒功率充电至 3.9V，静置 5min，0.05P 恒功率充至 3.9V<br>The temperature of cell is maintained at 25±2℃, Charge 0.5P constant power to 3.9V, and let 5min, 0.05P constant power to 3.9V |   |
| 2.2.0 | 标准充电温度<br>Standard charge temperature                                | 25±2℃   | 电芯温度<br>Cell Temperature  |
| 2.2.6 | 绝对充电温度<br>(电芯温度)<br>Absolute charging Temperature (Cell Temperature) | 0~35℃   | 无论电芯处在何种充电模式，一旦发现电芯温度超过绝对充电温度范围即停止充电。<br>No matter what charge mode the battery is in, stop charging once the cell temperature exceeds absolute charge temperature range.                       |
| 2.2.7 | 绝对充电电压<br>Absolute charging voltage                                  | 最大 3.9V<br>Max 3.9V   | 无论电芯处在何种充电模式，一旦发现电芯电压超过绝对充电电压范围即停止充电<br>No matter what charging mode the battery is in, once the battery voltage is found to exceed the absolute charging voltage range, the charging will stop |

### 2.2.1 其他充电条件(模式) C-Rate Other charge Condition (C-Rate)

#### 2.2.1.1 恒功率充电 Constant power charge

| 电芯温度/℃<br>Cell Temperature/℃     |              | 0   | 15  | 20  | 25  | 35  |
|----------------------------------|--------------|-----|-----|-----|-----|-----|
| 最大充电功率（P）<br>Max charge power(P) | 0%~ 100 %SOC | 0.2 | 0.5 | 1.0 | 3.0 | 1.0 |

### 2.3 放电模式/参数 Discharging/Parameter

| No.   | 参数<br>Parameter                                  | 产品规格<br>Specification  | 条件<br>Condition  |
|-------|--|--|--|
| 2.3.1 | 标准放电功率<br>Standard discharge power               | 0.5P   | 25±2℃  |
| 2.3.0 | 标准放电模式<br>Standard discharge power               | 电池平均温度 25±2℃, 0.5P 恒功率放电至 1.5V<br>The average temperature of cell is maintained at 25±2℃, 0.5P constant power discharge to 1.5 V |  |
| 2.3.3 | 最大持续放电功率<br>Maximum discharge power (continuous) | 5.0P   | N.A.   |
| 2.3.4 | 放电截止电压<br>Discharge cut-off voltage              | 1.5V<br>1.5V   | 温度（Temp. ）T>0℃<br>温度（Temp. ）T≤0℃   |
| 2.3.5 | 标准放电温度<br>Standard discharge temperature         | 25±2℃  | 电芯温度<br>Cell temperature   |
| 2.3.6 | 绝对放电温度<br>Absolute discharge temperature         | -40~60℃  | 无论电芯处在持续放电模式或脉冲放电 模式，<br>若电芯温度超过绝对放电温度，<br>则停止放电<br>Stop discharging once cell temperature is outside this range regardless of whether continuous or pulse current is adopted. |

#### 2.3.1 其他放电条件(模式) D-Rate Other discharge Condition (D-Rate)

| 电芯温度/℃<br>Cell Temperature/℃        |                 | -40 | -20 | -10 | 0   | 10  | 15  | 25  | 45  | 60  |
|-------------------------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 最大放电功率（P）<br>Max discharge power(P) | 0%~<10<br>0%SOC | 0.2 | 0.5 | 1.0 | 1.0 | 2.0 | 3.0 | 5.0 | 1.0 | 0.5 |

## 2.4.高低温容量 High/Low temperature capacity

| No.   | 参数<br>Parameter           | 产品规格<br>Specification | 条件<br>Condition  |
|-------|---------------------------|-----------------------|--|
| 2.4.1 | 55℃ 的容量<br>Capacity@55℃   | ≥100%                 | 新电池状态, 55℃, 0.5P , 1.5V~3.9V<br>Fresh cell , 55℃, 0.5P , 1.5V~3.9V   |
| 2.4.2 | -20℃ 的容量<br>Capacity@-20℃ | ≥80%                  | 新电池状态, -20℃, 0.5P , 1.5V~3.9V<br>Fresh cell , -20℃, 0.5P , 1.5V~3.9V |
| 2.4.3 | -40℃ 的容量<br>Capacity@-40℃ | ≥60%                  | 新电池状态, -40℃, 0.2P , 1.5V~3.9V<br>Fresh cell , -40℃, 0.2P , 1.5V~3.9V |

## 2.5 电芯温升 Cell temperature rise

本规格书中温升是指放电后的电池表面温度减去放电前的电池表面温度。电池温升的测量应在环境温度较为稳定且空间足够大的房间里进行。每个电池温度测量应选取经过校正的可以记录时间数据的温度感应器。

The temperature rise in this specification refers to the battery surface temperature after discharge minus the battery surface temperature before discharge. The measurement of battery temperature rise should be carried out in a room with a relatively stable ambient temperature and a large enough space. A calibrated temperature sensor capable of recording time data shall be selected for each battery temperature measurement.

| No.   | 参数<br>Parameter                                 | 产品规格<br>Specification | 条件<br>Condition   |
|-------|---|-----------------------|---|
| 2.5.1 | 持续放电温升<br>Continuous discharge temperature rise | ≤10℃                  | 电池以标准放电模式进行放电<br>The cell is discharged in the standard discharge method. |
| 2.5.2 | 持续放电温升<br>Continuous discharge temperature rise | ≤30℃                  | 电池以最大放电模式进行放电<br>The cell is discharged in the max discharge method.      |

## 2.6. 安全与可靠性 Safety and reliability

2.6.1 使用条件说明：安全测试、寿命测试、系统成组设计需要在电池大面施加预紧力，新鲜电芯的预紧力范围为 500N~5000N ， 建议预紧力控制公差为±200N。

2.6.1 Explanation of use conditions: safety test, life test, system group design need to apply pre-tightening force on the large surface of the battery, the pre-tightening force range of fresh batteries is 500N~5000N, and the recommended pre-tightening force control tolerance is ±200N.

2.6.2 产品在使用过程中会产生膨胀力，电芯在15mm钢板测试条件下衰减至 60%时膨胀力约为 50000N ， 客户在产品 设计过程中需要考虑结构强度可靠性， 建议电芯成组预留 1.5~2.0mm 的缝隙。

2.6.2 The product will generate expansion force during use. The expansion force of the battery core is about 50000N when it is attenuated to 60% under the test condition of 15mm steel plate. Customers need to consider the structural strength and reliability in the product design process. It is recommended that the battery cells be grouped Reserve a gap of 1.5~2.0mm.

### **3. 产品寿命终止管理 Product end of life management**

3.1 电池的使用期限是有限的。客户应该建立有效的跟踪系统监测并记录每个使用期限内电池的容量。当使用中的电池容量小于等于标称容量 60%(25°C)，应停止使用电池。违反该项要求，将免除深圳市种花家科技有限公司依据产品销售协议以及本技术协议所应承担的产品质量保证责任。

3.1 The battery life is limited. Customers should establish an effective tracking system to monitor and record the capacity of the battery during each service life. When the capacity of the battery in use is less than or equal to 60% of the nominal capacity (25°C), the battery should be stopped. Violation of this requirement will exempt Shenzhen Zhonghuajia Technology Co., Ltd. from the responsibility for product quality assurance based on the product sales agreement and this technical agreement.

3.2 电芯寿命判定条件参考2.1.14循环寿命。

The cell life determination conditions can refer to paragraph 2. 1. 14 cycle life.

### **4. 应用条件 Application conditions**

客户应当确保严格遵守以下与电池相关的应用条件：

Customers should ensure that the following battery-related application conditions are strictly observed:

4.1. 客户应配置电池管理系统，严密监控、管理与保护每个电池。电芯初次使用必须按照标准充电模式和标准放电模式激活，以保证后续使用中容量的充分发挥。

Customer shall procure that each product shall be used under the strict monitor, control and protection by the BMS incorporated by PARAGONAGE. When the cell is first used, it must be fully charged and discharged according the standard charge/discharge method to activate it.

4.2. 客户应保存完整的电池运转的监测数据（包括时间、电压、电流、温度、容量等，数据周期至少包含异常前至异常三个月的数据，采集间隔 1s，同时需要记录所有的故障记录）。用作产品质量责任划分的参考。不具备完整的电池系统使用期限内的监测数据的，深圳市种花家科技有限公司不承担产品质量保证责任。

4.2. The customer should save complete battery operation monitoring data (including time, voltage, current, temperature, capacity, etc., the data cycle includes at least the data from before the abnormality to three months before the abnormality, and the collection interval is 1s, and all fault records need to be recorded at the same time ). It is used as a reference for product quality responsibility division. If there is no complete monitoring data within the service life of the battery system, Shenzhen Zhonghuajia Technology Co., Ltd. will not be responsible for product quality assurance.

4.3. 未经深圳市种花家科技有限公司同意，客户不可擅自修改或者改变电池管理系统的设计和框架，以免影响电池的使用性能。



4.3. Without the consent of Shenzhen Zhonghuajia Technology Co., Ltd, customers are not allowed to modify or change the design and framework of the battery management system, so as not to affect the performance of the battery.

4.4. 客户应保存完整的电池运转的监测数据，用作产品质量责任划分的参考。不具备完整的电池系统使用期限内的监测数据的，我们公司不承担产品质量保证责任。

4.4. The customer should keep the complete battery operation monitoring data as a reference for product quality responsibility division. If there is no complete monitoring data within the service life of the battery system, our company will not be responsible for product quality assurance. considered without BMS diagnosis records (at a regular basis, esp. during maintenance) of the relevant product.

4.5. 电池管理系统需满足以下最基本的检测和控制要求

The BMS shall include the following monitoring and control features as a minimum requirement.

| No.   | 参数<br>Parameter                  | 产品规格<br>Specification                          | 保护动作<br>Action  |
|-------|----------------------------------|--|---|
| 4.5.1 | 充电终止 Stop charging               | 3.9V   | 电池的电压达到 3.9V 时，BMS 申请终止充电<br>Stop charging when cell voltage reaches 3.9V   |
| 4.5.2 | 放电终止 Stop discharge              | 最小 1.5V<br>Minimum 1.5V                        | 当电池的电压到达 1.5V，BMS 申请终止放电<br>Minimize the discharging current when cell voltage reaches 1.5V.                        |
| 4.5.3 | 短路保护 Short circuit protection    | 不允许短路<br>No short circuit allowed              | 发生短路时，由过流保护装置断开电池<br>When a short circuit occurs, the battery is disconnected by the overcurrent protection device. |
| 4.5.4 | 过流保护 Over current protection     | 参考第 2.2 和 2.3 条<br>Reference 2.2&2.3           | 电池管理系统控制充放电电流符合规格<br>Control discharge current by BMS to values within specification                                |
| 4.5.5 | 过热保护 Over temperature protection | 参考第 2.2 和 2.3 条<br>Reference 2.2&2.3           | 当温度超过本技术协议规定时，终止充电/放电<br>Stop charging and discharging when temperature exceeds specification                       |
| 4.5.6 | 充电时长保护 Charging time out limit   | 充电时间在8小时内<br>Charging completes within 8 hours | 充电时间长于 8 小时，则终止充电<br>Stop charging if charging time exceeds specification   |

备注： 以上 No.4.5.2 、 4.5.3 、 4.5.5 、 4.5.6 为警示条款，提请客户注意：当电池达到上述任何一项条款描述的指标和参数状态时，意味着电池已超出本技术协议规定的使用条件，客户需依“保护动作”及本技术协议 其他相关规定对电池采取保护措施，同时，深圳市种花家科技有限公司声明对上述使用状态的电池质量不承担任何保证责任，并对因此而导致的客户及第三方的任何损失不予赔偿。

Note: The above clauses 4.5.2, 4.5.3, 4.5.5, and 4.5.6 are warning clauses. Customers are reminded that when the battery reaches the indicators and parameter states described in any of the above clauses, it means that the battery has exceeded the usage conditions specified in this technical agreement. Customers are required to take protective measures for the battery in accordance with the "protective actions" and other relevant provisions of this technical agreement. At the same time, Shenzhen Zhonghuajia Technology Co., Ltd. declares that it does not assume any guarantee responsibility for the quality of the battery in



the above usage state, and will not compensate any losses caused to customers or third parties as a result.

4.6. 避免电池到达过放状态。 电池电压低于1.5V 时， 电池内部可能会遭到永久性的损坏， 此时我们的产品质量保证责任失效。根据本技术协议第 2.3.4 条，当实际放电截止电压低于标准放电截止电压时，系统内部能耗降低到最小，并在重新充电之前延长休眠时间。客户需要培训使用者在最短的时间内重新充电，防止电池进入过放状态。

4.6. Avoid the battery reaching an over discharge state. When the battery voltage is below 1.5V, the internal parts of the battery may be permanently damaged, and our product quality assurance responsibility becomes invalid. According to Article 2.3.4 of this technical agreement, when the actual discharge cutoff voltage is lower than the standard discharge cutoff voltage, the internal energy consumption of the system is minimized and the sleep time is extended before recharging. Customers need to train users to recharge in the shortest possible time to prevent the battery from entering an over discharged state.

4.7.若预计将电池存放30天以上的，建议将SOC调整为 50%左右。单体电池，-10~30℃建议补电周期为6个月，30~45℃建议补电周期为3个月，45℃~60℃建议补电周期为1个月； 以上补电周期为建议，实际存储SOC不得低于8%。存储周期不考虑BMS或其他除单体电池以外的自耗电影响。

If the battery is expected to be stored for more than 30 days, it is recommended to adjust the SOC to about 50%. For a single battery, the recommended recharge cycle is 6 months at -10~30°C, 3 months at 30~45°C, and 1 month at 45°C~60°C; the above recharge cycle is It is recommended that the actual storage SOC should not be lower than 8%. The storage cycle does not consider the influence of BMS or other self-consumption power except for single batteries.

4.8. 电池避免在本技术协议禁止的低温条件下充电(包括标准充电，快充，紧急情况充电)，否则可能出现意外的容量降低现象。电池管理系统应依照最小的充电温度进行控制。禁止在低于本技术协议规定的温度条件下充电，否则我们公司不承担质量保证责任。

Avoid charging the battery under low temperature conditions prohibited by this technical agreement (including standard charging, fast charging, and emergency charging), otherwise unexpected capacity reduction may occur. The battery management system should be controlled according to the minimum charging temperature. It is forbidden to charge at a temperature lower than the temperature specified in this technical agreement, otherwise our company will not be responsible for quality assurance.

4.9. 电箱设计中应充分考虑电芯的散热问题，由于电箱散热设计问题导致的电芯或电池过热损坏，我们公司不承担质量保证责任。

The heat dissipation of the battery cell should be fully considered in the design of the electric box. Our company does not assume the responsibility for quality assurance if the battery cell or battery is damaged due to overheating due to the heat dissipation design of the electric box.

4.10. 电箱设计中应充分考虑电芯的防水、防尘问题，电箱必须满足 UL 和 IEC 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），我们公司不承担质量保证责任。

The waterproof and dustproof problems of the battery cells should be fully considered in the design of the electric box. The electric box must meet the waterproof and dustproof grades stipulated in the relevant standards of UL and IEC. Our company does not assume responsibility for quality assurance for damage to cells or batteries (such as corrosion, rust, etc.) caused by waterproof and dustproof problems.

4. 11. 禁止不同 P/N 料号电芯在同一电池系统中混用，否则，我们公司不承担质量保证责任。

4. 11. It is forbidden to mix batteries with different P/N numbers in the same battery system, otherwise, our company will not be responsible for quality assurance.

## **5. 安全防范 Safety Precautions**

5. 1. 禁止将电池浸入水中。

Do not immerse cells into water.

5.2. 禁止将电池投入火中或长时间暴露在超过本技术协议第 2. 1.7 条, 第 2. 1.8 条和第 2. 1. 10 条规定的温度条件的高温环境中，否则可能会导致火灾。在任何正常的充放电使用情况下，电芯温度不能超过 60℃, 如果电芯温度超过60℃，电池管理系统需关闭电池，停止电池运行。

Do not drop cells into fire or expose them to any high temperature environment exceeding operation temperature as set out in paragraphs 2. 1.7, 2. 1.8, 2. 1.10, otherwise it may cause fire. At all use time, cell temperature should not exceed 60 °C, shut down system by BMS when it occurs.

5.3. 禁止电池正负极短路，否则强电流和高温可能导致人身伤害或者火灾。在电池系统组装和连接时，应有足够的安全保护，以避免短路。

Do not short circuit cell terminals, otherwise high current and temperature may cause body injury or fire hazards. Metallic cell terminals exposed from plastic packaging and ample safety precautions should be implemented to avoid short circuiting them during system integration or connections.

5.4. 严格按照标示和说明连接电池正负极，禁止反向充电。

Always connect cell terminals according to its label(s) in right polarity. Reverse charging is strictly prohibited.

5.5. 禁止超过最大功率进行电池充电，和禁止电池过充。否则，可能引起电池过热和火灾事故的发生。在电池安装和使用中，硬件和软件需实行多重过充失效安全保护。最低保护要求见本技术协议第 4.5. 1、4.5.2 、4.5.3 、4.5.9 条。

It is extremely dangerous to overcharge a cell which may cause overheating and fire hazards. Multiple level of fail-safe overcharge protection should be implemented by hardware and software. See paragraph 4.5. 1 、4.5.2、4.5.3 、4.5.9 for minimum requirement to be adopted by the BMS for protection.

5.6. 客户应将电池安全地固定在固体平面上，并将电源线安全地束缚在合适的位置，以避免摩擦而引起电弧和火花。

Products should be securely fixed to solid platform, and power cables should be securely attached by fastener to avoid intermittent contact which may cause arcing and sparks.

5.7. 严禁用塑料封装电池或用塑料进行电气连接。不正确的电气连接方式可能会造成电池使用过程中发生过热现象。

Do not service cells and electrical connections within plastic package of cell. Improper electrical connection within a cell may cause overheating in service.

5.8. 当电解液泄露时，应避免皮肤和眼睛接触电解液。如有接触，应使用大量的清水清洗接触到的区域并向医生寻求帮助。禁止任何人或动物吞食电池的任何部件或电池所含物质。

When the electrolyte leaks, skin and eye contact with the electrolyte should be avoided. In case of contact, a large amount of clean water should be used to clean the contact area and seek help from the doctor. It is forbidden for any person or animal to swallow any part or substance contained in the battery.

5.9. 尽力保护电池，使其免受机械震动、碰撞及压力冲击，否则电池内部可能短路，产生高温和火灾。

Protect cells from mechanical shock, impact and pressure. Internal electrical circuit may short circuit to generate high temperature and fire hazards.

5.10. 电池充电过程中可能发生不适当的终止充电现象。如：超出允许的充电时间充电，充电电压过高而终止充电或充电电流过强而终止充电。上述现象被定义为“不适当的终止充电”。当发生以上现象时，可能意味着电池系统出现漏电或某些部件出现故障。在没有找到根本原因并彻底解决之前继续对该电池充电可能会引起电池过热或发生火灾。当发生以上现象时，电池管理系统应该通过自动锁定功能，禁止后续的充电，并提醒使用者将装载有该电池的交通工具退回到经销商处进行系统维护。该电池只有经过有认证资格的技术人员全面检查，确定根本原因并彻底解决、改善后方可恢复充电。

Improper termination of charge may occur during battery charging. Such as: charging beyond the allowed charging time, the charging voltage is too high and the charging is terminated, or the charging current is too strong and the charging is terminated. The above phenomenon is defined as "improper termination charge". When the above phenomena occur, it may mean that the battery system is leaking or some components are malfunctioning. Continuing to charge the battery until the root cause has been identified and corrected may cause the battery to overheat or cause a fire. When the above phenomenon occurs, the battery management system should automatically lock the function to prohibit subsequent charging, and remind the user to return the vehicle loaded with the battery to the dealer for system maintenance. The battery may not be restored to charge until it has been thoroughly inspected by a certified technician to determine the root cause and has been thoroughly addressed and improved.

5.11. 在进行滥用测试实验时如操作不当可能会引起电池起火或者爆炸。该测试实验只能由配备适当的防护装备的专业人员在专业的实验室进行。否则，可能会导致严重的人身伤害和财产损失。

Improper operation during the abuse test may cause the battery to catch fire or explode. This test experiment should only be performed in a specialized laboratory by professionals equipped with appropriate protective equipment. Failure to do so may result in serious personal injury and property damage.

## 6. 免责声明Disclaimer

6.1. 如果由于产品需求单位不按本说明书中的规定进行使用，造成社会性影响，并对深圳市种花家科技有限公司的声誉造成影响的，深圳市种花家科技有限公司将会追究产品需求单位的责任。

16.1. If the product demand unit does not use it according to the regulations in this manual, causing social impact and affecting the reputation of Shenzhen Zhonghuajia Technology Co., Ltd., Shenzhen Zhonghuajia Technology Co., Ltd. will investigate the product Responsibilities of demand units.

6.2. 买方在订购深圳市种花家科技有限公司产品前，需要与深圳市种花家科技有限公司提前确认产品的最新状态。

Before ordering the products of Shenzhen Zhonghuajia Technology Co., Ltd., the buyer needs to confirm the latest status of the product with Shenzhen Zhonghuajia Technology Co., Ltd. in advance.

6.3. 英文规格释义仅供参考，请以中文版技术规格要求为准。

English specifications are for reference only. Please refer to the technical specifications of the Chinese version.

## 7. 风险警告 Risk Warning

### 7.1. 警示声明 Waring statement

**警告**

电池存在潜在的危險，在操作和维护时必须采取适当的防护措施！  
！ 不正确地滥用测试实验，可能导致严重的人身伤害和财产损失！

必须使用正确的工具和防护装备操作电池。

电池的维护必须由具有电池专业知识并经过安全培训的人士执行。  
不遵守上述警告可能造成多种灾难。

**CELLS ARE POTENTIALLY DANGEROUS AND PROPER PRECAUTIONS MUST BE OBSERVED IN HANDLING AND MAINTENANCE.**

**RUNNING TESTS ON THE CELLS IMPROPERLY MAY RESULT IN SEVERE PERSONAL BODY INJURY OR PROPERTY DAMAGES.**

**WORK ON CELLS MUST BE PERFORMED ONLY WITH PROPER TOOLS AND PROTECTIVE EQUIPMENT MUST BE USED.**

**CELL MAINTENANCE MUST BE CARRIED OUT BY PERSONNEL KNOWLEDGEABLE OF CELLS AND TRAINED IN THE SAFETY PRECAUTIONS INVOLVED.**

**FAILURE TO OBSERVE THE ABOVE MAY CAUSE VARIOUS HAZARDS.**

## **7.2. 危险类型：Types of Hazards**

客户知悉在电池使用和操作过程中存在以下潜在的危險:

Customer acknowledges the following potential hazards in connection with the usage and handling of the Products:

7.2. 1. 操作者在操作时可能会受到化学品、 电击或者电弧的伤害。尽管人体对遭受直流电与交流电的反应不同，但是高于 50V 的直流电压与交流电对人体的伤害是同样严重的，因此客户必须在操作中采取保守的姿势以避免电流的伤害。

Working with battery can expose the handler to chemical, shock and/or arcing hazards.

Although a person's body might react to contact with direct current voltage differently than from contact with alternate current voltage, Customer shall take a conservative position and consider the risk of shock or electrocution to be the same for both alternate current and direct current exposures greater than 50 V.

7.2.2. 存在来自电池中的电解液的化学风险。

Cells expose its handler to chemical hazards associated with the electrolyte used in the cell.

7.2.3. 在操作电池和选择个人防护装备时，客户及其雇员必须考虑到以上潜在的风险，防止发生意外短路，造成电弧、爆炸或热失控。

When selecting work practices and personal protective equipment, customer and its employees should consider potential exposure to these hazards and therefore prevent accidental short-circuit that can result in electrical arcing, explosion, and/or "thermal runaway" of the cells.