

# Specification Approval Sheet

## 产品规格确认书

Product Name 产品名称	Li-MnO <sub>2</sub> Battery
Model SPEC 型号规格	CP124920/160mAh/3.0V
Company Name 客户名称	
Document Number 文件编号	CNGC213-160505
Sample Number 样品单编号	
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Approved By 批准	Checkup 审核	Make 制定

Customer Confirmation 客户确认	Signature 签名	Date 日期
	Company Name : 公司名称 :	
Company Stamp : 公司印章 :		

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### AMENDMENT RECORDS

( 规格变更记录 )

Modification Time	Description	Issued Date	Approved By
0	New release	2016-05-05	
1	Modification	2016-06-05	
2	Modification	2016-07-01	
3	Modification	2016-07-14	

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## 1. Scope:

适用范围：

This document is made according to customer parameter requirements, and it describes the Product Specification of soft-packed Li-MnO<sub>2</sub> Battery produced by SAPC

本规格书是陕西应用物理化学研究所（SAPC）根据客户提供参数要求双方制定的锂锰软包装电池电芯。

## 2. Description

说明

### 2.1 Model: CP124920

型号：CP124920

### 2.2 Assembly Way

装配方式

Single cell.1S1P

单体电芯1S1P

## 3. Specifications

产品规格:

### 3.1 Assembled cell parameters

装配后电芯组件参数：

No.	Item	Spec	Note
1	<b>Model</b> 型号	CP124920/160mAh	1S1P
2	<b>Nominal Voltage</b> 标称电压	3.0V	When shipping, the voltage without load is between 3.10V and 3.25V. 出货时，电芯开路电压在 3.10V~3.25V 之间。
3	<b>Nominal Capacity</b> 额定容量	Typ:160 mAh@1 mA Discharge(放电)	Nominal Capacity refer to the capacity of 1mA discharge to 1.8 V cut-off voltage at 23°C. 在23°C，用 1 mA 电流放电至 1.8 V 的容量。
4	<b>Max.Discharge Current</b> 最大持续放电电流	20 mA	At 23±2°C the battery can discharge at least the max continuous discharge value which rated capacity 50% can permit. 在 23±2°C的环境下，电池能够至少放出额定容量的 50%所能允许的最大连续放电电流值。

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5	<b>Max. Discharge Current</b> 最大脉冲放电电流	40 mA	At $23 \pm 2^{\circ}\text{C}$ , battery discharge duration for 3 seconds and stand 27 seconds, it can discharge at least the max pulse discharge value which rated capacity 50% can permit 在 $23 \pm 2^{\circ}\text{C}$ 的环境下, 电池以工作 3S, 静置 27S 的脉冲放电方式能够至少放出额定容量的 50%所能允许的最大脉冲放电电流值
6	<b>Discharge Cut-off Voltage</b> 放电截止电压	1.8 V	
7	<b>Operating Temperature</b> 工作温度	$-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$	Exceed the operating temperature range could lead to battery operating voltage reduction or even a security risk. 超过使用温度范围可能导致电池容量减少、工作电压降低甚至有安全隐患。
8	<b>Recommended Storage Temperature</b> 储存温度	$-5^{\circ}\text{C} \sim +35^{\circ}\text{C}$	电芯应在 3.10V ~ 3.25V 状态下储存。
9	<b>Storage life</b> 储存寿命	5 years (年)	Relative humidity 相对湿度: 45~75%RH Temperature $-5^{\circ}\text{C} \sim +35^{\circ}\text{C}$
10	<b>Cell Weight</b> 电芯重量	Approx: 1.7 g 约: 1.7 g	
11	<b>Self Discharge Rate</b> 年自放电率	2%	Out of the recommended condition, the self-discharge rate 2% may increase. 当电池的储存条件不在推荐范围时, 电池的自放电率可能加大。
12	<b>Assemblage Dimension</b> 装配尺寸	Length : 20.0 mm Max Width : 49.0 mm Max Thickness : 1.25 mm Max	Measured weight of 300gf at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . Not including battery connecting wire. 测量时测量仪器作用于电池上的压力为 300gf ,温度 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ,不包括电池引线。

### 4. Battery Cell Performance Criteria

#### 电芯性能标准

##### 4.1 Standard testing environment

###### 标准测试环境

Unless specifically stated otherwise, tests must be done within one month of delivery.

The following is test conditions:

Test conditions:

Ambient Temperature :  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$

Ambient Humidity : 45~75%RH

除非另有说明, 测试应在电池出货的 1 个月内进行。本产品规格书中的所有测试均在以下环境 条件下进行 :

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温度：25°C ± 1°C

湿度：45~75%RH

### 4.2 The requirement of measure instrument

#### 测量设备要求

- (1) The measurement instrument has been certified by a qualified source.
  - (2) The accuracy of the measuring instrument is less than 0.01mm.
  - (3) The accuracy of multi-meter is at least 0.5%.
  - (4) The current accuracy of the battery test system is at least ±0.1%, the pressure accuracy is ±0.5%, and timer accuracy is not less than ±0.1%.
  - (5) The accuracy of the thermometer is at least ±0.5°C.
- (1) 测量设备、仪器需经检定机构检验合格。
  - (2) 测量尺寸的仪器精确度小于 0.01mm。
  - (3) 万用表测量电压及电流的准确度应不低于 0.5%。
  - (4) 电池测试系统的电流精度应在 ±0.1% 以上，恒压精度 ±0.5%，计时精度不低于 ±0.1%。
  - (5) 测量温度的仪表准确度应不低于 ±0.5°C。

### 4.3 Visual inspection

#### 外观检查

Not allowing any visual defects which will affect the electronic characteristics, such as leakage and damage.

不允许有影响电芯性能的外观缺陷，诸如泄漏、损坏等。

### 4.4 Mechanical Characteristics 力学特性

No. 序号	Item 项目	Testing Conditions and Method 测试方法及条件	Standard 标准
1	<b>Vibration Test</b> 振动测试	After standard charging, the cell is secured to a vibration table and subjected to vibration cycling in which the frequency is varied at the rate of 1Hz per minute between 10Hz and 55Hz; the excursion of the vibration is 0.38mm. The cell shall be vibrated for 30 minutes on each of X, Y, and Z axis. 将标准充电后的电芯固定在振动台上,并沿 X、Y、Z 三个方向各振动 30 分钟,振幅为 0.38mm,振动频率为 10Hz - 55Hz,每分钟变化 1Hz。	UL1642 No explosion, no fire 无爆炸、无起火
2	<b>Drop Test</b> 跌落测试	A battery is dropped from a height of 1 meter two times onto a concrete surface. 标准充电后,将电芯 2 次从 1 米的高度跌落至混凝土地面。	UL1642 No explosion, no fire 无爆炸、无起火

### 4.5 Safety Test 安全测试

No. 序号	Item 项目	Testing Conditions and Method 测试方法及条件	Standard 标准
1	<b>UN38.3</b> UN 测试	Follows UN38.3. 根据 UN38.3 标准。	<b>UN38.3</b>

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2	<b>UL-1642</b> (Cell Level) UL 测试 (单体电池)	Follows UL1642. 根据 UL1642 标准。	<b>UL-1642</b>
3	<b>humidity/thermal Test</b> 湿热试验	40°C ± 2°C, RH90%~95%/48h	<b>GB18287-2013</b>
4	<b>Puncture test</b> 针刺试验	20°C~30°C, 相对湿度 45%RH~75%RH, 大气压 86kPa~106kPa 环境条件下, 对电池进行针刺测试。 1、φ 3mm 耐高温钢针, 针尖圆锥角度 45°~60°, 钢针表面光洁, 无锈蚀、氧化层及油污; 2、针刺速度: (25 ± 5) mm/s; 3、针刺方向: 垂直于电芯极板方向; 4、不起火, 不爆炸。	<b>QC/T 743-2006</b>

### 4.6 High and low temperature test 高低温性能测试

No. 序号	Item 项目	Testing Conditions and Method 测试方法及条件	Standard 标准
1	<b>High Temperature</b> 高温性能	A battery is placed in an oven for 2 hours at 55°C ± 2°C, then discharged at a 1mA current to the termination voltage. 在 55°C ± 2°C 条件下, 将电芯放入高温箱中 2h 后, 再以 1mA 电流放电至终止电压。	Discharge 90 percent of the original capacity. 可放出初始容量的 90%.
2	<b>Low Temperature</b> 低温性能	A battery is placed in a thermal chamber for 2 hours at -20°C ± 2°C; then discharged at 1mA to the termination voltage. 在 -20°C ± 2°C 条件下, 将标准充电后的电芯放入低温箱中 2h 后, 再以 1mA 电流放电至终止电压。	Discharge more than 45 percent of the original capacity. 可放出初始容量的 45% (-20°C) 以上.

## 5. Storage and others

### 贮存及其它事项

#### 5.1 Longterm Storage

##### 长期贮存

If the cell is to be stored for 3 months or longer it should be held in a dry and cool environment. Voltage during storage needs to be maintained between 3.10V~3.25V and the storage conditions are the same as Item 3.3.1.11

长期贮存的电池(超过 3 个月)须置于干燥凉爽处, 储存电压应保持在 3.10V~3.25V, 且储存要求与 3.3.1.11 条相同。

#### 5.2 Any issues not covered in this specification should be discussed between the customer and SAPC

本说明书中未提及的任何事项, 须经双方协商确定。

## 6. Repair period 包修期限

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**The repair period is 6 months from the date that the batteries are shipped out from SAPC factory (the printing date on the cell).**

产品包修期限为 6 个月，自出厂日期（喷码）开始算起。



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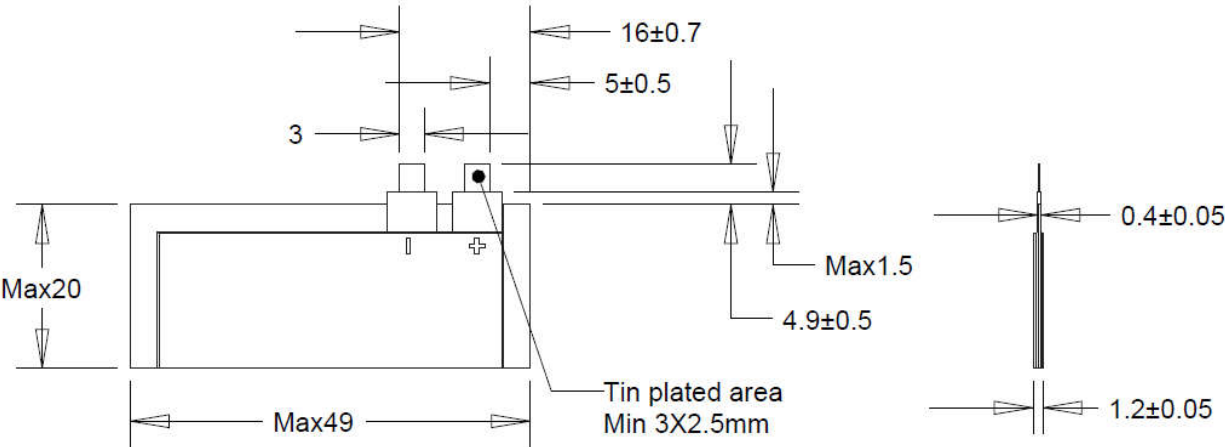
## 7.Drawing

### 7.1 Assembly diagram ( not to scale )

装配尺寸图(未按比例)

Model : CP124920

Unit : mm

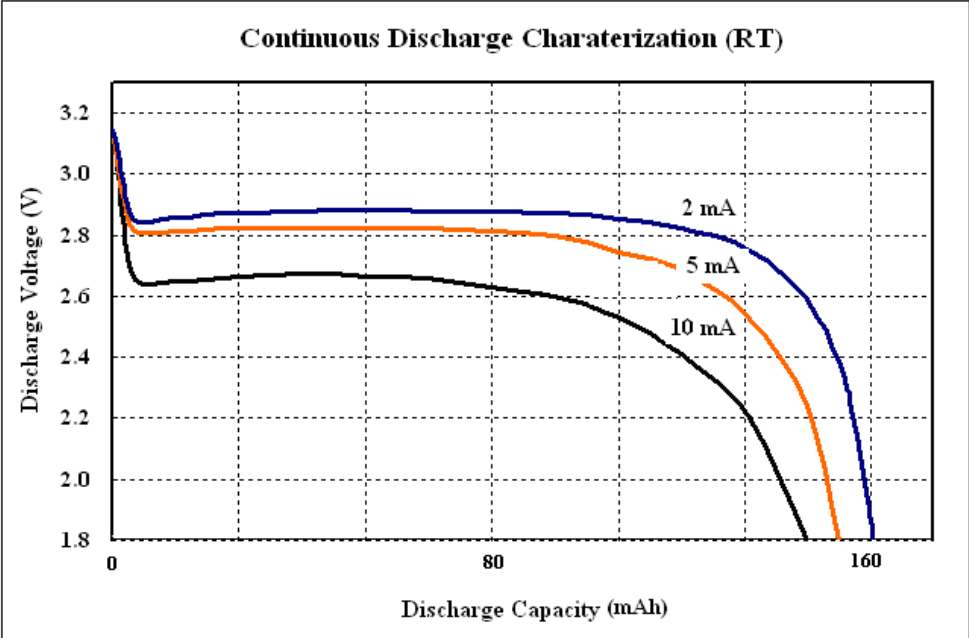


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## 8、 Discharge curve

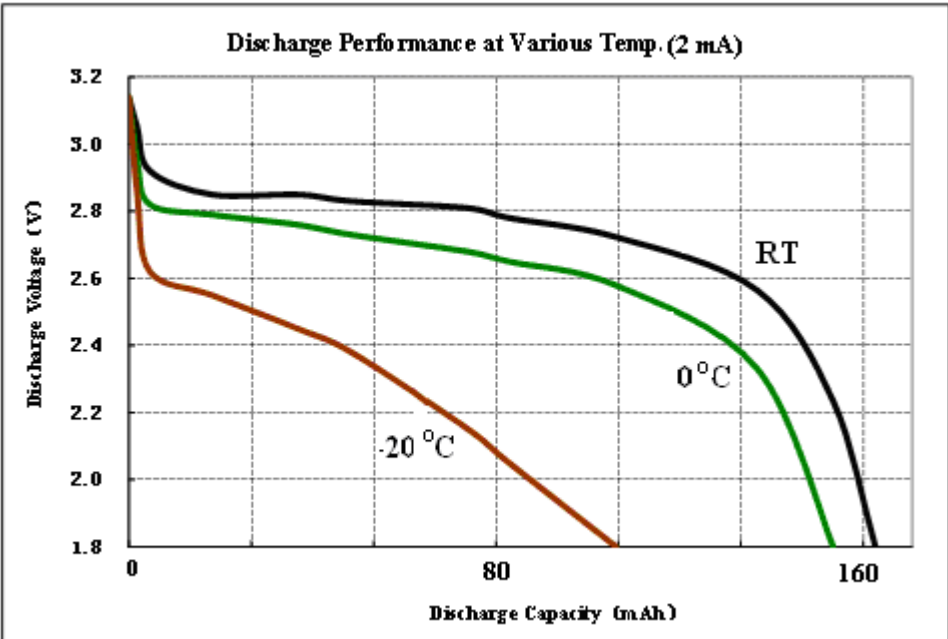
### 8.1 Different current discharge profiles at 23°C

CP124920 电池在 23°C不同电流条件下放电曲线图



### 8.2 Different temp discharge profiles at 2 mA

CP124920 电池在不同温度下 2 mA 放电曲线图



# Specification Approval Sheet

## Handling Precaution and Guideline

### For CP batteries Preface

This document of 'Handling Precautions and Guidelines for CP Batteries' shall be applied to the battery cells manufactured by SAPC

#### 前言

本文件“锂锰软包装电池操作指示及注意事项”仅适用于陕西应用物理化学研究所生产的电芯。

**Note (1):** The customer is requested to contact SAPC in advance if and when the customer needs variations of the operating conditions described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

注(1):

客户若需要变动文件中规定的工作条件，应事先联系陕西应用物理化学研究所。需要额外进行试验以核实电芯在该使用条件下的性能及安全性。

**Note (2):** SAPC will take no responsibility for any accident when the cell is used under conditions outside of this specification.

注(2):

对于在超出文件规定以外的条件下使用电芯而造成的任何意外事故，陕西应用物理化学研究所概不负责。

**Note (3):** SAPC will inform the customer in writing of improvement(s) regarding proper use and handling of the cell if it is deemed necessary.

SAPC reserves the right to revise this specification before the customer signs the datasheet. If a revision is required, SAPC will notify the customer.

注(3):

如有必要陕西应用物理化学研究所会以书面形式告知客户有关正确使用及操作电芯的改进措施。在规格书未签确前，本公司有权对本产品规格书进行修订，如有必要修订后，陕西应用物理化学研究所将会通知客户。

#### 1. Discharging Current:

##### 放电电流

The cell shall be discharged at less than the maximum discharge current specified in the Specification Approval Sheet. A high discharging current may reduce the discharge capacity significantly or cause overheating.

放电电流不得超过本规格书规定的最大放电电流，过大的放电电流会导致电芯容量剧减并导致电芯过热。

#### 2. Discharging Temperature

##### 放电温度

The Discharging Temperature must be within the range specified in this Specification Approval Sheet.

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电芯放电温度必须在本规格书规定的环境温度范围内进行。

### 3. Over-Discharge

#### 过放电

Over-discharging will cause cell degradation and functional losses. The cell can degrade into an over-discharge state through self discharging. In order to prevent over-discharging, the cell should be charged periodically to retain between 3.05V and 3.25V.

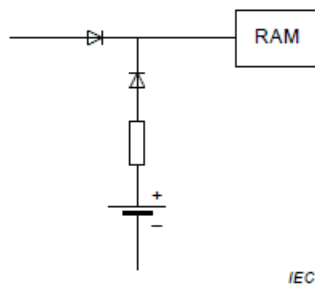
过放电会导致电芯性能及功能的丧失，要避免过放电。电芯长期未使用期间，它也可能因其自放电特性而处于某些过放电状态。应保持其开路电压在 3.05V ~ 3.25V 之间。

### 4. Charge protection

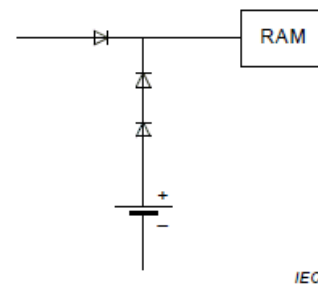
When incorporating a primary lithium battery into a circuit powered by an independent main power source, protective devices shall be used in order to prevent charging the primary battery from the main power source, for example

- a blocking diode and a current limiting resistor (see Figure);
- two series blocking diodes (see Figure);
- circuits with a similar blocking function based on two or more independent protective devices;

provided that the first protective device is capable of limiting the charging current through the lithium battery to the normal reverse current specified by the manufacturer which can be applied to the battery during its operating life, while the second protective device is capable of limiting the charging current to the abnormal charging current specified by the battery manufacturer and used for conduction of test I, Abnormal charging. The circuit shall be so designed that at least one of these protective devices remains operational when any one component of the circuit fails.



a) Diode and resistor



b) Two diodes

### 5. Storage

#### 贮存

Cells should be stored at the proper temperature that is identified in the Specification Approval Sheet.

电芯应在产品规格书规定的温度范围内储存。

### 6. Notice

#### 注意事项

#### 5.1 Handling of cells:

- ★ Avoid any short-circuit. It will cause the leads to get hot and lose electronic functions.
- ★ Soft package is easily damaged by sharp objects such as needles and knives. Avoid

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touching the cells with sharp objects when handling and storing.

- ★ Next to the leads is the sealed edge. Don't bend or fold the sealing edge as it is sensitive to movement.
- ★ Don't open the folded edge on the sides of the cell.
- ★ Don't bend the tabs as the tabs are sensitive.
- ★ Avoid mechanical shock to the cells.
- ★ Don't put the cells into an oven, washing machine or any high-voltage container.
- ★ Don't use a charger without a safety certification. Use only a recommended charger.
- ★ You should immediately stop charging if the cell overheats, emits an odor, changes color, changes shape, etc.
- ★ Adults should supervise the use of batteries by children.
- ★ Before using batteries, please carefully read and understand the handling guidelines.
- ★ Avoid electro-static discharge when using, charging, and storing cells.
- ★ Avoid putting the battery in contact with metal conductors such as neck chains, barrettes, or bolts, etc.
- ★ Don't use metal conductors to connect the positive and negative leads together.
- ★ Avoid errors during assembly by contacting the positive lead with the negative lead.

### 6.1 使用电芯时应注意

- ★ 慎防短路，任何情况引起的短路可能会导致极耳金属发热，使电池功能失效。
- ★ 电芯属于软包装，包装材料易被尖锐物品刺伤，诸如尖针，刀片等，电芯在使用和存放时，应避免与尖锐物品碰撞。
- ★ 电芯极耳引出端为顶封边，顶封边为电芯密封敏感区，使用时，禁止弯折顶封边。
- ★ 禁止打开电芯两侧的折边。★ 电芯极耳的机械强度并非异常坚固，禁止弯折极耳，特别是铝极耳。
- ★ 禁止机械撞击电芯、坠落、弯折电芯。
- ★ 不要把电池放在加热器皿、洗衣机或高压容器中。
- ★ 不要使用非指定的和没有安全认证的充电器给电池充电。
- ★ 在使用充电或储存期间如发现电池有变热、散发气味、变色、变形或其它反常之处应停止使用。
- ★ 把电池放到小孩够不到的地方以免吞服。
- ★ 儿童使用电池时，监护人应详细解释操作方法。
- ★ 在使用电池之前，应仔细阅读操作指南并对使用中的注意事项有足够深刻的理解。
- ★ 电池应在远离静电的场所进行充电、使用和储存。
- ★ 不要在火源附近或温度超过 60°C 的轿车中使用或遗留电池，也不要这些环境中进行充放电。
- ★ 不要把电池同项链发夹硬币或螺钉等金属品一起放在手提包中，也不要把电池同上述物品一起储存。
- ★ 不要使用金属导体短路电池的正、负极。
- ★ 在使用时应注意电池的正、负极不要反装。
- ★ 不要使用带有严重变形的电池。

### 6.2 Notice for Designing Battery Pack

#### 电池外壳设计注意事项

#### 6.2.1 Package Design

##### 外壳设计

- ① The battery pack should have sufficient strength and the battery should be

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protected from mechanical shock.

- ② No sharp objects should be inside the pack containing the battery.
- ① 电池外壳应有足够的机械强度以确保其内部电芯免受机械伤害。
- ② 外壳内安装电芯的部位不应有锋利的边角。

### 6.3 Notice for Assembling Battery Pack

#### 电池外壳组装注意事项

##### 6.3.1 Tab connection

##### 电芯的连接

- ① Ultrasonic welding or spot welding is recommended to connect the battery with the PCM or other parts.
- ② If the tab is to be soldered to the PCM, the instructions below are very important to ensure battery performance.
  - a) The solder iron should be temperature controlled and ESD safe.
  - b) Soldering temperature should not exceed  $350 \pm 10^{\circ}\text{C}$ .
  - c) Soldering time should not be longer than 3 seconds.
  - d) Soldering times should not be fewer than 5.
  - e) Let the battery tab cool down before soldering again.
  - f) Direct heat to the cell body is strictly prohibited. The battery will be damaged by heat above approx.  $60^{\circ}\text{C}$ .
- ① 建议使用超声波焊接或点焊技术来连接电芯与保护电路模块或其它部分。
- ② 如使用手工锡焊，须注意以下事项，以保证电芯的功能：
  - a) 烙铁的温度可控且防静电。
  - b) 烙铁的温度不能超过  $350 \pm 10^{\circ}\text{C}$ 。
  - c) 锡焊时间不能超过 3 秒；
  - d) 锡焊次数不能超过 5 次；
  - e) 必须在极耳金属片冷却后再进行二次焊接；
  - f) 禁止直接加热电芯，高于  $60^{\circ}\text{C}$  会导致电芯损坏。

##### 6.3.2 Cell fixing

##### 电芯的安装

- ① The cell should be fixed to the battery pack by its large surface area.
- ② There should be no sharp edges at the assembly contact area.
- ③ Cells must be held firmly in the battery pack; movement is not allowed.
- ④ The total thickness (the cell thickness plus the thickness of auxiliary materials, e.g. sponge pad, insulate pad, tape and so on) can't exceed the interior room of the plastic case, in order to prevent the cell from the damage and safe issue.
- ① 应将电芯的宽面安装在外壳内；
- ② 装电芯的位置不能有毛刺和尖锐边角；
- ③ 电芯不能在壳内活动。
- ④ 电芯的厚度与辅助材料(如：海面垫、绝缘片、胶带等)的总厚度不能大于壳体内部空间尺寸，以免造成对电芯的损坏和安全隐患。

## 7. Others

### 其它注意事项

- 7.1 Disassembly may cause an internal short circuit to the cell, which may cause out-gassing, fire, or other problems.

## Specification Approval Sheet

在任何情况下不得拆卸或解剖电芯，拆卸和解剖可能会引致电芯内部短路，进而引起鼓气、冒烟、起火及其它安全问题。

**7.2** LIP battery should not have liquid flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians, we recommend as below:

电芯内容物理论上不存在流动的电解液，但万一电池密封不严或刺伤造成吸潮而泄漏接触到皮肤、眼睛、或身体其它部位，以下是建议预防措施：

- a. The electrolyte touch eyes: Flush the electrolyte immediately with fresh water for 15min. and medical advice is to be sought.
- b. The electrolyte touch skin: Flush the electrolyte immediately with a great deal of fresh water.
- c. Breath the released gas: Go outside to breath flash air.
- d. Mis-eaten: Go to take some medical advice.
- a. 眼睛触到电芯内容物：立即用清水冲洗至少 15 分钟，如仍有不适，建议到相关医院就诊。
- b. 皮肤接触：立即用大量的清水冲洗。
- c. 吸入排放气体：换场所吸入新鲜空气。
- d. 误食：需马上医疗就诊。

### **7.3 Prohibition of dumping of cells into fire**

Never incinerate or dispose the cells in fire, for these may cause firing of the cells.

严禁将电芯投入火中

**7.4** The cells should never be soaked with liquids such as water, drinks or oil.

严禁将电芯浸入液体中，如水，饮料，汽油等。

**7.5** Prohibit using the cells mixed with different manufactories. Prohibit using new cells mixed with old ones.

禁止和不同厂家的电芯混用，禁止新旧电芯混用。

**7.6** Prohibit using damaged cells.

禁止使用已损坏的电芯。

## **8. Recommended Notice:**

推荐使用事项

**8.1** Using cells on specified facilities only.

仅在指定的设备上使用电池。

**8.2** Using cells in normal ambition temperature. Temperature: -10 ~ 35°C , Relative Humidity : 45~75%.

请在正常的室内环境中使用电池。温度-10 ~ 35°C，相对湿度：45~75%。

**8.3** Using the cells, away from heat source. Don't let children play with cells.

在使用过程中，应远离热源，避免儿童玩弄电池。切勿摔打电池。

**8.4** Avoid the positive pole shortcutting with the negative one. Avoid the cells affected with damp.

切勿将电池正、负极短路，切勿让电池受潮，以免发生危险。

**8.5** Useless cells should be deal with in a safety way. Don't drop them into the water or fire.

废弃电池请安全妥当处理，不要投入火中或水中。