LYOUNG ENERGY 远阳®

锂离子电池产品规格书

lithium-ion battery product specification

客户名称:
Customer Name

产品名称:
Model Name 18650 圆柱锂离子电池组

规格型号:
Product model FLY18650-2.6Ah 10.8V-3S1P

送样日期:
Date 2025 年 04 月 28 日

◆ 出厂签章:

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黄烈清	王仁树	王培	陈远洪
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◆ 客户确认签章:

审 核 Checked	批 准 Approved	确认签章 Company Stamp

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规格书修订记录 Revision history

更改日期 Date	更改内容 Event	版本号 Version
2025 年 04 月 28 日 April 28, 2025	首次发行 First issue	A/0

目 录 Content

1. 适用范围 Scope

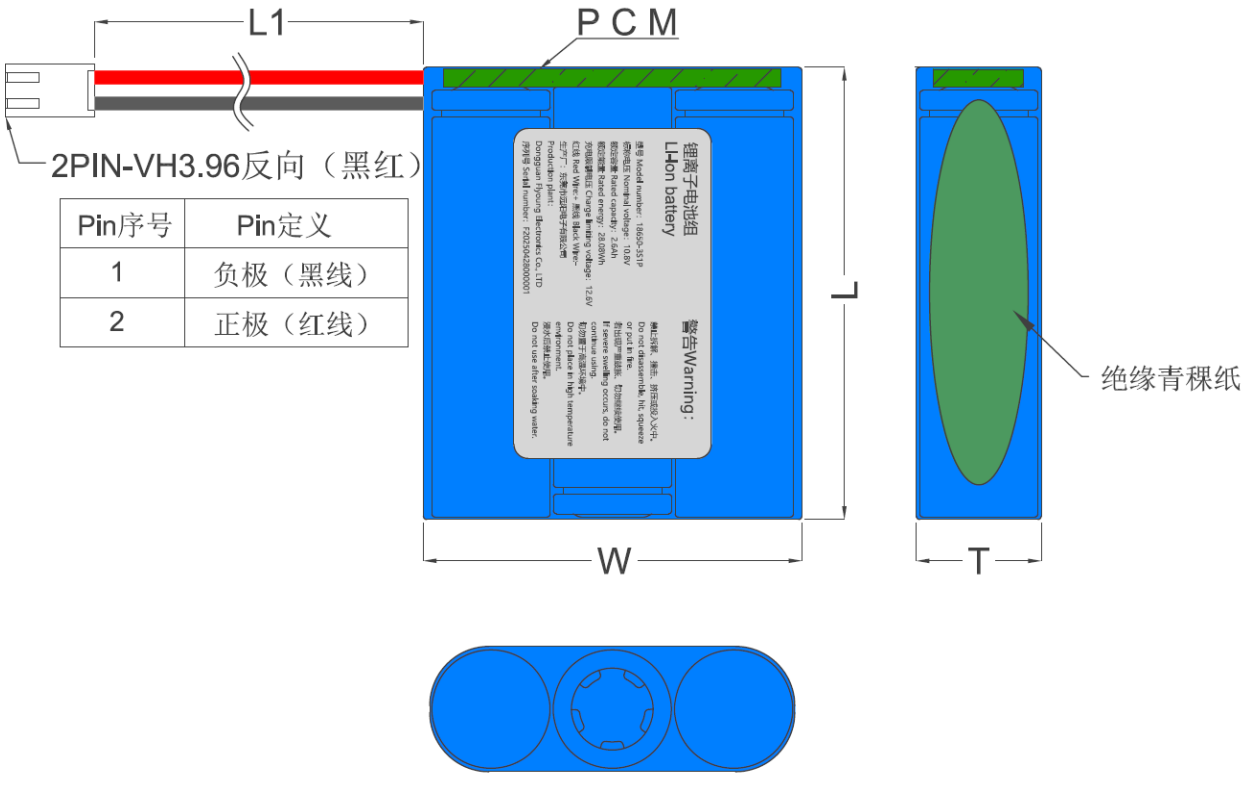
本标准规定了由远阳公司生产的锂离子电芯技术要求，测试方法及注意事项。
This standard specifies the technical requirements, testing methods and precautions for lithium-ion batteries produced by FLYOUNG Company.

2. 电池主要物料 Battery main materials

序号 NO.	物料名称 Material name	规格型号 Specifications	数量 Qty	备注 Remark
1	电芯/Cell	FLY18650-2600mAh	3	
2	保护板/PCM	XBL-3S002-V3	1	IC:CSC5113C MOSFET:TF060N03*2+R010
3	导线/Wire	UL3239-16#	2	红线 P+、黑色 P-
4	标签/ Label	50*30*0.05mm	1	亚银标签
5	热缩套管/PVC	PVC	1	蓝色
6	连接器端子 Connector terminal	VH3.96-2PIN-反向	1	线序：黑红

3. 电池尺寸及显示信息 Battery size and display information

项目 Item	W	L	T	L1	说明
规格参数 Specification	55.5±3.0mm	68.5±3.0mm	19.0±3.0mm	150±10mm	



Pin序号	Pin定义
1	负极（黑线）
2	正极（红线）

4. 电池规格 Specifications of cell

序号 NO.	项目 Items	规格参数 Specifications				
1.	标称电压 Nominal voltage	10.8V				
2.	标称容量 Nominal capacity	2.6Ah 0.2C 放电(0.2C Discharge)				
3.	最小容量 Min capacity	2.5Ah 0.2C 放电(0.2C Discharge)				
4.	充电电流 Charge current	标准充电： 0.2C Standard Charging:： 0.2C 快速充电： 1.0C Rapid charge： 1.0C				
5.	标准充电方法 Standard Charging method	0.2C CC(恒流)充电至 12.6V,再 CV(恒压 12.6V)充电直至充电电流≤0.02C 0.2C CC（constant current）charge to 12.6V,then CV(constant voltage 12.6V)charge till charge current decline to ≤0.02C				
6.	充电时间 Charging time	标准充电： 6.5 小时（参考值）Standard Charging： 6.5hours(Ref.) 快速充电： 2.5 小时（参考值） Rapid charge： 2.5hours(Ref.)				
7.	最大充电电流 Max. Charge current (不用于循环)Not For Cycle	1.0C（2.6A）	最大瞬间充电电流 Max instantaneous charging current	1.5C(3.9A)		
8.	最大放电电流 Max.discharge current	1.5C（3.9A）	最大瞬间放电电流 Max instantaneous discharge current	2.0C(5.2A)		
9.	充电电压 Charge voltage	12.6V				
10.	放电截止电压 Discharge cut-off voltage	7.5V				
11.	过充保护电压 Over charge protection	12.75V±0.15V	过放保护电压 Over discharge protection	8.1V±0.5V		
12.	放电过流保护电流 Discharge overcurrent protection current	6.0A~14.0A	短路保护延迟时间 Short protection delay time	≤1000us		
13.	工作温度 Operating temperature (不可在极限温度长时间持续充放电) Don't long time charge and discharge in extreme temperatures	充电/ Charging：	0℃~45℃：0.2C	16℃~45℃：0.5C		
		放电/ Discharging：	-10℃~55℃：0.2C	16℃~55℃：1.0C		
14.	储存温度 Storage temperature	1 个月内:0℃~ +45℃ Within 1 month: 0℃~ +45℃	3 个月内:0℃~ +35℃ Within 3 months: 0℃~ +35℃	6 个月内:0℃~ +25℃ Within 6 months: 0℃~ +25℃		
15.	电池内阻 Resistance	≤180mΩ（成品 finish product）				
16.	出厂电压 Factory voltage	10.5V-12.3V(SOC30%~70%)				
17.	电池重量 Battery weight	≈150.0g				
18.	环保要求 Environmental request	满足 ROHS 要求 Meet ROHS requirements				

5. 外观检查 Visual inspection

无破裂、划痕、变形、污迹、电解液泄露等
Without break, scratch, distortion, contamination, leakage and so on

6. 测试条件 Test Conditions

6.1 标准测试条件 Standard Test Conditions

若无特别要求，此规格书上的产品测试条件均为温度： 25°C±2°C；湿度：65%±20% RH。
Unless otherwise specified,all tests stated in this Product Specification should be conducted at temperature 25°C±2°C and humidity 65%±20% RH.

6.2 标准充电方式 Standard Charge Method

“标准充电”即在环境温度为 25°C±2°C 的条件下，先以恒定电流（0.2C）充电至 12.6V，再以 12.6V 的恒压充电至电流小于（0.02C）。
The "Standard Charge" means charging the cell at a constant current of （0.2C）until the voltage is 12.6V, and then charged at a constant voltage of 12.6V until its current is less than （0.02C）mA. For test purpose, charging shall be performed at 25°C±2°C.

6.3 标准放电方式 Standard discharge method

“标准放电”即在环境温度为 25°C±2°C 的条件下，以恒定电流（0.2C）放电到 7.5V。
The "Standard Discharge" means discharging the cell at a constant current of（0.2C）until the voltage is 7.5V. For test purpose, discharging shall be performed at 25°C±2°C.

7. 性能检查及测试 Performance Criteria

7.1 电性能 Electrical characteristics

<table>
<tr><th>序号
NO.</th><th>测试项目
Test Item</th><th>测试方法
Test Method</th><th colspan="4">检验标准
Criteria</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">倍率放电性能
Discharge Rate Capabilities</td><td rowspan="3">电池按照右表不同电流放电至截止电压 (7.5V)
The battery is measured with the various discharge currents in right table to the cut-off voltage after the standard charge.(7.5V)</td><td colspan="4">放电条件
Discharge Condition</td></tr>
<tr><td colspan="2">放电电流
Discharge Current</td><td>0.5C</td><td>1.0C</td></tr>
<tr><td colspan="2">相对（0.2C）放电容量比 Relative Capacity Rate of （0.2C）</td><td>≥90%</td><td>≥85%</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">不同温度放电性能
Different Temperature Discharge Capacity</td><td rowspan="2">电池按右表不同温度搁置 4h 以（0.2C） 电流放电至 7.5V
The battery is measured with discharge constant current of （0.2C） to 7.5V with follow discharge temperature and rest for 4h after the standard charging.</td><td>放电温度
Discharge temperature</td><td>-10°C</td><td>25°C</td><td>55°C</td></tr>
<tr><td>相对容量
Relative Capacity</td><td>≥50%</td><td>100%</td><td>≥90%</td></tr>
</table>

3	循环寿命 Cycle Life	电池以（0.2C）电流充电至 12.6V，（0.02C）电流截止，以（0.2C）电流放电至 7.5V ，25°C±2°C 连续进行充放电循环 300 次 Each cycle is an interval between（0.2C）charges to 12.6V with（0.02C）cut-off and （0.2C）discharge with 7.5V cut-off at 25°C±2°C. Capacity after 300cycles.		容量保持率≥80%初始容量 Capacity retention≥80% Initial capacity	
4	储存 Storage	电池按规定充电，25°C±2°C 储存 28d 后以（0.2C）电流放电至截止电压测试容量恢复率 Capacity after storage for 28d at 45°C±2°C after the standard charged measured with discharge current of（0.2C）to cut-off voltage		容量恢复率≥85%初始容量 Capacity recovery ≥85% Initial capacity	
5	常温荷电保持与恢复能力 Normal Temperature Charge Retention and Regain	电池按规定充电，25°C±2°C 储存 28d 后以（0.2C）电流放电至截止电压测试容量保持和恢复 Capacity after storage for 28d at 25°C±2°C after the standard charged measured with discharge current of（0.2C）to cut-off voltage.	相对初始容量 Relative Capacity vs. Initial Capability	保持率 Retention	恢复率 Regain
				≥85%	≥90%
6	高温荷电保持与恢复能力 High Temperature Charge Retention and Regain	电池按规定充电，60°C±2°C 储存 7d 后，以（0.2C）电流放电至截止电压测试容量保持率和容量恢复率 Capacity after storage for 7d at 60°C±2°C after the standard charged measured with discharge current of（0.2C）to cut-off voltage.	相对初始容量 Relative Capacity vs. Initial Capability	保持率 Retention	恢复率 Regain
				≥85%	≥90%

7.2 机械特性 Mechanical characteristics

序号 NO.	测试项目 Test Item	测试方法 Test Method	检验标准 Criteria
1	跌落测试 Drop Test	满电电池从 1m 的高度以随机的方向跌落至木地板 3 次(从头部、尾部、侧面三个方向)，实验后放置至少 1h 后进行外观检查。 A fully charged battery drop onto the wooden floor from 1.0m height three times in a random direction. After the experiment placed at least 1h, the appearance of the inspection.	不爆炸、不起火 No explosion, no fire
2	振动测试 Vibration Test	电池经受简单的调谐振动，振幅为 0.76mm。振动频率在 10~55Hz 范围内以 1Hz/min 的速率变化，在 90±5min 内恢复回来，电芯沿 3 个相互垂直的方向振动。 Battery is to be subjected to simple harmonic motion with amplitude of 0.76 mm. The frequency is to be varied at the rate of 1 hertz per minute between 10 and 55 hertz,and return in not less than 90±5 minutes. The cell is to be tested in three mutually perpendicular directions.	不爆炸、不起火、不漏液 No explosion, no fire, no leakage

7.3 安全测试 Safety Test

下述试验应在有强制排风条件及防爆措施的装置内进行，在试验前所有的电芯都按 6.2 规定标准充电方式充电，并搁置 24h 后，再进行以下试验。

All below tests are carried out on the equipment with forced ventilation and explosion-proof device. Before test, all cells should be charged in accordance with 6.2, and stored 24h prior for testing.

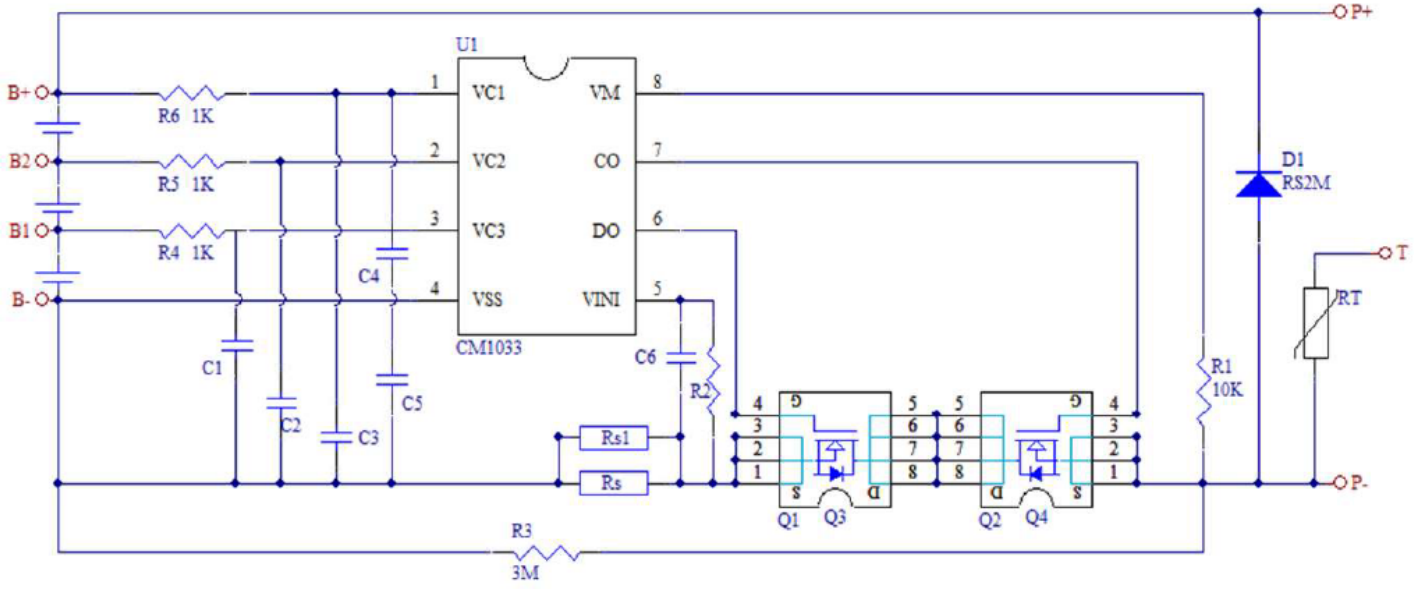
序号 NO.	测试项目 Test Item	测试方法 Test Method	检验标准 Criteria
1	挤压测试 Crush Test	将电池置于挤压设备的两个挤压平面之间，用液压油缸或类似的力挤压， 挤压面与电池接触，逐渐增加压力至 13±1 KN 后停止。 Battery is to be crushed between two flat surfaces.The force for the crushing is to be applied by a hydraulic ram or similar force mechanism. The flat surfaces are to be brought in contact with the batterys and the crushing is to be continued until an applied force of 13±1 KN is reached. Once the maximum force has been obtained is to be released.	不爆炸、不起火 No explosion, no fire
2	加热测试 Heating Test	将电池放在电热鼓风干燥箱中加热，温度以 5°C±2°C /min 的速率由室温升至 130°C±2°C 并保持 30min，观察 1h。 Battery is to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of 5°C±2°C per minute to a temperature of 130°C±2°C and remain for 30 min and observed 1h.	不爆炸、不起火 No explosion, no fire
3	过充（电芯） Over-charge Test (Cell)	标准充电方式充满电后，以(1C) 电流充电至 4.6V 或者充电 1h，观察 1h。 Fully standard charged cell is charged with (1C) to 4.6V or until charging time up to 1h.	不爆炸、不起火 No explosion, no fire
4	短路测试 Short-circuit Test	短接电芯的正负极，外部线路总电阻小于 5mΩ， 10min 后结束实验。 Short-circuit the standard charged cell by connecting positive and negative terminal less than 5mΩ, until the test time is lasting to 10min.	不爆炸、不起火 No explosion, no fire
5	过放电 Over-discharge Test	标准放电方式后的 电芯以（1.0C）电流放电 90 min, 观察 1h。 Each standard discharged cell is discharged at （1.0C）current for 90 min and observed 1h.	不爆炸、不起火 No explosion, no fire
6	低气压 Altitude Simulation	电池放入温度为 20°C±5°C 的低气压箱中，调节试验箱中气压为 11.6KPa，静置 6h 后观察 1h 。 Each fully charged battery is placed in a vacuum chamber with the ambient temperature (20°C±5°C). Once the chamber has been sealed, its internal pressure is gradually reduced to a pressure equal to or less than 11.6KPa held at that value for 6 hours. And it need take 1 hour to observe.	不爆炸、不起火、不漏液 No explosion, no fire, no leakage

8. 保护板参数 PCM parameter

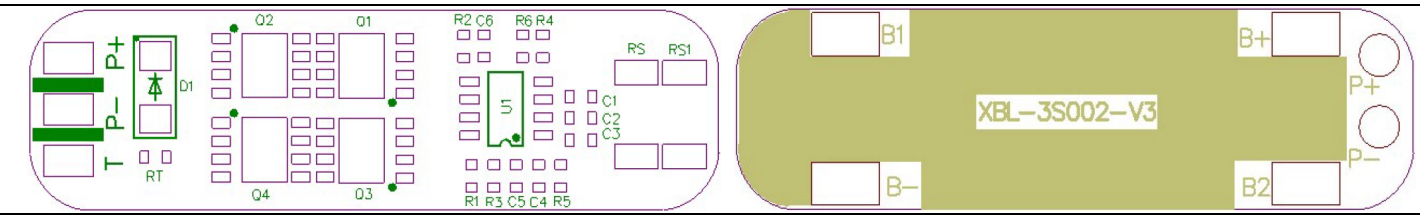
8.1 保护板主要元件清单 PCB component list

序号 NO.	物料名称 Description	物料代号 Location	物料规格 Part No.	用量 Qty	品牌 Brand
1.	保护IC Protection IC	U1	CSC5113C/SOP-8	1	/
2.	MOSFET	Q1,Q2	TF060N03/DFN5*6-8L	2	/
3.	贴片电阻 SMD Resistance	R1	10KΩ/±5%/0603	1	/
4.	贴片电阻 SMD Resistance	R2	330KΩ/±5%/0603	1	/
5.	贴片电阻 SMD Resistance	R3	3MΩ/±5%/0603	1	/
6.	贴片电阻 SMD Resistance	R4,R5,R6	1KΩ/±5%/0603	3	/
7.	贴片电阻 SMD Resistance	RS	10MΩ/±1%/合金/2W/2512	1	/
8.	贴片电容 SMD Capacitance	C1,C2	0.1uF/+80%-20%/50V/0603	2	/
9.	贴片电容 SMD Capacitance	C4,C5	1uF/+80%-20%/50V/0603	2	/
10.	二极管 SMD Diode	D1	RS1M/SMA	1	/

8.2 保护板原理图 PCM Schematic Diagram



8.3 保护板布局 PCM layout



9. 储存及运输 Storage and Transportation

9.1 储存 Storage:

9.1.1 锂电池需保存在阴凉，干燥，通风的环境中，避免接触火源与热源。
The Li-ion battery pack should be stored in a cool, dry and well-ventilated area, and should be far from the fire and the high temperature.
9.1.2 电池需按规格书规定温度范围进行储存，最佳储存温度为 25°C±2°C，最佳湿度为≤65%RH。
The battery should store in the product specification book stipulation temperature range, the best storage temp. Is 25°C±2°C. The best humidity is ≤65%RH.
9.1.3 电池应当在室温下存放，应充到 40%至 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一次充电，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 battery should be stored within room temperature, and charged to 40%~60% electric quantity. In order to avoid over-discharge, we suggest charge the batteries every three months. If stored over one year, we suggest activate the battery as per standard charge-discharge method.

9.2 运输 Transportation:

9.2.1 请勿与其他货物混合。
Do not mix the battery products with other cargos.
9.2.2 请勿将电池浸入水中或使其受潮。
Do not immerse the battery products in water or allow it to get wet.
9.2.3 最高运输温度不超过 55℃。
The highest temperature in transportation is lower than 55℃.
9.2.4 运输过程应防止剧烈振动、冲击、日晒雨淋。
During transportation, keep the cell from acutely vibration, impacting, solarization, drenching.
9.2.5 出货电池处于 10.5V-12.3V 充电状态，由于电池存在自耗，运送到客户端的电池无法完全保证 10.5V-12.3V 充电状态。
The capacity of delivery cell is approximately at 10.5V-12.3V of charging. It is not specified more than 10.5V-12.3V at customer, because of self-discharge.

10. 安全守则 Precautions and Safety Instructions

滥用锂离子充电电芯可能会造成电芯的损害或人身的伤害。在使用锂离子充电电芯以前，请仔细阅读以下内容。
Lithium-Ion rechargeable batteries subject to abusive conditions can cause damage to the cell and/or personal injury. Please read and observe the standard cell precautions below before using utilization.

10.1 电芯防范措施 Standard Cell Precaution

a.不要将电芯暴露在极热或有火星的环境中。
Do not expose the battery to extreme heat or flame.
b.不要将电池短路，过充或过放。
Do not short circuit, over-charge or over-discharge the battery.
c.不要使电池承受过重的机械冲击。
Do not subject the battery to strong mechanical shocks.
d.不要将电池浸入海水或水中，或者使其吸湿。
Do not immerse the battery in water or sea water, or get it wet.
e.不要颠倒电池的正负极。
Do not reverse the polarity of the battery for any reason.
f.不要拆卸或修整电池。

Do not disassemble or modify the battery.
g.不要和项链,硬币或发夹等金属物品放置在一起。
Do not handle or store with metallic like necklaces, coins or hairpins, etc..
h.不要使电池受到明显的损害或变形。
Do not use the battery with conspicuous damage or deformation.
i.不要将电池与插座连接。
Do not connect battery to the plug socket or car-cigarette-plug.
j.不要直接接触泄漏的电池。
Do not touch a leaked battery directly.
k.不要将锂离子电池混合使用。
Do not use Lithium-ion battery in mixture.
l.不要将电池放置在太阳光直射的地方。
Do not use or leave the battery under the blazing sun (or in heated car by sunshine).
m.将电池放置在远离儿童的地方。
Keep battery away from children.
n.不要针刺、锤打或践踏电池。
Do not drive a nail into the battery, strike it by hammer or tread it.
o.不要撞击或投掷电池。
Do not give battery impact or fling it.

10.2 电芯使用说明 Cell Operation Instruction

10.2.1.充电 Charging
a.电池充电温度范围为 0°C~45°C。
Charge the battery in a temperature range of 0°C to 45°C.
b.以（0.2C）的电流恒流充电至 12.6V，超过 （1.0C）的电流建议不要使用。
Charge the cell at a constant current of （0.2C） until 12.6V is attained. Charge rates greater than （1.0C） are not recommended.
c.保持恒压 12.6V 充电 1 小时(最大容量)。
Maintain charge voltage at 12.6V for 1 hour (recommended for maximum capacity).
*必须使用恒流恒压方式对电池进行充电。
Cell must be charged with constant current-constant voltage method.
*不要超过标准时间持续充电。
Do not continue to charge cell over specified time.
10.2.2.放电 Discharging
a.建议放电终止电压为 7.5V，建议最大持续恒流放电电流为（1.5C）。
Recommended cut-off voltage to7.5V. Recommended max continuous discharge current is （1.5C）.
b.为了达到较好的性能，电池的放电温度范围为-10°C~55°C。
For maximum performance, discharge the cell in a temperature range of -10°C to 55°C.
10.2.3.储存建议 Storage Recommendations
a.短期存放 Short Period Storage
•如果短期存放(不超过 3 个月) 电芯应储存在温度范围为 0°C~45°C，低湿度和不含腐蚀性气体的环境中。
Storage the cell at temperature of 0°C to 45°C (less than 3 months), low humidity and no corrosive gas atmosphere.
b.长期存放 Long Period Storage
•如果长期存放(超过 3 个月)，电池应存储在温度范围为 0°C~25°C，低湿度和不含腐蚀性气体的环境中。
In case of long period storage (more than 3 months), storage the cell at temperature range of 0°C ~ 25°C, low humidity, no corrosive gas atmosphere.

•不要让电池承担任何压力。
Don't put any stress on the battery.

11. 质量保证 Warranty

质保是从出厂日期（喷码）开始起十二个月。
Warranty period for this product is 12 months starting from the date when the products left the door of manufacturer.
自出货之日起，电池的保质期限依合同而定，但是在此期限内，如果非远阳公司的制程原因而是客户的误用造成的电池质量问题，远阳公司不承诺免费更换。
The warranty period of cell is made according to business contract. However, even though the problemoccurs within this period, FLYOUNG won't replace a new cell for free as long as the problem is not due to the failure of FLYOUNG manufacturing process or is due to customer's abuse or misuse.
＞远阳公司对违反安全守则操作所产生的问题不承担任何责任。
FLYOUNG will not be responsible for trouble occurred by handling outside of the precautions in instructions.
＞远阳公司对与电路、 电芯组、充电器搭配使用所产生的问题不承担任何责任。
FLYOUNG will not be responsible for trouble occurred by matching electric circuit, cell pack and charger.
＞出货后客户在产品组装过程中产生的不良电池不在远阳公司质量保证的范围之列。
FLYOUNG will be exempt from warrantee any defect cells during assembling after acceptance.
＞规格书所未包含的其它条款由双方协议解决。
Any other items which are not covered in this specification shall be agreed by both parties.