

锂离子电芯（磷酸铁锂）规格书

Specification

For

LFP805993-3000mAh Lithium iron phosphate Cell

Manufacturer Part NO

製造商料號：DX.805993C01

MODEL

型 号：

LFP805993

Nominal Capacity

标 称 容 量：

3000mAh

Customer

客 户：

Total Page

文件页数：

12

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修订履历 Revision History

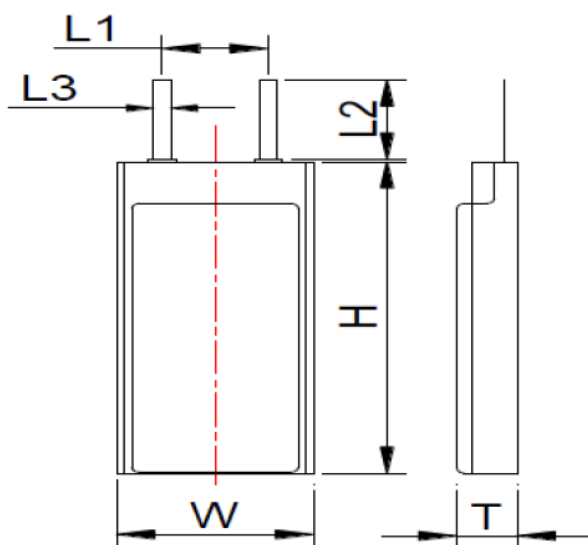
版本 Version	修订页码 Revise page	修订说明 Revision description	日期 Date	编辑 Prepare
A	—	初版发行 First edition	2020-4-21	付容 FuRong
B	1页 1 page	电芯尺寸 Dimension 1.电芯厚度 $\leq 8.2\text{mm}$ 更改为 $7.5 \pm 0.5\text{mm}$; 1. The thickness of cell has been changed from $\leq 8.2\text{mm}$ to $7.5 \pm 0.5\text{mm}$; 2.电芯宽度 $\leq 60.0\text{mm}$ 更改为 $59.0 \pm 1.0\text{mm}$; 2. The Width of cell has been changed from $\leq 60.0\text{mm}$ to $59.0 \pm 1.0\text{mm}$;; 3.电芯高度 $\leq 94.5\text{mm}$ 更改为 $93.5 \pm 1.0\text{mm}$. 3. The Height of cell has been changed from $\leq 94.5\text{mm}$ to $93.5 \pm 1.0\text{mm}$.	2020-6-15	付容 FuRong
		电芯内阻 Internal resistance of battery 1. 内阻 $\leq 4.0\text{m}\Omega$ 更改为 $\leq 7.5\text{m}\Omega$ 1. The internal impedance has been changed from $\leq 4.0\text{m}\Omega$ to $\leq 7.5\text{m}\Omega$		

1.适用范围 Scope

This specification describes the basic performance, technical requirement ,testing method ,warning and caution of the lithium ion Polymer (LiFePO4) rechargeable battery .The specification only applies to POWEROAK.

本标准规定了锂聚合物可充电电池(磷酸铁锂体系)的基本性能、技术要求、测试方法及注意事项，本标准只适用于德兰明海科技有限公司所生产的锂聚合物电池(磷酸铁锂体系)。

2.电芯外形尺寸 Dimension (Unit: mm)



项目 Item	性能 Specification	尺寸 Dimension
T	电芯厚度 Thickness of cell	$7.5 \pm 0.5\text{mm}$
W	电芯宽度 Width of cell	$59.0 \pm 1.0\text{mm}$
H	电芯高度 Height of cell	$93.5 \pm 1.0\text{mm}$
L1	极耳中心距 Distance of tabs	$25 \pm 2.0\text{mm}$
L2	极耳长度 Length of tab	$20 \pm 2.0\text{mm}$
L3	极耳宽度 Width of tab	$10 \pm 0.1\text{mm}$
	顶封边宽度 Width of top edge	$5 \pm 1.0\text{mm}$
	极耳胶外露长度 Exposed length of tab gum	$0.2 \sim 2.0\text{mm}$
	正极耳（铝转镍）厚度 Thickness of positive tab	$0.10 \pm 0.01\text{mm}$
	负极耳（镍）厚度 Thickness of negative tab	$0.10 \pm 0.01\text{mm}$

3.主要技术参数 Main Specifications

序号 No	项目 Item	标准 Specification	备注 Remark
3.1	标称容量Nominal capacity	3000mAh	25±5℃, 0.5C 放电容量 25±2℃ 0.5C Discharge capacity
3.2	最小容量 Min capacity	2900mAh	
3.3	标称电压Nominal voltage	3.2V	
3.4	充电截止电压 Charge end-off voltage	3.65V	
3.5	充电电流 Charge current	标准充电: 0.2C (0.6A) Standard charge: 0.2C (0.6A)	
		快速充电: 0.5C (1.5A) Fast charge: 0.5C (1.5A)	
3.6	充电时间 Charge time	标准充电: 7hours (Ref.) Standard charge: 7hours (Ref.)	
		快速充电: 3 hours (Ref.) Fast charge: 3 hours (Ref.)	
3.7	最大充电电流 Max charge current	1C (3.0A)	
3.8	持续放电电流 Continuous discharge current	3C (9.0A)	
3.9	最大放电电流Max discharge current	5C (15.0A)	≤10S
3.10	放电截止电压Discharge end-off voltage	2.0V	
3.11	内阻Internal impedance	≤7.5mΩ	离极耳顶端处 1~4mm 1-4mm from the top of tab
3.12	重量Weight	82±5g	
3.14	工作温度Operating temperature	充电温度: -10~80℃ /放电温度: -20~80℃ Charging temperature: -10~80℃ / Discharging temperature: -20~80℃	
3.15	存储温度Storage temperature	-10~30℃	
3.16	外观Appearance	无破裂、划痕、变形、污迹、电解液泄露等 No break、scratch、distortion、contamination、leakage.	

4.测试条件 Testing Conditions

4.1 标准测试条件 Standard testing conditions

4.1.1 测试条件温度: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 相对湿度: 15%~90%RH, 大气压力: 86kPa~106kPa;

All performance tests is required to be conducted at

temperature: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$,

Humidity: 15%~90% RH,

Atmospheric pressure: 86 kPa~106 kPa.

4.1.2除非有其它特殊说明外,所有的产品性能规格均以出厂日期1个月以内未使用的产品进行测试。

Unless other special instructions, the tested product is required unused within one month after outgoing.

4.2 标准充电模式 Standard charge mode

指在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下,以 0.2C 的电流恒流充电至单体电芯电压 3.65V 后,转为恒压 3.65 V 充电,至充电电流小于 0.05C 时,停止充电。

At an ambient temperature of $25 \pm 5^{\circ}\text{C}$, cell is charged with 0.2C constant current (CC) to end-off voltage 3.65V, then charge with constant voltage(CV), until its charge current less than 0.05C, stop charging.

4.3 标准放电模式

指在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下,以 0.5C 的电流恒流放电至单体电芯电压 2.0 V。

At an ambient temperature of $25 \pm 5^{\circ}\text{C}$, cell is discharged with 0.5C constant current (CC) to end-off voltage 2.0V.

5.常规性能 General Performance

序号	项目	标准	测试方法
5.1	1C放电性能 1C discharge performance	放电容量应不小于初始容量 95% Retention capacity $\geq 95\%$	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下,按照标准充电方式充满电后,静止 10min,电芯以 0.5C 放电至电压 2.0V (初始容量);再按照标准充电方式充满电后,静止 10min,电芯再以 1C 放电电流至电压 2.0V。At $25 \pm 5^{\circ}\text{C}$, Charge cell at method 4.2, rest 10min, then discharge it at 1C to 2.0V (Initial Capacity); And then charge it at method 4.2, rest 10min, then discharge it at 1C to 2.0V again.
5.2	常温3C电流持续放电容量 3C continuous discharge capacity at normal temperature	放电容量应不小于初始容量 90% Retention capacity $\geq 90\%$, Surface	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下,按照标准充电方式充满电后,静止 1h,以 0.5C 电流放电至 2.0V 终止,再按照标准充电方式充满电后,静止 10min,电芯再以 3C 放电电流至电压 2.0V。Rested the cell at least 1h after it is full charged at $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, then discharge it at 0.5C to the end-off voltage 2.0V. And then charge it at method 4.2, rest 10min, then discharge it at 3C to 2.0V again.

5.3	高温放电容量 Discharge capacity at high temperature	放电容量应不小于初始容量的 95% Retention capacity $\geq 95\%$	电芯按照标准充电方式充满电后; 1C 放电至截止电压; 按标准充电; 将电芯在 $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 下搁置 5h 后, 1C 放电至截止电压。Charge the cell at method 4.2; Discharge at 1C to the end-off voltage; Charge the cell at method 4.2; store the cell at $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 5h, then discharge at 1C to the end-off voltage at $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
5.4	常温循环寿命 Cycle life at	循环次数不小于 2000 次	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 以 0.2C 恒流恒压充电至 3.60V、截止电流 0.05C, 静置 10min, 然后以 0.2C 恒流
	normal temperature	≥ 2000 times	放电至 2.4V, 如此循环测试, 直至连续 3 次容量 $\leq 75\%$ 时终止。循环寿命 ≥ 2000 次。Charge the cell at 1C constant current and constant voltage at $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ to voltage 3.65V、current $\leq 0.05\text{C}$, store it for 10min, then discharge it at constant current at 0.2C to the end-off voltage 2.4V. Do the test until the capacity $\leq 80\%$ for 3 times. Cycle life ≥ 2000 times.
5.5	常温荷电 SOC at normal temperature	剩余容量不低于初始容量的 92%; 恢复容量不低于初始容量的 93% Residual capacity $\geq 92\%$ of initial capacity; remain capacity $\geq 93\%$ of initial capacity	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 以 1C 恒流恒压充电至 3.65V、截止电流 0.05C, 静置 10min, 然后以 1C 恒流放电至 2.0V (初始容量); 以 1C 恒流恒压充电至 3.65V、截止电流 0.05C, $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下搁置 28 天后, 1C 放电至电压 2.0V (剩余容量); 以 1C 恒流恒压充电至 3.65V、截止电流 0.05C, 静置 10min, 1C 放电至电压 2.0V (恢复容量)。Charge the cell at method 4.2; discharge it at 1C to the end-off voltage (Initial capacity); Charge the cell at method 4.2; store it at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 28 days; then discharge it at 1C to the end-off voltage (Residual capacity); Charge the cell at method 4.2, discharge it at 1C to the end-off voltage (Remain voltage).
5.6	高温荷电 SOC at high temperature	剩余容量不低于初始容量的 92%; 恢复容量不低于初始容量的 93% Residual capacity $\geq 92\%$ of initial capacity; remain capacity $\geq 93\%$ of initial capacity	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 以 1C 恒流恒压充电至 3.65V、截止电流 0.05C, 静置 10min, 然后以 1C 恒流放电至 2.0V (初始容量); 以 1C 恒流恒压充电至 3.65V、截止电流 0.05C, $55^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下搁置 7 天后, 1C 放电至电压 2.0V (剩余容量); 在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 以 1C 恒流恒压充电至 3.65V、截止电流 0.05C, 静置 10min, 1C 放电至电压 2.0V (恢复容量)。Charge the cell at method 4.2; discharge it at 1C to the end-off voltage (Initial capacity); Charge the cell at method 4.2; store it at $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 7 days; then discharge it at 1C to the end-off voltage (Residual capacity); Charge the cell at method 4.2, discharge it at 1C to the end-off voltage (Remain voltage).

5.7	高温充放电容量 Charge and Discharge capacity at high temperature	放电容量应不小于 初始容量的 95% Retention capacity ≥95%	将电芯在 $80^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 下搁置 1h 后,电芯按标准充电方式 充满电; 1C 放电至截止电压; 按标准充电; 1C 放电 至截止电压。store the cell at $80^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 1h,Charge the cell at method 4.2; Discharge at 1C to the end-off voltage; Charge the cell at method 4.2; then discharge at 1C to the end-off voltage at $80^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
5.8	低温性能 Low Temperature Discharge Performance	1. 容量保持率 ≥45% ; 2.电芯外观无变形, 无裂纹。 1. Capacity retention ≥45% 2.No deformation,	电芯按 4.2 规定充电结束后,将电芯放入 $-20 \pm 2^{\circ}\text{C}$ 的低温 箱中恒温 24h, 然后以 1C 电流放电至 1.8V, 实验结束 后, 将电芯取出在环境温度为 $25 \pm 2^{\circ}\text{C}$ 的条件下静置 4h, 然后目测电芯外观。The cell was charged in accordance with 4.2,and stored in an ambient temperature of $-20 \pm 2^{\circ}\text{C}$ for 24h,then discharged to 1.8V with 1C constant current.After that, place it in the
		No crack.	ambient temperature of $25 \pm 2^{\circ}\text{C}$ for 4h, then check its appearance.
5.9	低温性能 Low Temperature Charge Performance	容量保持率 ≥45% Capacity retention ≥45%	在环境温度为 $-10 \pm 2^{\circ}\text{C}$ 条件下, a.以 0.5C 电流恒流放电至 2.0V, 静置 1h。 b.以 0.2C 电流恒流充电至 3.65V, 静置 1h。 c.以 0.5C 电流恒流放电至 2.0V。 Under the ambient temperature of $-10 \pm 2^{\circ}\text{C}$ a.Discharged to 2.0V with 0.5C constant current,stay for 1h. b.Charged to 3.65V with 0.2C constant current,stay for 1h. c.Discharged to 2.0V with 0.5C constant current.

6.安全性能 Safe Characteristic

序号	项目	标准	测试方法
6.1	短路测试 Short-circuit test	不起火、不爆炸 No fire, no explosion	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 按照标准充电方式充满电后; 将电芯正、 负极经外部短 路 10min, 外部线路电阻小于 $20\text{m}\Omega$; 观察 1h The cell is charged in accordance with 4.2. Then the cell is short-circuited by connecting the positive and negative terminals with a wire for 10min, the wire has a maximum resistance load of $20\text{m}\Omega$, then observe it for 1h.

6.2	过充电 Over charge test	不起火、不爆炸 No fire, no explosion	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 按照标准充电方式充满电后; 1C 恒流充电至 6.00V 或充电时间达到 1.5h 后停止充电; 观察 1h The cell is charged in accordance with 4.2, charge it at 1C constant current to 6.0V or charging time reaches 1.5H, then stop charging, and observe it for 1h.
6.3	过放电 Over discharge test	不起火、不爆炸、不漏液 No fire, no explosion, no leakage	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 按照标准充电方式充满电后; 1C 恒流放电至 0V 或放电时间达到 1.5h 后停止放电; 观察 1h The cell is charged in accordance with 4.2, discharge it at 1C constant current to 0V or discharging time reaches 1.5H, then stop discharging, and observe it for 1h.
6.4	挤压测试 Crush test	不起火、不爆炸 No fire, no explosion	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 按照标准充电方式充满电后, 电芯按下列条件进行试验: -- 挤压方向: 垂直于电芯极板方向施压; -- 挤压板形式: 半径 75mm 的半圆柱体, 半圆柱体的长度(L)大于被挤压电芯的尺寸; -- 挤压头速度: $(5 \pm 1) \text{ mm/s}$; -- 挤压程度: 电压达到 0V 或变形量达到 30%或挤压力达到 200kN 后停止挤压; 观察 1h
			At $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the cell is charged in accordance with 4.2, and do crush test in these conditions: -- crush direction: pressure perpendicular to the direction of the electrode plate of the cell; -- Squeezing board: semi-cylinder with a radius of 75mm, whose length (L) is greater than the size of the extruded cell; -- extrusion head speed : $(5 \pm 1) \text{ mm/s}$; -- crush degree: stop crush after the voltage reaches 0V or the deformation reaches 30% or the extrusion force reaches 200kN; Observation of 1 h
6.5	跌落 Impact test	不爆炸、不起火、不漏液 No fire, no explosion, no leakage	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 按照标准充电方式充满电后; 将电芯正负极向下从 1.5m 高度处自由跌落到水泥地面上; 观察 1h The cell is charged in accordance with 4.2, and stored for 30 min. The positive and negative poles of the battery are freely dropped onto the concrete floor from a height of 1.5 m; observe it for 1h.

6.6	针刺 Nail Test	不起火、不爆炸 No fire, no explosion	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 按照标准充电方式充满电后, 用 $\Phi 5 \sim \Phi 8\text{mm}$ 的耐高温钢针 (针尖的圆锥角度为 $45^{\circ} \sim 60^{\circ}$, 针的表面光洁、无锈蚀、氧化层及油污), 以 $(25 \pm 5)\text{mm/s}$ 的速度从垂直于电芯极板的方向贯穿, 贯穿位置宜靠近所刺面的几何中心, 钢针停留在电芯中; 观察 1h The cell is charged in accordance with 4.2 use $\phi 5\text{mm} \sim \phi 8\text{mm}$ high temperature resistance steel needle, with speed of $25 \pm 5\text{mm/s}$, to go through the cell from vertical direction of pole plate, the penetrate position should be close to the geometric center of plate surface, the steel needle remains in the cell; Observe it for 1h.
6.7	热冲击 (130°C) Heating Test(130°C)	不起火、不爆炸 No fire, no explosion	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 按照标准充电方式充满电后, 将电芯放置于热箱中, 热箱按照 $5^{\circ}\text{C}/\text{min}$ 的速率由室温升至 $130^{\circ}\text{C} \pm 2^{\circ}\text{C}$, 并保持此温度 30min 后停止加热; 观察 1h The cell is charged in accordance with 4.2, and Put it in a heated circulating air oven. The temperature of the oven is raised at a rate of 5°C per minute to $130 \pm 2^{\circ}\text{C}$ and remain for 30 min.
6.8	海水浸泡 Seawater immersion	不起火、不爆炸 No fire, no explosion	电芯在 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下, 按照标准充电方式充满电后, 将电芯浸入 3.5%NaCl 溶液 (质量分数, 模拟常温下的海水成分) 中 2h, 水深应完全没过电芯; 观察 1h The cell is charged in accordance with 4.2; Immerse the cell in a 3.5% NaCl solution (mass fraction simulate the seawater composition at room temperature)for 2h, the water depth should pass the cell completely; observe it for 1h

6.9	温度循环 temperature cycle	不爆炸、不起 火、不漏液 No fire, no explosion, no leakage	电芯在 25℃±5℃条件下，按照标准充电方式充满电后，电芯放入温度箱中，温度箱温度按照下表进行调节，循环次数 5 次：			
			温度/℃	时间增量/min	累计时	温度变化率
			25	0	0	0
			-40	60	60	13/12
			-40	90	150	0
			25	60	210	13/12
			85	90	300	2/3
			85	110	410	0
			25	70	480	6/7
			The cell is charged in accordance with 4.2, and put it into the temperature chamber, and its temperature set standard according to the table below. Do cycle for 5 times.			
			Temp./℃	Time/min /min	Total/min	Temp.-alter-ratio/(min/℃))
			25	0	0	0
			-40	60	60	13/12
			-40	90	150	0
			25	60	210	13/12
			85	90	300	2/3
			85	110	410	0
			25	70	480	6/7

7.出货 Shipment

单体电芯按30%SOC或客户要求出货，电芯出货后充电前的剩余容量取决于储存时间和其它条件。

The Cell shall be shipped by insulated packaging and at 30% SOC or in accordance with customers' requirement.

The remaining capacity before charging shall depend on the time and conditions of storage.

8.质量保证 Quality Assurance

8.1 本规格书中，质量保证如果与品质保证协议冲突，以品质保证协议为主。In this specification, quality assurance protocol is the main quality assurance protocol if it conflicts with the quality assurance protocol,

8.2 若因客户的滥用或误用，德兰明海公司不提供免费更换。POWEROAK will not offer free replacement of broken products due to the abuse or misuse of customers.

8.3 德兰明海公司对违反安全守则操作所产生的问题不承担任何责任。POWEROAK will not undertake any responsibility for problems occurred by breach of safety operation.

8.4 德兰明海公司对与电路、电池组、充电器搭配使用所产生的问题不承担任何责任。 POWEROAK shall be exempt from problems occurred by matching electric circuit connection, other battery packs and charger.

8.5 出货后客户在电芯组装过程中产生的不良电芯不在德兰明海公司质量保证的范围之列。It's out of guarantee service by POWEROAK after customers assemble the cell (if the cell is bad in the process of assembly).

8.6 本规格书是经双方协商后制定的, 规格书之外的项目德兰明海公司不承担质量保证。This specification is developed after consultation between the parties. For projects not included in this specification, POWEROAK does not undertake quality assurance.

9.安全守则 Precautions and Safety introductions

滥用锂离子电芯可能会造成电芯的损害或人身伤害, 在使用锂离子电芯以前, 请仔细阅读以下的安全守则: Abusive use of (lithium-ion) LiFePO₄ rechargeable cells would cause damage to the cell or injury of human. Please read the precautions and safety instructions below before using:

9.1 电芯防范措施 Standard cell precautions

- 禁止将电芯暴露在极热或有火焰的环境中; Do not expose the cell to extreme heat or flame.
- 禁止将电芯短路, 过充或过放; Do not short circuit, over-charge or over-discharge the cell.
- 禁止使电芯承受激烈的机械冲击; Do not subject the cell to strong mechanical shocks.
- 禁止将电芯浸入水中, 或使电芯吸湿; Do not immerse the cell in water, or get it wet.
- 禁止拆卸或修整电芯; Do not disassemble or modify the cell.
- 禁止将电芯与项链, 硬币或发夹等金属物品接触; Do not handle or store with metal objects like necklaces, coins or hairpins, etc.
- 禁止使电芯受到明显的损害或变形; Do not use the cell with conspicuous damage or deformation.
- 禁止将电芯与插座连接; Do not connect cell to the plug socket.
- 禁止直接接触泄漏的单体电芯; Do not touch a leaked cell directly.
- 禁止将新旧电芯混合使用; Do not mix the new and old Lithium-ion cell and use together.
- 禁止将电芯放置在太阳光直射的地方; Do not expose the cell to blazing sun (or in heated car by sunshine).
- 将电芯放置在远离儿童的地方; Keep cell away from children and pet.
- 禁止针刺, 锤打或踩踏电芯; Do not nail into the cell, strike it by hammer or tread it.
- 禁止撞击或抛掷电芯; Do not impact or throw the cell.
- 禁止将电芯的正负极与壳体直接接触。Do not direct contact the cell positive and negative electrode with aluminum case.

9.2 电芯使用说明 Cell Operation Instructions

9.2.1 充电 Charging

- 电芯充电温度范围为-10~80℃; Charge the cell in a temperature range of -10°C to 80°C.
- 以1C的电流恒流充电至3.65V, 然后以3.65V的电压恒压充电至电流为0.05C, 建议不要使用超过2C及以上的电流(C: 标称容量); Charge the cell at a constant current of 1C until 3.65V, and then at a constant voltage of 3.65V until current is 0.05C. Over 2C Charge rate is not allowed. (C: Rated Capacity of cell)
- 使用恒流恒压锂离子电芯充电器; Use a matched or recommend (CC/CV) lithium-ion (Li+) battery charger.
- 禁止超过标准时间持续充电。Do not charge the cell over the standard charging time.

9.2.2 放电 Discharging

a. 建议放电终止电压为2.0V，建议最大持续恒流放电电流为3C； Recommended end-off voltage is 2.0V.

Recommended max continuous discharge current is 3C.

b. 为了达到较好的性能，电芯的放电温度范围为 $-20^{\circ}\text{C}\sim 80^{\circ}\text{C}$ 。 For a better performance, the cell should be discharged at a temperature range of $-20^{\circ}\text{C}\sim 80^{\circ}\text{C}$.

9.2.3 存储建议 Storage recommendations

a. 若长时间存放(超过3个月)，电芯应存储在温度范围为 $-10\sim 30^{\circ}\text{C}$ ，低湿度和不含腐蚀性气体的环境中； In case of long time storage (more than 3 months), the cell should be stored at a temperature range of $-10\sim +30^{\circ}\text{C}$, an environment of low humidity, no corrosive gas atmosphere.

b. 禁止让电芯承受任何压力 Do not allow the cell to be subjected to any pressure;

c. 建议每3个月要充放电一次，6个月必须充放电一次； It is recommended to charge and discharge the cell every 3 months, and it obligated to charge and discharge the cell every 6 months.

d. 基于对电芯的保护，应严格控制电芯的存储环境。 To protect the cell, good storage environment is necessary.

注：1. 若客户需要将电芯在文件规定之外的条件下操作或应用，请先咨询德兰明海公司； If the customer needs to operate or apply the cell under the conditions of out of this document, please consult POWEROAK. in advance

2. 在文件说明的条件之外使用电芯而产生的事故，德兰明海公司不承担任何责任。 POWEROAK.does not take any responsibility for accidents caused by using the cell out of the conditions described in this document.

10.安全保证 Requirement for safety assurance

为了产品安全，如需对产品进行其它设计；为锂离子电芯系统保护电路，若需使用的更高电流，快速充电和其它特殊应用，请先咨询德兰明海公司。 For safety assurance, please discuss with POWEROAK in advance for your equipment design, the circuit protection of battery/cells, high rate discharge, rapid charge and other aspects of special application.