



产品型号 Model	ITR26/70-46E(R5)	版本号 Version No.	B1
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圆柱形锂离子电池产品规格书

SPECIFICATION OF PRODUCT

for Lithium-ion Rechargeable Cell

型号: ITR26/70-46E(R5)

Model: ITR26/70-46E(R5)



拟定 Prepared	审核 Checked	审批 Approved

客户认同 Customer Approval	签名: Signature:
	日期: Date:
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1. 适用范围 Scope

本规格书适用于由安徽利维能动力电池有限公司生产的圆柱形锂离子电池。

This specification is applicable to cylindrical lithium-ion batteries which are produced by Anhui Power Battery Co., Ltd (EVPS).

2. 型号及说明 Type and Model

2.1 类型 Type: 圆柱形锂离子电池 Cylindrical Lithium-ion Battery

2.1. 电池型号 Model: ITR26/70-46E(R5)

2.2. 产地 Production Address: 中国安徽滁州 Chuzhou, Anhui Province, China

3 产品规格 Nominal Specifications

序号 NO.	项目 ITEMS	参数 SPECIFICATION	备注 REMARK
3.1	标称容量 Nominal Capacity	4.6Ah	0.5C@25°C±2°C
3.2	最小容量 Minimum Capacity	4.5Ah	0.5C@25°C±2°C
3.3	标称电压 Nominal Voltage	3.2V	
3.4	最大充电电压 Maximum Charge Voltage	3.65V	
3.5	最低放电截止电压 Discharge Cut-off Voltage	2.0V	
3.6	内阻 Internal Resistance	≤20mΩ(交流) ≤20mΩ (AC)	1KHz
		≤40mΩ (直流) ≤40mΩ (DC)	25°C, 50%SOC, 2C(9.6A)放电 10s 25°C, 50%SOC, 2C(9.6A) discharge for 10s
3.7	标准充电电流 Standard Charge Current	0.5C(2.3A)	
3.8	标准放电电流 Standard Discharge Current	0.5C(2.3A)	
3.9	最大持续充电电流 Maximum Continuous Charge Current	1C(4.6A)	
3.10	最大持续放电电流 Maximum Continuous Discharge Current	2C(9.2A)	

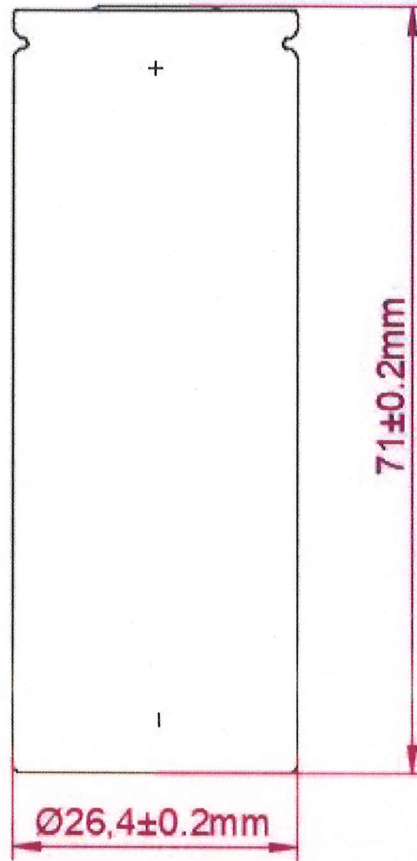


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3.11	标准充电方式 Standard Charge Method	25°C±2°C环境温度下，以 0.5C(2.3A) 恒流充电至电压达到 3.65V，转 3.65V 恒压充电到充电电流降低至 0.05C(0.23A)时停止充电。 At 25°C±2°C, 0.5C(2.3A) constant current(CC) charge to 3.65V, followed by 3.65V constant voltage(CV) charge until current taper to 0.05C(0.23A).	
3.12	标准放电方式 Standard Discharge Method	25°C±2°C环境温度下，以 0.5C (2.3A) 恒流放电到电压降低至 2.0V 时停止放电。 At 25°C±2°C, discharge with 0.5C(2.3A) constant current, 2.0V cut-off.	
3.13	工作温度 Operating Temperature	充电: 0°C~55°C Charge: 0°C~55°C	
		放电: -20°C~60°C Discharge: -20°C~60°C	
3.14	存储温度 Storage Temperature	小于 1 年: -20°C~25°C Less than 1 year: -20°C~25°C	40%~60%SOC 贮存 40%~60%SOC storage
		小于 3 个月: -20°C~35°C Less than 3 months: -20°C~35°C	
3.15	电池尺寸 Dimension	高度: 71±0.2mm 直径: 26.4±0.2mm Height: 71±0.2mm Diameter: 26.4±0.2mm	
3.16	重量 Weight	<98g	

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4. 电池尺寸及外观 Appearance and Dimension

4.1 电池尺寸 Dimension



4.2 产品外观 Appearance

4.2.1 条码清晰可完整、正确的扫取电池条码信息，确保读取成功率 $\geq 99.5\%$ 。

The barcode is clear, and the battery barcode information can be completely and correctly scanned to ensure the reading success rate $\geq 99.5\%$.

4.2.2 电池表面平整，无磕碰、褶皱等不良，无明显划痕、硌伤。

The surface of the battery is smooth, without bumps, wrinkles, scratches or crushes.

4.2.3 电池无破损、腐蚀等损伤，密封性良好，无漏液。

Battery without damage, corrosion and other damage, good sealing, no leakage.

5. 标准条件 Standard Test Conditions

5.1. 环境条件 Environmental Conditions

除非有特殊说明，所有测试的环境条件要求如下，温度： $25\pm 5^\circ\text{C}$ ；湿度： $65\pm 20\%$ ；大气压力： $86\sim 106\text{ kPa}$ 。本文所提到的室温，是指 $25^\circ\text{C}\pm 2^\circ\text{C}$ 。

Unless otherwise specified, all tests stated in this specification are conducted at temperature $25\pm 5^\circ\text{C}$; humidity $65\pm 20\%$; Atmospheric pressure: $86\sim 106\text{ kPa}$. In this specification, room temperature refers to $25\pm 2^\circ\text{C}$.



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5.2. 测量仪表要求 Measuring Instrument Meter Accuracy Requirements

- 电压测量装置 Voltage measuring device: 不低于 0.5 级 no less than 0.5 level
- 电流测量装置 Current measuring device: 不低于 0.5 级 no less than 0.5 level
- 温度测量装置 Temperature measuring device: $\pm 0.5^{\circ}\text{C}$
- 时间测量装置 Time measuring device: $\pm 0.1\%$
- 尺寸测量装置 Dimension measuring device: $\pm 0.1\%$
- 质量测量装置 Quality measuring device: $\pm 0.1\%$

6. 电性能测试 Electrical Specification

6.1. 初始容量 Initial Capacity

按标准充电方式充电后，按标准放电方式放电，重复 3 次，充电、放电时间间隔 10 min，计算 3 次放电容量平均值。

Repeating the standard charging and then standard discharging for three times. The time interval between charging and discharging is 10 min. The average discharge capacity of 3 times is calculated.

3 次放电容量平均值 $\geq 100\%$ × 最小容量

Average Discharge Capacity (3 times) $\geq 100\%$ × Minimum Capacity

6.2. 常温倍率放电性能 Discharge Rate Performance

电池按标准充电制度充电后，室温下搁置 10 min 后分别以 0.5C(2.3A)、1C(4.6A)、2C(9.2A)、3C(13.8A) 恒流放电至 2.0V。

At room temperature, the battery is fully charged according to the standard charging method, and kept for 10 min, then discharged to 2.0V at constant current of 0.5C(2.3A), 1C(4.6A), 2C(9.2A) and 3C(13.8A), respectively.

放电容量/初始容量: 0.5C $\geq 100\%$ 、1C $\geq 95\%$ 、2C $\geq 90\%$ 、3C $\geq 85\%$

Discharge Capacity / Initial Capacity: 0.5C $\geq 100\%$ 、1C $\geq 95\%$ 、2C $\geq 90\%$ 、3C $\geq 85\%$

6.3. 常温倍率充电性能 Charge Rate Performance

电池标准放电后，分别以 0.33C(1.52A)、0.5C(2.3A)、1C(4.6A) 恒流充电至 3.65V；搁置 10min；标准放电至 2.0V。

The battery is discharged according to the standard discharging method, then charged to 3.65V with constant current of 0.33C(1.52A), 0.5C(2.3A), 1C(4.6A), respectively, kept for 10min, and discharged to 2.0V.

放电容量/初始容量: 0.33C 充电后 $\geq 98\%$ 、0.5C 充电后 $\geq 97\%$ 、1C 充电后 $\geq 95\%$

Discharge Capacity / Initial Capacity:

After 0.33C Charge $\geq 98\%$ 、After 0.5C Charge $\geq 97\%$ 、After 1C Charge $\geq 95\%$

6.4. 低温放电性能 Low Temperature Performance

电池标准充电后，将电池分别放入 $-10^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的放电环境中搁置 24h，然后电池在 $-10^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 环境温度下以 0.5C(2.3A) 电流恒流放电，放电截止电压 1.6V。(放电环境温度控制精度 $\pm 2^{\circ}\text{C}$)

The battery is charged according to the standard charging method, put into the discharge environment of -10°C and shelved for 24h. Then the battery is discharged to 1.6V with constant current of 0.5C(2.3A) at -10°C ambient temperature. (Discharge environment temperature control accuracy: $\pm 2^{\circ}\text{C}$)

放电容量/初始容量: $-10^{\circ}\text{C} \geq 65\%$

Discharge Capacity / Initial Capacity: $-10^{\circ}\text{C} \geq 65\%$

6.5. 高温放电性能 High Temperature Performance

电池标准充电后，将电池放入 $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 环境中搁置 5h，然后电池在 $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 环境温度下以 0.5C(2.3A) 电流恒流放电，放电截止电压 2V。(放电环境温度控制精度 $\pm 2^{\circ}\text{C}$)

The battery is charged according to the standard charging method, put into the discharge environment of



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55°C and shelved for 5h. Then the battery is discharged to 2.0V with constant current of 0.5C(2.3A) at 55°C ambient temperature. (Discharge environment temperature control accuracy: $\pm 2^\circ\text{C}$)

放电容量/初始容量: $55^\circ\text{C} \geq 95\%$

Discharge Capacity / Initial Capacity: $55^\circ\text{C} \geq 95\%$

6.6. 常温荷电保持与容量恢复 Capacity Retention and Capacity Recovery at Room Temperature

电池标准充电; 室温下开路放置 28 天; 标准放电至 2.0V, 放电容量记为剩余容量; 室温下, 静置 10min; 标准充电后标准放电重复 3 次(充、放电时间间隔 10min), 3 次放电容量最高值记为恢复容量。

After standard charging, the battery is kept open circuit at room temperature for 28 days, then standard discharged to 2.0V, the discharge capacity is recorded as residual capacity. Repeating standard charging and standard discharging for 3 times, the time interval between charging and discharging is 10min, the discharge capacity is recorded as recovery capacity. The test could be terminated if any discharge capacity meets the standard requirement.

剩余容量 $\geq 90\%$ ×初始容量、恢复容量 $\geq 95\%$ ×初始容量

Residual Capacity $\geq 90\%$ × Initial Capacity、Recovery Capacity $\geq 95\%$ × Initial Capacity

6.7. 55°C高温荷电保持与容量恢复 Capacity Retention and Capacity Recovery at High Temperature(55°C)

电池标准充电; 置于 55°C 环境中, 开路放置 7 天; 室温下, 静置 8h; 按标准放电制度放电, 放电容量记为剩余容量; 室温下, 静置 10min; 按标准充电、放电制度循环 3 次(充电、放电时间间隔 10min), 3 次放电容量最高值记为恢复容量。

After standard charging, the battery is kept open circuit at 55°C for 7 days, then transferred to room temperature environment for 8h, standard discharged, the discharge capacity is recorded as residual capacity. Repeating standard charging and standard discharging for 3 times, the time interval between charging and discharging is 10min, the discharge capacity is recorded as recovery capacity. The test could be terminated if any discharge capacity meets the standard requirement.

剩余容量 $\geq 90\%$ ×初始容量、恢复容量 $\geq 95\%$ ×初始容量

Residual Capacity $\geq 90\%$ × Initial Capacity、Recovery Capacity $\geq 95\%$ × Initial Capacity

6.8. 循环寿命 Cycle Life (RT, 2.0V~3.65V)

环境温度: $25 \pm 2^\circ\text{C}$; 充电: 0.5C(2.3A)恒流充电至 3.65V 后, 以 3.65V 恒压充电至电流降低至 0.05C (0.23A), 停止充电; 放电: 1C(4.6A)恒流放电至 2.0V, 停止放电; 充、放电循环 2000 次, 充、放电时间间隔 10min。

1) $25^\circ\text{C} \pm 2^\circ\text{C}$, 0.5C(2.3A) constant current charge to 3.65V, followed by 3.65V constant voltage charge until current taper to 0.05C(0.23A), then rest 10 minutes;

2) $25^\circ\text{C} \pm 2^\circ\text{C}$, 1C(4.6A) constant current discharge to 2.0V, then rest 10 minutes;

3) Repeating Step 1) and step 2) for 2000 times.

第 2000 次放电容量/前 10 次放电容量均值 $\geq 80\%$

The 2000th Discharge Capacity $\geq 80\%$ × Average Discharge Capacity of the Top 10 Times

6.9. 储存性能 Storage

50%SOC 荷电态电池在 $45^\circ\text{C} \pm 2^\circ\text{C}$ 环境温度下储存 28 天后, 按标准充、放电制度循环 3 次(充放电时间间隔 10min), 3 次放电容量最高值记为恢复容量。

The battery is kept at 45°C for 28 days with 50%SOC. Then, repeating standard charging and standard discharging for 3 times, the time interval between charging and discharging is 10min, the discharge capacity is recorded as recovery capacity. The test could be terminated if any discharge capacity meets the standard requirement.

恢复容量 $\geq 90\%$ ×初始容量



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Recovery Capacity \geq 90% \times Initial Capacity

7 安全性和环境适应性测试 Safety and Environmental Suitability Testing

下述试验应在有强制排风和防爆措施的装置内进行。

The following tests should be carried out in a facility with forced ventilation and explosion-proof measures.

7.1 挤压测试 Crush

电池按标准充电方式充电后，平放于挤压平台，以半径 75mm 的半圆柱体垂直于电池极板方向施压；半圆柱体长度(L)大于被挤压电池长度；挤压速度(5±1)mm/s；当电池变形量达 15%后停止挤压。观察 1h。

After standard charging, the battery is put on the extrusion platform and crushed with a half cylinder (radius 75mm) at a rate of 5±1 mm/s, the length of which was bigger than the thickness of battery. The direction of the crushing force shall be vertical to axis of the cylinder. The test could be terminated if the crushed battery voltage reaches 0V or deformation extent achieves 15% or crushing force runs to 200kN, and observed for 1h.

电池不起火、不爆炸

No fire, no explosion

7.2 加热测试 Heating

电池按标准充电方式充电后，放置于空气流通的热箱中，热箱内温度以(5±2°C)/min 的速率升至 130±2°C并保持 30min，停止加热，取出电池，观察 1h。

After standard charging, the battery is heated in a hot oven with air circulation, the temperature of the oven is to be raised at a rate of 5±2°C per minute to 130±2°C and remain for 30min, and the heating shall be stopped and observed for 1h.

电池不起火、不爆炸

No fire, no explosion

7.3 过充电测试 Over Charge

电池按标准充电方式充电后，再以 1C(4.6A)电流恒流充电至 5.475V，观察 1h。

After standard charging, the battery is charged with a constant current of 1C(4.6A) to 5.475V, and observed for 1h.

电池不起火、不爆炸

No fire, no explosion

7.4 短路测试 Short Circuit

电池按标准充电方式充电后，将电池外部短路 10min，外部线路电阻应小于 5mΩ，观察 1h。

After standard charging, then external short circuit the battery for 10min, and the resistance of the external line shall be less than 5mΩ, observed for 1h.

电池不起火、不爆炸

No fire, no explosion

7.5 过放电测试 Over Discharge

电池按标准放电方式放电后，再以 1C(4.6A)放电 90min，观察 1h。

After standard charging, the battery is discharged with a constant current of 1C(4.6A) for 90min, and observed for 1h.

电池不起火、不爆炸

No fire, no explosion

7.6 低气压测试(高度模拟) Low Pressure Performance

电池按标准充电方式充电后，将电池放入低气压箱中，调节试验箱中气压为 11.6kPa，温度为室温，静置 6h，停止试验，取出电池，观察 1h。



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After standard charging, the battery is put into a low-pressure box with a pressure of 11.6kPa at room temperature, kept for 6h, and observed for 1h after taken out.

电池不起火、不爆炸、不漏液

No fire, no explosion and no leakage

7.7 温度循环测试 Temperature Cycle

电池按标准充电方式充电后，将电池放入温度箱中，温度箱温度按照下表进行调节，循环次数 5 次；观察 1h。

After standard charging, the battery is put into the constant temperature oven, and the temperature of the oven is set up according to table 1, repeating for 5 times, and observed for 1h.

温度循环实验一个循环的温度和时间 The temperature and time of a cycle			
温度°C Temperature/°C	时间增量min Increment/min	累积时间min Accumulation /min	温度变化率°C/min Temperature Variation rate/°C/min
25	0	0	0
-30	60	60	1
-30	90	150	0
25	60	210	1
85	90	300	1
85	110	310	0
25	70	380	1

电池不起火、不爆炸、不漏液

No fire, no explosion and no leakage

7.8 跌落测试 Drop Test

电池按标准充电方式充电后，由 1.2m 高度自由跌落到水泥地面上，正、负端子向下各一次，观察 1h。

After standard charging, the battery is dropped onto the cement floor from 1.2 meters height, the positive and negative terminal is downward once, respectively.

电池不起火、不爆炸

No fire, no explosion

7.9 海水浸泡测试 Sea Water Immersing

电池按标准充电方式充电后，将电池浸入 3.5%NaCl 溶液(质量分数，模拟常温下的海水成分)中 2h，水深应完全没过电池。

After standard charging, the battery is completely immersed into 3.5% NaCl solution (mass fraction, simulating the composition of seawater under normal temperature) for 2h, and observed for 1h.

电池不起火、不爆炸

No fire, no explosion

8 产品包装 Product Packaging

8.1 产品包装严格执行国家和行业有关标准。

Product packaging shall strictly comply with relevant national and industrial standards.

8.2 提供产品供货清单、出厂检验报告、合格标签。

Provide the product supply list, factory inspection report and qualified label.



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8.3 每盒装 40 只电池，每箱装 2 盒。

Packed in 40 batteries per case, 2 cases of per box.

9 产品运输 Product Transport

9.1 箱内做好防震措施确保运输过程的安全，行驶过程中尽量避免紧急启动或者刹车。

Take anti-shock measures in the box to ensure the safety of the transportation process. Try to avoid emergency start or brake during the driving process.

9.2 在运输过程中不和易燃、易爆、易腐蚀的物品同车装运，不经受雨、雪或液体物质的淋袭与机械损伤。

In the process of transportation, inflammable, explosive and easily corroded articles shall not be transported together with the vehicle, and shall not be subjected to rain, snow or liquid substances and mechanical damage.

9.3 产品装卸时，采用升降车或专用工具对产品进行装、卸车，轻取轻放不扔掷、挤压，避免造成电池损坏或对人体造成意外伤害，不与酸碱等腐蚀物品放在一起。

When loading and unloading the products, lift cars or special tools shall be used to load and unload the products. Take and put them gently without throwing or squeezing, so as to avoid battery damage or accidental personal injury, and not put them together with acid, alkali and other corrosive materials.

10 使用注意事项 Caution

10.1 当使用中电池内阻超过这个电池最初内阻的 150%，或电池的容量小于等于 80%标称容量应停止使用。

Discontinue use when the internal resistance of the battery exceeds 150% of the initial internal resistance of the battery, or the capacity of the battery is less than or equal to 80% of the nominal capacity.

10.2 若预计将电池存放 30 天以上，应将电池电量调整为满电态容量的 40%~60%。

If the battery is expected to be stored for more than 30 days, the battery should be adjusted to 40% to 60% of its full capacity.

10.3 电箱设计应充分考虑到电池的散热、防水、防尘问题，满足国家有关标准规定的防水、防尘等级，由于电箱问题导致电池过热损坏电池，或由于防水、防尘问题导致电池损坏(如腐蚀、生锈等)，利维能动力电池有限公司不承担质量保证责任。

The design of the electric box should fully take into account the problems of heat dissipation, waterproof and dustproof of the battery, and meet the requirements of the relevant national standards for waterproof and dustproof. Anhui Power Battery Co., Ltd(EVPS). will not be liable for the quality guarantee if the battery is damaged due to overheating of the battery due to electrical box problems, or if the battery is damaged due to waterproof or dustproof problems (corrosion, rust, etc.).

10.4 电池在任何正常使用情况下，电池的温度不能超过 60°C，电池避免在低于 0°C条件下充电，否则可能出现容量快速衰竭现象。

In any normal use of the battery, the temperature of the battery should not exceed 60 °C, the battery should not be charged under the condition of 0 °C, otherwise there may be rapid capacity depletion.

10.5 不要用超过规格要求的电流对电池进行充放电。

Do not charge and discharge the battery with more current than required.

10.6 严格按照指示和说明连接电池正负极，禁止反向充电。

Strictly follow the instructions and instructions to connect the positive and negative terminals of the battery, do not reverse charge.

10.7 避免电池受机械振动碰撞及压力冲击，否则电池内部可能短路，产生高温或火灾。

Avoid the battery by mechanical vibration impact and pressure impact, otherwise the battery may short



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circuit, high temperature or fire.

10.8 电池应储存在阴凉干燥处。

Batteries should be stored in a cool, dry place.

10.9 禁止将电池投入火中或试图拆开。

Do not throw batteries into fire or attempt to disassemble them.

10.10 禁止电池正负极短路和过充，否则强电流和高温可能导致人身伤害或者火灾。

Do not short-circuit or overcharge the positive and negative terminals of the battery, otherwise strong current and high temperature may cause personal injury or fire.

10.11 避免电池过放电，过放电会导致电池永久性的破坏。

Avoid over discharging the battery, which can cause permanent damage to the battery.

10.12 当电解液泄漏时，应避免皮肤和眼睛接触到电解液，如有接触，应使用大量的清水冲洗接触区域，并向医生寻求帮助，禁止任何人和动物吞食电池任何部件或电池所含物质。

When electrolyte leakage, should avoid skin and eyes contact with the electrolyte, if there is contact, should use plenty of water to wash the contact area, and seek help from a doctor, prohibit people and animals to swallow any parts of the battery or battery contained substances.

11 保证 Guarantee

11.1 电池正常使用半年内，经确认出现产品本身原因而造成的质量问题，可由本公司予以解决，此期限外或非产品本身原因而是客户误用造成的电池质量问题，本公司不承诺免费更换。

Within half a year of normal use of the battery, the company can solve the quality problems caused by the product itself after confirmation. After this period or the battery quality problems caused by the customer's misuse of the product, the company does not promise to replace the battery free of charge.

11.2 为了安全起见，如有设备设计、锂离子电池系统保护电路或高电流、快速充电和其它方面的特殊应用，请先咨询本公司相关事宜。

For the sake of safety, if you have equipment design, lithium-ion battery system protection circuit or high current, fast charging and other special applications, please consult with us first.

11.3 本公司对违反安全守则操作所产生的问题不承担任何责任。

The company does not assume any responsibility for any problems arising out of operation in violation of safety rules.

11.4 本公司对于电路，电池组以及充电器搭配使用所产生的问题不承担任何责任。

The company is not responsible for any problems caused by the combination of the circuit, battery pack and charger.

11.5 本公司对于出货后客户在电池组装过程中产生的不良电池不予以质量保证。

The company does not guarantee the quality of defective batteries produced by customers during the battery assembly process after shipment.

12 长时间存储 Storage for Long Time

如果电池长期存储，应在 3.14 规定的条件下进行，储存过程中电池不能结露。此外，每六个月给电池充电一次。

If the battery is stored for a long period of time, it shall be stored under the conditions specified in 3.14 and the battery shall not be dewy during storage. Also, charge the battery every six months.



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13 其它 Others

规格书未尽事宜，由双方协商解决。

Matters not mentioned in the Specifications shall be settled by both parties through negotiation.

附录 1 Appendix 1:



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锂离子电池使用指南

Lithium-ion Battery Usage Guide

使用锂离子电池前请参阅此文件，由安徽利维能动力电池有限公司提供。

Please refer to this document before using lithium-ion batteries, provided by Anhui Power Battery Co., Ltd(EVPS).

1. 概括 Generalize

本文件旨在为客户提供适当的警告和禁止措施，以便客户在使用安徽利维能动力电池有限公司生产和提供的锂离子电池时获得最佳的性能和安全性。

The purpose of this document is to provide customers with appropriate warnings and prohibitions so that customers can obtain the best performance and safety when using lithium-ion batteries manufactured and supplied by Anhui Power Battery Co., Ltd(EVPS).

2. 充电 Charge

2.1. 充电电流 Charge Current

充电电流应不高于产品规格书规定的最大充电电流。

The charging current shall not be higher than the maximum charging current specified in the product specification.

2.2. 充电电压 Charge Voltage

充电电压应不高于产品规格书规定的电压。

The charging voltage shall not be higher than the voltage specified in the product specification.

2.3. 充电温度 Charge Temperature

电池应在产品规格书中规定的温度范围内充电。

The battery shall be charged in the temperature range specified in the product specification.

2.4. 反向充电 Reverse Charge

连接电池时应确认其两极正确对齐，严禁反向充电。如果电池连接不当，可能会损坏。

When connecting the battery, make sure its two poles are aligned correctly and reverse charging is strictly prohibited. Batteries can be damaged if they are not properly connected.

3. 放电 Discharge

3.1. 放电 Discharge

放电电流应不高于产品规格书中规定的最大放电电流。

The discharge current shall not be higher than the maximum discharge current specified in the product specification.

3.2. 放电温度 Discharge Temperature

3.2.1. 电池应在产品说明书规定的温度范围内放电。

The battery shall be discharged in the temperature range specified in the product specification.

3.2.2. 电池在规定温度范围外放电，会造成电池的性能损失。

Battery discharge outside the specified temperature range will result in battery performance loss.

3.3. 过放 Over Discharge

3.3.1. 系统应配置防止超过产品规格书中规定的放电截止电压后进一步放电的装置。

The system shall be equipped with a device to prevent further discharge beyond the discharge cut-off voltage specified in the product specification.

3.3.2. 过放会导致电池性能、特性和功能的损失。

Over discharge can result in loss of battery performance, characteristics and functions.

3.3.3. 电池长时间不使用，电池的自放电可能会导致过放电。

Over discharge may occur when the battery is not used for a long time.



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3.3.3. 充电器应装有检测电池电压和确认充电程序的装置。

The charger should be equipped with a device to detect the battery voltage and confirm the charging procedure.

4. 存储 Storage

4.1. 存储条件 Storage Condition

4.1.1. 电池应储存在产品规格书规定的温度范围内。

Batteries should be stored in the temperature range specified in the produce specification.

4.1.2. 电池存储在规定的温度范围外，可能会导致电池性能损失、泄漏。

Storage of batteries outside the specified temperature range may result in loss of battery performance and leakage.

4.2. 长期储存 Long-term Storage

4.2.1. 充电后应短期内使用，长期存放会因电池的自放电而导致容量损失。

After charging, it should be used for a short time. Long-term storage will result in capacity loss due to self-discharge of the battery.

4.2.2. 如果需要长期储存，电池应在产品规格书规定的范围内以较低的电压储存，因为较高的电压储存可能造成性能的损失。

If long-term storage is required, the battery should be stored at a lower voltage within the range specified in the product specification, as higher voltage storage may result in loss of performance.

5. 循环寿命 Cycle Life

5.1. 循环寿命表现 Cycle Life Performance

5.1.1. 电池可以在产品规格书规定的次数内重复充放电，并保持有产品规格书内规定的容量。

The battery can be charged and discharged repeatedly within the number of times specified in the product specifications and maintain the capacity specified in the product specifications.

5.1.2. 电池的循环寿命由充电、放电、工作温度和/或储存环境决定。

The cycle life of the battery is determined by charging, discharging, operating temperature and/or storage environment.

6. 系统设计 Systematic Design

6.1. 电池与电池的连接 Battery to Battery Connection

6.1.1. 电池不能直接用导线焊接。应该先在电池端子上焊接导线，再在焊点上进行锡焊固定。

Batteries cannot be welded directly with wires. The conductors should be soldered to the battery terminals and then soldered to the solder joints.

6.1.2. 直接用导线焊接，产生的热量会对隔膜、绝缘片等部件造成损坏。

Direct use of wire welding, the heat generated will cause damage to the diaphragm, insulation and other parts.

6.2. 在系统中定位电池 Locate the Battery in the System

6.2.1. 电池应尽可能远离热源和高温元件。

Batteries should be as far away from heat sources and high-temperature components as possible.

6.2.2. 电池离热源和高温元件近，会造成性能损失。

Battery proximity to heat sources and high-temperature components can cause performance losses.

6.3. 电池的机械减震保护 Mechanical Shock Absorber Protection for Batteries

6.3.1. 电池应配备减震器，以尽量减少冲击。

Batteries should be equipped with shock absorbers to minimize impact.

6.3.2. 电池未配备减震器，会引起变形、漏液、发热和/或破裂。

Batteries are not equipped with shock absorbers, which can cause deformation, leakage, heating and/or rupture.



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6.4. 电池与充电器/系统之间的连接 The Connection Between the Battery and the Charger/System

电池应设计成只能连接到指定的充电器和系统，即使在指定的系统中，也应避免使用特殊的电池设计，如特殊的终端，用以防止电池反向连接。

Batteries should be designed to be connected only to specified chargers and systems. Even in specified systems, special battery designs, such as special terminals, should be avoided to prevent the batteries from being connected in reverse.

6.5. 电池管理系统控制要求 Battery Management System Control Requirements

6.5.1. 当电池的电压达到 3.65V 时终止充电。

The charging is terminated when the voltage of the battery reaches 3.65V.

6.5.2. 当电池电压达到 3.8V 触发一级保护终止充电。

The first-level protection is triggered to terminate the charging when the battery voltage reaches 3.8V.

6.5.3. 当电池电压达到4.0V触发二级保护终止充电,并锁定电池管理系统直到技术人员解决问题。

The secondary protection is triggered to terminate the charging and lock the battery management system until the technician solves the problem when the battery voltage reaches 4.0V.

6.5.4. 当电池的电压到达 2.0V 终止放电,触发一级保护, 将电流降为 0。

The first-level protection is triggered to terminate the discharge, and the current is reduced to 0 when the voltage of the battery reaches 2.0V.

6.5.5. 当电池电压低于 1.8V 时触发二级保护终止充电, 将电流降为 0, 锁定电池管理系统直到技术人员解决问题。

The secondary protection is triggered to terminate the charging, reduce the current to 0, and lock the battery management system until the technician solves the problem when the battery voltage is lower than 1.8V.

6.5.6. 发生短路时, 触发短路保护, 由过流器断开电池。

When a short circuit occurs, the short circuit protection is triggered, and the battery is disconnected by the overcurrent device.

6.5.7. 电池管理系统控制放电电流符合规格书规定。

The battery management system controls the discharge current to comply with the specification.

6.5.8. 当温度超过本规格书规定时, 终止充电/放电。

When the temperature exceeds the specification of this specification, the charge/discharge is terminated.

备注: 以上 No.6.5.2、6.5.3、6.5.4、6.5.5 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规格书规定的使用条件, 客户需依“保护动作”及本规格书其他相关规定对电池采取保护措施, 同时, 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。

Remarks: The above No.6.5.2, 6.5.3, 6.5.4, 6.5.5 are warning clauses, please pay attention to customers: when the battery reaches the indicators and parameters described in any of the above clauses, it means that the battery has exceeded this limit. For the conditions of use specified in the specification, the customer shall take protective measures for the battery in accordance with the "protective action" and other relevant provisions of this specification. And any damages to third parties will not be compensated.

7. 电池组组装 Battery Pack Assembly

7.1. 禁止使用已损坏的电池 Do Not Use Damaged Batteries

7.1.1. 组装前应先目视检查电池。

The battery should be visually checked before assembly.

7.1.2. 发现壳体变形或电解液异味, 请勿使用。

Do not use if the shell is deformed or the electrolyte smells.

7.2. 运输 Transportation

电池需要运输到订购地点, 应采取谨慎的预防措施, 以避免电池损坏。

Batteries need to be shipped to the place of order and careful precautions should be taken to avoid battery



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damage.

8. 其它 Others

8.1. 拆卸 Disassembly

8.1.1. 严禁从电池组中拆卸电池。

Do not remove the battery from the battery pack.

8.1.2. 由拆卸引起的内部短路可能导致发热和/或泄气。

Internal short circuits caused by disassembly may result in heating and/or deflating.

8.1.3. 当电解液接触皮肤或眼睛时，应立即用清水冲洗并就医。

When the electrolyte comes into contact with the skin or eyes, rinse immediately with water and seek medical attention.

8.2. 短路 Short Circuit

8.2.1. 短路会产生巨大的电流而导致发热。

A short circuit will generate a large current and cause heat.

8.2.2. 应采用适当的电路来保护意外短路。

An appropriate circuit should be used to protect against accidental short circuits.

8.3. 焚烧 Incineration

严禁在火中焚烧或处理电池，因为这会导致电池破裂。

It is strictly prohibited to burn or dispose of batteries in a fire as this can cause them to rupture.

8.4. 浸泡 Immerse

严禁将电池浸泡在水中，因为这会导致组件熔化而损伤功能。

Do not immerse the battery in water, as this will cause the component to melt and damage its function.

8.5. 混合使用 Combination

8.5.1. 混用不同类型的电池或不同厂家的相同类型电池，由于电池的特性不同，可能导致电池破裂或对系统造成损坏，虽然电池不含铅或镉等对环境有害的成分，电池在处理时仍应按当地规定进行。

Mixed use of different types of batteries or the same type of batteries from different manufacturers may lead to battery rupture or damage to the system due to different characteristics of the batteries. Although the batteries do not contain environmentally harmful ingredients such as lead or cadmium, the batteries should be handled in accordance with local regulations.

8.5.2. 处理电池时应为放完电状态，以避免因意外短路而产生热量。

The battery should be handled in the drained state to avoid heat generation due to accidental short circuit.

8.6. 警告 Warning

8.6.1. 如果使用不当，电池可能有起火或化学腐蚀的危险。

If not used properly, the battery may be a fire hazard or chemical corrosion.

8.6.2. 禁止拆卸电池，禁止将电池加热至超过 100°C 或焚烧。

Do not remove the battery, do not heat the battery to more than 100°C or incinerate it.

8.6.3. 在电池替换时仅可使用利维能电池，使用其它电池可能有起火或爆炸的危险。

Use only EVPS batteries when replacing batteries. There is a risk of fire or explosion when using other batteries.

8.6.3. 及时处理用过的电池。切勿随意拆卸，切勿在火中弃置。

Dispose of used batteries in a timely manner. Do not disassemble at will, do not discard in the fire.

8.6.5. 禁止坠落、冲击、弯折电池。

Do not fall, impact or bend the battery.

8.6.6. 电池外壳设计和包装禁止损伤电池。

Battery enclosure design and packaging shall not damage the battery.

8.6.7. 远离儿童。

Away from children.



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附录 2 Appendix 2:

锂离子电池的处理注意事项和禁止事项

Lithium-ion Battery Handling Matters Needing Attention and Prohibited Matters

锂离子电池处理不当可能导致泄漏、发热、烟雾、爆炸或火灾，可能会导致电池性能下降或电池性能丧失或安全事故，请务必仔细按照说明操作。

Improper handling of lithium-ion batteries may result in leakage, heat, smoke, explosion or fire, which may lead to battery performance degradation or loss of battery performance or safety accidents. Please be sure to follow the instructions carefully.

1. 存储 Storage

存储电池应在低温(推荐-20~25°C)、湿度低、没有灰尘和腐蚀性气体的环境中。

The battery should be stored at low temperature (recommended -20~25°C), low humidity, and free of dust and corrosive gases.

2. 安全预防和禁止事项 Safety Precautions and Prohibitions

为确保产品安全，请在使用说明书中说明以下注意事项。

To ensure the safety of the product, please state the following points for attention in the instruction manual.

3. 危险 Danger

3.1 电池滥用 Battery Abuse

3.1.1. 使用专用充电。

Use dedicated charging.

3.1.2. 仅在专用应用程序中使用或充电电池。

Use or charge the battery in dedicated applications only.

3.1.3. 不要直接用插座或点烟器充电器给电池充电。

Do not charge the battery directly from an outlet or cigarette lighter charger.

3.1.3. 不要给电池反向充电。

Do not reverse charge the battery.

3.2 环境滥用 Environmental Abuse

3.2.1. 不要把电池放在靠近火源或热源的地方。

Do not place batteries near a fire or heat source.

3.2.2. 不要把电池扔进火里。

Don't throw batteries into the fire.

3.2.3. 不要在温度可能超过规定的工作温度范围及存储温度范围的条件下使用，如直射阳光下或类似条件。

Don't throw batteries into the fire. Do not use in conditions where the temperature may exceed the specified operating temperature range and storage temperature range, e.g. in direct sunlight or similar conditions.

3.2.3. 请勿将电池浸没、抛掷、浸湿于水中。

Do not immerse, throw or immerse the batter in water.

3.3 其它 Others

3.3.1. 不要将电池与钥匙、项链、发夹、硬币或螺丝等金属物品一起存放在口袋或袋子里。

Do not store batteries in pockets or bags with metal objects such as keys, necklaces, hairpins, coins, or screws.

3.3.2. 不要故意将电池的正负极端子用金属物体连接。



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Do not intentionally connect the positive and negative terminals of the battery with metal objects.

3.3.3. 不要用针、螺丝刀等锋利的物体刺穿电池。

Do not pierce the battery with a sharp object such as a needle or screwdriver.

3.3.3. 不要用烙铁等加热物体加热电池。

Do not heat the battery with a soldering iron or other heating object.

3.3.5. 不要用锤子等重物击打电池。

Do not hit the battery with a hammer or other heavy object.

3.3.6. 请勿踩在电池上，将电池扔或摔在坚硬的地板上，以免造成机械冲击。

Do not step on the battery. Throw or drop the battery on a hard floor to avoid mechanical impact.

3.3.7. 请勿拆解电池。

Do not disassemble the battery.

3.3.8. 不要直接在电池上焊接。

Do not solder directly on the battery.

3.3.9. 不要使用严重损坏或变形的电池。

Do not use badly damaged or deformed batteries.

3.3.10. 不要将电池放入微波炉、烘干机或高压容器中。

Do not put batteries in microwave ovens, dryers, or high-pressure containers.

3.3.11. 请勿将电池与其他厂电池、不同类型或其它型号电池(如干电池、镍氢电池或镍镉电池)一起使用或组装。

Do not use or assemble the battery with other factory batteries, different or other types of batteries (such as dry batteries, nickel-metal hydride batteries or nickel-cadmium batteries).

3.3.12. 不要混合使用或组装新旧电池。

Do not mix or assemble old and new batteries.

4. 警告 Warning

4.1. 如果在规定时间内没有完成充电，请停止充电。

If the charging is not completed within the specified time, please stop charging.

4.2. 如果在使用、充电或储存过程中发现电池出现异常发热、变色、变形或异常情况，请停止使用电池。

If the battery appears abnormal heat, discoloration, deformation or abnormal conditions during use, charging or storage, please stop using the battery.

4.3. 如发现有泄漏或异味，应立即远离火源。如果液体泄漏到皮肤或衣物上，立即用清水冲洗干净。

If there is leakage or odor, keep away from the fire immediately. If liquid leaks onto skin or clothing, rinse immediately with clean water.

4.3. 如果电池漏液进入眼睛，不要揉搓眼睛，应用清水洗净并立即前往医院治疗。

If the battery leaks into your eyes, do not rub your eyes. Rinse them with clean water and go to the hospital immediately.

4.5. 如果电池的正负极端子变脏，使用前用干布擦拭。

If the positive and negative terminals of the battery are dirty, wipe them with a dry cloth before use.

4.6. 电池可在以下温度范围内使用。请勿超过这些范围。

充电温度：0°C ~ 55°C。放电温度：-20°C ~ 60°C。

The battery can be used in the following temperature range. Do not exceed these limits.

Charging temperature: 0°C ~ 55°C. Discharge temperature: -20°C ~ 60°C.

4.7. 处理电池前应先用合适的绝缘胶带覆盖正、负极端子。

Cover the positive and negative terminals with appropriate insulating tape before handling the battery.

5. 谨慎操作 防止电池滥用 Careful Operation to Prevent Battery Abuse

5.1. 电池必须使用恒流恒压充电。

Batteries must be charged with constant current and constant voltage.



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- 5.2. 充电电流必须控制在电池规格书中指定的值以内。
The charging current must be controlled within the value specified in the battery specification.
- 5.3. 充电截止电压不得超过 3.65V。
Charging cut-off voltage shall not exceed 3.65V.
- 5.3. 当达到电池规格中指定的充电时间或电流时，充电器必须停止充电。
The charger must stop charging when the charging time or current specified in the battery specification is reached.
- 5.5. 放电电流必须控制在电池规格书中指定的值以内。
The discharge current must be controlled within the values specified in the battery specification.
- 5.6. 放电截止电压不得小于 2.0V。
Discharge cut-off voltage shall not be less than 2.0V.
- 6. 运输安全操作规程 Code for Safe Operation of Transportation**
- 6.1. 包装被压坏、刺破或撕开查看过的不得运输，此类包装应予以隔离。
Packs crushed, punctured or torn upon inspection shall not be transported and such packages shall be quarantined.
- 6.2. 漏液产品如果包装破损导致电池或电池漏液的，应及时收集和隔离漏液产品，并与发货人联系以获得指示。
If the battery or battery leakage is caused by damaged packaging, the leaking product should be collected and isolated in time, and contact the shipper for instructions.
- 6.3. 电池组在应用中防止高温对电池性能的影响，电池在应用和充电过程中应远离产生热量的区域。
The battery pack shall be used to prevent the effect of high temperature on the performance of the battery, and the battery shall be kept away from the area of heat generation during the application and charging process.
- 7. 其它 Others**
- 7.1. 电池远离婴幼儿，避免发生吞咽等意外。
Keep the battery away from infants to avoid swallowing and other accidents.
- 7.2. 如儿童使用电池，其监护人应在使用前说明正确使用方法及注意事项。
If children use batteries, their guardians should explain the correct use methods and precautions before using them.
- 7.3. 在使用电池前，请务必阅读使用说明书及注意事项。
Please read the instructions and precautions before using the battery.
- 7.3. 在使用充电器前，请务必阅读充电器使用说明书。
Please read the instructions before using the charger
- 7.5. 在从应用中安装和拆卸电池之前，请务必阅读应用的使用说明书。
Be sure to read the app's instruction manual before installing and removing the battery from the app.
- 7.6. 当电池的使用时间比以往短很多时，请及时更换电池。
When the battery life is much shorter than before, please replace the battery in time.
- 7.7. 如果电池需要储存较长一段时间，应先将电池从应用中拆卸出，并存放于阴凉干燥处。
If the battery needs to be stored for an extended period of time, it should be removed from the service and stored in a cool and dry place.
- 7.8. 电池在充电、使用和储存过程中，应远离会产生静电的物体。
Batteries should be charged, used and stored away from objects that will generate static electricity.