# SPECIFICATION
# 规 格 书

# Rechargeable Lithium Titanate Battery
# 可充电钛酸锂电池

| | |
|---|---|
| Product Model<br>产品型号 | LTO18650-1500 |
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| Customer Approval<br>客户确认 | Signature/签 字 | Date/日 期 |
| | | |
| | Company Name/公司名称 | |
| | Company Stamp/公司印章 | |

Add: No. 12, Bangmin Road, Jianghai District, Jiangmen City, Guangdong Province, China P.C.: 529000
地址：中国广东省江门市江海区邦民路 12 号 邮编：529000
Tel: +86-750-3806863 3806878 3808313 Fax: +86-750-3808133 3808113
Web: www.jyh-battery.com E-mail: sales@jyh-battery.com

## Revision History 修订履历

| Revision<br>修订 | Description<br>描述 | Date<br>日期 | Approval<br>批准 |
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| A0 | First Edition | 2026.06.06 | 马海强 |
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# 1. Preface 序言

This product specification covers the requirements for the following rechargeable Lithium Titanate battery manufactured and delivered by **JYH Technology Co., Ltd.**
本产品规格书包含了下述由**广东锦业华科技有限公司**制造和交付的可充电钛酸锂电池的性能要求。

# 2. Product Description 产品描述

| | | |
|---|---|---|
| 2.1 | Product Name 品名 | Rechargeable Lithium Titanate Battery<br>可充电钛酸锂电池 |
| 2.2 | Model 型号 | LTO18650-1500 |
| 2.3 | Description 描述 | 18650 1S1P 1500mAh 2.4V Lithium Titanate battery<br>18650 1 串 1 并 1500mAh 2.4V 钛酸锂电池 |

# 3. Ratings 额定参数

| | | | |
|---|---|---|---|
| 3.1 | Nominal Voltage 标称电压 | | 2.4V |
| 3.2 | Nominal Capacity 标称容量 | | 1500mAh |
| 3.3 | Typical Capacity 典型容量 | | 1500mAh after standard charge and standard discharge<br>1500mAh 标准充电和放电条件下 |
| 3.4 | Minimum Capacity 最低容量 | | 1425mAh after standard charge and standard discharge<br>1425mAh 标准充电和放电条件下 |
| 3.5 | Standard Charge 标准充电 | | Constant current at 750mA charge to 2.7V, then constant voltage at 2.7V charge till current decline to ≤15mA<br>750mA 恒流充电至 2.7V，转恒压 2.7V 充电至电流 ≤15mA |
| 3.6 | Fast Charge 快速充电 | | Constant current at 1500mA charge to 2.7V, then constant voltage at 2.7V charge till current decline to ≤15mA<br>1500mA 恒流充电至 2.7V，转恒压 2.7V 充电至电流 ≤15mA |
| 3.7 | Standard Discharge 标准放电 | | 300mA to 1.5V. 300mA 放电至 1.5V |
| 3.8 | Fast Discharge 快速放电 | | 1500mA to 1.5V. 1500mA 放电至 1.5V |
| 3.9 | Maximum Continuous Charge Current 最大连续充电电流 | | 300mA (-40℃~-20℃)<br>750mA (-20℃~10℃)<br>1500 mA (10℃~20℃)<br>3000 mA (20~60℃) |
| 3.10 | Maximum Continuous Discharge Current 最大连续放电电流 | | 3000mA |
| 3.11 | Operating Temperature 操作温度 | Charge 充电<br>Discharge 放电 | -40℃ to 60℃<br>-40℃ to 60℃ |
| 3.12 | Storage Temperature 储存温度 | <1 year 小于 1 年<br><3 months 小于 3 个月 | -30℃ to 25℃<br>-30℃ to 35℃ |

| | | |
|---|---|---|
| | <30days 小于 30 天 | -30℃ to 45℃ |

3.13 Typical Weight 典型重量 46g

# 4. Electrical Performance 电气性能

Unless otherwise stated, tests should be conducted under the following conditions:
除非另作说明，测试应该在下列条件下进行：

| | |
|---|---|
| Time frame 时间期限 | Within one month after delivery 交货后的一个月内 |
| Ambient temperature 环境温度 | 25℃ ± 2℃ |
| Relative Humidity 相对湿度 | 65% ± 20% |
| Atmospheric Pressure 大气压 | 86kPa-106kPa |

4.1 Standard Capacity 标准容量

Standard capacity is measured with a discharge current of 0.2C and a discharge final voltage of 1.5V within 1 hour after the standard charge. Up to three cycles are permitted for this test.
标准容量是指在标准充电后 1 小时内，将电池以 0.2C 电流放电至 1.5V 终止电压的放电容量。允许连续测试 3 次，任意一次达到要求即可停止测试。

Criteria: Discharge capacity ≥minimum capacity
标准：放电容量 ≥最低容量

4.2 Open Circuit Voltage 开路电压

The open circuit voltage is measured within 1 hour after standard charge.
在标准充电后 1 小时内测量电池的开路电压。

Criteria: Open circuit voltage ≥2.5V
标准：开路电压 ≥2.5V

4.3 Initial Internal Impedance 初始内阻

The initial internal impedance is measured at the frequency of 1kHz within 1 hour after standard charge.
在标准充电后 1 小时，以 1kHz 的频率测量电池的初始内阻。

Criteria: Initial internal impedance ≤100mΩ
标准：初始内阻 ≤100mΩ

4.4 Fast Discharge Capacity 快速放电容量

The capacity is measured with a discharge current of 1C to a discharge final voltage of 1.5V within 1 hour after the standard charge.
快速放电容量是指在标准充电后 1 小时内，将电池以 1C 电流放电至 1.5V 终止电压的放电容量。

Criteria: Discharge capacity ≥95% of initial capacity
标准：放电容量 ≥初始容量的 95%

4.5 Discharge Capacity at 4C Rate 4C 倍率放电容量

After the standard charge, the battery is stored for 10mins. The capacity is measured with a discharge current of 4C to a discharge final voltage of 1.5V.

电池在标准充电后，搁置 10 分钟，然后以 4C 电流放电至 1.5V 终止电压来测量高倍率放电容量。

Criteria: Discharge capacity ≥92% of nominal capacity
标准：放电容量 ≥标称容量的 92%

4.6 Charge Retention 荷电保持能力

Charge retention is measured with a discharge current of 0.2C and a discharge final voltage of 1.5V after standard charge and storage time of 28 days.
在标准充电后，将电池存放 28 天，然后以 0.2C 电流放电到 1.5V 的终止电压。所得容量与初始容量的比率表示为荷电保持能力。

Criteria: Discharge capacity ≥90% of initial capacity
标准：放电容量 ≥初始容量的 90%

4.7 Charge Recovery 充电恢复能力

After charge retention test, the battery shall be done standard charge within 24 hours and stored for 1 hour. Charge recovery is measured with a discharge current of 0.2C and a discharge final voltage of 1.5V.
在完成荷电保持能力测试后 24 小时内, 将电池进行标准充电，搁置 1 小时， 然后以 0.2C 电流放电到 1.5V 的终止电压。所得容量与初始容量的比率表示为充电恢复能力。

Criteria: Discharge capacity ≥98% of initial capacity
标准：放电容量 ≥初始容量的 98%

4.8 Cycle Life 循环寿命

During this cycle life test, the ambient temperature should be kept at 25℃ ±2℃. The battery shall be charged at CC/CV=1C/2.7V, cut off till current decline to 0.05C, stored for 30 minutes, then discharged at a constant current of 1C to a final voltage of 1.5V, after that, stored 30 minutes prior to next charge/ discharge cycle. The battery shall be continuously charged and discharged for 10000 times.
在循环寿命测试期间，环境温度应维持在 25℃ ± 2℃。将电池以 1C/2.7V 进行恒流恒压充电，直到电流降低到 0.05C 切除，搁置 30 分钟，然后以 1C 电流放电至 1.5V 终止电压，之后搁置 30 分钟，再进行下一次充放电循环。电池应连续充放电 10000 次。

Criteria: Discharge capacity at the 10000th cycle ≥80% of initial capacity.
标准：第 10000 次的放电容量 ≥初始容量的 80%

## 5. Environmental Performance 环境性能

5.1 Discharge Capacity at High Temperature 高温放电容量

After the standard charge, the battery is stored at an ambient temperature of 55℃ ± 2℃ for 16-24 hours. The capacity is measured with a discharge current of 0.2C and a discharge final voltage of 1.5V.
在标准充电后，将电池在 55℃ ± 2℃的环境中存放 16-24 小时，然后以 0.2C 电流放电到 1.5V 的终止电压。所得容量表示为高温放电容量。

Criteria: Discharge capacity ≥95% of initial capacity
标准：放电容量 ≥初始容量的 95%

5.2 Charge and discharge Capacity at -20℃ -20℃充放电容量

The battery is stored at an ambient temperature of -20℃ ± 2℃ for 16-24h. Constant current at 0.2C charge to 2.7V, then constant voltage at 2.7V charge till current decline to ≤0.01C. The discharge capacity is measured with a discharge current of 1C and a discharge final voltage of 1.5V.
电池在-20℃ ± 2℃的环境中存放 16-24 小时，0.2C 恒流充电至 2.7V，转恒压 2.7V 充电至电流 ≤0.01C，然后以 1C 电流放电到 1.5V 的终止电压。所得容量表示为-20℃放电容量。

Criteria: Discharge capacity ≥ 80% of initial capacity
标准：放电容量 ≥ 初始容量的 80%

5.3 Charge and discharge Capacity at -40℃ -40℃充放电容量

The battery is stored at an ambient temperature of -40℃ ± 2℃ for 16-24h. Constant current at 0.2C charge to 2.7V, then constant voltage at 2.7V charge till current decline to ≤0.01C. The discharge capacity is measured with a discharge current of 1C and a discharge final voltage of 1.5V.
电池在-40℃ ± 2℃的环境中存放 16-24 小时，0.2C 恒流充电至 2.7V，转恒压 2.7V 充电至电流 ≤0.01C，然后以 1C 电流放电到 1.5V 的终止电压。所得容量表示为-40℃放电容量。

Criteria: Discharge capacity ≥ 60% of initial capacity
标准：放电容量 ≥ 初始容量的 60%

# 6 Mechanical Performance 机械性能

The test of mechanical performance is only applicable to single cell.
机械性能测试仅适用于单只电芯。

6.1 Vibration Test 振动测试

After standard charge, the cell is installed onto the vibration desk with clamps. The test is to be varied at the rate of 1oct/minute between 10 and 55Hz. Repeat vibration for 30 minutes in three mutually perpendicular directions. Equipment parameters of frequency and amplitude are as follows:
在标准充电后，将电芯用夹具安装在振动台的台面上，然后按 1oct/分钟的扫频速率在 10-55Hz 之间变动进行测试，三个相互垂直的方向各振动 30 分钟。仪器振动频率和振幅参数如下：

Vibration frequency: 10-30Hz, amplitude: 0.38mm; 30-55Hz, amplitude: 0.19mm
振动频率：10-30Hz ，振幅：0.38mm；30-55Hz，振幅：0.19mm。

Criteria: No scratch, no leakage, no fume, no explosion.
标准：无损伤、漏液、冒烟或爆炸。

6.2 Drop Test 跌落测试

After standard charge, the cell is dropped from a height of 0.75m to a concrete surface. Each cell is to be dropped once in the positive and negative directions of three mutually perpendicular mounting positions for a total of 6 times, then rest for 1 hour.
在标准充电后，将电芯从 0.75m 高度自由落体跌落到水泥地板上，电芯的正负极方向分别跌落三次，共计 6 次，跌落后搁置 1 小时。

Criteria: No fume, no explosion
标准：无冒烟或爆炸

# 7 Safety Performance 安全性能

The test of safety performance is only applicable to single cell.
安全性能测试仅适用于单只电芯

7.1 Overcharge 过充

At standard testing condition, the cell is charged with constant current 1C to voltage 4.0V, then charged with constant voltage of 4.0V till current approach to 0A. Charging is continued for 7 hours.
在标准测试环境下，将电芯用 1C 电流充电至 4.0V, 然后以恒压 4.0V 充电直到电流接近 0A，充电过程持续 7 小 时。

Criteria: No fire, no explosion.
标准：不起火、不爆炸

7.2 Over-discharge 过放

At standard testing condition, the cell is discharged at 0.2C current to final voltage of 1.5V, then connect 50Ω load to discharge for 24 hours.
在标准测试环境下，将电芯以 0.2C 电流放电至 1.5V 的终止电压，再连接 50Ω 负载放电 24 小时。

Criteria: No leakage, no fume, no fire
标准：无漏液、冒烟或起火

7.3 Crush 挤压

At standard testing condition, the cell is charged by standard charge, then placed on the crush flat, the axis is parallel to the crush flat, it is to be crushed between two flat surfaces. Crushing force is approximately 13kN and hold for 1 minute.
在标准测试环境下，将电芯进行标准充电，然后放在挤压设备的两个挤压面之间，电芯轴向平行于挤压平面，逐渐增加压力至13kN，保持压力1分钟。

Criteria: No fire, no explosion.
标准：不起火、不爆炸

7.4 Short-circuit 短路

At standard testing condition, the cell is charged by standard charge, then connect the positive and negative terminals of the cell with a circuit load having a resistance load of 80mΩ±20mΩ. The temperature of the battery case is to be recorded during the test. Stop the test until the cell surface temperature lower 10℃ than the max temperature.
在标准测试环境下，将电芯进行标准充电，然后将电芯正负极连接80mΩ±20mΩ的电阻，直至电芯表面温度低于最高温度10℃停止。

Criteria: No fire, no explosion
标准：不起火、不爆炸

7.5 Heating 加热

At standard testing condition, the cell is charged at standard charge, put the cells in the oven, the temperature of the oven is to be raised at 5℃ ± 2℃ per minute to a temperature of 130℃ ± 2℃ and remain for 30 minutes.
在标准测试环境下，将电芯进行标准充电，然后放在烘箱中，烘箱以5℃ ± 2℃/分钟升温至130℃ ± 2℃，并在该温度下维持30分钟

Criteria: No fire, no explosion
标准：不起火、不爆炸

7.6 Impact 重物冲击

At standard testing condition, the cell is charged at standard charge, then is placed on a flat surface so that the longitudinal axis of the cell shall be parallel with it. A 15.8mm diameter bar is to be placed across the center of the sample. A 9.1kg weight is to be dropped from a height of 610mm on the sample.
在标准测试环境下，将电芯进行标准充电，然后水平放置于一个与电芯纵轴平行的平板上，将一直径Φ15.8mm的棒放在样品中心，让重量9.1kg的重物从610mm的高度落到样品上。

Criteria: No fire, no explosion
标准：不起火、不爆炸

7.7 Low Pressure 低气压

At standard testing condition, charge the cell at standard charge, then store for 6 hours at absolute pressure of 11.6kPa. After that, rest for 2 hours at 20℃ ± 5℃.
在标准测试环境下，将电芯进行标准充电，然后在11.6kPa的绝对压力下存放6小时，之后在20℃ ± 5℃的环境中搁置2小时。

Criteria: No leakage, no fire, no explosion
标准：不漏液、不起火、不爆炸

## 8 Appearance 外观

The battery shall be free from deformation, cracks, scratches, rusts and leakage。
电池应无变形、破裂、划痕、生锈和漏液现象。

## 9 Outline Dimensions 外形尺寸

Battery configuration and outline dimensions refer to the attached drawing.
电池外形尺寸参见附图。

## 10 Shipment 出货

The battery shall be shipped in voltage range of 2.3-2.5V or in accordance with customers' requirement. The remaining capacity before charging shall be changed depending on the storage time and conditions.
电池出厂时电压范围为 2.3-2.5V 或按照客户要求，出货时的剩余容量取决于储存时间和条件。

## 11 Warranty 保质期

As long as the battery is treated in accordance with this product specification, from date of delivery, one-year limited warranty against workmanship and material defects is given.
依照本产品规格书要求进行操作，自出厂之日起，对于由加工制造和材料造成的缺陷产品给予一年的保质期。

# Precautions and Safety Instructions 安全守则

The cell/battery subject to abusive conditions can cause damage to the cell/battery and/or personal injury. Please read and observe the standard battery precautions below before using utilization.
滥用电芯/电池可能会造成电芯/电池损坏或人身伤害，在使用以前，请仔细阅读以下内容。

Note 1：The customer is required to contact JYH in advance, if and when the customer needs other applications or operating conditions than those described in this document.
特别说明 1：如果客户需要在该文件描述之外的条件下操作或应用，请向锦业华公司咨询。
Note 2：JYH will take no responsibility for any accident when the cell/battery is used under other conditions than those described in this document.
特别说明 2：在该文件说明的条件之外使用电芯/电池而产生的事故，锦业华公司不承担任何责任。

## 1. Precaution 预防措施

a) Do not expose the cell/battery to extreme heat or flame.
不要将电芯/电池暴露在极热或有火星的环境中。

b) Do not short circuit, over-charge or over-discharge the battery.
不要将电芯/电池短路、过充或过放。

c) Do not subject the cell/battery to strong mechanical shocks.
不要使电芯/电池承受过重的机械冲击。

d) Do not immerse the cell/battery in water or sea water, or get it wet.
不要将电芯/电池浸入海水或水中，或者令其吸湿。

e) Do not reverse the polarity of the cell/battery for any reason.
不要颠倒电芯/电池的正负极。

f) Do not disassemble or modify the cell/battery.
不要拆卸或修理电芯/电池。

g) Do not handle or store with metallic like necklaces, coins or hairpins, etc.
不要和项链、硬币或发夹等金属物品放置在一起。

h) Do not use the cell/battery with conspicuous damage or deformation.
不要使电芯/电池受到明显的损坏或变形。

i) Do not connect cell/battery to the plug socket or car-cigarette-plug.
不要将电芯/电池与插座或汽车点烟口连接。

j) Do not make the direct soldering onto a cell/battery.
不要直接在电芯/电池上焊锡。

k) Do not touch a leaked cell/battery directly.
不要直接接触泄漏的电芯/电池。

l) Do not use for other equipment.
不要将电芯/电池用于其它设备。

m) Do not use lithium Titanate cell/battery in mixture.
不要将钛酸锂电芯/电池混合使用。

n) Do not use or leave the cell/battery under the blazing sun (or in heated car by sunshine).
不要将电芯/电池放置在太阳光直射的地方（或阳光暴晒的汽车内）。

o) Keep cell/battery away from children.
将电芯/电池放置在远离儿童的地方。

p) Do not drive a nail into the cell/battery, strike it by hammer or tread it.
不要针刺、锤打或踩踏电芯/电池。

q) Do not give cell/battery impact or fling it.
不要撞击或投掷电芯/电池。

## 2. Cell/Battery Operation Instruction 电芯/电池使用说明

### 2.1. Charging 充电

a) Charge the cell/battery in a temperature range of -40℃ to + 60℃.
电芯/电池充电温度范围为-40℃ ～ +60℃。

b) Charge the cell/battery at the specified current until 2.7V is attained. Charge rates greater than 3000mA are NOT recommended.
按要求的电流将电芯/电池充电至 2.7V，建议不要使用超过 3000mA 的电流。

c) Maintain charge voltage at 2.7V for 2.0 hours (recommended for maximum capacity).
恒压 2.7V 充电 2 小时（建议为得到最大容量测试时使用）。

d) Use a constant current, constant voltage (CC/CV) lithium Titanate cell/battery charge controller.
使用恒流恒压钛酸锂电芯/电池充电器。

e) Do not continue to charge cell/battery over specified time.
不要超过标准时间持续充电。

### 2.2. Discharging 放电

a) Recommended discharge final voltage is 1.5V. Recommended max continuous discharge current is 3000mA.
建议放电终止电压为 1.5V，建议最大持续放电电流为 3000mA。

b) For maximum performance, discharge the cell/battery in a temperature range of -40℃ to +60℃.
为了达到较好的性能，电芯/电池的放电温度范围为-40℃ ～ +60℃。

### 2.3. Storage Recommendations 储存建议

a) Storage Temperature and Humidity 储存温度和湿度

Store the cell/battery at temperature of -30℃ to +35℃, low humidity and no corrosive gas atmosphere.
电芯/电池应储存在温度范围为-30℃ ～ +35℃，低湿度和不含腐蚀性气体的环境中。

b) Long Period Storage 长期存放

In case of long period storage (more than 3 months), store the cell/battery at temperature range of -30℃ to +25℃, low humidity, no corrosive gas atmosphere.

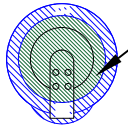
如需长期存放(超过 3 个月)，电芯/电池应存储在温度为-30℃ ～ +25℃、低湿度、不含腐蚀性气体氛围的环境中。

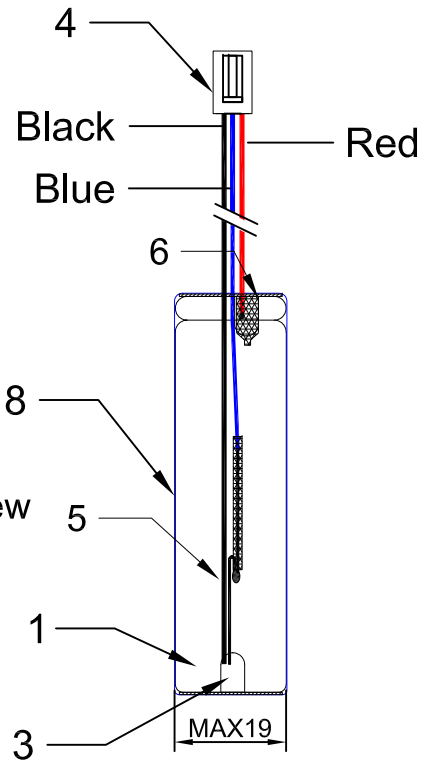
c) No press on the cell/battery.
不要让电芯/电池承受任何压力。

## Requirement for Safety Assurance 安全保证要求

For the sake of safety assurance, please discuss the equipment design, its system and protection circuit of lithium Titanate cell/battery with JYH in advance. And consult about the high-rate current, rapid charge and special application in the same way.
为了安全起见，请事先与锦业华公司讨论用电器设计方案、钛酸锂电芯/电池的体系及保护电路等。对高倍率放电、快速充电和其它特殊应用，也须向锦业华公司咨询。

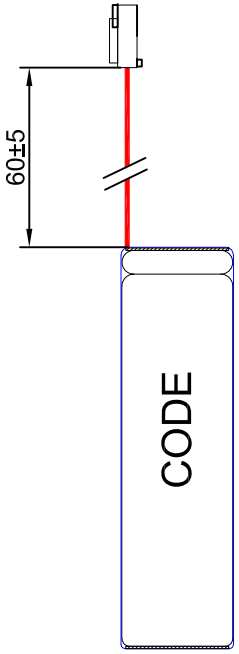
Top View



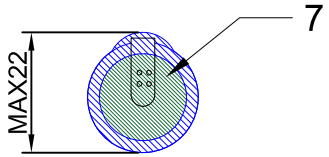




Front View

Right View




Bottom View




| S/NO. | NAME | QTY (PCS) | MATERIAL/SPEC. |
|---|---|---|---|
| 8 | Shrink sleeve | 1 | Blue |
| 7 | Insulation spacer | 2 | 18# |
| 6 | Insulation tube | 2 | Black |
| 5 | NTC | 1 | 68K |
| 4 | Connector | 1 | JST-VH-3P or equivalent 22AWG UL1007 |
| 3 | Leading tag | 2 | Nickel Plate |
| 2 | Insulation washer | 1 | 18# |
| 1 | Cell | 1 | LTO18650-1500 |

All dimensions are in mm

| | | | | | | |
|---|---|---|---|---|---|---|
| DOC. NAME | LTO18650-1500 | PREPARED BY | Technical Department | DATE | 2026.06.06 | Amendment Record |
| DOC. NO. | L026-002 | CHECKED BY | Lin Jun Biao | DATE | 2026.06.06 | 2026.06.06: A0,First edition. |
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| PAGE | 1 | SIGNATURE | | DATE | | |

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