

EEMB CO., LTD
Lithium Manganese Dioxide Battery
Specification
锂-亚硫酸氯电池
产品规格书
High Power Type
高功率型

Model 型号:	CR123ASL
Capacity 容量:	1500mAh

Prepared 编制	Checked 审核	Approved 批准

Customer 客户名称:

Customer Approval 客户确认:

Signature 签字	Checked 审核	Approved 批准

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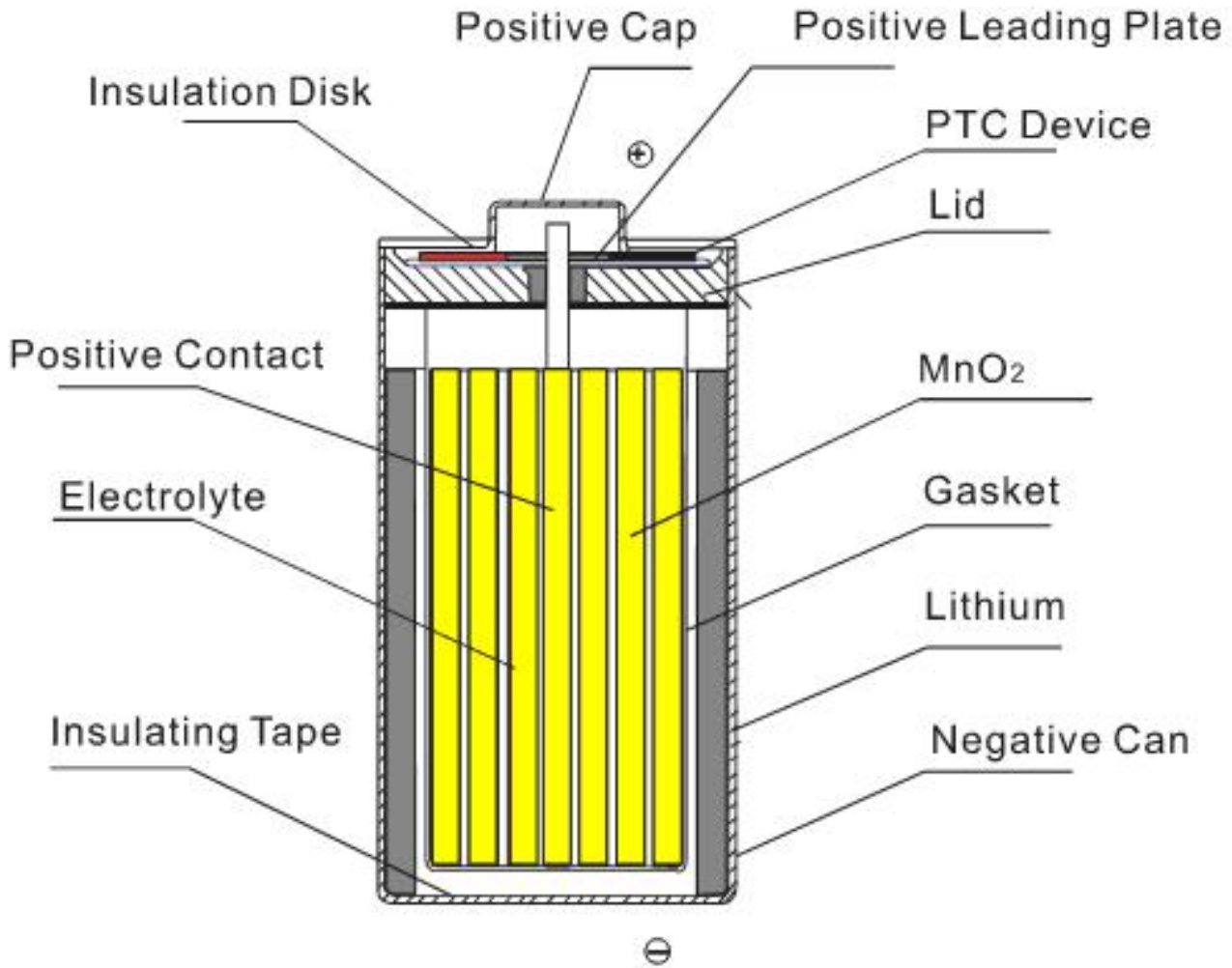
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Battery Structure



Catalog

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1. Scope 适用范围

This product specification defines the requirements of the Lithium Manganese Dioxide battery supplied to the customer by EEMB Co., Ltd.

本产品规格书适用于 EEMB 提供的 ER14505M 型锂-亚硫酸氯电池。

2. Features and Applications 特性及应用

Features 特性:

- High energy density 能量密度高
- Outstanding operational temperature range: -40°C to +85°C 工作温度范围大 -40°C to +85°C
- Stable discharge characteristics 放电性能稳定
- Low self-discharge: less than 2% per year at room temperature 低自放率: 室温下每年小于 2%
- Superior shelf life and operational life: up to 10 years 超长使用寿命: 长达 10 年
- Safe and environmentally friendly 安全环保

Applications 应用:

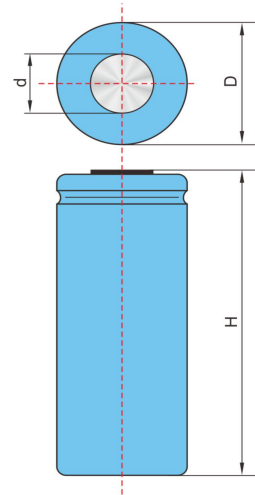
- Water, gas and electricity meters 水、气、电测试表
- Alarm system, GPS system, GSM system, Medical devices
报警系统、GPS 系统、GSM 系统、医疗器械

3. Battery Basic Characteristics 电池基本特性

No. 序号	Item 项目	Characteristics 规格
3.1	Model 型号	CR123ASL
3.2	Nominal Capacity 标称容量	1500mAh
3.3	Nominal Voltage 标称电压	3.0V
3.4	Standard Discharge Current 标准放电电流	1mA
3.5	Max. Continuous Discharge Current 最大持续放电电流	1500mA
3.6	Max. Pulse Discharge Current 最大脉冲放电电流	3000mA
3.7	Discharge Cut-off Voltage 放电截止电压	2.0V
3.8	Weight 重量	Approx. 20g
3.9	Operating Temperature 工作温度	-40~85°C
3.10	Storage Condition 贮存条件	Temperature ≤ 30°C; Humidity ≤ 75%RH

4. Dimension (Unit: mm) 尺寸 (单位: mm)

Item 项目	Specification 规格
D	Max. 17.0
H	Max. 34.5
d	Max. 6.3



5. Appearance 外观

It shall be free from any defects such as remarkable scratches, breaks, cracks, discoloration, leakage, or middle deformation. 电池表面无划伤、裂纹、脏点、锈蚀、变形、变色、漏液等缺陷，中间无翘起。

6. Performance and Test Methods 性能测试

Test condition: Temperature 20°C~25°C; Humidity 60±15%.

测试条件: 20°C~25°C; 相对湿度 65±20%

6.1 Electrical Performance

No. 序号	Item 项目	Standard 标准	Test Methods 测试方法
6.1.1	Open circuit voltage 开路电压	≥3.10V (23±2°C)	Measure with a three and a half digits voltmeter. 用三位半数字电压表测量
6.1.2	Load voltage 负载电压	≥3.00V (23±2°C)	Measure with a three and a half digits voltmeter. Resistor 100Ω, time ≤5s. 用三位半数字电压表测量, 电阻100Ω, 时间≤5s
6.1.3	Internal impedance内阻	≤1.0Ω	AC internal impedance tester, AC signal 1 kHz. 用交流内阻测试仪检测电池内阻, 交流信号1kHz
6.1.4	Rapid discharge at room temp. 常温快速放电	≥1200mAh	Constant current 100mA, continuing discharging to 2.0V at 23±2°C. 恒流100mA, 23±2°C连续放电至2.0V

	Slow discharge at room temp. 常温慢速放电	≥1500h	Constant resistor 3kΩ, continuing discharging to 2.0V at 23±2°C. 恒阻3kΩ, 23±2°C连续放电至2.0V
6.1.5	Pulse discharge 脉冲放电	≥0.75Ah	At 23±2°C, pulse discharge with 900mA, open for 3s, closed for 27s, discharge to the end-off voltage 2.0V. 23±2°C下, 900mA脉冲电流放电, 3s开启, 27s关闭, 放电至2.0V终止
6.1.6	Shelf life after high temperature storage 高温储存后寿命	≥1500h	Store at 60°C±2°C for 20days, take out the battery and discharge with 3kΩ constant resistor at 23±2°C til end-off 2.0V. 电池在 60°C±2°C条件下存放 20天, 再取出电池在 23±2°C条件下以 3kΩ恒阻放电至 2.0V 终止

6.2 Acclimation Performance

No. 序号	Item 项目	Standard 标准	Test Methods 测试方法
6.2.1	High and Low Temp. Cycle 高低温循环	No fire or explosion, no leakage. 电池不爆炸、不起火、无泄漏	According to the UL requirements: place the sample into the incubator, Raise the temperature form room one to 70±3°C within 30min and hold for 4h, Lower the temperature to 20±3°C within 30min and hold 2h, Then lower to -40±3°C within 30min and hold for 2h, Finally, raise the temperature to 20±3°C within 30min. Cycle for 10 times and observe after storing the battery at 20±5°C for 24h. 按照 UL 的试验要求: 把样品电池放在恒温箱内, 在 30min 内从室温升温到 70±3°C 保持 4h, 然后用 30min 降温到 20±3°C 保持 2h, 再用 30min 降温到 -40±3°C 保持 4h, 最后再用 30min 升温到 20±3°C。如此循环共 10 次后, 电池在 20±5°C 环境下贮存 24h 后观察。
6.2.2	Low pressure 低气压 (高空模拟)	No fire or explosion, no leakage. 电池不爆炸、不起火、无泄漏	According to the UL requirements: store the sample battery in the following condition: absolute pressure 11.6kPa, 20±3°C for 6h. 按照 UL 的试验要求: 样品电池在绝对压力为 11.6kPa, 温度为 20±3°C 条件下贮存 6h。

6.2.3	Vibration 振动	No fire or explosion, no leakage. 电池不爆炸、不起火、无泄漏	<p>According to the UL requirements: fix the battery firmly on the vibration platform, amplitude: 0.8mm (double amplitude 1.6mm), frequency change rate 1Hz/min, frequency range (10 ~ 55) Hz. Vibrated at axial, radial directions for 95min±5min.</p> <p>按照 UL 的试验要求: 电池牢固地固定在振动台上, 施加振幅为 0.8mm(双振幅为 1.6mm)、频率变化率为 1Hz/min、频率范围在 (10 ~ 55) Hz 的简谐振动。往返振动 95min±5min。电池做轴向和径向两个方向的振动。</p>
6.2.4	Shock 冲击	No fire or explosion, no leakage. 电池不爆炸、不起火、无泄漏	<p>According to the UL requirements: fix the battery firmly on the experiment table, same shock 3 times from axial, radial directions. In the first 3ms, the minimum average acceleration reaches 735m/ s², peak acceleration is 1225 m/ s²~1715 m/ s².</p> <p>按照 UL 的试验要求: 电池应牢固地固定在试验台上, 电池应在轴向和径向两个方向各进行三次相等大小的冲击。冲击时前 3ms, 最小的平均加速度达到 735m/ s², 峰值加速度为 1225 m/ s²~1715 m/ s²。</p>

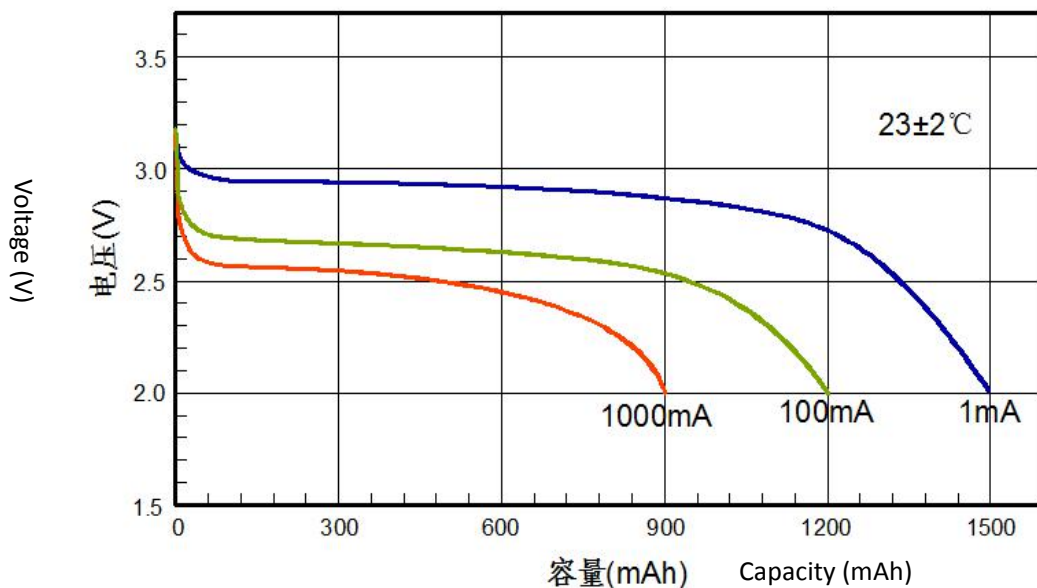
6.3 Safety Performance

No. 序号	Item 项目	Standard 标准	Test Methods 测试方法
6.3.1	Heat 加热	No fire No explosion 不起火不爆炸	<p>According to the UL requirements: put the sample battery innatural-convection flow or forced-convection oven and heat, temperature increase at 5±2°C/min to130±2°C and keep for 10min. 按照 UL 的试验要求: 样品电池放在自然对流或强制对流的烘箱中加热, 烘箱以 5±2°C/min 速度升温至 130±2°C, 并恒温 10min 后停止。</p>
6.3.2	Impact 重物撞击	No fire No explosion 不起火不爆炸	<p>According to the UL requirements: put the sample battery with the vertical axis paralleled to the horizontal level. Put a 15.8±0.1mm diameter steel stick on the central part of the battery in a cross shape. Then drop a 9.1±0.46kg heavy object form 610±25mm down to the sample.按照 UL 的试验要求: 将样品电池纵轴平行于水平面放置, 用直径 15.8±0.1mm 的钢棒呈十字交叉放置于电池中心位置, 然后将 9.1±0.46kg 重物从 610±25mm 的高出落到样品电池上。</p>

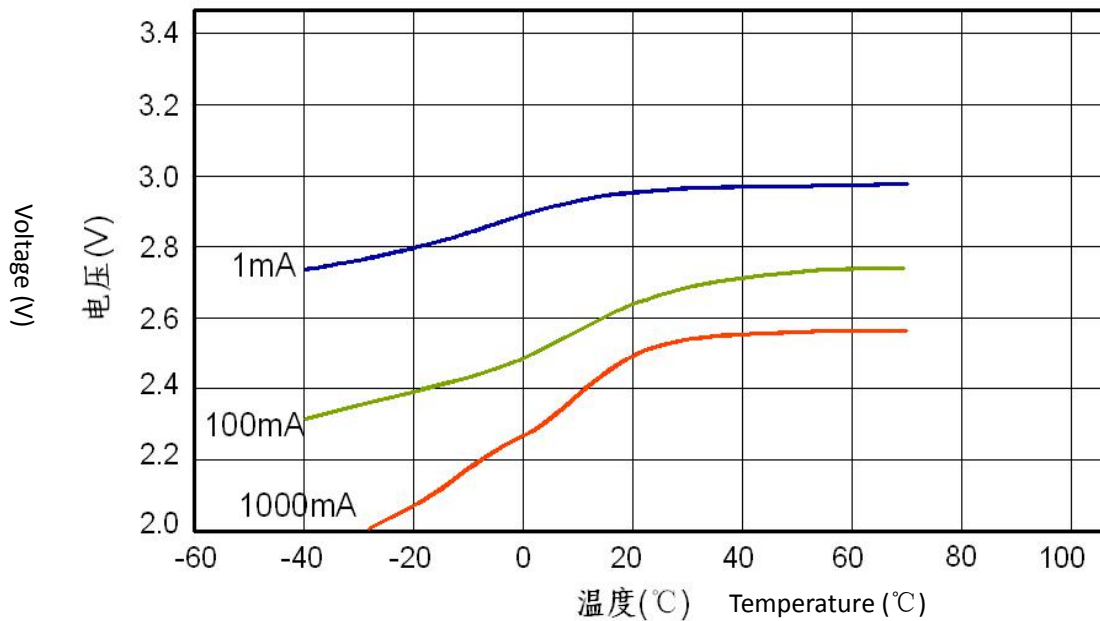
6.3.3	Crush 挤压	No fire No explosion 不起火不爆炸	According to the UL requirements: laying the sample battery in the center between two steel panels and exert 13±1 kN on the battery. Once reach the pressure, it can be released. 按照 UL 的试验要求: 在常温下, 把电池平躺放在压力机的两平面钢板中间, 在电池上施加 13±1 kN 的压力, 此压力一旦达到即可释放压力。
6.3.4	External Short-circuit 外部短路	No fire No explosion 不起火不爆炸	According to the UL requirements: at room temp. Short circuit the positive and negative terminals with a 80±20mΩ wire. Record the temp of the battery shell until fire or explosion occurred, or until the battery is full discharged to below 0.2V and the shell temp lowers again down to room temperature ±10°C. 按照 UL 的试验要求: 在常温下, 用阻值为 80±20mΩ 的导线将电池正负极短接。试验中记录电池壳体表面温度, 电池放电直至起火或爆炸, 或直至电池完全放电至 0.2V 以下, 并且壳体温度重新降至环境温度 ±10°C。
6.3.5	Forced discharge 强制放电	No fire No explosion 不起火不爆炸	According to the UL requirements: series connect the fully discharged battery with 3 new batteries and short circuit with a 80±20mΩ wire until fire, explosion or leakage occurs, or else, til the the battery is full discharged to below 0.2V and the shell temp lowers again down to room temperature ±10°C. 按照 UL 的试验要求: 将已放完电的样品电池与同一型号的 3 只新电池串联, 用阻值为 80±20mΩ 的导线将电池正负极短接, 直至电池起火、爆炸、漏液, 或直至电池完全放电至 0.2V 以下, 并且壳体温度重新降至环境温度 ±10°C。

7. Characteristics Curve 性能曲线

Discharge characteristics 放电曲线



Voltage V.S Temperature 电压与温度曲线



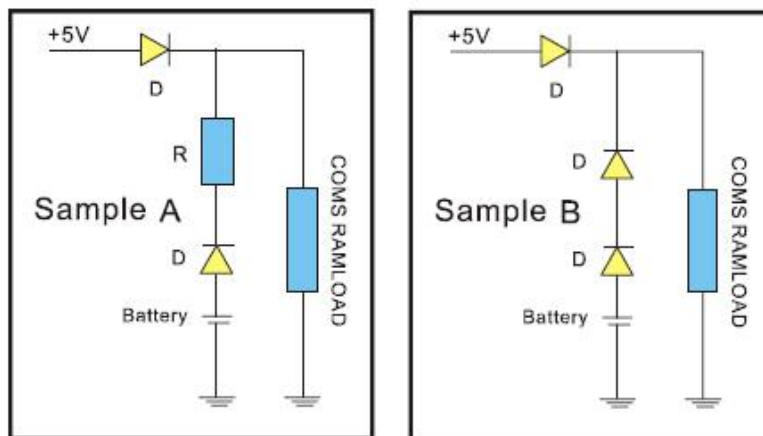
8. Memory Backup Circuit Design Suggestion 记忆备份电路设计建议

A primary lithium battery is not rechargeable, when used for memory backup in combination with another power source; current may flow into the battery from the other source. A protection diode and resistor into the circuit is needed to avoid battery charging or over discharging. Select a silicon diode or a diode with minimum leakage current, and design the circuit so that the amount of charging due to leakage current will not exceed 2% of the nominal battery capacity over the total period of use.

当与另一电源共同用于记忆备份电路时，一次锂电池是不可充的；电流可能会从另一个电源流入此电池中。需在电路中加入保护二极管和电阻，以防电池进行充电或过放。选择硅材料或泄漏电流小的二极管设计电路，这样能保证在整个使用过程中，由泄露电路产生的充电量不会超过电池标称容量的2%。

While used for memory backup, the following circuit shall be applied:

当本电池用于记忆备份电路时，应采用如下电路：



9. Matters Needing Attention 注意事项

Strictly observes the following needing attention. EEMB will not be responsible for any accident occurred by handling outside of the precautions in this specification.

您必须严格遵守下述电池使用注意事项。对于没有按照以下注意事项所造成的任何意外事故，EEMB 不负任何责任。

! Caution 注意

- Use Nickel-plated iron or Nickel-plated stainless steel for the terminals that contact the battery.
使用镀镍铁或镀镍不锈钢与电池接触
- Make sure that terminal contact pressure is 50g minimum, for a stable contact.
确保电池端接触压力最小为 50g，以保证稳定接触。
- Keep the battery and contact terminal surfaces clean and free from moisture and foreign matter.
保持电池和接触端表面清洁、无水分或异物。
- Before inserting the battery, check the battery contact terminals to make sure they are normal, not bent or damaged. (Bent terminals may not make good contact with the battery or may cause short circuit.)
在安装前，检查电池端子，确保其正常、无弯折或损坏。（弯的端子可能造成接触不良或短路）
- When the batteries are piled up in a disorderly way, their positive and negative terminals may short-circuit, consuming some batteries while charging others, causing explosion.
当电池无序堆放时，正负极端子可能会发生短路、电池间的充放电、甚至造成爆炸。
- Lithium batteries that are almost exhausted can output a voltage that is almost the same as that of a new battery: Please does not judge a battery only with a Voltmeter. Do not mix batteries of different types and brands, or new and used batteries. We are well informed that battery pack should be assembled with single batteries of similar voltage, capacity and inner resistance.
电量即将用尽的锂电池释放出的电压几乎与新电池一样：请不要仅依据电压示数判断电池的新旧程度。请勿将不同类型或品牌的电池混合使用。
- Lithium batteries need a period of time to recover their normal voltage after even a slight short circuit. Therefore, if the battery is short-circuited, wait an adequate long time for batteries to recover before measuring their electrical characteristics.
锂电池在发生轻微短路后，需要一段时间才能恢复正常电压。因此，如果电池被短路，请先等待电池恢复原电压，再对其参数进行测量。
- Use a high impedance (1M or higher) voltmeter to measure battery voltage.
请使用高电阻(1M 或以上)测量电池电压。
- Add fuse between negative and connector. Once short circuit, it will cut immediately and permanently.
请在负极和插头之间加入熔丝。一旦发生短路，熔丝会立即、永久切断电路。
- Do not contact terminals with conductive i.e. metal, goods. Keep batteries in non-conductive, i.e. plastic, trays.
请不要用金属等导电物体接触电池正负极。将电池置于塑料等不导电的物体周围。
- Reduce impact to insulation layer from vibration, but the dimension will enlarge.
减少震动对电池绝缘层的冲击，否则电池尺寸将会扩大。
- Battery characteristics vary with type and grade, even when batteries are the same size and shape. When replacing batteries with new ones, be sure to carefully check the symbols and numbers on them.
电池性能随类型和等级的变化而有所不同，甚至同一尺寸和形状的电池，性能也不相同。当用新电池替换旧电池时，请认真核对电池上的标志和参数。

! Danger 危险

- DO NOT recharge, short-circuit, disassemble, deform, heat or place the battery near a direct flame. This battery contains flammable materials such as lithium and organic solvent and performing any of the above actions could cause it to ignite explode or become damaged.
请勿对电池进行充电、短路、拆解、或使电池变形；请勿加热或置于明火附近。电池内含有锂、有机溶剂等易燃材料，上述任何操作都可能导致电池损坏甚至发生爆炸。
- DO NOT over-discharge the battery. In case the battery is over-discharged when connected with exterior power source or connected with other batteries in series, explosion may occur.
请勿对电池进行过放电。电池与外部电源链接或与其他电池串联可能会引起爆炸。
- Keep this battery out of the reach of children. If it is swallowed, contact a physician immediately.
请将电池远离儿童。若发生吞咽，请立即就医。
- When storing a battery or throwing it away, be sure to cover it with tape. If the battery is contacted with other metal objects, it could cause fire or become damaged.
当贮存或丢弃电池时，请务必对电池进行包裹处理。若电池与其他金属物品接触可能造成电池损坏或引发火灾。

! Warning 警告

- Thoroughly read the user's manual before use, inaccurate handling may cause leakage, heat, smoke, explosion, or fire, causing device trouble or injury.
在使用之前请详细阅读操作说明书，不适当的操作可能引起电池变热、着火、爆炸、毁坏或电池容量的衰减。
- Insert the battery with the "+" and "-" ends correctly oriented.
在装入设备时注意电池的正负极不要反装。
- If the battery is used together with new batteries, do not use it with a different type battery.
禁止把电池同干电池或其它原电池或者新旧电池一起使用，也不要同不同包装、不同型号或不同品牌的电池一起使用。
- Do not solder the battery directly. Protect the welding point and connector.
禁止直接对电池进行焊接。对焊点和插头做好保护措施。
- The battery should be preferably stored in dry and cool conditions. Avoid storing the battery in direct sunlight, or in excessively hot and humid place. Storage at high temperature must be avoided to preserve the battery life time.
电池应贮存在通风干燥处。请勿将点出贮存在阳光直射下或高温高湿环境中。为保持电池使用寿命，请避免在高温中贮存电池。

EEMB reserves the final explanation. Please use battery strictly according to specification. EEMB will not be responsible for any inappropriate operation. EEMB keeps the right to change product specifications without previous notice. If any question, please consult with the manufacturer
EEMB 保留最终解释权。请严格按照规范使用电池。EEMB 对任何不当操作将不负责。EEMB 保留修改产品规格书不另行通知的权利。如有任何问题, 请咨询制造商。