

SPECIFICATION OF BATTERY

CONFIDENTIAL

Name :	Tapo Battery Pack
Model :	Tapo A111-INT
Sunwoda Part No. :	
Description :	

E.E	Checked	Approval
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1. Revision History / 版本更改记录

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2. Application Scope / 适用范围

The specification describes the requirements for **lithium-ion battery** pack supplied by Sunwoda Electronic CO.LTD.
本规范适用于欣旺达电子股份有限公司设计的**锂离子电池**。

3. Typical Parameters/主要参数

3.1 Cell Main Characteristics/电芯特性

Nominal Voltage /额定电压	Cell Maker /电芯制造商	Cell Model /电芯型号	Cell Minimum Capacity /电芯最小容量
3.6V	SAMSUNG	INR21700-50G	4900mAh

3.2 Battery Pack Electrical Characteristics/电池特性

NO./序号	Items/项目	Specification/参数规格		Remarks/备注
1	Charge voltage /充电电压	4.20V		0°C~45°C
2	Nominal voltage /标称电压	3.6V		
3	Minimum capacity /电池最小容量	9500mAh		0.2C to 2.5V
4	Nominal capacity /电池标称容量	10000mAh		
5	Internal impedance /内阻	≤80mΩ		AC 1KHz
6	Standard charge current /标准充电电流	2A		
7	Maximum charge current /最大充电电流	2A		
8	Standard discharge current /标准放电电流	0.5A		
9	Maximum discharge current /最大放电电流	2A		
10	Discharge cut-off voltage /放电截止电压	2.5V		
11	Operation temperature /工作温度	Charging	0°C ~ 45°C	
		Discharge	-20°C ~ 60°C	
12	Storage temperature /存储温度	<1year	-20°C ~20°C	
		<3 months	-20°C ~40°C	
		<1 months	-20°C ~50°C	
13	Shipment voltage /出货电压	3.803~3.907V		出货容量（57.5%~67.5%）

4. PCM Specification/PCM 规格

4.1 PCM Electrical Characteristics (at 25℃) /保护板电气性能 (at 25℃)

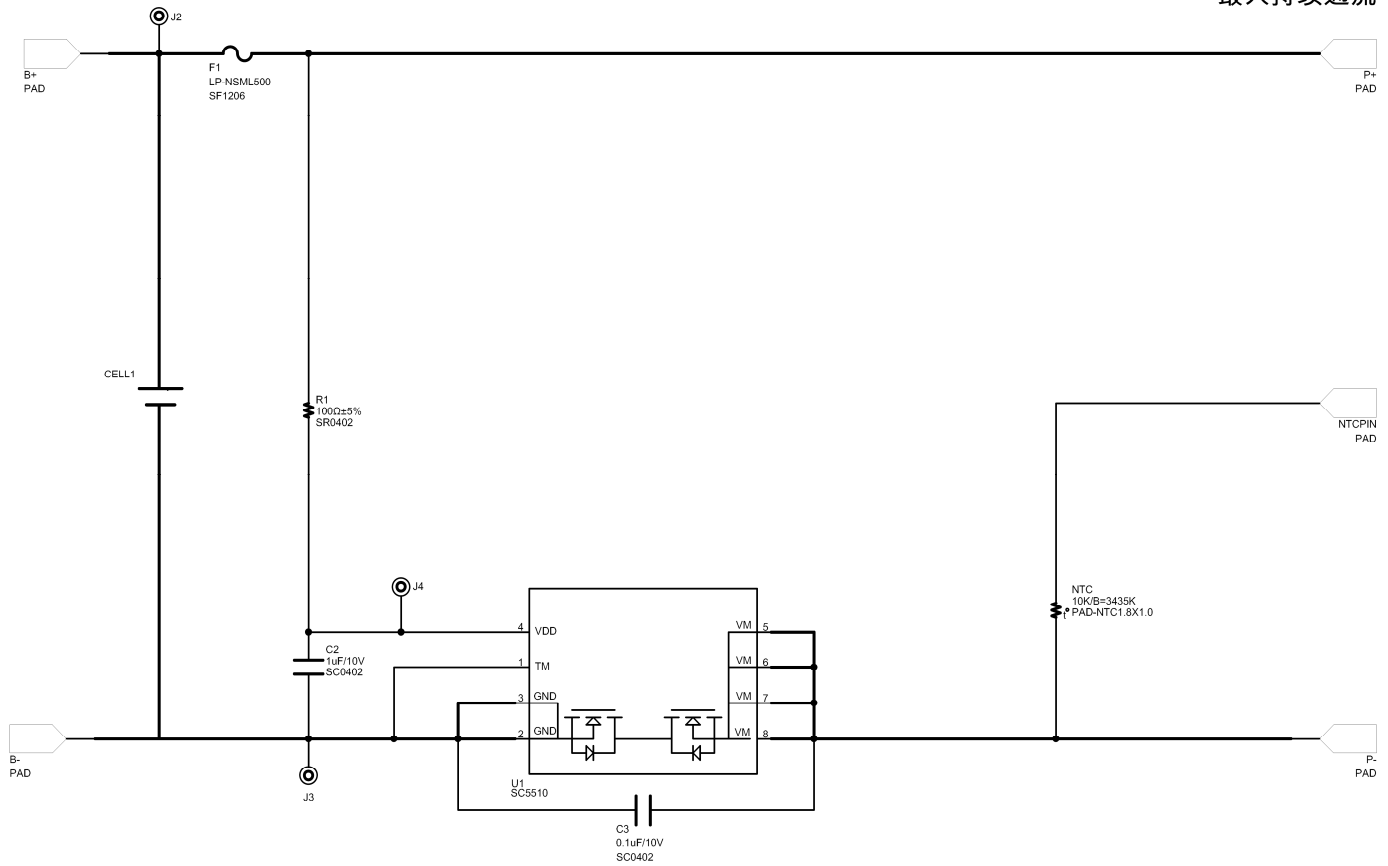
NO./ 序号	Items/ 项目		Unit. / 单位	Min. / 最小值	Typ. / 典型值	Max. / 最大值	Remarks/ 备注
1	Over-charge protection voltage /过充保护电压		V	4.250	4.275	4.300	
2	Over-charge release voltage /过充恢复电压		V	4.000	4.075	4.150	
3	Over-discharge protection voltage /过放保护电压		V	2.445	2.500	2.555	
4	Over discharge release voltage /过放恢复电压		V	2.795	2.900	3.005	
5	Charge over-current protection /充电过流保护		A	4.8	6	7.2	
6	Discharge over-current protection /放电过流保护		A	6.3	7	7.7	
7	Over-charge protection delay time /过充电保护延时		mS	96	128	160	
8	Over-discharge protection delay time /过放电保护延时		mS	28	40	52	
9	Charge over-current protection delay time/充电过电流保护延时		mS	6	8	11	
10	Discharge over-current protection delay time/放电过电流保护延时		mS	6	8	11	
11	Short circuit protection delay time /短路保护延时		uS	224	320	416	
12	Power consumption of protection circuit /保护电路功率消耗	Power down /休眠模式	uA	0.1	0.4	0.8	
		Operation /工作模式	uA	2	4.3	7.2	
13	NTC thermistor value / NTC 热敏电阻值		KΩ	/	10	/	10K±1% B(25/85)=3435K

4.2 Parts List /元器件清单

Symbol/位号	Parts name/ 器件名称	Description/描述	Qty/数量	Remarks/备注
PCM	PCM	TP01 电池保护板	1PCS	客供

4.3 Circuit Diagram / 电路原理图

●最大持续通流：2A



5. Test Protocol /测试协议

5.1 Charge Method/充电方法：

Standard Charge/标准充电方式：
Charging the battery with constant current of 2A at 20°C±5°C and then with constant voltage of 4.2V till charge current declines to 200mA . /在 20°C±5°C的环境温度下，以 2A 充电，当电池或电池组端电压达到 4.2V 时，改为恒压充电，直到充电电流小于或等于 200mA，停止充电。

5.2 Discharge Method / 放电方法：

Discharge cells or batteries with the current specified by the manufacturer at 20°C±5°C and between 40% RH and 75% RH till discharge 2.5V. /在环境温度 20°C±5°C,相对湿度 45%~85%下,电池或电池组依照制造商规定的电流进行恒流放电至 2.5V。

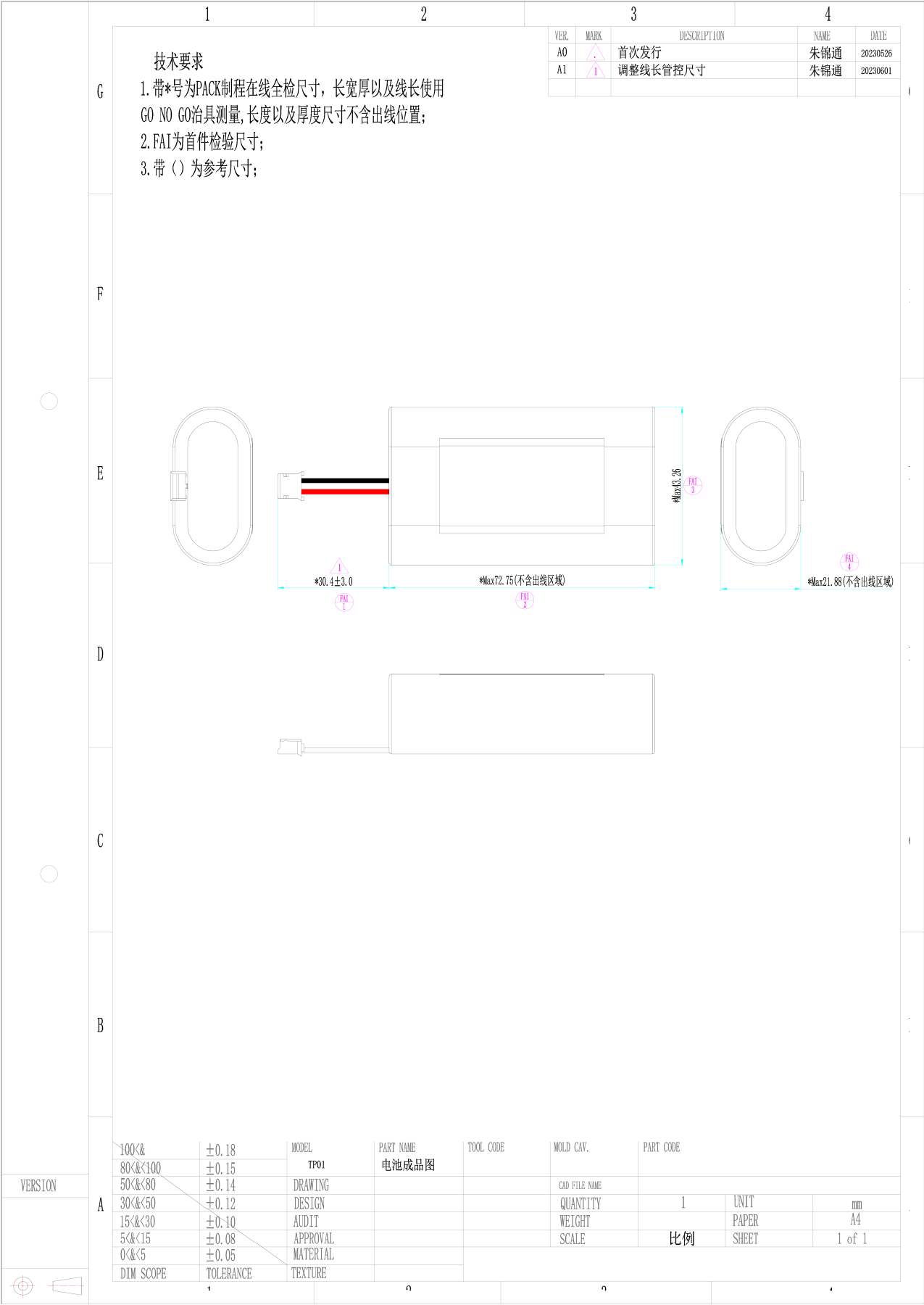
5.3 General Test /常规测试

Items/项目	Conditions/测试条件	Criteria/判定标准
Charge performance /充电性能	Set charge current to 2A, Charge cut-off voltage to 4.2V, charge cut-off current to 200mA by battery tester, Observe battery status. 使用电池充放电测试仪，设置充电电流 2A，充电截止电压 4.2V，充电截止电流 200mA，观察电池能否正常充电。	Can be charged normally. 可以进行正常充电。
Discharge performance /放电性能	According to 5.1 after charge, set aside for 0.5 hours with no load, and in 2000mA constant current mode to devolve power to 2.5 V, recording discharge time. 电池按照 5.1 进行充电后，开路搁置 0.5h，再以 2000mA 电流恒流放电至 2.5V，记录放电时间。	The discharge capacity must ≥9500mAh. 电池放电容量≥9500mAh 则为合格。
Storage Characteristic /荷电保持能力	According to 5.1 after charge, set aside the battery at 20°C±5°C for 28 days, then discharge with 0.2C to the cut-off voltage at 23°C ±2°C.Then charge as per 5.1 and discharge with 0.2C to the cut-off voltage at 23±2°C. 电池按 5.1 充满电后，在 20°C±5°C下开路搁置 28 天,以 0.2C 放电至 2.5V。	Retention capacity≥90%, Recovery capacity≥95%. /保持容量≥90%，容量恢复≥95%。
Cycle Life / 循环寿命	Doing the test at 20°C±5°C. The battery is charged at 0.2C to 4.2V, it is charged at constant voltage, until the charging current is less than or equal to 100mA, stop charging, after 0.5h, 0.2C discharge to 2.5V cycle, when the discharge capacity is less than 80% of the initial capacity for three consecutive times .It is the symbol of the battery life ending. 在 20°C±5°C的环境温度下进行，电池按 0.2C 充电，当电压达到 4.2V 时改为恒压充电，直到充电电流小于或等于 200mA 时停止充电，静置 0.5h 后，0.2C 放电至 2.5V 的方式进行循环，当连续三次放电容量<初始容量 80%时，则认为寿命终止。	Cycle count: 500 times;retention capacity ≥80% of the initial. /充放电次数：500 次 容量保持率在 80%以上。

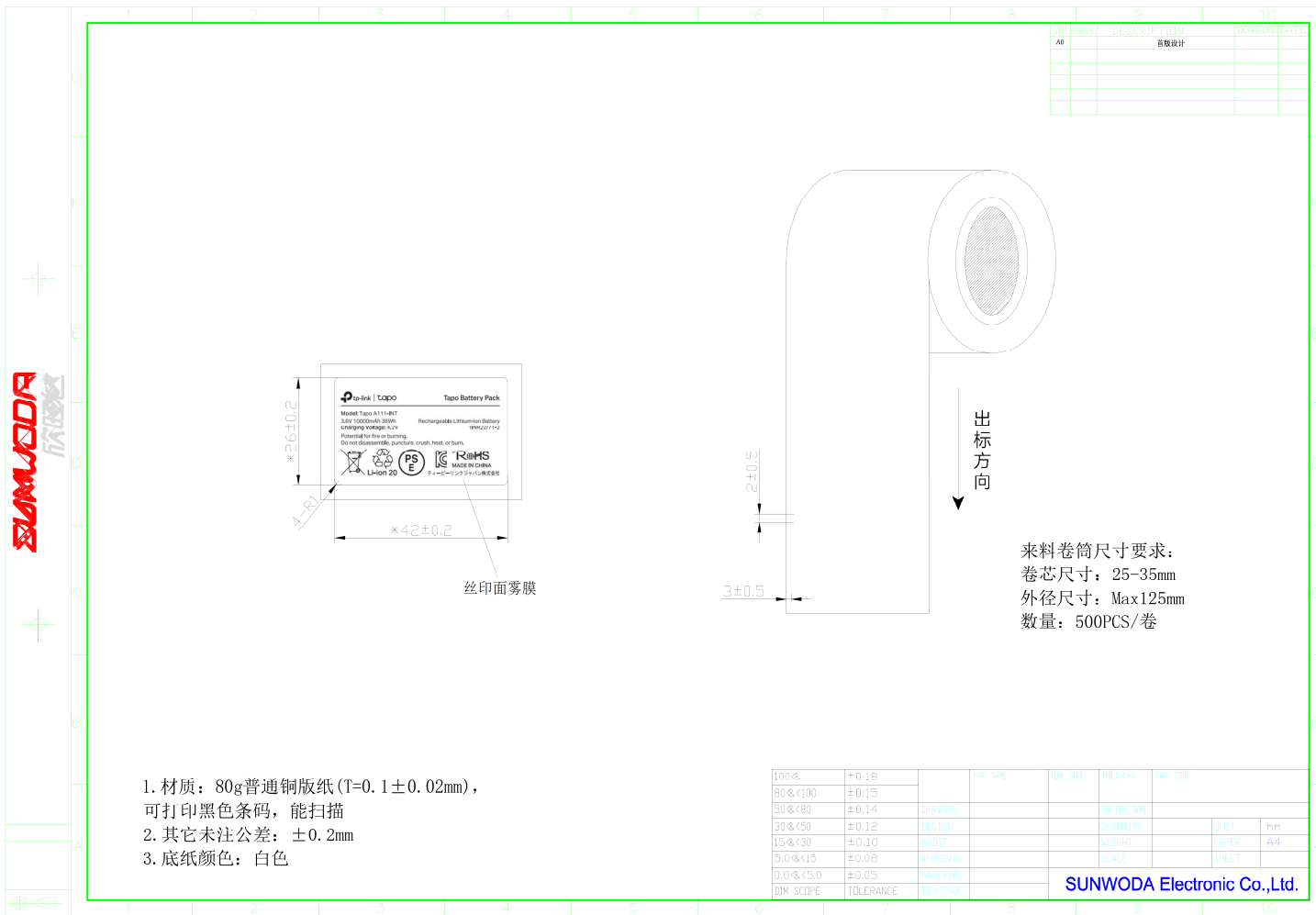
Storage performance /存放性能	The battery, which is less than 3 months from the production date to the experiment date, is charged to 40~50% capacity at 0.2C, and placed in an environment with a temperature of 20±5% and a humidity of 45~85% for open storage for 12 months, and the battery is fully charged according to the standard charging method. Let stand for 0.5h, and then discharge at 0.2C to 2.5V. 将生产日期到实验日期不足 3 个月的电池按 0.2C 充入 40~50%容量后，放置在温度 20±5%、湿度为 45~85%的环境中开路存放 12 个月后，电池按标准充电方式充满；静置 0.5h，再以 0.2C 放电至 2.5V。	Retention capacity≥90%, Recovery capacity≥95%。 /保持容量≥90%， 容量恢复≥95%。
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6. Description Of Mechanical Characteristics /机械特性描述

6.1. Appearance Requirements And Dimension Figure(Unit: mm)/外观要求和尺寸描绘(单位:毫米)



6.2. Label Figure / 商标图



7. Cautions And Warnings/注意事项与警告

7.1 Cautions /注意事项

- 7.1.1 Before using the batteries, carefully read the service manual and the identification on the surface of the batteries.使用电池前，请仔细阅读电池服务手册。
- 7.1.2 Children should not be allowed to play with them.
避免儿童玩弄电池。
- 7.1.3 The batteries should only be charged with a matching charger.
本电池只能使用配套充电器充电。
- 7.1.4 When the batteries are not be used for a long time, please store them safely so that they will stay in a half-charged state. Please wrap the batteries with non-conductive materials in order that metallic materials will not contact the batteries directly, which may result in damage to the batteries. Keep the batteries in a cool and dry place.
长期不用时，请将电池储存完好，让电池处于半荷电状态。请用不导电材料包裹电池，以避免金属直接接触电池，造成电池损坏，将电池保存阴凉干燥处。
- 7.1.5 The warranty period is half one year from the date of ex-factory. However, the manufacturer will not replace the battery free of charge even in the warranty period if the problem with the battery results from misuse rather than bad quality.
质保期是自出厂之日起半年内。属于使用不当而非质量问题的，即使在质保期内，生产厂家也不会无偿更换新电池。

7.2 Warnings /警告

- 7.2.1 During their use, the batteries should be kept away from heat sources and high voltages.
在使用过程中，电池应远离热源、高压。
- 7.2.2 Don't disassemble or assemble the batteries by yourself.
切勿私自拆装电池。
- 7.2.3 Do not short circuit the positive and negative poles of the battery with metal and do not store or move the batteries together with metal sheets either.
不要将电池的正负极用金属连接，也不要将电池与金属片放在一起存储和移动。
- 7.2.4 Do not heat and burn of the batteries, throwing them in fire.
严禁加热和焚烧电池，将电池投入火中。
- 7.2.5 Damping of the battery is prohibited.
禁止弄湿电池。
- 7.2.6 Do not use the soaked battery.
电池浸水后禁止使用。
- 7.2.7 Avoid to charge battery near a fire source or in direct sunlight.
避免在火源附近或阳光直射下充电。
- 7.2.8 The battery should not be damaged by means of methods like knocking metallic things into the battery, hammering the battery, knocking it violent or etc.
禁止用金属凿入电池、锤打或摔打电池或其他方法破坏电池。
- 7.2.9 Welding is not allowed to be conducted on the battery.
禁止在电池上直接焊。
- 7.2.10 Don't directly contact with the leaking battery.
不要直接接触及漏液电池。

8. Remarks/备注

- 8.1 What has been mentioned above can be regarded as the conventional framework between the supplying and requisitioning parties in respect to the product performance and examination rule of the battery.
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