深圳市沃尔德电子有限公司
SHENZHEN WORLD ELECTRONIC CO.,LTD

SPECIFICATION

电池规格书

Customer Name Code 客户名称代码	DYT
Model Name 产品名称	WP-DYT-02
Description 规格描述	36V /8.1Ah
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产品修订记录表

Product Modified Record List

版本 Revision	变更内容 Modified Content	责任人 Principle	日期 Date	备注 Note
A/0	设计 Design	李宗宝	2018.10.19	
A/1	更正参数，补齐认证资料	李宗宝	2019.04.02	

1、Scope of application documents/文件适用范围

The specification of this product is only applicable to the protection parameters of a rechargeable lithium-ion battery pack designed by Shen Zhen Word electronic co., LTD

本规格书仅适用由深圳市沃尔德电子有限公司设计的可充电锂离子电池组的保护参数.

2、The Specification Amendment/ 规格书修订

If the raw materials, production processing, production system or battery usage environments & other conditions need to be changed, the amendment side needs provide the written advice to the other side, only the both sides come to agreement, the amendment will be effective.

如因原材料、生产制程 、生产系统或电池使用环境或其他条件发生改变，修订方需将改变的信息以书面形式通知对方取得供需双方同意后再行修订。

3、Pack Testing Conditions/ 电池测试条件

Test should be conducted with new batteries within one week after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless specified, testing and measurement shall be done under temperature of 20±5℃ and relative humidity of 45~75%.

测试必须使用出厂时间不超过一个星期的新电池，且未进行过五次以上的充放电循环。除非特别说明，否则测试需要在温度20±5℃，相对湿度45~75%的条件下进行。

4、Standard Test Conditions / 标准测试条件

4.1 Measuring Instrument and Apparatus/ 测量器具及设备

.1 Dimension Measuring Instrument/ 尺寸测量器具

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.02mm.

尺寸测量器具的精度等级应不小于0.02 mm。

.2 Voltmeter（伏特计）

Standard class specified in the national standard or more sensitive class having inner impedance more than 10kΩ/V

按照国家标准指定规格等级或采用灵敏度更高的，测量电压时内阻不应小于 10kΩ/V。

.3 Ammeter（安培计）

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω.

按照国家标准指定规格等级或采用灵敏度更高的，包括电流表及电线在内的总外阻应小于 0.01Ω。

.4 Impedance Meter（电阻计）

Impedance shall be measured by a sinusoidal alternating current method(1kHz LCR meter).

内阻测试仪测量原理应为交流阻抗法（1kHz LCR）。

5、Battery Pack Brief Introduction /电池组概述

5.1 Cell Type 类别

Lithium-ion rechargeable battery/可充电锂离子电池

5.2 Reference Standard/参考标准

GB/T 18287-2013

5.3 Product Model/产品型号

WP-DYT-02 36V/8.1Ah

5.4 Cell Specification and Model/电芯规格型号

松下 NCR18650PF

6、Battery Pack Electrical Specification/ 电池组电性能

.1 Testing Conditions (Unless Specially Requirements) 测试条件（除非特别规定）

Atmosphere Pressure ： 86~106kPa Temperature：20℃±5℃ Relative Humidity：≤75%

大气压力： 86~106kPa 环境温度：20℃±5℃ 环境湿度：≤75%

.2The testing items under the Shipment Voltage. 测试项目在出货电压下进行.

.3 Battery Pack Electrical specification/ 电池组电性能

NO. /序号	Items/项目		Standards/标准	Testing Methods/测试方法
1	Nominal Voltage/标称电压		36 (V)	Follow GB/T18287-2013
2	Shipment Voltage/出货电压		36-39(V)	DMM/万用表
3	Nominal Capacity/标称容量		8.1(Ah)	Rest for 0.5~1 hour after fully charge, Using electrical loader to connect with the battery output port, and discharge with constant current **0.2C** till it can't discharge. Do the cycle three times, if there is one time that the discharge capacity is equal or more than 5 hours, you can stop. 将电池按标准充电方式充电后静止 0.5~1 小时，以 **0.2C** 电流恒流放电至电池不能放电止。可循环 5 次，当有一次放电时间达到 5 小时， 即可终止。
	Minimum Capacity 最 小 容 量		≥8.10(Ah)	
4	Battery internal Impedance 电 池 内 阻		Internal resistant 内阻≤200mΩ	Under 20±5℃ Environment Temperature , the Usage Frequency of Fully Charge(1KHz) , Use AC Internal Impedance test machine to test (HIOKI3555) 20±5℃环境温度下，完全充电后使用频率为（1kHz）的交流内阻测试仪测量(HIOKI 3555)。
5	Standard Charge 充电模式		CC-CV	Charger 充电器
	Standard Charging Current 标准充电电流		1620mA	Constant Current and Constant Voltage (CC/CV) Current 电流= 1620mA Voltage 电压=**42V** End Current 截止电流 =**162mA**
	Allowed Max Charging Voltage 允许最大充电电压		42V	Volta-meter 电压表
	Allowed Max Charging Current 允许最大充电电流		3A	Ampere-meter 电流表
6	Allowed Max Discharging Current 允许最大持续放电电流		20A	Allowed discharging with **20A** and the temperature of battery pack less than 30℃. 允许用 **20A** 电流进行持续放电，且电池组的表面温升≤30℃。
7	Discharge by the voltage 放电截止电压		**28V**	负载仪 Load meter（说明为电池组允许出现过放电压点）
8	Over Current Protection 过流保护电流		70-110A	
9	Dimension 外形尺寸	Length：长度	外壳	Vernier caliper 游标卡尺
		Width： 宽度	外壳	
		Thick：厚度	外壳	
10	Discharge Temperature Characteristics 放电温度特性		The ratio between discharge capacity and charge capacity should be not less than the following value.	At 20±5℃ discharge the battery with the current of 1620mAto the cut-off voltage and record charge capacity. Store the battery at the following temperature for 2h and discharge the battery with 1620mAto the cut-off voltage.

		放电容量与充电容量的比值应大于或等于下表数值	在（20±5 ℃）条件下，以 1620mA 恒流放电至电池不能放电后，完全充电，记录充电容量，将充满电的电池在下表所列的温度条件下恒温 2 小时，以 1620mA 恒流放电至电池不能放电止。

Discharge Current 放电电流	Discharge Temperature 放电温度			
	-10 ℃	0 ℃	25 ℃	60 ℃
1620mA	70%	80%	100%	95%

11	Weight 重量	约2000g	Electronic scale 电子秤
12	Operating Temperature 工作温度	Charge: :10to 45℃/45~85%RH 充电：10~ 45℃/45~85%RH Discharge: -20 to60℃/45~85%RH 放电：-20~60℃/45~85%RH	Temperature & Humidity Instruments 温湿度计
13	Storage Temperature 储存温度	1 month: -20 to 50℃ 3 month: -20 to 40℃ Over one year：-20 to 20℃	一个月：-20℃~50℃ 三个月：-20℃~40℃ 一年以上：-20~20℃、45~85%RH

7、Battery Pack Reliability Testing / 电池组可靠性试验

7. 1 Testing Condition (Unless Special Requirements)
测试条件（除非特别规定）
Atmosphere Pressure： 86~106kPa
大气压力： 86~106kPa
All testing under full capacity（41-42 V）
测试项目在充满电状态下进行.

7.2 Reliability Test/电池组可靠性试验

No. 序号	Item 项目	Testing Conditions and Method 测试方法及条件	Standard 标准
1	Free Fall Testing 自由跌落试验	Fall the battery freely from a height of 1.5m (minimum height) onto the cement floor. The test is to be carried out on six directions (±x, y, z axes). 将充满电的电池 PACK 从 1.5m 的高度上跌落到放置在水泥地面上，每面跌落 1 次，6 个面。	The appearance of battery should not leakage, break or explosion 电池外观不开裂，电性能正常。 内部电芯不破裂、不起火； 固定可靠。
2	Vibration Testing 振动试验	Fix a charged battery on a vibrating table, vibrate it for 90 minutes in three mutually perpendicular directions at the 0.8mm resonance. The frequency is to be varied at the rate of 1Hz/min between 10 and 55 hertz. 将充满电的电池固定在振动平台上，在三个相互垂直的方向按振幅 0.8mm 的谐振形式进行振动，频率在 10-55HZ 以 1Hz/min 的速率变化，往复振动 30 分钟。	The appearance of battery should n leakage, break or explosion 电池外观不开裂，电性能正常。 内部电芯不破裂、不起火； 固定可靠。
3	High Temperature 高温性能	A charged battery is placed in an oven for 2 hours at 55±2℃, then discharged at a 0.5C current to the termination voltage. 在 55±2 ℃条件下，将标准充电后的电芯放入高温箱中2h 后，再以 1C 电流放电至终止电压。	Discharge 85 percent of the origin capacity. 可放出初始容85%.
4	Low Temperature 低温性能	A charged battery is placed in a thermal chamber for 2 hours at -10℃±2℃; then discharged at 0.1C to the termination voltage. 在-10±2 ℃ 条件下，将标准充电后的电芯放入低温箱中 4h 后，再以 0.2C 电流放电至终止电压。	Discharge more than 70 percent of the original capacity. 可放出初始容量的 70% （-10 ℃）以上.

5	Constant Humidity & Temperature Testing 恒定湿热试验	Place a full charged battery under the environments of 40 ℃ and 90% - 95%RH for 48 hours. And keep it in the room temperature for 2 hours. Then discharge it at the current of 1C to the cut-off voltage. 将充满电的电池在 40 ℃、相对湿度 90%~95%的环境中放置 48 小时后，在室温 20±5 ℃ 放置 2 小时。以 1C 电流放电到电池不能放电.	The battery should be no remarkable breakage, distortion. Discharge time should not less than 36mins 电池外观应无变形、爆裂，放电时间应不低于 36 分钟。
6	High & Low Temperature Storage 高低温贮存	lay a full charged battery in a oven with 55±2 ℃ for 2 hours, then keep it under 20±5 ℃ for 4hrs, then place it in a oven with -20±2 ℃ for 2 hours, then keep for 4 hours under 20±5 ℃, cycle as high temperature-normal temperature-low temperature-normal temperature-high temperature for 10 times 电池充满电后，将电池放入55±2 ℃的高温箱中恒温2小时，再在环境温度20±5 ℃下放置4小时，然后放入-20±2 ℃的低温箱中恒温2小时，再在环境温度20±5 ℃下放置4小时，继续按高温—常温—低温—常温—高温循环10次。	The battery should be no remarkable breakage, distortion. And charge/discharge normally 电池外观无变形或爆裂现象，电池充放正常。
7	Humidity and heat test 湿度和热度测试	A charged battery is placed in a box for 48 hours where the temperature is 40±2℃ and the relative humidity is 90%～95% ； 将标准充电后的电芯放入温度为40±2 ℃，相对湿度为 90%～95%的箱子中，保持48h。	No explosion, no fire 无爆炸、无起火
8	Heat shock 热冲击	The cell is placed in a thermal chamber. Temperature is raised to 120±2℃ at the rate of (5±2℃)/min and held for 10 minutes, then cooled to room temperature at the rate of 5±2℃/min. 电池置于热箱中，温度以（5±2度）/min的速率升至120±2度并保温10min,再以5±2度/min的速度降至室温。	No explosion, no fire 无爆炸、无起火
9	Cycle Life 循环寿命	Discharge it with the current of 0.2C to the cut-off voltage, and store it for 15min.Charge a battery with the current of 0.2C , then keep the voltage and current constant and continue to charge it until completed . After storing the battery for 15min. The test is to be conducted as per the above cycles. The cycle should be 300 times. At the 301 times discharge capacity should not be less than**5880mAh** with 0.2C 以 0.2C 电流恒流放电至电池不能放电止，再以标准电流将其充电到规定限制电压，静止 15 分钟，以 0.2C 电流恒流放电至电池不能放电止，放电结束后，静止 15 分钟，再进行下次充放电循环，直至 300 次循环。第 301 次电池以 0.2C 电流恒流放电容量**≥5880mAh**。	Discharge Capacity 放电容量 **≥5880mAh**
10	Charge Retention 电荷保持能力	At 20±5℃ completely charge and store it for 28days, and then discharge it with 0.5C to the cut-off voltage. 完全充电后在环境温度为20±5℃的条件下，储存 28 天，然后进行 0.5C 恒流放电至电池不能放电止。	remain capacity 剩余容量 **≥7290mAh**

8、Battery Pack Security Testing / 电池组安全性试验

No. 序号	Item 项目	Testing Conditions and Methods 测试方法及条件	Standard 标准
1	Over-charge 过充电	After standard charging, the battery is conducted continously for 7 hours while the constant voltage is setted as 1.5 times of nomimal voltage(**1.5*36V**) and current is setted as I_t A. 将标准充电后的电芯，电源电压设定为1.5倍的标称电压(**1.5*36V**)，电流设定为I_tA的外接电流用电源持续给电池组加载7h。	No leakage, No crack, No explosion, no fire 无泄漏，无破裂，不爆炸、不起火

2	Over-Discharge Protection Test 过放保护试验	Discharge the battery at the rate of 0.2C with the load of**10***10Ω for 7h . 将充满电的电池，以0.2C放电至终止电压后，外接**10*10Ω**负载放电7h。	No leakage, No crack, No explosion, no fire 无泄漏，无破裂，无爆炸、无起火
3	Short-circuit Test 短路实验	Use a resistor with 80±20mΩ to make the battery short circuit for 1 hour. The appearance and characteristics are normal。 将充满电的电池，用100mΩ电阻器短路电池PACK输出端正负极1h，电池外观和性能正常不变。	No leakage, No crack, No explosion, no fire 无泄漏，无破裂，无爆炸、无起火。

9、Component Drawing/组件图纸

9.1 Assembly diagram（not to scale） Product photo and connector definition/ 产品图片和接口定义：

9.2 The labels contents and size（标贴内容及尺寸 ）

9.3 Packaging Method（包装方式）

以实物包装为准。

10、Main Specifications & Testing Methods of Protection Board：

电池保护板主要参数、标准及测试方法:

10.1 Testing Conditions 测试条件：

Temperature：20±5℃ 温度：20±5℃

Relative Humidity： 45~75% 相对湿度： 45~75%

Atmosphere pressure： 86~106kPa 大气压力： 86~106kPa

10.2 Main Specifications & Testing Methods of Protection Board 保护板主要参数及测试方法：

NO. （符号）	Name （名称）	MIN. （最小值）	TYP （典型值）	MAX. （最大值）	Unit （单位）
1	Over Charge Voltage 过充保护单节电压	4.20	4.25	4.30	V
2	Over Charge Release Voltage 过充释放单节电压	4.10	4.15	4.20	V
3	Over Discharge Voltage 过放保护单节电压	2.75	2.80	2.85	V
4	Over Discharge Release Voltage 过放释放单节电压	2.90	3.00	3.10	V
5	Over Current Threshold 过流值	70	90	110	A
6	Supply Current(single cell) 总自耗电流（亮灯）	/	/	8	mA
7	Internal Resistance in Normal Operation 导通内阻	/	/	40	mΩ
8	NTC	/	/	/	K

10.3 Bill of Materials.(Main Parts) 物料清单（主要部分）

No. 序号	Description 描述	Quantity 数量	Unit 单位
1	**保护板：WP-AWP-28**	**1**	**PCS**
2	**电芯：松下 NCR18650PF**	**30**	**PCS**

11、Warranty / 保质期

The delivery period from battery date for 12 months. If the battery defects is proved in manufacturing process rather than the user by use of abuse and error caused. Our company is responsible for replacement battery.

电池的保质期从出货之日算起为12个月。如果证明电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。

12、 Battery Cell Operation Notices / 电池操作注意事项

12.1 Prohibition short circuit/ 禁止电池短路

Never make short circuit cell. It generates very high current which causes heating of the cells and may cause electrolyte leakage, gassing or explosion that are very dangerous. The LI tabs may be easily short-circuited by putting them on conductive surface. Such outer short circuit may lead to heat generation and damage of the cell. An appropriate circuitry with PCB shall be employed to protect accidental short circuit of the battery pack.

避免电池短路。短路会产生很高的电流而使电池发热以及电解液泄漏，产生有毒气体或爆炸是非常危险的。

极片连接在导电物体表面很容易短路，外部短路会导致发热及损害电池。选用一个适当的保护电路可以在意外短路时保护电池。

12.2 Mechanical shock/ 机械撞击

Falling, hitting, bending, etc. may cause degradation of LI characteristics.

跌落、碰撞、弯曲等等都可能会降锂电池的性能。

12.3 Handling of tabs/ 极片操作注意事项

The battery tabs are not so stubborn especially for aluminum tab. Don't bend tab. Do not bend tabs unnecessarily.

极片的机械强度并非异常坚固，特别是铝片。没有必要时禁止弯折极片。

13、 Battery Shell Design Notices / 电池外壳设计注意事项

13.1 Pack toughness/ 外壳坚韧度

Battery pack should have sufficient strength and the LI cell inside should be protected from mechanical shocks.

电池外壳应该有足够的机械强度使电池免受机械撞击。

13.2 Cell fixing/ 电池的固定

The LI cell should be fixed to the battery pack by its large surface area. No cell movement in the battery pack should be allowed.

电池最大面积的一面应该固定在外壳上，安装后电池不能有松动。

13.3 Inside design/ 外壳内部设计

No sharp edge components should be insides the pack containing the LI cell.

外壳内安装电池的部位不应有锋锐边。

13.4 For mishaps/ 针对意外事件

Battery pack should be designed not to generate heat even when leakage occurs due to mishaps.

1) Isolate PCB (Protection Circuit Module) from leaked electrolyte as perfectly as possible.

2) Avoid narrow spacing between bare circuit patterns with different voltage. (Including around connector)

3) LI battery should not have liquid from electrolyte, but in case If leaked electrolyte touch bare circuit patterns, higher potential terminal material may dissolve and precipitate at the lower potential terminal, and may cause short circuit. The design of the PCB must have this covered.

发生意外时外壳设计应考虑即使在电池出现漏液时也不会发热。

1）尽量把保护电路与渗漏的电解液隔离开。

2）在不同的电压情况下避免出现小间距的裸露电路——包括插头周围。

3）电池不应该有来自电解液的液体，但是一但发生电解液渗漏触及裸露电路，高电势端接子材料可能会溶解然后沉淀到低电势端接子，可能会造成短路。保护板的设计必须含有覆盖保护层。

14、Notice for Assembling Battery Pack/ 电池装配注意事项

Shocks, high temperature, or contacts of sharp edge components should not be allowed in battery pack assembling process.

在电池装配过程中不允许撞击、高温或接触尖锐部分。

14.1 Cell connection

电芯的连接

Ultrasonic welding or spot welding is recommended for LI tab connection method.

Battery pack should be designed that shear force are not applied to the LI tabs.

If apply manual solder method to connect tab with PCM, below notice is very important to ensure battery performance:

1）The solder iron should be temperature controlled and ESD safe;

2）Soldering temperature should not exceed 350°C;

3）Soldering time should not be longer than 3s;

4）Soldering times should not exceed 5 times, Keep battery tab cold down before next time soldering;

5）Directly heat cell body is strictly prohibited, Battery may be damaged by heat above approx. 100°C

建议使用超声波或点焊焊接方法；外壳设计应使极片不受外力。

如果使用人工焊接保护板，下面的注意事项对于确保电池性能非常重要：

1）铬铁的温度必须可控且可防静电；

2）接时铬铁的温度不能超过 350度；

3）焊锡时间不能超过 3 秒钟；

4）焊锡次数不能超过 5 次，待极片冷却后才能进行下一次焊锡；

5）严禁直接加热电芯，高于100度会损害电芯。

电芯的安装 Cell installation

① The cell should be fixed to the battery pack by its large surface area.

② There should be no sharp edges at the assembly contact area.

③ Cells must be held firmly in the battery pack; movement is not allowed.

① 应将电芯的宽面安装在外壳内；

② 装电芯的位置不能有毛刺和尖锐边角；

③ 电芯不能在壳内活动。

14.2 Cell connection/ 电池连接

1) Direct soldering of wire leads or devices to the cell is strictly prohibited.

2) Lead tabs with pre-soldered wiring shall be spot welded to the cells.

Direct soldering may cause damage of components, such as separator and insulator, by heat generation.

1）严禁直接焊接引线或设备到电池上。

2）极片在焊接引线之前应该先点焊到电池上，直接与电池热焊接，产生的热量会使电池的隔离 体及绝缘体受损。

14.3 Prevention of short circuit within a battery pack/ 电池内部的短路预防

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection. The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or firing.

在电池和引线之间应该有足够的绝缘层用于安全保护。电池的包装构成应没有导致起烟起火的短路情况。

15、Other Notices / 其它注意事项 ！

15.1 Prohibition of disassembly / 禁止拆卸

1) Never disassemble the cells

The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, explosion,or other problems.

2) Electrolyte is harmful

LI battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

1）不要拆卸电池。

拆卸电池会发生电池内部短路，会引起起火、爆炸、有害气体或者其它问题。

2）电解液是有害的

万一电解液沾到皮肤、进入眼睛，应立即用清水冲洗以及求助医生。

15.2 Prohibition of dumping of cells into fire/ 不要把电池倾倒于火中

Never incinerate nor dispose the cells in fire. These may cause explosion of the cells, which is very dangerous and is prohibited.

不要焚毁电池，否则会致电池爆炸，这个很危险，必须禁止。

15.3 Prohibition of cells immersion into liquid such as water / 禁止浸泡电池

The cells shall never be soaked with liquids such as water, seawater, drinks such as soft drinks, juices, coffee or others.

请不要把电池浸泡在液体当中，像清水、海水，及非酒精饮料、果汁、咖啡或者其它的饮料。

15.4 Battery cells replacement/ 更换电池

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.

更换电池应由电池生产商或设备供应商完成，用户不要自行更换。

15.5 Prohibition of use of damaged cells/ 禁止使用损坏的电池

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more.

The Cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

电池可能在出货途中碰撞而受损。如果发现电池有异常，例如包装损坏、电池包裹变形，有电解液的味道、发现漏液等等，不要再使用这些电池。电池如果有电解液的味道或者出现漏液，电池放置应该远离火源避免起火及爆炸。

16、Using Battery Notes /使用电池注意事项

16.1 Handling of cells:

★ Don't charge the cells and keep them in a charged state for a long time.(Display units should dismantle the battery)
★ Avoid any short-circuit. It will cause the leads to get hot and lose electronic functions.
★ Soft package is easily damaged by sharp objects such as needles and knives. Avoid touching the cells with sharp objects when handling and storing.
★ Next to the leads is the sealed edge. Don't bend or fold the sealing edge as it is sensitive to movement.
★ Don't open the folded edge on the sides of the cell.
★ Don't bend the tabs as the tabs are sensitive.
★ Avoid mechanical shock to the cells.
★ Don't put the cells into an oven, washing machine or any high-voltage container.
★ Don't use a charger without a safety certification. Use a recommended charger only.
★ You should immediately stop charging if the cell overheats, emits an odor, changes color, changes shape, etc.
★ Adults should supervise the use of batteries by children.
★ Before using batteries, please carefully read and understand the handling guidelines.
★ Avoid electro-static discharge when using, charging, and storing cells.
★ Avoid putting the battery in contact with metal conductors such as neck chains, barrettes, or bolts, etc.
★ Don't use metal conductors to connect the positive and negative leads together.
★ Avoid errors during assembly by contacting the positive lead with the negative lead.

16.1 使用电芯时应注意：

★ 电池不能长时间充电，不能长期处于充电状态。（如展示品需拆下电池）
★ 慎防短路，任何情况引起的短路可能会导致极耳金属发热，使电池功能失效。
★ 电芯属于软包装,包装材料易被尖锐物品刺伤,诸如尖针,刀片等, 电芯在使用和存放时应避免与尖锐物品碰撞。
★ 电芯极耳引出端为顶封边，顶封边为电芯密封敏感区，使用时，禁止弯折顶封边。
★ 禁止打开电芯两侧的折边。
★ 电芯极耳的机械强度并非异常坚固，禁止弯折极耳，特别是铝极耳。
★ 禁止机械撞击电芯、坠落、弯折电芯。
★ 不要把电池放在加热器皿、洗衣机或高压容器中。
★ 不要使用非指定的和没有安全认证的充电器给电池充电。
★ 在使用充电或储存期间如发现电池有变热、散发气味、变色、变形或其它反常之处应停止使用。
★ 把电池放到小孩够不到的地方以免吞服。

★ 儿童使用电池时，监护人应详细解释操作方法。

★ 在使用电池之前，应详细阅读操作指南并对使用中的注意事项有足够深刻的理解。

★ 电池应在远离静电的场所进行充电、使用和储存。

★ 不要在火源附近或温度超过60度的轿车中使用或遗留电池，也不要在这些环境中进行充放电。

★ 不要把电池同项链发夹硬币或螺钉等金属品一起放在手提包中，也不要把电池同上述物品一起储存。

★ 不要使用金属导体短路电池的正、负极。

★ 在使用时应注意电池的正、负极不要反装。

★ 不要使用带有严重变形的电池。

17、Battery Storage Conditions / 电池的存放

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity. We recommend that batteries be charged about once per half 3 months to prevent over discharge.

电池应当在室温下存放，应充到 30%至 50%的电量。如长时间储存，建议每三个月充一次电以防止电池过放电。

18、Other Chemical Reaction / 其它的化学反应

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges, the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

由于电池是利用化学反应的原理，所以随时间的增加电池的性能会降低，即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内，会使缩短电池的使用寿命，或者会产生漏液导致设备损坏。如果电池长周期不能充电，即使充电方法正确，这样需要更换电池了。

19、Notes / 注释:

Any other items which are not covered in this specification shall be agreed by both parties.

本说明书未包括事项应由双方协议确定。