KAYO MAXTAR 嘉洋美和

深圳市嘉洋美和电池有限公司
KAYO MAXTAR BATTERY LIMITED

Customer: _____

Li-ion Polymer Battery Specification

锂离子聚合物电池规格书

Model/型号:KPL953048-2S1P-1400mAh

Note: 1.Kindly please sign on the underneath and send it back to us if the sample is approved.

如果样品测试合格请详细填写下表并将信息反馈给我们。

2. Kindly please contact us as soon as possible if the sample isn't approved. Thanks!

. 如果样品测试没有合格请尽快将信息反馈给我们，谢谢！

Customer's Approval Signature 客户确认	
Date/日期	

Checked & Approved by 审核批准	Prepared by 制定	Date 日期
Zhao Lei 赵雷	Li Wenqun 李文群	2017-02-17

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A0	First Edition 首版	Li Wenqun 李文群	Zhao Lei 赵雷	2017-02-17

Contents

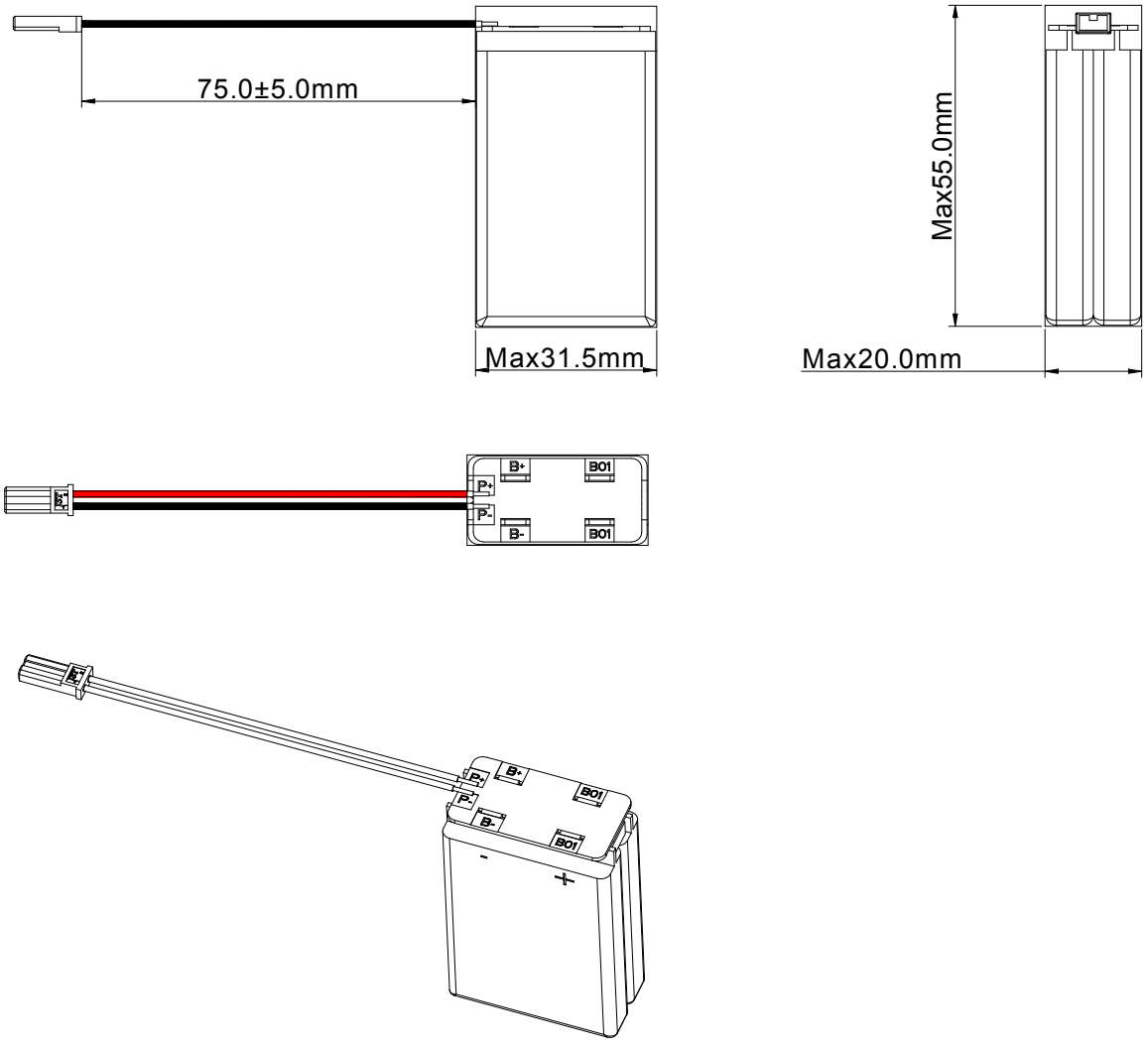
内容

1.Scope 使用范围

This specification is applied to KPL953048-2S1P -1400mAh battery Manufactured by KAYO MAXTAR Company Limited.

本标准适用于嘉洋美和电池有限公司所生产的 KPL953048-2S1P-1400mAh 电池。

2.Product Dimension 产品尺寸



3.Product Configuration 产品配置

No. 序号	Item 项目	Criteria 标准	Remark 备注
1	Li-ion polymer Cell 锂离子聚合物电池	KPL953048 1400mAh 3.7V	2PCS (2S1P)

2	PCM/保护板	8254AAT+A04468	
3	Wire & Connector 线材 & 插头	JST-RCY	L=75.0±5.0mm
4	PVC	Blue PVC	1pcs

4.Product Specification 产品规格

Table 1 表格 1:

No. 序号	Item 项目	Rated Performance 产品性能		Remark 备注
1	Rated Capacity 标称容量	Typical 典型值	1400mAh	Discharge at 0.2C after standard charge fully. 标准充电后以 0.2C放电
		Min	1350mAh	
2	Nominal Voltage 标称电压	7.4V		
3	Voltage at end of Discharge 放电截止电压	6.0V		
4	Charging Voltage 充电电压	8.4±0.05V		
5	Internal Impedance 内阻	≤200mΩ		
6	Standard Charge 标准充电	Constant Current 0.2C Constant Voltage 8.4V 0.01C cut-off 0.2C恒流充电至 8.4V，再 8.4V恒压充电至 0.01C截止		Charge time : Approx 6.5h. 充电时间：大约 6.5h
7	Standard Discharge 标准放电	Constant current 0.2C end voltage 6.0V 以 0.2C 放电至 6.0V 截止		
8	Maximum Charge	1.0C		23 ± 2℃ is recommend Operation

	Current 最大充电电流		Temperature, 60±25%RH Bare Cell. 推荐温度 23±2℃，湿度 60±25%RH	
9	Maximum Discharge Current 最大放电电流	3.0C(No more than 1min)	23 ± 2℃ is recommend Operation Temperature, 60±25%RH Bare Cell. 推荐温度 23±2℃，湿度 60±25%RH	
10	Operation Temperature Range 工作温度范围	Charge: 0~45℃ 充电温度：0~45℃	0~15℃	0.2C Max to 8.4V
			16~35℃	1.0C Max to 8.4V
			36~45℃	0.2C Max to 8.4V
		Discharge: -20~60℃ 放电温度： -20~60℃	23 ± 2℃ is recommend Operation Temperature, 60±25%RH Bare Cell. 推荐温度 23±2℃	
11	Storage Temperature Range 储存温度范围	Less than 1 year: -20~25℃ 1 年内：-20~25℃	23 ± 2 ℃ is recommend storage temperature 推荐储存温度 23±2℃	
		Less than 3 months: -20~40℃ 3 个月内：-20~40℃		
12	Storage Humidity Range 储存湿度	60±25%RH.		
14	Product Dimension 产品尺寸	Length/长度: Max55.0mm	Initial dimension 初始尺寸	
		Width/宽度: Max31.5mm		
		Thickness/厚度：Max20.0mm		

5.Product Performance 产品性能

5.1 Standard Testing Conditions 测试标准条件

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 otherwise defined, test and measurement shall be done under temperature of 20±5℃ and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature

15~30℃ and humidity 25~85%RH.

测试样品为出厂一周以内的新电池 ，并且电芯不得在试验前进行五次以上的循环，除非另有定义，测试和测量应在 20±5℃的温度下和 45～85％的湿度下进行。如果它判断出试验结果不受到这个条件下影响，测试可适当在温度 15～30℃，湿度 25～85％RH 下进行。

5.2 Measuring Instrument or Apparatus 测量仪器或者设备

5.2.1 Dimension Measuring Instrument 尺寸测量仪

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

游标卡尺测量仪用 0.01mm 或者 0.01mm 精度以上的测量仪来测试。

5.2.2 Voltmeter 电压表

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

用国家标准或者更敏感精度电压表测试，其内阻抗大于 10kΩ/V。

5.2.3 Ammeter 电流表

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

用国家标准或高于国家标准更敏感类的精确电流表，其内阻小于 0.01Ω。

5.2.4 Impedance Meter 内阻仪

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

用交流电方法测量，内阻仪参数（1kHz LCR meter）。

5.3 Standard Charge\Discharge 标准充放电

5.3.1 Standard Charge ：Test procedure and its criteria are referred as follows:

标准充电：测试程序以及标准如下：

Charging shall consist of charging at a 0.2C constant current rate until the cell reaches 8.4V. The cell shall then be charged at constant voltage of 8.4volts while tapering the charge current. Charging shall be terminated when the charging current has tapered to 0.01C. Charge time : Approx 6.5h, The cell shall demonstrate no permanent degradation when charged between 0 ºC and 45 ºC.

在 0~45ºC 温度条件，以 0.2C 恒流充电至 8.4V，然后以 8.4V 的恒压充电至 0.01C 截止，充电时间大约 6.5h

5.3.2 Standard Discharge

标准放电

Cells shall be discharged at a constant current of 0.2C to 6.0 Volts @ 20± 5℃.

电芯在 20± 5℃环境下，以 0.2C 恒流放电至 6.0V 截止。

5.4 Appearance 外观

There shall be no such defect as flaw, crack, rust, leakage, which may adversely affect commercial value of battery.

外观整洁，电池无破损，无污渍，露液和腐蚀等现象。

5.5 Initial Performance Test 初始性能测试

Table 2/表格 2:

Item 项目	Measuring Procedure 测试条件	Requirements 要求
⑴Open-Circuit Voltage 开路电压	The open-circuit voltage shall be measured within 24 hours after standard charge. 在标准充电后 24h，测试开路电压	≥8.1V
(2) AC Impedance Resistance 内阻测试	The Impedance shall be measured in an alternating current method (1kHz LCR meter) after standard charge at 20±5℃. 内阻仪参数(1kHz LCR meter) 标准充电后在 20±5℃状态下	≤200mΩ
(3) Nominal Capacity 额定容量	The capacity on 0.2C discharge shall be measured after standard charge at 23±2℃. 在标准充电后，以 0.2C 恒流放电，记录容量	Discharge Capacity ≥ 1350mAh 放电容量≥1350mAh

5.6 Temperature Dependence of Capacity (Discharge)

Cells shall be charged per 5.3.1. and discharged @0.2C to 6.0 Volts， except to be discharged at temperatures per Table 3. Cells shall be stored for 3 hours at the test temperature prior to discharging and then shall be discharged at the test temperature. The capacity of a cell at each temperature shall be compared to the capacity achieved at 23 ºC and the percentage shall be calculated. Each cell shall meet or exceed the requirements of Table 3.

以标准 5.3.1 充电后，电池以 0.2C放电到 6.0V，电池在各种温度条件下的放电数据如下表。测试前电池要在测试温度环境中静置 2H，然后进行放电测试，数据比率参照电池在 23℃情况下的放电容量。测试后的数

据应达到或超过表格 3 数据。

Table 3/表格 3:

Discharge Temperature 放电温度环境	-20℃	0℃	23℃	60℃
Discharge Capacity （0.2 C） 放电容量（0.2C）	50%	80%	100%	95%

5.7 Cycle Life and Leakage-Proof 循环寿命及漏液测试

Table 4 /表格 4:

No. 序号	Item 项目	Criteria 标准	Test Conditions 测试条件
1	Cycle Life (0.2 C) 循 环 寿 命 （0.2C）	Higher than 80% of the Initial Capacities of the Cells 高于标称容量 80%	Carry out 500 cycles charging/ Discharging in the below condition. ◆Charge: Standard Charge, per 5.3.1 ◆Discharge:0.2C to 6.0V ◆Rest Time between charge/discharge:30min. ◆Temperature:20±5℃ 以以下方式进行 500 次充放电： ◆充电:按照 5.3.1 的标准充电 ◆放电:0.2 C放电至 6.0V ◆充放电之间静置 30min ◆温度:20±5℃
2	Leakage-Proof 漏液测试	No leakage (visual inspection) 无漏液(目测)	After full charge, store at 60±3℃ 60±10%RH for 1month. 满充电，在 60±3℃温度及 60±10%湿度状态放置 30 天

6. PCM Specification 保护板规格

6.1 Using scope: The document applies to Li-ion Battery protection module for KAYO MAXTAR BATTERY LIMITED.

适用范围：本保护板适用于深圳市嘉洋美和电池有限公司生产锂离子电池保护单元

6.2 Battery capacity ： 2000mAh

电池容量：2000mAh

6.3 Environment request: ROHS.

环保要求：ROHS

6.4 Function description: Over charge protection, Over discharge protection, Over current protection Short circuit protection

功能描述：过充保护、过放保护、过流保护、短路保护

6.5 Electric features:

电气特性：

Item 项目	Symbol 符号	Content 详细内容	Criterion 标准
Over charge Protection 过充保护	V_{DET1}	Over charge detection voltage 过充电检测电压	4.25±0.05V
	V_{REL1}	Over charge release voltage 过充电解除电压	4.1±0.1V
Over discharge protection 过放保护	V_{DET2}	Over discharge detection voltage 过放电检测电压	2.7±0.1V
	V_{REL2}	Over discharge release voltage 过放电解除电压	3.0±0.1V
Over current protection 过流保护	V_{DET3}	Over current detection voltage 过电流检测电压	0.08±0.030V
	IDP	Over current detection current 过电流保护电流	5.5～9.0A
	tV_{DET3}	Detection delay time 检测延迟时间	Max20.0mS
	/	Release condition 保护解除条件	Cut load 断开负载
Short protection 短路保护	/	Detection condition 保护条件	Exterior short circuit 外部电路短路

	TSHORT	Detection delay time 检测延迟时间	Max400uS
	/	Release condition 保护解除条件	Cut short circuit 断开短路电路
Interior resistance 内阻	RSS	Main loop electrify resistance 主回路通态电阻	RSS≤60mΩ

7.Security Testing Standard 安规测试（Single cell）

Item 项目	Battery Condition 电池状况	Test Method 测试方法	Requirements 标准
Over charge test 过充测试	Fresh, Fully Charge 标准充满电的新电芯	At standard testing condition，charging cells with constant current 3C to voltage 4.6V, then with constant voltage 4.6V till current decline to 0A. Charging time no less than 8h. 在标准条件下测试，以 3.0C 电流恒流充电至 4.6V，然后以 4.6V 恒压充电，持续 8h。	No explode No fire 电池不爆炸，不起火
Over discharge test 过放测试	Fresh, Fully Charged 标准充满电的新电芯	Cell be discharged at constant current 0.5C to 3.0V, then discharged at 0.2C to .0V. 电芯标准充满电以后，以 0.5C 恒流放电至 3.0V，然后以 0.2C 放电至 0.0V 截止	No explode no fire, nor smoke 电池不爆炸，不起火，不冒烟
Heat shock test 热冲击测试	Fresh, Fully Charged 标准充满电的新电芯	Cell is to be heated in a circulating air oven, the temperature of the oven is to be raised at a rate of 5±2℃ per minute to 130±2℃ and remain for 10 minutes at that temperature. 将标准充满电后的电芯放于热箱中，热箱温度以 5±2℃/min 速率升至 130±2℃并在此温度下保持 10min。	No explode No fire 不爆炸，不起火

Crush 挤压测试	Fresh, Fully Charged 标准充满电的新电芯	Fully charged the battery in accordance with standard charge condition, the battery is to crusher between two flat plates .Continuous to applied force on battery of 13kN(17.2Mpa), stopped until a pressure reading of 13Kn (17.2Mpa) is reached on the hydraulic ram. 在标准充满电后，把电芯放在两个平面之间，直到液压缸持续加压，使压力达到 13KN（17.2Mpa）为止，然后立即释放液压缸。	No explode, No fire 不爆炸，不起火；
Short Circuit test 短路测试	Fresh, Fully Charged 标准充满电的新电芯	After the standard charge ,a cell is to be short circuited by connecting the positive and negative terminals of the cell with copper wire having a maximum resistance 80 ±20 mΩ. Stop the test when the surface temperature of the cell decays to about 10℃ from the maximum 在标准充满电后，用 80±20mΩ铜线连接电芯正负极，直到电芯温度下降到比峰值约低 10℃时，实验测试结束	No explode, No fire Top temperature no exceed 150℃ 不爆炸，不起火，温度不超过 150℃
Drop test 自由低落测试	Fresh, Fully Charged 标准充满电的新电芯	Drop the cell from 1m above onto wooden board with 18~20mm thickness for one time each from every direction after rated charge. After test, cells are discharged at 1C and charged at 1C,cycles 3times to obtain the time of discharging. 标准充满电后，将电芯由高度 1m 的位置自由跌落到置于地面上的 18-20mm 厚的木板上，从 XYZ 各方向各跌落一次，然后以 1.0C 充放电循环，直至放电时间不低于 51min，充放循环次数不超过 3 次.	No rupture, no fire Nor critical damage Time≥51min 不破裂，不起火，不爆炸，无明显受损。

Vibrate test 振动测试	Fresh, Fully Charged 标准充满电的新电芯	After standard charged, keep for 0.5h~1h,then installed onto the vibration test with clamps. Equipment parameters of frequency and amplitude are as follows(the frequency is to be varied at the rate of 1oct/min between 10Hz～55Hz, and repeat vibration for 30min. The battery is to be tested in three mutually perpendicular directions): frequency:10Hz～30Hz amplitude: 0.38mm frequency:30Hz～55Hz amplitude: 0.19mm 标准充满电 0.5~1.0h 后，将电芯安装在振动台的台面上，按照下面的振动频率和对应的振幅调整好实验设备，以 X，Y，Z 三个方向上从 10-55HZ 循环扫频振动 30min，扫频速率为 1oct/min： 振动频率：10Hz～30Hz，位移幅值（单振幅）：0.38mm； 振动频率：30Hz～55Hz，位移幅值（单振幅）：0.19mm；	No rupture, no fire Nor critical damage 不破裂，不起火，不爆炸，无明显受损。

8.Storage and Transportation 储存和运输

8.1 Storage: 储存

8.1.1 The Li-ion battery pack should be stored in a cool, dry and well-ventilated area. and should be far from the fire and the high temperature.

包装后的锂离子电池应该储存在低温、干燥和通风良好的地方，不应靠近有火和高温的地方。

8.1.2 The best Voltage in storage is 7.20V~7.90V.

电池储存最佳电压在 7.20V~7.90V 之间

8.1.3 The battery should store in the product specification book stipulation temperature range. the best storage temp. is 0 to 25℃. The best humidity is 60±25%.

电池应该在本规格书规定的温度范围内存放，最佳的存放温度为 0 ~25℃，最佳存放湿度为 60±25%。

8.1.4 If has surpasses above for 3 months the long time storage, suggested you should carry on Additional charge and discharge to the battery.

如果超过 3 个月以上的存放时间，建议对电池进行充放电。

8.2 Transportation 运输

8.2.1 Do not mix the battery products with other cargo.

严禁将电池产品和其他的产品混装。

8.2.2 Do not immerse the battery products in water or allow it to get wet.

严禁将电池产品置于水中或是将电池受潮

8.2.3 The highest temperature in transportation is lower than 65℃.

运输电池产品最高温度低于 65℃。

9. Use Attentions: 使用说明

To ensure proper use of the battery please read the manual carefully before using it.

为了确保电池的安全和正确使用，请在使用电池产品之前仔细阅读以下内容：

9.1 Handling 操作

9.1.1 Do not expose to, dispose of the battery in fire.

严禁靠近火源以及投入火中。

9.1.2 Do not put the battery in a charger or equipment with wrong terminals connected.

在充电或接入使用电器时，注意正负极不要接反。

9.1.3 Avoid shorting the battery

请勿将电池产品短路。

9.1.4 Avoid excessive physical shock or vibration.

避免敲击以及震动电池产品。

9.1.5 Do not disassemble or deform the battery.

请勿解剖电池体。

9.1.6 Do not immerse in water.

严禁电池产品浸入水中。

9.1.7 Do not use the battery mixed with other different make, type, or model batteries.

请勿不同厂家、不同类型、不同型号产品混用。

9.1.8 Keep out of the reach of children.

避免让儿童接触到。

9.2 Charge 充电

9.2.1 Battery must be charged in appropriate charger only.

电池必须使用适用的充电器充电。

9.2.2 Never use a modified or damaged charger.

不要使用经修理过的或是已损坏的充电器充电。

9.2.3 Do not leave battery in charger over 24 hours.

不要让电池充电超过 24 个小时。

9.2.4 Charging current: Can not surpass the biggest charging current which in this specification book stipulated.

充电电流：不能高于本规格书规定的充电电流上限。

9.2.5 Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

充电电压：不能高于本规格书规定的充电电压上限。

9.2.6 Charge temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.

充电环境温度：必须在本规格书规定的温度范围内进行充电。

9.2.7 Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

先恒流后恒压充电，不可反向充电，如果电池的正负极接触将会损伤电池。

9.3 Discharge 放电

9.3.1 The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the over sized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat。

放电电流不能高于本规格书规定的放电电流上限，过高的放电电流可能导致电池容量受损，并可能导致电池体过热而造成危险。

9.3.2 Electric discharge temperature: The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

放电环境温度：必须在本规格书规定的温度范围内放电使用。

9.3.3 Over-discharges: After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its

automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

过放：瞬间过放不影响使用，但长时间的过放会影响电池性能，如果电池长期不使用，电池性能也会降低，使用时需做几次充分的充放电后才能恢复。

9.4 Disposal: Regulations vary for different countries. Dispose of in accordance with local regulations.

处置：依据使用当地的法规处理废旧电池。

10. Period of Warranty 保质期

There is a twelve-month warranty for our export batteries from the date of shipment. If the problem happened during the warranty period, we are responsible to replace the defective ones according to the accurate analysis results. However, we won't take any responsibility if the problem is caused by the battery-related applications and related products.

出厂后 12 个月内（出货日期算起），嘉洋公司诚诺：正常使用情况下，电池性能表现不良者给予更换；如果不是产品本身引起的问题，我司将不负任何责任。

11. Others 其他

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.

因为电池为化学制品，长期使用或长期贮存不用都会造成电池性能变差。如果使用条件如充电、放电、环境温度等超出了规格书规定的范围，会引起电池的容量衰减和寿命缩短，或者使用该电池的设备会由于电池漏液而受到损害。如果电池采用正确的方法长时间充电而不能充满的话，就需要及时更换电池。

12. Note 备注

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

本规格书中未提及事宜，可由双方协商解决。