产 品 规 格 书
SPECIFICATION OF BATTERY

客 户 名 称 Customer	
产 品 类 型 Type	镍氢圆柱型充电电池 Ni-MH Cylindrical Cell
产 品 型 号 Model No.	LH210-2AH51
编 号 Spec. No.	L.LHC-085
编 制 Prepared by	阮一宇 Ruan Yiyu
批 准 Approved by	赵金龙 Zhao Jinlong
日 期 Date	20181120
客 户 确 认 Client Confirm	

1. 性能

除了特别要求外，电池应在到货后一个月内按以下要求测试
Unless special stated, tests should be carried out within one month of delivery
测试环境Ambient conditions:

环境温度Ambient Temperature：20±5℃
相对湿度 Relative Humidity：65±20%（RH）

备注Notes: 1)标准充/放电条件Standard charge/discharge condition

充电Charge: 200 mA(0.1C)×16h
放电 Discharge: 400 mA(0.2C) to 1.0V

2)除特别说明外，电池在测试过程中不得漏液，PVC外套不得破裂。
Except special explaining, the battery shall not leakage and PVC shall not breakage during the test.

测试项目 Test Items	测试条件 Test Conditions	要求 Requirements	备注 Notes
标称容量 Nominal Capacity	标准充电/ 标准放电 Standard Charge and Discharge	放电容量 Capacity ≥ 2000 mAh	允许循环5次 Up to 5 cycles are allowed
内阻(Ri) Internal Impedance(Ri)	标准充电后，搁置1～4小时，用1KHZ内阻仪测试。 Measure the impedance of battery by applying AC with frequency of 1000HZ for not less than 1 hour and not more than 4 hours after standard charge	≤ 55 mΩ	
开路电压 (OCV) Open-circuit Voltage (OCV)	电池应在标准充电后1小时内测量。 Voltage between the battery terminals shall be measured within 1 hour after standard charge	≥ 1.25 V	
高倍率放电 High-rate discharge	标准充电后搁置1小时，以 0.5 C 放电至 1.0V After standard charge, rest for 1 hour before discharge to 1.0V at 0.5 C current.	≥ 108 分钟 Minutes	允许循环5次 Up to 5 cycles are allowed
循环寿命 Cycle life	IEC61951-2:2017 7.5.1.2 参看备注1 See Remark 1	≥ 500 周 Cycles	
荷电保持 Charge retention	标准充电后，存放在20±2℃温度下贮存180天，然后放电到 1.0V。 Standard charged , stored for 180 days at 20±2℃, then standard discharge to 1.0V.	≥ 85% 标称容量 Nominal Capacity	如果存放周围环境温度发生变化，那么所得到的数据将有可能不同于上述数值。 If the ambient temperature is changed, the data may be different from the above value.
	标准充电后，在20±2℃条件下贮存360天，然后放电到 1.0V Standard charged , stored for 360 days at 20±2℃, then standard discharge to 1.0V.	≥ 80% 标称容量 Nominal Capacity	
过充 Over-charge	以 0.1 C 充电 1 年 Charge at 0.1 C for 1 year	不漏液，无明显变形，不爆炸. No leakage, nor disrupt, nor burst.	

测试项目 Test Items	测试条件 Test Conditions	要求 Requirements	备注 Notes
过放 Over-discharge	标准放电后，以 3 Ω恒定负载电阻持续放电3天，然后标准充电/标准放电。 After standard discharge , be conducted with constant load resistor of 3 Ω for 4 days, then standard charge and discharge	≥ 80% 标称容量 Nominal Capacity	
振动测试 Vibration test	标准充电后，放置24小时，在振动前后测试电池。 Standard charge. Then leave for 24 hours, check cell before/after vibration. 振幅Ampliture: 1.5mm 振动Vibration : 3000CPM	电压变化 Change of voltage ΔV＜0.02V/ cell 电阻变化 Change of internal impedance ΔR＜5mΩ/ cell	任意方向60分钟 Any direction for 60 minutes
跌落测试 Drop test	标准充电后，放置24小时，在跌落前后测试电池。 After standard charge, rest for 24 hours, check battery before/after dropped: 高度Height: 100 cm 木板厚度Thickness of the wooden board: 30mm	电压变化 Change of voltage ΔV＜0.02V/ cell 电阻变化 Change of internal impedance ΔR＜5mΩ/ cell 允许电池变形、磨伤，但不可破裂。 No breakage except impact point for PVC sleeves	任意方向自由跌落3次 Direction is not specified, Test for 3 times
强制放电 Forced discharge	0.2C强制放电至0V，然后反向以1 C充电60分钟。 The Reverse-charge is conducted for 60 minutes at current of 1C after pre-discharge at 0.2C current to 0V	电池不爆炸，但允许有漏液及机械变形。 The battery shall not explode, but leakage & deformation are acceptable	
外部短路测试 External Short Circuit	标准充电后，将电池在20+/-5℃的环境中短路，直至电池表面温度降至环境温度。(短路电路的连接阻抗为80±20mΩ)。 After standard charge, short circuit the cell at 20±5℃ until the cell temperature returns to ambient temperature. (The resistance of the inter-connecting circuitry shall be 80±20mΩ).	电池不燃烧、不爆炸，但允许有漏液及机械变形。 The battery shall not fire and explode, but leakage & deformation are acceptable	

***备注REMARK**

1. 循环寿命 Cycle life: IEC61951-2:2017 7.5.1.2

循环数 Cycle number	充电 Charge	搁置 Stand in charged condition	放电 Discharge
1	0.1C for 16h	None	0.25C for 2h20min
2 to 48	0.25C for 3h10min	None	0.25 C for 2h20min
49	0.25 C for 3h10min	None	0.25C to 1.0V/cell
50	0.1 C for 16h	1 h to 4 h	0.20C to 1.0V/cell
重复1至50次循环,直至某一第50次循环的放电时间少于3小时 Repeat 1 to 50 cycles ,until the discharge time of any 50th cycle is less than 3hours			

2. 外观APPEARANCE

电池应无裂痕、断口、灰尘、变色、漏液及变形。

Batteries should be without any flaw、stain、discoloration or leakage and deformation.

3. 保证WARRANTY

3.1.自出货之日起，电芯的保质期为一年。在此期限内，如果非 制程原因，而是由于客户的误用造成的电芯质量问题， 公司不承诺免费更换。

The warranty period of a Cell is one (1) year after the delivery to the Customer. However, even though the problem occurs within this period, won't replace a new cell for free as long as the problem is not due to the failure of manufacturing process or the problem is due to Customer's abuse or misuse.

3.2.由与充电器搭配使用所产生的问题 概不负责。

will not be responsible for trouble occurred by matching charger. 3.3.收货后在电芯组装过程中产生的不良电芯 不予以质量保证。

We will be exempt from warrantee any defect cells during assembling after acceptance by the Customer.

4.警告 WARNING

4.1.请勿投入火中及试图拆开。

Do not dispose of cell into fire or dismantled under any condition.

4.2.请勿与其他种类电池或旧电池混合使用。

Do not mix different cell types and capacities in the same battery assembly.

4.3.请勿超过规格温度及电流充放电。

Charge and discharge under specified ambient temperature and current recommend to specification. 4.4.请勿将电池短路,以免电池永久性损坏。

Short circuit leading to cell permanent damage must be avoided.

4.5.请勿直接在电池上锡焊。

Never solder onto cell directly.

4.6.应将电池按极性正确连接,不可反接。

Cell reversal should be avoided.

5.注意事项NOTICE

5.1.如电池在极限条件下使用，可能会减短电池使用寿命，如极限温度、深度循环、极度过充/过放电。

Use batteries in extreme condition may affect the service life, such as: extreme temperature 、deep cycle、extreme overcharge and over discharge.

5.2.电池应于储存在阴冷干燥环境中。

Batteries should be stored in a cool, dry place.

5.3.电池在使用时发现异常或问题，立即停止使用，将电池送交当地经销商处理。

Once problems be found，stop using，send batteries to local agent.

6. 贮存STORAGE

6.1.为保证电池维持容量，建议镍氢电池(组)在-20--35℃、低湿度(≤65%RH) 、无腐蚀剂气体条件下贮存。

It is strongly recommended to stored Ni-MH batteries and cells in the temperature range from -20℃ to 35℃, and in low humidity (≤65%RH) and no corrosive gas environment, to maintain a reasonably high capacity recovery level.

6.2.镍氢电池避免在较高温度或较高湿度下贮存，否则将导致电池漏液、生锈，以及容量降低。

Avoid storage higher (e.g. 35℃), lower temperature than -20℃, or higher humidity which would result in deterioration or damage to the cells and batteries such as follows:

. Permanent capacity loss.

. Electrolyte leakage resulted from the expansion or shrinkage of organic material inside the cells.

. Rust of metal parts.

6.3.长期存放将可能导致镍氢电池及电池组容量降低，并需1-3个充放电循环后才能达到最高放电容量。

Up to three full cycles of charge/discharge after long-term storage may need to obtain highest capacity.

6.4.建议每三个月对电池进行一次充放电的维护.

Recommended every three months to do a battery release-charging.

7. 参考REFERENCE

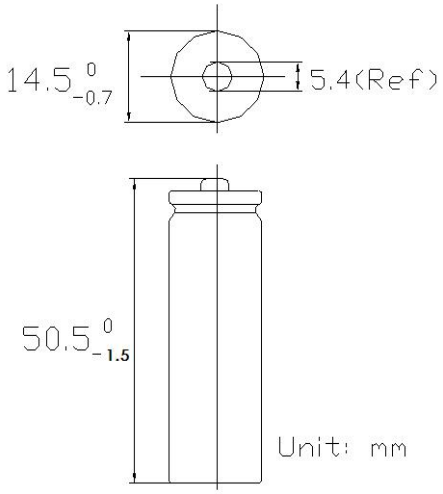
使用电池方面如有任何疑问，请与我们联系。

Please contact us if there is any question on using the batteries.

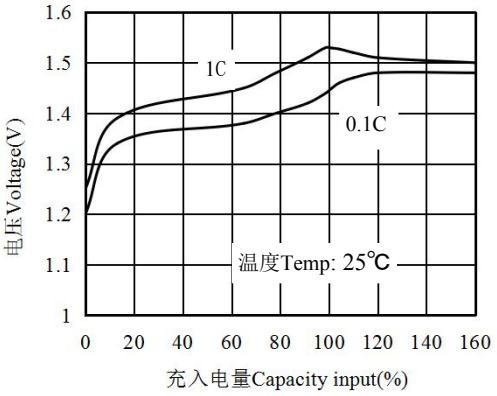
参数表 Data Sheet

类型 Type：密封圆柱型镍氢充电电池Sealed Rechargeable Nickel Metal Hydride Cylindrical Cell

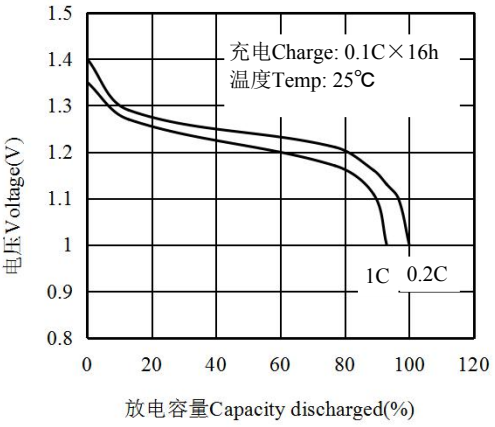
型号 Model No.	：LH210-2AH51
电芯标称尺寸 Nominal Dimension(cell) (包装后with sleeve)	：φ= 14.5 (-0.7 mm) ：H= 50.5 (-1.5 mm)
放电电流（持续） Applications(Continuous)	：推荐放电电流Recommended discharge current 200 ~ 6000 mA
额定电压Nominal Voltage	： 1.2V
容量 Capacity	：最小容量Minimum: 2000 mAh ：典型容量Typical : 2100 mAh （在20℃下，以0.2C 放电至1.0V ） （When discharged at 0.2C to 1.0V at 20℃）
充电条件 Charging Condition	： 200 mA充16小时(在20℃下) 200 mA charge 16h (at 20℃)
快速充电 Fast Charge	： 1000 mA ~ 2000 mA 推荐充电终止控制参数： Charge termination control recommended control parameters: -△V： 0-5mV DT/dt： 0.8-1℃/min 截止温度TCO： 45-50℃ 充入电量Timer： 105% 标称容量nominal input
涓流充电 Permanent charge	： 20 mA至 60 mA 20 mA to 60 mA
最大过充电电流 Max. overcharge current	： 200 mA (充电 1 年) 200 mA (up to 1 year）
循环寿命 Service Life	： ≥ 500 周cycles (IEC 标准Standard)
过充 Continuous Overcharge	： 200 mA充电 1 年 200 mA maximum current for 1 year 不漏液，无明显变形 No conspicuous deformation and/or leakage.
重量Weight	： 28 g (仅供参考ref.)
内阻Internal Resistance	： ≤ 55 mΩ (充电态upon fully charged)
最高充电电压 Max. Charging Voltage	： 1.5V (200 mA充电charging)
操作温度（参考） Ambient Temperature Range(ref.)	：标准充电 Standard Charging 0℃ to 40℃ ：快速充电 Fast Charging 10℃ to 40℃ ：放电 Discharging -20℃ to 60℃ ：涓流充电 Permanent charge 0℃ to 40℃ ：贮存 Storage(6 个月6 month) -20℃ to 35℃ ：贮存 Storage(1 个月1month) -20℃ to 45℃ ：贮存 Storage(1周1week) -20℃ to 55℃



充电曲线Charge curves



放电曲线Discharge curves



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